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January 6, 1994

Ms. Deborah Carlson
Remedial Project Manager
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Naval Facilities Engineering Command
10 Industrial Highway Mail Stop #82
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RE: Final Draft Revised Media Protection Standards Proposal for On-Shore Media Based on Human Health Risks and for Off-Shore Media Sediments and Surface Water (Based on Ecological Risks), dated September 27, 1993, Portsmouth Naval Shipyard Kittery, Maine

The Department has received and reviewed the Final Draft revised Media Protection Standards Proposal dated September 27, 1993. In some cases it was necessary to reference the PHERE. Some of our comments concern the PHERE, this is noted within the comment. The Department's comments are provided below.

Section 1, Media Protection Standards Proposal for On-Shore Media Based on Human Health Risks

General Comments

Maine Risk Assessment Guidance requires that factors must be "backcalculated" such that they can be used to develop acceptable concentrations of contaminant from an acceptable risk level. The Department is not asking that the Navy actually backcalculate factors, but the Navy must provide the assumptions that went into the development of acceptable concentrations of contaminant. Are these assumptions the same as those used in the PHERE?

The acceptable risk level, or target level fro an area (SWMU) is an incremental lifetime cancer risk of 1 x 10-5 (one in one-hundred thousand) or an area (SWMU) hazard index of "1". There are conditions under which the individual contaminants can be addressed individually, but only when there are sufficient toxicological data to support this.

By using an acceptable target carcinogenic risk level of 1 x 10-5 for each of the chemicals of concern, the total area risk level will exceed this if there is more than one carcinogen present in an area.

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Table 1-2 should include comparisons with the Maine DEP risk-based concentrations of metals in soils. A copy of Maine's Residential Soil Guidelines is attached.

If it turns out that benzene, or another volatile compound requires the development of a MPS, then Maine's Ambient Air guidelines should be included for comparison.

Proposed MPS for On-Shore Soils

Proposed MPS for the Portsmouth Naval Shipyard have been developed for five compounds; cadmium, lead, Arochlor 1254, benzo(a)pyrene, and arsenic. These were developed on the basis of their levels above background, risk, and comparison with federal and state regulations. Since the Department has identified a lack of compliance with Maine Risk Assessment Guidance and numerous technical errors, in addition to an absence of calculations or spreadsheets, it is not possible to accept these MPS as proposed.

Section 3, Media Protection Standards Proposal for Off-Shore Media: Sediments and Surface Water

In order to meet the specific requirements of the HSWA permit, a functional approach was developed to relate observations of chemical concentration levels (Exposure) to measures of biological impacts (Effects) in order to determine the occurrence of adverse chemical concentrations (chemical concentration levels associated with biological effects).

The Department is concerned with the presumption that this is a functional approach where it really is not. The targets or thresholds have generally been developed from a very rudimentary dataset. For example, EPA's marine water quality are pretty skimpy and Long and Morgan's work is only a good first step. It is the Department's belief that as we learn more, marine "effects levels" will drop lower. At the same time, it is recognized that the state of the (science) is so far behind that the authors are doing the best they can with the information that is available. The authors may consider including a statement that marine toxic criteria is far behind freshwater criteria and only just beginning to become functionally oriented.

Specific Comments

The York River Estuary still is being used as the reference site. In earlier review comments, dated June 16, 1993 of the Draft Phase I Report, the Department indicated that data gathered by the Maine Marine Monitoring Program, NOAA, and Gulfwatch indicate that the York River contains elevated levels of toxic contaminants and cannot be considered as a reference site.

Water Level 1 uses the lowest reported acute LC50 for marine species as the protective level. This level of protection would not be comparable to the level afforded by final

Page 1-3: The State of Maine does not prescribe the use of 1E-05 as the risk goal. Maine DEP has set 1E-05 as the upper bound for an acceptable Incremental Lifetime Cancer Risk for all media, for both residential and commercial/industrial scenarios.

It is stated in Section 1.2.3 that "... a target risk goal of 10.0 was used to derive media protection standards for MPS for each of the non-carcinogenic chemicals..." In accordance with the USEPA (1991) and Maine DEP (1992), a target risk goal of "1" should be used as the hazard index from which the MPS should be derived. All Tables and text must be changed to reflect a target risk goal of "1" for non-carcinogenic chemicals.

Maine DEP Guidance requires that the risk assessment consider whether the contaminants in the soil may leach into the groundwater. This was not a consideration in the development of the MPS. Please explain how leachability has been addressed.

Have risks due to inhalation of fugitive dusts been addressed in the Media Protection Standards? If so, where are they? In particular, arsenic, chromium, and beryllium are toxic via the inhalation route of exposure.

Since oral toxicity factors are typically applied to address the risks due to the dermal pathway, the ingestion and dermal risks should be summed. There are a few instances, e.g., Table 5-4 (PHERE) where the total risk exceeds the acceptable target level if dermal and ingestion risks are presented together, but not when they are separated. Also, if the exposures included the inhalation route, then this too should be added to the total risk.

There were no risks due to chromium exposure in any scenario. The levels of chromium at the Naval Base exceed background levels. Chromium can be quite toxic, (both carcinogenic and non-carcinogenic) depending upon its form. Most of the chromium found in soils that has been used in machining or metal plating exists as chrome III, the non carcinogenic form. However, in the absence of data on the type of chromium, it is most conservative to treat it as chromium VI, the carcinogenic form.

Specific Comments

Page 1-5: Please explain why soil samples from the first round of background samples were collected from a depth of six to twenty-four inches and the background samples obtained in the second round of samples was obtained at a depth of grade to 12 inches or to refusal? How can the two sets of background samples be compared to each other? Does this inconsistency invalidate one set of data?

Table 1-3 should be revised to reflect the two background sampling rounds.

Table 1-4: Please explain why 21 samples are listed in this table. What sampling stations make up the 21 stations? Shouldn't there be 25 samples in total from the first and second round of background sampling?

Page 1-6, second paragraph: Please explain what comparison the first sentence references. Please clearly state what areas contaminated with arsenic, beryllium, and cadmium, do not require remediation.

Page 1-6: Please include a map showing all monitoring well locations.

Page 1-7, Section 1.4.2, second paragraph: MEG should be spelled MEGs.

Page 1-8, First paragraph: It should be noted that maximum contaminant concentration values are used for this site, not average contaminant concentrations.

Page 1-8, Section 1.5.1: Please explain why the title of this section includes only USEPA Guidelines and not all Regulatory Guidelines? Please include risks exceeding MEDEP Ambient Air Standards and Guidelines to this section.

Page 1-9, First paragraph: This paragraph is very confusing because every other sentence refutes the results as overestimates of the actual exposures. Why wasn't the potential for overestimation examined before the sampling took place? Perhaps Phase II of the air monitoring study should include sampling stations at Quarters S, N, 68, and the CDC

In the presentation of the summary of the risks exceeding risk goals of 1 x 10-6 for carcinogens and "1" for non-carcinogens (Table 1-1), there were several inconsistencies with the corresponding values presented in the risk assessment document (PHERE) itself. These include:

> Table 5-1: carcinogenic risk due to beryllium was 1.05E-03 in the PHERE and 1.05E-06 in the MPS.
>
> Table 5-4: carcinogenic risk due to beryllium was 4.85E-04 in the PHERE and omitted from the MPS; dermal and inhalation exposures should be included.
>
> Table 5-3: the HI for mercury exceeds 1.0 and should be included in Table 1-1.
>
> Table 5-6: the carcinogenic risk target level for benzene was exceeded at the JILF and should be included in Table 1-1.
>
> Table 5-7: the carcinogenic risk target levels were exceeded for beryllium and should be included in Table 1-1.

Table 5-10: the carcinogenic risk target level for benzene is not included in the MPS and should be included in Table 1-1.

Table 5-11: the HI for mercury exceeds 1.0 and should be included in Table 1-1.

Table 5-12: the carcinogenic risk due to beryllium was 1.7E-03 in the PHERE and transcribed as 1.E-06 in the MPS.

Table 5-13: the carcinogenic risk due to beryllium was 2.5E-03 in the PHERE, and transcribed as 2.5E-06 in the MPS; the HI target level was exceeded and arsenic and chromium should be addressed.

Table 5-17: the HI for mercury exceeds 1.0 and should be included in Table 1.1.

Table 5-18: the carcinogenic risk target levels were exceeded for beryllium and arsenic and should be included in Table 1-1.

Table 5-19: the carcinogenic risk due to beryllium was 2.9E-03 in the PHERE, and transcribed as 2.9E-06 in the MPS; the HI target was exceeded due primarily to arsenic and should be included in Table 1-1.

Table 5-23: the carcinogenic target risk level due to inhalation of benzene was exceeded and should be included in Table 1-1.

Table 5-32: the carcinogenic risk target levels were exceeded for beryllium and should be included In Table 1-1.

Since none of the equations used to derive risk-based MPS for the chemicals of concern were presented, the calculations could not be checked. Please submit all equations and/or spreadsheets used to derive risk-based MPS.

Section 1.6 Target risk levels were exceeded for ingestion of beryllium in the pond sediments and should be addressed.

Table 1-11: The Maine Maximum Exposure Guideline (MEG) for aluminum is 1.4 ug/L, not 1.4 mg/L as is presented in the table. Also, a HI risk goal of "1" should be used.

The proposed MPS for lead at SWMU #10 is unclear.

Even though groundwater is not currently being used for drinking water purposes, MPS should be developed for the protection of groundwater.

chronic values. The Department recommends that a comparable level of protection be used and is in line with the purpose of the Water Quality Criteria.

Water Level 2 arbitrarily uses the 98 percentile. While the need for arbitrariness is recognized, please explain why so high a level was selected, especially when the geometric mean of NOAA Musselwatch includes contaminated sites. The authors are mistaken when they state that NOAA did not sample contaminated areas, rather, it generally avoided them, but in fact the data population contains many industrial areas. If a reference level is desired, a subset of reference stations from the NOAA data set is more appropriate.

Please explain further why a factor of two (2) was selected to define adverse chemical concentration (EQU 42)? It appears that this would shorten up the list of contaminated areas.

Page 3-19: Stations #3 and 7 appear to be omitted on the longer list. These should be added.

Please include a few examples of "cumulative or non chemical factors". Do the authors mean physical disturbance? Incidentally, I hope that we see the results of the Phase II hypotheses testing. The studies mentioned in paragraph 2, p 3-24 could provide promising contributions to our knowledge.

Page 3-26: Rather than using the short list for water quality adverse chemical concentrations, it appears that the longer list more supportable (unless that safety factor of 2x can be clarified) and therefore more appropriate. The longer list adds 5 stations (5, 14, 19, 20, 21) to the combined lists.

If you have any questions or comments, please call me at (207) 287-2651. Thank you for your attention.

Sincerely,

Nancy Beardsley

Nancy Beardsley
Remedial Project Manager, Federal Facilities Unit
Office of the Commissioner

attachment: Residential Soil Guidelines

pc: Mark Hyland, MEDEP
Jim Tayon, PNSY
Ernest Waterman, EPA

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STATE OF MAINE
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MEMORANDUM

TO: Stacy Ladner, BOHMC, DEP

FROM: Robert A. Frakes, Ph.D., State Toxicologist, DHS RAF

SUBJECT: Residential Soil Guidelines

DATE: July 16, 1990

I have put together the following information on the five metals you requested. Residential soil guidelines are based on ingestion of soil by a young child. Average case represents average soil ingestion (200 mg/day) and worst case represents abnormally high soil ingestion (800 mg/day) or pica behavior, as recommended in the U.S. EPA Exposure Factors Handbook.

Arsenic and beryllium are carcinogenic by the inhalation route. Arsenic is also carcinogenic by oral ingestion. Although these guidelines are based on non-cancer endpoints, long term exposure to soil at these levels would entail some cancer risk by inhalation of contaminated dust. For these two metals, the worst case guideline is recommended because it corresponds to approximately a 10^{-5} upper limit cancer risk.

Residential Soil Guidelines (ppm)

	Metal	RfD (ug/kg/day)	Ave. Case[1]	Worst Case[2]	U.S. Background Geometric Mean	U.S. Background Normal Range
As	[redacted]	1.0	75	19	5.2	1.6-16
Ba	[redacted]	50	3750	940	440	200-1000
Be	[redacted]	5	375	94	0.6	1-3
Co	[redacted]	NA[3]	-	-	6.7	3-20
Sn	[redacted]	600	45,000	11,000	0.89	0.3-3
Tin						

[1]Based on 200 mg/day soil ingestion
[2]Based on 800 mg/day soil ingestion
[3]Not available
[4]Inorganic tin

cc: Katie Zeeman, Ph.D.