

Part III --- Administrative, Procedural and Miscellaneous

Interest Rate Modification

Notice 2007-81

This notice provides guidance on the corporate bond yield curve and the segment rates required to compute the funding target and other items under § 430 of the Internal Revenue Code of 1986 (Code) and § 303 of the Employee Retirement Income Security Act of 1974 (ERISA). In addition, this notice provides guidance on the interest rates for determining minimum present values as required under § 417(e)(3) of the Code and § 205(g)(3) of ERISA. This notice implements changes to the funding rules and minimum present value requirements made by sections 101, 102, 111, 112, and 302 of the Pension Protection Act of 2006, P.L. No. 109-280 (PPA).

BACKGROUND AND PRIOR LAW

Section 412 of the Code provides minimum funding requirements that generally apply for defined benefit plans. Under § 412(b)(5)(A) prior to amendment by PPA, the funding standard account (and items therein) must be charged or credited with interest at the appropriate rate consistent with the rate or rates of interest used under the plan to determine costs.

Section 412(b)(5)(B) prior to amendment by PPA provides rules for specifying the interest rate that is used to determine a plan's current liability for purposes of § 412(l) and for purposes of the minimum full funding limitation under § 412(c)(7)(E). Section 412(b)(5)(B)(ii)(III) prior to amendment provides that, for plan years beginning in 2004, 2005, 2006, and 2007, the interest rate used to determine current liability must not be above and must not be more than 10 percent below the weighted average of the rates of interest on amounts invested conservatively in long-term investment-grade corporate bonds during the 4-year period ending on the last day before the beginning of the plan year. Notice 2004-34, 2004-1 C.B. 848, specified the corporate bond indices and the methodology for determining these corporate bond rates.

Section 417(e)(3) provides assumptions for determining minimum present values for certain purposes. For plan years beginning before 2008, the applicable interest rate for these purposes is the annual rate of interest on 30-year Treasury securities as prescribed by the Commissioner.

PENSION PROTECTION ACT OF 2006

PPA makes extensive changes to the minimum funding requirements that generally apply for plan years beginning on or after January 1, 2008. However, certain plans have delayed effective dates for these amendments provided under sections 104, 105, and 106 of PPA.

Section 430 of the Code, added by section 112 of PPA, specifies the minimum funding requirements that apply to single employer plans pursuant to § 412 of the Code. Section 430(a) defines the minimum required contribution for a single employer plan as

the sum of the plan's target normal cost and the shortfall and waiver amortization charges for the year. Under § 430(b), a plan's target normal cost is generally equal to the present value of all benefits expected to accrue or be earned under the plan during the plan year. Under § 430(d)(1), a plan's funding target for a plan year is generally equal to the present value of all benefits accrued or earned under the plan as of the beginning of the plan year.

Section 430(h)(2) specifies the interest rates that must be used to determine a plan's target normal cost and funding target. Under this provision, present value is generally determined using three interest rates ("segment rates"), each of which applies to cash flows during specified periods.

Each segment rate is, for any month, the single rate of interest determined by the Secretary for such month on the basis of the applicable corporate bond yield curve for that month, taking into account only that portion of such yield curve applicable to that segment. Section 430(h)(2)(D)(i) provides that the Secretary shall prescribe a corporate bond yield curve applicable for each month. The applicable corporate bond yield curve is, with respect to any month, a yield curve which reflects a 24-month average (the average of the yield curve values for the preceding month and the prior 23 months) of the yields on investment grade corporate bonds with varying maturities and that are in the top 3 quality levels available. Under § 430(h)(2)(D)(ii), an election may be made to use the corporate bond yield curve determined without regard to the 24-month averaging in lieu of the segment rates.

A transitional rule under § 430(h)(2)(G) applies for plan years starting in 2008 and 2009 (if the plan had its first plan year before 2008). Under this rule, the 24-month average segment rates as computed above are blended with the corporate bond weighted average rates determined under § 412(b)(5)(B)(ii)(II) (prior to amendment). However, § 430(h)(2)(G)(iv) provides that an election may be made to apply the 24-month average segment rates without applying the blended rates under the transitional rule of § 430(h)(2)(G).

Generally, section 302(b) of PPA amends § 417(e)(3) of the Code to provide that the interest rates used for the determination of minimum present values are segment rates as computed under § 430(h)(2), but determined without regard to yield curve rates from the preceding 23 months. However, for plan years beginning in 2008, 2009, 2010, and 2011 these segment rates are blended with the applicable rate of § 417(e)(3)(A)(ii)(II) as in effect for plan years beginning in 2007. This amendment is effective for plan years beginning after December 31, 2007. PPA provides conforming amendments to ERISA for the amendments to §§ 412, 417, and 430 of the Code.

Section 430(h)(2)(F) provides that the Secretary shall publish each month the corporate bond yield curve and the rates described above. In addition, the Secretary shall publish a description of the methodology used to determine such yield curve and such rates in sufficient detail to enable plans to make reasonable predictions regarding the yield curve and rates for future months.

DETERMINATION OF THE SEGMENT RATES

The following methodology is established to determine the corporate bond yield curve and the segment rates. A yield curve is calculated for each business day of the

month based on investment grade corporate bonds in the top three quality levels. The construction of the yield curve for a given day is explained in Appendix A to this notice. This daily yield curve is expressed as the yield for a zero coupon bond at each maturity point from ½ year to 100 years, in ½ year intervals. The value at any maturity point of the monthly yield curve is set equal to the arithmetic average for all of the business days in a month of the values for that maturity point from the daily yield curves. The monthly yield curve then is the set of values for each of the 200 maturity points. The monthly corporate bond yield curve derived from August 2007 data is shown in Table I of Appendix B. The monthly corporate bond yield curve is the table which would be used if an election is made under § 430(h)(2)(D)(ii).

The first segment rate applicable for a given month is the arithmetic average over the 10 maturity points from ½ year to 5 years of the applicable corporate bond yield curve. This is mathematically the same as the arithmetic average for the preceding 24 months of the “spot” first segment rates that can be developed from each of the monthly yield curves (as the arithmetic average over the 10 maturity points from ½ year to 5 years of those monthly yield curves) and this second approach has been used in order to facilitate presentation of the segment rates. Similarly, the second segment rate applicable for the given month is the arithmetic average for the preceding 24 months of the spot second segment rates for those months (where the spot second segment rate for a month is the arithmetic average over the 30 maturity points from 5½ years to 20 years of the monthly yield curve). The third segment rate applicable for the given month is the arithmetic average for the preceding 24 months of the spot third segment rates for those months (where the spot third segment rate for a month is the arithmetic average over the 80 maturity points from 20½ years to 60 years of the monthly yield curve). These 24-month average segment rates are the rates that would be applicable if an election was made under § 430(h)(2)(G)(iv) not to use the transitional rule of § 430(h)(2)(G), or if a plan’s first plan year begins after 2007. The three 24-month average corporate bond segment rates applicable for September 2007 are as follows:

**24-Month Average Segment Rates
Applicable For September 2007**

| First Segment | Second Segment | Third Segment |
|------------------|-------------------|------------------|
| 5.26 | 5.82 | 6.38 |

The funding transitional segment rates determined under § 430(h)(2)(G) applicable for September 2007, taking into account the corporate bond weighted average of 5.86 for September 2007 published in Notice 2007-68, 2007-35 I.R.B. 468, are as follows:

Funding Transitional Segment Rates
Applicable For September 2007

| <u>For Plan Years Beginning in</u> | <u>First Segment</u> | <u>Second Segment</u> | <u>Third Segment</u> |
|--|--------------------------|---------------------------|--------------------------|
| 2008 | 5.66 | 5.85 | 6.03 |

INTEREST RATE FOR MINIMUM PRESENT VALUE

Generally for plan years beginning after December 31, 2007, the applicable interest rates under § 417(e)(3) are segment rates computed without regard to a 24-month average. These are the monthly spot segment rates. For plan years beginning in years 2008, 2009, 2010, and 2011, the applicable interest rate is the monthly spot segment rate blended with the applicable rate under § 417(e)(3)(A)(ii)(II) as in effect for plan years beginning in 2007, where the blending ratio depends on the plan year. The minimum present value transitional segment rates determined under § 417(e)(3)(D) for August 2007, taking into account the August 2007 30-year Treasury rate of 4.93 published in Notice 2007-68, are as follows:

Minimum Present Value Transitional Segment Rates
For August 2007

| <u>For Plan Years Beginning in</u> | <u>First Segment</u> | <u>Second Segment</u> | <u>Third Segment</u> |
|--|--------------------------|---------------------------|--------------------------|
| 2008 | 5.02 | 5.18 | 5.28 |

SUPPLEMENTAL INFORMATION

The spot first, second, and third segment rates for August 2007 are, respectively, 5.40, 6.20, and 6.66. The spot segment rates for each of the months from September 2005 through August 2007 are shown in Table II of Appendix B. These rates are preliminary values from which the 24-month average segment rates and the minimum present value transitional segment rates provided above can be derived.

MONTHLY PUBLICATION OF RATES

Each month, the Service publishes by notice the corporate bond weighted average applicable for the current month as provided under § 412(b)(5)(B) prior to amendment by PPA and the 30-year Treasury rate as provided under § 417(e)(3). In the same notice, the Service will publish the monthly corporate bond yield curve of § 430(h)(2) derived from the preceding month (and the corresponding spot segment rates), the 24-month average funding segment rates applicable for the current month, and the funding transitional segment rates under the transition rule of § 430(h)(2)(G) applicable for the current month. In the same notice, the Service will also publish the

minimum present value segment rates as required under the transitional rule provided in § 417(e)(3)(D).

DRAFTING INFORMATION

The principal author of this notice is Tony Montanaro of the Employee Plans, Tax Exempt and Government Entities Division. However, other personnel from the Service and the Treasury Department participated in preparing this notice. Mr. Montanaro may be e-mailed at RetirementPlanQuestions@irs.gov.

APPENDIX A

The daily yield curve for a given day is constructed under methods and assumptions as described in this section. The description applies to the methodology in use at the present time. Any significant changes in this methodology will be announced by notice.

Data Set

The following criteria are provided for identifying those bonds to be included in the database used to construct the yield curve. The universe of possible bonds consists of a set of bonds which are designated as corporate, have high quality ratings (AAA, AA, or A) from nationally recognized statistical rating organizations, and have at least \$250 million in par amount outstanding on at least one day during the reporting period. The database is extended for maturities below 1 year by using AA financial and AA non-financial commercial paper rates, as reported by the Federal Reserve Board. The bonds chosen for the bond set pay fixed nominal semiannual coupons and the principal amount at maturity. Bonds with different or additional characteristics are generally excluded. The main exclusions are:

- (1) bonds not denominated in U.S. dollars;
- (2) bonds not issued by U.S. corporations;
- (3) bonds which are capital securities (hybrid preferred stock);
- (4) bonds having variable coupon rates;
- (5) convertible bonds;
- (6) "Agency" bonds, such as FNMA bonds;
- (7) asset-backed bonds;
- (8) callable bonds unless the call feature is make-whole;
- (9) puttable bonds; and
- (10) bonds with sinking funds.

In addition, a bond is excluded from use with respect to a given day if the bond has for that day:

- (1) a par amount outstanding below \$250 million;
- (2) a maturity greater than 30 years; or
- (3) a rating below A.

These criteria leave about 1,400 bonds in each daily set of bonds. For each day, the database information for each bond includes the bid price (for commercial paper, it is the ask price), coupon rate, maturity, par amount outstanding, and ratings.

Derivation of the Yield Curve

The daily yield curve is derived from a pricing model that gives the price of a bond as the discounted present value of its cash flows plus adjustment factors for credit quality. The results of the model generate a discount function, and the rates for the daily yield curve are calculated from the discount function. The discount function is derived from the daily determination of the instantaneous forward interest rates for each point in the future.

Derivation of Forward Interest Rates

The forward interest rates are assumed to be described as a series of cubic polynomials that are smoothly joined at specified knot points. The specified knot points are maturities of 0, 1.5, 3, 7, 15, and 30 years, and having a smooth junction at a knot means that the two polynomials that are meeting at the knot have the same value, the same derivative, and the same second derivative at that knot point. Such a series of cubic polynomials is called a cubic spline.

Three constraints are placed on the forward interest rate function. First, the second derivative of the function is set to zero at maturity zero. Second, the value of the forward rate function at and after 30 years is constrained to equal its average value from 15 to 30 years. Third, the derivative of the forward rate function is set to zero at maturity 30 years.

Using these constraints, the assumed cubic spline for the forward interest rate function can be described as a linear combination of B-splines, with five parameters. Thus, the daily forward rate function can be defined by determining the five daily parameters for the B-splines. These parameters, together with two adjustment factors described below, are estimated from the bond data.

Adjustment Factors for Credit Quality

In the pricing model, the adjustment factors for credit quality are added to the present value of the bond's cash flows as given by the forward rate and the discount function. Specifically, the adjustment factors are made up of two linear regression variables added to the present value with two respective regression coefficients that need to be estimated. These variables adjust the bond prices so that the discount function and the spot rates represent market-weighted average credit quality of the top three quality levels (AAA, AA, and A).

Specifically, some of the deviation between the predicted price for the bond (based on the cash flows and the discount function) and the actual price for the bond can be attributed to differences in credit quality and some of the deviation is an error factor. The model determines the portion of the deviation that is attributable to credit quality by determining the two adjustment factors that reflect the relative proportion of A-rated bonds within the data set and the relative proportion of AA-rated bonds within the subset of AA- and AAA-rated bonds. A high proportion of A-rated bonds results in a

larger deviation in price for the higher quality bonds, which means that the discount function used to develop the yield curve is more closely aligned with a discount function for A-rated bonds than for the higher rated bonds. Similarly, a higher proportion of AA-rated bonds within the subset of AA- and AAA-rated bonds means that the discount function is more representative of the AA-rated universe than the AAA-rated bonds.

These adjustment factors allow the yield curve to be based on the proportion of bonds at the three quality levels in the market determined over the entire maturity spectrum (rather than on the proportion at each specific maturity point). This avoids potential distortions which could arise because of different proportions of bonds at the three quality levels at various maturity points.

Estimates for the parameters

These seven parameters, comprising five parameters in the cubic spline and the two adjustment coefficients on the bond-quality adjustment variables, are estimated from the bond price data. The estimation is done by nonlinear least squares, that is, the seven parameter estimates are chosen to minimize the sum of the squared differences between the actual bond prices and the prices given by the bond price model.

Before the estimation is carried out, the bond data are weighted. The weighting consists of two stages. In the first stage, equal weights are assigned to the commercial paper rates at the short end of the curve, and the par amounts outstanding of all the bonds are rescaled so that their sum equals the sum of the weights for commercial paper. Then, the squared price difference for each bond is multiplied by the bond's rescaled par amount outstanding, and the squared difference for each commercial paper rate is multiplied by the commercial paper weight. In the second stage, for bonds with duration greater than 1, the weighted squared price difference for each bond from the first stage is divided by duration.

Additional Information

Additional background information regarding the daily corporate bond yield curve can be found at the following URL:

http://www.ustreas.gov/offices/economic-policy/reports/corporate_yield_curve_2007.pdf

Other developmental papers on the corporate bond yield curve can be found at the following URL:

http://www.ustreas.gov/offices/economic-policy/speeches_testimony_refund.shtml

APPENDIX B

Table I

Monthly Yield Curve Derived From August 2007 Data

| <i>Maturity</i> | <i>Yield</i> | <i>Maturity</i> | <i>Yield</i> | <i>Maturity</i> | <i>Yield</i> | <i>Maturity</i> | <i>Yield</i> | <i>Maturity</i> | <i>Yield</i> |
|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|
| 0.5 | 5.47 | 20.5 | 6.49 | 40.5 | 6.68 | 60.5 | 6.75 | 80.5 | 6.78 |
| 1.0 | 5.37 | 21.0 | 6.50 | 41.0 | 6.69 | 61.0 | 6.75 | 81.0 | 6.78 |
| 1.5 | 5.29 | 21.5 | 6.51 | 41.5 | 6.69 | 61.5 | 6.75 | 81.5 | 6.78 |
| 2.0 | 5.26 | 22.0 | 6.51 | 42.0 | 6.69 | 62.0 | 6.75 | 82.0 | 6.78 |
| 2.5 | 5.28 | 22.5 | 6.52 | 42.5 | 6.69 | 62.5 | 6.75 | 82.5 | 6.79 |
| 3.0 | 5.33 | 23.0 | 6.53 | 43.0 | 6.70 | 63.0 | 6.75 | 83.0 | 6.79 |
| 3.5 | 5.40 | 23.5 | 6.54 | 43.5 | 6.70 | 63.5 | 6.76 | 83.5 | 6.79 |
| 4.0 | 5.47 | 24.0 | 6.55 | 44.0 | 6.70 | 64.0 | 6.76 | 84.0 | 6.79 |
| 4.5 | 5.54 | 24.5 | 6.55 | 44.5 | 6.70 | 64.5 | 6.76 | 84.5 | 6.79 |
| 5.0 | 5.62 | 25.0 | 6.56 | 45.0 | 6.70 | 65.0 | 6.76 | 85.0 | 6.79 |
| 5.5 | 5.69 | 25.5 | 6.57 | 45.5 | 6.71 | 65.5 | 6.76 | 85.5 | 6.79 |
| 6.0 | 5.75 | 26.0 | 6.57 | 46.0 | 6.71 | 66.0 | 6.76 | 86.0 | 6.79 |
| 6.5 | 5.81 | 26.5 | 6.58 | 46.5 | 6.71 | 66.5 | 6.76 | 86.5 | 6.79 |
| 7.0 | 5.86 | 27.0 | 6.58 | 47.0 | 6.71 | 67.0 | 6.76 | 87.0 | 6.79 |
| 7.5 | 5.91 | 27.5 | 6.59 | 47.5 | 6.71 | 67.5 | 6.76 | 87.5 | 6.79 |
| 8.0 | 5.95 | 28.0 | 6.59 | 48.0 | 6.71 | 68.0 | 6.76 | 88.0 | 6.79 |
| 8.5 | 6.00 | 28.5 | 6.60 | 48.5 | 6.72 | 68.5 | 6.77 | 88.5 | 6.79 |
| 9.0 | 6.04 | 29.0 | 6.60 | 49.0 | 6.72 | 69.0 | 6.77 | 89.0 | 6.79 |
| 9.5 | 6.07 | 29.5 | 6.61 | 49.5 | 6.72 | 69.5 | 6.77 | 89.5 | 6.79 |
| 10.0 | 6.11 | 30.0 | 6.61 | 50.0 | 6.72 | 70.0 | 6.77 | 90.0 | 6.79 |
| 10.5 | 6.14 | 30.5 | 6.62 | 50.5 | 6.72 | 70.5 | 6.77 | 90.5 | 6.79 |
| 11.0 | 6.17 | 31.0 | 6.62 | 51.0 | 6.72 | 71.0 | 6.77 | 91.0 | 6.79 |
| 11.5 | 6.19 | 31.5 | 6.63 | 51.5 | 6.73 | 71.5 | 6.77 | 91.5 | 6.79 |
| 12.0 | 6.22 | 32.0 | 6.63 | 52.0 | 6.73 | 72.0 | 6.77 | 92.0 | 6.80 |
| 12.5 | 6.24 | 32.5 | 6.63 | 52.5 | 6.73 | 72.5 | 6.77 | 92.5 | 6.80 |
| 13.0 | 6.27 | 33.0 | 6.64 | 53.0 | 6.73 | 73.0 | 6.77 | 93.0 | 6.80 |
| 13.5 | 6.29 | 33.5 | 6.64 | 53.5 | 6.73 | 73.5 | 6.77 | 93.5 | 6.80 |
| 14.0 | 6.31 | 34.0 | 6.65 | 54.0 | 6.73 | 74.0 | 6.77 | 94.0 | 6.80 |
| 14.5 | 6.33 | 34.5 | 6.65 | 54.5 | 6.73 | 74.5 | 6.77 | 94.5 | 6.80 |
| 15.0 | 6.34 | 35.0 | 6.65 | 55.0 | 6.74 | 75.0 | 6.78 | 95.0 | 6.80 |
| 15.5 | 6.36 | 35.5 | 6.66 | 55.5 | 6.74 | 75.5 | 6.78 | 95.5 | 6.80 |
| 16.0 | 6.38 | 36.0 | 6.66 | 56.0 | 6.74 | 76.0 | 6.78 | 96.0 | 6.80 |
| 16.5 | 6.39 | 36.5 | 6.66 | 56.5 | 6.74 | 76.5 | 6.78 | 96.5 | 6.80 |
| 17.0 | 6.41 | 37.0 | 6.66 | 57.0 | 6.74 | 77.0 | 6.78 | 97.0 | 6.80 |
| 17.5 | 6.42 | 37.5 | 6.67 | 57.5 | 6.74 | 77.5 | 6.78 | 97.5 | 6.80 |
| 18.0 | 6.43 | 38.0 | 6.67 | 58.0 | 6.74 | 78.0 | 6.78 | 98.0 | 6.80 |
| 18.5 | 6.44 | 38.5 | 6.67 | 58.5 | 6.75 | 78.5 | 6.78 | 98.5 | 6.80 |
| 19.0 | 6.46 | 39.0 | 6.68 | 59.0 | 6.75 | 79.0 | 6.78 | 99.0 | 6.80 |
| 19.5 | 6.47 | 39.5 | 6.68 | 59.5 | 6.75 | 79.5 | 6.78 | 99.5 | 6.80 |
| 20.0 | 6.48 | 40.0 | 6.68 | 60.0 | 6.75 | 80.0 | 6.78 | 100.0 | 6.80 |

Table II

Historical Spot Segment Rates

| <u>Month</u> | <u>Year</u> | <u>First Segment</u> | <u>Second Segment</u> | <u>Third Segment</u> |
|--------------|-------------|----------------------|-----------------------|----------------------|
| September | 2005 | 4.44 | 5.23 | 6.05 |
| October | 2005 | 4.78 | 5.50 | 6.27 |
| November | 2005 | 4.95 | 5.60 | 6.34 |
| December | 2005 | 4.96 | 5.54 | 6.24 |
| January | 2006 | 4.96 | 5.49 | 6.14 |
| February | 2006 | 5.19 | 5.61 | 6.09 |
| March | 2006 | 5.27 | 5.77 | 6.31 |
| April | 2006 | 5.43 | 6.06 | 6.67 |
| May | 2006 | 5.52 | 6.19 | 6.79 |
| June | 2006 | 5.67 | 6.21 | 6.78 |
| July | 2006 | 5.67 | 6.19 | 6.75 |
| August | 2006 | 5.46 | 5.98 | 6.59 |
| September | 2006 | 5.32 | 5.81 | 6.42 |
| October | 2006 | 5.33 | 5.81 | 6.36 |
| November | 2006 | 5.25 | 5.64 | 6.07 |
| December | 2006 | 5.16 | 5.60 | 6.09 |
| January | 2007 | 5.35 | 5.78 | 6.22 |
| February | 2007 | 5.31 | 5.76 | 6.13 |
| March | 2007 | 5.13 | 5.68 | 6.19 |
| April | 2007 | 5.23 | 5.81 | 6.34 |
| May | 2007 | 5.32 | 5.85 | 6.32 |
| June | 2007 | 5.58 | 6.21 | 6.61 |
| July | 2007 | 5.53 | 6.22 | 6.60 |
| August | 2007 | 5.40 | 6.20 | 6.66 |