RESPONSE TO COMMENTS FROM THE STATE OF MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION ON THE DRAFT 1998 ANNUAL REPORT, MONITORING EVENTS 11-13 SITES 1, 3, & EASTERN PLUME NAVAL AIR STATION, BRUNSWICK, MAINE

COMMENTOR: Claudia Sait **DATE: 2 August 1999**

GENERAL RESPONSE TO COMMENTS

During a technical meeting held on 22 and 23 November 1999, the EPA and ME DEP made presentations to further detail their geology and hydrogeology comments on the draft 1998 Annual Report for Sites 1 and 3 and Eastern Plume. During these discussions the EPA noted that several general comments related to a general program overview, and are not comments directly related to the 1998 Annual Report.

During discussions at these meetings, the Navy provided an assessment of these comments. Therefore, this response letter will not address comment concerning site geology which were discussed at this technical meeting, but instead will provide a summary of the Navy's position on these topics.

As noted during the 22 and 23 November 199 technical meeting, the Navy believes the existing focus of the long-term monitoring program on the overburden aquifer is appropriate, although additional investigation of the southern terminus of the Eastern Plume is warranted. The additional investigations recommended in EPA comments (clay linears, fracture trace analysis, seismic surveys, potential for DNAPL) are not warranted at this time. Additional extraction wells are planned to be installed in Eastern Plume in 2000. If persistent groundwater contamination remains after these wells become operational, a re-assessment of these topics might be considered.

General Comments:

1. The Navy needs to change "chemicals of concern" throughout this report to "*contaminants of concern*".

Response – "Chemicals of concern" has been changed to "Contaminants of concern" in the text.

2. a.) MEDEP compliments the Navy and its consultant on the added graphics in this annual report. The bull's eye maps showing sequential monitoring event contaminant concentrations are a good visual aid. With better visualization, patterns tend to become more evident. For example, Figure A-1 through A-4 suggests that groundwater moves southwest from the "hotspot" within the landfill slurry wall toward Mere Brook. However, the shallow and deep potentiometric contour maps show the contours in this area are nearly perpendicular to Mere Brook, indicating that groundwater flows to the southeast. What is the Navy's explanation for this? Our

guess is that the shallow (and deep?) contours actually wrap parallel to Mere Brook upstream of MW-203. (Also see MEDEP's comment 11a for Monitoring Event 13.)

Response –It is possible that groundwater flow exits the landfill slurry wall and flows directly towards Mere Brook. The DEP's hypothesis of interpreting groundwater flow contours based solely on exceedance of MEG at MW-318 instead of based on potentiometric surface measurements requires more discussion. Note that the exceedances at MW-218 are for arsenic, which is quite immobile and has very low solubility in water. Therefore, it is also possible that arsenic concentrations detected at this monitoring well are the result of past metals releases from the un-capped landfill, rather than continuing flux of arsenic from the currently capped and successfully dewatered landfill.

b.) The Eastern Plume history of VOC concentrations for all monitoring events for the current shallow and deep monitoring wells are portrayed in Figures A-5 and A-6. A lot can be learned by comparing these visuals with past and present potentiometric maps and with the pattern of groundwater extraction through time. In the brief time the Department has spent with comparisons, it is evident that the contaminant history at all discontinued monitoring wells should be considered. Using the complete set of data, the progression of plume migration and the effects of pumping would be easier to interpret, and apparent anomalies may be explainable. The MEDEP recommends that the Navy compile a comprehensive bull's eye map to furnish to Radian during their review of extraction optimization. No response is required.

Response – These data have been made available to Radian for their use.

3. The deep clay thickness isopach map presented in Figure 3-29 is informative and a good addition to the annual reports. DEP suggests that a top of the deep contaminated sand contour map would be just as valuable, because it would show a rise in elevation as the plume approaches the streams. The Navy is encouraged to add such a figure.

Response – The Navy is working to complete a GMS 3-D visulization of the top of the deep sand unit to allow for future interpretation of site geology. It is anticipated this will be completed during 2000 and distributed to RAB members for their use.

4. The Department notes that in 1998, higher concentrations of certain contaminants in several media were measured downgradient of the Site 1&3 landfill. Several factors could be involved in this occurrence, such as, (1) the cessation of pumping of EW-06 and EW-07 in late 1997, (2) new releases of chemicals within the landfill, and (3) heavy rainstorms in later 1997 and June 1998. The Department agrees with the recommendation in Section 4.6.1. If the increasing trend continues, the Department will expect the Navy to propose activities that will reveal the cause of increases that will lead to a reversal of this trend.

Response – As suggested in this comment, many explanations could be offered for the changing chemical concentrations cited. Future Annual Reports will monitor trends and make recommendations to appropriately address increasing trends, as appropriate.

5. MEDEP concurs with almost all the recommendations in Section 4.6, and commends the Navy for proposing a significant amount of new work, which MEDEP agrees is necessary to improve the reliability of assessing current remedial activities. MEDEP supports the increased use of GIS to better understand the Eastern Plume behavior. MEDEP also encourages the Navy to expand the list of sampling parameters to assess natural attenuation mechanisms that currently may be helping degrade the plume. However, more effective first-phase cleansing of the aquifer will be needed to reduce contamination to levels that can be allowed to attenuate naturally. Eventually the Navy may want to consider enhanced (or engineered) biological in-situ treatment to speed up removal of the bulk of the chemical mass in the aquifer.

Response: As stated at the 1 September 1999 Technical Meeting, the Navy is interested in pursuing use of a natural attenuation remedial strategy for the Eastern Plume. The current groundwater extraction network may be providing the first-phase cleansing of the aquifer mentioned in this comment. Additional sample parameter may be added to the sampling program following discussions on how best to implement natural attenuation at the Eastern Plume with the DEP and EPA. To speed this process, it is requested that the ME DEP provide copies of biological in-situ treatment procedures (i.e., reports or other documentation) which have been implemented successfully in Maine.

<u>Specific Comments</u>:

6. <u>Geology</u>, Section 2.2, page 2-2, 2nd bullet, 2nd & 3rd sentences:

   "A deep sand unit is present at the base of the transition unit in some areas (deep sand). The deep sand interval in the transition unit is composed of fine sand."

   These sentences may confuse the reader in regards to the geologic entity being addressed. The Department disagrees that the deep sand unit is within the transition unit, and believes it has not been described in this manner in past reports. It is being mapped as an independent unit on potentiometric and plume concentration maps. Please check, and correct as appropriate.

Response –The Remedial Investigation and Supplemental Remedial Investigation completed by E.C. Jordan in 1990 and 1991 identify the coarse-sand as part of the transition unit. This is clearly noted in descriptions of site hydrogeology and cross sections (see Supplemental RI cross-section C-C'), and in many of the CP logs in the RI. The deep sand can be mapped as an independent unit and generally overlies fine grained units of the transition, or can directly overlie the Presumpscot Clay. Therefore the description provided in the Draft report is believed to be accurate.

7. <u>Hydrogeology</u>, Section 2.3, page 2-2, 2nd para:

"Shallow ground water generally flows toward Mere Brook and Merriconeag Stream."

Within the report area this is universally true, the only exceptions being very close-in to the operating extraction wells where minor areas of backflow locally occur. Therefore the word "generally" should be deleted.

Response – The word generally has been removed.

8. Surface Water, Section 2.4, page 2-3:

In that the Eastern Plume program is now focusing on learning the nature of groundwater discharge to these streams and their wetlands a statement should be added such as: *"The nature of groundwater discharge to these streams and its relationship with the Eastern Plume is being investigated."*

Response – The sentence has been added as suggested.

9. Remedial Activities, Section 2.5, page 2-3, 1st sentence:

"Because Sites 1 and 3 and the Eastern Plume are collocated, remedial actions and long-term monitoring for these sites were undertaken concurrently."

Sites 1 & 3 and the Eastern Plume are not "collocated"; they apparently do not mingle or overlay each other within the areas that exceed MCLs/MEGs, and exist as separate entities (see figures in this report and in past reports). Please replace "collocated" with "*adjacent to one another*", or rewrite the sentence for accuracy.

Response – The word "collocated" has been replaced with "adjacent to one another"

10. Remedial Activities, Section 2.5, page 2-3, 2nd para:

To improve clarity, please separate out in to two paragraphs Sites 1 & 3 and the Eastern Plume, by extracting sentences 2 through 4.

Response – The paragraph has been split into separate paragraphs.

11. Monitoring Locations Relative to the Eastern Plume, Section 2.6, page 2-4, numbered indentations:

Please modify the sentences to read in present tense instead of future tense *(e.g.* "Ground-water data from these wells *are* used to …

Response – The word "would" has been changed to "are" as suggested.

12. Ground-Water Extraction and Treatment System 1998 Performance Summary, Section 3.1, page 3-1, 3rd paragraph and inset graphs:

The both graphs shown side-by-side are identical, but the text names two different graphs. Please correct.

Response –. The appropriate graph showing monthly VOC mass removed from the Eastern Plume has been added.

13. Ground-Water Monitoring and Sampling Program, Section 3.3, page 3-3, 2nd para:

a.) Figure A-5 (VOC Concentrations Above MEG or MCL in Shallow Wells) shows that an exceedence occurred at MW-229B for only Event 10. The mix-up between the data for the A and B wells was called to the Navy's attention during review of Monitoring Event 10. The corrections were made in the 1997 Annual Report. The data set used to produce A-5 apparently needs to be corrected.

Response –Figure A-5 will be corrected; MW-229B for Monitoring Event 10 has been changed from red to green.

b.) Only count 12 rings (events) are evident on Figure A-5, unless the wider dark green counts as two rings, however the legend symbol is ok. Also, both Figure A-5 and A-6 have off-color rings (orange and yellowish) that are impossible to interpret.

Response – A separator was missing from some wells in the figure resulting in this error, although the data presented was accurate. Figures A-5 and A-6 have been modified to include this separator, and now have 13 rings. Our report copy does not contain orange or yellow rings; this may have been the unavoidable result of the color reproduction process.

14. Top of Bedrock Elevation and Clay Thickness, Section 3.3.3, page 3-3, 1st sentence:

a.) Please change "interpreted" to "*interpretative*".

Response – The word "interpreted" has been changed to "interpretive".

b.) Figure 3-28 indicates that the fire training area is underlain by a bedrock mound within 30 feet of the ground surface. A direct push exploration that was conducted in 1998 found a low permeability transition unit overlies the bedrock mound. Also lab results indicated only low levels of two compounds 1,1,1 TCA and 2-butanone were found. No response required.

Response – The point of this comment is unclear, although we agree with the observations noted in this comment.

15. Summary of Ground-Water Extraction and Treatment System Performance, Section 4.1, page 4-1, EW-1, bullets:

a.) The first statement is true, but it fails to mention that the annual extraction in 1998 was lower than for prior years.

Response – Addition on that statement is not believed to add to the point of this bullet, which is summarizing the VOC removal rates, not pumping rates for EW-1. Therefore, no change was made.

b) In the second bullet "…a similar order of magnitude lower compared with…" does not make sense. -Please check and correct as necessary.

Response –The word "lower" was removed to make this sentence clear.

c. "The similarity in total VOC concentrations suggest the deep ground water being withdrawn by EW-1 is not being diluted by ground water extracted also from the shallow interval."

If the upper sand is essentially uncontaminated, then any groundwater that flows through the upper screen will dilute the total VOC. If the equal concentration comparison between the MW-229A and EW-1 locations reflects reality, it would suggest that an insignificant quantity of water is moving through the shallow screen. A more plausible explanation is that the deep sand unit at EW-1 actually contains much higher concentrations than does the upper screen sand unit, and the upper zone is contributing a diluting volume of water. Being that MW-229A is located downgradient of the pumped well and major area of the plume, it should naturally have less concentrations of contaminants. Please add this possible explanation.

Response –The amount of groundwater moving from the shallow portion of the aquifer into EW-1 maybe diluting the extracted groundwater, although this dilution appears to be minimal based on the results to nearby MW-229A. It should be noted that the shallow overburden in the vicinity of EW-1 contains a clay intervals (see boring logs of EP-01, EP-02, EP-03 and EW-1), and therefore the hypothesis that EW-1 must be receiving significant flow from the shallow interval may not be valid. We do not dispute that MW-229A is downgradient and therefore is likely to contain lower VOC concentrations, but feel this statement is accurate as written based on known data.

16. Summary of Ground-Water Extraction and Treatment System Performance, Section 4.1, page 4-1, EW-2 and 2A, bullet 2:

"The mass of VOC removed by the ground-water extraction system has been increasing annually since the system began full-time operation in 1996."

What was the mass removed in 1996? VOC concentrations in influent from EW-1, EW-3 and EW-5 have fallen off since 1996, according to our analysis. The largest annual pumpage was recorded in 1997. The turn-around in mass removal occurred with the startup of EW-2A in June 1998. Without EW-2A, mass removal would have declined between 1996 and the present day. A response is not necessary, unless upon review, the Navy plans to revise the above report statement.

Response – The mass of VOC removed in 1996 was approximately 34.45 kg. We agree that the start up of EW-2A resulted in significant improvement in the amount of VOC being removed from the Eastern Plume. Other extraction VOC removal rates were limited in 1998, and the Navy is considering ways to improve VOC removal. No changes were made to this statement.

17. Summary of Ground-Water Extraction and Treatment System Performance, Section 4.1, page 4-2, EW-2 and 2A, bullet 3:

It is also important to point out that an area of contamination within the 100 µg/L total VOC contour on Figure 3-27 and northeast of MW-331 will not be captured by EW-2 or EW-2A. Flowlines drawn perpendicular to the potentiometric contours lead to Merriconeag Stream. Please present the complete picture.

Response –The cone of depression generated by EW-2 is believed to be creating a cone of depression which is approximately 400 ft wide as shown on Figure 3-27. Therefore, is likely that EW-2A is well positioned to capture VOC contaminated groundwater as it flows downgradient (i.e., southeast) from MW-331. The deep sand unit is confined and there has been no evidence to support the conclusion that deep groundwater is discharging to Merriconeag Stream. The statement is believed to be accurate as written; no changes were made.

18. Summary of Ground-Water Extraction and Treatment System Performance, Section 4.1, page 4-2, EW-3:

The reason for discontinuing pumping at EW-3 is not correct, in that total VOC increased in March 1998, increased again in July 1998, and increased even more in November 1998. In the RAB minutes for the January 21, 1999 meeting, the following reason was given:

"Extraction well EW-3 has had some problems with turbidity. It was inspected and was found to contain 7-feet of silt, with more silt entering through the screen (seen with a downhole camera)…The Navy has shut down the well, and wants to look at the location of the well to see if it is worth repairing." Please correct.

Response – The sentence has been changed to read:

"EW-3 was removed from the extraction network in December 1998 due to problems with turbidity."

The last sentence of this bullet was revised as follows:

This well is screened through both the shallow and deep intervals*, and therefore is not expected to be repaired.*

19. Summary of Ground-Water Extraction and Treatment System Performance, Section 4.1, page 4-2, EW-4:

Pumpage from EW-4 during the last two months of 1998 was very low compared to the normal rate, and the well was not sampled as part of Monitoring Event 13. Therefore, it is inappropriate to characterize its rate of VOC removal as "relatively consistent" during 1998. Please revise.

Response – The bullet has been changed to read as follows:

Pumping rates at EW-4 were relatively low during the last two months of 1998 compared to the previous months.

20. Summary of Ground-Water Extraction and Treatment System Performance, Section 4.1, page 4-2, EW-5:

1st Bullet: EW-5 was shut down for three months in the spring of 1998. Based on a 60 percent rise in total VOC from Event 12 to Event 13, it appears that the shut down allowed the groundwater to "freshen" considerably during a significant portion of 1998 at this location. Therefore, "relatively consistent removal rates" were not achieved in 1998. The decrease from 700 to 300 µg/L occurred largely in 1996. This description needs to be revised.

Response –This sentence has been revised as follows:

…were noted in DE-5 during 1998*, with the exception of November and December, when this well had reduced pumping rates.*

3rd Bullet: The DEP agrees that dilution of deep-aquifer concentrations by the clean shallow-aquifer contribution is occurring. EW-05 apparently is not removing much mass of the contaminants measured by the nearby piezometers. Therefore, EW-05 is not effectively remediating the northern lobe of the Eastern Plume. This situation needs to be corrected as soon as practical after Radian's review, which should support this current assessment.

Response – The ME DEP's concern regarding the effectiveness of this well is noted. Following Radian's review, the issue of extraction well locations will be discussed as a prelude to installing new extraction wells in the Eastern Plume.

21. Ground-Water Flow – General Observations, Section 4.2.1, page 4-3:

Both shallow and deep potentiometric contour maps strongly imply that groundwater moves to the lower reach of Mere Brook, as the two bullets suggest. Because of the principle of conservation of mass, migrating groundwater must discharge at locations where the aquifer head is lowest, so that new natural recharge to the system can be accommodated. It has been the Department's position that, in light of the consistent overall pattern of the contouring since the Remedial Investigation maps were produced, the only obstacle that may prevent the Eastern Plume from eventually discharging to surface water is an effective pumping network that creates hydraulic containment. Presently, the regulators and the Navy are taking actions that will lead to a detailed evaluation of the adequacy of the historical/current hydraulic containment, and recommend improvements as necessary. Information to this effect must be added.

Response – Disagree**.** As discussed at the 22 and 23 November 1999 technical meeting, we continue to believe it is possible that the deep flow system is "deadheaded" due to the pinch-out of the deep sand unit south and east of MW-311. This hypothesis is supported by three main points: (1) Confined conditions are observed in many portions of the deep sand. (2) As shown on Figure 3-29, a thick sequence of clay up to 60 ft thick underlies most of the deep sand across the Eastern Plume, which is likely to prevent downward groundwater flow into bedrock. (3) Upwards flow from the deep sand is limited by the fine-grained strata within the transition unit. Therefore, is it considered likely that groundwater is not flowing upward into streams as noted in this comment. The hypothesis that the Eastern Plume is not flowing upwards into Mere Brook and Merriconeag Stream has been further supported by the recent sediment vapor diffusion sampling, which did not detect VOC that would indicate the Eastern Plume is upwelling to the streams. No changes were made to this section.

22. Effects of Remedial Measures – Sites 1 and 3, Section 4.2.1, page 4-4, 1st bullet:

As stated in Event 12, comment 14:

> "The deep potentiometric contour maps indicate a bulb-shaped low head area that parallels Mere Brook and runs to the Site 1 & 3 landfill area. The July 2, 1998 contours, in particular, infer discharge of groundwater within the 21-foot bulb. This feature appears strange, but has not been addressed by past comments. Two explanations could be advanced: (1) the landfill cap and head lowering within the slurry wall might be casting a downgradient shadow, or (2) underground features exist under the Weapons Compound that might cause a drain effect on groundwater.

However, the Department offers a more supportable explanation. We observe that water elevations in two monitoring wells (MW-218 and MW-220) are largely responsible for the 21-foot contour shown with a pronounced western protrusion. The screens in these wells are between 30 and 45 feet below land surface, and are about 10 feet deeper than the screens in their paired shallower wells (MW-203 and MW-210B, respectively). But, the drilling logs indicate that all four screens are above the first confining stratum. Therefore, while a significant downward gradient is evident at these well pairs, all four wells monitor the shallow groundwater zone.

The Department recommends deleting MW-218 and MW-220 from the deep potentiometric maps, and redrawing the 21-foot contour so it is centered on Mere Brook and does not encompass the Weapons Compound." The Department does not agree with the Navy's response in Appendix B-2.

Response –The low area is likely to be caused by the down gradient effects of the low permeability cap and slurry wall, and dewatering at Sites 1 and 3, as stated in this bullet. We continue to believe MW-218 and MW-220 should be considered deep monitoring wells (see response to ME DEP comment No. 26 for further discussion). Alternative interpretations are not uncommon when identifying whether a well may be shallow or deep at this site, or while drawing contour lines due to differences in professional judgement. We believe this subject should be discussed as part of technical meeting in 2000 rather than in written responses. No changes were made in these figures.

23. Effects of Remedial Measures – Eastern Plume, Section 4.2.3, page 4-4, 2nd bullet:

The apparent small diameters of the cone of hydraulic influence in plan view relative to the expanse of the Eastern Plume imply that the plume is not being effectively contained by the present extraction well network and pumping rates. This is why it is crucial that the USN perform a thorough evaluation of the present situation, and to take corrective action as soon as possible.

Response – It is anticipated the effectiveness of the Eastern Plume extraction well network will be discussed with RAB members after the Radian report is released. Additional extraction wells are planned to be installed at the Eastern Plume during 2000 to address these concerns.

24. Effects of Remedial Measures – Eastern Plume, Section 4.2.3, page 4-4, 4th bullet:

It should be mentioned that a second, equally important reason for a larger "degree of influence" is that in this area the deep sand aquifer is strongly confined, whereas the shallow aquifer is unconfined or weakly confined. Please correct.

Response – The word "confined" was added as shown below:

…screened only in the *confined* deep sand interval, which

25. Inorganic Compound Concentrations and Distribution, Section 4.3.1.1, page 4-5, 2nd bullet:

"Dilution calculations (Appendix C) indicate ground-water discharge from this portion of the aquifer will be significantly diluted by flow in Mere Brook (dilution factor estimated to be 33-933 times). Therefore, observed ground-water concentrations of contaminants entering Mere Brook are likely to be significantly diluted compared with ground-water concentrations detected at MW-218."

The second sentence is misleading, because until the groundwater discharge at the stream interface is diluted by mixing with surface water as it moves downstream, it will retain a relatively high concentration locally, which may be of concern to MEDEP. We recommend modifying this statement to read: *"Therefore, observed ground-water concentrations of contaminants entering Mere Brook will become significantly diluted compared to concentrations detected at MW-218 as ground-water and surface water mix during downstream travel."*

Response – The second sentence of the bullet has been revised as suggested.

26. Volatile Organic Compound Concentrations and Distribution, Section 4.3.1.2, page 4-5, 3rd bullet:

MW-218 and MW-220 should not be called deep monitoring wells, as there is not a confining layer above their screens. The shallow and deep designation should be applied only to further downgradient where a confining transition zone separates distinct sand aquifers. See Comment 22 above.

Response – Disagree. The boring log for MW-203, which is the shallow well pair of MW-218, notes the presence of likely confining layers (i.e., silt and clayey sandy silt) between 35 and 42 ft below grade at this location, with MW-218 being screened from 45 to 50 ft below grade. Similarly, the boring log for MW-220 notes silt being present above the screened interval of this monitoring well, which is indicative of the transition unit. Because lithologic samples were not continuously collected as these wells were installed, the thickness of these layers is not fully known, although it appears likely that these lower-permeability units act as a vertical barrier to groundwater flow. Therefore these wells should be considered deep wells. Further discussion of this topic is recommended for a future technical meeting; no changes were made to these figures.

27. Volatile Organic Compound Concentrations and Distribution, Section 4.3.1.2, page 4-5, 4th bullet:

To emphasize the downgradient situation and appear less like bullet 2, DEP suggests the following language: *"Although VOC concentrations have been increasing at several points within the landfill during 1998, VOC concentrations have not been detected in downgradient sample locations above the MEGs/MCLs."*

Response – The 4th bullet has been revised as suggested.

28. Volatile Organic Compound Concentrations and Distribution, Section 4.3.1.2, page 4-5, 5th bullet:

a.) The MW-202A graph for volatiles in Appendix A-3 could be designed to be much more meaningful. Eight contaminants are shown in the legend, plus total VOC. However, Table 3-3 shows three contaminants which were detected at or above their MEG/MCL (TCE, PCE, and 1,1,2-TCA). Additionally, 1,1,1-TCA was measured at 80% of its MCL. It seems obvious that the wrong contaminants are being tracked, as none of the graphed contaminants are contained in the 232 ppb total VOC. Furthermore, the concentrations scale is so course that the trends of critical contaminants would not be evident. Please correct this problem by redesigning the MW-202A graph.

Response –The graph has been revised to show the following contaminants: total VOC, 1,1,1-TCA, 1,1,2,2 PCA and 1,1,2 PCA. The scale of the graph permits the full range of past VOC detections to be viewed, and therefore the scale has not been chnaged.

b.) The DEP notes that the concentration of nickel increased greatly in Monitoring Event 13 (November 1998), and exceeded the MCL of 100 µg/L and approached the MEG of 150 µg/L. Although it could be a spurious occurrence, another bullet is needed to acknowledge it.

Response – This bullet has been revised to read:

Nickel was detected above the ~~State MEG and~~ Federal MCL in ground-water samples collected from MW-202A, *and are approaching the State MEG*.

29. Volatile Organic Compound Concentrations and Distribution, Section 4.3.2.1, page 4-7, 5th bullet, last para:

"These changing VOC concentrations are likely the result of natural ground-water flow and VOC migration to the south-southeast and ground-water extraction at EW-2, which is causing ground-water movement in the deep interval and migration of VOC impacted ground water towards the location of EW-2 and EW-2A."

The Department agrees only with the natural flow explanation, and is concerned that the plume is migrating south to Mere Brook, and not east to be captured by EW-2A. The potentiometric contour maps of the deep sand (Figures 3-12 to 3-18) imply a southward migration pathway. EW-2 does not appear to affect the contours very much, and total VOC in its pumped water has dropped substantially. EW-2A is too far east of MW-207A to draw in this lobe of contamination. The increase in concentrations at MW-207A warrants a fresh look at plume containment in this area. The Department wants to discuss this development at the earliest opportunity.

Response – It is likely that the continued pumping of EW-2A will affect contamination migration within the deep sand interval, as this extraction well may be a major factor controlling groundwater flow in this area (see response to comment No. 21). Therefore, it is possible that pumping at EW-2A affect the contaminant concentrations at MW-207. Contaminant concentrations at MW-207A will continue to be tracked in future annual reports, with decisions made based on those data. No changes were made to the text.

30. Direct-Push Sampling Program, Section 4.3.2.2, page 4-8, 3rd bullet:

"No VOC concentrations above the State MEG or Federal MCL were detected at direct-push samples collected south of Mere Brook (DP-EP-01 through DP-EP-04). These results indicate VOC have not migrated south of the sampling locations of DP-EP-01 through DP-EP-04."

At DP-EP-01 the concentration of 1,1-dichloroethene was 5 µg/L, and the MEG/MCL is 7 µg/L. This result indicates that **VOC have migrated south of this location**, but that the regulatory guidelines were not quite exceeded. While not alarming , it can be inferred that the edge of the plume was encountered. Please correct.

***Response* –** The sentence has been changed as follows:

These results indicate VOC *above the State MEG or Federal MCL* have not migrated south of the sampling locations of DP-EP-01 through DP-EP-04

As noted during the 22 and 23 November 1999 technical meeting, the Navy agrees that additional investigations are necessary to futher characterize the southern terminus of the Eastern Plume. It is anticipated that these investigations will occurr in 2000 and may provide new data to define the plume edge (i.e., non-detections of VOC).

31. Leachate Station Seeps, Section 4.4.3, page 4-9, 4th bullet:

Arsenic levels at SEEP-5 are high (6 to 8 mg/L), and being that the seep is close to Mere Brook, represents a concern to DEP. The second explanation offered, concerning decreased flow and increased sediment entrainment, needs to be better developed (i.e., the turbidity value stated and compared to previous turbidities at this

seep). Perhaps when turbidity is elevated, sampling filtering should occur. Also, please change 1988 to 1998 in the first sentence.

MEDEP personnel would like to visit SEEPS 4 and 5 at the next opportunity.

Response – The relationship of inorganic concentrations to sample turbidity at leachate station seeps cannot be conclusively established at this time as suggested in this comment. During Monitoring Events 1 through 14, turbidity was measured in the leachate seep after the leachate sample was collected. Therefore, turbidity values may have different from the actual sample that was analyzed. To rectify this situation, beginning in Monitoring Event 15 leachate turbidity was determined directly from the sample being sent for inorganic analysis. Therefore the relationship of inorganic concentrations to turbidity can be more accurately assessed in the future. The ME DEP visited the SEEP 4 and 5 during the 1 September 1999 Technical Meeting.

32. Extraction System Refinement, Section 4.6.3, page 4-12, 1st bullet:

a.) Based on past direct-push electrical conductivity logs and the poor success rate of collecting groundwater samples at selected log signatures, the Department recommends that a modified approach be used to better identify geologic materials that will yield water. A discussion at the next Technical Meeting would be appropriate.

Response – We disagree with this comment. The use of the direct-push and electrical conductivity logs were highly successful as they provided extremely useful data regarding site geology in conjunction with groundwater sampling and analysis. This technology allowed for the identification of very thin (less than 1 ft thick) potential water bearing units which match up very well with continuous split-spoon samplers, at a much lower cost and in a quicker time. It should be noted that groundwater sampling was attempted in units that were very fine-grained (i.e., silts and clay) to determine if those units would yield sufficient water for sampling. Since they did not, this suggest that hydraulic conductivity is low, and groundwater flow and contaminant transport in these units is limited. The fact that groundwater samples could not be collected is not an indication that the sampling technique is flawed.

b.) In the second statement, "…to identify appropriate screen intervals limited to the VOC plume interval" needs to be made clearer.

Response – The end of this sentence has been modified to read as follows:

…to identify appropriate extraction well screen intervals to maximize VOC removal rates.

GENERAL RESPONSE TO COMMENTS ON RESPONSE TO COMMENT LETTER APPENDED TO 1998 ANNUAL REPORT

Previous response to comment letters for the 1997 Annual Report and Monitoring Event Reports completed during 1998 were appended to the 1998 Annual Report to document previous discussion items and regulator concerns. Changes to these response to comment letter are limited to minor text edits as these reports have already been issued, and more recent data may have changed or re-focused some previous concerns. The Navy feels that these issues cannot be resolved in written form and should be resolved in a technical meeting when all views can be discussed.

33. Appendix B-1, Comments on Monitoring Events 11 Report, (March 1998), Page 3, Comment 10:

As suggested by the Navy, a discussion of the enlarged ground water trough southeast of Site 1 would be productive. Please add it to the agenda for an upcoming technical meeting.

Response – We agree this topic is best discussed during a future a technical meeting.

34. Appendix B-4, Comments on 1997 Annual Report, Pages 6 & 7, Comment 19:

The Navy should recheck the information in its response. Mere Brook runs eastward between Sites 1 & 3 not Merriconeag Stream. Please review and rewrite.

Response – The name was changed from Merriconeag Stream to Mere Brook in the response to comments and in the 1997 Annual Report.

35. Appendix B-4, Comments on 1997 Annual Report, Pages 6 & 7, Comment 22.c.:

The Department is pleased that the Navy wants to resolve the issue of the background wells. We agree with the addition of the table but since the additional text was not included the MEDEP must reserve judgement as to its adequacy.

Response – The issue of background wells should be discussed at a future technical meeting, as it is too complex to attempt to resolve in response to comments.

36. Summary of Shallow and Deep Wells and Piezometers at Sites 1 and 3, Table 2-2, Comment 24.:

MEDEP continues to view EW-6 and EW-7 as shallow wells, based on geologic data and the depth to top and bottom of their well screens. At EW-6 clay/silt was penetrated below 40 feet below ground surface (bgs), and its screen was set from 17 to 41 feet bgs. At EW-7 clay was encountered below 30 feet bgs, and its screen was set from 17 to 29 feet bgs. These are shallow depths relative to the general stratigraphy of the Eastern Plume and Sites 1 and 3. The screens of these wells do not include the deeper aquifer.

Response – Disagree. This issue should be discussed at a future technical meeting. No change has been made.

37. Appendix B-4, Comments on 1997 Annual Report, Pages 6 & 7, Comment 26:

    The MEDEP agrees with the proposed footnote to be added to Table 2-4. However the topic of background wells should be added to the agenda for an upcoming technical meeting so that this matter can be resolved.

    Response – This issue should be discussed at a future technical meeting.

38. Leachate Station Seeps, Section 3.4.2.3, Page 3-16, Comment 50.:

    The Department was not referring to total VOC concentrations, which have remained relatively constant over recent monitoring events. We still believe that the graph shows an obvious increasing trend for vinyl chloride and a decreasing trend for 1,4-dichlorobenzene. These trends actually may reflect that a natural degradation process is working effectively. MEDEP believes that rising trends in vinyl chloride is a significant occurrence to point out in the report.

    Response – This issue should be discussed at a future technical meeting.