

**DEPARTMENT OF COMMERCE
PERSONNEL MANAGEMENT
DEMONSTRATION PROJECT EVALUATION**

YEAR FOUR REPORT



McLean, VA
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FINAL REPORT

Booz | Allen | Hamilton

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EXECUTIVE SUMMARY

This report presents Booz Allen Hamilton Inc.'s (Booz Allen) assessment of Year Four of the Department of Commerce Personnel Management Demonstration Project. This Executive Summary provides an overview of the purpose of the Demonstration Project, the current status of the personnel interventions, and recommendations for actions needed to continue operating the Demonstration Project successfully.

E.S.1. The Department of Commerce is nearing the end of a five-year Demonstration Project to test and evaluate a series of alternative personnel practices and to determine the generalizability of these interventions to other organizations.

The Department of Commerce (DoC) initiated a Personnel Management Demonstration Project (hereafter referred to as the Demonstration Project) in March 1998 as a means of testing and evaluating a series of personnel interventions. It was scheduled to last for five years (March 2003)¹. This effort was undertaken to determine whether alternative personnel practices are more successful in helping to achieve agency goals than traditional personnel practices. Based on the success of these interventions during the five-year Demonstration Project, it will be determined whether any or all of the interventions can be beneficially implemented elsewhere within DoC as well as government-wide.

The Demonstration Project was designed to apply some of the human resource interventions from an earlier DoC Demonstration Project at the National Institute of Standards and Technology (NIST). The NIST Project achieved highly successful results and, at its conclusion, the interventions were made permanent. The current project seeks to build on the success of the NIST Project and determine whether or not these interventions can be successfully implemented within DoC to a wider range of occupational areas and within organizations with different missions.

E.S.2. The Year Four Report focuses exclusively on analyses of objective data. Where appropriate, comparisons are made between the Demonstration and Comparison Groups and across time.

By design, the Year Four Report relies solely on objective personnel data, specifically data pertaining to performance, compensation, recruitment, and demographics for the time period April 2001 to March 2002 for both the Demonstration Group and the Comparison Group. For this report, Booz Allen conducted a series of analyses on these objective data in order to identify the state of the personnel interventions during the fourth year of the Demonstration Project.

Wherever possible, comparisons were drawn between the Demonstration and Comparison Groups as a means of assessing the degree to which the interventions appear to be having an

¹ The Demonstration Project has since been extended for an additional five years.

impact on Demonstration Group participants relative to the experiences of the Comparison Group participants. Similarly, where feasible, analyses were conducted to show the trends that are occurring across time in regards to the impact of the interventions. At this point, trends can be evaluated across the first four out of five years of the Demonstration Project.

E.S.3. Analyses of the Demonstration Project's Year Four data showed support that some of the interventions are having the desired effects.

The Year Four data analyses focused specifically on the interventions for individual performance, the three-year research and development (R&D) probation, recruitment, retention, and support for diversity. Overall, the data findings show success with some interventions. The findings also identified some interventions that could be better utilized.

E.S.3.1. The pay for performance system continues to exhibit a positive link between pay and performance.

A series of interventions were implemented during the Demonstration Project to improve the relationship between high performance and financial reward. These interventions include performance-based pay increases, performance bonuses, more flexible pay increases upon promotion, and supervisory performance pay. Year Four analyses highlight the following:

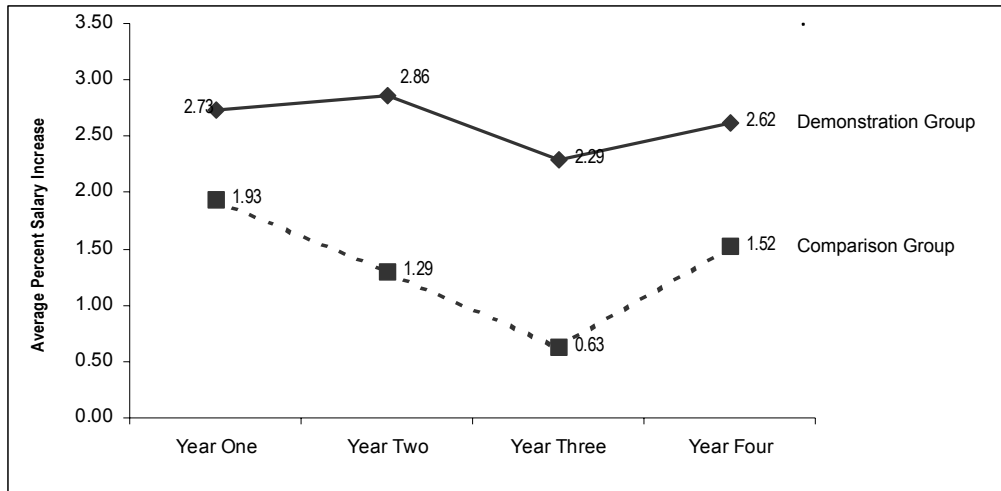
- Demonstration Group participants received larger average performance-based pay increases than did Comparison Group participants (2.6 percent of salary² versus 1.5 percent of salary)
- Among Demonstration Group participants, those in the ZA career path received the highest average performance-based pay increases and those in the ZS career path received the lowest
- Demonstration Group participants received smaller performance-based bonuses/awards than did Comparison Group participants (1.7 percent versus 2.1 percent)
- Average performance scores steadily increased from 82.0 in Year One to 85.7 in Year Four
- In Year Four, a regression analysis shows that performance score has a stronger impact on pay than many other factors (including pay band, interval, promotion, supervisory status, length of service, race, gender, veteran status, and age)
- The flexible pay upon promotion intervention continues to be successful
- As in previous years, the supervisory performance pay intervention continued to reward supervisors who had reached the top of their pay bands though not necessarily the highest performing supervisors.

Figure ES-1 displays trends for average performance-based pay increases over Years One through Four of the Demonstration Project. This figure shows that Demonstration Group

² Unless stated otherwise, references in this document to “percent of salary” or “pay increase percentage” pertain to the percentage increase in salary from the beginning to the end of Year Four; this concept is not intended to be synonymous with the “percent of percent” concept often discussed in the context of the Demonstration Project.

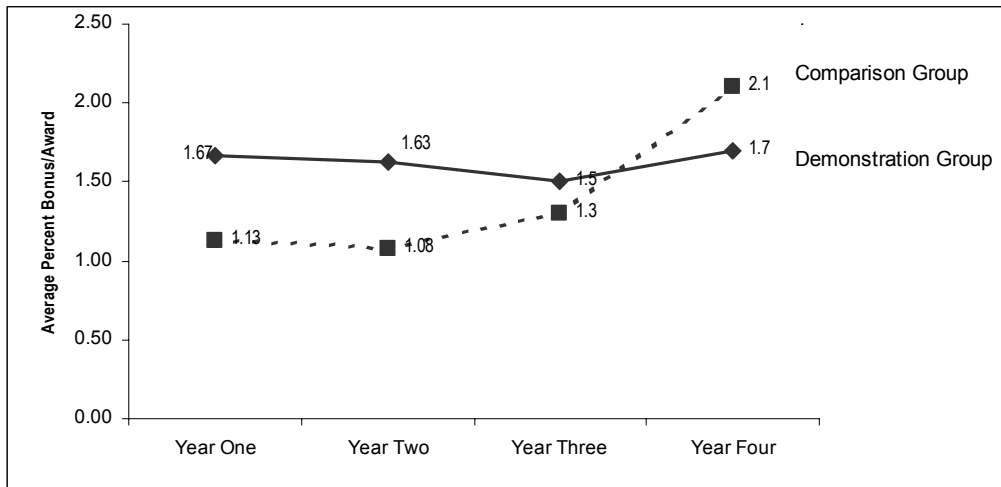
participants have consistently received higher average increases than the Comparison Group participants. Figure ES-2 displays trends for average bonuses/awards over Years One through Four of the Demonstration Project. This figure shows that Demonstration Group and Comparison Group participants have consistently received similarly sized average bonuses over the years. While average awards in the Comparison Group were greater than average bonuses in the Demonstration Group in Year Four, when total compensation (average performance-based pay increases plus bonuses/awards) is considered, Demonstration Group participants continued to fare better.

Figure ES-1. Trend Analysis of Average Percent Salary Increases



Note: The Comparison Group Year Two data point was revised in Year Three to reflect a correction in the formula used to calculate average percent salary increase.

Figure ES-2. Trend Analysis of Average Bonus/Award Percentages



E.S.3.2. The three-year probationary period for scientists and engineers continues to be used but assessing its utility remains difficult.

The three-year probationary period for scientists and engineers intervention was designed to allow supervisors the ability to make permanent hiring decisions for research and development (R&D) positions based on employees' demonstrated capabilities in the full R&D cycle. In Year Four, employees were both hired under and released from the three-year probationary period. However, whether this movement represents positive implementation of the intervention (by virtue of making appropriate decisions for those under probation) or under-use of the intervention is unclear due to limitations in the analyses that can be performed given the way that probation-related data are tracked.

E.S.3.3. Some of the recruitment and staffing interventions have been successful whereas other recruitment and staffing interventions have not been implemented to their full potential.

The recruitment and staffing interventions are intended to attract high quality candidates and speed up the recruiting and examining process. In Year Four, evaluation of some of these interventions showed stability or progress:

- Hired 344 new hires, primarily through merit assignment and agency based staffing
- Maintained previous usage levels of recruitment payments (received by approximately 3 percent of new hires)
- Used a wider range of starting salaries than the Comparison Group
- Took advantage of greater flexibility to re-negotiate starting salaries
- Expedited the classification process.

Evaluation of some interventions was stymied by the lack of data. For example, lack of criteria for new hire quality and lack of performance scores for those who received recruitment payments precluded analysis.

E.S.3.4. While not all retention interventions are being full utilized, some evidence exists that turnover is occurring as desired (relative to performance).

The series of retention interventions are designed to provide managers with tools to motivate and retain high performing employees. In Year Four, as in previous years, some of the interventions still receive little use (e.g., retention payments) or have not appeared to impact retention (e.g., supervisory performance pay). Regardless, analysis of the outcomes shows that turnover is happening as desired, with more turnover occurring among low performers than high performers (though this relationship was less pronounced than in Year Three). In addition, across years, turnover has remained constant within the Demonstration Group while turnover in the Comparison Group has increased.

E.S.3.5. The Demonstration Project interventions continue to reflect a system in which there is no evidence of unfair treatment based on race, gender, or veteran status.

Consistent with previous years, analyses suggest that the Demonstration Project has not been detrimental to the recruitment, compensation, or retention of minorities, women, or veterans. In Year Four, equal or greater proportions of minorities and females were hired into the Demonstration Group than is their representation in the Demonstration Group overall. This suggests that the Demonstration Project interventions are not harming DoC's ability to diversify its employee population in regards to minority status or gender. The proportion of veteran new hires was slightly lower than their representation in the employee population overall; the difference was slight but this does highlight a finding that needs to be tracked in the future (it is possible that this finding simply reflects a lower number of veterans currently in the job market).

As occurred in previous years, data also suggest that the pay-for-performance system did not reward participants differently based on race, gender, or veteran status in terms of average performance increases or bonuses. Rather, differences in performance-based pay increases and bonuses between groups (e.g., males and females) appear to be linked to performance scores.

In Year Four, turnover rates in the Demonstration Group were higher among minority employees than non-minority employees. However, the same pattern did not hold true among high performers. Among high performers in the Demonstration Group, turnover was slightly lower for minority employees than non-minority employees, suggesting that the Demonstration Project interventions are not harming the ability to retain high-performing minorities.

E.S.4. While the Demonstration Project has experienced some success, DoC needs to take further actions to strengthen the effectiveness of the interventions.

The Year Four findings suggest that the Demonstration Project is operating effectively and should continue. A series of recommendations are offered to focus DoC on areas that need more attention to ensure the success of the Demonstration Project and to prepare it for extension.

E.S.4.1. DoC should more fully implement the recruitment and staffing interventions.

Several challenges still remain with implementing and evaluating the recruitment and staffing interventions. One key intervention that warrants closer attention is the effort to attract higher quality candidates. However, no clear criteria for applicant quality have been defined nor measured, which precludes conducting these types of analyses. DoC should invest time in researching potential criteria, making decisions on data to be collected, and enacting methods to track the data. By doing so, it will be possible to determine which recruitment strategies are most successful in drawing the best and the brightest to the organization. Furthermore, it will permit tracking whether an influx of high-performing new

hires, combined with turnover of low performers, helps to improve aggregate organizational performance.

As addressed in the body of the report, in Year Four, new hires had a lower average performance score than the overall average in the Demonstration Group. If Year Five produces the same results, DoC may want to examine this issue to determine the factors leading to lower levels of performance among new hires. Areas to explore may include whether performance scores differ for those hired through different sources (e.g., merit assignment versus agency-based staffing), whether new hires with lower scores improve in their second year (that is, they experience a “learning curve”), and whether supervisors feel adequately prepared to assess new hires (given new hires’ limited performance history).

E.S.4.2. DoC should make greater use of retention interventions.

In Year Four, results continued to show that the outcome of retention efforts have been successful. Turnover rates in the Demonstration Group have been generally comparable with the Comparison Group over the years. And, data across the years have shown evidence that, within the Demonstration Group, lower performing employees turn over at a faster rate than higher performing employees.

While turnover outcomes have been acceptable, it is not clear that the outcomes have resulted from the Demonstration Project’s retention interventions. DoC should further examine why interventions, such as retention payments and supervisory performance pay, have not been more fully used as retention tools. This exploration will be particularly valuable as market conditions shift over the next six years and competition for high performers may increase.

In Year Three, we proposed several theories regarding the lack of use of retention payments. One, it may be that general satisfaction with pay (as demonstrated in the Year Three survey) has made retention payments less necessary. Two, it may be employees are not turning over at such a rate to raise concern. Three, the limited use of retention payments in the Demonstration Project may also reflect the trend elsewhere in DoC where retention payments have not been used to a great extent since they were first made available to government managers in 1990. Four, some managers may be unaware about how to use retention payments. And five, retention payments may not be widely used because of the restrictions on when they can be awarded (i.e., retention payments can only be paid to employees leaving the Federal Government, which occurs infrequently, or for employees who are retiring). These may be starting points for further exploration.

The supervisory performance pay intervention is also expected to impact retention of high performers. However, given that it is enacted for those supervisors who have reached the top of their pay bands, rather than to reward high performing supervisors, it is difficult to assess its value as a motivational tool. We recommend that DoC devise new retention strategies for supervisors. This will be particularly important given the projected losses (governmentwide) of leaders as the federal workforce ages. Creative retention tools may help to prolong the employment of high performing supervisors thus benefiting the organization.

E.S.4.3. DoC should support better database management, which will facilitate a more comprehensive evaluation.

As recommended in previous years, the need exists to improve database management for the Demonstration Project. Several data issues have impacted the ability to perform a comprehensive evaluation. One, additional data points are needed, such as criteria for quality of new hires and the number of Demonstration Group participants who have reached the top of their paybands. Two, each year, the datafiles provided for the evaluation are missing data in critical fields, such as pay and performance scores, which results in performing analyses on subsets of the Demonstration Project participants. Three, dedicated resources are needed at DoC to prepare the datafiles due to their complexity. As we have recommended previously, a permanent database manager could benefit the Demonstration Project because this person could not only build up expertise but also would retain historical knowledge of data issues.

E.S.4.4. DoC should use the extension as an opportunity to improve the Demonstration Project while also maintaining enough continuity to not sacrifice methodological rigor.

Based on the findings over the past four years, sufficient evidence exists to extend the Demonstration Project. From the evaluator's perspective, we offer the following broad recommendations as the Demonstration Project management plans to transition into the next five years:

- Determine the viability of each intervention in the extension phase. For example, consider whether the interventions that are no longer innovative and are now available governmentwide should remain within the Demonstration Project.
- Rely on evaluation reports as a resource for identifying interventions that could be better designed (e.g., supervisory performance pay) and determine the best way to implement these interventions in the future
- When planning database management for the extension period, consider the database management issues that surfaced over the past four years and plan for mitigating these issues, where possible
- Use the same assessment tools and measures (e.g., survey items, protocols, objective data analyses) during the extension period so that trends can span ten years
- Further explore how/whether groups (e.g., different career paths, different EEO groups) within the Demonstration Project have different experiences and potential root causes for these differences
- Continue to invest time and resources into training and education both at the onset and throughout the extension period.

1. INTRODUCTION

This chapter presents a brief background on the Department of Commerce's (DoC) Personnel Management Demonstration Project as well as the purpose and structure of this report.

1.1. The Department of Commerce is nearing the end of a five-year Demonstration Project to test and evaluate a series of alternative personnel practices and to determine the generalizability of these interventions to other organizations.

The Department of Commerce (DoC) initiated a Personnel Management Demonstration Project (hereafter referred to as the Demonstration Project) in March 1998 as a means of testing and evaluating a series of personnel interventions. It was scheduled to last for five years (March 2003)³. This effort was undertaken to determine whether alternative personnel practices are more successful in helping to achieve agency goals than traditional personnel practices. Based on the success of these interventions during the five-year Demonstration Project, it will be determined whether any or all of the interventions can be beneficially implemented elsewhere within DoC as well as government-wide.

The Demonstration Project was designed to apply some of the human resource interventions from an earlier DoC Demonstration Project at the National Institute of Standards and Technology (NIST). The NIST Project achieved highly successful results and, at its conclusion, the interventions were made permanent. The current project seeks to build on the success of the NIST Project and determine whether or not these interventions can be successfully implemented within DoC to a wider range of occupational areas and within organizations with different missions.

The Office of Personnel Management (OPM) clearly defines processes for evaluating Demonstration Projects. Following OPM guidelines, evaluators submit formal assessment reports at specified time intervals over the course of a Demonstration Project. As the evaluator of the DoC's Demonstration Project, Booz Allen Hamilton Inc. (Booz Allen) has submitted to date an Implementation Year Report and Operational Year Report that assessed the implementation and operation of the Demonstration Project during Year One and Year Three, respectively.

1.2. This report provides an assessment of Year Four of the DoC Personnel Management Demonstration Project.

This report is designed to serve as a mid-course check on the actions taken related to Demonstration Project interventions. It is the second report of this type; Booz Allen also submitted a Year Two report that provided a mid-course check.

³ The Demonstration Project has since been extended for an additional five years.

The intended audience for this report is DoC managers who may benefit from keeping abreast of the current state of the Demonstration Project and who may be interested in tracking trends as the personnel interventions take effect. DoC can use the report to provide an update to OPM on the impact the Demonstration Project is having on ensuring protection for or adherence to equal employment opportunity, veterans, Merit Systems Principles, and Prohibited Personnel Practices.

This update report is limited to objective personnel data, specifically data pertaining to performance, compensation, recruitment, and demographics for the time period April 2001 to March 2002 for both the Demonstration Group and the Comparison Group. As planned, it does not include the subjective data sources (e.g., survey, focus groups) that were used to prepare the Implementation Year Report (Year One) and the Operational Year Report (Year Three). In this report, we:

- Present pay-related results of the fourth performance year (e.g., performance scores, pay-for-performance increases, and bonuses)
- Present usage of recruitment and retention interventions
- Analyze results by protected class
- Compare Demonstration and Comparison Group results, where appropriate
- Compare performance results across Years One, Two, Three, and Four, where informative (additionally, Appendix A provides data results from across the evaluation years).

1.3. The structure of this report parallels the Year One, Year Two, and Year Three Reports; it evaluates each personnel intervention and recommends actions for continued operation.

This Year Four Report represents the fourth in a series of five reports that Booz Allen will prepare assessing the Demonstration Project (at the conclusion of Year Five, Booz Allen will submit a Summative Report). Each report builds on data and findings from previous reports, thereby permitting trend analyses over the course of the five years. To facilitate cross-comparisons of reports by those who are reading the reports annually, this and subsequent reports will follow a similar structure. This report contains the following chapters.

Chapter 2, “Data Collection and Analyses,” contains information on the objective data used in this assessment and the analyses conducted.

Chapter 3, “Findings and Conclusions,” focuses on the major interventions that are being tested during the Demonstration Project. Each section is dedicated to a set of interventions. Each conclusion is explained and then followed by findings that are supported by objective data and/or summary human resources (HR) data. Data are often presented in table format to facilitate understanding.

Chapter 4, “Recommendations,” contains recommendations for the interventions, as appropriate. We also provide general recommendations that may not pertain to a specific intervention, but address organizational issues that affect the Demonstration Project.

Two appendices accompany this report. The first contains data results reported in this and previous reports, and is provided to facilitate comparisons. The second contains statistical analyses of the relationship between pay and performance in more detail than is provided in the body of the report.

Booz Allen wrote this report and the conclusions stated within represent our professional expertise and judgment based on the evidence collected as part of the evaluation.

2. DATA COLLECTION AND ANALYSES

This chapter presents information on the data that were collected for the Year Four Report. We also address the types of analyses and statistics that were employed in order to address the overarching research questions.

2.1. Booz Allen used objective personnel data to measure the impact of the Demonstration Project's interventions.

For the Year Four Report, Booz Allen collected and analyzed objective data contained in a datafile presented to us by DoC, which relied upon data from NFC's Payroll/ Personnel System. The personnel data pertained to performance, compensation, and demographics for the time period April 2001 to March 2002 for both the Demonstration Group and the Comparison Group.⁴ Table 2-1 shows the objective data elements that were included in the analyses.

For some records, the data file provided to Booz Allen did not contain complete information (e.g., performance score was not included for some cases). For each individual analysis, we included only those records where the relevant data were complete; therefore, the number of cases varies across analyses.

⁴ The organizations participating in the Demonstration Group are: the Technology Administration's Office of the Under Secretary and Office of Technology Policy; the Economics and Statistics Administration's Bureau of Economic Analysis; the National Telecommunications and Information Administration's Institute for Telecommunication Sciences; and units of the National Oceanic and Atmospheric Administration's Office of Oceanic and Atmospheric Research, National Environmental Satellite, Data, and Information Service, and National Marine Fisheries Service. The organizations participating in the Comparison Group are: Headquarters of the Economics and Statistics Administration and units of the National Oceanic and Atmospheric Administration's Office of Oceanic and Atmospheric Research and Environmental Research Laboratories, National Environmental Satellite, Data, and Information Service, and National Marine Fisheries Service.

Table 2-1. Objective Data Elements

Objective Data Elements	
<ul style="list-style-type: none"> • Social Security Number • Gender • Race • Birth date • Veteran status • Education • Organization/Unit • Occupational series • Hire date (starting date with DoC unit) • Date entered Demonstration Project (Demonstration Group) • Career path (equivalent for Comparison Group) • Pay band (equivalent for Comparison Group) • Interval (equivalent for Comparison Group) • Supervisory status (supervisory employee/ non-supervisory employee) • Base pay/Salary as of 11/30/01 (Demonstration Group) • Base pay/Salary as of 3/31/02 (Comparison Group) • Eligibility for performance rating in Year Four (Demonstration Group) 	<ul style="list-style-type: none"> • Performance appraisal score • Performance-based pay increase (Demonstration Group) • Step increase (Comparison Group) • Quality step increase (Comparison Group) • Increase for promotion to grade within band (Comparison Group) • Performance bonus date (month and year) • Performance bonus amount • Retention payment amount • Recruitment payment amount • Eligibility for 3-year probation • Probation begin date • Probation end date • Promotion during Year Four • Promotion date • Pay band after promotion (equivalent for Comparison Group) • Interval after promotion (equivalent for Comparison Group) • Salary increase at promotion • Salary after promotion • Switched career paths during Year Four

It should be noted that the analyses of pay for performance use the performance-based pay increases; pay increases associated with the Annual Comparability Increase (ACI) and increases in locality pay are in addition to the performance-based increase.

2.2. Both descriptive and inferential statistics were used to analyze the Demonstration Project's objective data.

Descriptive and inferential statistics were used to analyze the objective personnel data. Descriptive statistics (e.g., frequencies, cross-tabulations, and means) were used to present information about performance scores, pay increases, and bonuses. Inferential statistics (e.g., t-tests, correlations, regression analyses) were used to test the statistical significance of relationships (e.g., between performance scores and pay increases). Inferential statistics were also used to test differences in mean performance payouts to members of protected classes (minorities, females, and veterans). The specific inferential statistics used were ANOVA (analysis of variance—used to test differences in means) and ANCOVA (analysis of covariance—used to test differences in means while controlling for other factors). Appendix B presents a full description of the ANCOVA process and results as they relate to protected classes.

2.3. Comparisons were drawn between the Demonstration Group and the Comparison Group in order to examine the impact of the Demonstration Project's interventions.

Many of the analyses in this report compare personnel data from the Demonstration Group to personnel data from the Comparison Group. Table 2-2 indicates the number of participants in each group and provides basic demographic data, such as gender, race/ethnicity, supervisory status, career path, and pay band.⁵ These demographic data illustrate the general similarity in the demographic characteristics of participants in the Demonstration and Comparison Groups, which is important for establishing the validity of the Comparison Group used in this evaluation. There are some minor differences between the two groups; it will be addressed in the report in any cases where the differences between the Demonstration and Comparison Groups impact how findings are interpreted.

Table 2-2. Demographic Characteristics of Demonstration and Comparison Group Participants

	Demonstration Group Participants	Comparison Group Participants
OVERALL	2,641	1,821
GENDER		
Male	1,536 (58%)	1,144 (63%)
Female	1,105 (42%)	677 (37%)
RACE/ETHNICITY		
White	2,119 (80%)	1,588 (87%)
Black	313 (12%)	82 (5%)
Asian	119 (5%)	100 (6%)
Native American	10 (<1%)	8 (<1%)
Hispanic	80 (3%)	43 (2%)
SUPERVISORY STATUS		
Non-Supervisory Employee	2,452 (93%)	1,672 (92%)
Supervisory Employee	189 (7%)	149 (8%)
CAREER PATH*		
		<i>(equivalent)</i>
ZP	1,656 (63%)	1,249 (69%)
ZT	153 (6%)	231 (13%)
ZA	474 (18%)	179 (10%)
ZS	349 (13%)	160 (9%)
PAY BAND*		
		<i>(equivalent)</i>
I	63 (2%)	60 (3%)
II	366 (14%)	354 (20%)
III	888 (34%)	731 (40%)
IV	1,076 (41%)	570 (31%)
V	239 (9%)	104 (6%)

Note: Career path and pay band (or the equivalent) were missing for nine Demonstration Group participants and two Comparison Group participants.

⁵ In order to compare the two groups, career path and pay band equivalents are provided for the Comparison Group participants.

2.4. Booz Allen collected HR summary data from the participating organizations as an additional means of tracking and analyzing data on the use of the Demonstration Project interventions.

In addition to collecting and analyzing objective personnel data, Booz Allen also collected summary level HR data from the participating organizations as an additional source of information regarding the use of the Demonstration Project interventions. Each participating organization in the Demonstration Group and the Comparison Group was asked to submit data pertaining to classification actions, performance rating grievances, and hiring methods used.

2.5. Analyses were also conducted comparing Year Four data with data from previous years to track the impact of the interventions over time.

Where possible, we conducted analyses that compare objective data in the Demonstration and Comparison Groups across the evaluation years. These analyses show the trends that are occurring across time in regards to how the interventions are impacting the Demonstration Project. Accordingly, these analyses indicate what may be the long term impact of the interventions and also provide insight into the amount of time that it may take for the interventions to have an impact.

3. FINDINGS AND CONCLUSIONS

This chapter presents Booz Allen’s conclusions concerning the results that DoC has achieved after four years of implementing its Personnel Management Demonstration Project. In this report, each conclusion is supported by findings from the objective data and summary level HR data obtained from DoC.

3.1. The pay for performance system continues to exhibit a positive link between pay and performance.

A series of interventions were implemented during the Demonstration Project to improve the relationship between high performance and financial reward. These interventions include performance-based pay increases, performance bonuses, more flexible pay increases upon promotion, supervisory performance pay, and the three-year probationary period for scientists and engineers in R&D functions.

Consistent with previous years, a positive relationship between financial rewards and performance was found in Year Four. In addition, also consistent with previous years, performance-based pay increases⁶ were higher for the Demonstration Group than for the Comparison Group. However, in Year Four, average bonuses/awards were higher for the Comparison Group than the Demonstration Group.

3.1.1. On average, Demonstration Group participants received larger salary increases than did Comparison Group participants.

Consistent with Years Two and Three⁷, objective data show that Demonstration Group participants received salary increases ranging from 0 percent to 21 percent⁸ based on performance, with an average performance-based pay of 2.6 percent (shown in Figure 1). There were 540 Demonstration Group participants for whom performance score data were missing or who were ineligible to receive a performance rating, and therefore were not included in these analyses. (Employees typically receive performance ratings of either “E” for eligible or “U” for unsatisfactory. Ineligibility, in this context, refers to people who were hired or received a pay adjustment within 120 days prior to the end of the performance year (for whom a “N” rating was designated), employees on performance improvement plans (for whom a “P” rating was designated), employees who separated from the Demonstration Project during the performance year, and individuals in employment categories not eligible to be rated (e.g., students).)

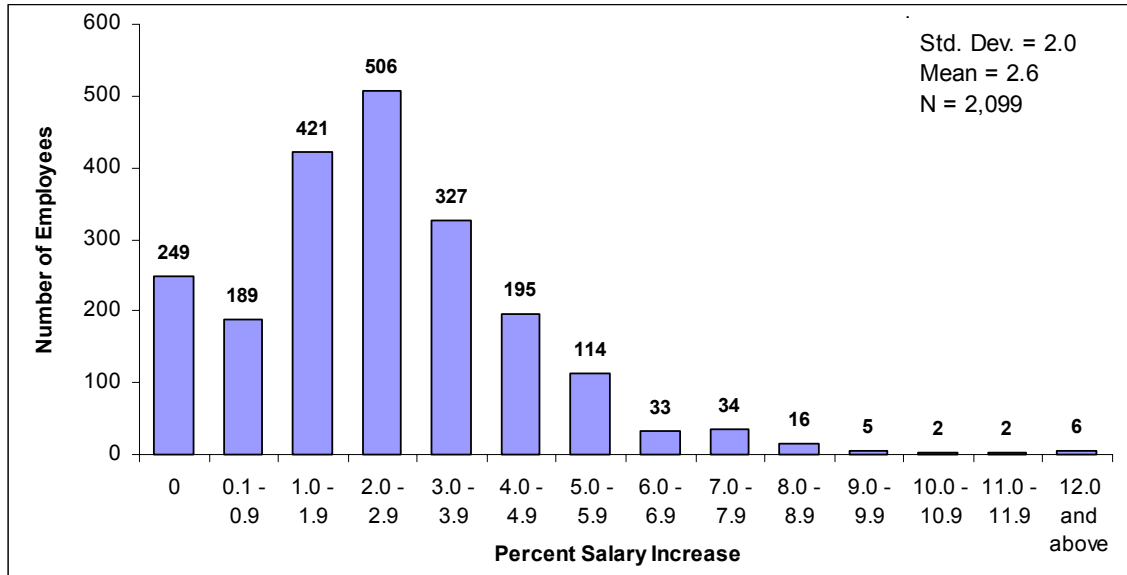
⁶ In our analyses, performance-based pay increases included pay that was directly linked to performance but did not include non-performance related elements of pay, such as cost-of-living adjustments (COLAs).

⁷ In this report, data are often compared to Year Two and Year Three. Because only limited objective data were available, comparisons are rarely made to Year One.

⁸ Unless stated otherwise, references in this document to “percent of salary” or “pay increase percentage” pertain to the percentage increase in salary from the beginning to the end of Year Four; this concept is not intended to be synonymous with the “percent of percent” concept often discussed in the context of the Demonstration Project.

Similar to Years Two and Three, over three-quarters of the employees received increases of less than 4 percent. Over 5 percent of Demonstration Group participants received percent salary increases of 6 percent or above providing some indication that, along with the finding that pay and performance are related, managers are taking advantage of their flexibility to award higher percentage increases to higher performing employees.

Figure 1. Range of Percent Salary Increases for Demonstration Group Participants



Note: This analysis is based on 2,099 of the 2,641 Demonstration Group participants for whom salary data were available.

One of the features of the DoC Demonstration Project is to determine whether NIST Demonstration Project interventions can be successfully implemented to a wider range of occupational areas. Therefore, the DoC Demonstration Project was designed to include four career paths: ZP (Scientific and Engineering), ZT (Scientific and Engineering Technician), ZA (Administrative), and ZS (Support). While each of these career paths includes a range of occupations, examining the differences across the career paths provides some indication of the impact of interventions on different occupational groupings.

For example, while the figure above indicates that the average performance-based pay increase across the Demonstration Project was 2.6 percent, results vary within each career path. These results are displayed in Table 3-1. These findings show that the largest average performance-based pay increases were experienced by, in descending order, those in the ZA, ZP, ZT and ZS career paths (this order is consistent with the three year historical pay increase averages prior to the Demonstration Project for individuals in these career paths).

Table 3-1. Average Performance-Based Pay Increase by Career Path

CAREER PATH	NUMBER OF EMPLOYEES	AVERAGE PERFORMANCE-BASED PAY INCREASE
ZP	1,372	2.60%
ZT	120	2.29%
ZA	379	3.13%
ZS	228	2.07%
Overall	2,099	2.62%

Note: Average pay increase by career path were computed for 2,099 of the 2,641 Demonstration Group participants for whom pay band and salary data were available.

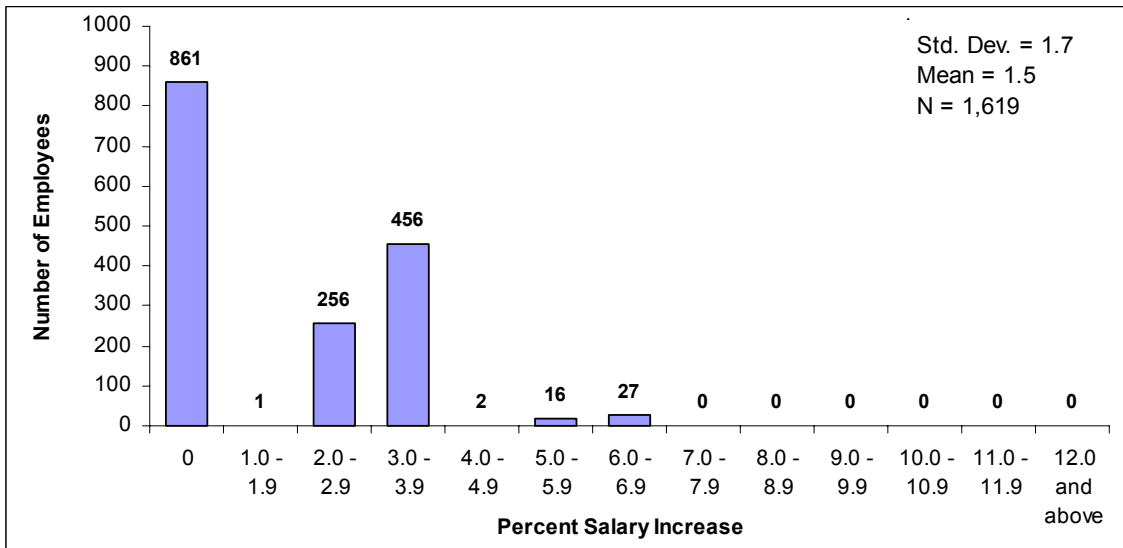
For the Comparison Group, we identified the following categories of increases that would be comparable to the performance-based increases in the Demonstration Group:

- Step increase
- Quality step increase
- Increase due to promotion to a grade within the equivalent pay band in the Demonstration Group.

The distribution of percent salary increases for the Comparison Group is shown in Figure 2. While percent increases in salary in the Comparison Group are not tied to the performance rating system, they are presented in this report to establish a pattern for comparison with percent increases in the Demonstration Group. The percent increases ranged from 0 percent to 6.9 percent, with an average percent increase of 1.5 percent.

All Comparison Group participants were found to be eligible for salary increases in Year Four. However, over 53 percent of the employees did not receive a salary increase in Year Four (although they received a passing performance rating), which is likely a function of the GS system wherein employees at the higher steps of a grade wait two to three years between step increases. This helps explain why more employees in the Demonstration Group received salary increases (88 percent) than in the Comparison Group (47 percent) during this time period.

Figure 2. Range of Percent Salary Increases for Comparison Group Participants

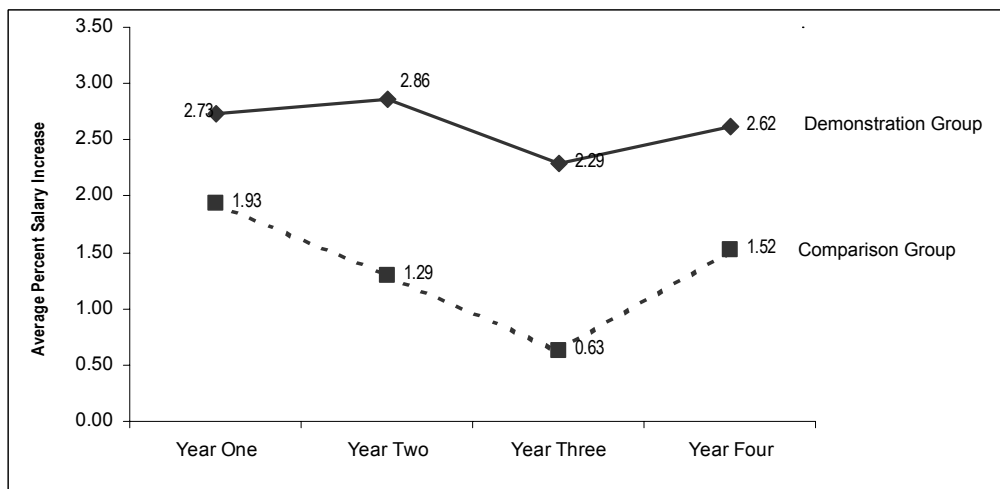


Note: This analysis is based on 1,619 of the 1,821 Comparison Group participants for whom salary data were available.

3.1.2. Salary increases increased from Year Three for both the Demonstration and Comparison Groups.

Year Four objective data showed an increase in the average percent salary increase for both the Demonstration and Comparison Groups from Year Three. Figure 3 displays a trend analysis of the average percent salary increases in the Demonstration and Comparison Groups from Year One through Year Four. This figure depicts a rise in salary increases in the Demonstration and Comparison Groups to levels similar to those reached in Years One and Two. For the fourth year in a row, Demonstration Group average performance-based pay increases are higher than Comparison Group average “performance-based” pay increases.

Figure 3. Trend Analysis of Average Percent Salary Increases

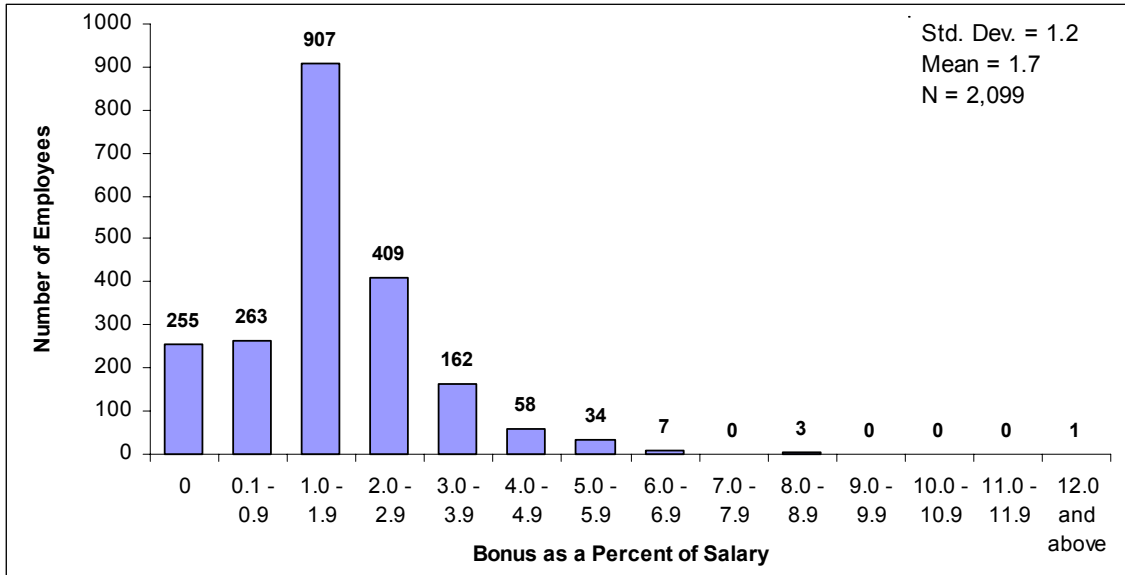


Note: The Comparison Group Year Two data point was revised in Year Three to reflect a correction in the formula used to calculate average percent salary increase.

3.1.3. A greater percentage of Demonstration Group participants received bonuses/awards than did Comparison Group participants; however, Comparison Group awards had a greater range.

In Year Four, 88 percent of Demonstration Group participants received bonuses. Bonuses ranged from 0.21 to 13.6 percent of salary for employees receiving bonuses. Figure 4 displays these results.

Figure 4. Range of Bonus Percentages for Demonstration Group Participants



Notes:

1. This analysis is based on 2,099 of the 2,641 Demonstration Group participants for whom bonus data were available.
2. Average bonus percentages are based on actions effective in November 2001, as reported in the Year Four data file provided by DoC.

Figure 4 indicates that the average bonus percentage across the Demonstration Project was 1.7 percent. Table 3-2 displays how the results vary within each career path. These findings show that the largest average bonuses were experienced by, in descending order, those in the ZS, ZA, ZP, and ZT career paths. This order is similar to that found for average performance-based pay increases with one exception: whereas those in the ZS career path received the smallest average performance-based pay increases, they also received the largest average bonuses. Several possible explanations may contribute to why this occurred for those in the ZS career path. One, bonuses may be more generously awarded in ZS, the career path with the lowest average salaries. Two, it may be that pay pools with ZS employees had larger bonus pools. And three, it may be that larger bonuses are being used to compensate for smaller performance-based pay increases.

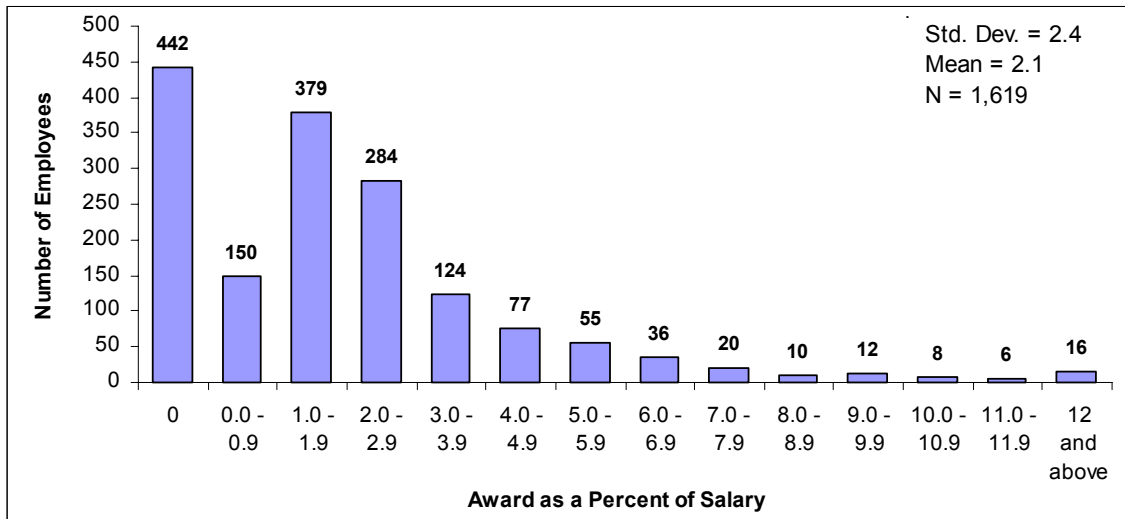
Table 3-2. Average Bonus by Career Path

CAREER PATH	NUMBER OF EMPLOYEES	AVERAGE BONUS
ZP	1,372	1.53%
ZT	120	1.47%
ZA	379	2.02%
ZS	228	2.41%
Overall	2,099	1.71%

Note: Average bonus by career path was computed for 2,099 of the 2,641 Demonstration Group participants for whom pay band and salary data were available.

In Year Four, 73 percent of Comparison Group participants received performance awards comparable to the bonuses provided under the Demonstration Project. Among those who received performance awards, awards ranged from 0.08 percent to 16.6 percent of salary, as shown in Figure 5. The range of awards for the Comparison Group participants was greater (0.08 to 16.6 percent) than the range of bonuses for Demonstration Group participants (0.21 to 13.6 percent). In both groups, the mode was 1.0 to 1.9; it appears that the Comparison Group’s higher average award percentage is driven by having a greater number of employees who received large awards (i.e., 7.0 percent and above).

Figure 5. Range of Award Percentages for Comparison Group Participants



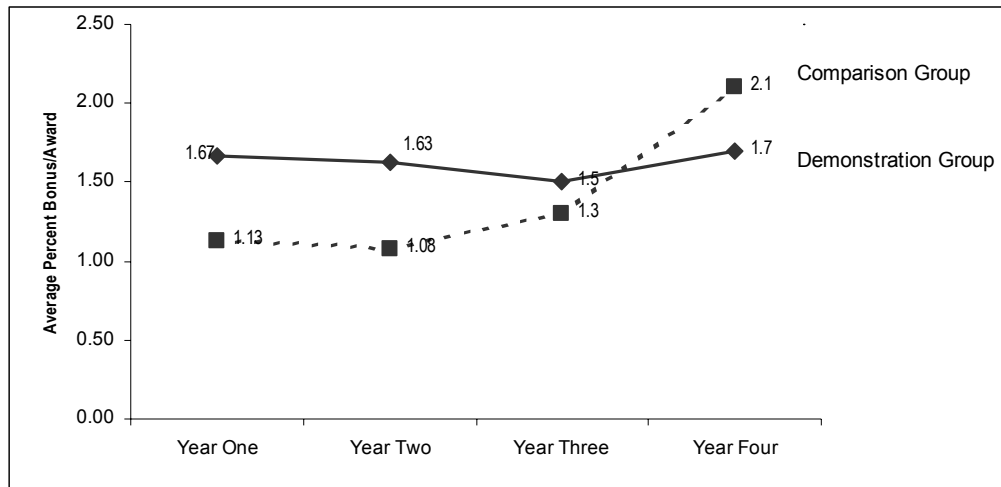
Note: This analysis is based on 1,619 of the 1,821 Comparison Group participants for whom salary data were available.

3.1.4. In Year Four, the Comparison Group’s average award percentages surpassed the Demonstration Group’s average bonus percentages.

Figure 6 displays a trend analysis of the average bonus/award percentages in the Demonstration and Comparison Groups from Year One to Year Four. Over time, average bonus percentages in the Demonstration Group have remained relatively constant. This finding is not surprising given that the intent of the intervention is to differentiate and appropriately reward strong versus weak performance, not necessarily to see an increase in the average payout.

Meanwhile, average award percentages in the Comparison Group remained relatively constant over Years One, Two, and Three, and then increased in Year Four to the point where the Comparison Group’s average award percentages exceeded the Demonstration Group’s average bonus percentages. This trend shows that while changes were not made in the Demonstration Group in the distribution of bonuses, the Comparison Group is experiencing increased usage of awards – a pattern that will be tracked closely in Year Five. If this pattern continues, it will be important to examine the overall compensation of Demonstration Project participants (salary plus bonuses/awards) to determine which group fares better.

Figure 6. Trend Analysis of Average Bonus/Award Percentages



3.1.5. Performance scores have steadily increased over the first four years of the Demonstration Project.

Employee performance is measured in the Demonstration Group on a weighted 100-point scoring system. These scores are then used as the basis for performance-related decisions for pay and rewards.

Table 3-3 displays the average performance appraisal scores in the Demonstration Group over the past four years. These data show that the average score has steadily increased. Compared with Year Three, a smaller percentage of Demonstration Group participants received scores of 69 or less in Year Four (2 percent versus 6 percent) and a higher

percentage received scores of 80 or above (85 percent versus 80 percent), thus driving the average performance score upward. The increase in average performance scores can be interpreted in at least three ways. One, it may suggest that individual performance has improved over the years. Two, it may be a positive result of the Demonstration Project's success in eliminating poor performers, which can improve average employee performance. And three, it may be indicative of score inflation rather than true performance improvement.

Table 3-3. Average Performance Appraisal Scores Across Years

DEMONSTRATION PROJECT YEAR	AVERAGE PERFORMANCE APPRAISAL SCORES
Year One	82.0 points
Year Two	83.4 points
Year Three	84.3 points
Year Four	85.7 points

Note: Average performance appraisal scores are the average number of points received under the 100-point system. Performance data for Demonstration Group employees are based on appraisals conducted in September 2001, and as reported in the Year Four data file provided by DoC.

We also examined average performance appraisal scores in Year Four by career path. As displayed in Table 3-4 and similar to Year Three, the results suggest a small range of average scores. The ordering of scores is almost identical to Year Three, with ZT and ZS having the lowest average scores and ZA having the highest average scores.

Table 3-4. Average Year Four Performance Score by Career Path

CAREER PATH	NUMBER OF EMPLOYEES	AVERAGE PERFORMANCE APPRAISAL SCORES
ZP	1,373	85.9 points
ZT	120	83.2 points
ZA	380	87.3 points
ZS	228	83.2 points

Note: Average performance scores by career path were computed for 2,101 of the 2,641 Demonstration Group participants for whom pay band and performance score data were available.

3.1.6. The link between performance and pay remains evident in the Demonstration Group.

The link between performance and pay is fundamental to the Demonstration Project. As in Years One, Two, and Three, objective data indicated that financial rewards are tied to job performance during Year Four. In Years One, Two, and Three, Booz Allen used correlation analysis as a broad measure of the relationship between pay and performance score. While this analysis was one of many analyses conducted to better assess the impact of performance on pay, it did not incorporate other factors that could impact pay progression. For this

reason, in Year Four Booz Allen conducted a regression analysis⁹ to replace the correlation analysis. The results of the regression analysis (presented in Appendix B) show that performance score had a stronger impact on pay progression than any other factor examined.

The results of the regression analysis provide support for a pay and performance link within the Demonstration Project by demonstrating that performance score is a key factor influencing pay. These results also show that the Demonstration Project is operating as intended because the system is designed to ensure a high degree of linkage between pay and performance. In fact, the payout procedures are designed to ensure that no employee receives a relative salary increase that is greater than that which someone with a higher performance score receives.

In addition to the regression analysis, a second analysis was performed to examine the relationship between pay and performance. In theory, under a pay-for-performance system, better performers should receive higher percentage pay increases. Conversely, lower performers are more likely to receive a low increase or none at all. Table 3-5 shows additional support that this is continuing to happen in the Demonstration Group. In Year Four, participants with higher performance scores were more likely to receive pay increases than were those with lower performance scores. Moreover, participants with higher performance scores received larger pay increases than those with lower performance scores. To note, employees in the 40-49 performance score category pose an exception to this finding; however, this exception should be viewed with caution given the small number of people in this particular category. Regardless, this finding will be examined in future years.

Table 3-5. Performance Score Category and Performance-Based Pay Increases Among Demonstration Group Participants

PERFORMANCE SCORE CATEGORY	NUMBER OF EMPLOYEES	PERCENT OF EMPLOYEES RECEIVING PAY INCREASES	AVERAGE PERFORMANCE-BASED PAY INCREASE PERCENTAGE
90-100	797	91%	3.3%
80-89	983	91%	2.5%
70-79	262	78%	1.5%
60-69	42	52%	0.7%
50-59	8	0%	0.0%
40-49	9	33%	1.6%

Note: Some, if not all, of the 91 percent of employees in the highest performance score category but with no pay increases may be employees at the top of their paybands.

⁹ Regression analysis is a similar, but more complex, analysis than correlation analysis in that regression analysis also measures the impact of other factors on the key relationship (e.g., the relationship between performance and pay). For this evaluation, a type of regression called “stepwise regression” was conducted using end salary as the dependent variable.

3.1.7. The link between performance and pay (as measured by bonuses/awards) remains evident in the Demonstration Group.

As was found for pay increases, objective data indicate that employee bonuses were tied to performance during Year Four. Statistics reveal a positive relationship between job performance (as measured by performance scores) and performance bonuses ($r = .37, p < .01$)¹⁰. (Appendix B provides a scatterplot of the data.) This correlation¹¹ in Year Four is slightly lower than the correlations of $r = .46 (p < .01)$ in Year Three, $r = .41 (p < .01)$ in Year Two, and $r = .46 (p < .01)$ in Year One, suggesting that the performance–bonus relationship has weakened slightly over the course of the Demonstration Project.

We also examined the relationship between job performance and bonuses in Year Four by career path. As displayed in Table 3-6, the results suggest that the relationship between performance and bonuses is strongest for, in descending order, those in the ZP, ZT, ZS, and ZA career paths.

Table 3-6. Correlation Between Performance Scores and Bonuses by Career Path

CAREER PATH	CORRELATION BETWEEN PERFORMANCE SCORE AND BONUS
ZP	.46
ZT	.40
ZA	.30
ZS	.34

Notes:

1. All results are significant at the $p \leq .01$ level.
2. Correlation by career path was computed for 2,099 of the 2,641 Demonstration Group participants for whom pay band data were available.

3.1.8. Evidence suggests that the flexible pay increase upon promotion intervention has been successful in providing managers with greater latitude.

The flexible pay increase upon promotion intervention provides managers with the flexibility to offer substantial pay increases when employees are promoted. Because of the less restrictive nature of pay bands, an employee’s salary, upon promotion, can be set anywhere within a band. This intervention is intended to reward high performing employees and encourage their retention by making their salaries more competitive with the public and private sectors.

Table 3-7 suggests that this intervention is being utilized. By subtracting the smallest promotion amount from the largest promotion amount, we calculated the size of the range of pay increases upon promotion. Thus, the size of the range is used as an indicator of

¹⁰ Based on 2,099 of the 2,641 Demonstration Group participants for whom performance rating and salary data were available.

¹¹ Correlational analysis was used in Year Four and all previous evaluation years. Correlation is a measure of the linear relationship between two or more variables and can have a value (“r”) ranging from -1.00 to $+1.00$.

flexibility in granting pay increases upon promotion, such that larger ranges are equated with having greater flexibility.

As was found in Year Three, at each level of promotion (e.g., from Band 1 to Band 2), managers in the Demonstration Group used a wider range of pay increases upon promotion than did those in the Comparison Group. For each comparison between the Demonstration Group and the Comparison Group, the wider range in pay increases upon promotion appears in bold.

Table 3-7. Range of Pay Increases Upon Promotion

Promotion by Band (or equivalent)	Demonstration Group		Comparison Group	
	Employees	Size of Range of Increase Upon Promotion	Employees	Size of Range of Increase Upon Promotion
Band 2	2	\$2,116	3	\$714
Band 3	43	\$10,270	27	\$5,261
Band 4	55	\$17,522	38	\$9,663
Band 5	24	\$13,885	8	\$5,538
Average Range		\$14,055		\$7,312

Notes:

1. Promotions are reported for those cases in which employees were promoted across bands (or the equivalent in the Comparison Group).
2. Size of range was computed by subtracting the smallest promotion amount from the largest promotion amount.
3. Average range was computed by generating a weighted average to account for the different number of employees in each band.

3.1.9. The supervisory performance pay intervention continued to reward supervisors who had reached the top of their pay bands.

In theory, the supervisory performance pay intervention facilitates paying supervisors at more competitive levels, with an intended outcome of motivating higher performance. As designed, this intervention is used for supervisors who reach the maximum of pay for the pay band and therefore are placed in the pay interval designated as supervisory performance pay. Supervisors receive performance scores along with all other employees in the Demonstration Group and are given pay increases appropriate to the score. Therefore, it is only when the supervisor reaches the top of the pay band that the intervention is enacted. As designed, this intervention rewards the highest paid supervisors (by expanding the pay band maximum by 6 percent) – but does not necessarily reward the highest performing supervisors. For this reason, this intervention may have limited utility as a motivational and/or retention tool for high performers.

An analysis Year Four data indicated that there were 189 supervisors in the Demonstration Group during Year Four. Of the 161 supervisors who had performance scores, 50 received supervisory performance pay. (In comparison, 41 supervisors, 44 supervisors, and 49 supervisors received supervisory performance pay in Year Three, Year Two, and Year One, respectively.) Mean scores indicate that there is not a meaningful difference in the performance scores for these two groups: Supervisors receiving supervisory performance pay had an average score of 91.6 (with a range of 79 to 98), while the average among all

other supervisors was 89.2 (with a range of 69 to 98). This finding of no significant difference reflects how the criteria for entry into the supervisory performance pay interval of the pay band are not dependent upon sustained superior performance. Instead, the criteria are being at the top of the regular pay band and receiving a performance score that warrants an increase above the top of the regular pay band.

3.2. The three-year probationary period for scientists and engineers continues to be used but assessing its utility remains difficult.

The three-year probationary period for scientists and engineers intervention was designed to allow supervisors the ability to make permanent hiring decisions for research and development (R&D) positions based on employees' demonstrated capabilities in the full R&D cycle. This intervention provides these supervisors with the ability to terminate poor performing employees anytime during the three-year period rather than being limited to the typical one-year probationary period. In Year Four, 10 employees were hired under the three-year probationary period. In Years One, Two, and Three, 22, 8, and 15 employees, respectively, were hired under the three-year probationary period.¹²

In Year Four, of those currently under the three-year probation, four employees left. Two were released from special probationary status, one was reassigned, and one resigned. However, whether this degree of movement represents positive implementation of the intervention (by virtue of making appropriate decisions for those under probation) or under-use of the intervention is unclear due to limitations in the analyses that can be performed given the way that probation-related data are tracked.

3.3. Some of the recruitment and staffing interventions have been successful whereas other recruitment and staffing interventions have not been implemented to their full potential.

The Demonstration Project implemented a number of interventions geared toward attracting high quality candidates and speeding up the recruiting and examining process. These interventions include agency based staffing, local authority for recruitment payments, flexible entry salaries, and flexible paid advertising. Overall, these recruitment and staffing interventions are intended to attract highly qualified candidates and bring new hires on board faster. Agency based staffing, supported by flexible paid advertising, will allow hiring officials to focus on more relevant recruiting sources. Local authority for recruitment payments will provide extra incentives for hiring high quality candidates and flexible entry salaries is a recruiting tool that gives hiring officials greater flexibility to offer more competitive salaries to highly qualified candidates.

It is important to recognize, however, that some of the recruitment and staffing interventions are not unique to the Demonstration Project. For example, agency based staffing and merit

¹² The number of employees reported as being hired under the three-year probationary period during Year Two differs slightly from that which was reported in the Year Two report. The number reported here, eight, is considered a more reliable count.

assignments are recruitment methods that are also available elsewhere. Similarly, flexible paid advertising is not unique. Given this reality, we sought to examine whether the interventions appeared to be working effectively in the Demonstration Group and show evidence of improvement over time. In doing so, the results show that some interventions (e.g., flexible starting salaries) have been more successfully implemented than others (e.g., recruitment payments).

3.3.1. In Year Four, it is not evident that the Demonstration Group brought in new hires of a higher caliber.

During Year Four, 344 new hires¹³ were brought into the Demonstration Group; 215 new hires were brought into the Comparison Group. (Individuals were designated as “new hires” if they were new to the Demonstration Project; they may or may not have been new to DoC.) As in previous years, the link between the Demonstration Project’s hiring interventions and the quality of new hires attracted and hired into the Demonstration Project was unclear. In order to examine the relationship between hiring interventions and the ability to attract high quality candidates, DoC will need to capture objective measures about the quality of applicants. Without this information, it will not be possible to fully assess whether the hiring interventions draw a better applicant pool.

While they do not provide direct insight into the quality of applicants, performance scores are one indication of whether high-quality candidates were hired. In Year Four, performance score data were available for 60 of the 344 new hires¹⁴. Scores ranged from 40 to 95¹⁵, with an average of 79.9 percent. This score is lower than the overall average performance score in the Demonstration Group of 85.7 percent. There are several possible explanations to this finding. One, it may suggest that new hires experience a “learning curve.” Alternatively, taking into account that a greater proportion of new hires are brought in through merit assignment than agency based staffing, it may suggest an advantage to recruiting externally rather than internally. Given that this finding is contrary to the intent of the Demonstration Group to hire higher quality candidates, it should be tracked closely in the future.

3.3.2. In the Demonstration Group, local authority for recruitment payments continue to be used to attract and hire employees.

Based on the objective datafile, nine of the 344 (2.6 percent) new hires in the Demonstration Group during Year Four received a recruitment payment (as a point of comparison, nine and seven Demonstration Group participants received recruitment payments in Year Three and Year Two, respectively). In Year Four, these payments ranged from \$2,500 to \$14,328. Performance scores were not available for any of these nine new hires, which precludes analyzing whether recruitment payments are an effective tool for recruiting higher performing employees.

¹³ The number of new hires in the objective datafile varies slightly from that which was reported by the personnel offices. This difference may be attributable to different methods of reporting.

¹⁴ The remaining 284 new hires were either hired after performance ratings were conducted or had missing data.

¹⁵ Two new hires received ratings of 40; otherwise, ratings ranged from 67 to 95.

3.3.3. Demonstration Group supervisors are taking advantage of their ability to offer more flexible starting salaries.

Consistent with previous years, objective data show that managers in the Demonstration Group used a wider range of salaries for new hires than in the Comparison Group, as displayed in Table 3-8. Starting salaries were compared by sorting new hires by path and by band (or their equivalents for Comparison Group participants). Out of 15 possible comparisons for starting salaries (categories in which both the Demonstration and Comparison Groups had at least two new hires), the range of salaries was wider for the Demonstration Group in 12 of the 15 comparisons (or 80 percent, which is slightly higher than Year Two (64 percent) and Year Three (67 percent)). For each comparison between the Demonstration Group and the Comparison Group, the wider range in starting salaries appears in bold. It should be noted that the locality pay differentials have not been accounted for in calculating these ranges, though they contribute to the size of the ranges in starting salaries.

Table 3-8. Comparison of Starting Salary Ranges Among New Hires in the Demonstration and Comparison Groups

	Demonstration Group		Comparison Group	
	Number of New Hires*	Size of Range of Starting Salaries	Number of New Hires	Size of Range of Starting Salaries
ZA				
Band 1	5	\$14,549	5	\$5,113
Band 2	17	\$22,515	11	\$13,041
Band 3	17	\$28,048	5	\$16,832
Band 4	7	\$42,333	2	\$22,470
Band 5	2	\$24,333	1	N/A
ZP				
Band 1	3	\$5,104	5	\$1,559
Band 2	97	\$26,969	51	\$22,567
Band 3	45	\$28,047	37	\$43,097
Band 4	17	\$32,343	7	\$31,031
Band 5	8	\$25,783	0	N/A
ZS				
Band 1	18	\$8,591	9	\$2,351
Band 2	24	\$9,180	7	\$3,183
Band 3	12	\$8,880	7	\$11,891
Band 4	17	\$16,955	9	\$10,959
Band 5	0	N/A	0	N/A
ZT				
Band 1	13	\$8,902	30	\$6,415
Band 2	5	\$10,740	26	\$11,229
Band 3	2	\$8,838	2	\$5,252
Band 4	1	N/A	0	N/A
Band 5	0	N/A	0	N/A

Notes:

1. The number of cases used in this analysis is based on the number of new hires for whom starting salary, career path, and pay band data were available (i.e., 310 out of 344 new hires in the Demonstration Group and 214 out of 215 new hires in the Comparison Group).
2. Size of range of was computed as by subtracting the smallest starting salary from the largest starting salary.

3.3.4. Compared to the Comparison Group, the Demonstration Group made greater use of merit assignment than agency based staffing and negotiated more offers; positions were filled in a similar timeframe.

Based on data provided by the participating organizations on the use of various methods for hiring, the Demonstration Group used merit assignment for 224 candidates and agency based staffing for 96 candidates, indicating a considerably greater use of merit assignment. The Comparison Group used merit assignment for 57 candidates and agency based staffing for 54 candidates, indicating a slightly greater use of merit assignment (see Table 3-9). Over the years, the Demonstration Group has shown a trend toward making greater use of merit assignment, perhaps reflecting the ease of filling positions from within. Alternatively, merit assignment usage numbers may be inflated by the influx of new work units into the Demonstration Project in Years Three and Four.

The organizations in the Demonstration Group reported that 26 candidates brought in through agency based staffing and 12 candidates brought in through merit assignment re-negotiated their job offers. This demonstrates the greater flexibilities permitted in the hiring process due to the Demonstration Project interventions. In these cases, managers were able to negotiate salaries, thereby increasing their ability to obtain competitive candidates.

The Demonstration Group and Comparison Group organizations reported very similar time frames for filling a position (from initial posting of vacancy to selection). While this suggests that the efficiency of recruitment processes is not greatly different under the Demonstration Project, it is interesting to note that both groups reported shorter timeframes in Year Four than Year Three – the Demonstration Group shortened from 69 days to 58 days and the Comparison Group shortened from 68 days to 56 days.

Table 3-9. Agency Data Request Results – Recruitment Methods

	DEMONSTRATION GROUP	COMPARISON GROUP
Agency based staffing		
Total number of offers made	96	54
Total number of offers accepted	94	54
Total number of offers re-negotiated (per candidate)	26	5
Acceptance rate (offers accepted/offer made)	98%	100%
Merit assignment		
Total number of offers made	224	57
Total number of offers accepted	224	57
Total number of offers re-negotiated (per candidate)	12	5
Acceptance rate (offers accepted/offer made)	100%	100%
Average number of calendar days required to fill a position (from initial posting of vacancy to selection)	58 days	56 days

3.3.5. The Demonstration Project has not yet used Direct Examination as a hiring intervention.

There are two Direct Examination authorities under the Demonstration Project: one is for critical shortage occupations and the other is for critical shortages of highly qualified candidates. To date, no critical shortage occupations have been identified under the Demonstration Project.

3.3.6. The Demonstration Project interventions have expedited the classification process.

In Year Four, human resources servicing offices in the Demonstration Group reported that it took an average of 28 minutes to produce and classify a position and an average of 21 minutes to process a classification action, which was much more timely than the Comparison

Group. This finding helps to support the hypothesis that the classification process is more expedient within the Demonstration Group.

3.4. While not all retention interventions are being full utilized, some evidence exists that turnover is occurring as desired (relative to performance).

The series of retention interventions available to the Demonstration Project have the potential to motivate and retain high performing employees. In Year Four, the impact of the retention interventions was varied and fairly consistent with Year Three. Interventions such as broadbanding and more flexible pay increases upon promotion are thought to be having a direct impact on retention. For example, because of broadbanding and more flexible pay increases upon promotion, managers have more latitude to raise the pay of high performers, which presumably helps retention. However, some retention interventions still receive little use (e.g., retention payments) or have not appeared to impact retention (e.g., supervisory performance pay).

3.4.1. Among Demonstration Group participants, the relationship between performance scores and turnover rates is in the desired direction but less pronounced than it was in Year Three.

One goal of the Demonstration Project is to retain higher performing employees. Ultimately, it is hoped that lower performing employees will separate at higher rates than will higher performing employees. As displayed in Table 3-10, dividing Demonstration Group participants into performance score groupings shows some evidence of the desired relationship in Year Four, though it is less apparent than it was in Year Three. By looking at the relative turnover rates across different levels of performance, there is some evidence that turnover is higher among those with lower scores, and turnover is lower among those with higher scores. For this analysis, turnover was defined as employees who retired, resigned, terminated, or otherwise separated from the Demonstration Project.

Table 3-10. Demonstration Group Turnover Rates by Level of Performance

PERFORMANCE SCORE CATEGORY	NUMBER OF EMPLOYEES	NUMBER OF SEPARATED EMPLOYEES	TURNOVER RATE
90-100	797	60	8%
80-89	983	106	11%
70-79	262	27	10%
60-69	42	2	5%
50-59	8	1	13%
40-49	9	1	11%

Notes:

1. Overall, 403 employees separated during Year Four. The total number of separated employees in this analysis is based on 197 of the 403 employees who separated in Year Four for whom valid Year Four performance scores were available.
2. The total number of employees in this analysis is based on the 2,101 employees for whom valid Year Four performance scores were available.
3. The previously reported turnover rate of 15 percent is based on the number of employees who separated during Year Four and the total number of employees in the Demonstration Group (regardless of whether performance scores were available).

3.4.2. In Year Four, the turnover rate in the Demonstration Group and the Comparison Group was the same.

Comparing Demonstration Group turnover to Comparison Group turnover can also be used as an indicator of the relative success of retention efforts. However, this analysis has its limitations because turnover can only be examined in the aggregate and not by performance levels (due to the fact that the majority of the Comparison Group is on a pass/fail performance rating system). Without information about performance levels, turnover rates can be interpreted in different ways. For example, lower turnover rates can be interpreted as a positive because more employees were retained. However, higher turnover rates can also be interpreted as a positive because they may suggest that lower performers are leaving, resulting in a stronger workforce overall. Given these limitations, we compare turnover between the groups but recognize that conclusions are difficult to draw.

Turnover was calculated as the number of employees who retired, resigned, terminated, or otherwise separated from the Demonstration Project, divided by the total number of Demonstration or Comparison Group participants. During Year Four, turnover was the same in both the Demonstration Group and the Comparison Group – 15 percent. This represents a leveling out from previous years in which the Demonstration Group had higher turnover than the Comparison Group. These results also show that turnover in the Demonstration Group has remained relatively constant while turnover in the Comparison Group has increased.

Cumulative turnover rate was calculated as the total number of separations in Years Two, Three, and Four divided by the average number of Demonstration or Comparison Group participants (the average number across Years Two, Three, and Four). (In Year One, data were not available on the number of separations and therefore could not be included in this calculation.) Over Years Two, Three, and Four, there has been a cumulative turnover rate of 44 percent in the Demonstration Group. In comparison, the cumulative turnover rate in the Comparison Group was 36 percent. (After Year Three, the cumulative turnover rates had

been 29 percent for the Demonstration Group and 21 percent for the Comparison Group.) Table 3-11 displays these results. The higher cumulative turnover rate in the Demonstration Group may be indicative of progress toward eliminating poor performers, given that there has been evidence that poor performers are turning over at higher rates than high performers (a clear finding in Year Three and, to a lesser extent, in Year Four).

Table 3-11. Turnover Rates by Group

GROUP	YEAR TWO	YEAR THREE	YEAR FOUR	CUMULATIVE OVER YEARS TWO, THREE, AND FOUR
Demonstration Group	13%	16%	15%	44%
Comparison Group	10%	11%	15%	36%

While the average turnover rate for Year Four across the Demonstration Project was 15 percent, results slightly varied by career path, as displayed in Table 3-12. These findings show that turnover is reasonably similar in the ZP, ZT, and ZA career paths and higher in the ZS career paths. The relationship between turnover and performance scores is less clear: for example, the ZS career path had the lowest average performance scores and the highest turnover (the desired relationship) but the ZT career path also had the lowest average performance scores and tied for the lowest turnover.

Table 3-12. Average Turnover Rate by Career Path

CAREER PATH	NUMBER OF EMPLOYEES	AVERAGE TURNOVER RATE	AVERAGE PERFORMANCE APPRAISAL SCORES
ZP	1,373	15%	85.9 points
ZT	120	14%	83.2 points
ZA	380	14%	87.3 points
ZS	228	20%	83.2 points

Notes:

1. Turnover rates by career path were computed for Demonstration Project participants for whom pay band data were available.
2. Average performance scores by career path were computed for 2,101 of the 2,641 Demonstration Group participants for whom pay band and performance score data were available; these averages are not limited to the subset of individuals who turned over in Year Four.

3.4.3. In the Demonstration Group, there was no significant difference in the average performance-based pay increases for those who separated and for those who remained.

In the Demonstration Group in Year Four, average performance-based pay increases among those who remain (2.6 percent) were slightly higher than for leavers (2.5 percent), although this was not a statistically significant difference. (The average for leavers is based on those leavers who left after receiving an appraisal and an increase.) Average bonuses and total awards follow the same pattern with those who remain having fared better than those who leave. Again, the differences were not statistically significant. Average performance-based pay increases, bonuses, and total awards (increases and bonuses) expressed as a percent of

salary appear in Table 3-13. Dollar figures for average performance-based pay increases and bonuses appear in Table 3-14.

Table 3-13. Stayers Versus Leavers: Percent Increases and Bonuses

Type of Award	Average Award (as a Percentage of Salary)
Performance-Based Pay Increase	
Stayers	2.6%
Leavers	2.5%
Bonus	
Stayers	1.7%
Leavers	1.6%
Total Awards	
Stayers	4.3%
Leavers	4.1%

Note: None of these differences was statistically significant at the $p \leq .05$ level.

Table 3-14. Stayers Versus Leavers: Average Performance-Based Pay Increases and Bonuses

Type of Award	Average Award (in Dollars)
Performance-Based Pay Increase*	
Stayers	\$1,627
Leavers	\$1,535
Bonus**	
Stayers	\$1,126
Leavers	\$986

Note: The difference between performance-based pay increases was not statistically significant at the $p \leq .05$ level. The difference between bonuses was statistically significant at the $p \leq .05$ level.

3.4.4. As in previous years, retention payments were not used.

Retention payments are an intervention that has been proposed as a tool for retaining high performing employees, especially those with expertise in critical skill areas. As in Years One, Two, and Three, an analysis of objective data suggests that no Demonstration Group participants received retention payments during Year Four. One explanation is that retention payments are not widely used because of the restrictions on when they can be awarded (i.e., retention payments can only be paid to employees leaving the Federal Government, which occurs infrequently, or for employees who are retiring).

3.4.5. The supervisory performance pay intervention is not impacting supervisor retention.

In theory, the supervisory performance pay intervention facilitates paying high performing supervisors at more competitive levels, thus improving retention. However, because this intervention was designed such that it rewards supervisors who reach the maximum of pay for the pay band, and not necessarily those with the highest levels of performance, its impact as a retention tool for high performers may be diminished.

As shown in Table 3-15, in Year Four, turnover among Demonstration Group supervisors (14 percent) was similar to all Demonstration Group participants (15 percent) and Comparison Group supervisors (13 percent). The turnover rate for Demonstration Group supervisors has fluctuated across the years, starting at 13 percent in both Years One and Two, increasing to 18 percent in Year Three, and now at 14 percent in Year Four.

In Year Four, turnover was the same for supervisors who received supervisory performance pay as for those who did not (14 percent). Just as there was little difference in the average performance scores of supervisors who did and did not receive supervisory performance pay, there is no difference in turnover rates.

Table 3-15. Turnover Among Supervisors

Group	Total Number	Number Who Separated	Turnover Rate
Demonstration Group			
All Employees*	2641	403	15%
All Supervisors	189	26	14%
Supervisors Who Did Not Receive Supervisory Performance Pay	132	18	14%
Supervisors Who Did Receive Supervisory Performance Pay	57	8	14%
Comparison Group			
All Employees	1821	281	15%
All Supervisors	149	20	13%

Notes:

1. Turnover rate was calculated as the number of individuals who separated divided by the total number of individuals.
2. "All Employees" includes supervisory and non-supervisory employees.

3.5. The Demonstration Project interventions continue to reflect a system in which there is no evidence of unfair treatment based on race, gender, or veteran status.

Booz Allen again performed a series of analyses on objective data pertaining to performance, compensation, and demographics of the Demonstration Project participants. Consistent with previous years, these analyses suggest that the Demonstration Project has not been detrimental to the compensation, recruitment, or retention of minorities, women, or veterans.

3.5.1. The Demonstration Project did not negatively impact the hiring of minorities and women.

Table 3-16 shows that, in Year Four, the proportion of minority new hires was consistent with their representation in the employee population overall, indicating that the Demonstration Project interventions are not harming DoC's ability to diversify its employee population in regards to minority status. The proportion of veteran new hires was slightly lower than their representation in the employee population overall; the difference was slight

but this does highlight a finding that needs to be tracked in the future (it is possible that this finding simply reflects a lower number of veterans currently in the job market). The most noticeable difference was the disproportionate number of female new hires; however, this increased hiring of females may help to create more gender balance in the Demonstration Group. Importantly, while this analysis demonstrates that there was sufficient diversity of new hires relative to the Demonstration Group population overall, it cannot address the diversity of the applicant pool from which new hires were drawn and the rates of hire per each group.

Table 3-16. Diversity of New Hires Compared to the Overall Demonstration Group

Category	New Hires (N=344)	All Demonstration Group Employees (N=2,641)
Minority Status		
Minority	20%	20%
Non-Minority	80%	80%
Gender		
Women	53%	42%
Men	47%	58%
Veteran Status		
Veteran	8%	13%
Non-Veteran	92%	87%

Note: The number of new hires in the objective datafile (n=344) varies slightly from that the number of new hires discussed in the report section on recruitment methods (n=318) because the latter covered some, but not all, of the new hires who joined the Demonstration Project.

3.5.2. As found in Years One, Two, and Three, the Demonstration Group's pay-for-performance system did not reward participants differently based on race, gender, or veteran status in terms of average performance-based pay increases or bonuses.

In Year Four, Booz Allen again analyzed objective data on the distribution of performance-based pay increase percentages and bonus percentages for participants in the Demonstration Project. These data were used to establish the links between pay and performance. When Booz Allen analyzed the effects of minority status, gender, and veteran status on the link between pay and performance, the results also demonstrated the link between pay and performance for these groups. This finding is consistent with findings from Years One, Two, and Three.

Table 3-17 presents raw data on average performance appraisal scores, raw data on average performance-based pay increases and bonuses, and the adjusted means produced by the ANCOVA analyses (see Appendix B for a more detailed description of the ANCOVA process and results). The table is broken down by protected class. These data show that the performance-pay link is evident within each comparison (i.e., within each comparison, the subgroup with the higher performance score also had a higher average performance-based pay increase and bonus while the subgroup with the lower performance score had a lower average performance-based pay increase and bonus).

Overall, these results suggest that the pay-for-performance system did not reward participants differently based on race, gender, or veteran status in terms of average performance increases or bonuses. Rather, differences in performance-based pay increases and bonuses appear to be linked to performance scores.

Table 3-17. Average Performance Appraisal Scores, Pay Increase Percentages (Raw and Adjusted), and Bonus Percentages (Raw and Adjusted) for the Demonstration Group

		Average Performance-Based Pay Increase Percentage		Average Bonus Percentage	
		Raw	Adjusted	Raw	Adjusted
Minority	85.3 points	2.6%	2.4%	1.6%	1.6%
Non-Minority	85.8 points	2.6%	2.7%	1.7%	1.7%
Female	85.9 points	2.9%	2.6%	1.9%	1.9%
Male	85.7 points	2.5%	2.6%	1.6%	1.6%
Veteran	83.6 points	2.0%	2.4%	1.5%	1.6%
Non-Veteran	86.1 points	2.7%	2.7%	1.7%	1.7%

Notes:

1. The average performance appraisal score for each Demonstration Group subgroup is the average number of points received under the 100-point system. Performance data for Demonstration Group employees are based on appraisals conducted in September 2001, and as reported in the Year Four data file provided by DoC. Average performance-based pay increase and bonus percentages are based on actions effective in November 2001, as reported in the Year Four data file provided by DoC.
2. The minority group includes all non-White personnel, specifically Blacks, Hispanics, Asians, and American Indians.
3. Adjusted averages were computed by statistically controlling for performance score, career path, and length of service.
4. Average performance-based pay increase and bonus percentages were computed for 2,099 of the 2,641 Demonstration Group participants for whom salary data were available. Average performance scores were computed for 2,101 of the 2,641 Demonstration Group participants for whom performance score data were available

3.5.3. As found in Years One, Two, and Three, similar patterns emerge in how members of different protected classes fared in terms of average performance-based pay increases and bonuses in the Demonstration Group versus the Comparison Group.

Booz Allen also examined Comparison Group data on performance appraisal scores, pay increase percentages, and bonus/award percentages to evaluate differences between the Demonstration and Comparison Groups during Year Four. Direct comparisons were not always possible due to the differences inherent in the different systems. Table 3-18 displays the data sources used from each group for purposes of comparison.

Table 3-18. Data from Demonstration and Comparison Groups Used for Comparisons

Demonstration Group	Comparison Group
Scores on a 100-point performance appraisal system	Scores on a 2-level or 5-level performance appraisal system
Performance Increase	Step Increase Quality Step Increase Promotion Increase (when the promotion was equivalent to transition within a pay band under the Demonstration Project)
Bonus	Performance Award

As shown, Demonstration Group participants were evaluated on a 100-point performance appraisal system. There were two performance appraisal systems being used by organizations in the Comparison Group; ESA (with 63 employees in the Comparison Group) used the traditional 5-level performance appraisal system, whereas NOAA (with 1,758 employees in the Comparison Group) used a 2-level performance appraisal system (i.e., pass/fail) that is being studied for effectiveness. Because most of the Comparison Group participants were evaluated on the 2-level system, the scores of the remaining employees in the Comparison Group were converted to the two-level system¹⁶ for purposes of composing a group average for the entire Comparison Group. Table 3-19 displays the data on performance scores, broken out by protected subgroups.

There are some important differences in how employees in the Demonstration and Comparison Groups were evaluated and rewarded. Employees in the Demonstration Group were evaluated based on a pay-for-performance system; hence, their pay increases were based on performance. In contrast, employees in the Comparison Group are under the traditional federal pay system. They received the traditional salary increases including step increases (as appropriate), quality step increases (as awarded), and increases related to promotions. In addition, some employees received performance awards; these award amounts did not affect base salary.

For purposes of comparison with the Demonstration Group, the Comparison Group’s step increases, quality step increases, and promotions (when those promotions are equivalent to a “within band” increase in pay in the Demonstration Group) were considered comparable to the performance increase given in the Demonstration Group. The Comparison Group’s awards were considered comparable to the bonuses given in the Demonstration Group.

Hence, in addition to the performance appraisal data, Table 3-19 presents a comparison of the average performance-based pay increase and the average bonus/award (presented as percentages of base salary), broken out by protected subgroups, across the Demonstration and Comparison Groups. After accounting for performance score, length of service, and career path in the ANCOVA analyses (thus producing adjusted means), these data suggest that, in most cases, similar patterns emerge in how members of protected classes fared in the

¹⁶ Scores from the 5-level system were converted to the 2-level system as follows: Levels 1 (unacceptable) and 2 (marginal) were converted to “fail.” Levels 3 (fully successful), 4 (level between fully successful and outstanding), and 5 (outstanding) were converted to “pass.”

Demonstration Group and in the Comparison Group in terms of average performance-based pay increase percentages and average bonus/award percentages. For example, although veterans received lower pay increase percentages than non-veterans in the Demonstration Group (in line with their lower performance scores), the same was true in the Comparison Group.

Table 3-19. Comparison of Performance Appraisal Scores, Average Performance-Based Pay Increases, and Average Bonuses/Awards Across Groups

	Performance Appraisal Scores		Average Pay Increase Percentage		Average Bonus/ Award Percentage	
	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group
Minority	85.3 points	100% Pass; 0% Fail	2.4%	1.6%	1.6%	2.2%
Non-Minority	85.8 points	100% Pass; 0% Fail	2.7%	1.6%	1.7%	2.2%
Female	85.9 points	100% Pass; 0% Fail	2.6%	1.6%	1.9%	2.4%
Male	85.7 points	100% Pass; 0% Fail	2.6%	1.6%	1.6%	2.1%
Veteran	83.6 points	100% Pass; 0% Fail	2.4%	1.3%	1.6%	1.6%
Non-Veteran	86.1 points	100% Pass; 0% Fail	2.7%	1.7%	1.7%	2.3%

Notes:

- 1. The performance appraisal scores presented for the Demonstration Group is the average number of points received under the 100-point system. The numbers presented for the Comparison Group are the percentages of employees who received "Pass" or "Fail" under the 2-level system. Performance data for Demonstration Group employees are based on appraisals conducted in September 2001, and as reported in the Year Four data file provided by DoC. Performance data for Comparison Group employees are based on appraisals occurring between April 1, 2001 and March 31, 2002 and as reported in the Year Four data file provided by DoC.*
- 2. Average performance-based pay increase and bonus/award percentages are based on actions occurring during the performance evaluation cycle that ended September 30, 2001 and as reported in the Year Four data file provided by DoC.*
- 3. Average performance-based pay increase and bonus percentages for the Demonstration Group are based on adjusted averages that were computed by statistically controlling for performance score, career path, and length of service.*
- 4. Average performance-based pay increase and bonus percentages were computed for 2,099 of the 2,641 Demonstration Group participants for whom salary and demographic data were available. Average performance scores were computed for 2,101 of the 2,641 Demonstration Group participants for whom performance score and demographic data were available.*
- 5. Average performance-based pay increase and bonus percentages were computed for 1,434 of the 1,821 Comparison Group participants for whom data were available on pay increases, bonuses, performance score, career path, and length of service.*

3.5.4. In the Demonstration Group, turnover rates were higher among minority employees than non-minority employees; the same pattern did not hold true among high performers.

In Year Four, turnover in the Demonstration Group was slightly higher among minorities (17 percent) than non-minorities (15 percent). This was not the case in Years Two and Three. This issue will be tracked in future years to ensure that there is no systemic issue with

retaining minority participants. It is also advisable to recognize that these differences are slight and more data are needed before drawing conclusions.

Among high performers (performance scores of 91–100), the results were the opposite. Turnover was slightly lower among minorities (7 percent) than non-minorities (8 percent). While this may suggest that the Demonstration Project is having some success in retaining high performing minority participants, it is again important to note that the differences are slight. These findings are displayed in Table 3-20.

Table 3-20. Comparison of Turnover Rates in the Demonstration Group Between All Participants and High Performers

Group	Demonstration Group All Participants			Demonstration Group High Performers		
	Number	Number Separated	Percent Separated	Number	Number Separated	Percent Separated
Minority	522	90	17%	127	9	7%
Non-Minority	2,119	313	15%	670	51	8%
TOTAL	2,641	403	15%	797	60	8%

3.5.5. The pattern of turnover rates by minority status was similar in the Demonstration Group versus the Comparison Group.

In Year Four, turnover rates by minority/non-minority status for the Comparison Group paralleled those for the Demonstration Group. Turnover was slightly higher among minorities (17 percent) than non-minorities (15 percent), as displayed in Table 3-21. This finding suggests that the pattern of turnover rates by minority status may be due to factors beyond the Demonstration Project’s interventions since both groups are experiencing a similar trend.

Due to the lack of performance data in the Comparison Group beyond Pass/Fail ratings, it is not possible to assess how the Comparison Group’s retention of high performing minorities compares to its retention of all minority participants.

Table 3-21. Comparison of Turnover Rates in the Demonstration and Comparison Groups

Group	Demonstration Group All Participants			Comparison Group All Participants		
	Number	Number Separated	Percent Separated	Number	Number Separated	Percent Separated
Minority	522	90	17%	233	40	17%
Non-Minority	2,119	313	15%	1,588	241	15%
TOTAL	2,641	403	15%	1,821	281	15%

4. RECOMMENDATIONS

This chapter presents Booz Allen’s recommendations as DoC continues to operate the Demonstration Project. These recommendations are intended to enhance aspects of the Demonstration Project based on Year Four findings and conclusions, trend analyses, and the knowledge that we have gained by evaluating the Demonstration Project over its first four years.

4.1. DoC should more fully implement the recruitment and staffing interventions.

Several challenges still remain with implementing and evaluating the recruitment and staffing interventions. One key intervention that warrants closer attention is the effort to attract higher quality candidates. However, no clear criteria for applicant quality have been defined nor measured, which precludes conducting these types of analyses. DoC should invest time in researching potential criteria, making decisions on data to be collected, and imposing methods to track the data. By doing so, it will be possible to determine which recruitment strategies are most successful in drawing the best and the brightest to the organization. Furthermore, it will permit tracking whether an influx of high-performing new hires, combined with turnover of low performers, helps to improve aggregate organizational performance.

As addressed in the body of the report, in Year Four, new hires had a lower average performance score than the overall average in the Demonstration Group. If Year Five produces the same results, DoC may want to examine this issue to determine the factors leading to lower levels of performance among new hires. Areas to explore may include whether performance scores differ for those hired through different sources (e.g., merit assignment versus agency based staffing), whether new hires with lower scores improve in their second year (that is, they experience a “learning curve”), and whether supervisors feel adequately prepared to assess new hires (given new hires’ limited performance history).

4.2. DoC should make greater use of retention interventions.

In Year Four, results continued to show that the outcome of retention efforts have been successful. Turnover rates in the Demonstration Group have been generally comparable with the Comparison Group over the years. And, data across the years have shown evidence that, in the Demonstration Group, lower performing employees turn over at a faster rate than higher performing employees.

While turnover outcomes have been acceptable, it is not clear that the outcomes have resulted from the Demonstration Project’s retention interventions. DoC should further examine why interventions, such as retention payments and supervisory performance pay, have not been more fully used as retention tools. This exploration will be particularly valuable as market conditions shift over the next six years and competition for high performers may increase.

In Year Three, we proposed several theories regarding the lack of use of retention payments. One, it may be that general satisfaction with pay (as demonstrated in the Year Three survey) has made retention payments less necessary. Two, it may be employees are not turning over at such a rate to raise concern. Three, the limited use of retention payments in the Demonstration Project may also reflect the trend elsewhere in DoC where retention payments have not been used to a great extent since they were first made available to government managers in 1990. Four, some managers may be unaware about how to use retention payments. And five, retention payments may not be widely used because of the restrictions on when they can be awarded (i.e., retention payments can only be paid to employees leaving the Federal Government, which occurs infrequently, or for employees who are retiring). These may be starting points for further exploration.

The supervisory performance pay intervention is also expected to impact retention. However, given that it is enacted for those supervisors who have reached the top of their pay bands, rather than to reward high performing supervisors, it is difficult to assess its value as a motivational tool. We recommend that DoC devise new retention strategies for supervisors. This will be particularly important given the projected losses (governmentwide) of leaders as the federal workforce ages. Creative retention tools may help to prolong the employment of high performing supervisors thus benefiting the organization.

4.3. DoC should support better database management, which will facilitate a more comprehensive evaluation.

As recommended in previous years, the need exists to improve database management for the Demonstration Project. Several data issues have impacted the ability to perform a comprehensive evaluation. One, additional data points are needed, such as criteria for quality of new hires and the number of Demonstration Group participants who have reached the top of their paybands. Two, each year, the datafiles provided for the evaluation are missing data in critical fields, such as pay and performance scores, which results in performing analyses on subsets of the Demonstration Project participants. Three, dedicated resources are needed at DoC to prepare the datafiles due to their complexity. As we have recommended previously, a permanent database manager could benefit the Demonstration Project because this person could not only build up expertise but also would retain historical knowledge of data issues.

4.4. DoC should use the extension as an opportunity to improve the Demonstration Project while also maintaining enough continuity to not sacrifice methodological rigor.

Based on the findings over the past four years, sufficient evidence exists to extend the Demonstration Project. From the evaluator's perspective, we offer the following broad recommendations as the Demonstration Project management plans to transition into the next five years:

- Determine the viability of each intervention in the extension phase. For example, consider whether the interventions that are no longer innovative and are now available governmentwide should remain within the Demonstration Project.
- Rely on evaluation reports as a resource for identifying interventions that could be better designed (e.g., supervisory performance pay) and determine the best way to implement these interventions in the future
- When planning database management for the extension period, consider the database management issues that surfaced over the past four years and plan for mitigating these issues, where possible
- Use the same assessment tools and measures (e.g., survey items, protocols, objective data analyses) during the extension period so that trends can span ten years
- Further explore how/whether groups (e.g., different career paths, different EEO groups) within the Demonstration Project have different experiences and potential root causes for these differences
- Continue to invest time and resources into training and education both at the onset and throughout the extension period.

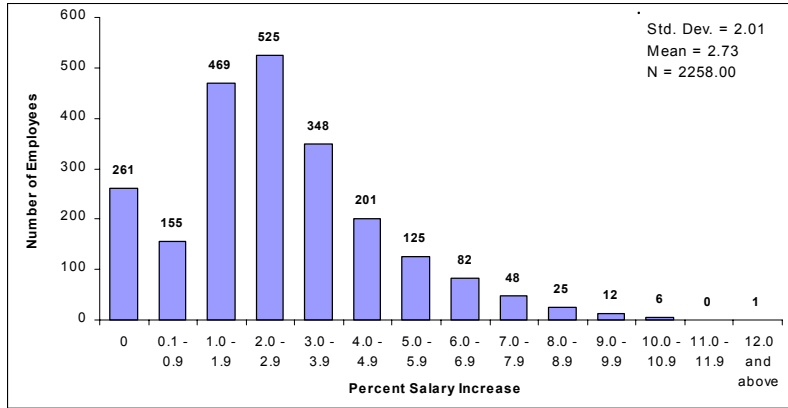
APPENDIX A

YEARS ONE, TWO, THREE, AND FOUR OBJECTIVE DATA RESULTS

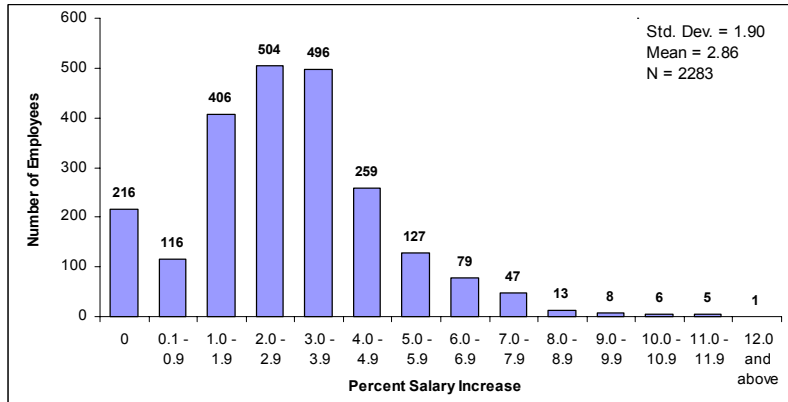
YEAR ONE, YEAR TWO, YEAR THREE, AND YEAR FOUR OBJECTIVE DATA RESULTS¹

Range of Percent Salary Increases for Demonstration Group Employees

Year One—Range of Percent Salary Increases for Demonstration Group Employees

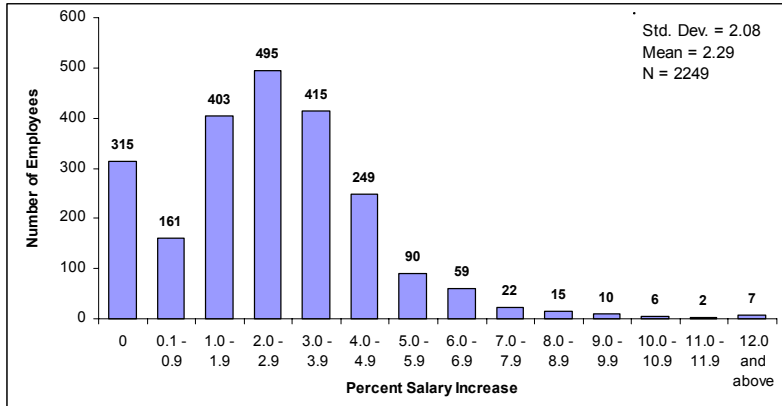


Year Two—Range of Percent Salary Increases for Demonstration Group Employees

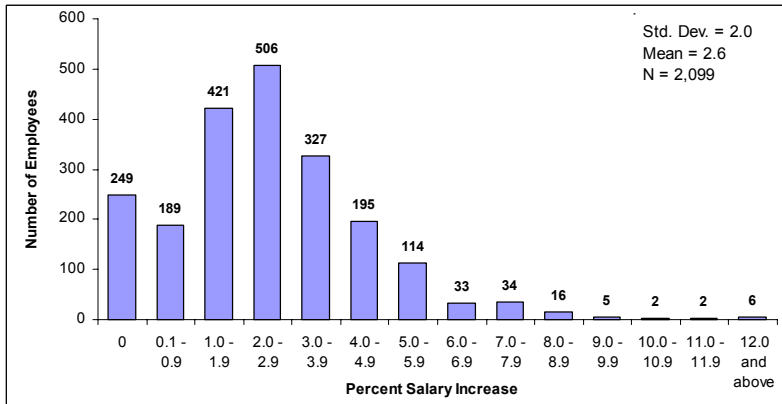


¹ This appendix is a compendium of data tables from previous reports and is provided for the ease of the reader in making comparisons with the Year Four data. Note that some analyses were not performed in all years.

Year Three—Range of Percent Salary Increases for Demonstration Group Participants



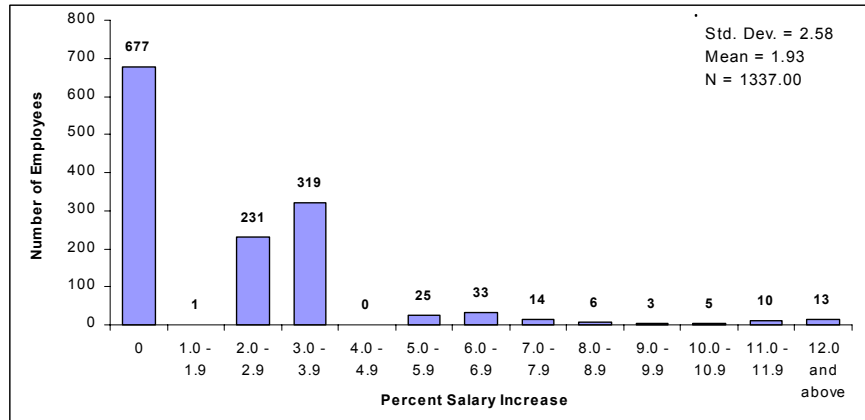
Year Four—Range of Percent Salary Increases for Demonstration Group Participants



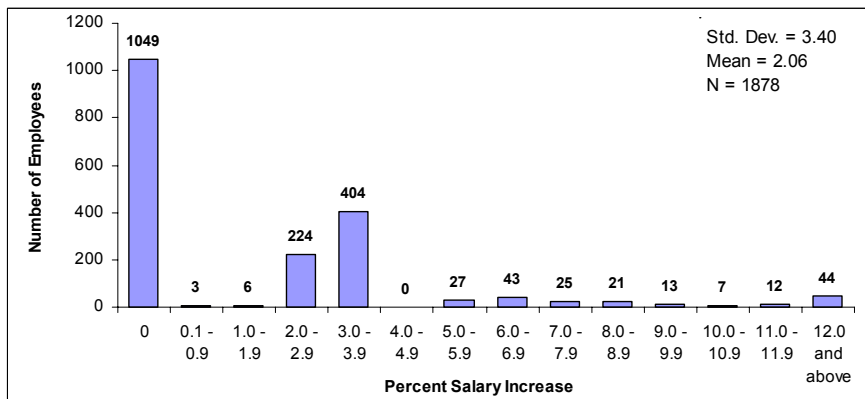
Note: This analysis is based on 2,099 of the 2,641 Demonstration Group participants for whom salary data were available.

Range of Percent Salary Increases for Comparison Group Employees

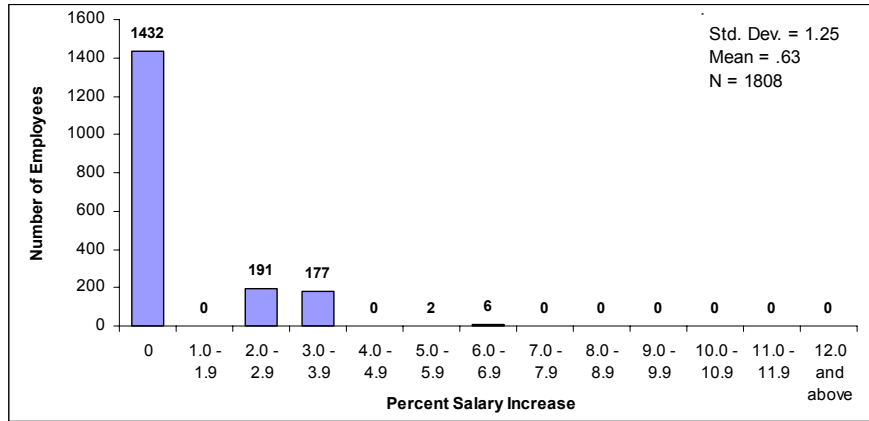
Year One—Range of Percent Salary Increases for Comparison Group Employees



Year Two—Range of Percent Salary Increases for Comparison Group Employees

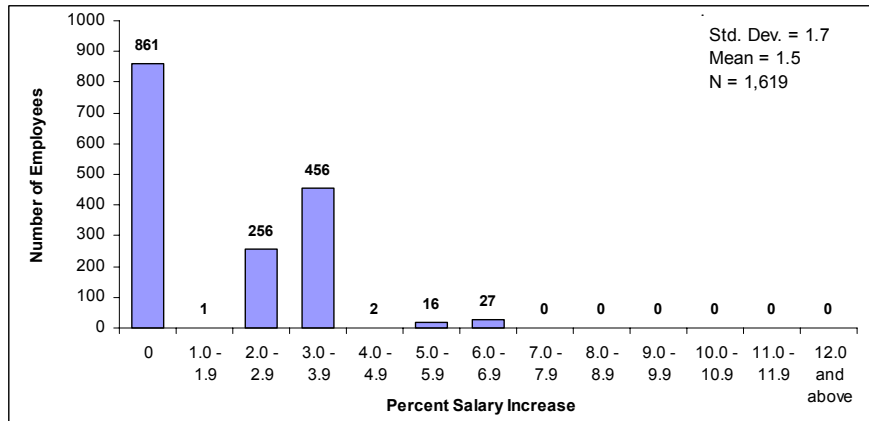


Year Three—Range of Percent Salary Increases for Comparison Group Participants



Note: The bar for zero percent salary increases was revised in Year Four to reflect a correction. The corrected data point did not change the previously stated mean and standard deviation.

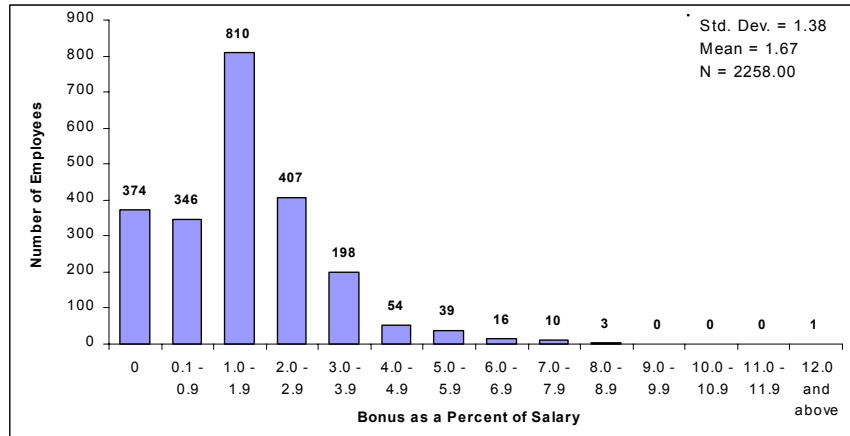
Year Four—Range of Percent Salary Increases for Comparison Group Participants



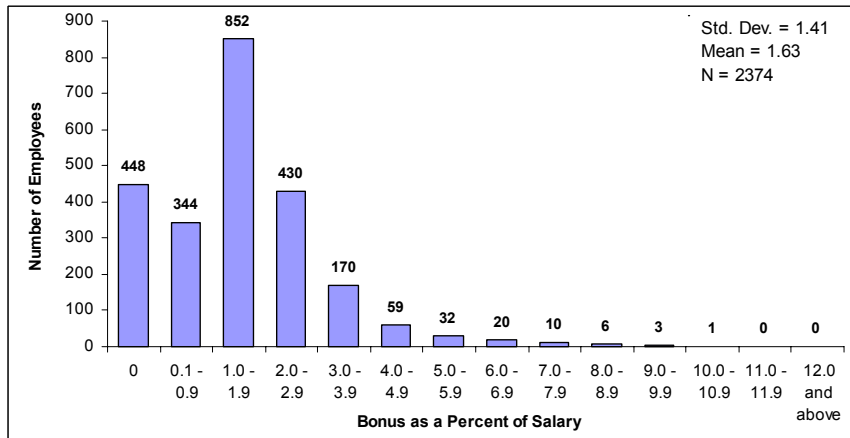
Note: This analysis is based on 1,619 of the 1,821 Comparison Group participants for whom salary data were available.

Range of Bonus Percentages for Demonstration Group Employees

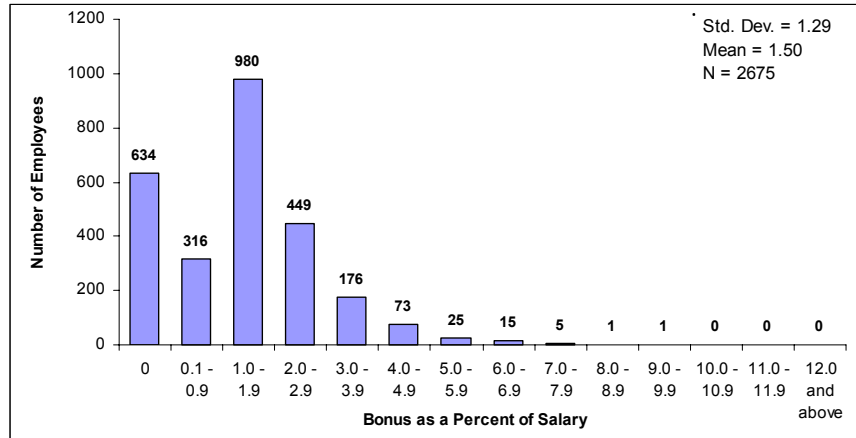
Year One—Range of Bonus Percentages for Demonstration Group Employees



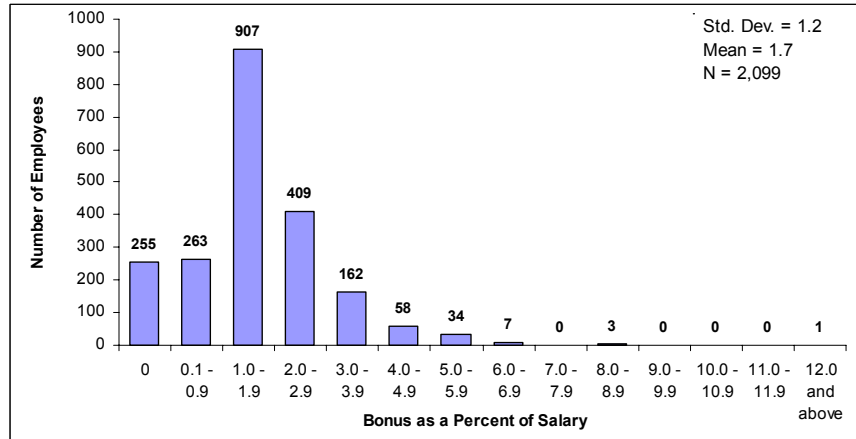
Year Two—Range of Bonus Percentages for Demonstration Group Employees



Year Three—Range of Bonus Percentages for Demonstration Group Participants



Year Four—Range of Bonus Percentages for Demonstration Group Participants

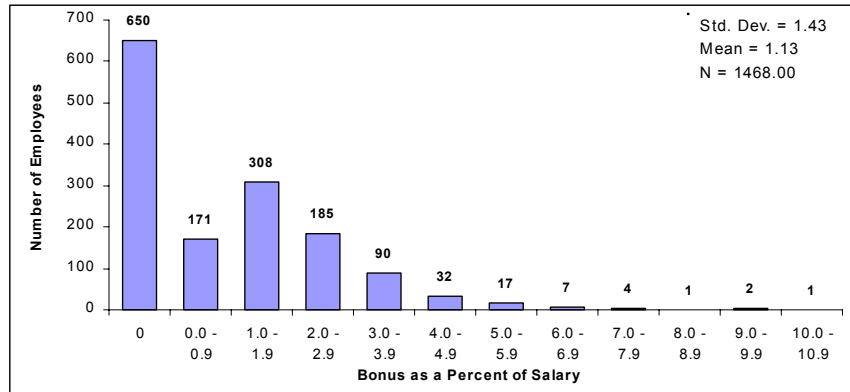


Notes:

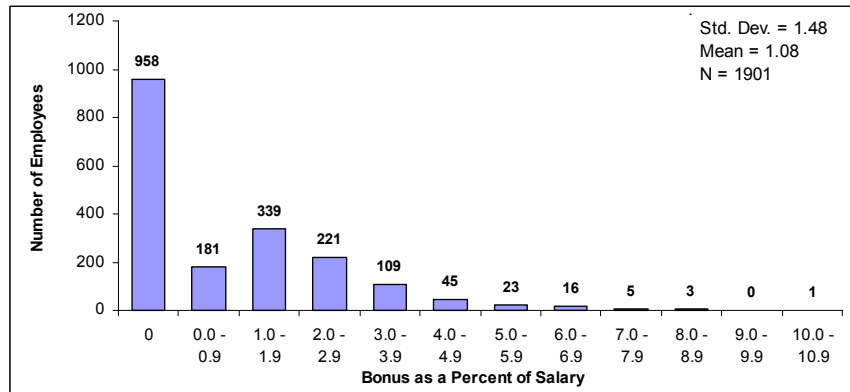
1. This analysis is based on 2,099 of the 2,641 Demonstration Group participants for whom bonus data were available.
2. Average bonus percentages are based on actions effective in November 2001, as reported in the Year Four data file provided by DoC.

Range of Award Percentages for Comparison Group Employees

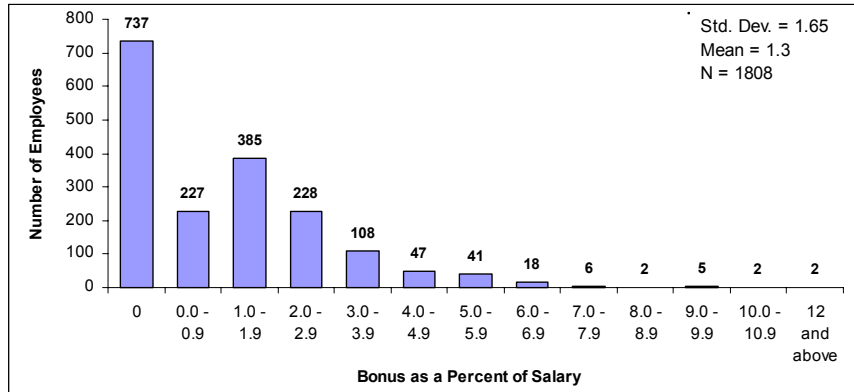
Year One—Range of Award Percentages for Comparison Group Employees



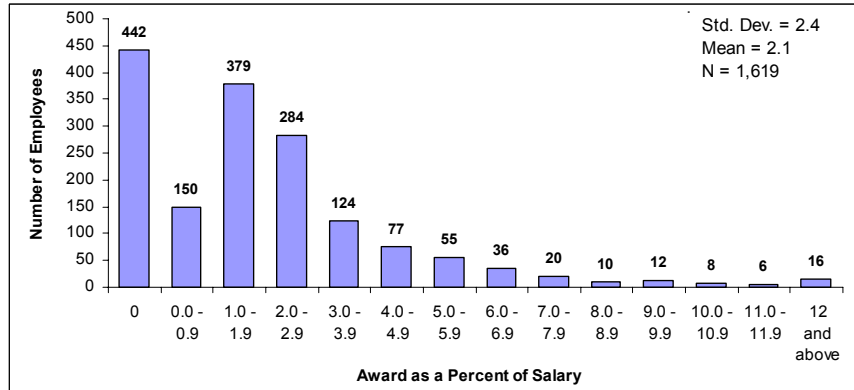
Year Two—Range of Award Percentages for Comparison Group Employees



Year Three—Range of Award Percentages for Comparison Group Participants



Year Four—Range of Award Percentages for Comparison Group Participants



Note: This analysis is based on 1,619 of the 1,821 Comparison Group participants for whom salary data were available.

Average Performance Score by Career Path

(This analysis was not performed on Year One or Year Two data.)

Year Three—Average Year Three Performance Score by Career Path

CAREER PATH	AVERAGE PERFORMANCE APPRAISAL SCORES
ZP	85.0 points
ZT	83.0 points
ZA	85.8 points
ZS	81.9 points
OVERALL	84.3 points

Notes:

1. Average scores by career path were computed for Demonstration Project participants for whom pay band data were available.
2. Overall score is a non-weighted average given that it is intended to represent the Demonstration Project as a single entity.

Year Four—Average Year Four Performance Score by Career Path

CAREER PATH	NUMBER OF EMPLOYEES	AVERAGE PERFORMANCE APPRAISAL SCORES
ZP	1,373	85.9 points
ZT	120	83.2 points
ZA	380	87.3 points
ZS	228	83.2 points

Note: Average performance scores by career path were computed for 2,101 of the 2,641 Demonstration Group participants for whom pay band and performance score data were available.

Average Performance-Based Pay Increase by Career Path

(This analysis was not performed on Year One or Year Two data.)

Year Three—Average Performance-Based Pay Increase by Career Path

CAREER PATH	AVERAGE PERFORMANCE-BASED PAY INCREASE
ZP	2.36%
ZT	1.86%
ZA	2.70%
ZS	1.63%
OVERALL	2.29%

Notes:

1. Average pay increase by career path were computed for Demonstration Project participants for whom pay band data were available.
2. Overall average pay increase is a non-weighted average given that it is intended to represent the Demonstration Project as a single entity.

Year Four—Average Performance-Based Pay Increase by Career Path

CAREER PATH	NUMBER OF EMPLOYEES	AVERAGE PERFORMANCE-BASED PAY INCREASE
ZP	1,372	2.60%
ZT	120	2.29%
ZA	379	3.13%
ZS	228	2.07%
Overall	2,099	2.62%

Note: Average pay increase by career path were computed for 2,099 of the 2,641 Demonstration Group participants for whom pay band and salary data were available.

Average Bonus by Career Path

(This analysis was not performed on Year One or Year Two data.)

Year Three—Average Bonus by Career Path

CAREER PATH	AVERAGE BONUS
ZP	1.42%
ZT	1.28%
ZA	1.63%
ZS	1.81%
OVERALL	1.50%

Notes:

1. Average bonus by career path was computed for Demonstration Project participants for whom pay band data were available.
2. Overall bonus is a non-weighted average given that it is intended to represent the Demonstration Project as a single entity.

Year Four—Average Bonus by Career Path

CAREER PATH	NUMBER OF EMPLOYEES	AVERAGE BONUS
ZP	1,372	1.53%
ZT	120	1.47%
ZA	379	2.02%
ZS	228	2.41%
Overall	2,099	1.71%

Note: Average bonus by career path was computed for 2,099 of the 2,641 Demonstration Group participants for whom pay band and salary data were available.

Average Performance Score by Career Path

(This analysis was not performed on Year One or Year Two data.)

Year Three—Average Performance Score by Career Path

CAREER PATH	AVERAGE PERFORMANCE APPRAISAL SCORES
ZP	85.0 points
ZT	83.0 points
ZA	85.8 points
ZS	81.9 points
OVERALL	84.3 points

Notes:

1. Average scores by career path were computed for Demonstration Project participants for whom pay band data were available.
2. Overall score is a non-weighted average given that it is intended to represent the Demonstration Project as a single entity.

Year Four—Average Performance Score by Career Path

CAREER PATH	NUMBER OF EMPLOYEES	AVERAGE PERFORMANCE APPRAISAL SCORES
ZP	1,373	85.9 points
ZT	120	83.2 points
ZA	380	87.3 points
ZS	228	83.2 points

Note: Average performance scores by career path were computed for 2,101 of the 2,641 Demonstration Group participants for whom pay band and performance score data were available.

Performance Category and Performance-Based Pay Increases

Year Two—Performance Category and Performance-Based Pay Increases

PERFORMANCE CATEGORY	NUMBER OF EMPLOYEES	AVERAGE PAY INCREASE PERCENT
90-100	748	3.9%
80-89	923	2.9%
70-79	468	1.7%
60-69	105	0.9%
50-59	34	0.5%
40-49	1	0.0%

Year Two—Performance Category and Demonstration Group Participants Receiving No Performance-Based Pay Increases

PERFORMANCE CATEGORY	NUMBER OF EMPLOYEES	NUMBER OF EMPLOYEES WITH NO SALARY INCREASE	PERCENT RECEIVING NO SALARY INCREASE
90-100	748	34	5%
80-89	923	61	7%
70-79	468	51	11%
60-69	105	48	46%
50-59	34	21	62%
40-49	1	1	100%

(Beginning in Year Three, the two tables above were combined into the table below.)

Year Three—Performance Score Category and Performance-Based Pay Increases Among Demonstration Group Participants

PERFORMANCE CATEGORY	NUMBER OF EMPLOYEES	PERCENT OF EMPLOYEES RECEIVING PAY INCREASES	AVERAGE PERFORMANCE-BASED PAY INCREASE PERCENTAGE
90-100	816	89.3%*	3.5%
80-89	1,001	88.5%	2.6%
70-79	323	83.3%	1.5%
60-69	57	49.1%	0.6%
50-59	14	21.3%	0.2%
40-49	42	0.0%	0.0%

* Some, if not all, of the 10.7% of employees in the highest performance score category but with no pay increases may be employees at the top of their paybands.

Year Four—Performance Score Category and Performance-Based Pay Increases Among Demonstration Group Participants

PERFORMANCE SCORE CATEGORY	NUMBER OF EMPLOYEES	PERCENT OF EMPLOYEES RECEIVING PAY INCREASES	AVERAGE PERFORMANCE-BASED PAY INCREASE PERCENTAGE
90-100	797	91%	3.3%
80-89	983	91%	2.5%
70-79	262	78%	1.5%
60-69	42	52%	0.7%
50-59	8	0%	0.0%
40-49	9	33%	1.6%

Note: Some, if not all, of the 91 percent of employees in the highest performance score category but with no pay increases may be employees at the top of their paybands.

Correlation Between Performance Scores and Bonuses by Career Path

(This analysis was not performed on Year One or Year Two data.)

Year Three—Correlation Between Performance Scores and Bonuses by Career Path

CAREER PATH	CORRELATION
ZP	.46
ZT	.44
ZA	.48
ZS	.60
OVERALL	.46

Notes:

1. All results are significant at the $p \leq .001$ level.
2. Correlation by career path were computed for Demonstration Project participants for whom pay band data were available.
3. Overall correlation is a non-weighted average given that it is intended to represent the Demonstration Project as a single entity.

Year Four—Correlation Between Performance Scores and Bonuses by Career Path

CAREER PATH	CORRELATION BETWEEN PERFORMANCE SCORE AND BONUS
ZP	.46
ZT	.40
ZA	.30
ZS	.34

Notes:

1. All results are significant at the $p \leq .01$ level.
2. Correlation by career path was computed for 2,099 of the 2,641 Demonstration Group participants for whom pay band data were available.

Range of Pay Increases Upon Promotion

(This analysis was not performed on Year One or Year Two data.)

Year Three—Range of Pay Increases Upon Promotion

Promotion by Band (or equivalent)	Demonstration Group		Comparison Group	
	Employees	Size of Range of Increase Upon Promotion	Employees	Size of Range of Increase Upon Promotion
Band 2	18	\$8,997	6	\$7,171
Band 3	60	\$10,206	26	\$9,727
Band 4	57	\$14,173	11	\$6,181
Band 5	21	\$17,537	4	\$1,985
Average Range		\$12,503		\$7,912

Notes:

1. Band (equivalent) and salary information was not available for two participants in the Comparison Group who were promoted. Promotions are reported for those cases in which employees were promoted across bands (or the equivalent in the Comparison Group).
2. Size of range was computed by subtracting the smallest promotion amount from the largest promotion amount.
3. Average range was computed by generating a weighted average to account for the different number of employees in each band.

Year Four—Range of Pay Increases Upon Promotion

Promotion by Band (or equivalent)	Demonstration Group		Comparison Group	
	Employees	Size of Range of Increase Upon Promotion	Employees	Size of Range of Increase Upon Promotion
Band 2	2	\$2,116	3	\$714
Band 3	43	\$10,270	27	\$5,261
Band 4	55	\$17,522	38	\$9,663
Band 5	24	\$13,885	8	\$5,538
Average Range		\$14,055		\$7,312

Notes:

1. Promotions are reported for those cases in which employees were promoted across bands (or the equivalent in the Comparison Group).
2. Size of range was computed by subtracting the smallest promotion amount from the largest promotion amount.
3. Average range was computed by generating a weighted average to account for the different number of employees in each band.

**Comparisons of Starting Salary Ranges Among New Hires
in the Demonstration and Comparison Groups**

**Year Two—Comparisons of Starting Salary Ranges Among New Hires
in the Demonstration and Comparison Groups**

	Demonstration Group		Comparison Group	
	Number of New Hires*	Size of Range of Starting Salaries	Number of New Hires	Size of Range of Starting Salaries
ZA				
Band 1	1	\$0	1	\$0
Band 2	16	\$16,492	2	\$1,817
Band 3	8	\$23,000	2	\$12,894
Band 4	7	\$18,171	6	\$16,401
Band 5	2	\$10,754	0	\$0
ZP				
Band 1	2	\$7,372	5	\$5,902
Band 2	24	\$20,059	56	\$12,214
Band 3	37	\$25,927	31	\$22,351
Band 4	31	\$31,657	10	\$35,752
Band 5	5	\$21,505	0	\$0
ZS				
Band 1	10	\$6,513	3	\$4,008
Band 2	13	\$5,106	5	\$23,938
Band 3	10	\$10,656	11	\$11,695
Band 4	6	\$10,585	4	\$2,592
Band 5	3	\$6,278	0	\$0
ZT				
Band 1	11	\$8,814	25	\$6,983
Band 2	2	\$7,526	32	\$9,704
Band 3	2	\$8,063	3	\$9,849
Band 4	2	\$5,858	0	\$0
Band 5	0	\$0	0	\$0

* The number of cases used in this analysis is based on the number of new hires for whom starting salary, career path, and pay band data were available (i.e., 192 out of 313 new hires)

**Year Three—Comparison of Starting Salary Ranges Among New Hires
in the Demonstration and Comparison Groups**

	Demonstration Group		Comparison Group	
	Number of New Hires*	Size of Range of Starting Salaries	Number of New Hires	Size of Range of Starting Salaries
ZA				
Band 1	1	\$0	0	\$0
Band 2	9	\$16,134	2	\$2,311
Band 3	9	\$15,502	3	\$27,009
Band 4	5	\$29,819	2	\$12,806
Band 5	7	\$25,390	0	\$0
ZP				
Band 1	6	\$8,438	3	\$6,486
Band 2	38	\$21,003	40	\$23,247
Band 3	18	\$19,040	34	\$28,427
Band 4	20	\$31,815	8	\$31,651
Band 5	6	\$8,000	1	\$0
ZS				
Band 1	6	\$4,763	0	\$0
Band 2	12	\$9,502	1	\$0
Band 3	16	\$11,411	6	\$11,154
Band 4	5	\$9,803	4	\$10,756
Band 5	1	\$0	0	\$0
ZT				
Band 1	13	\$8,889	5	\$2,850
Band 2	11	\$12,980	8	\$9,620
Band 3	3	\$12,690	1	\$0
Band 4	1	\$0	0	\$0
Band 5	0	\$0	0	\$0

Notes:

1. The number of cases used in this analysis is based on the number of new hires for whom starting salary, career path, and pay band data were available (i.e., 187 out of 280 new hires in the Demonstration Group and 118 out of 161 new hires in the Comparison Group).
2. Size of range of was computed as by subtracting the smallest starting salary from the largest starting salary.

**Year Four—Comparison of Starting Salary Ranges Among New Hires
in the Demonstration and Comparison Groups**

	Demonstration Group		Comparison Group	
	Number of New Hires*	Size of Range of Starting Salaries	Number of New Hires	Size of Range of Starting Salaries
ZA				
Band 1	5	\$14,549	5	\$5,113
Band 2	17	\$22,515	11	\$13,041
Band 3	17	\$28,048	5	\$16,832
Band 4	7	\$42,333	2	\$22,470
Band 5	2	\$24,333	1	N/A
ZP				
Band 1	3	\$5,104	5	\$1,559
Band 2	97	\$26,969	51	\$22,567
Band 3	45	\$28,047	37	\$43,097
Band 4	17	\$32,343	7	\$31,031
Band 5	8	\$25,783	0	N/A
ZS				
Band 1	18	\$8,591	9	\$2,351
Band 2	24	\$9,180	7	\$3,183
Band 3	12	\$8,880	7	\$11,891
Band 4	17	\$16,955	9	\$10,959
Band 5	0	N/A	0	N/A
ZT				
Band 1	13	\$8,902	30	\$6,415
Band 2	5	\$10,740	26	\$11,229
Band 3	2	\$8,838	2	\$5,252
Band 4	1	N/A	0	N/A
Band 5	0	N/A	0	N/A

Notes:

1. The number of cases used in this analysis is based on the number of new hires for whom starting salary, career path, and pay band data were available (i.e., 310 out of 344 new hires in the Demonstration Group and 214 out of 215 new hires in the Comparison Group).
2. Size of range of was computed as by subtracting the smallest starting salary from the largest starting salary.

Agency Data Request Results – Recruitment Methods

Year Three—Agency Data Request Results – Recruitment Methods

	DEMONSTRATION GROUP	COMPARISON GROUP
Agency based staffing		
Total number of offers made*	130	89
Total number of offers accepted	127	89
Total number of offers re-negotiated (per candidate)	16	0
Acceptance rate (offers accepted/offer made)	98%	100%
Merit assignment		
Total number of offers made	174	59
Total number of offers accepted	169	59
Total number of offers re-negotiated (per candidate)	18	0
Acceptance rate (offers accepted/offer made)	97%	100%
Average number of calendar days required to fill a position (from initial posting of vacancy to selection)	69 days	68 days

* The total number of offers made may appear lower than typical given the Presidential hiring freeze.

Year Four—Agency Data Request Results – Recruitment Methods

	DEMONSTRATION GROUP	COMPARISON GROUP
Agency based staffing		
Total number of offers made	96	54
Total number of offers accepted	94	54
Total number of offers re-negotiated (per candidate)	26	5
Acceptance rate (offers accepted/offer made)	98%	100%
Merit assignment		
Total number of offers made	224	57
Total number of offers accepted	224	57
Total number of offers re-negotiated (per candidate)	12	5
Acceptance rate (offers accepted/offer made)	100%	100%
Average number of calendar days required to fill a position (from initial posting of vacancy to selection)	58 days	56 days

Demonstration Group Turnover Rates by Level of Performance

Year Two—Demonstration Group Turnover Rates by Level of Performance

PERFORMANCE SCORE	NUMBER OF EMPLOYEES*	TURNOVER RATE
All Scores	2,275	10%
90-100	748	10%
80-89	923	9%
70-79	468	11%
60-69	105	9%
50-59	34	18%
40-49	1	0%

* Participants with Valid Performance Ratings in Year 2.

Year Three—Demonstration Group Turnover Rates by Level of Performance

PERFORMANCE SCORE	NUMBER OF EMPLOYEES	NUMBER OF SEPARATED EMPLOYEES	TURNOVER RATE
All Scores	2,253	339*	15%**
90-100	814	119	15%
80-89	998	127	13%
70-79	323	66	20%
60-69	57	17	30%
50-59	14	8	57%
40-49	42	2	5%

* Overall, 436 employees separated during Year Three. Valid Year Three performance scores were available for 148 of the 436 who separated in Year Three. For an additional 191 of the 436 who separated in Year Three, valid Year Two performance scores were available (presumably these employees separated prior to receiving a Year Two score). This analysis is therefore based upon these 339 employees. This analysis does not include 97 employees who separated in Year Three but for whom neither Year Two nor Year Three performance scores were available.

** 15 percent is the turnover rate among Demonstration Group participants for whom performance scores were available. The turnover rate presented elsewhere, 16 percent, is the rate for all Demonstration Group participants.

Year Four—Demonstration Group Turnover Rates by Level of Performance

PERFORMANCE SCORE CATEGORY	NUMBER OF EMPLOYEES	NUMBER OF SEPARATED EMPLOYEES	TURNOVER RATE
90-100	797	60	8%
80-89	983	106	11%
70-79	262	27	10%
60-69	42	2	5%
50-59	8	1	13%
40-49	9	1	11%

Notes:

- 1. Overall, 403 employees separated during Year Four. The total number of separated employees in this analysis is based on 197 of the 403 employees who separated in Year Four for whom valid Year Four performance scores were available.*
- 2. The total number of employees in this analysis is based on the 2,101 employees for whom valid Year Four performance scores were available.*
- 3. In Year Four, this analysis was performed as it was in Year Two.*

Average Turnover Rate by Career Path

(This analysis was not performed on Year One or Year Two data.)

Year Three—Average Turnover Rate by Career Path

CAREER PATH	AVERAGE TURNOVER RATE	AVERAGE PERFORMANCE SCORE
ZP	13%	85.0 points
ZT	25%	83.0 points
ZA	18%	85.8 points
ZS	23%	81.9 points
OVERALL	16%	84.3 points

Notes:

1. Rates by career path were computed for Demonstration Project participants for whom pay band data were available.
2. Overall turnover rate is a non-weighted average given that it is intended to represent the Demonstration Project as a single entity.

Year Four—Average Turnover Rate by Career Path

CAREER PATH	NUMBER OF EMPLOYEES	AVERAGE TURNOVER RATE	AVERAGE PERFORMANCE APPRAISAL SCORES
ZP	1,373	15%	85.9 points
ZT	120	14%	83.2 points
ZA	380	14%	87.3 points
ZS	228	20%	83.2 points

Notes:

1. Turnover rates by career path were computed for Demonstration Project participants for whom pay band data were available.
2. Average performance scores by career path were computed for 2,101 of the 2,641 Demonstration Group participants for whom pay band and performance score data were available; these averages are not limited to the subset of individuals who turned over in Year Four.

Average Increases, Bonuses, and Total Awards as a Percent of Salary

Year Two—Average Increases, Bonuses, and Total Awards as a Percent of Salary

Type of Award	Average Award (as a % of salary)
Pay Increase*	
Stayers	2.9%
Leavers	2.6%
Bonus	
Stayers	1.6%
Leavers	1.7%
Total Awards	
Stayers	4.5%
Leavers	4.3%

* Difference was statistically significant at the $P \leq 0.05$ level.

Year Three—Stayers Versus Leavers: Percent Increases and Bonuses

Type of Award	Average Award (as a Percentage of Salary)
Performance-Based Pay Increase	
Stayers	2.6%
Leavers	2.8%
Bonus	
Stayers	1.7%
Leavers	1.7%
Total Awards	
Stayers	4.3%
Leavers	4.5%

Note: None of these differences were found to be statistically significant at the $p \leq .05$ level.

Year Four—Stayers Versus Leavers: Percent Increases and Bonuses

Type of Award	Average Award (as a Percentage of Salary)
Performance-Based Pay Increase	
Stayers	2.6%
Leavers	2.5%
Bonus	
Stayers	1.7%
Leavers	1.6%
Total Awards	
Stayers	4.3%
Leavers	4.1%

Note: None of these differences was statistically significant at the $p \leq .05$ level.

Average Increases and Bonuses (in Dollars)

Year Two—Average Increases and Bonuses (in Dollars)

Type of Award	Average Award
Pay Increase*	
Stayers	\$1626
Leavers	\$1410
Bonus	
Stayers	\$934
Leavers	\$946

* Difference was statistically significant at the $P \leq 01$ level.

Year Three—Stayers Versus Leavers: Average Performance-Based Pay Increases and Bonuses

Type of Award	Average Award (in Dollars)
Performance-Based Pay Increase	
Stayers	\$1,551
Leavers	\$1,650
Bonus	
Stayers	\$1,037
Leavers	\$1,074

Note: Neither of these differences were found to be statistically significant at the $p \leq .05$ level.

Year Four—Stayers Versus Leavers: Average Performance-Based Pay Increases and Bonuses

Type of Award	Average Award (in Dollars)
Performance-Based Pay Increase*	
Stayers	\$1,627
Leavers	\$1,535
Bonus**	
Stayers	\$1,126
Leavers	\$986

Note: The difference between performance-based pay increases was not statistically significant at the $p \leq .05$ level. The difference between bonuses was statistically significant at the $p \leq .05$ level.

Turnover Among Supervisors

Year Two—Turnover Among Supervisors

Group	Overall Number	Turnover Rate *
Demonstration Group*		
All Employees	2740	13%
All Supervisors	218	13%
Supervisors Receiving Supervisory Performance Pay	44	7%
Comparison Group *		
All Employees	1928	10%
Supervisors Only	149	7%

* Number of employees who left divided by the total number of employees

Year Three—Turnover Among Supervisors

Group	Total Number	Number Who Separated	Turnover Rate
Demonstration Group			
All Employees	2781	436	16%
All Supervisors	222	39	18%
Supervisors Who Did Not Receive Supervisory Performance Pay	173	30	17%
Supervisors Who Did Receive Supervisory Performance Pay	49	9	18%
Comparison Group			
All Employees	1808	204	11%
All Supervisors	149	13	9%

Note: The turnover rate was calculated as the number of individuals who separated divided by the total number of individuals.

Year Four—Turnover Among Supervisors

Group	Total Number	Number Who Separated	Turnover Rate
Demonstration Group			
All Employees*	2641	403	15%
All Supervisors	189	26	14%
Supervisors Who Did Not Receive Supervisory Performance Pay	132	18	14%
Supervisors Who Did Receive Supervisory Performance Pay	57	8	14%
Comparison Group			
All Employees	1821	281	15%
All Supervisors	149	20	13%

Notes:

1. Turnover rate was calculated as the number of individuals who separated divided by the total number of individuals.
2. "All Employees" includes supervisory and non-supervisory employees.

Diversity of New Hires Compared to the Overall Demonstration Group

Year Two—Diversity of New Hires Compared to the Overall Demonstration Group

Category	New Hires (N=313)*		All Demonstration Group Employees (N=2,740)*	
Minority--Non-Minority	25%	75%	20%	81%
Women--Men	44%	56%	40%	60%
Veteran--Non-Veteran	12%	88%	9%	91%

* May not add to 100% due to rounding

Year Three—Diversity of New Hires Compared to the Overall Demonstration Group

Category	New Hires (N=280)*	All Demonstration Group Employees (N=2,781)
Minority Status		
Minority	20%	20%
Non-Minority	80%	80%
Gender		
Women	43%	41%
Men	57%	59%
Veteran Status		
Veteran	16%	14%
Non-Veteran	84%	86%

* The number of new hires in the objective datafile varies slightly from that which was reported by the personnel offices. This difference may be attributable to different methods of reporting.

Year Four—Diversity of New Hires Compared to the Overall Demonstration Group

Category	New Hires (N=344)	All Demonstration Group Employees (N=2,641)
Minority Status		
Minority	20%	20%
Non-Minority	80%	80%
Gender		
Women	53%	42%
Men	47%	58%
Veteran Status		
Veteran	8%	13%
Non-Veteran	92%	87%

Note: The number of new hires in the objective datafile (n=344) varies slightly from that the number of new hires discussed in the report section on recruitment methods (n=318) because the latter covered some, but not all, of the new hires who joined the Demonstration Project.

Average Performance Appraisal Scores (Raw), Pay Increase Percentages (Raw and Adjusted), and Bonus Percentages (Raw and Adjusted) for the Demonstration Group

Year One—Average Performance Appraisal Scores (Raw), Pay Increase Percentages (Raw and Adjusted) , and Bonus Percentages (Raw and Adjusted) for the Demonstration Group

Subgroup	Performance Appraisal Scores	Average Pay Increase Percentage		Average Bonus Percentage	
		Raw	Adjusted	Raw	Adjusted
Minority	80.34 points	2.73%	2.70%	1.46%	1.50%
Non-Minority	82.33 points	2.73%	2.74%	1.72%	1.71%
Female	82.64 points	3.10%	2.76%	1.95%	1.88%
Male	81.53 points	2.50%	2.71%	1.50%	1.54%
Veteran	79.38 points	2.26%	2.67%	1.49%	1.63%
Non-Veteran	82.22 points	2.78%	2.74%	1.69%	1.67%
Total	81.95 points	2.73%	--	1.67%	--

Notes:

1. The average performance appraisal score for each Demonstration Group subgroup is the average number of points received under the 100-point system. Performance data for Demonstration Group employees are based on appraisals conducted in September 1998, and as reported in the January 1999 data file provided by DoC. Average increase and bonus percentages are based on actions effective in November 1998, as reported in the January 1999 data file provided by DoC.
2. The minority group includes all non-White personnel.
3. Adjusted averages were computed by statistically controlling for performance score, career path, and length of service.

Year Two—Average Performance Appraisal Scores (Raw), Pay Increase Percentages (Raw and Adjusted), and Bonus Percentages (Raw and Adjusted) for the Demonstration Group

	Performance Appraisal Scores	Average Pay Increase Percentage		Average Bonus Percentage	
		Raw	Adjusted	Raw	Adjusted
Minority	82.7 points	2.8%	2.7%	1.5%	1.5%
Non-Minority	83.6 points	2.9%	2.9%	1.6%	1.6%
Female	83.9 points	3.1%	2.7%	1.8%	1.8%
Male	83.1 points	2.7%	2.9%	1.5%	1.5%
Veteran	81.8 points	2.5%	2.8%	1.4%	1.5%
Non-Veteran	83.6 points	2.9%	2.9%	1.6%	1.6%
Total	83.4 points	2.9%	--	1.6%	--

Notes:

1. The average performance appraisal score for each Demonstration Group subgroup is the average number of points received under the 100-point system. Performance data for Demonstration Group employees are based on appraisals conducted in September 1999, and as reported in the Year Two data file provided by DoC. Average increase and bonus percentages are based on actions effective in November 1998, as reported in the Year Two data file provided by DoC.
2. The minority group includes all non-White personnel, specifically Blacks, Hispanics, Asians, and American Indians.
3. Adjusted averages were computed by statistically controlling for performance score, career path, and length of service.

Year Three—Average Performance Appraisal Scores, Pay Increase Percentages (Raw and Adjusted), and Bonus Percentages (Raw and Adjusted) for the Demonstration Group

	Average Performance Appraisal Scores	Average Performance-Based Pay Increase Percentage		Average Bonus Percentage	
		Raw	Adjusted	Raw	Adjusted
Minority	83.5 points	2.6%	2.5%	1.5%	1.5%
Non-Minority	84.9 points	2.7%	2.7%	1.7%	1.7%
Female	84.7 points	2.9%	2.7%	1.8%	1.8%
Male	84.5 points	2.4%	2.6%	1.6%	1.6%
Veteran	83.2 points	2.1%	2.4%	1.5%	1.5%
Non-Veteran	84.8 points	2.7%	2.7%	1.7%	1.7%
Average	84.3 points	2.6%	--	1.6%	--

Notes:

1. The average performance appraisal score for each Demonstration Group subgroup is the average number of points received under the 100-point system. Performance data for Demonstration Group employees are based on appraisals conducted in September 2000, and as reported in the Year Three data file provided by DoC. Average performance-based pay increase and bonus percentages are based on actions effective in November 1999, as reported in the Year Three data file provided by DoC.
2. The minority group includes all non-White personnel, specifically Blacks, Hispanics, Asians, and American Indians.
3. Adjusted averages were computed by statistically controlling for performance score, career path, and length of service.

Year Four—Average Performance Appraisal Scores, Pay Increase Percentages (Raw and Adjusted), and Bonus Percentages (Raw and Adjusted) for the Demonstration Group

		Average Performance-Based Pay Increase Percentage		Average Bonus Percentage	
		Raw	Adjusted	Raw	Adjusted
Minority	85.3 points	2.6%	2.4%	1.6%	1.6%
Non-Minority	85.8 points	2.6%	2.7%	1.7%	1.7%
Female	85.9 points	2.9%	2.6%	1.9%	1.9%
Male	85.7 points	2.5%	2.6%	1.6%	1.6%
Veteran	83.6 points	2.0%	2.4%	1.5%	1.6%
Non-Veteran	86.1 points	2.7%	2.7%	1.7%	1.7%

Notes:

1. The average performance appraisal score for each Demonstration Group subgroup is the average number of points received under the 100-point system. Performance data for Demonstration Group employees are based on appraisals conducted in September 2001, and as reported in the Year Four data file provided by DoC. Average performance-based pay increase and bonus percentages are based on actions effective in November 2001, as reported in the Year Four data file provided by DoC.
2. The minority group includes all non-White personnel, specifically Blacks, Hispanics, Asians, and American Indians.
3. Adjusted averages were computed by statistically controlling for performance score, career path, and length of service.
4. Average performance-based pay increase and bonus percentages were computed for 2,099 of the 2,641 Demonstration Group participants for whom salary data were available. Average performance scores were computed for 2,101 of the 2,641 Demonstration Group participants for whom performance score data were available

Comparison of Performance Appraisal Scores (Raw), Average Pay Increases (Adjusted), and Average Bonuses/Awards (Adjusted)

Year One—Comparison of Performance Appraisal Scores (Raw), Average Pay Increases (Adjusted), and Average Bonuses/Awards (Adjusted)

Subgroup	Performance Appraisal Scores		Average Pay Increase Percentage		Average Bonus/Award Percentage	
	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group
Minority	80.34 points	100% Pass; 0% Fail	2.70%	1.94%	1.50%	1.28%
Non-Minority	82.33 points	100% Pass; 0% Fail	2.74%	1.92%	1.71%	1.11%
Female	82.64 points	100% Pass; 0% Fail	2.76%	1.93%	1.88%	1.22%
Male	81.53 points	100% Pass; 0% Fail	2.71%	1.92%	1.54%	1.09%
Veteran	79.38 points	100% Pass; 0% Fail	2.67%	1.72%	1.63%	0.70%
Non-Veteran	82.22 points	100% Pass; 0% Fail	2.74%	1.94%	1.67%	1.17%

Notes:

1. The average performance appraisal score presented for each Demonstration Group subgroup is the average number of points received under the 100-point system. The numbers presented for the Comparison Group subgroups are the percentages of employees who received "Pass" or "Fail" under the 2-level system. Performance data for Demonstration Group employees are based on appraisals conducted in September 1998, and as reported in the January 1999 data file provided by DoC. Performance data for Comparison Group employees are based on appraisals occurring between March 28, 1998 and January 31, 1999 and as reported in the January 1999 data file provided by DoC.
2. Average pay increase and bonus/award percentages are based on actions occurring between March 28, 1998 and January 31, 1999 as reported in the January 1999 data files provided by DoC.

Year Two—Comparison of Performance Appraisal Scores (Raw), Average Pay Increases (Adjusted), and Average Bonuses/Awards (Adjusted)

	Performance Appraisal Scores		Average Pay Increase Percentage		Average Bonus/ Award Percentage	
	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group
Minority	82.7 points	100% Pass; 0% Fail	2.7%	2.5%	1.5%	1.2%
Non-Minority	83.6 points	100% Pass; 0% Fail	2.9%	2.5%	1.6%	1.3%
Female	83.9 points	100% Pass; 0% Fail	2.7%	2.8%	1.8%	1.5%
Male	83.1 points	100% Pass; 0% Fail	2.9%	2.3%	1.5%	1.2%
Veteran	81.8 points	100% Pass; 0% Fail	2.8%	2.3%	1.5%	0.9%
Non-Veteran	83.6 points	100% Pass; 0% Fail	2.9%	2.5%	1.6%	1.3%

Notes:

- 1. The performance appraisal score presented for the Demonstration Group is the average number of points received under the 100-point system. The numbers presented for the Comparison Group are the percentages of employees who received "Pass" or "Fail" under the 2-level system. Performance data for Demonstration Group employees are based on appraisals conducted in September 1999, and as reported in the Year Two data file provided by DoC. Performance data for Comparison Group employees are based on appraisals occurring between April 1, 1999 and March 31, 2000 and as reported in the Year Two data file provided by DoC.*
- 2. Average pay increase and bonus/award percentages are based on actions occurring during the 1999 performance evaluation cycle that ended 9/30/99 and as reported in the Year Two data file provided by DoC.*

Year Three—Comparison of Performance Appraisal Scores, Average Performance-Based Pay Increases, and Average Bonuses/Awards Across Groups

	Performance Appraisal Scores		Average Pay Increase Percentage		Average Bonus/ Award Percentage	
	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group
Minority	83.5 points	100% Pass; 0% Fail	2.5%	0.3%	1.5%	1.1%
Non-Minority	84.9 points	100% Pass; 0% Fail	2.7%	1.2%	1.7%	1.9%
Female	84.7 points	100% Pass; 0% Fail	2.7%	1.3%	1.8%	1.8%
Male	84.5 points	100% Pass; 0% Fail	2.6%	0.9%	1.6%	1.8%
Veteran	83.2 points	100% Pass; 0% Fail	2.4%	2.4%	1.5%	0.9%
Non-Veteran	84.8 points	100% Pass; 0% Fail	2.7%	0.9%	1.7%	1.9%

Notes:

- 1. The performance appraisal score presented for the Demonstration Group is the average number of points received under the 100-point system. The numbers presented for the Comparison Group are the percentages of employees who received "Pass" or "Fail" under the 2-level system. Performance data for Demonstration Group employees are based on appraisals conducted in September 2000, and as reported in the Year Three data file provided by DoC. Performance data for Comparison Group employees are based on appraisals occurring between April 1, 2000 and March 31, 2001 and as reported in the Year Three data file provided by DoC.*
- 2. Average performance-based pay increase and bonus/award percentages are based on actions occurring during the performance evaluation cycle that ended 9/30/00 and as reported in the Year Three data file provided by DoC.*
- 3. Average performance-based pay increase and bonus percentages for the Demonstration Group are based on adjusted averages that were computed by statistically controlling for performance score, career path, and length of service.*

Year Four—Comparison of Performance Appraisal Scores, Average Performance-Based Pay Increases, and Average Bonuses/Awards Across Groups

	Performance Appraisal Scores		Average Pay Increase Percentage		Average Bonus/ Award Percentage	
	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group	Demonstration Group	Comparison Group
Minority	85.3 points	100% Pass; 0% Fail	2.4%	1.6%	1.6%	2.2%
Non-Minority	85.8 points	100% Pass; 0% Fail	2.7%	1.6%	1.7%	2.2%
Female	85.9 points	100% Pass; 0% Fail	2.6%	1.6%	1.9%	2.4%
Male	85.7 points	100% Pass; 0% Fail	2.6%	1.6%	1.6%	2.1%
Veteran	83.6 points	100% Pass; 0% Fail	2.4%	1.3%	1.6%	1.6%
Non-Veteran	86.1 points	100% Pass; 0% Fail	2.7%	1.7%	1.7%	2.3%

Notes:

- 1. The performance appraisal scores presented for the Demonstration Group is the average number of points received under the 100-point system. The numbers presented for the Comparison Group are the percentages of employees who received "Pass" or "Fail" under the 2-level system. Performance data for Demonstration Group employees are based on appraisals conducted in September 2001, and as reported in the Year Four data file provided by DoC. Performance data for Comparison Group employees are based on appraisals occurring between April 1, 2001 and March 31, 2002 and as reported in the Year Four data file provided by DoC.*
- 2. Average performance-based pay increase and bonus/award percentages are based on actions occurring during the performance evaluation cycle that ended September 30, 2001 and as reported in the Year Four data file provided by DoC.*
- 3. Average performance-based pay increase and bonus percentages for the Demonstration Group are based on adjusted averages that were computed by statistically controlling for performance score, career path, and length of service.*
- 4. Average performance-based pay increase and bonus percentages were computed for 2,099 of the 2,641 Demonstration Group participants for whom salary and demographic data were available. Average performance scores were computed for 2,101 of the 2,641 Demonstration Group participants for whom performance score and demographic data were available.*
- 5. Average performance-based pay increase and bonus percentages were computed for 1,434 of the 1,821 Comparison Group participants for whom data were available on pay increases, bonuses, performance score, career path, and length of service.*

Turnover in the Demonstration Group, All Participants and High Performers

Year Two—Turnover in the Demonstration Group, All Participants and High Performers

Group	All Demonstration Group Participants			Demonstration Group High Performers		
	Number	Number Separated	Percent Separated	Number	Number Separated	Percent Separated
Minority	520	63	12%	113	10	9%
Non-Minority	2,220	301	14%	638	62	10%
TOTAL	2,740	364	13%	751	72	10%

Year Three—Comparison of Turnover Rates in the Demonstration Group Between All Participants and High Performers

Group	All Demonstration Group Participants			Demonstration Group High Performers		
	Number	Number Separated	Percent Separated	Number	Number Separated	Percent Separated
Minority	556	77	14%	136	11	8%
Non-Minority	2,225	349	16%	687	61	9%
TOTAL	2,781	436	16%	823	72	9%

Year Four—Comparison of Turnover Rates in the Demonstration Group Between All Participants and High Performers

Group	Demonstration Group All Participants			Demonstration Group High Performers		
	Number	Number Separated	Percent Separated	Number	Number Separated	Percent Separated
Minority	522	90	17%	127	9	7%
Non-Minority	2,119	313	15%	670	51	8%
TOTAL	2,641	403	15%	797	60	8%

Comparison of Turnover Rates in the Demonstration and Comparison Groups

Year Two—Comparison of Turnover Rates in the Demonstration and Comparison Groups

Group	Demonstration Group			Comparison Group		
	Number	Number Separated	Percent Separated	Number	Number Separated	Percent Separated
Minority	520	63	12%	232	32	14%
Non-Minority	2,220	301	14%	1,696	151	9%
TOTAL	2,740	364	13%	1,928	183	10%

Year Three—Comparison of Turnover Rates in the Demonstration and Comparison Groups

Group	Demonstration Group			Comparison Group		
	Number	Number Separated	Percent Separated	Number	Number Separated	Percent Separated
Minority	556	77	14%	219	27	12%
Non-Minority	2,225	349	16%	1,589	177	11%
TOTAL	2,781	436	16%	1,808	204	11%

Year Four—Comparison of Turnover Rates in the Demonstration and Comparison Groups

Group	Demonstration Group All Participants			Comparison Group All Participants		
	Number	Number Separated	Percent Separated	Number	Number Separated	Percent Separated
Minority	522	90	17%	233	40	17%
Non-Minority	2,119	313	15%	1,588	241	15%
TOTAL	2,641	403	15%	1,821	281	15%

APPENDIX B

ANALYSES OF THE LINKAGE BETWEEN PAY AND PERFORMANCE: METHODS FOR STATISTICAL ANALYSES

ANALYSES OF THE LINKAGE BETWEEN PAY AND PERFORMANCE: METHODS FOR STATISTICAL ANALYSES

As in previous years, the body of this report contains results from statistical analyses performed on the objective data pertaining to the Demonstration and Comparison Group participants. In this technical appendix, we provide more detail on the statistical analyses from which the results were derived as well as other methodological issues of relevance to the study design. The following information is provided:

- Use of sample versus census data analysis techniques
- Results of the regression analysis
- Scatterplot displaying the performance score-bonus correlation in the Demonstration Group
- Results of the analysis of covariance (ANCOVA).

Use of Sample Versus Census Data Analysis Techniques

The database of Demonstration Group participants represents the entire universe of DoC employees who are receiving the human resource interventions as part of this Demonstration Project. By definition this group is a population rather than a sample. The most widely used inferential statistics, and those used as part of this evaluation (Analysis of Covariance), were designed to be applied to sample data. Despite this theoretical hurdle, it has become common practice among researchers to use these inferential statistics in the absence of a better method.

To most accurately describe the population in question, Booz Allen produced effect size estimates along with significance levels. By producing these additional data, Booz Allen hopes to mitigate the theoretical concerns of applying data analysis techniques developed for samples on data derived from a population.

Results of the Regression Analysis

Our regression analysis was based on the analysis performed in the NIST Demonstration Project. We examined the impact of the following eleven factors on pay progression (as measured by end salary dollars) in Year Four: initial Year Four salary (salary prior to pay increases, in dollars), pay band as of September 2001, interval as of September 2001, whether or not one was promoted in Year Four, supervisory status (supervisor/non-supervisor), length of service, performance score, race, gender, veteran status, and age. The regression analysis was conducted separately for each career path. In essence, the regression analysis looks at the degree to which each of these factors is related to one's salary at the end of Year Four.

The analyses show that performance score had a stronger impact on pay progression than any other factor examined. Higher end of Year Four salaries were associated with higher performance scores and lower end of Year Four salaries were associated with lower

performance scores. Similarly, many other relationships are in the expected directions: higher end of Year Four salaries were associated with higher initial salaries, higher pay bands, and longer lengths of service.

The analyses also showed some relationships in the opposite direction. For example, lower end of Year Four salaries were associated with receiving promotions. While this finding initially seems counter-intuitive, it may simply reflect that promotions are occurring more often among those who are at lower salaries and who still have “room” to progress.

Statistically speaking, the listed factors account for 60% (ZP), 59% (ZT), 70% (ZA), and 60% (ZS) of the variance. As shown in Table 1 below, the demographic variables of race, gender, veteran status, and age were found to not influence pay. This was consistent across career paths.

Table 1: Results of Regression Analysis

ZP Career Path				
Variables	B	Beta	R	Adjusted R-squared
Initial Year Four salary (prior to increases)	.509	.368	.773	.596
Performance Score	408.275	.378		
Promotion in Year Four	-22344.222	-.136		
Pay band as of September 2001	7250.387	.175		
Supervisory Status	-10710.966	-.084		
(Equation Constant)	-7979.102	--		

Variables not included because they did not significantly increase the prediction of end salary: Interval as of September 2001, Length of Service, Race, Gender, Veteran Status, and Age. This analysis was performed in SPSS. The negative B and Beta for Supervisory Status simply reflects that Supervisory Status had been coded as “0” for Supervisors and “1” for Non-supervisors. Therefore, the interpretation of this negative value is that higher end of Year Four salaries were associated with being a supervisor.

ZT Career Path

Variables	B	Beta	R	Adjusted R-squared
Performance Score	341.106	.486	.773	.590
Pay band as of September 2001	7723.301	.350		
Supervisory Status	-20587.878	-.163		
(Equation Constant)	30907.065	--		

Variables not included because they did not significantly increase the prediction of end salary: Initial Year Four salary (prior to increases), Interval as of September 2001, Promotion in Year Four, Length of Service, Race, Gender, Veteran Status, and Age. This analysis was performed in SPSS.

The negative B and Beta for Supervisory Status simply reflects that Supervisory Status had been coded as "0" for Supervisors and "1" for Non-supervisors. Therefore, the interpretation of this negative value is that higher end of Year Four salaries were associated with being a supervisor.

ZA Career Path

Variables	B	Beta	R	Adjusted R-squared
Initial Year Four salary (prior to increases)	.430	.336	.835	.694
Performance Score	422.095	.440		
Length of Service	2881.535	.265		
Promotion in Year Four	-20611.239	-.136		
(Equation Constant)	-26255.229	--		

Variables not included because they did not significantly increase the prediction of end salary: Pay band as of September 2001, Interval as of September 2001, Supervisory Status, Race, Gender, Veteran Status, and Age. This analysis was performed in SPSS.

ZS Career Path

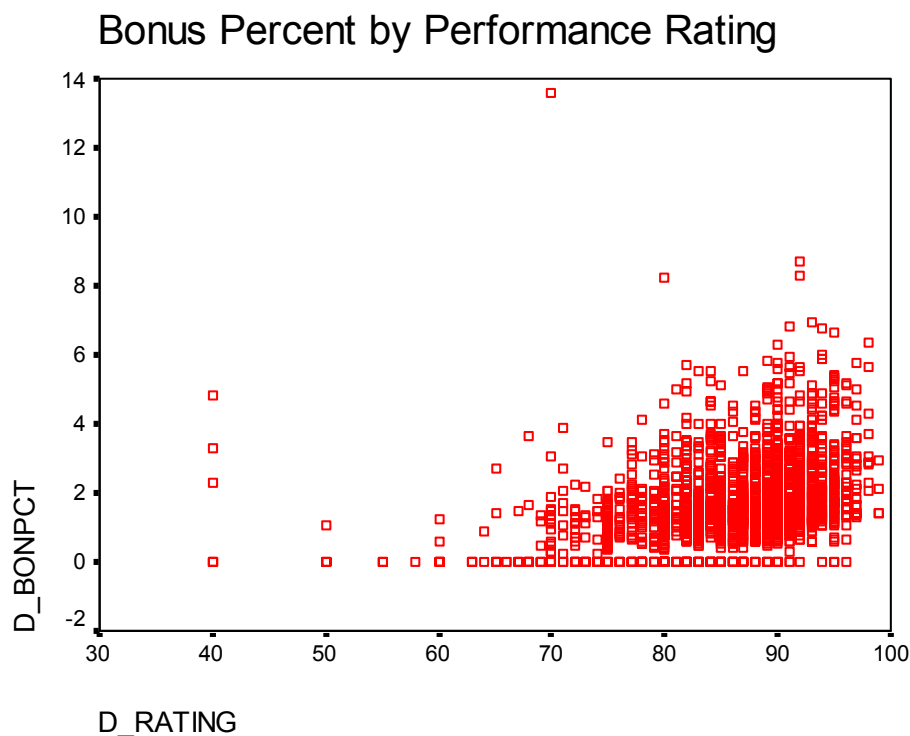
Variables	B	Beta	R	Adjusted R-squared
Performance Score	258.139	.575	.780	.603
Pay band as of September 2001	3981.908	.216		
Initial Year Four salary (prior to increases)	.233	.152		
Interval as of September 2001	-2030.344	-.087		
Promotion in Year Four	-4686.205	-.070		
(Equation Constant)	-8938.819	--		

Variables not included because they did not significantly increase the prediction of end salary: Supervisory Status, Length of Service, Race, Gender, Veteran Status, and Age. This analysis was performed in SPSS.

Scatterplot Displaying the Performance Score-Bonus Correlation in the Demonstration Group

Figure 1 displays a scatterplot showing the relationship between performance scores and bonuses (as a percentage of base salary) in the Demonstration Group. Correlational analyses revealed a correlation of $r = .37$. The scatterplot below suggests that the employees receiving low performance scores were unlikely to receive a large bonus. Additionally, those employees who did receive a large bonus were more likely to have received a high performance score.

Figure 1. Bonus Percent by Performance Score



Results of the Analysis of Covariance (ANCOVA)

Analysis of variance (ANOVA) involves determining whether the difference between two or more means is statistically significant. Analysis of covariance (ANCOVA, also referred to as ANACOVA) builds one more level of complexity. With ANCOVA, those differences between the means are examined while also *controlling* for the effects that another variable or variables may have on the relationship. That is, the question becomes "what is the effect of something when we take into account something else?" (Will G. Hopkins, *A New View of Statistics*).

When performing ANCOVAs, the output produces means that account for the presence of other specified variables. These means are known as "adjusted" means; they allow closer examination of the relationship between two variables of interest while removing the impact that other variables may have on the relationship.

Using a standard statistical software, the Statistical Package for the Social Sciences (SPSS), Booz Allen ran ANCOVA analyses to assess any differences in pay outcomes for EEO groups and veterans within the Demonstration Project. As in previous years, separate ANCOVA analyses were run for each protected subgroup (i.e., minorities, women, and veterans) to test whether the new pay-for-performance system adversely affected subgroups. In essence, the ANCOVA analyses indicate whether differences for subgroups in average pay increases or bonuses/awards were significant. We examined, for example, differences in average pay increases for females and males. In this example we sought to determine whether 1) there was a statistically significant difference in average pay increases between females and males and 2) whether the size of the effect of gender on average pay increases was large enough to be meaningful.

Separate ANCOVAs were run for several independent variables whose categories were:

1. Minority/non-minority
2. Female/male
3. Veteran/non-veteran

Separate ANCOVAs for each of these subgroups were performed for each of the two dependent variables of interest:

1. Percent Increase in Salary (amount of the performance-based pay increase expressed as a percent of salary from the beginning of the performance year)
2. Percent Bonus/Award (amount of bonus/award expressed as a percent of salary from the beginning of the performance year)

As reported in prior reports, ANCOVAs were calculated using three covariates: Performance Score, Career Path, and Time in Service. The ANCOVA analyses were used to address the question of how much impact gender, for example, had on differences in Percent Increase in Salary once the effects of Performance Score, Career Path, and Time in Service were statistically accounted for.

In these analyses, values less than .01 in the column labeled "Significance" were considered significant. Due to the large number of cases in the data set, it was not unexpected to find that many relationships were statistically significant. Because so many of these relationships were statistically significant, it is important to also consider the Eta squared value.

The column labeled "Eta Squared" is the estimate of the size of the effect that each independent variable had on the dependent variable of interest (Percent Increase in Salary or

Percent Bonus/Award). For these data, values greater than .05 were considered to be of interest. However, none of the EEO group variables in any of the analyses reached this level.

For each ANCOVA analysis, raw and estimated marginal means are presented. The raw measures are labeled “Unadjusted Means.” The estimated marginal means are means that have been adjusted for the covariates and are labeled “Adjusted Means.”

In summary, the findings presented below indicate that while many relationships between the independent variables and the dependent variables were statistically significant (due to the large sample size), none had an effect on the distribution of pay increases or bonuses/awards large enough to be meaningful.

DEMONSTRATION GROUP DATA

Dependent Variable = Percent Increase in Salary Independent Variable Categories = Minority/Non-Minority			DEMO GROUP
Group	Unadjusted Means	Standard Deviation	N
Minority	2.57%	2.05	405
Non-Minority	2.63%	2.04	1694
ANCOVA Results		Significance	Eta Squared
Career Path	.027	.002	
Performance Score	.000	.208	
Time in Service	.000	.194	
Minority/Non-Minority	.008	.003	
Group	Adjusted Means	Standard Error	
Minority	2.41%	.087	
Non-Minority	2.67%	.042	

Dependent Variable = Percent Increase in Salary Independent Variable Categories = Female/Male			DEMO GROUP
Group	Unadjusted Means	Standard Deviation	N
Female	2.87%	2.12	840
Male	2.45%	1.97	1259
ANCOVA Results		Significance	Eta Squared
Career Path	.011	.003	
Performance Score	.000	.205	
Time in Service	.000	.182	
Female/Male	.941	.000	
Group	Adjusted Means	Standard Error	
Female	2.62%	.061	
Male	2.62%	.049	

Dependent Variable = Percent Increase in Salary Independent Variable Categories = Veteran/Non-Veteran			DEMO GROUP
Group	Unadjusted Means	Standard Deviation	N
Veteran	1.95%	1.71	276
Non-Veteran	2.72%	2.07	1823
ANCOVA Results		Significance	Eta Squared
Career Path	.022	.002	
Performance Score	.000	.201	
Time in Service	.000	.187	
Veteran/Non-Veteran	.017	.003	
Group	Adjusted Means	Standard Error	
Veteran	2.39%	.105	
Non-Veteran	2.66%	.040	

Dependent Variable = Percent Bonus Independent Variable Categories = Minority/Non-Minority			DEMO GROUP
Group	Unadjusted Means	Standard Deviation	N
Minority	1.63%	1.39	405
Non-Minority	1.73%	1.19	1694
ANCOVA Results		Significance	Eta Squared
Career Path		.003	.004
Performance Score		.000	.142
Time in Service		.001	.005
Minority/Non-Minority		.079	.001
Group	Adjusted Means	Standard Error	
Minority	1.62%	.058	
Non-Minority	1.73%	.028	

Dependent Variable = Percent Bonus Independent Variable Categories = Female/Male			DEMO GROUP
Group	Unadjusted Means	Standard Deviation	N
Female	1.88%	1.40	840
Male	1.59%	1.09	1259
ANCOVA Results		Significance	Eta Squared
Career Path		.011	.003
Performance Score		.000	.136
Time in Service		.059	.002
Female/Male		.000	.011
Group	Adjusted Means	Standard Error	
Female	1.86%	.040	
Male	1.61%	.032	

Dependent Variable = Percent Bonus Independent Variable Categories = Veteran/Non-Veteran			DEMO GROUP
Group	Unadjusted Means	Standard Deviation	N
Veteran	1.51%	1.16	276
Non-Veteran	1.74%	1.24	1823
ANCOVA Results		Significance	Eta Squared
Career Path		.004	.004
Performance Score		.000	.138
Time in Service		.003	.004
Veteran/Non-Veteran		.228	.001
Group	Adjusted Means	Standard Error	
Veteran	1.63%	.070	
Non-Veteran	1.72%	.027	

COMPARISON GROUP DATA

Dependent Variable = Percent Increase in Salary Independent Variable Categories = Minority/Non-Minority			COMPARISON
Group	Unadjusted Means	Standard Deviation	N
Minority	1.59%	1.71	181
Non-Minority	1.62%	1.73	1253
ANCOVA Results		Significance	Eta Squared
Career Path		.004	.006
Performance Score		*	.000
Time in Service		.000	.045
Minority/Non-Minority		.805	.000
Group	Adjusted Means	Standard Error	
Minority	1.58%	.125	
Non-Minority	1.62%	.048	

*All Comparison Group employees received a rating of “passing” in Year Four.

Dependent Variable = Percent Increase in Salary Independent Variable Categories = Female/Male			COMPARISON
Group	Unadjusted Means	Standard Deviation	N
Female	1.74%	1.71	515
Male	1.54%	1.73	919
ANCOVA Results		Significance	Eta Squared
Career Path		.004	.006
Performance Score		*	.000
Time in Service		.000	.042
Female/Male		.562	.000
Group	Adjusted Means	Standard Error	
Female	1.65%	.075	
Male	1.59%	.056	

*All Comparison Group employees received a rating of “passing” in Year Four.

Dependent Variable = Percent Increase in Salary Independent Variable Categories = Veteran/Non-Veteran			COMPARISON
Group	Unadjusted Means	Standard Deviation	N
Veteran	1.28%	1.74	157
Non-Veteran	1.65%	1.72	1277
ANCOVA Results		Significance	Eta Squared
Career Path		.004	.006
Performance Score		*	.000
Time in Service		.000	.044
Veteran/Non-Veteran		.017	.004
Group	Adjusted Means	Standard Error	
Veteran	1.31%	.134	
Non-Veteran	1.65%	.047	

*All Comparison Group employees received a rating of “passing” in Year Four.

Dependent Variable = Percent Award Independent Variable Categories = Minority/Non-Minority			COMPARISON
Group	Unadjusted Means	Standard Deviation	N
Minority	2.19%	2.37	181
Non-Minority	2.22%	2.47	1253
ANCOVA Results		Significance	Eta Squared
Career Path		.063	.002
Performance Score		*	.000
Time in Service		.012	.004
Minority/Non-Minority		.721	.000
Group	Adjusted Means	Standard Error	
Minority	2.16%	.182	
Non-Minority	2.23%	.069	

*All Comparison Group employees received a rating of “passing” in Year Four.

Dependent Variable = Percent Award Independent Variable Categories = Female/Male			COMPARISON
Group	Unadjusted Means	Standard Deviation	N
Female	2.41%	2.74	515
Male	2.12%	2.27	919
ANCOVA Results		Significance	Eta Squared
Career Path		.077	.002
Performance Score		*	.000
Time in Service		.033	.003
Female/Male		.120	.002
Group	Adjusted Means	Standard Error	
Female	2.36%	.109	
Male	2.14%	.081	

*All Comparison Group employees received a rating of “passing” in Year Four.

Dependent Variable = Percent Award Independent Variable Categories = Veteran/Non-Veteran			COMPARISON
Group	Unadjusted Means	Standard Deviation	N
Veteran	1.62%	2.03	157
Non-Veteran	2.29%	2.49	1277
ANCOVA Results		Significance	Eta Squared
Career Path		.059	.002
Performance Score		*	.000
Time in Service		.015	.004
Veteran/Non-Veteran		.001	.007
Group	Adjusted Means	Standard Error	
Veteran	1.62%	.195	
Non-Veteran	2.29%	.068	

*All Comparison Group employees received a rating of “passing” in Year Four.