

From: [Linda Stedjee](#)
To: Harris_Ken@Waterboards
Cc: Packard_Harvey@Waterboards
Subject: More concerns with RWQCB staff's April letter
Date: Saturday, May 10, 2014 8:45:30 AM

Mr. Harris,

Going back over Mr. Thomas' letter to Mr. Packard, I have identified a couple more areas of concern. I want to share these additional concerns with you prior to the May 22 meeting.

1. Another apparent contradiction between statements

Mr. Thomas has presented the hypothesis that dilution of water in the aquifer by surface stream flows is the cause of the consistently-differing levels of nitrates in the four City wells, with the water from the wells closest to the creek being diluted the most.

This hypothesis appears to be contradicted by these statements from the April letter:

*"Staff should clarify that our current limited review of the Shell cleanup case consisted of looking at geologic cross sections, monitoring well locations, and the MTBE plume geometry based on a recent monitoring report. Geologic Cross Section A-A' (see attached) from a 2001 report by Miller Brooks cuts across the longitudinal axis of fabric of fluvial/alluvial (stream channel) geologic units emanating from the Morro Valley, particularly near City well MB-3 (see MW-12 location). **Consistent with the conceptual model of a stream channel environment, the cross section shows lense-shaped buried sand/gravel units that are isolated by thick layers of silt and clay in the north-south directions.** In this conceptual model, which is common for a coastal alluvial setting, **groundwater flows preferentially within these units westward towards the ocean...**" (emphasis added)*

These statements appear to argue that there can be very little intrusion of surface water into the part(s) of the aquifer from which the wells draw their water because the "lense-shaped buried sand/gravel units" are isolated.. Thus, the statements quoted above appear to contradict the hypothesis that surface stream water recharge from Morro Creek can produce significant differences in well nitrate levels.

Please note that since 2002, the differences in nitrate levels in the four municipal wells have often been substantial. In fact, in late 2012, while the nitrate reading for well 03 was over 165, the reading for well 15 was 42. It would take a whole lot of surface stream recharge to account for such a difference. Yet, in 2012, we were well into a long-term drought AND Mr. Thomas has argued in his letter that water in the aquifer flows through "units that are isolated by thick layers of silt and clay."

I don't believe that anyone would claim that surface stream recharge of the aquifer does not occur. Of course it does. However, I believe it is clear that this recharge is not sufficient to produce the huge differences in nitrate levels in the four municipal wells. Something else is going on, and that, I

believe, is sewage contamination from the dilapidated sewer lines, with the wells closest to those lines having the most contamination, and thus the highest nitrate levels.

2. Questionable arguments regarding potential for MTBE (and thus,sewage) in groundwater to reach the City wells

In his April letter, Mr. Thomas discussed material from a May 1, 2006 letter from Timothy Cleath to Frank Cunningham. The Cleath letter advised the City not to close the remediation project due to continued risk of MTBE contamination of the City wells.

Mr. Thomas referred to portions of the Cleath letter to support his hypothesis that MTBE (and thus sewage) is not likely to reach the wells. Mr. Thomas stated,

“The document hypothesizes that MTBE may be migrating via permeable backfill along sewer lines, and emanating southward along a “finger plume” that is perpendicular to the east-west MTBE plume core centerline emanating from the former Shell station, as evidenced by detections of MTBE in the shallow monitoring well adjacent to MB-3.”

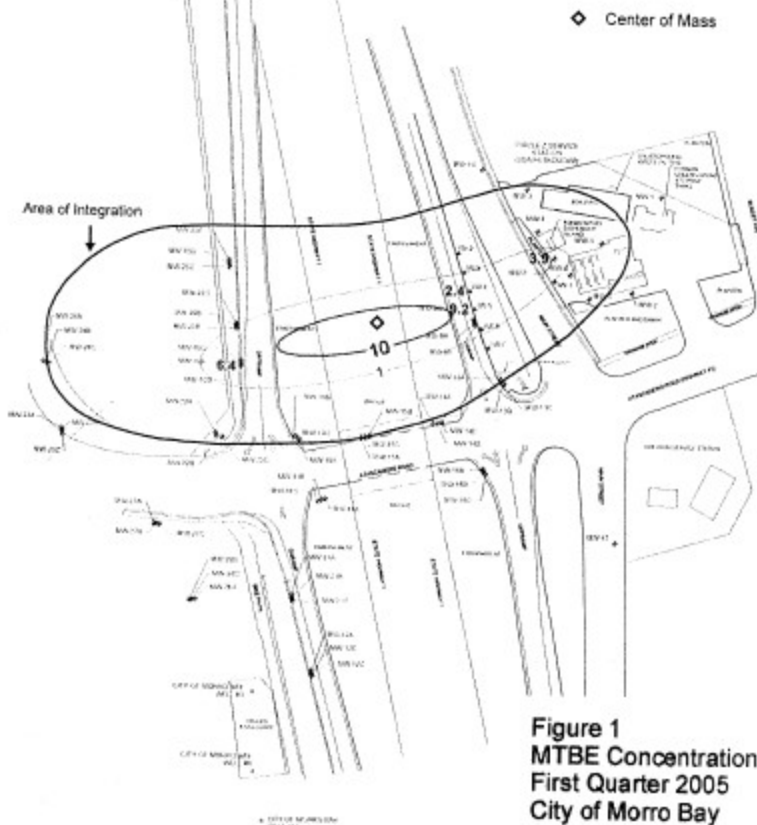
and,

“Staff believes that the hypothetical “finger plume” of low ppb concentrations of MTBE emanating from submerged sewer line does not constitute “hydraulic connection” in the context of the high ppm nitrate tainted volumes of water produced by the supply wells. Therefore, hypothetical movement of nitrate in the shallow units would need to pass vertically through clay and silt layers to reach the production intervals of the wells.”

Mr. Thomas does not appear to have carefully reviewed the diagrams in the Cleath letter and the text that discusses them. The diagram below, for example, shows the contours and center of mass for the large MTBE plume in the groundwater. This is NOT a “finger plume” in a sewer trench. It is a very large area of contamination. I would like to point out the obvious fact that, if MTBE from tanks on the site of the former gasoline station can spread this far, so can sewage leaking from the Main Street trunk line(s).

Please note that at no time did we suggest that the threat of sewage contamination of the wells came solely from exfiltrated sewage in the trenches. We believe that the shallow groundwater and aquifer contamination ranges much farther than that. Please consider this diagram from the Cleath letter. It shows the scope of MTBE contamination.

**Former Shell Station
1840 Main Street
Morro Bay, CA**
MTBE Concentrations (ug/L)
to Derive Mass Estimate
First Quarter 2005



**Figure 1
MTBE Concentration maps
First Quarter 2005
City of Morro Bay**

Cleath & Associates

**NOTE: Modification by Cleath & Associates
10 ug/l isocontour line added**

Base Map: AQUIVER, INC.

Cleath was clearly concerned that the cleanup was not complete, and the potential for MTBE to be lurking in the sewer trenches was only PART of his concern. He said of the remediation consultants' work,

"The methodology used for MTBE mass calculation is a simplification of an inherently difficult calculation. The main conceptual problem with the simplified mass calculations is a lack of data near the calculated center of mass, which resulted in a bias toward underestimating the MTBE mass after the plume core moved beneath Highway 1."

and,

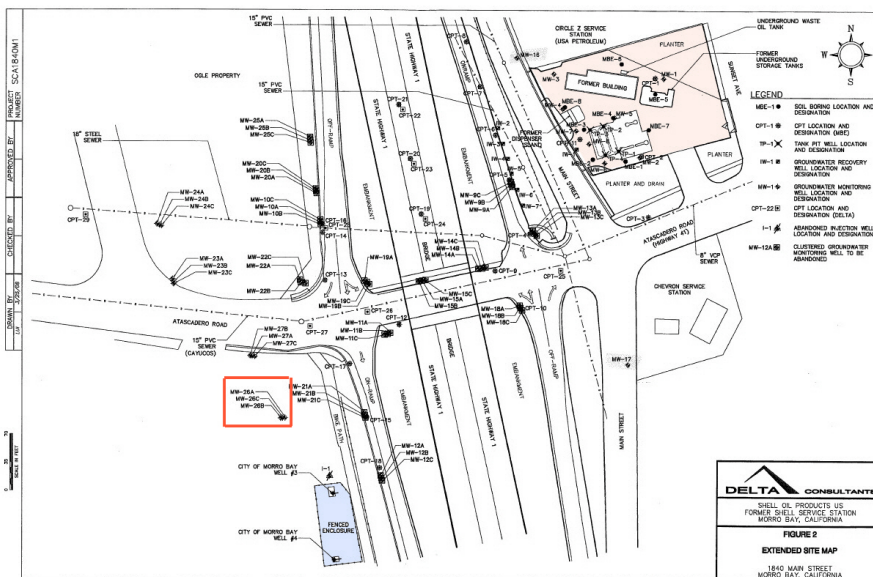
"Similarly, the 10 ug/l MTBE concentration contour interval was dropped from contour maps and associated MTBE mass calculations beginning in the first quarter 2004, despite the lack of any data beneath Highway 1 (nearest the plume core) and with perimeter values above

µg/l on several occasions. Again, assuming the greatest MTBE concentrations are in the plume core, a 10 µg/l contour interval could have reasonably been included on all maps."

Mr. Thomas stated the view that there is not a strong hydraulic connection between the City wells and a particular sewer trench that runs down Atascadero Road. This would not, even if he were correct, even begin to address our concern regarding the potential for exfiltrated sewage to enter the municipal wells. While the sewage might start out in a trench, it is not likely to stay there. The large expanse covered by the MTBE plume, as shown in the diagram above, clearly shows that contaminants in groundwater can travel far.

Again, we believe that the excavations and/or well drilling done as part of the MTBE remediation effort opened breaches in the aquifer boundary and/or clay layers that separate the "lense-shaped buried sand/gravel units", and that those breaches allow sewage to enter the area of the aquifer from which the wells draw their water. Those breaches could have occurred in any part of the remediation area.

As for Mr. Thomas' premise that, "the MTBE plume core has not been deflected towards the south by the City's wells", I ask that you consider that concept in light of the above diagram, and this one:



Please note that MTBE was detected in the MW26 cluster, shown by the red box. It is most definitely south of the MTBE plume shown in the diagram above AND it is south of the subject sewer trench that runs down Atascadero Road. Please also recall quotes in my last letter on this subject - quotes indicating that detections in the MW26 well cluster were found to be associated with use of the well field.

Conclusions

When considered in isolation from each other and from the huge body of evidence and information related to this case, your staff's hypotheses and arguments sound logical and reasonable. However, when considered in the context of the big picture, they simply do not hold up. This is a major reason

why I believe it would be wonderful for the RWQCB to work WITH concerned citizens, sharing ideas and concerns and thoroughly testing out ideas and hypotheses to produce optimal results.

Linda Stedjee

Linda Stedjee