

WHITE PAPER

# STORING BIOLOGICAL EVIDENCE FOR THE LONG HAUL

Planning Guidelines for Long-Term  
Evidence Storage

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*Preserving and readily retrieving biological evidence from adjudicated and unsolved cases has benefits for all members of the criminal justice system. As the identification power of DNA evidence is recognized, it is clear that crime-solving potential resides latent in biological evidence from crime scenes.*



—The Biological Evidence Preservation Handbook: Best Practices for Evidence Handlers

It is clear that preserving biological evidence has become more important today than it was ever before due to advances in DNA testing. Biological evidence can make or break any case, but there are several significant challenges to properly storing any type of biological evidence for a lengthy or indefinite amount of time.

Challenges include determining the appropriate temperature each item of biological evidence needs in order to maintain integrity, purchasing and operating appropriate refrigeration units/spaces to house evidence long term, and finding adequate storage space for larger items that will not require off-site storage facilities or result in the need for costly additions to the property and evidence room.

The good news is that the above issues with storing biological evidence for the long haul can actually be overcome through the use of specialized storage products and appropriate storage planning.

## TEMPERATURE-CONTROLLED STORAGE FOR BIOLOGICAL EVIDENCE

Storing biological evidence for any length of time can be an obstacle for evidence custodians because it is perishable in the wrong climates. How long biological evidence needs to be stored can range from a few months to an indefinite amount of time and this increases the difficulty of preserving that evidence for future testing. The length of time an item of biological evidence will need to be housed will depend on the type of crime and the stage of investigation.<sup>i</sup>

There are four stages to any investigation:

- Open (i.e., no suspect, but investigation continuing)
- Charges Filed (i.e., suspects charged and court proceedings active)
- Adjudicated (i.e., conviction, dismissal, or acquittal)
- Unfounded/Refused/Denied/No Further Investigation

Standard practice for open cases is to retain the evidence for as long as the statute of limitations for the crime, unless it is an open homicide investigation, then it needs to be stored indefinitely. Once charges are filed, the length of time the biological evidence must be stored is altered slightly.

Here is a reference chart outlining biological evidence retention guidelines throughout the lifecycle of a crime.

i. Technical Working Group on Biological Evidence Preservation. *The Biological Evidence Preservation Handbook: Best Practices for Evidence Handlers*. National Institute of Standards and Technology and the National Institute of Justice. U.S. Department of Commerce. April 2013.

ii. Mayo, Kristi. Preserving Biological Evidence: Technical Working Group Prepares to Release a Handbook Outlining Best Practices for Evidence Handlers. *Evidence Technology Magazine*. March – April 2013.

iii. Latta, Lt. Joseph T. and Chief Gordon A. Bowers. *Property and Evidence By the Book*. 2nd edition. 2011.

## SUMMARY OF BIOLOGICAL EVIDENCE RETENTION GUIDELINES FOR CRIME CATEGORIES

| Crime Categories (NIBRS)                        | CASE STATUS  |                             |  |   |
|---|--|-----------------------------|--|---|
|   | Open   | Charges Filed               | Adjudicated  | Unfounded/Refused/Denied/No Further Investigation |
| Homicide Offenses                               | Retain Indefinitely  | Retain Indefinitely         | At a minimum, retain for the length of incarceration | Dispose of upon receipt of authorization          |
| Sexual Offenses                                 | At a minimum retain for the length of the statute of limitations | Retain pending adjudication | At a minimum, retain for the length of incarceration | Dispose of upon receipt of authorization          |
| Assault Offenses, Kidnapping/Abduction, Robbery |  |                             |  |   |
| All Other Group A & B Offenses                  |  |                             | Dispose of upon receipt of authorization             |   |

Many law enforcement agencies have been freezing everything that comes through their facility in order to preserve it, but freezing may actually be detrimental to certain elements.<sup>ii</sup> Biological evidence should be stored in one of the following conditions, depending on the type of evidence, and sometimes depending on the type of analysis that will be conducted:<sup>iii</sup>

- Frozen: temperature is maintained thermostatically at or below  $-10^{\circ}\text{C}$  ( $14^{\circ}\text{F}$ )
- Refrigerated: temperature is maintained thermostatically between  $2^{\circ}\text{C}$  and  $8^{\circ}\text{C}$  ( $36^{\circ}\text{F}$  and  $46^{\circ}\text{F}$ ) with less than 25% humidity

- Temperature controlled: temperature is maintained thermostatically between  $15.5^{\circ}\text{C}$  and  $24^{\circ}\text{C}$  ( $60^{\circ}\text{F}$  to  $75^{\circ}\text{F}$ ) with less than 60 % humidity
- Room temperature: temperature is equal to the ambient temperature of its surroundings; storage area may lack temperature and humidity control method.

With advances in research experience in preserving biological evidence, it has become clear that some types do not need to be frozen. Storing evidence in the appropriate climate not only helps preserve it longer, but may reduce energy and operational costs associated with refrigerators and freezers.

The National Institute of Standards and Technology (NIST) and the National Institute of Justice (NIJ) has provided the following chart detailing the appropriate environments for long-term biological evidence types; however, as a precaution, always defer to your crime laboratory's policy.

**LONG TERM STORAGE CONDITIONS MATRIX**

| TYPE OF EVIDENCE                | FROZEN        | REFRIGERATED        | TEMPERATURE CONTROLLED | ROOM TEMPERATURE |
|---------------------------------|---------------|---------------------|------------------------|------------------|
| Liquid Blood                    | Never         | Best                |                        |                  |
| Urine                           | Best          |                     |                        |                  |
| Dry Biological Stained Items    |               |                     | Best                   |                  |
| Bones                           |               |                     | Best                   |                  |
| Hair                            |               |                     | Best                   | Acceptable       |
| Swabs with Biological Materials |               |                     | Best (Dried)           |                  |
| Vaginal Smears                  |               |                     | Best                   |                  |
| Feces                           | Best          |                     |                        |                  |
| Buccal Swabs                    |               |                     | Best                   |                  |
| DNA Extracts                    | Best (Liquid) | Acceptable (Liquid) | Acceptable (Dried)     |                  |

In situations where evidence needs to be frozen or refrigerated for an indefinite amount of time, like in the case of DNA extracts or liquid blood, finding a storage solution that maximizes storage capacity is key to controlling energy and operational costs associated.

## MAXIMIZING CAPACITY OF REFRIGERATED LONG-TERM EVIDENCE STORAGE

Figures A, B, C and D are the types of refrigerators and freezers typically found in most law enforcement agencies.

Depending on the amount of biological evidence that passes through the evidence and property room, the amount of space that needs to be allocated to this type of storage will vary. A residential refrigerator may end up being sufficient to house the amount of evidence. However, if more than one residential refrigerator is needed, alternative methods of storage should be examined.

Commercial refrigeration units can store more than a standard residential unit, but they are large, ranging from 4' to 8' wide and anywhere from 30" to 36" deep. Each unit can cost thousands of dollars.



A  
Labeled residential refrigerator/freezer



B  
Commercial refrigeration units



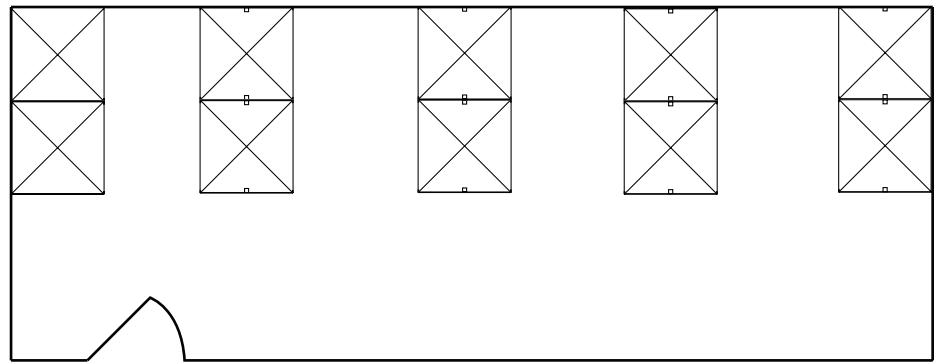
C  
Refrigerated evidence storage cabinet



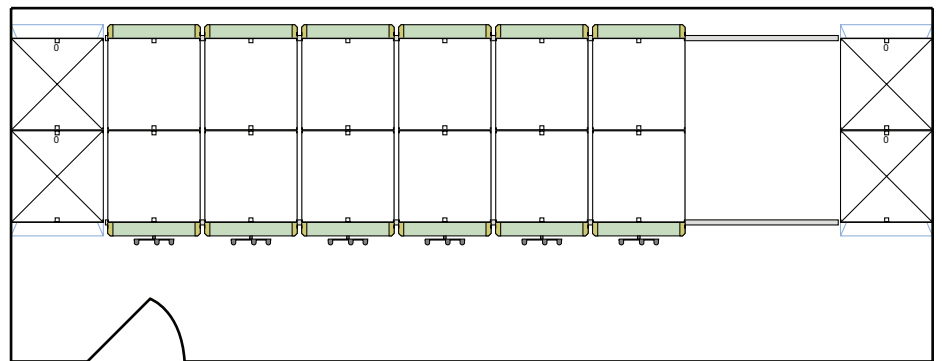
D  
Commercial walk-in refrigeration unit

Walk-in Refrigerators and Freezers are another alternative. This type of storage system is typically lined with stainless steel racking or shelving. Depending on the size of the walk in cooler, the opportunity to maximize space through the use of high-density mobile shelving should not be overlooked.

Below is a sample layout of a walk-in refrigerator or freezer, that measures 10' X 30' and is lined with stainless steel shelving.



Now look at the room outfitted with high-density mobile racking. You can see that there is no longer any wasted space and the capacity of the cold storage room has been increased.



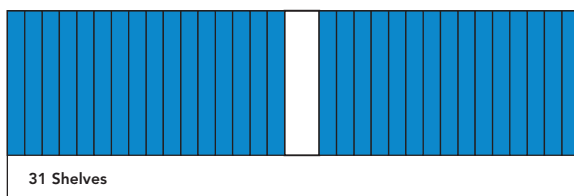
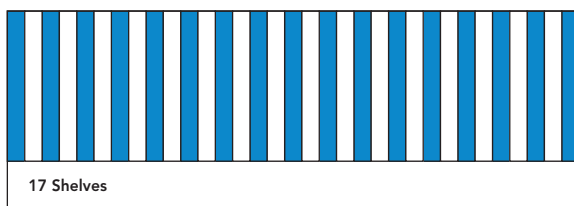
If additional storage capacity is not needed, the size of the walk in refrigerator or freezer could actually be decreased, reducing energy costs. This would require storage planning prior to the purchase and installation refrigerator or freezer room.

High-density mobile racking systems like ActivRAC are often the most economical solution for a freezer or cooler storage room. The systems are rated to -4° Fahrenheit. Special stainless steel carriages and rails can also be installed in climates below -4° if necessary.



In this example, high-density mobile carriages were installed with stainless steel racking to store blood samples.

This same principle carries over into climate-controlled or room-temperature storage rooms. A long-term evidence storage room might have 17 sections of shelves and 16 separate aisles. If high-density mobile storage is installed in the same room, all but one of the aisle spaces will be eliminated, doubling the storage capacity in the same space.



## STRATEGIES TO ACCOMMODATE LARGE ITEMS FOR THE LONG TERM

Many items containing biological evidence can be large or bulky. Some common examples would be soft furnishings (couches and beds), carpet, pieces of drywall, and even vehicles. Most often, samples will be taken off of the larger item and stored separately. This graphic depicts that process.i



Couch from crime scene with potential biological evidence



Cutout of couch material



Collection of biological material

If items containing the biological evidence are well documented with photographs or detailed files, and the samples have been stored safely, it may not be necessary to retain the actual item (couch, rug, wall, etc...). However, there may be instances where the larger piece needs to be stored for the life of the case. If this is the situation, it may take up an excessive amount of space in the property or evidence storage room.

Through the use of an industrial mobile racking system, large items can easily be stored indefinitely in a reasonable amount

of space. The ActivRAC mobile carriage and rail system enables existing industrial shelves and warehouse racks to move side-to-side, eliminating idle aisles and maximizing square footage, while still providing 100% accessibility. The systems have a load capacity of 7,000 lbs. to 30,000 lbs. and install on an existing concrete slab without the need for leveling or structural footings.

An example of how ActivRAC mobile racking was used to store large, bulky evidence can be found in the Houston Police Department (HPD) Property Room. The average police department may not need a system of this magnitude (Houston PD is the exception and not the rule when it comes to number of employees), but the storage principles remain the same.

The importance of DNA evidence had significantly increased the amount items the HPD needed to collect and store long term.

The project challenges identified by the HPD were:

- Safeguard the integrity of evidence
- Accommodate up to one million different items with unique space needs from drugs and jewelry to bicycles, car bumpers and washing machines
- Easily and efficiently store, locate and retrieve any evidence item
- Optimize the capacity given unique building angles

HPD's property room is hailed as a technically advanced, highly functional building that meets the need to maintain the integrity of evidence through proper security, climate control, and a highly efficient approach to storage.

With the use of ActivRAC mobilized storage systems, HPD was able to reduce the building envelope by as much as 30 percent, saving significant construction costs without sacrificing storage space.

At the opening of the facility, Mayor Bill White said the property room is a major asset for the city and its citizens and stated, "This property room is an indispensable part of the criminal justice system designed to keep our city safe."



*The criminal justice system relies on biological evidence when determining innocence and guilt, and proper evidence management plays a critical role in ensuring that justice is ultimately served.*

— Melissa Taylor, Management and Program Analyst - NIST's Law Enforcement Standards Office

## CONCLUSION

Many business and institutions must deal with an ever-increasing amount “stuff” and an ever-decreasing amount of space and budget, but most “stuff” lacks the life-changing potential associated with biological evidence. Properly preserving these items is of the utmost importance if justice is to be served or innocence proven.

From the facts presented in this paper, it is evident that both the storage unit and the storage layout can make a large impact on the ability to effectively house biological evidence long-term.

Preserving and storing biological evidence for the long haul can be challenging, but through appropriate uses of space and the correct selection of storage products, the integrity of the evidence truly can be maintained indefinitely.

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## ABOUT THE AUTHOR

Julie Weber is a LEED GA with over ten years of experience in the architecture, design and furnishings industry. She is an active member of Architecture for Humanity (AFH) - Milwaukee, the Wisconsin Green Building Alliance (WGBA) and the American Society of Interior Design (ASID) Wisconsin Chapter.

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