

The Bay Harbor Remediation Site from an Engineering Perspective

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Many opinions have been put forth in the News Review regarding the long term disposal of the leachate originating from the cement kiln dust at Bay Harbor. I have been involved in the debate about this site since the first samples that definitively showed the presence of toxic heavy metals were taken in 1988. Now, with a remediation effort well along under the regulatory authority of both the USEPA and the MDEQ, the final remedy for the site is under consideration.

The Bay Harbor site has been leaking high pH, heavy metal containing leachate into Little Traverse Bay since well before the Penn Dixie Cement company went bust and Bay Harbor was developed. The question of whether the development of Bay Harbor changed these emissions can never be answered satisfactorily since there is no data concerning emissions before the development project. The reality of the situation is that some leachate will be leaking into the Bay regardless of what plan is implemented.

Engineering is the art of the possible. While it would be wonderful if all leachate emissions could be eliminated, this is not possible regardless of how much money is spent on site remediation. The engineering choices available at Bay Harbor all result in significant reductions of the amount of leachate reaching the Bay. Selection of the final remedy at Bay Harbor is a controversial subject in our community, however, I believe some of the information presented in this editorial should make the community comfortable that this effort is on a good track and, if properly funded, will come out well.

Most of the recent discussion regarding the Bay Harbor site as reported in the News Review has been based on well meaning intentions rather than engineering calculation and data. With well over \$150 million spent by CMS Land to investigate and remediate this site there is not much mystery that remains. This could not be said when I wrote my whitepaper¹ three years ago and testified as an expert witness in the nascent lawsuit brought by The Friends of the Jordan River Watershed to prevent leachate trucking and injection into a shallow disposal well in the Jordan River Valley. With hundreds of test bores on the property and a fortune spent on engineering consultants by CMS, the options for the final remedy at this site are well defined. Following are some of my conclusions concerning this subject based on over 30 years of engineering experience.

1. In my whitepaper, I calculated that there were enough heavy metals in the CKD at Bay Harbor to produce leachate that will be a public health concern for hundreds if not thousands of years. This fact means that whatever final remedy is implemented it will have to be maintained and operated in perpetuity.

2. The CKD at Bay Harbor was treated as fill dirt during the development of the resort and it has worked its way into fissures in the bedrock of the site to depths of as much as 180 feet below lake level. Even though many of those in the environmental community would like a solution that completely isolates the CKD from groundwater contact in perpetuity it is my engineering judgment that there is no practical way to achieve this goal. Like it or not, we are going to be living with CKD leachate for a very long time.

3. Using EPA data, I have calculated an estimate for the amount of Mercury that falls into Little Traverse Bay from the air due, largely, to coal fired powerplants and factories to our West. My estimate is that about 1000 grams of Mercury is added to our Bay from airborne deposition each year. The amount of Mercury reaching Little Traverse Bay from Bay Harbor is estimated at 10-30 grams/year. Bay Harbor is not a major source of Mercury into the Bay and studies of zebra mussels taken from in front of Bay Harbor do not have Mercury levels that are statistically different from other locations in the Bay. If, by magic, all the Mercury emanating from Bay Harbor were to disappear, we would still have fish advisories.

4. The leachate collection system built by CMS at Bay Harbor only captures a fraction of the Mercury reaching the Bay. If all the leachate captured by the CMS collection system was treated to remove all the Mercury in it before discharge, it would only reduce the Mercury loading to the Bay by roughly 50% due to the fugitive emissions that are too deep to be collected. As long as the captured leachate is treated with reasonable efficiency, the amount of Mercury in it is not significant to the Bay ecosystem.

5. The primary result of the Bay Harbor remediation effort is to make Bay Harbor safe from the possibility that residents will accidentally contact untreated, very high pH leachate and be burned or blinded. Eye contact is a particular concern since high pH solutions will quickly destroy the cornea of the eye and cannot be washed out. The envisioned final remedy will ensure that almost all of Bay Harbor is free from this concern. At two locations, East Park and Pine Court, no such assurance can be given. Due to the very complex geography of these areas and the vast amounts of CKD concentrated here, there is a finite probability that whenever liquid collects it might have a high enough pH to be dangerous. Don't pick up a rock and poke around in these areas, you might hit the jackpot!

6. My primary concern regarding the Bay Harbor remediation effort regards long term funding. In the consent agreement between CMS and environmental regulators CMS Land agreed to fund the effort "in perpetuity." With over \$150 million spent to date and much more to come, future funding needs are very significant. I estimate that it will cost about 2 to 5 million dollars a year to operate and maintain the leachate collection system for the next few hundred years. Should CMS Land fail to cover these costs in the far future, they will likely fall to

Bay Harbor residents or taxpayers. I would like to see a well funded trust that stands independent of CMS set up to provide for the future operation and maintenance of the Bay Harbor final remedy.

7. I still have some concern about the effect of CKD on properties downwind from the old cement plant site. As anyone knows who was here when the plant was operating, there was a great amount of CKD that blew off the Bay Harbor site and its location and concentration has not been well examined. I estimate that something like a substantial fraction of a million tons of CKD is dispersed downwind of the site. An ominous clue is that groundwater running from the bluff on the South side of US-31 is contaminated with high levels of Arsenic. It is not within the current authority of EPA or MDEQ to investigate this off site area. If officials from Northern Michigan Community Health have competently investigated this possibility I have not been able to obtain the information. Before the Bay Harbor remediation effort is pronounced a success I would like to see this possibility fully investigated.

8. Little is known about what happens to the leachate that enters the Bay when it is frozen. The possibility exists that this leachate remains unmixed with the Bay until the ice melts. This could result in a very high local concentration of leachate in front of Bay Harbor which could be hazardous in the early spring or to ice fisherman.

In summary, I think we have come a very long way from the dark days when the Bay Harbor leachate collection system was a guy with a cart and a barrel. After years of denial and inaction, regulators and CMS have undertaken a world class remediation effort. I do not think there is good reason to be concerned about residual emissions to Little Traverse Bay as long as the entire remediation infrastructure is well operated and maintained in perpetuity. It is said that “eternal vigilance is the price of freedom” and at Bay Harbor this principle translates as “eternal maintenance and operation of the remediation infrastructure is the price of economic viability.” Let’s make sure the funding is in place to assure that Bay Harbor is economically viable in perpetuity!

¹ <http://www.friendsofthejordan.org/alba/pdf/cercla.pdf>