

South Tahoe Cross-Contamination & MTBE Contamination

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WHITE ENVIRONMENTAL ASSOCIATES

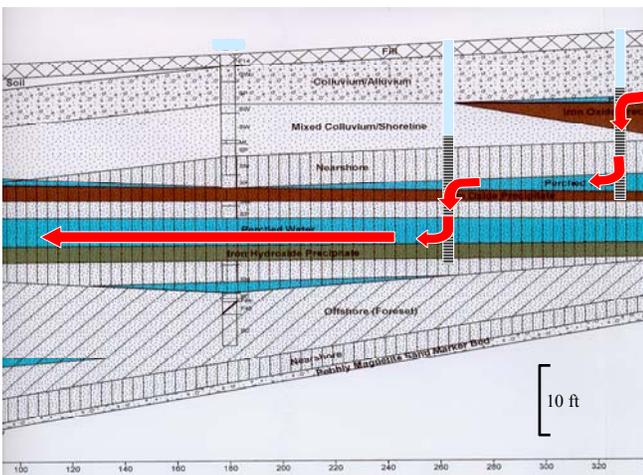
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There is no doubt that the problems experienced in California with gasoline groundwater contamination (including MTBE) was mostly caused by non-upgraded underground storage tanks (USTs), lack of upgraded UST maintenance and absent enforcement from a few of the more than 100 individual UST agencies in California. Now that the federal upgrades are in place and the state has taken additional action to tighten up the UST program along with enhanced enforcement, the state goes forward with a very expensive phase out of MTBE.

As it turns out, there is more to the groundwater contamination story than was initially explained by the leaking tank problems. During the investigation, implementation and monitoring of the clean up process, it appears that some monitoring wells installed by consulting firms (many at the direction of some oversight agencies) served as conduits to spread the contamination to deeper ground waters making it more difficult and expensive to clean up. In some cases, it appears that cross-contamination is primarily responsible for the adverse impacts experienced by many groundwater users including those that were required to close or abandon their drinking water wells

At the 2002 California Unified Certified Program Agency (CUPA) and Underground Tanks Conference in San Jose, Dennis Parfiit, Senior Engineering Geologist of the State Water Resources Control Board (SWRCB), gave a presentation on leaking USTs (LUSTs) assessments and site characterization. The theme of Mr. Parfiit's discussion was common pitfalls experienced at California LUST sites. The four most common pitfalls were:

- #1. Failure to develop a sound site conceptual model (SCM),
- #2. Reliance on regulatory guidance,
- #3. Inadequate data collection, and
- #4. Failure to fully evaluate data.



Source: Parfiit, SWRCB

The presentation stresses full and careful characterization of the subsurface stratigraphy before installing monitoring wells. The message goes on warning against the accidental perforation of confined layers that isolate lower layers of groundwater regardless of what regulations dictate if there is a danger of cross-contamination. Such wells must be carefully constructed to prevent cross contamination. Apparently, there have been monitoring wells discovered in California that have long well screens (for the purpose of collecting water samples at various levels) of 10 to 30 feet in monitoring wells that actually cross through confining layers allowing the contamination to spread from upper layer to a lower layers of groundwater. It is the lower layers that are usually tapped for drinking water.

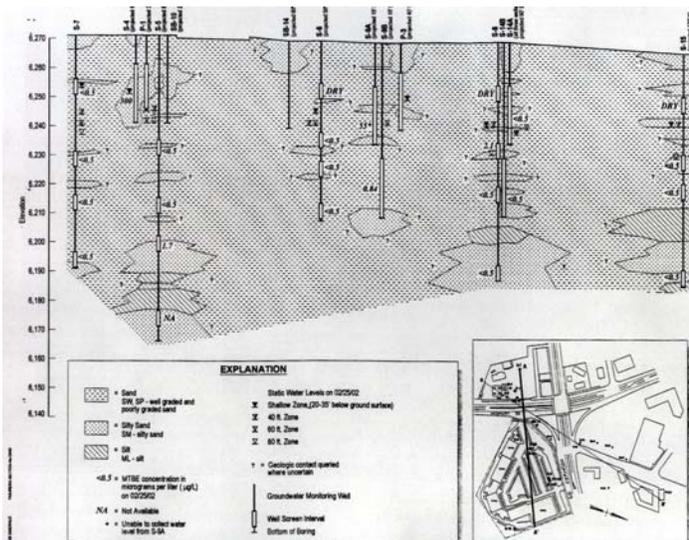
One of the most interesting questions asked in the presentation relative to situations that have confined or semi-confined groundwater was, "Reality takes a vacation; is the groundwater truly affected or is it a manifestation of the well construction?" Parfiit gives some actual examples of where such cross contamination has occurred (without specific reference to the locations). Mr. Parfiit estimates that this situation has been discovered at about 90% of the sites that he has investigated.

On March 3 of 2003 the Tahoe Daily Tribune published an article about how the actual clean up of MTBE in South Lake Tahoe was adding to the problem of contamination. The increased severity of the problem came from the drilling of observation/monitoring wells through confining layers of silt and clay that provided protection for lower levels of groundwater used for drinking water. The article stated that this multiple penetration of confining layers to lower levels of ground water "increased the cost of the clean up by millions of dollars." Furthermore, these

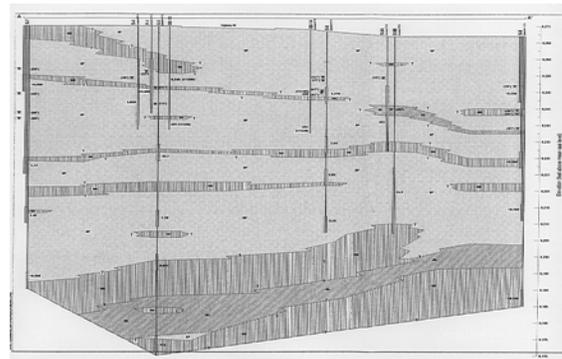
activities were under the supervision and direction of the Lahontan Regional Water Quality Control Board (LRWQCB) agency.

Craig Morgan P.E., President of Avalex Inc. of South Lake Tahoe was one of the primary critics of the clean up activities in South Lake Tahoe. Mr. Morgan presented his finding on cross-contamination at the Tahoe Science Seminar Series on "Groundwater and Hydrostratigraphy of Lake Tahoe" on February 14, 2003 together with Gordon Seitz, Ph.D., C.E.G. and Graham Kent, Ph.D. This impressive presentation gave the details behind Morgan's and his associates' allegations.

The presentation goes into a general description of the local hydrogeology and then summarizes the strong evidence of multiple aquifers with confining layers at the Shell retail gasoline outlet (RGO), the USA RGO, the Swiss Mart RGO and the community of Tahoe Verde Estates. Each one of these sites shows very strong evidence of continuous confining layers of silts and clays in the South Tahoe area. The presentation also discusses the continuing agency assumption that the silt and clay layers are discontinuous thus leading to the past and continuing practice of installing observation/monitoring wells with long well screens. The presentation concludes that well screens installed through the confining layer allowed contamination from the shallow groundwater to migrate into the deeper aquifer used by South Tahoe Public Utility District (STPUD) for drinking water. It is Mr. Morgan's contention that had these wells not been screened across the confining layer there is no reason to believe that STPUD's well would have been adversely impacted by groundwater contamination at the leaking underground tank sites.



At the Shell site, the diagram on the left shows how the LRWQCB characterizes the lithology and on the right is the actual hydrogeological interpretation. Due to the use of the LRWQCB interpretation, appropriate safeguards were not taken to protect lower groundwater levels resulting in cross-contamination.



Morgan reportedly shared his findings with the LRWQCB and South Tahoe Public Utility District (STPUD) staff on numerous occasions from mid 2000 until mid 2002 (before the STPUD MTBE suit settlement). On June 24, 2002, Mr. Morgan and Mr. Seitz met with Lahontan staff and presented detailed information concerning the hydrogeology at the South Y area and the problem of cross-contamination only to be met with a veiled threat of legal action from STPUD's attorneys.

Mr. Morgan's motive behind his efforts to reveal this problem is to prevent future such situations from happening. This is consistent with the motives by Mr. Parfiit of the SWRCB. Mr. Parfiit agrees with the conclusions made by Mr. Morgan on South Tahoe geology based on his investigation of the Tahoe Tom's RGO site. Both Mr. Parfiit and Mr. Morgan think that this information could have influenced the direction of the STPUD suit. Mr. Morgan also suspects that the information could have influenced the decision to phase out MTBE from California's gasoline in as much as Tahoe has been a focal point of discussion. Mr. Morgan strongly believes that policy makers ought to know the true facts concerning the causes of the MTBE contamination problem in South Lake Tahoe. Mr. Morgan also notes that, based on his knowledge of what happened in South Tahoe, he wouldn't be surprised if Santa Monica may have experienced the same problems.