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HUNTERS POINT
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June 3, 1994

Bill Radzevich
Department of the Navy, Western Division
Naval Facilities Engineering Command
900 Commodore Way,, Building 101
San Bruno, CA 94066-2402

Dear Bill,

Please find enclosed one copy each of ARCs comments on the Site Investigation Reports for Parcels C, D and E at **Naval Station Treasure Island, Hunters Point Annex.** Parcels C and D are presented together as there is considerable overlap in the general comments relevant to these areas. As you will see, we have a number of concerns ranging from data presentation to chemical detect levels.

We look forward to your receiving your response. If you have any questions regarding these comments, please contact me at (415) 495-1786.

Yours Sincerely,

Donald Meyers, Ph.D.

Comments on Parcels C and D Site Investigation Reports

Naval Station Treasure Island, Hunters Point Annex

San Francisco, California

General Comments - Parcels C and D

1) Non detect (ND) levels. There are numerous instances in which the ND levels for samples vary by more than an order of magnitude and several cases where the levels vary by two or more orders of magnitude (e.g. Parcel C, for a large variety of chemicals at PA30B012 at 0.75 ft. and 5.25 ft where ND levels range from about 360 ppb in the latter to 100,000 ppb in the former; Parcel D, vinyl Chloride at PA50CB401 and 402 where ND levels are 15 and 5000 ppb respectively). In some cases, typically those for the common ions (Fe, Ca etc.) this is not particularly disturbing. In other cases, however, such as those involving potentially very toxic substances (e.g. vinyl Chloride as noted above and benzo(a)pyrene in samples taken at PA49TA05 and 06 where ND levels vary by about three orders of magnitude), acceptance of substantially higher ND levels requires a supporting rationale.

2) Health Based Levels (HBLs). Harding Lawson Associates are to be commended for the considerable effort that they have expended in compiling the comparisons of sample levels, HBLs, IALs and MCLs (Appendix I). In examining this and other similar documents, however, the reader cannot help but become curious as to what the actual cutoff values are for the sampled chemicals. As the site-specific terms in the equation used to calculate HBLs have been determined, it would be a simple matter to compile a table for each risk level/type, receptor and major exposure pathway, indicating the value (i.e. ppm, ppb) at which a chemical is assigned an HBL label . As this information would be relevant to the site as a whole, it could be published as an single addendum. Relevant Interim Ambient Levels (IALs) and Maximum Contaminant Levels (MCLs) could also be included.

3) Interim Ambient Levels (IALs). A section dealing with the derivation of IALs or a citation referring to the document containing the necessary information should be provided. Appendix I includes IALs only for inorganic contaminants. Presumably, IALs for some organic compounds will be zero. Have IALs been determined for organic contaminants? If so, a citation indicating the source document should be provided or better still, the material should be included in the SI report.

4) Possible Resource Conservation and Recovery Act (RCRA) compliance issues. Table 2 indicates the presence of a large number of storage containers in a variety of conditions (open, leaking, etc.) holding known and unknown liquids. While this inventory is useful, there is no indication that this material/waste is being stored/handled correctly or that there is any site-wide program dealing with this problem. It seems likely that in many instances compliance with the requirements of RCRA is lacking.

5) Soil and ground water samples under buildings. In a number of cases, there has been inadequate investigation for contamination under building floors and foundations. Floors, concrete pads and asphalt should not be considered as caps. As it cannot be assumed that floors will not be breached in the future or that demolition and new construction will not occur, the value of knowing the level of contamination under buildings at this stage of the closure process should not be under estimated.

6) Pursue origins of contamination reaching storm drains and catch basins. While removal of contaminated sediment and further sampling near some catch basins has been recommended, failure to determine and eliminate the source of contamination will result in a reoccurrence of storm water contamination.

7) Asbestos. Table 2 shows that many buildings contain friable asbestos. Recommendations rarely mention asbestos mitigation. If asbestos is not friable, it should be stated explicitly or a blanket statement should be made early on in the report to the effect that the use of the word "asbestos" is equivalent to "unfriable asbestos". The former is preferred. If remediation is required, the extent and locations of the problems should be summarized and the report in which this information is available referenced in the text of the SI report.

8) Hydrogeological Investigation. Visualizing the hydrogeological conditions and the spatial distribution of contamination would be greatly assisted by the inclusion of cross sections showing the lithology.

A summary of hydrogeological parameters should be included or at a minimum, the document in which these can be found should be cited.

9) Free Product. If the phrase "free product" refers to non aqueous phase liquids (NAPLs), then the latter term is preferred. NAPLs may be mobile or residual and lighter or denser than water. None of these descriptions equates to "free". Characterization of NAPL properties is essential for the formulation of successful soil and groundwater remediation strategies.

10) Total Petroleum Hydrocarbons (TPH). Identification of contamination as TPH or as some fraction of TPH is only useful as a screening tool. Neither a solubility nor a molecular weight can be assigned to TPH making most calculations involving contaminant petroleum hydrocarbons impossible. In addition, any risk assessment based on TPH concentrations is essentially meaningless. Presumably RI phase analysis will specify the petroleum hydrocarbons involved.

11) Sandblast Grit. It appears that sandblast grit has not been tested for radioactivity. As repair and maintenance of vessels exposed to radioactive fission products or which produced radioactive materials as part of their normal operation was conducted at Hunters Point, it stands to reason that sandblast grit at certain locations may be

radioactive. If this problem has been addressed in another investigation, the report in question should be cited.

12) Risk Assessment. In general, people will be exposed to mixtures of toxic agents at this site. It appears that the underlying approach to this problem has been to consider that toxic affects of mixtures of chemicals is equal to the sum of the toxic effects of each chemical alone (i.e. the toxic effects are additive). One group of chemicals for which this approach may be inappropriate is the polycyclic aromatic hydrocarbons (PAHs). Although Appendix F of the Parcel A SI report states, "In all cases, however, animal experiments have shown that most PAH mixtures are much less potent than benzo(a)pyrene or individual PAHs (ATSDR 1989a).", reference to ATSDR 1993 (Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs), Update) offers a number of examples of toxicologic synergy and potentiation as well as antagonism. It therefore appears necessary to reexamine the original assumptions underlying the toxic effects of exposure to mixtures of PAHs and highlights the need to update the risk assessment as new information comes to hand.

It is not clear why the particular method for calculating exposure point concentrations in water (EPC_w) was used, when this can be measured directly or calculated from the contaminant concentration at or near the water table.

The use of an environmental attenuation factor (EAF) of 100 is also questionable. As this figure has been adopted by the Central Valley Division of the California Regional Water Quality Control Board, it presumably reflects conditions and contaminants found in that region. No case has been made for such similarities at Hunters Point. In view of the lithology seen in boring logs, the fraction of organic carbon is probably quite low which would result in higher-than-expected contaminant mobility.

"Chemical-specific" K_ds for certain metals are listed in Table H-3 but it is not clear how these were derived. The K_d for any chemical is at least partly site specific. A minimum requirement is knowledge of the fraction of organic carbon in the soil. In addition, metal solubility is affected or related to other parameters such as pH, dissolved oxygen concentration (DO) and oxidation potential (E_h). For instance, at low DO and negative E_h (conditions usually found in the center of petroleum hydrocarbon plumes), iron solubility may rise by two orders of magnitude (Buscheck et al., Proceedings of the Conference on Petroleum Hydrocarbons and Organic Chemicals, 1993).

13) Sanitary Sewer System. The sewer system appears to be in poor condition and is continuing to deteriorate. While there are various recommendations for further sampling and monitoring, there is no plan for repair or overhaul. As it will be some years before these parcels will be transferred, a plan that addresses this problem seems necessary.

It is not clear whether there is any co-localization of water, sewer and electrical systems. A clear statement on this matter is required as it may have a significant impact on remediation options.

General Comments - Parcel C

1) Hydrogeology. Given the number of monitoring wells in parcel C, the inclusion of hydraulic contours is virtually meaningless. Given the variety of contaminants in soil and groundwater and the high concentrations in which some of these are found, thorough characterization of the A aquifer is essential, if subsurface remediation is to have any chance of success. While various work plans indicate that further wells are to be installed, the existence of a parcel/site-wide ground water monitoring strategy is not apparent. The relevant documented should be cited in the text.

Specific Comments - Parcel C

PA 45, Steam Lines. It is concluded that, as there is no oil contamination within utilidors or steam lines in Parcel C, they were not used for waste oil transfers and thus release to the environment could have occurred. Figure 7B, however, shows that a considerable portion of the steam line system was not investigated. Areas of particular concern include the north side of Dry Dock 4 and berths three, four, six, seven, eight and nine. Further investigation of the system seems appropriate if the original conclusion is to be accepted.

PA-49, Fuel Distribution Lines, Building 203 System. Total petroleum hydrocarbon (TPH) and mercury contamination in this region is substantial. In view of the finding of NAPL and a measured concentrated of TPH of 210 g/Kg at PA49TA05, the suggested work plan for this area is inadequate. A number of factors suggest that a more expansive work plan is appropriate.

The large concentration of TPH and the presence of NAPL virtually ensures that the ground water will be saturated. Defining the nature and extent of the NAPL(s) should be a major objective, as failure to do so will jeopardize all other soil and groundwater remediation actions. The fact that sampling to the south of PA49TA05 shows substantially lower TPH concentrations suggests that further sampling to the north is warranted. If the lateral extent of the contamination is to be determined, then additional sampling points to the east and west of the fuel line will be necessary. This would include foundation borings in Building 203.

A thorough characterization of this region is important as contaminants are in close proximity to the A aquifer and the storm water systems associated with drainage areas E and I which have outfalls emptying directly into San Francisco Bay. The unknown flow characteristics of the A aquifer and the possibility for tracking of contaminants

through the drainage and sewer-system back fill give rise to many contaminant migration scenarios.

PA-49, Fuel Distribution Lines, Building 205 System. The main contaminants of concern in this area are Hg, As and benzo(a)pyrene. Further investigation of the heavy metals has been recommended. At least two factors suggest that further investigation of the region contaminated by benzo(a)pyrene is warranted. First, the concentration of benzo(a)pyrene (BaP) was sufficient to yield an HBL_c exceeding 10E-06 and several other polycyclic aromatic hydrocarbons (PAHs) were found in the same region. Second, most of these compounds are either directly carcinogenic or may become so following biotransformation. Thus, although the concentrations of each compound (except for BaP) may be below the HBL_c there is the possibility that contaminated dust from this area will have potential for carcinogenicity.

PA-50, Storm Drains. The Building 205 area is not included in the drainage map. Presumably this means that there are no storm drains or catch basins in this region. If so, it should be stated explicitly.

PA-50, Sanitary Sewers. Very little sampling of sewer water has been conducted. While this may be acceptable in reaches that are in good condition (e.g. reach 3), reaches in poor condition, such as reach 4, which has sagging and corroded pipes, broken joints, damaged manholes and design deficiencies (YEI, 1988a) demand closer attention.

It appears that only one sewer water sample has been taken in reach 4. The presence of fecal coliform in ground water at this location (PA50MW04A) highlights the need for further sampling and physical inspection of the system. In addition, it is not clear that the sewer system is completely isolated from the storm drain system which is highly contaminated in places with PCBs, chlorinated solvents and a variety of heavy metals.

From the above, it seems reasonable to conclude that there is considerable potential for the spread of certain contaminants throughout the site and possibly off site via the sewer system. The proposed work plan consisting of a soil boring and monitoring well at the one site originally sampled is inadequate.

Investigation of the sewer system should include soil boring/hydropunches at regular intervals along the line or at sites where fluid exchange is thought likely to occur. The existing A-aquifer water-level maps are inadequate to identify these regions. If more detailed maps exist, the document(s) containing these maps should be cited. Sewage fluid should also be sampled at the point where it reaches pump station A.

PA-51, Former Transformer Locations. Investigation and sampling of these areas has been thorough. It is debatable, however, whether the proposed work plan is adequate. Reuse already includes the presence of commercial workers who face a cancer risk

from PCB exposure of 10E-06. While this is currently considered adequate for the protection of human health, the PCB concentrations in the soil are far greater than levels considered to be supportive of basin plan marine water quality goals. This is an important consideration as a number of contaminated areas are less than 100 ft from the shoreline (PA51SS08, SS13, SS18) and a variety of routes exist by which contamination could reach San Francisco Bay. Even when using generous EAFs, meeting marine water quality goals requires PCB concentrations less than 0.01 ppb (Marshack's method, silt and clay soil, EAF = 100, < 10 ft to ground water).

PA-27, Building 205. No remedial action has been recommended for this building, although only one sample (from the pump chamber) was taken for analysis. A number of additional concerns need to be addressed. First, building 205 contains friable asbestos (see Table 2) which should be removed. Second, no sampling or physical inspection of the oil-containing lubrication pans is described and there is no mention of plans to remove the oil or check the integrity of the pans. The oil pans must be considered a potential source of future contamination. Third, there is no description of the condition of the floor (cracks, stains, etc.) and no foundation boring has been performed (see General Comment # 1). Clarification of the fate of storage containers is required.

PA-28, Buildings 211/253. Overall, the investigation of these buildings has been adequate. There appears to be room, however, for a slightly more expansive work plan. An additional soil boring/Hydropunch transect between the south west corner of Building 253 and Nimitz Avenue would, in combination with the proposed transects, help determine whether the large variety of PAHs found in soil boring PA28BO29 are migrating southward. Similarly, the work proposed for sampling under the hazardous materials room should be extended to the south to determine the extent of contamination.

Table 2 lists a bulging rectangular tank with unknown contents in Building 211, and two 55 gallon solvent tanks, another 55 gallon tank with unknown contents and asbestos in Building 253. There is no discussion of these problems in the text.

PA-28, Building 219 (Substation E). There is a conflict between Table 2 and the text of the SI. The latter states that the PCB-containing drums identified by ERM-WEST in 1988 were not present during the SI in 1993 while Table 2 states that three PCB-containing 55 gallon drums are present. This needs to clarified along with the need for any RI action.

PA-28, Building 231. This building has been thoroughly investigated and the work plan is comprehensive. Two points need to be clarified. First, is the asbestos present friable and second, what was the fate of the three storage containers (acid, oil and unknown) found during the preliminary assessment.

PA-28, Building 230. Table 2 indicates the presence of a number of polyurethane-containing 55 gallon drums. It is not clear whether these are present as part of ERMICOs ongoing operations or whether they have been abandoned. Oil stains indicating drainage toward a storm drain are also present but it is not clear whether soil samples were taken (e.g. as part of PA28BO21) or whether the origin of the stains was identified. No foundation boring has been performed, presumably due to the presence of ERMICO. It should be noted that ERMICO is not listed as a tenant in Table 2.

PA-28, Building 258. Table 2 lists a large number of potential contamination sources including asbestos pipe lagging and a variety of tanks and pickling drains which are not addressed in the text, either in terms of sampling or proposed RI action. Given the number and concentration of PAHs at PA28SS82, deeper samples should be taken to confirm that the contamination is limited to surface soil.

PA-28, Building 270. Catch basin PA28SW66 has been identified as a significant source for contamination to soil and A-aquifer groundwater, depending on the integrity of the basin. Given the high levels of a variety of contaminants (e.g. PCE 67 g/kg, Pb 14.6 g/Kg), contamination will be significant irrespective of the integrity of the catch basin. The state of the basin will simply determine the migration path of the contamination. As the catch basin is suspected to be bottomless, a soil boring/Hydropunch sequence surrounding the catch basin (including a foundation boring) would seem more appropriate than the indicated plan (in which samples are to be taken only to the south). In addition, hydropunches to the south of Buildings 270 and 271 are necessary to determine whether contaminants (e.g. PCBs and Pb) are migrating toward the bay which is less than 300 ft away. Clarification on the fate of the two storage tanks with unknown contents and the presumably empty 55 gallon drum is required.

PA-28, Building 271. In view of the fact that Building 271 was used for painting, sandblasting and curing, the lack of sampling inside the building is difficult to understand. The previous activities suggest the possibility that a number of contaminants may be present, particularly solvents and sand blast material. In fact Table 2 indicates the presence of two spill areas and friable asbestos. None of these have been addressed in the text. Foundation boring/Hydropunchs should be performed at the spill sites.

PA-28, Building 281. It is not clear whether the asbestos in Building 281 is friable.

PA-29, Building 203 and Associated Kiln Room. Petroleum hydrocarbon contamination in this area is substantial (210 g/kg). The work plan does not appear to be adequate to map the extent of contamination, in that neither foundation borings nor soil boring/Hydropunches to the north of the main contamination site (PA49TA05) are planned. Given the proximity of groundwater and the fact that one reach of the storm

drain system is adjacent to Building 203, the absence of a sampling plan in this region is difficult to understand.

The distribution and nature of TPH present as a NAPL must be determined as it will affect the remediation options in this area. (see also PA-49 Fuel Distribution Lines, PA-30 Building 241 and General Comments 5 and 6)

PA-29, Buildings 275/282. There are a number of concerns with the work plan for these buildings. First, there is need for at least one sampling/monitoring point at the south east corner of Building 275 to track the petroleum hydrocarbon contamination from Building 203. Second, the variety and concentrations of PAHs and the high level of As associated with the sandblast material in Building 282 suggests that further sampling, including a foundation boring is necessary. As some of the PAHs were also found in soil, further soil sampling to the north west of building 282 seems appropriate. Third, the storm drain and soil boring between Buildings 203, 275 and 282 yielded large concentrations of Al (46-55 g/Kg). While no levels protective of marine water quality have been suggested, those protective of drinking water, fresh water and fresh water aquatic life are 1 ppm or less. Using an EAF of 100 brings the corresponding soil level to 100 ppm or less. As the measured concentrations are about 500 times this level, further investigation of Al contamination is warranted. The fate of inventoried chemicals and storage containers needs to be clarified.

PA-29, Buildings 217/279/280. The investigation of these buildings and the surrounding area has been thorough and the work plan addresses virtually all the identified problems. An additional soil sample at PA29SB10 (sand blast material at Building 217) would aid in determining the origin of the PAHs which are above the HBL_c. The fate of friable asbestos in Building 217 and the storage containers holding unknown liquids in Building 279 requires clarification.

PA-30, Building 241. Substantial BTX and TPH contamination exists under Building 241 and in surrounding soils and includes the presence of a NAPL(s) at the ground surface and the soil/bedrock interface in the south east corner of the building. The boring log PA30BO12, suggests the possibility that both D- and L-NAPLs are present. The distribution and nature of NAPLs in the vadose zone must be determined.

The major concern here is the recommendation to sample the bedrock to establish the lateral and vertical extent of contamination. A number of points need to be considered prior to any invasive sampling of the bedrock. For example, is removal of contaminated bedrock a viable remediation option? If not, there seems little point in sampling it. What will be the consequence of accidently or intentionally drilling into the bedrock aquifer? Presumably there is an upward pressure gradient from the bedrock aquifer. If so, what is the likelihood of contamination infiltrating this aquifer via the bedrock if it left intact? In short, the probability for successful investigative

and remedial action needs to be very high to warrant the risk of polluting the deeper aquifer.

Also of concern is the fate of the 200 lb cyanide storage tank and the two 1500 gallon oil-containing steel-quenching tanks. It is not clear whether the asbestos present is friable.

General Comments - Parcel D

1) Groundwater Sampling and Monitoring. In general, groundwater sampling and monitoring in Parcel D has been thorough and is far superior to that encountered in Parcel C. There remain, however, some areas where additional monitoring should be considered. In particular, there is a corridor some 1,400 ft long (and about 600 ft wide at its minimum) starting at PA-44 and heading approximately SSW, finishing at berth 21 which lacks groundwater data. In view of this, at least one of the soil boring/Hydropunches proposed in the PA-55 work plan should be made a permanent monitoring well.

2) Pesticide Contamination. Relatively high levels of pesticide (including 4,4'-DDD and 4,4'-DDT at 50 and 19 ppb at PA36BO19) were found in the north western section of Parcel D, most notably in the north/south corridor formed by the PA-36 area. There are two points of concern here. First, it follows that as a large number of pesticides have been identified and are relatively confined to PA-36, some form of release must have occurred here. Efforts should be made to identify the source of the contamination. Second, most of the samples in which pesticide was found were from soil borings and groundwater samples. As the main exposure route is via ingestion and dermal contact with contaminated soil and dust, HBL values should also be calculated from pesticide levels in surface soil samples and indoor dust samples.

3) Investigation of Fenced Areas. There are two fenced areas that appear not to have been examined. One of these is associated with Building 365 (west of PA-44) and a large area south of PA-44. The exclusion of these areas from investigation requires a supporting rationale.

Specific Comments - Parcel D

PA 45, Steam Lines. Overall, investigation of the steam line system has been adequate. Three areas of concern remain. First, no samples were taken at test pits PA45TA14, 15 and 16, no doubt because of the lack of visible contamination. As there is no other analytical data on the soil along this reach of the system, soil samples should be taken from these pits for laboratory analysis. Second, there is no plan to sample the sand blocking access to a portion of the steam line system along Manseau Street. As there is a good chance that the sand is actually sandblast material, there is also a good chance that it is contaminated. This material should be analyzed and if necessary

added to the grit-fixation program. Third, there are several portions of the system which have not been investigated. Of particular interest are the short segments serving Buildings 323, 324 and 364, and Building 411. Past and present activities in Buildings 323 and 324 are not listed. Building 364, is the former National Radiological Defense Laboratory and is known to contain "potentially very dangerous" chemicals. Building 411 is also known to contain a variety of dangerous contaminants. These sections of the steam line warrant further inspection.

PA-48, Suspected Steam Line. The structure detected in this investigation is a long length (approximately 2,500 ft) of corrugated and perforated steel pipe which appears to be part of the storm drain system. It parallels part of the drainage system in areas A and H. A number of points remain to be clarified. First, is the pipe capable of conducting any significant flow? Second, as the pipe was traced to a storm drain near PA48TA01, what is the likelihood for transfer of contaminants (in either direction)? It should be noted that the point of connection is not marked on Plate 10 or the Plates showing the storm drain system. What area is drained by this system and what is the potential for contaminants in these areas to reach the system? Finally, as the pipe is perforated, waterborne contaminants will tend not to travel any great distance before migrating into surrounding soils. Can a single test-pit sample be used to characterize this 2,500 ft length of the storm-water drainage system?

PA-50, Storm Drain and Sanitary Sewer System. Investigation of the storm-drain system has been adequate and the work plan addresses the problems uncovered during this phase of the work. What is lacking in the recommendations is an indication of the importance of the order in which the work is be performed to ensure the success of any remedial action. Establishing the configuration of the system, removal of contaminant sources and separation of the storm-drain and sewer systems prior to sediment removal is essential if the build up of contaminated sediment in the future is to be prevented. Sediment removal appears first in the work plan summary.

It appears that the H and Cochrane Street reaches of the sanitary sewer system have not been sampled. A statement to the effect that no sampling was necessary for whatever reason(s) should be included in the text. It also appears that the outflow from Pump Station A is not monitored. The value of being able to demonstrate the levels of contaminants in the sewage leaving the site should be considered.

PA-32, Regunning Pier and Building 383. There are two main concerns with the investigation of this area. First, there has been no soil sample taken under Building 383. If this is the result of the building being in use, it should be stated explicitly. Second, it appears that the mock submarine missile launch tube has been overlooked. It does not appear on site maps and is not mentioned in the text. A physical inspection of the tube and any associated pipe work or equipment should be conducted to ensure that it is contaminant free.

PA-33, Buildings 302, 302A and 304. Investigation of these buildings and the immediate area has been adequate and the work plan addresses all of the problem areas identified. the work plan and the groundwater monitoring system would be improved, however, by the addition of a monitoring well just to the west of building 302A, roughly equidistant from wells PA55MW11A and IR09MW31A. This would provide hydrogeologic information in an area where no monitoring is currently performed.

Clarification of the fate of the various liquids stored in these buildings and the state of the asbestos is required.

PA-33, Buildings 364, 411 and 418. The investigation of these buildings has been thorough and the work plan addresses the identified problems. If possible, a foundation boring should be made in Building 418. Again, clarification of the action to be taken on the large volume and variety of stored liquids in Buildings 411 and 418 is required. The form of asbestos present in these buildings is not stated. ARC eagerly awaits completion of the report on Building 364.

PA-34, Buildings 351 and 366. No foundation borings have been performed in Building 366 despite the presence of oil stains on the floor, the presence of leaking drums and floor drains with unknown termination points and a highly contaminated storm drain PA34SW07 immediately to the north. The text should contain a statement giving reasons why investigation of contamination under Building 366 is unnecessary.

Clarification is required regarding the fate of stored liquids, adhesives and debris and the form of asbestos in Building 366.

PA-35, Buildings 274 and 306 and Area Bounded by Manseau, Morell and E Streets. Investigation of contamination under Building 274 should be conducted. Table 2 lists the presence of a sump but there is no mention of this in the text. The form of asbestos present in Building 274 is not stated. The valence state of the Cr found in the floor drain samples is not stated.

An inventory of the types of compounds stored in the area bounded by Manseau, Morell and E Streets is lacking. It is therefore difficult to determine whether this area has been adequately investigated. Efforts should be made to establish what was stored and how it was stored. The fact that part of the area is fenced suggests the storage of hazardous waste or materials.

Plate 31 indicates that Building 372 and surrounds has also been investigated. There is no description of this in the text and it is not listed in Table 2. The type of information supplied on the other buildings investigated should also be supplied for Building 372.

PA-36, Buildings 371, 704 and Surrounding Area. Further description of the inspections conducted in Buildings 371 and 704 are necessary to justify the absence of sampling in and under these structures. The presence of petroleum hydrocarbons in soil and groundwater in close proximity to Building 371 highlights the need to define the extent of this contamination. As maximum concentrations of TPH occur at around 11 ft, soil boring/Hydropunches should go at least to this depth. It should be noted that boring PA36BO24 reached only 6.75 ft but that the TPH concentration was double that seen in samples taken at the same depth in PA36SB23 some 100 ft to the north west. Samples from the latter boring at 11.75 ft proved highly contaminated (2.4 g/Kg). No indication is given as to the extent of paving in the Building 371/704 area.

The Building 371 area appears to be a local groundwater high, raising the possibility of contaminant migration to the south anywhere between 090 and 270. In view of the TPH contamination it is important to place a monitor well to the west. Soil boring/Hydropunch BO67 would be adequate for this purpose.

A notable feature of the soil borings taken throughout the PA-36 region is the presence of a large variety pesticides. As the main pathway for these compounds to exert toxic effects is via ingestion and dermal contact with contaminated dust, analysis of surface soil samples, dust samples from buildings and air flux chamber measurements are required to establish the health risk. The possibility that the various compounds may act in synergy, should be investigated as it will affect the HBL.

Clarification regarding the fate stored liquids and batteries in Building 704 is required.

PA-36, Buildings 400, 404A, 405 and Area West of Building 405. Overall, the investigation in this area has been thorough. There are, however, a few areas of concern. First, the area west of Building 405 contains a building labelled 710 which is not discussed in the text or listed in Table 2. Second, clarification is required regarding the contents and fate of the open and damaged drums and cans in this area.

As noted above, further sampling of pesticides should be undertaken.

Clarification regarding the fate of stored liquids in all buildings and leaking oil containers and transformers in Building 400.

PA-36, Buildings 406, 413 and 414. Investigation of this area has been thorough. Foundation borings should be performed to establish the level of contamination under each building. Again, the work plan needs to be expanded to establish the health risk associated with exposure to pesticide-contaminated dust.

Clarification is required regarding the fate of the various stored liquids and damaged drums in all three buildings and the form of the asbestos in Building 406.

PA-37, Buildings 401, 435 and 436. It is not clear whether a thorough physical inspection of Buildings 401 and 435 has taken place. Table 2 notes the possibility of a sump in Building 435 but the work plan makes no mention of further investigation. Given the level and variety of contaminants that have reached the storm drains in this area and the presence of USTs and contaminated soil immediately to the east of Building 435, investigation in and under these buildings is warranted. Soil boring/Hydropunches would also provide information on groundwater levels which is lacking for the entire PA-37 area.

Clarification is required regarding the form of asbestos in Building 401.

PA-39, Building 505 and Area West of IR13. Investigative and proposed work for soil and ground water in this area is thorough. There appears, however, to have been little investigation of Building 505. Considering past activities and the presence of tennis courts, it is not unreasonable to imagine reuse of this building. Thus, investigation should include some statement as to the buildings general state of repair and analysis for lead (from paint) and PCBs (there are 3 transformers present) should be conducted.

Clarification regarding the form of asbestos present and the fate of the 55 gallon drum containing an unknown liquid is required.

PA-44, Buildings 408, 409, 410, 438 and Metal Shed. Sampling and description of this area appears to be inadequate. From the text, it is difficult to determine what type of structures are in this area (e.g. are they fully enclosed buildings?). In addition, there has been no sampling in Buildings 408, 409, 410 or the metal shed. If there is any possibility that these buildings may be occupied in the future, then sampling must be performed. In addition, the south west area of PA-44 contains contaminated sumps and floor vaults and Pb-contaminated groundwater and is immediately adjacent to PA-33. As the direction of groundwater flow cannot be determined from the present data, migration of contaminants from adjacent regions into PA-44 cannot be excluded. Thus soil and ground water samples in the north west portion of PA-44 should be performed.

PA-53, Buildings 525 and 530. Two areas of concern remain in PA-53. First, high levels of PCBs and Pb were found at PA53SS09 adjacent to Building 530 and yet no investigation of soil or ground water under the building was conducted. Second, there is no apparent source for the high levels of 4,4'-DDT found at PA53SS11 in Building 525. As ingestion and inhalation of DDT-contaminated dust constitutes the main exposure pathway, surface soil samples should at the south west corner of Building 525.

Clarification is required regarding the form of asbestos in Building 525 and the fate of waste oil stored in Building 530.

Comments on Parcel E Site Investigation Report
Naval Station Treasure Island, Hunters Point Annex
San Francisco, California

General Comments

1) Citations. In cases where omission of data and/or descriptive material is acknowledged and is justified on the basis of prior publication, the relevant reference should always be cited. If space permits, a brief summary should also be provided.

2) Absence of Radiological Information. Parcel E contains buildings that were part of the National Radiation Defense Laboratory (NRDL) and is known to contain radioactive debris. In spite of this, there is a notable lack of information and citations regarding potential radiation hazards in this area.

3) Petroleum Hydrocarbons/Total Oil and Grease (TOG). The questionable origin of TOG in samples taken at PA-38 highlights the need for a more refined analysis. In the absence of positive identification, arguments pertaining to environmental impacts and toxicity must be considered highly speculative. If further analysis is to be performed during the RI phase, it should be stated in the text of the relevant "Discussion and Recommendations" section.

4) Risk Assessment Summary. The risk assessment covers PA-39 which includes the former NRDL animal facility. As no radiological information has been provided, the basis of the excess cancer risk estimates is unclear.

Specific Comments

PA-45, Steam Lines. Two points remain to be clarified. First, there appears to have been no inspection or sampling of the soil at the end of the steam line south of Building 521 despite the presence of viscous oil in the line which is buried directly in the ground. If the condition of the soil in this region has been reported elsewhere, the relevant document should be cited and a brief summary provided. Otherwise, sampling is necessary. Second, Hg and As were found in soil samples from PA45TA19 at levels exceeding various HBLs. Further investigation is required to determine the extent of this contamination.

PA-47, Fuel Distribution Lines. It appears that there has been no investigation of the fuel oil receiving station at Berth 29. This seems to be a rather obvious point where spills may have occurred during fueling operations. Plate 10 indicates that approximately 400 ft of fuel line has been removed in the vicinity of tank S-505 rather than 140 ft as stated in the text. There appears to have been no sampling at S-505 where both fuel lines and a contaminated steam line terminate. If this sampling has been reported elsewhere, the relevant document should be cited and a brief summary provided.

Analysis of soil samples from PA47TA04 at 2.25 ft indicate the presence of a variety of pesticides. As the main exposure pathway for these compounds is via ingestion of contaminated soil and dust, analysis of surface soil samples would be more appropriate.

PA-50, Storm Drain System. Investigation and recommendations for PA-50 appear to be adequate. There are, however, some minor problems with Plate 12. Test-pit symbols for PA50TA13 and 14 appear to be absent and there is an arrow head with a dashed tail in the south east corner of the parcel which is not defined in the legend accompanying Plate 12.

PA-50, Sanitary Sewer. A number of inadequacies are evident in the reporting of the sewer system sampling. First, PA50MW10A does not appear in Appendix D (Boring Logs and Well Completion Details) and the analytical results for the well water are not included in Appendix F (F13 or F14) thus excluding the possibility of examining detect levels. The full analytical report should be included in Appendix F.

It is stated that analysis of fluids from sewer vault locations that may be acting as groundwater sinks and sources would be performed ("5.4.2.2 Field Investigation"). If this has been performed for the latter, the data should be included, as should any relevant data from existing wells located along the sewer line (e.g. various wells associated with IR02).

The sample locations labeled on Plate 14 are barely readable.

PA-38, Former Buildings 507 and 509. Further explanation of the analysis for TPH/TOG is required, as it unclear how the relationship between TOG levels and petroleum hydrocarbons was evaluated. In other words, how does the analysis at PA38SS03 demonstrate that "...the majority of the TOG is not petroleum hydrocarbon...". The conclusion of this statement suggests that the TOG is another type of hydrocarbon to which the HBL (presumably the TOG HBL) does not apply. While this may be the case, it sheds no light on the toxicity of the detected compound. Identification of the compound and the calculation of an HBL is required before the recommendation that no further investigation is necessary cannot be accepted.

PA-39, Building 707 NRDL Animal Colony. Additional information pertaining to past activities in this building is necessary in order to assess the adequacy of the investigation. For instance, it is not clear whether this building contained radiological materials. As the facility was used to house experimental animals it is possible that both radioactive substances were stored and administered on the premises. There is also the question of the disposal procedures used for contaminated fecal matter, urine, bedding material and animal carcasses. If animals were exercised outside the building (possibly in the immediately adjacent fenced areas) there is also the possibility that contamination in these areas. If this information can be found in another report, a summary of the information and a citation should be provided.

Some clarification of the analytical results is required. Arsenic (and Be) are listed in Table I-17 as exceeding HBLs in a large number of cases assuming risk levels of either 10E-6 or 10E-5. Surprisingly, this information is not listed in the summaries on Plate 17 or mentioned in the text. No explanation is given for the lack of IALs for As and Be.

Conversely, asbestos appears in the summaries on Plate 17 but is absent from Tables I-17, 18 and 19. Again, no explanation is provided for the lack of an IAL.

The shed containing rubbish including paint cans and car batteries is not marked on Plate 17 and it is not clear how the contents of the 55 gallon drums was determined.

PA-40, Building 527 Electrical Substation. Building 527 is not marked on Plate 3.

PA-52, Offsite Railroad Right-of-Way. In general, the investigation and work plan for PA-52 appears to be adequate. The main area of concern is the relatively high level of PCBs found at PA52SS01. In the absence of a transformer site at this location and the presence of PCBs at only one other sample site in this PA area, where PCB levels were more than three orders of magnitude lower, suggests that further investigation should be performed at PA52SS01. The current work plan shows only one soil boring approximately 110 ft to the west (185 ft if Plate 18 is used, see below). It should be remembered that subsurface contaminants need migrate only a short distance before entering public and private property.

It should also be noted that the location of PA52SS01 in Plate 18 is approximately 75 ft east of that shown in Plate 19. This discrepancy should be rectified.

PA-54, Former Building 511A Woodworking Hobby Shop. The Analytical results show the presence of numerous carcinogenic PAHs in sample PA54SS01 at former Building 511. As the sample is a composite from two sites, one being inside the building footprint and the other outside, it is not possible to determine whether the PAHs are spread between the two areas or concentrated at one. The latter case may indicate the presence of a significant source of PAHs. In addition, as the level of benzo(a)pyrene alone is sufficient for it to exceed certain HBLs, it is difficult to see why the total for the carcinogenic PAHs fails to exceed any HBLs

Sample site PA54SS02 is marked at two different locations on Plate 20. This discrepancy should be rectified.

PA-56, Area VII, Railroad Tracks and UST Site 28. There are a number of concerns with the investigation of this area. First, PA56BO01 shows four PAHs above HBLs (10E-06) and a total for carcinogenic PAHs 2.36 mg/kg. A rationale for the lack of further investigation appears necessary. With respect to PA56BO04, which has substantial levels of As, it cannot be assumed at this point that contaminants measured at a few ppm above the IAL will not require cleanup. Delineation of contaminated areas now may save further problems after cleanup goals are established. The report containing the field investigation and results of the UST Site 28 closures should be cited. Simply stating that "...results were presented elsewhere and not presented here." is not very helpful.