

**Rebuttal Report on the Impact of Amending the Defined Benefit Retirement  
Plan to the Cash Balance Pension on Older Employees**

In re:

Phillip C. Engers, Warren J. McFall, Donald G. Noerr, and Gerald Smit, individually and on behalf of all  
others similarly situated, v. AT&T Corporation and AT&T Management Pension Plan  
Civil Action No. 98-CV-3660 (SRC/CCC)  
United States District Court  
for the District of New Jersey (Newark)

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## **1. Introduction and Summary of Findings**

This is a rebuttal report on the impact on older employees of AT&T's transition from the Defined Benefit Retirement Plan to the Cash Balance Pension (CBP) from 1997 through 2008.

- Section 1 contains the Introduction and a Summary of Findings.
- Section 2 describes the factors impacting benefits for employees during the transition between plans and explains the specific mechanisms through which the transition impacted older employees.
- Section 3 responds to issues raised by defendants' expert reports.
- Section 4 applies defendants' model to demonstrate that multivariate regression confirms the statistical significance of age as a factor in the impact of the plan transition.
- Section 5 provides a graphical analysis of the elevated wear-away for older employees.
- Section 6 describes the method for calculating potential and actual damages from the periods of wear-away.
- Section 7 provides a conclusion.
- Section 8 lists the sources of data used in the report.
- Section 9 addresses my qualifications and compensation.

### **Context of the Analysis**

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 thereby provides no additional benefits during that period.<sup>1</sup> I submitted a preliminary report on September 23, 2008, which analyzed wear-away and other impacts of the plan transition. The analyses in my preliminary report, and this rebuttal report, rely on employee data files provided by defendants.

Defendants produced expert reports by Dr. David Bloom and Lawrence Sher on November 5, 2008. This rebuttal report addresses the claims made in these reports, and presents revised calculations of wear-away and damages in response to these reports. The revised wear-away period and other impacts of the plan transition were calculated using spreadsheets produced by actuary Claude Poulin. The data compiled from these sources and the individual results of all the revised computations used in this report are included in electronic Attachment 1 (which contains personal identifiers subject to the Protective Order and therefore is to be treated as confidential filed under seal).

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<sup>1</sup>Class Action Complaint, page 1.

## Summary of Findings

The results of this study continue to strongly refute the claims made by defendants' experts, and confirm 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 remain:

1. The change to a cash balance plan was 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 impact the length of the wear-away period.
4. When the lost benefits from the periods of wear-away are compared, older employees have lost much larger amounts than younger employees.
5. Losses in future benefits as a result of the transition structure are quite steep for all but the youngest employees. For example, employees who were between 50 and 55 suffered on average over \$90,000 in lost benefits.
6. Older employees bear over 92 percent of actual damages.
7. Multivariate regression following Dr. Bloom's specifications confirms that age had a practically and statistically significant impact on each outcome. The statistical significance of the effect of age on wear-away is found to be so extreme (over 18 standard deviations) that it rules out the possibility that the impact is due to chance.
8. All of the analyses in this report use revised calculations which incorporate the substantive issues raised by Dr. Bloom. The results leave unchanged the findings of age impact of the plan transition in my preliminary report:
  - a. Average Potential Wear-Away for older employees increases from 177 to 183 percent of the average for younger employees;
  - b. Potential Damages for older employees remain almost 17 times that for younger employees with the revisions (changing from 1662 to 1656 percent); and
  - c. Actual Damages remain about 12 times as high for older as for younger employees on average, (increasing from 1207 to 1255 percent).
9. Besides the issues resolved by our revised calculations, all of the other concerns which Dr. Bloom raises are the result of inconsistencies and gaps in defendants' data. Dr. Bloom inappropriately criticizes our reliance on defendants' data.

10. Dr. Bloom's report is founded on two inappropriate assumptions. Dr. Bloom analyzes age 65 benefits, and uses January 1, 1998 to classify ages of employees. Both assumptions violate the class definition and complaint, distort Dr. Bloom's analysis and invalidate his conclusions.
11. Very few AT&T employees work into their sixties. Therefore, Dr. Bloom's assumption that employees only commence benefits at 65 is highly unrealistic. AT&T's payroll and pension data show that 99.3 percent retire and commence benefits before age 65.
12. Dr. Bloom's use of January 1, 1998 to compute membership in the protected class is inconsistent with the court's order and inappropriately excludes thousands of class members.

These findings provide strong evidence that older employees suffered a systematic cessation in earning additional retirement benefits as a result of the pension plan transition that AT&T designed and implemented.

## **2. Transition to AT&T Cash Balance Plan**

The original and rebuttal reports of actuary Claude Poulin detailed the design of AT&T's "greater-of" transition plan.<sup>2</sup> By its construction this transition systematically subjected older employees to longer wear-away periods and greater losses of future benefits. Mr. Poulin describes alternative "A plus B" or "sum of" designs for plan transitions which are routinely used to avoid subjecting older employees to greater wear-away and damages. In fact, Mr. Poulin points out that the "A plus B" transition plan is statutorily required for all cash balance conversions after June 2005 by the 2006 Pension Protection Act.<sup>3</sup>

The AT&T transition included features which in combination with the greater-of formulation guaranteed that the burden of these negative impacts are borne disproportionately by older workers.

- AT&T excluded the value of previously-earned early retirement benefits, which was greater for older employees because of their proximity to retirement;
- Conversion factors used by AT&T to determine cash balances were based on higher discount rates for older employees.
- Monthly benefits earned under the new formula are also reduced relative to the prior plan 1.6 percent of pay formula. The rates for older employees are reduced more than the average, resulting in more years of wear-away before the value of the cash balance plan benefit reaches parity with the prior benefit.<sup>4</sup>

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<sup>2</sup>Claude Poulin September 22, 2008 Declaration, ¶8-17, 26-29; Poulin December 3, 2008 Rebuttal ¶2-4.

<sup>3</sup>Poulin Declaration, ¶27, citing P. L. 109-280, Section 701(a) (adding ERISA Section 204(b)(5)(B)(ii)-(iv)).

<sup>4</sup>Poulin Declaration, ¶25-41.

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. Neither Mr. Sher nor Dr. Bloom dispute that the greater-of formulation combined with the three factors detailed in Mr. Poulin's declaration caused the greater impact on older employees.

### **3. Response to Dr. Bloom's Report**

Defendants submitted a report by Dr. David Bloom on November 5, 2008,<sup>5</sup> which responds to my preliminary report, and the actuarial analysis prepared by Claude Poulin. Dr. Bloom's report is founded on two inappropriate assumptions. Dr. Bloom analyzes age 65 benefits, and uses January 1, 1998 to classify ages of employees.<sup>6</sup> Both assumptions violate the class definition and complaint, which specify that the class' claims concern wear-aways of age 55 and over benefits, and that November 19, 2001 is the determinative date for the protected class. These two inappropriate assumptions distort Dr. Bloom's analysis and invalidate his conclusions.

In addition, although it is not specifically stated, Dr. Bloom does not appear to produce a single actuarial calculation or analyze a single employee's pension records. He appears to rely entirely on the results of Mr. Poulin's calculations and the database of wear-away and damage amounts that I compiled for all employees. He likewise apparently fails to rely on any calculations, analyses or opinions authored by Mr. Sher.

#### **Inappropriate Use of Age 65 Benefits Masks Wear-Away**

The switch to using age 65 benefits is the primary way that Dr. Bloom avoids finding significant age impact of the plan transition. This is because the use of the higher age means that Dr. Bloom's analysis is looking at the age impact 10 years later, after most employees would have already suffered through their years of wear-away. The wear-away in his analysis is not reduced; he just examines the impact after the fact.

The plaintiffs' complaint is not about wear-aways and age 65 benefits. They are complaining about wear-aways in the benefits beginning at age 55. In fact, both AT&T and Mr. Sher expected no wear-away in the age 65 benefits.<sup>7</sup> Mr. Poulin agrees with this expectation, as stated in his original report.<sup>8</sup> In addition, Dr. Bloom's analyses misrepresent the impact on AT&T employees of the plan transition by focusing on benefits commencing at age 65. Very few AT&T employees remain employed until age 65, so that Dr. Bloom's analysis is irrelevant to the impact experienced by most employees.

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<sup>5</sup>David Bloom, *Report Submitted on Behalf of Defendants in the Matter of Engers et al. v. AT&T Inc. et al.*

<sup>6</sup> Bloom ¶ 8, 57-63, 67, and Exhibits 5 to 12.

<sup>7</sup>Sher Rebuttal Report, page 9; Poulin Rebuttal ¶ 4, referencing Exhibit CC (AT&T chart showing wear-away crossover by age and service).

<sup>8</sup>Poulin September 22, 2008 Declaration, ¶ 42; Poulin Rebuttal ¶10.

**Chart 1: Age at Later of Pension Date or Retirement**

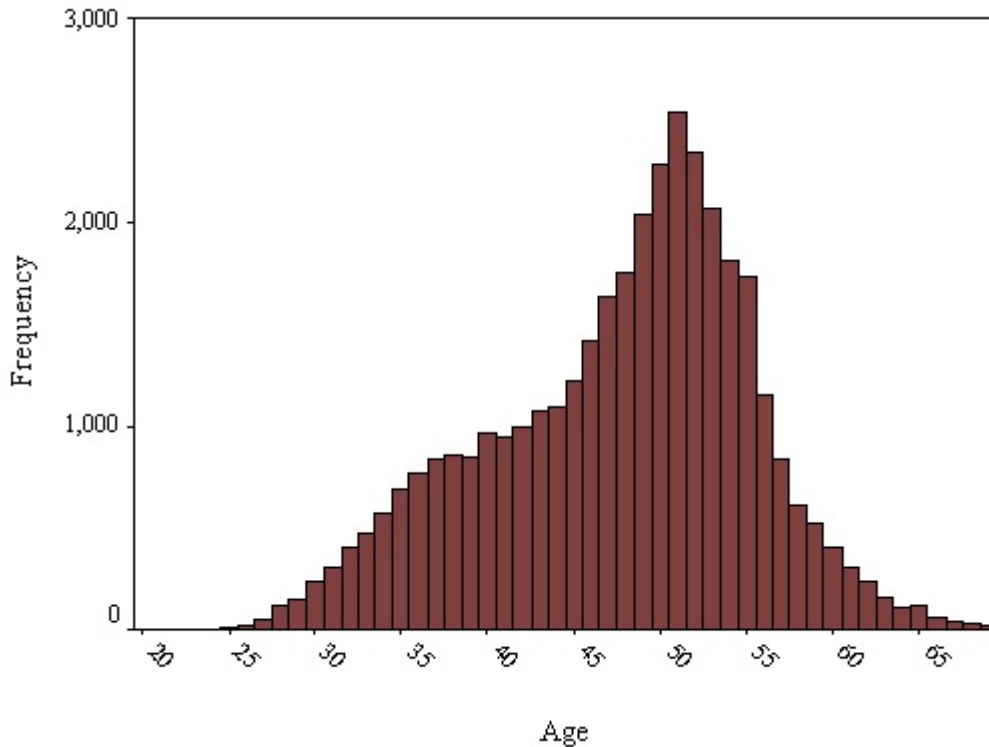


Chart 1 shows by the precipitous decline in employees after age 55, that very few employees work into their sixties. Therefore, Dr. Bloom’s assumption that employees commence benefits at 65 is highly unrealistic. AT&T’s payroll and pension data show that 84 percent of employees retire or have pension effective dates before reaching age 55, 90 percent before age 57, 96 percent before age 60 and 99.3 percent before age 65. As a result, only one to two percent of the active participants in AT&T’s plan are over age 60 from 1997 to 2005.<sup>9</sup> Unless employees wait to commence benefits years after they separate, Dr. Bloom’s analysis applies to very few employees at AT&T.

**Dr. Bloom’s Use of Age as of January 1, 1998 Inappropriately Eliminates Class Members**

Dr. Bloom’s use of January 1, 1998 to compute membership in the protected class is inappropriate because the class and collective action definitions dictate that November 19, 2001 should be used. The court specifically rejected AT&T’s request that the age cutoff date be January 1, 1998.<sup>10</sup> Dr. Bloom’s use of the incorrect date impacts membership in the class significantly. Table 1 below shows that thousands of class members would be inappropriately excluded using Dr. Bloom’s focus date.

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<sup>9</sup>1996 - 2005 AT&T Form 5500s.

<sup>10</sup>2007 WL 1557163 (D.N.J.).



<b>Table 1: Thousands of Class Members Inappropriately Excluded</b>			
<b>AT&amp;T Management Employees: 1997-2007</b>			
<b>Group</b>	<b>Total</b>	<b>Excluded by Dr. Bloom</b>	
		<b>#</b>	<b>%</b>
<b>Opt-Ins</b>	24,069	3,735	16%
<b>ADEA</b>	39,715	6,752	17%
<b>ERISA</b>	41,899	6,718	16%

### **Missing Comparators Hired After January 1, 1998**

There continues to be one particularly important omission in the data supplied by AT&T. Data was not supplied for individuals who have been hired by AT&T after January 1, 1998 and who have participated in this Pension Plan. Those individuals would not have any benefit losses from wear-aways of their previously-earned benefits, but would receive all of the benefits earned under AT&T's cash balance formula. If those individuals are primarily younger persons, their inclusion in this analysis would show even stronger relationships between the presence of wear-aways and age.

In paragraph 51 Dr. Bloom dismisses any issue regarding AT&T's failure to provide data for employees hired after January 1, 1998.<sup>11</sup> However, Dr. Bloom is discounting a group of potential comparators who participated in the new plan, and therefore could provide additional evidence of disparate impact of the plan on younger and older employees.

### **Age Disparity Is Uncontested from 6 Percent per Year Early Retirement Reduction**

Dr. Bloom offers no opposition to my analysis of the discriminatory impact of the 6 percent reductions for early retirement commencement before age 55. Claude Poulin's and my analyses of the age impact of reductions of the early retirement benefit before age 55 demonstrate significant additional damages that impact the class. Dr. Bloom's report does not address these early retirement damages and so leaves their impact uncontested.

### **Dr. Bloom's Suggested Substantive Modifications Confirm Age Disparities**

Dr. Bloom also lists details of our calculation method in fourteen bullets in his paragraph 38. Some of our methods he questions without specifying a correct method. For others he hints that an alternative method might be more appropriate, and for some he indicates a specific correction. In every case where an example is provided, a false impression of the significance of these concerns is given by Dr. Bloom's choice of the most extreme cases as "examples." Likewise Dr. Bloom fails to provide any sense of the magnitude of the overall impact of these issues. This subsection will

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<sup>11</sup>Bloom, ¶ 51.

respond to the substantive issues that Dr. Bloom raises, and document our revised calculations which incorporate those changes.

- **Interest Crediting Rates - bullet 7:** Dr. Bloom provides a list of corrected interest crediting rates for 2000 to 2002 at the top of page 14 in his report, with which Mr. Poulin agrees. These corrected rates are used in all wear-away and damage calculations in this report. The revised calculators do not anticipate the changes to interest crediting rates prior to years in which they were placed into effect, as specified by Mr. Poulin.<sup>12</sup>
- **Rounding Wear-Away - bullet 3:** Dr. Bloom criticizes that our calculation of wear-away inappropriately rounds up to the nearest whole year of wear-away, claiming that this biases our results.<sup>13</sup> We have revised Mr. Poulin's calculators to compute wear-away to the nearest tenth of a year, and all results in this report use the revised calculators. The results shown in Table 2 and following demonstrate that this revision results in only a 3 percent reduction in actual damages for all employees.
- **1997 Wear-Away - bullets 4-6:** Dr. Bloom also criticizes our calculation of wear-away in 1997. He makes somewhat contradictory complaints that we should not find any wear-away in 1997 (fourth bullet), and then later that we should not calculate zero wear-away in 1997 if the person is not out of wear-away by the end of the year (fifth bullet). Mr. Poulin and Mr. Sher agree that pay credits were assigned for 1997 and that wear-away occurred in that year.<sup>14</sup> We have created a modified version of the wear-away calculator that includes fractional years of wear-away for 1997 in addition to the other revisions. The revised calculations used in this report include the impact of this change.<sup>15</sup> The results demonstrate that this adjustment has virtually no impact on the calculations of wear-away: less than one-tenth of one percent change in actual and potential wear-away and damages.

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<sup>12</sup>Poulin Rebuttal, ¶ 17.

<sup>13</sup>Bloom, ¶ 38, third bullet and ¶ 67 n.11.

<sup>14</sup>Poulin, ¶ 15.

<sup>15</sup>Potential wear-away and damages computed for wear-aways ending in 1997 are included in Attachment 1. The same values are used for the revised actual wear-away and damages.

<b>Table 2: Revised Computations Confirm Impact of Transition</b>				
<b>AT&amp;T Management Employees: 1997-2007</b>				
<b>Value</b>	<b>Preliminary Report</b>	<b>Revised Calculations<sup>16</sup></b>		<b>% Change</b>
		<b>Value</b>	<b>Change</b>	
<b>Average Potential Wear-Away</b>	6.9	6.2	(0.7)	-11%
<b>Total Potential Damages (Millions)</b>	\$3,304	\$2,969	(\$334)	-10%
<b>Average Actual Wear-Away</b>	4.3	3.6	(0.7)	-17%
<b>Total Actual Damages with Early Retirement (Millions)</b>	\$2,352	\$2,276	(\$75)	-3%

Table 3 compares revised results for employees under 40 and employees 40 and over. The ratio of the outcome for older employees to younger employees is shown as the Adverse Impact Ratio, which provides a convenient measure of the relative disparity of the impact of the plan due to age. This chart shows that incorporating all of Dr. Bloom’s revisions leaves the impact on older employees nearly unchanged from my preliminary report. Even though the revised computations reduce the impact on older employees, they reduce the impact for younger employees proportionately. This results in similar levels of age disparity in outcomes as found in my preliminary report.

For example, Table 3 shows that the Average Potential Wear-Away for older employees increases from 177 to 183 percent of the average for younger employees. Similarly, the Potential Damages for older employees remain almost 17 times that for younger employees with the revisions (changing from 1662 to 1656 percent). Actual Damages remain about 12 times as high for older as for younger employees on average, (increasing from 1207 to 1255 percent).

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<sup>16</sup>Revised calculations include the computation of wear-away in tenths of a year, including 1997, and the interest crediting rate corrections.

<b>Table 3: Revised Computations Confirm Disparate Impact: Under 40 vs. 40 and Over</b>			
<b>AT&amp;T Management Employees: 1997-2007</b>			
<b>Value</b>	<b>Age Group</b>	<b>Preliminary Report</b>	<b>Revised Calculations<sup>17</sup></b>
<b>Average Potential Wear-Away</b>	Under 40	4.3	3.7
	40 and Over	7.6	6.8
	Adverse Impact Ratio	177%	183%
<b>Average Potential Damages</b>	Under 40	\$187	\$169
	40 and Over	\$3,111	\$2,800
	Ratio	1662%	1656%
<b>Average Actual Wear-Away</b>	Under 40	3.4	2.9
	40 and Over	4.6	3.7
	Ratio	134%	128%
<b>Average Actual Damages with Early Retirement</b>	Under 40	\$180	\$168
	40 and Over	\$2,172	\$2,108
	Ratio	1207%	1255%

### **Dr. Bloom's Other Data Criticisms**

All of the other concerns which Dr. Bloom raises are created by inconsistencies and gaps in defendants' data. This subsection will respond to these issues, and demonstrate that most of Dr. Bloom's issues have no material impact on wear-away or damages. Dr. Bloom inappropriately criticizes our reliance on defendants' data. As Dr. Bloom's report notes, we already excluded 8,964 employees with missing or anomalous information. He provides no clarification or additional solutions except the excision of greater and greater numbers of employee records. Defendants are responsible for their own data, and defendants are in the best position to provide corrections and clarification, but Dr. Bloom's report provides no additional data or clarification.

Moreover, all of the "examples" that Dr. Bloom provides are misleading and far from representative. In every example he picks the instance with the single greatest disparity between his suggested method and the value that we used. Rather than illuminating confusions in defendants' data, Dr. Bloom obfuscates these issues by producing the most misleading examples possible. I have not

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<sup>17</sup>Revised calculations include the computation of wear-away in tenths of a year, including 1997, and the interest crediting rate corrections.

changed the calculations in response to the following concerns, although I report the results of tests that show that our results would not be altered by these issues.

### **Use of SUB and FAB Amounts**

Dr. Bloom takes a shot gun approach in his criticisms of our selection of the value to use for the Special Update or alternatively, the Frozen Accrued Benefit.<sup>18</sup> These complaints stem from the fact that defendants' data sometimes do not include both amounts, and sometimes include multiple values of these amounts. The calculations in my preliminary report consistently used the maximum SUB on the transition date if there was no FAB value, or the maximum FAB if no SUB value was recorded on that date. Dr. Bloom variously implies that:

- including employees without both a SUB and a FAB amount is inappropriate (paragraph 38);
- the use of the highest SUB amount on the transition date is inappropriate (bullets 10 and 11); and that
- the use of the highest FAB value when there is no SUB is inappropriate (bullets 9 and 11).

I will respond to each of these criticisms below.

### **Use of Records Without Both SUB and FAB Values**

There are 813 records with SUB values but no FAB. I understand that there is no reason to exclude those records, particularly because the SUB is almost always higher than the FAB, and a lower FAB amount would not affect the calculation of wear-away. I have tested the results with those records excluded and the results do not change our findings of disparate impact. For final damage determinations, discrepancies in these records would still need to be resolved so Dr. Bloom's suggested exclusion would only postpone that process.

There are 2,013 records with FAB values but no SUB. I understand that this is an expected condition, as many employees were not eligible for the SUB. Therefore there is no reason to exclude those records. I have tested the results with those records excluded and the results do not change our findings of disparate impact. For final damage determinations, discrepancies in these records would again need to be resolved.

### **Selection of One Amount From Multiple SUB or FAB Values**

In our computation we use the maximum SUB on the transition date, or the maximum FAB on that date if a SUB amount is not recorded. Use of the amounts recorded on the transition date is appropriate as it is unknown whether later dates reflect the impact of the transition or later events in the employee's history. However, in footnotes 4 and 5 Dr. Bloom implies an alternative method for selecting the correct SUB or FAB amount based on comparing amounts recorded on the transition date with amounts recorded on later dates. Rather than selecting the maximum amount if multiple amounts are recorded on the transition date, Dr. Bloom implies that it would be

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<sup>18</sup>Bloom, ¶38, bullets 8 - 12.

appropriate to select the amount that matches an amount recorded for a later date.

Table 4 below shows that Dr. Bloom’s method would be used for very few employees, and his method would result in a minimal difference relative to our method in those cases. Dr. Bloom’s method could be applied for less than four percent of employees. In those few cases the difference between Dr. Bloom’s method and the method used in our analyses is always less than 3 percent for SUB amounts, and less than 11 percent for FAB amounts. Therefore the expected impact on results would be less than two-tenths of one percent.

<b>Table 4: Minor Differences from Methods for Selecting SUB or FAB Amounts</b>							
<b>All AT&amp;T Management Employees: 1997-2007</b>							
<b>Amount</b>	<b>Cases with Difference Between Dr. Bloom and Plaintiff Method</b>					<b>Dr. Bloom’s Examples</b>	
	<b>Count</b>	<b>Average Plaintiff Amount</b>	<b>Average Dr. Bloom Amount</b>	<b>Difference Between Methods</b>		<b>Difference</b>	<b>Worst Case?</b>
				<b>Average</b>	<b>%</b>		
<b>SUB</b>	1,791	\$1,100	\$1,066	\$34	3%	\$2,672	Yes
<b>FAB</b>	376	\$967	\$865	\$102	11%	\$5,539	Yes

Table 4 also shows how the “examples” that Dr. Bloom provides in his footnotes are misleading and far from representative. In both examples he picked the instance with the single greatest disparity between his suggested method and the value that we used. Rather than illuminating confusions in defendants’ data, Dr. Bloom obfuscates these issues by producing the most misleading examples possible.

In his own calculations, Dr. Bloom appears to use the higher of the SUB or the FAB, as we did, though he does not state whether he is using the highest amount recorded on the transition date, or on all dates.<sup>19</sup> In either case, his amount would be as high or higher than that used in our analysis. Therefore, Dr. Bloom endorses selecting the SUB/FAB amount in a way that would produce at least as great a wear-away and damages as our method does.

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<sup>19</sup>Bloom, ¶60.

## Low 1997 Salaries

Dr. Bloom lists several examples of anomalously low salaries in 1997.<sup>20</sup> Some are related to the fact that this is the first year of the analysis, for example, because of transfers into management during 1997. The solution Dr. Bloom employs is to exclude employees with 1997 salaries below \$10,000. Dr. Bloom's remedy changes potential wear-away and damages, but does not have a material impact on these outcomes. However, a low 1997 salary does not produce any error in actual wear-aways or damages, since those calculations are based on actual salary records for every year after 1997.

Therefore it would be completely inappropriate to remove these employees from the actual calculations, and counterproductive to remove them from the potential calculations. Table 5 shows that removing employees with 1997 salaries less than \$10,000 eliminates only 33 persons from our analysis, and changes potential wear-away and damages by 0.23 percent or less. In addition, Dr. Bloom's two examples in these bulleted paragraphs are highly unrepresentative and may give a false perception of systemic problems.<sup>21</sup>

<b>Table 5: Minimal Effect from Removal of 33 Employees with 1997 Salaries &lt;\$10,000</b>				
<b>AT&amp;T Management Employees: 1997-2007</b>				
<b>Value</b>	<b>Revised Calculations</b>	<b>Excluding 1997 Salary &lt;\$10,000</b>		<b>Change</b>
		<b>Value</b>	<b>Reduction</b>	
<b>Employees</b>	51,014	50,981	(33)	-0.06%
<b>Average Potential Wear-Away</b>	6.201	6.199	(0.002)	-0.04%
<b>Total Potential Damages (Millions)</b>	\$2,970	\$2,969	(\$0.2)	-0.01%
<b>Average Actual Wear-Away</b>	3.569	3.571	0.002	0.05%
<b>Total Actual Damages with Early Retirement</b>	\$2,281	\$2,276	(\$5.2)	-0.23%

<sup>20</sup>Bloom, ¶ 38, bullets 1 and 2, and 39.

<sup>21</sup>**HRID #1164123:** Dr. Bloom picks this employee to illustrate a low 1997 salary followed by a high 1998 salary. However, Dr. Bloom picks the individual that is the most extreme case. No other employee had a 1998 salary that was as high relative to their 1997 salary as this example: 35 times their 1997.

**HRID #8400329:** Dr. Bloom selects this person to illustrate a low 1997 salary that resulted in high potential wear-away. However, he again picked an unrepresentative extreme example. In any case, my revised calculations eliminate any issue regarding this case, since this person had no potential wear-away using the revised calculators.

### **Removal of Highly Compensated**

Dr. Bloom confirms my exclusion of 312 executives with high salaries because their SUB amounts do not reconcile with their opening cash balance, but states that one additional employee should have been excluded by this criterion.<sup>22</sup> However, he does not identify that employee so I am unable to exclude that employee from these analyses.

### **Inappropriate Exclusion of 496 Employees**

Dr. Bloom mentions without explanation that 496 individuals were “inappropriately excluded” from my analysis. I could not include these individuals without further information.<sup>23</sup>

### **Incorrect Birth Dates**

Dr. Bloom claims that I used the incorrect birthday for two individuals due to invalid dates in defendants’ data. However, he did not provide the correct dates. A correct date was determined for one of these individuals and that record was revised in all analyses presented in this report.<sup>24</sup>

### **Impact of Voluntary Retirement Incentive Plan (VRIP)**

Dr. Bloom incorrectly states that my report “provides no indication” that I considered the impact of the Voluntary Retirement Incentive Plan (VRIP) on separations subsequent to the transition. However, on page 7 of my Preliminary Report I state that “[t]he periods of actual wear-away for older employees are greatly impacted by early retirement incentive and other force management programs. AT&T had an early retirement incentive program in 1998 (the VRIP) that induced 15,500 managers to leave AT&T in 1998 and 1999, 88 percent of whom were older employees in their 40’s and 50’s. When the employees who left under the VRIP are not included, the average period of actual wear-away for employees 40 and over rises to 5.4 years.”<sup>25</sup> Using the revised calculations the average period of actual wear-away for employees 40 and over rises from 3.7 to 4.9 years when employees who accepted the VRIP are excluded.

### **Additional Concerns with Dr. Bloom’s Analysis**

In addition to his use of the age 65 benefit, the incorrect age cutoff date, and the misleading data criticisms, Dr. Bloom compromises the integrity of his report by several serious flaws in his analyses. Two are reviewed in this subsection.

### **Cavalier Removal of Employees from Calculations Because of Warning Flags**

Dr. Bloom reduces the ability of the court to trust his analysis by cavalierly removing thousands of individuals from his already “corrected” sample, based on the appearance of an undocumented

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<sup>22</sup>Bloom, ¶ 32 and 38, bullet fourteen.

<sup>23</sup>Bloom, ¶ 39.

<sup>24</sup>Bloom, ¶ 39.

<sup>25</sup>Bardwell, *Preliminary Report*, page 7.



“warning flag.” Dr. Bloom excludes thousands of individuals based on this flimsy justification.

In Exhibit 9 to his report, Dr. Bloom runs calculations where he excludes 4,537 individuals from the “Bardwell sample” and 4,001 records from his own “corrected sample” on the basis of “Warning Flags.” Dr. Bloom’s Exhibit 8 also excludes an unspecified number of observations “with Flags.” In his report, Dr. Bloom twice mentions that there are warning flags that indicate that SUB or FAB values may be incorrect or wrong.<sup>26</sup>

I have reviewed the database of electronic warning flags that was supplied in July 2008 after plaintiffs raised questions about the calculation of the FAB amount for named Plaintiff Warren McFall. However, I understand that no documentation was provided with those warning flags. I have reviewed the records containing warning flags in the database and do not find any that apparently relate to the correctness of SUB or FAB values.

A larger question is raised by Dr. Bloom’s failure to provide any evidence that the warning flags justify removal of thousands of employees. He claims over four thousand should be removed, but does not mention that 19,761 of the 51,015 participants in our sample have one or more “Warning Flags.” Dr. Bloom’s Exhibit 9 summarily reduces the number of employees to be excised to 4,537, but he provides no explanation for his selection.

### **Reliance on FAB Data Questionable**

Dr. Bloom’s report contains numerous analyses that attempt to assess the impact of the plan transition in the absence of the Special Update. These analyses are again flawed by examining the age 65 benefit. In these analyses Dr. Bloom also relies entirely on the FAB data, ignoring the demonstrated inconsistency of FAB values. Dr. Bloom does not address the concern regarding FAB reliability demonstrated by Mr. Poulin.<sup>27</sup>

## **4. Dr. Bloom’s Regression Confirms Statistically Significant Impact of Age**

My preliminary report explains why regression analysis is a potentially misleading tool in this case, because the age impact of the plan restructuring was predetermined and formulaic, and many of the relevant factors are highly correlated. However, if multivariate regression is used, the statistical significance of the effect of age on wear-away is found to be so extreme that it rules out the possibility that the impact is due to chance.

### **Age Impact Predetermined by Transition Plan**

The existence and length of potential wear-away can be calculated from four values for each employee: age, 1997 salary, opening cash balance account balance, and the higher of the benefit established by the Special Update or the Frozen Accrued Benefit. For actual wear-away, actual salary rather than projected salary is used. Age is positively correlated with years of wear-away:

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<sup>26</sup> Bloom, ¶ 31 and 38, bullet 12.

<sup>27</sup>Poulin Rebuttal, ¶ 26.

as age increases, the years of wear-away also increase. Service is a factor only through its impact on the amount of the Special Update or the Frozen Accrued Benefit. Service, salary, cash balance account, and the amount of the prior benefits are all 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 level of the now-frozen benefits that could be acquired by an employee of age 50 would be unachievable for a 30 or 40 year old employee.

### **Preliminary Report Provided Multivariate Regression Results**

My preliminary report explains why regression analysis is a potentially misleading tool in this case because the age impact of the plan restructuring was predetermined and formulaic. For that reason, I limited my presentation to the high level results from regression analysis, sufficient to demonstrate that regression analysis would support a finding that age has a high level of statistical significance in this 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 was built into the transition plan by defendants.

Dr. Bloom claims that my preliminary report omits “key details of regression analysis.”<sup>28</sup> However, attached to my report was a database of all of our wear-away and damage computations for the 50,015 employees in our file, and the spreadsheets that Mr. Poulin created to produce those computations. In contrast, Dr. Bloom produced none of his computational procedures or results. In addition, I provided the same model specifications that Dr. Bloom does for his regression analysis:

- **Dependent variables:** Potential and actual wear-away, fully documented in my report by the actual calculators that were used to determine wear-away;
- **Independent variables:** Age, salary, cash balance account value and the frozen prior benefit:
  - these variables were listed in footnote 9;
  - all were included in the database I supplied with my report;
  - all were defined in detail in my report, and used without confusion by Dr. Bloom in all other computations in his report; and

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<sup>28</sup>Bloom, ¶ 60.

- all programs used to compute these variables where required (e.g., age) were provided in the wear-away calculators.
- **Statistical significance of age:** Reported for both dependent variables:
  - Potential Wear-Away: 77 standard deviations (99 standard deviations in the revised analysis presented in this report);
  - Actual Wear-Away: 17 standard deviations (18 standard deviations in the revised analysis presented in this report).

Dr. Bloom could replicate our findings by applying the same computer program that he used to conduct his regression analysis. His results would replicate our findings if he used the age 55 or over benefits and the specification regarding the November 19, 2001 date in the ADEA class definition. Dr. Bloom's regression analyses fail to find statistically significant age impact simply because of the two inappropriate changes in assumptions that he made which invalidate his results throughout his report: the substitution of age-65 benefits to compute wear-away and his use of January 1, 1998 as the focus date.

### **Multivariate Regression Shows a Strong Relationship Between Age and Wear-Away**

In this subsection I present some detailed results from regression models constructed per Dr. Bloom's specifications.<sup>29</sup> These multivariate regression analyses of wear-away and damages use Dr. Bloom's method with his "Bardwell Sample." In addition to Actual Wear-Away, I derive results for regressions for Potential Wear-Away, and Potential and Actual Damages. Departures from Dr. Bloom's method are limited to those required to remedy his unsupported assumptions, as follows:

- age 55 and over benefits, rather than age 65 benefits are used; and
- age is defined as the age of the employee, not as a dichotomous variable that takes a value of 1 if the employee is 40 or older, which eliminates the issue of the focus date.

Table 6 reports the results of these regressions, which confirm the findings presented in my preliminary report. This table shows that age had a practically and statistically significant impact on each outcome. The table shows that age is a statistically significant factor at extremely high levels for each outcome, far exceeding the 0.05 *prima facie* threshold. The statistical significance reached a  $10^{-15}$  level or better for all outcomes except Actual Wear-Away, where it was still 0.00002.

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<sup>29</sup>Per Dr. Bloom's specifications in Exhibit 9 to his report, these models use the following specifications:

- Wear-Away is defined as the duration (measured in years), after 1/1/1998, that it takes for the Monthly Annuity under the CBP to exceed the maximum of the SUB or the FAB;
- OLS Regression reports the estimated coefficients and associated t-statistics, of the Age dichotomous variable in an Ordinary Least Squares regression of the wear-away period (measured in tenths of a year);
- Coefficients (and t-statistics) that are statistically significant at the 95% level (two-tail test) are bolded;
- Tobit Regression reports the estimated coefficients and associated t-statistics, of the Age dichotomous variable in a Tobit regression of the wear-away period (measured in tenths of a year);
- Coefficients (and t-statistics) that are statistically significant at the 95% level (two-tail test) are bolded;
- The regression control variables (in addition to the Age variable) include 1997 Salary, Opening Cash Balance as of January 1, 1998, and the greater of the FAB or the SUB.

Consider that this means that if you created a new plan transition without age bias every two seconds since the earth was created about 4.5 billion years ago, you would expect one of them to have this great an impact on older employees' Actual Damages, and none of them to have this great an impact on Potential Wear-Away or Potential Damages.

If age were not a significant factor in wear-away and damages resulting from the plan transition, 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.

<b>Table 6: Effect of Age on Wear-Away and Damages</b>				
<b>All AT&amp;T Management Employees: 1997-2007</b>				
<b>Value</b>	<b>r<sup>2</sup>: Proportion of Variation Explained</b>	<b>Statistically Significant at 0.05 Level</b>	<b>Statistical Significance or Probability (Std. Dev.)</b>	<b>Likelihood if Age-Neutral</b>
<b>Potential Wear-Away</b>	0.32	Yes	3 x 10 <sup>-23</sup> (99)	3 in 100 billion trillion
<b>Potential Damages</b>	0.91	Yes	7 x 10 <sup>-25</sup> (106)	7 in 10 trillion trillion
<b>Actual Wear-Away</b>	0.04	Yes	0.00002 (18)	2 in 100,000
<b>Actual Damages with Early Retirement</b>	0.57	Yes	7.5 x 10 <sup>-16</sup> (65)	8 in 10,000 trillion

The regression models reported in Table 6 are successful in estimating damages, capturing 57 to 91 percent of the variation in damages between employees. This indicates that important factors in the effect of the plan transition are included in the model. The success of the model is reflected in the value of r<sup>2</sup>, listed in the third column in Table 6. The “r<sup>2</sup>” column may be interpreted as the proportion of variation in the outcome which is successfully represented by the model.

The “Statistical Significance or Probability” column indicates the probability that wear-away and damages for older employees would be as high as they are if the plan transition were independent of age (and the standard deviations associated with this disparity). The “Likelihood” column indicates how often this high of a disparity would be observed in an age-neutral transition.

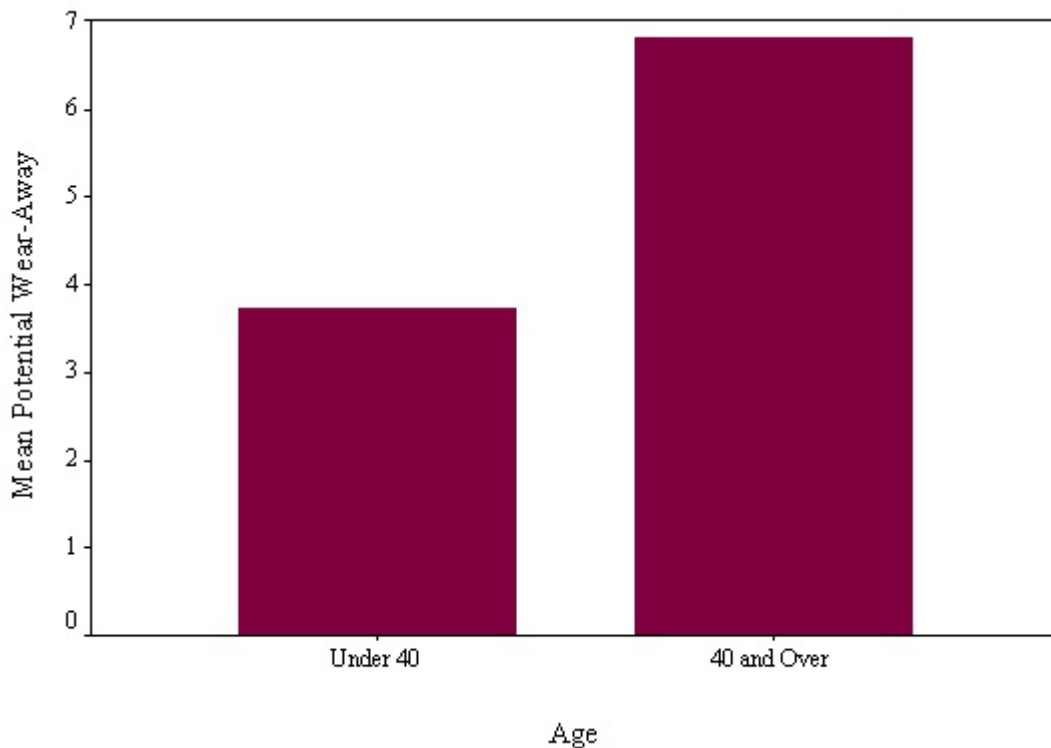
## 5. Wear-Away Duration Strongly Associated with Age

I have replicated sections 4 and 5 of my original report with the revised calculations of wear-away to tenths of a year, and employing the corrected interest crediting rates mentioned in Section 3.

### Potential Wear-Away Increases with Age

Chart 2 compares the average potential 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 transition resulted in employees 40 and over waiting on average almost seven years while they earned no additional benefits, versus just under four years on average for employees under 40. The average wear-away for older employees was 6.8 years, versus 3.7 for younger employees, so that older employees had on average 183% the potential wear-away of younger employees.

**Chart 2: Duration of Potential Wear-Away By Employee Age**

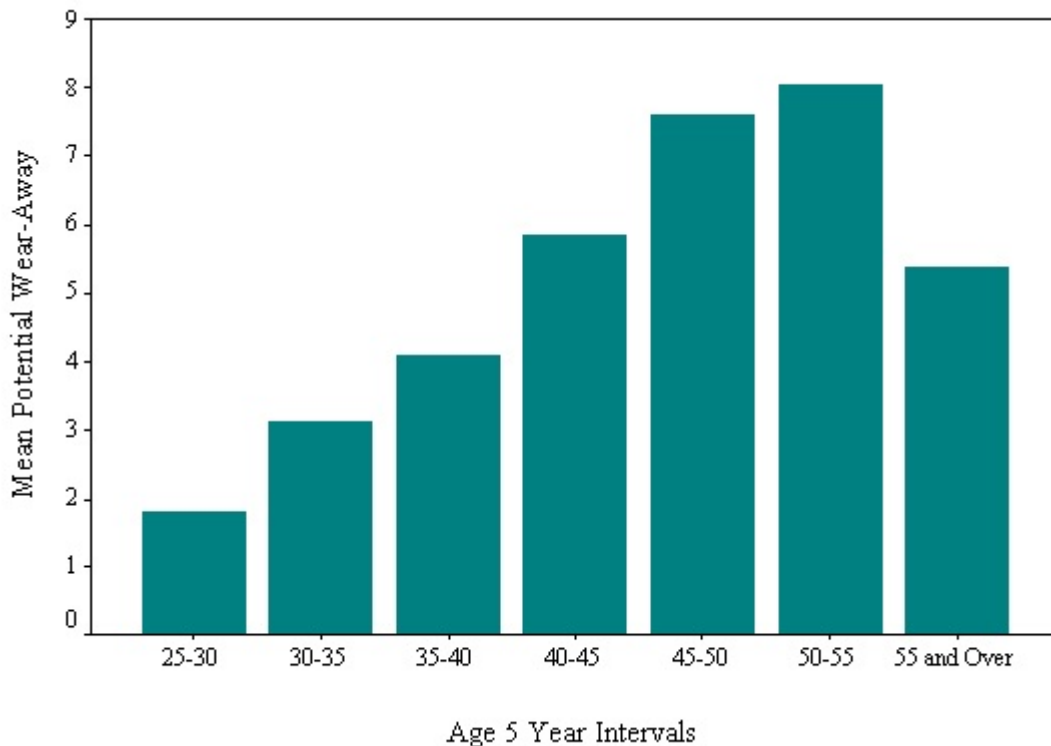


Potential wear-away is similarly elevated for ERISA and ADEA class members. ERISA class members experience 7.0 years of potential wear-away on average, versus 3.0 for non-members. ADEA class members experience 7.1 years of potential wear-away, versus 3.4 for non-members.

Chart 3 shows that, except for the truncation of wear-away as employees near retirement age, age is strongly related to longer wear-away periods. For every five year increase in the employee's age, the potential wear-away period on average becomes one and one-quarter years longer.

The impact gradually starts to decline between ages 55 and 60. As mentioned, AT&T's payroll and pension data show that 84 percent of employees retire or have a pension effective date before reaching age 55, 90 percent before age 57, 96 percent before age 60 and 99.3 percent before age 65. As a result, only one to two percent of the active participants in AT&T's plan are over age 60 from 1997 to 2005.<sup>30</sup>

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



### Actual Wear-Away Impacts Older Employees

The AT&T transition resulted in a similar relationship between age and length of *actual* wear-away as for potential wear-away. The average actual wear-away for employees 40 and over was 3.7 years, versus 2.9 for younger employees, so that older employees had on average 128% the actual wear-away of younger employees. Actual wear-away is also elevated for ERISA and ADEA class members. ERISA class members experience 3.8 years of potential wear-away on average, versus 2.5 for non-members. ADEA class members experience 3.9 years of potential wear-away, versus 2.6 for non-members. Chart 4 shows that, except for the truncation of wear-away as employees near retirement age, age is strongly related to longer actual wear-away periods.

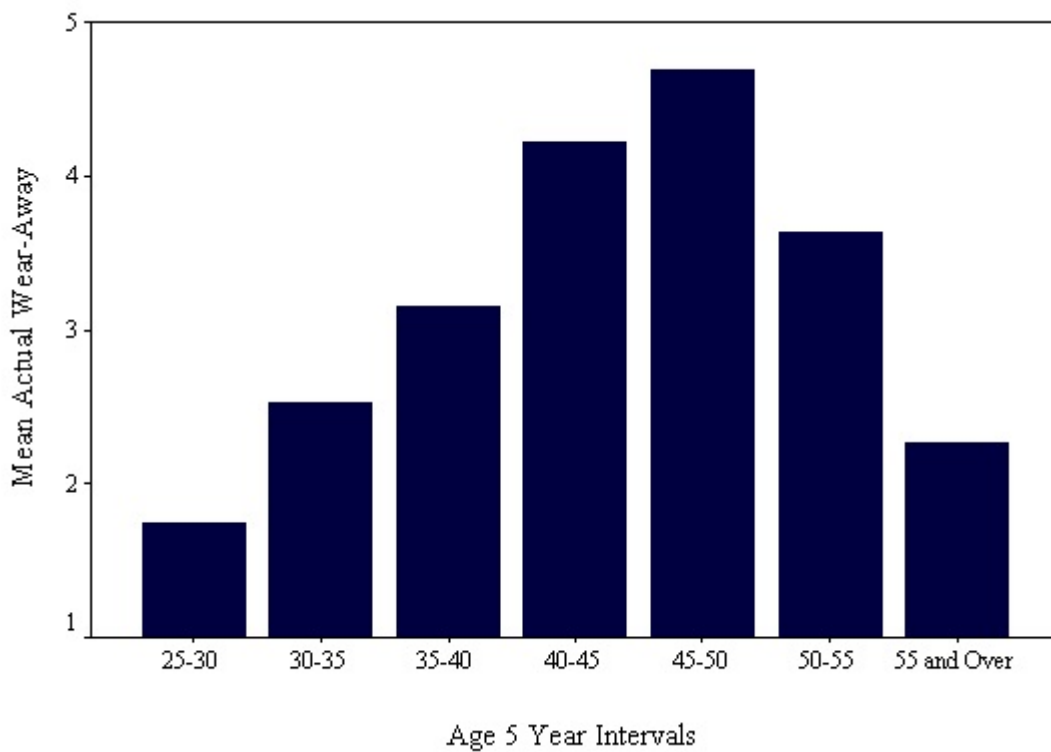
The periods of actual wear-away for older employees are greatly impacted by early retirement

<sup>30</sup>1996 - 2005 AT&T Form 5500s.

incentive and other force management programs. AT&T had an early retirement incentive program in 1998 (the VRIP) that induced 15,500 managers to leave AT&T in 1998 and 1999, 94 percent of whom were older employees in their 40's and 50's. When the employees who left under the VRIP are not included, the average period of actual wear-away for employees 40 and over rises from 3.7 to 4.9 years.

The periods of actual wear-away for the younger employees are also impacted by the fact that AT&T has not provided data for employees who were hired after January 1, 1998 and who have also earned benefits under this plan, none of whom would have any actual wear-aways of prior benefit amounts.

**Chart 4: Duration of Actual Wear-Away by Five-Year Age Intervals**



## 6. Calculation of Lost Retirement Benefits and Damages

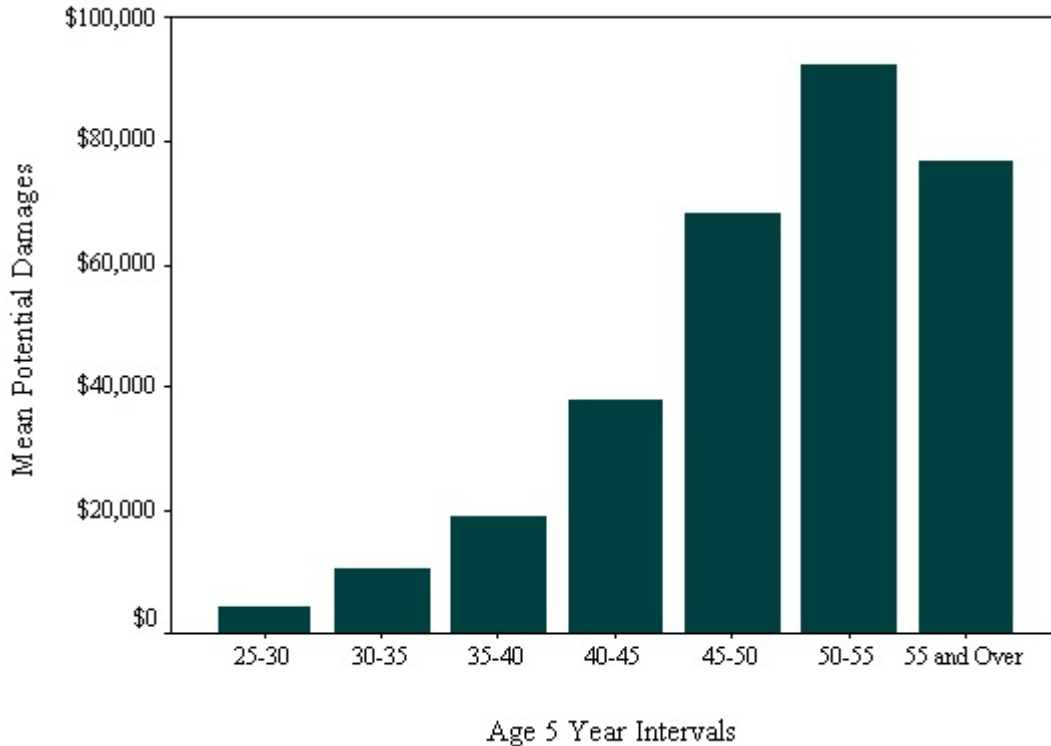
This section compares average potential and actual benefit losses by age, and the total potential and actual damages by age, reporting results from the revised calculations described above.

### Potential Losses in Retirement Benefits Disproportionately Impact Older Employees

The average loss in potential benefits by age group is shown in Chart 5. As with potential wear-away, potential damages reflect the losses that an employee at AT&T would see if he or she

continued to work through the end of wear-away. The losses are quite steep for all but the youngest employees. Employees who were between 50 and 55 were looking at an average loss of over \$90,000 in future benefits. The youngest employees on average have the smallest reductions in benefits.

**Chart 5 : Potential Damages by Five-Year Age Intervals**



**Early Commencement Penalty In Greater-of Formula Had Larger Impact on Older Employees**

In addition to the loss of future benefits, the greater-of transition provision in the new plan included an actuarially excessive reduction for commencement of the age 55 benefits before age 55 which resulted in substantial additional losses of previously-earned benefits. The amended retirement plan<sup>31</sup> provided for a one-half percent per month reduction in the frozen traditional benefit, or 6 percent per year, for commencing benefits before age 55.<sup>32</sup> The spreadsheets provided by Mr. Poulin were used to compute this early retirement penalty for all 25,407 individuals with early separation dates. Mr. Poulin’s spreadsheets were then applied to compare those reductions with actuarially-equivalent reductions and to compute the value of the lost benefits.

My revised results with the corrected interest crediting rates confirm that older employees suffered higher losses due to AT&T’s 6 percent per year reduction in retirement benefits for early commencement than did younger employees. The 6 percent reduction in benefits per year had the

<sup>31</sup>Section 4.06(a)(ii)(A)(2).

<sup>32</sup> Poulin Declaration, ¶ 45-46.



net effect of taking away part of the value of the Special Update Benefit for older employees, especially those whose employment ended shortly after the cash balance conversion.

### Actual Damages Greater for Older Employees

Employees lost benefits due to the plan transition from wear-away periods during which they earned no benefits, and from the early commencement penalty just discussed. Therefore, actual damages for employees were the sum of benefit losses due to both of these causes. Chart 6 depicts the average actual damages by age group as the sum of these benefit losses. This chart demonstrates that employees 40 and over experienced over three times the loss of younger employees.

**Chart 6: Actual Damages Sum Early Retirement and Wear-Away Losses**

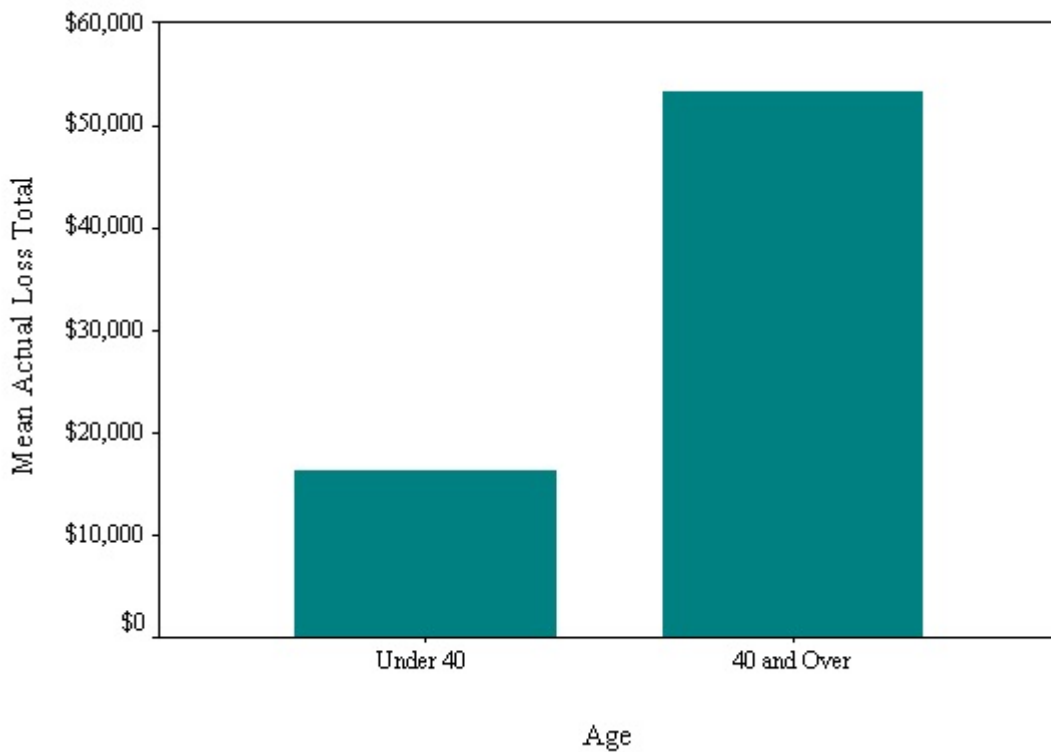
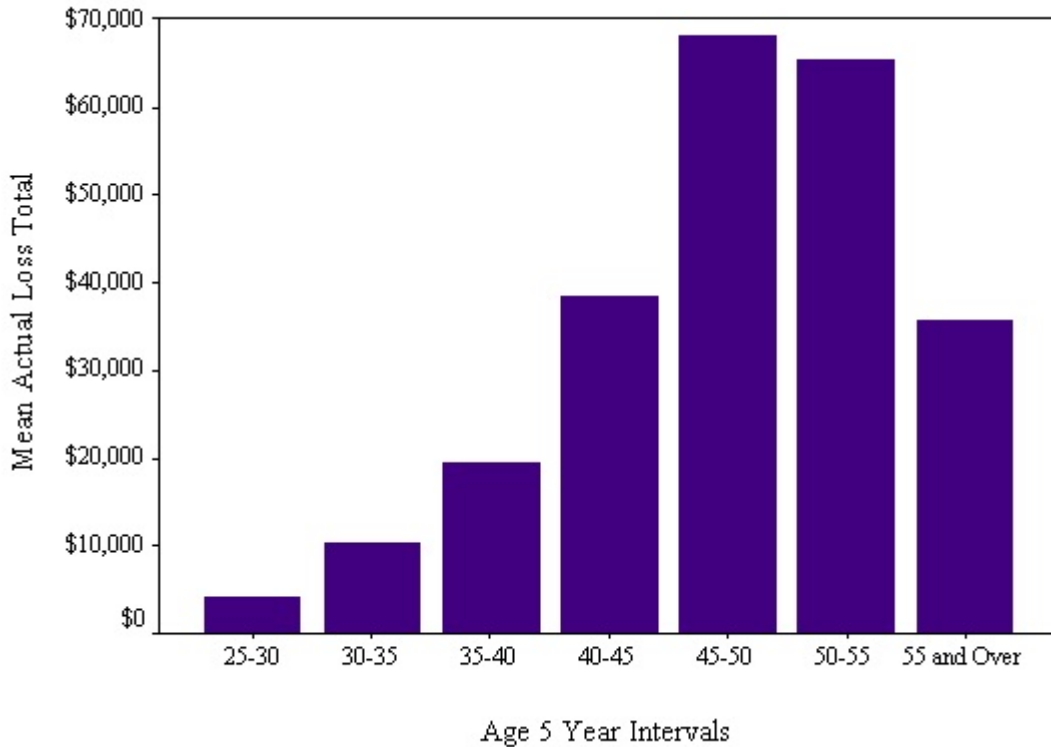


Chart 7 uses the same technique to display the sum of average actual early retirement and wear-away losses for five-year age groups. This chart shows the same pattern of age-related actual damages, with employees' losses increasing with age to almost \$70,000 before they decline as a result of the truncation of wear-away and early retirement penalties as retirement age is approached.

**Chart 7: Actual Damages by Five-Year Age Intervals**



**Older Employees Lost Disproportionate Amounts of Future Retirement Benefits**

The average loss in future retirement benefits by age group is shown in Table 7. Table 7 includes actual benefit losses from two sources: the loss of future retirement benefits due to wear-away, and the loss of early retirement benefits from the early commencement penalty.<sup>33</sup>

The losses are substantial for all but the youngest employees. Employees who were between 50 and 55 had on average over a \$90,000 loss in potential future benefits. The youngest employees on average have the smallest reductions in benefits.

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<sup>33</sup>The total column does not necessarily equal the sum of the other columns because each is an average of the age group, and losses from each cause vary by individual.

<b>Table 7 : Average Loss in Retirement Benefits By Age on Transition Date</b>				
<b>AT&amp;T Management Employees: 1997-2007</b>				
<b>Age Interval</b>	<b>Potential Loss in Future Benefits</b>	<b>Actual Retirement Benefit Losses</b>		
		<b>Wear-Away</b>	<b>Early Retirement</b>	<b>Total</b>
<b>20-30</b>	\$4,572	\$4,350	\$336	\$4,469
<b>30-35</b>	\$10,433	\$8,901	\$2,844	\$10,435
<b>35-40</b>	\$19,192	\$15,929	\$7,197	\$19,747
<b>40-45</b>	\$37,469	\$29,134	\$19,326	\$38,733
<b>45-50</b>	\$67,538	\$43,110	\$49,181	\$68,424
<b>50-55</b>	\$91,689	\$42,032	\$47,827	\$65,548
<b>55 and Over</b>	\$75,042	\$33,220	\$12,564	\$35,799

**Damages Calculations Reveal Older Employees Suffered Over 90% of Losses**

Totaling the damages for each employee with adequate data provides a calculation of the total damage resulting from the transition of the AT&T pension plan. The estimated damages are shown in Table 8. This table shows that over 92 percent of the damages were borne by older employees.

<b>Table 8: Total Losses in Retirement Benefits By Age on Transition Date</b>				
<b>AT&amp;T Management Employees: 1997-2007</b>				
<b>Age Interval</b>	<b>Potential Loss in Future Benefits (Millions)</b>	<b>Actual Retirement Benefit Losses (Millions)</b>		
		<b>Wear-Away</b>	<b>Early Retirement</b>	<b>Total</b>
<b>Under 40</b>	\$169	\$137	\$31	\$168
<b>40 and Over</b>	\$2,800	\$1,476	\$634	\$2,110
<b>Total</b>	\$2,970	\$1,614	\$665	\$2,278
<b>Under 40</b>	5.7%	8.5%	4.6%	7.4%
<b>40 and Over</b>	94.3%	91.5%	95.4%	92.6%

## 7. Conclusion

This report responds to the criticisms of defendants' experts, and reaffirms the demonstration in my preliminary report that older employees were adversely impacted by the pension plan transition engineered by AT&T. This report is based on the data produced to date. It bears reiterating that defendants' data deficiencies which resulted in the exclusion of employees from the analyses, will need to be corrected before damage calculations are complete. This report may be amended or a supplemental report submitted as a result of subsequent production by defendants.

## 8. 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

- The AT&T Management Pension Plan, amended and restated January 1, 1998.
- Copies of resolutions adopted by the Board of Directors of AT&T Corporation at a meeting held on April 16, 1997, amending the AT&T Management Pension Plan to provide the Special Update effective August 1, 1997 and to establish hypothetical cash balance accounts as of January 1, 1998.
- The Summary Plan Description of the 1998 AT&T Management Pension Plan.
- The Fourth Amended Class Action Complaint and Demand for Jury Trial.
- Fact Sheet, dated April 28, 1997, on the changes to the AT&T Management Pension Plan.
- Excel spreadsheets prepared by AT&T actuaries showing Crossover periods by Age and Service and showing Accrual Rates decreasing with Age.
- Letter dated April 28, 1997 from Harold Burlingame, AT&T Executive Vice President, to employees announcing changes to the AT&T Management Pension Plan.
- 1998 article by Harold Burlingame and Michael Gulotta, AT&T's Enrolled Actuary entitled "Case Study: Cash Balance Pension Plan Facilitates Restructuring the Workforce at AT&T" about AT&T's cash balance design and the features that effected older employees.
- Access databases and Excel spreadsheets of benefit data provided by AT&T for 59,979 plan participants.
- Declaration of Claude Poulin, September 22, 2008.
- Declaration of Claude Poulin, December 3, 2008.
- June 12, 2008 letter from defense counsel about calculation of the discrepancies in the data concerning Warren McFall's Frozen Accrued Benefit (Poulin Exhibit JJ).
- Query on Special Update to Frozen Accrued Benefit ratios in excess of 2.0 (Poulin Exhibit KK).
- *Report Submitted on Behalf of Defendants in the Matter of Engers et al. v. AT&T Inc. et al.*, David E. Bloom, November 5, 2008.
- *Report of Lawrence Sher*, Lawrence Sher, November 5, 2008.
- Engers v. AT&T, 2007 WL 1557163 (D.N.J.)

## Books

- Norusis, Marija J., *SPSS for Windows: Base System, Release 6.0*. SPSS, 1993.

## 9. 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**

Provided separately in electronic form.

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

### PERSONAL:

ROBERT A. BARDWELL  
4801 W. Yale Ave.  
Denver, Colorado 80219  
(303) 934-3851

### 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, 2008 -  
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 and deposed 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 from 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. Sundyne 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.