CHAPTER 1

INTRODUCTION

1-1 GENERAL

DoD Directive 5100.52, reference (a), provides response guidance and the following definitions:

a. A Nuclear Weapon Accident is:

"An unexpected event involving nuclear weapons or nuclear components that results in any of the following:

(I) Accidental or unauthorized launching, firing, or use by U.S. forces or U.S. supported allied forces of a nuclear capable weapons system. "

(2) An accidental, unauthorized, or unexplained nuclear detonation.

(3) Non-nuclear detonation or burning of a nuclear weapon or nuclear component.

(4) Radioactive contamination.

(5) Jettisoning of a nuclear weapon or nuclear component.

(6) Public hazard, actual or perceived.

b. A Nuclear Weapon Significant Incident is:

"An unexpected event involving nuclear weapons, nuclear weapon components, or a nuclear weapon transport or launch vehicle when a nuclear weapon is mated, or loaded on board that does not fall in the nuclear weapon accident category but:

(1) 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.

(2) Requires immediate action in the interest of safety or nuclear weapons security.

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

(4) Could. lead to a nuclear weapon accident and warrants that senior national officials or agencies be informed or take action. "

This directive also directs the Defense Nuclear Agency (DNA) to develop a technical document for nuclear weapon accident response. The Nuclear Weapon Accident Response Procedures (NARP) manual has been developed for this requirement. This manual summarizes DoD responsibilities and provides procedural guidance for a joint response to accidents involving nuclear weapons or components thereof in the United States and its territories or possessions. General guidance for overseas areas is included.

1-2 PURPOSE AND SCOPE OF THE NARP

This manual consolidates procedural guidance and technical information to assist DoD forces in preparing for nuclear weapon accident response and in responding to a DoD nuclear weapon accident. The document is designed to standardize where appropriate and integrate DoD methods with Department of State (DoS) procedures, the Federal Radiological Emergency Response Plan (FRERP), and DoE Accident Response Group (ARG) responsibilities/ procedures. Portions of the document may be useful to DoD elements responding to non-DoD radiological accidents or incidents under current interagency support agreements.

Procedures will not be addressed for response to accidental or unauthorized launching, firing, or use of a nuclear capable weapon system, or for response and recovery of seized or stolen weapons. This manual is designed to furnish a general approach to nuclear weapon accident response. The procedures must be used in conjunction with DoD directives, Federal instructions, State/ local plans, international/ bilateral agreements and theater policy to be effective.

1-3 ORGANIZATION AND USE OF THE NARP

This chapter introduces the NARP and provides checklists for On-Scene Commanders (OSCs) and their staffs. Chapters 2 and 3 describe responsibilities" of the DoD and other Federal agencies and provide general information on foreign governments' responsibilities/ capabilities in nuclear weapon accident response/ recovery. Chapter 4 discusses the concept of operations for response and recovery procedures, while Chapters

5 through 14 address radiological/hazardous material safety aspects, communications, security, medical assistance, weapons recovery, public affairs, logistics support, legal implications, and site restoration. Chapter 20 lists specialized units and organizations discussed throughout the document. Chapter 21 addresses training.

Potential OSCS and their staffs will enhance their ability to respond to a nuclear weapon accident by gaining familiarity with this manual.

1-4 NUCLEAR WEAPON ACCIDENT RESPONSE OVERVIEW

In a nuclear weapon accident, health and safety, public affairs, classified information security, and weapons recovery are the critical concerns facing the response force. Other aspects, such as medical assistance, security, logistics, legal implications, site restoration, communications and response force integration are areas that must also be addressed.

a. Health and Safety. A nuclear weapon accident can result in an immediate, but temporary, nonradiological threat to public safety from toxic or explosive hazards associated with the accident. Also, contamination may be released that could create long term public health concerns. Rapid initial safing actions on the nuclear weapons involved in the accident are the highest priority so that subsequent detonations and site contamination will not occur. Should conventional explosives in the weapon detonate, radiological contamination may exist. If the weapon is breached by external forces (for example, impact,_ fuel fire /explosion) there may be radiological contamination. Rapid determination of the presence or absence of radiological contamination is a critical element of initial accident response. Air sampling for radiation downwind of the accident may not be feasible because once the explosion and/ or fire is over, the resultant contamination may settle or disperse in a few hours. Initial ground radiation surveys will probably be the means of determining the presence/ absence of contamination. If a radiological problem exists, or is caused during weapon recovery operations, specialized Federal, state, and local radiological response teams will be required to define extent of contamination, protect the public, and return the area to normal use.

(1) Radiological Safety. The primary hazards associated with a nuclear weapon accident, unless the accident involves a nuclear yield, are materials which emit alpha radiation. Therefore, measures should be implemented to prevent alpha radiation from entering the body. Radiation hazards and basic radiation protection principles are described in Appendix l-F. If radioactive contamination occurs as a result of the accident, the first radiological response should be to identify the initially affected area and personnel, minimize any continuing radiological hazard to residents, and characterize the site contamination. Action to accomplish these tasks should be included in response force accident procedures/plans. In general, the extent of contamination is over-estimated initially to provide the greatest margin of safety for the public and then refined as actual measurement of contamination is obtained. The response force must obtain factual information to define the actual details of the contamination problem. The procedures/ plans will identify limitations on the response organization's capability to perform such actions and will state additional resource requirements, their availability, and how additional resources will be employed. Specific actions to resolve the radiological problem include

(a) Estimate the boundaries of radiological contamination using the Atmospheric Release Advisory Capability (ARAC), if available.

(b) Disseminate precautionary/ protective measures to be taken by residents in potentially contaminated areas, for example, notification, sheltering, or evacuation.

(c) Identify, monitor, and decontaminate, if necessary, personnel at the accident scene and first responders who may have already departed the accident scene.

(d) Establish" a radiological controls program to limit radiation exposures to personnel.

(e) Determine the various levels of contamination present within the contaminated area.

(f) Establish a bioassay program to quantify radiation doses, if required.

(g) Fix highly contaminated areas as appropriate to minimize resuspension.

(2) Hazardous Materials Response. An accident involving a weapon system can release non-nuclear hazardous materials, for example, high explosives, heavy metals, propellants, oxidizers, and plastics. Response procedures must include evacuation or sheltering recommendations to local officials and identifying, marking and containing of hazardous/toxic materials.

(3) Site Decontamination/ Restoration. Restoring a contaminated area may include removing, diluting, or fixing contamination at levels which are not detrimental

to health over a lifetime of exposure, and which will be technically achievable and financially acceptable. This process will be the most time consuming portion of nuclear weapon accident response and will be a coordinated Federal, State, local and/ or involved country government effort. It will involve preparation of protective measures, reentry recommendations and development of restoration procedures. One of the most difficult steps will be selection of criteria to determine when site restoration is complete. Many of the legal claims against the government will be related to the site restoration process; consequently, actions must be accurately documented.

b. Public Affairs. Public Affairs encompasses much more than the release of information to the public. The relationships of the OSC, his staff, and his public affairs officials with the news media and the general public is an important element in a comprehensive public affairs program designed to gain public understanding of accident response efforts.

(1) Public concerns which can be expected following an accident with a nuclear weapon include:

(a) Danger to those involved in or responding to the accident;

(b) Treatment of casualties;

(c) Credibility of information provided concerning the accident and its long term effects;

(d) Precautions to be taken by those in contaminated areas with regard food, water, livestock safety;

(e) Adequacy of contamination diagnoses and effects on the health of any persons exposed to contamination;

(f) Availability of shelter, food, water, and clothing if the accident situation results in people being evacuated from their homes, and security of their possessions;

(g) Safety of U.S. nuclear weapons;

(h) Decontamination of contaminated areas;

(i) Reparations for damages caused by the accident.

(2) DoD Directive 5230.16, reference (b), states that, in general, it is DoD policy neither to confirm nor deny the presence or absence of nuclear weapons at a specific location. The OSC is authorized to invoke two exceptions:

(a) First, confirmation of the presence of a nuclear weapon is appropriate when public safety is endangered.

(b) Second, the OSC may confirm or deny the presence of the weapon, as necessary, to allay public alarm.

(c) No other variations from DoD policy are authorized. If the exceptions are invoked, confirmation of the presence of the weapon should be made as soon as possible to preclude undue public concern and to establish response force credibility. The Assistant Secretary of Defense (Public Affairs) (ASD(PA)) and local government officials should be notified in advance or advised as soon as possible that an exception has been invoked.

(d) In locations outside the United States, its territories, and possessions, unless bilateral agreements exist, the OSC must have the concurrence of the appropriate theater Commander-in-Chief (CINC) and the approval of the host government through the U.S. Chief of Mission (COM), prior to exercising the exceptions above.

c. Weapon(s) Recovery. All nuclear weapon accidents will, by definition, have some form of weapon problem. Security and weapon safety concerns should not preclude or interfere with the performance of basic medical and humanitarian response to accident victims. Public affairs and health issues must be addressed concurrently with the weapon recovery effort. The weapon presents both a technical problem to be addressed by Explosive Ordnance Disposal (EOD) personnel and the DoE ARG and a need for appropriate security for the weapon and its components. Safety and security procedures for nuclear weapons are documented in EOD and security publications. Weapons involved in an accident may have been subjected to severe stress; consequently, as much time as necessary should be taken to permit a thorough assessment of possible damage by qualified EOD and DoE response personnel. (Through documented planning and close coordination between EOD and DoE ARG, the OSC can ensure safe removal, packaging, and shipment of weapon(s) and/or weapon components to their final destination.) If the high explosives detonate during the accident, or detonate during recovery operations, searching for classified and hazardous components may be necessary. Coordination between EOD, weapon recovery, and radiological response personnel is essential to minimize risk to personnel.

d. Response Forces Integration and Coordination and Associated Areas of Concern. From the initial report of the accident until the final actions of site restoration, several organizations, both within and without the DoD, will be involved in the response effort. The extent of involvement and degree of responsibility are situation

dependent, but all forces must be integrated totally to ensure effective use of their capabilities. Following initial identification of arriving response teams, an exchange of briefings should occur to apprise the arriving team of the current situation, actions in progress, and to inform the OSC about the capabilities of the newly arrived response teams. To ensure a coordinated effort, liaison officers may be exchanged, or select members of one team may be integrated into the lead team's staff. The following concerns and actions must be considered: initial identification and security clearance level of response team members with follow-on actions to ensure rapid recurring access to the accident site: medical, communications, security, legal, restoration and logistical support (for example, lodging, clothing, and equipment) needed or provided; and extensive administrative support to ensure complete documentation of events, decisions, and costs.

1-5 THE PHASES OF RESPONSE TO A NUCLEAR WEAPON ACCIDENT

The response procedures addressed throughout this document consider two force levels. The first level is that of Initial Response Force (IRF). The IRF may be a small force on-scene if an accident occurs near an installation with only a humanitarian emergency response capability. The second level is that of the Service Response Force (SRF). The response effort of these forces can be divided into two phases:

a. Initial Phase. The initial phase includes accident notification and immediate emergency measures taken by the nearest DoD/ DoE installation to provide a Federal presence and'"humanitarian support. Initiation of nuclear weapon accident response actions by the National Military Command Center (NMCC), Service operations centers, and others assisting in the response, results automatically from accident notification. Therefore, accidents must be reported immediately using the most expeditious means available (secure if possible). Upon receipt of accident notification, the appropriate response forces are identified and tasked by the Unified Commands, or Service and specialized teams are alerted and prepared for deployment by the Service operations center. A simplified notification chain resulting from the initial accident report to NMCC and/or Service operation centers is shown in Figure 1-1. Also, the initial phase requires defining and stabilizing the situation by the IRF. These actions include fire suppression, rescue and treatment of casualties, assessment of control, reconnaissance, and assessment of the hazards to public health and safety. Other actions of immediate concern include establishing communications with the accident site, the supporting military installation and command centers, public affairs, and providing security for classified material. Figure 1-2, although not all-inclusive, illustrates the inter-relationship of initial actions.

b. Follow-on Phase. The follow-on phase includes the conduct of all operations required to recover the weapon(s) and restore the environment to a technically achievable/ financially acceptable condition using the combined assets of the various agencies and organizations in the response and recovery.

1-6 NUCLEAR WEAPON ACCIDENT RESPONSE CHECKLISTS

Checklists derived from the primary nuclear weapon accident response requirements identified in this document are contained in Chapter 1, Appendices 1-A through I-F as a guide for the OSC in monitoring the progress of an accident response. The checklists' paragraphs are not all inclusive or arranged in priority order; the accident situation will dictate the priority and order of response force actions. Figure 1-3 (centerfold), Nuclear Weapon Accident Response Recovery Operations Flow Diagram, depicts the various response actions and the approximate time of their occurrence. Also, Figure 1-3 may be of assistance in accident response planning.

1-7 CHANGE PROCEDURES

Users are encouraged to submit recommended changes and comments which may enhance this manual's usefulness. Comments should be keyed to a specific page and paragraph of the text. Sufficient detail and justification should be provided to ensure understanding and provide for evaluation of the recommended change. Comments should be forwarded through command and Service channels to Director, Headquarters, Defense Nuclear Agency, ATTN: NOEA, 6801 Telegraph Road, Alexandria, VA 22310-3398.

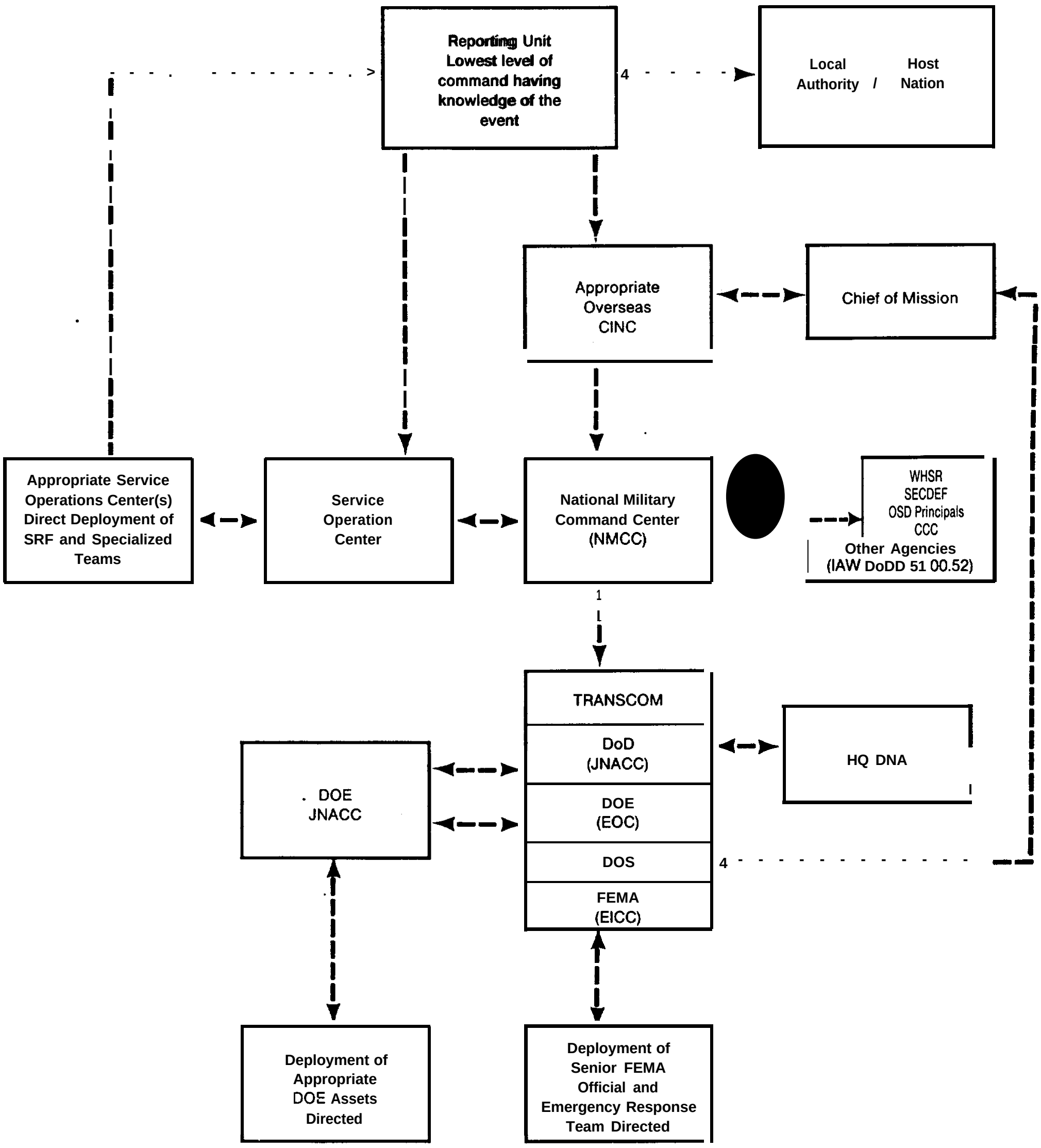

Figure 1-1. Nuclear Weapon Accident Notification **Flow** (Simplified).

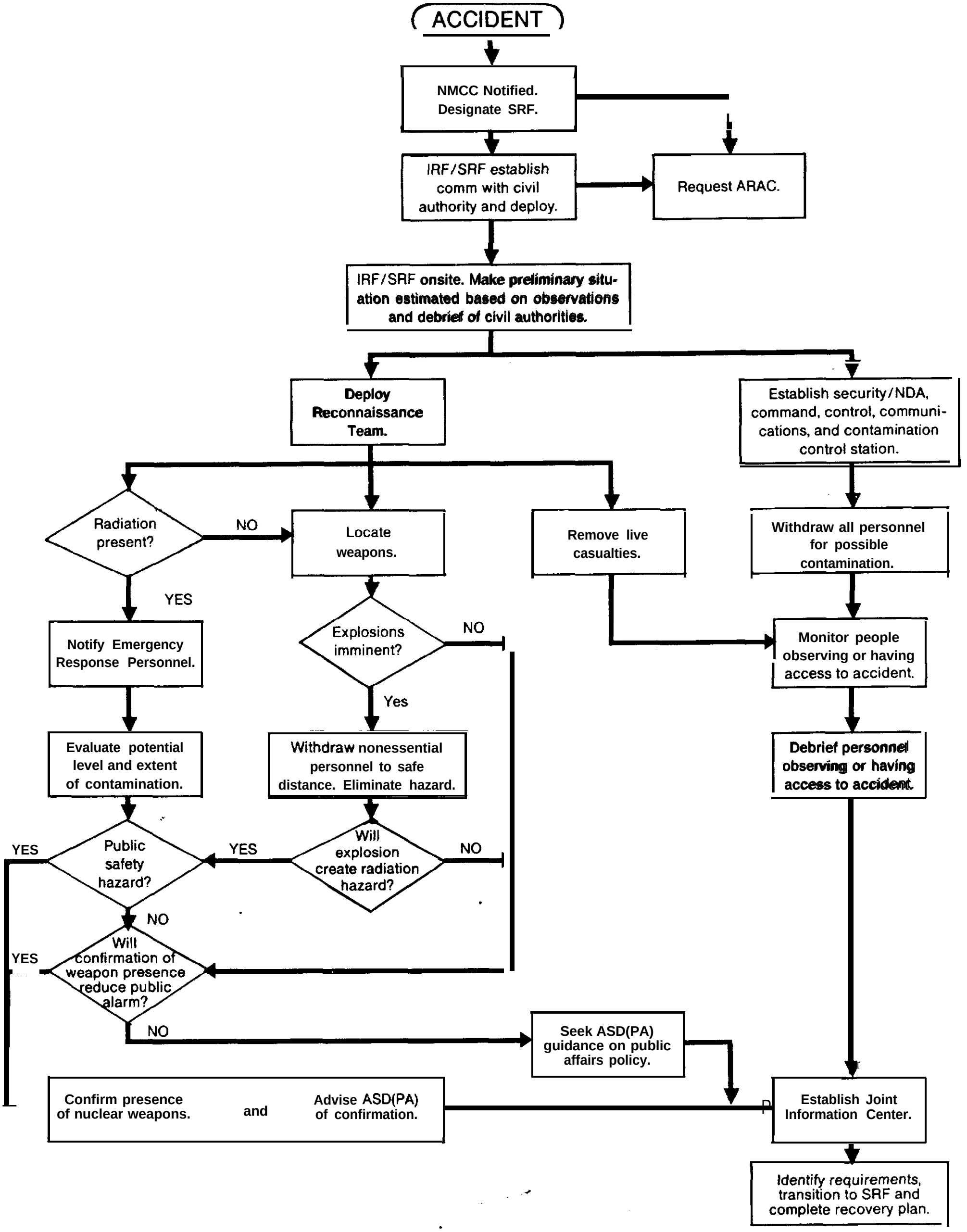

Figure 1-2. Relationship of Initial Actions During a Nuclear Weapon Accident Response.

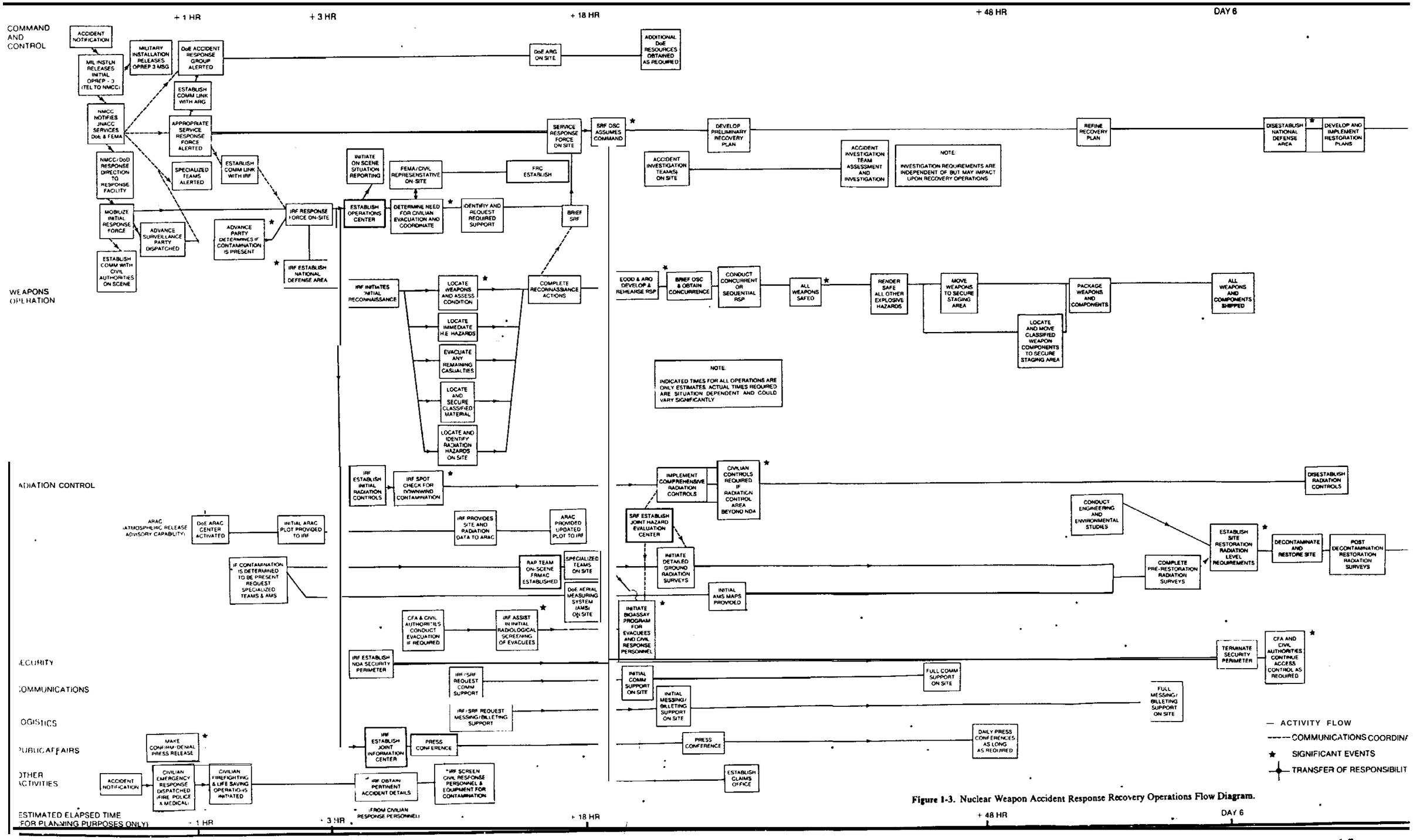

Figure 1-3. Nuclear Weapon Accident Response Recovery Operations Flow Diagram.

APPENDIX 1-A

RESPONSE FORCE PLANNING CHECKLIST

1. Review accident response plans to ensure:

a. Response force personnel roster is current.

b. Actions required upon arrival on-scene are identified.

c. Procedures exist for establishing communications from on-base, off-base, or remote sites.

d. Procedures/authority are addressed for public release of information.

e. Recommended guidance for involving civil officials/ authorities.

f. Potential assistance is identified from civil officials/ authorities and other federal agencies.

g. Personnel/equipment deployment plans are current and functional.

h. Proposed response force equipment is appropriate and adequate for the mission.

i. Notification procedures and telephone numbers are correct.

j. Reception plans for support teams are adequate.

2. Inspect response force equipment to ensure it is:

a. Fully serviceable/operable.

b. Ready for short notice deployment.

3. Verify readiness through periodic response force field and command post exercises.

4. Trained personnel are assigned to key positions. Replacements are appointed and trained promptly upon departure of incumbent.

APPENDIX 1-B

INITIAL RESPONSE FORCE

PRE-DEPARTURE CHECKLIST

1. Recall response force personnel and assemble equipment.

2. Contact authorities on-scene, if possible, for additional information.

3. Assess situation.

4. Review accident notification message (OPREP-3), as appropriate.

5. Provide advice on possible hazards to on-scene officials.

6. Dispatch advance party, if appropriate.

7. Obtain weather data at time of accident and weather forecast for accident site.

8. Coordinate communications procedures with home base/station.

9. Request ARAC plot, if available for the accident.

10. Augment response force, if necessary.

11. Ensure arrangements are being made for required logistics support.

12. Ensure proper travel route is established and obtain security escort.

13. Ensure other agencies are aware of response force and OSC's status.

APPENDIX 1-C

RESPONSE FORCE IMMEDIATE ACTIONS CHECKLIST

1. Establish a command post:

a. Identify civil and military forces present and their capabilities.

b. Determine actions to treat, identify, and evacuate casualties.

c. Reduce any immediate hazards (such as fires).

d. Place air samplers up and downwind of the accident.

e. Determine if contamination has been released. (Notify NMCC immediately).

f. Determine actual weather conditions at the accident site.

2. Establish control of the accident site to:

a. Protect personnel from explosive, radiological, toxic, or other hazards.

b. Safeguard classified material.

c. Establish internal and external communications, using secure means when possible, with DoD Joint Nuclear Accident Coordinating Center or NMCC in addition to the Service operation center.

3. Prepare appropriate press releases with Service and DoD Directives.

4. Establish direct communications with the Office of the Assistant Secretary of Defense (Public Affairs), if possible.

5. If contamination is present:

a. Advise medical treatment facilities receiving casualties the type of actual or possible contamination.

b. Through NMCC recommend deployment to the scene of the specialized teams from the appropriate Service operations center, if necessary.

(1) Army Radiological Control Team
(2) Navy Radiological Control Team
(3) Army Radiological Advisory Medical Team
(4) Air Force Radiation Assessment Team
(5) Air Force Air Transportable Radiac Assistance Package
(6) Defense Nuclear Agency Advisory Team
(7) Department of Energy Accident Response Group

c. Advise the NMCC of the TELEFAX phone number for ARAC plot delivery.

d. Identify and record names, addresses, and locations of persons possibly contaminated.

7. Determine the status and location of all weapons, if possible.

8. Seek the assistance of civilian authorities/officials and advise them of any possible hazards and precautions.

9. Keep the Service operations centers and/or National Military Command Center informed of conditions at the accident scene.

10. Establish a continuous and secure communications link with the military communications system.

11. Request HAMMER ACE, Joint Communications Support Element, Joint Communications Contingency Station Assets or other appropriate communication systems.

12. Establish a Joint Information Center (JIC) with toll free number for information request.

13. Identify a forward operating or staging base and reception center for follow-on forces.

14. Secure airspace (that is, prohibited area over accident site) with assistance of the Federal Aviation Authority or host country.

15. Establish liaison with Host Nation through Chief of Mission.

16. Perform emergency render safe procedures on weapons if necessary.

APPENDIX 1-D

RESPONSE FORCE CHECKLIST OF ACTIONS TO BE TAKEN

ON-SCENE AS SOON

AS AVAILABLE RESOURCES AND PERSONNEL PERMIT

1. Initiate surveys and determine extent of contamination.

2. Direct activities of a JIC to interface with DoS, Federal, state, or local and/or affected country government public affairs.

3. Establish a National Defense Area, or "Security Area" in coordination with affected country officials, if required. (Dissolve the designated area and return control to civil authorities/officials after all classified materials have been removed).

4. Establish a Joint Hazard Evaluation Center to coordinate explosive, toxic, or other hazard safety measures and radiological monitoring and health physics matters in supporting on-site operations.

5. Establish liaison with the FRC, FRMAC, and civil authorities/ officials, legal, and law enforcement agencies.

6. Establish the approximate perimeter of the contamination area.

7. Control exposure of public/ response force personnel to contamination. Coordinate actions with local/host nation police and public health officials.

8. Identify individuals who may have been exposed to contamination.

9. Provide advice to civil authorities or affected country government specialists, if requested, by establishing a radiological health program for any civilian personnel who may have internal contamination. Establish a similar program for response forces and people stationed at the accident site.

10. Conduct weapon(s) damage assessment.

11. Perform render safe procedures on weapon(s), as required.

12. Initiate systematic search to re-establish accountability for all the weapon(s) and weapon(s) components.

13. Develop and implement a weapons recovery plan, in conjunction and coordination with DoE ARG, to include the appropriate packaging requirements consistent with final disposition/ disposal requirements of the weapon(s).

14. Transport/ship weapon(s) and components to appropriate disposal areas.

15. Establish an environmental exposure injury prevention program.

16. Establish a claims processing facility. For overseas accidents, this facility will be in coordination with the Embassy and involved host government.

17. Determine availability of assets and facilities at or near the scene of the accident. Initiate actions to use supporting response force requirements.

18. Inform the Senior FEMA official or foreign government officials, upon arrival, of all on-site activities which could impact off-site and establish continuing liaison.

19. Document actions taken and ensure that evidence is retained for an accident investigation board.

20. Establish a standardized access control system.

21. Consider applying fixatives to highly contaminated areas to reduce resuspension.

'22. Establish the Community Emergency Action Team (CEAT).

APPENDIX 1-E

SERVICE RESPONSE FORCE CHECKLIST OF ACTIONS TO SUPPORT SUSTAINED SITE RESTORATION

1. Provide required medical, administrative, and logistic support (including that needed by DoE response organizations).

2. Assess levels of public understanding and identify/ respond to concerns about nuclear issues.

3. Establish coordination with Service and National Transportation Safety Board accident investigation teams.

4. Coordinate communications assets and frequency requirements of all response organizations. Be prepared to coordinate such actions with a representative of the National Communications System, who is responsible for coordinating and managing telecommunications support for Federal agencies during a radiological emergency.

5. Publish a Communications-Electronics Operating Instruction for use by all response organizations.

6. Request frequency clearances, if required.

7. Obtain additional communications assets, as required.

8. Establish channels for coordination of technical legal matters with higher headquarters and principal legal advisors of other participating Federal departments and agencies and/ or involved country officials.

9. Coordinate site restoration planning/action with FRMAC, FEMA, responsible state civil authorities, and military organizations and/ or involved host government officials.

10. Ensure actions are taken to begin preparations of a draft site restoration strategy.

11. Conduct environmental impact assessments.

12. Conduct decontamination operations.

13. Restore contaminated area to a condition that is technically achievable and financially acceptable.

14. Coordinate environment protection plans for post-restoration radiation monitoring and assessment with site restoration plans. This monitoring will be defined by restoration agreements.

15. Ensure protection of U.S. Government property.

16. Provide necessary operational security.

17. Counter potential terrorist and/ or radical group activities or intelligence collection efforts.

18. Establish personnel replacement /rotation program to support long term operations and, as appropriate, to minimize radiation exposure to radiation workers.

19. Debrief personnel with access to classified information.

20. Discuss with the Senior FEMA Official (SFO) the possible transfer of responsibility for the Joint Information Center to the SFO.

21. Request a Service Project Code for fund cites.

22. Consider transition of Federal responsibility for the disestablishment of the NDA and site restoration. Coordinate with State and local officials through FEMA.

.

APPENDIX 1-F

RADIATION HAZARDS AND BASIC RADIATION PROTECTION PRINCIPLES

l-F-l RADIATION HAZARDS

a. With no nuclear detonation, radiation levels will be too low to cause immediate (acute) biological effects. Do not delay or omit life or limb-saving measures because of radiation or contamination to keep low the probability that delayed effects, such as cancer, will occur “years later.

b. The primary pathway for introduction of alpha-emitting radiological contamination is inhalation. The greatest hazard from inhalation occurs immediately after an accident when contamination is released. If a weapon’s high explosives detonate, the explosion can create a cloud of contamination which gradually dissipates and settles from the air as it moves downwind. If a weapon burns, contamination may be carried into the air by the smoke and thermal currents from the fire and again be dispersed by the wind. In either case, once the explosion and/ or fire is over and the resulting contamination has settled or dispersed (approximately two/ three hours), the remaining inhalation hazard from resuspension of “radioactive particles is significantly reduced.

c. Radioactive contamination can be introduced into the body through wounds. The greatest potential for contamination of wounds involves personnel, involved in the accident or at the accident site initially; responding EOD personnel and associated workers may suffer injuries within the contaminated area. When responding to an accident involving injury, those responding always should be aware that administration of first aid for serious injuries is of primary importance.

d. Ingestion of radioactive fissile material (for example, plutonium or uranium) is a minimal problem, since these materials are not absorbed appreciably across the lining of the gastrointestinal tract.

l-F-2 RADIATION PROTECTION PRINCIPLES

Four basic radiation protection principles involve concentration and isotope, time, distance, and shielding. These four factors are interrelated.

a. Concentration and Isotope. The exposure rate from a radioactive material is related directly to the amount or quantity of the material present. For the types of radioactive materials present at nuclear weapons accidents, the total quantity present normally does not present a significant external radiation hazard. The primary radiation threat in a weapon accident is from inhalation. Quantity of radioactive material will be expressed in units depending upon the medium the radioactive material is in, for example, for the measure of radioactive material in air, the ***units*** are microcuries per cubic meter ($\mu Ci/m^3$) or becquerels per cubic meter (Bq/m^3); for ground measurement, the units are microcuries per square meter ($\mu Ci/m^2$) or becquerels per square meter (Bq/m^2). Field measurements of quantity are normally expressed in instrument-dependent units of counts per minute (CPM) or counts per second (CPS) and must be converted to definitive units such as $\mu Ci/m^2$ or Bq/m^2 for meaningful comparison.

b. Time. Any radioactive material will emit a known amount of radiation per unit time. For the type and quantities of radiation present at a nuclear weapon accident, exposure to the material for months or years would normally be required for external radiation to be a hazard. Exposure time to the radioactive materials present at a nuclear weapon accident is related to a health hazard primarily through the amount of material deposited in the lungs through inhalation over a period of time. The rate at which contamination maybe inhaled is highest during the initial period following the accident when a substantial quantity of contamination is airborne. If no airborne contamination exists, or if respiratory protection is being worn, exposure time is not a critical factor in nuclear weapon accident response when no beta/ gamma emitters are present.

c. Distance. The protective principle of distance, where radiation intensity varies inversely with the square of the distance (if the distance doubles the intensity is reduced by a factor of four), applies primarily to gamma radiation (not normally a significant part of the radiological problem in a nuclear weapon accident). Alpha particles, the primary radiological problem, will travel about two to three centimeters in air from its source; hence, distance will not be a significant radiation protection factor. Note: The source material could travel long distances.

d. Shielding. Shielding results from the ability of a material to attenuate or stop radiation. The alpha particles, emissions of primary concern in a nuclear weapon accident, can be stopped by paper, or cotton clothing. The emissions will not penetrate the outer layer of skin. Beta emissions can be stopped by a sheet of aluminum, while gamma emissions may require several inches of lead to be stopped. Alpha emitters are the primary type of radiation dispersed following a nuclear weapon accident. Assuming there is no nuclear yield, any light clothing or gloves used to prevent contamination of underlying clothing or the body will provide protection automatically from this type of external radiation.

APPENDIX 1-G

QUICK REFERENCE EMERGENCY PHONE NUMBERS

DEPARTMENT OF DEFENSE (DoD)

National Military Command Center (NMCC)	AUTOVON Commercial	227-6340 703-697-6340
Crisis Coordination Center	AUTOVON Commercial	364-9320 202-769-9320
Joint Nuclear Accident Coordinating Center (DoD-JNACC)	AUTOVON Commercial	221-2102 703-325-2102
U.S. Army Operations Center (AOC)	AUTOVON Commercial	227-0218 703-697-0218
U.S. Navy Command Center	AUTOVON Commercial	225-0231 703-695-023 1
U.S. Air Force Operations Center (AFOC)	AUTOVON Commercial	227-6103 703-697-6103
U.S. Marine Corps Operations Center	AUTOVON Commercial	225-7366 703-695-7366
Assistant Secretary of Defense (Public Affairs)	AUTOVON Commercial	227-5131 703-697-5131

DEPARTMENT OF ENERGY (DoE)

HQ DoE Emergency Operation Center	Commercial	202-586-8100
Joint Nuclear Accident Coordinating Center (DoE-JNACC)	AUTOVON Commercial	245-4667 505-845-4667
Radiation Emergency Assistance Center/ Training Site (REAC/TS)	Commercial	703-557-2380

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

Emergency Information and Coordination Center (EICC)	AUTOVON Commercial	544-7721 / 7720 202-646-2400
National Emergency Coordinating Center (NECC)	AUTOVON Commercial	380-6100 202-898-6100

DEPARTMENT OF STATE (DoS)

Operations Center	Commercial	202-647-1512