3.4.3.3 Hazmat Recognition and Identification

	YOUR ORGANIZATION STANDARD OPERATING PROCEDURES/GUIDELINES
TITLE: Hazmat Recognition and Identification	**SECTION/TOPIC:** First Responder Operations
NUMBER: 3.4.3.3	**ISSUE DATE:**
	REVISED DATE:
PREPARED BY: X Preparer	**APPROVED BY:** X Approver
These SOPs/SOGs are based on FEMA guidelines FA-197	

1.0 POLICY REFERENCE

CFR	
NFPA	
NIMS	

2.0 PURPOSE

This standard operating procedure/guideline addresses information gathering (container characteristics, shipping papers, markings, labels, etc.), use of reference materials and contacts (e.g., Emergency Response Guide, CHEMTREC), hazard categorization and assessment.

3.0 SCOPE

This SOP/SOG pertains to all personnel in this organization.

4.0 DEFINITIONS

These definitions are pertinent to this SOP/SOG.

5.0 PROCEDURES/GUIDELINES & INFORMATION

5.1 <u>Information Gathering</u>: (container characteristics, shipping papers, markings, labels, etc.)

Identification and Recognition

A. Hazardous materials must be identified before any action can be taken to control the incident. Failure to properly identify the materials involved will only make the situation more hazardous. Several types of information sources are available to help responders identify hazardous materials.

1. Placards – Placards are 10 ¾ inch diamond-shaped symbols that must be applied to each side and end of a motor vehicle, rail car, freight container, or portable tank container carrying hazardous materials. The color, symbol, and UN hazard class numbers on placards alert responders to the hazards of the material. The 4-digit UN ID number may be shown on the placard or on an adjacent orange panel displayed on the ends and sides of a cargo tank, vehicle, or rail car.

2. Labels – Labels are 4 inch diamond-shaped symbols applied to packages. Every DOT classified hazardous material shipment must be marked with the appropriate labels unless otherwise specified.

3. Shipping papers - DOT regulations require that shipping papers must accompany shipments of hazardous materials and hazardous wastes. The

4. Material Safety Data Sheets (MSDS)- MSDS information is completed by the manufacturer and regulated by the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). Information like the material name, physical and chemical data, the manufacturer's name, and special precautions are typically listed.

5. CHEMTREC – The Chemical Transportation Emergency Center is a 24-hour, 7 day a week emergency communication service that can provide valuable information (1-800-424-9300) in the event of a hazardous materials emergency.

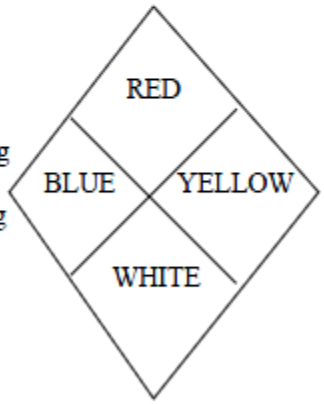
6. Emergency Response Guidebook – A guidebook published by the Department of Transportation carried on all apparatus. The ERG was designed to assist first responders during the initial phase of a hazmat incident.

7. NFPA 704 System - The National Fire Protection Association (NFPA) 704 marking system is primarily designed for fixed facilities like buildings, storage tanks, or individual rooms where hazardous materials identification is necessary. This system also uses a diamond-shaped symbol, colors, and numbers, to alert responders to the presence of hazardous materials. Each hazard poses a varying degree of danger and is rated on a scale from 0 (least hazardous) to 4 (most hazardous).

NFPA 704 System

Flammability (Red)
4 Extremely flammable
3 Ignites at normal temperatures
2 Ignites when moderately heated
1 Must be preheated to burn
0 Will not burn

Health (Blue)
4 Too dangerous to enter vapor or liquid
3 Extremely dangerous- use full protective clothing
2 Hazardous – use breathing apparatus
1 Slightly hazardous
0 Like ordinary material



Reactivity (Yellow)
4 May detonate; vacate area if materials exposed to fire
3 Strong shock or heat may detonate
2 Violent chemical change possible; use streams at a distance
1 Unstable if heated; use normal precautions
0 Normally stable

Special Information (White)
~~W~~ Water Reactive
OXY Oxidizing chemicals

8. Pipeline markings – Any place an underground pipeline crosses a mode of transportation, the pipeline owner is required to place a sign identifying the owner, pipeline contents, and emergency contact numbers.

9. Container markings – Depending on the type of hazardous material, some containers are required to have hazard information labels or information that will assist responders with identification stenciled directly onto containers.

10. Military Warning System – Whenever possible, the military uses the DOT placarding

system, but in some cases, it may employ its own system. The Emergency Response Guidebook contains contact numbers for incidents involving materials being shipped by, for, or to the Department of Defense.

11. National Response Center - The NRC, which is operated by the U.S. Coast Guard, receives reports required when dangerous goods and hazardous substances are spilled. Federal law requires that anyone who releases into the environment a reportable quantity of a hazardous substance (including oil when water is, or may be affected) or a material identified as a marine pollutant, must immediately notify the NRC. When in doubt as to whether the amount released equals the required reporting levels for these materials, the NRC should be notified. Contact numbers listed in the ERG.

12. Other sources – Responders can obtain valuable information by observing the occupancy or location where the incident occurs, the types of containers involved, interviewing bystanders and responsible parties, obtaining a manufacturer or trade name of the material involved, or making general observations at the scene.

5.2 Use of Reference Materials and Contacts: (e.g. Emergency Response Guide, CHEMTREC)

5.3 Hazard Categorization and Assessment:

Hazmat: Agent Identification

I. All **Chemical incidents** will be treated as a Hazmat situation. The standard chemical detection and air monitoring devices (i.e., HAZCAT) will be used during a response. If the incident is suspected or confirmed to involve unconventional warfare chemicals, the following list of detection devices (in conjunction with the standard equipment) will be used for agent identification:

M-8 Chemical Detection Paper - chemical liquids
M-9 Chemical Detection Paper - chemical liquids
Dragger Colormetric Tubes - chemical vapors
M256 Chemical Detection Kit - chemical liquids and vapors
APD-2000 CW Detector - chemical vapors

In all cases where a chemical WMD is suspected, every available chemical detection device will be used for secondary and tertiary confirmation of suspected chemicals.

II. For **Biological incidents** sampling is necessary and scene assessments will be undertaken if equipment is available.

- Hazmat teams will collect and test samples of any suspected Biological agent with the appropriate field detection kit. Phoenix PD will transfer the sample to the Arizona Department of Health Services (ADHS) State Laboratory for further testing and identification.
- Toxicology support is available at the scene and/or in the EOC through the Samaritan Regional Poison Control Center.
- Phoenix Police Department personnel will transport suspected biological agent samples to the ADHS State Laboratory.

III. For **Radiological incidents**, Victoreen Instrument CDU-700 and Ludlum Model IIC Radiacmeters will be used to identify the source of contamination and designate zones of operation (Hot, Warm and Cold). The same instruments will be used to monitor personnel.

The Arizona Radiation Regulatory Agency (ARRA) will be notified to deploy teams to assist with defining the extent of contamination.

AGENTS ADDRESSED

Chlorine
Hydrocyanic Acid, Hydrogen Cyanide & Cyanogen Chloride
Methyl Isocyanate, Methylene Bisphenyl Isocyanate & Methylene Dilsocyanate
Mustard (Sulfur Mustard)
Nerve Agents

Chlorine **Military Designation:** CL

Description: Chlorine is found as an amber liquid or greenish-yellow gas with a very characteristic irritating, pungent odor. Chlorine is severely irritating to the skin, eyes, and respiratory tract. Although generally stored as a liquid, when released, the resulting gas is about two times heavier than air.

Non-Military Uses: Chlorine is used widely in industrial settings in the organic synthesis and manufacture of antifreeze agents, solvents, refrigerants, resins, bleaching agents, and other *inorganic chemicals.* There is an exceptionally wide use of chlorine in non-commercial and home settings as a cleaning agent, bleaching agent, bacteriostatic, and disinfecting agent. Storage of this substance in a variety of liquid and granular forms is widespread.

Hydrocyanic Acid, Hydrogen Cyanide and CK (cyanogen chloride) **and Cyanogen Chloride**

Military Designations: AC (hydrocyanic acid)

Description: Both of these substances are liquids, but they vaporize (evaporate) at about 73/F and 58/C, so they will be in the gaseous form under most temperate conditions. AC has an odor of bitter almonds; CK is pungent. AC vapor is lighter than air, whereas CK gas is heavier than air. Cyanogen chloride is quickly metabolized to cyanide once absorbed into the body, and causes the same biological effects as hydrogen cyanide. In addition, CK is irritating to the eyes, nose, and throat (similar to riot control agents), whereas AC is nonirritating.

Non-Military Uses: Large amounts of cyanide (most in the form of salts) are produced, transported, and used by U.S. industry annually. Cyanide is used in fumigation, photography, extraction of metals, electroplating, metal cleaning, tempering of metals, and the synthesis of many compounds. It is released when synthetic fibers and plastics burn.

Methyl Isocyanate, Methylene Bisphenyl Isocyanate, and Methylene Dilsocyanate MDI

Military Designations: None

Description: Methylene Bisphenyl Isocyanate (MDI) is found as a solid in white to yellow flakes. Various liquid solutions are used for industrial purposes. There is no odor to the solid or the liquid solutions. The vapor is approximately eight times heavier than air. This chemical is a strong irritant to the eyes, mucus membranes, skin, and respiratory tract. This chemical is also a very potent respiratory sensitizer.

Non-Military Uses: Very large quantities of MDI are produced, transported, and used annually in the United States. Various industrial processes utilize MDI in production and usage of (poly)urethane foams, lacquers, and sealants. MDI is a commonly used precursor in the industrial production of insecticides and laminating materials. Noncommercial uses of polyurethanes such as in isocyanate paints or in cutting of uncured urethanes may also cause exposure. Thermal degradation of these substances may produce MDI as a combustion by-product.

Mustard (Sulfur Mustard)

Military Designations: H; HD; HS

Description: Mustard is a “blister agent” that causes cell damage and destruction. It is a colorless to light yellow to dark brown oily liquid with the odor of garlic, onion, or mustard. It does not evaporate readily, but may pose a vapor hazard in warm weather. It is a vapor and liquid hazard to skin and eyes, and a vapor hazard to airways. Its vapor is five times heavier than air.

Non-Military Uses: Sulfur mustard has been used as a research tool to study DNA damage and repair. A related compound, nitrogen mustard, was the first cancer chemotherapeutic agent and is still used for some purposes.

Nerve Agents
Tabun (GA); Sarin (GB); GD, GF, and VX
Soman (GD). None for GF and VX

Military Designations: GA, GB,

Description: Nerve agents are very toxic organophosphorus compounds that have biological activity similar to that of many insecticides. Their volatilities range from that of water to that of motor oil; they present a hazard from vapor and liquid. Under temperate conditions, the liquids are clear, colorless, and mostly odorless. They cause biological effects by inhibiting acetylcholinesterase, thereby allowing acetylcholine to accumulate and cause hyperactivity in muscles, glands, and nerves.

Non-Military Use: There is no non-military use. Threat of human exposure exists in research laboratories, in storage facilities, and from terrorists.