



# Records Emergency Planning and Response Webinar

## Session 4

Participant Guide  
*Final, July 2010*



FEMA

Course Number: AWR-211-2





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## Session 4 Introduction

### Session 4 Welcome and Overview

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**Records Emergency Planning  
and Response Webinar**

Session 4

*Please stand by! The webinar will begin shortly.*

- 1** Join the conference call by dialing the conference number in your Invitation or Reminder Emails. Please put your phone on mute.
- 2** Be sure to have all Session 4 materials ready before the session starts. You'll find the link to the materials in your Invitation or Reminder Emails.

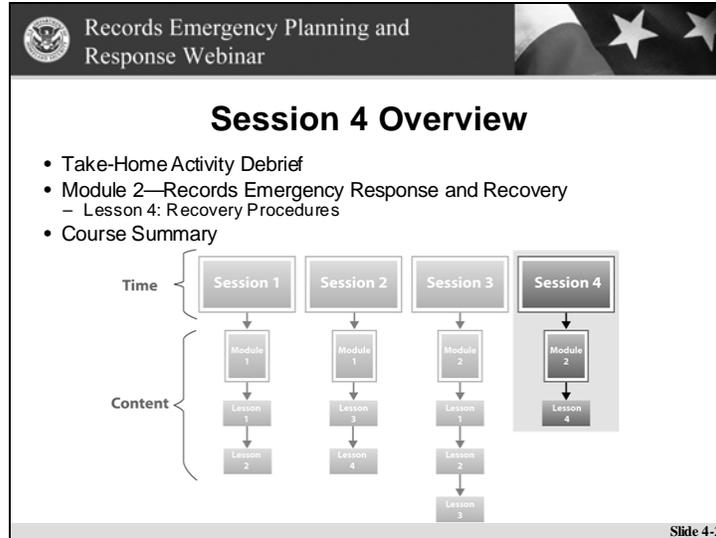
FEMA |

Required materials for Session 4:

- Session 4 Participant Guide
- Session 4 handouts:
  - **Handout 4.1**—Response and Recovery Procedures
  - **Handout 4.2**—Sample Records Emergency After-Action Report
  - **Handout 4.3**—Sample Post-Event Report
  - **Handout 4.4**—Common Drying Methods
- Materials from prior sessions:
  - **Handout 3.1**—Sample Pack-Out Tracking Log
  - Your completed handout from the Session 3 Take-Home Activity: **Handout 3.5**—Develop Your REAP—Decision Maker, Site Assessment, Goals and Timetables, or Action Team
- Course Reference(s):
  - **Reference 01**—Resource Center, References, Reading List



Slide 4-2





# Take-Home Activity Debrief

## Session 3 Activity: Develop Your REAP—Decision Maker, Site Assessment, Goals and Timetables, or Action Team

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### Take-Home Activity Debrief

Handout 3.5

- Activity: Decision Maker, Site Assessment, Goals and Timetables, or Action Team

**Handout 3.5—Develop Your REAP—Decision Maker, Site Assessment, Goals and Timetables, or Action Team Activity**

**Take-Home Activity Goal**  
The purpose of this activity is to continue working on your Record Emergency Action Plan (REAP).

**Take-Home Activity Description**  
Reflect on one of the following goals and document your completion or results on the Decision Maker, Site Assessment, Goals and Timetables, or Action Team Worksheet provided on page 3.

- **Task 1 - Decision Maker:** Identify the decision-maker responsible for approving the plan and document results in the REAP. Add to the plan about the responsibility and hours of day of the plan and for the performance review period on the REAP report.
- **Task 2 - Site Assessment:** If you have already done up digital activities from completion of the training, identify the completion of your assessment plan. Document the results on your findings (both paper and electronic), when they are used and are provided to the team.

**NOTE:** For those of you who have not done the Decision Maker, Site Assessment, or Action Team Worksheet 3.5, identify and document the activities and I will be doing your assessment. Although it is specific to general records, you might find a useful place to begin. The handout is available at the REAP Resource Center.

- **Task 3 - Goals and Timetables:** If you have already been submitted to begin the REAP process, document the work and timetables for your REAP.
- **Task 4 - Action Team:** If you have already been submitted to begin the REAP process, complete your REAP Action Team. Identify the individuals you need to be on the team, contact your team members, and assign their roles and responsibilities.

If you are still in the process of developing your plan, you may wish to work together and complete the plan by the end of the week.

As prepared to share your activities with the class at the beginning of the next webinar (Session 4).

**Submit Your Completed Work**  
Please email a copy of your completed work to your instructor no later than the day before Session 4.

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# Module 2— Records Emergency Response and Recovery



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## Module 2 Introduction and Objectives

### Module 2 Introduction

Slide 4-4

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Response Webinar

**Module 2—Records Emergency Response  
and Recovery**

Introduction and Objectives

Slide 4-4



## Module 2 Objectives

Slide 4-5

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### Module 2 Objectives

- At the conclusion of this module, you will be able to:
  - Assess damage to records after an emergency
  - Define the Assessment Team roles and responsibilities
  - Determine appropriate recovery techniques for records damaged in an emergency
  - Describe the health, safety, security, and privacy issues that should be addressed during a response
  - **Determine when and how to work with private vendors**
  - **Discuss response procedures for records in all media**

Slide 4-5

At the conclusion of this module, you will be able to:

- Assess damage to records after an emergency
- Define the Assessment Team roles and responsibilities
- Develop a response plan for records damaged in an emergency
- Describe the health, safety, security, and privacy issues that should be addressed during a response
- **Determine when and how to work with private vendors**
- **Discuss response procedures for records in all media**



## Lesson 4: Recovery Procedures

Slide 4-6

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**Module 2—Records Emergency  
Response and Recovery**

Lesson 4: Recovery Procedures

Slide 4-6



## Set Up the Recovery and/or Staging Areas

Slide 4-7



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### Set Up the Recovery Area

- Large enough to accommodate several tables
- Well-lit
- Good air circulation
- Securable with locks
- Access to clean running water
- Electricity with outlets for computers, fans, etc.
- Environmental controls for temperature and humidity



Photo courtesy of NARA

Slide 4-7

### Recovery Area

If you are going to recover records on site, you will need a recovery area. Recovery areas should be large enough to accommodate several tables, be well-lit with good air circulation, and have access to clean running water. You may also need a computer, fans, plastic sheeting, shelves, drying materials, and dehumidifiers.

In addition, recovery areas should be environmentally controlled, as mold may develop in 48–72 hours if the temperature and humidity are high. Ideally, the temperature should be below 65° F, with the relative humidity less than 50 percent. Monitor the climate within the recovery area and make the relative humidity levels consistent.

Cover shelves with plastic sheeting and tables with sheeting or a water-absorbent material such as clean newsprint from rolls. Set up fans so they are circulating the air but not blowing directly on the records. Keep wet records away from supports made of metal, which will rust.



## Staging Area

Slide 4-8



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### Set Up the Staging Area

- Large area, with room for:
  - Tables, supplies, and shelves
  - Tracking, boxing, and loading records
  - Space for staff to move about
- Accessible to trucks



Photo courtesy of NARA—Orleans Parish—post-Hurricane Katrina—2005

Slide 4-8

If you are not going to recover records on site, but instead will be shipping them off site or to a contractor for recovery, you will need a staging area where you can box or re-box records, record them in a tracking system, and prepare them for shipment.

Select a site that is large, with plenty of room for tables, supplies, and shelves; for boxing and loading records; for tracking them; for staff moving about, etc. The ideal site will be accessible to trucks unloading supplies and loading boxes of records and other materials.

### Requirements for Recovery and Staging Areas

As mentioned earlier, both the recovery and staging areas should have good lighting, good air circulation, and access to clean running water.

Both areas must also be securable with locks. Make sure the area will remain secured at the appropriate level for the records being handled.

Do not begin moving records until the staging and/or recovery area is prepared.



*Freezing Records On Site*

Slide 4-9

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### Freezing Records On Site

- Freezing records is a good option if you cannot treat all wet records within 48 hours.
- Freezer choices range from trailer to chest.
- Think about alternate resources—store freezers, local universities, colleges, food banks, etc.



Photos courtesy of NARA

Slide 4-9

Freezing records is a good option if you cannot treat all of the wet records within 48 hours. You can try to locate large freezers on site—for example, those in a cafeteria—or rent freezer trucks or freezers. You can also use small household chests or upright freezers.

Also think about alternate resources—store freezers, local universities, colleges, food banks, etc.



## What If You Don't Have Room for a Staging or Recovery Area?

Slide 4-10

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### What If You Don't Have Room for a Staging or Recovery Area?

- Locate appropriate facilities elsewhere, including:
  - Public buildings, such as armories or schools
  - Buildings with private meeting facilities
  - Church activity buildings
  - Commercial property for rent or lease
  - Rental trailers or tents

Slide 4-10

If the emergency is large-scale, or you do not have access to suitable areas on site, you will have to locate appropriate facilities elsewhere. Look for sites nearby that meet your criteria. These may include:

- Public buildings, such as armories or schools
- Buildings with private meeting facilities
- Church activity buildings
- Commercial property for rent or lease
- Rental trailers or tents



## Pack-Out Guidelines

Slide 4-11

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### Pack-Out Guidelines

- Pack-out is the process in which damaged records are identified, labeled, and moved off site.
- Do not begin until your staging and/or recovery area is prepared.
- Determine removal priorities—removed first are:
  - The wettest or most damaged records
  - Any records needed for immediate use
  - Essential records that cannot be duplicated and stored off site
- Try to handle records as little as possible.



Photo courtesy of NARA

Slide 4-11

Pack-out is the phase of emergency response in which damaged records are identified, labeled, and moved off site either for immediate recovery operations or to frozen storage until recovery operations can begin.

Do not begin moving records until your staging and/or recovery area is prepared. You must also decide whether you are going to try to recover the records on site or ship them to a contractor. You may decide to recover some on site, such as damp paper records, while sending records in other media, such as photographs, microforms, tapes, and hard drives, off site for special handling.

Determine removal priorities from your assessment. Usually the wettest or most damaged records are removed first, along with any records that are needed for immediate use or essential records that cannot be duplicated and stored off site.

Try to handle the records as little as possible and make sure they are well supported.



## Packing-Out Boxes

Slide 4-12



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### Packing-Out Boxes

- If the records are in boxes that are structurally sound:
  - Form a human chain.
- If the records are in large and heavy drawers, or if their containers are not structurally sound:
  - Use book trucks, dollies, or carts.



Photo courtesy of NARA

Slide 4-12

You must also decide how to remove the records physically from the area where the damage occurred.

If the records are in boxes that are structurally sound, the fastest and most efficient way to remove them is usually by forming a human chain. This is especially effective in removing materials from cramped quarters.

However, if the records are in large and heavy drawers, or if their containers are not structurally sound, you should use book trucks, dollies, or carts. Removal equipment should be made of metal. If you must use wooden carts, cover them well with heavy plastic sheeting before placing records or containers on them. For maps and flat files, remove drawers to protect and transfer the materials to the recovery or staging area. Materials may be frozen right in the drawers.



Slide 4-13

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### Packing-Out Boxes (cont'd.)

- If the records are in boxes that are not structurally sound and could collapse during the move:
  - Transfer them to other receptacles before removal.



Photo courtesy of NARA

Slide 4-13

If the records are in boxes that are not structurally sound and could collapse during the move, you must transfer them to other receptacles before removal. Options include:

- Clean, dry cardboard or plastic boxes
- Plastic milk crates lined with garbage bags or Rescubes
- Book carts, hand carts, or dollies
- Plastic garbage bags (one box per bag)



## Identification for Tracking

Slide 4-14

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### Identification for Tracking

- Each box or drawer of records removed must be identified by a unique number or code.

ORLEAN'S PARISH  
DABOX1144  
ABOVE BELOW  
Photo courtesy of NARA

Slide 4-14

For tracking purposes, each box or drawer of records removed must be identified by a unique number or code. Make sure all containers are labeled on two sides, using waterproof permanent markers. If you cannot write directly on the receptacle, place the panel from the box or a sheet of paper with identifying information in the container along with the records. Record the necessary information on the moved records electronically if computers or laptop computers are available, or on hardcopy forms, if they are not.

If you are using paper to record the tracking information, you should assign someone as soon as possible to enter the data into the tracking system designed and set up when your response was being developed. Use a design that is flexible, as you may need to add or change fields as the emergency unfolds. At a minimum, you should collect information on:

- Contents
- Original location
- Type(s) of damage
- Box number
- Response priority
- Destination during recovery
- All actions performed, and by whom
- Decisions made, and by whom

(Refer again to **Handout 3.1**—Sample Pack-Out Tracking Log for an example of a pack-out tracking form.)



## Stacking Pallets for Transport

Slide 4-15

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### Stacking Pallets for Transport

- Records sent off site are typically shipped in freezer trucks on pallets that have been shrink-wrapped.
- There are several systems for stacking pallets for transport.
- Before moving wet records, repack materials in boxes or containers strong enough to hold their weight.



Photo courtesy of NARA

Slide 4-15

Records that are sent off site are typically shipped in freezer trucks on pallets that have been shrink-wrapped. There are several systems for stacking pallets for transport. One system involves stacking the boxes in an alternating pattern (like bricks). This allows each level to stabilize the one below it, and uses the strength of the box walls to support the weight of the uppermost boxes. Usually, you can stack the pallets three levels high before the weight becomes too great for the lowest level. You can place a sheet of cardboard between levels to help to stabilize them.

If you are putting pallets in a freezer truck, make sure that there is enough space for air to circulate. Otherwise, the records will not freeze and mold will develop.

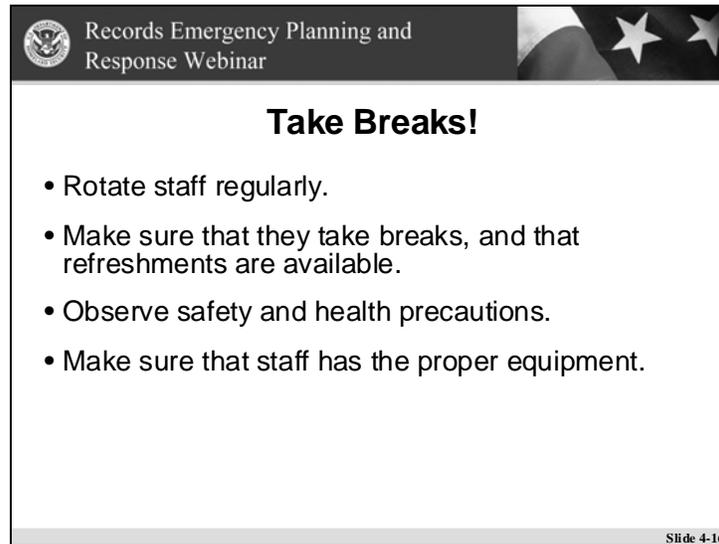
Never move wet records in large batches or pile them on top of each other, because the weight damages them. Before moving wet records, always repack materials in boxes or containers strong enough to hold their weight.

If reboxing, pack the materials loosely, but so they do not slump; they will swell as they absorb water. Remove them from shelves and drawers in a horizontal sequence. After you have removed the wettest records, the remainder can be moved in an orderly fashion.



## Take Breaks!

Slide 4-16



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### Take Breaks!

- Rotate staff regularly.
- Make sure that they take breaks, and that refreshments are available.
- Observe safety and health precautions.
- Make sure that staff has the proper equipment.

Slide 4-16

During pack-out and recovery, rotate staff regularly to avoid exhaustion and stress. Make sure that they take breaks, and that refreshments are available. Always observe safety and health precautions for workers, and make sure that they have the proper equipment.



## Special Procedures for Specific Types of Damage

Slide 4-17

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### Special Procedures for Specific Types of Damage

- Examples of the types of damaged records you may encounter:
  - Fire-damaged records
  - Muddy records
  - Contaminated records

Slide 4-17

Be aware that specific types of damage require specialized treatment. The following are just three examples of the types of damaged records you may encounter. Consult the conservation professionals you identified in your REAP regarding incidents that may occur in your area, producing a need for special treatment of damaged records.

### Fire-Damaged Records

If a fire has occurred, the records may be both wet and brittle. You can provide support by placing pieces of paper toweling or clean newsprint under charred materials before they are moved.

### Muddy Records

Do not attempt more than a minimal cleaning of wet records that are also muddy, unless you have available a large quantity of clean running water and you have the time. Attempting to remove mud from wet paper records may force dirt farther into the paper if a rubbing action is used. Mud may be easier to remove when dry. You may be able to rinse some tightly wound tapes, as only the edges will be exposed to additional water. It may be possible to rinse mud off boxes or enclosures to make the drying process faster.

### Contaminated Records

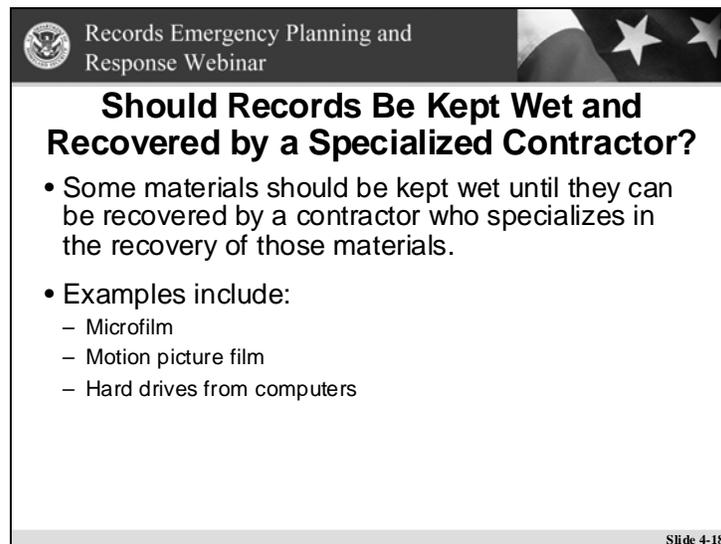
Sometimes records are flooded by water containing raw sewage, covered with asbestos from crumbling ceilings, or otherwise contaminated with materials that make them unsafe to handle without special precautions. If records are contaminated, or you suspect that they may be, make sure that all staff members use proper protective equipment and clean-up procedures. It is often best to leave this to trained operators under your supervision.

A contractor who specializes in treatment of contaminated materials should always be consulted, as these records require special handling and treatment.



## Should Records Be Kept Wet and Recovered by a Specialized Contractor?

Slide 4-18



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### Should Records Be Kept Wet and Recovered by a Specialized Contractor?

- Some materials should be kept wet until they can be recovered by a contractor who specializes in the recovery of those materials.
- Examples include:
  - Microfilm
  - Motion picture film
  - Hard drives from computers

Slide 4-18

Some materials should be kept wet until they can be recovered by a contractor who specializes in the recovery of those materials. Some examples include microfilm, motion picture film, and hard drives from computers.

With film-based media in particular—because there are so many photographic processes—unless you are sufficiently knowledgeable about photographic process identification, it is important to receive expert advice from a photographic conservator as soon as possible before determining how to proceed with the response.

If you determine that the photographic process is stable enough:

- Place wet microfilm or motion picture film in plastic bags to keep it from drying before it can be handled by an experienced conservator or specialized contractor.
- With guidance from a conservator, you may be able to wash off mud or dirt under cold, clean, running water, and then seal the items in bags.

Some photographic processes and other media should never be exposed to water. Take special care to keep them dry if they are important to the agency. Boxes with water-proof coating would be best for storing these records.

There are many good resources on the special needs of special-format records, including photographs. One such resource, from the Minnesota Historical Society, discusses assessing all types of materials. This resource is provided on the IPER Resource Center.



## Steps for Handling Mold

### Small Outbreaks

Slide 4-19

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### Steps for Handling Mold—Small Outbreaks

- Quarantine moldy records from unaffected records.
- Dry and clean the area where the moldy records were found.
- Mold cannot be removed from wet or damp records.

Photo courtesy of NARA

Slide 4-19

Quarantine moldy records from unaffected records. You will need to dry them in a location that vents to the outside. The area where the moldy records were found will need to be thoroughly dried and cleaned to ensure that mold does not germinate elsewhere.

Mold cannot be removed from wet or damp collections. Items must be completely dry before any attempt is made to remove mold. If using fans to dry the records, make sure the fans are not blowing directly on the materials or you will spread the mold spores. Point the fans at the ceiling.

You will have to clean the records once the mold has dried. You may use a HEPA-filtered vacuum and micro-hose kit, but this is very labor-intensive and should be carried out in a fume hood to avoid exposing others to the particulates produced by the vacuuming. This works better than brushing records clean and keeps the mold spores from returning to the air. Vacuum through a screen if the item is fragile.



## Larger Outbreaks

Slide 4-20

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### Steps for Handling Mold—Larger Outbreaks

- Quarantine and freeze the records.
- The preferred method of drying is vacuum freeze drying.
- If the outbreak is too large, call a contractor that specializes in mold remediation.

Slide 4-20

Quarantine and freeze the records. Placing the moldy items in an environment with a temperature below freezing will halt growth but will not kill spores.

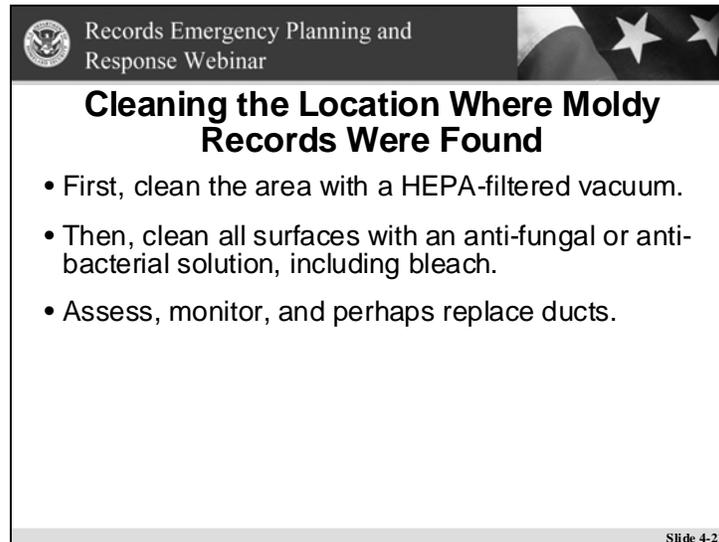
The preferred method of drying is vacuum freeze drying, so as not to spread the dry mold spores.

If the outbreak is too large for local staff to handle, call a contractor that specializes in mold remediation. Vacuum freeze drying is an effective method for eliminating most molds and may be considered for records that have special value or are irreplaceable.



## Cleaning the Location Where Moldy Records Were Found

Slide 4-21



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### Cleaning the Location Where Moldy Records Were Found

- First, clean the area with a HEPA-filtered vacuum.
- Then, clean all surfaces with an anti-fungal or anti-bacterial solution, including bleach.
- Assess, monitor, and perhaps replace ducts.

Slide 4-21

Begin by cleaning the area with a HEPA-filtered vacuum. Then clean all surfaces—shelves, floors, walls, ceilings, and windows—with an anti-fungal or anti-bacterial solution, including bleach.

You will also need to assess ducts for air circulation and air conditioning, and monitor them for the presence of mold. If molds persist, then you may need to clean or replace the ducts.



## Paper-Based Records that Require Special Handling

Slide 4-22

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### Paper-Based Records that Require Special Handling

- Large or oversized paper
- Coated papers
- Encapsulated and shrink-wrapped records
- Loose paper or paper held together with fasteners

Photos courtesy of NARA

Slide 4-22

### Large or Oversized Paper (Maps, Architectural or Engineering Drawings)

- Large or oversized paper records often require two people to handle and transport them safely, and will require a secondary support (the original drawer, a tray, or spun-bond polyester).
- If the record is rolled or folded, make sure there is enough space on the table to accommodate the record when it is unrolled or unfolded.
- Rolled and folded paper can be vacuum freeze dried successfully.

### Coated Papers

- Coated paper such as magazines or journals stick together, or “block,” and must be dried immediately to prevent damage. (Coated paper is usually glossy and is frequently used for color and photographic illustrations.) You must not allow coated paper surfaces to be in contact with one another during drying. Architectural linen can also block because it is coated with starch, which acts as an adhesive when wet.
- If the pages are stuck together, or blocked, an attempt can be made to recover them by placing the record in a freezer and vacuum freeze drying.
- If the pages are not stuck or blocked, gently place pre-cut pieces of spun-bond polyester fabric between the pages.
  - Allow air to circulate, and wait until the record is completely dry to remove interleaving material (the absorbent material placed between leaves of paper to hasten drying; interleaving material should be thin, absorbent, ink-free, and acid-free).



## Encapsulated and Shrink-Wrapped Records

Although exterior housings such as encapsulation and shrink-wrap do slow the intrusion of water, encapsulated or shrink-wrapped records are not protected from water damage. If the records do become wet, it is possible to vacuum freeze dry the encapsulated record successfully.

If you are planning to air dry the records, the exterior housing must be removed:

- Using scissors, cut through the encapsulation bond or weld on all sides of the record. If the plastic sheet is clean, it can be re-used to support the wet record while it is carried to the drying site.

## Loose Paper or Paper Held Together with Fasteners

Follow these steps when handling loose pages or paper held together with fasteners:

- Remove outer paper or paperboard folders and/or record jackets. If they contain valuable identification information, place the folders near their contents to dry.
- In some cases, it may not be prudent or possible to remove fasteners, but when it is possible, removing them will hasten drying and prevent corrosive rust from forming on the records.
- To prevent tearing when moving older and fragile paper, use supports such as sheets of polyester film, nylon screening, or spun-bond polyester. Modern printer papers contain fillers that give the paper wet-strength even when it is wet or saturated with water. It is important to recognize the difference between more modern and older papers, and to act according to the paper's need for support.
- Arrange paper records individually, if possible, or in small stacks of 1–5 records each. Turn records over frequently to increase exposure to the air.
- Do not rebox records until they are completely dry.



## Bound Volumes

Slide 4-23

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### Bound Volumes

- Stand upright:
  - Small, bound volumes with rigid covers that are partially wet
- Lay flat:
  - Volumes with soft covers
- Lay flat and open:
  - Large and heavy volumes

Slide 4-23

It is preferable to freeze and vacuum freeze dry bound volumes quickly, because this will help minimize the danger of paper distortion and warping of bindings.

Bound volumes can also be air dried successfully, but will require attention to ensure that the spine area of the book is completely dry before returning the book to a location without air circulation and with high humidity; book spines and covers are highly susceptible to mold.

### *Small Bound Volumes*

Small bound volumes with rigid covers that are only partially wet can be dried by standing them upright:

- Place the book upright and hold it open with blotter pieces to allow increased air circulation and to expose the tightly bound spine to air.
- If the book covers are sturdy enough, fan the pages open and interleave with small pieces of pre-cut blotter paper placed close to the spine.
- Place fanned volumes in front of a fan with the fan aimed at the ceiling. This will speed drying.
- Invert books to even the stress on the binding, rotating books upside-down to right-side-up while drying.
- Remove the blotters when the book is dry.



### *Large or Ledger Bound Volumes*

You may need to dry large or ledger bound volumes flat and open if their weight does not allow them to stand upright and open. This includes bound volumes with soft covers that are not sturdy enough to stand upright.

- If the pages are damp but not totally wet, fan them open.
- Otherwise, interleave pages with blotter paper, clean newsprint, or spun-bond polyester to wick moisture away from the paper.
- Turn the pages frequently and change the absorbent paper.
- Spun-bond polyester does not absorb water, and does not need to be changed if it is clean. It can be re-used

Slide 4-24

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### Paper-Based Records that Require Special Handling (cont'd.)

An encapsulated  
item with water  
damage



Photo courtesy of NARA

Slide 4-24



Slide 4-25

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### Paper-Based Records that Require Special Handling (cont'd.)

Water damage seen close up

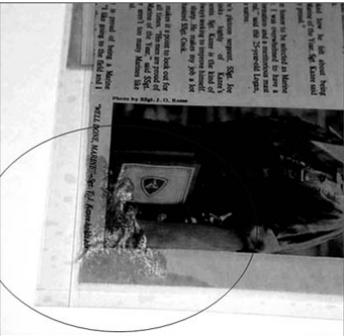


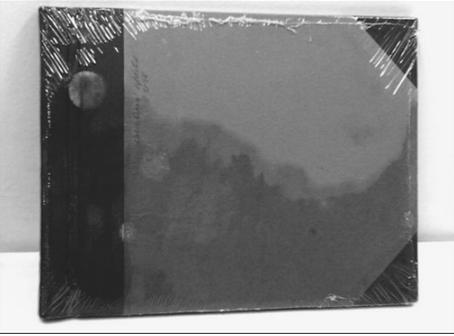
Photo courtesy of NARA

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### Paper-Based Records that Require Special Handling (cont'd.)



Clearly, shrink wrap does not provide a moisture barrier.

Photo courtesy of NARA

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### Paper-Based Records that Require Special Handling (cont'd.)

Rust from metal fasteners

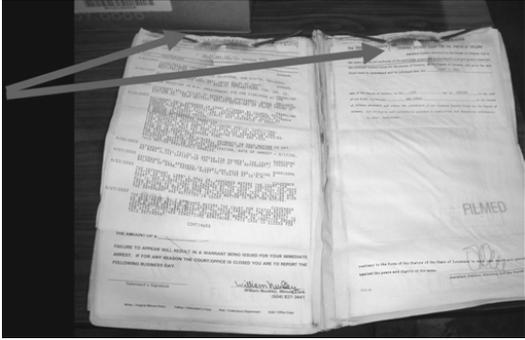


Photo courtesy of NARA

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Records Emergency Planning and Response Webinar

### Paper-Based Records that Require Special Handling (cont'd.)

Bound volumes drying



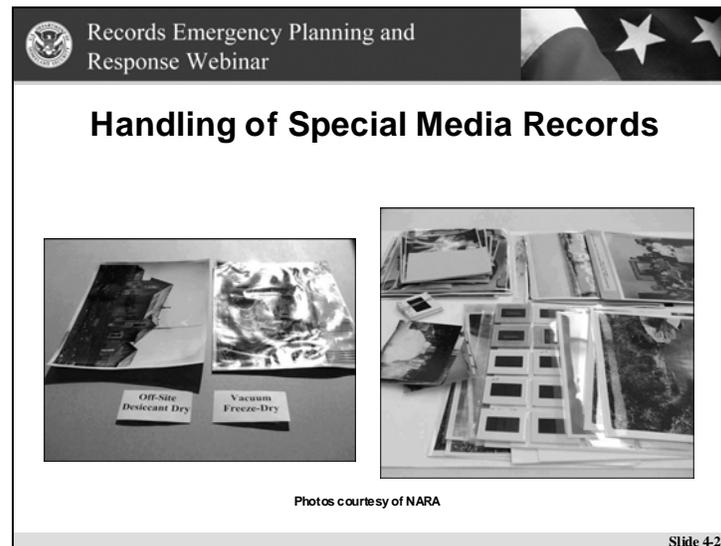
Photo courtesy of NARA

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## Handling of Special Media Records

Slide 4-29



### Photographs

Photographs, both negatives and prints, involve such a wide variety of material types and such a long history of technological innovation that it is difficult to give general advice on the recovery of photographic materials. If the photographs in your office are valuable to your agency, it is best to have the advice of a conservator or expert, because they have the requisite knowledge of photographic history and preservation.

- Just like coated paper, photographs will stick together, or “block,” and therefore must be dried immediately to prevent damage.
  - Do not allow their surfaces to come in contact with one another during drying.
- If the photos are stuck together or blocked, do not try to separate them. Contact a conservator for advice.
- Photographs can usually be vacuum freeze dried successfully. Do not vacuum freeze dry glass plate and cased photographs.
- When air drying, you must dry photographs under restraint or they will curl and distort.
  - Photographs are made up of more than one layer, and each layer dries at a different speed. This causes them to curl as they dry, which is why you need to apply pressure to keep them flat.
  - It is very difficult to correct this problem.



- If air drying:
  - If the surface is not cracked or flaking, and the photographs have soot or mud on the surface, you may be able to rinse them in a tray of cool, clear water while they are still wet.
  - Dry photographs image side up on clean blotters for at least one hour.
  - If the emulsion or surface of the photograph is sticky or tacky to the touch, you will need to interleave it with sheets of spun-bond polyester to prevent disturbance of the surface during drying.
  - Place the polyester and photographs between blotters to create a stack.
  - Put a flat sheet of Plexiglas™ or other heavy-weight flat material on top of the stack.
  - Suitable weights include telephone books or bricks wrapped in plastic to add additional pressure.



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### Handling of Special Media Records (cont'd.)



Photographs being dried in blotter packs—the optimum method of recovery

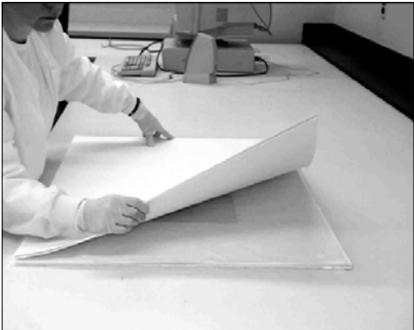
Photo courtesy of NARA

Slide 4-30

Slide 4-31

Records Emergency Planning and Response Webinar

### Handling of Special Media Records (cont'd.)



Multiple layers of sandwiched photographs are placed on top of each other, saving valuable work space.

Photo courtesy of NARA

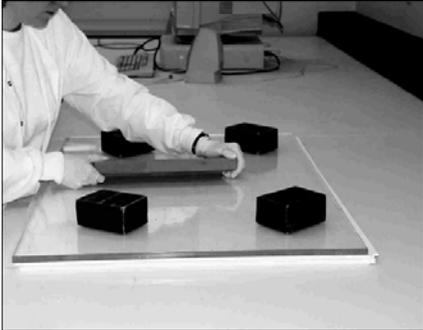
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Records Emergency Planning and Response Webinar

### Handling of Special Media Records (cont'd.)



The entire pack is then covered with Plexiglas™ for even pressure, and weights are added to minimize distortion.

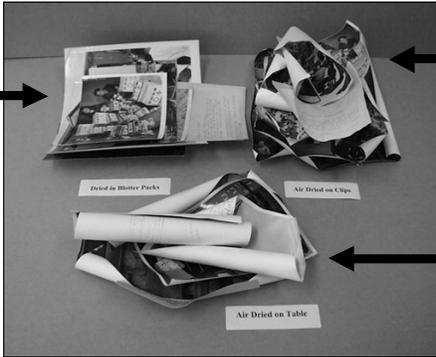
Photo courtesy of NARA

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### Handling of Special Media Records (cont'd.)



Dried in blotter packs

Air-dried on clips

Air-dried on table

Photo courtesy of NARA

Slide 4-33



## CDs and DVDs

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Response Webinar

### Handling of Special Media Records (cont'd.)

CDs and floppy  
disks air drying



Photo courtesy of NARA—Suitland—NH material—2006

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All types of disks are composed of several layers. Of these, the metal reflective layer is probably the most important and the most vulnerable to physical damage. Normally, this layer is covered by a very thin protective coating.

The metal reflective layer is usually unaffected by water unless it has been soaking for a week or longer.

If time and resources permit, immediate response can save the information on the disks.

- Remove the disk from its case or cartridge. Cases that are not damaged can be cleaned thoroughly with water or soap and water and re-used. Damaged ones should be discarded.
- Rinse the disk in clean room-temperature tap water and then in distilled water.
- If any residue remains, using distilled water, gently wipe the disk surface with a wet, soft cotton tissue—not paper towels, as they are too abrasive.
- Wipe in a radial direction from the center out, not a circular direction, to remove the water. Follow this wiping with another rinse in clean, distilled water.
- After rinsing, gently blot up any excess water with a soft, lint-free tissue to prevent water spots during drying.

The best chance of avoiding damage is to limit the time a disk is wet. Therefore, it is best to recover disks immediately. If immediate recovery is impossible, rinse the disks in distilled water and store them in their cases in cool, clean water until they can be recovered. If you need to transport the disks, they can be sealed in zip-lock bags immersed in cool or cold water in a portable cooler.



## Computer Hard Drives

Slide 4-35

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Response Webinar

### Handling of Special Media Records (cont'd.)

A CPU that was allowed to dry and rust. This illustrates the need to wrap and seal in plastic and recover immediately.



Photo courtesy of NARA—Orleans Parish—post-Hurricane Katrina—2005

Slide 4-35

Electronic information carriers such as computer hard drives and electronic media also require immediate attention to ensure recovery.

Computer hard drives have a large number of components, some of which are metal and susceptible to rust and oxidation; others are composed of soft plastics and materials susceptible to mold.

- Remove hard drives from computers.
- Send hard drives to a contractor as soon as possible for recovery.
- Keep hard drives wet, sealed in plastic, and do not let them dry out.



## Magnetic Tapes

Slide 4-36

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### Handling of Special Media Records (cont'd.)

Proper  
positioning to  
air dry audio  
and video  
cassettes



Photo courtesy of NARA—WNRC—NARA—2006

Slide 4-36

Tapes are constructed of layers of water-resistant materials. Although water will not cause these layers to swell and break up (as would the layers in a photograph), tapes can still be damaged. Both the tape and the binder layer may be susceptible to degradation when exposed to water. A fully wound tape is less susceptible to water damage than a loosely wound tape.

- Magnetic tape recovery should be a high priority if the tapes are valuable to your agency.
- Do not play or rewind a tape that is wet.
- You should consider sending the magnetic tapes to a contractor who specializes in recovery of magnetic tape.
- Initial response steps, if air drying:
  - Drain any excess water out of the cassette or off the reel of tape. The cassette gate, if present, may be flipped open to allow water to drain.
  - If the tape is wet with seawater or contaminated water, rinse the tightly wound tape with cool, clean water.
  - For reel-to-reel tapes, wipe the wound surfaces with a wet or soft, damp, lint-free cloth.
  - For cassette tapes, shake as much excess moisture out of the cassette housing as possible and stand the tape vertically with the empty hub on the bottom for air drying.
  - Allow the tape to acclimatize to the new environment for at least two days before any further treatment.



## Additional Tips on Handling Damaged Records

Slide 4-37

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Response Webinar

### Additional Tips on Handling Damaged Records

- Some water-soluble inks will bleed.
- Air dry records indoors if possible.
- Most records are extremely fragile when wet.
- Rinse off mud or soot in cool, clean water. Do not scrub.
- Many plastics will swell and soften when wet.
- Remove exterior housings (folders, encapsulation, shrink-wrap) to allow air drying.

Slide 4-37

- Some water-soluble inks will bleed.
- Air dry records indoors if possible. Sunlight and heat may dry certain materials too quickly—particularly bound volumes or artifacts made of wood—causing splitting, warping, and buckling. Changing weather, such as wind, can send documents flying and volumes falling.
- Documents, books, photographs, and special media are extremely fragile when wet. They tear easily and require caution when being handled. Always consider providing a secondary support to prevent more physical damage.
- When mud or soot is present, with guidance you may be able to rinse off some of the particulate in cool, clean water, but do not scrub the surface.
- Many plastics will swell and soften when they are wet. Sensitive surfaces, including wet photographs or electronic media such as CDs or DVDs, must be handled with care to avoid scratching the surface.
- While exterior housings such as folders, encapsulation, or shrink-wrapping may slow the seepage of water into the records, they will not prevent water damage and must be removed to allow air drying.

(Refer to **Handout 4.1**—Response and Recovery Procedures for the preceding recovery and response procedures presented in a quick-reference format that can be used as a job aid and incorporated into your REAP.)

For demonstrations of how to handle records damaged by water, mold, corrosion, pests, and other threats safely, refer to: The DVD that comes with the *Heritage Preservation's Field Guide to Emergency Response*, available for purchase on the Heritage Preservation website:

<http://www.heritagepreservation.org/catalog/product.asp?IntProdID=33>



## Implement Contractor Response

Slide 4-38

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Response Webinar

### Implement Contractor Response

- Consult the list of contractors in your REAP.
- Make sure that the procedures for activating the contract or Memorandum of Understanding (MOU) are part of your REAP.

Photo courtesy of NARA

Slide 4-38

If, because of the scale, nature, or impact of the incident, or because the affected records require special treatment, you determine that a contractor's services are required, consult the list of contractors you compiled as part of your REAP.

Remember to make sure that the procedures for activating the contract or Memorandum of Understanding (MOU) are part of your REAP and that you know how and from whom to obtain any authorizations needed. You should work with your contract, purchasing, or procurement staff.

Remember to review the list and contact information provided in the REAP annually to ensure that they remain current.



## Oversight of Contractor On Site

Slide 4-39

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Response Webinar

### Oversight of Contractor On Site

- You or your backup must remain on site.
- Ensure that records are:
  - Removed in the proper order
  - Properly handled, housed, and prepared for shipment
  - Correctly labeled and systematically tracked
- Ensure that:
  - Appropriate supplies and equipment are used
  - Records are properly prepared for shipment
  - Transportation equipment is clean, works properly, and holds only your records
  - All other conditions of the contract are met

Slide 4-39

When you and your contractor(s) have decided how you will proceed, your job is not finished. You or your backup must remain on site to make sure that the work is carried out properly and with due diligence, and to make any decisions required. For example, you may need to approve the use of additional equipment, housing materials, or add-ons to the contract if additional damage is discovered.

You must ensure the following:

- Records are removed in the proper order.
- Records are properly handled and housed.
- Records are not handled by a subcontractor without informing the client.
- Records are systematically tracked.
- Records are correctly labeled.
- Appropriate supplies and equipment are used.
- Records are properly prepared for shipment and are physically secure.
- Transportation equipment used to ship records is clean, in proper working order, and holds only records from your agency.
- All other conditions of the contract are met.



## Oversight of Contractor Off Site

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### Oversight of Contractor Off Site

- Maintain good lines of communication.
- Plan to visit the contractor's facility early in the process of recovery.
- Oversight of the contractor continues throughout the recovery.
- Ensure that contract specifications are being followed.

Slide 4-40

Maintaining good lines of communication with the recovery contractor is critical. You are now partners in the recovery.

You should plan to visit the contractor's facility early in the process of recovery to ensure that procedures have been communicated properly and that any issues that have arisen during the recovery steps are resolved appropriately.

Oversight of the contractor continues throughout the recovery to ensure the following:

- Your records are not mingled with those of another agency.
- Records continue to be properly labeled and tracked.
- Appropriate recovery methods and equipment are used.
- Records are maintained in their original order.
- Records are secure.



## Complete After-Action and Post-Event Reports

Slide 4-41

Records Emergency Planning and  
Response Webinar

### Complete After-Action and Post-Event Reports

- After-Action Report helps you:
  - Assess the response
  - Assess the REAP
- Post-Event Report summarizes and documents the:
  - Incident
  - Response
  - Recovery

Slide 4-41

After an emergency event has been fully resolved, it's important that you complete after-action and post-event reports to capture the details of the incident and of your response.

The after-action report helps you assess your response and the REAP, while the post-event report summarizes and documents the incident, response, and recovery.

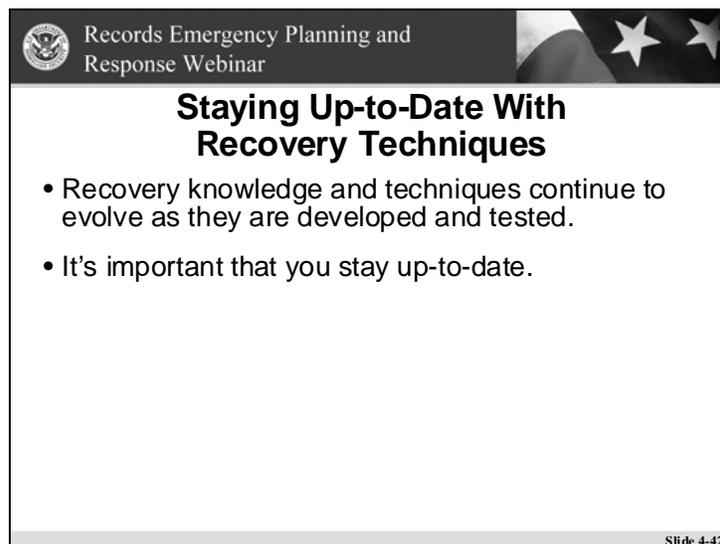
Therefore, not only do these reports provide a documented history of the event, they also provide data that can be used to assess your REAP and develop lessons learned and best practices. You can then use this information to determine and implement mitigation steps to avoid another similar event.

(Refer to **Handout 4.2**—Sample Records Emergency After-Action Report and **Handout 4.3**—Sample Post-Event Report for sample templates of after-event reports.)



## Staying Up-to-Date With Recovery Techniques

Slide 4-42



Records Emergency Planning and  
Response Webinar

### Staying Up-to-Date With Recovery Techniques

- Recovery knowledge and techniques continue to evolve as they are developed and tested.
- It's important that you stay up-to-date.

Slide 4-42

Recovery knowledge and techniques continue to evolve as they are developed and tested. The international preservation community, institutions, and practitioners continue to share their experiences as they work to recover damaged historic, cultural, and documentary resources. They have commercial partners who are constantly developing, testing, and sharing experiences and working toward better methods to dry large quantities of records and other paper-based bound and unbound materials.

If, during your assessment, you determine that it is necessary to contract out all or a portion of the recovery effort, it is important for you to know the terminology and understand the techniques that contractors offer, in order to be able to provide clear instructions and specifications to contractors and to manage and oversee the work they perform.

Being an informed consumer about the recovery services purchased will help make the best value of limited resources and yield the most satisfying results from recovery from a water-related incident.

In addition, as part of your annual review, you should update the response and recovery information in your REAP to reflect any changes in the field. A REAP containing an outdated response or recovery technique is not an effective REAP.

Keeping informed on recovery techniques, through trade publications, white papers, and studies such as the one done by NARA, will help you stay on top of new developments and will help you stay knowledgeable about what works and what doesn't.



## Overview of Common Drying Methods

Slide 4-43

Records Emergency Planning and  
Response Webinar

### Overview of Common Drying Methods

- Air drying
- Air drying with added heat (desiccant or dehumidification drying)
- Vacuum freeze drying
- Vacuum thermal drying
- Thermal vacuum freeze drying
- Freeze drying

Slide 4-43

NOTE: This section provides a brief overview of the techniques most commonly used for drying records. For additional information on each of these methods, refer to **Handout 4.4—Common Drying Methods**.

Much of the following information comes from a presentation by Kathy Ludwig at the NARA Preservation Conference in 2002; the presentation was based on research carried out in the Conservation Laboratory at NARA.

Additional information comes from the article by Betty Walsh, “Salvage at a Glance Revisited,” combined with NARA’s “Comparison of Drying Techniques: Understanding the Differences Between Vacuum Freeze Drying, Conventional Freezing, and Other Drying Methods,” and information from the Florida state website.

All three of these references are in **Reference 01** and on the IPER Resource Center.

### Air Drying

Air drying involves drying records at room temperature. Typically materials are spread out on, or interleaved with, absorbent papers. In some instances, materials may be dried under restraint in a stack of weighted blotters.

Air drying is a tried and true method most familiar to many, has been proven through long experience, and provides the greatest control over the drying process.



## Air Drying with Added Heat (Desiccant or Dehumidification Drying)

Materials are dried by pumping cycles of moist air out of a chamber or space and introducing dried (desiccated or dehumidified) air with relative humidity (or moisture content) lower than 15 percent. One potential problem with this is that air temperatures are usually in the range of 80° F–100° F, which can over-dry paper records, resulting in distortion, increased volume, and reboxing problems.

The literature often cites this method as giving excellent results for damp collections, and it allows access to the materials during the drying process, if that is required.

## Vacuum Freeze Drying

Vacuum freeze drying is almost always recommended for most incidents involving records in boxes, where the quantities are large and the records are of varying degrees of wetness. The records will generally be frozen first for transport to the facility and then held in storage in a freezer until the drying process is carried out.

Contractors dry the materials using a very strong vacuum to lower the pressure while holding the temperature below freezing. Cycles of controlled heat may be used on the shelving. This process sublimates the frozen water—that is, the water passes from the frozen state to the vaporous state without passing through the liquid phase. The items remain frozen throughout the drying process.

Vacuum freeze drying is most commonly performed off site at a contractor's facility and occasionally on site in a mobile vacuum-freeze-drying chamber. Only a few national vendors have vacuum-freeze-drying capabilities, so your records will likely be out of state for several weeks during drying.

## Vacuum Thermal Drying

Vacuum thermal drying is similar to vacuum freeze drying in the kind of chamber used, but different in that cycles of warm to hot air are used. Vacuum thermal drying is a cost-effective option for temporary records or archival materials of low intrinsic value. The procedure distorts paper considerably, causes coated records to block, and exacerbates the feathering and bleeding of soluble inks. The drying time is usually less than that for vacuum freeze drying, but drying time also depends on how wet the materials are initially.

Most vacuum drying facilities no longer use this method because of the problems described.



## Thermal Vacuum Freeze Drying

The technique of thermal vacuum freeze drying is similar to vacuum freeze drying in that a vacuum is used with controlled heat to vaporize the water, but this method also has a patented procedure to compress the materials into shape. It is more expensive per cubic foot than vacuum freeze drying.

## Freeze Drying

Freeze drying is a very slow technique. 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 slow process will dry damp and partially wet records, but the records are inaccessible for a long time. In addition, the energy used to keep the records frozen is very expensive, and the freezer storage may result in monthly costs that are ultimately as expensive as vacuum freeze drying.



## NARA's Study of Drying Techniques

Slide 4-44

Records Emergency Planning and Response Webinar

### NARA's Study of Drying Techniques

- And the winner is...
  - Vacuum freeze drying

Photo courtesy of NARA

Slide 4-44

In the NARA study “Efficacy of Various Drying Methods,” NARA preservation staff in the Conservation Laboratory compared four drying techniques on various records media including paper, photographs, and records that were encapsulated. The drying techniques assessed were:

- Air drying
- Desiccant drying
- Vacuum freeze drying
- Vacuum thermal drying

### The Results of the Comparison

The results of NARA’s study showed that each method had its advantages and disadvantages, but overall, the best results came from vacuum freeze drying all paper-based records, including those damaged by smoke, soot, or mold.

The complete report on the comparison study is available on NARA’s website, at:  
<http://www.archives.gov/preservation/conservation/drying-methods-01.html>



## Lessons Learned

Slide 4-45

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Response Webinar

### Tips for Air Drying

- Drying times differ.
- Air drying discourages mold growth.
- Point fans at ceiling; keep them on 24 hours a day.
- Remove records from containers; spread on surfaces to dry.
- Ensure that original container and order of records are maintained.
- Spread out records in stacks.
- Tend to records as they dry.

Slide 4-45

In addition to determining the best overall drying technique, and identifying the pros and cons of each technique, the study also resulted in several lessons learned.

### *Tips for Air Drying*

- Drying time will depend on the wetness of records, the relative humidity in the room, the type of record material, and the amount of exposed surface for drying. Optimizing all of these variables will take thought and patience.
- To discourage mold growth, the temperature should be below 65° F, and the relative humidity (RH) should be as low as possible (at least below 50 percent, or drying will be too slow and the risks of mold growth will become very high).
- Point fans at the ceiling and keep them on 24 hours a day to keep the air circulating.
- Records must be removed from containers and spread on surfaces to dry in the air. The process requires vast surface areas covered with absorbent papers.
- It's important to ensure that the original container and order of records are identified, labeled, associated, and maintained throughout the drying process.
- Records should be spread out in stacks no more than one-quarter to one-half inch thick.
- As records dry, the absorbent paper underneath must be changed frequently, and the papers must be turned over.



*Tips for Air Drying Special Media*

Slide 4-46

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Response Webinar

### Tips for Air Drying Special Media

- Remove encapsulations or L-sleeves of plastic.
- Separate and/or interleave coated paper records.
- Fan open pages of bound volumes; either stand volumes up or lay them flat.
- Use interleaving sheets in proportion to the thickness of the volume.
- Removed rusting metal fasteners.

Slide 4-46

- Records in encapsulations or L-sleeves of plastic must be removed to dry.
- Records on coated paper must be separated and/or interleaved to dry in order to prevent sticking or blocking.
- Bound volumes, depending on the sturdiness of the covers, must either be standing with pages fanned open or lying flat with pages fanned open.
- For interleaving bound volumes, the total number of interleaving sheets should be no more than one-third the thickness of the volume, to limit damage to the binding.
- You may need to remove metal fasteners if they have begun to rust or corrode.



## *Tips for Working with Contractors for Vacuum Freeze Drying*

Slide 4-47

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Response Webinar

### **Tips for Working with Contractors for Vacuum Freeze Drying**

- Discuss with the contractor:
  - Reboxing and the need to preserve original order
  - Opening boxes and/or removing records
  - Grouped and/or re-associating loose records
  - Procedures to ensure that records will not be lost
  - Shipping or transportation procedures
  - How additional charges will be authorized if they occur

Slide 4-47

If an emergency incident is larger than your current staff or space can handle, or the situation is too dangerous to staff or to the records involved, you may choose to select an outside contractor to undertake some or all of your recovery. Make sure that you understand the technology, the terminology, and all of the steps in the process.

Unless you work carefully with the contractors to specify in the Task Order or Deliverables what the requirements are, the results may not be what you expect. Determine up front if there is a minimum fee for small jobs and if there are cost breaks for large services. Other matters to discuss include:

- Whether records may be reboxed; the need to preserve the original order
- Whether the contractor may open boxes and/or remove records; ensure that intellectual control is preserved
- How you would like records grouped and/or re-associated if the fastener, folder, or adhesive attachment cannot be preserved and retained with the records
- Procedures to ensure that records will not be lost
- Shipping or transportation procedures to ensure that records are not further distorted; length of time required to freeze the records in the trailer during shipping
- How additional charges will be authorized if they occur (e.g., special handling fees, boxing fees, etc.)
  - One record storage box is not one cubic foot, but 1.2 cubic feet in terms of storage and space in a vacuum-freeze-drying chamber. This will be reflected in your charges and should be clear in the estimate you receive.



# Course Summary

## Course Review

Slide 4-48

Records Emergency Planning and  
Response Webinar

### Course Review

- What a REAP is and how to prepare to create a REAP
- How to develop a REAP
- How to put your REAP into action and:
  - Assess the damage to records
  - Develop a response plan
  - Implement a response plan
- Recovery procedures

Slide 4-48

In the *Records Emergency Planning and Response Webinar*, you learned:

- What a REAP is and how to prepare for creating a REAP
- How to develop a REAP
- How to put your REAP into action and:
  - Assess the damage to records
  - Develop a response plan
  - Implement a response plan
- Recovery procedures



## Next Steps

Slide 4-49



Records Emergency Planning and  
Response Webinar



### Next Steps

- What next steps will you take to develop, enhance, revise, or update your REAP?
  - In the next two weeks?
  - In the next month?



Slide 4-49



## Next Steps Worksheet

**What next steps will you take to develop, enhance, revise, or update your REAP?**

In the next two weeks?

In the next month?

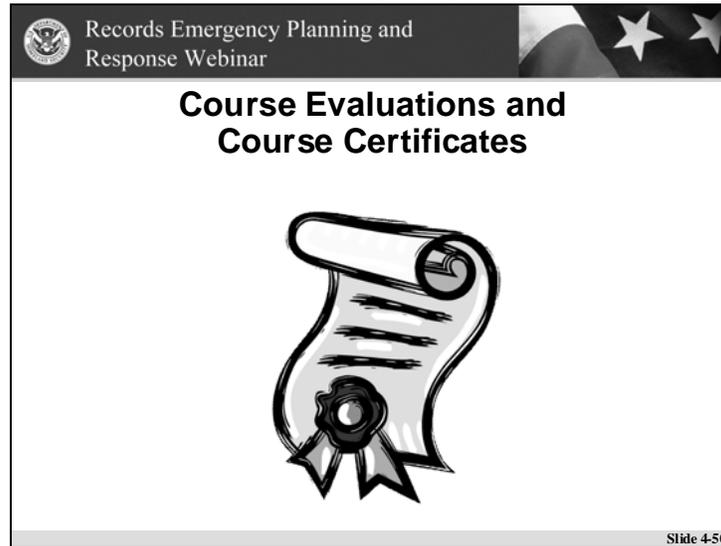


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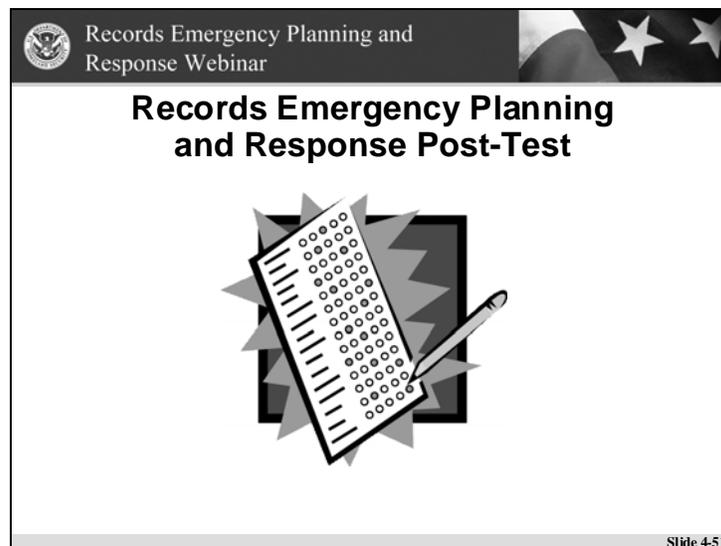
## Course Evaluations and Course Certificates

Slide 4-50



## Records Emergency Planning and Response Post-Test

Slide 4-51





Slide 4-52



**Thank You!**

