



LIBRARIES

INDIANA UNIVERSITY Bloomington

Disaster Response Plan

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INTRODUCTION

The Indiana University Libraries Disaster Response Plan has been compiled with several audiences and purposes in mind. In order to accommodate the needs of the myriad of individuals, libraries and scenarios in which it might be used it has been divided into multiple sections.

Section I is intended for the broadest number of general uses including the heads of circulation and stack maintenance at the various I.U. libraries, the collections librarians, and others who have an interest or direct involvement in the care of the collections of the general collections of the Indiana University Libraries.

Section II is written primarily for the staff of the E. Lingle Craig Preservation Lab. It provides a detailed description of the steps that will be taken by the staff of the Craig Preservation Lab in case of an emergency that involves the collections of the libraries. This section may also be of use to the members of the Libraries Emergency Response Team and to anyone else who has an interest in or direct responsibility for responding to an emergency in the libraries.

Section III is a list of suppliers, vendors and off-site resources for emergency materials and services. The initial focus of this section is on providers located in or near central Indiana but also includes sources of potential assistance from locations such as Chicago, Louisville, Cincinnati and Detroit. There is also a larger section of vendors and suppliers that could be useful but who are located at a greater distance and presumably could not respond to an emergency in as timely a fashion as a more local provider might.

Section IV contains several articles and excerpts of articles discussing the treatment of library materials during emergencies.

Section I: Library Disaster Response Plan for non-preservation lab staff

The Indiana University Office of Risk Management compiles an annual Emergency Action Plan (EAP) for every building on Bloomington and most other I.U. campuses. The EAP for Wells Library for the most recent year is included in Appendix B of this plan. [All of the Emergency Action Plans for the entire Indiana University system that are on file can be found at: <http://www.indiana.edu/riskmgmt/eap.htm>]. There should be nothing in the IUL Disaster Response Plan that conflicts with the EAP; however should such a conflict appear the EAP would take precedence over the IUL Disaster Response Plan. The primary difference in the focus of the two plans is that the EAP emphasizes safety of people and the IUL Disaster Response Plan is concerned more with the collections of the Indiana University Libraries after an emergency and presumes that the EAP guidelines will have been followed as necessary prior to any efforts being expended on the collections. Emergencies have been divided into the four categories that appear on chart on the following page.

The first priority for Moderate Emergencies that could have an impact on the safety of humans and for all Major or Catastrophic Emergencies is to make sure that people are evacuated to a safe location and that medical, police, and fire services are contacted as needed by calling 911.

When safety is an issue then only after the facility has been evacuated and emergency services have been contacted should the following steps be undertaken.

For emergencies that jeopardize the library collections each of the following offices should be contacted. (1) Call the Indiana University Physical Plant 24 hour emergency number: **855-8728**. BE VERY SPECIFIC about the nature of the problem. For instance, say that there is “water running on the floor” or “pouring from the ceiling” rather than “there is a leak.” Tell them the exact nature of the problem and that library materials are being damaged. (2) Notify the Craig Preservation Lab at **812-856-0991**. During normal working hours staff from the Preservation Lab can normally be at the site of an emergency within 45 minutes of receiving a call for assistance.

In general the staff of the Preservation Lab using on-site resources can manage all minor and some moderate emergencies that affect the general and special collections of the IUB libraries. Details of how they and other staff members of the University Libraries will approach this task as well as how they will work with others on more severe emergencies appear in Section Two of this Plan.

By far the largest number of emergencies which the staff of the Preservation Lab responds to is related to water. Approximately 85% of all library emergencies are water related. In a water emergency the number one item that the general library staff can do to assist is to limit the amount of water impacting the collections. If possible the source of the water should be shut off or diverted. If that is not possible each library circulation desk has been provided with multiple sheets of pre-cut plastic sheeting sized to cover a portion of the stacks in the library along with tape to fasten the sheeting in order to protect the collections. General library staff should attempt,

within reason, to cover the collections in order to limit the amount of water that is impacting material.

Items that are very wet will be separated by the Preservation Staff or under their supervision from those that are damp or only slightly wet. The former will need to be immediately triaged by the appropriate subject librarian and a decision regarding what to try to salvage versus what to replace will need to be made as soon as possible in order to attempt to save as many higher valued items as possible. The I.U. Libraries own two walk-in freezers that have a capacity of approximately 2,650 books. However it needs to be remembered that freezing does not fix a wet book, it simply allows the item to be somewhat stabilized in order to move to the next stage of being restored. Also, for many items freezing does more harm than good and so is counter-indicated.

While all materials owned by the Indiana University Libraries are valuable, individuals faced with decisions following serious flooding and water damage are reminded that replacement is nearly always much less costly, and often a better solution, than salvage and restoration. In order to assist in making sound, on-the-spot and timely decisions regarding salvage and restoration versus replacement, the following guidelines are to be followed. Materials have been segregated into four categories with Category I being most important and Category IV being least. In cases of emergencies and when a decision regarding what to work on or with first has to be made, individuals should focus on the higher priority categories first and work down the list when possible. Note: the following is adopted from the Library Preservation Department at Harvard University.

Category I: Irreplaceable/Essential

- Valuable/permanent papers with legal, fiduciary or evidentiary value, e.g., vital records or materials essential to the functioning of the Library;
- Irreplaceable materials that must be retained in their original format, e.g., manuscripts or rare books with intrinsic or artifactual value;
- Microfilm/photographic masters (should be stored off-site in secure, climate controlled environment).

Category II: Items with Significant Content and High Economic Value

- Materials with significant research value that are expensive-to-replace/repair, e.g., rare books or art books whose replace cost is in excess of \$500 or that are out-of-print;
- Materials with significant research value on media or in formats that must be salvaged immediately if they get wet, e.g., pre-1950 photographs, clay-coated papers.

Category III: Items belonging to other libraries

Category IV: Expendable

- Annual replacement and updates
- Duplicates
- Materials not central to the mission of the Library

Section Two: Information for the staff of the E. Lingle Craig Preservation Lab and Members of the Indiana University Libraries Disaster Response Team

Disaster Response Team Members and Duties

Disaster Response Team Members

- Response Director: Elise Calvi, 812/855-8155 or Doug Sanders, 812-856-4463
- Recovery Specialist: Head of General Preservation and Conservation, Elise Calvi, 812/855-8464, Doug Sanders, 812-856-4463, or Special Collections Conservator, Jim Canary, 812/855-3183
- Photographer: Designated by Head of Preservation
- Campus and Media Liaison: IUL Director of Communications, Becky Wood, 812/856-4817
- Logistics Coordinator: Libraries Facilities and Renovation Officer, Jim Champion, 812/855-3403
- Administrative Services Coordinator: IUL Director of Business Affairs, Mike Noth, 812/856-9274
- Pack-out and Relocation Supervisors: Circulation/Stacks Supervisors
- Collection Representative: Executive Associate Dean, Julie Bobay, 812/855-7743

Duties of the Disaster Response Team Members:

1. Response Director:

- responsible for overall management of recovery and salvage operation;
- determines when to begin salvage after consulting with Physical Plant, building representative, fire and safety;
- notifies disaster response team members;
- establishes command center;
- assesses and records damage with the photographer, Recovery Specialist and Risk Manager;
- determines the kind of salvage necessary;
- determines the level of preservation response needed by consulting the Collection Representative and written priority lists;
- informs the Administrative Coordinator and Campus and Media Liaison of needs;
- directs Logistics Coordinator;
- determines timetable for recovery;
- requests volunteers, as needed, through Media and Campus Liaison;
- arranges training of crew team captains;
- receives team reports;
- prepares final report.

2. Recovery Specialist:

- in cooperation with the Disaster Response Director and Collection Representative assesses damage;
- with the Director designates treatment area;
- advises Budget Officer and Campus Liaison on contacting outside agencies for assistance and supplies;
- consults with Logistics Coordinator for the transport of supplies and materials and the movement of damaged collections;
- responsible for handling and treatment of materials from the time they are removed from the disaster site until the materials are reshelved;
- supervises in-house cleaning and drying;
- trains volunteers;
- prepares report to the Director, including a photographic record, on the rehabilitation process and unsalvageable materials.

3. Photographer:

- photographs the extent of damage to the building, the furniture and the collections as part of the initial disaster assessment;
- provides a photographic record of the recovery, salvage, rehabilitation and restoration processes, with attention to recording unsalvageable materials, under the direction of the Recovery Specialist;
- tracks the dates and times of the photographs or film for the reports.

4. Campus and Media Liaison:

- works with campus administration to establish in advance work space for recovery;
- issues the approved authorization for the Disaster Recovery Team to do its work;
- acts as liaison with campus administration and coordinates with them;
- serves as source of all public information on the disaster;
- deals with media inquiries;
- arranges media announcements;
- issues information to the staff and to the University administration;
- keeps Dean of the Libraries informed;
- authorizes temporary staff reassignments as needed;
- receives reports from the Disaster Response Director;
- solicits volunteers as requested by the Disaster Response Director;
- thanks and acknowledges people who have participated in the recovery;
- decides on restoration of services.

5. Logistics Coordinator:

- sets up the command post;
- tells library staff and volunteers where to report on the advice of the Disaster Response Director;
- delegates functions as appropriate;
- makes sure any volunteers sign waiver forms;
- issues name tags;
- arranges for food and drink and sets up food area;

- is responsible for all transportation and relocation activities;
- makes any necessary arrangements to remove books from the disaster site;
- arranges for transportation and moving equipment;
- supervises loading and unloading;
- oversees shipping of boxes to freezers or other sites;
- supervises delivery and installation of needed equipment;
- supervises crews which set up the established recovery work place;
- arranges the return of books to their original location;
- coordinates with the appropriate building services and library staff.

6. Administrative Services Coordinator:

- coordinates budget and supply;
- is present at the command post;
- authorizes payment and signs vouchers for supplies and services needed, for on-campus or outside vendors;
- contacts vendors and services at the request of the Disaster Response Director;
- works closely with the logistics coordinator to arrange transport and delivery of needed supplies and services;
- with the Preservation Librarian is responsible for submitting insurance claims.

7. Pack-Out and Relocation Supervisors:

- perform regular safety inspections of library facilities;
- supervise the training of volunteers in making and packing boxes;
- keep count of boxes sent to other sites;
- work with Collection Representative and keep general records of sections moved to other sites, depending on the size of the disaster;
- prepare a written report of the packout activities;
- monitor the progress and orderly restoration of the stack area, including clean up and resetting shelving;
- organize and supervise the orderly return of library materials to approved shelving;
- keep records of the number of boxes and sections returned to the stacks;
- prepare a report on relocation activities which will include a photographic record.

8. Collection Representative:

- in consultation with the bibliographers, develops a pre-disaster priority list to be used during salvage operations;
- reviews priorities and floor plans at least annually;
- at the disaster site (in consultation with the relevant bibliographers, if possible) advises on priorities for action and salvage on the basis of the written guidelines;
- acts as recorder in damage assessment;
- consults with the Recovery Specialist, as needed, during the recovery process;
- works with appropriate bibliographers and serves as liaison to the cataloguing and acquisitions departments to record destroyed items and to arrange for replacement copies;
- maintains list of bibliographers and department heads with their telephone numbers. For disaster response in branch libraries, the Branch Librarian will act as the collection representative.

Responding to an emergency

After the building or area has been declared safe to enter, and the initial walk-through and assessment have been carried out, the Disaster Response Team may need to take some or all of the following steps, depending on the extent and type of disaster, to stabilize the environment.

1. Arrange security for the building or area.
2. Ensure that electricity has been turned off and/or find emergency power, as required.
3. Eliminate any source of water.
4. Ventilate building or area by opening windows or turning on the air conditioning and fans to increase air circulation.
5. Protect the building or area and materials from further harm by arranging for emergency repairs to roofs, windows and stacks and clearing mud or debris; protect undamaged materials by moving them or covering them with plastic.
6. Remove moisture from the environment by pumping out water, vacuuming or removing wet carpeting and turning on dehumidifiers and fans to dry the air. It is very important to physically remove as much water as possible first via extraction in order for this phase to be completed in as timely a fashion as possible.
7. Prevent mold by monitoring the temperature and humidity and lowering the temperature and humidity as much as possible; in winter, turn off the heat; in summer, set air conditioning to 65F; monitor for mold growth; continue to promote maximum air flow with fans (as needed and if it is safe to do so).
8. If mold or mildew is found on large numbers of materials, evacuate people and wait for assistance. (It generally takes 48-72 hours for mold or mildew to develop). Note: SOME TYPES OF MOLD ARE EXTREMELY TOXIC TO HUMANS.

Preparing for Recovery

1. Assess the damage (Disaster Response Director, Photographer, Collection Representative and Recovery Specialist). Determine the quantity of materials to be salvaged based on the damage assessment by the Disaster Director and established collection salvage priorities; decide which materials need to be freeze dried and which can be air dried; decide if Library Preservation can manage the disaster or if outside assistance is necessary. Insurance adjustors from the Indiana University Office of Risk Management should be contacted as early as practical in an emergency and be asked to be on-site and give a preliminary advice on how to proceed from an insurance point-of-view.
2. Establish a Command Post (Disaster Response Director chooses the site in coordination with University Physical Facilities and available resources; Logistics Coordinator sets up the site

The command post should have easy access to computers, telephones, faxes and copiers; other supplies and forms needed are purchase orders, worker identification tags, floor plans and the disaster manual; the Disaster Response Team will meet at the command post, where the Disaster Response Director will brief them and give directions for the beginning of the salvage operation; control access to the command post.

3. Contact Facilities (Campus and Media Liaison) Coordinate with University Risk Management the contacting of the pre-determined salvage facility or an outside contractor for freeze drying or air drying.

4. Organize Staff and Volunteers (Disaster Response Director and Conservators)

Request staff and volunteers and assembles them with trained team leaders to begin wrapping and packing damaged materials. All able staff, including student employees, may be asked to participate in salvage teams. Volunteers will sign a waiver of responsibility before beginning work. Everyone will be given breaks and food in case of a major disaster.

5. Arrange for Transportation, Supplies and Equipment (Logistics Coordinator and Administrative Services Coordinator)

Arrange for the delivery of materials and equipment as needed to the disaster site (including milk boxes, cardboard boxes, garbage bags, wrapping paper, book trucks, dollies, flat trucks, labels and pens) from on-site or off-site sources; arrange for transportation of boxed damaged items from the disaster site to the recovery area; assemble any additional supplies or equipment, such as tables, chairs, lights, fans, as needed, especially for on-site salvage in a pre-determined, large, clean area with delivery access.

Pack-Out and Damaged Material

The Pack-Out Supervisors will be the Stacks Supervisor(s) of the Access Services Department.

1. Pack-Out Supervisors meet with the Disaster Response Director and are briefed on the situation.
2. The Pack-Out Supervisors brief team leaders.
3. Teams assemble and begin the packing procedure according to preservation-approved techniques.
4. During packing, ranges and number of boxes are recorded.
5. When trucks arrive, the Pack-Out Supervisors brief the moving crews and oversee the loading of pallets. Material being sent to the freezers located at the Auxiliary Library Facility should be packed whenever possible in either plastic milk cartons or gray totes in order to facilitate stacking and thus maximize the use of the floor space in the freezers.
6. Pack-Out Supervisors oversee the unloading at the recovery site.
7. Supervisors report regularly on progress to the Disaster Response Director. Key points include:

- A. Identify and secure before an emergency occurs (responsibility of the Library Physical Facility Officer):
 - a. Work space (air-drying location, freezer, storage space)
 - b. Transportation (arranged by the Logistics Coordinator)
 - c. Packing area, with room to sort and pack materials
 - d. Loading area for receipt of supplies and shipping of wet books
 - e. Route for the removal of full boxes
 - f. Rest area for workers
- B. Workers
 - a. Salvage is taxing for workers; plan breaks for rest and refreshment every hour and a half, or more frequently as needed.
- C. The Packout Supervisor will select and brief leaders to direct the three or four person packing teams; the Campus Liaison will arrange for volunteers plus the following items:
 - a. Equipment
 - b. Plastic crates or cardboard boxes
 - c. Waxed paper or freezer wrap
 - d. Waterproof marking pens
 - e. Color-coded tags or labels for boxes (color indicates the level of damage)
 - f. Log books for recording materials leaving the library
 - g. Fans, dehumidifiers, electric generators
 - h. Book trucks, hand trucks, flat trucks

Sorting and Packing

The Circulation Supervisor organizes the workers into teams of three or four people and assigns the following tasks and priorities to each team:

Tasks

- Bring, prepare and assemble packing materials.
- Remove damaged materials. Wrap each wet book in freezer paper and place it in a plastic crate spine down.
- Sort materials during packing according to the level of damage and color code boxes appropriately.
- Record (preferably by scanning each item's barcode) what is being moved. Material that does not have a barcode or which cannot be opened to scan the barcode should be recorded in the log books. Note: it may be necessary to perform this task after the items have been placed in the freezer if time of critical.
- Move crates and boxes to loading point and load trucks.

Priorities

- Consult collections specialist/librarian of damaged area(s); pack in the indicated order.
- Start by removing materials from areas blocking access to stairs, elevators or hallways.
- Clear aisles and passageways first; use a human chain to pass items out separately to a packing area; when the aisles are clear, bring the packing crates to the shelves.
- Remove the highest Category materials first.
- In the general collections remove the wettest materials first; if water has come from above, start working with the top shelves, if from below, with the bottom shelves

- If the packing and removal operation will take more than ten hours, loosen tightly packed shelves or boxes so the books and paper do not jam as they swell. Otherwise, leave material packed together on shelves or in record boxes where it will present less surface area for mold growth.
- Books that are actually submerged in water are likely to be in less danger than book that are wet but no longer submerged. After the initial wetting, submerged books will remain more stable and be less vulnerable to mold attack than wet materials exposed to air.

Guidelines for Packing Wet Library Materials

- Be extremely careful when handling wet materials because they are very fragile.
- Don't unpack structurally sound containers like phase boxes or slip cases (although they may be reinforced by packing inside plastic crates).
- Fill cartons and crates three quarters full.
- Keep identification labels (call numbers and tags) with objects. Do not mark wet paper (but picture frames and reels can be marked with a grease pencil).
- To prevent further damage, do not stack materials in on the floor.

A detailed discussion of the salvage of water damaged library materials is provided in Section IV.

Top five problems to expect in an emergency.

Water. Water damage occurs in about 85% of all emergencies. After ensuring that the structure is safe to enter, the first action should be to stop the water at its source. If necessary, turn off electricity to affected areas. Secure any floating objects. Clear out as much water as possible and keep it from entering any unaffected areas. Wear protective clothing, waterproof gloves, and an appropriate mask. See Appendix B: "Salvage of water damaged materials" for a detailed description of how to treat items exposed to water.

Extreme environmental Conditions. Natural disasters, minor floods, and even prolonged power outages can all cause changes to the environmental conditions of the facility. Take immediate steps to stabilize the environment. Lower the temperature and humidity if necessary. Protect the collection from prolonged exposure to natural light. Try to maintain a maximum temperature of 70 degrees and a RH of 50% or less.

Mold. Following an emergency, a mold outbreak can occur in 48 to 72 hours or even sooner depending on the conditions. If a mold outbreak occurs or is expected be aware that it can cause or aggravate health problems. Appendix C is a copy of the OSHA factsheet on mold. If mold is found, take steps to contain it. Separate moldy objects from other material or seal affected rooms until mold abatement experts can be called in. Reduce humidity to 45% or less. Inactivate the mold through either air drying if possible or freezing if necessary.

Mud. Muddy objects can be frozen if necessary however many, BUT NOT ALL, items can be washed. To wash, use a series of tubs of water and submerge the items in sequence through the tubs. You can also rinse objects with a gentle stream of water if one can be found.

Bleeding Dyes. Keep bleeding materials separate from each other and from other materials. Blot wet papers and textiles to help prevent further transfer. Interleave.

Section III: Supplies, suppliers, vendors and non-Indiana University contacts

Emergency Supplies

The following is a list of emergency supplies that are kept in both the Preservation Lab and Wells Library. This material is available on an immediate basis to respond to an emergency. The material at each location is estimated to handle up to 500 books. Please contact the Craig Preservation Lab (812/856-0991) for specific product information.

| Quantity | Product |
|--------------|-------------------------------------------------------------------------------------|
| 1 | First aid kit |
| 4 | Flashlights (waterproof) |
| 3 boxes | Gloves (nitrile, various sizes) |
| 1 box (100) | Aprons (polyethylene) |
| 1 roll | Tape (yellow caution) |
| 2 rolls | Polyethylene sheeting (6 mil. Thick, pre-cut to heights of average range of stacks) |
| 1 | Camera (digital) |
| 1 carton | Paper towels |
| 1 pkg. (200) | Sorbent pads |
| 2 | Sponges (cellulose) |
| 1 box (40) | Bags (plastic trash, 30 or 42 gallon) |
| 1 box (40) | Bags (plastic, zip-lock type, 1 gallon) |
| 1 box (500) | Deli-wrap paper (10" X 15", single fold pop-up box) |
| 50 | Crates (white, collapsible) |
| 1 | Utility knife |
| 1 box (5) | Utility knife blades |
| 1 roll | Tape (clear, packing, 2" wide with dispenser rolls) |
| 2 rolls | Tape (Duct, 2" wide) |
| 1 | Hammer, claw-type 16 oz |

| | |
|---------------|------------------------------------------------------|
| 1 set of each | Screwdrivers (Phillips and flat-head) |
| 2 | Clipboard |
| 2 | Paper pads (8 1/2" x 11") |
| 1 box (12) | Pencils (#2, sharpened) |
| 1 box (12) | Pencils (wax, i.e., China markers) |
| 2 | Scissors (8", straight blade) |
| 25 | Rubber boots |
| 1 | Vacuum (wet-dry) |
| 4 | Fan (commercial-grade) |
| 2 each | Extension cords (25 and 50 feet, grounded) |
| 1 | Dehumidifier (commercial-grade) |
| 1 | Portable, hand-held battery operated barcode scanner |

Emergency Supplies located in each branch Library

| | |
|----------|-------------------------------------------------------------------------------------|
| 1 | Bucket (5 gallon, plastic) |
| 2 | Sponges (cellulose) |
| 6 sheets | Polyethylene sheeting (6 mil. Thick, pre-cut to heights of average range of stacks) |
| 1 roll | Tape (Duct, 2" wide) |

Section IV – Supplemental Reading

The following was excerpted from “A Primer on Disaster Preparedness, Management and Response: Paper-Based Materials.” The complete report is available from the National Archives at:

<http://www.archives.gov/preservation/emergency-prep/disaster-prep-primer.html>

National Archives and Records Administration

Archives and Preservation Resources

[Technical Information](#)

A Primer on Disaster Preparedness, Management and Response: Paper-Based Materials

October 1993

Procedures for Salvage of Water-Damaged Library Materials, Library of Congress, extracts from unpublished revised text, by Peter Waters, July 1993

Part 1

Introduction

Part 2

How Water Affects Books and Unbound Materials

Estimating Water Absorption

Part 3

Coated Papers

Archival Box Files

Access

Stabilizing the Environment

Assessment of Damage and Planning for Salvage

Part 4

The Recovery Team

Considerations for Recovery of Water-Damaged Collections

Part 5

Preliminary Steps in the Evacuation from Water-Damaged Areas

Removal and Packing of Water-Damaged Materials -- The Work Force

Removal from Water-Damaged Area--The Catalog and Other Records

Part 6

Removal and Packing

Disposition of Remaining Materials and Cleaning of Water-Exposed Areas

Cleaning After a River Flood

Thorough Washing to Remove Heavy Deposits of Mud

Principles of Stabilization by Freezing

Part 7

Cold Temperature Storage Conditions

Preparation for Freezing

Containers and Methods of Packing for Freezing

Part 8

Vacuum and Freeze Drying Technologies

Rehabilitation After Drying

Part 9

Evaluation of Loss

Summary of Emergency Procedures

Salvage of Water Damaged Library Materials

The Library of Congress

"Procedures for Salvage of Water Damaged Library Materials" extracts from unpublished revised text, by Peter Waters, July 1993

Part 1

INTRODUCTION

Since the first publication in 1975 of "Procedures for Salvage of Water-Damaged Materials" there has been no decrease in the frequency of accidents or unexpected disasters which have resulted in extensive water damage to library materials but there are many signs that we have begun to learn the immense value of disaster preparedness planning. Being familiar with the necessity of having to make a series of interrelated decisions promptly, understanding the effects of any particular course of action on subsequent ones -- this is the best kind of preparation needed in the event of major water-damage problems. A well-organized plan can greatly reduce the costs of salvage and restoration as well as the proportion of outright losses. This preparedness can also go a long way to lessen the emotional and stressful impact upon human beings.

The various courses of action discussed in this revised edition are designed to save the maximum amount of material with minimum amounts of restoration on the one hand or replacement on the other. However, it cannot be emphasized too much that no general instructions can take the place of an assessment of a given situation on site by a qualified, experienced library or archive specialist, who has proven experience in the reclamation of fire and water-damaged collections. It is strongly recommended that such assistance and advice be sought at the earliest moment after a disastrous event has occurred. In addition, the Conservation and Preservation Research and Testing Offices of the Library of Congress stand ready to serve as a technical information center and, if need be, a coordinating agency for emergency salvage efforts.

Library and archive staffs are now generally better informed about the mechanisms of drying cellulosic materials as well some of the technologies developed for this purpose. The use of vacuum chambers for drying large quantities of books and paper records has become an acceptable, almost common approach, but not without some confusion as to the differences and relative merits of vacuum drying and vacuum freeze-drying. Both methods effectively remove water but by quite different mechanisms and often with quite different results. An understanding of how these technologies function is essential in planning for a recovery operation, in order to make the best possible match between the nature, condition and needs of the materials and the capabilities of a particular drying system.

The use of fungicides to control the spread of mold growth has become an increasingly controversial subject because they may cause severe danger to workers and in some cases to the materials treated. Sterilizing by means of ethylene oxide and related chemicals has come under close scrutiny by the EPA, to the extent that we cannot recommend its use except by a commercial business firm which is fully insured and licensed to perform this service. Treatments involving the use of ethylene oxide (ETO), are best carried out under controlled conditions, as in vacuum chambers at the end of a drying cycle, and they must be guaranteed to leave no residual toxicity in the material. ETO remains the most effective treatment for severe mold attack resulting from major disasters, especially those exposed to river water.

The critical decisions that have to be made following water damage require knowledge of available drying technologies and their effects on a variety of composite materials. Ideally, materials removed from site, should be prepared and packed in a manner most suitable for the drying method to be used. Unfortunately, what tends to happen, particularly when no emergency plan exists, is that wet material is packed and shipped off to freezing facilities without knowledge of how the material will be dried. This may result in the material having to be re-packed before drying which adds considerably to the cost of drying and the potential for further damage.

The complete restoration of water-soaked documents, particularly bound items, can be a costly process even under the most favorable conditions. In the majority of cases, the high costs involved do not justify the salvage and restoration of books which are in print and can be replaced. However, decisions relating to these factors are virtually impossible to make during a salvage operation and even when a disaster plan exists. On the other hand it might be unwise not to attempt to salvage everything, if an insurance assessment is required and a claim is to be made.

Freezing, followed by vacuum freeze drying has been shown to be one of the most effective methods for removing water from large numbers of books and other paper records, but drying is not the final step in the reclamation process. In some cases, volumes which are only damp or which have suffered minor physical damage before freezing may come from a drying chamber in such good condition that they can be returned to the shelves. It is preferable that, where possible, the packing on site should be carried out in such a manner as to segregate very wet material from that which is partially wet and those that are damp from exposure to high humidity conditions. This will not only result in cost savings during the drying operation but will help to avoid over drying of the least wet material. In the majority of instances, drying must be followed by restoration and rebinding, and therefore the technique and success of the drying method chosen will directly affect the final cost of restoration. This can be very expensive. Thus, librarians and others faced with decisions which follow serious flooding and water damage from the aftermath of fire, and related water-damaged exposure, need to be reminded that replacement is nearly always much less costly than salvage and restoration. The necessity for making sound, on-the-spot, cost-effective judgments is the best reason

for being prepared in advance by developing a pre-disaster preparedness plan. There are a number of such plans that have been drawn up, which can be found in the literature, to serve as models. We encourage all of our colleagues who care about the integrity of library collections, including those who are difficult to persuade that a disaster could ever occur, to formulate disaster preparedness plans without delay so that it may never be necessary to refer to this document in times of distress!

part 2

HOW WATER EFFECTS BOOKS AND UNBOUND MATERIALS

Paper absorbs water at different rates depending on the age, condition, and composition of the material. Thus, some understanding of the mechanism of swelling action, as well as the development of mold, is essential to planning a successful salvage operation. In addition, when large collections are at stake, it is useful to be able to calculate in advance the approximate amount of water which will have to be extracted in a drying process. This will provide helpful data when selecting an appropriate drying method. Of equal importance is some knowledge of the length of time each type of material can be submerged in water before serious deterioration occurs.

ESTIMATING WATER ABSORPTION

Generally speaking, manuscripts and books dated earlier than 1840 will absorb water to an average of 80 percent of their original weight. Some may absorb as much as 200% of their original weight. Since there is a greater concentration of proteinaceous material and receptivity to water in such early books and papers, they are especially vulnerable to mold when damp. Modern books, other than those with the most brittle paper, will absorb an average of up to 60 percent of their original weight. Thus, in estimating the original weight of a collection, if one assumes an average of four pounds per book when dry for 20,000 books in each category, drying techniques must be capable of removing approximately 64,000 pounds of water from the earlier materials and 48,000 pounds from the latter.

The major part of all damage to bound volumes caused by swelling from the effects of water will take place within the first four hours or so after they have been immersed. Since the paper in the text block and the cardboard cores of book bindings have a greater capacity for swelling than the covering materials used for the bindings, the text-block of a soaked book usually expands so much that the spine assumes a concave shape and the fore-edge a convex shape, thus forcing the text block to become partially or completely detached from its binding. The board cores of bindings absorb a great amount of water in such circumstances and are usually the source of mold development between the board papers and fly leaves. This is especially apparent when the area in which water damage has occurred begins to dry out and the relative humidity falls below 70%. Although it is obviously important to remove as much moisture as possible from the environment, it is essential that the water content of the material be monitored because this will remain dangerously high, long after the area is apparently safe. Action taken to salvage the material should therefore be governed by the water content of the material and not by the relative humidity of the area. A water moisture meter, such as an Aqua Boy can be used to measure the water content inside books and box files. If such an instrument is unavailable a crude but quite effective way is to use a mirror within but not touching the text block. Condensation will cloud the mirror. A water content measuring less than 7% is considered dry.

Leather and vellum books, especially those of the 15th, 16th, and 17th centuries, can usually be restored successfully if they are dried under very carefully controlled procedures. Such materials are usually classified as rare and should be treated accordingly by not mixing them with less rare materials during preparations for salvage, stabilization and drying. The advice of a certified book conservator may be essential in order to safely carry out the most appropriate methods. If the material is frozen, freezer paper should be used between each volume to prevent sticking. (Refer to the section on freeze-drying for the special requirements needed for drying this type of material). Unfortunately, modern manufacturing processes so degrade the natural structure of leather that, once water soaked, book covers are often impossible to restore. Some leather bindings will be reduced to a brown sludge, while others will severely shrink. Swelling of covering materials, such as cloth, buckram, and certain plastics is negligible, in some cases shrinkage occurs. Book covers, however, which are made of a highly absorbent cardboard, will absorb water to a greater degree than an equivalent thickness of text block. Some book covering materials which have already deteriorated will absorb water at about the same rate as the text block.

Once access to the collection is gained, the external appearance of each volume and group of volumes is a useful indication of the degree of water damage. Those volumes found, usually in heaps, in the aisles will naturally be the most damaged. Not only will they have sustained the shock of falling, as rapid swelling caused them to burst from the shelves, but they will also have been exposed to water for a longer period than the volumes on the shelves above them. These will need special, flat packing and the most extensive

restoration. The appearance of such volumes can be a devastating, emotional experience, but one must not panic since every volume worth the cost of salvage and restoration can be saved. Above the floor levels there will be distinct signs among the shelves of the locations of the wettest material. Shelves which have expanded under the pressure of swollen paper and bindings will usually contain a mixture of evenly wet as well as unevenly wet material. The proportion of evenly wet material in these situations is usually less than those that are unevenly wet. This is because books, originally shelved closely packed together, will not easily be completely saturated especially if the paper is slow to absorb. This is the major reason why so many books become misshapen and distorted after water damage and also after they have been frozen and dried. If paper is unevenly wet, it will not dry without distortion. Misshapen volumes with concave spines and convex fore-edges can be immediately identified as belonging to the category of very wet. Others that have severely swollen text blocks but that still retain some spine and fore-edge shape may indicate that they were previously bound with library binding oversewing techniques and may have sustained irreversible sewing structure damage. Others may be relatively sound in shape and these stand the best chance of drying with the minimum of distortion.

part 3

COATED PAPERS

Coated papers are the most vulnerable to complete loss and should not be permitted to begin drying until each volume can be dealt with under carefully controlled conditions. The period between removal and freezing is critical. It may be necessary to re-wet them with clean cold water until they can be frozen. During the aftermath of the Corning Museum Library river flood of 1972, it was found that the highest percentage of water damaged books were printed on coated stock papers and that when they were frozen in the wet state most were dried successfully by freeze-drying.

ARCHIVAL BOX FILES

Archival box files often fare better than book material because their boxes are made of porous board stock which can be expected to absorb most of the water, protecting the contents inside. This would not be the case of course if they were completely immersed under water for many hours. During recovery, the contents of each box should be carefully inspected and the box replaced if it is water saturated. Failure to do so will increase the risk of physical damage as boxes collapse from pressure during recovery, shipment and cold storage.

ACCESS

Where water damage has resulted from fire-fighting measures, cooperation with the fire marshal, and health and safety officials is vital for a realistic appraisal of the feasibility of a safe salvage effort. Fire officers and safety personnel will decide when a damaged building is safe to enter. In some cases, areas involved in a fire may require a week or longer before they are cool and safe enough to enter. Other areas may be under investigation when arson is suspected. There may be parts of a collection that can be identified early in the salvage planning effort as being especially vulnerable to destruction unless they receive attention within a few hours after the fire has abated. If the fire marshal appreciates such needs, he may be able to provide means of special access to these areas even when other parts of the building remain hazardous.

Perhaps the most important and difficult decision to make after an assessment of damage has been made, is whether to remove the wettest materials first or to concentrate on those that are only partially wet or damp. If the majority are in the latter category the best course may be to recover these first since they may develop mold if they are left in dank and humid conditions while the wettest material is removed. A balance must be struck between the reduction of moisture content in the affected areas and the time involved for the safe removal of the majority of the collections in the best condition. To remove the wettest material first will obviously lower the moisture content, but it is often the case that this can be difficult and time consuming owing to the fact that shelves become jammed with swollen wet books and boxes that may require special equipment to free them. The aim is always to recover the majority of the collection in the best condition to avoid additional harm and costs brought about by post-disaster environmental damage. Once all entrances and aisles have been cleared, in addition to the above considerations, the most important collections, including rare materials and those of permanent research value, should be given priority unless other material would be more severely damaged by prolonged exposure to water. Examples of the latter are books printed on paper of types widely produced between 1880 and 1946, now brittle or semi-brittle. However, materials in this category which can be replaced should be left until last.

STABILIZING THE ENVIRONMENT

Salvage operations must be planned so that the environment of water damaged areas can be stabilized and controlled both before and during the removal of the materials. In warm, humid weather, mold growth may be expected to appear in a water-damaged area within 48 hours. In any weather, mold can be expected to appear within 48 hours in poorly ventilated areas made warm and humid by recent fire in adjacent parts of

the building. For this reason, every effort should be made to reduce high humidities and temperatures and vent the areas as soon as the water has receded or been pumped out.

Water-soaked materials must be kept as cool as possible by every means available and be provided with good air circulation until they can be stabilized. To leave such materials more than 48 hours in temperatures above 70 degrees Fahrenheit and a relative humidity above 60 percent without good air circulation will almost certainly result in heavy mold growth and lead to high recovery and restoration costs. Damaged most by these conditions are volumes printed on coated stock and such highly proteinaceous materials as leather and vellum bindings. Starch-impregnated cloths, glues, adhesives, and starch pastes are affected to a somewhat lesser degree. As long as books are tightly shelved, mold may develop only on the outer edges of the bindings. Thus no attempt should be made, in these conditions, to separate books and fan them open. As a general rule, damp books located in warm and humid areas without ventilation will be subject to rapid mold growth. As they begin to dry, both the bindings and the edges of books will be quickly attacked by mold. Archival files which have not been disturbed will not be attacked so quickly by mold. A different problem exists for damp books printed on coated stock, since if they are allowed to begin to dry out in this condition the leaves will quickly become permanently fused together.

ASSESSMENT OF DAMAGE AND PLANNING FOR SALVAGE

Weather is often the critical factor in determining what course of action to take after any flood or fire in which archive and library materials are damaged. When it is hot and humid, salvage must be initiated with a minimum of delay to prevent or control the growth of mold. When the weather is cold, more time may be taken to plan salvage operations and experiment with various reclamation procedures.

The first step is to establish the nature and degree of damage. Once an assessment of the damage has been made, firm plans and priorities for salvage can be drawn up. These plans should include a determination of the special facilities, equipment and personnel required. Overcautious, unrealistic, or inadequate appraisals of damage can result in the loss of valuable materials as well as confusion during all phases of the recovery operation. Speed is of the utmost importance, but not at the expense of careful planning which must be aimed at carrying out the most appropriate, safe and efficient salvage procedure within the circumstances prevailing. An efficient record keeping system is a must. Inventory of call numbers, shelf location and packing box numbers will help make the task of receiving collections returned after drying so that their original shelf locations can be identified, as efficient as possible.

Maintaining a detailed photographic and written record of all stages in the recovery operation is an essential, but often overlooked task which will aid the process of insurance claims and demonstrate the condition of the material before it is frozen and dried. We have found that on receiving materials back from a drying process, some administrators are shocked by the appearance of distorted material, believing perhaps that the condition should be much better, or be somewhat restored! The photographic record can be a very helpful reminder that distortion is mostly the result of the initial water damage and not necessarily the result of the drying process. The photographic record should provide key evidence for the reasons and nature of additional damage resulting from any part of the recovery process.

part 4

THE RECOVERY TEAM

Conducting a successful and efficient recovery operation after a major flood or similar disaster requires, in addition to a good supply of dedicated labor, a team of experts who should be assembled before practical work begins. The leader should be a person who has had practical experience and understands the effects of different environmental conditions on water-soaked materials of all types, conditions, and ages. The team leader should be assisted by custodians who know the collection intimately; conservators who can provide additional advice and guidance as well as help in training workers in safe removal procedures; procurement specialists; building maintenance engineers; electricians; carpenters; plumbers; a chemist if available, and health and safety experts.

One or more persons familiar with national and local resources are highly desirable to assist in locating and procuring the special facilities, equipment and supplies needed during the operation. They should be familiar with using the Yellow Pages to track down materials and equipment, able to seek out the key chemical supply companies in the country, if necessary, and generally have the authority to cut through administrative red tape.

The assembled team should be carefully briefed on the recovery plan and procedures to be followed as well as various contingency alternatives which might have to be adopted, priorities to be observed, and their own specific responsibilities. Team leaders need to be identified and instructed in the details of the recovery plan and its main aims and goals. They in turn should brief all workers so that they too will understand the

purpose of the plan and what is expected of each of them. A well briefed and dedicated team works much better than enthusiastic individuals who are allowed to carry out actions which may be disruptive to the main purpose of the team plan.

The major objectives of this team should be:

To stabilize the condition of the materials before removal by creating the environment necessary to prevent further damage;

To recover the maximum number of material from the damaged collections in a manner which will minimize future restoration and its costs.

PRIMARY CONSIDERATIONS FOR RECOVERY OF WATER-DAMAGED COLLECTIONS

- Seek the advice of specialists who can assist at the site of the disaster.
- Organize a disaster team and prepare a comprehensive plan of action, as well as plans for different contingencies.
- Do not attempt to remove materials from the area until an overall plan with a schedule of priorities has been established and all personnel thoroughly briefed and trained.
- In winter, turn off all heat in the building. In summer, reduce temperatures as much as possible through air-conditioning.
- Create maximum air flow through all affected areas by opening doors and windows. If electrical facilities are operational, use as many fans as can be acquired to create a current of air so directed as to expel humid air from the building. Use de-humidifiers together with air conditioning and a good air flow. The objective is to avoid pockets of stagnant air and to reduce moisture content.
- If house electricity is not available, hire portable generators to provide electricity for lights, fan, dehumidifiers, and other electrical services. For safety purposes, all electrical lines should be waterproofed and grounded and be administered by health and safety personnel.
- Do not permit anyone to open wet books; to separate single sheets; to remove covers when materials are water-soaked; or to disturb wet file boxes, prints, drawings, and photographs. Such handling can result in extensive and often irreparable damage to materials that otherwise might be salvaged. Reducing the cost of future restoration must be one of the top priorities of the salvage operation.
- Canvass the community to locate freezing and storage space.
- Locate sources of one cubic foot milk crates and corrugated board boxes.

part 5

PRELIMINARY STEPS IN THE EVACUATION FROM WATER-DAMAGED AREAS

If the materials are to be frozen, prior arrangements should have been made to ship the packed materials immediately to freezing facilities. Packed materials must not be allowed to remain on or near the site for more than a few hours, since such delay will further increase the possibility of mold development. Before actual removal of the water-soaked material begins, lighting, fans, dehumidifiers, and all possible venting should be fully operational. All work surfaces should be covered with polyethylene sheeting. Areas selected for packing or drying should be prepared for the operation by emptying them of all unnecessary equipment and furniture.

REMOVAL AND PACKING OF WATER-DAMAGED MATERIALS -- THE WORK FORCE

Safety of the materials and future restoration costs will depend largely on the competence and dedication of the salvage crews. The work will be arduous, dirty, and often frustrating. Team leaders should not hesitate to dismiss careless and thoughtless workers. Experience has shown that well-disciplined crews having brief rest periods with refreshments about every hour and a half are the most efficient. Working salvage crews to exhaustion pays no dividends.

REMOVAL FROM WATER-DAMAGED AREA -- THE CATALOG AND OTHER RECORDS OF THE COLLECTION

High priority should be given to salvaging the catalog and other records of the collection. Salvage operations should avoid any action that might remove or deface identifying marks and labels. During the pre-recovery planning stage a decision needs to be made on whether or not to use a location number identification system which could be used after the material is returned from the drying operation to reassemble the collection in similar shelf order. There will be a need to identify and segregate materials which are very wet from partially wet; mold contaminated from uncontaminated; rare and sensitive items from the less rare and sensitive etc. If an orderly, efficient and safe recovery is to be achieved, together with a control over the choice of drying and other special measures needed to save rare and sensitive materials, a box coding system is indispensable.

At least one person should be assigned specific responsibility for making an inventory at each location where the materials are taken from the shelves and boxed. This person might also be given charge of supervising the boxing and box coding process.

Conveyor belts and human chains are normally used to remove large numbers of material from each shelf, pack them in corrugated boxes or plastic milk crates and to move them to the loading site for shipment to cold storage facilities. It is at this time that a great deal of additional damage and confusion can occur. The number of people involved in this operation and their behavior needs to be closely supervised. Try to initiate a rhythm when using human chains that keeps everyone busy without being over taxed. Too many helpers will hamper progress, encourage loafing and generally reduce the efficiency of the operation. It is highly desirable to instruct the team daily on the tasks to be carried out and to keep them informed as to the major objectives of the recovery operation and as to any changes that have been made to the master plan. An efficient and dedicated work force needs to be provided with all the accouterments of human survival, such as regular rest periods, a place to eat, a convenience to wash and clean up and a immediate access to medical attention.

Manuscripts and other materials in single sheets create particularly difficult problems if they have been scattered. An indication of the approximate location in which they are found during the salvage operation may be extremely helpful at a later date. Materials should never be moved from the site in large batches or left piled on top of each other, either at the site or in adjacent temporary housing, since the excessive weight of water-affected books and paper records can lead to severe physical damage. When flood-damaged books were removed from the Biblioteca Nazionale in Florence following the river flood disaster of 1966 substantial numbers were piled high outside the library building while awaiting shipment to drying facilities. This action caused significant damage to the books from the weight of water saturated volumes and lead to very high costs of post-disaster restoration.

part 6 REMOVAL AND PACKING

The aisles between stacks and main passageways will probably be strewn with sodden materials. These must be removed first, separately, by human chain, in the exact condition in which they are found. Open books will be greatly swollen, but no attempt should be made to close them. Closing them will cause further damage by tearing the leaves, since paper will not slide when wet. Instead, books should be passed undisturbed to an adjacent dry area where an awaiting team may pack them without disturbing their shape. This particular type of material must not be packed tightly but should be packed flat in boxes and separated with at least one layer of freezer paper and one sheet of 1/2" polystyrene between each open book.

The packing team should have approximately the same number of people as the team which passes the damaged material to them. This will avoid bottlenecks and stacking materials on the floor awaiting packing. If a sufficient number of people and conveyor belts are available, the most efficient place to pack damaged materials will be on site. Teams will have to be organized to assemble packing materials and supply them to the packers in a smooth flow. Use of a second human chain or conveyor will reduce bottlenecks and the likelihood of incoming supplies interfering with the flow of packed materials being passed out of the building. After the aisles have been completely cleared, the main work of recovery can begin.

Hopefully, a decision will have been made as to which material to remove first: the wettest or the ones in the best condition. As stated earlier, if the majority is only damp and in relatively sound condition, these could be removed first and more rapidly than other materials. In these circumstances de-shelving and packing will be a relative quick operation and will help to establish a smooth worker flow. As each line of shelves is emptied, an assistant should code each box and record the box number and its general contents in a notebook. The contents of archival storage boxes are unlikely to be saturated with water if they were previously positioned close together. However, since certain types of boxes have a corrugated inside layer, they may be very wet, even though the major portion of the contents is only damp. In such cases, it is best to repack the contents in new boxes or in plastic milk crates. This will not only make each unit lighter to lift and prevent the collapse of a wet box but will also speed the drying process. When repacking it is important that the new boxes be properly identified.

DISPOSITION OF REMAINING MATERIALS AND CLEANING OF WATER-EXPOSED AREAS

If the wettest materials were removed first the drier material will usually be above the first four or five shelves and packed closely together. On no account should this third category be separated or spaced out during the earlier salvage efforts. Closely packed materials will not readily develop mold internally. However, since these will have been in a very humid atmosphere for, maybe several days, it is likely that some mold will

have developed on the outer edges of bindings and boxes. This is less like to occur if, during the evacuation of the wettest materials every effort had been made to reduce temperatures and humidity levels and establish a good air flow. There may be books and box files in such good condition that they need not be sent to freezing facilities but can be dried in ambient conditions. On no account however should the drying be attempted in the location in which they were found because the environment will be totally unsuitable. They should instead be removed to a controlled environment while shelves, wall, floors, and ceilings are sterilized and necessary maintenance work is being done to return the site to its normal condition. If moved, materials should be stacked with air spaces between them provided that the drying area has a good circulation of air, together with air-conditioning and dehumidification. If air-conditioning is not available, fans and dehumidifiers should be used to keep air moving and to extract moisture from the area. The relative humidity of a drying area is no guide to the actual moisture content of cellulose materials. The normal water content of paper is between 5 and 7 percent by weight. Materials which feel relatively dry to the touch as they come out of a humid, flood-damaged area, may actually contain moisture from above 10 to 20 percent. Heat is one of the best means of drying, but since it increases the risk of mold development on humid books and documents, it should be used only if a good circulation of air and dehumidification can be established. Hygrothermographs for recording temperature and relative humidity should be installed to monitor the general area, and moisture-content meters used to measure the moisture in the materials themselves.

CLEANING AFTER A RIVER FLOOD

The safest time to clean materials is after they have been dried. If water-damage is the result of a river flood then the following might, under certain circumstances, be considered. The Florence experience demonstrated that the best time to remove mud was after the books were dry. However some books did benefit from partial cleaning in the wet state. If adequate assistance is available, mud deposits on books which will not be further damaged by water may be washed off in clean, running water. Closed books may be held, one at a time, under water and the excess mud removed with a hose connected to a fine spray head. Similar washing should not be attempted with opened volumes, manuscripts, art on paper, or photographs. Rubbing and brushing should be avoided, and no effort be made to remove oil stains. Anything which is hard to remove is better left until after drying, when techniques for removal can be worked out during the restoration stage. In some cases, printed books bound in cloth or paper can be left immersed in clean running water for as long as two weeks. Although this should be avoided if possible, it is preferable when the only alternative is leaving such books in warm, humid air while awaiting attention.

THOROUGH WASHING TO REMOVE HEAVY DEPOSITS OF MUD

A more thorough washing procedure, intended to remove as much mud and slime as possible from books, requires six to eight tanks big enough to accommodate the largest volumes in the collection. This process is obviously wet and messy and needs to be set up outdoors in fair weather or in an area fitted out to use and remove large quantities of water. Since large quantities of water are required, the area will be wet and dirty throughout the operation, and good drainage is therefore essential. Any rustproof receptacles may be used if they are large enough, but plastic garbage cans (20 or 30 gallons) are recommended. Each can should be equipped with a hose to provide low-pressure, continuous water flow to the bottom so that dirty water, as it overflows the rim, will be constantly replaced by fresh. Each hose should be fastened securely to prevent damage to the books being washed. Wooden duck-boards, rubber boots, gloves and aprons are recommended for the protection of workers.

Keeping a book tightly closed, a worker should immerse one book at a time in the first can and remove as much mud as possible by gentle agitation under the water. Workers should not use brushes and or any tool which would cause an aggressive rubbing action. Books should be passed from one can to the next and the same operations repeated until most of the mud has been removed. At the last can, books should be rinsed by spraying them gently with a fine stream of water. No effort should be made to remove mud which continues to cling after sponging under water. This is much better done when the books are dry. Finally, excess water can be squeezed from books with hands pressure; mechanical presses should never be used. It must be emphasized that the above procedure should be attempted only by a carefully instructed team and in a properly fitted-out area. If there is any doubt about the ability of the team to follow directions, washing should not be attempted. There are many classes of books which should not be washed under any circumstances, and it is therefore imperative to have the advice of an experienced book conservator who can recognize such materials and who understands their treatment requirements.

PRINCIPLES OF STABILIZATION BY FREEZING

The most generally accepted method of stabilizing water-damaged library and archival materials before they are dried is by freezing and storing at low temperatures. This buys time in which to plan and organize the steps needed to dry the material and to prepare a rehabilitation site and the building for return of the collections after drying. Freezing provides the means for storing water damaged material safely and for an indefinite

period of time in similar physical condition in which they were found, preventing further deterioration by water and mold while awaiting treatment. Freezing is not a drying method, nor can it be expected to kill mold spores, but it is highly effective in controlling mold growth by inducing a dormant state in the spores. If mold damaged material is frozen it is important that the drying method chosen must prevent mold spore activity during the drying process. For this reason it is important to segregate such material during removal and packing operations. Stabilization by freezing also provides important advantages when it is not possible to immediately assess the value of the damaged materials or to determine which items can or cannot be replaced. In other words, stabilization gives time in which to estimate recovery costs, to prepare adequate environmental storage conditions, and to restore the building. In some cases, it may be necessary to restore or rebuild the original facilities - a process which can require a long period of time.

Had freezing technique been used after the catastrophic Florence flood in 1966, thousands of additional volumes could have been saved completely or would have suffered significantly less damage. The Florentine libraries which sustained the greatest losses contained mostly 19th and 20th-century materials. In these collections, losses were heaviest among books printed on coated stock, whose leaves stuck together during drying and could not be separated afterward. These losses could have been largely prevented if the materials had been frozen while wet, and if drying methods now known had been used to prevent adhesion of the leaves. The effect upon freezing water soaked volumes which have lost their shape or have had their binding structures damaged by immersion, will be to slightly increase the thickness of volumes by the physical action of ice crystals, but this additional increase in thickness has been found to contribute no significant problems to already damaged books. Studies conducted by the Research and Testing Office of the Library of Congress have uncovered no evidence of any damage to cellulosic and proteinaceous materials caused solely by the action of freezing.

Freezing as a salvage method has other advantages. It can stabilize water-soluble materials such as inks, dyes, and water stains etc. which would otherwise spread by wicking action if they were dried from the wet state by conventional drying methods. Freezing provides the means by which water-soluble compounds will remain stable during a freeze-drying process which involves the removal of water by sublimation. This is the only known drying method capable of drying without further spreading of water soluble compounds, provided that the frozen state of the material is maintained before and throughout the drying process.

part 7

COLD TEMPERATURE STORAGE CONDITIONS

The size and formation of ice crystals is governed by the rate and temperature of freezing. Blast freezing used for certain types of food-stuffs is designed to quickly freeze in a few hours, often involving temperatures in excess of -50 degrees Celsius. The advantage of quick freezing is that ice crystals are kept very small, resulting in a limited amount of swelling. Availability of blast freezing facilities may not be possible following water damage, so in normal circumstances, freezing will be slower and therefore the formation of ice crystals larger, but this should not cause problems for the majority of library and archive collections. Once frozen, cold temperature conditions should be maintained at about 0° Fahrenheit (-18° Celsius). Lower temperatures will do no harm but higher temperatures may increase the size of ice crystals.

PREPARATION FOR FREEZING

Before freezing, it may seem tempting to wash away accumulated debris particularly if this is the result of a river flood, but this is rarely advisable or safe because of lack of time, skilled workers and a pure water supply, and the quantity of material to be handled. (Aqueous washing to remove smoke damage should never be attempted under any circumstances). Washing should never be attempted by untrained persons as this will cause further damage, nor should time be taken for this purpose if so little skilled help is available that any significant delay in freezing the bulk of the materials would result. The washing of materials containing water-soluble components, such as inks, watercolors, tempera or dyes should not be attempted under any circumstances. Experience has shown that such materials, as well as those that are fragile or delicate, can be seriously or irreparably damaged by untrained workers attempting to clean and restore on-site. Such materials need expert attention and hours of careful work if damage is to be kept to a minimum. The period of emergency action and first aid is a dangerous and unsuitable time for the careful work required to restore materials to near-original state. The general condition of the damaged material will determine how much time can be spent in preparation for freezing. At the very least, bound volumes should be wrapped with a single fold of freezer paper, or silicone paper, if it is likely that their covers will stick together during the freezing process. All rare, intrinsically valuable and delicate material should be prepared for freezing separately from other materials and also in separate categories so that each can be located and identified before they are dried. Each category may require a different type of drying than used for the other less sensitive materials. For instance, early printed books and manuscripts are made up of a variety of material including vellum, leather, paper, wood metal, ivory, inks and water color media. Others will be delicate and

or highly water sensitive. These will need to be dried very carefully and if freeze-drying is used it should be undertaken with the minimum amount of internal chamber heating. If only a few items are involved it may be preferable to send them directly to a certified conservator for immediate treatment.

CONTAINERS AND METHODS OF PACKING FOR FREEZING

The choice of packing containers should be carefully considered. Although corrugated board boxes are cheaper to purchase, locate and store on site than plastic type milk crates, they may restrict the rate and efficiency of drying and also be prone to collapse when filled with wet material. If it is possible to decide in advance what method of drying is to be used, be guided by the technical requirements of the vendors drying system. For instance, if freeze-drying is to be used, one cubic foot plastic milk crates might be preferred, since these provide open spaces within the interlocking crates to aid in the efficient out-gassing of ice by sublimation. With some forms of vacuum drying where sublimation does not occur, corrugated boxes may be quite suitable, depending on the location of the heat source in the chamber. In either case, containers should not be larger than approximately one cubic foot, to avoid excessive weight, a vital consideration for workers removing material from site and also to help reduce damage from collapsing boxes. Usually boxes will be prepared for freezing on pallets and this is where the weight of heavy wet boxes can collapse and cause additional damage to material within the pile. To avoid this, use plastic milk crates or very sturdy corrugated boxes for the wettest material and re-box file records if their original boxes are saturated with water. Endeavor to use one size and type of box. If this not possible, do not mix sizes when packing on pallets. The number of boxes per pallet should be no more than can be supported without collapse. Although faster freezing and drying will result if boxes are not packed tightly, the contents will distort during the drying operation. To achieve the best drying results for books, they should be packed closely together so that drying is done under some restraining pressure. A book should never be packed foredge down as the weight of the text block will cause an inversion of its natural round shape. Pack books spine-down or flat and avoid placing larger volumes on top of smaller ones to avoid sagging which will be costly to correct during restoration.

The decisions taken at this stage will greatly affect the outcome and costs of the processes used for cold storage, drying and restoration. It has, unfortunately, not been sufficiently appreciated in the past that care in packing at this stage will significantly reduce post-recovery costs. High costs certainly occur if boxes are stacked on pallets in mixed sizes which will increase the potential for collapse under the weight of water, crushing and damaging the material in the process. It should be possible to move the wet materials directly from library to freezing facility, preferably in refrigerated trucks which can be drawn up to the loading site. For small collections of books and documents, dry ice may be used to freeze the material for transport in un-refrigerated trucks to long-term freezing facilities. (Gloves should be worn at all times when handling dry ice).

part 8

VACUUM AND FREEZE DRYING TECHNOLOGIES

It is important to understand that the processes used by vacuum and freeze-drying companies differ considerably depending on the specific requirements of the material to be dried. The majority of these companies have developed their technologies for food. Few have had experience in drying paper and books and therefore may not know if their normal operating system would be safe, or cost effective for this purpose. Freeze-drying has a number of significant advantages over vacuum drying since water remains in the frozen state during sublimation, a process which removes water from the solid state to the gaseous state. This avoids most of the problems associated with expansion, sticking and wicking of water sensitive and soluble media. Vacuum drying, generally considered to be a process that changes a liquid to a vapor, will result in a much greater risk of expansion, distortion, sticking, and staining.

Although both drying methods have been found to produce satisfactory results in a number of disaster recovery events, comparison between the two following a disaster has not been made. Our preference is for freeze-drying because it is the least aggressive of the two methods. However, there are situations where for instance, archival documents have been affected and where there is a low percentage of intrinsically valuable material, where vacuum drying has provided satisfactory results. The choice between the two should be governed by the nature, value and condition of the damaged material. Rare collections of significant value need to be dried with due regard to the sensitivity of the substrate and media and it is for this reason why we suggested earlier that such materials be segregated from the less rare.

Freeze-drying which is used to dry animal specimens, does so at very low internal chamber temperatures, lower than is used for most food processes. One animal specimen may take several weeks to dry. At this slow rate of drying the costs are high. Most paper and book material can withstand higher temperatures than those used to dry delicate animal specimens and there is a need for thermal energy to make the process

efficient and cost effective. If a vacuum or freeze-drying chamber is designed to operate with internal chamber heat sources, these must not touch the material to be dried, to avoid over heating and scorching. The internal temperature of a chamber should be no greater than 100 degrees Fahrenheit (37.8 degrees Celsius). For sensitive materials, including early book material where there is a mix of paper, vellum leather and wood etc., below ambient temperatures or those used to dry animal specimens should be used, to dry the material slowly and under carefully monitored conditions. (Note: In specifying an upper limit of 100 degrees Fahrenheit we consider this to be a safe temperature. There is insufficient data at this time to evaluate the effects of higher temperatures). It is important to realize that the success of any large drying system depends on the ability of the system to stop the development of mold during and after the drying process. Be aware of the risks in accepting material returned from commercial drying processes unless there is a guarantee that none will be returned damp or wet. If mold develops after return, it may not be possible to detect it, if the material remains boxed. If care was taken to segregate mold-contaminated from non-contaminated items during recovery, boxing and freezing, this will help determine if the drying was carried out properly. If mold develops in the non-contaminated material, the chances are that either the drying was not done correctly or that drying was not complete.

Mold-infected material, if dried completely under freeze-drying conditions, can be safely controlled for a short period of time, so that the spores remain quite dormant if stored after drying in an air conditioned environment maintained at 50 to 55 degrees Fahrenheit and a relative humidity of 35 percent or lower. However they must not be returned to the library or archive shelves until the mold contamination has been treated. For this reason we recommend that at the end of the drying cycle and while still in the drying chamber all mold-contaminated material be sterilized. If extreme care was not taken to separate contaminated from non-contaminated materials before the drying operation, we recommend that each drying load be sterilized.

REHABILITATION AFTER DRYING

If maximum benefits are to be gained from stabilization by freezing, every effort should be made, first, to identify and assess the value, condition, and total numbers and types of materials damaged, and second, to draw up comprehensive lists of those materials which can be replaced and those which should be reclaimed and restored. Replacement is nearly always cheaper than restoration. Volumes to be reclaimed will need to be evaluated in terms of the amount of restoration needed and probable costs. The best time to make such judgments, if a disaster preparedness plan does not exist, is after the volumes have been dried and before they are returned to the library or archive shelves. The following represent basic steps that need to be taken after drying in order to begin returning the material to normal housing environments.

Unless a drying company can guarantee in writing that no material will be returned boxed if it has a water content exceeding 7% by weight, there is a high possibility that some boxes will contain damp material that will add to the risks of post-drying mold development, and which, if allowed to develop, will quickly spread to other uncontaminated material, if left unchecked and therefore undetected.

It is important when preparing specification for a drying contract that acceptable water content is not specified as an average of a books total water content. For instance the text block of a book may be measured at far less than 7% but the water content of the book cover boards may contain higher 7% of water. Therefore it is necessary to specify that the waters content of all the books composite materials be less than 7%.

Do not store the material in un-opened boxes immediately upon return from the drying facilities, even if this seems to be the most convenient action to take.

All books and paper file records should be unboxed and placed on open shelving in a well ventilated, air-conditioned rehabilitation area, well separated from the main collections. The rehabilitation area makes it easier to assess the condition of the dried materials, as well as to identify those that can be replaced and those that must be cleaned and restored.

A carefully organized, random inspection of mold- infected materials should be conducted daily by personnel trained to carry out this important task.

Whether materials have or have not been sterilized during the drying process, it is necessary to monitor their behavior as a check against the effectiveness of drying and sterilization and to identify any potential for mold growth and to take the appropriate action, before the return of these materials to the main collections. We are concerned here with monitoring the dried volumes while they are in the rehabilitation area, and after their return to the main stacks. This monitoring should be continued at regular intervals for at least a year after they are returned to the main library shelving.

In preparing the rehabilitation area, provide about twice the number of shelves as would be needed for normal book requirements. This will compensate for the effects of distorted and expanded books and provide sufficient air space to allow the material to regain their moisture equilibrium content which, depending upon circumstances, may take a week or two. Theoretically, equilibrium moisture regain can be accomplished at the end of a drying run while the material is contained in the drying chamber. The chamber can be back filled with moisture to achieve the desired result. However this is only possible and safe if the drying method has been guaranteed to dry the material completely. If there remains some partially damp material at the end of a drying run, back filling the chamber with moisture would make such material more vulnerable to mold growth.

The rehabilitation area should be maintained at a relative humidity of 30 to 40 percent and a temperature of less than 65ø

Fahrenheit. Both humidity and temperature controls must be adjustable.

It is desirable to maintain the collection in the rehabilitation area for a period of at least six months. At this time, temperature and humidity in the rehabilitation area can be gradually changed to duplicate conditions in the stack areas to which they will be returned. At the end of this time, if no mold growth has occurred, the volumes can be returned to the main stacks and monitored as indicated above. It is highly desirable but usually not practical to leave volumes in the rehabilitation area for an added six months in an environment that duplicates normal stack conditions, as a check against post drying mold growth.

No materials should be returned to the main library shelves without very careful inspection, and preferably not before all necessary cleaning and restoration has been completed.

part 9

EVALUATION OF LOSS

When a flood or fire-damaged collection is covered by insurance, full settlement of a claim cannot be realized until the lost and damaged materials have been listed and their values established. The extent and success of possible restoration must also be determined. In the event that a claim is anticipated as a result of such damage, every item should be salvaged, frozen, and dried. After drying, the affected materials should be shelved in a specially equipped environmental storage area, isolated from the main stacks, and there inspected and monitored over a period of time. Such a policy is the best guarantee of sound judgments by custodians, consultants, and adjusters when they must calculate the degree of loss as a basis for compensation.

SUMMARY OF EMERGENCY PROCEDURES

- Seek the advice and help of book and paper conservators with experience in salvaging water-damaged materials as soon as possible.
- Turn off heat and create free circulation of air.
- Keep fans and air-conditioning on day and night and use dehumidifiers and insure a constant flow of air is necessary to reduce the threat of mold.
- Brief each worker carefully before salvage operations begin, giving full information on the dangers of proceeding except as directed. Emphasize the seriousness of timing and the priorities and aims of the whole operation. Instruct workers on means of recognizing manuscripts, materials with water-soluble components, leather and vellum bindings, materials printed on coated paper stock, and photographic materials.
- Do not allow workers to attempt restoration of any items on site. This was a common error in the first 10 days after the Florence flood, when rare and valuable leather and vellum-bound volumes were subjected to scrubbing and processing to remove mud. This resulted in driving mud into the interstices of leather, vellum, cloth, and paper, caused extensive damage to the volumes, and made the later work of restoration more difficult, time consuming, and extremely costly.)
- Carry out all cleaning operations, whether outside the building or in controlled environment rooms, by washing gently with fresh, cold running water and soft cellulose sponges to aid in the release of mud and filth. Use sponges in a dabbing motion; do not rub. These instructions do not apply to materials with water-soluble components. Such materials should be frozen as quickly as possible.
- Do not attempt to open a wet book. (Wet paper is very weak and will tear at a touch. One tear costs at least one dollar to mend!) Hold a book firmly closed when cleaned, especially when washing or sponging. A closed book is highly resistant to impregnation and damage.
- Do not attempt to remove mud by sponging. Mud is best removed from clothes when dry; this is also true of library materials.
- Do not remove covers from books, as they will help to support the books during drying. When partially dry, books may be hung over nylon lines to finish drying.

- Do not hang books from lines while they are very wet because the weight will cause damage to the inside folds of the sections.
- Do not press books and documents when they are water soaked. This can force mud into the paper and subject the materials to stresses which will damage their structures.
- Use soft pencils for making notes on slips of paper but do not attempt to write on wet paper or other artifacts.
- Clean, white blotter paper, white paper towels, strong toilet paper, and unprinted newsprint may be used for interleaving in the drying process. When nothing better is available, all but the color sections of printed newspapers may be used. Care must be taken to avoid rubbing the inked surface of the newspaper over the material being dried; otherwise some offsetting of the ink may occur.
- Under no circumstances should newly dried materials be packed in boxes and left without attention for more than a few days.
- Do not use bleaches, detergents, water-soluble fungicides, wire staples, paper or bulldog clips, adhesive tape, or adhesives of any kind. Never use felt-tipped fiber or ballpoint pens or any marking device on wet paper.
- Never use colored blotting paper or colored paper of any kind to dry books and other documents.
- Used and damp interleaving sheets should not be reused.
- Frequent changing of interleaving material is much more effective than allowing large numbers of sheets to remain in place for extended periods.
- Newsprint should not be left in books after drying is complete.
- A good grade of paper toweling is more effective than newsprint, but the cost is much greater.

FactSheet

Mold

Molds are the most common forms of fungi found on earth. They can grow on almost any material, as long as moisture and oxygen are available. Most molds reproduce through the formation of spores, tiny microscopic cells that are resistant to drying and are released into the air. Airborne spores are found both indoors and outdoors. When spores land on a suitable moist surface, they begin to grow and release chemicals that digest and can eventually destroy the surface and underlying materials. Molds can also cause adverse health effects.

General Cleanup Tips

- Make sure the working area is well ventilated.
- Place mold damaged materials in a plastic bag and discard.
- Clean mold off hard surfaces and other nonporous materials with detergent and water, and dry completely.
- Disinfect these cleaned surfaces with one of the following household bleach solutions: 1/4 cup household bleach per 1 gallon of clean water for light contamination. 1 1/2 cups household bleach per 1 gallon of clean water for heavy contamination.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request.

The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

CAUTION: Do not mix bleach with other cleaning products that contain ammonia. Highly toxic chlorine gas can be produced.

- Avoid breathing mold spores. A N-95 respirator is recommended.
- Avoid touching mold with your bare hands. Long gloves that extend to the middle of the forearm are recommended. Use ordinary household rubber gloves when cleaning surfaces with water, bleach, and a mild detergent. Gloves made from natural rubber, neoprene, nitrile, polyurethane, or PVC are recommended if using a disinfectant, biocide, or strong cleaning solution.
- Avoid getting mold spores in your eyes. Goggles without ventilation holes are recommended.

How to Recognize Mold

Mold may be recognized by:

- Sight – They usually appear as distinctly colored woolly mats (e.g., mildew is black and is one of the most common molds in a household).
- Smell – They often produce a foul odor, such as a musty, earthy smell.

Preventing Mold Growth

The key to mold prevention is moisture control. Mold will not grow if moisture is absent.

- Remove excess moisture with a wet-dry vacuum and dry out the building as quickly as possible (preferably within 24 to 48 hours).
- Use fans to assist in the drying process.
- Clean wet materials and surfaces with detergent and water.
- Discard all water damaged materials.
- Discard all materials visibly contaminated with mold.
- Remove and discard all porous materials that have been wet for more than 48 hours. Porous materials cannot be cleaned and may remain a source of mold growth.

These materials include the following: Carpeting and carpet padding; Upholstery, wallpaper, drywall; Floor and ceiling tiles, insulation materials; Clothing;

Health Effects of Mold Exposure

Molds can cause mild to severe health problems in sensitive individuals when a sufficient number of airborne spores are inhaled. Some individuals are far more sensitive than others. The most common health effects associated with mold exposure are allergic reactions.

Symptoms may include:

- Sneezing
- Runny nose
- Eye irritation
- Cough
- Congestion
- Aggravation of asthma
- Dermatitis (skin rash)

People at Greatest Risk

Infants, children, and the elderly are more susceptible to health problems attributable to molds. In addition, people with the following underlying health conditions may be more sensitive to molds:

- Individuals with allergies or existing respiratory conditions including asthma, sinusitis, or other lung diseases.
- Individuals with a weakened immune system (e.g., HIV patients).
- Recent organ or bone marrow transplant patients.
- Patients recovering from recent surgery and receiving chemotherapy or long-term steroid treatment.

Additional Information

Visit OSHA's Safety and Health Topics webpage on Molds and Fungi at <http://www.osha.gov/SLTC/molds/index.html>

U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

For more complete information:

DSG 9/2005

Salvage Operations for Water Damaged Archival Collections: A Second Glance

by *Betty Walsh*

Introduction

I have been salvaging wet records and writing disaster plans for the British Columbia Information Management Services (formerly the B.C. Archives and Records Service) since 1982. In May, 1988 the salvage section of the then current disaster plan was printed as an article in the WAAC Newsletter.¹ It was well-received and generated many requests for reprints.

Recently, I examined wet records from yet another disaster. Some problems were familiar - wet volumes and files, but others involved materials that are relatively new, such as carbonless papers and diazo microfiche. The experience reinforced for me the benefits of ongoing disaster planning. I also realized that it was timely to present WAAC readers with the updated plan in the form of this article.

I would like to thank the following experts for their advice. For the recovery of sound and video recordings, I am indebted to Brian MacDonald (National Archives of Canada), Gilles St. Laurent (National Library of Canada), and Gerald Gibson, (Library of Congress). The sections on the recovery of photographs were revised on the basis of a workshop supervised by Debbie Hess Norris at the Getty Conservation Institute. Additional tips on archival materials were provided by Nancy Marrelli (Concordia University).

Finally, many thanks go to my employer, and Barry Byers, my supervisor, for their ongoing support in maintaining the plan - and for giving me the practical experience in the salvage of wet records.

GENERAL

Salvage is only a small part of the overall disaster planning process: prevention, preparedness, response, and recovery. Most importantly, management should support planning; duties should be delegated ahead of time and staff should be trained. For more information, consult the classic references in the field.²

The first table shows the levels of flood emergencies to prepare against, and the responses that may be necessary. In the chaos of a real disaster, events will unfold in an unpredictable way.

A. Minor disaster

Do not enter the area until the Chief Conservator has declared it safe to do so. If there is an electrical hazard, make sure the circuit breakers have been disconnected.

The Chief Conservator notifies the Conservator and Imaging Services Supervisor (if needed for documentation or roll film recovery).

The Chief Conservator, accompanied by the Conservator and designated Records Curator will assess the damage:³⁻

Where is it?

How many records are damaged?

If it is water damage:

- Have the records been wet for more than 48 hours? Is mold present?
- Is the water clean or dirty?
- Are the records wet, partially wet or damp?
- What materials are damaged?

The Chief Conservator, in consultation with the Conservator, will formulate recovery plans. If further assessment shows that recovery is beyond the scope of Conservation and Technical Services, the Disaster Recovery Team is activated.

The Chief Conservator will coordinate with the building superintendent to:⁴⁻

- Clean up water. If assistance is not prompt, a mop-up team will be designated.
- Control the environment.
- Circulate air with fans.

The Chief Conservator will monitor the environment.

While the water is being cleaned up, a Records Curator will arrange for extra services (such as cold storage) and extra supplies (such as extra boxes, and newsprint for interleaves).

The Chief Conservator will supervise the packing of damaged materials, and the move to the Conservation Lab, roll film processing facilities, or cold storage.

The Records Curators will keep basic records regarding the location of the materials moved.

The Conservation Unit will air dry the damaged materials.

B. Moderate and major disasters

Do not enter the scene of disaster until the Recovery Director has designated it as safe to enter. Confer with the building superintendent, fire and police departments.

The Communicator alerts the Disaster Team by phone or in person at each worksite. Key team members will meet during the assessment stage; others are assembled after the site has been stabilized and salvage is ready to proceed.

The Recovery Director, Recovery Specialist, and Conservation Specialist, accompanied by the Recorder and a Photographer, will assess the scene of disaster.⁵ The latter three will estimate and record the damage in a preliminary way. They should consider:⁶⁻

Where is the damage? Is it in one small area, or in all sites? This will affect the mobilization of staff, supplies, and facilities.

How many records are damaged? Large quantities of records should be frozen to await further treatment.

What kind of water damage is it?

- Have the records been wet for more than 48 hours? Is mold present?
- Is the water dirty? The records may need to be cleaned.
- Are the records wet, partially wet, or damp? This affects the drying method.

What materials are damaged? Different media need specialized packing and drying methods. See the Salvage at a Glance table.

^a Stanford University Libraries, "Collections Emergency Response Manual," (Palo Alto: Stanford, 1992).

The Recovery Specialist will review the salvage priority list and revise it if necessary. It is better to freeze wet records rather than to discard them under the pressure of an emergency.

Given the extent of the damage, the Recovery Director decides whether the site will remain open, or closed so staff can participate in salvage operations.

The Recovery Director coordinates with the building manager to:

- Remove standing water. If the building manager cannot assist, the Recovery Director will make alternative arrangements.
- Reduce the temperature to less than 8°C (65°F) by turning down the heat.
- Lower relative humidity by adjusting the humidification system or installing rented dehumidifiers.
- Circulate air with fans. Separate compact storage units so air can move between them. Open doors if security is available.

The Recovery Specialist will monitor the temperature and relative humidity.⁷⁻

Electricity to power cleanup equipment may not be available. The Logistics Manager will obtain generators if the electricity is off. Use safely grounded, waterproof cords.⁸⁻

The Recovery Director will set up a headquarters near the site and ensure that it is accessible by phone or walkie-talkie.⁹

The Recovery Director will designate facilities for the treatment of records that can only be air dried. If the conservation lab is not operational, the Logistics Manager will locate alternative facilities.

The majority of paper and photographic records should be packed and shipped to cold storage. Freezing will stabilize wet materials and buy time until the records can be dried.

The Logistics Manager arranges for emergency facilities and supplies, particularly: cold storage, transportation to cold storage, and packing supplies. Arrangements should be made for team members - coffee, portable toilets, etc.¹⁰

The Communicator gathers teams at a designated assembly point. The Recovery Director will brief team members and assign them to:¹¹

Prepare packing materials (cutting freezer paper, assembling cardboard boxes) and move records to packers.

Pack the damaged collections. See packing instructions below for the materials being handled. Begin with items on the floor and the wettest objects, and then items on the ends of shelves.

Number the crates and record their contents. Label crates with Tyvek tags; mark cardboard boxes directly with a waterproof pen. Record separately: the catalogue range of the records; media priority; condition of the contents as wet, partially wet, or damp; and the destination (e.g. cold storage, conservation lab).

Move crates and boxes by hand trucks and pallet movers to a truck in an accessible location.

Meetings are held at the beginning of each day to review strategy and to keep up morale. Salvage team duties should be rotated.¹²

If the damage is substantial and salvage will take more than 10 hours, loosen tightly packed document boxes, books and pamphlets so they do not jam into the shelves.

Do not separate remaining dry books and documents when the relative humidity is high.¹³ If the RH remains high during cleaning and repairing of the storage areas, remove to an air conditioned room.

GUIDELINES FOR PACKING

A. General

Be extremely careful when handling wet materials - all of them are very fragile, and they can be easily damaged during packing and transport. If cardboard boxes are saturated or weak, replace them with new containers. Borderline boxes may be reinforced by packing inside plastic crates.

Pack files in order and retain documentary information. If the label is loose or lost, pencil identifying information and location on a piece of paper, and insert it in the volume or box. Don't mark wet paper. Film and tape reels and the backs of picture frames can be marked with a grease pencil.¹⁴

During removal, do not stack materials in piles or on the floor. If boxes are put on pallets, do not mix different sizes of boxes or stack more than 3 boxes high.¹⁵

If there is time, different materials should be packed separately, in the following categories: by media, moldy from uncontaminated, and wet from partially wet and damp.¹⁶

B. Packing Guidelines for Specific Media

1. Paper

Do not try to separate single sheets of paper or uncrumple them. Pick up files by their folders, and interleave the folders every two inches with freezer paper. If it is known from the outset that the records will be freeze dried, interleaving is not necessary. Fill cartons and crates three quarters full.¹⁷

Soluble Media (watercolors, soluble inks, hand colored maps and historic map and plan production processes): Do not blot the surface. Quickly freeze or dry.

Coated papers will stick together unless frozen or dried immediately. Keep them wet in cold water until they can be air dried or packed for freezing.

Framed prints and drawings: If time and space permit, unframe and pack as for single sheets.

Maps, plans, oversize prints and manuscripts: sponge standing water out of map drawers. Remove the drawers from the cabinet, ship and freeze them stacked up with 1" x 2" strips of wood between each drawer. Pack loose, flat maps in bread trays, flat boxes, or plywood sheets covered in polyethylene.¹⁸ Bundle rolled maps very loosely to go in small numbers to the freezer, unless facilities are available for conservators to unroll them.

Drafting cloths are coated with starch and may stick together like coated papers.¹⁹ Be careful not to blot the surface or apply pressure. Immediately freeze or dry.

Maps and plans by photoreproductive processes (diazos and blueprints in particular): Do not blot the surface. Quickly freeze or dry.

Maps and plans on Mylar:²⁰ Do not blot if the inks are soluble. Freeze or air dry.

2. Books

Don't open or close wet books or remove book covers. Gently shape closed books to reduce the distortion set into the book on drying.²¹

If the water is very dirty, wash the books before freezing. Do not wash open books and those with water soluble media (e.g. letter press books). Wash closed books in tubs of cold running water and dab away (do not rub!) mud with a sponge. Time and facilities may limit treatment at this stage; it may be safer to clean the books after they are dried.²²

Lay a sheet of freezer paper around the cover, and pack spine down in a milk crate or cardboard carton. Pack only 1 layer deep, to prevent crushing of bindings. Oversized volumes can be packed flat in cartons or bread trays, 2-3 books deep.²³

If books have fallen open, pack them "as is" in cartons or trays. They can be stacked in between sheets of freezer paper and foam.²⁴

Leather, parchment, and vellum bindings are an immediate priority because they distort and disintegrate in water and they are highly susceptible to mold growth. They should be air dried; if there are large quantities, freeze them. Books with coated papers will stick together unless frozen or dried promptly. Keep them wet in cold water until they can be air dried or frozen.

3. Parchment and Vellum

Interleave between groups of folders, pack in crates or flat boxes, and freeze.

4. Paintings

Tilt the painting to drain off excess water, and take it to work area for immediate drying.

Transport horizontally if you can; if not, carry the painting facing toward you, holding the side of the frame with the palms of your hands. Larger paintings should be carried by 2 people. The order of removal and treatment is: first, the most highly valued; second, the least damaged; third, slightly damaged; and fourth, severely damaged.²⁵

5. Computer Magnetic Media

Check with the Systems Administrator, to ensure that undamaged backup tapes are available.

It is far more practical to recover data from backup tapes than it is to salvage damaged media.

Separate into the following: dry, wet enclosures only, and wet media. If water has condensed inside cassettes, treat the tapes as wet.²⁶ Do not touch magnetic media with bare hands.

Media damaged by mud, sewage, or sea water: as soon as possible, rinse in tap water.

Keep magnetic media wet so that contaminants will not dry onto the tape or diskettes. Media can remain wet in cold clean water for several days. Pack inside plastic bags. If media will remain wet for weeks, immerse them to prevent mold. Do not freeze magnetic media because the tape can stretch, and lubricants can migrate out.²⁷

a) Cartridge backup tapes

Keep wet by packing inside plastic bags. Pack all tapes vertically in plastic crates or cardboard cartons.

b) Floppy disks

Pack upright in plastic bags inside boxes or in containers of cold water.

c) Open reel computer tapes

Handle the tapes by their hubs and pack them vertically inside plastic bags inside boxes.

6. Compact Discs and CD-ROM's

If the discs have been exposed to sea water, wash them in tap water immediately. Do not scratch the disc during rinsing or packing.²⁸ Pack discs vertically in crates or boxes.

7. Sound and video recordings

a) Sound and Video Tapes

Separate the tapes into the following: dry tapes, wet boxes only, and wet tapes. If water has condensed inside a cassette, treat the tape as wet.

Salvage tapes according to the following priorities:²⁹

- unmastered originals over masters,
- masters over reference copies,
- older tapes over newer,
- paper over acetate,
- acetate over polyester based tapes.

Tapes that have been damaged by mud, sewage, or sea water: as soon as possible, rinse in tap water.

Keep tapes wet, at their initial level of wetness. (For example, some tapes may have only become wet on the outside of the tape pack, and it is not necessary to immerse them). If the tapes dry at this stage, contaminants will dry onto the tape and be harder to remove later. Pack tapes individually inside plastic bags, keeping loose labels with the tape. Pack tapes vertically into plastic crates and cartons.

In general, magnetic tapes can remain wet for several days, as long as the water is cool and clean. This is longer compared to paper records.³⁰ However, immersion may be limited in two cases. Many tapes have water soluble label adhesives and inks,³¹ and paper boxes and labels. In addition, older tapes may not survive long immersion. This may reduce the salvage time to 48 hours or less for some media.

If magnetic tapes cannot be salvaged for more than a week, immerse them to prevent mold. Do not freeze magnetic media.³²

b) Discs

Salvage shellac and acetate discs first, because they are sensitive to water. If storage boxes are badly damaged, transfer the discs (up to 5 at a time) to plastic crates or cardboard cartons. Pad the bottom of the crate with ethafoam and interleave with ethafoam every 25 records to absorb shocks. Always support the discs vertically and hold the discs by their edges. Avoid shocks and jolts during transport.³³ Groups of discs, particularly 78's, can be very heavy. Pack them in small boxes (or larger ones with extra padding) that can be easily moved.

8. Photographic Materials

a) Salvage the following historic photographs without delay. They are best preserved by water protective measures, because the damage may be severe.

Wet collodion glass negatives. Salvage first and air dry immediately. Both immersion and freeze drying will destroy the binder.³⁴

Cased photographs:

- Ambrotypes: Salvage and air dry immediately, both immersion and freezing will destroy the binder.³⁵
- Pannotypes: Salvage and air dry immediately.
- Tintypes: Salvage and air dry immediately.
- Daguerreotypes: Salvage and air dry immediately.

Color transparencies by the additive process. (Autochromes, Dufaycolor). The recovery rate is poor because the dyes dissolve. Do not freeze.³⁶ Air dry immediately.

Dye transfer prints. The recovery rate is poor because the dyes migrate. Prevent damage by enclosing in water proof containers.³⁷

Deteriorated nitrates. Emulsions are water soluble and could be lost. Air dry or freeze immediately.

Deteriorated acetate negatives. Air dry or freeze immediately. Handle with care because of the swelling of the emulsion and backing layers.

Carbon prints and Woodburytypes. Air dry or freeze quickly. Handle with care because the binder will swell up considerably.³⁸

Other photographs should be kept wet until they are either air dried or frozen. If allowed to partially dry, they will stick together. If there is time, rinse the photographs with cold water before they are dried or frozen.³⁹ Pack inside plastic bags in boxes or pails. Keep to a minimum the immersion time before treatment or freezing.⁴⁰

Prints, negatives, and transparencies. Salvage prints first, followed by negatives and transparencies on stable bases. Unframe and unmat framed photographs if there is time. If facilities and personnel are available, air dry; pack and freeze if not.⁴¹

Motion Pictures. If only the outside of the can is wet, dry the container and relabel it if necessary.⁴² If the film is wet, fill the can with cold water, and replace the lid. Pack into plastic pails filled with cold water or cardboard cartons lined with garbage bags. Ship to a film processor for rewashing and drying.

Microforms.

Microfilms in rolls. Do not remove the films from their boxes. Hold cardboard boxes (and their labels) together with rubber bands. Wrap 5 cartons of film into a block with plastic wrap. Pack the blocks into a heavy duty cardboard box lined with 3 garbage bags; tie each bag separately. Label as 'wet film for rewashing and drying', and ship to a microfilm processor.⁴³

Aperture cards. Pack and freeze.

Microfilm strips in jackets. Pack and freeze.

Diazo microfiche. Pack and freeze.

RECOVERYMETHODS

A. Overview of Drying Methods

The drying method should be selected after careful assessment of the collections. It is important to monitor the capabilities of suppliers who provide freeze drying and vacuum drying services. Check references beforehand and inspect selection of materials before and after they are dried.

Air drying - Records are dried in a work space at room temperature. To discourage mold growth, the temperature should be below 18° C and the RH as low as possible (at all costs, below 60%) and fans should keep the air circulating. Materials are spread out on or interleaved with absorbent papers.

Freeze drying (vacuum freeze drying) - Frozen records are dried in a vacuum chamber at temperatures below 0° C. The water passes from ice to vapor without becoming liquid, even though heat may be applied to the shelves to speed up the process.⁴⁴ It is important to monitor the temperature of the records inside the chamber; once the materials have dried, they will heat up. Freeze drying prevents additional bleeding or feathering of soluble media, distortion of bindings, and the sticking together of coated materials.

Vacuum drying (vacuum thermal drying) - Frozen or thawed records are dried in a vacuum chamber at temperatures above 0° C. A vacuum is drawn, heated air is put into the chamber, and a vacuum is applied again to pull out moisture. (For magnetic tapes, the air should not be heated.) The process may be repeated again.⁴⁵

Freezer drying - Records are packed in permeable containers and kept in a cold storage vault for months. Over time, moisture sublimates out of the records, in the same way that food gets freezer burn. This is a slow process that will dry damp and partially wet records.

Desiccant dehumidification - Records are dried, while still on their shelves, by large dehumidifiers that are brought on site. The temperature and relative humidity should be controlled. This method may not be suitable for drying most collections, because soluble media will further bleed, and coated materials will block together.⁴⁶

B. Recovery Methods for Specific Media

1. Paper

a) Drying methods⁴⁷

Air drying is suitable for drying small quantities of damp and partially wet papers from minor disasters. It can be used, on a triage basis, to dry wet materials in a major disaster when services are not available.

Freeze drying is preferred for large quantities and wet materials. It is the best way to dry water soluble media, coated paper, and drafting linens.

Vacuum drying will dry large quantities of wet records without intrinsic value. However, it is not suitable for many archival materials because they have water soluble inks that could bleed. Never vacuum dry coated papers and drafting linens because they will stick together.

b) Air Drying of Paper

During the following operations, maintain the original order of the files. Pencil box and folder information on slips of paper and keep them with the records.⁴⁸

Documents and manuscripts. Damp and partially wet records can be dried in the following ways:

- Spread documents out over blotters, paper towels, or unprinted newsprint. Change the absorbent materials when they become wet.
- Interleave stacks of 25 sheets of damp papers and turn over frequently.⁴⁹
- Dry damp records vertically, supported by bookends or supports through plastic crates.

Coated papers. Note that freeze drying has a far better success rate than air drying. If the papers are wet, separate each coated paper from the other by applying a sheet of polyester and lifting the plastic away with the paper. At this point, the paper can be dried on the polyester, which can be hung on lines.⁵⁰ Alternatively, dry the partially wet paper by interleaving between every sheet with waxed paper, or laying individual sheets on polyester web covered blotters.

Drafting cloths. Dry by interleaving with waxed paper, freezer paper,⁵¹ or polyester web covered blotters.

Maps and plans on Mylar.⁵² Do not blot if the inks are soluble. Air dry.

2. Books

a) Drying Methods⁵³

Air drying is suitable for drying small quantities of damp and partially wet books. It can be used, on a triage basis, to dry books in a major disaster when services are not available. Leather bindings should be air dried.

Freeze drying is preferred for large quantities and wet materials. It is the best way to dry coated papers and bound volumes with soluble inks.

Vacuum drying will dry large quantities of wet books. the books will distort more than if they were freeze dried and they will require more rebinding or restoration afterwards. Coated paper books should never be vacuum dried because they will stick together.

b) Air Drying Wet and Partially Wet Books

Air drying involves the following procedures:⁵⁴

Wet books will need to be drained before drying:

- Stand the book upright, on its head, on absorbent paper.
- Support the book by opening the covers somewhat, but not the pages.
- When the pages begin to dry and separate on their own, interleave them.

Prepare interleaves:

- Suitable materials are thin blotters, unprinted newsprint, and paper towels.
- Cut interleaves that are bigger than the pages.

Insert the interleaves into the gutter margin of the book:

- The sheets should project above the head and foreedges of the book, but not on the lower edge where the book will stand.
- Beginning at the back, put the interleaves at intervals through the book.
- The sheets should not equal more than one third of the thickness of the volume, so that the binding won't be strained.
- Separate the covers from the text block with absorbent paper or sheets of plastic.
- Open the covers of the book and stand it upright.

Change the interleaves as they become wet, every 2 to 3 hours:

- Put new interleaves in different places in the book.
- Change the paper underneath the book, and turn the book over (if it was standing on its tail, stand it on its head - this will reduce strain on the binding).
- Remove the used interleaves from the vicinity of the books. The sheets can be dried and used again if they are not dirty or cockled.

After the books feel dry to the touch, remove the interleaves and reshape the bindings:

- Flatten each book under a sheet of plastic or covered board with a light weight on top.
- Do not pile books on top of each other, because they could distort.

Ensure that the books are thoroughly dry before they are reshelved. Monitor for mold during and after drying.

c) Air Drying of Damp Books or Books with Slightly Wet Edges

Stand books upside down, and fan open the pages. Support paperbacks and books with damaged covers with bookends or weights. Every couple of hours, refan the pages. In the final stages, turn the book over to dry the tops of the pages. When the book feels dry, flatten under weights as above.⁵⁵

Damp or partially wet pamphlets - open and dry flat. Turn pages often.

d) Books with Coated Papers

Freeze drying will give the best results for wet coated papers. If the book is partially wet, fan open the pages and interleave between every page with waxed paper.⁵⁶ Damp books should be stood on their heads and fanned open. Fan through the pages frequently.⁵⁷

e) Books with Leather and Vellum Bindings

A book conservator should dry rare and vellum bindings.

If the books have been frozen, thaw them in the following way. Place blotters on the outside of the book, and then lay the book flat under weights. This will prevent the binding from drying out and distorting while the rest of the book thaws.⁵⁸

In the drying phase, isolate the binding from the text block with a sheet of plastic or blotter. Interleave the book. Lay the book flat on blotters, place another blotter on top, followed by a flat board and weights. Be careful to minimize the strain put on the binding. Change the interleaves as they become wet.

If leather bindings are freeze dried, they will in the very least severely distort. However, freeze drying may be chosen for bound volumes which contain soluble media, and have bindings of low intrinsic value.⁵⁹

3. Parchment and Vellum Manuscripts

A conservator may air dry individual sheets and charters by drying them with weights around the edges, or flattening them between weighted blotters.

Tests have shown that parchment and vellum manuscripts may be freeze dried. However, the sheets may increase in thickness and brightness, and decrease in mechanical properties. The changes may be reduced by subsequently dampening the records and flattening them under weighted blotters.⁶⁰

In any case, do not freeze dry gilded or illuminated manuscripts.⁶¹

4. Paintings

Ideally, this treatment should be done by a conservator.

Initially, set up tabletops padded with blotters and covered with plastic.

Separate the merely wet paintings from those showing structural damage. Signs of structural damage are tears in the canvas, flaking, lifting, and dissolving of paint and ground layers. Let structurally damaged paintings dry, face up in a horizontal position, on the tables.

Contact a conservator about drying paintings with high or fragile impasto layers.

Other structurally sound paintings on canvas can be dried in the following way: Set up several more layers of blotter on the table, followed by a layer of Japanese tissue paper. Unframe the painting, but don't remove it from its stretcher. Lay it face down on this surface, making sure the tissue is not wrinkled. Cut blotters to the inside dimensions of the stretcher frame. Cut a sheet of plywood or thick masonite to the same dimensions, or smaller to fit inside the stretcher keys. Cover the back of the canvas with a blotter (if the canvas is large and more than one blotter is necessary, abut the blotters end-to-end), then

the board, and finally weights. Change the blotter until the canvas is dry. If the tissue on the front has any tendency to stick to the paint layer, leave it in place.⁶²

5. Computer Media

a) Magnetic tapes

Rinse off sewage, mud and sea water with tap water, if this has not been done already. If oil and greasy deposits remain, wash the tape in an unscented and undyed dish detergent.⁶³

Tapes can be air dried or vacuum dried without heat.⁶⁴ Vacuum drying has not been comprehensively tested on a variety of magnetic media. However, it may be the only practical way to dry large quantities of tapes. Do not freeze dry, freezer dry, or vacuum dry with heat (vacuum thermal drying).⁶⁵ The following instructions are for air drying of media.

Cartridge backup tapes. If only the outside of the cassette is wet, air dry it on absorbent materials. If the tape has become wet on the inside, or the cartridge is damaged, dismantle and air dry like reel to reel audio tapes.

Open reel computer tapes. Remove the tape from its canister and wrap-around. Rinse off the exterior of the tape with distilled water. If the tape is in good condition, dry the exterior wet surfaces with a lint-free cloth.⁶⁶ If the edge of the tape is fragile, do not blot and do the following. Separate the reel flanges from the tape with a rubber grommet or similar material. This lets air flow around the tape and prevents the tape from sticking to the flange. Let the tapes air with fans blowing on them. (Do not use heat). When the tape looks dry on the outside, run it reel-to-reel on a tape cleaner or winder. Run the tape 6 times over the cleaning tissues and not the blades (remove them if you can), then put the tapes twice through both the tissues and blades. Never put wet tape on a tape drive because the tape could stick to the equipment and tear. Finally, recopy the tape.⁶⁷ Monitor the tape carefully; stop cleaning if the oxide layer begins to shed, or mechanical distortion becomes apparent.

Floppy disks. Wet disks should be removed from their jackets, washed, and dried. Before starting, dry a corner of the jacket and the disk hub with a lint free cloth. Mark both the jacket and the hub with a waterproof pen, so both can be matched later on.⁶⁸

5.25" disks. Move the diskette to one side of the jacket. Cut the opposite edge of the jacket with non-magnetic scissors. (Beware - the diskette begins 1/16" from the edge).⁶⁹

3.5" disks. If the jacket has screws, remove them. Hold the diskette with the metal door side down, and remove the door letting its spring fall outward. With a microspatula, open the shell at the side.⁷⁰

Carefully remove the disk without touching the surface. Wash disks in a tray of distilled water. Dry with a soft lint free cloth, or spread flat to dry on the same. Insert the diskette

into a new jacket (taken from a new diskette - this can be reused), ensuring that the jacket or shell is firmly taped together so it won't get caught in the disk drive. Copy the disk on to a new disk and check the data. Label the new disk. Copy the information on the old jacket onto the new jacket. The computer drive heads should be cleaned frequently.⁷¹

6. Compact Discs and CD-ROM's

If discs were exposed to sea water, wash the tapes with tap water, if this has not been done already. Clean off mud and sewage by washing the tape in a detergent solution. Do not rub the disc because dirt could scratch the tracks. After either procedure, rinse with distilled water.⁷²

Before drying, rinse all discs with room temperature distilled water. Dry the disc vertically in a rack. If blotting is necessary, take care to avoid scratching the surface. Blot, do not rub, with a soft lint-free cloth.⁷³

CD cases and the enclosed paper should also be dried. Once the disc is removed, open the case and freeze dry the entire case and glossy paper booklet. Do not freeze dry the CD. While the cases are being dried, either store the discs in spare cases or stack the CD's interleaved with polyester web (such as Tech Clean Absorb Wipes).⁷⁴

7. Sound and Video Recordings

a) Magnetic tapes

Rinse off sewage, mud and sea water with tap water, if this has not been done already. If oil and greasy deposits remain, wash the tape in an unscented and undyed dish detergent.⁷⁵ Tapes can be air dried or vacuum dried without heat.⁷⁶ Vacuum drying has not been comprehensively tested on a variety of magnetic media. However, it may be the only practical way to dry large quantities of tapes. Do not freeze dry, freezer dry, or vacuum dry with heat vacuum thermal drying).⁷⁷ The following instructions are for air drying of media.

Reel to reel tapes. Wash the tape while it is still wound on its reel. Rinse with distilled water. If the edges of the tape are in good condition, blot the sides of the tape and the reel with a lint free cloth.⁷⁸ Loosen the flanges of the reel if possible. Support the tape vertically and air dry it; or air dry by laying it on sheets of newsprint spread over plastic covered tables. If contaminants have spread inside the tape pack, run the tape twice over a tape cleaner.⁷⁹ Monitor the tape carefully during cleaning; stop if the oxide layer begins to shed, or mechanical distortion becomes apparent.

If the reels are still dirty, remove the tape and wash the reel with detergent and water. An alternative is to replace the reel or the flanges. The box can be air dried as well. Replace the box if it is badly damaged.

Videocassettes. If only the outside of the cassette is wet, air dry it on absorbent materials. If the tape has become wet on the inside, dismantle the cassette and dry as with reel to reel tapes.⁸⁰ Inspect the cassette spindles and springs for rust.⁸¹

Audio cassettes. If the tapes have only been splashed on the outside, dry off exterior of the tape. If the tape has become badly contaminated, or the cassette is damaged, dismantle the cassette and air dry the tape as above. cassettes without mounting screws may have to be broken open, and the case replaced. Re-record the tape after drying.⁸²

b) Shellac, acetate, and vinyl discs

Salvage first shellac and acetate discs, which are sensitive to water. If these discs need to be washed, keep contact with water to a minimum.⁸³

Remove the discs from their sleeves and jackets. If labels have separated from the disc, mark the center of the disc with a grease pencil. Keep track of the label. Dry loose labels on sheets of unprinted newsprint or blotters. Write the number of the corresponding disc under the label. Jackets, sleeves, and labels may be dried like other paper materials.⁸⁴

If dirt has been deposited on the discs, wash them. The best way to clean them is with a record cleaning machine.⁸⁵ If this is not possible, wash in trays of distilled water. Air dry the discs on supports that permit free circulation of air. If the disc needs to be wiped off, use a soft lint free cloth and blot along the grooves.

8. Photographs

a) The first priority is to air dry photographs that are very sensitive to water. The recovery rate may not be high.

Spread tabletops with small pieces of blotters or unprinted newsprint that can be changed as they become wet.⁸⁶ Remove photographs from their enclosures. Be sure to keep identifying information with the photo and maintain the original order.

Wet collodion glass negatives, unmounted ambrotypes, tintypes and pannotypes. Dry binder side up on blotters.

Cased photographs. (These are daguerreotypes, ambrotypes, and tintypes in cases). If water has penetrated inside the case and assembly, the package should be dismantled and the components air dried. Remove the assembly from the case. Carefully fold back the preserver frame, cut the sealing tape (if present) and take the assembly apart. Place daguerreotypes face up on blotters with the case components beside them. Wet collodion photographs should be dried in a similar way binder side up.

Additive color transparencies (Autochromes, Dufaycolor). If water has penetrated inside, dismantle the slide. Remove the binding tape and cover glass, and dry face up.⁸⁷

Dye transfer prints. Dry emulsion side up on blotters.

Deteriorated nitrate negatives. If they are still salvageable, dry emulsion side up on sheets of polyester web (Hollytex or Reemay) over blotters. (The emulsion side can be identified by the notch code on sheet films - if the notch is in the upper right hand corner, the emulsion side is facing you.) Nitrates in the earliest stages of deterioration may be hung with plastic clips on a line. Don't let the negatives touch each other.

Deteriorated acetate negatives. If the emulsion is very swollen or channeled, dry emulsion side up on blotters covered with polyester web. Acetates in the early stages of deterioration may be carefully hung with plastic clips on a line.

Carbon prints and Woodburytypes. Dry emulsion side up on blotters.

b) Other prints, negatives, and transparencies

In order of preference, the drying methods are: air dry; freeze, thaw and air dry; and freeze dry.⁸⁸ Do not vacuum dry, it will make the photographs stick together in a lump.

If the photographs have been previously frozen, thaw them. Treat small batches that can be easily dried in one day without growing mold.⁸⁹

Keep the photographs wet in plastic bags until they are separated from each other and their enclosures. If it appears that the photographs could dry and stick together during thawing, immerse them again in cold water.

Remove photographs from their enclosures. Maintain their original order, and keep identifying information with them. If the enclosures and slide mounts have valuable information, dry them alongside the photographs.⁹⁰ If the enclosure information is minimal, it can be copied on to slips of paper that are kept with the photo.⁹¹

If the photographs have been exposed to dirty or salt water, clean them by immersing them in a tray of cool water. If the surface is in good condition, it can be very gently brushed with a soft artist's brush or dental cotton) to release dirt. Do not brush photographs that have damaged binder layers, or processes with delicate surfaces - such as collodion chloride printing out papers and glossy Ilfochrome prints.⁹²

General air drying instructions. Spread tabletops with small pieces of blotters or unprinted newsprint that can be changed as they become wet.⁹³

Prints. Dry prints before negatives. Dry the print face up on blotters. If the print is in good condition, it may be blotted: lay a sheet of polyester web on the surface, and blot very gently over the web. Otherwise, the gelatin binder will stick directly to the blotting paper.⁹⁴ Unmounted albumen prints may curl up as they dry. To prevent this, dry them with weights around the edges,⁹⁵ or under lightly weighted polyester web and blotters.⁹⁶

Roll film negatives. Dry emulsion side up on blotters.

Sheet film negatives and transparencies. These have a gelatin layer on the back that could stick to absorbent papers. Carefully hang negatives to dry with plastic clips onto a line.⁹⁷ If clips are not available, dry the films emulsion side up on polyester web covered blotters.

Glass negatives. Dry negatives vertically, either by carefully propping them up on their long sides⁹⁸ or putting in racks. Dry flat those negatives that are broken, cracked, or have flaking emulsions.⁹⁹

Lantern slides. If water has penetrated inside, dismantle to prevent emulsion from sticking to other components. Dry the transparency as for glass negatives. Keep paper title and mask if they have documentary information.^{100,101}

Color slides in paper or plastic mounts. Be sure to remove slides from their plastic sleeves and pages. In a small emergency, when the environment is controlled, it may be possible to dry the slides in their mounts. If conditions are not ideal, it is necessary to unmount the slides and dry the components separately; careful record keeping is necessary. Hang the film chips on a line with extended paper clips.¹⁰² Alternatively, dry emulsion side up on absorbent materials.

9. Microforms

The best way to dry roll microfilms is to arrange for a microfilm processor to rewash and dry them.

Microforms: Follow the instructions under historic photographs for setting up a workspace, washing, and drying.

a) Aperture cards

Remove the film chips from their mounts. Wash the chips and dry them binder side up on blotters or newsprint. when they are dry, remount them.¹⁰³

b) Microfilm strips in jackets

Cut the strips from the jackets. Wash and dry the film, and insert into new jackets.¹⁰⁴ Alternatively, dry the outside of the jacket, and duplicate the film immediately.

c) Diazo and Vesicular microfiche

Remove from enclosures. Inspect diazo films for blistering and delamination. If damaged, discard and replace with a print from a security copy. Wash all damaged microfiche in cool clear water. Lay out to dry on absorbent materials or hang to dry on a line.¹⁰⁵

REHABILITATION

A. Rehabilitation of Storage Areas

After the collections have been removed, check the shelves and repair them if necessary. If mold growth has occurred, sterilize the shelves.

Monitor the environment and inspect the area for mold. Do not return the collections until conditions have stabilized.¹⁰⁶

B. Rehabilitation of Collections

Records that have been dried in low RH conditions need to acclimatize to the usual stack conditions. When the collections return, uncover them and let them equilibrate to the moisture content of the area; this could take up to two weeks. Inspect the records to ensure that they are indeed dry (less than 7% moisture content), and monitor daily for mold. In an ideal situation, collections should be kept in a separate rehabilitation area for 6 months. If this is not possible, monitor the collections closely for mold and humidity damage.¹⁰⁷

At this stage, it may be necessary to rehouse records in new enclosures.

Assess and sort dried records for future conservation, such as cleaning and structural repairs.

The Preservation Services Unit coordinates with records Centre Services and library staff on the following: sorting of collections for reshelving, labeling of records and books, and tracking the location of records.

C. Post-Disaster Review

As soon as possible after the disaster salvage and recovery operation is completed the Disaster Response Team will review the disaster plan.¹⁰⁸

- How can similar events be prevented in the future?
- What worked?
- What didn't work?
- What supplies were missing?
- What supplies were not available on short notice?

Management will send thank you letters to all staff, volunteers, and consultants who helped out. A report of the disaster will be sent to the Ministry Executive and any interested organizations.

Betty Walsh
Conservator
B.C. Information Management Services
P.O. Box 9419 Stn Prov Govt

SALVAGE AT A GLANCE, the 17" by 22" summary chart that accompanies this article, is printed on Kimdura, a synthetic paper designated by the manufacturer to be waterproof and stain, oil, grease, UV, and tear resistant. You will not have to salvage the salvage chart.

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- ⁵¹ Fortson, 57.
- ⁵² Fortson, 57; Turchan, 62; Henderson, 22.
- ⁵³ Buchanan, "Drying", 1-2; Fortson, 58.
- ⁵⁴ Peter Waters, *Procedures for Salvage of Water-Damaged Library Materials*, 2nd ed. (Washington: Library of Congress, 1979), 7-21; Buchanan, *RAMP*, 80-83; Fortson, 53-55, 59; Buchanan, "Drying," 3.
- ⁵⁵ Fortson, 54, 57.
- ⁵⁶ Fortson, 54-55.
- ⁵⁷ Barton and Wellheiser, 67.
- ⁵⁸ Procedure from the National Library of Canada.
- ⁵⁹ This procedure was followed for water damaged judges' bench books at B.C. Information Management Services.
- ⁶⁰ A.E. Parker, "Freeze-Drying Vellum Archival Materials", *Journal of the Society of Archivists*, 14 No. 2 (1993), 181; Françoise Fleider, Françoise Leclerc, and Claire Chahine, "Effet de la Lyophilisation Sur le Comportement Mécanique et Chimique du Papier, du Cuir et du Parchemin" (Paper presented at the ICOM Committee for Conservation 5th Triennial Meeting, Zagreb, 1978), 78/14/8, 5-6.
- ⁶¹ Parker, 180.
- ⁶² CCI, 2.

⁶³ Van Bogart.

⁶⁴ *Ibid.*; Edward F. Cuddihy, "Storage, Preservation, and Recovery of Magnetic Recording Tape" in *Environment et conservation de l'écrit, e l'image et du son, actes des deuxièmes journées Internationales études de L'ARSAG, Paris, 16-20 Mai, 1994* (Paris: Association pour la Recherche Scientifique sur les Arts Graphiques, 1994), 185.

⁶⁵ Van Bogart.

⁶⁶ *Ibid.*

⁶⁷ Sidney B. Geller, *Care and Handling of Computer Magnetic Storage Media*, NBS Special Publication 500-101 (Washington: National Bureau of Standards, 1983), 34-35.

⁶⁸ ARMA International Guideline for Records and Information Management, *Magnetic Diskettes - Recovery Procedures* (Prairie Village: Association of Records Managers and Administrators, 1987), 3.

⁶⁹ ARMA, 3; Lundquist, Eric G., *Salvage of Water Damaged Books, Documents, Micrographic and Magnetic Media* (San Francisco: Document Reprocessors, 1986), 85; Kahn, 20.

⁷⁰ Kahn, 20; Jeanne Drewes, submission to the Conservation Distlist, 9:57, Jan. 31, 1996.

⁷¹ ARMA, 4-5.

⁷² Van Bogart.

⁷³ *Ibid.*; Kahn, 28; Gilles St. Laurent, *The Care and Handling of Recorded Sound Materials* (Wash.: Commission on Preservation and Access, 1991), 1.

⁷⁴ Gilles St. Laurent, personal communication, October 10, 1996.

⁷⁵ Van Bogart.

⁷⁶ *Ibid.*; Cuddihy, p. 185.

⁷⁷ Van Bogart.

⁷⁸ *Ibid.*

⁷⁹ Public Archives, p. 11.7; Brian MacDonald, personal communication, December 21, 1995.

⁸⁰ MacDonald.

⁸¹ Van Bogart.

⁸² Public Archives, p. 11.8; MacDonald.

⁸³ St. Laurent, communication; Gibson.

⁸⁴ Public Archives, p. 11.8.

⁸⁵ St. Laurent, *Sound*, p.10.

⁸⁶ Norris, 604.

⁸⁷ Christopher Harvey, "The Treatment of Flood-Damaged Photographic Material at the Perth Museum and Art Gallery, Scotland," *Paper Conservation News* 76 (December 1995). 10-11.

⁸⁸ Hendriks and Lesser, "Disaster Preparedness," 67.

⁸⁹ Harvey, 9.

⁹⁰ Norris, 603.

⁹¹ Harvey, 10.

⁹² Norris, 607.

⁹³ *Id.*, 603.

⁹⁴ *Ibid.*

⁹⁵ Hofmann, 14.

⁹⁶ Norris, 604.

⁹⁷ *Ibid.*, 605.

⁹⁸ *Ibid.*

⁹⁹ Harvey, 9.

¹⁰⁰ Norris, 605.

¹⁰¹ Harvey, 10.

¹⁰² Norris, 605-606.

¹⁰³ Public Archives, p. 12.10.

¹⁰⁴ Julia Niebuhr Eulenberg, *Handbook for the Recovery of Water Damaged Business Records* (Prairie Village, Kansas: ARMA, 1986), 34.

¹⁰⁵ *Ibid.*

¹⁰⁶ Bohem, 16.

¹⁰⁷ Waters, 12; Buchanan, *RAMP*, 88.

¹⁰⁸ Bohem, 17.

EMERGENCY ACTION PLAN

For

Herman B Wells Library
BL209

The Office of Library
Administration Address: 1320
East 10th Street Bloomington,
Indiana 47405
Phone: (812) 855-3403
Fax: (812) 855-2576

Date Revised: January 7, 2013

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I) **PURPOSE**

The purpose of an Emergency Action Plan is to protect IU employees from serious injury, property loss, or loss of life, in the event of an actual or potential major disaster. A major disaster may include, but is not limited to, any of the following: fire, tornado, earthquake, bomb threat, or hazardous chemical spill. In the event of a major disaster, this Emergency Action Plan describes the initial responsibilities and actions to be taken to protect all employees until the appropriate university or municipal responders take over.

II) **SCOPE**

For the protection of IU employees, an Emergency Action Plan is a requirement of OSHA

1910.38. It is also necessary and prudent for the protection of our students and visitors. It is a requirement that the employer review with each employee upon their initial assignment or when the plan changes, those parts of the plan that the employee must know to protect her/himself in the event of an emergency. In addition, the written plan shall be made available for employees to review and plan for their evacuation.

III) **GENERAL PROCEDURES**

It is impossible to provide specific information for all situations. There is no guarantee implied by this plan that a perfect response to disasters or emergency incidents will be practical or possible. Therefore, this plan is a guide for employees to familiarize themselves with basic emergency planning, response and evaluation.

A) **Pre-planning**

Preparation will increase the margin of safety in an emergency. To evacuate successfully:

- 1 Train employees in ways of assisting others.
- 2 Inform employees how to communicate in an emergency.
- 3 Assign specific tasks.
- 4 Identify employees with specific needs.
- 5 Provide a building specific plan.
- 6 Evacuation route maps are posted in the building. Employees should know at least two evacuation routes. The following information is marked on the maps:

- Emergency and accessible exits
- Evacuation routes
- Location of fire extinguishers
- Fire alarm pull station locations
- Tornado shelters
- Areas first searched

B) **Notification of Emergency Warning**

In the event of a disaster, the warning may come from any of the following sources: IU Notify, commercial radio or television, Indiana University stations: WFIU 103.7 FM and WTIU Channel 30, NOAA radio, building smoke detection or sprinkler system, emergency

siren, web/internet, private citizen, or Indiana University Police Department (IUPD). It is

recommended that several sources be monitored to assist in determining when emergency situations exist since no one system can cover all circumstances. A person receiving notification of a possible disaster or a building emergency should immediately sound the alarm to notify employees and IUPD (e.g. In case of fire, yell, "Fire!" pull building alarm, call other offices, etc.) Inform immediate supervisor who will continue notification up the Chain of Command. The building emergency alarm system is reserved for total evacuation of the building.

C) Emergency Alarms and Advisories

1 Sprinkler Alarm – Smoke Detection – Fire Alarm

In the event of a fire, sprinkler and/or HVAC smoke detection systems will activate the alarm automatically. The Ademco dialer will send a notification to IUPD/Control Center. Manual alarms are located on each floor.

- 2 **Homeland Security Advisory System (HSAS)** is the national advisory system that provides a means of disseminating information regarding the risk of terrorist acts.

For more information go to:

<http://www.nationalterroralert.com/homeland-security-alert/> or type "National Terror Alert" into the web search engine.

3 Emergency Sirens

When you hear a *steady wail* it means that a tornado has been sighted in Monroe County or the National Weather Service has issued a tornado warning. Take cover immediately. Tune to local cable TV or radio stations.

When you hear a *fast wail* it means that some type of unusual emergency has occurred, such as a hazardous chemical spill. Go indoors. Tune to a local cable channel or radio station for further instructions.

IV) ASSIGNMENTS AND RESPONSIBILITIES

- A) The Building Manager shall obtain volunteers to perform the duties of the Emergency Control Committee and floor wardens. Emergency Control Committee (ECC) will report to the Emergency Control Center (See Section V), unless the prevailing situation dictates otherwise. **Communication will be by public address system, or voice with the ranking member in charge.**

Emergency Control Committee, consisting of one staff member and one alternate from each floor (if applicable):

- **Alexis Andronikos, Reference Services**
- **Jennifer Chaffin, Human Resources**
- **Jim Champion, Building Manager**
- **Jill Clancy, Department of Information & Library Science**
- **David Cole, Department of Information & Library Science**

- **Karin Dahlgren, Center for Innovative Teaching & Learning**
- **Jane Goldsmith, Chief CWA steward**

- **Madeleine Gonin, Center for Innovative Teaching & Learning**
- **Lynn Hufford, Preservation**
- **M. Kylie Leach, Center for Innovative Teaching & Learning**
- **Randy Lent, Access Services**
- **Dee Mortensen, IU Press**
- **Diana Payne, ALF Internal Processing**
- **Daniel Pyle, IU Press**
- **Fran Sturgis, Stacks Manager**
- **Samantha Tiery, Department of Information & Library Science**
- **Michelle White, Technical Services**

B) Persons providing help to those requesting assistance: Floor Wardens & Asst. Floor Wardens:

- **Stacks Supervisors**

C) Responsibilities

1 Emergency Control Committee

- Review plan annually, revise as necessary, and make copies available to building employees and Emergency Management & Continuity.
- Plan training exercises to test evacuation plan.
- Instruct personnel of their duties.
- Determine method of monitoring for emergency situations.
- Determine method of notifying building occupants of emergency.
- In any emergency situation, the ranking member of the Main Library Emergency Control Committee present shall have initial authority to coordinate procedures, and amend, modify or supersede any provisions of this plan in order to ensure employee safety.
- Report missing or injured occupants to emergency personnel.
- Assess nature and extent of all emergencies.
- Assume initial control of all emergency actions until IUPD arrives, then:
 - Obtain volunteers to carry out specific actions.
 - Develop system to assist persons who need assistance.
 - Order evacuation, if deemed necessary.
 - Take any other action necessary to protect life.

2 Floor Wardens

- Obtain recommended training: First Aid/CPR, Warden Training, Fire Extinguisher and additional training as necessary.
- When the alarm activates, quickly check rooms on their floor as they exit the building. Advise anyone they see of the need to evacuate.
- Assist persons who need assistance.
- Once out, advise building ECC and/or emergency personnel of anyone remaining in the building.

- Keep occupants from reentering building until advised by ECC or emergency personnel that reentry is allowed.

Note: Often times, Emergency Control Committee members receive Floor Warden training and perform the duties of both positions.

V) **EMERGENCY CONTROL CENTER**

When sheltering in place, emergency actions should be coordinated from the Emergency Control Center located at the Wells Library East Tower Circulation Desk. The phone number for the Emergency Control Center is 855-4501.

VI) **EVACUATION ROUTES & MEETING PLACES**

- A) Maps of evacuation routes are displayed in hallways and departments. Each map will show the way to an exit, depending on where employees are located in the building. The building manager shall verify that the signs are in place and up to date. It will be the responsibility of the first-line supervisor to inform employees of evacuation routes. Meeting places will be established to account for individuals.
- 1 Primary meeting place: **Wells Library south parking lot, near the cafeteria entrance. Employees should look for and congregate near their supervisors to assist in accounting for departmental personnel.**
 - 2 Inclement weather meeting place: **Fine Arts Lobby.**
- B) Establish a procedure to account for employees in departments and/or floors: **Supervisors are to account for employees in departments &/or floors.**
- C) Establish a procedure for reporting to the Emergency Control Committee and emergency personnel any missing, trapped or injured occupants: **Supervisors shall report missing, trapped or injured occupants to the Emergency Control Committee and emergency personnel.**

VII) **DISABILITIES**

In an emergency, each person has different skills and abilities. The employee with a disability is responsible for informing her/his department administrator or immediate supervisor that she/he will require assistance during an evacuation. It is important not to assume that persons with obvious disabilities need assistance, or to assume what type of assistance they may need.

- A) Assign a designated area for persons who may need assistance when evacuating, (e.g. hearing, mobility, vision or speech impaired, the elderly and children). The area for rescue assistance will have direct access to an exit, where those who are unable to use stairs or who are unable to navigate the emergency route may remain. Examples in this building:

1 One-hour fire-resistive hallway adjacent to an exit.

Wells Library, sometimes two per floor. When the receiver is lifted, a call is automatically placed to a dedicated emergency phone at East Tower Circulation

Desk. The emergency phone may also be reached by dialing 855-4501. Calls to this number should be limited to emergencies of a serious nature.

B) Fire Procedures: To evacuate the building upon seeing smoke/fire or hearing the fire alarm (other types of evacuation are covered elsewhere in this document):

- 1 Verbally warn employees in the immediate area, (such as yelling, “FIRE!”) and activate alarm upon discovery of smoke or fire. The signal for a building wide evacuation will be the sound of the fire alarm. All employees are required to evacuate the building, unless otherwise assigned or authorized to remain by the emergency agency in charge. The alarm may not sound continuously. If the alarm stops, continue the evacuation and warn others who may attempt to enter the building after the alarm stops.
- 2 **DIAL 911** from a telephone in a safe area to report the incident to IUPD. (There may be a 4 second delay before the operator answers.) The IU dispatcher is responsible for contacting the appropriate department or agency.
- 3 Give your name, building room number and type of emergency.
- 4 Stay on the line until you have given all necessary information.
- 5 After calling 911, contact the Research Collections Circulation Counter at 855-4501 so they may assist in directing emergency personnel to the location of the emergency.
- 6 **CLOSE THE DOORS AS YOU LEAVE**
- 7 Use Stairways. When out, move away from the building to a prearranged assembly area for a head count. Leave walks and drives open for fire and emergency responders.
- 8 If necessary for a safe, orderly evacuation, activate fire extinguishers or fire hose. At the discretion of the individual, use extinguisher if trained and assigned to do so.
- 9 Notify:
 - a. Fire fighters if you suspect someone may be trapped inside the building.
 - b. The East Tower Circulation Desk, immediate supervisor, the ECC Chairperson, proper agencies for any needed services and the highest ranking member of the Emergency Control Committee.

- Building Manager and ECC Chairperson:
Jim Champion - 855-9299

C) Tornado or Severe Thunderstorm Procedures

In the event of a tornado or severe weather warning, the following procedure should be put into effect.

- 1 Listen for latest advisories on commercial and/or weather radio. (WTTS, 92.3 FM is the local Emergency Alert System station for Bartholomew, Brown, Decatur, Jackson, Lawrence and Monroe Counties.)
 - a. Tornado or Thunderstorm Watch: Weather conditions are favorable for the possible development of tornadoes or severe thunderstorms. Continue normal activities but have someone monitor the situation and notify others if conditions deteriorate.

Post spotters (any employee) at window to observe and report imminent weather changes during a tornado watch. Inform supervisor and/or building manager if deteriorating weather occurs or if tornado warning is issued. (Training is available from the National Weather Service to become an official severe weather spotter.)

- b. Tornado or Thunderstorm Warning: A tornado or thunderstorm is occurring or is sighted in the area. In addition to dark clouds and/or hail the emergency siren may sound.

The warning siren is a steady wail. It sounds when there is a tornado in the area. If you hear the siren, check your floor to make sure that everyone has heard the siren. Then immediately move personnel to the designated safe assembly area, such as the lowest level of your building without windows. For example, a restroom, center stairwell, hallway or office. Close the door. The siren typically sounds for five minutes. There is no “all clear” signal. Stay sheltered until the all-clear is given by the National Weather Service. **Direct library employees and patrons to restrooms, stairwells, interior rooms or hallways. AVOID glass areas, exterior walls and main level lobby. Do not leave the building. Stay sheltered until the all clear is given by the National Weather Service. Access Services staff will notify employees and patrons via the PA system when the tornado warning has expired.** If you are outside when you hear the siren, take cover in a building close by.

- 2 If necessary, initiate emergency shutdown procedures.
- 3 After tornado passes, restore calm and check for injuries.
- 4 Report injuries and damage to IUPD via 911, then Risk Management.

D) Blizzard

- 1 If indoors:
 - a. Stay calm and await instructions from the designated official.
 - b. Stay indoors!
 - c. If there is no heat:
 - d. Close off unneeded rooms or areas.
 - e. Stuff towels or rags in cracks under doors.
 - f. Cover windows at night.
 - g. Eat and drink. Food provides the body with energy and heat. Fluids prevent dehydration.
 - h. Wear layers of loose-fitting, lightweight, warm clothing, if available.
- 2 If outdoors:
 - a. Find a dry shelter. Cover all exposed parts of the body.
 - b. If stranded in a vehicle:
 - Stay in the car or truck.
 - Run motor about ten minutes each hour. Open the window a little for fresh air. Make sure exhaust pipe is not blocked.
 - Make yourself visible to rescuers.
 - Exercise to keep blood circulating and to keep warm.

E) Earthquake

An earthquake usually occurs without any type of warning. Due to the suddenness, all personnel should attempt to get under a table or desk, or any place that the employee

feels is safe. Standing in a doorway is not recommended. After an earthquake has stopped, initiate the following procedure:

- 1 Stay calm and await instructions from the designated official.
- 2 Keep away from overturned fixtures, windows, filing cabinets, and electrical power.
- 3 Check for injuries and provide assistance as needed.
- 4 Maintenance department should check for fires and shut off utilities to control gas and water leaks.
- 5 If major structural damage has occurred, the Emergency Control Committee should order a complete evacuation. The building should be inspected by Physical Plant for damage before reentry.
- 6 Physical Plant should then notify proper agencies, companies or departments as needed.

F) Flood

- 1 If outdoors:
 - a. Climb to high ground.
 - b. Avoid walking or driving through floodwater.
 - c. If car stalls, abandon it immediately and climb to higher ground.
- 2 If indoors:
 - a. Be ready to evacuate as directed by the designated official.
 - b. Time permitting, move vital material and equipment to higher ground.

G) Hostile Intruder

If a person is observed acting unusual, engaged in an illegal activity, or seems out of the ordinary the observer should dial 911 and report it to the police. At that time, the caller will be given information and instructions concerning the circumstances.

IX) MEDICAL EMERGENCIES

Emergency Medical Service (EMS) personnel or those individuals who are trained by the American Red Cross will provide first aid. Until rescue personnel arrive, administer first aid in the building or, in the event of a complete evacuation, at a designated safe assembly area outside.

- A)** Call **911** immediately if the injury is life threatening. Provide the following information:
 - 1 Nature of medical emergency.
 - 2 Location of the emergency (address, building, room number).
 - 3 Your name and the phone number from which you are calling.
- B)** Do not move victim unless absolutely necessary.
- C)** After calling 911, contact the East Tower Circulation Desk at 855-4501 so they may assist in directing emergency personnel to the location of the emergency.
- D)** Call the following personnel trained in CPR, AED and First Aid to provide the required assistance prior to the arrival of the professional medical help.

| | | | |
|---|-------------------|----------|----------------|
| 1 | Alexis Andronikos | 855-7444 | CPR + AED + FA |
| 2 | Madeleine Gonin | 856-1378 | CPR + AED + FA |
| 3 | Diana Payne | 856-1425 | CPR + AED + FA |
| 4 | Samantha Tiery | 855-5120 | CPR + AED + FA |
| 5 | Michele White | 855-1666 | CPR + EAD + FA |

E) The First Aid Kits are located at the East Tower Circulation Desk.

F) An Automated External Defibrillator (AED) unit and first aid kit are located at the Information Commons Reference desk on the 1st floor of the West Tower.

G) If personnel trained in First Aid are not available, as a minimum, attempt to provide the following assistance:

- 1 Stop bleeding with firm pressure on the wounds (note: avoid contact with blood or other bodily fluids).
- 2 Clear the air passages using the Heimlich Maneuver (abdominal thrusts or chest compressions) in case of choking.

H) When rendering assistance to personnel exposed to hazardous materials, consult the MSDS and wear the appropriate personal protective equipment. Attempt first aid ONLY if trained and qualified. Call 911 and refer to Hazardous Substance Spill section of this document.

X) PROCEDURE FOR EMERGENCY SHUTDOWN OF OPERATIONS

An emergency shutdown of the Herman B Wells Library can be ordered by the Dean of the Libraries or the Dean's designee and in concert with: Physical Plant, law enforcement, the Office of Risk Management or local fire department. No employee should risk any type of injury. However, if time permits, personnel should perform the following duties:

A) An emergency shutdown of computers should be accomplished in the event of a severe electrical storm. If time permits, exit the program and shut off the computer power supply.

B) Utility Controls will be shut off by maintenance personnel who will know the location and operation of: main controls for **steam and electrical** supply leading into the building. For utility or building service emergencies, call 855-8728.

C) Critical Operations will be shut down by assigned personnel.

- 1 Designated personnel involved in critical operations may remain on site.

Assignments: **NO CRITICAL OPERATIONS AT THIS TIME**

| Work Area | Name | Job Title | Assignment |
|-----------|------|-----------|------------|
|-----------|------|-----------|------------|

- 2 If the emergency situation will not permit any of the personnel to remain, contact the following offices: **NA**

XI) CHEMICAL, BIOLOGICAL, RADIOLOGICAL, NUCLEAR,

EXPLOSIVE (CBRNE) THREAT

Indiana University policy is to evaluate bomb/CBRNE threats in order to determine the appropriate action that must be taken. The threat that a bomb/CBRNE has been planted is usually made via the telephone. In the majority of cases, these threats have been proved to be false and no device or material was located. However, the potential for loss of human life and property is so great that each situation must be pursued and evaluated. For more information, refer to Bomb/Bio-Chemical Threat policy.

- A) Telephone Threat:** The person receiving a telephone bomb/CBRNE threat should remain calm and obtain as much information as possible by completing the following **checklist** at the end of this section. If your phone is equipped with caller identification, write down the number that is on the display screen. After the caller hangs up, **immediately call 911**. Give all available information. Notify IUPD, then immediate supervisor.
- B) Written Threat:** Written threats can come in the form of a note, letter or fax, through the U.S mail or campus mail. Any document will become evidence at the trial of any perpetrator. It may, in fact, be critical to a successful prosecution and positive identification of the perpetrator. It therefore is extremely important.
- 1 **DO NOT** handle the envelope or letter/note any more than is necessary and limit the number of persons who touch these items. Know who the people are that have touched these items so elimination fingerprints can be obtained. Once proper notification has been made to police/security personnel, place the item(s) in a folder or large envelope to protect them and tell others not to handle them.
 - 2 Immediately call 911 to notify the campus police or persons with the safety/security responsibility at any IU facility.
 - 3 Safeguard the received material until it is given to the proper authority.
- C) Suspicious Package:** If a suspicious package or device is found, **immediately** notify the police. **Do not touch or handle** any suspicious item! **Do NOT use the fire alarm**. Request all persons to leave the room the package is in.

If the package is a suspected bio-hazard (e.g. Anthrax): It is unlikely that any threat of exposure to a bio-hazard, such as anthrax, will be found, but the potential exists. All such threats should be taken seriously.

1 Appearance

- a. Powdery substance felt through or appearing on the package or envelope.
- b. Oily stains, discoloration, or odor.
- c. Lopsided or uneven envelope.
- d. Excessive packaging material such as masking tape, string, etc.
- e. Excessive weight.

2 Handling Suspected Packages or Envelopes

- a. Do not shake or empty the contents of any suspicious package or envelope.
- b. Do not carry the package or envelope, show it to others or allow others to examine it.
- c. Put the package or envelope down on a stable surface; do not sniff, touch, taste, or look closely at it or at any contents that may have spilled.

- d. Alert others in the area. Leave the area. Close any doors and assemble outside the room's entrance. Take actions to prevent others from entering the area.
- e. WASH hands with soap and water to prevent spreading potentially infectious material to face or skin.
- f. Notify IUPD, by calling 911, and your supervisor.
- g. If possible, create a list of persons who were in the room or area when the suspicious letter or package was recognized and a list of persons who also may have handled it.
- h. Await arrival of assistance.

D) Bomb/CBRNE Threat Evacuation: A bomb/CBRNE threat evacuation is entirely different from a fire evacuation. The use of fire alarms is not recommended since it does not allow for a controlled evacuation. Upon locating or being advised of a bomb/CBRNE threat, the building manager, her/his designee or the ranking member of the Wells Library Emergency Control Committee will cordon off the area, wait until IUPD arrives, and then consult with the University Police for an evacuation decision. The University Police is responsible for ordering this type of evacuation. If a decision to evacuate is made, a uniformed police officer, going room-to-room, will notify occupants of the decision to evacuate. If evacuation takes place, do not re-enter until the building has been searched and declared safe by the authority having jurisdiction. **Primary evacuation routes must be searched prior to ordering an evacuation** unless the on-scene police officer determines otherwise.

TELEPHONE BOMB/CBRNE THREAT CHECKLIST

QUESTIONS TO ASK CALLER

- When is the bomb going to explode?
- Where is it?
- What building?
- What floor?
- What does it look like?
- What kind of bomb is it?
- What will cause it to explode?
- Did you place the bomb? Why?
- What is your address? Name?
- Can we help you?

EXACT WORDING OF THREAT

Sex of caller: M / F Race: _____ Approximate age: _____ Length of call: _____ Telephone # at which call received: _____

Time received: _____ Date call received: ___/___/___ Nationality: _____

CALLER'S VOICE

| | | | | |
|--------------------|-------------|----------------|---------------------|-------------|
| ___ Calm | ___ Nasal | ___ Soft | ___ Angry | ___ Stutter |
| ___ Loud | ___ Excited | ___ Lisp | ___ Laughter | ___ Slow |
| ___ Raspy | ___ Crying | ___ Rapid | ___ Deep | ___ Normal |
| ___ Distinct | ___ Slurred | ___ Whispering | ___ Clearing Throat | ___ Ragged |
| ___ Deep Breathing | | ___ Disguised | ___ Cracking Voice | ___ Accent |

BACKGROUND SOUNDS/NOISES

| | | | | |
|------------------|-----------------------|-----------------------|-----------------------|-------------|
| ___ Street Noise | ___ Voices/Talking | ___ Wildlife Sounds | ___ PA System | ___ Music |
| ___ Static | ___ Motor | ___ Factory Machinery | | ___ Clear |
| ___ Radio/TV | ___ Long Distance | ___ Local | ___ Office Sounds | ___ Weather |
| ___ Cell Phone | ___ Restaurant Sounds | | Other (Specify) _____ | |

CALLER'S ATTITUDE & LANGUAGE

____ Well Spoken (education)

____ Incoherent

____ Profane/Foul

____ Irrational

____ Taped Message

____ Message Being Read

REMARKS

Your name: _____ Your position: _____

Your telephone: _____ Date checklist done: _____

(Keep this checklist near your phone.)

XII) HAZARDOUS SUBSTANCE

“Hazardous substances” includes substances that have the potential to cause either acute or chronic health problems due to chemical or physical properties.

“Location” means any place on the IU campus where chemicals are being used or stored, such as the Chemistry Building, Physical Plant, IU Art Museum, dark rooms, etc.

The following are the locations of:

Material Safety Data Sheet (MSDS): **For cleaning supplies, binder located in Room 055.**

Personal Protective Equipment (PPE): **N/A**

Spill Containment and Security Equipment: **N/A.**

The following page is a copy of the IU Bloomington Chemical Response Guide poster. You can contact the Office of Environmental Health and Safety for a full sized poster (8.5 x 14).

EMERGENCY PHONE NUMBERS

Police (IUPD)911
Fire Dept.....911
Ambulance911
EH&S.....5-6311

FIRST AID



For skin/eye contact:

1. Rinse affected area immediately at safety shower/eye wash station.
2. Get medical attention if the skin or eyes are red or painful after rinsing.

For inhalation:

1. Move to fresh air immediately.
2. Get medical attention for exposure or if breathing is impaired.

SPILL CONTROL KIT

Absorbents

- Absorbent pads, mats, paper towels for oil and water.
- Flor-Dri, Oil-Dri, kitty litter, or sand for oil.
- Universal absorbent, 1:1 baking soda (sodium bicarbonate) & kitty litter or Oil-Dri for all spills including acids.

Personal Protective Equipment (PPE)

- Disposable rubber or nitrile gloves.
- Safety glasses or goggles.

Clean-Up Material

- Plastic dust pan and scoop.
- Plastic trash bag for paper and contaminated gloves.
- 5 gallon bucket for spill materials and used absorbents.

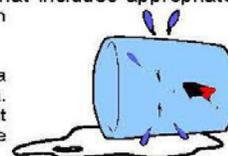
Other Spills (i.e. Mercury)

- Call EH&S for clean up.

Chemical Spill Response Guide

Despite our best efforts to be cautious and practice safe work procedures, accidents resulting in the release of chemicals occur. For this reason, it is essential that all personnel have a spill response plan that includes appropriate procedures and materials to adequately contain and clean up a minor chemical spill.

All shops are required to have Material Safety Data Sheets (MSDS) for chemicals stored or used in their area. Several sections of the MSDS provide important emergency and spill response information for these chemicals.



The following procedures outline who and when to call for assistance. They should also be used in conjunction with the MSDS as a guide to help respond in the event

Major Spill

If the spill poses an **immediate risk to life and health** because of the type or quantity of the chemical or involves an **uncontrolled fire or explosion**:

- Evacuate the immediate area and keep others from entering the area until assistance arrives. If building evacuation is necessary activate the nearest fire alarm.
- Call 911 and give details of the accident including location, types of hazardous materials involved, and whether there is personal injury. Stay on-site until assistance arrives.

If the accident involves **personal injury or chemical contamination**, follow the above steps as appropriate and at the same time:

- Move the victim from the immediate area of fire, explosion, or spill (if this can be done without further injury to the victim or you).
- Locate nearest emergency eyewash or safety shower. Remove any contaminated clothing from the victim and flush all areas of the body contacted by chemicals with copious amounts of water for 15 minutes. (If building is evacuated this step may not be feasible.)

Minor Spill

If the spill involves the release of a type or quantity of a chemical which **does not** pose an immediate risk to health and **does not** involve chemical contamination to the body:

- Notify other personnel and neighbors of the accident.
- Isolate the area. Close doors and evacuate the immediate area if necessary.
- Remove ignition sources and unplug nearby electrical equipment.
- Establish exhaust ventilation. Open windows and vent vapors to outside of building only.
- Locate spill kit.
- Choose appropriate personal protective equipment (safety glasses, gloves, etc.)
- Confine and contain spill. Cover with appropriate absorbent material. Sweep solid material into a plastic dustpan and place in a sealed 5-gallon container.
- Wet mop spill area. Be sure to decontaminate broom, dustpan, etc. Put all contaminated items (gloves, clothing, etc.) into a sealed 5-gallon container or plastic bag. Label waste container and call EH&S for waste pickup. If spill was greater than one pint of a hazardous material you must notify EH&S.



Indiana University
University Office of Environmental, Health,
and Safety Management

Christopher E. Kohler
Laboratory Safety Manager
2011

XIII) FIRE PREVENTION AND WORKPLACE HAZARDS

A) Employee Responsibility

It is the responsibility of all employees to prevent any type of fire in the building. Listed below are general items to accomplish this objective:

1. Follow general guidelines listed in this plan. You may also refer to the Faculty Emergency Procedures Handbook.
2. Smoking is not allowed in Indiana University buildings. Extinguish all cigarettes in proper receptacles.
3. Do not put any type of hot object, such as cigarette butts, in trash cans.
4. All employees will know the evacuation routes and exits, and will proceed to them when instructed.

B) Listing of Typical Fire and Workplace Hazards

Call the Office of Risk Management, 855-9758, with specific fire/safety questions.

1. **Electrical circuits**, wiring and extension cords worn and frayed.
2. **Electrical Appliances**, such as, coffee pots, microwaves and portable heaters left unattended or on at the end of the day.
3. **Flammable Solvents**, such as, gasoline, paint thinner or degreaser, in amounts greater than maintenance quantities.
4. **Flammables & Combustible liquids** not stored in a designated area or storage cabinet. (Refer to laboratory safety standards.)
5. **Impaired Fire Controls**
 - a. Fire and smoke doors blocked open.
 - b. Storage and trash in stairways and hallways.
 - c. Storage closer than 18 inches to sprinkler heads.
6. **Oil-soaked Rags**. Store dirty rags in a metal container with a lid.

C) Housekeeping

Good housekeeping will be the responsibility of **ALL** employees.

1. Waste materials are to be discarded in their proper places.
2. Heat producing equipment shall be maintained in good working order and a minimum of 36 inches from combustible items.
3. Personnel are responsible for keeping their work areas neat and orderly.
4. All aisles and exits will be kept clear.
5. Access areas to fire extinguishers will be kept clear.

6. Emergency telephone number, **911**, will be posted on all telephones.
7. Each supervisor will be responsible for properly training their employees who are required to handle, store and maintain hazardous materials.
8. All fire/smoke doors are to remain closed and unobstructed from their intended function of retarding the spread of fire and smoke.

D) Maintenance of Fire Equipment and Systems

Refer questions and problems regarding the fire sprinkler and/or smoke detector systems, fire extinguishers and their locations to Operations Center/Control Center (855-8728).

XIV) NEWS INFORMATION

Information to the news media will only be released through the Office of the Vice President for University Relations: 855-0850 or cell phone: 812-360-0909.

XV) POST-EMERGENCY EVALUATION

Following any emergency, a post-emergency evaluation will be conducted to evaluate the cause, employee and outside department actions, and to determine what corrective or preventative actions are necessary.

XVI) FOR FURTHER INFORMATION REGARDING THIS PLAN, CONTACT:

The Building Manager, **Jim Champion, 855-9299, ichampio@indiana.edu**, his designee or any member of the Wells Library Emergency Control Committee listed below:

Alexis Andronikos, Reference Services 855-7444, aandroni@indiana.edu **Jennifer Chaffin, Human Resources 855-5407, jlchaffi@indiana.edu** **Jill Clancy, SLIS 855-2018, jilclanc@indiana.edu** **Jane Goldsmith, Chief CWA Steward 855-8237, goldsmi@indiana.edu** **Madeleine Gonin, CITL 856-1378, mgonin@indiana.edu** **Lynn Hufford, Preservation 855-8155, hufford@indiana.edu** **Randy Lent, Access Services 855-8249, lent@indiana.edu**

| | |
|-------------------------------------------|---------------------------------------------------------------------------------|
| Dee Mortensen, IU Press | 855-0268, mortense@indiana.edu |
| Diana Payne, Google Project | 856-1425, diapayne@indiana.edu |
| Samantha Tiery, SLIS | 855-5120, sjhale@indiana.edu |
| Fran Sturgis, Stacks Manager | 855-3706, fasturgi@indiana.edu |
| Michelle White, Technical Services | 855-1666, white98@indiana.edu |

XVII) DEFINITIONS

| | |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ademco ----- | Brand name for automatic telephone dialer. |
| Assembly Area ----- | Designated safe area for gathering groups of people during an emergency. Contingent on the type of emergency, may be indoor or outdoor. |
| BTFD ----- | Bloomington Township Fire Department. |
| DEHS ----- | Department of Environmental Health and Safety. |
| Emergency Control Center ----- | Designated area from where staff members report during an emergency to be assigned various responsibilities and where building emergency operations are controlled. |
| Emergency Control Committee (ECC) | Building occupants with authority to make decisions affecting the university in an emergency. |
| EMS ----- | Emergency Medical Service. |
| Floor Warden ----- | Person who assists Emergency Control Committee during emergency situations, warns and checks on occupants, and assists in maintaining control of scene. |
| Hazardous Substances ----- | Includes every known chemical. |
| HVAC ----- | Heating, Ventilation and Air Conditioning. |
| HSAS ----- | Homeland Security Advisory System. |
| IDLH ----- | Immediately Dangerous to Life and Health. |
| IUPD ----- | Indiana University Police Department. |
| LEL ----- | Lower Explosive Limit. |
| MSDS ----- | Material Safety Data Sheet. |
| NOAA ----- | National Oceanic and Atmospheric Association. Radio information available from weather receivers or scanners in Bloomington at 162.45 MHz. |
| PI ----- | Principal Investigator. |
| PPE ----- | Personal Protective Equipment. |
| Ranking Member ----- | Member of Emergency Control Committee with superior rank or knowledge. |

EMERGENCY PROCEDURES

TORNADO

SEEK SHELTER

- Move to an interior room on the lowest level
- Stay from windows and exterior doors
- Listen to a weather radio for updates
- Stay away from hazardous materials



FIRE

EVACUATE

- Pull the fire alarm
- Call 911
- Leave the building, **CLOSE DOORS** behind you
- If unable to exit the building go to the nearest stairwell or place of refuge
- Assemble in designated area



ACTIVE SHOOTER

GET OUT, HIDE OUT, FIGHT BACK

- Call 911
- Leave the building
- If evacuation is not possible, hide in a concealed place
- Lock and barricade door, turn off the lights
- Wait for law enforcement
- As a LAST resort, over power the shooter



MEDICAL EMERGENCY

STAY CLEAR

- Call 911
- Provide the location, nature of injury or illness, current condition of the victim and other requested information
- Do not move the victim unless in immediate danger
- If trained—administer first aid, CPR/AED



PHONE NUMBERS

EMERGENCY POLICE, FIRE, EMS

911

NON-EMERGENCY

| | |
|---------------------|----------|
| IU POLICE..... | 855-4111 |
| PHYSICAL PLANT..... | 855-8728 |
| EH&S..... | 855-6311 |
| IUEMC..... | 855-2004 |
| INLOCC..... | 855-9758 |

FOR MORE INFORMATION:
PROTECT.IU.EDU

SUSPICIOUS ACTIVITY

SEE SOMETHING, SAY SOMETHING

- Object is out of the ordinary
- Person is behaving strangely
- Gut feeling that something is wrong
- If you see something suspicious, do something
- Call 911



BOMB THREAT

REMAIN CALM

- Get as much information as possible from the caller—location of device, what it looks like, what will cause it to explode.
- Note background sounds, gender of caller, and any notable characteristics of the caller's voice
- Call 911



HAZARDOUS MATERIALS

STAY BACK

- If life-threatening, pull the fire alarm, evacuate and call 911
- If non-life-threatening, call 911 and provide information on type of incident and location
- If you come into contact with a hazardous material, decontaminate and call 911



UTILITY FAILURE

IDENTIFY LOCATION

- Call Physical Plant or IUPD to report issues
- Be prepared to provide failure type and location
- University officials may evacuate a building due to utility failures



During an emergency always **call 911** first!