N60028_000824
TREASURE ISLAND
SSIC NO. 5090.3.A

MEMORANDUM

TO: **Treasure Island Restoration Advisory Board and Jim Sullivan, EFA-West**

FROM: **Paul V. Hehn, Treasure Island RAB - Technical Subcommittee Chair**

DATE: **January 23, 1998**

RE: **Comments on Document: DRAFT "Corrective Action Plan Sites 04/19, 06, 14/22, 15, 16, 20, and 25"**

The following are my comments on the above referenced document. I have divided my comments into two sections. The first section is on general comments the apply to all sites reviewed for the entire Corrective Action Plan (CAP) report. In section two comments, questions and concerns expressed for individual sections of the CAP.

DOCUMENT:

DRAFT - Corrective Action Plan

General Comments and Concerns

1. The entire plan is based on the assumption that the soil and groundwater toxicity cleanup screening levels proposed by the Navy will be accepted at their current levels (14.3 mg/L for water and 430 mg/kg for soil) by the Regional Water Quality Control Board (RWQCB). These levels have not as yet been accepted by the RWQCB, and the indication that I get is that the RWQCB is pushing for levels to be approximately an order of magnitude lower than those proposed by the Navy. At a much lower concentration, the entire CAP would need to be revised and

redone including the basic assumptions, costs and planning. At the lower cleanup levels, the dig, haul, thermal destruction/recycling scenario used for many of the sites considered in the CAP may no longer be the best available technology or the most cost effective. Also larger impacted would also results that could affect future reuse efforts. The entire CAP would need to be significantly, if not entirely, redone.

2. There is a question if the RBCA approach to the risk assessment for the CAP sites will be acceptable to the RWQCB. Has this approach already been approved by the RWQCB? It is my understanding that the RWQCB is tending to move away from the use of RBCA for petroleum hydrocarbon sites. If the risk assessment using RBCA is not acceptable to the RWQCB, the entire CAP will have to be redone. Has this been addressed?
3. Continued problem of the use of soil samples collected from impacted sites around TI to establish "background/ambient" metal concentrations to determine areas of significant impacts from metals. This is not an accurate way of establishing true background levels in non-impacted soils. This will affect what areas are considered for remediation. Need better true background levels for comparison or at the very least, regional levels from the Bay area for comparison.
4. Explanation of the abbreviations used in the sample results tables in Appendix A is needed. For example what are names of the laboratories used that are abbreviated, and what is sample type <u>ORIG</u>?
5. Need a key to the boring log symbols in Appendix D. It is unclear what some of the symbols indicate such as the depth to water measurement. Was this the initial drill intercepted depth to water, or a measured, stable depth to water measured after the complication of drilling but before groundwater sample collection?
6. The appendix should also include the boring logs from the earlier borings and wells completed at the sites, not just the logs from the Phase II work. Since this earlier work is referred to in the text, the details of these earlier borings/wells should be included for review.
7. The detailed analytical results for the earlier investigative work referred to in the text and on which some of the conclusions of the COC is based, should be included in the appendix for reference and review when looking at the COCs and the remediation recommendations

8. During discussions of the analytical results and the COCs for each site, it is unclear whether the number of analytes include the immunoassay results or not. Were the immunoassay results included in the results displayed on the figures? Were the immunoassay results used in the determination of the COCs or in the remediation planned areas?
9. From a number of the results of the soil samples, it appears that impacts to soil are currently located in a "smear zone" below the current water table (greater than 6 feet and reported as low as 9+ feet). Does this indicate that at some time in the past, the depth to water was lower? If the depth to water was lower in historic times, impacts to soil from historic activities were able to migrate to this lower depth and this depth was routinely not sampled during the Phase II RI investigation (only soil sampled to depth of CURRENT groundwater level of 5 to 7 feet generally). This makes it possible that there may be significant amounts of impacted soil below the sampled depths that could hold significant amount of Total Petroleum Hydrocarbons (as well as other contaminants) that are not sampled, not known and could be a significant source of long term impacts to groundwater and redevelopment work for years to come, and which are not considered in the remediation efforts! This question needs to be considered and answered or the cleanup efforts could be greatly compromised by these unknown impacts.
10. In many of comparisons of the immunoassay to laboratory data in Appendix B, it is noted that there are high concentrations of motor oil but low concentrations of diesel. Are the motor oil results reported really severely degraded diesel? If so the immunoassay sample results did not pick them up so many of the low immunoassay results might really be areas of motor oil (aka degraded diesel) and thus might really represent false negatives? I find it hard to believe that there can be that much motor oil around the entire base? Are we really looking at degraded diesel and it should be degraded diesel that is being considered for remediation not motor oil?
11. Also in Appendix B, for water sample from HP-025, how can there be a match between immunoassay and laboratory data for diesel when the table indicated that the water sample was not analyzed in the laboratory?
12. CAP does not consider the possible impacts and remediation of MTBE for any of the releases on YBI or TI. These need to be considered and incorporated prior to completion of any CAP program or planning for closure. MTBE consideration

could significantly change the plans for remediation of soil and groundwater at all CAP (as well as all CERCLA) sites.

Comments on Specific Sites and Sections

SECTION 3.0 - SITE BACKGROUNDS AND INVESTIGATIONS

- Introduction - While it is indicated that the immunoassay results were used for field screening purposes only and are not discussed in the CAP, were the immunoassays used in determining the COCs and in planning the remedial actions?

SECTION 3.1 - SITE 04/19 - HYDRAULIC TRAINING SCHOOL/REFUSE TRANSFER AREA

- Section 3.1.1.1 - Site 04/19 - Building 458 (the pyrotechnics magazine) is not considered a contaminant source. Why not? Are there other sources of information available on this building and its history? If so, please present them here.
- Section 3.1.3.1 - Soil Sampling - For the soil boring samples listed under pesticides, give the concentrations for the samples.
- Section 3.1.3.1 - Soil Sampling - For the metals mentioned, give the range of concentrations for the samples.

SECTION 3.2 - SITE 06 - FIRE TRAINING SCHOOL

- Section 3.2.1.1 - The report indicated that the eastern portion of the school is partially paved and partially graveled. Has this always been the case or was it different in the past?
- Section 3.2.1.1 - What is the disposition of the two USTs, piping and oil/water separator tank located in the eastern portion of the school? Have these been removed? Have samples been collected, especially below the oil/water separator?
- Section 3.2.2.2 - Why were borings drilled to greater depths (approx 15 feet)? Was groundwater lower at this time? Source of odors? Soil samples collected?

- Section 3.2.2.4 - Why is there no information available from the monitoring wells completed by PRC in 1991?
- Section 3.2.2.5 - Holes were noted in the USTs that were removed in 1992. These same USTs were reported to have tested as being tight in 1986. Did the holes occur between 1986 and 1992 thus placing the time of releases or was the tank testing faulty and releases could have happened earlier?
- Section 3.2.2.5 - Were the UST excavations purged prior to water samples being collected from the excavations?
- Section 3.2.2.5 - Was so little soil (17 cubic yards) removed and disposed from the removal of USTs 240C and 240D when the soil concentrations were high?
- Section 3.2.3 - Dioxins - Dioxins reported to have been detected from hydraulic punch 06-C06 when in Table 3.2.3 reported as 06-C09. Which is it or is it both?
- Section 3.2.3.3 - Table 3.2-7 does not include the Region 9 PRGs and CARB ambient contaminant concentrations as indicated.
- Section 3.2.4 - Site 6 has been affected by petroleum constituents BUT also by VOCs, SVOCs, metals and dioxins. These others also need to be considered in looking at impacts and remediation of Site 6.
- Section 3.2.4 - Inferred that TPH-P could have could have resulted from USTs 240C and 240D but according to the site history, these tanks were only used for TPH as diesel. Which is it?
- Section 3.2.4 - It was reported in Section 3.2.2.1 that only UST 240B was leaking but here it is reported that both 240A and 240B tank testing indicated leaks. Which is it?
- Section 3.2.4 - In the commingled plume discussion, to much emphasis is placed on leaks from USTs only. What about potential leaks from lines, pads, drains, trenches, and stuff dumped or spilled on the ground?

SECTION 3.3 - SITE 14/22 - NEW FUEL FARM/NAVY EXCHANGE SERVICE STATION

- Section 3.3.1.1 - Are the eight smaller unleaded ASTs still active? When will they be removed? Do they have adequate containment?
- Section 3.3.1.1 - Where is/was building 85? Not indicated on the figures.

- Section 3.3.1.1 - After 1980, what happened to the sludge and tank bottom water removed from the ASTs? Was it disposed of at the YBI sludge disposal area?
- Section 3.3.2.1 - Boring logs for the borings completed in 1985 not included in appendix.
- Section 3.3.2.1 - Borings completed in 1985 drilled to 30 and sampled down to 11 feet bgs. Where these lower samples collected below groundwater level or was groundwater level lower at that time?
- Section 3.3.2.1 - How can it be that TPH-E (diesel) was detected in groundwater at 91,000 µg/L in Well M4 but there was no TPH-E detected in the soil samples?
- Section 3.3.2.3 - Reported in the first paragraph that in 1991 floating product was measured in seven wells but in the next paragraph it states that floating product was observed in only one well. Which is it?
- Section 3.3.2.4 - Reported that UST 85 detected jet fuel at 4,900 mg/kg is soil. Was jet fuel also stored at the site? Not reported in the site history of the tanks. Should this be tested in other areas and other sites for possible impacts?
- Section 3.3.2.5 - The locations of the samples collected from the location of the pipeline should be shown on the figures since there is no information on where they were collected.
- Section 3.3.3.2 - Well completion logs for wells 14-MW03, 14-MW04, 22-MW04 and 22-MW05 not included in appendix. Please include in appendix for reference and review.
- Section 3.3.3.2 - TPH-E - Stated that motor oil the most frequently detected constituent in hydraulic punch samples. Were these immunoassay samples? Could these really have been degraded diesel and not really motor oil?
- Section 3.3.3.3 - Table 3.3-8 does not include the Region 9 PRGs and CARB ambient contaminant concentrations as indicated.
- Section 3.3.4 - Stated that motor oil contamination more widespread that TPH-P or TPH-E. Could this really be degraded diesel? Was motor oil really that broadly dispersed at the site?
- Section 3.3.4 - Stated that highest and most frequent detections of TPH-E from monitoring wells and two hydraulic punch locations. Aren't the hydraulic punch one time only samples? How can they the most frequent detections?

SECTION 3.4 - SITE 15 - OLD FUEL FARM

- Section 3 4 1.1 - Exact location of Building 89 not indicated on the figures.
- Section 3.4.3.1 - High incident of TPH-E as motor oil may really be very old diesel releases or false readings from immunoassays.
- Section 3.4.3.1 - Low frequency of detection and low ranges of TPH-P as gasoline may be due to the very old age of releases in this area. Very degraded.
- Section 3.4.4 - High incident of TPH-E as motor oil may really be very old diesel releases or false reading from immunoassays.

SECTION 3 5 - SITE 16 - CLIPPER COVE TANK FARM

- Section 3.5.1.3 - After reviewing the boring logs for Boring 16-P, groundwater was encountered at a depth of 41 feet bgs but was not sampled. Why not?
- Section 3.5.4 - High incident of TPH-E as motor oil may really be very old diesel releases or false reading from immunoassays.
- Section 3.5.4 - The elevated concentrations found in the southwestern portion of the site might also be a result of very old, degraded releases, but the locations of the former ASTs are not indicated on the figures so it is difficult to tell what is going on. Need to add the locations of the former ASTs to all of the figures for this site.

SECTION 3.6 - SITE 20 - AUTO HOBBY SHOP

- Section 3.6.1.1 - The locations of former buildings 194, 224, and 267 mentioned in the text are not located on the figures. Please include them for reference from past activities at the site.
- Section 3.6.1.1 - Have the drains (floor, storm or ?) plus sewer connections and pipes been checked from this location for impacts or pathways? If not, they should be.
- Section 3.6.1.1 - The location of the former service station mentioned in the text should be located on the figures.

- Section 3.6.1.1 - Results and locations of soil samples collected from around the final perimeter of the excavation which resulted from the removal of the USTs should be included in the text and the figures.
- Section 3.6.2.1 - results of earlier investigation should be included in all tables and in all figures to give a complete picture of the investigations at the site.
- Section 3.6.2.4 - Has the Navy discussed with the City about getting the results of the excavations sidewall samples collected during the UST excavation work performed during 1990?
- Section 3.6.3.1 - Even though there is no discussion of the immunoassay results in this sections, are they included in the results stated for the number of detections for various contaminants?
- Section 3.6.3.2 - Section on TPH-Extractables mentions that "diesel detections in samples collected from monitoring wells and hydraulic punch locations in the southern portion of Site 20 where soil staining was evident (20-MW03) were the lowest of all detections (58 µg/L)." So what does this mean? Why mention it without some additional discussion as to its meaning. Please complete this discussion and statement.
- Section 3.6.3.2 - Based on the results of the sampling, it appears to me that there is a high likelihood that there are groundwater plume trending off site to the north, northeast, and southwest.
- Section 3.6.3.2 - High concentrations from numerous metals in groundwater at the site needs to be addressed in the remediation plans for this site.
- Section 3.6.4 - In order to determine fully if contaminant plumes are present at the site, need to incorporate the sample results from all earlier investigations and sampling completed at the site. It appears to me that there is a high likelihood that there are groundwater plume trending off site to the north, northeast, and southwest.
- Section 3.6.4 - So what does it mean that the detection of petroleum contaminants were not greater than 50 percent? Please elaborate on this vague statement.

SECTION 3.7 - SITE 25 - SEAPLANE MAINTENANCE AREA

- Section 3.7.1.1 - Were the storm, sewer and floor drains checked in and around these building and activity area for possible contaminants and pathways for contaminants?
- Section 3.7.3 - Are the results of all earlier investigations by all parties included in the tables and figures? If not, they should be to give a complete picture of all information available for the site.
- Section 3.7.2.3 - Only one anomaly indicated on the Figure 3.7-2. Where is the other anomaly?
- Section 3.7.3.2 - Of the 45 soil sample collected from the 29 hydraulic punch locations, were only the 10 soil samples selected for off-site laboratory analysis used for the conclusions and remediation planning or were the immunoassay results also used? Need to state which is the case here. If only the 10 laboratory samples, may be to small a sample set on which to base conclusions. If used the immunoassay results, then a question of the accuracy of the soil sample results, and also a question about the validity of the conclusions and the remediation planning. Which is it? Again the question of high motor oil results really motor oil or is it really degraded diesel, especially if using the immunoassay results ?
- Section 3.7.3.2 - Why were only 9 soil samples collected and analyzed for TPH-P? Why not the rest of the soil samples?
- Section 3.7.3.2 - What about the possibility of impacted soil at depths greater than the current depth to water as indicated in other sites? Possible unknown and unsampled sources from historic activities when groundwater levels lower?
- Section 3.7.3.3 - The groundwater sample results indicated throughout this section are listed as mg/L. Should this really have been μg/L? The results shown in the figures are in μg/L. Which is correct? If really in mg/L, then significant problems in groundwater!
- Section 3.7.3.3 - In section for TPH-Extractables as other components, the upper end of the range is indicated as 6,700 mg/L. On Figure 3.7-5, the highest concentration listed is 7,300 μg/L. Which is correct?

- Section 3.7.3.3 - In the section on VOCs, carbon disulfide was detected in 10 of the 43 groundwater samples collected. What is the source of this contaminant?
- Section 3.8 - Much more extensive discussion in this section for this site on the fate and transport of constituents then in the discussion of other sites in the CAP. Why? Please explain.
- Section 3.8 - Please define what "shallow" groundwater is. Is it 10 feet, 40 feet, 100 feet? It also appears from reviewing the boring logs from site 16 that groundwater was encountered at Site 16 at 41 feet bgs but was not sampled. The groundwater should have been, and should be sampled at Site 16 since petroleum hydrocarbon odors were noted in the boring log for Boring 16-P within 2 to 7 feet of the groundwater intercept! Probable groundwater impacted at Site 16.
- Section 3.8 - Even though the petroleum hydrocarbon site listed in the CAP may not interact with each other, what about interaction with other CERCLA sites adjacent to the CAP site since TPH is also detected in the soil and groundwater on the CERCLA sites?
- Section 3.8 - Even though Building 99 is located approximately 600 feet upgradient of Site 04/19, this is not a very large distance for solvent (PCE, TCE, and 1,2-DCE) plumes to travel. Solvent plumes in the south and east bay portions of the San Francisco Bay area known to have traveled miles(!) downgradient from the source areas. Not an adequate reason to discount the possible interaction.
- Section 3.8 - General question - The entire CAP is based on the assumption that current groundwater levels will remain at the same levels over time. What happens to the contaminants in the soil and groundwater, and the remediation planning over time, if the as a result of reuse the amount of open space and irrigation (lawn watering) increases or decreases? If more paved areas, the potentially less infiltration to groundwater from watering and rainfall, thus possible decrease in groundwater levels which could expose currently submerged smear zone. Could be increased impacts to groundwater and to Bay waters. Also would be larger areas of unsaturated soil that will require remediation then currently planned. If more open space, less paved areas or areas covered with buildings, more watering or rainfall infiltration could result

in increased infiltration which could raise groundwater level. Could impact new soil zones or zones previously remediated. Could saturate areas currently planned for bioventing making it very difficult to complete the remediation plans. Could also affect the reuse of the areas and the risk assumptions since increased potential contact with utility or construction workers, or potential impacts into floors of buildings. Please address these issues when looking at future risk at these CAP sites.

SECTION 5.0 - AREAS OF CONCERN

- Introduction - Areas of concern use the Navy proposed screening levels that may not be acceptable to the RWQCB. The screening levels should be finalized with the RWQCB before this CAP is finalized and the areas of concern are determined. Significant changes in the screening levels would significantly change the size and shape of the areas of concern and also the remediation plans and costs.
- Introduction - Prior to determinations for groundwater AOCs, at least one full water year of monitoring should be completed and reported.
- Introduction - Please indicate how many of the immunoassay results were used for the determination of the AOCs for soil and groundwater. How many immunoassay verses laboratory data went into the AOC determinations on a site by site basis. This will help in the determination on the level of confidence in the AOC for each individual site.
- Section 5.1 - For determination of the Areas of Concern, also need to check other geoprobe results areas that have high immunoassay results but no corresponding laboratory results. Higher areas of immunoassay results may indicate expansion of the AOC based on immunoassay results, or at the very least indications that additional soil and groundwater sampling (with laboratory analysis) should be performed to determine that accurate AOC for this site prior to starting on , planning or costing out remediation efforts.
- Section 5.2 - For determination of the Areas of Concern, also need to check other geoprobe results areas that have high immunoassay results but no corresponding laboratory results. Higher areas of immunoassay results may indicate expansion of the AOC based on immunoassay results, or at the very

least indications that additional soil and groundwater sampling (with laboratory analysis) should be performed to determine that accurate AOC for this site prior to starting on , planning or costing out remediation efforts.

- Section 5.3 - For determination of the Areas of Concern, also need to check other geoprobe results areas that have high immunoassay results but no corresponding laboratory results. Higher areas of immunoassay results may indicate expansion of the AOC based on immunoassay results, or at the very least. Indications that additional soil and groundwater sampling (with laboratory analysis) should be performed to determine that accurate AOC for this site prior to starting on , planning or costing out remediation efforts.

SECTION 6.0 - PROCESS OPTIONS AND REMEDIAL TECHNOLOGIES

- Table 6-1 - Consideration of In-Situ Treatment needs to also consider the remediation of in-situ soil located below the current groundwater level. None of the listed alternatives would do a good job for this type of soil treatment under current site conditions.
- Table 6-2 - Consideration of groundwater remedial technologies inaccurately indicates that containment by Partial Vertical Barriers (aka Funnel and Gate technology) not applicable since small amount of floating product at sites. Partial Vertical Barriers are very effective for many types of dissolved phase contaminants in groundwater. They are used to remove dissolved phase contaminants such as solvents, metals, and petroleum hydrocarbons very effectively, depending on the site specific situations. Please correct the notation for this technology and the result of its elimination in this table.
- Table 6-2 - Consideration of groundwater remedial technologies inaccurately indicates that Ex Situ Treatment using Physical Treatment by Air Stripping was eliminated due to not being effective on TPH. In fact, air stripping can be very effective in the removal of TPH from groundwater in Ex Situ Treatment depending on the type of TPH. It has been used effectively for a number of years on various sites around the country. However, it can be an expensive treatment technology to use for TPH due high energy, and operation and maintenance costs. Some of the other technologies listed in this CAP are

probably more efficient and cost effective for these sites. Please correct the notation for this technology and the result of its elimination in this table.

SECTION 7.0 - POTENTIAL REMEDIAL ALTERNATIVES

- Section 7.1.1 - Please expand on how the air monitoring around soil excavation areas will be completed "at all times" during excavation. What kind of health and safety precautions will be taken to limit impacts to potential nearby residents or workers from vapors and dust which will results from these excavations.
- Section 7.1.1 - Please indicate what kind of security measures will be used to prevent people (especially children) from entering the excavations after normal working hours.
- Section 7.1.1 - Will soil that has any mixed waste other than TPH be acceptable to the soil recycling facility? If so, which other contaminants are acceptable and at what concentrations will they accept them? If not acceptable to the soil recycling facility, will on site segregation of soil have to be completed? How will they segregation and how will it be determined what soil can go where? Laboratory analysis? What, where and how long? Areas available for soil stockpiling if necessary? Will this impact nearby reuse plans?
- Section 7.1.1 - If the soil that will be used to refill the excavations will be soil returned from the soil recycler, this soil will be rendered sterile of all biological life necessary for plant growth by the high temperatures generated by the soil recycling process. Have any plans been made to add organic matter to this returned soil or add non-sterile top soil to allow plant regrowth in these areas?
- Section 7.1.1 - Do they really think that they will be hand digging in the deeper soils? Excavation at depth and up to 19,600 cubic yards of soil by hand?
- Section 7.1.1 - What plans are there for in situ treatment of soils below the current groundwater level?
- Section 7.1.2 - Why is the cost of off-site disposal to a land fill more expensive than the cost of the recycling?
- Section 7.1.3 - How can it be said that the fraction of heavier and weathered hydrocarbons that are recalcitrant to biodegradation in the TI soil is expected to be low when most of the petroleum hydrocarbons identified at all of the

CAP sites are listed as TPH-E as diesel and as motor oil? These are going to be the types of petroleum hydrocarbons that will be difficult and slow to biodegrade.

- Section 7.1.3 - Please give the details of how you know that "biodegradation is already occurring at some of the sites"? Has biodegradation sampling been done at all of the site for which it is proposed been completed to establish that it will work? If not, this needs to be completed prior to the use of this technique to be sure that it will be effective.
- Section 7.1.3 - How was it determined that it would take 18 months for bioventing to be completed as specified in the cost estimate?
- Section 7.2.2 - In situ biosparging may be a beneficial way to treat some or all of the impacted groundwater (depending on what is in the water) if a viable population of microorganisms is already present in the groundwater and oxygen is the limiting factor to biodegradation. This needs to be tested to establish that this is true prior to final determination on acceptable groundwater remediation techniques.
- Section 7.2.2 - The estimated time frames listed for cleanup periods for biosparging may be overly optimist since the actual time it takes to complete remediation will depend on the concentrations present in the groundwater, whether or not a viable population of microorganisms is already present , if only oxygen is the limiting factor, and how recalcitrant to biodegradation the petroleum hydrocarbons in the groundwater are to biodegradation. All of these questions need to be answered prior to making a final determination on the type and appropriateness of the proposed remedial technique.
- Section 7.2.2 - The costs proposed for biosparging the areas of concern for groundwater are much to low to be considered to be valid. This could not possibly cover the cost of installing, implementing, and operation and maintenance of these biosparging system for a period of two years. Need to significantly revise and review these costs.
- Section 7.2.3 - I believe that ORC™ is a trade make protected name brand and it should be so indicated throughout the report where mentioned.
- Section 7.2.3 - Recent studies of the use of ORC™ in remediation of petroleum hydrocarbons impacts in groundwater have shown that it is not a very effective way to remove TPH in areas of high concentrations or in areas

where free product is present. It will probably eventually work but it may take some time and will require multiple doses to remain effective. Either a large amount must be injected into the AOC or very closely spaced injection points used or multiple injections over time. It may be more cost effective if you want to use ORC™ to install multiple wells in the AOC in an effective spread pattern and then use the replaceable ORC™ socks with the socks being replace every six month or so. Most of these options will be fairly expensive but have ~~the advantage of not being very person power intensive.~~

- Section 7.2.4 - ~~Please refer to the discussion above for Section~~ 7.2.2 ~~to help in~~ the ~~determination of the effectiveness of natural attenuation~~ and estimated time frames for natural attenuation alternative.
- Section 7.2.4 - ~~Expand on the~~ discussion of the costs related to natural attenuation. Are the costs presented per well per sampling event? Certainly not a cost per site per event! Also will need to include the cost of initial testing to establish on a site by site basis if natural attenuation will work for a specific site as proposed.

SECTION 8.0 - RECOMMENDATIONS

- Section 8.1 - If going to do excavation and backfilling or near surface soils, may want to consider added bulk ORC™ to excavation and/or to backfill material to provide source of bioremediation enhancement to soil and groundwater for any TPH that may remain or is missed during the excavation. This additional ORC™ may also move for soil into shallow (less than 10 feet bgs) groundwater for additional groundwater remediation at specific sites.
- Section 8.1 - The AOC around 04/19-MW03 may be twice a large as that represented on Figure 5.1-1 based on the possible impacted represented by surrounding immunoassay sample results. Recommend that additional investigation and sampling be completed in this area to more accurately represent AOC before finalizing remediation plan.
- Section 8.1 - Bioventing will not be an effective alternative for the remediation of TPH as diesel or motor oil above groundwater, but especially not effective for impacted soil TPH as diesel or motor oil below current groundwater level.

- Section 8.2 - Assumes that current screening/cleanup level will be accepted by the RWQCB. If a lower screening/cleanup level required, then natural attenuation may not be a good alternative.
- Section 8.2 - The AOC around 06-C10 may be 50% larger than represented in Figure 5.2-1 , and AOCs around 06-E08 and 06-E04 may be +20% larger based on the possible impacted represented by surrounding immunoassay sample results. Recommend that additional investigation and sampling be completed in this area to more accurately represent AOC before finalizing remediation plan. These larger areas will require higher costs to complete remediation, especially since deeper TPH as diesel not effectively remediated using bioventing.
- Section 8.3 - High concentrations of TPH as gasoline, TPH as diesel and motor oil in groundwater need to be remediated, especially if the RWQCB does not remove the beneficial use designation from groundwater at TI. But also may have risk consideration for future construction or utility worker safety.
- Section 8.3 - The AOCs may be larger than represented in the figures around 14-HP006 (+40% larger) and 22-HP019 (+25% larger) based on the possible impacted represented by surrounding immunoassay sample results. Recommend that additional investigation and sampling be completed in this area to more accurately represent AOC before finalizing remediation plan. These larger areas will require higher costs to complete remediation, especially since deeper TPH as diesel not effectively remediated using bioventing.
- Section 8.3 - Bioventing will not be an effective alternative for the remediation of TPH as diesel or motor oil above groundwater, but especially not effective for impacted soil TPH as diesel or motor oil below current groundwater level.
- Section 8.4 - Ubiquitous concentrations of TPH as gasoline, TPH as diesel, and motor oil in groundwater still need to be remediated especially if the RWQCB does not remove the beneficial use designation from groundwater at TI. But also may have risk consideration for future construction or utility worker safety.
- Section 8.4 - Bioventing will not be an effective alternative for the remediation of TPH as diesel or motor oil above groundwater, but especially not effective for impacted soil TPH as diesel or motor oil below current groundwater level.

- Section 8.4 - Areas of TPH impacts to soil and groundwater around areas of 15-HP016 and 15-HP013 may result from releases from leaking pipeline? Possible releases from leaking pipeline need to be investigated and remediated at this site.
- Section 8.5 - Excavation and recycling of shallow soils probably best alternative for this site.
- Section 8.5 - It is necessary to sample (and remediate if necessary) groundwater beneath this site detected at +40 feet bgs in Boring 16-P.
- Section 8.5 - Bioventing of deeper soil indicated in deeper boring (such as Borings 16-F, H & P) may not be effective due to lower permeable soils detected at depth in these borings. Less air flow will occur in these soil then in the sands common on TI. What is the depth of the proposed bioventing?
- Section 8.6 - Excavation and recycling soil effective for most shallow soils at this site. It is important to collect adequate soil samples (analyzed in laboratory) from sidewalls and bottom of excavation prior to backfilling to be such all contaminants above future accepted screening level has been removed.
- Section 8.6 - Bioventing of TPH as diesel and motor oil in impacted soils near 20-HP007 may not be effective because sampled soil may have been below current groundwater level. More information about the occurrence of these impacts need to be collected prior to finalizing CAP and remediation plans. Also, bioventing not the best alternative for removal of TPH as diesel and motor oil.
- Section 8.7 - Based on information provided in Appendix B, additional potential AOC areas in soil around 25-HP012 (to 1 foot bgs) and 25-HP013 (to 8 feet bgs). If a lower screening/cleanup level is finalized, then additional AOC soil impact areas around 25-HP017 and 25-HP016. These additional areas could make the final AOC two to three times larger than that which is currently represented.
- Section 8.7 - For the limited area of impacts to soil by TPH as diesel and motor oil near 25-MW02 and 25-HP015 (impacts below current groundwater level) bioventing may not be effective.
- Section 8.7 - It is unusual to see groundwater concentrations this high in an area immediately adjacent to the Bay margin, and in an area of tidal influence! There must be a large, highly concentrated source here to see these large

numbers. Also, concentrations of TPH as gasoline and benzene this close to Bay, obviously going into Bay water and may be harmful to Bay organisms!

- Section 8.7 - At any of the sites (including this one) the use of biosparging as a remedial alternative for the remediation of TPH as diesel and motor oil will be a very long, slow process. Not a very effective remediation technique.

RECOMMENDATIONS

- I do not believe that the CAP program should go forward until the questions of acceptable cleanup levels and the designation of beneficial uses of groundwater at TI and YBI are resolved with the RWQCB.
- I believe that this review process should be an interactive process with the Navy, the regulators and the RAB members. I would be willing to sit down with all parties at RAB meetings, interim meetings or at special meetings to go over other ideas, plans, concerns, and solutions to try to correct the short comings of the current Corrective Action Plan. I believe that this is another important report and investigation to the successful transition of Naval Station Treasure Island, and therefore deserves the best efforts and the best results that can be achieved at this point to move the facility into the remediation stage and to transition to the City and County of San Francisco.

cc:
David Rist (DTSC)
David Leland (RWQCB)
James Ricks, Jr. (EPA)
Martha Walters (SFRA)
Richard Knapp (TtEMI)
RAB Community Members (see list)
Information Repository (3 copies)