SFUND RECORDS CTR
88205614

SFUND RECORDS CTR
3737-00555

LEVINE·FRICKE
CONSULTING ENGINEERS AND HYDROGEOLOGISTS

RECEIVED
OCT 1 1991
COOPER, WHITE & COOPER

September 26, 1991

LF 1530.06

AR0275

Keith Howard
Cooper, White and Cooper
1333 North California Boulevard, Suite 450
Walnut Creek, California 94596

Subject: Review of Preliminary Health Assessment for United Heckathorn Site, Richmond, California

Dear Keith:

In accordance with your request last week, Levine·Fricke has prepared the enclosed comments on the August 27, 1991 draft Preliminary Health Assessment (PHA) for the United Heckathorn Site prepared by the California Department of Health Services.

Our comments address many technical areas of concern and inaccurate statements appearing in the draft PHA. However, there are two areas where it may be most appropriate for Levin or its counsel to comment directly. These areas include (1) traffic flow and access controls at the Site, particularly with respect to scrap metal sales by the general public, and (2) LRTC's personnel protective requirements and other standard operating procedures (e.g., protocols against eating and drinking on site). As you probably recall, the PHA bases several of its potential exposure pathways, in part, on assumptions related to these two areas.

Please call me or James D. Levine if you have any questions on the enclosed comments.

Sincerely,

Alan L. Leavitt

Alan L. Leavitt
Senior Engineer

cc: Roger Pool, Farella, Braun & Martel
William S. Benak, Levin Enterprises, Inc.

1900 Powell Street, 12th Floor
Emeryville, California 94608
(415) 652-4500
FAX (415) 652-2246

Other offices in Irvine, CA; Sacramento/Roseville, CA; Tallahassee, FL

September 26, 1991 LF 1530.06

COMMENTS ON DRAFT PRELIMINARY HEALTH ASSESSMENT
UNITED HECKATHORN SITE
RICHMOND, CALIFORNIA

GENERAL COMMENTS

The Draft Preliminary Health Assessment for the United Heckathorn Site (the "PHA") appears to be an initial draft document, which contains many errors and a limited understanding of conditions at the United Heckathorn Site ("the Site").

Particular areas of concern include the following:

- The PHA identifies airborne particulate emissions and ground-water seepage to the Lauritzen Canal as apparently significant contaminant transport pathways. However, the available data indicate that these migration routes are not very significant and would not lead to significant chemical exposures.

- The PHA identifies several pathways as being complete, despite the presence of little or no data to confirm that human exposures have occurred or are presently occurring. These pathways include inhalation and ingestion exposure to residential soils.

- The PHA includes preliminary risk calculations for the inhalation of air by off-site receptors, and the ingestion of contaminated fish. Neither of these risk calculations could be reproduced. Additionally, the PHA uses input values that are based on "worst-case" assumptions, which is not consistent with EPA guidance for superfund sites. Consequently, the potential health risks related to the Site are believed to be lower than those calculated in the PHA.

Some of the misunderstandings appearing in the draft PHA may be attributable to the PHA's frequent dependence on secondary sources of information such as Tetra Tech Inc.'s "Revised Community Relations Plan, Levin Richmond Terminal Corporation Site" (December 1988) for background information. In finalizing the PHA, it would be advisable to review primary sources of information, including Levine·Fricke's Remediation Investigation/Feasibility Study (RI/FS) and interim cleanup

reports, and Harding Lawson Associates (HLA) previous reports for the Site. Additionally, it may be advisable for the authors to discuss current site operation activities with Levin Richmond Terminal Corporation (LRTC) representatives. These information sources would aid in more accurately characterizing potential exposure pathways and human health risks attributable to the Site.

Our specific comments are discussed below, following the same organization as the PHA.

BACKGROUND

A. Site Description and History

Page 7, Paragraph 5
This paragraph discusses previous soil excavation and disposal activities related to installation of a train scale at the Site in 1984, and states that pesticide-affected soil was removed to an "unknown destination." The source of this information is attributed to Tetra Tech Inc.'s "Revised Community Relations Plan, LRTC Site" (December 1988), which noted simply that soil had been removed from the Site. The comment that soil was removed to an unknown location is misleading and inaccurate. Details of the above excavation and soil disposal activities, which included the disposal of soil at an approved hazardous waste disposal facility, were documented in HLA's report entitled "Interim Remedial Action Measures, Train Scale Excavation, United Heckathorn Site" (November 1986). This document is included in the PHA's list of references.

Page 8, Paragraph 1
This paragraph discusses other soil excavation work, stating that soil was transferred from the Site to another location near the Parr Canal, and in June 1984, the soil was reportedly moved to a landfill, but no classification of the landfill is known. It should be noted that this subsequent soil disposal was performed under DHS oversight, with the soil being disposed of at an approved hazardous waste land disposal facility. Details of this activity are presented in HLA's report entitled "Site Characterization and Remedial Action for Parr Canal Site" (June 1985). This report, which contains the destination for materials removal from the Site, was approved in a letter from the DHS to LRTC dated October 21, 1985.

Page 9, Paragraph 1
The last sentence of this paragraph states "Over 100 tons of visible chemical residue, contaminated soils, and sediments were excavated from the intertidal area of the embankment of the Lauritzen Canal in November 1990." It should be noted that the quantity of material excavated in November was much greater than 100 tons, and that LRTC and other Potential Responsible Parties (PRPs) have completed significant additional cleanup activities at the Site under EPA oversight.

Over 1,000 tons of contaminated soil and debris were disposed of at an approved hazardous waste landfill during the November 1990 cleanup. During subsequent cleanup work, over 4,000 additional tons of contaminated soil and debris were excavated and contained in an upland portion of the Site beyond the intertidal zone. Following excavation, the shoreline area was reconstructed with a geotextile filter fabric and imported fill to minimize future sediment erosion and to stabilize the embankment. This interim cleanup has substantially reduced the potential for migration of contaminated soils and sediments into the Lauritzen Canal. Details of this work are discussed in Levine•Fricke's reports entitled "Interim Remedial Actions Performed Along the Embankment, United Heckathorn Site" (January 11, 1991), and "Removal of Pesticide-Affected Soils, United Heckathorn Site" (May 31, 1991).

B. Site Visit

Page 9, Paragraph 3
The word "tarp" is misspelled as "trap."

Page 10, Paragraph 1
This paragraph states that "...there were no structures on the embankment, but a rail line ran above the riprap...." It should be noted that most of the Lauritzen Canal embankment is covered by a pile-supported wharf and rail line. These features are very significant structures that limit access to the embankment area and must be considered in the development and selection of any remediation plan for the Site.

Page 10, Paragraph 3
The PHA states that portions of the Site appear to have been graded and that the gravel layer was only visible at the northern end of the Site. This comment and numerous subsequent statements indicate a general misunderstanding of surface conditions at the Site. The northerly portion of the Site, extending several hundred feet south of Cutting Boulevard, is covered predominantly with asphalt. The area of

the former United Heckathorn facility is covered mainly with gravel fill, which, in places, cover the former building foundations. Because LRTC stores bauxite, other bulk materials, and related equipment in this area, the gravel surface is not completely visible. Additionally, residual bauxite and other products have darkened the color of the gravel surface so that its presence may not be readily apparent.

Page 11, Paragraph 2
This paragraph includes a discussion of personal protective equipment worn during the September 13, 1990 inspection of the "hot spot" area of the Site where an emergency response cleanup was anticipated.

The PHA notes a Levine•Fricke representative stated Levine•Fricke staff "always wore protective overalls, shoe coverings, and a hardhat when entering the area." It should be noted the above personal protective equipment was donned during the September 13, 1990 site visit in anticipation of personnel walking along the embankment area in an area where the potential existed for dermal contact with soils containing significantly elevated pesticide concentrations.

We note Levine•Fricke's Site Safety Plan (November 9, 1989), and subsequent addenda to the Site Safety Plan, identify the personal protective equipment Levine•Fricke staff use when performing specified field activities (e.g., soil sampling, excavation work, etc.) at specific areas of the Site. Where there is little or no likelihood of chemical exposure (e.g., when working outside of a specified exclusion zone), Levine•Fricke's personal protective equipment is generally limited to hard hats and safety boots.

The comment "...gravel has been scraped off in this area (former United Heckathorn Building 2 area) and to varying extents northward (former United Heckathorn Building 1 area)..." is not an accurate description. The surface of this area is almost entirely covered with a gravel layer.

Page 12, Paragraph 2
This paragraph discusses Levine•Fricke's proposed procedures to perform an interim cleanup of the embankment area, including DHS questions regarding air monitoring and the potential release of contaminated sediment to the Lauritzen Canal. It should be noted that work plans for the proposed

interim cleanup were submitted to and approved by both DHS and EPA before site cleanup, that these documents included provisions that addressed the involved agencies' concerns, and that the proposed interim cleanup was effectively completed under EPA's oversight.

Page 12, Paragraph 3
The PHA describes two unrealistic hypothetical exposure scenarios, given existing conditions, which limit access to the Site. First, the PHA states there is a public access road leading to the Lauritzen Canal along the east side of the Site, and persons could go fishing there and "not be bothered." This description is not consistent with actual site conditions because the east side of the Site is bounded by 4th Street, which does not provide access to the Lauritzen Canal.

Additionally, the PHA states "...the west side of the Site was accessible through an open fence to the adjoining site and children could climb over a break in the United Heckathorn fence to gain access to the site." Levine·Fricke staff have not observed any breaks in the fence during previous field work at the Site. Moreover, even if someone were to approach the Lauritzen Canal by driving or walking across the Site, there would be very poor access for fishing, given the relatively steep and narrow embankment, the presence of the pile-supported wharf, and the likelihood that LRTC personnel would not allow trespassers to remain on site.

C. Demographics, Land Use, and Natural Resource Use

Page 13, Paragraph 1
The report states a residential area is located approximately 300 yards north of the Site. This distance is not consistent with the statement on Page 3 indicating the residential area is located approximately 700 yards from the Site.

Page 15, Paragraph 1
The words "agencies" and "expressed" are misspelled.

COMMUNITY HEALTH CONCERNS

Page 15, Paragraph 3
The statement that gravel, which was put on the Site to contain dust, has "mostly disappeared," appears to reflect a general misunderstanding of site conditions. As noted previously, most of the area near the former United Heckathorn facility remains covered with a layer of gravel fill.

However, the presence of bulk material and the generally dark color of the gravel fill may make the surface conditions in this area less obvious.

Page 15, Paragraph 4
The discussion regarding the City of Richmond's future development plans for the surrounding area does not appear relevant to community health concerns.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

A. On-Site Contamination

Air

Page 16, Paragraph 1

This section of the PHA discusses air monitoring, which Ecology and Environment (E&E) performed for EPA in 1988. As a general comment, it should be noted that air monitoring was also performed by HLA for LRTC in 1983 and 1984, as reported in HLA's "Revised Draft Site Characterization and Remedial Action Plan, Former United Heckathorn Site" (November 6, 1986). HLA's air monitoring is particularly relevant because it included sampling for heavy metals and chlorinated pesticides, whereas E&E's sampling was limited to only chlorinated pesticides.

The PHA states E&E's monitoring was performed between July 18 through July 26, 1989, and July 27 through August 8, noting that the Site was unoccupied on both occasions. The year 1989 should be changed to 1988. The statement that the Site was unoccupied during the testing periods is not consistent with E&E's field photography log sheets, which include photographs with such captions as "railroad workers at Station 3 location"; "large ship docked in Lauritzen Canal upwind from sampler"; "water truck spraying down dust on roadway"; and "railroad activity."

The PHA reports airborne DDT concentrations were relatively high near the former United Heckathorn building where subsurface soil contained high DDT concentrations. In this area, the average total DDT concentration was reported to be 143.9 nanograms per cubic meter of air. Concentrations elsewhere at the Site and at downwind locations generally were much lower, on the order of a few nanograms per cubic meter or less. Because the highest sampling results were approximately ten thousand times lower than the permissible exposure limit

established for DDT by the federal Occupational Safety and Health Administration, it should be noted that E&E's air sampling data did not indicate a significant potential health risk to persons working at the Site or to downwind receptors. This conclusion is further supported by the risk calculations included in Appendix A of the PHA and by medical monitoring, which LRTC conducted at the Site in 1983. DHS's risk calculations indicated potential excess cancer risks of less than one in one million for downwind receptors. Additionally, in 1983, LRTC conducted a medical monitoring program of facility employees and on-site subcontract employees who could have been exposed to DDT at the Site. This monitoring program was described in HLA's Revised Draft Site Characterization and Remedial Action Plan (1986). Based on laboratory analysis results, none of the site workers were reported to have blood serum DDT levels greater than those expected to occur in the general population. This previous medical monitoring data, E&E's air sampling data, and the PHA's risk calculations all support the PHA's statement on Page 38 that "the airborne concentrations measured at that time are at exposure levels considered safe."

The PHA states that E&E's samples are reported to be "biased low," because they were collected using a high volume sampler, which tends to strip contaminants from particulates. No evidence is provided to support this claim. However, details in E&E's "CERCLA Expanded Site Inspection Report, United Heckathorn Site" (February 15, 1989) provided information to indicate there was essentially no DDT breakthrough from the high volume air samplers. For example, E&E's report (Page 4-7) notes total air volumes were selected to reduce the possibility of contaminant breakthrough of the sampling media, and sample collection efficiency was monitored by a breakthrough analyses of the sample collection train (Page 4-16). E&E reported the collection efficiency was greater than 99.4 percent for all samples. Thus, the PHA's criticism that these samples were biased low does not appear warranted.

<u>Page 17</u>
The monitoring dates listed in Footnote a of Table 1 should be changed from 1989 to 1988 to identify the correct sampling periods.

Footnote c of Table 1 states Total DDT represents the sum of DDT + DDD + o,p'DDT. This note should be corrected to state that Total DDT equals the sum of 4,4'DDT + 4,4'DDD + 4,4' DDE.

Upland Soil

Page 18
The dates in Table 2 should also be changed from 1989 to 1988, to reflect the actual sampling year.

The explanatory note for Table 3 should state the second number used in Levine•Fricke's sample ID represents sampling depth in feet, not inches. Also, for clarity, it would be helpful to use an example sample ID number and include the example in the data table.

Page 21, Paragraph 2
The sentence "A hazardous waste must be taken to a Hazardous Waste Disposal Site which has a liner to prevent migration of contaminants from the Site" is misleading. Existing state and federal laws and regulations are vastly more complicated than the above statement suggests. For example, the Superfund Amendments and Reauthorization of 1986, the National Contingency Plan, and EPA's RI/FS guidance documents indicate treatment, containment, and disposal options generally should be evaluated for remediation of hazardous wastes at superfund sites.

The discussion of the relationship between total and soluble metals concentrations in upland soils appears to be overly conservative. The PHA's assumption that the total amount of metals in upland soil is potentially mobile represents a worst-case analysis, which is not supported by chemical fate and transport data. Mobility would be limited by such factors as pH, redox potential, organic content in soil, and ground-water infiltration and flow rates. Notwithstanding these factors, it would not be appropriate to directly compare Soluble Threshold Limit Concentrations (units of mg/L) to total metal concentrations (units of mg/kg or ppm) without accounting for the 10:1 dilution step required as part of the Waste Extraction Test analysis procedure.

Page 21, Paragraph 3
The Army Corps of Engineers approved Levin's permit to dredge the Lauritzen Canal but did not actually perform dredging there.

Page 22, Paragraph 2
This portion of the PHA provides a very incomplete summary of the interim soil cleanup performed near the embankment area. The PHA states removal of embankment soils and riprap containing high pesticide concentrations was ordered by the DHS, but not carried out by the responsible parties. Although

the PHA notes the cleanup was carried out in November 1990, after EPA issued an emergency cleanup order, there is no mention of who undertook this work. The report should note that Levin and two other PRPs, Stauffer and Rhone-Poulenc, completed the cleanup under EPA oversight. See our earlier comments concerning Page 9, Paragraph 1 for additional details on this interim cleanup.

Page 23
The explanatory note to Table 5 should state soil samples were collected from depths of 0 to 4 inches and 12 to 18 inches, not "either a 4-inch depth...or a 12-18-inch depth."

Page 24, Paragraph 3
The PHA states ground water carrying contaminants is estimated to continually enter the Lauritzen Canal, where contaminants may accumulate in sediments. This discussion implies this migration route is of concern. It should be noted contaminant transport in this manner is probably negligible. The PHA notes on Page 35 that DDT is "practically insoluble and binds tightly to organic material." Consistent with these properties, the concentrations of pesticides dissolved in ground water at the Site generally have been measured at low part-per-billion concentrations. Based on an average dissolved chlorinated pesticide concentration in ground water of 13 parts per billion and an average seepage rate into the Lauritzen Canal of 390 gallons per day, HLA has calculated an average pesticide loading of only 0.24 ounce per year (see HLA's Revised Draft Site Characterization and Remedial Action Plan, November 1986). Seepage of ground water into the Lauritzen Canal is believed to result in a negligible increase in sediment pesticide concentrations.

The last sentence of Paragraph 3 states "this value is an estimate, however, since no actual measurements have been taken." This sentence apparently refers to HLA's calculations of ground-water seepage flow rates into the Lauritzen Canal. The meaning of this sentence is not clear because HLA based its calculations on field permeability data, measurements of the average saturated thickness of fill, and other measurements.

Page 24, Paragraph 4
The comparison of pesticides and lead concentrations in ground water to Maximum Contaminant Levels is misleading, given the high total dissolved solids concentrations of this ground water, and the PHA's acknowledgement that this ground water is not suitable for either domestic or industrial purposes.

B. OFF-SITE CONTAMINATION

Air

Page 24, Paragraph 5
Levine•Fricke did not perform off-site air sampling for organochlorine compounds in 1989. This sentence should be revised by changing Levine•Fricke to Ecology & Environment, and 1989 to 1988.

In addition to presenting off-site air contamination data, it should be noted these airborne pesticide concentrations were extremely low (i.e., generally less than 1 nanogram per cubic meter of air). Based on the PHA risk calculations presented in Appendix A, DHS has stated the measured off-site airborne pesticide concentrations were considered safe (see Page 38 of the PHA).

Page 25
The sampling year should be changed from 1989 to 1988 in the explanatory note to Table 6.

Lauritzen Canal Sediments

Page 25, Paragraph 2
The earlier sampling effort cited in the PHA was performed by HLA, not Tetra Tech.

Page 26, Paragraph 1
The PHA states the Lauritzen Canal was dredged from the electrical substation, near former United Heckathorn Building 1, south to the Santa Fe Channel. According to the information in HLA's site characterization report, the northern limit of dredging did not extend northward as far as the electrical substation, but to a point approximately 200 feet south of the substation.

The statement that canal sediments contained metals at concentrations above their respective STLC values is not supported by available data. Although waste extraction tests (WET) were not performed on these samples, the existing data suggest these sediments would have soluble metal concentrations below their respective STLCs. Making the very conservative assumption that all of the metals would be solubilized in the WET procedure, and considering the 10-fold

dilution that occurs during the test, the total metals concentrations reported in Table 8 of the PHA would result in soluble concentrations generally less than the metals' respective STLC values.

Surface-Water Sampling

Page 31, Paragraph 3

The PHA states no surface-water sampling has been conducted at the Site. This is not the case. HLA performed surface-water sampling in 1984 and found no organochlorine pesticides above the detection limit of 0.5 ug/L (HLA, "Revised Draft Site Characterization and Remedial Action Plan, Former United Heckathorn Site," November 1986). More recently, Levine•Fricke performed surface-water sampling in November 1990, before commencing the interim cleanup along the embankment area. Details of this work were presented in Levine•Fricke's report entitled "Interim Remedial Actions Performed Along the Embankment, United Heckathorn Site" (January 11, 1991). A total of 30 surface-water samples (including filtered and unfiltered water) was collected and analyzed for organochlorine pesticides. None of these samples contained pesticide concentrations above the laboratory detection limits, which ranged from 0.05 to 1 ug/L.

These data are consistent with the very low solubility and high soil adsorption coefficient for DDT and other similar chlorinated pesticides, indicating these compounds generally remain bound to sediments, which tend to settle and remain on the channel bottom.

PATHWAYS ANALYSIS

A. Environmental Pathways

Page 33, Paragraph 1

The PHA states some contaminants with suitably high vapor pressures may volatilize, or solvents containing pesticides may volatilize and carry the pesticide with them. While this may be theoretically possible, there is no evidence to suggest this is occurring at the Site. None of the organochlorine pesticides detected at the Site have high vapor pressures, nor are significant solvent concentrations known to be present, which could enhance volatilization of soil contaminants.

The PHA states placement of gravel over pesticide-affected soils has not adequately controlled air emissions of DDT on and off site. However, given the magnitude of the airborne DDT concentrations detected by HLA and E&E (i.e., no more than a few nanograms per cubic meter at most sampling stations), contaminant air emissions from the Site appear to be largely controlled and do not appear to pose a significant health risk to on-site or off-site receptors (see previous comments concerning Page 16 of the PHA).

The PHA suggests that "...because the gravel layer appears to have been removed in the middle area of the site, it is likely that even greater amounts of contaminants are migrating into the air than what was measured in 1988." This comment reflects a misunderstanding regarding the gravel at the Site. Additionally, it does not consider the interim cleanup performed in 1990-91, which removed a large quantity of contaminated soil and sediment from the area of the former United Heckathorn buildings, thereby reducing the potential for air emissions from the Site. Finally, DHS concluded, based on its own risk calculations for the 1988 data, the airborne pesticide concentrations measured at downwind areas were at levels considered to be safe (see Page 38). There is no reason to believe current airborne concentrations and their associated potential risks have increased since that time.

<u>Page 33, Paragraph 2</u>
The PHA states the effect of the freeway on continued soil deposition into the residential area is unknown. This sentence implies soil deposition has been previously documented to occur in the residential area. To Levine•Fricke's knowledge, no data exist on this subject. It is inappropriate to assume there has been either soil deposition or significant aerial fallout of dust from the Site at this downwind location, based on the available information.

<u>Page 34, Paragraph 2</u>
The first sentence of this paragraph should be clarified as follows:

1. as previously noted, the Army Corps of Engineers did not dredge the Lauritzen Canal in 1984-85

2. the dredging area originated approximately 200 feet south of the electrical substation, not at the electrical substation

3. the area where a sediment pesticide concentration of 118 ppm was detected did not correspond to the dredging area -- the area where sediment was dredged had concentrations that generally were much lower than this

4. Table 5 and Figure 3 of the PHA appear to be inappropriately cited because neither reference provides information related to the points discussed in the text.

Page 34, Paragraph 3
As noted previously (see comment concerning Page 24, Paragraph 4), it appears inappropriate to compare ground-water concentrations to MCLs, given the poor ground-water quality at the Site.

Also, seepage of ground water into the Lauritzen Canal is not believed to present a significant migration pathway for aquatic organisms for the reasons previously stated (see comments concerning Page 24, Paragraph 3).

Page 35, Paragraph 1
The PHA reports no data were identified concerning contaminant concentrations in the Lauritzen Canal, Santa Fe Channel, or Richmond Inner harbor, but surface-water runoff would be expected to carry soil containing DDT and heavy metals. We note that sediment sampling data are available for all three water bodies, based on field work performed by HLA, Levine·Fricke, and the U.S. Army Corps of Engineers. The statement "surface water runoff would be expected to carry soil containing DDT and heavy metals" is quite vague. This point should be clarified by identifying the specific drainage areas and discharge points to which reference is made. Data should be provided, with the appropriate reference(s) to support this discussion.

B. Human Exposure Pathway

General Comments

This portion of the PHA identifies and discusses several exposure pathways that are reported by DHS to be complete (see Table 9, Page 37). Two of these pathways (3a and 3b) involve transport of contaminated sediments to the Lauritzen Canal via ground-water seepage and aerial fallout of particulates. Under current conditions, these pathways appear to result in negligible mass loadings of pesticides to the Lauritzen Canal,

based on the extremely low pesticide concentrations of ground water (i.e., typically a few parts per billion) and air (i.e., typically a few nanograms per cubic meter) relative to the high contaminant concentrations existing in areas of the Lauritzen Canal.

The PHA also identifies two pathways (1b and 2b) that involve inhalation and ingestion of airborne dust generated from residential soils in off-site areas. We question the characterization of these pathways as being complete, given the fact that there are no soil sampling results that document residential soils as a source of contaminants to off-site air.

The remaining pathways involve inhalation of airborne dust from the Site, and the ingestion of contaminated shellfish and fish. These last two pathways may be complete, but the available data and related risk calculations indicate the potential health risks from this exposure route are quite low, contributing to an excess cancer risk on the order of approximately one in one million. DHS's risk calculations are discussed in further detail below.

Page 36, Paragraph 4
The year air monitoring was performed should be changed from 1989 to 1988. As previously discussed, the Site did not appear to be inactive during the 1988 sampling event, and the gravel cover remains intact over much of the Site. Considering these points, and the fact that significant quantities of contaminated soil and sediment were removed during the 1990-91 cleanup work, the statement that current air emissions would likely be greater than those previously measured does not appear to be valid.

Page 39, Paragraph 2
The PHA reports that migratory scoter ducks in Richmond Harbor accumulate high concentrations of DDE after eating local fish for only about three months, based on research conducted by Ohlendorf et al. (in press). It would be helpful if the PHA would include data to document DDE tissue concentrations in scoters before and after they overwinter in the Richmond Harbor area, as well as a comparison of DDE tissue concentrations of birds sampled from various geographic areas, to support the above statement.

Page 39, Paragraph 4
This paragraph references the PHA's calculation of the potential human health risks of ingesting contaminated seafood from the Lauritzen Canal. While the PHA notes this calculation was based on extremely limited data (i.e., a

single fish sample), it appears the PHA calculation overestimates exposure risks because of the extremely conservative assumptions that were used. The potential risks of ingesting fish from the site area are discussed further below.

Appendix A: Inhalation of Contaminated Airborne Dust in the Residential Neighborhood Near United Heckathorn

Levine•Fricke did not write the report entitled "Determination of Organochlorine Pesticides and Polychlorinated Biphenyls in Ambient Air, 1989."

The PHA risk calculation uses a 70-year exposure duration time. This value appears to be overly conservative, based on EPA's Risk Assessment Guidance for Superfund (EPA, July 1989). EPA recommends 30 years to calculate reasonable maximum residential exposures. Notwithstanding this change, Levine•Fricke was unable to reproduce the risk calculation presented in Appendix A.

Appendix B: Excess Risks Associated with Eating Fish Near United Heckathorn

This appendix presents DHS's risk calculation for exposure to DDT via ingestion of fish. The DHS calculation is based on a single, shiner surfperch sample collected in June 1986 by United Anglers, and submitted to the California Department of Fish and Game (CDFG) for chemical analyses. The shiner surfperch was one of several fish species that United Anglers caught from the Lauritzen and Parr Canals. Although data were available for five other fish tissue samples, DHS did not discuss them in the PHA or use them in its risk calculation. For the reasons stated below, the shiner surfperch analysis is not believed to be appropriate for use in estimating human exposure risks related to the Site. Regardless of the input parameter selection, Levine•Fricke was unable to reproduce the risk calculations presented in Appendix B.

The shiner surfperch sample reportedly consisted of two small fish, weighing approximately 25 grams apiece (Record of Communication between Claudia Willen, DHS, and Brian Finlayson, CDFG, August 5, 1986). Because of their small size, the fish were combined and a whole-body analysis was performed on the resulting composite sample, with the total DDT concentration reported to be 13.6 ppm. As noted in the CDFG laboratory report (August 4, 1986), the reported whole

body analysis was higher than would be expected if only the edible fillet had been analyzed. Typically, DDT and its metabolites concentrate in lipids (e.g., fat tissue and nervous tissue), which are removed when the fish are prepared for human consumption.

Use of the above shiner surfperch sample for even preliminary risk calculations appears inappropriate, given the extremely small sample size (i.e., only one composite sample) and the whole-body analyses performed. To obtain more representative fish tissue concentrations for the waterways near the Site, Levine•Fricke calculated the upper 95% confidence limit for all of the fish samples collected by United Anglers from the Lauritzen and Parr Canals (excluding the surfperch sample and one other sample where whole-body analyses were performed). The samples from Parr Canal were included in this calculation because the potential exposure pathway identified by DHS included persons consuming fish caught in the general vicinity of the Lauritzen Canal, which would presumably include Parr Canal.

The use of upper 95% confidence limits is consistent with EPA's Risk Assessment Guidelines for Superfund, which states that reasonable maximum exposures are more appropriate than worst-case scenarios in developing risk estimates. The upper 95% confidence limit for total DDT was calculated to be 1.1 mg/kg, based on the edible muscle portion of five tissue samples. Levine•Fricke has recalculated potential excess cancer risks from the ingestion of fish, using the upper 95% confidence limit, an exposure duration of 30 years, and other input parameters, which were the same as those used by DHS. As shown in Table 1, the potential excess cancer risk is estimated to be 7.7×10^{-6}, which is over 2 orders of magnitude lower than the value calculated by DHS.

TABLE 1

INGESTION OF FISH
CARCINOGEN

Exposure Input Variables	Acronym	Units	Adult Value	DDT
Fish consumption rate	CR	mg/day	38000	
Chemical concentration in Fish	C	mg/kg		1.1E+00
Exposure frequency	EF	days/yr	65	
Fraction Ingested	FI		0.5	
Exposure duration	ED	yr	30	
Body weight	BW	kg	70	
Exposure extrapolation factor	EEF	yr	70	
Weight Conversion Factor	CF	Kg/mg	1.0E+6	
Time conversion factor	CF	days/yr	365	
CHRONIC DAILY INTAKE Adult	CDI	mg/kg/day		2.3E-05
Total				2.3E-05
Oral Cancer Slope Factor	CSF	1/mg/kg/day		3.4E-01
EPA Carcinogenic Classification				B2
Ingestion Risk	RISK			7.7E-06
TOTAL RISK FOR ALL CHEMICALS		7.7E-06		

$$CDI = \frac{(CR)\,(C)\,(FI)\,(ED)\,(EF)}{(BW)\,(EEF)\,(CF)} \qquad RISK = (CDI)\,(CSF)$$