

EV 09 – Critical Incidents
Session 29 – Hazardous Materials Awareness
LD41 – Hazardous Materials Awareness

Revised: 12/09/19

Course Goal: To provide all recruit officers with the knowledge of Federal, State, City, and Department Policies and Procedures relating to the first responder at a Hazardous Materials Incident.

Session goal: To teach recruit officers how to recognize a hazardous materials incident, understand the hazardous that may be presented, and how to respond within their level of training.

Learning Objectives:

- Identify a hazardous materials incident **[41.I.A]**
- Identify the specific challenges that are presented by incidents involving hazardous materials **[41.I.B]**
- Recognize the roles and responsibilities of a First Responder at the Awareness level **[41.I.C]**
- Identify the primary pathways in which hazardous materials can enter the human body, including
 - Inhalation
 - Absorption
 - Ingestion
 - Injection **[41.I.D.1-4]**
- Identify precautions peace officers can take to protect themselves from contacting hazardous materials **[41.I.E]**

Session time: 4.0 hours

Resources Needed:

- Classroom with tables
- Audio/visual device
- Power point
- NA Emergency Response Guidebooks (one per student).

Summary:

This Summary consists of four blocks of instruction, which, upon completion, should allow the recruit officers to:

1. Recognize and identify a hazardous materials incident
2. Understand the health and safety issues as they related to a hazmat incident
3. Identify the specific challenges that are presented by incidents involving hazardous materials
4. Recognize the roles and responsibilities of a first responder at the Awareness level (as dictated by CA State standards)
5. Safely and competently respond to a hazmat incident within the student's level of training
6. Identify the primary pathways in which a hazardous material can enter body (Inhalation, Absorption, Ingestion, Injection)
7. Identify precautions that personnel can take to protect themselves from contacting a hazardous material.
8. Recognize the indicators of a hazardous materials incident, including, but not limited to the following;

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- a. NFPA 704 signs
 - b. Placards/Labels
 - c. Physical indicators
 - d. Witness/Involved party statements
 - e. Types of containers
 - f. Victims/Injuries/Signs or Symptoms
9. Understand how to utilize sources of information of materials present at a hazardous materials incident to include, but not limited to the following;
- a. Emergency Response Guide (DOT ERG)
 - b. Safety Data Sheets
 - c. Shipping Papers
 - d. Other Misc. Documentation
10. Recognize the guidelines for safely assessing and approaching a hazardous materials incident
11. Identify factors to consider when establishing a perimeter around a hazmat incident.
12. Identify types of control zones at a hazardous materials incident, including;
- a. Exclusion Zones
 - b. Contamination Reduction Zone
 - c. Support Zone
13. Recognize the notification required, and the type of information to be conveyed when identifying a hazardous materials incident
14. Recognize the roles required, and comprehend the implementation of the Incident Command System (ICS) at a hazardous materials incident.
15. Understand the hazards and recognition factors for the varying types of terrorist incidents, including;
- a. Chemical Warfare
 - b. Biological Warfare
 - c. Radiological incidents
 - d. Illicit use of Toxic Industrial Materials.

The learning activities are designed to provide the student with hands on use of the North American Emergency Response Guidebook. Generally, the students must be able to demonstrate that they can use the NA/ERG to conduct the following

Use the NA/ERG to:

Determine the primary/secondary hazard and initial isolation distance for a material given the following information;

1. Only the chemical name
2. Only the chemical UN ID number
3. Only the placard description
4. Only the transportation vehicle type

Use the NA/ERG to:

Determine the isolation and downwind protection distances for a chemical with a toxic inhalation hazard.

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Outline	Instructor Notes
<p>I. Intro: Peace Officers need to know the risks presented by hazardous materials and their role in responding to hazardous materials incidents [41.I]</p> <ul style="list-style-type: none">a. Understand the health and safety issues as they relate to a hazardous materials incident.b. Recognize and Identify a potential hazardous materials incidentc. Safely and competently respond to a Hazardous materials incident with given level of trainingd. Understand scene safety, scene isolation, and required notificationse. Understand and competently utilize the ERG <p>II. LAPD Hazardous Materials Unit Breakdown</p> <ul style="list-style-type: none">a. Personnel Resources (1 Sgt.II, 7 Police Officers 3's)b. LAPD Hazardous Materials Unit responsibilities (per LAPD Manual)<ul style="list-style-type: none">i. Respond to incidents involving the use, or potential use of chemical, biological, and radiological materials as well as traditional hazardous materials or substances for classifying or identifying the hazard/substance involvedii. Provide Hot Zone force protectioniii. Respond to and, in partnership with the Fire Department, mitigate dispersal mechanisms and potential hazards posed to Life, Environment, and Property.iv. Assist federal authorities in gathering and preserving evidencev. Conduct reconnaissance for, and assist the Bomb Squad in locating chemical, biological, and radiological dispersal devices,vi. Integrate with SWAT on tactical/dynamic incidents involving armed suspects with potential CBRN materials.vii. Investigation and enforcement of hazardous materials transportation safety laws and environmental crimes.viii. Provide First Responder Awareness Training to all Department Employees. <p>III. Section 1: What is HazMat?</p>	<p>As an introduction, Instructor will facilitate the class to develop a working definition for Hazardous Material and discuss prior experiences that students may have with such materials.</p> <p>Instructor will give general examples of how the Hazardous Materials Unit has been utilized in the field.</p>

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<ul style="list-style-type: none">a. A by-product of modern society providing great benefits to human kind. “Better living through chemistry”<ul style="list-style-type: none">i. However, which these benefits come associated hazards<ul style="list-style-type: none">1. Pesticides enable us to product greater amounts of food but are toxic to humans and pollute the environment.2. Medicines save countless lives but have toxic side effects.3. Chlorine is used in our pools and purifies our drinking water but has killed large quantities of people when used as a weapon or accidently released in a concentrated format.ii. Because of their use in everyday life, hazardous materials incidents occurb. There is no single definition for hazmat, as it is often defined by the agency regulated that type or location of material.<ul style="list-style-type: none">i. EPA Defines hazmat as, “Any substance which due to its properties may cause or significantly contribute to an increase in mortality or serious illness, or presents a substantial hazard to human health or the environment.”ii. DOT defines hazmat as “any substance or material in any form or quantity which poses an unreasonable risk to safety health and property when transported in commerce.”iii. OSHA defines hazmat as “any substance to which exposure results or may result in adverse effects on the health or safety of employees.iv. The best “WORKING DEFINITION” to be used, “Any material outside normal safe	
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<p>containment in sufficient concentration that may pose a serious and immediate threat to life, environment, or property.”</p> <p>IV. Identify a hazardous materials incident [41.I.A]</p> <ul style="list-style-type: none">a. Any emergency involving the release or potential release of a hazardous material presenting a threat to life, environment, or property.b. Examples:<ul style="list-style-type: none">i. Large Chlorine Gas releaseii. Weaponized chemical agentsiii. Boiling Liquid Expanding Vapor Explosion (BLEVE)c. Similarities/Difference in relation to other Incidents<ul style="list-style-type: none">i. Differences<ul style="list-style-type: none">1. Incidents are not always reported as a hazmat incident2. Require specialized personnel and equipment3. Exposure symptoms may not materialize for yearsii. Similarities<ul style="list-style-type: none">1. Think Safety: First, Last, and always2. Initial Lack of control3. Inadequate initial resources4. Large populations may be affected <p>V. Identify the specific challenges that are presented by incidents involving hazardous materials [41.I.B]</p> <ul style="list-style-type: none">a. Often difficult to identify materialsb. Potential long and short term health effects	<p>Instructor will describe the process by which a BLEVE occurs and the threats posed by a BLEVE.</p>
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<ul style="list-style-type: none">c. Impact on public health and safety as well as the environmentd. Multiple hazards (fire, explosion, victim rescue, large scale evacuations, etc.)e. Levels of Response<ul style="list-style-type: none">i. Recognize the roles and responsibilities of a First Responder at the awareness level [41.I.C]<ul style="list-style-type: none">1. Basic Post Requirement for Peace Officers2. 4 hours of classroom instruction3. Defined as one who is likely to witness/discover a hazmat release, initiate notification and take NO FURTHER ACTION.4. Limitations of Responsibilities of Awareness Level Responders (S.I.N.)<ul style="list-style-type: none">a. Safety first, last, and alwaysb. Isolate and deny entryc. Notify – make necessary notification to specialized resourcesii. First Responder – Operational Level<ul style="list-style-type: none">1. 8 hours of instruction2. Has been trained to respond DEFENSIVELY to incidents to protect life, environment, and property.3. May respond defensively without trying to stop the release at the source.4. May work at a distance from the point of release to contain the	
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<p>released material.</p> <ul style="list-style-type: none">iii. Hazmat Technician<ul style="list-style-type: none">1. Additional 160 hours of training2. Establish Control Zones3. Work at the source of the leak to stop the leak and mitigate the threativ. Hazmat Specialist<ul style="list-style-type: none">1. Additional 80 hours of Training2. Specialist provide incident support and expertisev. Incident Commander<ul style="list-style-type: none">1. Additional 40 hours of training2. Able to assume command of a hazardous materials incident<ul style="list-style-type: none">a. Responsible for the conduct of the incidentb. Establish response goalsc. Coordinate responsed. Assumes responsibility for all personnel involved.f. Exposure vs. Contamination<ul style="list-style-type: none">i. Exposure - Being in the general area of a substance which may cause contaminationii. Contamination - Actually encountering the material. The amount of contamination depends on how much material is involved and how long it remains there.iii. Individual reactions to toxic materials - Because there is no average person every individual reacts differently when exposed. Factors that affect each person's	
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<p>susceptibility may include;</p> <ol style="list-style-type: none">1. Age2. Gender3. Physical condition4. Medical history5. Prior exposures <p>VI. Identify the primary pathways in which hazardous materials can enter the human body; including [41.I.D]</p> <p>a. Inhalation [41.I.D.1]</p> <ol style="list-style-type: none">i. Primary route of exposureii. Vapors and extremely fine particulates can be inhaled and rapidly absorbed into the body through the lungs.iii. Protective Actions<ol style="list-style-type: none">1. Stay upwind2. Remain alert to wind changes3. Wear appropriate PPE <p>b. Absorption [41.I.D.2]</p> <ol style="list-style-type: none">i. Absorbed through the skin or eyesii. Occurs when materials spill, are splashed, or drifts onto an exposed area of skin.iii. Protective Action<ol style="list-style-type: none">1. Remain Upwind, uphill, and upstream2. Wash exposed areas frequently3. Respond within level of training wearing appropriate PPE <p>c. Ingestion [41.I.D.3]</p> <ol style="list-style-type: none">i. Occurs when material is swallowed while responder is eating, drinking, smoking or	<p>Instructor shall facilitate examples of the difference between exposure vs. contamination.</p> <p>Instructors will discuss the nature of bioaccumulation (using Mercury as an example) to show the effects of Chronic exposure causing Schizophrenia.</p>
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<p>happen to touch there mouth or lips while at scene</p> <ul style="list-style-type: none">ii. Protective Actions<ul style="list-style-type: none">1. Avoid eating drinking, smoking, or chewing gum at scene2. Wash hands and face frequentlyd. Injection [41.I.D.4]<ul style="list-style-type: none">i. Hazmat enter the body when the skin is puncturedii. Protective Actions<ul style="list-style-type: none">1. Respond within the appropriate level of training wearing the right PPE2. Be cautious of sharp objectse. Acute vs. Chronic Effects<ul style="list-style-type: none">i. Acute<ul style="list-style-type: none">1. One-time, limited, or short-term exposure2. Effects generally manifest immediatelyii. Chronic<ul style="list-style-type: none">1. Continuous, recurring, or long-term exposures2. Effects appear years later (cancers, developmental disorders, etc.)f. Documenting Personal Exposures<ul style="list-style-type: none">i. Exposure Report – Every person who is exposed or who may have been exposed at a hazmat incident shall document their exposure.ii. Employee shall complete a 15.7 (exposure report) containing the following	<p>Explain the significance of inhalation vs. absorption by explaining that the surface area of the skin is approximately 20ft² whereas the surface area within the lungs is approximately 900 Ft².</p>
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<p>information;</p> <ol style="list-style-type: none">1. Exposed person’s name2. Date, time, and location of exposure3. Incident Number4. Name of hazardous material if known5. Type, concentration, and duration of exposure6. Method of decontamination and medical treatment received7. Specific task or duties performed at scene. <p>iii. Medical Evaluations</p> <ol style="list-style-type: none">1. Federal and State regulations require that First Responders be medically evaluated when;<ol style="list-style-type: none">a. Individuals are injured because of their exposureb. Experience symptoms which may be related to exposure. <p>BREAK</p> <p>VII. Section 2: Recognition and Identification</p> <ol style="list-style-type: none">a. Learning Need – Peace officers must become familiar with the indicators and warning systems that identify specific dangers of hazardous materials to respond safely and effectively to hazardous materials incidents [41.II]b. Recognize the indicators of a hazardous materials incident including, but not limited to [41.II.A]<ol style="list-style-type: none">i. Victims/Injuries [41.II.A.6]	<p>Instructor will discuss the nature of a puncture/open wound during a hazmat incident that may be considered an “injection” as it allows for direct access to the bloodstream.</p>
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<ul style="list-style-type: none">ii. Physical indicators [41.II.A.2]<ul style="list-style-type: none">1. Hissing, Pinging, or knocking of the outer container2. Fire, Smoke, Vapor Clouds3. Visible Leaks of containers used for Hazmat4. High pitched Operating Valve (Vessels transporting Hazmat)iii. Container(s) [41.II.A.5]iv. Additional Indicators<ul style="list-style-type: none">1. Witnesses or involved parties [41.II.A.4]2. SENSESv. National Fire Protection Association 704 (NFPA) [41.II.A.1]vi. Physical indicators [41.II.A.3]c. Case Study<ul style="list-style-type: none">i. UCLA Illegal Transportation Investigation<ul style="list-style-type: none">1. Containers of water sensitive, temperature sensitive materials found uncovered in ice baths in the back of a moving truck2. Consistent with frequent illegal disposal investigationsii. Suspect White Powder Letters<ul style="list-style-type: none">1. Threat of Anthrax sent to Editor of LA Times2. Continued threats of “anthrax” or White powder since October 2001 when the “Amerithrax” investigation began.d. Hazmat Locations	<p>Instructor will facilitate discussion regarding students experience recognizing placards/signs/labels that indicate the presence of hazardous material and what hazards those respective markings</p>
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<ul style="list-style-type: none">i. Hazardous Materials are manufactured, stored, used and transported anywhere<ul style="list-style-type: none">1. Highways<ul style="list-style-type: none">a. Transported in vehiclesb. Released when traffic collisions occur2. Industrial Sites3. Private Homes4. Clandestine Labsii. Oftentimes these indicators are not correct, or even present, so responders should remain vigilant of indicators of hazardous materials. <p>e. Hazmat Containers</p> <ul style="list-style-type: none">i. Vehicle Containersii. 55- Gallon Drumsiii. Intermodal Containersiv. Bulk/Non-bulk Containersv. Cylinders <p>f. Hazmat Special Markings</p> <ul style="list-style-type: none">i. Hazardous Wasteii. Signal Words (OSHA mandates)iii. NFPA 704 Signsiv. Labelsv. Placardsvi. Pipeline Markers<ul style="list-style-type: none">1. Product, operator name, and 24 hours' emergency phone number2. Located at public road crossing, railroad crossing, route of pipeline,	<p>may indicate.</p>
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<p>and areas accessible to the public.</p> <ul style="list-style-type: none">g. List Standardized sources of information of materials present at a hazardous materials incident, including, but not limited to [41.II.B]<ul style="list-style-type: none">i. Shipping Papers [41.II.B.3]ii. Material Safety Data Sheets (Fixed Facilities) [41.II.B.2]iii. Emergency Response Guide (ERG) [41.II.B.1]h. Communications Standards<ul style="list-style-type: none">i. US DOT – Implementation of the Emergency Response Guide -National Standard for transportation of hazmat with four regulated modes of transportation<ul style="list-style-type: none">1. Regulations Cover the following<ul style="list-style-type: none">a. Packaging/Securementb. Documentationc. Placards<ul style="list-style-type: none">i. Required to be displayed on containers use to transport hazmat on all four sides of the container, vehicle, or rail car.ii. Components – Background, symbol, ID number, Class/Division Numberd. Markings<ul style="list-style-type: none">i. On tanks or packages, and indicates the	
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<p>shipping name of the materials (usually near the hazard label)</p> <ul style="list-style-type: none">e. Labels<ul style="list-style-type: none">i. Affixed directly to smaller containers and are used to indicate a hazard classification using 4" diamonds <p>2. Divides Hazardous Materials into "Hazard Classes" and "Divisions"</p> <ul style="list-style-type: none">a. Class 1 – Explosives<ul style="list-style-type: none">i. Trinitrotoluene (TNT)ii. Ammonium Nitrate/Fuel Oil (ANFO)iii. Black Powderiv. Lead Azidev. Pentaerythritol Tetra-Nitrate (PETN)b. Class 2 – Gases (May be flammable, non-flammable/non-toxic, or toxic)<ul style="list-style-type: none">i. Anhydrous ammoniaii. Hydrogen sulfideiii. Phosgeneiv. Acetylenev. Diborane	
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<ul style="list-style-type: none">vi. Oxygenc. Class 3 – Flammable/Combustible liquids<ul style="list-style-type: none">i. Gasolineii. Alcoholic Beveragesiii. Hexaneiv. Toluenev. Acetonevi. Paintd. Class 4 - Flammable solids; Spontaneously combustible materials; and Dangerous when wet/water reactive substances<ul style="list-style-type: none">i. Aluminum phosphideii. Naphthaleneiii. Sodiumiv. Bariumv. Carbonvi. Magnesiume. Class 5 – Oxidizing substances and Organic Peroxides<ul style="list-style-type: none">i. Red Fuming Nitric Acidii. Organic Peroxide, type B, solid, Temperature controlled	
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<ul style="list-style-type: none">iii. Potassium nitrateiv. Calcium nitratev. Magnesium peroxide <p>f. Class 6 – Toxic substances and Infectious Substances</p> <ul style="list-style-type: none">i. Organo-phosphorus pesticidesii. Infectious substancesiii. Acroleiniv. Arsenic trioxidev. Nicotine <p>g. Class 7 - Radioactive Materials</p> <ul style="list-style-type: none">i. Uranium Hexafluorideii. Thorium nitrateiii. Plutonium <p>h. Class 8 – Corrosive Substances</p> <ul style="list-style-type: none">i. Nitric Acidii. Sodium hydroxideiii. Hydrofluoric Acidiv. Sulfuric Acid <p>i. Class 9 – Misc. Hazardous materials, products, substances or organisms.</p> <ul style="list-style-type: none">i. Molten Sulfurii. Some Hazardous	
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<p>Waste</p> <ul style="list-style-type: none">iii. Airbagsiv. Asbestos <p>3. Identifies the hazard of the material</p> <p>4. Is used in several areas of the communication standard to warn of the hazards of the material being transported</p> <p>5. Shipping Papers</p> <ul style="list-style-type: none">a. Preferred Hazmat Identification Sourceb. Communicates specific informationc. Required to be in specific locations<ul style="list-style-type: none">i. In a Highway Vehicle – in the Cab (called a Bill of Lading) and kept in the Cab in reach of the driverii. In an airplane – Air Bill kept on the flight deckiii. On a Railroad – Waybill & Consist and kept with the Crewiv. On a maritime Vessel – Dangerous Cargo Manifest is kept on the Bridged. Lists the following information	
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<ul style="list-style-type: none">i. Materials nameii. Hazard class/divisioniii. Identification number (UN Number)iv. Emergency Informatione. Emergency Response Information must contain the following;<ul style="list-style-type: none">i. First Aidii. Fire or Explosion hazardsiii. Spill mitigation methodologiesiv. Protective Equipment requiredv. Isolation distancesii. OSHA (Occupational Safety and Health Administration)<ul style="list-style-type: none">1. Requires MSDS when hazmat is kept in the work place<ul style="list-style-type: none">a. Must provide the following;<ul style="list-style-type: none">i. Chemical nameii. Company or manufacturer nameiii. Hazard identificationiv. Response guidance	<p>Learning Activity #1 – Use of the NA/ Emergency Response Guide</p>
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<ul style="list-style-type: none">v. Chemical/physical propertiesvi. First aid informationvii. Personal protection <p>2. OSHA Signage and Other Documents [41.II.B.4]</p> <ul style="list-style-type: none">iii. NFPA 704 Identification System<ul style="list-style-type: none">1. Used at Fixed Facilities<ul style="list-style-type: none">a. Purpose is to provide first responders with a general idea of the hazard presented by the materials located within the facilityb. Breakdown of the 704 Sign<ul style="list-style-type: none">i. Flammabilityii. Healthiii. Reactivityiv. Special Information <p>BREAK</p> <p>VIII. SECTION 3 – SAFETY, ISOLATION, AND NOTIFICATION (S.I.N.)</p> <ul style="list-style-type: none">a. Learning Need – Peace officers must have a clear understanding of the need for safety, isolation, and notification when acting as First Responders at the scene of a hazardous materials incident [41.III]b. Identify precautions peace officers can take to protect themselves from contacting hazardous materials [41.I.E]<ul style="list-style-type: none">i. Recognize the guidelines for safely assessing and approaching a hazardous materials incident [41.III.A]	
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<ul style="list-style-type: none">ii. Approach the scene of a known or suspect Hazmat Incident from the following directions;<ul style="list-style-type: none">1. Uphill2. Upwind3. Upstreamiii. Assessing the Incident [41.III.D.5]<ul style="list-style-type: none">1. It is essential that first responders conduct an initial assessment of the incident without compromising safety.<ul style="list-style-type: none">a. Maintain a safe distanceb. Utilize Binocularsc. Provide exact locations of the incident2. It is not necessary to get close enough to identify the materials3. Utilize the ERG to determine safe minimum distancesiv. Safety Guidelines [41.III.D.7]<ul style="list-style-type: none">1. Do not enter the hot zone to provide medical aid or assist in evacuations2. Treat all materials as hazardous until positively identified3. Approach Uphill, upwind, and Upstream4. Maintain a safe distance5. NEVER eat, drink, smoke, or chew gum at the scene6. Extinguish all ignition sources (i.e. Flares)	<p>Discuss some of the “special” hazards associated with the 704 system – including “oxy”, “A” for Artisan, and Dangerous When Wet indicators.</p> <p>Learning Activity #1 Scenarios based on given hazmat placards/signs/ and labels</p>
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<p>c. Isolation</p> <ul style="list-style-type: none">i. The first operational priority is to isolate and deny entry to any unauthorized personnelii. Identify factors to consider when establishing a perimeter around a hazardous materials incident [41.III.B]<ul style="list-style-type: none">1. Established by First Responders2. Size of the Perimeter is dependent upon;<ul style="list-style-type: none">a. Size and type of incidentb. Environmental factors (wind, change in elevation, etc.)c. Personnel resources3. Should be large enough to prevent exposure to responders and the public4. Utilize ERG to determine perimeter/Isolation distances.5. NEVER use flares to establish a perimeter, instead rely on<ul style="list-style-type: none">a. Barricadesb. Banner Tapec. Conesd. Vehicles6. MAKE SURE THE PERIMETER EXTENDS FURTHER DOWNWINDiii. Response Laws and Regulations<ul style="list-style-type: none">1. State Law – 409.5 PC – Closure of Disaster areas includes hazmat incidents2. Media are excluded unless the	<p>Discuss the importance of maintaining a position uphill, as all but 19 materials are heavier than air and would therefore flow downhill and settle in low-lying areas.</p>
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<p>incident is deemed a crime scene.</p> <p>iv. Identify the types of control zones at a hazardous materials incident, including [41.III.C]</p> <ol style="list-style-type: none">1. Established by Technicians and Specialists2. Exclusion Zone (Hot zone) [41.III.C.1]<ol style="list-style-type: none">a. Extreme Dangerb. Entry is restricted to trained personnel in proper PPE3. Contamination Reduction Zone (Warm Zone) [41.III.C. 2]<ol style="list-style-type: none">a. Where decontamination occursb. Should have no contamination other than what is brought out from the Exclusion zone by technicians, victims, or equipment.4. Support Zone (Cold Zone) [41.III.C.3]<ol style="list-style-type: none">a. Considered safe for support personnel and resource stagingb. Location of the Command Post.5. ALL three zones are found within the initial perimeter <p>v. Incident Command System</p> <ol style="list-style-type: none">1. Historical background, development from Standardized Emergency Management System	<p>LEARNING ACTIVITY #2- Have class determine perimeter size, isolation distance, primary hazards, and, if necessary, downwind protection distance for certain distances.</p>
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<p>(SEMS)</p> <ol style="list-style-type: none">2. ICS required at all Hazmat Incidents3. 2454 CVC designates the IC authority to the “on highway/road hazmat event to the law enforcement agency with primary traffic investigative authority”4. Incident Commander<ol style="list-style-type: none">a. Assumes Control of the incidentb. Organizes resourcesc. Authorizes actions5. Command/IC (Overall management)<ol style="list-style-type: none">a. Operationsb. Planningc. Logisticsd. Admin/Finance6. Safety Officer<ol style="list-style-type: none">a. Ensures Operation is conducted safelyb. Identify and evaluate hazardsc. Identify potentially unsafe situationsd. Emergency authority to stop activitiese. Modify response activities <p>d. Notification</p> <ol style="list-style-type: none">i. Mandatory Notifications	
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<ul style="list-style-type: none">1. Any Hazmat reported release, threatened release, actual release, or fire/explosion SHALL result in any school (k-12) within ½ mile of the incident being notified ii. Optional Notifications iii. Additional Requests<ul style="list-style-type: none">1. Identify the information that should be communicated to dispatch from the scene of an incident, including [41.III.D]<ul style="list-style-type: none">a. Type of premises and/or vehicles involved/ nature of the problem [41.III.D.2]b. Location of incident [41.III.D.1]c. Size and perimeter of involved area [41.III.D.3]d. Weather conditions [41.III.D.4]e. Name of hazardous material involved, if known Information about placards, ID numbers, warning signs, etc. [41.III.D.6]f. EMS, if appropriate [41.III.D.8]g. Safe entry and exit routes to and from the sceneh. Location of command post [41.III.D.9] iv. Identify the procedures to be followed before leaving the scene, (e.g., decontamination, exposure reporting) [41.III.E]<ul style="list-style-type: none">1. Check with authorized person	<p>Instructors will emphasize the necessity for a Safety Officer/Assistant Safety Officer for ANY hazardous material's incident.</p>
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<p>regarding the need for personal or equipment decontamination</p> <ol style="list-style-type: none">2. Complete an exposure report3. Check out with personnel officer <p>v. Preliminary Investigations</p> <ol style="list-style-type: none">1. Environmental Crimes<ol style="list-style-type: none">a. Usually committed for profit motive to;<ol style="list-style-type: none">i. Avoid cost of disposal or storage of hazmatii. Dispose of waste generated during the production of illicit narcotics (Meth, PCP)b. Harms the health and safety of humansc. Degrades the natural environment <p>BREAK</p> <p>IX. SECTION 4 – USE OF HAZARDOUS MATERIALS AS WEAPONS</p> <ol style="list-style-type: none">a. Chemical Warfare Defined<ol style="list-style-type: none">i. Warfare, and associated military operations, using the toxic properties of chemical substances to kill, injure, or incapacitate an enemyii. History of Chemical Weapons<ol style="list-style-type: none">1. World War 1 – Use of Chlorine, Phosgene, Sulfur mustard resulting in over 1 million casualties2. Iran-Iraq War – Nerve and blister agents, and use of Mustard, sarin,	<p>Discuss RACR Division (Real Time Analysis and Critical REesponse Division) and their responsibilities as a Department Command Post.</p>
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<p>Tabun, VX, and hydrogen Cyanide.</p> <p>3. Aum Shinrikyo – a Japanese religious cult that dispersed Sarin utilizing plastic bags as dispersal agents within the Tokyo Subway system resulting in 12 deaths, and 5500 injuries.</p> <p>iii. Conventional Chemical Weapons</p> <p>1. Nerve Agents</p> <p>a. Phosphorus-containing organic chemicals</p> <p>b. Less toxic versions are used as pesticides (malathion/parathion)</p> <p>c. Adversely affect the nervous system</p> <p>i. Disrupts the mechanism by which nerve transfer messages to organs, preventing the muscles from relaxing</p> <p>d.G-Agents</p> <p>i. Sarin – colorless, odorless, non-persistent agent</p> <p>ii. Soman (GD) – Colorless, non-persistent liquid with a fruity odor</p> <p>iii. Tabun (GA) – Colorless to brown non-persistent liquid with a fruity odor</p> <p>iv. VX – Colorless to straw colored, odorless, persistent, oily liquid</p> <p>e.Signs/Symptoms of Nerve Agent Poisoning (SLUDGEM)</p> <p>i. S – Salivation</p>	
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<ul style="list-style-type: none">ii. L – Lacrimation (tearing of the eyes)iii. U – Urinationiv. D – Defecationv. G – Gastrointestinal Painvi. E – Emesis (Vomiting)vii. M – Miosis (Pin Point Pupils) <p>f. The effects of nerve agents are very long lasting and cumulative and survivors of nerve agents poisoning almost invariable suffer chronic neurological damage.</p> <p>g. Nerve Agent Treatment</p> <ul style="list-style-type: none">i. Wear PPEii. Remove the casualty from the contaminated area (Uphill, Upwind, Upstream)iii. ABCs (CPR)iv. Decontaminate the patientv. Triage patients for transport to a medical facility <p>h. Mark 1 Auto-Injectors</p> <p>2. Blister Agents</p> <ul style="list-style-type: none">a. Also known as Vesicants, these are chemical compounds that cause severe skin, eye, and mucosal pain and irritation. Most common is Sulfur Mustard (aka “Mustard Gas”).b. Named for the ability to cause	
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<p>large, painful water blisters on the bodies of those affected</p> <ul style="list-style-type: none">c. Persistent agent – designed to deny portions of the battlefield to the enemy.d. Signs and Symptoms<ul style="list-style-type: none">i. Sever skin, eye and mucosal pain and irritationii. Skin erythema (redness) with large fluid blisters that heal slowly and may become infectediii. Tearing, conjunctivitis (bloodshot eyes), corneal damageiv. Mild respiratory distresse. ALL blister agents are HEAVIER than air, and readily absorbed through the eyes, lungs, and skinf. Effects are typically delayed; exposure to vapors becomes evidence within 4-6 hours, and skin exposure in 2-48 hours.g. Blister Agent Treatment<ul style="list-style-type: none">i. Wear PPEii. Remove Casualty from Contaminated areaiii. Remove outer clothing and decontaminate the victimiv. Transport the victimv. Supportive Therapy – generally after inhalation of the vapor, survival is unlikely	<p>Instructor will display a Nerve Agent Antidote auto injector for class to see.</p>
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3. Blood Agents

- a. Also called cyanogen agents – they are carried by blood for distribution throughout the body and exert their toxic effects at the cellular level
- b. Prevent the exchange of oxygen and carbon dioxide between the blood and the body cells requiring them.
- c. Case Study – Hydrogen Cyanide (HCN)
 - i. Cyanide salts are easily accessible white colored solid
 - ii. A solution of Cyanide salt in water products HCN, a colorless, very poisonous liquid that boils slightly above room temperature with a faint almond odor.
 - iii. Utilized in capital punishment, however,
 - iv. COMMONLY used in industry (pharmacology, plating, and jewelry districts)
- d. Cyanide Devices – one of the main chemical methods in which terrorist groups have shown interest because of its ease of dissemination and availability
- e. Improvised HCN device
 - i. 1995 Device found in a Tokyo subway
 - ii. 2003 Al Qaeda reportedly planned an attack on the New York City Subway

<p style="text-align: center;">system using an HCN device</p> <p>4. Pulmonary/Choking Agents</p> <ul style="list-style-type: none">a. Chemical Weapons designed to impede an individual's ability to breathe, resulting in suffocationb. Many agents now used in industry were deployed as weapons during WW1, including<ul style="list-style-type: none">i. Chlorineii. Phosgeneiii. Chloropicriniv. Diphosgenec. Case Study- Chlorine<ul style="list-style-type: none">i. Pale green gas that is 2.5 times heavier than airii. Strong disagreeable odoriii. Exposure to high concentrations results in severe lower airway and lung damageiv. Utilized in industry and private homes (bleaching operations, sewage treatment and household cleaners)v. Used as a weapon in WW1vi. Only treatment is supportive therapyd. Case Study – Phosgene<ul style="list-style-type: none">i. Highly toxic colorless liquid (below 47 degrees), as a gas, it may appear white to pale yellow in colorii. Odor resembles recently	<p>Discuss the interaction of most blood agents and the interference of the Oxygen/Carbon Dioxide exchange with hemoglobin.</p>
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<p>cut hay and is strongly unpleasant</p> <ul style="list-style-type: none">iii. 3.4 times heavier than airiv. Utilized as a weapon during WW1, but currently used in industry.v. Delayed onset of symptoms (1-24 hours)vi. No antidote, supportive therapy only <p>b. Biological Weapons</p> <ul style="list-style-type: none">i. Biological Warfare Definedii. Modern Biological Warfare Development<ul style="list-style-type: none">1. 1930-1942 major world superpowers began to research, develop, and produce biological weapons.2. USA continued development of a biological program until 19693. Although a Biological Weapons and Toxins Weapons Convention of 1972 was agreed to, the Soviet Union continued to develop bio weapons until the fall of the Soviet Union.iii. Biological Agents<ul style="list-style-type: none">1. Agents Developed by both the USA and USSR included the following;<ul style="list-style-type: none">a. Bacillus anthracis (Anthrax)<ul style="list-style-type: none">i. A Spore forming Bacteriumii. Weaponized spores are 1-5 microns in size (not discernible)	
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<ul style="list-style-type: none">by the human eye)iii. Can be dispersed via a liquid slurry or dry powderiv. One spore can be a lethal doseb. Francisella tularensis (Tularemia)c. Botulinum toxind. Smallpox<ul style="list-style-type: none">i. Incubation of 12-14 days,ii. Severe flu-like symptoms and pustular rashiii. Highly contagiousiv. Weaponized by the USSRv. Preventable by vaccinatione. Marburg virus (hemorrhagic fever)<ul style="list-style-type: none">i. Weaponized by the USSRii. Supportive therapy is only treatmentf. Yersinia pestis (Plague)<ul style="list-style-type: none">i. Small non-spore forming bacteriumii. Sensitive to light and readily killed by disinfectantsiii. Pneumonic plague vs bubonic plague vs	
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<p style="text-align: center;">septicemic plague</p> <p>iv. Case Study – Anthrax</p> <p>1. Physical Presentation</p> <p>a. An aerosol biological attack will cause an initial clinical syndrome that mimics influenza with symptoms such as the following;</p> <ul style="list-style-type: none">i. Feverii. Malaiseiii. Muscle Achesiv. Headachev. Sore throatvi. Nausea <p>b. Infections caused by consuming contaminated food/drinks will likely present with abdominal pain/cramps, diarrhea, nausea or vomiting, and malaise</p> <p>c. Inhalation Anthrax has a two-stage course</p> <ul style="list-style-type: none">i. First stage involves flu-like symptomsii. Second stage commences with a sudden onset of acute respiratory distress, sweating and cyanosis.iii. Once the 2nd stage is reached the disease is almost always fatal.	<p>Discuss the History of the Amerithrax Investigation, as well as the Department/Hazardous Materials methodologies for handling a suspect “white powder letter” incident. Discuss the significance of size/shape/morphology when dealing potential biological pathogens.</p>
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<ul style="list-style-type: none">iv. Death is universal if left untreated and may be as high as 95% of treated cases if therapy is delayedd. Sverdlovsk, Russia 1979<ul style="list-style-type: none">i. Accidental release of weapons grade agent from manufacturing facility resulted in 70 reported cases of anthrax, and 68 deathsv. Toxins – Ricin<ul style="list-style-type: none">1. Derived from Castor Bean plants<ul style="list-style-type: none">a. Highly toxicb. Easily producedc. Can be delivered as an ingestible poison, via injection (best method) or aerosold. Treatment is Supportive therapy only.c. Radiation<ul style="list-style-type: none">i. Ionizing Radiation Defined<ul style="list-style-type: none">1. Particles or energy emitted from radioactive/radiation sources pass through matter and can strip electrons from atoms/molecules causing them to become electrically charged or ionized.2. The basic building block of life is DNA, and damage to these cells change its chemistry or DNA3. Three main types of ionizing radiation (Alpha, Beta, and	
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<p>Gamma)</p> <p>4. Alpha Radiation</p> <ul style="list-style-type: none">a. Small particles the spread approximately 2” from the source.b. Do not penetrate the skin and can be shielded by a simply piece of paper.c. Present an INHALATION hazard and possible an absorption hazard if open wounds are exposed to the particulates <p>5. Beta Radiation</p> <ul style="list-style-type: none">a. Can travel several meters in the air and are moderately penetratingb. Can penetrate human skin, and if allowed to remain on the skin they may cause skin injury (beta burns)c. Present an inhalation, ingestion, and absorption hazardd. A sheet of aluminum foil several millimeters thick will shield beta.e. PPE provides some protection against most beta particles <p>6. Gamma Radiation</p> <ul style="list-style-type: none">a. Abel to travel great distances and penetrate human tissue as well as most other materials.b. Presents both an internal	
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<p>and external hazard</p> <ul style="list-style-type: none">c. Dense materials (lead, concrete, etc. are required to provide adequate shielding against Gamma.d. Frequently accompanies the emission of alpha and beta particles. <p>7. Neutron – a subatomic particle with no net electric charge and a mass slightly larger than that of a proton.</p> <ul style="list-style-type: none">a. May be produced as free neutrons in either fusion or fission <p>8. Radiation Protection Measures</p> <ul style="list-style-type: none">a. Time – The shorter the time in a radiation field, the less the radiation exposureb. Distance – the farther a person is from the source, the lower the radiation dose<ul style="list-style-type: none">i. Inverse Square lawc. Shielding – Shielding offered by proper PPE and barriers can reduce radiation exposure. <p>d. Toxic Industrial Chemicals</p> <ul style="list-style-type: none">i. The current focus is on the use of toxic industrial chemicals as a means of producing improvised chemical weapons<ul style="list-style-type: none">1. Chlorine2. Methyl Bromide (controlled use as a pesticide)	<p>Discuss the Departments</p>
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<p>3. Hydrogen Sulfide</p> <p>4. Phosgene</p> <p>5. Cyanides</p> <p>6. Fumigants</p> <p>7. Methyl Isocyanate</p> <p>ii. Many of these chemicals can be used as detergent suicides, or “chemical suicides”, or can be formed by mixing readily available chemicals.</p>	<p>standards of Primary/Secondary radiological screening, as well as the nature of radioactive material being used as an RDD (radiological dissemination device) and an RED (radiological Emission Device).</p> <p>Run student learning activity [41.V.A,B]</p>
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Hazardous Materials Awareness - Signage – Learning Activity #1

Purpose: To reinforce the students understanding of the hazards indicated by specific signs/placards/labels etc.

Description: This Learning Activity is conducted with the class. The class will be given specific information, from which they will use the NA/ Emergency Response Guide to determine what the primary and secondary Hazards are of the involved material

Part 1: The class will be given the name of a chemical. Instructors will facilitate navigation through the ERG (Blue pages – for alphabetical look up of a known chemical) to determine the Guide page to be used. The class will then locate the appropriate guide and identify primary and secondary hazards associated with a material.

Part 2: The class will be given an ID label (4 digit UN number). The instructor will facilitate navigation through the NA ERG (Yellow pages – for numerical look up of a chemical by ID number) to identify the name(s) of the chemical and determine which guide will be used for response considerations. The classes will then look up the appropriate guide and determine the primary/secondary hazards associated with the materials

Part 3: The class will be given a description of a placard (i.e. orange background, or red/white vertical stripes, etc). The instructor will facilitate using the NA ERG “Table of Placards” to identify the appropriate guide to use for such a material and then identify what the primary/secondary hazards are for that given material.

Key learning points:

- To teach students the function how to navigate the NA Emergency Response guide by either Chemical Name, Chemical ID number, or by placard markings
- To teach students how to identify the primary/secondary hazards of a given material listed in the NA ERG.

Resources needed: Each student shall be assigned one copy of the NA Emergency Response Guide.

Time required: 15 minutes (*Part 1 – 5 minutes, Part 2 – 5 minute, Part 3 – 5 minutes*)

Hazmat Incident Response - Learning Activity #2

Purpose: To train the students to recognize the outward indicators of a hazardous materials incident, apply safety precautions, and utilize the NA Emergency Response Guidebook to determine initial isolation and protective actions distances. Students will also be trained as to what notifications to make when handling such an incident.

Description:

The instructor will give the class a scenario. The incident should include a vehicle transporting hazardous Materials that has a failure (either intentional or accidental release) of a container containing material that has a toxic inhalation hazard. The class will be broken into 5 groups, and each group will address a different portion of the response plan and listed below.

Option #2

The instructor will describe the scenario and direct each group to provide the following information.

- Group #1** Identify the name of the chemical based on the given UN ID# and determine what guidebook page should be used for further information. When responding, instructor shall ensure that the group addresses that the chemical is highlighted in green indicating that it presents a toxic inhalation hazard.
- Group #2** Based on the corresponding ID #, this group shall identify the initial protection distances for the material as well as identify the downwind protection distances (based on the given quantity and given time of the day).
- Group #3** Based on the guidebook page recommended by group #1, this group will determine what the primary/Secondary hazards are for a given chemical.
- Group #4** This group will discuss with the class what methodologies may be used to isolate and protect persons downwind of incident. (Evacuation, shelter-in-place, etc.)
- Group #5** This group will determine what information needs to be collected and present a briefing that would be given to RACR division during the request for an HMU response.

The instructor will facilitate this discussion and cover any unanswered responses until the course content is covered for this portion.

Key Learning Points:

- Students will learn how to use the NA Emergency Response Guidebook to safely handle the preliminary phases of a hazardous materials emergency.

Time Required: 20 minutes