Principles of Preparedness for Agroterrorism and Food Systems' Disasters

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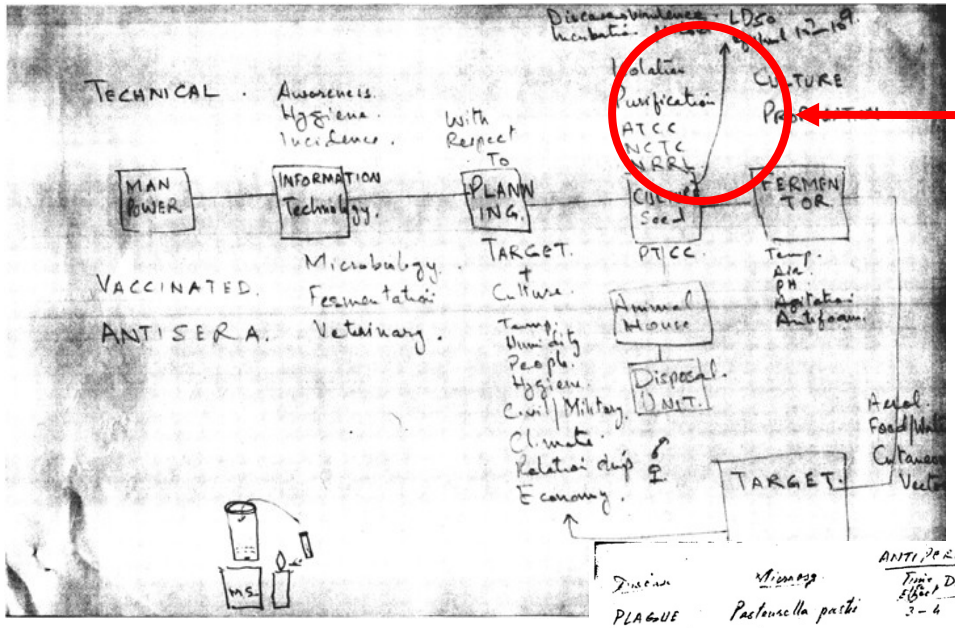
Complying with FSMA Intentional Adulteration/Food Defense

FEMA

UCDAVIS WIFSS
Western Institute for Food Safety & Security

Key Food and Agriculture Related Documents Seized in Afghanistan



Note!

Antipersonnel Agents

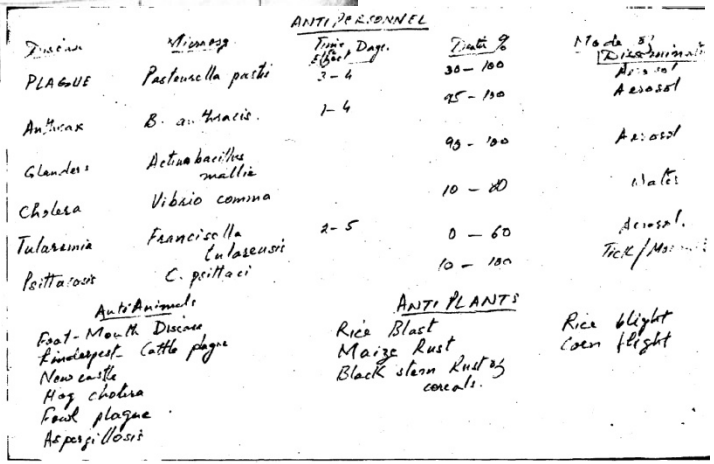
ability to deliver viable, virulent org. in a susceptible target.

Are not necessarily Lethal to obtain Military objectives that incapacitate without causing Death.

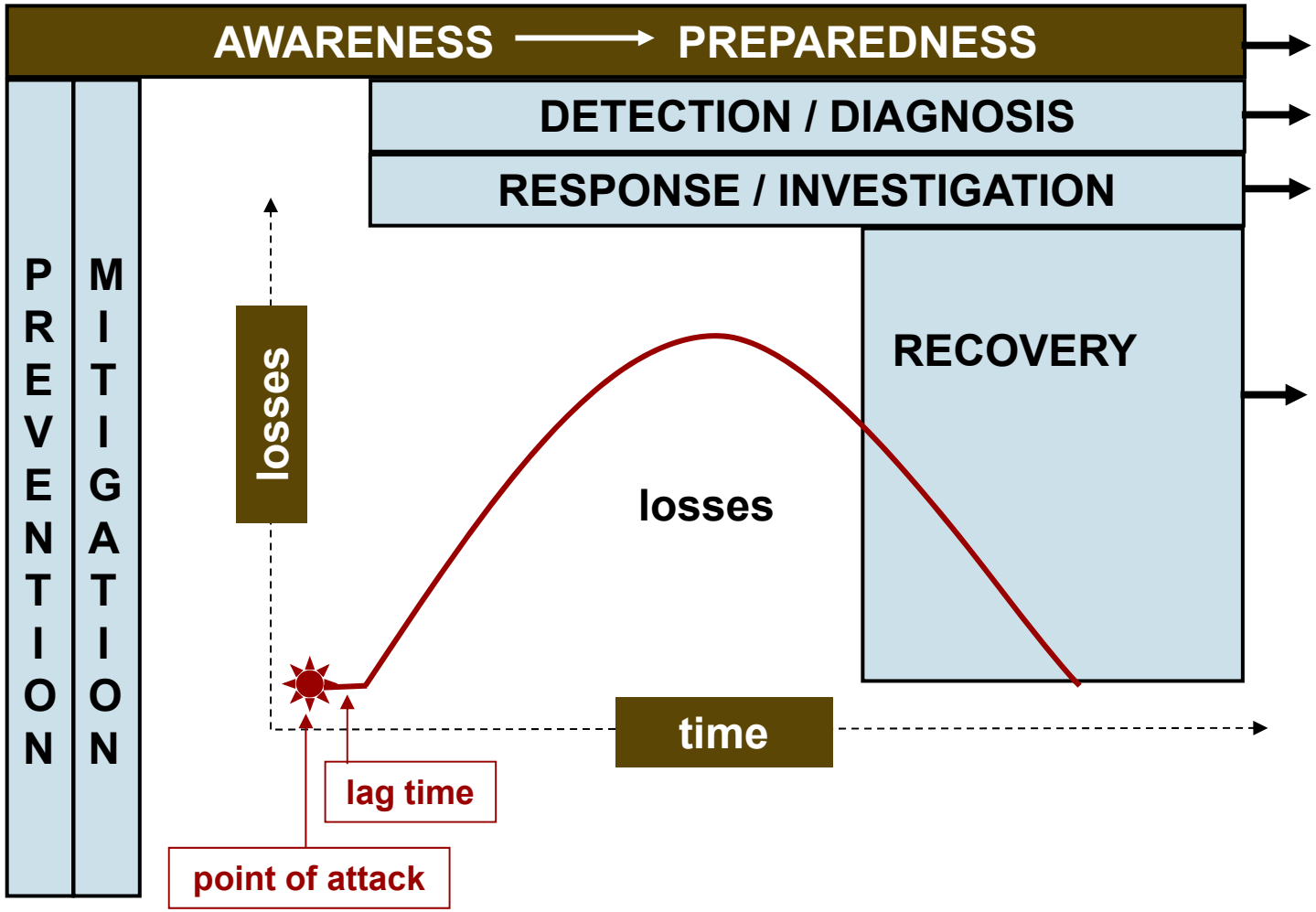
Anti'food Agents

used against Crops / animals resulting serious shortage of
Medicinal plants,
Leather,
Wool

Has long term strategic application.



The Steps to Preparedness



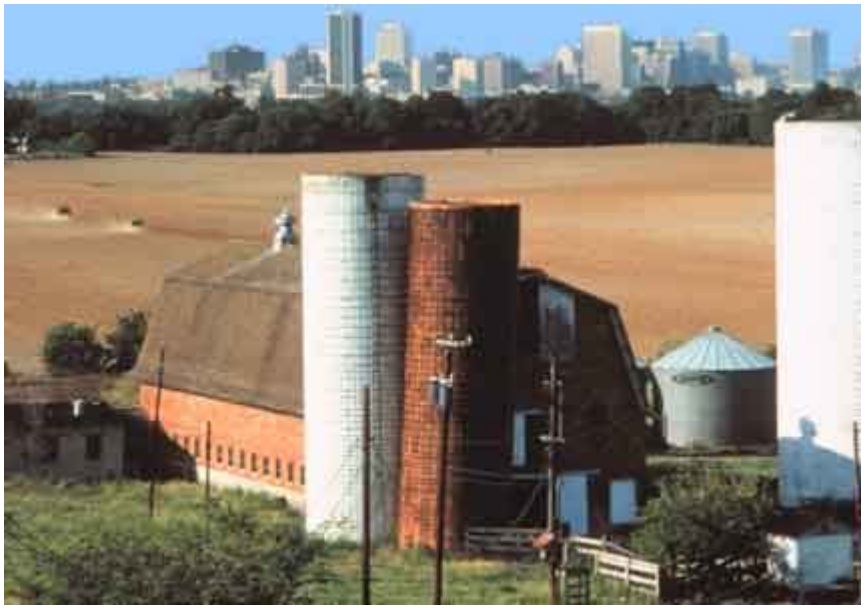
Understanding the Dangers

"For the life of me, I cannot understand why the terrorists have not attacked our food supply, because it is so easy to do."

— Tommy Thompson, former Secretary
U.S. DHHS (2004)

Weapons of Mass Destruction

- **C**hemical **
- **B**iological **
- **R**adiological**
- **N**uclear
- **E**xplosives



** *Greatest threat to the food and agriculture system*

Prior Use of Chemical and Biological Weapons against Agriculture

- WWI – Glanders to infect draft animals
- WWII – Colorado potato beetles to destroy potato crops
- Contamination of a salad bar in Oregon (1984)
- Feed-product contamination in Wisconsin (1996)
- Contamination of ground beef with nicotine (2003)
- Threat to poison the water supply with ricin in South Carolina (2003)

Chemical Threats

- Pesticides/Herbicides*
- Dioxins and Furans
- Polychlorinated Biphenyls (PCBs)
- Poisons and Venoms
- Industrial Chemicals *

• *Greatest threat to the food and agriculture system*

Industrial Chemicals- Melamine

- Not approved for direct addition to human or animal foods marketed in U.S.
- In 2007, pet food contamination caused illnesses and deaths in dogs and cats in the U.S.
- In 2008, contamination of milk and infant formula caused illnesses in infants and young children in China.
  - at least 22 dairy manufacturers found to have melamine in their products

Threat Classification Lists

Biological threats published by:

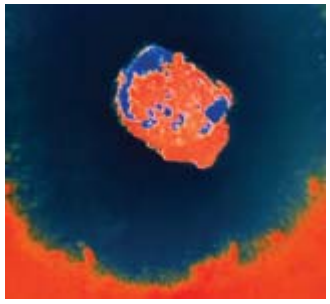
- Centers for Disease Control and Prevention
- World Organization for Animal Health—also the Office International des Epizooties (OIE)

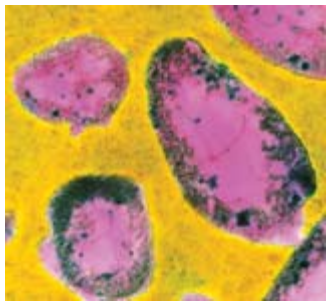
CDC and OIE Lists

- Potential for use in an agroterrorism attack
- An agent could be chosen if it:
  - Is easily obtainable
  - Is easily cultured
  - Is easily dispersed
  - Causes illness and death
  - Causes economic hardship
  - Has been previously weaponized

CDC Category A Agents

- Anthrax*
- Botulism*
- Plague*
- Smallpox
- Tularemia*
- Viral hemorrhagic fevers and arenaviruses (e.g., Ebola, Marburg)





** Especially well suited for use in agroterrorism*

Ricin

- Toxin derived from the castor bean plant
- Forms: powder, mist, pellet, or dissolved in water or weak acid
- Not affected by extreme conditions/temperatures
- Accidental exposure is highly unlikely
- CDC Category B agent

Ricin found in the Office of Senate Majority Leader Bill Frist (February 2004)

- Ricin was identified prior to causing any illness
- No perpetrator has been identified
- Technology is readily available to obtain and prepare ricin for use as a WMD

Botulism

- Occurs after ingestion of *Clostridium botulinum* toxin
- Most potent toxin known
- CDC Category A agent

Botulinum Toxin as a Weapon

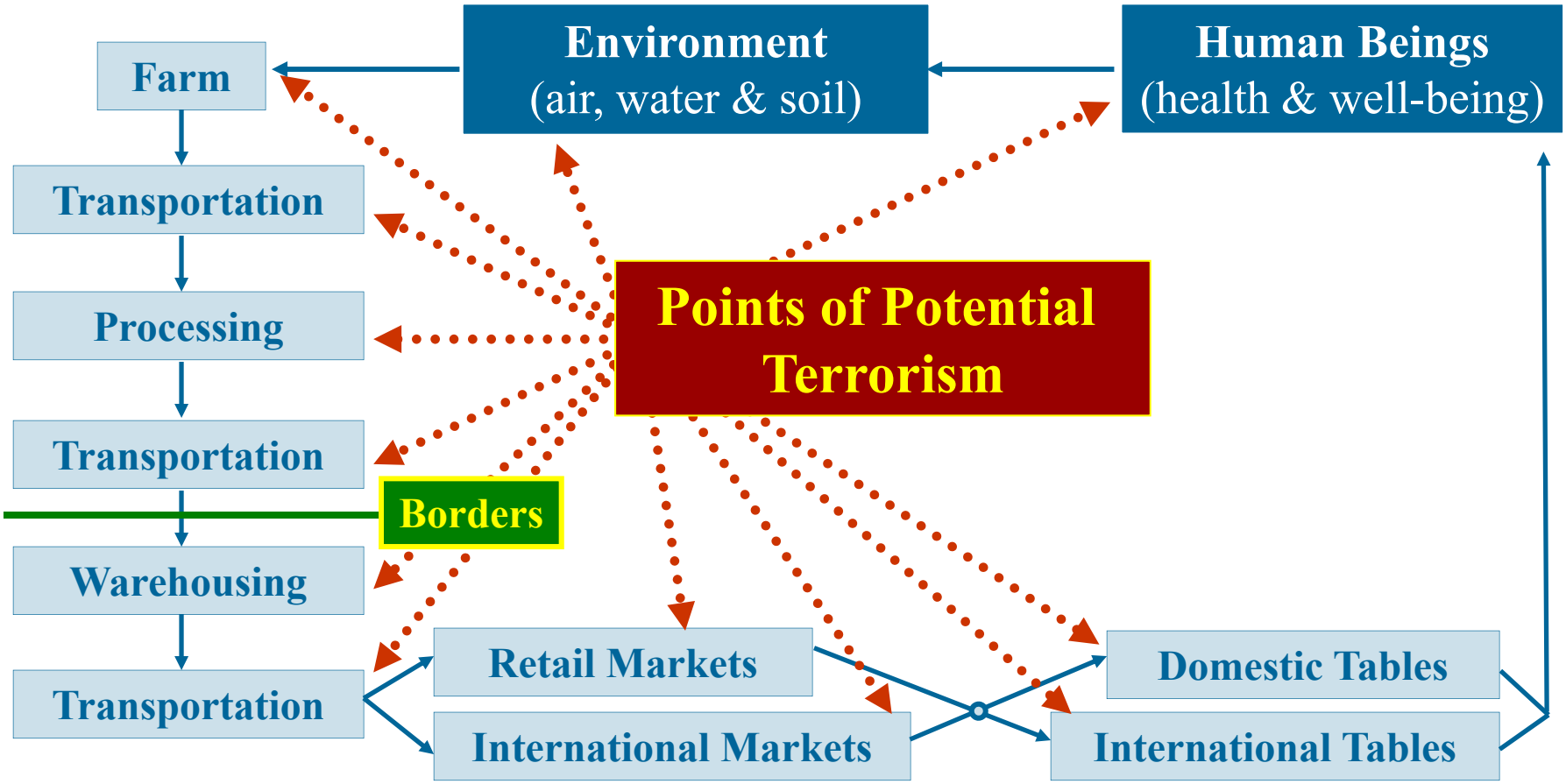
- Outbreaks of foodborne botulism usually caused by eating contaminated home-canned foods
- In the U.S., about 110 cases of botulism are reported on average each year; approximately 25% are foodborne
- Toxin could be used to contaminate food and cause disruption

Explosive Threats

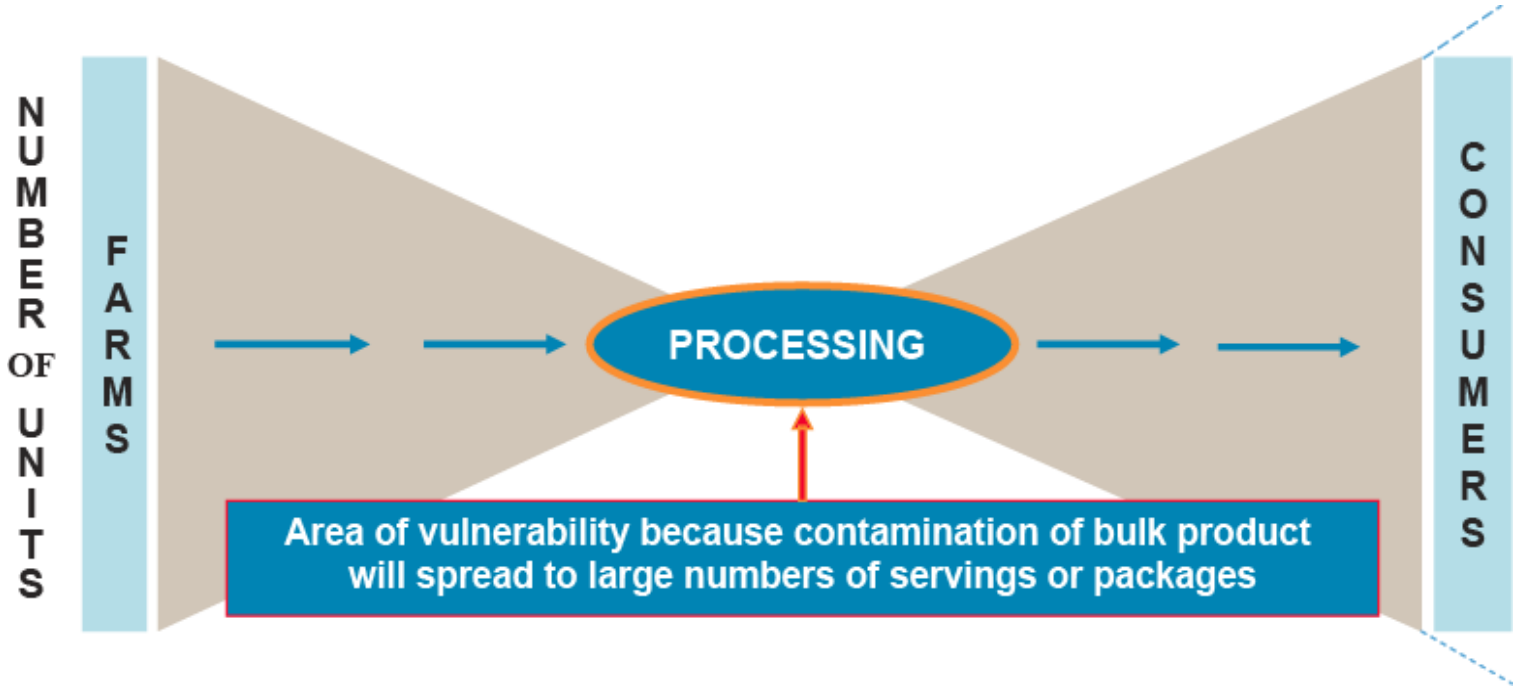
- Favored method of domestic terrorists
- Vulnerable sites:
  - Production units
  - Transportation
  - Processing and distribution sites
  - Marketing centers
  - Research labs
- Fertilizers are important because they can be used in producing explosives

Farm to Table

A New Food Continuum



Effect of Concentration of Processing on Consumer Vulnerability



Concentration of product and facilities increases the danger of a contamination incident reaching more consumers.

RISK

- **Capability + Intent = THREAT**
  - Capability to carry out attack
  - Intent to carry out an attack
- **THREAT + Vulnerability = RISK**
  - Threat is defined above
  - Vulnerability is the accessibility of the target to the attacker

CARVER plus Shock

- Target prioritization tool
- Assesses vulnerabilities
- Helps identify the most attractive targets to attackers
- Identifies the most vulnerable points in your agricultural infrastructure

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CARVER plus Shock, *cont.*

1. **C**riticality
2. **A**ccessibility
3. **R**ecuperability
4. **V**ulnerability
5. **E**ffect
6. **R**ecognizability
7. **Shock**

CARVER plus Shock Analysis

Step 1. Establish Parameters

– Parameters include:

- Food supply chain element or agricultural facility being assessed
- Endpoint of concern
- Type of attacker and attack being protected against
- Agent(s) that might be used

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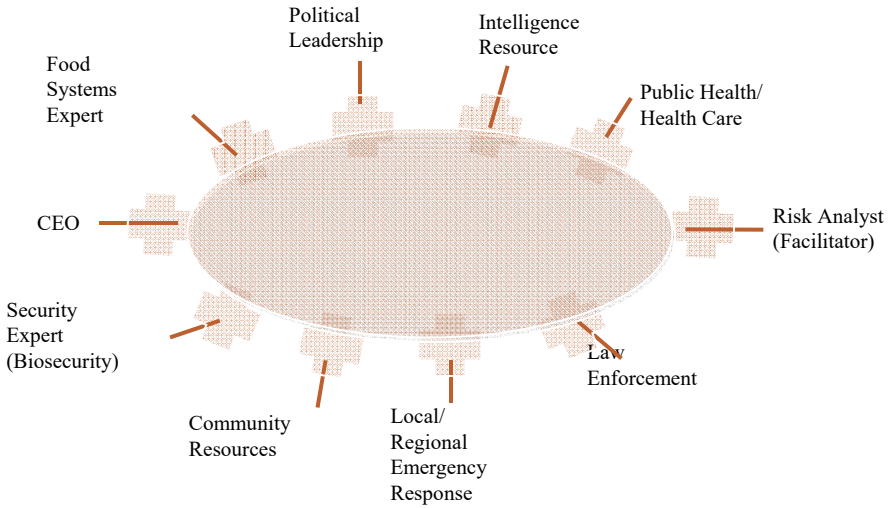
CARVER + Shock Analysis, *cont.*

Step 2. Assemble Experts

– Compile a team of subject matter experts to conduct the assessment

- Knowledgeable of the food supply and CARVER + Shock



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CARVER + Shock Analysis, *cont.*

Step 3. Detail Food Supply Chain

- Develop a description (e.g. flow chart) of the system under evaluation:
  - The system and its subsystem
  - Complexes
  - Components
  - Nodes

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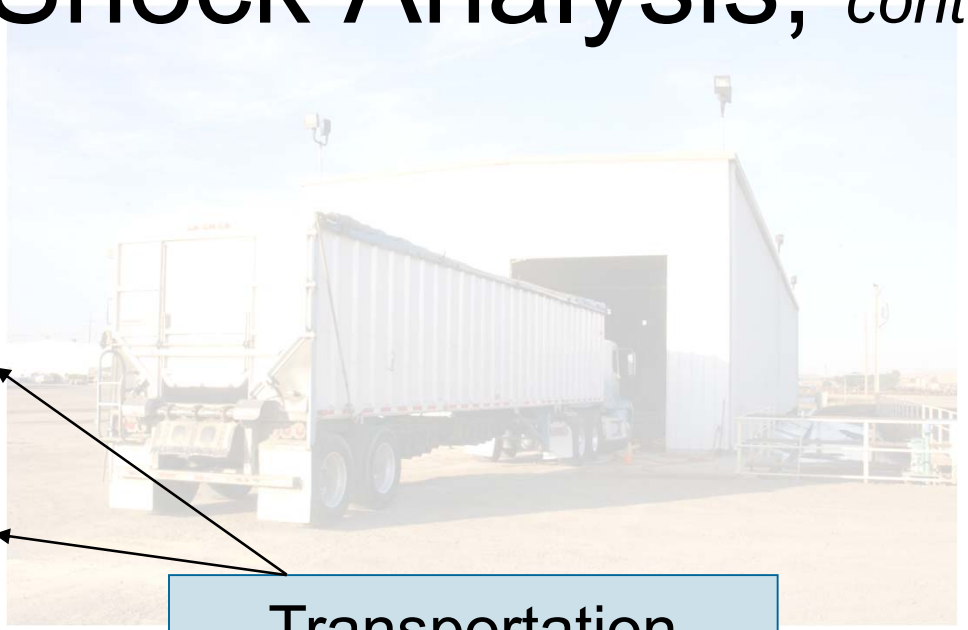
CARVER + Shock Analysis, *cont.*

Step 3, *cont.*



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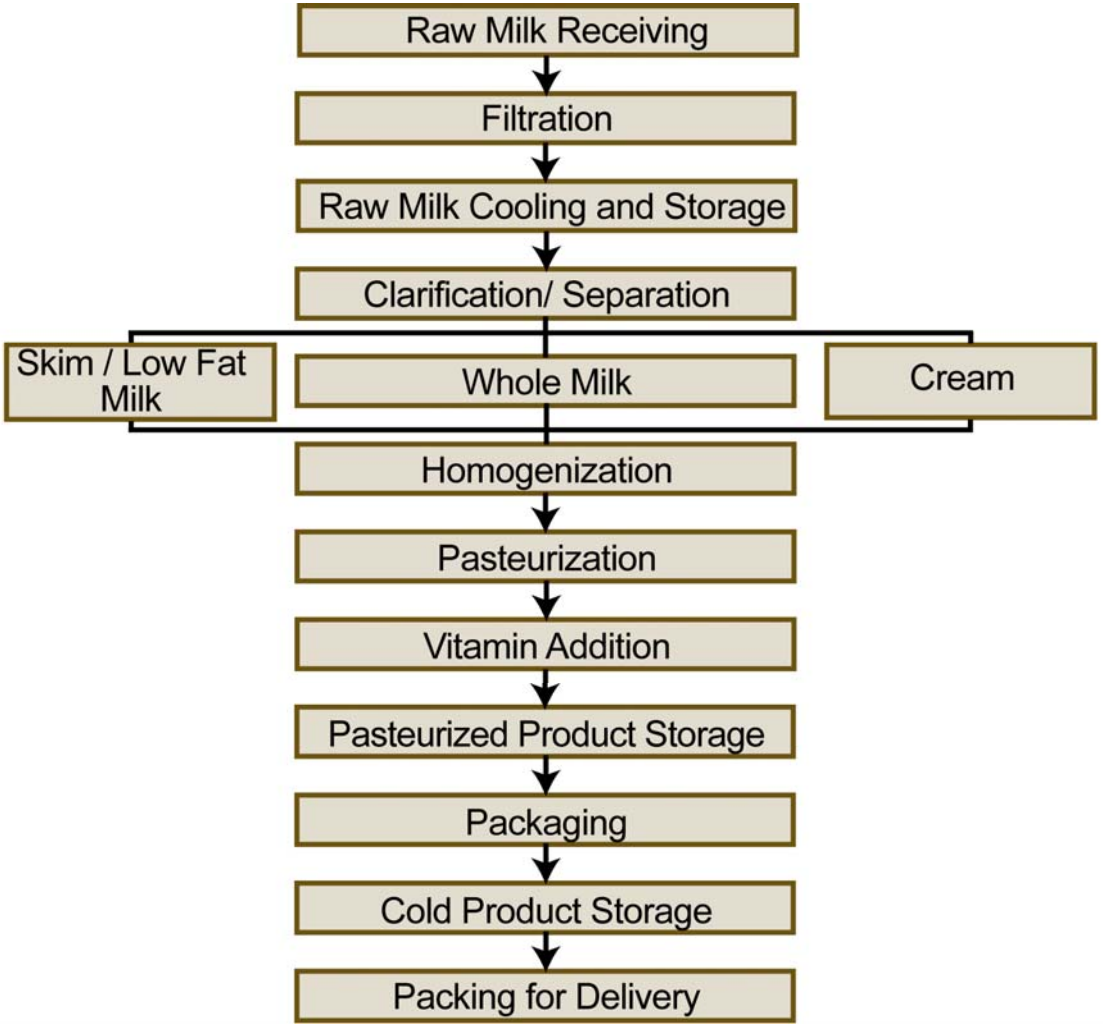
Process Flow for a Typical Milk Processing Plant



CARVER + Shock Analysis, *cont.*

Step 4. Assign Scores

- Rank or score individual parts for each of the seven CARVER plus Shock attributes to calculate an overall score for that node
  - The highest overall scored nodes are potentially the most vulnerable

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CARVER + Shock Analysis, *cont.*

Step 5. Calculation of Final Values, Interpretation, and Lessons Learned

- Assign overall value for each node
- Compare and rank the vulnerability of nodes relative to each other
- Develop countermeasures

FDA Food Security Guidelines

Released 2003 to help prioritize preventative measures

1. Food Producers, Processors, and Transporters
2. Importers and Filers
3. Retail Food Stores and Food Service Establishments
4. Dairy Farms, Bulk Milk Transporters, Bulk Milk Transfer Stations, and Fluid Milk Processors

FSIS Food Security Guidelines

Recommend that a facility security plan identify:

- Potential hazards—biological, chemical, and physical
- If control is possible at the point(s) of hazard

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FSIS Guidelines, *cont.*

Recommend that a facility security plan determine:

- The most effective point to exert control
- The method, frequency, and limit needed
- Where and how often monitoring and verification of the established limits should occur
- Corrective and preventive actions needed

Local Intelligence Networks

- It all starts and ends locally
- 85% of our nation's critical assets are privately owned
- Two-way communication is the key

Agency Based Input into the Fusion Center

- Public Safety -- the TLO
- Other Government Agencies – TLO at Your Level
- Private Businesses and Corporations – InfraGard

Prevention Strategies

- Awareness of biological and chemical agents easy to introduce
- Key agricultural and food systems groups need to actively participate
- Key members must understand their roles to harden targets and reduce vulnerabilities

Physical Security Measures

- Critical in protecting infrastructure, but effectiveness and cost must be assessed.
- Some basic needs include:
  - Hardening of vulnerable elements and/or triggers for worst-case consequences
  - Multi-layered, redundant security systems
  - Secure and effective perimeters

Prevention Strategies, *cont.*

- Use assessment process
- Target mitigation measures
- Incorporate security
- Involve local law enforcement
- Address emergency response issues
- ***Enhance biosecurity***

What is a Biosecurity System?

Biosecurity: the strategies, functions, practices, and facilities to keep harmful substances out of the food supply

Implementing Biosecurity

- Four principles to address:
  1. Sanitation
  2. Security and Protection
  3. Monitoring the System
  4. Communication
- Applicable to the entire food system, farm-to-table

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Security and Protection, *cont.*

- Plan ahead:
  - Emergency response plans
    - Security breakdowns
    - Contamination protocols
  - New employee training procedures
  - Business plan changes

Biosecurity System Monitoring

– Is the system working? Monitoring includes:

- Checking employees' performance of procedures
- Evaluating outcomes of procedures
- Cost/benefit analysis
- Threat assessment
- Risk management
- Other tests and evaluations

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Emergency Operations Plan (EOP)

- Details roles, responsibilities, and tasks
- Contains protection information for citizens, property, animals, and the food supply
- Describes potential actions for natural or technological hazards
- Development and testing of a plan is key

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EOP, *cont.*

- A local EOP is essential
- Use of resources without a plan is of little value
- A plan avoids duplication of resources and response
- A plan allows quick and effective integration of all efforts and resources

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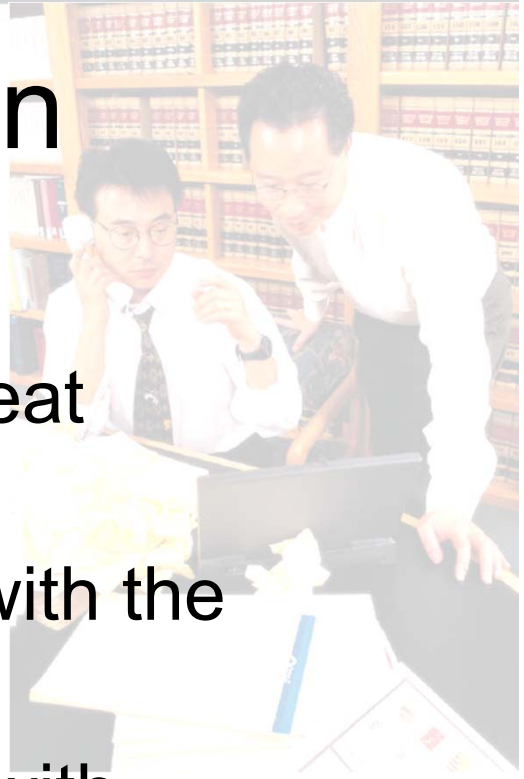
EOP, *cont.*

- A written EOP should cover all aspects of emergency management and all types of emergencies
- Remember, the plan:
  - Consists of sections for individual operational responders
  - Consists of components that follow the same format
  - Involve all levels of government and the private sector

EOP Guidance for Food Emergencies

- The National Association of States Departments of Agriculture (NASDA) developed a Food Emergency Response plan template
- Released February 2006

Evaluating the Plan



Periodically evaluate the plan to:

- Review risks based on current threat information
- Compare implementation results with the planned actions
- Compare test exercise outcomes with planned roles, responsibilities, and actions
- Reflect changes in organizational roles and responsibilities

Case Study: Attack on the Food Supply

- Health Departments in several communities have received
- calls from local hospitals
  a large number of
- cases of patients with severe
  gastrointestinal illness
- State Department of Health contacts CDC and learns of three surrounding states with similar outbreaks
- Milk distributed to schools and sold in grocery stores is linked to the outbreaks
- Laboratory tests confirm ricin as the causative agent

Questions for Discussion

1. What agencies are key initial contacts in a suspected attack on the food supply (processing/storage/transport/retail)?
2. What agencies would be involved with the following actions in a food contamination incident? Product Stop Sale, Testing, Recalls, Traceback/Traceforward, Product Removal and Disposal, Cleaning and Disinfecting
3. What laboratory resources are available to assist in food tampering investigations (local, state and federal)?

Principles of Preparedness for Agroterrorism and Food Systems' Disasters

Attack on Food Supply – Federal & State Agencies

- CDC
- FBI
- FDA
- DHS
- State Dept. of Health & State Dept. of Ag
- FSIS
- Customs and Border Protection