

NUCLEAR ACCIDENT AND INCIDENT RESPONSE AND ASSISTANCE (NAIRA)



COORDINATING DRAFT

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Nuclear Accident and Incident Response and Assistance
(NAIRA)

TABLE OF CONTENTS

		<u>PAGE</u>
Chapter 1	INTRODUCTION	
	Scope	1-1
	General	1-1
Chapter 2	RESPONSIBILITIES	
	General	2-1
	Response Forces	2-1
	Wartime Versus Peacetime NAIRA Responsibilities	2-10
Chapter 3	PROTECTION FROM NUCLEAR WEAPON HAZARDS	
	General	3-1
	Hazardous Radiological Materials	3-1
	Radiation Hazards	3-3
	Protective Measures for Radiation Hazards	3-3
	Non-Radiological Hazards	3-4
Chapter 4	MANAGEMENT OF THE INITIAL RESPONSE FORCE	
	General	4-1
	Initial Response Phase	4-1
	Transfer of Responsibility	4-4
Chapter 5	SECURITY	
	General	5-1
	Mission	5-1
	Organization	5-1
	Execution	5-2
	Logistics and Administration	5-5
Chapter 6	ALPHA TEAM	
	General	6-1
	Mission	6-1
	Organization	6-1
	Equipment	6-3
	Overview	6-4
	Interface with Follow-On Force	6-4
Chapter 7	SURVEY AND MONITORING TECHNIQUES	
	General	7-1
	Gamma Probe	7-1
	Alpha Probe	7-5
	Air Sampling	7-5
	Sampling Procedures	7-6

		<u>PAGE</u>
Chapter 8	CONTAMINATION CONTROL	
	General	8-1
	Initial Monitoring	8-1
	Protective Measures	8-3
	Contamination Control Station (CSS)	8-3
Chapter 9	DECONTAMINATION	
	General	9-1
	IRF Decontamination Team Mission	9-1
	IRF Decontamination Team Organization	9-1
	Considerations	9-1
	Personnel Decontamination	9-2
	Equipment Decontamination	9-4
	Terrain Decontamination	9-9
	Levels of Contamination	9-9
Chapter 10	MEDICAL	
	General	10-1
	Responsibilities	10-1
	Pre-Accident Preparation	10-6
	Contamination Control and Decontamination	10-11
	Casualty Treatment	10-12
	Dose Assessment	10-15
Chapter 11	PUBLIC AFFAIRS	
	Scope	11-1
	General	11-1
Chapter 12	NAIRA TRAINING	
	General	12-1
	Intent	12-1
	Scope	12-1
	Alpha Team Training	12-2
	Civilian Integration	12-2
	Training Resources	12-2
APPENDIX A	Fire Fighting	A-1
APPENDIX B	Points of Contact	B-1
APPENDIX C	OSC Checklist for IRF	C-1
APPENDIX D	Acronyms	D-1
APPENDIX E	Radiological Control Forms	E-1
References		Reference - 1
Glossary		Glossary - 2

20

Chapter 2
RESPONSIBILITIES

2-1. General. The Department of Defense (DOD), Department of Energy (DOE) and the Federal Emergency Management Agency (FEMA) establish joint policy for coordinating response to a nuclear weapon accident. This joint policy outlines responsibilities for on-site command and control at the scene of a nuclear accident or significant incident and is discussed in more detail in the NARP manual. Specific responsibilities of each of these agencies and the organizations that work for them in responding to a nuclear accident are described in AR 50-5. For the purposes of this FM, the following must be understood.

a. DOD and DOE responsibilities are worldwide, subject to the provisions of international agreements, host nation restrictions, and theater command policy.

b. DOD has responsibility for establishing transition-to-war and wartime NAIRA policy.

c. The role of FEMA applies only within the United States and its territories and only during peacetime.

2-2. Response Forces.

a. In both CONUS and OCONUS, each US Army installation, having custody of nuclear weapons is responsible for responding to accidents occurring on or near the installation that involve nuclear weapons and components. These installations will have a dedicated IRF that is trained and prepared to respond to any nuclear accident or incident. IRF procedures and responsibilities will be included in the installation NAIRA SOP.

b. Installations that do not have custody of nuclear weapons will also have an IRF but it is not required that they be a specially trained and dedicated organization. No specific installation NAIRA SOP is required, however, this contingency should be covered in an annex to the installation SOP.

c. There are three levels of response to a nuclear accident: the initial response, the regional response, and the service response. The regional and service response forces will be referred to as follow-on forces in this FM. The responsibility and organization of the follow-on forces are described in paragraph 3 of this Chapter and in more detail in AR 50-5 and the NARP manual.

(T) Initial Response Force (IRF)--General Responsibilities.

(a) The IRF is the nearest military installation, regardless of size, to respond to an accident, to take immediate emergency measures, and to provide a federal presence and humanitarian support. The On-Scene Commander (OSC) goes to the accident scene and is the military representative at the accident. The IRF performs emergency operations to save lives, provide

security, confirm or deny the presence of contamination, and contain the hazard as much as possible. The IRF will coordinate on-scene containment activities with civil authorities, and will remain in charge until relieved by follow-on forces or, in the instance of custody by a non-DOD agency, by the agency response force. Outside the United States, the responsibility for military response to ~~off-base~~ nuclear accidents rests with the commander of the unified command. Basic principles of response will be according to this FM and AR 50-5 and each commands NAIRA SOP, as modified to support mission requirements and host-nation policies.

(b) The IRF OSC remains in charge until relieved by a follow-on forces OSC (only if necessary). If the tactical situation precludes waiting for follow-on forces, guidance in paragraph 2-3 should be used.

(c) On US territory, the OSC establishes a National Defense Area (NDA), as required. NDAs may be established, eliminated, or have their boundaries changed to protect DOD resources as specified in AR 50-5.

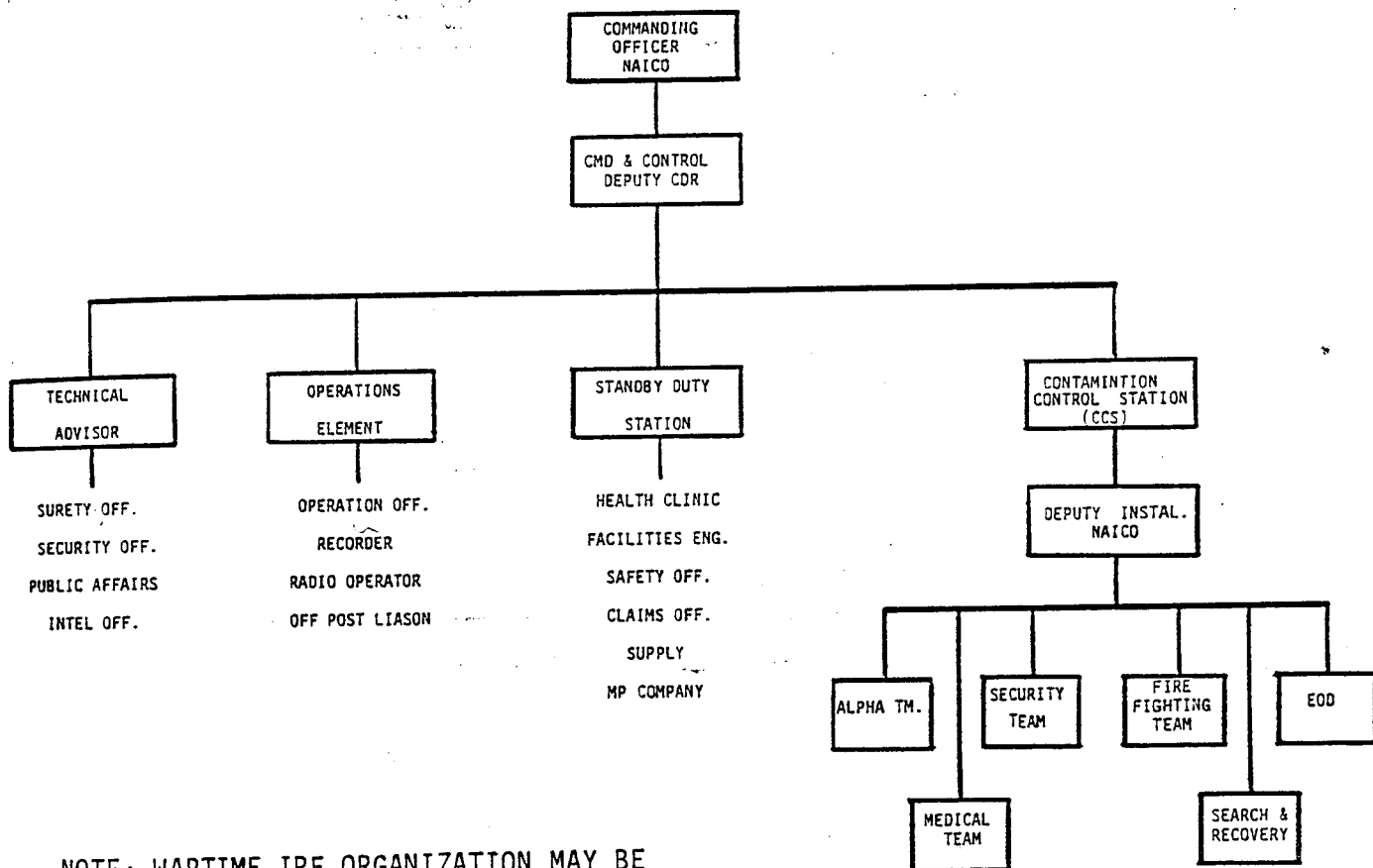
(d) On foreign territory, the OSC in coordination with local authorities establishes a Local National Exclusion Area (LNEA) as required and in coordination with local authorities.

(e) The IRF supports the follow-on forces at the accident scene, as required.

~~(2)~~ Initial Response Force--Specific Responsibilities. US Army units designated as an IRF will establish, train, equip, and exercise their forces as described in this FM, AR 50-5 and the NARP. Team composition should consist of a minimum of two primary and two alternate members of each position, to assure a 24-hour capability. Figures 2-1 and 2-2 show the organization of the IRF. Each position should be occupied by the most senior qualified people. The responsibilities of each position are as follows:

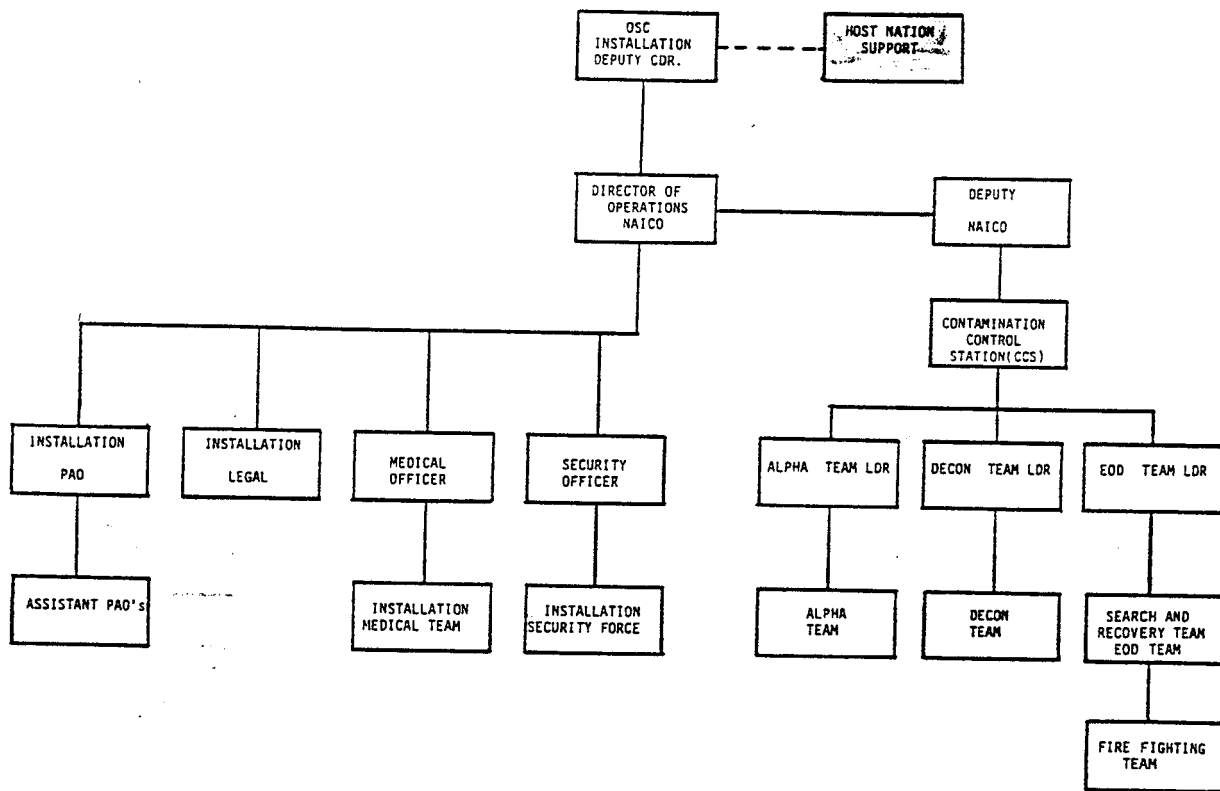
(a) OSC On Scene Commander. The OSC is normally the deputy installation commander and usually a general or flag officer. In some cases the installation commander will assume the IRF OSC duties, until replaced or assisted by a DOD/DOE OSC. The designated OSC is responsible for ensuring that his IRF is trained and equipped to respond to a nuclear accident or incident. The OSC also will ensure that the installation has a NAIRA SOP or a NAIRA annex to the installation SOP that establishes procedures and responsibilities for each IRF emergency team. The OSC commands all emergency forces and directs all operations at the scene, including but not limited to--

1. Security, safeguarding and disposition of all classified material involved.
2. Treatment of casualties.
3. Surveys to determine actual and potential hazards.
4. Actions to minimize the hazardous effect of a nuclear weapon accident.



NOTE: WARTIME IRF ORGANIZATION MAY BE DIFFERENT AND WILL BE BASED ON THE TACTICAL SITUATION AND THE COMMANDERS REQUIREMENTS AT THE TIME OF THE ACCIDENT

Figure 2-1. Initial Response Force-CONUS



NOTE: WARTIME IRF ORGANIZATION MAY BE DIFFERENT AND WILL BE BASED ON THE TACTICAL SITUATION AND THE COMMANDERS REQUIREMENTS AT THE TIME OF THE ACCIDENT

Figure 2-2. Initial Response Force-OCONUS

5. Requests for required assistance.
6. Reports.
7. Public information.
8. Control and logistic support of observers and other authorized personnel.
9. Claims.
10. Relations with local civilian groups.
11. Communications between the accident or incident site and higher headquarters.

(b) Nuclear Accident and Incident Control Officer (NAICO). A NAICO, normally field grade, is designated by the OSC to represent him at the scene of a nuclear weapon accident or significant incident. The NAICO acts as the designated representative of the OSC when he is not present at the site of the accident or incident, and is responsible for the duties listed in paragraph 2(a) above until the OSC's arrival. Each NAICO will be qualified by experience or training to command and coordinate the activities associated with NAIRA. The NAICO and his staff will respond as soon as possible after notification of a nuclear weapons accident or significant incident.

(c) Deputy NAICO. The deputy NAICO will assist the NAICO in all aspects of controlling the accident response. He normally operates out of the Operation Center and advises the NAICO on the operations of the contamination control station, the activities of the alpha, EOD, security, and medical teams and the recovery of the weapon and sensitive components.

(d) ~~Security Officer~~. Usually a military police officer or an Army Depot guard force officer, the security officer controls the security response force actions at the site of the nuclear accident. He establishes security to preclude entry into the 610 meter exclusion area (see Chapter 5) and coordinates with civil law enforcement agencies to provide effective control and access to the accident site. The security officer reports to and takes orders from the Deputy NAICO, NAICO and OSC.

(e) Medical Team. The medical team will normally consist of an installation Emergency Medical Team (EMT), which is capable of providing immediate treatment of casualties. Follow-on medical teams (RAMT - Radiological Assistance Medical Teams) will provide the OSC with a more indepth medical treatment capability.

(f) Alpha Team. The alpha team is normally controlled by an officer from the installation NBC Defense Company, Ordnance Company, or by specially trained personnel at Army Depots. The alpha team is organized as described in Chapter 6 and provides an immediate radiological survey. Follow-on Radiological Control Teams (RADCON) will provide a more detailed radiological survey capability (see AR 50-5).

(g) Decon Team. The decontamination team consist of assets from the installation NBC Defense Company, Ordnance Company or Army Depots. It is normally controlled by an NBC officer who is trained in radiological decontamination procedures as described in Chapter 9 of this FM and FM 3-5, "NBC Decontamination." The decontamination team will not undertake large-scale decontamination operations, but will mainly be concerned with hasty decontamination of personnel and equipment.

(h) Explosive Ordnance Disposal (EOD) Team. The EOD team consists of a senior qualified EOD supervisor and an initial entry party. The initial entry party should consist of an EOD officer and two assistants. Procedures for EOD operations during nuclear accidents are as described in FM 9-15 and FM 9-16. The EOD team responsibilities include, but are not limited to, the following:

1. Identify weapons and determine their condition.
2. Conduct render-safe and disposal procedures when necessary.
3. Based upon observations made during initial entry, advise on survey methods and reference points, and on the location of the hotline and command post.
4. Identify and collect classified components of the weapon and associated material.

(i) Public Affairs Officer (PAO). The initial response force PAO is normally the installation PAO. The PAO's main responsibilities are to:

1. Advise and assist the OSC with information.
2. Respond to information requirements prescribed by AR 360-5.
3. Ensure all news releases are coordinated as described in Chapter 11 of this FM.

(j) Stand-By Duty Station. The Stand-By Duty Station consist of other installation organizations that provide the OSC additional assistance in their area of expertise. They consist of, as a minimum, the following:

1. Health Clinic
2. Facilities Engineer
3. Safety Officer
4. Claims Officer
5. Supply Officer
6. MP Company

The Stand By Duty Station missions and responsibilities, as described in AR 50-5, should be included in installation NAIRA SOPs. Also, the Stand-By Duty Station should be included in all NAIRA training exercises, as feasible.

(3) Follow-On Forces Responsibilities.

(a) The capabilities of the initial response force in responding to a nuclear accident are limited; total control of the accident response will be the responsibility of the follow-on forces. Depending on the location of the accident, follow on forces should respond to the accident as early as one hour to as late as 24 hours after the accident has occurred.

(b) Follow-on forces will consist of an aggregate of personnel with a military staff as the nucleus. The response force may be augmented by DOE scientific and technical advisers, and by specialized teams from other services, as required. An example of the follow-on forces functional organization for CONUS is shown at Figure 2-3 and for OCONUS at Figure 2-4. The main difference is that the FEMA (Federal Emergency Management Agency) only responds to CONUS accidents or incidents. Notice also that Figures 2-3 and 2-4 depict the IRF as entirely integrated into the follow-on force organization. The IRF will continue to play a major role in response and assistance, unless other missions prevail. Depending on the extent and seriousness of the accident, the initial response force OSC will probably remain in command and control of the accident response if he is a general officer. If not, the IRF OSC will assist a follow-on force OSC, who will be a general officer. Some specific responsibilities of the follow-on force OSC include:

1. Safeguarding national security materials and information.
2. Coordinating with Federal, state, and local authorities. A liaison officer should be provided to state/local authorities and the senior FEMA official by the OSC at the earliest opportunity. The need for a liaison officer in an OCONUS accident is just as important. The liaison officer most likely will be a member of the DOE response force.
3. Ensuring that an assessment of hazards affecting public health and safety is made.
4. Notifying civil authorities of the precautions and other measures required for the protection of public health safety.
5. Establishing the priorities for response efforts.
6. Coordinating reviewing, and approving public information and news releases. Establishing a Joint Information Center, if not already established.
7. Communicating all essential/required information and situation reports to the National Military Command Center and service Operations Center.

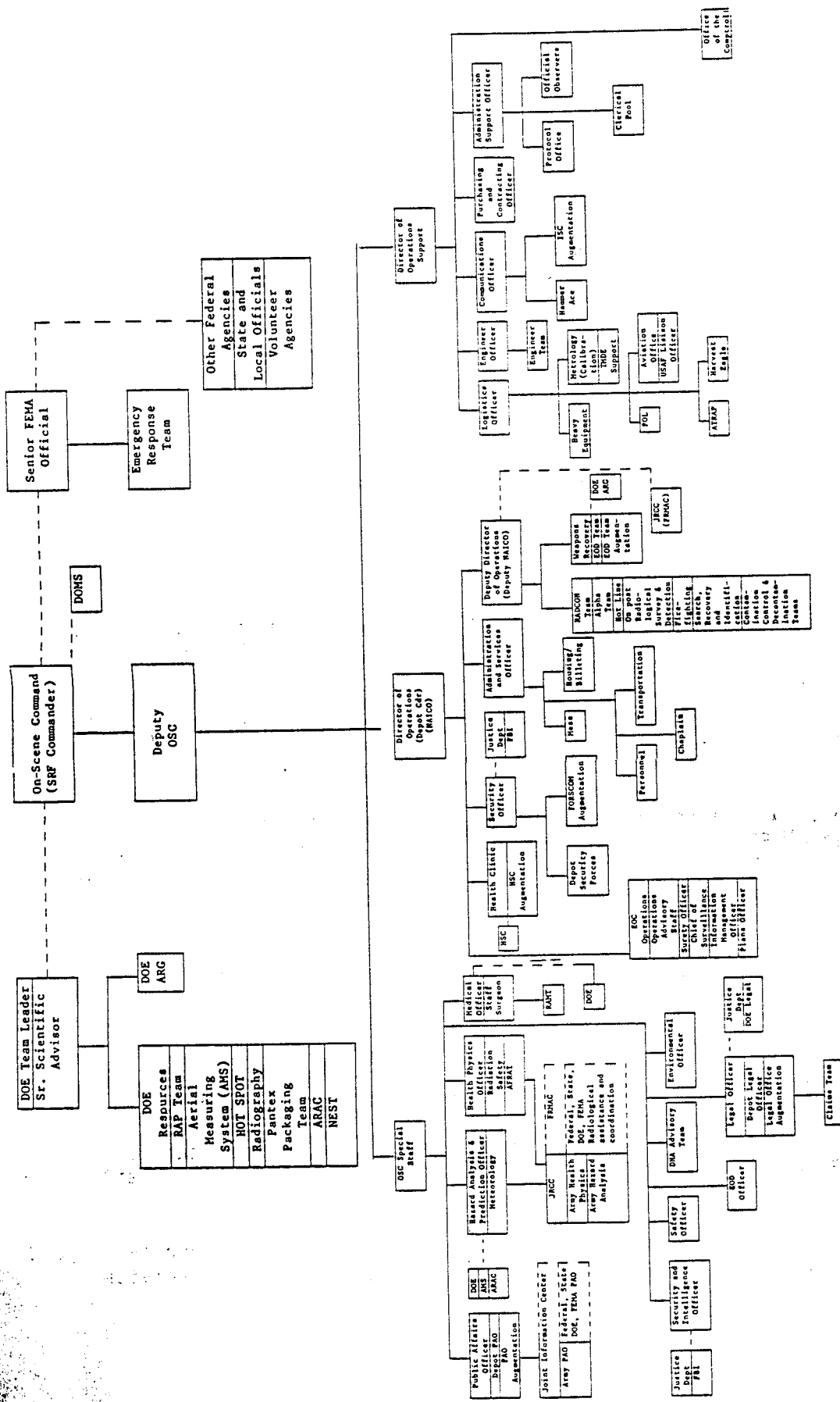
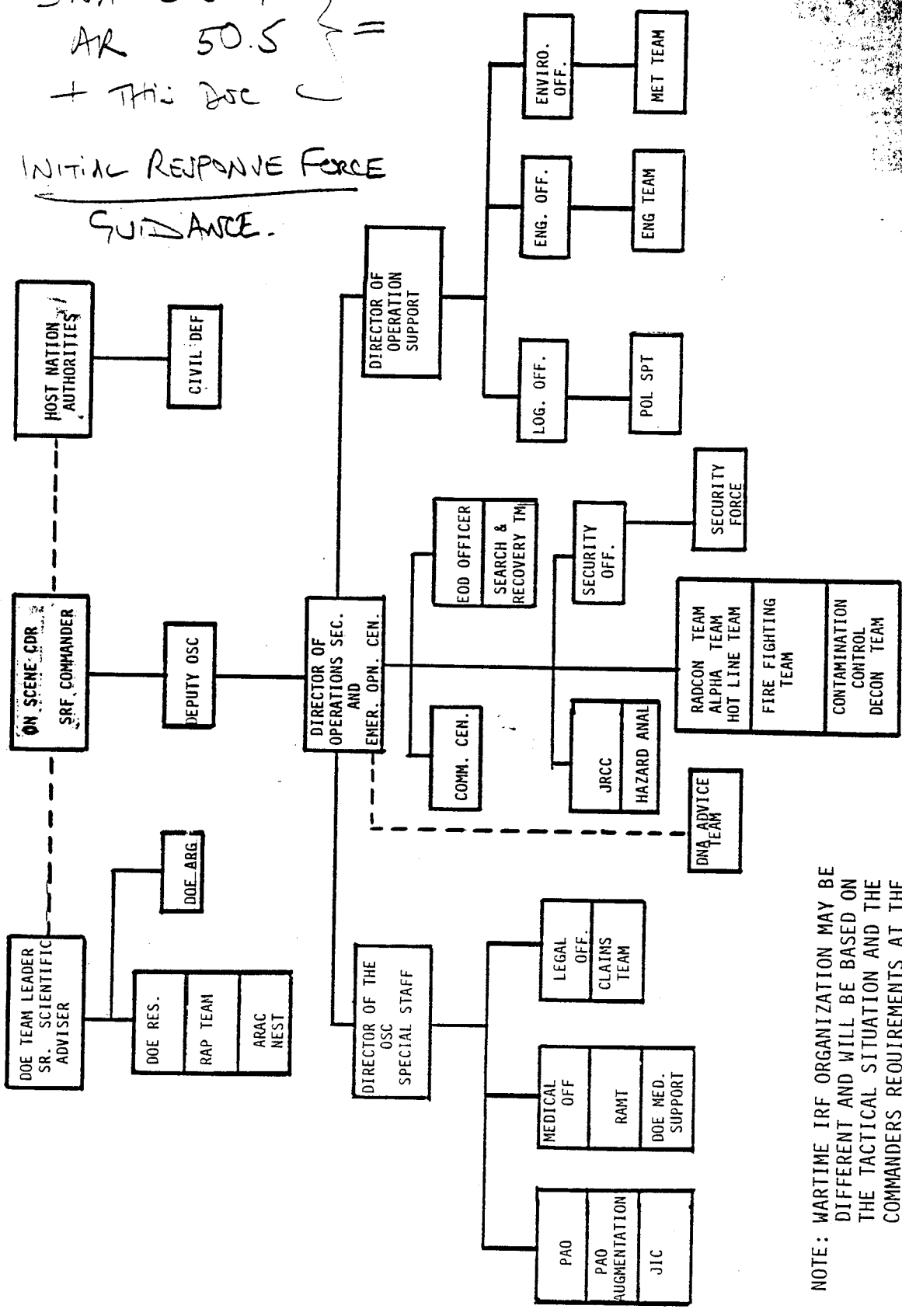


Figure 2-3 Follow on Forces - CONUS

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 AR 50.5
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INITIAL RESPONSE FORCE
 GUIDANCE.



NOTE: WARTIME IRF ORGANIZATION MAY BE DIFFERENT AND WILL BE BASED ON THE TACTICAL SITUATION AND THE COMMANDERS REQUIREMENTS AT THE TIME OF THE ACCIDENT

Figure 2-4 Follow on Forces - CONUS

Figure 2-3 Follow on Forces - CONUS

8. Coordinating with the senior FEMA official (CONUS only) and state or host nation authorities to restore the accident site.

9. Coordinating with the accident investigation board or team.

10. Obtaining assets required to support response operations.

11. Determining specific capabilities and assets of each DOD or DOE element responding to the accident and integrating those elements into the response force.

12. Developing a site restoration plan.

13. Establishing the Joint Radiological Control Center and initiating a radiation safety and environmental monitoring program.

(c) Other follow-on forces who will respond to the accident and assist the OSC are as follows:

~~1. DOE and DOD Staff advisors~~

~~2. Department of Energy Accident Response Group (ARG)~~

~~3. Federal Emergency Management Agency (FEMA)~~

~~4. Defense Nuclear Agency Advisory Team~~

~~5. Joint Nuclear Accident Coordinating Center (JNACC)~~

~~6. Accident Investigation Board.~~

~~7. Nuclear Emergency Search Team (NEST)~~

~~8. Atmospheric Release Advisory Capability (ARAC).~~

~~9. Radiological Advisory Medical Team (RAMT).~~

~~10. Radiological Control Team (RADCON)~~

Duties and responsibilities of each of these forces are in AR 50-5 and the NARP manual.

~~2-3~~ Wartime Versus Peacetime NAIRA Responsibilities.

a. The responsibility of various IRF forces as described above is mainly applicable to a peacetime situation. Although elements of the IRF will be available during wartime, the feasibility of their response to NAIRA accidents is not likely. In a wartime OCONUS environment, the IRF represents divisional and corps assets who will most likely be involved in other priority missions and have already deployed with their assigned units to their General Defense Positions (GDP). Therefore, the commander who has custody of the

nuclear weapon at the time of the accident or incident has responsibility for NAIRA during wartime. The initial procedure used to control the accident must be oriented to minimizing injury or loss of life, securing the area to prevent spread of contamination, and notifying of higher headquarters. Additional actions will depend on various factors, the most important of which are safety and minimal interference with military operations. Units who have custody of nuclear weapons must be aware of the susceptibility of weapon damage to direct enemy action, vehicle and aircraft accidents, terrorism or sabotage, handling accidents, and fires. It is necessary that the commander of the unit having custody of nuclear weapons provide the safest, most secure environment possible for these weapons to minimize such hazards. However, units must be prepared to implement necessary emergency measures in the event of a weapon accident. The unit having custody of the weapon at the time of the accident must determine the extent of damage, make a decision based on the tactical situation, and take emergency measures as required. During such situations, command and control is essential and the unit must continue mission operations.

b. Units which have custody of nuclear weapons must have SOPs which include tactical NAIRA emergency measures. During wartime, NAIRA procedures for delivery and support units will remain limited to emergency measures outlined below. Detailed decontamination and clean-ups, if required, will be left to follow-on forces and host nation territorial commands as appropriate.

(1) Emergency measures, in priority order, include:

- (a) Rescue
- (b) First aid
- (c) Evacuation of injured
- (d) Firefighting
- (e) Minimize loss of life, personal injury, hazard effects, and destruction of property
- (f) Securing area to prevent spread of contamination to civilian or friendly forces
- (g) Notification and request for assistance to Division or Corps Tactical Operations Center, Division Support Command (DISCOM), or Corps Support Command (COSCOM) as appropriate.

(2) Additional actions by the unit or individual having custody of the weapon(s) at the time of the accident, within their capabilities, may include:

- (a) Marking the accident site
- (b) Warning units downwind of a possible radiation hazard.

(c) Determining status of weapon(s) or components for reporting to the tactical commander and for a follow-up message to the commander responsible for area damage control.

(d) Secure classified information and material.

(3) The following actions are taken/directed by the senior member of the unit present at the accident location:

(a) Assume a radiological protective posture; mask and evacuate downwind area.

(b) Segregate contaminated wounded.

(c) Determine category and disposition of weapon damage as shown in Table 2-1.

(d) Report status to higher headquarters. Consideration should be given to Emergency destruction (ED) of the weapon if it is in Category 7, and unless altered by directive from higher headquarters.

(e) Mark suspected contaminated area.

(f) If required and time permits, decontaminate personnel and equipment (See Chapter 9).

(g) Displace as directed.

Table 2-1. Weapon Category and Disposition

CATEGORY	STATUS OF WEAPON	ACTION
1	Weapon has burned, detonated (HE) or structural integrity has been lost (i.e., weapon cannot be fired or safely transported)	Weapon will be released to the control of Higher Headquarters. Consideration should be given to ED. Consult higher headquarters.
2	Weapon has been damaged to point where it cannot be fired; however, no explosion or release of radiation has occurred	Weapon will remain with unit and be returned to the ordnance NASP when situation permits
3	Weapon has received minor damage but is still serviceable	Weapon will remain with unit and be inspected to ensure continued serviceability

Chapter 3

PROTECTION FROM NUCLEAR WEAPON HAZARDS

3-1. General.

a. The hazards surrounding nuclear weapons and special nuclear material are similar to those of conventional weapons and dangerous chemicals. However, somewhat more emphasis on usage protection is necessary because of the potential long-term effect on persons and the denial of property if contaminated.

b. Nuclear weapons are designed to survive all but the most severe abnormal environments and are "one-point" safe. A nuclear yield can be produced only upon functioning of the weapon in the normal sequence of arming and firing. In an abnormal situation, the high explosive and radioactive material can be hazardous. The precautions outlined in this section are based on the nature of the hazardous material which may be encountered and on experience gained during actual "accident" situations.

3-2. Hazardous Radiological Materials!

a. ~~High Explosives. The high explosive contained in most nuclear weapons constitutes a major hazard in a nuclear weapon accident.~~ If the high explosive becomes ignited, it will either burn rapidly or on some occasions explode. Non-nuclear detonation and fires that occur during shipment or storage of nuclear weapons must be handled in accordance with the provisions of TM 5-315 and TB 385-2. — *sk was there.*

b. Radioactive Nuclear Weapon Materials.

(1) Plutonium. Plutonium is a heavy metal which when first processed looks like stainless steel, but which rapidly oxidizes to a characteristic brownish-black color. When associated with a fire, plutonium may burn, producing radioactive plutonium oxide particles. Detonation of the high-explosive component may pulverize plutonium into minute, invisible particles that are dispersed in smoke and dust, causing contamination over a large area. If the high explosive burns instead of detonating, the amount of plutonium dispersed into the atmosphere is insignificant, and represents a serious health hazard only in the immediate area of burning at the accident site and in the smoke cloud. Plutonium in a pulverized form is flammable. Deposits of pulverized plutonium produced when an accident occurs may be resuspended by natural forces, such as the wind, or by personnel, vehicles, and low-flying aircraft operating in the area. Air sampling is necessary to properly evaluate the hazard caused by airborne radioactive particles. The plutonium referred to throughout this manual is plutonium-239 (abbreviated 239Pu). 239Pu emits a 5.15-meV alpha particle that travels about 4 centimeters in air.

(a) The primary hazard caused by plutonium results from inhalation of alpha-emitting particles. The actual amount of plutonium or plutonium oxide that is absorbed through the lungs is the critical factor. This is extremely difficult to estimate because absorption is dependent on many factors, i.e., particle size, solubility of the material, particle density, and breathing rate of the individual. Most of the plutonium that enters the bloodstream is deposited in bone and the liver. A few months after exposure, 80 to 90 percent of absorbed plutonium will be found in the skeleton. Skeletal deposition may produce bone diseases (including cancer) many years later. It is assumed that any airborne plutonium from a high explosive detonation or fire will have settled by the time the ALPHA or RADCON team arrives at the scene; alpha contamination would be on the ground or on debris. If there is a possibility that plutonium is still airborne at the accident, a high-filtration respirator (equivalent to the M17-series field protective mask, or better) should be worn until any cloud or smoke has settled or drifted away from the area, until the possibility of blowing dust or smoke has passed, or until air sampling equipment has been operated and indicates less than 50 cpm/m³ airborne alpha contamination. Table 3-1 is a guide to the type of respiratory protection recommended in areas where plutonium contamination, airborne, on the ground, or on debris, is encountered. (The personnel hazard at this point would be inhalation of plutonium resuspended in the air by EOD team/ALPHA team/RADCON team activity around the weapon and handling of contaminated parts.)

(b) The entry of plutonium into the bloodstream through deep puncture wounds also presents a serious hazard even though it is a slow process. Thorough cleaning and bandaging will normally prevent this entry. Absorption of plutonium through unbroken skin or from shallow wounds is of negligible concern. See Chapter 10 for further guidance on treatment of plutonium contamination.

Table 3-1. Recommended Respiratory Protection Against Airborne Alpha Contamination¹

Permissible level (cpm/m ³)	Protection
0 to 50	No respiratory protection.
50 to 50,000	High-filtration respirator at least 99.9 percent effective (M17-series mask or equivalent).
Greater than 50,000	Self-contained breathing apparatus.

¹The guide to EOD personnel is contained in FM 9-15.

Note. Prior to initial entry, personnel will always don high-filtration respirator (M17-series mask or equivalent).

(2) Uranium. Uranium may be in the form of uranium-235 or uranium-238 (abbreviated 235U or 238U). When first processed, uranium looks like stainless steel, but it slowly oxidizes to a golden color and then to a characteristic blue-black or black color. Like plutonium, uranium is a heavy metal, is an alpha emitter, is flammable in a finely divided powder, and sparks when scratched with a metallic object. Uranium particles, which are dispersed and enter the body in the same manner as plutonium, are less severe radiological health hazards. The principal known hazard with uranium particles is heavy metal poisoning. Safety precautions applicable to plutonium are also applicable to uranium.

(3) Fission Products. Should a nuclear weapon or device involved in an accident result in a partial nuclear yield, there will be a beta-gamma radiation hazard from the fission products as well as an alpha radiation hazard from unfissioned uranium or plutonium. Because of the short range and low penetrating ability of beta particles, they constitute a limited external hazard, but may produce skin burns if beta emitters remain in contact with the skin.

3-3. Radiation Hazards. The significant hazardous levels of ground radiological contamination that have been established for a nuclear accident are:

a. Alpha radiation-1,000 micrograms of plutonium-239 per square meter (1,000 mg 239Pu/m²). However, any concentration higher than 10 micrograms of plutonium-239 per square meter for alpha radiation may produce a serious resuspension problem because the plutonium may become airborne (or aerosolized). When alpha contamination is detected, the contaminant is assumed to be 239Pu because it constitutes the greatest internal hazard. Measures taken to control 239Pu contamination are more than adequate for contamination by 235U. These levels are arbitrary lines to establish contours and do not indicate contours of maximum permissible contamination. A radioactive hazard will exist outside these lines.

b. Beta-gamma radiation-10 millirad per hour (10 mrad/hr). It should be emphasized that large-scale beta-gamma contamination will result only from a nuclear, or partial nuclear, detonation. Since nuclear weapons are designed to minimize the probability of an accidental significant nuclear detonation, this occurrence will be extremely rare. On the other hand, low-energy gamma radiation is emitted during plutonium decay. Therefore, localized hot spot readings of several mrad/hr may be present even though a nuclear yield has not occurred.

3-4. Protective Measures for Radiation Hazards.

a. All personnel entering an accident area will wear respiratory protective equipment until it has been positively determined that this type of protection is not needed. The site should be approached from upwind, and visible concentrations of dust or smoke should be avoided. Table 1 is a guide to the type of respiratory protection recommended against airborne alpha contamination. This table is based on the hazard from plutonium contamination, so if only uranium is present, a greater margin of safety is provided since uranium is not as hazardous as plutonium.

b. Eating, drinking, chewing, and smoking will not be permitted in the contaminated area. Smoking material and foodstuff will not be carried into the contaminated area.

c. Cuts or breaks in the skin should be protected to minimize the possibility of internal contamination.

d. Disposable items such as coveralls, hood, gloves, and boot covers should be worn to avoid personnel contamination and facilitate decontamination procedures. Military uniforms and civilian clothing are generally not satisfactory for these operations, but may be worn in an emergency if additional precautions are taken to protect the body.

e. To prevent large-scale resuspension of hazardous material, all aircraft, particularly rotary-wing types, should stay clear of the contaminated area. Motor vehicles required to travel in the contaminated area must move slowly to avoid resuspension of hazardous material.

f. Entry into and exit from the area of suspected contamination will be through the established control points at the contamination control station. Surfaces in the area (debris, shrubbery, puddles, and the like) which are possibly contaminated should be avoided when possible.

g. Prior to entry into the area of suspected contamination, personnel should insure that their clothing and equipment are properly prepared. A final check of clothing and equipment will be made by the monitor at the entry point.

3-5. Non-Radiological Hazards. Non-radiological hazards may also be present at a nuclear weapon accident, and the initial response force must understand their characteristics and hazards. The following is a list of the most common non-radiological hazards expected as a result of a nuclear accident.

(1) Beryllium (Be).

(a) Beryllium is a light, gray-white non-radioactive metal, hard and brittle, and resembles magnesium.

(b) Inhalation is the most significant means of entry into the body. Because it oxidizes easily, any fire or explosion involving beryllium will liberate toxic fumes and smoke. When beryllium enters the body through cuts, scratches or abrasions on the skin, ulceration often occurs. One of the peculiarities of beryllium poisoning is that there are no specific symptoms for beryllium intoxication. The most common symptom is an acute or delayed type of phenonitis (berylliosis). Other commonly occurring signs and symptoms are ulceration and irritation of the skin, shortness of breath, chronic cough, cyanosis, loss of weight and extreme nervousness. Beryllium or its compounds, when in finely divided form, should never be handled with the bare hands but always with rubber gloves. An M17, or equivalent respirator, and anti-contamination clothing must always be worn in an area known or suspected to be contaminated with beryllium dust. Self-contained breathing apparatus is necessary whenever beryllium fumes or smoke are present. Decontamination of

personnel, terrain, or facilities will be similar to radiological decontamination. An effective method, when applicable, is vacuum cleaning, using a cleaner with a high efficiency particle air (HEPA) filter. Since beryllium is not radioactive, its detection requires chemical analysis in a properly equipped laboratory. Direct detection in the field is impossible.

(2) Lithium (Li).

(a) Lithium and its compounds, normally lithium hydride, may be present at a nuclear weapon accident. Due to its highly reactive nature, naturally occurring lithium is always found chemically with other elements. Upon exposure to water, a violent chemical reaction occurs, producing heat, hydrogen, oxygen, and lithium hydroxide. The heat causes the hydrogen to burn explosively, producing a great deal of damage.

(b) Lithium can react directly with the water contained in the body tissue causing severe chemical burns. Lithium hydroxide is also a caustic agent which affects the body, especially the eyes, in the same manner as lye (sodium or potassium hydroxide). Respiratory protection and firefighters clothing is required to adequately protect personnel exposed to fires involving lithium or lithium hydrides. A self-contained breathing apparatus is necessary if fumes from burning lithium components are present. Protection for the eyes and skin is necessary for operations involving these materials.

(3) Lead (Pb). Pure lead and most of its compounds are toxic. Lead enters the body through inhalation, ingestion or skin absorption. Inhalation of lead compounds presents a very serious hazard. Skin absorption is usually negligible since the early absorbed compounds are seldom encountered in sufficient concentration to cause damage. Upon entry into the body, lead will concentrate in the kidneys and bones. From the bone deposits, it will be slowly liberated into the bloodstream causing anemia and resulting in a chronic toxic condition. Lead poisoning displays several specific characteristics and symptoms. The skin of an exposed individual will turn yellowish and dry. Digestion is impaired with severe colicky pains, and constipation results. With a high body burden, the exposed individual has a sweet, metallic taste in his mouth and a dark blue coloring of the gums resulting from a deposition of black lead sulfide. Lead concentrations within the body have been successfully reduced by using chelating agents. An M17 mask will protect personnel against inhalation of lead compounds.

(4) Plastics. When involved in a fire, all plastics present varying degrees of toxic hazards due to the gases, fumes, and/or minute particles produced. The gaseous or particulate products may produce dizziness and prostration initially, mild and severe dermatitis, severe illness, or death if inhaled, ingested, placed in contact with the skin, or absorbed through the skin. Any fire involving plastics should be approached on the assumption that toxic fumes and particles are present. This includes all nuclear weapon fires.

Chapter 4

MANAGEMENT OF THE INITIAL RESPONSE FORCE

4-1. General. The concept of operations presented in this chapter focuses on IRF actions. The IRF must be prepared to respond to a nuclear weapon accident or incident on or off a military installation, whether their mission is in CONUS or OCONUS. This chapter assumes a worst case accident and is applicable to both CONUS and OCONUS unless otherwise stated. The management of such an accident will occur in two phases:

a. Initial Phase. Included in this phase are those immediate emergency measures taken by the nearest DOE/DOD installation to provide a federal presence and humanitarian support. Initiation of nuclear weapon accident response actions results automatically when an accident is reported. Therefore, accidents must be reported immediately using the most expeditious means available. Accidents then will be reported through the installation chain of command directly to the National Military Command Center and the Service Operations Center. Upon receipt of accident notification, the appropriate follow-on forces will be identified and tasked, and specialized teams alerted and prepared for immediate deployment.

b. Follow-on Phase. The follow-on force continues those actions initiated by the IRF and commences long term actions that are necessary to return the environment to an acceptable condition. Weapon(s) recovery and site restoration are the primary objectives of this phase.

4-2. Initial Response Phase.

a. After an assessment has been made by the OSC nearest the accident involving nuclear weapons, there are specific actions which must be taken. In general, action required to define and stabilize the situation should be initiated immediately. These actions would include fire suppression, reconnaissance, rescue and treatment of casualties, and assessment of the hazards to public health and safety. Other actions of immediate concern include establishing communications between the accident site, the supporting military installation and command centers, and providing security for nuclear weapons, associated components, and classified materiel. The names of all personnel including sightseers at the accident site and their location relative to the accident should be recorded to facilitate subsequent radiological health programs. The release of public affairs information regarding the accident shortly after its occurrence should also be planned and coordinated. If recall and staging or transportation will delay IRF arrival, consideration should be given to immediately dispatching an advance party to assess the situation, advise civilian response personnel of hazards, obtain civilian assistance in establishing initial security, and provide positive information on conditions at the accident site to higher authority.

b. As a minimum the OSC must accomplish the following (rough priority):

(1) Assume the worst situation (high explosive detonation and scattered radioactive materials) and make an on-scene assessment as soon as possible, since initial reports usually do not portray what has actually happened.

(2) Take positive action in all emergency situations involving nuclear weapon material. This action may involve preparing for deployment or actual deployment. The OSC must be kept informed of the situation so response can be rapid and orderly.

(3) Activate the IRF and assemble deployable elements at a predetermined location, when there is a clear and imminent danger from a nuclear accident or incident.

(4) Ensure the IRF deploys directly to the accident site if it can arrive in enough time to perform lifesaving, suppression, and containment actions, and alleviate public apprehension. The follow-on force reports to the contamination control station (CCS) or assembly area if the accident is on or near the base, or to a convoy assembly area if the accident is located at a greater distance.

(5) Make sure the initial response to a nuclear weapon accident parallels the initial response phase described in AR 50-5 and the NARP manual, with these additional actions:

(a) When the IRF arrives at the scene of a nuclear weapons accident or incident, the following must be accomplished:

1. ~~Take initial emergency actions to establish command and control of the accident site.~~ Immediately establish a 610 meter (2000 ft radius) exclusion area using IRF security force (see Chapters 5 and 8) to protect personnel from possible radiation and weapon explosive hazards.

2. Protect classified material.

3. Seek the assistance and cooperation of state and local authorities and advise them of possible radiological hazards.

4. Remain on scene until the arrival of the IRF OSC or DOE team leader having primary responsibility.

(b) The IRF should withdraw from the accident site according to guidance listed in Appendix A for fires involving nuclear weapons or components.

(c) The OSC must make rescue and care of medical casualties one of the highest priorities, and if detailed information is lacking, consider medical casualties as being exposed to radioactive contamination. After coordinating with the public affairs representative, notify officials at hospitals and clinics where medical casualties are evacuated so that protective measures can be taken. As soon as a determination is made on the presence or absence of radioactive contamination, inform the same medical officials. (See Chapter 10).

(d) The IRF security force must evacuate public and nonessential personnel. Do not direct passage through the plume of the fire because of potential acute hazards such as radioactivity, explosion, fire, or potentially lethal toxic gas or vapor concentrations.

(e) The IRF security force should consider these elements in establishing security:

1. Providing complete protection for nuclear weapons, associated components, and classified material (See Chapter 5).
2. Monitoring security personnel to ensure that they are not positioned in a contaminated area.
3. Maintaining at least 610 meters (2000 feet) from the accident site to the initial security perimeter (exclusion area perimeter).
4. Establishing an entry control point.
5. Contacting local and state law enforcement agencies as soon as possible to ensure a coordinated security effort at the accident site.
6. Identifying and badging individuals who will be allowed entry to the accident site.

(f) The IRF legal representative must advise the OSC on establishing an NDA or LNEA (National Defense Area or Local National Exclusion Area). At offbase accident sites, an NDA (CONUS) or LNEA (OCONUS) may be established for the protection or security of all types of DOD resources and personnel and not merely nuclear weapons and components and classified materials. Commanders of MACOMs and installations have the authority to establish NDAs or LNEAs. Normally, they have or will delegate this authority to the on-scene commander. In most cases one or more NDAs or LNEAs should be established as soon as possible. NDAs or LNEAs may be expanded or reduced in size as necessary to protect the DOD resources and personnel involved. The size of the NDA or LNEAs should be reduced as the situation permits. Once the NDA or LNEA is disestablished, responsibility for security in that area reverts to civil authority. (See Chapter 5 for more information on establishing the NDA or LNEA.)

(g) The IRF Public Affairs representative must prepare news releases about the accident. To preclude undue public alarm and in the interest of public safety, the OSC has the authority to inform the public that a nuclear weapon was involved in the accident.

(h) The IRF OSC must determine the presence of radiological contamination and report the findings as soon as possible. One of the first actions should be to monitor people and equipment that are close to the accident site and conduct air sampling downwind of the accident site. If positive results are obtained, do not penetrate the exclusion area; however, an initial perimeter survey should be initiated outside the exclusion area to confirm or deny the presence of contamination. (See Chapter 7.) If the

results are negative and EOD personnel are present, send a team composed of EOD personnel and radiation monitors to the site to monitor for contamination and identify other hazards.

(i) The IRF OSC must establish procedures to check personnel and vehicles at the initial monitoring point for contamination and perform decontamination, if necessary. Control contamination with water, oil, or other materials. Take these actions early in the response effort to prevent contamination from spreading outside the accident site. Arrange for bioassay medical followup on exposed individuals.

4-3. Transfer of Responsibility. IRF and follow-on force representatives will take the following actions when they assume, or are relieved of, responsibility at the scene of an accident:

a. The in-place OSC briefs the arriving OSC of the actions taken and the current status (only if there is a change of command).

b. Other incoming follow-on force members contact their on-scene counterparts for status briefings and determine required follow-up actions and support.

c. Agency personnel transfer responsibility and agree on a specific hour and date for record purposes.

d. The OSC advises the appropriate MACOM headquarters of the date and time of the transfer of responsibilities. The OSC keeps civil officials informed by introducing them to key members of his staff, explaining follow-on forces capabilities, and including them in the briefings.

e. Follow-on forces will take over IRF actions and initiate the recovery phase of the damaged nuclear weapon. Render-safe procedures, radiation monitoring, security, and public affairs action will continue where applicable. Specific procedures for management of follow-on forces and site restoration are discussed in AR 50-5 and the NARP manual.

Chapter 5

SECURITY

5-1. General. When a nuclear weapon accident occurs off a military installation, security assistance may have to be obtained from civil authorities until sufficient military forces reach the scene. Additionally, off-installation accidents may require establishment of a National Defense Area (NDA) or a Local National Exclusion Area (LNEA-for OCONUS) to permit effective control of civilian land by military forces. Even after establishment of the NDA or LNEA, close coordination with civil law enforcement agencies will be essential to an effective security program. Security of nuclear weapons is of paramount importance, and this security becomes even more critical when weapons are involved in an accident, due to the need for emergency access and possible exposure to unauthorized individuals.

5-2. Mission. The mission of the IRF security force is as follows:

- a. Provide complete protection for the nuclear weapon(s), associated components, classified material and government property at the accident or incident site.
- b. Establish security perimeter around accident or incident site consistent with the hazard.
- c. Assist the alpha team at the contamination control station entry control point.
- d. Ensure individuals who will be allowed entry to the accident site are identified and issued a badge before entry into the area through the entry control point.

5-3. Organization.

a. The organization of the NAIRA security force will vary widely depending on whether the accident occurs CONUS or OCONUS and if it occurs on or off a military installation. For OCONUS NAIRA, the security force will consist of elements from the Division or Corps MP Company. CONUS NAIRA security forces should consist of the depot's Military Police force along with available assets from the installation civilian guard force. Following an off-installation accident, the OSC should coordinate with local authorities for additional security requirements, if necessary.

b. The number of NAIRA security personnel required will vary depending on the situation. Table 5-1 provides a list of security force requirements based on the initial 610 meter exclusion area; the table will be useful to the OSC and the security force officer in determining requirements. Because the number could vary, the OSC should make provisions for the use of installation civilian guards or host nation support.

Table 5-1. Force Requirements

SEPARATION DISTANCE BETWEEN GUARDS (Meters)	GUARDS REQUIRED TO SURROUND 610 METER EXCLUSION AREA
25	153
50	77
75	51
100	38
200	19

5-4. Execution.

a. Accident Assessment. Upon arrival at the accident site, the security officer must assess the situation. This assessment includes an evaluation of the emergency response operations and actions of local law enforcement agencies. While the assessment is being made, security should be established at the accident site in cooperation with civil authorities. Fragmentation hazard distances and the possibility of radioactive contamination should be considered when placing initial security personnel (i.e., 610 meter exclusion area). For CONUS NAIRA, initial security is not to be confused with the NDA, which may not yet be established and may be different in size. The security officer should consider the following elements in his assessment:

- (1) Threat (present and potential danger to the secure area from entry by unauthorized personnel)
- (2) Location (on or off military installation)
- (3) Accident environment (remote, rural, suburban, urban)
- (4) Terrain characteristics (critical or dominating features)
- (5) Contamination (radiation intensity and extent)
- (6) Accident hazards (high explosives, rocket motors, or hazardous chemicals)
- (7) Local meteorological conditions (including prevailing winds)
- (8) Transportation network in accident area (access routes, types and quantities of vehicles)
- (9) Structures in accident area (type and quantity)
- (10) Safety of security personnel (fragmentation distances, contamination, cold weather)

b. National Defense Area (NDA) - For CONUS Only

(1) A National Defense Area may be required any time an accident involving nuclear weapons or components occurs on non-Federal property. An NDA is established only as a means for protecting DOD and Army resources located at the accident site. The NDA may or may not encompass the entire radiological control area. Security of any portion of the radiological control area which exists outside of the NDA is a matter of public safety and should be provided by civilian authorities. Due to restrictions under the Posse Comitatus Act, military personnel may not assist local officials in law enforcement activities such as providing security outside the NDA. However, humanitarian efforts such as firefighting, warning the public of dangers, and providing food, shelter, and medical care are authorized.

(2) DOD Directive 5200.8, Security of Military Installations and Resources, and Section 21 of the Internal Security Act of 1950 (50 USC 797) provide the legal basis for establishing an NDA. This area is specifically established to enhance safeguarding government property that is located on non-Federal land. Both the officer in charge of the IRF, and the OSC have been delegated the authority to establish NDAs. An NDA may be established only to protect Department of Defense resources. Initially the NDA may have to be quite large until missing resources and classified materials are found.

(3) The NDA should be clearly defined and its boundaries marked with a temporary barrier, such as rope or wire. Warning signs with the statement "National Defense Area - Keep Out. By order of General _____, Commander, (your MACOM Command) (Title 50 United States Code 797)" must be posted. The warning signs should be posted at the contamination control station and at other points along the boundary to be visible from any direction of approach. The warning sign could have the name of the IRF, officer in charge, or the OSC; however, using the MACOM commander's name may be a greater deterrence to unauthorized entry.

(4) The OSC who establishes the NDA should advise the civil authorities of the authority and need for establishing the NDA and the security controls in effect. If possible, the OSC should secure the landowner's consent and cooperation. However, obtaining such consent is not a prerequisite for the establishment of the NDA.

(5) In maintaining security of the NDA, military personnel are governed by US Army policy on the use of deadly force to protect nuclear weapons. Security personnel should be thoroughly briefed and given specific instructions for dealing with civilians. All personnel should be made aware of the sensitive nature of issues surrounding a nuclear weapon accident. Public affairs policies must be strictly adhered to; requests for interviews and queries concerning the accident must be referred to public affairs personnel. Civilians should be treated courteously and in a helpful but watchful manner. Only authorized personnel should be allowed to remove anything, or touch any accident debris.

(6) Local civil authorities should be asked to assist military personnel in preventing unauthorized entry into the NDA, and removal of unauthorized persons from the NDA. Within the NDA, military personnel may

detain unauthorized persons or persons violating the law, regulations, or rules. Once persons are detained, one of the following actions should be taken in a timely manner: removing them from the NDA; removing them from the NDA with an order of the commander barring reentry; or delivering them to civil authorities. Any of these actions should be coordinated with the legal officer and approved by the OSC as needed. The on-scene commander should be notified of the detention and any action taken. The security officers must insure that actions of on-scene personnel do not constitute a violation of the Posse Comitatus Act (PCA).

(7) As resources and classified materials are found and/or removed, the NDA boundaries must be changed as necessary to protect recovered or remaining resources. When no resources remain requiring protection, the NDA must be disestablished. Early coordination with state and local officials will permit an orderly transfer of responsibility as NDA boundaries are changed and when the NDA is disestablished.

(8) For OCONUS NAIRA, a local national exclusion area (LNEA) will be established only in coordination with host nation authorities. The LNEA will serve the same purpose as the NDA but will be subject to local laws and host nation agreements with the United States.

c. Security Procedures.

(1) Security personnel around the NDA or LNEA should be in locations that will enable them to maintain good visual contact with each other. This is necessary to prevent unauthorized persons from entering the NDA or LNEA undetected between posts. During the initial emergency response, the security force officer should attempt to position his guard force completely around the accident site at a distance no closer than 610 meters from the accident. Spacing of the guard force is critical, to ensure that eye contact and communications between each guard is maintained. Lighting should be provided or guard spacing adjusted to ensure that visual contact can also be maintained in heavily wooded areas or at night. Each guard should have a means of summoning assistance, preferably a radio, or be in contact with someone who does.

(2) If limitation on the size of the force does not allow for the positioning of guards close enough to maintain security around the entire site, Table 5-1 should be used to estimate the additional requirements needed. The security officer should notify the OSC of his requirements immediately. The local police force could be used to assist military security personnel. Coordination should be made with civil authorities at the Accident control point to use local police force.

(3) In maintaining the perimeter security, security personnel should use the minimum degree of control and force necessary. Security force personnel should be thoroughly briefed and given specific instructions concerning their duties. The briefing should include as a minimum:

(a) Responsibilities (General guard orders, specific orders, limits of post).

(b) The current threat (from physical entry of unauthorized personnel).

(c) The contamination dangers involved.

(d) Rules of force and challenging procedures.

(e) Instructions for dealing with civilians.

(f) Apprehension procedures.

(g) Public affairs information procedures.

(4) Security forces also will maintain an entry control point for the perimeter, located at the Contamination Control Station (see Figure 8-2). It will be manned by at least two armed security force personnel. Personnel entering or exiting the accident site must go through the entry control point. Entry controllers will maintain an accurate count of the number of personnel inside the area and should establish an identification system to control access into the site. They will also brief personnel entering the area of the 2-person rule and will record names of those entering and exiting the area. Authority to enter the area will be determined by the OSC.

(5) A security operations center should be established near the entry control point as the focal point for security operations. Representatives of all participating law enforcement agencies should be located at the security operations center and have the capability to communicate with their personnel. Communications should be established between the security operations center and the entry control point and with designated posts out on the security perimeter. Communications can be established with either wire or 2-way radios.

(6) As required by the situation, road blocks and traffic control points should also be established at road junctions or intersections leading to the accident site to divert civilian traffic to other routes and to warn of possible dangers. Security force personnel should also be positioned to direct response force vehicles to the accident site. Vehicle holding areas should be established to control vehicle parking.

(7) Additional security measures to consider include establishing a mandatory response force capable of reacting to an intrusion of the security force perimeter. Initially, however, sufficient personnel may not be available to form such a force. Platoon early warning systems (PEWS) can also be used on the exterior of the perimeter during hours of darkness to provide early warning of possible intrusions. Security force patrols and military working dog patrols can also be utilized on the exterior of the perimeter.

5-5. Logistics and Administration.

a. Military. The IRF will have a security element for perimeter security, entry and exit control, and protection of classified information and property. It is likely that sufficient personnel will not be included in IRF security elements initially responding to a nuclear weapon accident. As a result, the IRF security element should be augmented as soon as possible.

Installations tasked to provide an IRF should maintain equipment to adequately control an accident site. This equipment should include rope and stanchions for barricading the accident site, NDA or LNEA signs, entry control point signs, and portable lights. Riot control gear should be available for crowd control if required. Security personnel will normally possess equipment such as weapons and ammunition (90 rounds of 5.56 mm), cold weather gear, protective masks, hand-held radios, canteens, and helmets. Magazines will be inserted in weapons; however, security personnel will not chamber a round in their weapons.

b. Civilian Response. Civilian law enforcement response will depend on the location of the accident site. If the accident occurs off a military installation near a populated area, local police, fire, and rescue units probably will be notified and may already be on-scene when the IRF arrives. Civilian law enforcement personnel may also be requested to augment military security personnel if necessary.

c. Other. Numerous other civilian and military agencies may arrive either announced or unannounced to assist in nuclear weapons recovery, accident investigation, site restoration, etc. The IRF must be prepared to integrate these resources into response force activities based on the OSC's.

Chapter 6

ALPHA TEAM

6-1. General. As used in this manual, alpha team will be understood to refer to a specially trained and equipped team, formed in an NBC Defense Company, Special Ammunition Ordnance Company, or Army Depot special weapons section. This special team configuration is only implemented for training or an actual nuclear weapon accident.

6-2. Mission. The scope of the alpha team responsibilities will vary with the seriousness of the accident and the current tactical situation. The basic mission of the alpha team is to:

a. Detect and identify radiological contamination resulting from an accident by performing an initial monitoring and survey (as described in paragraph 8-2).

b. Establish rough point survey to determine approximate size of contaminated area.

c. Report the presence of radiological contamination immediately to the OSC/NAICO or, in his absence, to the senior officer present.

d. Mark the 1000mg PU 239/m² alpha contour line if alpha radiation is present.

e. Mark the 10 millirad/hr beta/gamma contour line if beta/gamma radiation is detected.

f. Mark the exclusion perimeter. It may be a combination of the alpha and beta/gamma contour lines.

g. Provide security for any nuclear weapon components if the team is first to arrive at the accident site.

h. Establish the Contamination Control Station.

i. Perform other duties as assigned by the OSC/NAICO.

6-3. Organization. The base unit for the formation of an alpha team should be a chemical decon platoon, special ammunition ordnance platoon or Army Depot special weapons section. The minimum number of personnel necessary to adequately perform the alpha team mission is 16. By maintaining platoon integrity in organizing for alpha team responsibilities, command and control is already established, and the additional personnel that may be assigned allow for faster, more efficient operations. Additionally, rotation of personnel performing strenuous tasks will enhance the team's ability to conduct sustained activities. All personnel on the alpha team should be qualified in the detection, identification, and measurement of radiation, and should have a general working knowledge of decontamination and the health physics aspects of radioactivity.

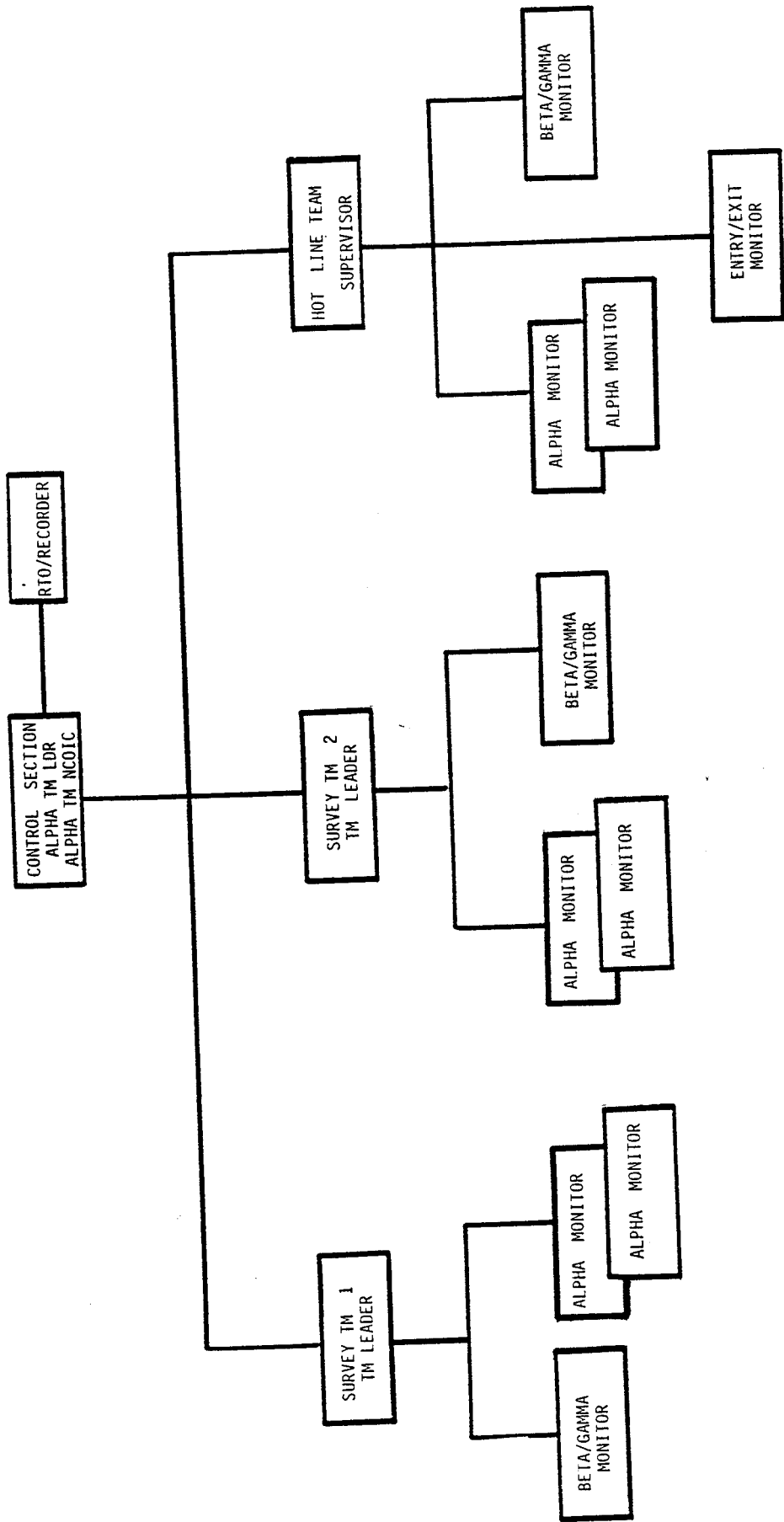


Figure 6-1. Alpha Team Organization

a. The team leader will coordinate the activities of the alpha team with the other response teams at the site and furnish advice on radiological monitoring and survey procedures and emergency decontamination measures for personnel.

b. All team members will be trained in the operation of assigned radiac instruments and air samplers.

c. All team members will have a minimum security clearance of SECRET.

6-4. Equipment.

a. The table below lists the minimum quantities of equipment recommended to accomplish the alpha team mission.

Table 6-1. Detection and Identification

<u>ITEM</u>	<u>NUMBER</u>
*Radiac Set AN/PDR-56F (AN/PDR-60)	8
*Radiac Set AN/PDR-27() (AN/VDR-2)	3
Radiacmeter IM 174A/PD	3
Radiacmeter IM 147/PD	16
Charger Radiac, PP 1578	1
Repair Parts, spare batteries	as reqd
Air Sampler, high vol, 24VDC, Staplex	3
Tripod mount, Staplex	3

*NOTE: Substitution of equivalent equipment is permitted, such as the Broken Arrow Response Kit (BARK with PRM-5) or LUD 220 (Gamma) and LUD 3 (ALPHA).

Table 6-2. Communications Equipment

<u>ITEM</u>	<u>NUMBER</u>
AN/PRC 77	4
TA 1	3
TA 312	2

Table 6-3. Miscellaneous

<u>ITEM</u>	<u>NUMBER</u>
Engineer Tape	10 rolls
Marking Signs	100
Lensatic Compass	

b. Additionally, during peacetime incidents, much more material will be needed. Under administrative rather than tactical constraints, all actions will be directed to minimizing exposure to hazards that may result in long term bodily damage. Table 6-4 includes equipment which is needed only for peacetime response. It should be packaged separately from the unit's other MTOE/TDA equipment, so it can be left behind as the unit deploys for war.

Table 6-4.

Swipe kit, nose and surface
Film badges
Engineer tape
Radiation hazard signs
Personnel decon equipment
Protective equipment
Boots
Coveralls
Respirators

Administrative items
Clipboards
Maps
Acetate
Blank forms
Miscellaneous
Plastic bags - lg, med, small
Flashlight
Binoculars
Foot lockers

6-5. Overview.

a. The alpha team will respond to a nuclear accident/incident site where the weapon may or may not have dispersed a radioactive contaminant. The team conducts initial monitoring immediately upon arrival to determine the extent of contamination.

(1) If the alpha team is the first contingent of the IRF on-site, the team leader will direct a limited party to conduct life saving efforts at the accident site, while the remainder of the team appraises the radiation situation at the edge of the 610 meter initial exclusion area.

(2) If the EOD team has already arrived at the site, they should be able to give the alpha team a preliminary radiological estimate of the situation. The alpha team will conduct its initial monitoring outside the initial exclusion area until EOD has rendered the weapon safe.

(3) After the initial radiological survey, the alpha team leader or the OSC will determine if the need for further surveying outweighs the risk of entering the exclusion area to do so. The alpha team will not normally enter the exclusion area until the EOD team has completed render-safe procedures.

b. The survey teams will mark the area of significant contamination along any routes into the area; the level of concern will be determined by the location of the accident and current level of hostility.

c. If contamination is found in the accident area, the team will monitor any personnel who were in the accident area. The team also will establish a hot line to control the movement of personnel and equipment into and out of the contaminated area.

d. Decontamination of personnel, equipment and terrain can be performed to a limited degree, depending on the extent of hazard and time and resources available.

6-6. Interface with Follow-On Force. The alpha team will continue to perform their mission as described above until arrival of the follow-on force RADCON teams. Depending on other mission requirements of the alpha team and the decision of the commander of the NAIRA site, the alpha team will either be

relieved of any further responsibility for survey and monitoring or will become part of the RADCON team and continue to assist in NAIRA survey and monitoring.

Chapter 7

SURVEY AND MONITORING TECHNIQUES

7-1. General. The radioactive materials expected to be present at a nuclear weapons accident are uranium and plutonium. These isotopes emit alpha and weak gamma radiation. Due to the nature of these emissions, they cannot be detected with the radiacmeters in general use in the field. Instead, the specialized equipment operated by the alpha team is necessary. The techniques and procedures described below are general instructions. Refer to Chapter 8 for specific actions for each situation.

7-2. Gamma Probe. Plutonium, the most serious radiological hazard, may have been scattered in the area of the accident, or may have become airborne and deposited some distance downwind. A relatively quick means of surveying the outer limits of serious contamination may be necessary. This may be accomplished using either the AN/PDR-56F or AN/PDR-60 with their accompanying X-ray probe or (PG-1) gamma probe. (see Figure 7.1.) If available, the Broken Arrow Response Kit (Figure 7-2) and Ludlum Model radiacmeters (Figure 7-3) can also be used. The Broken Arrow Response Kit and Ludlum Model radiacmeters are locally purchased and have much better sensitivity for detecting radioactive hazards. Normally they are used only by alpha teams at Army Depots and by follow-on forces, such as the RADCON team. If these instruments are used, guidance as specified in the NARP manual should be used to determine areas of significant contamination.

a. When monitoring an area using the PG-1 or X-ray probe, the meter dial will indicate a reading relative to the intensity of contamination present. Alpha Radiation Levels will vary with the situation, and levels considered hazardous are specified in Table 7-1. The measurements indicated in the Table represent the safe limits in CPM for unprotected entry during peacetime. For Wartime, the values given represent the safe limits if a unit must remain in the accident area, due to mission requirements, for a cumulative total of the times given.

b. Probes used by the radiacmeters discussed above can detect the extreme low energy gamma radiation emitted by plutonium. In the presence of high background radiation, however, these instruments may be unusable.

Table 7-1. Hazardous Levels of Alpha Radiation

PEACETIME		WARTIME			
		> 48 hrs	24-48 hrs	8-24 hrs	< 8 hrs
Roads	120	120	1200	4200	4200
Occupied Area	4200	4200	7000	12000	12000
Isolated	12000	12000	21000	45000	45000

Readings for AN/PDR-60 with PG-1 probe (CPM).

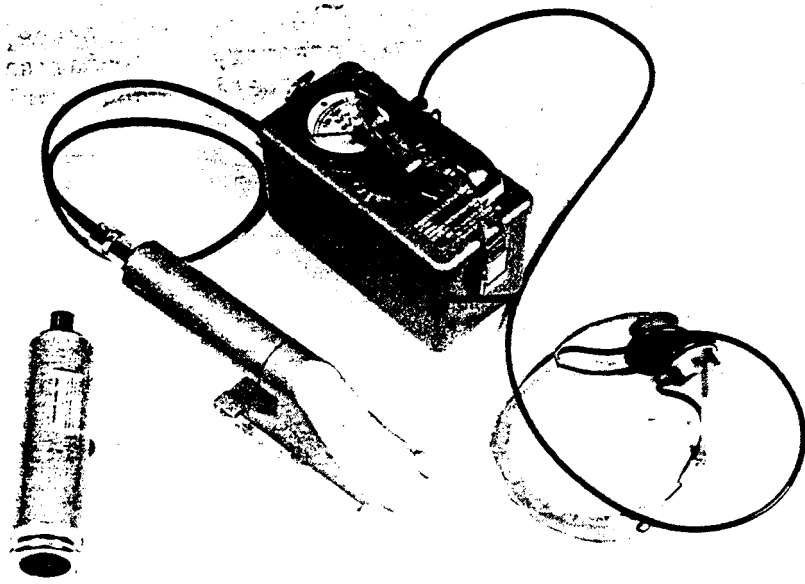
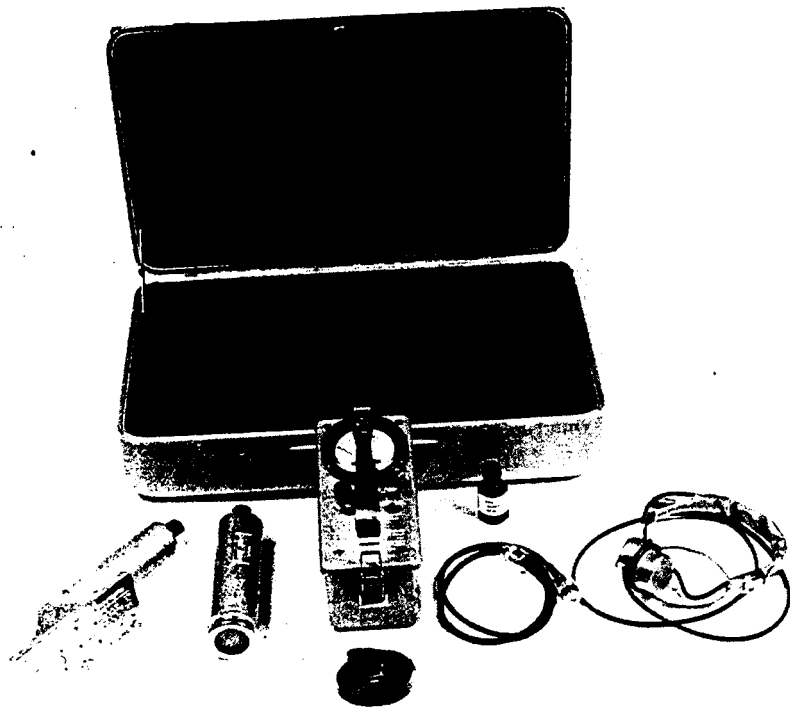


Figure 7-1. AN/PDR-60 with Gamma Probe

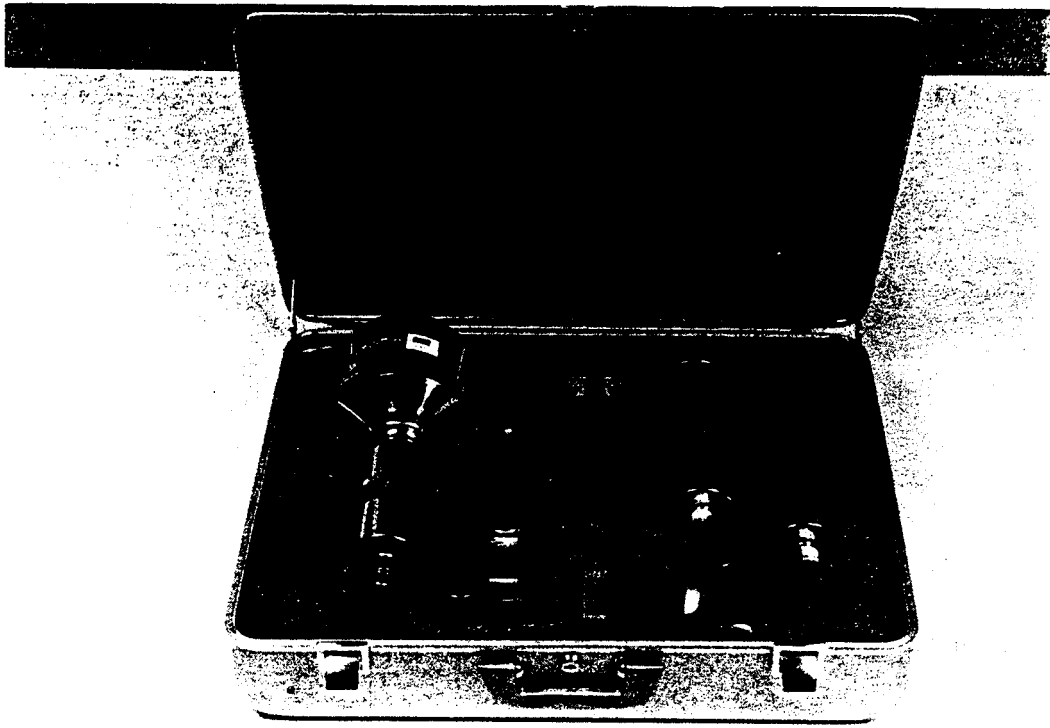


Figure 7-2. Broken Arrow Response Kit (BARK)

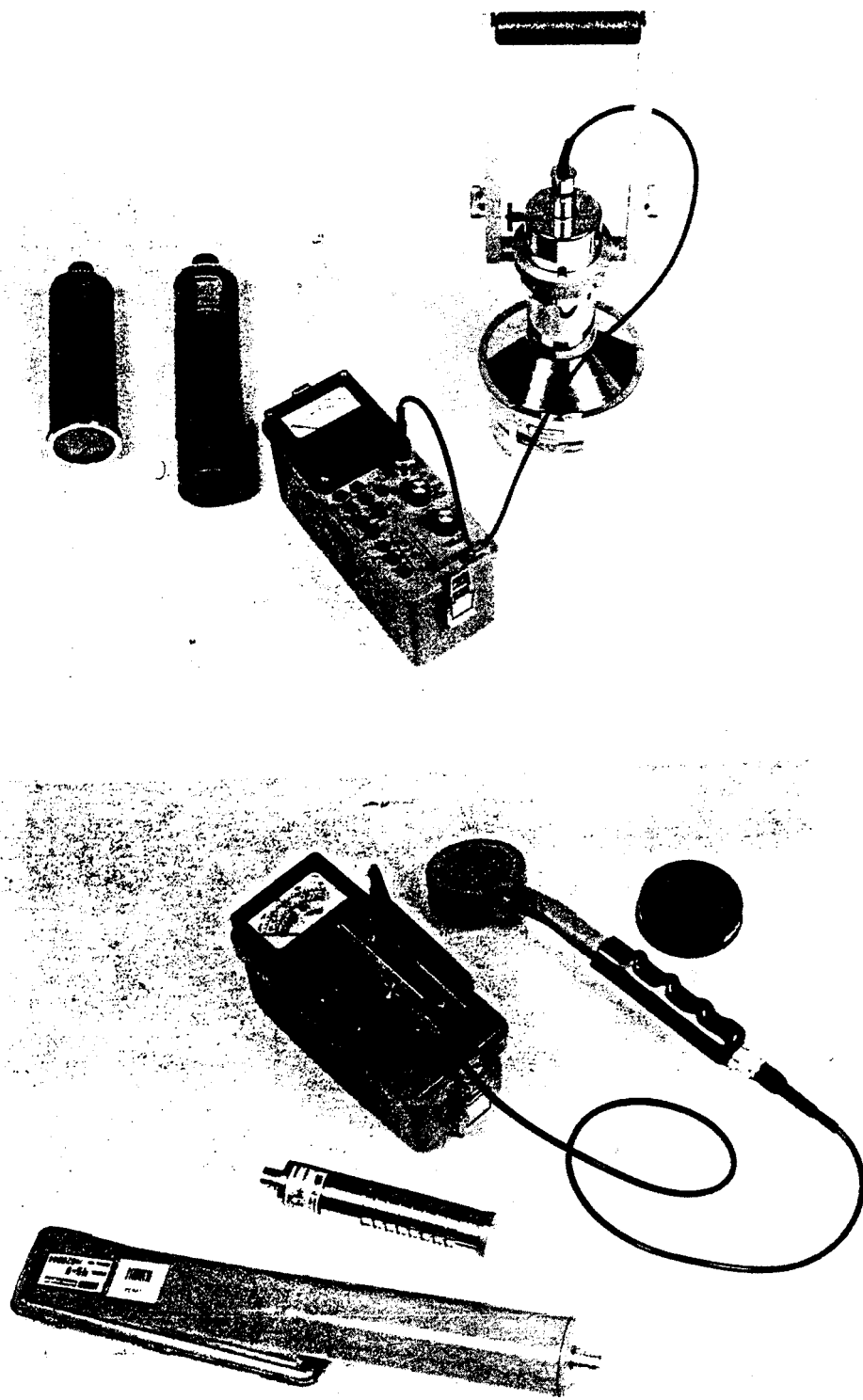


Figure 7-3. Ludlum with Fidler Probe

c. During peacetime this type of monitoring is done to quickly identify areas of significant contamination, and is followed by more precise identification of safe levels. During periods of hostility, this may be the only monitoring performed, since low levels may not be of interest under these circumstances.

d. While providing a quick method of surveying, these probes are not capable of detecting very low levels of contamination. Areas surveyed only with the gamma probe cannot be considered "clean" and will not be used for the Contamination Control Station unless surveyed with the alpha probe.

7-3. Alpha Probe. The presence of plutonium can also be determined by detecting the alpha radiation emitted. Alpha radiation is difficult to detect, primarily due to the extremely short range of the emitted alpha particles. The main probes of both the AN/PDR-56 and the AN/PDR-60 are designed to detect this alpha radiation.

a. When monitoring for alpha radiation, the probe must be placed very close, approximately 3 millimeters, to the contamination before it can detect the radiation. This makes alpha monitoring a slow, tedious, and physically tiring process.

b. If the surface is wet (due to rain, dew, or firefighting) or covered with dust, the alpha particles may be totally shielded; the survey team would then have to resort to the gamma probe method discussed above.

c. To obtain a reading, the alpha probe should be placed very close to the surface being monitored. To obtain a representative reading for a particular point, several readings should be taken within several feet of each other. Record the highest level. The probe face is very thin and extremely fragile; it must be set down gently, ensuring that any sharp objects such as grass stubble or rocks do not puncture the thin window. On grassy surfaces, either the back of the probe or the operator's other hand may be used to push the grass aside, with the probe face then lowered to the surface by a rolling motion of the probe.

d. Placing the probe directly on the surface to be monitored ensures consistent results, even though the probe face may become contaminated. If the probe contamination reading is high, the probe must be decontaminated.

e. Contamination can generally be removed by wiping across the probe face gently with a soft cloth, or gently pouring water from a canteen over the probe face.

7-4. Air Sampling. Alpha particle emitters present a significant long term hazard once they enter the body. Since inhalation is the principle route of entry into the body, it is important to determine the amount of radioactive contamination in the air. This is done by collecting and analyzing air samples.

a. In a nuclear accident that results in large scale air contamination, the particles will probably have been deposited on the ground or dispersed before air sampling can be performed. The problem in most cases is to determine the hazard due to resuspension of the contaminants that are already on the ground.

b. Air monitoring includes the collecting of particles suspended in the air (sampling), measuring the radioactivity of the collected sample (analyzing), and calculating the amount of radioactive material per unit volume of air.

c. Filtration is the most practical air sampling method at a nuclear accident site. This can be accomplished using the Staplex high volume air sampler (see Figure 7-4). Air is drawn across a high efficiency paper filter, which is then monitored using an alpha probe to determine the presence and amount of radioactive contaminants.

d. Results of air sampling will determine masking requirements for personnel, or will confirm the absence of an airborne hazard. During peacetime, precautionary measures may need to be taken for any civilians in the affected area.

e. During a wartime accident, circumstances may not allow careful air sampling to be performed, or other hazards, such as chemical agents, may be of more concern. If sampling cannot be performed, personnel should wear full protective clothing until the lack of hazard can be confirmed.

7-5. Sampling Procedures. Samplers will be positioned so that the extent and amount of airborne contamination can be determined both downwind and at the accident site (see Figure 7-5).

a. One 30 minute sampler must be taken at a location 610 meters upwind from the site to determine a background radioactivity level.

b. Another air sampler is then set up for continuous monitoring at the hotline (CCS), since personnel in this area may resuspend contamination.

c. A third air sampler is placed about 25 meters downwind from the accident site to determine the hazard in the immediate area and is operated continuously.

d. Lastly, an air sampler also is placed downwind at a distance dependent on the wind velocity. This air sampler should be operated until the absence of an airborne hazard can be confirmed.

Table 7.2

Air Sampler Placement

WIND VELOCITY	DOWNWIND DISTANCE (meters)
4-9 knots	1050
10-13 knots	1550
14-17 knots	2050
above 17	2550

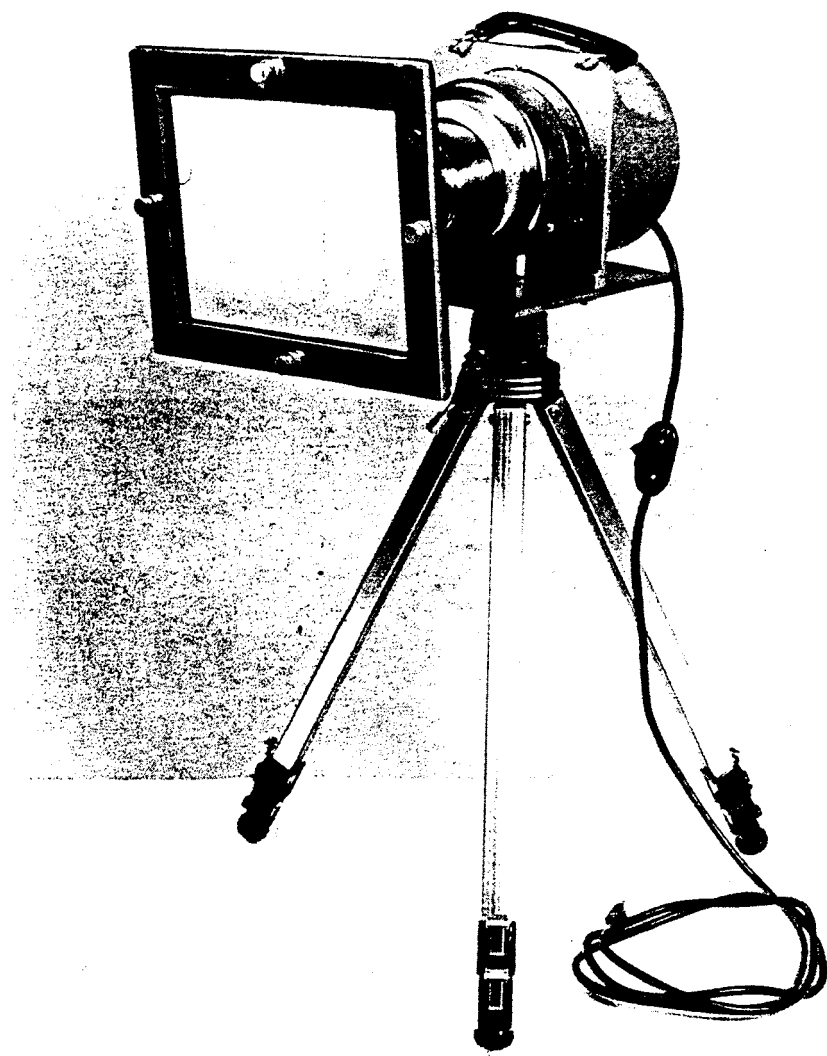


Figure 7-4. STAPLEX Air Sampler

WIND
DIRECTION



AIR
SAMPLER
(background)



CONTAMINATION
CONTROL LINE

AIR SAMPLER
(PERSONNEL PROT.)



HOT LINE

610 M

ACCIDENT
SITE



125 M

AIR
SAMPLER



AIR
SAMPLER
DOWNWIND DIST.
BASED ON
TABLE 7-2



Figure 7-5 STAPLEX Air Sampler Placement

e. If air samples are to be taken, filters must sample 100 to 1000 cubic meters of air. The airborne concentration of contamination can be roughly determined by the Alpha team, but if the RADCON team is expected to arrive at the site, the filters should be placed in small plastic bags and labeled. This will allow more precise measurements to be made when the necessary equipment arrives. An example of how the air sampling can be measured using the AN/PDR-60 is shown at Figure 7-6. A reading above 50 CPM will require respiratory protection (i.e., M17 series masks). Record air sampling data on sample collection logsheet as shown in Figure 7-7.

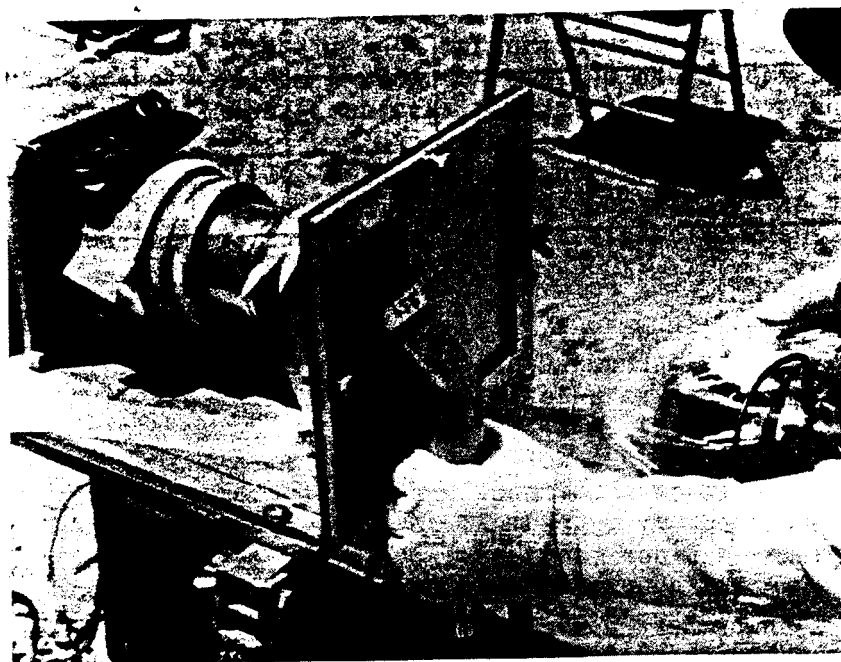


Figure 7-6. Monitoring STAPLEX with AN/PDR-60

Chapter 8

CONTAMINATION CONTROL

8-1. General.

a. One purpose of the IRF is to minimize the spread of contamination. This is accomplished in three steps:

- Initial monitoring by the alpha team to determine extent of contamination.
- Protective measures by the IRF to preclude spread of contamination.
- Establishing a contamination control station (CCS) to reduce contamination during operations.

b. The priority given to control of contamination and to the degree of assurance to which it is performed must be determined by the OSC at the location of the incident, and by the current tactical situation.

8-2. Initial Monitoring.

a. Initial personnel and area monitoring is performed immediately upon arrival at the accident site by the alpha team to determine the extent of alpha and beta/gamma radiation. (Area monitoring within the 610 meter exclusion area, however is normally not performed until the EOD team has completed render-safe procedures.) Before detailed operations can be initiated, seriously contaminated objects, and personnel may need to be segregated. Civilian personnel who may have become contaminated will present special problems, since military personnel may not forcibly detain, monitor or segregate civilians during peacetime incidents. Local civilian authorities present at the scene usually constitute the most effective means of dealing with civilians.

b. An alpha and beta/gamma rough point survey to determine the approximate size of the contaminated area can be conducted by two alpha monitoring teams. The area around the 610 meter exclusion area is monitored at four to eight points as shown in Figure 8-1. As these points are approached, monitors (beta/gamma monitor, followed by two alpha monitors) note the readings obtained and record time and location. If significant levels of contamination are detected (a reading of 10 mrad/hr for beta/gamma or a reading as shown in Table 7-1 for alpha), caution should be exercised in taking the downwind readings due to possible airborne hazard. The area inside the points marked, or the 610 meter area, will be considered the contaminated area until the team can survey inside the 610 meter area or until time permits a more detailed survey to be conducted. Normally, a rough point survey as described above is all the alpha team will have time to do prior to arrival of the RADCON Team. The rough point survey, however, will allow the OSC/NAICD to make a quick decision to minimize radiation hazards to the public and response force personnel.

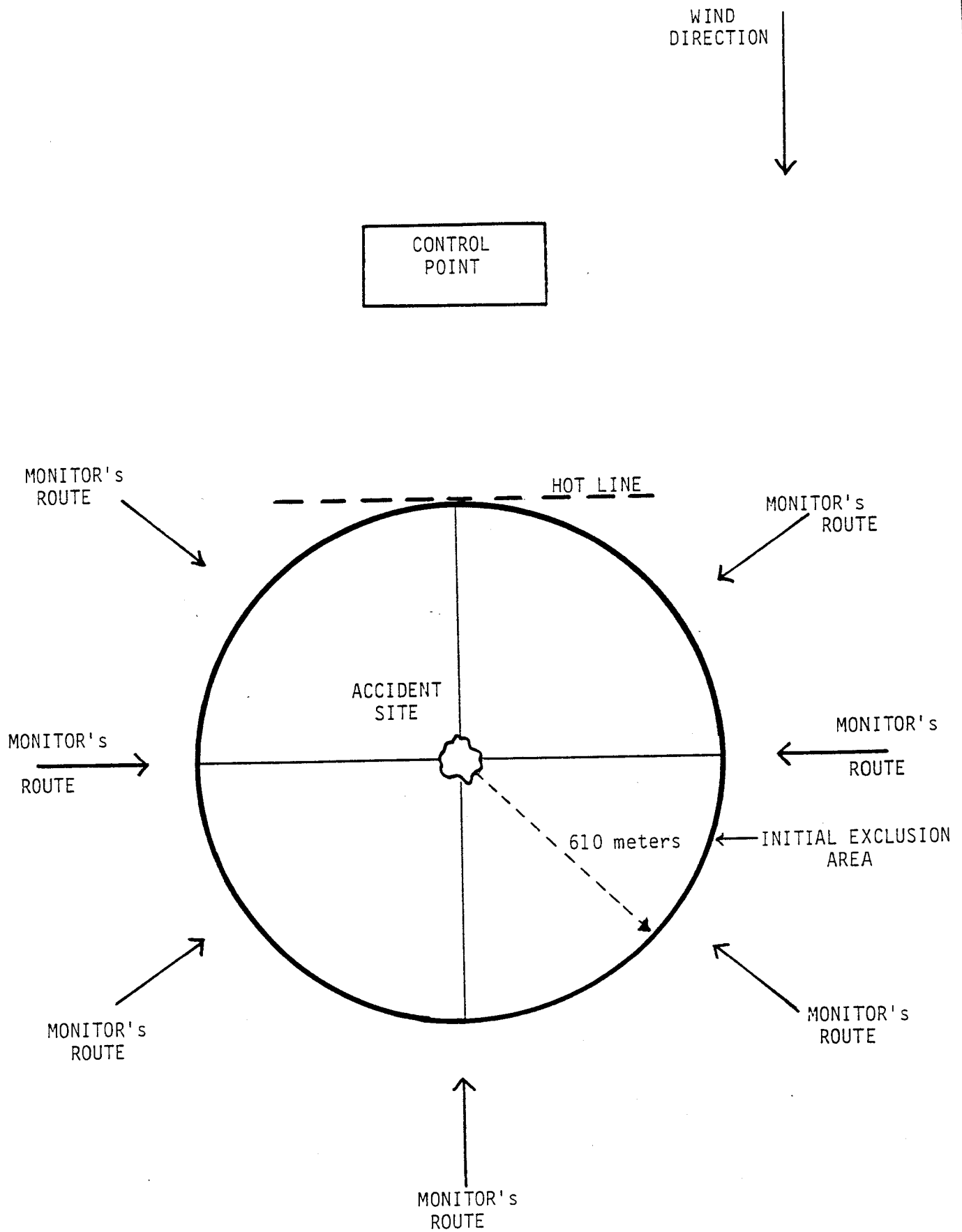


Figure 8-1 Exclusion Area Monitoring

c. Once the initial exclusion area has been established by the alpha team, actions should be taken to remove all unnecessary personnel to a clean area. All personnel and equipment leaving the area will be monitored. This is usually conducted at the contamination control station.

8-3. Protective Measures. Since alpha contamination is an internal hazard, adequate precautions must be taken to prevent entry into the body. It can be inhaled, ingested, or absorbed through cuts and breaks in the skin. Effective protective measures are an important aspect of contamination control and will greatly reduced both the hazard to personnel and subsequent decontamination efforts.

a. Personnel entering a contaminated area must be fully dressed in protective clothing.

b. Peacetime protective clothing should include:

- Anti-contamination coveralls.
- Shoe covers.
- Cotton gloves.
- Hood or hair cap.
- Respirator or protective mask.

c. During a wartime incident, the standard protective ensemble, consisting of protective mask with hood, chemical protective overgarment, protective gloves and protective overboots, will provide adequate protection.

d. All openings in the clothing must be taped closed so that there will be no entry of contamination onto the body. This protective clothing will be systematically removed during passage through the contamination control station to minimize the spread of contamination.

8-4. Contamination Control Station (CCS).

a. The CCS is a facility to prevent further spread of contamination. The CCS is established by the alpha team upwind from the accident site. It must be in an area that is free of radioactive contamination. All personnel working in the CCS area must be dressed in full protective clothing.

und wenn der Wind dreht?

b. All personnel and equipment entering and leaving the accident scene are channeled through the CCS. Accurate records must be kept to allow follow-on teams to remonitor those personnel initially released.

c. The CCS consists of three elements:

(1) Hot Line. The hot line is a line separating the area of known contamination from the contamination reduction area.

(2) Contamination Reduction Area. This area contains several stations and various items of equipment and supplies used to eliminate, or reduce to an acceptable level, contamination picked up by personnel operating in the contamination area.

(3) Contamination Control Line. This line separates the contamination reduction area from the clean area.

d. The CCS should be as complex as the situation demands. For response during peacetime, this may include augmentation by quartermaster bath units or NBC decontamination teams. The steps listed below outline the best actions that should be taken at the CCS.

(1) The hot line is designated by engineer tape or a line marked on the ground.

(2) Response force personnel preparing to enter the accident area should dress out, adjust masks, and check equipment for proper operation before entering the CCS.

(3) CCS personnel inspect response force for proper protective clothing, and log in all personnel and equipment.

(4) Personnel returning from the accident site place all equipment and data on the ground adjacent to the hot line.

(5) If protective clothing has been taped, all tape should be removed and placed in a receptacle before beginning to process through the CCS.

(6) Remove one shoe cover, have foot monitored by CCS personnel for alpha and beta/gamma contamination, step across the hot line with that foot and discard the shoe cover. Remove the other shoe cover, have foot monitored, and step completely across the hot line. If shoe is contaminated, remove and set aside.

(7) Remove the outer garment, gloves and hood, and place in the appropriate containers. Take care not to contaminate bare hands or inner clothing.

(8) Undergo detailed monitoring of the entire body for both alpha and beta/gamma contamination. Especially check the hands, neck, and feet.

(9) Remove the protective mask upon completion of monitoring. Personnel found to be contaminated should be sent to a decontamination station if one is available. These personnel should be remonitored before exiting the contamination reduction area.

(10) As the final step in the sequence, thoroughly wash the face, neck and hands; follow this as soon as possible with a complete body shower. Chapter 9 will provide more detailed procedures for radiological decontamination of personnel and equipment.

e. The CCS area should be checked periodically for contamination during operations. It may need to be moved if significant levels of contamination are carried in to the area.

f. The CCS shown at Figure 8-2 is an example of a simple field setup.

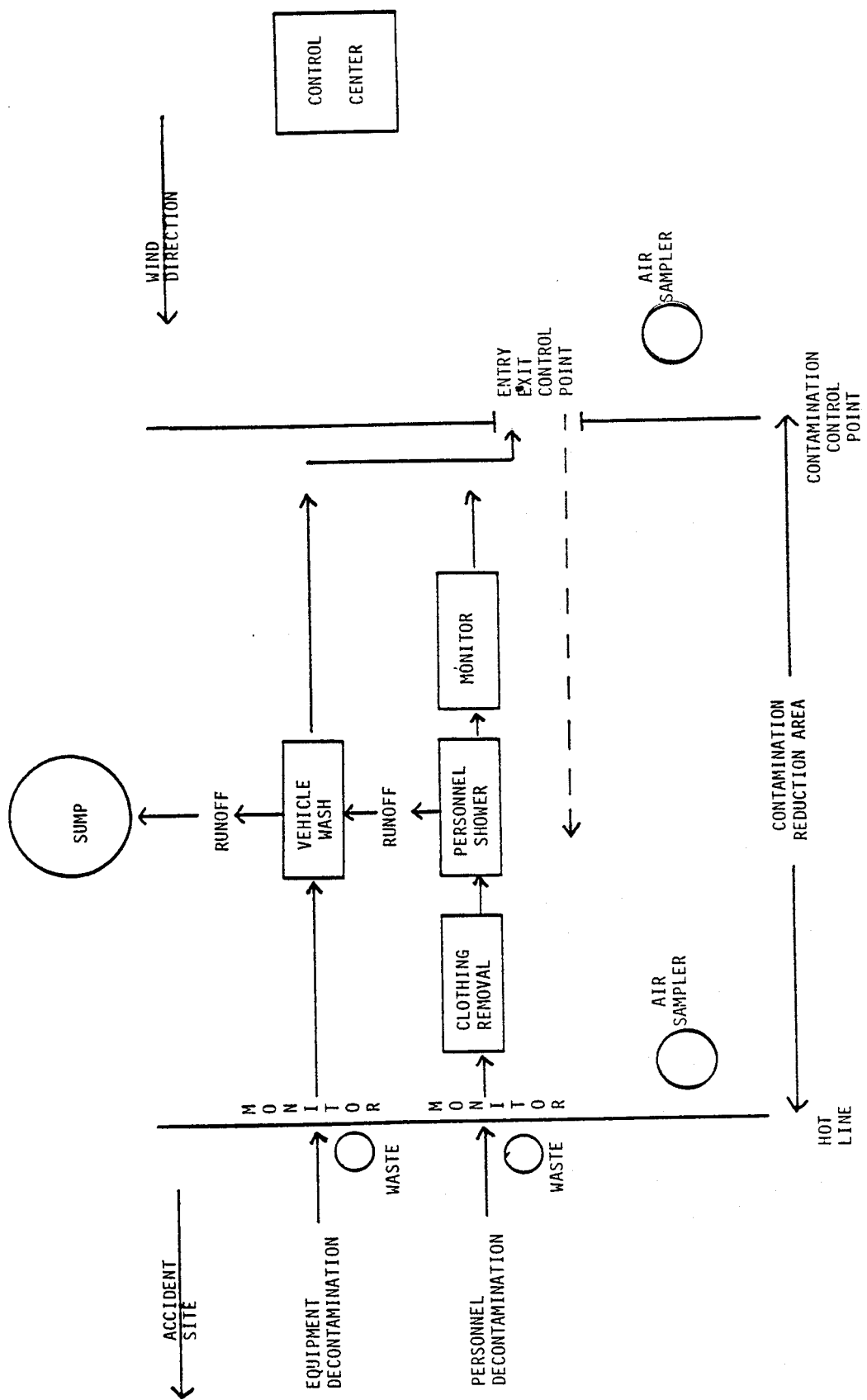


Figure 8-2. Contamination Control Station (CCS)

Chapter 9

DECONTAMINATION

9-1. General. IRF decontamination teams will not normally undertake large-scale decontamination operations. They may, however, provide advice and supervision of decontamination operations. Decontamination methods will vary according to the amount of radiation present.

9-2. IRF Decontamination Team Mission. The IRF decontamination team consists of a specially trained and equipped team, formed in an NBC Defense Company or Army Depot special weapons section. The mission of the IRF decontamination team is to:

- a. Provide assets for decontamination of personnel, equipment and terrain contaminated in a nuclear weapon accident.
- b. Assist the alpha team in establishing a contamination control station.
- c. Perform other missions as assigned by the OSC/NAICO.

9-3. IRF Decontamination Team Organization. NBC Defense Company and Army Depot special weapon teams will support NAIRA decontamination missions as required by unit NAIRA SOPs. Normally, one platoon consisting of 15-20 personnel will be sufficient to support decontamination requirements.

9-4. Considerations. There are several factors that should be considered before decontamination operations begin.

a. The alpha team's instruments are not sensitive enough to ensure decontamination is conducted down to peacetime allowable levels. Therefore, during peacetime, the RADCON team must monitor all personnel and equipment before they are ultimately released. (Reference Chapter 5, detention of civilian personnel will be coordinated with senior civilian authorities at the accident site.)

b. Terrain decontamination is extremely time- and resource-intensive. Restoration to acceptable levels must await follow-on forces with large numbers of personnel and equipment.

c. The amount of allowable remaining contamination for personnel can be raised during war. When the danger from enemy air or ground attack exists, it would be impractical to undergo continued, intensive efforts to reduce contamination to peacetime standards.

d. Depending on the location of the accident and the level of contamination, it may be desirable to abandon the contaminated equipment and avoid the accident area until time and resources allow for more complete action.

9-5. Personnel Decontamination.

a. Monitoring of personnel at the CCS decontamination station is performed to detect contamination on the body, to serve as a guide for decontamination, and to identify potential internal hazards. Monitoring for alpha contamination can be very slow and difficult. (a cursory check may be sufficient if routine procedures require decontamination and change of clothing.) Moreover, results of alpha monitoring in the rain may be misleading because of the attenuation by the moisture present.

b. The selection and correct use of proper instruments is essential. The main probe of the AN/PDR-60 and AN/PDR-56 may be used to monitor personnel. A smaller, lighter auxiliary probe may be used with the AN/PDR-56. Although the instrument is not calibrated to yield correct CPM readings with this probe, it will indicate the presence of contamination. Earphones should be used to allow monitors to concentrate on manipulating the probe, rather than watching the meter dial. This can greatly speed the monitoring process.

c. The steps outlined in paragraph 8-4 d comprise the most extensive monitoring procedures likely to be performed under the supervision of the IRF at the CCS. Time and resources may not allow full use of these steps, or some steps may need to be condensed or combined. Particular attention must be paid to those areas of the body which are most likely to be contaminated--the hands and feet.

d. Wounded personnel should be monitored under the supervision of, or by, medical personnel. Medical personnel treating the wounded should be monitored frequently to prevent contamination of others and of medical supplies and equipment.

e. If contamination is found in excess of the acceptable levels indicated in Table 9-1, decontamination will be required. If no contamination is found record the level and release the individual. During peacetime, when the RADCON team is expected to respond, these personnel should not be fully released until more detailed monitoring has been conducted.

Table 9-1. Acceptable Contamination Levels

	PEACETIME	WARTIME			
		> 48 hrs	24-48 hrs	8-24 hrs	< 8 hrs
Skin	100/25	100/25	240/60	240/60	240/60
Clothing	150/40	150/40	300/80	300/80	300/80

Contamination levels are given in CPM for the AN/PDR-60/AN/PDR-56 respectively.

f. If personnel decontamination is required for either a casualty or response force personnel, FM 3-5 and the procedures described below should be used.

(1) Nuclear weapons accidents may produce contamination in particulate form. Any method of cleaning used to remove dirt/soil from a surface will reduce the level of nuclear contamination. The presence of fuel, oil, or hydraulic fluids may require the use of detergents or other cleaning agents effective in removing these substances. Difficult areas will be those places where dirt collects, such as fingernails and hair.

(2) Levels of skin contamination that are likely to be encountered will not constitute a direct radiation hazard to either the patient or those around him. Alpha radiation, in particular, is not a hazard when it is outside of the body (deposited on skin for example).

(3) If initial efforts using soap and water do not reduce the level of skin contamination to acceptable levels, the remaining contamination can be considered relatively "fixed" (at least until the skin surface is sloughed off). If future spread of contamination can be controlled, by application of a bandage for example, and if control of the individual is adequate, then decontamination is no longer an immediate concern (particularly in the case of alpha-emitting particles). Damage to the skin, however, may permit penetration of the radioactive material and must be avoided. The physician's and decon platoon leaders' decision on decontamination procedures should be based upon the special physical and biological principles involved and on a careful risk versus benefit analysis. The following principles should be considered:

(a) Whole body showering of casualties should be avoided unless body contamination is very widespread. Whole body showering of noninjured personnel will be a priority.

(b) Always begin with the least irritating technique and proceed to stronger or more abrasive techniques only if necessary. Table 9-2 lists recommended techniques and sequences.

(c) Progress should be evaluated by frequent monitoring with appropriate survey instruments. Ensure that the skin is thoroughly dry before monitoring for alpha activity.

(d) Damage to intact skin must be avoided. Evidence of skin irritation may not appear for up to 24 hours after the damage occurs. Decontamination should be performed in two or three mild sessions rather than during one intense effort.

(e) The most highly contaminated areas should be decontaminated first, with care taken to prevent movement of the contamination to adjacent areas. A careful examination should be made to find any small cuts or abrasions.

(f) It may be necessary to clip hair. Shaving should be avoided unless internalization of the contamination is not a concern.

(g) Alpha contamination may be left on the skin to be shed by the natural renewal process. If this course is adopted the contaminated area should be covered with a glove, bandage, or other material which is then removed/replaced daily. At each change of covering, both the covering and the contaminated skin must be monitored.

(h) All bandages, hair clippings, tissue and wash water if possible, should be retained and labeled with patient identification information for future use in dose assessment and for proper disposal.

g. Those items of clothing and launderable equipment that are contaminated should be set aside and identified as radioactive. During peacetime these may be laundered at an approved decontamination facility. During wartime, however, it may be necessary to store them in sealed containers or buildings and postpone their eventual disposal.

h. As a worst case situation, if large numbers of personnel are involved and time does not allow careful monitoring to determine the need for decontamination, have all personnel process quickly through a shower and monitor briefly afterwards.

9-6. Equipment Decontamination. Five general methods by which surface contamination may be removed or reduced are as follows:

- Brushing or vacuum cleaning.
- Washing, soaking or scrubbing with hot or cold water. Soaps, detergents or chelating agents may be used.
- Steam cleaning.
- Cleaning with solvents.
- Removing surface by using chemicals, abrasives, sandblasting, grinding, or electrolysis.

a. The simplest removal method should be tried first, then followed by the more difficult method. Time and resources may dictate which method is used.

b. After an item has been monitored and found to be contaminated, an appropriate decon method will be selected and the necessary steps performed; then the results will be evaluated by remonitoring. The procedure may need to be repeated until the acceptable level is achieved. Refer to Chapter 6, FM 3-5 for detailed procedures for the above decontamination methods.

Table 9-2. Personnel Decontamination

Method*	Surface	Action	Technique	Advantages	Disadvantages
Showering with soap and water	All parts of body	Emulsifies and dissolves contaminant.	Wash 2-3 minutes and monitor. Do not wash more than 3-4 times.	Readily available and effective for most radioactive contamination.	Continued washing will defat the skin. Indiscriminate washing of other than affected parts may spread contamination. Follow guidance in FM 3-5.
Soap and water	Hair	Same as above.	Wash several times. If contamination is not lowered to acceptable levels, shave the head and apply skin decontamination methods.		
Lava soap, soft brush, and water	Skin and hands	Emulsifies, dissolves, and erodes.	Use light pressure with heavy lather. Wash for 2 minutes, 3 times. Rinse and monitor. Use care not to scratch or erode the skin. Apply lanolin or hand cream to prevent chapping.	Same as above.	Continued washing will abrade the skin.
Tide or other detergent (plain)	Same as above.	Same as above.	Make into a paste. Use with additional water with a mild scrubbing action. Use care not to erode the skin.	Slightly more effective than washing with soap.	Will defat and abrade skin and must be used with care.

Table 9-2. Personnel Decontamination (cont'd)

Method*	Surface	Action	Technique	Advantages	Disadvantages
Sodium hypochlorite, diluted 1:10 w/water	Skin and hands	Emulsifies, dissolves, and erodes.	Wash 2-3 minutes.	Converts Pu to insoluble compound.	In some cases it may be disadvantageous to make Pu insoluble.
Mixture of 50% Tide and 50% cornmeal	Skin and hands	Same as above.	Make into a paste. Use with additional water with a mild scrubbing action. Use care not to erode the skin.	Slightly more effective than washing with soap.	Will defat and abrade skin and must be used with care.
Flushing	Eyes, ears, nose, and mouth	Physical removal by flushing.	Roll back the eyelid as far as possible, flush with large amounts of water. If isotonic irrigants are available, obtain them without delay. Apply to eye continually and then flush with large amounts of water. (Isotonic irrigant [0.9% NaCl solution]: 9 grams NaCl in beaker, fill to 1000 cc with water.) Can be purchased from drug suppliers.	If used immediately will remove contamination. May also be used for ears, nose, and throat.	When using for nose and mouth, contaminated individual should be warned not to swallow the rinses.
					Further decontamination should be done under medical supervision.

Table 9-2. Personnel Decontamination (concluded)

Method*	Surface	Action	Technique	Advantages	Disadvantages
Flushing	Wounds	Physical removal by flushing.	Wash wound with large amounts of water and spread edges to stimulate bleeding, if not profuse. If profuse, stop bleeding first, clean edges of wound, bandage, and if any contamination remains, it may be removed by normal cleaning methods, as above.	Quick and efficient if wound is not severe.	May spread contamination to other areas of body if not done carefully.
Sweating	Skin of hands and feet.	Physical removal by sweating.	Place hand or foot in plastic glove or booty. Tape shut. Place near source of heat for 10-15 minutes or until hand or foot is sweating profusely. Remove glove and then wash using standard techniques; or gloves can be worn for several hours using only body heat.	Cleansing action is from inside out. Hand does not dry out.	If glove or booty is not removed shortly after profuse sweating starts and the part washed with soap and water immediately, contamination may seep into the pores.

*Refer to FM 3-5 "NBC Decontamination" for more details on Radioactive Decontamination.

(1) Vehicles.

(a) If vehicles are required within the contaminated area, attempt to use the same vehicles and keep them in the contaminated area until completion of operations.

(b) The highest levels of contamination usually will be under fenders, on the undercarriage where lubricants are exposed, on wheels and tires, and inside where tracked into a vehicle. When liquids are used for decontamination, procedures should start at the top.

(2) Radiacmeters.

(a) A low level of contamination can be allowed when instruments are being used in monitoring for high levels of contamination. The initial reading is noted and subtracted from any subsequent readings.

(b) Contamination of a beta/gamma instrument may be determined by removing it from the contaminated area and checking the reading. Any reading above twice background indicates contamination of the instrument. Alpha instrument contamination can be determined within the contaminated area by holding the probe 30 centimeters or more from all surfaces and noting the meter reading. The meter needle should indicate background, and only background clicks should be heard when the headset of the instrument is not contaminated.

(c) Extreme care is necessary to avoid damaging the probes when decontaminating alpha instruments. Contamination can generally be removed by running water under low pressure, as from a canteen, over the surface of the probe.

(3) Miscellaneous.

(a) Moistureproof protective clothing, rubber boots, and similar items can usually be effectively decontaminated by showering, washing, or hosing prior to removal.

(b) Canvas, rope, and similar coarse materials should be decontaminated by dry brushing or shaking. If these procedures do not work, the item will have to be discarded.

(c) When items are soaked, washed, or scrubbed with liquids other than water, or with soap, or solvents, clear water should be used as a final rinse.

(d) If a power-driven decontaminating apparatus, M12 or M17, is used, adequate drainage needs to be provided to ensure control of contaminated waste water. (See FM 3-5.)

c. In wartime situations, it may not be practical to attempt decontamination of any equipment which has high levels of contamination. In this case, the equipment may be discarded, and the entire area of contamination avoided.

9-7. Terrain Decontamination. In addition to the long-term hazard presented by plutonium in the soil, resuspension of contamination in the air is a more immediate concern.

a. Spraying with water as a temporary 'fixing' agent is sufficient to minimize the airborne resuspension hazard. A fine, misty airborne spray will best remove airborne particles as well as 'fix' the soil surface or pavement contamination. This will allow operations to continue in the area with less of a resuspension hazard. Immediately upon determination and plotting of the contamination contours, it is best to fix temporarily all levels above those listed in Table 9-1.

b. More complete terrain decon will await the RADCON team and other follow-on response organizations. Their instruments will ensure that decontamination is performed down to necessary restoration levels. This may require large numbers of additional personnel and equipment, obviously beyond the scope of the initial response capability.

c. In wartime situations, it will not be practical to perform large scale terrain decontamination. Mark the area and report location to higher headquarters.

9-8. Levels of Contamination. Acceptable Emergency Remaining Contamination Levels, as given in Table 9-1, have been established to furnish practical guidelines for alpha team monitoring of emergency decontamination efforts.

a. During peacetime, these levels are valid only until the RADCON team is available to remonitor personnel, material and terrain.

b. During wartime, follow-up monitoring will be conducted when time and situation permits. Adequate records must be kept of the location and initial contamination levels of terrain and equipment, and of the identity and unit of any personnel involved. (See Appendix E)

Chapter 10.

MEDICAL

10-1. General.

a. Nuclear weapons accidents are a significant problem, and all elements of a military medical service should be prepared to provide medical support when they occur. To accomplish this most effectively, all medical facilities should have a detailed procedural guide readily available, so that even personnel who have not been specifically trained in the hazards of nuclear weapons can perform necessary actions effectively and safely with minimal supervision. To ensure adequate on site medical support, dedicated Emergency Medical Teams (EMTs) are trained and prepared to assume the medical mission at the accident location. In addition, the US Army Radiological Advisory Medical Team (RAMT) will provide expert advice concerning medical treatment and management of radiological casualties and the hazards associated with radiation exposure and contamination.

b. When radioactive contamination is not dispersed the medical requirements are greatly simplified. Specifically, emergency life-saving procedures used in any major disaster are applicable to a nuclear weapon accident where radioactive contamination is not a factor. However, even without radioactive contamination present, there may be other weapon-specific nonradioactive toxic hazards.

c. Although it is a remote possibility, if a nuclear detonation did occur at an accident, the degree of physical damage could be many times greater than that which would result from the high explosive detonation alone. A partial nuclear yield, involving only a very small fraction of the fissionable material present, is at least a theoretical possibility.

10-2. Responsibilities.

a. Medical personnel will assist in accident-related emergency medical treatment and in establishing health and safety programs to support response operations over an extended period of time. To accomplish this, medical personnel will be required to:

- (1) Provide timely emergency medical care to casualties.
- (2) Conduct medical operations in a manner that will reduce or prevent the spread of radioactive contamination.
- (3) Advise medical facilities receiving (or that have received) casualties of possible or confirmed contamination and measures which should be taken to prevent its spread.
- (4) Prevent internal contamination of exposed personnel.

(5) Implement the bioassay sampling program. Process and screen bioassay samples.

(6) Implement a personnel dosimetry program to ensure that bioassay data and external exposure information is entered into the health records of response force personnel.

(7) Provide on-site emergency medical coverage for the accident response force personnel.

(8) Provide initial therapy for patients with significant internal contamination.

(9) Assist decontamination team in casualty decontamination and supervise the decontamination of personnel when initial decontamination efforts fail to achieve the desired results.

(10) Assist in obtaining radiation health histories of all persons involved in the accident and in the subsequent response, and of those civilians in the surrounding community who may have been exposed to radiation or contamination as a result of the accident.

b. A summary of medical actions required in response to a nuclear weapon accident is found in Table 10-1. Actions are listed in rough priority. The type of accident (contamination, yield, or no contamination or yield) determines what actions are appropriate.

Table 10-1. Medical Actions in Response to Nuclear Accidents

Time After Accident	Type			Action		
	Weapon Intact	Alpha Contamination Present	Fission Yield	Medical Management Actions	Bioassay and Dose Assessment	Admin, Decon, Public Health
0-2 hours	X			Treat seriously injured. Evacuate.		Determine if casualties have been evacuated.
0-2 hours		X		Administer chelation therapy (Pu) or Sodium Bicarbonate (U).		

Table 10-1. Medical Actions in Response to Nuclear Accidents (Cont)

Time After Accident	Type			Action		
	Weapon Intact	Alpha Contamination Present	Fission Yield	Medical Management Actions	Bioassay and Dose Assessment	Admin, Decon, Public Health
0-2 hours		X	X		Obtain blood samples.	
0-2 hours			X	Administer Potassium Iodide (KI) to those downwind of the accident and/or highly contamination.		
0-2 hours		X	X	Decontaminate and cover wounds.	Obtain nasal swabs.	Determine the extent of the downwind hazard and advise OCS of steps that may be employed to protect the local population.
2-6 hours			X	Closely observe for vomiting and erythema. Record time of occurrence and part of body affected.		

Table 10-1. Medical Actions in Response to Nuclear Accidents (Cont)

Time After Accident	Type			Action		
	Weapon Intact	Alpha Contamination Present	Fission Yield	Medical Management Actions	Bioassay and Dose Assessment	Admin, Decon, Public Health
2-6 hours		X	X	Assist in decontamination of casualties with minor injuries.	Record external contamination levels on RHH.	Obtain radiation health history(RHH).
2-6 hours		X			Obtain initial urine (single void) sample.	
2-6 hours		X	X			Determine airborne hazard to response force personnel and advise OSC. Complete decontamination of casualties. Evaluate contaminated wounds. Begin decontamination of medical facilities.
2-6 hours			X			Measure for Na-24 activity. Collect metal objects from exposed persons.

Table 10-1. Medical Actions in Response to Nuclear Accidents (Cont)

Time After Accident	Type			Action		
	Weapon Intact	Alpha Contamination Present	Fission Yield	Medical Management Actions	Bioassay and Dose Assessment	Admin. Decon., Public Health
6-24 hours		X	X	Arrange for evacuation (from theater) of persons with contaminated wounds, internal contamination or with 50 cGy or more of external radiation. Evaluate and decide upon skin decontamination.	Arrange for whole body counts.	Decontaminate medical facilities.
6-24 hours		X	X		Determine bioassay priorities.	
6-24 hours			X	Determine initial dose estimate.	Establish a personnel dosimetry system.	
6-24 hours		X		Administer daily chelation therapy.	Obtain 24-hour urine (U).	

Table 10-1. Medical Actions in Response to Nuclear Accidents (Concluded)

Time After Accident	Type			Action		
	Weapon Intact	Alpha Contamination Present	Fission Yield	Medical Management Actions	Bioassay and Dose Assessment	Admin, Decon, Public Health
24-48 hours			X		Obtain blood sample.	
			X		Revise and update dose estimate.	
48-72 hours		X		Obtain 48 hour urine (U).		
		X		Obtain fecal sample.		
48-72 hours			X	Obtain daily blood sample.		

10-3. Pre-Accident Preparation. The potential for contamination greatly complicates the medical support mission at the accident site. Other factors such as the delayed arrival of the medical teams at the site, toxic hazards, and security requirements may also contribute to the complexity of the mission. Before an accident occurs, therefore, the responsible medical officer should be identified; the EMT formed, equipped, trained and exercised; and the medical assets to support the recovery phase built up.

a. Emergency Medical Team. The EMT provides on-site emergency medical treatment and evacuation of casualties. Additionally, the EMT provides emergency medical support to the response force, until relieved or augmented by the RAMT, and begins the collection of time-critical laboratory specimens (bioassay samples) and personnel data for evaluation and dose assessment.

(1) Organization.

- (a) One medical officer.
- (b) One SFC, 91B.
- (c) One SSG, 91C or 91B.

(d) Three medical specialists 91A, to include an ambulance crew.

(2) Training.

(a) ~~The EMT leader will attend the Nuclear Hazards Training Course (NHTC) conducted by the Interservice Nuclear Weapons School (INWS), Kirtland Air Force Base. Other team members should attend the NHTC (see Chapter 12). Additional training should be provided by the supporting RAMT.~~

(b) Members of the EMT must be trained to provide medical care while wearing all individual protective clothing and equipment. Training should be conducted year round to assure that acclimatization is accomplished as well as task proficiency. The team must be expert in contamination control, decontamination, bioassay sample collection, patient rescue/evacuation, and must be prepared to operate with counterparts (or patients) in the national language of the host country.

(c) Each EMT should participate in a Training Exercise at least quarterly.

(3) Clothing, Equipment and Supplies.

(a) Individual equipment listed in Table 10-2 will be issued to each member of the EMT. Chemical protective overgarments may be substituted for anticontamination suits but will impose an unnecessary heat load during warm weather. In addition, CTA 50-900 series individual clothing and equipment and personnel effects necessary to operate in any environment will accompany each team member.

Table 10-2. Individual Equipment and Supplies

ITEM	# ISSUED
Anticontamination clothing, set	1
Gloves, cloth	1 pair
Gloves, rubber	1 pair
Gloves, surgical	2 pair
Hood, cotton, anti-C	1
Mask, CBR, protective, MA series	1
Anti-C overboots	1 pair
Tape, masking, 2" wide	1 roll

ITEM	# ISSUED
Dosimeter, pocket, IM-147/PD	1
Dosimeter, pocket, IM-9E/PD	1
Dosimeter, film badge or TLD	1

(b) Required nonmedical items of team equipment and supplies are listed in Table 10-3. Additional items may be added by the EMT leader based upon his mission analysis.

(c) The EMT leader will be appointed as a Class A agent or working group cashier in order to purchase items to meet unforeseen requirements and to obtain emergency resupply.

Table 10-3. Nonmedical Items of Team Equipment and Supplies

ITEM	# MAINTAINED BY EMT	# MAINTAINED BY RAMT
Radiac set AN/PDR-27 ()	1	3
Radiac set AN/PDR-56, AN/PDR-60	0	3
Radiac set, battery operated, scalar, alpha counter	0	1
Radiac set, battery operated, gamma, single channel analyzer, NaI detector	0	1
Charger, Radiac detector PP-1578A/PD	2	2
Radiac meter, high range, gamma IM-174/PD	0	2
Radiac meter, IM-9E/PD	0	5
Radiac meter, IM-93 ()/PD	0	10
Wet bulb globe temperature index apparatus	1	0
Film (TLD) badges	0	10

Table 10-3. Nonmedical Items of Team Equipment and Supplies (Cont)

ITEM	# MAINTAINED BY EMT	# MAINTAINED BY RAMT
Calibration Sources		As required.
Forms, radiation health history	200	200
Contaminated casualty tags	50	20
Cotton swabs with envelopes and Tables	300	200
Urine cups, lids and labels	300	200 (for 24-hour urine sample)
Purple top tubes and labels	300	100 (for blood)
Urine sample cups with labels (single void)	50	0
1 gallon cubetainers (for 24-hour urine samples)	0	20
Blood sample tubes	100	0
1 gm dose of chelation therapy drug	0	50
Potassium Iodide	100 doses	200 doses

(4) Administration. A Health Service Support Plan (HSSP) is written by the commander responsible for the EMT. The EMT will develop an SOP or other written guidance to enable it to fulfill its mission as stated in the HSSP. Particular attention must be paid to:

- (a) Preparation and maintenance of travel orders.
- (b) Development and maintenance of a team notification system.
- (c) Continuous availability of critical team members.
- (d) Functional packing for equipment and supplies.
- (e) Coordination of actions with the supporting RAMT.

b. US Army Radiological Advisory Team (RAMT). The RAMT furnishes guidance to the OSC in the areas of: radiological health hazards, decontamination, contamination control, medical treatment, medical surveillance procedures and dose assessment (including bioassay) and radiation exposure control. It provides the following services to the medical treatment facility which has received or is receiving casualties: radiological monitoring of facilities, equipment, casualties and personnel; advice on decontamination and techniques of contamination control; advice on initial and follow-up bioassay procedures; advice on treatment of internally deposited radionuclides; guidance on potential hazards to personnel from radiological contamination resulting from the accident; and provision of initial estimates of radionuclide uptakes.

(1) Composition. (All personnel assigned to the RAMT will possess a final secret clearance with CNWDI access, and all enlisted members will possess a valid military drivers license, validated for wheeled vehicles through 2 1/2 ton and commercial vehicles.)

- (a) One nuclear medical science officer (68B), RAMT leader.
- (b) One nuclear medicine officer (60B, 61Q, 61R or 61S).
- (c) A minimum of two specialists, MOS 91X20 or equivalent (91W20 or 91S20 with additional training).
- (d) Additional personnel as determined by the RAMT leader.

(2) Training.

- (a) All RAMT members will attend the NWTC conducted by INWS.
- (b) The RAMT leader and team physician will attend the Medical Effects of Nuclear Weapons (MENW) course presented by the Armed Forces Radiobiology Research Institute (AFRRI).
- (c) The RAMT leader will attend the Senior Officers Nuclear Accident Course (SONAC) offered by INWS.

(d) The RAMT leader and physician will attend the REAC/TS course (health, physics and physician's course, respectively).

(e) ~~An annual exercise of the RAMT capability should be conducted to validate plans, determine response times and exercise personnel. Frequent training (monthly) is necessary to maintain proficiency with assigned equipment.~~

(3) Clothing, Equipment and Supplies.

(a) Individual equipment is the same as for EMT; see a(3) above.

(b) Table 10-2 lists minimum essential RAMT equipment and nonmedical supplies. In addition, the team physician will specify what medical supplies to carry.

(c) The RAMT leader will be appointed as a Class A agent or working group cashier in order to purchase items to meet unforeseen requirements and to obtain emergency resupply.

10-4. Contamination Control and Decontamination. All personnel and equipment will be monitored and decontaminated before they are permitted to leave the contamination control point, except critically injured casualties and equipment essential to their support and evacuation. Aside from contamination spread by environmental factors (windborne or rain water runoff), medical operations could be the primary cause of contamination beyond the immediate site of the accident.

a. Contamination Control. When evacuating contaminated casualties the following measures will reduce the spread of contamination and greatly simplify the recovery/decontamination process:

(1) Remove as much contamination as possible. Up to 90% of the contamination will be removed with outer clothing. Clothing and personal effects removed from contaminated persons should be individually bagged and identified for future analysis.

(2) Contain the contamination. Wrap the casualty in a blanket or place him in a chemical agent patient wrap. If monitoring indicates only a portion of the body is contaminated, that part may be enclosed (a surgeon's glove over a contaminated hand, for example).

(3) Identify all contaminated casualties or those believed to be contaminated. Identify contaminated equipment, such as ambulances and stretchers. Notify the receiving medical treatment facility that contaminated casualties are en route. If other than EMT ambulances transport a contaminated casualty, an EMT medical specialist or a member of the alpha team or the RAMT should accompany the patient in the ambulance, to ensure that the treatment facility understands the nature of the contamination and precautions to be taken.

(4) If an ambulance is used within the contaminated area, transfer the patient to a clean ambulance at the hot line. Maintain the one "dirty" ambulance inside the contaminated area for future use, if possible.

(5) Take aggressive steps to determine the location of potentially contaminated casualties evacuated prior to arrival of the EMT at the accident site. Identify equipment used in their transport and personnel with whom they have come into contact. Report this information to the RAMT as soon as possible (by radio, if available).

(6) Contaminated wounds should be bandaged.

b. Decontamination. Although medical assistance may be required, decontamination of personnel is primarily the responsibility of the contamination control station (CCS) and as described in Chapters 8 and 9. Critically injured casualties (in the judgment of competent medical authority) will bypass the CSS and detailed decontamination will be performed at the medical treatment facility. Again, measures to control contamination must be employed.

10-5. Casualty Treatment.

a. A high priority at any accident site is the rescue and treatment of casualties. If casualties remain in the immediate vicinity of the accident then their rescue becomes the first priority of medical personnel. If the presence of alpha contamination has not been ruled out, the emergency medical personnel who enter the contaminated area should wear protective clothing and respirators. The presence of smoke and fumes may also require respiratory protection. Emergency handling procedures are summarized below:

(1) Administer lifesaving first aid (stop the bleeding, assure an open airway, restore breathing and circulation). If CPR is required, mouth to mouth resuscitation is the least preferred method.

(2) Move victims away from the contaminated area (and away from the high explosive hazard) by scoop stretchers. Do not delay life-saving procedures because of radiological contamination.

(3) Administer intravenous fluids for shock. (Prophylactic IV's should be delayed until skin decontamination is complete).

(4) If the victim is unconscious, consider other causes since radiation does not cause unconsciousness or other visible signs of injury.

(5) If immediate transport of the victim is necessary, employ contamination control measures and notify the receiving facility of the known or suspected contaminants. Assist the less seriously injured through the contamination control station.

b. Once life saving procedures are complete and the severely injured persons have been transported, seven categories of casualties will remain that may require medical attention: (1) Trauma (including burns) without radiation involvement, (2) Persons with internal contamination, (3) Persons with external contamination, (4) Contaminated wounds, (5) Persons who have been exposed to radiation, (6) Persons who are uninjured and not contaminated. The severity of these injuries is normally greater than that indicated by their conventional injuries such as wounds and burns because of the compounding effect of the radiation exposure. This will impact significantly on the timely treatment and management of these casualties.

(1) Trauma. Casualties with trauma and no contamination do not require specialized care or treatment by the EMT at the accident site.

(2) Internal Contamination. Internal contamination occurs when radioactive material has entered the body by means of ingestion, inhalation, through wounds or by absorption through the intact skin. The effect of this radioactive material is determined by its chemical properties (to some extent physical properties such as particle size) and the route of entry. In particular the solubility of the material is an important consideration. Treatment is designed to perform one or more of the following functions: block uptake by important organs, speed elimination of the radionuclide from the body, or mobilize deposited radionuclides to enhance elimination and reduction of absorption (particularly from the GI tract).

(3) External Contamination. External contamination alone does not require medical care unless skin contamination persists after processing through the contamination control station. Persistent areas of contaminated skin will require medical attention as previously discussed. The presence of radionuclide contamination on casualties will complicate the provision of medical care. Persons with substantial external contamination must be considered to be internally contaminated unless they were wearing respiratory protection until decontamination was complete.

(4) Contaminated Wounds. Wound can be a significant source of internal contamination and should be decontaminated as soon as possible. Radioactive material may be present as the wound-causing missile (shrapnel) or as dust and dirt that subsequently contaminated the wound. The evaluation of alpha contamination in wounds is difficult and usually requires specialized equipment, particularly if quantitative information is required.

(5) Radiation Exposure Casualties. Persons that receive significant doses of radiation (greater than 50 cGy) may require medical attention. This is analogous to exposure to X-rays in a clinical setting. The person is not contaminated (internally or externally) with radioactive material and does not represent a hazard to people around him. Only a nuclear yield can expose persons to radiation of this magnitude.

(6) Uninjured/Uncontaminated Persons. Some persons who are neither injured nor contaminated may require medical attention due to hysteria. However, bioassay procedures and instrument surveys of these individuals (particularly civilians) will be required to document the fact that they were not contaminated (internally or externally) and to provide them with a measure of reassurance.

c. Specific treatment procedures for radiation.

(1) Plutonium

(a) Plutonium is considered the most significant radiological hazard associated with a nuclear weapons accident when the weapons involved contain plutonium. Plutonium is an alpha emitter and thus represents a biological hazard only when it has entered the body through inhalation and subsequent deposition in the lungs for example. Because both its physical and biological half-lives are long compared with man's lifespan, it will essentially remain in the body for a lifetime. Two means of entry are of primary concern: inhalation and contaminated wounds. Intact skin is highly resistant to penetration by plutonium, and absorption from the gastrointestinal tract is almost nonexistent. Once in the lungs or tissue, plutonium is solubilized by the body fluids and enters the bloodstream where it is distributed throughout the body. Insoluble compounds will remain at the site of deposition or, in the case of inhalation, will be ingested and then eliminated from the body. Once it enters the bloodstream, plutonium is deposited in the skeleton (45%), liver (45%), and other tissues (10%) with subsequent retention half-lives of 100 years, 40 years, and 200 years respectively.

(b) Medical treatment should be designed to prevent plutonium from entering the body and to prevent the soluble portion in the blood from being deposited in the body.

(c) Wounds with possible plutonium contamination should be decontaminated by washing and irrigating. Contaminated puncture wounds and burns can result in significant intake of plutonium, and represent special problems. It may be necessary to surgically remove contaminating material, but specialized equipment is needed to determine the precise location of the contamination and to evaluate progress of the procedure. Chelation therapy, if initiated immediately, may result in urinary excretion of up to 50 percent of the plutonium reaching the bloodstream.

(d) Plutonium deposited in the lung after inhalation is likely to be relatively insoluble and a large percentage may remain in the lung. Chelation therapy may prevent redeposition in the skeleton or liver of any soluble fraction that reaches the bloodstream, but to be effective must be initiated within one to two hours after inhalation.

(2) Uranium.

(a) Uranium is a naturally occurring heavy metal which is commonly used in nuclear weapons. Three isotopes, all radioactive, are found in nature. U-238 is the most abundant isotope, constituting 99.3% of natural

uranium, whereas only 0.7% of the uranium, as mined, is U-235. Weapon construction may use uranium of almost any isotopic composition. All isotopes of uranium are alpha emitters, and as such do not present a radiological hazard unless the metal or its compounds become internalized.

(b) The radiological hazard associated with any form of uranium is much less than that associated with plutonium. Uranium, however, is also a toxic chemical and may result in kidney damage. If the uranium enrichment is less than 5 to 8% (less than 5-8% U-235) then the limiting factor is chemical toxicity.

(c) Uranium absorbed into the bloodstream is rapidly excreted in the urine; thus, only urine samples obtained within the first 2-3 days after exposure will result in a reliable estimate of the exposure.

(d) Less soluble compounds of uranium are less likely to cause kidney damage; the critical organ is the bone or, if inhaled, the lung. The biological half-life is 300 days, 100 days, or 15 days in the bone, whole body or kidney respectively. The half-life in the lung depends strongly upon the particulate size as well as the solubility of the compound, and may range from 120 to 1470 days.

(e) Medical treatment should be designed to prevent acute damage to the kidneys. Soluble forms are rapidly excreted, but attempts to mobilize insoluble forms have been disappointing.

(3) Tritium. Tritium is the only radioactive isotope of hydrogen. It has a physical half-life of 12.6 years and combines readily with many elements. Tritium released to the atmosphere is rapidly oxidized to produce water. It is a weak beta emitter and cannot be detected by common field radiac meters. Radioactive water (tritiated water) is readily absorbed by the body, is chemically identical to normal water, and is rapidly distributed throughout the body tissue. The normal biological half-life of 8-10 days may be reduced to as little as three days by medically supervised forced fluids. Protective clothing may offer temporary protection from skin absorption of tritium, but air filtering respirators have no protective value.

10-6. Dose Assessment.

a. General. In many cases, definitive medical care for radiation casualties must be planned based upon the radiation dose received or the amount of radioactive material ingested or inhaled. Many of the methods used to enhance the removal of radioactive material from the body carry risks that are acceptable only if the risks associated with retention of the radioactive material are greater. Large doses of whole body, external radiation must be quantified within 5-7 days of exposure to enable effective treatment planning.

(1) Accurate dose assessments are required to reassure exposed personnel, for medical and legal reasons, and to satisfy Federal regulations.

(2) Although the initial dose estimates may not be available for several days, much of the raw data and samples required for analysis are time sensitive - they must be collected immediately after the accident.

(3) Determination of radiation dose received by personnel is a medical responsibility. Bioassay procedures are laboratory tests, and should be treated with similar attention to detail, particularly in the identification of samples. The final estimate will be recorded on Form DD 1141 and will become a permanent part of the service member's health record in accordance with AR 40-14.

b. Bioassay. Bioassay is the process of assessing the quantity of radioactive material that is within the body. The actual estimate is calculated based upon models of radionuclide metabolism or upon previous experience gained from experiments and industrial accidents. Sample and information collection, as prescribed below and in Table 10-1, must be initiated by the medical personnel on site and turned over to the RAMT or other teams established to interpret the data. It is desirable to obtain bioassay samples from all persons who were in the contaminated area without respiratory protection. Table 10-5 may be used to assign bioassay collection priorities based upon external contamination levels.

Table 10-5. Guidelines for Assignment of Priorities for Collection and Processing of Bioassays

Alpha Contamination Level on Clothing or Skin		
Priority	60 cm ² probe	17 cm ² probe
HI	Above 300,000 cpm	Above 75,000 cpm
MED	50,000-300,000 cpm	12,500-75,000 cpm
LO	Below 50,000 cpm	Below 12,500 cpm

(1) Nasal Swabs. While a nasal swab is not actually a measurement of radionuclides in the body and therefore not a bioassay per se, it is the only means available in the early hours after the accident to determine if internal contamination is likely. The sample must be obtained before the casualty showers or washes his face and within the first hour after exposure. It is therefore usually obtained during processing at the contamination control station. If the CCS is not established early enough, however, it may be necessary to obtain the nasal swabs independently. The sample should be collected on a clean, moist cotton swab by someone other than the casualty. Each nostril should be swabbed separately, and the two samples placed in separate test tubes or envelopes until analysis. Each sample must be labeled with the person's name and time and date of collection. Initial analysis can be performed by the RAMT and may determine the course of early treatment. A reading of 500 dis/sec or greater on each sample is a strong indicator of

significant internal contamination (plutonium) while 50 dis/sec or less suggests an insignificant exposure. A high reading on only one swab may indicate another source of contamination.

(2) Urine Samples. An immediate, single void specimen should be obtained immediately after the accident, particularly if it is believed that future chelation therapy will be required. The need for further samples is highly dependent upon the accident scenario and the radionuclides involved (See Table 10-6).

(3) Fecal Samples. When intake of uranium, plutonium, or fission products is suspected, fecal matter is required for analysis. All fecal matter should be collected beginning two days after exposure.

(4) Blood Samples. Samples should be obtained as soon as possible for later CBC and differential analysis if whole body exposure to external radiation is suspected to exceed 50 cGy (50 Rad). This is a possibility only in the event of a nuclear yield. Samples should be collected at 6-hour intervals if clinical symptoms appear that are suggestive of the acute radiation syndrome.

Table 10-6. Guidelines for Bioassay Sampling

<u>Suspected Radioactive Material</u>	<u>Feces Optimum Sampling Time After Exposure</u>	<u>Urine Optimum Sampling Time after Exposure</u>	<u>Sample Quantity</u>
Plutonium	2 days	2-3 weeks	24 hours total
Uranium	2 days	24 hours	24 hours total
Tritium	N/A	4-8 hours	1 voiding

(5) Whole Body Counting. Whole body counting is the process of measuring the radiation emitted from the body due to radioactive contamination. These systems are not generally available but arrangements for the use of a nearby system should be made and used as soon as internal contamination of personnel is suspected. External decontamination must be completed before whole body counting can be used effectively.

(6) Radiation Health History. Data obtained from analysis of samples and whole body counting should be correlated with information obtained from the individual and recorded on Form 11-1, Radiation Health History (Figure 10-1). This information can then be used to estimate the radiation dose and radionuclide uptake of other personnel who, for one reason or another, may not have had measurements or tests performed.

c. Determination of External Radiation Exposure. If a nuclear yield has occurred it will be necessary to estimate the radiation dose received due to the initial radiation liberated. The dose estimate is not necessary for immediate treatment decisions (a reasonable estimate is needed within the first week), but the information upon which to base a future estimate is perishable.

(1) Dosimeters. Personnel dosimetry may have been worn by those with the weapon when the accident occurred. These dosimeters, if present, should be collected as soon as possible and protected. Immediate processing should be requested for non-self-reading types of dosimeters (film, TLs, and DT236). Self-reading dosimeters may be read and then reissued to the individual (or another person if necessary). All personnel who subsequently enter the radiation area would be provided with personnel dosimeters (response force personnel already should be equipped with dosimeters). The record keeping associated with this task may become immense, and additional personnel (and dosimeters) should be requested as soon as possible.

(2) Biological Indicators. Human biological response to radiation exposure has been widely studied and can provide an estimate of the total dose received. The estimate is based not only on the response, but also on the time of occurrence of the clinical signs and symptoms. Changes in the levels of circulating blood cells has been closely correlated with absorbed dose, and may in fact be the best single source of information upon which to base a prognosis. The number of circulating lymphocytes reaches a nadir in about 48 hours and provides the earliest picture of the clinical situation and radiation damage. 25%, 50% and 75% reductions correspond with whole body doses of 60, 150 and 300 cGY (Rad) respectively. An early base line count is essential as "normal" values vary widely.

(3) Radiation Health History. A completed Form 11-1 (Radiation Health History) will compile essential information gained from interviews clinical observations and initial radiac measurements onto one document. The initial dose estimate may be made based upon this information.

(1) SOC SEC NO _____ (2) NAME _____ (last) _____ (first) _____ (m.i.) _____

(3A) BIRTH DATE _____ (3B) MALE or FEMALE
day/mo/yr

(4) TEMPORARY ADDRESS _____
 TELEPHONE _____

(5) PERMANENT ADDRESS _____
 TELEPHONE _____

(6) NAME & ADDRESS OF EMPLOYER _____

(7) HAVE YOU EVER BEEN TREATED WITH X-RAYS OR RADIOACTIVE ISOTOPES? YES NO

(7A) REASON FOR TREATMENT _____

(7B) DATE OF TREATMENT _____
mo/yr

(7C) PLACE OF TREATMENT _____

(8) HAVE YOU EVER HAD ANY CANCER OR OTHER MALIGNANCY? YES NO

(8A) INDICATE TYPE
 LEUKEMIA BREAST THYROID LUNG STOMACH BONE
 INTESTINES OTHER _____
Specify type

(8B) DATE OF DIAGNOSIS _____
mo/yr

(9) HAVE ANY BLOOD RELATED MEMBERS OF YOUR FAMILY (GRANDPARENTS, PARENTS, BROTHERS OR SISTERS) EVER HAD CANCER OR LEUKEMIA? YES NO TYPE _____

(10) ARE YOU NOW TAKING MEDICATION? YES NO

(10A) WHAT MEDICATION _____

(11) DO YOU HAVE ANY ALLERGIES? YES NO

(11A) WHAT ALLERGIES _____

(12) NAME & ADDRESS OF FAMILY PHYSICIAN _____

(13) DATE & TIME OF POSSIBLE OR ACTUAL EXPOSURE TO RADIATION/CONTAMINATION _____ AM or PM
day/mo/yr time

(14) DURATION OF EXPOSURE HOURS _____ MINUTES _____

(15) ACTIVITIES DURING PERIOD OF EXPOSURE (Meals, type work, bathing, sleeping, etc.) _____

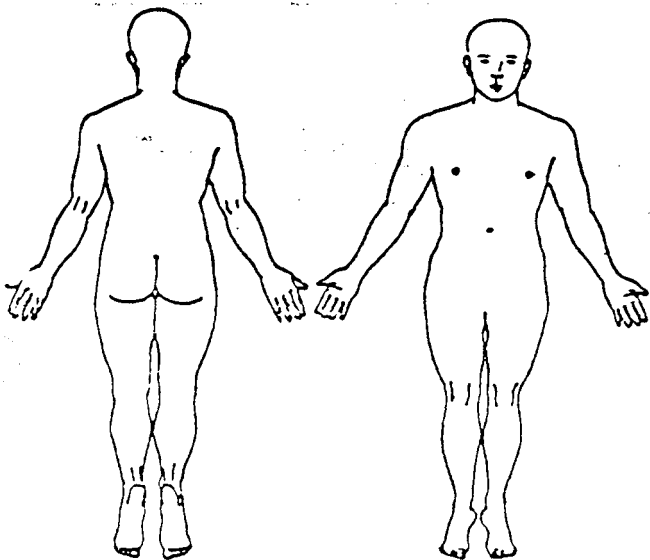
Figure 10-1. Radiation Health History

(16) LOCATION DURING PERIOD OF EXPOSURE _____

(17) DO YOU OWN A PET? YES NO TYPE _____
 LOCATION _____

(18) WHO WAS WITH YOU WHEN YOU MAY HAVE BEEN CONTAMINATED?

NAME	ADDRESS	TELEPHONE
_____	_____	_____
_____	_____	_____



SURFACE CONTAMINATION
 RADIONUCLIDE(S) OR TYPE(S) OF RADIATION

BODY PART	CONTAMINATED AREA	INITIAL COUNT	DECONTAMINATION

DECONTAMINATION METHOD AND AGENT USED

INTERNAL CONTAMINATION

ROUTE OF EXPOSURE	RADIO-NUCLIDE	CHEMICAL FORM	SOLUBILITY

Chapter 11

PUBLIC AFFAIRS

11-1. Scope. This chapter will provide US Army commanders with guidance on the release of information to the public in the event of a nuclear weapon accident/incident so as to ensure public safety and prevent public alarm. It is the policy of the Department of Defense and the US Army to establish proper procedures and guidance for the release of information to the public. AR 360-5, DOD 5230.16, DNA 5100.1 and EUCOM Directive 15-1 and 15-5 provide more specific guidance governing the release of information on the event of a nuclear accident or incident.

11-2. General.

a. Each major command having custody of nuclear weapons must understand the procedures to use in releasing NAIRA accident/incident information to the public. This will be especially important in host nation environments and during the initial stages of an accident prior to arrival of the follow-on force. The on-scene commander (OSC) and his designated public affairs representative must understand their major command's public affairs guidance. The OSC will neither confirm nor deny the presence of a nuclear weapons accident or incident and should obtain concurrence with his major command before releasing any other information.

~~b. Each OCONUS major command must have specific public affairs plans and SOPs in the event of a nuclear accident or incident. These plans and SOPs will include:~~

~~(1) Provisions and procedures to inform expeditiously the Assistant Secretary of Defense, Public Affairs (ASD (PA)), and the chief of US mission, Department of State, and to provide the host government with emergency news releases.~~

~~(2) Provisions for the use of the host government's public release facilities.~~

(3) Contingency plans, announcements, and methods of release developed by Unified Commanders, or designees, in consultation with the chief of US mission, Department of State, in the country concerned.

(4) Provisions for clearing contingency announcements and methods of release with host governments, when required by international agreement. This process shall be accomplished by the Unified Commanders through the chief of US mission, Department of State, in the country concerned.

c. In overseas areas, and US territories and possessions, Unified Commanders or their designees, with concurrence of the host government through the appropriate chief of US mission, Department of State, may officially confirm or deny the presence of nuclear weapons or radioactive nuclear weapons components at the scene of an accident or significant incident, in the interest of public safety or to reduce public alarm. The ASD(PA) shall be

advised in advance, if practicable, if an exception to policy is necessary. In those countries where required by international agreement, civil authorities of foreign governments shall be informed through the chief of the appropriate US mission, Department of State, of an accident or significant incident involving nuclear weapons or radioactive nuclear weapons components. In those countries where public affairs coordination procedures have not been established, public announcement required either for public safety or to ease public alarm will be coordinated by the Unified Commanders or designees with the host government through the appropriate chief of US mission, Department of State.

d. In CONUS areas a credible public affairs program is also very important, and the OSC will be faced with a wide range of complex public affairs issues. News media, public officials, and private citizens will be demanding immediate information concerning the nuclear accident, and it is important that proper procedures are used. The OSC will as a minimum perform the following:

- (1) Establish direct communication with ASD (PA) from the accident scene.
- (2) Establish a Joint Information Center (JIC) in preparation for the arrival of DOE and FEMA Service Response personnel.
- (3) Establish a point at the accident scene for news media support.
- (4) Protect classified information.
- (5) Inform local and state officials of radiation and other hazards which may exist at the site, but do not confirm or deny presence of nuclear weapons.

e. Each CONUS Army installation having custody of nuclear weapons will also prepare advance plans for the coordination and release of information to local authorities and the public. Coordination will be made with local communities that might be affected by an accident or that might be called upon to assist. This coordination should be limited to carefully selected local authorities and should not divulge classified information. Only information considered essential for advance planning is to be released.

f. The OSC, whether at a CONUS or OCONUS accident, must ensure that response force personnel are briefed on public affairs policy, especially those who might come in contact with the general public. They must understand how to respond to questions concerning the accident and response operations.

g. The IRF will only respond with one or two professional PAOs and will not be capable of responding to the influx of calls and press pressure.

(1) Installations can be prepared by having approved fact sheets on hand to distribute to the media in the event of an accident. This information could include an explanation of alpha versus beta rays, dosages, lethality, etc., and would reduce the amount of effort required for individual responses to similar requests. Additionally, the chances for misinformation being reported are lessened if the media is provided facts in writing.

(2) Installations should train additional personnel to respond as assistant PAOs. These assistants would in effect be acting as buffers pending formal release of information. ~~Preprogrammed/precanned releases could be used by the assistants to ward off press pressure pending accident assessments and analysis.~~

end of note

Chapter 12

NAIRA TRAINING

12-1. General. NAIRA training must address both the complete peacetime contingency response and a limited wartime response. It is important to stress the differences between the two, however. Peacetime safety standards must be maintained, and in wartime the scope of response action will depend greatly on the situation.

12-2. Intent. Before a specific NAIRA training event is undertaken, the objectives of the exercise should be carefully established. Care must be taken to limit the objectives for the exercise so more specific appraisals can be made of abilities and weaknesses. The following areas are among those that should be considered:

- a. Practice of specific response team actions.
- b. Realistic appraisal of notification scheme and transit time for response elements.
- c. Specific communication capabilities between response teams.
- d. Consideration given to all contingencies
 - contamination present/not present
 - injuries at scene/deaths at scene
 - civilians inside exclusion area/unpopulated area
 - follow-on response available/not available
 - peacetime/transition to war/wartime
- e. Coordination between response force teams

12-3. Scope. Before an exercise is planned that involves the integration of all response teams, each team should already be proficient in their areas of responsibility.

a. Limited scope. An exercise can be held that involves only some of the participants, or that is conducted on a small area. This type of exercise can test basic procedures and coordination between parties, without adding the difficulty of controlling a more complete exercise.

b. Broad scope. Conversely it is possible to plan and execute relatively large scale NAIRA exercises, involving all initial response elements, at a more realistic-sized accident site.

(1) Although prior coordination is paramount, an exercise of this nature can be carried out using the resources at the disposal of the responsible command. For added realism, other external assets may be integrated into the exercise.

(2) When conducting an exercise, the use of controller personnel will be necessary to ensure participants observe exercise guidelines, to monitor situations, and to maximize the benefit of the exercise.

(3) Consideration should be given to the arrival of follow-on response teams if the exercise simulates a peacetime accident. Follow-on forces need not actually arrive, but care must be taken to ensure that a smooth handoff could be conducted.

12-4. Alpha Team Training. The role of the alpha team is critical during the initial response to either a peacetime or wartime accident.

a. Under most circumstances, it is not possible to train with actual radioisotopes, making it difficult for alpha team members to exercise proper technique while monitoring. Any simulation of contamination must be specifically monitored by controller personnel.

b. The Trainer, Radiac Set AN/PDR-56F-T1 (6665-01-216-5858), is an excellent training device for alpha team members. This device looks and operates like the AN/PDR-56F Alpha Radiac Set. It can be used to obtain simulated contamination readings using the main probe, X-ray probe, or the auxiliary probe. The size of the desired contamination area can be set from 5 meters to 1000 meters. Additionally, the probe face can simulate the effects of probe face puncture, allowing monitors to develop proper technique for monitoring rough surfaces.

12-5. Civilian Integration. Civilian agencies (host nation) may have capabilities that can complement those available in US response teams.

a. Coordination should be made at the appropriate level with host nation agencies that deal with disaster response and public health. During peacetime, local standards will be in effect for those civilians exposed to a contamination hazard. Host nation support during this type of accident will be crucial. Advance coordination should also address the wartime contingency, specifically whether and where the host nation agencies can respond to an accident.

b. Although integration of the civilian component into US Army NAIRA exercises may not be feasible, having a liaison team present will help to ensure that effective integration will be possible during an actual incident. Additionally, it will serve to demonstrate US response capabilities, and assure the host nation that an accident can be adequately controlled.

12-6. Training Resources. The US Army and DOD agencies have a number of courses in the NAIRA field to assist in training of response force personnel. Also, the Defense Nuclear Agency is in the process of publishing a NARP training package for use by IRF and follow-on forces.

a. Training Courses. The following is a list and description of nuclear weapon accident response training courses for US Army personnel.

(1) Interservice Nuclear Weapons School. The Interservice Nuclear Weapons School (3416th Technical Training Squadron) at Kirtland AFB, New Mexico, conducts courses on nuclear emergency response training involving actual monitoring of alpha and gamma radiation on controlled, simulated accident sites. Points of contact for further information on the Interservice Nuclear Weapons School can be obtained by calling AUTOVON 244-4567/8226 or by referring to DNA Publication 5100-52 TL and DOD5010 16-C.

(a) Nuclear Weapons Orientation Advanced (NWOA) - The course is designed to provide training on the scope of the national nuclear weapons program, with briefings on operational and physical characteristics of stockpile nuclear weapons, effects and employment, organizational involvement, methods of delivery, nuclear safety program, intelligence estimates, test program, and future trends. A mobile training team version of this course exists. Special requirements: TOP SECRET security clearance. Course duration: 2 days.

(b) Flag Officers Nuclear Accident Course (FONAC) - The course is designed to provide training for prospective Service Response Force (SRF) on-scene commanders (OSC) with the problems and responsibilities involved in nuclear accidents; characteristics and operation of radiation detection instruments; hazards of radioactive, toxic and explosive materials; Nuclear Emergency Team operations, organizations, and response systems; public information, explosive ordnance disposal, security, legal, and medical aspects; and on-scene commander responsibilities. A field exercise familiarization is included. Special requirements: TOP SECRET security clearance. Course duration: 2 1/2 days.

(c) Senior Officers Nuclear Accident Course (SONAC) - The course is designed to provide training for selected interservice officers (grades O-4 through O-6) and federal civilian employees (GS-12 and above) in the problems and responsibilities involved in nuclear accident response; with the capabilities, organization, and operation of a Nuclear Emergency Team; and with the techniques involved in monitoring contaminated areas. The scope of training includes problems associated with a nuclear accident or incident, including a review of actual incidents; hazards of radioactive, toxic and explosive materials; characteristics and operation of radiation detection instruments, including new instruments, Nuclear Emergency Team operations, organization, alert, and response systems; public information, security, legal, and medical aspects; on-scene commander responsibilities, including coordination of requirements with local, state, and federal officials; field exercises; techniques of monitoring for radioactive material, including air sampling, protective equipment, and control of personnel in contaminated areas. Special requirements: TOP SECRET security clearance. Course duration: 3 days.

(d) Nuclear Hazards Training Course (NHTC) - The course is designed to provide training for officers and enlisted of the medical services in the organization and function of Nuclear Emergency Teams and in techniques involved in monitoring contaminated areas. The scope of training includes principles of nuclear devices; related hazards when involved in an accident or incident; characteristics and operation of radiation detection equipment; hazards of explosive materials and Nuclear Emergency Team operations. Special requirements: SECRET security clearance. Course duration: 4 days.

(e) Nuclear Emergency Team/Nuclear Emergency Team Operations (NET/NETOPS) - The course is designed to provide training for selected interservice officer and enlisted personnel and federal civilian employees who are members or potential members of Nuclear Emergency Team and Disaster Preparedness Response Forces, in the techniques and skills necessary to cope with nuclear emergency situations. The scope of training includes concepts of nuclear physics and basic weapon theory, with emphasis on nuclear components and related materials which present special problems in accident and incident situations; characteristics, operation, functions, and construction of selected radiac equipment utilized for the detection of radiation under a variety of conditions; characteristics and hazards of radioactive materials on the human body; characteristics and hazards of explosive materials; problems associated with a nuclear accident or incident, including a review of actual accidents and incidents; NET operations, including coordination requirements with local, state, and federal officials, survey and analysis procedures, recovery and disposition of materials, and decontamination techniques. Special requirements: SECRET security clearance. Course duration: 9 days.

(f) Nuclear Emergency Team Exercise (NETEX) - The course is designed to provide refresher training for Nuclear Emergency Teams. The standard operating procedures (SOP) of the command performing the NETEX will be used as an evaluation instrument. The training exercise includes safety, security, nuclear weapons identification, development and testing of a nuclear response team in handling accident situations involving an aircraft crash, a vehicular and igloo accident, an isolated weapons impact, and a multicarrier collision. Special requirements: SECRET security clearance. Course duration: 4 days.

(2) US Army Defense Ammunition Center and School. The Defense Ammunition Center and School at Savanna Army Depot, Savanna, Illinois, conducts training on various topics related to NAIRA. Additional information on NAIRA courses offered by the Defense Ammunition Center and School can be obtained by calling AUTOVON 585-8934 or commercial (815) 273-8931. Correspondence to the Ammunition School should be addressed as follows: Director, US Army Defense Ammunition Center and School, ATTN: CINCAC-ASA, Savanna, Illinois 61074-9639.

(a) Nuclear Accident/Incident Response and Assistance (NAIRA) Operations Course. The objective of this course is to develop the skills necessary to cope with nuclear emergency situations through training stressing the use of approved techniques. The course is divided into subcourses which examine NAIRA procedures in great detail. Practical applications are stressed through realistic exercises in which students act out parts by "role playing." Performance is monitored and constructive critiques are held to reinforce proper procedure. Students are expected to dress out in full protective equipment which may include self-contained breathing apparatus. This course is specifically designed for personnel who have responsibilities in local NAIRA planning procedures. Special requirements: SECRET security clearance. Course duration: 2 weeks - 80 hours.

(b) NAIRA Officers Course. The objective of this course is to develop the procedures necessary to cope with a nuclear emergency situation from a leadership or command and control standpoint. Basic information is

covered for Army nuclear weapons including the types of hazards they present during an accident/incident situation. A review and analysis of past accidents is conducted with emphasis upon procedures and lessons learned. Information is developed to inform the NAI Operations Officer or OSC on resources available for help and assistance, with special emphasis placed on the functioning of a command post during a simulated nuclear accident/incident. Prospective enrollees should be assigned or have a planned assignment as a NAIRA Operations Officer or OSC, or on the staff of an OSC. Special requirements: SECRET security clearance. Course duration: 2 1/2 days - 20 hours.

(c) Fire, Radiation and Explosive Hazards Course. This course is designed to provide training to firefighting personnel who must respond to fire involving Army nuclear weapons when expert help is not immediately available. Topics covered, however, are relevant to other individuals who must respond immediately to an emergency situation. Information is basic in terms of weapon construction and functioning details, but specific in terms of procedures in the use of radiation protection equipment, decontamination, and explosive safety procedures. Anyone needing training in immediate response action is eligible to attend this course. This may include not only fire department officers and firefighters, but also law enforcement officers, civil defense and safety officials, transportation personnel, and others who may have emergency duties. Special requirements: none. Course duration: 4 days - 32 hours.

b. Training Literature. The Nuclear Weapon Accident Response Procedures Training Package (NARPTP) is a Defense Nuclear Agency publication scheduled for release in FY88. This training package is designed to aid and assist the using command in the preparation and execution of nuclear weapon accident exercises. It is applicable to the preparation and execution of seminars or discussion type training, command post exercises (CPXs) and field training exercises (FTXs) involving nuclear weapons accidents. It is designed for use by organizations assigned initial and follow-on force missions and provides exercise scenarios to test and evaluate all members of the response force team.

Appendix A

FIRE FIGHTING

A-1. Purpose and Scope. To provide guidance and information for personnel on the initial response force team who have responsibility for firefighting operations which involve nuclear weapons or nuclear components. Firefighting efforts are initiated to prevent loss of life or serious injury, to prevent contamination scattering (plutonium), to salvage the burning aircraft, vehicle structure, and/or its nuclear weapons/components, and to prevent property or material damage.

A-2. General.

a. Responsibilities. Each major command having custody of a nuclear weapon must have personnel who are trained in proper firefighting techniques. Although follow-on forces have personnel trained in this area, the criticality of extinguishing a nuclear weapons fire early make this absolutely essential. Each IRF team must have a designated firefighting team. EOD along with the IRF Decon personnel might have to perform this function if installation or local civilian firefighters are not available. Because of this the OSC must ensure that they are properly trained.

b. On-Post Accidents. On-post nuclear weapon accidents that involve a fire hazard will require immediate coordination with on-post civilian firefighters who normally respond to fires. Every effort must first be made by IRF firefighting personnel (i.e., EOD and IRF Decon Team) in extinguishing the fire, using methods described in this FC, TB 385-2 and TP 20-11, before requesting civilian assistance. Self-contained breathing apparatus must be used for protection from non-radiological (e.g., Beryllium, Lithium, Lead) vapor hazards. If the fire involves a structure (i.e., building) and is too large for the IRF to handle, civilian firefighters should be warned of the possible radiological and non-radiological hazards and used only for the time required to extinguish the fire. EOD personnel should be present to ensure security of weapons components.

c. Off-Post Accidents. In the event of a nuclear weapons accident that occurs off an Army installation and involves a fire, careful coordination must be made with civilian authorities (CONUS) or host nation support personnel (OCONUS). If the accident involves a civilian structure or personnel, civilian police and firefighters will be present. The OSC must coordinate with local officials to notify them of the potential seriousness of the accident and the necessary precautions that must be taken in fighting the fire. The OSC must make every effort to use the same procedures described in this FC for saving lives, establishing command and control, and securing classified components of the weapon system. When an accident occurs off post in the civilian community, public affairs guidance as described in Chapter 11 must also be followed.

d. Standing Operating Procedures (SOP). Inherent in any NAIRA operation is an effective SOP that details each MACOM's procedure for control and movement of weapons, exposure control, evacuation of personnel, responsibility for and general fire prevention precautions.

A-3. Safety Considerations.

a. General Hazards. Even though nuclear weapons are designed to prevent a nuclear yield in the event of accidental detonation, there is still a potential hazard from the two major components of a nuclear weapon: (1) the high explosive; and (2) the nuclear material. Other components may produce hazards, but they are of such a nature that precautions taken against high explosive and nuclear materials are more than sufficient for their control, e.g., gasoline or other volatile and explosive fuels.

b. High Explosive Hazards. If the high explosive is accidentally ignited by fire at one point, it will burn or perhaps explode, but it will neither burn nor explode with sufficiently uniform pressure to make the mass critical. If the weapon is inadvertently struck, or falls from a sufficient height, the blow may cause ignition of the explosive, an explosion, or breakup and scattering. Burning high explosives have easily recognizable characteristics. The high temperature at which they oxidize causes a hot flame, or "torching", which is easily distinguishable from the flame of burning petroleum fuels or other materials. The smoke of burning explosive from nuclear weapons is noticeably light in color as it mingles with that from most other burning fuels. As they burn, high explosives melt, flow, drip, spread and mix with surrounding ground or wreckage. After the fire is extinguished, these explosives are safe only if they are completely burned. High explosives which have not completely burned remain an extreme explosive hazard. After these explosives have cooled below ignition temperature they will, like metal, take on curious shapes. They may have picked up impurities, while molten or burning, that will make them actually more dangerous than they were before melting.

c. Detonation and Fragmentation Hazard. A high explosive detonation may range from a very small one to one of considerable magnitude; or it may be a series of small explosions. The breakup of the weapon from impact or a small explosion will result in local scattering of small pieces of high explosive. Rough handling as well as accidents may produce powdered explosives. Most high explosives are quite sensitive under these conditions and more apt to detonate when subjected to heat, impact, or friction. A nonnuclear detonation will produce a fragmentation zone that generally has the shape of a circle within which most fragments fall, unless the detonation is screened in some manner. In addition, due to weapon case construction, the fragmentation distance will be less than the given radius at the sides of the weapon and greater at the forward and aft ends. Only those personnel required to conduct firefighting operations should be closer than 610 meters (2000 feet) from the weapon or within the NDA/LNEA, if already established. In the event of an HE detonation, personnel within or at the boundary of the zone (610 meters) should take cover since some fragments may travel beyond this distance.

Appendix B

POINTS OF CONTACT

B-1. National Military Command Center (NMCC)

AUTOVON: 851-1411/3840
COMM: (202) 697-6340/4874

B-2. Army Operations Center (AOC)

AUTOVON: 255-0441
COMM: (202) 695-0441

B-3. Joint Nuclear Accident Coordinating Committee (JNACC)

a. DOD Element

AUTOVON: 244-8279/8270
COMM: (505) 844-8279

b. DOE Element

AUTOVON: 244-4667
COMM: (505) 844-4667

B-4. AMC Operations Center

AUTOVON: 284-8406/9223
COMM: (202) 274-8406/9223

B-5. DESCOM Emergency Operations Center

AUTOVON: 570-4041/4000
COMM: (717) 267-4041/4000

B-6. Radiological Advisory Medical Team (RAMT)

a. Walter Reed Hospital

AUTOVON: 291-5107
COMM: (301) 427-5107

b. 10th MEDCOM - Europe (Landstuhl)

Military Ext. 2223-7387
COMM: (from CONUS) 49-6371-86-7387
(in Germany) 06371-86-7387

c. 7th MEDCOM - Europe (Heidelberg)

AUTOVON: 370-8906
COMM: (from CONUS) 49-6221-572-8906
(in Germany) 06221-572-8906

B-7. Radiological Control Team (RADCON), APG, MD

AUTOVON: 283-6934
COMM: (301) 278-6934

B-8. Broken Arrow Response Kit (BARK) - Local Purchase Item

Eberline Corporation
PO Box 2108
Sante Fe, NM 87501
(505) 471-3232

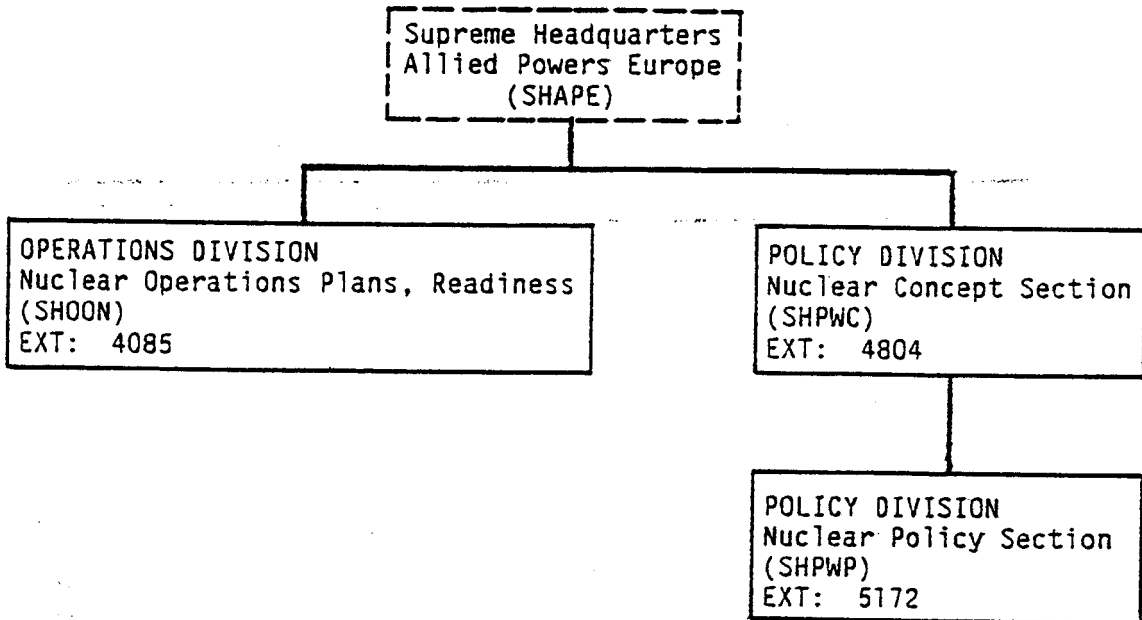
B-9. STAPLEX Air Sampler

Staplex Company
777 Fifth Avenue
Brooklyn, NY 11232
(718) 768-3333

B-10. Ludlum Radiacmeter - Local Purchase Item

Ludlum Measurement Inc.
501 Oak Street
PO Box 248
Sweetwater, TX 79556
(915) 235-5494

SUPREME HEADQUARTERS ALLIED POWERS EUROPE
(SHAPE)
APO NY 09055



Commercial: Country Code 032 - City Code 65-44-XXXX
Overseas Operator: Ask for SHAPE Belgium Operator then
EXT-XXXX

ETS: 423-XXXX

Address: US National Military Representative
ATTN: (Specify Duty Sec)
APO NY 09055

MSG ID: USNMR SHAPE BE//((Specify Duty Sec))//

CMD/UIC: JT/WINBAA

ALLIED FORCES NORTHERN EUROPE (AFNORTH) 4
APO NY 09084

Allied Forces
Northern Europe
(AFNORTH)

Operations Division
Chief, Nuclear Operations Branch
(OCN)
Ext: 2315/2319

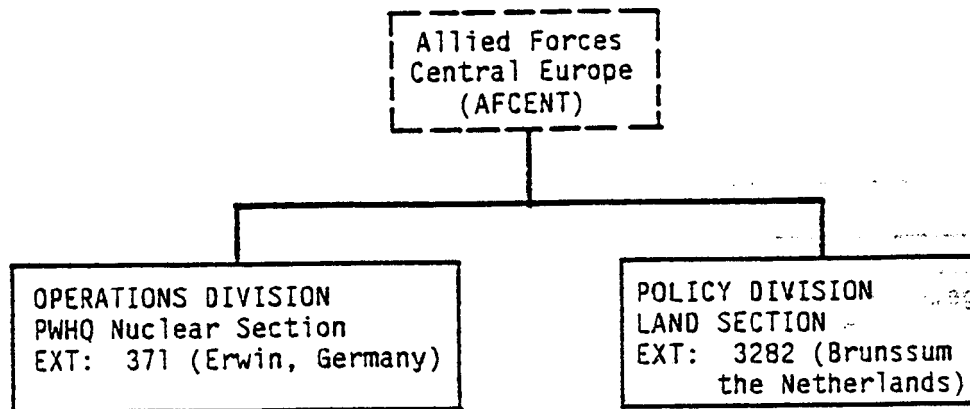
Commercial: Country Code 047 - City Code 02-549050-XXXX
Overseas Operator: To SHAPE Belgium Operator- Ask for AFNORTH
Operator EXT-XXXX

Address: Cdr, USA Element, AFNORTH
ATTN: ACAN-(Nuc Ops)
APO NY 09084

MSG ID: CDUSAELM AFNORTH KOLSAAS NO//ACAN-(Nuc Ops)//

CMD/UIC: J1/W2H2AA

ALLIED FORCES CENTRAL EUROPE (AFCENT)
APO NY 09011



Commercial: NA

Country Code 0031
City Code 45-26-EXT-XXXX

Overseas Operator:
To SHAPE Belgium Operator
Ask for AFCENT Operator
Ask for Erwin Germany EXT-XXXX

NA

Address:
Cdr, USA Element, AFCENT
ATTN: ACAC-AGP-PWHQ NUC SEC
APO NY 09011

Cdr, USA Element, AFCENT
ATTN: ACAC-AGP-LAND SECTION
APO NY 09011

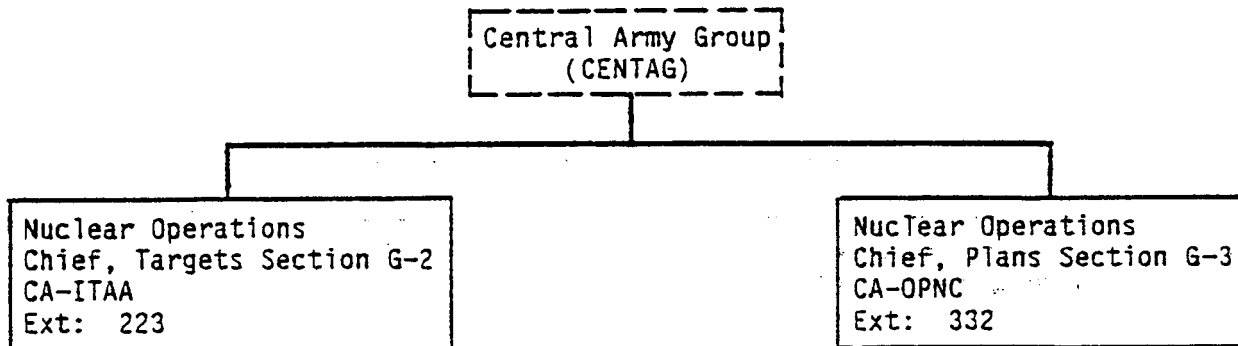
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CDRUSAELM AFCENT BRUNSSUM NL//
ACAC-POL-4//

CMD/UIC: J1/W2HWAA

J1/W2HWAA

CENTRAL ARMY GROUP (CENTAG)
APO NY 09099-5427



Commercial: Country Code 062 - City Code 21-398-EXT-XXXX
Overseas Operator: To Heidelberg Germany Operator
Ask for CENTAG Operator EXT-XXX

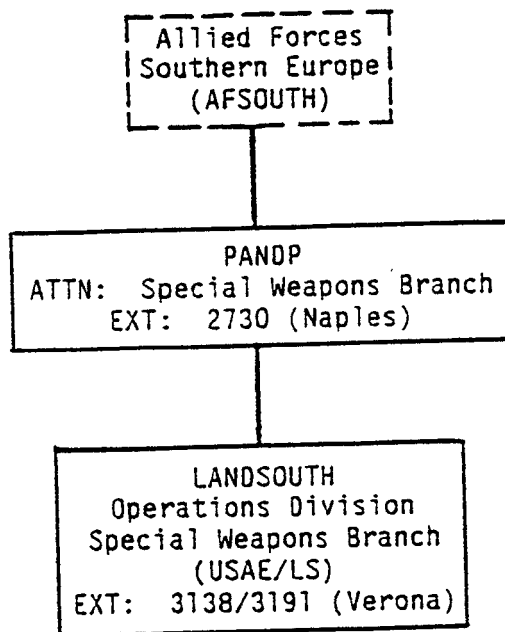
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Address: Cdr, USA Element, CENTAG
ATTN: CA-XXXX
APO NY 09099-5427

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CMD/UIC: J1/W2HRAA

ALLIED FORCES SOUTHERN EUROPE (AFSOUTH)
FPO NY 09524-2004



Commercial: (Naples) Country Code 081 - City Code 081-721-XXXX
(Verona) Country Code 045 - City Code 045-8000-100-EXT-XXXX

Overseas Operator: To Naples Operator - Ask for AFSOUTH Operator EXT-XXXX
To Verona Italy Operator - Ask for LANDSOUTH Operator
EXT-XXXX

AUTOVON: (Naples) 625-4237-XXXX
(Verona) NA

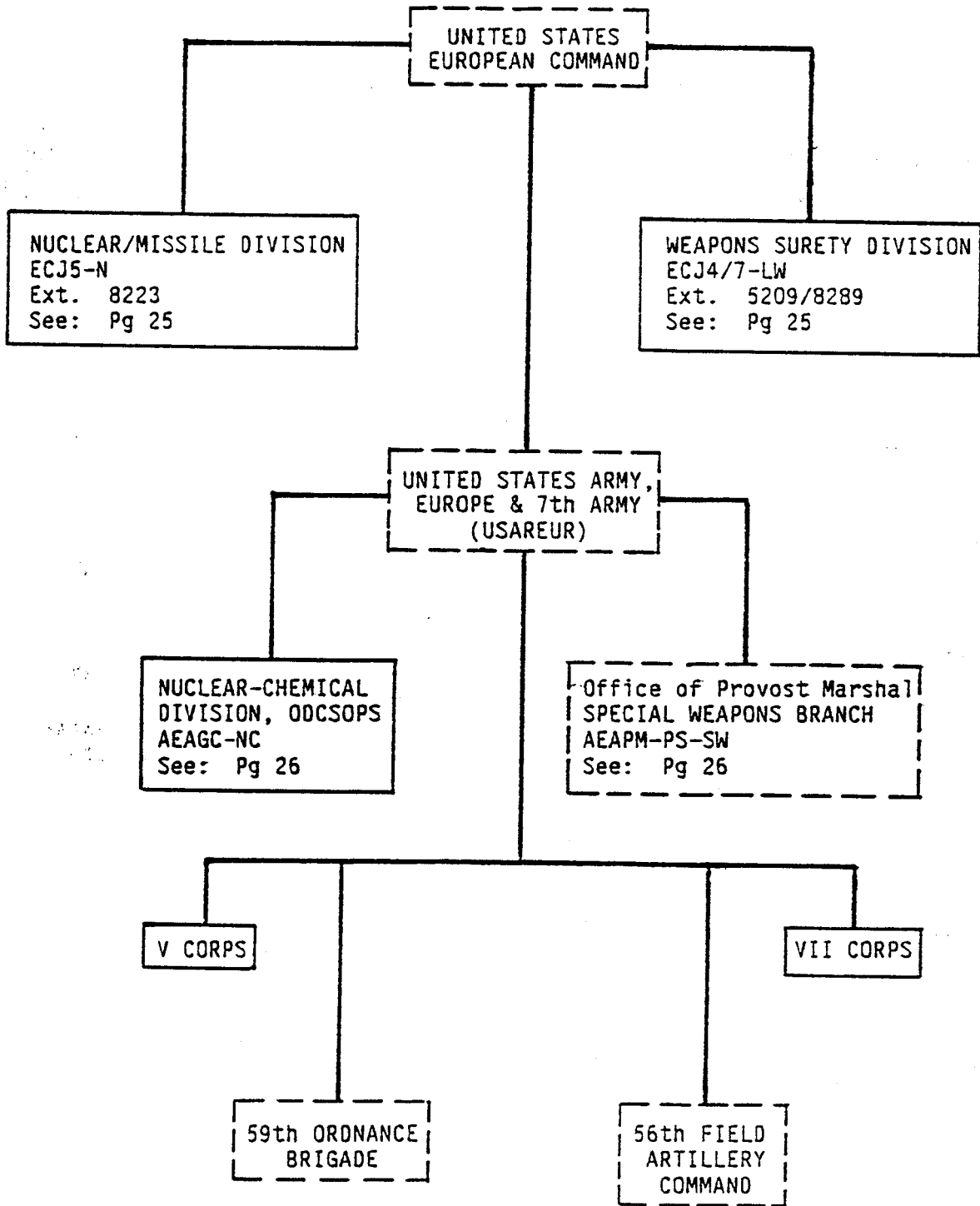
Address: (Naples) Cdr, USA Element, AFSOUTH
ATTN: SP WPNS BR
FPO NY 09524-2004

(Verona) Sr US Officer
USA Spt Elm-LANDSOUTH
ATTN: USAELS
APO NY 09453

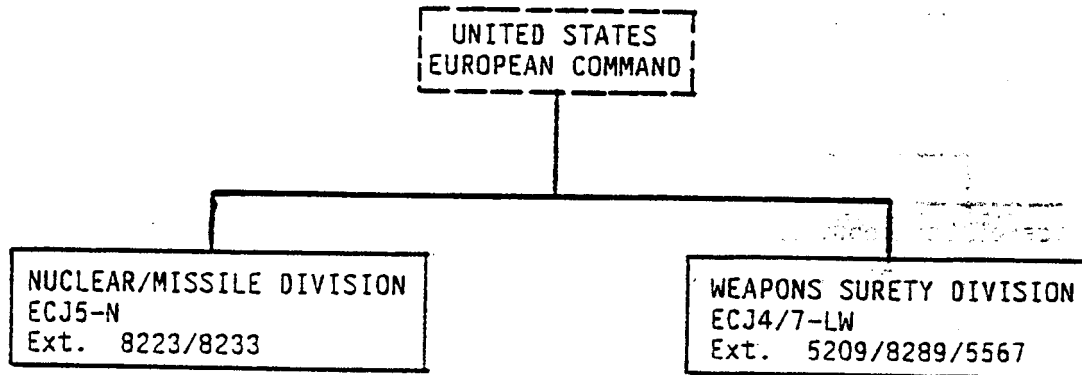
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(LANDSOUTH) USASELM LANDSOUTH VERONA IT//(SP WPNS BR)//

CMD/UIC: J1/W2HXAA

UNITED STATES EUROPEAN COMMAND (USEUCOM)



UNITED STATES EUROPEAN COMMAND (USEUCOM)



Commercial: (0711) 680-XXXX From Europe
49-711-680-XXXX From CONUS
AUTOVON 430-XXXX

A. Nuclear/Missile Division, J5

Address: HQ USEUCOM
ATTN: ECJ5-N
APO NY 09128-4209

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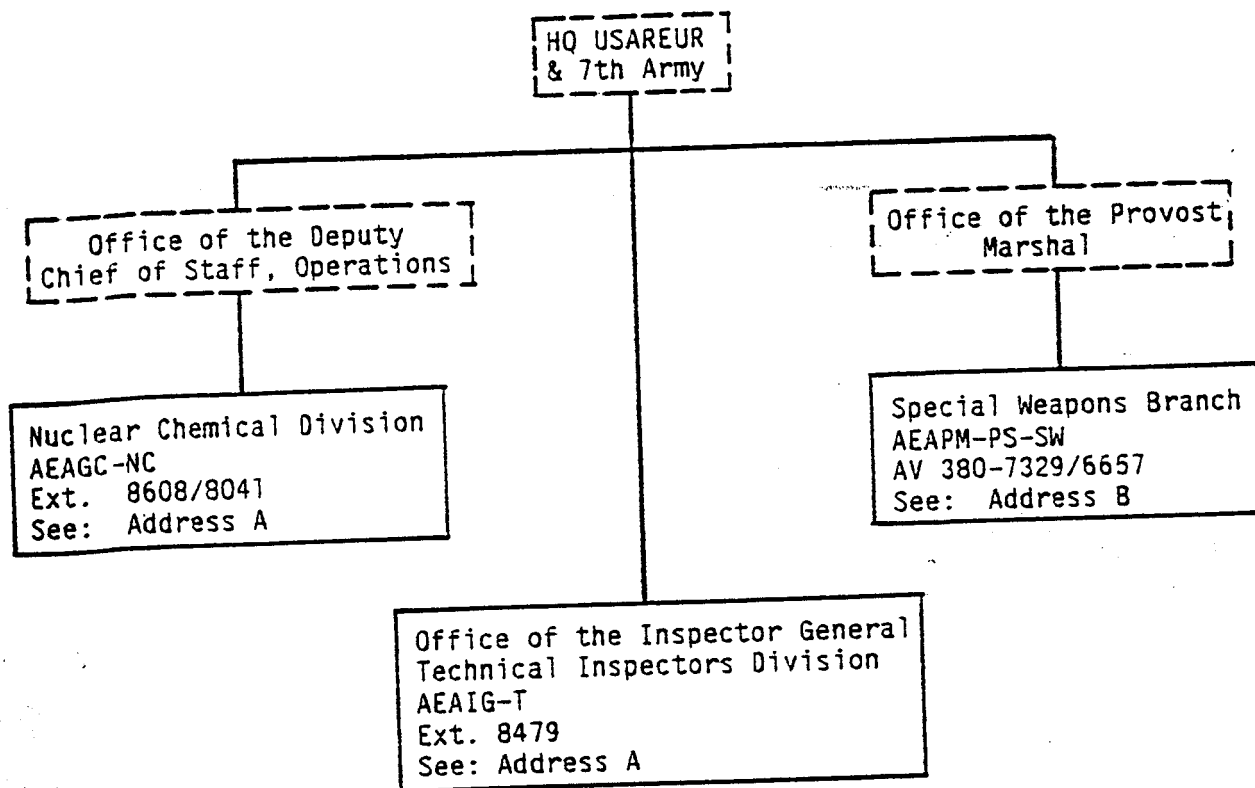
B. Weapons Surety Division, J4/7

Address: HQ USEUCOM
ATTN: ECJ4/7-LW
APO NY 09128

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CMD/UIC: JA/W092AA

USAREUR and 7th Army



Commercial: 06221-57-8608/8041
AUTOVON: 370-8608/8041/6612
FTS: N/A

A. Address: Cdr, US Army Europe
ATTN: AEAXX-X
APO NY 09403-0100

MSG ID: CINCUSAREUR HEIDELBERG GERMANY//AEAXX-x//

B. Address: USAREUR Provost Marshal
ATTN: AEAPM-PS-SW
APO NY 09086

MSD ID: USAREUR PROVOST MARSHAL MANNHEIM GERMANY//AEAPM-PS-SW//

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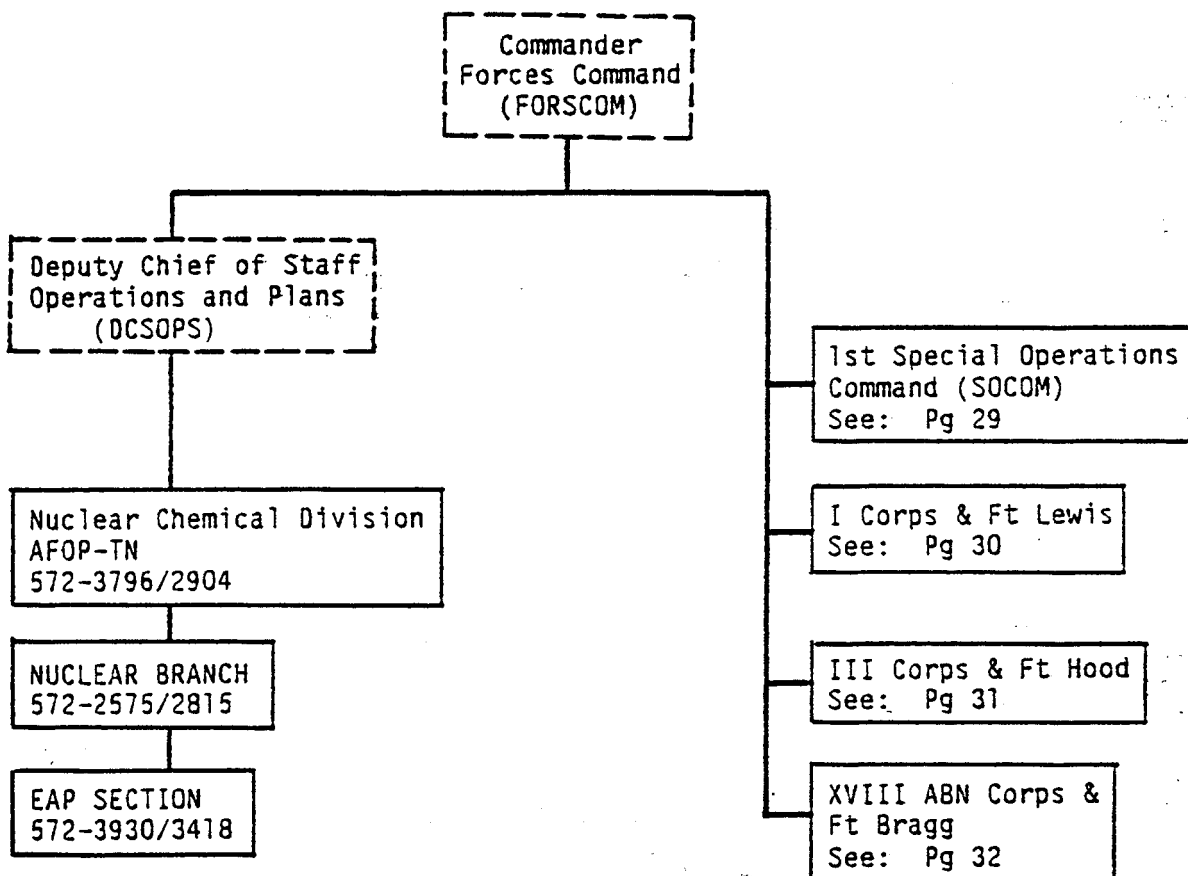
V and VII Corps (Europe)

	<u>HQ V Corps-Plans</u>	<u>V Corps Arty</u>
Commercial:	069-151-6441	069-151-8107
AUTOVON:	320- 6441	320- 8107
FTS:	N/A	N/A
Address:	Commander V Corps ATTN: AETVGCP APO NY 09079	Commander V Corps Artillery ATTN: AETV-AT APO NY 09079
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CMD/UIC:	E5/WAT6AA	E5/WAOTAA

VII Corps

Commercial:	0711-726703
AUTOVON:	4212-530/552
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HQ FORCES COMMAND (FORSCOM)



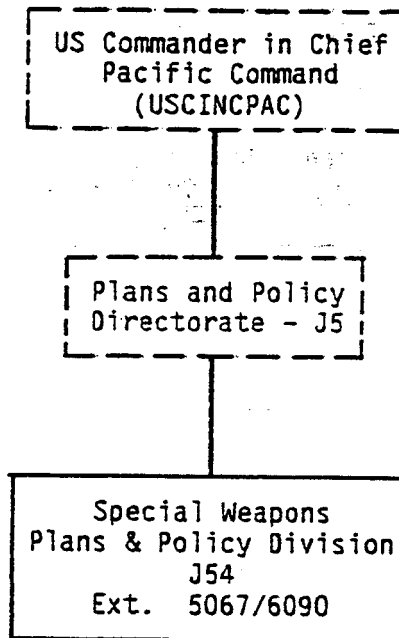
Commercial: (404)
AUTOVON: 572-xxxx
FTS: 243-xxxx

Address: Cdr, USA FORSCOM
ATTN: AFOP-TN
Ft McPherson, GA 30330-6000

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CMD/UIC: FC/W3YBAA

UNITED STATES PACIFIC COMMAND



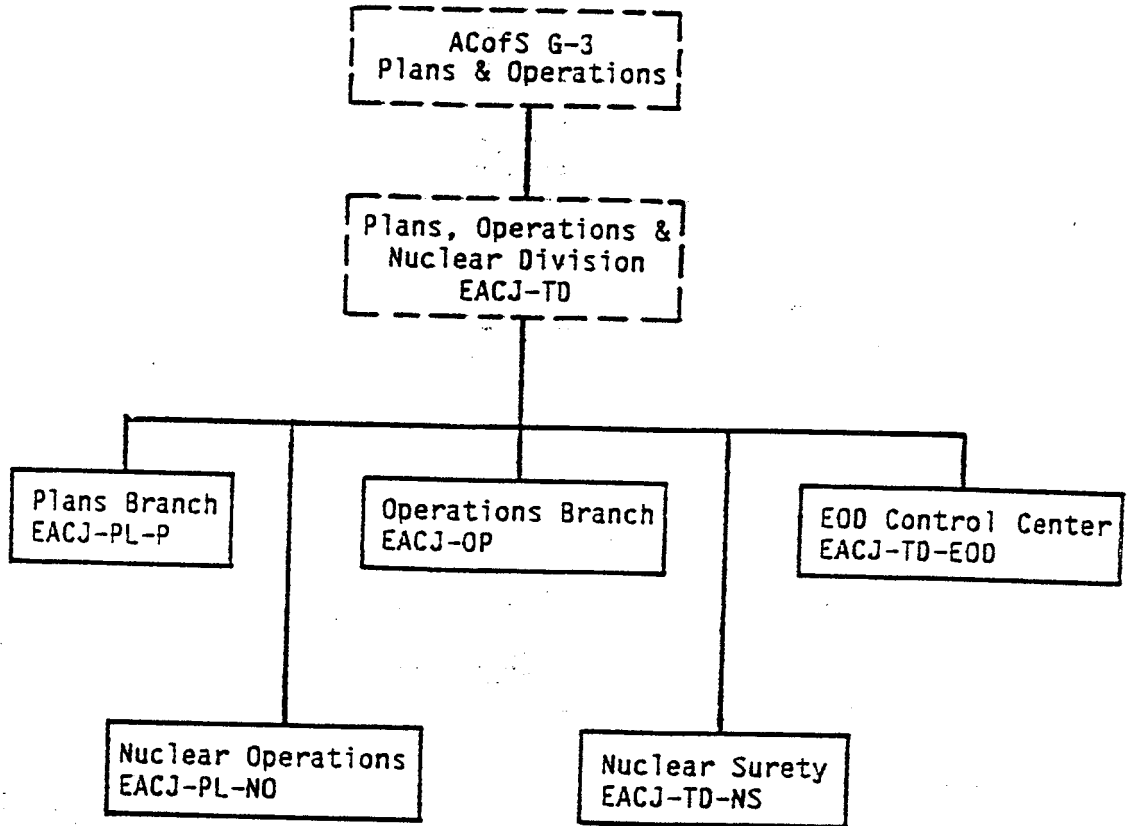
Commercial: (808) 477-XXXX
AUTOVON: 477-XXXX
FTS: (808) 477-XXXX

Address: Cdr, USCINCPAC
ATTN: J54
Box 15
Camp H. M. Smith, HI 96861

MSG ID: CDR USCINCPAC HONOLULU HI//J54//

CMD/UIC: JA/W093AA

HQ, EIGHTH US ARMY



Commercial: N/A
AUTOVON: 262-3642
FTS: N/A

Address: Cdr, Eighth US Army
ATTN: EACJ-XX-XX
APO SF 96301

MSG ID: CDUSAEIGHT SEOUL KOREA//EACJ-XX-XX//

CMD/UIC: PB/WAJMAA

AMC - SENECA AND SIERRA ARMY DEPOTS

COMMANDER
SENECA ARMY DEPOT
(SDSSE-CO) Ext. 5206

DIRECTOR OF
SPECIAL WEAPONS
SDSSE-DSW Ext: 8250

Commercial: (607) 869-xxxx
AUTOVON: 489-xxxx
FTS: Not Available

Address: Commander, Seneca Army Depot
ATTN: SDSSE-DSW
Romulus, NY 14541

MSG ID: CDR SEAD ROMULUS NY//SDSSE-DSW//

Electronic Mail: sdsse%office-8.arpa@AMC-HQ.arpa

CMD UIC: X1/WOMGAA

COMMANDER
SIERRA ARMY DEPOT
(SDSSI-CO) Ext. x666

DIRECTOR OF
SPECIAL WEAPONS
(SSDSSI-DSW) Ext. x117

Commercial: (916) 827-4xxx
AUTOVON: 830-9xxx
FTS: Not Available

Address: Commander, Sierra Army Depot
ATTN: SDSSI-DSW
Herlong, CA 96113

MSG ID: CDR SIAD HERLONG CA//SDSSI-DSW//

Electronic Mail: jbrown%office-8.arpa@AMC-HQ.arpa

CMD UIC: X1/WOMJAA

Appendix C

OSC CHECKLIST FOR INITIAL RESPONSE FORCE (IRF)

C-1. Pre-Accident Checklist for IRF

a. Review accident response plans checklists and supporting documents to ensure:

- (1) 24 hour notification rosters are current.
- (2) Primary and alternate response force members are trained.
- (3) Procedures and equipment exist for establishment of communications between on-base, off-base and remote sites.
- (4) Procedures are available for obtaining authority to release information to the public.
- (5) Memorandum of Understanding for mutual support between military and host nation response forces (i.e., police, firefighters)
- (6) Personnel/equipment deployment plans are current and functional.
- (7) Procedures for obtaining emergency repairs and fuel are adequate.
- (8) List of military and/or civilian point of contact in regions (i.e., telephone number for local police chief, mayor, etc.).
- (9) Movement of nuclear weapons versus NAIRA response responsibilities have been coordinated (i.e., who's responsible for weapons at accident site prior to arrival of OSC).
- (10) Coordinate command, control and communications efforts between different sectors of NAIRA responsibilities through which a nuclear weapon will be moving (i.e., who will have responsibility for the nuclear accident if it occurs in a sector that is not the responsibility of the commander who has custody of the nuclear weapon).

b. Inspect response force equipment and supplies to ensure current and serviceable:

- (1) Functional representative response kit.
- (2) Required maps and charts.
- (3) Radiacmeters, dosimeters and decon equipment.
- (4) Administrative equipment (typewriter, paper, tables, chairs, etc.).
- (5) Rations.
- (6) Specialized equipment.

c. Ensure response forces maintain proficiency.

- (1) Exercises at specified intervals.
- (2) Primary and alternate participation.

C-2. Immediate Action Checklist for IRF

a. Upon arrival on-scene establish a command post and:

- (1) Identify civil and military forces already present and their capabilities.
- (2) Determine what actions have been taken to treat, identify, and evacuate casualties.
- (3) Reduce any immediate hazards (such as fires).
- (4) Determine if contamination has been released.

b. Establish control of the accident site in order to:

- (1) Safeguard classified material.
- (2) Warn/protect personnel from explosive, radiological, toxic, or other hazards.

c. Establish internal and external communications, using secure means when possible.

d. If contamination is present:

- (1) Advise medical facilities receiving casualties of possible or actual contamination.
- (2) Request immediate deployment to the scene of the appropriate specialized teams (Army RADCON Team, Army RAMT, DNA Advisory Team and the DOE ARG) through DOD JNACC.

e. Determine the status and location of all weapons.

f. If authorized, advise host nation officials (OCONUS) or local and state civilian authorities (CONUS) of any possible hazards and precautions (see Chapter 11, Public Affairs).

g. Establish a positive communication link with the military communications system and civilian host nation authorities.

h. Seek the assistance and cooperation of state and local authorities.

C-3. Installation Commander Checklist (when not OSC)

a. Ensure the IRF is notified and assembled or dispatched to the scene.

b. Determine the status of situation:

- (1) Nature of accident.
- (2) Number of military and civilian medical casualties.
- (3) Property damage.
- (4) Effect on installation mission.
- (5) Effect on civilian populace.
- (6) Need for assistance.

c. Installation PAO notified.

d. Contact civil officials if accident is or will affect civilian personnel or facilities.

e. If responding to a nuclear weapon accident, notify MACOM for deployment of follow-on force.

f. Monitor on-scene actions.

g. Ensure support is provided to IRF and on-scene commander at the accident scene.

C-4. On-Scene Commander (OSC) Checklist

a. Installation Accident---Immediate Actions:

- (1) Obtain available facts about the accident.
- (2) Assemble or deploy IRF to the accident scene.
- (3) Depart to accident scene.
- (4) Make sure actions are taken to:
 - (a) Remove and treat medical casualties.
 - (b) Fight fires.
 - (c) Evacuate area.
 - (d) Establish security.
 - (e) Establish 610 meter exclusion area.
 - (f) Establish on-scene control point.
 - (g) Monitor for radiation to determine if contamination is present.

- (h) Shut down utilities as required.
- (i) Secure classified material.
- (j) Seek MACOM guidance on initial release of information to press.

b. Installation Accident--Immediate Actions:

- (1) Determine situation.
- (2) Assemble or deploy IRF to the accident.
- (3) Depart for accident scene.
- (4) Contact host nation officials (OCONUS) or local civilian authorities (CONUS) present at the accident and coordinate on-scene contamination activities. Do not confirm or deny presence of nuclear weapons until MACOM has been notified.
- (5) Make sure actions are taken to:
 - (a) Remove and treat all casualties.
 - (b) Control fires.
 - (c) Evacuate area.
 - (d) Only after assessing situation and if public health and safety is in danger, recommend to host nation official that a 610 meter exclusion area be established.
 - (e) Establish on-scene control point.
 - (f) Monitor for radiation to determine if contamination is present.
 - (g) Stop the danger or control its spread.
 - (h) Secure classified material.
 - (i) After guidance from MACOM, make initial news release. (See Chapter 11.)
- (8) Establish communication with the base to report situation. In a nuclear weapon accident, establish and maintain communications with the MACOM and IRF command post.

c. On-Scene Detailed Actions: All nonessential personnel must be directed to evacuate accident site. Coordinate with host nation officials and police to ensure civilians are at a safe distance from accident. Coordinate with host nation or civilian authorities to see that actions are taken to:

(1) Remove and treat civilian medical casualties. If it has been determined that radioactive contamination has been released, notify both military and civilian medical personnel of hazards.

(2) Fight fire using military assets if possible. Assist and coordinate with civilian fire fighting personnel if required or if they insist. Ensure security personnel are present. Advise senior civilian authorities and firefighters on need to withdraw based on possibility of high explosive detonation.

(3) Evacuate area.

(4) Coordinate with host nation or civilian authorities for security of area or 610 meter exclusion area of non-essential personnel.

(5) Establish on-scene control point with host nation Civil Defense Teams (OCONUS only-if present).

(6) Coordinate efforts of host nation Civil Defense Teams and US Military NAIRA follow-on forces to monitor for radiation.

(7) Coordinate with Installation Commander and MACOM for news releases to media.

(8) Develop plans for recovery of nuclear weapon and its components if responsibility is not being transferred to a higher headquarters.

Appendix D

ACRONYMS

AMC	US Army Materiel Command	EOC	Emergency Operations Center
AOC	Army Operations Center		
ARAC	Atmospheric Release Advisory Capability	EOD	Explosive Ordnance Disposal
ARG	Accident Response Group	EPA	Environmental Protection Agency
ASD(PA)	Assistant Secretary of Defense (Public Affairs)	EUCOM	European Command
ATSD(AE)	Assistant to the Secretary of Defense (Atomic Energy)	FCDNA	Field Command, Defense Nuclear Agency
CBC	Coulter Blood Count	FEMA	Federal Emergency Management Agency
CCA	Contamination Control Area		
CCL	Contamination Control Line	FONAC	Flag Officers' Nuclear Accident Course
CCS	Contamination Control Station		
CGY	Centi-Gray		
CONUS	Continental United States		
CP	Command Post	HQDNA	Headquarters, Defense Nuclear Agency
CPM	Counts Per Minute	HSSP	Health Service Support Plan
CPX	Command Post Exercise		
DESCOM	US Army Depot Systems Command	INWS	Interservice Nuclear Weapons School
DNA	Defense Nuclear Agency	IRF	Initial Response Force
DOD	Department of Defense	JA	Judge Advocate
DOE	Department of Energy	JCS	Joint Chiefs of Staff
DOS	Department of State	JIC	Joint Information Center
ED	Emergency Destruction		
ECP	Entry Control Point	JNACC	Joint Nuclear Accident Coordinating Center

LNEA	Local National Exclusion Area	SCBA	Self Contained Breathing Apparatus
NAICO	Nuclear Accident/Incident Control Officer	SENAC	Senior Executive Nuclear Accident Course
NAIRA	Nuclear Accident and Incident Response and Assistance	SONAC	Senior Officers' Nuclear Accident Course
NARCL	Nuclear Accidents Response Capability Listing	SRF	Service Response Force
NARP	Nuclear Weapon Accident Response Procedures	US-CINCEUR	United States Commander in Chief, Europe
NASP	Nuclear Ammunition Supply Point	Ci/m ³	Microcuries Per Cubic Meter
NCA	National Command Authority		
NUWAX	Nuclear Weapon Accident Exercise		
OASD(PA)	Office of the Assistant Secretary of Defense (Public Affairs)		
OCONUS	Outside Continental United States		
OSC	On-Scene Commander		
PAO	Public Affairs Officer		
RADCON	Radiological Control		
RAMT	Radiological Advisory Medical Team		
RCA	Radiological Control Area		
RCL	Radiological Control Line		
REM	Roentgen Equivalent Man/Mammal		
RRF	Regional Response Force		
RSP	Render Safe Procedures		

Appendix E

RADIOLOGICAL CONTROL FORMS

E-1. Personnel Data Form. The Personnel Data Form is kept at the entry control point to the contamination control station. This form must be kept for all personnel who enter into the accident area. Figure G-1 shows a Personnel Data Form.

E-2. Radiological Control Area Log. This form is used at the contamination control station to monitor entry/exit of personnel into accident area. It should be kept at the entry control point so that an accurate record of radiation exposure can be recorded for each person who exits the accident site. Figure G-2 shows a Radiological Control Area Log.

E-3. Nuclear Accident Response Capability Report. Just as important as keeping up to date records at the scene of a nuclear accident is keeping unit nuclear accident response capabilities current. This report is controlled by the Joint Nuclear Accident Coordinating Center (JNACC) at the Defense Nuclear Agency. The JNACC is the central agency for the collection, compilation, and maintenance of a Nuclear Accident Response capability listing (NARCL) and for coordination of assistance activities in the event of an accident or incident involving radioactive materials. Each US Army unit must support the JNACC by furnishing team/equipment capabilities existing within their organizations that could be called upon in the event of an accident involving radioactive materials. DD Form 2325 shown at Figure G-3 should be completed and forwarded to the JNACC when a NAIRA capability is achieved, discontinued, or changed, and annually as of 1 July. Information should be submitted directly to: Director, Defense Nuclear Agency, ATTN: OPOC, Washington D.C., 20305-1000

PERSONAL DATA FORM

(Please print or place "X" in boxes as appropriate)
See Reverse for Additional Instructions

(1) SOC SEC NO _____ (2) NAME _____ (3) BIRTH DATE _____
(last) (first) (m.i.) (day)(month)(yr)

(4) MALE or FEMALE

(5A) MILITARY or (5B) CIVILIAN

(6) USA (7) GRADE _____ (9A) DOO (9B)

USA	<input type="checkbox"/>
USAF	<input type="checkbox"/>
USN	<input type="checkbox"/>
USMC	<input type="checkbox"/>
OTHER	<input type="checkbox"/>

 (10) GRADE _____ (11) SERIES _____
 USAF (8) SPECIALITY CODE _____ or NEC/DESIGNATOR _____ DOE GRADE _____ SERIES _____
 USN OTHER _____ DOE GRADE _____ SERIES _____
 USMC OTHER _____ PROFESSION AGENCY _____
 OTHER _____ (Specify)

- | | (Yes) | (No) |
|--|--------------------------|--------------------------|
| (12) HAVE YOU EVER WORN A FILM BADGE OR OTHER DOSIMETRIC DEVICE? | <input type="checkbox"/> | <input type="checkbox"/> |
| (13) HAVE YOU EVER BEEN CLASSIFIED AS A "RADIATION WORKER"? | <input type="checkbox"/> | <input type="checkbox"/> |
| (14) HAVE YOU HAD TRAINING IN RESPIRATORY PROTECTION EQUIPMENT (MASK)? | <input type="checkbox"/> | <input type="checkbox"/> |
| (15) HAVE YOU WORKED IN ANTI-CONTAMINATION CLOTHING AND RESPIRATORS? | <input type="checkbox"/> | <input type="checkbox"/> |
| (16) HAVE YOU RECEIVED A SIGNIFICANT DOSE OF RADIATION WITHIN THE LAST YEAR? | <input type="checkbox"/> | <input type="checkbox"/> |
| (17) HAVE YOU BEEN BRIEFED ON PROCEDURES FOR WORKING IN A CONTAMINATED AREA? | <input type="checkbox"/> | <input type="checkbox"/> |

(18) YOUR ORGANIZATION/BUSINESS ADDRESS: _____
(Unit/Employer Name or Symbol) (Street, P.O. Box, Mail Stop, etc.)

(City or Military Base) (State or County) (ZIP Code)

(19) UNIT RESPONSIBLE FOR RECORDING YOUR RADIATION DOSIMETRY RESULTS _____
(Place "X" if unknown)

(20) YOUR ORGANIZATION/BUSINESS TELEPHONE _____
(Area Code and Number)

(Signature) (Date)

FOR RAD HEALTH CENTER USE
FILM BADGE NO _____
EXTERNAL DOSE _____
INTERNAL DOSE _____

PERSONAL DATA FORM ACCOUNTING NUMBER

THIS FORM SUBJECT TO THE PRIVACY ACT.

Figure E-1 Personal Data Form

PERSONAL DATA FORM
INSTRUCTIONS FOR NON-SELF EXPLANATORY ITEMS

ITEM	COMMENT
3	Show day and year as numerical and month as alphabetical; e.g., 23 Jan 65 or 01 Jun 42.
5	Check either 5A or 5B.
6	Foreign military and US Coast Guard check "OTHER."
7	Show alphabetical/numerical grade; e.g., E3 or O5, rather than rank; e.g., PFC or CDR.
8	Show "MOS," "NEC," "AFSC," etc., of your current duty assignment.
9B	Civilians with DOD agencies check "DOD" and appropriate service or "OTHER."
10	DOD and DOE employees show pay schedule and level; e.g., GS-10, SES-79.
11	US government civilians other than DOD or DOE, show grade and series for profession; other civilians give short title for profession; e.g., health phys, rad monitor, or comp programmer.
12	Check "YES" if you were monitored by thermoluminescent dosimeter; i.e., TLD; check "YES" if you worked with soft beta emitters and were monitored by some means other than film badge or TLD.
13	Check "YES" if an occupationally exposed individual or radiation worker.
14	Check "YES" if trained in use of M17 or M17A protective masks.
15	Check "YES" if anti-C work was participation in training courses with or without actual radioactive contamination.
16	Check "YES" if you underwent medical treatment involving radiation or radioactive materials, if your occupational exposure is near permissible limits and/or if an accident response dose report is necessary to continue your regular radiation work.
19	Following codes may be used: "R" for Radiological Safety Officer or Radiological Protection Officer, "M" for Medical Department, "C" for Commander, "F" for USAF Master Radiation Registry.
20	In lieu of commercial number, show "AVN" for AUTOVON or "FTS" for Federal Telecommunications System.

RADIOLOGICAL CONTROL AREA LOG

DATE _____ PAGE _____ OF _____

TIME _____

RECORDER _____

SSN _____

SOC SEC NO		NAME (LAST, FIRST, M.I.)																		CONTROL NUMBER	FILM BADGE NUMBER	DOSIMETER IN	DOSIMETER OUT	TIME IN	TIME OUT	FULL PROTECTION	NO RESPIRATOR	STREET CLOTHES	CONTAMINATION FOUND	DECONTAMINATED	REMARKS																																																
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80

THIS FORM SUBJECT TO THE PRIVACY ACT.

Figure E-2 Radiological Control Area Log

INSTRUCTIONS FOR THE USE OF THE RADIOLOGICAL CONTROL AREA LOG

- a. Column 71 should be marked with an X if the person was wearing full anti-contamination clothing and a respirator.
- b. Column 72 should be marked with an X if the person was wearing anti-contamination clothing without a respirator, or street clothing without a respirator.
- c. Column 73 should be marked with an X if the person was wearing street clothing.
- d. Column 75 should be marked with a Y if contamination was found on body or personal clothing when exiting the control area. If no contamination was detected leave blank.
- e. Column 76 should be marked with a Y if all detected contamination was removed from the person, N if not and remarks are mandatory. If no contamination was detected leave blank.
- f. Any unusual incidents or additional data deemed important for radiological safety should be described in the remarks section and sequentially numbered. The number should be indicated in Columns 77-80. Remarks may also be used to indicate when recorders change in mid sheet. If personal clothing was confiscated during decontamination, articles taken should be noted in remarks.
- g. Each day should be started with a new form and the total number of pages entered on each sheet of the previous days forms.

F-6

1. LG
3. RP
6. A
7. B
8. G
9. T
10.
11.
12.
13.
14.
30.

DD

1. LOCATION (Military Installation and Nearest Town)		2. SERVICE CODE		REPORT CONTROL SYMBOL	
3. REPORTING ORGANIZATION (Military Designation)		4. MAJOR COMMAND		5. DATE PREPARED (YYMMDD)	
INSTRUCTIONS: ¹ Indicate capability by "X" even if only partial. ² Indicate number available.					
6. ALPHA MONITORING CAPABILITY	¹	15. REACTOR SPECIALISTS	²	21c. PG-2 INSTRUMENT PROBES	¹
BETA MONITORING CAPABILITY	¹	16. HEALTH PHYSICISTS	²	22. AERIAL SURVEY CAPABILITY (With radiac instruments)	¹
8. GAMMA MONITORING CAPABILITY	¹	17. WEAPON DESIGN SPECIALISTS	²	23. HELICOPTER TRANSPORTATION	¹
9. TRITIUM MONITORING CAPABILITY	¹	18. MEDICAL PERSONNEL (Radiologically Trained)	²	24. AIR TRANSPORTABLE RADIO- LOGICAL ASSISTANCE PACKAGE	¹
10. EOD CAPABLE	¹	19. PUBLIC AFFAIRS SPECIALISTS	²	25. MULTI-CHANNEL ANALYZER	¹
11. AIR SAMPLING CAPABILITY	¹	20. LEGAL REPRESENTATIVES	²	26. SELF-CONTAINED BREATHING APPARATUS	¹
12. DECONTAMINATION CAPABILITY	¹	21. PRM-5 RADIAC INSTRUMENTS	²	27.	
13. EOD UNDERWATER CAPABLE	¹	21a. FIDDLER INSTRUMENT PROBES	²	28.	
14. PHYSICAL SECURITY FORCES	¹	21b. SPA-3 INSTRUMENT PROBES	²	29.	
30. DUTY HOURS TELEPHONE CONTACT (AUTOVON, Commercial, WATS, etc.)	31. NON-DUTY HRS TELEPHONE CONTACT		32. EMERGENCY TELEPHONE CONTACT		33. REMARKS (Report Unique Response Capability not covered by above items on reverse).

Form 2325, 84 FEB

NUCLEAR ACCIDENT RESPONSE CAPABILITY REPORT

Figure E-3. Nuclear Accident Response Capability Report

REFERENCES

Related Publications

Related publications are sources of additional information. They are not required in order to understand this publication.

Army Regulations (ARs)

- 15-22 Nuclear Weapon Accident Investigation Board
- 27-20 Legal Services - Investigating and Processing of Claims
- 40-13 Medical Support NAIC
- 40-14 Control/Recording Procedures for Occupational Exposure to Ionizing Radiation
- ✓ 50-57 Nuclear Surety
- 50-115 Safety Rules for Army Nuclear Weapons
- ✓ 55-207 Movement of Nuclear Weapons, Components and Nuclear Weapons Material
- 75-14 Interservice Responsibilities for Explosive Ordnance Disposal
- 75-15 Responsibilities and Procedures for Explosive Ordnance Disposal
- N/A 360-51 Public Information
- 380-150 Access to and Dissemination of Restricted Data
- 385-40 Accident Reporting and Records
- 420-90 Fire Prevention and Protection
- 700-65 Nuclear Weapons and Nuclear Weapons Materiel
- 755-15 Disposal of Unwanted Radioactive Materiel

Field Manuals (FMs)

- 3-3 NBC Contamination Avoidance
- 3-4 NBC Protection
- 3-5 NBC Decontamination
- 3-100 NBC Operations
- 3-101 Chemical Staffs and Units
- ✓ 8-9 NATO Handbook for Medical Service Personnel
- N/A 9-157 Explosive Ordnance Disposal (EOD) Unit Operations
- FC 19-152 Special Reaction Teams Operational Concepts/Training
- 100-50 Operations for Nuclear Capable Units

Technical Bulletins (TBs)

- ✓ 385-2 Nuclear Weapons Firefighting Procedures

Technical Manuals (TMs)

- 5-225 Radiological and Disaster Recovery at Fixed Installations
- ✓ 5-315 Firefighting and Rescue Procedures in Theaters of Operations
- N/A 8-215 Nuclear Handbook for Medical Service Personnel
- ✓ 9-1100-816-14 Emergency Destruction of Nuclear Weapons (WC/2)
- ✓ 9-1100-816-40 Nuclear Weapons Expendable

Technical Manuals (TMs) (cont)

* 9-1185-217 EOD Procedures for Nuclear Weapons
9-1185-219 EOD Procedures for Incident and Accident Hazards
39-20-11 General Firefighting Guidance

Department of the Army Pamphlets

DA PAM 39-3 Effects of Nuclear Weapons
DA PAM 360-5 Army Information Officer's Guide

DOE and DOD Directives

DOD 1000.9 Mishap Investigation, Reporting and Record Keeping
DOD 3025.1 Use of Military Resources During Peacetime Civil
Emergencies Within The United States, Its Territories
and Possessions
DOD 5010.16-C Defense Management Education and Training Program
* DOE 5530.1 Response to Accidents and Significant Incidents
Involving Nuclear Weapons
* DOD 5100.52 Radiological Assistance in the Event of an Accident
Involving Radioactive Materials
* DOD 5100.52 TG Planners Procedures and Response Guide for Accidents
Involving Nuclear Weapons
DOD 5200.1 Information Security Program Regulation
DOD 5200.8 Authority of Military Commander under the Internal
Security Act of 1950 to Issue Security Orders and
Regulations for the Protection of Property or Places
Under their Command
DOD 5210.2 Access to and Dissemination of Restricted Data
DOD 5210.41 Security Criteria and Standards for Protecting Nuclear
Weapons
DOD 5210.41M Nuclear Weapons Security Manual
DOD 5230.16 NAIC Public Affairs Guidance
DOD 7730.12 Notification Procedures for Accidents and Significant
Incidents Involving Nuclear Weapons, Reactors, and
Radioactive Materials
* DNA 5100.J NARP-Nuclear Weapon Accident Response Procedures
DNA 5100.52.TL Nuclear Accident Response Capability Listing
DNA TP 0-1A Numerical Index to Joint Nuclear Weapons Publications

Other

UR 50-100 USAREUR Nuclear Surety (NATO CONFIDENTIAL)
ED 15-1 Public Affairs Policies and Procedures
ED 15-5 Public Affairs, Nuclear Accident/Incident Public Affairs
Guidance
ED 60-10 EUCOM Utilization of Nuclear Weapons in Allied Command
Europe
* AF 355-1 Air Force Disaster Preparedness-Planning and Operations
* AF 355-2 Air Force Nuclear Accident Response and Recovery Plan
USCINCEUR

Other (cont)

✓ ~~CONPLAN 4367-87~~

Peacetime Response to Nuclear Weapons Accident or Incident

ACE DIRECTIVE
80-6, Vol 2

Nuclear Accident/Incident Control (NAIC) (USEUCOM 60-10)

~~NUWAX 83~~

Nuclear Weapon Accident Exercise 1983 - After Action Report

* ~~SREF 85~~

Service Response Force Exercise 1985 - After Action Report

* ~~SREF 86~~

Service Response Force Exercise 1986 - After Action Report

GLOSSARY

Airborne Radioactivity. Any radioactive material suspended in the atmosphere.

Air Sampler. A device used to collect a sample of the radioactive particulates suspended in the air.

Alpha Team. An Army team possessing an alpha radiation monitoring capability. They are usually identified as part of a Nuclear Accident and Incident Control (NAIC) Team.

Background Count. (In connection with health protection.) The background count usually includes radiation produced by naturally occurring radioactivity and cosmic rays.

Background Radiation. Radiation arising from radioactive material other than the one directly under consideration. Background radiation due to cosmic rays and natural radioactivity is always present.

Contamination. The deposit and/or absorption of radioactive material, biological, or chemical agents on, and by, structures, areas, personnel, or objects.

Contamination Contour Lines. The limits of radioactive contamination extending outward from the accident site.

Contamination Control. Procedures to avoid, reduce, remove, or render harmless, temporarily or permanently, nuclear, biological, and chemical contamination for the purpose of maintaining or enhancing the efficient conduct of military operations.

Contamination Control Line. The inner boundary of the contamination control station.

Contamination Control Station (CCS). An area specifically designated for permitting ingress and egress of personnel and equipment to/from the radiation control area. The outer boundary of the Contamination Control Station is the radiological control line, and the inner boundary is the line segment labeled the contamination control line. An illustration of the Contamination Control Station is at Figure 8-2.

Decontamination. The process of making any person, object, or area safe by absorbing, destroying, neutralizing, making harmless, or removing chemical or biological agents, or by removing radioactive material clinging to or around it.

Disintegration (dis/sec). A measurement means by which the process of spontaneous breakdown of a nucleus of an atom resulting in the emission of a particle and/or a photon occurs.

Exclusion Area. Any designated area containing one or more nuclear weapons or components. During initial phase of a nuclear weapon accident/incident, it consists of a 610 meter (2000 ft) radius around the accident/incident site.

Explosive Ordnance Disposal (EOD). The detection, identification, field evaluation, rendering-safe, and/or disposal of explosive ordnance which have become hazardous by damage or deterioration when the disposal of such ordnance is beyond the capabilities of personnel normally assigned the responsibility for routine disposal.

Federal Emergency Management Agency (FEMA). This agency establishes federal policies for and coordinates all civil defense and civil emergency planning, management, mitigation, and assistance functions of executive agencies. FEMA assists local and state agencies in their emergency planning. Its primary role in a nuclear weapon accident is one of coordinating federal, state, local, and volunteer response actions.

Fidler (Field Instrument for the Detection of Low Energy Radiation). A probe, used with the PRM-5 and other supporting instrument packages, capable of detecting low energy gamma and x-rays.

Film Badge. A photographic film packet to be carried by personnel, usually in the form of a badge, used for measuring and permanently recording gamma ray dosage.

Host Nation - (DOD, NATO). A nation which receives the forces and/or supplies of allied nations and/or NATO organizations to be located on, or to operate in, or to transit through its territory.

Host Nation Support - (NATO). Civil and military assistance rendered in peace and war by a host nation to allied forces and NATO organizations which are located on or in transit through the host nation's territory. The basis of such assistance is commitments arising from the NATO Alliance or from bilateral or multilateral agreements concluded between the host nation, NATO organizations and (the) nation(s) having forces operating on the host nation's territory.

Hotline. A line separating the area of known contamination from the contamination reduction area.

Initial Response Force (IRF). Is the nearest military installation, regardless of size, who has the mission to respond to a nuclear accident or incident to take immediate emergency measures, and to provide federal presence and humanitarian support.

Joint Information Center (JIC). A facility established at the scene of a nuclear weapon accident or significant incident to coordinate all public affairs activities. The JIC will include representation from DOE, DOD, FEMA, and other federal agencies, as well as state and local governments.

Joint Nuclear Accident Coordinating Center (JNACC). A combined Defense Nuclear Agency and Department of Energy centralized agency for exchanging and maintaining information concerned with radiological assistance capabilities and coordinating assistance activities.

Local National Exclusion Area (LNEA). An area established on foreign land for the purpose of safeguarding classified defense information, or protecting US equipment and/or material. Establishment of a LNEA temporarily places such land under the effective control of US and Local National Authorities and results only from an emergency event. The senior US representative in coordination with senior diplomat representatives at the scene will define the boundary, mark it with a physical barrier, and post warning signs. The land owner's consent and cooperation will be obtained whenever possible; however, host nation necessity will dictate the final decision regarding location, shape, and size of the LNEA.

Monitoring. The act of detecting the presence (or absence) of radiation and the measurement thereof with radiation measuring instruments.

National Defense Area (NDA). An area established on non-federal lands located within the United States, its possessions or territories, for the purpose of safeguarding classified defense information, or protecting Department of Defense equipment and/or material. Establishment of a National Defense Area temporarily places such non-federal lands under the effective control of the Department of Defense and results only from an emergency event. The senior Department of Defense representative at the scene will define the boundary, mark it with a physical barrier, and post warning signs. The land owner's consent and cooperation will be obtained whenever possible; however, military necessity will dictate the final decision regarding location, shape, and size of the NDA.

Nuclear Accident and Incident Control Officer (NAICO). An Army officer designated by the commander responsible for Nuclear Accident and Incident control to represent the commander at the scene of a nuclear weapon accident of significant nuclear weapon incident, and to act as on-scene commander during the absence of the appointed on-scene commander.

Nuclear Radiation. Particulate and electromagnetic radiation emitted from atomic nuclei in various nuclear processes. The important nuclear radiations, from the weapons standpoint, are alpha and beta particles, gamma rays, and neutrons. All nuclear radiations are ionizing radiations, but the reverse is not true.

Nuclear Weapon Accident. An unexpected event involving nuclear weapons or radiological nuclear weapon components that result in any of the following:

- a. Accidental or unauthorized launching, firing, or use by US Forces or US-supported Allied Forces, of a nuclear-capable weapon system which could create the risk of an outbreak of war.
- b. Nuclear detonation.
- c. Non-nuclear detonation or burning of a nuclear weapon or radiological weapon component.
- d. Radioactive contamination.

e. Seizure, theft, loss, or destruction of a nuclear weapon or radiological nuclear weapon component, including jettisoning.

f. Public hazard, actual or implied.

Nuclear Weapon Accident/Significant Incident Assistance. That assistance provided after an accident or significant incident involving nuclear weapons or radiological nuclear weapon components to:

a. Evaluate the radiological hazard.

b. Accomplish emergency rescue and first aid.

c. Minimize safety hazards to the public.

d. Minimize exposure of personnel to radiation and/or radioactive material.

e. Establish security, as necessary, to protect classified government material.

f. Minimize the spread of radioactive contamination.

g. Minimize damaging effects on property.

h. Disseminate technical information and medical advice to appropriate authorities.

i. Inform the public (as appropriate) to minimize public alarm and to promote orderly accomplishment of emergency functions.

j. Support recovery operations of damaged weapons or weapon components.

k. Support the removal of radiological hazards.

Nuclear Weapon Incident. An unexpected event involving a nuclear weapon, facility, or component resulting in any of the following, but not constituting a nuclear weapon(s) accident:

a. An increase in the possibility of explosion or radioactive contamination.

b. Errors committed in the assembly, testing, loading, or transportation of equipment, and/or the malfunctioning of equipment and material which could lead to an unintentional operation of all or part of the weapon arming and/or firing sequence, or which could lead to a substantial change in yield, or increased dud probability.

c. Any act of God, unfavorable environment, or condition resulting in damage to a weapon, facility, or component.

Nuclear Weapon Significant Incident. An unexpected event involving nuclear weapons or radiological nuclear weapon components which does not fall in the nuclear weapon accident category but:

a. Results in evident damage to a nuclear weapon or radiological nuclear weapon component to the extent that major rework, complete replacement, or examination or recertification by the DOE is required.

b. Requires immediate action in the interest of safety or nuclear weapons security.

c. May result in adverse public reaction (national or international) or premature release of classified information.

d. Could lead to a nuclear weapon accident and warrants that high officials or agencies be informed or take action.

One-Point Detonation. A detonation of HE (High Explosives) which is initiated at a single point.

One-Point Safe. The criterion for design safety that a weapon must have less than one chance in a million of producing a nuclear yield of more than 4 pounds of TNT (equivalent energy release) when the high explosive is initiated and detonated at any single point.

On-Scene Commander. The person designated to command the rescue efforts at the rescue site.

On-Site. That area around the scene of a nuclear weapon accident or significant incident that is under the operational control of the installation commander, facility manager, DOD on-scene commander, or DOE team leader. The on-site area includes any area which has been established as an NDA or NSA.

Oralloy. Enriched uranium. One of the primary fissionable materials used in nuclear weapons.

Physical Security. That part of security concerned with physical measures designed to safeguard personnel, and to prevent unauthorized access to equipment, facilities, material, and documents.

Plutonium (Pu). An artificially produced fissile material. The Pu-239 isotope is used primarily in nuclear weapons.

Rad. Unit of absorbed dose radiation. One rad represents the absorption of 100 ergs of nuclear (or ionizing) radiation per gram of the absorbing material or tissue.

RADIAC. A term devised to designate various types of radiological measuring instruments or equipment. This term is derived from the words "radioactivity detection indication and computation," and is normally used as an adjective.

Radiological Advisory Medical Team (RAMT). A special team established at Walter Reed Medical Center under the Commander, US Army Health Service Command, which is available to the on-scene commander, Nuclear Accident and Incident Control Officer, or Commander of a military hospital. Team personnel will advise on radiological health hazards and exposure level criteria.

Radiological Control Area (RCA). The control area encompassing all known or suspected radiological contamination at a nuclear weapon accident.

Radiological Control (RADCON) Team. Special radiological teams of the US Army and US Navy that are organized to provide technical assistance and advice in radiological emergencies.

Radiological Survey. The directed effort to determine the distribution of radiological material and dose rates in radiological emergencies.

Radionuclide. A radioactive atomic particle distinguished by the composition of its nucleus (i.e., by the number of protons and the number of neutrons).

Roentgen. A unit of exposure of gamma (or X-ray) radiation in field dosimetry. One roentgen is essentially equal to one rad.

Rough Point Survey. A hasty radiological surveying technique where the area surrounding a nuclear accident site is monitored at four to eight points to determine the presence or absence of any radiological contamination.

Service/Agency Response Force (SRF). A DOD or DOE response force that is appropriately manned, equipped, and capable of performing the initial response force tasks and coordinating all actions necessary to effectively control and recover from an accident or significant incident. The specific purpose of a Service/agency response force is to be able to provide nuclear weapon accident/significant incident assistance. Service/agency response forces are organized and maintained by those Services and agencies which have custody of nuclear weapons or radioactive nuclear weapon components.

Tritium. Tritium is a radioactive isotope of hydrogen having one proton and two neutrons in the nucleus. Tritium is a beta emitter.

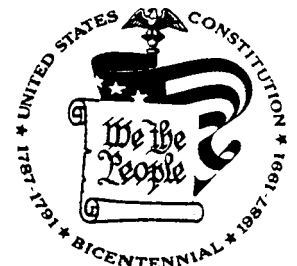
Tuballoy (TU). A term, British origin, for uranium metal containing U-238 and U-235 in natural proportions; therefore, the term is considered ambiguous and its use is discouraged. This term is sometimes applied to depleted uranium.

Uranium. Uranium is a heavy, silvery white, radioactive metal. In air, the metal becomes coated with a layer of oxide that will make it appear from a golden-yellow color to almost black. Uranium is an alpha emitter.

Warhead. That part of a missile, projectile, torpedo, rocket, or other munition which contains either the nuclear or thermonuclear system, high explosive system, chemical or biological agents, or inert materials intended to inflict damage.

Weapon Debris (nuclear). The residue of a nuclear weapon after it has exploded; that is, the materials used for the casing, and other components of the weapon, plus unexpended plutonium or uranium, together with fission products, if any.

Weapons Recovery. Includes a comprehensive assessment of the accident, neutralizing the weapon hazards, and removing, packaging, and shipping of the weapon hazards.



Glossary-7