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TREASURE ISLAND
SSIC NO. 5090.3.A

STATE OF CALIFORNIA — ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, *Governor*

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
EGION 2
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BERKELEY, CA 94710-2737

May 5, 1994

Commanding Officer
Western Division
Attn: Mr. Ernesto Galang, Code 1813
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, California 94066-0720

Dear Mr. Galang:

BASELINE HUMAN HEALTH RISK ASSESSMENT DRAFT, NAVAL STATION TREASURE ISLAND

The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) completed its review of the draft Baseline Human Health Risk Assessment, dated November 4, 1993. Because of the need to complete a second phase of the Remedial Investigation, the Baseline Human Health Risk Assessment will require revision in conjuction with the completion of the Phase II Remedial Investigation Report.

The following comments are an addendum to our comments dated February 4, 1994 on the draft Baseline Human Health Risk Assessment. These comments were prepared by Calvin C. Willhite, Ph. D, DTSC, Office of Scientific Affairs.

BACKGROUND

The chief compounds of concern at Treasure Island include metals and a variety of compounds known collectively as "total petroleum hydrocarbons" (TPH) (including diesel fuel, gasoline, aviation fuels, hydraulic oils and used motor oils). Since Treasure Island is composed entirely of imported fill, it is important to determine whether the compounds found at NAVSTA TI can or do migrate into the waters of the San Francisco Bay. The authors of the documents have elected to eliminate, for example, inorganics in groundwater (p. A-5) as, "Groundwater at NAVSTA TI is not used for drinking"; the document is clearly deficient in that no environmental fate and transport or comparison and contrast to 93-5WQ (SWRCB, May, 1993) have been carried out. Although not used for direct human consumption, contaminated waters at NAVSTA TI have the potential to migrate to and degrade the water quality of the Bay.

The document is inadequate regarding consideration of compounds known collectively as total petroleum hydrocarbons (TPH). The Department of Toxic Substances Control (DTSC) has the

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authority to enforce the cleanup of hazardous substances releases pursuant to the Hazardous Substance Account Act (HSA Act) (Chapter 6.8 commencing with section 25300 of Division 20 of the Health and Safety Code). The HSA Act contains a "petroleum exclusion" which provides that the term "hazardous substance" does not include "[p]etroleum, including crude oil or any fraction thereof which is not otherwise specifically listed or designated as a hazardous substance....." (Health and Safety Code section 25317.)

The Department has always applied, and will continue to apply, an interpretation of the exclusion which is more stringent that the federal Environmental Protection Agency's interpretation of a similarly worded exclusion under federal law. The petroleum exclusion contained in the HSA Act precludes state regulation under the Act of unrefined petroleum and crude oil. However, once petroleum and crude oil are refined, the refined petroleum is subject to state regulation if it is a specifically listed hazardous substances. The Department's interpretation accurately reflects state legislative intent and ensures that the State of California can regulate all releases of hazardous substances which may pose a hazard to health and the environment. The Department has the authority to regulate sites where there is a health threat posed by hazardous substances originating from a release of refined petroleum. However, although the Department has the authority to work on these sites, due to resource limitations, the Department will work only on selected sites based on an evaluation of the degree of risk posed by the release. The Regional Water Quality Control Boards (RWQCB) an the State Water Resources Control Board (SWRCB) have uncontrovertible overlapping jurisdiction to order clean up at sites where discharge of any wastes, including refined petroleum, threatens water quality, including beneficial uses of the waters of the San Francisco Bay. At any site where the risk to health and the environment can be adequately addressed by those agencies, the site is be referred pursuant to the August 1, 1990, Memorandum of Understanding (MOU) between the Department and the SWRCB or other appliable agreements between the Department and that agency. There have been, and continue to be, substantial national, state and even county-wide discrepancies in the manner in which TPH in soil and groundwater at regulated sites is handled [attachments].

In 1985, the Department of Health Services (now the DTSC), the State Water Resources Control Board (Board), and various counties formed a Leaking Underground Fuel Tank (LUFT) task force to establish procedures which would assist regulatory agencies in supervising cleanups at leaking underground storage tank sites. The task force recommendations resulted in a LUFT field manual, which addresses reclassification criteria for contaminated soil

(Attachment, October 18, 1989). The manual mentioned that the Department had used 1,000 ppm total petroleum hydrocarbons (TPH) to classify soil in the past, and recommended this value be used by field personnel to classify contaminated soil as hazardous waste until new criteria were released by the Department. At the request of the Alternative Technology Division of the DTSC, the Department's Hazardous Materials Laboratory (HML) conducted bench tests using a modified Pensky-Martins Closed Cup ignitability test to evaluate the ignitability of gasoline-contaminated soil. The Pensky-Martins Closed Cup Method is designed for liquid wastes. In the absence of an alternative test, HML modified the Pensky-Martins Closed Cup Method to test contaminated sandy soil on the basis that it was ignitable liquid in the soil which was being tested. The tests were conducted using various concentrations of gasoline freshly applied to sandy soil. Sandy soil with concentrations of 1,200 milligrams per kilogram (mg/kg), or parts per million (ppm), gasoline and higher "flashed" indicating a potential ignitability hazard. As a result, the Department established an interim threshold value of 1,000 ppm gasoline as field guidance to determine the potential ignitability characteristic of gasoline contaminated soil.

Total Petroleum Hydrocarbon (TPH) is not a regulatory criterion that is listed in Article 11, Title 22, California Code of Regulations (22 CCR) by which wastes are classified as hazardous. The modified Pensky-Martens Closed Cup Method has not been adequately demonstrated to be reproducible, it has not been adopted into regulation, nor is it the modified method one which DTSC certifies hazardous waste testing laboratories to perform. In light of these limitations, it is important to reiterate that the threshold value is a recommendation and it is not a regulatory criterion.

CALIFORNIA CLASSIFICATION

Similar to federal criteria, the generator is responsible to classify the contaminated soil. The criteria for identification of hazardous waste are found in Title 22 of the California Code of Regulations (22 CCR) Article 11 and in Title 40 of the Code of Federal Regulations Part 261 (40 CFR 261). The general characterization used to identify hazardous waste are corrosivity, reactivity, ignitability, and toxicity (including acute toxicity, aquatic toxicity, chronic toxicity, and the soluble and total concentrations of specified persistent and bioaccumulative substances). The generator may use knowledge of the waste in determining which of these characteristics are reasonably expected to be exhibited and may test only for those characteristics. For example, the Department does not reasonably expect waste soils contaminated with hydrocarbons to exhibit characteristics of ignitability or reactivity. Without specific

knowledge of the source of the contamination, it is difficult to know whether the soils would exhibit the characteristic of corrosivity, and therefore this characteristic should be tested. Contaminated soils may be expected to exhibit the characteristic of toxicity and appropriate testing should be performed. To reach a determination that the waste soils are a nonhazardous waste, the waste soils must not be contaminated with any substance which has an acute oral LD_{50} of less than 5000 mg/kg, an acute dermal LD_{50} of less than 4300 mg/kg, or an acute inhalation LC_{50} of less than 10,000 ppm pursuant to the requirements of 22 CCR 66696(a) [except as provided in 22 CCR 66696(b) or (c)]. It should be noted here that the acute fatal concentration for gasoline in air is about 5000 ppm and the acute oral LD_{50} for diesel in rats is 7500 mg/kg (attachments). The waste soils must not exhibit the characteristic of aquatic toxicity as assessed by a 96-hour aquatic bioassay, as specified in 22 CCR 66696(a)(4). The waste must not contain any persistent or bioaccumulative substance with a total concentration which equals or exceeds the associated Total Threshold Limit Concentration or with a soluble concentration (using the California Waste Extraction Test) which equals or exceeds the associated Soluble Threshold Limit Concentration. The regulatory thresholds for these characteristics can be found in 22 CCR 66699. The hazardous waste characteristics of chronic toxicity (including carcinogenicity, mutagenicity, teratogenicity and fetotoxicity) and environmental damage are also used to determine whether a waste is a hazardous waste. These characteristics can be found in 22 CCR 66696(a)(6). There are no definitive regulatory thresholds available for these characteristics; their use relies mainly upon published toxicologic and epidemiologic data regarding the compounds of concern.

FEDERAL CLASSIFICATION

To be classified as nonhazardous, the waste soils must not be contaminated with any substance listed as a hazardous waste pursuant to 40 CFR 261.31, 261.32 or 261.33. If the waste soils are not the result of an underground fuel tank leak which is being remediated according to the provisions of 40 CFR Subtitle I, and the waste is not otherwise excluded from federal regulation as a hazardous waste, the waste must be tested for the federal Toxicity Characteristic (after September 25, 1990 for large quantity generators). The regulatory thresholds for the federal Toxicity Characteristic compounds can be found in the March 29, 1990 Federal Register. Under federal regulations, the contaminated soil resulting from leaking underground fuel tanks is considered a solid waste and the generator is responsible to determine whether it is hazardous pursuant to the federal hazardous waste listings in 40 CFR 261.31, 261.32, or 261.33 or characteristics described in 40 CFR 261.21 (ignitability), 262.22

(corrosivity), 261.23 (reactivity), or 261.24 (toxicity). Most likely oil, gasoline or diesel contaminated soil would not be a hazardous waste based on the federal hazardous waste criteria because of the following: 1) the contaminants, motor or hydraulic oil, gasoline or diesel, are not listed wastes; 2) the contaminants are not known to be reactive or corrective; 3) the ignitability test is not applicable to solids, and with the exception of a highly contaminated soil, when ignited most gasoline or diesel contaminated soil would not burn persistently and vigorously as required by the ignitability criteria; and 4) the application of the Toxicity Characteristic Leaching Procedure (TCLP) and federal toxicity criteria has been indefinitely postponed for soil contaminated with petroleum products from the underground storage tanks (UST). 40 CFR 261.4(b)(10), the federal regulation which exempts petroleum-contaminated soil from UST sites from the federal toxicity criteria, does not apply to all fuel contaminated soil. Fuel contaminated soil form an above ground storage tank, for example, would not be exempt from the federal toxicity criteria. There is concern that if benzene concentrations in these contaminated soils exceed 0.5 milligrams per liter (mg/1) using the Toxicity Characteristic Leaching Procedure (TCLP), then the contaminated soil would be classified as a RCRA characteristic hazardous waste.

Limited data reviewed by the Department also suggest that diesel and gasoline contaminated soils may not exhibit aquatic toxicity; however, there is still some uncertainty on this issue. Of concern are compounds present in gasoline and diesel which are known to exhibit aquatic toxicity. For example, benzene, toluene, and xylene have aquatic 96-hour LD_{50}'s on the 10 to 50 ppm range. Because of uncertainties in the composition of fuels and the presence of compounds which exhibit aquatic toxicity, contaminated soil should be tested for aquatic toxicity. The Department requires the generator to perform at least four 96-hour fish bioassay tests on the representative soil samples. Although the soils themselves may not exhibit aquatic toxicity, this conclusion does not apply to those compounds in spilled fuels which are present in either fresh or salt waters beneath NAVSTA TI.

If the contaminated soil contains any persistent or bioaccumulative substance with a total concentration which equals or exceeds the associated Total Threshold Limit Concentration (TTLC) or the associated Soluble Threshold Limit Concentration (STLC) is using the California Waste Extraction Test, then the soil is hazardous. Sections 66261.24(a)(2)(A) and 66261.24(a)(2)(B), 22 CCR, list the TTLC and STLC values of the persistence or bioaccummulative toxic substances. The presence of lead (either as the parent organic form or as in the decomposition products) from leaded fuels is also of concern. If

the lead concentration in contaminated soil is greater than or equal to the TTLC of 13 mg/kg for organic lead, 1,000 mg/kg for inorganic lead, or the STLC of 5 mg/1 for organic lead, then the contaminated soil is regulated as hazardous waste.

In summary, the Department expects oil, gasoline or diesel contaminated soil would only be classified as a hazardous waste under California regulations if it fails the acute aquatic toxicity criterion, a 96-hour fish bioassay test, or fails the TTLC or STLC criteria for lead. This conclusion assumes there are no contaminants other than oil, gasoline or diesel, and assumes that contaminants like polynuclear aromatic hydrocarbons found in waste crankcase oil are present at concentrations no greater than background. For fuel contaminated soil which has been classified as nonhazardous waste, land disposal restrictions and related treatment standards do not apply.

If the contaminated soil is deemed hazardous, it may, under certain conditions, be exempted from California's land disposal restrictions regulations. Under Section 25179.6(a)(2)(B) H&SC, a non-RCRA hazardous solid waste (e.g. fuel contaminated soil) which does not meet the treatment standards established by the Department is exempt from land disposal restriction if the disposal of the waste has been approved by the Department or other agency authorized to approve the cleanup.

If the contaminated soil is hazardous and is not exempted, then the treatment standards for non-RCRA solid hazardous waste containing organics, Section 66268.113 CCR, would apply. These standards require treatment prior to disposal for hazardous wastes to following levels:

- 1% oil and grease (measured by EPA Method 9071)
- 25 ppm volatile organics (measured by EPA Method 8270)
- 435 semi-volatile organics (measured by EPA Method 8770)

These require treatment prior to disposal by incineration, solvent extraction, critical fluid extraction, thermal separation unit, or an alternative treatment method approved by the Department.

If the treatment standards do apply, a treatability variance may be requested pursuant to Section 66268.44 CCR. Hazardous Waste Treatment Facility Permits are required to treat contaminated soil, above ground on in situ, if the contaminated soil has been classified as a hazardous waste (see preceding discussion on federal and California waste classification criteria). If the waste contaminated soil is deemed not to be a hazardous waste then a permit is not required.

Permitting options are identified for each alternative treatment technology listed. Permit options are described in more detail below.

Permit by rule regulations provide an expeditious permit process for low risk treatment processes and waste streams. In general, if a proposed treatment process is eligible for permit by rule, the Department would not consider other permitting options. Only approved treatment processes and waste streams listed in Section 66450.3, 22 CCR, are eligible for permit by rule and must meet conditions include: site specific notification, closure cost estimate, waste analysis plan, written inspection schedule, contingency plan, certification specifying the local authorities have been notified, submittal of site specific information, financial assurance for closure, and liability insurance for sudden accidental occurrences. The fee for a permit by rule is less than for a full permit. Permit by rule regulations might be modified in the future to include additional low risk demonstrated technologies for treating fuel contaminated soil. Technologies being considered include above ground biotreatment of low volatility fuel contaminated soil, and incineration of recovered vapors by catalytic convertors, fume incinerators or internal combustion engines.

The Department may grant a variance from permitting requirements for a hazardous waste or treatment process which is not regulated under RCRA and which poses an insignificant hazard to public health and the environment. The Alternative Technology Division grants such variances for research, development and demonstration (RD&D) projects, limited to the amount of waste and time necessary to demonstrate the treatment technology. To encourage new technology, the Department does not require a fee for processing RD&D variances. A fee is required to process a permit variance for a hazardous waste treatment facility (non RD&D).

Transportable Treatment Unit (TTU) Permits - For treatment processes wastes not covered by PBR, a TTU permit may allow statewide operation of a treatment technology on specified California-only regulated waste streams. For each site where operations are proposed the TTU operator must provide notice, submit site specific information, and then comply with reporting requirements. Processing of TTU permits, as with any facility permit, may take a year or longer to process. Fees or processing permits for incinerators and other transportable treatment units are established under Section 25205.7 H&SC, and vary depending on facility size. A TTU permit is not required for a TTU to treat contaminated soil which has been classified as non-hazardous waste.

Hazardous Waste Facility Treatment Permits Issued by DTSC - Permits are required for treatment, storage, or disposal of RCRA or non-RCRA hazardous waste.

Hazardous Waste Facility Treatment Permits Issued by U.S. - EPA - Treatment, storage, or disposal of a RCRA hazardous waste requires a RCRA permit. For information concerning RCRA regulated wastes/activities and permitting requirements contact the Environmental Protection Agency (EPA), Region 9, at (415) 744-2138.

Regulatory requirements for diesel, gasoline and related products vary by county and by Regional Water Quality Control Board. For the San Francisco Bay Region, the Tri-Regional Board Staff Recommendations (attached) can be applied to those components found in regulated waters, including the salt groundwater contaminated with gasoline, diesel, hydraulic oil and other oils and grease found at NAVSTA TI. Where those compounds are found in waters which discharge to or are otherwise continuous with waters of the San Francisco Bay, values contained in the document, "California Enclosed Bays and have Estuaries of California" [93-5WQ, May 1993], and Estuaries Plan Water Quality Control Plan for Enclosed Bays have been applied. For those fresh waters the values contained in, "California Inland Surface Waters Plan. Water Quality Control Plan for Inland Surface Waters of California", [91-13WQ, April, 1991] (attached) may be applicable here as has been the case at the Presidio. These values and plans and their use is required by the federal Clean Water Act and by California Water Code Section 13170 (attachments).

GENERAL COMMENT

A great deal of effort has been expended in the site characterization phase of the investigation of NAVSTA TI; however, in the absence of relevant studies on the impact of the compounds of concern in relation to the waters of the San Francisco Bay, the investigation can only be regarded as incomplete and any conclusions drawn here based on the documentation provided can only be considered tentative.

SPECIFIC COMMENT

Baseline Human Health Risk Assessment Appendices.

1. Page A-4. Some rational should be provided to explain how carbon disulfide, phthalates, endrin and associated organochlorine pesticides are present as laboratory contaminants? If such is in fact the case, then these data suggest a dirty laboratory or sloppy handling of samples and

calls into question reliability of the data upon which the risk assessment is based. Endrin, for example, is very unlikely to appear as a laboratory contaminant, but phthalates, acetone and the like may actually be attributed to laboratory procedures. A careful re-review of data quality objectives, data quality assurance and quality control in this section is in order.

2. Page A-5. This reviewer disagrees with the exclusion of the groundwater exposure human direct contact pathway since, "Groundwater at NAVSTA TI is not used for drinking". The State and Regional Water Resources Control Board have adopted Resolutions No. 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California" and Resolution 88-63, "Sources of Drinking Water Quality". The first outlines the principles of maximum benefits so as to not unreasonably affect present and potential future beneficial uses of such water and the second specifies that ground and surface waters are considered drinking water sources unless shown otherwise.

Although 40 CFR 130.2(c) and 131.3(i) [Federal Clean Water Act] focus on surface waters, the Porter-Cologne Act includes both surface and groundwaters; California's Water Quality Control Plans (e.g., 93-5 WQ and 91-13 WQ) are applied to ground and surface waters with the distinction being those waters with existing total dissolved solid concentrations in excess of 3000 mg/L, low sustained yield (less than 200 gallons/day for a single well), or waters within agricultural drains and geothermal waters. Narrative objectives taken from the Basin Plan resolutions read as follows: "Groundwaters shall not contain chemical constituents in concentrations that adversely affect beneficial uses." Thus, inclusion of all potential beneficial uses of NAVSTA TI groundwater including domestic, municipal supply and migration should be included in the baseline public health risk assessment. Potential for movement of compounds present in on-site fresh or salt groundwater to the Bay should be included in the evaluation to comply with those same resolutions regarding toxicity: "All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal or aquatic life."

3. Page C-5. Comparison of site soil metal values to the entire Western United States is inappropriate; native soil copper and lead values - for example - in many areas of the United States are so high that historic commercial mining has been profitable. In other areas, native soil arsenic and associated groundwater arsenic values are so high that recent epidemiologic study results have been able to identify cancer clusters in those towns built on those soils

and whose occupants drink and bathe in those groundwaters. Comparison of on-site to off-site reference concentrations ("background") should rely on local documented background data that has been collected for the San Francisco, Bay Area (C.M. Scott, 1991; attachment) and for sites regulated by the DTSC where quality assurance/quality control and chain of custody procedures with state-certified laboratories have been used (e.g., Pacific States Steel, Union City). These values should be presented and discussed in relation to anthropogenic concentrations (e.g., Appl. Occup. Environ. Hyg. 8:217 - 220, 1993) found in "background" soils not necessarily associated with site-specific activities at NAVSTA TI.

4. Page C-4. Top line. Cite title, date and specific DTSC guidance which "does allow subtraction of background concentrations from measured levels for carcinogens?" Provide of clear rationale why such should be permitted in the situation at NAVSTA TI.

5. Appendix D. For COPC toxicity profiles on chemicals like acetone, aldrin/dieldrin, arsenic, benzene, 2-butanone, cadmium, lead, chlordane, copper, DDT and congeners, the 1,2-dichloroethylenes and other compounds reviewed in ATSDR documentations, those reviews should be cited and the documentations listed in the bibliography.

6. For diesel and gasoline it is recommended that the U.S.EPA RFD and cancer potency factors developed for the mixture as a whole be included in hazard index and cancer risk estimations [U.S. EPA Memorandum, 3QTQ Fy92 Master Line Response Table attachment] to calculate site-specific risks. The following parameters need to be supplied for the soils contaminated with fuels:

<u>Soil Column Data</u>

Volumetric water content
Effective porosity
Soil bulk density
Fraction organic carbon
Numbers and thickness of each soil layer
Thickness of incorporation
Thickness of soil cover
Depth of unsaturated zone
X-Dimensions of the Source(s)
Y-Dimensions of the Source(s)
Thickness of boundary layer
Infiltration rate

Chemical Concentration and Properties

Representative aromatics
Representative aliphatics
Representative PNAs

a. Molecular weights of individual components and gasoline and diesel complex mixtures

b. Koc for individual components and mixtures (mg/l)

c. Vapor pressure (mm Hg)

d. Solubility (mg/L)

e. Henrys Law constant (mg/L/mg/L)

f. Log Kow

g. Diffusion coefficient of compounds and mixture in air (cm^2/sec)

h. Diffusion coefficient of compounds and mixture in water (cm^2/sec)

i. Decay rate

j. Permeability coefficient (cm/hour)

k. Adsorption coefficient

Media Parameters

Porosity
Hydraulic conductivity
Hydraulic gradient
Longitudinal dispersivity
Transverse dispersivity
Vertical dispersivity
Thickness of aquifer

Receptor Well Data

X-, Y-, Z- coordinates to top and bottom of wells.

Chemical Data

Emission rate
First order decay rate (if any) in air

Receptor Data

Distance from source to receptor
Distance from soil surface to receptor
Meterologic Data
NAVSTA TI mean annual wind speed
Frequency of San Francisco Bay storms
Fraction of time wind blows in direction(s) of interest
Vertical dispersivity

7. What data are available to determine the contribution of Pb in soil at NAVSTA TI from vehicular motor traffic on the San Francisco/Oakland Bay Bridge?

8. What data are available to determine the contribution of Pb in soil at NAVSTA TI from paint chips and maintenance of the San Francisco/Oakland Bay Bridge?

9. Page D-15. The statement that, "no information is presently available for 2, 4-DB," is not true. Applicable references for Butoxon (also known as Butyrac, Embutox and Legumex D) are summarized in National Technical Information Service publication PB80 - 13326. Additional data are found in:

   Gig. Sanit. 41 (2): 20, 1976.
   Residue Review 10: 97, 1965.
   World Rev. Pest Control 2: 119, 1970.
   Federal Register 47: 30420, 1982.

   As this has been a registered pesticide, applicable data will also be on file at the U.S. EPA Crystal City Library and in the Cal/EPA Pesticide Registration Library in Sacramento.

10. Page D-16. The DTSC does not produce cancer slope factors. Please revise line 8 from bottom on page D-16 and the entire text to indicate that the Cal/EPA Office of Environmental Health Hazard Assessment is responsible for such values.

11. Page D-17. A toxicology profile for dicamba should highlight chronic toxicity, and reproduction and developmental toxicity (attachment).

12. Table C-1. Editorial comments (e.g., magnesium entry: "an essential element") can be eliminated from the table. It may be instructive to include as a point of reference, instead, a column listing U.S. EPA Preliminary Remedial Goals (attachment) for these compounds.

13. Table C-1. Mercury. The form (organic/inorganic) should be specified - in spite of the table title. Were these soils sediment?

14. Table C-2. The chronium oxidation state (Cr+3 or Cr+6) studied should be listed.

15. Table C-2. Selenium. The specific forms analyzed (selenate/selenite) should be listed.

16. Table C-2, (-3. Revise table to delete the word "site"; replace with the word "area."

17. Page D-1. The discussion of LMS is trivial; U.S. EPA policy recognizes no differential in mechanism of action between initiators or promoters; thus, delete line 3 from bottom, "the initiation of." This reviewer suggests replacement of this section with U.S. EPA language and cite the source:

    "For those substances that are known or probable human carcinogens, according to the Agency classification scheme (Group A or B), Lifetime HAs are not recommended. The chemical concentration values for Group A or B carcinogens are correlated with carcinogenic risk estimates by employing a cancer potency (unit risk) value together with assumptions for lifetime exposure. The cancer unit risk is usually derived from the linear multistage model with 95% upper confidence limits. This provides a low-dose estimate of cancer risk to humans that is considered unlikely to pose a carcinogenic risk in excess of the stated values. Excess cancer risk estimates may also be calculated using the One-hit, Weibull, Logit or Probit models. There is no current understanding of the biological mechanisms involved in cancer to suggest that any of these models is able to predict risk more accurately than another. Because each model is based on differing assumptions, the estimates that are derived can differ by several orders of magnitude." (Office of Drinking Water, Health Advisories, U.S. Environmental Protection Agency, 1987).

18. Page D-2. The authors should note that although current U.S. EPA policy uses A-E letter classifications, draft revision of U.S. EPA Carcinogen Assessment Guidelines has deleted such a system. For revision, the authors should contact the U.S. EPA project officer: Jeanette A. Wiltse, Ph.D Office of Health and Environmental Assessment, U.S. EPA, 401 M Street, S.W. Washington, D.C. 20460 (202-260-7315).

19. Page D-2. U.S. EPA has published differential cancer potency values for several PAH compounds compared to that for B(a)P which may not yet appear in IRIS or HEAST. The accuracy of the results of the PAH theoretical cancer risk estimate would be improved were those values used [attachment].

20. Page D-13. A summary of chronic carbazole (9-azafluorene) toxicity can be found in the IARC Monograph series (Volume 32, page 239, 1983) and data on the acute toxicity in J. Pharmacol. Exp. Ther. 90:260, 1947. Appropriate RFD values can be computed using standard methodology and safety factors (Fed. Regist. 50 (219): 26946, November 13, 1985). Since the compound is also known as USAF EK-600, a summary of its use, environmental fate and toxicity should be made available.

21. Page C-2. It is not appropriate to cite Klassen, Amdur and Doull (a toxicology student reference text) as an authoritative reference for concentrations of metals in soil for the Bay Area.

22. Page C-2, C-3. In discussion of the soil metal concentrations for NAVSTA TI, a summary of the site history and an indication of the source of fill used to build NAVSTA TI is in order here. Perhaps it is more appropriate to compare NAVSTA TI soil metal concentrations to the fill source area than to immediate native Bay Area soil metal reference ("background") concentrations?

23. Page C-4. The entire discussion on this page is extraneous and can be deleted from the text without changing the conservative approach to site risk assessment. This reviewer is puzzled by the example of zinc used here since inorganics have largely been excluded from consideration (p.A-5)?

24. Table C-1. Confusion is likely to occur given the terms used here; it would be preferable to divide the discussion as "area" or "operable unit"; use of the word "site" suggests other regulated entities at DTSC Region II (e.g. Bay Area Drum, Midway Village. etc.)

25. Page D-17 and D-18. Citation and a brief summary of the ASDR documentation for 1,2-dichloroethene is in order here. A discussion of the microbial degradation of trichloroethylene and tetrachloroethylene (both compounds of concern at NAVSTA TI, pages D-34 and D-35) to 1,2-dichloroethylene (Vet. Hum. Toxicol. 28(2):127, 1986; Appl. environ. Microbiol. 49(5): 1080, 1985; Appl. Environ.

Microbiol. 45(4): 1286, 1983; Environ. Toxicol. Chem. 4:739, 1985; J. Am. Water Works Assoc. 76(2):56, 1984) is in order here.

It may be that the occurrence of 1,2-DCE is not related to its use as a solvent, but that it has arisen as a result of microbial environmental degredation of TCE and PCE. Since 1,2-DCE is an intermediate in this pathway which leads to generation of vinyl chloride, data should be provided to demonstrate that this degradation has or has not or will not occur in the future.

Since 22 CCR 64444.5 contains MCL values for separate cis and trans isomers, the data for the separate compounds should be presented.

26. Page D-36. Toluene. Toxicological summaries should, at a minimum, cover all of the features included in summaries produced by volunteer groups (e.g., ACGIH, attached). Principal regulatory actions (e.g., 22 CCR 12805 and 22 CCR 12000 affecting toluene) for all compounds of concern should be summarized in these toxicological profiles.

27. Page D-18, lines 7-9 from bottom. The conclusion, "Exposure to diesel has proved to produce renal failure, increased squamous cell lung cancer and prostate cancer among workers exposed to diesel," is not only redundant, but alarmist as well. To this reviewer's knowledge, there are no rigorous epidemiologic data or convincing case reports or even cluster investigations which lead to the above conclusion. Literature references to peer-reviewed papers on this subject are necessary to substantiate this conclusion.

A brief summary of NTP TR310 (September,1986) [attachment] regarding marine diesel fuel is in order here along with related evidence published in Toxicol. Appl. Pharmacol. 65:84-91 (1982), Advances in Modern Environmental Toxicology, vol. 7, pp. 133-140 (1984), API Med. Res. Publ. 261:60017; API/LBI Project No. 20698-11 (Washington, DC); Advances in Modern Environmental Toxicology, Vol. 7, pp. 121-132 (1984). The statement (lines 3 and 4) on page D-19 is not correct; the authors have failed to review the literature on diesel toxicology. It is very important to point out here that the toxicology of benzene and related aromatics (listed on page D-19) is significantly different when exposure occurs to the complex fuel mixture as compared to exposures to the individual constituents (e.g., App. Occup. Environ. Hyg. 5(7):453-463, 1990) and appropriate adjustments are necessary to the "toxicity values" (p. D-19) which "are being evaluated"(?)

28. Page D-20. Although U.S. EPA may not have published an RFD for endosulfan, one cannot drop the agent from risk

calculation simply because state of federal agencies have not provided toxicity values. The endosulfan RFD may be calculated from the NCI (1978), Innes etal. (1969) or Thorpe and Walker (1973) oncogenicity bioassays, from the FAO/WHO NOAEL of 2.5 mg/kg-day) (Report 68.30, Rome, 1968) or from the rodent multigeneration bioassay or from the chronic feeding study in dogs (NOAEL = 0.75 mg/kg-day) (Hayes and Laws, 1991; attachment), whichever is most appropriate.

29. Page D-20 and D-24. The entire text should be subjected to editing for errors in English. On page D-20 line 9 from bottom, the word "data" is plural, requiring plural verb conjugation. The sentence at the bottom of page D-24 is awkward, as is the writing style of the entire draft. At the bottom of page D-18, the statement, "Diesel has also <u>proven</u> to produce skin tumors...," is inaccurate; the bottom line of page D-18 to top line D-19 is speculation, given the absence of any supporting documentation and the presence of 5-10% PNAs?

30. Page D-22. The gasoline summary is very poor; at a minimum, the text should incorporate at least as much information as is presented in brief reviews (J. Appl. Toxicol. 9(3):203-210, 1989), summaries by volunteer groups (ACGIH, 1991; attached) and U.S. EPA (attached). Discussion of drinking gasoline from soft drink bottles is irrelevant here.

31. Page D-26. A discussion of 8 CCR Chapter 4, Subchapter 4, Article 4 [attachment] is in order here.

32. Page D-27. The U.S. EPA Office of Drinking Water values for methoxychlor [attachment] can be used in the revision of the NAVSTA TI risk assessment.

33. The Page D-26. The lead discussion should focus on the brief review (and quote U.S. EPA where possible).

The documentation supporting the EPA (Federal Register 56(110):26460-26564, June 7, 1991) rulemaking activities for activities for human exposure to environmental lead summarizes the current state of scientific knowledge:

- Inhibited activity of enzymes involved in red blood cell Metabolism, delta-aminolevulinic acid dehydratase (ALA-D), and pyrimidine-5-nucleotidase (Py-5-N), has been associated with PbB levels of 10-15 ug/dl and possibly lower.

- Elevated erythrocyte protoporphyrin (EP) levels, an indication of lead-related interference with heme synthesis, have been associated with PbB levels of 12-23 ug/dl depending on iron status.

- Interference with vitamin D hormone synthesis has been detected in children with PbB levels as low as 12 ug/dl.

- Altered electrical brain wave activity has been identified at PbB levels down to 15 ug/dl and possibly lower.

- Deficient in IQ and other measures of cognitive function, such as attention span, have been associates with PbB levels of 15 ug/dl and possibly lower in socially disadvantaged children.

- Slowed peripheral nerve conduction has been detected in children with PbB levels of 20-30 ug/dl.

- Deficits in mental indices have been found in infants with maternal or umbilical cord PbB levels as low as 6-7 ug/dl.

- Low birth weights and decreased gestational age, factors that may influence early neurological development, have been associated with infants having maternal PbB above 12-14 ug/dl and possibly as low as 7 ug/dl.

- Small increases in blood pressure have been related to adults with PbB levels down to 7 ug/dl.

The lack of an apparent exposure threshold for several lead effects is supported by the fact that many of the biochemical changes that appear to underlie lead toxicity (e.g., alternatives in enzyme activity, membrane receptors, calcium homeostasis) have been observed at the lowest experimental dosages administered, often with no discernible threshold. There is uncertainty regarding the point at which subtle molecular changes individually or collectively become significant enough that they should be regarded as constituting "adverse" effects. However, such effects clearly become more pronounced (and likely) and broaden to cause more severe disruptions of the normal functioning of many organ systems as PbB levels. The continuum of effects from biochemical responses, cellular dysfunction, and morphological change to organ system alterations, clinical symptoms, and toxicity makes it difficulty to clearly identify what PbB level, if any, constitutes an appropriate "threshold" below which there are no significant risks of adverse effects".

The PRC authors must revise the text to include the 15 ppb U.S. EPA regulatory value as defined in Fed. Regist. 56 (110): 26460 - 26564, 1991.

34. Page D-27. Bottom line. The statement, "Little information exists regarding the effects and toxicity of 2-methyl-4-pentanone," is not correct. The World Health Organization (Environmental Health Criteria 117) published a comprehensive review in 1990 and a brief sketch of the data is attached. It appears the PRC authors have failed to review the literature. There is no reason to make the statement, "Ketones are readily absorbed through intact skin ...", in the case of methyl isobutyl ketone given the data published for this compound to date.

35. Page D-28. Comprehensive reviews of molybdenum are available (National Research Council, 1977; U.S. FDA Toxicity of Essential Minerals, 1975). Since molybdenum toxicity depends on the chemical form (molybdenum trioxide, molybdenum sulfide, etc.) and whether the form is soluble or insoluble, the discussion must focus on the particular type(s) of molybdenum found at NAVSTA TI.

36. Page D-28. It appears the authors have failed to consider the most likely source of naphthalene and methylnaphthalene at NAVSTA TI as spilled diesel fuel, kerosene and related TPH mixtures where these compounds occur as part of the cycloparaffin-component certainly not from moth repellants containing naphthalene.

    The statement, "Little is known about methylnaphthalene," p.D-28, bottom line) is not correct. The 1993-94 revision of the ATSDR documentation [attachment] for these compounds needs to be consulted and cited.

37. Page D-31. The statements, "Acute doses of phenol... central nervous stimulation," followed by, "Repeated exposure to phenol causes the same symptoms as acute doses," are incorrect. Although overt acute intoxication with phenol in animals can produce CNS stimulation evidenced by tremors and convulsion (Toxicol. Appl. Pharmacol. 21:214-229, 1972), studies in humans have shown no such problems - even after exposure to concentrations orders of magnitude than those of concern at NAVSTA TI (Br. J. Ind. Med. 29:70-73, 1972); nevertheless, pediatric and other clinical toxicology of overt human phenol intoxication has produced death (Br. J. Ind. Med. 9"227-229, 1952; JAMA 139:777-779, 1949; Canada. Med. Assoc. J. 46:616-616, 1942; Lancet 2:1273-1274, 1922). A comparison of doses is in order here;

the text makes no differentiation regarding dose-dependent toxicity.

The statement here, "Phenol has very low thresholds for taste and odor," and related statements throughout the text must contain actual data accompanied by citation to literature references to substantiate the statements made; compared to mercaptans, for example, the odor threshold is high for phenol. Appropriate references are:

J. Appl. Toxicol. 3(6):272-290, 1983
Chem. Senses Flavor 1:283-305, 1975
Am. Ind. Hyg. Assoc. J. 47(A):142-151, 1986
Compilation of Odour Threshold Values in Air and Water, National Institute for Water Supply, Voorburg, Netherlands
Taste and Odor in Water. A Critical Review. R. A. Baker, the Franklin Institute, 1963.

The ATSDR document on phenol should be cited (1989). Page D-31. The current 1991 ATSDR documentation for PAH compounds should be cited (attachment). A discussion of background concentrations (Table 5-2) of these compounds found typically in rural, agricultural and urban soils should be included. The PAH discussion should be at least as comprehensive as that produced by volunteer groups (e.g., chrysene, ACGIH, 1991, Documentation of the TLVs and BEIs, 6th ed. Vol. 1, Cincinnati). The PAH discussion should cite the clinical toxicology regarding human skin caner and PAH exposure dating from the 18th century.

38. Page D-33. The slope factor discussion should include U.S. EPA potency adjustments for PAH compounds other than B(a)P [attachment].

39. Page D-35 and D-36. The discussion of TCE is grossly inadequate. There is no mention of the withdrawal of all criteria by U.S. EPA other than the MCL for this compound and there is no summary of the human epidemiology data regarding carcinogenesis.

It is recommended that the Naval Facilities Engineering Command, Western division contact the following officers of the Navy regarding TCE and carcinogenicity prior to revision of the NAVSTA TI risk assessment:

Commander H. Donald Kennedy, Jr.
Special Projects Officer, U.S. Navy
Environmental Programs Directorate
Naval Environmental Health Center

2510 Walmer Avenue
Norfolk, VA 23513-2617
804-444-7575 X434
804-444-7261 (FAX)
and
Lt. Brenda D. Smith
Special Projects Assistant, U.S. Navy
2510 Walmer Avenue
Norfolk, VA 23513-2617
804-444-7575 X449
804-444-7261 (FAX)

40. Page D-36. Toluene is listed pursuant to 22 CCR 12000 and the basis of that regulation and the associated no significant risk level should be identified.

41. Page D-37, 38. The xylene toxicity profile should be at least as comprehensive as that produced by volunteer groups (ACGIH, 1991; attachment).

42. Page D-38. The zinc toxicity profile should be modified to address the particular zinc compounds found NAVSTA TI; zinc compounds like zinc yellow and zinc chromates are confirmed human carcinogens; zinc butter (zinc chloride) has produced acute pulmonary disease and caused dyspnea and death in human beings; zinc oxides are well-known to have induced metal fume fever. Zinc, depending upon the particular presentation, may not be "a low-potency toxicant."

43. Table D-1. Why are compounds like calcium and beryllium listed as compounds of concern in the table, yet no toxicity profiles or other mention of such entries is made in the remainder of the text?

44. Table D-1. Footnotes. Delete the entries:
"DTSC (PETS) = DTSC Pesticide and
"Environmental Toxicology Section"
The DTSC has no connection with that particular department of the Cal/EPA.

45. Page E-1. Since the document was written, it has been announced that NAVSTA TI is to become a Job Corps Center. The accuracy of the risk assessment could be strengthened if that land use and associated training and education uses were specifically considered in the NAVSTA TI exposure assumption (e.g., fire fighter training as on Table F-13).

46. Page E-2 and E-3. The Cal/OSHA Title 8 Pb in construction standard should be cited here and the 30 ug/dl promulgated blood Pb value used in worker risk evaluation. Further,

specific citation to the DTSC regulation or draft or interim final guidance is necessary to substantiate the statement." The point of departure for risk management is a 0.01 risk (?) of exceeding this value."

47. Page E-3. Appendix G Title. The Title and statement, "Exposure dose equations and exposure factor values for the inhalation of VOCs from groundwater pathway...", is puzzling since the authors have made the statement that domestic use of NAVSTA TI groundwater is not considered (p.A-5); thus, exposures via bathing, showering and associated volatilization are not considered? Perhaps the authors are referring to exposures to soil gas bearing VOCs here?

48. Table E-7. The inhalation rate used appears to be that of an adult; the child inhalation rate should be substantiated by reference to a standard physiology text or original paper. The rationale for use of Hawley (1975) for particulate concentration in air (0.07 mg/m^3) is necessary along with an explanation for how this value applies to NAVSTA TI. How can this value be justified for an island in the path of nearly continuous sea breeze? The Hawley figure in the absence of empiric data for NAVSTA TI appears arbitrary.

49. Table E-8. Provide a reference for the 120 mg/day soil ingestion rate from the literature or by citation to DTSC or U.S. EPA guidance.

50. Table F-1, F-2. In the absence of a "toxicity value" for diesel, no health risk has been calculated.

51. Table F-1. The site silver concentration in soil (4400 ppm) is remarkably high; no indication of the source or cause of this has been given. Perhaps there is an economic advantage to recover spent silver at NAVSTA TI?

52. Table F-1, F-2, F-3, F-4, F-5 F-6, F-7. In the absence of using a "toxicity value" for gasoline, no cancer risk or hazard index has been provided.

53. Table F-10. In presentation of HQ for child and adult, the total future resident value is given as 1.1 E-01 and 1.7 E-01 child/adult). Is this the ratio between child divided by adult?

54. The Table F-13 to F-46. The air lead concentrations used in each set of DTSC LEADSPREAD calculations should be justified by footnotes. Were these the actual measured concentrations

of lead in air at each areas? If so, cite to particular table in site characterization data summary.

The DTSC risk manager should make note of the lead found at the YBI Landfill. It may be since soil pH and environmental fate and transport data are not provided that lead and likely other metals like zinc and copper commonly found to co-localize with Pb in soil due to past human activities may represent soluble forms of the metal which have the potential to migrate to the Bay.

55. Table F-46. This table ends the quantitative estimation portion of the report. No consideration of groundwater exposure from irrigation with on-site fresh groundwater is given. More important, no discussion of movement of waste oils from seaplane maintenance, PCB storage and vessel waste oil recovery areas, the new fuel farm, the Navy exchange service station, the 5th Street fuel spill, tanks 103/104 with diesel at 2400 ppb, 3100 ppb and 7500 ppb and gasoline at 47000 ppb in groundwater to the Bay has been provided.

    What data are available to show that vinyl chloride should not be included in Table G-1 calculations? Parent PCE, TCE and the intermediate environmental microbial degradation product, 1,2-dichloroethylene, have been quantified in site groundwater.

56. Page G-2. The author should justify equation 1 which depends on the slab foundation assumption. Are all NAVSTA IT structures built on slab foundations?

57. Page G-5. The section 3.1 states that since "no building exists at Site 11, no complete exposure pathway exists"; no consideration of current occasional visit to the area has been undertaken. The DTSC risk manager should note the hazard quotients of 2.8 and 7.7 - values greater than the "noncarcinogenic point of departure (?) of 1" (section 3.2) The authors have elected not to calculate excess cancer risk for compounds in groundwater at Site 11 since "no carcinogenic toxicity values" exist. Using the gasoline and related values appearing in the attachments, cancer risk can be calculated for the YBI Landfill and other NAVSTA TI operable units.

BASELINE HUMAN HEALTH RISK ASSESSMENT. Text, Figures and Tables.

1. Page ES-2. Diesel and gasoline toxicity values provided by U.S. EPA are attached to remedy the problem pointed out by the authors here.

The conclusion that, "Table ES-1 shows cancer risks, hazard indices and blood lead levels...", is an overstatement of the situation. First, these are theoretical, calculated or estimated data; second, it is actually unlikely that worker or resident actual blood Pb values are represented by the figures presented in the tables.

The regulatory value stipulating 22 CCR 12711 as the no significant risk level should e included in paragraph 4 of this page. Adual Federal Register or California Regulatory Notice Register, citations should be given to substantiate the statement, "DTSC and EPA recommend a target excess cancer risk range for contaminated sites of excess cancer risk range for contaminated sites of 1 in 10,000 (1×10^{-4}) to 1 in 1 million (1×10^{-6})"; this reviewer is not aware of any such "target".

2. Page ES-3, E5-4. The document is problematic since a number of compounds were excluded from the risk assessment since "no toxicity values were available." References are attached which allow derivation of or use of U.S. EPA values with standard methodology for including those agents in the risk assessment.

3. Page ES-3. Calculated worker blood Pb values should be compared and contrasted with 8 CCR 1532.1 promulgated values.

4. Page ES-3. The authors should utilize ATSDR terminology regarding blood Pb values (cited Fed. Regist. 56 (110):26460-26564, 1991); there is no such value as a "benchmark" blood lead level.

   Contrast and comparison of site groundwater Pb and other metals should be made to 91-13 WQ (April 1991) and 93-5 WQ (May 1993) for all fresh and salt NAVSTA TI groundwater that is in communication with the San Francisco Bay. If site waters cannot be shown unequivocally to be isolated from the Bay, then it must be assumed that RWQCB Basin Plan values would be appropriate regulatory values for NAVSTA TI groundwater given the location of the site surrounded on all sides by the San Francisco Bay.

5. Page ES-5. The relative source contribution from bridge paint and vehicular exhaust to Pb in soil at site 11 should be quantified.

6. Page 1, Section 1.0, bottom line. No effort has been made to determine environmental impact of compounds found at NAVSTA TI on species other than human beings?

7. Page 4. Section 1.3.1. Although there may be some legitimate rationale for failure to collect "background" reference concentration data for TI, this cannot hold for YBI.

8. Pages 4-5. Data suitable for derivation of quantitative toxicity values for COC that do not have U.S. EPA IRIS or Cal/EPA OEHHA values are attached.

9. Page 5. The LEADSPREAD program was not actually developed by DTSC, rather it is a modification of a previous program developed by U.S. EPA.

The statement, "If 99 percent of the population is estimated to have a blood lead level less that 10 mg/dl, the estimated exposure is not of regulatory concern", should be deleted. The selection of the 10%, 5%, 2% or 1% and Pb in drinking water value is a risk management decision. Further, it is important to make adjustment as necessary for the bioavailability of the particular Pb form; for example, Pb fume as compared to slag remaining from steel operations. One of the particular differences in the DTSC program and the U.S. EPA program is the assumption that indoor air Pb is 100% of outdoor air for the former where it is 30% for the latter; other differences include dietary Pb at 13 ug/day (DTSC) vs. 5.7 (U.S. EPA) (55 mg/day, DTSC). The DTSC program incorporates a default value of 44% bioavailability; if this is not the case for the particular Pb forms at NAVSTA TI (not specified by PRC authors).

10. Page 5. Gasoline and diesel toxicity factors supplied by U.S. EPA are attached.

SUMMARY The main issues with which the DTSC risk managers should concern themselves regard the spilled fuels found at YBI landfill, the PCB equipment storage area, vessel waste oil recovery, Seaplane Maintenance areas, the new fuel farm, the exchange service station and the perchloroethylene (and perhaps its microbial degradation products TCE and cis/trans -1,2-DCE) at tanks 103/104 and 5th Street. No vinyl chloride data are given. The mean groundwater individual PAH concentrations at the YBI landfill (4-5 ppb) are several orders of magnitude greater than the 31 ng/L PAH 93-5 WQ regulatory values. There are no data presented for other compounds like non-volatile pesticides or metals in NAVSTA TI groundwater (e.g., PCBs, toxaphene, chromium, lead zinc) and no comparison to ARAR values has been attempted. In the absence of environmental fate and transport of these compounds in

relation to the Bay, the baseline risk assessment is not complete.

If you have any question regarding this comments, please call me at (510) 540-3809. I will coordinate any question you may have for Calvin Willhite.

Sincerely,

Thomas P. Lanphar

Thomas P. Lanphar, Project Manager
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Admin Records (3 copies)