BACE 2011-06-01-BACE response to
BAAQMD reply to BACE HRA evaluation

BACE response to BAAQMD 6/1/2011 reply to BACE 5/26/2011 HRA evaluation

June 1, 2011

Mark Chernaik, Ph.D., J.D.

Submitted by Bay Area
For
Clean Environment

Dear Scott,

Thank you for the thoughtful reply to the evaluation. What follows are some additional comments and questions that I hope will enhance the understanding of Lehigh's March 2011 Health Risk Assessment.

1. Mercury content of Lehigh's limestone

You wrote: "Lehigh indicated that there were analytical anomalies for two sampling days (of 30) in question and requested that they be excluded from the 30-day average; this is often done for questionable data."

Could you please specify the nature of the analytical anomalies that justify exclusion of this data? The nature of these analytical anomalies is not specified in the Health Risk Assessment.

You indicate that Lehigh requested that this data be excluded from the 30-day average. Could you please share all of the correspondence between Lehigh and BAAQMD regarding the treatment of the sampling data in question?

You wrote: "The 30-day averaging protocol was developed by USEPA and the District believes this methodology is appropriate for estimating emissions from this facility." Could you please provide a citation to or copy of the USEPA protocol used by Lehigh that specifies the methodology for analyzing the mercury content of Lehigh's limestone and the treatment of analytical results?

There is nothing analytically anomalous about the data for these two sampling days that is readily apparent. Two runs were made on each day of sampling. The mercury contents of the two runs made on March 26 and 27 differ by only a few percent (March 26, run 1 = 0.774 ppm, run 2 = 0.780 ppm; March 27 Run 1 = 1.44 ppm, Run 2 = 1.42 ppm), consistent with the small differences in the mercury contents for all of the other sampling days. Even if we exclude data from March 26 and 27, there is substantial variation in the mercury content of Lehigh's limestone, ranging almost two-and-half-fold, from a minimum of 0.20 ppm to 0.48 ppm. This substantial variation in measurements from the other 28 days of sampling further suggests that the measurements of March 26 and 27 validly reflect an inherent variability of the mercury content of Lehigh's limestone. Finally, when the U.S. EPA promulgated the new Portland Cement NESHAP in September 2010, it stated:

> "Industry commenters stated that we should account for additional sources of variability in this floor determination, namely intra-quarry variability and variability of the mercury content in local coals which kilns could utilize. As explained below, beyond those situations where commenters documented that sources actually used inputs with greater mercury content than used during the 30-day test period (see note 11 above), or where further intra-quarry mercury variability could reasonably be estimated, we did not do so.

> "EPA is of course aware that limestone quarries are immense, and are customarily used from periods of 50 to 100 years. Taking the average of 30 days of sampling data from one part of the quarry would not necessarily encompass all of the different mercury levels throughout the quarry."

The U.S. EPA also supplied a graph depicting the average mercury content of limestone used by U.S. Portland Cement plant. See: average mercury content of limestone.gif One U.S. Portland Cement plant uses limestone with an average mercury of more than 1.1 ppm. One of the two quarries with the highest mercury content of limestone in the U.S. is Lehigh's quarry in Tehachapi, California, about 200 miles from Lehigh's quarry in Cupertino. Therefore, there is nothing inherently anomalous with the measurements of March 26 and 27 showing mercury contents from 0.77 to 1.44 ppm.

Without further justification of why the data from March 26 and 27 should be excluded, BAAQMD's decision to exclude this data seems arbitrary.

2. The District's recent issuance of a permit for the kiln with an hourly mercury emission limit of 0.064 lb/hr

It is the contention of No Toxic Air that when predicting maximum hourly ambient air concentrations of mercury under the 2010, 2011 and 2013 production scenarios, the HRA should assume a clinker production rate of 200 tons per hour (which requires the consumption of 289 tons of limestone per hour) and a maximum mercury content of limestone.

It is the contention of No Toxic Air that, according to the mercury analysis that Lehigh performed in 2009, the maximum mercury content of limestone is 1.43 parts per million - the average mercury content of limestone that Lehigh sampled on March 27, 2009.

If the district can demonstrate that there are analytical anomalies that justify exclusion of this data (and the data from March 26, 2009), then it is the contention of No Toxic Air that, according to the mercury analysis that Lehigh performed in 2009, the maximum mercury content of limestone is 0.482 - the average mercury content of limestone that Lehigh sampled on April 1, 2009.

You wrote: "The District has recently issued a permit for the kiln with an hourly mercury emission limit of 0.064 lb/hr (permit is for a carbon sorbent injection system installed to reduce mercury emissions); this is the emission rate used in the HRA for the 2011 production scenario and will be enforced using a 30-day rolling average based on material balance until the CEM is operational later this year."

As you know, the District has issued two permits for the facility, a Major Facility Review Permit that was noticed by the District on January 7, 2011 and a Minor Revision of a Major Facility Review Permit that was noticed by the District on May 10, 2011.

It is my understanding that none of the limits on mercury emissions contained in the Major Facility Review Permit that was noticed by the District on January 7, 2011 come into effect until September 9, 2013.

The Minor Revision of a Major Facility Review Permit that was noticed by the District on May 10, 2011 does contain the following limit (on page 24):

> "The owner/operator of S-154, S-171 and S-172 shall not emit more than 261 lbs/yr (12-month rolling average) and 0.064 lb/hr (3-hour rolling average) of total mercury during normal operation. These mercury limits may be revised based on a new stack or other modifications that Lehigh will be making, which could affect the Health Risk Analysis results. (Basis: H&S Code 44300 et seq.)"

You wrote that the new hourly limit on mercury emissions would be: "enforced using a 30-day rolling average based on material balance until the CEM is operational later this year."

Does the Minor Revision of a Major Facility Review Permit that was noticed by the District on May 10, 2011 contain a deadline by which Lehigh must make CEM of mercury emissions operational?

Until Lehigh does make CEM of mercury emissions operational, how would enforcement of the hourly limit "using a 30-day rolling average based on material balance" prevent gross exceedances of the hourly limit?

For example, let us suppose that Lehigh is operating at a maximum production capacity of 200 tons per hour of clinker (289 tons per hour of limestone) and is using limestone that contains a mercury content of 1.43 ppm. Potential mercury emissions might be 0.826 lbs/hour (289 tons/hour x 2000 lbs/ton x 0.00000143). The Minor Revision of a Major Facility Review Permit explains that: "the 2011 Production scenario represents the implementation of the Activated Carbon Injection system (subject of this application) and an hourly emission rate of 0.064 lb/hr of mercury (approximate 65% reduction from baseline)." If we apply a 65% reduction of mercury emissions because of the implementation of the Activated Carbon Injection system, then Lehigh might still emit 0.289 lbs/hour for a substantial period of time. However, these elevated emissions would be completely masked by an enforcement mechanism that uses a <u>30-day rolling average</u> based on material balance.

Finally, would you agree that the new mercury limit contained in the Minor Revision of a Major Facility Review Permit that was noticed by the District on May 10, 2011 has no bearing on the analyses in the HRA on prior year (2005, 2009/2009, and 2010) Production Scenarios?

3. Comparison of predicted ambient air levels of arsenic, manganese and mercury to 8-hour Reference Exposure Levels

You wrote: "Formal guidance from OEHHA is not yet available, however, OEHHA provided interim guidance to air districts on April 19, 2010. This guidance indicates that an 8-hr REL should be compared to the annual-average concentration for continuously emitting sources, and

that the annual-average concentration should be adjusted by considering the operating schedule for non-continuously emitting sources (e.g., a factor of 4.2 for a source that operates 5 days a week, 8 hours/day). Since Lehigh's kiln is operated more than 4000 hours/yr, the adjustment factor would be about 2.2."

Could you please share the interim guidance that OEHHA provided to air districts on April 19, 2010? I looked carefully for the document on OEHHA's website, but could not find this interim guidance.

In developing the 8-hr REL for mercury, OEHHA stated:

> "The 8-hour Reference Exposure Level is a concentration at or below which adverse noncancer health effects would not be anticipated for repeated 8-hour exposures (see Section 6 of the Technical Support Document)."

So, I agree with you that my analysis was too simple: predicted maximum 8-hour exposures at schools and other relevant receptors may not be similar to repeated 8-hour exposures.

However, I have concerns that an adjustment of the annual-average concentration of mercury is an appropriate method of comparing predicted 8-hour exposures at schools and other relevant receptors to the 8-hour Reference Exposure Levels considering the strong tendency of mercury to bioaccumulate (because of its well-known avidity for sulfhydryl and thiol groups in biological material). As OEHHA has noted:

> "The half life of elimination of mercury in humans following a single inhalation exposure of 14-24 min. was 21 days from the head, 64 days from the kidney, and 58 days from the body as a whole (Hursh et al., 1976). Urinary elimination among workers occupationally exposed for several years had an elimination half-life of 55 days (Sallsten et al., 1994). Thus, since mercury is only slowly eliminated, the intervals between daily 8-hr exposures, and between weeks are not long enough for the elimination of significant amounts of the metal and it will accumulate in the body with repeated exposure."

Considering that the half-life of mercury following a single inhalation exposure is so long (58 days), multiple exposures to mercury over a period of only several days would result in a nearly cumulative dose of mercury and may exert a profound toxic effect on the nervous system.

4. Maximum 1-hour concentrations of Hg under the 2013 production scenario

For the 2013 Production Scenario, I did in fact consider that a much taller stack and higher flow rates would enhance dispersion. For example, the HRA indicates that maximum hourly emissions of arsenic would be the same under the 2005 and the 2013 production scenarios (compare tables 5A and 25A). The HRA predicts that maximum 1-hour concentrations of arsenic under the 2005 production scenario would be 4.04 E-3 at the MEIR, and roughly the same, 3.58 E-3, under the 2013 production scenario. So, clearly the tall stack and higher flow rates are not having much of an effect on particle-bound pollutants. For the various Production

Scenarios, what assumptions are being made about the speciation and fraction of particle-bound mercury in overall mercury emissions from the kiln?

Average Mercury Content of Limestone.gif

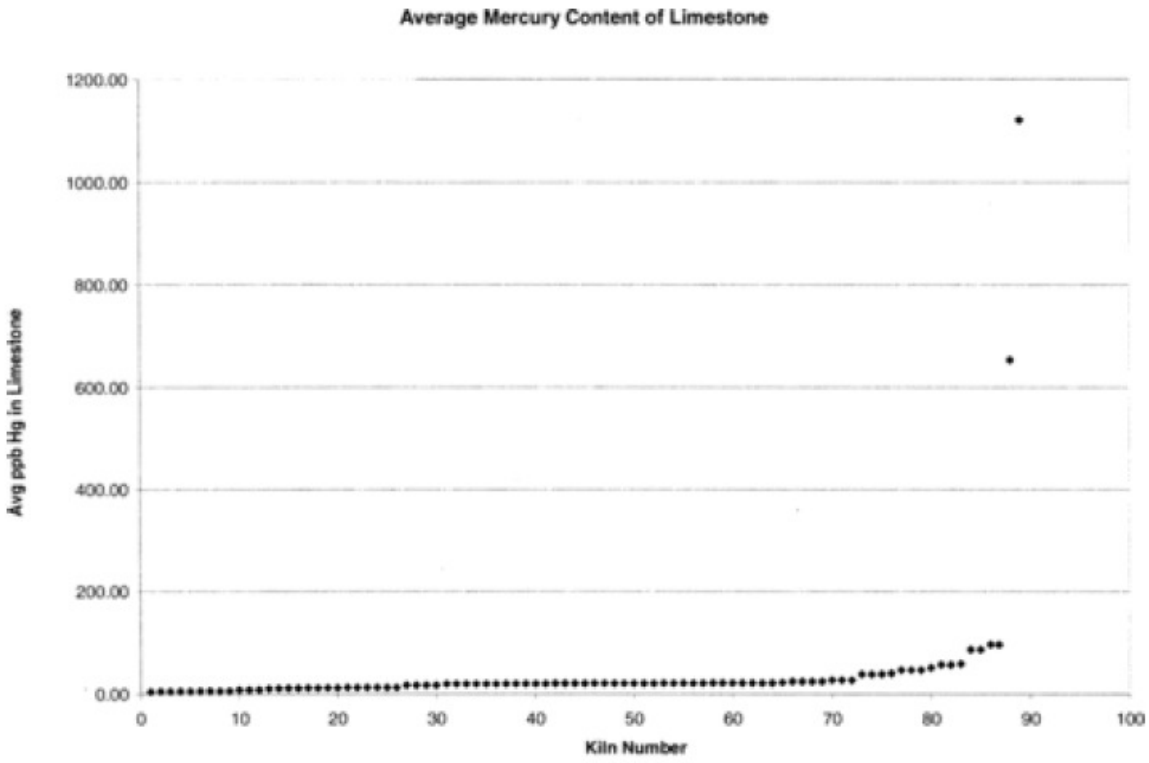

Figure 1. Average Mercury Concentration of Limestone

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