



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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NSY PORTSMOUTH
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August 31, 1998

Mr. Fred Evans
Department of the Navy
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mailstop 82
Lester, PA 19113-2090

re: Draft Groundwater Monitoring Summary Report (December, 1996 - December, 1997) for
Portsmouth Naval Shipyard, Kittery, Maine, July 1998.

Dear Fred:

The Maine Department of Environmental Protection has reviewed the document referenced
above. The Department's comments follow.

General Comments

- 1) This report has the appropriate level of detail and substance, and in general is well organized.
- 2) Groundwater elevations are based on a PNSY-established datum that equates mean sea level (msl), or zero elevation, to exactly 100.00 feet above actual msl. While the use of a transposed msl may be obvious to some local readers, "outsiders" will be puzzled by the high values along the coast. Therefore, the artificial datum must be footnoted in all tables and maps that contain elevation data. Originally, it would have been preferable to have called this an adjusted PSNY datum, instead of msl.
- 3) In many sections of the report, it is repeated that data were collected four times during the report period. Naming the data collection months would be more useful.
- 4) In both the executive summary (page ES-3) and in Section 5.5 the Navy states that the most appropriate time to "collect groundwater" is immediately after seaward gradients are the largest (e.g., April 7 extreme high/low tide elevations). Also, the Navy makes the hypothesis that contaminants are expected to be at minimum concentrations at high tide due to inflow of "clean water" (bottom of page 3-14).

The MEDEP concurs that extreme tide days are the best time to define groundwater flow patterns, but such events probably are not the best to characterize maximum concentrations in contaminated groundwater.

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It is DEP's view that changes in groundwater elevations in response to tides is mostly a pressure phenomena, except where fractured bedrock is in contact with sea water. That is, mass migration of saline water into aquifers does not occur between high and low tides. It is noted in Table 3-2 that in wells with more than 2 feet of water level fluctuation due to tide cycles less than half had lower salinity on April 7 than for the other sampling dates. This suggests that other factors, such as recharge of fresh water from seasonal rainfall, are effective processes altering groundwater chemistry.

MEDEP would like the Navy to respond with technical justification for extreme tide-cycle sampling, and discuss how significant antecedent precipitation affects sampling timing. Why not sample during a period of lowest tide amplitudes?

5) We count at least 20 monitoring wells that are tidally influenced (over 2 feet of fluctuation). What means were employed to sample all of these locations within a span of a few hours ("between 1 hour before low tide and the end of slack tide") on the same day?

6) Subsections 3.3.5 (Potential Facility Background Monitoring Wells) and 3.3.6 (Freshwater Wells) should follow the current Section 4.0, not precede it. It is illogical to present potential background monitoring wells prior to presenting the nature and extent of contamination. Also, we are puzzled why organic analytical results and regulatory exceedences for fresh water wells (only) are found under the general heading of "Hydrologic Evaluation". Please make the appropriate changes.

Specific Comments

7) Executive Summary, Hydrogeology, p, ES-3, para 1

"Similarly, brackish and/or saline water groundwater conditions occur when a greater than 2-foot tidal range was observed."

Suggest rewriting for clarity as "Similarly, brackish and/or saline conditions in groundwater were found at locations where the tidal influence in monitoring wells was greater than 2 feet between high and low tide." Then, need to add that tidal effects on groundwater quality were observed in the general areas of ..., with the farthest landward intrusion being approximately __ feet from the shoreline.

8) Executive Summary, Potential Background Wells and Freshwater Wells, page ES-4

"Aluminum, iron, and manganese were detected at concentrations in excess of secondary MCLs [in potential background wells] suggesting that metals may be naturally occurring at these concentrations."

The MEDEP advises the Navy that it is possible that a true background condition of groundwater quality may not exist at PNSY. However, it is prudent to continue to seek out wells that may serve to define baseline concentrations.

9) Executive Summary, Facility Groundwater Nature and Extent of Contamination, p. ES-5, para 2

"...(PCBs)/pesticides were not detected at any measurable levels in any of the samples collected from any of the sites. As a result, these contaminants do not appear to require further evaluation with respect to groundwater."

The MEDEP disagrees with the statement that these contaminants do not appear to require further evaluation with respect to groundwater. According to the Seep and Sediment Data Package for Round 10, pesticides, mainly 4,4'-DDT, were detected above the chronic saltwater ambient water quality criteria (AWQC) at nine of the fourteen seeps sampled. PCBs were detected as much as two orders of magnitude above the chronic saltwater AWQC at four of the fourteen seeps sampled. Similarly, 4,4'-DDT was detected above the NOAA Effects Range-Low at all the sediment locations sampled and was detected above the NOAA Effect Range-Median at 11 of the 13 sediment locations sampled. PCBs were detected above the ER-L at 12 of the 13 sediment locations sampled and were detected above the ER-M at 4 of the 13 sediment locations sampled. The sources of these compounds are unknown. The continuing presence of these compounds in the sediment, and especially in the seeps, indicates that eliminating their further evaluation in groundwater would be imprudent at this time.

10) Executive Summary, Facility Groundwater Nature and Extent of Contamination, p. ES-5, para 5

"Miscellaneous water quality parameters were analyzed..."

Please change "Miscellaneous" to "Selected field" throughout the report.

11) 1.0 Introduction, page 1-1, para 1

"...where known or potential releases of hazardous constituents had occurred."

Suggest rephrasing the above as follows: "...where known releases of hazardous constituents had occurred, or a strong potential existed for a release."

12) 1.2 Scope of Work, page 1-2, para 4

The emphasis of these two sentences is on the impact current conditions are creating. MEDEP would like the tone changed to reflect that impacts of past on-base conditions will also be evaluated.

13) 3.2 Sample Collection Procedures, page 3-7, stabilization bullets

All the plus symbols should have an associated minus sign.

14) 3.2 Sample Collection Procedures, page 3-7, para 4

"If the parameters had not stabilized within 1-1/2 hours, then sampling was initiated."

In such cases, these wells should be flagged in Table 3.2, and footnoted.

15) 3.2 Sample Collection Procedures, page 3-14, para 4

"Four wells required the use of peristaltic pumps..."

These wells should be flagged and footnoted in Tables 3-2 and 4-3.

16) 3.3 Hydrologic Evaluation, page 3-15, para 1

"A comparison of water levels for Round 8 and the remaining three rounds is provided to highlight observed seasonal variations."

Give the appropriate location in the report of the comparison (i.e., reference Table 3-3).

17) 3.3.1 Low Tide Description of Groundwater Flow Patterns, page 3-15, para 2

This is a good place to discuss any rainfall events that may have closely preceded a sampling round.

18) Table 3-3, Groundwater Elevations, page 3-18

Monitoring well JW-18B elevation data are not given because the "reference point [was] never surveyed". This deficiency should be corrected as soon as possible, as the well is somewhat anomalous in terms of salinity (see comment 21b). At the very least, please add depth of water measurements for this well to the table.

19) 3.3.3 Tidal Influence and Salinity, page 3-19, para 5

"Typical salinity values for the Piscataqua River are approximately 28 ppt (Halliburton NUS, 1995).

At the end of this sentence, it would be informative to add the following:

"...while ocean water is approximately 35 ppt (ref)." One reference is Drever, James I., 1982: The Geochemistry of Natural Waters; Prentice-Hall, Inc., 388 p.

20) 3.3.3 Tidal Influence and Salinity, page 3-20, para 1

- a) Some data on our copy of Map 4 is difficult to read due to excessive smudging of ink.
- b) JW-16 was below 1 ppt for three of four sampling rounds, and therefore, does not belong in a brackish category. Please delete this reference.
- c) "The groundwater at well JW-18B is highly brackish to saline, which suggests that the deep bedrock outside of the historical island areas is subject to saline conditions (does not receive fresh-water recharge from precipitation.)"

The screened depth of JW-18B is 25-30 feet bgs, or 5-10 feet below top of bedrock. As such, the well taps the top of bedrock, not deep bedrock. Because it is within the historical fill area between islands, it is likely that natural near-shore mud (probably not removed before fill was emplaced) effectively seal the bedrock from possible fresh-water recharge from above. Depending on mud/rock permeability and the vertical gradient (head levels are not available for this well), this condition could slowly change over time towards freshening of shallow groundwater.

The MEDEP suggests rewording this sentence as follows: "The groundwater at well JW-18B is highly brackish to saline, which suggests that bedrock at this location outside the historical island area is not receiving significant fresh-water recharge from precipitation."

- d) "Finally, saline groundwater conditions occur in fill, shallow bedrock and deep bedrock wells along the facility boundary."

This is a little misleading because almost all wells along the shoreline (facility boundary) are installed where fill has been emplaced, and those few wells that are not within filled areas generally yield fresh water (e.g., JW-3, JW-4). Please rephrase this statement.

21) 3.3.4 Seasonal Variations Among Rounds, page 3-20, para 3

"The times of high and low slack are approximately 2 hours later than those shown."

Why is this? The predicted tides in Table 3-4 are for published tide tables for PNSY, according to the text. Some explanation is needed as to why a relatively long time delay for Seavey Island was observed.

22) 3.3.5 Potential Facility Background Monitoring Wells, page 3-22, para 4

"One of the objectives of the Groundwater Investigation and Monitoring Plan was to attempt to identify an initial list of potential background monitoring wells at the PNS including both saline and freshwater background wells and overburden and bedrock wells."

It would be clearer to express this objective as follows:

“One objective of the Groundwater Investigation and Monitoring Plan is to develop a tentative list of overburden and bedrock monitoring wells at the PNSY that includes both saline and freshwater wells.”

23) 3.3.5 Potential Facility Background Monitoring Wells, page 3-22/26

"All of the potential background wells are located within the historical island areas and are upgradient of the sites under investigation for this report."

The weakness of this statement is that sites not under investigation for this report are not excluded from possibly being upgradient of potential background wells. MEDEP will have to evaluate the likelihood of impacts from any such sites before each potential background well can be accepted.

24) 3.3.6 Freshwater Wells, page 3-26, para 3

"Based upon the salinity readings collected during the fieldwork, certain monitoring wells are considered freshwater wells, as there are pockets of groundwater on the islands which are unaffected by sea water."

This wording paints a bleaker picture of sea water intrusion than is presently justified. This report presents evidence (Map 4) that strongly indicates the historical islands are underlain by freshwater lenses, which are much more than "pockets" in terms of the total PNSY area. This sentence could be rewritten as:

“Based upon salinity readings collected during the field program, practically all monitoring wells located on the historical islands and away from the shoreline indicate the presence of freshwater lenses.”

25) 4.0 Nature and Extent of Contamination, page 4-1 para 3

The acronym ICP is not defined here, nor in the listing of acronyms and abbreviations on page iv. Please add.

26) 4.0 Nature and Extent of Contamination, page 4-2, para 1

"Additional compounds that were detected in some of the samples included 2-butanone, freon-113, toluene, and xylene."

Also, bis(2-ethylhexyl) phthalate was detected, and its maximum was much greater than 10 µg/L (see next sentence in report).

27) 4.1 OU-2, Site 6 (DRMO), page 4-3, para 4

"Miscellaneous water quality parameters (identified on Table 4-1) were..."

The parameters are not identified on this table, but merely included. Some readers will not know which are considered "miscellaneous". This problem is present in all OU subsections.

28) 4.1 OU-2, Site 6 (DRMO), page 4-4, para 1

"Since it is unlikely that groundwater at the site would be used for these purposes, only limited conclusions can be made concerning the significance of an exceedence."

The MEDEP agrees with this statement and considers it to be an important statement. Therefore, we were surprised to see it omitted from Subsection 5.5 Overall Conclusions. Please include this statement in subsection 5.5.

29) 4.2 OU-3; Site 8 (JILF), Site 9 (Mercury Burial Sites I & II), and Site 11 (Waste Oil Tanks), page 4-4, para 2

Throughout this paragraph (and in other subsections of 4.0), references should be made as to whether exceedences of MCLs or MEGs occurred, where such values have been established by EPA and MEDEP.

30) 4.4 Non-Site Related Wells and Background Wells, page 4-8, title

Change the subsection title to read: Non-Site Related Wells and Potential Background Wells

31) 4.4 Non-Site Related Wells and Background Wells, page 4-8, para 6

"A total of six monitoring wells previously installed at the PNS to assist..."

These monitoring wells should be listed together within parentheses.

32) 4.4 Non-Site Related Wells and Background Wells, page 4-9, para 2

"No other VOCs were detected in samples collected from these wells."

This statement is misleading since, according to Section 5.5, Conclusions, "VOCs were not part of the analytical suite for the non-site related wells." Please reword.

33) 4.4 Non-Site Related Wells and Background Wells, page 4-9, para 3

"It should be noted that BEHP was also detected in the associated laboratory quality control blank samples; therefore the presence of this chemical is questionable."

Immediately before the word "presence" insert "environmental".

34) 4.4 Non-Site Related Wells and Background Wells, page 4-9, para 4

"The overall concentration of metals detected in samples collected from the non-site related wells and JW-1, JW-3, and JW-4 were less than concentrations detected in monitoring wells from other sites at the PNS."

This is an important finding and should be added to Sections 5.4 and the Executive Summary.

35) 4.4 Non-Site Related Wells and Background Wells, page 4-10, first full para:

MEDEP finds it significant that TPH(DRO) was detected in five of seven non-site related monitoring wells, all installed in bedrock; whereas two shallow wells did not contain detectable DRO.

36) 5.1 OU-2, Site 6 (DRMO), page 5-2, first bullet

"VOCs were not analyzed based on historical data."

This is not a conclusion based on results of the four rounds of sampling, as implied at the bottom of page 5-1. Delete this bullet.

37) 5.1 OU-2, Site 6 (DRMO), page 5-2, second bullet

"Organics (SVOCs) do not seem to be having any adverse effects on the groundwater at the DRMO based on the results of the sampling over the four rounds."

The term "adverse effects" needs to be defined in this context. For example, does it mean exceedences of MCLs/MEGs?

38) 5.1 OU-2, Site 6 (DRMO), page 5-2, last bullet, ending phrase

"... and exceedences should be interpreted with caution."

Please replace "with caution" with "in light of anticipated future water use."

39) 5.2 OU-3; Site 8 (JILF), Site 9 (Mercury Burial Sites I & II), and Site 11 (Waste Oil Tanks), pages 5-2 & 5.3

Throughout this subsection (and other subsections of 5.0), references should be made as to whether exceedences of MCLs or MEGs occurred, where such values have been established by EPA and MEDEP.

40) 5.2 OU-3; Site 8 (JILF), Site 9 (Mercury Burial Sites I & II), and Site 11 (Waste Oil Tanks), page 5-4

a) First bullet: The VOCs commonly detected should be named here. The second sentence should be deleted, or the else the rationale given why trace levels of BTEX might not be attributable to potential source areas.

b) Second bullet: "None of the VOC positive results from these wells were reported with any consistency."

The meaning can be misconstrued. Please rephrase to indicate that the results, rather than the reporting, were inconsistent.

41) 5.3 OU-5, Site 27 (Berth 6), page 5-5, para 1 and first bullet

para 1: "Lead was consistently detected above the action level (no true MCL is available) in the samples from FW-2."

bullet 1: "Positive detection of lead in excess of the MCL appears to be the most potentially significant threat to groundwater quality."

Please correct the MCL inconsistency. Also, note that the state MEG for lead is 20 µg/L, and reference when appropriate.

42) 5.5 Overall Conclusions, page 5-6, para 2

"As discussed in Section 3.0, the most appropriate time to collect groundwater..."

See General Comment #4, questioning the most appropriate time to collect groundwater samples with respect to the tide cycle.

43) 5.5 Overall Conclusions, page 5-6, para 4

"These monitoring wells were selected based upon the salinity ranges (0.5 ppt; no noticeable taste or odor) observed in the wells during the groundwater monitoring. This list is only considered preliminary since it considers hydrogeology only."

Salinity is chemistry, as is the discussion in Subsection 4.4 concerning these wells. Please rewrite.

44) 5.5 Overall Conclusions, p. 5-7 para 3

"PCBs/pesticides were not detected at any measurable levels in any of the samples collected from any of the sites."

It is important to note that, as stated earlier in the report, PCBs/pesticides were not analyzed at all wells (these wells should be stated).

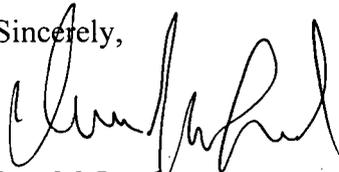
45) 5.5 Overall Conclusions, page 5-7, para 4

"Overall concentrations of metals were similar across the PNS including the non-site related wells."

Add the phrase at the end "...with several exceptions". Lead at Site 27 is one example.

Please feel free to contact me at (207) 287-8010 if you have any questions.

Sincerely,



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