



UNITED STATES ARMY
LOGISTICS MANAGEMENT COLLEGE
FT. LEE, VIRGINIA

DEFENSE

HAZARDOUS MATERIALS

WASTE HANDLING COURSE

WORKBOOK



"To Manage Our Recourses Wisely"

OCTOBER 1993

CHAPTER 1

THE HAZARDOUS MATERIALS AND HAZARDOUS WASTE PROBLEM

LEARNING OBJECTIVES.

At the completion of this unit of instruction you should be able to:

- a. Identify the three major program components of the Department of Defense (DOD) environmental policy.
- b. List and discuss the five major problem areas associated with hazardous materials (HM) and hazardous wastes (HW) in the DOD, our communities, and our daily lives.
- c. Define the terms hazardous material, hazardous waste, hazardous substance, hazardous chemical, and hazardous property and identify which agencies regulate each and under what circumstances.

I. ENVIRONMENTAL PROTECTION AND THE DOD.

1.1 Policy.

a. National Security. National security depends on the well being of the environment, and federal agencies charged with protecting national security are also responsible for protecting the environment. The linkage between these responsibilities is evident in the environmental program of the Department of Defense (DOD). In 1991, for the first time, the United States recognized environmental issues as a national security concern. The National Security Strategy, stated:



'Global environmental concerns include such diverse but interrelated issues as stratospheric ozone depletion, climate change, food security, water supply, deforestation, biodiversity, and treatment of wastes. A common ingredient in each is that they respect no international boundaries. The stress from these environmental challenges is already contributing to political conflict.'

annually on cleanup of past contamination. Spills or unsafe disposal practices may allow chemicals to reach both people and the environment by transmittal through surface or ground waters. Many of these chemicals are persistent and do not easily decompose or degrade in the environment. This means that they may still be hazardous long after they are first released. Further, concentration of, or exposure to, a chemical that appears to have no visible effect on an animal, plant, or human may still affect its survival through behavioral changes or through changes in the offspring. These and other effects will be discussed in more detail in Chapter 5.

1.5. Laws and Regulations Pertaining to Hazardous Materials/Waste.

Several federal laws and regulations have been developed to protect the environment and human health. The DOD is required to comply with these federal laws. Additionally, many states have passed their own environmental and worker protection laws. The DOD must also comply with many state hazardous materials and waste laws. Detailed regulations have been written from these laws by the various departments of transportation, environmental protection agencies, and other agencies at federal and state levels. The DOD

Environmental Legal Issues

- Almost 12,000 pages of federal environmental laws.
- Compliance requirements continue to change.
- States use federal laws as guidelines; may set tougher compliance standards.

has added its own specific hazardous materials and waste regulations and guidance. These regulations govern just about everything we do with hazardous materials and waste, whether we store, transport, package, or dispose of them. The problem comes in the fact that we must comply with these regulations and educate our workers of their requirements so that we do not violate any of them. If we do violate a hazardous materials and waste law or regulation, the result can be a fine against our installation or an order to shut down our activities that are in violation, or even, if someone isolates the law knowingly and willfully, a criminal penalty such, as a jail sentence. It is wise to pay close attention to what your installation and your personal requirements are for handling hazardous materials, so that you or your employer are not penalized in some way that would not be pleasant. We will review these legal requirements in Chapter 3. Government contractors are also responsible and liable for environmental damage and mismanagement (see Appendix I-A).

1.6. Public Relations.

Given the potential for accidents when any organization handles hazardous chemicals, it is not surprising that communities are sensitive about chemicals transported on their streets or stored nearby. This is just as true of many communities near military installations. People may be happy to have a military installation contributing to their local economy, but are still concerned about how that installation carries out its mission. Thus, any military installation that handles hazardous materials has a potential for a future public relations problem if those materials are not properly managed. Numerous incidents of public relations problems involving poor hazardous materials management practices have occurred on DOD installations in recent years. One incident resulted in a delay in an upgrade of the Army's chemical warfare stockpile capability of at least two years,

simply because of a credibility problem between a depot and its local community. Other problems have required the installation chain-of-command to hold public meetings with interested citizens, trying to assure them that they and their families were not in danger from installation practices.

II. HAZARDOUS TERMINOLOGY.

Before the growth of worker protection and environmental regulations, understanding the term “hazardous” was not a particularly challenging concept. It meant something that could hurt you, burn you, cut you, or pose a danger to one working with it. Hardhats, eye protection, and steel-toed shoes are among the familiar symbols of our efforts to control what we might now call “old fashioned hazardous.” We understand the traditional definition of “hazardous”, because we can immediately appreciate with our five senses the physical thing that can pose hazards -- e.g. sharp objects, fires, and explosions.



If it were only the old-fashioned hazards we had to deal with today, things would be easier. But we must also handle the newfangled hazards. Those give us worse problems. Why, for example, are rubber gloves good enough protection against one cancer-causing substance, but full “moon suits” required to work around another?

Compounding the problem is that the various environmental and worker protection laws do not agree on terminology within or across agencies. The terms “hazardous waste,” “hazardous material,” and “hazardous substance” all have specific legal and scientific definitions in the Federal regulations. Many individuals incorrectly use these terms interchangeably to mean the same thing. However, it is very important to understand the differences among the definitions and how those differences affect operations.

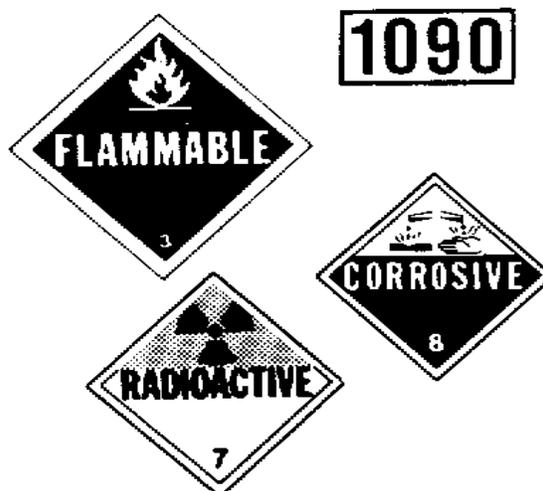
2.1. Hazardous Defined.

The commonplace use of the term “hazardous” refers to a something which because of its quantity, concentration, or physical, chemical or infectious characteristics may:

- cause, or significantly contribute to, an increase in mortality or an increase in serious, irreversible, or incapacitating reversible illness; or
- pose a substantial present or potential hazard to human health or the environment when properly managed.

2.2. Hazardous Material -- HMTUSA.

Source of the Term. Hazardous material (HM) is a term used by the Hazardous Material Transportation Uniform Safety Act (HMTUSA), a law administered by the Department of Transportation (DOT). It covers more than 16,000 items and categories of substances that have been identified by the Secretary of Transportation as being dangerous during transport. 103 of Title I of this law defines such materials as a substance or material in a quantity or form which may pose an unreasonable risk to safety, health, and property when transported in commerce." Examples of hazardous materials include: insecticides (e.g., Malathion) acids (e.g., nitric, sulfuric, hydrochloric), alkaline materials (e.g., sodium hydroxide), compressed gases (e.g., acetylene, butane), and explosives (e.g., trinitrotoluene). The focus of DOT's ones is on avoiding health risks by properly containing, identifying, and labeling during transport.



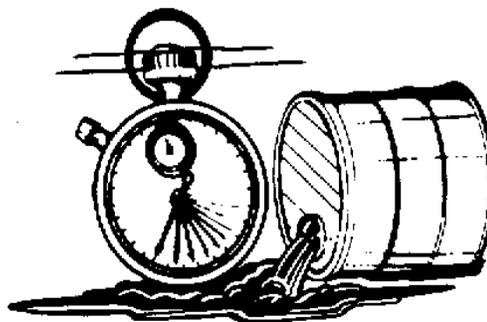
Definition. A HM is any product listed as such in Title 49 of the Code of Federal Regulation (CFR), Sections 100.199. Most of the regulated chemicals are listed by name, or sometimes by product type (like "batteries"), in the DOT Hazardous Materials Table (49 CFR 172.101). Part of this Table is copied in your Reference Book. Categories of products regulated as hazardous materials under the HMTA include explosives, flammables, oxidizing materials, gases, poisons, radioactive substances, and agents causing disease. These categories are called 'hazard classes.'

Scope. Chemicals not listed by name may still be regulated if they meet the definition of any hazard class set up by DOT. Because of the potential risk to the general public, the definition of hazardous material is very broad.

2.3. Hazardous Substance -- CERCLA.

Source of the Term. Hazardous substances (HS) is the term used in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Clean Water Act. CERCLA gives EPA authority to require reporting of Hazardous substance releases and to require actions to clean up contamination caused by hazardous substances.

Definition. CERCLA defines a hazardous substance in two ways: (1) any toxic or hazardous pollutant

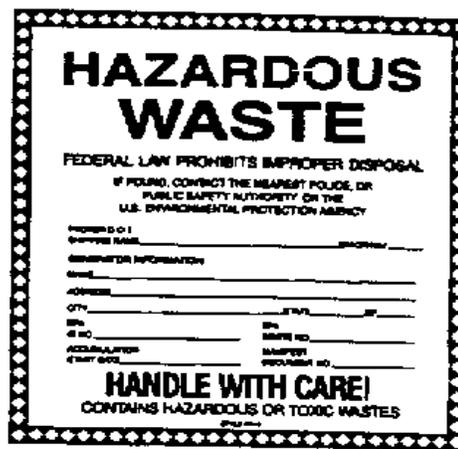


identified by the Clean Water Act (i.e., toxic pollutants) or Clean Air Act (hazardous air pollutant), the Resource Conservation and Recovery Act (i.e., hazardous waste), or the Toxic Substance Control Act (i.e., PCBs); or (2) any other substances the EPA designates as posing a substantial danger when spilled or released into the environment. HS are listed in the EPA's National Contingency Plan and codified in 40 CFR 302.4. Only the EPA can designate a HS. DOT incorporates EPA hazardous substances into their regulations in 49 CFR 171.101, Table 1.

Scope. The definition is very broad. The HS 'family' consists of hazardous materials, hazardous chemicals, and hazardous wastes. The breadth of the definition reflects Congress's intent to grant EPA extensive authority to regulate cleanup activities.

2.4. Hazardous Waste -- RCRA.

Source of the Term. Hazardous waste (HW) is the term used by the federal hazardous waste law - the Resource Conservation and Recovery Act (RCRA) -- to describe any of an array of substances that are no longer fit for their intended use and pose a risk of damage to human health or the environment if improperly managed or disposed. CERCLA directs how hazardous wastes are cleaned-up when releases into the environment occur.



Definition. Although the regulatory definition of a HW is very complicated, generally speaking material becomes a waste at the point at which it can no longer be used, for its originally intended purpose, for a downgraded but essentially similar purpose, or as a direct substitute (without waste reprocessing). To determine if a waste is a *hazardous* waste, EPA uses both lists and definitions. The four hazards identified by definition are called "characteristics," and include ignitability, corrosivity, reactivity, and toxicity (we will cover these in detail in chapters 3 and 4).

Scope. The focus of hazardous waste regulation is risk to human health and the environment from hazardous chemicals in water, air, or land. Because these wastes are often naturally diluted and because exposures to them are generally less intense than exposures to either hazardous materials or hazardous substances, fewer items come under the definition of hazardous waste than under the other categories. Additionally, the hazardous waste law is relatively new. Many wastes that may be hazardous in the general sense of the word are not yet regulated as hazardous waste because the rules are still evolving. See Appendix 1-B for a list of operations and processes that produce "typical" hazardous wastes.

2.5. Hazardous Chemicals -- OSHA.

Source of the Term. As scientific knowledge increase about the potential adverse effects of

chemical products on humans, the Occupational Safety and Health Administration (OSHA) began to develop a program to protect workers from exposure to chemicals in the workplace (the Hazard Communication Standard). This program uses the term “hazardous chemicals” to refer to substances covered by the regulations.

Definition. Hazardous chemicals are defined in 29 CFR 1910.1200 as “any chemical which is a physical hazard or a health hazard.” The rule provides more precise definitions, based on either the chemical’s potential for burning, exploding, or otherwise causing similar injuries to workers, or the likelihood that exposure to it will result in acute or chronic health effects among employees. Thousands of substances are regulated as hazardous chemicals.



Scope. Workplace exposures to chemicals are often more direct and concentrated than environmental exposures to the general population. Workers encounter hazardous chemicals such as solvents, paints, or cleaners close-up and sometimes in confined spaces. Therefore, the term hazardous chemicals encompasses a larger universe of substances regulated at lower concentrations than do general environmental protection rules. For example, exposure of workers to the carcinogen benzene is heavily regulated by OSHA. At the same time, exposure of the general public (not under OSHA authority) is less regulated, because the public’s exposure is much less intense than that of workers who use benzene on the job.

2.6. Hazardous Property -- DOD 4160.21-M.

Used within the DOD, this term is used during the disposal process by the Defense Reutilization and Marketing Office (DRMO) as a description for items that are inherently dangerous during handling and pose a risk to their workers. The “family” of hazardous property include materials, chemicals and wastes. Specifically:

- The item is hazardous in accordance with DOT 49 CFR 171-179 (i.e., a hazardous material).
- Is regulated by the EPA under 40 CFR (a hazardous waste and/or substance).
- The item is hazardous in accordance with OSHA 29 CFR 1910 (a hazardous chemical regulated in workplaces).

III. THE RESOURCE CONSERVATION and RECOVERY ACT.

3.1. Overview.

The Resource Conservation and Recovery Act (RCRA) evolved from the Solid Waste Disposal Act of 1965. RCRA has been amended many times, the latest being the Hazardous and Solid Waste Amendments (HSWA) of 1984. It has quickly become one of the broadest, complex and far-reaching environmental programs under EPA's Office of Solid Waste and Emergency Response. RCRA, defined by some, is the "Really Confusing Regulatory Act", that presents a tremendous challenge to all involved.



The basic purpose of RCRA is to regulate the management of hazardous. The law provides control from point of production through point of disposal. RCRA has these goals:

- To protect human health and the environment,
- It reduce waste and conserve energy and natural resources,
- To reduce or eliminate the generation of hazardous waste as expeditiously as possible.

RCRA outlines specific management programs for solid waste, medical waste, hazardous waste, and underground storage tanks. We will focus our discussion of RCRA on the regulation of hazardous wastes.

RCRA controls the generation, transportation, storage, and disposal of wastes. The law provides for:

- (1) Federal classification of hazardous wastes;
- (2) a "cradle-to-grave" tracking system (manifest) for waste material;
- (3) Federal safeguard standards for three categories of hazardous waste handlers;
- (4) enforcement of standards for facilities through permits; and
- (5) authorization of state programs to replace Federal programs.

a. Hazardous Waste Sources. Hazardous wastes may arise as by-products of many processes (see Appendix 1-A and Table 3-I). They may also be generated by households when commercial products are discarded. These include drain cleaners, oven cleaners, wood and metal cleaners, polishes, pharmaceuticals, oil and fuel additives, grease and rust solvents, herbicides, pesticides, and paint thinners (to name a few).

According to EPA, about 2.5×10^8 tons of hazardous waste are generated annually in the U.S. This represents approximately four percent of the total of industrial, agricultural, and commercial and domestic waste generated. Ninety percent of the 2.5×10^8 tons is generated by facilities that produce 500 pounds (about 100 kg) per month.

b. State Program Authorization.

Congress intended the states to eventually assume responsibility for the RCRA hazardous waste program. States, once satisfied the EPA requirements, gain

regulatory authority over all activities involved in the hazardous waste business. Technical standards are maintained by on-site inspections and extensive permit State inspections. Federal agency hazardous waste treatment, inspected annually by EPA (§ 3007(c)).

c. Federal Facility Responsibilities. RCRA states that Federal agencies in their waste disposal and management practices "...will be subject to and comply with, all Federal, State, interstate, and local requirements, both substantive and procedural..., respecting control and abatement of solid or hazardous waste disposal.... Neither the United States, nor any agent, employee, or officer thereof, shall be immune or exempt from any process or sanction of a State or Federal court with respect to the enforcement of any such injunctive relief" (§ 6001). The provisions also apply to any tenant, lessees, or others allowed or permitted to operate on or by the installation.

Federal Facilities Compliance Act (FFCA) of 1992. However, the language of the original statute did not give a State the authority to issue fines and penalties against Federal facilities. The FFCA removes the waiver of sovereign immunity with respect to Federal, State, and local solid and hazardous waste provisions under RCRA. This includes administrative and civil fines and penalties. An authorized State can assess fines and penalties against Federal facilities for past violations of solid and hazardous waste laws. EPA 'may commence' an administrative enforcement action against Federal agencies pursuant to the enforcement authorities in RCRA. FFCA does not apply to underground storage tanks or any other environmental law (e.g., CAA, CWA, CERCLA, etc.)

Table 3-1: Common Army Waste Streams

- Used Oil
- Antifreeze (ethylene glycol)
- Batteries
- Paint and Paint-Related Wastes
- Solvents
 - 1,1,1,-Trichloroethane
 - Methyl Ethyl Ketone
 - Pechloroethylene (PERC)
 - Acetone
 - Petroleum distillates (degreasing and painting)
 - PD680 Type I (maybe Type II)
 - CLP and Breakfree (weapons cleaning)
- NBC Wastes
 - DS2, STB, & M256, M256A1, M272 kits
- Pharmaceutical Wastes
- Silver Recovery
- Household Hazardous Waste
- POL-Contaminated Soil

The amount of the penalties assessed against DOD under FFCA could be substantial. Penalties can be as high as \$25,000 per day per violation (see Appendix 3-C). In setting amount, the regulators consider such factors as the potential for harm and the noncompliance.

The FFCA requires states to apply any funds they collect in fines from Federal agencies to environmental compliance or cleanup programs in the state, except where state constitution prohibits such earmarking. State or EPA regulators are also required to conduct environmental assessments of Federal facilities, and the facility's parent agency to reimburse the regulators for the cost of the assessment.

FFCA affects difficulties further by now requiring them to pay "nondiscriminatory" (i.e., assessed against both Federal and nonfederal entities) and reasonable service charges. Payment of service charges was already required by RCRA, but the waiver was expanded to include "fees or charges assessed in connection with processing and issuance of permits as well as any other nondiscriminatory charges that are assessed in connection with Federal, state, interstate, or local solid waste or hazardous waste regulatory program

d. Regulatory Framework. RCRA is divided into 10 subtitles or sections, each enacting provisions directed by Congress (see Figure 3-2). RCRA has three key programs affecting hazardous materials and waste management:

- Solid Waste (Subtitle D),
- Hazardous Waste (Subtitle C), and
- Underground Storage Tanks (Subtitle I).

Figure 3-2. Major Subtitles of RCRA

Subtitles of RCRA	Coverage
Subtitle A	General Provisions
Subtitle B	Office of Solid Waste, Authorities of the EPA Administrator
Subtitle C	Hazardous Waste Management
Subtitle D	State of Regional Solid Waste Plans
Subtitle E	Duties of the Secretary of Commerce In Resource Recovery
Subtitle F	Federal Responsibilities
Subtitle G	Miscellaneous Provisions
Subtitle H	Research, Development, Demonstration, & Information
Subtitle I	Underground Storage Tanks
Subtitle J	Medical Waste Tracking Program

of organisms absorbing much of the contaminant in the food they eat, and not eliminating it through excretion, with a result that increasingly higher concentrations of the chemical are found in organisms higher in the food chain. Problems arise when the concentration reaches a point where the organisms are adversely affected. Polychlorinated biphenyl is an example of a chemical type that is persistent and subject to biological magnification. PCBs have been found in the fat tissue of almost all humans tested. (How much is too much has not been determined.) Most chemicals which biomagnify are heavily regulated.

Pesticide residues in domestic foods, by commodity group, 1987-1991.

Year	Commodity						Total
	Grains & grain products	Milk, dairy products & eggs	Fish, shellfish & means	Fruits	Vegetables	Other	
	% of samples with residues found						
1987	57	24	73	50	37	37	42
1988	49	19	72	51	35	28	40
1989	44	13	65	44	32	20	35
1990	46	9	68	49	38	21	40
1991	42	22	42	51	32	19	36

Source: Food and Drug Administration, Food and Drug Administration pesticide Program Residues in Foods, J. Assoc. Off. Anal. Chem. Vols. 71-74, (1988, 1989, 1990, 1991).

Notes: Domestic samples are collected as close as possible to the point of production. Fresh produce is analyzed as the unwashed whole, raw commodity. Although a percentage of samples contain pesticide residues, the percent of samples with over-tolerance residues (as set by EPA) is low. Since 1987, less than 1 percent were violative.

c. Resistance. Organisms can build up a resistance to the effect of certain chemicals after repeated, long-term exposures. Pesticides again provide a good trample of this operation. If lethal dose of an insecticide is administered to an entire insect population, it would be expected that roost would die. Many of the individuals that do survive do so because they have a natural genetic ability to resist the pesticides effects. These survivors reestablish the population and pass on their resistant characteristics. As larger amounts of the pesticide are applied, the cycle continues, and eventually an entire population will be produced which will be nearly immune to the effects of that specific chemical. This mechanism is also observed in various bacteria which cause disease in humans which are now resistant to some drugs used to control them. This requires the production of new drugs to control these resistant populations.

III. CHEMICAL DANGERS.

Beside the dangers of fire and explosion, some chemicals pose direct threats to human health. Avoiding chemicals is the preferred method of protection. However, this is not always realistic.

Hazardous chemicals may enter the human body by three routes of exposure. Understanding these routes provides us with a starting point for protecting ourselves from toxic exposure.

3.1. How Toxic Substances Enter the Body.

a. Skin Absorption. The skin is the body's first line of defense against foreign materials. Foreign materials may enter the body through the skin and eyes by either absorption or injection. Some chemicals have characteristics against which the skin provides no barrier and can be directly absorbed. Sharp objects contaminated with harmful chemicals may pierce the skin, injecting the material through the skin into the bloodstream. Wearing proper protective clothing over exposed skin is the way to avoid skin exposure, if skin exposure does occur, the affected area should be washed with water for some significant length of time. Sometimes a surfactant (detergent) may be needed to dissolve a chemical that normally doesn't dissolve in water. Care should be used in selecting detergent or soap if the skin has been injured -- some cleaning compounds are abrasive or corrosive themselves.

Toxic chemicals can also be absorbed through the eyes. Chemicals splashed or sprayed into the eyes can result in blindness. The blood vessels on the eye's surface will quickly carry these chemicals into your bloodstream. Splashing hazardous liquids into your eyes or rubbing your eyes after your hands have been contaminated can lead to eye absorption of hazardous chemicals. Eye protection should always be worn when working with dangerous chemicals.

b. Inhalation. Inhalation is the most efficient way of transporting hazardous material from the environment into the body. The inside surface area of the lungs averages 70 square meters in a human all of which is exposed compared to only about 2 square meters of skin surface area. Hazardous materials may be in the air in the form of particulates, vapors, or gases. Even, in small concentrations, due to the large volumes of air being inhaled and in constant contact with the air sacs, there is plenty of opportunity for absorption. The temperature and moisture in the lungs is very conducive to dissolving and absorption of chemicals. When inhaled, a hazardous chemical is transferred into the bloodstream just like oxygen. In a contaminated environment, the use of protective breathing equipment is the way to avoid inhalation of hazardous material.

Inhalation Hazards. Airborne contaminants result from many types of activities: cutting, sanding, cleaning, welding, painting, sweeping, soldering, etc. Dusts, fumes, vapors, mists and gases represent the more common inhalation hazards.

Dust is made up of tiny airborne particles formed as solids are broken up or when granular or powdered solids are transferred as in grinding, sanding, or sweeping.



Smoke is a mixture of fire gases and airborne dust or fine particles. It is found in processes involving combustion or burning such as welding and soldering.

Fume particles are formed by cooling vapors from operations where solids have been melted as in welding and soldering.

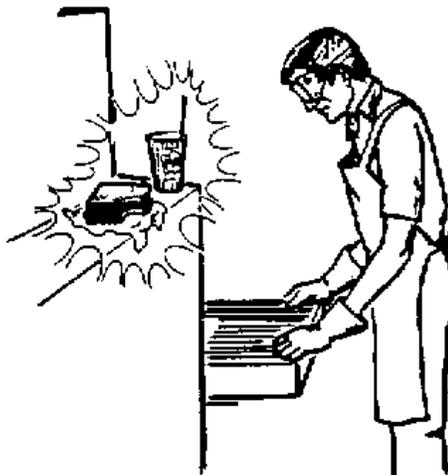


Vapors are the gases formed above any exposed liquid surface as the liquid evaporates.

Liquids form **mists** (tiny airborne droplets) when sprayed, bubbled, or stirred (agitated). Mists are often formed in spraying operations. Mists also form when liquid vapors condense. This happens when coolants or lubricants are applied to hot surfaces.

Gases may be compressed for use in a particular operation on such as welding or they may be a by-product of the process itself, as in starting engines.

c. Ingestion. Ingestion, a third route of exposure, is less common in the workplace. Ingested chemicals enter the body through the mouth and are absorbed into the bloodstream through the lining of the digestive tract. If the food we eat or the liquids we tick are contaminated with hazardous chemicals, they may enter the bloodstream along with the digested food. In a warehouse, the transfer of hazardous material to food may occur by smoking or eating foods in areas where dusts of hazardous material are floating in the air, or by handling cigarettes or food with hands or utensils contaminated with hazardous materials. Even licking your lips may allow exposure. Good housekeeping and personal hygiene is the best way to avoid exposure through ingestion.



3.2. Toxicity.

Poisons or toxins are generally regarded as those substances that cause or contribute to illness or death when administered to an organism in good health in relatively small amounts. The *toxicity* of a substance is defined as its ability to cause damage to living tissue, impairment of the central nervous system, severe illness, or, in extreme cases, death when ingested, inhaled, or absorbed by the skin in certain amounts. Toxicity is not a 20th century phenomenon. Certain chemicals have been known to cause health effects for hundreds of years (thousands of years, in some cases). However, *toxicology* is more recent. It is a discipline for the understanding of how chemicals can adversely affect living organisms. Thousands of chemicals are in our environment, and they have a multitude of possible adverse effects. (See Toxicological Data on *Commonly used Toxic Materials in the Reference Book*.) Estimating the size of the smallest regularly repeated dose that will cause observable symptoms in most people is the job of *toxicologists*.

(1) Executive Commitment.

Environmental issues and considerations today have the same impact on mission performance as material readiness, training, health and safety, and legal issues. The efforts of the environmental manager in inspection, training, problem identification and correction, waste minimization, environmental auditing, and other activities must be augmented by a real demonstration of command



interest and emphasis if they are to succeed. Visible commitment and support of the Commander are essential. Such commitment is best insured through holding subordinates accountable for performance in this area. Hazardous compliance must be perceived as an essential part of the mission, not as an impediment to the performance of the mission.

(2) Planning and Programming. AR 200-1 outlines installation responsibilities for identifying environmental requirements for budgeting purposes. AR 200-1 contains specific provisions dealing with funding and environmental compliance. Paragraph 12-7g states:

“All military and civilian personnel must ensure that the activities for which they are responsible are conducted per all Federal and applicable State environmental laws. Commanders, supervisors, managers and operators are also responsible for ensuring the compliance of their tenant activities and GOCO contractors, and for informing personnel at all levels that neither operational necessity nor budgeting deficiencies will excuse noncompliance.”

There are numerous reporting requirements specified by Federal environmental regulations as well as Army/DOD requirements. The principal Army/DOD requirement is the “Environmental Pollution, Prevention, Abatement and Control Report” commonly referred to as the 1383 Report.

The 1383 report is an 8-year environmental master plan, documenting the status of existing environmental projects, and identifying funding requirements for future environmental projects. The Directorate of Engineering and Housing (DEH) has the installation responsibility for preparing the 1383 Report for the commander. This report is eventually sent to EPA and becomes the official Federal facilities environmental compliance report. All 1383-identified requirements are also submitted separately into the Command Operating Budget (COB).

RISK MANAGEMENT WORKSHEET

Operation/Training Event: MALONE 17 (M16 ZERO RANGE)

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Organization: 29TH IN REGT

Date: 26 JUNE 1997

Prepared by: 1LT DUNCAN

(C, 2-29TH)

HAZARD	INITIAL PROBABILITY	INITIAL EFFECT	INITIAL RISK LEVEL	CONTROLS IMPLEMENTED	RISIDUAL PROBABILITY	RESIDUAL EFFECT	RESIDUAL RISK LEVEL
1. ACCIDENTAL DISCHARGE	UNLIKELY	CATAST.	MEDIUM	1. RANGE OIC WILL GIVE A SAFETY BRIEFING. 2. DRILL SERGEANTS WILL SUPERVISE STUDENTS WHILE THEY ARE FIRING. 3. A RANGE SAFETY NCO WILL CLEAR AND INSPECT WEAPONS BEFORE THE SOLDIER LEAVES THE FIRING LINE. 4. RANGE OIC WILL INSURE THAT QUALIFIED COMBAT LIFESAVERS ARE ON SITE.	UNLIKELY	CATAST.	MEDIUM
2. FRATRICIDE	UNLIKELY	CATAST.	MEDIUM	1. OSUT CADRE WILL PROVIDE ONE SAFETY NCO FOR EVERY 10 FIRING POINTS. *ALL WPNS WILL BE POINTED UP AND DOWNRANGE AT ALL TIMES. 2. DRILL SERGEANTS WILL INSURE THAT SOLDIERS ARE TEAMED TOGETHER TO DOUBLE CHECK EACH OTHER. *RANGE SAFETIES WILL VISUALLY CLEAR ALL WPNS AFTER FIRING IS COMPLETE. 3. RANGE OIC WILL IDENTIFY PROBLEM SOLDIERS PRIOR TO START OF TRAINING. *MEDEVAC WILL BE REHEARSED AND A STEP BY STEP SOP ON SITE. 4. RANGE OIC WILL READ SAFETY BRIEFING TO ALL SOLDIERS ON RANGE.	UNLIKELY	CATAST.	MEDIUM
3. HEARING LOSS	REMOTE	CRITICAL	MEDIUM	1. RANGE OIC WILL ENSURE THAT A SAFETY BRIEFING IS GIVEN AND HEARING PROTECTION IS AVAILABLE AND USED.	UNLIKELY	CRITICAL	LOW

INITIAL OVERAL RISK: EXTREMELY HIGH HIGH MEDIUM LOW

INITIAL OVERAL RISK: EXTREMELY HIGH HIGH MEDIUM LOW

RISK ACCEPTANCE: type signature block, and sign.

Aaron K. Duncan

AARON K. DUNCAN
1LT, IN
COMMANDING

Michael E. Boatner

MICHAEL E. BOATNER
LTC, IN
COMMANDING

RICHARD J. ROWE, JR.
COLONEL, INFANTRY
COMMANDING

RISK MANAGEMENT WORKSHEET

Operation/Training Event: MALONE 17 (M16 ZERO RANGE)

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Organization: 29TH IN REGT

Date: 26 JUNE 1997

Prepared by: 1LT DUNCAN

(C, 2-29TH)

HAZARD	INITIAL PROBABILITY	INITIAL EFFECT	INITIAL RISK LEVEL	CONTROLS IMPLEMENTED	RISIDUAL PROBABILITY	RESIDUAL EFFECT	RESIDUAL RISK LEVEL
4. HOT WEATHER INJURIES	REMOTE	MARGINAL	LOW	1. RANGE OIC AND RANGE SAFETY NCO'S WILL MONITOR THE TEMPERATURE AND SOLDIERS CONDITIONS THROUGHOUT TRAINIG. *EACH RANGE WILL HAVE 5 WATER CANS AVAILABLE FOR THE USING UNIT. 2. THE RANGE OIC WILL MAKE SURE THAT FLUIDS ARE CONSUMED AT REST BREAKS AND AS HE DIRECTS. *A CBT LIFESAVER BAG WITH IV FLUIDS AVAILABLE AT ALL TIMES. 3. RANGE OIC WILL DIRECT UNIFORM MODIFICATIONS AS NEEDED. *THE UNIT WILL HAVE A CADRE LDR IN THE SAME UNIFORM AS THE SOLDIER TO BETTER DETECT WEATHER PROBLEMS. 4. RANGE OIC WILL FOLLOW FB FORM 7 TO CONDUCT TRAINING IN HEAT CATEGORY 2 THROUGH 5. 5. DRILL SERGEANTS WILL IDENTIFY PRIOR HEAT INJURIES AND INFORM THE RANGE OIC.	REMOTE	MARGINAL	LOW
5. COLD WEATHER INJURIES	REMOTE	MARGINAL	LOW	1. THE RANGE OIC WILL MONITOR THE TEMPORATURE AND SOLDIERS CONDITION THROUGHT TRAINING. 2. RANGE OIC WILL ENSURE THAT FLUIDS ARE CONSUMED AT REST BREAKS AND AS HE DIRECTS. *MEDEVAC PROCEDURES WELL REHEARSED WITH A STEP BY STEP BY STEP SOP ON SITE. 3. OSUT COMPANY COMMANDER WILL DIRECT UNIFORM MODIFICATIONS AS NEEDED. 4 RANGE OIC WILL FOLLOW FB FORM 7 TO CONDUCT TRAINING IN HEAT CATEGORY 2 THROUGH 5. 5. DRILL SERGEANTS WILL IDENTIFY PRIOR HEAT INJURIES AND INFORM THE RANGE OIC.	REMOTE	MARGINAL	LOW
6. ANIMAL/INSECT BITES	REMOTE	CATAST.	MEDIUM	1. DRILL SERGEANTS IDENTIFY STUDENTS WITH ALLERGIES PRIOR TO TRAINING. 2. RANGE OIC WILL ENSURE FIRST AID KITS ARE AVAILABLE, AND THE LOCATION IS INCLUDED IN SAFETY BRIEFING BY RANGE OIC. (SOLDIERS ALLERGIC TO BEE STINGS WILL HAVE TO HAVE) 3. RANGE OIC WILL GIVE A SAFETY BRIEFING WHICH IDENTIFIES POSSIBLE ANIMAL/WILDLIFE DANGES.	UNLIKELY	MARGINAL	LOW

RISK MANAGEMENT WORKSHEET

Operation/Training Event: MALONE 17 (M16 ZERO RANGE)

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Organization: 29TH IN REGT

Date: 26 JUNE 1997

Prepared by: 1LT DUNCAN

(C, 2-29TH)

HAZARD	INITIAL PROBABILITY	INITIAL EFFECT	INITIAL RISK LEVEL	CONTROLS IMPLEMENTED	RISIDUAL PROBABILITY	RESIDUAL EFFECT	RESIDUAL RISK LEVEL
7. SEVERE WEATHER INJURIES	REMOTE	CRITICAL	MEDIUM	1. RANGE OIC WILL GIVE DETAILED SAFETY BRIEFING ON SEVERE WEATHER PROCEDURES. 2. ALL RANGE PERSONNEL WILL DRILL WEATHER EVACUATION AND MEDICAL PROCEDURES QUARTERLY. 3. RANGE OIC WILL ENSURE THAT COMBAT LIFESAVER WITH KIT AND COMMO PRESENT. 4. RANGE OIC WILL IDENTIFY SEVERE WEATHER SAFE-AREAS IN SAFETY BRIEFING	REMOTE	MARGINAL	LOW

DAILY RISK ASSESSMENT CHECKLIST

Operation _____

Date: _____

Unit **HHC 29TH INF REGT** _____

Prepared by: _____

FACTOR	RISK LEVEL			
	EXTREME	HIGH	MEDIUM	LOW
Planning guidance	None	Vague	Implied	Specific
Preparation time	None	Minimal	Adequate	Extensive
Task complexity	Extreme	Moderate	Routine	Simple
Operation duration	> 24 hours	16-24 hours	8-15 hours	< 8 hours
Terrain	Flood conditions	Mountain, desert, jungle, water	Flat, rolling hills	Cantonment
Medical support	None	First aid trained	Combat lifesaver	Medics
Leader/cadre presence	None	Minimal	Substantial	Simple
Leader/cadre experience	< 1 month	1 - 6 months	7 - 18 months	> 18 months
Rest in previous 24 hours	< 2 hours	2 - 4 hours	5 - 7 hours	> 7 hours
Physical condition	Poor	Marginal	Adequate	Excellent
Personnel experience	< 1 month	1 - 6 months	7 - 18 months	> 18 months
Heat	Category V	Category IV	Category II and III	Category I or less
Cold	Wind chill <20	Wind chill 20-30	Wind chill 31-50	Wind chill >50
Severe weather	Lightning/tornado	Storm warning	Storm watch, rain	Clear, calm
Equipment/weapons condition	Poor	Marginal	Adequate	Excellent
Total items checked in column				
Points per item checked	4	3	2	1
Points per column (total checked times points per item)				
Points per entire checklist (add points per column together)				
Extreme Risk: > 45 points	High Risk: 32 - 45 points	Medium Risk: 16 - 31 points	Low Risk: < 16 points	

Are all controls listed on the FB Form 46-R in place? YES NO

Are there hazards present which are not on the FB Form 46-R? YES NO

Instructions for use of this checklist: This checklist addresses conditions which may change between the planning stage of the operation/training, and the execution. It also addresses operations/training which are conducted on a repetitive basis. It is to be used in conjunction with FB Form 46-R, Risk Management Worksheet which was prepared during the planning stage of the operation/training. This checklist should be completed by the commander or manager conducting the operation/training immediately prior to beginning the operation or training. It should be updated if conditions change.

Place a check mark in the appropriate column for each factor. Total the checks in each column and enter at the bottom of the column. Multiply the total checks times the point factor for each column. Add the total points for each column together and enter in the space for points for the checklist. Check the appropriate box in the last row of the checklist to indicate the overall level of risk for the operation (extreme, high, medium, low).

The individual who accepted the risk on the FB Form 46-R, Risk Management Worksheet, must be consulted and approve the operation or training prior to beginning if:

1. The total point value on the checklist is greater than 31, i.e. the overall operation is high or extreme risk.
2. Any factors are rated as extreme risk or more than one factor is rated as high risk.
3. Any controls which are listed on the FB Form 46-R, Risk Management Worksheet, are not in place.
4. There are hazards present which are not listed on the FB Form 46-R, Risk Management Worksheet.

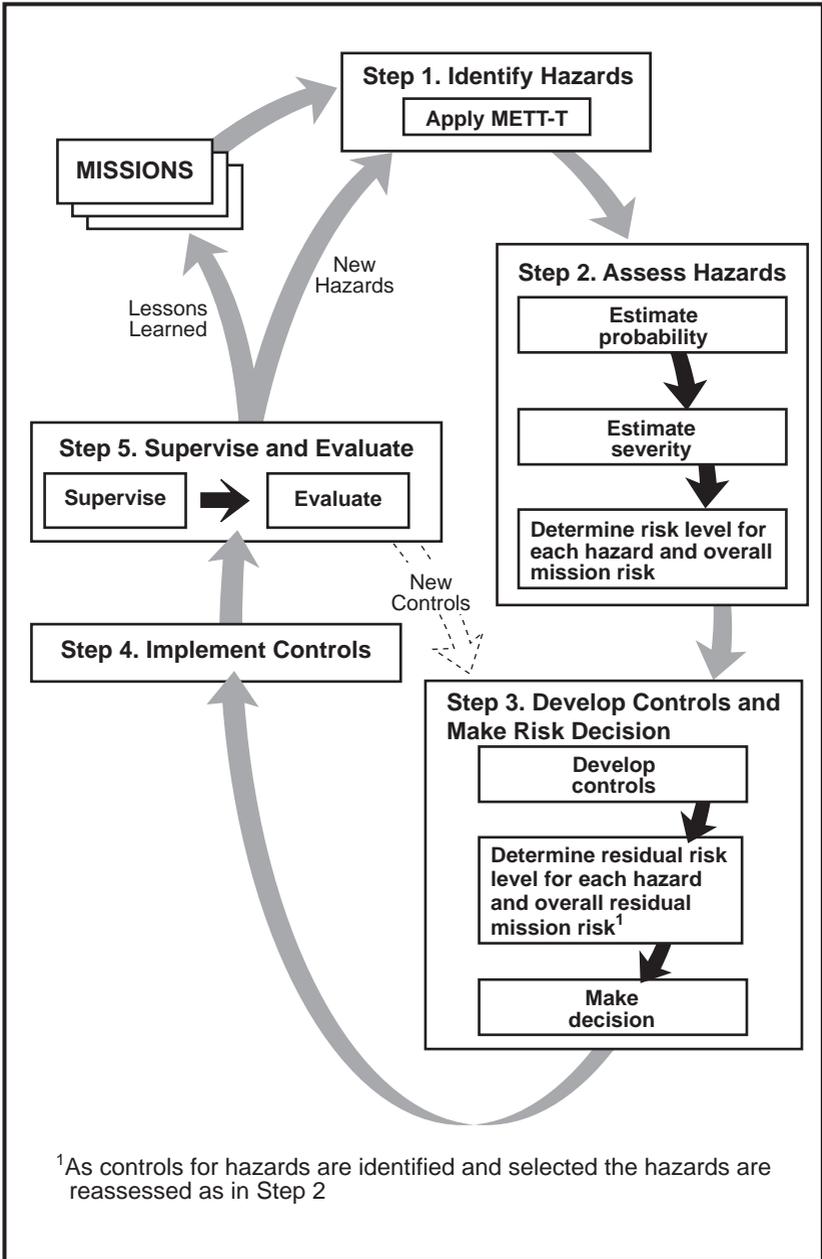


Figure 2-7. Continuous Application of Risk Management