N42237.AR.000411
NSB KINGS BAY
5090.3a

LETTER REGARDING U S GEOLOGICAL SURVEY REVIEW AND PENDING RECOMMENDATIONS ON THE SUPPLEMENTAL RCRA FACILITY INVESTIGATION REPORT FOR SITE 11 NSB KINGS BAY GA
9/9/1996
U S GEOLOGICAL SURVEY

United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
Peachtree Business Center, Suite 130
3039 Amwiler Road
Atlanta, Georgia 30360-2824

September 9, 1996

Anthony B. Robinson, Engineer-in-Charge
Department of Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, SC. 29418

Dear Anthony,

This letter summarizes our review of Supplemental RFI Report, Site 11, Old Camden County Landfill, Naval Submarine Base, Kings Bay, Georgia. This "FINAL DRAFT" version of the report is dated January, 1996. It was prepared by ABB Environmental Services, Inc., for the Navy, SouthDiv, who requested the USGS to provide technical review.

As before, following are page-numbered comments referring to a particular passage of text or some aspect of the figures and tables that warranted more than a margin note. These comments are ordered under the major section headings of the report. The passage in question is indicated on the appropriate page of the manuscript by an encircled * in the margin. If more than one passage on a given page elicited comment, they are distinguished by lower-case letters on both the page and in this letter. In this review, little attention was given typographical accuracy or editorial style—thus, the margin notes in the manuscript and on the figures are technically substantive, and require attention.

Do not be overly concerned at the length of this commentary; it is after all a long and complex report, and my thoroughness is intended only to help improve a well-written document. My comments generally address problems in three categories: (1) points that were unclear to me, which may or may not need further explanation; (2) the presentation and interpretation of data in figures, which in many cases need some straight-forward revision, and (3) the discussion of some of the conclusions drawn. We cannot dig up the entire landfill, nor can we drill an unlimited number of holes, and as such our available data base has obvious limitations. My primary concern is that some of the "conclusions" drawn (primarily, that contaminant releases have ceased, and mostly effect the western boundary of the landfill) are actually only possible scenarios based on limited interpretations of the available data, which do not preclude other possible scenarios. Until additional data are collected to rule them out definitively, which is essentially impossible, a thorough discussion of all other possible scenarios is needed.

Editorial Comments (by section and page):

Executive Summary

p. ii(a). What conditions were not addressed previously? How do the new activities address them?

p. ii(b). Considering the sparseness of the data, it is impossible to say that "the source of groundwater contamination has either exhausted itself or was a one-time disposal."

p. iii. The sampling was not exhaustive; there could be other containers not found that are a source of VOC.

1. Introduction

No comments.

2. Previous Investigations

p. 2-1. Why was the analytical program reduced? Were the eliminated constituents absent in previous samples?

p. 2-5a. The concentrations of VOCs in samples from well KBA-11-2 have a broad range over the sampling period. Does the sampling period correspond to the six bimonthly sampling events from January, 1992 to January, 1993? Were there any temporal trends?

p. 2-5b. Which sampled wells contained SVOCs, and when? Are there MCLs for SVOCs? Why are SVOCs artifacts of sampling and laboratory analysis? Are there other sampling or analytical methods that can alleviate this problem? Is it prudent simply to ignore them?

p. 2-5c. For the inorganic monitoring, which wells were the "upgradient" wells and which were the "downgradient?" If there is a ground-water mound in the interior of the landfill, which admittedly was not known at the time, then all the wells at the margins of the landfill could have been "downgradient" from at least some part of the landfill. More recent information, therefore, may require to reconsider the utility of the simple t-test for unpaired data presented here.

p. 2-6. Are there MCLs for the VOCs and SVOCs detected in the subsurface soil samples?

p. 2-7a. The two additional soil borings that were made in the landfill during supplemental RFI activities (fig. 3-2) do not fill data gaps sufficiently to permit a "thorough evaluation of potential contamination within the disposal area" as implied. A "thorough" evaluation would require a large number of borings.

p. 2-7. Please provide a brief description of "direct-push methodology." Is it the same as "piezocone penetration," which is listed in Table 2-1 as part of the activities for the Phase I Interim Investigation?

p. 2-8 (fig. 2-2). It is not necessary to show the monitoring wells.

p. 2-9a. How were background concentrations of vinyl chloride determined for the air screening survey.

p. 2-9b. There are a number of problems in figures 2-4 to 2-6, which are indicated in the margins of pp. 2-11 to 2-13.

p. 2-9c. What were the concentrations of the VOCs detected in the five PIWs? Which PIWs had these VOC hits; that is, were they closer to the landfill than the others?

p. 2-9d. Again, there are a number of problems in figures 2-8 to 2-10, which are indicated in the margins of pp. 2-15 to 2-17. Also, these plots of total VOCs lack the ability to pinpoint the occurrence of an individual VOC. Considering the broad range of concentrations of VOCs detected, it seems that comparing these total-VOC plots may be like comparing apples and oranges.

p. 2-11 (fig. 2-4). What would cause the 27.5-ft contour in the southern part of the landfill to bend?

p. 2-12 (fig. 2-5). The data do not justify the curved contours (25-ft to 28-ft) along Spur 40 and in the southern part of the landfill.

p. 2-13 (fig. 2-6). This figure is unacceptable. Eight of the 16 data points shown do not fit the contours.

p. 2-14 (fig. 2-7). It is not necessary to show the monitoring wells.

p. 2-15 (fig. 2-8). Much of the data presented is illegible. Why are many hydrocone locations shown here not shown on figure 2-7, and vice-versa? What month were the samples collected? It is not necessary to show the monitoring wells. A 0-µg/l contour is illogical, implying concentrations less than zero outside it; it should be given some small positive value.

p. 2-16 (fig. 2-9). Much of the data presented is illegible, because there are too many contours drawn. See also comments on p. 2-15 concerning month, monitoring wells, and 0-µg/l contour.

p. 2-17 (fig. 2-10). All comments on p. 2-16 also apply to this figure.

p. 2-18. I suggest the samples discussed be identified by number.

p. 2-19 (fig 2-11). It is not necessary to show the monitoring wells.

p. 2-20 (fig 2-12). It is not necessary to show the monitoring wells.

3. Characterization of Potential Organic Contaminants

p. 3-2. In the areas around the 'hot spots', there appears to be a limited number of test trenches. Considering the high contaminant concentrations near trenches 6, 9, and 10, it seems more exploratory trenches in this area would be desirable.

p. 3-3. It is unclear why the water table would have been deeper during landfilling operations.

p. 3-6 & p. 3-10. It is not necessary to display the magnetic survey grid in figs 3-2 and 3-3. The survey is not discussed here and has already been discussed in the text relating to figure 3-1.

p. 3-8. Due to the relatively sparse sampling of trench soil and waste materials at Site 11, the conclusion that the presence of toluene is limited is weak—it may be widely distributed, but not at the few sites sampled. The toluene must have come from somewhere in the landfill, as it is not naturally occurring.

p. 3-14a. Why are pesticides detected in laboratory blanks?

p. 3-14b. The groundwater samples discussed were obtained from wells at only two locations within the landfill. It is not possible to conclude that the 'release of chlorinated solvents has most likely exhausted itself,' just because concentrations at these two locations are lower than at locations downgradient. It is well possible that the sources of these contaminants are in landfill wastes that lies somewhere between these locations and the downgradient locations. Also, it is possible that the source of these contaminants is somewhere upgradient of well clusters 11-10 and 11-22, but the contaminants do not disperse sufficiently in the groundwater to be detected in high concentrations at these two locations.

p. 3-17. Were samples split between the contract labs, or was there some other check of analytical quality? I am not too familiar with this type of contract analytical work, but it seems if only one of three labs reports any pesticides, I would be very skeptical of the one lab's quality, especially if samples were split. (See comment on p. 3-14b.)

p. 3-23. Under "Offsite Groundwater Contamination" spanning pp 3-23 to 3-50 (28 pages and 12 figures), there area nine subheadings, none of which is listed in the table of contents. It might be easier to follow if the section were split into two sections.

p. 3-29a. Again, I may not be well informed, but are such sporadic detections common?

p. 3-29b. The lack of detections of these three compounds in groundwater or liquid samples from within the landfill does not convince me that there are no ongoing releases in the landfill. Comparing figures 3-3 (landfill sample locations) and 3-5 (off-site sample locations) there are no on-site sampling locations within about 250 ft of wells KBA-11-13A and KBA-11-13B, where some of the highest concentrations of these contaminants were detected.

p. 3-29c. The lower concentrations of phenols in KBA-11-13A than in wells further downgradient may well indicate that not all plumes of contamination emanating from the landfill are being intercepted by monitoring wells along the western boundary of the landfill. There are gaps of about 250-300 ft between the KBA-11-13 well cluster and the KBA-11-3 well cluster to the north and well KBA-11-2 to the south. Thin plumes of non-dispersive contaminants could easily pass through these gaps without detection until further downgradient. Again, the conclusion that no releases of these constituents is ongoing based only on non-detection in the landfill samples is unconvincing.

p. 3-29d. This comment is merely a point of semantics, but it may help avoid confusion. Figures 3-6 to 3-10 clearly indicate the existence of several contaminant plumes associated with Site 11. It might be clearer to state that ketones, because of their high mobility, represent the leading edge of "any contaminant migration" rather than simply "the plume."

p. 3-34a. No concentrations are given for detections of hydrocarbons and phenols in wells in the Crooked River Subdivision.

pp. 3-35 to 3-39 (figs. 3-6 to 3-10). All contaminant concentration values used in construction of the 15 plumes on these five figures should be shown. It is not possible to evaluate the accuracy of these contoured plots without knowing the value and location of the concentration data. As I have mentioned before, it is not necessary and could be misleading to identify well locations if data at that location are not used in the construction of the contours. Concentration values and locations are shown on the cross-sections in figures 3-11 to 3-15, making those plots informative and easy to evaluate and understand.

p. 3-35 to 3-49 (figures 3-6 to 3-12, 3-14, and 3-16). The page number should be indicated on all oversize figures, which are all listed with page number in the table of contents.

p. 3-35. There is no evidence that the 10-µg/l contour is disjoint in the northwestern part of the landfill in January 1994 as shown, and there is no evidence that the 10-µg/l and 100-µg/l contours are disjoint south of Porcupine Lake in September 1994.

p. 3-36. There is no evidence in figure 3-7 that the 1-µg/l contour is disjoint as shown on all time periods, because there are no monitoring wells at all in the gap between the disjoint contours shown. In figure 3-8, which is very similar in that area, the contours are not disjoint.

p. 3-47a. The ketone detected at well KBA-11-8B in January and April 1994 is not indicated in figure 3-6.

p. 3-47b. Figure 3-7 does not indicate that chlorinated hydrocarbons "extended west beyond [well] KBA-11-18" as is stated in the text. The plume delineated in figure 3-7 does not appear to reach as far west as well KBA-11-18.

p. 3-47c. In figure 3-12, only one deep well in the subdivision (well KBA-11-17C), is shown as a non-detect. One data point is insufficient to determine the maximum depth of chlorinated hydrocarbon migration beneath the subdivision.

p. 3-47d. If the extent of aromatic hydrocarbons "generally mimics that of the chlorinated hydrocarbons," why is the 1-µg/l contour continuous in figure 3-8 and disjoint in figure 3-7?

p. 3-50. Where is it discussed previously that contamination near the KBA-11-8 well cluster is estimated to be relatively limited? Detections in that area are fairly common, and it is far from the recovery wells. There are inadequate monitoring wells south of this area to preclude possible migration of contaminants off-site to the south.

p. 3-51. What was the concentration of the VOCs detected at the upgradient well (KBA-11-11C)? A more thorough analysis of all soil-boring data along the eastern and southern perimeter of the landfill is probably warranted to determine if there is potential migration of contaminants offsite in those directions.

p. 3-51b. The high concentration of acetone at KBA-PS-9 indicates high levels of contamination and should be discussed further.

4. Characterization of Inorganic Constituents

pp. 4-5 & 4-6. Were there also nondetected values in the background ground-water data? How were they accounted for in the ANOVA tests used on the background data? How were nondetects treated in the log transformation? It is impossible to take the log of zero.

p. 4-8. What are the "delineation wells" listed in Table 4-6, and referenced in tables 4-7 and 4-8? I cannot find a description of them.

p. 4-11. Why are there so few samples for tin? (See also p. 4-7.)

p. 4-18a. Which statistical test did zinc fail? It is not mentioned in the previous paragraph, which has a list of eight other inorganic constituents that are significantly different compared to background.

p. 4-18b. Again, since I do not know what the delineation wells are (see comment on p. 4-11), I do not understand why they define the extent of any other inorganic releases or why they should yield water having concentrations like background concentrations.

p. 4-26. There are no summary conclusions presented for Section 4.4 as there are for other sections (see last paragraph of Section 4.5, below). If the analysis of trench soils and liquids was basically inconclusive, it could be stated.

5. Conceptual Model of Contaminant Transport

p. 5-1a. I have already raised some questions regarding whether or not the release of contaminants has ceased or is still ongoing. See comments on pp. 3-8, 3-14b, 3-29b, and 3-29c.

p. 5-2b. The investigation of groundwater contamination has focussed on the hot spots on the western edge of the landfill because of its proximity to the base's property boundary and the probability of ground-water flow from that area to residential areas off-site. Samples collected in the landfill area are more dispersed away from these hot spots, and off-site sampling beyond the northern, eastern, and southern boundaries is nearly nonexistent. See also comment on p. 3-50.

p. 5-2c. The trenches, which are 100s of feet apart in most instances (fig. 3-3), do not necessarily intercept all contaminant releases in the landfill. See also comment on p. 5-1a, above, and others. The discussed comparison between trench samples and soil/groundwater samples may also mean that the trenches are not detecting all the contaminant releases. This and other possibilities also should be discussed.

6. Recommendations

p. 6-1a. The data do not definitively support this claim. See comment on p. 5-1a, and other comments referenced there.

p. 6-1b. To be on the safe side, additional sampling should be considered in areas where data are sparse: that is, in the areas near the hot-spots identified in comments on pp. 3-29b and 3-29c. Also, recent reliable data indicate that the landfill overlies a ground-water mound, and that ground water may well flow from the landfill in all directions. Considering this new information, additional sampling along and beyond the northern, eastern, and southern boundaries of the landfill is needed.

p. 6-1c. Same as comment on p. 6-1a.

p. 6-2a. Same as comment on p. 5-2b.

p. 6-2b. Same as comment on p. 6-1a.

Sincerely,

L. Elliott Jones
Hydrologist

Enclosure: copy of annotated manuscript

cc (w/o encl.): Richard E. Krause, U.S. Geological Survey, Atlanta, Ga.
David W. Hicks, U.S. Geological Survey, Atlanta, Ga.