

Section 10: Laboratory Procedures

10.1: Laboratory Processing Scope

The Curatorial Facility for Artifact Research (CFAR) maintains a laboratory for the purposes of processing, analyzing, and storing artifacts from the held-in-trust collections managed by the Texas Historical Commission (THC). Per Section 1. Subsection 1.1: Statement of Purpose, page 4, the laboratory is designed for processing artifacts and collections resulting from permitted and non-permitted investigations associated with HSD's historic sites, pursuant to Texas Government Code §§442.007(d)(7) and Texas Natural Resources Code §§191.091-092. The procedures outlined below adhere to all state and federal codes applicable to managing archeological collections.

The Laboratory Procedures are intended to serve as guidelines on how to process and curate all archaeological collections under the stewardship of the THC.

10.2: Laboratory Processing Materials

Materials for Object Handling

- nitrile gloves
- cotton gloves
- lab trays (plastic or stainless steel)
- ethafoam for lining trays and object support
- acid-free tissue paper (buffered and unbuffered)
- acid-free archival boxes and trays and lids
- magnifying glass and / or loupes
- UV-filtered light source
- acid-free copy paper

Materials for Object Processing

- archival quality pen
- #2 pencil
- bag tags
- B-72
- acetone
- labeling brushes
- N95 face mask
- cleaning brushes
- strainer
- 4-mil polyethylene bags
- acid-free archival boxes and lids

Materials for Labeling

Direct Labeling Supplies	Indirect Labeling Supplies
Acryloid B-72	Tyvek®
Acetone	Acid-free card stock
Labeling brush	Japanese Paper
Pigma Micron pens (various sized tips)	Cotton twill tape, washed
Acid-free 100% cotton paper	100% cotton string, undyed
	Teflon monofilament
	Nylon monofilament with polyethylene tubing

Table A.

10.3: Laboratory Safety Procedures

The list of general safety guidelines below are to be followed when handling any collection object, housed at CFAR. All individuals accessing collections, including staff, volunteers, researchers, and conservators, are expected to follow these guidelines. It is important to use both the proper handling techniques and the appropriate materials when working with collection objects.

- There is no food or drink of any kind allowed in the Research Room or otherwise near collection materials. Food and beverages can only be consumed in designated areas.
- Open toed shoes are not allowed in the laboratory, only closed toed shoes are allowed. The lab holds broken glass, rusty nails, scalpels and razor blades, chemicals, and dirt / soil. Ensure the shoes have non-slip soles and good tread for traction.
- Remove all jewelry from hands, long necklaces, watches, or loose clothing that might catch on artifacts you are handling. If you have long nails, be aware that many artifacts have soft surfaces that will easily scratch or tear.
- You must wear gloves at all times when handling objects / artifacts. Depending on the material type of object your will be handling you will use either Nitrile or lint-free cotton gloves.
- Do not handle artifacts unnecessarily. It is during handling and transport that objects are most likely to be compromised or damaged.
- Place all boxes and / or bags down on a table or similar secure workspace before opening to investigate contents.
- Be careful when searching through artifact boxes or archived files. There are bagged objects that are weak and / or broken that may be further damaged when handling the box.
- Carefully remove the bags within boxes one at a time and place on designated trays. These trays should be padded as needed.
- When transporting objects, boxes, or trays, clear a space for the destination prior to moving.
- Only move one artifact / object at a time and use both hands. Artifacts are only to be lifted from the bottom / base: NOT edges, rims or handles.
- Do not move artifacts over “free space.” Handle artifacts over tabletops, stable trays or secured platforms. When moving artifacts across distances or rooms you must use a cart with appropriate containers & supports.
- Archaeological objects are unstable and in state of decay as soon as they are excavated. Always visually inspect the artifacts prior to handling to identify weak points, fatigued or worn areas, stress fractures, corrosion products that might dislodge, composite objects that might be

separating from parent material, broken or sharp edges, etc. Assume that all artifacts / objects have stability issues and familiarize yourself with them before you attempt to handle the artifact. Consider the artifact's weight, broken elements, center of gravity, and any loose parts.

- NEVER separate artifacts from their accompanying tags or other information. Always keep them together in the same box, on the same lab tray and / or in the same bag.
- NEVER handle potentially live ammunition that may be found in the collections. If you are unsure as to the state of what may be an intact round, ask for staff assistance immediately. Do NOT attempt to separate the bullet from the cartridge case.
- In the event that an object becomes compromised, and material separates from the parent object, no matter how small or fragmentary, do NOT discard the resulting material(s). Keep them associated with the parent object until staff is notified and can collect it for documentation and re-insertion into the collection.

10.2a Repository Chemical Hygiene Plan

The CFAR laboratory mixes, handles, and applies chemical substances in their laboratory procedures. Chemicals pose a significant health risk to user safety and must be considered with the utmost concern. When handling chemicals, every precaution and safety procedures must be followed to minimize risk and ensure safety.

Safety Data Sheets (SDSs) for all chemicals are located in the laboratory in the compliance center (mounted on the wall across from the sink). When handling any chemical, always refer to the SDS and follow the use guidelines outlined for the specific chemical(s) you are using, as well as proper disposal of the chemical(s).

General Handling Guidelines:

- Notify another staff member when chemicals are in use.
- Only mix chemicals within the chemical sink.
- Ensure proper ventilation from the vent hood is on and in use.
- Wear a N95 mask or respirator (depending on chemical type).
- Wear safety goggles.
- Wear nitrile gloves.

Disposal Guidelines:

- Only pour chemicals and solutions in the chemical sink, unless otherwise directed by the Safety Data Sheets.
- Thoroughly rise and wash all containers and tools with hot water and soap that encountered a chemical and let them air dry on the drying rack above the sink.
- Remove nitrile gloves without touching their exterior and dispose of them in the trash.

Storage:

All chemicals (e.g., B-72 pellets, acetone) must be sealed, labeled, and stored in the chemical storage cabinets under the vent hood. All acids must be stored in the cabinet marked "ACID STORAGE."

Chemical Spills or Splashes

In the event of a chemical spill immediately notify a staff member and proceed to clean the splash appropriately following the Safety Data Sheet protocol. If a chemical splash occurs and comes into contact with your person, immediately remove your clothing and shower yourself in the laboratory shower, located to the right of the chemical sink. Pull directly down on the hanging handle to release water. If a chemical splash occurs and enters your eyes, immediately wash out both of your eyes in the eye washing sink, to the right of the chemical sink, for at least 20 seconds.

How to Make a Stable B-72 Solution:

The CFAR maintains already made B-72 solution, mixed by the Archaeological Collections Manager. Use this solution before attempting to mix a new solution. If a B-72 solution has not been already mixed, and the Archaeological Collections Manager is unable to do so themselves, follow these instructions for creating a stable B-72 solution. When labeling artifacts:

- Ensure the ventilation hood is on and wear a N95 mask.
- Measure 1 to 4 parts of B-72 pellets to acetone
 - For example, 25 grams of B-72 pellets to 100ml of acetone
 - Ensure a 20-25% solution ratio
- Mix the measurements of B-72 pellets and acetone in a beaker over the chemical sink with a glass rod.
- If the B-72 solution is too thin, add additional B-72 pellets to the solution. If the B-72 is too thick or bubbling, add additional acetone to thin it.
- Store within a sealed jar, preferably with an internal brush to use for labeling.
- Label the solution

When using B-72 solution for purposes other than labeling, such as repair or conservation, different ratios of B-72 pellets to acetone will be used and different processes may be applied. When repairing or conserving:

- Ensure the ventilation hood is on and wear a N95 mask.
- Measure 1 to 10 parts of B-72 pellets to acetone
 - For example, 50 grams of B-72 pellets to 100ml of acetone
 - Ensure a 10-15% solution ratio
- Place the B-72 pellets in a mesh cloth and tie it closed
- Place the closed mesh bag of B-72 pellets in the measured acetone
- The B-72 pellets will slowly dissolve into the acetone, and create an even solution
- Store within a sealed jar, preferably with an internal brush to use for labeling.
- Label the solution

10.4: Object Cataloguing Procedures

For the purposes of gathering information from and managing the archeological collections at the HSD repository, cataloguing includes documenting all pertinent information about the artifacts in a collection and, if possible, is accomplished immediately after accessioning. Use the Artifact Categories and Sub-Categories in the Appendix to determine object material. All of the following data are recorded on a *Catalog Record Worksheet* form (See Appendix A) located in the Appendix. Initial cataloguing information includes, but is not limited to:

- Site number (trinomial)
- Context number
- Artifact number (permit number, lot number)
- Site name
- Project name
- Project number
- X Coordinate (unit associated with the lot)
- Y Coordinate (level associated with the lot)
- Z Coordinate (elevation/depth associated with the lot)
- Count
- Artifact material (See Artifact Categories and Sub-Categories in Appendix)
- Class (if identified)
- Object description
- Laboratory location
- Cataloguer's name
- Date of cataloguing

Contract archaeological collections should be transferred to the THC with assigned lot numbers. The repository assigns unique lot numbers as necessary. These lots generally represent discrete provenience units. Lot numbers specific to certain collections may have been originally generated in the field by Principal Investigators during excavations at a site.

All catalog information, including object count(s), object description(s), object provenience data, date of object recovery, and the Principal Investigator's information should all have been recorded on a *Specimen Inventory* worksheet (see Appendix B) original at the point of the submission to the THC. If a *Specimen Inventory* does not exist for any collection at the time of processing, a *Specimen Inventory* should be completed by repository staff. Specimen inventories are specific to the items recovered from a single site during one project.

10.4a Assigning Numbers to Artifacts and Artifact Groups with Collections

The numbering of individual artifacts in the archeological collections will be based on the accession number of the artifact and the artifact's provenience information. Artifacts will receive a trinomial identifier with each number separated by a period. The first number will be the accession number given to the collection by the curator or registrar (this will typically be the permit number for the excavation the object came from). The second number will be the lot number that the artifact belonged to, and the third number will be the number of that object within the lot. The third number should be added sequentially to all artifacts in the lot. To catalog archeology collections, individual catalog numbers must:

- be from the same permit accession
- be from the same provenience (to the smallest level)
- be of the same material (or composite materials)
- have the same object name

How to Divide Object Materials by Lot

- Within provenience, split objects into groups by object material. You cannot mix different materials in the same lot unless the objects are classified as composites.
- Further divide lots by the specific material type that falls within a broader material category.
 - For example, do not catalog chert, jasper, and obsidian projectile points from the same provenience as one lot, if at all possible. Although these materials are all stone, make separate lots for each specific material type. It is especially important to separate material types that the archeologist considers to be diagnostic.
- You can use the object name to further separate lots from the same provenience or made from the same material.
 - For example, you can make separate lots by classifying objects as rim sherds and body sherds. Object names can be general, such as chipped stone, or specific, such as projectile point. Use only one object name per lot. For example, do not list several projectile point types as the object name.

10.5: Object Inventory Procedures

A baseline inventory should be conducted whenever a collection or object is accessioned. This inventory is comprised of the categories represented in the collection, quantities, and linear feet of documentation as appropriate. If an accessions inventory was not taken at the time of accessioning the collections, such as some Legacy collections, or you are in the process of accessioning and processing a collection now, then a baseline inventory must be conducted as soon as possible.

For Archeological Collections this should include a detailed *Specimen Inventory* form. For both House Museum and Archeological Collections, the information obtained and documented on the *Specimen Inventory* form includes:

- assigned accession numbers
- categories and counts of objects (Category level only)
- diagnostic artifacts within the accession
- Inventory of records as well as the linear feet of documentation.

All of the inventory procedures utilize a single *Inventory Record* form to document the inventory. While the form is generic, additional information specific to the type of inventory being performed is included as deemed appropriate. Following the completion of each inventory all associated collection records are updated to reflect inventory results. The following information is included on the generic *Inventory Record* (see Appendix D) form:

- accession numbers and catalog numbers
- object, artifact, sample and/or document count(s)
- object names, types, classifications and short descriptions
- permit number(s) for archeological artifacts
- condition of the object(s) and/or documents
- linear feet of associated documentation, number of individual sheets
- shelf location within the repository at time of each inventory
- condition of object(s) and/or documents
- date of inventory and name of person conducting it
- general remarks made as a result of the inventory

10.6: Object Cleaning Procedures

All stable artifacts must be cleaned unless being retained for residue analysis (Table B). Appropriate cleaning procedures depend on the type and condition of the material. Use care when cleaning an object and take precaution to maintain the provenience of the objects.

Wet-wash each artifact	May be wet-washed in bulk	Dry-brush	May be left unwashed for specialized analysis
Fired Ceramics with glaze	Shell	All metals	Stone tools (blood or pollen residue)
Glass	Brick	Wood	Ceramics (food residue)
Tabacco Pipes	FCR	Leather	Tabacco pipe stems (DNA)
Bone	Slag	Textiles	Tabacco pipe bowls (tobacco residue)
	Coal	Fragile objects	
		Unglazed ceramics	

Table B.

Bulk Wet Washing

Bulk, non-diagnostic artifacts should be washed together rather than individually washed and or brushed. Exactly what artifacts will be bulk washed will be determined by the research design of the archaeological project, the artifacts' stability, and/or the chance for future residue analysis. Only artifacts stable enough to wash with water should be bulk washed (see Table B).

- Place a silt trap in the drain of the sink before cleaning any objects.
- Gather bulk artifacts and place them into a plastic strainer within the laboratory sink.
- Run lightly pressurized water over the artifacts and move the artifacts within the strainer.
- Separate and lay artifacts out individually on a raised screen drying rack to dry completely.

Individual Wet Washing

- Place a silt trap in the drain of the sink before cleaning any objects.
- Place the object within a plastic strainer in the laboratory sink.

- Run lightly pressurized water over the artifact.
- Clean the artifact with a wet bristled brush (e.g., a soft-bristled paintbrush) until the surface is free of dirt and accretions.
- Rinse artifact thoroughly, allowing the strainer to hold the object while water runs through it.
- Once clean, set artifact on a raised screen drying rack and dry completely.
- Artifacts must be completely dry before labeling, packaging, or storing them.

Dry Brushing

- Place the artifact over an empty tray.
- Using a completely dry bristled brush, lightly brush the surface of the artifact to remove dirt and accretions.
- Empty the removed dirt and accretions from the tray in the trash.

10.7: Object Labeling Procedures

CFAR labels objects is to ensure their provenience and context remains known. Some objects will be directly labeled, others will not and must be labeled indirectly.

Directly labeled means using acryloid B-72 on the surface of an artifact to secure a label with provenience information. Acryloid B-72 is reversable. Indirectly labeled means using archival grade materials to label an artifact with string and a tag with the artifact’s provenience information. Only diagnostic artifacts and a percentage of bulk artifacts will be labeled at all.

What Objects to Directly Label

- All diagnostic artifacts one-half inch or larger should be labeled with provenience information.
- Artifacts illustrated or photographed in reports and/or publications should be labeled as such.
 - These materials should be boxed separately, if possible, and clearly labeled with the illustration number in the report for easy reference.
 - This information should be noted in the associated document inventory as well.

What Objects Not to Directly Label

- Bulk artifacts and artifacts smaller than a quarter do not need to be individually labeled but must be accompanied by a bag tag with their provenience information.
- Objects with powdery or flaking surfaces (patina), ferrous metals and objects of cloth, leather or wood should not be directly labeled.
 - These items should be packaged appropriately and contain a bag tag with their provenience information.
- Larger objects may be labeled with a cotton string tie tag of acid free card stock or Tyvek.

Directly Label	DO NOT Directly Label
Diagnostic glass	Architecture
Diagnostic ceramics	Ecology
Diagnostic lithic	Fauna
Non-ferrous metal	Ferrous metal

	Synthetic materials
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Table C.

Label (directly OR indirectly – as directed above) a 10% Sample
Plain glass body sherds
Plain ceramic body sherds
Window glass
Debitage
Bone
Shell
Fire Cracked Rock (FCR)
Brick

Table D.

Where to Directly Label Objects with B-72 Solution

Artifact Class	Location
Debitage	Middle of artifact – Ventral surface
Tools	Middle of artifact – Flake scar if possible
Points	Middle of artifact – Flake scar if possible
Fire cracked rock	Middle of artifact – flat surface
Diagnostic glass	Middle of artifact away from marks
Diagnostic/decorated historic ceramics	Middle of artifact away from marks
Undecorated historic ceramics	Middle of artifact
Native American ceramics	Middle of artifact – interior surface unless decorated
Non-ferrous metal	Middle of artifact – away from marks

Table E.

Where NOT to Directly Label Objects with B-72 Solution

- Do not label broken edges or any other broken surfaces with potential for mending
- Do not label striking platforms, point bases, and other diagnostic attributes of lithicdebitage, tools, and points
- Do not label makers marks, pontil scars, surface treatments, decoration, and other diagnostic attributes of glass or ceramic
- All labels should be visible without turning the artifact. Do not fold labels over edges or wrap them around pipe stems

What Label Information to Include on Artifacts

Please note the following requirements when labeling:

- All labels directly on an artifact must be legible and reversible
- Each artifact should be marked using acid-free paper labels, or using archival grade waterproof ink
- All labels (paper or handwritten) must be placed on top of a base coat of acryloid B-72, and completely sealed by a topcoat of acryloid B-72. DO NOT place paper or write directly on an artifact.

- If the surface of the artifact is dark and you are handwriting the label, use a white base coat of acryloid B-72, and a clear topcoat of acryloid B-72.
- Labels should include the provenience catalogue information:
 - The trinomial site number
 - The letter P, followed by the permit number
 - Lot number
 - Specimen number

The labeling system to be used is illustrated as follows:

<u>Site Number</u> _____	<u>41BO165</u>
Permit#.Lot#.Spec#	P173.0537.1

How to Directly Label Individual Artifacts:

- Clean (if necessary or applicable) the area to be labeled.
- Place a thin coat of clear reversible lacquer (e.g., Acryloid B-72) on the labeling area. If the artifact is dark in color, use white lacquer acryloid B-72 for the base coat. Multiple applications may be necessary on porous objects, such as unglazed ceramics.
- Place paper label on base coat and let the base coat dry completely. If handwriting the label, write the label information on top of the base coat using a permanent water- or pigment-based ink (e.g., India ink). Let ink dry completely.
- Apply a topcoat of clear varnish (e.g., Acryloid B72).
- Let the label dry thoroughly before packaging or storing the object.

10.8: Object Photography

CFAR follows the *National Parks Service’s Museum Handbook, Part II* guidelines and the *Museum of Fine Arts, Houston Photography Instructions* to inform our photography procedures. CFAR photographs diagnostic, conserved, and representative collection samples of objects to ensure their current and or changed state is visually recorded. Additionally, digital photographs expand access to view and share objects without physically handling them and causing further deterioration.

When to Photograph an Object

- If the object is diagnostic.
- If the object is being conserved.
- If the object represents a sample of a class of artifacts in the collection.

Supplies

- photo table
- tripod
- bounce lights
- backdrops (white, black, grey, and red)
- light box
- copy arm
- copy stand

- photo and color scale

10.8a Photography Set-up

Lightbox:

- Place the box on the photography table.
- Plug in the top light and turn it on.
- Place a white piece of paper in the lightbox.
- Place the object on top of a white piece of paper with an appropriately sized scale.

Backdrop:

- If the object is larger than the lightbox, use a backdrop and photography table.
- Choose a backdrop color that contrasts the object(s) you will be photographing.
 - White is most commonly used, but black may be more appropriate for objects such as ceramics. Place the photography table in front of the backdrops.
- Place a white piece of paper with a scale on the table and the object on top of the paper with the scale in view.

Tripod and Camera:

- Set the tripod up at a distance and height that allows the object to be captured with blank space around itself with the scale in view. The legs and angle is adjustable.
 - Keep in mind, the camera zoom may need to be adjusted depending on the different size of the objects being photographed, or the tripod itself may need to be adjusted completely.
- Do not point the camera directly at the object horizontally or from above, but at an approximate 30-degree angle from horizontal.

10.8b Image Capture

- Place the object in the chosen set-up station.
- Ensure the scale is visible but not covering any part of the object.
- Ensure the object is in the frame of the lens and there is a solid background border present around each edge of the object, including the scale.
- Ensure camera is in focus, and capture image.
- If possible, keep the camera on the tripod and move the object to the desired position for each photograph taken

At a minimum, objects must be photographed on the front and back side of their surface. If an object has more than two distinct surfaces, those must be photographed in full and in primary view as well. For rounded objects, such as a glass jar or ceramic crock, five total photographs at a minimum should be taken, one at each 90 degree turn of the object, and one of the bottom.

Objects with diagnostic qualities should be photographed in detail after overview shots have been taken. If possible, keep the camera secured to the tripod and zoom into the area in which a diagnostic quality is present to capture the photograph. If you must remove the camera from the

tripod to capture a quality image of a diagnostic trait, ensure that a scale is still present in the shot and the captured image is clear and in focus.

10.8b Image Labeling and Recording

Digital labeling of the photographs should be labeled with a photo number follow this format:

Photo number and format to be developed

Record artifact information when each photograph is taken in the Photography Log.

Necessary information includes:

- Metadata standards and what information include to be developed

All digital images and photographs should be printed 2 per page on acid-free paper and labeled with a description and their corresponding photo number.

10.8c. Where to save and store images

To be determined

10.9: Object Laboratory Packaging and Housing Procedures

Collections will be packed and stored hierarchically, in the same manner in which the materials will be inventoried and cataloged for our collections management database. Artifact storage and artifact cataloging in CFAR's collections database are based on a one catalog record/one container/one site/one owner relationship. CFAR does not mix materials from more than one site or more than one site owner in a single container.

10.9a Packaging

All packing materials must be archival quality and acid-free. Place all artifacts in polyethylene, re-closable plastic bags at least 4-mil thick. Artifacts must be grouped and bagged by provenience and separated by material type within the provenience. If the artifact collection is large, key artifact classes (example: projectile points, personal items, glass ware, minimum vessels counts, etc.), including illustrated artifacts, may be pulled from the provenience material and bagged/boxed separately. Tiny or delicate objects must be stored in archival quality, acid-free materials with appropriate padding and protection.

Bag Tags

All artifacts must have a corresponding tag inside the bags they are packaged with. Provenience information must be clearly written on the tag with archival waterproof ink or #2 pencil. The tag must be in a 2"x3" 2-mil self-sealing bag. It must include information regarding artifact provenience and the count and weight totals. The bag tag labeling system to be used is illustrated as follows:

Texas Historical Commission	
Site #: 41BO165	Levi Jordan Plantation
Lot #: 18831	Unit: 910E/990N
Level:	Subunit:
Category: Metal; Iron/Steel; Square Nail: Indeterminate	
Quantity: 2	Weight: 3.3g
Comments:	

Boxes

Use of acid-free, polypropylene boxes is required. Place all artifact bags in polypropylene boxes with lids (either standard 15" x 12.5" x 10" or half-sized 15" x 12.5" x 5"). Artifacts should be packaged by sequential lot number whenever possible, to increase accessibility for users.

Interior acid-free cardboard boxes may be used as containers and dividers if needed. Material must be organized by provenience and/or appropriately grouped by material and packed with respect to weight and fragility. All boxes must have paper labels in a plastic sleeve to identify the contents, provenience, and lot numbers. The CFAR will provide templates for the box labels.

Specialized storage containers or packaging materials may be utilized, if needed. However, use of alternative materials requires the prior approval of the Archaeological Collections Manager, due to shelf configuration and space requirements.

Each box should be accompanied by a box inventory in an appropriately sized bag (9x12 works well). No box is to weigh more than 30 pounds.

10.10 Field Laboratory Procedures

To be developed

10.11 General Conservation Laboratory Procedures

To be developed