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TECHNICAL REPORT CPO-89- 3

RECRUITMENT OF ENGINEERS AT THE U.S. ARMY
MISSILE COMMAND, FY 1979-88

R. Bryan Kennedy
Civilian Personnel Office
U.S. Army Missile Command

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U.S. ARMY MISSILE COMMAND

Redstone Arsenal, Alabama 35898-5000

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DEPARTMENT OF THE ARMY
UNITED STATES ARMY MISSILE COMMAND
REDSTONE ARSENAL, ALABAMA 35898

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TO: Recipients of Subject Report

The following pen and ink changes should be made to subject report:

1. Cover - Change "Technical Report CPO-89-2" to read, Technical Report CPO-89-3.
2. Page 1/(11 blank), block 4 - change "CPO-89-2" to read, CPO-89-3.

Frank R. Kilmer

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I. INTRODUCTION

Changes in the societal values, attitudes, and priorities, which began in the late 1950's and early 1960's, have caused sweeping changes in the structure and practices of government and private enterprise. Employment practices have been the dominant area affected by these changes. The Federal Government, the Nations single largest employer with 2,984,000 employees as of March 1989 [1], has not only been affected by these changes but, in many instances, has been instrumental in initiation of reforms that are presently accepted as standard personnel practices.

The Federal Government, which has provided leadership in personnel practices such as recruitment of minorities, women, the handicapped, etc., frequently has difficulty in attracting and retaining personnel with the quality of expertise needed to accomplish its ever expanding mission. Although the general public's awareness of the Federal Government's varied departments and responsibilities has increased through expanded public relations activities, there is still a sizeable segment of the public that do not adequately understand the function of civilian employees within the Department of Defense (DoD). Quite often this segment of the public considers the DoD as being only those personnel in military uniform when, in fact, there is a large number of civilians, 965,000 as of March 1989 [1], with widely ranging occupations that also make up the DoD.

II. BACKGROUND

Support functions and labor requirements by civilians for the military during the early history of the Nation was most often accomplished on a case-by-case basis with contracts. Later, the Congress realized, as presidential administrations and their political appointees were changed, that continuity of Government services, policies, and programs was lacking. To correct this lack of continuity, Congress established a non-political civilian government workforce. Evolving from this has been the integration of civilian employees within the DoD.

III. PERSONNEL MANAGEMENT WITHIN THE FEDERAL GOVERNMENT

A workforce consisting of military and civilian personnel requires two entirely different personnel systems. Each system has its peculiar requirements and often times requires a manager to understand and administer both systems. Some of the more obvious differences in the systems are pay plans, unions, dress, retirement systems, and duty assignments and hours. The personnel management program must recognize the requirements of both groups of personnel and provide opportunities within the varying occupations of those groups. Management officials must employ innovative ideas and most recent policies to ensure mission accomplishment.

For further discussion of background and personnel management within the Federal Government, refer to Technical Report CPO-85-2 [2].

IV. DISCUSSION

Occupational categories within the Federal Government mirror those categories from the whole of society, i.e., from common laborer through highly technical professional. The shortage of any occupational group within society, such as doctors, scientists, engineers, etc., creates the same shortage within the Government workforce, thereby increasing the difficulty of recruiting professionally qualified personnel into Federal employment.

The technological change created by the industrial revolution, two global wars, space exploration, and the continuing arms race have helped to ensure a constantly changing and more technically oriented society. Since the year 1900, the United States has transformed from a basically agrarian society to a dynamic industrial and technology based society with an unprecedented standard of living. These changes have been reflected in all areas of government. Within the DoD, there have been changes in requirements, missions, and management and personnel practices while, at the same time, the DoD is faced with continuing and changing challenges created by technological expansion. Leaders of the DoD learned from examples in World War II that it is essential for weapon systems to be kept up-to-date and that the most current scientific technology be utilized.

The Presidents and Congress, in varying degrees since the 1960's, have designated as a top priority scientific research and engineering and the development of new, highly technical weapon systems. The United States has focused on the necessity of maintaining a strong defensive posture due to the militarization and stockpiling of sophisticated weapons by potential adversary governments. Additionally, the increasing competition from foreign industries for numerous types of products has forced private industry in the United States to seek and employ increasing large numbers of scientist, engineers, and other highly technically qualified persons. The continued movement towards a world of high technology has a seemingly insatiable demand for highly qualified scientists and engineers of which there is a continuing shortage.

Since the 1950's, Federal employers have faced a shortage of top-level scientists and engineers. Private industry, being aware of salaries Federal recruiters can offer, have continually devised compensation packages that are at a higher level than that offered by the Federal Government. In order to be more competitive, the Office of Personnel Management (OPM) authorized an advanced in-hire rate for engineers and scientists, grades GS-5 through GS-12.

In spite of the increased rate of pay, positions often were vacant for long periods of time. Because of the continuing shortage of engineers and in an attempt to streamline the recruitment procedures, the OPM approved direct-hire authority. The granting of direct-hire authority eliminated the requirement that engineers apply to OPM and provided that Federal agencies could accept applications directly from applicants. The provision of an advanced in-hire rate and the authority to deal directly with applicants helped to alleviate the recruitment problem but did not provide, on a timely basis, the quality of candidates needed.

The U.S. Army Missile Command, after numerous studies, initiated a formal centralized college recruitment program in an attempt to improve the recruitment of engineering graduates. Technical Report CPO-85-2 reported on the effectiveness of the program for the first 3 years and compared these results to the 3 years prior to the program initiation [2]. The referenced report concluded that the centralized recruitment program had significantly increased the number of engineers recruited at the GS-5 and GS-7 level at the Army Missile Command. This report provides an additional 4 years of recruitment data.

V. U.S. ARMY MISSILE COMMAND

The U.S. Army Missile Command (MICOM), located on Redstone Arsenal, is a 39,000 acre military reservation in Madison County, Alabama, responsible for the total life cycle management of all Army missile systems. Total life cycle management includes research, development, production management, procurement, quality assurance, maintenance, and logistics support to U.S. troops and foreign governments that have purchased Army missile systems. In excess of 7,000 civilian and approximately 1,000 military employees are assigned to MICOM.

The primary mission of the U.S. Army Missile Command (research, development, and production of missiles) dictates a strong emphasis on the recruitment, and retention of highly qualified engineers. While specialists from many occupational categories are required for overall mission accomplishment, the engineer and scientist career program, with over 1,400 members, is the largest career program within MICOM. Increasing competition from private industry coupled with an aging workforce has created the need for developing and utilizing an innovative and competitive recruitment program to attract qualified engineers and scientists into the Federal sector.

VI. RECRUITMENT OF ENGINEERS AT MICOM

Since its inception, the U.S. Army Missile Command's primary objective has been to develop, procure, and field the very latest in both land combat and air defense missile systems. Resulting from this mission, the engineer and scientist career program has long been the most dominant career program at MICOM. This dominance has been manifested in the number of its members, monies expended, training opportunities, grade structure and promotion opportunities, prestige, etc. The complexity of the mission performed requires the skills of many other career programs; however, none surpass the contribution and importance of the engineers and scientists.

Achieving the MICOM mission requires constant recruitment innovations and effects. A study by the Department of Defense Laboratory Management Task Force [3] concluded that while numerous studies have been conducted to identify shortages of scientists and engineers, findings and conclusions are often contradictory. Some studies recognize and identify shortages throughout the country, while others indicate no current shortage and predict no shortages for the future.

VII. RESULTS

It can be reasonably concluded the increased in-hire rate of pay and the direct-hire authority was a positive step in the recruitment of engineers and scientists for the Federal Government. Technical Report CPO-85-2 also reported the centralized college recruitment program attracted a significantly larger group of engineers, grades GS-5 and GS-7, into the work force. The utilization of career fair and the continuing emphasis on student cooperative education programs in engineering are examples of two other special recruitment efforts.

Management officials have continued the practice of dedicating 50 to 80 entry level positions (GS-5 and GS-7) to be utilized for the centralized college recruitment program. While recruitment restrictions have in some cases hampered hiring engineering graduates, the concerted and consistent dedication by top management to the program has assured continuation of the program.

To determine the effectiveness of the college recruitment program in recruiting engineers, data were gathered from the U.S. Army Missile Command's automated data bank. The data covered a 6-year period (Table 1). The first 3 years of the program included data from October 1981 through September 1984, and the 3 years prior to the implementation of the centralized college recruitment program covered from September 1978 through September 1981.

TABLE 1. Engineers Recruited in Grades GS-5 and GS-7
FY 79 through FY 84

<u>U.S. Army Missile Command Appointments</u>			
FY 79	FY 80	FY 81	TOTAL
1	3	15	19
FY 82	FY 83	FY 84	TOTAL
37	66	51	154

As the above figures depict, the total number of Engineers and Scientists, grades GS-5 and GS-7, increased from 19 for the 3 years prior to implementation of the centralized college recruitment program to 154 for the first 3 years of the program. This increase of 135 appointments equates to a plus 710 percent. The significant increase in the number of engineers recruited for the MICOM work force, as shown in Table 1, indicates the centralized recruitment program to be highly successful.

NOTE: Information extracted from reference 2.

The time frame October 1978 through September 1981 represents the only period of time prior to the implementation of the centralized college recruitment program that is available for comparison purposes. Research studies are enhanced by additional longitudinal data to help verify whether or not the program is bringing continual success, needs alteration, or should be abandoned. The additional 4 years of longitudinal data, FY 85 through FY 88, shown in Table 2, indicates an increase when compared to the first 3 years of the program, FY 82 through FY 84. During the first 3 years of the program an average of 51 engineers were recruited. During the time frame FY 85-FY 88 an average of 56 engineers were recruited each year. Both of these time frames are considered to be significant successes when compared to the average of 6 engineers per year that were recruited prior to the beginning of the program.

TABLE 2. Engineers Recruited in Grades GS-5 and GS-7
FY 85 through FY 88

FY 85	FY 86	FY 87	FY 88	TOTAL
41	31	106	47	225

VIII. RESEARCH SIGNIFICANCE

The significant success of the centralized college recruitment program and the continuing problem of attracting highly qualified engineers to Federal employment indicates a continuing need for the program.

According to Kazi-Ferrouillet [4], some of the biggest demands for new bachelor's degree graduates continues to be in the engineering field with an average starting salary of \$29,820.00. Compared to the Federal Governments starting salary in the low 20's, it is obvious that recruitment of engineers, particularly female and minority engineers, will continue to be a problem for Government agencies.

Pure scientific research and experiments frequently predict the effect of adding an element to another group and verifies these results by retesting. Research on humans and organizations is often confounded by outside or additional forces and circumstances that cannot be controlled. While listing all influences that will confound an experiment is probably impossible, the following discussion represents a partial attempt to deal with this issue. Campbell (7) lists nine threats to internal validity and six threats to external validity of experimental results. History, a threat to internal validity, is the only threat addressed in this report as it poses the greatest problem to this study. Historical occurrences which may have influenced results of the 10-year period studied are:

- o Increased desire to enter public service.
- o More Engineering and Scientific graduates.
- o Change in society's overall attitude toward the Department of Defense.
- o The fact that so many spaces (50 to 80) were set aside may have caused managers to focus on the commitment to fill these spaces each year.

IX. CONCLUSION

The Social Scientist, unlike the Physical Scientist, deals in areas of more uncertainty and continually faces the problem of replicating studies in order to ensure that the scientific method has been adhered to. Any research in the social science areas should always recognize that the research is not conducted in a test tube therefore, results and the measurement of results are not easily identified or measured. Without question, positive strides for recruitment of engineers were accomplished by the development of a strong centralized college recruitment program at the U.S. Army Missile Command.

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2. Kennedy, R. B., Effectiveness of a Centralized College Recruitment Program in Attracting Engineers into the Work Force at the U.S. Army Missile Command, Redstone Arsenal, AL, May 1985.
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4. Kazi-Ferrouillet, Good Numbers, Cautious Optimism, The Black Collegian, pp 47-64, March 1, 1988.

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[G]OVERNMENT WORKFORCE ARE DISCUSSED. [R]ECRUITMENT RESULTS FROM [FY]79 THROUGH [FY]88
ARE COMPARED WHICH INDICATES THE CENTRALIZED COLLEGE RECRUITMENT PROGRAM FOR ENGINEERS
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