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UTILIZATION OF CENTRALIZED COLLEGE RECRUITMENT IN  
ATTRACTING BLACK ENGINEERS (U) ARMY MISSILE COMMAND  
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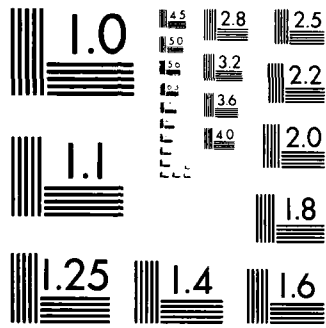
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TECHNICAL REPORT CPO-85-3

Utilization of Centralized College Recruitment in  
Attracting Black Engineers into the Work Force  
at the U.S. Army Missile Command

R. Bryan Kennedy, Ed.D.  
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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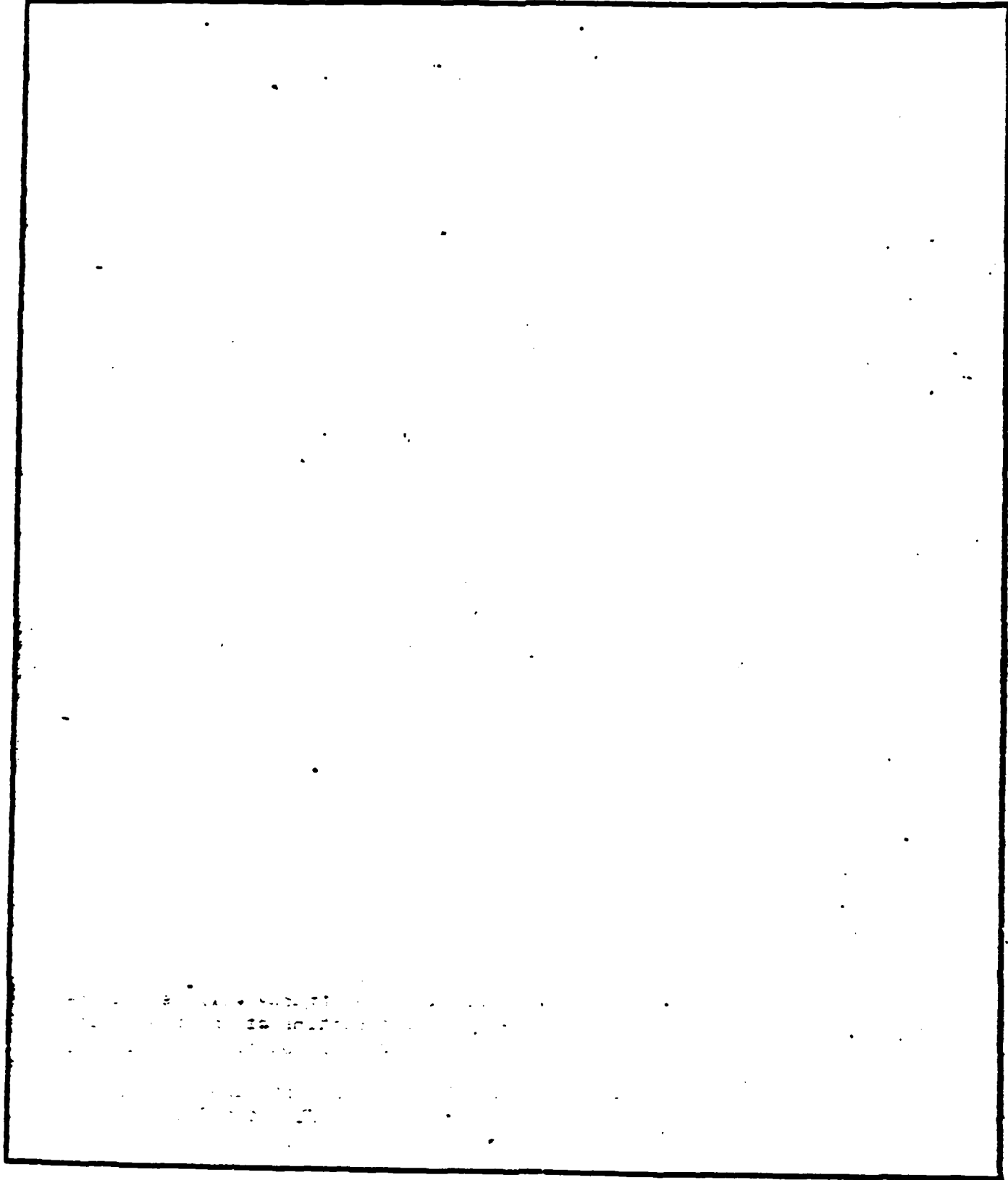


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## I. INTRODUCTION

When viewed as one employer, the Federal Government is by far the Nation's largest employer. According to the U.S. Office of Personnel Management Central Personnel Data File (1), the Federal Government employed 2,068,334 persons as of March 31, 1983.

Federal employees are engaged in non-defense as well as defense occupations. Occupational categories within the Federal Government often mirror non-government occupational categories. Shortages within occupational categories within the larger society will often reflect as shortages within the Federal personnel system.

The technological revolution that has swept the civilized world since 1900 has been well documented and this technical report is not the appropriate place to reiterate the changes brought to all areas of life. It is important to note that the change to a highly technical industrialized society has completely altered society's expectations of what is required of the Federal work force, especially in the area of the Department of Defense.

United States military and civilian leaders have been determined to insure the safety of the U.S. and its allies and have been able to convince the American people of the need for an adequate up-to-date defense establishment. It has become ingrained in the consciousness of the American people that the idea of a Maginot Line is a myth, as evidenced by appropriations for a strong defense department.

The birth of the cold war was almost simultaneous with the end of the shooting war in 1945 and it was obvious that a strong defense should be continued. Since 1945 the U.S. has expended considerable effort and large sums of money for the research, development, and production of new and highly sophisticated weapons. Large expenditures of money for defense purposes has been necessitated by the rapid advancement of technology, increased buildup of potential adversaries, political instability in many parts of the world and the emergence of third world countries.

During much of the same time frame, 1960 to the present, private industry in the U.S. has faced a formidable challenge from foreign industry which has required an expansion of their research capabilities and monetary outlays for modernization to remain competitive both at home and in the world market. Increased need for scientific and technical personnel from within the defense establishment as well as the larger society have combined to create a shortage of engineers that at times approaches the critical level. In the past, many innovative ideas and inventions were products of small, individually owned laboratories or shops. The present emphasis by industry for research in highly specialized areas, usually requiring complex and costly facilities combined with monetary incentives offered to research engineers and scientists, has practically eliminated the small, independent researcher (Kennedy, 1985) (2).

Because of lower pay scales and other benefits, Federal recruiters and personnel managers have found continuing difficulty in attracting scientists and engineers into the Federal work force. In an attempt to put the

Federal Government in a more competitive position, the Office of Personnel Management (OPM) approved an increased rate of pay, grades GS-5 through GS-12, for engineers and scientists. Despite the increased rate of pay, positions often went unfilled for long periods of time. In an attempt to further improve the Federal Government's recruitment position and to speed up recruitment actions, Federal agencies were granted direct hire authority in the appointment of engineers and scientists. Direct hire authority allows Federal agencies to by-pass OPM registers and deal directly with applicants in filling certain hard-to-fill engineering and scientist positions. While the advanced in-hire pay rate and the direct hire authority greatly improved recruitment for these positions, the problem of attracting a sufficient number of high quality candidates was not eliminated.

In an attempt to further resolve the problem of recruiting engineers, a decision was made by the U.S. Army Missile Command's Civilian Personnel Office to initiate a centralized engineering recruitment program by visiting certain colleges to attract engineering graduates. This research measures the success of the centralized recruitment program with particular emphasis on the recruitment of black engineers at the GS-5 and GS-7 level. For the first 3 years of the centralized college recruitment program, recruitment of black engineers grades GS-5 and GS-7 was analyzed and compared to the same series (grades GS-5 and GS-7) for the 3 years prior to the program's implementation. Recruitment of twice as many black engineers, grades GS-5 and GS-7, is considered significant for purposes of this study.

## II. 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. According to Kennedy (2), \$4,834 billions were appropriated in Fiscal Year 83 for procurement of supplies, missile hardware, and services needed to perform the U.S. Army Missile Command's mission. In excess of 8,000 civilian and approximately 1,000 military employees are assigned to this command.

## III. Personnel Management within the Federal Government

For over a century, the Army filled specialized personnel needs by recruiting directly from the civilian population by utilizing whatever contract terms that were available. Oftentimes political and personal connections determined the Federal work force, and each change in national administration brought a large scale turnover in Federal employees. This system of recruitment became known as the "spoils system." When President Thomas Jefferson took office in 1801 much of the Federal system was staffed by members of the opposition who enjoyed lifetime tenure. Jefferson's administration began to replace many of the appointees and bring his own friends and followers into Government. Jefferson is given credit for initiating the spoils system in the Federal Government. By the 1830s, the spoils system was accepted as a way of life and was further perfected during President Andrew Jackson's administration.

With the break-up of the Federal Government during the 1860s and the subsequent election of U. S. Grant as President, widespread corruption in the Federal personnel system became more apparent. During the 1870s civil service reform became a visible national issue. In August 1881 a National Civil Service Reform League was organized. Even though the membership was small, an effective propaganda effort was conducted by the use of monographs and pamphlets. The appeal of these writings was primarily to ethical and moral principles rather than to economy or efficiency (Van Riper, 1967) (3).

The assassination of President James Garfield by a disappointed Federal office seeker brought about a loud cry for reform and resulted in the passage of the Civil Service Act in 1883. Attacks on the spoils system by the period's new media helped insure senate committee hearings and, eventually passage of the Civil Service Act. This act established the Civil Service Commission (the name was changed in 1978 to Office of Personnel Management), which was designed to bring a merit system to government service and replace the practice of political patronage. Lack of early success in this program is blamed by some analysts on the fact that the Commission was created from a negative rather than positive viewpoint. Early emphasis was placed on insuring that Government agencies refrain from certain activities rather than developing and applying an effective personnel management program.

Overall administration of the Federal personnel program is the responsibility of the Office of Personnel Management. Operations are conducted at headquarters in Washington, D.C. and in regional and area offices scattered throughout the country. According to the Comptroller General's Report (4), OPM, during Fiscal Year 78, spent about \$35.4 million on examination and referral of applicants, processed 1.6 million applications, and referred 1.1 million applicants to Federal agencies from which 152,771 selections were made.

Since the passage of the Civil Service Act of 1883, a major requirement of the Federal personnel system has been to hold open, competitive examinations for applicants for competitive service appointments. These examinations were to be based on merit, practical in character and, as far as possible, relate to matters that fairly tested the relative capacity and fitness of an applicant for the appointment sought.

From time to time, OPM examination procedures have come under criticism from various groups within society. Through the years, OPM has continued to invest a large amount of energy into efforts to further refine and validate examination procedures. OPM has continued to rely on the use of both assembled and unassembled examination procedures. Assembled examinations require applicants to report to examination centers where batteries of exams are administered which test skills and knowledges in certain areas. Some occupational groupings do not require an assembled exam but instead require the submission of an application for employment which is rated and assigned a numerical score based on information submitted.

Because of the difficulty in attracting and retaining engineers and scientists, OPM approved advanced pay rates. In a further attempt at attracting engineers and scientists into the Government, the requirement

to apply through OPM was relaxed. Engineers and scientists in any occupational series designated as hard to fill are allowed to apply directly to a Federal agency without going through the usual OPM rating and ranking procedures.

#### IV. Equal Employment Opportunity

For the most part, civil service recruitment procedures were accepted as fair and equal until the early 1960s. Increased awareness and the emergence of charismatic black and female leadership led to a push for change in the overall society which also challenged traditional recruitment practices.

Even though the Government was not included in the Civil Rights Act of 1964, that statute did state that it was the policy of the U.S. Government to insure nondiscrimination in Federal employment based on race, color, religion, sex or national origin. On September 24, 1965, President Lyndon B. Johnson issued Executive Order 11246 (5) which transferred Federal equal employment enforcement to the Civil Service Commission and established the policy of the government to:

Provide equal opportunity in federal employment for all qualified persons, to prohibit discrimination in employment because of race, creed, color, or national origin and to promote the full realization of equal opportunity through a positive, continuing program in each executive department and agency (p.1).

President Nixon issued Executive Order 11478 (6) on 8 August 1969 which stated that "equal employment opportunity must be an integral part of every aspect of personnel policy and practice in the employment, development, advancement and treatment of civilian employees of the Federal Government. Executive Order 11478 set forth a new direction for the Equal Employment Opportunity Program and emphasized that each Federal agency was responsible for developing an affirmative action program."

According to the Comptroller General's Report September 29, 1977 (7), Executive Order 11478 stated that the government policy was to:

- A. provide equal opportunity in Federal employment for all persons,
- B. prohibit discrimination in employment because of race, color, religion, sex, or national origin,
- C. promote full equal employment opportunity through a continuing affirmative action program of each executive department and agency.

This equal opportunity policy was to apply to, and be an integral part of, every aspect of personnel policy and practice in the employment, development, advancement and treatment of civilian employees of the Government.

Under Executive Order 11478, the Civil Service Commission was directed to:

- Review and evaluate program operations.
- Obtain necessary data and report to the President on overall progress.
- Issue appropriate regulations, orders, and instructions with which agencies must comply.
- Provide prompt, fair, and impartial consideration of all complaints involving Federal employment discrimination.
- Provide counseling for employees who believe they have been discriminated against and encourage informal resolution of these matters.
- Provide for appeals of decisions to the Civil Service Commission following impartial review by the Federal agency involved.

The Equal Employment Opportunity Act of 1972 (8) was the legal basis for assuring equal employment opportunities for females and minorities. The Civil Service Commission was assigned responsibility for leadership and enforcement. Under terms of this act, each Federal agency was directed to establish an Equal Employment Opportunity program as part of the personnel policy. A major thrust of the act was to provide affirmative action for increasing representation of minorities and females in the Federal work force. Agencies were required to continuously report progress made toward Equal Employment Opportunity actions.

Additionally the Civil Service Commission was required to:

- Annually approve national and regional Equal Employment Opportunity plans (commonly referred to as affirmative action plans) submitted by each agency.
- Review and evaluate the operation of agencies' Equal Employment Opportunity programs.
- Publish periodic reports reflecting the Government's progress in providing Equal Employment Opportunity.

The Civil Service Reform Act enacted on October 13, 1978 (9), stated that in order to have a competent, honest, and productive work force, personnel management should be implemented consistent with the merit system principles.

One of the primary principles as defined by the act was that:

Recruitment should be from qualified individuals from appropriate sources in an endeavor to achieve a work force from all segments of society, and selection and advancement should be determined solely on the basis of relative ability, knowledge, and skills, after fair

and open competition which assures all receive equal opportunity (Public Law 95-454 Civil Service Reform Act, 1978).

Public policy as defined by Congress in the above paragraph, by passage of the Civil Service Reform Act, is to recruit and attract a Federal work force that mirrors the larger society as to race, sex, and ethnic group. Each Federal agency is required to analyze their work force regarding composition of females and minorities and, accordingly, design an affirmative action program that will allow the agency an opportunity to achieve a work force that mirrors the civilian labor force of the recruitment area.

A major requirement of the Civil Service Act of 1883 was to hold open, competitive examinations for applicants for competitive service appointments. These examinations should be practical in character and as far as possible relate to matters that fairly test the relative capacity and fitness of the applicant for the appointment sought. Minority and ethnic group members began to challenge the validity of the competitive examination process both in the public and private sector in the 1960s and early 1970s. Minority group members began to resort to litigation in an effort to gain relief that they had been unable to win through administrative procedures.

A summary of Supreme Court civil rights decisions involving relevant labor force, civilian labor force, and employment related statistical issues was provided by Niehaus and Nitterhouse (1980) (10), as follows:

This first major case, Griggs v. Duke Power Company, was one in which the Court held that tests used for employee selection must be job related. Majority opinion held that job qualifications are the controlling factor that determine employment discrimination. Griggs was a prelude to later decisions which discussed relevant labor force civilian labor force issues directly.

In Teamsters v. United States, the Court affirmed the idea that statistics could be used to either prove or disprove discrimination. The issue of seniority systems was addressed, with an opinion stating that "an otherwise neutral, legitimate seniority system does not become unlawful under Title VII simply because it may perpetuate pre-act discrimination."

The Hazelwood School District v. United States case spoke directly to issues of statistical significance testing, relevant labor force, and labor market geographic area. Essentially, the conclusion reached was that uses of all normal rules of statistics as applied to social systems are valid in determining if discrimination is present. The Court held that relevant labor force is the proper standard when comparing racial composition of the school district's teaching staff and racial composition of the qualified public school teacher population. This includes use of a geographic area consistent with the relevant labor force standard.

The Regents of the University of California v. Alan Bakke case, although a Title VI case, had obvious implications for preferential personnel practices. The decision seemed to indicate that affirmative action programs are permissible, especially if past racial discriminations were proved, and

particularly by the organization in question. In Bakke, civilian labor force statistics were used as the standard. However, the idea of a straight quota was opposed by the justices who found that Bakke's rights had been denied.

Recruitment of black engineers and scientists into the Federal work force continues to be a problem for managers and recruiters. The difficulty in recruitment of black engineers does not revolve around the usual problem, i.e., red tape, position on recruitment registers, lack of specific technical skills, etc., but rather, that there are not sufficient black engineering graduates to fill both industry and government needs.

According to the Minority Engineer (11), minorities, when considered as a group, accounted for only five percent of the total 67,000 graduates who received bachelor's degrees in engineering in 1982. In order to achieve parity, as measured on the basis of the 1980 census of the college age population, 14.1 percent of the graduates would have to be blacks.

Blacks account for a small percentage of the engineering population in the U.S. According to the National Science Foundation's 1980 statistics, only 1.3 percent of the country's engineers are black and 91.5 percent of these are men. Electrical and civil engineering are the most popular fields for black engineers. Thirty-three percent are in electrical engineering, 12 percent are in civil engineering, and 9 percent are in mechanical engineering. Enrollments for Fall 1982 showed 17,598 blacks enrolled as full time undergraduate students in U.S. engineering schools. This represents 5.8 percent of the first year enrollments in engineering.

Master's degrees, including professional engineer degrees, were awarded to 188 black engineers in 1982. This represented approximately one percent of the total degrees awarded at this level. Of the 2,841 doctorate degrees awarded to engineers in 1982, only 11 were earned by black students (11). Bachelor's degrees awarded to black engineering students in 1983 showed a 13 percent increase over 1982. While there is a trend toward increasing the number of black engineers, statistical data does not forecast that this increase will dramatically alter the recruitment picture in the near future.

#### V. Recruitment of Engineers at the U.S. Army Missile Command

Because the primary mission of the U.S. Army Missile Command is scientific in nature, the Engineer and Scientist Career Program with 1,491 members, as of December 1984, is the largest career program. While there are many other career programs represented at the Missile Command, e.g., procurement, supply, comptroller, quality assurance, etc. recruitment problems have most often been in the engineer and scientist program. During the late 1970s, increased recruitment of engineers and scientists was needed by the Missile Command due to an aging work force. Problems in recruiting candidates for these professions were further complicated by increased competition from private industry for the same type of candidates.

According to the Department of Defense Laboratory Management Task Force (12), numerous National studies to identify shortages have been conducted, but their findings and conclusions are often in conflict. Some of the studies claim present shortages exist throughout the country while other

studies indicate that there is no present shortage and very little evidence to predict shortages in the future. Kennedy (2) conducted an analysis of the effectiveness of a centralized college recruitment program in attracting engineers (grades GS-5 through GS-7) into the work force but did not analyze the recruitment data to determine whether or not the program attracted a larger number of black engineers.

## VI. Discussion

While the approval by OPM of an increased rate of pay for engineers and scientists and the granting of direct hire authority to agencies undoubtedly helped agencies to attract and retain engineers, the U.S. Army Missile Command continued to experience difficulty in attracting sufficient numbers of young engineers. In times of great need during the 70s, sporadic visits were made to various colleges in an effort to attract young engineers. However, no college recruitment program had been developed and utilized.

After a thorough assessment of recruitment needs, a decision was made in the Spring of 1981 to initiate a formal college recruitment program for engineers and scientists. The recruitment effort was to be coordinated by the Recruitment and Placement Division of the Civilian Personnel Office with technical recruitment assistance from the Army Missile Laboratory of the U.S. Army Missile Command. A decision was made to concentrate recruitment efforts at engineering schools located primarily in the Southeastern United States. Occasional visits to selected engineering schools in other parts of the country were also included as part of the overall recruitment plan.

Fifty to eighty entry level positions (GS-5 and GS-7) were to be set aside each year to be utilized for the recruitment, placement, and training for engineering graduates. A decision was made that college visits would be continued even during periods of recruitment austerity in order to familiarize faculty and students with the U.S. Army Missile Command and its mission. Predominantly black engineering colleges were on the recruitment schedule for at least one and possibly two visits per year, e.g., Tennessee State University, Tuskegee Institute.

To determine the effectiveness of the centralized college recruitment program in recruiting black engineers, data were gathered from the U.S. Army Missile Command's automated data bank. The data reflects a 6-year recruitment period (Table). 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 the period from September 1978 through September 1981.

TABLE. Black 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
0	0	2	2
FY 82	FY 83	FY 84	TOTAL
5	5	5	15

As the above figures depict, the total number of black engineers, grades GS-5 and GS-7, increased from 2 for the 3 years prior to implementation of the centralized college recruitment program to 15 for the first 3 years of the program. This increase of 13 appointments equates to a plus 650 percent. Earlier in this study, significant increase was defined as an increase of twice as many black engineers recruited. According to the definition stated earlier, a significant increase has occurred.

## VII. Research Significance

Researchers of natural science have the advantage of conducting experiments in a laboratory setting where strict controls can be utilized to insure that the results are not contaminated by outside influences. As a result of laboratory conditions, data can be checked and re-checked and conditions can be varied to suit the needs and desires of the researcher. Researchers in the social science area who deal with individuals and organizations cannot apply strict laboratory conditions and must accept that certain uncontrolled events may confound study results.

Proponents of pure scientific research often question the effectiveness, reliability, and need for research that cannot control outside influence and be repeated for validity. In direct opposition to groups that maintain evaluations using social science methods are a waste of time, is a continuing call for evaluations to determine which programs are the most effective. Social science researchers have long been aware of certain inherent problems in their research that are not present in pure scientific research. Ambiguity, lack of truly comparable comparison bases, and lack of concrete evidence all contribute to lack of certainty in results. It has been charged that some public administrations seek safety under the cloak of ignorance and do not seek meaningful program evaluation.

Campbell (13) addresses the various threats to internal and external validity that may confound studies of the nature addressed in this technical report. Since the data used in this report is archival in nature, history, one of the threats to internal validity, is the only one addressed. While some of the other threats could possibly have a confounding influence, their effect is viewed as minimal. Historical occurrences which may have influenced results of the 6-year period studied are:

- o A slow-down of recruitment of all Engineers and Scientists by private industry.
- o Larger number of Engineering and Scientist graduates.
- o Change in Engineering and Scientist graduates' attitude toward Department of Defense.
- o Set aside of spaces (50 to 80) may have caused additional management focus on the filling of these particular vacancies.

## VIII. Implications

As discussed earlier in this report, it is impossible to evaluate individual and organizational behavior with the same assurance that you can conduct laboratory experiments. Increasingly, Government programs as well as programs in private industry are being evaluated under less than ideal conditions. Some public administrators are so committed to certain programs that they may tend to disregard honest and meaningful evaluations; however, these evaluations will become increasingly significant due to available funds and resources. The effectiveness of future evaluations, within the Government, is dependent on the ability of public administrators to determine and conduct meaningful evaluations.

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