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COMMISSIONER

February 7, 2000

Mr. Arthur Coccoli
Code 1821 AC
Department of the Navy, Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop 82
Lester, PA 19113-2090

Re: Building 95
Target Analytes-Groundwater Sampling
Naval Air Station, Brunswick, Maine

Dear Mr. Coccoli:

To follow up on numerous meetings, conference calls, and emails regarding the groundwater sampling at the former Pesticide Shop-Building 95, the Department has reviewed all the information provided by the Navy and has come to the following conclusions.

The November 30, 1999, memorandum from Jason Speicher presents arguments for excluding Avitrol® (4-Aminopyridine), maleic hydrazide, and Rotenone from the list of target analytes for groundwater monitoring near Building 95. Initially, 18 substances that were reportedly handled at Building 95 were considered as potential analytes. Of the 18, four compounds (pyrethrin, Monuron TCA, resmethrin, and arsenic lead) were removed from the list of target analytes, as agreed at the November 3, 1999 meeting with Naval staff. The criteria, considered for this determination, included relative toxicity for humans, solubility in water, potential mobility in soil, and persistence.

In his November 30 memorandum, Mr. Speicher reviewed characteristics of eight of the potential target analytes and concluded that Avitrol, maleic hydrazide and Rotenone are not expected to migrate into the groundwater, therefore should be eliminated from the list. Some of the substances with similar characteristics will be retained as target analytes because they can be detected as part of analyses for other target compounds.

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Following are DEP's observations and comments on arguments presented in the subject memorandum. Arguments presented by the Navy are shown in italics.

1. General

- *It is stated that DDT and pyrethrins were listed as contaminants of concern (COCs).*

The DDT and pyrethrins were COCs for the removal action. It appears from the information on file and the fact that Building 95 was to be included in the Five Year Reviews that some type of institutional control was intended for this site. For the Department to find that this site is safe for unrestricted use the list of COCs will have to include more chemicals.

The list of potential COCs for soils should initially be all of the chemicals handled and stored at Building 95. The list of COCs for groundwater may be limited somewhat to mobile compounds. Depending on results of the analyses that are currently proposed, it may be necessary to analyze groundwater for all of the compounds that were handled/stored at Building 95.

- Arsenic lead" (lead arsenate?) was excluded as a potential target analyte during the November 03, 1999 meeting, however the groundwater must still be monitored for inorganics, which include lead and arsenic.
- At this time, it is acceptable to select target analytes based on characteristics that dictate their potential for migration to groundwater. However, the validity of such arguments will have to be re-evaluated if it is determined that potential solvents, such as fuels are present.

2. Avitrol

- *Avitrol is described in the Extension Toxicology Network (EXTOXNET) database as relatively immobile in soil and, according to the Materials Safety Data Sheet (MSDS) only the inerts in Avitrol formulations are soluble in water.*

According to studies referenced in the Toxicology Data Network (TOXNET), Avitrol is described as moderately soluble in water (8 grams/liter), and has a low sorption partition coefficient ($K_{oc} = 33$). The K_{oc} indicates that Avitrol may be highly mobile in soil. Given the uncertainty about the characteristics, it must be assumed that Avitrol has the potential to migrate into groundwater.

- *The Navy recommends that Avitrol be struck from the list of groundwater target analytes.*

Given the uncertainty about Avitrol's mobility, and the potential for it to be present at all, the compound must be considered a target analyte. It is understood that the analysis for this compound may be difficult. Consequently, Avitrol must be retained as a potential second-round analyte, to be targeted if the first round of samples indicates that other substances with similar characteristics are present in the groundwater.

3. Baygon

- *Propoxur, the primary ingredient in Baygon is short-lived, water soluble, and may be mobile in soils. Because of the potential for propoxur to migrate into groundwater, it is recommended that this substance be retained as a target analyte.*

Concur. According to Mackay et al. 1997¹, the solubility of propoxur in water is approximately 2.0 grams/liter, the K_{oc} is 33, and the half-life in soil is up to 26 days. It is agreed that although propoxur is short-lived, the potential for migration to groundwater is such that the substance should be retained as a target analyte.

4. Diazinon

- *Diazinon has low solubility, high K_{oc} and short half-life, therefore is not expected to have migrated into the groundwater. Diazinon can be considered a low priority target analyte for groundwater monitoring. However, because the method used to analyze for some of the other target analytes will detect Diazinon, the substance is retained as a target analyte.*

Concur, based on features listed in Mackay et al (1997) (solubility approximately 0.04 grams/liter, K_{oc} = 1,000 and half-life in soil up to 12 weeks).

5. Malathion

- *Malathion may be moderately soluble in water (depending on the formulation), but has such a short half-life that it is not likely to be found in groundwater.*

¹ Mackay, D., W-Y Shiu and K-C Ma. 1997. Illustrated handbook of physical-chemical properties and environmental fate of organic chemicals. Vol V. Pesticide chemicals. Lewis Publishers, Boca Raton, Florida.

However, because the method used to analyze for some of the other target analytes will detect Malathion, the substance is retained as a target analyte.

Concur, based on features listed in Mackay et al (1997) (solubility approximately 0.15 grams/liter, $K_{oc} = 590$, and half-life in soil less than 20 days).

6. Maleic hydrazide

- *According to two MSDSs, maleic hydrazide has a short half-life and solubility in water may be insignificant at 20°C to moderate at 25°C. It is argued that, due to the short half-life and potentially low solubility at temperatures typical of Maine, maleic hydrazide is not likely to occur in groundwater and should be removed from the list of target analytes.*

While temperature is important, the range of values for water solubility may reflect differences in the design of the separate studies. The solubility may be anywhere between <0.0001 gram and 6.0 gram / liter, and K_{oc} values from TOXNET indicate high to moderate mobility ($K_{oc} = 40$ to 342, depending on the clay content of the soils).

Given the uncertainty about solubility and mobility of maleic hydrazide, this substance must be retained on the list of target analytes. It is understood that the analysis for this compound may be difficult. Consequently, maleic hydrazide must be retained as a potential second-round analyte, to be targeted if the first round of samples indicates that other substances with similar characteristics are present in the groundwater.

7. Rotenone

- *Rotenone is short-lived and relatively insoluble in water, therefore does not need to be included among the target analytes for groundwater monitoring at Building 95.*

Concur. According to studies summarized in TOXNET, solubility is near 0.0002 grams / liter at 20°C, the K_{oc} is approximately 4,000 and the half-life in soil is less than one week. However, Rotenone may have to be considered in the future if monitoring results indicate that other compounds with similar characteristics are present.

8. Sevin

- *Carbaryl is the primary ingredient in Sevin. It is argued that Carbaryl has a short half-life in soil and, according to one MSDS is insoluble in water. It is*

Table 1. Target analytes selected from the list of pesticides used at Building 95.

Compound (original list)	Target Analyte	Recommended by Navy	Response to Navy
2,4,5-T	Yes		
2,4-D	Yes		
Arsenic lead	Yes ¹		
Avitrol	Yes (dispute) ²	Delete	Retain ³
Baygon	Yes (dispute) ²	Keep	Keep
Cyndgas	Yes		
DDT	Yes		
Diazinon (drexel)	Yes (dispute) ²	Keep	Keep
Resmethrin	No		
Lindane	Yes		
Malathion	Yes (dispute) ²	Keep	Keep
Maleic hydrazide	Yes (dispute) ²	Delete	Retain ³
Monuron TCA	No		
Pyrethrin	No		
Rotenone	Yes (dispute) ²	Delete	Delete ⁴
Sevin	Yes (dispute) ²	Keep	Keep
Simazine	Yes (dispute) ²	Keep	Keep

1. Assumed to be retained as part of analyses for inorganics.
 2. Dispute by Navy via November 30, 1999 memorandum
 3. Substance should be retained, but as second-round analyte, depending on outcome of monitoring for other substances.
 4. Substance does not need to be retained unless other less mobile substances are detected.
11. The question was raised as to which substances would have to be detected to trigger expanded analyses for maleic hydrazide and Avitrol. The trigger would be anything that is of comparable or less potential mobility. For maleic hydrazide that would be carbaryl or simazine. For Avitrol, it could be any of the analytes currently targeted. Although not discussed, if DDT is detected in groundwater, all potential analytes (including rotenone) will have to be addressed.

recommended that Carbaryl be considered a target analyte, only because it will be detected by the method used for Propoxur.

Concur. According to Mackay et al (1997), the half-life for Carbaryl in soil is 20 to 100 days, the K_{oc} is approximately 630 and solubility is approximately 0.04 grams / liter. However, Carbaryl may have to be considered in the future if monitoring results indicate that other compounds with similar characteristics are present.

9. Simazine

- *Simazine is moderately persistent (28-149 day soil half-life), moderately to poorly bound to soils ($K_{oc} = 32$ to 1,000), and has a low water solubility (approximately 0.005 grams/liter). Because of its solubility, Simazine has a low potential for leaching into the groundwater and the Navy recommends that it not be considered a target analyte. However, because it will be detected as part of analyses for other substances, results for Simazine will be reported.*

The reported characteristics are supported by data in Mackay et al. (1997). Because it may be only poorly bound to soil, Simazine should be considered more than an add-on. Simazine should be a target analyte, even if it were not part of a suite of substances covered by currently proposed analyses.

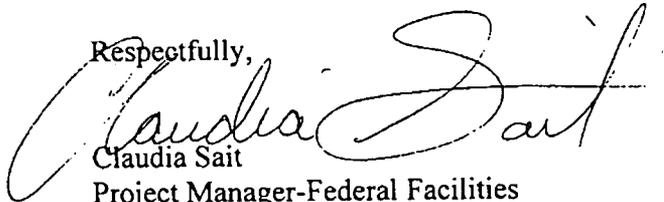
10. The table below summarizes what was initially considered, subsequently re-evaluated by the Navy (Nov 3, 1999 memorandum), and MEDEP' response. It is assumed that arsenic and lead are already target analytes, and if not, they should be. Avitrol and maleic hydrazide must be retained as target analytes. They may be retained as second-round analytes, to be targeted if other substances with similar migration-related features are detected.

12. The Navy also asked, at what concentration would an analyte have to be to trigger the expanded analyses. If an analyte is detected, the Department will evaluate the need for further testing. To consider other (e.g., toxicological) benchmarks as triggers would be inappropriate at this time. It would be impudent to assume that even if one target analyte is present at levels below toxicological benchmarks, the others will also be below such benchmarks.
13. There are two additional items that need to be addressed. On October 8, 1998, MEDEP commented on the Draft Final Closure Report for Building 95 (August 1998). The Navy must respond to these issues and comments.

Also the Draft Long Term Monitoring Plan for Building 95 will need to be revised incorporating all the modifications discussed in the last year. Due to the substantial changes to the plan, a final draft must be submitted for review and comment prior to implementation.

I hope this information will be helpful in resolving the impasse at Building 95. If you have any questions or comments please call me at (207) 287-7713.

Respectfully,



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Project Manager-Federal Facilities
Bureau of Remediation & Waste Management

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