

## APPENDIX

### LISTING AND BRIEF DESCRIPTION OF TABLES IN THE APPENDIX

**Basic Assumptions Used for Retirement Tables [Appendix page iv].** This section describes the plan design and provides the demographic assumptions used in the retirement tables that follow in the Appendix. It also describes some underlying principles used in the tables.

**Summary Payout Table [Appendix page vi].** This table shows the payouts from the Cliff Retirement Table and Tables A-1, A-2, B-1, B-2, and B-3.

**Summary Present Value Table [Appendix page vii].** This table compares the actuarial value at age 70 of the benefits received before age 70 and the lifetime benefits payable after age 70 for the payouts in the Cliff Retirement Table and Tables A-1, A-2, B-1, B-2, and B-3.

**Cliff Retirement Table [Appendix page viii].** This table shows benefits under a typical cliff retirement pattern for a participant who works full-time until age 70 and then retires.

**Table A-1 [Appendix page ix].** This table shows the impact of phased retirement on a participant in a plan that averages compensation in the last five years of employment with no protection for those who do not work a full-time schedule. The participant in this example works 50 percent of a full-time schedule beginning at age 60 and fully retires at age 70. No retirement benefits are received during phased retirement.

**Table A-2 [Appendix page x].** This table shows the impact of phased retirement on a participant in a plan that averages compensation in the last five years of employment and in which compensation is annualized during phased retirement and a partial year of benefit service is earned. The participant in this example works 50 percent of a full-time schedule beginning at age 60 and fully retires at age 70. No retirement benefits are received during phased retirement.

**Table B-1 [Appendix page xiii].** This table shows the impact of phased retirement on a participant in a plan that averages compensation in the last five years of employment and in which compensation is annualized during phased retirement and a partial year of benefit service is earned. The participant in this example works 50 percent of a full-time schedule beginning

at age 60 and fully retires at age 70. The participant receives 50 percent of the age 60 accrued benefit during phased retirement. Early retirement and deferred retirement benefits are actuarially adjusted. The offset for in-service benefits received is limited to 50 percent of the accrued benefit because the participant is receiving only 50 percent of the age 60 accrued benefit during phased retirement.

**Table B-2 [Appendix page xiv].** This table shows the impact of phased retirement on a participant in a plan that averages compensation in the last five years of employment and in which compensation is annualized during phased retirement and a partial year of benefit service is earned. The participant in this example works 50 percent of a full-time schedule beginning at age 60 and fully retires at age 70. The participant receives 100 percent of the age 65 (normal retirement age) accrued benefit during phased retirement beginning at age 65. Early retirement and deferred retirement benefits are actuarially adjusted. The offset for in-service benefits received is applied to the full accrued benefit because the participant is receiving 100 percent of the age 65 accrued benefit.

**Table B-3 [Appendix page xvi].** This table shows the impact of phased retirement on a participant in a plan that averages compensation in the last five years of employment and in which compensation is annualized during phased retirement and a partial year of benefit service is earned. The participant in this example works 50 percent of a full-time schedule beginning at age 60 and fully retires at age 70. The participant receives 50 percent of the age 65 (normal retirement age) accrued benefit during phased retirement beginning at age 65. Early retirement and deferred retirement benefits are actuarially adjusted. The offset for in-service benefits received is limited to 50 percent of the accrued benefit because the participant is receiving only 50 percent of the age 65 accrued benefit during phased retirement.

**Table C [Appendix page xx].** This table compares the following definitions of final average compensation:

- o *Decreasing Final Average Pay:* Final average pay is the average of the last five compensation amounts and final average pay decreases during phased retirement.
- o *Non-Decreasing Final Average Pay:* Final average pay is the average of the last five compensation amounts but not less than any prior final average pay. Unlike Decreasing Final Average Pay above, final average pay remains level during phased retirement.

- o *Average With Phased Years Annualized:* Compensation during phased retirement is annualized. Final average pay is the average of the last five compensation amounts using annualized compensation during phased retirement.
  
- o *Average Using Partial Years to Divide:* A partial year is used in the divisor during phased retirement years and compensation is *not* annualized. Final average compensation averages the last five compensation amounts and divides it by the sum of the portions of a full-time schedule worked in those five years. For example, after two years of working 50 percent of a full-time schedule, the divisor would be four: one for each of the three years in which the participant worked full-time and  $\frac{1}{2}$  for each of the two years the participant worked 50 percent of a full-time schedule.

## BASIC ASSUMPTIONS USED FOR RETIREMENT TABLES

### Underlying principles used in tables:

- Under current law, final average pay can decrease in a plan that uses the high  $x$  of the last  $y$  if the participant takes phased retirement and receives reduced pay for more than  $y - x$  years.
- Before normal retirement, the accrued benefit can decrease as a result of decreasing pay.
- The accrued benefit payable (after early retirement reduction) cannot decrease as a result of decreasing pay.
- Benefits are payable annually at the beginning of the year.

### Plan provisions used in tables:

#### *Benefit Formula:*

$1\% \times \text{Final Average Pay} \times \text{Credited Service}$  [No service cap]

#### *Normal Payment Method:*

Single life annuity payable annually

#### *Final Average Pay (FAP):*

Average of the five prior compensation amounts. At age 60, final average pay is the average of the compensation amounts from age 55 through age 59.

#### *Retirement Ages:*

Normal retirement: age 65

Early retirement: age 55 with 10 years of service

#### *Early Retirement Reduction and Late Retirement Increase:*

Actuarial adjustment using 6.15 percent interest and GATT mortality (blended GAM-83)

**Participant information assumed in table:**

Hire Age:	25 <sup>45</sup>
Salary at Hire:	\$25,000
Annual Salary Increase:	4%
Retirement Age:	See individual examples

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<sup>45</sup> The authors understand that it is not all that common for an employee to work for the same employer from age 25 until retirement. A participant's retirement decision will depend on the expected retirement income from all sources. However, it is cumbersome to show retirement benefits from several employers. This more common type of employment pattern does not provide the most straightforward illustration of various phased retirement designs on retirement plans. We have, instead, chosen to use a career employee to simplify our example.

### Summary Payout Table

<b>Comparison of Benefit Payments</b>							
<b>Age</b>	<b>Cliff Retirement</b>	<b>A-1</b>	<b>A-2</b>	<b>B-1</b>	<b>B-2</b>	<b>B-3</b>	<b>Age</b>
60	–	–	–	\$ 9,842	–	–	60
61	–	–	–	9,842	–	–	61
62	–	–	–	9,842	–	–	62
63	–	–	–	9,842	–	–	63
64	–	–	–	9,842	–	–	64
65	–	–	–	9,842	\$40,076	\$20,038	65
66	–	–	–	9,842	40,076	20,038	66
67	–	–	–	9,842	40,076	20,038	67
68	–	–	–	9,842	40,076	20,038	68
69	–	–	–	9,842	40,076	20,038	69
70+	\$70,763	\$35,383	\$66,342	50,737	40,076	53,209	70+

**Summary Present Value Table**

<b>Comparison of Actuarial Value of Benefits at Age 70</b>						
	<b>Cliff Retirement</b>	<b>A-1</b>	<b>A-2</b>	<b>B-1</b>	<b>B-2</b>	<b>B-3</b>
Accumulated value at age 70 of benefits received from ages 60 to 69	–	–	–	\$150,000	\$252,500	\$126,300
Present value at age 70 of future lifetime benefits	\$680,300	\$340,200	\$637,800	\$487,800	\$385,300	\$511,600
Actuarial value of past and future benefit payments at age 70	\$680,300	\$340,200	\$637,800	\$637,800	\$637,800	\$637,800

**Cliff Retirement Table**

**No Phased Retirement**

<b>Age</b>	<b>Salary</b>	<b>Final Average Pay</b>	<b>Benefit From Formula</b>	<b>Accd Ben Adj for Early or Late Ret</b>	<b>Accrued Benefit Payable<sup>46</sup></b>	<b>Benefit Received</b>	<b>Age</b>
60	\$ 98,653	\$ 87,838	\$30,743	\$19,684	\$19,684	–	60
61	102,599	91,351	32,886	22,934	22,934	–	61
62	106,703	95,005	35,152	26,748	26,748	–	62
63	110,971	98,805	37,546	31,230	31,230	–	63
64	115,410	102,757	40,075	36,510	36,510	–	64
65	120,026	106,867	42,747	42,747	42,747	–	65
66	124,827	111,142	45,568	47,029	47,029	–	66
67	129,820	115,587	48,547	51,869	51,869	–	67
68	135,013	120,211	51,691	57,360	57,360	–	68
69	140,414	125,019	55,008	63,612	63,612	–	69
70+	–	130,020	58,509	70,763	70,763	\$70,763	70+

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<sup>46</sup> Accrued Benefit Adjusted for Early or Late Retirement at current age, but not less than any prior Accrued Benefit Payable.



**Table A-1**

**Benefits Payable Only After 100% Retirement**

**Decreasing Final Average Pay**

**Full Year of Service Earned During Phased Retirement**

<b>Age</b>	<b>Salary</b>	<b>Final Average Pay</b>	<b>Benefit From Formula</b>	<b>Adjusted Accrued Benefit</b>	<b>Accrued Benefit Payable</b>	<b>Benefit Received</b>	<b>Age</b>
60	\$49,327	\$87,838	\$30,743	\$19,684	\$19,684	–	60
61	51,300	81,486	29,335	20,458	20,458	–	61
62	53,352	74,880	27,706	21,082	21,082	–	62
63	55,486	68,010	25,844	21,496	21,496	–	63
64	57,705	60,865	23,737	21,625	21,625	–	64
65	60,013	53,434	21,374	21,374	21,625	–	65
66	62,414	55,571	22,784	23,515	23,515	–	66
67	64,911	57,794	24,273	25,935	25,935	–	67
68	67,507	60,160	25,845	28,680	28,680	–	68
69	70,207	62,510	27,504	31,807	31,807	–	69
70+	–	65,010	29,255	35,383	35,383	\$35,383	70+

Note: Documentation for this table follows Table A-2.

**Table A-2**

**Benefits Payable Only After 100% Retirement**

**Final Average Pay Based on Annualized Pay During Phased Retirement**

**Partial Year of Service Earned During Phased Retirement**

<b>Age</b>	<b>Salary</b>	<b>Portion of Year Worked</b>	<b>Annualized Salary</b>	<b>Final Average Pay</b>	<b>Credited Service @ Beginning of Year</b>	<b>Benefit From Formula</b>	<b>Adjusted Accrued Benefit</b>	<b>Accrued Benefit Payable</b>	<b>Benefit Received</b>	<b>Age</b>
60	\$49,327	0.5	\$ 98,654	\$ 87,838	35.0	\$30,743	\$19,684	\$19,684	–	60
61	51,300	0.5	102,600	91,351	35.5	32,430	22,616	22,616	–	61
62	53,352	0.5	106,704	95,005	36.0	34,202	26,025	26,025	–	62
63	55,486	0.5	110,972	98,806	36.5	36,064	29,997	29,997	–	63
64	57,705	0.5	115,410	102,758	37.0	38,020	34,638	34,638	–	64
65	60,013	0.5	120,026	106,868	37.5	40,076	40,076	40,076	–	65
66	62,414	0.5	124,828	111,142	38.0	42,234	44,091	44,091	–	66
67	64,911	0.5	129,822	115,588	38.5	44,501	48,628	48,628	–	67
68	67,507	0.5	135,014	120,212	39.0	46,883	53,775	53,775	–	68
69	70,207	0.5	140,414	125,020	39.5	49,383	59,638	59,638	–	69
70+	–	–	–	130,021	40.0	52,008	66,342	66,342	\$66,342	70+

Note: See next page for documentation of calculations in this table.

## DOCUMENTATION OF TABLES A-1 AND A-2

### *Phased Retirement Assumptions:*

- Participant takes phased retirement and works 50 percent of a full-time schedule beginning at age 60 and fully retires at age 70.
- No benefits are payable during phased retirement and full benefits are received at full retirement.

### *Salary and Final Average Pay (FAP) – Table A-1:*

- Salary is \$25,000 at age 25 accumulated to current age at 4 percent salary increase.
- FAP is the average of the prior five years' salary.

### *Salary and Final Average Pay (FAP) – Table A-2:*

- Salary is \$25,000 at age 25 accumulated to current age at 4 percent salary increase.
- Salary is annualized by dividing pay for the year by the percentage of a full-time schedule worked in the year. During phased retirement, because the participant works 50 percent of a full-time schedule, the salary is divided by 0.5.
- FAP is the average of the prior five years' *annualized* salary.

### *Credited Service @ Beginning of Year – Table A-2:*

- A partial year of service equal to the portion of a full-time schedule worked during the year is credited during phased retirement.

### *Adjusted Accrued Benefit:*

- The accrued benefit reduced actuarially for early retirement for ages less than 65 and increased actuarially for late retirement for ages more than 65.

### *Accrued Benefit Payable:*

- The Adjusted Accrued Benefit for the current age, but not less than any prior accrued benefit payable.



**Table B-1**

**Partial Benefits Payable During Phased Retirement**  
**Full Benefits Paid at Full Retirement**  
**Pay Annualized During Phased Retirement**  
**Partial Year of Service Earned During Phased Retirement**  
**Offset for Benefits Paid Applies Only to Portion of Benefit Earned**

<b>Age</b>	<b>Salary</b>	<b>FAP</b>	<b>Benefit From Formula</b>	<b>Adjusted Accrued Benefit</b>	<b>Cumulative Offset for Benefits Paid</b>	<b>Increase in Benefit After Adj for Benefits Paid</b>	<b>Accd Benefit Payable After Adj for Bens Paid</b>	<b>Benefit Received</b>	<b>Age</b>
60	\$49,327	\$ 87,838	\$30,743	\$19,684	–	\$ 2,777	\$19,684	\$ 9,842	60
61	51,300	91,351	32,430	22,616	\$ 878	2,054	21,738	9,842	61
62	53,352	95,005	34,202	26,025	1,855	4,486	24,170	9,842	62
63	55,486	98,806	36,064	29,997	2,944	7,369	27,053	9,842	63
64	57,705	102,758	38,020	34,638	4,162	10,792	30,476	9,842	64
65	60,013	106,868	40,076	40,076	5,530	14,862	34,546	9,842	65
66	62,414	111,142	42,234	44,091	7,070	17,337	37,021	9,842	66
67	64,911	115,588	44,501	48,628	8,810	20,134	39,818	9,842	67
68	67,507	120,212	46,883	53,775	10,785	23,306	42,990	9,842	68
69	70,207	125,020	49,383	59,638	13,033	26,921	46,605	9,842	69
70+	–	130,021	52,008	66,342	15,605	31,053	50,737	50,737	70+

Note: Documentation of formulas and calculations for this table follow STET Table B-3.

**Table B-2**

**Full Benefits Payable During Phased Retirement After Normal Retirement Age**  
**Full Benefits Paid at Full Retirement**  
**Pay Annualized During Phased Retirement**  
**Partial Year of Service Earned During Phased Retirement**  
**Offset for Benefits Paid Applies to Full Benefit Earned**

<b>Age</b>	<b>Salary</b>	<b>FAP</b>	<b>Benefit From Formula</b>	<b>Adjusted Accrued Benefit</b>	<b>Cumulative Offset for Benefits Paid</b>	<b>Increase in Benefit After Adj for Benefits Paid</b>	<b>Accd Benefit Payable After Adj for Bens Paid</b>	<b>Benefit Received</b>	<b>Age</b>
60	\$49,327	\$ 87,838	\$30,743	\$19,684	–	\$ 2,777	\$19,684	–	60
61	51,300	91,351	32,430	22,616	–	2,932	22,616	–	61
62	53,352	95,005	34,202	26,025	–	3,409	26,025	–	62
63	55,486	98,806	36,064	29,997	–	3,972	29,997	–	63
64	57,705	102,758	38,020	34,638	–	4,641	34,638	–	64
65	60,013	106,868	40,076	40,076	–	5,438	40,076	\$40,076	65
66	62,414	111,142	42,234	44,091	\$ 4,015	–	40,076	40,076	66
67	64,911	115,588	44,501	48,628	8,552	–	40,076	40,076	67
68	67,507	120,212	46,883	53,775	13,699	–	40,076	40,076	68
69	70,207	125,020	49,383	59,638	19,562	–	40,076	40,076	69
70+	–	130,021	52,008	66,342	26,266	–	40,076	40,076	70+

Note: Documentation of formulas and calculations for this table follows Table B-3.

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**Table B-3**

**Partial Benefits Payable During Phased Retirement After Normal Retirement Age  
Full Benefits Paid at Full Retirement  
Pay Annualized During Phased Retirement  
Partial Year of Service Earned During Phased Retirement  
Offset for Benefits Paid Applies Only to Portion of Benefit Earned**

<b>Age</b>	<b>Salary</b>	<b>FAP</b>	<b>Benefit From Formula</b>	<b>Adjusted Accrued Benefit</b>	<b>Cumulative Offset for Benefits Paid</b>	<b>Increase in Benefit After Adj for Benefits Paid</b>	<b>Accd Benefit Payable After Adj for Bens Paid</b>	<b>Benefit Received</b>	<b>Age</b>
60	\$49,327	\$ 87,838	\$30,743	\$19,684	–	\$ 2,777	\$19,684	–	60
61	51,300	91,351	32,430	22,616	–	2,932	22,616	–	61
62	53,352	95,005	34,202	26,025	–	3,409	26,025	–	62
63	55,486	98,806	36,064	29,997	–	3,972	29,997	–	63
64	57,705	102,758	38,020	34,638	–	4,461	34,638	–	64
65	60,013	106,868	40,076	40,076	–	5,438	40,076	\$20,038	65
66	62,414	111,142	42,234	44,091	\$ 2,007	2,008	42,084	20,038	66
67	64,911	115,588	44,501	48,628	4,276	4,276	44,352	20,038	67
68	67,507	120,212	46,883	53,775	6,850	6,850	46,926	20,038	68
69	70,207	125,020	49,383	59,638	9,781	9,781	49,857	20,038	69
70+	–	130,021	52,008	66,342	13,133	13,133	53,209	53,209	70+

Note: See next page for documentation of formulas and calculations for this table.



## DOCUMENTATION OF TABLES B-1, B-2, AND B-3

### *Phased Retirement Assumptions:*

- Participant takes phased retirement and works 50 percent of a full-time schedule beginning at age 60.
- Participant fully retires at age 70.

### *Salary and Final Average Pay:*

- Salary is \$25,000 at age 25 accumulated to current age at 4 percent salary increase.
- FAP is the average of the prior five years' annualized salaried whereby annualized salary is the actual salary divided by portion of the year worked.

### *Benefit From Formula:*

- Benefit formula shown above using final average pay and credited service whereby credited service is the sum of all prior portions of year worked.
- Partial year of service is credited during phased retirement.

### *Adjusted Accrued Benefit:*

- The accrued benefit reduced actuarially for early retirement for ages before normal retirement age and increased actuarially for years after normal retirement age.
- Formula for early retirement reduction to age x: Benefit from Formula  $\frac{N_{65}}{N_x}$  but not less than any prior adjusted accrued benefit.
- Formula for late retirement increase to age y: Benefit from Formula  $\frac{N_{65}}{N_y}$  but not less than the benefit from formula at age y.

*Cumulative Offset for Benefits Paid:*

- The adjustment reflects the annual benefit that could be purchased with the benefits that were received in prior years.
- Prior benefit payments are actuarially increased to the current age.
- This formula follows Example 3 of §1.411(b)-2.
- PRBA = phased retirement beginning age.

- Accumulation of prior benefits paid: 
$$\text{Ben Paid} \times \frac{\sum_{i=1}^{x-1} D_i}{D_x} = \text{Ben Paid} \times \frac{N_{PRBA} - N_x}{D_x} .$$

- Annuity purchased by accumulation of prior benefits paid: 
$$\text{Ben Paid} \times \frac{\frac{N_{PRBA} - N_x}{D_x}}{\frac{N_x}{D_x}} = \text{Ben Paid} \times \frac{N_{PRBA} - N_x}{N_x} .$$

*Increase in Accrued Benefit After Adjustment for Benefits Paid:*

- PRBA = the age at which benefit payments begin during phased retirement.
- PR % = percentage of accrued benefit received during phased retirement.
- Before age at which benefits are paid =  

$$\text{Accrued Benefit Payable}_x - \text{Accrued Benefit Payable After Adjustment for Benefits Paid}_{x-1} .$$
- Beginning with age at which benefits are first paid (this adjustment is the *cumulative* increase in the accrued benefit at age PRBA) = 
$$\text{Max}[0, (\text{Accrued Benefit Payable}_x - \text{Accrued Benefit Payable}_{PRBA}) \times PR\% - \text{Cumulative Offset}_x ]$$
  

$$+ (1 - PR\%) \times (\text{Accrued Benefit Payable}_x - \text{Accrued Benefit Payable}_{PRBA})$$

*Accrued Benefit Payable After Adjustment for Benefits Paid:*

- Before PRBA, the prior year's accrued benefit payable after adjustment for benefits paid plus the current year's increase in accrued benefit after adjustment for benefits paid.
- Beginning with the age at which benefits are first paid,  

$$\text{Accrued Benefit Payable}_{PRBA} + \text{Increase in Accrued Benefit After Adjustment for Benefits Paid}_x .$$

*Benefit Payout Assumptions — Table B-1*

- 50 percent of the accrued benefit at initial phased retirement is payable during phased retirement.
- Accrued benefit payable after adjustment for benefits paid at full retirement begins at that age.

*Benefit Payout Assumptions— Table B-2:*

- 100 percent of the accrued benefit is payable beginning at normal retirement.
- Accrued benefit payable after adjustment for benefits paid at full retirement begins at that age.

*Benefit Payout Assumptions — Table B-3:*

- 50 percent of the accrued benefit is payable beginning at normal retirement.
- Accrued benefit payable after adjustment for benefits paid at full retirement begins at that age.

**Table C**

**Various Final Average Pay Alternatives**

<b>Age</b>	<b>Salary</b>	<b>Decreasing Final Average Pay</b>	<b>Non-Decreasing Final Average Pay</b>	<b>Annualized Phased Years</b>	<b>Average With Phased Years Annualized</b>	<b>Divide by Partial Years</b>	<b>Average Using Partial Years to Divide</b>	<b>Age</b>
55	\$81,087	–	–	\$81,087	–	1.0	–	55
56	84,330	–	–	84,330	–	1.0	–	56
57	87,703	–	–	87,703	–	1.0	–	57
58	91,211	–	–	91,211	–	1.0	–	58
59	94,859	–	–	94,859	–	1.0	–	59
60	49,327	\$87,838	\$87,838	98,654	\$87,838	0.5	\$87,838	60
61	51,300	81,486	87,838	102,600	91,351	0.5	90,540	61
62	53,352	74,880	87,838	106,704	95,055	0.5	93,600	62
63	55,486	68,010	87,838	110,972	98,806	0.5	97,157	63
64	57,705	60,865	87,838	115,410	102,758	0.5	101,441	64
65	60,013	53,434	87,838	120,026	106,868	0.5	106,868	65
66	62,414	55,571	87,838	124,828	111,142	0.5	111,142	66
67	64,911	57,794	87,838	129,822	115,588	0.5	115,588	67
68	67,507	60,106	87,838	135,014	120,212	0.5	120,212	68
69	70,207	62,510	87,838	140,414	125,020	0.5	125,020	69
70	–	65,010	87,838	–	130,021	0.0	130,021	70

Note: See next page for documentation of this table.

## DOCUMENTATION OF TABLE C

### *Basic Assumptions:*

- Hire age = 25
- Starting salary = \$25,000
- Annual salary increase = 4%
- Years to Average in Final Average Pay = 5
- Percentage of Full-Time Work During Phased Retirement = 50%
- Phased Retirement Beginning Age = 60
- Full Retirement Age = 70

### *Salary:*

- Prior year's salary multiplied by  $1 + \text{salary increase}$ .

### *Decreasing Final Average Pay:*

- Final average pay is the average of the prior five years of salary.

### *Non-Decreasing Final Average Pay:*

- Final average pay is the average of the prior five years of salary, but not less than any prior final average pay.

### *Annualized Phased Years:*

- During phased retirement, salary is annualized by dividing the pay received by  $(1 - \% \text{ of full-time schedule worked during phased retirement})$ .
- Annualized salary at age 61 equals  $\$51,300 \div (1 - 0.5) = \$106,200$

*Average With Phased Years Annualized:*

- Final average pay is the average of the prior five years of annualized salary.

*Divide by Partial Years:*

- Portion of full-time worked in current year.

*Average Using Partial Years to Divide:*

- Final average pay is the sum of the prior five years of salary divided by the sum of the prior five years' portions of full-time schedule worked.