


ADVANCING ENV. HEALTH TRAINING IN EMERGENCY RESPONSE & HAZMAT

Hoa Tan, CA Dept of Public Health; Megan Floyd, Sacramento County EMD;
Aleem Shafi, Yolo County EH; Deborah Anderson, CA Dept of Public Health
Th-12
February 29, 2024



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Wastewater Learning Objectives

- Identify wastewater issues
- Recognize Environmental Health roles
- Consider response actions




Sewage overflow in Roswell, Georgia
alongside the Chattahoochee River. Courtesy USGS




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Wastewater Module Outline

- Reasons for Concern:
Why should we care?
- Role of Environmental Health
- Types of Wastewater Treatment Systems (public and onsite)
- System Vulnerabilities
- Responding to Wastewater Emergencies



Impacted Storm Drain
Courtesy EPA



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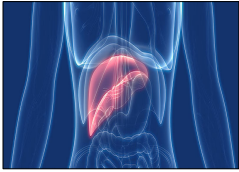
Why Should We Care?
What is in Wastewater?

Pathogens

- **Bacteria** – E. Coli, Salmonella, Typhoid fever, and Cholera
- **Viruses** – Hepatitis A
- **Fungi** – Aspergillus
- **Parasites** – Roundworms, Cryptosporidium, Giardia

Chemicals

- **Heavy Metals** – Lead, Mercury, etc.
- **Hydrocarbons** – Petroleum, fuels



Viral Hepatitis Inflammation of Liver
Courtesy CDC

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Why Should We Care?
Contaminant transmission



Wastewater spill following Hurricane Katrina
Courtesy FEMA

- Sewage spills are point sources
- Contaminants are:
 - Transported from point source
 - Introduced into living and food service areas
 - Not always recognizable by odor or appearance

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Why Should We Care?
Think BEFORE the Disaster!



Pumping due to power loss at main lift station, Connecticut
Courtesy FEMA

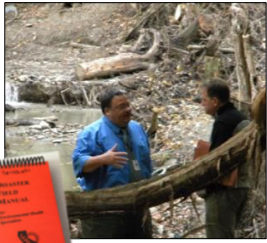
- Learn about potential sources
- Think about system vulnerabilities
- Consider possible actions
- Understand the "why"
- Meet the "who":
 - Establish partnerships with knowledgeable experts

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Role of Environmental Health

- Prevent disease and injury
- Protect against water contamination
- Ensure proper wastewater treatment and disposal
- Provide emergency information on treatment and handling
- Conduct interventions to protect the public in homes, food service and other industries



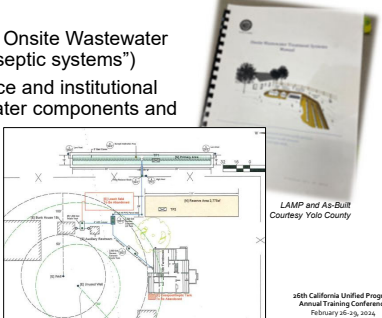
*EH Responders, New York
Courtesy FEMA*

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Role of Environmental Health

- Maintain local records Onsite Wastewater Treatment Systems ("septic systems")
- Provide field experience and institutional knowledge of wastewater components and issues
- Maintain partnerships with industry experts




*LAMP and A2-Built
Courtesy Yolo County*

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**Wastewater System:
Public Sewer System**

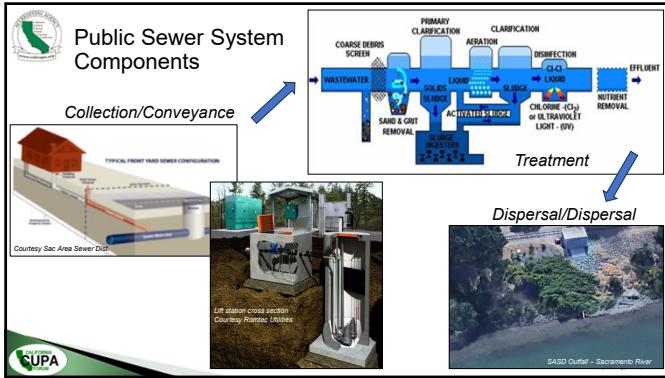
- Wastewater is:
 - Collected
 - Treated
 - Discharged
- Large-scale
- Permitted by RWQCB
- Dependent upon: power and operators



Regional Wastewater Treatment Plant, Elk Grove

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Public Sewer System

Let's think ahead....

- Identify systems in your area and relevant components from utility maps
- Understand key partner roles
- Consider areas of need (disadvantaged communities, hospitals, elder care, schools) and prioritize
- Recognize aging infrastructure

3rd Party Program Engineering Conference 12/20/19, 10/20

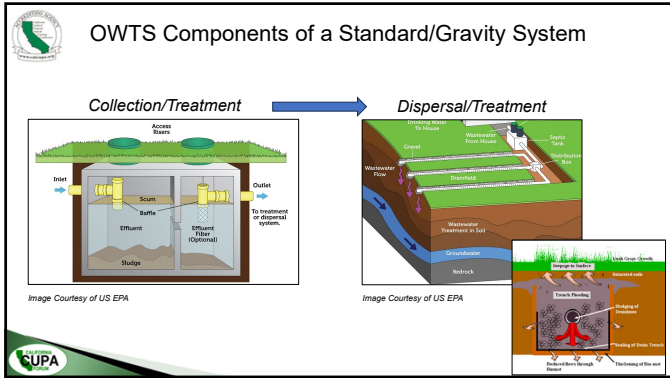
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Wastewater System: Onsite Wastewater Treatment Systems (OWTS) / "Septic Systems"

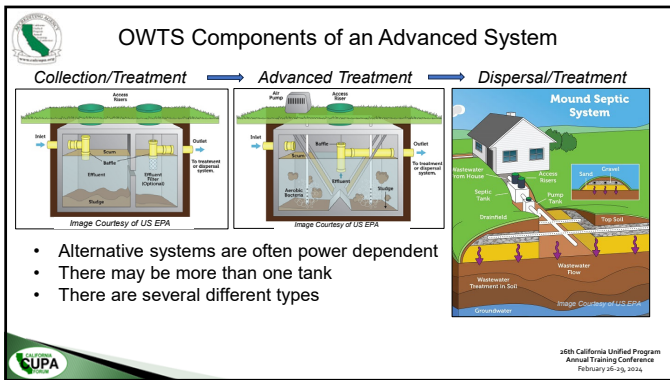
- Wastewater is:
 - Collected
 - Treated
 - Discharged
- Small-scale
- Permitted by local agency
- System could be gravity, pump-to-gravity, or pressurized

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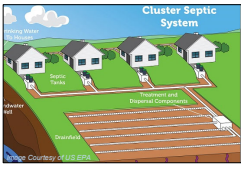
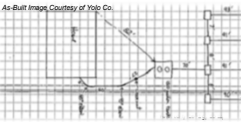
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OWTS / Septic Systems
Let's think ahead....

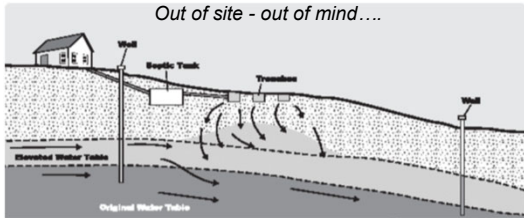
- Identify local OWTS types
- Understand key partner roles
- Prioritize disadvantaged communities, schools, etc.
- Provide messaging to the property owners and operators
- Recognize aging infrastructure and unpermitted systems

As-Built Image Courtesy of Job Co.

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System Vulnerabilities, Failures & Considerations
Out of site - out of mind....



Compromised systems = lack of treatment and contaminated water

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Public System Vulnerabilities, Failures & Considerations: Floods




- Collection system can be overloaded
- Flood waters could overwhelm treatment plant
- Power dependent system


Pictures courtesy FEMA

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OWTS System Vulnerabilities, Failures & Considerations: Floods

- OWTSs will not work when underwater
- Septic tanks will "float" if pumped during flood conditions
- Homeowners may try to divert water away from their home



Flooded yard, Memphis TN
Courtesy FEMA



Flood water diversion, North Dakota
Courtesy FEMA

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Responding to Wastewater Emergencies
Job and Public Safety



Open unmarked septic tanks after fire damage



Marked tank lids - but was EH consulted?




Flooded roadways

Point Pleasant Area Flooding 2016/17
Courtesy of Sac County EMD


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Responding to Wastewater Emergencies
Job and Public Safety



Open unmarked septic tanks after fire damage



Marked tank lids - but was EH consulted?




Flooded roadways

Point Pleasant Area Flooding 2016/17
Courtesy of Sac County EMD

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Responding to Wastewater Spills Assessment



Survey of damage
Courtesy FEMA

- Prioritize imminent health hazards
- Consider vulnerable populations/communities. Identify local languages, etc.
- Recognize community-wide impact on systems for response and recovery

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Responding to Wastewater Spills

- Messaging is important
- Know your resources
 - Proper clean-up
 - Sampling
- Flood waters pose risks
 - Infectious Diseases
 - Chemical Hazards
 - Physical Injuries



Residents in flood water. Home
Courtesy FEMA

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Alternative Means of Managing Wastewater
When normal wastewater systems are inoperable.



Modify an existing toilet



Build a homemade Port-a-John



Use of porta-potties
Images Courtesy of FEMA



Use campers/motor home holding tanks

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Alternative means of managing Wastewater
Holding Containers – Non-discharging Units

Picture courtesy FEMA

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Plan Ahead
BEFORE the Emergency

Partner meeting, Alabama
 Courtesy FEMA

- Identify key partners:
 - Environmental Health
 - Public works and utility agencies
 - Licensed contractors / sewage haulers
- Know wastewater operations
 - RV Parks
 - Treatment Plants
 - Local CSAs or CSDs
- Understand the role of other state and local departments

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Take Aways:

- Plan for wastewater issues during disasters/emergencies
- Meet your Subject Matter Experts (SMEs) and agencies
- Identify underprivileged communities and create trusted partnerships
- Establish messaging templates
- Cross-train

FEMA Specialist assists homeowner, New Jersey
 Courtesy FEMA


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Module Summary

- Injury and disease prevention is critical during disaster response and recovery
- Environmental Health plays a critical role in community response and recovery operations, helping to restore buildings and communities to safe and sanitary conditions.
- Think about planning now - Don't wait until the disaster occurs!




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Questions?




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Food Safety – Learning Objectives

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Some Considerations



**POWER
OUTAGE**



AFTERSHOCKS









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 - Norovirus, Salmonella, Shigella, etc.

Germ Farm

Scrub'em!
www.kids-handwashing.com

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Disaster feeding may NOT meet your code!

<https://www.cdeh.com>




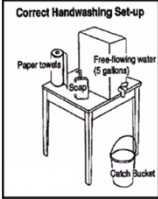
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Centralized Kitchen

Base Camp

Mobile Kitchen

Pop-Up Food Service

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Environmental Health and Safety

- Environmental health and safety professionals
- Environmental health and safety professionals
- Environmental health and safety professionals

Field Tips:
Use professionalism, sensitivity, and flexibility in working in harsh conditions with stressed managers, workers, and clients

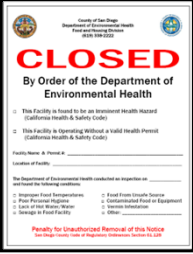




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Environmental Health and Safety

- Environmental health and safety professionals
- Environmental health and safety professionals
- Environmental health and safety professionals
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- Environmental health and safety professionals
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- Environmental health and safety professionals



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Environmental Health and Safety

- 40% of businesses do not reopen following a disaster*
- 25% fail within one year*
- over 90% of companies fail within two years of being hit by a disaster if they don't reopen within 5 days**

* According to Federal Emergency Management Administration (FEMA)
** According to U.S. Small Business Administration

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Any Questions?


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**Drinking Water -
Learning Objectives**

- Recent Responses
- Drinking Water Regulations
- Drinking Water Concerns
- EH Functions
- Key Partners
- System Assessments
- Resources
- Public Messages




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Roles

- Discuss environmental health issues related to drinking water to improve the necessary knowledge to perform drinking water related activities during emergencies
- Discuss available resources during disaster response



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STATE WATER BOARD
Division of Drinking Water

4 Branches



- Program Management
- Envir. Lab. Accreditation Program (ELAP)
- Technical Operations Section
 - Safe and Affordable
- Quality Assurance Section
- SAFER Drinking Water Program
 - Northern Field Operations
- 2 Sections
 - 10 Districts
 - Southern Field Operations
- 3 Sections
 - 14 Districts

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Public Water System (PWS)

- Serves 25 or more people at least 60 days of the year.
- Meet At Least One of the Following:
 - Have Its Own Source
 - Treats the Water
 - Sells the Water

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PWS types

- Community Water System (CWS)
 - Serves 15 or More Service Connections Used By Yearlong Residents
 - Or Serves 25 or More Yearlong Residents
- Noncommunity Water System
 - Non-Transient Non-Community (NTNC)
 - Serves 25 or More of the Same Persons For More Than 6 Months
 - Transient Non-Community (TNC)
 - Serves 25 or More Persons For More Than 60 Days Per Year

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Reasons for Concern

Disaster-Related Damage

- Earthquake, Fire, Flood, Terrorism, Climate Change & Drought

Existing Concerns


- Aging water and wastewater infrastructure
- Population growth
- Frequency of natural disasters
- Public Safety Power Shutoff (PSPS)




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Environmental Health Roles




COORDINATE WITH OTHER AGENCIES




ASSESS DISASTER IMPACT ON REGULATED WATER SYSTEMS




ENSURE ADEQUATE SUPPLY OF SAFE WATER IS AVAILABLE TO THE PUBLIC & RESPONDERS




PREVENT WATERBORNE DISEASES



PROVIDE INFORMATION ON DRINKING WATER SAFETY




PROVIDE WATER SYSTEM STATUS INFORMATION TO STATE AGENCIES






ASSIST REGULATED WATER SYSTEMS WITH RECOVERY

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Priority Activities in Emergencies

- Assess water systems/Assist operators
- Collect/Interpret sample results
- Provide public information on water disinfection, etc.
- Coordinate with key partners
- Monitor needs and arrange for emergency water supplies

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Disaster Response

Contact	Coordinate	Communicate
<p>Contact with potentially effected systems to gather:</p> <ul style="list-style-type: none"> status of system, immediate needs, and communicate regulatory expectations 	<p>Coordinate issuance of unsafe water notices for systems impacted</p> <p style="text-align: center;">With EOC/ DOC</p>	<p>Provide water system status information to local and state emergency management officials</p> <p>CalWARN CUEA (CA Utilities Emergency Association)</p>



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- Local Agencies** - Environmental Health/Local Primacy Agencies (LPA), Health Officer/Health Dept., OES
- State** - California Department of Public Health (CDPH, California Office of Emergency Services (OES), Water Board DDW 24 District Offices
- Water Utilities**
- Other** - Volunteer Organizations, Industry, Media



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Response Process

Water system/
private wells
impacted

LPA or other local
regulatory agency
responds


State Drinking
Water Program
requested or
responds directly if
no LPA

Notifications made to Local Health Dept., CDPH, CalOES




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Boil Water Notice

- Bacteriological Contamination
- Rolling boil for one minute*
Or chemical disinfection
- Issued by utility/ regulatory agency due to:
 - system depressurization
 - lack of adequate surface water treatment
 - pipe breaks
 - other contamination enters pipes



*In cases of high elevation, boiling time will need to be increased



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Do Not Drink Notice




- Acute contamination (nitrate, nitrite, perchlorate)
- Use alternative source
- Can use water for other purposes other than drinking or food preparation



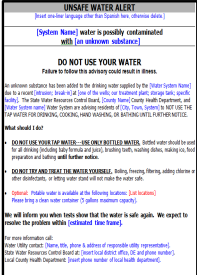
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Do Not Use Notice

- Water not to be used at all for any purpose
- Cross connection concerns
- Unknown chemical contaminants
- Or presence of known contaminant
- Could be due to system depressurization in conjunction with one of above
- Implication for community







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Hauled Drinking Water

- Potable Water haulers regulated by CDPH FDB
- Tanks must be food grade
- 0.3 mg/L chlorine residual minimum
- Source: Permitted public water systems
 - Source of water (treatment plant vs. hydrants).
 - Manifests showing source, disinfection test results.
 - Chlorine residual/re-chlorination may be needed before use

List of Potable Water Haulers licensed by CDPH can be found at:
<https://www.cdph.ca.gov/Programs/CEH/DFDCS/CDPH%20Document%20Library/FDB/FoodSafetyProgram/Water/CountyList.pdf>

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Bottled Water/Bladder Tanks (Temporary Storage)





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Emergency Water Disinfection

USEPA Guidance


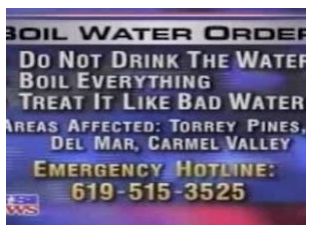
- Unscented household bleach (5 - 6% chlorine)
- Clear water: 8 drops to 1-gallon water
- Cloudy water: Filter through cloth first then disinfect as above
- Typically, 30 minutes of chlorine contact time is required for optimal disinfection




<https://www.epa.gov/ground-water-and-drinking-water/emergency-disinfection-drinking-water>

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Public Information

- Health advisories may be needed
- Be accurate, clear, brief
- Agreement with other agencies is ideal
- For example: How long should water be boiled?


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Emergency Water Quality Sampling Kit (EWQSK)

- Maintained by DDW
- For testing of intentionally introduced contaminants/ terrorism.
- Hazmat personnel can use the kit
- DDW provides training on the purpose, capabilities and use of the EWQSK.
- Located at DDW district offices
- Understand responsibilities in response



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Rancho Marina Mobile Home Park Fire – Disaster Response

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 **Rancho Marina Mobile Home Park**

- Located at 395 W Brannan Island Road, Isleton 95641
- Community water system that serves 77 structures with approximately 150 year-long residents
- Treats groundwater for arsenic, iron, and manganese removal




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 **Initial Damage**

- 42 of the 77 structures were destroyed during the fire
- This included 30 mobile homes, 8 RV's, a laundry room, the water treatment plant
- All power, water, and wastewater disposal was damaged during the fire

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EOC

EMD has 2 roles

- Hazardous Materials/ Hazardous Waste
- Environmental Health

Environmental Health role in Public Health Unit

- Monitored and coordinated with American Red Cross, opening shelters
- Ordered Bottled water for Point Pleasant and Wilton areas of the county
- Ordered Bleach for private well disinfections
- Provided direction for field staff

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DOC

- The purpose of the DOC is to determine objectives and tactics
- Developing of an Action Plan
- Activated DOC
- EMD's Action Plan
 - Conduct facility damage assessments
 - Conduct well assessments
 - Conduct water sampling for private water wells
 - Provided guidance documents for well disinfection
 - Provided bottled water and bleach

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Floods

- Provided guidance information for addressing the following:
- Flooded water wells- both private residences and water systems
- Septic systems
- Food handling
- Hazardous Materials and Hazardous Waste management

As an inspector you may be asked to help in areas that are out of your specific area of expertise. You will need to be able to provide guidance or know how to get the information that is being requested.



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ADVANCING ENV. HEALTH TRAINING IN EMERGENCY RESPONSE & HAZMAT

Hoa Tan, CA Dept of Public Health; Megan Floyd, Sacramento County EMD;
Aleem Shafi, Yolo County EH; Deborah Anderson, CA Dept of Public Health
Th-12
February 29, 2024



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HazMat - Learning Objectives


EH Roles in Managing Hazardous Material Releases After A Disaster

- Disaster Hazmat concerns
- EH roles and priorities
- Key partners
- Assessment, mitigation, cleanup
- Resources
- Job Safety
- Terrorism



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Disaster Hazmat Concerns

- Household hazardous waste (HHW) including Pesticides, Cleaning products
- Guns / ammo
- Universal wastes (white goods/ appliances)
- Building materials (asbestos, LEAD)
- Vehicles: Fuels
- Soil (Arsenic)
- Radioisotopes




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 **Disaster Hazmat Concerns**

- Transportation
- Trains, Trucks, Boats, Cars, etc.
- Fixed Facility chemicals
- Oil and hazardous substances
- Commercial cleaners, auto repair, paints, solvents, pools



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 **Disaster Hazmat Concerns**



2023, Benicia Oil Refinery, KGED

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 **Disaster Hazmat Concerns**




2023, Palestine Ohio, Gene J. Puskar, AP

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 **Disaster Hazmat Concerns**




2006, Louisiana Department of Environmental Quality

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 **Fire Ash/Debris is Hazardous!**






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 **Disaster Hazmat Concerns**

- CHEMICAL RELEASES
- BIOLOGICAL AGENTS
- RADIOLOGICAL/ NUCLEAR
- EXPLOSIVES



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 **NA-TECH**
(Natural Hazard Triggering Technological Disasters)



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 **Restoration Priorities**



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 **Reasons For Concern**

- Multiple types of HazMat
- Multiple sources
- Exposure to people
- Environmental contamination

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EH Functions

- **Protect public health, environment and property**
- **Protect yourself, coworkers**
- **Assess, Collect, Segregate, Clean up and Dispose**
- **Regulatory Oversight/ Surveillance**
- **Inform public of health risks**
- **Community / business recovery**

Work within your training and capability!




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Priority Activities


Locate & ID Hazmat




Evaluate health risks & safety hazards




Provide technical assistance




Notify agencies & advise leadership




Assessment/Mitigation



Info to public





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Key Partners

- **LOCAL: OES, Health Dept., Fire Dept., Law Enforcement**
- **STATE: Cal OES, Cal/EPA, CHP, Cal. Dept. of Fish and Wildlife (DFW), Cal. National Guard Civil Support Team**
- **FEDERAL: U.S. EPA, U.S. Coast Guard, FEMA**

Emergency Support Functions (ESF 10 – Oil and Hazmat)

- **OTHER: Industry , Media, Volunteer and community organizations**



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Suspected HazMat Release




- Safe approach
- Isolate area & deny entry
- Notify appropriate agency
- Establish temporary command

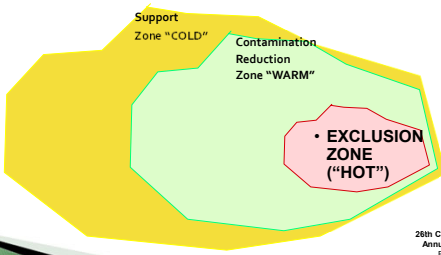



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Control Zones





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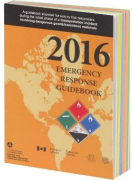

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Chemicals in Transport

Emergency Response Guidebook
Generic Chemical Information
UN Number Listing
Placard Identification

- Yellow Section – ID #
- Blue Section – Chemical Name
- Orange Section – Guide #
- Green Section – Isolation Distance





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Identifying Hazardous Materials

Labels



National Fire Protection Association (NFPA)



DOT Placards



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Remember

Situation Not Always Recognized as Haz Mat Release!!

- Some HazMat is odorless, colorless & tasteless!
- You may be exposed before you know it!
- Approach Uphill, Upwind, Upstream
- PPE Required by Law

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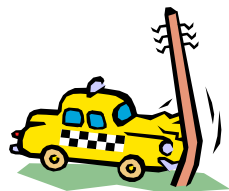
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Remember

Situation Not Always Recognized as Haz Mat Release!!


Many reported as:

- Traffic accident
- Medical aid
- Fire,
- Person down, etc.





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 **Protective Actions**

1. Evacuation
2. Shelter in Place
3. Decontamination



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 **Shelter-in-place VS Evacuate**



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 **Initial Assessment**

Unknown Environment?

OSHA requires screening for:


1. Radiation
2. Hydrogen sulfide
3. Carbon monoxide
4. Flammability
5. Oxygen

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 **Facility Assessments**


- Facility / equipment operable?
- Structural damage?
- Chemical storage secure?
- Any safety hazards?
- Any releases?
- Releases contained / cleaned?
- Power supply available / interrupted?





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 **Disaster Hazardous Waste Cleanup**


 CalEPA
California Environmental Protection Agency



 Department of
 Toxic Substances
 Control





LOCAL
 PUBLIC HEALTH /
 ENVIRONMENTAL
 HEALTH

Disaster Funding available for:
 - Household Hazardous Waste Cleanup
 - Technical assistance

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 **Decontamination**

- Emergency Responders
- Victims/evacuees
- Equipment
- Environment



3-Step Process: Rinse, Wash, Rinse
 Capture wastewater, if you can

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 **Decontamination**

Emergency "Decon"

- Use copious amounts of water
- Remove all clothing from victim



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 **Terrorism**

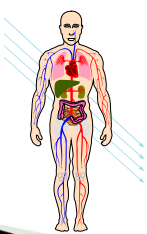
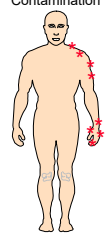
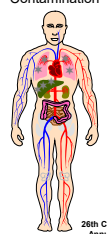
- Biological
- Chemical
- Radiological/ Nuclear


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 **Radiological Exposure:
3 Types**

Irradiation **External Contamination** **Internal Contamination**

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Rapid Epidemiologic Assessments After Chemical Releases


The ACE Toolkit: surveys, consent forms,
training materials, and Epi Info™ 7 databases

- Customizable
- The ACE team also provides training
https://www.atsdr.cdc.gov/ntsip/ace_toolkit.html




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Any Questions?

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