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To Whom It May Concern:

U/S (undersigned), representing California Mold Assessment, was asked to review a report developed by Executive Environmental Services Corporation regarding a microbial assessment of several classrooms at Newhart Middle School. The initial assessment was conducted in the afternoon of May 9, 2006.

The purpose of an indoor air quality (IAQ) assessment is to determine if the indoor air is "worse" than the outdoor air. The basic hypothesis is the outdoor air is good. Molds are dynamic by nature in that they fluctuate in genera and counts (qualification and quantification) throughout the day.

In assessing moisture, fungi, and VOC's, Etc., in an indoor environment it is very important to have control data available. In other words measuring carpet moisture at 25 to 50% is irrelevant unless there is a "dry standard" with which to make a comparison. This applies to the other percentages listed in the report. Page 4 indicates "Areas measuring less than 15 percent moisture are considered dry. Areas measuring more than 20 percent moisture are considered wet enough to support mold growth." These figures are accurate ONLY for wood (non specific) and do not hold true for other building materials (carpet, sheetrock, ceiling tiles). U/S doubts that wooden framing members were moisture sampled in this assessment as the moisture meter described does not have the penetrating capability. It is U/S assumption the moisture measurements are for sheetrock walls (one area having simulated wood paneling) since that is the most common surface material. Elevated moisture content for sheetrock is anything over 50% moisture. An evaluator MUST take into consideration the equilibrium moisture (relative humidity) of the rooms sampled. By EESC's description of their sampling methodology, all moisture content percentages are misleading and false.

EESC collected numerous samples for laboratory analysis. Among these were three outside samples. There are NO comparisons that can be made that describe PELs as described in their report (page 6). TLVs may be addressed if used properly. Since mold is dynamic and ever changing, control samples must be collected to which all other samplings are compared. EESC collected three outdoor (control) samplings. This allows for a much better control criteria since the premise is no single event is influencing the results. In order for these figures to be valid, they MUST be averaged and that "average" figure then becomes the control number to which all suspect samplings are compared. This report, although while not referring to any specific numbers, appears to favor the

highest number for their controls. This is "stacking the deck" in favor of NOT finding any problems. Another "stacking the deck" element is the fact EESC collected two viable and two non-viable samplings from each room except P-3. If they are going to collect two samplings from each end of the classroom, they should be added together to equal a total number of spores for that room. EESC's report almost reflects the presence of two separate rooms in each room (north half and south half).

In reviewing this EESC report several glaring inconsistencies and methodologies were noted. The report indicates the assessment commenced after the school day was concluded but not the exact time. This is important in that most rooms surveyed had elevated relative humidity levels. This could be a normal condition IF the students had immediately left the room. If any significant time (30 minutes or longer) the rooms would have come to normal equilibrium and the relativity factors would be real. The only humidity level indicated in the report listed an outside relative humidity of 52%. This means if the classrooms had been vacated longer than approximately 30 minutes the equilibrium humidity would come to that of the outdoors. Anything higher could be indicative of a moisture problem. Some rooms had 60% relative humidity.

EESC collected viable and nonviable samplings for analysis. Various rooms were described as "having a musty odor" however there was no explanation for this. Musty odors come from fungal VOC off gassing (mold farts) and dampness. Generally speaking, if one has dampness one has mold. Various areas were described as having prior water staining or elevated moisture present, e.g., rust staining on carpet of P1, high moisture in carpet and drywall damage in P2, water intrusion through door and window and staining of carpet in P3, "historical" water damage to carpet in P4, damaged ceiling tiles to 100% moisture presence accompanied by a musty odor, visible rust in 108, water damaged ceiling tiles and hardwood wall paneling and rust in 109, past water damaged ceiling tiles and some water staining in 135.

Although no visible mold was described in ANY of the rooms, there exist sufficient red flags or other indicators that further investigation is warranted. ANY water-damaged area is suspect of having mold. EESC did not "see" any on the surface but what about in the wall cavity. This is the residence of choice for most fungi since it is: 1. protected; 2. dark; 3. able to hold moisture better; 4. numerous nutrient sources. All walls having staining or elevated moisture should be cavity-air sampled.

The samplings collected are a good representation of some elements of the investigation; however, they create more questions than they answer. The distinction between the cultureable samplings (viable) and the air samplings (non viable) are somewhat in conflict. In a typical setting the results should be more closely aligned. In this case there were more spores (CFUs) of significant nature in the cultured samplings than in the non-viable air samplings. This is because of the elevated moisture presence. The humidity is greater in all but one classroom than what was noted outside (52% vs. 60%). There has to be a reason for this elevation. The simple explanation is "there is moisture present creating the elevated humidity." The why was never addressed. Many fungi are somewhat stable as long as their "home" meets their criteria: moisture presence and

adequate nutrient source. When fungi become threatened they leave their "home" and settle in other areas where they begin their colonization again. This is when they are encountered in significant numbers in the aerosol loadings of a room. So, if there is sufficient moisture present and the nutrient supply is adequate (most everything can be a nutrient source) the fungi will be stable. To have moisture and nutrients and NOT have fungi/mold is almost unheard of.

Discussion of Results:

U/S created an **average** of outside control marker molds encountered. The table compares the control (outside) spores with the indoor spores per cubic meter.

P1

Genera sp.	Control	Quantity detected
Aspergillus Niger	4	0
Aspergillus Versicolor	0	142
Cladosporium	145	106
Paeciliomyces	0	12
Penicillium	32	294

P2

Genera sp.	Control	Quantity detected
Aspergillus Niger	4	0
Aspergillus Versicolor	0	47
Cladosporium	145	153
Penicillium	32	247

P3(south half not sampled)

Genera sp.	Control	Quantity detected
Aspergillus Niger	4	24
Aspergillus Versicolor	0	24
Cladosporium	145	106
Penicillium	32	47

P4

Genera sp.	Control	Quantity detected
Aspergillus Niger	4	0
Aspergillus Versicolor	0	35
Cladosporium	145	82
Paeciliomyces	0	200
Penicillium	32	624

P6

Genera sp.	Control	Quantity detected
Aspergillus Niger	4	35
Aspergillus Versicolor	0	35
Cladosporium	145	153
Paecilomyces	0	0
Penicillium	32	223

108

Genera sp.	Control	Quantity detected
Aspergillus Niger	4	0
Aspergillus Versicolor	0	0
Cladosporium	145	83
Paecilomyces	0	12
Penicillium	32	59

109

Genera sp.	Control	Quantity detected
Aspergillus Niger	4	24
Aspergillus Versicolor	0	0
Cladosporium	145	71
Paecilomyces	0	0
Penicillium	32	165

135

Genera sp.	Control	Quantity detected
Aspergillus Niger	4	0
Aspergillus Versicolor	0	12
Cladosporium	145	94
Paecilomyces	0	0
Penicillium	32	0

Paeciliomyces is a fungi that was not proven in the control samplings. This is a strong indication that there is a fungal presence within the class rooms where this fungi was identified. *Aspergillus versicolor* was detected in greater quantification in six of the rooms sampled. Cladosporium was detected in greater quantification in only one room.

Penicillium was detected in greater quantification in all eight rooms sampled. The amounts detected were extreme in comparison. *Basidiospores* were used as a marker fungi in the control sampling. *Basidiospores* are the result of decaying wood and are extremely common in outdoor air. Using these spores as a marker spore for a control basis also slants the overall outcome to a more desirable effect.

Aspergillus versicolor, when found indoors, often indicates high moisture presence. This species produces the mycotoxin, Sterigmatocystin, which is reported to be carcinogenic. The fungus has a characteristic musty, earthy odor, often connected with moldy interiors and is the cause of eye, nose and throat irritation.

Aspergillus niger is the third most common Aspergillus species associated with disease and is a very common environmental isolate. It is commonly associated with "fungus ball", a condition wherein fungus actively grows in the human lung forming a ball without invading lung tissue. *Aspergillus niger* is reported to cause skin diseases and is a common cause of fungal ear and nose infections.

Recommendations:

Reevaluate the rooms to determine the moisture content using IICRC S500 standards, determine the moisture source, collect wall cavity air samples to determine what, if anything, is happening inside the walls. Remove ANY AND ALL water damaged material, collect new non-viable air samples showing time, temperature, relative humidity for EACH sample and compare them with averaged control samplings.

The described wet ceiling tiles are generally wet due to leaking roofs or uninsulated refrigeration lines dripping condensate moisture onto the tiles. This is often true when the wet tiles are in a line (as the pipe runs). Uninsulated lines will attract moisture much like a glass of ice water will develop water on the outside. On a humid day a tremendous amount of moisture will be condensed onto these refrigerant lines.

While carpet is a visually pleasing surface, it is many times a mine-field of biological elements that are harmful to our health. IF they are to be used it is absolutely imperative there be a "walk-off" mat at the entrance into the room. This means each student and faculty must wipe his/her feet BEFORE entering the room. Additionally, carpets are sponges that hold moisture long after other substrates have dried. In areas of high relative humidity carpets will have rust stains even where there has been no water incursion incident. Carpet has NO place in a classroom setting!

Respectfully submitted,

Ken Duvall, CIE CRMI
California Mold Assessment

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