

Via Electronic Mail

Dear County Supervisor,

Re: Lehigh Synergistic Toxicity Data Not Considered

As founder and Director of the El Camino Hospital Cancer Center, I am constantly seeking novel approaches to improve the treatment of cancer, through both surgical and pharmacologic means. In addition, I am on constant surveillance for ways to reduce the incidence of cancer in our community so that our fellow citizens need not ever walk through the doors of my clinic. My training as a clinician-scientist, with a medical degree in Surgical Oncology and a Ph.D. in Molecular Pharmacology, has been invaluable in these efforts.

It has come to my attention that you will shortly be voting on a measure, which requires the parties involved to demonstrate that continuing mining and operations of the Quarry and Plant will have 'no adverse impact on neighborhood health.' *I have studied the analysis from BAAQMD and do NOT believe their analysis successfully demonstrates 'no adverse impact on health;' their methodology fails to accurately account for synergistic toxicity. In addition, several of the assumptions inherent in their models are highly suspect.*

Radar Scope Carcinogens from Lehigh's HRA Sep 2010

The National Cancer Institute (NCI) has published a list of critically dangerous carcinogens (cancer inducing chemicals). Lehigh emits five of the six Nasties! The following carcinogens from Lehigh's HRA contribute more than 1 part in 200 (>0.5%) to the total risk, even when assuming that total toxin risk is additive.

NCI Official "Nasties": Arsenic, Beryllium, Cadmium, Chromium, Nickel. Plus
Benzene
1,3-Butadiene
Diesel particulate matter
Ethylene dibromide
Naphthalene
2,3,4,7,8-PeCDF (Pentafuran) and 2,3,7,8-TCDF (Tetrafurane)
Vinyl Chloride

Synergistic Toxicity

Furthermore, it has been well established that multiple toxins may act synergistically. Specifically, consider the scenario where toxins A and B are present at 10% of their lethal doses. If A and B showed merely additive effect one might argue the total toxicity to be 20%. However, a synergistic effect, could easily lead to 25% toxicity or even 100% toxicity. This can occur as a first toxin impairs the immune system in a way that lowers the threshold of action of a second toxin. Consequently, the interactions AMONG toxins make the risks far worse than just adding the individual risks of each toxin.

BAAQMD is not currently considering the potential impacts of combinations of the above toxins. The rationale for ignoring synergistic effects has been the impracticality creating a matrix 'dose-response' study. Such a study would require thousands of volunteers to test the effects of multiple carcinogens. It is true that such a study design is impractical. However, modern epidemiological studies use more sophisticated bio-statistics, global information systems, [mass spectrometry](#), ANOVA, factor analysis, etc. to circumvent the limitations imposed in traditional multifactorial study design.

OEHHA and BAAQMD Are Not Providing Synergistic Toxicity Data

OEHHA agrees that they must consider synergistic toxicity. But because OEHHA can't find any dose-response studies on these multiple carcinogens, their "synergistic toxicity" simply adds the individual risks of the toxins (*Ref. 2*). That's not synergistic toxicity. More modern methods are available and should be implemented to study the problem. **Without an accurate estimate of toxicity, it is impossible to argue definitively that Lehigh's proposed action poses no adverse impact.**

As I understand it, for you to vote to give vested rights to Lehigh to dig a new pit, case law (*Ref. 3*) requires Lehigh to prove it poses no adverse impact on neighborhood health. BAAQMD and OEHHA say it doesn't pose such risk, but that's only because their methods are flawed for carcinogens making their conclusion unusable.

I know you care as much as I do about the health of everyone in the county. My colleagues and I are happy to introduce you to researchers at Stanford and other institutions who can help Santa Clara County and OEHHA adopt the recommended modern methods.

Scientists knew for years that smoking caused cancer, but it took over 25 years for the research to reach the control agencies. Now we regret the harm that was done during that lost period.

Even if your district does not contain the Quarry and Plant, there's a second-hand smoke aspect here. I hope each Supervisor would say to the other: Yes, you may be OK with the plume of carcinogens in your district, but it drifts over to mine, and I am not OK with it.

Sincerely,



Shyamali Singhal, MD, PhD, FACS
Los Altos, California

References:

Ref. 1: "Air Toxics Hot Spots Risk Assessment Guidelines Part II: Technical Support Document for Cancer Potency Factors" (May 2009) http://www.oehha.ca.gov/air/hot_spots/2009/TSDCancerPotency.pdf

5. Dose-Response. A basic tenet of toxicology is that increasing exposure or dose generally increases the response to the toxicant. While dose-response curves vary in shape and are not necessarily always monotonic, an increased gradient of response with increased exposure makes it difficult to argue that the factor is not associated with the disease. To argue otherwise necessitates that an unknown factor varies consistently with the dose of the substance and the response under question. While increased risk with increasing levels of exposure is considered to be a strong indication of causality, absence of a graded response does not exclude a causal relationship (IARC, 2006).

Ref. 2: OEHHA Technical Support Document for Acute Reference Exposure Levels d_rell.pdf that states (*emphasis added*): For many facilities a large number of chemicals may be emitted or may be present in the air at the location of the receptor or exposed population. To assess the cumulative impact of several chemicals present at the same time, it is important to consider the interaction of effects of the toxicants. Unless specific information is available to the contrary, the *interaction of two or more chemicals is assumed to be additive* for a given toxicological endpoint. This may underestimate the effect in the cases in which interactions are synergistic or overestimate it if the effects are not additive or are antagonistic.

Ref. 3: Case Law - Hansen Brothers Enterprises, Inc. v. Board of Supervisors, 12 Cal.4th 533, available here: that to continue excavation operations...[Lehigh]... must prove that the continued operations do not, and/or will not, have a substantially different and adverse impact on the neighborhood.