

20 JANUARY 2006



Operations

**GUIDE TO SERVICES CONTINGENCY
PLANNING: MORTUARY AFFAIRS
SEARCH AND RECOVERY**

NOTICE: This publication is available digitally on the AFDPO WWW site at:
<http://www.e-publishing.af.mil>

OPR: HQ AFSVA/SVOM (Mr. Trevor T. Dean) Certified by: HQ AF/ILV (Mr. Arthur J. Myers)
Pages: 139
Distribution: F

Purpose: This volume implements AFPD 34-1, *Air Force Services Combat Support Programs*, and expands on information provided in AFI 10-214, *Air Force Prime RIBS Program*, and AFI 34-242, *Mortuary Affairs Program*. It summarizes Services considerations for mortuary affairs search and recovery (S&R) operations in CONUS, PACAF, and USAFE and for OCONUS deployments. This volume is one of the AFH 10-247 series of publications that are guides to Services contingency planning.

Figure 1.	S&R Operations May Have to Overcome Many Obstacles.	6
Figure 2.	Force Module Mortuary Transitions.	7
Figure 3.	Terrorist Attacks on Vehicles and Buildings Add to Services' S&R Efforts.	8
Table 1.	Roles of Primary Military Responders and Related Support.	9
Figure 4.	S&R May be Quite Difficult Even without the Media Creating Additional Hazards.	23
Figure 5.	MoUs Are Very Important for Fatal Military Mishaps-Mishaps Off Base.	24
Table 2.	Case Study of a Complicated S&R Involving a Contract Military Transport Mishap.	25
Figure 6.	September 11th Pentagon Search and Rescue Followed by Search and Recovery Stress Emergency Responders.	29
Table 3.	Terrain-Based S&R Considerations.	32
Figure 7.	Examples of Trajectory Impacts.	37
Table 4.	Basic S&R Logistics (Supplies, Equipment, and Support) Requirements.	39
Figure 8.	There Are Many Choices and Levels of Appropriate PPE.	53
Figure 9.	After Initial Fire Rescue Efforts, the Bioenvironmental Engineer Will Identify the Level of PPE Requirements.	54
Figure 10.	CE and Services Have Requirements to Create Sketches and Maps.	55

Figure 11.	Compact Mishap Sites Can Present Challenges for Searching in Wreckage and Sketching the Scene.	56
Figure 12.	You May Need a Contingency-Type Mortuary at Some Mishaps.	59
Figure 13.	Firefighters Can Provide Some of the Best, Earliest Assessments of the Situation.	60
Figure 14.	A Linear but Broadly Scattered Mishap May Require Only One Search Technique.	61
Figure 15.	One Mishap May Require Several S&R Techniques Based on Terrain, Type of Aircraft, and Trajectory.	61
Table 5.	Reasons for Search and Concurrent Recovery.	63
Figure 16.	Assigning Responsibilities and Providing Proper PPE is Essential in Human Remains S&R.	65
Table 6.	Specific Logistics Requirements.	66
Figure 17.	Remote Locations and Mass Fatalities May Require Extensive Logistics Support and On-Site Mortuary Operations.	71
Table 7.	CISM Refresher Briefing Review Areas.	73
Table 8.	Team Leader Specific Actions.	74
Table 9.	Suggested Transportable Sets.	75
Figure 18.	Hazards Can be Easy to Miss, but Can Prove Dangerous to Searchers (flare on right).	77
Table 10.	Investigation Safety Practices.	77
Figure 19.	A Standard Aircraft Mishap Scenario.	78
Figure 20.	Sweep Searches Are Best for Open Areas.	78
Figure 21.	A Standard Sweep Pattern.	79
Figure 22.	A Standard Lane Sweep Scenario.	80
Figure 23.	Standard Lane Sweep Views.	81
Figure 24.	Lane Directions Can Vary Based on Stability and Type of Slope.	81
Figure 25.	A Standard Grid Search Scenario.	82
Figure 26.	Open (left photo) and Close-Quarter (right photo) Grid Searches.	82
Figure 27.	A Standard Crater Search Scenario.	83
Figure 28.	Compact Impact Areas Require a Different Approach to Site Search Methods.	83
Figure 29.	Crater View.	84
Figure 30.	Typical Views of Some Damaged Building Interiors.	84
Figure 31.	Use of Flags for Remains, Personal Effects, and Investigator Marking.	86

Figure 32.	A Standard Sweep Line in Action.	87
Figure 33.	Setting Marker Poles and Tall Stakes.	87
Figure 34.	Brush Cutting to Allow Lane Marking.	88
Figure 35.	Lane Sweep in Brush.	88
Figure 36.	Trailing S&R Team Searches Trees.	89
Figure 37.	Trailing S&R Team Searches Obstacles.	89
Figure 38.	Trailing S&R Team Members Also Have to Use Caution.	90
Figure 39.	Experienced Personnel Use Standard Climbing and Anchoring Techniques.	90
Figure 40.	Stable-Slope Lane Searches Can Be Up and Down the Slope.	91
Figure 41.	Remains and Personal Effects Can be Hard to Find on Rocky Slopes.	91
Figure 42.	A Standard Lane on a Steep Incline (Talus Slope).	92
Figure 43.	S&R May Have to be Concurrent with Surveying and Videotaping.	92
Figure 44.	S&R in Snow May Require Some Adjustments in Procedures and Support.	93
Figure 45.	Grid Search View with Many Fragmented Remains.	94
Figure 46.	Control Crater Access with Barrier Tapes or Ropes.	94
Figure 47.	Crater Search with Observable Remains.	95
Figure 48.	Removal of Debris with Tools to Access Remains.	95
Figure 49.	Take Precautions to Address Hazards in the Crater Such as Using Ladders, Ventilation, and Higher Levels of PPE.	96
Figure 50.	Take Precautions When Planning Sifting Operations.	96
Figure 51.	Building Search Teams and Special Support Personnel May Enter as Teams.	97
Figure 52.	Damaged Building Interior with Remains.	98
Figure 53.	Damaged Building Interior and Marking Methods.	98
Figure 54.	Create Individual Sketches for Each Room and Hallway.	99
Figure 55.	Numbered Stake in the Middle of Remains Field (for GPS Purposes).	100
Figure 56.	Typical Building Room Marking for Nearby Remains.	100
Figure 57.	Handle Remains with Care, Placing on Sheets as Needed Before Placing in the Human Remains Pouch.	101
Table 11.	Primary Steps for Remains Recovery (non-expedient).	102
Figure 58.	Some Remains Recovery May Require Extensive Efforts.	104

Table 12.	Daily Concerns for Critical Incident Stress Management. (extracted from PEP guidance in AFI 44-153)	106
Figure 59.	Services May Require Overpack Barrels for Any Contaminated Clothing and Equipment.	108
Table 13.	Follow-up Actions List.	111
Figure 60.	Sifting Boxes May Be Required Even for Some Contingency Losses.	113

SECTION 1. INTRODUCTION

Purpose. This guide provides guidance for home station and deployed Air Force Services Prime RIBS personnel and base augmentees performing mortuary affairs search and recovery (S&R) operations. It identifies and provides home station and Air Expeditionary Force (AEF) contingency planning procedures for conducting search and recovery of deceased United States (US) military personnel, US noncombatants, allied, coalition partner, third country, and adversary personnel. The guide addresses requirements and approaches to S&R that should be considered by Services. It also addresses some of the circumstances where a Services mortuary S&R team may have to either perform expedient S&R or provide a non-Services unit with support for some type of expedient S&R. This publication is not directive in nature. Records required by directive publications will be maintained according to applicable Air Force record management programs and disposition schedules.

Primary Sources. This handbook was developed from Air Force Services' publications, Tyndall (Silver Flag) Services Combat Training and Air Force Institute of Technology mortuary affairs search and recovery course materials, contacts with their instructors, and contacts with AFSVA mortuary affairs personnel. Additional sources for this publication were after action report inputs provided by locations supporting overseas deployments. The following publications and electronic guides were used for writing this publication: the Silver Flag Exercise Site's Prime RIBS Contingency Training Handbook; the Headquarters Air Force Services Agency (HQ AFSVA) Readiness web page (<https://www-r.afsv.af.mil>); AFI 10-214, *Prime RIBS Program*; AFI 34-242, *Mortuary Affairs Program*; drafts of the updated Joint Publication 4-06, *Joint Tactics, Techniques, and Procedures for Mortuary Affairs in Joint Operations*; DoD Directive 1300.33, *Mortuary Affairs Policy*; and safety publications AFI 91-204, *Safety Investigations and Reports*, and AFPAM 91-211, *USAF Guide to Aviation Safety Investigation*. In addition, valuable lessons learned were identified for the September 11th Pentagon recovery, as released in RAND Publication CF-176-OSTP and the companion Columbia University Fathom seminar, *Protecting Emergency Responders: Lessons Learned from Terrorist Attacks*.

Mission of S&R. When there is an incident (such as a transportation mishap involving military vehicles), a fatal aircraft mishap, or mass casualties (normally five or more military deaths that could be associated with a mishap, terrorist attack, or a natural disaster) that involve Air Force/Department of Defense (DoD) personnel, all reasonable steps must be taken to recover and identify the individuals. Under the National Response Plan (NRP), DoD may be tasked to provide assistance at a mass-fatality incident that does not involve military personnel. Military support is provided through specific tasking by the United States Northern Command (USNORTHCOM). As determined by US policy or DoD requirements, military mortuary affairs support may also be provided for foreign humanitarian or mass-fatality efforts, whether or not the US has a military presence in the country or area of responsibility.

DoD policy is that every reasonable effort should be made to identify remains and account for unrecovered remains of US military personnel, employees, contractors, their dependents and others who die in military operations, training mishaps, and other multiple fatality incidents. The mission of Services S&R is to recover all the remains and do so in a manner that preserves dignity, respect, and evidence. The goal of the mortuary affairs program for outside the continental United States (OCONUS) contingency opera-

tions is to complete the mortuary S&R mission, ensure that all remains are returned to CONUS as quickly as possible, and preserve the remains for identification. With terrorist and guerrilla tactics focusing attacks on buildings and vehicles, Services' ability to support S&R responses for fire and blast-damaged buildings and vehicles takes on more significance. Services units must plan for and maintain a capability to conduct a greater variety of S&R operations, including while deployed and operating under increased threat.

Due to the possibility of increased threat, OCONUS AEF contingency teams may have to adopt some methods and techniques to expedite the typical S&R process (see Section 6). For mishaps in high threat areas, expedient S&R by a Services team or a unit or special team conducting remains recovery may have to suffice. In these cases, security information on the location would be required for a follow-on S&R for any further remains.

S&R personnel must develop plans for conducting S&R operations and maintain all required equipment and protective gear. By following procedures, S&R teams provide for more thorough recovery of remains and capturing of data, which may be crucial in identifying personnel and contributing to the process for identifying the causes of mishaps. S&R may have to operate in locations that are very difficult to work in because of location and terrain.

Figure 1. S&R Operations May Have to Overcome Many Obstacles.



Whether in CONUS, Pacific Air Forces (PACAF), U.S. Air Forces in Europe (USAFE), or even in some OCONUS AEF contingency locations, military S&R is not required for every mortuary case. Often when civilian S&R occurred, the identification of an individual was determined by a civil jurisdiction through the hospital or coroner or medical examiner. The military must still determine how the identification was established and obtain the appropriate documentation from the civil authority. The military must be convinced that the recovered human remains were recovered as completely as possible given the situation at the location (i.e., loss-site, whether a mishap, attack, disaster, aviation mishap, etc.).

The medical examiner will determine if follow-on military or civilian S&R is justified. If there are difficulties in making a decision or working with civilian authorities, the main source for obtaining support is through the Office of the Armed Forces Medical Examiner. The other appropriate contacts are with your major command (MAJCOM) Services mortuary personnel and the Air Force Mortuary Affairs office (AFSVA/SVOM).

Office of the Armed Forces Medical Examiner. The Office of the Armed Forces Medical Examiner (OAFME) is a tri-service military organization with personnel from the Departments of the Army, Navy, and Air Force, as well as American Registry of Pathology civilian employees. They provide on-scene support for most fatal aircraft mishaps. Whether during peacetime or hostilities (whenever possible), a com-

Transitions in Capabilities. This is primarily a concern for deploying forces that will be a part of an AEF or joint service contingency operation. Support for S&R basically builds with the flow of Unit Type Codes (UTCs) within the overall force module flow for a deployment. Preliminary mortuary capabilities should arrive during the initial 24 hours of a deployment with the LWRRA team and the LWRRG kit (see [Figure 2.](#)).

Command & Control				Generate-the-Mission						Operate-the-Airbase	
Open-the-Airbase		Establish-the-Airbase									
0-Hour	24-Hour	Day-2	Day-3	Day-4	Day-5	Day-6	Day-7	Day-8	Day-9	Day-10	
LWRR3	Lead Mgmt										
LWMRE											
	LWRRRA	Supt Initial 275		Plan Services Activities							
	LWRRRG	Initial Mortuary Capability									
	LWRRRE	MRE Pallet-3,456 meals									
			LWRRRB	Supt Increasing Pop							
			LWRRRP	Protocol							
			LWRRRB	Supt Increasing Pop							
			LWRRRF	Single Pallet Kitchen (SPEK)							
			LWUGR	UGR Rations (pallet)							
			LWMRE	LWRR4	EOC						
				LWRRRB	Supt Increasing Pop						
				LWRRRB	Supt Increasing Pop						
				LWRR9*	Mortuary, Ration Mgmt						
					First Hot Meal						
					LWUGR						
							LWRRRA				
							LWRRRB				
							LWUGR				
								LWMRE			
								LWUGR			
									LWRRRB		
									LWRRRB		
									LWMRE		
									LWUGR		
										Morgue	Operational

*R9 includes 6KAAE(3A)

Roles and Definitions. Most response team preparations have historically been based on responding to a mishap involving military personnel, usually involving a DoD aircraft mishap. However, deaths caused by other various fatal occurrences (i.e., ground transportation mishaps, fires, enemy or terrorist attacks, mass casualty events, building collapses, or natural disasters) could require S&R.

Response to these events should be handled with procedures similar to those involving aircraft mishaps. Especially when OCONUS for deployments, you must develop base and unit operating instructions (OIs) that define the roles of the major responding members. Be aware that wing plans for disaster responses

will also cover many aspects of your responses where S&R operations will be employed. The wing plans and your OIs must be compatible. S&R pre-planning should address: (1) having a workable team roster with recall procedures; (2) an updated list of supporting agencies (including AFSVA/SVOM); (3) standard sets of reporting procedures and locations; (4) a full set of checklists for confirming availability (or obtaining when it is not possible to have on hand) of the equipment, supplies, communications, and transportation requirements; (5) standard safety and security procedures; and (6) identifying the types of facilities for holding, tentatively identifying, and examining remains.

Figure 3. Terrorist Attacks on Vehicles and Buildings Add to Services' S&R Efforts.



The primary military representatives who may be involved with Services during the S&R timeframe are listed in [Table 1](#). Some parallel or responsible civil authority positions are also listed. Some of these positions may not be relevant for every mishap or loss location, but do apply to most situations.

Table 1. Roles of Primary Military Responders and Related Support.

Role	Related Responsibilities
Mortuary Officer	<ol style="list-style-type: none"> 1. Appointed in writing by the installation commander as mortuary officer (MO). <ol style="list-style-type: none"> a. Also appointed by the installation commander is at least one alternate b. Alternate should preferably be a field-grade officer or equivalent-grade civilian. 2. The MO is the installation's Services commander, division chief, or deputy. <ol style="list-style-type: none"> a. The primary and alternate MOs are not to be tasked as a Casualty Notification Officer. b. They should be exempt from additional duties outside Services during a mortuary case. 3. Oversees the entire mortuary affairs program. <ol style="list-style-type: none"> a. Develops a written installation-level plan for the implementation and execution of the mortuary affairs program and for S&R operations b. Assists the Interim Safety Board (ISB) and/or Safety Investigation Board (SIB) Medical Officer with the identification and handling of remains including the handling of remains in aircraft mishaps and disasters occurring on and off base. c. Contacts the person authorized direct disposition of remains (PADD), (after Casualty Affairs has made the initial notification) to inform them of their mortuary entitlements and the services provided by the Air Force. Note: For OCONUS deaths, AFSVA/SVOM contacts the PADD, obtains disposition instructions, and keeps them informed of status of case. d. For OCONUS deaths, coordinates all actions related to the Summary Courts Officer (SCO) actions only. [As above, AFSVA/SVOM contacts the PADD, obtains disposition instructions, and keeps them informed of status of case.]

Role	Related Responsibilities
	<ol style="list-style-type: none"> 4. Functions as the S&R Team Chief, maintaining a competent, trained S&R team and ensuring the team is appropriately staffed to conduct continuous S&R operations with 26 personnel operating at any given time (2 teams of 13-persons each). Theater Components may only require a single 13-person team. 5. Advises the installation commander of S&R team requirements. <ol style="list-style-type: none"> a. Ensures that the installation commander appoints in writing all S&R team members from Services and other organizations on the installation. b. Verifies that all S&R team candidates have been screened by medical authorities and deemed both physically and mentally fit for S&R duty, prior to appointment. c. Knows the importance of conducting and following critical incident stress management (CISM) pre-exposure preparation (PEP) training, pre-briefings, and debriefings. 6. Maintains a competent, trained S&R team and selects team leaders from the Services organization based on experience, training, physical ability, and mental attitude. 7. Ensures that team members are trained in human anatomy and the ability to recognize portions of human anatomy. 8. Ensures that all deployable UTC management and lead team members receive home station training (HST) and services contingency training (SCT) on wartime/contingency S&R procedures.
S&R Team OIC and NCOIC	<ol style="list-style-type: none"> 1. Normally a Services officer or NCO appointed and trained to take over on-site responsibility as the S&R team chief when the MO (i.e., Team Chief) cannot be on site. 2. Identifies a 10-person core (10 personnel total for 26-person S&R team). 3. Ensures that core members are trained annually to perform duties as S&R team leaders and flankers, conduct remains recovery, and use proper tagging procedures. 4. Closely adheres to CISM philosophy and practices. 5. Helps oversee field efforts and provides on-scene technical support for issues that arise in the field.

Role	Related Responsibilities
	<ol style="list-style-type: none"> 6. Works with photographers to ensure whenever possible that remains are photographed prior to bagging. 7. Works with CE engineer assistants (EAs) to ensure that tagged remains or the spot locations are surveyed. Remains available for working with surveyors to answer questions on tagging and locations.
S&R Team members	<p>Team Leader. A team leader is appointed for each 13-person team (designated for convenience in this handbook as <i>Gold</i> and <i>Silver</i> teams).</p> <ol style="list-style-type: none"> 1. The team leaders are responsible to ensure that personnel are trained, properly equipped for the recovery methods, and have proper fitting personal protective equipment (PPE) to conduct S&R. 2. The team leader should always be an experienced core member trained in human anatomy and the ability to recognize portions of human anatomy. 3. The team leader closely adheres to CISM philosophy and practices. 4. Specific areas: <ol style="list-style-type: none"> a. For line movement sweeps, anchors the middle of the sweep line and sets the pace. b. Observes the behavior of team members during recovery efforts for signs of physical and mental fatigue. c. Advises the S&R team chief of logistics needs and site conditions that may require replacement of personnel or equipment or acquiring of additional support or equipment. d. Should be provided with radio or phone communications with the S&R team chief and other critical response force personnel (i.e., fire department, security forces, medical, etc.) when operating in a hazardous environment. e. Determines how many personnel are required for individual sweeps (or other marking efforts), recording, bagging, tagging, and for relief. f. Keeps team chief apprised of progress. g. Observes that follow team members are tagging and bagging remains and personal effects found by sweep team members.

Role	Related Responsibilities
	<p data-bbox="456 247 1105 317">h. Ensures all team members have proper personal protective equipment (PPE).</p> <p data-bbox="418 386 1218 604">Team Flanker. Two team flankers are appointed on each 13-person team when conducting sweep line movements. The flankers occupy the ends of sweep lines. Whenever possible they should be an experienced core member trained in human anatomy and the ability to recognize portions of human anatomy. Closely adheres to CISM philosophy and practices.</p> <ol data-bbox="418 625 1218 1100" style="list-style-type: none"> 1. Ensures that the bounds of sweeps remain within assigned areas of the search. 2. Anchors or conducts turns when sweeps are reversing direction. Ensures that personnel on their side of the team leader are able to remain in line, maintain spacing, and reform without gaps given the planned spacing for the coverage area. 3. Should have voice contact with the team leader either by unaided voice, loudspeaker, walkie-talkie, or radio, as appropriate for the site conditions. 4. Also observes the behavior of team members during recovery efforts for signs of physical and mental fatigue. <p data-bbox="418 1169 1218 1388">S&R team members. Team members must be trained and equipped to perform S&R line searches and marking, trained in recognizing the need for and use of PPE, be trained for basic human remains recognition, be able to recover fragmented remains under supervision, and must have taken CISM PEP training.</p> <ol data-bbox="418 1409 1218 1722" style="list-style-type: none"> 1. Some members may be trained to create mishap sketches-diagrams. 2. Some members may receive familiarization training in use of cameras and handheld GPS units. 3. In some regions team members may be chosen for familiarity and certification in specialties that may be required for their locale (i.e., mountain or rock climbing, SCUBA diving).

Role	Related Responsibilities
	<p>4. Several members should be trained and assigned to create and fill in the log of events for pre-response, response, and in-field efforts. They should have computer and software skills to create and fill in data sheets needed to log in all recovered remains, personal effects, and any specially labeled equipment.</p>
Interim safety board	<p>This board is convened by the individual wing or group commander to provide a response to a major mishap (normally other than Category A). The interim safety board (ISB) members preserve evidence before the arrival of the formally appointed safety investigation board.</p>
Medical Officers	<p>Based on mishap investigation procedures, two medical officers and a bioenvironmental specialist are normally involved with a loss of life mishap where S&R is required: (1) the ISB Medical Officer, (2) the mishap safety investigation board (SIB) Medical Officer, and (3) the base Bioenvironmental Engineer.</p> <p>Interim safety board (ISB) medical officer. An initial responder from the nearest medical treatment facility. The flight surgeon normally becomes the ISB medical member for the mishap. This medical officer's main function is preservation of medical evidence. The ISB Medical Officer may recover remains and life-science items prior to the arrival of the S&R team at the site. If off-base, this may require approval of the off-base authority with jurisdiction (see <i>Coroner or Medical Examiner</i>).</p> <ol style="list-style-type: none"> 1. This member is also on the scene to render medical attention to survivors and to provide ongoing medical support to the investigation, including S&R. 2. When off-base medical authorities respond and have jurisdiction, the ISB Medical Officer should work with those medical authorities and the local coroner or medical examiner per pre-established agreements. 3. For mishaps, the ISB Medical Officer contacts the OAFME to coordinate any forensic pathology assistance. 4. For off-base mishaps where the local jurisdiction efforts may be inadequate, the OAFME becomes a medical member with secondary jurisdictional authority. (See Safety Investigation Board (SIB) item 3 regarding jurisdiction.)

Role	Related Responsibilities
	<p>Mishap safety investigation board (SIB) medical officer.</p> <ol style="list-style-type: none"> 1. Assists in the identification process and requests additional support as necessary for positive identification. 2. Obtains medical related evidence and records, collects and safeguards other records, and provides for photographic evidence to support identification. <p>Bioenvironmental engineer. (The bioenvironmental engineer operates per AFPAM 91-211).</p> <ol style="list-style-type: none"> 1. Determines what respiratory protection is required at the site and advises the medical member of site hazards. 2. Determines what hazards are present on site and obtains assistance from civil engineer (CE) environmental and readiness technicians to help mitigate the situation. 3. Ensures that personnel providing on-site support have proper PPE for biological, chemical, and composite hazards. 4. Establishes work/rest cycles based on weather conditions.
Civil Engineers	<p>There are typically five CE Air Force Specialty Codes (AFSCs) that respond to and support an Air Force or other designated loss of life event which requires S&R. They are listed below. When the S&R and investigation teams have to remain on site, such as due to remote location, other CE AFSCs may be present to provide life-sustaining support with Services.</p> <p>Engineer Assistant. Engineer assistants (EAs) provide surveying support for development of a detailed mishap site map.</p> <ol style="list-style-type: none"> 1. Trained in use of higher precision electronic survey equipment (including GPS). 2. They use a variety of surveying equipment and techniques to plot information on plan drawings, and may create information within an electronic geographic information system (GIS) for detailed plotting for safety and mishap investigation boards.

Role	Related Responsibilities
	<p data-bbox="451 247 1198 317">3. They must know Services S&R requirements to capture data and provide detailed S&R plan drawing plots.</p> <p data-bbox="451 386 1227 493">Fire Department. Firefighters are typically first responders and may remain on site as long as there is a danger of reigniting or exposure to hazardous substances.</p> <ol data-bbox="451 510 1227 940" style="list-style-type: none"> <li data-bbox="451 510 1227 653">1. During the initial response, whether it is an AF fire chief or the local civilian counterpart, they usually have control of the scene for the initial emergency response, rescue and lifesaving, and fire fighting efforts. <li data-bbox="451 674 1227 816">2. They are typically more aware of the hazards associated with aircraft components, fuels, propellants, oxidizers, composite materials etc., as well as with other chemical hazards. <li data-bbox="451 837 1227 940">3. They are an excellent first choice for bioenvironmental engineers to contact to ascertain the types of hazards to be considered for S&R. <p data-bbox="451 1010 1247 1155">Explosive Ordnance Disposal (EOD) Specialist. EOD members respond primarily to aircraft mishaps, but may respond to any mishaps or terrorist attacks where there are explosives involved.</p> <ol data-bbox="451 1171 1227 1455" style="list-style-type: none"> <li data-bbox="451 1171 1227 1278">1. They identify, safe, remove, or destroy explosive ordnance that may be found in and around a mishap site if they are unsure that it was consumed during the mishap. <li data-bbox="451 1299 1227 1369">2. They may have to remain on site when there is a risk of exposure to unexploded ordnance. <li data-bbox="451 1390 1227 1455">3. Request a briefing from the EOD representative regarding possible hazards and recognition requirements. <p data-bbox="451 1524 1247 1631">Environmental Specialist. These members are more familiar with the release of hazardous materials into the environment surrounding an mishap scene.</p> <ol data-bbox="451 1648 1247 1879" style="list-style-type: none"> <li data-bbox="451 1648 1247 1717">1. They may work with bioenvironmental engineers to determine hazards, mitigation efforts, and protection. <li data-bbox="451 1738 1247 1879">2. They will normally take efforts to contain any hazardous runoff or releases from spreading to other areas outside of the crash site. As such, they may find scattered remains that have been carried off-site by flowing water.

Role	Related Responsibilities
	<p>Readiness Technician. These members have a great appreciation for operating within hazardous environments and what is required for testing to determine hazards.</p> <ol style="list-style-type: none"> 1. They may be on scene to help organize overall response efforts and may coordinate for other CE support. 2. They often work with EOD, the bioenvironmental engineer, firefighters, and environmental specialists to determine precautions to take on site while working in the hazardous environment.
Safety representatives	<p>Primarily for aircraft mishaps, the tasked or responsible wing sends a trained flight safety officer, who may become the ISB Investigation Officer (IO).</p> <ol style="list-style-type: none"> 1. The flight safety officer is at the mishap scene to ensure there is preservation of physical evidence. 2. For other mishaps, a safety officer from ground safety may be involved. 3. Safety officers should be directing photographers to preserve the scene and to take photos and videos of any efforts that may take place and could or will disturb the scene.
Mishap Investigations	<p>Air Force mishaps are identified in AFI 91-204, <i>Safety Investigations and Reports</i>, and the many categories are listed in Paragraph 1.6 Mishap Categories (see Appendix B-1). Mortuary Officers supporting S&R should be aware of the categories, as the category could affect how you respond. Be aware that there may be two boards.</p> <p>The primary board is the safety investigation board (SIB).</p> <p>The other board is for legal investigations — an accident investigation board (AIB) for aerospace mishaps and a ground accident investigation board (GAIB) for ground mishaps not involving aerospace assets. The accident investigation board may be conducted concurrent or in parallel with the safety investigation board.</p> <p>Safety and legal investigations are not the same. Services S&R may have to provide support to both boards.</p>

Role	Related Responsibilities
	<p>Safety Investigation Board (SIB). The SIB is for mishap prevention and only the factual portion of the SIB report is releasable. (The SIB operates per AFI 91-204.)</p> <ol style="list-style-type: none"> 1. The SIB is the formal mishap investigation board appointed by a MAJCOM commander. 2. The SIB is composed of the SIB President, an Air Force Safety Center representative, an investigating officer, a pilot member, a maintenance member, a medical member, a commander's representative, and a recorder. 3. Armed Forces Medical Examiner Teams are medical members and may have primary or secondary jurisdiction under federal law. 4. Experts in their field are added on as functional teams when required. 5. Field investigation may be from a week to ten days. 6. Lower echelon commanders may convene an SIB when broader expertise and objectivity are required to investigate a less serious mishap. 7. A formal report is released but controlled. <p>Accident Investigation Board (AIB) and Ground Accident Investigation Board (GAIB). AIBs and GAIBs are legal investigations to develop and report the cause or causes of the mishap and those factors that substantially contributed to the mishap. AIB and GAIB reports are releasable in their entirety. (The AIB operates per AFI 51-503 and the GAIB operates per AFI 91-507.)</p> <ol style="list-style-type: none"> 1. The AIB or GAIB team is appointed and begins its investigation as soon as it can do so without interfering with the SIB team. 2. AIB and GAIB Presidents are usually field grade officers (or civilian equivalent for GAIB), senior in grade to persons involved in the mishap and come from outside the mishap wing (for AIBs) or the squadron or group (for GAIBs), unless waived. <ol style="list-style-type: none"> a. For Class A aerospace mishaps involving a fatality, the AIB President is a General Officer or Brigadier General (select).

Role	Related Responsibilities
	<ul style="list-style-type: none"> b. For aircraft mishaps, AIB Presidents are pilots or navigators with experience in the aircraft involved. c. For missile or space mishaps, AIB Presidents are a missile or space operations officer with expertise and experience in the system involved. d. GAIB Presidents are individuals with sufficient knowledge, skill, or training regarding the accident subject area. <p>3. Team Composition. Required AIB and GAIB members include a President, a Legal Advisor, a Recorder (for AIBs), plus others as required.</p> <p>4. Legal investigations may follow up on the SIB investigation and may be in the field longer than an SIB field team.</p> <p>5. The AIB and GAIB investigation processes include procedures for notifying the next of kin of persons killed or seriously injured in the mishap and releasing the investigation to the public.</p>
Security Forces	<p>Security Forces (SF) respond to secure the area and prevent intrusions.</p> <ul style="list-style-type: none"> 1. Since many mishaps occur off base where SF have little or no jurisdiction, they should have pre-coordinated security arrangements with civil law enforcement personnel, including: <ul style="list-style-type: none"> a. Establishing liaison with local police authorities to ensure prompt reporting of off-base mishaps. b. Adequate traffic control en route to the mishap scene. c. Security at the scene. d. Help in communicating with people at remote mishap locations, such as use of police radio nets to speed up initial communications. 2. They may have to work with local or state wildlife officials to obtain support for or to allow use of weapons to keep varmints from removing remains at a mishap site.
Other military-related personnel	<p>Judge Advocate (JAG).</p> <p>Memorandums of agreement and understanding (MoAs and MoUs) should be run past the JAG for review prior to being maintained by wing plans (XP).</p>

Role	Related Responsibilities
	<ol style="list-style-type: none"> 1. A JAG representative at a mishap or off-base emergency response (that involves S&R) may be more aware of all existing MoAs and MoUs or know which office can assist in locating any of these types of agreements. 2. The JAG is available for legal advice concerning various legal questions, which may arise during S&R. Advice may include issues of jurisdiction over the remains to proper handling of potential claimants. <p>Contingency Contracting Officer (CCO).</p> <ol style="list-style-type: none"> 1. The CCO is an important element of the response, as they can use contingency or emergency procedures to obtain resources when base resources are exceeded. 2. They can help with obtaining contract support of water, food, utilities, equipment, vehicles, and supplies that the response, S&R, support, and mishap investigation teams will require. 3. For bases that have converted (such as under A-76) to contract support, many key emergency response positions (i.e., CE operations and fire, Services, security) could be affected. The CCO may be able to authorize unforeseen contract changes to provide proper support. <p>Public Affairs (PA). PA representatives maintain liaison with civilian media and manage media inputs for contingency operations.</p> <ol style="list-style-type: none"> 1. They must be knowledgeable of mishap and other contingency plans and respond to mishaps and incidents. 2. They may be of value in keeping media personnel informed and help to avoid media intrusion in S&R efforts.

Role	Related Responsibilities
	<p>Special Agents. Office of Special Investigations (OSI) and other military special agents (as well as agents from various federal departments) could be in charge of the loss location when a criminal or terrorist act has caused the deaths. Their procedures take precedence and S&R must be coordinated with them as a part of evidence gathering and preservation. They may have control of the site, but work with OAFME, as the local medical examiner or OAFME retain control of the remains (See following section on <i>Federal, state, or local investigation teams.</i>)</p> <p>Airfield Management. Airfield managers work with civil engineer (environmental planners, natural resource officers, and operations and maintenance technicians) and local and state authorities to determine the best methods to mitigate airfield hazards and bird/wildlife aircraft strike hazards (BASH). While S&R efforts are underway, they may be better trained and equipped for supporting efforts to deter wildlife from scavenging the mishap scene based on their airfield BASH equipment, techniques, and professional contacts.</p> <p>Alert Photographer. Alert photographers are directed by the ISB Medical Officer and Investigating Officer; they assist S&R team efforts by documenting location and position of remains and personal effects. Support includes still photos and video.</p>
MAJCOM or Component Forward/Rear HQ Services representatives	<p>Determine the lines of communications and the chain of command for reporting. These will vary by type of incident, location, branches of service, and major commands involved.</p> <ol style="list-style-type: none"> 1. Always start with your MAJCOM or theater Services representative. 2. Determine the collateral commands and services to notify as the authorities for actions (i.e., deployed unit, home station, deploying command). 3. Determine the circumstances where you may be contacting AFSVA/SVOM directly or through your higher chain of command.

Role	Related Responsibilities
Civilian authorities	<p>Local, state, or country authorities may have jurisdiction for all or various aspects of: emergency or mishap response, search and rescue, and search and recovery. Work with the JAG and your military counterparts to these agencies when dealing with the following.</p> <p>Coroner or medical examiner (usually referred to herein as the ME). The ME may own the mishap or mishap scene and are responsible for release or turnover of remains to the mortuary.</p> <ol style="list-style-type: none"> 1. The ME may work with military medical authority as coordinated under a MoA, MoU, or per agreement coordinated by the OAFME. 2. Depending on the circumstances and location, the ME may direct recovery operations within a hazardous situation. 3. The ME identifies the deceased. <p>Federal, state, or local investigation teams may be involved with initial evidence gathering at an off-base mishap until it is determined that the military has jurisdiction or can share investigation responsibility. They will also be involved with any mass fatality-casualty efforts tasked under the NRP. Department of Homeland Security (DHS) directorates and agencies will have jurisdiction for various aspects of the response and investigation. Military mortuary affairs support is a part of NRP support.</p> <ol style="list-style-type: none"> 1. Work with Security Forces and OSI for any security related issues. 2. A military safety coordinator may be appointed-provided by the AF Safety Center to coordinate efforts with civilian authorities for aircraft mishaps. 3. For suspected terrorist events and mass fatality incidents, DHS agencies such as the Federal Bureau of Investigation (FBI), Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF), and other federal investigatory agencies may take over and direct actions in spite of normal state, local, or military jurisdictional authority. The OSI or resident installation special agent and the OAFME are the military's points of contact for working on-scene Services S&R efforts with federal involvement.

Role	Related Responsibilities
	<p>Local fire department crash rescue/recovery personnel and search and rescue (SAR). They are usually the first responders responsible for firefighting, life saving, and SAR.</p> <ol style="list-style-type: none"> 1. They may have to transition their efforts to assist Services in S&R at hazardous locations. 2. In case of building fires or collapse of structures, local departments may have to conduct criminal and arson investigations and SAR concurrent with Air Force initial responses. 3. They may remain on scene to support Services' initial S&R. <p>Law enforcement. State and local law enforcement usually has jurisdiction for off-base responses. Work with Security Forces and OSI for any security related issues.</p> <p>Federal Aviation Agency or National Transportation Safety Board. While not typically involved with a military mishap, they may be involved if the mishap also involved a collision with a civilian aircraft or the aircraft is a military charter.</p>

NOTE: For bases that use A-76 contracts for operations and maintenance support, always closely review the statement of work for the contractor's specific capabilities, taskings, and support requirements as they directly relate to mishaps. Develop and include mishap response plans in A-76 studies and contract documents to ensure that support will be adequate to support Services during on- and off-base mishap responses. Contracting officers must be intimately knowledgeable of contract requirements and support capabilities during mishap responses.

Civilian community initial response members (i.e., those that provide SAR, S&R, law enforcement, environmental, fire department, and coroner or medical examiner support) are usually involved in all off-base mishaps. For the most part, Security Forces, Medical Group, and Civil Engineer (CE) environmental and fire department personnel have knowledge of the cooperative agreements with their civilian counterparts and can be of assistance.

However, the jurisdictional medical examiner (ME) **can own the scene of off-base mishaps and control the remains**. What you do must be cleared with them; they may even assume some or most of the immediate responsibility for the remains. Coordinate with the OAFME to work issues of control of remains and S&R efforts.

Ensure that you notify the ME that for deceased military, the **ME's office should not take action for the care of the remains**, as the Services Mortuary Officer will act as the agent for the person authorized to

direct disposition of the remains. The ISB Medical Officer would normally provide them with similar guidance regarding control and disposition of clothing and other personal effects and life support related items, if remains had to be moved or removed from the site.

NOTE: When local identification is adequate, the person authorized to direct disposition of the remains may use the mortuary of their choice as coordinated by Services. If identification cannot immediately be made locally by the ME, OAFME, or OAFME working with the ME, then the remains or DNA samples may have to be shipped to Dover for further identification efforts. If this presents difficulties, then OAFME can work within the ME's facilities, but this can present legal and funds management issues regarding paying for unfunded expenses.

For aircraft crash sites, unless the mishap is quite remote, members of the media are likely to be present when S&R is conducted in CONUS, PACAF, or USAFE. It is a frequent occurrence that mishap response teams have been hampered by news media helicopters hovering overhead or media vehicles blocking roads at the mishap. S&R responders may face some of the same difficulties with media representatives being present when S&R teams perform their duties. When off-base, unless an area has been declared a National Defense Area (NDA), local law enforcement, MEs, and other emergency responders have the authority and responsibility to protect the area from damaging intrusions, as well as to protect on-scene crews from danger or injury. Work with them to provide as much isolation from the media as necessary to do your work.

Figure 4. S&R May be Quite Difficult Even without the Media Creating Additional Hazards.



You will probably be working in a hazardous environment such as chemical or fuel spills, biomedical hazards of human remains (i.e., bloodborne pathogens), burned areas, loose debris, composite materials, other sharp objects, and dangerous terrain. It is important that media helicopters keep their distance. Law enforcement personnel can usually advise media copter pilots of the conditions and warn them what/how to avoid or not to create any rotor downwash that would kick up toxic materials, rekindle fires, or create flying debris. If this does not work, then law enforcement, emergency management, or fire personnel can contact the Federal Aviation Agency (FAA) Flight Standards District Office to keep media aircraft away from or at higher altitudes near the mishap, even if the National Transportation Safety Board (NTSB) is not investigating the mishap (i.e., solely a military aircraft).

Memorandums of Agreement or Understanding. There may be several memorandums of agreement (MoAs) or understanding (MoUs) that apply to an off-base mishap. Depending on whether the aircraft is military or a Civil Reserve Air Fleet (CRAF) aircraft, the investigation may be military, FAA, NTSB, or

even an international effort. Memorandums may involve law enforcement, transportation authority, fire department, state-local search and rescue units, medical response and treatment, and ME agencies. Jurisdiction varies depending on geographical areas, so determine with the JAG or the agency's military counterpart if there is a MoA or MoU with the responding civilian authority. The Mortuary Officer and the Medical Group each have responsibility to ensure that there are MoUs (or an overall agreement or response plan) to provide support for and transitions between medical treatment, medical examiner support, and mortuary responsibility. The Mortuary Officer should coordinate or develop MoUs with the Medical Group and obtain a copy of all MoAs and MoUs with local MEs. The local responding medical officer is normally the main point of contact for issues that may arise during the interim mishap board portion of a mishap response.

When there is a death of a service member, jurisdiction must be determined. There are three kinds of jurisdiction: exclusive federal jurisdiction (there is no civilian (local) authority), concurrent jurisdiction (either civilian (local) or military authorities can have jurisdiction), and proprietary jurisdiction (usually entirely civilian (local)). For concurrent jurisdiction, a local ME with jurisdiction may waive jurisdiction to allow military efforts. Deaths in areas of exclusive federal jurisdiction belong to the OAFME. Military bases are not necessarily under exclusive federal jurisdiction. In all cases the local JAG should be consulted regarding authority. The individual with jurisdiction has authority to order and perform an autopsy on human remains.

Figure 5. MoUs Are Very Important for Fatal Military Mishaps-Mishaps Off Base.



Regardless of the jurisdiction, the OAFME must be notified (normally by the medical officer or OSI (when criminal or terrorist actions are suspected)). The OAFME will perform autopsies on all military aircraft mishaps for which it can obtain jurisdiction. Agreements on S&R, control of the mishap site, and preservation and identification of the remains are of prime importance at military mishaps and terrorist attacks. The OAFME must be contacted to make arrangements.

Agreements and procedures affecting S&R are not always clear-cut and geographic circumstances can influence agreements. S&R efforts may be dictated by where a mishap occurs. Many airlift support requirements are met using Civil Reserve Air Fleet (CRAF) aircraft (i.e., civil air carriers committed to provide support by contract) and the location of the mishap may dictate the responsible parties and the procedures used. The following S&R case study on the December 1985 Gander Newfoundland crash points out the importance of developing mutual agreements and having standard procedures to rely on before an emergency response.

Table 2. Case Study of a Complicated S&R Involving a Contract Military Transport Mishap.

Action	Remarks
Mishap background	During the early dawn of 12 December 1985, the Army's 101 st Airborne Division lost 248 personnel.
	The aircraft was a DC-8 military contract charter flight (i.e., Arrow Air flight with a crew of eight).
	The personnel were returning from a six-month deployment to the Sinai as a part of a multinational force. They carried medical and dental records
	The aircraft crashed on takeoff at the end of the runway in Gander, Newfoundland, after refueling.
	All on board were killed by the impact or the resulting fires (that burned for more than four hours).
Initial S&R efforts	Canadian teams provided most S&R and mishap investigation, with minimal U.S. military and federal assistance allowed.
	There was no initial memorandum of agreement to allow US military or federal support.
	The Royal Canadian Mounted Police (RCMP) conducted recovery operations at the crash site, mapping out the crash site into an area 350 meters long by 50 meters wide. The area was further broken down into 10-by-10 and 10-by-30 meter grids.

Action	Remarks
Timeline of S&R	The first day after the crash was for S&R, where 125 bodies were discovered and 100 dead were removed to a temporary morgue set up in a hanger at Gander International Airport.
	Three days after the crash, a US-Canadian MoU was signed to allow military S&R tagging of remains and sending the remains and effects to Dover AFB.
	Four days after the crash, the RCMP announced that all remains were believed to have been removed from the crash site. A six-inch snowfall covered the crash site before a final sweep could be made.
Mortuary expert inputs	Canadian and US Office of Armed Forces Medical Examiner (OAFME) pathologists at the Dover mortuary center jointly agreed that an adequate inventory of remains had been retrieved. .
	Seven days after the crash, the decision was made to preserve the site.
	AFIP personnel visited the crash site to examine and photograph the wreckage and document ground gouges, tree strikes and burn patterns.
	Eleven days after the crash, all autopsies of the collected remains had been completed. There were at least two bodies that had not been recovered.
Bargaining for an MoU	Seventeen days after the crash, planning began immediately to reopen S&R operations.
	Negotiations held on how to approach S&R and what procedures would be used for the crash site.

Action	Remarks
Second S&R	Twenty-eight days after the crash, a second S&R effort was carried out primarily by five four-man teams composed of Army graves registration specialists.
	An additional four-man team was added two weeks later to provide for relief and rotation of the S&R teams.
	Approximately 10-meter square shelters were constructed for use on the site to allow propane jet heaters to melt the snow.
	Army graves registration teams divided the enclosed areas into one-meter-wide lanes, with one specialist working each lane. The specialists conducted the search on hands and knees with brick mason trowels and garden tools to sift through the soil and ash.
	Because almost all medical and dental records were on board the aircraft, recovery efforts included trying to recover these items as well as remains and personal effects.
	The second S&R lasted 26 days and was completed 54 days after the crash. Recovery consisted of the following. <ol style="list-style-type: none">1. Two complete remains.2. Over 300 anatomical portions.3. Approximately 100 health records.4. Four and one-half tons of personal effects and unit equipment.5. A hanger full of aircraft parts uncovered during the second recovery mission.

Action	Remarks
Final identification results	<p>All 256 souls on board were identified.</p> <ol style="list-style-type: none"> 1. 226 were identified from fingerprint and dental comparisons. 2. 22 were identified by combinations of association of personal effects, anthropologic, medical, radiographic and dental comparisons, and facial reconstruction drawings. 3. 8 bodies, which lacked any type of identification, were identified by a comprehensive effort that reviewed or created data from oral pathology, anthropology graves registration (personal effects), mortuary affairs, pathology, radiology photography, facial reconstruction, and an FBI disaster squad fingerprint effort, using an automated data processing and medical records/repository (library) system to sort and process the materials and information.

While Air Force Services has standard S&R procedures and teams, each mishap or mishap is different. S&R procedures, equipment, and techniques must be tailored to the mishap, circumstances, weather, and the jurisdictional authority's requirements.

Media Precautions. Since S&R teams can still be either in the media spotlight of a camera lens or a microphone, teams must use precautions when conducting on-scene operations and communications. When possible, plan to use encrypted radios to avoid interception of sensitive information. While megaphones may be useful and okay to use in some locations, and **may be required** for safety's sake, team chiefs and team leaders should usually consider using walkie-talkie type systems with hands-free microphones most of the time. They usually provide for better, quieter communications. Take precautions when using cell phones and carefully control your equipment if you must take photos during contingency or emergency situations. Take advantage of any existing or brought-in screening materials (vehicles, trees, tents) that can be used when setting up mortuary support equipment on scene.

Be aware of where media are located and advise law enforcement of any immediately occurring sensitive procedures when recovering remains (i.e., picking up large body parts or intact remains). Law enforcement can help divert media intrusions, especially where the media may want to approach personnel removing and carrying remains.

In addition to normal pre-S&R team briefing on procedures and the stresses of the situation, it is advisable to let team members know the extent of press coverage at the site. This can help team members be more tempered in their actions, which could be misinterpreted or blown out of proportion by the media.

Ensure that the on-scene Public Affairs representative is knowledgeable about your procedures, so media personnel can be briefed regarding the basic processes being used and the stresses that can be placed on the teams. Most media personnel will not be familiar with military S&R requirements and procedures.

Figure 6. September 11th Pentagon Search and Rescue Followed by Search and Recovery Stress Emergency Responders.



SECTION 2. NOTIFICATION AND S&R PLANNING

S&R Notification Process. For most fatal incidents, proper notification normally starts with a wing command post (CP) emergency operations controller (or similar function when deployed) following emergency action plans (EAPs) or operating instructions (OIs). The controller calls the Services Commander in the capacities of Mortuary Affairs Officer (MO) and Search and Recovery (S&R) team chief. While deployed, the contact may be through the Services Control Center. The CP continues EAP contacts to notify the other primary response support participants, including civil engineers and logistics readiness, which Services will have to directly rely upon for initial S&R efforts. The CP would also notify the mission support group commander, who coordinates and directs many overall support requirements for crisis actions, responses, and resource priorities.

Initial notification procedures should identify the situation of the incident, the basic location, the number of souls-on-board for aircraft mishaps or larger transportation mishaps or attacks (such as those involving a transport ship, charter aircraft, train, bus, or van), and that mortuary and S&R support may be required. If *confirmed* loss of life is known, then this should also be passed on to the Mortuary Officer. Upon notification, the S&R team chief needs to determine that there is an actual requirement for mortuary affairs support and S&R efforts. Not every loss of life incident requires S&R. The Mortuary Officer should determine whether or not deceased service members have been or will be recovered by a civil authority with jurisdiction.

If circumstances dictate that S&R is required, then the next step is to determine which type of response to use. There may be several detailed wing response plans to address loss of life based on mishap categories and the situation, such as related to a single seat or multi-seat military aircraft mishap, mass casualty from an mishap or hostile act, single or mass casualty deaths caused by natural disaster (such as a flash flood, tornado, etc.), or a terrorist attack. Whatever the type of loss, there are two initial actions required by the S&R team chief.

The first action is to initiate a notification and alerting of both mortuary support personnel and S&R team members. A recall could be initiated for S&R team members (if required) based on known information. If deployed, the Services Control Center can be fully activated. As a minimum, S&R OICs, NCOICs, and team leaders should be notified to begin initial actions to (1) pull together the mandatory S&R supplies and equipment and (2) identify any shortfalls in core and other S&R team personnel.

The second action is to follow EAP response procedures to gain early access to the mishap scene to determine the details of the loss situation. This is needed to refine requirements for the number of S&R team personnel, logistics support, personal protective equipment, vehicles, meals, water supplies, on-site mortuary holding-cold storage, etc.

There are two additional actions that run concurrent with the first two efforts: begin a **log of events** (Appendix A) and the **hazard assessment review process** (Appendix B).

Preparatory Notifications. With the initial team actions underway and with your present knowledge of the fatality situation (i.e., there is more than one fatality or there is dismemberment (even with a single fatality)), the installation's MO should request mortician assistance with the S&R efforts. This request

should be through the MO's MAJCOM Services mortuary personnel notifying AFSVA/SVOM. This will also allow the MO to press ahead with other initial efforts. It will also allow AFSVA/SVOM to initiate actions to provide assistance as requested. When more specifics are known on the fatality situation (i.e., there are multiple fatalities from a single incident (usually three or more fatalities from the same base) and when all families are present at the installation), then the MO should request AFSVA/SVOM to provide assistance for working with and briefing the families. This will also help the MO to press ahead with many other urgent taskings.

Site-Specific Considerations. While usually not a first responder, the Services commander or division chief should try to arrive on site as early as possible to conduct a site investigation. Services' initial response is normally as the MO going on-site with the follow-on response element. When on site, the MO determines if S&R is appropriate. As the S&R team chief, the MO must consider many aspects of support and hazard assessment (see Appendix B). After actually seeing the loss site and determining the condition and number of remains that will be recovered, the S&R team chief needs to consider numerous response requirements and support required for the various agencies (i.e., security forces, fire department, environmental and engineering technicians, etc.). When determining support-response requirements, especially for those involving aircraft impacts, there are at least eight major areas to consider: **time, terrain, temperature, trajectory, threats, transportation, teams, and training.**

Time. When can you get to the site and how much time do you have to work the first day and then each following day? What will be the travel time? What about the time that each team can be available on site (based on stress factors, meals, cleanup, etc.)? What is the expected total time for primary S&R? What about total time on site to support investigation teams and be present during wreckage movement-removal?

Terrain. The type of recovery is primarily based on the terrain and trajectory of impact as they affect scatter of wreckage and remains. The terrain also affects the S&R teams' ability to approach the location, maneuver at the location, identify objects and remains, and then remove the remains.

Table 3. Terrain-Based S&R Considerations.

Terrain Type	Primary S&R Considerations
Open field	<ol style="list-style-type: none"> 1. Typical S&R site sweep search patterns and recovery can be used. 2. The extent of human remains scatter can usually be estimated easily based on scatter of aircraft wreckage (unless an ejection seat was used) 3. Except for impact craters, remains may be more accessible for recovery. 4. The site can be more easily secured to protect against scavengers.
Brush land	<ol style="list-style-type: none"> 1. Depending on the height of brush and whether or not it burned, standard search patterns may have to be altered. Rope or barrier tape-marked boundary lanes and grids may have to be used for S&R searches. 2. The extent of scatter is harder to determine for both human remains and wreckage. Cadaver dogs can help identify the limits of search areas. Determine if these animals are available in your area and what type of efforts they can support. 3. The site may pose hidden hazards from animals and reptiles. 4. Scavenging by varmints can be a major concern. 5. Some remains may be embedded within brush piles and bushes. These may be hard to reach and may not be readily recognizable except by smell. 6. Mapping the location for remains is more difficult, but good results are possible using proper GPS survey methods, lane marking, and alternate methods for marking and sighting.
Desert	<ol style="list-style-type: none"> 1. Generally the same concerns as for brush land except for barren deserts with primarily sand and rock. 2. Barren deserts usually have the same concerns as open fields and may be searched using standard sweep patterns. 3. Temperature extremes may greatly shorten the ability to perform some S&R tasks when higher levels of PPE are required (i.e., full coveralls, Tyvek® suits, etc.)

Terrain Type	Primary S&R Considerations
Water (lake-river-ocean shore)	<ol style="list-style-type: none">1. Water S&R normally requires <i>immediate</i> efforts to obtain support from special civilian S&R teams, Navy or Coast Guard dive teams with S&R training, or specially trained AF personnel who can provide support.2. The type and depth of water are a major consideration due to submerged debris, unknown scatter of remains, and possible movement of remains and debris due to tides or water flow.3. Typical S&R sweep search patterns and recovery may not be possible except in shallow water.4. May require underwater cameras to allow videotaping of the scene and various aspects of the recovery process in lieu of other search techniques.5. For rivers (or creeks, irrigation canals, etc.), rapid movement of remains downstream can be a major concern that requires action to have personnel pick up floating remains.6. Requires boats and special purpose teams and equipment.7. Scavenging can be a severe problem (by creatures great and small), especially in some salt-water locations.8. Hazardous liquids can make the location a multi-hazard environment where special PPE is always required.9. Mapping the location for remains can be quite difficult and only rough order GPS methods may be possible.

Terrain Type	Primary S&R Considerations
Swamp	<p>Other than operating under hostile fire, this is often the most hazardous place to conduct S&R operations and can cause more CISM concerns than many other recoveries of the same size.</p> <ol style="list-style-type: none">1. Generally all the same concerns as would be expected by combining brush land and water body recoveries, except that the water may not be flowing.2. Typical S&R search patterns and recovery may not be possible except in shallow water.3. Depth of the water and hazardous reptiles can be major problems.4. Fatigue- and temperature-related stresses are major limiting factors. Heat stress is normally a critical factor.5. Searching techniques that require feeling for remains (even with poles and tongs-grasps) in obscured waters can be an extreme CISM concern.6. Hot weather swamps can pose extreme biomedical hazards due to exposure to decomposing remains and blood-borne pathogens, as well other environmental hazards.7. Cadaver dogs maybe required to find scattered remains near the surface of the water. <p>Exposure to floating or continuously released hazardous fuels or chemicals can create life-threatening situations when not immediately detected.</p>

Terrain Type	Primary S&R Considerations
Mountain-steep slopes	<p>Mountainside recovery concerns vary by the degree of slope, the location on the slope, the rock and earth geology, and the wreckage and remains scatter. (See Appendix B)</p> <ol style="list-style-type: none"> 1. Typical S&R search patterns and recovery techniques may not be possible. Lane and grid searches using tethered members may be required. Special teams and assistance may be required immediately. 2. Talus is the accumulation of rock debris on a slope or at the base of a mountain or cliff. Fractured-rock talus slopes can be made up of rock sizes that range from small boulders to gravel. These loose talus slopes can be extremely dangerous due to unstable conditions that can cause gradual or sudden collapse. The collapse can bury or injure S&R team members and further cover up remains and wreckage. 3. On lower slopes, up-slope overhangs can collapse on S&R team members. 4. Scavenging can be a problem. 5. Mapping the location for remains can be quite difficult and GPS and standard surveying methods may not be as useful or possible.
Forest and tropical forest-jungle	<p>The types of forest vary greatly. All forests can create problems with sighting and recovering of remains caught within trees or dense tree canopies.</p> <ol style="list-style-type: none"> 1. Generally the same concerns as for brush lands, except that dense forests and jungles create even greater visibility problems and hazards for S&R teams. 2. Forests can pose major problems for obtaining GPS readings. Lane and confined-area grid searches and manual marking for mapping may be required. 3. Scavenging can be a major concern. 4. Decomposition is a major concern. 5. Heat stress is a major concern in jungles and tropical forests.

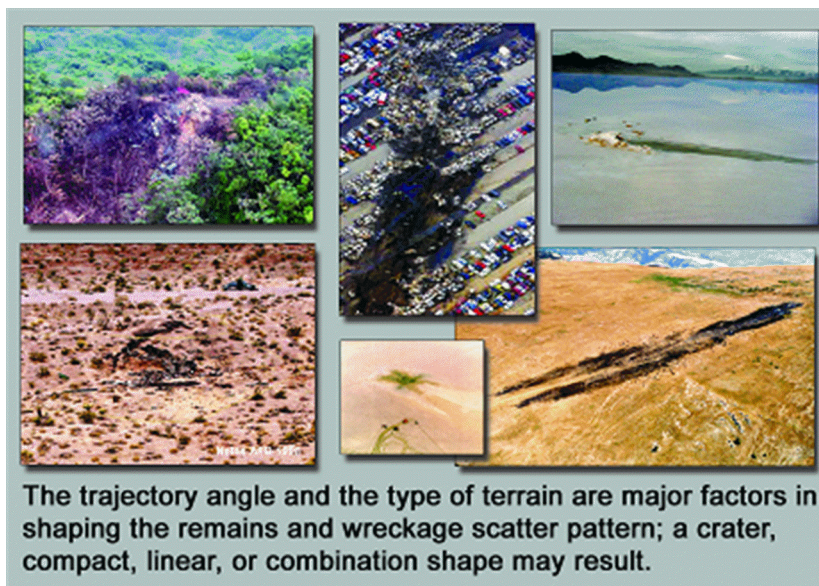
Terrain Type	Primary S&R Considerations
Buildings (including multistory buildings)	<ol style="list-style-type: none">1. Condition of the facility is a major concern and possibilities of collapse must be considered.2. Ceiling and floor collapse risks must be ascertained prior to entry of each part of the building.3. S&R may have to be done along with an accompanying shoring team and firefighters.4. Specially trained urban search and rescue team structural technicians may have to accompany the Services S&R team.5. Normal search methods are not practical for most buildings. Room-by-room confined area searches are normal. Cadaver dogs may be required to find remains buried in debris.6. Marking of remains and identifying personal items can be a problem, especially in very confined quarters. Concurrent marking, photo, and recovery-removal may be used to mark and bag remains.7. Breathing apparatus and respirators may be required, especially when there has been a fire involved.8. Hazardous materials such as asbestos or other insulation products must be considered along with possible combustion hazards. As a minimum, all participants should be in coveralls.9. Plotting of remains and personal effects within rooms and halls (corridors) is usually done by using tape measures and estimating positions on floor plans or grid drawings for each room and hall.10. S&R tagging nomenclature is changed to reflect the names or designations on the floor plans.

Terrain Type	Primary S&R Considerations
Snow-covered areas	<ol style="list-style-type: none"> 1. Requires special clothing for protection from overheating, freezing, and wet snow and moisture buildup. 2. Normally requires special equipment and vehicles to access the site. 3. Access location normally has to be near but not at the site if helicopters are used, due to chances that down-wash will obliterate signs of remains and wreckage. 4. Special equipment for use on site such as snowshoes, ski poles, longer stakes, longer flags, shovels, large area tents, and large heaters to melt snow. 5. Cadaver dogs normally required to find buried remains in deeper snows.

Temperature. The temperatures and humidity may have a drastic affect on how long remains are recognizable or identifiable. It also affects the type of equipment team members need and the number of team members required based on heat stress or cold stress.

Trajectory (at impact). For aircraft mishaps, except for a mid-air breakup, the trajectory at impact is normally a very deciding point on the type and scatter of remains. Vertical impacts tend to be very compact and may crater in soft soils. Shallow impacts are linear, but can cause a compact or very wide scatter of wreckage and remains. Trajectory, speed, and terrain each play a part in scatter. The wider the scatter and the more terrain covered with debris and remains, the larger the total team requirements and the amount of resources required for S&R.

Figure 7. Examples of Trajectory Impacts.



Threats. Whether CONUS or OCONUS, contingency responses must consider any possible threats to S&R team members at mishaps or other losses. These range from: fire hazards; biomedical bloodborne pathogen hazards; hazardous materials, chemicals, fuels, and objects; hostile threats from an enemy; possible poisonous or deadly flora or fauna (i.e., mammals, insects, amphibians, reptiles, marine life (fish, mammals, invertebrates, etc.); conventional chemical contaminated remains; and chemical, biological, radiological, and nuclear (CBRN) contaminated remains. Assessing the threats will dictate **if or when** you can conduct normal S&R, the size and type of teams, the type of S&R recovery operations, the PPE that will be required, and any other associated support personnel and equipment required. Threats can dictate the requirements for replacing or cleaning of PPE and clothing. Fire department, security forces, environmental specialists, and medical personnel all have a critical role in identifying threats and their impacts on S&R.

Transportation. What is needed to get the S&R teams to the site, sustain their mission, and support them as they shuttle back and forth to the site? Will travel back and forth from homestation be feasible or will lodging be required in the area? For some remote areas, contingency lodging may be required and contingency equipment sets moved forward. Consider maintaining serviceable home station training (HST) equipment (tents, feeding equipment, etc.) in a trailer, or have a pre-identified source where a trailer or truck can be rented.

Teams. Given the recovery area size, terrain, condition of the remains, number of remains, temperature and PPE-related heat/cold stress factors, will the standard 13-/26-person teams be adequate? Will additional military personnel have to be tasked, cleared, and trained as augmentees? Are military S&R teams required from other bases? Will civilian teams be required to augment portions of the support or even conduct some of the efforts? For mass casualty mishaps or incidents involving weapons of mass destruction, federal teams may have to be accessed.

Training. Besides situational and critical incident stress management (CISM) briefings, what just-in-time (JIT) training may be required to meet the S&R situation and use of PPE?

In addition to the above, it is **a necessity** to determine if there were other humans or animals killed at the location. Mishaps such as an aircraft crashing into an occupied residence, across a roadway, or in an open field with cattle will all create other remains that may make it hard or impossible for S&R team members to clearly distinguish the various military remains. It may also require that civil authorities maintain full control of S&R. Let the Services mortuary chain of command know if other losses are involved or suspected. OAFME may have to provide earlier support to help determine the type of remains during even initial S&R. Once you have identified the above site-specific considerations, then you move on to refining the basic plans for logistics support.

Determining Basic Logistical Requirements. Services officers wear a dual hat for many mishaps and mishaps; they normally have to consider contingency site support for personnel at the scene (contingency meals, water, lodging, etc.) as well as plan for mortuary S&R. The primary emphasis of this handbook is for the **S&R-specific efforts** and does not address contingency site support in detail. Contingency site support should be addressed in standard response plans.

There is a minimum basis for having S&R supplies to be used in a field deployable S&R kit. Some S&R supplies are required by practice (i.e., they are mandatory for the operation). Other supplies are required based on analysis of the situation and circumstances (i.e., personal protective equipment (PPE), terrain, temperature, condition of the remains, etc.). **Table 4.** lists mandatory and basic requirements for S&R. **Bold text items** are basic requirements or categories of support (depending on your geographic location).


Some items are listed based on field experience and common use. They are not necessarily addressed in even the latest addition of AFI 34-242, *Mortuary Affairs Program*. Where experience has shown that other items can be or have been used or substituted, and when additional items may be necessary, these are presented in *italics*.

Table 4. Basic S&R Logistics (Supplies, Equipment, and Support) Requirements.


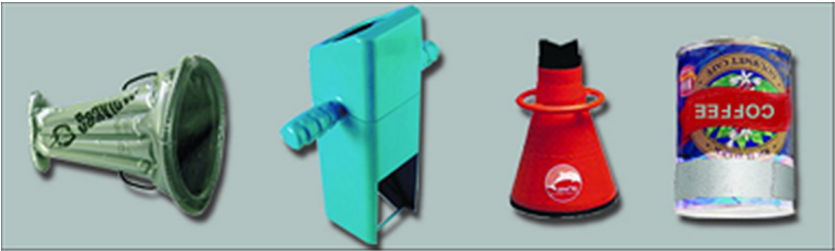

Item	Minimum Quantity
S&R recovery items	
Human Remains Pouch (HRP) More than one HRP per soul-on-board will probably be required for all mishaps and mishaps. Being able to rapidly obtain additional HRPs from Logistics Readiness supply is a must.	8 each
Plastic Bags 18 inches x 12 inches 1. This is a standard GSA-type supply item. 2. The Military Specification requirement is for heavy duty, waterproof, greaseproof, transparent bags made from polyethylene . 3. <i>If additional bags are required, consider using top-closing, polyethylene-based: heavy duty freezer bags, hospital bio-medical waste or specimen bags, and commercial grade food storage and industrial parts service bags as suitable substitutes. These come in a large assortment of sizes that may better meet the needs on site.</i> 4. <i>Bags are readily available locally or on a rush order from many manufacturers and regional distributors.</i> 5. <i>Heat-sealable bags with a vacuum-sealing machine can provide better protection from biohazards.</i>	1,000 each
Grease pencil, china marker <i>Standard opaque, permanent markers or laundry markers have proved to be reliable for marking stakes, bags, tags, flagging, and flags. Have these on hand in the same quantity as above, but also keep a few grease pencils and china markers.</i>	24 each
Tag, shipping, cloth with wire tie These are standard shipping tags (NSN 8135-00-178-9193).	5,000 each



Item	Minimum Quantity
<p>Stakes, at least 4 feet long, locally manufactured (by contract or CE if necessary). Large numbers of these stakes may not be readily available or useful at many mishap-mishap scenes. Alternative products should be considered. <i>Examples can be found at http://www.quikstake.com/surveyor/surveyor.html or more commonly as shown. See Section 4 Marking Stakes, Flags, and Tapes.</i></p> <ol style="list-style-type: none"> 1. <i>For confined areas, areas with many individual fragmented remains, and remains in open fields without obstructions, small marker flags can be used for much of the marking.</i> <ol style="list-style-type: none"> a. <i>High visibility flags in various colors are readily available from surveyor supply distributors.</i> b. <i>Various colors can be selected for use at mishap scenes to more easily allow mishap and safety investigation teams to see the layout of tagged and removed items and remains (i.e., remains, personal effects, critical aircraft parts, impact points).</i> c. <i>Flags may be obtained with wire flagsticks of 15-, 21-, and 30-inch lengths in various flag sizes, which can aid in marking in high grass and brush.</i> 2. <i>Wire-type flags can be wrapped around objects to help with siting marked remains and personal effects tagged locations in dense brush or forest areas.</i> 3. <i>High visibility survey flagging (matching the flags) of 1-, 1 1/4-, and 2-inch widths can be used to help with easier siting of tagged remains and personal effects in brush or forest areas. Permanent markers can write upon them for additional reference control.</i> 	<p>1,000 each</p>


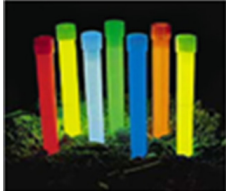





Item	Minimum Quantity
<p>4. <i>For areas with very hard soil, U-, T-, L-, and C-shaped lightweight steel fence posts can be used in place of tall wooden stakes to allow better driving into the soil.</i></p> <p>5. <i>Manual post drivers can be used with metal fence posts and wood stakes to aid in driving markers. They can be purchased, made by CE, or made under a contract.</i></p> 	
<p>Bed sheets, white (or a subdued color in a contingency environment) (flat, twin or double, same as used for normal bedding)</p>	<p>12 each</p>
<p>Leather gloves (work type, cowhide, sizes small through large) These are standard GSA-type supply items. Local purchases may be necessary for on-site replacement of lost, damaged, or contaminated items or to meet sizing needs.</p>	<p>26 pairs</p>
<p>Gloves, heavy duty (orthopedic) surgical gloves</p>	<p>5 packages</p>
<p>Masks, surgical type</p>	<p>5 packages</p>




Item	Minimum Quantity
<p>Personal Protective Equipment (PPE). S&R teams must plan ahead for stocking or immediately obtaining PPE. This is especially important when mishaps involve aircraft or combat losses involving other weapon systems (such as some Army special purpose vehicles) that include composite materials. MAJCOMs and air components will procure and stock enough PPE to outfit a 10-person core team.</p> <p>The recommended amounts/types are listed in AFI 34-242, Table 6.2 represent minimal PPE requirements to outfit one person for five days. Refer to the Services Agency Readiness website and TO 00-105E-9, <i>Emergency Rescue and Mishap Response Information</i>, Chapter 3. Additional sets should be obtained based on determinations made at the site investigation or where OCONUS bases may have to pre-position PPE due to possible supply line delays.</p> <p>The Bioenvironmental Engineer makes the final determination as to what type PPE (including respirators) are required based on the specific health risk assessment at the mishap site. Also contact the Bioenvironmental Engineer for guidance when responding to an expedient S&R at a combat loss where a specific health assessment cannot be accomplished before entry.</p>	
Steel Toe Boots	Initial minimum 1 pair each member
<p>Terrain-Unique Equipment. Minimum quantity not stated as requirements are determined by circumstances of the location and the number of personnel required for various aspects of S&R.</p>	
Water and Swamp Conditions	
<p>1. <i>Emergency rest-recuperation-wash station: Hydration fluids, energy snacks, eye wash, full body shower, private changing area, and towels-soap-water for self or directed decontamination of personnel (such as for someone who has slipped and been covered with contaminated water). Air conditioning may be necessary when there are heat stroke concerns due to extreme heat and humidity. A large RV can provide excellent support when there is roadway access to the area.</i></p>	
<p>2. <i>Flotation support: Power boat, rowboats, rubber rafts, tethered large inner tubes with ice chests, etc. Some items may be local area rental items or available from recreation services.</i></p>	
<p>3. <i>Life preservers or emergency flotation devices.</i></p>	
<p>4. <i>Hip boots or full waders.</i></p>	


Item	Minimum Quantity
<p>5. Underwater viewing. (Fish) Camera and screen. Available from many fishing-sporting goods stores.</p>	
<p>6. Underwater viewer. These can be purchased from many fishing-sporting goods stores, children's toy or science stores, or made from a large can with clear plastic wrap taped tightly over one end and the other end removed.</p>	
<p>7. Military diver wet suits Items can be obtained at local dive shops or some sporting goods stores, but are also a Defense Supply Center Philadelphia (DSCP) item. Prime Vendor support is at http://www.dscp.dla.mil/gi/general/mardiv.htm. DSCP contact is at diving@dscp.dla.mil.</p>	
<p>8. Snake Grabber Tongs are used for snake removal-control, but are also very controllable for reaching and picking up small objects or remains underwater.</p>	
<p>9. Insect repellent.</p>	
<p>10. Trekking (hiking) poles for balance and feel while wading.</p>	
<p>11. Longer length stakes and poles sized for siting and marking lanes and grid corners in shallow water.</p>	



Item	Minimum Quantity
<p>12. Lane (safety color) rope and heavy duty barrier tapes for marking grid and search lanes. (Available at safety and construction equipment supply stores.)</p>	
13. Steel toe boots with thick protective soles.	
14. Polarized sunglasses or goggles.	
15. Hydration pack backpacks.	
16. Machetes and other cutting tools as needed for the type of grasses and bushes.	
Brush and Forests	
1. Snake leggings or guards.	
2. Brush leggings or chaps	
3. Grid area searches: small tape measures, measuring wheel, garden hand implements (trowels, rakes, small hoes, etc.), lots of string, protective elbow and knee pads (penetration and padding).	
4. Hard hats if working around trees, scrub trees, rocky slopes, and rock overhangs.	
5. Recognition in area of restricted visibility: high visibility vests, whistles, flashlights	
6. Tall siting poles and grid marking poles	
7. Machetes and brush cutters	
8. Hydration pack backpacks	
9. Insect repellent	
Tropical Forests and Jungles	
1. Snake leggings or guards	



Item	Minimum Quantity
2. Grid area searches, especially where some work must be done on hands and knees: small tape measures, measuring wheel, garden hand implements (trowels, rakes, small hoes, etc.), protective elbow and knee pads (penetration protection).	
3. Brush leggings or chaps	
4. Dense jungle conditions and three-canopy tropical forests may require auxiliary lighting sets.	
5. Recognition in area of restricted visibility: high visibility vests, whistles, flashlights, various colored chemiluminescent light sticks (example: standard Federal Stock Code 6260 DLA item Cyalume® green NSN 6260-01-074-4229) to attach to personnel and siting poles.	
6. Machetes and brush cutters.	
7. Hard hats if working around trees, riverbank or rocky slopes, and rock overhangs.	
8. Hydration pack backpacks.	
9. Long ropes or heavy duty barrier tape to mark edges of search lanes and grid search areas to work around obstructions.	
10. Insect repellant.	
Deserts	
1. Snake leggings or guards	
2. Grid area searches: small tape measures, measuring wheel, garden hand implements (trowels, rakes, small hoes, etc.), lots of string, protective elbow and knee pads (penetration protection).	
3. Hard hats if working around scrub trees, tall cactus, rocky slopes, and rock overhangs.	
4. Hydration pack backpacks.	
5. Wide-brimmed hats and large handkerchiefs for neck covering to protect from the sun.	
6. Polarized sunglasses or goggles.	




Item	Minimum Quantity
Mountains and Steep Slopes (Normally special training and some equipment is required for this. In areas where mountain recoveries are possible, a number of augmentee S&R members with mountain climbing or mountain rescue experience may be required.). See Appendix B discussion.	
1. Long (60 meter+) lengths of climbing rope and rope ladders to allow personnel to traverse and climb slopes. Obtain from climbing and rescue supply stores.	
2. Safety harnesses, climbing grabs, pulleys, and other climbing devices for raising and lowering personnel on slopes. Obtain from climbing and rescue supply stores.	
3. Climbers helmets (or hard hats with chin fasteners), elbow and knee pads, leather gloves, steel toe climbing boots. Obtain from climbing and rescue supply stores.	
4. Snake leggings for some lower mountainous areas.	
5. Hydration pack backpacks.	
6. Goggles or other eye protection.	
7. Climbing axes for working on slopes and for balance.	
8. Larger frame backpacks for carrying remains up and down slopes.	
9. Ice chests with handles and locking latches (for S&R members to use for temporarily holding remains while on the slopes – chests may be lowered down slopes using ropes).	
10. Barrier tape to mark lanes being worked. [Tape used rather than ropes as any ropes used should only be for life-safety purposes.]	


Item	Minimum Quantity
Cratered Impacts	
1. Fire department's exhaust fan or a large diameter (4 to 5 feet) circulation fan used for fresh air or to remove fumes. Can be obtained from building supply and fire-safety supply stores. Generator support may also be required.	
2. Cool air may have to be ducted (with flexible ducts) to specific areas being searched. Flightline (equipment) air conditioners with ducts may be required.	
3. Rope ladders or extension ladders may be used to work on steeper slopes.	
Buildings	
1. Hardhats and goggles to wear in areas that have been damaged by fire or collapse.	
2. Standard cotton coveralls in areas exposed to fire, unless Tyvek® coveralls required for special hazards (asbestos, chemicals).	
3. Colored adhesive duct or plastic lane tape, 2-inch wide , to stick on walls and floor surfaces. Allows marking on floors and walls to indicate remains and personal effects tag numbers. Can be used to also attach a physical tag to the location. Can be ordered from or is available at building supply stores.	
4. OSHA hazardous perimeter marking barrier. Identify and mark off areas where remains have been found and teams are working in a hazardous environment. Can be ordered from or is available at safety equipment and supply stores.	
5. Large exhaust fans to remove smoke or other pollutants and provide fresh air. Usually initially used by fire department, but large diameter (4 to 5 feet) exhaust or circulation fans can be obtained from building supply and fire-safety supply stores if needed for longer term use. Air may have to be ducted (with flexible ducts) to specific areas being searched.	

Item	Minimum Quantity
6. <i>Respirators and breathing masks for work in areas exposed to dust (including concrete dust), smoke damage, asbestos, building insulation materials, etc.</i>	
Temperature variations	
1. <i>Coveralls, general purpose (for warm weather) and insulated (for cold weather). Standard commercial cotton and cotton-polyester coveralls used as S&R clothing in lieu of military uniforms when:</i> <ol style="list-style-type: none"> <i>Site conditions are likely to damage or ruin uniforms and/or</i> <i>Temperature conditions require either cooler or warmer outer clothing.</i> 	
2. <i>Extreme cold conditions warrant insulated steel toe boots, arctic weather clothing (gloves, coveralls or overalls and jackets), and extreme cold breathing masks and/or oral filters.</i> <ol style="list-style-type: none"> <i>Extreme cold weather items should be stocked in locations that may support extreme cold S&R.</i> <i>Extreme cold items are available from DSCP's Warfighter Net at http://ct.dscp.dla.mil using Search term "extreme cold".</i> 	
3. <i>Extreme heat may require using hot weather steel toed boots and broad brimmed hats. Items are available from DSCP's Warfighter Net at http://ct.dscp.dla.mil using Search term "hot weather".</i>	
4. <i>Snow conditions can increase not only cold but also create wet and icy conditions. Deep snows require snowshoes, ski poles, warming tents, and large area tents and heaters to melt snow in a remains field search area to allow finding and removal of remains.</i>	
Fragmented or Contaminated Remains Equipment (Always work with the bioenvironmental engineers when developing biomedical hazardous material (HAZMAT) related Services kit items. Bioenvironmental engineers will determine PPE and disposal procedures for HAZMAT efforts.)	
1. <i>Barrels-drums, tarps, wheelbarrows, plywood, shovels, rakes. Used to pick up, catch, and move sifted materials at the location. Common local purchase items if not already available on base.</i>	

Item	Minimum Quantity
2. Hazardous waste barrels. May have to be used to contain sifted waste that is environmentally contaminated material. CE would provide and remove waste and store in barrels after S&R sifting.	
3. Hazardous waste containers. Should be used to contain and transport coveralls and other PPE apparel contaminated at the site. Contents would be taken to a laundry facility for cleaning or to a disposal site as required.	
4. Hazardous Biomedical tags or bags. Although fragmented remains are in and of themselves hazardous substances for S&R members, remains that have been exposed to hazardous chemicals or CBRN contamination may require separate tagging or bagging to identify that there is added concern. See Section 4. Some remains may require being placed in heat-sealed vacuum bags in lieu of top closing bags.	
5. Hand tools. Garden tools and medical forceps can be used for removal of embedded human remain fragments from craters and sifting boxes. <div data-bbox="342 888 987 1115"></div>	

Item	Minimum Quantity
<p>6. <i>Debris sifting boxes.</i> <i>Constructed of wood frame with expanded metal, woven metal mesh, or welded mesh sieve material in the bottom. Wire mesh should be suitable to the area soils and conditions. Mesh size should be about 3/8 by 3/8 inch mesh for most soils. Sandy or silty soils may allow use of 1/4 by 1/4 inch mesh, while gravel or clay soils may require 1/2 by 1/2 inch mesh. Use the larger diameter (smaller gauge number) wire sizes that are available in the mesh size you need. This will help avoid breakage during field use. Sifting boxes are available through local manufacture by contract or CE. There are typically two types.</i></p> <p>a. <i>Freestanding box using folding or rigid legs. Can be larger, but may be cumbersome to transport and assemble. Leg attachment points may require maintenance during use.</i></p> <p>b. <i>Box with extension handles. Smaller boxes can rest on wheelbarrows and drums. Larger boxes can be used with folding saw horses and provide more portability.</i></p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	

Item	Minimum Quantity
Other Common Equipment and Tools	
<p>1. <i>Visual support. Working in brush, deserts, and swamp-wetlands may require having visual contact or oversight. Lightweight 8-, 10-, and 12-foot step-ladders can be very helpful during many situations where maintaining visual contact is important. They are also needed to use when driving in longer siting poles and grid poles used for alignment and searches, as well as searching the top portion of bushes and some trees.</i></p>	
<p>2. <i>Maneuvering while in a search line. Swamps, sand, snow, brush, and rocky hillsides can all cause members to fall due to unseen conditions or loose soils.</i></p> <p>a. <i>Straight ski poles (various sizes about armpit height) with plastic baskets bottom web for swamps, sand, and snow.</i></p> <p>b. <i>Adjustable length walking or hiking staffs (trekking poles) with carbide tips (with or without small rock baskets) for hard soils with loose rocks or rocky slopes.</i></p>	
<p>3. <i>Handling sharp objects. Moving small debris during the recovery process may require more than just protective gloves. Several sizes of small wrecking bars can help pull or wedge debris away from remains.</i></p>	
<p>4. <i>Protection from sharp objects. When actually working up close or around composites or sharp metals, additional protection may be required for the lower legs. Baseball catcher shin guards are a good choice, especially since they can go over a Tyvek® coverall or standard chemical suits.</i></p>	
<p>5. <i>Removal of remains from debris or ashes. Numerous kinds of shovels prove useful and have different purposes. Long handle round point and short handle utility shovels are good to dig the area around remains for removal. Short handle flat nose shovels are good to lift loose remains scattered in debris and ashes for placing in sifting boxes.</i></p>	

Item	Minimum Quantity
<p>6. Reach tools. Various types of (snake) grabber tongs are good for reaching into bushes or other areas where remains may have lodged and having a safe reach is required. Garden rakes and cultivators also provide good reach and can be used to help move small debris or wreckage away from remains.</p> 	

NOTE: The term "Tyvek® coverall" is used throughout [Table 4](#), and this handbook. There are various levels of protection afforded by Tyvek®, military Tyvek® F, and other manufacturers' Tyvek-type clothing. These coveralls range from simple, inexpensive disposable coveralls (for protection against dust and some liquids - no CBRN protection) to semi impervious coveralls to fully encapsulated, impervious coated suits (for protection against fuels and almost all biological and chemical dust and liquid hazards). Shelf life may range from 2-5, 10, or 15 years depending on storage, interim or intermittent use, and type of coverall. Likewise, prices range from less than \$10 for some coveralls to approximately \$200 for a suit. Coverall protection must be carefully chosen as a part of the overall personal protective equipment package.

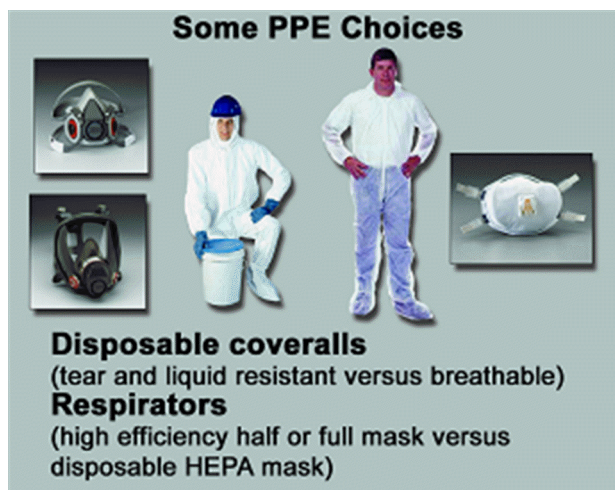
Choosing Personal Protective Equipment (PPE). Common and more unique PPE items were identified in [Table 4](#), or the cited references. It is important to identify the proper PPE **prior to deploying** to the mishap location. Once S&R personnel are on site, there is little time to obtain PPE that **adequately fits** the team members. Also, one of the aspects of PPE is to ensure that personnel are trained in its wear and use. Based on the earliest known information of the mishap, the Mortuary Officer-S&R team chief should conduct a hazard assessment review (see Appendix B) and discuss the on-scene hazards with the bioenvironmental engineer, wing safety, and fire response personnel. The Bioenvironmental Engineer will identify specific PPE requirements. PPE that are not already included as S&R emergency response kit items should be obtained for team members as an emergency procurement if the item is not available otherwise. PPE are divided into three areas for protection: *respiration, ocular, and dermal*. Responses to aircraft or other mishaps that involve composite materials require special cautions when choosing respirators, eye protection, and skin protection (see Appendix C).

While PPE physically protect the wearers, it can also help in the mental well-being of S&R team members. Even with excellent programs for handling critical incident stress, problems with post traumatic stress flashbacks and hyperarousal symptoms (i.e., panic attacks, severe headaches, nausea, and insomnia) do occur as a result of more traumatic S&R efforts. Just putting on an everyday uniform item (such as a BDU or DCU, hats, and boots) that was also worn at a mishap scene S&R effort can trigger sensory and memory flashbacks for affected members. This is especially so when: (1) the personal wear items become associated with strong smells or stains at a mishap scene, (2) members have handled recognizable remains, or (3) members may have unintentionally stepped on or touched remains.

NOTE: For contingency locations, it may not be possible to use alternative outer protective equipment other than the standard chemical contamination protection suits and several pairs of leather and surgical gloves. However, respirator choices will be determined by bioenvironmental engineers with consideration that the chemical protective masks may not be suitable for use at a mishap unless special filters are ordered based on more specific chemical-environment hazards.

For rougher, longer S&R operations, PPE kits should include common team clothing items such as numerous sets of dust or protective coveralls, pairs of gloves, a pair of protective boots, and a hat. A hardhat may also be required if additional protection is necessary. These items should be available for each team member who will be closely handling remains or conducting search efforts for remains, particularly for S&R operations that are conducted under more traumatic circumstances.

Figure 8. There Are Many Choices and Levels of Appropriate PPE.



The chances are great that S&R contamination will require replacement of clothing items. Also, a common critical incident response practice, which is used to reassure victims of traumatic mishaps, is to provide comfort, medical care, food, and replacement clothing. When possible, plan to have extra coveralls, safety boots and gloves, and hats readily available, as they may be needed by more than just core team members. Requiring S&R team members to have to justify and obtain new personal clothing items damaged during S&R can be regressive to critical incident stress practices.

NOTE: Teams that have been in the field for a week (or more) at remote recovery operations have had problems with S&R team members being unable to maintain or clean normal BDUs/DCUs used during S&R. Providing, washing, and replacing standard coveralls is usually a good hygienic practice and easier on team members.

Important parts of PPE are respirators, masks, and filter masks. For specific concerns on use of filter masks, respirators, or self-contained breathing apparatus (SCBA), check with your Bioenvironmental Engineer for recommendations on use of these types of PPE. Personnel will have to be qualified and must

have participated in mask fitting for use of respirators. They should have undergone preliminary HAZMAT training for use of SCBA.

Figure 9. After Initial Fire Rescue Efforts, the Bioenvironmental Engineer Will Identify the Level of PPE Requirements.



Bioenvironmental engineers are the primary experts on determining immediate hazards and whether S&R members need to use SCBA at the scene. *Life safety action-type training* should be handled on a regular basis prior to any emergency response, with only PPE-use *refresher training* attempted during JIT training.

SAFETY CAUTION – Disposable Dust Masks. Some disposable dust masks can provide a sufficient level of protection for some work around non-combustion particulates found near mishap wreckage. However, they should not be used in place of fitted respirators, which are required for work within mishap wreckage and for close handling of remains. Disposable particulate masks must be chosen with caution, as many *nuisance dust* masks are not approved for use in any post-mishap environment due to either poor fit or not being adequate for filtering. *Only use the proper* (oil and non-oil based particulate and aerosol environment) approved Occupational Safety & Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) N, P and R rated masks with 95 to 100 ratings (with or without an exhalation valve).

“N” designates *not oil resistant*,

“R” designates *oil resistant*, and

“P” designates *oil proof*.

The **95 to 100 rating** designates the efficiency of the filter for filtering out particulates only, not gases or vapors.



Pre-Response Actions. As with any operational or emergency action plan, the primary training and decisions on how to handle problems and support should be done well ahead of any emergency response. This will eliminate delays, shortfalls, or limiting factors. CE engineer assistants (EAs) and the base multimedia center alert (or duty) photographers should be a part of an overall homestation S&R training program to ensure they can function as needed with Services. Even with the best planning and contacts by command post controllers, some personal pre-response contacts should be made to clarify actions prior to field work. Pre-response contacts or efforts normally fall into at least five areas: emergency procurement, S&R team assignments, field mapping support, photographic support, and S&R team JIT training.

Emergency Procurement. The S&R team chief should always touch base with the contracting office and determine if they will have a representative available or at the scene to obtain urgent contract support. Until someone has actually been at the site to determine what hazards and conditions exist, the adequacy of S&R resources is unknown. Services and the contracting office must have a clear understanding of what can be done to obtain urgent or emergency procurement for contingency situations. Purchase, leasing, and rental are usually options for obtaining many vehicles and heavy or specialized equipment. Whenever possible, Services and contracting should pre-identify sources for replacement PPE items not available on base. These items may have to be ordered as needed based on the team composition and situation.

S&R team assignment. Circumstances will dictate whether (1) all core and assigned S&R team members are needed at the same time, (2) members will work in shifts, (3) some members or teams will conduct the search while others work the recovery, and (4) additional augmentees are required for longer efforts. This also leads to assignment of core team members as team leaders and trainers for the additional members. Untrained augmentees must be reviewed and brought into the CISM efforts and have proper PPE and training. Some members may have to be tapped for field recording, close handling of remains, field sketching, and administrative support for remains handling.

Field mapping support. All mishap-site mapping must be accomplished in coordination with the ISB/SIB Medical Officer, Civil Engineers, and the S&R team. If the loss site is related to a possible criminal or terrorist investigation, then the investigating agency with jurisdiction must also be involved with any mapping decisions. Contact CE to determine if qualified CE EAs will be available to conduct the S&R mapping. A real world worst-case situation may be that the EAs are deployed and there are no CE civilians to perform this work. This situation should be considered during pre-deployment planning to ensure that there is some remaining capability to respond to mishaps, even if CE must obtain contract civilian surveyors or obtain support from another military unit.

When EA survey support is initially limited, survey-grade GPS is not available, or standard (total station) survey equipment is not available, many CE EAs and officers can: (1) provide various forms of field measurement and mapping using grids to produce detailed measurement information (for later compilation and drawing), (2) use distance wheels and tapes and other measurement techniques, (3) create data tables of the measurements, and (4) scale draw layouts for mapped objects and reference points based on all the data tables.

Figure 10. CE and Services Have Requirements to Create Sketches and Maps.



Be aware that CE personnel supporting S&R should also receive critical incident stress screening and be in on your S&R briefings. Last minute substitutes may not have had CISM related support and this could present some problems on site.

When a CE EA team is either not available or able to support an S&R team, such as when conducting an expedient recovery, Services personnel should make their own field sketches of the location and identify key objects and the boundary of the mishap (see Section 4). Pre-identify team members that have a good capability for perspective drawing and practice with them as a part of normal S&R homestation training. If it is likely that S&R teams will have to complete all their own sketching, such as for some contingency responses, Services should build an S&R response kit that also contains drawing supplies (pen, pencils, rulers, erasers, adjustable protractor, gridline and plain drawing paper), measuring equipment (such as an assortment of tapes (12-, 25-, 50-, and 100-foot) and a measuring wheel), and a folding table and chair that can be used for drawing in the field, or obtain this equipment from CE (through prior arrangements).

In a non-contingency environment, realize that the shortfall of CE being unable to support surveying and mapping capability usually must be corrected in time to support an SIB. Work with CE to ensure that they are also working early-on to provide mapping support for your S&R site mapping needs. If CE is unable to provide survey-grade GPS support, then standard field surveying and detailed measuring techniques may have to be used to create diagrams. For contingency situations where CE cannot respond, Services should plan on creating the diagrams and sketches and can use a polar or grid diagram method to plot remains.

Polar diagrams are normally used for compact mishaps. The center of the remains or major impact point becomes the center of the sketch and distances and directions are plotted out from this. You need a directional compass as well as measuring equipment and drawing tools.

Grid diagrams are more common and use field determined grids with corner stakes. Normally grids are rectangular and several grids may cover a remains field. Oftentimes strings are pulled between corner grid points to help identify grid locations (you also need drawing tools). [For the purpose of this handbook, the term *remains field* is used to designate a large number of partially intact and fragmented remains that are located closely together on a mishap site.]

Figure 11. Compact Mishap Sites Can Present Challenges for Searching in Wreckage and Sketching the Scene.



Grid searches may be followed up by CE using any survey-grade GPS, other surveying techniques, or simple measuring equipment for distance marking from established grid corner points.

NOTE: When there are many remains in close proximity and no survey-grade GPS support is available, the above standard survey or manual distance measurement methods are preferable for marking numerous remains **rather than** trying to use a handheld precision lightweight mobile GPS receiver unit (PLGR GPS) or a similar handheld non-survey, non-mapping grade GPS unit. Attempts to use non-survey-grade GPS readings to plot numerous individual remains in a tight remains field can introduce inaccuracies that are greater than the size of the remains field. This happens primarily in mountainous and heavily forested or jungle areas and when there are unique atmospheric disturbances that make obtaining multiple satellite readings difficult or impossible. To help increase accuracy and orientation, CE could take several **extended-time** readings with a PLGR GPS to establish longitude-latitude-altitude at primary features, key primary remains grid locations, and several search boundary locations to include on the final drawings. CE should make sampling checks (with measuring tapes or distance wheels) to ensure that hand held GPS readings are providing **accurate enough measurements** to establish those points.

Photographic support. Photographic support is a *must have* for forensic and SIB purposes. Contact the deployed Joint Combat Camera representative or your CONUS or OCONUS base multimedia support office's alert photographer(s) who will cover the mishap scene. Determine their capability **to remain on scene** to support photo documentation of your marking efforts. Determine if they can provide **still photo and video** documentation. Photographers are normally under the initial control of the ISB Medical Officer (flight surgeon) and then under the ISB Investigation Officer (IO) before they transfer to support the SIB. However, they must also support S&R, so always contact the ISB IO to ensure the photographers will still be available to provide support for S&R.

NOTE: For events that require investigations of criminal or terrorist incidents, photographers may be provided and controlled by the military, federal, or state investigating organization.

Not all base photographers (whether military, civilian, or contract) are up to taking photos of the type needed to photo-document remains. Since they may be on scene for an extended time period, consider having a first response team member or augmentee trained for some photographic support in case the photographer is no longer able to continue, such as due to injury or on-scene critical incident stresses. At remote locations or in many terrain locations, the remains may not wait for a replacement base photographer to show up or for the OAFME photographer to arrive and take their photos. The on-scene photographer may require some type of support mechanism to continue working during S&R efforts. Determine with the ISB IO or Medical Officer if the supporting photographer received critical incident briefings and pre-exposure preparation. The photographer may need to sit in on the S&R team's CISM debriefings and accompany the team as an S&R member. S&R teams have enough to do in the field and do not need to take on additional photographic responsibility if this can be avoided by keeping the photographers *CISM healthy*. (See Appendix D if Services must provide their own photographic support.)

S&R team JIT training. From the initial knowledge of the mishap and each team chief's reports on team status, begin to inform the team members of the situation and prepare them with any required necessary JIT. This should include use and wear of PPE, other safety equipment, and expected search and recovery techniques and equipment that may be needed. Team members should have already been screened and be familiar with CISM. However, determine if there are any ongoing influences or problems that could overly stress them and conduct additional briefings and discussions to make sure they are ready. Assign

team positions and responsibilities and review checklists to determine if there are any last training areas to review.

Again as a reminder (if it was previously unknown during your initial notifications), when you determine that the loss situation involves dismemberment and/or multiple fatalities, ensure that your pre-response actions include the previously stated *preparatory notifications*.



SECTION 3. FIRST RESPONSE

Mortuary Officer Initial Site Assessment. The Services commander (as the mortuary officer (MO)) is a primary member of the follow-on support forces for a fatal mishap. The MO must respond when it has been determined that local civilian authorities will not provide for initial or all S&R support. The MO should also respond when the Air Force does not have jurisdiction in order to establish liaison with the civil authorities and coordinate providing any Services' related S&R support. The MO's on-site assessment should include the major considerations of time, terrain, temperature, trajectory, threats, and transportation. Based on their locale (whether at a CONUS or OCONUS base or a deployed AEF location), the MO should develop response plan checklists to cover the above major consideration.

After a detailed review, the MO develops working plans to cover mortuary field support. This normally involves setting up a mortuary operation facility to temporarily process, identify, and store-hold remains. Ideally, if you have the resources you would set up a mortuary operation (1) using major items from an LWRRG UTC kit (or equivalent resources), (2) within either a four-section TEMPER tent or the Small Shelter System, (3) with either a military or equivalent commercial refrigerated storage (or insulated storage box with dry ice), (4) powered by a generator (if commercial power is not available), (5) with adequate area lighting, (6) with a water supply, (7) with access for truck and forklift operations, (8) with good drainage and runoff protection, and (9) with ventilation (such as an environmental control unit). A contaminated waste collection tank would be required for most CONUS and OCONUS locations.

Figure 12. You May Need a Contingency-Type Mortuary at Some Mishaps.



The MO must decide **what is the necessary level of support** and decide with the mission support group commander (or other equivalent designated mishap authority who may be responsible for overall support) if this is possible, or if there are other alternatives.

If the location falls under a local jurisdiction, mortuary operations may not be required. In this case, coordinate with the medical examiner with authority to determine their plans and offer support as needed or be available for counsel if appropriate. If the mishap area is within a densely or rather densely populated area (especially for aircraft mishaps), the local emergency response procedures and authorities nearly always take immediate precedence. This is a situation that normally requires not just MoAs and MoUs, but also coordinated response plans that have been thoroughly tested during joint exercises. Work with local authorities in all ways possible. Normally the fire department is a major participant in joint responses. Develop a good working relationship with your base's fire chief. Firefighting personnel can help provide on-scene guidance and information regarding overall emergency response situations involving casualties

and the condition of remains. They normally work with the responding medical officer (flight surgeon) on the condition of the remains.

Figure 13. Firefighters Can Provide Some of the Best, Earliest Assessments of the Situation.



In a jurisdiction or at a site that will require remote temporary mortuary support, determine: (1) the level of mortuary processing and support needed, (2) size of the support teams required, (3) whether mortuary and S&R efforts will be shared, (4) the location and types of facilities and equipment that will be needed (including refrigerated storage), (5) the basic layout, (6) site access and control methods, and (7) security, including avoidance of direct public or media viewing.

Since processing and tentative identification may extend until the OAFME has completed on-scene efforts, do not limit support planning to just what is needed for S&R. Get with CE, logistics readiness, and the contracting representatives as soon as possible to let them know the expected requirements and determine how best to provide support. CE may have to deploy a support team with some electrical and utilities support capability for beddown efforts. Determine if there are any limitations, such as lack of support capabilities. For legal issues, get with the JAG. Also discuss efforts with the mission support group commander, who can address filling requirements or identifying possible alternatives.

Determining Mishap Related Information. If there is no formal on-site briefing, the S&R team chief must obtain information from the best sources available (whether they have jurisdiction or not) regarding: (1) the type of mishap or aircraft mishap, (2) the number of personnel involved or souls on board, (3) what are the conditions of remains (obtained from the medical authority and responding fire rescue personnel), (4) what are the remaining biomedical and chemical hazards on scene, (5) are there any explosive ordnance-propellant-fuel hazards on scene, (6) is there more than one area with remains, (7) if there is an impact crater are remains expected to be in the crater and is this a confined area that requires additional PPE, (8) are composite materials involved, and (9) if any nuclear, biological, or chemical weapons are involved or suspected.

View the site and determine if any other Services related support will be required in addition to S&R. If so, then make a decision **now** as to whether you will work *related support* **or** *S&R operations*. For complicated major mishaps, the responding Services officer should avoid trying to split early efforts into performing as the Services officer, commander, mortuary officer, log of events monitor, and S&R team chief. Trying to *multitask* these efforts can make it very dangerous for the S&R team. Assign others to work related support or place the S&R OIC or NCOIC in charge of S&R. As soon as possible while at the site, determine what basic teams will be required. Contact the S&R OIC or NCOIC and have the team leaders begin notifying team members, placing them on standby, or recalling personnel. Let them know that they need to provide S&R support and whether they will be staying in the field or working from homestation. Have the team leaders initiate team leader actions and begin preparing for any just-in-time efforts.

Site Conditions and How to Conduct the Search. Based on the type of terrain and the scatter of wreckage and remains, decide on the primary method **or methods** for search and recovery that are possible and feasible. Details on actual search methods (i.e., standard area sweeps, lane sweeps, grid searches, crater-impact area searches, and building room-hallway searches) are presented in Section 4.

NOTE: Home station training should be where you review and practice search methods and recovery techniques. Knowing your proven capabilities when on the scene for the initial site assessment will better allow you to determine how you can conduct the search as you are standing at the mishap site.

Consider (and enter into the log of events) the current weather conditions and temperature, as well as the expected conditions (forecast) for the next few days. This may greatly influence the search methods and recovery timing. Consider that for nearly vertical impacts that bury or crater, compact remains searches can be used most effectively. However, determine if a crew member may have ejected unsuccessfully prior to impact. This could drive several separate types of S&R. For more horizontal impacts that scatter debris in a linear fashion (along the direction of the flight path), standard sweep searches are normally used if not restricted by terrain.

Figure 14. A Linear but Broadly Scattered Mishap May Require Only One Search Technique.



If the mishap involved numerous personnel, such as passengers on transport aircraft or a terrorist attack on a convoy or mass transit vehicle, consider that you could have concentrated remains near large fuselage or vehicle segments, but still have many scattered-fragmented remains caused by the impact or explosion. This could drive the need to have separate types of S&R and additional S&R personnel.

Figure 15. One Mishap May Require Several S&R Techniques Based on Terrain, Type of Aircraft, and Trajectory.



Take time when on site to visit what has been identified as a possible or actual remains location. Sketch the mishap site and mark the tentative remains locations and major mishap features. Some locations may

have identifiable and largely intact remains, as well as broad intervening areas with unrecognizable remains scattered amongst debris and wreckage. It is very important that (1) all search efforts be identified, (2) separate efforts be coordinated, and (3) team leaders be assigned to specific areas with specific functions. Team leaders must follow specific techniques that are appropriate for their specific remains location. They must evaluate the current skill levels and the level of PPE needed for their specific remains location.

Although the mishap may be one occurrence, as a safety practice each remains location should be evaluated to determine proper PPE and S&R procedures. All remains and personal effects markers must still be integrated so there is no duplication (or confusion) between remains locations. Separate, detailed remains recovery sketches-diagrams can be drawn for each specific remains location at the overall mishap site. These would then be consolidated later into an overall mishap scene diagram for inspection report purposes.

The normal S&R process (as assisted by others) is to (1) search for the remains and personal effects, (2) stake and S&R tag (see Appendix E) each finding, (3) shoot a survey point or take measurements for each tag location, (4) photograph the remains close-up and in perspective to the major site features prior to removing remains, (5) sketch the site, and (6) remove the remains (bag and attach tags). A detailed site remains map-diagram can be completed later. Identification is determined by others whether in CONUS or OCONUS. These normal S&R events are shown only in basic order.

The normal S&R process may not be possible or feasible for a given situation. Then you need to ask yourself what can you do to accomplish S&R? In some cases the local jurisdictional authorities may dictate most or all of the procedures. However, when you have to run S&R and make the decisions, you and the incident or mishap on-scene commander must decide how to conduct the search and when to recover remains.

In some cases, conditions may require remains marking and recovery to be concurrent with the search. Do you (and the other responders supporting the overall efforts) have the assets, authority, and training to conduct search, marking, photography, sketching-plotting-measuring, and removal as a concurrent effort? Especially during a contingency operation, you may be in a situation and under conditions where you have to recover remains and personal effects expeditiously, including prior to any SIB or OAFME personnel arriving on-scene. Concurrent recovery is normally the call of the ISB's Investigation Officer, Medical Officer, and the responsible (on-scene) commander, who have to assume authority to safeguard both the remains and/or the ability to investigate the mishap. Although not an all-encompassing list, the following conditions may require concurrent S&R.

It is very important that the senior Services S&R team leader (on the scene of an OCONUS loss) advise the acting authority (such as the SIB/AIB president) that remains should be **kept refrigerated and held at the site** (or another central place) **until S&R is complete**. This does two things. It avoids having to make multiple shipments to the port mortuary. More importantly, it helps to avoid unnecessary additional stress on the person authorized to direct disposition (PADD) and other family members, who would worry more about the death and the condition of the remains. Retaining remains during the S&R process helps to limit or avoid the more tragic situation of the PADD being notified that partial remains have been received at the port, that the remains have been identified as their service member, but the family should probably wait before accepting the remains for burial, because there is a strong possibility that other are remains will be recovered during ongoing S&R efforts.

Table 5. Reasons for Search and Concurrent Recovery.

Reason	Comment
1. The terrain and weather are such that rain or extreme conditions may cause the immediate loss of remains and personal effects.	
2. Individual team actions (ISB, S&R, SIB) will create an imminent threat or cause the loss of wreckage, remains, and personal effects.	Terrain such as steep or loose talus slopes, unstable earth slopes, unstable snow slopes, or areas with rocky overhangs can collapse with each effort of ISB, S&R, and SIB team members.
3. When the remains are in <i>public</i> plain view, intact or substantially intact, identifiable, not commingled, and cannot be otherwise protected or screened from view; the remains may be removed to maintain dignity.	Caveat. Based on jurisdiction, a competent medical authority should determine that investigation evidence would not be lost and that marking, photography, and removal would be adequate for investigation.
4. The remains are highly fragmented (even if commingled) and are subject to rapid decomposition due to heat and humidity.	
5. Remains will be subject to further damage or loss by fire, exposure to industrial type contamination or chemicals (i.e., corrosives, oxidizers, propellants or other fuels, etc.).	
6. Remains are in a high threat contingency location and expedient S&R is needed (by Services or another unit).	
7. The mishap scene or portions of it are subject to uncontrollable scavenging by predators or varmints	
8. Due to bloodborne pathogen or other biomedical hazards, leaving the remains will present an undue hazard to responding personnel who must be on site.	This should not be a major consideration if training is adequate and proper PPE is available.

Unless your base has developed and included directions for an ISB (within a comprehensive response plan) on how and when to remove and mark remains, there are no definitive directions. Removal of

human remains is addressed in Air Force Pamphlet 91-211, *USAF Guide to Aviation Safety Investigations*. The defining portion is stated here.

Excerpt from AFPAM 91-211 (23 July 2001):

5.8.3. Site Preservation. The ISB and SIB must ensure the site is stabilized to prevent loss of evidence. However, there may be compelling reasons to remove some crucial evidence from the scene quickly.

5.8.3.1. Disposition of Human Remains. Ideally, human remains (as opposed to survivors) should be left in place until a trained investigator can document their locations, condition, etc. However, for humanitarian, jurisdictional, and practical reasons, there is usually pressure to remove human remains from a scene promptly, so the ISB and/or recovery/rescue personnel may not wait until the full SIB has assembled. Further, in some climates, it could be essential to the health and safety of those working in the vicinity of the wreckage to remove remains rapidly. The following steps should be conducted by or under the supervision of the ISB or SIB's medical member:

5.8.3.1.1. Before moving any human remains, jurisdiction for those remains must be clarified. In most cases, the local coroner/medical examiner will have jurisdiction (legal control) over the remains. Ideally, jurisdiction issues for geographic areas surrounding military installations and ranges should be delineated ahead of time during mishap response planning. Most FAA Regional Medical Examiners maintain a database delineating the areas of jurisdiction and may be of assistance in clarifying these issues.

5.8.3.1.2. Proper personal protective equipment (PPE) must be worn to protect against blood-borne pathogens, composite materials and other potentially hazardous aerospace materials. The extent of PPE should be determined by the medical member with appropriate consultation, as needed, by a bioenvironmental engineer.

5.8.3.1.3. Before moving any human remains, the medical member is responsible for detailed site diagramming coordinated with specific clearly labeled stakes and photographs showing pertinent detail.

5.8.3.1.4. Because personal life support and escape equipment is intimate with the remains, carefully photograph and examine these items if their removal is required.

5.8.3.1.5. Remove human remains only after completely documenting and closely scrutinizing all surfaces of remains with on-scene photography. Ensure photographs include adjacent structures, which could account for traumatic injuries or objects which show evidence of tissue transfer.

5.8.3.1.6. The gross position, posture, and condition of crash victims are valuable evidence. Questions often can be resolved with photographic evidence of the location of human remains, e.g., the location of crew members in relation to the cockpit can help determine who occupied each crew position. In the case of multi-pilot aircraft without cockpit voice recorders, it is often difficult to determine who was flying the aircraft without such information.

When possible, if remains must be removed prior to arrival of the SIB, then remains should be removed concurrent **with at least** a preliminary marking effort. The ISB Medical Officer should meet with the S&R team chief and photographer to ensure that the remains are (1) marked, (2) photographed, and (3) the location can later be surveyed (or measured and recorded). Again, the senior Services S&R team leader

should advise, especially for OCONUS situations, that all the remains should be kept together and refrigerated before release. If early removal of the remains is required, the alert photographer should shoot video (whenever possible) of the scene prior to and periodically during concurrent S&R. However, it is not a requirement to delay removal of remains to bring in the CE survey team when the site can be properly staked (or flagged) and tagged by the ISB and S&R team. Efforts should be made to ensure that the stakes-flags will not be lost or removed prior to surveying. When properly marked, survey-grade GPS readings can be made by CE EAs. If no GPS system is available, CE or Services should take readings for GPS locating purposes (even if only a PLGR GPS is available) within the best possible accuracy of the handheld GPS unit. Take the readings on several key mishap scene parts or markers to provide longitude, latitude, and elevations (if possible on sloping terrain).

Figure 16. Assigning Responsibilities and Providing Proper PPE is Essential in Human Remains S&R.



Since each type of terrain may present various options or limitations in using specific search methods, mapping and sketching efforts, and the timing for recovery, you should carefully review the primary search considerations and equipment needs that were presented in [Table 3](#). and [Table 4](#). Review these to make sure the teams are ready and equipped for specific types of searches. Then, **make your final decisions** on search methods and team members.

Determine Specific Logistical Requirements. Based on the just determined search methods and recovery techniques, the S&R team chief starts obtaining mishap-specific logistics. Begin with the team itself and determine how many personnel will be required for how long. Then consider S&R support items, transportation of team members and remains, and near site support. [Table 6](#). provides guidance.

Table 6. Specific Logistics Requirements.

Support Area	Specifics
Personal equipment and PPE	<ol style="list-style-type: none"> 1. Identify to team leaders the expected details of the stay so they can ensure that all team members possess or can obtain enough personal items to support them in the field and during the operations. 2. Common items may include sleeping bags, toiletries, suntan lotions, medications, eyeglasses, and on and off duty clothing (to suit the location and circumstances). 3. Personal items should mirror a standard deployment kit, except that members may have to bring quite a few extra personal items such as underwear, socks, and t-shirts to allow proper hygiene in conditions that may not warrant laundry for these small items. 4. Members need to make personal preparations for being away from homestation or the deployment base. 5. Make sure that there are enough PPE items to support the core and other participating members in the operation (see Table 4, guidance on PPE requirements).
Processing and Storing Remains	<ol style="list-style-type: none"> 1. Off-base: Determine the jurisdiction requirement for handling remains. Temporary on site refrigerated storage may be required prior to civilian movement. 2. If remote and off-base: A mortuary tent operation and refrigerated storage may be required. Human remains pouches are required, as well as plastic bags for fragmented remains. 3. On-base: Emergency action plans should address this. Unless there is a local agreement for off-base support, use base capabilities as much as possible, especially if it will take a longer time to recover and identify fragmented remains. Consider a base hospital mortuary, a deployment asset refrigeration unit, a section of a refrigerated area, a refrigerated van, or an area that can be isolated and have a portable refrigeration unit brought in.

Support Area	Specifics
Transportation of Remains	<p>This may be an ongoing, phased effort that could involve local jurisdictions, Medical Group, Services, and Contracting.</p> <ol style="list-style-type: none">1. On site: This depends on the location and whether the remains are intact, primarily intact, or fragmented.<ol style="list-style-type: none">a. A closed or covered pickup truck, SUV, or ambulance may be used to transfer remains to an on-site mortuary operation for processing and refrigerated storage.b. For very rough terrain, an all-terrain RV capable of carrying a litter with human remains pouches may have to be used.2. Long distance travel without refrigeration. Determine if using and obtaining transfer cases is feasible and necessary if you must use ice. Transfer cases are normally only used OCONUS, but may be required based on circumstances.3. Other transport should be in an enclosed, covered vehicle with either air conditioning or a refrigerated box (to suit the length of travel).
Transportation of Personnel	<ol style="list-style-type: none">1. If S&R personnel are traveling to the site as a group, they should be transported by bus. A separate vehicle, such as a truck, should be provided to transport supplies and equipment, if needed.2. Vehicles should be suitable to the conditions at the S&R site and must be capable of being thoroughly cleaned and decontaminated if personnel will be exposed to hazardous materials and cannot be adequately decontaminated on site.3. If in the local base area, obtain motor pool transportation as tasked in base support plans.

Support Area	Specifics
S&R Operations	<ol style="list-style-type: none">1. Search. Determine the methods and areas and the specific field use equipment, marking methods and equipment, and PPE required.<ol style="list-style-type: none">a. Determine with Communications and CE Readiness the methods to contact the main support base (if remote).b. On site communications with radios, walkie-talkies, or other methods must be planned given the site layout, obstructions, and separation distances.2. Recovery. Determine the equipment, PPE (as directed by the Bioenvironmental Engineer), marking methods and supplies, and surveying capabilities. Determine if Services may have to provide their own distance marking for later use in official diagrams.3. Sketches and diagrams. Even if CE EAs will be present, creating your own initial working sketches for the location (and within individual grid, crater, or building room-hallways) can speed things up for recovery members.4. Special support.<ol style="list-style-type: none">a. Make sure to identify any special teams or members from other units or branches of the armed forces, civilian teams, or special K-9 support (cadaver dogs if necessary for more hazardous locations where there are many fragmented remains).b. Lodging and meals may be required to support them, although they normally have their own special equipment and PPE.c. Contingency contracting support may be required for any other special equipment or supplies.

Support Area	Specifics
Lodging and Meals	<p>This is mishap location-dependent.</p> <ol style="list-style-type: none"> 1. On-base. Provide for MREs, box meals, or hot meals at the location from the base dining facility. 2. Off-base nearby. Determine how to get meals to personnel on site from local vendor or base dining facility. MREs may be used initially. Allow members to use personal quarters. Set up a mortuary or support tent-shelter only if required. 3. Off-base remote. <ol style="list-style-type: none"> a. Contract quarters for the team. <ol style="list-style-type: none"> (i) When commercial lodging is used, meals must be planned for morning, lunch, and dinner. (ii) It may be possible to have the morning meal near lodging or on site, lunch can be catered or purchased from closest vendors, and evening would be near lodging. (iii) Set up a mortuary or support tent only if required. b. On-site tents or shelters. <ol style="list-style-type: none"> (i) Use deployable assets for lodging, shower-shave, and latrine, except that water storage and waste holding tanks may be required. (ii) Meals would be prepared on site: tray meals whenever possible but box lunches okay. MREs are last choice, but may provide better nutrition for use during more arduous S&R endeavors. (iii) Set up mortuary and support tents-shelters as needed.

Support Area	Specifics
Laundry	<p>Depends on location, degree of on-site contamination and exposure, type of PPE, and length of stay.</p> <ol style="list-style-type: none"> 1. When possible and in coordination with the bioenvironmental engineer, use disposable Tyvek® and other coveralls. 2. Insulated coveralls may require daily replacement and laundry to allow replacement every three days. 3. Primary personal clothing (BDUs/DCUs) worn on site with laundry service provided at remote locations to allow replacement every three days. 4. For off-duty clothing at remote locations, provide for nearby or on-site washing or contract laundry service to allow replacement every five days.
Personal Comfort and Hygiene Station	<ol style="list-style-type: none"> 1. Depending on the remoteness of the location, a beddown operation may be required for more than just the mortuary operation. 2. Whether or not at-the-site lodging and meals are provided (which would necessitate providing shower-shave and latrine units or support), consider the need for: <ol style="list-style-type: none"> a. Showers. b. Air conditioning for relief from heat or heating for relief from cold. c. Sheltered chemical toilets or portable toilets. d. Hand wipes (if water is in limited supply or drainage is a problem) and trash containers. <p>This should be a coordinated Services and CE effort to determine the level of support on site for responders and S&R team members.</p>

Support Area	Specifics
On-site Administration	<p>You do not want to become a slave to providing hourly electronic updates of S&R. However, for more remote operations, meet with Communications Squadron personnel and determine the ability to e-mail and fax information back to the base from the location.</p> <ol style="list-style-type: none"> 1. Services should plan on having a laptop computer on site or for use at commercial lodging. 2. When possible, have a combination printer-copier-fax machine available to be hooked to the Services laptop computer. <ol style="list-style-type: none"> a. Can be used to copy sketches for Services and CE to use daily. b. Some personnel, who may be pulled from the S&R line due to stress, can perform administrative support by updating the daily log of events. c. Computer can be used for ordering supplies and identifying needs, especially if there is a digital camera available to take photos of situations that require support.

Figure 17. Remote Locations and Mass Fatalities May Require Extensive Logistics Support and On-Site Mortuary Operations.



Brief the Team on the Situation. The S&R team chief will normally provide this briefing upon return to the base (unless required to remain at the site). The briefing should be based on the site visit and information obtained from the flight surgeon, fire department, EOD, and as discussed with the bioenvironmental engineer. Identify the search area entrance and exit points. Provide information on the status of remains and condition of remains. This should be expanded to include a short refresher (for previously trained core personnel) on anatomical recognition for any known to be missing or fragmented remains. Include information on: (1) the team numbers and makeup, (2) the mishap location, (3) debris boundaries and known or expected remains boundaries, (4) size, shape and terrain of search areas, (5) individual team search areas, and (6) any special responsibilities or cautions. Tell them whether or not concurrent recovery

will be required, and if so, who is detailed for specific tasks. It is appropriate to brief the *believed-to-be* (BTB) names (if known) in the event that an S&R team member knows, was close to, or worked with the BTB person. In that event, the S&R member could be removed from the search team PRIOR to going to the scene.

Identify who will be on site (i.e., the ISB, security, fire department, OSI or other special agents, etc.) and who has jurisdiction or control if conducting a shared civilian-federal-military effort. Identify how the search areas will be marked, the initial direction of search and spacing between S&R team members, and the patterns-methods-equipment to be used. Make sure that your teams know who the other teams are who will be working on site and why they are on site. Confusion is dangerous and can also impact the support for next of kin when it is time to determine disposition of remains and (on-scene) personal effects.

NOTE: OSI, state, and federal investigators may have their own marking procedures for evidence, which must be coordinated with your S&R procedures for remains and personal effects.

Identify the S&R OIC and NCOIC who will be on site and what they will do. Team members should know who each S&R team's leader is. For sweep searches, there should be two flankers and enough line people as designated to cover the search area. Depending on the location and separation, flankers should be equipped with portable megaphones, whistles, compasses, sketch maps, a machete or hand ax, and a radio or walkie-talkie.

Each S&R team chief and team leader should have a walkie-talkie or portable radio for communication in case assistance is required. Ask if team members know of any other PPE needs or specific procedures that should be followed.

Refresher Briefing on Critical Incident Stress Management (CISM) Concerns. Based on the situation brief, team leaders should have a better idea of the stresses that members will be facing. There are at least four areas to review.

Table 7. CISM Refresher Briefing Review Areas.

#	Description of the Review Area
1	Let yourself know you are feeling stress and let others know you are feeling stress. Talk about your feelings of stress. Stress repressed becomes stress expressed, but usually in a physical or emotional way that interferes with being able to perform.
2	Know and practice positive stress behaviors. Know and stay in touch with your purpose, team members, and a chosen buddy. Accurately identify what you can and cannot control on site.
3	Review some of the ineffective coping mechanisms (insufficient sleep, nourishment, or fluid intake; use of alcohol and abuse of medications or drugs; breakdown in respect for the chain of command, lawful orders, directives, and communication).
4	Review the more likely traumatic sites and surprise events that could happen during the recovery.

During the initial and follow-on CISM briefings, let team members know that they should contact the Life Skills Support Center (LSSC) at any time if they have coping problems that develop after an S&R event. The LSSC can provide support or coordinate support with CISM-companion agencies to address problems that arise related to CISM (i.e., anger, depression, anxiety, stress, couple and family coping, conflict resolution, etc.).

Team Leader Actions. Based on the briefings and taskings, the team leaders need to take more specific actions.

Table 8. Team Leader Specific Actions.

#	Description of the Specific Action
1	Ensure team members respond with sufficient personal items in the event of multi-day deployment.
2	Ensure the appropriate S&R equipment is assembled.
3	Acquire team transportation to and from the S&R area. Try to limit travel by foot as much as possible.
4	Brief and account for all team members and determine any physical limitation given the final taskings.
5	Coordinate with CE to go over the efforts that teams will use in the search areas and determine how to best document the efforts on maps.
6	Begin a detailed log of events and requirements.
7	Obtain primary and alternate communications frequencies and schedules to be used at the mishap location and in route as necessary.
8	Assign individual task responsibilities for each team member to ensure that as soon as you reach the site, you can begin beddown (as necessary) and distribution, deployment, and/or reading of equipment and PPE.



SECTION 4. SEARCH METHODS AND RECOVERY OF REMAINS AND PERSONAL EFFECTS

Deploy the Team. It is always preferable to deploy all team personnel together along with their equipment. This prevents having to split kits and supplies and allows all equipment to be deployed.

NOTE: Some base missions and locations make it more likely that limitations will be placed on the number of personnel and the amount of equipment that can initially deploy (such as when using helicopters or a limited number of heavy military trucks or special purpose vehicles). When it is likely that remote S&R operation recovery is required using limited or special transportation, S&R teams should consider breaking their team kits into smaller, more transportable sets. PPE and tools may still have to be pulled from a general stock of supplies and placed into kits, but this normally would not happen until the actual initial deploying members and the situation are known.

Table 9. Suggested Transportable Sets.

Kit	Primary Requirement
Initial team kit	Provides limited capability (i.e., a small-scale initial response kit for one 13-person team) for search, tagging, staking, and marking, with some initial remains recovery and small-scale refrigerated storage. PPE and special tools pulled from inventory based on the situation.
Large-scale team search kit	Remainder of search-tagging-staking-marking set. PPE and additional special tools pulled from inventory based on the situation.
Large-scale recovery kit	Infrastructure for long-term operations at a site (generators, rest and medical tents, supply storage, special purpose vehicles, additional tools, sifting boxes, etc.). Hazardous material and/or waste containers.
Mortuary set	Infrastructure for set up of field mortuary collection point for processing remains, short- or long-term refrigerated storage (refrigeration units, generators, refrigerated vans, etc.), and water. Waste collection/handling and hazardous material and waste containers.
Site schematic set	Measuring and drawing kit with paper, drawing supplies, measuring tapes and wheel, small folding table and chair.

The S&R OIC/NCOIC and team leaders should use checklists for personnel, PPE, and equipment to ensure that all required resources are loaded into transportation. If the length of travel is long, water and

some snack items or meals may have to be loaded with the transport. Plan to bring *at least one day's worth of MREs and water* when there are any concerns about possible delays in setup of resources. For more remote locations, consider bringing additional water and MREs as well as small tented enclosures with chemical (bucket) type toilets, toilet paper, and wet wipes.

Site Setup and Beddown Actions. The initial site visit should reveal if and where local, nearby, or *at-the-site* support will be needed for lodging, food, mortuary, and emergency medical on-site support. Depending on where support will be provided and the amount of time available to begin operations, begin either beddown or setup.

You may have to stage from (1) the mishap location, (2) your main support vehicle or a tent, or (3) nearby lodging. Determine where you will require setup and begin unloading and arranging team kits and PPE. If you have to setup tents or shelters in addition to conducting S&R, make sure that CE has deployed sufficient support forces to help get this underway with enough Services personnel. Action plans should indicate how many CE and Services support personnel need to deploy. If Services S&R must begin immediately, CE may have to perform more of the beddown efforts. Upon arrival at the mishap scene, determine where the entry checkpoint is and provide a list of personnel who will be taking part in S&R operations. Also identify any key personnel and methods of contact. Receive an update on the conditions and hazards.

Clearance to Proceed at an Aircraft Mishap, Other Fatal Mishap, or Other Fatal Losses. Obtaining clearance to proceed with S&R will depend on the cause that necessitates an S&R response and whether the deceased member(s) include other branches of the armed forces. The approving authority to allow S&R entry may be the local off-base jurisdictional authority or the on-scene ISB authority (i.e., off- or on-base aircraft mishap), the military on-scene commander (such as for transportation mishaps or combat losses), or military special agents and federal criminal investigating officials (such as for criminal acts and terrorist attacks) who may also be working with the OAFME. Decisions must be based on a formal decision to allow entry after considering the remaining hazards. Whenever the S&R team chief is in doubt into an area, ask to make sure that the location is still clear and if there are any hot spots (i.e., fires, chemical or fuel spills, or other hazards) that require higher levels of PPE. Many normally benign items (i.e., tires, batteries, hydraulic accumulators, etc.) are potentially lethal in a post-crash environment and may have to be avoided until they lose potential energy (such as created by an impact or fire).

A bioenvironmental engineer on the response force, in conjunction with EOD and the fire department, provides guidance on the hazards specific for a given mishap prior to entry and for as long as required.

Figure 18. Hazards Can be Easy to Miss, but Can Prove Dangerous to Searchers (flare on right).

The following mishap investigation safety practices should be followed at most mishaps.

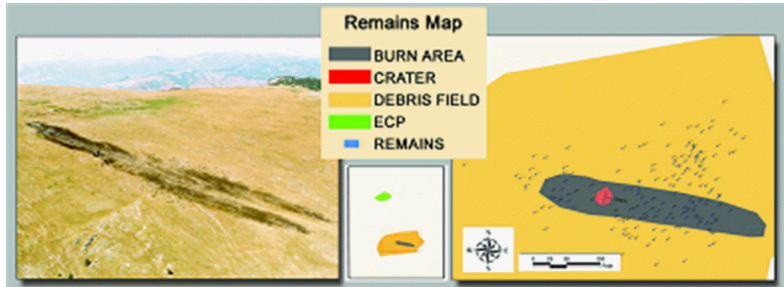
Table 10. Investigation Safety Practices.

#	Safety Practices
1	Expect HAZMAT to be present in any mishap until its presence has been ruled out. Anyone authorized to work in and around a crash scene must constantly be alert to indications of the possible presence of HAZMAT, which should be marked with warning placards or signs, labels on packages, shipping papers, or verbal information from people at the scene.
2	Wait until potential energy transfers (such as fires, explosions, vapors, breached radioactive materials containers, etc.) are eliminated, if HAZMAT is present. Some benign items may not be initially evident and you could find them during the search. Have them checked when found.
3	Stay away from wreckage containing HAZMAT until a competent expert has predicted the behavior of the HAZMAT at the mishap and ensured that it poses no threat to personal safety.
4	Obey any subsequent evacuation instructions of EOD, security forces/ police, bioenvironmental engineers, and fire fighters. In no event should S&R responders follow fire fighters or other emergency or rescue personnel into the wreckage area unless cleared to do so. If on site and there is reigniting, stay at least 2,000 feet upwind from any fires burning in wreckage where HAZMAT are present and stay out of any plume of smoke from the site.

Buildings and even shallow craters (under some weather conditions) can act as confined spaces when S&R members need to recover remains. Always determine with a bioenvironmental engineer and the fire department if these type locations remain safe to enter. Working there may require wearing of higher levels of PPE and the use of exhaust fans to remove fumes or other pollutants and provide fresh air.

Search Methods: There are only a limited number of search methods that are employed for remains searches. These are: (1) *standard area sweep-cross sweep*, (2) *lane sweeps*, (3) *grid searches*, (4) *crater or compact impact searches*, and (5) *building room and hallway searches*.

Figure 19. A Standard Aircraft Mishap Scenario.



Always remember that the responders and searchers must keep an accurate account (as best as possible with the on-site medical person) regarding the number count of remains. If there are a known number of souls-on-board and the search finds a total of the same number of souls (whether intact, primarily intact, or in the correct number of fragments), then the search could be terminated without covering the whole area. As with the *clearance to proceed*, termination of the search is a decision of the on-scene commander, civil authority with jurisdiction, or the authorized investigating officers.

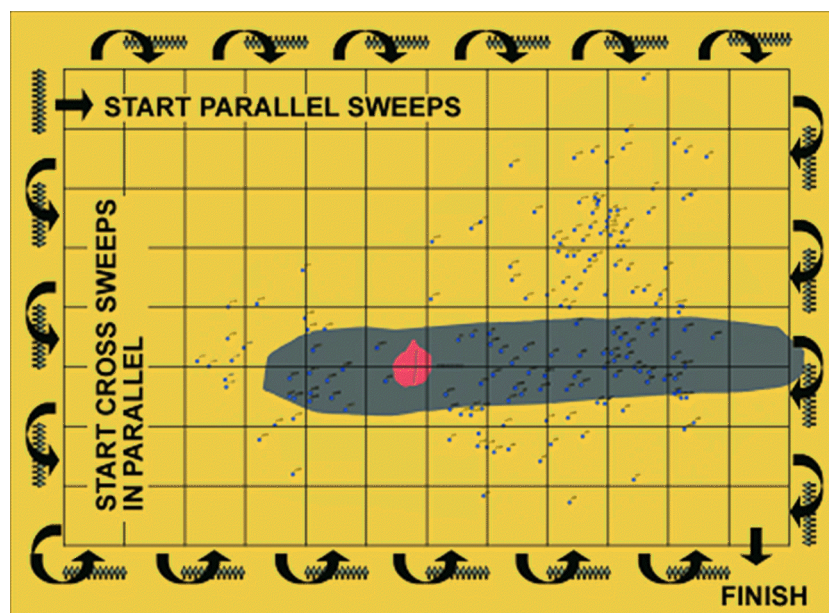
The on-scene medical officer or civil authority with jurisdiction (such as the ME) is to be informed of all remains being removed from the location. Even when a civil authority is in charge, the on-scene medical officer normally works with the local authorities to track and determine the status of remains. The S&R team chief must remain current on the status of remains recovery to provide status to S&R team members. This avoids teams from searching for remains they believe are still missing (i.e., remains not logged in) when the remains were actually recovered and transported off-site (without telling the search team).

Figure 20. Sweep Searches Are Best for Open Areas.



Standard Area Sweep-Cross Sweep. This method is used when a larger area is open and unobstructed enough to allow a line sweep of personnel marching together. The bounded search area is traversed by a team of personnel walking between two flankers. The team proceeds in a line along a set course and searches for remains, each person responsible for a designated width in their line of march. When the search area (or box) has been searched in a parallel direction, then the sweeps are conducted for the search box in sweeps perpendicular to the first search. This is the search method that can be used most often and is also a faster method for searching open areas.

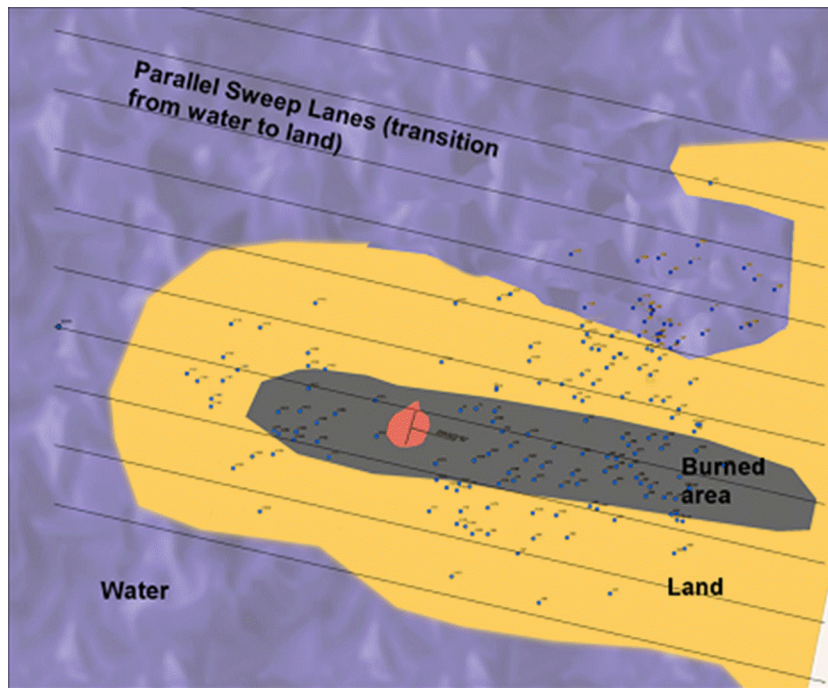
Figure 21. A Standard Sweep Pattern.



Lane Sweeps. This method is used in an area where the view is obstructed, there are obstacles that prevent a line sweep, or there is a steep incline that prevents use of a line sweep. It is also used in snow fields where a sweep will eliminate markings from the snow and greatly decrease the effectiveness of a cross sweep. When a lane search is used in an obstructed area, then tall sitting posts (or poles or marker stakes) are driven into the ground and barrier rope or tape is stretched between the posts. A line of posts extends for the width on both ends of the search box. This breaks the search box into a series of marked narrow parallel lanes. S&R team personnel again form a search line that extends across the width of the lane and there are additional search members in a team that trails the actual line. The search team line proceeds down the lane. For areas that have many remains (i.e., a remains field) or are inaccessible and would disrupt the search team line, trailing members conduct a separate search at the obstacle or the remains field.

Lane sweeps are also effective when working in swamp conditions, as standard sweeps and cross sweeps may not be possible, feasible, or safe. Lane sweeps in swamps provide for lanes that can be physically laid out to better judge progress and location. Lane searches allow others to search the lane (such as in boats or with cameras and divers) when the water becomes too deep for walking. It also allows a lane with more debris to be sectioned off into smaller grids for more detailed searching and use of magnetometers, other detection equipment, and cadaver dogs. Deep-water lanes may require intermediate marker poles for reference use by divers.

Figure 22. A Standard Lane Sweep Scenario.



Lane sweeps on a steep incline are sometimes used when the slope of a mountain or hillside will not allow team members to climb the surface without using ropes and safety harnesses. The direction of the lanes (such as vertical to the slope or across the slope) depends on whether the slope is stable or unstable. Unstable slopes (i.e., loose talus, loose soil, or rock strewn mountainsides) often become more unstable from the aircraft impact and personnel walking on the surfaces.

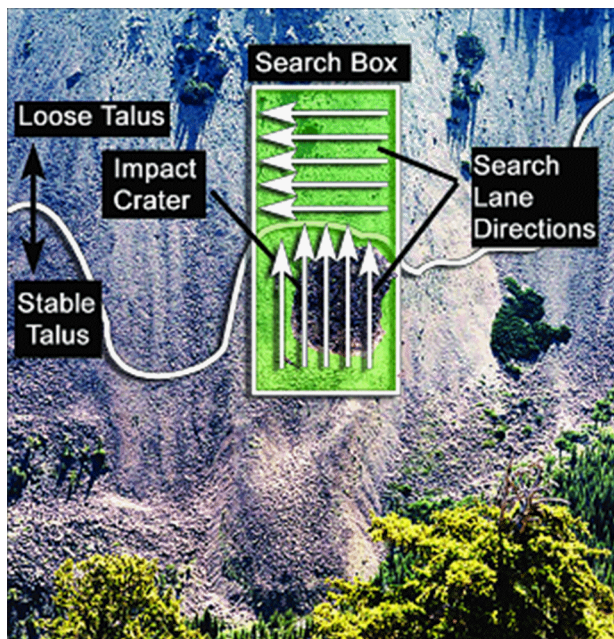
NOTE: A searcher walking on a loose talus or other unstable slope will normally cause the loose material to start sliding down the slope. These slides can cover up debris or remains or injure search and investigation members lower on the slope.

Figure 23. Standard Lane Sweep Views.



Except for life-saving efforts at the impact site, special approach methods must be considered when working on unstable slopes. Approach is normally accomplished from the bottom of the slope working upwards.

Figure 24. Lane Directions Can Vary Based on Stability and Type of Slope.

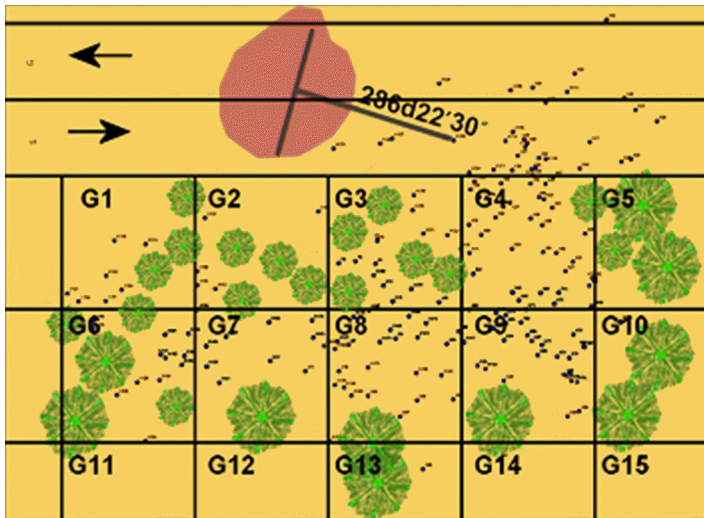


SAFETY CAUTION – Slopes. When assessing and working any mishap or loss where slopes are involved, whether a mountainside or a crater, it is safer to start at the bottom and work up if it would be necessary to blindly step over obstructions. Obstructions could include wreckage, broken trees, or large rocks and boulders. You do not want to step blindly over an obstruction or wreckage, as you could be stepping on remains, jagged wreckage, evidence, hazardous materials, or a loose or slippery

surface (which could cause a fall and impalement of portions of the anatomy). Firefighting ladders can be used to traverse over some obstacles when there is no choice but to go down into a crater.

Grid Search. A grid search is usually conducted in a smaller area that has limited accessibility, has poor visibility, has a larger number of remains and wreckage, or is a remains field. This type of search is frequently used in snow-covered areas or areas that are heavily forested or have dense underbrush.

Figure 25. A Standard Grid Search Scenario.

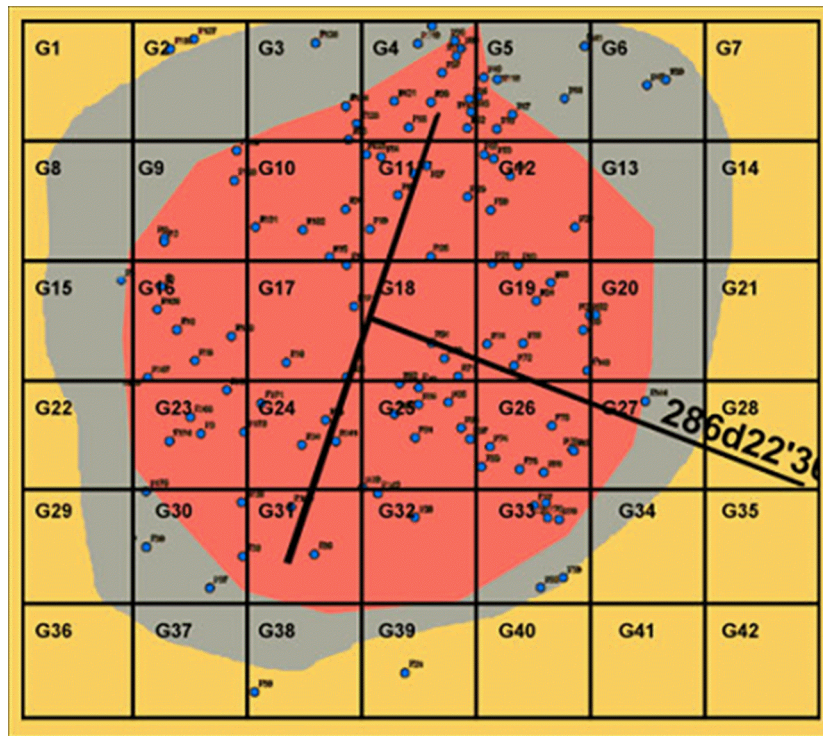


The overall search box is broken into a series of grids using corner marker stakes at each grid intersection. Individual grids are then searched by teams with fewer members who work side-by-side conducting a detailed search from one end of the grid box to the other.

Figure 26. Open (left photo) and Close-Quarter (right photo) Grid Searches.



Crater and Compact Impact Area Searches. These searches are similar to a grid search in that the area is marked off into several grid-marked areas. However, the large number of fragmented or fire-damaged remains, and often the large amount of wreckage, precludes the use of a normal grid search.

Figure 27. A Standard Crater Search Scenario.

Instead, search members move somewhat individually (or in buddy teams when working around composite materials and jagged wreckage) from the outside of the grid toward the center. S&R team members may have to pull out small pieces of debris as necessary to further expose or free observable remains. Do not remove wreckage debris unless the actions are approved by an investigating officer.

Figure 28. Compact Impact Areas Require a Different Approach to Site Search Methods.

For mishap areas that are within a crater, fuel and other hazardous materials may be present and are sometimes more concentrated. Searchers may require forced fresh air, SCBA respirators, and higher levels of PPE protection as determined by a bioenvironmental engineer. Craters also may present a greater problem with uneven or unstable footing.

Figure 29. Crater View.

Building (Room and Hallway) Searches. Searches of buildings that have been damaged by natural events (tornadoes and earthquakes), fire, or explosives (terrorist bomb, aerial attack, or explosives handling mishap), must first be inspected for safety by specially trained personnel. **Then**, searching is usually accomplished by small teams of Services S&R members who enter the buildings and move systematically through each room and corridor, using grid or crater search techniques. Entering most damaged buildings (other than single story wooden structures and some lightweight steel, prefabricated structures) can place search members in an extremely dangerous situation. Greater levels of safety precautions must be used and cadaver dogs may be required.

Figure 30. Typical Views of Some Damaged Building Interiors.

Detailed On-scene Procedures. In addition to the detailed procedures for the search, there are other detailed efforts that must be followed.

Data sheets need to be kept while in the field for every tagged item of recovered remains, personal effects, and any specially labeled equipment. Include the tag number and a brief general description of the remains whenever chain of custody and evidence are required (examples: bag with white hand, bag with foot in shoe, HRP with whole remains in uniform, bag with flight cap Captain's rank, bag with charred flesh, bag with large leg bone and flesh, etc.). Oversight of tagging may even be a joint effort with military and federal investigators and medical examiners. The field data would be entered into the log of events, but must be created on site for investigations that require chain of custody trails. A signed copy of the log may be required to remove remains and personal effects from cordoned, controlled areas where custody of evidence is required.

Refine the site sketch for search methods. One of the first detailed efforts is to refine the sketch of the boundary and remains or remains fields. Then more closely establish the search area by driving stakes for boundaries, lanes, or grids. Mark the area for major sweep, grid, or lane points and plot those marks on the sketch (with a numbering system that fits your needs). If on site, CE can assist with or create the initial sketch and help drive stakes or other markers. CE can then shoot these key locations with a survey-grade GPS while Services search teams are going into action. Mishap boards use these sketches and now can coordinate them with photographic evidence. Electronic mishap reports use geographic information system (GIS) technology to associate information (i.e., photos, descriptions, shots of your markers, medical examiner (ME) or medical officer descriptions of the remains, and other attributes) with each mapped location. Official photographs are normally taken by others for the mishap boards (see Appendix D). S&R teams should work with the photographer to make sure photos are taken of marked-tagged remains.

Alternate data collection and sketch method. If CE does not have a survey-grade GPS or higher level total survey station capability, or there are problems with equipment or personnel, consider using a grid-measurement approach to identify and mark objects, remains, and personal effects markers. A grid approach to data collection for the more critical remains locations allows CE, Services, or other personnel to use tape measures and record data. This data would be added to the mishap reports. A designated Services or CE person should sketch each numbered grid separately when more detail is required.

NOTE: Some locations may be saturated with remains (i.e., a remains field, such as in a crater or burned out passenger fuselage section). If it is not possible to plot each individual marker-point, plot the remains field and have the photographer carefully photograph the points and videotape the efforts if possible.

Refine your marking system methods. When there are many remains in a small area, trying to drive larger stakes can hinder operations. Large stakes should be used to designate grids, lanes, and intact or largely intact remains. For a remains field with numerous fragmented remains, use standard stakes to designate the outside of the area. Run barrier marking rope or tape or Occupational Safety & Health Administration (OSHA) flag banners to show where an area has many remains (and hazards if necessary). Then use small, high-visibility marker flags (on ground surfaces) or tape (such as on floors, walls, vehicle or aircraft metal surfaces). When you have completed searching a grid, then sketch the grid. At the end of the day (or search), combine the grids in one sketch or have CE do this as a part of their mapping effort.

IMPORTANT NOTICE. Air Force Services Mortuary Affairs S&R nomenclature for marking intact remains, portions of remains, and personal effects has changed to the revised Joint Publication 4-06 nomenclature, with variations only as necessary.

Depending on the mishap and your being able to obtain and stock resources ahead of time, you can develop a color coding system using designated colors for flags, flagging, and tape for remains, personal effects, and even any special equipment. See Appendix E for additional guidance on marking.

Example. Yellow, red, and orange for remains, portions of remains, and personal effects (respectively, except that you can limit remains and portions of remains to one color if needed). Investigators usually have their own marking methods, but if they need a different marking method, a blue flag could be used for special equipment identified by investigators. Permanent markers are used to write on the flag using the **R-#** designation for intact remains, **P-#** designation for portions of remains, and **E-#** designation for personal effects. If investigators do not have enough of their own marking kit designations, then you can suggest that they also use a flag and another numbering system (such as an

S-#) for items ISB members or investigators designate as special equipment, personal effects (example: life support items), or evidence. (See Appendix E for specific marking procedures.)

Figure 31. Use of Flags for Remains, Personal Effects, and Investigator Marking.



Detailed Techniques for S&R. This handbook does not present *how-to* detailed procedures for conducting S&R. General guidance is presented here and in Appendix F when considering S&R procedures.

Detailed Procedures for a Standard Area Sweep-Cross Sweep. The search box is traversed by a team of personnel, each of whom is responsible for a four-foot wide lane (i.e., two feet on either side of a line that the person is marching). Enough team members are used between two flankers (and with a team leader) to extend the width of a selected search width. The team proceeds in a line along a set course and stops its forward movement as necessary to mark remains when found. Stakes or flags are typically used to identify intact, primarily intact, and fragmented remains. The team leader or a designated follow-team member places an R-P-E-S designation on the stake or flag and records the item if known. When predetermined, experienced line members may carry flags and flag the items. Upon reaching the end of a designated search box, the team pivots around the inside flanker and travels in the opposite direction until the entire box is covered. This is then repeated if necessary starting at the end of the search box and moving in a sweep line that is perpendicular to the first. This continues until the lengths and widths of the box are again covered (if necessary).

Figure 32. A Standard Sweep Line in Action.



Detailed Procedures for Lane Sweeps. When there is an obstructed view or obstacles, then drive marker stakes or siting posts (taller grid marker stakes that can be seen better above brush) into the ground. Run barrier rope or tape between the posts. The posts extend for the width of the search box. Lane searches can also be used on rock-covered hillsides that are stable and not steeply sloped and for snow-covered locations to better designate the location and line of march.

NOTE: Because CE will need to survey the location lanes and marker points, it helps to have them on site to assist with the marking and clearing. Because they could come into close proximity or contact with remains, CE personnel on site should all be under the CISM program. They should only perform support with the assistance of the S&R OIC or NCOIC or a designated S&R core trained person, who is tasked to lay out the lanes for the location.

Figure 33. Setting Marker Poles and Tall Stakes.



Some lanes may have to be cleared with machetes and brush cutters to allow running lane and barrier rope or tape.

Figure 34. Brush Cutting to Allow Lane Marking.



Within each narrow lane within the search box, S&R team personnel again form a search line that extends across the width of the lane. Flankers are used. Because it may not be possible to traverse the search box in the perpendicular direction, the width between members can be reduced from four-foot wide to just walking shoulder to shoulder when searching for and marking remains.

Figure 35. Lane Sweep in Brush.



Other S&R team members walk directly behind the search line. The line proceeds down the lane and when they encounter an obstacle (such as a tree, bush, or large boulder), the line members *continue around the obstacle*. However, the trailing S&R team members search the obstacle. For trees, this is normally by viewing the tree with binoculars, climbing lower branches if necessary or possible, using a step ladder to clearly view the bush or tree, and marking trees (with colored flagging) to indicate that they may require additional viewing from other angles (especially if remains are found nearby).

For bushes and boulders, the obstacles are close searched to include: (1) using brush cutters and reaching devices to gain access to some areas, (2) using ladders, or (3) climbing to confirm that there are no fragmented remains present.

Figure 36. Trailing S&R Team Searches Trees.



When remains are found, the trailing team leader contacts the sweep line team leader to obtain the next consecutive number of the remains (or PPE or special identifications) and marks and tags the remains. Marking can include use of flags, stakes, and flagging to draw attention to the remains.

Figure 37. Trailing S&R Team Searches Obstacles.



NOTE: Snakes may seek refuge from the search line by going under brush or other objects. When trailing S&R team members search these areas, they need to show greater caution when in snake country.

Figure 38. Trailing S&R Team Members Also Have to Use Caution.



Lane sweeps on steep inclines such as a mountain or hillside usually require special teams to assist or S&R trained team members to use climbing ropes and safety harnesses. The search direction must be determined as a part of determining PPE needs and search procedures. It is based on the location and the possibility that rocks could be dislodged and create a hazard. Unstable slopes are the worst-case scenario, since they can collapse or slide under foot. When possible, searching of unstable slopes should be from below going up the slope.

For more **stable slopes**, search members can use the lane approach going up or down the slope, but avoid stepping blindly over obstacles if going down a slope. Ropes are usually lowered down the slope from some advantageous location. When possible, ropes are manned by personnel at the top. If not possible, the ropes must be anchored (such as from boulders), then search line team members can use a ratchet mechanism to raise themselves up the rope as they work the slope. The outside vertical edges of the expected remains search area are marked with barrier tape.

Another procedure that can be used if ropes cannot be extended down a slope is to suspend wire cables or climbing ropes across the slope and have team members clip onto the rope with short tethered-ropes and harnesses. For stable slopes, barrier tape is used to mark lanes that extend up the slope from the bottom of the remains search area. Searchers in harnesses climb the face of the slope together in a line. Each searcher may have to look at an individual lane that could be at least six feet wide.

Figure 39. Experienced Personnel Use Standard Climbing and Anchoring Techniques.



SAFETY CAUTION – Use of Ropes on Slopes. Climbing rope and gear should be used to anchor search personnel. Only use barrier marking tape and not barrier rope to mark lanes unless the lane tapes can be anchored at the top (see [Figure 40.](#)). The only ropes used on a steep-slope location should be weight-certified climbing rope, except for small ropes that searchers can use to raise or lower light-weight equipment.

Figure 40. Stable-Slope Lane Searches Can Be Up and Down the Slope.



For portions of slopes that are **unstable**, S&R efforts can be dangerous. Barrier tape should be run in narrow lanes across the face of the slope (unless cross slope cables or climbing ropes with tethers are used).

Figure 41. Remains and Personal Effects Can be Hard to Find on Rocky Slopes.



When required for safety, searchers wear harnesses and use climbing ropes to traverse across the face of the slope. Lower members of the search line take the lead and subsequent members follow at a safe distance to prevent causing rock or debris to slide onto nearby personnel. Again, each searcher may have to look at an individual lane more than six feet wide.

Figure 42. A Standard Lane on a Steep Incline (Talus Slope).



For **loose, unstable slope conditions** where remains can be covered up easily by shifting surface material (1) searching, (2) remains and personal effects photography, (3) key investigation debris and life-support evidence identification, (4) marking with flags and flagging or tape, (5) shooting survey points, and (6) recovery of remains and some key evidence may have to be accomplished one lane at a time, basically as a closely sequenced or concurrent effort. ISB and support personnel may have to accompany the S&R members to make decisions on tagging and removal of remains, personal effects, key equipment, and aircraft evidence if it is probable that slides could develop and cover evidence during S&R. Determine the need to conduct concurrent efforts based on the movement of the slope and debris while entering the area and consider that wet weather conditions could increase the slope instability. When possible, efforts should be videotaped, as they may have to be used by SIB members to obtain information.

Figure 43. S&R May Have to be Concurrent with Surveying and Videotaping.



SAFETY CAUTION – Fractured Composite Materials. Always be extremely cautious around composite materials on rocky or talus slopes, as they can be highly fractured due to the more vertical impact with the rocky surface. They can present a penetration hazard and, even if there was limited fire damage, can cause respiratory hazards. The fractured materials can slide down on searchers or be hidden among rocks, so it may be hard to avoid them when traversing the slope.

Lane sweeps are used in deeper snows and allow a team of encumbered S&R personnel (wearing snowshoes, carrying ski poles for balance, and wearing heavier clothing) to march slowly, shoulder to shoulder across a lane looking for disturbed areas in the snow. Disturbed areas such as holes, discolorations, and

surface scars in the snow may be indications of where wreckage, remains, and personal effects have landed.

Figure 44. S&R in Snow May Require Some Adjustments in Procedures and Support.



In deeper snows, lane sweeps can help clear larger areas more quickly, help eliminate them from further searching, and identify areas where more remains are concentrated. The remains field portion of the lanes can be further sectioned off and a grid search used. Access to and traversing the lanes can be difficult and exhausting. A warming and reconstitution tent may be required nearby.

Detailed Procedures for a Grid Search. After determining the requirement for grid sizes and locations to cover the remains search area, begin creating the grids using corner marker stakes driven at each grid intersection and edge boundaries. The grids are marked with string, barrier or boundary tape, or even barrier rope to designate the area. Grids with hazardous materials or greater hazards should be bounded with OSHA barrier flags to designate that higher PPE should be used. The more remains in an area, the smaller the number of grids that can be used. See Appendix E for guidance on marking and measuring within grids.

Grids are searched by smaller teams working side by side to conduct a detailed search from one end of the grid box to the other. Searchers may have to use small tools and kneel down, so they should have PPE to protect their knees, lower legs, and feet. Members may have to assist the person next to them in confirming remains and marking them. For small areas with a larger number of fragmented remains, searchers may have to work hunched over and carefully pick their footing to avoid stepping on remains. Some remains may have to be recovered concurrent with the search just to allow searchers to continue in a sweep across the grid. In close quarters, CE EAs may have to take survey readings of the individual remains when removed. Otherwise, use flags as necessary to mark remains.

Figure 45. Grid Search View with Many Fragmented Remains.



Detailed Procedures for Crater (or Compact Impact Area) Searches. The area around a crater (or compact impact area) should be roped off whenever possible to control site access. If necessary due to size, it should be broken into grids to allow for better control and marking. See Appendix E for guidance on marking and measuring within grids or craters.

Because of the jigsaw nature of the remains and debris or crater materials, search members normally have to move individually or with a buddy (especially when working around composite materials). When possible, movement is from the bottom of the crater working upward or from the outside of an impact area working toward the center.

Figure 46. Control Crater Access with Barrier Tapes or Ropes.



The initial search is for **exposed or already observable** remains. This method requires ISB investigation board members (usually the IO and Medical Officer) to be present to identify key wreckage that should be photographed and carefully preserved before being moved to gain access to the remains. EOD or fire department personnel may have to be nearby for safety.

Figure 47. Crater Search with Observable Remains.



NOTE: Crater or impact area searches are usually an *initial search method* for compact remains fields and **partly observable** remains. It is not the same occurrence as during (or after) the SIB when a portion of wreckage is moved and additional hidden remains are found. No matter which of the search methods are used, never search through and remove wreckage to allow removal of remains unless approved by investigating officers.

When allowed to extricate remains from a debris or wreckage area, such as for marking the remains and making an anatomical determination of what the remains are, members may have to use hand tools, garden tools, reaching tools, and forceps to expose the remains. Using the proper tools and techniques will help preserve the remains and protect searchers from being exposed to bloodborne pathogens and sharp objects.

Figure 48. Removal of Debris with Tools to Access Remains.



For craters or impact areas with fuel and other hazardous materials, determine with bioenvironmental engineers all the types of protection required. This could include bringing in fresh air, using different respirators (such as SCBA respirators), and changing the level of PPE. For crater slopes that are covered with sharp debris, searchers may have to use ladders to go down and over the slopes when searching for remains. When remains in craters have to be removed concurrent with the search, CE EAs may have to take survey readings of the key wreckage and individual remains when removed. Use flags as necessary to mark individual remains and personal effects when they are concentrated in a small impact area.

Figure 49. Take Precautions to Address Hazards in the Crater Such as Using Ladders, Ventilation, and Higher Levels of PPE.



SAFETY CAUTION – Sifting Operations. Never begin a sifting operation, especially when there has been a fire, until it has been determined that composite materials are not involved. Fine composite materials can become airborne during sifting and this can create major respiratory hazards, cause injury to eyes, and lead to increased skin penetrations. If composite materials are present, the sifting operation may have to be located downwind from all other personnel and require higher levels of PPE, post-operation personnel decontamination, disposal of protective garments, and use of some form of fixant spraying to prevent dust. If the materials have been exposed to spilled fuel, be extremely cautious before beginning any sifting operations. Determine with the fire department if the sifting operations could cause an increased risk of spontaneous combustion due to static electric sparking and increased oxygenation.

Figure 50. Take Precautions When Planning Sifting Operations.



When a grid, crater, or compact area search is required in a snow-covered area where concentrated remains and wreckage are present, large tents may have to be used to enclose the area, protect the personnel, and melt snow. Even if not used to melt the snow, snow may have to be loaded, sifted through with rakes or even large sifting boxes to find objects, and removed to a discard location. In some ways this type of approach is like an archeological dig and close searching by removing layers of snow, debris, and remains may be required. Use caution around melting snow runoff from any melting operations, as the liquids can contain bloodborne pathogens and hazardous materials.

Detailed Procedures for a Building (Room and Hallway) Search. While specially trained and equipped county, state, and federal urban search and rescue (USAR) personnel and canines often search damaged buildings for survivors and for remains, few military personnel are fully USAR trained to provide this support. Air Force fire department personnel that respond to fire collapsed or damaged buildings have some USAR training for search and rescue. Special local, state, and federal fire investigators may also

enter these buildings with their special training. They may remove some remains **when found**, if they determine that it is safer and necessary for them to do so at the time.

With the exception of a few types of single story structures, entering a damaged building can place search members in an extremely dangerous situation. Depending on your location, a building structural assessment and USAR search should have been completed before a Services S&R team arrives. State and federal teams are available to assist the military as a part of MoAs and other agreements. They would enter the structure and mark for hazards (using a special FEMA USAR marking system to identify building condition and body locations). The number of casualties is marked on the outside of the building. The system also identifies if and how it is safe to enter. Firefighters should be familiar with the FEMA USAR marking systems for structural assessment and victim identification. If not, be sure to enter only if you can determine that a USAR search was conducted.

If the building is at a location where there is no USAR support and *search and rescue* and *search and recovery* are solely military efforts, then S&R may require variations in the pre-entry efforts. Searches for victims and remains must still be a well-coordinated effort that ensures the building is safe. Usually a thorough inspection is required and qualified CE personnel may have to brace and shore some sections to allow entry. Also, hazardous materials must be identified. Burned soot, asbestos or other fibrous materials, concrete dust, damaged pretension rods (which can fail explosively if touched), overstressed structural members, and even composite materials can all be present within a damaged building and can vary considerably from hallway to hallway.

NOTE: Search teams with supporting personnel should enter the facilities only with the proper levels of PPE. This should be determined by checking with a bioenvironmental engineer after qualified inspectors and safety personnel have signed off on entry for the various locations within the building.

Figure 51. Building Search Teams and Special Support Personnel May Enter as Teams.



Even when the structure has been declared safe for entry, S&R teams should move through the damaged structure accompanied by special support personnel. The S&R teams enter the buildings and move systematically through each room and corridor using open or shoulder-to-shoulder lane and grid search techniques as applicable. Depending on the jurisdiction, especially when building damage is not related to an aircraft mishap, Services must determine if there are any ME, medical officers, or mishap or criminal investigation officers that must be present with the team and if there are any other requirements for marking and removal of remains.

Figure 52. Damaged Building Interior with Remains.



Typically the teams should plan to mark remains as they encounter them if they were not already marked or indicated by USAR personnel. Marking may be a problem due to the surface materials not allowing (driven) stakes or flags to be used. Sometimes even high visibility marking tape will not stick to some damaged surfaces. When this happens, use marking tape and flagging streamers to wrap around nearby objects when possible. The metal flagstick of colored flags can also be wrapped around pipes and other nearby objects to indicate remains. Then attach the S&R tags to the wrapped tape, flagging, or flags.

Figure 53. Damaged Building Interior and Marking Methods.



For building searches where remains have to be removed concurrently to allow progress in the confined space, S&R should include photographing and bagging all identifying personal effects. Marking floor plan sketches is important. Mark on an individual grid type drawing of the floor plan layout **for each room or hallway**. Use floor plan nomenclature on the S&R tags to specify the room or hallway location. Combine the individual drawings into a final combined mishap diagram.

For buildings where an explosion may have widely scattered remains (horizontally and vertically), recovery team members should enter, mark, photograph, and remove the remains as encountered in each room and hallway. Entry and search efforts may require you to pick your way around debris such as furniture and fallen ceiling materials. If there are no major hindrances within the room, then recover remains in a manner that (1) allows you to more accurately measure and sketch the locations and (2) creates the least hindrance in case you have to evacuate the building in a hurry. With these objectives in mind, proceed first from the room's **doorway floor area** outward toward the two side walls. Also remove any loose-remains hanging from the walls or ceiling.

For smaller rooms, move search efforts along in a search line parallel to the doorway wall while working toward the opposite wall. For larger rooms, you may have to set up grid search patterns. **Try to always clear the grid areas away from the doorway (or other entry point) in a manner that allows for unhindered exit in case of evacuation.** When the floor area has been cleared, then remove fixed-remains on the walls, ceiling, and above floor fixtures and structures. Use ladders and support stands.

Figure 54. Create Individual Sketches for Each Room and Hallway.



For collapsed buildings, mark, photograph, and then remove remains **in each cleared area** (1) *as approved* by either the USAR structural technicians or structural engineers and (2) *as allowed* by investigators who may be conducting initial or concurrent evidence gathering. When debris removal is underway, mark, photograph, and remove remains as they become exposed during heavy equipment efforts or as debris removal teams uncover the remains. The USAR technician, structural engineer, and fire department SAR personnel may be able to identify which floor level the remains were associated with at collapsed building sites, but this is **often only tentative**. Long-term investigations are usually required. There is **no one safe way** to search collapsed buildings. Recovery is normally a part of the evidentiary and debris removal processes. In some cases, only USAR team members may be capable of retrieving remains, so determine with USAR team leaders how you need to work with them.

Marking Stakes, Flags, and Tape. There can be variations in the physical marking methods (stakes, flags, tape) to fit the circumstances of the remains, terrain, and the type and number of remains. However, the marking designations should always be consistent.

Outside marking method for intact or nearly intact remains. For marking intact remains or primarily intact remains, a stake is the preferred method. Drive a stake at those locations and mark it with an “**R**” (for single intact remains) or “**R - #**” (for multiple intact remains). Use consecutive numbers for each stake. Use a “**P - #**” for fragmented (i.e., partial) remains (example, **P-1**). If identity is confirmed or known, such as for a recognizable portion of primarily intact remains, show this on the tag attached to the stake, but still use a “**P - #**” designation on the stake (whether known or unknown). See Appendix E, *S&R Tags, Marking, and Recording*, for more detailed guidance.

NOTE: Other personnel who have been or are on site may use other specific marking scheme colors and designations as a part of the ISB and SIB investigating procedures for marking specific mishap investigation evidence types (instruments, flight controls, ejection seats, human remains, crash related landmarks, etc). Contact the on-scene commander and/or ISB or SIB Investigating Officer to coordinate or deconflict flag color usage.

Outside marking method for fragmented remains. For marking multiple fragmented remains in a small or enclosed area (such as a crater), high visibility flags can be more readily used with the continuing sequence “P - #” designation. If the remains field appears to have a central area, drive a stake there *with a circled sequence number* to allow for coordinating with follow on surveying and GPS plots.

Figure 55. Numbered Stake in the Middle of Remains Field (for GPS Purposes).



Inside building marking method. For marking in a building room or hallway when tape will stick to it, use 12-inch lengths of colored, high-visibility plastic (adhesive) tape. If additional visibility is needed to find the marking, attach about 18 inches of similar colored flagging to hang under the tape (see [Figure 56.](#)). If the tape will not stick to the surface material, wrap a piece of high visibility flagging, tape, or the wire flagstick around the closest object to help highlight the location for recovery.

Figure 56. Typical Building Room Marking for Nearby Remains.



Mark on the tape with an indelible marker to show the “R - #” or “P - #” designation plus the floor and room number. You may have to assign a temporary room number if the room is not designated on the floor plan. Make sure to write that assigned room number on your copy of the actual floor plan you use.

Example. The search finds the eighth set of partial remains in a building on the second floor in room 240. The remains would be designated as “F2 Rm240 P-8”.

For hallways, use the hallway designation on the floor plan (or the letter you have to assign to it if not marked on the floor plan — mark the letter that you assigned on the floor plan).

Example. The search finds the twelfth set of partial remains in a building on the fourth floor, in the central hallway (you mark it as “C” on the floor plan), nearest to room 412. The remains would be designated as “F4 HC Rm412 P-12”.

Continue to use consecutive numbers if possible, but if several teams are working multiple floors or areas, assign them a block of *R-and P-numbers* that they can use without having to constantly check back and forth. The S&R team chief **must ensure** that team leaders compare their marked floor plans to reconcile any assigned floor and hallway designations (1) **before leaving the location** and (2) **before CE EAs visit the location (to create official diagrams)**. **Correct any duplications or errors.** You can vary the marking method as needed for your situation, but always ensure that your marking method for each building is consistent.

Remains Recovery Procedures. The recovery team must act as a unit to tag and designate remains and portions of remains. Due to physical stresses, exposure, and mental stresses, which can be considerable over the period of S&R, some S&R team members may have to be replaced. Do not expect team members to remember which remains were where, even if they were on the original search team. Use standard marking-tagging procedures throughout the effort and document findings on the sketches and in data tables.

The recovery team makeup varies by circumstances, but is normally eight members, a photographer provided by the base multimedia support office, and a team leader. If remains recovery must be concurrent with search, then a CE engineer assistant or an S&R team member may have to accompany the team to provide on-the-spot surveying for shots of the location. For many mishaps, remains are dismembered and burned and there may not be 100% recovery. Team members must handle remains with the utmost care to ensure against loss or destruction of valuable identification media or evidence.

Figure 57. Handle Remains with Care, Placing on Sheets as Needed Before Placing in the Human Remains Pouch.



NOTES:

No remains should be moved or disturbed without the consent of the ISB or SIB Medical Officer, ISB or SIB President, or the on-scene commander. This should also be done in coordination with the servicing JAG when possible.

The standard tagging procedures presented in this section are not the same as those that may have to be used for an expedient or contingency recovery.

For outdoor recoveries, use survey-grade GPS to survey each intact or primarily intact remains. Also plot as many as possible “**R**” (remains), “**P**” (fragmented or partial remains), “**E**” (personal effects), and “**S-type**” (an item or equipment (on or about the remains) identified by an inspector or investigator) designations. Also plot the circled number center stake of any remains fields. If only a handheld PLGR-type GPS is available, use it as previously discussed to identify the primary longitude-latitude-altitude for appropriate key locations.

Table 11. Primary Steps for Remains Recovery (non-expedient).

Step	Primary Remains Recovery Procedures
Tagging	<ol style="list-style-type: none"> 1. Use three tags for portion of remains found. <ol style="list-style-type: none"> a. The <i>P-number</i> must be written on each tag and the stake or flag. b. Attach one tag to the remains portion. c. Attach the second tag to the remains small plastic bag. This tag can be eliminated if the remains bags can be marked on directly. d. Temporarily attach the third (second) tag to the stake or flag. 2. Use two tags for each whole remains found or partial remains which are too large to fit into a small bag and must be included in a separate HRP. <ol style="list-style-type: none"> a. The <i>R- or P-number</i> must be written on each tag and on the stake or flag. b. Attach one tag to the remains or on the remains (if first wrapped in a sheet). c. Attach the second tag to the human remains pouch.
Photography	<ol style="list-style-type: none"> 1. Ensure that a color photograph is taken of each remains with the tag's R- or P-number showing. 2. The same applies to any E- or S-numbered or ISB-tagged items whenever possible. 3. Photographs and videotapes should include a close-up shot of the remains and an image that depicts the remains in relationship to the majority of the wreckage or the mishap scene.
GPS Position	<p>When a GPS reading is possible, CE should take readings at:</p> <ol style="list-style-type: none"> 1. All major remains and remains field, 2. The boundary points of the various search methods used, and 3. At major identification points within and near the search area. <p>If CE is not available to take the readings and PLGR-type GPS is available, then Services should take a reading for the major identification points and identify these on the sketch.</p>

Step	Primary Remains Recovery Procedures
Retrieve Remains	<ol style="list-style-type: none"> 1. Carefully place the remains in an HRP or plastic bag. 2. Minimize handling to prevent undue damage.
Detailed Search	<ol style="list-style-type: none"> 1. The ground beneath the remains should be carefully examined and immediate area to assure that all portions are recovered. 2. If it is suspected that there are remains mixed with small debris and soil, a sifting box operation should be established to recover all possible remains and personal effects. 3. Videotape the primary operation to show the basic effort, but a constant video is not required unless the investigating officer requires this. <ol style="list-style-type: none"> a. It may not be necessary to photograph each unidentifiable desiccated, burned, or chemically damaged piece of small remains. b. The local medical examiner or medical officer should make the determination.
Attach Third Tags	For portions of remains that are in plastic bags and then placed in a HRP, securely attach the third tag marked with the P-numbers (once a photo has been taken of the remains) to the outside of the human remains pouch.
Preserve and Transport	<ol style="list-style-type: none"> 1. Ice or refrigerate the remains as soon as possible to reduce degradation. Refrigerate at a temperature of 38 to 40 degrees Fahrenheit (3.3 to 4.4 degrees Centigrade). If refrigeration is not readily available, pack HRP and plastic bag remains in ice or ice packs in insulated chests or in a transfer case, depending on the size of the remains. Transfer cases are normally only used OCONUS, but for larger mishaps with commingled remains, transfer cases can be obtained when shipment is required to Dover AFB. 2. Transport the remains by mortuary personnel to the temporary collection point or morgue.

Personal Effects Recovery Procedures. [The personal effects (PE) referred to here are those PE **found at the site of a mishap**.] PE are marked using the “E-#” designation and annotated on the site map. PE are placed in plastic bags secured with wire-tie shipping tags. Those PE found near the remains and identified as *being of the remains* (i.e., personal *associated* remains that an **investigating officer determines** are related) are placed in a plastic bag and then placed in the same HRP. There is no different marking convention for *PE associated with remains or partial remains*. Mark these types of PE with a tag using an

“E-#” designation, but write the words “Associated with” and the tag number of the **associated remains** (i.e., the “R-#” or “P-#”) as designated by the investigating or medical officer.

Example. The detached right leg in a portion of a flight suit (listed as portion P-8) has a flight cap partially hanging across the right lower leg pocket. While moving wreckage, the cap appears to fall from the pocket. There are currently nine marked personal effects. If an ISB or SIB investigating officer deems that the portion of remains and the cap are related, then mark the flight cap as associated. Mark the flight cap with “E-10 Associated with P-8”.

PE or other personal belongings found loose at the site will be marked and annotated on the site map and placed in plastic bags secured with wire tie shipping tags. Place all loose PE into a separate HRP. Do not attempt to re-associate personal property or accouterments found loose at the mishap site until the remains are processed and identified by a medical examiner. Always ask the investigating officer when in doubt. When conducting a contingency S&R without an investigating officer, always treat and label the item as **an unassociated personal effect**. The items must be safeguarded and delivered to the identification processing facility. Services personnel are responsible for loose personal effects and will inventory the PE and annotate them on a DD Form 1076, **Military Operations Record of Personal Effects of Deceased Personnel**. PE may be retained as evidence by civil and military law enforcement or federal investigative authorities until no longer needed.

Continuing Remains Recovery. Remains may be found throughout an investigation or by circumstance after the investigation. Some locations (such as mountainsides) may experience movement that uncovers additional remains. Weather conditions may affect remains exposure (i.e., remains can be uncovered by action of running water or revealed under melting snow). Normally the most frequent reason to recover additional remains is the movement of mishap wreckage as a part of the final investigation or as a part of the site cleanup.

Figure 58. Some Remains Recovery May Require Extensive Efforts.



Depending on the location and jurisdiction, Services S&R personnel should either retain a number of personnel on scene throughout the investigation and until aircraft recovery, or place personnel on standby to be called as required. The normal practice is to leave a team leader and at least five S&R team members at the scene to be present during salvage operations should there be subsequent recovery.

When recovery is complete and S&R terminated by the on-scene commander, notify HQ AFSVA/SVOM and the MAJCOM by telephone. The mortuary officer (MO) should not request disposition instructions prior to termination of aircraft salvage operations without the approval of HQ AFSVA/SVOM. If there is a subsequent recovery of fragmented remains, the MO should contact HQ AFSVA/SVOM and contact the person authorized to direct disposition of the remains. Subsequently recovered remains could be marked

with the *in sequence P-number* designation only if the MAJCOM Services mortuary office or AFSVA/SVOM instructs the team to do so. Otherwise use *new P- or E-numbers, the date, location, and recovering team base designation*. Write information on the tag that the site may be related to a previous mishap if Wing Safety identifies the site as a known previous mishap site. If the remains were found after an extended period of time after the mishap, contact AFSVA/SVOM to determine if remains recovered by the Air Force (or a jurisdictional authority) should be sent to the OAFME for identification.

Identification Process. For aircraft mishaps, the ISB/SIB Medical Officer assists with the identification process, which is made by the medical examiner (ME) with jurisdictional authority and with OAFME when secondary jurisdiction is necessary. For recognizable remains, remains can be identified based on a statement of identification. However, presumptive identification from circumstantial evidence should not be used. For remains identified based on a statement of recognition of the deceased, an Air Force mortuary specialist should still complete a review of the case prior to final disposition of the remains.

For *not recognizable* remains, identification must be made by scientific means to establish a positive ID. Identification is made at the jurisdictional level, either by the local ME with or without assistance from HQ AFSVA/SVOM, the base medical facility with the medical officer assisted as necessary, or through OAFME or Dover AFB mortuary center. The medical examiner releases the remains to a mortuary or the mortuary officer for processing following completion of all medical actions, including ISB/SIB medical actions for aircraft mishaps.

Remains transfer from the initial mishap investigation may be by vehicles owned by the jurisdictional authority to their serving mortuary facility, by base hospital medical transportation, or by an appropriate, adequate vehicle designated to transport the remains. Adequacy depends on the location and time to transport. AFI 34-242 applies for CONUS and OCONUS transportation of remains.

Critical Incident Stress Management (CISM) Recognition and Debriefing. When an SIB is on scene, the medical officer normally assigns a trained *peer stress debriefer* to be on site for daily support, if required. The medical officer may assign a peer stress debriefer to be on site to cover the primary aspects of S&R. Determine with the on-scene medical officer if a peer stress debriefer will be available. If not, the S&R team chief, OIC, NCOIC, and team leaders need to be more aware of the daily aspects of stress and look for signs of problems with participating members (see [Table 12](#)).

Table 12. Daily Concerns for Critical Incident Stress Management. (extracted from PEP guidance in AFI 44-153)

Area of Stress Management	Primary Guidance for Signs of Stress
About Stress	<ol style="list-style-type: none"> 1. Stress is inherent to survival. 2. Stress is necessary for human development and growth. 3. Stress is initially positive in generating action, but too much is unhealthy. 4. Stress can affect physical health. 5. Stress is additive and a combination of stressful experiences can have as much effect as one traumatic stressful event. 6. Stress is manageable.
Dealing with Stress	<ol style="list-style-type: none"> 1. Everyone has stress reactions. 2. Reactions are NORMAL reactions to abnormal situations. 3. Reactions must be dealt with to avoid performance disruption and the development of physical and psychological illnesses. 4. If you don't deal with stress, it will deal with you. 5. In many cases, there are effective, simple means for dealing with stress.
Positive Stress Behaviors	<ol style="list-style-type: none"> 1. Know and stay in touch with your purpose. 2. Be a team player and think US instead of ME. 3. Develop a sense of confidence about your group's ability to accomplish your mission. 4. Practice your spiritual beliefs and utilize them as source of support. 5. Have a buddy. 6. Accurately identify what you can and cannot control.

Signs of Ineffective Coping	<ol style="list-style-type: none"> 1. Insufficient sleep. 2. Insufficient nourishment. 3. Insufficient fluid intake, alcohol, and other drug abuse. 4. Breakdown of respect for those in the chain of command. 5. Breakdown of respect for lawful orders and directives. 6. Breakdown of communication within the chain of command. 7. Not taking care of yourself (i.e., getting too thirsty, tired, or hungry).
------------------------------------	--

Some precepts of pre-exposure preparation (PEP) guidance should be considered throughout S&R. Place emphasis on the following (AFI 44-153) guidance for all members:

“It is ultimately your responsibility to deal with your feelings of stress by knowing and using the methods most effective for you, but your ability to effectively deal with stress **[is] greatly enhanced by letting others be a part of your efforts.**”

All personnel who were a part of the S&R operation, including any personnel from another unit that directly assisted Services with S&R (i.e., on-site photographer and surveyors) must undergo structured critical incident stress (CIS) support. A CIS defusing is a more informal method conducted as soon as possible (such as on the bus trip back if possible when an S&R group is being transported together), but at least within 8 to 12 hours from return from S&R. A CIS debriefing is a more formal session to be held within 24 to 72 hours of return from S&R. Both are conducted by or for the medical group by a trained critical incident stress manager. This can be somewhat problematic in keeping track of scheduling everyone if an S&R contingent remains on site to support continuing recovery. Do not delay CIS debriefing until all personnel return if this will delay the training for most personnel beyond 72 hours. Check with your medical officer for a decision on scheduling team personnel for CIS defusing and debriefing sessions.

Redeploy the Team to Home Station. When S&R has been terminated by the on-scene commander or head of the investigating board, then the team must demobilize and recover field equipment that has been used on site. Recovery of equipment and transportation back to station should be according to standard procedures within wing plans or operating instructions. If exposed to bloodborne pathogens or other hazardous materials, some exposed materials may have to be treated as a hazardous material for transport back to station. Meet with representatives from the medical group (bioenvironmental engineer), readiness logistics (transportation), civil engineers (environmental and readiness technicians), and contracting (if necessary) to arrange for encapsulating barrier materials or overpack barrels (see [Figure 59.](#)) to contain contaminated tent materials, refrigeration units, clothing, or field equipment that must be taken back to the base and decontaminated or disposed of (as necessary).

NOTE: Be aware that if the site itself must be cleaned up due to hazardous wastes and debris, the clean-up contractor or military personnel may uncover additional small fragmented remains within the several months that it takes to organize and conduct the cleanup. Recovery of a few highly fragmented remains may not be a critical incident to more seasoned members, but consider some form of CISM PEP and follow-up with the recovery team members.

Figure 59. Services May Require Overpack Barrels for Any Contaminated Clothing and Equipment.



To avoid any chances of contaminating people and transportation, always try to ensure that returning team members have an opportunity to clean up and change into clean clothes or coveralls for the return trip to the base. If this is not possible, at least provide for wet towelettes and other materials to help them clean up. Team members may still have to wear surgical masks and barrier gloves to avoid contact during the trip if unable to clean up and change. Try to provide stress relief and some refreshments on the way back to the base, especially if members will be traveling for a while from a remote site. If there is unit transportation for all team members, then try to schedule a defusing session or have a medical officer peer stress debriefer on board to observe members.



**SECTION 5. KEEPING RESPONSIBLE
PARTIES INFORMED OF STATUS**

One of the most important areas of concern during search and recovery (S&R) efforts is to make sure that all responsible parties are informed. When within exclusive federal jurisdiction, it is easier for the Services mortuary officer to work mortuary affairs issues within the overall military system of notification and support. It is a Services mortuary affairs responsibility to keep the person authorized to direct disposition (PADD) informed of their entitlements and to provide necessary mortician assistance. AFSVA/SVOM is responsible for informing the PADD for OCONUS deaths when the PADD is in CONUS.

When other jurisdictions have authority, then there is sometimes a loss of control due to other parties releasing information that has not yet been received by military authorities. Always work with your base public affairs and medical officers to make certain they are working with local media and medical examiners to ensure that information being released is factual and that the next of kin are not confused. Services is not the first point of contact for informing the next of kin on the results of S&R. Services is required to conduct S&R and keep the base and command authorities advised of status so they can make official notifications.

Services should always work with the base and command authorities to ensure that S&R information is presented in an efficient, consistent manner and that information is accurate and not speculation. However, during a loss of life mishap or mishap, it is up to the proper base authorities to notify the next of kin of the status of their loved ones. Again, AFSVA/SVOM is responsible for informing the PADD for OCONUS deaths when the PADD is in CONUS. Mortuary affairs should not make contact with PADD until proper casualty affairs notification has been made. Until then, it is better to make preliminary contact with the deceased's unit and provide the unit with the expected mortuary affairs contact information.

Before taking any actions with the next of kin or PADD, the mortuary officer should actually obtain information listed in the deceased member's records to determine the recorded PADD for remains and personal property. The recorded PADD may not be the same person or the apparent next of kin. The unit can help emphasize that all of the military mortuary affairs efforts will be of the highest priority and that the military will take action when needed, even if a local jurisdiction is in charge of the initial efforts and the media may be looking for a story. After official notification, it becomes a mortuary affairs effort and the PADD is provided information. If there are conflicts, immediately contact the JAG.

Person Authorized to Direct Disposition (PADD). The PADD is determined from the member's record. If there is a question on who the PADD should be, there is an order of precedence established in AFI 34-242. For conflicts or disputes, the determination of the PADD must be legally adjudicated. Once they are known, it is important to keep the PADD informed of S&R efforts. However, S&R efforts do not always equate to identification (ID) of the remains and the need to begin processing for entitlements. The PADD needs to know this. AFI 34-242 relates that Air Force policy is to individually segregate and identify the remains of deceased personnel to the fullest extent possible and to use all available means and scientific resources to accomplish this. This is especially important when multiple casualties are involved. No information concerning ID is to be released until final conclusions are established on all remains. If the remains are recognizable, presumptive ID can be made. However, if remains are not recognizable, scientific means must be used to establish a positive ID. If local ID support is not available, the mortuary officer should contact HQ AFSVA/SVOM for ID assistance. A PADD briefing guide is available on the

Services Mortuary Affairs website. Remains are not to be classified as unidentifiable or unknown until an Air Force mortuary specialist has reviewed the case and processed the remains.

Remember: “The mortuary officer will not brief the PADD on mortuary entitlements until the remains have been positively identified. In the interim, the PADD should be kept informed daily on the status of identification.” [Excerpt from AFI 34-242, paragraph 7.3]

Chain of Command and Notifications. You need to have an operating plan and checklist to use upon initial notification of a death and when S&R will be required. Services should have an official command or base plan (or both) and checklist to address initial notification to your theater or supporting MAJCOM services mortuary office. The Services Mortuary Affairs website has numbers and methods of communications for outside your MAJCOM. Although not a frequent occurrence, notification procedures should be taught to and well understood by alternate mortuary officers and staff. When S&R efforts are initiated, the primary mortuary officer has little time to initiate and send updates while working the various aspects of the initial site visit and S&R preparations.

The primary methods and points of contact are listed in AFI 34-242, including information required for initial death reports and supplemental reports. Sample formats are available in the publication. Depending on the type of mishap, notification would include the MAJCOM Services offices, AFSVA/SVOM, and AF/ILV.

For overseas deployment situations, the deployed base’s Services Control Center will include the day’s mortuary affairs status in the daily SITREP. For AEF deployments where Air Force personnel are on an AEF base or joint operating base, obtain notification details through the theater Services mortuary office for Air Force and other branches of the armed forces, as well as authorized civilians and civilian contractors.

Follow-Up Actions. Of prime importance as a follow-up action is to ensure that all S&R participants receive follow-on CIS debriefings. The following is **not a prioritized** list, and some actions may be completed by the mortuary officer, NCO, or technicians.

Table 13. Follow-up Actions List.

#	Action
1	Coordinate actions related to disposition of the remains, mortuary entitlements, military honors, and Summary Court Officer.
2	Maintain a mortuary case file for the deaths of all eligible personnel.
3	Maintain a written record of all communications with the PADD.
4	Complete any final message notifications to close out S&R.
5	Document findings and conclusions (unless accomplished by AFSVA/SVOM) on AF Form 697, Identification Findings and Conclusions, and forward to the commander for signature.
6	Close out the S&R log of events.
7	Coordinate with CE for a final copy of the site diagram to include in your case records.
8	Complete an after action report (see Section 7, After Action Reports and Lessons Learned) and forward copies per applicable AF, MAJCOM, and theater requirements.
9	Institute changes and training based on lessons learned.



**SECTION 6. CONTINGENCY
OPERATIONS**

Contingency Location S&R. In a contingency environment, basic S&R procedures should be used, but modified for the theater and situation. S&R, tentative (Believed to Be (BTB)) identification, temporary refrigerated storage or interment-disinterment, and evacuation of remains must meet theater requirements. Services S&R is based on a designated 26-person team with an S&R OIC and NCOIC and 10 core-trained Services personnel. Equipment and manning are per UTCs, with augmentees provided by other units, including other services for some joint service operations. [Theater components may only require a single 13-person team.] AFI 34-242 provides much more definitive guidance to wing commanders regarding support for S&R teams. All augmentee members must also be trained and provided CISM preparation. Mortuary support is typically at the level of a mortuary collection point operation.

AEF or joint service beddown bases with Air Force or primarily Air Force *base operating support* responsibility may conduct S&R in support of mishaps or incidents near their installation. For a fatal mishap or incident, the mortuary officer must contact the Component Headquarters Services staff to determine responsibility for S&R. The Component Headquarters staff coordinates with the mortuary affairs *lead Service* to make this determination. When the beddown location will conduct S&R operations, Services manages them using core and tasked members. Wing Operational Instructions should be developed to identify the tasking requirements and the levels of training and protection. If the location is too small to have a full 26-person team and more personnel are required, contact the theater Services mortuary representative to obtain assistance from other units.

S&R may only be conducted under conditions that do not endanger the S&R team. Sometimes local authorities near the base, country and embassy officials, and groups like the Red Cross/Red Crescent have good contacts in the immediate mishap area. They can lend assistance when contacting or dealing with local inhabitants who may also have been affected by the mishap. Under joint operations, local authorities and (non-hostile) military personnel may arrive on the scene and be ostensibly in charge for initial search and rescue efforts. Work with military liaison personnel in country to help in assuming control for S&R operations. Under non-hostile conditions, EOD, CBRN requirements, and Security Forces determine if/when the area is safe to conduct S&R operations. Use standard search and *tagging and bagging* procedures. Under hostile conditions, installation commanders must determine when it is safe to conduct S&R operations. *Expedient grab and bag* procedures may have to be used.

The mortuary officer coordinates with bioenvironmental engineering personnel, who will determine what personal protective equipment (PPE) are required at the mishap site. When expedient S&R is required and a pre-site visit is not possible, a Bioenvironmental Engineer may have to rely on information from any emergency responders or unit members with on-site information to help determine the use of PPE.

The mortuary officer coordinates with Civil Engineers (CE) to determine if survey-grade GPS capability exists to plot remains and personal effects locations. Sketch the site and have CE finalize site diagrams.

Use the search method that applies best to your location and the time available for searching. Normally only a standard area sweep, a lane search method with a trailing team, and a small grid search are considered. Heat stress, work and rest cycles, lifting requirements, sanitation, and bloodborne pathogens must all be considered as limiting factors when conducting S&R.

Units conducting recovery operations OCONUS in a remote location must still take special precautions to preserve all items that might be useful in establishing a tentative identification of remains. When performing recovery operations, use any means available to cover and contain all remains and portions of remains recovered. The policy is to not remove personal property and effects from the remains at the mishap site (i.e., official cards (line badge) and papers, nametags, and accouterments). Only weapons and/or ordnance may be removed from the remains and this should be by Security Forces or EOD personnel.

If normal recovery can be used, then use the *tagging and bagging* process. This uses the previously identified methods for using stakes and flags marked with consecutive R- (while intact they may be unrecognizable) or P-numbers for fragmented-partial unknown remains. When possible, also mark all personal effects (PE) with consecutive E-numbers. If survey-grade GPS is available, the location of each intact and portion of remains and PE should be plotted. These GPS coordinates will be annotated on both remains and PE tags. If only a non-survey, non-mapping GPS is available and time is short, take as accurate a reading as possible on the most prominent feature at the mishap site and then hand draw maps or sketches (in relation to that feature) so that the information can be used later to plot the location of remains and personal effects. If sifting operations are required, the sifting boxes and any support stands should be made as portable as possible. Smaller sifting boxes with removable handles work well with folding sawhorses (see [Figure 60](#)).

Figure 60. Sifting Boxes May Be Required Even for Some Contingency Losses.



Use two tags for each remains (intact or portion) and PE. If survey-grade GPS readings are available, the GPS coordinate must be written on both tags. If only a site feature GPS reading can be taken, then the R-, P-, and E-number should be written on both tags. Attach one tag to the remains or each portion of remains or PE, and the other tag(s) to the human remains pouch (HRP) containing the remains, multiple associated remains, or multiple PE bag(s).

If a beddown location photographer or a combat camera photographer is not available to take photos, and there is no investigating officer or other on-scene commander to take photos, then bring a digital camera to take photos of the primary mishap site, perspective shots of the site and primary remains (intact or primarily intact), and as many fragmented remains and PE as possible that are tagged. Fragmented remains should be placed in plastic bags and then into an HRP. Minimize handling to prevent damage.

Examine the ground beneath the remains and immediate area to assure that all observable remains are recovered. Based on the number of souls involved, if analysis of the remains indicates that other remains are still unaccounted for, and if you have the time and equipment to continue S&R, expand the search or check for buried remain fragments in a crater (such as with a sifting box), scattered in the area, or under wreckage. The site may have to be *marked* (usually by an identifying GPS coordinate for the site rather than a permanent marker). Later S&R efforts would be made to recover the unrecovered remains. The problem with not completing all S&R efforts in a contingency environment is the problem of animal scavenging, human pilfering, or enemy intelligence gathering.

PE associated with the remains are placed in plastic bags and then placed in the same HRP as the remains. All other PE are placed into plastic bags and then placed into a separate HRP. PE found loose at the site should be annotated on the site map and the PE placed in plastic bags secured with wire tie shipping tags. Do not attempt to re-associate personal property or accouterments found loose at the mishap site until the remains are processed and identified.

Follow standard refrigeration or icing procedures for transport and storage. Transfer cases are used OCONUS and can be packed with ice for transport, but do not place ice directly on remains.

Expedient S&R Situations. Due to hostilities, this may require a *grab and bag* process. A small team of core Services personnel, Security Forces, EOD, and an investigating officer(s) and medical person (if possible) are normally inserted into the site in armored vehicles or helicopters. Expedient S&R teams would have a predetermined kit of PPE that is suitable for their geographic area.

Based on the number of souls involved, the response kit would contain enough HRPs (example: double the number of souls when possible) and plastic bags to recover all primary observable remains that can be safely obtained within the mission on-ground times. If remains have become contaminated by hazardous substances, at least two HRPs should be used to contain the set of remains during transport back from the mishap location. If there are limitations in transport, a single HRP may have to contain a larger number of bagged fragmented remains than would be used with normal procedures.

PE found on or associated with the remains are placed in plastic bags and then placed in the same HRP as the remains. When possible, wrap the intact or primary remains together in a sheet and place in the HRP before placing in bags for smaller remains and PE. All other PE are placed into plastic bags and these are placed into a separate HRP.

If a photographer cannot accompany the team, bring a camera whenever possible and have someone photograph the location. Also, have someone take a GPS reading for the site, especially if a GPS position or map location cannot be determined by the helicopter pilot or vehicle operator. Have the pilot or vehicle operators note any reference points that may help when returning to the location for follow-on S&R. Photograph the major mishap items and the remains (intact and primarily intact) in perspective to the major mishap items. If flying into the location, try and take an aerial shot of the location during approach.

NOTE: In a contingency environment, determine if a low light flash can be safely used. If not, use a film camera with low light film or a digital camera where you can use a longer exposure setting. Longer exposure fast speed-low light film and digital cameras can often be processed to enhance lighting details.

Support for Non-Services Units Conducting S&R. Units that must recover the remains of their own members may request guidance and assistance with supplies if they have to recover the remains due to

operations in a high threat area, mission security, or necessity. When this is a possibility for contingency beddown bases, try to have a few handout kits available for release.

Each single-person kit could include several pairs of surgical gloves, two surgical masks, five or six large plastic baggies, a sheet (use a subdued color if a white sheet would be too visible during a contingency situation), and a half dozen blank tags wrapped up inside a rolled up HRP. A separate HRP may also be provided. This would either be tied together or sealed for easier transport in a backpack. If possible, provide them with a paper copy of this handbook's Section 6 and Appendix F and highlight those portions that they should follow for an expedient S&R operation. Advise them that PE found on or associated with the remains should be placed in plastic bags and then placed in the HRP with the remains. Tell them that when possible, they should wrap the intact or primary remains together in a sheet and place this in the HRP before placing the plastic bags for smaller remains or PE. They should be told to place all other PE into plastic bags and then place these into a separate HRP.

Special (classified mission) units and other field operating units should recover the remains and bring them back for processing following either their necessary classified procedures or the standard procedures for a beddown base location casualty collection point and mortuary collection point (MCP). Remains receive medical confirmations and mortuary affairs processing and return stateside to the Dover AFB mortuary center. If not a classified mission, have the unit write down on the tags any identifying information on the deceased, the unit, the date, and location. If they took a GPS reading at the site, include that information on shipping tags and in the daily mortuary report. If a map location was available with any identifying local features, provide these on the tag or include a copy of the marked map in a sealed bag along with the tag.

NOTE: Ensure that remains being returned from hostile actions (to your MCP for processing and return stateside) have been or are checked if necessary for contamination and possible unexploded ordnance (UXO) before processing and placing in transfer cases.



**SECTION 7. AFTER ACTION
REPORTS AND LESSONS LEARNED**

The When and Where of Providing Inputs. The mortuary officer will submit an after action report to HQ AFSVA/SVOM through their MAJCOM. The report will include the location of the incident, the start date and end date of S&R operations, the number of fatalities, lessons learned and limiting factors. The report must be submitted NLT 30 days after recovery operations have been completed. Additional information can be extremely useful for analysis and determining of resources and training. When possible, also forward a copy of the log of events, which should identify the PPE and other special equipment, vehicles, and assistance that were used.

Follow-on Update Actions. It is vitally important that each S&R effort be used as an opportunity to improve efforts. There are always lessons learned, even if there is no formal requirement to submit a lengthy lessons learned report outside of the after action report. Findings should be discussed and base and Services organization plans, emergency response plans, and operating instructions (OIs) should all be updated to correct any shortcomings in (1) response procedures, (2) notification efforts, (3) S&R tactics, techniques, and procedures, (4) training, (5) personnel, (6) transportation, (7) supplies, and (8) equipment. Even if new resources are not obtained and physically on hand, pre-identifying sources for emergency procurement or leasing is usually acceptable and can eliminate having to maintain a large quantity of supplies that are perishable. Updating plans and availability of resources and documenting this information is especially important when deployed and AEF rotations can create a lack of continuity. Always include important efforts in a continuity folder and up-to-date OIs.



APPENDIX A. S&R LOG OF EVENTS

The following three pages identify suggested information for a log of events that can be used by Services search and recovery (S&R) teams to document S&R actions. The first page is for the initial contact and the next two pages are used by team chiefs.

A running log of events is maintained by a recorder at the location for all mishaps. It is attached to the first three pages and may be copied for use in an after action report.

Each entry on the running log should include the date, time, actions that occur, actions or support that is requested, and the person who requested the action. For OCONUS deployments, the format for the log of events can be similar or the same as the Services Control Center's (SCC) log of events, but should be kept as a separate portion of that log if maintained by the SCC.

Provide other information such as weather conditions, time personnel/teams arrive or leave the site, daily team status, requests for other support or when support arrives, all CISM and safety briefings, and all actions taken to handle shortfalls or limiting factors.

Reproducible copies of the three pages are available on the Services Mortuary Affairs website.

Completed by the Services Commander or other assigned position functioning as the Mortuary Officer-S&R Team Chief during the time of the mishap.

LOG OF EVENTS				Page 1
Class A Mishap Category:		Time MO Notified:		
Date and Time of Occurrence:				
Location of the Mishap:				
Number of Known Souls Involved or On-Board:				
Terrain Type(s) Involved:				
Mortuary Officer Notification of S&R POC's				
Position:	Name:	Contacted at Phone #:	Action(s) Take 1 = Notification only 2 = Recall person 3 = Contact team members 4 = Inventory Team Kit 5 = Inventory PPE items 6 = Recall team members	
S&R OIC				
S&R NCOIC				
S&R Team Chief (Gold)				
S&R Team Chief (Silver)				
Mortuary Officer-Team Chief Actions				Check ?
Assign an initial recorder to keep log of events				
Initiate hazard assessment review process				
Ready and proceed to emergency action plan location				
Determine status and obtain update on mishap				
Obtain briefing on S&R team status from team chiefs (obtain page 2 from team chiefs)				
Obtain briefing on equipment status from S&R OIC or NCOIC				
Equipment Shortfalls:	1.	2.		
	3.	4.		
Equipment Limiting Factors:	1.	2.		
	3.	4.		

Filled out by the Gold team's Team Chief or a designated person-recorder.

LOG OF EVENTS					Page 2 (1/2)
TEAM STATUS					
(Used by each team chief or assigned team recorder)					
Mishap Type:					
Date of Occurrence:					
Location of the Mishap:					
Terrain Type(s) Involved:					
Initial Known or Identified Hazards:					
Name of S&R Team Chief:			Phone # for contact:		
Name of S&R OIC:			Phone # for contact:		
Name of S&R NCOIC:			Phone # for contact:		
Other:			Phone # for contact:		
Team	Position	Name	Contact Method	Status by Applicable Code Numbers (See Note)	
GOLD					
1	Team Chief				
2					
3					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
Team Kit Status:					
Initial Known PPE Requirements:					
NOTE: Identify Status to include Code Numbers: 1=Core Member, 2=Assigned Team Member, 3=Augmentee, 4=Trained, 5=CISM qualified, 6=respirator fit/qualified, 7=Special Qualification (List as the position above (i.e., diver, mountain climber, etc.))					

Filled out by the Silver team's Team Chief or a designated person-recorder.

LOG OF EVENTS					Page 2 (2/2)
TEAM STATUS					
(Used by each team chief or assigned team recorder)					
Mishap Type:					
Date of Occurrence:					
Location of the Mishap:					
Terrain Type(s) Involved:					
Initial Known or Identified Hazards:					
Name of S&R Team Chief:			Phone # for contact:		
Name of S&R OIC:			Phone # for contact:		
Name of S&R NCOIC:			Phone # for contact:		
Other:			Phone # for contact:		
Team	Position	Name	Contact Method	Status by Applicable Code Numbers (See Note)	
SILVER					
1	Team Chief				
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
Team Kit Status:					
Initial Known PPE Requirements:					
NOTE: Identify Status to include Code Numbers: 1-Core Member, 2-Assigned Team Member, 3-Augmentee, 4-Trained, 5-CISM qualified, 6-respirator fit qualified, 7-Special Qualification (List as the position above (i.e., diver, mountain climber, etc.)					

**APPENDIX B. HAZARD
ASSESSMENT REVIEW PROCESS**

To safely conduct a search and recovery (S&R) operation, the Mortuary Officer-S&R Team Chief determines with the Bioenvironmental Engineer what personal protective equipment (PPE) is required at the mishap site. For normal aircraft mishaps, the Bioenvironmental Engineer will select PPE items based on fact finding from many sources, including the fire department, wing safety, aircraft maintenance, flying operations, local responding authorities, environmental engineers for the jurisdiction, and the primary point of contact subject matter experts.

For responses to expedient S&R or where there are mass fatalities over a large area, such as during homeland security responses in support of National Response Plan supported efforts (such as declared disasters or terrorist attacks), a bioenvironmental engineer may not be on the immediate scene in your area. Therefore, you need to understand that determining the hazards is a multi-step process.

1. First responders control the mishap scene and conduct search and rescue (SAR). First responders use action plans and material safety data sheets (MSDS) in the initial response.
2. When there are fatalities, S&R efforts are required as a follow-on action at the scene. Hazards for close contact support must be evaluated by obtaining information from initial responders and other knowledgeable sources of information (such as those mentioned above).
3. Follow on investigations or continuing recovery efforts may reveal additional on-scene hazards and require additional S&R efforts and reevaluation of PPE.

Appendix B-1 presents background information on safety mishap classifications.

Appendix B-2 is suggested information for initial review of on-site hazards at a mishap scene.

For mishap locations that are wetlands, swamps, or water bodies, determine if special dive teams will be required.

For mishap locations that have mountains and steep slopes, determine early whether the degree of slope requires assistance or special teams to recover remains. Mountains with steeper slopes that require assistance may be traversable by military personnel with training. When the region is unknown, local climbing clubs may be able to provide the Yosemite Decimal Rating (YDR) for the location and help determine what PPE and climbing gear may be required. In North America, the YDR is generally stated as:

Class 1: Hiking.

Class 2: Simple scrambling, with possible occasional use of the hands.

Class 3: Scrambling, a rope can be carried, but is usually not required.

Class 4: Simple climbing, with exposure. A rope is often used. Natural protection can be easily found. Falls may well be fatal.

Class 5: Technical free climbing. Climbing involves rope, belaying, and other protection hardware for safety.

5.0 – 5.4: A physically fit climber can actually climb at this level with little or no rock climbing skills, using only natural ability.

5.4 – 5.7: Requires use of rock climbing techniques such as hand jamming and or strength.

5.7 – 5.9: Rock climbing shoes, good skills, and some strength are usually necessary at this level.

5.9 to 5.14: Beyond 5.9, requiring excellent skills and strength, this level requires training for climbing techniques and commitment of time to maintain that level.

Anything with a Class 4 or higher rating may require assistance, equipment, and use of slope techniques. Inclement weather, ice, and snow may prevent normal approach and require special assistance and transportation.

**APPENDIX B-1. SAFETY MISHAP
BREAKOUT**

There are five classes of Air Force mishaps: A, B, C, D, and E. A **Class A fatal mishap** would require a Services search and recovery (S&R) response. A Class A mishap results in one or more of the following:

1. Direct mishap cost totaling \$1,000,000 or more.
2. A fatality or permanent total disability.
3. Destruction of a Department of Defense (DoD) aircraft (except Unmanned Aerial Vehicles (UAV) unless above apply).

Services S&R team chiefs should be familiar with the category of fatal mishaps to help determine who will be the primary subject matter expert points of contact (POC) for determining hazards at the S&R location when a bioenvironmental engineer representative may not be immediately present. Emergency action plans should have already been established on base for response to these categories, and the plans should identify the primary POC for the initial responders. The Command Post and Fire Department Control Center normally have this contact information. Contact Wing Safety, the Command Post, and the Fire Department to help determine POCs for hazard evaluation.

These are the primary categories and subcategories of Air Force mishaps.

Nuclear: Nuclear Weapon, Reactor, and Radiological.

Space: Pre-Launch, Launch, and Orbit.

Aviation: Aircraft Flight, Aircraft Flight-Related, Aircraft Ground Operations, and UAV.

Guided Missile

Explosives and Chemical Agents

Directed Energy: Directed Energy Weapon and Directed Energy Device.

Afloat: On board or related to a DoD vessel and DoD diving or swimmer operations.

Motor Vehicle: Government Motor Vehicle (GMV), Government Vehicle Other (GVO), and Private Motor Vehicle (PMV).

Off-Duty Military: Sports and Recreation and Miscellaneous.

Ground and Industrial: Fire, Combat Training, Physical and Athletic Conditioning, Contractor, Natural Phenomena, Industrial Space, Industrial Aviation, Industrial Weapons, Industrial, and Miscellaneous.

**APPENDIX B-2. S&R HAZARD
ASSESSMENT REVIEW SHEET**

MISHAP HAZARD ASSESSMENT REVIEW				
Class A Mishap Category:		Initial Sketch of Mishap Site (with North orientation)		
Date and Time of Occurrence:				
Location of the Mishap:				
Number of Known Souls Involved or On-Board:				
Number of Possible Military Fatalities Involved (if different from above):				
Terrain Type(s) Involved:				
Number and Type of Other Possible Remains Involved:				
Hazards Identified by First Responders			Date Identified	
Fire Department:				
Security Forces:				
Medical:				
Other:				
Hazards Identified by Initial Site Visit of Mortuary Officer			Date Identified	
Terrain Related:				
Hazardous Substance Related:				
Condition of Remains:	Intact or Primarily Intact: Yes <input type="checkbox"/> No <input type="checkbox"/>	Fragmented: Yes <input type="checkbox"/> No <input type="checkbox"/>	Fire damaged: Yes <input type="checkbox"/> No <input type="checkbox"/>	Contaminated: Yes <input type="checkbox"/> No <input type="checkbox"/>
Hazards Identified by Investigation Category Subject Matter Experts				
POC Name, Office, Emergency Contact Phone Number:		Hazard		Date Identified
(1)				
(2)				
(3)				
(4)				

**APPENDIX C. COMPOSITE
MATERIAL GENERAL
PRECAUTIONS**

The following information was developed from an analysis of hazards at an F-117 crash, Air Force studies on composite materials, and the federal Occupational Safety & Health Administration (OSHA) technical report on composite materials.



S&R team members must have a PPE pre-briefing regarding the three areas of personal protection — breathing, eyes, and skin (body, hands, feet), as well as weather-related work practice controls and protection efforts. The Bioenvironmental Engineer provides this in conjunction with any EOD, fire department, or other technical expert inputs. These type briefings and operational practice reviews are especially important when composite materials are involved at a mishap where S&R efforts are required.

When operating in a contingency environment, especially when joint service weapon systems and vehicles are involved, fully developed situational and PPE pre-briefings may not be possible. The following are circumstances where a bioenvironmental engineer representative may not be present on-scene to provide immediate direction or a pre-briefing and PPE selection.

1. Expedient S&R in a combat area,
2. Forward or other unit conducted S&R in a combat area, or
3. S&R in support of homeland security related responses.

In these cases, S&R team members must be aware of composite material hazards, safety related practices, and common guideline considerations for PPE. They may have to rely on the inputs of other competent authorities to safely continue operations.

Fire department crash and rescue personnel have information on which aircraft, vehicles, and other weapon systems have composite materials that require special actions during mishap responses. For civilian related disasters or terrorist responses, *search and rescue* (SAR) personnel will have been in the area before you enter for S&R and will have noted the hazards and losses.

During the course of S&R efforts if you encounter suspected composite materials and the circumstances are not as expected or covered in a pre-response PPE determination (by a bioenvironmental engineer or

other responsible medical, fire, or safety personnel with jurisdiction at the scene), then leave the area. Next, determine as best a possible by contacting an appropriate authority if your PPE are still adequate and whether your safety and operating procedures should be changed.

Composite Material Hazard Categories. These are the broad hazard categories that must be considered at mishaps involving composite materials.

1. Organic Compound/Matrix Hazards (resins, adhesives, residual solvents, organic fibers)
2. Smoke and Fume Hazards
3. Reinforcement Hazards
4. Specific Carbon Fiber Hazards
5. Electrical Hazards to Equipment
6. Hazards to the Environment

Definitive Guidance. There is no definitive guidance for encountering these materials that will cover all circumstances. Each mishap or event involving composite materials must be looked at individually. A general rule is that unprotected personnel should avoid being downwind of areas with suspected composite materials, especially when fire is involved.

Composite Fiber Safety Awareness. The following information regards composites.

1. Carbon fibers do not generally burn in fires, but this is dependent on the type of fibers.
 - a. Impact damage (such as at a crash or a structural collapse) normally cracks the fibers and releases small particles and dust.
 - b. As the fibers heat up, they may oxidize and lose weight, in effect they become smaller particles and increase the chances of being inhaled.
 - c. The particles are very light and the heat generated by the fire can make them become airborne.
2. Graphite fibers are electrically conductive and the dust or fiber particles can cause shorts or other problems with electrical equipment.
3. Fibers which are still encased in resin are extremely stiff and sharp. It is very easy to get a graphite splinter by handling or contacting damaged composites.

In case of expedient recovery or where common response kit items must be procured and stocked well ahead of time, you must have foreknowledge of the on-scene practices and equipment. Consider the rules of thumb used by emergency first responders (see Table C). Then work with your bioenvironmental engineers to develop a specific response kit that includes their latest data on PPE and working near composite materials.

Table C. Safety PPE for Emergency Responders.

Situation	Requirement
Burning/Smoldering Composites (primarily fire department and qualified HAZMAT workers)	<ol style="list-style-type: none"> 1. SCBA 2. Aluminized Proximity Suits 3. Aluminized/puncture resistant gloves 4. No rubber gloves
Broken or Splintered Composite Material (responders)	<ol style="list-style-type: none"> 1. Full -face respirator with dual cartridge (HEPA & organic) filters. 2. Coated and hooded Tyvek® suit with optional booties (taped seams). 3. Leather work gloves (external). 4. Nitrile gloves (internal). 5. Hard-soled, leather work boots
Minimal Composite Exposure (responders)	<ol style="list-style-type: none"> 1. BDUs with sleeves worn down. 2. Non-disposable and disposable HEPA respirators. 3. Safety glasses with side shields. 4. Leather work gloves (external wear). 5. Nitrile gloves (internal wear). 6. Hard-soled work boots.

Adopt expedient recovery guidelines for operations on site when pre-site investigations may not be possible. Based on previous AF weapon system study guidance also adopted by the Army for their weapon systems, the following guidelines should be considered for contingency field use.

1. **When personnel are within 25 feet** of any burned composite materials or personnel may have break or cut either burned or unburned composite parts:
 - a. Fitted full face respirators or fitted respirators and safety goggles are required.
 - b. Safety goggles must be worn tight and have either no or small vent holes to minimize particulate/fiber entry.
 - c. Skin protection is required for the exposed areas of the body, hands, and feet.
 - d. Coveralls should be as pre-selected by the bioenvironmental engineer given similar circumstances. Wear external booties to eliminate possible boot contamination and reduce dermal

contact potential. Seal any openings or attachment points, especially at the ankles and wrists, with duct-tape to keep out particulates.

- e. Gloves: should be puncture resistant leather gloves as a minimum with pre-approved hazard gloves worn as an insert to protect against bloodborne pathogens, solvent residue, and fuel spills. **Caution: Do not wear Nitrile rubber gloves when handling burning or smoking composite materials.**
 - f. Boots: Steel-toed shoes and boots should be worn.
 - g. Additional protection (i.e. SCBA, splash suits) as determined by the bioenvironmental engineer, fire department, safety, and maintenance personnel with appropriate weapon or background specific training, will be worn when jet fuel/hydraulic fluid or other hazards exist.
2. Recommended PPE for **personnel working in peripheral areas**. The on-scene commander shall establish the limits as appropriate with the advice of appropriate primary emergency responders, emergency managers, subject matter experts, and safety and medical personnel. [As a guide, the peripheral area should be defined as more than 25 feet away from damaged composite parts. This distance may vary depending upon environmental conditions (i.e. rain, dry, high winds, remote site, etc.), which might help or hinder the situation.]
- a. A disposable or non-disposable fitted respirator.
 - b. Safety glasses with side shields.
 - c. BDUs with sleeves worn down and tightened.
 - d. Hard soled shoes.
 - e. If any debris is to be manipulated, the previously discussed glove ensemble is also required.

If you encounter or believe that special conditions exist that would increase the hazard, obtain increased protection as determined by appropriate subject matter experts and bioenvironmental engineers is highly recommended.

**APPENDIX D. SERVICES
PHOTOGRAPHIC SUPPORT**

Military mishap safety investigators have developed a list of photographs that can be used for forensic analysis of aircraft mishaps by safety and medical personnel. Initial photographic support is normally provided by alert photographers under the initial direction of the ISB Medical Officer and ISB Investigating Officer. The photographers also support the Services Mortuary Officer for documenting remains and personal effects during the search and recovery process.

For contingency situations where mishap safety photography is not available, Services should plan to provide some photographic coverage. When possible, follow these four general coverage requirements. If a digital camera is not available, even disposable film cameras can provide adequate support if they can provide somewhat wide angle and close-up shots. Remember to carry a small (at least 6 inch) ruler for perspective in close-up shots.

1. Wide view approach shots of the overall mishap site and the major mishap features from several angles.
2. Closer broad area shots that capture the main points of emphasis (i.e., intact, major portions, and fragmented remains) with major mishap features somewhere in the background.
3. Close-ups of the individual remains (intact remains and nearly intact remains), personal effects, and fragmented remains.
4. For areas that have a large number of fragmented remains (i.e., a remains field), then take wide angle photos of the remains field and close-up photos of individual remains in relation to the remains field.

**APPENDIX E. S&R TAGS,
MARKING, AND RECORDING**

Due to joint service commitments, the Air Force Services Mortuary Affairs search and recovery (S&R) nomenclature for marking intact remains, portions of remains, and personal effects will be the Joint Publication 4-06 nomenclature, with variations only as necessary. Teams conducting S&R must complete S&R tags, which are blank tags with ties.

NOTE: Try and obtain cloth tags (approximately 2-1/2 inch by 5 inch minimum, in white or manila) with either wire or twine ties for tagging remains, portions of remains, and personal effects. The larger cloth tags are easier to write on in the field and there is less chance of them being damaged or becoming illegible when tagging portions of remains. Shipping tags on the outside of human remains pouches should have reinforced holes and wire ties. Some tags are available as National Stock Number items (NSN 8135-00-178-9193 or NSN 8135-00-292-2345), but tags are also available commercially.

Air Force markings on tags will follow the primary requirements of Joint Publication 4-06, *Joint Tactics, Techniques, and Procedures for Mortuary Affairs in Joint Operations*, which identifies the primary conventions for marking remains, portions of remains, and personal effects. Modify the markings only as necessary to meet the mishap situation, maintain consistency, and provide for accurate records.

The interim safety board (ISB) Investigating Officer and Medical Officer are to mark life support or personal equipment on remains that must be removed to preserve evidence. For Class A fatal mishaps when Services personnel are present for S&R, the marking method for any special equipment or items (designated by an inspector or investigator) can be made using another designation. This should not disrupt normal S&R marking using E-# designations for personal effects. Military and federal investigators may use other markers as necessary for marking during investigations, but may use another flag with a different marking designation or color (such as an “S-#” designation) if needed when many special markers are required.

To ensure that the various ways of marking will be standardized and used on site, marking schemes should be addressed and adopted in pre-mishap planning, such as emergency action plans, response plans, and operating instructions. This will provide ISB members or other investigators with a knowledge of the other marking methods being used on site for marking and recovering remains, personal effects, and special equipment items that may have to be removed to preserve them. As previously noted, safety and other investigating officers may use other specific marking scheme colors and designations for investigation purposes. Contact the on-scene commander, authority with jurisdiction at the scene, ISB or SIB Investigating Officer, or criminal investigators to coordinate or deconflict the use of marking. Ensure that CE EAs are also aware of the final decisions on marking to ensure that their maps address the various types of marking.

Before beginning any S&R operation, you must decide on the chosen marking methods that fit the situation, make sure they are consistent, and ensure that data will be recorded.

For most S&R operations the information regarding the recovering unit designation and branch of service should be used if the remains must be processed through another branch of the armed forces prior to ship-

ping the remains to the place of final preparation and release, or to Dover for OCONUS and contingency deaths. All tags should show the date when marked.

NOTE: The primary exception to using the “R-#”, “P-#”, and “E-#” designation marking on tags and stakes is for contingency deployments when hostilities or unsafe conditions require an expedient recovery. For expedient recoveries there is no required marking on stakes and tags in the field, although tagging should be accomplished as soon as possible from data gathered and recorded in the field.

The following tables and figures provide additional information. Table E-1 identifies a marking system for remains (by type), personal effects, and any specially identified equipment. Figure E-1 identifies a suggested S&R tag marking system. Table E-2 identifies a suggested format for recording data on markers. Figure E-2 identifies marking conventions for grid or crater marking.

Table E-1. Types of Remains and Marking Situations.

Tag Side	Tag Required Markings	Stake or Flag Markings
Known or identified, single remains		
Front	Last name, first name, middle initial, SSN, branch of service. Recovering Unit: designation, branch of service. Date.	R (on stake) If there are multiple single remains, use the R – # convention (on the stake).
Reverse	Blank unless noting a specific hazard (such as CBRN or other contamination).	
Known or Identified, one soul in several major portions		
Front	Last name, first name, middle initial, SSN, branch of service. Recovering Unit: designation, branch of service. Date. Part # of total part #s (#_ /#_)	P – # (on stakes)
Reverse	Blank unless noting a specific hazard (such as CBRN or other contamination).	
Believed to be (i.e., one soul), fragmented		
Front	P – sequential # Recovering Unit: designation, branch of service. Date.	P – # (on stakes or flags)
Reverse	BTB: Last name, first name, middle initial, SSN, branch of service. Note any specific hazard (such as CBRN or other contamination).	

Tag Side	Tag Required Markings	Stake or Flag Markings
More than one soul, fragmented		
Front	P – sequential # Recovering Unit: designation, branch of service. Date.	P – # (on stakes or flags)
Reverse	Blank unless noting a specific hazard (such as CBRN or other contamination).	
Associated or unassociated personal effects		
Front	E – sequential # Recovering Unit: designation, branch of service. Date.	E – # (on stakes or flags)
Reverse	If associated personal effects, write “Associated with” and the appropriate R-# or P-#. Non-contingency associations are made by investigating or medical officers. Note any specific hazard (such as CBRN or other contamination).	
Special Designation: when assigned by designated safety, mishap, or criminal investigator personal effect or equipment (unless they have their own sequence system)		
Front	S – sequential # Recovering Unit: designation, branch of service. Date.	S – # (on stakes or flags)
Reverse	Name of inspector or investigator requesting or marking the tag. Note any specific hazard (such as CBRN or other contamination).	

Figure E-1. USAF Services S&R Remains Tag Marking Conventions.

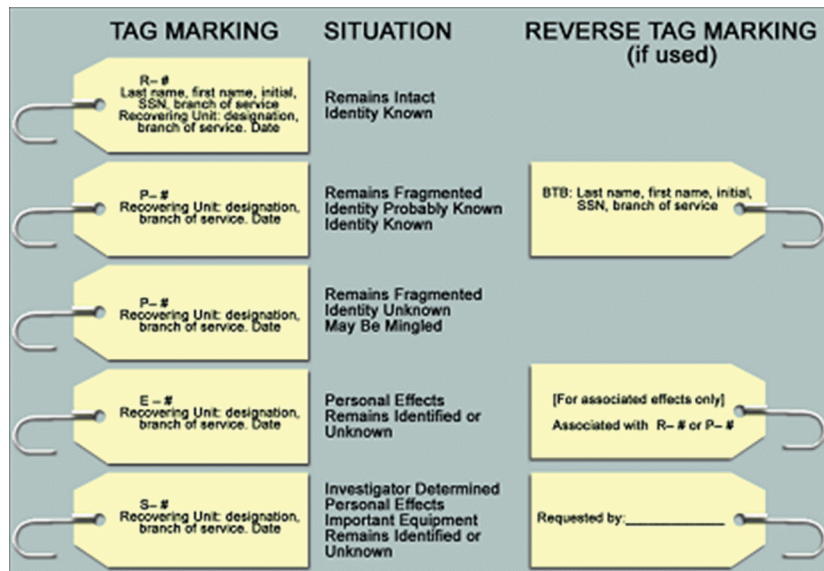
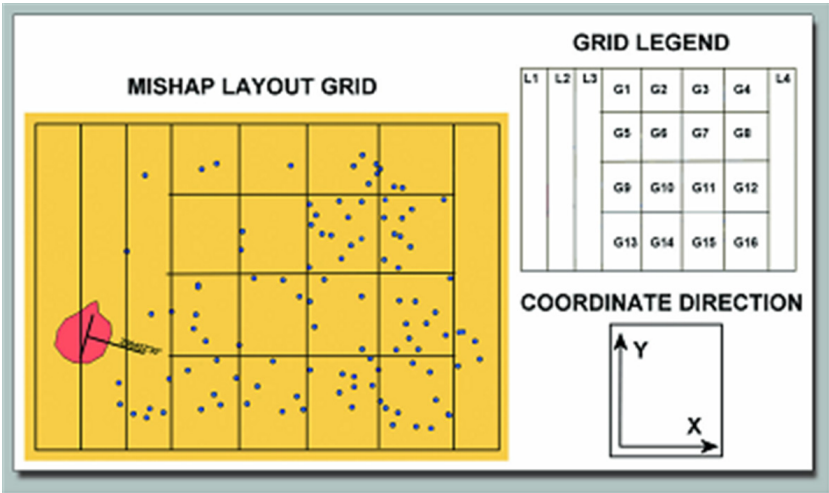


Table E-2. Suggested Log Information for Recording Stake, Flag, and Tag Marking of Remains, Personal Effects, and Special Equipment Items.

Marker Number (R-#, P-#, E-#, S-#, or Remains Field Stake (with a circled #))	GPS Coordinate Military Grid Reference System (MGRS) or Latitude/Longitude and Elevation (If used)	Measured Grid X-Y Coordinate* (If used, state unit of measure)	Description or Remarks (Stake, tag, flag, flagging on a bush or tree, etc.)

* When using a grid or crater measurement system, use a standard convention for measuring and stating grid-crater measurements (see Figure E-2). Each grid should be designated with a number and/or letter, which should be shown in a simple legend. The normal convention for stating a grid coordinate can use an X and Y coordinate system. This avoids having to force your efforts to fit a North-South grid system (like latitude and longitude), **if using latitude and longitude** does not present the best alignment for search efforts or your plotting.

Figure E-2. Standard Convention for Grid or Crater Measurement.



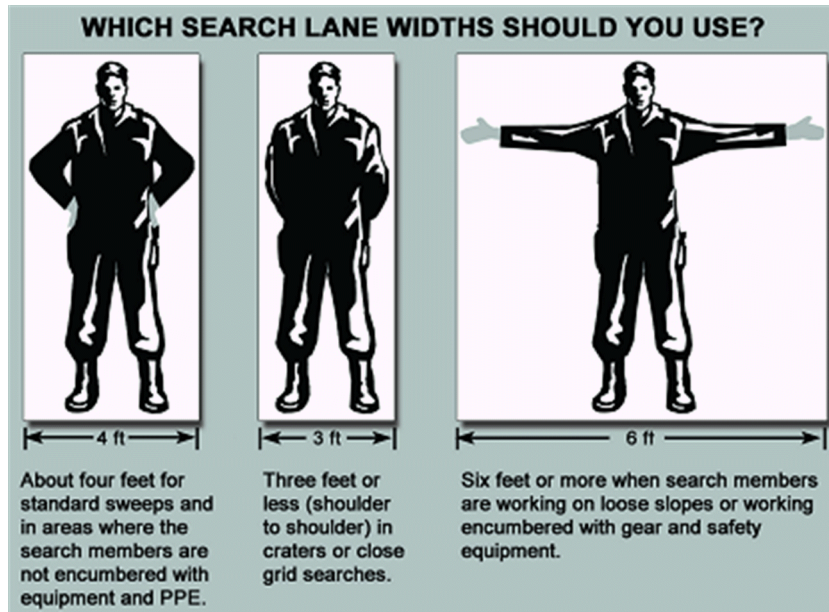
APPENDIX F DETAILED S&R
PROCEDURE CONSIDERATIONS

The procedures you use in training for a search and recovery (S&R) operation should be similar and familiar enough that S&R team members are comfortable with using and modifying them (as needed) in the field. It is not possible to train for all contingency situations that you could encounter. Standard sweep searches versus obstructed area lane searches versus grid searches share some common procedures and techniques, while the separation between team members is a primary difference. Most searches have some form of a follow-up team for bagging, tagging, and recovery. Searching within an obstructed area can require having a dedicated, well-equipped follow-up team to take the time necessary to search around an obstacle, tree, or other impediment. [They do this while the sweep portion of the lane search continues.] Grid searches are constricted areas and require that personnel work closer together in an even closer line. Bagging, tagging, and removal are fairly standardized. Some issues may arise as to the width of a search line or lane, how to maintain separation, and how to mark remains and personal effects. There have been questions raised on directing the march and whether there should be talking or voice directions for each movement. There is no prime directive — you use what you have to use to get the job done properly and safely. As a guide, the following information (based on sweep and lane searches) can be used for practice and in the field.

Forward Progress: The line must proceed together. The line does not have to progress across the search area or down a lane using *one large lock-step at a time*. The line should proceed at a slow, halting pace that allows members adequate time to look left, look right, look down, look up (if trees, bushes, or other overhangs exist), and look toward their line buddies. This takes practice and should be practiced not only on an open field, but also in deep grass and low brush or ground cover. When members are trying to take one lock-step at a time through rough ground, tall grass, low or taller brush, or a crop field, they may become preoccupied with taking each step to keep pace and not look at how-where they are going.

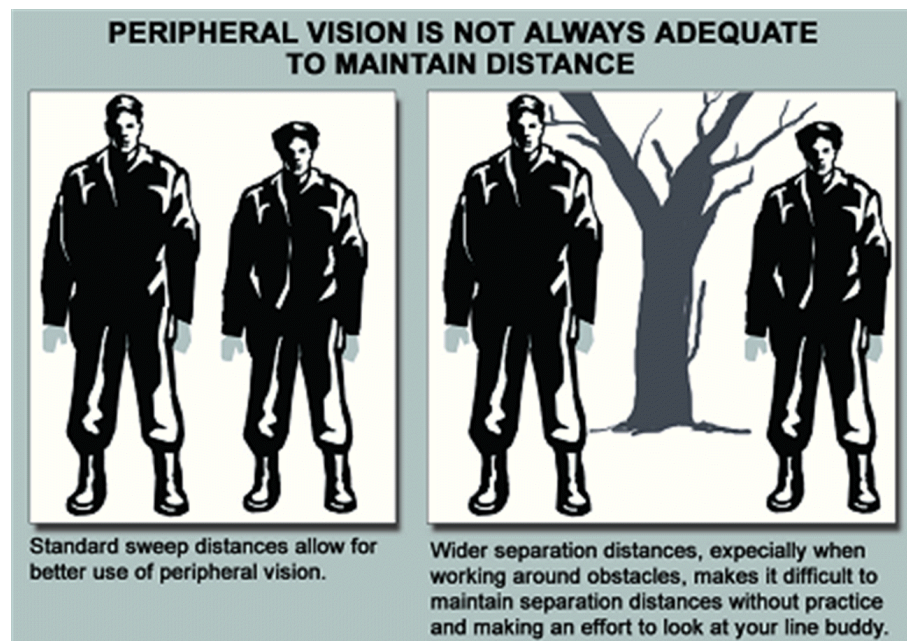
Sweep teams should progress together about 24 to 30 inches at a time, taking one *progress step* forward at a time (i.e., either one large or two to three small steps **as needed** to avoid obstacles and slippery surfaces). While watching for and avoiding sharp objects, line members may have to (learn to) shuffle their feet somewhat to work their way through taller grass, crops, or ground cover. This helps to part the vegetation and not push it down on top of remains. It is the job of the team leader, flankers, S&R OICs/NCOICs, or S&R team chief that may be present to oversee the march and communicate together to make sure the line speed is not too fast, and that line members are not being overcome by stress or fatigue.

Personal Lane Widths. Marching in formation may be a military tradition on a parade field or at a ceremony. However, it is not a normal process to march in a fixed line through brush, forests, grasslands, swamps, snow fields, hillsides, cactus-covered deserts, or plowed agricultural fields while also searching for remains, personal effects, and hazardous materials. Movement becomes even more difficult when some or all members are encumbered with ropes, machetes, hiking staffs, or snowshoes and ski poles. S&R members must keep together in a line and maintain the *same relative spacing* to avoid missing remains and personal effects. Make provisions for a trailing team with tools and equipment to cover an obstructed area when the line cannot penetrate some locations within the forward sweep.

Figure F-1. Adequate Lane Widths.

Peripheral Vision. Members often misjudge the distance between them and their line buddies when just using their peripheral view. You cannot rely strictly on peripheral vision to maintain separation. Line members need to look at their line buddies after every few steps. This is especially true when members are working farther apart due to wearing or carrying equipment or working in brush. A search line is a buddy care situation, as you may be the first person to see that something is wrong with your line buddy, such as heat exhaustion, dizziness, mental stress, ticks and other biting insects, leaches, hazardous liquids and other substances, or cuts and scrapes. When walking through brush, it is even possible to pick up small scattered human remains or waste on your clothing. Available team leaders, flankers, and trailing team members can help keep members in line. When working in tall grass or swamps, having a spotter (with a radio) elevated on a ladder may be necessary to help keep members in line and spaced.

Figure F-2. Perception of Lane Widths.



Cross sweeps. Using a sweep and cross sweep technique can be a thorough, relatively fast method to sweep an area for remains and personal effects. However, in some locations, a cross sweep may not be as valuable a technique as using more personnel working closer together and having them proceed only one time across an area. This is often the case when working in agricultural areas where crops are in dense rows. By having one person walk in the lane between crop rows, each S&R member would search the ground surface and through the crop on both sides. In taller grass and grain fields, it is important to not tramp down the grass or grain stems. Shuffle and walk between them like the teeth on a giant comb. You should be able to see about the same amount of ground surface before and after you pass through. Look for areas of the grass or grain crop that show signs of having been knocked down.

What do remains look like? A sweep or lane search may find scattered larger fragments of the body (such as a foot, hand, leg, head, main torso), while a crater or impact area search often finds charred remains (whether whole or partial) and highly fragmented remains. Often clinging dirt and soot make the remains look more like dampened clods of soil. Charred remains may look little different than some charred structural or fabric debris or wreckage. Always have the medical officer, experienced core team members, or fire rescue personnel brief the team on the status of the remains and what they should be looking for. Rule of thumb: When in doubt, mark and collect it. S&R members and inexperienced personnel, including fire rescue and medical personnel should err on the side of caution by collecting anything that might be human remains and then letting the medical examiner and anthropologist make the final determinations.

Who should mark remains? A sweep line can call trailing members forward to mark and tag remains. However, if using colored flags and flagging materials, these materials are small, lightweight, and compact. The flags and flagging can be carried by **experienced** sweep line personnel and used to mark remains upon finding during each progress step. Small remains can be marked after notifying the closest team member with radio communications such as the team leader, a flanker, or a follow team member

such as the S&R officer or NCO. Larger remains may require more than marking the remains with a flag. If there are issues of dignity or recognition by the news media or others, consider having a follow member cover the remains with a sheet or portions of a sheet until remains can be recovered. Sheets also draw attention and let any investigators or medical personnel know that larger remains are present. When working in taller grass, crops, brush, or among trees, use a flag and add streamers of same-colored flagging (tied to the flag or nearby crop, brush, or tree) to draw additional attention. Notify the nearest team leader, flanker, or follow-team member that remains have been found.

Using hand signs, voice, loudspeakers, radios and other methods to control search procedures.

Using loud commands and oral procedures may be necessary for safety's sake during some sweeps. However, control procedures that work in an open field may not work when personnel are encumbered with equipment, vision is obscured by brush and trees, and there are inclement weather conditions. Some hand signs and shouting commands at locations within public view may appear irreverent to onlookers when S&R members march together and raise their hands in a thumbs-up sign after each pace forward. Loud voices trying to yell line commands, especially over a long period of time when voices begin to wear out, can also be misinterpreted by team members and the public or media. With too much noise and effort around, an S&R member who raises a hand upon finding remains and yells to gain attention may not be seen or heard. They can be visually lost even on a sweep line if the line is using a raised arm, thumbs-up signs (to signify no remains) or in denser tall brush or trees where a raised arm is lost in the foliage. Their voice may be drowned out (when there are many other raised voices present at or on site or in the line) or just from the wind blowing through trees and brush. Whatever you determine are the best communication methods for your possible locales (whether mountains, plains, swamps, brush lands, etc.), practice them frequently.

If possible, especially when working in public view, try to use enough small radios (i.e., check with base communications regarding use of palm size FRS/GMRS two-way radios if secure radios are in short supply) with headsets to allow positive line control. Two-way radios can help in conducting quieter line communications. However, even using simple whistles on the line (one medium blast for remains, two short blasts for personal effects, and a loud long blast to obtain advice or safety-medical support) can be used very effectively everywhere. Whistles *may be undesirable* in a higher threat contingency situation. [Let other personnel on site know if whistles will be used and what the signals mean.]

Try to maintain a somewhat quiet line sweep without yelling commands. Expect and allow some low-key, controlled line chatter, as low volume talk can be an important coping mechanism during a critical incident. It also keeps members from clamming up – they are better prepared to speak up with concerns or problems and gain help. Line chatter should still be somewhat limited **and always avoid gallows humor**, as other line members, survivors, relatives, friends, and bystanders could overhear and may not understand or appreciate what was said. Joking can become excessive, so control humor. It could cause nervous or emotional laughing from over-stressed individuals and this could also be misinterpreted. Chatter should not be loud enough to prevent someone from gaining attention. **There should be no chatter over the radio.**

Using tools. Hand tools (such as rakes, shovels, and gardening hand tools) and reach tongs should be used to handle remains to the extent that the remains are extricated from something (such as imbedded in the ground, debris, larger wreckage, or brush and trees). The tools are used to remove the ground surface materials or debris **from around the remains** until the remains can be picked up with gloved hand(s) or medical forceps. Long reaching (snake grabber) tongs can be used to grasp some remains (such as in trees, bushes, swamps) and stabilize them to allow dignified removal by personnel. When required for safety

reasons, these reaching tools may have to be used to extricate some remains, such as lifting the remains from fuel-covered water, hazardous materials, or from a location where wreckage or debris could cause crushing injuries to recovery personnel. Whenever possible, always try to use ladders, reach vehicles or stands, or bucket trucks to reach and lower remains from trees or other elevated locations.

NOTE: If the use of tools changes or damages remains or other personal effects or equipment, note this in the log of events and on the remains marking log. This will help prevent false interpretation of injury by the medical examiner. Shovels, picks, and hand tools can cause extensive remains and other artifact damage that is difficult to differentiate from actual injuries or accident related damage.

ARTHUR J. MYERS, SES-5
DCS/Installations & Logistics/Director of Services (ILV)