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**ABSTRACT**

A study of employment procedures at an unnamed gas utility company was made, examining selection procedures, white and blue collar employee performance, promotion rates, and turnover. The data is based on application files, interviews with management personnel, and employee records. The company relied primarily on walk-ins and employee referrals for its job applicants. Private employment agencies were used for some specialized white collar jobs. Social agencies and the employment service were sources of black applicants. The company's selection procedures included informal and subjective elements that led to employment preference for white applicants who were related to company employees. Black employees were hired primarily as a consequence of explicit affirmative action by the company's personnel office at headquarters. Variables that had a significant effect on the screening and hiring of new employees were referral sources, aptitude and intelligence tests, and evidence of specific skills and experience. The data suggested the possibility of discrimination against blacks and female employees in performance ratings and promotions. Both blue and white collar workers appeared able to improve their performance indicators through technical job-related courses made available or supported by the company. Short run turnover was highest for employees who were young, female, or black, and who had transferable skills. (Appended are statistics and procedures used in the study.) (Author/CT)

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SELECTION AND PERFORMANCE IN A  
GAS UTILITY COMPANY

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Final responsibility rests with the author.

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16 Abstract (cont.)

made available or supported by the company. We found short run turnover highest for employees who were young, female, and who had transferable skills. Black employees and those with low performance ratings also had high termination rates. After the first two years, younger, female, and black employees had lower turnover rates. The recruiting and selection process has a built-in bias against minority applicants, and only strong affirmative action will enable blacks to enter this relatively stable internal labor market.

**TABLE OF CONTENTS**

**Introduction. . . . . Page 1**

**The Company's Employment Procedures . . . . . Page 5**

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**Analysis of Selection Procedures. . . . . Page 11**

**White Collar Employee Performance . . . . . Page 18**

**White Collar Promotion Rates . . . . . Page 27**

**White Collar Turnover. . . . . Page 31**

**Blue Collar Performance Ratings . . . . . Page 33**

**Blue Collar Turnover. . . . . Page 37**

**Summary and Conclusions . . . . . Page 41**

**Appendix A. . . . . Page 49**

**Appendix B. . . . . Page 53**

**Appendix C. . . . . Page 55**

**Appendix D. . . . . Page 63**

**Appendix E. . . . . Page 87**

**Appendix F. . . . . Page 93**

**Appendix G. . . . . Page 99**

**Bibliography. . . . . Page 101**

LIST OF TABLES

Job Applicants, Table 1 . . . . . Page 49

White Male Applicants Selected for Interview, Table 2 . . . . . Page 55

Black Male Applicants Selected for Interview, Table 3 . . . . . Page 55

Total Male Applicants Selected for Interview, Table 4 . . . . . Page 56

Selection for Interview for Key Punch Job, Table 5 . . . . . Page 56

Selection for Interview for Key Punch Job, Table 6. . . . . Page 57  
(Key Punch Experience Variable Omitted)

Selection for Interview for Key Punch Job, Table 7. . . . . Page 57  
(Agency Referral Variable Omitted)

Selection for Interview for Home Economist Job, Table 8 . . . . . Page 58

Selection for Interview for Accounting Clerk Job, Table 9 . . . . . Page 58

Selection for Interview for Secretary-Clerk Job, Total, Table 10. . . Page 59

Selection for Interview for Secretary-Clerk, White, Table 11. . . . Page 59

Selection for Interview for Secretary-Clerk, Black, Table 12. . . . Page 59

Blue-Collar Hiring, Model 1, Table 13 . . . . . Page 60

Blue-Collar Hiring, Model 2, Table 14 . . . . . Page 61

Relative Importance of Interview Categories, Table 15 . . . . . Page 62  
(Number of White Collar Job Groups)

White Collar Promotions per Year, Table 16 . . . . . Page 87  
(Exempt Employees-Model 1)

White Collar Promotion per Year, Table 17 . . . . . Page 88  
(Exempt Employees-Model 2)

White Collar Promotions per Year, Table 18 . . . . . Page 89  
(Exempt Employees-Model 3)

White Collar Promotions per Year, Table 19. . . . . Page 90  
(Non-Exempt Employees-Levels 5,6,7)

White Collar Promotions per Year, Table 20. . . . . Page 91  
(Non-Exempt Employees)

Blue Collar Termination, Table 21 . . . . . Page 93  
(New Hires-Less than Two Years)

Blue Collar Termination, Table 22 . . . . . Page 94  
(New Hires-Less than One Year)

Blue Collar Termination, Table 23 . . . . . Page 95  
(On-Board Employees)

White Collar Termination, Table 24. . . . . Page 96  
(New Hires-Less than Two Years)

White Collar Termination, Table 25. . . . . Page 97  
(On-Board Employees)

Significant Variables in the Analysis of Blue Collar Evaluation,  
Table 26. . . . . Page 99

## INTRODUCTION

Individuals find employment in our economy through a complex process that involves search on the part of the prospective employees and selection processes utilized by employers. To a large extent job seekers know very little about the criteria and decision rules that they face when they apply for employment.

Except for highly skilled jobs, Employers are usually faced with large numbers of job applications from which they must select the successful candidates. Their success or failure is a function of their ability to pass through the employer's screening process. Labor market specialists frequently refer to the "matching" process, but the employer with a vacancy provides little information about exactly what characteristics are being sought in a new employee, and each employer has its own criteria for selection. Consequently, job applicants are forced to play the game without knowing the rules, since they are set anew by each prospective employer. The game is not necessarily a fair one. Some groups in the labor force may have more information than others concerning the availability of jobs and the criteria used by those who do the screening. Some will have an advantage because they have characteristics that are given positive weight in the selection process. In the absence of special effort, it is likely that minority groups in the labor force will be disadvantaged by their relative lack of information, and by their inability to satisfy criteria that depend on experience or relationships that are less available to them. From the employer's perspective, the selection process is difficult to control and monitor. Personnel officers have a good deal of latitude in carrying out the hiring function, and it is extremely difficult and costly to evaluate the results of their activities. First of all, there may be considerable discrepancy between management's perception of the process, and the effective screening rules. The actual hiring criteria can only be determined by examining the results of the hiring decisions. Then there is the problem of validating the process, that is, determining the extent to which the criteria utilized

in the screening of applicants are related to the job performance of successful candidates. The problem is complicated by the fact that the makeup and effectiveness of an employer's labor force at any point of time is the result not only of its selection procedures, but also of the decision rules utilized in the firm's "internal labor market." An employee's performance is a function of personal characteristics and background, brought with the individual to the employer, and of the employee's organizational experience with the employer.

The efficiency of individual firms, and the economy's potential for growth is dependent in part on the extent to which all groups in the labor force are able to find their most productive employment. This is more likely to occur if job seekers are more aware of the criteria used by the firms and industries in selecting employees, and if employers take steps to insure that their selection procedures, and the administration of their "internal labor markets" make the most effective use of the available labor supply. Through the examination of a relative stable Utility Company, this study has attempted to provide some insight into the selection process, and into the factors that appear to affect an employee's relative success in the organization. Although limited to a single firm, our results add to our understanding of the factors that determine how individuals move into productive employment, and progress through the job matrix of a firm. The study serves as an illustration of the importance, as well as the difficulty, of testing assumptions made by employers when they screen applicants for employment, and of assessing the effects of their manpower policies and procedures.

The cooperating employer is a Gas Utility company that employs approximately 1600 individuals, of whom two hundred are supervision or management, five hundred are white collar workers, and nine hundred are blue collar wage earners. The study was based on application files, interviews with management personnel, and on the records of individuals who were on the company's payroll as of January 1, 1968, and who were hired by the company from that time through January 1, 1972.

The applicants for employment during the period of the study<sup>1</sup> were over 70% male and 91% white. Their average age was about 24, and almost all of them had at least a high school degree. Only about 9% had no prior work experience, and over one-third of the applicants were currently employed when they applied. About 45% of the total had left their prior employment voluntarily. Approximately 35% of the applicants asked for employment at "any" job, and over 70% were "walk-ins" who came to the company without any specific referral. Of those who were referred to the employer, the predominant source of referral was an employee of the company. Although the company hired only 92 employees during the period of the study, it received 3013 job applications. It is particularly interesting to observe the large number of walk-in applicants for the small number of available openings. In view of the substantial number of applicants who were apparently willing to change jobs to come to work for the company, it was apparently viewed as a relatively desirable place to work.

<sup>1</sup> Refer to Appendix A, Table 1 for the Characteristics of the Applicant Population

## THE COMPANY'S EMPLOYMENT PROCEDURES

The large number of applications—creates an information processing problem. Vacancies are not always available when the applications are received, and in spite of the volume of job seekers, the employer may not be able to identify an acceptable applicant for a particular job at the time that it must be filled. When an opening is to be filled, the employer must be able to find a candidate who is acceptable to the management from the applications that are on hand, or if that fails, from some other source. The following description of the company's employment procedures is based on the perceptions of the personnel staff who are responsible for the activity.

The company carries on its activities at a central office and at seven division offices. Applications are accepted at all locations from anyone who wishes to apply for a job. Normally, the application will be filled out at the point of application, although some are mailed in. All offices have been instructed to mark application forms from black applicants with some identifying code on the bottom of the form. (The employment supervisor learned from us that one of the division offices had not complied with this instruction.)

At the central office, the employment supervisor's secretary (K) screens all of the applications received there, and picks out those that seem to her best suited for any current or expected openings. She gives these to the employment supervisor (J) who states that he also reviews all of the applications and picks out any others that appear to him to have special promise. Normally applications are retained for one year. The applications selected by K and J are kept in a special file (the hot file) in the employment supervisor's desk for quick reference should an opening occur. The hot file may also contain applications of a few individuals who have been interviewed but not hired. When an opening occurs, J goes first to the applications in his hot file. If he has an individual who has been interviewed recently and who appears to be particularly qualified, he may simply offer the job to that person without considering other applications. Normally, however, he will examine a few files from the hot file and ask K to go back through recent applications

in a general file for qualified individuals. Those selected in this way are called in for interviews and testing. If there are not enough prospective candidates, employment agencies will be asked to refer individuals with particular specifications. This latter procedure is usually followed for jobs that require some advanced skills including key punch and is not followed for lower level jobs such as mail clerks or clerk-typist. Individuals who are referred from the employment agencies in this manner fill out application forms, are interviewed, and tested. J works regularly with four employment agencies that are familiar with his requirements and who normally can be counted upon to send him qualified people.

After interviews and testing, the employment supervisor picks out a few of the best candidates and these are interviewed by the department head. The above procedures apply to individuals who apply for work at the central office for work at that office or at Division D which is nearby.

In selecting individuals to be interviewed, proximity to the job and referral source are given heavy weight. Of the two, referral by a relative employed by the company appears to be the most important consideration. The company also makes a point of interviewing black applicants who are referred by certain social agencies.

At the divisions, it appears that some screening takes place in advance, that is, at the time the application is filled out. There is no established procedure and the process varies from a casual evaluation by someone in the office to a short interview. However, if this initial screening does not result in some sort of positive opinion, the applicant probably will not be selected for interview and testing when a job opening occurs. Normally, when a job opens up at the division, the division manager will screen his applications and pick out seven or eight. The employment supervisor (J) will then go to the division to interview the applicants selected by the division manager. J will pick out the top two or three on the basis of the interviews and the final employment decision will be made by the division manager and the employment supervisor jointly.

Division B is an exception to this procedure, since the division manager sends all of his applications to the central office where J does the initial screening and selection of individuals for interview. The division manager instituted this procedure primarily to get away from the problem of referral from relatives employed by the company. It is apparent that for some time the company has made general use of the referrals from employed relatives as a prescreening device. The assumption has been that the company would get superior applicants if they gave preference to relatives referred to them by their employees. J asserts that although preference is given in selection for interviews and testing, that after the additional information made available through the interviews and test is obtained, relatives are given preference only if they are as well-qualified as the other applicants.

An interesting aspect of the employment procedure is the disposition of applicants who are selected for interview and testing but who are not hired. Although some exceptional applicants are retained in the "hot file" it appears that the others are put back into the general office application file. These applications are not marked or identified in any way so that K and J would have to depend upon their memories to pick them out if a relevant job opening appeared in the next month or two.

### Tests

Applicants for blue-collar jobs are given the Wonderlic test and the Bennett mechanical test. Applicants for white-collar jobs have been given a total of 11 tests during our sample period. The test selection depends on the type of job for which the individual is being considered. The parent company established norms for three of the tests, including the Wonderlic (whites only). Black applicants are rated on the publisher's national norms. In other cases, the company utilizes norms developed by the publishers of the individual tests.

After interview and testing, selection is based primarily on the applicants' related skills, as measured by test scores, and on their attitudes toward work, as measured by the interviewers. In addition, personality is considered to see if the applicant would "fit in" with the other people already in the section where the opening exists. Finally, as indicated above, additional preference may be given to relatives of current employees.

## Minority Employment

The company has developed and is presumably complying with a positive action program. J has a black assistant (T) whose primary duties are the recruitment and screening of minority applicants. When minority applicants appear at the central personnel office, they are introduced to T who interviews them and may note his comments on their application forms. He identifies minority employees with the most promise and holds their applications in his files for further consideration when an opening occurs. If a minority applicant with special qualifications is located, a special effort is made to place that individual as soon as possible. Two of their divisions prefer to recruit their own minority employees, and very little has been done to recruit black employees in two of the other divisions. In any case, minority hiring is normally done as a result of stimulation from the central office. (Note that this is the procedure as seen from the central office) For about every third or fourth hire, J suggests to the division manager that the opening should be filled with a black employee. He will then ask T to check his files (The Affirmative Action file) to see if he has any qualified applicants. If a qualified black applicant is on file at this point, he may be hired immediately without making further comparisons with other applicants, provided that the approval of the division manager has been obtained. In some cases, the division official may wish to talk with the prospective employee before the final hiring decision is made, but the minority applicant may be hired without the division manager's active participation. If there is no qualified black applicant in the file, T attempts to find one through active recruitment.

T is aware of all job openings and he can suggest minority employees if he has qualified applications in his file. However, unless he does, it is unlikely that a black applicant will participate in the screening process unless J, as indicated above, has suggested that the particular opening should be filled with a black employee.

The screening process as perceived by the individuals in the central office personnel section is highly subjective. Only about 10% of the applicants are tested or interviewed for employment. This initial cut

appears to be very informal, and there was little indication that the criteria used at this state had been developed on the basis of predicted job success. In many cases relatively untrained personnel at the central office and at the divisions made choices that eliminated most of the applicants from further serious consideration. The procedure appears to operate in such a way as to produce acceptable candidates for employment with a minimum of information processing. Given the volume of applications relative to the number of openings, this may be the most efficient way to locate and hire satisfactory employees. However, it would be easy for qualified applicants to remain dormant in the files while less qualified candidates are selected for interview and testing. The initial screening at the divisions, and the weight apparently given to referrals by employed relatives, and to "fitting in" are factors that could limit the company's ability to locate and hire the most productive employees, and that could make it difficult for job applicants who are "different" to obtain employment with the company. The affirmative action "push" from the central office helps to ameliorate the problem with respect to minority job applicants, but the informal initial screening process is a potential source of inequity and inefficiency. The hiring decisions are based on a combination of tests and interviewer ratings, with the final choices made by operating management together with the employment supervisor. Each case is considered separately, and the only way to determine the criteria that are used in the exercise of managerial judgment is through an examination of the results of their decisions.

The proof of the pudding is in the eating, and the only way to identify the significant criteria in the two-step screening of job applicants is by studying the characteristics of the individuals who are selected. The initial screening, for interview and testing, and the hiring decisions, were studied separately. Analyzing the information that was available to the company at each step, we tried to fit models that would identify the significant variables in the selection process. Applicants for blue-collar jobs, all of whom were male, and applicants for white-collar jobs, were studied separately, because the two types of jobs are not comparable. Wherever possible, an attempt was made to fit separate models for black and white job applicants.

### Selection for Interview and Testing

White Male Applicants for Blue-Collar Jobs:<sup>3</sup> For white male applicants selection for interview was overwhelmingly dominated by relationships with individuals already employed by the company. The most significant variable was having a relative employed by the company, and the next most important variable was a referral from an unrelated employee. The other variables that were positively correlated with selection for interview were working at the time of application, a high school degree, and other education. A relatively small F and coefficient for the high school degree variable is probably explained by the fact that a high proportion of the applicants had a high school degree. In summary, the selection for interview was much more probable for those individuals who had relatives working for the company or were referred to the company by an employee. The chance of selection for interview was somewhat improved if the applicant was currently working, had a high school degree and had some additional education. There were small but statistically significant negative relationships between selection for interview and having held other employment, in particular, having worked in the steel industry, and having a college degree. It appears that the company may have been less willing to interview individuals who might return to employment in another industry and college degrees were apparently considered to be over-qualification.

<sup>2</sup>Refer to Appendix B

<sup>3</sup>Refer to Appendix C Table 2

Black Male Applicants for Blue-Collar Jobs:<sup>4</sup> Although having an employed relative helped black applicants be selected for interview the small numbers made this an insignificant factor in the selection process. The most significant variable in being selected for interview for black applicants was being referred to the company by a social agency. The company apparently gave significantly more attention to black applicants who came to them from social agency sources than to those who made application in any other way. Another relatively significant variable was having white collar experience, and the company showed some preference for black applicants who had worked previously at such jobs as switchboard operator, lab technician, and inspector. The chance of selection for interview for these applicants was reduced if they had previous work experience and in particular, if they had worked in the steel industry. The previous job variable is moderately correlated with unskilled work experience, and results should probably be interpreted as a negative reaction to individuals with that type of experience as well as a reluctance to interview individuals who might return to another job. Years of education was negatively correlated with selection for interview and this may be explained by the dominance of the terminal high school degree and a reluctance to interview individuals with more education. In summary, the company was substantially more likely to interview black applicants who had come to them from a social agency and individuals who had previous white collar employment experience. The latter may have been used as an implicit quality indicator, and is consistent with the negative effect of the previous job variable which to a substantial degree indicates previous unskilled employment. In the analysis of all male applicants<sup>5</sup>, the race variable and social agency referrals were identified as significant variables, indicating that the company had shown some preference for black applicants.

#### White Collar Job Applicants

Since hiring for white collar jobs is done for specific job openings that cover a wide range of employment requirements, it was necessary to seg-

<sup>4</sup> Refer to Appendix C Table 3.

<sup>5</sup> Refer to Appendix C Table 4.

ment the data by the type of job for which the individual applied. Separate analysis was done for applications for key punch, home economist, accounting clerk and secretary clerk jobs. The latter group which combined applicants for clerk, secretary, and steno-clerk jobs, was large enough to permit analysis of white and black applicants separately as well as an analysis of the total applicant population.

#### Key Punch<sup>6</sup>

The first screen of applicants for key punch jobs was heavily weighted by private agency referrals, and individuals who were currently working, primarily with key punch experience, were selected for interview. It would appear that the private agency referrals selected for interview were primarily those with clearly relevant skills and it appears that only such individuals were probably referred to the company.

#### Home Economist<sup>7</sup>

In selecting applicants to be interviewed for the home economist job the company appears to have responded positively to applicants who were referred by employees, those with college degrees and applicants with some blue collar experience. The latter would include previous work as a cook. The chance of being selected for interview was somewhat negatively affected by having worked in manufacturing and by early availability for employment. No single variable was dominant, although an employee reference was the most significant variable.

#### Accounting Clerk<sup>8</sup>

As in the case of the key punch job, selection of applicants for interview for the accounting clerk job was dominated by agency referral. The ability to operate adding machines and other office equipment also helped individuals be selected for interviews, and secretarial experience had a negative effect. It would appear that for a job that can utilize specific skills, the company relied very heavily on referrals from employment agencies and that specific skills were helpful.

<sup>6</sup> Refer to Appendix C Table 5, 6, 7

<sup>7</sup> Refer to Appendix C Table 8

<sup>8</sup> Refer to Appendix C Table 9

## Secretary-Clerk<sup>9</sup>

White applicants were more likely to be selected for interview if they were referred to the company by an employee or by an employment agency and if they had some period of other education. There is also some indication of preference for applicants who were not married at the time of their application. For black applicants the only significant variable that can be identified is referral by a private employment agency. In addition to being significant, private agency referral had a very high coefficient in the model, and no other variable added significantly to the variance explained. In summary, the chance of being selected for interview for the secretary-clerk job was substantially improved if the applicant was referred by a private employment agency or by a company employee. There was some preference given to black applicants but their selection for interview was substantially a function of being referred to the company by a private employment agency.

## Hiring Blue-Collar Employees<sup>10</sup>

Two hundred individuals were interviewed for blue collar jobs and fifty were hired. The problem of identifying those factors that were most significant in determining which individuals to hire is made difficult by the fact that there are high correlations among the variables that could have been considered in the selection process. This is particularly true of various categories on the interview form. There is a strong possibility of a halo effect; particularly since the tests were administered and their results seen by the personnel representative prior to the interview. One response to this problem was to test separate models using different sub groups of the highly correlated interview variables.

The first model included appearance, attitude, and overall verbal rating from among the interview variables. Analysis showed that the attitude rating on the interview was the most significant variable in the model with the highest beta value. The appearance rating was also significant. Having a relative employed by the company was positively related to selection for hire, and the score achieved on the mechanical test was positively related to being hired. On the other hand, individuals who had some other education (nonacademic post high school) were less likely to be hired by the company. Although our analysis dropped them

<sup>9</sup> Refer to Appendix C Tables 10, 11, 12

<sup>10</sup> Refer to Appendix C Tables 13, 14

from the model, it should be noticed that race and referral by a company employee just missed our test of significance. Black employees were more likely to be selected for hire as were applicants who were referred to the company by employees.

The second model substituted the overall rating for the interview variables that had been used in the first model, and none of the tests were included. The tests were dropped from this model because they were highly correlated with the overall interview rating. In this second model the overall interview rating dominated as an indicator of those individuals who were hired by the company. Having a relative employed by the company was positively related to being selected for hire, while having some other education appeared to decrease the probability of being hired. The very high significance of the overall rating in the blue collar hiring model may simply indicate that it is the interviewer's summary estimate of all the other information obtained from the job applicant. The overall rating is highly correlated with appearance, personality, ambition and the other subjective interview ratings, as well as with the mechanical and Wonderlic test scores.

It would appear that the interviewees' mechanical test score and the interviewer's judgment of his attitude and appearance were highly significant in being selected for a job. There was also significant evidence that individuals with relatives employed by the company were given some preference in being hired for blue collar jobs. It is interesting that having had some other education was not only not helpful, but appeared to decrease the probability of being selected for employment.

During the period studied, 10 individuals were hired for blue-collar jobs without going through the interview and test procedures. Five of them had previously worked for the company, possibly as summer employees, and four of the others were referred to the company by employees. Since these individuals represent a substantial fraction of the total number hired, their experience adds to the evidence that the informal communication network, knowing someone on the inside is important in gaining entry into company employment. In this regard, the data show that none of the black applicants who were hired were related to company employees or had been referred to the company by an employee. But four of the eleven blacks hired

for blue-collar jobs were referred to the company by the Employment Service.

Since all blue-collar hired were analyzed together, the results do not indicate the significance of variables that may be important to a limited number of jobs. For example, a review of the tabulated data indicates that particular skills and prior experience with the company increased the probability of being hired.

#### Hiring White Collar Employees

Since only 21 white collar employees were hired from the interviewed group, regression analysis was ruled out. However, the data was examined carefully in an attempt to identify the factors that distinguished the individuals hired from the interviewed population for those jobs for which several employees were hired in the same period.

Except for key punch jobs, the company apparently used the Wonderlic test either as a screening device to eliminate those with low scores, or as a criterion in selecting applicants who did particularly well on the test. For all jobs, the company preferred applicants with the specific skills required for the job and with experience in performing the particular type of work. Specific tests, such as typing, clerical, and number were utilized in selecting employees for jobs that used those skills. The applicant ranked highest on any one of these factors was not necessarily selected for employment, although a very high ranking on one criterion apparently could balance a relatively lower ranking on another. Selection for all of the jobs considered was based in substantial part on interviewer ratings, particularly on appearance and the overall interviewer rating. Personality, attitude and verbal ratings were also given weight. The applicant with the highest appearance rating was hired in four of the five job categories considered, and in all five the successful applicants were on average rated higher on verbal and appearance than those rejected. However, in all but two cases, there was an overlap of ratings between those hired and those who were not. That is, a rejected applicant had an interview rating that was at least as high as the lowest score of an individual who was hired.<sup>11</sup> The company was more likely to hire applicants referred by private employment agencies for Key Punch jobs, but agency referral was not a factor in hiring for the other jobs.

<sup>11</sup> Refer to Appendix C Table 15

Five white collar employees were hired without going through the testing and interview process, but four of them had previously worked for the company and the fifth was an engineer who had been referred by an employee. Evidently prior employment with the company made it possible to go through an informal hiring process, since the applicant was, in some sense, a known quantity.

For those hired through the normal procedure, the selections were based on skills, experience, tests, and interviewer ratings. The weights given to the various criteria varied in individual cases, and it is clear that subjective judgments were involved both in the interviewer ratings, and in the way the ratings and other variables were considered in making the hiring decisions. It would appear that the employment office had more influence over the hiring of white collar than blue collar employees, and that as a consequence, the preference for relatives of employees and for those referred by employees, that played a role in hiring for blue-collar jobs, does not surface as significant criteria.

## WHITE COLLAR EMPLOYEE PERFORMANCE

The company's screening process for the selection of new employees is based on the belief that the criteria used will identify successful employees. But after joining the company, the abilities and personal characteristics of the employees interact with experiences in and out of the organization to determine their relative performance. Courses taken outside the firm, internal training, job assignments and tenure with the employer are among the factors that can affect the employee's effectiveness in the organization. Theoretically, in order to assess the effectiveness of the company's hiring process, the performance of groups of employees with identical job assignments and job histories should be studied to determine if the hiring criteria were related to the observed differences in performance.<sup>12</sup> As an approximation, we analyzed the performance ratings of employees at each job level, and tried to identify significant relationships between the ratings and the information available for the individual employees.<sup>13</sup> To assess the company's screening process we were interested in the possible significance of variables that were available at the time of hire. In addition, we tried to obtain some insight into the operation of the firm's internal labor market by examining the impact of such organizational variables as tenure, location, and training. Unfortunately, interview forms had not been standardized over an extended time period, and it was not possible to include the various interviewer ratings in our analysis. However, test scores, which had been found to be correlated with interviewer ratings, were utilized to the extent that they were available.

The annual performance rating given to white collar workers was used as a dependent variable in models based on personal and organizational variables. The amount of variance explained by the models varied by white collar job level, and variables were identified as being related to the performance measure at different levels of significance. The details of the analysis are presented in Appendix D, but in the discussion that follows, the possible role of a variable in affecting performance was judged on the basis of both the level of statistical significance and the

<sup>12</sup> For an excellent discussion of this problem see Personnel Selection and Placement, Marvin Dunnette, Wadsworth Publishing Company, Belmont, California, 1966. Particularly, Chapter 6, "A Model for Test Validation and Selection Research."

frequency with which the variable was identified as having a significant relationship with performance ratings.

Although referral by a private employment agency was one of the significant criteria in the screening process, there was no indication that was related to the relative success of white collar employees at any job level. It is tempting to suggest that the agency referral criterion is not an effective predictor of performance, but it must be remembered that we have no information on how well applicants rejected on that basis would have performed. The use of private agency referral as one of the criteria used in selecting new employees could have helped the company recruit satisfactory employees in spite of the fact that the criterion is not significantly related to the relative performance of those who were hired. Nevertheless, the data indicates that employees selected on other bases did not perform significantly worse than those who were referred by private employment agencies. The same can be said for applicants who were referred to the company by employees. Although that criterion was used in part of the screening process for some white collar jobs, there is no evidence that employees who came to the company from that source performed any better than walk-ins or individuals who were referred by others. However, in some jobs the informal communication network may have an effect. In the lowest and highest jobs in the clerical-technical group (level 1 and level 7) employees who were related to employees of the company when they were hired received significantly higher performance ratings. But the evidence is mixed, since in job level 3, there is some indication that such employees received lower ratings.

The company used evidence of specific skills and experience to screen job applicants, and there is mixed evidence concerning the effectiveness of those criteria. The clerical test was identified as a significant variable in models for job level 2 and for job level 4 clerks, tending to validate the company's use of that criterion for secretarial-clerk jobs. On the other hand, the data indicate that employees who had office skills when they were hired receive lower performance ratings in job levels 1 and 6. Of particular interest is the fact that the criterion

does not appear to have been significant for relative performance in the other five job levels.

There is also mixed evidence on the utility of the Wonderlic test as a criterion for selection. It was apparently used as a factor in the hiring process in four of the five white collar job groups considered. However, analysis of the performance ratings shows evidence of some positive relationship to the Wonderlic test in only two of the seven job levels, job levels 2 and 4. The Wonderlic test results had a negative relationship with performance ratings in job levels 1 and 6, and the strongest evidence of significance was negative for job class 1. The key punch job, for which the Wonderlic was evidently not used as a hiring criterion, is in job level 2.

In summary, there appears to be mixed evidence concerning the effectiveness of the hiring criteria that were available for study. The paucity of evidence of significance is underlined by the variables that were identified as being significantly related to performance ratings. In six of the seven job levels, at the highest level of significance used in the analysis, the data showed that male employees received higher performance ratings than females in the same job levels. Since each job level is made up of a variety of jobs in some of which I am sure women are not equally represented, the sex variable may be a proxy for job title. However, the same result was obtained in the analysis of the job level 4 clerks, a group that was more homogeneous than the total job level population. Only in job level 7, which includes skilled technicians, executive secretaries and accountants, was there some evidence that female employees received higher ratings than their male counterparts.

There was also uniform evidence that performance ratings were positively related to length of tenure with the company. The "total years" variable was significant in models for all of the white collar job levels.<sup>14</sup> There is no way of determining whether this reflects learning and improvement on the job, or whether the social norm of the organization results in higher ratings for longer service employees. Possibly related to this finding is the evidence that in job class 1, employees with high school degrees received lower performance ratings than others at that level.

<sup>14</sup> Age was also a significant variable, but it was highly correlated with total years, and the analysis indicated that it was the period of employment, rather than age that was related to higher performance ratings.

Since almost all recent new hires have high school degrees, this may reflect the fact that employees with greater seniority tend to receive higher ratings.

There is some indication that white employees received higher ratings than blacks in job level 2 which included 13% black employees, and job level 3, in which 7.8% of the employees were black. The evidence for the disparity was stronger for the latter job level. Job level 1 included 31% black employees, and there was no evidence of any racial difference in performance ratings. There were no black employees at levels 6 and 7, and black representation at levels 4 and 5 was less than 3%.

There was mixed evidence on the importance of post-employment training and education for white collar employees. Secretarial courses had a negative relationship with performance ratings for employees in job levels 1 and 4, and general external courses, not supported by the employer, were associated with lower ratings for job levels 6 and 7. The direction of causation is not clear, since the data may simply indicate that employees with shortcomings take outside training of this type to improve their status. Gas distribution courses were associated with higher ratings in job levels 4 and 6; approved business courses had a positive relationship with ratings in job level 5; miscellaneous approved courses had a significant positive relationship with performance ratings in job level 3; and internal training and technical courses were associated with higher ratings in job level 7. It cannot be concluded that these courses helped improve employee ratings, since the employer may have selected those with higher ratings for internal training or for sponsorship of outside courses.

It must be noted that the amount of variance in performance ratings in some job levels was relatively low and all cases most of the variance is a function of individual differences and organizational factors that have not been captured by our models. However, there is enough evidence to raise questions about the effectiveness of some of the screening criteria used by the company, and substantial evidence that female employees are at a disadvantage in performance ratings. In the stable environment of the Utility company it appears that tenure of employment has a substantial impact on performance ratings, and that some post-employment training is either an aid to performance rating or a sign of recognition of superior performance.

## Exempt Positions

Performance ratings were analyzed for three levels of the exempt Supervisory, Administrative and Professional Personnel. For Job Level 20 which included Buyers, Office Managers, Sales Representatives, and Instructors among its job titles, older employees with longer tenure with the Company received higher ratings. The same was true for individuals who had prior work experience, particularly in the gas industry. Employees in this group who had moved up in the organization most rapidly also appeared to receive higher performance ratings. At this level, the female employees received higher ratings than their male counterparts.

Performance ratings of foremen, who are at job level 30, were studied. One interesting result was that their ratings were negatively related to their scores on the Bennett mechanical test. At this level, foremen who moved to their positions in the smallest number of steps received higher ratings than others, as did individuals who took high school equivalency courses. Once again, the direction of causation is suspect since those with the best performance ratings might have been moved up fastest, and those with the drive and motivation to achieve higher performance ratings might also have had the motivation to complete their high school education.

Job Level 40 included a wide variety of supervisory positions, and there may not have been enough homogeneity to obtain meaningful results. However, at this level rapid promotion and prior experience in the gas industry were negatively related to performance ratings. It may be that administrators at this level are mostly long service employees who have made stable careers with the company. The only variable that had a positive relationship with performance ratings was the Dale Carnegie course. At this level successful human relations may be the key to success, or at least a successful evaluation.

## Validity of Performance Ratings

All of the above analysis was based on performance ratings, not on actual performance. They represent one indication of the organization's evaluation of its employees but they may not be accurate measure of employees' effectiveness. Over the period from 1969 through 1973, there

were some persistent differences in the average performance ratings awarded by the different divisions. In three of the five years (1971-1973), location G had the highest average performance rating and in the other two years, only one other division had a higher average. Similarly, Location F gave the lowest average rating for three of the five years (1969-71) and was one away from the bottom in a fourth year. Persistent differences of this kind may represent different standards of evaluation, but they may also reflect differences in age, seniority, and time in grade, at the different locations. The normal expectation is that individual ratings will move toward the top as an individual remains in a job, and the evidence shows that pattern. In some years, Location G had a model figure of 5 (top) for its performance ratings. Of the 32 year to year changes in average ratings represented by the data, 21 were increases while the ratings went down only 11 times. These figures raise serious questions about the true relationship between the ratings and individual performances.

#### Performance Ratings and Merit Increases

Presumably one role for performance ratings is to motivate superior performance. At the company studied, the yearly salary increases are partly a response to the individual's level of performance, but in the system used by the company, the salary change is a mechanism through which the individual's salary level within grade is brought into consistency with his relative performance ratings. As a consequence of the latter constraint, individuals with salaries at the upper end of the range may not receive annual merit increases that reflect their relative performance. The data show a strong relationship between performance ratings and the salaries of the individuals being rated. This can be taken as a form of confirmation of the system, i.e. that individuals who have moved to the upper end of the salary range through merit continue to perform in a relatively superior fashion. However, it may also indicate a reluctance on the part of the supervisors to give individuals relative ratings that are lower than their relative

position on the salary scale! As an expected consequence, the relationship between performance ratings and the resultant percentage merit increase is very small and in some cases, negative. A system of this kind does not provide a differential reward for differential performance, although theoretically individuals at the upper end of the range who performance falls would receive small increases. In practice, however, the constraints of the salary range and the reluctance to reduce performance ratings appear to dominate and the net result is that there is no effective differential reward for performance.

The structure of the system also produces a negative relationship between the salary of the individual being rated and the percentage increase awarded. Those who are at the upper end of the range tend to receive lower percentage increases than individuals at the bottom of the range. This is another way of looking at the absence of incentive in the constrained merit system. Individuals near the top of the range tend to receive higher performance ratings but lower percentage merit increases.

Analysis of normalized merit increase data established performance ratings, and salary level before the increase, as the only variables that explained significant variance. Job level, location, and supervisory endorsements did not appear to be significant. Prior to the 1971 imposition of wage controls, supervisors were asked to select a per cent increase within a range that would bring the individual's salary and performance rating into conformity. This added a constraint to the system at the intermediate level similar to the structural constraint at the top of the range. After the imposition of the 1971 wage controls, a more structured method of calculating merit increases was instituted and as a consequence the individual's merit increase was more directly and automatically responsive to a combination of the performance rating and the individual's relative salary within the range. The data show much more unexplained variance in the 1969 to 1971 period than in 1972 and 1973. In the latter two years the two variable model explains over 70% of the variance and over 80% in 1973. When both variables are included in the model performance rating is significantly related to the merit increases. It indicates that given the salary level

merit increases are directly and positively related to performance ratings. But that given the performance rating, merit increases are significantly and negatively related to the salary level at which the individual is rated. In summary, the data shows, as one would expect from analysis of the structure of the system, that as individuals moved to the upper level in a given salary range the incentive as measured by merit increases tended to decrease.

The use of the more structured system of awarding merit increases increased the relative impact of the performance ratings on the merit changes. Although the negative relationship between salary level and wage changes continued to be strongly negative, there was visible evidence that performance ratings were positively associated with the merit increases.

## WHITE COLLAR PROMOTION RATES

Another measure of white collar employee performance, or rather of the employer's recognition of performance, is an employee's rate of progression in the organization. This variable was analyzed to see if any of the screening variables, or other information available at the time of hire, was significantly related to the promotion rate.<sup>15</sup> In addition, organizational data were studied to see if we could identify other factors that were related to upward mobility in the firm.

For employees in exempt classifications, there was little evidence that the hiring criteria that could be studied were related to this measure of success. In fact, scores on the clerical test had a significant negative relationship with the rate of promotion, and there was some indication that employees who had specific office skills when hired were promoted less rapidly than others. There was some evidence that the judgment test was positively related, and the memory test negatively related to promotion. Weaker evidence (low level of significance in a single model) suggested that the Mechanical and Wonderlic tests were positively related to the promotion rate.

Of the other information available at the time of hire, prior utility industry experience appeared to be positively related to promotion, with small retail experience having the opposite relationship. Of particular significance is the finding that individuals who were related to company employees when they were hired had significantly higher rates of promotion.

The promotion rates of exempt employees were significantly related to their work locations, with company headquarters having the strongest positive relationship with progression. This is largely explained by the greater opportunities for advancement at headquarters, but there is evidence of other significant differences in upward mobility at the various locations.

15

Refer to the tables in Appendix E for the statistical analysis of white collar promotion rates. As indicated above, interview ratings were not available for use in our models of performance. However, analysis of hiring data indicated a positive correlation between test scores and over-all interviewer ratings. When test data were included in these models, the sample was limited to individuals who had been given at least one test. Averages were used to fill in for missing data.

Younger employees, or these with fewer years of employment with the company, had higher promotion rates than their more mature colleagues. This finding reflects the pyramidal structure of the organization, which provides fewer opportunities for advancement as one progresses up the job ladder. As employees gain experience with the company and are promoted to more responsible positions, they reduce their chances for subsequent promotions. Since corporate management does not have an "up or out" philosophy, older employees in terms of age and experience with the company, will have lower promotion rates than those who are still on the way up.

Exempt employees may have been able to help their promotion prospects through continued education and training, although only two of the course types available to them had a significant positive relationship with promotions. Gas Distribution courses had a significant positive relationship with progression, and there was some evidence that engineering courses were positively associated with promotion. There is, of course, the possibility that sponsorship for these courses was an independent sign of recognition, and that they did not have any effect on promotion opportunity. Business courses, and miscellaneous other courses approved by the company, had a negative relationship with the promotion rate.

For non-exempt employees, two of the screening criteria were positively associated with promotion rates. Employees who had special office skills before being hired, and those with some post-high school technical education had higher promotion rates than their peers. As in the case of exempt employees, the results of the clerical tests had a significant negative relationship with the rate of progression, and there was weak evidence that those with higher scores on the Wonderlic test were more likely to be promoted.

Although not significant in the screening process, prior utility experience was positively related to promotion while experience in manufacturing and small retail establishments was associated with lower promotion rates. For these non-exempt positions, it would appear that academic education was not related to upward mobility. Employees with college degrees had lower rates of progression, and there is some evidence that years of education was negatively related to the promotion rate. For non-exempt employees, the age variable appeared to dominate

the "plateau" effect of company tenure. Younger employees had higher promotion rates than their older colleagues. Differential opportunity may explain part of the effect, but there is some indication that the company promoted younger employees more rapidly. One possibility is that the younger employees were rewarded for greater efficiency. But the data do not support the hypothesis that performance ratings were significant in determining promotions. The performance ratings of exempt white collar employees were not significantly related to promotion rates, and for non-exempt employees there was a significant negative relationship between performance ratings and the rate of progression. This supports the view, suggested earlier, that the performance ratings were distorted by their role in salary administration, and may not represent a valid measure of performance. Performance ratings for white collar employees were positively associated with age and tenure, and administrators were apparently reluctant to give anything but the highest rating to individuals who had achieved the top of their job range. Since older employees had lower rates of progression, this bias would cause a negative relationship between ratings and promotions.

Again in the non-exempt group, individuals who were related to company employees when they were hired, appear to have been promoted more rapidly than those who were not. There is also some evidence that male employees may have had higher rates of progression than their female colleagues.

Non-exempt employees were apparently able to improve their promotion rates through job related training and education. Those who took gas distribution, engineering, technical, secretarial, and other approved courses, had higher promotion rates. However, individuals who took courses toward the completion of a college degree appear to have had lower rates of progression.

It must be emphasized that most of the variance in promotions rates was determined by characteristics, experience, and relationships that were not included in our analytical models. Particularly for non-exempt employees, our models explained a relatively small fraction of the total variance and the best models for this group were based on a curtailed sample of employees in job levels 5, 6, and 7. However, in summary, the

data suggest that for some levels of white collar workers, office skills and non-academic education, which were used to screen job applicants, were positively related to promotion rates. The evidence on tests is mixed, since the clerical tests appear to predict in the wrong direction, and the evidence of a positive association of the progression rate with the Wonderlic test was weak. Prior experience in the utility industry was positively related to progressions, and the informal communication network appears to impact on promotions. Having a relative with the company was associated with more rapid promotion for both exempt and non-exempt employees. The data cast some doubt on white collar performance ratings as a measure of effective performance, since they were either not significant, or negatively related to promotion rates. Employees may have been able to improve their promotion prospects by taking job related courses, and there is some evidence that younger and male employees were more upwardly mobile than others. Promotion experience varied among the company's locations, and the best prospects for promotion were found at headquarters.

## WHITE COLLAR TURNOVER

From the company's point of view, another measure of successful employee performance is the rate of retention. Turnover reflects the cost of unsatisfactory employees, and the firm's inability to retain those who do meet the company's standards. In either case the terminated employee has added to the company's costs. In the subject company, over 67% of terminated employees left voluntarily, 29% to take another job, and 25% in the process of leaving the labor force. Only 16% of those terminated were either discharged or essentially coerced into leaving. Almost 37% of those terminated were rated as above average or outstanding, and over 75% were average or above. These ratings may be subject to some question, since supervision indicated that it would prefer not to re-hire about 60% of the terminated employees.

We analyzed the company's turnover experience in an attempt to determine if employment screening criteria were related to this measure of employee performance, and to try to identify some of the factors that might affect termination rates.<sup>16</sup> We first studied white collar employees who were hired since 1968, and identified the variables that were significantly related to termination in the first two years of employment. At the 95% level of significance, our models indicated that younger employees had higher termination rates, and that the employer found it easier to retain new employees who received higher performance ratings. High school graduates and individuals with some non-academic education were more likely to stay through the first two years, but having prior miscellaneous work experience increased the probability of early termination. At a lower level of significance, the first two years, and the same was true for college graduates. Employees who were related to employees when hired had a higher retention rate than those without family connections.

Since the turnover problem is not confined to new hires, we used an "on-board" model to study the retention of employees who were already employed by the company at the beginning of the study. A continuous variable was used as a measure of their retention during the period of the study. The results show a dramatic contrast. When compared with the

<sup>16</sup> Refer to the tables in Appendix F for the statistical analysis of termination rates.

turnover analysis of new hires, the relationships were reversed for the sex, age, performance rating, and other education variables. Employees "on-board" were more likely to leave the company's employment if they were man, older, had received high performance ratings, and had some non-academic post-high school education. Some part of these results can be explained by the retirement of older employees, who, as we have seen, tend to receive higher performance ratings. But the evidence seems to indicate that relatively good employees were more likely to leave. That conclusion is supported by the fact that higher promotion rates were associated with higher rates of termination.

These results illustrate the fact that turnover experience with new employees does not provide a valid base for manpower planning. Although young employees and female employees may leave their employment more readily than older and male workers when they are first hired, they become a relatively stable part of the labor force after they have been regular employees for some time.

## BLUE COLLAR PERFORMANCE RATINGS

Blue collar workers were given periodic performance ratings, and we tried to use these data to determine if the company's employment screening criteria were related to this measure of performance. In addition, we tried to identify other factors that might have an impact on the performance ratings.<sup>17</sup>

We were able to place the blue collar jobs into logical groups for the purpose of analysis, so that the results would not be distorted by differences in the type of work. For example, separate groups were defined for apprentices, unskilled workers, meter readers and similar jobs, semi-skilled and skilled workers, and truck drivers. The groups were then broken down into job levels, and each level was analyzed separately, based on the performance ratings for that level. These groupings were necessary for the development of satisfactory models, although as a consequence, some groups could not be analyzed because they were not large enough to provide significant results. The discussion below is based on the analysis of two levels of group 2, general labor and trainees, and four levels of group 5, semi-skilled and skilled workers.

The Mechanical test used by the Company to screen job applicants proved to be a significant variable in four of the six job groups that were analyzed.<sup>17</sup> In three of them (5-5, 2-1, 2-2) employees with higher test results received higher performance ratings. In one group (5-4) the relationship was negative. Employees with higher test scores received lower ratings than those who did not do as well on the tests. It is interesting to note that two of the groups that showed a positive relationship between test results and ratings were made up of entry level jobs, where general mechanical aptitude is more likely to have relevance than in higher level jobs that require substantial training and experience. Although the interviewer ratings given during the hiring process could not be used for this analysis, the test scores were correlated with overall interviewer ratings. This would indicate that for three of the groups, blue collar performance ratings were positively related to interviewer judgments.

<sup>17</sup> Refer to Appendix G for a table showing the significant variables in the analysis of blue collar evaluation.

Our earlier analysis had indicated that job applicants were more likely to be rejected if they had more than a high school education, and that having a college degree had a negative effect on the chance of being selected. In the analysis of performance ratings, the education variables showed mixed results. In two of the semi-skilled and skilled groups (5-4, 5-7) a college degree and years of education showed a negative relationship with the ratings. However, in the lowest skilled group studied (2-1), there was a significant positive relationship between years of education and performance ratings. The positive relationship between education and ratings for lower level jobs was reinforced by the fact that in group 2-2 (trainees), having a high school degree was positively related to ratings. The opposite relationship was seen for one of the higher skilled groups (5-5).

We have seen that job applicants who were related to company employees had a better chance of being selected for employment than others. There was some evidence that being a relative of an employee was associated with the performance ratings that were given in four of the six groups. In three of them (2-1, 2-2, 5-2) having a relative working for the company when hired was associated with higher performance ratings. In one of the groups (5-5), being a relative had the opposite effect. In the absence of an independent measure of performance, there is no way of determining whether the higher ratings for relatives resulted from preferential treatment, or whether the preference given to relatives in the hiring process led to the employment of superior workers. This result may be associated with the fact that in the three groups that appear to have given higher ratings to relatives, there was a significant relationship between race and ratings. In all three groups, black employees received lower ratings than whites. There are many possible explanations of the results. The black employees in these entry level, unskilled or low level semi-skilled jobs may not perform as well as others in their groups. This would suggest that the preference given to black job applicants led to the hiring of less qualified workers. There is also the possibility of racial bias in the ratings, possibly compounded by the fact that the black employees are less likely to benefit from any halo effect associated with having a relative working for the company. Our analysis cannot determine which of the explanations is valid, but the results could

be used to alert an employer to the possible existence of a problem.

The Wonderlic test, which was not a significant variable in the blue collar selection process, was positive related to performance ratings in two of the groups (2-2, 5-7), and showed the reverse relationship in one (5-5). Employees who had indicated that they possessed specific manual work skills when they were hired received significantly lower performance ratings in three of the groups (2-2, 5-2, 5-7). This is a surprising results, and may indicate that employees without specific skills are more open to training, and that the company's blue collar jobs did not permit them to use the skills they brought with them.

Less surprising was the finding that in the entry level group (2-1) older employees received higher performance ratings than younger employees in these jobs. This may indicate some bias against youth, but it is likely that more mature workers took their jobs more seriously. At this level, age and length of service measure different dimensions. The higher ratings went to older employees, not those with more seniority. In three of the groups, (2-1, 5-2, 5-5-) length of service with the company was negatively related to performance ratings. In only one group (5-4) was there a positive relationship. For the entry level unskilled job, and for the lowest level of semi-skilled classifications, this suggests that newer employees perform better than those who have stayed in the job for some period of time. In general, these results indicate that employees who progress more slowly are those who receive lower ratings. It is interesting to note that the group in which seniority was positively associated with performance ratings, was the same group in which the mechanical test results had a negative relationship with the ratings. It appears that in this group experience was an important factor.

Our analysis indicated that performance ratings in five of the six groups studied were positively related to a number of the training courses taken by employees. Only in group 5-2, was there no significant relationship between ratings and any of the courses. Gas distribution training and general internal training were each associated with higher ratings in three of the groups. In a few cases training activities were associated with lower ratings, which may indicate that in some instances courses were used to try to make up deficiencies.

Work location is another factor that may have affected performance rating. Place of work was identified as a highly significant variable in models for all of the work groups, but the direction of the relationship was not uniform for most locations. One division was associated with higher performance ratings in five of the work groups, and in another the relationship was positive in three of the four groups for which that particular location was a significant factor. Another division of the company was associated with lower ratings in three groups and with higher ratings in a fourth. It was not possible to determine if these differences were associated with different standards or with different mixes of employees. However, evidence of persistent and relatively uniform bias in one or the other direction should receive some attention from management.

In summary, our analysis indicated that some of the criteria used by the company in screening job applicants were related to blue collar performance ratings, although the relationships were not uniform. The mechanical test appeared to have some validity, and for some groups, the wonderlic test scores were positively associated with ratings. Employees who had relatives working for the company received higher ratings, which is evidence for the existence of, or the effectiveness of the informal communication network. The data raised the possibility that black employees did not perform as whites in lower level jobs, or that their ratings suffered from racial bias. Ratings were apparently not used to reward senior employees, which supports the view that the performance ratings were reasonable indicators of employee effectiveness. Ratings were affected by location, and by post-employment training. The latter result indicating that in many cases employees could effect their ratings through training and education opportunities made available by or supported by the employer.

## BLUE COLLAR TURNOVER

In our discussion of white collar employees we have already noted the importance of turnover as a cost item and as a measure of successful employee recruitment. As expected, our analysis of blue collar workers indicated that younger employees and women were more likely to leave the company's employment in the first two years. There is some evidence that black applicants were given preference in the employment screening process, but that group appears to have a higher than average short term turnover rate. A college degree, which appeared to decrease the probability of selection for employment, was also associated with higher rates of turnover in the first two years. There was evidence of preference for relatives of company employees in the rehiring process, and our analysis indicates that individuals in this category were more likely to stay with the company for the first two years. New employees who had some post-high school education were more likely to leave, as were those who had some blue collar work skills. High scores on the Wonderlic test were associated with a high turnover rate in the first year of employment, and the same is true for employees who had prior work experience in the Utility industry. To some degree these results indicate that the mobile, better educated, more intelligent, new employees were more likely to leave their jobs in less than two years. They presumably had more opportunities and could take advantage of them. Of course some of the terminations were involuntary, or the result of unsatisfactory performance, and our analysis shows that employees with low performance ratings were more likely to terminate their employment during the first two years than were employees with higher ratings.

To the extent that the short run termination data can be used to assess the criteria used in hiring, it appears that the employment screening process helped short run stability through the recruitment of relatives, and through the negative weight given to college degrees and post-high school education.

As was true in the case of white collar workers, the picture changes dramatically when the turnover of regular employees is examined. In contrast to the results of our analysis of new hires, women and younger employees

had lower turnover rates, and employees with college degrees were more likely than others to remain with the company. Regular blue collar employees with high performance ratings left the company after shorter periods of employment than did those with lower ratings, and there is some evidence that white employees and those with relatives employed by the company, had higher turnover rates. Of particular interest is the finding that higher scores on the Mechanical test were associated with a higher probability of termination, and there was some evidence of the same relationship for Wonderlic scores. To some degree these findings reflect the retirement of older workers, but they illustrate again the fact that the attachment of employees to a firm changes substantially after the initial period of employment, and after a regular employment relationship has been established. Short run turnover is substantially affected by that part of the labor force that is engaged in active search, and has not yet made a commitment to an occupation or an employer. New employees who are able to obtain high performance ratings find reinforcement with the company, and those who are discouraged by low ratings tend to leave. The regular labor force is more stable, and turnover in this group is related to different factors. White employees, those with higher test scores, and higher performance ratings undoubtedly have the best alternative employment opportunities, and as a result are more likely to terminate voluntarily.

Our analysis of the turnover experience of regular employees has illustrated an interesting dilemma. The employment criteria are designed to recruit the best employees from among the job applicants. To the extent that the selections are successful by this measure, short run turnover may be curtailed. In particular, there will be a low level of involuntary termination. But after the initial period of employment those employees with high mechanical aptitude, and who are able to achieve high performance ratings are those who are more likely to leave for alternative opportunities. Even the company's investment in training opportunities may make it easier for employees to go elsewhere. To some degree retention is made more difficult by the quality achieved through employment screening. Perhaps the most unkind cut is that even those who had relatives employed by the company when they were hired, and who may have been shown some preference

as a result, appear to have the higher termination rates after the initial period of employment than do those who have not benefited from such a relationship.

## SUMMARY AND CONCLUSIONS

Perhaps the most important lesson to be learned from this study is the difficulty of pinning down and identifying the significant variables that may be related to personnel decisions and employee performance. Personnel record systems are normally not designed or administered to provide for an audit of the company's decisions, and the processes that the records track are themselves subject to frequent change. Application forms, tests, and interview procedures are modified in response to the employer's experience and requirements. The jobs to be filled change over time, and with them the criteria for selection. Interviewer ratings that are part of the selection process are the result of subjective judgments made by a number of different individuals. The recorded data do not provide a basis for distinguishing between variance in application population and variance caused by differences among the interviewers. Performance measures are difficult to come by, and those that are available may not always reflect employee effectiveness. In this study, periodic ratings given to white collar employees were used as one measure of employee performance. But the ratings were awarded within the context of a merit increase system, and the constraints of that system led to ratings that were not solely measures of performance. Even the promotion rate, which was also used as a measure of employee success in the organization, may be more of a reflection of the company's promotion philosophy and policies, than a valid indicator of relative performance. But even if all of the data were true measures of relevant factors, the complexity and instability of the system would make it very difficult to identify variables that were significantly related to the selection and performance of employees. Each individual considered is a unique case, and the decision rules that result in the acceptance or rejection of job applicants may vary considerably as different applicants are considered by different management personnel. In this study we made the heroic assumption that there would be sufficient stability in the process and that the available measures would be reliable enough to enable us to

identify some of the factors that may be related to selection and performance. Our analysis provided some insight into the company's selection of new employees, and we were able to identify variables that appear to be related to different measures of employee success. These findings may be useful as indicators of some of the factors that influence the company's decisions that affect employee success, but our models were able to explain only a fraction of the variance in any case. The unexplained variance represents characteristics, processes, and circumstances, that affected employee selection and performance but were not captured by our analysis. The failure of many apparently relevant variables to survive the tests of significance is an indication of the complexity and limited stability of the processes that were studied.

The Utility company received a large number of unsolicited job applications, most of which were walk-ins, in spite of the fact that they hired few employees. This made it possible for the company to rely primarily on its most recent applications when an opening occurred, and an individual who was not hired after going through the interview and testing process would normally not be considered again unless his or her qualifications were outstanding. Under this system the most qualified applicants in the files could easily be overlooked.

Walk-ins and referrals from employees produced more than enough job applications in most areas. However, for some specialized white collar jobs the company made regular use of a few private employment agencies.<sup>18</sup> Referral from commercial agencies was a significant factor in the initial screening for all white collar jobs. The company depended on the agencies to send it applicants who met its normal requirements.

The initial selection of individuals to be considered from the pool of applicants was very informal, and apparently not based on any explicit criteria. To some degree the process was decentralized, with some of the first level screening, particularly for blue collar jobs, done at the divisions by managers who used their own criteria for selection. This made

<sup>18</sup>Gordon, Margaret S. and Margaret Thal-Larsen, Employer Policies in a Changing Labor Market, Institute of Industrial Relations, University of California, Berkeley, July 1969.

Trevor Bain, Labor Market Analysis: A Review and Analysis of Manpower Research and Development, Draft Report, Center for Policy Research, Inc. New York, N.Y. June, 1975.

it difficult for the company's personnel officer to influence the initial screening except at the headquarters location. It is not surprising, therefore, that in the selection of blue collar employees for interview and testing, applicants related to company employees, and those who were referred by employees, were given preference. This preference was significant only for white applicants. Presumably because the personnel officer had more influence over white collar hiring, their selection for interview and testing was not significantly biased in favor of relatives, although employee referral was a factor.

Applicants were recommended for employment on the basis of a number of interviewer ratings and test scores. The final decisions were made jointly by the division managers and the personnel officer. Particularly for blue collar workers, the selection process appeared to be very subjective, with emphasis on selecting employees who would fit in. Relatives of employees were given preference, employee referral seemed to have some influence, and the interviewer's ratings of attitude and appearance were significant factors. However, scores on the Mechanical aptitude test were significant in the hiring decisions, so that selection was not based simply on subjective judgments. In hiring white collar employees, scores on the Wonderlic test, and on specific skill tests were significant factors, and evidence of specific skills and relevant experience was considered. However, interviewer ratings of appearance, attitude, and personality, were apparently given considerable weight, leaving room for subjective interviewer judgment.

The study shows that there is an informal communication network based on employees who are relatives, or who refer applicants to the company, that is significant in the employment of white workers. Some whites find their paths smoothed because of previous summer employment or other contacts. Blacks evidently do not benefit from the same informal process, and their employment is more likely to be the result of the company's explicit affirmative action program. The personnel officer actively seeks out qualified black applicants, and urges their consideration on division managers.

Social agencies and the employment service are sources of candidates. The latter agency provided almost half of the black applicants hired for blue collar jobs. The informality of the initial screening, the hiring process, and the subjective nature of some of the criteria that are significant in the selection decisions, leave the system open to preferential treatment, and discrimination. But as a result of the strong push from the personnel officer at headquarters it appears that overall black applicants have a somewhat better chance of being hired than whites. Blacks were less than 9% of the total applicants, and they represent over 17% of those hired. Our analysis of the hiring process established that preference for blacks was a significant factor in blue collar selection and in hiring for some white collar jobs.

There is mixed evidence on the validity of the company's hiring criteria. Unfortunately interview rating data were not available, but test scores that were correlated with overall interviewer ratings were studied. The Mechanical aptitude test used to screen blue collar applicants was a significant variable in models of blue collar performance ratings in three of six wage earner groups including two entry level groupings. There was a negative relationship in one group. Of interest is the fact that the Mechanical test had a negative relationship with performance ratings given to foremen. The selection of relatives was associated with higher performance ratings in three groups, and with lower ratings in a fourth. Relatives also appeared to have lower short run turnover rates. It appears that the factors that were significant in selecting blue collar workers, particularly white employees, were positively associated with performance in some groups. However, in some cases the relationship was reversed, and the picture is clouded by the fact that black employees received lower blue collar performance ratings than whites.

For white collar employees the record does not provide strong evidence for the effectiveness of the hiring criteria. Neither agency referral or employee referral were related to any performance measure. High scores on the clerical test were associated with high performance ratings, but they were also associated with lower promotion rates. The Wonderlic test

showed both positive and negative relationships with performance ratings at different levels, and a weak positive relationship to rate of progression. Office skills showed a negative relationship with performance ratings at two levels, and with the promotion rate of exempt employees. There was a positive relationship with the rate of progression of non-exempt white collar workers. Paradoxically, employees who had relatives working for the company when they were hired were associated with higher performance measures in two rating groups, with higher exempt and non-exempt promotion rates, and with lower short run turnover. The analysis did not indicate that relatives were given significant preference for white collar jobs. It is possible that the relationship affected their ratings and promotions. It is also possible that employees who have relatives working for the company find it easier to identify with the company's goals, are more highly motivated, or have other characteristics that enable them to outperform other employees. The mixed evidence on the effectiveness of the hiring criteria is underlined by the finding that male employees and white employees were significantly associated with higher white collar performance ratings. The racial differential in ratings was significant in levels 2 and 3, each of which included a relatively small percentage of black employees. It was not present in the lowest level where 31% of the employees were black. In addition, male employees in non-exempt classifications had higher rates of promotion than women. The analysis suggests the possibility of discrimination against women and blacks. But for whatever reasons, they were rated lower on the available indicators of performance.

White collar performance ratings were higher for older, more senior employees, and there was some evidence that this finding was related to a bias in the rating system caused by the constraints imposed by the company's merit rating system. There was some evidence that older blue collar workers at some levels received higher ratings, but the higher ratings were not associated with longer tenure for this group. Both blue collar

workers and white collar workers appeared to be able to improve their performance indicators through training or education made available by the company. This effect was largely confined to technical job-related courses. Academic courses taken as part of degree programs were not associated with higher ratings or promotion rates.

Our study found that short run turnover was highest for employees who were young, female and who had transferable skills. New hires with relatives working for the company showed closer ties to the company and had lower turnover rates in the first two years of employment. Black employees, and those with low performance ratings were more likely to terminate their employment in this period. We found that after the first two years, younger and female employees, and black employees, had lower turnover rates. White employees and those with higher performance ratings, who would find it easier to obtain alternative employment, had higher termination rates.

Our study provides convincing evidence for the importance of effective, monitored, affirmative action programs. The selection process includes very informal elements that eliminate job applicants from consideration without reference to any explicit criteria. An informal communication network appears to result in preference for relatives, and others with inside connections, and its benefits accrue only to whites.<sup>19</sup> The hiring decisions are based in part on subjective judgments, and on some criteria that are not clearly related to job performance. The performance measures themselves are subject to some question, and there is evidence of possible discrimination in the rating process. The selection decisions are partly decentralized, so that they are not necessarily based on uniform standards or policies. The hiring of black employees is largely the result of explicit pressure from the personnel officer at headquarters, who has limited ability to influence the decentralized selection process. Although the company has been successful in recruiting

<sup>19</sup> Hiestand, Dale L., Discrimination in Employment, Ann Arbor Institute of Labor and Industrial Relations, The University of Michigan-Wayne State University, February, 1970.

and hiring black employees, its results have been achieved in spite of the system that has a built-in preference for whites. At some point, black applicants may find their paths smoothed by some type of informal communication network that now operates in favor of whites, but that time has not yet arrived. Until it does, the ability of black employees to enter the company's internal labor market, and the progress of blacks and women in the organization, is likely to depend in large part on effective affirmative action.

Efficiency as well as equity is a goal of manpower management. The absence of explicit selection criteria, and the informal decentralized decision process, suggested limited the company's ability to hire the best available employees. The informal preference system appeared to select individuals who fared well on the performance measures, but there remains the possibility that the same preference that resulted in their employment, improved their performance indicators. Our study indicates that the company should conduct a critical examination of its rating systems. There appears to be the possibility of systematic differences among the company's divisions, distortions related to the constraints of the merit increase system, and informal norms that keep the ratings from being used as reliable indicators of performance.

Our project illustrates the difficulty of administering a rational internal labor market. A continuous research activity would be required to insure that the system was operating in accordance with the organization's goals. Performance measures, personnel records, and data collection would have to be designed so that they could be utilized effectively in making personnel decisions, and in assessing the results of internal labor market policies. The complexity of the system, and the large number of factors that may be involved in each decision, suggests that statistical analysis would have to be supplemented by a continuous audit of the process itself to insure that the informal system, that always operates, does not frustrate the company's goals.

TABLE 1  
JOB APPLICANTS

Individual Characteristics	Total		Interviewed Only		Hired	
	N	%	N	%	N	%
<b>Sex</b>						
Men	2122	70.4	153	69.2	71	77.2
Women	891	29.6	68	30.8	21	22.8
<b>Age</b>						
Average		23.6		24.3		
Less than 18	165	5.5	4	1.8	1	1.0
30 or over	337	11.2	32	14.5	8	8.6
25 or over	790	26.2	61	27.6	26	28.2
<b>Race</b>						
White	2745	91.1	177	80.0	76	82.6
Black	268	8.8	44	20.0	16	17.4
<b>Married</b>	1222	40.6	106	48.0	40	43.5
<b>Divorced and Separated</b>	75	2.6	10	4.5	1	1.1
<b>Dependents</b>						
0	2004	66.5	139	62.9	59	64.1
1	424	14.1	37	16.7	15	16.3
2	331	11.0	22	10.0	11	12.0
3	166	5.5	14	6.3	6	6.5
>3	88	2.9	9	4.1	1	1.1
<b>Education - years</b>						
Average		12.9		12.9		12.9
12	1961	65.1	169	76.5	46	60.9
>12	982	32.6	45	20.3	36	39.2
12 or greater	2944	97.7	214	96.8	92	100.0
<b>High School Degree (those who specified)</b>						
Academic	1070	39.4	58	28.2	38	45.2
Business	724	26.7	55	26.7	14	17.9
General	618	22.8	74	35.9	24	28.6
Technical/Vocational	255	9.4	14	6.8	7	8.3
None	47	1.7	5	2.4	0	0.0
<b>College Degree</b>						
Accounting and Bus. Adm.	170	5.7	5	2.3	1	.1
Engineering and Science	81	2.7	0	0	3	2.2
Liberal Arts	141	4.7	5	2.3	2	2.2
Associate Degree	150	5.0	9	4.1	9	9.8
<b>Other Education</b>						
At least 1 year (of those who did) Average	278	9.5 9 mos.	18	7.9 mos.	4	7.0 mos.

TABLE 1 (Cont.)

<u>Work Experience</u>	<u>Total</u>		<u>Interviewed Only</u>		<u>Hired</u>	
	N	%	N	%	N	%
Previous job (any)						
None	275	9.1	17	7.7	6	6.5
Now working	1008	33.4	97	43.9	43	46.7
Date available						
Immediately	2689	87.6	200	90.4	77	83.7
1 month	140	5.0	7	3.2	3	3.3
2 months	79	2.6	2	.9	1	1.1
Last job - Industry						
Gas utility	46	1.5	3	1.4	5	5.4
Engineering and Mfg.	549	18.2	54	24.4	18	19.6
Retail	643	21.3	44	19.9	13	14.1
Construction	166	5.5	14	6.8	5	5.4
Other (Service or Utilities)	909	30.2	59	26.7	30	32.6
Last job - Occupation						
Clerical	405	13.3	24	10.9	11	12.0
Laborer	910	30.2	79	35.7	31	33.7
Skilled Labor	176	5.8	14	6.8	11	12.0
Sales	186	6.2	9	4.1	3	3.3
Secretary	129	4.2	13	5.9	4	4.3
Management	114	3.9	10	4.5	5	5.4
Reason for Termination						
Quit	1349	45.0	112	50.7	55	59.8
Layoff	657	21.7	49	22.2	10	10.9
Temporary work	566	18.8	27	12.2	16	17.4
Dismissed	25	0.8	1	.5		
Previous Employment						
Gas Utility work	78	2.7	6	2.7	14	15.2
Company C work	28	0.9	3	1.4	13	14.1
Past work Experience						
Number of permanent jobs (of those with more exp.) Av.	1.976		2		2	
Two or more jobs for those with work experience	1163	55.6	102	60.4	37	54.4
Permanent jobs in past 5 yrs. (% of those with 2 or more jobs)	962	46.5	88	51.8	30	44.1
Had an on-the-job accident	107	3.6	14	6.3	3	3.3

TABLE 1 (cont)

Application Data	Total		Interviewed Only		Hired	
	N	%	N	%	N	%
<b>Skill (work applied for)</b>						
Unskilled white	456	15	31	14.0	9	9.8
Skilled white	819	27	35	14.8	14	15.2
Unskilled blue	509	17	49	22.2	22	23.9
Skilled blue	142	5	16	7.2	6	6.5
Any	1077	36	90	40.7	41	44.6
<b>Relatives</b>						
Related to white collar	88	2.9	16	7.2	14	15.2
Related to blue collar	165	5.5	36	16.3	14	16.3
<b>Referred by</b>						
Walk in	2205	73.2	99	44.8	42	45.7
Employee of company	485	16.1	64	29.0	31	33.7
School	66	2.2	7	3.2	3	3.3
Commercial Agency	41	1.4	23	10.4	8	8.7
Other	149	4.9	40	4.5	1	1.1
Employment Service	35	1.2	9	4.1	4	4.3
Chamber of Commerce	6	0.2	0	0.0		
O.I.C.	3	0.1	3	1.4		
Politician	2	0.1	0			
U.T.D. (black program)	1		1	.5		
Urban League	8	0.3	2			
Kay's Boys' Club	4	0.1	0			
P.E.P.	1		1	.5		
C.E.P.	2	0.1	1	0.5	1	1.1
NAACP	3	0.1	1	0.5	0	0.0
Community Act Pgh.	1		0	0.0	1	1.1
Part-time to full-time	1		0	0.0	1	1.1
<b>References</b>						
Faculty	592	19.6	36	16.3	18	19.6
Professional	580	19.3	36	16.3	22	23.9

## APPENDIX A

TABLE 1 (cont)

Individual Characteristics (Cont)	Total		Interviewed Only		Hired	
	N	%	N	%	N	%
<b>Skills</b>						
Typing	1083	36.0	83	37.6	10	32.6
Teletype	56	1.9	6	2.7	2	2.2
Adding Mach./Calculator	910	30.0	72	28.1	24	24.0
Computer Operator	86	2.9	2	.9		
Key Punch	211	7.0	18	8.1	7	7.6
Office-other (1 or 2 skills)	519	17.2	39	15.9	6	6.5
<b>Blue-Collar</b>						
-truck	282	9.4	25	11.3	12	12.0
-machine op.	359	11.9	31	14.0	18	19.6
-heavy equip.	129	4.4	13	5.9	4	4.3
<b>Military Service</b>						
Officer	20	0.7	2	.9		
Clerical	132	4.4	7	3.2	3	3.3
Equip. Op. (truck)	73	2.5	9	4.1	2	2.2
Skilled Labor	184	6.1	18	8.1	8	8.7
<b>Dishonorable Discharge</b>	2	.1	2	.9	0	0.0

## Appendix B

### Analytical Procedure

From the data collected, a set of approximately 60 variables were selected for preliminary analysis. Some of the data could not be utilized because of missing data problems, and in some cases variables were constructed by aggregation from data collected. Inter-correlations were calculated, and variables were eliminated if correlations were higher than .5, or if the variable definitions suggested the possibility that the two variables were measuring the same characteristic and the correlation was greater than .35. A step-wise regression procedure was used that permitted the entry or removal of variables as a function of the F statistic. The iteration process was followed until the regression equation included only those variables with an F statistic greater than 1. This resulted in a linear model that maximized the  $R^2$  statistic. In the text discussion, it is assumed that there is some evidence for the significance of variables that remained in the equation at this level of analysis. The analysis was continued by removing variables according to the value of the F statistic, until it was determined that the remaining variables added significantly to the explained variance at the 95% level of significance. The tables that have been included in the report include only the final models that were developed through the above procedure.

## APPENDIX C

TABLE 2

White Male Applicants Selected for Interview

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Work Now	.04	4.10
Relative	.39	145.31
Steel Job	-.07	4.72
Other Job	-.04	3.17
High School Degree	.07	5.46
College Degree	-.08	8.61
Other Education	.05	8.61
Nonrelative Employee Referral	.13	4.38
Constant	.04	18.97
Multiple R <sup>2</sup>	.16	

TABLE 3

Black Male Applicants Selected for Interview

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Years of Education	-.08	5.84
Previous Job	-.33	5.85
Steel Job	-.33	8.28
White Collar Experience	.45	8.03
Social Agency Referral	.47	23.40
Fired	.17	3.82
Constant	1.43	
Multiple R <sup>2</sup>	.35	

TABLE 4

Total Male Applicants Selected for Interview

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Work Now	.05	4.69
Relative	.39	140.97
Steel Job	-.08	6.65
Social Agency Referral	.40	42.33
College Degree	-.08	8.42
Other Education	.04	4.35
Race	.08	4.31
Nonrelative Employee Referral	.13	19.20
Constant	.08	
Multiple R <sup>2</sup>	.17	

TABLE 5

Selection for Interview for Key Punch Job

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Adding Machine Skill	.23	5.11
Key Punch Experience	.35	10.50
Agency Referral (Employment)	.55	14.59
Constant	-.04	
Multiple R <sup>2</sup>	.50	

TABLE 6

Selection for Interview for Key Punch Job  
 (Key Punch Experience Variable Omitted)

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Adding Machine Skill	.20	4.22
Working Now	.43	18.10
Agency Referral (Employment)	.50	13.87
Constant	-.06	
Multiple R <sup>2</sup>	.56	

TABLE 7

Selection for Interview for Key Punch Job  
 (Agency Referral Variable Omitted)

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Teletype Skill	.68	8.08
Working Now	.60	31.86
Steel Job	-.48	5.18
Management Experience	-1.32	10.49
Constant	.04	
Multiple R <sup>2</sup>	.54	

TABLE 8

Selection for Interview for Home Economist Job

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Date Available	-.03	2.40
Manufacturing Job	-.18	3.30
Blue Collar Experience	.21	3.98
Employee Reference	.22	6.49
College Degree	.16	4.64
Constant	-.03	
Multiple R <sup>2</sup>	.28	

TABLE 9

Selection for Interview for Accounting Clerk Job

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Adding Machine Skill	.16	3.99
Other Office Equipment Skill	.14	4.18
Secretarial Experience	-.17	2.87
Agency Referral (Employment)	.81	2.87
Constant	-.02	53.72
Multiple R <sup>2</sup>	.64	

TABLE 10  
Selection for Interview for Secretary-Clerk Job--Total

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Race	.26	34.64
Other Education	.00	13.87
Manufacturing Job	.10	5.39
Alone	.21	8.38
Employee Referral	.21	22.39
Agency Referral (Employment)	.55	39.33
Constant	.01	
Multiple R <sup>2</sup>	.34	

TABLE 11  
Selection for Interview for Secretary-Clerk  
White Applicants

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Alone	.23	10.10
Employee Referral	.21	24.75
Agency Referral (Employment)	4.9	18.03
Other Education	.44	15.52
Constant	.01	
Multiple R <sup>2</sup>	.21	

TABLE 12  
Selection for Interview for Secretary-Clerk  
Black Applicants

<u>Variable</u>	<u>Coefficient</u>	<u>F</u>
Agency Referral (Employment)	.64	11.77
Constant	.36	
Multiple R <sup>2</sup>	.19	

## APPENDIX C

TABLE 13

Blue-Collar Hiring - Model 1

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Appearance	.12	.42	1.88
Attitude	.40	.10	6.32
Relative Employed	.12	.12	2.02
Other Education	-.17	-.16	-2.76
Mechanical Test	.21	.48	3.35
Multiple R <sup>2</sup>	.29		

TABLE 14

Blue-Collar Hiring - Model 2\*

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Overall Rating	.50	.13	8.05
Relative Employed	.16	.15	2.66
Other Education	-.17	-.16	-2.83
Multiple R <sup>2</sup>	.27		

\*The overall rating used as the single variable in a hiring model results in an R<sup>2</sup> of .21 compared with an R<sup>2</sup> of .27 for the model that includes all of the significant variables. The mechanical test scores were reinserted in this second model to see if they would have any significance in a model that also included the overall rating. The mechanical test variable did not add significantly to the multiple R<sup>2</sup>, indicating that it does not have a significant effect independent of the overall rating.

TABLE 15

Relative Importance of Interview Categories  
(Number of White Collar Job Groups)

	<u>Hired were Higher Overall</u>	<u>Highest Hired</u>	<u>No Range Overlap</u>
Experience	2	0	0
Attitude	4	2	0
Overall Verbal	5	3	0
Appearance	5	4	1
Ambition	4	2	1
Personality	4	2	0
Overall	4	2	0
Voice	3	1	0

Analysis of Variables Related to White Collar Employee Performance Rating

White collar employees received regular performance ratings on a scale from 1 to 5. In order to use this rating as a measure of relative performance they were normalized to adjust for time in a particular job level. The rating for the first year in a job level was increased by two, the second year rating was increased by one, and for all rating beyond that the figures were used as given. The ratings were then averaged for each individual for the time spent at a particular job level producing a performance construct with three as the approximate "average" measure of performance. The first analysis of the data was designed to identify the variables that were available at the time of hire that appeared to be related to subsequent job performance as measured by the ratings. Unfortunately, interview forms have not been standard over an extended period of time and the subjective information obtained during the interviews was not included in the analysis. Test scores, however, were utilized to the extent that they were available.

Job Level 1

There were 35 individuals studied in this job level, 11% of whom were male and 31% of whom were black. Because of high correlations among what may have been important variables, several models were utilized in attempting to identify the correlates of performance ratings. In the first model, race, age and the Wonderlic test were included, but sex was not. This model indicates that the Wonderlic test was significantly negatively related to performance ratings and utility work experience was the only variable that appeared to be positively related. Both race and age dropped out of the model because no significant relationship could be found. In the second model, the sex variable was included and the age, high school degree, and race variables dropped. The numerical test was substituted for the Wonderlic test and the office skills variable was utilized. In this model only the sex variable was positively associated with performance rating, while the acquisition of office skills appeared to have a negative effect. Since office skills

APPENDIX D

were highly correlated with high school degree and age, the latter variables were substituted in the next model. The results indicate once again that sex was significantly related to performance ratings, as was manufacturing experience. Other experience and a high school degree appeared to be negatively related to performance rating. In a final analysis of the first level jobs, the Wonderlic test, age, sex, and high school degrees were included in the model. The analysis indicates that sex was positively related to performance ratings, as was the manufacturing experience. The Wonderlic Test was negatively related to performance. Although they dropped out in the final stages of this analysis there is some indication that age and having a relative working with the company effect performance ratings positively.

The first model used was (Model 1), the next model (Model 2).

Job Level 1 Performance Ratings - Model 1

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Wonderlic Test	-.39	-.28	-2.54
Utility Experience	.32	.93	2.13
Multiple R <sup>2</sup>	.25		

Job Level 1 Performance Ratings - Model 2

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.26	.67	1.76
Office Skills	-.45	-.78	-2.97
Multiple R <sup>2</sup>	.35		

Job Level 1 Performance Ratings - Model 3

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.46	.12	3.06
Manufacturing Experience	.28	.72	1.88
Other Experience	-.28	-.46	-1.84
High School Degree	-.28	-.97	-1.84
Multiple R <sup>2</sup>	.35		

APPENDIX D

Job Level 1 Performance Ratings - Model 4

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.35	.89	2.15
Wonderlic Test	-.26	-.19	-1.48
Manufacturing Exp.	.21	.53	1.35
Multiple R <sup>2</sup>	.28		

Job Level 1 - Including Organization Variables

The final analysis did not establish that any of the organisation variable impacted on performance ratings. However, the maximal R<sup>2</sup> model in the analysis that included sex and total years with the company indicates the possibility that total years had some positive effect on performance ratings. Secretarial courses appeared to be negatively related with performance ratings at this level. These analyses also indicated that male employees tended to receive higher ratings, that utility experience was associated with good ratings and office skills appear to have some negative effect on performance ratings. Although the variable dropped out in the final steps of analysis, a maximal R<sup>2</sup> model indicated that the Wonderlic test scores were negatively related to performance ratings.

Job Level 1 Performance Ratings - Model 5

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.42	.10	2.64
Multiple R <sup>2</sup>	.17		

Job Level 1 Performance Ratings - Model 6

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Utility Experience	.32	.91	2.30
Office Skills	-.53	-.93	-3.88
Multiple R <sup>2</sup>	.39		

Job Level 2

There were 161 employees studied in this job level, 8% of whom were

APPENDIX D

male and 13% of whom were black. In this group there was an inverse correlation between office skill and age, the first model used to analyze the data included age, and dropped the office skills variable. The significant results of this analysis indicate that men, and older employees, tended to receive higher ratings, and that small retail experience affected ratings positively. Scores on the numerical test taken by employees before being hired were negatively related to their performance ratings. The last variable to drop out of the analysis was race, which indicates the possibility that white employees received higher ratings than their black counterparts. Similarly, the Wonderlic test score variable dropped out in the final stage of analysis, and there is some possibility that the scores on this test were positively related to performance ratings. It should be noted that the  $R^2$  achieved in this analysis is relatively small, indicating that most of the variance is not explained by our model. A second model including the office skills variable in place of age was used to analyze the data. The results were similar to the first model, with the office skills variable showing a negative relationship with performance rating, as would be expected because of the inverse correlation with age. In summary, it appears that at this job level, older male employees tend to receive higher ratings, and that numerical test scores were negatively related to performance rating. There is some additional evidence that white employees were viewed more positively, and that the Wonderlic test scores were positively related to performance rating.

Job Level 2 Performance Ratings - Model 1

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.22	.69	2.97
Numerical Test	-.15	-.17	-2.11
Small Retail Experience	.15	.37	2.08
Age	.23	.16	3.09
Multiple $R^2$	.19		

APPENDIX D

Job Level 2 Performance Ratings - Model 2

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.21	.64	2.47
Numerical Test	-.14	-.16	-1.96
Small Retail Experience	.17	.41	2.28
Office Skills	-.18	-.41	-2.15
Multiple R <sup>2</sup>	.17		

Job Level 2 - Including Organization Variables

Further analysis of the Job Level 2 employees indicated that performance ratings were positively affected by clerical courses sponsored by the company. When total years with the company was substituted for age in the model, total years was significantly and positively related to performance ratings, although this model explains somewhat less variance than the model which included age. Although they dropped out in the final stage of analysis, the maximum adjusted R<sup>2</sup> model gave some indication that black employees received lower ratings than their white counterparts at this level, that scores on the clerical test were positively related to performance ratings, and that rate of advancement was positively associated with the performance ratings. The models are consistent with the other analyses that showed male employees receiving higher performance ratings than their female counterparts.

Job Level 2 Performance Ratings - Model 3

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.23	.71	3.08
Clerical Course	.16	.39	2.29
Number Test	-.16	-.17	-2.23
Small Retail Experience	.12	.31	1.71
Age	.24	.16	3.20
Multiple R <sup>2</sup>	.22		

APPENDIX D

Job Level 2 Performance Ratings - Model 4

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.23	.70	2.98
Total Years	.21	.23	2.77
Clerical Course	.15	.36	2.08
Number Test	-.16	.18	-2.29
Small Retail Experience	.13	.33	1.82
Multiple R <sup>2</sup>	.21		

Job Level 3

There were 77 individuals studied in this job level, 31% of whom were male and 7.8% of whom were black. The office skills variable was not included in the model used to analyze these data because of significantly high correlations with the age and sex variables. The analysis indicates that men and older employees tended to receive higher ratings than others. Race was negatively correlated with performance ratings, indicating that black employees tended to receive lower ratings than their white counterparts. Utility experience was also negatively correlated with performance ratings. The last variable to drop out of the analysis was Relative which indicates that there is some evidence that employees who had relatives working for the company when they were hired received lower performance ratings than others. The  $R^2$  achieved with this model is relatively high indicating that a substantial fraction of the variance is explained by the model.

Job Level 3 Performance Ratings

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.30	.59	3.43
Race	-.23	-.80	-2.66
Utility Experience	-.20	-.63	-2.33
Age	.59	.42	6.66
Multiple $R^2$	.47		

Job Level 3 - Including Organizational Experience Variables

When the organizational variables were added to the model, with total years substituting for age, the results again indicated that whites, and men tended to receive higher performance ratings than others. Total number of years with the company was positively related to performance ratings as was previous manufacturing experience. The promotion rate was not significant but individuals who had taken miscellaneous approved courses supported by the company appeared to have improved their performance ratings. When age was substituted for total years in the model, the results were similar, with age replacing total years as the significant variable positively related to performance

APPENDIX D

ratings. In this model manufacturing experience dropped out and utility experience was once more negatively associated with performance ratings. The last variable to drop out in the final stage of analysis was having a relative employed by the company, which was negatively associated with performance ratings.

Job Level 3 Performance Ratings - Model 2

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.19	.37	2.18
Race	-.20	-.68	-2.30
Total Years	.54	.57	6.41
Other Approved Course	.20	.62	2.29
Manufacturing Experience	.19	.47	2.27
Multiple R <sup>2</sup>	.51		

Job Level 3 Performance Ratings - Model 3

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.30	.60	3.43
Race	-.23	-.80	-2.66
Utility Experience	-.21	-.63	-2.33
Age	.59	.43	6.66
Multiple R <sup>2</sup>	.47		

Job Level 4

There were 219 employees studied in this job level, 58.9% of whom were male and 2.7% of whom were black. The race variable was not included in the analysis because of the small representation of black employees. The  $R^2$  achieved with the model utilized to analyze the data was discouragingly small at this level. However, the analysis indicated that having a college degree was positively related with performance ratings, and that older employees tended to receive higher ratings. Employees at this level who had previous manufacturing experience appeared to have received lower ratings than others. This job level includes a number of accounting jobs that are probably associated with college degrees and the analysis may reflect some upward bias in the rating given to employees with such jobs.

Job Level 4 Performance Ratings - Model 1

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Manufacturing Experience	-.19	-.39	-3.08
College Degree	1.88	.46	2.96
Age	.25	.16	4.02
Multiple $R^2$	.13		

Further analysis was performed on job level 4 classifications for a population of clerks who were more homogeneous than the total population at that job level. A model which included the Wonderlic and clerical tests showed that older and male employees apparently received higher performance ratings than their counterparts. Scores on the clerical tests were positively related with performance ratings, as was previous government experience. Although it dropped out in the last stage of analysis the Wonderlic test scores were positively related to performance ratings.

A model which substituted the number test for the Wonderlic produced the same final results. However, the number test dropped out at an early stage of the analysis and was not positively related to performance ratings. Although the college degree variable dropped out in the final analysis, it was significant in the maximum adjusted  $R^2$  model and was positively related to performance ratings.

Job Level 4 Performance Ratings - Model 2 (Clerks)

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.29	.57	3.05
Clerical Test	.21	.24	2.24
Government Experience	.17	.53	1.80
Age	.19	.13	1.98
Multiple R <sup>2</sup>	.20		

When organizational experience variables were added to the model, and total years was included rather than age as a variable, the results indicated that male employees and those with longer years of service tended to receive higher performance ratings. This model also indicated that employees with college degrees and those that had taken company approved courses to complete their B.S. degree requirements received higher performance ratings. Results on the number test were also positively related to the ratings. When the Wonderlic test was substituted for the number test, it dropped out in the final stages as a significant variable. However, analysis of the data utilizing a model which included age rather than total years, and the Wonderlic test, indicated the possible importance of other variables. The final level of analysis indicated that male employees received higher ratings, but age did not add significantly to the explained variance. Although the government experience variable was positively related to the performance ratings, employees who had held previous jobs in general appeared to receive higher ratings. Employees who had taken secretarial courses and approved courses to complete the requirements for a B.A. degree received lower performance ratings. The Wonderlic test was positively associated with performance ratings, and employees who had taken Gas distribution training appeared to have improved their ratings. Although it dropped out at the last stage of the analysis, courses designed to complete the B.S. degree were positively related to performance ratings. Office skills were highly correlated with both total years and age, but office skills did not show up as a significant variable when a model including office skills rather than age or total years, was used to analyze the data.

#### APPENDIX D

In summary, it would appear that male clerks and those employed for a longer period with the company received higher ratings and that a college degree and courses which led to the completion of the B.S. degree improved ratings as did Gas distribution training. There are some indications from these analyses that the period of employment with the company rather than age by itself improved performance ratings, since age was not identified as a significant variable. In a model including age, employees who had held previous jobs, that is who presumably had fewer years with the company at a given age, tended to receive lower performance ratings.

APPENDIX D

Job Level 4 Performance Ratings - Model 3 (including total years)

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.22	.44	2.33
Total Years	.36	.27	3.73
B.S. Course	.16	.68	1.76
Number Test	.19	.23	1.94
College Degree	.17	.32	1.70
Multiple R <sup>2</sup>	.25		

Job Level 4 Performance Ratings - Model 4 (including age)

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.28	.44	2.85
Previous Job	-.17	-.40	-1.81
Gas Distribution Training	.17	.61	1.79
Secretarial Course	-.17	-.42	-1.77
B.A. Degree Course	-.22	-.63	-2.38
Wonderlic Test	.17	.20	1.78
Government Experience	.18	.56	2.00
Multiple R <sup>2</sup>	.26		

Job Level 5

There were 83 individuals studied in this job level, 45.7% of whom were male and 1.2% of whom were black. The race variable was not utilized in the analysis because of the small representation of black employees. Although the  $R^2$  achieved in the analysis of this job level was relatively small, the results indicate again that older employees tended to receive higher performance ratings than others. At this level it appears that the scores on the numerical test were positively related to performance ratings. In this job level sex and age were highly correlated so that it is possible that the age effect indicated above reflects a tendency for male employees to receive higher performance ratings.

Job Level 5 Performance Ratings - Model 1

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Numerical Test	.19	.47	1.92
Age	.40	.27	3.92
Multiple $R^2$	.18		

Job Level 5 Including Organizational Variables

When organizational experience variables were added to the model, with total years substituting for age, there was an increase in the variance explained by the analysis. Total years with the company and scores on the number test were both significantly and positively related to performance ratings. Although it dropped out just before the final analysis, there is some indication that scores on the mechanics test were negatively related to performance ratings at this level. A model which included age but not total years of experience showed age as a significant variable, and also indicated that employees who had taken approved business courses succeeded in obtaining higher performance ratings. Both experience in the gas industry and steel industry experience were negatively related to performance ratings. The number test scores were the last variables to drop out of the analysis, but there is indication in this model that they were positively related to performance ratings.

APPENDIX D

Job Level 5 Performance Ratings - Model 2 (including total years)

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Total Years	.46	.36	4.62
Number Test	.23	.55	2.28
Multiple R <sup>2</sup>	.23		

Job Level 5 Performance Ratings - Model 3 (Age)

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Business Course	.19	.22	1.77
Gas Experience	-.21	-.66	1.99
Steel Experience	-.19	-.80	-1.83
Age	.40	.27	3.93
Multiple R <sup>2</sup>	.22		

Job Level 6

There were 85 individuals studied in this job level 90.5% of whom were male and none of whom were black. High correlations among the age, sex, and college degree variables posed difficult problems for the analysis of this job level. The model that did not include sex or age indicated that retail experience and office skills were negatively associated with performance ratings, and the college degree variable dropped out before the final stage of the analysis. It would appear that these results reflected the relationship between sex and performance ratings. The college degree and sex variables were highly correlated (.6) with the degree being associated with female employees. In turn, the college degree variable was negatively related to performance ratings, suggesting that female employees tended to receive lower ratings. The negative relationships between retail experience and office skills probably have the same basis.

Job Level 6 Performance Ratings - Model 1

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Previous Job	.18	.45	1.84
Large Retail Experience	-.24	-.78	-2.37
Small Retail Experience	-.28	-.65	-2.84
Office Skills	-.29	-.53	-2.83
Multiple R <sup>2</sup>	.27		

A second model was utilized which included sex, but which did not include either the college degree or age variables. The results indicated that male employees tended to receive higher performance ratings as did employees who had held other jobs before being employed by the company. In spite of the inclusion of the sex variable, small retail experience and office skills were significantly and negatively associated with performance ratings. The last variable to drop out of the analysis was the Wonderlic test, which had a negative relationship with performance ratings.

APPENDIX D

Job Level 6 Performance Ratings - Model 2

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.22	.64	2.26
Previous Job	.19	.47	1.91
Small Retail Experience	-.28	-.66	-2.89
Office Skills	-.32	-.58	-3.16
Multiple R <sup>2</sup>	.27		

A third model was tested which substituted the age variable for sex, results indicating a dominating impact of the age variable with older employees receiving higher performance ratings. Manufacturing experience and gas pump experience were also associated with performance ratings. The latter may be picking up the effects of the sex variable which was excluded from this model. In summary, it appears that there is significant evidence that older employees and male employees tend to receive higher performance ratings at this level and that if the intelligence test given to job applicants has any predictive validity for jobs at this level, higher test scores are associated with lower performance ratings.

Job Level 6 Performance Ratings - Model 3

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Manufacturing Experience	.16	.30	1.73
Gas Pump Experience	.15	.54	1.61
Age	.51	.39	5.39
Multiple R <sup>2</sup>	.21		

Job Level 6 - Including Organizational Variables

A model that included sex and total years with the company indicated that both variables added significantly to the explained variance. Male employees and those with longer service received higher performance ratings. Gas distribution training helped improve performance ratings. Although employees who took general external training not paid for by the company received lower ratings. Neither the Wonderlic nor the clerical test was significant, and both dropped out of the analysis at a very early stage. In a model that did not

include sex, but did include large retail experience and high school degree, an which substituted the numbers test for the Wonderlic and clerical test, total years with the company and the Gas distribution training were positively associated with performance ratings while external trainings not supported by the company and small retail experience were negatively related to the ratings. In addition, large retail experience was negatively related to performance ratings and employees who took courses to complete a B.S. degree requirement appeared to have received lower performance ratings. Small retail experience was associated with lower ratings. A third model which excluded sex and substituted college degree indicated again that the college degree was negatively related to performance ratings and that manufacturing experience appeared to have improved the ratings. It is possible that both the latter findings reflect higher performance ratings given to male employees.

APPENDIX D

Job Level 6 Performance Ratings - Model 4 (including Sex)

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	.18	.52	1.83
Total Years	.41	.36	4.04
Gas Distribution Training	.22	.53	2.34
General External Training	-.16	-.22	-1.70
Small Retail Experience	-.18	-.41	-1.81
Multiple R <sup>2</sup>	.34		

Job Level 6 Performance Ratings - Model 5 (excluding sex)

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Total Years	.37	.33	3.86
Gas Distribution Training	.26	.64	2.85
General External Training	-.17	-.24	-1.90
B.S. Degree Course	-.15	-.38	-1.67
Large Retail Experience	-.27	-.89	-2.87
Small Retail Experience	-.18	-.42	-1.91
Multiple R <sup>2</sup>	.39		

Job Level 6 Performance Ratings - Model 6 (excluding sex)

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Total Years	.39	.34	3.91
Gas Distribution Training	.28	.68	2.98
Manufacturing Experience	.17	.31	1.79
College Degree	-.17	-.39	-1.68
Multiple R <sup>2</sup>	.33		

Job Level 7

There were 31 individuals studied in this job level, 58% of whom were male and none of whom were black. The  $R^2$  achieved by the model used to analyze this job level was relatively small. However, there is significant evidence that at this level individuals who were related to employees at the time they were hired tended to receive somewhat higher performance ratings. There is also some indication that women received higher ratings than men at this level and that construction experience was negatively related to job performance. However, the latter two variables dropped out in the last stage of analysis, and did not add significantly to the variance explained by the model.

Job Level 7 Performance Ratings - Model 1

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Relative	.34	.10	1.96
Multiple $R^2$	.12		

Job Level 7 - Including Organizational Variables

Several models including different groupings of courses were used to analyze the data because of the high correlation among variables. In all cases the organizational variables substantially increased the variance explained by the models. The first organizational model indicated that employees who had been given general internal training by the company received higher performance ratings while those who had taken unsupported external courses appeared to have received lower ratings. Again in this model employees with relatives in the company received higher performance ratings. At this level apparently Gas distribution training, Dale Carnegie courses, engineering courses, and secretarial courses, did not significantly improve performance ratings. Although the variable dropped out at the last step prior to the final analysis, there is some evidence in this model that employees who took technical courses improved their performance ratings.

APPENDIX D

Job Level 7 Performance Ratings - Model 2

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
General Internal Training	.32	1.00	2.02
General External Training	-.29	-.45	-1.84
Relative	.40	.12	-2.51
Multiple R <sup>2</sup>	.32		

A second model which included business courses in place of some of the other training courses reinforced the evidence from the first model that technical courses apparently helped performance ratings. Again in this model unsupported external training was negatively related to the performance ratings, and individuals with relatives employed by the company were rated higher than others. Although it dropped out just before the final stage of analysis, there is some indication that total years with the company was associated with higher performance ratings.

Job Level 7 Performance Ratings - Model 3

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
General External Training	-.37	-.58	-2.29
Technical Course	.29	.28	1.78
Relative	.41	.13	2.52
Multiple R <sup>2</sup>	.30		

Job Level 20

There were 73 individuals studied in this job level which is an exempt classification. 93% of the employees studied were male and 4% were black. The models reported below include both the demographic and organizational variables. Although female employees were only a small percent of those at this job level, their performance ratings were higher than their male counterparts. Older employees and those with more years with the company tended to receive higher performance ratings, and having held a previous job and in particular having had experience in the gas industry were associated with higher performance ratings. Although they dropped out in the final stages of analysis there is some indication that manufacturing experience and small retail experience were negatively related to performance ratings. In a model that substituted age for total years with the company the number of promotions per year was positively related to performance ratings.

Job Level 20 Performance Ratings - Model 1

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	-.33	-.94	-3.37
Previous Job	.22	.69	2.11
Total Years	.30	.20	2.95
Gas Experience	.40	.97	4.03
Multiple R <sup>2</sup>	.37		

Job Level 20 Performance Ratings - Model 2

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Sex	-.33	-.94	-3.39
Previous Job	.18	.56	1.78
Promotions Per Year	.20	.88	1.97
Gas Experience	.37	.90	3.76
Age	.30	.22	3.05
Multiple R <sup>2</sup>	.39		

Job Level 30

There were 169 individuals studied in this job level, which is an exempt classification. 99% of the individuals studied were male and only 2% were black. The initial analysis failed to develop a model that explained any substantial fraction of the variance in performance ratings. The job level includes a wide range of job titles covering such diverse job classifications as foreman, accountant, sales representative, and assistant manager, capital and operating budget. There are 51 job titles in the level and given the size of the sample it is not surprising that the analysis failed to produce significant results. A separate analysis was done of the 63 foremen who are at this job level. They were all men and all white. The first model used included the total number of promotions, but not total years of service. The final analysis indicated that individuals who had taken high school equivalency courses were more likely to receive higher performance ratings. Of particular interest is the fact that the scores on the Bennett mechanical test were negatively related to foreman's performance rating. Total promotions and other experience were also negatively related with performance ratings. The former result seems to indicate that individuals who either jumped steps or moved up a short promotion ladder to foreman were more highly regarded by their superiors. The analysis indicates that employees who start at the very bottom and work their way up through foreman do not receive as high performance ratings as those who have a shorter route to the supervisory position. A number of other variables were included in the model with the highest adjusted  $R^2$ , although as individual variables they did not contribute significantly to the explained variance. Among the last to drop out of the analysis were the fluency rating, which was positively associated with performance ratings, and construction experience and the clerical test, both of which were negatively related with performance ratings.

APPENDIX D

A second model was utilized which included promotions per years as a variable. This model also identified the results of the mechanical test as negatively related to performance ratings. Government experience and other experience were also negatively related with the ratings. Although they dropped out in the last stages of the analysis, the model with the maximum adjusted  $R^2$  included high school equivalency courses and construction experience. Individuals who had taken the high school equivalency courses appeared to have achieved higher performance ratings, while construction experience was negatively related to the ratings. A third model included total years of employment as a variable, and the final results were identical to the second model described above. The last variable that dropped out of the analysis indicate the possibility that construction experience was negatively related to performance ratings, and that gas distribution courses and the judgment rating were positively related to the ratings.

Foremen Performance Ratings - Model 1

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Total Promotions	-.27	-.69	-2.39
High School Equivalency Course	.19	.82	1.73
Mechanical Test	-.32	-.27	-2.91
Other Experience	-.26	-.42	-2.37
Multiple $R^2$	.27		

Foremen Performance Ratings - Models 2 and 3

<u>Variable</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Mechanical Test	-.32	-.27	-2.80
Government Experience	-.23	-.98	-2.01
Other Experience	-.30	-.48	-2.64
Multiple $R^2$	.23		

Job Level 40

There were 61 individuals studied in this job level which includes exempt job classifications. 98% of the employees were male and none of them were black. At this job level performance ratings did not appear to be affected by age or total years with the company. The only variable that had a significant positive relationship with performance ratings was the Dale Carnegie Course. Perversely, prior experience in the gas industry and the rate of promotion were negatively related to performance ratings, as was small retail experience. This job level includes a wide variety of supervisory positions and it may be that there was insufficient homogeneity in the group to identify significant factors related to performance ratings. However, the absence of a "seniority" effect and the negative relationship of the promotion rate and gas industry experience are significant.

Job Level 40 Performance Ratings

<u>Variables</u>	<u>Beta</u>	<u>Coefficient</u>	<u>T</u>
Promotions Per Year	-.27	-.17	-2.30
Dale Carnegie Course	.39	.63	3.31
Gas Experience	-.24	-.40	-2.06
Small Retail Experience	-.20	-.48	-1.69
Multiple R <sup>2</sup>	.26		

APPENDIX H

TABLE 16

White Collar Promotions per Year  
Exempt Employees - Model 1\*

	Beta	Coefficient	T
Years of Service	-.15	-.001	-2.58
Gas Distribution Course	.10	.02	2.00
Engineering Course	.09	.007	1.73
Oil Experience	-.11	-.06	-2.18
Relative	.11	.03	2.16
Location 1	.31	.09	5.86
Location 2	.15	.05	2.97
Location 3	.15	.06	2.97
Location 4	.20	.07	3.87
Location 5	.12	.04	2.38
Location 7	.16	.05	3.30

$R^2 = .24$

\*No Tests

APPENDIX E

TABLE 17

White Collar Promotion per Year  
Exempt Employees - Model 2\*

	Beta	Coefficient	T
Gas Distribution Course	.08	.02	1.66
Oil Experience	-.10	-.06	-1.96
Age	-.18	-.002	-3.61
Relative	.10	.03	2.04
Location 1	.31	.09	5.84
Location 2	.12	.04	2.86
Location 3	.14	.05	2.76
Location 4	.20	.07	3.88
Location 5	.12	.03	2.26
Location 7	.16	.05	3.22

$R^2 = .24$

\*No tests

APPENDIX E

TABLE 18

White Collar Promotions per Year  
Exempt/Employees - Model 3\*

	Beta	Coefficient	T
Clerical Test	-.14	-.02	-2.13
Age	-.14	-.002	-2.00
Relative	.12	.04	1.66
Location 1	.34	.11	4.82
Location 2	.16	.05	2.31
Location 3	.18	.08	2.58
Location 4	.27	.09	3.66
Location 5	.17	.05	2.49
Location 7	.22	.07	3.17

$R^2 = .30$

\*With Tests

APPENDIX E

TABLE 19

White Collar Promotions per Year  
 Non-Exempt Employees\* - Levels 5, 6, 7

	Beta	Coefficient	T
Gas Distribution Course	.15	.03	2.13
Technical Courses	.16	.01	2.26
Steel Experience	.13	.06	1.88
Utility Experience	.13	.06	1.80
College Degree	-.14	-.03	-1.84
Office Skills	.19	.04	2.52
Other Education	.16	.03	2.12
Location 2	-.14	-.05	-2.02
Location 3	-.16	-.07	-2.23
Location 6	-.16	-.05	-2.29
Non-exempt Performance Rating	-.12	-.02	-1.73

$R^2 = .23$

\*No Tests

TABLE 20

White Collar Promotions per Year  
Non-Exempt Employees\*

	Beta	Coefficient	T
Secretarial Course	.10	.06	1.98
Clerical Test	-.10	-.02	-1.99
Manufacturing Experience	-.11	-.04	-2.15
Utility Experience	.12	.09	2.40
Age	-.15	-.002	-2.87
Relative	.15	.07	2.95
Location 1	.14	.05	2.74
Location 8	.10	.07	1.98

$$R^2 = .10$$

\*With Tests

APPENDIX F

TABLE 21

Blue Collar Termination  
New Hires - Less than Two Years \*

	Beta	Coefficient	T
Sex	-.28	1.45	-5.04
Bank Experience	.16	.45	2.89
Government Experience	.11	.19	2.10
Oil Experience	.15	.01	2.72
Small Retail Experience	-.12	-.15	-2.20
Age	-.30	-.02	-5.69
Relative	-.11	-.12	-2.12
College Graduate	.13	.27	2.32
Location 2	-.16	-.21	-2.73
Location 4	-.11	-.16	-1.86
Location 6	-.12	-.16	-2.17
Location 7	-.10	-.11	-1.62
Location 8	-.12	-.22	-2.09

$R^2 = .41$

\* Termination was coded as + 1

APPENDIX F

TABLE 22

Blue Collar Termination  
New Hires - Less Than One Year \*

	Beta	Coefficient	T
Wonderlic Test	.13	.07	2.15
Utility Experience	.11	.22	1.80
Age	-.24	-.02	-4.10
Location 2	-.41	-.46	-5.28
Location 3	-.23	-.39	-3.30
Location 4	-.29	-.36	-3.83
Location 5	-.35	-.38	-4.39
Location 6	-.24	-.28	-3.33
Location 7	-.35	-.33	-4.02
Location 8	-.20	-.32	-2.77

$R^2 = .24$

\* Termination was coded as + 1

APPENDIX E

TABLE 23

Blue Collar Termination  
On-Board Employees

	Beta	Coefficient	T
Sex	-.20	-.39	-7.44
Mechanical Test	-.07	-.11	-2.81
Bank Experience	.08	.19	3.17
Government Experience	.04	.25	1.71
Oil Experience	.07	.76	2.60
Small Retail Experience	-.05	-.28	-2.09
Age	-.31	-.03	-9.87
High School Graduate	-.05	-.15	-1.64
College Graduate	.05	.35	1.79
Location 3	-.05	-.25	-1.67
Location 4	-.04	-.14	-1.25
Location 5	-.05	-.18	-1.70
Location 6	-.04	-.18	-1.86
Location 7	-.04	-.12	-1.23
Location 8	-.05	-.27	01.96
Performance Rating	-.07	-.22	-2.70

$R^2 = .19$

APPENDIX F  
TABLE 24

White Collar Termination  
New Hires - Less Than Two Years \*

	Beta	Coefficient	T
Other Experience	.15	.11	2.15
Age	-.27	-.01	-3.76
High School Graduate	-.16	-.31	-2.27
Other Education	-.14	-.10	-1.94
Non-exempt Performance Rating	-.15	-.15	-1.79
Exempt Performance Rating	-.24	-.18	-2.87

$R^2 = .16$

\* Termination was coded as + 1

## APPENDIX F

TABLE 25

White Collar Termination:  
On-Board Employees

	Beta	Coefficient	T
Sex	-.18	-.55	-4.62
Government Experience	.06	.30	1.94
Age	-.31	-.03	-8.76
College Graduate	-.06	-.21	-1.65
Other Education	-.09	-.31	-2.90
Promotions/Year	-.12	-.26	-3.63
Non-exempt Performance Ratings	-.08	-.28	-2.04
Exempt Performance Ratings	-.08	-.19	-1.78

 $R^2 = .25$