# EXHIBIT A-1

**IN THE UNITED STATES DISTRICT COURT**
**FOR THE DISTRICT OF COLUMBIA**

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| **KENNETH CAMPBELL, *et al.*,**<br>**Plaintiffs,**<br>**v.**<br>**NATIONAL RAILROAD PASSENGER CORPORATION,**<br>**Defendant.** | **Case No. 1:99-cv-02979** |

# Expert Report of Donald Deere, Ph.D.

# I. QUALIFICATIONS, ASSIGNMENT, AND CONCLUSIONS

## A. Qualifications

I spent 24 years on the faculty in the Department of Economics at Texas A&M ("Texas A&M"), the last 17 with tenure. I taught courses in labor economics, statistics, and public finance. I retired from Texas A&M in 2007, and I am currently an Adjunct Associate Professor of Economics at Texas A&M. Formerly, I was Associate Director of the George Bush School of Government and Public Service at Texas A&M, where I also taught as a member of the visiting faculty in 2008.

I received training in economics and statistics/econometrics at the Massachusetts Institute of Technology ("MIT"), where I earned a Ph.D. in Economics in 1983. I have taught at M.I.T., the University of California, Santa Barbara, and Texas A&M. My research has been published in numerous professional, peer-reviewed journals, including the *American Economic Review*, the *Journal of Political Economy*, the *Quarterly Journal of Economics*, and the *Journal of Labor Economics*.

I also am a Senior Economist for Welch Consulting, a firm that provides expert services in economics and statistics to the legal community, as well as general consulting in economics and statistics. In addition, I serve as a Senior

Economist for Unicon Research Corporation, a firm that conducts grant and contract research for U.S. government agencies. My *curriculum vitae*, including a list of publications, is in Attachment 1. A list of my testimony during the last four years is in Attachment 2. Attachment 3 contains a list of the information I considered in formulating the opinions expressed in this report. My billing rate for work on this matter is $475 per hour.

B. **Assignment**

I have been retained by counsel for defendant, National Railroad Passenger Corporation ("Amtrak"), to evaluate the February 21, 2012 report of Drs. Bradley and Fox (the "BF Report") submitted with the Plaintiffs' Memorandum in Support of Motion for Class Certification and the statistical studies that they conducted in this case. I was specifically asked to address the following questions:

1. Whether Drs. Bradley and Fox conducted statistical studies that evaluated the selection and discipline decisions of any common decision-maker(s) at Amtrak;

2. Whether Drs. Bradley and Fox conducted statistical studies that evaluated particular criteria used in selection or discipline processes at Amtrak;

3. Whether Drs. Bradley and Fox employed generally-accepted statistical methods and conformed to generally-accepted statistical standards;

4. Whether the results reported by Drs. Bradley and Fox are reliable; and

5. If my conclusion as to B(1) and B(2) are negative in that Drs. Bradley and Fox did not conduct statistical studies that evaluated these issues, how a reasonable study of questions B(1) and B(2) should be conducted in accordance with generally-accepted statistical methods and standards.

C. **Conclusions**

My findings and conclusions include the following:

1. I agree with Dr. Bradley that the studies described in the BF Report do not assess the decisions of any particular decision-makers with regard to hiring, promotions, selections, transfers, or discipline; I also agree that the studies described in the BF Report, therefore, do not provide any evidence as to whether any particular decision-makers engaged in discriminatory decision-making with regard to hiring, promotions, transfers, or discipline. I reached this conclusion because the studies conducted by Drs. Bradley and Fox aggregate data across many different jobs, locations, and collective bargaining agreements, and, accordingly, across many different decision-makers. Further, Drs. Bradley and Fox did not control for relevant factors in making selection decisions such as seniority, other

work experience, or education, or relevant factors in resolving disciplinary charges such as prior disciplinary record and severity of offense.

2. I agree with Dr. Bradley that the study described in the BF Report does not assess any specific selection procedure or criterion involved in the hiring of candidates for any particular job at Amtrak; I also agree that the study described in the BF Report, therefore, does not provide any evidence that any specific selection procedure or criterion caused a disparate impact on the hiring of African Americans. I reached this conclusion because the studies conducted by Drs. Bradley and Fox aggregated data across many different jobs with different selection criteria, and because the studies did not control for legitimate factors such as seniority, other work experience, or education.

3. I agree with Dr. Bradley that the study described in the BF Report does not assess any specific selection procedure or criterion involved in the competitive selection of Amtrak employees for promotions or transfer; I also agree that the study described in the BF Report, therefore, does not provide any evidence that any specific selection procedure or criterion caused a disparate impact on the promotion or transfer of African Americans. I reached this conclusion on the same grounds as summarized above with regard to external hires.

4. I agree with Dr. Bradley that the study described in the BF Report does not assess any specific disciplinary criterion or procedure; I also agree that the study described in the BF Report, therefore, does not provide any evidence that any specific disciplinary criterion or procedure caused a disparate impact on the discipline received by African Americans. I reached this conclusion because the studies conducted by Drs. Bradley and Fox did not examine any particular disciplinary criteria or procedure, but instead aggregated data across different employees in different jobs, locations, and unions. I also reached this conclusion because the statistical studies of Drs. Bradley and Fox did not control for important factors in making a disciplinary decision such as prior disciplinary record, severity of offense, and tenure at Amtrak, or compare disciplinary resolutions among employees with similar disciplinary records or offenses.

5. I agree with Dr. Bradley that the analyses described in the BF Report could be considered "bottom line" studies. Even understood in this limited way, however, the studies are fundamentally flawed. In particular, the study of selections with no applicant flow data fails to adhere to commonly-accepted standards governing statistical sampling. As such, the "extrapolation" technique upon which Drs. Bradley and Fox's findings are based is invalid.

6. To conduct a reasonable study of questions B(1) and B(2) above, the analyses must be designed to assess a particular selection criterion or a particular

decision-maker. I examined deposition testimony and other materials related to the factual background of the case, and have determined that a valid analysis could not aggregate data across jobs with different selection criteria or across job and location with different decision-makers. In addition, the time period associated with the data would have to be a controlled for factor in any such study, as selection criteria possibly and decision-makers likely changed over time. The study also would have to isolate individuals who were not selected based on the specific criteria and compare those individuals to others who passed these same criteria. Similarly, the study would have to control for the legitimate factors that decision-makers considered in making a selection decision, such as seniority, other work experience, education, and other similar factors. Based on my review of data in the joint database and example job files, Drs. Bradley and Fox could have conducted this type of study using the information contained in the job files, the joint database and other available documents.

The following sections of this report explain my findings in detail. First, I begin my discussion with factual background, including a descriptive assessment of the data, an overview of selection and decision-making processes at Amtrak, and a summary of the documents upon which I relied (Section II). Next, I discuss and evaluate the analyses presented in the BF Report (Section III). This is followed by my assessment of questions B(1) and B(2) above (Section IV), moving

next to a discussion of my evaluation of whether Drs. Bradley and Fox adhered to statistical standards and generally-accepted methods (Section V), and closing with a discussion of how a reasonable study of questions B(1) and B(2) could be conducted (Section VI).

## II. FACTUAL BACKGROUND

### A. Descriptive Data

The starting point for my study of the questions that I was asked to answer is an examination of basic relationships in the data. Along with understanding the factual record relating to decision-makers and decision-making criteria at Amtrak, the basic empirical relationships set the context for evaluating these questions. Based on my review of the data used by Drs. Bradley and Fox, I identified the following descriptive factors that were relevant to my review of the questions described above.

During the data period, from 1996 to 2008, there were approximately 36,937 agreement employees in the data, of which 31.3% or 11,566 were African Americans. Approximately 43.4% of these 11,566 African American employees no longer appear to be employed by Amtrak. The 11,566 total African American employees were employed in 86 different cities identified in the database.

The distribution of these 36,937 employees across specific race/ethnicity categories varies considerably by location, union, and job. The following table

provides the race/ethnicity distribution for six large cities. The table shows, for example, that the percentage of African American varies from 11.3% in Boston to 54.0% in Washington, D.C. The percentage white varies from 38.5% in Los Angeles to 85.3% in Boston. Hispanics are 23.1% of employees in Los Angeles and 1.7% in Philadelphia.

**Race/Ethnicity Composition Varies by City**

| City | % White | % African American | % Hispanic | % Asian / Pacific Islander | % Other |
|---|---|---|---|---|---|
| BOSTON, MA | 85.3% | 11.3% | 2.0% | 1.0% | 0.3% |
| CHICAGO, IL | 44.8% | 45.8% | 7.2% | 2.0% | 0.2% |
| LOS ANGELES, CA | 38.5% | 31.3% | 23.1% | 5.6% | 1.5% |
| NEW YORK, NY | 42.3% | 46.8% | 7.9% | 2.6% | 0.5% |
| PHILADELPHIA, PA | 64.6% | 32.7% | 1.7% | 0.5% | 0.4% |
| WASHINGTON, DC | 39.9% | 54.0% | 2.4% | 3.3% | 0.4% |

The table below provides the race/ethnicity composition for the eight largest unions. African Americans comprise 50.2% of ASWC employees and 8.0% of BLET (Off) employees. White employees are 40.1% of the ASWC employees and 87.7% of the BLET (Off) employees. Hispanics are 10.7% of employees in TCU (Off) and 2.5% in UTU (NE). Note also that the race/ethnicity distributions are different for the TCU and UTU unions, depending on whether employees are covered by the Northeast Corridor ("NE") or Off-Corridor ("Off") collective bargaining agreements ("CBAs").

**Race/Ethnicity Composition Varies by Union**

| Union | % White | % African American | % Hispanic | % Asian / Pacific Islander | % Other |
|---|---|---|---|---|---|
| ASWC | 40.1% | 50.2% | 6.6% | 2.6% | 0.5% |
| BLET (OFF) | 87.7% | 8.0% | 3.1% | 0.6% | 0.6% |
| IBEW | 71.5% | 19.0% | 4.8% | 4.3% | 0.5% |
| JCC | 46.2% | 41.7% | 7.9% | 4.1% | 0.2% |
| TCU (NE) | 49.0% | 45.1% | 3.7% | 1.8% | 0.5% |
| TCU (OFF) | 55.0% | 31.8% | 10.7% | 1.8% | 0.7% |
| UTU (NE) | 69.6% | 26.9% | 2.5% | 0.5% | 0.5% |
| UTU (OFF) | 79.5% | 14.0% | 5.1% | 0.9% | 0.5% |

For my analysis, I truncated all Amtrak job codes used for a specific position from 1996-2008; this allowed me to capture data associated with a "job," regardless of historical variation in job code over time. My approach captures a broader range of data than data for a single job code, but it is meant to limit data to a specific job over time and is far more precise than the use of "Craft"[1] data. The table below provides the race/ethnicity composition for the three largest jobs in the three largest unions in the "Clerical and On-Board Services" craft. There is substantial variation in the race composition of jobs within the same union.

[1] For ease of reference, in this report the term "Craft" references the "Craft Group" used by Drs. Bradley and Fox in the BF Report. A review of documents does not indicate that "Craft Group" is a category designation used by Amtrak.

**Race/Ethnicity Composition Varies by Job**

| Union | Job Title | % White | % African America | % Hispanic | % Asian | % Other |
|---|---|---|---|---|---|---|
| ASWC | SERV. ATTEND. | 35.7% | 53.6% | 6.5% | 3.0% | 1.2% |
| ASWC | TRAIN ATTEND. | 37.9% | 50.3% | 9.4% | 1.9% | 0.6% |
| ASWC | LEAD SERV. ATTEND. | 52.5% | 38.0% | 5.3% | 3.6% | 0.6% |
| TCU (NE) | TICKET/ACCT. CLERK | 45.2% | 49.6% | 2.4% | 2.3% | 0.5% |
| TCU (NE) | STORE HOUSE CLERK | 66.6% | 27.7% | 2.7% | 2.1% | 0.9% |
| TCU (NE) | RED CAP/BAG. | 44.0% | 49.3% | 5.9% | 0.8% | 0.0% |
| TCU (OFF) | TICKET/ACCT. CLERK | 65.8% | 21.8% | 9.7% | 2.3% | 0.4% |
| TCU (OFF) | R&I CLERK | 50.9% | 36.0% | 11.3% | 1.1% | 0.6% |
| TCU (OFF) | RED CAP/BAG. | 53.6% | 32.8% | 11.3% | 1.8% | 0.6% |

The 36,937 employees included in the data used by Drs. Bradley and Fox were covered by 24 collective bargaining agreements, which were periodically updated, and worked in almost 600 different jobs in a total of about 3,500 different job/location combinations.

The studies described in the BF Report analyzed a total of 55,815 employee selections, including 14,662 external hires and 41,153 internal selections. Only 6,193 selections contain applicant data in the joint database, including 4,588 external selections (representing 31.3% of all external selections) and 1,605 internal selections (representing 3.9% or all internal selections). Approximately 49,000 selections – the large majority of the selections that Dr. Bradley and Fox

analyzed – were not reflected in the applicant data included in the joint database, but rather were derived from the employee history data.

The table below provides the percentages of the internal selections that Drs. Bradley and Fox have identified that involve an employee moving between jobs within the same union. For each of the four "Craft Groups" the job movements analyzed are within union over 72% of the time; job movements are within union 86% or more of the time in the Engineering and Clerical & On-Board Services "Craft Groups."

**Most Internal Selections Are Within Union**

| Craft | % of Internal Selections That Are Within Union |
|---|---|
| I. SHOP | 76.3% |
| II.ENGINEERING | 86.0% |
| III. OPERATING | 72.3% |
| IV.CLERICAL & ON-BOARD SERVICES | 88.5% |

The analysis that Drs. Bradley and Fox conducted of the 6,193 selections contained in the applicant data included in the joint database ignores individuals with missing race data and does not distinguish the specific race/ethnicity groups of non-African Americans. The table below provides the race/ethnicity distribution for all candidates for these 6,193 selections, including those for whom race/ethnicity was not identified. The single largest category is "Unknown" with 34.4%.

**The Largest Race/Ethnicity Category Among Candidates Is "Unknown"**

| Race/Ethnicity | % of Candidates |
|---|---|
| White | 28.4% |
| African American | 27.4% |
| Hispanic | 6.2% |
| Asian | 2.2% |
| Other | 1.5% |
| Unknown | 34.4% |
| **Total** | **100.0%** |

The discipline charges analyzed by Drs. Bradley and Fox involve some employees who receive multiple charges. The table below compares the fraction of employees who received a discipline charge with and without a prior charge. The population is the employees in BF Figure 1 for 2002, the middle year of the data period. In the first column, these employees are separated based on whether or not they had a charge in the discipline data prior to 2002. The second column reports the numbers of these employees who receive a discipline in 2002 or later, with the corresponding discipline rate in the last column. The discipline rate is more than twice as high for those who had a prior discipline charge.

**Discipline Charges Are More Likely for Employees with Prior Charges**

| | Employees in 2002 BF Snapshot | Employees with a Charge in 2002 or Later | Discipline Rate |
|---|---|---|---|
| Without a charge **before 2002** | 17,404 | 3,163 | 18.2% |
| With a charge **before 2002** | 6,325 | 2,452 | 38.8% |
| Total | 23,729 | 5,615 | 23.7% |

The discipline events analyzed by Drs. Bradley and Fox involve charges of violating a variety of rules. The resolution of these charges ranges from termination to findings of "not guilty." The table below shows the variation in termination rates across the various rule violations.

**Discipline Termination Rates Vary by Rule Violation**

| Rule Violation | Number of Charges | Number Resulting in Termination | Termination Rate (%) |
|---|---|---|---|
| Duties | 1,262 | 1 | 0.1 |
| Incompetence | 974 | 12 | 1.2 |
| Operating Rule | 2,805 | 50 | 1.8 |
| Safety | 1,112 | 25 | 2.2 |
| Other | 83 | 2 | 2.4 |
| Absenteeism | 9,465 | 249 | 2.6 |
| Unprofessional | 2,613 | 249 | 9.5 |
| Insubordination | 893 | 87 | 9.7 |
| Rule G | 1,057 | 116 | 11.0 |
| Sleep | 152 | 31 | 20.4 |
| Dishonesty | 1,825 | 385 | 21.1 |
| Two or More Rules | 1,895 | 378 | 19.9 |
| **Total** | **24,136** | **1,585** | **6.6** |

The termination rate also varies with the number of prior disciplinary charges that the employee has received as shown in the table below.

**Discipline Terminations Rates Vary with Prior Discipline History**

| Number of Prior Disciplinary Charges | Total Charges | Number Resulting in Terminations | Termination Rate (%) |
|---|---|---|---|
| 0 | 8,354 | 424 | 5.1 |
| 1-3 | 10,807 | 752 | 7.0 |
| 4+ | 4,975 | 409 | 8.2 |
| **Total** | **24,136** | **1,585** | **6.6** |

These simple relationships, such as, for example, (1) the variation in the race/ethnicity composition of employees across locations, unions and jobs, (2) the variation in termination rates with the rule violated and with prior violations, or (3) descriptive facts, such as the number of locations, unions, and jobs involved, provide context for the detailed evaluation of the BF Report that begins in Section III.

## B. Selections and Discipline Decision-Making

I requested deposition transcripts, collective bargaining agreements, and other materials that would provide the factual background of this case. Based on my review of the materials, I determined the following:

### 1. Selection Processes Vary Depending on a Variety of Factors, but Comparative Selection Decisions Are Made by Local Decision-Makers

After a review of the deposition testimony and other materials, I have concluded that selection processes at Amtrak vary depending on many factors. The selection process begins by the local department filling out the Job Requisition Form and submitting it to Human Resources ("HR"). (Allan Dep. 38; Pesce Dep. 40; Ray Dep. 52). The requisition form given to HR contains a summary of the job and education, work, and other requirements that the local department determines is important for that particular open position (Allan Dep. 56). Similarly, the selection criteria used by HR to screen candidates' applications varies depending on the location and requirements of the job as identified by the hiring department. (Allan Dep. 58; Drummond Dep. 22-23). In addition to HR, the hiring manager may decide to participate in the screening process. (Allan Dep. 62; Drummond Dep. 24-25, 28; McRae Dep. 121-122). Amtrak's selection process sets aside room for variation to accommodate local or position-specific needs at many other stages as well. For example, certain job openings may require pre-interview tests (Brennan Dep. 30) or posting for local union bids and transfers (Allan Dep. 45-47; Brennan Dep. 32-33). The set of questions asked during the interviews for a specific job opening may vary depending on the position and current needs of the hiring department. (Bellotti Dep. 50-51).

I also have concluded that selection decisions between competing candidates are made by local managers. (*See, e.g.*, Boyce Dep. 81-82; Brennan Dep. 44-45; Drummond Dep. 76-78). An interview panel consists of local managers and representatives, including the hiring manager, other managers, an HR representative, or a union representative. (Frank Dep. 33; Wilson Dep. 60). The interview panel evaluates and discusses the candidates. (Hastings Dep. 57-59; Guerin Dep. 49-51).

Typically, the local hiring manager then makes the selection decision. (Mason Dep. 33-35; Johnson Dep. 65; Brennan Dep. 102-103; Bellotti Dep. 88-89; Allan Dep. 181). After a selection decision is made, the decisions may be approved by a higher-level local manager (Whitaker Dep. 49-50). Still, the decision to approve focuses on the number of openings and other budgetary restrictions; it is not a comparative decision between two candidates. (Boyce Dep. 83; DeVito Dep. 45-46). Moreover, I did not see any testimony or other information that indicates that the higher-level "approvers" knew the recommended candidates' race, or the races of the other candidates in competition for the position. (Boyce Dep. 83; DeVito Dep. 45-46; Alderman Dep. 62; Marello Dep. 65).

Drs. Bradley and Fox asserted in the BF Report that the Chief Executive Officer (CEO) at Amtrak made the selection decisions for agreement-covered

employees. (Bradley Dep. 90-92). Based on my review of the depositions, one deponent testified that the CEO has signed off on the paperwork for the creation of a position or the decision to fill a position since October 2002. (Walker Dep. 110-114). However, when asked questions about the CEO's role in the selection process, other deponents state that the CEO only signs off on the decision to create a new job opening. (Hinton Dep. 32-33; Roeber Dep. 28-29; Rose Dep. 28-32, 45; Boyce Dep. 41-42; Commer Dep. 35). Moreover, as explained in the preceding paragraph, all depositions that I examined confirm that hiring decisions between competing candidates are made at the local level. Therefore, I could not confirm the factual assumption made by Drs. Bradley and Fox that the CEO made these selection decisions. In my professional experience as a labor economist studying decision-making by employers for 25 years, I have never encountered a large employer whose CEO made selection decisions for the level of positions as issue in this case. Given that there were over 55,000 selections, I would find this assumption highly implausible.

### 2. Discipline Processes Vary Depending on a Variety of Factors

As with selection decisions, discipline decisions are made at the local level. (Brennan Dep. 70-77*;* Gonzalez Dep. 72-73; Anderson Dep. 89; Boyce Dep. 91-93). Amtrak has adopted "Standards of Excellence" as the basic guideline for employee behavior. (AMK0000007282; AMK00000084286). Beyond these

general guidelines, discipline rules at Amtrak depend on several factors including the following:

- Job position;
- Prior disciplinary record;
- Tenure;
- The controlling collective bargaining agreement; and
- Federal law.

(Boyce Dep. 91-92; B. Campbell Dep. 67-75; Commer Dep. 69-70). With regard to collective bargaining agreements, different agreements contain different disciplinary rules. Depending on the controlling collective bargaining agreement, discipline rules differ from union to union for employees within the same "craft" or in different "crafts." (Commer Dep. 67-68, 73-75). For example, within the so-called "Clerical and On-Board Services Crafts," collective bargaining agreements for TCU-NEC, TCU-OC, and ASWC provide that an employee who has been in service for more than 90 calendar days cannot be disciplined or dismissed without a trial; UTU-Stewards, by contrast, requires a trial after 60 calendar days of compensated service. (*See* the applicable collective bargaining agreements for these unions, such as AMK0000040592 for UTU-Stewards).

The rules at Amtrak also allow local managers to exercise discretion in making disciplinary decisions. (Brennan Dep. 84-86*;* Gonzalez Dep. 75, 79; Boyce Dep. 90-95; B. Campbell Dep. 67-75; Commer Dep. 69-70). Local managers may, for example, decide the exact level of discipline that is assessed

after a finding of guilt through the formal discipline process. (Birckett Dep. 88-91). Local supervisors and charging officers exercise discretion in deciding whether to bring a formal disciplinary charge in the first place. (Birckett Dep. 86; Boyce Dep. 94, 105-106; B. Campbell Dep. 75-77).

### C. **Information Utilized**

In preparing this report, I relied upon the information listed below. For a more detailed list of information relied upon, please see Attachment 3.

- The expert report of Drs. Bradley and Fox;
- Plaintiffs' Objections and Responses to Defendant's Request for Production Directed to Drs. Bradley and Fox;
- Two (2) data disks provided by Drs. Bradley and Fox;
- Thirteen (13) Compact Discs re: Parties' Joint Database;
- Exemplars of Job Description Documents;
- Exemplars of Job Files (*discussed in detail in the next paragraph*);
- Amtrak Collective Bargaining Agreements;
- Index of Amtrak Collective Bargaining Agreements;
- Plaintiffs' 4th Amended Complaint;
- Plaintiffs' Motion and Memorandum in Support of Class Certification;
- *Brown v. Nucor Corp.*, 576 F.3d 149 (4th Cir. 2009);
- Index of Managers/Employees Depositions;
- Index of 30(b)(6) Depositions;
- Deposition Transcripts and Exhibits.

As mentioned in the above list, I requested several examples of the job files that were made available to Plaintiffs during discovery in this case. A job file contains documents related to a specific job opening at Amtrak (Allan Dep. 117-119). These documents span the various stages of the selection process, from the

Job Requisition Form to the Job Offer Letter. The job files that I looked at contained some or all of the following documents:

- Job requisition and qualification profiles;
- Job advertisements or related documents;
- Job ability requirements;
- Applicant flow logs;
- Applications for employment and attached documents including, but not limited to, resumes, proof of military service, and copies of diplomas or other certificates;
- Cover letters submitting applications for employment and associated documents;
- Job bid forms and related documents;
- Transfer requests;
- Applicant questionnaires;
- Pre-employment test, surveys, and related materials;
- Interview guides;
- Interviewer's report forms;
- Interview questions;
- Interview notes;
- Internal written communication regarding hiring decision and notifying candidates;
- Offer letters to select candidates with information on the position and scheduling;
- Consents for release of information;
- Authorization for examination or treatment forms.

The following are examples of job files for specific openings that I reviewed to generate the above list: Service Attendant (AMK0000503988), Assignment Clerk (AMK0000429223), Locomotive Engineer Trainee (AMK0000429699), Machinist (AMK0000552410), ARASA Supervisor (AMK0000517741).

## III. OVERVIEW OF THE ANALYSES DESCRIBED IN THE BF REPORT

To determine exactly how Drs. Bradley and Fox conducted their studies in this case, I reviewed the BF Report and supporting computer programs and read the transcripts of the deposition testimony and exhibits of Drs. Bradley and Fox. The BF Report provides statistical calculations from studies of three topics: the hiring of new employees to Amtrak, the promotion[2] or transfer of existing Amtrak employees, and the administration of discipline to Amtrak employees. For each topic, the statistical analyses compared African Americans to non-African Americans.

In BF Tables 1-4, the BF Report presents statistical calculations regarding the selection of African Americans for hire, promotion, or transfer that are aggregated across a large number of different jobs organized by what Drs. Bradley and Fox refer to as the "Craft Group." The employees in these jobs are represented by a variety of different unions. In addition, these jobs are located in different cities and are filled across a 13-year period from 1996 to 2008. The aggregate statistical calculations of employee selections in the BF Report do not focus on the following:

[2] The term "promotion" is used throughout the BF Report, although I would not agree that all of these identified job changes represent a promotion of the employee involved. Drs. Fox and Bradley appeared to agree that the label "Promotions" in the BF Report was not accurate, but that "internal selections" would be more accurate. (Fox Dep. 187-191; Bradley Dep. 136). This issue is discussed in more detail in Section V(E), below.

- Any particular job;
- Set of similar jobs; or
- Even the jobs represented by the same union.

Also, these aggregate statistics do not focus on any particular decision-maker (such as a hiring manager) in a given location responsible for selections for particular jobs. Further, the aggregate statistics on employee selections do not control for a number of factors, including:

- The qualifications of any candidate for any job;
- The selection criteria used in filling any job; or
- Any CBA rules affecting how individuals are selected for any job.[3]

In BF Tables 5-6, the BF Report presents statistical calculations regarding discipline that are aggregated across employees in a large number of different jobs. The employees combined in their study were represented by different unions, are located in different cities, and received discipline determinations across a 13-year period from 1996 to 2008. The aggregate statistical calculations of employee discipline in the BF Report do not focus on the following:

- Any particular job;

[3] The candidates included by Drs. Bradley and Fox in their analysis of the applicant data meet minimum qualifications, but there is no control in the analysis for any variation in qualifications beyond the minimum.

- Set of similar jobs; or
- Even the jobs covered by the same collective bargaining agreement or union.

These aggregate statistics also do not focus on any particular local decision-maker. Further, the aggregate statistics on the incidence of discipline (BF Table 5) do not control for the following factors for an employee who is, or could be disciplined:

- Seniority;
- Job;
- Union; or
- Discipline.

Moreover, the aggregate statistics on the resolution of discipline (BF Table 6) do not control for the rule that an employee is charged with violating, or the number of prior work rule violations for that same employee.

## IV. EVALUATION OF THE STUDIES DESCRIBED IN THE BF REPORT

After reviewing the BF Report, its statistical calculations and all supporting material, I agree with Dr. Bradley's deposition testimony that the studies described in the BF Report: (1) are not designed to assess whether any particular decision-makers within Amtrak are engaged in intentional discrimination; and (2) do not provide any results that show whether any particular decision-maker within Amtrak has engaged in intentional discrimination. (Bradley Dep. 96).

As discussed above, there is substantial testimony indicating that the local manager makes the decision to select a specific candidate for a job opening, to hire a new employee or to promote or transfer an existing employee. (Birckett Dep. 66-69; Boyce Dep. 81-82; Brennan Dep. 44-45; Commer Dep. 62-64; Cowan Dep. 42-44; Drummond Dep. 76-78; Forgione Dep. 55-55; Fortune Dep. 65; Gambrel Dep. 169-170; Gallagher Dep. 52-53). Despite the testimony of Dr. Bradley indicating there was a final central decision-maker who made the final approval on employment selections (Bradley Dep. 91), the testimony that I reviewed indicates that selection decisions are local and that higher managerial approval of these selections does not involve comparing alternative candidates. (Boyce Dep. 83; DeVito Dep. 45-46; Alderman Dep. 62; Marello Dep. 65). In sum, the evidence indicates that decisions to select particular candidates among competing candidates are made by local decision-makers. The BF Report, however, does not present any statistics focused on any particular decision-maker who is making any selection decisions involving the jobs examined. Thus, the studies described in the BF Report are not designed to assess, nor do they provide results that show, whether any particular decision-maker at Amtrak has selected African Americans at a disproportionately low rate.

After my review, I also agree with Dr. Bradley's deposition testimony that the studies described in the BF Report (1) do not assess whether any particular

employment practice at Amtrak caused a disparate impact on African Americans; and (2) do not provide a basis for a statistical opinion that any particular employment practice at Amtrak caused a disparate impact on African Americans. (Bradley Dep. 99).

The testimony reviewed above indicates that despite having a common requisition form, the duties, responsibilities, and required or preferred qualifications are tailored to the specific job being filled. (Allan Dep. 56-58; Drummond Dep. 22-23). Further, the selection criteria used by HR to screen candidates can vary across positions, locations, or departments, and different jobs may have different requirements with regard to testing, interview questions and forms, or union posting rules. (Allan Dep. 45-47, 62; Drummond Dep. 24-25, 28; McRae Dep. 121-122; Brennan Dep. 30-33). In sum, the evidence indicates that position requirements and selection criteria vary across jobs and perhaps also across locations. The BF Report does not present any statistics about any particular job nor about any particular selection criterion for any particular job. Thus, the studies described in the BF Report do not examine, and cannot be the basis for an opinion about, whether any particular employment practice at Amtrak caused a disparate impact against African Americans.

The BF Report merely presents aggregate statistics calculated across a number of different decision-makers involving a number of different jobs,

represented by different unions, in different locations, and at different time periods with no attention to any differences in decision-makers, jobs, selection criteria, union rules, or competitive qualifications.

## V. FLAWS IN THE "BOTTOM LINE" STUDIES DESCRIBED IN THE BF REPORT

I agree with Dr. Bradley that the analyses outlined in the BF Report could be described as "bottom line" studies which do not assess decisions of particular decision-makers or particular selection criteria or procedures. (Bradley Dep. 92). However, even with a "bottom line" assessment, there are serious flaws in the statistical methodology used by Drs. Bradley and Fox. These flaws lead me to conclude that the results are unreliable. There are five methodological flaws that I discuss below:

A. The aggregated analyses do not show any consistent pattern and obscure considerable variation in the detailed results;

B. Controlling for relevant factors shows no disparities in disciplinary resolutions resulting in termination even in the aggregated analyses;

C. The extrapolated benchmarks are based on a sample that is unrepresentative of the more than 49,000 selections to which they are applied;

D. The analyses only consider a subset of the selections during 2003-2008, which under-counts the number of African American selections during this period; and

E. The analyses are not tailored to the complexity of Amtrak's workforce dynamics (appearing, for example, to have misidentified many promotions).

The details follow.

### A. There Is No Consistent Pattern Underlying the Aggregate Statistical Analyses Described in the BF Report

As discussed above, the selection analyses described in the BF Report present only "bottom line" statistics that aggregate across numerous jobs, locations, and decision-makers, and do not control for differences in candidates' qualifications or disciplinary backgrounds, selection criteria, or union rules. It is possible, however, to take these limited, "bottom line" studies and examine whether the underlying detailed results reflect an overall pattern that is in agreement with the aggregated results. The "bottom line" results also show a wide range of outcomes sometimes to the benefit of African Americans, sometimes to the detriment of African Americans, and sometimes statistically neutral. This detailed "bottom line" analysis does not substitute for a proper study that controls for differences in candidates' qualifications and other major factors that affect who is selected for a position or who is disciplined. However, the details embedded in

the bottom line results can provide information as to whether the aggregate statistics reflect a consistent pattern of adverse results or whether they merely obscure significant variation in the underlying results with African Americans favored in some situations, disfavored in others, and still other situations where there are no statistically significant differences.

Table 1 documents the variation in outcomes across job and city pairs in the analysis of external hires conducted by Drs. Bradley and Fox.[4] These calculations are made in the same manner as the studies reported in the BF Report, but instead of aggregating the difference in African American selections to a single aggregated result by Craft, the calculations are made for each job and city. The table shows the percentage of job/city pairs with a statistically significant difference adverse to African Americans, the percentage with a statistically significant difference favorable to African Americans, and the percentage with no statistically significant difference. The first column shows the percentages counting each job/city pair once, which means that each job/city carries equal weight in the analysis, regardless of the relative number of selections in the job/city. The second column shows the same percentages after weighting each job/city pair by the number of selections in the job and city, which will give more weight to job/city pairs where there were more selections. These analysis results show considerable variation in

[4] The analyses of the variation in selection outcomes across job and city are limited to those for which a job code and city is identified in the BF data.

outcomes: 15.1% of selections are in job/city pairs that are significantly favorable to African Americans; 37.3% are in job/city pairs that are significantly adverse to African Americans; and 47.6% are in job/city pairs with no statistical differences.

**Table 1. There Is Substantial Variation in Outcomes Across Job/City Pairs Underlying the Bradley/Fox "Bottom Line" Analysis of External Hires**

| | % of Job/City Pairs | % of Job/City Pairs (Weighted by Number of Selections) |
|---|---|---|
| **Significantly Favorable to African Americans** | 3.6% | 15.1% |
| **Significantly Unfavorable to African Americans** | 9.7% | 37.3% |
| **No Statistical Difference** | 86.7% | 47.6% |

Table 2 shows similar variation in outcomes across job/city pairs in the analysis of internal selections conducted by Drs. Bradley and Fox. Again, the analysis revealed no consistent pattern of outcomes significantly adverse to African Americans: 21.0% of selections are in job/city pairs that are significantly favorable to African Americans; 35.4% are in pairs that are significantly adverse to African Americans; and 43.6% are in pairs where there is no statistical difference.

**Table 2. There Is Substantial Variation in Outcomes Across Job/City Pairs Underlying the Bradley/Fox "Bottom Line" Analysis of Internal Selections**

| | % of Job/City Pairs | % of Job/City Pairs (Weighted by Number of Selections) |
|---|---|---|
| **Significantly Favorable to African Americans** | 6.1% | 21.0% |
| **Significantly Unfavorable to African Americans** | 12.1% | 35.4% |
| **No Statistical Difference** | 81.8% | 43.6% |

Table 3 makes analogous calculations showing the variation in discipline charges that are included in the aggregate statistics presented in BF Table 5. The analyses show significant variation in outcomes: 19.9% of discipline charges are in job/city pairs that are significantly favorable to African Americans; 42.2% are in job/city pairs that are significantly adverse to African Americans; and 37.9% are in job/city pairs where there is no statistical difference.

**Table 3. There Is Substantial Variation in Outcomes Across Job/City Pairs Underlying the Bradley/Fox "Bottom Line" Analysis of Discipline**

| | % of Job/City Pairs | % of Job/City Pairs (Weighted by Number of Selections) |
|---|---|---|
| **Significantly Favorable to African Americans** | 5.8% | 19.9% |
| **Significantly Unfavorable to African Americans** | 15.9% | 42.2% |
| **No Statistical Difference** | 78.2% | 37.9% |

In sum, examination of the detailed components of the aggregated "bottom line" statistics presented in the BF Report shows substantial variation in outcomes; no uniform pattern of results adverse to African Americans exists. The aggregate analyses conducted by Drs. Bradley and Fox obscure the underlying variation in outcomes that are sometimes to the disadvantage of African Americans, sometimes to their advantage, and other times are not statistically different. The detailed bottom line results presented above show that there is no consistent pattern of outcomes adverse to African Americans in hiring, internal selections, or disciplinary charges.

### B. Control for Relevant Factors in An Aggregated "Bottom Line" Analysis Implies No Statistical Difference in the Disciplinary Termination Rates of African Americans

The aggregated analysis of discipline resolutions reflected in BF Table 6 ignores factors that are likely to affect the severity of punishment for rule violations. These factors include the employee's union, seniority, and discipline history, as well as the specific rule that was violated. A regression technique known as logistic regression, or logit, is a standard tool for comparing the odds of a particular event, such as termination for a discipline violation, for African Americans relative to non-African Americans, after controlling for relevant factors. A logit regression analysis of the data presented in BF Table 6 which controls for the employee's union, service time with Amtrak, discipline history and also the

rule(s) that was violated, shows that the odds of a termination resolution for African Americans are not statistically different than for non-African Americans.[5]

### C. The "Extrapolation" Analysis Reported in BF Tables 2-4 Violates Statistical Standards Governing Sampling

Drs. Bradley and Fox used the employee history data to identify 49,622 selections for which there was no applicant data contained in the joint database. BF Table 2 examines 10,074 hires, i.e., external selections, and BF Table 3 examines 39,548 internal selections that, as demonstrated below, appear to include many selections that have been mischaracterized as "promotions." BF Table 4 combines the results of BF Tables 2 and 3.

Because these 49,622 selections are not in the applicant data contained in the joint database, Drs. Bradley and Fox must first devise a measure of the relative availability of African Americans among those considered for these selections. This measure of availability then serves as a "benchmark" against which the actual selections are compared. Thus, there are actually two statistical estimation problems facing Drs. Bradley and Fox:

- The first is to estimate the benchmarks – the percentage of African Americans among the candidates considered for the 49,622 selections.

[5] The estimated odds ratio is 1.07 with associated standard deviations of 1.09.

- The second is to estimate the difference between the actual selections and the selections that would be expected if these (estimated) benchmarks reflect African American availability.

In an attempt to solve the first estimation problem, Drs. Bradley and Fox simply used the percentage of African American applicants they calculated from the applicant data contained in the joint database. These estimated benchmarks are derived from a sample of selections – namely, the 6,193 selections for which applicant data was contained in the joint database. If a sample is to provide a reliable estimate for some larger population, then fundamental statistical standards dictate that the sample must be representative of this population. Further, standard statistical practice is to provide an indication of the margin of error for any such estimate.

The approach described in the BF Report violates both of these fundamental statistical standards. First, the BF Report does not include any analysis, or even discussion, of whether the sample of selections used to calculate the various benchmarks is representative of the 49,622 selections to be studied in BF Tables 2 and 3. Second, the BF Report provides no information on the margin of error in these benchmark estimates. Indeed, as discussed below, it is not possible to provide an accurate measure of the error rate in these benchmark estimates.

The benchmarks used for BF Tables 2-4 are not derived from a representative sample. In fact, Dr. Bradley described this sample as a "convenience sample." (Bradley Dep. 155). A convenience sample is essentially data which is easily available rather than data obtained through a process specifically designed to be representative of a larger population in order to provide reliable estimates of population characteristics. By contrast, a "probability sample" is designed to ensure that the sample is representative. This is critical because only a representative sample can produce reliable estimates of the population. Further, in designed "probability samples," accurate measures of the margin of error – which statisticians call "sampling error" – can be calculated. Thus, unlike a probability sample, which is designed to be representative, a convenience sample typically does not provide a representative sample and also does not allow calculation of an accurate margin of error.

Thus, it is imperative to assess the representativeness of a convenience sample before basing any statistical conclusions on such a sample because they are inherently unreliable unless it has been determined that the convenience sample is indeed representative. *See* E.K. Foreman, *Survey Sampling Principles*, at 294 (New York: Dekker 1991) ("[O]nly limited confidence may be placed in nonprobability survey sample results."); Elizabethann O'Sullivan, Gary R. Rassel, and Maureen Berner, *Research Methods for Public Administrators*, at 147 (5th Ed.

Longman 2008) ("Nonprobability sampling designs are used widely. They typically are cheaper and easier to carry out than probability designs. Their major weakness is that in using them one cannot estimate [population] parameters from sample statistics."); Paul S. Levy and Stanley Lemeshow, *Sampling of Populations*, at 21 (3rd Ed. New York: Wiley & Sons 1999) ("In probability sampling, because every element has a known chance of being selected, unbiased estimates of population parameters . . . can be constructed from the sample data. Also, the standard errors of these estimates can be estimated . . . . This gives the users of the survey estimates insight into how much value can be placed on the estimates. Nonprobability sampling, on the other hand, does not have this feature, and the user has no firm method of evaluating either the reliability or the validity of the resulting estimates.").

The most difficult part of applying conclusions from convenience samples in the legal setting is the fact that statistical methods cannot be used to assess the error rate of the sample. *Survey Sampling Principles*, at 294 ("[I]t is worth noting that the chances of an error exceeding a critical size may be evaluated for sample estimates based on a probability sample, and calculations made of the associated risks attaching to dependent decisions. Nonprobability sampling precludes such risk calculations."); *Research Methods for Public Administrators,* at 147 ("However, with nonprobability samples, statistical theory cannot be applied to

make these estimates or to evaluate their accuracy. The adequacy of the nonprobability sample can be evaluated only by subjective means; no mathematical evaluation is possible.").

I examined whether the sample of selections used to calculate the "benchmarks" are in fact representative of the larger population of 49,622 selections in two ways. First, I simply compared the jobs represented by the 1,605 internal selections contained in the applicant data from the joint database to the 39,548 selections for which there was no applicant data in the joint database. (This simple comparison is provided in Attachment 4 in a table). The comparison shows that for a large majority of jobs filled via an internal selection there are few, if any, selections for the same job in the sample underlying the estimated benchmark.

Second, I examined whether the distribution of selections across the different divisions and unions within each "Craft Group" (defined in footnote 1) is the same for the sample of 6,193 applicant flow selections as it is for the larger population of the 49,622 selections. The similarity of these two distributions can be tested through formal statistical methods, which I used to assess whether any differences between the two distributions were statistically significant.

In Tables 4-5 below, I compare the 6,193 total selections in the applicant flow data to the 10,074 external selections (i.e., hires) identified in the employee

history data. In Tables 6-7 below, I compare the 1,605 internal selections in the applicant flow data to the 39,548 internal selections identified in the employee history data.[6] The areas highlighted in red show statistically significant differences in the pair-wise distributions for the particular union or division within each Craft Group.[7] I also report the test of whether the overall distributions are the same. The prevalence of red and the rejection of the hypothesis of equal overall distributions in every case indicate that the sample is not representative of the larger population for union or division. The comparison of the red highlighted areas (pair-wise distribution not representative) to the areas not highlighted in red (pair-wise distribution representative) provides visual evidence that the distribution in the sample of selections is not representative of the distribution in the population. I conclude that the sample is not representative of the larger population.[8]

[6] Of the 1,605 internal selections in the applicant flow data, 474 are in the "Shop Crafts," 151 are in the "Engineering Crafts," 488 are in the "Operating and Police Crafts," and 492 are in the "Clerical and On-Board Services Craft."

[7] The red shading is based on a series of two-by-two Chi-square tests that compare the percentages of each distribution in a given union or division.

[8] The analysis considered selections identified by the applicant data contained in the joint database that could be matched to the history data for purposes of assigning job and union (division was present in the applicant data). 1,262 selections could not be matched to the history data. However, I also conducted the statistical tests after imputing values to the unmatched selections in the way most favorable to Drs. Bradley and Fox. Thus, I imputed the values in a way designed to minimize differences in the distributions, which would help make the sample more representative, but even with these most favorable assumptions the distributions are statistically significantly different.

**Table 4. The Selections in the Applicant Flow Data Are Not Representative by Division of the External Selections in the Employee History File - Bradley/Fox Table 2**

| | Shop | | Engineering | | Operating | | Clerical/On-Board | |
|---|---|---|---|---|---|---|---|---|
| **Division** | **Applicant** | **History** | **Applicant** | **History** | **Applicant** | **History** | **Applicant** | **History** |
| Boston | 43.6% | 56.4% | 14.5% | 85.5% | 84.5% | 15.5% | 55.6% | 44.4% |
| Chicago | 24.2% | 75.8% | 17.5% | 82.5% | 90.0% | 10.0% | 11.0% | 89.0% |
| Los Angeles | 50.2% | 49.8% | 19.3% | 80.7% | 98.3% | 1.7% | 40.4% | 59.6% |
| New York | 53.6% | 46.4% | 68.4% | 31.6% | 84.8% | 15.2% | 47.5% | 52.5% |
| Philadelphia | 8.2% | 91.8% | 40.2% | 59.8% | 3.7% | 96.3% | 28.9% | 71.1% |
| Washington, DC | 26.5% | 73.5% | 16.3% | 83.7% | 86.4% | 13.6% | 23.9% | 76.1% |
| Total | 38.6% | 61.4% | 39.3% | 60.7% | 41.5% | 58.5% | 30.5% | 69.5% |
| Count | 1,716 | 2,733 | 389 | 602 | 1,324 | 1,867 | 2,134 | 4,872 |
| Test of Common Distribution (p-value) | <.001 | | <.001 | | <.001 | | <.001 | |

**Table 5. The Selections in the Applicant Flow Data Are Not Representative by Union of the External Selections in the Employee History File - Bradley/Fox Table 2**

**Shop**

| Union | Applicant | History |
|---|---|---|
| IAM | 37.9% | 62.1% |
| IBB | 15.0% | 85.0% |
| IBEW | 31.4% | 68.6% |
| JCC | 27.8% | 72.2% |
| NCFO / SEIU | 28.0% | 72.0% |
| SMWIA | 28.6% | 71.4% |
| TCU ARASA MECH | 77.5% | 22.5% |
| Total | 31.3% | 68.7% |
| Count | 1,247 | 2,733 |
| Test of Common Distribution (p-value) | <.001 | |

**Operating**

| Union | Applicant | History |
|---|---|---|
| ATDA | 43.9% | 56.1% |
| BLET (NE) | 83.0% | 17.0% |
| BLET (OFF) | 48.7% | 51.3% |
| FOP | 32.9% | 67.1% |
| UTU (NE) | 22.6% | 77.4% |
| UTU (OFF) | 57.7% | 42.3% |
| UTU (YARD) | 65.6% | 34.4% |
| Total | 39.1% | 60.9% |
| Count | 1,199 | 1,867 |
| Test of Common Distribution (p-value) | <.001 | |

**Engineering**

| Union | Applicant | History |
|---|---|---|
| BMWE (NE) | 100.0% | 0.0% |
| BMWE (OFF) | 7.2% | 92.8% |
| BRS (N) | 61.3% | 38.7% |
| BRS (S/W) | 21.4% | 78.6% |
| TCU ARASA MW | 88.7% | 11.3% |
| Total | 33.6% | 66.4% |
| Count | 304 | 602 |
| Test of Common Distribution (p-value) | <.001 | |

**Clerical/On-Board**

| Union | Applicant | History |
|---|---|---|
| ASWC | 33.4% | 66.6% |
| TCU (NE) | 25.4% | 74.6% |
| TCU (OFF) | 25.2% | 74.8% |
| TCU (TOWER) | 41.0% | 59.0% |
| TCU ARASA OBS | 82.1% | 17.9% |
| Total | 30.0% | 70.0% |
| Count | 2,091 | 4,872 |
| Test of Common Distribution (p-value) | <.001 | |

For the internal selections:

**Table 6. The Internal Selections in the Applicant Flow Data Are Not Representative by Division of the Internal Selections in the Employee History File - Bradley/Fox Table 3**

| | Shop | | Engineering | | Operating | | Clerical/On-Board | |
|---|---|---|---|---|---|---|---|---|
| **Division** | **Applicant** | **History** | **Applicant** | **History** | **Applicant** | **History** | **Applicant** | **History** |
| Boston | 9.0% | 91.0% | 0.9% | 99.1% | 33.2% | 66.8% | 5.7% | 94.3% |
| Chicago | 2.2% | 97.8% | 1.9% | 98.1% | 36.9% | 63.1% | 1.4% | 98.6% |
| Los Angeles | 14.1% | 85.9% | 2.9% | 97.1% | 64.0% | 36.0% | 2.7% | 97.3% |
| New York | 12.8% | 87.2% | 9.5% | 90.5% | 28.9% | 71.1% | 6.6% | 93.4% |
| Philadelphia | 0.6% | 99.4% | 2.1% | 97.9% | 0.5% | 99.5% | 1.7% | 98.3% |
| Washington, DC | 2.2% | 97.8% | 2.2% | 97.8% | 33.3% | 66.7% | 1.5% | 98.5% |
| Total | 4.9% | 95.1% | 3.5% | 96.5% | 5.0% | 95.0% | 2.7% | 97.3% |
| Count | 462 | 8,954 | 151 | 4,113 | 482 | 9,135 | 478 | 17,346 |
| Test of Common Distribution (p-value) | <.001 | | <.001 | | <.001 | | <.001 | |

**Table 7. The Internal Selections in the Applicant Flow Data Are Not Representative by Union of the Internal Selections in the Employee History File - Bradley/Fox Table 3**

| Shop | | | Operating | | |
|---|---|---|---|---|---|
| **Union** | **Applicant** | **History** | **Union** | **Applicant** | **History** |
| IAM | 2.2% | 97.8% | ATDA | 2.7% | 97.3% |
| IBB | 4.8% | 95.2% | BLET (NE) | 16.3% | 83.7% |
| IBEW | 1.8% | 98.2% | BLET (OFF) | 6.6% | 93.4% |
| JCC | 2.5% | 97.5% | FOP | 3.6% | 96.4% |
| NCFO / SEIU | 4.5% | 95.5% | UTU (NE) | 2.5% | 97.5% |
| SMWIA | 1.8% | 98.2% | UTU (OFF) | 2.2% | 97.8% |
| TCU ARASA MECH | 13.1% | 86.9% | UTU (YARD) | 14.4% | 85.6% |
| Total | 3.2% | 96.8% | Total | 3.7% | 96.3% |
| Count | 298 | 8,954 | Count | 355 | 9,135 |
| Test of Common Distribution (p-value) | <.001 | | Test of Common Distribution (p-value) | <.001 | |

| Engineering | | | Clerical/On-Board | | |
|---|---|---|---|---|---|
| **Union** | **Applicant** | **History** | **Union** | **Applicant** | **History** |
| BMWE (NE) | 100.0% | 0.0% | ASWC | 1.1% | 98.9% |
| BMWE (OFF) | 0.4% | 99.6% | TCU (NE) | 1.5% | 98.5% |
| BRS (N) | 0.9% | 99.1% | TCU (OFF) | 2.0% | 98.0% |
| BRS (S/W) | 0.3% | 99.7% | TCU (TOWER) | 3.6% | 96.4% |
| TCU ARASA MW | 13.8% | 86.2% | TCU ARASA OBS | 7.8% | 92.2% |
| Total | 2.2% | 97.8% | Total | 1.7% | 98.3% |
| Count | 93 | 4,113 | Count | 299 | 17,346 |
| Test of Common Distribution (p-value) | <.001 | | Test of Common Distribution (p-value) | <.001 | |

Lastly, I reviewed Drs. Bradley and Fox's report in *Brown v. Nucor*, 576 F.3d 149 (4th Cir. 2009), the case cited in the BF Report as support for their extrapolation method used in this case. (BF Report at 11, n.19; Bradley Dep. Exh.

4). In that case, Drs. Bradley and Fox used data on applications submitted for 36 selections during the three-year "sample" period, from January 1, 2001 to December 9, 2003, to estimate benchmarks for 27 other selections during the 13-month "population" period, from December 9, 1999 to January 21, 2001. Thus, unlike in the present case, it appears that all relevant selections from the sample period were utilized. In addition, the employer identified the combined 63 selections as all for "similarly-situated" positions and, accordingly, there was some attempt to ensure that the sample selections were representative, *i.e.*, "similarly-situated," of the population to which the estimated benchmark would be applied. There is nothing inherently wrong in using a sample to estimate the benchmarks for comparison; the problem lies in using a sample (of convenience) that is not representative.

Because a sample of convenience is not designed to be representative, and therefore subject to the dangers noted above, there is a higher burden for establishing representativeness. Although Drs. Bradley and Fox may have relied on the employer's admission that the positions were "similarly-situated" in *Brown*, there is no such indication in this case. Further, Drs. Bradley and Fox did not report the results of any examination of representativeness in this case. As I demonstrated above, the sample used by Drs. Bradley and Fox to estimate the

benchmarks in this case is not representative of the target population, with the implication that the benchmarks are statistically unreliable.

As noted above, it is generally-accepted statistical practice to include a margin of error attached to any sample estimate of a population value. As well-documented in the literature, it is not possible to provide a reliable margin of error calculation with a non-representative convenience sample. Nevertheless, by using the convenience sample of 6,193 applicant flow data selections to estimate their benchmarks, Drs. Bradley and Fox are implicitly *assuming* that this sample is representative. Thus, margin of error calculations should be provided.

The margin of error provides important information about the precision of the benchmark estimates. It tells the reader how wide of a range is expected to include the true benchmark. A wider range implies less certainty about the true benchmark, and thus is consistent with a wider range of values for the resulting number of African American selections among the 49,622 selections, even if the selection process were completely neutral. The size of the standard error is a function of the size of the sample. The standard error will be larger when the size of the sample is smaller.[9]

[9] If "benchmarks" were calculated for each job and location, the standard errors of the "benchmark" estimates will become critically important. As noted above, the aggregation across jobs and locations makes the studies described in the BF Report useless for assessing whether

Returning to the second estimation problem facing Drs. Bradley and Fox, namely the comparison of the 49,622 selections with those expected to form the estimated benchmarks, the standard error for each benchmark should be included in the calculations in BF Tables 2-4.[10] The inclusion of these standard errors will unambiguously reduce the number of standard deviations reported in BF Tables 2-4. (Bradley Dep. 178).

Lastly, I can also demonstrate that the fact that the sample used by Drs. Bradley and Fox was unrepresentative led to an over-estimation of the benchmarks. I conducted a basic, alternative analysis that compares internal selections to a set of individuals in "feeder" positions. Recall from the descriptive statistics discussed in Section IIA that a large majority of the 39,548 internal selections not included in the applicant data in the joint database involved movements within the same union. There are six unions where the fraction of internal selections involving a within-union job change exceeds 85%.[11] The

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any particular decision-makers made discriminatory decisions or whether any particular selection criterion caused a disparate impact.

[10] Again, by using the benchmarks, Drs. Bradley and Fox must assume that the underlying sample is representative, or else the whole exercise is pointless. Thus, margin of error calculations should be reported and then included in these second step calculations. The inclusion of the error margin for the benchmarks affects the number of standard deviations calculated for the difference between expected African American selections and the (estimated) benchmarks in BF Tables 2-4.

[11] For the reasons discussed in this report, I do not agree with Dr. Bradley that if employee job changes typically are within a particular organizational structure such as a union, then aggregation across all selections in that structure is appropriate.

within-union internal selections in these six unions together constitute 43% of the 39,548 internal selections in BF Table 3.

For this illustration, I used the employees in a union in a given year as a "feeder pool" of individuals for the selections into the jobs in that same union and year. I restricted the selections considered to those that involve a within-union job change. The race composition of these union-by-year "feeder pools" was derived from the data underlying BF Figure 1. I compared the race composition of the selections in each of these unions for each of the years 1996-2008 to the race composition from the BF data for the same union and year. I then aggregated these comparisons across the years for each union.

**Table 8. Illustration of a Comparison of Within-Union Selections to "Feeder Pools" Defined by Union and Year**

| Union | Total Selections | African American Selections | Expected African American Selections | Actual Minus Expected | Number of Standard Deviations | Percent of Selections Within Union |
|---|---|---|---|---|---|---|
| ASWC | 5,390 | 2,593 | 2,755.8 | -162.8 | -5.35 | 94.3% |
| BMWE (OFF) | 1,513 | 174 | 186.5 | -12.5 | -1.14 | 96.0% |
| BRS (S/W) | 1,644 | 306 | 291.7 | 14.3 | 1.06 | 93.3% |
| FOP | 302 | 68 | 75.1 | -7.1 | -1.15 | 94.4% |
| IBEW | 2,109 | 413 | 396.8 | 16.2 | 0.96 | 85.9% |
| TCU (OFF) | 6,040 | 2,274 | 1,921.1 | 352.9 | 10.45 | 91.4% |
| **Total** | **16,998** | **5,828** | **5,627.0** | **201.0** | **3.87** | **92.2%** |

Table 8 reports the results of these "feeder pool" comparisons. For four of the unions, the African American selections are not statistically different from the

number expected based on the union-by-year "feeder pools." For selections in the ASWC union, the difference is negative and statistically significant. For selections in the TCU (Off-Corridor) union, the difference is positive and statistically significant. In the aggregate across these unions, there is a statistically significant "surplus" of 201 selections of African Americans.

This example by no means substitutes for a proper study outlined in Section V, of the alleged disparate impact of a specific selection criterion for a specific job or of alleged disparate treatment by a specific decision-maker. However, it illustrates alternative "bottom line" type calculations using "feeder pools" derived for the same unions and years as the selections to which they are compared. It also illustrates the sensitivity of any "bottom line" results to the construction of the benchmarks for comparison. If the benchmarks are unreliable, or even if their reliability is unknowable, then the resulting calculations and conclusions are also unreliable. These results demonstrate that the unreliable benchmarks used by Drs. Bradley and Fox made a tremendous difference even in their improper "bottom line" analysis. These results also show that there is no consistent pattern of disparities against African Americans as to internal selections.

### D. The "Bottom Line" Analysis Underestimates the Relative Selection of African Americans by Not Considering All Selections During the Time Period

The BF Report analyzes 6,193 selections using applicant flow data. These selections, which include hires of external candidates as well as selections of internal candidates, comprise only about 36% of all selections from July 2003 to December 2008. Thus, many additional selections are not reflected in the joint database's applicant flow data. Moreover, applicants may apply to multiple positions, decline one position in favor of another, or choose not to interview for every position to which they apply.[12] As a result, it is possible that a particular candidate who was unsuccessful with regard to a selection that is listed in the applicant data might have been successful when the selection was not contained in the applicant data. Table 9 provides information on the success of the candidates in both scenarios during the same time period the BF report analyzes.

[12] These are possible reasons for the non-selection specifically identified in the applicant flow data.

**Table 9. Selection of Applicant Flow Candidates in the BF Applicant Flow Data AND in the BF Employee History File**

| Group | All Candidates | Selections in the Applicant Flow Data | Selections[b] from Employee History File | All Selections | # SD |
|---|---|---|---|---|---|
| All Candidates in Applicant Flow Data | | | | | |
| Number | 19,495 | 6,193 | 4,414 | 10,607 | |
| % African American | 40.8% | 37.7% | 43.2% | 40.0% | 1.26 |
| Internal[a] Candidates in Applicant Flow Data | | | | | |
| Number | 4,347 | 1,605 | 3,005 | 4,610 | |
| % African American | 40.3% | 35.8% | 44.8% | 41.7% | 1.29 |

[a] "Internal" does not distinguish current and former employees.

[b]Selections from the BF employee history file in July 2003 - December 2008.

There are 19,495 different candidates in the applicant flow data examined in the BF Report, of which 7,947 (40.8%) are African Americans. Restricting attention to the selections captured in the applicant data, 37.7% are of African Americans.[13] By contrast, out of the same 19,495 candidates, 43.2% of the selections in the applicant flow data are of African Americans. For all selections from July 2003 to December 2008, whether included in the applicant data or not, 40.0% were of African Americans. This percentage is not statistically significantly different than the 40.8% of African Americans contained in the candidate data.

[13] I calculate that there are 2,481 individuals who are ever coded as African American in the applicant flow data analyzed in the BF Report who are never in a pool in which they are not selected and from which a non-African American is selected.

During this same period according to BF Figure 1, African Americans comprised approximately 30% of the agreement workforce, which is about ten percentage points lower than the share of all selections received by the African Americans in the applicant flow data.

The second row of Table 9 provides the same analysis restricted to the 4,347 internal candidates contained in the applicant data. There, African Americans comprise 40.3% of the internal candidates and receive 41.7% of all selections during this period – *i.e.*, those both listed in the applicant data and those which were not. The 41.7% of selections received by African Americans is not statistically significantly different than the 40.3% of all candidates who are African Americans.

In sum, the applicant analysis described in the BF Report considered only a subset of the selections of these candidates during the time period examined. The simple comparisons I discussed above show that the overall relative success of the African American candidates listed in the applicant data appears to be similar to their representation in the applicant data. The inclusion in the applicant flow data of only a fraction of all selections from July 2003 to December 2008 casts doubt on the reliability of the analysis reported in BF Table 1.

A final point about the BF Report's "bottom line" analysis of applicant data: the study ignores individuals with unknown race. In this case, that is no small fraction because 17,692 applicants (of which 58 were actually selected) were excluded from the analysis because they declined to self-disclose their race. This figure represents more than 34% of all applicants in the joint database and is a greater fraction than any other single race/ethnicity group. Given the sizable proportion of the applicants without race information, it would be standard statistical practice to report those assumptions and to discuss how it is simply impossible to tell whether the results are reliable because of the extensive amount of missing race information. The BF Report, however, does not mention the prevalence of individuals with unknown race and provides no information on the sensitivity of the results to different assumptions about the true racial composition of applicants with unknown race.

### E. Movement Patterns Indicate that Many of the Internal Selections Are Not Promotions

Inspection of the 39,548 internal selections analyzed in BF Table 3 suggests that these job changes are not properly described as promotions. Table 10 provides the eight pairs of jobs with the largest number of selections labeled "promotions" in BF Table 3. For six of these pairs of jobs, there are a large number of movements that would essentially be demotions if the opposite move were deemed

a promotion. For example, there are 487 movements from job SF114 (a coach train attendant position) to job SF113 (a sleeper train attendant position), but at the same time, there are also 319 movements from job SF113 to job SF114. In half of these six pairs or jobs listed in Table 10, the "demotion" rate is 88% or higher and it is above 60% in the other three. By contrast, there are two pairs, from job SF123 (on-board services trainee position) to SF114 (a coach train attendant position) and from job XY100 (a trainee position) to job C8902 (a coach cleaner position), with regard to which the moves occur almost exclusively in only one direction. From the patterns, it appears that only these latter two job pairs could possibly be described as promotions, which may not be competitive – the others likely should be considered transfers.

**Table 10. Apparent Anomalies in the "Promotions" Identified by Drs. Bradley & Fox**

**A. Examples**

| Job Code Change Identified as "Promotion" | Number of "Promotions" | Number of Promotions Identified with the Reverse Job Code Change | Ratio |
|---|---|---|---|
| SF114 to SF113 | 487 | 319 | 65.5% |
| C8100 to C8114 | 427 | 377 | 88.3% |
| TE101 to TE100 | 326 | 318 | 97.5% |
| SF123 to SF114 | 310 | 2 | 0.6% |
| E3100 to E3155 | 281 | 176 | 62.6% |
| SF134 to SF132 | 276 | 178 | 64.5% |
| XY100 to C8902 | 257 | 0 | 0.0% |
| TC101 to TC100 | 253 | 237 | 93.7% |

**B. Summary**

| Category | Total | % of Total |
|---|---|---|
| All "Promotions" identified | 39,548 | 100.00% |
| "Promotions" that have a "reverse" | 29,890 | 75.6% |
| "Promotions" with same employee moving from Job A to Job B and back to Job A (a partial subset of the "Promotions" that have a "reverse" category above) | 9,593 | 24.3% |

The lower portion of the table shows that at least some "demotion" job changes exist for 29,890 (75.6%) of the total 39,548 job changes analyzed. As a special case, there are 9,593 job changes that involve the same employee first moving from Job A to Job B and subsequently moving from Job B back to Job A. These job "cycles" comprise almost one-quarter of the job changes analyzed. This table suggests that a good many of the internal selections identified for analysis by Drs. Bradley and Fox are unlikely to be what most employees would consider a

promotion.[14] The table also suggests a considerable degree of complexity in the data patterns that requires a detailed examination of the data, CBAs and testimony regarding the expected selection criteria and procedures. Statistical studies that were not tailored to address this complexity would provide misleading and unreliable results. The studies conducted by Drs. Bradley and Fox simply ignored these issues.

## VI. REASONABLE STUDIES OF PARTICULAR SELECTION CRITERIA AND DECISIONS OF PARTICULAR DECISION-MAKERS

### A. Particular Selection Criteria or Procedures

#### 1. Selections

I agree with Dr. Bradley's testimony that an appropriate analysis of an employment test would assess the individuals who took the same test and whether they passed or failed. (Bradley Dep. 111-115, 208). I also agree that aggregating data across different tests is problematic (Bradley Dep. 111), because it would be impossible to say that one employment test caused a disparate impact based on a study that compared results of individuals who were given different tests. Similarly, to conduct a reasonable study of a particular selection criterion, the

[14] It is worth noting that, the larger number of "selections" identified for analysis in BF Tables 2-4, the larger will be the problems that make the reported results unreliable. This is because Drs. Bradley and Fox conducted highly aggregated analyses where the large numbers of selections across different jobs, locations, unions and decision-makers will amplify the inaccuracy of the results. Thus, an artificially large set of selections compared to benchmarks that are artificially too high because of an unrepresentative sample combine to make the analyses doubly unreliable.

comparison must be made between otherwise qualified individuals who are subject to that selection criterion.

Thus, the analysis of a particular selection criterion would study individuals considered for the same job. Because there may have been more than one selection criterion involved in a particular job, one also would have to identify the candidates who passed and failed for that particular criterion – or, if it was not a pass/fail standard, one would need to correlate the criterion with the probability of selection through a regression study. The regression analysis would have to control for other factors affecting the probability of selection to isolate the effect of the particular criterion being studied. Also, if selection criteria vary over time for the same job, then the regression analysis would need to be separated by time period.

For example, suppose that a typing test is required for an R&I (reservation and information) Clerk job and previous customer service experience also is a preferred qualification for this job. If the typing test is challenged, then a comparison of the passing rates of otherwise minimally qualified African Americans and whites among the candidates for each R&I Clerk job opening would be necessary to assess whether this criterion has disparate impact. A statistically significantly lower passing rate for African Americans would indicate the typing test has disparate impact in the selection of R&I Clerks. Alternatively,

if the customer service preference is challenged, the selection rates of African Americans and whites who meet the minimum qualifications, including passing the typing test, would need to be compared in a regression that controls for the amount of customer service experience and other qualifications considered by decision-makers. If the control for customer service experience statistically significantly reduces the relative selection rate of African Americans after controlling for other qualifications considered by decision-makers, then customer service would have disparate impact in the selection of R&I Clerks.

As this example demonstrates, it is necessary to isolate the specific criterion being challenged and to examine only those candidates to whom the criterion is applied in order to assess disparate impact. Statistical calculations that aggregate across jobs and/or locations where different criteria are being applied cannot provide reliable information about whether the employment opportunities of specific unsuccessful candidates for one job were adversely affected by the application of any specific selection criterion. In particular, a study that aggregates across different jobs with different selection criteria, but includes a control for job (i.e., an indicator variable for each job), does not provide job-or selection-specific information on selection disparities and, therefore, is an unreliable method for assessing disparate impact. Further, the analyses must control for other

qualifications and selection criteria to determine whether the challenged criteria caused a disparate impact.

Such an approach would have led Drs. Bradley and Fox to conduct substantially different studies – with substantially different results. First, the results would have to be calculated by job and focused on a specific, challenged selection criterion in order to provide meaningful conclusions about disparate impact. Second, the detailed statistics embedded in the BF Report's aggregated analysis shows a lack of a pattern of consistently adverse results, which in turn suggests that such a pattern is unlikely to emerge from proper studies controlling for relevant factors and focusing on a specific selection criterion for a specific job.

**2. Discipline**

As with selections, a reasonable study of the administration of employee discipline would involve comparisons of employees who are similarly at risk of being disciplined and are subject to the same discipline criterion. Discipline criteria vary for different rule violations. In general, the analysis would focus on the application of a specific discipline criterion to a specific job. The risk of a rule violation will vary depending on the duties and responsibilities of the job, such as possibilities for theft in jobs involving financial transactions or with access to valuable equipment or supplies.

Thus the analysis of a particular discipline criterion (*i.e.*, breaking a particular rule) would study individuals similarly at risk of a rule violation and subject to the same criterion. Comparisons by job, and perhaps by location, seem an appropriate starting point. As with selection criteria, if discipline criteria vary over time, then studies should be separated by time period. If there were factors, such as seniority, that affected the risk of a violation, then a regression analysis would need to be used to control for such factor(s). If the discipline rate of African Americans were found to be statistically significantly higher, then one could conclude that that a particular rule had a disparate impact in that particular job. As such, the legitimacy of the particular work rule causing the disparate impact would be at issue.

For example, suppose that a particular operating rule is challenged as it applies to Assistant Conductors and suppose that proper operations improve with experience. Here, the violation rates of African American and white Assistant Conductors would need to be compared in a regression that controls for time as an Assistant Conductor (and possibly time in other On-Board Services positions).[15] The regression would estimate the difference in the probability of receiving a violation of this rule for African Americans compared to whites, controlling for

[15] Even if a specific operating rule applies to all On-Board Services employees, violation risk is likely to vary across jobs due to different expectations or duties. A study of such a rule should not aggregate across these jobs.

time in the position. A statistically significant and negative difference would indicate that this particular rule has a disparate on Assistant Conductors.

As this example demonstrates, it is necessary to isolate the specific rule being challenged and to examine only those employees to whom the rule is similarly applied, while controlling for any other factors that affect violation risk in order to assess disparate impact. Such an approach would have led to substantially different results than those reported by Drs. Bradley and Fox. First, the results would have to be calculated by job and focused on a specific rule in order to provide meaningful conclusions about disparate impact. Second, the lack of a pattern of consistently adverse results in Drs. Bradley and Fox's detailed results embedded in the aggregated disciplinary analysis suggests that such a pattern is unlikely to emerge from a series of proper studies controlling for relevant factors and focused on a specific discipline rule for a specific job.

### B. **Decisions of a Particular Decision-Maker**

#### 1. **Selections**

A reasonable study of whether the selection decisions of a particular decision-maker show adverse outcomes for African Americans similarly situated to whites would focus on the decisions of each particular decision-maker. Just as aggregating data across different tests makes it impossible to say that a particular employment test caused a disparate impact, so too is it impossible to conclude that

a study comparing the selection outcomes of different decision-makers shows that a particular decision-maker made discriminatory decisions. With local decision-making, selections for the same job in the same location during a reasonable span of time likely would be made by the same decision-maker. The study should determine whether, among similarly qualified candidates, the selection rate of African Americans is statistically significantly lower than for whites. To the extent that relevant qualifications (which may include qualifications and selection criteria beyond the minimally necessary for the position) are not pass/fail, a regression analysis would need to be used to control for such factors.

For example, suppose that the decisions made by a hiring manager who selected On-Board Service Trainees in Los Angeles are challenged. A regression analysis comparing the African American and white minimally qualified candidates considered by this manager that controls for the amount of previous customer service experience (and other relevant factors) would be required. If this regression yields an estimated probability of selection for African Americans that is statistically significantly lower than the probability of selection for whites, then there is evidence of a disparity in this decision-maker's hiring of On-Board Service Trainees.

As this example demonstrates, it is necessary to isolate the specific decision-maker whose decisions are challenged and to examine only those candidates

reviewed by this decision-maker in order to assess whether his or her selection decisions were discriminatory. Statistical calculations that aggregate across numerous decision-makers cannot provide reliable information about whether a particular decision-maker made decisions that were systematically adverse to African Americans. In particular, a study that aggregates across different decision-makers, but includes a control for decision-maker (*i.e.*, an indicator variable for each job-by-location), does not provide decision-maker-specific information on selection disparities, and, therefore, is an unreliable method for assessing disparate treatment.

Such an approach would have led Drs. Bradley and Fox to report substantially different results. First, the results would have to be calculated by job and location in order to provide meaningful conclusions about particular decision-makers. Second, the lack of a pattern of consistently adverse results in the detailed results embedded in the aggregate analyses conducted by Drs. Bradley and Fox suggests that such a pattern is unlikely to emerge from a series of proper studies controlling for relevant factors and each focused on a specific decision-maker.

2. **Discipline**

A reasonable study of particular a decision-maker with regard to discipline would attempt to assess whether the decision-maker administered discipline differently to African Americans than to whites. This difference could be either in

charging a violation to African Americans in situations where whites would not be charged, or in administering a harsher penalty to African Americans than to whites for the same rule violation(s). The focus on job and location within a reasonable time span would be a sensible approach to isolating specific decision-makers. Comparing the discipline rates by rule among equally at risk African American and white employees supervised by this decision-maker would provide evidence of possible disparate treatment with regard to charging violations. A regression-based comparison of the discipline resolution outcomes for a specific decision-maker among the employees who violated the same rule that also controls for past discipline and other relevant factors would provide evidence of possible disparate treatment with regard to resolution of disciplinary charges.[16]

For example, suppose that the manager of Ticket Agents in Washington, D.C. is alleged to assess more violations for tardiness to African Americans than to whites. A comparison of the relative violation rates for tardiness between African Americans and whites supervised by this manager, ideally controlling for time-punch data, would be required. If the estimate difference in the probability of receiving a violation for African Americans compared to whites is statistically significant and positive, then this would provide evidence of a disparity in the

[16] In measuring past discipline activity it would be reasonable to exclude past discipline actions from the same decision-maker upon whom the analysis is focused, unless there is verification that the assigned discipline was otherwise legitimate.

assessment of tardiness violations to Ticket Agents by this manager. If there are no time-punch data available, however, then it is not possible to distinguish whether any such disparity is due to a difference in assessing a "tardy" for the same arrival times or whether there is a difference in arrival times.

As this example demonstrates, it is necessary to isolate the specific individual whose discipline decisions are challenged and to examine only those employees subject to this decision-maker's supervision to assess the statistical evidence of disparate treatment. Statistical calculations that aggregate across numerous decision-makers cannot provide evidence about whether a particular decision-maker administered discipline more frequently or more harshly to African Americans.

Such a reasonable approach would have led Drs. Bradley and Fox to substantially different results. First, the results would have to be calculated by decision-maker in order to provide meaningful conclusions about disparate treatment. Second, the lack of a pattern of consistent adverse results in the detailed results embedded in the aggregated analyses of disciplinary resolutions conducted by Drs. Bradley and Fox suggests that such a pattern is unlikely to emerge from a series of proper studies controlling for relevant factors affecting discipline risk and focused on a specific decision-maker.

### C. **The Job Files and Other Data and Information Provide Sufficient Information to Develop These Reasonable Studies**

The studies I described above address two questions: (1) whether a specific selection or disciplinary criterion caused a disparate impact on African Americans; and (2) whether particular decision-makers made discriminatory decisions. Of course, these questions cannot be addressed without allegations that identify the specific selection criteria and/or decision-maker(s) at issue. With sufficiently specific allegations to focus the analysis, attention can then turn to developing the necessary data sources. Without such allegations to define the question, conducting a proper study is impossible.

Starting with a complaint that a given plaintiff did not receive a particular promotion at a particular time (or over a specified period) due to a specific, allegedly invalid selection criterion leads to investigation of this employee's employment history. This investigation is expanded to include other employees who appear to be peers of this plaintiff, with subsequent expansion to other employees who received or appear to have been in a position to receive the referenced promotion, and thus were likely to be affected by the challenged selection criterion. Thus, groups of employees in likely "feeder" jobs for the promotion in question can be developed as data. In addition to the employee history information, there are detailed (daily) payroll records that identify rates of pay, jobs worked, and work locations contained in the joint database. The payroll

information can be combined with the employee history information to help identify job changes that are both relatively permanent and involve an increase in pay. In addition to the applicant flow data, there are job files that contain detailed candidate records related to the selections, including the requisitions describing the selection criteria, candidates' qualifications, interview notes and rating sheets, if any. (*See* discussion in Section II(C), above).

Once the data has been developed to generate a sufficient sample of promotions to the job in question and thereby a sufficient sample of applications of the referenced selection criterion, attention turns to developing data on the factors that affect selection and should be controlled in a disparate impact analysis. The job files can include a position description, the number and identity of those selected, and detailed interview notes on candidates as well as a candidate roster of those not interviewed. Resume information for outside candidates, if any, also may be in the job files. The union bid sheets from internal candidates, if any, may be included for a position that was "bulletined" or posted according to the governing CBA. In selections with internal candidates, particularly those with bid sheets, reference can be made to the appropriate CBA to assess the role of seniority in filling a bulletined position or, if relevant, the identification that a position was exempted from being bulletined. The data also may include information regarding the education and training of employees relevant to the referenced promotion.

After using all of the above sources to generate a well-developed set of data on the selection outcomes, the relevant control factors and the race/ethnicity of the employees in the job affected by the selection criterion that is challenged, an analysis of potential disparate impact can proceed. A separate analysis is required for each specific selection criterion that is challenged.

The discussion above was couched in terms of conducting an analysis to assess the potential disparate impact of a specific selection criterion. In the case of an allegation of intentional discriminatory decisions, *i.e.*, those made by a particular decision-maker(s), the development of the data sources would be similar. An important difference in the required analysis, however, would be focusing on the decision-maker rather than on the selection criterion. To this end, the job files, which may contain the identities of the interview panel for each selection, would likely be a valuable data source. Alternatively, focus on selections for a specific job in a specific location and during a certain time period may be a reasonable proxy for a specific decision-maker.

In the case of specific allegations about discipline awards and resolution, either with regard to a particular work rule or a particular decision-maker, the data development tasks may be somewhat easier. The charges of rule violations and the resulting resolutions, if any, appear to be fairly well-identified in the joint database. The data development must still facilitate comparisons of employees who are

similarly at-risk for the violating the challenged rule or affected by the same decision-maker, which means reliance on the employee history file for job and location information. The daily payroll data might also play a role for cases of absenteeism or tardiness, to the extent that individuals are not paid when they do not work. Finally, it is necessary to develop detailed histories of rule violation charges and the associated resolution from the existing data for all employees at risk of violating the rule for the specific rule that is challenged.

In sum, a proper statistical study of possible disparate impact or of potential discriminatory decisions must begin with a research question regarding a specific challenged selection criterion or a specific decision-maker. This is required to guide the development of the necessary data and the design of the relevant statistical comparisons. Subsequent data development must assess all available sources in order to gather the necessary information. The statistical analysis uses these data to assess whether there is any statistically significant disparity associated with the challenged criterion or challenged decision-maker. If these steps for a proper study are not taken, then the study does not provide a basis for reliable conclusions regarding the disparate impact of a specific criterion or the disparate treatment by a specific decision-maker.

I have not felt obligated to conduct the proper study that I outlined above for Drs. Bradley and Fox. I have, however, reviewed a large amount of the data and

information that is available and would allow for such a study, including: job files; job descriptions; collective bargaining agreements; the employee history, payroll, applicant flow, education, training and other data in the Joint Data Base; the complaint; declarations of plaintiffs and others; and deposition transcripts of managers and company representatives. In my review of the BF Report and its supporting material I saw no evidence of any such detailed review with the result that the BF Report provides only a rather mechanical and aggregated set of statistical calculations of a "bottom line" that are unreliable for the reasons discussed above and that ignore many important details in the available record. In the peer review process in academic research, a submission of scholarly work that does not meet minimum requirements does not merit a response that does the scholar's work for him or her.

For all of these reasons, I have reached the conclusions provided in Section I of this Report.

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# ATTACHMENT 1

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Dr. Deere has a Ph.D. in economics from the Massachusetts Institute of Technology. In 2007, Dr. Deere retired from the tenured faculty of the Department of Economics at Texas A&M University, where he taught courses in labor economics, economic principles and public finance. While at Texas A&M University, he also taught graduate statistics in, and was Associate Director of the George Bush School of Government and Public Service. Dr. Deere also is Senior Economist for Unicon Research Corporation, where he served as Vice President from 2001-2004. Dr. Deere's research has concentrated primarily on labor markets and public policy affecting wages and employment. His research has been published in numerous professional peer-reviewed journals, including the *American Economic Review*, the *Journal of Political Economy*, the *Quarterly Journal of Economics*, and the *Journal of Labor Economics*.

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"Subscription to Workers' Compensation in Texas."

"Heads I Win, Tails You Lose: The Economic Impact of the Texas Lottery on Demographic Groups," with J. Dyer.

"The Cross Sectional Impact of Unemployment Insurance on Layoffs, Employment, and Wages," with J.A. Miron.

"Part-Time Employment," with S.G. Bronars.

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# Donald R. Deere, Ph.D.

## SELECTED WORKING PAPERS (continued)

"Union Organizing Activity and Union Membership 1973-1988," with S.G. Bronars.

"Union Membership, Union Organizing Activity, and the Union Wage Differential 1973-1988," with S.G. Bronars.

"Competitive Incentives: School Accountability and Student Outcomes in Texas," with W.E. Strayer.

"Climbing the Economic Ladder," with A.J. Rettenmaier.

## HONORS AND AWARDS

**Fellowships:**

National Science Foundation Graduate Fellowship.
Rotary Foundation Graduate Fellowship.
Sloan Foundation Dissertation Research Fellowship.

Research Grants/Contracts:
Grant from the Smith Richardson Foundation, "Social Security, Wages and Retirement," 1995.

Four Contracts with the Texas Workers' Compensation Research Center, "Nonsubscription to the Texas Workers' Compensation System," 1992-1995.

Grant from the Texas Advanced Research Program, "Unionization, Profitability, and Firm Behavior," 1988.

Grant from the U.S. Department of Health and Human Services, "Demand Variability, Structural Changes in the Labor Market and the Growth of Part-Time Employment," with S.G. Bronars, 1984.

**Peer Review:**

Professional Journals:

American Economic Review
Journal of Political Economy
Quarterly Journal of Economics
Journal of Labor Economics
Review of Economic Studies
Rand Journal of Economics
Review of Economics and Statistics
Economic Journal
Industrial Relations
Economic Inquiry
Industrial and Labor Relations Review
Industrial Relations
Journal of Labor Research

Grants Competition:

National Science Foundation

# ATTACHMENT 2

**List of Testimony Given by Donald Deere in the Past Four Years**

Esmeralda Hinojosa, et al. v. Knife River Corporation, et al.
Deposition: 03/29/12
Trial: 04/27/12
In the District Court of Washington, County Texas 335th Judicial District
Cause No. 34659

Jeanette Stone, et al. v. FedEx Home Delivery, et al.
Deposition: 08/19/11
In the 361st Judicial District Court, Brazos County, Texas
Cause No. 08-001967-CV-361

Larry Randall Powell, et al. v. The Dallas Morning News L.P., et al.
Deposition: 06/25/10
In the United States District Court Northern District of Texas, Dallas Division
Civil Action No. 3:06-CV-1960-BF-ECF

Seth Hudson v. William Woodard Black and Ashley T. Brode, D/B/A Dillo Disposal Services
Deposition: 07/27/09
In the District Court of Robertson County, Texas 82nd Judicial District
Cause No.08-12-18271-CV

OFCCP, United States Department of Labor, v. Southside Bank
Depostition: 05/02/09
United States Department of Labor Office of Administrative Law Judges
Case No. 2007-OFC-00005

Jarmon, et al. v. Davidson, Old American County Mutual, et al.
Deposition: 02/12/08
In the District Court of Johnson County, Texas 413th Judicial District
Cause No. 200600134

# ATTACHMENT 3

## Information Utilized

In preparing this report, I relied upon the information listed below.

- The expert report of Drs. Bradley and Fox
- Plaintiffs' Objections and Responses to Defendant's Request for Production Directed to Drs. Bradley and Fox
- Two (2) data disks provided by Drs. Bradley and Fox
- Thirteen (13) Compact Discs re: Parties' Joint Database
- Correspondence between parties re: Parties' Joint Database
- Exemplars of Job Description Documents
- Exemplars of Job Files
- Amtrak Collective Bargaining Agreements
- Index of Amtrak Collective Bargaining Agreements
- Plaintiffs' 4th Amended Complaint
- Plaintiffs' Motion and Memorandum in Support of Class Certification
- *Brown v. Nucor Corp.*, 576 F.3d 149 (4th Cir. 2009)
- Foreman, E.K. *Survey Sampling Principles*. 1991, New York: Dekker
- O'Sullivan, Elizabethann and Gary R. Rassel, Maureen Berner. *Research Methods for Public Administrators*, 5th Edition. 2008, Longman
- Levy, Paul S. & Lemeshow, Stanley. *Sampling of Populations*. 3rd Ed. 1999, New York: Wiley & Sons

- Index of Managers/Employees Depositions
- Index of 30(b)(6) Depositions
- Deposition Transcripts and Exhibits
    - Expert Deposition Transcripts and Exhibits
        - Bradley, Edwin
        - Finkelman, Jay
        - Fox, Liesl
        - Roth, Thomas
    - 30(b)(6) Deposition Transcripts and Exhibits
        - Bagley, Earl
        - Broadwater, Karen
        - Bullock, Lee
        - Campbell, Theodore (Volumes 1, 2, and 3)
        - Davidson, Sheila (Volumes 1 and 2)
        - Green, Lorraine (Volumes 1 and 2)
        - Hall, Gerri (Volumes 1, 2, and 3)
        - Loverson, Peter
        - Mallery, Gilbert
        - Marshall, Kevin (Volumes 1, 2, and 3)
        - Miller, LaVerne (Volumes 1 and 2)
        - O'Connell, Michael
        - Walker III, Edward
        - Woodcock, Charles
    - Consultant Deposition Transcripts and Exhibits
        - Blackwell, Annie
        - White, Charles
    - Declarant Deposition Transcripts and Exhibits
        - Alexander, Burnell
        - Bailey, Jr., Theodore
        - Boykin, Phillip

- Brunswick, Marcus
- Burditt, Raymond
- Carter, Kim McKay
- Carter, Thomas
- Carter, Vernon
- Clark, Daphne Pinkey
- Clipper, Christopher
- Felton, Sr., Alfred Norman
- Gillis, Kenneth
- Haley, Ivory
- Hamilton, Carolyn
- Haymer, Betty Jo
- Hutchinson, Wilson
- Johnson, Darrell
- Johnson, Harold
- Johnson, Wanda
- Jones, Alfred
- Ladson, Jane
- Landers, Castro
- Landry, Gilbert John
- Moore, Daisy
- Murdock, Ricky Kavansa
- Murphy, Timothy
- Price, Barry
- Richards, Brian
- Ridley-Jones, Lysa
- Robinson, Cheryl
- Ross, Ramona
- Rowlette, Wendy
- Saunders, Takeela
- Shepard, Donald Curtis
- Sparks, Kevin
- Thelwell, Bryant
- Watkins, Brian
- Williams, Ronnie
- Willis, Garner

- Manager/Employee Deposition Transcripts and Exhibits

  - Alderman, Ed

- Allan, Suzanne
- Allen, James Benton
- Anderson, Jeff
- Bello, Paul
- Bellotti, Louis
- Birckett, Sidney
- Blair, Barney
- Borman, Curt
- Boyce, Brian
- Brennan, Stephen
- Brown, Robin
- Brzezinski, Jim
- Callahan, Warren
- Campbell, Bernard Lee
- Commer, Louis Jay
- Conaty, William
- Cowan, David
- Daly, Edward
- Deming, Wayne
- DeVito, Joseph
- Drummond, James
- Duffy, Timothy
- Duncan, Jeff
- Felder, Stephen
- Forgione, John
- Fortune, Thomas
- Fowler, John
- Frank, Robert
- Gadbois, Richard
- Gallagher, Michael
- Gambrel, Carol
- Guilian, Valorie
- Gonzales, Robert
- Gordon, David
- Guerin, Thomas
- Hanna, Barbara
- Hardin, Robert
- Hart, Curtis
- Harvey, Caroline
- Hastings, William

- Hightower, Wanda
- Hinton, Travis
- Howland, Scott
- Huss, Kathryn
- Johnson, Deborah
- Kerins, Patricia
- Kiesling, David
- Koroma, Cynthia
- Kumpel, Claude
- Manger, Paul
- Marello, Alfonso
- Mason, Rich
- Mauck, Gary
- McClinton, Phyllis Ann
- McRae, DeQuincy
- Miller, John
- Miller, Timothy
- Murray, Darryl
- Nichols, David
- Niemi, Leo
- Olson, Robert
- Pavlakis, Stephanie
- Perez, Felix
- Pesce, Daryl
- Pingley, Zachary
- Porter, Paula
- Rae, Thomas
- Ray, Sarah
- Reid, Malva
- Reuter, Patrick
- Richmond, Earl
- Roberts, Dan
- Roeber, Fred
- Rose, Mark
- Roseen, John
- Saboury, Wilbert
- Schmitt, Robert
- Schneider, Richard
- Small, Daniel
- Underwood, Glen

- Villamor, Leonard
- Walls, Brenda
- Whitaker, Irene
- Williams, Richard
- Wilson, Jack
- Wood, Richard
- Zajic, Richard

# ATTACHMENT 4

| Table A1. Counts of Internal Selections from Applicant Flow and Vacancies (Shop Crafts) | | | |
|---|---|---|---|
| **Craft Group** | **Union/Truncated Job Code** | **Internal Applicants** | **Internal Vacancies** |
| I. SHOP | IAM : 00 | 12 | 330 |
| I. SHOP | IAM : 01 | 0 | 4 |
| I. SHOP | IAM : 12 | 0 | 134 |
| I. SHOP | IAM : 13 | 0 | 182 |
| I. SHOP | IAM : 14 | 0 | 1 |
| I. SHOP | IAM : 15 | 0 | 29 |
| I. SHOP | IAM : 16 | 1 | 99 |
| I. SHOP | IAM : 17 | 0 | 121 |
| I. SHOP | IAM : 18 | 2 | 10 |
| I. SHOP | IAM : 20 | 0 | 7 |
| I. SHOP | IAM : 21 | 2 | 61 |
| I. SHOP | IAM : 23 | 0 | 9 |
| I. SHOP | IAM : 33 | 0 | 12 |
| I. SHOP | IAM : 37 | 0 | 34 |
| I. SHOP | IAM : 38 | 0 | 1 |
| I. SHOP | IAM : 40 | 4 | 13 |
| I. SHOP | IAM : 41 | 3 | 40 |
| I. SHOP | IBB : 27 | 0 | 7 |
| I. SHOP | IBB : 33 | 0 | 3 |
| I. SHOP | IBB : 46 | 0 | 12 |
| I. SHOP | IBB : 56 | 0 | 16 |
| I. SHOP | IBB : 58 | 6 | 33 |
| I. SHOP | IBB : 59 | 0 | 41 |
| I. SHOP | IBB : 60 | 0 | 6 |
| I. SHOP | IBB : 61 | 0 | 1 |
| I. SHOP | IBEW : 00 | 27 | 683 |
| I. SHOP | IBEW : 01 | 3 | 10 |
| I. SHOP | IBEW : 06 | 0 | 1 |
| I. SHOP | IBEW : 08 | 0 | 1 |
| I. SHOP | IBEW : 12 | 0 | 99 |
| I. SHOP | IBEW : 14 | 0 | 77 |
| I. SHOP | IBEW : 15 | 0 | 23 |
| I. SHOP | IBEW : 16 | 0 | 8 |
| I. SHOP | IBEW : 17 | 0 | 2 |
| I. SHOP | IBEW : 18 | 0 | 2 |
| I. SHOP | IBEW : 20 | 0 | 7 |

| | | | |
|---|---|---|---|
| I. SHOP | IBEW : 21 | 0 | 6 |
| I. SHOP | IBEW : 22 | 0 | 1 |
| I. SHOP | IBEW : 23 | 0 | 8 |
| I. SHOP | IBEW : 24 | 0 | 5 |
| I. SHOP | IBEW : 26 | 0 | 1 |
| I. SHOP | IBEW : 27 | 0 | 1 |
| I. SHOP | IBEW : 28 | 7 | 178 |
| I. SHOP | IBEW : 30 | 0 | 20 |
| I. SHOP | IBEW : 39 | 1 | 6 |
| I. SHOP | IBEW : 43 | 0 | 28 |
| I. SHOP | IBEW : 44 | 1 | 51 |
| I. SHOP | IBEW : 45 | 0 | 13 |
| I. SHOP | IBEW : 46 | 0 | 4 |
| I. SHOP | IBEW : 48 | 0 | 17 |
| I. SHOP | IBEW : 51 | 1 | 3 |
| I. SHOP | IBEW : 53 | 0 | 5 |
| I. SHOP | IBEW : 54 | 0 | 21 |
| I. SHOP | IBEW : 55 | 0 | 336 |
| I. SHOP | IBEW : 56 | 1 | 117 |
| I. SHOP | IBEW : 59 | 0 | 26 |
| I. SHOP | IBEW : 60 | 0 | 213 |
| I. SHOP | IBEW : 61 | 0 | 5 |
| I. SHOP | IBEW : 62 | 0 | 81 |
| I. SHOP | IBEW : 63 | 0 | 175 |
| I. SHOP | IBEW : 64 | 0 | 34 |
| I. SHOP | IBEW : 65 | 0 | 69 |
| I. SHOP | IBEW : 66 | 0 | 7 |
| I. SHOP | IBEW : 67 | 0 | 2 |
| I. SHOP | IBEW : 68 | 0 | 13 |
| I. SHOP | IBEW : 71 | 0 | 1 |
| I. SHOP | IBEW : 72 | 0 | 15 |
| I. SHOP | IBEW : 74 | 0 | 22 |
| I. SHOP | IBEW : 75 | 3 | 50 |
| I. SHOP | IBEW : 78 | 0 | 5 |
| I. SHOP | IBEW : 79 | 0 | 3 |
| I. SHOP | JCC : 00 | 45 | 988 |
| I. SHOP | JCC : 01 | 0 | 137 |
| I. SHOP | JCC : 02 | 29 | 726 |
| I. SHOP | JCC : 07 | 0 | 1 |
| I. SHOP | JCC : 09 | 0 | 2 |
| I. SHOP | JCC : 10 | 0 | 1 |

| | | | |
|---|---|---|---|
| I. SHOP | JCC : 13 | 1 | 291 |
| I. SHOP | JCC : 14 | 0 | 561 |
| I. SHOP | JCC : 16 | 0 | 1 |
| I. SHOP | JCC : 19 | 0 | 4 |
| I. SHOP | JCC : 20 | 0 | 47 |
| I. SHOP | JCC : 22 | 0 | 25 |
| I. SHOP | JCC : 23 | 0 | 3 |
| I. SHOP | JCC : 24 | 0 | 105 |
| I. SHOP | JCC : 25 | 0 | 1 |
| I. SHOP | JCC : 26 | 1 | 94 |
| I. SHOP | JCC : 27 | 0 | 37 |
| I. SHOP | JCC : 39 | 1 | 18 |
| I. SHOP | JCC : 41 | 0 | 22 |
| I. SHOP | JCC : 42 | 4 | 50 |
| I. SHOP | JCC : 43 | 1 | 19 |
| I. SHOP | JCC : 44 | 0 | 1 |
| I. SHOP | NCFO / SEIU : 01 | 0 | 1 |
| I. SHOP | NCFO / SEIU : 03 | 18 | 286 |
| I. SHOP | NCFO / SEIU : 04 | 2 | 56 |
| I. SHOP | NCFO / SEIU : 06 | 0 | 9 |
| I. SHOP | NCFO / SEIU : 08 | 0 | 6 |
| I. SHOP | NCFO / SEIU : 09 | 0 | 4 |
| I. SHOP | NCFO / SEIU : 10 | 0 | 20 |
| I. SHOP | NCFO / SEIU : 17 | 1 | 70 |
| I. SHOP | NCFO / SEIU : 18 | 10 | 196 |
| I. SHOP | NCFO / SEIU : 19 | 0 | 14 |
| I. SHOP | SMWIA : 00 | 10 | 132 |
| I. SHOP | SMWIA : 12 | 0 | 39 |
| I. SHOP | SMWIA : 13 | 0 | 221 |
| I. SHOP | SMWIA : 14 | 0 | 167 |
| I. SHOP | SMWIA : 15 | 0 | 16 |
| I. SHOP | SMWIA : 18 | 0 | 22 |
| I. SHOP | SMWIA : 20 | 0 | 12 |
| I. SHOP | SMWIA : 21 | 2 | 35 |
| I. SHOP | SMWIA : 23 | 1 | 14 |
| I. SHOP | SMWIA : 29 | 1 | 143 |
| I. SHOP | SMWIA : 30 | 0 | 37 |
| I. SHOP | SMWIA : 32 | 2 | 31 |
| I. SHOP | TCU ARASA MECH FOREMEN : 00 | 2 | 81 |
| I. SHOP | TCU ARASA MECH FOREMEN : 01 | 46 | 435 |
| I. SHOP | TCU ARASA MECH FOREMEN : 06 | 42 | 81 |

| | | | |
|---|---|---|---|
| I. SHOP | TCU ARASA MECH FOREMEN : 07 | 5 | 31 |
| **Total** | | **298** | **8,954** |

Note: Includes internal selections from the applicant flow data that can be matched to the employee history file

| Table A1. Counts of Internal Selections from Applicant Flow and Vacancies (Engineering Crafts) | | | |
|---|---|---|---|
| **Craft Group** | **Union/Truncated Job Code** | **Internal Applicants** | **Internal Vacancies** |
| II. ENGINEERING | BMWE (NE) : 57 | 4 | 0 |
| II. ENGINEERING | BMWE (NE) : 64 | 6 | 0 |
| II. ENGINEERING | BMWE (NE) : 65 | 1 | 0 |
| II. ENGINEERING | BMWE (NE) : 73 | 4 | 0 |
| II. ENGINEERING | BMWE (NE) : 77 | 1 | 0 |
| II. ENGINEERING | BMWE (NE) : 85 | 1 | 0 |
| II. ENGINEERING | BMWE (NE) : 95 | 5 | 0 |
| II. ENGINEERING | BMWE (OFF) : 00 | 0 | 86 |
| II. ENGINEERING | BMWE (OFF) : 01 | 0 | 10 |
| II. ENGINEERING | BMWE (OFF) : 02 | 0 | 7 |
| II. ENGINEERING | BMWE (OFF) : 03 | 0 | 161 |
| II. ENGINEERING | BMWE (OFF) : 04 | 0 | 141 |
| II. ENGINEERING | BMWE (OFF) : 05 | 0 | 66 |
| II. ENGINEERING | BMWE (OFF) : 06 | 0 | 99 |
| II. ENGINEERING | BMWE (OFF) : 07 | 0 | 180 |
| II. ENGINEERING | BMWE (OFF) : 08 | 0 | 84 |
| II. ENGINEERING | BMWE (OFF) : 09 | 0 | 86 |
| II. ENGINEERING | BMWE (OFF) : 10 | 5 | 147 |
| II. ENGINEERING | BMWE (OFF) : 11 | 0 | 67 |
| II. ENGINEERING | BMWE (OFF) : 12 | 0 | 47 |
| II. ENGINEERING | BMWE (OFF) : 13 | 0 | 19 |
| II. ENGINEERING | BMWE (OFF) : 14 | 0 | 46 |
| II. ENGINEERING | BMWE (OFF) : 15 | 0 | 1 |
| II. ENGINEERING | BMWE (OFF) : 16 | 1 | 123 |
| II. ENGINEERING | BMWE (OFF) : 17 | 0 | 9 |
| II. ENGINEERING | BMWE (OFF) : 18 | 0 | 91 |
| II. ENGINEERING | BMWE (OFF) : 19 | 0 | 46 |
| II. ENGINEERING | BMWE (OFF) : 20 | 0 | 2 |
| II. ENGINEERING | BMWE (OFF) : 22 | 0 | 45 |
| II. ENGINEERING | BMWE (OFF) : 23 | 0 | 1 |
| II. ENGINEERING | BMWE (OFF) : 24 | 0 | 5 |
| II. ENGINEERING | BMWE (OFF) : 25 | 0 | 2 |
| II. ENGINEERING | BMWE (OFF) : 26 | 0 | 5 |
| II. ENGINEERING | BRS (NORTHERN) : 09 | 0 | 2 |
| II. ENGINEERING | BRS (NORTHERN) : 25 | 0 | 42 |
| II. ENGINEERING | BRS (NORTHERN) : 32 | 0 | 83 |

| | | | |
|---|---|---|---|
| II. ENGINEERING | BRS (NORTHERN) : 34 | 0 | 101 |
| II. ENGINEERING | BRS (NORTHERN) : 51 | 0 | 35 |
| II. ENGINEERING | BRS (NORTHERN) : 57 | 4 | 1 |
| II. ENGINEERING | BRS (NORTHERN) : 63 | 0 | 117 |
| II. ENGINEERING | BRS (NORTHERN) : 64 | 0 | 4 |
| II. ENGINEERING | BRS (NORTHERN) : 65 | 0 | 2 |
| II. ENGINEERING | BRS (NORTHERN) : 66 | 0 | 6 |
| II. ENGINEERING | BRS (NORTHERN) : 67 | 0 | 7 |
| II. ENGINEERING | BRS (NORTHERN) : 68 | 0 | 4 |
| II. ENGINEERING | BRS (NORTHERN) : 69 | 0 | 9 |
| II. ENGINEERING | BRS (NORTHERN) : 70 | 0 | 18 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 00 | 0 | 24 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 01 | 0 | 25 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 02 | 0 | 1 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 03 | 0 | 1 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 04 | 0 | 29 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 05 | 0 | 17 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 06 | 0 | 9 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 07 | 0 | 29 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 08 | 0 | 72 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 09 | 2 | 0 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 10 | 0 | 17 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 11 | 2 | 40 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 12 | 0 | 61 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 13 | 0 | 2 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 14 | 0 | 248 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 15 | 0 | 12 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 16 | 0 | 3 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 17 | 0 | 101 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 20 | 0 | 60 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 21 | 0 | 68 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 30 | 0 | 263 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 31 | 0 | 105 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 35 | 0 | 200 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 39 | 0 | 21 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 43 | 0 | 35 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 47 | 0 | 64 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 49 | 0 | 1 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 54 | 0 | 3 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 55 | 1 | 9 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 56 | 0 | 15 |

| | | | |
|---|---|---|---|
| II. ENGINEERING | BRS (SOUTH/WEST) : 57 | 0 | 8 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 58 | 0 | 76 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 59 | 0 | 14 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 61 | 0 | 19 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 62 | 0 | 27 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 71 | 1 | 20 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 72 | 0 | 10 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 73 | 0 | 3 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 74 | 0 | 8 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 77 | 0 | 1 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 79 | 0 | 12 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 82 | 0 | 19 |
| II. ENGINEERING | BRS (SOUTH/WEST) : 83 | 0 | 11 |
| II. ENGINEERING | TCU ARASA MW SUPV : 00 | 3 | 47 |
| II. ENGINEERING | TCU ARASA MW SUPV : 01 | 7 | 91 |
| II. ENGINEERING | TCU ARASA MW SUPV : 02 | 0 | 6 |
| II. ENGINEERING | TCU ARASA MW SUPV : 03 | 1 | 3 |
| II. ENGINEERING | TCU ARASA MW SUPV : 04 | 7 | 31 |
| II. ENGINEERING | TCU ARASA MW SUPV : 05 | 6 | 42 |
| II. ENGINEERING | TCU ARASA MW SUPV : 06 | 2 | 5 |
| II. ENGINEERING | TCU ARASA MW SUPV : 07 | 0 | 12 |
| II. ENGINEERING | TCU ARASA MW SUPV : 08 | 7 | 23 |
| II. ENGINEERING | TCU ARASA MW SUPV : 09 | 10 | 16 |
| II. ENGINEERING | TCU ARASA MW SUPV : 10 | 0 | 7 |
| II. ENGINEERING | TCU ARASA MW SUPV : 11 | 6 | 19 |
| II. ENGINEERING | TCU ARASA MW SUPV : 12 | 6 | 34 |
| II. ENGINEERING | TCU ARASA MW SUPV : 13 | 0 | 4 |
| II. ENGINEERING | TCU ARASA MW SUPV : 14 | 0 | 3 |
| **Total** | | **93** | **4,113** |

Note: Includes internal selections from the applicant flow data that can be matched to the employee history file

**Table A1. Counts of Internal Selections from Applicant Flow and Vacancies (Operating and Police Crafts)**

| Craft Group | Union/Truncated Job Code | Internal Applicants | Internal Vacancies |
|---|---|---|---|
| III. OPERATING and POLICE | ATDA : 00 | 6 | 185 |
| III. OPERATING and POLICE | ATDA : 01 | 0 | 44 |
| III. OPERATING and POLICE | ATDA : 02 | 0 | 8 |
| III. OPERATING and POLICE | ATDA : 03 | 1 | 20 |
| III. OPERATING and POLICE | ATDA : 04 | 1 | 33 |
| III. OPERATING and POLICE | BLET (NE) : 00 | 27 | 107 |
| III. OPERATING and POLICE | BLET (NE) : 05 | 0 | 32 |
| III. OPERATING and POLICE | BLET (OFF) : 00 | 128 | 1,309 |
| III. OPERATING and POLICE | BLET (OFF) : 01 | 0 | 68 |
| III. OPERATING and POLICE | BLET (OFF) : 02 | 0 | 262 |
| III. OPERATING and POLICE | BLET (OFF) : 03 | 0 | 12 |
| III. OPERATING and POLICE | BLET (OFF) : 04 | 1 | 4 |
| III. OPERATING and POLICE | BLET (OFF) : 05 | 0 | 112 |
| III. OPERATING and POLICE | BLET (OFF) : 06 | 15 | 246 |
| III. OPERATING and POLICE | BLET (OFF) : 10 | 0 | 12 |
| III. OPERATING and POLICE | FOP : 00 | 5 | 32 |
| III. OPERATING and POLICE | FOP : 01 | 1 | 59 |
| III. OPERATING and POLICE | FOP : 02 | 0 | 12 |
| III. OPERATING and POLICE | FOP : 03 | 1 | 19 |
| III. OPERATING and POLICE | FOP : 04 | 0 | 1 |
| III. OPERATING and POLICE | FOP : 05 | 1 | 3 |
| III. OPERATING and POLICE | FOP : 06 | 0 | 2 |
| III. OPERATING and POLICE | FOP : 07 | 0 | 1 |
| III. OPERATING and POLICE | FOP : A0 | 0 | 8 |
| III. OPERATING and POLICE | FOP : A3 | 0 | 1 |
| III. OPERATING and POLICE | FOP : C0 | 1 | 29 |
| III. OPERATING and POLICE | FOP : C1 | 0 | 2 |
| III. OPERATING and POLICE | FOP : D0 | 0 | 1 |
| III. OPERATING and POLICE | FOP : H0 | 3 | 45 |
| III. OPERATING and POLICE | FOP : H1 | 0 | 2 |
| III. OPERATING and POLICE | FOP : J0 | 0 | 3 |
| III. OPERATING and POLICE | FOP : J1 | 0 | 1 |
| III. OPERATING and POLICE | FOP : J3 | 0 | 1 |
| III. OPERATING and POLICE | FOP : N0 | 0 | 4 |
| III. OPERATING and POLICE | FOP : O0 | 0 | 17 |
| III. OPERATING and POLICE | FOP : O1 | 0 | 2 |

| | | | |
|---|---|---|---|
| III. OPERATING and POLICE | FOP : U0 | 0 | 7 |
| III. OPERATING and POLICE | FOP : Y0 | 0 | 61 |
| III. OPERATING and POLICE | FOP : Y1 | 0 | 5 |
| III. OPERATING and POLICE | FOP : Y3 | 0 | 2 |
| III. OPERATING and POLICE | UTU (NE) : 00 | 39 | 1,329 |
| III. OPERATING and POLICE | UTU (NE) : 01 | 14 | 484 |
| III. OPERATING and POLICE | UTU (NE) : 02 | 0 | 90 |
| III. OPERATING and POLICE | UTU (NE) : 03 | 1 | 123 |
| III. OPERATING and POLICE | UTU (NE) : 05 | 0 | 79 |
| III. OPERATING and POLICE | UTU (NE) : 06 | 0 | 26 |
| III. OPERATING and POLICE | UTU (NE) : 08 | 0 | 12 |
| III. OPERATING and POLICE | UTU (NE) : 09 | 0 | 21 |
| III. OPERATING and POLICE | UTU (NE) : 10 | 14 | 377 |
| III. OPERATING and POLICE | UTU (NE) : 11 | 0 | 12 |
| III. OPERATING and POLICE | UTU (NE) : 12 | 0 | 55 |
| III. OPERATING and POLICE | UTU (OFF) : 00 | 73 | 2,376 |
| III. OPERATING and POLICE | UTU (OFF) : 01 | 8 | 827 |
| III. OPERATING and POLICE | UTU (OFF) : 02 | 0 | 47 |
| III. OPERATING and POLICE | UTU (OFF) : 03 | 0 | 1 |
| III. OPERATING and POLICE | UTU (OFF) : 04 | 0 | 38 |
| III. OPERATING and POLICE | UTU (OFF) : 05 | 0 | 248 |
| III. OPERATING and POLICE | UTU (OFF) : 06 | 0 | 2 |
| III. OPERATING and POLICE | UTU (OFF) : 10 | 0 | 26 |
| III. OPERATING and POLICE | UTU (OFF) : 11 | 0 | 87 |
| III. OPERATING and POLICE | UTU (OFF) : 12 | 0 | 12 |
| III. OPERATING and POLICE | UTU (YARDMASTERS) : 00 | 5 | 19 |
| III. OPERATING and POLICE | UTU (YARDMASTERS) : 01 | 2 | 7 |
| III. OPERATING and POLICE | UTU (YARDMASTERS) : 02 | 7 | 35 |
| III. OPERATING and POLICE | UTU (YARDMASTERS) : 03 | 0 | 10 |
| III. OPERATING and POLICE | UTU (YARDMASTERS) : 04 | 0 | 7 |
| III. OPERATING and POLICE | UTU (YARDMASTERS) : 05 | 1 | 11 |
| **Total** | | **355** | **9,135** |

Note: Includes internal selections from the applicant flow data that can be matched to the employee history file

**Table A1. Counts of Internal Selections from Applicant Flow and Vacancies (Clerical & On-Board Services Crafts)**

| Craft Group | Union/Truncated Job Code | Internal Applicants | Internal Vacancies |
|---|---|---|---|
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 00 | 0 | 293 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 07 | 2 | 408 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 08 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 09 | 1 | 47 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 10 | 0 | 7 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 11 | 0 | 6 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 12 | 1 | 704 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 13 | 1 | 662 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 14 | 2 | 1,226 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 17 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 19 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 21 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 23 | 48 | 55 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 28 | 0 | 182 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 31 | 0 | 65 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 32 | 1 | 426 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 33 | 0 | 10 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 34 | 9 | 1,157 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 35 | 0 | 210 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 37 | 0 | 8 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 38 | 0 | 6 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 39 | 0 | 7 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 40 | 0 | 148 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 41 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 42 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 46 | 1 | 34 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 47 | 0 | 7 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 48 | 0 | 5 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 49 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | ASWC : 50 | 0 | 34 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 00 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 01 | 0 | 6 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 02 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 03 | 0 | 4 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 05 | 1 | 18 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 06 | 0 | 187 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 07 | 0 | 32 |

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| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 08 | 0 | 10 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 09 | 3 | 114 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 10 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 11 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 12 | 0 | 6 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 13 | 6 | 69 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 15 | 3 | 123 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 16 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 17 | 3 | 36 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 18 | 16 | 473 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 19 | 1 | 11 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 20 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 22 | 4 | 25 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 23 | 0 | 24 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 24 | 0 | 9 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 25 | 1 | 20 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 27 | 0 | 5 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 28 | 0 | 57 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 29 | 1 | 139 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 30 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 31 | 0 | 58 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 32 | 0 | 34 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 33 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 34 | 0 | 28 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 35 | 0 | 35 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 36 | 0 | 86 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 37 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 38 | 0 | 9 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 40 | 1 | 14 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 41 | 1 | 32 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 42 | 0 | 74 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 43 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 45 | 1 | 145 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 46 | 0 | 132 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 47 | 0 | 21 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 48 | 0 | 81 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 49 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 52 | 0 | 46 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 53 | 1 | 259 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 54 | 0 | 9 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 55 | 0 | 78 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 56 | 0 | 2 |

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| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 58 | 0 | 6 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 59 | 1 | 191 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 61 | 0 | 18 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 62 | 3 | 374 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 63 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 64 | 0 | 7 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 65 | 0 | 27 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 66 | 0 | 90 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 67 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 68 | 3 | 510 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 69 | 5 | 146 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 70 | 0 | 79 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 71 | 0 | 19 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 72 | 0 | 18 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 73 | 0 | 20 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 74 | 0 | 25 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 75 | 0 | 159 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 76 | 2 | 81 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 77 | 0 | 8 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 78 | 2 | 29 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 79 | 0 | 16 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 81 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 83 | 2 | 15 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 84 | 6 | 9 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (NE) : 87 | 0 | 19 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 00 | 4 | 31 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 01 | 0 | 12 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 02 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 03 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 04 | 0 | 79 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 05 | 0 | 10 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 06 | 0 | 136 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 07 | 9 | 129 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 08 | 1 | 51 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 09 | 1 | 15 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 10 | 0 | 252 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 11 | 0 | 7 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 12 | 0 | 173 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 13 | 2 | 31 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 14 | 0 | 57 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 15 | 32 | 1,035 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 16 | 0 | 3 |

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|---|---|---|---|
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 17 | 0 | 7 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 18 | 0 | 20 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 19 | 0 | 54 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 20 | 0 | 15 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 21 | 0 | 4 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 22 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 23 | 0 | 5 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 24 | 1 | 55 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 26 | 3 | 14 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 27 | 1 | 140 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 28 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 29 | 0 | 139 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 31 | 0 | 114 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 32 | 0 | 94 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 33 | 0 | 4 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 34 | 0 | 5 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 35 | 1 | 194 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 36 | 0 | 13 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 37 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 39 | 0 | 5 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 40 | 3 | 32 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 41 | 1 | 22 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 42 | 0 | 9 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 43 | 0 | 174 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 45 | 0 | 4 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 46 | 18 | 773 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 47 | 0 | 10 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 49 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 50 | 9 | 337 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 51 | 0 | 50 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 52 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 53 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 54 | 0 | 5 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 55 | 1 | 19 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 56 | 0 | 10 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 57 | 0 | 43 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 58 | 0 | 208 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 59 | 2 | 983 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 60 | 0 | 16 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 61 | 4 | 166 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 62 | 0 | 4 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 63 | 0 | 204 |

| | | | |
|---|---|---|---|
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 64 | 1 | 41 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 65 | 1 | 89 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 66 | 0 | 55 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 67 | 0 | 149 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 68 | 1 | 0 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 69 | 0 | 92 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 70 | 0 | 8 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 71 | 0 | 4 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 72 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 74 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 75 | 0 | 26 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 76 | 0 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 77 | 0 | 8 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 78 | 0 | 19 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 79 | 23 | 107 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 80 | 0 | 2 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 81 | 0 | 11 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 82 | 1 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (OFF) : 83 | 14 | 1 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (TOWER) : 00 | 0 | 11 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (TOWER) : 01 | 0 | 112 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (TOWER) : 03 | 2 | 158 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (TOWER) : 06 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (TOWER) : 07 | 14 | 115 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (TOWER) : 08 | 0 | 4 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (TOWER) : 09 | 0 | 9 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU (TOWER) : 10 | 0 | 15 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU ARASA OBS SUPV : 01 | 0 | 29 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU ARASA OBS SUPV : 04 | 0 | 3 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU ARASA OBS SUPV : 06 | 0 | 80 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU ARASA OBS SUPV : 07 | 0 | 32 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU ARASA OBS SUPV : 10 | 4 | 15 |
| IV. CLERICAL & ON-BOARD SERVICES | TCU ARASA OBS SUPV : 11 | 12 | 29 |
| **Total** | | **299** | **17,346** |

Note: Includes internal selections from the applicant flow data that can be matched to the employee history file