

GENERAL SERVICES ADMINISTRATION FEDERAL SUPPLY SERVICE AUTHORIZED FEDERAL SUPPLY SCHEDULE PRICE LIST



CONTRACTOR:	BMS CAT, INC. 303 ARTHUR STREET, FORT WORTH, TX 76107
SPECIAL ITEM NUMBER (SIN):	426-4F
GSA CONTRACT NUMBER:	GS-07F-0087T
FEDERAL SUPPLY SCHEDULE:	084
FCS CLASS:	R414
BUSINESS SIZE:	LARGE
TELEPHONE:	877.730.1948
FAX:	817.334.3531
WEB SITE:	WWW.BMSCAT.COM
E-MAIL:	MROCCO@BMSCAT.COM
CONTRACT ADMINISTRATOR:	MARK ROCCO
DUNS:	832756584
CONTRACT PERIOD:	11/1/11 - 10/31/16

ON-LINE ACCESS TO CONTRACT ORDERING INFORMATION, TERMS AND CONDITIONS, UP-TO-DATE PRICING, AND THE OPTION TO CREATE AN ELECTRONIC DELIVERY ORDER ARE AVAILABLE THROUGH GSA ADVANTAGE!, A MENU-DRIVEN DATABASE SYSTEM. THE INTERNET ADDRESS FOR GSA ADVANTAGE! IS: [HTTP://WWW.GSAADVANTAGE.GOV](http://www.gsaadvantage.gov)



fire damage



water damage



mold remediation



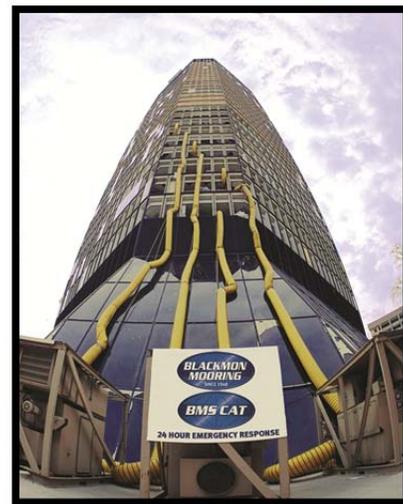
document recovery



reconstruction

COMPANY OVERVIEW

Blackmon Mooring & BMS CAT specialize in the restoration and reconstruction of properties and contents throughout the world, to allow customers to quickly return to daily operations. We provide all of the restoration, mitigation, remediation, reconstruction and document recovery services that are needed for any size loss. With over 60 years of experience, we are accustomed to working with all types of institutions at all levels of security.



PRODUCTS AND SERVICES

MITIGATION - Immediate response to the loss scene to stop further deterioration of the building and contents. Available 24/7 through our toll free number

RESTORATION SERVICES - Fire, smoke and water recovery for all types of retail, commercial, industrial, and educational facilities

RECONSTRUCTION - Providing construction services to ensure a seamless restoration experience.

MOISTURE CONTROL SERVICES - Desiccant dehumidification means quick recovery at minimized costs through regionally located response centers

MICROBIAL REMEDIATION - Remediation projects are handled based on set protocols with precision and state-of-the-art technology

HVAC DECONTAMINATION & CLEANING - Clean-up of HVAC as part of the loss

DEBRIS REMOVAL & DEMOLITION - Controlled demolition and containment of damaged areas in conjunction with other restoration activities on building and contents

ELECTRONIC RESTORATION & TELECOMMUNICATIONS RECOVERY - Innovative procedures to restore hardware, control panels, and telephone systems damaged by soot particles or moisture.

INDUSTRIAL EQUIPMENT RESTORATION - Our cleaning protocols prepare the equipment for recertification prior to commencement of production operations

MEDIA RECOVERY - Microfilm, microfiche, X-ray, and magnetic media recovery after a loss

PROJECT MANAGEMENT - Coordination of all aspects of clean-up and recovery of a loss site

DOCUMENT, BOOKS, & VITAL RECORDS RECOVERY BMS CAT has the largest freeze-dry chamber capacity in the world with regionally located chambers

CUSTOMER OVERVIEW

1a. Table of awarded special item number (SIN) and SIN description:

SIN	SIN DESCRIPTION
426-4F	Emergency services
426-4FRC	Disaster Recovery
426-4FSTLOC	Fast Response

1b. Identification of the lowest priced model number and lowest unit price for that model for each special item number awarded in the contract.

Net GSA pricing is listed on the attached pricing tables.

1c. Hourly rates:

N/A

2. Maximum order:

None

3. Minimum order:

\$250

4. Geographic coverage (delivery area):

Global

5. Points of production:

Amarillo, TX; Atlanta, GA; Austin, TX; Boston, MA; Chicago, IL; Cleveland, OH; Dallas/Fort Worth, TX; Houston, TX; Lubbock, TX; Los Angeles, CA; Miami, FL; Midland/Odessa, TX; Nashville, TN; New York, NY; Oklahoma City, OK; Orlando, FL; San Antonio, TX; San Francisco, CA; Tulsa, OK; Washington DC

6. Discount from list prices or statement net price:

Prices are shown net. The discount has been deducted and the IFF has been added.

7. Quantity discounts:

N/A

- 9a. Government purchase cards accepted: Yes
- 9b. Government purchase cards accepted above the micro-purchase threshold: Yes
10. Foreign items: None
- 11a. Time of delivery: 1 day ARO
- 11b. Expedited delivery: N/A
- 11c. Overnight and 2 day delivery: N/A
- 11c. Overnight and 2 day delivery: N/A
- 11d. Urgent Requirements N/A
12. F.O.B. point: Shipping Point
- 13a. Ordering address: Same as contractor, Attn: Mark Rocco
- 13b. Ordering procedures: For supplies and services, the ordering procedures, information on Blanket Purchase Agreements (BPA's) are found in Federal Acquisition Regulation (FAR) 8.405-3.
14. Payment address: Same as contractor
15. Warranty provision: N/A
16. Export packaging charges if applicable: N/A
17. Terms and conditions of Government purchase card acceptances: None
18. Terms and conditions of rental, maintenance and repair: N/A
19. Terms and conditions of installation: None
20. Terms and conditions of repair parts indicating date of parts price lists and any discounts from list price: None
- 20a. Terms and conditions for any other services: None
21. List of service and distribution points: Amarillo, TX; Atlanta, GA; Austin, TX; Boston, MA; Chicago, IL; Cleveland, OH; Dallas/Fort Worth, TX; Houston, TX; Lubbock, TX; Los Angeles, CA; Miami, FL;

Midland/Odessa, TX; Nashville, TN; New York, NY; Oklahoma City, OK; Orlando, FL; San Antonio, TX; San Francisco, CA; Tulsa, OK; Washington DC

22. Preventive maintenance: N/A
- 23a. Special attributes such as environmental attributes: N/A
- 23b. Section 508 compliance for EIT: N/A
- 24: Notification regarding registration in Central Contractor Registration (CCR) Database: Now is SAM. Registration valid

ITEM DESCRIPTION	Unit	New GSA Contract Price Reduction 5-24-2015
General Cleaning Laborer	hour	\$21.71
Administrative Support	hour	\$28.21
General Restoration or Dehumidification Supervisor/Technician	hour	\$46.32
Remediation Supervisor/Technician	hour	\$48.75
Resource Coordinator	hour	\$37.15
Project Accountant	hour	\$50.95

Electronics Restoration Supervisor/Technician	hour	\$48.25
Industrial Corrosion Control Supervisor/Technician	hour	\$37.15
Assistant Project Manager	hour	\$64.66
Project Manager	hour	\$77.20
Project Director	hour	\$82.50
Health and Safety Officer	hour	\$53.08
Project Consultant	hour	\$120.90
Project Coordinator	hour	\$86.85
Structural or Mechanical Engineers	hour	\$120.90

SERVICE		
Document Freeze Drying via Sublimation		
<1,000 cubic feet	cubic/foot	\$28.95
>1,000 cubic feet	cubic/foot	\$24.13

Labor Category	Labor Description
Project Coordinator	A project coordinator typically coordinates the overall activities of a project or a variety of projects as a support to the management on site at a specific project. His time is billed to an individual project or could be allocated across the spectrum of multiple jobs.
Project Director	Accountable for determining the scope of work, setting up the project, and overall communication between the client and BMS CAT. Serves as the primary point of contact for the customer and project managers. Insures the project is fully staffed with the proper labor, equipment, and material resources.
Project Manager	Responsible for the overall management of a specific restoration project. This individual will implement protocols, assign crews, interact with policyholder, insurance representatives, and basically oversee the entire project is completed within appropriate timeframes and cost projections.
Assistant Project Manager	Reports directly to the Project Manager and is typically utilized on large projects with a wide variety of tasks or a large number of laborers. Assists with operations by ensuring crews understand their daily responsibilities and oversees crew progress.
Project Consultant	Industry expert brought in to address a specialized subject that is specific to a loss. Responsibilities include but are not limited to assessing environmental issues or proprietary equipment that may have special restoration requirements.

Health & Safety Officer	This individual is responsible to ensure the contractor's personnel adheres to all health and safety protocols utilized on a specific project. Establishes site-specific safety protocols and provides any necessary health and safety training.
COW / Project Auditor	Responsible for reviewing a project's paperwork for audit. The COW/Project Auditor will review crew sheets, equipment logs and material usage for accuracy.
Project Accountant	The person mainly responsible for all paperwork and information pertaining to tracking and preparing the necessary documentation for invoice preparation.
Clerical	Responsible for on-site data entry, filing and printing. This person gathers and maintains data needed for the project.
Administrative Support / Field Admin Doc, Moisture Doc Tech	Person responsible for conducting document moisture readings, then entering data recorded into the BMS CAT system to track drying efforts and ensure efficiency.
Resource Coordinator	Person responsible for pulling together a broad range of resources needed for a project. This could include, but not be limited to, consumables, equipment, chemicals, personnel, finding hotel and transportation, or other logistical considerations.
Dehumidification Supervisor/Technician	Responsible for installation, maintenance and positioning of drying equipment to support moisture control efforts. The Dehumidification Supervisor/Technician is familiar with operating requirements for dehumidification units, air conditioners and air movers and is responsible for ensuring equipment is maximizing the drying efforts. This person is responsible for moisture mapping, equipment manipulation and Relative Humidity level documentation.
Remediation Supervisor/Technician / Env Remediation Supervisor	This person is responsible for supervising a crew that would complete a specific assignment on a restoration project. Responsibilities include performing remediation per the Scope of Work and supervising general labor.
Electronics Restoration Supervisor/Technician	Person involved with the disassembly, cleaning and reassembly of electronic equipment. Responsibilities include performing electronics restoration per the Scope of Work and supervising general labor.
Industrial Corrosion Control Supervisor/Technician	This is the person responsible for disassembling, cleaning, treating for corrosion, and the reassembly of industrial equipment. Responsibilities include performing corrosion control per the Scope of Work and supervising general labor.

Equipment Operator	A skilled operator who is trained and responsible for operating equipment on the job site. Equipment may include fork lifts, aerial lifts and/or skid steers.
Inventory Data Entry	Responsible for computer system data entry required for tracking documents removed from a customer site. He/She ensures that all boxes and materials are documented for.
General Restoration Supervisor/Technician/Mitigation Restoration Supervisor	This is a person who has specific training in basic restoration procedure. The overall skill set would be in general restoration procedures vs. any specialized training. This would not include services provided in the areas of hazardous materials, drying, equipment and machinery cleaning, or other specialized areas. Responsibilities include performing restoration per the Scope of Work and supervising general labor.
Laborer Excavation	Performs hands on sifting through rubble and soil following a transportation incident where debris has been spread and personal effects and other items are potentially buried under layers of soil or other debris.
General Cleaning Laborer - Direct Hires/General Cleaning Laborer - Labor Svc	Responsible for the completion of simple daily tasks as assigned by the Project Manager and/or Project Director, including but not limited to debris removal, equipment staging, general cleaning, and mucking out.
Management Fee	A n hourly management fee applies when an employee of the client is working under BMS CAT supervision, while remaining on the clients payroll.

ABOUT US

Blackmon Mooring & BMS CAT specialize in the restoration of commercial properties on a global basis. From hurricanes, fires and earthquakes to floods and mechanical breakdowns, we stabilize the loss site, determine the scope of damage and restore the property to pre-loss condition. Our focus on products and services, flexibility, urgency, experience, training and staffing make Blackmon Mooring & BMS CAT a prime partner to meet your disaster recovery needs.

WHAT ARE SOME OF THE CHALLENGES IN A COMMUNITY-WIDE DISASTER?

When a community is faced with an event on a grand scale, local resources are quickly overwhelmed and exhausted. Additionally, airports may be shut down for a period of time, roads can be washed out and local hotels can be damaged. We overcome these problems by staging additional resources into the area before certain events such as hurricanes. During other types of events, we begin shipping additional resources, after anticipating our customer's needs. Our experience in area wide disasters has taught us a number of ways to be prepared and react to unique circumstances.

HOW EASY IS IT FOR THE GSA OR OTHER GOVERNMENT AGENCIES TO DO BUSINESS WITH BLACKMON MOORING AND BMS CAT?

It is actually quite easy, especially during an emergency. We are on the GSA schedule 84 for emergency services. Many people feel that because of this, other competitive bids are not necessary. Additionally, we participate in the cooperative purchasing act and the recovery purchasing act. Many agencies will establish a BPA with us in advance of an emergency.

WHAT HAPPENS TO THE SENSITIVE DOCUMENTS THAT GET WET, MOLDY OR FIRE DAMAGED DURING THESE EVENTS?

We recover all of our client's paper documents, books and electronic media. We have not found a situation where we could not accomplish recovery. We have the world's largest and most advanced vacuum freeze drying chambers. We follow very strict chain of custody and have secure facilities. We have worked with many federal agencies and the DOD on Top Secret clearance items.

RECOVERY PROCESS

Through pre-defined instructions and parameters, our technicians can be on the job immediately to mitigate damage. The joint development of a scope allows us and the facility representative to agree on the work that is needed to restore the property.

When a loss occurs, one of our own project managers is sent to the site to evaluate the loss, determine immediate needs, assist with mitigation and submit a scope of work and price to the customer. Once the scope is accepted, operations crews, equipment and chemicals are dispatched.

A project manager and project superintendent oversee the restoration project. Depending on the skills needed for the project, specially trained supervisory staff are on hand. These supervisors manage a labor force trained for the type of work required.

Blackmon Mooring & BMS CAT offer full-service disaster restoration. Advantages of choosing a restoration company that can handle all your recovery needs include:

- Expertise in various types of losses
- Extensive industry experience
- Convenient, single point of contact through the Contract Administrator
- Consistency in operations and billing through company-owned locations
- Turn-key service from mitigation to reconstruction.

WHY CHOOSE US?

For over 65 years, Blackmon Mooring & BMS CAT have been the experts in cleaning, recovery and restoration. From document recovery to large area wide disasters, we're trusted with some of the biggest jobs in the world, yours.

- In-house 24-Hour Call Center and 24/7 Response
- Local, Regional, National and Global Capabilities
- Priority Status available for Community-wide Disasters
- GSA Pricing
- One Company Handling Full Service Mitigation, Restoration, Construction and Document Recovery to Simplify the Billing Process.



National Disaster Response Team

- Fire, Smoke & Water Restoration Services
- Construction Services
- Moisture Control / Dehumidification Services
- Microbial Remediation
- Document & Media Restoration Services



www.blackmonmooring.com

800.433.2940

www.bmscat.com



**REFERENCES FOR
GOVERNMENT PROJECTS**

Federal Bureau of Investigation

Contact: Renee Braun, Contracting Officer-OSCU - Finance Division,

Phone: 540.868.4801

Contact #2-Craig Rodgers-Records Management-Program Analyst

Phone: (540) 324-5820

A regional FBI office containing records storage of active files were flooded when the area was struck by Hurricane Sandy. Many of the files were classified as "Top Secret" when the damage occurred.

Following the flooding the FBI packaged and loaded the boxes into refrigerated trailers for storage until a solution could be found. The FBI determined that BMS CAT was the best option for the situation and transported the refrigerated trailers to our facility in Fort Worth, Texas. BMS CAT freeze dried 8 truckloads of documents in our chambers.

Additional security measures were applied for the duration of the project both in transport and while the documents were at the BMS CAT facility. The project was completed to the satisfaction of the FBI.

Raytheon – Space & Airborne Systems

Contact: - Jeff Belton-Strategic Sourcing Specialist

Telephone: 972.205.4468

A helicopter burst into flames after it crashed into the Raytheon plant located in El Segundo, CA in March of 2011. The building housed hundreds of Raytheon engineers and staff. The helicopter landed in a patio area, setting the first two floors of the building on fire.

Raytheon being a military contractor had many sensitive documents that needed to be recovered. There were thousands of files that had been placed into large 55 gallon bags. Some marked for recovery, some for disposal, many were wet with employee's personal effects intermixed.

BMS CAT was brought in the day after to start recovering documents and employee's personal items. They set up a large onsite cleaning facility to triage all the bags. The lightly affected items that were not wet or moldy were cleaned onsite. Everything else was shipped to BMS CAT's corporate headquarters in Ft. Worth where the items were freeze dried, cleaned and subjected to Gamma Radiation. The entire process took a few months.

BMS CAT's unique web based inventory system was of great value to Raytheon. The CAT teams in Ft. Worth and El Segundo were able to look at the same data and provide fast, accurate answers to Raytheon. BMS CAT also set up an employee personal effects processing procedure for safe return to the employees.

National Archives

Contact: Ann Harrison, Contracting Officer

Phone: 301.837.0772

Severe thunderstorms flooded a group of buildings that lie between Constitution and Pennsylvania Avenues in the nation's capital—an area commonly called the Federal Triangle. One of the buildings was the Archives—or Rotunda—building, which belongs to the National Archive and Records Administration. This is a historic, multi-story facility that houses some of the most important records of our history as a country. More specifically, it houses the original Declaration of Independence, the U.S. Constitution and the Bill of Rights—documents often referred to as the "Charters of Freedom."

Severe street and sewer flooding literally filled the sub-basement, half of the basement and the outer moat that surrounds the building. The National Archives building lost power when eight feet of water flooded the building and covered two transformers in the sub-basement. As such, the electrical switch gear and all air-conditioning and indoor environmental controls were damaged by water and off-line for several days. This required the basements and moat areas to be pumped and temporary electrical power to be brought in using generators.

Additionally, temporary lighting, desiccant dehumidification and air-conditioning were set up to stabilize the indoor environment. This helped to both dry the wet structural materials, and to protect archival materials stored and displayed within the building from high moisture levels. Due to prior planning on the part of the National Archives, and the rapid response of BMS CAT, there was no permanent damage to this historic building or any of the valuable records housed within.

Bronxville ISD, Bronxville, NY

Contact: Dan Carlin

Phone: 914.395.0500

On August 29th, Hurricane Irene made landfall in the New York City area. As a result, the Bronxville area experiences substantial flooding. BMS CAT was called in to perform the restoration. This was actually the second time that the school required assistance following flooding. Both times the school suffered damage throughout the first floor including a gym floor. BMS CAT performed water damage restoration, controlled demolition, moisture control and reconstruction.

Internal Revenue Service

Contact: Edward Roberts

Phone: 512.640.8008

Blackmon Mooring & BMS CAT worked closely with the Department of Homeland Security to clean up and recover sensitive documents, office equipment and personal effects damaged by a February plane crash and subsequent building fire.

Applying a unique inventory system the company deploys as part of its aviation disaster business, Blackmon Mooring & BMS CAT inventoried the entire contents of the building, including 6,000 boxes of tax files. Documents were boxed and labeled, and later cleaned and sanitized. Freeze drying prevented further deterioration and damage to wet documents, and charred edges on burned documents were trimmed to prevent IRS employees from inhaling soot. Blackmon Mooring & BMS CAT also employed a combination of ozone, safe chemicals, air exchanges, air filtration and ionization to deodorize recovered documents that had been contaminated by fire, plane fuel or mold.

As part of the document recovery process, Blackmon Mooring & BMS CAT took possession of active criminal investigation and grand jury files. To preserve the sanctity of the chain of custody and evidence, the IRS took the unusual step of adding BMS CAT to the grand jury list. Comfort and trust were also important in the recovery of personal effects. The IRS took the position that the building was unsafe for their employees to retrieve personal items. Instead, the IRS asked Blackmon Mooring & BMS CAT to inventory and photograph employee personal effects and then post the photographs on a secure website for employees to view and claim. In addition to the recovery of personal effects and documents, Blackmon Mooring & BMS CAT worked with IRS on the recovery and/or disposal of office equipment and furnishings.

University of Texas Medical Branch - Galveston, TX

Contact: Paul Pousson
Phone: 512.499.4559

Hurricane Ike pounded the barrier island of Galveston, damaging every building on the University of Texas Galveston Medical Branch. BMS CAT crews were ready and waiting to respond as the storm passed. At the height of restoration, BMS CAT crews numbered over 1,400 strong. Restoration efforts began immediately and included: debris removal, moisture control, water extraction, decontamination, odor removal, electronic restoration, content restoration, and document restoration.

U.S. Pentagon - Washington, D.C.

Contact: Menandra Whitmore
Phone: 703.602.6273

On September 11, 2001 terrorists attacked this facility. Smoke and water damage affected the entire library which housed more than 250,000 bound volumes, 2,000,000 pieces of micro-graphics, classified and confidential records, historical military documents and more than 100 computer workstations and a dedicated server room. Mold and mildew had begun growing, as it was more than 10 days before FBI/ATF investigators released the library. Dehumidification was set up immediately to control the indoor environment and halt mold growth and materials deterioration. A crew of 25 technicians and supervisors worked daily for one month to recover the collection and facility.



CLEANING DAMAGED DOCUMENTS

A BMS CAT WHITE PAPER

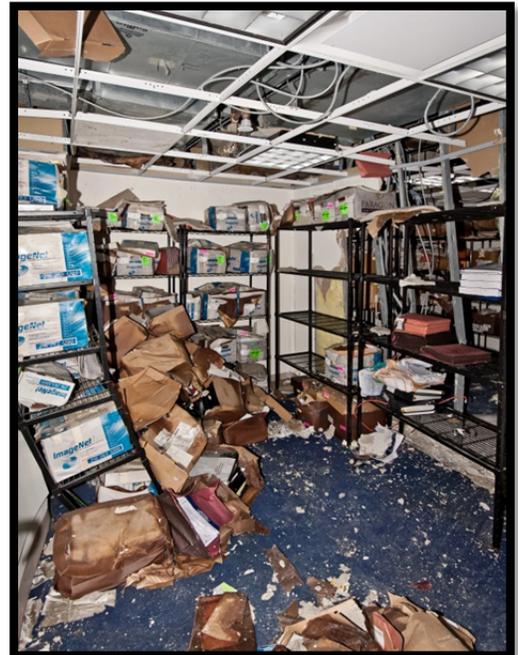
CAN PAPER BE SAVED? RECOVERING DAMAGED DOCUMENTS

SUMMARY

When a facility suffers damage from water, fire or microbial growth, documents stored within are susceptible to irreversible damage. Can paper and media be recovered?

WHY DOES IT MATTER?

In today's environment preserving documents for business and historical purposes is not only a need, it is often the law. Retention of records is required in many cases for several decades. Additionally, some documents may have historical value to an organization. Documents and media that have become wet, moldy or have debris such as soot can be recovered. Often, these materials are highly secure and careful consideration must be taken to ensure that any company hired to handle records have proper security protocol in place. Such was the case when BMS CAT was hired to restore documents damaged at a FBI facility during Hurricane Sandy that were TOP SECRET.



CLEANING OFF SITE

There are many reasons to clean documents off site. Typically, documents are not the only thing damaged, the facility housing the documents usually needs repairs and/or restoration. While this may seem cumbersome, it allows for several benefits.

1. Restoration and repairs can be performed freely without fear of further damaging documents or books.
2. Documents are in a secure facility while cleaning, including cameras, supervisors and dedicated staff.
3. Technicians have a dedicated facility for cleaning.
4. Costs are lower because local technicians can be utilized instead of incurring the costs of transportation and housing.

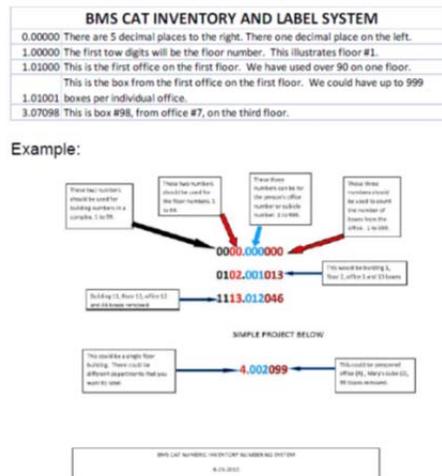
When packing out documents, it is generally appropriate to begin with materials that have sustained the most damage. Site conditions may prevent this. Microfilm and other photographic negatives should not be allowed to dry out. The emulsions become soft when wet and will act like an adhesive. When these items dry next to paper or other films, the emulsions will stick to whatever is next to it permanently. Trying to pull items apart will destroy the film. Film should be placed in a plastic bag and a moderate



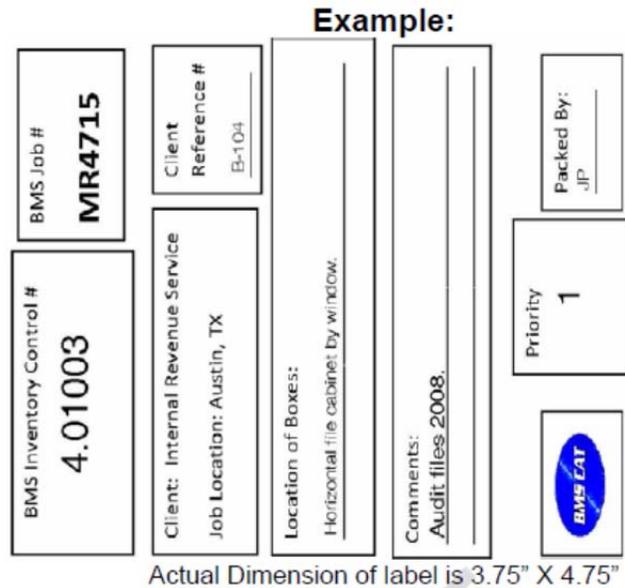
amount of distilled water is added to keep items wet. Finally, film and other photographic materials should be stored at a cold temperature. When dealing with bound volumes, they should be packed “spine-down.” Large volumes should be placed flat in boxes.

HOW DO YOU KEEP TRACK OF IT ALL?

BMS CAT utilizes an inventory system that gives each box a unique number that will become its own identifier. The inventory number will tell us the building, floor, office (or cubicle) and how many boxes were removed from each space. On both the box label and corresponding spreadsheet, there is a section for comments describing the documents.



Each box is labeled with two identical labels. All inventory information is consolidated onto spreadsheets and provided to the customer.



WHAT CAN BE DONE?

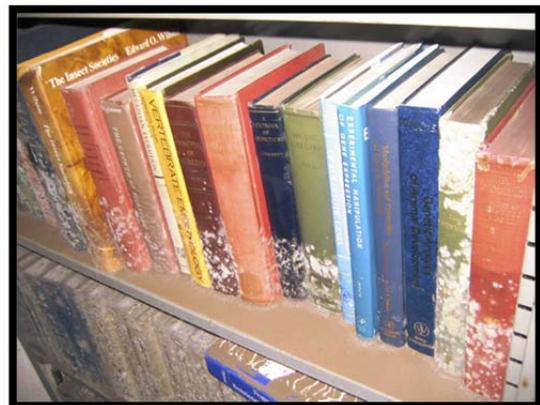
BMS CAT has extensive experience in document and special media recovery following a disaster. The cleaning portion can be performed on documents damaged by debris, char or soot.

Water Damage: If the Moisture Content of the paper is less than 7%, documents can be cleaned without drying first. If Moisture Content is greater than 7%, documents will continue to sustain further damage as the water equalizes or wicks into paper. Freeze drying is generally accepted to be the least damaging of all methods of drying wet paper.

Fire & Smoke Damage: Documents damaged by smoke and soot are cleaned using “chemical sponges” made of pure latex rubber. Soot particles are removed from the edges of volumes and documents. Technicians use gentle sweeping motions, moving from the center out to the edges of the document. If necessary, HEPA vacuums will be used to trap additional debris. If odors exist, ozone may be used to neutralize the odor. Ozone should not be used, however, on archival or intrinsically valuable records.

General Cleaning Protocol:

- Each item is first HEPA vacuumed to remove gross accumulations of mold and debris.
- The technician then uses a dry cloth and/or a “chemical sponges” made of



pure latex rubber to further remove accumulations from the surface.

- If books are damaged, the spine and fore edge may be accessed and cleaned with a bottle brush or dry cloth if necessary.
- Binders are not a good candidate for cleaning or retention following damage. Instead, information from each binder is retained with the materials that were housed in that binder. Additionally, we photocopy or photograph the original information to prevent confusion when re-filing.
- If requested, BMS CAT will also replace file folders made of permanent-durable materials. The old file labels are retained and placed in a plastic bag and hermetically sealed and new file labels are applied to replace them.
- Documents that have been wet or have mold should be cleaned and sanitized. An EPA registered biocide will be applied to the documents, specifically where visible mold growth has occurred.
- If documents are exposed to Class 3 Water, or “Black Water”, they should be sterilized via Gamma Radiation. Black Water can include sewage, river water, water from area wide flooding and any water that has been present for extended periods of time.
- If documents will be returned to a healthcare setting, Gamma Radiation is recommended for the safety of patients who may have compromised immune systems.



CONSIDERATIONS

If your documents are important enough to recover, security must be a concern. Security occurs at several points as demonstrated below:

Customer Site Security	Transportation Security	Restoration Security
<ul style="list-style-type: none"> •Additional security should be hired if necessary •Segregate documents from other restoration activities •An inventory of the documents should be performed and audited •When documents are placed in a truck/trailer a security lock should be applied •A dedicated security person should visually monitor the trailer door •Documents should not be left alone during transport or when in the trailer •Restoration employees should have visible ID badges with pictures and wear uniforms 	<ul style="list-style-type: none"> •Trailer doors should be secured with a US Customs High Security Seal •Straight through shipment should be used if common carrier is shipping •Team drivers should be used so no overnight stays are required •Transportation should be performed by a security vetted company with GPS Tracking •Driver background checks should be performed 	<ul style="list-style-type: none"> •The facility where restoration occurs should be secure •There should be no open doors for visitors to walk in •Employees should be background checked and drug screened •Only employees with a need to access the documents should be allowed to enter the facility •The facility should be alarmed •The document processing areas should be segregated from other areas of the building •Ensure that training for employees applicable to your industry has occurred (HIPAA, Sarbanes Oxley etc)

WHAT CAN YOU DO?

If there is any advance notice of potential damage, all possible protective measures should be taken such as covering items with plastic, raising furniture and protecting electronics. Additionally, consider permanent storage of certain valuable items (rare books, historical newspapers or long term archival documents) in buffered, acid free storage boxes.

It is important to have a plan in place for a disaster. It is highly recommended that you pre-contract with a restoration company before a loss occurs. This gets any administrative “red tape” out of the way, expedites response times and allows you to carefully pre-qualify the service for your exact needs. BMS CAT offers a Response Service Agreement at no cost.



WHY CHOOSE FREEZE DRYING TO SALVAGE WET BOOKS & PAPER

A BMS CAT WHITE PAPER

WHY CHOOSE FREEZE DRYING TO SALVAGE WET BOOKS & PAPER

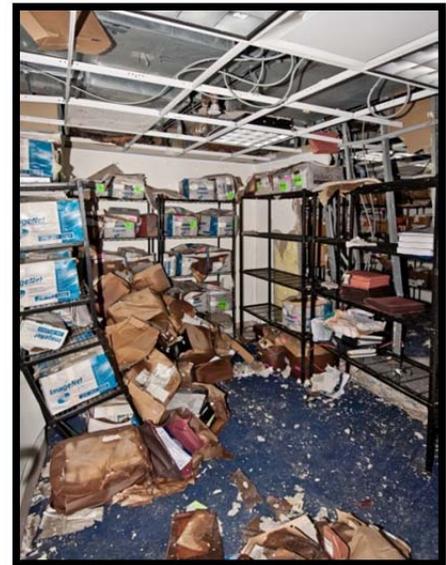


SUMMARY

When papers and books are wet, freeze drying via sublimation is the best and fastest way to salvage them. Papers and books can be wet from a variety of circumstances. The cause of the wet papers or books may be broken water pipes, a roof torn off during a tornado, area wide flooding, etc. Often times many of these papers and books may become submerged under water. They can become contaminated with a variety of contaminants and sustain substantial damage. The dilemma for the owner of the documents and books is what to do and who to turn to.

WHY DOES IT MATTER?

In today's environment preserving documents for business and historical purposes is not only a need, it is often the law. Retention of records is required in many cases for decades. Additionally, some documents may have historical value to an organization and they want to preserve these permanently. Often, these materials are highly secure and confidential. Documents and books that have become wet, moldy or have debris such as soot can be recovered while in a secure environment.



WHAT CAN YOU DO?

By freezing paper that has become wet, the mechanical disintegration of the paper will end, ink will stop dissolving and the potential for mold and fungus growth ceases. Once frozen, paper can stay frozen indefinitely and transported via any refrigerated means.

WHY SHOULD YOU CHOOSE FREEZE DRYING?

Documents exposed to water will continue to sustain further damage as the water equalizes or wicks into paper. The Library of Congress and the [National Archives &](#)

[Records Administration](#) both recommend vacuum freeze drying by sublimation as the preferred method of removing water from paper.

Modern large scale freeze drying chambers actually cost less than desiccant or air drying papers or books. During the freeze drying process the quality of paper is maintained. By comparison, papers dried by air or dehumidification will swell up to 25%, wrinkle (cockle) and lose tensile strength



AIR OR DESICCANT DRYING

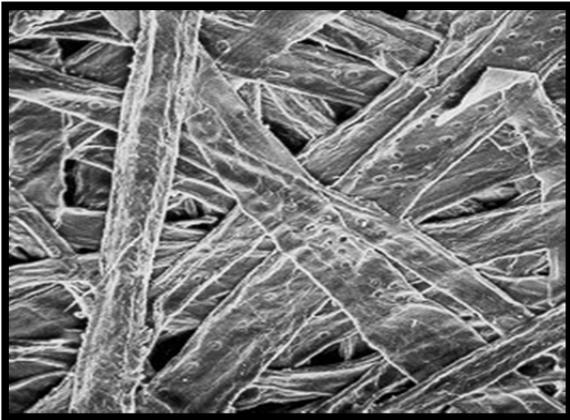


FREEZE DRYING VIA
SUBLIMATION

Water exists in three phases: liquid, solid and gas. It is the liquid phase of water that is most damaging to paper and any media printed on it. The cross-scission and cross-fusion of paper is gradually destroyed by water. The tiny fibers of the paper separate and lignin, that binds the fibers together, no longer serves as an adhesive. Most writing pen inks are water soluble and begin to run or dissolve. And finally, mold now has an optimal environment for growth. Because of this, simply air drying water soaked paper is not practical.

By allowing paper and books to start drying instead of freezing, additional damage is occurring to the documents. The escaping water molecules separate and break the

paper fibers, while rendering the lignin useless. Paper generally swells about 25% greater in volume and 30% or greater in reduced strength causing it to tear easily.

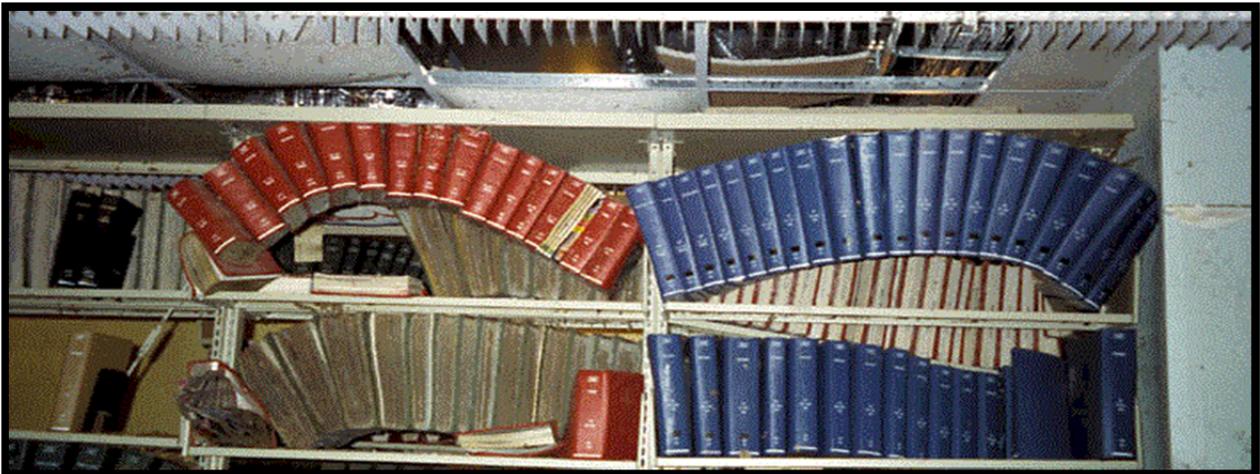


MICROSCOPIC VIEW OF PAPER



**PAPER LEGAL FILES SWELLING
AND DISTORTING ON METAL
SHELVING**

When books are allowed to start to air dry, the same issues mentioned above occur, but to a greater degree. The spines of the books are generally stitched. This stitching will minimize the dimensional change of the spine but all the energy of moisture evaporation into the air will cause massive swelling on the foredge of the book. For this reason, it is important to completely remove any books prior to any attempts to dehumidify the area. If necessary, a plastic vapor barrier can be constructed to section off the area. It is important to remember that time is of the essence when freezing books in order to minimize damage.



Drying frozen, water-soaked paper via sublimation (or freeze drying) is slower than evaporation directly from the liquid phase. However, sublimation causes the least amount of damage to the paper and content. The drying rate using sublimation can be

controlled by manipulating process parameters, minimally impacting the time difference. Due to the damage produced by air drying and desiccant drying wet paper and books, it is clear that drying via sublimation is the best solution

WHAT IS FREEZE DRYING VIA SUBLIMATION?

The technical aspects of drying via sublimation (or freeze drying) can be complex, but the basic principles of the process have been widely understood and accepted for generations.

Sublimation is a phase change which requires latent (not apparent) heat energy. This energy leaves the solid ice with the vapor and, by the process known as evaporative cooling; the temperature of the ice tends to get colder. Therefore, it is necessary to have heat from outside the system (in our case, electrically heated shelves). Now, if there is more heat energy available than that required for optimum sublimation, the temperature of the ice will rise and its vapor pressure will rise, thus increasing the rate of sublimation. It is important to know that, for certain historic archival documents the heated shelves are optional; the process will simply take slightly longer. Depending on the type and age of the material, some archivists recommend removal of heated shelves for preservation purposes. In order to closely monitor the temperature of the paper, BMS CAT places temperature sensors in multiple boxes throughout each chamber.

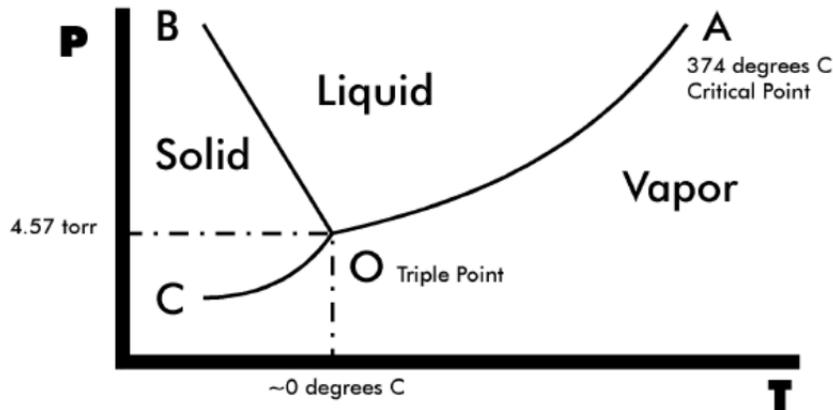
Low pressure and a surplus of heat (energy) are essential during the freeze drying process. However, when the pressure reaches 0.100torr (prox) the process becomes adiabatic (without loss or gain of heat). At this point the process is truly optimized, because all of the electric heat added works to raise the temperature of the ice verses supporting sublimation.

The condenser (freeze trap) assists the vacuum pump in lowering chamber pressure. When the sublimed vapor clings to the condenser surface, it changes phase and reverts back to a solid, giving up its latent heat as sensible (apparent) heat, thus the need for refrigeration. As the ambient condenser pressure is lowered, vapor from within the chamber tends to fill this region and equalize



pressure of the total chamber/condenser volume (vapor laws). The coil must be sized to condense vapor at the optimum sublimation rate. This can be accomplished via large surface area or very low surface temperature.

Freeze Dry Theory - Phase Diagram



Water Phase Diagram

The graph above is the phase diagram for water. For any combination of pressure (vertical axis) and temperature (horizontal axis), you can tell whether water is solid, liquid, or gas. Normal atmospheric pressure at sea level is 760 Torr. If the pressure is below 4.57 Torr (point O), water can exist in only two states - solid and vapor (depending on the temperature). Point O is called the triple point of water because it is the only temperature and pressure where water can exist in all three states, solid, liquid, and vapor. Remember, all the damage to paper is done during the liquid phase of water. By keeping the pressure below 4.57, we prevent further damage while allowing the ice to sublime (go directly to vapor).

The process of freeze drying consists of placing the frozen documents into the freeze dry chamber, reducing the pressure in the chamber to about 2.3 Torr and adding heat to warm the documents, causing sublimation, the conversion of ice to vapor. The vapor is condensed on refrigerated coils in the cold trap attached to the chamber. Periodically, the cold trap is isolated from the chamber and the refrigeration cycle is reversed to heat the coils. Next, the cold trap is opened to atmospheric pressure, and the ice is melted and removed as the liquid water runs into a container. There are several cold traps operating "push pull" - while one trap is in defrost; the other is still connected and removing water.



Vacuum Pressure Comparisons 3-18-2013

	Torr (mm Mercury)	Micron	psia, (lb/in ²) abs	Inches Mercury Absolute	Inches Mercury Gauge	kPa abs	
Pressure at Sea Level →	0	760	760,000	14.7	29.92	0	101.4
	1.3	750	750,000	14.5	29.5	0.42	99.9
	1.9	735.6	735,600	14.2	28.9	1.02	97.7
	7.9	700	700,000	13.5	27.6	2.32	93.5
	21	600	600,000	11.6	23.6	6.32	79.9
	34	500	500,000	9.7	19.7	10.22	66.7
	47	400	400,000	7.7	15.7	14.22	53.2
	50	380	380,000	7.3	15	14.92	50.8
	61	300	300,000	5.8	11.8	18.12	40
	74	200	200,000	3.9	7.85	22.07	26.6
	87	100	100,000	1.93	3.94	25.98	13.3
	88	90	90,000	1.74	3.54	26.38	12
	89.5	80	80,000	1.55	3.15	26.77	10.7
Household vacuum cleaner →	90.8	70	70,000	1.35	2.76	27.16	9.3
	92.1	60	60,000	1.16	2.36	27.56	8
	93	51.7	51,700	1	2.03	27.89	6.9
	93.5	50	50,000	0.97	1.97	27.95	6.7
	94.8	40	40,000	0.77	1.57	28.35	5.3
	96.1	30	30,000	0.58	1.18	28.74	4
	96.6	25.4	25,400	0.49	1	28.92	3.4
	97.4	20	20,000	0.39	0.785	29.14	2.7
	98.7	10	10,000	0.193	0.394	29.53	1.3
	99	7.6	7,600	0.147	0.299	29.62	1
Water cannot exist as a liquid below this point. Sublimation occurs from this point ↓		4.56					
BMS Chamber for Freeze Drying →	99.9	1	1,000	0.01934	0.03937	29.88	0.13
	99.9	0.75	750	0.0145	0.0295	29.89	0.1
	99.99	0.1	100	0.00193	0.00394	29.916	0.013
Incandescent Light Bulb →	99.999	0.01	10	0.00019	0.000394	29.9196	0.0013
	100	0	0	0	0	29.92	0

$1 \text{ psi (lb/in}^2\text{)} = 6,894.8 \text{ Pa (N/m}^2\text{)} = 6.895 \times 10^{-3} \text{ N/mm}^2 = 6.895 \times 10^{-2} \text{ bar}$

HOW DO YOU KNOW IF DOCUMENTS ARE WET?

If paper items, such as books and manuscripts, have been exposed to excessive humidity, are near a water intrusion, under a sprinkler discharge or partially submerged in water, they should be inspected for moisture content with a moisture meter. The moisture meter will determine the amount of moisture present in the material. Simply visually inspecting the items or touching them will not tell the whole story. Moisture can be deceiving, you cannot always feel or see it. An archivist's electronic moisture measurement meter will give you the full picture.



DELMHORST P-2000 PAPER MOISTURE
METER

The meter will read from 4.3% to 18% (saturation) moisture range on paper. It is important to check the owner's manual for instructions on how to calibrate the device prior to use and calibrate before each use.

Moisture Content is considered within the acceptable range when the measurement is < 7% MC (Moisture Content). Many offices may have documents that are in the 5% to 7% MC range. Moisture Content is considered higher than desired when the range is >7% MC but < 11% MC. Document moisture content is then considered "humid - damp".

It is recommended that action to reduce the moisture content to less than 7% within 48-72 hours. During this time frame it is acceptable to try moisture removal on site with blocking or air movement when dealing with small batches of documents. If you are unable to remove moisture within 72 hours, schedule documents for freeze drying.

Moisture Content is considered "unacceptable" when the moisture content is greater than 11% MC. At this point, the documents are considered "wet" and should be freeze dried via sublimation immediately. Your first step is to freeze the documents to mitigate any further damage until the documents can be shipped to the freeze drying chambers.

Zone	ACCEPTABLE-DRY			HUMID-DAMP			UNACCEPTABLE-WET		
Delmhorst Reading	4.5	5	7	8.0	9	10	11	14	18
% of Saturation or moisture content of paper	25%	28%	39%	44%	50%	56%	61%	78%	100%

CONSIDERATIONS

Freezing: The most effective method way to stabilize water-damaged archival and library materials is freezing at low temperatures as quickly as possible. This method is the most generally accepted by conservators. By freezing at a level of around -30°C (-20°F) is recommended. Frozen materials should remain in cold storage until freeze drying can occur.

BMS CAT is able to provide refrigerated trailers at the site of the loss. These trailers are capable of achieving a -20°F temperature. This will allow teams inventorying to process items then immediately place pallets of wet books or documents into the refrigerated trailer, thus mitigating the damage. Once a trailer is full it can be shipped with the appropriate security levels in place to our secure freeze drying facility.



Compression: It is important to note that books dried without mechanical compression will distort and cockle. Several companies will attempt to solve this issue with rubber bungee cords with minimal success.



NO COMPRESSION



BUNGEE COMPRESSION

BMS CAT has developed a proprietary process of “Self Compensating Mechanical Compression” book reforming process. A snapshot of the process is illustrated below.



BENEFITS OF FREEZING AND FREEZE DYRING VIA SUBLIMATION

Freezing Documents Halts Mold: Mold requires three things to thrive: moisture, food and temperature. By freezing documents, the temperature required for mold to thrive is lowered to a point where it cannot survive. While mold spores are not destroyed by freezing, they remain dormant until a more favorable environment is available. Freezing will stop the infection of mold and harmful damage to the documents ceases.

Freezing Stabilizes Soluble Inks and Dyes: Freezing has the additional advantage of stabilizing inks, dyes, dyestuffs and colorants used for manuscripts, maps, sketches and drawings that are soluble in water. Later, when freeze-drying takes place, migration or feathering of inks or dyes can be restrained since the liquid stage is by-passed.

Freezing Prevents Adhesion of Pages: Books and periodicals are generally printed on stock that uses a coating pigment with a binder of casein and starch, both of which are highly water-soluble. If coated stock is permitted to dry it will turn the book into a clay-like brick at which point restoration is impossible. The only practical method to salvage these items, especially when large quantities are involved, is freezing while wet then freeze drying.

Freezing Gives You Time To Assess: By freezing water-damaged documents, they are stabilized as long as they remain frozen. Disasters can be stressful and confusing. By stabilizing documents through freezing, there is time to assess the damage. Decision makers can determine which documents can be discarded, replaced or copied. It allows time to determine what repairs or restoration is required and how much time it will take to recover damaged storage areas.

Freeze Drying Uses Fewer Chemicals Produces Fewer Odors: The process uses fewer chemicals, thus producing limited odors. The vacuum chambers cause VOC's (Volatile Organic Compounds) to "flash off", boil or vaporize because the pressure in the chamber is lower than the boiling point of the VOC's. Additionally, many chemical contaminants escape with the gasses released during the process. As a result, the documents will smell better and have very few (if any) contaminants remaining. Any contaminants that do remain can be cleaned during the cleaning process.



Following a plane crash in the Hudson River, many paper documents were submerged in water filled with pungent jet fuel. Our freeze drying chambers were able to remove most of the odor from the jet fuel.

Freeze Drying is Safe for Documents and Books:

“In studies conducted by the Research and Testing Office of the Library of Congress, there was NO evidence found that freezing drying causes damage of cellulosic and proteinaceous materials (5).” Source: Vacuum freeze-drying, a method used to salvage

water-damaged archival and library materials A UNESCO (United Nations Educational, Scientific, and Cultural Organization) Study 1987.

Freeze Drying Produces a Cleaner Document: The gasses during the sublimation process deposit loose matter at the surface of the papers. This facilitates a better cleaning of the papers from silt, loose mold spores and other contaminants.

Freeze Drying Is a Safe and Secure Way To Dry Documents: According to the National Archives (NARA) “Records can dry in their original containers reducing risk for disruption of original order.” This allows us to have a secure process, keeping clients documents segregated from other client’s documents.



According to the National Archives (NARA) “Records must be removed from their containers, spread on shelves to dry in warm dehumidified air, and periodically rotated to expose wet paper surfaces.” As you can imagine, a great deal of space must be used to spread paper out individually. The risk of this process is that documents can be knocked off of shelves and intermixed with other client’s documents. Because paper is spread throughout a facility, there is greater risk of retrieving the wrong file or intermixing files.

WHAT CAN YOU DO?

If there is any advance notice of potential damage, all possible protective measures should be taken such as covering items with plastic, raising furniture and protecting electronics. Additionally, consider permanent storage of certain valuable items (rare books, historical newspapers or long term archival documents) in buffered, acid free storage boxes.

It is important to have a plan in place for a disaster. It is highly recommended that you pre-contract with a restoration company before a loss occurs. This gets any administrative “red tape” out of the way, expedites response times and allows you to carefully pre-qualify the service for your exact needs. BMS CAT offers a Response Service Agreement at no cost.

SUMMARY

BMS CAT offers over 8,500 cubic feet of freeze drying space in our freeze-drying chambers. Our 7th generation equipment is completely controlled electronically and monitored 24 hours a day by our trained professional recovery staff and around the clock security. BMS CAT recently upgraded software and equipment and continues to improve in several areas including:

- More rapid drying cycles
- 24 thermocouples per chamber for more precise knowledge of temperature inside boxes
- Increased control of chamber pressure
- Enhanced remote monitoring.
- Decreased vacuum pressures down to 1 Torr

Click for additional white papers on Document Cleaning and Document Destruction

References, National Archives and Records Administration (NARA), The Library of Congress, The United Nations, The Northeast Document Conversation Center, UNESCO (United Nations Educational, Scientific, and Cultural Organization)



STERILIZATION of DOCUMENTS

There are three options for sterilization: heat, chemical and radiation.

HEAT:

- (d) Typically one bakes materials in the an oven at
 - (i) 171°C (340F) for at least one hour
 - (ii) 160°C (320F) for at least two hours
 - (iii) 121°C (250F) for at least 16 hours

CHEMICAL:

Sterilants are specialized chemicals, such as glutaraldehyde or formaldehyde, which are capable of eliminating all forms of microbial life, including spores. The term sterilant conveys an absolute meaning; a substance can not be partially sterile.

Some species of pathogenic bacteria are capable of adapting to hostile conditions by forming a thick outer and chemically impervious shell. They transform from their normal or vegetative state to form spores and are difficult to eliminate since they can resist the effects that sanitizer or disinfectant exposures have on bacteria. Elimination of spores is carried out by specialized chemical agents or physical means, and requires several hours for total microbial destruction.

Some of the factors requiring consideration are whether they are the easy to kill bacteria in their vegetative state or whether they are present on the surface as highly resistant spores. A major consideration that also needs to be addressed is whether other materials such as blood, feces or organic matter are present within the bacterial environment. These contaminants reflecting an unclean surface can rapidly inactivate some germicides, such as hypochlorites, rendering them ineffective for their intended use.

RESISTANT BACTERIA AND SUB-LETHAL SANITIZER DOSAGE

In any given population, bacteria exist within a wide range of sensitivities towards a specific sanitizer dose. Under normal conditions of exposure, sanitizers are capable of destroying 99.999% of the bacteria present. In essence, a surface which initially harbor 1,000,000 bacteria per square centimeter prior to sanitation may be expected to contain only 10 microorganisms per square centimeter afterwards. In such a scenario, the objective of the

sanitation process has been achieved in the sense that the total bacterial population has been reduced to safe levels.

What may not be as evident is that the remaining 10 surviving microorganisms capable of withstanding the sanitization procedure have the potential to act as a source of future contamination. If on subsequent clean up and sanitization, proper dosing or procedures were not adhered to, or the surface has not been adequately rinsed, the 10 surviving bacteria will survive a second cycle of sanitization, as will other bacteria. Over a period of time and involving several cleaning and sanitization cycles, the resistant survivors have the capacity to proliferate, especially during periods in which they are exposed to food product. When this occurs the food processing plant is now dealing with a bacterial population which no longer responds to sanitizing doses of germicide, resulting in a failure of the sanitizer to achieve its objectives. In essence by applying the sanitizer at less than lethal doses or for shorter intervals, the end result is the same as if selective culturing of a resistant strain had been carried out with the possibility of the surface becoming enriched with pathogens and hard-to-kill microorganisms.

A surface which is allowed to deteriorate to such a level of poor hygiene needs to be "shocked", by switching to high doses of an alternate product such as hypochlorite and dosing at disinfectant levels. It is not uncommon to require the use 400+ ppm of available chlorine over a period of a week before the surface can be returned to the desirable and bacterial free state.

BIOFILM FORMATION

Biofilm formation is another mechanism, in which bacterial resistance towards a sanitizer can occur. As previously indicated, proper cleaning is essential before effective sanitization can occur. Certain bacteria secrete a polysaccharide which is a constituent of their membrane. These secretions are very sticky and attach themselves firmly to metal surface. The resulting film so formed containing trapped bacteria is referred to as a biofilm. Bacteria which are responsible for biofilm formation may in themselves not be harmful or pathogenic. However, the gelatinous matrix which they excrete is capable of attracting to itself and embedding pathogenic bacteria, such as *Listeria monocytogenes*. Although the pathogens themselves do not contribute towards the integrity of the film, they nevertheless are capable of contaminating products which come into contact with the surface.

Biofilms are often very difficult to remove, since their matrix is very resistant to chemical attack by detergents. They often require higher than normal concentrations of alkaline detergents and strong oxidizing levels of sodium hypochlorite in order to remove them. Several applications may be required before the biofilm can be totally removed.

RADIATION: (all information is provided from Sterigenics)

For over forty years, Gamma Radiation has been highly regarded as a safe, cost-competitive methodology for the sterilization of healthcare, products, components and packaging. Today, spurred in large measure by its compatibility with single-use, disposable medical devices, Gamma Radiation is being used by an ever increasing percentage of the healthcare industry. As a result, Gamma Radiation, which once accounted for only 5% of the sterilization market, has grown to nearly 50%.

Simplicity and reliability, along with budget sparing cost-effectiveness, are the driving factors behind the industry's conversion to Gamma Radiation.

The Nature of Gamma Radiation

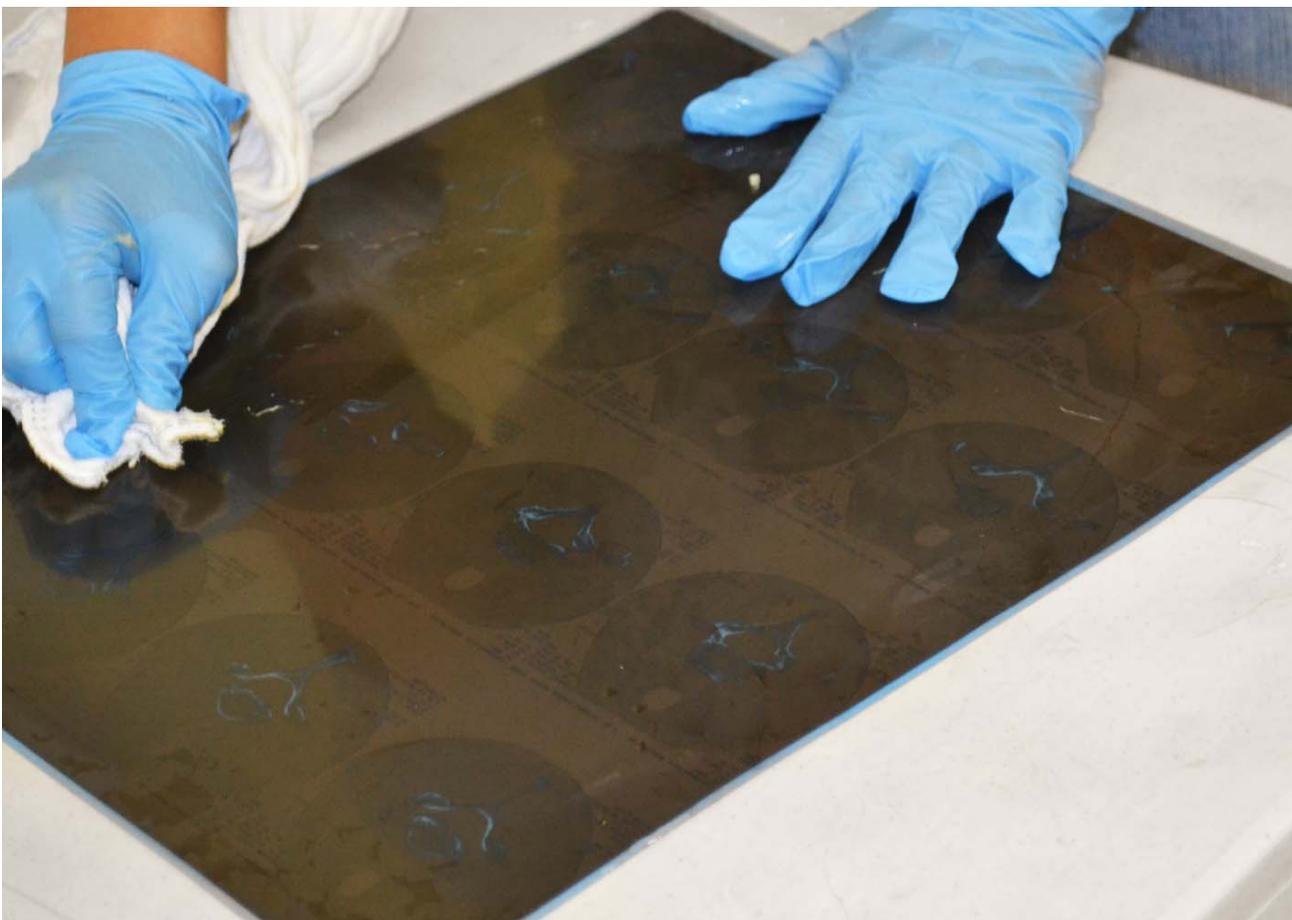
A form of pure energy that is generally characterized by its deep penetration and low dose rates, Gamma Radiation effectively kills microorganisms through out the product and its packaging with very little temperature effect.

Penetrating Sterilization, Even with High-Density Products Gamma Radiation is a penetrating sterilant. No area of the product, its components, or packaging is left with uncertain sterility after treatment. Even high-density products, such as books and paper files can be successfully processed.

The source of the radiation is Cobalt 60. There is no residue after the process and there are no visible changes to the documents.

When to use this process?

- Black water-particularly sewage.
- Area wide flooding with dirty water.
- Documents that have been submerged in water for a long period of time.
- Documents going back into a healthcare setting. In particular to hospitals or patient offices with open wound care.
- Situations where there are extreme employee concerns over safety of handling the documents.
- Irradiation will **eliminate** microbial hazards.
- The process will bring the documents to **near sterility**.
- Destroys E. coli O157:H7, salmonella, Listeria, etc.
- Safer than pasteurizing milk.
- Entire boxes of documents are evenly sterilized.
- The source of radiation is gamma Cobalt 60.



CAN SPECIAL MEDIA BE SAVED? CLEANING X-RAYS, FILM & MICROFILM

A BMS CAT WHITE PAPER

CAN SPECIAL MEDIA BE SAVED? CLEANING X-RAYS, FILM &



SUMMARY

When media such as x-rays, movie film, microfilm and microfiche are damaged, important data can be threatened. Organizations must follow applicable laws and regulations when retaining important data on any type of media. Additionally, some media may have historical value to the organization. Can special media be saved if it becomes, wet or contaminated with mold or debris?

WHY DOES IT MATTER?

The length of time an organization must retain records depends on the type of record and the applicable state and federal laws. It is important to understand the retention requirements up front. Documents with healthcare information, for instance, would fall under HIPAA and federal requirements for retention trump the state. Special media also often holds information with historical value. From valuable research to documentation on an event, there are many reasons an organization would retain special media even if the law does not require it.



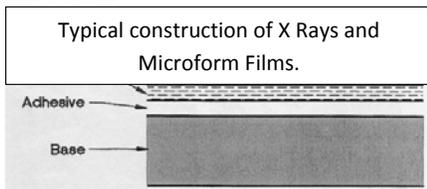
WHAT CAN BE DONE? BMS CAT utilizes X Ray film processing machines and Kodak film processing machines. Our Kodak equipment was set up and adapted



for disaster recovery by technicians with 25 years experience with Kodak. Unlike paper, media should never be frozen.

Emergency triage recommendations is to never let film based media dry in the field. We recommend getting sturdy boxes and line them with two plastic bags. If the film is dripping with water then place them in the bags and seal them. If the film is moderately wet place the film in the bags and pour ½ to 1 quart of distilled water over the files. Seal the bags and prepare the boxes for shipment to BMS CAT Film Processing Center.

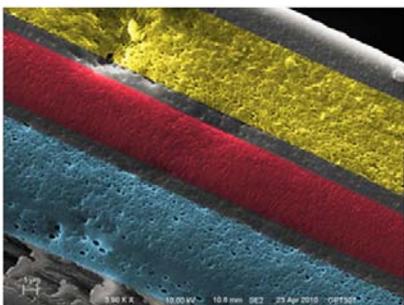
X-Rays: Often used as a medical image, x-rays are vital to our healthcare system. When x-rays get wet, the emulsion side of the media will reactivate. This is the side where the image is held. When wet, the emulsion acts like an adhesive and will begin to adhere to almost any surface. If handled improperly, irreversible damage to the image will occur.



Movie Film & Microfilm (Microforms): Microforms come in a number of formats. The most familiar of these are 16mm or 35mm roll microform and microfiche, the latter resembling a plastic file card. Roll microform, in either 16mm or 35mm formats, can be

cut into short strips and housed in clear "jackets" to produce a microfiche. The emulsion side of this film is matte, while the non-emulsion side is glossy.

Emulsion layers of color movie



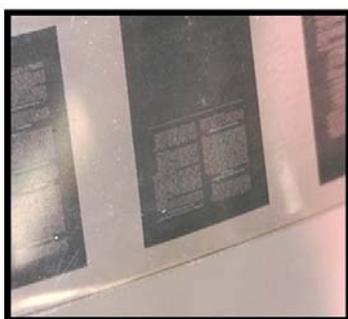
Comment [MRocco1]: Insert the photo below in the audio tape section.

Current movie film is made out of a polyester base substrate. This is the carrier that the film emulsions will be layered on. Film prior to 1950 could be made out of cellulose nitrate. Cellulose nitrate material is very unstable and very flammable. Cellulose acetate film was introduced in 1950 is non-flammable. Films that have bases of cellulose acetate will naturally degrade over time (even newer versions of Cellulose film. If the film is not properly stored, the degradation process is accelerated. Acidic oils and fingerprints can damage the film, so it is important to be cautious when handling. Once wet, these items should not be allowed to dry to avoid sticking together at the enclosures.

Polyester film is both stable and durable. It has a long life expectancy.

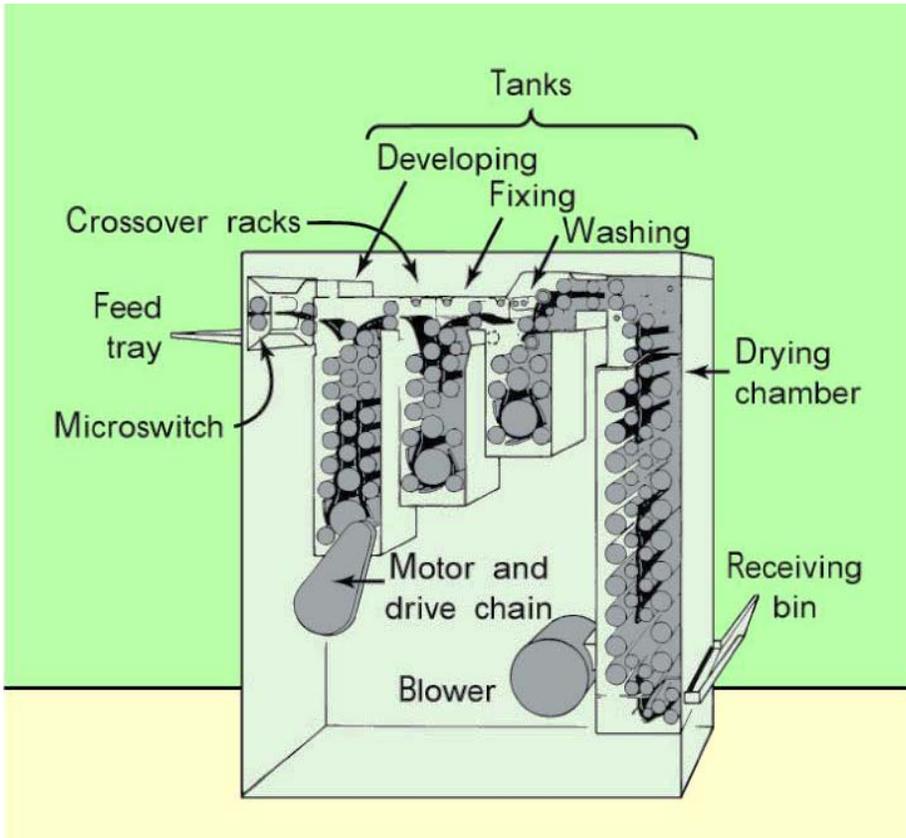


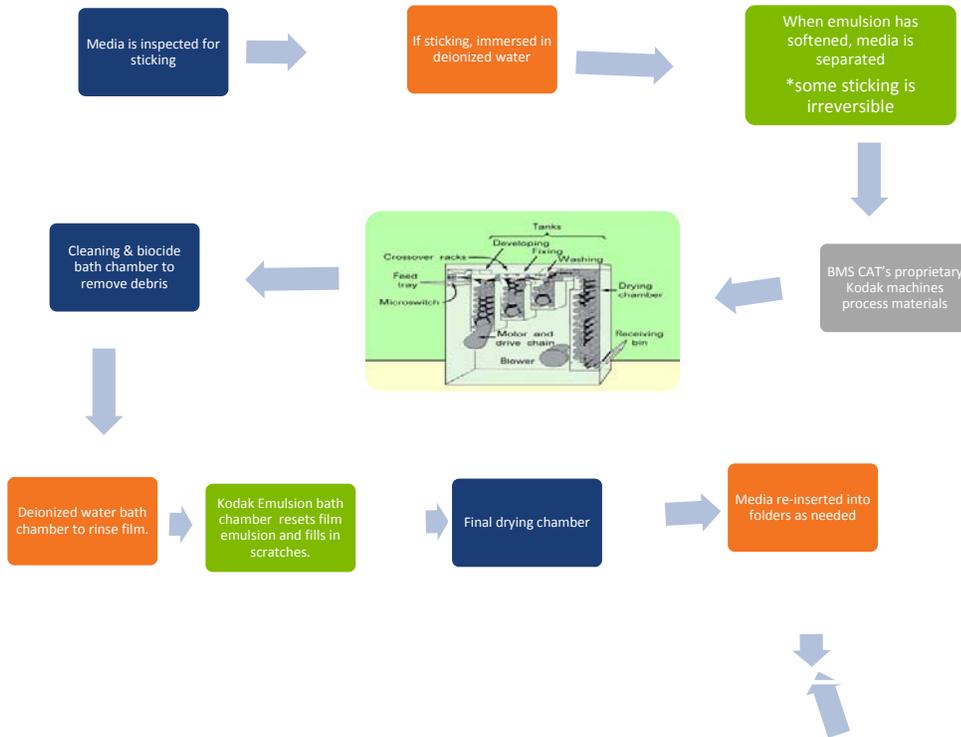
MICROFILM BEFORE CLEANING



MICROFILM AFTER CLEANING

BMS CAT's standard procedures for processing x-rays and film are as follows:



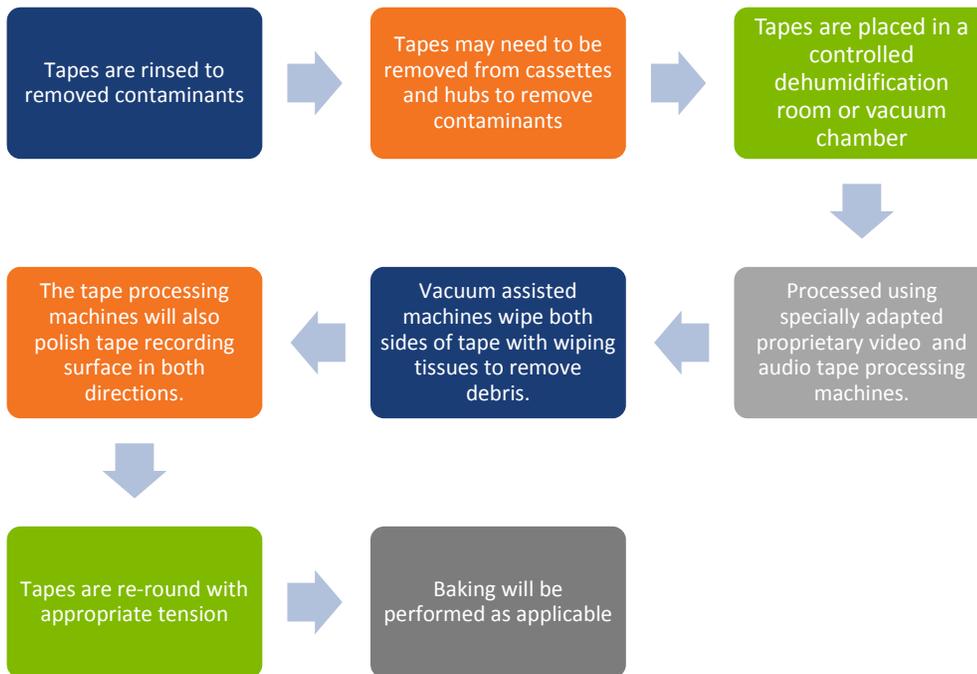


During all of the above stages the media passes through a series of baths, rollers and squeegees to ensure that all surfaces areas are uniformly processed.

Tape: Magnetic tape has been used for recording, distributing and preserving information. Its ease of use and versatility has made it a popular choice for record keeping. With careful handling, tape can be recovered. Tapes should not be allowed to

dry. Drying will occur unevenly and deformation can occur. Tapes should remain wet and refrigerated until shipping occurs.

BMS CAT's standard procedures for processing audio, video, dat and LTO tapes are as follows:



Master audio tapes after a vault fire.



Before BMS Restoration Process



After BMS Restoration Process



It is important to note that during both entire processes, media is carefully inventoried at each step. Upon completion, items are repackaged and returned to the customer in batches. In the past, air drying has been the primary method of restoration for these types of media. With new technology and stricter safety protocol, this process is no longer recommended.

CONSIDERATIONS

Media stored under humid conditions can become a host for mold, mildew, and fungus. Generally the organisms start the attack from the outside edge and make their way into the inside. These biological agents can cause significant damage to the emulsion. The growth initially appears in the form of matte-white spots and eventually grows into a lacy, web like pattern. Once the organisms have eaten into the emulsion, however, the image loss is irreversible. Our Kodak film processing equipment in conjunction with an EPA registered biocide can stop the degradation. It is recommended then to store the media in a cold and dry environment.

If your items are important enough to recover, security must be a concern. Security occurs at several points as demonstrated below:

Customer Site Security

- Additional security should be hired if necessary
- Segregate media from other restoration activities
- An inventory of the media and documents should be performed and audited
- When items are placed in a truck/trailer a security lock should be applied
- A dedicated security person should visually monitor the trailer door
- Items should not be left alone during transport or when in the trailer
- Restoration employees should have visible ID badges with pictures and wear uniforms

Transportation Security

- Trailer doors should be secured with a US Customs High Security Seal
- Straight through shipment should be used if common carrier is shipping
- Team drivers should be used so no overnight stays are required
- Transportation should be performed by a security vetted company with GPS Tracking
- Driver background checks should be performed

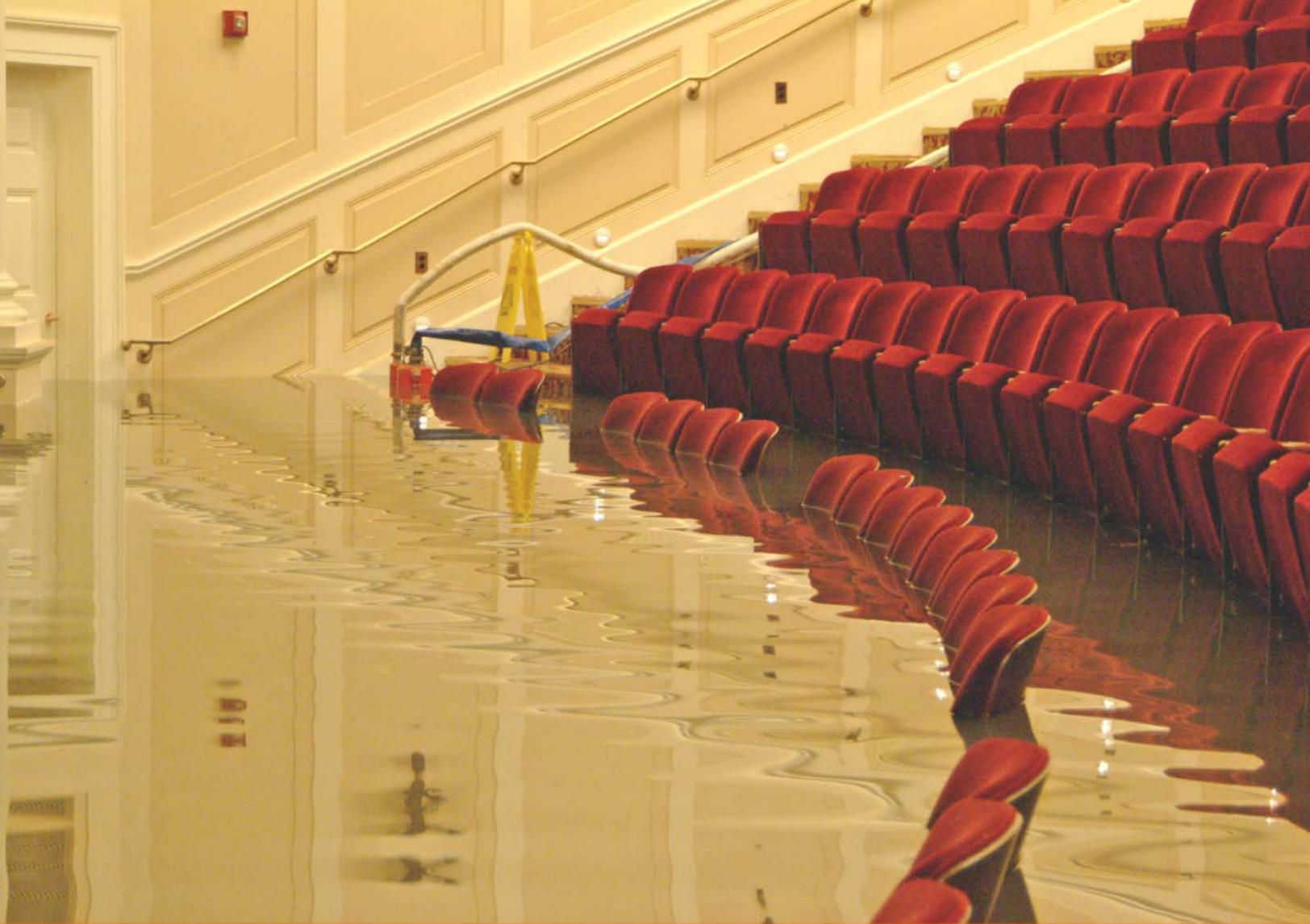
Restoration Security

- The facility where restoration occurs should be secure
- There should be no open doors for visitors to walk in
- Employees should be background checked and drug screened
- Only employees with a need to access the documents should be allowed to enter the facility
- The facility should be alarmed
- The processing areas should be segregated from other areas of the building
- Ensure that training for employees applicable to your industry has occurred (HIPAA, Sarbanes Oxley etc)

WHAT CAN YOU DO?

If there is any advance notice of potential damage, all possible protective measures should be taken such as covering items with plastic, raising furniture and protecting electronics. Additionally, consider permanent storage of certain valuable.

It is important to have a plan in place for a disaster. It is highly recommended that you pre-contract with a restoration company before a loss occurs. This gets any administrative "red tape" out of the way, expedites response times and allows you to carefully pre-qualify the service for your exact needs. BMS CAT offers a Response Service Agreement at no cost.



WHEN IT RAINS IT POURS WATER DAMAGE RESTORATION

A BMS CAT WHITE PAPER

WHEN IT RAINS IT POURS – WATER DAMAGE RESTORATION

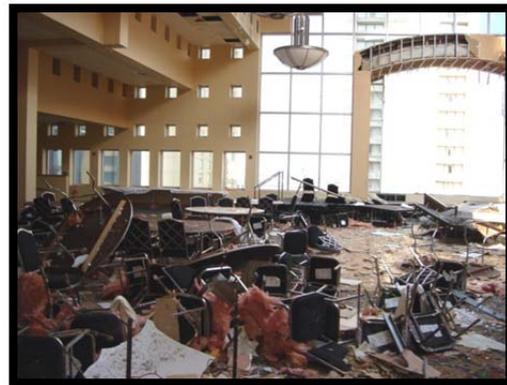


SUMMARY

Damage to a facility from water can come in many forms. From a sprinkler malfunction to a hurricane, water damage can damage and destroy a building and its contents. Can a facility ever return to normal? Are any of the contents salvageable?

WHY DOES IT MATTER?

Water is extremely damaging to most common materials like wood, paper, building materials and electronics. If water can be removed from contact with affected items, damage can be reduced. If items are left in standing water, they will continue to deteriorate even after surface water is removed. Floodwaters are often mixed with sewage, animal waste, fertilizers and industrial waste. When working in a flood, workers should consider the water a biohazard. Additionally, mold and mildew can cause irreparable damage to building materials and building contents even after all the standing water is gone.



WHAT CAN BE DONE?

Restoration to flood damaged facilities and contents, including paper documents, is possible. By removing excess water, reducing the moisture content of the building through dehumidification and decontamination of contents and building materials, a facility can return to operation and minimize losses following water damage. Even BMS CAT customers who suffered extreme losses following Hurricane Katrina were able to salvage facilities and some contents. Some of those facilities sat under water for weeks following the storm.

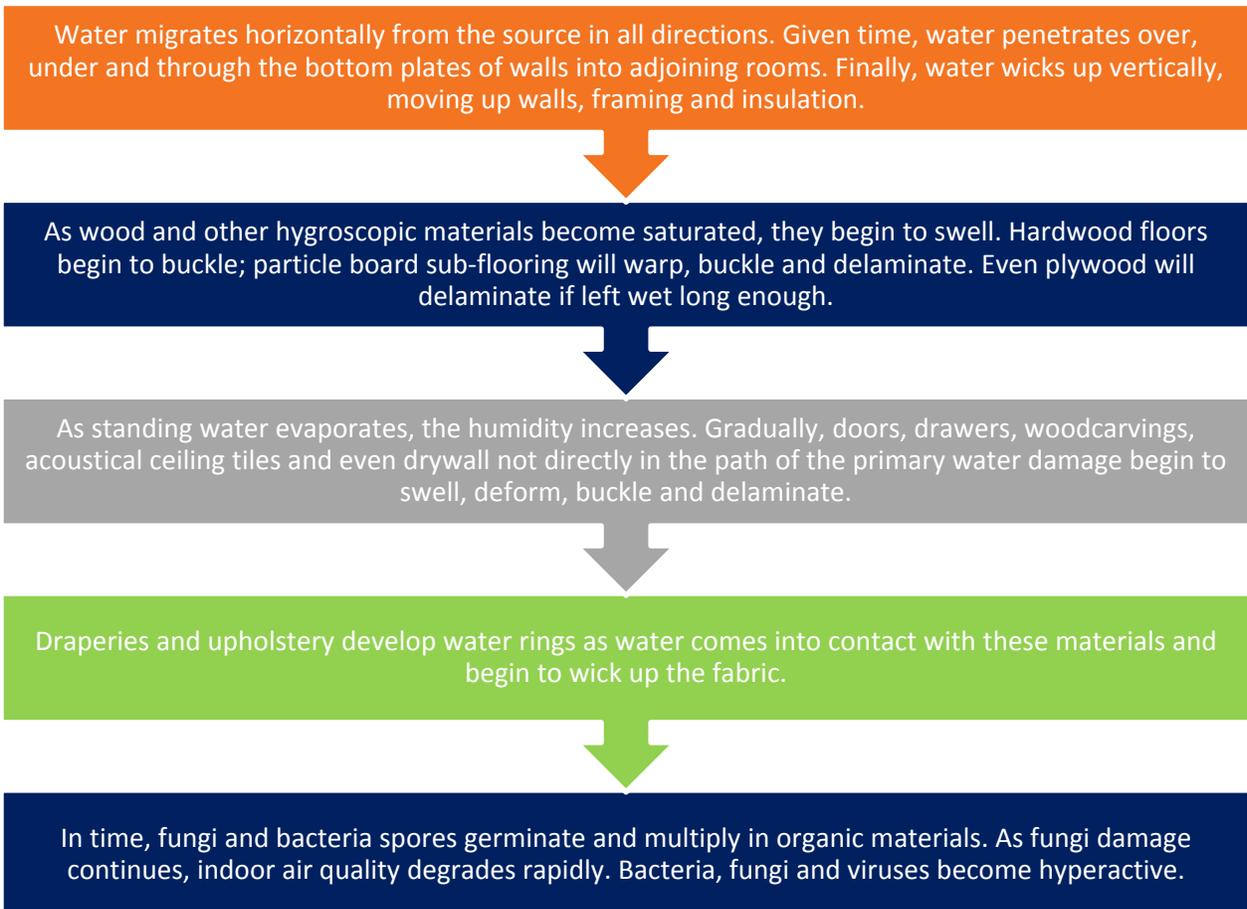


CONSIDERATIONS

The source of the water is a health and safety consideration. For restoration, water is placed in three general classifications:

Category 1 "Clean" Water	Category 2 "Grey" Water	Category 3 "Black" Water
<ul style="list-style-type: none">•No substantial harm to humans•Broken pipes & appliance malfunctions•Does not usually stay "clean" after it mixes with contaminants	<ul style="list-style-type: none">•Significant degree of contamination•Overflows from dishwashers, washing machines, etc.•Will begin to alter with time and temperature changes	<ul style="list-style-type: none">•Always contains pathogenic agents•Grossly unsanitary•Large quantities of sewage, seawater & riverwater/lakewater•Very common•Health & Safety considerations

When water damages occur they can go through five stages if not treated properly and quickly.



HEALTH & SAFETY

Health and safety evaluations should be performed for each water loss. In general, individuals who may come in contact with water damaged materials should have current tetanus shots and protect hands, eyes and mouth using personal protective equipment. Biocide chemicals used to kill microorganisms can be potentially harmful to humans and can cause respiratory injury. Instructions for application and dilutions of antimicrobial agents should be carefully followed.

DRYING TYPES

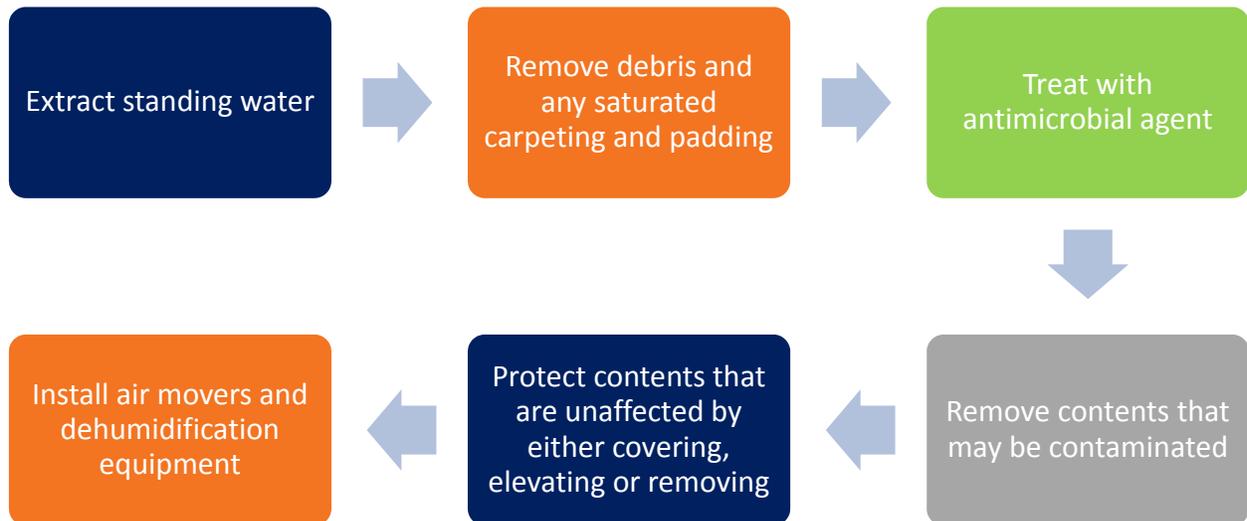
Rapid response and proper restoration will help restore the structure and contents and minimize the need for additional repairs and replacements. There are four basic principles to drying and restoring water-damaged materials back to their condition prior to the damage:

- **Water Extraction:** Removal of excess water from the damaged surfaces using wet vacuuming equipment, submersible pumps, mopping and soaking up the excess moisture.
- **Evaporation:** Once the excess water is removed the remaining moisture needs to evaporate or change from a liquid to a vapor. This can occur more quickly with air moving equipment.
- **Dehumidification:** Once the moisture from the structure and content materials have evaporated into the air, it must be removed by dehumidification. Dehumidification is the process of removing moisture from the air.
- **Temperature Control:** This is important because both evaporation and dehumidification are enhanced by controlling the temperature in the affected area; plus microorganism growth is temperature related.



THE RESTORATION

In order to minimize the damage that has already occurred, basic emergency services steps must be taken:



WHAT CAN YOU DO?

If there is any advance notice of potential water damage, all possible protective measures should be taken such as covering items with plastic, raising furniture and protecting electronics. Additionally, consider permanent storage of certain valuable items (rare books, historical newspapers or long term archival documents) in buffered, acid free storage boxes.

- If you have experienced water damage you can begin to mitigate the loss by:
- Keeping the indoor temperature below 70° if safe
- Turn off electricity to affected areas
- If you cannot stop the flow of water, contact a plumber
- Freeze paper items to stop deterioration

It is important to have a plan in place for a disaster. It is highly recommended that you pre-contract with a restoration company before a loss occurs. This gets any administrative “red tape” out of the way, expedites response times and allows you to carefully pre-qualify the service for your exact needs. BMS CAT offers a Response Service Agreement at no cost.



PUTTING THE PIECES BACK TOGETHER RECONSTRUCTION AFTER DISASTER

A BMS CAT WHITE PAPER

PUTTING THE PIECES BACK TOGETHER - RECONSTRUCTION AFTER DISASTER



SUMMARY

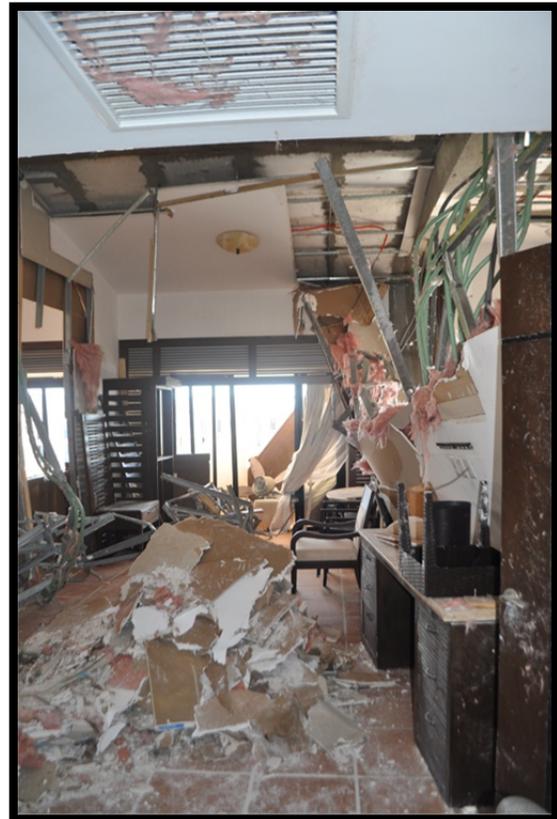
At BMS CAT, we respond to all types of disasters: fire, water, microbial and storm. Sometimes the damage is contained to the contents of a facility and a few structural pieces. Often, however, significant structural damage has occurred as a result of the



damage. Once the “restoration” phase of the project has completed, the facility may still not be back to normal. This is when reconstruction comes into play. According to Wikipedia, the term “reconstruction” means “returning a damaged building to a known earlier state by the introduction of new materials.”

WHY DOES IT MATTER?

Once building materials have been introduced to foreign matter, such as water, soot or other debris, it will begin to deteriorate and may continue to deteriorate if appropriate action is not taken. The restoration phase of the clean-up may require removal of certain portions of the structure such as drywall, windows, flooring and other damaged materials. Once those materials have been removed, in a process called “controlled demolition,” a facility is left without many key components. Can you imagine going to a hotel without any walls? Or a hospital without any windows?



CONSIDERATIONS

Business Interruption is a major consideration after a facility has been damaged. For most organizations, if their facility is inoperable, revenue and production are lost. When

a project is large enough to include reconstruction, time is of the essence. It is important to note that reconstruction and construction are two very different things.

Construction

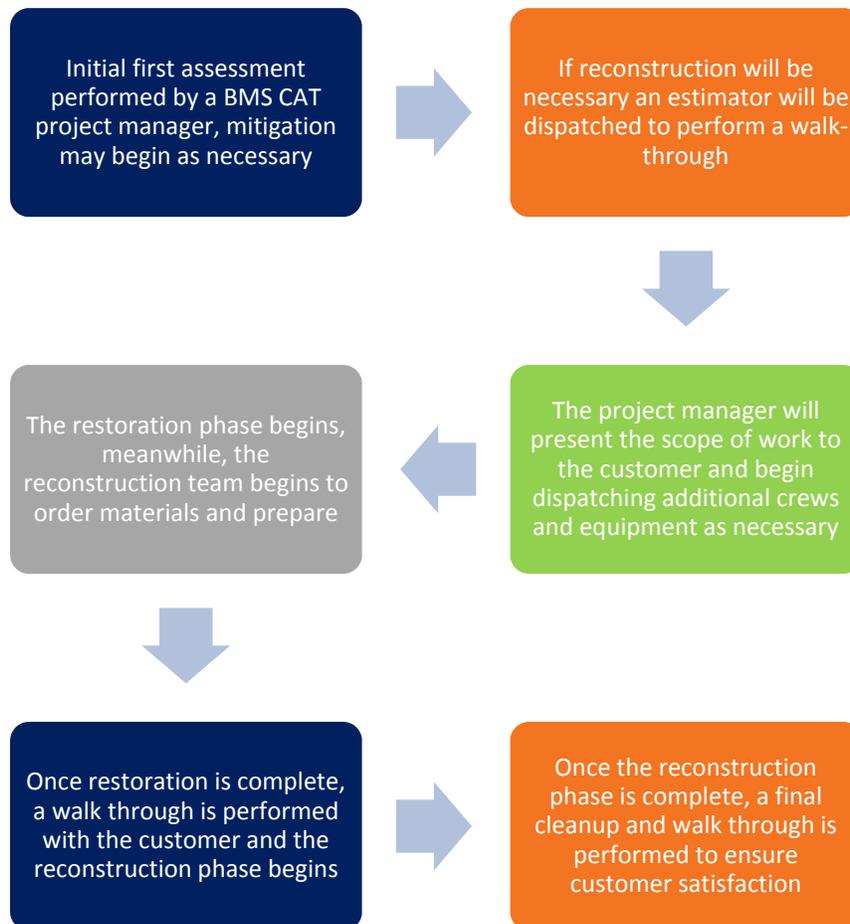
- A contractor has a plan in place with a timeframe established well in advance
- An entire facility is being constructed therefore all materials (in mass quantity) can be pre-ordered
- New construction typically begins with a foundation and a plan is followed
- A contractor can carefully plan labor to maximize effectiveness, using a plumber in multiple areas on multiple projects in one period of time
- Specific items can be pre-ordered to allow for manufacturing, avoiding rush charges

Reconstruction

- The project is unexpected and results from a disaster
- The contractor must order materials quickly and in smaller quantities
- Reconstruction must begin with controlled demolition and will work around undamaged areas of the facility
- Speciality contractors are called in as needed and may only be needed for a portion of the time
- When facilities have items, such as speciality carpeting, the contractor must rush order materials in smaller quantities

With all these considerations in place, how should one approach a reconstruction project? The project may differ and several things will affect a reconstruction project. Following an area wide disaster considerations include: infrastructure failure, delayed permitting, access to facility, resource availability and other limiting factors, such as curfews. When BMS CAT performs a restoration project that includes reconstruction, the project typically goes as follows:





It is important that the customer is part of each step. At BMS CAT, we prefer that the customer representative meet with the project manager on a regular basis, often daily.

HEALTH & SAFETY

Health and safety evaluations should be performed for each loss. In general, individuals who may come in contact with water damaged materials should have current tetanus shots and protect hands, eyes and mouth using personal protective equipment. When reconstruction is occurring, additional health and safety plans may be necessary to protect occupants of the facility.

WHAT CAN YOU DO?

It is important to have a plan in place for a disaster. It is highly recommended that you pre-contract with a restoration company before a loss occurs. This gets any administrative “red tape” out of the way, expedites response times and allows you to carefully pre-qualify the service for your exact needs. BMS CAT offers a Response Service Agreement at no cost.



CONFIDENTIAL



**DOCUMENT DESTRUCTION SERVICES
FOR WET OR DRY PAPER MEDIA**

A BMS CAT WHITE PAPER

SECURE DOCUMENT DESTRUCTION SERVICES for WET OR CONTAMINATED PAPER MEDIA



Secure document destruction is imperative to ensure the safety and security of an entity's information. Breach of protocol can be catastrophic to both the entity and its business associates. Secure destruction of documents must be done accurately, thoroughly and a verifiable chain of custody is required.

SECURE DESTRUCTION IS COMPLICATED BY WET, MOLDY OR CONTAMINATED DOCUMENTS

While secure document destruction must be performed with acute accuracy, protocol becomes complicated when documents have become wet and mold growth has occurred. When paper becomes wet or damp, it often completes the equation to produce mold; moisture + warmth + food. In this case, the food is paper. The presence of mold will create an unsafe environment for those handling the documents. Even if records were once wet but have dried, mold can exist. Employees that are handling the documents or trying to shred them can be exposed to airborne mold spores.

The onset of mold is of major concern in the secure destruction industry. Some people will have an allergic reaction. Some molds can be toxic. Workers should wear masks or respirators and disposable gloves when working with records containing mold (and have the proper training required by OSHA). There is tremendous litigation over mold in the workplace. An employer has a legal responsibility to forewarn employees of the dangers of being exposed to mold, to train the workers on how to work with mold and to provide the appropriate personal protective equipment (PPE).

Many document destruction companies will NOT accept wet, moldy or contaminated documents. This is what we specialize in!

BMS CAT will come to your site, inventory and remove contaminated and wet documents for you! We will provide a detailed inventory list. Our proprietary web based inventory system will keep you compliant with the latest industry regulations such as HIPAA, FACTA, HITECH, GRAHM-LEACH-BLILEY, State and Federal regulations.

DESTRUCTION TECHNIQUES

The Federal regulatory compliance laws define the acceptable methods of destruction as shredding, pulverizing or incineration. The US Federal Government for a definition. Federal Standards & The Department of Defense document "NISPOM 2-28-2006" defines secure as follows:

"The method of destruction must preclude recognition or reconstruction of the classified information or material."

In this paper, we will be highlighting the three methods of destruction based on the document destruction requirements. Less reputable destruction vendors may issue a certificate of destruction without being knowledgeable of the various required processes. When that occurs, where does the risk lie for the documents that may not be entirely destroyed?

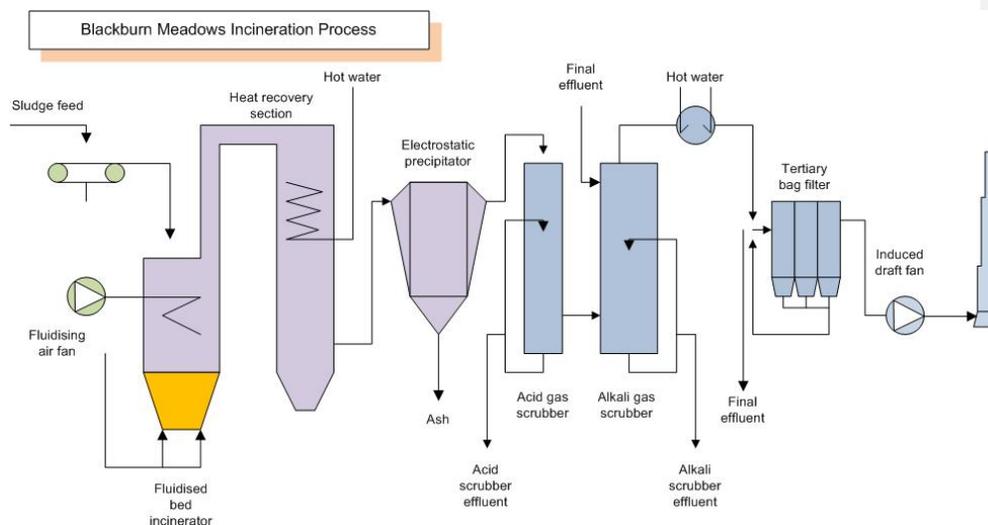
1. Incineration:

The photo below shows a typical incineration plant.



The image below shows a typical incineration process. The process will vary but the area of concern, is the initial burn area below the feed. Here, not everything will burn 100%. There may be some “dropout” of unburned material that may be sent to a landfill

Why should dropout be a concern? What if some of the unburned documents are literally blown away at the landfill? Or an employee of the



incinerator or landfill could read the documents and then give the documents to the news media or commit identity theft?

One risk management solution to unburned documents is to add to the specifications of secure destruction that “any unburned documents shall be recycled through the incineration process again! The second portion of this solution is to require a witness at the ash pit. The two items together can make incineration truly secure. A third party witness would also be more objective.

What we have not talked about is attempting to incinerate wet and/or frozen documents. Obviously, that makes matters many times harder. Experience has shown that even hand feeding small batches at a time is not very effective. If incineration has to be used, plan on the extra effort and costs to monitor and recycle unburned documents back into the incinerator. For very sensitive data it is best to pay for third party witnesses.

2. FIRST STEP-SECURE SHREDDING OF PAPER

This is the first stop on the road for paper to be pulverized. Documents are securely received, shredded, baled and then sent to a paper mill for recycling/pulverizing.

The photo below is the intake conveyor to the shredder. The yellow portion is the filling hopper.



This picture is a conveyor belt not shred blades, the first set of blades that will rip the documents into shreds. There are multiple sets of blades that will shred the documents until an acceptable particle size is achieved.



The photo below is the discharge side of the shredder. The paper would then go up a conveyor and exit the secure shred room.



The photo below shows the shredded documents being compressed and baled for shipping.



The photo below is that of a shredded bale of documents. This is would be put on a secure truck and sent to a paper mill to be recycled.



The photo below is an auger that would feed the paper or wood chips into the digester.

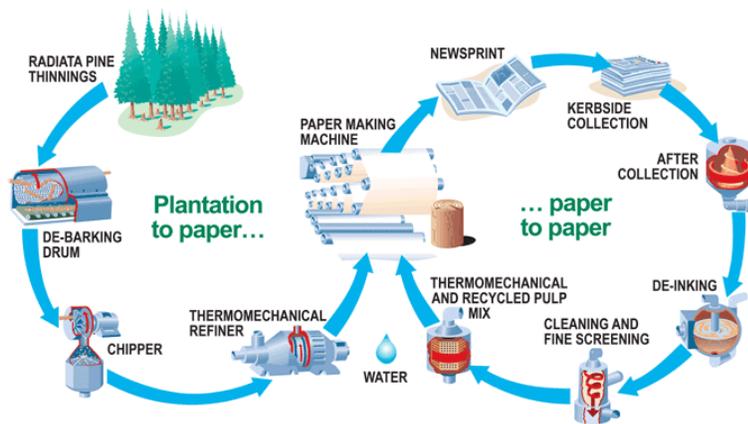


The photos below shows the digester and a mix of chips/cardboard to be fed into the digester.



3. PAPER RECYCLING or PULVERIZING:

Paper pulverizing is accomplished when paper is mixed with wood chips or just other paper. The process turns everything into thick slurry called paper pulp. From the security standpoint, the digester accomplishes the task of meeting the definition of secure destruction: “The method of destruction must preclude recognition or reconstruction of the classified information or material.”



BMS CAT provides secure document destruction services that will meet many current industry standards. The following are our minimum standards:

- All BMS employees are trained to comply with the federal information protection laws.
- All employees have had a criminal background check, drug and alcohol screening and annual random re-verification.
- All areas are fenced in, locked and alarmed.
- Access to the shredding area is by controlled key access.
- The shredding area can contain an entire truckload off loaded in a fenced in area protected from the rest of the building.
 - In this secure receiving area the shipment is received and verified.
 - The load is fed into the shredder in this area.
 - Video surveillance cameras are recording the entire shredding process.
 - Upon completion of the shredding the shredded material is baled and placed onto a trailer.
 - The trailer is locked with a security seal.
 - The trailer containing the securely shredded paper is transported directly to a paper mill to be placed into a vat to be converted into paper pulp to be recycled. There is no waste from this process.
- Witness certification can be provided upon request.
- Certification of Secure Destruction will be provided including some or all of the following information:
 - License number of the trailer delivering the documents.
 - Seal number on the trailer.
 - Name of the person cutting the seal and who their employer is.
 - Name and date of the inventory manifest provided.
 - The number of boxes and or pallets.
 - Weight is optional but it does not track back to an inventory.
 - Signature on the receiving manifest by the shredding facility.

- Chain of Custody: Chain of custody verification is accomplished with the Certificate of Destruction identifying the transport and receipt of the documents as outlined above.

FEDERAL STANDARDS Department of Defense NISPOM 2-28-2006

- BMS CAT secure document destruction via shredding and pulping meets the Federal Standards for SECRET AND TOP SECRET level documents. The key in this area is that a cleared person must witness the destruction. Otherwise the standard BMS CAT process will qualify.
- The standard states “The method of destruction must preclude recognition or reconstruction of the classified information or material.”
- Therefore, the shredding is a preparation process for pulping.

**We help the GSA and the Government Go Green and
Achieve Sustainable Goals with our recycling processes!**



Comment [MRocco1]: I recommend that we have this sentence in the larger font, bold, underlined and in GREEN.