THE BOARD OF SUPERVISORS OF THE COUNTY OF STANISLAUS
ACTION AGENDA SUMMARY

DEPT: CHIEF EXECUTIVE OFFICE — BOARD AGENDA # *B-5

Urgent ____ Routine X — AGENDA DATE June 12, 2001

CEO Concurs with Recommendation YES pht NO ____ (Information Attached) — 4/5 Vote Required YES ✓ NO ____

SUBJECT: APPROVAL OF RECOMMENDATIONS TO PROCEED WITH THE EMERGENCY REPAIR OF WATER DAMAGE AT THE FORMER MODESTO CITY HALL BUILDING, 801 11TH STREET, MODESTO

STAFF RECOMMENDATIONS:

1. RATIFY AND AUTHORIZE THE CHIEF EXECUTIVE OFFICER TO PROCEED WITH ABATEMENT AND REPAIR OF THE PUBLIC FACILITY DIRECTLY RELATED TO THE EMERGENCY SITUATION.
2. DELEGATE THE AUTHORITY TO THE CHIEF EXECUTIVE OFFICER TO PROCURE THE NECESSARY EQUIPMENT, SERVICES, AND SUPPLIES FOR THE ABATEMENT AND REPAIR WITHOUT GIVING NOTICE FOR BIDS.
3. MAKE A FINDING BASED ON SUBSTANTIAL EVIDENCE THAT THE EMERGENCY WILL NOT PERMIT THE DELAY RESULTING FROM COMPETITIVE SOLICITATION FOR BIDS, AND THAT THE ACTION IS NECESSARY TO RESPOND TO THE EMERGENCY.

(Continued on Page 2)

FISCAL IMPACT: At this time, the total cost of abatement is estimated to be in the order of magnitude of $125,000. The County's General Liability Insurance will pay all of the abatement costs except for the $10,000 deductible, which will be paid by the General Liability Self-insurance Fund (5051).

BOARD ACTION AS FOLLOWS:

No. 2001-422

On motion of Supervisor Caruso , **Seconded by Supervisor** Simon
and approved by the following vote,
Ayes: Supervisors: Mayfield, Blom, Simon, Caruso, and Chair Paul
Noes: Supervisors: None
Excused or Absent: Supervisors: None
Abstaining: Supervisor: None

1) X **Approved as recommended**
2) ____ **Denied**
3) ____ **Approved as amended**

Motion:

Christine Ferraro

ATTEST: CHRISTINE FERRARO TALLMAN, Clerk **By: Deputy** **File No.**

1010-06

STAFF RECOMMEN-DATIONS: (CON'T)

4. AUTHORIZE THE CHIEF EXECUTIVE OFFICER TO INFORM THE BOARD OF SUPERVISORS THE STATUS OF THE EMERGENCY ACTION AND THE BOARD TO VOTE BY 4/5 AT THE NEXT BOARD MEETING AND EVERY 14 DAYS THEREAFTER UNTIL THE ACTION IS TERMINATED.

DISCUSSION:

On May 22, 2001, it was discovered that a water pipe had broken on the third floor of the building. The water pipe broke sometime between May 21 and 22, 2001. Approximately 3,500 gallons of water had flooded the building before it was discovered and the pipe repaired. The combination of the water, the age and type of building materials, and the temperature within the building provided excellent conditions for the growth of mold. Mold can cause serious health effects in people when they are exposed to it. If immediate remedial action were not taken by removing all wet building materials and completely drying the building, mold would grow and render the building unfit for occupation.

In an effort to impede the growth of mold, the standing water was removed from the building. A Certified Industrial Hygienist reviewed the building and made recommendations. Dehumidification equipment and large fans were then employed in the building to remove moisture from the air and building components. A hazardous materials abatement company was asked to seal rooms with falling ceilings, which contain asbestos material. An abatement contractor has started removing the wet carpet and tiles. The initial expenses are approximately $50,000, which is part of the rough estimated total cost of $125,000.

The Certified Industrial Hygienist recommendations include the removal of the temporary partition walls, removal of the water damaged ceiling tile, exposure and removal of suspect water damaged pipe lagging and ceiling assemblies, removal of tile carpeting and associated mastic, and drying the electrical race way below the floor.

These items are available from the Clerk of the Board for your reference:

1. Copy of Recommendations from the Certified Industrial Hygienist;
2. EPA Mold Resources;
3. Article from EPA web site regarding mold damage;
4. Letter from Industrial Hygienist concerning the immediate need to remove mold & fungus.

POLICY ISSUE: This action supports the Board's stated priorities of a safe and healthy community, community leadership, and community service delivery.

STAFFING IMPACT: There is no impact on staffing for Fiscal Year 2000-2001 budget.

RGA
ENVIRONMENTAL INC
4101 Doyle Street
Emeryville, CA 94608
Tel: 510 547-7771
Fax: 510 547-7771

June 1, 2001
STAN 6586

Andy Casazza
Sr. Management Consultant
Stanislaus County CEO Office
1010 10th Street
Modesto, CA 95354

RE: Water Damage City Hall – Preliminary Assessment

This letter will summarize preliminary testing completed by RGA at the captioned site on 5/29/01 and currently in progress. The purpose of the work was to evaluate the extent and potential for water induced mold growth on floors 3 through the basement. Andy Casazza of Stanislaus County provided assistance and answered questions during the survey.

Based upon information provided by Mr. Casazza, a visual assessment made by the Robert Gils and moisture measurements, the following conceptual recommendations are made for lessening of mold / fungus impact. RGA is in the process of identifying damaged material in the respective categories below.

Recommendations

Walls:
It appears that the majority of the temporary partition walls saturated. Some also show evidence of bulging. The partition walls are covered with a glued on vinyl wall covering which complicates drying and renders the walls subject to mold infestation. Remove partition walls.

RGA is in the process of evaluating existing (E) perimeter and partition walls and wallboard conditions. RGA expects that roughly 25 – 50% of the wallboard assembles in the affected area will require removal to avoid mold infestations.

Ceilings:
There are water-damaged ceilings throughout the building. Some of the acoustical tiles have delaminated from the underlying substrate or have fallen from their ceiling grid. Depending upon the types of ceiling systems it may not be possible to remove or replace assembles without collapsing the entire ceiling. - Remove water damaged ceiling tiles and associated water-damaged assemblies as appropriate.

There is asbestos and non-asbestos pipe lagging visible above ceilings. Some of the visible pipe lagging has delaminated or is water saturated. The extent of damage cannot be assessed without exposing the ceiling space. Expose and remove suspect water damaged pipe lagging above existing ceiling assembles.

Floors:

Tile under existing carpeting is delaminating. Remove tile carpeting and associated mastic.

There is water accumulated within electrical / cabling raceways within the building. Dry raceways.

Should you have further questions, please contact me.

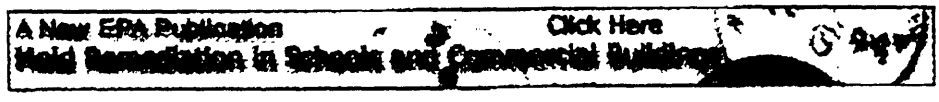
Robert E. Gils, CIH #1151

EPA United States Environmental Protection Agency

MOLD RESOURCES

Introduction to Molds

Molds produce tiny spores to reproduce. Mold spores waft through the indoor and outdoor air continually. When mold spores land on a damp spot indoors, they may begin growing and digesting whatever they are growing on in order to survive. There are molds that can grow on wood, paper, carpet, and foods. When excessive moisture or water accumulates indoors, mold growth will often occur, particularly if the moisture problem remains undiscovered or un-addressed. There is no practical way to eliminate all mold and mold spores in the indoor environment; the way to control indoor mold growth is to control moisture.



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Basic Mold Cleanup

The key to mold control is moisture control. It is important to dry water damaged areas and items within 24-48 hours to prevent mold growth. If mold is a problem in your home, clean the mold and get rid of the excess water or moisture. Fix leaky plumbing or other sources of water. Wash mold off hard surfaces with detergent and water, and dry completely. Absorbent materials (such as ceiling tiles & carpet) that become moldy may have to be replaced.

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Ten Things You Should Know About Mold

1. Potential health effects and symptoms associated with mold exposures include allergic reactions, asthma, and other respiratory complaints.
2. There is no practical way to eliminate all mold and mold spores in the indoor environment; the way to control indoor mold growth is to control moisture.
3. If mold is a problem in your home or school, you must clean up the mold and eliminate sources of moisture.

4. Fix the source of the water problem or leak to prevent mold growth.
5. Reduce indoor humidity (to 30-60%) to decrease mold growth by: venting bathrooms, dryers, and other moisture-generating sources to the outside; using air conditioners and de-humidifiers; increasing ventilation; and using exhaust fans whenever cooking, dishwashing, and cleaning.
6. Clean and dry any damp or wet building materials and furnishings within 24-48 hours to prevent mold growth.
7. Clean mold off hard surfaces with water and detergent, and dry completely. Absorbent materials such as ceiling tiles, that are moldy, may need to be replaced.
8. Prevent condensation: Reduce the potential for condensation on cold surfaces (i.e., windows, piping, exterior walls, roof, or floors) by adding insulation.
9. In areas where there is a perpetual moisture problem, do not install carpeting (i.e., by drinking fountains, by classroom sinks, or on concrete floors with leaks or frequent condensation).
10. Molds can be found almost anywhere; they can grow on virtually any substance, providing moisture is present. There are molds that can grow on wood, paper, carpet, and foods.

If you have IAQ and mold issues in your school, you should get a copy of the *IAQ Tools for Schools* Kit.

Mold-Related Publications and Resources

For Questions on:

Asthma and Mold
Floods/Flooding
Health and Mold
Homes and Mold
Indoor Air Regulations and Mold
Large Buildings and Mold
Schools and Mold and Indoor Air Quality

Other Mold-Related Resources

A new EPA publication, ***Mold Remediation in Schools and Commercial Buildings*** (EPA 402-K-01-001, March 2001), is available via this web site as both an HTML file and as an Adobe Acrobat PDF file (5MB file size). The printed version should be available sometime in August 2001.

Asthma and Mold - Molds can trigger asthma episodes in sensitive individuals with asthma. People with asthma should avoid contact with or exposure to molds.

Asthma web site
Asthma Brochure
Mold page from Asthma web site

Allergy & Asthma Network/Mothers of Asthmatics (AAN/MA): (800) 878-4403;
http://www.aanma.org EXIT EPA
American Academy of Allergy, Asthma & Immunology (AAAAI):
http://www.aaaai.org EXIT EPA
American Lung Association: 1-800-LUNG-USA (1-800-586-4872);

http://www.lungusa.org EXIT EPA
Asthma & Allergy Foundation of America: (800) 7ASTHMA;
http://www.aafa.org EXIT EPA
Canada Mortgage and Housing Corporation (CMHC): http://www.cmhc-schl.gc.ca/cmhc.html EXIT EPA
National Institute of Allergy and Infectious Diseases: http://www.niaid.nih.gov EXIT EPA
National Jewish Medical and Research Center: (800) 222-LUNG (5864);
http://www.njc.org EXIT EPA

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Floods/Flooding - Mold growth may be a problem after flooding. EPA's Fact Sheet: Flood Cleanup: Avoiding Indoor Air Quality Problems - discusses steps to take when cleaning and repairing a home after flooding. Excess moisture in the home is cause for concern about indoor air quality primarily because it provides breeding conditions for microorganisms. This fact sheet provides tips to avoid creating indoor air quality problems during cleanup. U.S. EPA, EPA Document Number 402-F-93-005, August 1993.

Federal Emergency Management Agency (FEMA): (800) 480-2520;
http://www.fema.gov EXIT EPA mitigation website: http://www.fema.gov/mit EXIT EPA publications on floods, flood proofing, etc.

University of Minnesota, Department of Environmental Health & Safety - http://www.dehs.umn.edu/remanagi.html. EXIT EPA managing water infiltration into buildings.

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Health and Mold - Molds can trigger asthma episodes in sensitive individuals with asthma (See Asthma Section above); molds can also trigger allergies in sensitive individuals.

EPA's publication, *Indoor Air Pollution: An Introduction for Health Professionals*, assists health professionals (especially the primary care physician) in diagnosis of patient symptoms that could be related to an indoor air pollution problem. It addresses the health problems that may be caused by contaminants encountered daily in the home and office. Organized according to pollutant or pollutant groups such as environmental tobacco smoke, VOCs, biological pollutants, and sick building syndrome, this booklet lists key signs and symptoms from exposure to these pollutants, provides a diagnostic checklist and quick reference summary, and includes suggestions for remedial action. Also includes references for information contained in each section. This booklet was developed by the American Lung Association, the American Medical Association, the U.S. Consumer Product Safety Commission, and the EPA. EPA Document Reference Number 402-R-94-007, 1994.

Allergic Reactions - excerpted from Indoor Air Pollution: An Introduction for Health Professionals section on: Animal Dander, Molds, Dust Mites, Other Biologicals.

> A major concern associated with exposure to biological pollutants is allergic reactions, which range from rhinitis, nasal congestion, conjunctival inflammation, and urticaria to asthma. Notable

triggers for these diseases are allergens derived from house dust mites; other arthropods, including cockroaches; pets (cats, dogs, birds, rodents); molds; and protein-containing furnishings, including feathers, kapok, etc. In occupational settings, more unusual allergens (e.g., bacterial enzymes, algae) have caused asthma epidemics. Probably most proteins of non-human origin can cause asthma in a subset of any appropriately exposed population.

Stachybotrys or *Stachybotrys atra (chartarum)* and health effects

- Consult the Centers for Disease Control (CDC) website EXIT EPA
- CDC's National Center for Environmental Health (NCEH) EXIT EPA has a toll-free telephone number for information and FAXs, including a list of publications: NCEH Health Line 1-888-232-6789.
- NCEH factsheets, questions and answers on *Stachybotrys chartarum* and other molds EXIT EPA

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Homes and Molds

Biological Pollutants in Your Home - This document explains indoor biological pollution, health effects of biological pollutants, and how to control their growth and buildup. One third to one half of all structures have damp conditions that may encourage development of pollutants such as molds and bacteria, which can cause allergic reactions -- including asthma -- and spread infectious diseases. Describes corrective measures for achieving moisture control and cleanliness. This brochure was prepared by the American Lung Association and the U.S. Consumer Product Safety Commission. EPA Document Reference Number 402-F-90-102, January 1990.

Moisture control is the key to mold control, the Moisture Control Section from *Biological Pollutants in Your Home* follows:

Moisture Control

Water in your home can come from many sources. Water can enter your home by leaking or by seeping through basement floors. Showers or even cooking can add moisture to the air in your home. The amount of moisture that the air in your home can hold depends on the temperature of the air. As the temperature goes down, the air is able to hold less moisture. This is why, in cold weather, moisture condenses on cold surfaces (for example, drops of water form on the inside of a window). This moisture can encourage biological pollutants to grow.

There are many ways to control moisture in your home:

- Fix leaks and seepage. If water is entering the house from the outside, your options range from simple landscaping to extensive excavation and waterproofing. (The ground should slope away from the house.) Water in the basement can result from the lack of gutters or a water flow toward the house. Water leaks in pipes or around tubs and sinks can provide a place for biological pollutants to grow.

- Put a plastic cover over dirt in crawlspaces to prevent moisture from coming in from the ground. Be sure crawlspaces are well-ventilated.
- Use exhaust fans in bathrooms and kitchens to remove moisture to the outside (not into the attic). Vent your clothes dryer to the outside.
- Turn off certain appliances (such as humidifiers or kerosene heaters) if you notice moisture on windows and other surfaces.
- Use dehumidifiers and air conditioners, especially in hot, humid climates, to reduce moisture in the air, but be sure that the appliances themselves don't become sources of biological pollutants.
- Raise the temperature of cold surfaces where moisture condenses. Use insulation or storm windows. (A storm window installed on the inside works better than one installed on the outside.) Open doors between rooms (especially doors to closets which may be colder than the rooms) to increase circulation. Circulation carries heat to the cold surfaces. Increase air circulation by using fans and by moving furniture from wall corners to promote air and heat circulation. Be sure that your house has a source of fresh air and can expel excessive moisture from the home.
- Pay special attention to carpet on concrete floors. Carpet can absorb moisture and serve as a place for biological pollutants to grow. Use area rugs which can be taken up and washed often. In certain climates, if carpet is to be installed over a concrete floor, it may be necessary to use a vapor barrier (plastic sheeting) over the concrete and cover that with sub-flooring (insulation covered with plywood) to prevent a problem.
- Moisture problems and their solutions differ from one climate to another. The Northeast is cold and wet; the Southwest is hot and dry; the South is hot and wet; and the Western Mountain states are cold and dry. All of these regions can have moisture problems. For example, evaporative coolers used in the Southwest can encourage the growth of biological pollutants. In other hot regions, the use of air conditioners which cool the air too quickly may prevent the air conditioners from running long enough to remove excess moisture from the air. The types of construction and weatherization for the different climates can lead to different problems and solutions.

Should You Have the Air Ducts in Your Home Cleaned? - excerpt on duct cleaning and mold follows, please review the entire document for additional information on duct cleaning and mold.

You should consider having the air ducts in your home cleaned if:

There is substantial visible mold growth inside hard surface (e.g., sheet metal) ducts or on other components of your heating and cooling system. There are several important points to understand concerning mold detection in heating and cooling systems:

- Many sections of your heating and cooling system may not be accessible for a visible inspection, so ask the service provider to show you any mold they say exists.
- You should be aware that although a substance may look like mold, a positive determination of whether it is mold or not can be made only by an expert and may require laboratory analysis for final confirmation. For about $50, some microbiology laboratories can tell you whether a sample sent to them on a clear strip of sticky household tape is mold or simply a substance that resembles it.

- If you have insulated air ducts and the insulation gets wet or moldy it cannot be effectively cleaned and should be removed and replaced.
- If the conditions causing the mold growth in the first place are not corrected, mold growth will recur.

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Indoor Air Regulations and Mold

Standards or Threshold Limit Values (TLVs) for airborne concentrations of mold, or mold spores, have not been set. Currently, there are no EPA regulations or standards for airborne mold contaminants.

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Large Buildings and Mold

EPA has a number of resources available, you can start with "Building Air Quality: A Guide for Building Owners and Facility Managers" and the "Building Air Quality Action Plan"

Excerpt from the *Building Air Quality: A Guide for Building Owners and Facility Managers*, Appendix C - Moisture, Mold and Mildew:

> How to Identify the Cause of a Mold and Mildew Problem.
>
> Mold and mildew are commonly found on the exterior wall surfaces of corner rooms in heating climate locations. An exposed corner room is likely to be significantly colder than adjoining rooms, so that it has a higher relative humidity (RH) than other rooms at the same water vapor pressure. If mold and mildew growth are found in a corner room, then relative humidity next to the room surfaces is above 70%. However, is the RH above 70% at the surfaces because the room is too cold or because there is too much moisture present (high water vapor pressure)?
>
> The amount of moisture in the room can be estimated by measuring both temperature and RH at the same location and at the same time. Suppose there are two cases. In the first case, assume that the RH is 30% and the temperature is 70°F in the middle of the room. The low RH at that temperature indicates that the water vapor pressure (or absolute humidity) is low. The high surface RH is probably due to room surfaces that are "too cold." Temperature is the dominating factor, and control strategies should involve increasing the temperature at cold room surfaces.
>
> In the second case, assume that the RH is 50% and the temperature is 70°F in the middle of the room. The higher RH at that temperature indicates that the water vapor pressure is high and there is a relatively large amount of moisture in the air. The high surface RH is probably due to air that is "too moist." Humidity is the dominating factor, and control strategies should involve decreasing the moisture content of the indoor air.

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Schools and Mold and Indoor Air Quality

The Agency's premier resource on this issue is the *Indoor Air Quality Tools for Schools* kit. Our schools-related resources on the web start at: http://www.epa.gov/iaq/schools.

The asthma companion piece for the *IAQ Tools for Schools* kit, titled *Managing Asthma in the School Environment* (http://www.epa.gov/iaq/schools/asthma) has been recently published. This publication has a section entitled *Clean Up Mold and Moisture Control* at: http://www.epa.gov/iaq/schools/asthma/eat-cumcm.htm

Excerpt from *IAQ Tools for Schools* kit companion piece, *Managing Asthma in the School Environment*:

Common Moisture Sources Found in Schools

Moisture problems in school buildings can be caused by a variety of conditions, including roof and plumbing leaks, condensation, and excess humidity. Some moisture problems in schools have been linked to changes in building construction practices during the past twenty to thirty years. These changes have resulted in more tightly sealed buildings that may not allow moisture to escape easily. Moisture problems in schools are also associated with delayed maintenance or insufficient maintenance, due to budget and other constraints. Temporary structures in schools, such as trailers and portable classrooms, have frequently been associated with moisture and mold problems.

Suggestions for Reducing Mold Growth In Schools

Reduce Indoor Humidity:

- Vent showers and other moisture-generating sources to the outside.
- Control humidity levels and dampness by using air conditioners and de-humidifiers.
- Provide adequate ventilation to maintain indoor humidity levels between 30-60%.
- Use exhaust fans whenever cooking, dishwashing, and cleaning in food service areas.

Inspect the building for signs of mold, moisture, leaks, or spills:

- Check for moldy odors.
- Look for water stains or discoloration on the ceiling, walls, floors, and window sills.
- Look around and under sinks for standing water, water stains, or mold.
- Inspect bathrooms for standing water, water stains, or mold.
- Do not let water stand in air conditioning or refrigerator drip pans.

Respond promptly when you see signs of moisture and/or mold, or when leaks or spills occur:

- Clean and dry any damp or wet building materials and furnishings within 24-48 hours of occurrence to prevent mold growth.
- Fix the source of the water problem or leak to prevent mold growth.
- Clean mold off hard surfaces with water and detergent, and dry completely.

- Absorbent materials such as ceiling tiles, that are moldy, may need to be replaced.
- Check the mechanical room and roof for unsanitary conditions, leaks, or spills.

Prevent moisture condensation:

- Reduce the potential for condensation on cold surfaces (i.e., windows, piping, exterior walls, roof, or floors) by adding insulation.

Floor and carpet cleaning:

- Remove spots and stains immediately, using the flooring manufacturer's recommended techniques.
- Use care to prevent excess moisture or cleaning residue accumulation and ensure that cleaned areas are dried quickly.
- In areas where there is a perpetual moisture problem, do not install carpeting (i.e., by drinking fountains, by classroom sinks, or on concrete floors with leaks or frequent condensation).

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Other Resources

American Conference of Governmental Industrial Hygienists, Inc. (ACGIH): (513) 742-2020; http://ww.acgih.org EXIT EPA Occupational and environmental health and safety information, legal issues, publications, including: Bioaerosols: Assessment and Control, ed. Janet Macher. 1999, a key reference on bioaerosols for professionals.

Health Canada, Health Protection Branch, Laboratory Centre for Disease Control, Office of Biosafety: http://www.hc-sc.gc.ca/main/lcdc/web/biosafty/msds/index.html EXIT EPA Material Safety Data Sheets for Infectious Microorganisms, including Aspergillus and other molds and airborne biologicals.

New York City Department of Health, Bureau of Environmental & Occupational Disease Epidemiology, "Guidelines on Assessment and Remediation of Fungi in Indoor Environments," section 3 - Remediation. EXIT EPA

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Claims
COVERING THE BUSINESS OF LOSS

Wringing Out Extra Costs From Water Damage Claims

By Mickey Lee

The tornadoes came and left, leaving behind hundreds of homes, schools and businesses damaged in a Southern state. Among the damaged buildings was a partially-occupied professional center that suffered damage to its roof and a couple of windows, allowing considerable water to enter and flood nearly half of the two-story structure.

Within 24 hours of the loss, the building was inspected and a plan for drying it out was presented to the owners. The insurance adjuster gave his approval for work to begin. However, the owners began thinking this may be an opportunity to do some upgrading of the facility that would make it more marketable. So, after an initial extraction of the water, temporary boarding up of the windows and relocation of the existing tenants into the unaffected areas, the damaged portion of the building was cordoned off while plans were formed.

Two months later, a contractor was called in to begin work on the planned upgrades. Once work began, though, it was evident that considerably more restoration work would have to be done than first anticipated. Most of the drywall and insulation would have to be replaced due to mold growth. All of the ceiling tiles were sagging from being in the high-humidity environment. Much of the cabinetry and millwork would have to be replaced due to swelling and delamination. Finally, the entire building's HVAC system would have to be cleaned due to microbial contamination.

All of this additional damage could probably have been prevented

with well-applied restorative drying techniques.

So the question is: What can be done to reduce the impact of a water damage event on your policyholder's business? There are three important principles to keep in mind:

- Timely action - to reduce the initial damage;
- Triage - to organize the most efficient recovery; and
- Targeted results - to dry sufficiently and limit recovery costs.

Timely action

It is essential to remember that damage resulting from water is progressive. The longer the water flows or wet conditions exist, the more is absorbed and the greater is the recovery problem. Merely stopping the source of the incoming water does not stop further water damage, though it is an obvious and critical first step.

Water damage usually occurs in the following five stages:

Stage 1: The free-flow of water by gravity. Gravity will level out the available water and cause it to find cracks in the floor, plumbing penetrations and many other openings. This affects the floors below as well as other adjacent spaces. Quick action at earlier stages of water damage will reduce the costs and resulting cleanup. On the other hand, delaying action increases both exponentially.

Stage 2: The wicking of moisture into materials that are in direct contact with water. Damage continues to increase as long as free-water touches gypsum board, wood floors, furniture and documents due to the tendency of materials to draw in moisture through capillary action. This damage is mitigated by quick and thorough water-extraction, as it will remove the free-water and stop the wicking. Effective action at this stage will drastically reduce the time and effort to dry out the wet building materials.

Stage 3: High humidity damage. This occurs when the moisture on and in the wet materials begins to evaporate, saturating the surrounding air. Previously unaffected materials now take on moisture. Early signs of high humidity damage include condensation forming on walls, ceiling tiles sagging from high moisture content and paper stock taking on moisture to the point it cannot be used for copying.

This damage is mitigated by controlling the relative humidity inside the building through the use of high-capacity dehumidifiers. Quick action at this stage will keep the

moisture content of the building material and contents below the threshold at which they will support microbial growth.

Stage 4: Active microbial growth. This begins when materials have taken on sufficient moisture to be able to support mold and mildew. The threshold for most cellulose-based material (i.e., wood, documents and the paper covering on gypsum board) is when their moisture content exceeds 20 to 25 percent of their weight.

Reducing this damage is accomplished by controlling three key conditions of the building's air: relative humidity, temperature and air circulation. Controlling these will create an environment that will rapidly dry the materials back to their pre-loss moisture content. Effective action at this point will generally confine the damage to the area that was directly affected by the water damage event.

Stage 5: The spread of microbials to other, originally unaffected areas of the building. The spread of microbials (i.e., mold, mildew, odors and other pathogens) may eventually occur due to unchecked microbial growth in the affected area, the movement of people throughout the building, air circulation systems and/or elevator movement from floor-to-floor. If this stage of water damage occurs, a comprehensive plan must be put together involving various indoor air quality professionals and contractors.

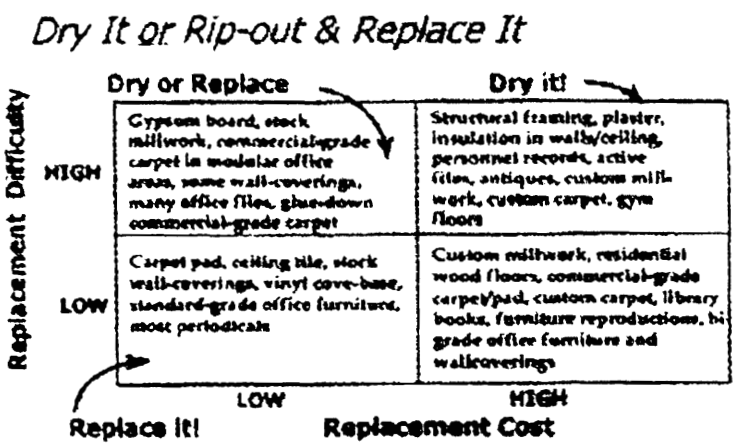
Quick and effective action at the earliest possible stage will reduce interruption to the business, reduce overall restoration costs and increase the likelihood that irreplaceable items will still be usable. This type of needed action can be facilitated by: (1) qualifying a drying contractor prior to any loss, (2) communicating your agendas and plans with the contractor and (3) placing them into a written disaster recovery plan (DRP).

Triage

Triage is the classifying of needs in order to ensure the best use of resources, equipment and personnel. When it comes to the continuity of the business, the top priorities are personnel and business data. Those are obvious and are generally covered well in a DRP. What is often not covered, though, are recovery plans for the facility - the physical plant that houses data and personnel.

In advance of a disaster, your policyholders should prioritize the recovery of areas within your facility. Records should be reviewed for their potential importance after a disaster noting their location

and priority in the DRP. One goal should be to ensure that emergency personnel and contractors know the company's recovery priorities, so they are not pulled from critical needs to work on "squeaky wheels" that, in actuality, are of lower priority.



It is very important to involve a drying contractor after a water damage event. The contractor can help assess which items are worth restoration and which are better replaced. Damaged items that have lower costs associated with replacement and are easily obtained should be replaced rather than dried-out and restored. On the other hand, items that are difficult to replace or have a very high replacement cost validate the restoration effort.

Targeted results

How dry is dry enough? Your drying contractor will allow the building to "tell" him or her when it is dry enough and when to stop the drying process. Beware the drying company that tells you it can dry the building in five days, but cannot define how it will know when the building is dry. A knowledgeable contractor should also demonstrate a familiarity with moisture-measuring instruments, which he will use to test the affected materials for moisture content.

Your contractor should monitor the building in three different ways:

- By determining the pre-loss moisture contents of the gypsum board, wood floors and other building materials;
- By frequently monitoring the moisture in the building materials to track their drying progress; and
- By monitoring daily the conditions of the air inside the water-damaged areas, as well as the status of the building's HVAC system.

Following are three general principles that should be used by drying professionals to determine when the drying of a building is complete. These principles are a part of a drying standard that professional drying contractors should offer customers to define the

end result of their services.

Drying is generally considered sufficient when:

- The interior ambient conditions are at, or better than, normal room conditions (i.e., the building's HVAC will be able to maintain the proper ambient conditions.);
- The moisture on and in the building materials themselves will not support active microbial growth; and
- The building materials and contents will return to equilibrium with normal room conditions, by themselves, without further damage to them.

Calculating your AC/H

The first step in determining how much equipment is needed is to calculate the volume of the space that must be conditioned. It is always advantageous to restrict the drying effort only to the area affected. Doing so will limit equipment needed, thus reducing the cost of the job. However, with today's open office designs and existing HVAC systems, limiting the job to ideal circumstances may not always be possible.

A competent drying service will then determine how many times the air inside the building must be changed each hour for drying to proceed efficiently. This objective is called the air-change per hour rate or AC/H. Arriving at a targeted AC/H requires consideration of several factors:

1. *The density of room build-out* - It will be substantially more difficult to circulate dehumidified air throughout a space with many closed office areas than in one of the same size that is designed in an open style. To compensate for reduced circulation, and avoid constructing complicated delivery systems, a higher AC/H rate can be targeted.
2. *The materials affected* - Some materials are more difficult to dry than others. If the carpet is the only material affected, you can get by with fewer AC/H than if there are extensive drywall, insulation and hardwood floors involved. The more difficult the materials are to dry, the more aggressive the approach must be.
3. *The degree of wicking of water* - As long as water is touching drywall, it continues to wick through capillary action up the wall. It is not uncommon for water to wick two to three feet above the actual water level. Accordingly, a wall that is wet to a level of 36 inches will require a more aggressive approach than one wet to a height of six inches.
4. *The ambient condition in the building* - The final major factor considered in setting the targeted AC/H is the existing outside

weather conditions and the operability of the building's HVAC system. In some cases, the need for dehumidified air can be reduced if the outside air is substantially drier than the inside air. If so, the HVAC system can be used to deliver the drier outside air, while it helps to initially purge the building of built-up moisture. However, when outside air conditions are not favorable or if mold or mildew problems are suspected, this technique may make matters worse and contribute to a spread of mold spores.

Once drying professionals factor in these variables, they can develop the targeted AC/H. Typically, targets range from 1 to 4 AC/H. In recommending a system to achieve this AC/H, a contractor also considers whether the building has electrical power and how entrances and elevators ease or limit the use of certain equipment. With all logistical concerns reviewed, the contractor can make a decision on the specific mix of dehumidifiers and air-moving equipment to be used.

Not surprisingly, many of the same factors discussed above also affect the time needed to return building materials to their pre-loss moisture content. In addition, other factors can drying time. A common consideration is the finish on the affected walls. For example, gypsum board with vinyl wall-covering dries two to three times slower than gypsum board that is covered with a latex paint.

Generally, drying an average commercial office building will take five to seven days, while many heavy-commercial buildings will take seven to 10 days. The restoration of costly finishing materials, such as hardwoods, and the thorough drying of multiple layered walls, often require additional time.

By developing a few critical plans before a disaster occurs and then by working closely with a drying contractor, you and your policyholder can reduce the interruption to the insured business, limit costs to only what is necessary and reduce the potential for more serious problems later.

Mickey Lee is national technical services manager for Munters Moisture Control Services, based in Glendale Heights, Ill.

See Related Sidebar: Case Study: Double Trouble in Hawaiian High-Rises

RGA ENVIRONMENTAL, INC

4701 Doyle Street, Suite 14, Emeryville, California 94608
Fax: 510 547-1983 Tel:510 547-7771
Ken@rgaenv.com

FAX TRANSMITTAL SHEET

TO: **Mr. Rob Robinson**	FROM: **Kenneth Pilgrim**
COMPANY: **Stanislaus County**	DATE: **06/07/2001**
FAX NO: **209-525-4385**	TOTAL NO. OF PAGES FAXED: **4**
PHONE NO:	SENDER'S JOB REFERENCE NO:
RE: Water Damage at Modesto City Hall	CC:

☑ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY

Mr. Robinson,

Please find a letter with attachments for the referenced building.

Regards,

Kenneth Pilgrim

RECEIVED
JUN - 6 2001

Rob
Andy

RGA
ENVIRONMENTAL INC
4101 Doyle Street
Emeryville, CA 94608
Tel: 510 547-7771
Fax: 510 547-7771

June 6, 2001
STAN 6586

Mr. Rob Robinson
Deputy Chief Executive of Capital Projects - Management Consultant
Stanislaus County CEO Office
1010 10th Street
Modesto, CA 95354

RE: Modesto City Hall
Water Damage

Dear Mr. Robinson:

Details in this letter are supplemental to the findings outlined in our preliminary report dated June 1, 2001. A water leak on the third floor of the subject building has resulted in water saturation of floors three through the basement. The materials noted in the June 1, 2001 report were significantly saturated with water for approximately two to four days prior to discovery.

Cleanup or remediation of flood-damaged materials can be very effective if a material is dried within four days after the event[1]. It is RGA's understanding that the affected building materials listed in the June 1, 2001 have not been dried. Mold / fungal growth is logarithmic and saturated building materials are a good food source for mold / fungus. Growth will continue over time and increase the quantity and severity of the affected materials. The scope of any remediation work will likely be enlarged with time. It is RGA's opinion that it is the best interest of the county to respond to this incident as soon as possible.

If you have further questions or need any additional information, please contact me at 800-776-5696.

Regards,
RGA Environmental, Inc.

Robert E. Gils, CIH #1151

Attachments

[1] IICRC S500 Standard and Reference Guide for Professional Water Damage Restoration (Second Edition) See attached pages

IICRC S500

Standard and Reference Guide for Professional Water Damage Restoration

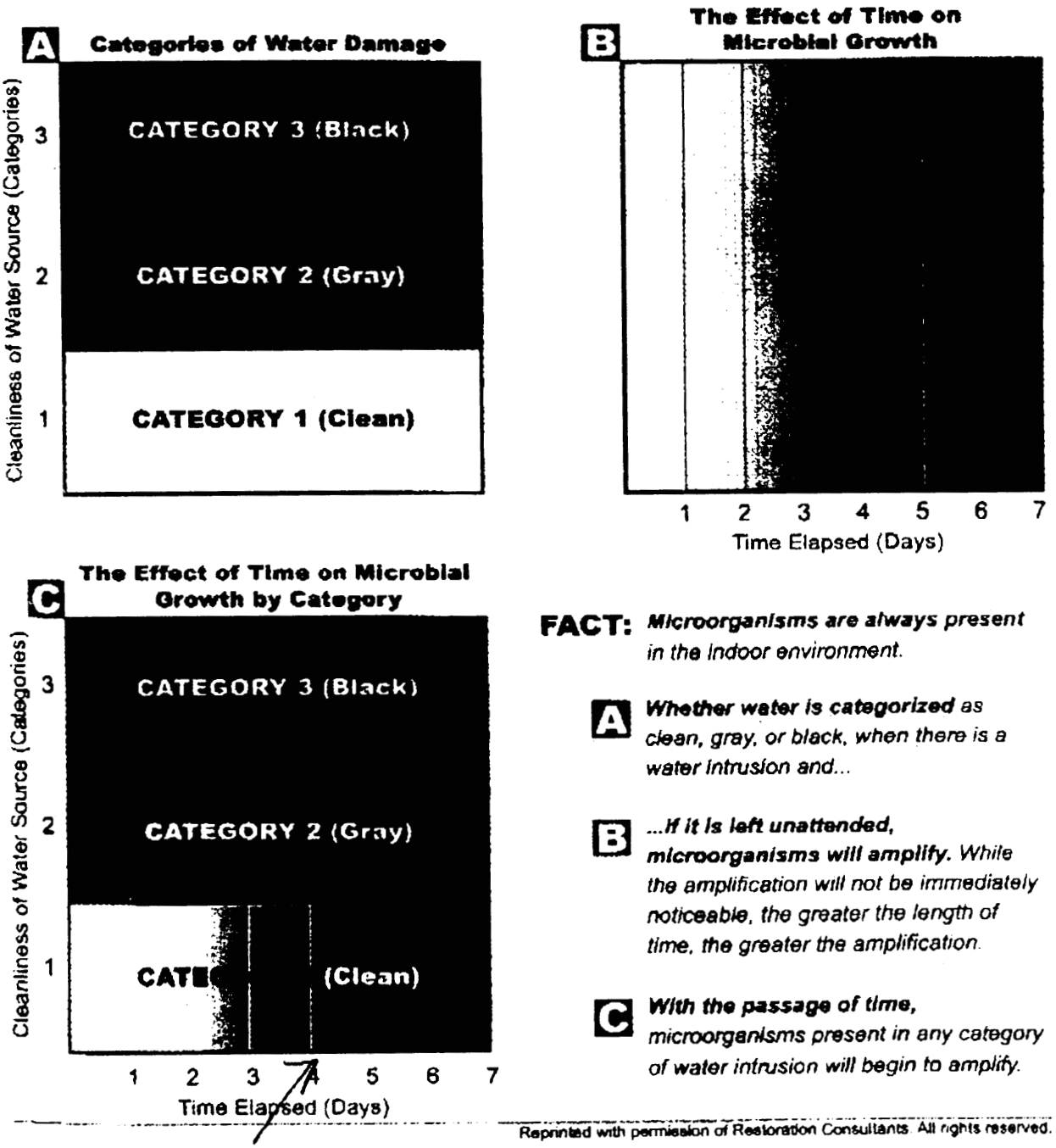
INSTITUTE of INSPECTION CLEANING and RESTORATION ® CERTIFICATION

Second Edition

Figure 1

(see 5.1, 5.2, 10, and 11.2.10)

TO PREVENT AMPLIFICATION OF MICROORGANISMS, IMMEDIATE RESPONSE IS NECESSARY FOR ALL CATEGORIES OF WATER INTRUSION.



FACT: *Microorganisms are always present in the indoor environment.*

A ***Whether water is categorized*** *as clean, gray, or black, when there is a water intrusion and...*

B ***...if it is left unattended, microorganisms will amplify.*** *While the amplification will not be immediately noticeable, the greater the length of time, the greater the amplification.*

C ***With the passage of time,*** *microorganisms present in any category of water intrusion will begin to amplify.*

Note