

## Letter I3

## Comments

To: United States Army  
 From: Ho'oiipo DeCambra   
 Re: Response to EIS Military Training Activities at Makua Valley  
 Fax: (808) 438-7801

Date: October 6, 2005

I3-1 | **Wai'anāe, Hawai'i** The document, a draft environmental impact statement for military training at the live-fire training facility, reveals that the military does not keep their word to the Wai'anāe community to consider other training locations other than Makua.

I3-2 | "The Army has also refused to consider locations other than Makua, where live-fire training could be conducted with less harm to irreplaceable cultural and biological resources, violating both its obligations under the National Environmental Policy Act and its promises during public scoping for the EIS in 2002 that it would explore such alternatives," Earthjustice July 21, 2005.

I3-3 | "The EIS is supposed to give the Army and the public the information they need to decide whether to allow training at Makua," said Malama Makua spokesman Fred Dodge. "That's why, when we settled our lawsuit, we insisted that the Army agree to carry out comprehensive archeological surveys of the areas where mis-fired mortar or artillery shells could destroy cultural sites. The Army's failure to hold up its end of the bargain makes this EIS useless for making an informed decision about training at Makua."

I3-4 | The public are not being treated fairly in the EIS public hearings process.

I3-5 | The Army has been dishonest instead of truthful. The process is flawed with manipulation and lack of information forth coming. Wai'anāe citizens have been taking responsibility for planning future use of Makua Valley while the Army has irresponsibly continued the misuse and abuse our beloved 'aina.

I3-4 | The Army has failed to produce an appropriate EIS upon which the public can make comments and evaluate. I therefore object to the action  
 I3-5 | proposed as contemplated in the EIS.

## Responses

I3-1

The EIS considered other alternatives in Section 2.5. The EIS now includes evaluation of an alternative in which training proposed for MMR would be conducted at the Pohakuloa Training Area, island of Hawaii (See Chapter 2 for a description of this alternative). This alternative was added in response to public comments received on the Draft EIS. Use of MMR, however, remains the preferred alternative.

I3-2

The EIS was prepared in accordance with the National Environmental Policy Act and with applicable federal and Army regulations. Review of the Draft EIS by the US Environmental Protection Agency found the document to be adequate. Also, please see response to Comment I3-1.

I3-3

The Army thanks you for your comment and appreciates your participation in this public review process. Your comment has been considered and has been included as part of the administrative record for this process.

I3-4

The Army has provided the public with 75 days to review the Draft EIS and has conducted three public meetings to receive comments. In addition, the Army has held informational meetings prior to the start of the review period, has maintained a project web site with background information on the project, and has made its resource specialists available during public meetings on the Draft EIS.

I3-5

The Army thanks you for your comment and appreciates your participation in this public review process. Your comment has been considered and has been included as part of the administrative record for this process.

**Letter I4**

**Comments**

Evaluation of Makua DEIS for adequacy: Focus on Geological, Soil and Water Quality issues.

Prepared by Eric Heinen De Carlo, Ph.D.  
 Department of Oceanography, University of Hawaii  
 and  
 Environmental, Marine and Analytical Consultants  
 Prepared: October 6, 2005

INTRODUCTION

I4-1 | This review is presented as a series of comments derived from examination of relatively short sections of the overall draft environmental impact statement (DEIS) over a period of several weeks. This approach was necessary because of time constraints imposed on the reviewer by his other professional responsibilities, as well as the limited time allowed by the Army for technical review of the voluminous materials related to the DEIS. Had the Army allowed more time for review of the DEIS, as Earthjustice and others requested, I would have been able to provide more extensive comments. Salient points of each section reviewed are briefly summarized and comments provided on relevant issues.

I4-2 | The first 131 pages of the EIS (through 2-42) identify in a generally appropriate fashion the relevant geological and environmental contamination issues, but do not provide any information regarding either the acquisition or existence of adequate data to evaluate either the extent of contamination or the likelihood of said contamination to have migrated within and outside of MMR.

I4-3 | Pages 3-6 to 3-8 provide a list of hydrogeologic investigations conducted or underway by the Army and its contractors. Although the list initially might seem extensive, several items immediately catch the eye. Four sets of streambed samples are to be collected, but the total number of sites within stream beds is not specified. Only two sets of soil samples are to be collected in the Open Burn/Open Detonation (OB/OD) area and only one set in the junk car pit. Only 9 new wells are to be installed/sampled throughout MMR and six rounds of sampling are meant to take place. The total amount of environmental sampling indicated appears quite low given the size of MMR and areas upon which activities at MMR might potentially impact.

I4-5 | Pages 3-78 and 3-79 (Section 3.7: Water Resources) describe Surface Water quality issues in Makua Valley, specifically at Makua Military Reservation (MMR). The report states that surface water was sampled during only one rain event leading to surface runoff (14 Feb 2003) and that 60 samples were collected from four streams/gulches. It should be pointed out that 41 of these samples were collected automatically from one location (Makua Stream) with the remaining samples collected manually from the four streams. **This represents a rather biased sample loading toward Makua Stream and the comparability of data between manually and automatically collected samples**

**Responses**

I4-1  
 The Army extended the public review period from 60 days to 75 days. In response to comments, an additional 60 days were provided to the community to review the Draft EIS and associated studies related to marine resources and archaeological surveys, from February 2 to April 3, 2007. The technical experts retained on behalf of Malama Makua were provided 76 days for review of the marine resources study, archaeological study, and Draft EIS.

I4-2  
 The EIS was prepared in accordance with the National Environmental Policy Act and with applicable federal and Army regulations. Review of the Draft EIS by the US Environmental Protection Agency found the document to be adequate. Results of extensive sampling results reported by the analytical laboratory of soil, surface water, and groundwater showed no pattern of contamination.

I4-3  
 Four sets of streambed samples were collected from four locations, with three different depth intervals collected at each location. Please see Appendix G-1 for details.

I4-4  
 Soil samples collected at MMR were located in the areas of maximum concentrations of training activities. Background samples provided additional information to expand the spatial coverage. The sampling and analysis plan distributed to the public in 2002, as well as Appendix G-1 of the Draft EIS, discuss soil study methodology and data. The data collected are representative of the existing conditions at MMR and were incorporated modeling.

I4-5  
 To evaluate potential contamination of off-site receptors, data were collected from all streams within MMR, but more data were collected from the largest stream (Makua Stream) with the most flow at MMR. The study further found consistent results between manually and automatically collected samples. Please see Appendix G-1 for details.

## Comments

- I4-6 | has not been ascertained. The DEIS also states that not all samples were analyzed for all constituents, further limiting the value of the data obtained in this study. Fifty seven (57) were analyzed for metals and explosives and an unspecified number was analyzed for all parameters. An argument was made that the latter unspecified number of samples represented samples collected during early stages of streamflow, and therefore should represent worse case scenarios. Although the so called “first flush” effect is well known in urban areas with high runoff potential such as Honolulu (e.g., De Carlo et al., 2004 and references therein), it has not been as clearly demonstrated for natural groundcover such as exists at MMR. Even if the assumption that these samples have the greatest likelihood of containing
- I4-7 | contaminants were true, good analytical practices require examination of a series of
- I4-8 | samples covering the duration of the event. Furthermore, only one set of samples from each stream was analyzed for furans and dioxins.

The DEIS reports using both freshwater acute toxicity standards and also maximum contaminant level (MCL) criteria for drinking water as a comparison basis. Use of the latter is a conservative approach given that no surface water within MMR is used for drinking, but is appropriate as it allows consideration of potential future uses of water resources in MMR that differ from those currently in effect.

- I4-9 | Although no freshwater acute toxicity standard was exceeded, certain parameters were found in concentrations that exceeded preliminary remediation goals (PRG) values for tap water, indicating some water contamination. Because PRG are set at values lower than the enforceable MCL, the DEIS claims no concern exists, as measured concentrations were within the human health risk range considered acceptable by EPA. This claim would only be valid, however, if the sampling regime to characterize the aquatic environment were adequate, which is not the case. Results of biased sampling during a single event are insufficient to eliminate concern. Some organic contaminants (dioxins, furans) were hypothesized to be associated with suspended sediment rather than present in the aqueous phase. Risks from chlorinated pesticides were approximately 16 times above the 1 per million cancer risk, but within the range considered acceptable by EPA (10E-4 to 10E-6).
- I4-10 |

Gasoline constituents, the BTEX class, were the most frequently detected compounds, although at concentrations below their respective PRG. The DEIS claims that finding these and other volatile organics in low concentrations is not surprising given the use of gasoline-powered grass cutting equipment at MMR. **These findings are also suggestive, however, that gasoline residues may be distributed throughout the MMR area, and the reported findings do not preclude that gasoline residues might be present at considerably higher concentrations in other locations that were not sampled.**

Three other detects (out of the 57 water samples) included compounds associated with explosives (perchlorate, 2-4 DNT), although all were at concentrations below PRG. Four samples from early 2004 contained detectable amounts of RDX, two above the PRG, the other two below. **The latter findings, when combined with observations in**

## Responses

I4-6  
The number of samples and analyses was completed as outlined in the sampling and analysis plan. The samples analyzed allowed for an assessment of potential for off-site contamination.

I4-7  
First flush as defined in the sampling analysis plan and Appendix G-1 is the first water to flow from the range during a stream flow event. First flush and peak flow tend to have the highest levels of contamination. Samples from first flush and peak flow were taken at MMR.

I4-8  
Four sets of samples from each stream flow event was analyzed for furans and dioxins. These were spaced throughout the event, including samples at first flush and peak flow, and thus sound analytical practices were used over the series of the event.

I4-9  
The Army thanks you for your comment and appreciates your participation in this public review process. Your comment has been considered and has been included as part of the administrative record for this process.

I4-10  
The EIS was prepared in accordance with the National Environmental Policy Act and with applicable federal and Army regulations. Review of the Draft EIS by the US Environmental Protection Agency found the document to be adequate.

I4-11  
The sampling scheme, as described in the sampling analysis plan, provided a representative assessment of potential gasoline residues. A review of these data showed there is no impact to off-site receptors.

## Comments

- I4-12 | **ground water and in lysimeter water samples described below, indicate that RDX contamination, albeit low based on existing data, has not been quantified statistically or reliably and appears sufficiently common within MMR to be investigated further.**
- Iron (Fe) and thallium (Tl), both non-carcinogens, were measured at concentrations above the PRG, but not considered deleterious. High concentrations of Fe are common in Hawaiian soils, and suspended particles likely caused the Fe levels observed in water. A variety of other compounds were identified at concentrations below PRG, therefore were considered by the DEIS to be of no significant concern. Compounds associated with explosives, although found, were also at levels substantially below PRG. **These results, however, need to be considered with the caveat that they derive from an investigation that did not include a statistically defensible sampling frequency and/or event coverage.**
- I4-13 |
- I4-14 | Total metal concentrations, except lead (Pb) and arsenic (As), were positively correlated with suspended solids, indicating that most metals were associated with soil particles (**this is an expected finding based on a large body of literature published over the years**). Pb and As, however, were very infrequently detected according to the DEIS. The lack of correlation between the concentrations of the latter two elements and suspended solids is puzzling because both of these elements are highly particle reactive and are typically associated with iron oxides, some of the more abundant phases in Hawaiian soils (e.g., Hayes and Leckie, 1978; Irving, 1998; De Carlo and Anthony, 2002; De Carlo et al., 2004). The lack of correlation between Fe and As and suspended solids may indicate the presence of these elements in a different form, such as an organic compound or some uncharacterized complex.
- I4-15 | Within pages 3-81 to 3-92, the Coastal Water quality section deals with nutrient and sedimentation effects on reefs. It discusses one incident of sediment discharge in 1976 that may have been associated with runoff from the OB/OD area and the measures taken since to prevent further runoff. The section refers to a 1977 study that describes recovery of the reef after the event. No significant details are provided otherwise.
- Review of the section entitled: 2002-2003 Hydrogeologic Investigation. This section discusses the hydro-geologic setting of nine new groundwater wells and one rehabilitated well (from the 1994 Halliburton study) for water quality testing. It is stated on page 3-87 that six rounds of water sampling took place between Dec 2002 and January 2004.
- Results of analysis of water samples collected between 2002 and 2004 indicates that a few compounds are present at concentrations above tap water PRG or EPA primary drinking water standards. RDX was found above the PRG once in December 2002 in well ERDC-MW-4A (0.62µg/L) and slightly below (0.48µg/L) the PRG in the following sampling. The explosive compound 2,4,6 TNT was also found, although below the PRG. Benzene was found in well ERDC-MW-3B at concentrations 3 times above the PRG but more five times below the MCL. Repeated sampling found benzene again at similar

## Responses

- I4-12  
The sampling protocols were designed to sample the most likely mechanisms of contaminate dispersion in the areas of concentrated training activity. That results coupled with background samples indicate that there is no widespread explosive contamination at MMR.
- I4-13  
Environmental samples were collected in the areas of concentrated training activities, and therefore represent the most likely areas to contain substantial levels of contaminants.
- I4-14  
These metal compounds are at levels below PRGs, and therefore do not require further evaluation. Metal concentrations are common in soils in Hawaii.
- I4-15  
The EIS was prepared in accordance with the National Environmental Policy Act and with applicable federal and Army regulations. Review of the Draft EIS by the US Environmental Protection Agency found the document to be adequate. The Draft EIS listed all available and existing information about the study.

## Comments

levels. Other fuel constituents, although detected at least once in all the wells, were at concentrations two orders of magnitude below the PRG.

Page 3-88 lists other compounds (organochlorine pesticides or dioxin/furan type compounds) found either below their respective PRG or between the PRG and the MCL. The DEIS mentions that, in the case of dioxins/furans, the compounds may have been associated with particles because the water samples were unfiltered and may have been introduced during well construction (the latter is something difficult to ascertain, suggesting further sampling is necessary). The next few paragraphs show that a variety of compounds (organic pesticides, plasticizers, perchlorates) were found repeatedly in the groundwater well samples... albeit at very low concentrations. A detection of toluene in several well samples was thought suspect because of its detection also in rinsate samples.

I4-16 | Further clarification regarding the nature of the rinsate, its purpose within the quality assurance and quality control plan, and its chemical composition should be incorporated into the DEIS to assist in evaluating the significance, or lack thereof, of the detection of toluene.

I4-18 | Arsenic (As) was detected in samples from four wells during the first round of sampling, at concentrations 4 times below to just under the MCL. The lack of As detection in subsequent samplings was cited as a reason for suspecting this element was introduced into the groundwater during well construction. This, again, is difficult to ascertain or discredit without further sampling.

Thallium (Tl) was detected repeatedly (i.e., during several sampling rounds) but generally in different wells. Only during the first sampling was Tl found above the MCL.

This section of the DEIS summarizes groundwater sampling as characterized by sporadic detects of various compounds/elements but not at concentrations that pose human health risks. The DEIS claims that the source of these substances is uncertain and may be recent introduction rather than transport of contaminated groundwater. It further states that continued monitoring will be performed to further reduce uncertainties. **It is important to point out that the extent of sampling carried out under this task is very limited and that extrapolation of the results described above to all of MMR is neither a scientifically prudent nor acceptable approach. Clearly what is necessary is more (areally and spatially) extensive monitoring!**

I4-19 | Vadose Zone monitoring (page 3-90). The DEIS describes ground borings and installations of lysimeters in only three locations to monitor the vadoze (unsaturated) zone and evaluate potential downward migrations of contaminants. Two lysimeter locations were in the OB/OD area (B-1 and B-2) and one in the Junk Car pit (B-3). Sampling depths were 30 and 42 feet at B-1, and 30 and 45 feet at B-2. The depth of sampling at B-3 was 19 feet. Porewater samples were collected in April and June, 2003. Concentrations of RDX at B-1 were 4.8 mg/l at 30 feet and 2.9 mg/l at 45 feet, whereas concentrations at the B-2 were about one order of magnitude lower (0.027 mg/l at 30 ft, 0.033 mg/l at 42 ft). HMX (1.4 mg/l) was also found in the deeper lysimeter at B-1.

## Responses

I4-16

Dioxin levels in groundwater samples are very low. Low levels of dioxin are common in the environment in Hawaii, as indicated by the results of the off-site sampling (Appendix G-1, Section 3.6). Additional sampling for dioxins is not warranted given the results.

I4-17

The QA/QC plan (in Appendix G-1) describes in details the rinse procedures and methods and significance of a given analyses detection.

I4-18

Six rounds of ground water sampling were conducted on the Makua Water wells. Any significant concentrations of arsenic would have been detected in the subsequent sampling round.

I4-19

The results of the hydrogeologic investigation showed a high degree of consistency across the site. The purpose of the investigation was to establish the baseline conditions and the potential for off-site contamination. The sampling results adequately characterized the site.

## Comments

- Because only two episodes of lysimeter sampling were undertaken to acquire porewater, evaluation of the temporal variations in organic compounds within the unsaturated zone is clearly not possible.** Additionally, according to the DEIS, some lysimeters contained either no or insufficient water to allow the complete suite of analyses to be conducted, thereby further limiting the information obtained. Of the reported results, only carbon tetrachloride, chloroform, RDX and HMX were detected above EPA Region IX tap water RPG. Lysimeter samples from the OB/OD showed (not surprisingly) the highest concentrations of RDX and HMX. 2,4 DNT and tetryl were also detected in OB/OD area lysimeter samples. The DEIS summarizes the results to indicate that explosives have migrated at least 50 feet below the surface of the OB/OD area but claims that this area is not representative of Makua in general because the OB/OD area has been used extensively for detonation, whereas the rest of Makua has not. Furthermore, the DEIS claims that the composition of the soil below the OB/OD area is such that extensive migration at depth is unlikely. Lower concentrations of explosives in the “junk car” area are used in the DEIS to support the contention that the OB/OD area is not representative of Makua as a whole. Yet, the lack of deeper lysimeters precludes any reasonable evaluation of the potential for migration of materials throughout the rest of the unsaturated zone. Given that RDX and HMX are rather insoluble in water, the fact that detectable amounts of these compounds were found within the lysimeters (as well as in other samples described in earlier sections) suggests a potentially widespread distribution and that more elevated concentrations may occur within the ground at MMR.
- The DEIS claims that soils from the boreholes in which the lysimeters were installed did not contain the explosives found in the lysimeter samples and implies that it is likely the compounds were not found because they are water soluble and little water exists in the dry soils of Makua. This implication is rather puzzling considering the relative insolubility of these compounds in water. The Merck Index of organic compounds states that RDX is relatively insoluble in water, whereas HMX is slightly soluble in water. **Given the detection of RDX in a variety of water samples from different sources, further sampling of soils should be undertaken to ascertain the accuracy of the alleged absence of these compounds within soils. It is likely their distribution is highly heterogeneous, thereby requiring more extensive sampling.**
- The DEIS provides an example calculation of how much of the compounds in question would be found in (dry) soil with 3000 ppb RDX. The calculation assumes that about 1% water would occur in the soil, and subsequently assumes that the water in question would contain 3000 ppb RDX yielding a result of 30 ppb RDX in the soil as a whole. This calculation is rather naïve as it assumes that all the RDX in the soil itself would be associated with water. Because RDX is relatively insoluble in water, this (and similar compounds such as HMX) is (are) much more likely to be associated with the solid phase than with the aqueous phase. Hence although the 30 ppb calculated in the DEIS may be a value that is below the detection limit for RDX in soil, this calculation is flawed and misleading. The discussion shifts to how RDX-type compounds would bind to soils with a high organic content. Although RDX and HMX are more likely to have a high affinity for organic compounds than water, this alone has little bearing on the potential mobility of any RDX/HMX in the subsurface of MMR. The DEIS then claims

## Responses

- I4-20  
It is common practice to collect groundwater samples over one year to evaluate the seasonal impacts from basinwide groundwater flow. The impact to the vadose zone by seasonal variation is limited; therefore, two rounds of sampling are acceptable to evaluate the vadose zone contamination that could potentially impact off-site receptors.
- I4-21  
RDX and HMX are not detected in the downgradient monitoring wells. The two boreholes B-1 and B-2 were placed in the regions shown from geophysical data to have the greatest potential for having been trenched. These areas would most likely contain the highest concentrations of RDX and HMX. Also, retardation rates of RDX and HMX in the vadose zone is well documented (ERDC, 2002) to occur the further from the source area that the RDX travels in solution. In order for the RDX and HMX to be of a concern, there has to be an impacted receptor. There is no known impacted receptor.
- I4-22  
The presence of these compounds in the lysimeter samples suggests that they are sufficiently soluble to be carried by water to the depths of the lysimeters. Lysimeters collect soil moisture by creating soil suction pressures lower than the surrounding soil.
- I4-23  
The sampling of all environmental media (including air, sediment, soil, surface ground water) present at MMR can be used to scientifically evaluate training (both historic and present) and the likelihood of contaminants being transported off MMR. The sampling of environmental data are reported in Appendix G-1.
- I4-24  
The calculations are made using practical worst case scenarios to evaluate the potential impacts to off-site receptors. Even using these practical worst case scenarios, impacts of RDX to off-site receptors due to surface water was found to be less than significant.

## Comments

- I4-25 | that, because of the affinity of RDX/HMX for organic matter and the fact that the abundance of organic matter decreases sharply with depth, relatively little RDX is expected to leave the surface and migrate downward in the OB/OD area. **This is nonsense, as in the absence of organic matter any RDX type compound would have a lesser tendency to bind to soils and should migrate more readily (potentially considerable distances/depths). Although the DEIS claims that there is no evidence that RDX (and presumably HMX) has (have) migrated to the groundwater aquifer, based on its absence in well MW-5 closest to this area, the occurrence of these compounds in lysimeter porewater under the OB/OD area suggests that it does indeed migrate downward. The significance or extent of RDX migration within or out of MMR, simply cannot be ascertained without analysis of a broader (temporal and spatial) suite of lysimeter samples collected throughout Makua.** Finally, the absence of RDX/HMX in water from well MW5, the well nearest the OB/OD area, is also used in the DEIS as evidence that these compounds have not migrated to the depth of the aquifer. Again, the absence of a compound in a given sample says absolutely nothing about any past or future conditions, it only indicates that the compound in question was not present at the particular time of sampling in that particular location. It is possible that preferential flow paths may exist in the soil at MMR and carry these compounds to other unsampled locations. Because activity in the OB/OD area has varied over time, it follows that the source of contaminants to the area also varied, and it is quite possible that higher concentrations of RDX/HMX occur below the two deepest lysimeters at B-1 and B-2.
- I4-26 | **This alone contradicts the Draft EIS assumption that concentrations of contaminants measured at B-1 and B-2 decrease below the deepest lysimeters.**

Section 3.8: Geology.

- I4-28 | The DEIS states that “it is not appropriate to rely on individual sample results for comparison to the PRG’s; a better approach is to use a set of samples collected over an area of exposure, or over a period of time, to evaluate the average concentrations to which people may be exposed.” The DEIS further states that “EPA recommends using a statistical sample and comparing the calculated 95% upper confidence limit (UCL) of the sample set to the PRG’s.” **These statements indicate that the authors of the DEIS are clearly aware of the need to obtain sufficiently large data sets in order to have significant confidence in the results obtained from their investigation. This also supports our contention that more extensive sampling of various media (soils, water, etc.) in MMR is necessary to arrive at any statistically valid conclusion that no danger exists (or alternatively that danger does exist). The water sampling described in the sections prior to Section 3.8, however, fails miserably in this consideration alone.**
- I4-29 |
- I4-30 | Page 3-103: There is an **error** in the conversion between pounds and kilograms. The DEIS states that 113 lbs/yr/acre is equal to 250 kg/yr/acre (in parentheses); this is reversed. One kilogram equals 2.2 lbs; therefore, 250 lbs/yr/acre is approximately equal to 113 kg/yr/acre.

## Responses

- I4-25  
Retardation rates of RDX and HMX in the vadose zone is well documented (ERDC, 2002) to occur the further from the source area that the RDX travels in solution. In order for the RDX and HMX to be of a concern, there has to be an impacted receptor. There is no known impacted receptor.
- I4-26  
The distribution of monitoring wells was designed to sample groundwater flowing from MMR that could potentially impact off-site receptors. Even assuming another contaminated site other than the OB/OD area or impact area, the monitoring well network would have evaluated impacts to off-site receptors due to groundwater flow. Therefore, additional lysimeters are not warranted.
- I4-27  
Please see response to Comment I4-26.
- I4-28  
The EIS was prepared in accordance with the National Environmental Policy Act and with applicable federal and Army regulations. Review of the Draft EIS by the US Environmental Protection Agency found the document to be adequate. Sampling and testing were conducted at MMR to evaluate the potential impacts to off-site receptors. The representative sampling scheme was performed and data analysis showed no potential for contamination to impact off-site receptors.
- I4-29  
Please see response to **Comment I4-28**.
- I4-30  
The text in Section 3.8.3 of the EIS has been revised.

## Comments

I4-31 | 2002-2003 field investigation by USACOE: 102 surface soil samples (18 subsurface), 11 streambed, 20 muliwai sediment samples, 6 reference soil samples were collected for analysis. **The collection of only 18 subsurface samples is clearly inadequate. One objective of the DEIS is to examine subsurface contamination not just surface contamination (although the latter is more likely to move NOW, subsurface contamination can also be mobilized upon erosion of the overlying surface soils). The 18 subsurface samples are additionally BIASED towards areas the Army expected contamination. This is scientifically unacceptable, although the intention was likely to present a potentially worse case scenario.**

I4-33 | The DEIS used "industrial soil" PRG in a comparison with the 95% UCL of sample results. This approach is deemed conservative as the upper (i.e., higher concentration) observed values are compared to PRG for industrial sites. The PRG for industrial sites are values below existing criteria for the given contaminants, and values towards which cleanup efforts should strive. The DEIS claims PRG for industrial sites represent conservative criteria, as it is assumed that "industrial workers" who would be exposed to the PRG levels of contaminants during a normal work-week for 30 years are unlikely to suffer any ill effects.

I4-34 | On page 3-108, the DEIS reports concentrations of DNT (a component of explosives and also a breakdown product of TNT) ranging from 0.28 to 76 mg/kg (ppm). This represents a range of concentrations spanning three orders of magnitude and, although the DEIS states that this and other explosive compounds were always at concentrations below the industrial PRG, the occurrence of such a wide range of concentrations suggests that the distribution of explosive type compounds is highly variable within the sampling area. **Hence there is a significant probability that the area has not been adequately characterized or that hot spots of high concentrations exist but have not been identified.**

I4-35 | The comparison of metal concentrations in soil samples collected from MMR to those reported by Halbig (1985) for Big Island soils poses potential problems. Although the DEIS states that (natural) concentrations may vary between Oahu and Hawaii, it claims that the data provided by Halbig for the Big Island "may provide an indication of the normal range in soils derived from Hawaiian basalts." This is only partially true, because rocks and soils from the Big Island are much younger than those on Oahu, therefore soil pedogenesis associated with weathering of basaltic material has occurred to a much lesser extent there than on Oahu. Volcanic rocks from Oahu, especially the older rocks of the Waianae range, have weathered for much longer period of time, hence, metals may have leached out more extensively, possibly resulting in a lower background for Oahu than Hawaii. Additionally, it is imprudent for the USACOE to use data that are more than 20 years old when data are available from a substantial number of more recent investigations of trace elements in the Hawaiian environment, especially given that some of these studies were carried out on Oahu. The DEIS further states that 95% UCL of arsenic (As), lead (Pb) and selenium (Se) exceeded the background ranges reported by Halbig (1985). Of these three elements, As also exceeded PRG values based on a carcinogenic endpoint. Although the DEIS reports that As is used commonly in

## Responses

I4-31  
Sampling and testing were conducted at MMR to evaluate the potential impacts to off-site receptors. The representative sampling scheme was performed and data analysis showed no potential for contamination to impact off-site receptors.

I4-32  
Please see response to Comment I4-31.

I4-33  
The Army thanks you for your comment and appreciates your participation in this public review process. Your comment has been considered and has been included as part of the administrative record for this process.

I4-34  
The environmental sampling plan was designed to sample all media that are likely to have contamination, i.e. air, soil, sediment, ground water and surface water. Further, samples were collected in the areas of concentrated training, as well as background areas to identify potential "hot spots". The representative sampling scheme was performed and data analysis showed no potential for contamination to impact off-site receptors.

I4-35  
The Army thanks you for your comment and appreciates your participation in this public review process. Your comment has been considered and has been included as part of the administrative record for this process. In addition, the reference study was provided to support the discussion for background concentrations.

I4-36  
Please see response to Comment I4-35.

I4-37  
Please see response to Comment I4-35.

## Comments

- I4-38 | rodenticides (it is also used in other pesticide preparations) and should be expected to be present at more elevated concentrations than background owing to the extensive development of Oahu, no reference supporting these arguments is presented. In reality the background for As in the fine fraction (< 63 µm) of uncontaminated stream sediments from forested areas of Oahu is only about 1.5 mg/kg (De Carlo, Tomlinson and Anthony, Applied Geochem, 2005), although concentrations in areas impacted by agricultural activities can be two orders of magnitude higher. Given that MMR has not been subjected to a high degree of development and that it is not downwind/downstream of highly developed or agricultural areas, concentrations of As in soils should be expected to be quite low, if no contamination has resulted from activities at MMR.
- I4-39 |

The DEIS states clearly on Page 3-110 that dioxins have been found in many surface soil samples and represent “a potential group of chemicals of concern.” Equivalent toxicities, in terms of the 2,3,7,8-TCDD isomer, are calculated to allow comparison with the EPA Region IX industrial soil PRG. The average for the 102 surface soils collected is 0.00266 µg/kg with a 95% UCL of 0.00743 µg/kg. According to the DEIS, however, the 95% UCL represents a 4.64 X10<sup>-7</sup> cancer risk, which is considered acceptable for part time occupational exposure to these soils. Because dioxins are widely distributed throughout the environment and are derived from sources such as the burning of plastics, the DEIS claims that there is no evidence of a significant on-site source of contamination with respect to dioxins. **Although the source of the dioxins cannot be ascertained, it remains equally uncertain that there is no on-site source of these compounds. Owing to the frequent occurrence of burning in the OB/OD fires in other areas of MMR, it seems likely that the dioxins could, in fact, be locally derived, rather than atmospherically deposited. A means of evaluating this possibility would be to conduct dioxin analyses in suites of soil samples collected from various depths in areas that are known to have been disturbed (e.g., dug up for burning operations) and determine whether these samples contain higher concentrations of dioxins than observed on average at MMR.**

- I4-40 |
- I4-41 |
- I4-42 | Although it is likely, as stated in the DEIS, that past activities at MMR have contributed to low levels of contamination with the various persistent organic compounds described in the section on “other chemicals of potential concern”, the inadequacy of soil sampling and analysis does not allow a statistically defensible evaluation of the extent of contamination by such substances, irrespective of their original sources. Hence it remains impossible to reliably evaluate any potential impacts of these materials on the environment.

On page 3-226 of section 3.11.4 (Hazardous materials and wastes) the DEIS describes procedures for the disposal of excess propellant/charges remaining after completion of exercises and how the incinerated wastes (containing Pb, DNT, benzene and cyanide) are collected and disposed of. The DEIS states that these materials are treated as hazardous wastes, that samples of the hazardous wastes are sent out for characterization and that when storage containers are full, these are disposed of in accordance with hazardous wastes procedures. These procedures appear to be environmentally sound BMPs. It should be noted, however, that on the following page (3-

## Responses

- I4-38  
The commentor notes that background arsenic concentrations in forested areas of Oahu are in the range of 1.5 milligrams per kilogram. However, the area in which soil samples were collected is not forested. The Affected Environment sections of the EIS describe past uses of Makua Valley that included agriculture and ranching. Concentrations above presumed background levels, or scattered elevated concentrations may be attributable to these past uses. Arsenic is also used as an herbicide, and it is possible that organic arsenical herbicides may have been applied in the past, but there are no records of such uses. Arsenic is found in numerous inhabited or agricultural areas throughout Oahu at concentrations above natural "background" levels. Arsenic, however, is not a significant constituent of military ordinance, and therefore arsenic concentrations are not expected to increase as a result of the project.
- I4-39  
In fact, prior to military use, as indicated in the EIS, Makua Valley was used for agriculture. Some of the non-military related compounds likely derive from that period of use.
- I4-40  
Dioxins have been demonstrated to be present outside Makua Valley at concentrations similar to those found in Makua Valley. It is widely accepted that dioxins have been deposited over great distances, and that some quantity of dioxins is derived from combustion from many sources. The evidence indicated no unusual concentrations of dioxins in samples from Makua Valley that would suggest an onsite source.
- I4-41  
The results of the hydrogeologic investigation indicate that additional dioxin analysis is not warranted at this time.

**Comments**

**Responses**

(Cont.)

I4-42

The EIS was prepared in accordance with the National Environmental Policy Act and with applicable federal and Army regulations. Review of the Draft EIS by the US Environmental Protection Agency found the document to be adequate. Sampling and testing were conducted at MMR to evaluate the potential impacts to off-site receptors. The representative sampling scheme was performed and data analysis showed no potential for contamination to impact off-site receptors.