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Abstract

Executive Summary

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Keywords

Cornell, real estate, mold, building environment, mold prevention, mold legal policy

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Executive Summary

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Mold Species

Many types of mold exist in the environment, and species live in the soil, on plants, and on dead or decaying matter. According to the United States Environmental Protection Agency (EPA), "Molds belong to the kingdom Fungi, and unlike plants, they lack chlorophyll and must survive by digesting plant materials, using plant and other organic materials for food. Without molds, our environment would be overwhelmed with large amounts of dead plant matter."[2] The EPA goes on to say that mold species reproduce by releasing tiny spores into the air. These will only survive if they land on a damp spot, where they can begin growing and digesting the matter beneath them. Thus, by reducing the humidity within a building, the likelihood of mold growth will be greatly reduced.

Mold species most commonly found in buildings, including single-family dwellings, hotels, office buildings, industrial facilities, and a number of other workplace environments, include: Alternia, Aspergillus, Cladosporium, Penicillium, and Stachybotrys. Although thousands of mold species have been identified within different building types, these five are the most prevalent.

Alternia is most commonly found in carpets, textiles, and on horizontal surfaces in building interiors, especially window frames. The species Alternaria alternata is capable of producing tenuazonic acid and other toxic metabolites, which are associated with some diseases in humans and animals. Alternaria produces large spores that are deposited in the nose, mouth, and upper respiratory tract. This species may be related to Baker's asthma. According to a mold remediation company, Mold Remediation Services (MRS), "It has been associated with hypersensitivity pneumonitius, sinusitis, deratomycosis, onychomycosis, subcutaneous phaeohyphomycosis, and invasive infection. Human symptoms related to this species

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include edema and bronchiospasms; chronic cases may develop pulmonary emphysema."[3]

Aspergillus molds are not a significant threat to the safety and welfare of humans and pets; only a few of these molds can cause serious illnesses. A disease named after the species, Aspergillosis, is one to which most people have natural immunity. However, in rare cases, there has been some evidence of negative health effects. Such effects vary based on the state of the immune system of the individual.

Cladosporium molds are contaminants and non-pathogenic. This mold species is the most commonly found outdoor fungus. However, it is also identified in many indoor settings, such as on the surface of fiberglass lining of the interior surface of ducts. Cladosporium molds grow and reproduce by consuming dead and woody plants, human food, straw, soil, paint, and textiles. Mycosis, a type of cancer, has been linked to Clasporium. Human symptoms related to this species include edema and bronchiospasms; chronic cases may develop pulmonary emphysema.[4]

According to MRS, "Some Penicillium species are fairly common indoor fungi, even in clean environments. This particular specie of fungi can proliferate in abundance in indoor environments. Penicillium species can be found in basement level offices and rooms, in libraries, auditoriums, storage rooms of paper materials and also in ventilation systems." Exposure to Penicillium species can have ill effects including respiratory and hypersensitivity, because of the many toxins released.

And lastly, Stachybotrys mold species are found in 2 to 3 percent of all homes in the United States. Stachybotrys is a slow-growing fungus, and it can be found on high cellulose containing materials such as straw, grass, sawdust, lumber, and drywall plaster board or ceiling tiles. According to MRS, "Stachybotrys spores are breathed into the lungs. Persons with chronic exposure to the toxin report cold or flu-like symptoms with sore throat, diarrhea, headaches, fatigue, dermatitis, intermittent local hair loss and general malaise, [a condition of general bodily weakness or discomfort, often marking the onset of a disease]. The toxins may also suppress the immune system."[5]

Mold Growth & Prevention

Without oxygen and moisture, mold species would die out. Humans obviously cannot live without oxygen in their homes; therefore, reducing the moisture in indoor air is the primary way to prevent mold growth. Although eliminating all mold and mold spores in the indoor environment is impossible, mold can be kept to a minimum by controlling moisture.

Many reasons exist as to why too much moisture enters a building. Some moisture problems in buildings have been linked to changes in building construction practices during the 1970s, 80s, and 90s. Some of these changes have resulted in buildings that are tightly sealed, but lack adequate ventilation, potentially leading to moisture buildup.[6] The potential for future mold problems can be created in many ways during the construction process. Moisture may enter the exposed building if the contractors do not seal the building envelope

during construction. By leaving the envelope open, it is possible for moisture to collect in water-absorbent materials. These water absorbent materials include drywall, acoustic ceiling tile, insulation, or wood studs. Once the building is enclosed, this moisture is retained in the material, providing fertile areas for mold growth. The McGraw Hill Companies report on two construction projects that resulted in substantial liabilities related to mold:

- In August 2000, a jury in Santa Clara County, California, awarded $12 million to plaintiffs suing the general contractor, the designers, and over a dozen subcontractors and suppliers for mold problems that caused the courthouse building to be evacuated a year earlier.[7]
- In June 2001, a jury in Texas awarded $32 million to plaintiffs suing the general contractor and its subcontractors for a moisture and mold problem in a private home that had been estimated to cost $600,000 to fix.[8]

Although the actions of contractors and builders can contribute substantially to the potential for growth of mold, the design of a building is more likely to affect that potential. For example, the design of heating, ventilating, and air conditioning (HVAC) systems can either reduce or increase the probability of future mold growth in a building. As previously noted, moisture and oxygen are the two primary environmental elements that foster mold growth. However, organic nutrients, a surface on which to grow, and darkness will also contribute to that growth. Therefore, according to The Trane Company (Trane), "...if we keep the air conveyance system clean and dry, we can significantly reduce the potential for microbial contamination within a building. How we accomplish this objective is determined by the manner in which air is delivered to a building's occupied spaces."[9] Trane identifies 3 basic characteristics of HVAC design that will reduce the potential for the HVAC system to become a source of microbial contamination. These characteristics are as follows:

1. **Sloped Drain Pans**
   - Without sloped drain pans, water collects and creates a prime location for mold growth. Another problem that Trane states, "slime can clog the drain line and force condensate water to overflow into the bottom of the air handler. That means more wet interior surfaces and more potential for mold growth, not to mention possible equipment and building damage."[10]

2. **Cleanable Surfaces**
   - Although one would think having cleanable surfaces in HVAC systems would be a given, many designers line the interior of the ductwork with a porous material making the duct system nearly impossible to clean, and a prime location for moisture and dirt to collect. Today, American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) recommends using double-wall ductwork to avoid this problem. A smooth, nonporous surface should be used inside ducts and equipment.

3. **Accessibility**
    - Without accessibility, cleanable and inspectable system components are practically useless. Therefore, according to Trane, accessibility is of utmost importance. Accessibility should be provided via hinged doors and/or removable panels. Connections in the ductwork, where dirt and other materials can collect, should also have accessibility points designed into the system.

Although constructing a tighter building may seem like the most logical solution to reduce the possibility of mold growth, constructing a tighter building also means compromising the ventilation of the building. Therefore, if one constructs a so-called tight building, increased consideration must be given to the ventilation system. Otherwise, air forced into the building will tend to remain longer before being pushed back out into the environment. According to Dr. Nathan Yost, Principal of the Building Science Corporation, a building and construction consulting firm, "Moisture that gets into the air from activities such as cooking, bathing and even breathing will remain in a tight house longer than it would in a loose house. That's why exhaust fans should be installed in bathrooms and kitchens and vented to the outside. Clothes dryers should also be vented to the outside."[11]

In addition to these HVAC design elements, other steps are being taken to combat mold. Building manufacturing companies have been concentrating on the development of construction materials that will resist mold growth, primarily by reducing the amount of organic materials used in building products. Several companies have developed a new interior panel product that, according to Buildings Magazine, "goes a step beyond the more traditional construction by removing the paper from both the front and back of the board and reducing the organics in the core of the board. The result is a panel with fiberglass mat facings on both sides of the panel. With the highest resistance to mold on the market, this board is ideal for any structure where the concern for exposure to mold growth may be particularly significant."[12] However, although many inventors are stating the effectiveness of their products, Howard, states, "NAHB is not aware of specific materials used in the home building process that would make the growth of mold more difficult."[13] He did state that the NAHB continues to evaluate products designed to resist mold growth.

The Legal Environment Concerning Mold Claims

Until the late 1990's, mold issues were not generating much in the way of legal claims. However, the number of mold-related claims has increased significantly since 1998. During 1998, 48 mold-related claims were filed. In 1999, there were an unbelievable 2,567 claims filed, increasing to 7,143 in 2001. Texas, California, and Florida have led the way with 4,097; 3,087; and 1,387 claims, respectively, over the last 10 years. One would assume that most of this is the result of hot and humid climates; however, it is actually suspected that the initiative of attorneys has had more impact on the number of claims than the local climate. Gerald Howard of the NAHB says that in addition to the initiative of attorneys, an in-

creased focus on health effects of mold has increased mold-related claims. He states, "People are unnecessarily being frightened about possible health effects from mold in their homes."[14]

Regardless of the State, mold and its impacts have become a serious financial and liability threat over the last several years. The lack of education on the overall mold issue and the lack of federal mold standards are two obvious reasons for mold becoming such a serious issue.

Education on mold growth and remediation is far from adequate. The majority of the population is uneducated on the health effects of mold, and according to the International Union of Operating Engineers (IUOE), "Without a consensus from the scientific community on health effects of mold, speculation will continue to be diverse. There needs to be a comprehensive educational program with a clear understanding of the facts about mold and its potential health effects in our homes and workplace. Additionally, a comprehensive plan needs to be developed for the delivery of this education program to the population."[15]

The lack of federal mold standards has created a major concern. Currently, Courts are recognizing the guidelines set-forth by major institutions and jurisdictions. For example, as discussed above, The City of New York and the Environmental Protection Agency have both written guidelines for the remediation of mold. Such guidelines not only specify *how* remediation should be conducted, but also *when* it should be conducted. The City of New York was the first institution to create guidelines for this process. The EPA, and a number of other jurisdictions, have adopted and modified these guidelines.

Because only recommendations exist, professionals are not bound by any process or standard minimum mold level. For example, if a commercial building was classified as having extensive contamination, which is having mold present in more than 100 contiguous square feet, it is recommended that an industrial hygienist be consulted. However, one must also realize that the classification itself is subjective and simply the opinion of a so-called professional. This obviously creates a moral hazard problem. Industrial hygienists (IH) are usually consulted by water damage restoration companies. The IH's duty would be to assess the situation, and determine whether or not the building is contaminated with mold, the type of mold, and the level of mold present. Because of the lack of regulations, IHs are allowed to determine whether the home should be remediated and/or evacuated based on their professional judgment. Thus, water damage restoration companies are simply transferring the risk by subcontracting with an IH, who then becomes responsible for accurately assessing the condition.[16] The IUOE confirms such situation, "The lack of standards has multiple ramifications within a variety of industries. … The problem remains, however, that until guidelines are transformed into standards, the industry-wide practice will remain non-uniform and, therefore, potentially unsafe."[17]

Liability has obviously become the word of the day for many industries related to mold prevention and remediation. The questions surfacing are: Who is liable? And how does one become liable? Several examples can illustrate how liability can transfer hands. One party

that is increasingly attracting more responsibility for mold-related claims is the insurance company itself. Insurance companies are beginning to exclude any mold-related coverage/claims from their policies. Even if the mold claims are covered under the newly written policy, losses are usually capped at nominal amounts. For example, mold occurring only as a result of high humidity is not covered under most policies. However, mold remediation is usually covered if it develops because of a covered loss, such as water damage because of a broken pipe or leaking roof. As of 2003, in more than half the states, policies are including caps or exclusions related to mold.[18] One must also realize that many of the exclusions and caps found within insurance policies will never be upheld in the courts resulting from the controversy and uncertainty that still exists with respect to mold remediation.

Insurance companies in effect transfer the liability back to themselves when they delay in response to a homeowner's claim. Melinda Ballard, President of Policy Holders of America, shared a personal experience as an example. Her insurance company did not act responsibly when addressing her mold claim, which cost the company in excess of $30 million in additional damages. Based on her professional experience, Ballard explains that serious mold claims that are worsened by the insurance company's non-responsive behavior usually fall into the following categories:

- The insurance company/adjuster(s) delays inspection or adjustment of the loss for weeks or even months, allowing mold to develop;
- The insurance company/adjuster(s) fails to make prompt payment to the insured, delaying repairs of the loss/water damage;
- The insurance company/adjuster(s) grossly underestimates the scope of the work necessary to rid the home of all building materials that were wetted by the water event, allowing molds to grow on these materials when they are left in the residence. This underestimation of scope will also generally result in insufficient payment; and
- The insurance company/adjuster(s) will not allow and/or refuses to pay for temporary repairs that would allow wetted building materials to be dried or removed until the investigation is "complete."

Mikolic confirmed that the above situations occur frequently in the industry. For example, in 2000, a federal jury in California awarded $18 million—all but $500 thousand of that amount in punitive damages—to a homeowner against an insurer that declined coverage for mold damage. The trial judge reduced the award to $3 million, but the case is still on appeal.

If the insurance company is not liable, then who is liable? Many times, contractors are being held responsible for mold growth that appears days, or even years after their services take place. It is not uncommon to see a water damage restoration company service a call, and then 5 years later receive a call from the clients' attorney stating the liability they may have encountered through provision of their services. Because of a lack of indemnification, contractors are reluctant to work in situations where future liability could exist. Jim Hussey, Chairman of the Board for The Air Conditioning Contractors of America, explains the situation

related to HVAC systems, referring to the insurance companies' reaction of filing for absolute mold exclusions in their policies or extreme restrictions with the payouts related to remediation:

> "Our members are especially vulnerable to liability claims, for often the first culprit named in a mold situation will be the HVACR system, even though HVACR systems do not cause mold. On the contrary, a well-functioning HVACR system and a well-trained, alert technician is your best defense against the spread of mold. Well-trained and experienced contractors are solution providers, given the opportunity to perform without the threat of litigation. The federal government would be doing consumers a favor if they solve this insurance problem, as our industry is the one island of knowledge, skill and experience in this vast sea of mold hysteria to help insulate homeowners from the impacts of mycotoxins".[19]

Because of the absence of liability coverage for the contractor, the situation has worsened. Hussey feels that the only way to correct the situation is to increase government-funded research in mold prevention and remediation; raise the standards of performance; provide liability coverage for contractors servicing mold-related issues; educate the consumer to reduce fraud; investigate the establishment of an insurance pool to cover consumers as well as contractors; and establish geographic benchmarks so that toxic mold can be controlled. Industry professionals must realize that mold remediation is not a "one-size-fits-all" process. Location, building type, moisture level, type of mold, occupants, and a number of other variables significantly affect the remediation process.

An interesting case involving a mother and three sons from Orange County, California resulted in a payout of more than $900,000, after the mother claimed their mold-infested apartment made them sick. The mother claimed they noticed a musty odor when they moved into the apartment in 1995. Two years later, the four family members developed allergies and asthma, and the mother had lesions that took months to heal. After consulting a number of agencies, the owner of the apartment complex settled for roughly $900,000. What is disturbing about this case is that a family was awarded financial damages because mold was growing hidden behind their walls. It would have been difficult for the property manager or owner to find or prevent the continued mold growth because no complaints were recorded until 2 years after the move-in date. And why would one live in an apartment that has a musty odor for two years before taking action? Also, stated in the case was that the apartment dweller's attorney blames poor ventilation and modern building materials for the current mold problems. Is that just an attorney out to get fees?[20] A similar, follow-up case occurred in a Delaware apartment complex. Like the claim filed in Orange County, the ultimate award was reduced from $1,040,000 to $818,390 after issues of tenant negligence were confirmed. Is a 21 percent decrease in the award a sufficient adjustment for tenant negligence?

Industrial Hygienists also retain liability if the remediation protocol has been written incorrectly or inaccurately. Because of this liability factor, IHs have begun to adopt the NYC guidelines, thus reducing their liability. Initially, the IH written protocol was specific, but after realizing the potential liability they were creating, the protocols were written much more vaguely. Such vaguely written protocol allowed for more interpretation by the mold remediator, thus transferring the risk away from the IH.

Finally, homeowners, hotel owners, and commercial building owners retain the liability and assume the risk of mold growth in their structures if they are not able to transfer that risk to another party. The owner, property manager, or owner's representative may all be held accountable for mold growth if mold is excluded in their insurance policy or if the above referenced party(ies) delays in his response to a complaint or concern. Similar to the insurance company, if the property manager delays action on a work order request that ultimately results in mold growth, the owner can be held accountable for such action. Liability may result not only from guest or tenant complaints, but also from complaints made by employees. For instance, in March 2000, an Ohio hotel manager filed a claim against the hotel owner after the manager participated in the remediation of toxic mold at the hotel. The manager claimed his respiratory ailments developed after the remediation.[21]

Financial Implications

Over the last several years, the financial exposure attributable to possible health impacts of mold growth has grown to inconceivable and possibly unjustifiable levels. Although it is obvious that mold cases have significantly affected the insurance industry, the question that really needs to be answered is why, within the last several years, policyholders are seeking millions of dollars in mold claims. For example, Ed McMahon supposedly found mold in his Beverly Hills home after a burst pipe was poorly repaired. McMahon links the death of his dog, Muffin, to the mold and is suing his insurance company for $20 million. Would this have happened just 10 years ago? Are the health impacts indeed real, or is it that all the "hype" and "hysteria" have convinced everyone that mold is the key to millions?[22]

Another interesting and highly publicized case involved a newly developed tower, Kalia Tower, part of the Waikiki Hotel in Honolulu, Hawaii. The Tower, developed for approximately $95 million in 2001, was found to be infested with Eurotium species mold, which is a kind of Aspergillus. Eurotium infestation has caused the 453 guest rooms to be closed indefinitely, with remediation costs estimated at more than $10 million. Who would have guessed that a one-year-old, first class hotel would become the case study of the decade for mold? Although many hotel operators across the country, and especially across the Hawaiian Islands, are trying to prove that their facilities are mold-free, this is an uphill battle. George Benda, Chairman and CEO of the Chelsea Group Ltd., a consulting group that specializes in indoor air quality (IAQ), said: "Fact is, they can't prove it. … Mold is everywhere, but that's hard to explain (that) to a panicked public."[23]

In an even more substantial case relative to the original building cost, according to Robertson & Vick, Construction Defect Litigator, "a Florida county sued the architect and builders of its $13 million courthouse, claiming that construction defects led to a problem that sickened 15 workers. After a trial in 1996, a state court jury awarded the county $11.5 million, which, (after) adding in attorneys' fees and settlements with some of the defendants, exceeded the building's cost."[24] The basis of the suit was that the building did not allow for proper ventilation: the HVAC system allowed water damage from condensation, and humidity control was insufficient.[25]

Many mold-related public-entity cases are beginning to surface, and public entities are starting to become intimately involved with the effects of mold, because of lawsuits filed against those entities. A mold-related, publicly involved case involves a California County Judge, who filed a lawsuit against the County because of a faulty HVAC system, which allowed the growth of the mold. The judge alleged the mold problems caused physical ailments while the County claimed that the mold was only a problem to "sensitive" people. Subsequent to the County Judge's suit, about a hundred employees filed a separate suit against the County. Are these people "jumping on the band wagon?"

Remediation

As discussed, the key to controlling mold growth is moisture control. Therefore, remediation is premised on the removal or reduction of moisture. Although federal regulations do not control the means by which mold remediation is undertaken, the EPA offers several guidelines and suggestions for mold remediation. Many jurisdictions have adopted the guidelines set-forth by the New York City Department of Health and Mental Hygiene for mold remediation protocol as these guidelines have played an influential role in courts' decisions with insurance and other mold related claims. Although the specifics of the remediation process are beyond the scope of this article, the highlights will be discussed below

The guidelines adopted by New York City state that controlling relative humidity at levels 60 percent or lower will significantly inhibit mold growth.[26] The process of remediation varies based on the size of contamination. Regardless of the size, which is determined by professional judgment, the New York City guidelines state that the objective of remediation, "is to remove or clean contaminated materials in a way that prevents the emission of fungi and dust contaminated with fungi from leaving a work area and entering an occupied or non-abatement area, while protecting the health of workers performing the abatement."[27]

To understand mold remediation processes, building materials can be categorized into three groups, including: non-porous (e.g. metals, glass, and hard plastics), semi-porous (e.g. wood and concrete), and porous (e.g. sofas and drywall). Most non-porous and semi-porous water damaged materials can be cleaned, dried, and returned to their prior state. On the other hand, porous materials are difficult to salvage because the mold spores can grow deep into the material. Contamination is classified into five levels and described by the NYC Department of Health & Mental Hygiene as shown below. One must keep in mind that

these are guidelines, and not laws, thus the mold remediator should use professional judgment to adopt a similarly effective method satisfying the objective stated by New York City guidelines.

Level I: **Small Isolated Areas (10 SF or less)**[28]

- Remediation can be conducted by regular building maintenance staff. Such persons should receive training on proper clean-up methods, personal protection, and potential health hazards. This training can be performed as part of a program to comply with the requirements of the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- Respiratory protection (i.e. N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.
- Containment of the work area is not necessary. Dust suppression methods, such as misting, not soaking, surfaces prior to remediation, are recommended.

Level II: **Mid-Sized Isolated Areas (10 to 30 SF)**

- Highlight 1 and 2 in Level I are applicable to Level II.
- The work area should be covered with a plastic sheet(s) and sealed with tape before remediation, to contain dust/debris.
- Contaminated materials that cannot be cleaned should be removed from the building in sealed plastic bags. There are no special requirements for the disposal of moldy materials.

Level III: **Large Isolated Areas (30 to 100 SF)**

- Personnel trained in the handling of hazardous materials and equipped with respiratory protection, (i.e. N95 disposable respirator), in accordance with the OSHA respiratory protection standard (29 CFR 1910.134), is recommended. Gloves and eye protection should be worn.
- The work area and areas directly adjacent should be covered with a plastic sheet(s) and taped before remediation, to contain dust and debris.
- Seal ventilation ducts and grills in the work area and areas directly adjacent with plastic sheeting.

Level IV: **Extensive Contamination (>100 Contiguous SF)**

- A health and safety professional with experience performing microbial investigations should be consulted prior to remediation activities to provide oversight for the project. [Such professional is usually an industrial hygienist.]
- Personnel trained in the handling of hazardous materials equipped with: Full-face respirators with high efficiency particulate air (HEPA) cartridges; Disposable protective clothing covering both head and shoes; and gloves. Containment of the affected area: Complete isolation of work area from

occupied spaces using plastic sheeting sealed with duct tape, including ventilation ducts and grills, fixtures, and any other openings; the use of an exhaust fan with a HEPA filter to generate negative pressurization; and airlocks and a decontamination room.

- Air monitoring should be conducted prior to occupancy to determine if the area is fit to reoccupy.[29] The IH should confirm that the mold level, after remediation, is appropriate for human living.[30]

Level V: **Remediation of HVAC Systems**

- HVAC system remediation includes 5 levels of contamination as well. For a complete description of the recommended processes, please consult the New York City Department of Health & Mental Hygiene: Bureau of Environmental & Occupational Disease Epidemiology.

How do the Numbers Add up?

Cost estimates in Table 1 are representative of the costs involved with mold remediation. The following costs have been provided by a well-known, national fire and water damage restoration company, which has done a significant amount of work in mold remediation over the last several years.

Table 1: Mold Remediation Cost Estimates

Object	Service	UOM	Price
Air Duct	Subcontract Services	N/A	$15,000.00
Project/Site	Supervisor	HRS	$48.50
Labor	Hourly Charges	HRS	$34.50
Negative Air	700 CC	DAY	$100.00
Walls/Floor	Clean & Disinfect	SF	$0.90
Containment	Set up & Take Down	HRS	$34.50
3 Stage Decon Chamber	Set up & Take Down	HRS	$37.50
Personal Protection	Full Garb-Employee	EA	$25.00

Mold remediation costs vary by job type, location, and a number of other factors; however, the costs presented are accurate within plus or minus 10 to 15 percent of the current market. These costs have been taken from a completed and paid job in the Jackson, Michigan area. The structure was a 3-story brick building, with a basement. The second and third floors were vacant at the time, while a restaurateur occupied the ground floor. Floorplates are approximately 6 thousand square feet. Including profit and overhead, the total mold remediation cost came in at approximately $90,000, and the chart includes a sample of the specific costs used to calculate the total project cost. Throughout remediation, the area that needs to be contained also needs to have a negative air pressure. Such pressure prevents contaminated air from flowing into adjacent areas. A machine capable of creating such negative pressure will be billed to insurance companies at approximately $100 per day. Throughout the remediation process, all surfaces need to be cleaned and disinfected. For

example, assuming the carpet has already been removed (an additional charge obviously exists for such service), to vacuum, clean, and disinfect the concrete floor, a company would charge $.90 per square foot. As discussed, containment will also be necessary on jobs that are assessed with extensive contamination. Such services have their own hourly costs, as shown above in tabular form. A 3-stage decontamination chamber is erected to limit the spread of the mold; employees will enter this chamber each time they enter and exit the containment. Lastly, full body personal protection equipment, known in the industry as PPE, can run more than $25 per suit, and employees may need to change suits 3 to 7 times per day to limit the spread of contamination.[31] These suits need to be replaced each time the employee comes out of the containment.

Conclusion

The presence of mold in buildings and its costly remediation has become a contentious and expensive issue over the last several years, and answers to "why?" are for the most part unjustifiable and incomplete. Mikolic states, "The mold situation is still an evolving, controversial topic; government agencies, both political and legal, are not spending the time or money to remedy the situation."[32] And until these issues are resolved, the situation will continue to worsen. This will cause contractors, insurance companies, and building owners unnecessary problems. These problems could be avoided with proper cooperation among public and private entities in an effort to educate all parties involved and to adopt and enforce appropriate standards and measures to effectively deal with the issue.

Sources

[2] Mold Remediation in Schools and Commercial Buildings, United States Environmental Protection Agency, March 2001
[3] http://www.moldremovalspecialist.com
[4] http://www.moldremovalspecialist.com
[5] http://www.moldremovalspecialist.com
[6] Quoted from Mold Remediation in Schools and Commercial Buildings, United States Environmental Protection Agency, March 2001
[7] http://www.construction.com/NewsCenter/Headlines/DCP/20030106m.asp
[8] http://www.construction.com/NewsCenter/Headlines/DCP/20030106m.asp
[9] http://www.trane.com/commercial/issues/iaq/hvacbas.asp
[10] http://www.trane.com/commercial/issues/iaq/hvacbas.asp
[11] http://www.nsdcar.com/hot_topics/NARMoldFAQ.htm
[12] http://www.buildings.com/Articles/detail.asp?articleID=1307
[13] Response of Gerald M. Howard, CEO/EVP, National Association of Home Builders
[14] Response of Gerald M. Howard, CEO/EVP, National Association of Home Builders
[15] International Union of Operating Engineers, Indoor Air Quality Testimony, U.S. House Financial Services Committee, July 18, 2002
[16] William C. Mikolic, Franchisee of Servpro
[17] http://financialservices.house.gov/media/pdf/071802ti.pdf
[18] Policyholders of America, Melinda Ballard, President
[19] State of The Air Conditioning Contractors of America; Mold: A Growing Problem, July 18, 2002, Jim Hussey, Chairman
[20] http://www.mold-help.org/submenus/mold_and_sick_buildings/900.htm
[21] http://www.facworld.com/FacWorld.nsf/doc/Polltoxmo2/$file/HTMold2.pdf
[22] http://www.mold-help.org/submenus/moldnews/mould.htm
[23] Indoor Environment Connections, October 2002, Page 3
[24] http://rvclaw com/lawcom6-4-01.asp
[25] http://www.bickerstaff.com/articles/akers200111.pdf
[26] http://nyc.gov/html/doh/html/epi/moldrpt1.html#remed
[27] http://nyc.gov/html/doh/html/epi/moldrpt1.html#remed
[28] http://www.ci.nyc.ny.us/html/doh/html/epi/moldrpt1.html
[29] http://nyc.gov/html/doh/html/epi/moldrpt1.html#remed
[30] William C. Mikolic, Franchisee of Servpro
[31] Servpro of E. Jackson/SE Ingham Counties and William C. Mikolic, Franchisee
[32] William C. Mikolic, Franchisee of Servpro

- NOTES -