23 January 1992

MOBILITY REQUIREMENTS STUDY (U)

(VOLUME I)

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Mobility Requirements Study
Volume I

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Mobility Requirements Study

Volume I

Executive Summary

Introduction

Congress tasked the Department of Defense to determine future mobility requirements for the Armed Forces and to develop an integrated mobility plan (Section 909 National Defense Authorization Act for FY 1991). In both the determination of the requirement and the formulation of the integrated plan, the Mobility Requirements Study (MRS) took into account a number of interrelated factors, including potential threats, warning time, allied participation, overseas bases and access rights, and availability of commercial shipping. Other factors, such as preservation of US civil maritime capability, defense budget pressures, and lessons learned from the Persian Gulf war, were also considered.

Strategic Outlook

The United States is rapidly adapting to a changed global security environment. The new defense orientation is primarily regional, requiring the ability to respond quickly and effectively to unpredictable challenges to US interests by adversaries possibly fielding armor formations, modern air defenses, chemical weapons, and ballistic and cruise missiles. Forward-deployed forces enhance our ability to respond quickly to threats in some parts of the Pacific or Europe, but areas exist where other formidable threats may require equally urgent response. Future US forces will meet the challenge through increased flexibility in planning, training, and employment, provided they have the capability to deploy to an area of potential crisis in sufficient time, with a proper mix of combat and support forces.

The broad national security interests that generate our military objectives, strategy, and forces remain constant:

- The survival of the United States as a free and independent nation, with its fundamental values intact and its institutions and people secure.
- A healthy and growing US economy to ensure opportunity for individual prosperity and resources for national endeavors at home and abroad.
- Healthy, cooperative, and politically vigorous relations with allies and friendly nations.
- A stable and secure world, where political and economic freedom, human rights, and democratic institutions flourish.

The National Military Strategy, derived from these interests, requires that the United States deploy a decisive force either as a member of a coalition or unilaterally and sustain it in parts of the world where adequate pre-positioned equipment or bases may not be available and where the capability to support the force once it has arrived is limited. Although the exact flashpoint of tomorrow is unpredictable, there are threats to US interests in the world that will require fast, effective fighting forces capable of fulfilling diverse missions. The uncertain and dangerous future world will require more capability than the United States possesses today to project a powerful force quickly to overseas crisis areas. To quote the President's National Security Strategy of the United States, "The ability to project our power will underpin our strategy more than ever." Our forward presence is declining, the number of potential crisis flashpoints is increasing, and future coalitions could be *ad hoc*. To support national interests, deployment capability must increase through expanded investment in sealift, pre-positioning, and transportation infrastructure in the United States and in sustained investment in airlift.

Deployable Force Requirements

The study effort began with analysis of logistic and warfighting aspects of potential regional crises set in 1999 using the following scenarios:

- Regional Contingency in the Middle East or Persian Gulf.
- Regional Contingency on the Korean Peninsula.
- Regional Contingency in Europe.
- Regional Contingency in Southeast Asia.
- Regional Contingency in the Western Hemisphere.
- Two concurrent Regional Contingencies beginning sequentially.

In the scenario analyses, the following critical factors had the most effect on US success:

- US strategic orientation
  - — Alliance arrangements.
  - — Forward presence.
  - — Pre-positioning alternatives.
- Speed in reacting to intelligence indications of aggression
  - — Civil Reserve Airlift Fleet (CRAF) employment.
  - — Access to US and allied shipping.
- Capability (size and training level) of allied forces and support.

- Capability (size and training level) of enemy forces.
- Concept of operations employed by the enemy.

Over 90 separate war games were conducted and analyzed to examine the effects of variations in the critical factors. From the analysis emerged key insights:

- Middle East or Persian Gulf: Success in this scenario requires additional mobility assets to close a heavy combat element into the theater early and to reinforce rapidly with combat forces from the United States.
- Korea: Additional heavy forces available for use early in a conflict improve allied defensive capability.
- Europe: NATO sealift and airlift deliver the forces necessary to achieve warfighting objectives.
- Southeast Asia and Western Hemisphere: Airfield availability and reception constraints limit rapid buildup of power. Amphibious lift and the direct delivery capability of the C-17 significantly improve US success in these scenarios.

In addition to scenario-specific insights, the analysis deepened understanding of the phases of a contingency operation and of the risks of having insufficient forces during each phase. The operational risks and factors most relevant to mobility forces are:

- Early Risk: Risk that a potential aggressor can attack early enough and with sufficient strength to overrun key objectives in the territory of a US ally before sufficient US and coalition forces arrive. The "early risk" period of a crisis is approximately 2 weeks or less.
- Late Risk: Risk that before the United States and its coalition partners can deploy decisive force and successfully counterattack, an aggressor may have caused unacceptable attrition to US forces, politically fractured the coalition, or ravaged occupied territory. The "late risk" period in most major contingency scenarios runs to about the 8th week.
- Support Risk: An additional critical consideration that drives mobility requirements is the level of support equipment provided for the combat force deployed in each phase. Host nations can provide some of the necessary support, but for most scenarios, for the fully deployed force, 1.5 tons of deployed support equipment is planned as the minimum for every ton of deployed combat equipment.

The key decision in determining the requirement for mobility forces is how much risk to accept in each of the phases.

In addition to scenario-based analyses, the study closely examined the experience gained in Operation DESERT SHIELD and applied it to future requirements. In general, the study concluded that the DESERT SHIELD deployment had been a success, but that limitations in mobility forces had imposed considerable risk. In the future, the United States must be able to deploy its combat power more quickly and with a more robust level of support throughout the force deployment.

Mobility Requirements

The scenario analyses and Operation DESERT SHIELD experience provide the basis for determining the total requirement for the mobility forces of the United States. The requirement is based on reducing both early risk and late risk to moderate levels, and deploying adequate support to combat units.

The requirement for mobility forces is derived from the Middle East or Persian Gulf scenario, a demanding scenario in a region where vital US interests are clearly at stake. The capability to handle the Middle East or Persian Gulf scenario with moderate risk will be adequate for any other major regional contingency. In addition, amphibious lift and airlift components of these forces can handle lesser regional contingencies with no more than moderate risk.

The total mobility requirement is the pre-positioning, sealift, and airlift assets linked to a transportation system in the United States to deploy the following forces:

- Early Risk Period (first 2 weeks):
  - — Marine Expeditionary Brigades.
  - — Army light forces.
  - — Navy carrier battle groups.
  - — Army heavy brigade.
  - — Air Force combat squadrons.
  - — Special operations forces.
  - — Combat support and combat service support.

- Late Risk Period (3rd to 8th week):
  - — Army heavy divisions.
  - — Additional special operations forces.
  - — Marine Expeditionary Forces.
  - — Theater support forces.
  - — Additional Navy carrier battle groups.
  - — Additional Air Force combat squadrons.

This mobility requirement is based on accepting no more than moderate risk to the attainment of US objectives. The moderate risk capability might not be adequate to support these objectives in some worst case scenarios. The forces recommended by the commanders of

unified commands normally are based on a low-risk requirement and can require significantly more mobility assets than are onhand or programmed. In addition, the moderate-risk capability cannot handle a second, concurrent major regional contingency beginning sequentially. Substantial coercive requisitioning of commercial shipping and activation of the full CRAF reduces risk in the second theater. However, the moderate-risk requirement yields a strategically prudent force that is fiscally responsible.

Integrated Mobility Plan

To meet the total mobility requirement, the Department of Defense has developed a notional plan for execution through the normal programming, budget, and acquisition procedures. The major components of the plan are:

- To acquire—through new construction and conversion—additional sealift capacity equal to 20 large (380,000 sqft total capacity and 300,000 sqft capacity for pre-positioning configuration), medium-speed (24-knot sustained) roll-on/roll-off ships (LMSRs). In addition, to lease two container ships (2000 container capacity each) for pre-positioning. The exact size and number of ships needed will be determined during the acquisition process. The approximate delivery schedule for these ships is as follows.

	FY 1993	FY 1994	FY 1995	FY 1996	FY 1997	FY 1998	FY 1999	Total
Pre-positioning		4		4	1			9
Fast sealift				2	5	4		11
Container		2						2

- To deploy (by FY 1997) an afloat pre-positioned package of approximately 2 million sqft of Army combat and combat support equipment. This package will be carried on nine LMSRs in the pre-positioning configuration. In the near term, chartered pre-positioning ships will be used to supplement converted and newly constructed ships. This additional force, added to the quick-reaction forces already in the DOD program, will provide an adequate capability to respond in force within the first few weeks to any regional crisis that threatens US interests.

- To add (by FY 1998) 3 million sqft of surge sealift capability for the rapid deployment of heavy Army divisions and support from the United States. This capability will be provided by 11 of the LMSRs in high readiness. When added to the eight fast sealift ships currently maintained by the Military Sealift Command, this will provide adequate capability to deploy rapidly from the United States into a regional crisis.

- To expand (by FY 1999) the Ready Reserve Force (RRF) from the current 96 ships to 142 ships (of which 104 will be dry-cargo ships) and to increase the readiness of

the fleet. The expansion and continuing modernization of the RRF will be through acquisition of used ships, or alternatively, charter, build-and-charter, and national defense features in new commercial ships or combination thereof. This fleet will be adequate to deploy, within 8 weeks, the decisive force required for the United States to prevail in a major regional contingency.

- To consider through the acquisition process new concepts that might provide the required sealift capacity at lower cost.

- To continue the C-17 program to improve the airlift component of strategic mobility.

- To improve specific components of the transportation system within the United States to move combat and support units from their peacetime locations to airports and seaports of embarkation by accomplishing the following:
  - Buy and stage about 233 additional heavy-lift railcars, increase the daily railcar loading capacity of key installations, and improve military use of containerization.
  - Develop a containerized west coast ammunition loading facility.
  - Negotiate additional berthing at loading ports for deploying units.
  - Improve the readiness and availability of Transportation Terminal Units.
  - Seek new legislation to ensure continuous and expeditious use of ports.

Conclusions

The MRS has been a massive effort involving many offices and staffs in the Department of Defense responsible for transportation. The study analyzed, compared, and revised many different conflict scenarios and mobility plans. The recent experiences of Operations DESERT SHIELD and DESERT STORM give both urgency and understanding to the analysis. The study's integrated mobility plan strikes the best balance among requirements, confidence in achieving mobility goals, and cost. The plan will provide the nation a strategically prudent and fiscally responsible deployment capability to protect the nation's interests in a turbulent future.

I. SETTING THE STAGE

Background

ngressional Directive

In accordance with Section 909 of the National Defense Authorization Act for FY 1991, ıe Department of Defense conducted a study to determine future mobility requirements for he Armed Forces and developed an integrated plan to meet those requirements.

Congressional Reporting Requirements

The law directed the Department of Defense to submit two reports. The first report, including intertheater requirements and an integrated plan to meet those requirements, was due 29 March 1991. The second report, including intratheater requirements, surface requirements, and CONUS mobility requirements, was due 28 June 1991.

Because the scope of the Mobility Requirements Study (MRS) was well beyond any previous mobility study conducted by the Department of Defense, there was insufficient time to meet the congressional deadlines.

An interim response was sent to Congress on 22 April 1991. This response described the overall study methodology and organization, assumptions, strategic setting, scenarios, and mobility characteristics and presented emerging results of strategic sealift analysis. It focused specifically on sealift options and recommendations for using sealift funds appropriated in FY 1990 and FY 1991.

2. Organization and Methodology

Organization of the Study

The Director for Force Structure, Resources, and Assessment (J-8), Joint Staff, was given responsibility for conducting the MRS on 9 January 1991. The Director, J-8 chaired an Advisory Group and met with a Coordinating Committee that was responsible for reviewing plans, examining work in progress, and developing recommendations. A working group was established by the Director, J-8 under the chairmanship of the Chief, Integration and Assessment Division, J-8, Joint Staff. The working group executed all study tasks and included representatives from the Joint Staff, Office of the Secretary of Defense, USTRANSCOM, and the Military Departments.

Study Methodology

The original study methodology emphasized the derivation of mobility requirements from planned delivery profiles across a range of detailed scenarios. However, as the study progressed, it became clear that a fixed set of detailed scenarios was an inadequate basis for force planning in a future with as much uncertainty as the late 1990s. Both the National Security Strategy and the National Military Strategy call for flexibility in the armed forces to support US interests in a world that will be turbulent and unpredictable and will require US capability to project significant military power overseas. The study methodology was broadened to include examination of varying assumptions of potential threats, warning time, allied participation, reduced forward presence, overseas base access, and availability of US, allied, and foreign shipping. In addition, considerations of maintenance of US civilian maritime capability, pressures on the Defense budget, and the deterrent effect on potential adversaries of US and allied success in Operation DESERT STORM also were factors in reaching the study's final recommendations.

Using scenarios, historical analysis, and capabilities required to meet US objectives, a fiscally prudent high-confidence requirement was developed which moved 4⅔ Army divisions 8,700 nautical miles in 6 weeks. The capability of the FY 1999 mobility forces to close the combat and support forces of the high-confidence requirement was analyzed and mobility shortfall was determined. A range of options was derived to reduce or eliminate the shortfall. Warfighting analysis of each of the options was conducted to determine the relative risk to US objectives of not meeting the delivery schedule. Additionally, the cost of each option was determined and trade-offs between risk and costs were analyzed. Finally, three options of increasing confidence and cost emerged for final consideration.

Mobility Requirement

Both the mobility requirement and the improvement program recommended by the study are fiscally constrained. They represent a sharp break with the past practice of defining military requirements without considering cost, then proposing programs that fall far short of meeting the requirement, and calling the shortfall risk. The requirement in this study and the corresponding program will provide a mobility program adequate to meet with moderate risk the nation's needs in the uncertain world of the late 1990s.

3. Report Organization

The MRS will be presented in three volumes.

- Volume I summarizes analysis results, conclusions, and recommends a notional medium-confidence mobility plan at a reasonable cost. Analysis and results are provided in the following major areas:

- Intertheater mobility
- Amphibious lift
- CONUS infrastructure
- Logistics-over-the-shore (LOTS) operations
- Beyond the turn of the century; obsolescence of strategic airlift, sealift, and amphibious lift

- Volume II will provide a compendium of the detailed analysis used to support the results reported in Volume I. Compilation and documentation are ongoing. Additionally, the results of continuing analysis of concurrent scenarios occurring sequentially, LOTS, and container ship utilization will be reported. Volume II will be published in April 1992.

- Volume III will provide the analysis, conclusions, and recommendations for the intratheater and tanker portions of the study. Volume III will be published in August 1992.

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Part II. THE STRATEGIC CONTEXT

1. International Security Environment

Unprecedented Change

The international security setting is undergoing the most consequential change since the close of World War II. According to the National Security Strategy of the United States:

> "In the emerging post-Cold War world, international relations promise to be more complicated, more volatile, and less predictable. Indeed, of all the mistakes that could be made about the security challenges of a new era, the most dangerous would be to believe that suddenly the future can be predicted with certainty. The history of the 20th Century has been replete with surprises, many unwelcome."

Although global war is improbable, certain realities endure: a formidable nuclear arsenal in the Commonwealth of Independent States (CIS); continued long-term vital interests across the Atlantic, the Pacific, and in our own hemisphere; and the uncertainty of a continually changing world.

The New Context

The United States is undertaking a number of dramatic departures from the strategic principles that have formed American defense posture over the past four decades. The most significant is a major shift in emphasis from a strategy of global Soviet containment to one of primarily regional orientation.

Through increased flexibility in planning, training, and employment, the regional challenges of the future will be met with a restructured US force, a smaller force than today's, which still can protect and promote US global interests. The strategy recognizes that the evolving CIS, though fragmented, is likely to retain modern and significant military power for the foreseeable future.

Responding to regional crises is one of the key demands of our new strategy. The regional contingencies we might face are many and varied and could arise on short notice. US forces therefore must be able to respond rapidly to deter and, if necessary, to fight unilaterally or as part of an international coalition.

2. Interests and Objectives

National Security Interests and Objectives

Notwithstanding the twin forces of international change and domestic budget deficits, the broad national security interests that give focus to military objectives, strategy, and forces remain largely constant.

- The survival of the United States as a free and independent nation, with its fundamental values intact and its institutions and people secure.
- A healthy and growing US economy to ensure opportunity for individual prosperity and resources for national endeavors at home and abroad.
- Healthy, cooperative, and politically vigorous relations with allies and friendly nations.
- A stable and secure world, where political and economic freedom, human rights, and democratic institutions flourish.

Mobility

As the National Security Strategy states:

> "In this new era, therefore, the ability to project our power will underpin our strategy more than ever. We must be able to deploy substantial forces and sustain them in parts of the world where pre-positioning of equipment will not always be feasible, where adequate bases may not be available (at least before a crisis), and where there is a less-developed industrial base and infrastructure to support our forces once they have arrived. Our strategy demands we be able to move men and materiel to the scene of a crisis at a pace and in numbers sufficient to field an overwhelming force. The success of our forces in the war to liberate Kuwait was stunning, but we should not allow it to obscure the fact that we required 6 months to deploy these forces. As our overall force levels draw down and our forward-deployed forces shrink, we must sustain and expand our investment in airlift, sealift, and pre-positioning afloat or, where possible, ashore. We also must ensure unimpeded transit of the air and sea lanes and access to space through maritime and aerospace superiority. Our security assistance must, among other things, enhance the ability of other nations to facilitate our deployments. And, over the longer term, we must challenge our technology to develop forces that are lethal but more readily deployable and more easily sustained than today's."

The regional contingencies we could face are many and varied. We must be prepared for differences in terrain, climate and the nature of threatening forces, as well as for differing levels of support from host nations or others. We must also be able to respond quickly and effectively to adversaries who may possess cruise missiles, modern air defenses, chemical weapons, ballistic missiles, and even large armor formations. Forward-deployed forces speed our ability to respond to threats in areas like the Pacific or Europe, but regions exist where other formidable threats may require equally urgent response.

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Part III. DETERMINING REQUIREMENTS (U)

1. Background (U)

(U) Methodology

(U) Two analytical methods were used in the study to provide the basis for mobility requirements: scenarios and historical experience. Scenario-based requirements are most relevant for planning against relatively well-defined threats as has been the case during the Cold War. However, when one dominant threat does not exist, as is forecast for the United States in the foreseeable future, scenarios can illuminate, but not comprehensively set, requirements. Similarly, empirical evidence from past experiences, such as Operations DESERT SHIELD and DESERT STORM and the Panama and Grenada operations, provide valuable insights. Past experiences can be extrapolated but are of only limited value in future events under changed circumstances. Further, we can expect that potential adversaries also will benefit from experience, thereby offsetting some of the advantages accrued through lessons learned. Using both scenarios and extrapolated historical analysis, the study examines logistic and warfighting aspects of different potential contingencies requiring the deployment of US forces. The results of these analyses are then examined to derive a national mobility requirement that would rapidly deliver a sufficiently large US military force to respond to future contingencies.

2. Scenarios (U)

(U) Scenario Selection

(S) [redacted] (b)(1) 2

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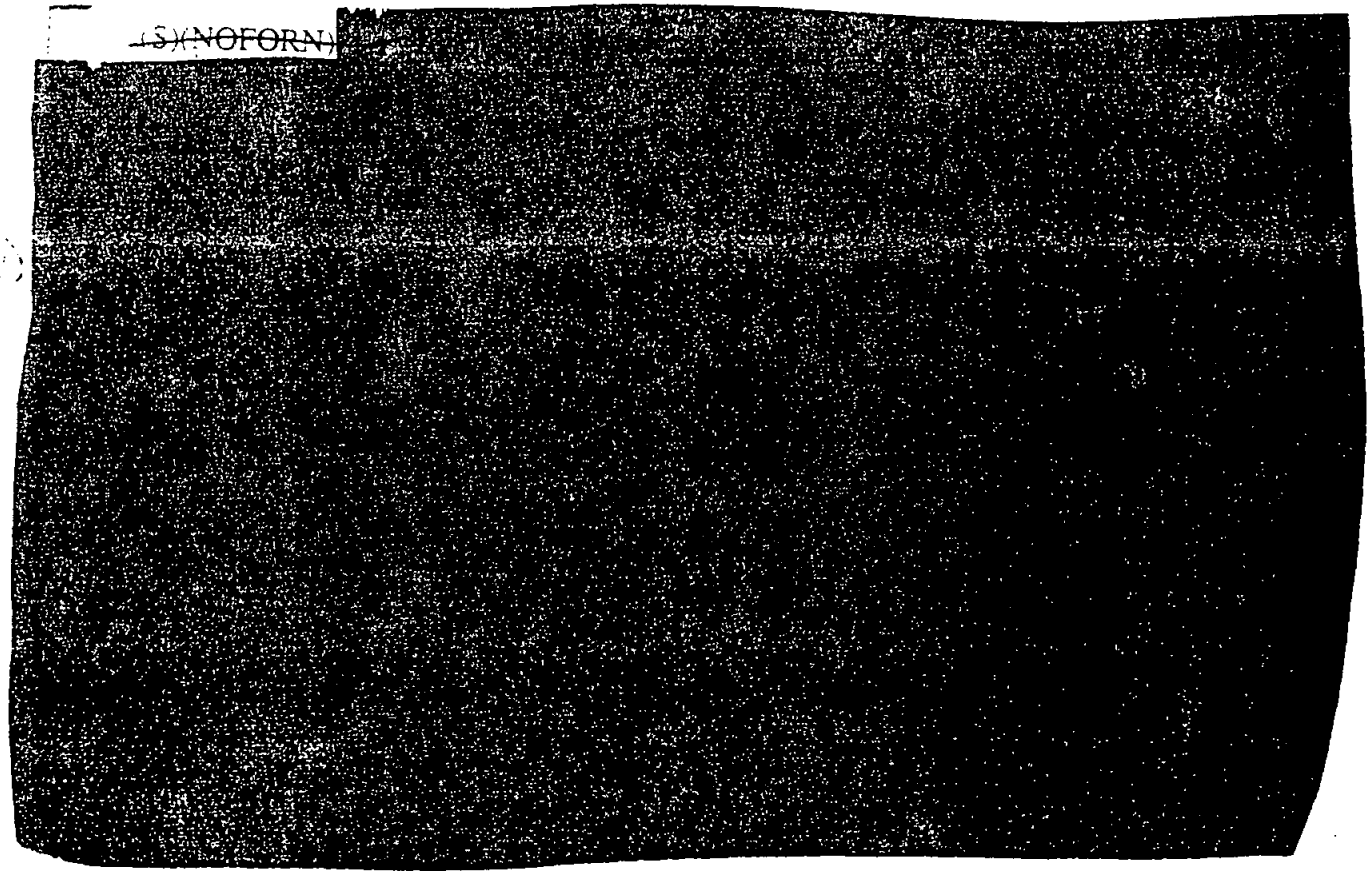
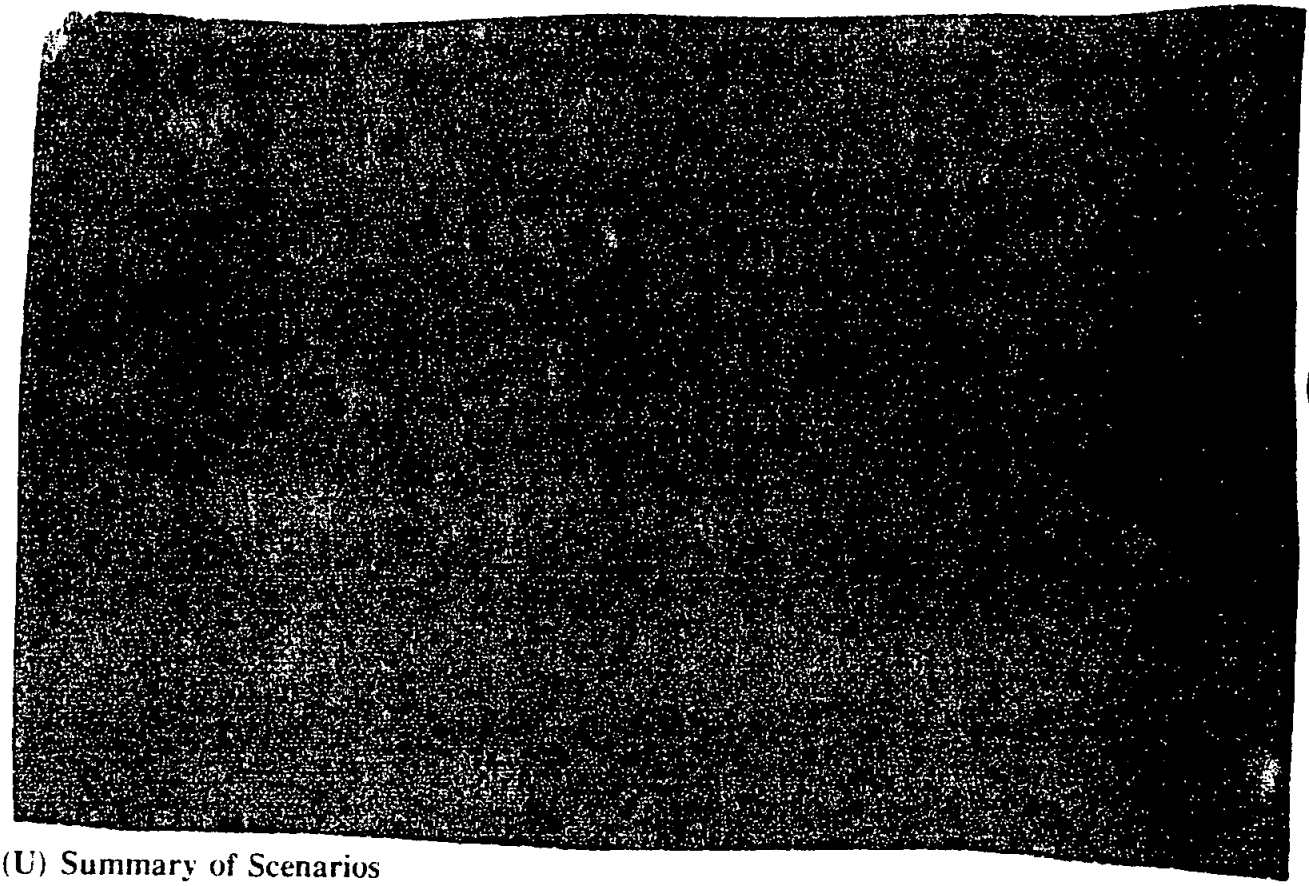
(U) Mobility options in meeting scenario requirements range from relying solely on US government assets to requisitioning US commercial ships, use of varying stages of the Civil Reserve Airlift Fleet (CRAF),[1] and varying degrees of reliance on allied transport. The individual scenarios include major detailed assumptions about future threats, forces employed (including Reserve forces), delivery schedules and distances, warning time, host-nation support, concepts of operation, and implicit assumptions about political will and risk. The selected scenarios are representative of the kinds of threats, infrastructure, and distances likely to be confronted by the United States in responding to crises in the coming decade. Individual countries are identified to establish the specifics necessary for analysis, such as distance, ports, infrastructure, and terrain. However, the selection of specific countries is not intended to predict future US crisis reactions or exclude other locations.

(U) Initial Scenario Assumptions



[1] CRAF is a partnership program between the Department of Defense and the civilian airline industry where the airlines contractually commit their aircraft, crews, and infrastructure to DOD use during emergency conditions.



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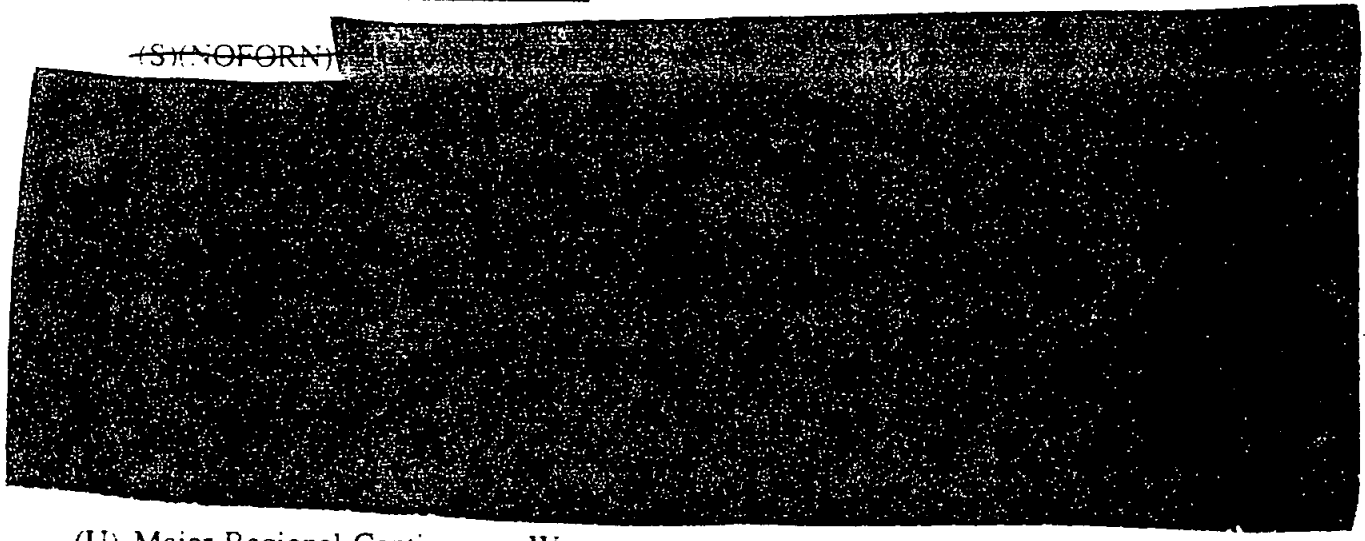
(U) Summary of Scenarios

(U) Major Regional Contingency-East



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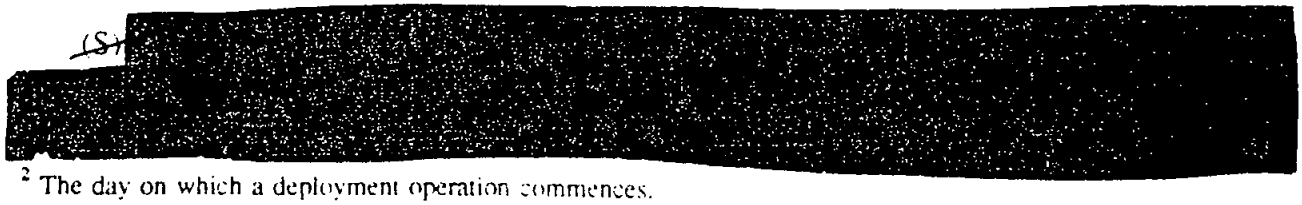
(U) Major Regional Contingency-West



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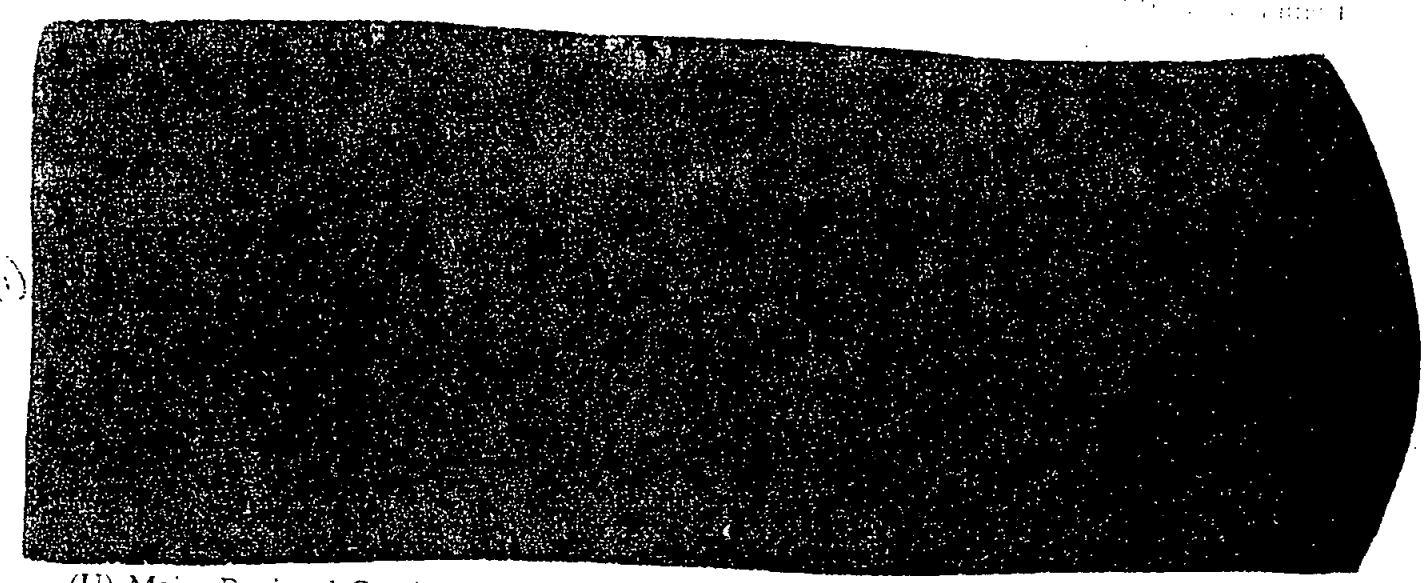
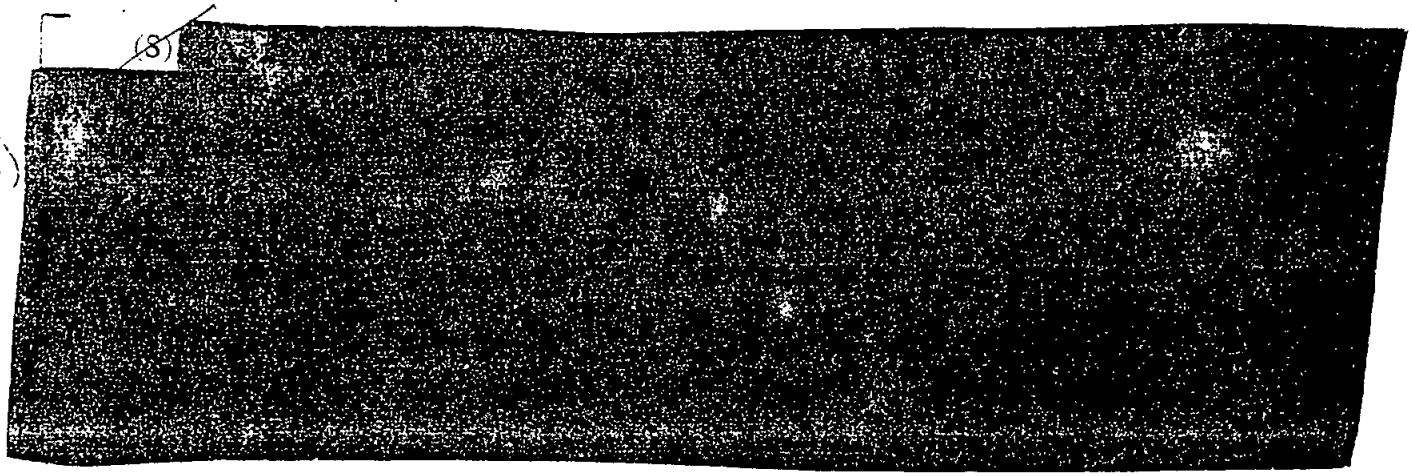
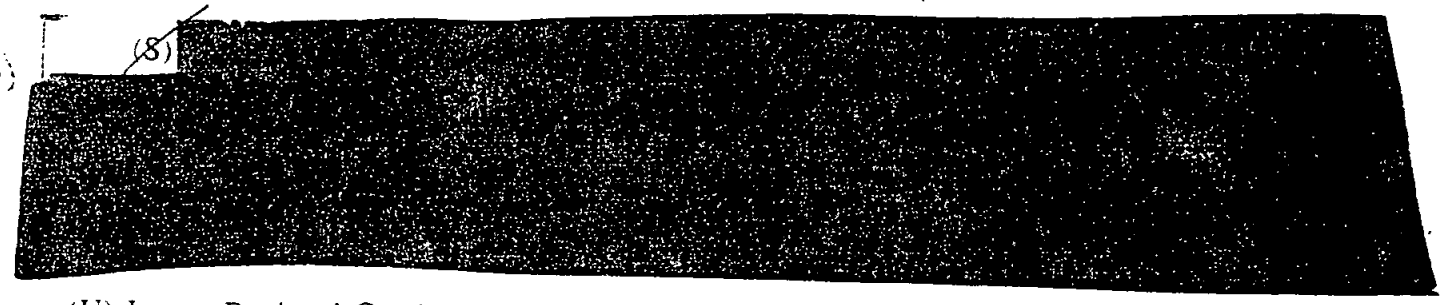
[2] The day on which a deployment operation commences.



(U) Major Regional Contingency-Europe



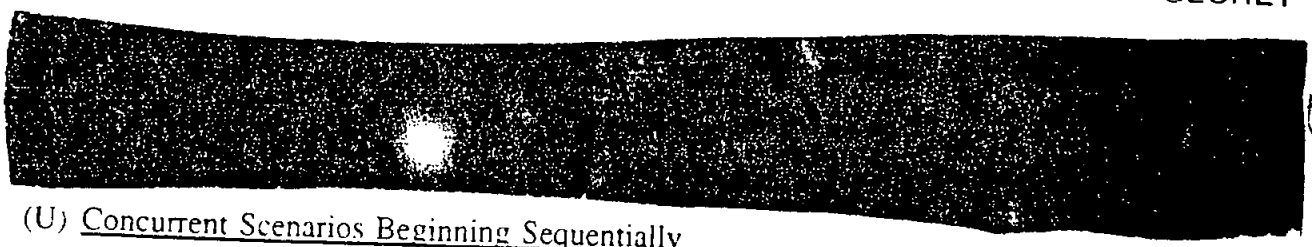
(U) Lesser Regional Contingency-Short



(U) Lesser Regional Contingency-Long

[3] Provides up to 1 million Reserve personnel for 24 months.

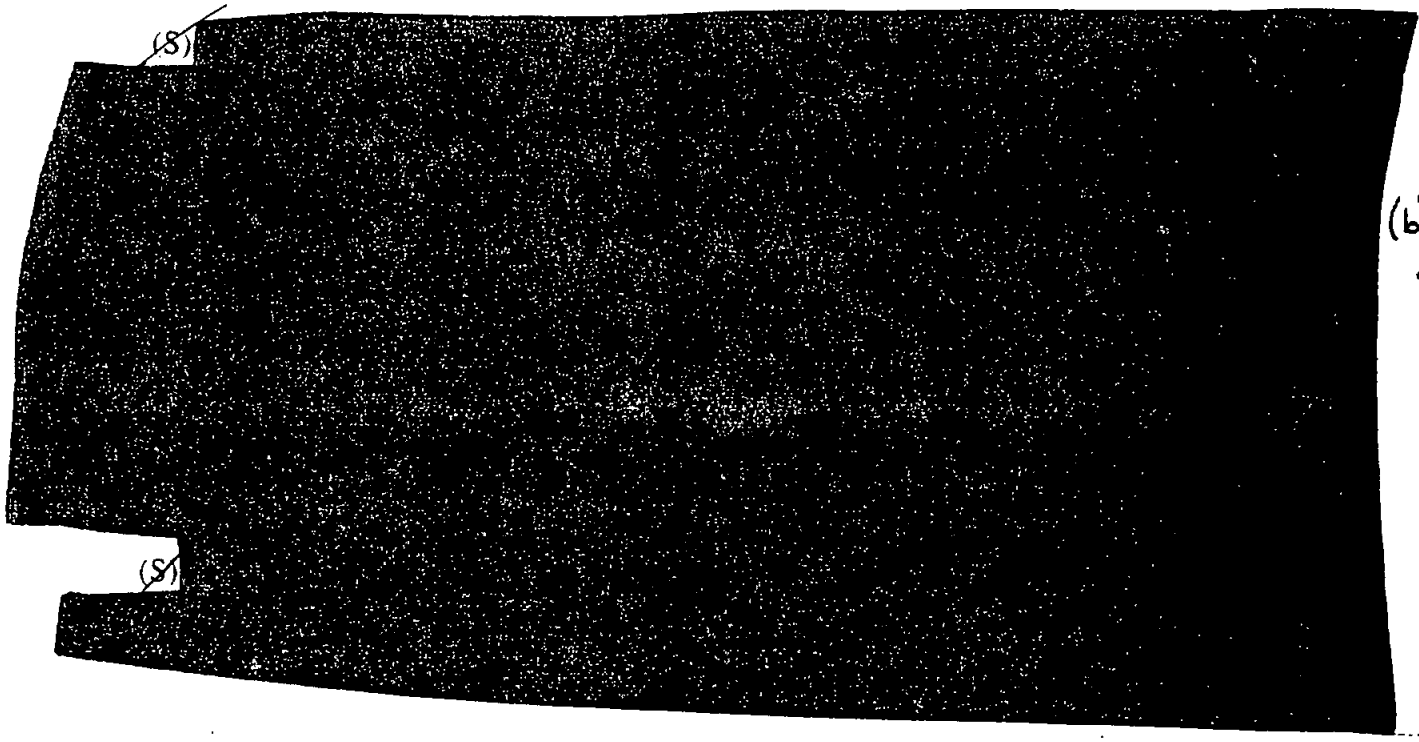
[4] All existing force structure is activated for the duration of the crisis plus 6 months.

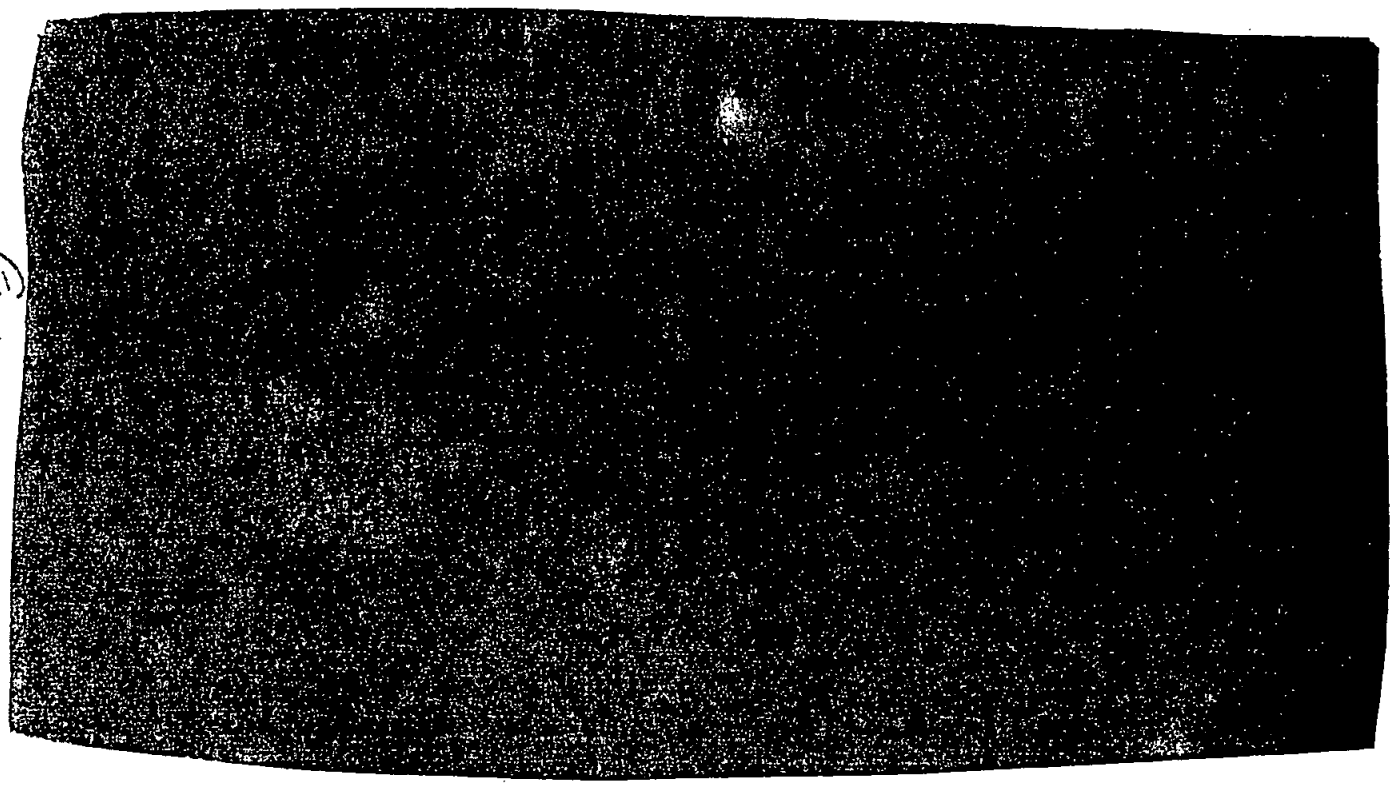


(U) Concurrent Scenarios Beginning Sequentially

3. Operations DESERT SHIELD AND DESERT STORM (U)

(U) Operations DESERT SHIELD and DESERT STORM witnessed the most intensive military deployment in US history. More than one-half million people and nearly 10 million tons of materiel were transported to SWA in support of military operations over a 7-month period. The deployment experience provided valuable lessons and data on US deployment capabilities. Where applicable, "lessons learned" have been applied to factors and assumptions used in Mobility Requirements Study analyses, such as loading times for units, ship capacities and speeds, availability of US and foreign charters, and readiness and reliability of the Ready Reserve Force. The key lesson to be taken from Operations DESERT SHIELD and DESERT STORM for mobility force planning is that our nation must be prepared, with little warning, to project significant US forces over great distances to areas that may have little or no infrastructure.





[5] Phase I: 7 August 1990 through 5 November 1990.

[6] Phase II: 5 November 1990 through 15 January 1991.

Part IV. INTERTHEATER REQUIREMENTS AND SOLUTIONS (U)

1. Attaining and Maintaining the Baseline (U)

(U) The FY 1992-1997 Future Years Defense Program (FYDP) provides the baseline for projecting FY 1999 forces. In those cases where assets are outside the FYDP, projections to FY 1999 are derived by extending current budgets through straight-line adjustments or using existing program data.

(U) In addition to currently available mobility assets, the Mobility Requirements Study (MRS) baseline includes the FY 1999 projection for a Ready Reserve Force (RRF) enhanced according to current plans in size, composition, and readiness (funding requirement for the improvement plan is not currently programmed but is validated by the study); the airlift fleet programmed in the 1992-1997 FYDP (92 of a total 120 C-17 buy); and programmed pre-positioning. MRS options and recommendations are in addition to the capability represented by the baseline. However, just attaining and maintaining the baseline generates additional funding requirements for more mobility assets with improved readiness.

(U) Sealift Baseline Mobility Assets

(U) The US strategic sealift capability is made up of ships in the RRF, Military Sealift Command (MSC)-controlled ships, US flag, and effective US control (EUSC) fleets. These are described in the following summary and numbers displayed in Table IV-1.

- (U) RRF: The RRF is composed of government-owned, inactive commercial ships with military utility. They are maintained by the US Maritime Administration (MARAD) in 5-, 10-, or 20-day states of readiness to support deployment of military forces. Activation of these ships is controlled by the Navy.

- (U) MSC-controlled fleet: This fleet consists of government-chartered dry cargo and tanker ships that provide point-to-point cargo service in areas not normally served by American companies. It includes two aviation logistic support ships designed to provide the necessary equipment and support for maintenance of a Marine Aircraft Group. The MSC also exercises control over the following assets:

  — (U) Fast Sealift Ships (FSSs): These eight ships were purchased in the early 1980s and converted to a roll-on/roll-off (RO/RO) configuration for the rapid movement of Army equipment from CONUS. These ships are maintained in a 4-day reduced operating status (ROS).

— (U) Maritime Pre-positioning Ships (MPS): This program consists of 13 modified commercial vessels under long-term charter, operating in three squadrons (located at Diego Garcia, the western Atlantic, and Guam-Tinian). Each squadron carries unit equipment (UE) and sustainment for a Marine Expeditionary Brigade (MEB). The composition and capacity of these assets is shown in Table IV-5.

— (U) Afloat Pre-positioning Ships (APS): This force consists of eight dry cargo ships carrying Military Service equipment and sustainment for contingencies in Southwest Asia (SWA) as well as several tankers. The composition and capacity of these assets is also shown in Table IV-5.

- (U) US flag Merchant Marine Fleet: These oceangoing cargo ships are owned by US businesses and operated under US registry. They could be made available to support military operations via voluntary charter or through requisitioning after a Presidential declaration of national emergency. A number of these ships would not be available if requisitioning occurred because of economic and maintenance withholds. These withheld ships are in domestic service supplying Hawaii and Alaska. A small number of ships also would not be available because of maintenance cycles.

- (U) Effective US-controlled fleet: This fleet includes US-owned, but foreign registered, ships under the flags of Panama, Honduras, Liberia, Republic of Marshall Islands, and the Bahamas. These ships are available after a Presidential declaration or proclamation of emergency; however, their availability is contingent, on a country-by-country basis, upon the nature of the crisis and the issues involved.

Table IV-1. (U) FY 1999 Strategic Sealift Assets

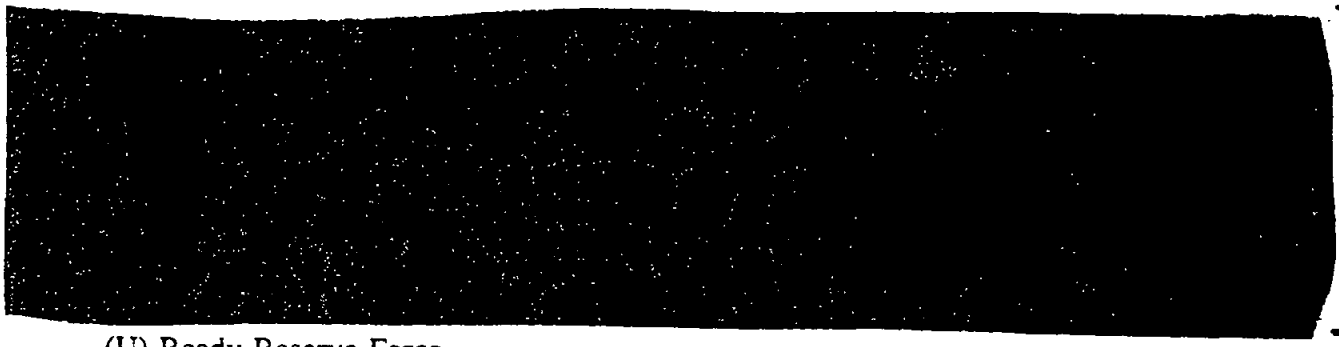
UNCLASSIFIED

	SHIP TYPE (militarily useful dry cargo)							
FLEET/TOTAL	FSS	RO/RO	BB	LASH/SB	T-ACS	CONT	OTH	WITH-HOLD
RRF / 104(81)		36(17)	49(49)	7(7)	12(8)			
MSC / 19(16)	8(8)	4(4)	5(2)				2(2)	
US FLAG / 71(134)		12(20)	0(11)	2(6)		38(77)	10(12)	9(8)
EUSC / 14(29)		0(2)	8(15)	0(4)		6(8)		

FSS = Fast Sealift Ship
RO/RO = Roll On/Roll Off ship
BB = Breakbulk
LASH/SB = Lighterage Aboard Ship/Sea Barge
T-ACS = Auxillary Crane Ship
Cont = Container Ship
Oth = Other
Note: Numbers in parentheses indicate ships in 1991.

(U) Ship capacities can be measured in three ways: weight (dead-weight tons or short tons [STONs]); volume (measurement tons [1 MTON = 40 cubic feet]), and area (square feet). Available square-foot capacity is of primary military concern since this is a measure of the ability to move UE (tanks, artillery, trucks, and other equipment). It is also the unit of

measure used for RO/RO ships, the preferred method of moving UE. Non-RO/RO ships also contribute capacity for moving UE but are not optimum platforms. The net square-foot capacity of the ships listed in Table IV-1 in 1999 varies from 9 to 14 million sqft depending on assumptions about the magnitude of coercive requisitioning of US assets. Capacities are displayed in Table IV-2.



(U) Ready Reserve Force

(U) At the commencement of the study, the RRF contained 96 ships including 81 dry-cargo ships, 11 tankers, two modified tankers equipped with an offshore petroleum distribution system (OPDS), and two troop ships. This has been used as the current notional RRF throughout the study despite modernization changes that have occurred to the RRF during the study. RRF readiness timelines in effect before Operation DESERT SHIELD were as follows: 65 ships in 5 days, 27 in 10 days, and four in 20 days. All ships required industrial facility activation prior to their turnover to MSC for operation. However, because of recurrent funding shortfalls and subsequent maintenance deferrals, the RRF was unable to meet established timelines during the Operation DESERT SHIELD Phase I deployment. To enhance the RRF to the FY 1999 Mobility Baseline requires the addition of 46 ships (23 dry cargo) and increased readiness by placing 36 RO/ROs in a 4-day reduced operating status (ROS 4), 27 other high priority ships (BB, LASH/SB, T-ACS, and OPDS) in an RRF 5-day status, and the remaining ships in an RRF 10-20 day status. The ships in an ROS 4 status will: (1) require no shipyard activation work, (2) be outported[3] at or near their proposed seaport of embarkation, (3) be available for loading at designated seaport of embarkation (SPOE) by day 4 following activation, (4) have a cadre crew onboard, and (5) conduct annual sea trials. The RRF-5 ships will be outported near a required shipyard activation point, be available to MSC by day 5, and have a 2-man maintenance crew aboard. RRF 10/20 ships will be available to MSC by days 10 and 20 respectively. The RRF ships in a 5 and 10/20 status will also have annual alternating sea and dock trials.

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[1] The ship capacity that is not usable when cargo is stowed aboard.

[2] Seasheds are open-topped, large cargo containers that fit into the container cells of a container ship to provide the capability to carry large, heavy, or outsized cargo such as tanks and helicopters. Flatracks provide a break-bulk capability to containerships for the carriage of tanks and other heavy and/or outsized cargo.

[3] Outporting is the staging of RRF ships at locations other than the three National Defense Reserve Fleet (NDRF) anchorage sites.

(U) The additional cost of attaining and maintaining the enhanced sealift mobility baseline above the projected FYDP is $2.7 B through FY 1999 and the funding profile is displayed in Table IV-3. This notional funding profile is based on acquiring used ships from the open market. There are alternatives in the timing of acquisitions. For deliveries in the end of the middle delivery period and in the late delivery period,[4] there may be alternative concepts—such as a build-and-charter program or the incorporation of national defense features in civilian ships—that could provide the same capability as the FY 1999 baseline capability but at a lower cost. MSC and the Navy will determine the mix that minimizes cost but maintains the same delivery capability as the FY 1999 mobility baseline. As discussed further in Part VIII, the DOD total sealift capacity will begin to decline below the capacity used in this study in about FY 2000 because of RRF ship obsolescence.

Table IV-3. RRF Enhancement Costs (U)

UNCLASSIFIED

COST ($M, FYDP $)	FY92	FY93	FY94	FY95	FY96	FY97	FY98	FY99
FYDP	234	234	243	253	263	274	—	—
Acquisition	20	358	291	126	153	71	83	0
Maintenance	205	313	357	382	421	454	474	490
Total Additional $ Required	0	428	405	255	311	251	557	490
Total RRF $ (FYDP + Additional Required)	225	671	648	508	574	525	557	490

(U) US Flag Fleet

(U) The US flag fleet currently numbers 134 militarily useful dry cargo ships but is projected to decline to 71 ships by 1999. MARAD further estimates that this decline will accelerate after the turn of the century. All of these ships would not be available if requisitioned because of economic and maintenance withholds (approximately eight ships). However, the US flag fleet still has the potential of providing significant additional mobility capability to the military depending on the assumptions concerning the timeliness of coercive requisitioning and their availability for military loading. Requisitioning large numbers of this fleet would have a profound effect on commercial operations, requiring operators to take steps such as chartering replacement tonnage from foreign fleets or booking cargo on foreign vessels under space-sharing agreements to protect market share. MARAD believes that any ships we might need from the much diminished US flag fleet could be chartered. Experience during Operations DESERT SHIELD and DESERT STORM was consistent with this assessment since no US flag fleet ships were requisitioned and 31 ships were provided on a voluntary charter basis. Because of the projected response times for US flag ships and the

[4] The middle period runs from the time the first ship arrives in theater from Conus until all the combat UE arrives in theater; the late delivery period is the time period in a force deployment after all the combat unit equipment arrives in theater.

low number of militarily useful non-container ships, they have limited utility for offsetting early-to-middle-delivery period sealift shortfalls.[5] Consequently, requisitioning is considered an option used as a hedge in the event that the United States becomes involved in a second major contingency.

(U) In the study, six US flag ships were assumed to volunteer for charter without requisitioning and two were obtained from the Sealift Readiness Program (SRP).[6] Excursions were conducted that assumed coercive ship requisitioning on C-day and C+4.

(U) Contractual Shipping Agreements

(U) During Operations DESERT SHIELD and DESERT STORM, the MSC contracted with operators of commercially scheduled container liner service to provide for port-to-port delivery of containerized cargo. Termed the Special Middle East Shipping Agreement (SMESA), this service had the potential of delivering over 2,700 40-foot-equivalent "container" units (FEUs) per week during Operation DESERT SHIELD. For analysis in the MRS, a similar capability was assumed to be available in the mobility baseline in the noncoercive cases. The capability modeled in the MRS was 2,500 FEUs per week. Commercial liner service was an important contribution to Operations DESERT SHIELD and DESERT STORM. To the extent that it meets sealift delivery requirements and are cost effective, this capability should be maintained by negotiated contracts.

(U) Airlift Baseline Mobility Assets

(U)

(S) The US airlift assets available in FY 1999 depend on the execution of the 1992-1997 FYDP and the programmed C-17 procurement. They include both military transport aircraft and those civilian aircraft in the Civil Reserve Airlift Fleet (CRAF) and are depicted in Table IV-4 (the CRAF program is described on page IV-6). The FY 1999 baseline airlift capacity is projected to be approximately 57 million ton miles per day (MTM/D). Military assets compose approximately 39 MTM/D, and CRAF Stages I, II, and III compose the remainder. CRAF Stages I and II provide approximately 5 MTM/D; CRAF Stage III contributes about 13 MTM/D. The total DOD airlift program (military and civil) will decrease to approximately 52 MTM/D soon after the end of the century, primarily because of the retirement of the remaining C-141 fleet. Thus, this capacity falls below the airlift capacity used in this study by approximately 5 MTM/D.

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[5] The early period is the time from the start of a force deployment until the first ship arrives in theater from CONUS.

[6] The SRP is a subset of the US flag fleet and requires US flag operators who participate in the peacetime movement of DOD cargo to commit half of their vessels to a phased contingency callup when activated by the Secretary of Transportation at the request of the Secretary of Defense. MARAD estimates that 19 ships will be in the SRP in 1999.

(U)

(~~S~~) The most demanding scenario in this study—MRC-E—assumes that an airlift capacity of approximately 44 MTM/D is available from military and civil assets (CRAF level II), including approximately 7 MTM/D of lift that is withheld from military assets to provide minimal support in other theaters such as Europe and Korea. Approximately 13 MTM/D capacity remains in CRAF Stage III. As explained more fully in Part VIII, activation of CRAF III was not viewed a probable decision in the case of a limited regional contingency.

Table IV-4. FY 1999 Airlift Assets (CRAF as of 1 Oct 91) (U)
UNCLASSIFIED

	AIRCRAFT TYPE								
					Long Range International (B747 Equivalents) (Note 1)				
FLEET	C-5	KC-10	C-141	C-17	WBP	NBP	WBC	NBC	TOTAL PAX/Cargo
Military (PAA) (Note 2)	109	57	152	80					
CRAF I					18	0	13	10	41 18/23
CRAF II					73	0	22	19	114 73/41
CRAF III					245	11	77	73	406 256/150

Note 1: WBP = wide-body passenger; NBP = narrow-body passenger; WBC = wide-body cargo; NBC = narrow-body cargo
Note 2: PAA = primary aircraft authorization. 23 KC-10 aircraft are considered in the cargo role (remainder allocated to air refueling). For MRS analysis, 10 KC-10s were used as mobility assets prior to D-day and none thereafter based on recent Operation DESERT STORM experience. 80 of 102 PAA C-17s in program delivered by FY 1999. CRAF is expected to be restructured soon and will include more cargo and aeromedical aircraft in Stage II. A projected decrease in overall CRAF participation because of airline bankruptcies and fleet changes is also expected.

(U) Civil Reserve Airlift Fleet

(U) CRAF is a partnership program between the Department of Defense and the civilian airline industry where the airlines contractually commit their aircraft, crews, and infrastructure to DOD use during emergency conditions. In return, these airlines are offered portions of DOD's peacetime contractual business. CRAF supports DOD passenger, cargo, and aero-medical evacuation requirements and can be activated in three stages:

- (U) Stage I: Committed Expansion. This stage provides assets to meet early contingency deployment requirements and can be activated by USCINCTRANS.
- (U) Stage II: Airlift Emergency. This is an additional airlift expansion program in support of a national security crisis, short of a declared emergency. The Secretary of Defense has the authority to activate this stage.
- (U) Stage III: National Emergency. The Secretary of Defense may issue the order to activate this stage in support of a defense-oriented national emergency declared by the President or Congress.

(U) The transition to an emphasis on regional contingency responses places a premium on earlier availability of CRAF. This fact, plus Operations DESERT SHIELD and DESERT STORM experiences, is the basis for the CRAF contract currently being negotiated. The new proposed contract includes additional aircraft at each stage plus earlier access to aeromedical evacuation assets. Table IV-4 shows the current CRAF assets. The MRC scenarios assume activation through CRAF Stage II. Excursions on the MRCs were conducted that assumed activation of CRAF Stage III on days C+10 and C+15. CRAF is not used in the LRC scenarios because of the short time between C-day[7] and D-day[8] and the need to preserve operational security.

(U) CRAF Stage III activation effectively removes the equivalent of a major airline fleet from the commercial market. This would cause the airline industry hardships, particularly on international routes and in the long haul air cargo sector where unrecoverable industry share would be lost. Loss of the passenger market share should be recoverable when aircraft return, based on passenger loyalty and the impact of hub-and-spoke flying. Cabotage laws (Coastal Trade and Navigation) and foreign-carrier-pricing competitiveness would provide some, but not complete, protection. However, the true economic effect of a CRAF Stage III activation goes beyond the carriers. It also affects the viability of industries that rely heavily on air cargo for time-critical deliveries.

(U) Two key points have emerged from the mobility analysis concerning CRAF. First, pre-positioning of equipment places additional demands on CRAF to deliver the associated personnel and equipment that cannot be pre-positioned or is not cost effective to pre-position. Second, CRAF cargo assets, under certain conditions, may reduce the effectiveness of organic airlift assets and constrain cargo delivery and offload. This occurs as a result of the increased ground time because of longer unloading times that CRAF aircraft require and the added requirement for their unique material handling equipment.

(U) Pre-positioning Baseline Mobility Assets

(U) The study assumes that afloat and land-based pre-positioned assets consumed during Operations DESERT SHIELD and DESERT STORM have been replenished to their pre-war levels. Significant additional pre-positioning that might occur as a result of ongoing negotiations in the Middle East would augment or in some cases could reduce the mobility requirements of the study. Table IV-5 shows the FY 1999 afloat pre-positioning ships. Once their pre-positioned cargo is discharged and if released for common-user lift[9] assignment, these ships could contribute an additional 2 million sqft of capacity during second sailings. However, recent operational experience reveals that the supported CINC may retain some of these

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[7] C-day is the day on which a deployment operation commences or is to commence.

[8] D-day is the day on which hostilities commence.

[9] Transportation services provided by a Military Department or joint command on a common basis for two or more DOD users or agencies (any commodity that does not have a pre-assigned delivery platform).

ships to support contingency operations. Current worldwide major afloat and land-based pre-positioned equipment sets and their locations are summarized in Table IV-6.

[redacted]

(U)
2

Table IV-6. Pre-positioned Equipment and Supplies (FY 1992) (U)
UNCLASSIFIED

Command	Army	Air Force	Navy	Marine Corps
Global (Note 1)	4 APS Ships (Diego Garcia)	3 APS Snips (1 Med and 2 Diego Garcia)	1 APS Ship (Diego Garcia)	3 MPS Squadrons (listed below)
USEUCOM (Note 2)	POMCUS Sets (Germany, Nether-lands, Belgium) ARMS (Italy)	NATO Pre-positioning Procurement Package		MEB Equipment in Norway and MPS (4 ships) in Atlantic
USCENTCOM (Note 3)	Equipment at sites in countries under various programs (HNS and WRS)	Equipment at sites in countries under various programs (HNS and WRS)		MPS (5 ships) in Indian Ocean
USPACOM	Equipment at sites in countries under various programs (HNS and WRS)	Equipment at sites in countries under various programs (HNS and WRS)		III MEF MPS (4 ships) in Western Pacific
USSOUTHCOM	The majority of USSOUTHCOM's theater WRS is positioned in CONUS			

Note 1: Three prepo tanker ships at Diego Garcia are not included because they support all Services. MPS squadrons are being reconfigured after Operations DESERT SHIELD and DESERT STORM into crisis action modules involving one or more ships. This reconfiguration offers response options to contingency missions ranging from disaster relief to a major contingency.
Note 2: POMCUS = pre-positioned organizational materiel configured in unit sets. Six heavy brigade sets and an Armored Cavalry Regiment (ACR) set. A heavy brigade set is located in Italy.
Note 3: HNS = host-nation support; WRS = wartime reserve stocks.

(U) As shown in Table IV-6, several of the pre-positioned ships are located at Diego Garcia. Anchorage space is limited at Diego Garcia and additional anchorages would have to be negotiated. Since recommendations of this study include additional pre-positioning afloat, negotiations for alternative sites may be required.

(U) Other Baseline Mobility Considerations

(U) Foreign and Allied Assets

(U) In addition to national assets, we have treaty commitments with NATO and the Republic of Korea (ROK) that will provide additional mobility assets should a conflict involve those specific areas. Table IV-7 shows these additional dry cargo shipping assets provided by the NATO Shipping Pool and Korean Flag shipping and the airlift assets provided by the NATO Allied Pre-committed Civil Aircraft Program (NAPCAP) and the Korean airline augmentation, which were used in the analysis.

(b)(1)
1,3

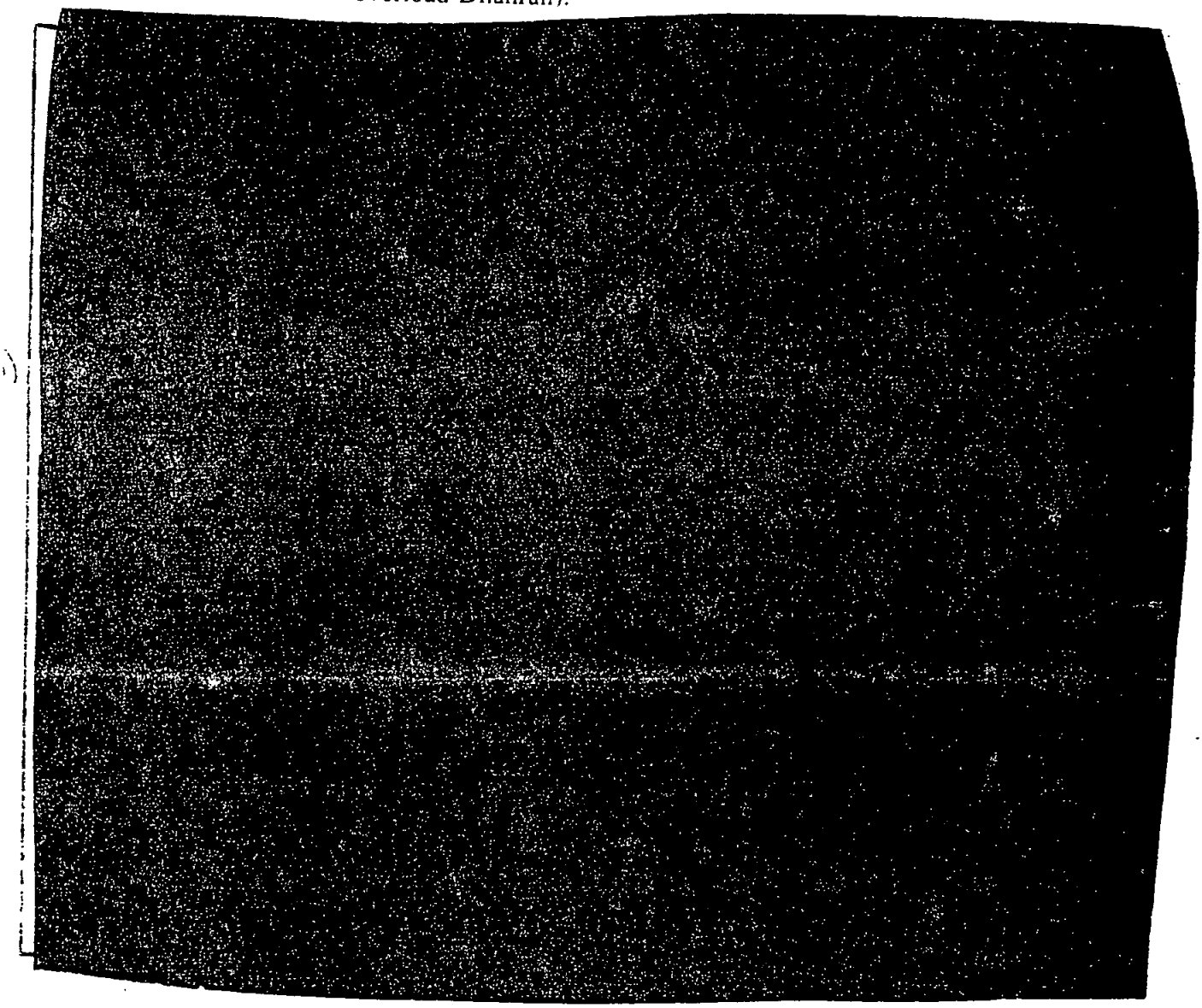
(U) Foreign Charters

(U) In addition to ships provided under treaty, a large number of foreign ships could be available for charter on the open market. The number of ships available would vary depending on the nature of the crisis, the duration of the contingency, and the amount of international support to the United States during the crisis. In Operations DESERT SHIELD and DESERT STORM, we were able to charter 168 dry cargo foreign ships, which made an overall contribution of approximately 20 percent of the total dry cargo delivered. Foreign charters cannot provide a significant contribution to the delivery of cargo in the early and middle delivery periods. Consequently, MRS options and recommendations do not rely on foreign charters for early and middle delivery period response.

(U) En Route Basing

(U) In previous years, with a large US presence overseas, the availability of en route basing was assumed. As US forces are withdrawn and overseas presence is reduced, the required en route basing and capacity must be maintained. En route bases with sufficient throughput capacity reduce the need for tanker aircraft to refuel transport aircraft. Additionally, recovery airfields separate from reception airfields are needed to minimize the ground time and the demands on fuel storage at reception airfields. En route and recovery bases are crucial to timely maintenance of aircraft and crew staging. Availability of many of these en route and/or recovery bases depends almost entirely on host-nation agreements. This is especially true in the case of civilian airfields, where the host government may restrict or prohibit the flow of certain types of passengers or cargo (such as explosives). If use of en

route area is desired, the only alternative is to refuel transport aircraft in flight using organic tankers. Analysis using the MRC-E and MRC-W scenarios was conducted to determine the amount of maximum-on-ground (MOG)[10] capacity available and used. Table IV-8 summarizes results for MRC-E. Note that this table assumes delivery to multiple aerial ports of debarkation (does not overload Dhahran).

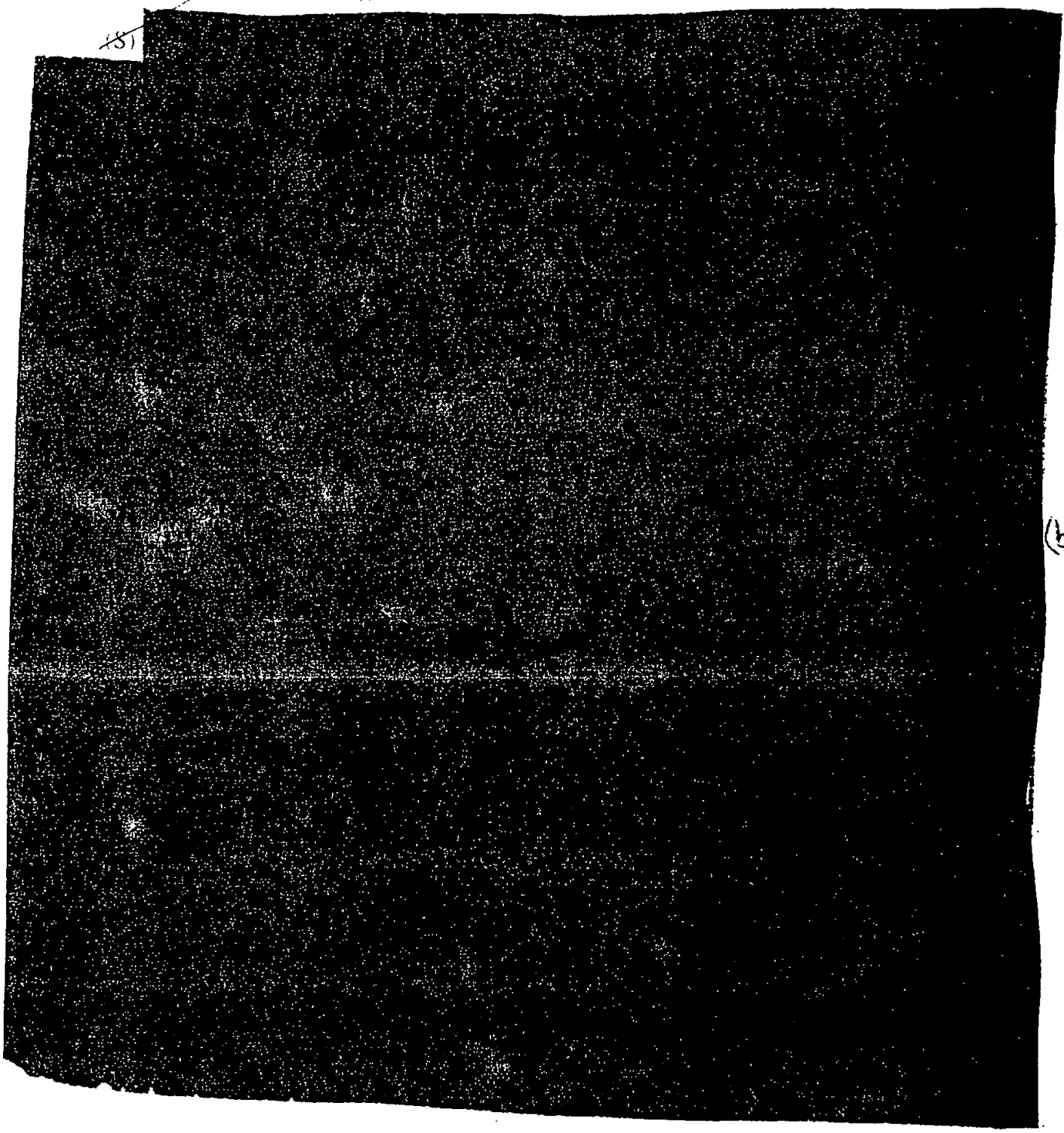


[10] MOG is the highest number of aircraft being used in an operation that will be allowed on the ground during a given span of time based on simultaneous support.

2. Requirements Analysis (U)

(U) Major Regional Contingencies

(S)



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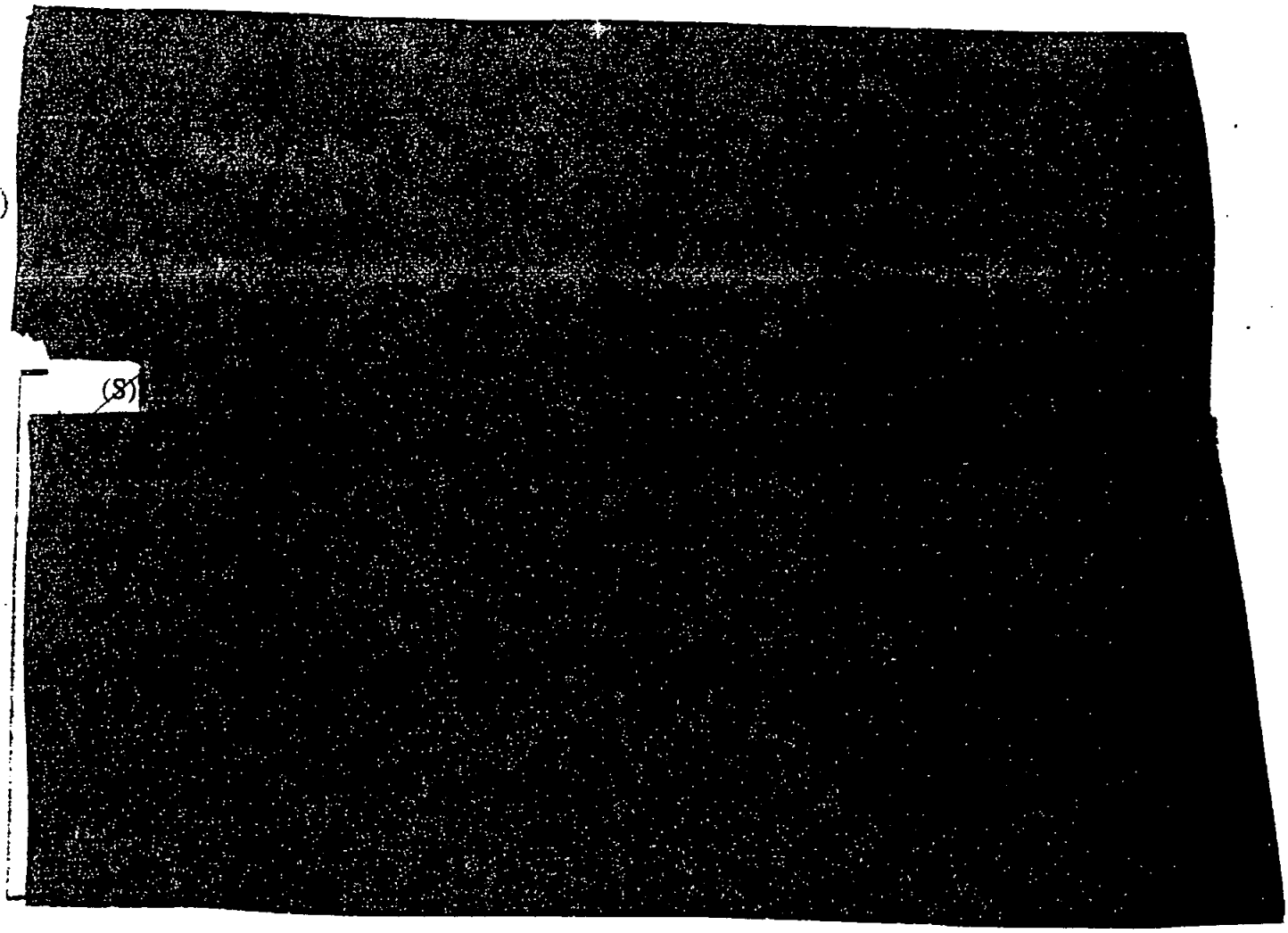
(U) Sensitivity Analysis

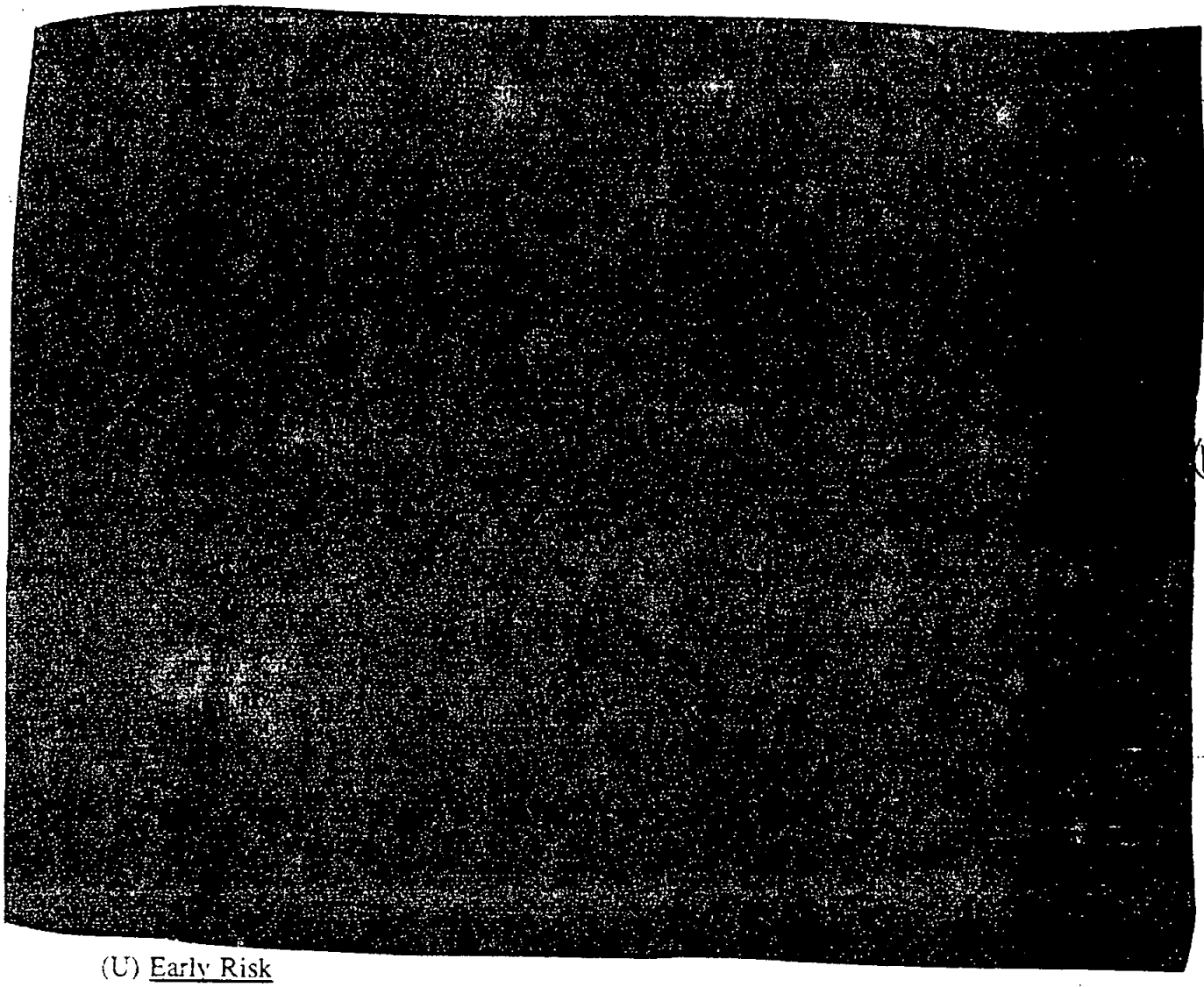
(U) In each of the scenarios, excursions were run to determine the sensitivity of the outcomes to the key assumptions. The assumptions having the greatest impact were reaction time (C-day to D-day), size and delivery schedule of US forces, capability (size and training level) of allied forces, concept of operations, and capability (size and training level) of enemy forces.

(U) Many different excursions were run varying these assumptions. Mid-range assumptions were chosen for comparison of alternative outcomes; however, final recommendations were chosen to include hedges against over-optimistic assumptions and uncertainty.

(U) MRC-E Analysis

(U) More than 60 computer-assisted wargames were conducted and analyzed to evaluate the risk posed by a variety of force and mobility combinations under a variety of assumptions. Table IV-9 shows the baseline scenario assumptions and the range of variations for key assumptions.





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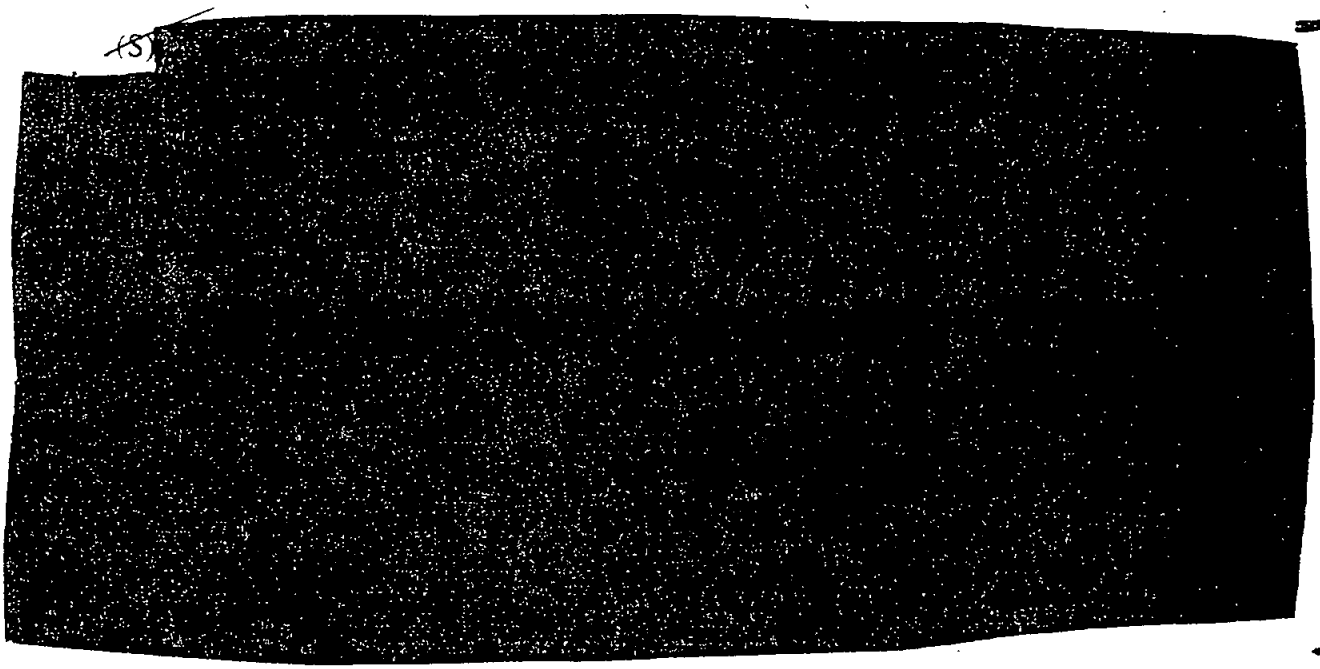
(U) Early Risk

(S)



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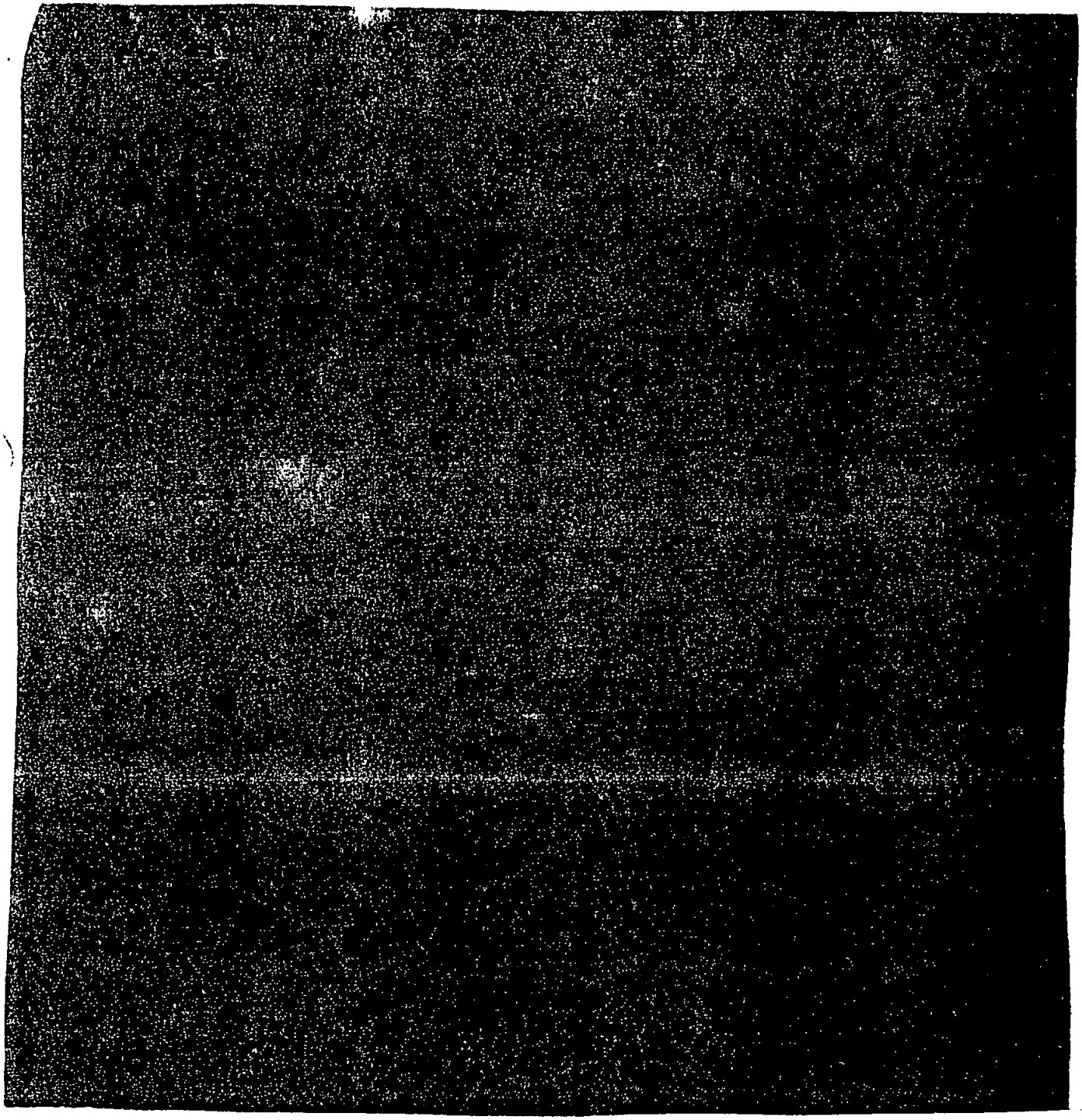

(U) Late Risk

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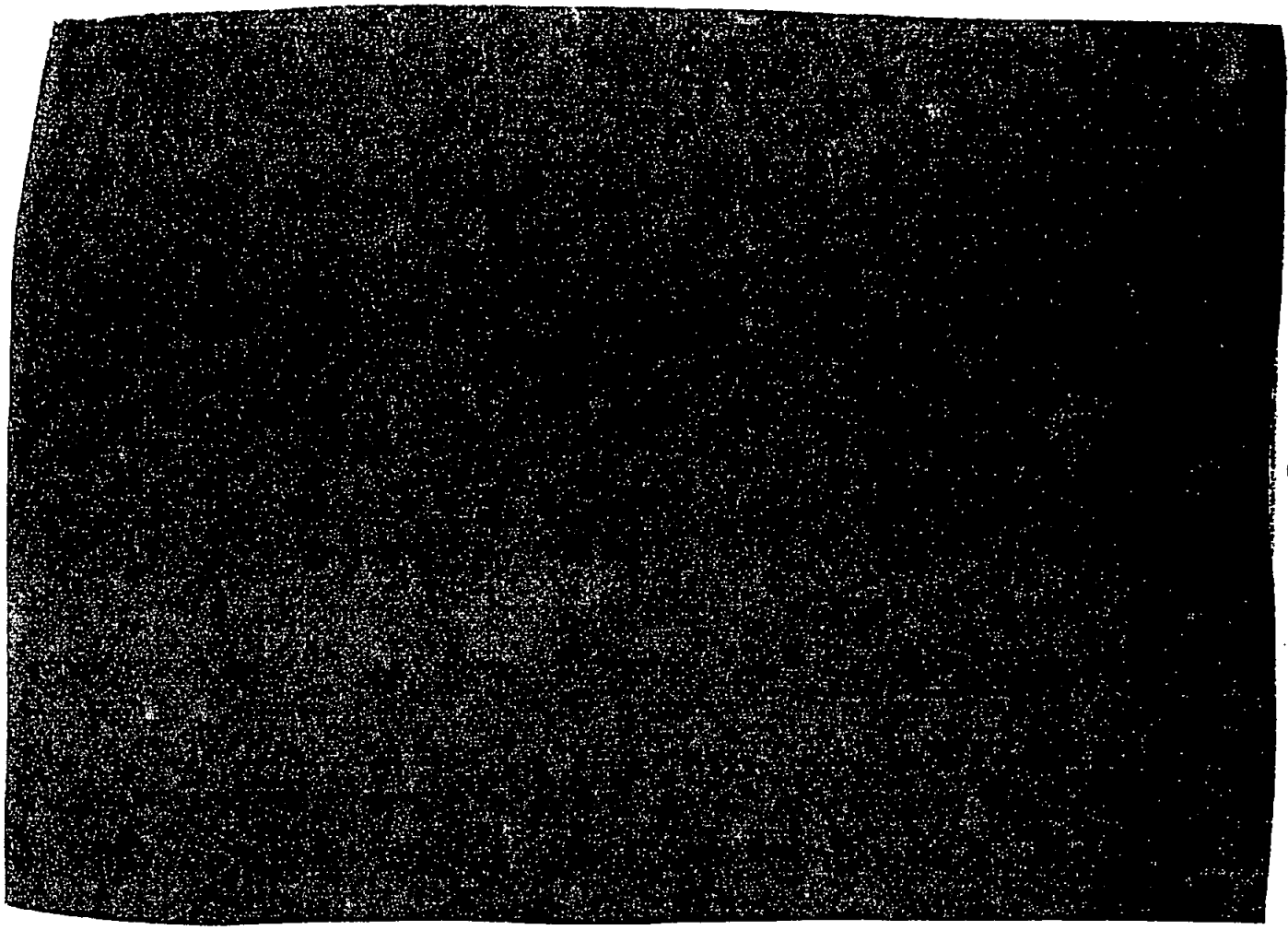

(U) Support Risk

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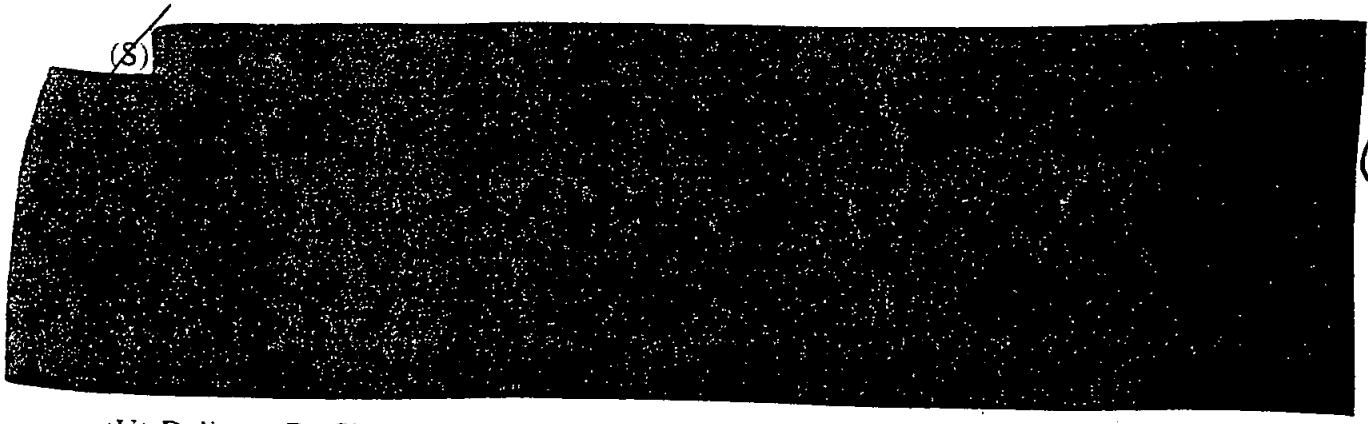
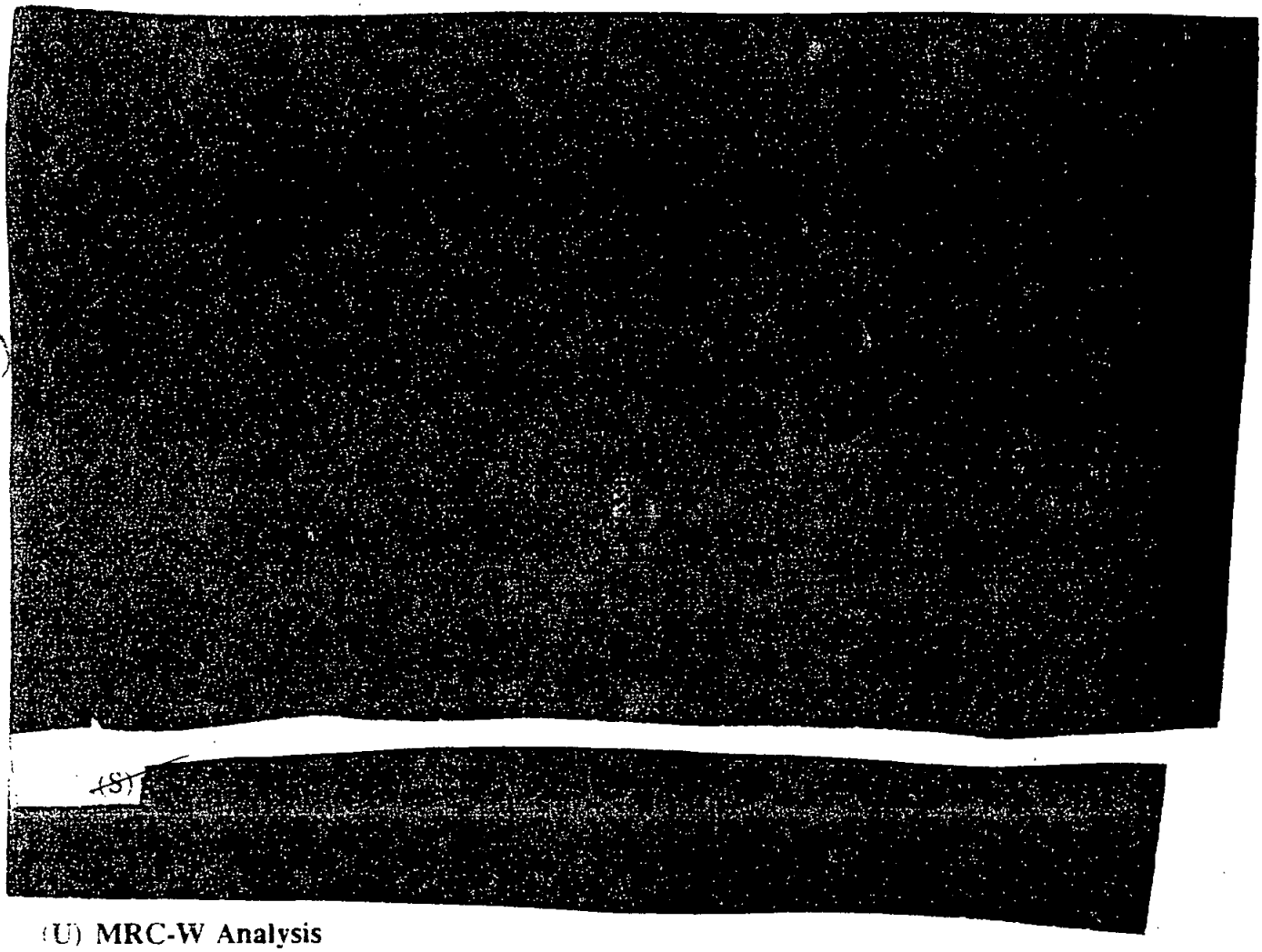


(U) Delivery Profiles

(U) The warfighting and support analysis supports Case D, delivered on time, as the moderate-risk force for the MRC-E scenario. Figure IV-3 shows the cargo delivery profile required for Case D to arrive in theater as scheduled. Also shown is the delivery profile the

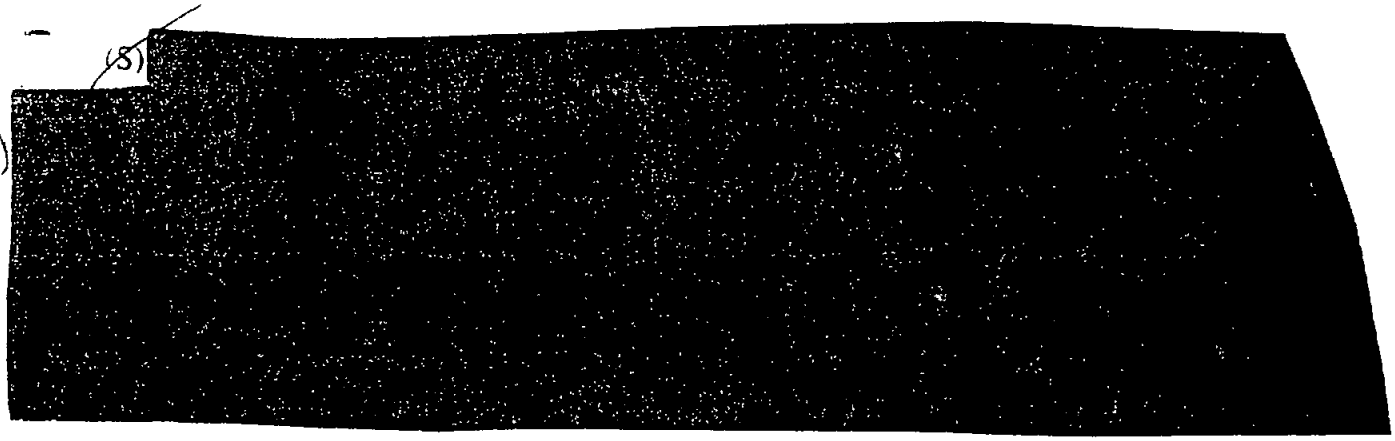
FY 1999 mobility assets are capable of achieving. The difference between the two curves represents the mobility shortfall in the MRC-E scenario at the moderate-risk requirement.

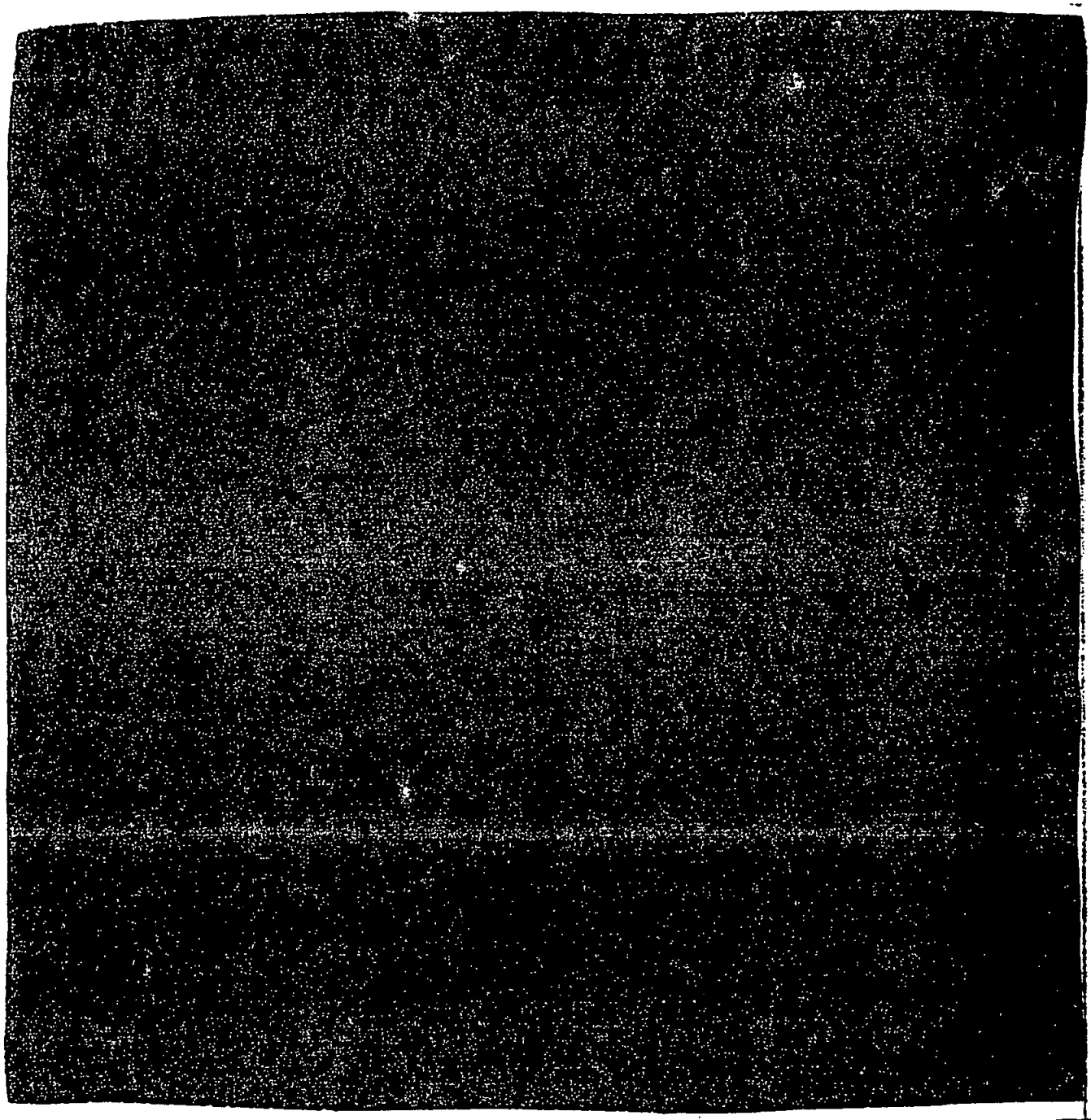


(S)

(U) MRC-W Analysis

(S)





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(U) Early Risk

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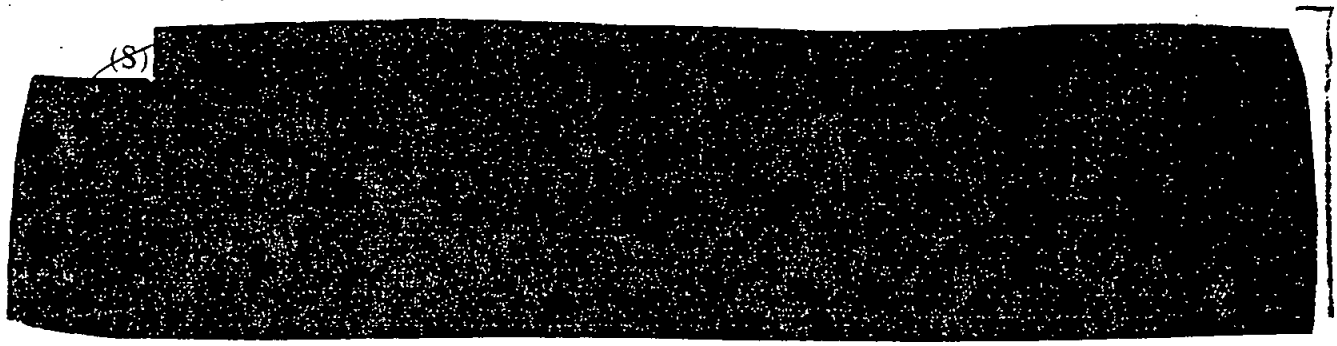

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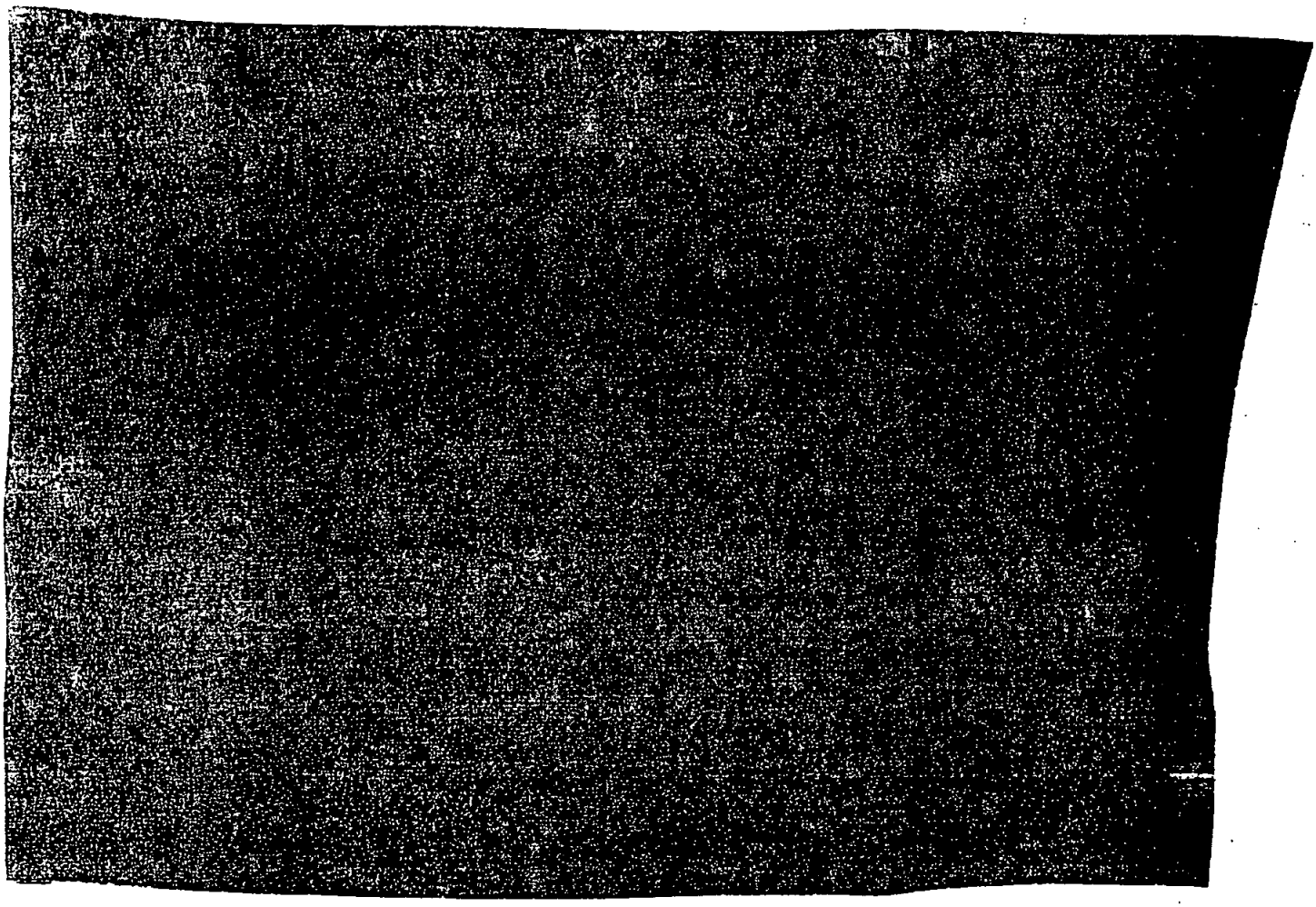
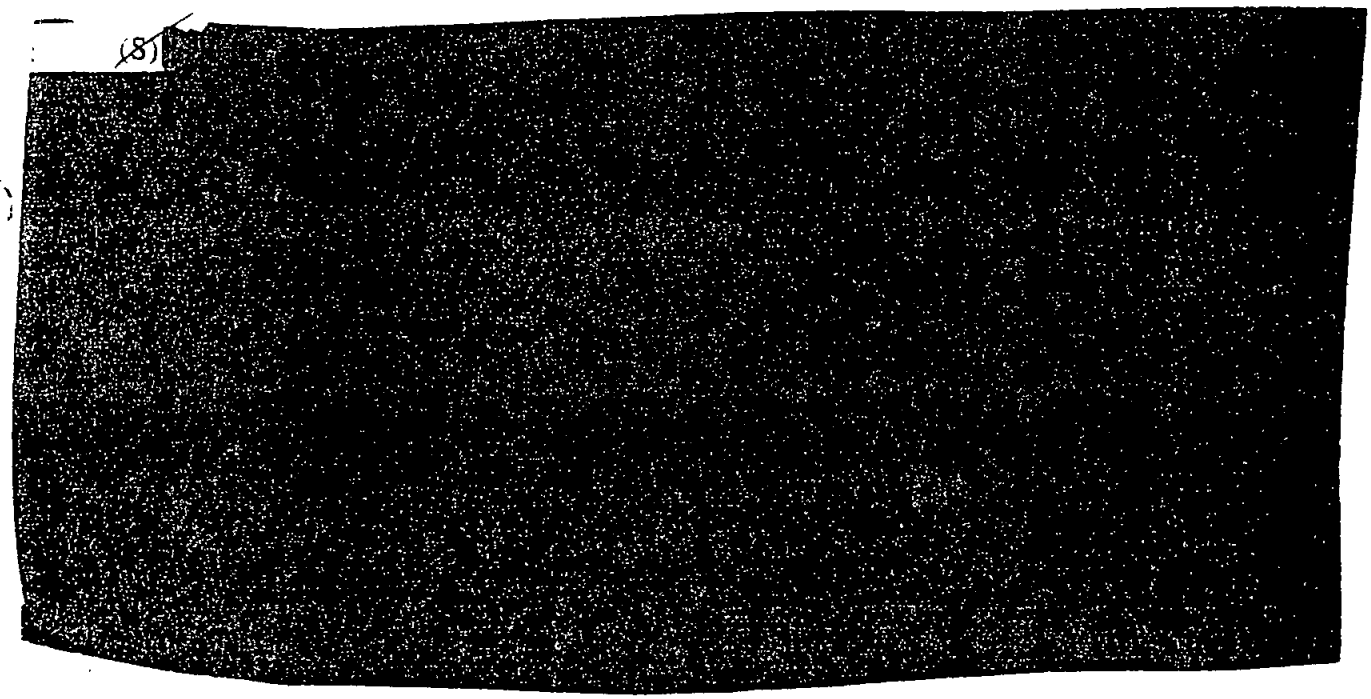
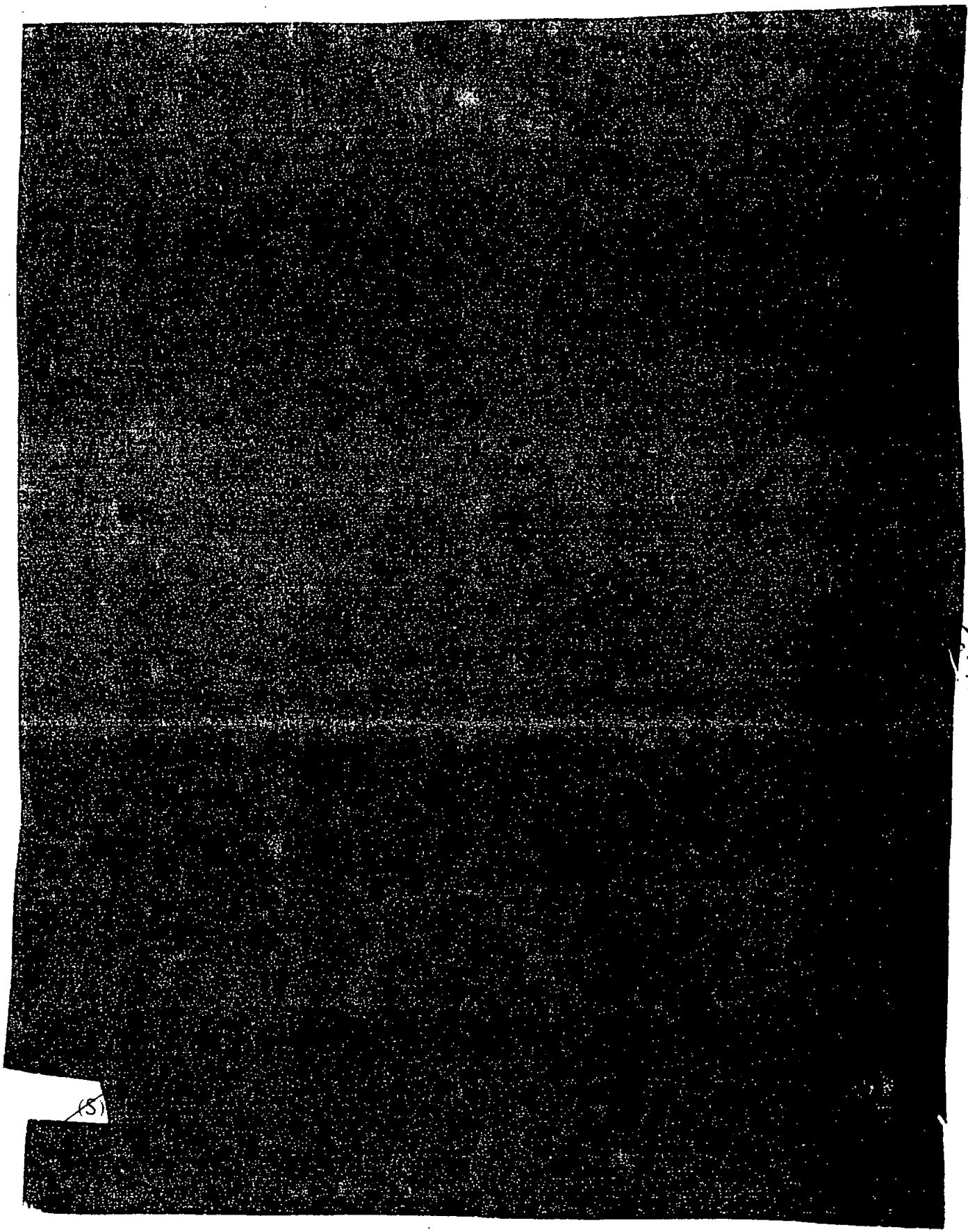
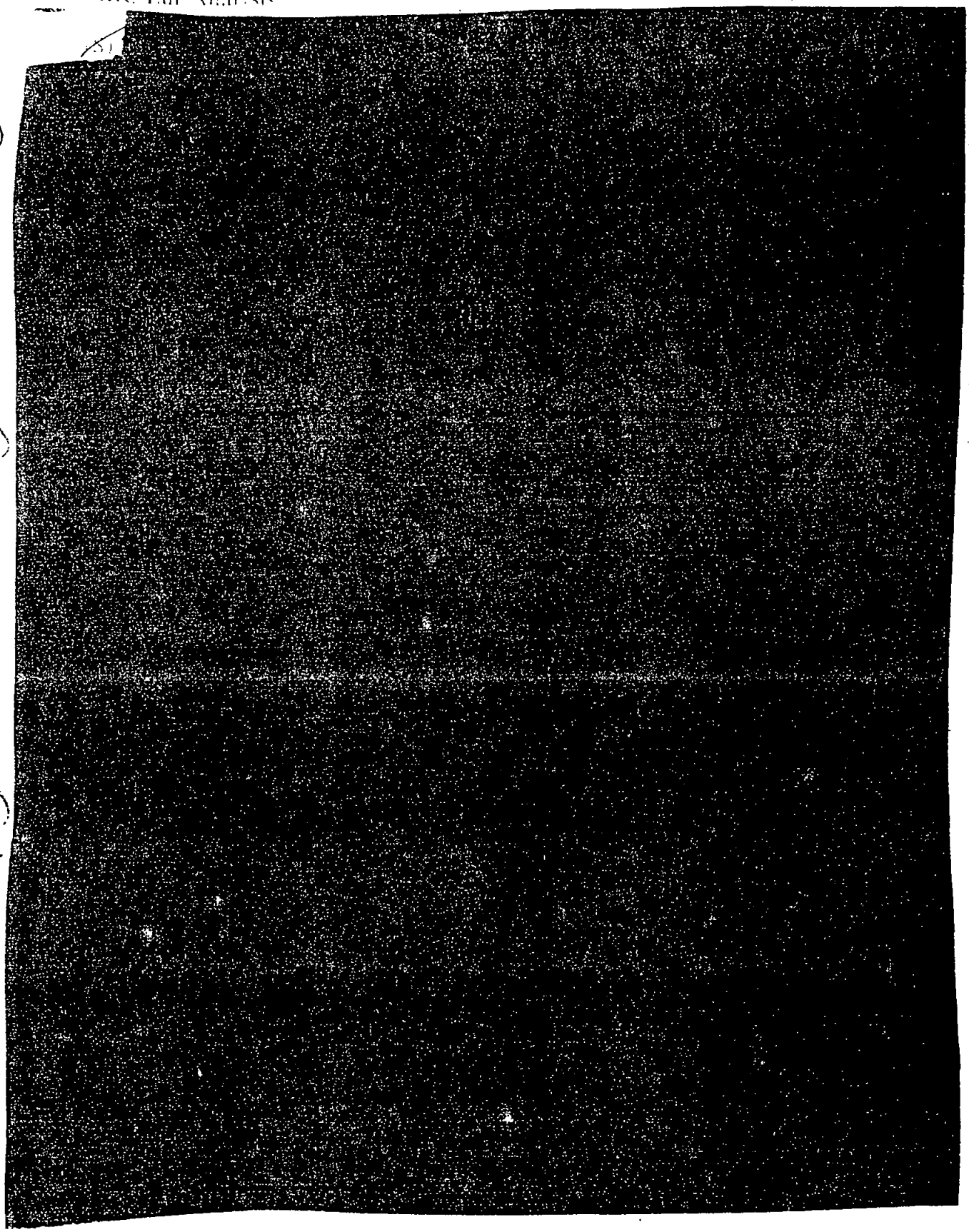


(U) Late Risk

(S)







[redacted]

(U) Lesser Regional Contingencies

(U) Evaluation of risk in the LRCs was accomplished using seminar wargames and mobility analysis. The uncertainties involved in LRCs make detailed wargaming analysis even more difficult than in MRCs and place a premium on prudent judgment in evaluating risk.

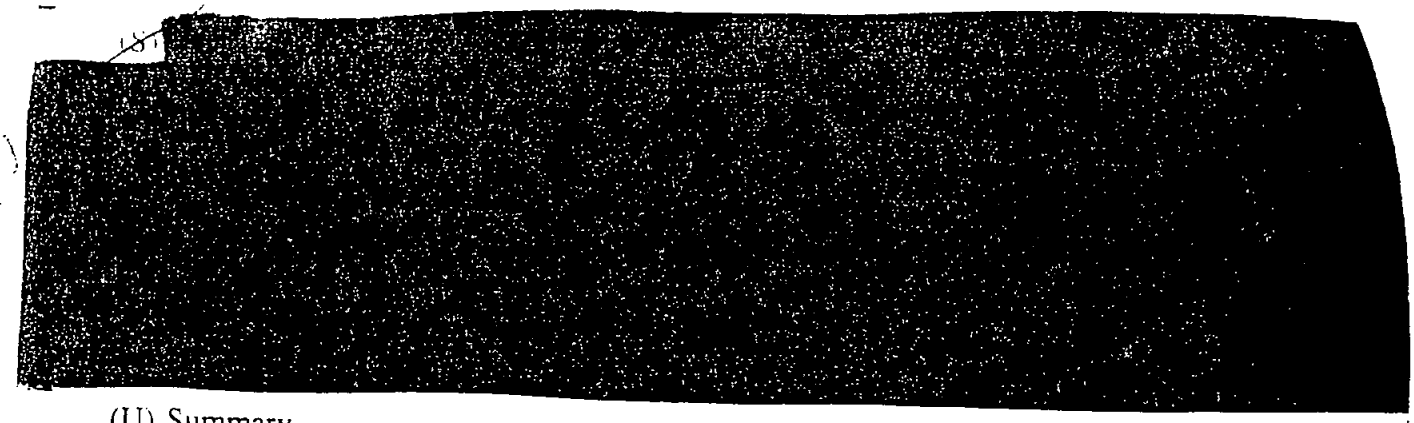
(U) Warning time in this type of scenario is extremely short because of the fast-breaking nature of typical crises and the imperative to preserve secrecy during preparation of a US response. These characteristics limit the usefulness of sealift in the early days of these crises and currently limit airlift to active duty forces for the initial response.

(U) LRC-Short

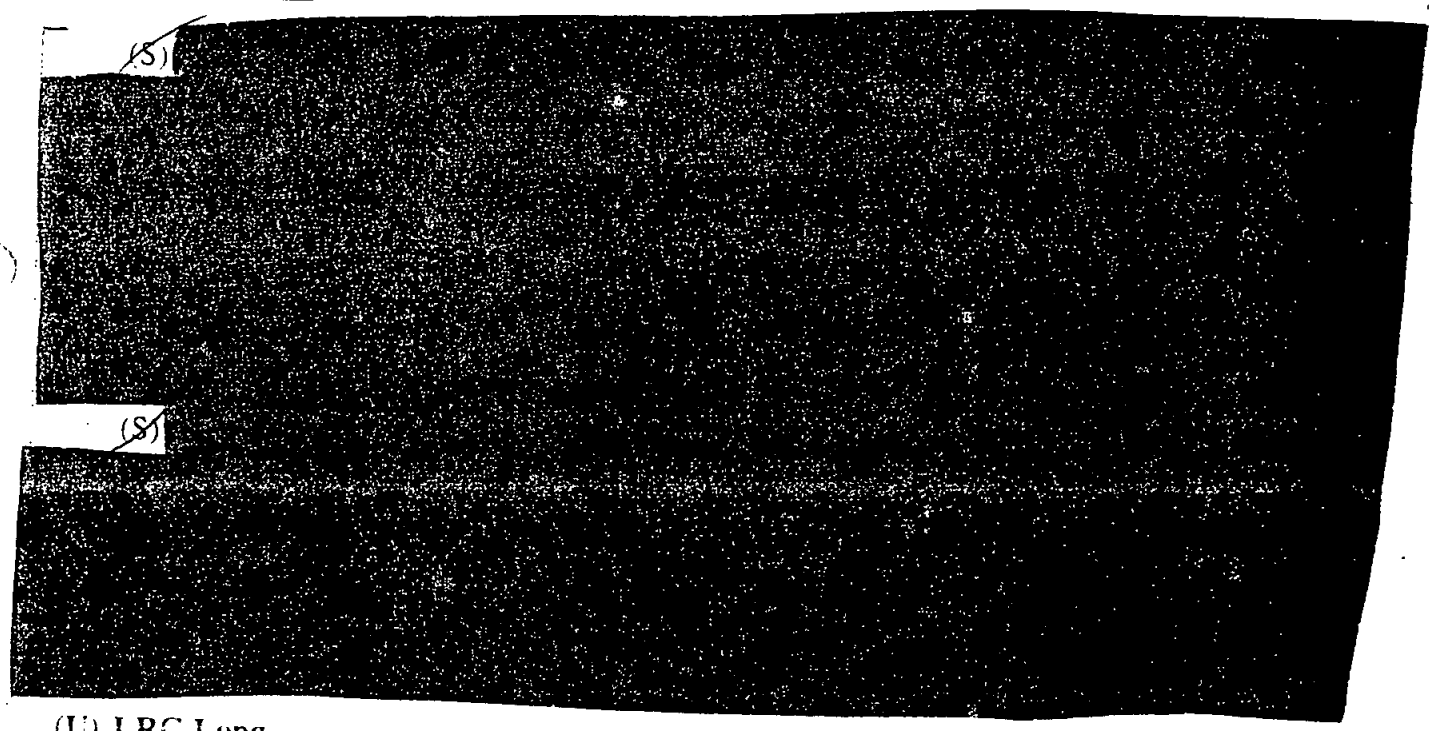
(U) Risk

[redacted]

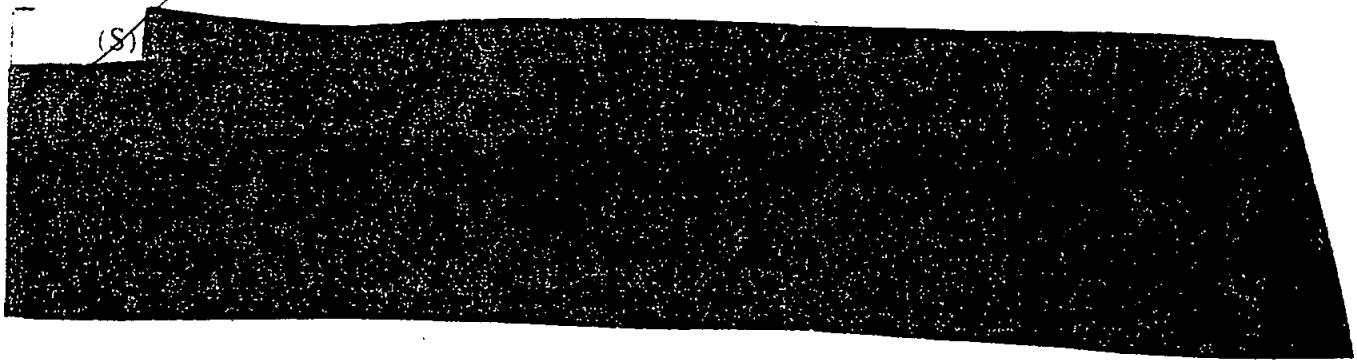
(U) Additional Factors



(U) Summary



(U) LRC-Long



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(U) Summary

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(U) Concurrent Scenarios Beginning Sequentially

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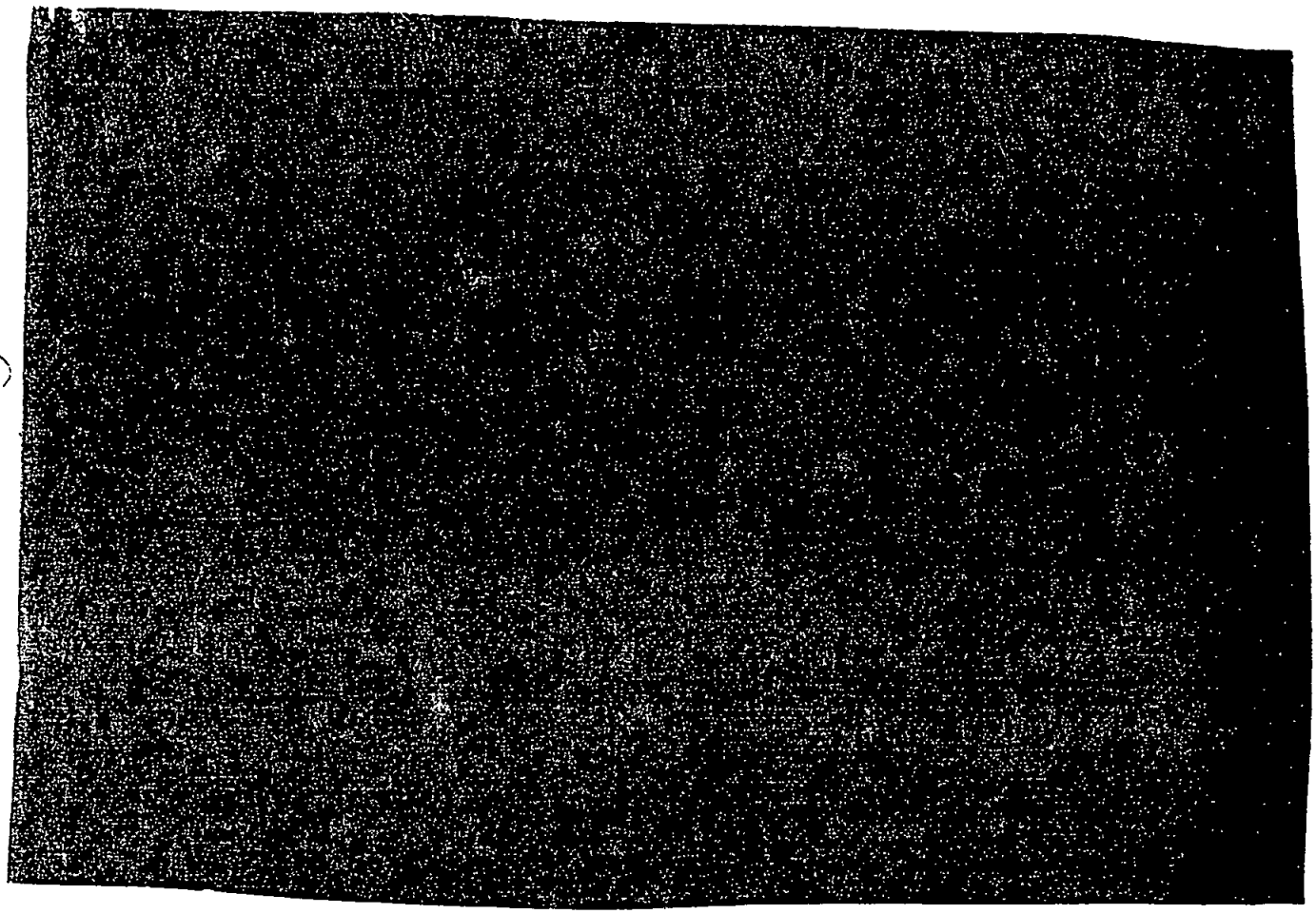
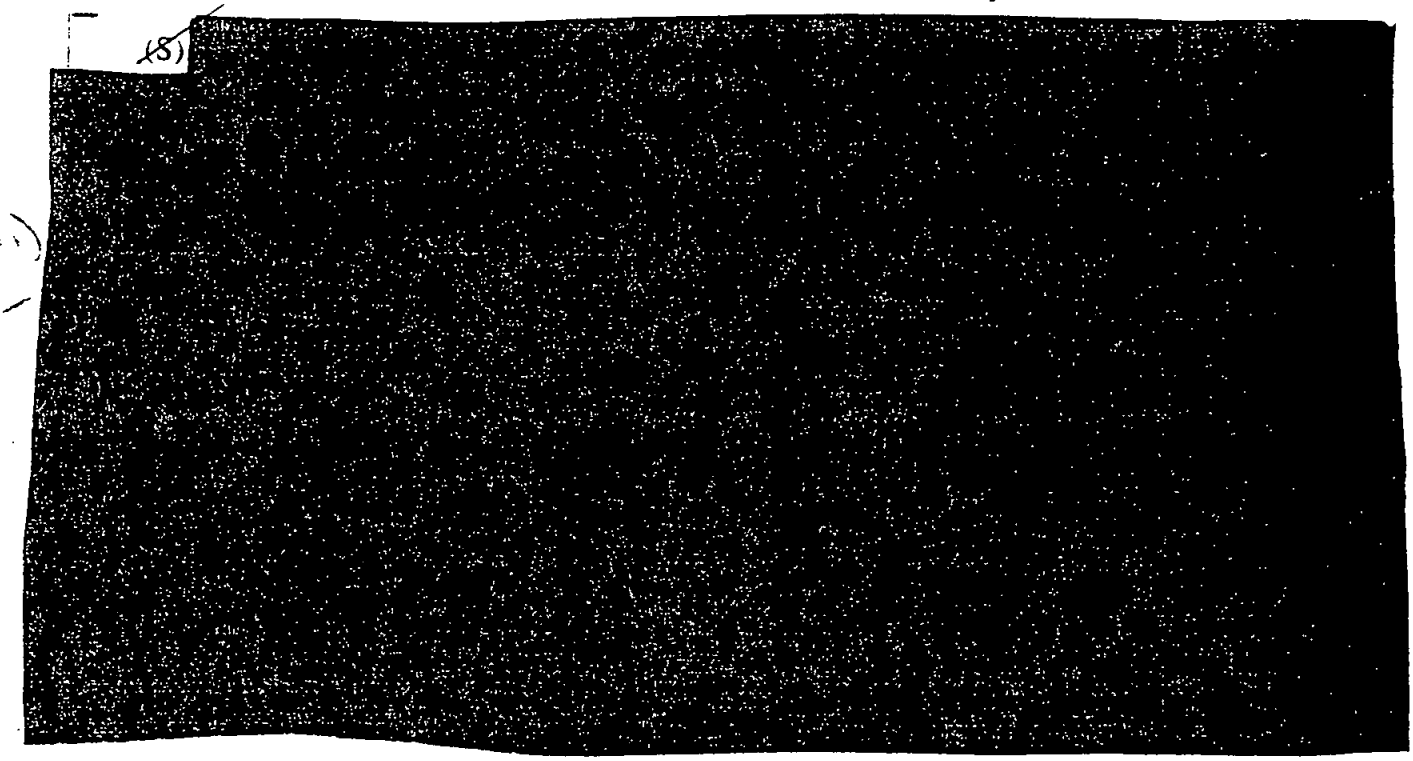
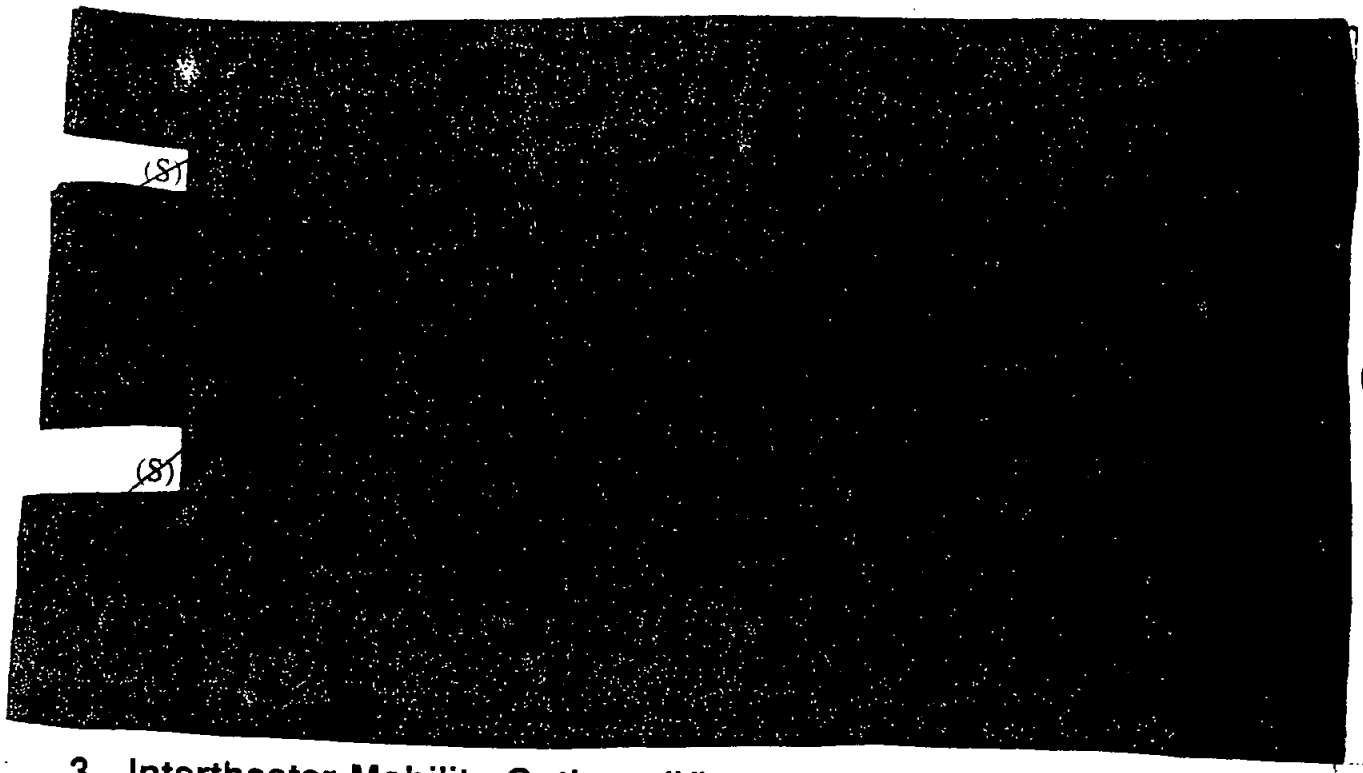


(U) Operations DESERT SHIELD and DESERT STORM Analysis





3. Intertheater Mobility Options (U)

(U) General

(S) To evaluate options in developing the total intertheater mobility requirement and to reach a study recommendation, judgment was applied to the results of the scenario and historical analyses. The following basic chain of reasoning was applied:

- (U) It is unlikely that the United States will find itself involved in two major regional contingencies at the same time. Therefore, given limited resources, the intertheater mobility requirement is based on responding to only one crisis at a time. The occurrence of two concurrent MRCs beginning sequentially is viewed as an extraordinary situation requiring extraordinary measures; e.g., using CRAF Stage III and coercive requisitioning of sealift assets to improve the capability to respond to the second contingency.

- (U) The intertheater mobility requirement is based on the MRC-E scenario (Case D force closure profile), the most demanding region where vital US interests are clearly at stake. The MRC-E scenario is the only one in that force delivery profiles achieved by programmed FY 1999 mobility assets run high risk.

- (U) Mobility assets that meet the mobility requirement for the MRC-E scenario provide adequate capability for MRC-W and for other major regional contingencies in the uncertain future.

- (U) The airlift and amphibious components of the MRC-E required force provide adequate capability to deploy forces for lesser regional contingencies in the uncertain future (with completion of the C-17 Program).

(b)(1)
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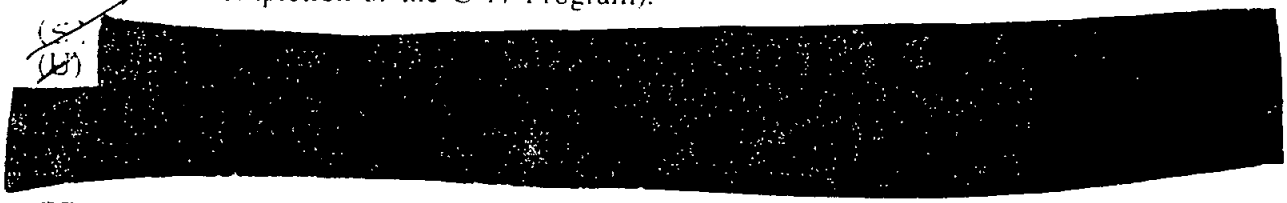
- (S) (b)



- (U) Above these thresholds, it is more important to reduce the early risk, so that key objectives will be defended, than it is to reduce late risk, when there are many more mobility options available to close forces into theater.

- (U) Affordable MRS options favor afloat pre-positioning over airlift to solve early delivery shortfalls because of the reduced cost. Although the study looked at adding airlift capability in some cases, it did not systematically analyze alternative airlift fleets. The study considers afloat pre-positioning more flexible than land-based pre-positioning but less flexible than airlift, for meeting early delivery requirements.

- (U) Table IV-17 summarizes the criteria (derived from warfighting analysis) used in analyzing various options to determine risk.

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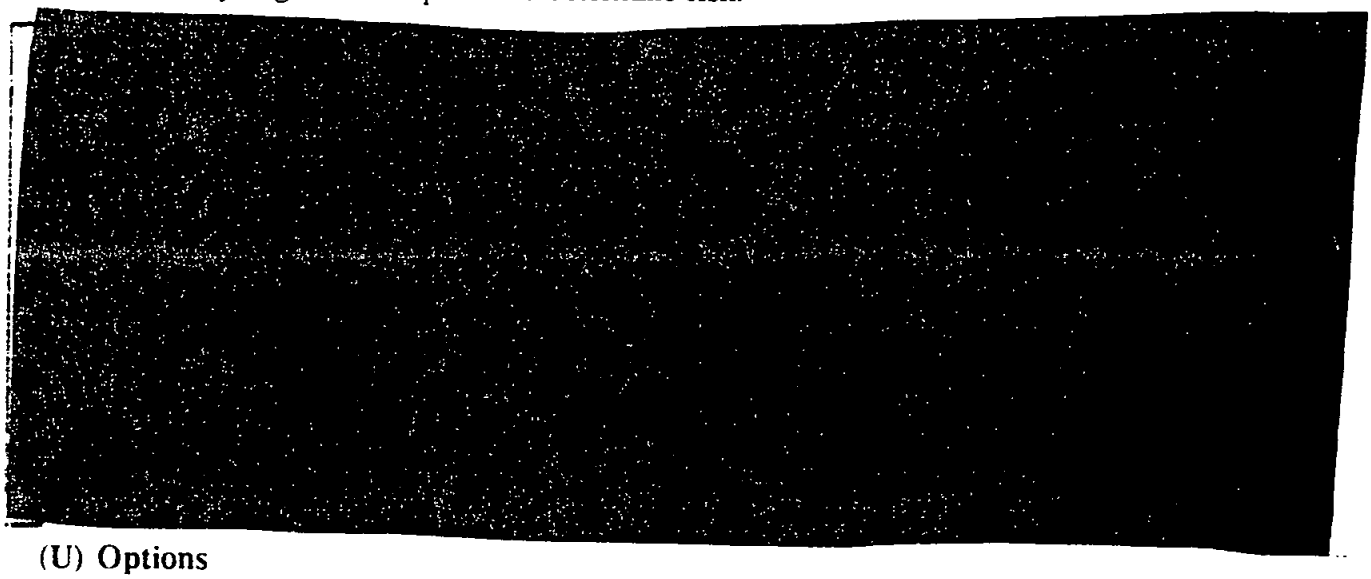
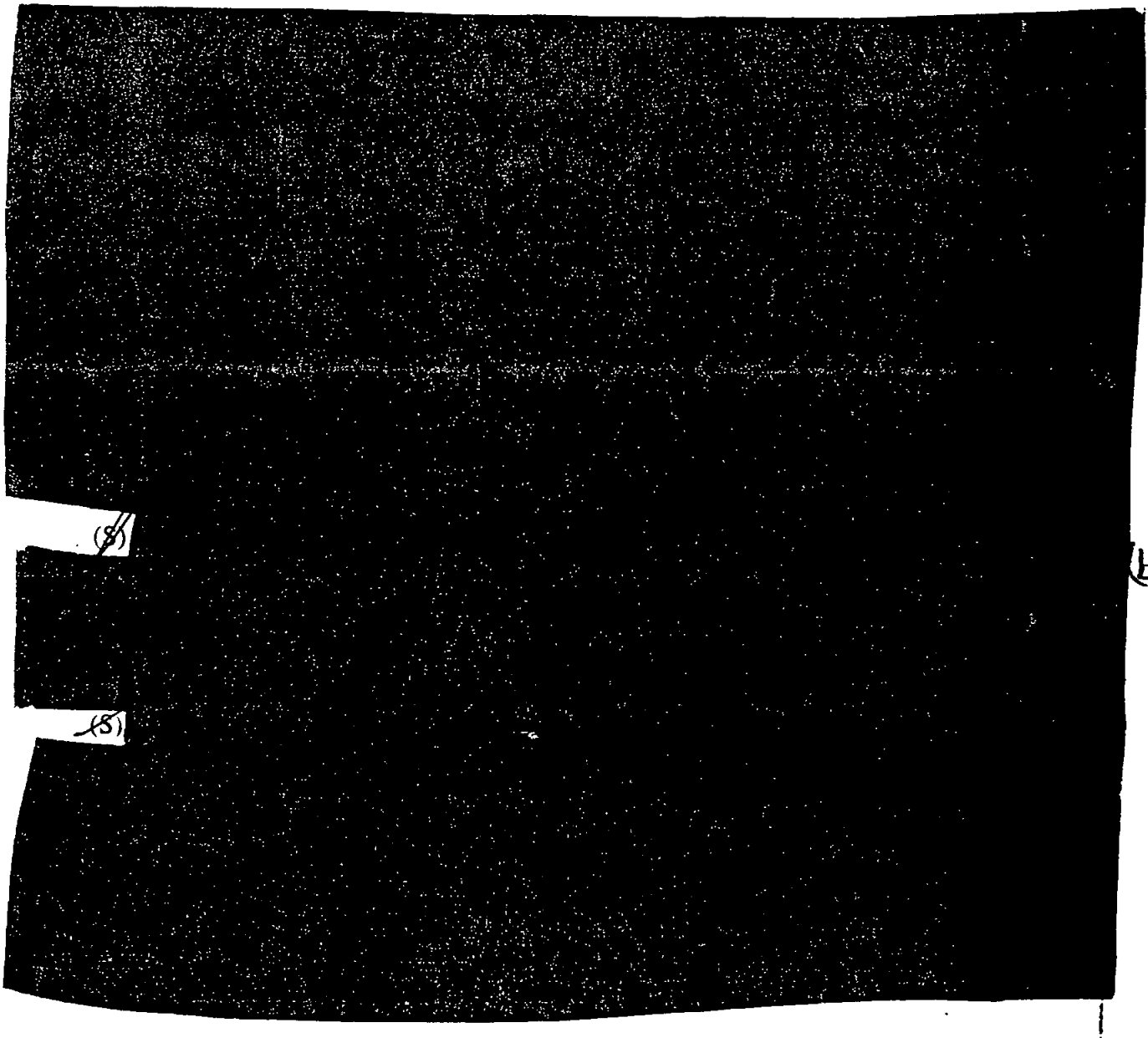


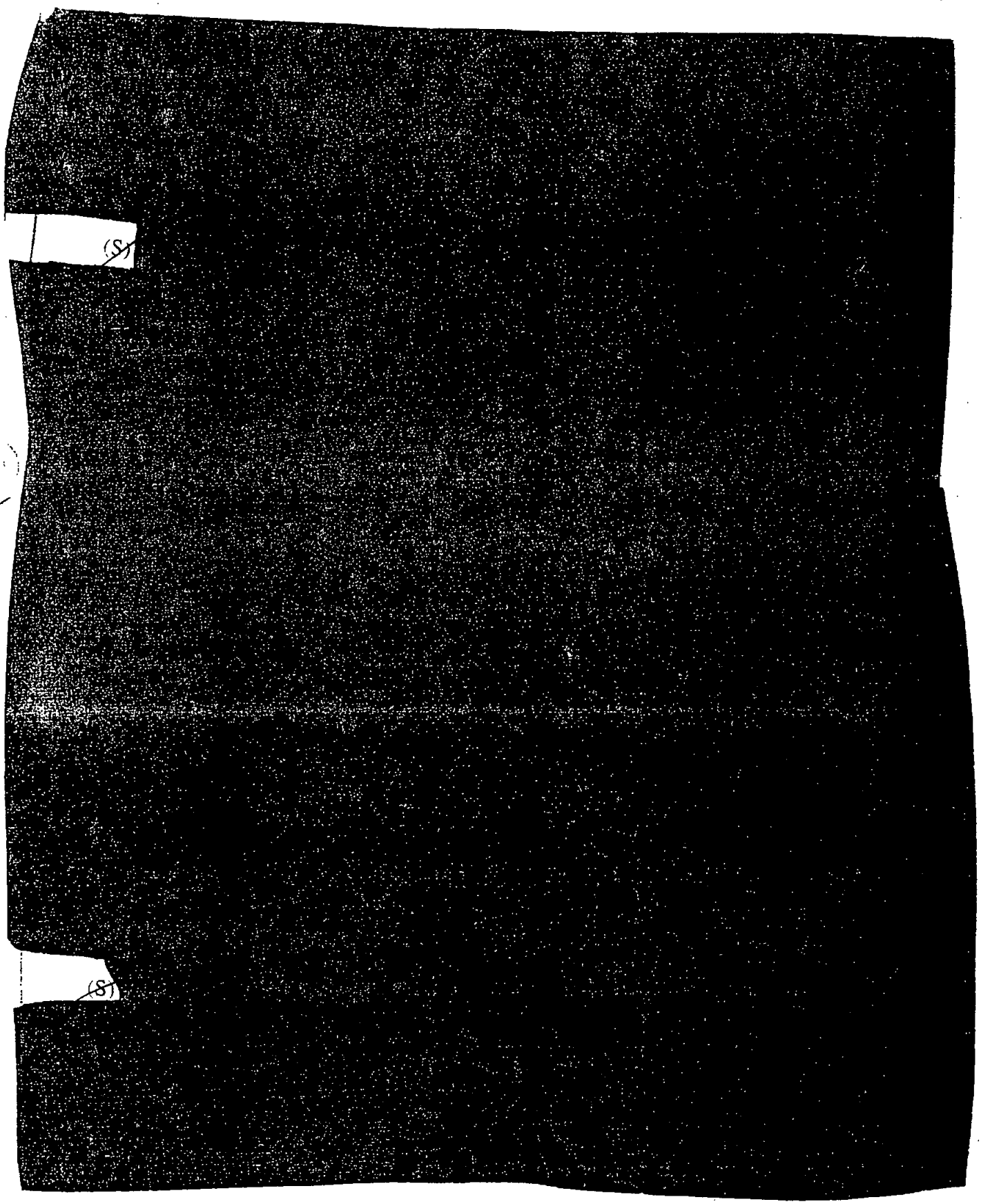
(U) Options

(U) During the course of the study, 13 options were analyzed to determine their capability to close combat and support forces in the MRC-E scenario. Risk was evaluated based on the effect that the delivery of the forces had on warfighting outcomes. The cost of each option was calculated based on a 6-year average (the time necessary to procure the largest option). For comparison purposes, each option was given a "confidence rating." Confidence is the inverse of risk, and the confidence rating combines early, reinforcement, support, and late risk. Heavier weight is assigned to early risk, and support risk is considered throughout the delivery period. Most options were eliminated by inspection because they were either

low-confidence options or they had a lower confidence rating at a higher cost than other options. Ultimately, three options were selected. The low-confidence/high-risk option provides fundamental enhancements to the RRF and continues the procurement of the C-17 program, both necessary first steps in building the other two options. The other two options (medium-confidence/moderate-risk and high-confidence/moderate-risk) provide for the pre-positioning afloat of a combat heavy force that can be used to reduce risk in the geographic area from the Middle East to Korea, and they hedge against optimistic assumptions about warning. They differ in the timeliness with that they deliver the combat and support forces, the level of pre-positioning, and the amount of early, reinforcing, and late risk and the level of support that is accepted to reduce cost.

(U) Table IV-18 summarizes the important characteristics of the final three options. Each of these options provides an increase in mobility over present capability and currently programmed improvements.

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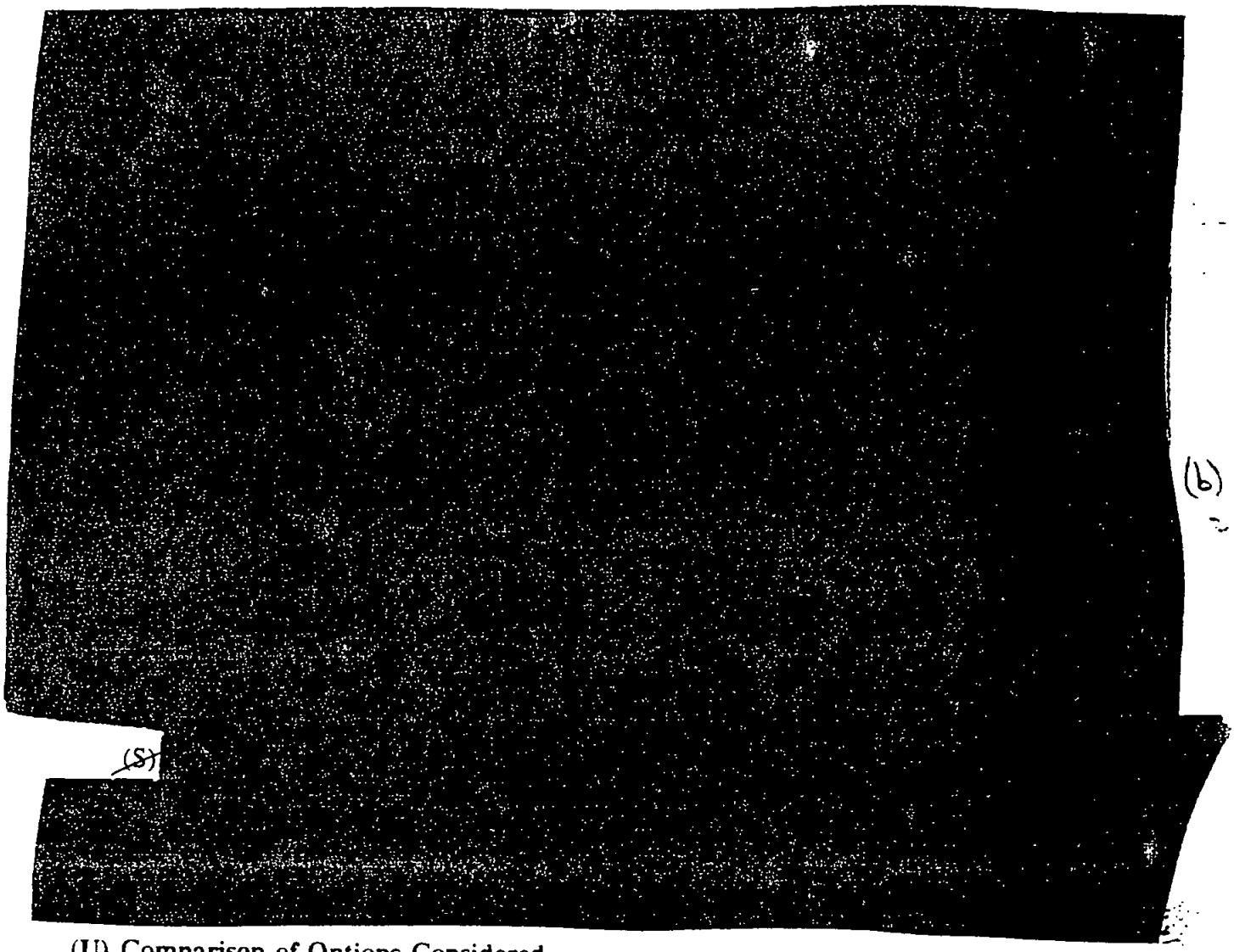


(U) Comparison of Options Considered

(U) The following section shows the three options in detail with their associated costs. All costs are expressed in then-year dollars (adjusted for inflation) and are in addition to the FY 1993-1997 program submitted with the FY 1992 budget, the approved C-17 program through FY 2001, and the sealift funds appropriated in FY 1990-1992 ($1.875 B).

(U) Low-Confidence/Low-Cost Option: Attaining and maintaining the FY 1999 mobility baseline.

- Completes the C-17 programmed buy of 120 aircraft
- Enhances the RRF to the FY 1999 baseline by:
  - — Acquiring 19 additional RO/ROs by 1996.
  - — Acquiring 2 additional T-ACSs by 1995.

— Acquiring 20 additional tankers by 1997.
— Acquiring 3 OPDS ships.

- Increasing the RRF readiness:
  — 36 ships in an ROS-4 status that provides:
    — No requirement for shipyard activation.
    — Outporting near seaport of embarkation.
    — Cadre crew aboard.
    — Conducting of annual sea trials.
  — 27 ships in an RRF-5 status that provides:
    — Outporting near shipyard activation point.
    — 2-man maintenance crew aboard.
    — Annual alternating sea and dock trials.
  — 41 ships in an RRF-10 and 20 status that provides:
    — Annual alternating sea and dock trials.
  — Implementing a Merchant Mariner Reserve Program.

	Total thru FY 99	Avg thru FY 99	High	Low
Costs	$0.82 B	$0.12 B	$0.49 B	$0.0 B

(U) Attaining and funding the baseline provide the underpinning of the remaining options. The study anticipates that MARAD will obtain the additional militarily useful ships for the RRF on the open market from the lowest bidder. If prices on the open market are not favorable, purchases can be delayed. The study recognizes there is a limited and shrinking pool of available assets as well as limited capabilities (size and speed) within the pool. Consequently, to the extent that MARAD is unable to meet the specifics of the option, adjustments in the remaining options will have to be made to maintain an equivalent capability. This option is a low-confidence option.

(U) As described further in Section VIII, as C-141s continue retiring after the turn of the century, the military airlift capability falls below that used in this study by 5 MTM/D. To maintain this medium level of confidence capability to the extent this level of airlift may be required, in the mid-1990s the Department of Defense will have to consider a number of options such as extending the current C-17 program by approximately 34 (PAA) aircraft, utilizing CRAF Stage III, chartering, procuring of other aircraft, or some combination thereof.

(U) Similarly, decisions to maintain the DOD sealift capacity, as the RRF ships begin to obsolesce, will have to be made by the turn of the century.

(U) The above program is notional since there may be other alternatives, such as a build and charter program or the use of national defense features on commercial ships, for providing the same capacity and delivery profile for the end of the middle delivery period and the late delivery period at lower cost. These alternatives need to be studied and compared during the acquisition process.

(U) Medium-Confidence/Medium-Cost Option: Provides a heavy combat force early, rapid reinforcement, moderate support, and moderate to high, but acceptable, late risk.

(S) [redacted] (b)(1)-2

- Low-Confidence/Low-Cost Option plus:
  - — Acquires 9 pre-positioning configured LMSRs.
  - — Acquires 11 LMSRs for surge (rapid reinforcement) sealift.
  - — Acquires 2 containerships for pre-positioning.
  - — Pre-positioning of combat (minimum of heavy brigade equivalent) and support equipment (2.0 million sqft).

	Total thru FY 99	Avg thru FY 99	High	Low
Costs	$6.98 B	$1.00 B	$1.57 B	$0.60 B

(S) [redacted] (b)(1)-2

(U) High-Confidence/High-Cost Option: Provides a heavy combat force early, rapid reinforcement, moderate support, delivery on time)

(S) [redacted] (b)(1)-2

- Low-Confidence/Low-Cost Option plus:
  - — Acquires 15 Pre-positioning configured LMSRs.
  - — Acquires 17 LMSRs for surge (rapid reinforcement) sealift.
  - — Pre-position combat (minimum of a heavy brigade equivalent) and support equipment (3.4 million sqft).

	Total thru FY 99	Avg thru FY 99	High	Low
Costs	$10.47 B	$1.50 B	$2.05 B	$1.10 B

(S) [redacted] (b)(1)-2

4. Recommendation (U)

(U) Each of the options represents an improvement over the currently programmed mobility capability. While the LC/LC option is relatively inexpensive, it meets none of the decision criteria and is a high-risk option. The other two options meet to varying degrees all of the decision criteria. The decision therefore becomes a matter of cost versus confidence. The average annual cost of the MC/MC option through 1999 is an additional $1.0 B, while the cost for the HC/HC option for the same period averages $1.50 B per year. However, the HC/HC option provides the capability to close the combat forces 10 days earlier and it provides a higher level of support throughout the delivery period.

(U) The study recommends the medium-confidence/medium-cost option as the best balance among intertheater requirements, levels of confidence in successful outcomes, and costs. It will provide a sufficient intertheater lift capability to respond adequately to most contingencies.

5. The Recommended Intertheater Mobility Program (U)

(U) The study recommends that the pre-positioning program consist ultimately of 9 new large (notional size - 300,000 sqft), medium-speed (24-knot sustained) RO/RO ships (LMSRs) and 2 medium-speed (22-knot sustained) container ships (notional size of 2,000 TEU capacity). New ships would not be delivered until 4 years after initial contract dates. Therefore, the study recommends an interim pre-positioning package based to the extent possible on large, 24-knot sustained speed ships procured from the commercial market and converted in US shipyards to LMSRs in the pre-positioning configuration. If there is a shortage of these ships, then the difference can be made up with large, 20-knot sustained ships, chartered short-

term through MSC, with options for charter extensions and to buy. Once the new construction ships come on-line beginning in 1996, the large 24-knot ships can be used for surge sealift. The purchase options on the leased ships can be executed and the ships put in the RRF or the leases allowed to expire.

(U) To begin a notional afloat pre-positioning program in the near term using chartered ships would require outlays of an estimated $0.292 B thru FY 1996. These costs include maintenance of Army equipment and charter costs of ships. Actual costs would depend on the size of the ships obtained for the program.

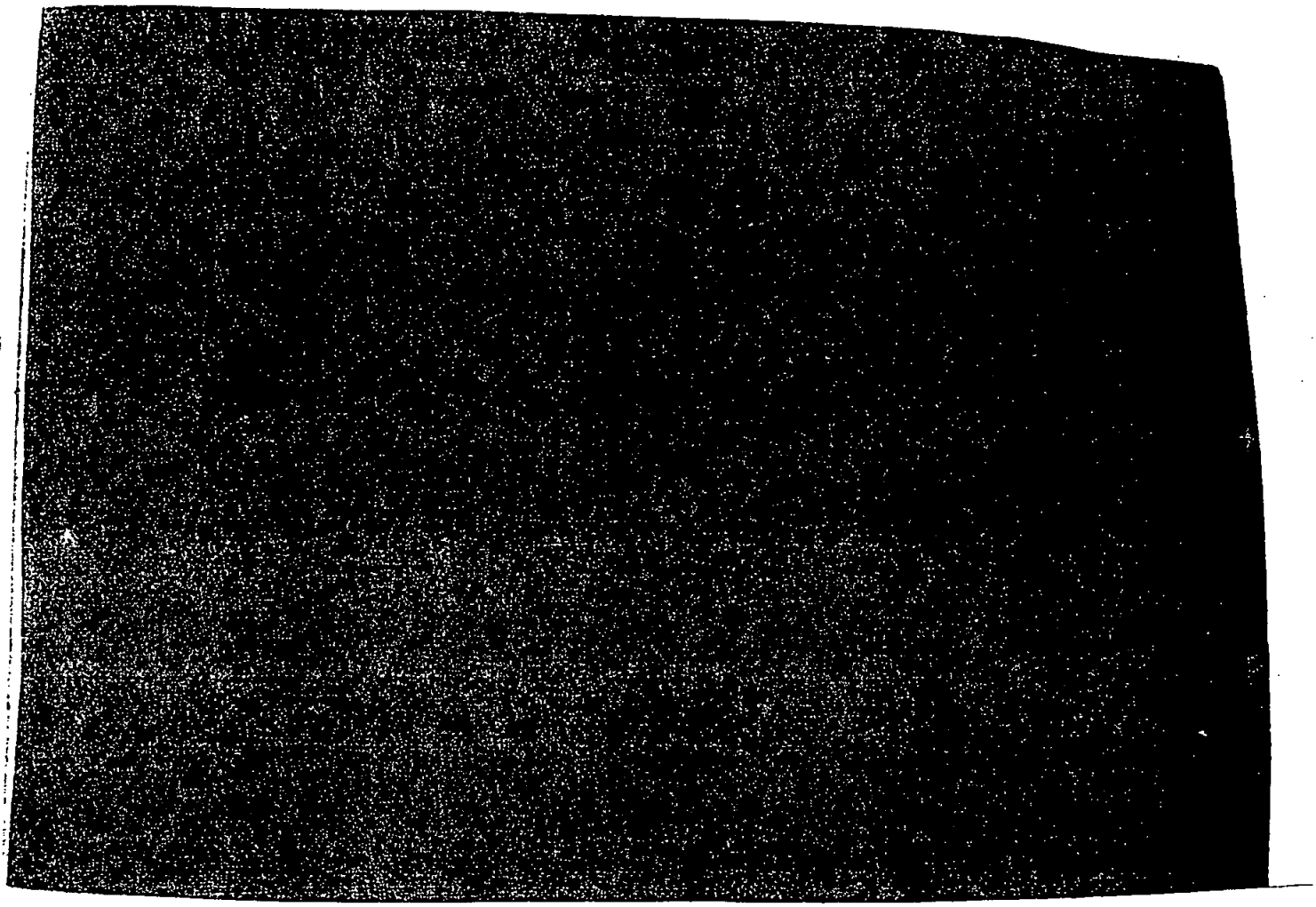
(U) For medium-confidence rapid reinforcement (surge) capability, the study recommends procurement of 11 large (notional size - 380,000 sqft), medium-speed (24-knot sustained) RO/RO ships (LMSRs), outported near their respective embarkation ports. A portion of these can be 24-knot sustained speed ships acquired from the commercial market and converted for military cargo. These could include the ships converted for the interim pre-positioning program as they are replaced by new construction pre-positioning ships. The remainder of the fleet will be new construction.

(U) The pace of building the pre-positioned force package and the rapid reinforcement force package will be dictated by evolving strategic realities and sound business decisions based on availability of suitable ships for conversion and charter, and on efficient procurement. The study recommends that both packages be built concurrently within fiscal constraints. While the study acknowledges these ships and their characteristics are notional and prudent procurement decisions may alter their size and delivery profile, the minimum criteria necessary to meet the intent of the study's recommendation are:

- (U) Ships procured to meet the pre-positioning and surge recommendations must be capable of at least a 24-knot sustained speed.

- (U) No more than one-ninth of an Army division's combat equipment may be carried on a single ship (necessitating a minimum of 10 newly procured, 24-knot sustained-speed, surge LMSRs).

(U) Figure IV-10 provides a notional program to implement the medium-confidence/ medium-cost option that enhances the RRF, acquires 20 new ships constructed or converted in US shipyards, and charters two container ships for pre-positioning resupply and ammunition. Pre-positioned unit equipment acquisition costs are not addressed in the program. It is assumed that there will be modernized equipment available as the Army reduces to 12 active divisions. It is recognized, however, that an equivalent Reserve component unit may not be modernized as early as would be the case without pre-positioning. This program is a conservative and notional projection. Innovative, smart contracting and skilled management should reduce expenditures.



Part V. AMPHIBIOUS LIFT (U)

1. Background (U)

(U) Amphibious forces provide the National Command Authorities with unique and flexible crisis response capabilities. They are unique in that ship-to-shore mobility systems permit rapid projection ashore of combined arms forces. They are flexible beeause they carry everything needed to fight: troops, combat vehicles, ammunition, and sustaining supplies. Amphibious forces provide a tangible US forward presence without forward bases.

(U) Amphibious forces deployed to a crisis area allow power projection without actually committing US forces ashore. Further, if crises require greater levels of combat power, amphibious forces possess a forcible entry capability to secure airfields and ports for the introduction of follow-on forces.

(U) The Department of the Navy's Integrated Amphibious Operations and USMC Air Support Requirements Study (DON Study), signed by the Secretary of the Navy in April 1990, provides a comprehensive basis for decisions on required levels of amphibious lift capability. This study examined in detail the role of amphibious lift in a variety of contingencies ranging from peacetime forward presence through three different levels of missions and capabilities. Refer to Table V-1.

Table V-1. Mission Levels and Capabilities (U)

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Mission Level	Mission Capabilities	Contingency Force	Forward Deployed	Amphibious Lift (Deployment)
Regional War	Sustained effort in one theater Minimum capability in remaining theater	1 MEF AE and 1 MEB AE in other theater		1 MEF AE and 1 MEB AE
Contingency II (similar to Major Regional Contingency cases)	Two-ocean ready crisis response	2 MEB AEs	1 MEU	3 MEB AEs or 1 MEF AE (-)
Contingency I (similar to Lesser Regional Contingency cases)	Two-ocean presence Limited crisis response	1 MEB AE	2 MEUs	2 MEB AEs (+) or 1 MEF AE (-)

MEF = Marine Expeditionary Force
MEB = Marine Expeditionary Brigade
MEU = Marine Expeditionary Unit
AE = Assault Echelon

(U) Aggregate amphibious lift capacity is computed based on so-called "fingerprints" of a notional MEB. These fingerprints correspond to the five main lift categories: numbers of troops, square feet of vehicle stowage area, cubic feet of cargo stowage space, numbers of

vertical takeoff and landing aircraft deck spots, and numbers of air-cushion landing craft (LCAC) deck spots. Appropriate multiples of these fingerprints for a notional MEB, compared to the particular capabilities of each specific amphibious ship in the fleet, produce the aggregate amphibious lift capability. Holding the notional MEB constant, Figure V-1 compares the capacity needed for MEUs, MEBs, and MEFs. For example, it takes 3.2 MEBs of LCAC capacity to equal the LCAC requirement for one MEF.

	TROOPS	VEHICLE STOW (SQ FT)	CARGO STOW (CU FT)	AIR SPOTS	LCAC SPOTS
MEF (AE)	37,800	870,000	1,360,000	460	78
MEB (AE)	13,500	300,000	560,000	185	24
MEU	2,800	6,200	160,000	47	6

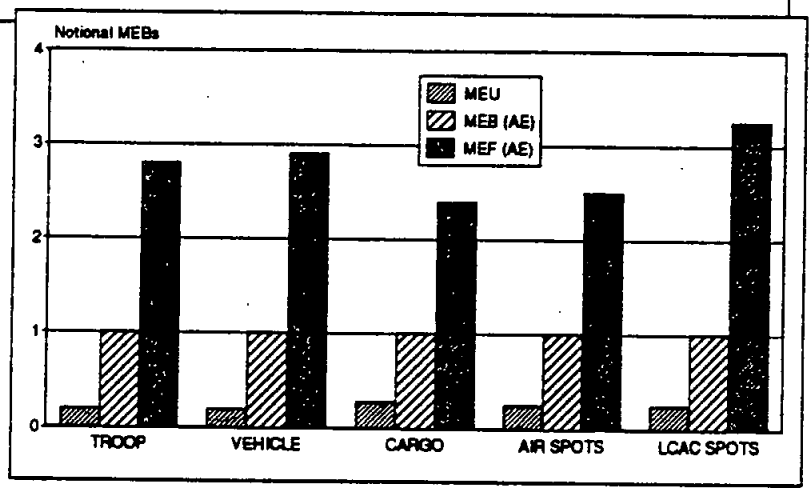

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Figure V-1. Amphibious Lift Fingerprints (U)

2. Methodology (U)

(U) The Mobility Requirements Study (MRS) examined a set of scenarios to determine the requirements for amphibious shipping. Those requirements were compared to the amphibious lift provided for in the FY 1992-1997 Program Force; and shortfalls, if any, were identified. The study also determined the requirements for Assault Follow-On Echelon (AFOE) shipping.[1]

[1] The shipping required for that echelon of the assault troops, vehicles, aircraft equipment, and supplies that, though not needed to initiate the assault, are required to support and sustain the assault. In order to accomplish its purpose, it is normally required in the objective area no later than 5 days after commencement of the assault landing.

(U) In addition to crisis response and warfighting, amphibious lift plays an important role in meeting the day-to-day demands for forward presence in widely separated parts of the world. This study did not examine amphibious lift from the point of view of peacetime forward presence requirements. Amphibious lift assets used for forward presence are not considered strategic mobility assets, but rather they are considered naval force structure, operating as part of naval task groups. Forward presence requirements are a separate study, and analysis may result in different recommendations of amphibious force levels.

3. Analysis of Requirements (U)

(U) Analysis Results

(S)(NOFORN)

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(U) Assault Follow-On Echelon Shipping

(S)(NOFORN)

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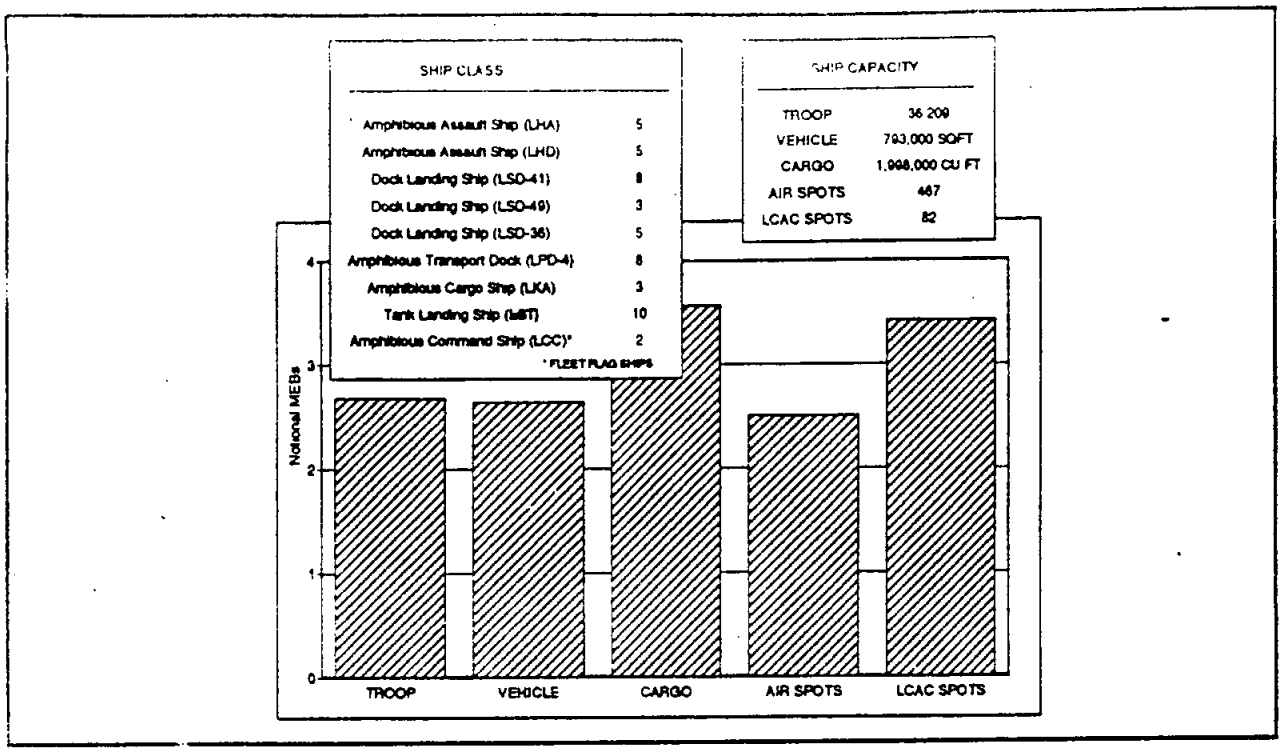

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Figure V-2. FY 1997 Program Force Amphibious Lift Capability (U)

[redacted]

[2] Ships in Reduced Operating Status require no shipyard activation work, are outported at or near the proposed seaport of embarkation, can be available at that port by the fourth day after activation, have a cadre crew onboard, and conduct annual sea trials. Ships in RRF-5 status are outported near a required shipyard activation point, can be available by the fifth day after activation, and have a two-man maintenance crew onboard.

4. Conclusions (U)

(U) ~~(S)(NOFORN)~~ The FY 1992-1997 Program Force provides sufficient amphibious lift to meet the contingency response requirements of the scenarios examined in the MRS. Consequently, no change to the Program Force is recommended.

~~(S)(NOFORN)~~ [redacted] (b)(1)

(U) Amphibious force requirements to cover forward presence missions may be different, requiring an increase in amphibious lift capacity.

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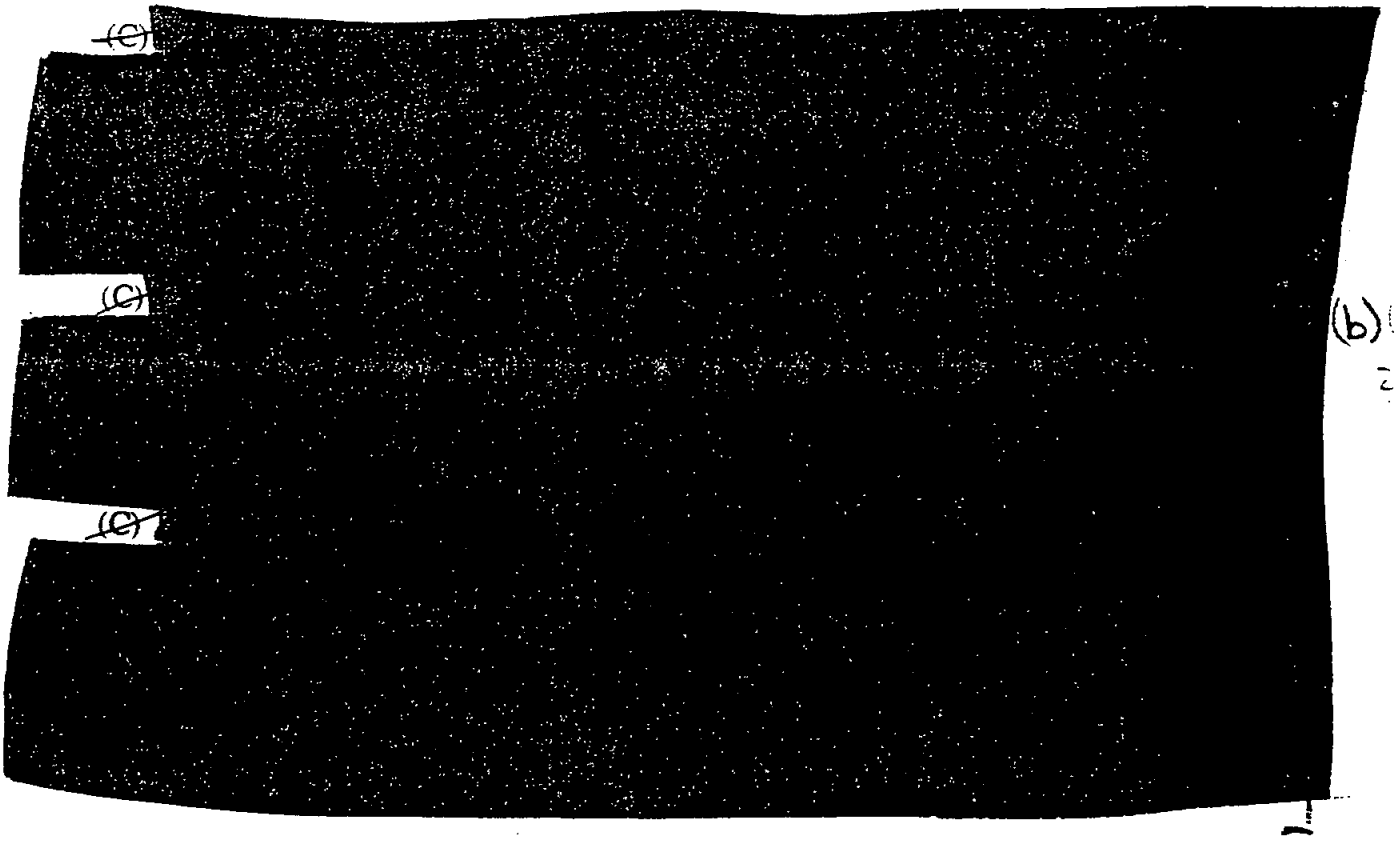
Part VI. INTRATHEATER LIFT REQUIREMENTS (U)

1. Methodology (U)

(U) A two-pronged analysis of intratheater requirements is being conducted. First is a quantitative analysis by an interdisciplinary group led by the Assistant Secretary of Defense (Program Analysis and Evaluation). This effort is still ongoing and will not be completed in time to be included in this volume. The results will be included in Volume III. The second analysis of intratheater mobility requirements is based on a comparison of the scenarios modeled in the Worldwide Intratheater Mobility Study (WIMS) (completed in 1988) and those used in the Mobility Requirements Study (MRS).

2. Results (U)

(U)
(C) WIMS and MRS scenarios yield different requirements.



(U) For the first time in US history, in Operation DESERT STORM, heavy-equipment transporters were employed at the operational level of war. Heavy armored forces were transported to positions where they arrived in a state of readiness able to place maximum combat power at decisive points and times.

(U) Successful operations during Operation DESERT STORM are driving a rapid reevaluation of ground transport doctrine. Further analysis of doctrinal adjustments is required prior to publishing final recommendations on further intratheater ground transportation requirements.

Part VII. CONUS REQUIREMENTS AND SOLUTIONS (U)

1. Background (U)

(U) Methodology

(U) The focus of the CONUS analysis is the movement of units and equipment from their peacetime locations to designated seaports of embarkation (SPOEs). The ports selected are limited in number to consolidate shiploads. The analysis uses standard planning factors that were updated to incorporate lessons learned from Operations DESERT SHIELD and DESERT STORM.

(U) This analysis examines deployments to Southwest Asia and Korea. Requirements to move units, equipment, and supplies to ports are compared to the delivery capacity of existing CONUS infrastructure. Shortcomings are identified in the following areas:

- (U) Installation outloading capabilities and procedures at selected origins.
- (U) A west coast container ammunition outloading capability.
- (U) Adequate quantity and types of berths at key ports of embarkation.
- (U) Adequate quantity and responsiveness of port operators to support cargo flow.
- (U) Congressional authority to ensure priority use of commercial transportation facilities and services and early availability of Transportation Terminal Units (TTUs).

2. Installation Outloading (U)

(U) Background

(U) Installation outloading is a complex issue involving many cargo characteristics and multiple modes of transportation. The time available to outload cargo from installations varies by scenario. It is driven by the required delivery date of the cargo in theater minus the time it takes to load, transit, and offload. In this analysis, shortfalls are identified by comparing the time required to complete outloading against the time available. Additional assets are needed to close the shortfall.

(U) Analysis

(U) The analysis compares the benefits of different modes of moving unit equipment (UE), emphasizing military convoy, rail, and containerization.

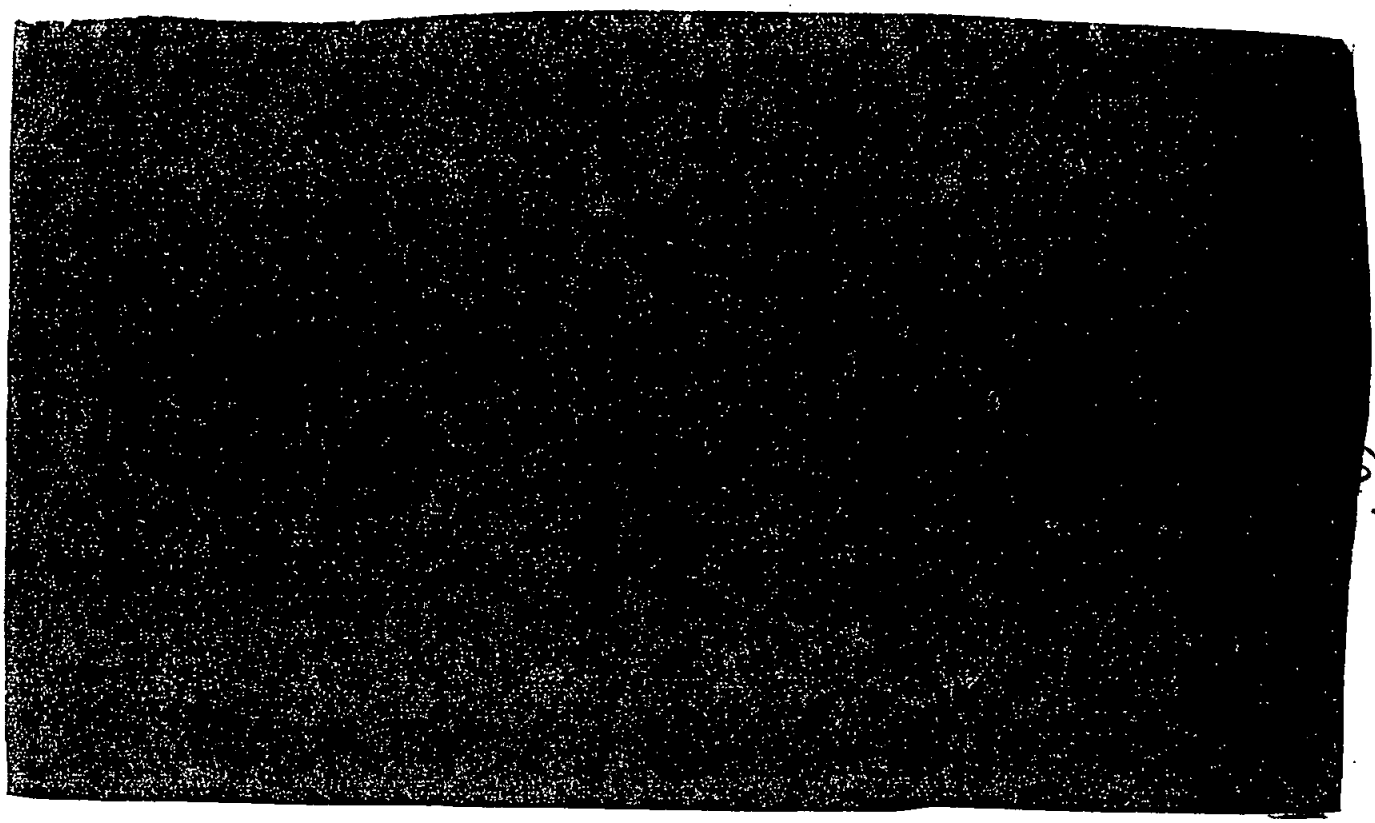
(U) Military convoy is the preferred method of moving wheeled vehicles to ports within 1 day's driving distance (about 400 miles). Military convoy offers the advantages of speed, simplicity, minimal dependence on commercial support, and minimal impact on installation outloading facilities. The disadvantages of additional vehicle maintenance and highway repairs need to be considered.

(U) Tracked vehicles move by rail, primarily using heavy-duty railcars owned and managed by the Armed Forces. Future armored systems will increase the requirement for heavy-lift railcars as more vehicles exceed the lift capability of standard commercial flatbed railcars, whose inventory is decreasing.

(U) Increased use of containers will be necessary in the future to match trends in the shipping industry. Though the deployment of combat forces is best supported by RO/RO ships, a portion of combat support (CS) and combat service support (CSS) equipment is well suited for containerization. Approximately 25 percent of the CS and CSS UE—about 3 million sqft or the equivalent of nearly 60 breakbulk ships or 30 RO/RO ships (100,000 sqft-capacity)—can be carried on 7 container ships. The current lack of in-transit visibility (ability to track specific contents of each container) and insufficient theater reception capability degrade the usefulness of containers.

(U) Staging transportation equipment at origins improves loading and moving time. Preloading of containers or crates also reduces the outloading time. Prestaging eliminates delays waiting for equipment to arrive, which may take up to 7 days for commercial rail cars and 4 days for trucks, containers, and busses.

(U) The Army will require upgrading in unit readiness to meet the demanding delivery profiles from the fort to the seaport of embarkation (SPOE). Plans for supporting the deployment and training of Army contingency forces are being prepared. These plans will address the timely arrival and reception of forces and supplies at the SPOE, concepts for increased containerization of UE, and requirements for No-Notice Sealift Emergency Deployment Readiness Exercises. These improvements will require increased investments to facilitate rapid Army movements.



(U) Besides improvements at key installations where major combat units are located, improvements are needed at depots, ammunition plants, and other installations that support rapid deployment. The Army is expanding its analysis that began with the key installations identified in Table VII-1 to determine specific improvements required at other supporting installations; however, preliminary estimates are that required improvements may range from $100 to $200 M. Additionally, the Army has identified required improvements in rail and highway infrastructure linking the installations and ports. Initial analysis of installations where the major combat units are located indicates improvements estimated at $45 M are needed to upgrade and repair bridges and widen roads to accommodate rapid movements to the ports. Projects to effect these improvements must be developed in conjunction with the Department of Transportation and the affected state and local governments.

(U) Early requirements for railcars at support installations also will add to the number of pre-positioned railcars indicated in Table VII-1, increasing the total number of pre-positioned railcars to over 500. Furthermore, railroads are not replacing militarily useful, but uneconomical, heavy-lift commercial railcars being retired from the commercial rail fleet. To replace this capability, the Army estimates it will need to procure at least 500 more railcars over the next 15 years.

(U) Recommendations

- (U) Buy and stage 233 heavy-lift railcars as depicted in Table VII-1 at a cost of $43.5 M. Procure an additional 767 railcars at a cost of approximately $100 M to

pre-position at supporting installations and replace projected losses in the present Defense Freight Rail Interchange Fleet.[1]

- (U) Increase the daily railcar loading capacity of key installations at a cost of $19.2 M. Continue analysis of outload infrastructure improvements to include depots, ammunition plants, and other supporting installations and infrastructure linkages. The program to increase outload capacity at these locations has an estimated cost of $150 to $250 M.

- (U) Support and encourage the use of containers. The purchase and positioning of containers and container-handling equipment for CS and CSS units are required to use the ships available in the commercial shipping industry needed to augment the Ready Reserve Force (RRF). Estimated costs for this program still are being developed, but the Army has identified improvements costing about $89 M.

- (U) Increase reliance on military convoy when feasible, as an interim solution for the insufficient number of heavy-lift railcars.

- (U) Increase readiness of Army units through deployment training enhancements. Estimated cost of training enhancements is $194 M between FY 1993 and FY 1999.

3. West Coast Containerized Ammunition Loading Facility (U)

(U) Background

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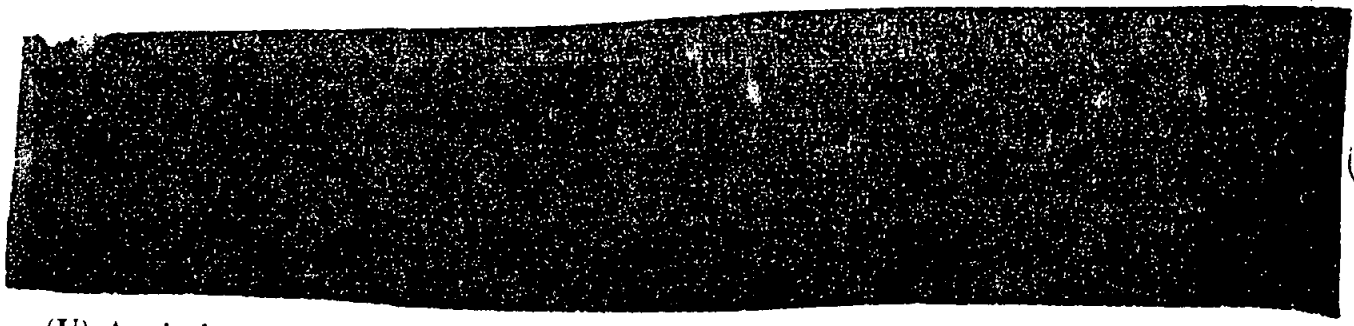
[1] DOD-owned heavy-lift rail cars.



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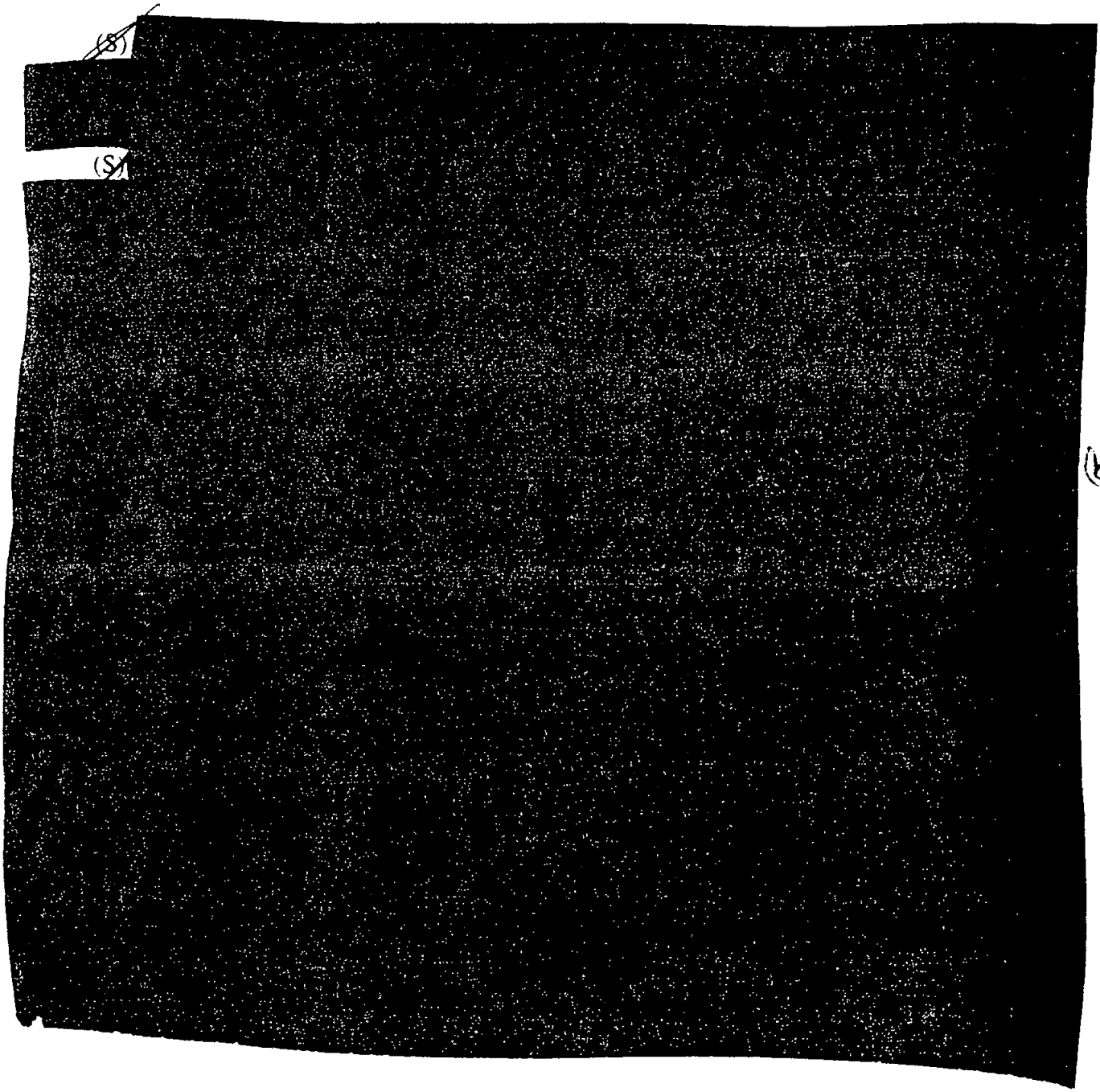

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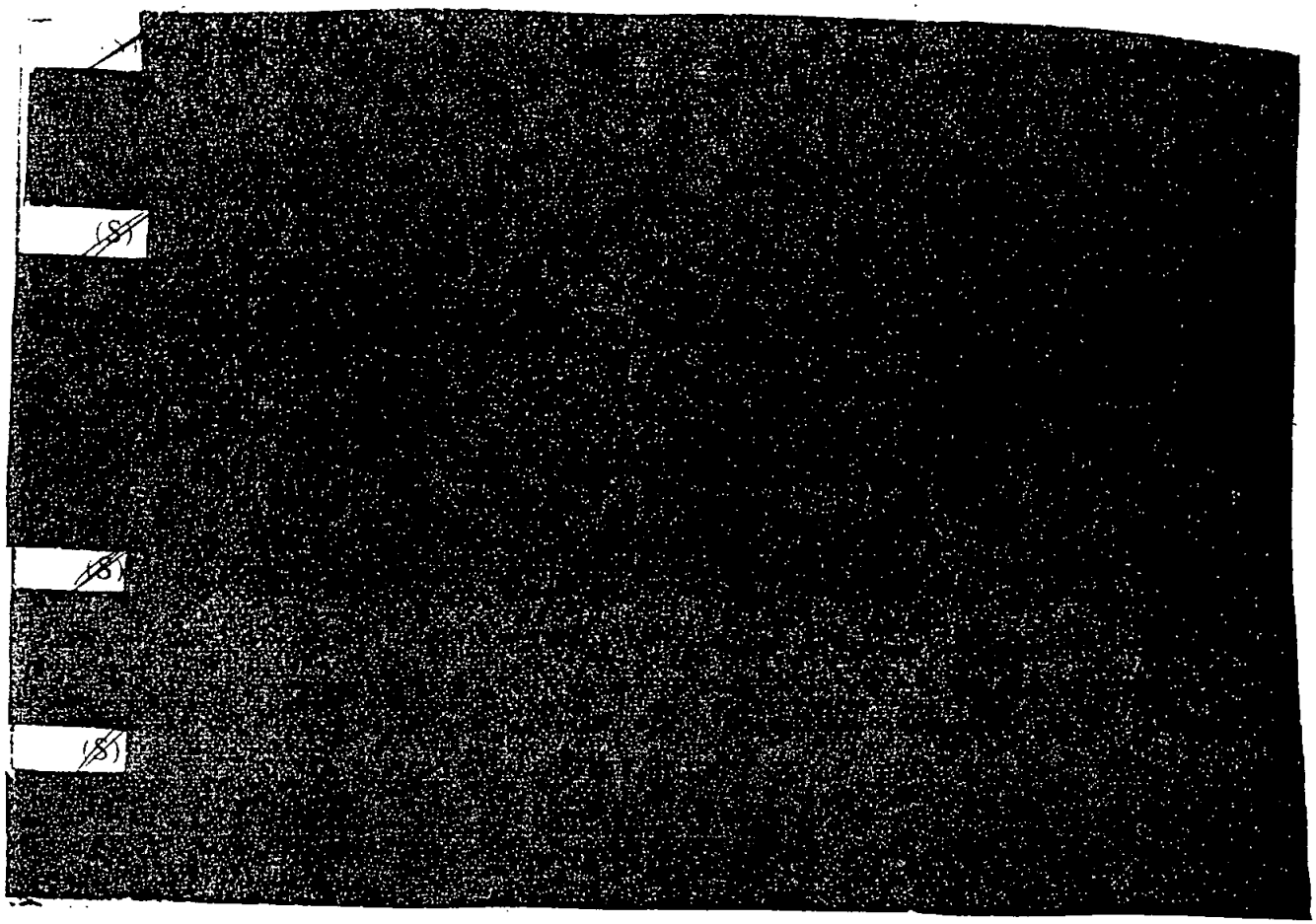
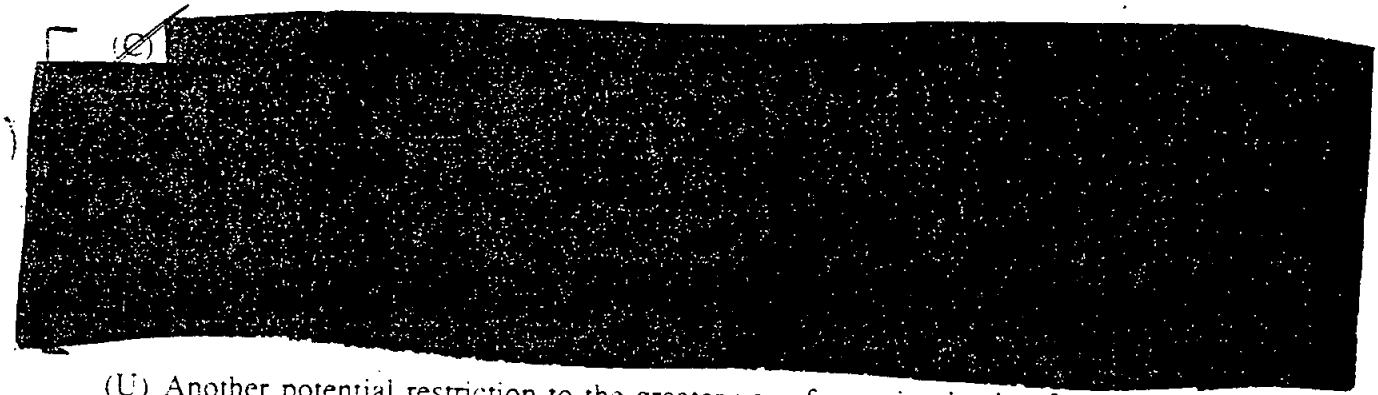


(U) Although adding a west coast containerized ammunition loading facility offers increased flexibility and capability, it is necessary to ensure current ammunition loading port facilities are maintained and enhanced. Army analysis of MOTSU's capability indicates an additional $70 M in facilities upgrading and construction are necessary to permit MOTSU to meet the outload requirements of the Army's force flow, assuming an 80-percent container and 20-percent breakbulk mix.



(U) Another potential restriction to the greater use of containerization for transporting ammunition is the availability of 20-foot containers. Commercial industry favors 40-foot containers; as a result, the number of 20-foot containers is more limited. However, 40-foot containers are not suitable for transporting military munitions. The shortage of 20-foot

containers makes procurement a worthwhile investment. Staging government-owned containers at the depots from which ammunition is drawn will facilitate faster reaction to a contingency.

(U) Theater container reception infrastructure also is required to move the cargo from the port forward to the deploying forces. Depot and theater reception capabilities must support increased use of containers. A balanced program of outloading capability, theater reception, and port throughput is essential.

(U) To contribute to a balanced program, and ensure a total distribution system, the Army needs to modify its program for the Palletized Loading System (PLS) to make additional PLS flatracks and containers compatible with International Standards Organization standards. The cost to accomplish this modification is approximately $60 M, which includes modifying 45,000 PLS flatracks and procuring associated container handling equipment.

(U) Recommendations

- (U) Obtain a west coast ammunition containerized capability of at least the same capacity as MOTSU. The estimated costs for this expanded capability at NWS Concord is $90 M.

- (U) Maintain and enhance current ammunition loading capability at MOTSU at an estimated cost of $70 M.

- (U) Acquire additional 20-foot containers and containerized facilities and equipment to enhance the overall containerized ammunition capability on both coasts as existing breakbulk fleets are retired.

- (U) Complete necessary studies and upgrade the outloading capability at the identified depots to facilitate increased container usage. The estimated cost of these improvements still is being determined.

- (U) Modify Army PLS to accommodate increased containerization of ammunition movement.

4. Port Throughput Capacity (U)

(U) Background

(U) Port throughput capacity must support the flow of cargo as it arrives on a daily basis. MRS analyses show that the flow of cargo will surge early but be completed in a short period of time. Ports selected for each scenario consider the number and types of berths and the origin of the deploying units. The required berths are computed based on the projected daily arrival of cargo at each port and the number of large, medium-speed, RO/RO ships (LMSRs)

required to move that cargo. The flow of cargo is limited only by installation outloading and CONUS transit time.

(U) The port facilities and services to be used in a crisis are identified during peacetime by the US Maritime Administration (MARAD) to promote rapid response when needed through advance communication and coordination. Port Planning Orders (PPOs), negotiated to signify need and intent, are reissued in time of need as either priority service orders or allocation orders. The facilities under a PPO must be in place and adequate to support the flow of cargo delivered to the port and the type of ships scheduled to move the cargo.

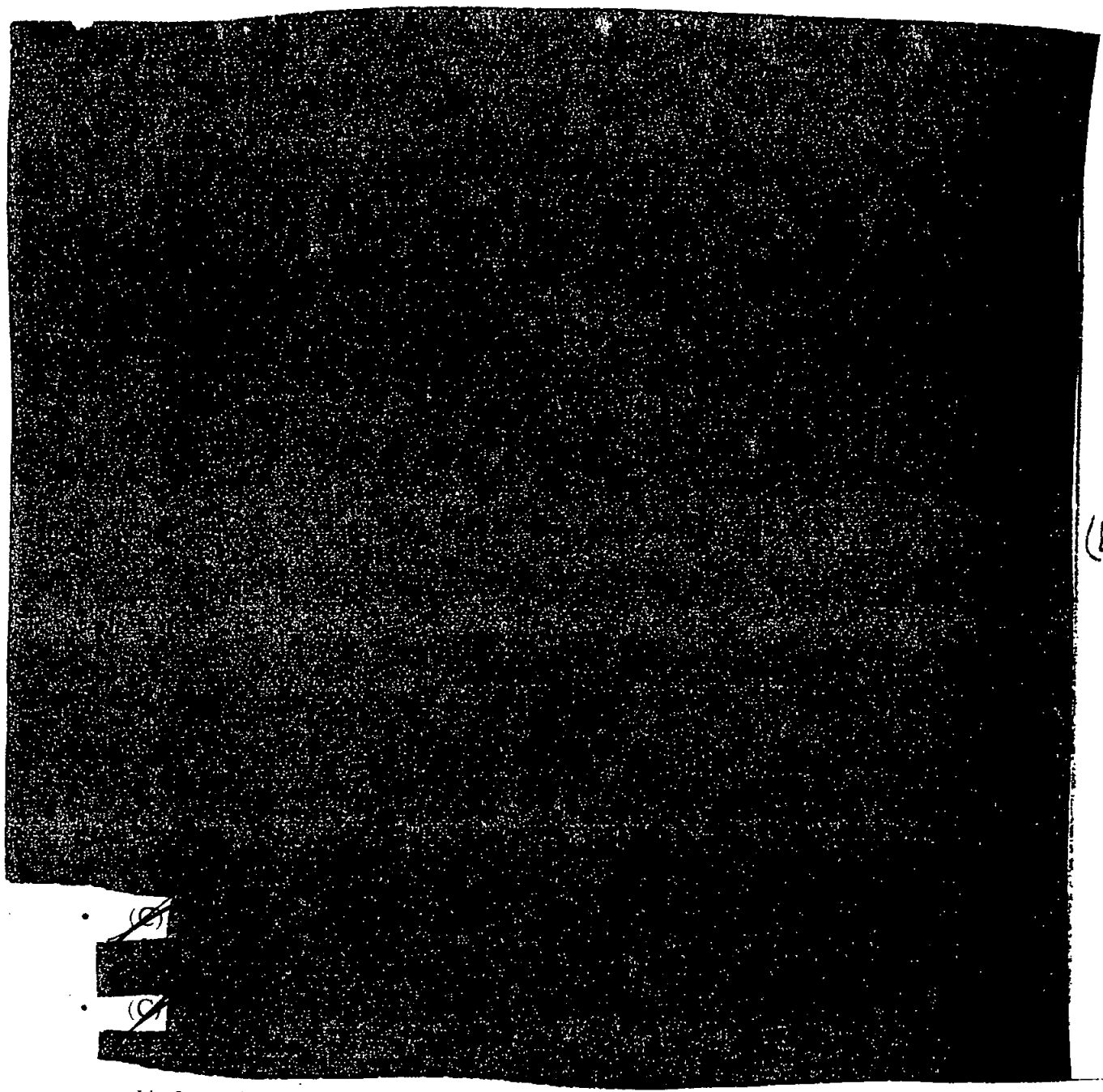
(U) Berths with sufficient size and depth to accept fast sealift ships (FSSs) and LMSRs are limited. Consequently, advanced planning to ensure adequate availability of larger berths is necessary.

(U) The location of the berths is extremely important. Currently, there is a disconnect between berths and deploying unit locations; 13 of 29 RO/RO berths and 11 of 26 FSS berths under PPOs (MARAD prenegotiated agreements for port services and berths) on the east coast are in the port complex of New York, while approximately 85 percent of the units to be deployed originate in southeastern states.

(U) As additional berths are obtained, efforts must be made to increase reception and staging within the port facility to support surge requirements. Army analysis of five key ports indicates improvements of approximately $8 M are needed at those locations.

(U) Recommendations

- (U) Negotiate additional use of existing berths, per Table VII-4, for those ports with adequate capacity nearest the deploying units. Ports that primarily support resupply operations require only container capability. The analysis shows a decreased requirement for breakbulk berths, an increased requirement for properly sited RO/RO and FSS berths, and an increased requirement for container berths. For each type of ship, the table shows the full capacity and number of berths available, the current number of berths under PPOs, and the FY 1999 projected requirement for berths.



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- (U) Investigate initiating a program similar to the Civil Reserve Airlift Fleet program to provide assurance of sufficient port throughput capacity when and where needed.

5. Port Operations (U)

(U) Background

(U) Terminal Transfer Unit (TTU) personnel are critical to port operations and should be in place at the ports before cargo arrives. They are responsible for all aspects of ship loading, to include load planning, contracting commercial support, supervising the actual loading, and

documenting and manifesting the cargo loaded. Operation DESERT SHIELD experience and MRS scenario analysis demonstrated a shortage of TTU personnel.

(U) Currently, port operations are handled through a combination of military ocean terminals and outports and 18 TTUs. Terminals and outports are manned by full-time civilian and active Army personnel; TTUs are manned by Army Reserve component personnel.

(U) Analysis

(U) The ports used in each of the scenarios were compared with the current location of active terminals. Key ports, including Savannah, Jacksonville, and Houston, do not have active military terminals. Relocation of terminals is being studied further.

(U) The predicted port throughput capacity was converted to TTU requirements to support the number of berths being used on the basis of one TTU per three berths. Current Reserve component force levels are not adequate to satisfy all requirements. Two additional TTUs are required to meet the study requirements. The number of TTUs is tied to the number of berths in operation. Consequently, changes in assumptions that increase or decrease the number of ships change the number of TTUs proportionately. Additional Reserve component personnel would be required if a mix of smaller RO/RO or breakbulk vessels were used.

(U) Based on Operation DESERT SHIELD experiences and the speed with which cargo is predicted to flow to the ports in the MRS scenarios, the time to activate Reservists is too long to meet projected requirements. The earliest availability of Reserve TTU personnel is tied to the Presidential 200,000 Selected Reserve callup. If the initial authority is not available in time to provide TTU manning when it is needed, other ways of manning TTUs must be investigated.

(U) Recommendations

- (U) Realign TTUs and locate close to strategic ports that are expected to be used for deploying forces.

- (U) Based on Operation DESERT SHIELD experience and MRS analysis, increase the TTU billet structure from 75 to about 120 personnel. Further study to determine the precise personnel authorizations for each TTU should be completed and authorizations should be adjusted accordingly.

- (U) Review the number of authorized TTUs and adjust to provide support to all key strategic ports.

- (U) In conjunction with the relocation of TTUs, revise callup authority for Reserve TTUs to ensure TTU manning within 24 hours of a decision to deploy from the ports.

- (U) In conjunction with improvements to TTU utilization and availability, develop a Surface Deployment Control Group within each Army Division to facilitate unit deployments prior to the arrival of TTUs.

6. Congressional Authority (U)

(U) A critical element of PPOs is the authority to gain priority use or allocation of berths based on the Defense Production Act of 1950 (DPA 1950). This act is renewed on an annual basis, although it was not renewed or usable during most of Operation DESERT SHIELD. New permanent legislation, or a long-term extension of the DPA 1950, is required to ensure continuous and expeditious use of ports. Port facilities were negotiated during Operation DESERT SHIELD without invoking the authority authorized by DPA 1950; however, in Savannah, the FSSs were delayed by as much as 31 hours while waiting for berth space. The timelines stipulated in this study, particularly for MRCs, are such that sufficient space may not be provided on a voluntary basis.

(U) Authority also is required to activate Reservists providing essential port operation services quickly.

7. Movement Control (U)

(U) Operations DESERT SHIELD and DESERT STORM demonstrated the criticality of cargo visibility and control during deployment and redeployment. Although movement control shortfalls were most visible in theater, underlying causes originate in CONUS and potential solutions must include consideration of CONUS requirements. Specific Army fixes address UE in-transit visibility, container control, and port management enhancements. The additional cost of these fixes is estimated at $134 M during FY 1993-1999.

8. Programmatic Summary (U)

(U) Although enhancements necessary to make the CONUS portion of strategic mobility fully capable of supporting warfighting commanders are relatively inexpensive (in comparison to the purchase of ships and airplanes), the required timelines cannot be met without them. Figure VII-5 shows the total estimated costs for CONUS improvements. Solutions to each of these concerns directly influence one another as do other decisions, including availability, siting and readiness of ships, and theater reception capability.

Table VII-5. CONUS Improvement Cost Summary (U)
UNCLASSIFIED

Area of Concern	Actions Required	Cost
Installation Outloading	Add 233 additional heavy-lift railcars for major installations	$43.5 M
	Add 767 additional heavy-lift railcars for supporting installations and replacement	$100 M
	Upgrade key installations	$19.2 M
	Support facilities improvements	$150-250 M
	Containerization improvements	$89 M
	Repair bridges and roads	$45 M
	Increase Army readiness training	$194 M
Ammunition Capacity	Construct west coast container ammunition facility	$90 M
	Upgrade and enhance MOTSU	$70 M
	Improve depot outloading capability	TBD
	Add theater container reception infrastructure	$60 M
Port Capacity	Identify port requirements to port authorities via MARAD	NONE
	Improve ports (5 key ports)	$8 M
	Determine additional port upgrading based on MARAD results	TBD
	Establish CRAF-type program for strategic seaports	TBD
Port Operations	Relocate active terminals at strategic seaports	TBD
	Increase TTU size to 120	NONE
	Add structure for two additional TTUs	TBD
Congressional Authority	Obtain legislation for priority service of port capacity	NONE
	Obtain legislation for priority use of commercial transportation	NONE
	Obtain authority for early TTU activation (Ready Mobility Force)	TBD
Movement Control	Enhance movement controls	$134 M
TOTAL		**~$1.11 B**

(U) Table VII-6 shows the programmatics for the CONUS improvements.

Table VII-6. Programmatic Summary (U)

UNCLASSIFIED

Current FYDP ($M)	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	F Y 98	FY 99	TOTAL
Outloading Infrastructure	19	24	24	24	24	24	—	—	139
Railcars/ Equipment	3	2	3	4	5	6	—	—	23
Containers	0	0	0	0	0	0	—	—	0
PLS	99	335	421	342	0	0	—	—	1,197
Unit Readiness Trng Enhancement ($M—Operations & Maintenance, Army (OMA))	1	1	1	1	1	1	—	—	6
Movement Control	18	20	16	17	14	14	—	—	99
West Coast Container Ammo Facility	0	0	0	0	0	0	0	0	0
TOTAL COSTS	140	382	465	388	44	45	0	0	1,464

Option Adj (FYDP—$M)	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	TOTAL
Outloading Infrastructure	1	13	14	13	13	13	37	37	141
Railcars/ Equipment	0	13	13	13	13	13	26	26	117
Containerization	0	3	5	5	3	3	3	3	25
Containers	0	2	15	15	19	7	6	0	64
PLS	2	8	19	15	15	0	0	0	59
Unit Readiness Trng Enhancement ($M—OMA)	1	10	32	30	30	32	30	30	195
Movement Control	9	10	19	21	21	21	21	21	143
West Coast Container Ammo Facility	0	0	0	0	20	50	20	0	90
TOTAL COSTS	13	59	117	112	134	139	143	117	924

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Part VIII. OTHER CONSIDERATIONS (U)

1. Logistics-Over-The-Shore (U)

(U) Background

(U) Logistics-over-the-shore (LOTS) provides a unique capability for offloading transport or supply ships in areas having limited or nonexistent port facilities or to augment limited capacity in damaged ports. An excursion of the MRC-E is examined that used LOTS equipment and associated personnel to unload cargo ships in-stream, outside of the scenario ports, and then transport and offload this cargo to existing piers. This excursion examines the contribution of LOTS to port throughput, the requirements and penalties associated with transporting LOTS equipment, the crane ship requirement, the contribution of air-cushioned lighterage, the adequacy of LOTS force levels, the active and Reserve mix of LOTS units, the efficiency of self-deploying LOTS assets, and the impact of port damage on throughput.

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(U) LOTS Analysis

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[1] C-day is the day on which a deployment operation commences or is to commence.

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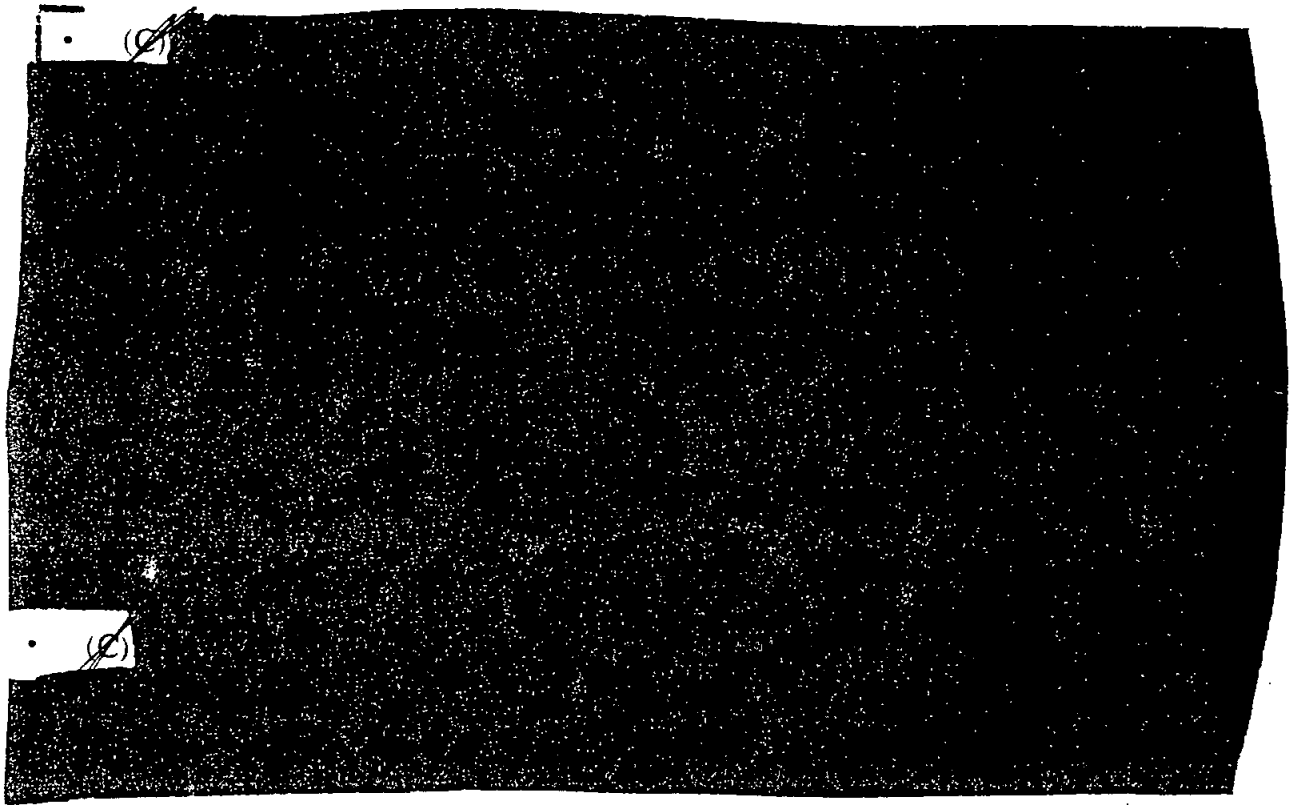
(U) Conclusions

(U) Several key findings from this analysis follow:

- (U) About 50 percent of the Army LOTS packages are made up of Reserve units.
- (C)



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- (U) A requirement for 10 auxiliary crane ships (T-ACS) (12 programmed) was validated.

- (U) In this analysis, air-cushion lighterage proved inferior to conventional lighterage because of the short distances between onload and offload locations and their increased maintenance requirements. In different scenarios with greater distances between the onload and offload sites, air-cushioned lighterage may be more advantageous.

(U) LOTS Recommendations

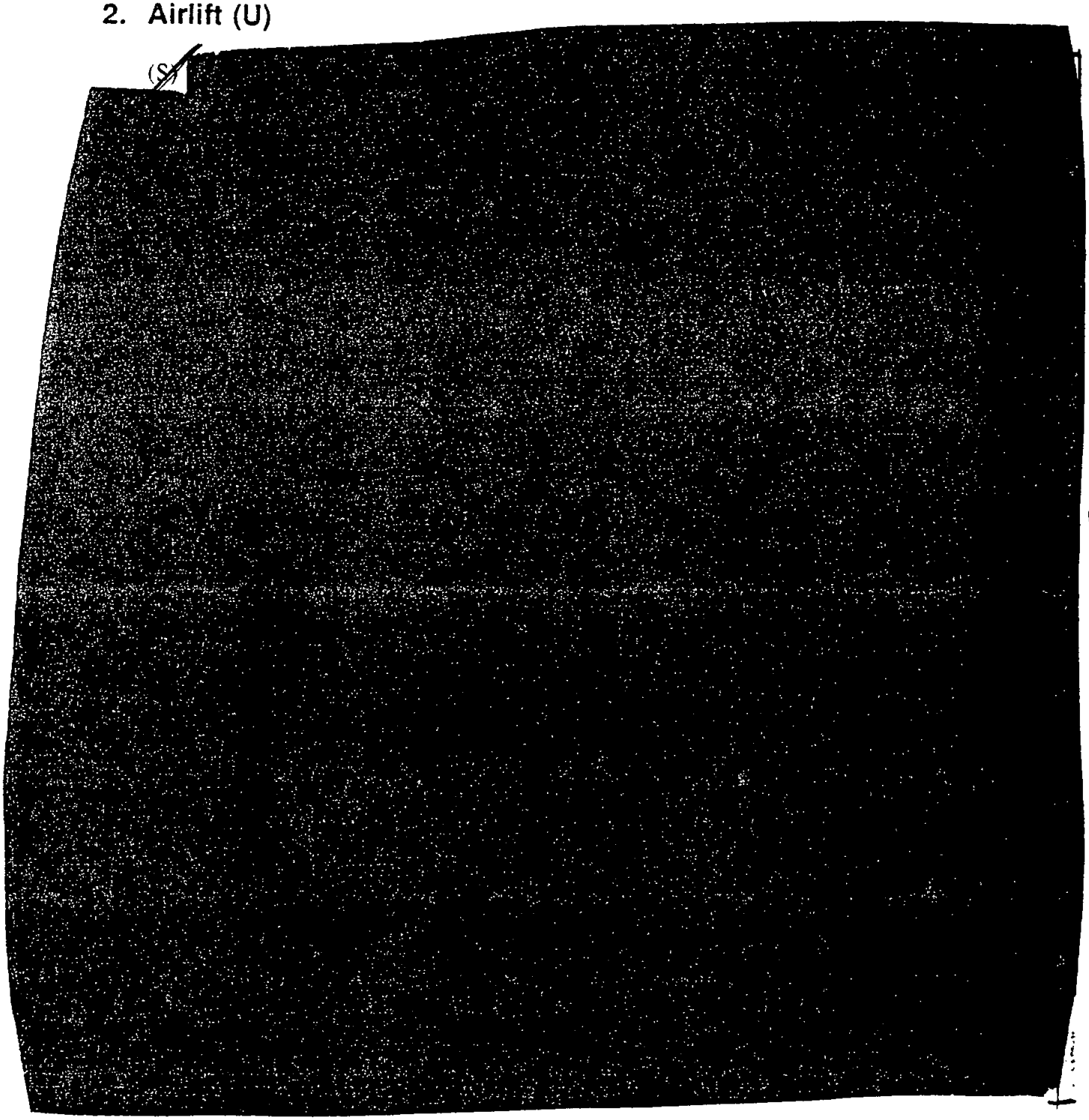
(U) Continue development of the total requirement for LOTS capability, based on the entire spectrum of discharging sealifted cargo through both fixed ports and over the beach, with primary focus on fixed port oprations under a variety of circumstances.

(U) Reassess Army active and Reserve mix to ensure LOTS personnel can deploy on time to support the early employment of LOTS.

(U) Limit the procurement of T-ACSs to 10.

2. Airlift (U)

(S)



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(U) After the turn of the century, there will be a significant decline (about 5 MTM/D) in the total airlift capacity as the final C-141s are retired. Figure VIII-2 displays capability over time. Note that in FY 2001, the airlift capacity peaks and begins to decline. In order to retain the medium-confidence capability that this study recommends, to the extent that this level of airlift may be required, the Department of Defense will have to consider a number of options, such as extending the current C-17 program by approximately 34 PAA, utilization of CRAF Stage III, charter, other procurements of aircraft, or some combination thereof. World conditions and other factors may change in a way that alters requirements. If the Department of Defense were to extend the C-17 program, funding decisions should be made in the mid-1990s to maintain the procurement profile.

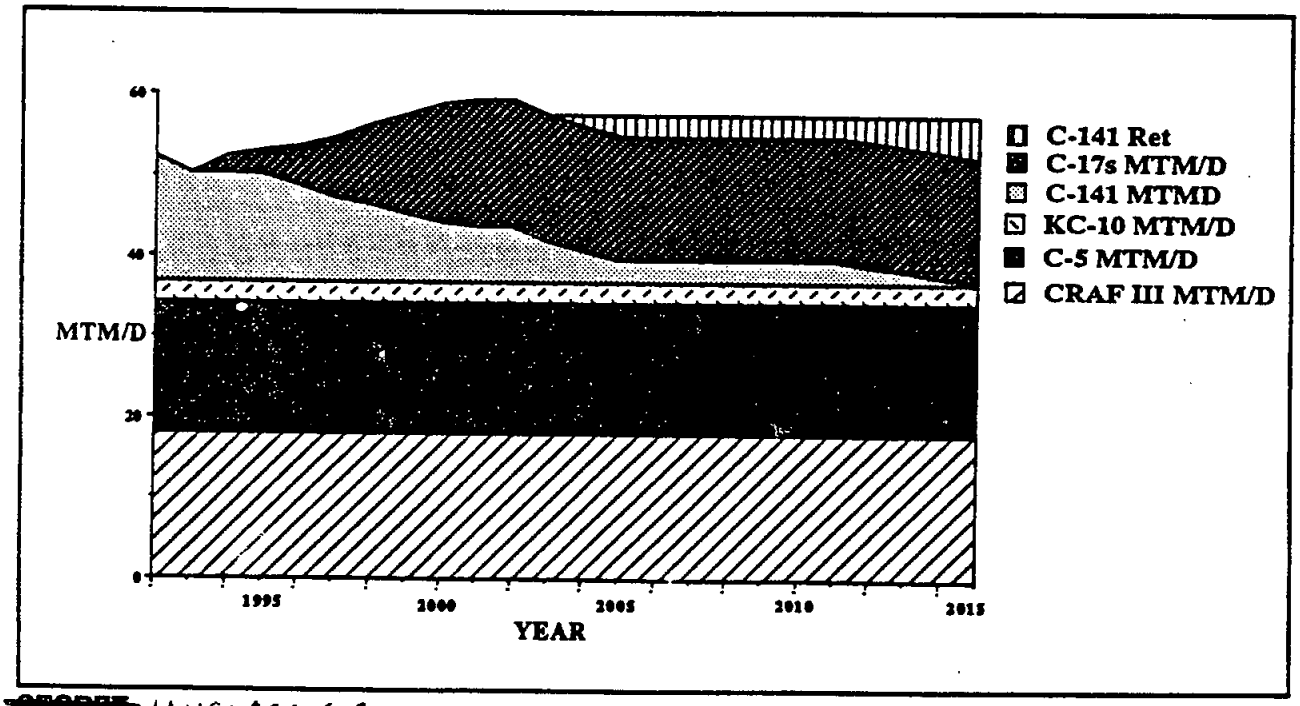

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Figure VIII-2. C-141 Retirement Impact on Strategic Mobility (U)

3. Sealift (U)

(U) This study validates previous DOD plans for the MARAD to increase the RRF to 142 ships (104 of which will be dry-cargo ships) and, at the same time, change the fleet composition. The RRF in 1999 is expected to have a median age of 32 years; 76 of the 104 dry-cargo ships will be steam-turbine-powered vessels. Table VIII-1 shows the FY 1999 RRF dry-cargo ship profile. As with the C-141 portion of the strategic airlift program, shortly after the turn of the century, many of the older ships will reach the ends of their useful lives.

Table VIII-1. FY 1999 RRF Profile (U)

UNCLASSIFIED

Ship Type	AGE (years)				
	0-10	11-20	21-30	30+	Average
RO/RO	0	17	15(5)	4(3)	24
Breakbulk	0	0	0	49(49)	36
LASH/Seabarge	0	0	7(7)	0	26
T-ACS	0	0	3(3)	9(9)	33

Note: Figures in parentheses indicate numbers of steam-powered ships in each age group.

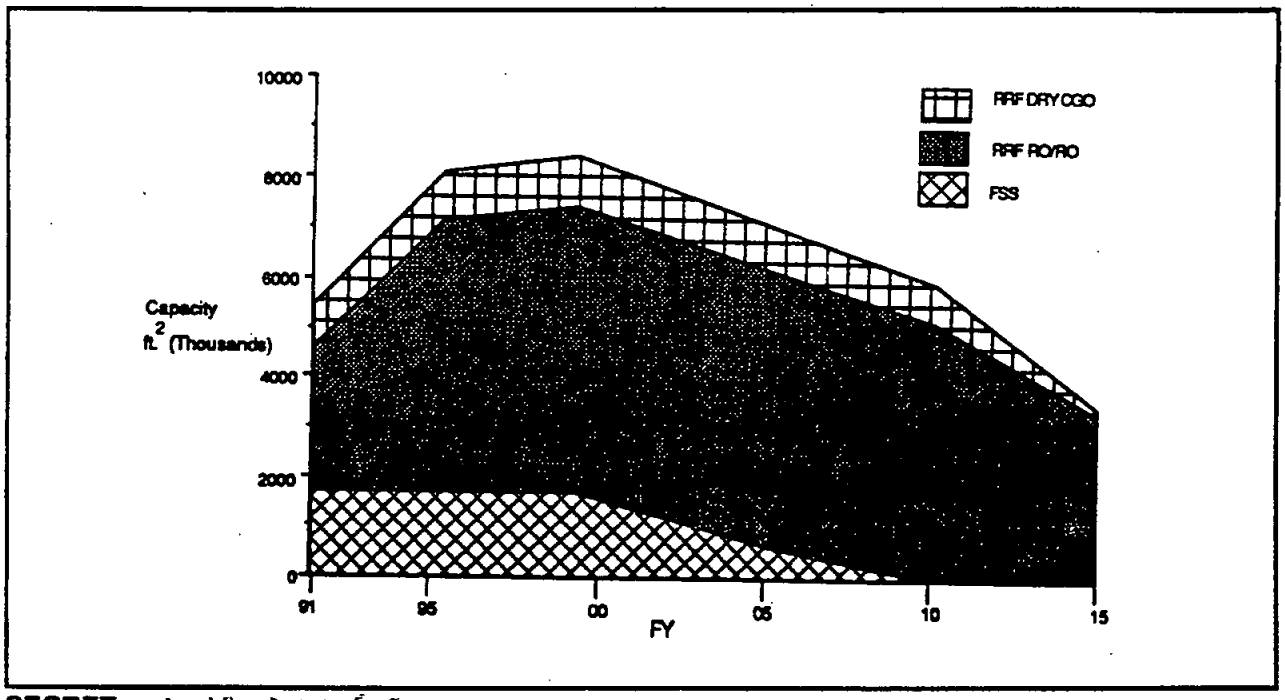

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Figure VIII-3. RRF Capacity Decline (U)

(U) (U) Figure VIII-3 shows the loss of UE capacity of the RRF after the turn of the century. To maintain the FY 1999 RRF baseline capacity will require approximately 13 additional large, medium-speed, RO/RO ships (LMSRs) at an approximate cost of $3.4 B (FY 1992 dollars). A combination of acquisition of used ships, charter arrangements for contingencies, or new concepts such as build and charter or national defense features in new commercial ships, may compensate for RRF 10 and 20 ships at reduced costs. This decline in capability will need to be addressed at the end of the decade.

(U) The MRS did not include any analysis of tanker ships or container ships for sustainment. These critical areas need further analysis and study, particularly in view of the proposed RRF enhancements.

4. Amphibious Lift (U)

(U) US amphibious lift assets available in FY 1999 are shown in Table VIII-2. This table also shows the decline in the number of ships through 2007, primarily as a result of block obsolescence of many ships in the current amphibious fleet.

(U) The amphibious lift mobility baseline depends on the execution of the FY 1992-1997 FYDP to support the goal of a 2.5-MEB total lift capability. However, even with full-support from the FYDP, future block obsolescence—which peaks during the period from 2003 to 2007—significantly impacts this total lift capability. Refer to Figure VIII-4. This reality should focus attention on the developing LX-class amphibious ship program and the need to provide capable ships to avoid projected shortfalls.

Table VIII-2. Future Amphibious Fleet (U)
UNCLASSIFIED

Class	FY 1992	FY 1999	FY 2007
LPH	7	0	0
LHD	2	5	5
LHA	5	5	5
LPD	11	8	0
LKA	4	3	0
LSD-36	5	5	1
LSD-41	8	8	8
LSD-49	0	3	3
LST	18	10	0
LCC	2	2	0
Totals	62	49	22

5. Ready Reserve Force Manning (U)

(U) To man the existing RRF to US Coast Guard standards is estimated to require 2,110 licensed (deck, engineering, and radio) and unlicensed (deck and engine) billets. MARAD further estimates that it would take 3,088 billets to man the RRF totally. The recent activation of the 78 RRF ships and other ships under MARAD jurisdiction for Operations DESERT SHIELD and DESERT STORM required approximately 2,700 licensed and unlicensed crew members. As of 1990, MARAD estimated the number of qualified deep-draft vessel seafarers to be 25,000 and projected a decline to 11,000 around the turn of the century. This decline in mariners will make future activations of the RRF increasingly difficult. In addition to the declining mariners problem, there also is a problem with training and experience levels. As the US-flag fleet modernizes, fewer seamen are knowledgeable about the operation of equipment and steam plants on the majority of the older RRF ships.

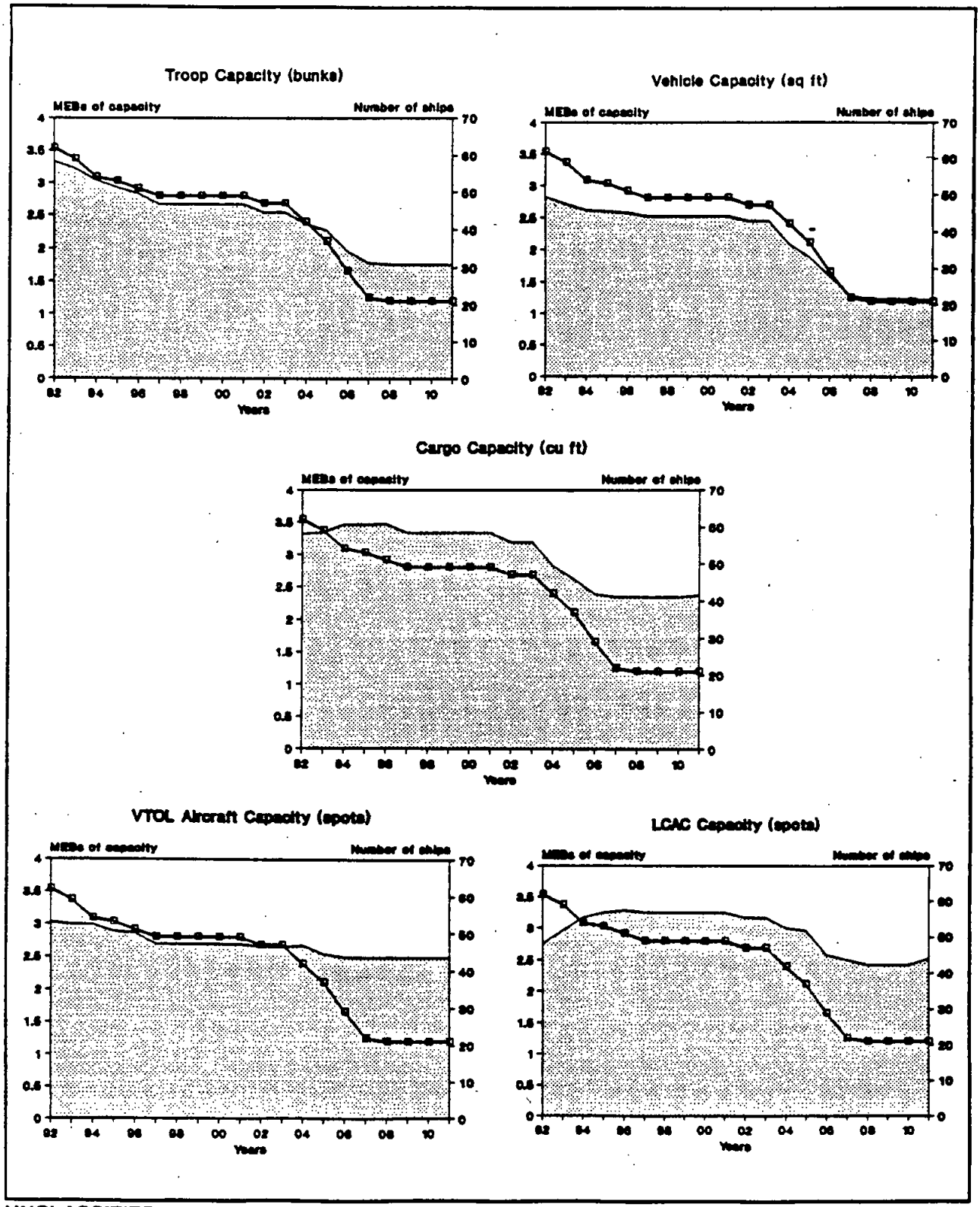

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Figure VIII-4. Impact of Block Obsolescence on Amphibious Lift (U)

(U) The enhanced RRF proposed by this study will partially solve these manning and training deficiencies by placing cadre and maintenance crews on ships in a reduced operating status and RRF-5 status,[2] respectively. Additionally, it is recommended that a program such as the MARAD-proposed "Civilian Merchant Marine Personnel Reserve" be established.

6. National Defense Reserve Fleet (U)

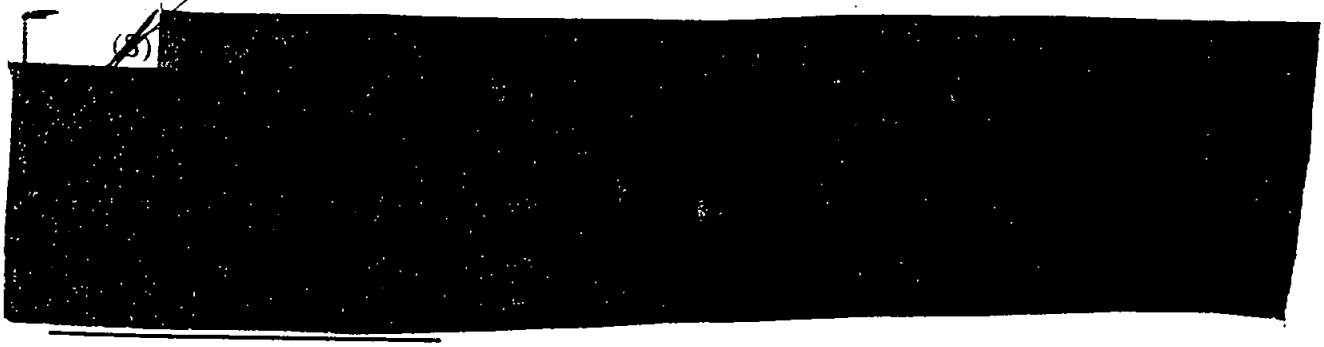
(U) For the most part, the National Defense Reserve Fleet (NDRF) consists of older ships that are no longer commercially viable. Many of the newer additions were acquired at scrap value. The current NDRF inventory numbers 105 ships (71 WW II-era VICTORY-class breakbulks, 23 other breakbulks, 1 container ship, 1 RO/RO, and 9 tankers), all of which are steam-powered. Although maintained in a preserved state, it is expected to take 60 to 90 days after callup to make the fleet available. The current annual cost of maintaining these ships is $6.5 M. Because of the long activation time for this fleet, the declining number of qualified steam-powered ship mariners, and the age, size, and limited capacities of these ships, it is recommended that those ships not planned for upgrading to RRF status be scrapped.

7. New Developments (U)

(U) In those instances where afloat pre-positioning or government-controlled sealift is required, this study addresses only currently available technology for conventional sealift. However, in the future, options for alternative and imaginative solutions to satisfy mobility requirements will be developed. Some of these options include jumbo barge carriers, mobile offshore bases, and ultrafast sealift. Currently, these options are concepts and are yet to be developed. As technology becomes available and concepts mature, these or other options may provide alternative cost-effective means of meeting the shortfalls identified by this study.

8. Ammunition Requirements—Threat Allocation (U)

(U) General Analysis



[2] Ships in a reduced operating status require no shipyard activation work, are outported at or near their proposed seaports of embarkation, can be available at the port by the fourth day after activation, have a cadre crew on board, and conduct annual sea trials. Ships in an RRF-5 status are outported near a required shipyard activation point, can be available on the fifth day after activation, and have a 2-man maintenance crew onboard.

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(U) Recommendation

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9. Enhanced Host-Nation Support (U)

(U) Analysis

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(U) Recommendation

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Part IX. INTEGRATED PLAN (U)

(S) The medium-confidence, medium-cost option will provide sufficient lift capability to respond adequately to most contingencies. In addition, the CONUS improvement plan and the interim afloat pre-positioning program are necessary to ensure the entire mobility system is ready and capable. The notional programmatics reflecting additional dollars required to execute this integrated plan are shown in Table IX-1.

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