

Walter Chun, PhD, CSP, CHSP, CHST
1045 Lolena Place
Honolulu, Hawaii 96817
(808)375-2048
oshman@hawaii.rr.com

September 14, 2007

Senator Daniel Inouye
300 Ala Moana Blvd, Room 7-212
Honolulu, Hawaii 96850-4975

Senator Daniel Inouye
Hart Senate Office Building, Suite 722
Washington, DC 20510-1102

RE: Contamination of Residential Sites at Kaneohe Military Base

Honorable Senator Daniel K. Inouye,

Thank you for forwarding the letter from the Department of the Navy regarding the concerns with the contamination of residential sites at Kaneohe Military Base (KMB). I am concerned that the issues related to the contaminated residential sites are not addressed and will be lost. I offer the following reiteration of concerns. I don't believe it is too much to expect that at the end of the day the Navy will take actions to address how they will notify the occupants, monitor the exposure of the children and their families, ensure the documentation of the contamination for future generations and ensure the protection of our environment. I have no hidden agenda, I just want to know that we are doing all we can to protect our Enlisted families and the environment. How we got here is another story and not part of my concerns at this time.

Concerns:

This project consists of 212 residential units with lawns and surroundings contaminated with chlordane, heptachlor and heptachlor epoxide. This fact is not disputed by the Navy, see the risk assessment report. The International Agency for Research on Cancer (IARC) classifies chlordane and heptachlor as Group 2B carcinogens.¹ The Navy contends that their risk assessment determined the site to be "safe" although the Navy risk assessment identifies the residential children cancer risk to be 2 to 8.8 times higher than the EPA's benchmark. The Navy's response did not address:

- Risk management actions for the exposure to the residential children and families. The Navy's health risk assessment accepted the cancer risk, i.e., 2 to 8.8 times higher than the EPA's benchmark.

¹ Volume 53; Occupational Exposure in Insecticide Application, and Some Pesticides; International Agency for Research on Cancer (IARC); last updated November 1997.

- The occupants are subject to exposure to the carcinogens and have not been notified. They have a right to know.
- There is no monitoring program to monitor the exposure and the protection of the environment. And to monitor the exposure as it relates to their assessment.
- There is no process to ensure the contaminated area is monitored and documented for future use and release to future generations.

Additional Information:

1. The occupants planted and harvested vegetables and herbs or spices in their back yards. As pointed out in the Navy response some vegetables were analyzed and did not show detectable levels of contamination. However, the samples of vegetables were in an area that was identified to be in the clean area. Other areas with vegetables and/or spices within the contaminated areas were not accessible for sampling without raising concerns. The planting and harvesting of these vegetables and herbs indicates that the occupants are not aware that they reside on contaminated soils. They have a right to know and must be informed.

2. The Navy letter refers to a risk assessment report produced by the Navy Environmental Health Center (NEHC). The assessment report is seriously flawed.

- This assessment is based on a maximum exposure of 6 years for the occupants. What about future use? This area is being turned over to a privatization contractor, how will the 6 year exposure to residents be tracked? What controls residential exposures?? How will introduction of the contaminants to the environment be monitored?
- Use of limited data not intended for a health risk assessment was used. And the sampling protocol is highly questionable.
- The calculations show a residential child risk 2 to 8.8 times higher than the EPA's lower-bound benchmark – How was this determined to be acceptable?

3. In January 2005 the Navy discovered chlordane contamination at an Officers' housing construction project at KMB. They directed the contractor to remove the contamination and to provide a clean ground cover. This is an acceptable practice typical of projects throughout the State of Hawaii. In July 2005 the chlordane contamination was discovered at the 212 residential Enlisted housing project and the direction was to spread the contaminated soil and plant lawns. We were informed that other sites were cleaned up and that this is the only contaminated housing site at KMB.

4. The Navy letter indicates that the Department of Health (DOH) from the State visited the site and reviewed pertinent documentation. The "DOH did not find it necessary to impose any additional requirements." From the beginning the Navy took the position that the State of Hawaii DOH did not have jurisdiction on the military base. However, the DOH did provide comments to the Navy's risk assessment which were ignored by the Navy. The DOH comments questioned adequacy of the sampling protocol, stated that the "Target cancer risk too high"; that the adequacy of the 6 year

exposure is not appropriate if the future use is transferred to the private sector; and area recommended (by the Navy) for remediation is inadequate. Finally, the DOH points out the acceptable cancer risk as $1E10^{-6}$ and they did not agree with the raising of the cleanup limits by the Navy, i.e., 1.6 mg/kg required by EPA to the Navy's 32 mg/kg. See Attachment B.

Summary:

The Navy alleges that they conducted a risk assessment and determined that the exposure is safe. However, the risk assessment report by itself identifies the fact that the residential project site is contaminated. The risk assessment identifies the residential child risk of exposure to cancer at a rate 2 to 8.8 times higher than the EPA's benchmark. Further the assessment reduced the impact of exposure to only 6 years based on resident time of military personnel.² . The assessment did not address the turnover of the residential units to a privatization contractor and how the exposure would impact those residents. The Navy has accepted the risk without taking actions to notify the residents, control the exposure, monitor the conditions, and to protect the environment. Is it acceptable to you or the community to expose infants and toddlers to a cancer risk that is 2 to 8.8 times higher than the benchmark? Additional comments to the risk assessment are provided in Attachment A. Did the MILCON intend to improve the quality of life for our Enlisted to include the development and occupancy of residential units on contaminated land; or the exposure of Enlisted families to unacceptable cancer or non-cancer risks?

We continue to find contaminants in our ocean, land and air from the military operations in Hawaii. It is an undisputed fact that the useable land for this project is contaminated with Group 2B carcinogens. It is also undisputed that the Navy's risk assessment identified a cancer risk to the residential children to be 2 to 8.8 times higher than the EPA's benchmark. The Navy continues to deny that there is a problem and has not taken any action(s) to address the concerns of the exposures. The project is built and young military families presently occupy residential units on contaminated land and it is what it is. We need to address the exposures and protect these families and our environment. It is clear that the issue of the contaminated residential project and the exposures will continue to be ignored. **Senator Inouye your office is our only hope that:**

- there will be a means to address the exposure of Group 2B carcinogens and to protect the infants and toddlers of the young military families;
- that there is a process to notify them of the hazards;
- that there is a monitoring plan to monitor the actual exposures to compare to the assessment;
- that the Navy address the contamination of the environment and the impact;
- and finally to address the future use of this land for future generations, including the privatization of these units.

² Page 5 of the Pioneer Technologies Corporation report dtd November 15, 2005, Navy Risk Assessment

Please let me know if I can provide any other information or if I can provide any other assistance.

Thank You,


Walter Chun, PhD, CSP, CHSP, CHST

Attachment A Comments to the Risk Assessment

Attachment B Comment to the Navy Risk Assessment from the DOH

CC: Marine Commandant Kaneohe Military Base
Congresswoman Mazie Hirono

**COMMENTS TO THE HEALTH RISK
ASSESSMENT**

ATTACHMENT A

COMMENTS TO THE HEALTH RISK ASSESSMENT

The following comments to the Navy's health risk assessment are provided:

A. The health risk assessment does not meet the requirements of the NEHC policy for human health risk assessments. We note that the NEHC Human Health Risk Assessment (HHRA) that provide detailed information for the managing, planning, designing, conducting and effectively communicating the results of HHRAs were not followed. The risk assessment for the chlordane, heptachlor, heptachlor epoxide at KMB falls short of meeting the policy or the process.

B. The sampling data that was used for the health risk assessment was not collected for this purpose nor is it sufficient to adequately reflect the conditions of occupancy. The DOH commented earlier on a rough draft that the sampling data was insufficient and recommended a sampling protocol. The risk assessment does not indicate that there was any plan or objective sampling protocol for this assessment. Further the DOH pointed out flaws in the assessment that were also not addressed. The comments provided by the DOH were ignored. A copy of the DOH comments is provided in Attachment B.

C. The health risk assessment included a human health risk assessment for adult and child residents, construction workers, maintenance workers and utility workers. An excerpt from the assessment is provided with our comments, see page 3 of the report:

- "Resident - Adults and children who live at the site 350 days per year for six years. Current and future residents would potentially be exposed for a maximum of six years. This was based on two three-year tours, which is the Navy's maximum tour-length at one location."

Comment: This assumption limits the assessment only to 6 years. What about exposures to the general public or others that occupy more than 6 years. It should be noted that the residential units at this project will be converting to a privatization contract in 2007.

D. The risk assessment does not adequately address release of the contaminants to the environment, e.g., storm water discharges, etc., exposure to infants and toddlers from the conditions of the sealed units that are air conditioned.

E. The calculation of cancer risk is shown on page 5 of the assessment report. The acceptable risk is shown as 1E-06 or one in one million. This calculation does not include risks or correction factors for children. For example is twice the risk calculation, e.g., 2E-06, acceptable to infants or toddlers?

"Calculation of Cancer Risks

The carcinogenic risk associated with individual exposure pathways were summed to yield the total carcinogenic risk. A 1 in 1,000,000 cancer risk (i.e., 1E-06) means that in a population of 1,000,000 people exposed under an identical exposure scenario (i.e., had exactly the same daily intake of a carcinogen over the same period), there could be one additional case of cancer in the population. For cancer risk, EPA's approach "emphasizes the use of one chance in one million (i.e., 1 E-06) as the point of departure while allowing site or remedy-specific factors, including potential future uses, to enter into the evaluation of what is appropriate at a given site." As risks increase above 1 chance in 1,000,000, they become less desirable, and the risk to individuals generally should not exceed 1 in 10,000 (i.e., 1 E-04) (40 Code of Federal Regulations [CFR] 300.430[e][2]). These benchmarks are presented so that the reader can evaluate the carcinogenic risks presented in this assessment with respect to EPA policy."

F. The cancer risks shown on the reports reflect areas of exposure that exceed the "...cancer risk benchmark of 1E10-6." (Page 5 of the report) **Is the cancer risk 2.4 times higher acceptable for the residential children based on a 6 year exposure?**

- Area 1 Topsoil in place
 - o Sub-Area: 0705-03 - The Residential-Child 6 year exposure cancer risk was 1.4E-06.
 - o Sub-Area: IT-1 - The Residential-Child 6 year exposure cancer risk was 2.4E-06.
- Area 2
 - o Sub-Area: IT-1 - The Residential-Child 6 year exposure cancer risk was 2.3E-06.
 - o Sub-Area: 1T-2 - The Residential-Child 6 year exposure cancer risk was 2.2E-06.

H. The current land use assessment, topsoil in stockpiles, also identifies the acceptance of cancer risks above the EPA's lower-bound cancer risk benchmark. This assessment is based on soil samples from stockpiles of soil that were not spread. The adequacy of the sampling data is highly questionable. Further the release of the land for privatization is not addressed. **Is the cancer risk 2 times higher acceptable for the residential children based on a 6 year exposure?**

"Current Land Use: Topsoil In Stockpiles - 1, 2, 3, 4, 5, & 7

- Stockpile 2
 - o The maximum, minimum, and average Residential-Child 6 year exposure cancer risks were 1.5E-06, 1.4E-06, and 1.4E-06, respectively.
- Stockpile 3
 - o The maximum and average Residential-Child 6 year exposure cancer risks were 2.1E-06 and 1.5E-06.
- Stockpile 4

- o The maximum and average Residential-Child 6 year exposure cancer risks were 2.0E-06 and 1.1E-06.
- Stockpile 7
 - o The maximum and average Residential-Child 6 year exposure cancer risks were 1.7E-06 and 1.3E-06.

I. The future land use acceptance is also based on subsurface soil samples. The adequacy of the sampling for this purpose is highly questionable. For example the basis for the heptachlor epoxide assessment is based on two samples. The risk assessment accepts the cancer risk that are above the EPA's benchmark. ***Is the cancer risk 8.8 times higher acceptable for the residential children based on a 6 year exposure?***

"Future Land Use: Subsurface Soil in Areas 1, 2, 2A, 3, 4, & 5

- Area 1 - The maximum and average Residential-Child 6 year exposure cancer risks were 5.8E-06 and 1.9E-06.
- Area 2 - The maximum and average Residential-Child 6 year exposure cancer risks were 4.5E-05 and 3.0E-06.
 - o The maximum Residential-Adult 6 year exposure cancer risk was 4.8E-06.
- Area 2A - The maximum and average Residential-Child 6 year exposure cancer risks were 1.9E-05 and 2.2E-06,
 - o The maximum Residential-Adult 6 year exposure cancer risk was 2.0E-06.
- Area 3 - The maximum Residential-Child 6 year exposure cancer risk was 8.8E-06.
- Area 4 - The maximum Residential-Child 6 year exposure cancer risk was 5.1E-06.
- Area 5 - The maximum and average Residential-Child 6 year exposure cancer risks were 2.1E-05 and 5.0E-06.
 - o The maximum Residential-Adult 6 year exposure cancer risk was 2.2E-06.

J. The assessment conducted by the Navy includes uncertainties that defined but did not address adequately, see pages 7 &8 of the report . These same uncertainties are the same concerns we raise:

"UNCERTAINTY ANALYSIS

This section presents an evaluation of the uncertainties that are present in each step of the risk assessment process. The risks presented in this assessment are conditional estimates based on a number of assumptions about exposure and toxicity. These uncertainties may result in either an under- or overestimation of risk. The key uncertainties associated with the risks presented in this assessment are:

- **Exposure Point Concentrations** -- There were a small number of samples from some areas/stockpiles. The small number of sample locations limited the amount of data available to calculate the EPCs for use in the risk calculations. Confidence in risk estimates typically increases with increasing sample size. incorporation of more data would increase the confidence in risk estimates, and could increase, decrease, or have no effect on the numerical results.
- **Not Analyzing All Samples for Heptachlor and Heptachlor Epoxide** - The current topsoil in place (i.e., Area 1 and Area 2) and the stockpile samples were not analyzed for heptachlor and heptachlor epoxide. Tables UN-1 and UN-2 present the average percent contribution of chlordane to the hazard indices and cancer risks, respectively for subsurface soil. Based on these data, the hazard indices and cancer risks calculated based on chlordane data only may be underestimated by approximately 6 to 25%. Therefore, the impact of not analyzing the current topsoil in place and stockpile samples for heptachlor and heptachlor epoxide on this evaluation is minimal.
- **Exposure Parameters for Current Residents** - The risk assessment assumed that current and future residents would potentially be exposed for a maximum of six years. This was based on two three-year tours, which is currently the maximum at one location. If the maximum tour length is increased, then the risks will increase. If the maximum tour length is reduced, the risks will decrease.

K. The Navy risk assessment was provided to the State of Hawaii DOH and they provided their comments. We note that the majority of the DOH comments were ignored by the Navy. The DOH identifies and controls the cleanup of Chlordane, heptachlor and heptachlor epoxide in the State. Consistency throughout the island is needed for present use as well as for future use.

- The DOH did not agree to the averaging of sampling data over a large area. The sampling data is questionable. We have the same concerns.
- The target cancer risk is too high. The Navy assessment accepts a residential child risk of $1E10^{-4}$ which is 100 times higher than the acceptable EPA benchmark of $1E10^{-6}$. The DOH disagreed with the acceptance of the $1E10^{-4}$ risk. This is not consistent with the rest of the State.
- The DOH points out the difference in the exposure times, i.e., 6 years and also points out that this is not acceptable if future use includes transfer to the private sector.
- Additional soil data for Area 5 was not considered. The Navy risk assessment should include all soil data. The DOH also points out that not all stockpiles were included in the evaluation.
- The area recommended for remediation is inadequate. The Navy cleaned up one area only on the site. The DOH was concerned about other areas, and more importantly the changing of the cleanup levels. The Navy risk assessment report

changed the cleanup level from 1.6 mg/kg to 32 mg/kg. This change in the cleanup level was not acceptable to the DOH.

**COMMENTS TO THE NAVY RISK ASSESSMENT
FROM THE DOH**

ATTACHMENT B

LINDA LINGLE
GOVERNOR OF HAWAII



CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File: EHAH/HEER Office
06-005-CAC

January 4, 2006

Mr. Terry Metcalf
Metcalf Construction Company, Inc.
73-4273 Hulikoa Drive
Kailoa-Kona, HI 96740-2074

Site/Facility: Chlordane Issues at Marine Corp Base Hawaii (MCBH)
Subject: Review of the Navy Human Health Risk Assessment

Dear Mr. Metcalf:

The following comments are provided to you at your request for a Department of Health (DOH) review of the Navy risk assessment. The risk assessment follows standard USEPA methods. However, the assessment contains the same flaws that we pointed out for the October 24, 2005, draft of the document. The document reviewed for this correspondence was the November 17, 2005, Health Risk Assessment prepared for the housing redevelopment project at Marine Corps Base, Kaneohe (MCBH). The document was prepared to address the potential risk to future residents posed by chlordane in exposed or potentially exposed soils.

Specific comments include:

1. Soil data averaged over inappropriately large areas. As we have discussed in the past, soil data should not be averaged over an area that exceeds approximately ten house lots. This is needed in order to ensure that potentially significant hot spots are not inappropriately "risked away" due to dilution of the data. Area 2A, in contrast, includes over 20 house lots. The number of lots included in Areas 2, 3, 4 and 5 is also excessive. We have provided a more detailed discussion of this issue in previous memos. A draft, revised map of recommended "decision units" was also provided. To address this issue, the five original areas were subdivided into 13 smaller sub-areas that contained approximately ten or less house lots. A draft map that depicted these areas was provided to representatives of MCBH.

2. Target cancer risk too high. Conclusions of the risk assessment are based on the acceptance of a target risk level of one-in-a-hundred-thousand (10⁻⁴) and a target Hazard Index of 1.0. This equates to a target cleanup level of 35 mg/kg (risk driven by non-cancer concerns). For chlordane, our office recommends a target excess cancer risk of one-in-a-million (10⁻⁶) for residential sites but allows sample data to be averaged over an area that includes up to ten individual house lots (i.e., target cleanup level of 1.6 mg/kg averaged over ten lots). This helps to expedite the sampling effort but ensures that the worst-case cancer risk posed by chlordane on any given lot will not exceed one-in-one-hundred-thousand (16 mg/kg).

The conclusions of the risk assessment are also based on an assumed exposure duration of six years (two three-year assignments), rather than 30 years as generally recommended by USEPA for residential exposure. The risk assessment correctly notes that an exposure duration of six years is not appropriate if personnel are assigned to the base for longer periods in the future or if the area is eventually transferred to private sector.

3. Additional soil data for Area 5 not considered. Sample data collected by Kauai Environmental in July 2005 were not incorporated into the risk assessment. Of most concern are sample data for area five, where up to 57 mg/kg chlordane was reported in shallow soil samples (e.g., samples SSKP0705-27, SSKP0705-28, SSKP0705-29, SSKP0705-30).

4. Reuse of all stockpiles not evaluated. The risk assessment refers to data for stockpiles 1, 2, 3, 4, 5 and 7. Maps depicting the location of these stockpiles are not provided. Based on other data provided to our office, over 20 stockpiles of soil are located on the site. This suggests that data for of the majority of the stockpiles were omitted from the risk assessment and that potential onsite reuse of soil from these stockpiles has not been adequately evaluated.

5. Area recommended for remediation inadequate. The risk assessment recommends that areas where soil poses an excess cancer risk of 10-4 or exceeds a Hazard Index of 1.0 be remediated (i.e., target cleanup level of 35 mg/kg). [Note that the Navy's cover letter presents a cleanup level of 32 mg/kg. Specific cleanup levels are not mentioned in the risk assessment.] Based on this rationale, the risk assessment concludes that only soil in the immediate vicinity area of Sample 2-11 requires removal (104 mg/kg chlordane). The report recommends removal of a small area of soil from the original sample location and retesting to confirm chlordane levels are below 35 mg/kg. There is no reason to believe that elevated levels of chlordane were fortuitously restricted to this sample point location, however, and excavation of single "sample points" is inappropriate. Either more detailed, incremental soil samples should be collected in the area to more closely delineate the extent of soil contaminated above levels of concern or the entire area of soil encompassing sample points 2-11, 2-12 and 2-13 should be excavated (sub-area A-2C in previous comments).

Following the rationale used to recommend remediation in Area 2 (chlordane >35 mg/kg in a single sample) suggests that remediation in Area 5 is also needed (see Comment 3, chlordane up to 57 mg/kg; sub-area A-5a in previous memo). Using a more conservative target excess cancer risk of 10-6 for clusters of up to ten lots suggests that additional removal of soil may be required in areas 2A, 3 and 5 (average chlordane significantly above 1.6 mg/kg; sub-areas A-2e, A-3c and A-5b in previous comments).

Please contact me at 808-586-4249 if you have any questions.

Sincerely yours,



Clarence A. Callahan, Ph.D., Acting Supervisor
Site Discovery, Assessment, and Remediation Section

cc: R. Brewer