Pension Benefit Guaranty Corporation

# 2019 Actuarial Report

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# ACTUARIAL VALUATION REPORT- 2019 FISCAL YEAR

The 2019 Annual Report of the Pension Benefit Guaranty Corporation (PBGC) contains a summary of the results of the September 30, 2019 actuarial valuation. The purpose of this separate Actuarial Valuation Report is to provide greater detail concerning the valuation of future benefits than is presented in PBGC's Annual Report.

## Overview of Valuation Results

PBGC calculated and validated the present value of future benefits (PVFB) for both the single-employer and multiemployer programs and of nonrecoverable future financial assistance (NRFFA) under the multiemployer program. Generally, except for the changes in interest, mortality and expense assumptions, we used the same methods and procedures as in 2018 for the Single-Employer and Multiemployer Programs. These calculations reflect the present value of claims as of the date of the financial statements. They present a snapshot of the liabilities as of a point in time and do not include liability projections over the period subsequent to the date of the financial statements.

For the single-employer program, the liability as of September 30, 2019 consisted of:

(1) $113.5 billion for the 4,965 plans that have terminated; and

(2) $173.0 million for not-yet-identified probable terminations.

Liabilities for "probable terminations" reflected reasonable estimates of the losses for plans that are likely to terminate in a future year. These estimated losses were based on conditions that existed as of PBGC's fiscal year-end. Management believes it is likely that one or more events subsequent to PBGC's fiscal year-end will occur, confirming the fact of the loss. In addition, the liability for reasonably possible terminations has been calculated and is discussed in a note to the financial statements of PBGC's 2019 Annual Report.

For the multiemployer program, the liability as of September 30, 2019 consisted of:

(1) less than $500,000 for 10 pension plans that terminated before the passage of the Multiemployer Pension Plan Amendments Act of 1980 (MPPAA) and of which PBGC is trustee;

(2) $2,807.0 million for estimable post-MPPAA losses due to financial assistance to 85 multiemployer pension plans that were currently receiving PBGC assistance; and

(3) $65,187.7 million for probable estimable post-MPPAA losses due to financial assistance to 106 multiemployer pension plans that were probable to receive PBGC assistance in the future.

The results of the valuation (the present value of future benefits and nonrecoverable future financial assistance) are presented in Table 1 and are displayed in the graphs on pages 9 and 10.

**Table 1:**
**Present Value of Future Benefits and Nonrecoverable Future Financial Assistance – 2019**

| | Number of Plans | Estimated Number of Participants (in thousands) | Liability (in millions) |
|---|---|---|---|
| I. Single-Employer Program | | | |
| A. Terminated plans | | | |
| 1. Seriatim at fiscal year-end (FYE) | 4,478 | 998 | $75,934 |
| 2. Seriatim at DOPT, adjusted to FYE | 128 | 216 | 22,779 |
| 3. Nonseriatim[1] | 359 | 217 | 14,623 |
| 4. Missing Participants Program (seriatim)[2] | -- | 28 | 116 |
| Subtotal | 4,965 | 1,459 | $113,452 |
| B. Probable terminations (nonseriatim)[3] | 0 | 0 | 173 |
| Total[4] | 4,965 | 1,459 | $113,625 |
| II. Multiemployer Program | | | |
| A. Pre-MPPAA termination (seriatim) | 10 | * | $** |
| B. Post-MPPAA liability (net of plan assets) | | | |
| 1. Currently receiving assistance | 85 | 96 | 2,807 |
| 2. Probable for assistance | 106 | 1,193 | 65,188 |
| Total | 201 | 1,289 | $67,995 |

*Fewer than 500 participants
** Less than $500,000

Notes:
1) Liability for terminated plans includes an estimated liability of $17 million in settled litigation.

2) The Missing Participants Program refers to a liability that PBGC assumed for unlocated participants in plan Terminations under PBGC's Expanded Missing Participants Program.

3) The net claims for probable plans reported in the financial statements include $173 million for not-yet-identified probable terminations.

4) The PVFB in the financial statements ($113,100 million) is net of estimated recoveries on terminated plans ($147 million), and estimated assets for plans pending trusteeship ($378 million), or, $113,625 million less $0 million less $147 million less $378 million = $113,100 million.

## Single-Employer Program

PBGC calculated the single-employer program's liability for benefits for each of the terminated plans and for each of the plans considered to be a probable termination using one of three methods:

(1) seriatim at fiscal year-end (FYE);

(2) seriatim at date of plan termination (DOPT), adjusted to FYE; and

(3) nonseriatim.

In addition, PBGC included liabilities for incurred but not reported (IBNR) plans, for the Missing Participants Program, and for the Collins Settlement.

### Seriatim at FYE Method

The liability for each participant's benefit was calculated separately at FYE for plans for which PBGC had sufficiently complete and accurate data. This was termed the seriatim at FYE method. PBGC selected plans to be valued using the seriatim at FYE method according to two criteria:

(1) completeness - whether PBGC’s computer system contained enough of the plan’s participant records and whether enough of those records had been finalized; and

(2) accuracy - whether the participant's record contained enough of the critical elements of data that were necessary to perform an actuarial valuation.

For this valuation, these criteria were met by 4,478 pension plans (90% of the single-employer terminated plans) representing $75,934 million (67%) in liabilities and about 998,000 (68%) participants. This was an increase of 149 plans over the 4,329 plans valued seriatim at September 30, 2018.

The critical error rates for 566 plans or 12.6% of the seriatim plans (0.1% lower percentage than last year) exceeded 5%. The overall error rate for the group of 4,478 seriatim plans was 1.2%, which is a higher percentage than last year. A data error is considered critical if the value of the data element in error has a major impact on the liability associated with a benefit record.

**Seriatim at DOPT Method**

There were 128 plans for which a final seriatim valuation as of date of plan termination (DOPT) had been completed, but the Office of Benefit Administration of PBGC had not finished processing the case as of year-end (e.g., participant data had not been fully loaded into PBGC's computer database, or the data lacked too many critical elements to be valued by the seriatim at FYE method). When PBGC benefit calculations were finalized but not ready for seriatim valuation as of fiscal year-end, PBGC valued the plan's liability seriatim as of the plan's termination date and brought the total amounts forward to September 30, 2019 using the nonseriatim method outlined below. Because PBGC had finalized and valued these benefits for each participant and valued them using PBGC assumptions and regulations as of each plan's date of termination, these amounts are more accurate than similar calculations for plans whose benefits are not final.

**Nonseriatim Method**

If calculations of benefits provided by PBGC were not final, PBGC based the liability calculations on the plan's most recent actuarial valuation performed before the termination date that is available to PBGC. For the 359 terminated plans valued nonseriatim, PBGC obtained the liability for each plan as of the most recent available actuarial valuation date for each category of participant: retired, active, and terminated vested. These liabilities were adjusted to reflect such factors as:

(1) benefits accrued between the valuation and plan termination dates;

(2) differences between the interest rates assumed by the plans' actuaries and those assumed by PBGC;

(3) differences between the mortality, retirement age, and expense assumptions used by the plans' actuaries and those used by PBGC; and

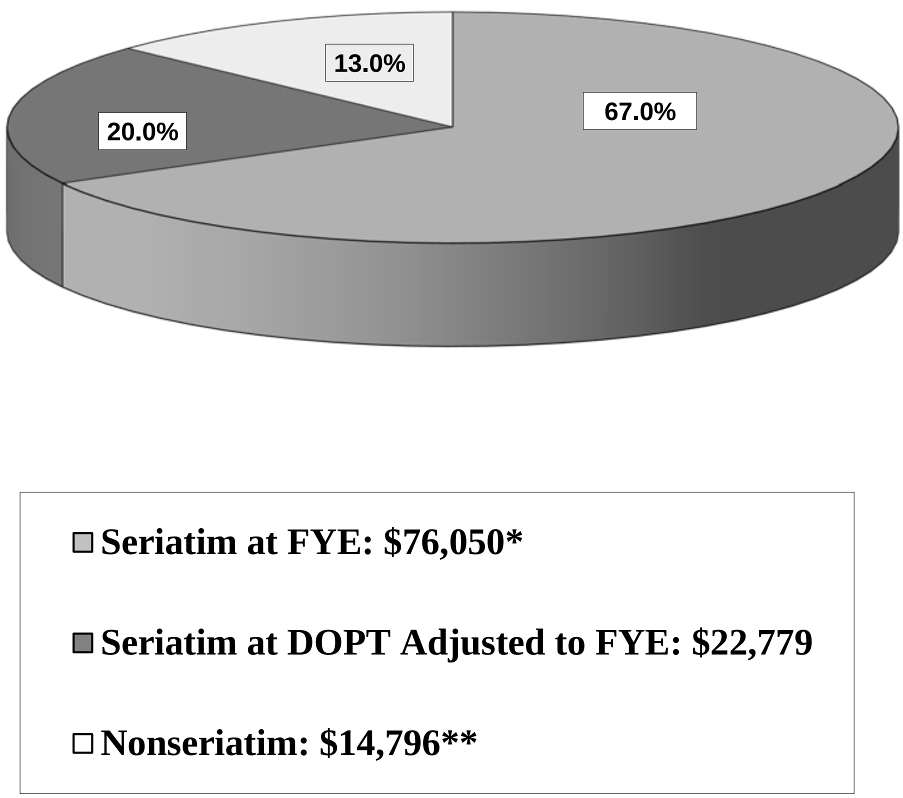
(4) the effect on the liability of time elapsed between the valuation date and September 30, 2019.

PBGC based the adjustment factors used in the nonseriatim procedure on its experience in routinely estimating the liability for benefits for administrative purposes.

# Distribution of FYE19 Single-Employer Liability by Method of Calculation

## Liability for Benefits: $113,625

**(Dollars in Millions)**

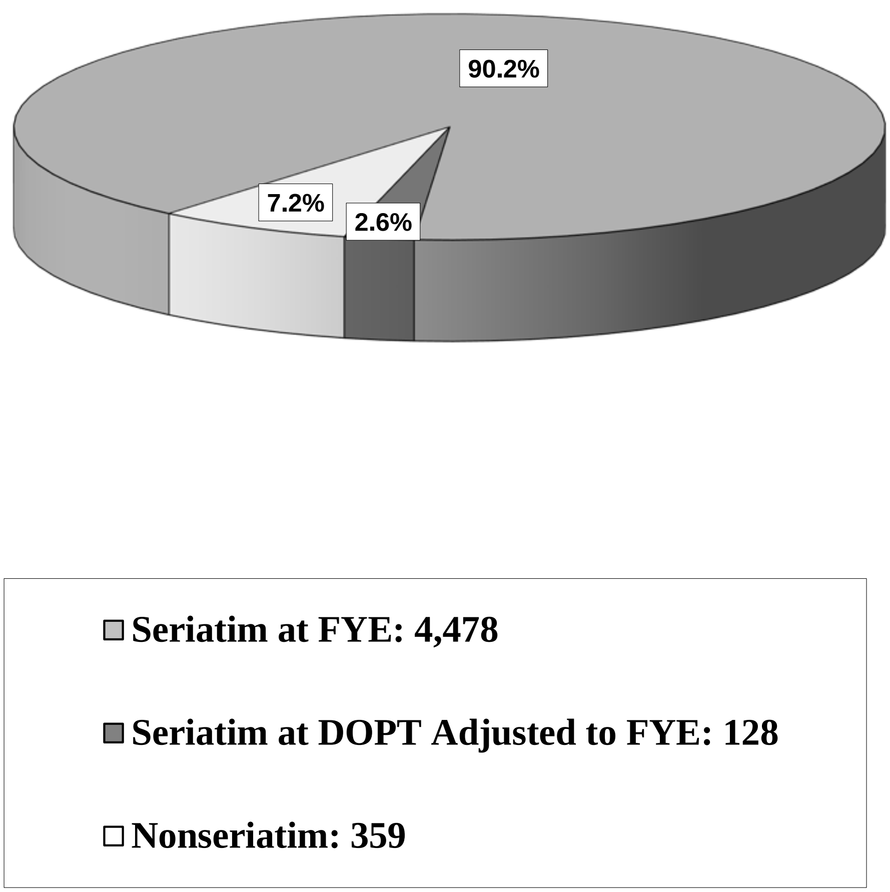



***Seriatim at FYE includes the Missing Participants Program**

****Nonseriatim includes not-yet-identified Probable terminations**

# Distribution of FYE19 Single-Employer Plans by Method of Calculation

## Total Plans: 4,965



## Missing Participants Program

The Missing Participants Program refers to a responsibility that PBGC has assumed under the Retirement Protection Act of 1994 to act as a clearinghouse for unlocated participants in standard plan terminations. As with other parts of PVFB, only the liabilities are shown here. Because plan administrators have transferred a corresponding asset amount to PBGC, the net increase in liabilities of PBGC due to this program, if any, will be negligible. Effective January 22, 2018, PBGC revised the existing program, as authorized by the Pension Protect Act of 2006, to establish similar programs for most defined contribution plans, multiemployer plans covered by the pension insurance system, and certain defined benefit plans that are not covered by PBGC guarantees. This valuation incorporates the impact of this change.

## Collins Settlement

The Collins Settlement refers to the liability for benefits that PBGC incurred as a result of the settlement of a class action lawsuit during fiscal year 1996. This settlement provides benefits for participants in plans which terminated between January 1, 1976 and December 31, 1981 without having been amended to conform to ERISA's vesting requirements. The remaining liability under this settlement is included in the nonseriatim portion of the liability.

## **Multiemployer Program**

There was a total of ten pre-MPPAA terminations, nine of which were granted discretionary coverage under the provisions of ERISA as passed in 1974. The remaining plan terminated when coverage under Title IV was mandatory (from August 1, 1980 until September 25, 1980). PBGC calculated the liability for these ten terminations under the seriatim at FYE method using the same assumptions as for the single-employer program.

The post-MPPAA portion of the liability represented the present value, as of September 30, 2019, of net losses that PBGC expected to incur from non-recoverable future financial assistance to 191 pension plans of which 85 were insolvent (i.e., currently receiving PBGC financial assistance) and 106 were expected to become insolvent. The liability for each plan was calculated (using the cash flow method) as the present value of future guaranteed benefit and expense payments, net of the present value of future employer contributions and withdrawal liability payments. This liability was determined as of the later of September 30, 2019 and the actual or projected date of insolvency, and then discounted back to September 30, 2019 using interest only. The most recent available actuarial reports and information provided by representatives of the affected plans served as the basis for the valuations.

Projected benefit payments were estimated based on liabilities, current benefit payments and estimated average ages for actives, terminated vesteds and retirees from the most recent actuarial reports, combined with assumptions of retirement ages and of future rates of mortality and termination. Projected expense payments were estimated as a constant percentage of the projected benefit payments; this percentage is equal to the ratio of current expense payments to current benefit payments. The projected date of insolvency was then established using a cashflow model with initial assets, expense payments, contributions, and projected benefit and withdrawal liability payments as inputs, estimated when necessary.

The post-MPPAA liability of $67,995 million as of September 30, 2019 is about $11,842 million higher than it was a year earlier.  The main reasons for the increase in liabilities were due to the addition of new plans to the multiemployer inventory, change in liability interest factors, and updated data information from new actuarial valuation reports received during the year.

## Actuarial Assumptions, Methods, and Procedures

PBGC continues to review the actuarial assumptions used in the valuation to assure that they remain consistent with current market conditions in the insurance industry and with PBGC's experience. The actuarial assumptions, which are used in both the single-employer and multiemployer valuations, are presented in Table 2A. Assumptions concerning data that were not available are discussed in the data section of this report.

Beginning with the March 31, 2017 valuation, PBGC used forward yield curve interest factors to value PBGC's liabilities. The interest factors so determined for the September 30, 2019 valuation vary annually from 2.36% in year 1 to 1.98% in year 31 and beyond. For the September 30, 2018 valuation the interest factors vary annually from 2.95% in year 1 to 2.93% in year 31 and beyond. These interest factors are dependent upon PBGC's mortality assumption.

Beginning with the June 30, 2016 valuation, PBGC updated the mortality assumptions by adopting the recommendations from a study by an independent consulting firm. The study recommended that, when conducting valuations for its financial statements, PBGC use the RP-2014 Healthy Male Table times 1.09 and Healthy Female Table times 0.99. The study also recommended that continuing mortality improvements be taken into account by using the most recent projection scale available to project these tables forward. Beginning with the June 30, 2017 valuation, PBGC updated the valuation systems to fully implement using generational mortality tables. PBGC used the adjusted RP-2014 Healthy Male and Female Mortality tables each projected generationally with scale MP-2018 for the September 30, 2019 valuation.

The mortality tables used for healthy lives in the FY 2018 valuation are the adjusted RP-2014 Healthy Male and Female Mortality tables each projected generationally with scale MP-2017.

Retirement age assumptions were not changed.

The SPARR (Small Plan Average Recovery Ratio) assumptions as shown in Table 2B were updated to reflect the SPARR calculated in FY2019. The FY2019 SPARR of 5.77% is used for the September 30, 2019 valuation.

Based on the results of a 2018 study of PBGC's case administration expenses, a new expense assumption was adopted for the 12/31/2018 and subsequent Financial Statements. The new expense reserve factors are significantly higher than the prior reserve factors primarily due to increased annual expenses, change in discount rate, and increased lag to complete tasks. The reserve factors are static and do not assume any future increases or decreases. The factors are intended to estimate a reserve for the entire inventory of plans and is not intended to predict costs for any one plan.

PBGC used the expense assumption for expenses in all terminated plans and single-employer probable terminations. The reserve for expenses was assumed to be 0.68% of the liability for benefits plus additional reserves for cases whose plan asset determinations, participant database audits, and actuarial valuations were not yet complete. The factors to determine the additional reserves were based on case sizes (large/small), number of participants, and time since trusteeship. The factors used in the expense reserve formula are shown in Table 2C.

During the 2019 fiscal year, PBGC improved the system that calculates the liabilities to address some of the valuation audit findings surrounding the valuation systems. In this year we have made improvements to our ability to value missing participant liabilities, included additional annuity forms, improved the accuracy of multiemployer cash flow projections, improved the calculation of shared payment QDROs, as well as increased and improved the reports available for the analysis of our results.

We continue our ongoing efforts to improve the quality of the seriatim data and, as in other years, made various changes to generally improve the accuracy, speed, security and auditability of the calculations as well as integrate with the evolving PBGC technologies.

**Table 2A**

**Actuarial Valuation Assumptions**

| | Previous Valuation as of 9/30/18 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Interest Factors** | Forward Yield Curve: | | | | | | | |
| | Period | Rate | Period | Rate | Period | Rate | Period | Rate |
| | 1 | 2.95% | 11 | 3.23% | 21 | 2.52% | 31 | 2.93% |
| | 2 | 3.24% | 12 | 3.13% | 22 | 2.46% | 32 | 2.93% |
| | 3 | 3.36% | 13 | 3.04% | 23 | 2.39% | 33 | 2.93% |
| | 4 | 3.37% | 14 | 2.99% | 24 | 2.31% | 34 | 2.93% |
| | 5 | 3.36% | 15 | 2.97% | 25 | 2.23% | 35 | 2.93% |
| | 6 | 3.49% | 16 | 2.97% | 26 | 2.18% | 36 | 2.93% |
| | 7 | 3.48% | 17 | 2.97% | 27 | 2.22% | 37 | 2.93% |
| | 8 | 3.45% | 18 | 2.99% | 28 | 2.34% | 38 | 2.93% |
| | 9 | 3.52% | 19 | 3.06% | 29 | 2.50% | 39 | 2.93% |
| | 10 | 3.43% | 20 | 3.15% | 30 | 2.77% | 40 | 2.93% |

| | Current Valuation as of 9/30/19 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Interest Factors** | Forward Yield Curve: | | | | | | | |
| | Period | Rate | Period | Rate | Period | Rate | Period | Rate |
| | 1 | 2.36% | 11 | 2.09% | 21 | 1.92% | 31 | 1.98% |
| | 2 | 1.82% | 12 | 2.11% | 22 | 1.81% | 32 | 1.98% |
| | 3 | 1.87% | 13 | 2.14% | 23 | 1.68% | 33 | 1.98% |
| | 4 | 2.00% | 14 | 2.16% | 24 | 1.55% | 34 | 1.98% |
| | 5 | 2.03% | 15 | 2.17% | 25 | 1.45% | 35 | 1.98% |
| | 6 | 2.18% | 16 | 2.18% | 26 | 1.39% | 36 | 1.98% |
| | 7 | 2.09% | 17 | 2.20% | 27 | 1.42% | 37 | 1.98% |
| | 8 | 2.16% | 18 | 2.25% | 28 | 1.54% | 38 | 1.98% |
| | 9 | 2.20% | 19 | 2.40% | 29 | 1.70% | 39 | 1.98% |
| | 10 | 2.10% | 20 | 2.59% | 30 | 2.00% | 40 | 1.98% |

## Table 2A

## Actuarial Valuation Assumptions

| | Previous Valuation as of 9/30/18 | Current Valuation as of 9/30/19 |
|---|---|---|
| **Mortality**<br>**Healthy Lives** | RP-2014 Healthy Male Table times 1.09 and RP-2014 Healthy Female Mortality Table times 0.99, each projected generationally with Scale MP-2017. | RP-2014 Healthy Male Table times 1.09 and RP-2014 Healthy Female Mortality Table times 0.99, each projected generationally with Scale MP-2018. |
| **Disabled Lives Eligible for Social Security (SS) Disability Benefits** | Healthy Male and Female Mortality Tables as described above, set forward 7 years for male lives and 8 years for female lives. | Healthy Male and Female Mortality Tables as described above, set forward 7 years for male lives and 8 years for female lives. |
| **Disabled Lives Not Eligible for SS Disability Benefits** | Healthy Male and Female Mortality Tables as described above, set forward 5 years for male lives and 7 years for female lives. | Healthy Male and Female Mortality Tables as described above, set forward 5 years for male lives and 7 years for female lives. |
| **SPARR** | Calculated SPARR through fiscal year ending 9/30/18. | Calculated SPARR through current fiscal year ending 9/30/19.<br><br>See Table 2B for values and notes. |
| **Retirement Ages** | (a) Earliest possible for shutdown companies.<br>(b) Expected retirement age (XRA) tables from 29 CFR 4044 for ongoing companies.<br>(c) Deferred participants past XRA are assumed to be in pay status, retroactive to their XRA.<br>To reflect lower likelihood of payment:<br>(d) Unlocated deferred participants past age 65 are phased out over 3 years.<br>(e) Located deferred participants are fully phased out past age 70.<br>(f) Deferred participants in the Missing Participants Program are phased out over 10 years past age 70. | Same |
| **Expenses** | All terminated plans and single-employer probable terminations:<br><br>1.37% of the liability for benefits<br>plus<br>Additional reserves as shown in Table 2C for cases where plan asset determinations, participant database audits and actuarial valuations were not complete. | All terminated plans and single-employer probable terminations:<br><br>0.68% of the liability for benefits<br>plus<br>Additional reserves as shown in Table 2C for cases where plan asset determinations, participant database audits and actuarial valuations were not complete. |

## Table 2B

### Small Plan Average Recovery Ratio (SPARR) Assumptions

The SPARR is used in the calculation of the liability for benefits determined under section 4022(c) of ERISA, which provides participants with a portion of PBGC's recoveries. The SPARR has been determined by PBGC for terminations initiated in a given fiscal year based on actual recoveries and unfunded benefit liabilities for plan terminations initiated during a five year averaging period. As of the end of fiscal year 2019, the SPARR had been calculated for plan terminations initiated in fiscal years 1991-2019. The FY 2019 SPARR is assumed for probable plans affected by future SPARRs.

| Fiscal Year | SPARR | Fiscal Year | SPARR |
|---|---|---|---|
| 1991 | 12.01% | 10/1/05 – 9/15/06 | 4.13% |
| | | 9/16/06-9/30/06 | 3.50% |
| 1992 | 7.73% | 2007 | 4.35% |
| 1993 | 7.44% | 2008 | 4.26% |
| 1994 | 7.04% | 2009 | 3.85% |
| 1995 | 7.22% | 2010 | 9.15% |
| 1996 | 7.90% | 2011 | 12.30% |
| 1997 | 5.98% | 2012 | 12.56% |
| 1998 | 6.84% | 2013 | 17.23% |
| 1999 | 8.01% | 2014 | 4.93% |
| 2000 | 4.58% | 2015 | 9.29% |
| 2001 | 4.94% | 2016 | 9.39% |
| 2002 | 9.60% | 2017 | 6.92% |
| 2003 | 7.86% | 2018 | 6.84% |
| 2004 | 3.42% | 2019 | 5.77% |
| 2005 | 4.39% | | |

## Table 2C

## Reserve Factors for Expenses

## (Previous Valuation as of 9/30/18)

| Large Plans (more than 100 participants) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Plan Asset Audit | Participant Data Audit | Actuarial Valuation | | | | Interim Plan Processing |
| Years Since Trusteeship | Per Large Plan | Per Large Plan | Per Large Plan | Per Participant for the First 100 | Per Participant for the Next 400 | Per Participant for >500 | Per Participant |
| 0<=y<1 | $23,020 | $78,290 | $118,640 | $1,130 | $370 | $15 | $330 |
| 1<=y<2 | 15,270 | 48,470 | 69,450 | 660 | 220 | 10 | 190 |
| 2<=y<3 | 12,050 | 35,970 | 40,380 | 380 | 130 | 5 | 110 |
| 3<=y | 8,570 | 33,130 | 31,730 | 300 | 100 | 5 | 90 |

| Small Plans (100 or fewer participants) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Plan Asset Audit | Participant Data Audit | Actuarial Valuation | | | | Interim Plan Processing |
| Years Since Trusteeship | Per Small Plan | Per Small Plan | Per Small Plan | Per Participant for the First 100 | Per Participant for the Next 400 | Per Participant for >500 | Per Participant |
| 0<=y<1 | $11,500 | $21,470 | $118,640 | $1,130 | N/A | N/A | $330 |
| 1<=y<2 | 7,320 | 18,060 | 69,450 | 660 | N/A | N/A | 190 |
| 2<=y<3 | 5,550 | 15,130 | 40,380 | 380 | N/A | N/A | 110 |
| 3<=y | 5,040 | 11,430 | 31,730 | 300 | N/A | N/A | 90 |

In addition to the reserve factors shown, an expense loading factor equal to 1.37% of the liability for benefits applies to both Large Plans and Small Plans.

## Table 2C

### Reserve Factors for Expenses

### (Current Valuation as of 9/30/19)

**Large Plans (more than 100 participants)**

| | Plan Asset Audit | Participant Data Audit | | Actuarial Valuation | | | Interim Plan Processing |
|---|---|---|---|---|---|---|---|
| Years Since Trusteeship | Per Large Plan | Per Large Plan | Per Large Plan | Per Participant for the First 100 | Per Participant for the Next 400 | Per Participant for >500 | Per Participant |
| 0<=y<1 | $134,940 | $393,310 | $190,990 | $4,220 | $710 | $60 | $2,680 |
| 1<=y<2 | 101,520 | 288,520 | 146,130 | 3,230 | 530 | 60 | 2,050 |
| 2<=y<3 | 71,020 | 200,070 | 106,100 | 2,340 | 390 | 40 | 1,490 |
| 3<=y<4 | 47,360 | 146,880 | 73,110 | 1,620 | 280 | 20 | 1,010 |
| 4<=y<5 | 31,850 | 101,590 | 46,980 | 1,040 | 180 | 20 | 650 |
| 5<=y | 25,480 | 73,890 | 33,810 | 750 | 120 | 20 | 470 |

**Small Plans (100 or fewer participants)**

| | Plan Asset Audit | Participant Data Audit | | Actuarial Valuation | | | Interim Plan Processing |
|---|---|---|---|---|---|---|---|
| Years Since Trusteeship | Per Small Plan | Per Small Plan | Per Small Plan | Per Participant | Per Participant | Per Participant for >500 | Per Participant |
| 0<=y<1 | $134,940 | $49,490 | $190,990 | $4,220 | N/A | N/A | $2,680 |
| 1<=y<2 | 101,520 | 35,430 | 146,130 | 3,230 | N/A | N/A | 2,050 |
| 2<=y<3 | 71,020 | 26,450 | 106,100 | 2,340 | N/A | N/A | 1,490 |
| 3<=y<4 | 47,360 | 22,210 | 73,110 | 1,620 | N/A | N/A | 1,010 |
| 4<=y<5 | 31,850 | 17,150 | 46,980 | 1,040 | N/A | N/A | 650 |
| 5<=y | 25,480 | 13,190 | 33,810 | 750 | N/A | N/A | 470 |

In addition to the reserve factors shown, an expense loading factor equal to 0.68% of the liability for benefits applies to both Large Plans and Small Plans.

## Data Sources and Assumptions

The seriatim portion of this valuation was based on participant data maintained by PBGC's Office of Benefits Administration. For the seriatim liability, benefit amounts have been determined for each participant using plan documents, together with ERISA and PBGC regulations relating to guaranteed benefits and the allocation of assets. If specific data were not available for deferred vested participants under the seriatim method, participants were assumed to be married and to elect the qualified Joint and Survivor (J&S) benefit; wives were assumed to be four years younger than their husbands. When certain other data elements for a participant were missing, they were replaced by the average for the plan. When the plan average was not available, the average for all plans valued seriatim was used.

The nonseriatim liability was based on the plan's most recent actuarial valuation performed before the termination date that is available to PBGC. The valuation information generally was obtained from actuarial reports or Schedule SB or MB filings. For nonseriatim plans and probable terminations, provision generally has been made to reduce benefits to guaranteed levels. Attained ages for active participants, terminated vested participants, and retired participants were assumed to be ages 53, 53 and 69 respectively for new nonseriatim plans when plan data were unavailable. For post-MPPAA multiemployer plans, the assumed ages are 55 for actives, 56 for terminated vested and 65 for retirees when the data were unavailable.

## Valuation Statistics

The FY 2019 valuation for the single-employer program included approximately 1,459,000 participants owed future payments in terminated plans as of September 30, 2019. For the multiemployer program, the FY 2019 valuation included, as of September 30, 2019, 22 participants in terminated pre-MPPAA plans and approximately 96,000 participants in post-MPPAA plans currently receiving financial assistance and 1,193,000 participants in post-MPPAA plans expected to receive financial assistance. Of these, about 886,000 participants from terminated single-employer plans and 14 participants from terminated multiemployer plans were receiving benefits from PBGC at fiscal year-end.

The average monthly benefit paid by PBGC for participants in pay status during FY 2019 was $559 (including supplemental benefits) for the single-employer program and $122 for the multiemployer program in the ten pre-MPPAA plans.

Tables 3 through 6 summarize the detailed results of the seriatim and nonseriatim valuations for both the single-employer and multiemployer programs.

## Table 3:
## Liability for Pay-Status Recipients in "Seriatim at FYE" Method

| | Single-Employer | | | | | Multiemployer | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age | Number of Benefit Recipients** | Average Monthly Benefit | Average Supplemental Monthly Benefit | Liability (Millions) | Percent of Liability | Number of Benefit Recipients | Average Monthly Benefit | Liability (Millions) | Percent of Liability |
| Under 50 | 1,646 | $115 | $239 | $75 | *% | 0 | - | $0 | 0% |
| 50-54 | 1,652 | 253 | 267 | 126 | *% | 0 | - | 0 | 0 |
| 55-59 | 14,266 | 328 | 124 | 1,271 | 2% | 0 | - | 0 | 0 |
| 60-64 | 51,927 | 391 | 115 | 4,841 | 9% | 0 | - | 0 | 0 |
| 65-69 | 128,367 | 483 | 232 | 12,832 | 24% | 0 | - | 0 | 0 |
| 70-74 | 157,538 | 524 | 338 | 14,025 | 27% | 0 | - | 0 | 0 |
| 75-79 | 133,430 | 565 | 263 | 10,163 | 19% | 0 | - | 0 | 0% |
| 80-84 | 98,749 | 574 | 194 | 5,805 | 11% | 1 | 157 | * | 21% |
| 85-89 | 64,996 | 514 | 94 | 2,509 | 5% | 3 | 45 | * | 13% |
| Over 89 | 43,275 | 402 | 112 | 886 | 2% | 10 | 141 | * | 66% |
| TOTAL | 695,846 | $508 | $162 | $52,533 | 100% | 14 | $122 | * | 100% |

* Less than 0.5% or less than $500,000
** Approximately 1% of participants are receiving supplemental benefits.
Note: The liability in this table does not include the liability for the Missing Participants Program.

## Table 4:
## Liability for Deferred Participants in "Seriatim at FYE" Method

| | Single-Employer | | | | | Multiemployer | | | |
|---|---|---|---|---|---|---|---|---|---|
| Age | Number of Benefit Recipients** | Average Monthly Benefit | Average Supplemental Monthly Benefit | Liability (Millions) | Percent of Liability | Number of Benefit Recipients | Average Monthly Benefit | Liability (Millions) | Percent of Liability |
| Under 40 | 298 | $197 | $0 | $10 | 0% | 0 | - | $0 | 0% |
| 40-44 | 4,714 | 198 | 0 | 170 | 1% | 0 | - | 0 | 0 |
| 45-49 | 18,397 | 229 | 73 | 865 | 4% | 0 | - | 0 | 0 |
| 50-54 | 45,858 | 302 | 131 | 3,240 | 14% | 0 | - | 0 | 0 |
| 55-59 | 72,518 | 363 | 138 | 6,950 | 30% | 0 | - | 0 | 0 |
| 60-64 | 72,149 | 417 | 142 | 8,999 | 38% | 0 | - | 0 | 0 |
| Over 64 | 25,342 | 331 | 136 | 2,688 | 11% | 0 | - | 0 | 0 |
| Other*** | 62,818 | - - | - - | 479 | 2% | 8 | - | * | 100% |
| TOTAL | 302,094 | $351 | $132 | $23,401 | 100% | 8 | - | $* | 100% |

* Less than 0.5% or less than $500,000
** Less than 1% of participants (not including others) will receive supplemental benefits.
*** "Other" includes unlocatable participants and participants scheduled at year end for lump sum payments.
Note: The liability in this table does not include the liability for the Missing Participants Program.

## Table 5:
## Seriatim at DOPT and Nonseriatim Liability

**Plans with Final DOPT Benefits**

| | Number of Plans | Liability (millions) | Percent of Liability |
|---|---|---|---|
| A. Large | 74 | $22,629 | 60.5% |
| B. Other | 54 | $150 | 0.4% |
| Subtotal | 128 | $22,779 | 60.9% |

**Plans with Non-Final DOPT Benefits**

| | Number of Plans | Liability (millions) | Percent of Liability |
|---|---|---|---|
| A. Large | 102 | $13,885 | 37.1% |
| B. Other | 257 | $721 | 1.9% |
| Subtotal | 359 | $14,606 | 39.0% |

**Probable Plans**

| | Number of Plans | Liability (millions) | Percent of Liability |
|---|---|---|---|
| A. Large | 0 | $0 | 0.0% |
| B. Other | 0 | $0 | 0.0% |
| Subtotal | 0 | $0 | 0.0% |
| | | | |
| Total | 487 | $37,385 | 100.0% |

Notes:

1) Final DOPT benefits refer to those benefits that PBGC has determined and valued seriatim as of DOPT for the plan. Non-Final DOPT benefits are estimates of these final DOPT benefits.
2) Large Plans in this table are those whose present value of Title IV benefits at DOPT equals or exceeds $10 million.
3) The liability shown in this table does not include the liability for settlements.
4) The liability for Probable plans is shown as a gross amount (i.e., plan assets and collections on employer liabilities are not subtracted from the liability for benefits). Also, the numbers in this table do not include the liability for not yet identified probable terminations.

**Table 6A:**
**Distribution of Single-Employer Liability (including 4022(c)) by Trusteeship Status, Recipient Status, and Valuation Method**
**(Dollars in millions)**

| Recipient Status | Seriatim/ Missing Participants | Nonseriatim/ Collins | Total Terminated Liability | Probables/ IBNR | Total Liability | Percent of Total Liability |
|---|---|---|---|---|---|---|
| **Receiving Payments** | | | | | | |
| Trusteed | $52,542 | $19,984 | $72,526 | $0 | $72,526 | 63.8% |
| Pending Trusteeship | 3 | 185 | 188 | 0 | 188 | 0.2% |
| Total | $52,545 | $20,169 | $72,714 | $0 | $72,714 | 64.0% |
| **Not Receiving Payments** | | | | | | |
| Trusteed | $23,505 | $16,930 | $40,435 | $0 | $40,435 | 35.6% |
| Pending Trusteeship | 0 | 303 | 303 | 173 | 476 | 0.4% |
| Total | $23,505 | $17,233 | $40,738 | $173 | $40,911 | 36.0% |
| **All Payment Statuses** | | | | | | |
| Trusteed | $76,047 | $36,914 | $112,961 | $0 | $112,961 | 99.4% |
| Pending Trusteeship | 3 | 488 | 491 | 173 | 664 | 0.6% |
| Total | $76,050 | $37,402 | $113,452 | $173 | $113,625 | 100.0% |
| Percent of Terminated | 67.0% | 33.0% | 100.0% | | | |
| Percent of Total | 66.9% | 32.9% | 99.8% | 0.2% | 100% | |

Notes:

1) Recipient status for Seriatim, Missing Participants, IBNR and Collins liabilities refers to status as of 9/30/19. For Nonseriatim and Probable liabilities, recipient status refers to the status as of the most recent actuarial valuation report (date of plan termination if benefits are "final"). The term "final" is defined in the notes to Table 5.

2) The Probable liabilities are shown as gross amounts (i.e., plan assets and collections on employer liabilities are not subtracted from the liability for benefits).

**Table 6B:**
**Distribution of Single Employer Participants (including 4022(c)) by Trusteeship Status, Recipient Status, and Valuation Method**
**(Participants in thousands)**

| Recipient Status | Seriatim/ Missing Participants | Nonseriatim | Total Terminated Participants | Probables | Total Participants | Percent of Total Participants * |
|---|---|---|---|---|---|---|
| **Receiving Payments** | | | | | | |
| Trusteed | 696 | 197 | 893 | 0 | 893 | 61.2% |
| Pending Trusteeship | 0 | 4 | 4 | 0 | 4 | 0.3% |
| Total | 696 | 201 | 897 | 0 | 897 | 61.5% |
| **Not Receiving Payments** | | | | | | |
| Trusteed | 330 | 225 | 555 | 0 | 555 | 38.0% |
| Pending Trusteeship | 0 | 7 | 7 | 0 | 7 | 0.5% |
| Total | 330 | 232 | 562 | 0 | 562 | 38.5% |
| **All Payment Statuses** | | | | | | |
| Trusteed | 1,026 | 422 | 1,448 | 0 | 1,448 | 99.2% |
| Pending Trusteeship | 0 | 11 | 11 | 0 | 11 | 0.8% |
| Total | 1,026 | 433 | 1,459 | 0 | 1,459 | 100.0% |
| | | | | | | |
| Percent of Terminated | 70.3% | 29.7% | 100.0% | | | |
| Percent of Total | 70.3% | 29.7% | 100.0% | 0.0% | 100.0% | |

Notes:

1) Recipient status for Seriatim and Missing Participants liabilities refers to status as of 9/30/19. For Nonseriatim and Probable liabilities, recipient status refers to the status as of the most recent actuarial valuation report (date of plan termination if benefits are "final"). The term "final" is defined in the notes to Table 5.

2) Participant counts for IBNR and Collins are not included.

* may not add due to rounding

## Reconciliation of Results

Table 7 reconciles the September 30, 2019 valuation with the September 30, 2018 valuation. It shows that the $8,943 million increase in the liability for the Single-Employer program was the net effect of:

(1) increased liability from change in interest factors = $12,270 million

(2) actual benefit payments = ($6,020) million

(3) decreased liability for probable plans = ($4,012) million

(4) change in mortality assumptions = ($32) million

(5) new plan terminations as of the beginning of the year = $4,583 million

(6) expected interest on liability = $2,950 million

(7) other changes = ($796) million.

The Multiemployer columns reconcile the liability for the post-MPPAA financial assistance to insolvent plans. The liability for the pre-MPPAA terminated plans in FY19 is less than $500,000 and not included or shown in this table.

**Table 7:**
**Reconciliation of the Present Value of Future Benefits** (dollars in millions)

| | Total Single Employer | Post-MPPAA Multiemployer |
|---|---|---|
| 1. Liability at BOY (9/30/18) | | |
| (a) Present Value of Future Benefits for all Plans | $104,682 | $56,153 |
| (b) Liability for Probable Plans (gross liability including unreported) | (4,185) | (53,759) |
| (c) Liability for Unreported Terminated Plans and other settlements | (18) | 0 |
| (d) 9/30/18 Liability for Terminated Plans (a + b + c) | $100,479 | $2,394 |
| 2. Change in Valuation Software | | |
| (a) Effect on Liability as of DOPT | $0 | $0 |
| (b) Projection of (a) from DOPT to BOY + post-DOPT changes | 18 | (8) |
| (c) Total (a + b) | $18 | ($8) |
| 3. Net New Plans and Missing Participant Liability | | |
| (a) New Missing Participant Liability | $42 | $0 |
| (b) New Termination Inventory as of DOPT | 4,491 | 261 |
| (c) Deletions as of DOPT | (1) | 0 |
| (d) Projection of (b + c) from DOPT to BOY | 93 | 0 |
| (e) Total (a + b + c + d) | $4,625 | $261 |
| 4. Nonseriatim Data Changes and Effect of DOPT Seriatim Valuation | | |
| (a) Effect on Liability at DOPT | ($49) | ($26) |
| (b) Projection of (a) from DOPT to BOY | (9) | 0 |
| (c) Total (a + b) | ($58) | ($26) |
| 5. Actuarial Charges/Credits | | |
| (a) Expected Interest | $2,950 | $75 |
| (b) Change in Interest Factors | 12,270 | 297 |
| (c) Change in Mortality Assumption | (32) | (11) |
| (d) Change in Method (Current Year: Seriatim at DOPT to Seriatim at FYE) | 99 | 0 |
| (e) Effect of Experience* | (480) | (12) |
| (f) Change in Other Assumptions (Expense, SPARR, PBGCC STD Rates) | (290) | 0 |
| (g) Total (a + b + c + d + e +f) | $14,517 | $349 |
| 6. Expected Expense Payments | ($126) | $0 |
| 7. Actual Benefit Payments | ($6,020) | ($163) |
| 8. Liabilities at End of Period (9/30/19) | | |
| (a) Liability for all Terminated Plans = (1d) + (2c) + (3e) + (4c) + (5g) + (6) + (7) | $113,435 | $2,807 |
| (b) Liability for Unreported Terminated Plans and other settlements | 17 | 0 |
| (c) Liability for all Terminated Plans (a + b) | 113,452 | 2,807 |
| (d) Liability for Probable Plans (gross liability including unreported) ** | 173 | 65,188 |
| (e) 9/30/19 Present Value of Future Benefits for all Plans (c + d) | $113,625 | $67,995 |

* Includes change from expected benefits ($6,335 million) to actual benefits ($6,020 million) in Total Single Employer.
Includes change from expected benefits ($174 million) to actual benefits ($163 million) in Post-MPPAA Multiemployer.
Actual does not include payments made by employers.

** Includes $173 million for not yet identified probable terminations.
Includes $1,149 million for small reserves Post-MPPAA Multiemployer plans.

**Statement of Actuarial Opinion**

This valuation has been prepared in accordance with generally accepted actuarial principles and practices and, to the best of my knowledge, fairly reflects the actuarial present value of the Corporation's liabilities for the single-employer and multiemployer plan insurance programs as of September 30, 2019.

In preparing this valuation, I have relied upon information provided to me regarding plan provisions, plan participants, plan assets, and other matters.

In my opinion, (1) the techniques and methodology used for valuing these liabilities are generally acceptable within the actuarial profession; (2) the assumptions used are appropriate for the purposes of this statement and are individually my best estimate of expected future experience, discounted using current settlement rates from insurance companies as determined by PBGC's Policy Research and Analysis Department; and (3) the resulting total liability represents my best estimate of anticipated experience under these programs.

I, Scott G. Young, am the Chief Valuation Actuary of PBGC. I am a Member of the American Academy of Actuaries, a Fellow of the Society of Actuaries and an Enrolled Actuary. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

*Scott G. Young*

Scott G. Young, FSA, EA, MAAA
Fellow of the Society of Actuaries
Enrolled Actuary
Member of the American Academy of Actuaries
Chief Valuation Actuary and Department Director
Actuarial Services and Technology Department
Pension Benefit Guaranty Corporation

March 26, 2020