

**Comments on
Draft EIR for the Southern Pacific Railyard Site
Sacramento, California Redevelopment Project**

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EXECUTIVE SUMMARY

Summary of Key Findings

- The draft Environmental Impact Report (EIR) does not fulfill the requirement of CEQA to adequately and reliably inform decision-makers and the public about the potential public health and environmental hazards posed by the residual chemicals that are now at, and would be left at the SP site after SP's "remediation."
- Conventional superfund site evaluation and remediation requirements were not developed with the intention of making superfund properties safe for intense public and residential use.
- Contrary to several statements made in the draft EIR, it is not sufficient to claim that by meeting current regulations or enforceable agreements for hazardous chemical "clean-up" public health and environmental quality will be protected, or that appropriate "mitigation" will necessarily be provided now or in the future by meeting regulatory requirements.
- Because of the assumptions in its development, the 174 mg/kg clean-up level for soil-lead established for proposed residential areas at the SP site does not necessarily protect the health of all potentially exposed children.
- New environmental standards are being developed for lead that could, in the near-term, significantly affect the ability to redevelop the SP site and Richards Boulevard Area as proposed. The evolving nature of the understanding of impacts of soil-lead on human health and of the development of associated standards should not be used as an excuse to proceed with the plans to introduce children and adults into an area that could have significant adverse health consequences.
- The draft EIR did not adequately address the implications of the inadequate definition of groundwater pollution from the SP site, or the proposed and pending changes in the drinking water standards for several of the chemicals of potential concern (e.g., lead and arsenic) for the redevelopment of the SP site.
- Many of the contaminants of concern at the site (such as the heavy metals left in the soil) would remain hazardous for as long as they remain at the site, i.e., forever. The draft EIR did not give adequate attention to plausible exposure scenarios beyond the initial project period.
- The draft EIR did not adequately discuss the implications for project feasibility and desirability of the acknowledged insufficiency of information on the existence and potential significance of hazardous chemical contaminants in the Richards Boulevard Area.
- The draft EIR did not address key issues associated with the impacts of residual chemicals that will be left at the site after SP's remediation on the feasibility of

implementing the proposed plans, including the fact that some lenders have already established more stringent soil-lead limitations than those currently being required by the state regulatory agency for residential properties at the SP site.

Introduction

The Southern Pacific Company (SP) owns a 240-acre site in downtown Sacramento; the site has been used for more than 100 years as a railyard and for maintenance, repair, and rebuilding of locomotives and rail cars. Those activities have caused extensive contamination of the soil and groundwaters of the area with a variety of potentially hazardous chemicals, including heavy metals, petroleum hydrocarbons, and chlorinated solvents and their transformation products. The site is on the state of California "superfund" list and is under remediation in accord with the California Department of Toxic Substances Control (DTSC) requirements.

In cooperation with the city of Sacramento Department of Planning and Development, the Southern Pacific Company has proposed an intensive mixed-use redevelopment plan for the SP site. The Department of Planning and Development is also planing for conjunctive redevelopment of the adjoining 1100-ac "Richards Boulevard Area" currently owned by 200 separate property owners and used for commercial and industrial purposes (SEC, 1992). The proposed redevelopment plans aim to encourage intensive public use of the redeveloped property (SP site and Richards Boulevard Area). Included within the proposed redevelopment are plans for affordable housing as well as other residential housing.

There has been considerable controversy about the appropriateness of trying to redevelop a superfund site such as the SP site for intense public use and especially for residential purposes. This has led to a review of this matter by the Sacramento Environmental Commission (SEC).

The minutes of the Sacramento Environmental Commission meeting of August 24, 1992 stated,

"While the state is the regulatory authority overseeing the cleanup, the city has responsibility as the agency that issues entitlements for development to make sure that the entitlements and grants do protect the public's health."

"Chairman Yim clarified that an important concern of the committee is that there is a distinction between remediation and cleaning to a pristine condition. This area [SP site] is being remediated, and not cleaned to pristine."

As noted by the SEC, the city of Sacramento will have significant responsibility and liability for the health and welfare of individuals using the redeveloped property of the SP site and Richards Boulevard Area. Further, while the fully redeveloped property could be a significant asset to the City, failure to achieve the proposed degree of redevelopment once the City is committed, could represent significant additional liability for the City owing in large part to the residual potentially hazardous chemicals that will be left on the SP property after accomplishment of the degree of

remediation agreed to by SP, and to the unknown nature and extent of chemical contamination of the Richards Boulevard Area.

In the interest of those needing affordable housing, Legal Services of Northern California requested the assistance of Drs. G. Fred Lee and Anne Jones-Lee in the review of the adequacy of the Southern Pacific Sacramento Railyard hazardous chemical investigation and remediation relative to the proposed plans for redevelopment of the site for affordable housing. They also requested that Drs. Lee and Jones-Lee review the potential significance of potentially hazardous chemicals in the Richards Boulevard Area for the development of affordable housing in that area as well.

"Remediation" Requirements

The current DTSC requirements for state "superfund" site remediation do not require clean-up of contaminated soils and water to background conditions, i.e., to the concentrations that would be present had no industrial or other contaminating activities taken place at the site. Instead, the regulations allow there to be substantial amounts and concentrations of potentially hazardous chemicals remaining at the site after SP's "remediation." Such chemicals can be a threat to the public health of future users and residents of the area. There are significant questions about the advisability of using any of the SP site for affordable housing or other residential purposes because of the approach being used by SP for evaluation of the nature and extent of the chemical contamination at the site and for proposed partial remediation of the potentially hazardous chemicals.

As discussed in this report, it is not sufficient to demonstrate that current regulations or enforceable agreements for clean-up may be met. The issue is the protection of public health and environmental quality that will be achieved given the evaluation, remediation, and redevelopment scenarios and plausible worst-case exposure through intended and inadvertent use as well as plausible misuse of the area. The regulations governing superfund site investigation and remediation were not focused on making a "remediated" superfund site safe for intense public use and residential development. Hence conventional superfund evaluation and remediation approaches cannot be considered necessarily adequate for the redevelopment plan envisioned for the SP site. Given the proposed plans for redevelopment of the site, and the nominal nature of superfund-site-related requirements for such purpose, extraordinary measures should be taken at the SP site for hazardous substance investigation and remediation using the latest information available on the potential significance of chemical contaminants of potential concern at the site, before specific plans are agreed to for redevelopment. Further, the Environmental Impact Report (EIR) should also use extraordinary measures to inform the City Council, the Redevelopment Agency, other regulatory agencies, and the public about the potential problems that could occur as a consequence of adoption of the proposed redevelopment plan.

The inadvisability of relying on "applicable regulations" for protection of public health and the environment is easily demonstrated by consideration of the fact that the need for the current superfund program that will cost the Country several hundred billion dollars, evolved out of industry's management of its wastes largely in accord with the then-"current" applicable regulations. "Meeting current applicable regulations" did not prevent harm to public health and the environment/natural resources of the Country, and it did not excuse those who met the applicable regulations or future owners of the property from the financial responsibility associated with site remediation.

According to the California Environmental Quality Act (CEQA), an Environmental Impact Report (EIR) on a proposed project is to provide decision-makers and the public with a disinterested, in-depth discussion of the potential impacts of a proposed project on public health and the environment. **The authors found that the draft EIR for the Southern Pacific Railyard site redevelopment project does not fulfill the requirement of CEQA to adequately and reliably inform decision-makers and the public about the potential public health and environmental hazards posed by the residual chemicals that would be left at the site by Southern Pacific Company. It falls far-short of providing a presentation and appropriate discussion of the issues pertinent to the residual potentially hazardous chemicals that will be left at the site after SP's partial remediation. The draft EIR is also highly deficient since it does not adequately discuss the commonly expected exposures, or the readily plausible worst-case scenarios that could occur at the site that could cause the public to be exposed to potentially dangerous concentrations of these chemicals. Of particular concern are lead and other chemicals in the soils in and near the affordable housing, and other residential and public access areas to which people, especially children, could be exposed through intended, inadvertent, and unintended activities. Therefore, the draft EIR should be rejected as inadequate.**

For a variety of reasons which should have been discussed in the draft EIR, currently accepted levels of residual chemicals such as lead that are allowed to remain at a remediated superfund site could be judged to be excessive by new standards that have recently been or are now being developed. In 1991 a US Public Health Service Centers for Disease Control Panel of experts concluded (CDC, 1991),

"Results of recent studies have shown that lead's adverse effects on the fetus and child occur at blood lead levels previously thought to be safe; in fact, if there is a threshold for the adverse effects of lead on the young, it may be close to zero."

From a regulatory view, this could cause land now considered sufficiently "remediated" for residential use to be judged to be hazardous (or even a "hazardous waste") and require further remediation. This could mean that those who acquire property and utility easements at the SP site could become responsible parties and have to help pay for further remediation. From a human health perspective, this could result in the exposure of children and adults who reside in or otherwise use the property, to levels of lead and other contaminants that, despite their current acceptance, could adversely affect human health and welfare. Since these issues could be key to

the implementation of the proposed redevelopment plan, the draft EIR should have better-informed decision-makers and the public about these situations and their potential significance to the implementation of the proposed redevelopment plan for the SP site. This information is well-known by those concerned with the protection of public health from hazardous chemicals.

The current understanding of the degree of contamination of the soils at the SP site is insufficient to properly characterize the potential hazards or to reliably plan further for any future uses of the site. SP should not be undertaking the minimum or near-minimum evaluation of the presence of potentially hazardous chemicals at the site, as it has thus far. Because of the proposed intensive use of the site by the public after redevelopment, SP should be undertaking an extraordinary hazardous chemical evaluation program to search out and clearly delineate all of the potential hazards that could occur at the site before overall plans are adopted for redevelopment of the site. Those hazards should then be fully remediated so that any residual potentially hazardous chemicals allowed to remain at site would not, under plausible worst-case scenarios of land use (including intentional and inadvertent use, and misuse) represent a real or perceived threat to future users of the area with this redevelopment and reasonably expected future re-redevelopment.

This information could lead interested parties to adopt the attitude that development of appropriate soil-lead standards may involve endless iterations, and that they cannot wait forever but must "get on with the project." The evolving nature of the understanding of impacts of soil-lead on human health and of the development of associated standards should not be used as an excuse to proceed with plans to deliberately introduce children and adults into an area that could have significant adverse health consequences. Whatever potentially hazardous chemical residues that would be left at the SP site would be for the benefit of SP. The issue is not one of "balancing" the interests of SP with public health concerns; protection of public health from potentially hazardous chemical contaminants being deliberately left at a site for the benefit (cost-savings) of the owner, must be the overriding concern and focus. The proposed plans for investigation, evaluation, remediation, and redevelopment call for deliberately introducing large numbers of people, including those in need of affordable housing, into an area in which even the draft EIR admits represents greater risk of exposure to potentially hazardous chemical contaminants. It is not prudent public health practice to presume that that which is not known must be safe or of "acceptable risk." This is of particular concern to those who would occupy the affordable housing; that sector of the population has long borne the brunt of exposure to environmental chemical risks that others do not wish to accept for themselves. The US EPA has recognized this inequity and is moving to rectify it.

Stormwater Quality Management Issues

In 1990, the US EPA began to implement its stormwater quality management program, a program that could significantly impact the redevelopment of the SP site and the Richards Boulevard Area. Within a few years, water quality objectives will be imposed on stormwater

discharges such as those which would occur from the project area to the Sacramento River, that will require the construction of treatment works to remove contaminants. Because of lack of dilution with other stormwater, and the significant contamination of the SP site soils by a variety of potentially hazardous chemicals, there could be special, additional stormwater runoff treatment requirements similar to those applicable to industrial sites imposed on the SP site and Richards Boulevard Area development.

While the draft EIR stated that one of the approaches that could be used for dealing with stormwater-associated contaminants is the construction of detention basins, there is justifiable concern about the ability of detention basins to remove those pollutants that could adversely affect beneficial uses of receiving waters. Thus, such an approach may have little or no mitigating effect for the adverse impacts of stormwater-associated contaminants on receiving water quality. Further, there is growing recognition that stormwater detention basins are presenting problems to their owners/operators because of the accumulation of particulate forms of potentially toxic chemicals in the solids detained in the basins. As a result of changes that are being made in the levels of lead that are considered acceptable to occur in soil (i.e., levels of leachable lead that cause a soil to be classified as a hazardous waste), the accumulations in stormwater detention basins may begin to be classified as hazardous wastes. This means that many detention basins will become considered toxic pits and require management as such. Such management carries significant costs and a higher degree of management practice than that typically associated with a stormwater detention basin today.

The issue of management of stormwater associated with the SP site and Richards Boulevard Area could represent a significant financial burden to owners of the redeveloped property in the area. The draft EIR should have discussed these issues.

Groundwater Contamination Issues

Another significant deficiency in the draft EIR is its inadequate description and discussion of the groundwater contamination issues, both on-site and off-site, as they could impact redevelopment at the SP site. There is widespread contamination of groundwater of the SP site area, both on-site and off-site, by a variety of chemicals that represent a significant threat to the use of those groundwaters for domestic purposes; those groundwaters will have to be remediated. The studies conducted thus far have not adequately defined the extent of groundwater pollution by the chemical contamination originating from the SP site. Proposed and pending changes in the drinking water standards for several of the chemicals of potential concern (e.g., lead and arsenic) could cause those who own the property in the future to become responsible parties and have to pay for further remediation of the soils and groundwater in order to prevent continued contamination of the groundwaters above accepted standards for their use for domestic water supply purposes. The draft EIR has not properly presented and discussed this issue.

Plausible Worst-Case Exposure Scenarios

The EIR should present a number of plausible worst-case scenarios for exposure of the public to residual potentially hazardous chemicals at the site under the proposed evaluation, partial remediation, and redevelopment alternatives. It should discuss how each of those potentially hazardous exposure conditions would be mitigated, the cost of mitigation, and the mechanisms for funding such mitigation. It is inadequate and can be highly misleading to simply indicate, as was done in the draft EIR, that mitigation will be accomplished through meeting applicable regulations. Many of the contaminants of concern at the SP site (such as the heavy metals left in the soil) would remain hazardous for as long as they remain at the site, i.e., forever. Therefore, consideration should be given in the EIR to plausible worst-case exposure scenarios not only for the initial redevelopment of the site, i.e., the so-called project life, but also for potential re-redevelopment for plausible future uses of the site beyond the current "project life." This information should then be made public with an adequate opportunity for public review and comment.

Richards Boulevard Area

The draft EIR acknowledged that there is insufficient information available to evaluate the existence and potential significance of hazardous chemical contaminants in the Richards Boulevard Area. However, the City Council and Redevelopment Agency are being asked to adopt a redevelopment plan for that area that includes substantial residential housing, including affordable housing, and other public use. As discussed in these comments, there is a variety of plausible scenarios by which soils and groundwater in the Richards Boulevard Area could have become contaminated by potentially hazardous chemicals that could affect future uses and users of the land. The presence of such chemicals could control the nature of the redevelopment of that area. Planning for specific redeveloped uses in the Richards Boulevard Area without regard to the potential significance of the presence of hazardous chemicals that could be in the area, and total reliance on regulatory requirements for directing the evaluation and remediation/mitigation of those contaminants for public health and environmental quality protection, as is being proposed in the draft EIR, is inadequate and inappropriate.

There are several other significant factors related to hazardous chemicals that can be extremely important in implementation of the Richards Boulevard Area plan that were not addressed in the draft EIR but should have been. Unlike the SP site, the Richards Boulevard Area is not designated as a state superfund site and is not under any order for hazardous chemical clean-up. The properties in that area, like those anywhere else, can be sold without any hazardous chemical evaluation or remediation (except that which may be required by a lender). Therefore, the DTSC direction and supervision of site evaluation and regulations regarding clean-up levels at the SP site will not necessarily be applicable to the Richards Boulevard Area. Further, unlike the SP site, there are no "deep pockets" that are under order to provide even partial "remediation" of contaminated soils in the Richards Boulevard Area.

The proposed plan calls for substantial housing to be placed in the Richards Boulevard Area where there currently exist commercial/industrial establishments. There is no current mechanism that would force commercial/industrial establishments to remediate chemical contaminants on their property to cause the property to become suitable for residential development. While conceivably ordinances or other mechanisms could be developed, there is no assurance that the current property owners would be financially able to do the evaluation and remediation that may be needed. Thus the City's adoption of a plan that causes current commercial/industrial property owners to have to sell their property in order to develop the housing, could make the City liable for the hazards associated with chemical contaminants in the area and/or the "deep pockets" for funding the hazardous chemical evaluation and remediation. While the draft EIR and plans do not discuss any funding limitations that may be controlling factors in the redevelopment of the Richards Boulevard Area, even if funding of hazardous chemical remediation became the responsibility of the City, potentially significant limitations do exist. The residents of Sacramento could decide that it is inappropriate for the City to spend its increasingly limited funds on remediation of the Richards Boulevard Area when there are many other matters and deserving areas that are not being adequately funded.

Hazardous chemicals, including lead, exist in urban soils throughout cities in California and the Nation, in levels that exceed the "remediation" levels prescribed by DTSC for the SP site. While there is a mechanism to address this situation at the SP site because it is classified as a state superfund site, there is no mechanism being generally implemented to address the same types of contamination problems in other areas. It is therefore highly inappropriate to adopt redevelopment plans for the Richards Boulevard Area that presume that the approaches being used at the SP site to address hazardous chemicals (however inadequate) can and will be translated and implemented in the Richards Boulevard Area. In the opinion of the authors, no planning for the inclusion of housing, especially affordable housing, or other public use areas in the Richards Boulevard Area should take place until

- a reliable assessment has been made of the current nature and degree of contamination of the area by hazardous chemicals,
- the degree of remediation of those hazardous chemicals has been established and shown to be protective of public health and environmental quality,
- a funding mechanism for the evaluation and the remediation has been defined
- the property has been remediated in accord with the goals established, and
- the City's responsibility and liability for evaluation and remediation of the potentially hazardous chemicals and for the residual chemicals left at the site is established.

Affordable Housing

It is the conclusion of the authors that the set-aside associated with redevelopment projects that is to be devoted to affordable housing should not be used at the SP site or possibly at the Richards Boulevard Area either. This conclusion is based on the large number of unknown aspects of the hazardous chemicals that SP plans to leave at the SP site, and the potential presence of hazardous chemicals in the Richards Boulevard Area that could adversely

affect the ability to fund, construct, and safely occupy affordable housing in these areas. The funds planned for affordable housing and in support of SP site infrastructure from those funds should be used to construct such housing and associated infrastructure at a location not contaminated by potentially hazardous chemicals.

If the City and Redevelopment Agency attempt to proceed with the development of affordable housing in the SP site and Richards Boulevard Area, it is recommended that a self-sustaining trust fund of adequate magnitude be developed as part of the redevelopment project to provide for a "public's consultant" to conduct independent, third-party review of public health and environmental issues of potential importance to residents and users of these areas, separate from the activities of the City, DTSC, and other regulatory agencies. The use of the fund should be controlled by the residents and entities directly responsible for their welfare.

Financial Constraints on Implementation of Redevelopment Plans

The draft EIR and associated Plans presented some information on the financial implementability of the proposed plans. That presentation, however, did not address key issues associated with the impacts of residual chemicals that will be left at the SP site, and that could be present in the Richards Boulevard Area, on the feasibility of implementing the proposed plans. Lenders such as FannieMae have already established more stringent soil-lead limitations than those currently being required by state regulatory agency for residential properties. Because of the potentially hazardous chemicals anticipated to be left at the SP site after remediation, and that are potentially present in the Richards Boulevard Area, lending institutions, developers, and potential purchasers of property may well conclude that residual chemical concentrations could present too great a risk, and/or that there are too many unknowns associated with future standards to financially support the redevelopment plan. The Sacramento area has significant amounts of land that could be developed for the same purposes as the SP site/Richards Boulevard Area but that do not carry with them the same risks to future lenders, owners, and users of the property. These issues, and such potential alternatives for development of affordable housing, should have been investigated and discussed in the draft EIR since they could play dominant roles in the ability to implement the proposed plans.

Authors' Previous Comments on SP Site Planning

In response to the City Council's expressed concerns about the hazardous chemicals at the SP site and their influence on the redevelopment of the site, the authors were contracted by the city Sacramento through its Department of Planning and Development to conduct an independent review of the site investigation and remediation. Their review was to focus on the adequacy of the evaluation of the potential chemical hazards that existed at the SP site, and the adequacy of remediation that had been and was then proposed to be conducted at the site relative to the plans for redeveloping the site outlined by SP and the Department in accord with a ROMA-proposed

design. The authors conducted their review in the summer of 1990 and in October 1990 submitted a report and technical supplement on their findings to the Department of Planning and Development; it was the authors' understanding that their report was to be transmitted to the City Council and others. The executive summary from their report is incorporated as an addendum to this Executive Summary.

Many of the issues raised in the authors' October 1990 report have still not been adequately addressed and remain of concern today. As the authors had anticipated, a number of new issues have surfaced in the interim that raise significant new questions about the ability to implement the ROMA (SP and Department of Planning and Development) design. Since the staff and administration of the Department of Planning and Development and those responsible for developing the draft EIR were aware of and acknowledged the concerns raised by the authors in their reports and associated meetings, it is surprising that the draft EIR did not adequately address many of the issues they raised. In the opinion of the authors, this situation reflects a project advocacy position in the draft EIR prepared under the supervision of that Department. Because of this, it is the authors' opinion that the redrafting of a proper EIR to present and discuss all of the issues related to hazardous chemicals at the SP site and Richards Boulevard Area and their implications for the redevelopment, should be done outside of the Department of Planning and Development by a disinterested firm knowledgeable in the topic area. It is the authors' suggestion that the development of the new draft EIR be conducted under the supervision of a committee composed of individuals representing the dominant areas of concern in the redevelopment of the SP site and Richards Boulevard Area.

EXECUTIVE SUMMARY

Some areas of the Southern Pacific Railyard site (SP site) are known to be contaminated with a variety of potentially hazardous chemicals including lead and other heavy metals, and a variety of organics some of which are known human carcinogens. While SP has signed an enforceable agreement with the Department of Health Services (DHS) to remediate the site under California Bond Expenditure Plan Requirements (state "superfund"), that agreement does not require that all potentially hazardous chemicals be removed from the site. Partial clean-up is accepted remediation at superfund sites, but must be accompanied by constraints on future uses of the site.

The city of Sacramento (the City) contracted for us to act as independent technical advisors to the City to review initial aspects of the remediation of the SP site. We were asked to critically review and comment on the information available on the current degree of contamination, the adequacy of the investigations being conducted and planned to define contamination and its hazards to public health and the environment, the adequacy of past and proposed approaches for remediation of the contamination, and the compatibility of proposed plans for redevelopment with the residual contamination that will exist after the site has been cleaned up to the degree accomplished and proposed - i.e., "remediated." We provided a technical discussion of the results of our review in a technical report to the City Department of Planning and Development. That report provides additional information on the basis of our findings.

This report summarize the conclusions of our review and presents our recommendations to the City for actions and approaches it should consider taking as part of its evaluation of the remediation and redevelopment of the SP site. This executive summary highlights principal findings and recommendation discussed in this report.

Adequacy of Site Remediation

- * The state "superfund" review and remediation process applicable to the SP site may not be adequate to provide for long-term protection of public health (especially children) and environmental quality if the site is redeveloped as currently envisioned. "Superfund" investigations and remediation approaches being used today were not developed to be necessarily adequate for ensuring protection of public health and environmental quality associated with intense public use of "remediated" sites.
- * Remediation that has been accomplished and that is planned for parts of the SP site involve leaving potentially hazardous chemicals in those areas. The constraints on future uses of those areas, such as designating them as commercial/industrial and imposing associated deed restrictions, may not provide adequate protection for users of those areas or surrounding areas.
- * The current personnel in DHS who are responsible for overseeing the investigation and remediation of the SP site appear to be providing diligent implementation of DHS policy and approaches for the SP site.
- * SP's meeting requirements approved by DHS for site investigation and remediation cannot be considered necessarily adequate to provide long-term protection of public health and environmental quality from chemical contaminants derived from SP's activities, or to protect the City's interests associated with the redevelopment of the property.
- * The amount of site investigation and remediation that has been effected thus far at the SP site has provided a limited track record of the adequacy of the design, implementation, and efficacy of the site investigation and remediation that will be accomplished at the site to provide for public protection associated with the envisioned

redevelopment. The approaches adopted thus far do not give us confidence that future site investigation, remediation, and redevelopment will be done in a way to ensure near-term or long-term protection of public health, environmental quality, or the interests of the City given the proposed plans for redevelopment.

- * Potentially significant deficiencies have been found in a number of areas of the SP site investigation including soil-gas migration assessment, remediation of lead-contaminated soils, chemical translocation (uptake from soil by plant roots with deposition in leaves and/or fruit) of lead and other contaminants, and overall characterization of contamination associated with the site.

- * With DHS approval SP has adopted a remediation approach for some areas of the site that involves partial clean-up of potentially hazardous chemicals. This remediation also includes the designation of those areas for commercial/industrial use and the imposition of deed restrictions (which the City must implement) designed to limit activities in those areas. While deed restrictions may provide appropriate protection of public health in isolated, insulated industrial areas that have received partial clean-up (remediation), this approach may not be appropriate or adequate for the commercial/industrial areas of the SP site. This is largely related to the proximity of the commercial/industrial areas, without isolation, from residential and public open-space that is currently being planned, as well as possible uses within commercial/industrial areas that could cause unacceptable exposure of members of the public.

- * If the City chooses to proceed to include plans for residential use, open-space, and other intensive public contact activities at the redeveloped site, it should consider providing significant additional safeguards to address the concerns raised about the adequacy of the investigation and remediation for providing near-term and long-term protection of public health, environmental quality, and the interests of the City.

- * The City should consider developing a comprehensive set of additional safeguards to be implemented associated with any permitting of activities in areas only remediated to levels acceptable for commercial/industrial use.

Groundwater Contamination

- * At least two areas of groundwater contamination (plumes) have been found to have been generated by SP's operations; one plume extends beneath the City from the SP site south to at least O St. The plumes contain highly hazardous chemicals that cause the waters to be unsuitable for use for domestic and some other purposes. The type, degree, and extent of contamination of the groundwater beneath the SP site and off-site underneath the City have not yet been adequately characterized.
- * While it is reported that the groundwaters in the area of the SP site are not now used for domestic purposes, the City should consider requiring that they be remediated to meet state drinking water standards to protect the resource for future users.
- * Potential problems with soil-gas migration of hazardous chemicals from contaminated groundwater have not been adequately addressed.
- * The City should consider requiring an appropriate, in-depth evaluation of the potential for soil-gas migration from the contaminated groundwaters to the basements or other enclosed areas of buildings that exist or could be developed above the groundwater contamination plumes from the SP site.

Stormwater and Sewage Management

- * The current redevelopment plans for the SP site could be significantly impacted by failure of the City to solve its combined sewer overflow problems. The Regional Water Quality Control Board has considered placing a moratorium on future development within the City until those problems are resolved.

- * The City should consider the impact that a moratorium on sewer hook-ups at the SP site could have on the redevelopment of the site. If it is found that there is a significant potential for such a moratorium, then the City should consider the possibility of developing its own domestic wastewater and stormwater management systems, including treatment works for the SP site.

Redevelopment Planning

- * The planning that has been done by the Roma Design Group has provided insight into possibilities for redevelopment of the site and has helped focus our review of the site investigation and remediation on problems that could arise from redevelopment of the site in light of remediation approaches adopted and proposed by SP.

- * The City should consider evaluating the degree of public health and environmental quality protection that should be provided by SP's site investigation and remediation.

- * Before further significant planning for redevelopment is done, the City should consider carefully evaluating the compatibility of the proposed uses, both in the near-term and the long-term, with the remediation being conducted, including the provision to leave potentially significant amounts of hazardous chemicals at the site. The resolution of the various issues raised in this report should be accomplished before significant additional

planning is done.

Overall Recommendation

- * The City should consider becoming a more active participant in decision-making concerning, and oversight on, the site investigation, the remediation of various areas of the SP site, and the appropriateness of redevelopment of the site for certain types of uses. A focus of its participation should be the minimization of the potential for children to be exposed to elevated concentrations of lead and other contaminants through intended and inadvertent use, as well as through plausible misuse of the area.
- * We recommend that the City conduct in-depth reviews of each component of site investigation, remediation, and redevelopment as they are developed and executed to help ensure that the desired level of protection of public health, environmental quality, and its interests will be achieved.
- * To implement these recommendations, an independent, third-party advisor(s) should be retained by the City to provide in-depth evaluation and advice to the City on each aspect of site investigation, remediation, and redevelopment, as each is developed, reviewed by DHS and others, and implemented. The advisor(s) must be knowledgeable, highly active, and adequately funded. The advisor(s) should report to City officials responsible for formulating City policy. If such an advisor were appointed, we would recommend the City proceed, cautiously, with the redevelopment of the SP site.

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INTRODUCTION

Background

The Southern Pacific Company (SP) owns a 240-acre site in downtown Sacramento; the site has been used for more than 100 years as a railyard and for maintenance, repair, and rebuilding of locomotives and rail cars. Those activities have caused extensive contamination of the soil and groundwaters of the area with a variety of potentially hazardous chemicals, including heavy metals, petroleum hydrocarbons, and chlorinated solvents and their transformation products. The site is on the state of California "superfund" list. SP has signed an "enforceable agreement" with the Department of Health Services (DHS - now Department of Toxic Substances Control (DTSC)) to remediate the site in accord with current DTSC remediation standards. One of the key contaminants of concern at the site is lead. DHS-DTSC has established that if the future uses of the property are to be industrial/commercial, the remediation requirement for lead would be 3,000 mg Pb/kg; however, if the property is to be used for residential or other purposes that would involve the exposure of children to the soil, DHS-DTSC has established a lead remediation requirement of 174 mg Pb/kg. SP has determined that it will remediate areas that it designates for future use as industrial/commercial to 950 mg Pb/kg in order that the remaining soils not be classified as "hazardous waste" under the DHS-DTSC Title 22 requirements.

In cooperation with the city of Sacramento Department of Planning and Development, the Southern Pacific Company and its consultant (ROMA Design Group) has proposed an intensive mixed-use redevelopment plan for the SP site. The Department of Planning and Development is also planning for conjunctive redevelopment of the adjoining 1100-ac "Richards Boulevard Area" currently owned by 200 separate property owners and used for commercial and industrial purposes (SEC, 1992). The proposed redevelopment plans aim to encourage intensive public use of the redeveloped property (SP site and Richards Boulevard Area). Included within the proposed redevelopment are plans for affordable housing as well as other residential housing.

During the winter of 1989-1990, the Sacramento City Council raised questions of the City's Department of Planning and Development concerning the adequacy of the "clean-up" of the potentially hazardous chemicals, including lead, at the Southern Pacific Railyard site relative to the proposed redevelopment. Key components of that plan included the City's assuming ownership of substantial parts of the redeveloped property for streets, roadways, parks, open space, etc. The ROMA plan also called for development of substantial residential units, including some affordable housing. This raised concern about the exposure of people to residues of potentially hazardous chemicals that would be left at the site after the proposed remediation.

The questions of the City Council eventually caused the Department of Planning and Development to issue a contract to the authors to conduct an overview review of the adequacy of the evaluation of the potential chemical hazards that existed at the railyard site, and the adequacy of remediation that had been and was then proposed to be conducted at the site relative to the plans for redeveloping the site outlined by SP and the Department of Planning and Development.

The authors conducted their review in the summer of 1990 and developed two reports for the city of Sacramento,

- ! *"Review of Southern Pacific Railyard Site Investigation, Remediation, and Redevelopment"* (Lee and Jones, 1990a)
- ! *"Preliminary Assessment of 'Superfund' Remedial Investigation/Feasibility Study Activities Completed and Projected and Adequacy of Remediation Program for Clean-up of Chemical Contamination at SPTC Sacramento Railyard Site"* (Lee and Jones, 1990b)

The primary conclusions from the authors' review, which were presented to and accepted by the Department of Planning and Development in October 1990, were:

- There were significant potential hazards associated with the proposed redevelopment of the Southern Pacific Sacramento Railyard site relative to the degree of evaluation and remediation that SP had used and was proposing to use in "clean-up" of the site. While areas of the site were being remediated and proposed for "remediation" in accord with conventional minimal federal and state superfund guidelines, those guidelines were not prepared for the protection of public health and the environment at sites such as the SP site redeveloped with non-isolated intense public access and residential use.
- The project should only proceed if the City and others are made fully aware of the potential problems for public health and the environment that could arise as a result of implementation of the proposed plan for the site redevelopment.
- At the time of the authors' review during the summer of 1990, the extent and degree of contamination of the Southern Pacific Sacramento Railyard site was poorly understood.
- The authors found significant problems in the proposed plan for evaluation of the nature, extent, and significance of potentially hazardous chemicals at the site in light of the nature of the anticipated redevelopment.
- The residents in affordable and other housing on the property, as well as visitors to the area, could be exposed to significant amounts of hazardous chemicals that would be left at the site after SP had performed the remediation at the site that it proposed to undertake.

Execution of the proposed redevelopment would

- result in children's residing on properties at the site and having the opportunity for intimate contact with the lead-containing soils of the area;

- present significant opportunity for non-residents who would come to the area for recreation, to have contact with lead-containing soils;
 - present opportunity for children to be exposed to soils containing elevated concentrations of lead in industrial/commercial areas through a variety of plausible activities.
- More detailed planning of the site redevelopment was discouraged until resolution of many unknowns about the hazardous chemical conditions that could exist at the site.
 - The city of Sacramento would be assuming significant liability associated with the proposed plan for redevelopment of the site through ownership of and responsibility for property, and through implementation of land-use restrictions (deed restrictions) imposed and anticipated to be imposed on areas of the site by the then Department of Health Services (DHS - now Department of Toxic Substances Control (DTSC)).
 - The authors recommended that if this redevelopment project was to proceed as planned, a disinterested, truly independent, third-party review of the activities that would take place at the site be provided to the City decision-makers and the public on the adequacy of the site evaluation and remediation relative to redevelopment, considering not only initial but also long-term potential problems and plausible situations. The authors advocated that the third-party review be independent from and in no way controlled by the Department of Planning and Development or other entities in the City that were predisposed to project development or that otherwise had an interest in the outcome.
 - The authors indicated their position that no further planning that could lead to adoption of a particular plan should be done until SP had completed the evaluation and remediation of the contaminated soils that it planned to undertake as agreed to with DTSC.
 - The authors recommended that the City proceed cautiously with proposed plans for redevelopment of the site and that third-party independent review of these plans be conducted throughout the site investigation, remediation, redevelopment, and beyond, to inform the City elected officials of the adequacy of site investigation and remediation relative to proposed and executed plans for redevelopment of the site.

From their experience on the project, it was not clear to the authors at the time of their review almost two years ago that an appropriate framework existed within the City administrative structure that would allow appropriate review of the site by third-party reviewers. The authors encountered pressures that they believed inconsistent with the objectives of disinterested review.

The authors' report was accepted by the Sacramento Environmental Commission (SEC)

and caused it to undertake a further review of the hazardous chemical issues associated with the SP site redevelopment.

Current Situation

During the past nearly two years since the authors conducted their review of the SP site, they have continued to attend meetings and follow the general status of the work being done at the site. The minutes of the Sacramento Environmental Commission meeting of August 24, 1992 stated,

"While the state is the regulatory authority overseeing the cleanup, the city has responsibility as the agency that issues entitlements for development to make sure that the entitlements and grants do protect the public's health."

"Chairman Yim clarified that an important concern of the committee is that there is a distinction between remediation and cleaning to a pristine condition. This area [SP site] is being remediated, and not cleaned to pristine."

As noted by the SEC, the city of Sacramento will have significant responsibility and liability for the health and welfare of individuals using the redeveloped property of the SP site and Richards Boulevard Area. Further, while the fully redeveloped property could be a significant asset to the City, failure to achieve the proposed degree of redevelopment once the City is committed, could represent significant additional liability for the City owing in large part to the residual potentially hazardous chemicals that will be left on the SP property after accomplishment of the degree of remediation agreed to by SP, and to the unknown nature and extent of chemical contamination of the Richards Boulevard Area.

In the interest of those needing affordable housing, Legal Services of Northern California requested the assistance of Drs. G. Fred Lee and Anne Jones-Lee (the authors) in the review of the adequacy of the Southern Pacific Sacramento Railyard hazardous chemical investigation and remediation relative to the proposed plans for redevelopment of the site for affordable housing. They also requested that Drs. Lee and Jones-Lee review the potential significance of potentially hazardous chemicals in the Richards Boulevard Area for the development of affordable housing in that area as well.

On behalf of the Legal Services of Northern California, the authors have reviewed the following documents:

- *"Draft Environmental Impact Report Railyards Specific Plan and Richards Boulevard Area Plan,"* Volumes 1, 2, and 3, Prepared by EIP Associates, dated June 10, 1992;

- *"Ground Water Quality Monitoring Report for April 1991 Sacramento Yard, Sacramento, California,"* Prepared by Woodward-Clyde Consultants dated July 1991;
- *"Railyards Specific Plan,"* Prepared by ROMA Design Group, dated June 1992;
- *"Richards Boulevard Area Plan,"* Prepared by ROMA Design Group, dated June 1992;
- *"Facility Element of the Railyards Specific Plan and the Richards Boulevard Area Plan,"* Draft Prepared by ROMA Design Group, dated June 1992;
- *"Final Investigation Report Soil Gas and Lead Sampling Program Residential and Open Space Study Area Sacramento Rail Yard, Sacramento, California,"* Prepared by ERM-West, Inc. dated November 1991;
- *"Draft Documents Summary Railyards Specific Plan Richards Boulevard Area Plan Facility Element Environmental Impact Report,"* Prepared by ROMA Design Group and EIP Associates, dated June 1992;
- *"Progress Report No. 1 on the Richards Boulevard/Southern Pacific Railyards Planning Process, Including Issue Papers on: Intermodal Terminal, Hazardous Materials, and Lead Remediation Standards Staff Report,"* Report to Sacramento City Council under signature of R. Thomas, Deputy City Manager, and J. Molloy, Executive Director, dated July 21, 1992.

The authors' review has revealed that some of the critical public health and environmental quality issues that they raised two years ago concerning redevelopment of the site, have still not been properly addressed in the draft EIR or supporting documents. As discussed in this report, the authors remain highly concerned that the public is not being reliably informed about the long-term public health hazards and the city of Sacramento's potential liability that could result from the City's administration of activities at the redeveloped site which involve exposing the public to the residual potentially hazardous chemicals being left at the site after SP's remediation. While the Richards Boulevard Area was not included in the authors' review two years ago, some of the same issues that are of concern at the SP site certainly exist in the Richards Boulevard Area as well. Further, in the past two years significant new information has been developed that should have been presented and discussed in the draft EIR; some of that new information casts even greater doubt on the economic feasibility of the proposed redevelopment project for both the SP site and Richards Boulevard Area.

The typical EIR focuses on evaluating the impact of a project on the environment. For most EIR's, the issue of the significance of residual, potentially hazardous chemicals on the development of the project is of limited concern; typical EIR's address the impact of the project on the environment, not the impact of the environment on the project. For complex superfund sites such as the SP site, however, the residual hazardous chemicals that will be left at the site by

SP after its remediation could have a significant adverse impact on the success of the project. Such chemical residues can be a significant threat to public health, the environment, the ability to finance the project, and therefore the character of the project.

This report provides a discussion of many of the significant deficiencies that the authors have identified in the adequacy of the draft EIR in addressing the impacts of the residual chemicals left at the SP site after its remediation. Topic-specific and well as line-item-specific comments on a number of the documents listed above are presented in this report. Comments are limited to those concerning the toxic/hazardous chemicals issue in the soil and water media. In general, where the same problem or deficiency occurs at more than one location in a document or in more than one document, it is only commented upon herein once. No attempt has been made to identify and discuss each and every shortcoming or technical deficiency in the documents; rather focus is placed on a number of key issues of deficiency of the draft EIR with regard to addressing the hazardous chemicals issues. The fact that a particular shortcoming is not mentioned in this report is not an indication of its lack of significance.

SIGNIFICANCE OF LEAD (Pb) RESIDUES AT SP SITE

The Southern Pacific Sacramento Railyard site has widespread lead-contamination of the soils. Based on the information provided in the draft EIR, the degree and extent of the contamination of the SP property with lead, and for that matter other potentially hazardous chemicals, is not yet known. Lead that is present in the soil will be a threat to public health and the environment forever. Of particular concern is its threat to the health of children. The approach for "remediation" of lead-contaminated soils at the SP site has been established to be removal of lead to 950 mg Pb/kg in those areas to be initially redeveloped for commercial and industrial purposes, and to 174 mg Pb/kg in areas to be initially redeveloped for residential uses. There is no provision in the plan for isolation of the commercial/industrial properties (built-upon or not) from the residential areas in a manner so as to prevent access to children. The approach relied upon for prevention of future (*ad infinitum*) use of the commercial/industrial properties by children (e.g., residences, day care facilities, open-space, etc.) is deed restriction to be implemented by the City staff. In their 1990 reports to the City, the authors expressed their numerous and strong concerns about the reliability of that two-standard approach and deed restrictions to provide appropriate protection of public health of the residents and users of the SP redevelopment.

There is substantial and growing national concern about the threat of lead residues in soils, especially in inner cities and certain other residential areas, to the health of children (GAO, 1992). This concern has caused the US Department of Health and Human Services' Centers for Disease Control (CDC) to conduct comprehensive reviews of the significance of lead to the public health of children. CDC (1991) has concluded,

"Lead poisoning remains the most common and societally devastating environmental

diseases of young children."

The levels of lead in children's blood that are considered indicative of concern have decreased significantly in the recent past. The CDC (1991) considers 10 :g Pb/dL in blood of children as a threshold of lead poisoning, but it is known that lead in children's blood at the 10 :g/dL level is damaging to children's health. (The concentration unit ":g/dL" is "microgram per deciliter"; a deciliter is 100 milliliters.) An expert panel working through CDC (1991) has determined:

"Epidemiologic studies have identified harmful effects of lead in children at blood levels at least as low as 10 :g/dL.

Some studies have suggested harmful effects at even lower levels..."

The Panel of experts concluded (CDC, 1991),

"Results of recent studies have shown that lead's adverse effects on the fetus and child occur at blood lead levels previously thought to be safe; in fact, if there is a threshold for the adverse effects of lead on the young, it may be close to zero."

As additional work is done on the significance of lead in the human system, it is virtually certain that the 10 :g/dL threshold will be decreased (i.e., made more stringent). The California Department of Health Services (DHS) (now the Department of Toxic Substances Control (DTSC)) used a blood-lead level of 5 :g/dL as the mean (average) blood-lead level in its model to establish the 174 mg/kg soil-lead level for residential area soils on the SP property (DHS, 1989).

CDC is undertaking a nation-wide survey of blood-lead levels; from the information available, the average blood-lead level for the US population is between 5 and 10 :g/dL. It is, therefore, expected that many children from urban areas, especially central city urban areas, have lead in their blood at concentrations above the 5 :g/dL level used by the DHS-DTSC.

DHS-DTSC has been conducting surveys of lead in soils and the blood of children in several California cities and has found large numbers of children whose blood-lead levels exceed 5 :g/dL. There can be no doubt that there will be increased regulatory activity over the next 5 to 10 years to significantly further limit the exposure of children to lead in the environment. There is also growing recognition that lead is potentially more significant to the health of adults than previously thought (Allison, 1992). Lead is stored in the bones and may be released by osteoporosis or events such as pregnancy.

In 1975, the US EPA promulgated an interim drinking water regulation MCL (maximum

contaminant level) for lead of 50 :g/L. In 1988, the US EPA proposed a lead MCL for drinking water of 0.005 mg/L (5 :g/L). In June 1991, the US EPA published its "Final Rule" establishing the maximum contaminant level goals (MCLG's) and national primary drinking water regulations (NPDWR's) for lead in drinking water (US EPA, 1991). The US EPA (1991) stated,

"EPA is promulgating an MCLG of zero for lead..."

"EPA proposed to set the MCLG for lead at zero, based on the following considerations: (1) The occurrence of a variety of low level health effects for which it is currently difficult to identify clear threshold exposure levels below which there are no risks of adverse health effects; (2) the Agency's policy goal that drinking water should contribute minimal lead to total lead exposures because a substantial portion of the sensitive population already exceeds acceptable blood lead levels; and (3) the classification of lead as a Group B2 (probable human) carcinogen."

"EPA continues to believe that an MCLG of zero for lead is appropriate (Category I contaminant) for the same reasons cited in the proposal (i.e., no clear threshold for some non-carcinogenic health effects, need to minimize lead in drinking water because a substantial portion of the sensitive population already exceeds acceptable blood lead levels, lead is a B2 carcinogen)."

The US EPA has established an Action Level of 15 ug/L for lead in drinking water. That level will trigger efforts to reduce the concentrations of lead in the drinking water (US EPA, 1991). The drinking water regulations are of particular significance to the SP site for several reasons.

One of the ways in which soil clean-up objectives are established is based on a comparison of leachable lead from the soil with the drinking water standards. At this time, a soil that leaches lead in the US EPA TTLC test or the DHS Title 22 STLC test in amounts greater than 5 mg/L is declared to be a "hazardous waste" and must be managed accordingly. The 5 mg/L extractable lead limit was developed by multiplying the drinking water MCL for lead of 50 :g/L (0.05 mg/L) by an arbitrary factor of 100.

If and when the US EPA adopts a 5 :g/L drinking water MCL for lead (which could be within a couple of years), the accepted leaching of lead in the TTLC and STLC procedures will likely decrease to 50 :g/L, a value 100-times less than the current extractable lead limit for designation of "hazardous wastes." Because of the highly arbitrary nature of the factor of 100 used to establish the allowed leaching of lead, from which the classification of "hazardous waste" is derived, the allowable leachable lead value could be decrease even more (i.e., become less than 50 :g/L). It is the authors' professional opinion that it will be very surprising if the acceptable leachable lead is not decreased to below 50 :g/L within the next few years; there is no doubt that the 5 mg/L leachable lead level now allowed will be decreased. (As discussed in a subsequent section of this report, this conclusion is in contrast to the conjecture offered on behalf

of SP that the accepted soil-lead residue levels applicable to residential properties at the SP site could be expected to be increased.) It is the authors' experience that frequently in standard tests, lead-contaminated soils will leach more than 0.5 mg Pb/L (i.e., at least 10-times the previously accepted drinking water standard). **This means that soils that today "pass" the leaching tests to avoid classification as "hazardous waste," may well not pass the test in the future owing to more stringent allowable leaching standards. This would mean that soils remediated to meet today's soil clean-up objectives could, in the near future, be declared to be hazardous waste.**

Such decreases in the acceptable leachable lead have highly significant potential implications for the redevelopment of the SP site. SP could "remediate" the lead at the site to levels that are now considered acceptable by DTSC for commercial/industrial property as well as those accepted by DTSC for children's exposure, only to find that within a few years, further remediation would have to be undertaken because of the change in the acceptable soil-lead levels. While there may be some who attempt to argue that that would be a problem far-greater than the just the SP site (i.e., is prevalent in inner cities throughout the US), there is an important difference between the redevelopment of the SP site and the existing inner-city conditions. In order to redevelop the SP site, the developers will have to obtain financial backing.

Lending institutions and bonding institutions are becoming increasingly concerned about the significance of lead residues in soils as a factor that can influence the collateral value of property. The high cost of remediation of lead-contaminated soil, currently ranging from \$300 to \$600/yd³ (i.e., \$0.5 million to \$1 million/ac-ft of soil removed and placed in a hazardous waste landfill), is causing lenders to start to establish their own soil-lead standards that are even stricter than those currently imposed by the DTSC at the SP site. While DHS-DTSC has determined that a soil-lead residue of 174 mg/kg is currently acceptable for children's exposure at the SP site, in September 1991 the Federal National Mortgage Association (FannieMae), which controls 1 in 7 residential mortgages in this country, established **100 mg/kg** as its accepted soil-lead residue level (FannieMae, 1991). At the July 1991 National Ground Water Association Site Assessment conference, held in Columbus, OH, representatives of the Bank of America characterized lead residues in soils as "*the due diligence issue of the 1990's*" (Forslund and Henry, 1991).

Based on information obtained by the senior author at a recent National Ground Water Association Site Assessment Conference held in Orlando, FL, lending institutions across the US are becoming increasingly concerned about providing mortgages for properties containing lead-contaminated soils. At that conference, the authors presented a review paper on the significance of lead in urban soils as a potential cause of water quality and public health problems. It provides important background information pertinent to potential problems associated with the redevelopment of the SP site and Richards Boulevard Area.

The DHS established the 174 mg/kg soil-lead level for residential areas at the SP site based on the assumption that children consume, on average, 0.1 g soil/day, and based on the level of lead that could be in that soil that could cause blood-lead levels of 5 :g/dL. It is well-known that

some children consume greater quantities of soil than assumed, some on the order of 1 g soil/day or more. This means that a soil that has been remediated to the 174 mg Pb/kg level at the SP site could still be dangerous to some children who would live in or use that area. That model also shows that even some children who consume average amounts of soil containing lead at 174 mg/kg would be expected to develop blood-lead levels in excess of 10 :g/dL.

Wong (1992) indicated that DTSC will soon release its "blood-lead biokinetic model," a copy of which has been obtained by the authors. That model enables the description of a relationship between soil-lead levels and blood-lead levels for children who consume various amounts of soil. That model also considered other sources of lead that could contribute to blood-lead. It is clear from the use of that model that children who tend to eat greater amounts of soil than average could, by exposure to soil containing lead at 174 mg/kg, readily develop blood-lead levels that are now clearly identified by CDC as being detrimental to their health.

While DHS adopted its approach to establishing accepted soil-lead residues for SP residential areas in 1989, there are significant questions about whether that approach will persist in the future. There will certainly be some who argue that there should be no children who could be harmed by the lead left in the soil at that site.

The state of New Jersey has developed a "draft soil clean-up standards" for lead of 100 mg/kg for residential uses and 600 mg/kg for non-residential purposes (NJ DEPE, 1992). Davis (undated) reviewed the clean-up standards for a number of federal Superfund sites and found that in both Florida and South Carolina Superfund site clean-up standards for lead were less than 174 mg/kg. As discussed by Lee and Jones-Lee (1992), several European countries have adopted soil-lead standards of 100 mg Pb/kg. There is, therefore, considerable justification for concluding that the 174 mg/kg soil-lead level applied to residential areas at the SP site will in the future be considered unsafe for children. Further, it is possible that the 950 mg/kg level applied to areas of the SP site designated for commercial/industrial use, will be found to be excessive compared with new soil-lead standards that could be adopted for such uses in the future.

It is a plausible scenario that areas of the SP site could be remediated to levels currently acceptable to DTSC for children's contact and therefore could be set aside for residential development including affordable housing, only to find at a later time (10 to 20 years from now when housing could be constructed at the SP site) that the then-current accepted soil-lead residue levels would require further remediation of the property in order to develop housing. There are significant questions about who would fund the additional remediation that could be required for public health protection as well as to satisfy lenders' requirements.

As discussed in a subsequent section of this report, it is important to understand that the 174 mg/kg soil-lead remediation level adopted for residential areas was developed for the SP site. It cannot be presumed to have any relevance to the soil-lead "remediation" that could be required in the Richards Boulevard Area which is not part of the SP superfund site. Certainly some portions of the Richards Boulevard Area can be expected to have soil-lead residues greater than 174 mg/kg.

While the draft EIR did provide limited mention of some changes in standards for water and soils, it provides no discussion of the implications (such as those noted above) of potential future changes that are known among professionals in the field, for implementation of the proposed redevelopment plan for the SP site and Richards Boulevard Area. This is one of the most significant deficiencies in the draft EIR and causes it to fail to meet the CEQA requirements. The draft EIR should fully inform the decision-makers and the public of these issues and provide in-depth, current information on their implications for the redevelopment of the site and Area and implementation of the plans.

It is premature to do any definitive planning for redevelopment of the SP site, or for that matter the Richards Boulevard Area, until a much better understanding of the public health hazards that soil-lead residues represent to children and adults. There is a wide variety of unknown factors that are under review that could influence whether the set-aside for affordable housing can, in fact, be used to construct such housing at the remediated SP site and the Richards Boulevard Area as currently planned in the SP-City of Sacramento Department of Planning and Development "ROMA" plan. These factors include:

- changes in what is considered an acceptable blood-lead level in children;
- changes in the accepted soil-lead remediation levels;
- determination of the percent of exposed children that should be protected from soil-lead;
- changes in the approach for classification of lead-contaminated soils as a hazardous waste;
- levels of soil-lead that lenders will accept in order to loan money on property.

It will likely become necessary to use the funds set aside for affordable housing, including any infrastructure-development funding included within those funds, for construction of affordable housing and associated infrastructure in areas that are not now contaminated with lead.

STORMWATER QUALITY ISSUES

At two locations in the draft EIR Executive Summary (pp. 1-21 and 1-34), mention was made of the manner in which stormwater from the site would be managed. At one location it was stated that a detention pond would be constructed, and in the other location it was stated that best management practices would be used to manage stormwater-associated contaminants. The discussion presented in the draft EIR reflected a lack of understanding of what is happening today and what will happen in the near future in addressing stormwater runoff-associated contaminants. As discussed by Lee and Jones (1991c), best management practices involving detention ponds are proving to be largely ineffective in preventing problems of surface water pollution by stormwater-associated contaminants.

In their 1990 report to the City on the redevelopment of the SP site, the authors expressed concern about the management of stormwater at the SP site. Since then, the US EPA has begun to implement its stormwater quality management program. That program could significantly impact the redevelopment of the SP site and the Richards Boulevard Area. Within a few years, water quality objectives will be imposed on stormwater discharges such as those indicated in the draft EIR would be discharged from the project area to the Sacramento River, that will require the construction of treatment works to remove contaminants from the discharge. Because of the significant contamination of the SP site soils by a variety of potentially hazardous chemicals and the large amount of residual, potentially hazardous chemicals that could be left in some areas after the SP remediation, there could be special, additional stormwater runoff treatment requirements similar to those applicable to industrial sites, imposed on the SP site development.

The fact that the conventional storm sewers in Sacramento and the SP area cannot handle any additional stormwater load necessitates the construction of a separate stormwater outfall to the Sacramento River from the project area. This means that the contaminants in the stormwater runoff from the SP site would not have the benefit of the dilution that typically occurs in other areas of the City. This, in turn, would make the stormwaters from the project area much more expensive to treat and could pose an additional financial burden on those who own property in this area. As discussed in the authors' reports to the City, the stormwater quality management issues associated with the SP site could be important in affecting the development of the project. This is another issue that was not adequately addressed in the draft EIR.

As noted above, the draft EIR stated that one of the approaches that could be used for dealing with stormwater-associated contaminants is the construction of detention basins. Two issues should have been addressed in the draft EIR regarding detention basins. First, while that approach has been common in the past, there is justifiable concern that is now being heard about the ability of detention basins to remove those pollutants that could adversely affect beneficial uses of receiving waters. Detention basins basically trap contaminants associated with larger-sized particulates in stormwater runoff. Such forms of many contaminants are typically not available to adversely affect aquatic life. While use of a detention basin may reduce the total load of contaminants to the receiving water, it would be expected to have limited ability to remove the available or more available forms of contaminants in the stormwater, i.e., those chemical forms that could adversely affect receiving water quality. Thus, such an approach may have little or no mitigating effect for the adverse impacts of stormwater-associated contaminants on receiving water quality as assessed by the designated beneficial uses.

Second, there is also growing recognition that stormwater detention basins are presenting problems to their owners/operators because of the accumulation of particulate forms of potentially toxic chemicals in the solids detained in the basins. As discussed by the authors (Lee and Jones-Lee, 1992) and elsewhere in this report, as a result of changes that are being made in the levels of lead that are considered acceptable to occur in soil (i.e., levels of leachable lead that cause a soil to be classified as a hazardous waste), the accumulations in stormwater detention basins may begin to be classified as hazardous wastes. This means that many detention basins

may come to be considered toxic pits and require management as such. Such management carries significant costs and a higher degree of management practice than that typically associated with a stormwater detention basin today.

The issue of management of stormwater associated with the SP site is very uncertain at this time. It could represent a significant financial burden to owners of property in the area. While reference was made to these problems in the authors' report to the City staff two years ago, the draft EIR is significantly deficient in its addressing of stormwater quality management issues for the redevelopment of the SP site. The draft EIR should have discussed the many aspects of this topic that the authors discussed with city of Sacramento Department of Planning and Development staff.

GROUNDWATER QUALITY ISSUES

As discussed in the authors' report to the City two years ago, the groundwaters beneath the SP site and off-site down-groundwater gradient from the site, are highly polluted with a variety of chemical contaminants that would adversely affect the use of the groundwater for domestic water supply purposes. In the fall of 1990 when the authors reported on their review to the City, they reported that the full extent of groundwater pollution by hazardous chemicals from the SP site was not then known. They also reported that the approach that had been used to that point to investigate the extent of groundwater pollution was not adequate. Of particular concern were the limited number of parameters investigated, and the inadequate lower detection limits of the analytical methods for the determination of the concentrations of some of the potentially hazardous chemicals that were measured.

Vinyl Chloride

One of the chemicals of great concern for groundwater pollution associated with the SP site is vinyl chloride. Vinyl chloride is a known human carcinogen and is hazardous to people at extremely low levels. DHS has established a vinyl chloride MCL (maximum contaminant level - drinking water standard) in groundwater used for domestic purposes of 0.5 :g/L. The lower analytical detection limit used by SP's consultant in its assessment of groundwater contamination by vinyl chloride reviewed by the authors in the fall of 1990, was about 2 :g/L. This means that vinyl chloride concentrations reported as being "non-detectable" (i.e., less than 2 :g/L) could, in fact, have exceeded the drinking water MCL for that known human carcinogen and pose a threat to those who would attempt to use the water for domestic purposes. Thus, the analytical approach used measure vinyl chloride in the groundwater through the fall of 1990 was not sufficiently sensitive to define the extent and degree of groundwater pollution by that chemical. This situation was reported to the City Department of Planning and Development and to DHS by the authors.

SP was subsequently required to do additional groundwater character investigations. The draft EIR reported on the results of studies conducted in the summer of 1991 that served as the basis for the draft EIR released in the summer of 1992. Evidently, the summer 1991 data are the most recent data on the groundwater characteristics associated with the SP site. (If this was not the case, the draft EIR did not reliably report on the information available at the time it was released to the public. If studies were conducted after those reported in the draft EIR, they should have been mentioned and discussed in the draft EIR.)

The review of the vinyl chloride results provided by WCC (1991) as referenced in the draft EIR, shows that the 1991 investigation of vinyl chloride-contamination of groundwater was also inadequate to define the full extent of the groundwater plume that contained potentially hazardous levels of vinyl chloride, still owing to an inadequately sensitive method. Therefore, even today, the full extent of the plume as defined by the current DHS standard is not known. Figure 4.13-10 of the draft EIR shows that the volatile organic compound (VOC's) (of which vinyl chloride is a component) plume extends in a southerly direction from the site to well-beyond "L" St. In constructing the illustration of the plume in that figure, a 0.1 mg/L level of "volatile organic compounds" was used to define the extent of the plume. However, concentrations of vinyl chloride (the most significant compound in the VOC's) of almost 200 times the MCL may not have been included within the extent of the plume shown. If the plume of vinyl chloride in excess of the MCL would have been developed, a much larger plume than that shown for the VOC's would likely have been portrayed. The groundwater plume containing vinyl chloride in excess of 0.5 :g/L should have been included in the draft EIR. This would have provided a much more reliable assessment of the extent of groundwater pollution of potential public health concern.

The issue of inadequate detection limits compared with the MCL's should have been presented and discussed in the draft EIR to inform decision-makers that the actual plume presented in the draft EIR does not represent the full extent of groundwater contamination that has occurred due to SP's operation at the Sacramento Railyard site. As noted above, these issues were brought to the attention of and discussed with the staff of the City Department of Planning and Development in the fall of 1990; EIP Associates representatives were also made aware of them at that time. The draft EIR is therefore deficient in properly informing the public and decision-makers of the real situation with respect to groundwater contamination by vinyl chloride and its potential implications for the project.

Lead and Arsenic *Pending Regulations*

In the past two years since the authors conducted their review for the City, lead and arsenic have been the subject of increased regulatory attention for their presence in groundwater. Both of those chemicals are of potential concern at the SP site as they may impact groundwater quality. As discussed above, in 1988 US EPA proposed a 10-fold reduction in the MCL for lead, reducing the value from 50 :g/L to 5 :g/L (see US EPA, 1991). The US EPA has adopted an

Action Level for lead in drinking water of 15 :g/L, a level not based on its potential carcinogenic properties. A much lower concentration limit could be promulgated to account for this potential impact. The US EPA (1991) has established a MCLG of "Zero." The DTSC blood-lead level model previously mentioned indicates that when the drinking water standard for lead of 15 :g/L is considered, that source is predicted to comprise about 20% of the daily lead intake for children.

Increasingly stringent drinking water standards for lead will almost certainly be adopted because of the increased regulatory action to minimize the public's exposure to lead through water, soils, air, etc. that is taking place across the US and in other countries. These actions are being taken in recognition of the increasing understanding of the significance of lead concentrations in soil and water to public health.

A review of the 1991 data for lead in groundwater reported by WCC (1991) shows that a number of the groundwater samples associated with the SP site contained concentrations of lead above the US EPA's Action Level of 15 :g/L. This means that groundwater associated with the SP site could have to be remediated to remove lead as well as VOC's. As discussed below, this is of particular significance since it could greatly increase the cost of groundwater remediation beyond that which has been considered in the past.

During the past year, both the US EPA and the DHS have announced plans to establish revised, more stringent drinking water standards for arsenic, a known human carcinogen. At this time the arsenic MCL for drinking water is 50 :g/L to protect against arsenic's toxic (non-carcinogenic) properties. The incidence of cancer associated with drinking water containing arsenic at that 50 :g/L standard would be about 1 additional cancer in 1000 people who consume about 1.5 qts of the affected water per day over their lifetimes (a 10^{-3} lifetime cancer risk). Typically regulatory agencies establish drinking water standards for carcinogens at levels associated with 1 additional cancer in one million people who consume 2 qts of the affected water per day over their lifetimes. That risk is three orders of magnitude (1000-fold) lower than that associated with the existing arsenic standard. This is causing regulatory agencies to re-examine the suitability of the MCL for arsenic in drinking water. While a new MCL is not yet available, if it were decreased to 5 :g/L (a factor of 10 below the existing standard), it would still be associated with an estimated lifetime risk of 1 additional cancer in 10,000 people. Adoption of such a value would change the appearance of arsenic-contaminated groundwater shown in Figure 4.13-9 from a few areas of arsenic contamination to widespread arsenic pollution of groundwater.

Identification of Problem in Draft EIR

The draft EIR does not adequately address the issues of heavy metal contamination of groundwater. From its presentation in Figure 4.13-9, it would appear that there are only a few

areas at the site where the groundwaters have excessive concentrations of heavy metals compared to current standards. For the past several years the US EPA has been developing and has proposed new drinking water standards (MCL's) for heavy metals and a number of other constituents. The draft EIR and plans make reference to a Woodward-Clyde Consultants report dated July 1991 as a source of information for groundwater quality monitoring for the SP site. A review of that report shows that for heavy metals (pg. 2 of that report - WCC (1991)) six of the 50 groundwater wells sampled for dissolved inorganic chemicals in 1991 showed excessive concentrations of heavy metals based on the standards in effect today. However, when the data presented in the report are compared with the US EPA proposed and considered water quality standards for heavy metals, the impression of groundwater contamination with excessive concentrations of heavy metals changes to one of widespread contamination throughout the site. Such a comparison would reveal that groundwater in the area contains excessive concentrations of arsenic, nickel, and lead.

Implications for SP Site Redevelopment

The contamination of SP site-associated groundwaters with heavy metals, as discussed above, is of particular significance to the redevelopment of the SP site since the removal of lead and other heavy metals from the groundwater requires significantly different processes than those used for treatment for vinyl chloride and other VOC's in groundwater. While removal of much of the vinyl chloride in groundwater can be effected by air-stripping of water pumped from the aquifer, lead cannot be removed in that way; treatment processes for lead, arsenic, nickel, and other heavy metals are substantially more expensive. Furthermore, while the remediation of on-site VOC-contamination of groundwater can be readily implemented, this is not the case for remediation of the off-site VOC plume that extends considerable but as yet undefined distances south of the SP site.

The draft EIR presented the issues of groundwater contamination and remediation as relatively simple, straightforward, and readily addressed. The fact is, however, that adequate remediation for vinyl chloride will be very difficult to effect, and the issue of the remediation of lead-, arsenic- and nickel-contaminated groundwater was not addressed. It is not that this information was not available to those who developed the draft EIR; this information is widely known by those who work in the water supply water quality area and should be known to firms doing EIR's that contain groundwater quality components. The draft EIR's failure to address these issues properly is another example of the deficiency of the document in properly and reliably informing the public and decision-makers about the hazardous chemical issues at the SP site.

The matter of SP site-derived contaminants in groundwater on-site and off-site has additional implications for the redevelopment of the SP property. It could be found that the residual chemicals left in the soils after SP's remediation of the site could be contributing to ongoing contamination of the groundwaters. It is a plausible scenario that a new property owner

at the SP site could be in the position of becoming "deep pockets" or otherwise a responsible party to assist SP in cleaning up the groundwater. For lead-contamination of groundwater, the only remedy to stop the source of pollution may be to excavate the lead-contaminated soils at the SP site at a cost of several hundred dollars per ton. Soils at the SP site containing elevated levels of lead could leach sufficient lead to the groundwater to potentially cause exceedance of the 5 :g/L drinking water standard proposed by the US EPA. Thus, while achieving a 950 mg/kg clean-up level for lead in industrial areas of the site may satisfy current DTSC requirements, such areas as well as others may in the future have to be remediated further because of groundwater pollution considerations. This was not addressed in the draft EIR.

A similar situation may exist for arsenic. Various arsenic-containing compounds have been applied to industrial, agricultural and other properties over the past century as insecticides and herbicides to control weed growth. Many areas treated with arsenic for such purposes have been found to contain arsenic residues in high concentration even many years after such use was terminated. It is not unreasonable to expect that arsenic may have been used on the SP site. This may account for the finding of elevated concentrations of arsenic in some soil and groundwater samples. The draft EIR is significant deficient in its failing to address the potential arsenic issue at the SP site. This issue includes the potential for excessive concentrations in soils, and the contribution of soil-associated arsenic to groundwater pollution. While the new drinking water standard for arsenic is not yet available, the draft EIR should have discussed these issues and pointed out that it is another of the undefined factors that could have significant implications for the feasibility of implementing the proposed plans for redevelopment of the SP site and, as discussed below, for the Richards Boulevard Area.

The issues of judging the adequacy of groundwater remediation at the site, and the potential role of residual, potentially hazardous chemicals that will be left at the site can have potentially significant ramifications to future property owners, possibly causing them to become responsible parties and to have to pay for cleaning up the property more than was required of SP by DTSC at the time of SP's remediation. The US Congress continues to pass regulations that require that the US EPA develop more protective standards for domestic water supplies than exist today. Through their legislators, the public is requiring greater protection of their water. When the authors first became involved in the SP matter in the summer of 1990 on behalf of the City, SP representatives indicated at a public meeting that they felt SP should not have to clean up the contaminated groundwater since the groundwaters were not being used for domestic water supply purposes. They also pointed out that since the groundwater already had concentrations of iron and manganese above drinking water standards SP's addition of carcinogens to the groundwater should not require clean-up. As discussed in the authors' report to the City, such reasoning was highly inappropriate and not in accord with protecting the interest of the public. Further, DHS (now DTSC) made it clear to the authors at that time that despite its protestations, SP would have to clean-up the groundwaters of the contamination caused by its activities.

A significant factor in the issue of groundwater polluted by SP's operations is that during the current drought, the state of California has exceeded its total water resources reserves from

surface sources; communities, agricultural interests, and others are having to significantly reduce their water use activities. Governor Wilson conducted a comprehensive review of the water resources needs of California. His review panel concluded that because of increased population, within a few years the State will be permanently several million acre-ft/yr short of developed water resources. As discussed by the authors (Lee and Jones, 1991d) this means that there will be a greater dependence on the groundwater resources of the State for domestic water supply. The Department of Water Resources has already indicated that the groundwater in the Sacramento Valley area is a resource of the State and areas in which groundwater is not now being extracted for domestic water supply will be used in the future. There is no doubt that it is the State's policy to require clean-up of contaminated groundwater, that increasingly stringent standards will be applied to establish and judge the adequacy of clean-up, and that waters cleaned-up to current standards will likely have to be cleaned-up further in the future to new standards that will be adopted. Further, many contaminant sources not now considered significant will in the future be found to be significant causes of groundwater pollution that require remediation. Of particular concern will be industrial areas such as the SP site and Richards Boulevard Area.

In summary, the fact that the concentrations of heavy metals in groundwater beneath the SP site exceed existing drinking water standards is of significance in terms of the cost of remediation of the groundwater and implications for additional soil remediation. Remediation of this contamination cannot be accomplished by air-stripping as had been planned for VOC treatment; treatment processes for remediation of heavy metal contamination are substantially more expensive. As discussed elsewhere in this report, this contamination also means that the residual heavy metals in the soils at the SP site could be contributing to the excessive concentrations of heavy metals in the groundwater that will be evidenced with revised drinking water standards. This could cause future owners of properties at the site to become responsible for further remediation of the soils to remove the source of the groundwater pollution. Issues of this type should have been addressed in the draft EIR. The draft EIR is significantly deficient in the information provided to the City Council, the public, and other decision-makers on this situation.

It is the authors' experience that there is insufficient information on the degree of contamination of the groundwater at the SP site and off-site areas that could have been contaminated by SP's activities to fully characterize the degree and extent of the groundwater contamination that will ultimately have to be remediated.

EVALUATION OF SUFFICIENCY OF REMEDICATION OF SUPERFUND SITES

Another significant deficiency in the draft EIR is its failure to inform decision-makers and the public about some of the new approaches that will be used within the next few years to evaluate the potential presence and significance of hazardous chemicals in soils and

groundwater. Today, federal, and state superfund sites such as the SP site, are investigated for hazardous chemicals by measuring about 200 types of chemicals. It is well-known that thousands of potentially hazardous chemicals have been and are today in use that could lead to environmental pollution. The approximately 200 chemicals selected were those on the list of Priority Pollutants that was developed from a Court Decree; it is well-recognized among experts in the field that the list of Priority Pollutants did not, and still does not, represent a proper compilation of the chemicals that could be present at a site such as the SP site, that could adversely impact future users of the property and the ability to implement the proposed redevelopment plan. A somewhat similar situation exists for the Richards Boulevard Area.

In their work two years ago, the authors discussed with staff of the Department of Planning and Development what was well-known then by professionals in the field, that significantly more advanced approaches are going to be used in the future to evaluate the adequacy of past superfund site remediations to protect public health and the environment. Mention of this issue was included in the authors' reports on the SP site to the City. As they informed the staff, future requirements will undoubtedly include measurement of more than the approximately 200 Priority Pollutant chemicals, and will undoubtedly include biological assay procedures. Biological assay procedures, such as those for mutagenesis (gene mutations), have been known for many years. (Gene mutation, along with cancer and birth defects, is one of the potential impacts of concern associated with low-level exposure to certain chemicals of types present at some industrial sites and other areas.) Application of biological assay procedures to superfund site evaluations has been discussed at US EPA national conferences (US EPA, 1988). Such testing procedures have been advanced to the point at which they will become part of new "Standard Methods" for measurement of contaminants in the environment (APHA *et al.*, 1992).

The authors have presented two professional papers, "*Redevelopment of Remediated Superfund Sites: Problems with Current Approaches in Providing Long-Term Public Health Protection*," (Lee and Jones, 1991a) and "*Evaluation of Adequacy of Site Remediation for Redevelopment: Site Assessment at Remediated, Redeveloped 'Superfund' Sites*," (Lee and Jones, 1991b), at a national environmental engineering conference, and a National Ground Water Association property site assessment conference, respectively. In those papers, which have been published in the conference proceedings, the authors discussed inadequacies in the current approaches for evaluating the potential hazards associated with superfund sites, as well as some of the changes that will take place in making such evaluations in the future. Copies of those papers were made available to the management of the City's Department of Planning and Development. They evolved from the authors' work on behalf of the City in their review of the SP site.

The mandatory periodic, five-year, review of so-called remediated superfund sites at the federal and state of California levels could readily mean that the new techniques being developed today for assessing the hazards of residual hazardous chemicals at superfund sites, including those that have received remediation, could readily be applied to the SP site. This could necessitate additional remediation by future property owners. This is one of the reasons that

lenders, developers, and the public may not support the redevelopment of the SP site and Richards Boulevard Area as proposed by SP and the Department of Planning and Development. Rather than properly informing the decision-makers and the public of the implications of information widely recognized in the field, for the redevelopment of the SP site, the Department and the draft EIR simply state that applicable standards for hazardous chemical management will be met. That is a statement of the obvious. However that statement does not give consideration to either the sufficiency of "current" regulations and standards or of the economic feasibility of attaining those standards as they become increasingly stringent. It is obvious that neither SP nor the City has unlimited funds to meet *any* standard that might be adopted in the future for site remediation. In considering incorporating into the redevelopment the "highest" use of the property (i.e., residential, public access) that would require greatest attention to public health protection from residual potentially hazardous chemicals, and the plan to leave residues of potentially hazardous chemicals at the site, careful consideration should have been given to anticipated future changes in regulatory requirements to provide protection of public health. The draft EIR is highly deficient in not informing decision-makers and the public about this situation, especially since the SP site situation has been specifically discussed in the national professional literature.

PUBLIC-INTEREST INDEPENDENT REVIEW

One of the most significant problems that exist today in the development of management approaches for hazardous chemicals in the interest of the economically disadvantaged is the ability to obtain expert, truly independent advice on hazardous chemical issues of importance to those who live in or use the properties and facilities in the area. At the Environmental Commission meeting that was held in June 1992, it was suggested by one of the commission members that rather than hiring an expert who could advise the City on hazardous chemical matters associated with the SP site, the City could rely on SP's consultants to provide the necessary information. While such an approach could be convenient, it would be unrealistic, at best, to expect a disinterested, comprehensive discussion of issues of importance to those concerned about hazardous chemicals at the site from a consultant working for a proponent of a project. While there is a tendency in matters such as the SP site redevelopment, in which significant monies, interests, and opportunities are involved, to "work out" differences in perspective through negotiation, there is (or should be) no ability to "negotiate" the protection of public health. Thus it is a matter of considering the best and most current technical information as it applies to what is done at the site to formulate prudent public health policy for site redevelopment. In the politically, financially, and opportunity-charged matter of the SP site redevelopment (a project that must address complex issues of chemical contaminants in various media), it is not prudent to anticipate disinterested reporting on issues that could significantly adversely affect the project by a consultant working on behalf of any party with financial or opportunity interests in the development. Indeed, in other fields and areas, disinterested review is not sought from one of the interested parties.

Consultants in the environmental field on behalf of an interested client in an advocacy situation, always face the problem of clients' exerting pressure to only express views that are advantageous to the client, and of losing business as a result of not being sufficiently accommodating. Owing in part to the involvement of the legal system in resolving disputes on matters of environmental and public health protection from contaminants, environmental consultants must often operate in the adversary system that is significantly different from the strictly technical arena. In the adversary system, only the best possible information for the client's position is presented unless the opposition forces presentation of contrary information. In the adversary system, it is up to the opponent's consultants and attorneys to seek out, identify, and point out in a convincing manner the inadequacies of the technical position. This is significantly different from the scientific method in which scientists and engineers are taught to adequately investigate and reliably present and interpret the technical information on the issues and then formulate an approach to manage the issues in a cost-effective manner. This means that it is not realistic to expect that a consultant working for an interested party with an advocacy position regarding the development can provide disinterested reporting of the issues.

In their report to the City on their SP site review, the authors recommended that if the SP redevelopment project was to proceed, truly independent (disinterested), third-party review should be provided to the City so that it would have the opportunity to understand the risks and aspects of liability that it City could be assuming through permitting and regulating activities at the redeveloped site and its ownership of infrastructure and other properties (such as possibly affordable housing) on the site. The Environmental Commission accepted the conclusions of the authors' review of two year ago including the recommended need for independent, third-party review of the activities at the site (i.e., a "public's consultant"); that recommendation has not been implemented. If affordable housing is incorporated into the redevelopment of the SP site, those who would occupy such housing should have expert advice on hazardous chemical issues that could affect their health and welfare. This advice should not be filtered through SP, the City, or others who have an advocacy interest in the property. Although a variety of groups has an interest in the redevelopment of the SP site, many have limited interest and support for the health and welfare of the public that will use the property after development.

The "public's consultant" recommended by the authors should maintain close familiarity with the most recent developments in assessing the potentially hazardous concentrations of contaminants associated with soils, groundwater, surface water and air that are present at the SP site after it has been "remediated" to the extent it will be by SP. As discussed elsewhere in these comments, the current perceptions of adequate "clean-up" objectives will almost certainly change in the future for those chemicals that are now being considered. Without question, the numbers of chemicals and approaches for assessing their potential hazards will also change as more is learned about them; as discussed in this report, these changes are already being made for several of the chemicals of current concern at the site. While in some instances new information may be expected to raise the concentrations of chemicals believed to be hazardous, the new information on the potential hazards for many other chemicals will cause their critical concentrations, and hence "clean-up" objectives, to be lowered in order to protect public health

and environmental safety at the site.

The appointment of a public's consultant would not relieve the City of any of its responsibility for proper implementation of deed restrictions, issuance of building permits and land-use permits, licensing of daycare facilities, and other activities; the consultant should have the responsibility to review what the City does in the administration of public health protection measures. This independent oversight needs to be provided forever since the chemical contaminants that will be left at the site will represent a public health threat forever. Any activity at the SP site will have to be closely watched to protect the public's interest to the greatest possible extent.

As part of redeveloping the property, SP should develop a trust fund to generate sufficient funds, in perpetuity, to enable those who represent the interests of residents of the affordable housing in the project to appoint qualified consultants (the public's consultant) to keep close watch on all activities that take place at the site that could in any way adversely affect those residents. The selection of the public's consultant should be done by those who represent the interest of the affordable-housing and other residents, and users of the property.

It might be argued that it should be the responsibility of the regulatory agencies to carry out these functions in the interest of those in affordable housing and that therefore there should be no need for an independent consultant overseer. While in principle this should be the case, the realities of the funding and resources limitations of regulatory agencies are such that they cannot be expected to provide the degree of perpetual review needed for as long as potentially toxic chemicals are to be left at the site for the benefit of SP. It is appropriate that SP be responsible for funding the independent review on behalf of the affordable housing residents since it is the entity that contaminated the site and that benefits from being able to leave residues of potentially hazardous chemicals on the site. It should be the financial responsibility of SP to ensure that none of the chemical residues left at the site adversely affects future users of the site and of the groundwaters that have been and could continue to be contaminated by chemicals used at the site.

While there is a variety of financial assurance instruments being used today to try to ensure that funds would be available in the future to address issues of long-term hazards of potentially hazardous chemicals, it is becoming recognized that the only reliable approach to ensure that funds will be available in perpetuity is through a dedicated, non-revocable trust fund that generates sufficient income to cover the work needed considering the magnitude of the efforts needed for plausible worst-case scenarios and possible inflation. Sufficient funds should also be available within this framework for the public's consultant to independently sample soils, water, air, and blood and tissue of residents and site users to establish and if necessary verify that excessive exposures to potentially hazardous chemical residuals at the site are not occurring.

It is suggested that as a starting point the magnitude of funding be established at \$200,000/yr for this independent review. However, a more detailed analysis of the types of

independent measurements that should be made on the property and individuals needs to be made in order to establish a reliable estimate for the level of funding that should be provided. Alternatives to providing such funding could be to limit redevelopment to industrial uses or to remediate the property so as to remove all residual chemicals that could pose a threat to public health of future users of the site and to the environment. While those alternatives may not be as economically profitable for SP, or as politically desirable for the City, not electing such approaches and creating situations which place the public who reside at or use the property at greater health risk creates the need for much greater monitoring and oversight at the site.

SPECIFIC COMMENTS

Draft EIR Executive Summary

On page 1-1, it is stated,

"This EIR is considered a 'Program' EIR. A Program EIR is one which evaluates a series of actions that will take place in the future, which are tied together geographically, logically, or programmatically. As such the focus of analysis in this EIR is on the impacts of the entire development program anticipated under the Alternatives. The site-specific impacts of individual projects, such as single office buildings that will be constructed as part of the implementation of the Alternatives, are not addressed in this EIR. Impacts associated with specific projects not considered here will require additional environmental evaluation. The benefit of a Program EIR to the lead agency is that it allows for a comprehensive consideration of the effects of a development program as well as for the provision of programwide mitigation measures. The benefit of a Program EIR to future developers is that it limits the amount of additional analysis for individual developing projects."

That quoted statement of what is accomplished and advantages of this "Program EIR" is misleading in several respects. First, clearly the results of the EIR's and additional environmental evaluation of specific projects can have substantial impacts on and implications for the overall concept and viability of this redevelopment project. In the view of the authors, that quoted statement leaves the impression that adoption of the Program EIR sufficiently addresses the hazardous materials issues on the entire parcel of property to be redeveloped to enable the specific uses and their juxtaposition and arrangement as outlined in the recommended Alternative. This cannot be assumed to be the case. For example, the inability to place residential units or other public-use facilities on the property owing to prohibitively expensive remediation to provide adequate public health protection, would dramatically alter the entire project.

Second, the quoted statement notes that the Program EIR is done today for future actions. As discussed in this report, it is clear that the regulations and restrictions applicable today will be

made more stringent in the foreseeable future. The draft EIR does not adequately address changes in regulations that have been developed and are being developed today that will undoubtedly influence the nature and extent of soil and groundwater remediation that will take place in the future; current regulations are not necessarily, and in some instances are not, reliable gauges for anticipating the nature and type of remediation that will be required to provide appropriate protection of the public health of those who live in or otherwise use the redeveloped area. The failure to discuss in the draft EIR aspects that can be readily anticipated to affect the hazardous materials identification, remediation, and impact issues is a serious deficiency of the draft EIR that should cause it to be rejected.

Third, owing to the future changes in requirements and existing inadequacies in the definition of the contamination at the site, the conduct of a Program EIR cannot be presumed to significantly limit the environmental and public health evaluation that will have to be conducted by future developers. To indicate, as the draft EIR did, that adoption of a Program EIR will significantly limit future hazardous chemical "analysis" that will be required of developers and property owners, can be highly misleading. Such a statement is another "pro-project" statement that does not reflect the issues that should have been discussed in the draft EIR.

The quoted statement clouds the issue of what needs to be accomplished by this EIR. By defining its role in such gross generalities it appears to excuse itself from addressing real, necessarily specific issues of importance to the ability of the remediation and planning to protect the health and welfare of the public that uses or lives in the project. This is particularly disturbing in light of the acknowledgement in the evaluation of the hazardous materials issues with each of the seven "Alternatives" representing what are stated to be unmitigable health risks. It does not appear to the authors that it is appropriate to allow the specific public health protection concerns to be passed off to "future" "additional environmental evaluation." It appears to the authors that the "Program EIR" serves the purpose of defining and limiting the responsibilities of SP for remediation of the site. This is the time at which the decision-makers and the public need to exercise considerable control over the future direction of the SP project redevelopment.

The third full paragraph of page 1-23 presents a discussion of hazardous materials at the SP site and Richards Boulevard Area with respect to potential exposure of future workers or residents to toxic contaminants. It states *in toto*,

*"The known and suspected presence of **hazardous materials** in the Railyards and Richards Areas presents the potential for exposure of future workers or residents to toxic contaminants. Information exists to confirm the presence of contamination within the Railyards Area; much less is known about the Richards Area but numerous localized contaminants are suspected. Although these impacts are considered significant for all of the Alternatives, the Alternatives that contain substantial residential development, particularly in the Richards Area, could be considered to present the greatest potential for long-term exposure effects. A program for mitigation of these impacts is presented that involves careful*

investigation and testing of soils and groundwater, intricate ties between the remediation and development approval processes, and long-term oversight and monitoring of land use activities in the Planning Area."

The draft EIR presentation could cause someone not familiar with the real potential significance of the residual chemicals that will be present after the site has been "remediated" to conclude that it would be a simple and straightforward matter to provide "mitigation" of the potentially impacts of the residual chemicals on future users of the properties for as long as these contaminants represent a threat. For many, if not most, of the contaminants, the threat will remain forever. A decision-maker or member of the public may well conclude from the draft EIR statement quoted that while there could be significant impacts associated with the toxics at the redevelopment site, the draft EIR presents an approach by which those impacts for any of the Alternatives would be "mitigated" or alleviated. However, examination of Table 1-2 in the Executive Summary, item 4.13-15, shows that the "mitigation measures" proposed are recognized to not alter the EIR's categorization of the risks of exposed persons as "significant and unavoidable."

Such discrepancy is indicative of the manner in which the toxics issue has been handled throughout the draft EIR. Broad statements were made in the draft EIR that indicate that the toxics issues can be addressed for the protection of public health and yet the fine-print of the document reveals that such protection is not ensured or is left to future undefined action. The draft EIR does not present information that the City Council, the public, and other decision-makers need to evaluate plausible situations that could readily occur at the SP site that could significantly impact the ability to use that site as proposed in the plans.

A properly developed review of hazardous materials issues in the draft EIR executive summary for the SP site would include the following points (with corresponding discussion in the text):

- The SP site is highly contaminated by a variety of potentially hazardous chemicals.
- The DTSC will require that SP remediate the site in accord with SP's designation of proposed uses of the property (e.g., industrial, commercial, residential) to current DTSC remediation standards. By SP's choice to minimize cost, SP's current approach of "remediation" will involve leaving large amounts of potentially highly hazardous chemicals at the site that will be a threat future uses of the properties forever.
- The current degree of understanding of the types, concentrations, and distribution/location, of potentially hazardous chemicals at the SP site is not adequate to allow adoption of a plan for redevelopment at the site in a specific and meaningful manner.
- Future changes in remediation standards and evaluation approaches will almost certainly cause additional remediation at locations that have already been and will already have been "remediated" according to "current" standards.

- Future owners of the redeveloped properties could become "responsible parties" to cover the costs of additional evaluation and remediation, for as long as potentially hazardous chemicals remain on the property.
- There is no significant history/experience of redeveloping highly contaminated, industrial properties (such as the SP site) for intense public use as proposed. Traditional superfund site investigation and remediation approaches were not developed with the intent of making the remediated property suitable for residential development or intense public interaction. There is, therefore, a wide variety of unresolved issues that will need to be addressed that could influence the future use of the SP site for public contact as proposed in the plans.
- It is possible that lenders and/or developers will have limited interest in redeveloping the property because of the residual potentially hazardous chemicals that will be left at the site by SP's choice.
- No plan should be adopted for redevelopment of the Southern Pacific site or the Richards Boulevard Area until the sites have been investigated and remediated to the degree that current property owners will undertake. Once that has been accomplished, the issues of residual potentially hazardous chemicals can be better addressed in terms of how the site and area can be redeveloped considering the constraints imposed by those chemicals.

Page 1-34 presents a summary of hydrology and water quality issues for the redevelopment project. It does not address the issues of groundwater quality that are discussed in other sections of this report.

Page 1-35 presents the executive summary of hazardous materials. While the executive summary identifies that there is significant contamination of many areas of the SP site and potential contamination of the Richards Boulevard Area, it presents a misleading impression of the ability to manage the contamination so that it does not represent a significant threat to future users of the redeveloped property. As discussed in this report, there is a variety of issues concerning the residual potentially hazardous chemicals that would be left at the site. While the draft EIR implies that "mitigation" of those concerns is a matter of fact, those knowledgeable in this area know that it is not a simple matter to manage such residues especially in the arena of changing standards and evaluation approaches by which adequate contaminant control is judged.

On page 1-35, in the second paragraph it was stated,

"To date, only the Grit Blast Pile site and the Battery Shop have received final certification of closure from the State Department of Toxic Substances Control."

At the time that the authors did their review of the SP site, the Battery Shop area had just

received approval by DHS for closure indicating that DHS considered SP's proposed plan for remediation of that area of the site to be appropriate. The authors have discussed in detail in their reports and papers the inappropriateness of the DHS decision of approving this degree of remediation of this area when taken in the context of the fact that large amounts of lead were being left at the site under a one to two-foot thick veneer of low-lead soil.

While DTSC imposed a deed-use restriction on the Battery Shop area that requires that all future users of that property must obtain DTSC permission before any excavation or other activities could take place on the site that could bring to the surface the high lead in the soil that is below the top soil veneer, the deed restrictions have to be administered by the City. Therefore, the City assumes liability for the proper administration of activities at the site that could take place at anytime in the future, i.e., forever, that could cause the elevated lead to be exposed at the surface where children could be in contact with it. It should be noted that the Battery Shop area is near a proposed residential area and that the proposed plans for redevelopment of the site both two years ago and now do not call for any isolation, e.g., fencing, that could keep children from being exposed to potentially hazardous concentrations of lead that are being left at the site by SP in order to save funds in site remediation. These issues were discussed in detail in the authors' report, copies of which were made available to EIP representatives. It is highly inappropriate for the draft EIR to imply that there would be no potential problems with the "closed" Battery Shop area. The draft EIR is deficient in its not discussing the potential problems of this area.

On page 1-36 it was stated,

"Long-term exposure to hazardous materials, if any remain in the Railyards Area, would be mitigated by the following measures..." (emphasis added)

The quoted statement is grossly misleading. **There is no question that hazardous materials will be left at the site after SP's remediation.** This is even recognized in the "summary of impacts and mitigation" tables presented in Table 1-2 of the Executive Summary. There is no evidence provided in the plans or the draft EIR to suggest that SP is now committed to removing all chemical contaminants to achieve a "pristine" character at the site. "Remediation" of a site to meet a regulatory requirement that allows substantial amounts of potentially hazardous chemicals to be left at a site proposed for public and residential use redevelopment is in no way equivalent to returning the property to a pristine condition. Further, as discussed elsewhere in this report, there is substantial reason to believe that currently applicable clean-up standards for residential areas will be determined in the future to be inadequate for the protection of public health. To state, as was done in the draft EIR, that there may not be any hazardous materials left at the site, given the nature of the toxics evaluation and proposed remediation approach, shows a pro-development bias in the development of the draft EIR.

Indeed, the conclusion of the description of the "impacts and mitigation" provided in the draft EIR was,

"Cumulative development in the region, including development of the Planning Area,

would increase the number of people exposed to risks associated with hazardous materials."

and that that impact was,

"Significant and Unavoidable" and could not be mitigated.

Thus it was the conclusion of the draft EIR that the safety, health and welfare of those individuals coming in contact with the development after SP's "remediation" cannot be ensured owing to the residual toxic chemicals anticipated to be left at the site in order to minimize SP's costs.

On page 1-39 is a summary of stormwater and drainage issues considered in the draft EIR. Not addressed were issues of stormwater quality and their implications for the development at the site. As discussed previously, stormwater-associated contaminants from the SP site have to be managed separately from the stormwater management activities for the rest of the City. The costs of managing stormwater-associated contaminants from the site could be significant to property owners, and could discourage potential developers and owners from acquiring redeveloped properties in favor of other locations.

Section 4.13 Hazardous Materials

Significance of Hazardous Chemical Residues Left after SP Remediation

The first sentence of the introduction to this section of the draft EIR on page 4.13-1 stated,

"This section addresses the anticipated effects of known or suspected hazardous materials contamination on redevelopment of the Planning Area."

In the third paragraph on that page, it is stated,

*"In order to evaluate these issues, this chapter summarizes the existing conditions in the Planning Area (Setting Section), evaluates impacts associated with redevelopment, and proposes mitigation measures. ... In addition to soils contamination, issues posed by groundwater contamination and remediation are **fully addressed.**"* (emphasis added)

Such introductory statements could lead decision-makers to believe that the ensuing discussion represents a comprehensive, in-depth review of these topic areas. This section of the draft EIR, however, does not provide a reliable and adequate basis upon which to judge the potential impacts of the residual potentially hazardous chemicals that will be left at the site after SP's

"remediation" on the redevelopment of the planning area. As discussed in this report, the draft EIR clearly does not "fully address" groundwater contamination and remediation.

Figures 4.13-6 through 4.13-11 are purported to present diagrams of principal areas of contamination for various chemicals. It is important to understand how those presentations can mislead a reader to believe that contamination by those chemicals is restricted to those areas noted. The concentration limits used to develop the figures determine the extent of contamination revealed. For a number of chemicals of concern at the site, had the figures been developed to show potentially hazardous levels of the chemicals, significantly different degrees of contamination would have been revealed. The specific misleading nature of Figure 4.13-9 (areas of groundwater contamination) is discussed elsewhere in this report.

As an example of the distorted perception that can be provided from this method of presentation is given in Figure 4.13-10 that purports to identify principal areas of groundwater contamination by a group of chemicals that are labeled "volatile organic compounds" (VOC's). For this figure "contamination" was defined as concentrations of VOC's of 0.1 mg/L (and greater). However, that cut-off level for the presentation is well-above concentrations that are of concern. Vinyl chloride, a known human carcinogen, is one of the chemicals included in the group VOC's, and the most significant component in relation to the SP site groundwater contamination plume. The drinking water standard for vinyl chloride is 0.0005 mg/L (0.5 :g/L); the "definition" of VOC "contamination" portrayed in the figure is 200-times higher than levels of vinyl chloride known to be of concern. If the specific chemicals that comprise the group of "VOC's" had been shown in this figure, a significantly wider plume could have been indicated than that shown.

The first paragraph on page 4.13-31 stated,

"Nickel and arsenic concentrations in excess of drinking water standards have been detected in four wells."

As discussed in this report, the quoted statement is based on currently used analytical detection limits, current US EPA drinking water standards, and the extent to which the groundwater contamination issue has been defined thus far. To fail to mention approaching changes in the drinking water standards and new information being developed is a serious deficiency in the draft EIR that causes it to not provide the full information and implications to the decision-makers and the public that should be known by those doing EIR's. Further study as well as consideration of the newly proposed US EPA drinking water standards and those that will likely be adopted for arsenic will significantly change this picture. The existing groundwater data, viewed in light of approaching changes in drinking water standards, show nickel, arsenic, lead and other contaminants to be substantially more prominent contaminants than indicated by the statement in the draft EIR. Issues of this type should have been addressed in the draft EIR; instead the draft EIR made statements to limit the perception of the nature, degree, and potential significance of the contamination.

Remediation of Groundwaters

On page 4.13-36, the statement was made in the second paragraph, under the heading "site status,"

"Groundwaters may be remediated by pumping the contaminated water to the surface and treating it."

Those familiar with the remediation of contaminated groundwater know that groundwater remediation for the variety of chemical contaminants currently present is not a simple task as is suggested by the quoted statement; there are significant questions as to whether once contaminated, groundwaters can ever be fully remediated. Further, since the contamination is known to extend well-beneath the already developed downtown Sacramento area, there can readily be difficulties with the placement and operation of extraction wells and transport of groundwater to a treatment facility. These issues should have been addressed in the draft EIR.

"Remediations" Already Accomplished

On page 4.13-36, in the section on "site status" of the Former Battery Shop area, it was stated with regard to that area,

"Soils were remediated to a lead level of 950 mg/kg."

A properly developed EIR would have discussed the implications of that remediation approach on the redevelopment plans. Such implications were discussed in detail in the authors' report to the City in the fall of 1990 and in subsequent papers published since that time. Note should have been made in the draft EIR that it is considered hazardous for children to be exposed to soils containing 950 mg/kg lead.

The "site status" for the Sacramento Station area (40 acres in the southern portion of the site) was discussed on page 4.13-37 of the draft EIR. The fact that that area was "cleaned up" to achieve 950 mg/kg lead in the soil means that part of this property contains levels of lead known or believed to be hazardous to children. It is important to recall that the 950 mg/kg clean-up level was established because it is just under the level that would result in the classification of the soil, by one of the classification approaches, as a "hazardous waste."

As discussed elsewhere in this report, another of the approaches for classification of soils as "hazardous waste" is tied closely with the drinking water standards. As the drinking water standard for lead is decreased, as it is being, it would be expected that the "hazardous waste" designations for lead in soil could also be lowered. Thus, it could be anticipated that soils currently containing 950 mg/kg lead may in the future have to be remediated as a "hazardous waste." While a 950 mg/kg "remediation" for lead in soil is currently accepted by the DTSC, a

proper EIR would have pointed out plausibly anticipated changes in regulations that could affect the project's viability and redevelopment. It is insufficient to focus only on the existing regulations when they are in the process of change and much of the project's redevelopment activities will not be undertaken for many years into the future.

With regard to Table 4.13-6 on page 4.13-39, it should be understood that the TTLC limits and the STLC limits for a number of the chemicals listed are likely to be decreased. The DTSC currently has under review the drinking water standard for arsenic that can affect the STLC value for arsenic. Similarly, the STLC value of 5 mg/L for lead will almost certainly decrease as a result of adoption of the new drinking water standard for lead, which could influence the STLC value. Thus, while the statement was made on page 4.13-40 that lead exceeded the TTLC in about 6% of the soil samples, that percentage could significantly change if the new values are adopted. Similar changes may occur for other contaminants as part of the development of new drinking water standards that the US EPA is proposing to adopt.

*Department of Planning and Development
Reconnaissance Study*

The first paragraph on page 4.13-45 the draft EIR stated,

"In 1991, at the City's request, a reconnaissance study was conducted to investigate these other areas. Samples were collected on a 100-foot grid over a 92-acre area. Soil samples were collected from one- and four-foot depths and were analyzed for lead."

It is unclear why such a limited "reconnaissance" study was developed by the City Department of Planning and Development. It appears that that study was undertaken by the Department to enhance the information base upon which it could recommend the redevelopment plan to the City Council; if the information existing at that time were sufficient, there would have been no need for the additional work. In recognition of the technical deficiencies in the then existing information, that "reconnaissance study" should have included the measurement of a far-greater number of potentially hazardous chemicals. Further, certainly more depths should have been sampled, and a more comprehensive grid covering the entire property (rather than less than half of it) should have been intensively sampled. As it stands now the City Council and Redevelopment Agency are being asked by the Department to approve a plan and a draft EIR for the plan that is based on grossly inadequate information on the toxic chemicals present at the site that will likely ultimately control the future ability to redevelop the property as proposed.

During the time the authors were active in the third-party review on behalf of the City, the authors concluded that the sampling grid SP had proposed, of 400-ft intervals, was grossly inadequate to properly characterize the potential contamination and hazards of the area. There is still need to do a proper characterization of contamination of the soils at the SP site. A 100-ft

grid is not necessarily adequate for a site as complex as the SP site in its historical use. Repeatedly through the draft EIR, mention was made that this area, some 50 or so years ago, was used for some activity that certainly could cause the area to become highly contaminated. The draft EIR should have pointed out the serious deficiencies that exist today in the assumption that a 100-ft grid is adequate, and leaving any surprises for future developers to discover and address, and that the only heavy metal that need be analyzed in the soils on that grid is lead.

Another of the disturbing aspects of the "reconnaissance" sampling program is that the 100-ft grid was placed atop the 400-ft grid previously sampled; points in the 100-ft grid that had been sampled previously in the 400-ft grid sampling were not re-sampled. This was a serious error since re-sampling of those locations could have provided an indication, still lacking, of how well the site has been characterized in the soil sampling program. As far as can be seen, there has been no significant repeated sampling at any one location that has been presented in a manner to enable reviewers to determine how well a sample taken from one location at one time represents the conditions at that location. Given the nature of soil and its sampling, repeated sampling at one location could yield substantially different results. Those who are familiar with conducting studies of this type know that soils on highly industrialized properties with long histories of varied uses such as the SP site, can be highly variable in their composition, especially for a contaminant like lead.

The contours shown for lead in the soils in Figure 4.13-4, indicate that there are areas in which lead is less than 174 mg/kg; the draft EIR's presentation of that conclusion was based on a sampling program inadequate to properly characterize the presence of lead at that site. It is highly likely that additional sampling at the site would show that significantly greater areas contained lead concentrations in excess of 174 mg/kg than shown in the figure. About all that can be said now from the data available is that they identify areas where lead is known to have been above or below 174 mg/kg at the time of sampling. It is inappropriate to make projections that the lead is below 174 mg/kg in areas between 100-ft sample grids, especially when that assessment serves as a basis for assessing public health significance of lead-contaminated soil. That figure showing "lead distribution" in the soil at the SP site does not properly represent the potential hazards of lead at the site. The areas that have excessive amounts of lead could be far-greater than those shown if an appropriate sampling program had been conducted. What the figure shows in light of the sampling program used is that essentially the whole property is contaminated with excessive lead rendering it unsafe for children's contact based on current DTSC standards. Even greater areas of the site than shown in the figure would be considered unsuitable for obtaining financing through FannieMae which has guidelines, as discussed elsewhere, of 100 mg/kg lead in soil on properties. Further, as discussed in this report, recently developed information as well as new approaches for evaluating the significance of soil-lead to children could readily result in the substantial reduction of the 174 mg/kg value.

It is also not clear how many other chemicals are present in the soils above those considered safe for human contact. This issue should have been addressed in the draft EIR since it could have a significant impact on the ability to implement the proposed plan.

Disposition of Contaminated Soils

On page 4.13-45, the "site status" section stated,

"Soil contaminated with lead could possibly be placed in contained areas without treatment and capped fixed in place, or excavated and removed to a Class I landfill, or recycled."

That quoted statement suggests in-place fixing and capping of lead-contaminated soils as though it were accepted that that approach can be reliably used to manage soils contaminated with lead. The only accurate part of that quoted statement is that if the contaminated soils are removed from the site, the lead would no longer represent a threat to future uses or users of the property. There are several aspects of that quoted statement that should have been more properly addressed in the draft EIR.

First, the placement of lead-contaminated soil in a Class I landfill (hazardous waste landfill) is not inexpensive and does not ensure that it will not threaten public health or the environment. This has important implications for whomever acquires property at the SP site for which additional "remediation" is needed at any time in the future beyond that accomplished by SP. There is increasing recognition that the methods being used for landfilling of hazardous wastes today do not necessarily ensure that those landfills will not require remediation at some time in the future. Chemicals such as lead placed in a hazardous waste landfill will be a threat to environmental pollution forever; they do not disappear. The methods for managing hazardous chemicals such as lead do not ensure that they will not be mobile in sufficient amounts at a hazardous waste landfill to cause groundwater pollution at some time in the future. It is recognized that the procedures being used today for landfilling of hazardous wastes do not necessarily provide adequate funds to properly monitor and maintain a hazardous waste landfill for the time that it will represent a threat, i.e., forever. This also applies to municipal landfills of the type being developed today, and indicates that future owners of the SP site may have liability associated with the removal of contaminated soil to municipal or hazardous waste landfills. Therefore those who "remediate" contaminated soils by transport to municipal or hazardous waste landfills could ultimately become responsible parties to pay for clean-up of the landfill area associated with future problems that develop there.

The US Congress General Accounting Office (GAO, 1990) released a report entitled *"Hazardous Waste Funding of Postclosure Liabilities Remains Uncertain."* The GAO has determined that the current provisions of RCRA do not necessarily establish reasonable assurance that any entity will provide the funding necessary to conduct landfill post-closure operations to prevent groundwater pollution by landfills. The GAO (1990) stated as one of its conclusions,

"Owners/operators are liable for any postclosure costs that may occur. However, few funding assurances exist for postclosure liabilities. EPA only requires funding

assurances for maintenance and monitoring costs for 30 years after closure and corrective action costs once a problem is identified. No financial assurances exist for potential but unknown corrective actions, off-site damages, or other liabilities that may occur after the established postclosure period."

While the GAO report focused on RCRA hazardous waste landfills, its findings are equally applicable to municipal solid wastes and in many instances industrial "non-hazardous" solid wastes. In fact, the situation for municipal solid wastes is even more uncertain because of the prevalence of the mistaken belief that leakage from municipal (so-called "nonhazardous waste") landfills does not represent a highly significant threat to groundwater quality.

This situation can affect lenders, developers, and purchasers of property at the SP site and other superfund sites since they then can potentially have significant liability associated with owning properties requiring further remediation.

The potential liabilities that may have to be assumed by future owners of properties (provided they can obtain financing) at the SP site, could result in the City's developing a highly attractive plan for redevelopment only to find that no one will invest the funds necessary to implement the plan. These liabilities arise out of the nominal investigation of the potentially hazardous chemicals at the site that SP has elected to conduct and the remediation approach adopted by SP.

The indication in the statement quoted above - that untreated, lead-contaminated soils may be "remediated" by capping - is a significant misrepresentation of what is known today about the ability to do this for areas such as the SP site. The draft EIR shows (Table 4.13-7) that in areas where the concentrations of lead in the soil is known to be more than 950 mg/kg, SP is cleaning up just enough so the soil is not classified as a hazardous waste by the DTSC, i.e., to the 950 mg/kg level established by DTSC for commercial and industrial areas at the SP site. Such capping procedures do not necessarily ensure that the public will not be exposed to excessive concentrations of lead at some time in the future. As discussed by the authors in their reports to the City (Lee and Jones, 1990a,b) and in this report, deed and other use-restrictions are becoming widely recognized and criticized as having potentially significant problems in truly keeping potentially hazardous concentrations of contaminants isolated from the public in perpetuity. Further, as discussed in this report, the 950 mg/kg value could readily be significantly decreased through revisions of the drinking water standards so those areas "remediated" to that level would be considered to contain hazardous waste and require further remediation. In addition, the soils containing 950 mg/kg lead could be a source of lead responsible for continued contamination of the groundwater of the area. While lead in soil is not highly mobile-leachable, the leaching tests that have been used have not considered leaching that would cause groundwater to be non-usable for domestic purposes based on the new standards that the US EPA has proposed.

Even the proposed 5 :g/L standard for lead may be judged to be inadequate protection from lead since, as noted elsewhere, the US EPA and other professionals content that the public's

exposure to lead should be "zero" or as close to zero as possible. The Centers for Disease Control (CDC, 1991) has stated,

"Lead is a poison that affects virtually every system of the body. Results of recent studies have shown that lead's adverse effects on the fetus and child occur at blood lead levels previously thought to be safe; in fact, if there is a threshold for the adverse effects of lead on the young, it may be close to zero."

"Lead poisoning remains the most common and societally devastating environmental disease of young children. Enormous strides have been made in the past 5 to 10 years that have increased our understanding of the damaging, long-term effects of lead on children's intelligence and behavior. Today in the United States, millions of children from all geographic areas and socioeconomic strata have lead levels high enough to cause adverse health effects. Poor, minority children in the inner cities, who are already disadvantaged by inadequate nutrition and other factors, are particularly vulnerable to this disease."

One of the "four essential program components of a strategy to eliminate childhood lead poisoning" cited by the CDC (1991) is,

"Continued reduction of children's exposure to lead in the environment, particularly from water, food, air, soil, and the workplace."

"Deaths and acute, severe illness from lead poisoning are now rare. However, we now know that large numbers of children may suffer adverse health effects at blood lead levels that were once considered safe." (CDC, 1991).

The fixation of lead in the statement quoted above from the draft EIR is another area in which the draft EIR is deficient. A proper reporting on the ability of "fixation" to permanently fix lead so that it does not represent a threat to potential users of property at some time in the future would have indicated that while fixation processes are being considered for significantly reducing the hazards associated with lead in soil, it does not necessarily eliminate them. The authors have been involved in the issues of how to determine when a contaminant has been adequately "fixed" so that it is no longer a hazard. The approaches being used today for such determinations, such as the TTLC and STLC tests, allow contaminants to be leachable from the so-called "fixed" wastes in amounts up to 100-times drinking water standards; "fixed" wastes that leach a contaminant in amounts less than a level arbitrarily established at 100-times the drinking water standard are classified as "non-hazardous." The amount of leaching "allowed" from a "fixed" waste is not related to the potential hazard that it could pose. Further these tests have not yet been adjusted for the new interim Action Level for lead in drinking water and certainly do not consider the proposed drinking water standard for lead which could decrease the allowable leachable lead by a factor of 100.

It is obvious that the tests used to judge fixation are significantly deficient compared to the potential public health threat posed by lead and other contaminants in soils. Again, these are the types of issues that should have been called to the attention of decision-makers and the public in the draft EIR for the SP site. The conventional TTLC and STLC tests were designed to classify wastes as to whether they should be placed in a hazardous waste landfill or in a municipal solid waste landfill. It is not appropriate to use those procedures for characterizing whether the contaminants, specifically lead, in a soil represent a hazard to future users of property containing "fixed" soils. The test approaches have assumptions built into them that have no relevance to readily plausible situations that could occur at a redeveloped SP site. Soils could be judged by these procedures to have been adequately "fixed" while contaminating groundwaters and exposing children and others to excessive concentrations of lead.

The draft EIR should have presented a discussion of these issues from a disinterested, technically valid perspective of the potential problems with conventional approaches for "managing" or "remediating" contaminated soils at superfund sites at which there is not intense public use of the remediated property. Rather, the draft EIR gave the reader the impression that any of these approaches can be carried out to permanently solve the problems with lead-contaminated soils.

Significance of "Certification of Closure"

Page 4.13-45 noted that two areas of the SP site have received final certification of closure by DTSC and that there are other areas at the SP site for which such certification is pending. A properly developed draft EIR would have discussed the fact that the "certification of closure" does not mean that the adequacy of that closure is not subject to review. While DTSC has no formally stated policy requiring the formal re-examination of a superfund site that has received certification of closure for the adequacy of remediation, DTSC policy explicitly states that DTSC will follow the approach prescribed in federal CERCLA requirements. CERCLA has a 5-yr review requirement; the adequacy of remediation of a superfund site is subject to review every 5 years, in perpetuity. These reviews will consider new information developed and can result in requirements for further remediation for the site. While most purchasers of property at SP could be expected to hold the former owner of the site responsible for such clean-up, if the former owner (in this case SP) is not able to provide the necessary funding for future site clean-up, the current owners could become responsible parties to pay for the clean-up.

The authors discussed these issues with the City Department of Planning and Development staff in the summer and fall of 1990. These issues should have been discussed in the draft EIR since they will play a major role in the ability to implement the proposed plans. One could question why anyone would want to acquire property from the SP Company when there is a legacy of hazardous chemicals at the site that could readily require further remediation as part of the periodic review that will take place in the future.

On page 4.13-47, second paragraph, the statement is made,

"The Railyard Area is listed as a state 'superfund' site under the provisions of the state Hazardous Substances Clean-up Fund. Cleanup of the majority of the site is subject only to state law."

That quoted statement is incomplete and misleading. Since the State law includes a section indicating that the State will comply with federal regulations governing site clean-up, the federal regulations can be judged to be applicable to State superfund sites.

Potential Contamination of the Richards Boulevard Area and Potential Significance for Redevelopment

Page 4.13-49 discussed the history of the Richards Area and noted that the Richards area was used for agricultural production; no mention was made of the kinds of crops that were raised there. There is growing recognition that some of the historical uses of pesticides such as lead arsenate, has left what could be highly significant lead and arsenic residues in soils. The senior author recently reviewed this topic in his helping to develop a site assessment manual for the National Ground Water Association. That review revealed that the former use of lead arsenate pesticides has left thousands of mg/kg of lead and arsenic in the soils of some agricultural lands.

Arsenic has also been widely used as a herbicide. This use may account for some of the elevated arsenic levels that are being found at the SP site. To the extent that the Richards Boulevard Area was used for the production of crops and treated with pesticides such as lead arsenate, it could be found that parts of the area are highly contaminated with lead and arsenic. That contamination could be sufficient to preclude reasonable expectations of developing affordable residential housing there; the cost of remediating the soils to levels safe for child exposure could far surpass the willingness or ability of the public to support the remediation of the site so that affordable housing and other residential areas could be constructed in the Area.

The Richards Boulevard Area could also easily be widely contaminated by lead derived from its formerly extensive use as a gasoline additive. The Richards Boulevard Area is bound on three sides by roadways which have received extensive use for many years. Such areas in other communities have been found to have soil-lead residues above 500 mg/kg, and in some cases, above 1,000 mg/kg. This issue has recently been reviewed by the authors (Lee and Jones-Lee, 1992).

It is clear that financial return for affordable housing cannot support even moderate remediation costs; such costs would become a burden on other properties in the development or a general burden on the City taxpayers, the State, and the federal government. With the increasing shift from federal and state support of such projects, ultimately it will be the City taxpayers who will almost certainly have to pay the bills for any remediation to support affordable housing if

the current owners of the property are unable to support it. The current owners of Richard Boulevard Area properties, now being used for industrial and commercial purposes, will almost certainly follow the same approach SP is following, i.e., declaring future uses of the property in the Richards Boulevard Area as industrial and commercial, not residential, thereby affording themselves the opportunity to potentially do less remediation at the site than would be required if the area were developed for residential purposes.

The character of the SP site and Richards Boulevard Area could readily and largely be controlled by issues of the nature and potential impact of potentially hazardous chemical residues at both the locations, and the ability to reliably plan, execute, and fund remediation measures that can, in fact, protect public health and the environment under plausible worst-case exposure scenarios, and meet the requirements of lenders. It is unwise, at best, and is not in the public interest to try to adopt a Master Plan for redevelopment of the SP site and especially the Richards Boulevard Area when these issues have not been adequately evaluated and addressed. In the authors' view, it is totally inappropriate to give any consideration to planning for redevelopment in the Richards Boulevard Area for anything other than present uses until comprehensive studies have been done on the existing contamination of the area. There is a variety of readily plausible sources of contaminants for the Richards Boulevard Area (e.g., automobile exhaust-derived lead, lead arsenate and other materials used on crops, arsenic used as an herbicide, etc.) that could completely control any possible use of the Richards area for residential purposes. This issue should have been discussed in the draft EIR. It represents yet another item on the long list of deficiencies in the draft EIR.

The City Council should not be trapped into believing that a "quickie" survey of the Richards Boulevard Area could be conducted for a few chemicals to achieve sufficient information to begin planning. In order to responsibly and reasonably consider even the possibility of inclusion of residential or public use of an area with a history such as that of the Richards Boulevard Area a reliable characterization needs to be made of the nature and potential impacts of the contaminants that could be present in the area that could influence the future use of this area for any purposes other than the current use of light industrial commercial.

Deed Restrictions

On page 4.13-72, first paragraph, the draft EIR should have pointed out that it is the city of Sacramento that must implement the deed restrictions through its land-use and other regulatory activity responsibilities. This fact causes the City to assume liability for improper implementation of the deed restrictions.

Future Additional Remediation

In the second paragraph on page 4.13-72, it was stated,

"A site that has been remediated may be subject to additional remediation at a future time if any of the following conditions occur: (1) the clean-up standards themselves change; (2) the previous remediation is determined to have been inadequate; or (3) previously unidentified hazardous material contamination is identified."

The draft EIR is significantly deficient in its failing to discuss the reasonable expectation of changes in standards and regulations the near future and implications of such changes for the overall feasibility of the SP Railyard site and Richards Boulevard Area redevelopment plan (such as have been discussed in this report). As discussed in this report, a fundamental flaw of the draft EIR is its inadequate attention to the hazardous materials issues as they relate to the feasibility and implementation of the plan.

Significant and Unavoidable Impacts from Hazardous Chemicals

On page 4.13-82, under "Cumulative Impacts," the statement was made

"Planned development in the region would also increase the number of people living in proximity to such uses who could be exposed to risks associated with hazardous materials handling."

*"Even with waste minimization and the implementation of all applicable federal, state and local regulations, this is considered a **significant and unavoidable impact.**" (emphasis theirs)*

The description of "cumulative impacts" of "hazardous materials" is limited to the anticipated exposure of residents and public users of the region to "hazardous materials" associated with the commercial and industrial activities on the redeveloped property. **Ignored was the entire issue of the exposure of residents and public users of the area to the residual potentially hazardous materials left at the site by SP in the commercial, industrial, and residential areas.**

Mitigation by "Applicable Regulation"

The statement on mitigation measures to address this issue was,

"The City of Sacramento, Sacramento County, and other involved jurisdictions in the region shall coordinate with the EPA, the DTSC, the CVRWQCB [Central Valley Regional Water Quality Control Board], the SMAQMD and other applicable agencies to develop policies to enforce regulations which ensure that risks associated with hazardous materials are reduced to the maximum extent possible, in

compliance with all applicable federal, state, and local regulations."

Such a statement gives an unreliable sense of security about the regulatory provisions for public health and environmental quality protection associated with the SP site. It is inadequate for a properly developed EIR for a superfund site proposed for redevelopment with residential and intense public contact, to, *a priori*, portray compliance with existing regulations as necessarily sufficient to protect environmental quality and the public health. This is especially true for an unconventional public-interaction-intensive redevelopment of a superfund site. Contrary to the indications of the draft EIR, one cannot assume that if the site is being investigated and remediated in accord with current "standards" everything will be fine.

The inadvisability of relying on "current regulations" for protection of public health and the environment is easily demonstrated by consideration of the fact that the need for the current superfund program that will cost the Country several hundred billion dollars, evolved out of industry's management of its wastes largely in accord with the then-"current applicable regulations." "Meeting current regulations" did not prevent harm to public health and the environment/natural resources of the Country, and it did not excuse those who met the applicable regulations or future owners of the properties from the financial responsibility associated with site remediation.

Those familiar with development and implementation of public health and environmental standards and regulations for potentially hazardous chemicals know that often there is many-year lag time between the recognition of the problem and the beginning of effective addressing of the problem by regulatory agencies. Further, there is usually a significant period of time (often many years) between the start of regulatory attention and the effective management of the problem. Further, what might be considered appropriate initial standards for management of a hazardous chemical problem rarely stands as the standard ultimately required. Until effective management is achieved, the public and the environment are vulnerable to significant harm.

The senior author has been involved throughout most of his professional career in developing and implementing standards to protect public health and the environment. In the early 1970's he was an invited reviewer of the National Academies of Science and Engineering's "Blue Book" of water quality criteria. During the 1970's he served as chairman of a US Public Health Service Committee organized to evaluate the need and the ability to develop water quality criteria for PCB's in drinking water.

An example of the lag between technical understanding and effective management is provided by the establishment of MCL's for arsenic in drinking water. Those who have public health backgrounds and work in the area of water supply water quality have long known that arsenic has long been known to be a human carcinogen. The work that is now causing the regulatory agencies to develop water quality standards for arsenic based on its carcinogenic properties was completed many years ago. It is only now that consideration is being given to revising the drinking water MCL to reflect that information; it will be a number of years hence

before control programs to achieve the revised MCL will be in place. Meanwhile, people continue to be exposed to levels of arsenic that are associated with known elevated cancer risk. Similarly, the hazards of lead to children have been known for a number of years. It is only now, however, that the regulatory agencies are beginning to develop new standards to reflect the increased understanding. Meanwhile, the public continues to be exposed to what are now believed to be excessive concentrations of arsenic, lead, and other chemicals.

Another example of how factors other than public health protection from exposure to carcinogens influence the establishment of drinking water standards is provided by the promulgation of drinking water standards for trihalomethanes (THM's), a group of chemicals that are suspected human carcinogens that are widely present in domestic water supplies throughout the country. More than 10 years ago, the US EPA adopted THM standards for drinking water that allowed a projected upperbound cancer risk of one additional cancer in about 10,000 people who consume 2 liters of water over 70 years. Typically regulatory agencies attempt to control chemicals to achieve an upperbound cancer risk of 1 additional cancer in a million people. The primary reason that the US EPA significantly relaxed that degree of cancer protection in the case of THM's was economic; it was judged that spending an extra 10¢ per person per day for drinking water treatment to effect the additional THM removal was excessive. Now, 10 years later, the US EPA is considering revising the THM standard to provide for greater protection.

A similar situation was seen in the development of PCB's standards in fish tissue. PCB's are carcinogens. About 20 years ago, the Food and Drug Administration (FDA) adopted standards for PCB's in edible fish tissue that were based to a considerable extent on economic factors. The US EPA is now in the process of significantly lowering the allowable PCB content of fish tissue in order to provide for greater protection of public health. However, during the past 20 years, people who consumed fish from certain areas have been exposed to what are known to be excessive concentrations of PCB's. These, and many other examples, are not situations in which new information is driving the change in policy. The health implications of those situations have been known for many years. The lag that has occurred between when the health implications first became first recognized and when the governmental agencies began to act on the matter is due to political, perceived economic, and other factors not necessarily related to public health protection.

As another example, it is well-known in the field that while today the "superfund" program focuses a large part of its efforts on TCE clean-up associated with various types of landfilling activities, the pollution of groundwaters by landfills has been well-known and documented since the 1950's. Nevertheless, it took the federal government 20 years to begin to formulate legislation that would begin to implement control programs. The states have not yet begun to effectively address the issue of pollution of groundwaters by landfills. Of all the municipal landfills in the state of California, 83% are known to be polluting groundwaters based on State Water Resources Control Board SWAT results. Yet, very few of those landfills are under orders to clean up the contaminated groundwater. Natural resources are being damaged, and in some instances the public is being unnecessarily exposed to hazardous or deleterious conditions,

because of the slow rate at which the regulatory agencies are able to act on what are known to be significant problems that have been in existence for many years.

It is well-known that today's superfund program at the federal and state levels does not represent the ultimate degree of remediation that will have to be performed at essentially every superfund site. This is why periodic (5-yr) review was built in to the provisions of CERCLA.

The public is routinely exposed to contaminants in the environment while appropriately protective regulations and standards are being developed. However, there is a substantial and significant difference between such exposure as a result of existing conditions and that which results from the deliberate introduction of people into an area where the latest information indicates residual contaminants could cause health impacts. This is especially true when known potentially hazardous chemicals are being left at the site for the economic benefit of the entity that introduced them into the property. The evolving nature of the understanding of impacts of soil-lead on human health and of the development of associated standards should not be used as an excuse to proceed with plans to deliberately introduce children and adults into an area that could have significant adverse health consequences. The issue is not one of "balancing" the interests of SP with public health concerns; protection of public health from potentially hazardous chemical contaminants being deliberately left at a site for the benefit (cost-savings) of the owner, must be the overriding concern and focus. The proposed plans for investigation, evaluation, remediation, and redevelopment call for deliberately introducing large numbers of people, including those in need of affordable housing, into an area in which even the draft EIR admits represents greater risk of exposure to potentially hazardous chemical contaminants. It is not prudent public health practice to presume that that which is not known must be safe or of "acceptable risk." This is of particular concern to those who would occupy the affordable housing; that sector of the population has long borne the brunt of exposure to environmental chemical risks that others do not wish to accept for themselves. In a recent article entitled, "*Environmental Equity: EPA's Position - Protection Should Be Applied Fairly*," US EPA Administrator W. Reilly (1992) stated,

"It [impartiality with regard to protection of health of human beings] is emerging as an issue because studies are showing that certain groups of Americans may disproportionately suffer the burdens of pollution. And it is emerging because across America people of color are forging a constituency to put this issue squarely on the national agenda."

The findings of the US EPA's Environmental Equity Workgroup concluded,

"While there are large gaps in data on actual health effects, it is possible to document differences in observed and potential exposure to some environmental pollutants by socioeconomic factors and race."

One of the Workgroup's recommendations was,

"EPA should establish mechanisms to ensure that environmental equity concerns are incorporated in its long-term planning and operations."

The US EPA has recognized the inequity in public health protection afforded to those of lower socioeconomic standing and is moving to rectify it.

Should the SP site be found to remain highly contaminated with potentially hazardous chemicals after SP's remediation, construction of affordable housing in the area could result in that public's being exposed unnecessarily to hazardous chemicals. Because of the essentially unprecedented nature of the project - taking intensely industrialized and contaminated "superfund site" property (or for that matter the industrialized Richards Boulevard Area), partially removing some contaminants for the cost-savings of the current owner, and encouraging residential and public use of the property - simply meeting the standards does not relieve the City or others from the responsibility of taking extraordinary steps to protect their public health and welfare. It is plausible that the courts could determine at some time in the future that the City's permitting of certain types of activities within the SP site that are subsequently found to have caused the public to be exposed to excessive amounts of contaminants, constitutes negligence on the part of the City. Contributing to that finding could be the City's adoption of a plan for redevelopment of the SP site (and for that matter the Richards Boulevard Area) that did not properly consider and evaluate the potential public health and environmental hazards of the potentially hazardous chemicals that would be left at the site after SP's remediation. Instead of locating the affordable housing in a highly contaminated - albeit "remediated" area, it may be far more appropriate to use the funds derived from the set-aside to construct affordable housing where there is little likelihood that changes in the standards for judging the significance of contaminants to public health and the environment will result in unnecessarily exposure of people to hazardous chemicals.

In the view of the authors, the City's involvement in the planning and management of the redevelopment of the SP property could make the City a significant responsible party in helping to address any public health or environmental harm that could arise from the use of the property as planned and approved by the City even if "applicable standards and regulations" are met. It was for this reason that in 1990 the authors cautioned the City about going ahead with the redevelopment of the SP site as planned and urged that it only proceed if the City fully understood and accepted the potential consequences of adopting the then-proposed plan, and adequate independent oversight provided. The draft EIR on the plan should have been the place where the issues were fully presented, discussed, and evaluated. While the Department of Planning and Development has since aggressively proceeded with the redevelopment largely in accord with that plan, the City Council and Redevelopment Agency should be presented with a comprehensive, reliable review of the hazardous chemical issues before it considers endorsing the Department's proposed plan. The draft EIR does not provide such a review.

The bottom line is that it is not prudent public health protection practice to bring large

numbers of the public into intimate contact with soils and groundwater systems that have been partially cleaned up, such as has been done and is contemplated for the SP site. As discussed in this report, if SP undertook a complete clean-up of the site so that no potentially hazardous chemicals would be left at the site, then the redevelopment of the site might be fairly straightforward in accord with the proposed plan. However, there is little doubt that the future ability to redevelop the SP site as planned is very much in question and carries with it significant liability to the City, to any developer, and to any property owner who purchases property at the SP site. There are parallel concerns for the redevelopment plans for the Richards Boulevard Area.

RAILYARDS SPECIFIC PLAN (RSP) "Hazardous Substances"

Figure 16A on page 148 of the RSP presents the RSP's authors' perception of principal areas of soils contaminated with heavy metals other than lead. Examination of that figure would lead one to believe that there are only a few areas where other heavy metals are present in excessive concentrations. However, such an impression is an artifact of how the figure was constructed. TTLC values which were used as the basis for determination of what is "contamination" are for hazardous waste classification. The fact that soils in an area contain concentrations below the TTLC value does not mean that the area is safe for unrestricted public contact.

Figure 16B for lead has been discussed previously; it was noted that that figure is not based on an adequate database to support the notations of areas contaminated to levels specified, and especially the implication that areas not marked (i.e., are seen as "white" areas) are not contaminated with level of lead sufficient to adversely affect children and even others exposed to them. It is more likely that considerably greater areas of the SP site contain soil-lead at a level considered potentially hazardous to children and at least are above the FannieMae standard for lead in soil. Many of the statements made in the RSP with regard to the hazardous materials at the SP site are similar to those made in the draft EIR. The authors are not commenting on each of the inappropriate statements made in the RSP, but refer the reader to their previous comments on the draft EIR since the same problems occur in both.

Page 163 presents a summary of the tentative remediation schedule for various areas of the SP site. According to that schedule, it will be 1999 before all parts of the site will be "cleaned-up" to the standards that exist at the time the clean-up is approved. As stated on page 163, it is acknowledged that large areas of the site remain largely unexplored. It is certainly too early to start adopting any redevelopment plan that would lock in the redevelopment to a certain program based on the knowledge that exists on the site today.

On page 166, second paragraph of the left column, mention is made that DTSC may be moving toward a single soil-lead remediation level that would be above the 174 mg/kg value

currently required by DTSC. In the opinion of the authors based on the regulatory climate that exists today for lead, there is little likelihood that the lead clean-up standard for residential areas would be raised above 174 mg/kg. In fact, it is more likely that the current 174 mg/kg level could be judged to be too high for the protection of children's health. Further, even if the state standard were raised, it may be irrelevant if the controlling factor is the soil-lead level that would be accepted by lenders.

As discussed in this report, the 174 mg/kg soil-lead value is not overly protective. In fact, considering the approach and assumptions used in developing the DTSC value, some children could be adversely impacted by being in contact with soils that are remediated to that level. As discussed in this report and by Lee and Jones-Lee (1992), there are other countries and other states that have soil-lead standards more stringent than 174 mg/kg. With health authorities explicitly stating that the exposure to lead should be as close to zero as possible, there is little likelihood that any health agency would determine that children within its jurisdiction can be exposed to greater concentrations of lead than currently thought. If anything, the trend will be the other way, and properties that have been remediated to achieve the 174 mg/kg level could have to be remediated again when the new more stringent standards are adopted at some time in the future. While SP representatives made similar conjectures about the possible raising of lead remediation levels for residential areas to the authors and the City two years ago, this has not occurred and there is no indication that it will in the future. The authors took issue with that conjecture of the SP representative at that time, and there is mounting indication now that the clean-up level for lead in residential areas will more likely be decreased.

Beginning on page 165 and continuing through the remainder of the section, there is a discussion of objectives and policies that are primarily designed to address the hazardous chemical issues associated with the site after its initial remediation. That section presented an overly optimistic appraisal of what can, in fact, be done in implementing the objectives and associated policies. A properly developed discussion of these topics would have included plausible worst-case scenarios in the event that problems developed either in achieving the objectives or in the policies, so that the decision-makers would be aware of potential consequences of not being able to implement the objectives and policies as described in that document. Those familiar with the topic area covered by the objectives and policies know that there are examples of where similar objectives and policies have been adopted in the past and there have been significant problems with trying to provide public health and environmental protection. Further, it is well-known that governmental agencies, including regulatory agencies, are frequently not adequately staffed or funded to properly implement various regulations and policies for which they are responsible. There is no reason to believe that suddenly the public, at the federal or state level or especially within the city of Sacramento, will decide that it should devote large amounts of money to helping to redevelop the SP site to help save SP funds. Funds devoted to those areas could be taken out of funds that could be used for other purposes of benefit to the people of Sacramento. It is going to be a very long time, if ever, before the redevelopment of the SP site in accord with the current plan represents a significant financial asset for the City. For many years, and possibly forever, it could be a significant drain on the

City budget.

Appendix A presented public health effects of chemicals present on the railyard site. It discusses the potential problems associated with lead and other heavy metals specifically copper, zinc, antimony, and mercury. No mention was made of arsenic in soils, yet arsenic has been found in some soil samples at the site at concentrations above what FannieMae considers to be excessive concentrations for covering loans on multi-family residential property.

RICHARDS BOULEVARD AREA PLAN

The Richards Boulevard Area Plan prepared by the ROMA Design Group has a paucity of reference to the potentially highly significant hazardous chemical issues that may control the redevelopment of the Richards Boulevard Area, especially as they relate to the development of affordable housing in the area. One mention was made on page 40, where it was stated that Objective 9 of the redevelopment plan was,

"Ensure that all new uses within the Richards Boulevard planning area comply with applicable laws regarding hazardous materials remediation, storage, use and handling, and incorporate precautions that protect adjoining uses from unacceptable health and safety risks."

Several "policy statements" followed that expression of that objective.

Further, on page 87, the document contained a section entitled, "Land Use Compatibility Standards." That section began,

"Prior to approving residential development, the following studies must be undertaken:

Hazardous Materials Reconnaissance and Remediation

Due to the history of industrial uses in the area, all sites proposed for residential development must undertake appropriate testing to determine the presence or absence of toxic contaminants. Necessary remediation of soils and/or groundwater should be completed in accordance with requirements of the appropriate federal, state and local agencies."

That was the only information provided. Such is a simplistic, pacifying statement that ignores the real and potentially very significant issues facing the redevelopment of the Richards Boulevard Area for residential use. As discussed in this report there are many unknowns and highly significant constraints that could impair the implementation of the redevelopment plan. Also as discussed in this report, "compliance with applicable laws" cannot be considered to

provide adequate protection of public health. It is clear to the authors that the planning for the redevelopment of the Richards Boulevard Area has largely been done without adequate regard to the potential significance of hazardous chemicals and their impact on the ability to implement the plan. While planners have typically assumed that all hazardous chemical issues can be readily "solved" through meeting applicable regulations and standards, such an approach is unrealistic in light of

- the increasing understanding of the impacts of very low levels of contaminants on public health
- the ever-increasing and high significant costs associated with investigation, evaluation, and "remediation" of chemical contaminants, and
- the increasing involvement of environmental conditions and issues in the lending policies of financial institutions.

Planning without adequate and reliable regard for the influence of the presence of hazardous chemicals is out-dated, can be highly wasteful of public and private funds, and can place public health and environmental quality at considerable risk.

Further, and of particular significance to the Richards Boulevard Area planning, based on the comments made by property owners at the EIR workshop in early August 1992, there will be significant opposition to the proposed plan by current owners of property in the Richards Boulevard Area. This has significant implications for the ability to implement the plan and the City's potential liability in trying to develop affordable housing in that area in accord with the plan.

REVIEW

Page 1-1, paragraph 1 of the EIR stated,

"This Environmental Impact Report (EIR) is an informational document intended to disclose to the decision-makers and the public the environmental consequences of implementation of the Railyards Specific Plan (RSP) and the Richards Boulevard Area Plan (RBAP)."

The authors found, however, that the draft EIR did not properly address the potential hazards that the residual chemicals being left at the site after SP's "remediation" represent to public health and the environment. The draft EIR therefore fails to properly inform decision-makers and the public about the significant potential public health hazards and property value consequences to future owners-users of the SP site property. It further fails to properly inform the City elected officials and administration of the potential of highly significant liabilities associated with the proposed remediation and redevelopment plans as recently presented by ROMA Design Group (ROMA, 1992).

The draft EIR is highly deficient in addressing the issues of the impact of the residual hazardous chemicals on the uses and users of the "remediated" property. Most of the draft EIR was devoted to the impact of the proposed redevelopment project on the City's environmental issues. Issues such as traffic, air quality, etc. were analyzed and discussed in some detail in the draft EIR. Not adequately addressed, however, were issues of the impact of the "environment" (hazardous chemicals) on the feasibility and implementability of the redevelopment plans.

It was also highly inappropriate and very misleading for the draft EIR to inform the decision-makers and the public that the hazardous chemicals that will be left at the site will be "mitigated" by

"...implementation of remediations levels, site and building designs appropriate for proposed land uses, tracking of deed restrictions that limit allowable land uses..."

As discussed in the authors' reports to the City and professional papers, and as is well-known by many professionals familiar with hazardous chemicals and their impacts on public health and the environment, the superfund site evaluation and remediation guidelines that exist at the federal and state levels do not necessarily protect public health and the environment where highly contaminated industrial sites such as the SP site are to be redeveloped for intense commercial and residential purposes.

The California Environmental Quality Act (CEQA) directs the conduct of EIR's for activities in the state of California. Section 15151 of that Act states,

"An EIR should be prepared with a sufficient degree of analysis to provide decision-makers with information which enables them to make a decision which intelligently takes account of environmental consequences."

It goes on to state,

"The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure."

The draft EIR's discussion of the hazardous chemical issues does not represent full disclosure and is significantly deficient in its presentation and discussion of the issues pertinent to the future redevelopment and use of the SP site for industrial, commercial, and residential purposes. It is for these reasons that this draft EIR should be rejected as being significantly deficient in informing individuals of the adequacy of the investigation and remediation relative to the proposed redevelopment plans for the site.

At several locations in the draft EIR, statements were made that SP is "voluntarily" remediating parts of the site that it has designated as industrial/commercial for future uses, to 950 mg Pb/kg - remediation beyond the 3,000 mg/kg required by DTSC for such uses. It should be

noted, however, that the so-called "voluntary" additional remediation is designed allow the lead in the soil of those regions to be just under the 1,000 mg Pb/kg concentration that would cause the soils to be classified as a "hazardous waste." It is obvious that if SP did not remediate the lead to less than 1,000 mg/kg, it would be virtually impossible to sell the property for any purpose since it would contain a DHS-DTSC-designated hazardous waste.

The draft EIR also discusses various alternatives for the redevelopment of the Richards Boulevard area. It mentions that at this time the information on the degree of contamination of that area is limited. It is highly inappropriate to try to discuss environmental impacts of alternative development scenarios for an area when insufficient information is available on the hazardous chemical situation in the area. In the opinion of the authors, it was a significant mistake on the part of the City to mix together in a single EIR the SP site and the Richards Boulevard area. It is not possible at this time to meaningfully address the environmental issues associated with the Richards Boulevard Area because of a lack of information about the constraints on redevelopment of the area that will be imposed by the hazardous chemicals that are undoubtedly present in the area. This area has a high probability of having concentrations of lead in soils that would be considered to be hazardous to children and that would require remediation before the area could be used for residential purposes, yet ROMA has proposed large residential developments in the area. Such a development scenario may not be economically feasible because of the costs of remediation of the properties and the lack of identified funding mechanisms for such remediation. These issues were not addressed in the draft EIR, but should have been.

The authors believe that the failure to properly address these issues and to develop appropriate mitigation procedures could have significant economic consequences for the redevelopment project as proposed by the ROMA Group. It is highly likely and certainly understandable that property developers may be very reluctant to purchase the properties within the site which, while remediated to current DTSC guidelines for a potential specified use, still contain significant concentrations of highly hazardous chemicals that will be associated with that property forever unless removed. As discussed by the authors in reports to the City, there can be little doubt that in time the remediation guidelines will be significantly strengthened to provide for far greater public health and environmental protection than is being provided today. This will almost certainly mean that what now is considered adequate "remediation" will be considered to be inadequate in the future and to require further remediation of the property. It is conceivable that developers and/or lenders who would finance such developments will be very reluctant to acquire and develop "remediated" but not truly cleaned-up properties. The Federal National Mortgage Association ("FannieMae") has established limitation on allowable soil-lead concentrations of 100 mg/kg, substantially below the current DTSC limit of 174 mg/kg. Lenders are justifiably concerned about the high cost of remediating contaminated soils since the costs can be substantial, even exceeding the collateral value of the property. Lenders' perceptions of the potential significance of the potentially hazardous chemicals left at the SP site by SP can influence/control the feasibility of the entire project. With SP's current approach to evaluation and remediation of the property, it may not be possible to use this property for purposes other

than industrial with severely restricted public contact.

The draft EIR presented a number of alternatives for development of the site and professes to examine the environmental consequences of each alternative. From the information provided in the draft EIR, however, it appears that little or no consideration was given to the economic feasibility of developing the alternatives. For example, several of the alternatives involve placing residential housing units in areas that appear to be high in soil-associated contaminants. Because of the difference in the cost of remediation to industrial/commercial standards versus to residential standards, it is appropriate to question whether SP would and even could provide the financial resources to "remediate" those areas to even the current residential standards. A properly conducted EIR should consider alternatives which are potentially economically feasible; otherwise, the listing of alternatives is inflated and unrealistic.

One of the alternatives that should have been listed is for industrial use only, without parks, waterfeatures, etc. Because of the greater ability to fence such an area and keep children out, it could be possible to only remediate the significantly contaminated areas of the SP site and the Richards Boulevard Area to industrial/commercial standards, and not encounter long-term significant hazard to the users of the property and nearby property owners/users. However, as discussed in this report, that may not be possible because of the changes in the definition of levels of lead in soil that cause the soil to be classified as a hazardous waste. It is possible that the 950 mg/kg soil-lead remediation level currently applicable to commercial/industrial properties on the SP site would not be allowed in a few years. Redevelopment alternatives that involve large amounts of residential housing, parks and other public areas may not be feasible because of economic constraints associated with the much higher levels of hazardous chemical remediation required for such uses. In the end it may be that the best and only viable use of these areas is industrial development with highly limited contact by people.

There are significant questions about the appropriateness of the planning process that has taken place for the SP site and now the Richards Boulevard Area. As discussed in the authors' reports to the City, the planning process that had taken place up to two years ago when the authors conducted their review was useful in helping to define potential uses of the property that could be made if it were not for the hazardous chemicals present there. However, the additional planning that has taken place over the past few years and especially any formal adoption of these plans as representing what would and could likely be the future development there is highly premature and will almost certainly be of limited value. Both the SP site and the Richards Boulevard Area need to be more properly characterized with respect to hazardous chemicals than has been done to date. Once the full extent of the hazards are known and the extent to which SP and for that matter the property owners in the Richards Boulevard Area are willing to commit to remediation of their properties are known, it will then be possible to start to meaningfully evaluate various alternatives and their associated environmental impacts for area redevelopment. By that time (at least 5 to 10 years from now) the new remediation standards currently being developed will likely have been implemented. Lenders will have also likely established an approach for lending money for the redevelopment of formerly heavily contaminated areas.

Based on discussions that the senior author has recently had with representatives of major banks concerned with environmental quality issues, it is anticipated that it will be at least 5 years before some lending institutions formulate definitive policy for addressing such issues. As discussed in this report, some lending institutions have already established definitive policy in this regard that has resulted in soil limitations for several contaminants of concern at the SP site (and likely at the Richards Boulevard Area), that are more stringent than those applied to the SP site by DHS-DTSC. The FannieMae guidelines are close to the clean-up objectives proposed for adoption by the state of New Jersey.

While the Richards Boulevard area is not now considered a superfund site, parts of the area will likely have problems similar to those encountered in some areas of the SP site. It will likely be that even if the public health and regulatory agencies do not require remediation of the site, the lending institutions that would be asked to fund redevelopment will almost certainly require site remediation as a condition of lending. Therefore, there may be very significant economic constraints on the future use of the Richards Boulevard Area for anything other than industrial purposes.

REFERENCES

Allison, M., "Lead Poisoning: Not Just for Kids," *Harvard Health Letter* 17(7):6-8 (1992).

APHA *et al.*, Proposed Joint Task Groups for the 19th Edition of *Standard Methods*, AWWA Standard Methods Committee, American Public Health Association, Washington, D.C. (1992).
CDC (Centers for Disease Control), "Preventing Lead Poisoning in Young Children," Statement by the Centers for Disease Control, Atlanta, 5 pp. October (1991).

Davis, M., "Similarities and Inconsistencies in Establishing Cleanup Levels," Michigan State University, East Lansing, MI (undated).

DHS (California Department of Health Services), Memorandum from DHS Toxic Substances Control Program to B. Kilgore, Waste Management Engineer Site Mitigation, Regarding Southern Pacific Sacramento Station, October 18 (1989).

FannieMae (Federal National Mortgage Association), "Environmental Hazards Management Procedures," IN: Delegated Underwriting and Servicing Guide, Book II of the Multifamily Guide, FannieMae, Washington, D.C., September 1 (1991).

Forslund, B., and Henry, E., "Lead - The Due Diligence Issue for the 1990's?" IN: Proc. 1991 Environmental Site Assessments Case Studies and Strategies: The Conference, National Ground Water Association, Dublin, OH, pp. 597-608 (1991).

GAO (US General Accounting Office), "Hazardous Waste Funding of Postclosure Liabilities Remain Uncertain," Report to Congress, GAO/RCED-90-64, GAO, Washington, D.C., June (1990).

GAO (US General Accounting Office), "Toxic Substances: Federal Programs Do Not Fully Address Some Lead Exposure Issues," GAO/RCED-92-186, US General Accounting Office, Office of Public Affairs, Washington, D.C., May 15 (1992).

Lee, G. F., and Jones, R. A., "Review of Southern Pacific Railyard Site Investigation, Remediation, and Redevelopment," Report to City of Sacramento, CA Department of Planning and Development, October (1990a).

Lee, G. F., and Jones, R. A., "Preliminary Assessment of 'Superfund' Remedial Investigation/Feasibility Study Activities Completed and Projected and Adequacy of Remediation Program For Clean-up of Chemical Contamination at SPTC Sacramento Railyard Site," Technical Report to City of Sacramento, CA Department of Planning and Development, October 7 (1990b).

Lee, G. F., and Jones, R. A., "Redevelopment of Remediated Superfund Sites: Problems with Current Approaches in Providing Long-Term Public Health Protection," Proceedings Environmental Engineering 1991 Specialty Conference, ASCE, New York, 505-510, July (1991a).

Lee, G. F., and Jones, R. A., "Evaluation of Adequacy of Site Remediation for Redevelopment: Site Assessment at Remediated-Redeveloped 'Superfund' Sites," Proceedings of 1991 Environmental Site Assessments Case Studies and Strategies: The Conference, Association of Ground Water Scientists and Engineers-NWWA, Dublin, OH, pp. 823-837 (1991b).

Lee, G. F., and Jones, R. A., "Suggested Approach for Assessing Water Quality Impacts of Urban Stormwater Drainage," IN: Symposium Proceedings on Urban Hydrology, American Water Resources Association Symposium, November 1990, AWRA Technical Publications Series TPS-91-4, AWRA, Bethesda, MD, 139-151 (1991c).

Lee, G. F., and Jones, R. A., "Impact of the Current California Drought on Source Water Supply Water Quality," Presented at CA/NV AWWA Fall Conference, Anaheim, CA, October 4 (1991d).

Lee, G. F., and Jones-Lee, A., "Importance of Considering Soil-Lead in Property Site Assessments," Presented at National Ground Water Conference, "Environmental Site Assessments: Case Studies and Strategies," Orlando, FL, August (1992).

NJ DEPE (New Jersey Department of Environmental Protection and Energy), "Draft Soil Clean-up Standards," NJ DEPE, Trenton, NJ, September 1 (1992).

Reilly, W. K., "Environmental Equity: EPA's Position - Protection Should Be Applied Fairly," EPA Journal 18(1):18-22 (1992).

ROMA Design Group, "Draft Documents Summary Railyards Specific Plan Richards Boulevard Area Plan Facility Element," Report by ROMA Design Group and EIP Associates, Prepared for the City of Sacramento and Southern Pacific Transportation Company, June (1992).

SEC (Sacramento Environmental Commission), Sacramento, CA, Minutes of meeting, August 24 (1992).

US EPA, Proceedings of United States Environmental Protection Agency Symposium on Waste Testing and Quality Assurance, Volumes 1 and 2, US EPA, Washington, D.C., July 11-15 (1988).

US EPA, "Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper; Final Rule," Federal Register 56(110):26460-32113, 40 CFR Parts 141 and 142, June 7 (1991).

WCC (Woodward-Clyde Consultants), "Ground Water Quality Monitoring Report for April 1991 Sacramento Yard, Sacramento, California," Report of Woodward-Clyde Consultants, July (1991).

Wong, J., DTSC, Personal Communication to G. Fred Lee, August (1992).