



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION I
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BOSTON, MASSACHUSETTS 02114-2023

May 13, 2003

Lonnie Monaco (monacolj@efane.northdiv.navy.mil)
Engineering Field Activity Northeast, Naval Facilities Engineering Command
Code 1821/LM
10 Industrial Highway, Mailstop 82
Lester, PA 19113-2090

Re: *Draft 20001 Annual Report for Sites 1 & 3 and Eastern Plume, dated December 2002, Draft Monitoring Event 20 Report - April 2002 for Sites 1 & 3 and Eastern Plume, dated March 2003, Naval Air Station Brunswick, Maine*

Dear Mr. Monaco:

Pursuant to § 6 of the Naval Air Station Brunswick, Maine Federal Facility Agreement dated October 19, 1990, as amended (FFA), the Environmental Protection Agency has reviewed the subject documents. We have included some suggestions for future reports and have identified some areas for future LTM optimization. EPA will not require the Navy to change these subject documents, however, all future documents should address the appropriate comments. EPA has the expectation that when the agreed to work in the south and bedrock are complete any outstanding substantive comments made on previous documents will be addressed. EPA looks forward to continue working with the Navy to optimize the LTM program for NAS Brunswick. If you have any questions with regard to this letter, please contact me at (617) 918-1384.

Sincerely,

A handwritten signature in black ink, appearing to read "Christine A.P. Williams".

Christine A.P. Williams
Remedial Project Manager
Federal Facilities Superfund Section

cc. Ed Benedikt/Brunswick Conservation Commission (rbenedik@gwi.net)
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Long-Term Technical Problems with the Eastern Plume

Eastern Plume Flow South of MW-308

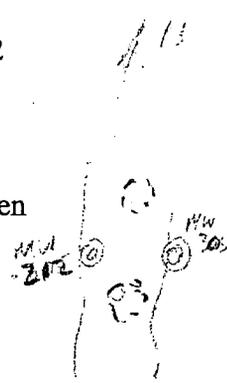
Deep groundwater flow in the Eastern Plume is toward Merriconeag Stream, yet no significant contamination has been recorded as reaching the stream South of Picnic Pond.

Recommendation

The Technical Evaluation Group should consider ~~this~~ the possible causes of this situation and generate recommendations to address the inconsistency.

Eastern Plume Flow North of MW-308

In the North, clay overlies a significant NNE oriented bedrock trench. MW-NASB-212 resides in the western side of the trough, and MW-305 resides on top of the eastern bedrock wall. Together these wells bracket the deepest part of this trench, and the area where the plume disappears. Well logs demonstrate that sand is in contact with the eastern wall of the bedrock trench at MW-305. This plume disappearance has never been fully explained or explored.



Recommendation

Place a monitoring well in the Lower Sand in the deepest part of the clay trough, between MW-NASB-212 and MW-305. Such a well should be sufficiently out of alignment with these two wells so that a three-dimensional flow vector could be generated on the basis of all three. The proposed 2003 geophysical study will provide an assessment of the bedrock trough, and the location of steepest Eastern bedrock wall in the vicinity of these two wells. This information can be used to locate the proposed well.

The 2000 Diffusion Investigation

The 2000 Diffusion Investigation demonstrated that low level below-MCL contamination is reaching the Northwest arm of Picnic Pond. It is not clear whether this contamination stems from the deep aquifer, the shallow aquifer or both. Furthermore, the area of the marsh grass close to Sandy Road had traces of a TCE-signature plume.

In the South, above-MCL contamination is reaching Mere Brook in the vicinity of Seep-10.

Recommendations

A follow-up diffusion study is planned by EPA for late summer 2003 to fill remaining data gaps on the expression of the plume into surface water, and to refine the contaminant extent in the above areas. On the basis of the results of the 2003 study, modify the long-term monitoring program to track the above issues. Monitoring the well-defined flow of contamination to surface water will provide excellent references for

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the expected continued decline of the deep contamination.

Location Errors

The GIS locations of CP-120 and CP-130 disagree with those published in the maps of the Remedial Investigation (RI). The published maps appear to be more accurate than the published table of well/boring coordinates. The table was published as a solid block of coordinates, apparently prone to simple typographic errors. The two possible errors mentioned significantly impact the top-of-clay contouring.

Recommendation

While no further information is available to assess the correct location of CP-130, CP-120 can now be correctly located on the basis of the recent direct push investigation at the southern boundary. Please correct the GIS database and re-contour the Top-of-Clay theme. This should be presented in the next Eastern Plum Monitoring Report.

Southern Extent of the Eastern Plume

Data from the original Remedial Investigation and the recent EC/MIP Investigation suggest that a large contaminant mass exists in the area of MW-205. The plume here has historically lower concentrations (300-700 ug/L), but appears to be of a much thicker vertical extent than that in the area of EW-02A. The MW-205 area consists of highly conductive sand, residing at the western edge of the semi-confining Transition Unit. Finally, MW-205 is compromised in that it is screened 20 feet above the Marine Clay

Recommendation: Fully evaluate the vertical and lateral extent of the Eastern Plume around and downgradient from MW-205. It is especially important to investigate the contamination in the overburden down to the clay, under the marsh directly South of MW-205. This is where the plume disappears. It is an area that has never been examined. An evaluation of an in situ 3 dimensional flow meter should be discussed for installation at depth to determine the true flow direction under Mere Brook (e.g. http://www.nwmp.sandia.gov/wlp/factsheets/in_situ.pdf).

Water Level Measurement Precision

Review of the LTM water level database demonstrates that the water level data lacks precision (repeatability of a given measurement). As an example, nine duplicate measurements for each event taken at MW-229A between November, 1996 and September 1999 had duplicate measurements differences ranging from .07 ft to 0.60 ft (March 15, 1999), with a mean a of 0.28 feet. This lack of precision calls into question the accuracy of water levels and associated contouring to date.

In addition, the water levels for many wells demonstrated a significant drop over the long-term in values beginning in 1997. (For example, the water table at MW-305 had a

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mound that implied groundwater flow towards MW-NASB-212 in early 1997 and prior years.) While the changes appear to be physically real, they also may be an artifact of database manipulation.

Recommendations

Given the importance of the water level data to monitoring the plume, implement an improved water level measurement technique; or alternatively, for each event measure the water level at each well repeatedly until a repeated value plus or minus 0.10 is achieved.

Please indicate whether in the Navy's opinion, the mentioned long-term changes in groundwater levels were physically real, or artifacts.

P-105

P-105 historically registered high total VOC concentrations (≥ 1500 ug/L). It was dropped from the LTMP in 1998 with the agreement that it would be contoured at the same values as P-106. Unfortunately, this has not happened (e.g. Events 18 and 19).

Recommendation

Check the total VOC concentrations of P-105. If they are greater than 140 ug/L (the Event 19 value of EW-5A, the closest well, ~120 ft away), then restore P-105 to the LTMP.

Missing Well Logs

No well construction logs are available for a group of 9 wells, MW-NASB-205 through MW-NASB-213. Given that these wells are grouped together, it is possible that they were drilled and installed sequentially by the same driller. If this is the case, it may be possible to identify the driller and obtain copies of the well reports. Of particular interest is the log for MW-NASB-212, near the North end of the Eastern Plume.

General Comments on the 2001 Annual Report

Annual Report Design

These sections reference summary figures published in the reports of Monitoring Events 18 and 19. Annual summaries need to be stand-alone documents. Ideally, the Annual Report should contain all tables and graphics necessary for the reader to fully evaluate the progress at the Sites from prior years and through the current report year. Otherwise, evaluation of an annual review becomes a cumbersome process, involving three or more documents.

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Recommendation

Please include all location maps, water elevation/piezometric maps, contaminant concentration maps, other analysis graphics and tables similar to those published in 1996 and 1997.

General Data Errors in 2001

An unusual number of apparent data errors exist in the 2001 Events.

These include:

- The possible mislabeling of the VOC samples for MW-231A in Event 18.
- The possible mislabeling of the VOC samples for MW-231B in Event 19.
- The possible mislabeling of the VOC samples for MW-229A in Event 19.
- The apparent water level errors for GP-3A, GP-6, and MW-225B, which all registered anomalous values near 15 ft. MSL in Event 19.
- The possible water level errors at GP-1A and GP-2A in Event 19

Furthermore, water levels in the published event reports for GP-1A, GP-2A and GP-3A differ from those released in the GIS database in 2001. GF notes that some changes were made to the water level data per the request of MEDEP. It is not clear if these points were included.

Recommendation

Please identify which items of the list are actual errors. Determine the reasons for the actual errors, verify the 2001 data to the extent possible, and ensure appropriate QC steps to reduce similar situations in the future. Finally, please all document changes made to the original database release, and the reasons for these changes in the September 2002 Monitoring Event Report (or the next possible report).

Specific Comments on the 2001 Annual Report

Sections 1.1 and 2.2

These sections reference summary figures published in the reports of Monitoring Events 18 and 19.

Please include all location maps, water elevation/piezometric maps, contaminant concentration maps, other analysis graphics and tables within the 2001 Annual Report.

Section 3.1, Bullet 2, Dash 2

The logic in this paragraph assumes that deep interval VOC concentrations in MW-229A and EW-01 are at least approximately equivalent. Despite the fact that these wells are relatively close, it is entirely possible that shallow interval water significantly dilutes the

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deep water concentrations within EW-01 to the registered levels, given their differences in construction and location.

Please delete this paragraph.

Section 3.2.1, Bullet 3, Dash 2

This paragraph discusses time trends for stream gauges GP-1A, GP-2A and GP-3A, which apparently replaced GP-1 (in the marsh of the NW arm of Picnic Pond, just East of Sandy Road), GP-2 (in open water of the NW arm of Picnic Pond, just west of Merriconeag Road), and GP-3 (at the Picnic Pond dam). Maine DEP estimated the surface elevation of Picnic Pond in September and October, 2000 is being 28 ft. MSL plus or minus 2 ft, on the basis of 37 three-dimensional GPS points. The depth of Picnic Pond at the dam in September 2000 was 15 ft. as measured in the 2000 Vapor Diffusion Study).

These three gauges appear to have data quality issues. Figure 5, Event 19 indicates GP-3A registered 15.01 ft. MSL. For this to be true, Picnic Pond would have to be completely dry and Merriconeag Stream would have to flow North from GP-4 (15.69 ft. MSL).

The Event 19 water level values for GP-1A and GP-2A (23.69 and 21.62 ft. MSL) in the marsh in the Northwest arm of Picnic Pond are likely impossible, based on historical data for GP-1 and GP-2, and the DEP-estimated level of Picnic Pond, unless the marsh was completely dry.

Some of the values in the published event reports for the GP data differ from those released in the database in 2001. Specifically, Event 18 database values differed for all three above gauges. The database value for GP-3A differed for Event 19.

Recommendations

Re-survey GP-1A, GP-2A and GP-3A from the on-base USGS elevation reference point. Please verify all water level data, including wells, against original field logs. Please include an explanation for data changes between the published event reports, and the released 2001 water level database.

Section 3.2.1, Bullet 3, Dash 3

This paragraph notes that the Event 19 stream gauge GP-6 water level was 14.42 ft. MSL, or 9 ft. higher than that measured in March 2001. For this to be true, the New Gurnet Road bridge would have had to be virtually washed out in a major flood. This gauge is located just above the maximum high tide extent. The appropriate or level is about 5-6 ft. MSL for October conditions.

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Recommendations

Please determine the source of the error, and correct all discrepancies appropriately. Please update the water level database and the well log. Please include corrected water level tables and shallow groundwater potentiometric contour maps in the next published report.

Section 3.2.1, Bullet 4

This bullet notes that deep groundwater flow moves toward Merriconeag Stream from both the East and West. However, there is no evidence of Eastern Plume chemicals of concern ever reaching Merriconeag Stream South of Picnic Pond (1991 RI and 1999 Diffusion Study). To be accurate, please note this apparent contradiction in this bullet.

Section 3.2.1, Bullet 5

This paragraph appears to contradict itself in describing groundwater flow. Figure 6 of Event 19 (Interpreted Deep Groundwater Potentiometric Surface Contour Map) has the 21 ft. contour delineated inappropriately close to PZ-2. In this graphic, PZ-2 and MW-231A appear to reside close to a convergence of flows from both the SW and NE, that together swing to the SE. Consider changing the second sentence to read "This has been investigated by data...".

Section 3.2.3, Bullet 2

This bullet suggests that the October 2001 flow patterns in the deep interval can be considered as non-pumping equilibrium conditions. However, the aquifer could not recover much beyond the well riser elevation of EW-02A (22.27 ft MSL), due to its artesian condition. Surprisingly, MW-311, did not achieve artesian conditions despite being only 50 feet away and having a well riser 0.8 ft. lower in elevation (21.48 ft MSL) than that of EW-02A. This suggests that the two wells are not perfectly connected hydraulically, or there is a surveying error in their well riser elevations.

Finally, MW-311 on Figure 8-14 of the 1991 RI registered a piezometric value of 29.98 ft msl. Allowing 5ft for the general drop in water levels observed since that time reveals that MW-311 should still have flowed artesian in Event 19. This suggests that the deep aquifer system was unable to recover in this area.

Recommendations

Please modify the bullet to read that deep aquifer conditions rebounded, but could not achieve actual non-pumping equilibrium. Re-survey the well riser elevations for these two wells. Determine if contamination may have escaped from the well vault of EW-02A and note this in the next published report.

Section 3.2.3, Bullet 4 It does appear that the water level data for Event 19 at MW-

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225B are anomalous.

Appendix B.1, Field Record of Well Gaging Forms appears to be a rewrite of field data, rather than the raw data collected in the field. If this is true, please verify this anomaly against the original log data. Also, if this table is rewritten, given the importance of the groundwater level data, please insure a quality control check is in place, as such rewrites are prone to human error.

Section 3.6.1, Para. 3

This conclusion infers that the migration of the main body of the Eastern Plume appears to be slowing. It is not clear what this conclusion is based on. Please indicate the basis for this conclusion.

Section 3.6.2, Para. 3, Bullets 1 and 2

GF supports moving the Eastern Plume in order to monitored natural attenuation. However, in order to this, all flowpaths need to be identified. As detailed under Long Term Technical Issues, it is not clear that this flowpaths exiting in the North or in the South have been identified.

Please investigate the exiting flowpath from MW-205 under Mere Brook.
Please investigate the exiting flowpath to the Northeast of MW-NASB-212.

Section 3.6.2, Para. 4

This conclusion refers to EW-02A, but appears to be intended for EW-02. The Technical Evaluation Group should consider the future of EW-02 (but not EW-02A).

Figures

Figures 10 of Events 18 and 19

1) In Figures 10 of the Reports for Events 18 and 19, the area of P-105 has been contoured as on or outside of the 100 ug/L contour.

Please correct the contouring in the vicinity of P-105, and investigate its current contaminant concentration. If the value is greater than that of EW-5A, please restore it to the LTMP.

2) The withdrawal of the plume from MW-229A with the shutdown of EW-01 during Event 19 implies that significant contamination exists between MW-229A and MW-230A. However, more likely it is VOC a sample labeling error.

Please note the uncertainty of the Event 19 MW-229A VOC value in the tables and

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figures. Please include updated graphics and tables in the next published report.

VOC Trend Graphs of the 2001 Annual Report

The graphs of VOCs for MW-NASB-212 and MW-229A indicate Total VOC concentrations as being less than that of individual constituents at a point in the time trend.

Please correct these and all similar situations in the VOC graphs of the 2001 Annual Report.

Tables

The elevation of the well riser for P-132 in Table 4 of Events 18 and 19 is listed as 42.95 ft. MSL. According to its construction log, the riser should be 2.8 ft. higher than 42.45 ft. MSL (ground level). The well log itself appears to have elevation intervals for the riser stickup and casing interchanged.

If the correct P-132 riser elevation is, in fact, 45.25 ft. MSL, then the water table elevation for P-132 in Event 19 Figure 5 would be 26.41 ft. MSL.

Please correct these issues appropriately, and include finalized tables and graphics in the next published report.

General Comments on the April 2002 Report

Please include in each future report a table of issues noted during inspection of physical remedies, planned resolution, expected date of issue resolution, and entity responsible for resolution of issue.

Please indicate on figures what measurement of VOC is included, low flow or mid-level VDS, or other VDS. It was difficult to reconcile MW225A, MW 207A and MW 230A(R) with the table B-3 values.

Additional stream gages, piezometers, and/or shallow groundwater monitoring wells may be needed between site 2 and sites 1&3 in order to determine shallow groundwater contours and resolution of contamination (possible other sources).