

Preliminary Report on the Impact of Amending the Defined Benefit Retirement Plan to the Cash Balance Pension (CBP Select) on Older Employees

In re:

Wayne Tomlinson, Alice Ballesteros, and Gary Muckelroy, individually and on behalf of all others similarly situated, v. El Paso Corporation and El Paso Pension Plan

Civil Action No. 4-cv-02686-WDM-CBS

United States District Court
for the District of Colorado

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1. Introduction and Summary of Findings

This report is a preliminary analysis of the impact on older employees of El Paso Corporation's transition from the Defined Benefit Retirement Plan to the Cash Balance Pension (CBP) from 1997 through 2006.

- Section 1 contains the Introduction and a Summary of Findings.
- Section 2 describes the factors impacting benefits for employees during the transition between plans.
- Section 3 explains the specific mechanisms through which the transition impacted older employees.
- Section 4 provides a graphical analysis of the elevated wear-away for older employees.
- Section 5 describes the method for calculating reductions in benefits and damages for the putative class.
- Section 6 provides a conclusion.
- Section 7 lists the sources of data used in the report.
- Section 8 addresses my qualifications and compensation.

Context of the Analysis

This is a class action under the Employee Retirement Income Security Act of 1974, as amended (“ERISA”), 29 U.S.C. § 1001 et seq., and a representative action under the Age Discrimination in Employment Act of 1964, as amended (the “ADEA”), 29 U.S.C. § 621 et seq. Plaintiffs claim that defendants have violated the ADEA and ERISA by amending a defined benefit retirement plan in a manner that freezes the benefits of older, longer-service employees during a “wear-away” period, and provides lower rates of benefit accrual to almost all employees, especially older employees.¹ I have been retained by the plaintiffs to conduct statistical analyses of the impact of age on retirement benefits for the putative class.

This analysis of wear-away and other impacts of the plan transition relies on two sources of data provided by defendants. Spreadsheets were produced, providing detailed pension records for 956 El Paso, 547 Sonat and 1,372 Coastal class members. These were augmented by a web-based “extranet” through which we had restricted access to Mercer’s *BeneCalc* pension administration system. We were provided information for a subset of 737 El Paso, 509 Sonat and 1,203 Coastal employees. In addition, our access to the extranet was restricted so that batch processing functions were disabled. This meant that only reports for individual employees had to be requested one at a time. In order to compile data for all putative class members, we had to construct an automated “robot” that could submit thousands of queries to this limited system.

Routines were also devised to recalculate data and reconstruct missing data, for example, account balances for employees for whom those data were missing. The database that we were able to compile was sufficient to calculate wear-away, reductions in benefits and damages for most employees.² The data from these

¹Class Action Complaint, p. 1.

²Information was incomplete for some employees.

sources was combined and used to calculate the wear-away period and other impacts of the plan transition using spreadsheets produced by actuary Claude Poulin.³

Summary of Findings

The results of this study demonstrate that the conversion to the CBP by defendants adversely impacted older employees and resulted in substantial loss in benefits for older employees. My central findings are:

1. While all employees were negatively impacted by the change to a cash balance plan, the plan is implicitly structured in such a way that older employees are more negatively impacted by the plan conversion than are younger employees.
2. Older employees spend on average a longer time accruing no additional benefits (*wear-away* period) than do younger employees, resulting in an adverse impact on older workers.
3. Age impacts the length of the wear-away period both directly through structural features of the plans and indirectly, by means of its strong relationship with all the other factors that directly impact the length of the wear-away period.
4. When the benefits under the new plan are compared to the benefits under the old plan, older employees have larger average reductions in benefits than do younger employees.
5. El Paso could have foreseen the impacts of the plan conversion on older workers using information available at that time, and therefore could have modified the plan design in order to reduce those impacts.
6. If multivariate regression is used, the statistical significance of the effect of age on wear-away is found to be so extreme (over 35 standard deviations) that it rules out the possibility that the impact due to chance.
7. Reductions in benefits as a result of the transition are quite steep for all but the youngest employees. For example, employees who were over 50 on the date their company went to the cash benefit plan had on average a 91.5 percent reduction in benefits after five years, and still had a 77.0 percent reduction in benefits after 15 years.
8. Over 90 percent of damages were borne by older employees.

These findings provide strong evidence that older employees suffered a systematic reduction in benefits as a result of the pension plan transition that defendants implemented.

2. Transition to El Paso Cash Balance Plan

On January 1, 1997, El Paso converted its traditional defined benefit pension plan into a “cash balance” plan. A cash balance plan attempts to mimic the behavior of a defined contribution plan, even though it is still regulated as a type of defined benefit plan. Employees under a cash benefit plan have an “account balance”

³The data compiled from all these sources, and the results of all computations are included in electronic Attachment 1, (with confidential data subject to Protective Order and to be filed under seal).

which is expressed as a dollar amount. The account balance opened on January 1, 1997 with employees receiving an opening account balance having a computed relationship to the accrued traditional benefit as of that date. The cash benefit account balance can grow by additions of pay credits, which are a function of salary, age, and years of vested service, and by additions of interest credits, which are computed by multiplying an interest crediting rate, based on short-term Treasury interest rates, by the balance in the account at the time the interest credits applied.

Rather than switching immediately from the traditional pension plan to the cash benefit plan, El Paso implemented a five-year transition period during which both plans grew in value. During the transition period, a person who was retiring would receive the benefit from the more valuable of the two plans. At the end of the transition period, on January 1, 2002, the benefit in the traditional pension plan was “frozen.” Employees retiring after that time would still receive the benefit derived from the more valuable of the two plans, but the traditional benefit would cease to gain value, while the cash balance plan account value continued to grow. For many employees, however, the value of the cash balance plan value was substantially lower than the value of the frozen benefit, such that the cash benefit plan account value would not be used in computing the actual benefit. This greater-of transition occurs over a period of years during which the value of the actual retirement benefit ceased to grow at all. This phenomenon is called “wear-away.” Generally speaking, the duration of the wear-away period will increase as a function of the size of the gap between the cash account value and the value of the frozen benefit. This phenomenon could be avoided by using an “A plus B” transition in which the cash balance credits are added to the frozen benefits.

The Sonat and Coastal companies were acquired by El Paso in 1999 and 2001, respectively. Prior to their acquisition by El Paso, these companies also had traditional defined benefit plans with benefit computation methods similar to El Paso’s. These employees were also converted to El Paso’s cash benefit plan after five-year transition periods.

3. Plan Transition Impact on Older Employees

The transition from a traditional defined benefit plan to a cash balance plan is generally a move by the plan sponsor to reduce their costs. If that is the case, it can be expected that employees as a group will have reduced benefits when such a transition occurs. In the case of the El Paso Pension Plan, the burden of these negative impacts are borne disproportionately by older workers.

Design of the Transition Resulted in Systematic Impact on Older Employees

El Paso’s transition to a cash balance plan disproportionately impacted older workers in a number of ways. These impacts were built into the very structure of the new plan. These impacts are detailed in Mr. Poulin’s declaration and summarized more briefly here:

- A given nominal pay credit is more valuable for a younger employee than for an older employee, due to the interest credits that will be associated with it over the life of the employee.⁴
- Exclusion of early retirement benefits from the opening cash balance account increases the gap between the opening balance and the frozen benefit, increasing the length of the wear-away period. This effect is greater for older people, who are more likely to be old enough to have early retirement benefits included in their frozen benefit.⁵

⁴Claude Poulin Declaration, §20-22

⁵Claude Poulin Declaration, §36

- El Paso applied a pre-retirement mortality discount in the computation of the opening account balance. While the proportional impact is similar for older and younger workers, it reduces the opening account balances by a larger absolute amount for older workers, increasing the length of the wear-away period.⁶
- The benefits accrued under the prior formula during the five year transition period are not included in the opening account balance. This creates a larger gap between the value of the frozen benefit and the value of the cash balance account on the date when the prior pension benefit is frozen, thus increasing the length of the wear-away period. The size of this gap is larger with older workers, because the prior pension plan allows their increases in salary to multiply over all of their years of service.⁷
- Drops in interest rates after the plan conversion have a greater impact on older people.⁸

The fact that these disproportionate impacts are built into the structure of the plan indicates that they were not random, nor would they have been unexpected. At any time prior to implementing the new plan, an analyst with the details of the plan and a few basic assumptions could have estimated the impacts on El Paso employees and recognized that the impact is borne primarily by older workers.

4. Wear-Away Duration Strongly Associated with Age

Calculation of Wear-Away

The plaintiffs have retained actuary Claude Poulin, who has made a detailed analysis of the former and new benefit plans sponsored by El Paso.⁹ Mr. Poulin produced nine spreadsheet calculators that were used in our analyses: three spreadsheets for each company, El Paso, Sonat and Coastal.¹⁰ Each spreadsheet computed values for a different analysis: (1) length of wear-away; (2) reduction in benefits from the plan transition; and (3) resulting damages.

In most instances of putative employment discrimination, the only way to determine whether employment decisions have a discriminatory impact is through observing the impact on employees. This case is different. The impact of the plan transition is *predetermined* and can be *calculated* from the age, service, prior plan benefit and salary. Therefore, we can evaluate the *systematic impact resulting from the design of the plan transition*. In other words, we know from its construction that the plan transition was not age neutral. The impact was known by defendants in advance of implementation. The monetary losses to the putative class could be calculated in advance, resulting in a substantial reduction in liabilities on defendants' books.

Wear-Away Increases with Age

Using Mr. Poulin's spreadsheets, we report the wear-away period computed using the current annuity

⁶Claude Poulin Declaration, §37

⁷Claude Poulin Declaration, §38

⁸Claude Poulin Declaration, §39-40

⁹Declaration of Claude Poulin.

¹⁰Wear-away, benefit reduction and damage calculation spreadsheets produced by Claude Poulin.

purchase rates. This wear-away period is the number of years during which the cash balance account, expressed as a monthly age 65 benefit, is less than the now frozen monthly age 65 benefit under the prior plan. The existence and length of wear-away can be calculated from four values for each employee: age, vested service, cash plan balance, and the frozen benefit value of the prior plan¹¹. El Paso’s payroll and pension data demonstrate convincingly that the duration of the wear-away period is strongly associated with age. During the wear-away period, employees are accruing no additional benefits. Older employees spend on average a longer time accruing no additional benefits than do younger employees, resulting in an adverse impact on older workers.

Chart 1 compares the average wear-away duration for employees 40 and over to younger employees. This chart shows the strong relationship between age and length of wear-away, and the sizeable impact on older employees. The plan transition resulted in employees 40 and over waiting on average over eight years while they earned no additional benefits, versus less than 2 years on average for employees under 40. An “adverse impact ratio” is often used to quantify the severity of adverse impact. In this case, we can compute the ratio of the mean years of wear-away for older employees relative to younger employees. The average wear-away for older employees was 8.2 years, versus 1.9 for younger employees, giving an adverse impact ratio of 421%, far exceeding ratios often associated with findings of discriminatory impact.

Chart 1: Duration of Wear-Away By Employee Age

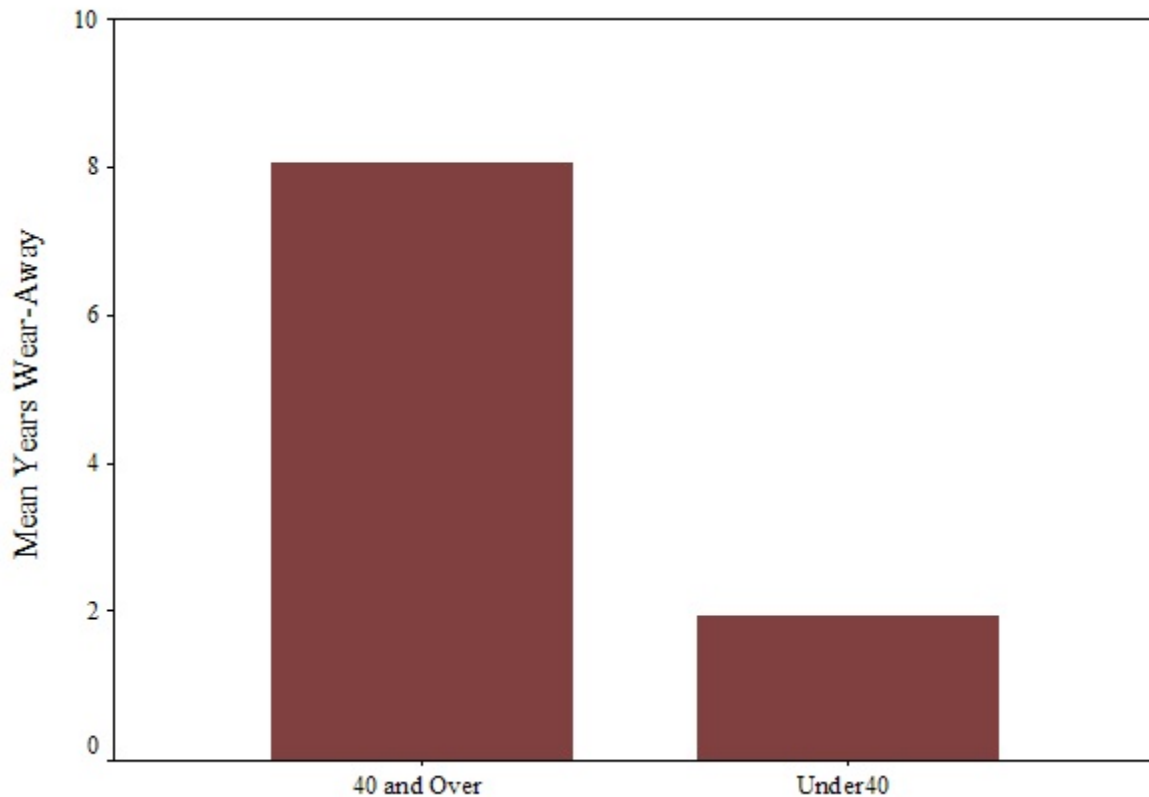


Chart 2 shows the same pattern, but displayed for each of the three companies separately. The wear-aways are consistently six to 11 years on average for older employees, while the wear-away for younger employees

¹¹These data elements are computed as of the date the prior pension benefit was frozen, i.e. January 1, 2002 for El Paso, January 1, 2005 for Sonat, and April 1 2006 for Coastal.
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ranged from less than one at Coastal (0.6 years) to 4.1 at El Paso. The adverse impact ratios range from 308% at Sonat to 1015% at Coastal, implying that the wear-away for older employees was over 10 times the that for younger employees.

Chart 2: Duration of Wear-Away by Employee Age, by Company

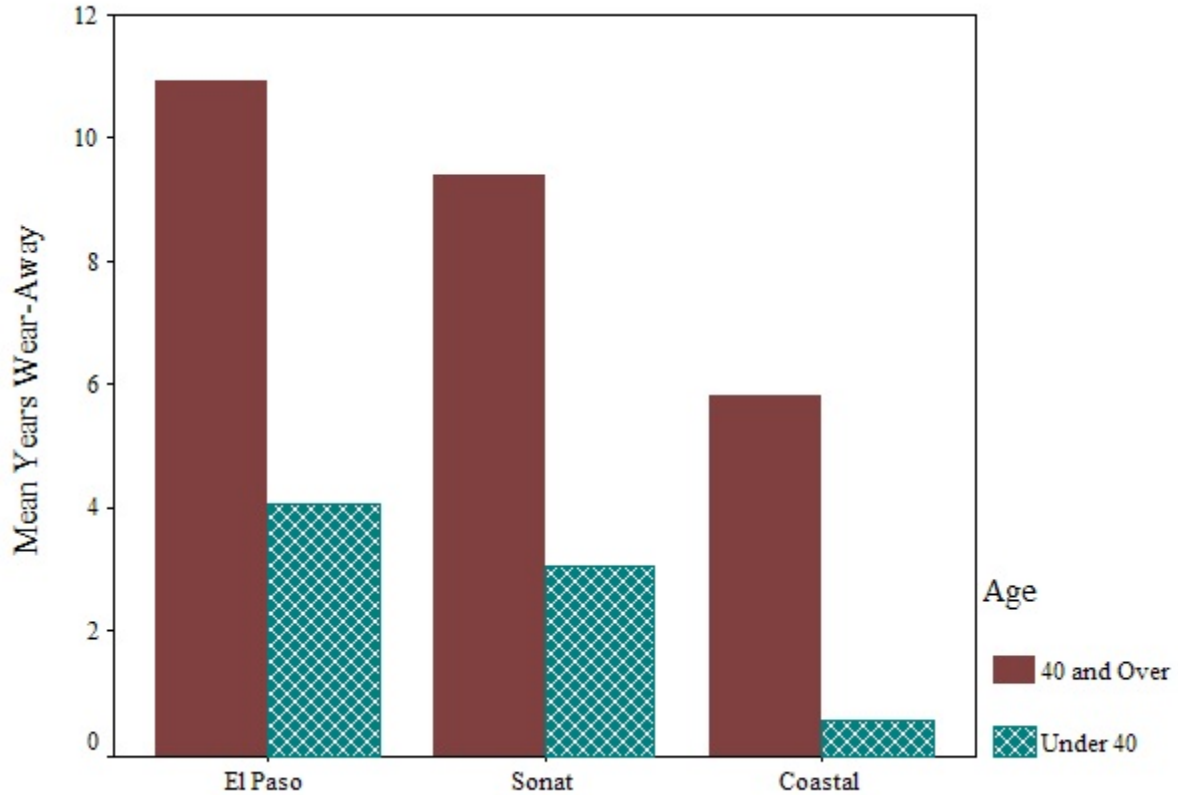


Chart 3 shows that as employees age, they experienced increasingly lengthy wear-away periods. For every five year increase in the employee's age, the wear-away period on average becomes approximately two years longer.

Chart 3: Duration of Wear-Away by Five-Year Age Intervals

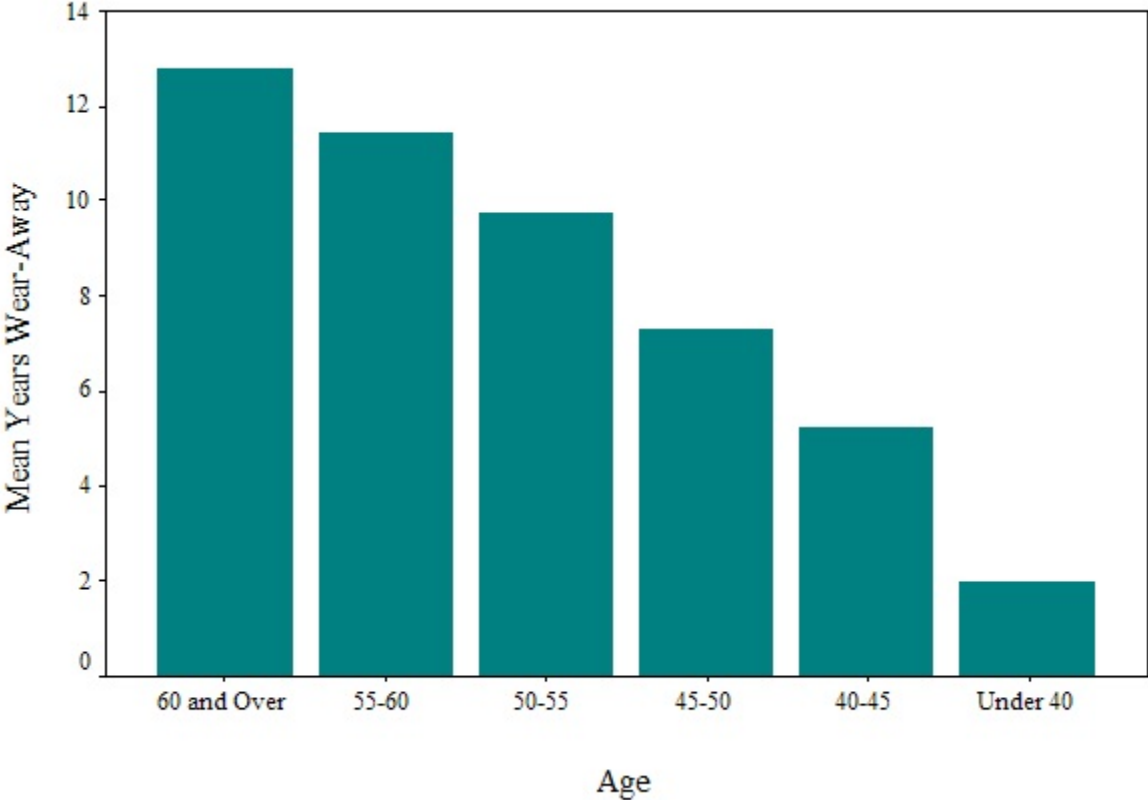
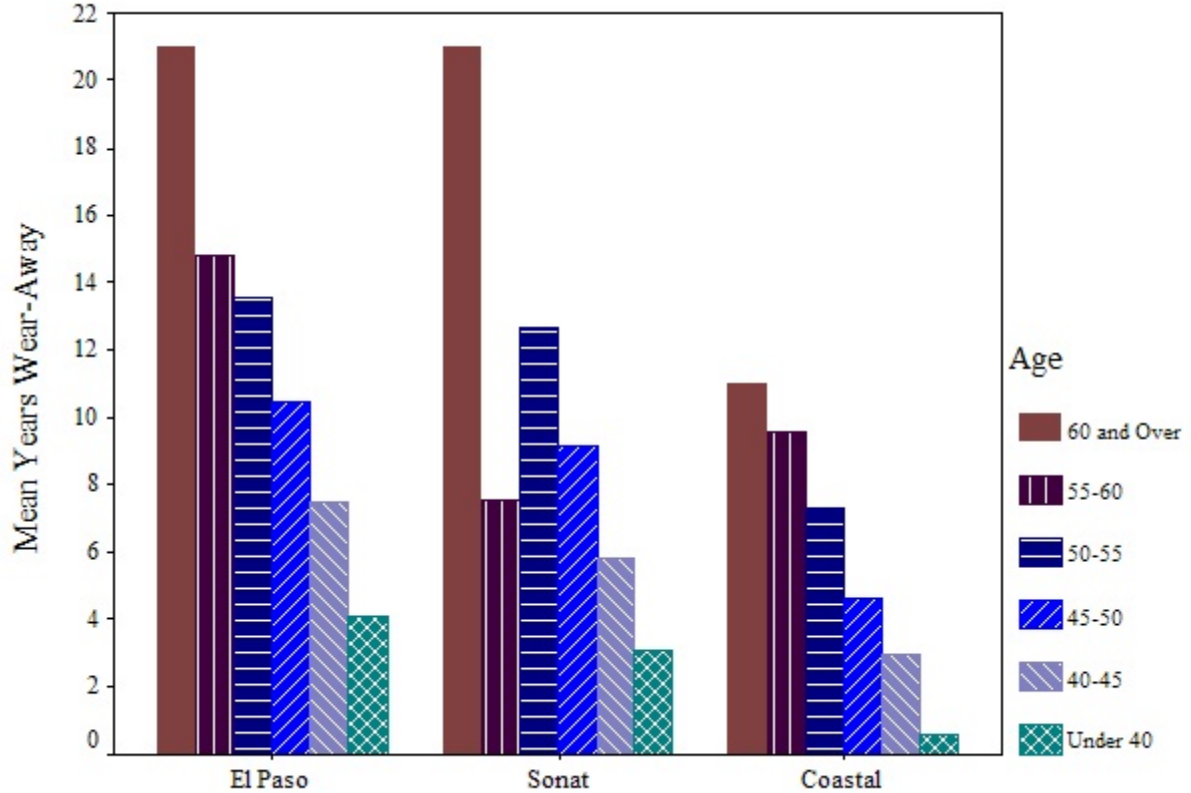


Chart 4 shows the wear-away for the same five year age bands, but for each company separately. This chart demonstrates that for El Paso and Sonat wear-away periods for older employees over 20 years. Many workers over age 50 will never resume earning retirement benefits before they retire.

Chart 4: Duration of Wear-Away by Five-Year Age Intervals, by Company



Age Central Determinant of Wear-Away

The existence and length of wear-away can be calculated from five values for each employee: age, vested service, the frozen benefit, the cash balance plan value, and salary. Age is positively correlated with years of wear-away: as age increases, the years of wear-away also increases. In addition, vested service, the frozen benefit, salary, and the cash plan balance are positively correlated with age: as age increases, each of these tends to increase.

Since these factors are all positively correlated with age, the age of employees has a strong impact on the existence and length of wear-away. Age is the necessary antecedent of higher values of the other variables. As such, age is the necessary if not sufficient condition through which any of them impacts wear-away. This relationship between age and the other variables means that each of these variables will mediate the impact of age, tending to act as a proxy for age in their impact on wear-away.

For example, while an employee age 50 can have 25 years of service, it is impossible for an employee who is age 30 or 40 to have that many years of service. Similarly the frozen benefits that could be acquired by an employee of age 50 would be unachievable for a 30 or 40 year old employee. Age is a necessary precursor for all the factors affecting wear-away.

Chart 5 demonstrates the relationship between age, years of service and wear-away. Duration of wear-away is indicated by the number shown at each location representing a combination of age and service. For example, the number 11 near the middle of the chart indicates that employees age 42 with 11 years of service have an average of 11 years of wear-away. The duration of wear-away increases with age, as seen by looking across a row of numbers. Similarly, the duration of wear-away increases with increasing service, as seen by

examining a column of numbers. There is a clear upper limit on Vesting Service, reflecting the fact that generally people don't begin to work until a certain age, thus many combinations of age and service are impossible.

Chart 5: Duration of Wear-Away by Age and Years of Vesting Service

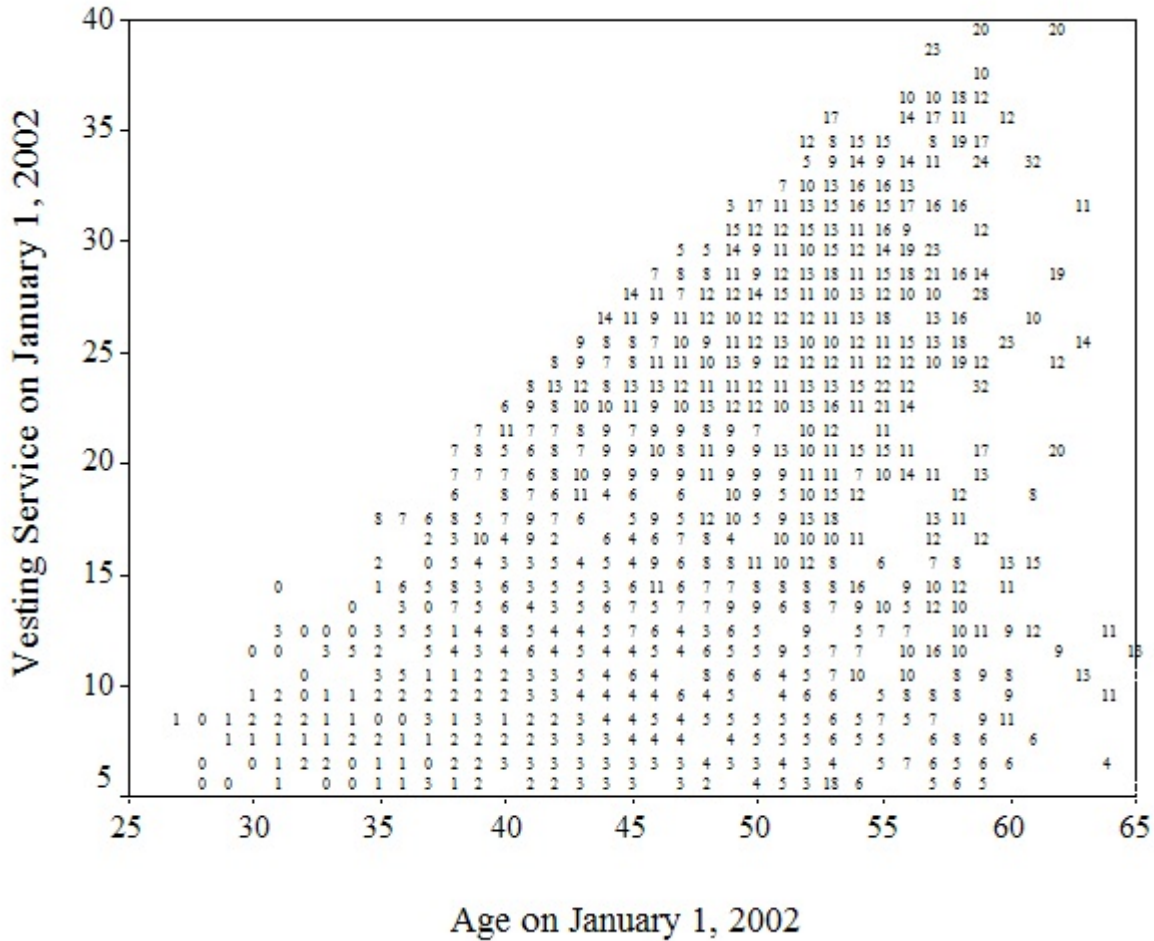
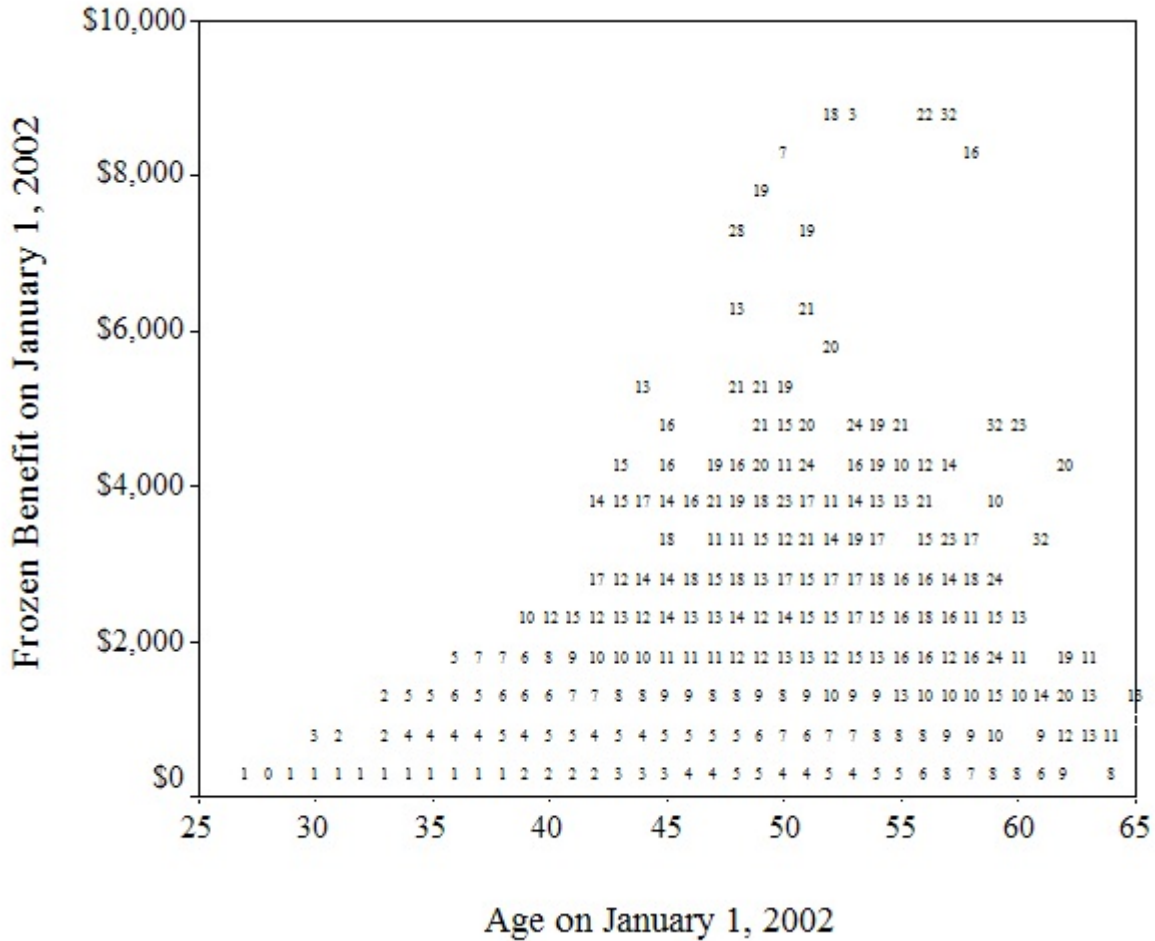


Chart 6 demonstrates the relationship between age, years of service and frozen benefit. Similar to Chart 5, duration of wear-away is indicated by the number shown at each location representing a combination of age and frozen benefit. The duration of wear-away increases with age, as seen by looking across a row of numbers. Similarly, the duration of wear-away increases with increasing frozen benefit, as seen by examining a column of numbers.

Chart 6: Duration of Wear-Away by Age and Frozen Benefit



Multivariate Regression is Not Needed to Understand the Impact of Age on Wear-Away

In this case there is no need to use statistical tools like correlation analysis or multivariate regression. These tools are designed to investigate patterns that are not already known. For example, multivariate regression estimates the way each of a group of factors impacts an outcome. These tools are inappropriate in this case, since *we already know the precise relationship between each of the factors and wear-away*. We can use a tool like Mr. Poulin’s spreadsheets to *compute* the impact of age on wear-away. There is no need to estimate the impact.

In any case, regression analysis does show the key role of age in lengthening the period of wear-away for older employees. This is a strong relationship because the underlying relationship between age and wear-away were built into the transition plan by defendants.

Multivariate regression evaluates the size of the effect of age on wear-away, while controlling for other variables. Age is found to be a primary and statistically significant factor in length of wear-away. A regression model including all the variables used in Mr. Poulin’s calculations of wear-away¹² indicates that wear-away for employees is affected by their age, and that the impact is statistically significant at the levels

¹²The model included age, service, salary, final average salary, cash balance account value and the frozen prior benefit.
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far exceeding the prima facie threshold of 0.05. In fact, the statistical significance of the effect of age on wear-away is so extreme (over 35 standard deviations) that it rules out that the impact is due to chance. To illustrate, consider that the likelihood that age is not a factor in length of wear-away is less than the chance of winning the six-number Colorado lottery 40 times in a row, each time with only one ticket.

If age were not a significant factor in wear-away, we would expect that controlling for other factors would reduce the age effect to statistical insignificance. In contrast, controlling for the significant effects of other variables leaves a highly significant effect of age.

5. Calculation of Benefit Reductions and Damages

In addition to the spreadsheets used to calculate wear-away, Mr. Poulin developed spreadsheets to calculate the reduction in benefits and damages resulting in the plan transition. As employees continue to work after the date of transition to the cash balance plan, they generally accrue benefits more slowly than under the prior pension plan. For most employees, there is a period during which they do not accrue benefits at all, due to the wear-away effects discussed previously. When that period ends, the employees may begin to accrue benefits again, but at a slower rate than they would have under the previous plan. The benefit reduction analysis presented here compares the monthly benefit accrued under the cash balance plan to the monthly benefit that would have been accrued under the prior pension plan. This comparison is shown at five, ten, and fifteen years after the transition date.

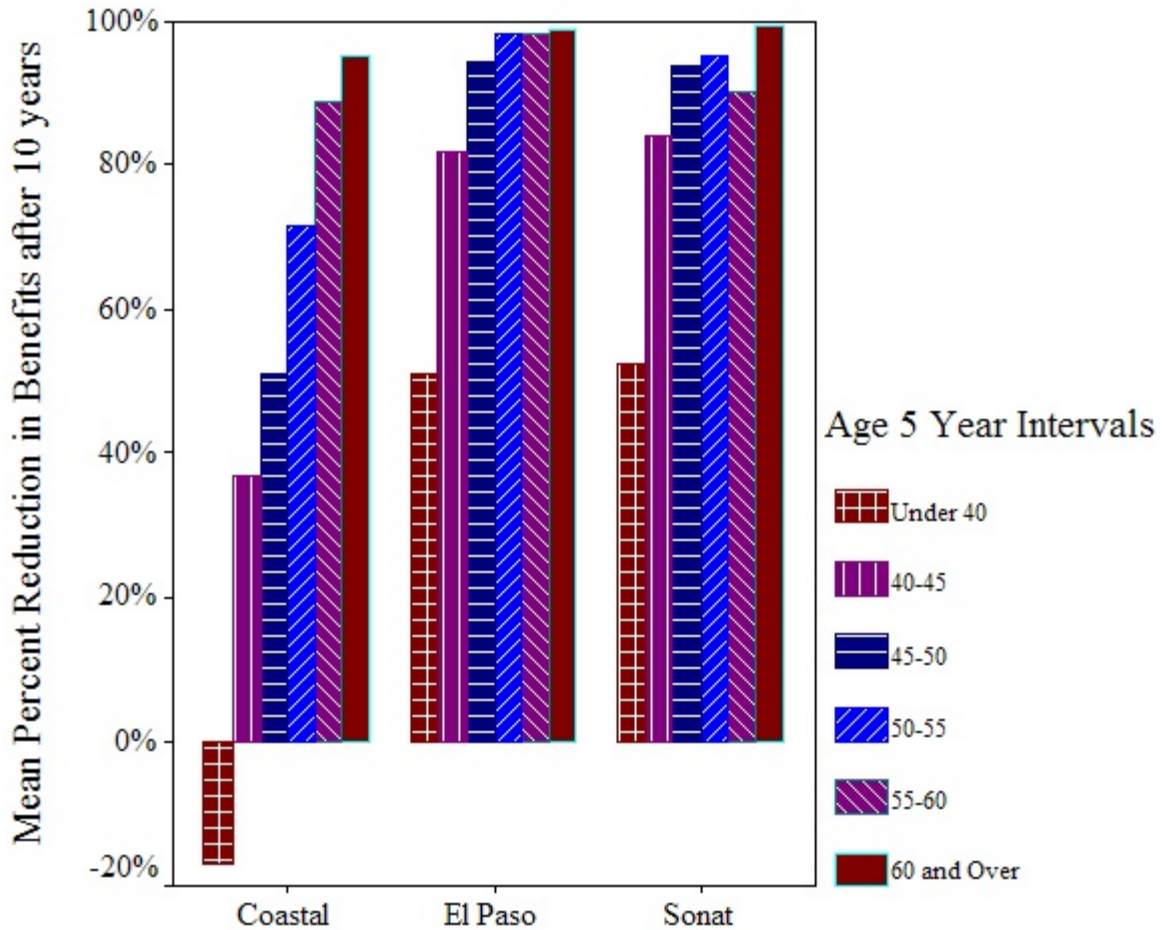
Benefit Reductions Disproportionately Impact Older Employees

The average percentage reduction in benefits for all employees by age group is shown in Table 1. The reductions are quite steep for all but the youngest employees. Employees who were over 50 on the date their company went to the cash benefit plan had on average a 91.5 percent reduction in benefits after five years, and still had a 77.0 percent reduction in benefits after 15 years. The youngest employees on average have the smallest reductions in benefits, but over time the reduction they experience increases.

Table 1: Reduction in Benefits By Age on Transition Date			
Age Interval	Percent Reduction in Benefits after Five Years	Percent Reduction in Benefits after Ten Years	Percent Reduction in Benefits after Fifteen Years
Under 40	13.4 %	16.9 %	24.0 %
40-45	76.2 %	64.0 %	58.7 %
45-50	87.4 %	75.1 %	68.6 %
50-55	91.5 %	82.8 %	77.0 %
55-60	97.9 %	92.2 %	87.4 %
Over 60	99.0 %	95.7 %	90.9 %

The benefit reduction patterns vary by company. Chart 7 shows benefit reductions after ten years, by age and company. Younger employees in the Coastal company actually had increased benefits in the cash benefit plan, resulting in negative values for the benefit reduction calculation. El Paso and Sonat employees experienced greater reductions at relatively younger ages. In all three companies, there is a clear pattern showing that older employees bear the brunt of the benefit reductions.

Chart 7: Benefit Reductions After Ten Years by Age Interval and Company



Damages Calculations Reveal Older Employees Suffered Over 90% of Losses

Claude Poulin’s also created spreadsheets that enable us to calculate damages from wear-away only, for each individual employee who has been impacted by the transition in the El Paso pension plan.¹³ The estimated damages are shown in Table 2. This table shows that over 90 percent of damages were borne by older employees.

¹³Damages are included only for employees for whom data were available, and excluding SERP employees.

Table 2: Estimated Total Damages by Age and Company			
Age Group	Damages for El Paso Employees	Damages for Sonat Employees	Damages for Coastal Employees
All Employees	\$21,652,360.36	\$7,348,851.71	\$7,514,335.75
Employees 40 and Over	\$20,301,920.58	\$6,549,533.49	\$7,254,093.00
% Borne by Older Employees	94%	89%	97%

6. Conclusion

This report provides overwhelming and incontrovertible evidence that older employees were impacted by the pension plan transition engineered by defendants. This report is based on data produced to date. It is my understanding that data on additional employee data will be produced by defendants. This report may be amended or a supplemental report submitted as a result of subsequent production by defendants. Section 1 lists detailed conclusions under the Summary of Findings.

7. Data and Information Sources Used

This is an analysis based on documents received to date. This report may be revised and a supplemental report submitted if additional information is provided. I have used the following information in this analysis:

Data and Documentation

1. Tomlinson v. El Paso Class Action Complaint filed December 29, 2004.
2. Plaintiffs' Opposition to the Motion to Dismiss.
3. Plaintiffs' Motion for Class Certification and Conditional Approval of ADEA Collective Action, with supporting brief and exhibits.
4. Judge Walker Miller's March 22, 2007 and March 19, 2008 Decisions.
5. El Paso Pension Plan document effective January 1, 2001.
6. CBP Select SPD dated August 23, 2002.
7. Mercer's Calculation Reference Manual for the El Paso Pension Plan.
8. El Paso's Form 5500 for the 2002 plan year.
9. El Paso's Actuarial Valuation Report for the 2002 plan year.
10. Pension records for Wayne Tomlinson, Alice Ballesteros and Gary Muckelroy.
11. Online calculator benefit projections for Wayne Tomlinson, Alice Ballesteros and Gary Muckelroy (P-345 to 407).
12. Sample data for Sonat and Coastal employees, including Scott W., James N., Conrad B., Carl S. and Anna G.
13. An "extranet" for Mercer's BeneCalc pension administration system.
14. Spreadsheets for 956 El Paso, 547 Sonat and 1372 Coastal class members.
15. Declaration and exhibits of Kevin Minor of Mercer related to calculations of wear-away.
16. Declaration of Claude Poulin.

17. Wear-away, benefit reduction and damage calculation spreadsheets produced by Claude Poulin.

8. Consultant Background

I have been retained as an expert witness in this case. I possess a Ph.D. in Mathematical Statistics and have been endorsed as an expert in the field of statistics. I have been retained by plaintiffs and defendants to perform statistical evaluation of discrimination in a variety of contexts, and have testified as an expert in the area of statistics and the statistical evaluation of discrimination in United States District Court for the District of Colorado, United States District Court, Nevada, and the Circuit Court of the Sixth Judicial Circuit, Pinellas County, Florida. My Curriculum Vitae is attached. Cases in which I have testified as an expert at trial or by deposition within the preceding four years are indicated on my Curriculum Vitae in bold and are bulleted (▣). My publications in the previous ten years are listed in my Curriculum Vitae.

My hourly rates are \$350 per hour for testimony and preparation, \$250 for consultation and research.

Robert A. Bardwell, Ph. D.



Attachment 1: Electronic Files Including Data Compiled and Processed by Plaintiffs

Attachment 2: Curriculum Vitae of Robert A. Bardwell, Ph. D.

CURRICULUM VITAE

PERSONAL:

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EDUCATION:

University of Colorado, Boulder	Ph.D.	Mathematics	1985 – 1989
University of Colorado, Denver	B.A.	Philosophy	1981 – 1982
University of Chicago			1969 – 1971

PROFESSIONAL EXPERIENCE:

Statistical consulting	1989 – present
University of Colorado instructor and teaching assistant	1985 – 1989
Research, consulting and statistical programming	1976 – 1986

PUBLICATIONS:

- Bardwell, Robert A., Paul Klite, and Jason Salzman. “Local TV News: Getting Away with Murder.” *Harvard International Journal of Press/Politics*, 2(2): 102-112 (1997).
- Max, Wendy, Dorothy P. Rice, Eric Finkelstein, Robert A. Bardwell, Steven Leadbetter. “The Economic Toll of Intimate Partner Violence against Women in the United States.” *Violence and Victims*, 19 (3) (June 2004).

RESEARCH, CONSULTING, AND STATISTICAL PROGRAMMING:

- ☐ Joseph M. Sellers, Cohen, Milstein, Hausfeld & Toll P.L.L.P., New York
Retained and testified in deposition for plaintiffs regarding the impact of underwriting on black applicants in re Patricia Amos, et al. v. GEICO Corporation, et al., Civil Action No. 06-cv-1281 (RHK/JSM), United States District Court, District of Minnesota.
- Nichols Kaster & Anderson, PLLP, Minneapolis, Minnesota, 2007-8
Retained to identify potential Muslim class members using custom Muslim name identification program.
- Stephen R. Bruce, Washington, D.C., 2007 -
Retained as expert witness for plaintiffs claiming violation of the ADEA and ERISA by replacing a defined benefit retirement plan with a cash balance plan in a manner that freezes the benefits of older, longer-service employees during a “wear-away” period, in re Wayne Tomlinson, et al. v. El Paso Corporation and El Paso Pension Plan, Civil Action No. 4-cv-02686-WDM-CBS, United States District Court, for the District of Colorado.
- Minami Tamaki LLP, San Francisco, CA 2007-8
Retained as expert witness for plaintiffs in race discrimination in hiring class action, in re Albert Crews et al. v. Cisco Systems, United States District Court, Northern District of California.
- Hagens Berman Sobol Shapiro LLP, Los Angeles, 2007-
Retained as expert witness by plaintiffs in California overtime employment class action, to testify regarding the appropriate use of sampling to estimate damages and provide evidence of commonality in re Randall et al. v. Costco Wholesale Corporation, Case No.: BC 296369, California Superior Court.
- REKO LLP, Toronto, Ontario, 2007-
Retained as expert witness by plaintiffs in nationwide overtime employment class action, to design a stratified random sample to estimate damages and provide evidence of commonality in re Fresco v. Canadian Imperial Bank of Commerce, File No. 07-W-334113PC2, Ontario Superior Court, Canada.
- Institute for Environmental Solutions, Denver, 2007 -

Retained as sampling and research design consultant on *The Tree Project*, a community-scale research program to assess the environmental impact of urban tree cover. Assisted with the integration of available scientific tools, and the development of new measurement protocols, and consulted on the design of the spacial sampling plan for the initial survey in Golden, Colorado.

- FIMAC Solutions, Inc., Denver, 2007 -
Retained to research and develop econometric analysis of core deposits for banking institutions. Developed a suite of analytic tools that, (1) provide less conservative projections of the decay rate of non-maturity deposits than those provided by regulatory agencies; (2) generate more accurate forecasts of account balances; and (3) include an index to evaluate risk form core deposit decline. These analytic tools employ appropriate times series and hazard rate analyses.
- Arius Energy, LLC, Denver, 2006 -
Designed and developed web-based tool for individuals and communities to track their carbon footprint and energy consumption.
- Federal Election Commission, 2006-7
Designed and developed sampling program used by the Federal Election Commission to monitor contributions and expenditures for all Federal elections. Program was developed as a web-based application that can also run on auditors' notebook computers. Program designs, draws and evaluates samples of transactions for audit. All results were tested against the American Institute of Certified Public Accountant statistical auditing programs.
- John Robert Holland, Denver, Colorado, 2007
Retained as expert witness by plaintiffs to evaluate the adverse impact of treatments for bed bug infestations on persons with disabilities in re Charlotte McConnell, Willard McConnell and John McConnell v. The Tower at Speer, LLC, Marcy Payne, and Libby Burney, District Court, City and County of Denver, Colorado.
- Nichols Kaster & Anderson, PLLP, Minneapolis, Minnesota, 2006-7
Retained as expert witness by plaintiffs to evaluate the adverse impact of hiring, compensation, discipline and terminations decisions on Hispanic employees in re Mendez et all v. Faribault Foods, Inc. and The Work Connection, United States District Court, Minnesota.
- Cornish and Dell'Olio, Colorado Springs, Colorado, 2006-
Retained as expert witness by plaintiff to evaluate the disparate impact of testing and terminations decisions on the women in the training academy for the Colorado Springs Fire Department, in re Karyn S. Palgut v. The City of Colorado Springs, Civil Action No. 06-cv-01142-WDM-MJW, United States District Court, Colorado.
- Legal Aid Society of Minneapolis, Minneapolis, Minnesota, 2006
Retained as expert witness by plaintiffs to evaluate the adverse impact of alternative pre-employment tests on Minneapolis Fire Cadet Selection Process; demonstrated adverse impact and proposed the remedy which was implemented, of augmenting pool of Stage II candidates with 55% additional protected class applicants.
- Killmer, Lane & Newman, LLP, Denver, Colorado, 2006-
Retained as expert witness by plaintiffs to evaluate the impact of gender on utilization, hiring and promotions at Car Toys, Inc., in re Monica Britton, et al. v. Car Toys, Inc., and Bruce Cameron, Civil Action No. 05-CV-00726-WYD-PAC, United States District Court, Colorado.
- ▣ Shores, Williamson & Ohaebosim, LLC, Wichita, Kansas, 2006
Deposed as expert witness by plaintiffs to evaluate the impact of gender on workforce utilization, promotions, terminations, and compensation at The Fresh Market, Inc., in re Terrence Mcfadgon, Terra Mukes, Gloria Keith, and Starika Smith v. The Fresh Market, Inc., Case No.: 05-2151, United States District Court, Western District of Tennessee.
- University of Colorado Health Sciences Center, Denver, Colorado, 2005-

Member of research team for *A Study of Immigrant Housing Conditions in Commerce City, Colorado*, to assess housing-related health risks affecting recent immigrant families with children. Responsible for construction of housing inventory and GIS profile of the study area; construction of the sample frame; design the sample of participating households; supervision of survey analysis, compilation of survey estimates, and contribution to resulting publications.

- ▣ McKenna Long & Aldridge LLP, Denver; Seyfarth Shaw LLP, Washington, D.C., 2005-
Deposed as expert witness for defendants on the impact of age on separations at the Hershey Company, in re Montagne, et al. v. The Hershey Company, Case No.: 04-cv-1881-WYD-BNB, United States District Court, Colorado.
- The Carey Law Firm, Colorado Springs, Colorado, 2005-
Retained as expert witness by plaintiffs to estimate attorneys fees retained by the Colorado in Supplemental Security Income (SSI) Reimbursements, 1997 - 2005, in re Chad Martinez and Larry King v. Colorado Department of Human Services and Otero County Department of Human Services, Case No.: 02 CV 1066, District Court, City and County of Denver, Colorado.
- Cayman Islands Real Estate Brokers Association, Grand Cayman, Cayman Islands, 2005-2006
Retained to conduct an econometric analysis of the impact of stamp duty rates on real estate transaction volume and value in the Cayman Islands from 1990 through 2004.
- Shores, Williamson & Ohaebosim, LLC, Wichita, Kansas, 2005-
Retained as expert witness by plaintiffs to evaluate the impact of gender on workforce utilization, promotions, terminations, and compensation at Wichita Police Department in re Greta Semsroth, et al. v. City of Wichita, and Chief Norman Williams, Case No. 04-1245-MLB, United States District Court, District of Kansas.
- ▣ King & Greisen, LLP, Denver, Colorado, 2005-
Deposed as expert witness by plaintiffs to evaluate race discrimination in layoffs in re Freeman, et al. V. Roxanne White, et al., Case No.: 05CV164, United States District Court, Colorado.
- Burr & Smith, LLP, Tampa, Florida, 2005-6
Retained as expert witness by plaintiffs to design a stratified random sample of nationwide class to estimate damages and provide evidence of commonality in re Kent Dunwiddie, Grant Lincoln, and Edward Gotowala, et al. v. Central Locating Service, Ltd., Corporation, Case No.: 5:04CV315-OC-10GRJ, United States District Court, Middle District of Florida.
- Bennett Bigelow & Leedom, P.S., Seattle, Washington, 2005
Retained regarding health care regulatory dispute, to evaluate the application of non-linear regression model in calculating demand for kidney dialysis facilities.
- ▣ Strindberg Scholnick & Chamness, LLC, Salt Lake City, Utah, 2005
Deposed as expert witness for plaintiffs regarding race discrimination in workforce utilization, concentration and underrepresentation, in re Terry H. Fullwiley v. Union Pacific Corporation and Union Pacific Railroad Company, Case No. 2:04-CV-671DB, United States District Court, District of Utah, Central Division.
- White O'Connor Curry & Avanzado LLP, Los Angeles, California, 2005
Retained as expert witness for defendants to evaluate alleged age discrimination in terminations in re Harold Moore Hennesy, et al. v. Infinity Radio Inc., Arbitration No. 77116Y0035804 BEAH, American Arbitration Association, Denver, Colorado.
- ▣ Colorado Center on Law and Policy, Denver, 2004
Testified as expert on computer systems and statistical modeling for plaintiffs, assessing adequacy of project management, testing, and preparation for release of the Colorado Benefits Management System (CBMS), which was designed to integrate administration of six Colorado and Federal benefit programs for all Colorado counties. Developed and presented model of caseload backlog resulting from CBMS implementation in re Valerie Imani Hawthorne-Bey, et. al., v. Karen Reinerstson, Executive Director of the Colorado

Department of Health Care Policies and Financing, et. al., Case No. 04-CV-7059, District Court, City and County of Denver, Colorado.

- Newman & Newman, LLP, Seattle, Washington, 2004 –
Retained as expert witness for plaintiffs to design a sample of all Internet domain name registration changes over a two year period and to create an econometric model of the impact of the Internet domain name Wait Listing Service to be implemented by defendants in re Registersite.com et al. V. Internet Corporation for Assigned Names and Numbers, Verisign, Inc., and Does 1-10, Case File No. CV04-1368 ABC (CWx) 02-RB-2104 (CBS), United States District Court, Central District of California.
- King Clextion & Feola, Denver, Colorado, 2004 – 2005
Retained as expert witness for plaintiff to analyze the impact of race and national origin on promotions and compensation in re Medhanie Gebreluel Werede v. Allright Holdings Inc., Civil Action No. 01-WM-1167, United States District Court, Colorado.
- Hale Hackstaff Friesen, LLP, Denver, Colorado, 2004 – 2005
Retained as expert witness for plaintiff to design and conduct a door-to-door survey of voters and voting behavior to determine the impact of disparate treatment of absentee ballots and to analyze evidence of voting rights violations in re Jeffrey Vigil v. Carol Snyder, County Clerk, Adams County Colorado, Case File No. 02-RB-2104 (CBS), United States District Court, Colorado.
- ▣ Nichols Kaster and Anderson, Minneapolis, Minnesota, 2003 – 2004
Deposed as expert witness for plaintiff regarding race discrimination in utilization, and terminations in re Jarvis Jones v. St. Paul Companies, Inc., Case File No. 02-1305, United States District Court, Minnesota.
- ▣ Nichols Kaster and Anderson, Minneapolis, Minnesota, 2003 – 2004
Deposed as expert witness for plaintiff regarding gender discrimination in utilization and salary and other compensation in re Susan M. Veeder v. Cargill, Incorporated, Civil No. 02-1711 (PAM/RLE), United States District Court, Minnesota.
- ▣ Killmer and Lane LLP, Denver, Colorado, 2003 – 2004
Testified for defendant regarding expert report analyzing race, ethnic, and age composition of the Juror Pools and bias in jury selection process in re People of the State of Colorado v. Dante Lamar Owens, Case No. 98-CR-2729, District Court, Arapahoe County, Colorado.
- ▣ DeFranco & Allen, LLC, Boulder, Colorado, 2003 – 2004
Testified for defendant as expert witness regarding race, ethnic, and age composition of the Juror Pools in Arapahoe County, Colorado. Constructed model of jury selection process revealing systemic bias in re People of the State of Colorado v. Trevon Washington, Case No. 98-CR-2459, District Court, Arapahoe County, Colorado.
- ▣ Thomas Feldman, Denver, Colorado, 2002 – 2004
Testified as expert witness for plaintiff to evaluate discrimination in layoffs related to filing worker's compensation claims in re Denise J. Welsch v. Sundryne Corporation, Civil Action No. 02-Z-468 (BNB), United States District Court, Colorado.
- ▣ Nichols Kaster and Anderson, Minneapolis, Minnesota, 1998 – 2003
Deposed as expert witness for plaintiff to evaluate race and ethnic discrimination in hiring, utilization, promotions, and salary in re Maria Garcia, et al. V. Viratec Thin Films, Inc., Civil Number 01-1978 MJD/JGL, United States District Court, Minnesota.
- ▣ King Clextion & Feola, Denver, Colorado, 2002 – 2003
Deposed as expert witness for plaintiffs to analyze the impact of race and national origin on promotions and compensation in re Solomon Goitom, Amune D. Meskele, Fowski Ali, and Omar Nur v. Allright Holdings, Inc., Civil Action No. 01-WM-1353 (CBS), United States District Court, Colorado.
- ▣ Johnson, Blakely, Pope, Bokor, Ruppel & Burns, P.A., Tampa, Florida, 2001 –
Testified as expert witness for plaintiff to evaluate the impact of race on the quality of education and the relative impacts of poverty and race in re William Crowley v. The Pinellas

County School Board, et al., Case No.00-005667-CI-021, Circuit Court of Sixth Judicial Circuit, Pinellas County, Florida.

- ▣ Tegtmeier, Frank & Jones, LLC, Colorado Springs, Colorado, 2001
 - Testified** regarding expert report for defendant analyzing race, ethnic, and age composition of the Qualified Jury Panel and bias in jury selection process in re U.S.A. v. Rice, United States District Court, Colorado.
- ▣ Gerash, Prugh & Gerash, L.L.C., Denver, Colorado, 2001
 - Testified** regarding expert report for defendant analyzing race, ethnic, and age composition of the Qualified Jury Panel and bias in jury selection process in re U.S.A. v. Carl Kenneth Kabat, Case No. 00-CR-385-N, United States District Court, Colorado.
- Research Triangle Institute, Research Triangle Park, North Carolina, 2000 – 2001
 - Center for Disease Control, Washington, D.C.
 - Retained to lead project to analyze large and detailed national probability sample and compute statistical estimates and variances for incidence, prevalence, and total costs in *Cost Study of Intimate Partner Violence Against Women* being prepared for congress, and to conduct independent evaluation of the cost report.
- Register Machine Learning Technologies, Inc., Littleton, Colorado, 2000 – 2001
 - Retained to develop algorithms applying probability theory to improve performance of advanced genetic programming computer application.
- ▣ Kummer Kaempfer Bonner & Renshaw, Las Vegas, Nevada, 2000 – 2004
 - Deposed and testified** as expert witness for plaintiff on the impact of race in hiring and promotions in re Jordan v. County of Clark and Clark County Department of Aviation, Case No. CV-S-99-0688-HDM (RJ), United States District Court, Nevada.
- Gerash, Prugh & Gerash, LLC., Denver, Colorado, 1999 – 2001
 - Prepared expert report for defendant analyzing race, ethnic, and age composition of the Qualified Jury Panel and bias in jury selection process in re U.S.A. v. Lawrence Sposato et al., Case No. 99 CR 232-S, United States District Court, Colorado.
- U. S. Equal Employment Opportunity Commission, Denver District Office, Colorado, 1999 – 2001
 - Retained to analyze the existing model used to estimate labor market availability for a large number of store locations, and to design a corrected model; evaluated the impact of racial discrimination in hiring, and the estimated the resulting damages.
- ▣ Zarlengo & Kimmell, LLC, Denver, CO, 2000
 - Deposed** as expert for plaintiff on the impact of race on compensation and promotions at PacifiCare between 1997 and 1998 in re Antoinette Ingram v. FHP Health Care/PacifiCare, Case No. 98 BP 2795, United States District Court, Colorado.
- ▣ Holland & Hart LLP, Denver, Colorado, 2000
 - Deposed** as expert for defendant to evaluate alleged age discrimination in layoffs in re Hennesy, et al. v. Gates Rubber Company, Civil Action No. 99-M-1787, United States District Court, Colorado.
- Goldstein and Dodge, Denver, Colorado, 2000
 - Submitted report assessing the bias in Division Independent Medical Examinations performed for the Division of Workers Compensation.
- Isaacson, Rosenbaum, Woods & Levy, P.C., Denver, Colorado, 1999 – 2000
 - Retained as expert witness for plaintiff to evaluate ethnic and gender discrimination in hiring, promotions and terminations in re Nuvia Rodriguez v. Greyhound Lines, Inc., Civil Action No. 99-N-1596, United States District Court, Colorado.
- The Leventhal Law Firm, P. C., Denver, Colorado, 1999
 - Submitted affidavit for plaintiff testifying to the limitations of the studies relied upon by defendant experts who discounted the possibility that injury resulted from rear-end collision, in re Czeslawa Sosnowska v. Kimberlee Hrbek Smith, Case No. 97CV1400, Denver District Court, Colorado.

- Feiger & Collison, P.C., Denver, Colorado, 1999 –
Retained as expert witness for plaintiff to evaluate gender discrimination in promotions and terminations in re Blasio, et al. v. United Parcel Service, Case No. 98-M-1709, United States District Court, Colorado.
- Pacey Economics, Boulder, Colorado, 1999
Retained to design and analyze samples of properties to be appraised in south Globeville neighborhood to estimate total property value for settlement of damages from heavy metals pollution from smelter.
- Collect America, Ltd., Denver, Colorado, 1999
Retained to design and analyze samples of collections to be audited for approval of IPO.
- Nichols Kaster and Anderson, Minneapolis, Minnesota, 1998 –
Retained as expert witness for plaintiff to evaluate race and ethnic discrimination in promotions and salary in re Augustine C. Crawford et al. v. Ceridian Corporation, Computing Devices International and General Dynamics Information Systems, Civil Number 97-2634, United States District Court, Minnesota.
- Center for Policy Research, Denver, Colorado, 1998 – 2000
Retained as consultant on survey execution, weighting, and estimation for a large and detailed national probability sample for the National Violence Against Women survey; conducted sensitivity analyses and theoretical explication of the impact of sample weighting and revised methodology report throughout review by the Center for Disease Control.
- ▣ Curtis L. Kennedy, Denver, Colorado, 1997 – 2000
Testified and deposed as expert witness for plaintiffs concerning alleged age discrimination in re James R. Henry v. US WEST, Inc. et al., Civil Action No. 96-N-724. United States District Court, Colorado.
- Boulder Police Department, Boulder, Colorado, 1998 – 1999
Retained to evaluate probability associated with physical and circumstantial evidence, resulting in an unprecedented technique for identification of shot-shell pellet evidence in Case No. P83-7907, homicide of Sidney Wells.
- ▣ Mohr, Hackett, Pederson, Blakely, Randolph & Haga, P.C., Phoenix, Arizona, 1997 – 1999
Deposed as expert witness for plaintiffs concerning alleged age discrimination in re Jeney v. Quaker Oats, Civil Action No. CIV 96-0822-PHX-RCB. Retained as expert witness concerning age discrimination in re Gentile v. Quaker Oats, Coleman v. Quaker Oats, Tallariti v. Quaker Oats, and Russell v. Quaker Oats and Christenson v. Quaker Oats.
- Miller, Lane, Killmer & Greisen, LLP. Denver, Colorado, 1998
Retained as expert witness for plaintiff to evaluate race and ethnic discrimination in employment decisions in re Visor et al, v. Sprint/ United Management Company, Case Number 96-K-1730, U.S. District Court, Colorado.
- Johnson, Blakely, Pope, Bokor, Ruppel & Burns, P.A., Tampa, Florida, 1997
Retained as expert witness for plaintiff to evaluate gender discrimination in allocation of stock option plan in re Gosche v. West Publishing Company, Case No. 97-Z-1954, U.S. District Court, Colorado.
- Johnson, Blakely, Pope, Bokor, Ruppel & Burns, P.A., Tampa, Florida, 1997 –
Retained as expert witness for plaintiff to evaluate gender discrimination in allocation of stock and constructed econometric model of resulting losses in re Patricia Winn Carter and Maxine M. Jones, et al. v. West Publishing Company, Case No. 97-2537-CIV-T-26A, U.S. District Court, Middle District of Florida.
- ▣ Colorado Lawyers Committee, Denver, Colorado, 1997
Testified as expert witness for plaintiffs concerning residency in land title dispute in re Espinoza v. Taylor, Case No. 81-CV-5, Culebra County District Court.
- Jefferson County Department of Human Services, 1997
Retained to review the implementation of the NAOMI computer system at the Jefferson County Department of Human Services in response to persistent failures in prior launch of

the system; the NAOMI system was used by most or all caseworkers in Jefferson County to do CWEST submissions only, but had been designed to integrate casework for multiple programs related to child welfare. Authored report analyzing failures in the prior launch of NAOMI, and submitted recommendations for disciplined implementation.

- Colorado Department of Human Services, 1997
Retained to develop computer programs to analyze recidivism and issues relating to the quality of child welfare using data in CWEST, the Child Welfare information system for Colorado.
- Roman, Benezra, & Culver, Denver, Colorado, 1997
Retained as expert witness for plaintiffs concerning gender and ethnic discrimination claim resulting from terminations in re Chacon v. Public Service Company of Colorado.
- ▣ Fox & Robertson, P.C., Denver, Colorado, 1997
Deposed as expert witness for plaintiff to design and conduct a public survey to project number of persons who use wheelchairs that are denied access to retail stores in re CCDC et al. v. Campbell-Ritter Corp. et al., 96-WY-2490-AJ, CCDC et al. v. AnnTaylor Stores Corp. et al., 96-WY-2491-AJ, CCDC et al. v. Nine West Group, Inc. et al., 96-WY-2492-AJ, and CCDC et al. v. Hermanson Limited Partnership I, 96-WY-2493-AJ, United States District Court, Colorado.
- ▣ Holland & Hart, Denver, Colorado, 1997
Deposed as expert witness for defendant concerning alleged age discrimination in re Ronald Kirkland v. Safeway Inc., 96-CV-0264-J, United States District Court, Colorado.
- Roman, Benezra, & Culver, Denver, Colorado, 1996 – 2000
Retained as expert witness for plaintiffs concerning age discrimination claim resulting from layoffs in re Vaszlavik et al. v. Storage Technology Corporation.
- Peacock & Myers, Albuquerque, New Mexico, 1996
Retained in trademark infringement litigation to construct an econometric model of variable costs associated with production in re Rogers, et al. v. Legin, et al.
- Holland & Hart, Cheyenne, Wyoming, 1996
Retained as expert witness for defendant concerning computation of lost earnings and age discrimination claim resulting from reduction in force in re David Moffat v. Amoco Corporation, Civil Action No. 95-CV-242-D, United States District Court, Wyoming.
- Mineral Management Services, U. S. Department of Interior, Denver, Colorado, 1996
Retained to develop sampling plan, statistical algorithms and software to audit target selection and estimate royalty underpayment for statistical billing, and to compute median weighted gas valuation index.
- U. S. Department of Justice, District of Colorado, 1996
Retained as expert witness for defendant concerning claim of age and gender discrimination in promotions in re Edward F. Craig, Jr. v. Hazel R. O’Leary, Civil Action No. 93-K-1828, United States District Court, Colorado.
- Gerash, Robinson & Miranda, P. C., Denver, Colorado, 1995
Prepared expert report analyzing ethnic, gender, and age composition of the Qualified Jury Panel and bias in jury selection process in re U.S.A. v. Hampton, 95-CR-253-M, United States District Court, Colorado.
- ▣ Holland & Hart, Cheyenne, Wyoming, 1995
Deposed as expert witness for defendant concerning age and ethnic discrimination claim resulting from reduction in force in re Robert Nicol v. Amoco Corporation, Civil Action No. 95-CV-115-D, United States District Court, Wyoming.
- Plaintiff Employment Lawyers Association, Denver, Colorado, 1995
Conducted seminar on *Using Statistics to Prove Disparate Impact*.
- Jeffery Menter, Greenwood Village, Colorado, 1995
Computed present value of lost earnings in re Michael Marsh v. Delta Air Lines, Inc.
- ▣ Bart Rice, P.C., Englewood, Colorado, 1995

Deposed as expert for plaintiffs regarding age bias in severances in re Mary Fields et al. v. Information Handling Services Inc., Civil Action No. 95-B-516, United States District Court, Colorado.

- Mineral Management Services, U. S. Department of Interior, Denver, Colorado, 1995
Programmed method for aggregating transactions and computing median weighted gas valuation index; designed weighted, multi-stage, proportional sampling strategy for validating index using ratio estimation.
- Colorado Department of Social Services, Implementation Assistance Committee, 1995
Retained to evaluate sampling strategy and survey analysis for measuring compliance with settlement agreement in re L.P.M., et al. by their next friend David Littman v. Roy Romer and Karen Beye, Civil Action No. 94-M-1417, United States District Court, Colorado.
- Mineral Management Services, U. S. Department of Interior, Denver, Colorado, 1995
Authored report on the application of statistical sampling to audit target selection and royalty billing; programmed automated routines for designing the required samples, randomly sampling royalty transactions, and computing estimated underpayment.
- Macon Cowles & Associates, Boulder, Colorado, 1995
Retained to analyze employee records for evidence of ethnic bias in promotions at the Denver Mint in re Joe Sanchez v. Lloyd Bensten, Civil Action No. 94-Z-1400.
- Mineral Management Services, U. S. Department of Interior, New Orleans, Louisiana, 1995
Presented findings regarding methods for measuring gas, oil, and mineral royalty payment compliance and billing royalty underpayments based on statistical sampling to State and Tribal Audit Committee Conference.
- Sears, Anderson & Swanson, Colorado Springs, Colorado, 1994
Evaluated disparities in salaries using multivariate regression.
- Holland and Hart, Denver, Colorado, 1993
Consulted regarding discriminatory impact of investigative stops in re Irvin v. Sungailia, et. al., Civil Action No. 93-M-1551.
- ▣ Paul A. Baca, Denver, Colorado, 1993 – 1994
Deposed regarding disparate impact of promotional practices of Denver Police Department in re Humphries v. Belo, Civil Action No. 93-N-2731.
- Teamsters Local Union No. 435, Denver, Colorado, 1993 – 1994
Analyzed discipline and termination policy and provided expert report for arbitration involving Supervalu Inc.
- Children's Legal Clinic, Denver, Colorado, 1993 – 1994
Consulted on survey design of judges and guardians ad litem, and designed program for monitoring guardian ad litem representation of children in dependency and neglect hearings in the Denver Juvenile Court.
- Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1993 – 1994
Retained as expert to analyze class-wide age discrimination in terminations at Martin Marietta Corporation Astronautics Group for consolidated cases in re Marvin Wilkerson, et. al. v. Martin Marietta Corporation, Civil Action No. 91-S-2078, United States District Court, Colorado.
- Donald P. MacDonald, Denver, Colorado, 1993 – 1994
Consulted concerning alleged age discrimination in terminations in re Ken Fortner v. Halliburton Energy Services.
- Reginald H. Martin & Associates, Denver, Colorado, 1993 – 1994
Retained to design statistical method for measuring gas, oil, and mineral royalty payment compliance for the Mineral Management Service of the United States Department of Interior, and to design and analyze methods for billing royalty underpayments based on statistical sampling.
- Serge L. Herscovici, Littleton, Colorado, 1993
Consulted concerning alleged gender discrimination in re Elizabeth Ponder v. Metromedia.

- Rothgerber, Appel, Powers & Johnson, Denver, Colorado, 1993
Retained as consultant on alleged age discrimination in terminations in re Backlund et. al. v. Gates Corporation.
- Pulmonary Consultants, Denver, Colorado, 1993
Reviewed analyses of two studies of dust exposure and pulmonary function.
- ▣ Colorado Lawyers Committee, Voting Rights Task Force, Denver, Colorado, 1993 – 1994
Conducted study of minority voting patterns in current and revised House District 60 using ecological regression and homogeneous case analysis; **deposed and testified** as expert witness in voting rights litigation in re Jennie Sanchez, et. al. v. Colorado, Civil Action No. 93-S-963, United States District Court, Colorado.
- Serge L. Herscovici, Littleton, Colorado, 1993
Retained as expert to prepare analysis of age discrimination in departmental terminations in re Mildred M. Pittman, et. al. v. Martin Marietta Corporation, Civil Action No. 92-M-1557, United States District Court, Colorado.
- World Gaming Corporation, Las Vegas, Nevada 1992 – 1994
Computed probabilities and payoffs for new casino game.
- ▣ Paul A. Baca, Denver, Colorado, 1992 – 1994
Deposed as expert on ethnic discrimination in promotions in re Rodriquez, et. al. v. Denver Sheriff's Department, et. al., Civil Action No. 92- -2335, United States District Court, Colorado.
- Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1992 – 1993
Retained as expert to prepare analysis of age discrimination in departmental terminations in re Marvin Wilkerson, et. al. v. Martin Marietta Corporation, Civil Action No. 91-B-2078, United States District Court, Colorado.
- Colorado Lawyers Committee, Foster Care Task Force, 1992 – 1994
Retained as expert consultant to analyze Foster Care Review database and prepared issues analysis in re L.P.M., et. al. by their next friend David Littman v. Roy Romer and Karen Beye, Civil Action No. 94-M-1417, United States District Court, Colorado.
- Causey, Demgen & Moore Inc., Denver, Colorado, 1992
Designed stratified sample of inventory for Tattered Cover Bookstore audit.
- ▣ Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1992
Deposed as expert concerning analysis of age discrimination in departmental terminations in re Alivan Rea, et. al. v. Martin Marietta Corporation, Civil Action No. 91-S-1242, United States District Court, Colorado.
- Kelly, Haglund, Garnsey & Kahn, Denver, Colorado, 1992 – 1993
Retained as expert and prepared offer of proof concerning congressional redistricting in re Martinez, et. al. v. Romer, Civil Action No. 91-C-1972, United States District Court, Colorado.
- ▣ Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1992
Deposed as expert in preparation of lost-earnings analyses for termination with alleged age and ethnic discrimination in re Chan v. Apache Oil Corporation, Civil Action No. 90-M-1898, United States District Court, Colorado.
- Lundy Foundation, Denver, Colorado, 1992
Designed and analyzed survey of AIDS/ARC service providers and users and authored survey report.
- Colorado Lawyers Committee, Voting Rights Task Force, Denver, 1992
Conducted model study of minority voting patterns in Denver Colorado using ecological regression. Designed Colorado State House District creating a minority opportunity district and prepared expert demographic analysis in re Reapportionment of the Colorado General Assembly, Case No. 92 SA 19, Supreme Court, State of Colorado.
- ▣ Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1991

Deposed as expert witness in preparation of lost earnings analyses for termination with alleged age discrimination in re Mark Bremmer v. Martin Marietta Corporation, Civil Action No. 90-Z-828, United States District Court, Colorado.

▣ David A. Lane, Esq, Denver, Colorado, 1989

Analyzed ethnic and age composition of the Qualified Jury Wheel and **testified** as expert concerning age bias in jury selection process in re U.S.A. V. Laymon, 89-CR-113, United States District Court, Colorado

▣ Colorado Professional Black Firefighters, Paul A. Baca, Esq., 1989

Analyzed results of Denver Fire Department promotional exam for racial or ethnic bias and **testified** as an expert witness at the preliminary injunction hearing in re Fuller V. Cisneros, United States District Court.