Air Pollution Training Institute
MD 20
Environmental Research Center
Research Triangle Park, NC 27711

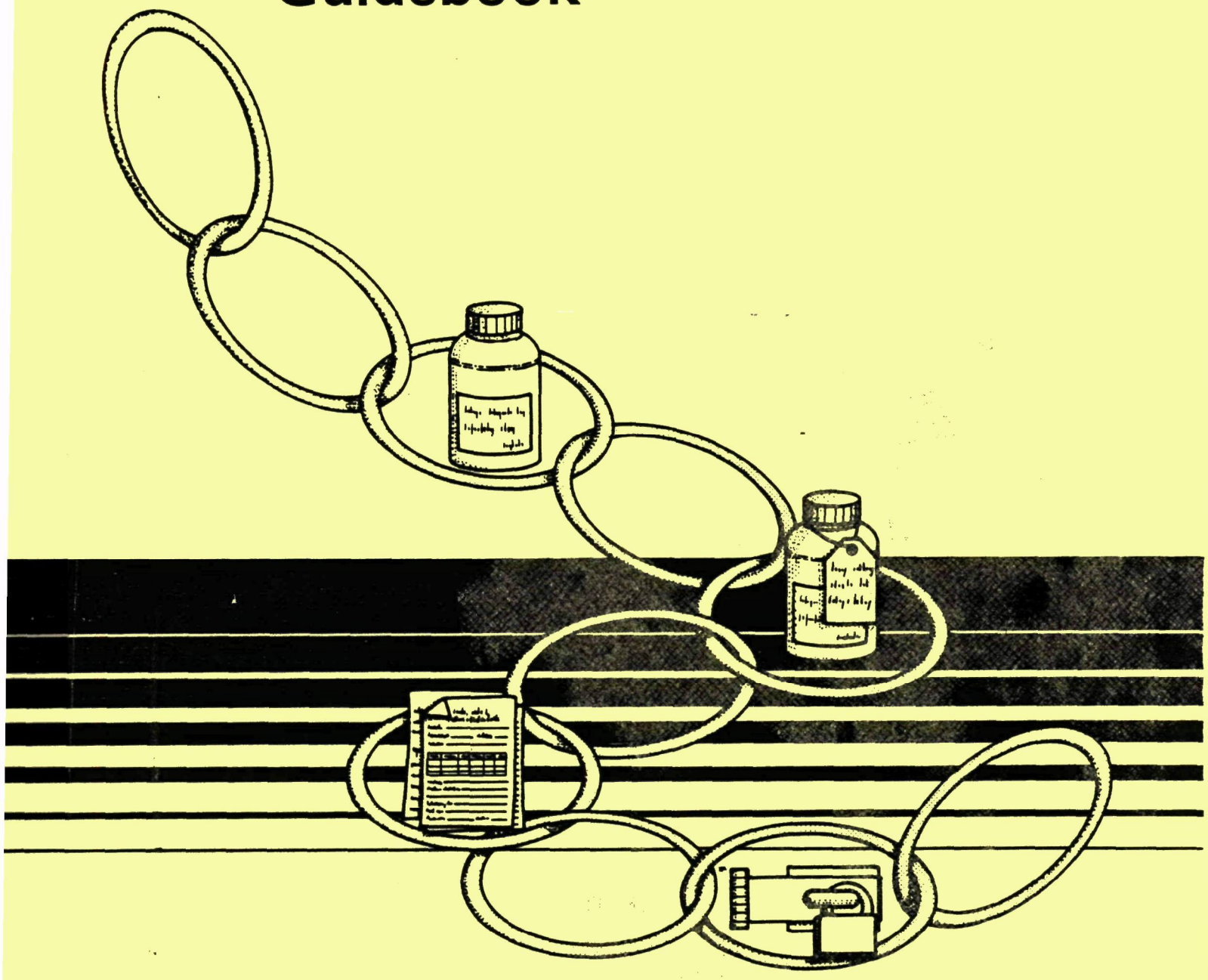
EPA 450/2-82-018
February, 1983

Air

EPA

APTI
Slide/Tape Course 443
Chain of Custody

Guidebook



United States
Environmental Protection
Agency

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Slide/Tape Course 443
Chain of Custody

Guidebook

Prepared by:
B. Michael Ray
Cynthia France

Northrop Services, Inc.
P.O. Box 12313
Research Triangle Park, NC 27709

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R. E. Townsend

United States Environmental Protection Agency
Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711

Notice

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Chain of Custody

Course Description

This two part slide/tape presentation covers proper procedures for documenting the possession or custody of samples and data. Part A defines chain of custody, presents a rationale for maintaining proper chain-of-custody documentation, and delineates correct chain-of-custody procedures for both samples and data. Part B presents a model chain-of-custody procedure for a hypothetical measurement project in which manual sampling takes place at one location and the samples are analyzed at another. You will see the entire procedure, from preliminary operations through preparation and storage of the final data.

Supplementary Reading

Reference documents are not required; however, the *Quality Assurance Handbook for Air Pollution Measurement Systems* Volume II (EPA 600/4-77-027a) and Volume III (EPA 600/4-77-027b) are recommended to you as on-the-job references.

Using the Slide/Tape Presentations

You do not need to follow the script provided as you view each slide/tape presentation. The script is provided for you to review the content. To use the **slides,** load them into a carousel tray upside down. Be sure they are in numerical order. The **audio cassette** can be used in two ways. If your cassette player has a mechanism for synchronizing an audio cassette and 35-mm slides, you can use the side of the cassette marked "automatic advance." This will cause the slides to advance automatically while you listen to the tape.

- To use the slides and audiotape together, advance the slide tray to the first slide and focus the image.
- Leave the tray positioned at slide #1.
- Place the cassette in the tape player so that the side marked "Automatic Advance" will play. The tape recorder will advance the slides for you.

If you do **not** have equipment that automatically advances the slides, you can use a 35-mm slide projector and any cassette player.

- Use the side of the tape marked "Manual Advance."
- Set the slide tray to slide #1, and advance the slides manually as you hear a "beep" (tone) on the tape.

If you have any problems using these slides and tapes, please contact the Training Institute.

Air Pollution Training Institute
Environmental Research Center
MD 20
Research Triangle Park, NC 27711
Telephone Numbers:
Commercial: (919) 541-2401
FTS: 629-2401

Part A

Chain-of-Custody Procedures for Samples and Data

Goal and Objectives

Goal

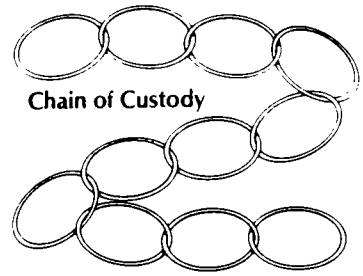
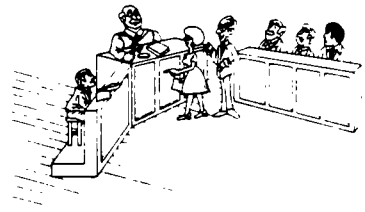
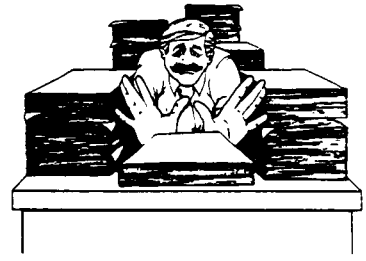
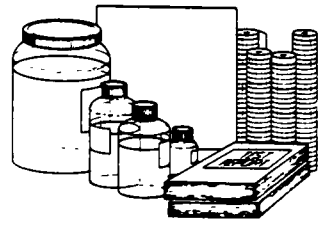
To familiarize you with proper procedures for documenting the possession or custody of samples and data.

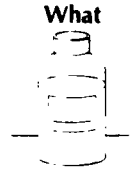
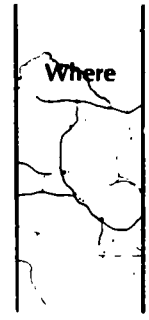
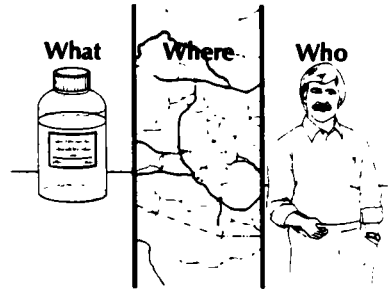
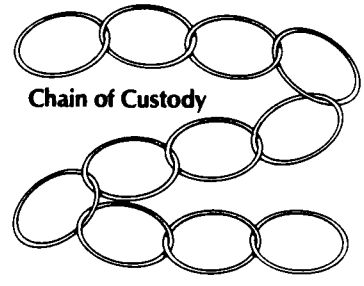
Objectives

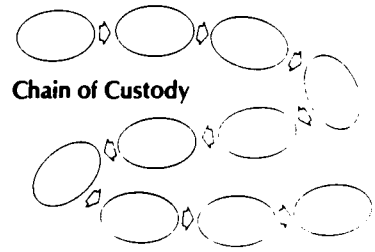
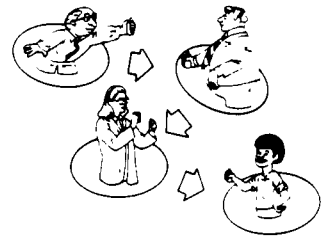
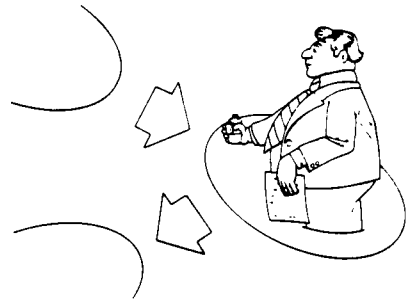
After viewing this slide/tape presentation, you should be able to

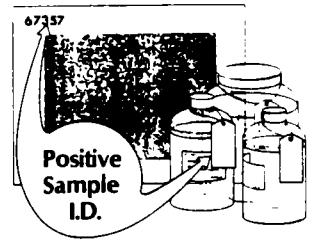
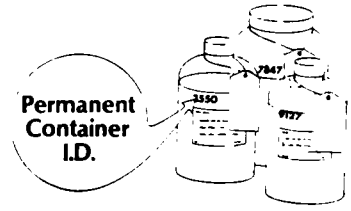
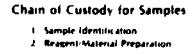
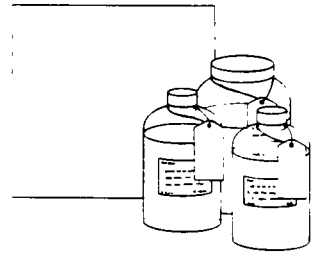
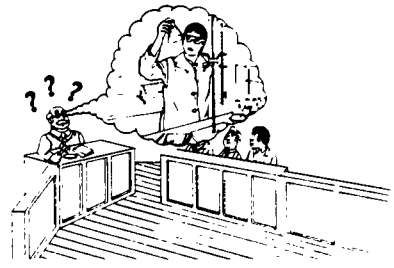
1. recognize the definition of chain of custody.
2. describe a rationale for following chain-of-custody procedures.
3. recognize situations in which chain-of-custody procedures are most appropriate.
4. identify proper chain-of-custody procedures for samples:
   a. during sample identification.
   b. during reagent and material preparation.
   c. during sample handling at the site, during transport, and at the lab.
   d. during final disposition.
5. recognize proper chain-of-custody procedures for:
   a. data identification.
   b. data custody in manual and automated data-acquisition systems.
   c. data custody during data processing and storage.
6. identify correct procedures for using, correcting, and storing standardized logs and data forms.

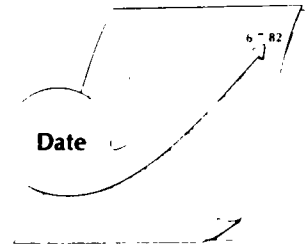
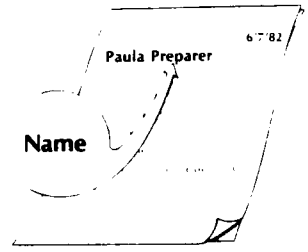
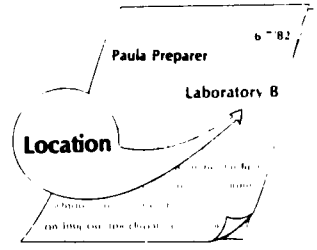
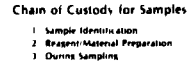
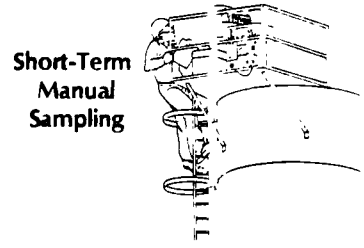
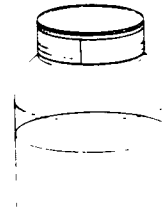
Chain-of-Custody Script—Part A

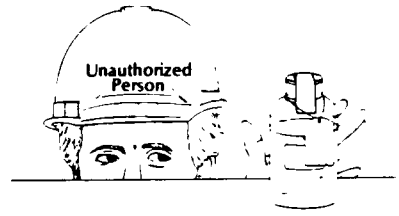
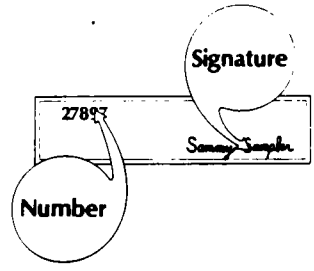
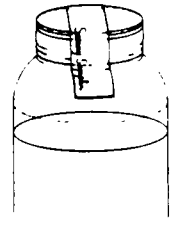
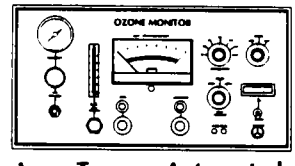
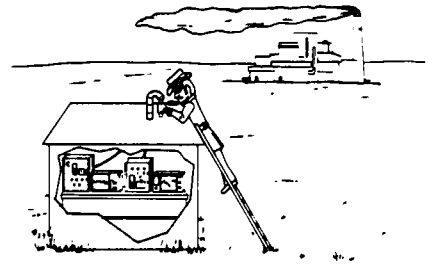
Slide no.	Narration	Illustration
1.	**Judge:** "Would the prosecuter and attorney for the defense please approach the bench." **Attorneys:** "Yes, your Honor."	
2.	**Judge:** "Mr. Prosecuter, have you any additional evidence to present concerning the integrity of the samples you have attempted to introduce into evidence in this case?" **Prosecuter:** "No, your Honor. The State did not maintain records or security of the samples." **Judge:** "Mr. Prosecuter, I have no choice but to dismiss this case because of lack of security of the samples. How could this happen? Don't you realize that this is a busy court and trials cost money." **Prosecuter:** "Yes, your Honor." **Judge:** "Case dismissed."	
3.	**Narrator:** This courtroom scene is not unusual. Every regulatory agency must cope with mountains of data, any of which could become part of a legal or quasi-legal proceeding.	
4.	If we knew which data, which samples, or which reports would be required in court, we could be sure to document them carefully.	

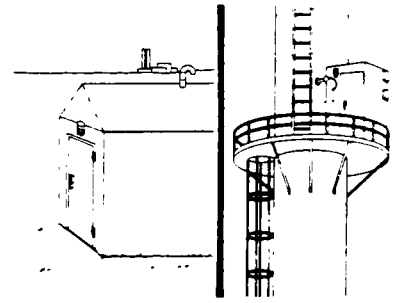
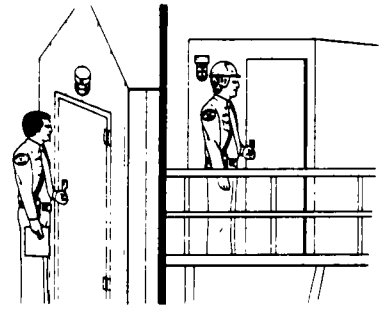
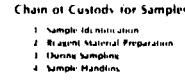
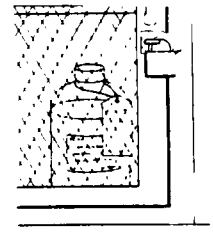
Slide no.	Narration	Illustration
5.	Unfortunately, we never know which tests or data will be ones we may actually need, so we must be prepared to produce any of them when asked.	
6.	In legal proceedings, we must prove the ***legal integrity*** of both the samples and the data. That means ***what***... There must be positive written identity,	
7.	***where*** they've been at all times, and...	
8.	***who*** has had access to them.	
9.	Verification of what, where, and who will be easier if you use...	
10.	chain-of-custody procedures.	

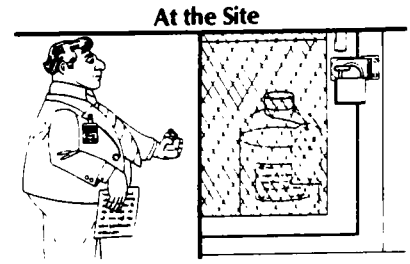
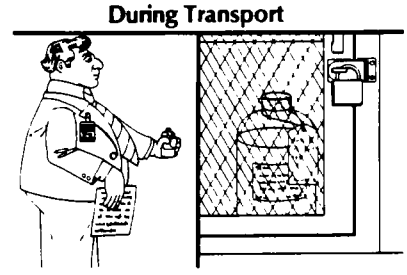
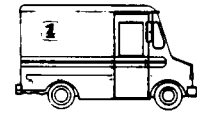
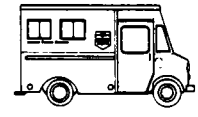
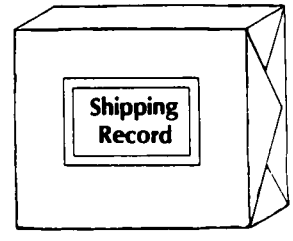
Slide no.	Narration	Illustration
11.	Chain-of-custody procedures document all possessions and exchanges—	
12.	all "custodies" of both samples and data.	
13.	Chain-of-custody forms should always accompany both the samples and the data.	
14.	The fewer people handling samples and data, the better. Everyone who does handle samples and data should be associated with the project. If no established set of chain-of-custody procedures is available, they should be developed.	
15.	Let's consider a typical set of procedures for ***samples***. Sample identification is the first step.	Chain of Custody for Samples 1 Sample Identification
16.	Imagine a legal proceeding in which a lab analyst admits that he is uncertain whether he analyzed sample #6 or sample #9.	

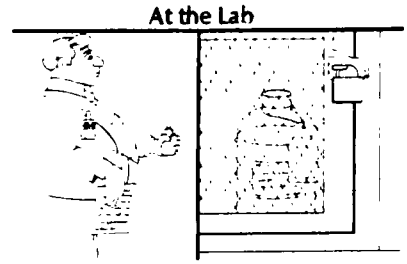
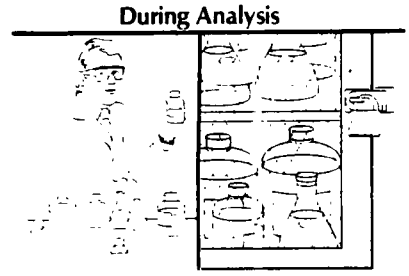
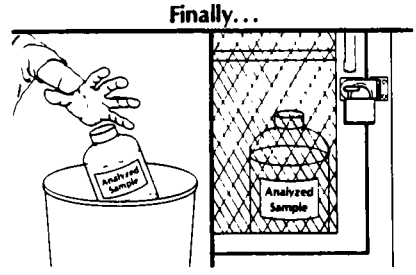
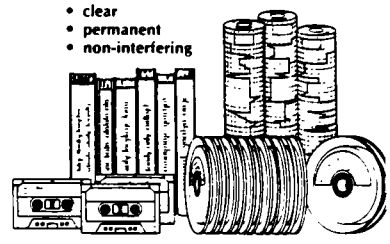
Slide no.	Narration	Illustration
17.	Such an admission could destroy the validity of an entire test report. Therefore,	
18.	every sample must carry positive identification at all times.	
19.	Each sample container must have its own unique and permanent identification. This helps prevent container mix-up.	
20.	Next, let's consider chain-of-custody procedures for reagent and materials preparation.	
21.	Materials and reagents may be used to calibrate sampling equipment, or they may become part of the sample itself.	
22.	In a legal proceeding, both the methods of preparation and the competence of the preparer may be questioned. ...So, it's important to...	

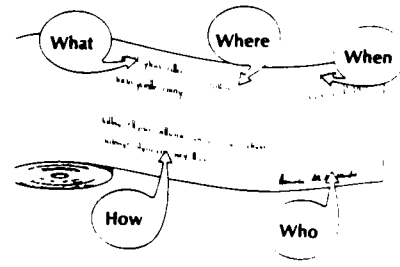
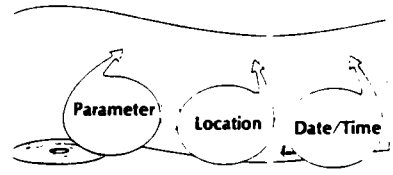
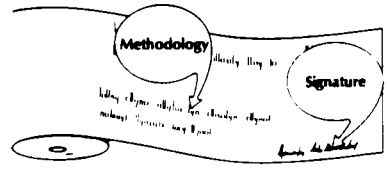
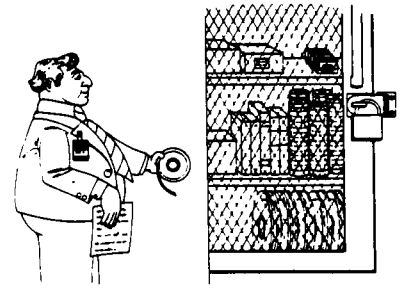
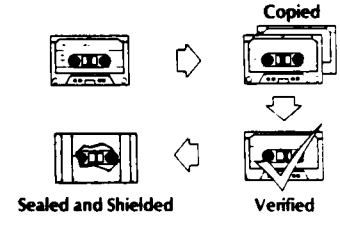
Slide no.	Narration	Illustration
23.	keep records! These records must include the ***date*** of preparation,	
24.	the ***name*** of the person who prepared the reagents and materials,	
25.	and the ***location*** of reagents and materials from preparation through use.	
26.	Chain-of-custody must be maintained ***during sampling***.	
27.	During short-term manual stack sampling, for example, ***one*** person has the responsibility for security. The collected sample. . .	
28.	is placed in a nonreactive container and sealed, usually with tape, to prevent accidental opening.	

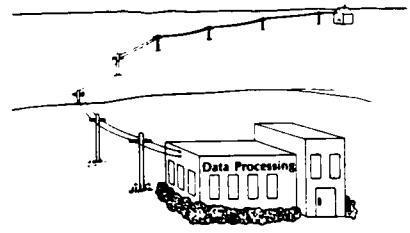
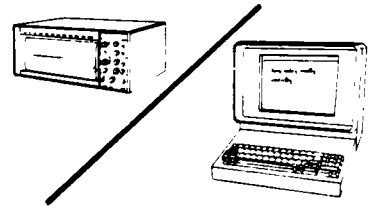
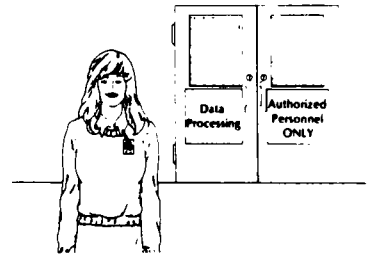
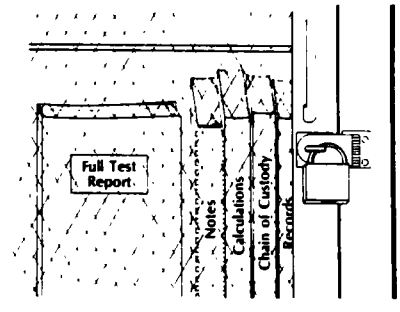
Slide no.	Narration	Illustration
29.	If there is any possibility that unauthorized persons may have even temporary access to the samples, the container should be. . .	
30.	sealed with a self-adhesive sticker, signed and numbered, and. . .	
31.	attached so that it cannot be removed without tearing it.	
32.	In long-term sampling situations, sampling devices are left unattended for long periods. As a result, maintaining proper chain-of-custody may present some problems.	 Long-Term or Automated Sampling
33.	When the sampling probe must be exposed to the environment, for example, tampering is a possibility.	

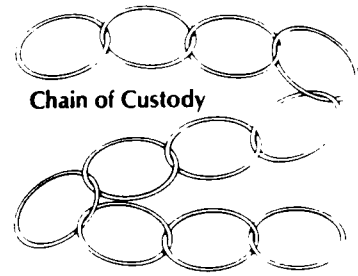
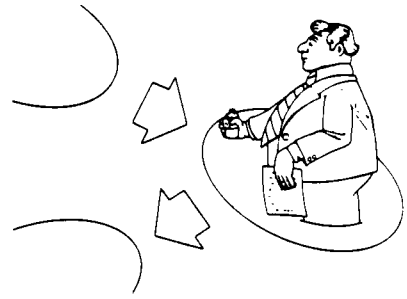
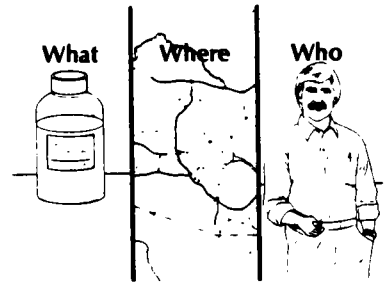
Slide no.	Narration	Illustration
34.	Placing the sampling device in a locked shelter may help.	
35.	Installing security lights and checking the sampling device at random intervals may also help.	
36.	Handling the sample is the fourth area of concern in these chain-of-custody procedures.	
37.	Samples should usually be either in the physical possession of a properly designated person, or...	
38.	in limited-access locked storage.	

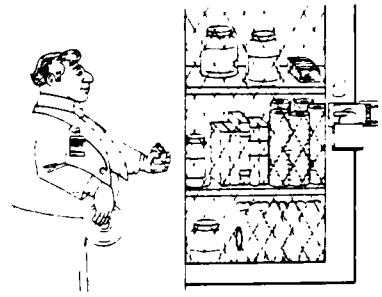
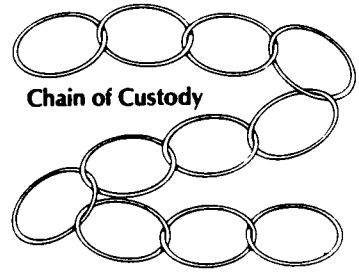
Slide no.	Narration	Illustration
39.	Physical possession or locked storage is appropriate for sample handling at the sampling site,	
40.	as well as during transport.	
41.	It's best to use project personnel to transport samples, but from time to time common carriers must be used.	
42.	Samples transported by the U.S. Postal Service must be sent by registered mail, return receipt requested, and marked "deliver to addressee only."	
43.	Samples sent by U.P.S. require a description of the items on the bill of lading, and must be marked "deliver to addressee only."	
44.	A shipping/receiving record should always accompany the transported samples.	

Slide no.	Narration	Illustration
45.	At the lab, samples should be in the possession of the sample custodian, or in limited-access locked storage.	
46.	During analysis, samples and intermediate solutions must be in continuous view of the analyst, or in limited-access locked storage.	
47.	The final disposition of samples is the last concern in this set of chain-of-custody procedures.	Chain of Custody for Samples 1. Sample Identification 2. Reagent Material Preparation 3. During Sampling 4. Sample Handling 5. Final Disposition
48.	After analysis, some samples will be discarded and others will need to be securely stored—depending on the objectives of the project involved. If samples are toxic or hazardous, they must be disposed of safely.	
49.	Chain-of-custody procedures for ***data*** are every bit as important as those for samples. First, let's look at data identification.	Chain of Custody for Data 1. Identification
50.	Data should be clearly identified with permanent, non-erasable markings that do not interfere with the data.	I.D. Markings: • clear • permanent • non-interfering 

Slide no.	Narration	Illustration
51.	I.D. information usually includes ***what, where, when, how,*** and ***who.*** That means a listing of. . .	
52.	the parameter measured, the location, the date and time of the sampling,	
53.	the measurement methodology used–including units for reporting and the instrument's full scale setting—and the signature of the sampler.	
54.	Chain-of-custody procedures in manual and semi-automated data-acquisition systems are the same as those for sample handling:	Chain of Custody for Data 1. Identification 2. Data Acquisition: • manual • semi-automated
55.	physical possession by a designated person or in limited-access locked storage.	
56.	Magnetic tape records require additional care. They should be copied, verified, sealed, and transported separately in shielded containers.	

Slide no.	Narration	Illustration
57.	Unique chain-of-custody problems may occur when data-acquisition systems are fully automated,	Chain of Custody for Data 1. Identification 2. Data Acquisition • manual • semi-automated • automated
58.	as with telemetry systems. No one "possesses" the data as it travels from the sampling site to the data-processing facility.	
59.	Comparing data recorded at the site to data received at the processing facility is one way of assuring the integrity of the data.	
60.	Chain-of-custody procedures must also be maintained throughout the processing of the data.	Chain of Custody for Data 1. Identification 2. Data Acquisition: • manual • semi-automated • automated 3. Data Processing
61.	Only authorized persons should be allowed access to the areas where data are processed.	
62.	Finally, the full test report and all notes, calculations, and chain-of-custody records leading up to it should be placed in limited-access locked storage, where they remain as long as required by regulations, or until they are no longer useful.	

Slide no.	Narration	Illustration
63.	Briefly, let's review what we now know about chain-of-custody procedures. Think for a moment about ***what*** chain-of-custody procedures are and ***why*** we use them.	
64.	Remember chain-of-custody procedures document all possessions and exchanges of samples and data.	
65.	Chain-of-custody procedures verify what samples and data are—their identity, ***where*** they've been, and ***who*** has had access to them.	
66.	This is important when data from a project may be used in a legal proceeding.	

Slide no.	Narration	Illustration
67.	If the samples and data you work with are always in the physical possession of a designated person or in limited-access locked storage, you may generally assume. . .	
68.	that you are following chain-of-custody procedures.	

Part B

Model Chain-of-Custody Procedure

Goal and Objectives

Goal

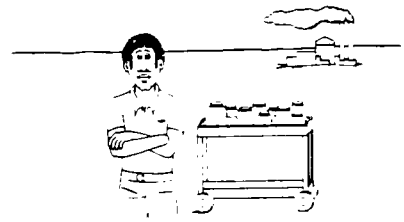
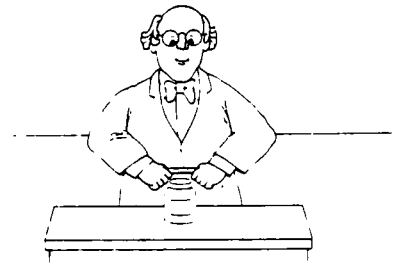
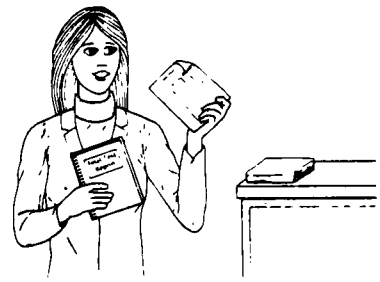
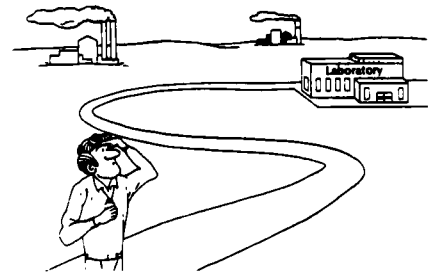
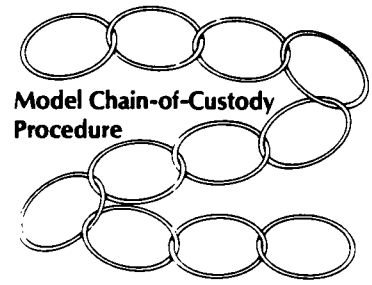
To present you with a model of the proper use of chain-of-custody procedures, as demonstrated in a hypothetical measurement project employing manual sampling at one location and subsequent sample analysis at another.

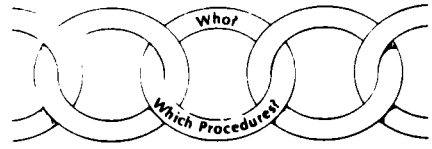
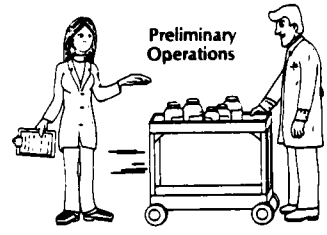
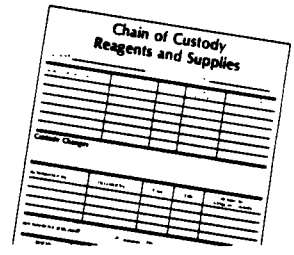
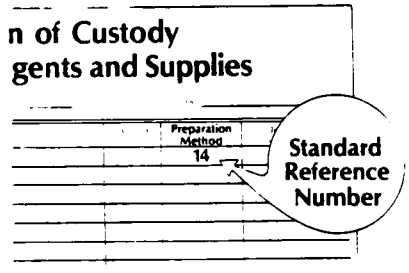
Objectives

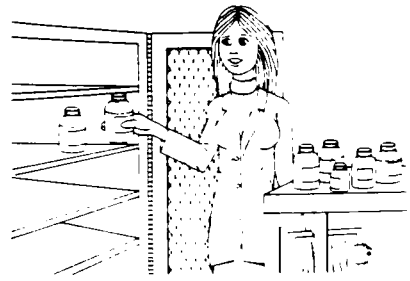
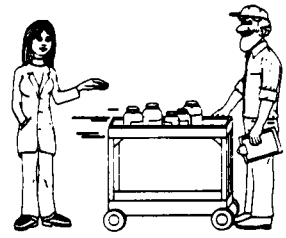
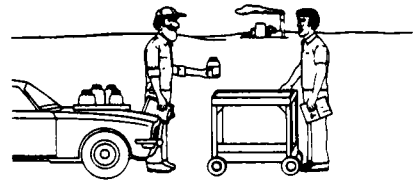
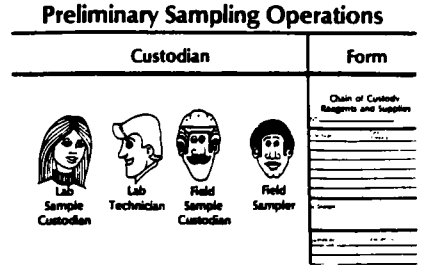
After viewing this slide/tape presentation, you should be able to

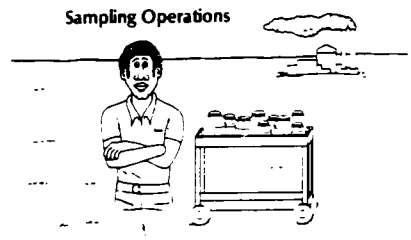
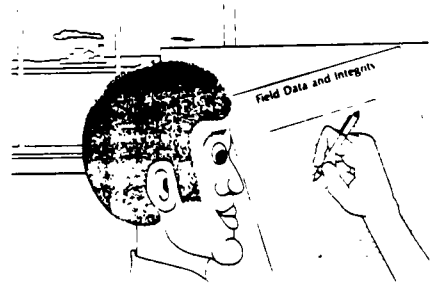
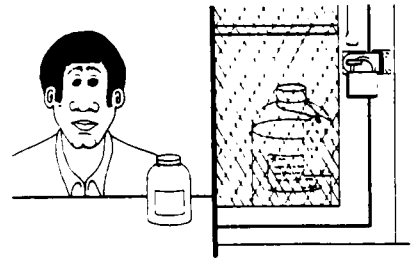
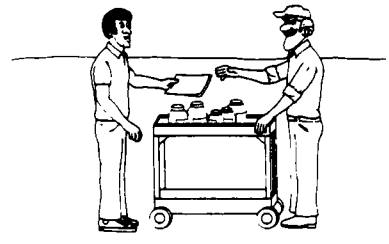
1. identify the person(s) responsible for custody of samples for each of the operations listed in the model.
2. distinguish between proper and improper chain-of-custody procedures in hypothetical examples similar to those in the slide/tape.

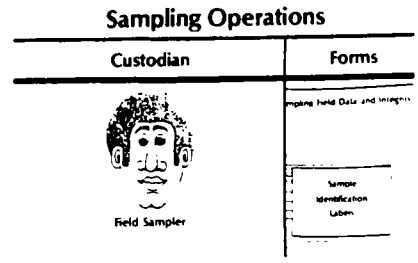
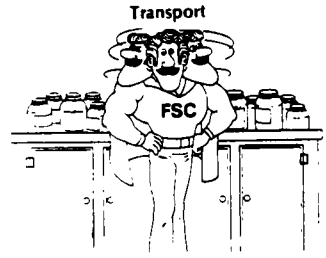
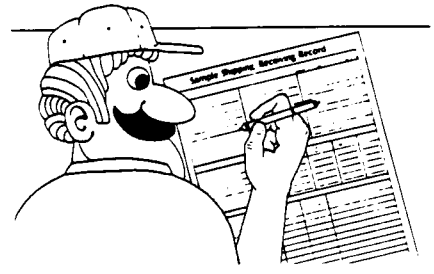
Chain-of-Custody Script—Part B

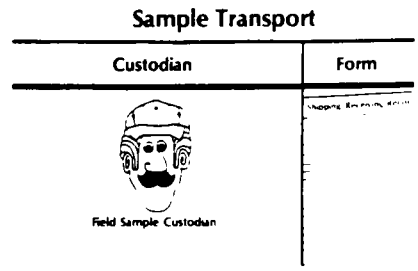
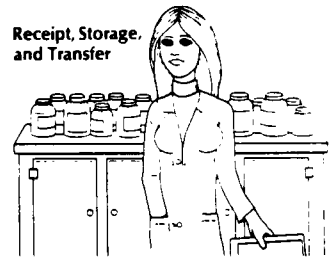
Slide no.	Narration	Illustration
1.		
2.		
3.		
4.	Suppose you are working on a measurement project involving manual sampling at one location and sample analysis at another.	
5.	You know that following chain-of-custody procedures is important in this case, since the data from your project will be used in a legal proceeding.	

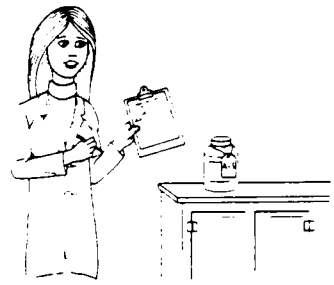
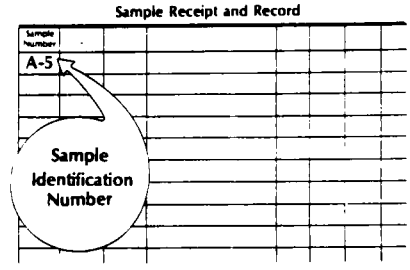
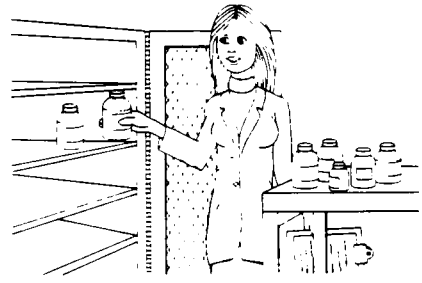
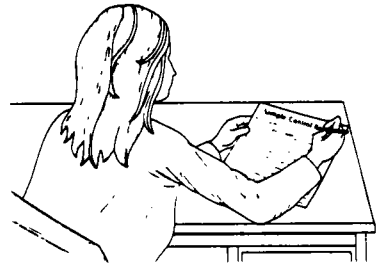
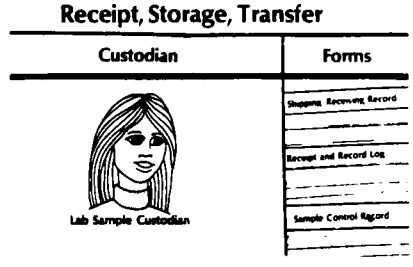
Slide no.	Narration	Illustration
6.	Chain-of-custody procedures should be followed in each of these steps: preliminary operations; sampling operations; sample transport; sample receipt, storage, and transfer; sample analysis; and sample-data record keeping.	Chain of Custody in: • Preliminary Operations • Sampling Operations • Transport • Receipt, Storage, Transfer • Sample Analysis • Sample-Data Record Keeping
7.	Let's consider ***who*** is responsible for the custody of samples in each step and ***which procedures*** they should follow.	
8.	The lab-sample custodian begins the chain-of-custody procedures during the preliminary operations. She gives reagents and supplies needed for sampling to a laboratory technician for preparation.	
9.	The chain-of-custody form for reagents and supplies, filled out by the lab-sample custodian, documents this exchange.	
10.	The lab technician then prepares the reagents and supplies that will be used in the sampling operation.	
11.	He documents his methods of preparation by recording on the same chain-of-custody form the appropriate reference number for standard methods listed in lab manuals.	

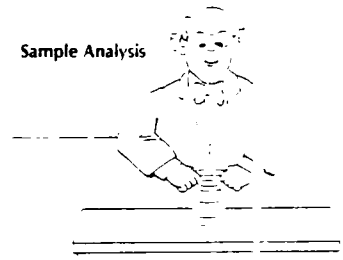
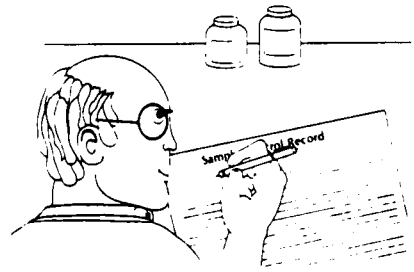
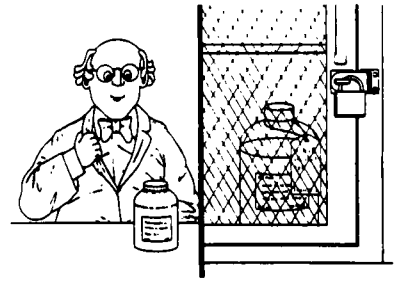
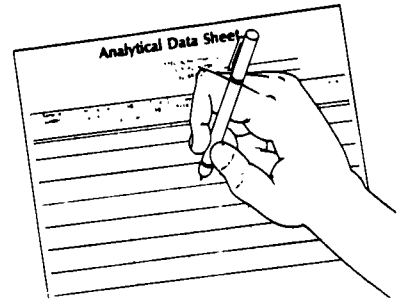
Slide no.	Narration	Illustration
12.	Prepared reagents and supplies are returned to the lab-sample custodian, who places them in limited-access locked storage,	
13.	and completes the chain-of-custody form for reagents and supplies, placing it in the locked project files.	
14.	When the reagents and supplies are needed in the field, the field-sample custodian takes possession of them. At that time, he also receives a copy of the chain-of-custody form.	
15.	The field-sample custodian keeps the reagents and supplies until they are released to the field sampler. In some cases the field-sample custodian and the field sampler are the same person.	
16.	In preliminary sampling operations, custody of reagents and supplies rests first with the lab-sample custodian, next with the lab technician, and then back to the lab-sample custodian. The chain-of-custody form for reagents and supplies provides documentation. Finally, the field-sample custodian takes possession until the reagents and supplies are delivered to the field sampler.	

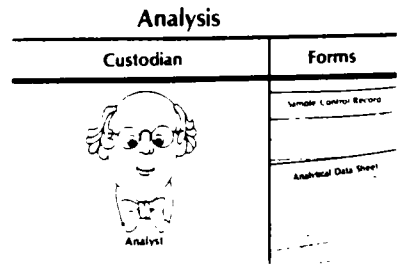
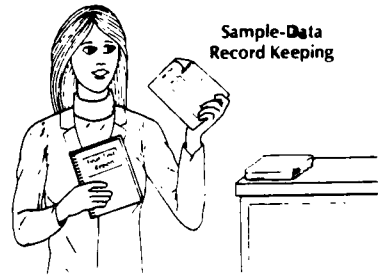
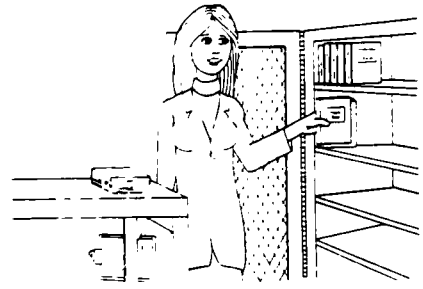
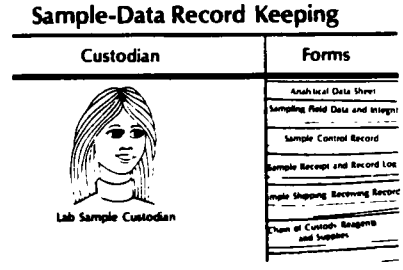
Slide no.	Narration	Illustration
17.	During sampling operations, the field sampler is responsible for the custody of samples.	
18.	He starts chain-of-custody procedures for samples at the sampling site by filling out standardized forms that list all necessary sampling information, including sample custody.	
19.	Once the sample is obtained, the field sampler keeps the sample in continuous view at all times or in limited-access locked storage.	
20.	The field sampler also places adhesive-backed identification labels on all samples. . .	
21.	before delivering them to the field-sample custodian along with the sampling-data forms.	

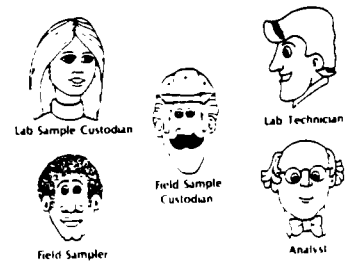
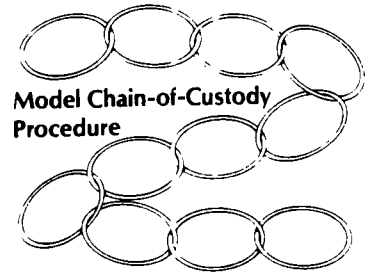
Slide no.	Narration	Illustration
22.	So, in sampling operations, custody is the responsibility of the field sampler. The necessary chain-of-custody forms are the ***field-sampling data sheets*** and the ***sample identification labels.***	
23.	The next step is getting the sample from the sampling site to the lab. The field-sample custodian is responsible for recovering, preserving, and storing the samples until they are delivered to the lab.	
24.	He attaches tamper-proof seals to all the samples before. . .	
25.	arranging to have them transported by project personnel, or, if necessary, by common carrier.	
26.	The field-sample custodian fills out the shipping/receiving form, keeping one copy and sending the other with the samples.	

Slide no.	Narration	Illustration
27.	Briefly, then, proper custody of samples during transport is arranged by the field-sample custodian and documented on the shipping/receiving form.	
28.	The next step of the process involves the receipt and handling of samples at the lab. The lab-sample custodian maintains the chain-of-custody at this stage.	
29.	When samples are received, the lab-sample custodian verifies the number of samples and their identification.	
30.	She also checks to see that they have not been tampered with.	
31.	Only then does she sign the field-sampling data forms or complete the shipping/receiving forms.	

Slide no.	Narration	Illustration
32.	Next, the lab-sample custodian assigns each sample its own alpha-numeric identification number, and...	
33.	records that number on the Sample Receipt and Record Log.	
34.	Finally, the lab-sample custodian places the samples in limited-access locked storage until they can be analyzed.	
35.	She records, on the Sample Control Record, all transfers of sample custody within the lab and all procedures performed on the samples.	
36.	The proper receipt, storage, and transfer of samples at the lab is managed by the lab-sample custodian and documented by the Shipping/Receiving forms, the Sample Receipt and Record Log, and the Sample Control Record.	

Slide no.	Narration	Illustration
37.	During sample analysis, the analyst has responsibility for the integrity of samples.	
38.	After obtaining the samples from the lab-sample custodian, the analyst verifies the information given on the Sample Control Record and makes appropriate notes.	
39.	During analysis the analyst keeps the samples as well as any intermediate solutions in continuous view or in limited-access locked storage.	
40.	He records all analytical data on a data sheet, including associated calibrations, references to standard solutions or instrument numbers, and sample calculations.	
41.	In some cases, the analyst must reseal remaining portions of samples and return them to the lab-sample custodian.	

Slide no.	Narration	Illustration
42.	So, during analysis, the analyst is the responsible custodian who documents his work with samples on the Sample Control Record and the Analytical Data Sheet.	
43.	The final step in this project involves sample-data record keeping. When the final report is issued, the lab-sample custodian receives a copy of it, along with all associated documents.	
44.	She places them in limited-access locked storage.	
45.	So, the proper custodian of the final report copy and all the forms is the lab-sample custodian.	
46.	For each step of the process—preliminary operations; sampling; transport; receipt, storage, and transfer; sample analysis; and final record keeping,	**Chain of Custody in:** • Preliminary Operations • Sampling Operations • Transport • Receipt, Storage, Transfer • Sample Analysis • Sample-Data Record Keeping

Slide no.	Narration	Illustration
47.	the person responsible for the custody of samples follows prescribed procedures and documents every possession and exchange. . .	
48.	to preserve the chain-of-custody.	
49.	Credit	Model Chain-of-Custody Procedure Technical Content: Mike Ray Instructional Design: Cynthia France Graphics: Leslie White Photography Audio: David Churchill Narration: Rick Palmer
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16. ABSTRACT

This Guidebook was developed for use in the Air Pollution Training Institute's Slide/Tape Course 443, "Chain of Custody". It contains viewing information and scripts for two slide/tape presentations concerning chain-of-custody procedures.

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