

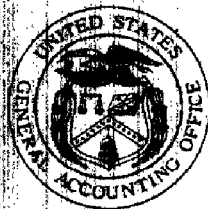
GAO

Briefing Report to the Chairman,  
Committee on Armed Services, House of  
Representatives

March 1994

# ARMY ACQUISITION

## Information on the Status and Performance of the Javelin Antitank Weapon



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National Security and  
International Affairs Division

B-250141

March 9, 1994

The Honorable Ronald V. Dellums  
Chairman, Committee on Armed Services  
House of Representatives

Dear Mr. Chairman:

The Army plans to make a low-rate initial production decision for its Javelin antitank weapon system in April 1994. As requested, we are providing information on the Javelin's (1) cost and acquisition plan, (2) projected effectiveness in certain countermeasure environments, (3) capability to identify friend from foe, and (4) training plan to enhance target recognition and identification capabilities. On March 3, 1994, we briefed your office on the results of our review. This report documents the information presented in that briefing (see app. I).

BACKGROUND

The Javelin weapon system is a portable medium-range, antitank weapon system being developed to replace the Dragon weapon system. The Javelin is scheduled to be fielded by the Army and Marine Corps for use in rapid deployment operations, rough terrain, and air assault operations. The system consists of a missile, an expendable container and launch tube that houses the missile (round), and a reusable command and launch unit for target acquisition and surveillance. The command and launch unit and the missile both have advanced imaging infrared devices, called focal plane arrays, which are designed to allow (1) the gunner to locate and lock-on to targets and (2) the missile to autonomously guide itself to the target without additional gunner involvement.

RESULTS IN BRIEF

The Javelin's acquisition (development and production) is estimated by the Army to cost \$4.2 billion--\$300 million more than the June 1989 development estimate. However, the Army and Marine Corps have reduced the Javelin's quantities by more than 40 percent. The Office of the Secretary of Defense (OSD) program analyst responsible for reviewing land forces' armor and antiarmor systems estimates that

(1) fielding could take as long as 25 years and (2) the longer period would increase program cost by \$600 million, for a total program cost of \$4.8 billion.

Based on this projection, the missile unit cost will increase by more than 150 percent and the command and launch unit cost by more than 360 percent over the June 1989 development cost estimate. According to the OSD analyst, the threshold for questioning cost-effectiveness has been breached. In addition, the Conference Committee report on the fiscal year 1994 Defense Authorization Act (House Report 103-357, Nov. 10, 1993) stated that the conferees expected the Army to (1) reassess the Javelin's cost-effectiveness in view of escalating costs and (2) ensure that system development and production costs are brought under control. However, a new cost-effectiveness analysis has not been conducted.

The Javelin is designed to significantly improve the Army's antitank capability. However, like other fielded infrared systems, the Javelin may experience problems with some countermeasures. In addition, it is not designed to identify friends on the battlefield from foes. It has some inherent identification capability. This capability is limited by the weather, the gunner's distance from the target, and the gunner's training. However, there are some questions as to whether training will be adequate to prepare the soldier to (1) acquire valid targets and (2) identify friend from foe without additional equipment, which is not yet developed.

#### SCOPE AND METHODOLOGY

We discussed the Javelin's cost and acquisition plan with and examined documents from the Army's Javelin Project Office, Redstone Arsenal, Alabama, and OSD, Washington D.C. We did not independently verify the data contained in these documents.

We discussed the Javelin's performance in countermeasures and examined available test results from the Army Materiel System Analysis Activity and Army Research Laboratory, Aberdeen Proving Ground, Maryland; Vulnerability Assessment Laboratory, White Sands Missile Range, New Mexico; and the Javelin Project Office. We did not review the results of some tests because (1) some test reports had not yet been completed and (2) the outcomes of some completed tests had not been analyzed.

We discussed the Javelin's ability to identify friend from foe with officials from the Office of the Deputy Chief of Staff for Operations and Plans, Washington D.C.; and the Javelin Project Office. We also discussed the training aspects of this issue and reviewed documents from the U.S. Army Infantry School, Fort Benning, Georgia; Center for Night Vision and Electro-Optics, Fort Belvoir, Virginia; and the Javelin Project Office.

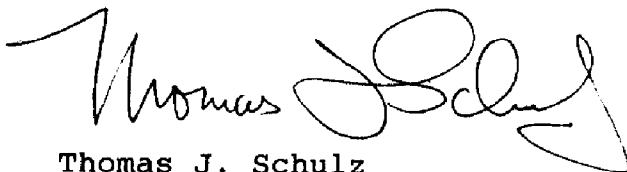
We performed our work from July 1993 through March 1994 in accordance with generally accepted government auditing standards. We discussed the facts in this briefing report with Department of Defense and Army officials responsible for the Javelin, and they generally agreed with the facts presented. We have revised the report to incorporate their comments where warranted.

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As arranged with your office, unless you publicly announce its content earlier, we plan no further distribution of this report until 10 days from its issue date. At that time, we will send copies to the Ranking Minority Member, House Committee on Armed Services; the Chairmen and Ranking Minority Members of the Senate Committee on Armed Services and the House and Senate Committees on Appropriations; and the Secretaries of Defense and the Army. We will also make copies available to others on request.

If you have any questions concerning this report, please contact me at (202) 512-4841. The major contributors to this report are listed in appendix II.

Sincerely yours,



Thomas J. Schulz  
Associate Director, Systems Development  
and Production Issues

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ABBREVIATIONS

CLU	command and launch unit
OSD	Office of the Secretary of Defense

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**GAO** Briefing for House Committee  
on Armed Services

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**Army Weapons Acquisition**

**Information on the Javelin  
Antitank Weapon System**

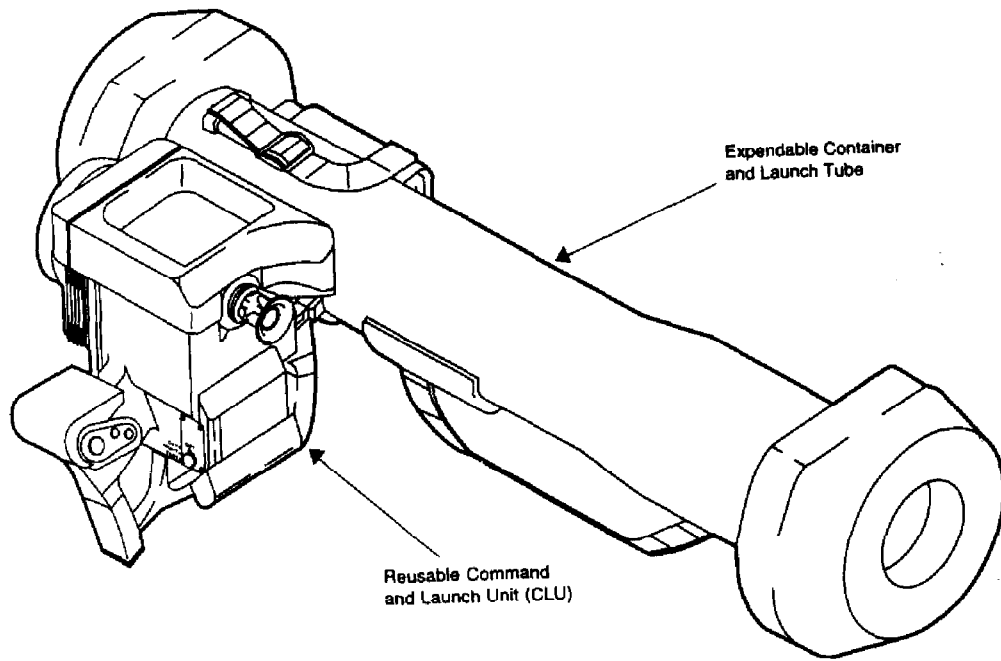
**March 3, 1994**

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# GAO The Javelin System

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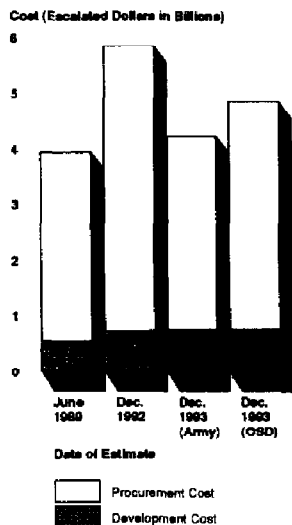
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**GAO Javelin's Acquisition Plans**

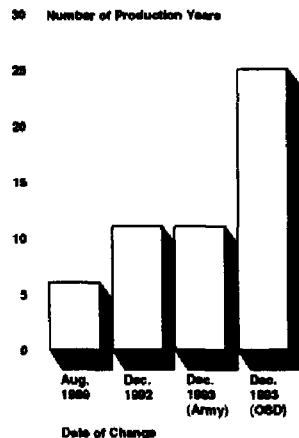
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- June 1989 Estimates
    - \$3.9 billion
    - 70,550 rounds
    - 6,486 command and launch units
    - 6-year production period
  - December 1992 Estimates
    - \$5.8 billion
    - 66,485 rounds
    - 5,917 command and launch units
    - 11-year production period
  - December 1993 Army Estimates
    - \$4.2 billion
    - 33,611 rounds
    - 3,855 command and launch units
    - 11-year production period
  - December 1993 OSD Estimates
    - \$4.8 billion
    - 33,611 rounds
    - 3,855 command and launch units
    - 25-year production period projected
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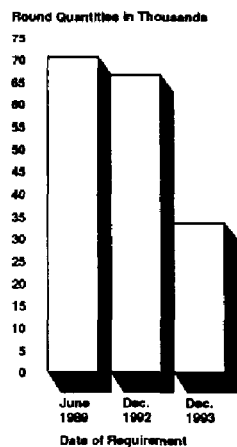
GAO Acquisition Cost



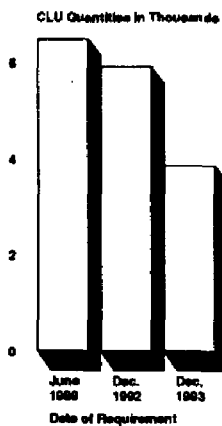
GAO Production Period Changes



GAO Round Production Quantity Changes



GAO Command and Launch Unit Quantity Changes



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## GAO Javelin's Acquisition Plans

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In June 1989, the Army estimated that 70,550 Javelin rounds and 6,486 reusable command and launch units could be developed and produced for \$3.9 billion. The Army intended to procure 58,000 rounds and 5,000 launch units for its infantry and 12,550 rounds and 1,486 launch units for the Marine Corps.

However, by December 1992, the Javelin's acquisition cost had grown to about \$5.8 billion, but total Army and Marine quantities were reduced to 66,485 missiles and 5,917 launch units. The Army attributed the cost growth to (1) technical problems during development, primarily with the missile's infrared imaging device, and resultant development stretch-out; (2) technical problems during testing that increased the production estimate; (3) stretch-out of production from 6 to 11 years; and (4) reduction of Marine Corps quantities and deferment of their procurement by about 2 years.

Because of force reductions and budgetary constraints, the Army reduced its Javelin quantities in late 1993 by more than 40 percent--decreasing the combined requirement to 33,611 rounds and 3,855 launch units. As a result, the Army estimates cost will decrease to \$4.2 billion. Javelin's project management officials attribute the relatively modest decrease to the large amount of cost that does not vary with quantities.

However, the Office of the Secretary of Defense (OSD) program analyst responsible for reviewing land forces' armor and antiarmor systems estimates acquisition cost may decrease only about 17 percent--to about \$4.8 billion--because of the rate at which the Army plans to fund the Javelin's procurement. According to this official, to provide funding for other programs, the Army plans to produce only about 6,886 rounds and 834 command and launch units during the first 6 years of the Javelin's 11-year production period. As a result, the analyst does not believe funding will be available during the last 5 years of scheduled production to produce the remaining 26,725 rounds and 3,021 launch units. Rather, the analyst estimates that production could take as long as 25 years.

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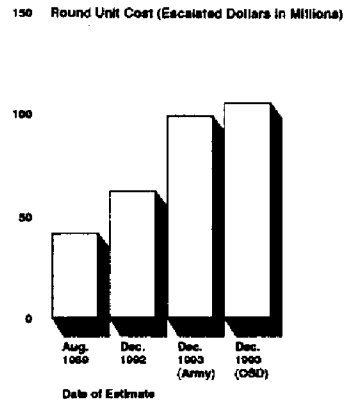
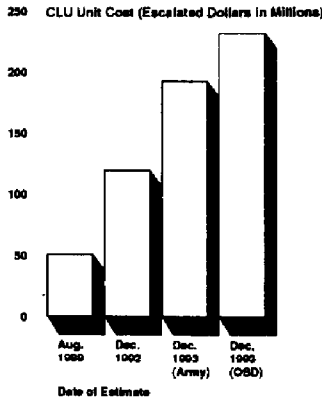
**GAO Javelin's Procurement  
Unit Cost**

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- Round Estimates
  - 1989 - \$41,400
  - 1992 - \$62,000
  - 1993 - \$98,600 (Army)
  - 1993 - \$105,000 (OSD)
  
- Command and Launch Unit Estimates
  - 1989 - \$50,300
  - 1992 - \$118,600
  - 1993 - \$192,600 (Army)
  - 1993 - \$232,000 (OSD)
  
- Threshold for Questioning  
Cost-Effectiveness Breached
  
- Cost-Effectiveness Reassessment  
Directed by Authorization Committees
  
- Cost-Effectiveness Studies Not  
Undertaken

GAO Command and Launch Unit Procurement Unit Cost

GAO Round Procurement Unit Cost



In 1989, the Army estimated the Javelin's procurement units costs at \$41,400 for the round and \$50,300 for the command and launch unit. By December 1992, the round's estimated costs had increased 50 percent to \$62,000, and the launch unit's cost had more than doubled to \$118,600. In December 1993, the Javelin Project Manager estimated that the round's unit cost had increased to \$98,600 and the launch unit's cost to \$192,600.

However, at the same time, the OSD analyst responsible for reviewing land forces' armor and antiarmor systems estimated the round's unit cost at \$105,000 and the launch unit's cost at \$232,000. According to the analyst, the threshold for questioning the Javelin's cost-effectiveness has been breached. The analyst said the Javelin could still be an acceptable solution to replacing the Dragon, but production should not be approved without considering costs.

The escalating costs also raised congressional concern. The Conference Committee report on the fiscal year 1994 Defense Authorization Act stated that the conferees expected the Army to (1) reassess the Javelin's cost-effectiveness in view of escalating costs and (2) ensure that system development and production costs are brought under control. However, as of January 1994, the Army had not begun studies to determine whether the Javelin remains the most cost-effective weapon for satisfying the mission shortfall.

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**GAO Javelin's Battlefield Limitations**

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- Like Other Fielded Infrared Systems, Not Capable in Some Battlefield Environments
  - Limited Ability to Identify Friend From Foe
  - No Current Equipment Solution
  - Inherent Capability Dependent on Weather, Target Distance, and Gunner Training
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## GAO Javelin's Battlefield Limitations

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The Javelin is expected to be effective at greater range than the Dragon--2,000 versus 950 meters--and be more lethal. In addition, the Javelin's fire and forget design is intended to increase soldier survivability by decreasing gunner exposure to enemy fire. However, according to engineers at the Army Materiel Systems Analysis Activity and the Javelin Project Office, the Javelin--like all fielded infrared weapon systems--has limitations in the presence of some countermeasures. The Army has developed mitigating techniques that, according to the engineers, will be effective in some cases. The details of the limitations are classified.

In addition, although the Javelin's infrared optics allow the gunner to attack targets at extended ranges, out to 2,000 meters, the Javelin is not required to distinguish friend from foe. However, the Javelin does have some inherent capabilities. The gunner can, to some extent, identify target images produced by the Javelin's infrared optics to distinguish friend from enemy. The gunner's ability to accomplish this task will be dependent on (1) the weather, (2) distance from the target, and (3) training.

Because of the number of friendly fire deaths during Operation Desert Storm, the Army is developing identification equipment. Its current expectation is that this equipment, suitable for use with the Javelin, will be available about 5 years after the Javelin is first provided to the soldier.

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## GAO Planned Javelin Training

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### Recognition and Identification Training Considered Deficient

- Infrared Training Software:
  - Omits Moving Targets
  - Ignores Low-Contrast Targets
  - Does Not Replicate Javelin Imagery

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Training officials at the U.S. Army Infantry School consider the currently planned Javelin gunner training inadequate in the areas of recognition and identification. In their opinion, the training will not adequately teach gunners to use the Javelin's infrared optics to recognize tanks from wheeled vehicles or identify friendly tanks from enemy tanks.

A Javelin logistics official said the Javelin training will teach gunners to use the system--that is, turn it on, lock-on to targets, and fire the missile. In addition, an Army Infantry School official said gunners will be taught general thermal recognition and identification. However, both said the gunners will not be taught to recognize or identify thermal images as seen through the Javelin optics. According to an Army research psychologist, the current training software will not teach gunners to recognize (1) moving targets, (2) targets with approximately the same temperature as that of their background, or (3) targets whose image is degraded by electronic noise--as the Javelin's images frequently are.



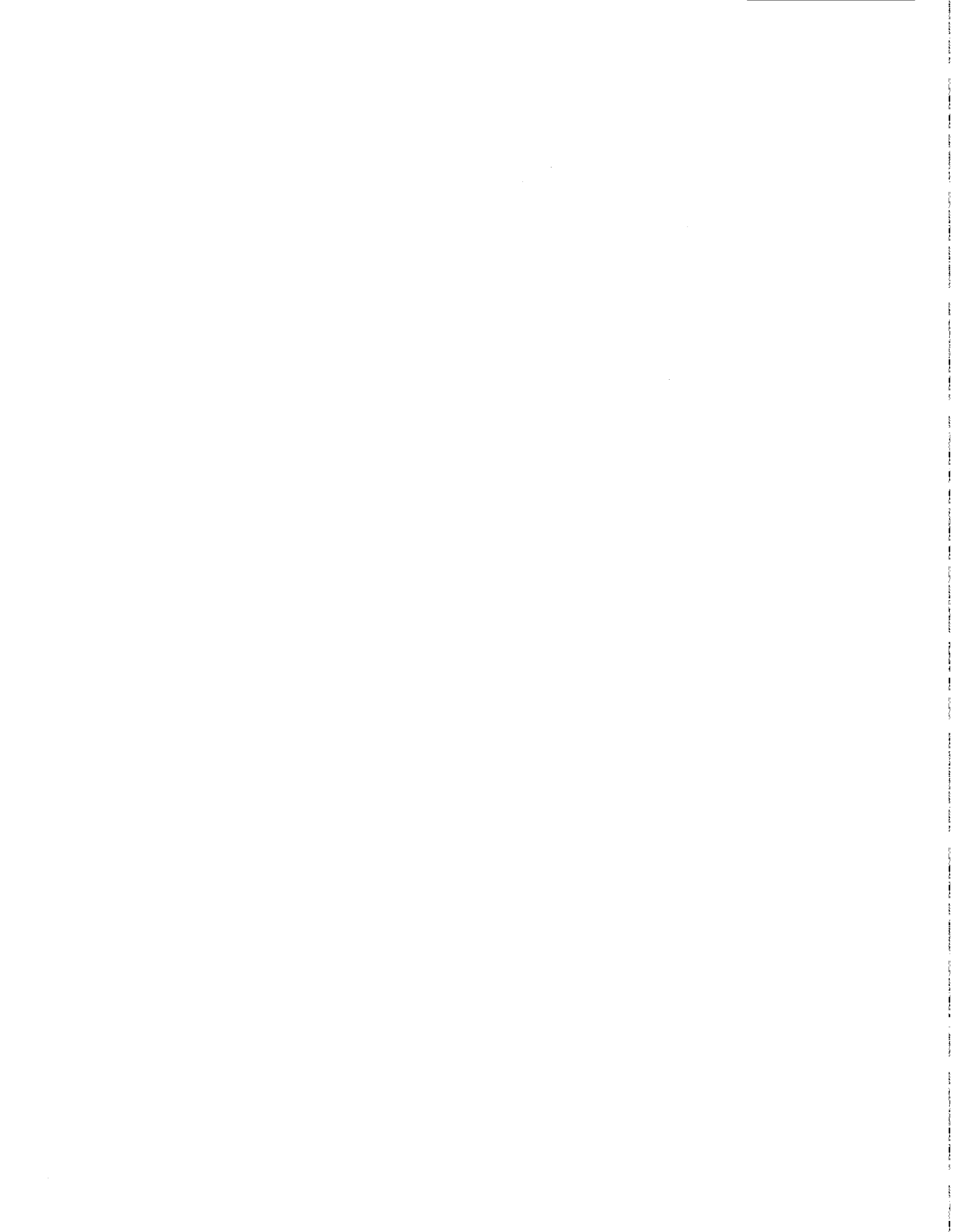
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