IBCTR

INTERNATIONAL BIOLOGICAL and CHEMICAL THREAT REDUCTION

SAND2016-9351C

Material Control and Accountability

Inventory Management and Biological Waste Handling

Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000. SAND 2015-8940 TR

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Material Control & Accountability

Material Control & Accountability is an awareness of what exists in the laboratory, where it is, and who is responsible for it.

Material Control & Accountability

Material

Control

Accountability

Material

What material/information should we keep track of?

Agent	• Which agents? • Only viable organisms? Just DNA?
Quantity	• Any amount of a replicating organism can be significant. • For toxins, must define a threshold amount.
Form	• Repository Stocks, Working Samples, In host • What about contamination?
Detail	• How much detail? • Each vial as a separate inventory record?
Scope	• Laboratory Strains? Clinical Samples? Wild-type?

Control

Control is…

- Engineered / Physical
- Administrative
- Procedural

Containment is part of material control

- Containment Lab / Freezer / Ampoule

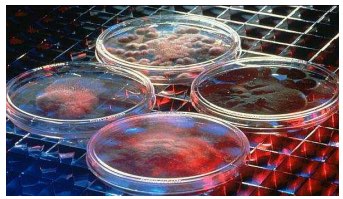
Procedures are essential for material control

- For both normal and abnormal conditions

Accountability

All material should have an associated "accountable person" who is ultimately responsible for the material.

- The person best in a position to answer questions about the associated material
- Not someone to blame!
- Ensure that no material is "orphaned"



Material Control & Accountability

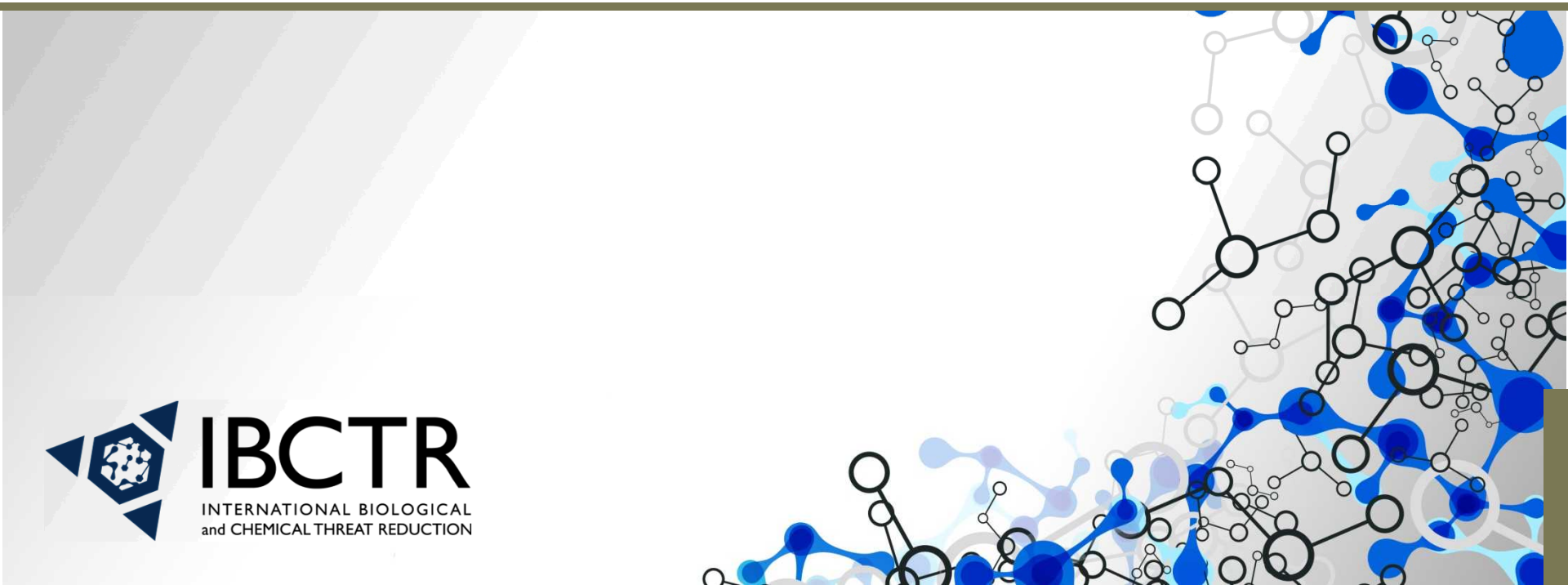
Group Activity:

Discuss and answer the following questions:

1. How would you apply the principle of graded protection to MC&A?
2. How would you apply the principle of balanced security to MC&A?

Take **5 minutes** and be prepared to share your answers with the class

Inventory Management



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Definitions

Inventory

- Database that tabulates the pathogens in the lab
    - *Can include diagnostic samples, isolates, cultures, etc.*

Inventory (and tracking) system

- Procedures and tools to update information and storage locations

Inventory Management

- Entire process involved in tracking inventory items throughout the life cycle (receipt through disposal)

Key Principles: Inventory Management System

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Set of policies, procedures, and tools for inventory management

"Living" database of pathogen inventory
- Updated with receipt, procurement, transport, use, and disposal

Requires training, maintenance, and inspection

Control access to database

Ensure control and accountability
- Designate owners
- No orphans

Meet regulatory and institutional requirements

Key Principles: Inventory Management System

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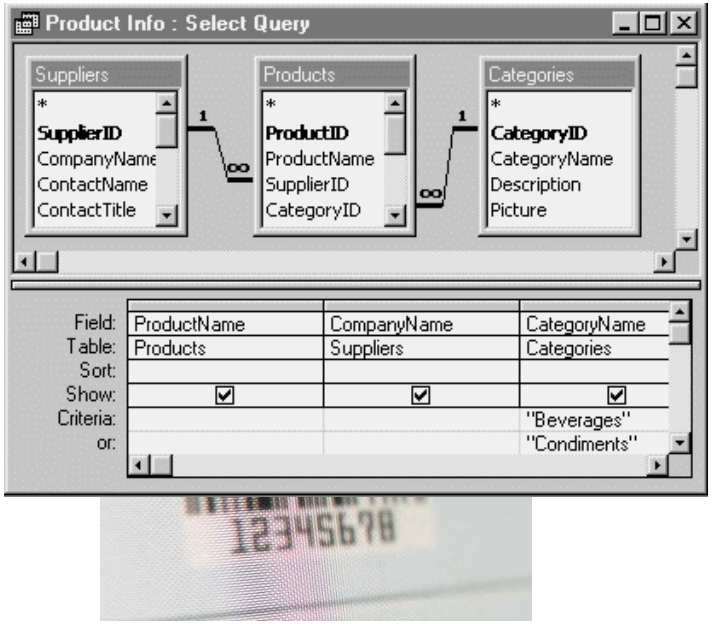
Types (examples):

Paper-based
- Card catalogue
- Inventory log book
- <100 Inventory items

Computer/web-based system
- Microsoft Access or Excel
- Commercially available software



Use and Function (examples):

Inventory Tracking
- Unique identifier
- Barcodes

Many desirable functions
- Improve laboratory work
- Reduce inventory

Inventory Management: Physical Inspection

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Inventory Audits/Reconciliation

Assures accuracy of inventory database

Provides visual assessment

Should be done once or twice a year

- More often for high risk pathogens

Inventory Management: Reporting

A summary of the inventory may not be useful for emergency responders

Use a summary of hazards

- For Institution
- For building
- For individual labs
    - *Useful when making hazard door signs*

Inventory Management: Access Control

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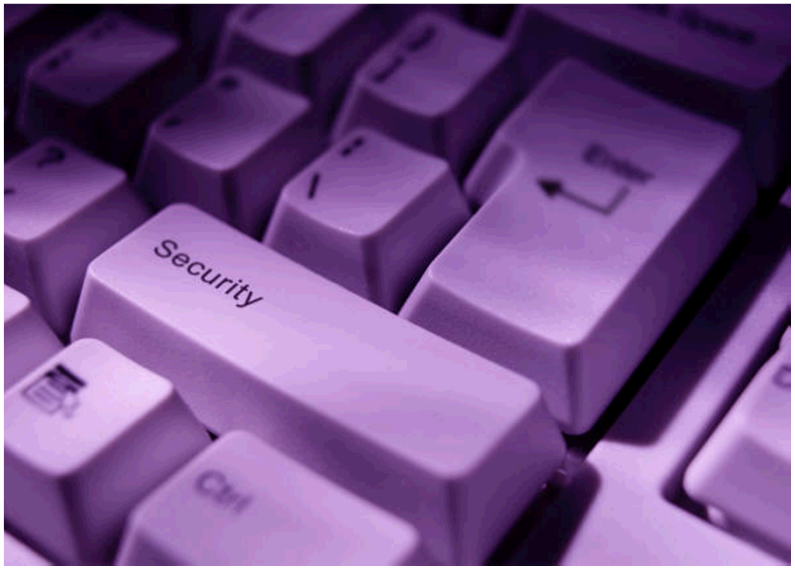
Different levels of access to inventory system and database

- Students
- Faculty, staff researchers
- Department heads, system administrators
- Biosafety and security officers, centralized procurement



Outsider Threat

Insider threat

- Personnel management
- Procurement
- **Inventory management**
  - ***Owner***
  - ***Physical Inspection***
  - ***Data protections***

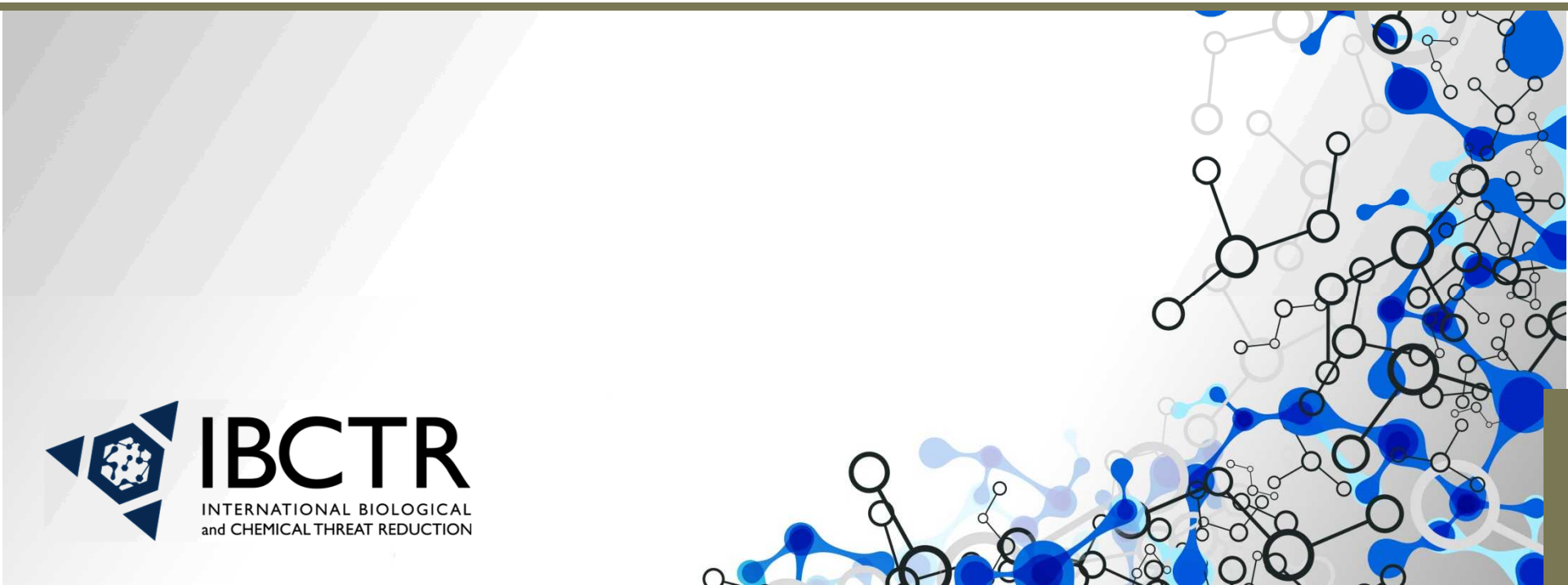
Inventory Management: Conclusions

What are the main challenges to effective chemical inventory management?

Benefits of a Inventory Management System

- Save time
- Save money
- Improve research
- Improve safety
- Improve security
- Regulatory compliance
- Earn recognition

Biological Waste Disposal



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Biorisk Management: the AMP Model

Biorisk Management =
Assessment, Mitigation, Performance

What IS biological waste?

Small Group Discussion, Part 1:

What can be considered **biological waste**?

Think of as many examples as you can and write each example on a single **sticky note**.

You have **5 minutes**.

Categories of Biological Waste

Solid waste (non-sharp)

Sharps

Pathological Waste

Liquid Waste

Mixed Waste

Who Defines Biological Waste?

Countries, States (Regulatory Agencies)

- Laws
- Regulations
- Guidance

Institutions

- Policies

What IS biological waste?

Class Exercise, Part 2:

Distribute the **sticky notes** with examples of **biological waste** to each of your group members.

Post each **sticky note** on the **flip chart** with the category of waste it fits under.

You have **5 minutes**.

Why pay attention to waste?

Reflection and Class Discussion:

Who is at **increased risk** if waste materials contaminated with biological materials are not handled and treated properly?

What are **potential incidents** that can occur?

Complete the template in your **workbook** and then discuss with the class.

Why pay attention to waste?

Small Group Exercise:

Each group will be assigned one category of waste.

Look at the examples of waste under each category and also your list of increased risks from improperly handled and untreated waste.

Develop a process to mitigate the risk from this category of waste materials. A flow chart is a good way to visualize a process.

Write or draw your process in your **workbook** and also on your **flipchart**.

Steps in Waste Management

Segregation

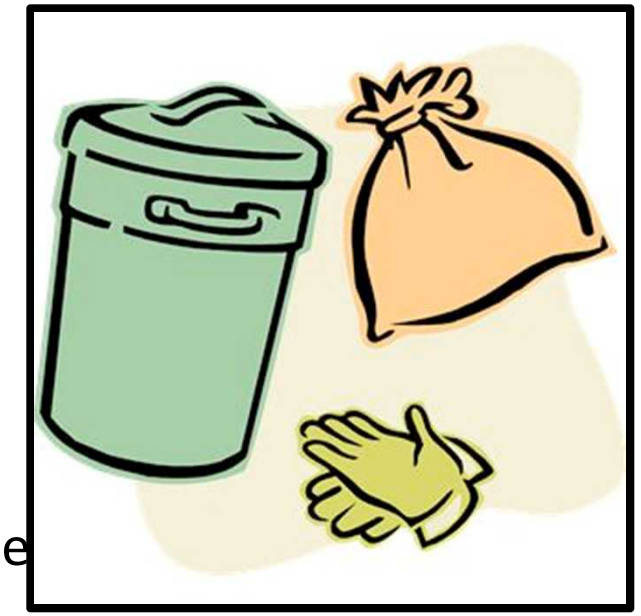
Collection

Storage

Transport

Treatment

Final Disposal



Look at your process. Are all these compone
them into your process.

Non-Sharps Waste Management

Sharps Waste Collection

Sharps Containers
- Closable and when closed not reopenable
- Autoclavable?

Container Size & Location are Critical
- Minimize handling of used sharps

Avoid Overfilling

Cautions:
- Container substitution
- Container reuse

Waste Storage and Transport

Waste Treatment Options

Cradle-to-grave responsibility applies

Do it yourself …

- Standard practice for liquids
- Autoclaves and other solid waste treatment devices generally require permitting, usually by local entity
- Shredding probably required

Have someone else do it …

- Very common, few contractors
- Less liability but requires due diligence
- Likely lower cost option unless quantities are large
- Require your transporter to:
    - *generate manifest of types and amounts of biowaste transported*
    - *provide certificate of destruction*

Intermediate vs. Final Treatment

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Intermediate Treatment

- Usually performed for worker protection
- Autoclaving most common method
- Standard microbiology lab practice
- Performed before transport to final treatment

Final Treatment

- Much more effort involved
  - *Permitting*
  - *Monitoring*
  - *Recordkeeping*
  - *Reporting*
  - *Risk Management*
- Two options:
  - *On-site treatment by facility staff*
  - *Off-site treatment by disposal contractor*

Treatment Technologies

Autoclave

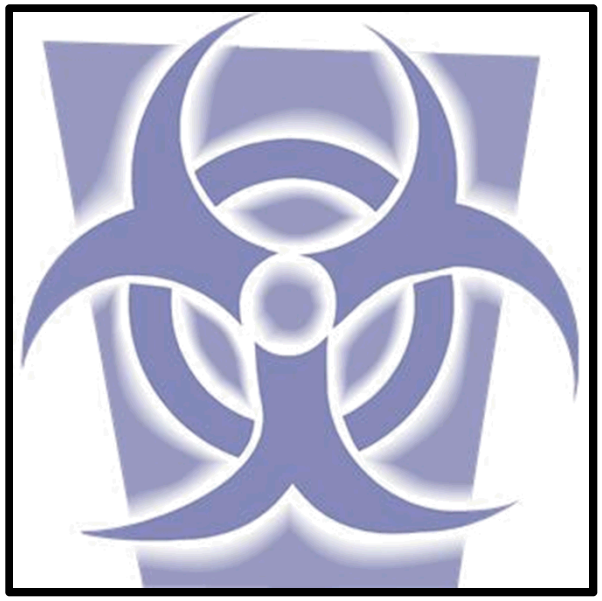
Incineration

Chemical treatment

Microwave

Alternative technologies

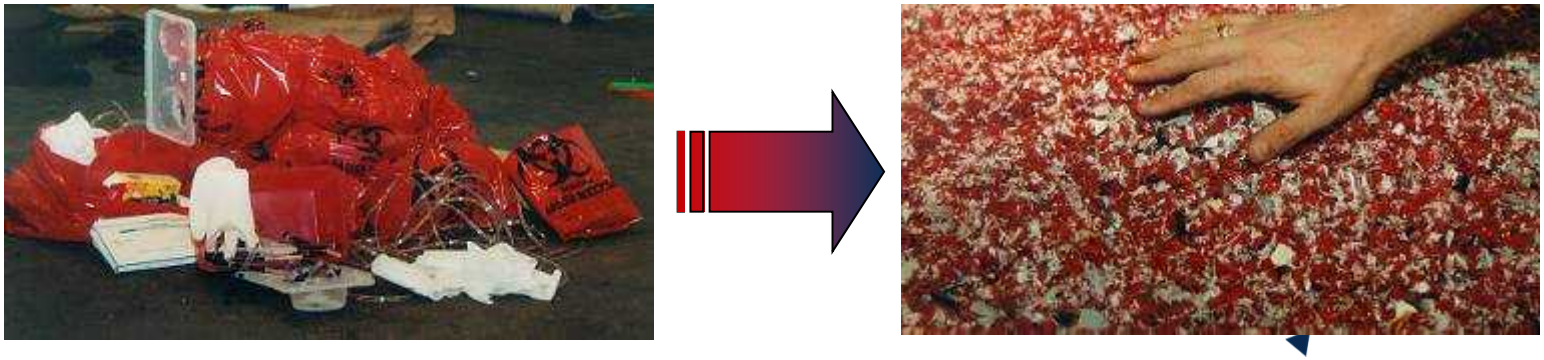
- irradiation
- high-temp pyrolysis (vitrification)
- macrowave
- others



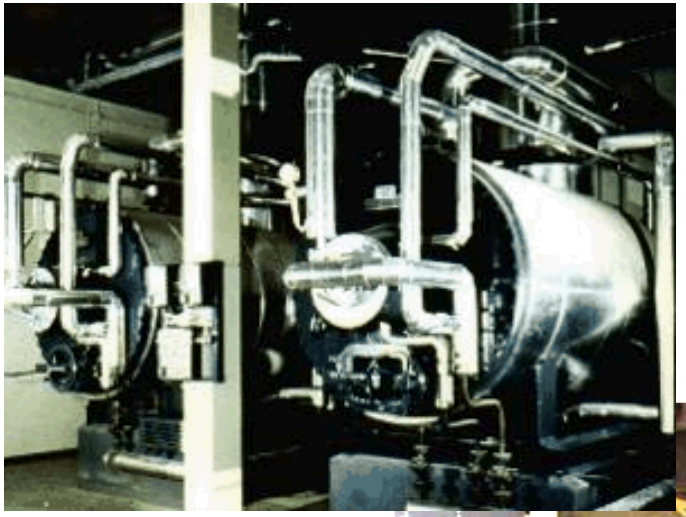
Treated Biological Waste

Biological solid waste that has been treated by an acceptable method is considered non-contaminated and non-hazardous; the liquid can be sewer-disposed and the solids put in sanitary landfills.

Most localities require that decontaminated medical waste (especially sharps) be made unrecognizable before being landfilled. A shredding step must be included after treatment.



Pathological Waste Treatment



Liquid Waste Treatment

Drain Disposal (Sanitary Sewer)

Autoclave following validated procedures

Chemical inactivation (e.g. 10% Chlorine Bleach overnight before drain disposal)

Use Engineered Treatment System

- Onsite
- Offsite

Why pay attention to waste?

Small Group Exercise:

Look back at the process your group designed for management of the biological waste type you were assigned.

Based on group and class discussion, as well as the additional information just presented, do you have any changes to your process?

Finalize your process and present it to the group.

Review of Biological Waste Disposal

To wrap-up, let's discuss what we learned about **Biological Waste Disposal**.

What did we learn?	What does it mean?	Where do we go from here?