



August 27, 2008

Robert L. Bowen, Project Director  
California Department of General Services  
Real Estate Services, Project Management Branch  
707 Third Street, 3-305  
Sacramento, CA 95605

Ref: Evaluation of HTI Clearance Criteria  
Board of Equalization (BOE) Building  
LaCroix Davis Project No. 2372-572

Dear Mr. Bowen,

As requested, LaCroix Davis LLC (LCD) has reviewed the letter by Brian P. Daley, President, Hygiene Technologies International Inc. (HTI), dated August 21, 2008. The letter focused on the HTI criteria and rationale for post-abatement clearances. The letter was addressed to David J. Gau with the California State Board of Equalization (BOE). The purposes of this report are to evaluate the HTI clearance criteria and to respond with a scientifically and professionally supported assessment.

***HTI Fungal Clearance Criteria*** – The HTI post-abatement clearance criteria outlined in the referenced letter can be summarized as follows:

1. ***Visual Inspection:*** Conduct a thorough visual inspection of the work area to verify that the work has been completed “in a manner consistent with that protocol.”
2. ***Settled Dust and Mold Growth:*** Verify that the work area is “orderly, visibly free of settled dust, and visibly free of suspect mold growth.”
3. ***Dry Materials & Water Intrusion Sources:*** “All materials are required to be *dry* and the cause or causes of water intrusion are either remediated or that the involved parties are aware that water intrusion work will be performed in a timely manner.”
4. ***Spore Trap Air Sampling:*** Conduct spore trap air sampling inside the containment(s) and outside the building. Apply the industry standard approach of comparing the inside sample results with the outside results to determine that air clearance criteria are met.
5. ***Surface Sampling:*** Assure that “surface sample data from a representative number of potentially-affected materials within the abatement enclosure(s) show no evidence of fungal growth and no evidence of settled *marker* spores.” The criteria continue to state that “typical marker molds include *Stachbotrys*, *Chaetomium*, *Ulocladium*, and *Scopulariopsis*.”



**LaCroix Davis Evaluation** – LCD has reviewed the HTI clearance procedures and we agree with the principles articulated in the first four steps. We, however, do not agree with the procedures and the criteria set forth by HTI in step 5. The last step is inconsistent with the environmental science, regulated hazardous materials, and professional practice. The following sections describe our analysis of the HTI document:

1. Clearance Criteria for Common Environmental Contaminants – Steps 1 – 4 are consistent with the post-abatement clearance procedures for regulated, environmental contaminants such as lead-based paint (LBP), asbestos-containing materials (ACM) and polychlorinated biphenyls (PCB). All three contaminants are regulated by multiple federal, state and local agencies. In each case, the clearance procedures and criteria are well-described within the regulatory framework. The clearance criteria for these contaminants are health-based. Further, and most importantly, none of them require total elimination of the contaminant to achieve post-abatement clearances.

The principal that total elimination of an environmental contaminant in post-abatement situation is unnecessary and generally unachievable can be illustrated with LBP and PCB regulations. The two federal agencies that are primarily responsible for the regulation and enforcement of LBP in the United States are the Environmental Protection Agency (EPA) and the Department of Housing and Urban Development (HUD). The health of children and adults alike can be adversely affected by excessive exposures to lead.

The EPA has established health-based criteria to assess lead in the environment and to conduct post-abatement clearances. There are clearance procedures that stipulate the surfaces to be tested and the standards to be used to interpret the results. The surfaces and the standards are interior floors (40 micrograms per square foot), interior window sills (250 micrograms per square foot), and window wells (400 micrograms per square foot). Clearly, these surface clearance criteria allow *de minimus* amounts of lead dust to remain within the contained area and still achieve clearance.

A second example is the EPA wipe clearance standard for PCB-contaminated surfaces, which is 10 micrograms per 100 centimeters squared on impervious, solid surfaces. PCBs are confirmed human carcinogens. The standard is derived from the USEPA PCB Spill Clean up Policy, 40CFR761, Subpart G.

2. Zero Tolerances for Environmental Contaminants is Rare – Most regulated environmental contaminants do not have zero tolerance clearance levels because it is generally unnecessary, difficult to achieve in a cost-effective manner, and can not be defended on a human health basis. One clear exception to the above statement occurs with aggressive, lethal human pathogens such as anthrax and Ebola. In these cases, it is generally accepted public health policy to establish zero tolerance levels for all tested surfaces. However, common airborne fungal spores do not fit into this category. They are consistently found in a wide range of concentrations in indoors and outdoors. They should not be equated with lethal, human pathogens in post-abatement clearance testing.

3. Professional Practice and Standard of Care – LCD conducted an informal telephonic assessment of professional practice and standard of care in post-abatement clearance testing for mold. This sort of survey is common in the environmental health and safety profession and is often referred to as “benchmarking”. The survey was conducted by interviewing the principal consultants and/or owners of seven (7) environmental consulting firms located in California. The list of firms and the location of the office contacted follows:

- AIH Consulting Inc., San Francisco, CA
- BioMax Environmental LLC, Pinole, CA
- Entek Consulting Group Inc., Rockland, CA
- Environ International Inc., Mt. View, CA
- Exponent Inc., Oakland, CA
- Forensic Analytical Consulting Services, Inc., Hayward, CA
- IHI Environmental Inc., Emeryville, CA

In each telephone interview, the consultant/principal was asked about the firm’s mold clearance testing practices. All confirmed that they typically follow the first four steps outlined in the referenced HTI letter. One consulting firm indicated that they do not normally conduct clearance air testing; the firm generally relies on a thorough visual assessment of scope of work completion and visual confirmation that the containment is free of debris and mold. Thus, virtually all the consulting firms agree with the first four steps. Not one of the firms routinely use tape lift samples for clearance testing and none have adopted or condone the zero tolerance criteria for settled marker spores.

**Summary and Conclusions** – LaCroix Davis has evaluated the HTI post-abatement mold clearance criteria. LCD has determined that the first 4 of the 5 procedural steps described in the clearance process are consistent with environmental practices, scientifically supportable, and generally accepted by the environmental health and safety (EH&S) professional community. However, the HTI practice of zero tolerance of marker spores on tape lifts is not scientifically sound, is not health risk-based and is not an accepted practice in the EH&S community.

Respectively Submitted,

*Signed Wet Signature Copy To Follow*

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