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INTRODUCTION

The report, "Phase I remedial Investigation Report (Draft) Red Hill Oily Waste Disposal Facility, Fleet and Industrial Supply Center Pearl Harbor, Oahu Hawaii", presents the results, interpretations, and conclusions of the data gathered at the Red Hill Oily Waste Disposal Pit Facility, located within the Fleet and Industrial Supply Center(FISC), Red Hill Fuel Storage Facility, Oahu, Hawaii.

The United States Navy began constructing the Red Hill Fuel Storage facility in 1938, and by the time the construction ended, the facility had 20 large Underground Storage Tanks (UST), each with a capacity of about 12.6 million gallons. These tanks were used to store Navy special fuel oil (NSFO), diesel fuel, jet fuel (JP-5), aviation gas (AVGAS), and motor gasoline (MOGAS). A system of tunnels with access portals known as Adits, were constructed to connect the USTs to each other and also to the associated Naval facilities.

The Red Hill Oily Waste Pit Facility was constructed as an oily waste reclamation and disposal facility during the early 1940s and was connected to the Red Hill Fuel Storage Facility USTs. The original oily waste pit was active from 1943 through 1948. Later, a Stilling Basin was constructed approximately at the same site in 1972, and was intermittently used through 1986, to deposit oily waste such as bottom sludge and rinse water generated from cleaning the USTs and also the leaks in valves and pipes within the Adit system.

The investigation included ten Exposure Areas of Concern within the site confines and also an adjacent parcel owned by the United States Coast Guard. The entire site area lies directly over the Pearl Harbor Basal Aquifer, which is a major drinking water source for the island of Oahu.

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GENERAL COMMENTS

Our reviewers have found this report, "Phase I remedial Investigation Report (Draft) Red Hill Oily Waste Disposal Facility, Fleet and Industrial Supply Center Pearl Harbor, Oahu Hawaii", to be quite comprehensive and generally appears to be thorough and scientifically valid. The surface and subsurface soil and sediment sampling and analysis appears to be especially thorough and quite adequate. We agree with the final conclusion that the basal groundwater pathway is of potential concern and requires additional investigation. However, we have some serious questions about the preliminary assessment of the basal groundwater, the Dense and Non-aqueous Phase Liquids (DNAPLs), and a few general comments on the contents of this report.

BASAL GROUNDWATER AND DNAPLs

The report does not give any reason why more effort was not expended on a preliminary investigation of the basal groundwater contamination during this phase I investigation. Sampling of the existing basal groundwater wells in the vicinity of the contaminated site for groundwater contamination, or at least an inventory of these existing basal wells at the site would have been helpful. Was such type of investigation ruled out in the scope of work for the Phase I study? Also, the report does not mention the presence of DNAPls in the groundwater. If any of the potential groundwater contaminants are DNAPLs, then this should be considered as the potential contaminant transport pathway, as DNAPLs may not follow the expected groundwater pathway. Other comments are discussed in detail in the following paragraphs.

As requested by Mr. Shakil Shaikh, of the Hazard Evaluation and Emergency

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Response office of the Department of Health (telephone conversation, dated 08/04/95), we have focussed our review on Section 5, Contaminant Fate and Transport, of the above mentioned report.

SPECIFIC COMMENTS

Section 5.4.1.1 Groundwater Pathway (Stilling Basin)

The report uses Attenuation factors of 10 and 100 as the lower and the upper limit respectively for the groundwater pathway beneath the Stilling Basin. The Attenuation factor represents the attenuation and retardation associated with the transport of contaminants in the subsurface. It can be seen in Appendix C, that the low permeability clay layer (Silty Clay) in Boring 04 (RH-B04 [MW-03]) is limited to less than 10 feet. Where as in other borings, it extends beyond 10 feet. Since all the borings around the Stilling Basin do not encounter a low permeability tuff and since the low permeability clay layer in all these borings is of variable thickness, we recommend an attenuation factor of 10 for the Stilling Basin site. An attenuation factor of 100 may result in misleadingly low contaminant concentration values.

Also, compounds such as Total Fuel Hydrocarbons (TFH), 1-1, Dichloroethene (1,9-DCE), Benzo[a]anthracene (B[a]A), and others are some of the compounds that occur in perched groundwater, in concentrations of concern to environment and health. These compounds should also be of concern to the basal groundwater because the tuff which causes the perched groundwater is not really continuous, as can be seen from the boring logs (Appendix C) taken from the borings constructed around the stilling basin. Hence, the

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concentrations entering the basal water where the tuff is not present could conceivably be the same as those observed in the perched groundwater.

Appendix C Ogden Exploratory Borings Logs

As can be seen from the boring logs in Appendix C and the Figure 2-4, the borings around the Stilling Basin encountered tuff at about 25-35 feet below ground surface (bgs), except for boring B04 and the background boring B-01. The boring B04 is less than 100 feet from all the other borings and boring B01 is about 25 feet upslope of the other borings. Our reviewers presume wind laid tuff deposited over the entire area. But, the presence of tuff in all but two of the borings indicate a localized distribution of the tuff. There is a possibility of a stream laid tuff in the area. The tuff acts as a low permeability confining layer and if the presence of this localized distribution of the tuff is true then the leaching of contaminants into the basal groundwater will be enhanced. Also, this localized distribution will be a potential groundwater contaminant pathway.

Section 5.4.11.4 The Groundwater Exposure Pathway (Coast Guard Parcel)

The report repeatedly refers to Section 5.4.3.4for details regarding Benzo[a]pyrene B[a]P concentrations in the leachate. But there is no Section 5.4.3.4in the report. This inconsistency should be corrected and reflected in the final report. Also, inspite of obtaining the calculated concentrations of compounds such as Total Fuel Hydrocarbons and Dieldrin, at or near the Health Based Levels (HBLs) or the Standard Quantitation Limits (SQL), at the point of entry into the basal groundwater, the report concludes that the

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groundwater exposure pathway is insignificant. This conclusion is contradictory to the results. The groundwater exposure pathway should be considered important and is of concern. It should be further investigated.

Section 5.4.12.2 Surface Water Exposure Pathway

The report concludes that due to the limited frequency and duration of flooding events and the effect of dilution by rain water, the surface water exposure pathway, for all the sites, via runoff to Halawa Stream is insignificant. The report does not provide any quantitative evidence to support this conclusion. This conclusion is probably true, but it must be supported by quantitative data, especially for the Site Runoff Area, where the maximum arsenic value detected in surface soils was 28.3 mg/kg. This value is about five times the maximum background value detected (Section 5.4.7 Site Runoff Areas). Calculations that can justify this conclusion must be presented. Furthermore, the report does not mention anything about the transport of contaminated sediment to the Halawa stream. This issue also must be evaluated. Is the Halawa Stream channelized all the way to Pearl Harbor? Are there any potential sediment traps along the way to Pearl Harbor? We recommend that these questions be considered and appropriate answers be presented in the final report.

Section 7.1.4 Quantitative Human Health Preliminary Risk Evaluation

On page 7-47, second paragraph, the report quotes from the USEPA Risk Assessment Guidance For Superfund (RAGS) manual that *"the Site does not warrant cleanup*

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if: (1) the Site-specific cumulative excess carcinogenic risk is equal to or less than 10^{-6} and (2) the Site-specific cumulative HI (Hazard Index) is equal to or less than 1. Remedial action must be justified if: (1) the Site-specific cumulative excess carcinogenic risk is between 10^{-6} and 10^{-4} (2) the Site-specific cumulative HI is equal to or less than 1. The site may pose a significant risk to human health and warrant cleanup if (1) the Site-specific cumulative excess carcinogenic risk is greater than 10^{-4}; or (2) the Site-specific cumulative HI, segregated by toxic effects or mechanisms or action, is much greaterthan 1". On page 7-65 and 7-70, the report states that the cumulative health risks for the future residential settings at the Coast Guard Parcel, with increases in exposure frequency and duration, and the additional potential for the exposure of children indicate a higher excess cancer risk of 8 X 10^{-5}, and a noncancer HI of 1.3. These figures are very near to the EPA limits. Hence, the site requires further investigation. If these figures are considered non-significance, then the report needs to fully discuss the rationale for that conclusion and should provide a stronger justification for no further action.

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