Mold Remediation Project

Written and produced by the Tony Mazzocchi Center for
Health, Safety and Environmental Education, a project of the
United Steelworkers - USW, the Communications Workers of America
and the Labor Institute

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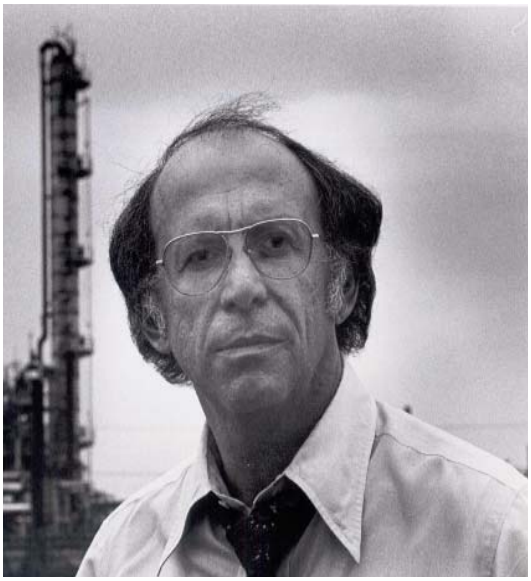
Tony Mazzocchi
(1926-2002)



Tony Mazzocchi is credited by many with founding the modern health and safety movement. As Vice-President and Secretary-Treasurer of the Oil, Chemical and Atomic Workers, he also helped to create OSHA and was the first to link worker safety and health to the environmental movement. The following passage from his biography, *The Man Who Hated Work and Loved Labor*, by Les Leopold, conveys some of his vision and passion for the labor movement:

> "Tony Mazzocchi conjured up a labor movement that didn't really exist, but just might. This movement would be militant and green. It wouldn't just fight to protect the workforce from toxics — it would eliminate toxics. It would lead the struggle to prevent global warming. It would give workers real control over the quality and pace of work and over corporate investment decisions. It would champion the fight against militarism and for justice and equality. It would demand life-enhancing social programs like free higher education and free health care for all. In short, it would make good on its potential to transform American capitalism into something more humane."

Tony Mazzocchi Center Anti-Harassment Policy

Steelworker members are entitled to a harassment-free environment at all union activities, events and meetings. This includes training and related programs coordinated by the USW's Tony Mazzocchi Center (TMC) and extends beyond USW members to all of our program participants.

There are two principles fundamental to the labor movement: Human rights and solidarity. Harassment strikes at the heart of both.

The TMC will not tolerate nor condone behavior that is likely to undermine the dignity or self-esteem of an individual, or which creates an intimidating, hostile or offensive environment. As Steelworkers, we must speak out against harassment and stand together to protect human rights.

Harassment is not a joke. It is an expression of perceived power by the harasser over another person, usually for reasons over which the victim has little or no control; such as a person's or group's sex, race, age, marital status, sexual orientation, disability, political or religious beliefs and/or place of national origin.

Harassment can be defined as any action (verbal, psychological or physical) on a single or repeated basis which humiliates, insults or degrades and is known, or ought reasonably to be known, to be unwelcome by the victim of the harassment.

Harassment can include but is not limited to: Unwanted comments, slurs, racist or sexist jokes, pictures or posters, bullying or intimidation, graffiti, physical contact of any kind, remarks about a person's appearance or personal life, unwelcome sexual advances or demands and suggestive looks or gestures.

The Tony Mazzocchi Center takes harassment complaints seriously. Complaints of harassment at TMC activities will be investigated and reported to the USW Health, Safety and Environment Department leadership for any necessary follow-up. A substantiated complaint will result in action by the TMC which could include the removal of the harasser from the event. A letter outlining the reasons for the removal will be sent to the local union.

> "We can't make people like each other. But we can, through concrete action, promote tolerance and mutual respect in our union."

Example of the Factsheet Reading Method for a Task Containing Seven Factsheets.

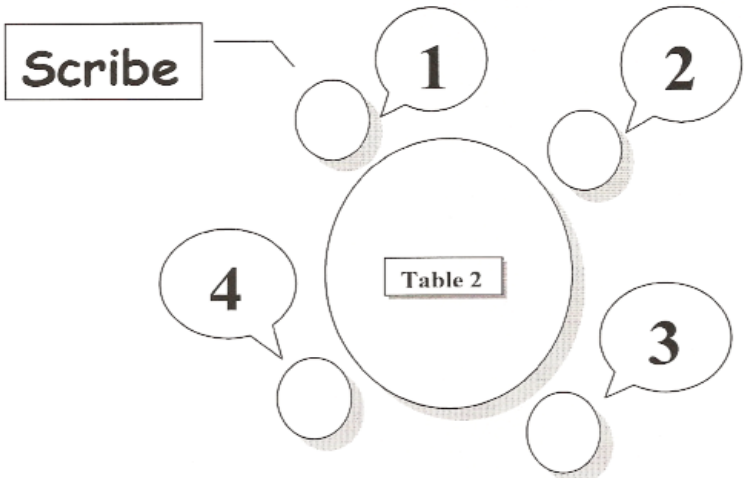
The Small Group Activity Method places workers at the center of the learning experience. It is designed to draw on two bodies of knowledge: The knowledge and experiences workers bring into the room and the factsheets contained in your workbooks.

Each of you will be assigned a small number of factsheets to read. You will then share this new information with your table. The idea is for each of you to describe your assigned factsheets to the others in your group.

Your trainer will assign your individual factsheets in the following way:

First, select a scribe for this task. Starting with the scribe and moving to his/her left, count out loud from 1 to 7. Keep going around the table until all numbers (factsheets) are distributed. For example, if there are four people at your table, the scribe will have self-assigned Factsheets 1 and 5; the person to their left will be responsible for Factsheets 2 and 6, etc. The numbers that you have assigned yourself correspond to Factsheets 1 through 7 on the following pages.

Once everyone has read their assigned factsheets individually, your scribe will go around the table and ask each of you to explain to the rest of your group what you have learned. No notes need to be taken during this discussion. The factsheets should be explained in the order they were assigned (1 through 7), as many times factsheets build on previous fact-sheets. Once this process is complete, your trainer will read the scenario and the task. In this way we all start at the same place and with the same information.



The method described above is used several times in this book. A note is used each time the method is to be used.

Tony Mazzocchi Center Proficiency Assessment

Mold Remediation Project

Complete this page BEFORE you begin your training.

Workbook Title: *Mold Remediation Project*

Workbook Version: Edition 3, Draft 1, December 2010

Today's date _ _ / _ _ / _ _ _ _
M M D D Y Y Y Y

As you complete the assessments at the end of each activity, please only mark one answer choice per question. Make your marks dark and clear when selecting your choice. See the following example:

O	●
No	Yes

Thank you.

Activity 1: The Politics of Mold

Purpose

To recognize the need to organize around mold as a serious public and occupational health issue.

This Activity has one task.

Task

Scenario:

Since the well-publicized World Trade Center (WTC) disaster and the cleanup, it's widely reported that the government put other considerations like business, commerce and politics above the health, safety and protection of cleanup workers and community residents.

Concerns about respiratory health, cancers and psychological issues for WTC workers and community residents were publicly scoffed at by the media, politicians and regulators who declared the WTC as "safe." Now there is widespread recognition of the "World Trade Center Cough."

There have been numerous reports of odd cancers in relatively young people who worked or live around the WTC disaster site. Mental health treatment has also been necessary for psychological issues surrounding involvement in the WTC event, rescue and recovery and cleanup efforts.

It is easy to see how mold is an evolving public health crisis ready to explode upon the public.

Mold was clearly being treated in the same manner in the Gulf Coast after Katrina as the hazards of the World Trade Center Disaster were treated.

Facilitator's Note

Use the Factsheet Reading Method for this Task, Factsheets 1 through 7.

The Factsheet Reading Method is described on page 1.

Factsheet 1: Symptoms of Heavy Mold Exposure After Flooding

There are many dangers associated with heavy mold exposure. These dangers include the following:

- Coughs that sometimes linger for weeks, burning eyes, stuffiness and runny nose are some of the symptoms caused by exposure to mold.
- Experience tells us that about a quarter of the people exposed to mold in this way will become sensitized to mold, which will result in respiratory symptoms any time they are exposed to mold in the future.
- A person who is heavily exposed to mold without protection for a significant period is also at risk of toxic effects and even possible fungal infection.

Source: *Worker Health and Safety Takes a Back Seat in the Gulf Coast*; NYCOSH UPDATE, *Health and Safety News*, November 28, 2005.

Factsheet 2: Mold Levels Were High in Gulf Coast Homes after Flooding

Mold is one hazard from which almost no one is adequately protected. A team of investigators from the Natural Resources Defense Council, which took indoor and outdoor air samples in New Orleans, found extremely high levels of airborne mold in every sample.

Samples taken indoors in houses that had been flooded all contained more than 650,000 mold spores per cubic meter. According to the National Allergy Bureau of the American Academy of Allergy and Immunology, anything above 50,000 spores is very high.

Source: *Worker Health and Safety Takes a Back Seat in the Gulf Coast*; NYCOSH UPDATE, *Health and Safety News*, November 28, 2005.

Factsheet 3: Where Will Help Come From?

Residents looked to State and Government Agencies for help, but some examples of the responses received after Katrina were:

- EPA said it had no authority over indoor air;
- FEMA officials said it is the responsibility of state and local government; and
- OSHA was invisible.

Source: Dr. Gina Solomon, NRDC Investigator; www.nrdc.org/health/effects/katrina/contents.asp.

Factsheet 4: Learn the Lessons of the World Trade Center

Workers and community folks are still suffering from their exposure to the toxic dust from the September 11, 2001, collapse of the twin towers.

Over 70,000 people have registered with the federal government complaining of respiratory and mental health problems. And these problems are getting worse.

The EPA commissioner told people the air was safe to breathe, but it was not. What toxins are now mixed in our soil?

Source: 9/11 Responders "Health to Be Resurveyed," *New York Times*, June 2, 2006.

Factsheet 5: Be Better than the WTC; Treat Workers Like Dirt

During the World Trade Center disaster, officials painted a green line in a circle around the WTC disaster area.

The rules were:

- Inside the green line, cleanup workers were subject to the regulations and "protection" of the Occupational Safety and Health Administration, OSHA.
- Outside of the green-line circle, people further from the effects of ground zero in the community, were subject to the regulations and protection of the Environmental Protection Agency, EPA.

Unfortunately for cleanup workers who were right in the disaster area, the OSHA regulations and protections enforced were much less protective than the EPA regulations were for the community. Essentially, the contaminated dirt was more measured, watched over and protectively regulated than the workers doing the cleanup work.

Mold measurements, hazard recognition and protections need to be equally as strong and as effective for workers through OSHA regulations as they are for the community through the EPA. These regulations should be the same in every possible way.

Source: "Use of Air Masks at Issue in Claims of 9/11 Illness," *The New York Times*, June 5, 2006.

Factsheet 6: Make the Right Connections

It is important that we all contact our elected officials and let them know that doing something about mold is important to us.

Some things that you should do are:

- Call;
- Write;
- Fax;
- Email; and
- Visit

Your city, parish or county, State and Federal elected officials and call for the investigation of the negative health effects of mold, rules and regulations about safe mold related work practices, cleanup and control and how injuries and/or illnesses related to mold can be recognized and treated.

Factsheet 7: There Is Strength in Numbers and Organization

Becoming a member of an organization is an important part of beginning the process of properly dealing with mold as an occupational and public health hazard.

In our experience doing training like this, there are many issues that people continue working on after the training, such as:

- Continue dialogue on environmental/community/labor issues;
- Ask to have more training for others;
- Decide to discuss how best to have mold and other local issues get the political and regulatory attention they deserve;
- Invite others to speak at and/or meet with their group or organization; and
- Join or affiliate with each others' organizations.

Task *(continued)*

In your small groups, pick someone to record and report to the larger group your table's response to the following questions.

Using your personal experiences and the factsheets you have read, do you agree or disagree that mold is a public and occupational health risk? (Circle one.)

Agree **Disagree**

List your reasons below.

_____

_____

_____

_____

_____

If you agree, what should be done about it?

_____

_____

_____

_____

_____

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Summary: The Politics of Mold

1. To know or recognize that health hazards can be the result of mold exposure.
2. The negative health experiences at the World Trade Center must not be repeated in other disasters.
3. We need an OSHA and EPA Standard for mold.
4. Be an activist; join an organization.
5. It is important to be politically active and to contact your elected officials.

Tony Mazzocchi Center Proficiency Assessment

Activity 1: The Politics of Mold

Learning Objectives:

1. **To recognize the need to organize around mold as a serious public and occupational health issue.** How much do you agree or disagree that the training met this learning objective?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

2. **To know or recognize that health hazards can be the result of mold exposure.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

3. **The negative health experiences at the World Trade Center must not be repeated in other disasters.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

4. **We need an OSHA and EPA Standard for mold**. How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

5. **We an activist; join an organization**. How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Activity 2: Mold and Its Dangers

Purposes

To understand the critical health effects from mold exposure.

To understand the importance of monitoring and sampling.

This Activity has two tasks.

Task 1

Scenario:

Jay, a senior citizen volunteer, is on his first assignment.

> "I don't understand why I have to wear all this protective gear just to go into a small house and clear it out," complained Jay.
>
> "It's just moldy walls. It's not like this can hurt us. They make cheese out of mold," continued Jay. "Besides, I saw an article before I left home that said we could just wash it with soap and water. Why aren't we doing that here? It would be a lot easier."

Facilitator's Note

Use the Factsheet Reading Method for Task 1, Factsheets 1 through 12.

Factsheet 1: What Is Mold?

Tiny organisms called mold are found in virtually every environment and can be detected indoors and outdoors, year round. Mold is a natural part of the environment and is usually not harmful. However, people can get sick when large amounts are present or when certain types of mold that are not usually present indoors start to grow.

Mold growth is most successful in warm and moist conditions. To live successfully, mold requires moisture and a food source — anything organic, including wood, dirt, carpeting or sheetrock.

Source: "Katrina and Rita Cleanup Workers Mold Factsheet," NYCOSH.

Factsheet 2: Mold vs. Viruses and Bacteria

Mold, viruses and bacteria are similar in several ways:

- All are microbial;
- All can grow in moist conditions; and
- All can be disease-causing agents.

Yet, it is important to distinguish the differences among the three:

- Each requires different ways of decontamination;
- Each reproduces differently; and
- Each infects and affects humans in different ways.

There are more studies and data on bacteria and viruses than mold.

Source: OAI, Inc. Environmental Health and Safety, *8-Hour Mold Awareness Training*.

Factsheet 3: Identifying Mold

Mold can often be identified by sight. Growth or discoloration on walls, ceilings and even plants are visible signs of mold. It feeds on both dead and decaying material (especially wood) or it can feed on living hosts. Mold can appear as slimy, fuzzy, wooly or textured patches of growth.

In some cases you **will not** see mold. It grows between walls and in other cool, moist places. Seeing a small patch on the wall does not mean that there is a small mold problem. There could be a large mold infestation behind the wall. Signs and precursors to mold include:

- Earthy or musty odor;
- Signs of chronic water leaks (AC units, leaking roof, plumbing leaks, etc.);
- Wet or dirty insulation ducts;
- Damp or dirty carpet;
- Standing water near windows, doors or house ventilation systems;
- Slimy or foamy water in drip pans of air-handling or air conditioning units; and
- Over-watered indoor plants.

Sources: OSHA quick card 3263-09N-05; OAI, Inc. Environmental Health and Safety, *8-Hour Mold Awareness Training*, and New York Committee for Occupational Safety and Health, NYCOSH, http:// NYCOSH.org/workplace_ hazards/moldfacts.html.

Factsheet 4: Toxic Mold

Toxic health effects occur from high dose exposures, such as the exposures that may occur when workers or residents perform mold cleanup work without wearing proper respiratory protection.

Symptoms include:

- Sore throat;
- Flu-like aches and pains; and
- Severe fatigue.

There are over 1,000 species of mold in the U.S. Common molds include Cladosporium, Penicillium and Aspergillus. Stachybotrys chartarum, also known as Stachybotrys atra, is a mold that is associated with negative health effects in people, including cold-like symptoms and sinusitis.

Sources: Little Sisters of the Assumption Family Health Services, Inc., http://www.littlesistersfamily.org; Institute of Medicine of the National Academies 2004; and New York State United Teachers, Division of Field Services.

Factsheet 5: Mold in the Gulf Coast After Katrina and Rita

Cleanup workers and returning residents had to deal with a wide range of hazards. One of the main hazards was the exposure to mold, which was growing inside homes and buildings that had been underwater.

Mold is one hazard from which almost no one is adequately protected. Air samples in New Orleans after Katrina found extremely high levels of airborne mold in every sample. Anything more than 50,000 spores is classified as very high. Of the houses that had been flooded and then sampled indoors, all contained more than 650,000 mold spores per cubic meter.

Sources: NYCOSH update, "Worker Safety Takes a Back Seat in the Gulf Coast: Federal Agencies Offers advice that Is Either Useless or Wrong," *Health and Safety News*, November 28, 2005.

Factsheet 6: Monitoring and Sampling

Monitoring and sampling in the work area is done to determine:

- The presence of mold, fungi or similar microbes;
- The types of microbes present;
- If workers are being exposed; and
- The effectiveness of remediation.

There are no fully reliable commercial direct reading instruments (DRIs) to monitor mold spores and similar microbial organisms. They must be collected and analyzed at a laboratory that specializes in biological analysis.

Sampling for mold in most cases is unnecessary if visible mold growth is present.

Since no EPA or other federal limits have been set for mold or mold spores, sampling cannot be used to check a building's compliance with federal mold standards.

Surface sampling may be useful to determine if an area has been adequately cleaned or remediated.

Sampling for mold should be conducted by professionals who have specific experience in designing:

- Mold sampling protocols;
- Sampling methods; and
- Interpreting results.

Sample analysis should follow analytical methods recommended by the:

- American Industrial Hygiene Association (AIHA);
- The American Conference of Governmental Industrial Hygienists (ACGIH); or
- Other professional organizations.

Sources: http:/www.epa.gov/mold/moldresources.html, Laborers-ACG Education and Training Fund, *Microbial Remediation,* June 2003.

Factsheet 7: Visual Inspection

Once moisture becomes available, mold will grow on a variety of substances normally found indoors:

- Ventilation systems and building materials (such as gypsum wallboard and ceiling tiles) should be thoroughly inspected.
- The extents of any water damage and mold growth should be evaluated. This will be important in determining remediation techniques.
- Although mold growth may not be evident by visual inspection, an assessor with microbiological training will often confirm mold growth with tape samples. Tape pulls the sample off the surface and preserves it for analysis; although this method is not always successful.

An initial visual inspection is the most important step in identifying a possible contamination problem.

Sources: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003; and Eileen Storey MD, MPH, Kenneth H. Dangman MD, PhD, MPH, Paula Schenck MPH, Robert L. DeBernardo MD MPH, Chin S. Yang. PhD, Anne Bracker CIH, MPH, Michael J. Hodgson MD, MPH, *Guidance for Clinicians on the Recognition and Management of Health Effects Related to Mold Exposure and Moisture Indoors*, University of Connecticut Health Center, Division of Occupational and Environmental Medicine, September 30, 2004.

Factsheet 8: Bulk Sampling

Bulk sampling can be done if there is visible contamination. Dust samples that have settled on surfaces can provide information on airborne concentrations that have been deposited over time. The results will identify levels and dominant species, which help the assessor characterize the burden of mold from the particular source sampled.

Note: You should always wear proper Personal Protective Equipment (PPE) when doing bulk sampling because it involves disturbing contaminated material. This means there is the chance of exposure during the process.

Sources: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003; and Eileen Storey MD, MPH, Kenneth H. Dangman MD, PhD, MPH, Paula Schenck MPH, Robert L. DeBernardo MD MPH, Chin S. Yang. PhD, Anne Bracker CIH, MPH, Michael J. Hodgson MD, MPH, *Guidance for Clinicians on the Recognition and Management of Health Effects Related to Mold Exposure and Moisture Indoors*, University of Connecticut Health Center, Division of Occupational and Environmental Medicine, September 30, 2004.

Factsheet 9: Air Sampling

A qualitative assessment is often more valuable than air sampling to determine whether there is likely exposure to a mold problem. Reasons for this include:

- Colonies of mold isolated from sampled air do not identify an unhealthy environment.
- More important, the failure of mold colonies to develop from sampled air does not indicate a healthy environment.
- Air sampling is now being used less often on microbial remediation projects because it often leads to "false negatives."
- False negative results can lead to the conclusion that risks are lower than they actually are.
- Air sampling must be performed in conjunction with an initial visual inspection and surface sampling.
- If the building is ventilated with outdoor air, at least one outdoor air sample should be taken.

Sources: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003; and Eileen Storey MD, MPH, Kenneth H. Dangman MD, PhD, MPH, Paula Schenck MPH, Robert L. DeBernardo MD MPH, Chin S. Yang. PhD, Anne Bracker CIH, MPH, Michael J. Hodgson MD, MPH, *Guidance for Clinicians on the Recognition and Management of Health Effects Related to Mold Exposure and Moisture Indoors*, University of Connecticut Health Center, Division of Occupational and Environmental Medicine, September 30, 2004..

Factsheet 10: Collecting Air Samples

The reasons for collecting area air samples are to:

- Detect and quantify the presence of bioaerosols, such as mold and fungi;
- Identify bioaerosol releases;
- Assess human exposure to biological agents; and
- Monitor the effectiveness of control measures.

Airborne particles are captured in some type of sampling media where they can be analyzed in a lab using techniques such as high magnification. Collection must be done in a way that ensures survival of the organisms. The mold and fungi must remain biologically active during the lab analysis.

Liquid-filled impingers have been preferred as devices for collecting bioaerosols. Impingers use air that is drawn in at a high velocity into a liquid filled (usually water) flask through a glass nozzle or jet. The particles collide with a flat plate at the bottom of the flask, lose their velocity and are trapped in the liquid. Liquid-filled impingers offer the advantage of easy microbial analysis because portions of the collection liquid can be placed directly onto agar (a jelly like substance derived from algae), which is heated or incubated so that the samples will grow. The resulting colonies are counted and identified.

Sources: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003; and Eileen Storey MD, MPH, Kenneth H. Dangman MD, PhD, MPH, Paula Schenck MPH, Robert L. DeBernardo MD MPH, Chin S. Yang. PhD, Anne Bracker CIH, MPH, Michael J. Hodgson MD, MPH, *Guidance for Clinicians on the Recognition and Management of Health Effects Related to Mold Exposure and Moisture Indoors*, University of Connecticut Health Center, Division of Occupational and Environmental Medicine, September 30, 2004.

Factsheet 11: Interpretation of Air Sampling Data

An environmental assessor will review air data carefully to determine if there is mold growth or amplification and if species that might merit added concern are present. Methods for sampling have limitations; and the ecology of fungi and mold complicates sampling.

- Mold indoors should reflect the outside species and the movement of outside air into the indoor environment. Mold identified in air sampled indoors should be at lower concentrations and of similar types to molds identified in air sampled from the outside. If the concentration inside is higher, or the species different from the outside air, mold is suspected to be growing (amplifying) inside.
- A specific species (other than, perhaps, species that may reflect a particular outside type dominant in certain climates at certain times) should not dominate the mold in the indoor air. If other species occur as a significant percentage indoors and they do not correspond to outdoor relationships, an indoor source of the species is more probable.
- It is important to explore for indoor moisture and areas where the mold may be growing if certain toxigenic or highly allergenic molds are confirmed in the indoor air and are more dominant than in the outside samples. Remediation should not be based on air sampling alone, however, even if these certain species are present in the sampling result.
- Air sampling is limited and negative results do not prove the absence of mold exposure. Mold may be growing in carpets or on the wall and wallpapers, yet not be airborne at the time of sampling. Where there are other indications, such as moisture noted where it should not be, further investigation for hidden sources is recommended.

Source: Eileen Storey MD, MPH, Kenneth H. Dangman MD, PhD, MPH, Paula Schenck MPH, Robert L. DeBernardo MD MPH, Chin S. Yang. PhD, Anne Bracker CIH, MPH, Michael J. Hodgson MD, MPH, *Guidance for Clinicians on the Recognition and Management of Health Effects Related to Mold Exposure and Moisture Indoors*, University of Connecticut Health Center, Division of Occupational and Environmental Medicine, September 30, 2004.

Factsheet 12: Preventing Mold Growth

In order for mold to grow, five elements must be present:

1. Air;
2. Food source;
3. Surface for growth;
4. Warm temperature; and
5. Moisture.

To prevent mold from growing, identify and correct the moisture problem and make sure the area is well ventilated.

When cleaning be sure to:

- Discard mold-damaged materials in plastic bags;
- Remove or replace water-damaged carpets and upholstery;
- Disinfect cleaned surfaces;
- Use respiratory protection; and
- Use hand and eye protection.

Additional steps to prevent recurrence of mold include:

- Keep humidity level in the house between 40-60 percent;
- Use a dehumidifier during humid months;
- Allow for adequate ventilation of house, especially in bathroom, kitchen, attic and basements;
- Clean bathrooms with mold-killing products; and
- Avoid carpeting in bathrooms and basements.

Sources: OSHA quick card 3263-09N-05; ICWUC Center for Worker Health and Safety Education, "Hurricane and Mold Awareness."

Task 1 *(continued)*

Using your experience and the factsheets you just read, please answer the following questions.

1. Why should Jay wear protective gear to clean up houses?

2. How can mold affect our health?

3. When should testing be done?

Task 2

Scenario:

"I don't understand why I feel tired all the time. I am only in my first trimester," said Yolanda, a displaced Winfield, Missouri, resident.

"Maybe it is the running back and forth and all the work," offered Naomi, Yolanda's sister. "You are down there on weekends gutting your house and getting rid of that horrible smell. I even think you are coming down with a cold. I heard you coughing late last night. You really have to start taking it easy; this is your first baby."

"I know, but if I don't get that stuff off the walls nobody will," explained Yolanda. "It is taking me eight hours a day for four weekends in a row just to clean up the mold and black stuff off the floors and walls."

Facilitator's Note

Use the Factsheet Reading Method for Task 2, Factsheets 13 through 16.

Factsheet 13: Health Symptoms of Mold Exposure

Because exposure to either living or dead mold can cause health problems, killing mold does not get rid of all the health hazards. Symptoms or illness caused by exposure to mold may occur or get worse when around the mold and better when away from the mold.

A person who is heavily exposed to mold without protection for a significant period is at risk of toxic effects and even possible fungal infection. Breathing or touching mold spores may cause an allergic reaction in some people or worsen breathing problems such as asthma.

Residents of flooded areas and volunteers who are exposed to large amounts of mold may have symptoms including:

- Cough;
- Congestion;
- Runny nose;
- Burning eyes;
- Headaches;
- Sneezing and sore throat;
- Fever;
- Bloody nose and ears;
- Lethargy/Fatigue;
- Coughing blood;
- Memory loss;
- Respiratory problems; and
- Sinus irritation.

The type and severity of symptoms and diseases related to mold exposure depend in part on the extent of the mold present.

Sources: NYCOSH Update Newsletter Article.html; OAI, Inc. Environmental Health and Safety, *8-Hour Mold Awareness Training;* LA Dept. of Health and Hospitals Section of Environmental Epidemiology and Toxicology; Public Information Series, *What You Need to Know About Your Health and Your Property*; and Centers for Disease Control and Prevention, the CDC Mold Work Group, *Prevention Strategies and Possible Health Effects in the Aftermath of Katrina and Rita*, October 2005, p. 20.

Factsheet 14: General Health Effects

In homes in New Orleans which had been flooded and found to have severe mold problems, the mold spore levels were over 1,000,000 mold spores per cubic meter of air, or more than 100 times the levels in the outdoor air.

Scientific evidence links mold and other factors related to damp conditions in buildings to:

- Asthma symptoms in those with the chronic disorder;
- Coughing wheezing and upper respiratory symptoms in otherwise healthy individuals;
- Pneumonia; and
- Lower respiratory illness in children.

The health effects of molds are becoming more widespread. To take just one example, the number of individuals with asthma, which often results from an over-exposure to molds, has increased an astounding 59 percent since 1970, according to the American Lung Association.

Sources: Little Sisters of the Assumption Family Health Services, Inc., http://www.littlesistersfamily.org; Institute of Medicine of the National Academies 2004; New York State United Teachers, Division of Field Services.

Factsheet 15: Mold Can Cause Illnesses

Mold can cause illness in several ways:

- **Irritation** — Exposure to mold can irritate the eyes, nose and upper breathing passages. Symptoms of irritation include burning eyes, nasal congestion, coughing and post-nasal drip.
- **Allergy** — Many people become allergic to mold and develop hay fever or asthma symptoms such as itchy/watery eyes, nasal congestion, sneezing, chest tightness, cough and wheezing.
- **Toxins** — Some molds create chemicals called toxins that can cause illness. While much remains unknown about mold toxins, it appears that some molds produce toxins that can have effects on the skin, the respiratory system, the immune system and the nervous system.
- **Infection** — Some molds can also cause infection, such as chronic sinus infections. Other types of mold-induced infection are much less common and occur mainly among people with weakened immune systems.

Source: New York Committee for Occupational Safety and Health, NYCOSH, http://www.nycosh.org/workplacehazards/moldfacts.html.

Factsheet 16: Those Who Are at the Highest Risk

There is a wide variability in how people are affected by mold exposure. Those who are at the highest risk, who may be affected more severely and quickly than others, include:

- Workers with minimal or no protection;
- Children (especially infants, babies and toddlers);
- The elderly;
- Individuals with respiratory conditions or allergies and asthma;
- Pregnant women (especially during the first trimester); and
- People with immune deficiency diseases such as:
  - Hepatitis;
  - Aids;
  - Chemotherapy patients; and
  - Transplants recipients.

Those with special health concerns should consult their doctor if they are concerned about mold exposure.

Source: OAI, Inc., Environmental Health and Safety, *8-Hour Mold Awareness Training*.

Task 2 *(continued)*

Using the information from the factsheets your group just discussed and your experience, answer the questions below.

1. Could mold exposure make Yolanda cough? Please explain.

2. What are some of the illnesses that you could get from mold?

3. How can you recognize the symptoms of mold?

Summary: Mold and Its Dangers

1. There are many dangers associated with the removal of mold.

   There is a wide variability to how people are affected by mold exposure. Those at higher risk include:

   - Workers with minimal or no protection;
   - Children;
   - The elderly;
   - Individuals with:
     - Respiratory conditions;
     - Allergies; or
     - Asthma;
   - Pregnant woman; and
   - People with immune deficiency diseases.
2. Molds are found in virtually every environment.
3. Adverse health effects of molds are becoming more widespread.
4. Monitoring and sampling in the work area is done to determine:
   - The presence of mold, fungi or similar microbes;
   - The types of microbes present;
   - If workers are being exposed; and
   - The effectiveness of remediation.

Tony Mazzocchi Center Proficiency Assessment

Activity 2: Mold and Its Dangers

Learning Objectives:

6. **To understand the critical health effects from mold exposures.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

7. **To understand the importance of monitoring and sampling.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

8. **Molds are found in virtually every environment.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

9. **Adverse health effects of molds are becoming more widespread.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Activity 3: Indoor Air Pollution

Purposes

To develop a better understanding of indoor air pollution and its causes.

To gain knowledge of the containment of mold and other toxins during remediation.

This Activity has two tasks.

Task 1

Scenario:

"I am so glad to finally be back to work," said Sara, an office worker. "But since we have returned, I have not been feeling well. It seems to really hit me when I am at work. Once I leave, the headaches clear and I feel better."

"Loretta, on the 2nd floor, told me the same thing just last week," replied Carol, a coworker. "I wonder how many people feel this way and what we can do about it."

"I wonder if she sneezes like I do every time the air conditioner kicks on," questioned Sara. "Do you think we have 'Sick Building Syndrome'?"

Facilitator's Note

Use the Factsheet Reading Method for Task 1, Factsheets 1 through 5.

Factsheet 1: Sick Building Syndrome

In July 1968, an explosive epidemic of illness characterized principally by fever, headaches and muscular pains affected at least 144 people, including about 100 employees of a health department building in Pontiac, Michigan. A defective air conditioning system was implicated as the source and mechanism that spread the sickness, but extensive laboratory and environmental investigations failed to identify the origin of the disease; so it was simply labeled "Pontiac Fever."

Many years later it was learned that this illness was caused by a bacterium identified as Legionella pneumophila. This name was first attributed to the causative organisms of the 1976 outbreak of a disease that struck 182 people attending an American Legion Convention in an air conditioned hotel in Philadelphia, Pennsylvania. Thirty-four people died from the illness. In Australia's largest epidemic in Wollongong in 1987, 44 cases required hospitalization and fourteen victims died.

Today the term "Sick Building Syndrome" has become interchangeable with "tight building syndrome."

This terminology applies to any building in which more than 20 percent of the employees experience symptoms such as:

- Headaches;
- Fatigue;
- Eye;
- Nose; or
- Throat irritation that ceases once the employee leaves the building.

continued

Factsheet 1: Sick Building Syndrome *(continued)*

This definition does not fit the classical symptoms of Legionnaires' disease since, with this disease, many of the symptoms become more severe over time. The distinction is due to the presence of an infection that can be determined by medical diagnosis and laboratory tests. Thus, when true infections are identified due to bacteria, fungi or viruses, they are classified as a "Building Related Illness." In these cases, the percentage of occupants affected is highly variable. **Only two employees need to contract the infection before that building is suspect**.

In the case of so-called sick buildings, the problems lie in the internal environment.

- Humidity can be part of the problem;
- As can lighting;
- Noise;
- Vibration;
- Radiation;
- Odor perception; and
- Other factors; such as overcrowding, office layout and personal conflicts.

These variables can be compounded by the employee's anxiety about other problems in the workplace.

Source: http://www.hbi.com.au/sbs.html.

Factsheet 2: Indoor Air Pollution — Health Threat

Indoor air pollution is a health threat common to buildings, especially modern ones, in many countries. Numerous studies by international health and environmental scientists have documented the widespread nature of the problem. The World Health Organization estimated in 1989 that 30 percent of all new or refurbished buildings have indoor air pollution.

The Environmental Protection Agency (EPA) ranks indoor air pollution as one of the top five air quality problems affecting the general population. Air quality poses a greater problem to the American public than:

- Toxic waste dumps;
- Emissions from industrial plants; and
- Pesticides used for farming.

Recent articles show that 40 percent of buildings in the U.S. suffer from "sick building syndrome."

Studies suggest that 10 to 25 million office workers (one in five) suffer health problems caused by indoor air pollution and inadequate ventilation. Healthcare costs from poor indoor air quality is estimated to run into the tens of billions of dollars each year.

Even though the EPA has worked on problems associated with indoor air pollution, action by Congress has been slow in coming. Although legislation is being considered, actual EPA and OSHA rules and recommendations will take time before changes are seen in the workplace.

Source: Laborers-ACG Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 3: Spreading Mold with Heating, Ventilation and Air Conditioning Systems

Mold growing near the intake to a heating, ventilation and air conditioning (HVAC) system indicates potential ventilation humidity problems. An HVAC system that is part of an identified moisture problem may also be a site of mold growth. Experience and professional judgment should be used when working with the HVAC system. Consult a professional if needed.

The HVAC system has the potential to spread mold throughout a building. Known or suspected mold growth in HVAC ducts or other system components should be investigated and resolved promptly. If substantial amounts of mold can be seen growing on the inside of hard surface ducts (e.g., ducts made of sheet metal), consider cleaning the ducts.

Factsheet 4: Controlling Moisture in Your Heating, Ventilation and Air Conditioning System to Prevent Mold

If the HVAC system has insulation on the inside of the air ducts and the insulation gets wet or moldy, it should be removed and replaced because the material cannot be cleaned effectively. **Please note that there are no antimicrobial products or biocides approved by EPA for use on lined ductwork.**

Controlling moisture is the most effective way of keeping mold from growing in air ducts. Steps to control moisture in ductwork include:

- Promptly and properly repairing any leaks or water damage.
- Removing standing water under the cooling coils of air handlers by making sure the drain pans slope toward the drain and the drain is flowing freely.
- Making sure ducts are properly sealed and insulated in all non-air-conditioned spaces so moisture due to condensation does not enter the system and the system works as intended. To prevent condensation, the heating and cooling system must be properly insulated.
- Operating and maintaining any in-duct humidification equipment strictly according to the manufacturer's recommendations.
- Making sure that carpets, drapes, furniture and other furnishings are dried promptly after they have been cleaned.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health Professionals," Chapter 2, Lesson 4, available at: http//www.epa.gov/mold/moldcourse/chapter2/lesson4.html.

Factsheet 5: HVAC Remediation

Mold remediation involving a heating ventilation and air conditioning (HVAC) system should be done only by professionals experienced in working with HVAC systems.

Professionals may have several different methods and techniques for approaching HVAC remediation. As with the rest of a mold remediation project, professional judgment is required when working with HVAC systems.

An HVAC system found to be contaminated with mold should be turned off and not used until the system has been remediated. Using a mold contaminated system may spread mold throughout the building and increase the exposure of building occupants.

If possible, the HVAC system should be remediated during the off hours when the building is not in use.

Effective containment of the area served by the ventilation system is important to avoid the spread of mold and mold contaminated materials. All intakes and supply vents should be sealed with plastic and tape and negative air pressure should be maintained in work areas. (A fan can be used.) Contaminated, porous materials in the HVAC system should be bagged and removed. Materials that can be cleaned should be vacuumed with a HEPA vacuum or cleaned taking the appropriate measures. All items should be dried promptly.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," Chapter 5, Lesson 2, available at: http//www.epa.gov/mold/moldcourse/chapter5/lesson2.html.

Task 1 *(continued)*

Using your group's discussion of Factsheets 1 through 5 and your experience, answer the questions below.

1. What are symptoms of "Sick Building Syndrome?"

2. How does mold contribute to "zSick Building Syndrome?"

3. What is needed to remediate the HVAC system in this workplace?

Task 2

Scenario:

Russ, a building contractor, was hired to remediate a two-story apartment complex. There are 14 units total and the job will take several days to complete. Several meetings are scheduled for tenants to attend.

The tenants gathered early to make a list of questions to ask Russ.

Facilitator's Note

Use the Factsheet Reading Method for Task 2, Factsheets 6 through 14.

Factsheet 6: Containment

The goal of containment is to limit the spread of mold throughout the building in order to minimize the exposure of remediators and building occupants to mold.

The larger the contaminated area and the greater the possibility that someone will be exposed to mold, the greater the need for containment. Although, in general, the size of the contaminated area indicates the level of containment required, the final choice of containment level should be based on professional judgment. Heavy mold growth in a small area, for example, could release more mold spores than lighter growth in a relatively large area. In this case, the smaller contaminated area may warrant a higher level of containment.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," available at:
http//www.epa.gov/ mold/moldcourse.

Factsheet 7: Type of Containment

Two types of containment are 'limited and full.'

- **Limited containment** is generally used for areas involving between 10 and 100 square feet of mold contamination.
- **Full containment** is used when areas larger than 100 square feet are to be remediated or in cases where it is likely that mold could be spread throughout the building during remediation.

Maintaining the containment area under negative pressure will keep contaminated air from flowing into adjacent, uncontaminated areas and possibly spreading mold. A fan exhausted to the outside of the building can be used to maintain negative air pressure. If the containment is working, the polyethylene sheeting of the containment area should billow inward on all surfaces. If it flutters or billows outward, containment has been lost and the problem should be found and corrected before remediation continues.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," available at: http//www.epa.gov/ mold/moldcourse..

Factsheet 8: Limited Containment

Limited containment consists of a single layer of 6-mil, fire-retardant polyethylene sheeting enclosing the moldy area. Access to the contained area is through a slit entry covered by a flap on the outside of the containment area. Limited containment is generally recommended for areas involving 10 to 100 square feet of mold contamination.

In small areas, the polyethylene sheeting can be secured to the floor and ceiling with duct tape. In larger areas, a frame of steel or wooden studs can be built to hold the polyethylene sheeting. Epoxy can also be used to fasten the sheeting to the floor or ceiling.

All supply and air vents, doors and pipe chases in the containment area must be sealed with polyethylene sheeting to minimize the spread of mold and mold spores to other areas of the building. Stairs should also be sealed if a riser is missing or open. (A pipe chase is an enclosure through which pipes are run; a riser is the upright piece of a stair step, from tread to tread.)

Heavy mold growth on ceiling tiles may affect HVAC systems if the space above the ceiling is used as a return air plenum. In such cases, containment would be installed from floor to ceiling deck. The filters in the air-handling units serving the affected area may have to be replaced once the remediation is complete.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," available at: http//www.epa.gov/ mold/moldcourse.

Factsheet 9: Full Containment

Full containment is recommended for the cleanup of mold-contaminated surface areas of more than 100 square feet and when intense or long-term exposures are expected. It is also recommended if it appears likely that the occupant's space would be further contaminated if full containment were not used because high levels of airborne dust or mold spores are likely. Full containment requires double layers of polyethylene sheeting to create a barrier between the moldy area and other parts of the building. A decontamination chamber or airlock — an area with doors between the contaminated area and the clean area — should be built for entry into and exit out of the remediation area.

The entryways from the outside into the airlock and from the airlock into the containment area should be slits covered by flaps on the outside surface. The chamber should be large enough to hold a waste container and allow a worker to put on and remove Personal Protective Equipment (PPE). All contaminated PPE, except respirators, should be placed in a sealed bag while in this chamber.

Respirators should be worn until remediation workers are outside the decontamination chamber.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," available at: http//www.epa.gov/ mold/moldcourse.

Factsheet 10: Are Professionals Needed?

For large or complex mold remediation jobs, you may consider hiring professionals who have experience working on large mold remediation projects, particularly since extensive containment and PPE may be needed. Be sure to check references and ensure that the professional has experience working in mold remediation situations. Remediators should follow EPA mold remediation guidance or other government or professional remediation guidance. Building occupants need to be informed about what is going to happen, when it will happen and how they may be affected.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," available at: http//www.epa.gov/ mold/moldcourse.

Factsheet 11: Large Area Remediation

Containment should be designed to prevent the movement of mold spores from one area of the building to another. This effort usually requires full containment using double layers of polyethylene sheeting and fans to create negative air pressure.

A decontamination chamber or airlock should be used to separate the clean areas from the contaminated areas during entry into and exit from the remediation area. The entryways to the airlock from the outside and from the airlock to the main containment area should consist of a slit with covering flaps on the outside surface of each entry.

Contaminated PPE, except respirators, should be sealed in bags while inside the containment exit chamber.

Workers should wear respirators until they are in the uncontaminated area, where the respirators can be removed. Disposable respirators can be thrown away and reusable respirators can be put into a bag for cleaning.

Full PPE may also be necessary during these operations and may consist of protective clothing and full-face or powered air-purifying respirators (PAPR) with HEPA filters. Protective clothing should include head and foot coverings with all gaps sealed with duct tape or the equivalent.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," available at: http//www.epa.gov/ mold/moldcourse.

Factsheet 12: Communication During Mold Remediation

Communication with building occupants is essential for successful mold remediation. Some occupants will naturally be concerned and their concern may increase if they believe information is being withheld. The status of the building investigation and remediation should be openly communicated, along with information on known or suspected health risks.

Small-scale remediations will not usually require a formal communication process; but do be sure to take individual concerns seriously and consider whether formal communication is required. Managers of medium or large remediation efforts should make sure they understand and address the concerns of the building occupants and communicate clearly what has to be done.

Depending on the situation, communication, communication strategies and communication issues may also be handled by others such as:

- Building owners;
- School principals;
- Public relations specialists; and
- Some organizations or buildings may have a communications strategy that can be used; or they may wish to develop a comprehensive strategy.

continued

Factsheet 12: Communication During Mold Remediation *(continued)*

Communication techniques may include:

- Regular memos;
- Meetings with occupants (with time for questions and answers); and
- Telling the occupants about the size of the remediation project, the activities planned and the schedule.

Communication is especially important if occupants are relocated during remediation.

When deciding whether to relocate occupants consider:

- The size of the area affected;
- The extent and types of health effects exhibited by the occupants; and
- The potential health risks associated with debris and activities during the remediation.

Be sure to ask about, accommodate and plan for individuals with asthma, allergies, compromised immune systems and other health concerns. Smooth the relocation process and give occupants an opportunity to participate in resolving problems by clearly explaining the disruption of the workplace and work schedules. Notify individuals of relocation efforts in advance, if possible.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," available at: http//www.epa.gov/ mold/moldcourse.

Factsheet 13: Special Communications

Special communication strategies may be warranted when treating a mold problem in a school. Teachers, parents and other affected groups should be notified as soon as significant issues are identified. Consider holding a special meeting so parents can learn about the problem and ask questions of school authorities, particularly if it is necessary or advisable to vacate the school during remediation.

In some cases, particularly when large areas are contaminated with mold or complaints run high among teachers or students, it may be a good idea to hire a remediation professional who can provide expert information to concerned parents and teachers, as well as do the remediation work. It is important that the best information available be provided to everyone who might be affected by the investigation and remediation.

Please note: EPA does not regulate mold or mold spores in the air. EPA does not certify mold remediators or inspectors.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," available at: http//www.epa.gov/ mold/moldcourse.

Factsheet 14: Are You Finished?

How do you know when you have finished remediation? Ultimately, it is a judgment call. People should be able to occupy or work in the building without health complaints or physical symptoms. The most important action, if mold growth is to be controlled in a building, is to eliminate the source of moisture that caused the mold problem. No matter how good the mold cleanup is, if the water problem is not solved, mold will return. Therefore, determining whether moisture in the building is being controlled is key in assessing the effectiveness of the remediation effort. If moisture is not being controlled, even removing all the mold growing in the building will be only a temporary solution.

A visual inspection of the area that has been remediated should show no evidence of present or past mold growth. There should be no moldy or musty odors associated with the building because these odors suggest that mold continues to grow. If mold or moldy odors are present in the building, the remediation has not been effective.

Keep in mind that remodeling, cleaning and construction may have introduced new building materials or chemicals capable of causing upper respiratory irritation that, in some individuals, may mimic the symptoms caused by exposure to mold.

Source: Environmental Protection Agency, "Introduction to Mold and Mold Remediation for Environmental and Public Health professionals," available at: http//www.epa.gov/ mold/moldcourse.

Task 2 *(continued)*

Scenario Restated:

Russ, a building contractor, was hired to remediate a two-story apartment complex. There are 14 units total and the job will take several days to complete. Several meetings are scheduled for tenants to attend.

The tenants gathered early to make a list of questions to ask Russ.

Task:

Using your group's discussion of the factsheets and your experience, answer the questions below.

How should Russ answer the following questions?

1. Will we be able to live in our apartments while the job is taking place?

2. How will contaminated material be disposed of?

continued

Task 2 *(continued)*

3. What will stop the spreading of the mold to the areas that have already been completed or do not need to be remediated?

4. How will you communicate the progress of the job?

5. How will you know if all remediation is completed?

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Summary: Indoor Air Pollution

1. Indoor air pollution is a health threat.
2. We need to push legislation to protect workers from indoor air pollution.
3. HVAC systems have the potential to spread mold throughout buildings.
4. HVAC system remediation should be done by professionals.
5. Containment is used to limit the spread of mold.
6. Finished remediation is a judgment call of the professional.
7. Communication should reach everyone affected before beginning remediation.

Tony Mazzocchi Center Proficiency Assessment

Activity 3: Indoor Air Pollutuion

Learning Objectives:

10. **To develop a better understanding of indoor air pollution and its causes.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

11. **To gain knowledge of the containment during remediation.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

12. **Indoor air pollution is a health threat.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

13. **We need to push legislation to protect workers from indoor air pollution.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

14. **HVAC systems have the potential to spread mold throughout buildings.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

continued

Learning Objectives *(continued):*

15. **HVAC systems remediation should be done by professionals.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Activity 4: Preparing, Protecting and Performing the Work

Purposes

To remove and/or clean contaminated materials in a way that prevents fungi, bacteria, mold spores and dust from leaving the work area.

To protect the health of workers performing remediation.

This Activity has three tasks.

Task 1

Scenario:

Marsha's home is two stories with no basement. The first floor had seven feet of standing water before it receded two days later. No flood water reached the top floor. Nothing has been removed. The first floor has a kitchen, dining room, living room, a bathroom and laundry room.

Facilitator's Note

Use the Factsheet Reading Method for Task 1, Factsheets 1 through 10.

Factsheet 1: General Remediation Concerns

The following items are the major issues of concern on most mold remediation projects:

- Work area preparation;
- Worker protection;
- Containment and isolation;
- Movable objects;
- Negative pressure enclosures;
- Elimination of contaminants;
- Waste disposal;
- Post-remediation inspection; and
- Methods to reduce or eliminate recurrence of infestations.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 2: Work Area Preparation

Work area preparation includes all tasks that should be performed before work begins. This includes conveying the scope of the work to the workers, training for worker protection and the construction of the containment.

Contamination should not be disturbed until proper controls have been implemented that avoid exposures to workers, building occupants and all areas adjacent to the contamination.

Work area preparation also includes:

- Limiting access to only authorized personnel trained in the hazards of the contamination present and hazards regarding remediation. To avoid unauthorized entry, signs should be posted at entrances to the work area.
- Correcting any conditions that caused contamination and that will prevent it from recurring in the future (water leaks, problems in ventilation/air filtration systems, humidity and condensation).
- Reviewing the design of the building to ensure that all areas affected by water damage or microbial growth will be dealt with. This includes any hidden areas such as wall cavities. Also, water leaks occurring on one floor of a building could affect all of the floors below it.
- Controlling electrical hazards in damp/wet areas by shutting down and locking out power.
- Salvaging materials such as books or documents for preservation.
- Removing any objects that can be moved, such as furniture and light fixtures.
- Containment of fixed objects in the workplace.
- Containment to control exposure to adjacent areas.
- Training those who prepare the work area or otherwise work in the area of contamination in the proper use of PPE and other safe work practices.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 3: Limiting Access

Remediation procedures should be designed to prevent unauthorized entry into the work area. Signs should be posted at all entrances to the work area warning against the hazards present.

Written notification to building occupants will also help prevent exposure risk and the spread of contamination.

Signs explaining the present dangers should be:

- Color coded;
- Legible;
- In English; and
- Additional languages maybe required on signs for non-English speaking individuals.

You — as well as contractors, supervisors and remediation workers — are responsible for enforcing this limited access.

Factsheet 4: Worker Protection

Before entering the work area, it is recommended that you (and any visitors) be instructed in the use of:

- Respirators;
- Dress;
- Decontamination; and
- Entry and exit procedures.

Appropriate Personal Protective Equipment (PPE) must be used to protect you from exposure to contaminating organisms and chemicals used during the remediation process.

The use of:

- Respirators;
- Rubber boots;
- Rubber gloves;
- Eye protection; and
- Protective clothing

is highly recommended.

Extensive contamination should be assessed by an experienced health and safety professional and remediated by personnel with additional training and experience handling environmentally contaminated materials (i.e., hazardous waste workers).

Open sores and cuts should not be left exposed. Also, injuries resulting in breaks of the skin should be treated and reported immediately.

Showers and equipment rooms are also recommended for large remediation projects for your safety as well as to control the spread of contamination.

Factsheet 5: Movable Objects

Movable objects such as furniture and light fixtures should be removed. This will reduce the chances of contamination remaining or reoccurring when the job is finished.

Before removing such items they should be:

- HEPA-vacuumed;
- Wet-wiped with the proper solution; and
- Dried.

Non-movable objects should be covered with plastic after completing the same process.

Before covering, the object must be free of all moisture.

Contaminated items made of fabric, such as drapes and rugs, should be discarded or cleaned by a professional cleaner that handles such contamination; otherwise, reinfestation may occur if conditions are right for growth.

Next, the work area and surrounding areas should be HEPA vacuumed. Care should be taken not to disturb areas of visible contamination.

Factsheet 6: Sealing Doors and Windows

In order to use negative pressure ventilation to control as much of the hazards as possible:

- Our work areas need to be sealed enough that a fan can do its best work.
- There should be one way in and out of the workspace covered with overlapping poly or plastic bags.
- All other doors and windows need to be sealed.
- All areas around the ventilation fan need to be covered and taped.
- It is also very important that mold contaminated areas be contained to keep mold from spreading and contaminating clean areas. For instance, if mold has contaminated the first floor in the house but the second floor is clean, it is important to seal the clean second floor from the contaminated first floor by taping plastic with duct tape over all openings.
- Any HVAC systems vents and air ducts should be sealed with two layers of poly or garbage bags.

Sources: U.S. Environmental Protection Agency (EPA), "Mold Web Course," PDF Version, www.epa.gov/mold/moldcourse; and Laborers-AGC Education and Training Fund, *Microbial Remediation,* June 2003.

Factsheet 7: In Times of Scarcity We Need to Improvise

If you are remediating your own home, it is important to recognize that when materials or equipment recommended for safe mold remediation are unavailable or unaffordable, being able to improvise is important.

- If the technically recommended 9-mil poly sheeting isn't available for containment and for creating a negative pressure area, garbage bags can be used in its place.
- Any strong tape can be used to replace duct tape.
- Two fans can be used to create negative pressure and air exchange when HEPA filters are not available.

Contractors should always follow the guidelines set by the government agencies.

Sources: Worker Health and Safety Takes a Back Seat in the Gulf Coast; and NYCOSH UPDATE, *Health and Safety News*, November 28, 2005.

Factsheet 8: Doorways and Airlocks

All doorways through the decontamination chamber and to the work area should be sealed with three sheets of 6-mil poly attached to the framing of the doorway.

- One sheet is attached to the top, bottom and sides of the doorway opening. A slit is cut into the plastic to allow entrance.
- The second sheet is attached to the top of the opening and to one side of the doorway.
- The third sheet of poly is attached to the top and opposite side of the doorway to create an S-shaped entryway.

It should be noted that some building codes require the use of flame retardant poly when containments are built inside of buildings. This should be outlined in the project specifications.

Factsheet 9: You Need a Strong Fan to Create Negative Pressure

To make the work area safer for us to work in, ventilation can be used to create a kind of vacuum draft away from the area where we are working. This is often referred to as "negative pressure."

It is recommended that the air in a mold remediation work area be changed four times per hour. That's a lot of air to get moved around so the fan used for ventilation needs to be powerful.

If we are remediating a 12′ X 20′ house that has 10′ ceilings, that's 2,400 cubic feet of air to get moved out four (4) times an hour, or every 15 minutes (1 hour = 60 minutes, 60/4 = 15 minutes). So, that means in our example we need to move 160 cubic feet per minute (2,400/15 = 160).

Fans are generally rated by the amount of air a machine can move in a minute (cubic feet per minute). This rating is written cfm. To move that air out we need a fan that will move 400 cubic feet per minute.

Most manufacturers rate their machines under ideal laboratory conditions. In the real world, experts say that these machines are 80 percent efficient.

So, we need a fan that is rated at 500 which, operating at 80 percent of its rating, will move 400 cubic feet per of air per minute; exactly what we need in our example.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation,* June 2003.

Factsheet 10: Testing the System

The negative pressure system should be tested before any contaminated material is disturbed.

After the work area has been prepared, the decontamination facility set up and the negative pressure units installed, they should be started one at a time.

- Look at the barriers and plastic sheeting.
- The plastic curtains of the decontamination facility may move slightly in toward the work area.

The use of smoke tubes (tubes that produce a controlled amount of smoke through a chemical reaction) is the preferred way to check system performance visually, as well as the direction of airflow through openings in the barrier. For example, smoke emitted on the inside of the work area should move toward the exhaust units. Smoke emitted in the shower room of the decontamination unit should move inward to the work area. Smoke tubes can also be used to check if air flow is moving inward at high and low levels to the work area.

Source: Laborers-AGC, *Microbial Remediation,* June 2003.

Task 1 *(continued)*

In your groups, using your experience and the factsheets, please answer the following questions.

1. What steps need to be taken to prepare Marsha's house before remediation?

2. Who is allowed access to the remediation area?

3. What material will be needed before beginning the remediation?

4. Where should fans be set up in the remediation process area?

Task 2

Scenario:

Marsha's home was sprayed two days ago with a biocide to help break down the mold.

It's time to start the remediation process.

Facilitator's Note

Use the Factsheet Reading Method for Task 2, Factsheets 11 through 21.

Factsheet 11: Use of Negative Pressure Systems During Removal Operations

The negative pressure units should be started just before beginning removal (i.e., before any microbial contaminated material is disturbed).

- After removal has begun, the units should run continuously to maintain a constant negative pressure until the work area is decontaminated.
- The units should not be turned off at the end of the work shift or when removal operations stop temporarily.
- Air movement should be directed away from other workers in the enclosure and toward the negative air machine.

Workers should start removing the microbial-contaminated material farthest from the negative air machine and work towards it.

If a power failure occurs, work should stop and should not start again until the power is restored and negative pressure units are operating again.

Source: Laborers-AGC Training and Education Fund, *Microbial Remediation*, June 2003.

Factsheet 12: HEPA Filters and the Environment

A portable HEPA-filtered negative pressure unit has two openings at each end, one for air intake and one for exhaust. The unit also needs a fan and a series of filters.

The fan draws contaminated air through the filters and discharges clean air through the exhaust.

Each unit should have a pre-filter, which lengthens the life of the more expensive HEPA filter.

Negative pressure units should be started just before remediation work begins and should run continuously until the work area is decontaminated.

Location of the negative pressure unit(s) is important:

- Air from the outside should mostly enter the work area from the decontamination area or near the entrance/exit;
- The negative pressure unit should be as far as possible from the work entrance/exit area or the makeup air sources;
- The negative pressure unit(s) should be located on the floor and in or near an unused doorway or window;
- The end of the unit or its exhaust duct should be placed through an opening in the plastic barrier;
- The plastic around the unit or duct should be sealed with tape; and
- Whenever possible, exhaust units should be vented to the outside of the building.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 13: Shutting Down the System

As gross removal nears completion, filters should be checked for loading and replaced if necessary.

When the negative air system is shut down at the end of the project, the filters should be left in the unit and the openings should be sealed with poly and duct tape.

Filters should be replaced after final cleanup is complete in order to avoid any risk of recontaminating the area.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 14: Bagging Contaminated Waste

During and following remediation, all contaminated materials must be removed as soon as possible.

- A staging area for the waste should be set up prior to starting the remediation project.
- Waste should be placed in a double 6-mil plastic bag or equivalent containers for disposal.
- Items that cannot be sealed in plastic bags should be wrapped in two layers of plastic and sealed with duct tape.
- Materials that may puncture the bag or plastic (such as wallboard, wood, metal, sharp objects) should be padded before being sealed.

The bagging of the waste should be done in a two-step process.

- The first bag should be placed on the waste in the contaminated work area; and
- The waste should then be bagged in the second layer as it is being moved out of the contaminated into the clean area.

This process will help keep the clean area from being recontaminated with mold spores.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 15: Avoid the Problems of Cleaners and Disinfectants

The cleanup process involves thorough washing and disinfecting of the walls, floors, closets, shelves and contents of the house. In most cases, common household cleaning products and disinfectants, such as bleach, are used for this task. FEMA also suggests the use of disinfectants and sanitizers on the ductwork for the heating and air conditioning system, if it has been flooded.

This can be a problem. Disinfectants and sanitizers, such as chlorine and alkyl ammonium chlorides, contain toxic substances. The chemicals in some household products used for cleaning can cause adverse health effects from shortness of breath to pulmonary edema. Mixing of these cleaners may also produce harmful gases.

Concentrations of more than one cup of bleach to a gallon of water can burn exposed skin. If a bleach solution is all that is available, it is important to ventilate the work area to help prevent inhaling the harmful vapors.

Source: http://www.epa.gov/iaq/pub/flood.html.

Factsheet 16: Cleaners, Disinfectants and Bleach Alternatives

Rapid industrialization over the latter part of the 1900s has had a detrimental effect on the Earth's environment. The polluting of our fresh and salt water sources have led to deformities, birth defects, sickness and death in the developing and developed world. For decades, environmental groups have been discussing these problems and their effects now and to future generations.

So, instead of adding to the problems caused by toxic chemicals, other biocides may be used to destroy organisms. Some examples are:

- Alcohol;
- Hydrogen peroxide;
- Iodine;
- Quaternary ammonium compounds (such as dimethylbenzyl ammonium chloride); and
- Ammonia.

Proper PPE must be used and safe handing practices must be followed when using these products.

Some biocides are also manufactured as aerosol bombs, which can also be used to kill organisms on hard surfaces. Typically, the area is isolated and contained. After the area is vacated, a worker enters wearing a fully encapsulated suit and activates the aerosol bomb. The bomb fills the air with a biocide. The aerosol must contact the area for a specified time. Workers then wipe down all surfaces with a solution of isopropyl alcohol and water to remove any dead organisms. After using biocides, it is recommended that surfaces be HEPA vacuumed to remove any residue of dead fungal organisms that may still be present.

There are now 60 EPA recommended companies that have environmentally safe biocides available. Many volunteer groups use environmentally friendly biocides when remediating homes and buildings. Remediation starts with spraying of these environmentally friendly chemicals on all surfaces and leaving for two days before removal begins. Remember, proper PPE must be used when using any chemicals.

Sources: http://www.emamerica.com/data/frontpage/content/hurricane-katrina-efforts.html; and Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 17: Remediation Process

Following are the seven steps to follow during the remediation process:

Step 1: Before removal of either porous or hard materials, all contaminated surfaces should be misted with biocide to stop the growth of contamination and to reduce the formation of dust aerosols.

Note: Organisms such as mold and mildew can be toxic even after a biocide has been used. Precautions such as PPE and containment must still remain in effect until all traces of these organisms have been removed. Biocides will have limited effectiveness if the conditions that promote contamination growth (flooding, dampness, etc.) are not corrected to prevent recurrence.

Step 2: After bleaching, surfaces containing high levels of contamination should be disposed of when feasible.

Step 3: Double plastic bags or two layers of poly sheeting should be used for the disposal of these surface items (6-mil poly is recommended).

Step 4: Contaminated surfaces that remain after the bleaching process should be scraped to remove contamination and then wet scrubbed with the bleach solution to remove any residue.

Step 5: A final sanitation wash using a non-reactive detergent solution is then used. The surface should then be rinsed with water, dried and HEPA-vacuumed for final cleaning.

Step 6: All contaminated debris should be bagged and disposed of as recommended.

Step 7: Carpets should be HEPA-vacuumed and steam cleaned. HEPA vacuuming should be performed at a rate no faster than 90 seconds per square yard. Complete drying of the carpet should follow steam cleaning.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 18: Post-remediation Inspection

A visual inspection should be made after completion of the project to ensure the elimination of any organisms. Special attention should be given to:

- Basements;
- Lower rooms;
- Crawl spaces; and
- Rooms with water or flooding damage.

Window frames, ceiling tiles, as well as any cellulose-based materials, should also be closely examined.

Carefully examine all accessible heating, ventilation and air conditioning components.

Any indoor space with exposed soil, such as an unfinished basement or crawl space, must also be examined.

Air monitoring should be conducted after extensive or large scale remediation to determine its effectiveness and to determine whether an area is fit for symptomatic persons to reoccupy.

If post-remediation air samples indicate the presence of any organisms, even in minor amounts, further investigation of possible sources is required.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation,* June 2003.

Factsheet 19: Final Disposal Procedures

The final step of the remediation process is to remove contaminated debris from the work area. Care must be taken to avoid spreading any contaminated debris back into the areas determined to be clean. Follow the checklist for safe handling and disposal of microbial remediation debris on the next page.

Factsheet 20: Final Disposal Checklist

- Debris that has been removed from surfaces should be placed in 6-mil bags or equivalent containers.
- Materials that may puncture the bag (such as wallboard, wood, metal, sharp objects) should be carefully sealed in two layers of 6-mil poly.
- Wet-wipe or HEPA-vacuum any debris from the outside of the bags.
- Place the bags in fiberboard drums with locking rims. Generally four to five bags can be put in each drum.
- **Note**: Before each drum is brought into the work area for loading, the outside of the drum should be covered with a large plastic bag. This outside bag should be kept on the drum while it is being filled.
- Drums should be labeled with appropriate information to identify their contents.
- Once the drum is filled, lock the lid or rim into place. The drum will then be ready for transportation out of the work area.
- Before leaving the work area, remove the plastic bag on the outside of the drum and put it on the next drum to be filled with waste.
- Before the drum enters the load-out area, it should be wet wiped to make sure there is no contamination on the outside of the drum.
- Move the sealed drum into the waste load-out area and into the enclosed truck.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation,* June 2003.

Factsheet 21: Administrative Controls to Protect Workers

A pre-job plan to protect workers through administrative controls should consider and address the following:

- Consider size, strength and abilities of workers as they are assigned to certain jobs;
- Rotate those jobs between workers to reduce the same repetitious movements which could cause injury over time;
- Plan work for the cooler portions of the days when possible;
- Work in shifts so that it is less likely someone will push themselves past their limit; and
- Plan breaks with water, hot weather drinks and energy snacks.

Sources: PACE Local 8-675, *Ergonomics. Designing Jobs and Tools to Fit People... 2003*, available at www.pace8-675.org/articles/ergonomics.html, accessed November 2004; Canadian Centre for Occupational Health and Safety, *Job Design, 2002*, available at www.ccohs.ca/oshanswers/ hsprograms/ job_design.html; United Steel Workers of America, *Ergonomic Job Design: Eliminating and Reducing Risk Factors for Musculoskeletal Disorders*, United Steelworkers of America Health, Safety & Environment Department Draft Ergonomic Fact Sheet #5, 2002; and *Job Design with the Worker in Mind*, PACE Local 8-5, 1995.

Task 2 *(continued)*

Scenario Restated:

Marsha's home was sprayed two days ago with a biocide to help break down the mold.

It's time to start the remediation process.

Task:

In your groups, using your experience and Factsheets 11 through 21, please answer the following questions.

1. What would be the first step your group would take to start the remediation process?

2. Where and how would you set up the staging area?

continued

Task 2 *(continued)*

3. Why is it important to bag all contaminated waste?

4. How can you tell if the remediation process is completed?

5. How do you dispose of the contaminated debris?

Facilitator's Note

Use the Factsheet Reading Method for Task 3, Factsheets 22 through 26.

Factsheet 22: Developing a Health and Safety Plan (HASP)

A site Health and Safety Plan describes the potential hazards of the worksite, along with all employer policies, controls and work practices selected to minimize those hazards.

The most important factor in reducing workplace injuries is implementing the plan.

Implementation requires commitment to provide adequate resources for:

- Training;
- Accountability;
- Self audits; and
- Worker involvement.

Factsheet 23: Scope of Work

When developing a HASP, it must contain a description of the project. What will be done on this job? Example: Mold remediation.

You must also include the method of work for the job. Example: All walls, floors and AC vents will be thoroughly cleaned and mold removed.

How will you do this job? What equipment will you need to complete this work? Example: Biocides will be used to kill the mold; the rooms will be sealed so that contaminants are not able to escape.

Factsheet 24: Designation of Responsibilities

The HASP should include who has the responsibility over the job. Who will be in charge of developing the procedures for the job and the training of the workers?

Factsheet 25: Site-Specific Health and Safety Concerns

All work on your project should be characterized for health and safety risks.

Listed in the HASP should be the primary health hazard with which you will be dealing.

You may also list how hazards exist with the equipment being used to remove the mold, ergonomics and other chemicals potentially present.

Develop a list of Personal Protective Equipment (PPE) that will be needed for the job.

Other site-specific concerns may include:

- Emergency phone number(s);
- Medical personnel on site;
- Adverse weather conditions;
- Fire and explosion;
- Decontamination Zones;
- Natural Hazards (spiders, ants, mosquitoes etc.); and
- Support Zone (break areas, support facilities).

Factsheet 26: Decontamination and Disposal

Procedures or policies should be developed to address:

- Prevention — minimizing the contact with mold;
- Decontamination of equipment, tools and materials used; and
- Personal clothing decontamination.

A decontamination site should be designated. Water, soap, trash barrels, trash bags and scrub brushes are a few of the materials needed.

Task 3 *(continued)*

Using your group's discussion of Factsheets 22 through 26 and your experience, develop a HASP (Health and Safety Plan) for mold remediation.

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Summary: Preparing, Protecting and Performing the Work

1. Most mold remediation projects involve major issues of concern.
2. Creating negative pressure reduces the amount of worker exposure to mold.
3. Using HEPA filters on exhaust fans reduces the environmental exposure.
4. Properly bagging waste reduces exposures to workers, the community and the environment.
5. Properly applying mold control products helps limit worker exposures and controls mold.
6. Bleach is a health hazard and has many drawbacks as mold control.
7. Always use the most effective materials and recommended equipment if possible.
8. In times of scarcity, materials are not always available or affordable; but we must always strive to protect ourselves in the safest manner.

Tony Mazzocchi Center Proficiency Assessment

Activity 4: Preparing, Protecting and Performing the Work

Learning Objectives:

16. **To remove and/or clean contaminated materials in a way that prevents fungi, bacteria, mold spores and dust from leaving the work area.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

17. **To protect the health of workers performing remediation.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

18. **Creating negative pressure reduces the amount of work exposure to mold. Using HEPA filters on exhaust fans reduces the environmental exposure.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

19. **Properly bagging waste reduces exposures to workers, community and the environment.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Activity 5: Physical Hazards During Mold Remediation

Purpose

To learn to develop a Hazard Map that workers can use to locate and identify hazards.

To identify the physical and other health hazards encountered during mold remediation work.

To introduce Systems of Safety Thinking.

To address the identified hazards using the highest level of Systems of Safety.

This Activity has three tasks.

Facilitator's Note

Use the Factsheet Reading Method for Task 1, Factsheets 1 through 3.

Factsheet 1: Using Hazard Mapping to Identify Possible Risks

A Hazard Map is a visual representation of the workplace where there are hazards that could cause injuries or illness.

The Hazard Mapping method draws on what workers know from on-the-job experience. The Hazard Mapping approach is best when conducted with a small group of workers with some similarity in their work.

Hazard Maps can be used to get detailed information. For example maps might target:

- Physical hazards;
- Mold and other hazards left by flood waters;
- Heat stress;
- Frequency of exposure;
- Level of exposure;
- A specific chemical or agent; or
- Workers or job titles most likely to be exposed.

Factsheet 2: Hazard Mapping Labels

HAZARD CODE KEY		
	Blue	Electrical Hazard
	Green	Chemical Hazard
	Orange	Physical Hazard
	Brown	Flammable/Explosive Hazard
	Black	Other Hazards (specify): Such as Heat Stress and Fatigue

Level of Hazard Key	
1	**Low Hazard**
2	**Medium Hazard**
3	**High Hazard**
4	**Very High Hazard**

Factsheet 3: Examples of Hazard Mapping Labels

EXAMPLES: HAZARD CODES AND LEVELS OF HAZARD	
2	A number "2" inside a Blue Circle indicates "Class 2, Medium Hazard, Electrical."
3	A number "3" inside a Green Circle indicates "Class 3, High Hazard, Chemical."
4	A number "4" inside an Orange Circle indicates "Class 4, Very High Hazard, Physical."
1	A number "1" inside a Brown Circle indicates "Class 1, Low Hazard, Flammable/Explosive."
2	A number "2" inside a Black Circle indicates "Class 2, Medium Hazard, Other Hazard."

Task 1 *(continued)*

Review the Hazard Map on the next page of a city parking lot that was abandoned and is now being considered for reuse. The hazards are identified as to type of hazard by color. Work in your groups to answer the questions below.

1. **What types of hazards are identified in the hazard map of the parking lot? (See Factsheet 2 for types of hazards and Factsheet 3 for examples.)**

_____

_____

_____

_____

_____

2. **Insert in each colored circle a number to indicate the level of the hazard as determined by your group. (See Factsheet 2 for levels of hazards and Factsheet 3 for examples.)**
3. **What are the advantages of using hazard mapping?**

_____

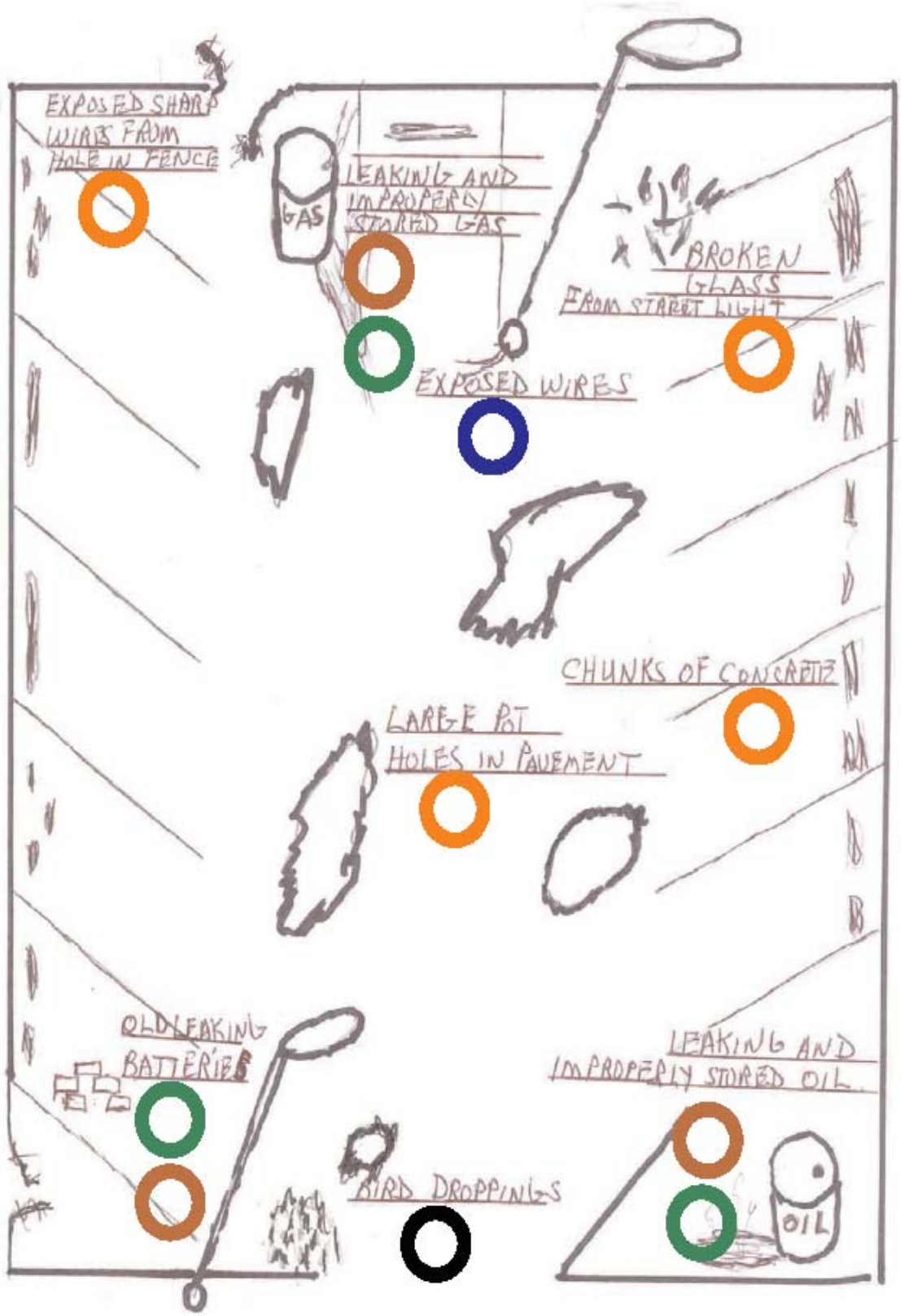
_____

_____

_____

_____

Parking Lot Hazard Map



Task 2

Scenario:

Standing water causes mold, bacteria growth, pest infestations and release of toxic substances from wet building materials. The water itself can carry an unknown mix of toxic chemicals and waste that can contaminate houses and apartments, personal belongings and yards even after the flood recedes.

You are part of a team that will be working to clean up the mold and water damage to a two-story home where the flood level reached 10 feet and remained at that level for 48 hours.

Facilitator's Note

Use the Factsheet Reading Method for Task 2, Factsheets 4A through 12.

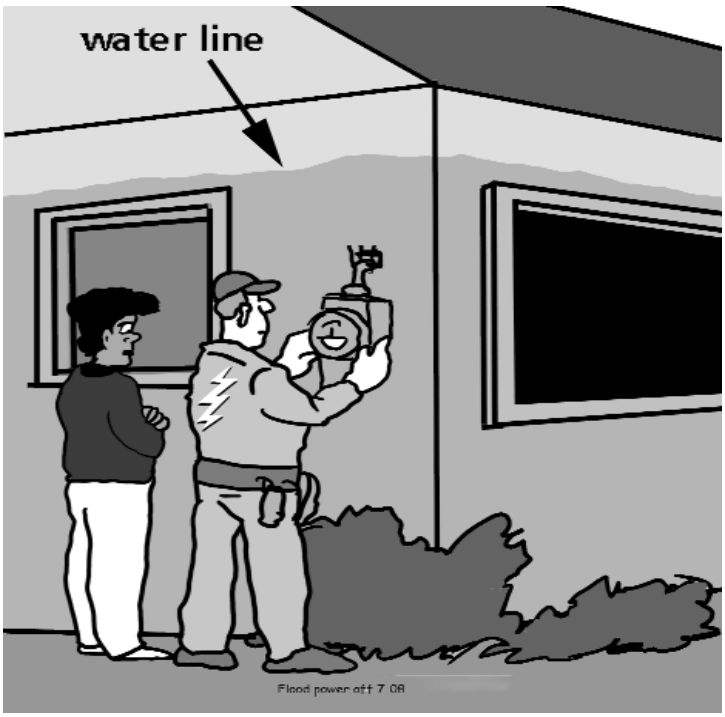
Factsheet 4A: The Dangers of Mixing Water and Electricity

Even if the water has been pumped out of your area, the rain and flooding could have made your electricity dangerous! It can be deadly!

Factsheet 4B: How to Protect Yourselves from the Dangers of Mixing Water and Electricity

In dealing with electricity:

- If the flood waters have risen past your electrical outlets, do not turn on the electricity until you have contacted an electrician; and
- If the electricity has not yet been returned to your area, make sure the power is turned off at the main box.



Factsheet 5: Identifying Slipping, Tripping and Falling Hazards

Basically, slips occur because of a loss of traction between your foot and the surface you're walking on. To eliminate the hazard you must either increase the traction or eliminate the reason for losing it.

What are we walking and working on?

- Is it wood?
- Is it concrete?
- Is it tile?
- First floor, second floor, the roof?
- Stairwell?

What could cause the slips and trips?

- Trash;
- Debris;
- Mud and sediment;
- Furniture and appliances;
- Poor lighting;
- Holes in floors;
- Working from ladders or scaffolds; or
- Worker fatigue.

Sources: "Reducing the Potential for a Slipping Hazard," Mark for Quality Chemical Maintenance, Inc., and *Accident Prevention Manual for Business and Industry*; National Safety Council, Administration and Programs, 10th edition, NSC, 1992, p. 489.

Factsheet 6: Develop Your Strategy — Eliminating Slips, Trips and Falls

Some of your first steps in cleanup should be:

- If possible, make sure lighting is adequate;
- Remove mud and other debris;
- Plan adequate breaks;
- Rope-off and clearly mark dangerous areas; and
- Use ladders or scaffolds when needed.

Most falls resulting in injury are surprisingly short. Statistics show that 60 percent of fall injuries occur from elevations of ten feet or less, and almost one-third from heights of less than five feet.

Sources: "Reducing the Potential for a Slipping Hazard," Mark for Quality Chemical Maintenance, Inc., and *Accident Prevention Manual for Business and Industry*; National Safety Council, Administration and Programs, 10th edition, NSC, 1992, p. 489.

Factsheet 7: Working Around Heavy Equipment

Many types of mobile heavy machinery may be present on a job site. These include backhoes, bull-dozers, front-end loaders, fork lifts and trucks. Personnel operating such equipment require special training; but anyone in the area should be part of a traffic-control plan that protects pedestrians.

Plan and use vehicle travel patterns in advance. This is particularly important on a job where many people will be wearing protective equipment, which makes it harder for them to hear and see.

Source: Adapted from New England Consortium, *Basic Health and Safety Course for Hazardous Waste Site Personnel*, Student Manual, Edition 3.0, 1996.

Factsheet 8: Diseases from Flood Waters

Flood waters have dumped raw sewage to many areas which settled on surfaces. This causes a major concern for these diseases:

Hepatitis B

Hepatitis B is caused by a virus (HBV) that is carried by blood and other body fluids; such as saliva, semen and vaginal fluids. It is an extremely serious disease that causes inflammation of the liver. Hepatitis B can also cause cirrhosis of the liver and liver cancer. Five to ten percent of those infected with hepatitis B become permanent carriers of the virus and can transmit it to others.

Tetanus

People who clean up debris after a flood may sustain injuries that put them at risk for tetanus infections if their tetanus vaccinations are not up to date. Any new wound or old sore can result in a tetanus infection if the individual is not protected by a vaccination. Early symptoms include:

- Lockjaw;
- Stiffness in neck and abdomen; and
- Difficulty in swallowing.

A booster shot is needed every ten years. If you need a shot, you can go to the nearest public health department.

Source: *A Guide for Shelter Residents, Staying Safe After the Storm*, South Carolina Department of Health and Environmental Control.

Factsheet 9: Environmental Sampling

Following the hurricanes, more than 80 impacted locations were sampled along the Gulf Coast from Mobile Bay, Alabama, to the Louisiana/Texas state border. Sediment sludge layers were targeted for sampling in order to determine the contamination levels in the storm surge deposited materials. The following is an example of what was found in the sampled material:

Metals	
Arsenic	Lead
Barium	Mercury
Cadmium	Selenium
Chromium	Silver

Microbiologic Analysis
Coliform Bacteria - raw sewage
E. coli - untreated sewage
Staphylococcus aureus – Staph infection
Salmonella- food poisoning
Yeast
Mold

Source: Subra, Wilma, "Environmental and Human Health Impact of the 2005 Katrina and Rita Hurricane Season," May 2, 2006

Factsheet 10: What Is a Confined Space?

Don't enter a space from which you cannot escape in case of an emergency. Make sure all areas you enter are well ventilated and contain sufficient oxygen.

OSHA defines a confined space as an enclosed space which:

- Is large enough so that a worker can enter and has limited or restricted openings;
- May contain a hazardous atmosphere or other health hazards;
- While hazards may already exist before entering a confined space, others can be created by the work activity.

Before entering a confined space:

- Make sure a plan is in place that will ensure exit in case of emergency.
- Use engineering and other means available to make sure atmosphere has sufficient oxygen.
- Wear sufficient PPE for the hazards present.

Sources: OSHA Rule on Confined Space to Require Entry Permit, 20 CFR 1910.146(b); and "Confined Spaces Alert," DHHS (NIOSH) Publication No. 86-110.

Factsheet 11: Heat Stress

Heat stress is a health problem common to many work activities. Heat stress can lead to serious injuries and even death. On average, 384 people die each year from heat stroke. About half of the people who survive heat stroke suffer brain damage.

There are several factors to consider as we try to determine the risk for heat stress on a specific day and location. These include:

- High temperatures;
- Wearing required respirators and protective clothing;
- Working in houses, enclosures or other environments with minimal air movement;
- Humidity levels; and
- Work activity levels (workload).

Therefore, we all need to know the signs and symptoms of heat stress. If you feel any of the signs or symptoms, it is essential that you retreat to a decontamination area and get out of your protective equipment.

Four Kinds of Heat-related Illnesses

1. Heat Rash

Symptoms include prickly heat, swelling of the skin and inflammation of the sweat glands (which can limit the body's ability to sweat and cool down).

2. Heat Exhaustion

Its probable cause is lack of water and salt in the body. Signs of heat exhaustion include:

- Slurred speech, confusion;
- Fatigue, nausea and headache;
- Clammy and moist skin, pale complexion;
- Fainting after standing; and
- Cramps and painful spasms of muscles used during work.

3. Fainting from Heat

This may occur after standing up for a period of time. It results often because the blood has collected in the blood vessels in the lower parts of the body.

4. Heat Stroke

This is a medical emergency. It results from the total failure of the body's ability to cool itself down. Main signs of heat stroke are:

- Hot dry skin of red, mottled or bluish coloration;
- Mental confusion, delirium; and
- Loss of consciousness, convulsions and coma.

A person suffering from heat stroke must get medical help immediately or there will be damage to body organs and possibly death.

Source: *Chemical and Radioactive Hazardous Waste Cleanup Workbook*, Vol. 1, Draft 5, The Tony Mazzocchi Center, pp. 398 and 399.

Factsheet 12: Preventing Heat Stress

Preventing heat stress is a top priority because of the serious health problems it presents.

There are ways to prevent or reduce the possibility of heat stress. Review the following recommendations from a group of federal agencies and see if they can be useful in your work:

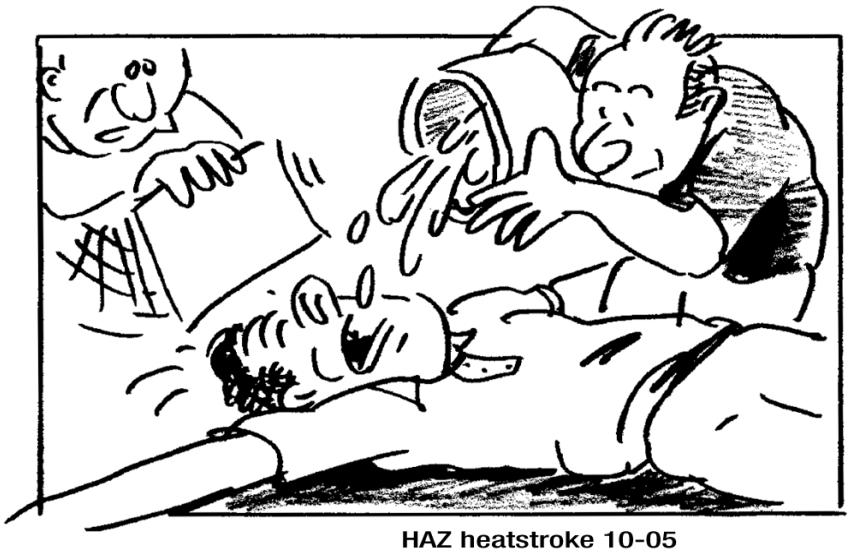
- Establish a work/rest regimen based on the job and weather that day;
- Train workers to recognize and treat symptoms of heat stress;
- If possible, use PPE to include reflective clothing, cool ties and ice vests;
- Drink approximately one cup of cool, not cold, water every 20 minutes; and
- It usually takes workers five to seven days to get acclimated to the heat. This does not mean they are safe from heat stress.

Source: *Chemical and Radioactive Hazardous Waste Cleanup Workbook,* Vol. 1, Draft 5, The Tony Mazzocchi Center, pp. 400 and 401.

What to Do When Heat Stress Hits

If you notice any of the heat stress symptoms in yourself or a coworker, here's what to do:

- Take the victim to a cooler and uncontaminated place (which may require going through decontamination).
- Remove protective clothing.
- Give water to drink, if conscious.
- If the symptoms are from heat exhaustion, allow the victim to rest. If there are symptoms of heat stroke, call an ambulance to transport the victim to a medical facility.
- In the meantime, cool the victim with water, cold compresses and/or rapid fanning.



HAZ heatstroke 10-05

Task 2 *(continued)*

Using the information from Factsheets 4A through 12, the scenario and your experience, your task is to create a hazard map of the two-story house. Create a simple floor-plan that your group would be familiar with.

Use the five steps on the next page as a guide to create your hazard map.

Select a scribe to record your answers and be ready to report-back.

Note: To best develop your Hazard map, you should proceed one step at a time (Steps 1-5). When you have finished your Hazard Map, you should place it on the wall and during report-back your scribe will explain the map and include answers to Step 5, questions (a and b).

Step 1:

Make a drawing on the two sheets of paper provided showing two floors of the house to be remediated. Write large and use a separate sheet of paper for each level. Label specific rooms and areas. Use the dark markers provided.

Step 2:

Mark the hazards with a color-coded circle on the map to show **WHAT** and **WHERE** the hazards are. Use colored dots, pencils or markers, whichever is provided. **(*Refer to the codes on Factsheets 2 and 3.*)**

Step 3:

Label each hazard with a number (1 to 4) to show the LEVEL OF THE HAZARD that is present. (*Refer to the codes on Factsheets 2 and 3.*)

Step 4:

Label each hazard with a **NAME OR BRIEF DESCRIPTION OF THE HAZARD.**

Step 5: Using the completed Hazard Map in your group, list all hazards identified.

_____

_____

_____

_____

_____

_____

_____

Facilitator's Note

Use the Factsheet Reading Method for Task 3, Factsheets 13 through 20.

Factsheet 13: Systems of Safety and Subsystems

Strive to integrate system solutions or hazard controls here

USW Systems of Safety

Strive to avoid reliance on hazard controls here

Major Safety Systems	Work Organization Factors[1]						
	Design	Mitigation Devices	Maintenance and Inspection	Warning Devices	Training	Procedures	Personal Protective Equipment
Hierarchy of Prevention and Control	*Elimination or Substitution*	*Engineering Controls*	*Administrative Controls*				*Personal Protective Equipment*
Levels of Protection	Highest	Middle					Lowest

Less Likely to Fail ⟷ Most Likely to Fail

[1] Work Organization Factors exist in virtually all workplaces. They often contribute to a hazard ***or its control***, or may be a hazard in and of themselves. They should be considered when identifying system failures and when integrating system solutions. They should also be accounted for when documenting failures and solutions.

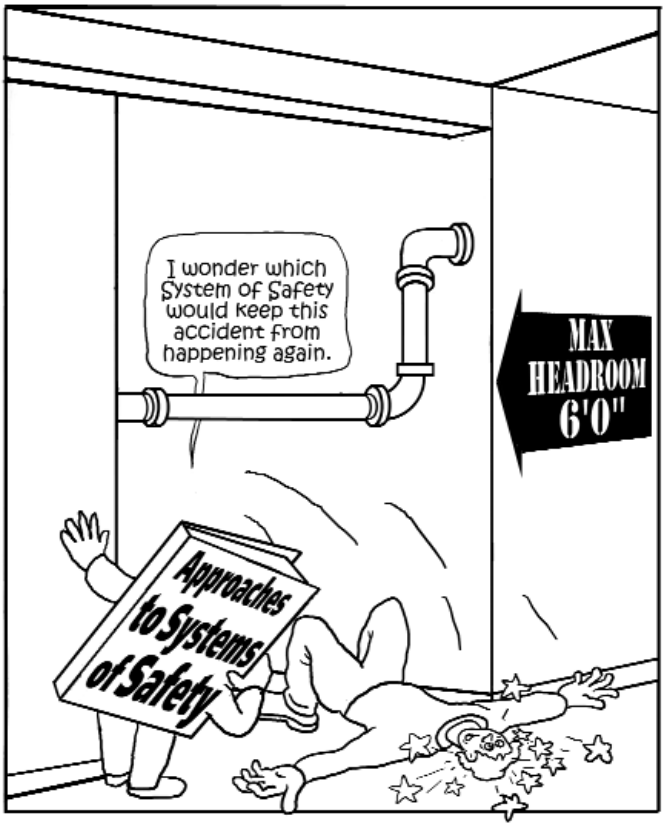
A few examples of the above chart are listed below, but there are many other examples that are not listed.

Design	Mitigation Devices	Maintenance and Inspection	Warning Devices	Training	Procedures	Personal Protective Equipment
Equipment and Process Design	Safety and Check Valves	Inspection and Testing	Monitors	Hazard Identification	Well-defined, Up-to-date Operating Manuals	Air-purifying Respirators (APR)
Computer Hardware and Software	Suppression Devices	Vibration Monitoring	Hazard Warning Lights	Pre-job Training	Management of Change (MOC)	Self-contained Breathing Apparatus (SCBA)
Proper Material Selection	Emergency Isolation Devices	Quality Control	Facility Alarms	Relevant and Meaningful Training	Pre-startup Safety Review	Chemical Protective Clothing
Use of Inherently Safer Technologies and Chemicals	Relief Valves	Preventive and Predictive Maintenance Programs	Process Instrumentation Alarm Devices	Emergency Response Training	Job Hazard Analysis	Hard Hats, Gloves and Eye Protection
Work Organization						
Management of Organizational Change		**Workload**		**Staffing**		**Buddy System**

Revised March 2010

Factsheet 14: What Are Systems of Safety?

Systems of Safety are proactive systems that actively seek to identify, control and/or eliminate workplace hazards.



Surprisingly, the same hazard can often be addressed in more than one system. Take the low pipe in the doorway above. On the next three pages you'll see how this same problem could be handled by each of the major Systems of Safety.

Which is the best approach? Well, if you look at the Systems of Safety fulcrum, you will find the Systems of Safety arranged in order of strength: The most powerful — Design — on down to the least powerful — Personal Protective Equipment.

Design	Mitigation Devices	Maintenance and Inspection	Warning Devices	Training	Procedures	Personal Protective Equipment	Hazard

A good investigation team will consider the full range of recommendations for each root cause.

▲ Fulcrum

Factsheet 15: Systems of Safety — Personal Protective Equipment, Procedures and Training

Personal Protective Equipment

Subsystems that include a broad range of working conditions and situations that affect workers.

- Weakest system; and
- Controls the hazard directly at the individual's level.

Procedures

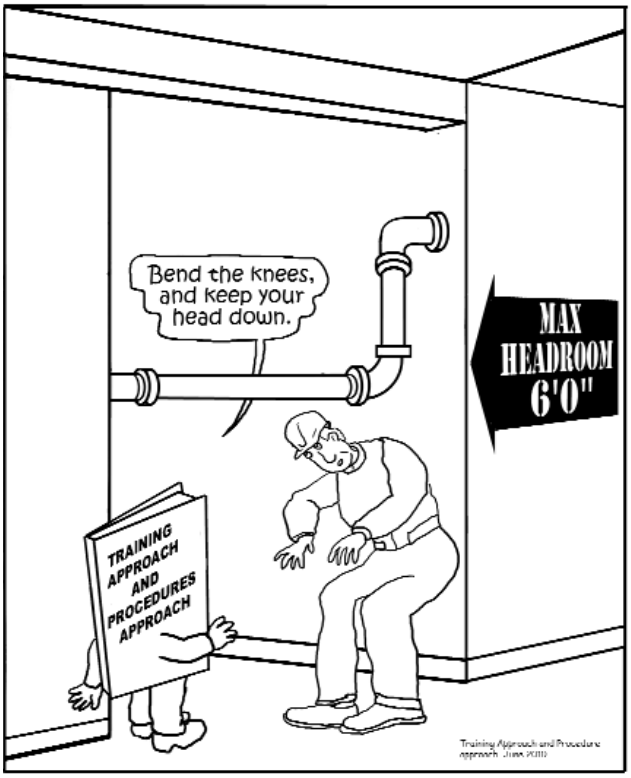
The instructions necessary to maintain and operate equipment or processes.

- Easier to affect groups of workers.

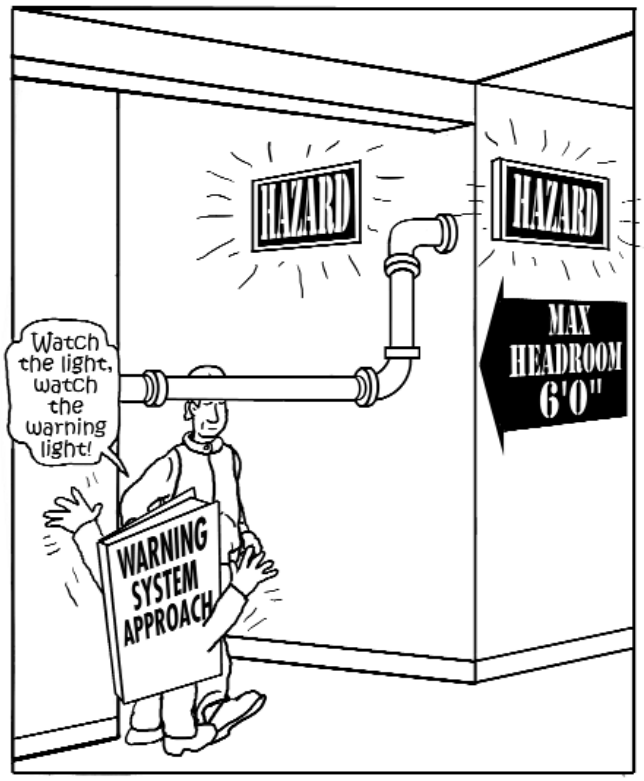
Training

Educating and preparing workers to perform their jobs.

- Dependent on individuals' memories and lack of distraction.



Factsheet 16: Systems of Safety — Warning Devices Systems and Maintenance and Inspection



Warning System

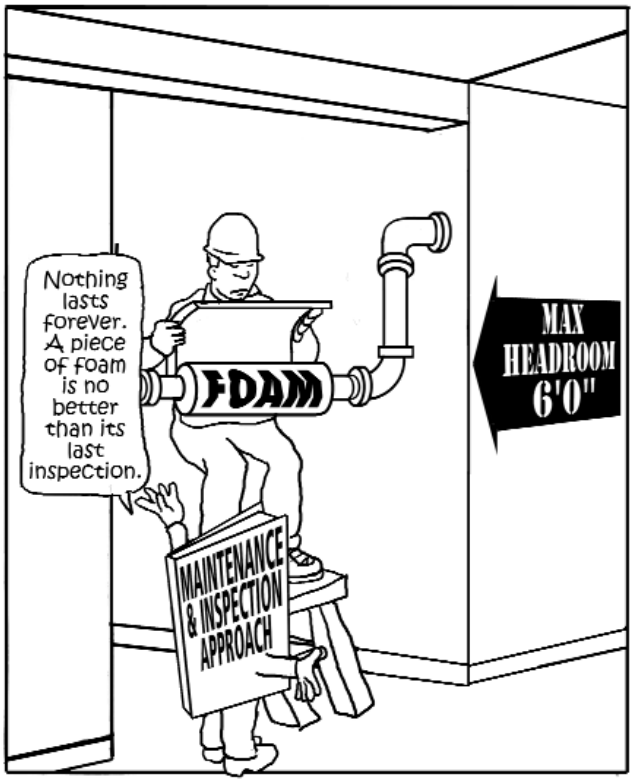
Devices that warn of a dangerous, or potentially dangerous, situation.

- Draws attention; and
- May be missed or ignored.

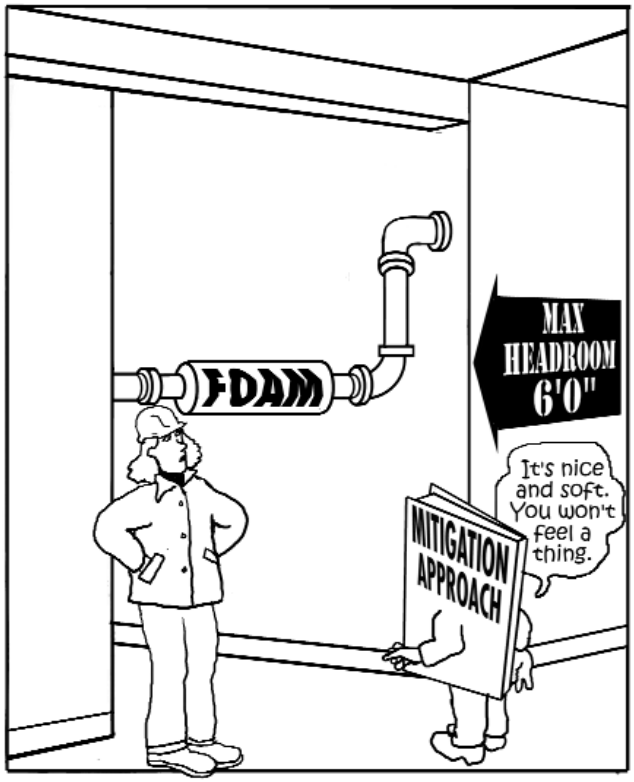
Maintenance and Inspection

The system responsible for maintaining, repairing and inspecting equipment and processes.

- Vital to make sure even the best designed system continues to function safely.



Factsheet 17: Systems of Safety — Mitigation Devices and Design Systems



Mitigation System
Subsystems that automatically act to control or reduce the effect of hazards. • Workers protected automatically.

Design
The primary (highest level) system that designs the hazard out of the process. • Strongest system; and • Hazard eliminated.

Factsheet 18: Work Organization and Workplace Health and Safety

Work organization is about the control of work and the division of labor. It includes:

- The tasks performed;
- Who performs them; and
- How they are performed.

Many workplaces are undergoing massive changes in the ways in which work is organized, often made possible by innovations in information and communications technologies.

New forms of work organization are being introduced with very little attention to their potential to harm workers' and workplace health and safety. Examples of work organization factors include:

- Combined jobs;
- Multi-tasking;
- Reduced staffing levels;
- Increased workload;
- Work intensification;
- Increased work pace;
- Electronic performance monitoring;
- Use of temporary workers;
- Use of contract workers;
- Extended working hours, days or weeks; and
- Alternative work schedules.

continued

Factsheet 18: Work Organization and Workplace Health and Safety *(continued)*

A growing body of research and investigations in the United States and around the world has linked certain work organization factors with increased risk of job injury, illness, stress and death and with catastrophic workplace events such as explosions. For example, the U.S. Chemical Safety and Hazard Identification Board (CSB) 2007 report "Investigation Report: Refinery Explosion and Fire (15 Killed, 180 Injured), BP, Texas City, Texas, March 23, 2005 (Washington, DC: CSB.), made a connection between hours of work/extended shifts and the risk of explosions or other acute, traumatic catastrophes.

Sources: Lessin, Nancy and Kojola, Bill, "Work Re-Organization: A Hazard to Workplace Health and Safety," *AFL CIO Fact Sheet*, January 2006; Landsbergis PA, Cahill J, Schnall P, "The Impact of Lean Production and Related New Systems of Work Organization on Worker Health," *Journal of Occupational Health Psychology*, 4(2): 108-130, 1999; and U.S. Chemical Safety and Hazard Identification Board (CSB), Washington, DC, "Investigation Report: Refinery Explosion and Fire (15 Killed, 180 Injured), BP, Texas City, Texas, March 23, 2005," 2007.

Factsheet 19: Eliminate the Hazard with the Design System of Safety

You can design within any System of Safety; **but a true Design fix is the one which eliminates the hazard**.

For example: A worker is exposed through inhalation to a hazardous chemical which was being used in a cleaning process. The worker's respirator leaked. Suggested recommended fixes were:

1. **Design** and make a new respirator for the worker to wear. Is this an effort to eliminate the hazard? **No!** It is a fix in the Personal Protective Equipment System of Safety.

2. **Design** a new procedure which makes it less likely that the worker will be exposed. Is this an effort to eliminate the hazard? **No!** It is a fix in the Procedures System of Safety.

3. **Design** a training program which will address selection and wearing of respirators? **No!** It is a fix in the Training System of Safety.

4. **Design** a warning system to alert the worker when the concentration of the chemical reaches a certain point. Is this an effort to eliminate the hazard? **No!** It is a fix in the Warning Devices System of Safety.

5. **Design** a better maintenance and inspection program to maintain the ventilation system, reduce tripping and slipping hazards and make the job safer overall. Is this an effort to eliminate the hazard? **No!** It is a fix in the Maintenance and Inspection System of Safety.

6. **Design** a better ventilation system which will remove most of the dangerous fumes. Is this an effort to eliminate the hazard? **No!** It is a fix in the Mitigation System of Safety.

7. **Design** the cleaning process to use a cleaning agent that is not dangerous to workers. Is this an effort to eliminate the hazard? **Yes!** It is a fix in the **Design System of Safety**.

Factsheet 20: Worker Involvement Creates Strong Systems of Safety

Many sites have Health and Safety Committees. These committees have workers who usually concentrate their activity on:

- Handling worker complaints;
- Promoting injury rate reduction goals; and
- Evaluating and recommending changes/enhancements to existing systems.

The best scenario takes place when workers are involved in creating or changing Systems of Safety.

OSHA recognizes in their Process Safety Management (PSM) Standard that:

- Active worker involvement in the development and use of process Systems of Safety is essential for the prevention of disasters; and
- Workers have a unique understanding of the hazards related to the processes that they operate and maintain.

A report published by the Environmental Protection Agency made the same point:

> ". . . operators have traditionally been more aware than management of the frequency, severity and nature of chemical incidents. Similarly, workers are often more aware of the ineffectiveness of Personal Protective Equipment and other mitigation devices. Were the company's technological decision-making to be informed by such worker insights, primary prevention would be significantly encouraged."

Source: Ashford, Nicholas, *The Encouragement of Technological Change for Preventing Chemical Accidents*, A report to the Environmental Protection Agency, Cambridge, MA: MIT, 1993.

Task 3 *(continued)*

Your group was able to identify several hazards that will be faced as you remediate the mold in the two-story house. Using your knowledge of Systems of Safety and the list on the flipchart that the group developed in Task 2, complete the chart on the next page by listing hazards you will face, your group's recommendations to address the hazards and the SOS you used to make the recommendation.

continued

Task 3 *(continued)*

Hazards Identified	Recommendation to Fix or Address the Hazard	System of Safety Used When Making the Fix

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Summary: Physical Hazards During Mold Remediation

1. A hazard is something that can hurt you, make you sick or even kill you.
2. In creating a Hazard Map we are making a visual representation of workplace hazards that could lead to injury, illness or even death.
3. Electrical shock is a real hazard. Be sure that all circuits and electrical parts are shut off before starting work.
4. It is important that workers receive their shots for protection against Tetanus.
5. You should not enter an area which you cannot leave quickly in case of an emergency. Make sure there is sufficient oxygen.
6. Heat Stress is a dangerous condition; it must be taken seriously and requires planning.
7. Systems of Safety is an important tool in addressing hazards encountered in the remediation of mold in homes and other buildings. Systems of Safety, with the most effective listed first are:
   - Design;
   - Mitigation Devices;
   - Maintenance and Inspection;
   - Warning Devices;
   - Training;
   - Procedures; and
   - Personal Protective Equipment.

Tony Mazzocchi Center Proficiency Assessment

Activity 5: Physical Hazards During Mold Remediation

Learning Objectives:

20. **To learn to develop a Hazard Map that workers can use to locate and identify hazards.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

21. **To identify the physical and other health hazards encountered during mold remediation work.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

22. **To introduce Systems of Safety Thinking.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

23. **To address the identified hazards using the highest level of System of Safety.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

24. **A hazard is something that can hurt you, make you sick or even kill you.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Activity 6: Personal Protective Equipment (PPE) and Mold Remediation

Purpose

To understand what Personal Protective Equipment (PPE) is and its proper care, use, limitations and inspections required.

This Activity has one task.

Task

Scenario:

"I knew it would be hot and that the work wasn't going to be easy; but I never really thought about having to wear all these suits, gloves and taping up," said Jeff.

"Yeah; and on top of all that, these hard hats, safety goggles and ear plugs make it hard for me to move very fast," said Wilma.

"I'm pretty sure we need all this to keep us safe from the mold, but I got pretty hot and a little bit dizzy before we came out yesterday," said Jeff.

"Well, I'll tell you one thing. I'll stay in there longer than that Suzanne or I'll pass out trying," said Wilma.

"It didn't even appear that she was hot or tired when we all came out of our PPE yesterday," said Jeff.

"Shut up," said Wilma.

Facilitator's Note

Use the Factsheet Reading Method for this Task, Factsheets 1 through 6.

Factsheet 1: Introduction to PPE for Mold Remediation

Personal Protective Equipment (PPE) is any protective clothing or device worn to prevent contact with, and exposure to, hazards in the workplace.

The purpose of wearing protective clothing is to keep contaminated materials off worker's skin and clothing and to keep the clothing that workers will be wearing home clean.

The type of protective clothing worn must be based on the type of exposure that the worker may get. Examples include workers demolishing contaminated drywall and lumber that may be exposed to particulate matter. Workers required to pressure-wash mold or other microbial growth from areas or who are exposed to sewage need protection from contaminated liquids.

Examples of PPE include:

- Gloves;
- Protective clothing;
- Eye protection;
- Hearing protection;
- Hard Hats;
- Boots (leather or rubber); and
- Respirators.

Source: Laborers–AGC Education and Training Fund, *Microbial Remediation,* June 2003.

Factsheet 2: Protective Gloves

Protective gloves are worn to protect hands from contact with contaminated material and offer protection from hand injuries. Glove selection must be based on the type of work being done, expected contaminants and any chemicals being used.

Gloves (long gloves that extend to middle of forearm are recommended) protect the skin from contact with mold and from potentially irritating cleaning solutions.

The material from which gloves are made should be suited to the type of materials being handled. If you choose to use a biocide, such as chlorine bleach or a strong cleaning solution, gloves should be made from:

- Natural rubber;
- Butyl;
- Viton;
- Neoprene;
- Nitrile;
- Polyurethane; or
- Polyvinyl chloride (PVC).

If a mild detergent is being used:

- Ordinary household rubber, latex or vinyl gloves are suitable.

Before each use, gloves must be inspected for signs of cracking, shrinking, discoloration, holes or punctures. When gloves show any of these signs they should be taken out of service immediately and disposed of properly.

Factsheet 3: Full-body Protective Suits

Full-body protective suits may be worn by workers during microbial remediation work. The two most common types of material used are Tyvek and Saranex.

Tyvek is a plastic fiber. It's breathable; so the risk of heat stress that is commonly caused by wearing non-permeable protective clothing is reduced. It provides skin protection from particles as small as 0.5 microns. Tyvek has reasonable puncture and abrasive resistance. Tyvek offers little protection from chemicals or liquids. Tyvek is inexpensive and disposable.

Saranex is also a plastic fiber. It's made from a material similar to Tyvek and then coated with Saran, the same plastic as Saran Wrap®. It provides excellent resistance to a wide range of chemicals. Saranex is an inexpensive, disposable solution to protective clothing.

Disposable clothing is recommended for medium and large remediation projects. It prevents:

- The transfer and spread of mold to clothing; and
- Eliminates skin contact with mold.

When limited protection is warranted:

- Disposable paper coveralls can be used.

When full protection is required:

- A body suit of breathable material, such as Tyvek and mold-impervious disposable head and foot coverings should be used.
- All gaps, such as those around ankles and wrists, should be sealed. (Many workers use duct tape to seal clothing.)
- Inspect all suits before donning (putting on).

Sources: U.S. Environmental Protection Agency Mold Web Course; and Laborers-ACG Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 4: Eye Protection

Because of the possibility of microbial-contaminated dust particles coming in contact with the eyes, workers should always wear tight-fitting eye protection. If full-faced air-purifying respirators (APR) are being used, the eye protection is part of the respirator.

However, if full-face APRs are not being used, then goggles designed to prevent the entry of dust and small particles should be used. Safety glasses or goggles with open vent holes are not acceptable.

Eye protection should be evaluated based on types of exposure. Protective eyewear must be reasonably comfortable, fit snugly and be easy to clean and disinfect.

Eye and face protection shall comply with ANSI Z87.1 1989, American National Standard Practice for Occupational Educational Eye and Face Protection.

Factsheet 5: Foot, Head and Hearing Protection

Protective equipment must be provided, used and maintained in a sanitary and reliable condition. PPE refers to many different protective devices.

A hazard assessment should be conducted of all work areas so that proper protective equipment can be selected.

Safety Boots:

When working in areas where there is a danger of foot injury due to falling or rolling objects or objects piercing the sole, footwear must comply with the American National Standard. You can usually find "ANSI Z41-1991" imprinted inside the shoe. This standard specifies impact and compression tests with which the footwear must comply. To meet ANSI standards, the protection must be an integral part of the shoe. Using removable toe caps or covers is not allowed in areas that require foot protection.

Hard Hats:

Head protection must be provided whenever there is a possible danger of head injury due to falling objects or impacts. Head gear must comply with ANSI Z89.2-1986.

Ear Plugs:

The need for hearing protection must be determined at the start of each job. When an employee is exposed to a 90 db time-weighted average (TWA) and engineering out the noise levels is not feasible, then hearing protection must be provided. Hearing protection can be in the form of ear plugs or earmuffs.

Factsheet 6: Limitations and Hazards

All PPE has limitations and hazards associated with their use. The following need to be considered when PPE is used on a job site:

- Proper storage location (clean and dry);
- Inspect all PPE before use;
- Clean and disinfect after use;
- Repair or discard damaged equipment;
- Only use PPE you are trained to use; and
- Only use PPE that fits properly.

Other limitations and hazards to consider while wearing PPE may include the following;

- Restricting normal movement;
- Limiting vision;
- Limit hearing;
- Uncomfortable; and
- Hot.

Source: Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003.

Task *(continued)*

Scenario Restated:

> "I knew it would be hot and that the work wasn't going to be easy; but I never really thought about having to wear all these suits, gloves and taping up," said Jeff.
>
> "Yeah; and on top of all that, these hard hats, safety goggles and ear plugs make it hard for me to move very fast," said Wilma.
>
> "I'm pretty sure we need all this to keep us safe from the mold, but I got pretty hot and a little bit dizzy before we came out yesterday," said Jeff.
>
> "Well, I'll tell you one thing. I'll stay in there longer than that Suzanne or I'll pass out trying," said Wilma.
>
> "It didn't even appear that she was hot or tired when we all came out of our PPE yesterday," said Jeff.
>
> "Shut up," said Wilma.

Task:

Using the information you discussed from Factsheets 1 through 6, the information in the scenario and your experience, work together in your groups to help Jeff and Wilma by answering the questions below.

1. List reasons that it is important for all workers to wear their PPE when remediating mold.

_____

_____

_____

_____

_____

_____

continued

Task *(continued)*

2. Your table is assigned a small area to remediate the mold. List the types of PPE they should wear in doing the job.

_____

_____

_____

3. Today your group has been assigned to remediate your second house. Do you continue using your same PPE? Please explain your answer.

_____

_____

_____

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_____

_____

_____

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Summary: Personal Protective Equipment (PPE)

1. PPE should always be worn during mold remediation.
2. Always inspect gloves, safety glasses, goggles and shoes prior to use.
3. Only use approved PPE.
4. Use the right PPE for the right job.
5. Protective equipment must be provided, used and maintained in a sanitary and reliable condition.
6. Eye and face protection shall comply with ANSI Z87.1 1989, American National Standard Practice for Occupational Educational Eye and Face Protection.

Tony Mazzocchi Center Proficiency Assessment

Activity 6: Personal Protective Equipment (PPE) and Mold Remediation

Learning Objectives:

25. **To understand what Personal Protective Equipment (PPE) is and its proper care, use, limitation and inspections required.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

26. **PPE should always be worn during mold remediation**. How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

27. **Always inspect gloves, safety glasses, goggles and shoes prior to use.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

28. **Only use approved PPE**. How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

continued

Learning Objectives *(continued):*

29. **Use the right PPE for the right job.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

30. **Protective equipment must be provided, used and maintained in a sanitary and reliable condition**. How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace.**

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Activity 7: Respirator Protection

Purpose

To understand respirator requirements, types, selection, use and care.

This Activity has one task.

Task

Scenario:

Paul and Rick just arrived at the job site for their first day on the job. Their new boss, Jeff, was already waiting for them when they arrived.

> Jeff said, "You guys will be working with my crew chief, Burt, today. He will show you around and get you all set up."
>
> Just then Burt showed up and introduced himself as Jeff headed out for his next meeting.
>
> Burt explained to Paul and Rick the job they would be starting today.
>
> "We are working in the lobby area of a local hotel. Today we will be tearing out all the sheet rock that is covered in mold."
>
> Burt told Rick and Paul to head over to the change trailer to pick up the PPE they would need and to meet him at the van in 10 minutes for the short ride to the job site.
>
> Paul and Rick walked into the change trailer. Rick looked around and said to Paul, "Look at all this stuff, respirators, filters, gloves and boots. Do you know what are we going to need?"

Facilitator's Note

Use the Factsheet Reading Method for this Task, Factsheets 1 through 8.

Factsheet 1: Need for Respirators

The purpose of a respirator program is to ensure that all workers are properly protected from respiratory hazards.

Respirators protect remediation workers from inhaling mold, mold spores, dust and hazardous chemicals. Three types of respiratory protection are described on the next pages:

- Minimum;
- Limited; and
- Full.

Only respirators approved by the National Institute for Occupational Safety and Health (NIOSH) should be worn during mold remediation.

These respirators must be used according to any applicable Occupational Safety and Health Administration (OSHA) regulations.

Factsheet 2: Types of Respirators

The most common type of respirator used for mold remediation is called a negative pressure respirator, also known as an air-purifying respirator. This type of respirator cleans the air you breathe by removing or filtering contaminates from the air before they enter your lungs.

Minimum respirators — Are one-time use only, disposable paper masks. They do not seal to the face to provide a good fit. The protection factor (PF) is between 5 to 10. It is recommended that this type of mask have a N95 designation.

Limited respirators — Are the half-faced APRs which are made of rubber or plastic. They fit from the top of the nose to under the chin. The half-face APR has a NIOSH-assigned PF of 10 and requires the user to have a fit-test. These respirators are the minimum type recommended during microbial remediation work.

Full-Face APRs — Full-face APRs are made of rubber or plastic. They cover the whole face, starting at the forehead, down over the temples and eyes and under the chin. The full-face APR has a NIOSH-assigned PF of 50 and requires the user to have a fit-test.

Sources: OSHA 29CFR 1910.134; and Laborers-AGC Education and Training Fund, *Microbial Remediation,* June 2003.

Factsheet 3: Respirator Program

Before a worker can wear a respirator on the job, the worker must pass a medical evaluation, be fit-tested for tight fitting respirators and be trained to use the respirator he/she will be using on the job.

Medical Evaluation—Wearing a respirator may place a physiological burden on the wearer. OSHA requires that the employer provide a medical evaluation to determine if a worker can wear a respirator. This must be done before a worker is fit-tested.

Fit-testing—A qualitative fit-test or quantitative fit-test must be preformed on all negative or positive pressure tight fitting respirators before a worker is required to wear it. The worker must be fitted on the same make, model, size and style of respirator that will be used on the job.

Fit-testing must be conducted annually and whenever changes in the worker's physical condition could affect the respirator's fit. Such conditions include, but are not limited to:

- Cosmetic surgery;
- Dental changes;
- Facial scarring; and
- 10 percent or 20-pound change in body weight.

Training — Workers must be trained in the respiratory hazards to which they are potentially exposed to during routine and emergency situations. Workers need to be trained in the proper use of respirators, including putting them on and removing them, any limitations on their use and their maintenance. Training is required annually.

Sources: OSHA 29 CFR 1910.134; and Laborers-AGC Education and Training Fund, *Microbial Remediation,* June 2003.

Factsheet 4: Protection Factors (PF)

Protection Factor (PF) is a value assigned by NIOSH to a respirator based on its efficiency.

Protection Factor is the concentration outside the respirator divided by the concentration that can get inside the respirator.

A respirator with a PF of 10 reduces a worker's exposure by 10 times or 1/10 of the outside level. You could also say that with the respirator on, the worker is 10 times more protected than without the respirator.

A PF of 10 means that the respirator can only be used in exposures up to 10 times over the permissible exposure limit (PEL).

The key to understanding respiratory protection is to realize that all respirators leak to a certain degree. The amount of leakage depends on how well the face piece seals to the face.

Sources: OSHA 29 CFR 1910.134; and Laborers-AGC Education and Training Fund, *Microbial Remediation,* June 2003.

Factsheet 5: Filter Cartridges

Respirators with high efficiency particulate air (HEPA) filters are necessary during mold remediation. The use of chemicals during remediation will require the appropriate chemical cartridge. Combination HEPA/chemical cartridges may also be used and are recommended.

All filters, cartridges and canisters used in the workplace must be labeled and color coded with the NIOSH-approval label. The label must not removed and must remain legible.

All cartridges are assigned a color designating the type of contaminant they will filter:

Cartridge Color: Contaminant

- Olive: Multi-Containment;
- White: Acid gas;
- Black: Organic vapors;
- Green: Ammonia gas;
- Yellow: Acid gas and organic vapors;
- Purple: Any particulates – P100;
- Orange: Any particulates – P95, P99, R95, R100; and
- Teal: Any particulates free of oil – N95, N99, N100.

P = Oil proof
N = Not resistant to oil
R = Resistant to oil

100 = 99.97 percent efficient
99 = 99 percent efficient
95 = 95 percent efficient

Sources: OSHA 29 CFR 1910.134; and Laborers-AGC Education and Training Fund, *Microbial Remediation,* June 2003.; and LabSafetySupply.com, "Respirator Specifics: Selecting Types and Use," available at: www.labsafety.com/refinfo/ezfacts/ezf275.htm.

Factsheet 6: Respirators: Clean, Care and Storage

Follow the manufacturer's instructions for cleaning and disinfecting your respirator. Generally:

1. Remove and properly discard filters and/or cartridges.
2. Immerse the respirator in warm water (about 110° F).
3. A solution of germicidal or mild detergent and a soft brush are used for cleaning.
4. Rinse the respirator thoroughly in clean, warm water.
5. Rinsing is extremely important because a residue of the cleaning agent can damage the respirator and irritate the skin.
6. As you clean and dry each part of the respirator, inspect it carefully to be sure it is in good condition.
7. Thoroughly dry all parts before putting the respirator back together.
8. Loosen harness straps.
9. Place respirator in a clean bag, box or appropriate storage area. The storage area should be in a cool, dry place. Do not place any weight on the respirator.

When storing your respirator, even overnight, you must store it in a position that will prevent the face piece and inhalation and exhalation valves from being deformed. Protect the respirator from dust, sunlight, extreme heat and cold, moisture, damaging chemicals and physical damage.

Source: OSHA 29 CFR 1910.134, NASD Review: 04/2002, Laborers-AGC Education and Training Fund, *Microbial Remediation*, June 2003.

Factsheet 7: Respirators: Inspection

All respirators must be inspected before each use and during cleaning.

Check the following items when conducting a respirator inspection:

- Function;
- Condition, including tightness;
- Condition of parts, especially rubber parts, for flexibility and deterioration;
- Parts, including face piece, head straps, connecting tubes;
- Buckles, lens cover, sealing surface, gaskets, inhalation and exhalation valves (missing valves must be replaced); and
- Inspect and install filter cartridges.

Sources: OSHA 29 CFR Part 1910.134; Labor-AGC Education and Training Fund, *Microbial Remediation*, June 2003; and *Respiratory Protection Training Manual*, Hammer/Hamtch, April 2006.

Factsheet 8: Donning/Doffing and Pressure Checks

Use only the respirator type and size you have been fit-tested for.

Donning (putting on) steps:

- Don your respirator by placing your chin into the respirator.
- Seal against face and pull straps over head.
- Adjust straps starting at the bottom, middle and then top.

Pressure checks:

Negative air-pressure fit check:

- Place hands over inhalation points and inhale, creating a negative pressure.
- Hold for 10 seconds (respirator should collapse against the face) and listen for leaks.
- Adjust if necessary and repeat.

Positive fit check:

- Place hands over exhalation valve cover and exhale creating a positive pressure.
- Hold for 10 seconds (respirator should puff away from the face) and listen for leaks.
- Adjust if necessary and repeat.

Doffing (taking off) steps:

- Bend forward at the waist, grasp the respirator and remove.

Sources: OSHA 29 CFR Part 1910.134; Labor-AGC Education and Training Fund, *Microbial Remediation*, June 2003; and *Respiratory Protection Training Manual*, Hammer/Hamtch, April 2006..

Task *(continued)*

Scenario Restated:

Paul and Rick just arrived at the job site for their first day on the job. Their new boss, Jeff, was already waiting for them when they arrived.

> Jeff said, "You guys will be working with my crew chief, Burt, today. He will show you around and get you all set up."
>
> Just then Burt showed up and introduced himself as Jeff headed out for his next meeting.
>
> Burt explained to Paul and Rick the job they would be starting today.
>
> "We are working in the lobby area of a local hotel. Today we will be tearing out all the sheet rock that is covered in mold."
>
> Burt told Rick and Paul to head over to the change trailer to pick up the PPE they would need and to meet him at the van in 10 minutes for the short ride to the job site.
>
> Paul and Rick walked into the change trailer. Rick looked around and said to Paul, "Look at all this stuff, respirators, filters, gloves and boots. Do you know what are we going to need?"

Task:

Using your knowledge, experience and the discussion of the factsheets, answer the following questions.

1. What is needed before Rick and Paul can use a respirator?

continued

Task *(continued)*

2. Your group is assigned to help the new people, Paul and Rick, pick out the proper PPE they will need for the job. Make your list below and explain why they need the items your group choose.

3. When should the PPE be donned?

4. What inspections do Rick and Paul need to do before donning their PPE?

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Summary: Respirator Protection

1. Before you wear a respirator you must be medically evaluated, trained and fit-tested.
2. You must choose the correct respirator and filters for the job.
3. Always clean and store respirators properly to protect them.
4. Inspect and perform negative and positive seal checks every time you put on a respirator.

Tony Mazzocchi Center Proficiency Assessment

Activity 7: Respirator Protection

Learning Objectives:

31. **To understand respirator requirements, types, selection, use and care**. How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

32. **Before you wear a respirator you must be medically evaluated, trained and fit-tested.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

33. **You must choose the correct respirator and filters for the job.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

34. **Always clean and store respirators properly to protect them.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

35. **Inspect and perform negative and positive seal checks every time you put on a respirator.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Activity 8: PPE and Respirator Practice

Purposes

To practice donning (putting on) and doffing (taking off) PPE and respirators.

To complete medical evaluations and qualitative fit testing.

This Activity has four tasks.

Task 1

There is only one Factsheet for this task. Each worker should read the Factsheet and then the Factsheet should be discussed by the group.

Trainer's note: Demonstrate to the students before handing out coveralls and gloves how to properly don and doff PPE.

Demonstrate to students steps for inspection, donning, negative and positive pressure checks and doffing before task. One trainer should do this while the other trainer reads Factsheet 1 aloud. This should be done at this point.

Factsheet 1. Respirators: Inspection, Donning/Doffing and Pressure Checks

Inspection steps:

- Before each use, inspect respirator for wear and damage.
- Use only the respirator type and size for which you have been fit tested. Inspect the straps, buckles, lens cover, sealing surface, gaskets, inhalation and exhalation valves (missing valves must be replaced).
- Inspect and install filter cartridges.

Donning (putting on) steps:

- Don your respirator by placing your chin into the respirator.
- Seal against face and pull straps over the head.
- Adjust straps starting at the bottom, middle and then top.

Pressure checks:

Negative air-pressure fit check:

- Place hands over inhalation points and inhale, creating a negative pressure.
- Hold for 10 seconds (respirator should collapse against the face); then listen for leaks.
- Adjust if necessary and repeat.

Positive fit check:

- Place hands over exhalation valve cover and exhale creating a positive pressure.
- Hold for 10 seconds (respirator should puff away from the face); then listen for leaks.
- Adjust if necessary and repeat.

Doffing (taking off) steps:

- Bend forward at the waist, grasp the respirator and remove.

Sources: OSHA Rule on respirator protection standard, 29 CFR Part 1910.134, and *Respiratory Protection Training Manual,* Hammer/Hamtch.

Task 1 *(continued)*

Medical Wearing Evaluation — Wearing a respirator may place a physiological burden on the wearer. OSHA requires that an employer provide a medical evaluation to determine if a worker can wear a respirator. The evaluation must be done before a worker is fit tested or required to use a respirator. Medical evaluations are required annually after initial evaluation. All participants will now be directed by the trainer to the area for medical evaluations.

Trainer's note: Please direct class to the area that has been set up for evaluations. Medical evaluations will be done individually. See OSHA standard appendix C, 29 CFR 1910.134, Respirator Evaluation Questionnaire (Mandatory).

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Task 2

In your small groups, you will each be given a respirator and filter cartridges. Your task will be to work with a partner and, using the check sheet on the following page, verify each step as your partner completes the steps required to:

- **Inspect his/her respirator and filters;**
- **Don (put on) the respirator; and**
- **Perform the negative and positive pressure checks and doffing (taking off) the respirator.**

Air-purifyng Respirator Job Aid
MSA, Scott APR

Proper Size	Critical
Mask Selection Inspection	
1. Select proper size.	**Yes**
2. Verify Face Piece Condition: - Packaging; - Straps, buckles, lens; - Sealing surface; - Inhalation valves; - Exhalation valve.	
3. Inspect and Install Cartridges: - Gasket is in place; - Inspect cartridges; - Install filters/cartridges.	**Yes**
Donning and Pressure Check	
1. Don mask: - Chin into mask; - Seal against face; - Pull straps over head.	
2. Adjust strap - Bottom, middle, then top.	
3. Negative pressure seal check - Inhale and hold breath 10 seconds; - Adjust straps as necessary.	**Yes**
4. Positive pressure seal check - Exhale slowly, 10 seconds; - Mask expands evenly; - Listen for excessive leaks; - Adjust straps if necessary.	**Yes**
Doffing the Respirator	
1. Bend forward at the waist.	**Yes**
2. Grasp respirator.	**Yes**
3. Remove mask.	**Yes**
4. Return respirator: - Report any respirator problems.	

Task 3

In your small groups you will each be given PPE (Coverall, glove. . .). Your task will be to pick a partner and practice the proper donning and doffing techniques that have been demonstrated by your trainers.

- In your small groups inspect all your PPE;
- Don (put on) your coveralls, gloves. . . ;
- Practice taping glove to coveralls; and
- Practice doffing (taking off) tape, gloves and coveralls.

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Task 4

Students will complete qualitative fit-testing after they have received a medical evaluation. A fit-test is required before a worker may wear a respirator. The fit-test is required to be completed annually after the first fit-test.

Complete an irritant smoke or banana oil qualitative fit-test using the following steps:

1. Smell a weak concentration of the test agent.
2. Inspect the respirator.
3. Don the respirator.
4. Perform a negative pressure check.
5. Perform a positive pressure check.
6. Wear the respirator for at least five minutes.
7. Close eyes.
8. Breathe normally.
9. Breathe deeply. Breaths must be deep and regular.
10. Turn head from side to side.
11. Nod head up and down.
12. Read the Rainbow passage (OSHA Standard 29 CFR 1910.134).
13. Jog in place.
14. Breathe normally.
15. If the agent is still detected, readjust the mask. Repeat steps 4 through 14.
16. If the test agent is still detected, select another size mask or type respirator and repeat steps 2 through 14.
17. Clean, sanitize and maintain the respirator.

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Summary: Practice Using PPE and Respirators

1. Full-face respirators are recommended by many respected sources.
2. Medical evaluations are required to determine if a worker can wear a respirator.
3. Proper donning (putting on) PPE and doffing (taking off) PPE techniques are necessary to minimize exposure.
4. Qualitative fit is required to ensure that the respirator is fitting properly.

Tony Mazzocchi Center Proficiency Assessment

Activity 8: PPE and Respirator Practice

Learning Objectives:

36. **To practice donning (putting on) and doffing (taking off) PPE and respirators.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

37. **To complete medical evaluations and qualitative fit-testing.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

38. **Full-face respirators are recommended by many respected sources.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

39. **Medical evaluations are required to determine if a worker can wear a respirator**. How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace.**

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

continued

Learning Objectives *(continued):*

40. **Proper donning (putting on) PPE and doffing (taking off) PPE techniques are necessary to minimize exposure**. How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Activity 9: Decontamination

Purpose

To develop an understanding of basic decontamination methods and their importance in protecting your health.

This Activity has one task.

Task

Scenario:

Wilma and Suzanne arrived at the job site.

> Jeff called out to them "Hey can you two give me a hand with this decontamination line I'm trying to set up?"
>
> "I don't see why we need a decontamination line. All we're doing is going into the house and removing moldy stuff. Right?" Wilma asked Suzanne. "Besides it will take us a lot longer to get this job done."
>
> "I think we need to be careful not to get the mold particles on us when we take off our PPE," said Suzanne. "I know I don't want to take this stuff back home with me."
>
> "Let's go see what Jeff's plan is for the decontamination line," said Wilma.

Facilitator's Note

Use the Factsheet Reading Method for this Task, Factsheets 1 through 9.

Factsheet 1: Contamination Hazards

On a microbial remediation project, workers wear PPE to protect themselves against hazards. However, the nature of the work is such that the PPE itself will be exposed to contaminants.

- For example, puddles resulting from the water or biocides applied during the removal process can contaminate boots.
- Handling contaminated tools can contaminate gloves.

Therefore, it is important for the workers to know how to remove their PPE without being exposed. A formal decontamination sequence must be followed.

Decontamination is the process of removing or neutralizing contaminants that have accumulated on PPE, tools or equipment used on the job.

Contamination is any hazardous material that has escaped normal containment and can be moved from one location to another.

Contamination hazards can be a:

- Gas;
- Solid (particulate); or
- Liquid.

Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

Factsheet 2: Bringing It Back Home: Why Contamination Must Be Controlled

Contamination can hurt you.
Contaminants can get on your skin; and if they are airborne, you can breathe them into your lungs.

If you have a cut, contamination in any of its three physical states (gas, liquid or solid) can enter your body and do harm.

If you are punctured by an object contaminated with a hazardous material (for example, a sharp piece of piping coated with PCBs) the hazardous material will enter your body.

Contamination can hurt others.
Contamination is not only a hazard for workers who participate in site remediation work; it is a hazard for their coworkers and their families.

Contamination can spread.
Contamination is portable.

You can carry it off the work site and expose other people. This has happened. Workers have brought asbestos on their clothing to their homes.

Contamination can hurt the community.
Hazardous materials have been taken off a site and have exposed members of the surrounding community. In one situation, trucks left a contaminated site with dirt on their tires extremely contaminated with mercury and other toxic metals.

Contamination is a big deal. The law demands the implementation of decontamination procedures during cleanup activities.

Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

Factsheet 3: The Decontamination Plan

The principles of decontamination apply to both toxic chemicals and particulate contamination. The goal is to ensure that the contamination stays in a controlled area. A successful decontamination procedure must be governed by a specific plan. These plans need to combine several principles that are outlined below:

Prevention of Exposures in the First Place

Avoid exposure through work practices. For example, don't walk through a contaminated area; walk around the area.

Use remote techniques whenever possible.

Use extra layers of disposable clothing. Disposable clothing does not require decontamination.

Be sure protective clothing is properly sealed. All junctures must be sealed with tape.

Selection of Decontamination Method

Physical Removal. A water rinse, scraping, brushing and the use of adhesive tape are examples of physical removal.

continued

Factsheet 3: The Decontamination Plan *(continued)*

Who and What Should Be Decontaminated

All remediation workers in the hot zone must go through the decontamination station—no exceptions!

Workers who work in the warm zone may also need decontamination.

All materials and equipment that leave the hot zone must go through decontamination procedures if they are contaminated.

Decontamination Stations

The entrance and the exit to a hot zone must be controlled. If there's any evidence that workers or equipment could be contaminated, a decontamination station must be set up. Remember, almost all activities that involve mold and other toxic substances will entail some type of contamination.

The decontamination station has a series of sequential steps designed to decontaminate. The series of steps can be elaborate or quite simple. Make sure the contamination does not get out into the cold (clean) zone.

Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

Factsheet 4: The Three-zone Plan

Three zones must be defined for any activity that involves mold and other toxic substances.

1. Hot zone (work area);
2. Warm zone (decontamination area); and
3. Cold zone or clean zone (also called support zone).

Hot zone is the area immediately surrounding any hazardous materials and extends far enough to prevent adverse effects from hazardous materials releases to personnel outside the zone. This zone is also referred to as the work area or restricted zone in other documents.

Warm zone is the area where personnel and equipment decontamination and hot zone support take place. It includes control points for the access corridor and thus assists in reducing the spread of contamination. This zone is also referred to as the decontamination, contamination reduction or limited access zone in other documents.

Cold zone is the area that contains the command post and other support functions deemed necessary to control the incident. This is also referred to as the clean zone or support zone in other documents.

It is important to have **separate entrances and exits in the hot zone**.

The exit of the hot zone is the decontamination station.

Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

Factsheet 5: Dirty PPE Is a Major Source of Contamination; Removal of Protective Equipment

Protective clothing is used for the purpose of preventing contamination of the skin and personal clothing.

In many cases, only coveralls, gloves and shoe covers (booties) are needed in microbial remediation areas. If they are not used properly, you will be contaminated. The removal of the protective clothing is one of the major sources of self-contamination; therefore, it is important to remove protective clothing correctly.

Decontamination steps:

1. Drop equipment onto plastic sheet.
2. Remove all outer tape and place into garbage can or plastic bag.
3. Step into wading pool to decontaminate outer boots and gloves with water if not using disposable PPE.
4. Remove disposable boot covers and outer gloves and place into garbage can or plastic bag.
5. Remove disposable coveralls; place into garbage can or plastic bag.
6. Remove respirator and put into appropriate container.
7. Remover inner gloves and place in container in garbage can or plastic bag.
8. Step off pad into clean zone.
9. Shower and wash up at this time if possible.

Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

Factsheet 6: The Decontamination Station

The decontamination station must be positioned upwind of the hot zone.

The decontamination station must provide an **organized process** to reduce the level of contamination. This can be extensive or quite simple. It must do the job though.

For example, the heavily contaminated outer protective clothing is removed first after it is decontaminated. This is followed by removal of the lighter or less contaminated protective clothing. Each procedure should be done at separate stages in the decon station. This is to prevent cross-contamination. Consider this an assembly-line operation.

It should be organized **as a line** with the most gross contamination first; leading to less contamination; and ending at the boundary of the clean zone. The step-off pad is at this boundary.

The respirator should be the last piece removed.

Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

Factsheet 7: An Ounce of Prevention . . .

The best method for decontamination is to minimize the contamination in the first place. This can be accomplished by several methods. These methods will only work if they have been planned before the hazardous waste activities begin.

Ways to Minimize Contamination

Work practices can be used to avoid contamination. Here are some basic no-no's:

- Don't enter the hot zone unless necessary.
- Don't drink or eat in the hot and/or contamination reduction zones.
- Don't walk in puddles or under dripping pipes or equipment.
- Don't touch potentially contaminated equipment.

The following work activities need to be discussed at the pre-job briefing.

1. Disposable protective clothing:

Disposable clothing can be worn over other protective clothing or equipment.

2. Protection of tools and equipment from contamination:

Tools, especially monitoring equipment, are very difficult to decontaminate. They can be wrapped in plastic bags or covered with tape. Plastic sheets can be used to encase contaminated equipment. Strippable coatings, like tape, can be easily stripped off equipment.

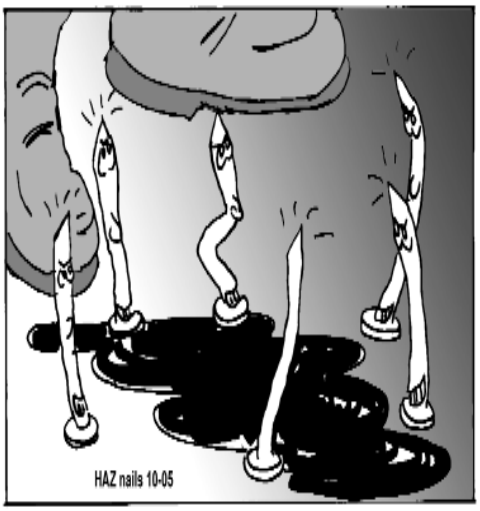
Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

4. Proper assembly and inspection:

Personal Protective Equipment needs to be assembled properly and inspected before use.

***Very Important*: Zippers should be taped and all areas where suits meet with gloves or boots need to be sealed (tape, velcro, etc.).**

5. Avoid damage:



Avoid puncturing or ripping the protective suit, gloves or boots. Watch out for nails, sharp edges and broken pallets.

6. Periodic check:

Check out your buddy's PPE. Is it torn or cut? Is it disintegrating or turning color?

7. Doffing:

Taking off your PPE, is one of the most important procedures in which to make sure that you do not contaminate yourself.

Important: Remember; if your PPE is leaking or torn, leave the area immediately. Decontaminate yourself and get medical assistance if necessary.

Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

Factsheet 8: The Craft of Decontamination

Physical Removal

Often the contaminants can be easily dislodged and removed.

- A water rinse is a common way to remove loose hazardous materials.
- Scraping, brushing and wiping are other ways to remove contaminants.

Sometimes decontamination is impossible or impractical. If this is the case, the contaminated items should be bagged and disposed of.

Remember, the decontamination techniques should not put the worker at greater risk than the original contamination.

The most common methods to decontaminate protective clothing are:

- Water and detergents;
- Water and bleach; and
- Airing out the suit at a warm temperature.

The decontamination method to be used is dependent on the contaminant itself.

PPE is most often decontaminated by soap and water, followed by a lot of rinsing with clean water.

Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

Factsheet 9: The Decontamination Line

All workers and equipment must go through a decontamination line when leaving the work area. How you doff your PPE is one of the most important steps to prevent being contaminated.

Workers who work on the decontamination line must be protected at the same level or no less than one level below the workers who come through the line.

The equipment listed below is the minimum needed for proper decontamination and should be on site before the operation begins:

- **Plastic sheets and/or plastic bags** — for equipment and tools;
- **Plastic buckets** — to clean respirators;
- **Collection containers** — for contaminated clothing and disposable equipment. These can be garbage cans with plastic liners or plastic bags;
- **Absorbents** — can be paper towels or clean cloth rags;
- **Wading pools or their equivalent**s — to hold and capture the decontamination solutions if used;
- **Wash and Rinse solutions (Spray bottles may be used)** — can be detergents or specially formulated decontamination solutions and water;
- **Long-handled, soft-bristled brushes** — to rub and wash off contamination; and
- **Metal or plastic drum** — for collecting contaminated wash and rinse solutions for disposal.

Source: *Hazardous Waste Operations and Emergency Response (HAZWOPER) Workbook, Workbook 2 of 3*, Tony Mazzocchi Center, May 2008.

Task 1 *(continued)*

Scenario Restated:

Wilma and Suzanne arrived at the job site.

> Jeff called out to them "Hey can you two give me a hand with this decontamination line I'm trying to set up?"
>
> "I don't see why we need a decontamination line. All we're doing is going into the house and removing moldy stuff. Right?" Wilma asked Suzanne. "Besides it will take us a lot longer to get this job done."
>
> "I think we need to be careful not to get the mold particles on us when we take off our PPE," said Suzanne. "I know I don't want to take this stuff back home with me."
>
> "Let's go see what Jeff's plan is for the decontamination line," said Wilma.

Task

Using information from Factsheets 1 through 9 that you just discussed, your experience and the scenario, help Jeff, Wilma and Suzanne by answering the questions below.

1. List all the tools and equipment Jeff, Wilma and Suzanne will need to set up the decontamination line.

_____

_____

_____

_____

_____

2. Using the large sheet of paper given to you by your trainers, draw out your decontamination line.

3. List each step of your decontamination line.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Summary: Decontamination

1. Full-face respirators are recommended by many respected sources.
2. Contamination is any hazardous material that has escaped normal containment and can be moved from one location to another.
3. Proper donning (PPE on) and doffing (PPE off) techniques are necessary to minimize exposure.
4. It is important for the workers to know how to remove their PPE without being exposed.
5. Proper set-up and use of the decontamination line limits exposures.
6. Personal Protective Equipment is necessary to limit hazardous exposures.
7. All workers and equipment must go through a decontamination line when leaving the work area.

Tony Mazzocchi Center Proficiency Assessment

Activity 9: Decontamination

Learning Objectives:

41. **To develop an understanding of basic decontamination methods and their importance in protecting your health.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

42. **Contamination is any hazardous material that has escaped normal containment and can be moved from one location to another.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

43. **It is important for the workers to know how to remove their PPE without being exposed.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

44. **Proper set-up and use of the decontamination line limits exposures.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

continued

Learning Objectives *(continued):*

45. **All workers and equipment must go through a decontamination line when leaving the work area.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

Activity 10: Field Activity

Purposes

To practice the knowledge and skills acquired in the mold remediation training.

To gain experience in proper donning (putting on) and doffing (taking off) procedures of Personal Protective Equipment (PPE).

To gain experience in proper decontamination (decon) procedures.

This Activity has two tasks.

Task 1

Scenario:

You are assigned to remediate a block of houses for mold. The area has been scouted and it is determined that there is still furniture and other debris in most homes.

The odors from some of the houses can be smelled on the front porches. The grass in the yards is high and overgrown. Debris is still scattered about.

Mold has been reported on most items, including walls, throughout the houses.

The Crew Chief and assigned crew have been given PPE and a box of supplies to complete this job before the end of the weekend.

Facilitator's Note

Use the Factsheet Reading Method for Task 1, Factsheets 1 through 7.

Factsheet 1: Ergonomics: Job Design with the Worker in Mind

People come in all shapes and sizes. Ergonomics is the study of work. It tries to match people's jobs and equipment with their bodies, physical abilities and psychological qualities. The basic principle of ergonomics is to make the job fit the worker instead of forcing the worker to fit the job.

Hazard Factors

Workers are more likely to develop injuries from inflammation of the tendons, nerves or muscles if their jobs involve:

- High repetition or rapid movements;
- Awkward postures or positions;
- High force (lifting, pushing/pulling);
- Vibrations;
- Cold temperatures;
- Improper equipment or tools;
- Poorly fitting gloves; and/or
- Lack of rest/recovery time.

Factsheet 2: Watch Out for Snakes

When you return to your home, be cautious of snakes that may have sought shelter in your home.

How to Prevent Snake Bites

- Be aware of snakes that may be swimming in the water to get to higher ground.
- Be aware of those that may be hiding under debris or other objects.
- If you see a snake, back away from it slowly and do not touch it.

Signs of Snake Bites

If you have to walk in high water or through yard and home debris, you may feel a bite but not know that you were bitten by a snake. You may think it is another kind of bite or scratch. Pay attention to the following snake bite signs.

Depending on the type of snake, the signs and symptoms may include:

- A pair of puncture marks at the wound;
- Redness and swelling around the bite;
- Severe pain at the site of the bite;
- Nausea and vomiting;
- Labored breathing (in extreme cases, breathing may stop altogether);
- Disturbed vision;
- Increased salivation and sweating; and
- Numbness or tingling around your face and/ or limbs.

Source: Centers for Disease Control, "How to Prevent or Respond to a Snake Bite," available at: http://www.bt.cdc.gov/disasters/snakebite.asp.

Factsheet 3: If Bitten By a Snake

What To DO if You or Someone Else is Bitten by a Snake.

If you or someone you know is bitten:

- Try to see and remember the color and shape of the snake. This can help with treatment of the snake bite.
- Keep the bitten person still and calm. This can slow down the spread of venom if the snake is poisonous.
- Seek medical attention as soon as possible.
- Dial 911 or call local Emergency Medical Services (EMS).
- Apply first aid if you cannot get the person to the hospital right away.
- Lay or sit the person down with the bite below the level of the heart.
- Tell him/her to stay calm and still.
- Cover the bite with a clean, dry dressing.

What NOT To Do if You or Someone Else Is Bitten by a Snake.

- Do not pick up the snake or try to trap it. This may put you or someone else at risk for a bite.
- Do not apply a tourniquet.
- Do not slash the wound with a knife.
- Do not suck out the venom.
- Do not apply ice or immerse the wound in water.
- Do not drink alcohol as a pain killer.
- Do not drink caffeinated beverages.

Source: Centers for Disease Control, "How to Prevent or Respond to a Snake Bite," available at: http://www.bt.cdc.gov/disasters/snakebite.asp.

Factsheet 4: Pesky Mosquitoes

One of the many insects we are faced with is the mosquito. After a storm the standing water is the perfect breeding ground for the pesky and sometimes dangerous insects.

Insect repellent helps reduce your exposure to mosquito bites that may carry West Nile virus or other diseases, and allows you to continue to play, work and enjoy the outdoors with a lower risk of disease.

Use repellent when you go outdoors. You should use repellent even if you're only going outside for a few minutes — it only takes one bite to get West Nile virus. Many of the mosquitoes that carry the West Nile virus bite between dusk and dawn. If you're outside during these hours pay special attention to using repellent.

Which Mosquito Repellents Work Best?

A wide variety of insect repellent products are available. CDC recommends the use of products containing active ingredients which have been registered with the U.S. Environmental Protection Agency (EPA) for use as repellents applied to skin and clothing.

When EPA registers a repellent, they evaluate the product for efficacy and potential effects on human beings and the environment. (Efficacy is the ability to produce a desired amount of a desired effect.) EPA registration means that EPA does not expect a product, when used according to the instructions label, to cause unreasonable adverse effects to human health or the environment.

Of the active ingredients registered with the EPA, two have demonstrated a higher degree of efficacy in the peer-reviewed, scientific literature. Products containing these active ingredients typically provide longer-lasting protection than others:

- DEET (N,N-diethyl-m-toluamide);
- Picaridin (KBR 3023); and
- Oil of lemon eucalyptus [active ingredient: P-menthane 3,8-diol (PMD)], a plant- based repellent, is also registered with EPA. In two recent scientific publications, when oil of lemon eucalyptus was tested against mosquitoes found in the U.S. it provided protection similar to repellents with low concentrations of DEET.

In general, the more active ingredient (higher percentage) it has, the longer a repellent will protect you from mosquitoes. For example, DEET products are available in many formulations — something with 30 percent DEET will protect you longer than one with 5 percent DEET. You cannot directly compare the percentage of one active ingredient to another, however.

Natural Oils

If you are concerned about the use of DEET, you may choose a natural mosquito repellent. The most common natural mosquito repellents are essential oils of varying types. The most effective are said to be citronella oil and clove oil. It is important to be careful when using clove oil as it is a skin irritant, so it must be diluted and used sparingly. Other effective oils include lemon, eucalyptus, cinnamon, castor, rosemary, cedar and peppermint. When using any essential oil as a natural mosquito repellent, remember that they are solely for external use. Be sure to test the oil on a small patch of skin before applying it fully to ensure that you are not allergic to it.

Remember — if you're getting bitten, do something about it!

Choose a repellent that you will use consistently. Also, choose a product that will provide sufficient protection for the amount of time that you will be spending outdoors.

Sources: Center for Disease Control, "What You Need to Know About Mosquito Repellent," available at: http://www.cdc.gov/ncidod/dvbid/westnile/mosquitorepellent.htm and http://www.mosquito-netting.com/2007-09-natural-mosquito-repellent.html.

Factsheet 5: Bee Stings

Bees stings are a biological hazard that you may face. For most workers, bee stings are no more than an uncomfortable nuisance. If you have a severe allergy to bee stings, getting stung can produce a life-threatening reaction called anaphylactic shock. You may experience total body swelling, difficulty breathing and dizziness and the shock reaction can escalate to death if you are not treated rapidly with antihistamines and/or epinephrine. Workers who have this severe allergy should carry "anaphylaxis" kits containing these medicines at all times. If no kit is available, it will be necessary to transport the worker immediately to a hospital or clinic.

Factsheet 6: Setting Up a Decontamination Unit

The decontamination unit is designed to allow passage to and from the work area during removal operations with minimal leakage of contaminants outside the work area enclosure.

Unit Construction

Materials used to construct a typical unit include:

- 2 x 4 lumber for the frame;
- 1/4- to 1/2-inch plywood **OR** 6-mil polyethylene sheeting (poly) for the walls; and
- Duct tape, staples and nails.

The floor should be covered with three layers of poly. The decontamination unit can be built in sections to allow for disassembly and reuse in other areas of the building. The design of the decontamination unit will vary with each project, depending on the size of the crew and the physical layout of the facility.

Factsheet 7: Materials and Equipment List for Preparing a Work Area

The following table is a list of materials and equipment needed for preparing and setting up the work area and decontamination unit for performing microbial remediation work.

Material and Equipment	Description and Uses
Polyethylene sheeting	Seal off work areas and items in work areas; material to protect surfaces in the work area (other than those being altered). Construct decontamination and enclosure systems. Some localities require fire-retardant poly. Types: 4-mil thickness 12' x 100' rolls 20 lbs 6-mil thickness 20' x 100' rolls 60 lbs
Duct Tape	Seam poly sheets together. Form airtight seal between poly and wall. Provide some support for vertical sheets.
Adhesive spray	Seal seams. Provide additional support to vertical sheet.
Furring Strips (cut into blocks)	Support vertical sheets of poly.
Nails	Attach furring strips to top edge of poly and wall. Construct frame of decontamination unit.
Staples and staple gun	Attach poly to wood frame.
Retractable razor knives	Slice poly and tape.
Warning Signs	Post at entrances to building and decontamination unit.
Vacuum cleaner with HEPA filter	Clean non-stationary items before removing them from the work area.
Ladders, scaffolding	
Carpentry tools	Hammers and saws
Prefab showers or materials for shower construction	

Task 1 *(continued)*

Scenario Restated:

You are assigned to remediate a block of houses for mold. The area has been scouted and it is determined that there is still furniture and other debris in most homes.

The odors from some of the houses can be smelled on the front porches. The grass in the yards is high and overgrown. Debris is still scattered about.

Mold has been reported on most items, including walls, throughout the houses.

The Crew Chief and assigned crew have been given PPE and a box of supplies to complete this job before the end of the weekend.

Task:

Using your group's discussion of Factsheets 1 through 7, your experience and the scenario, complete the task below.

Your task is to develop a step-by-step action plan of how the job will be done.

Step 1: Develop a pre-job briefing

Your pre-job briefing should include but is not limited to the following:

- **Who does exactly what?**

_____

_____

_____

continued

Task 1 *(continued)*

- **How will the task be done with the supplies given?**

  _____

  _____

  _____

- **The hazards present and needed precautions.**

  _____

  _____

  _____

- **The designation of a crew chief.**

  _____

- **Setting up the decon line in a safe area.**

  _____

  _____

  _____

Your facilitator will have each group share their pre-job briefing before moving to step 2.

Step 2: Develop your action plan (all actions from start to finish)

Your facilitator will have each group share their action plan before moving to Step 3.

Job Assigned: _____

Step-by-Step Action Plan for Your Job

1.

2.

3.

4.

5.

6.

7.

8.

Step 3:

- Don (put on) the PPE supplied to you;
- Complete your assigned job; and
- Go through the decontamination station.

continued

Task 1 *(continued)*

Trainers' Notes:

- PPE will include: Full-face respirator, Tyvek suits and rubber gloves.
- Box will include: Duct tape, masking tape, caution barrier tape, large plastic garbage bags, scissors, water spray bottles, long-handle stiff-bristled brushes, material for building decon chamber and box fan.
- Please be sure water or sports drink is available to all students performing the activity.

Trainers: Field Activity Set-up

- Set up activity in the location that the class is being held. The room should include a doorway and, if possible, a window. Check to see if another smaller room is available for this.
- Use book boxes, chairs, tables, etc., for the debris that will be in the room.
- Tape chart paper upon walls to simulate sheetrock.
- Once room has been arranged, sprinkle flour or powder upon floor and all items. Slightly mist the chart paper with water to help flour stick. The dusting of this will help simulate how spores and dust can become airborne.
- If class is large, split into groups and run this activity more than once.
- Be sure the box is equipped with the same materials for each group.

Trainers please clean up mess after activity is complete.

Task 2

Post-Field

A part of all plans is to have an evaluation of the job, whether in a drill or after a real response. In your groups, work together to answer the following questions:

1. What worked well?

2. What could have been done differently?

3. What are the most important lessons learned from this field exercise?

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Summary: Field Activity

1. One of the most important lessons is not to work alone in dangerous situations.
2. Any work that can involve dangerous situations needs to have a pre-job briefing and plan.
3. Doffing (taking off) of PPE is a major source of self-contamination. Be careful and practice often.

Tony Mazzocchi Center Proficiency Assessment

Activity 10: Field Activity

Learning Objectives:

46. **To practice the knowledge and skills acquired in the mold remediation training.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

47. **To gain experience in proper donning (putting on) and doffing (taking off) procedures of PPE**. How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

48. **To gain experience in proper decontamination (decon) procedures.** How much do you agree or disagree that the **training met this learning objective**?

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

49. **One of the most important lessons is not to work alone in dangerous situations.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

50. **Any work that can involve dangerous situations needs to have a pre-job briefing and plan.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

continued

Learning Objectives *(continued):*

51. **Doffing (taking off) of PPE is a major source of self-contamination. Be careful and practice often.** How much do you agree or disagree with the following statement? Understanding and applying this learning objective **will assist me in improving health and safety at my workplace**.

O	O	O	O	O
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree

OVERALL PROFICIENCY ASSESSMENT SECTION

52. How would you rate the **quality of this training overall?** .

O	O	O	O	O
Very high quality	Somewhat high quality	Neither high nor low quality	Somewhat low quality	Very low quality

53. Thinking about **using what you have learned to help improve health and safety** at your workplace, **how useful is this training**?

O	O	O	O
Very useful	Somewhat useful	Slightly useful	Not useful

54. What would you suggest be **done to improve this training**? If you need more space, please write on the back of this page.

Tony Mazzocchi Center
Final Proficiency Assessment

Mold Remediation Project

Trainee Name _____
Print

Trainee's ID. No. __ __ __ __ - __ __ __ __ The two-digit month and two-digit day of trainee's birth date and the last four numbers of the trainee's social security number. (For example, someone born September 22nd and whose last four digits of their social security number are 1234, would enter 0922-1234.)

Trainer Name _____
Print

By initialing below, I (the trainee), have assessed that I have successfully achieved the minimum levels of knowledge and skills communicated in the activities in which I have participated.	
Activity	**Trainee's Initials**
Activity 1: The Politics of Mold	
Activity 2: Mold and Its Dangers	
Activity 3: Indoor Air Pollution	
Activity 4: Preparing, Protecting and Performing the Work	
Activity 5: Physical Hazards During Mold Remediation	
Activity 6: Personal Protective Equipment (PPE) and Mold Remediation	
Activity 7: Respirator Protection	
Activity 8: PPE and Respirator Practice	
Activity 9: Decontamination	
Activity 10: Field Activity	

Number of Course Hours Completed _____

Please turn page over to finish completing this form.

To be completed by the **Trainee:**

1. I, the trainee, agree that I have successfully completed the Mold Remediation Project training.

   Trainee signature _____ Date: _____

2. I, the trainee, agree that the trainers have effectively facilitated the Mold Remediation Project training.

   Trainee signature _____ Date: _____

To be completed by the **Trainer:**

3. I, a member of the team of trainers, confirm that this trainee has successfully completed _____ **hours** of Mold Remediation Project training.

   Trainer signature _____ Date: _____

4. I, a member of the team of trainers, agree that our team of trainers has successfully facilitated the Mold Remediation Project training.

   Trainer signature _____ Date: _____

Appendix A: Tony Mazzocchi Center Worker-Trainers and Worker-Centered Training

USW International Union, with its long history of environmental safety and health activism, believes that workers are really the best resource for making our facilities safe and for protecting the community from harm. To put that belief into practice:

- The training is designed to be conducted by USW rank and file worker-trainers.
- Workers are the center of the learning process.
- Experience and knowledge of the workers in class is considered one of the most important resources for education in the class.
- Trainers, acting as facilitators and using the current workbook as a resource and guide, lead the class through activities which refresh and reinforce topics dictated by the regulations.

Tony Mazzocchi Center Worker-Trainers and Worker-Centered Training

Worker-Centered Training is based on Activities. An Activity can take from 30 minutes to an hour. Each Activity has a common basic structure:

1. **Small Group Tasks**: The workshop always operates with people working in groups at tables. (Round tables are preferable.) Each Activity has a task, or set of tasks, for the groups to work on. The idea is to work together, not to compete. Very often there is no one right answer. The tasks require that the groups use their experience to tackle problems and to make judgments on key issues. Part of the task often includes looking at factsheets and reading short handouts.
2. **Report-Back**: For each task, the group selects a scribe whose job it is to take notes on the small group discussion and report back to the workshop as a whole. During the report-back, the scribe informs the entire workshop about how his or her group tackled the particular problem. The trainer records these reports on large pads of paper in front of the workshop so that all can refer to it. After the scribe's report, the workshop is opened to general discussion about the problem at hand.
3. **Summary**: Here the trainer highlights the key points and brings up any problems and points that may have been overlooked in the report-back. Good summaries tend to be short and to the point.

Worker-centered training is based on the idea that every workshop is a place where learning is shared. Learning is not a one-way street, running from trainer to worker. Rather, worker-centered training is a structured procedure that allows us to share information. It is based on three learning exchanges:

- **Worker to worker;**
- **Worker to trainer; and**
- **Trainer to worker.**

Appendix B: Tony Mazzocchi Center (TMC) Green Policy Statement

The environmental and health and safety movements were born together during the 1960s. The very first health and safety training programs in the country were called "Hazards in the Workplace Environment." The TMC believes that the only difference between worker health and safety and the environment is the facility fence. Therefore, it is the policy of the TMC to integrate environmental concerns in all of our programs and in the ways in which we carry out our training.

The TMC strives to:

- Connect environmental and health and safety issues as much as possible in our training;
- Look for workplace solutions that improve the environment outside of our facilities;
- Work extensively to reduce the use of hazardous substances;
- Encourage our employers to reduce energy use and reduce the emission of greenhouse gases that cause global warming;
- Use recycled paper (at least 50 percent post-consumer content) when producing our training materials;
- Encourage workbook reuse and recycling;
- Promote the use of (union-made) non-chlorine paper products and environment-friendly toners and inks; and
- Conserve paper by reducing the length of our texts.

In addition, the TMC will pursue training that will help us become energy auditors in order to reduce the carbon footprint of our facilities.

Fundamentally, health and safety is environmentalism and environmentalism is always part of health and safety.

Appendix C: Course Certification and Certificate of Completion Validation Instructions for Worker-Trainers

In compliance with the NIEHS Minimum Criteria, please complete the following steps:

Upon completion of the course, the Lead Worker-Trainer will verify that the trainee has:

1. Completed the "Proficiency Assessment Instrument" at the end of each activity.
2. Completed and signed the "Final Proficiency Assessment Instrument" at the end of the workbook.
3. Entered their "Personal Identification Number" (the two digit month and two digit day of their birth date and the last four numbers of their social security number) in the space provided on the "Final Proficiency Assessment Instrument." (For example, someone born September 22nd and whose last four digits of their social security number are 1234, would enter 0922-1234.)
4. Signed and dated the "Final Proficiency Assessment Instrument" in the space provided.

continued

Course Certification and Certificate of Completion Validation Instructions for Worker-Trainers *(continued)*

The Lead Worker-Trainer will then:

1. Instruct each trainee to remove the "Final Assessment Instrument" and "Course Certificate of Completion" (Certificate) from the back of the workbook.
2. Sign the "Final Proficiency Assessment Instrument" in the spaces provided in order to verify that the trainee has successfully completed the course.
3. Insert the number of hours of training under No. 3 on the "Final Proficiency Assessment Instrument."
4. Complete Certificate for the trainee by:
   a. Printing the trainee's name on the first blank line.
   b. Filling in the "TMC Training Site."
   c. Filling in the date(s) of training.
   d. Filling in the trainee's Personal Identification Number in the space provided.
5. Verify that the Personal Identification Number is the same on both the "Final Assessment Instrument" and the Certificate.
6. Execute the Certificate by signing his/her name above "USW TMC Worker-Trainer."
7. Present the Certificate to the trainee.
8. Collect and send to Nashville all Proficiency Assessment Instruments for proper recording and registration.

All of the above steps must be completed in order to certify that the trainee has successfully completed the course.

TONY MAZZOCCHI CENTER
FOR HEALTH, SAFETY AND ENVIRONMENTAL EDUCATION
A PROJECT OF THE UNITED STEELWORKERS AND THE LABOR INSTITUTE

The Tony Mazzocchi Center for Health, Safety and Environmental Education

A project of the United Steelworkers and The Labor Institute

Five Gateway Center, Room 902, Pittsburgh, PA 15222

_____

Successfully completed _____ hours

NIEHS Certified Mold Remediation Project

On Date: _____ at the TMC Training Site in _____

James S. Frederick
USW TMC Program Director

USW TMC Worker-Trainer

Expires _____. Requires annual recertification.

Personal ID Number: _____

The training programs provided by the Tony Mazzocchi Center are made possible in part by the following cooperative agreements: **National Institute for Environmental Health Sciences (NIEHS) Worker Education and Training Program (WETP)**, Worker Health and Safety Training Cooperative Agreement (5 U45 ESO6175) and HAZMAT Training at DOE Nuclear Weapons Complex Cooperative Agreement (5 U45 ESO9761)

Only valid if signed by a USW TMC Certified Worker-Trainer

Appendix D: Attendance Form and Sign-in Sheet

The Tony Mazzocchi Center

Mold Remediation Project

Attendance Form

Please print

Name of Class: _____ **Date of Class:** _____

Instructors: _____

Name: _____ **Work Number:** _____

Mailing Address: _____ **Home Number:** _____

_____ **E-mail:** _____

Union/Mgmt.: _____

Plant: _____ **Plant Location:** _____ **Local #:** _____

OPTIONAL INFORMATION

Ethnic Group:

___ American Indian or Alaska Native
___ Black, not of Hispanic Origin
___ Hispanic
___ Asian or Pacific Islander
___ White, not of Hispanic Origin
___ Other _____

Education:

___ Some High School
___ High School Graduate
___ College Graduate
___ Some Postgraduate Work
___ High School Level Vo-Tech
___ Some College
___ Associate Degree
___ Advanced Degree
___ Other _____

Primary Job Title/Duties:

___ Officials & Managers
___ Professionals
___ Craft Workers
___ Laborers
___ Unemployed
___ Technicians
___ Office/Clerical
___ Operatives
___ Community

Have you received USW job-related Health and Safety training previous to this?

___ Yes
___ No

Your Signature: _____

Instructor's Signature _____

SIGN-IN SHEET

TONY MAZZOCCHI CENTER
FOR HEALTH, SAFETY AND ENVIRONMENT EDUCATION
A PROJECT OF THE UNITED STEELWORKERS, THE COMMUNICATIONS WORKERS OF AMERICA AND THE LABOR INSTITUTE

(Please print clearly.)

Class Title _____ **Class Completion Date** _____

Location/Facility _____ **Training/Class Hours:** _____

Grant Program: _____ **Dist. & LU #** _____

Instructors: 1) _____ **2)** _____

3) _____ **4)** _____ **5)** _____

Name (first and last) ***PLEASE PRINT*** **Name (first and last)**

1		16	
2		17	
3		18	
4		19	
5		20	
6		21	
7		22	
8		23	
9		24	
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11		26	
12		27	
13		28	
14		29	
15		30	