Willis Towers Watson

American Electric Power

UMWA Postretirement Health Care Plan

Actuarial Valuation Report
Postretirement Welfare Cost for Fiscal Year Beginning January 1, 2021 under U.S. GAAP

May 2021

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Purposes of valuation

American Electric Power (AEP) engaged Willis Towers Watson US LLC (Willis Towers Watson) to perform an actuarial valuation of its postretirement welfare program.

As requested by AEP, this report documents the results of an actuarial valuation of the UMWA Postretirement Health Care Plan (the Plan) as of January 1, 2021.

The primary purpose of this valuation is to determine the Net Periodic Postretirement Benefit Cost/(Income) (Benefit Cost), in accordance with FASB Accounting Standards Codification Topic 715 (ASC 715) for the fiscal year beginning January 1, 2021. It is anticipated that a separate report will be prepared for year-end financial reporting and disclosure purposes.

Limitations

This valuation has been conducted for the purposes described above and may not be suitable for any other purpose. In particular, please note the following:

1. There may be certain events that have occurred since the valuation date that are not reflected in the current valuation.
2. This report does not provide information for plan reporting under ASC 965.

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Section 1: Summary of key results

Benefit cost, plan assets & obligations

All monetary amounts shown in U.S. Dollars

Fiscal Year Beginning		01/01/2021	01/01/2020
Benefit Cost/ (Income)	Net periodic postretirement benefit cost/(income)	758,502	784,070
	Benefit cost/(income) due to special events	0	0
	Total benefit cost/(income)	758,502	784,070
Measurement Date		**01/01/2021**	**01/01/2020**
Plan Assets	Fair value of plan assets (FVA)	48,003,101	42,184,746
Benefit Obligations	Accumulated postretirement benefit obligation (APBO)	(88,077,450)	(76,631,366)
Funded Ratio	Fair value of plan assets to APBO	54.5%	55.0%
Accumulated Other Comprehensive (Income)/Loss	Net prior service cost/(credit)	0	0
	Net loss/(gain)	8,957,762	374,790
	Total accumulated other comprehensive (income)/loss (pre-tax)	8,957,762	374,790
Assumptions	Discount rate	2.85%	3.50%
	Expected long-term rate of return on plan assets	5.50%	6.25%
	Current health care cost trend rate	6.50%	6.00%
	Ultimate health care cost trend rate	4.50%	4.50%
	Year of ultimate trend rate	2029	2026
Participant Data	Census date	01/01/2021	01/01/2020

Employer Contributions

Employer contributions are the amounts paid by AEP to provide for postretirement benefits, net of participant contributions and Medicare subsidy for non-Cook Coal locations plus the Net Periodic Benefit Cost for Cook Coal.

AEP's funding policy for non-Cook Coal locations is to pay claims costs for the year and administrative expenses, less any Medicare Part D subsidy (RDS) received. For Cook Coal, the funding policy is to contribute an amount equal to the postretirement welfare cost net of retiree drug subsidy payments received for Cook Coal retirees (the sum of which can be no less than zero). We understand the sponsor may deviate from this policy, as permitted by its terms, based on cash, tax or other considerations.

Comments on results

The cost of the postretirement welfare plan is determined in accordance with generally accepted accounting principles in the U.S. ("U.S. GAAP"). The fiscal 2021 postretirement welfare benefit cost for the plan is $758,502. Under U.S. GAAP, the funded position (fair value of plan assets less the projected benefit obligation, or "APBO") of each postretirement welfare plan at the plan sponsor's fiscal year-end (measurement date) is required to be reported as a liability. The APBO is the actuarial present value of benefits attributed to service rendered prior to the measurement date, taking into consideration expected future trend increases. The plan's overfunded (underfunded) APBO as of January 1, 2021, was $(40,074,349), based on the fair value of plan assets of $48,003,101 and the APBO of $88,077,450.

Fiscal year-end financial reporting information and disclosures are prepared before detailed participant data and full valuation results are available. Therefore, the postretirement benefit asset (liability) at December 31, 2020, was derived from a roll forward of the January 1, 2020 valuation results, adjusted for the year-end discount rate, other updated valuation assumptions and asset values, as well as significant changes in plan provisions and participant population. The current fiscal year-end financial reporting information will be developed based on the results of the January 1, 2021 valuation, projected to the end of the year and similarly adjusted for the year-end discount rate, any other assumption changes and asset values, as well as significant changes in plan provisions and participant population.

Change in net periodic cost

The postretirement welfare cost decreased from $784,070 in fiscal 2020 to $758,502 in fiscal 2021, as set forth below:

All monetary amounts shown in U.S. Dollars

($ in millions)	Postretirement Welfare Cost
Prior year	0.8
Change due to:	
■ Expected based on prior valuation and contributions during prior year	(0.1)
■ Unexpected noninvestment experience	0.1
■ Unexpected investment experience	(0.2)
■ Assumption changes	0.2
■ Changes in substantive plan	0.0
Current year	0.8

Significant reasons for these changes include the following:

- The discount rate decreased by 65 basis points compared to the prior year which decreased the postretirement welfare cost.
- Actual asset returns during 2020 were greater than the assumed rate of 6.25% which decreased the postretirement welfare cost.
- The expected return on asset assumption was decreased from 6.25% to 5.50%, which increased the postretirement welfare cost.
- The per capita claims cost assumptions were updated to reflect another year of both experience and pandemic circumstances which decreased the postretirement welfare cost.
- The initial health care cost trend rate assumption was updated to reflect a higher starting rate (6.50%) and longer period to reach the ultimate trend (8 years) which increased the postretirement welfare cost.

Basis for valuation

Appendix A summarizes the assumptions and methods used in the valuation. Appendix B summarizes our understanding of the principal provisions of the plan being valued.

Changes in assumptions

The following assumptions were revised for the 2021 valuation: mortality, discount rate, per capita claims costs, trend rates and expected return on assets.

Changes in methods

None.

Changes in benefits valued

None.

Actuarial certification

This valuation has been conducted in accordance with generally accepted actuarial principles and practices. However, please note the information discussed below regarding this valuation.

Reliances

In preparing the results presented in this report, we have relied upon information regarding plan provisions, participants, assets, and sponsor accounting policies and methods provided by AEP and other persons or organizations designated by AEP. See the Sources of Data and Other Information section of Appendix A for further details. We have relied on all the data and information provided as complete and accurate. We have reviewed this information for overall reasonableness and consistency, but have neither audited nor independently verified this information. Based on discussions with and concurrence by the plan sponsor, assumptions or estimates may have been made if data were not available. We are not aware of any errors or omissions in the data that would have a significant effect on the results of our calculations. The results presented in this report are directly dependent upon the accuracy and completeness of the underlying data and information. Any material inaccuracy in the data, assets, plan provisions or other information provided to us may have produced results that are not suitable for the purposes of this report and such inaccuracies, as corrected by AEP, may produce materially different results that could require that a revised report be issued.

Measurement of benefit obligations, plan assets and balance sheet adjustments

Census date/measurement date

The measurement date is January 1, 2021. The benefit obligations were measured as of January 1, 2021 and are based on participant data as of the census date, January 1, 2021.

Plan assets and balance sheet adjustments

Information about the fair value of plan assets and the general ledger account balances for the other postretirement benefit plan cost at December 31, 2020, which reflect the expected funded status of the plans before adjustment to reflect the funded status based on the year-end measurements, and differences between the expected Medicare Part D subsidies and amounts received during the year was reviewed for reasonableness and consistency, but no audit was performed.

Accumulated other comprehensive (income)/loss amounts shown in the report are shown prior to adjustment for tax effects. Any tax effects in AOCI should be determined by AEP in consultation with its tax advisors and independent accountants.

Effects of Health Care Legislation

This valuation reflects our understanding of the relevant provisions of the Patient Protection and Affordable Care Act (PPACA) and Health Care and Education Reconciliation Act (HCERA) as amended by subsequent legislation. The IRS has yet to issue final guidance with respect to many aspects of these laws. It is possible that future guidance may conflict with our understanding of these laws based on currently available guidance and could therefore affect the results shown in this report. The valuation does not anticipate the effects of any possible future changes to PPACA or HCERA.

Assumptions and methods under U.S. GAAP

As required by U.S. GAAP, the actuarial assumptions and methods employed in the development of the other postretirement benefit cost and other financial reporting have been selected by AEP. Willis Towers Watson has concurred with these assumptions and methods, except for the expected rate of return on plan assets selected as of January 1, 2021. Evaluation of the expected return assumption was outside the scope of Willis Towers Watson's assignment and would have required substantial additional work that we were not engaged to perform. U.S. GAAP requires that each significant assumption "individually represent the best estimate of a particular future event."

The results shown in this report have been developed based on actuarial assumptions that, to the extent evaluated by Willis Towers Watson, we consider to be reasonable. Other actuarial assumptions could also be considered to be reasonable. Thus, reasonable results differing from those presented in this report could have been developed by selecting different reasonable assumptions.

A summary of the assumptions, methods and sources of data and other information used is provided in Appendix A. Note that any subsequent changes in methods or assumptions for the January 1, 2021 measurement date will change the results shown in this report.

Nature of actuarial calculations

The results shown in this report are estimates based on data that may be imperfect and on assumptions about future events that cannot be predicted with any certainty. The effects of certain plan provisions may be approximated or determined to be insignificant and therefore not valued. Reasonable efforts were made in preparing this valuation to confirm that items that are significant in the context of the actuarial liabilities or costs are treated appropriately and are not excluded or included inappropriately. Any rounding (or lack thereof) used for displaying numbers in this report is not intended to imply a degree of precision, which is not a characteristic of actuarial calculations.

If overall future plan experience produces higher benefit payments or lower investment returns than assumed, the relative level of plan costs reported in this valuation will likely increase in future valuations (and vice versa). Future actuarial measurements may differ significantly from the current measurements presented in this report due to many factors, including: plan experience differing from that anticipated by the economic or demographic assumptions, changes in economic or demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for the measurements (such as the end of an amortization period), and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements. Retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements.

See Basis for valuation in Section 1 above for a discussion of any material events that have occurred after the valuation date that are not reflected in this valuation.

Limitations on use

This report is provided subject to the terms set out herein and in our Master Consulting Services Agreement dated July 29, 2004 and any accompanying or referenced terms and conditions.

The information contained in this report was prepared for the internal use of AEP and its independent accountants in connection with our actuarial valuation of the other postretirement benefit plan as described in Purposes of valuation above. It is not intended for and may not be used for other purposes, and we accept no responsibility or liability in this regard. AEP may distribute this actuarial valuation report to the appropriate authorities who have the legal right to require AEP to provide them this report, in which case AEP will use best efforts to notify Willis Towers Watson in advance of this distribution. Further distribution to, or use by, other parties of all or part of this report is expressly prohibited without Willis Towers Watson’s prior written consent. Willis Towers Watson accepts no responsibility for any consequences arising from any other party relying on this report or any advice relating to its contents.

Professional qualifications

The undersigned are members of the Society of Actuaries and meet the "Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States" relating to other postretirement benefit plans. Our objectivity is not impaired by any relationship between the plan sponsor and our employer, Willis Towers Watson US LLC.

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The Pricing Specialist is responsible for developing and/or determining the reasonableness of retiree welfare plan trend and participation assumptions as well as assumed per capita claims costs (including the aging/morbidity assumption if applicable). The Valuation Actuary is responsible for other aspects of the valuation (e.g., developing and/or reviewing the reasonableness of other valuation assumptions and methods, ensuring that the valuation model reasonably reflects the substantive plan, preparing demographic data, performing the valuation, implementing the appropriate accounting or funding calculations, etc.).

Willis Towers Watson US LLC

May 2021

https://wtwonline.sharepoint.com/sites/tctclient_604598_2021RETANN/Documents/UMWA Report 2021.docx

Section 2: Accounting exhibits

2.1 Balance sheet asset/(liability)

All monetary amounts shown in U.S. Dollars

Measurement Date		01/01/2021	01/01/2020
A	**Development of Balance Sheet Asset/(Liability)[1]**		
1	Accumulated postretirement benefit obligation (APBO)	88,077,450	76,631,366
2	Fair value of plan assets (FVA)	48,003,101	42,184,746
3	Net balance sheet asset/(liability)	(40,074,349)	(34,446,620)
B	**Current and Noncurrent Classification**		
1	Noncurrent asset	0	0
2	Current liability	(2,459,467)	(2,539,229)
3	Noncurrent liability	(37,614,882)	(31,907,391)
4	Net balance sheet asset/(liability)	(40,074,349)	(34,446,620)
C	**Accumulated Other Comprehensive (Income)/Loss**		
1	Net prior service cost/(credit)	0	0
2	Net loss/(gain)	8,957,762	374,790
3	Accumulated other comprehensive (income)/loss[2]	8,957,762	374,790
D	**Assumptions and Dates[3]**		
1	Discount rate	2.85%	3.50%
2	Current health care cost trend rate	6.50%	6.00%
3	Ultimate health care cost trend rate	4.50%	4.50%
4	Year of ultimate trend rate	2029	2026
5	Census date	01/01/2021	01/01/2020

[1] Whether any amounts in this table that differ from those disclosed at year-end must be disclosed in subsequent interim financial statements should be determined.
[2] Amount shown is pre-tax and should be adjusted by plan sponsor for tax effects.
[3] Rates are expressed on an annual basis where applicable.

2.2 Summary and comparison of postretirement benefit cost and cash flows

All monetary amounts shown in U.S. Dollars

Fiscal Year Ending			12/31/2021	12/31/2020
A	**Total Postretirement Benefit Cost**			
	1	Employer service cost	869,244	742,102
	2	Interest cost	2,480,261	2,645,283
	3	Expected return on assets	(2,601,977)	(2,603,315)
	4	Subtotal	747,528	784,070
	5	Transition obligation/(asset) amortization	0	0
	6	Net prior service cost/(credit) amortization	0	0
	7	Net loss/(gain) amortization	10,974	0
	8	Amortization subtotal	10,974	0
	9	Net periodic postretirement benefit cost/(income)	758,502	784,070
B	**Assumptions**			
	1	Discount rate	2.85%	3.50%
	2	Expected long-term rate of return on plan assets	5.50%	6.25%
	3	Current health care cost trend rate	6.50%	6.00%
	4	Ultimate health care cost trend rate	4.50%	4.50%
	5	Year ultimate trend rate is expected	2029	2026
C	**Census Date**		01/01/2021	01/01/2020
D	**Assets at Beginning of Year**			
	1	Fair market value	48,003,101	42,184,746
E	**Cash Flow**		**Expected**	**Actual**
	1	Employer contributions[1]	2,459,467	4,035,784
	2	Plan participants' contributions	0	0
	3	Benefits paid by the Employer[2]	2,644,707	2,627,743
	4	Benefits paid from plan assets[2]	1,467,767	0
	5	Expected Medicare subsidy	(245,319)	(296,471)

1 Reflects benefit payments and expenses (non-Cook Coal), as well as contributions to plan trust (Cook Coal), net of RDS.
2 Amounts shown are prior to offset for Medicare subsidy.

2.3 Detailed results for postretirement welfare cost and funded position

All monetary amounts shown in U.S. Dollars

Detailed results			01/01/2021	01/01/2020
A	**Service Cost**			
	1	Medical	869,244	742,102
B	**Accumulated Postretirement Benefit Obligation [APBO]**			
	1	Medical:		
		a Participants currently receiving benefits	65,413,283	54,021,680
		b Fully eligible active participants	9,835,339	12,404,399
		c Other participants	12,828,828	10,205,287
		d Total	88,077,450	76,631,366
C	**Assets**			
	1	Fair value [FV]	48,003,101	42,184,746
D	**Funded Position**			
	1	Overfunded (underfunded) APBO	(40,074,349)	(34,446,620)
E	**Amounts in Accumulated Other Comprehensive Income**			
	1	Transition obligation/(asset)	0	0
	2	Net prior service cost/(credit)	0	0
	3	Net loss/(gain)	8,957,762	374,790
	4	Total	8,957,762	374,790

2.4 Expected benefit disbursements, administrative expenses and participant contributions

All monetary amounts shown in U.S. Dollars

			01/01/2021	01/01/2020
A	**Medical**			
	1	Gross disbursements	4,112,474	3,852,833
	2	Participant contributions	0	0
	3	Net disbursements	4,112,474	3,852,833
B	**RDS**			
	1	Gross disbursements	(245,319)	(233,813)
	2	Participant contributions	0	0
	3	Net disbursements	(245,319)	(233,813)
C	**Total**			
	1	Gross disbursements	3,867,155	3,619,020
	2	Participant contributions	0	0
	3	Net disbursements	3,867,155	3,619,020

Section 3: Participant data

3.1 Summary of participant data

Census Date			01/01/2021	01/01/2020
A	**Participating Employees**			
	1	Number		
	a	Fully eligible	11	18
	b	Other	16	18
	c	Total participating employees	27	36
	2	Average age	47.9	49.2
	3	Average credited service	19.3	20.8
	4	Average future working life		
	a	to expected retirement age	13.7	12.6
	b	to full eligibility age	4.7	5.7
B	**Retirees and Surviving Spouses**			
	1	Retirees		
	a	Number under 65	28	29
	b	Number 65 and older	175	168
	c	Total	203	197
	d	Number with married/family health care coverage	101	92
	e	Number with single health care coverage	102	105
	f	Average age	75.7	76.3
	g	Distribution at January 1, 2021		

Age	Number
Under 55	0
55-59	4
60-64	24
65-69	39
70-74	41
75-79	29
80-84	22
85 and over	44

			01/01/2021	01/01/2020
C	**Dependents**			
	1	Number	101	92
	2	Average age	69.0	69.5
	3	Distribution at January 1, 2021		

Age	Number
Under 55	2
55-59	11
60-64	24
65-69	22
70-74	20
75-79	8
80-84	9
85 and over	5

3.2 Age and service distribution of participating employees

	Attained Years of Credited Service and Number								
Attained Age	0-4	5-9	10-14	15-19	20-24	25-29	30-34	Over 34	Total
Under 25									
25-29									
30-34			1						1
35-39			4						4
40-44			4	1	2				7
45-49			1	1	2				4
50-54			3	1		1			5
55-59				1	1	1			3
60-64				1			1		2
65-69								1	1
70 & over									
Total	0	0	13	5	5	2	1	1	27 [1]

Average:	Age:	47.9	Number of Participants:	Fully eligible	11	Males	27
	Service	19.3		Other	16	Females	0

Census data as of January 1, 2021

[1] Ages and service totals for purposes of determining category are based on exact (not rounded) values.

Appendix A: Statement of actuarial assumptions, methods and data sources

Economic Assumptions

Discount rate 2.85%

Medical cost trend rate

- 2021 6.50%
- 2022 6.25
- 2023 6.00
- 2024 5.75
- 2025 5.50
- 2026 5.25
- 2027 5.00
- 2028 4.75
- 2029+ 4.50

Expected long-term rate of return on plan assets 5.50%

Demographic Assumptions

Mortality

Base mortality rates use the headcount-weighted Pri-2012 mortality table (using contingent survivor tables only after retiree death) with blue collar adjustments.

Mortality improvements are projected forward on a generational basis using Scale MP-2020.

Disability

Rates vary by age as indicated by the following sample values:

Age	Rate
20	0.120%
30	0.120
40	0.147
50	0.357
60	1.380

Termination

Annual rates vary by age as indicated by the following sample values:

Age	Rate
20	10.7%
30	5.9
40	2.1
≥45	0.0

Retirement — Annual rates vary by age as indicated by the following values:

Age	Rate	Age	Rate
55	6.0%	61	10.0%
56	6.5	62	12.0
57	7.0	63	15.0
58	7.5	64	20.0
59	8.0	65	50.0
60	9.0	66 – 69	30.0
		70	100.0

Percent married — 95%

Spouses ages — Wives three years younger than husbands.

Participation rates
- Employees – 100%
- Dependent – 100%

2021 Annual Per Capita Claims Costs				
Per Capita Claims Cost Assumption	**Age**	**Medical and Rx Claims**	**Medicare Part D RDS Subsidy**	
■ Overall average	< 65	19,734	N/A	
	>=65	11,939	(1,002)	
■ By age group	< 35	8,181	N/A	
	35-49	8,868	N/A	[Note that for 2021-22,
	40-44	9,927	N/A	the medical portion of
	45-49	11,594	N/A	the claims cost rates
	50-54	14,252	N/A	(but not the Rx portion)
	55-59	17,186	N/A	Is loaded by 2% in
	60-64	21,045	N/A	anticipation of increased
	65-69	10,672	(966)	utilization associated
	70-74	11,829	(1,050)	with pandemic-driven
	75-79	12,668	(1,084)	abatement of many
	80-84	12,922	(1,073)	routine services, cost of
	85-89	12,605	(1,001)	COVID-19 testing and
	90-94	11,415	(865)	treatment, etc.]
	>= 95	9,932	(695)	

Administrative expenses — $452 per primary participant in 2021, increasing 3.5% per year.

Methods – Postretirement Welfare Cost and Funded Position

Service cost and APBO	Projected unit credit actuarial cost method, allocated in equal amounts, from the valuation date on or after date of hire to full eligibility date.
Net loss (gain)	Net loss (gain) in excess of 10% of the APBO is amortized on a straight-line basis over the expected average expected remaining service of active participants expected to benefit under the plan.
Benefits not valued	All benefits described in the Plan Provisions section of this report were valued. Willis Towers Watson has reviewed the plan provisions with AEP and based on that review is not aware of any significant benefits required to be valued that were not included. Certain plan provision changes were negotiated, but AEP has been unable to implement. These changes have not been valued.
Timing of benefit payments	Benefit payments are assumed to be made uniformly throughout the year and on average at mid-year.
Change in assumptions and methods since prior valuation	The discount rate was decreased from 3.50% to 2.85%. Anticipated per capita claims costs were updated to reflect recent experience and cover a potential spike in post-pandemic utilization of medical services. Mortality improvement assumption updated to MP-2020. The health care cost trend assumption was updated to start at 6.50% in 2021 reducing to an ultimate rate of 4.50% in 2029. The prior assumption was an initial rate of 6.00% in 2020 reducing to an ultimate rate of 4.50% in 2026. The expected return on assets was decreased from 6.25% to 5.50%.

Sources of Data and Other Information

American Electric Power furnished the participant, benefit payments and assets information, as well as the accrued postretirement benefits cost as of December 31, 2020. Data were reviewed for reasonableness and consistency, but no audit was performed. We are aware of no errors or omissions in the data that would have a significant effect on the results of our calculation.

Assumptions Rationale - Significant Economic Assumptions

Discount rate	As required by U.S. GAAP, the discount rate was chosen by the plan sponsor based on market information on the measurement date.
Expected long-term return on plan assets	We understand that the expected return on assets assumption reflects the plan sponsor's estimate of future experience for trust asset returns, reflecting the plan's current asset allocation and any expected changes during the current plan year, current market conditions and the plan sponsor's expectations for future market conditions.

Per capita claims costs	AEP supplied data on retiree medical and prescription drug claim payments for the 48-month period ending September 30, 2020. Separate medical and prescription drug claim rates were calculated by dividing annual paid claims (from October through September for each 12-month period) by covered lives over these four periods. These rates were then age-graded over standard Willis Towers Watson morbidity curves to generate quinquennial age-banded medical and prescription drug claims rates. These claim rates were trended to 2021 and a weighted average was taken to calculate final age-banded 2021 claim rates for medical and prescription drug benefits. Weighting factors of 30% were used for the two most recent years, while factors of 20% were used for the other two years.
Medicare Part D subsidy value	We calibrated our modeling tool to reflect the 2021 cost of the current prescription drug benefit for AEP's UMWA post-65 retirees. The tool employs a continuance table of annual retiree drug utilization levels, developed from analyzing the experience of many large employers reflecting utilization of 1.8 million Medicare-eligible members during 2016. After the plan-specific benefit provisions have been calibrated to current costs, the Modeler trends costs forward to 2021 at 7.00% per year. Actuarial equivalence was determined using the following two-prong approach outlined in the regulations for Medicare Part D: ■ *Gross Value Test* – The Modeler calculates the value of standard Medicare Part D coverage (ignoring benefit enhancements from ACA) and compares it to AEP's plan costs. AEP's plan passed this test by being richer than the projected value of standard Medicare Part D coverage for these groups. ■ *Net Value Test* –The net value prong of the test compared the value of Standard Part D (ignoring benefit enhancements from ACA) coverage in 2021 less the greater of $396.72 (the national average Part D premium) and 25.5% of the gross value of Part D coverage to the projected 2021 value of AEP coverage. For plans deemed to be actuarially equivalent, the tool calculates the average expected value of the employer subsidy in 2021, using the continuance table calibrated to the prescription drug portion of AEP's plan cost. This produced an average 2021 per person annual employer retiree drug subsidy of $1,014. This rate was converted to rates varying by quinquennial age bands using Willis Towers Watson's standard morbidity factors.

Claims cost trend rates	Assumed increases were chosen by the plan sponsor and, as required by U.S. GAAP, they represent an estimate of future experience, informed by an analysis of recent plan experience, leading to select and ultimate assumed trend rates and reflecting the expected near-term effect of recently enacted program changes. In setting near term trend rates, other pertinent statistics were considered, including surveys on general medical cost increases. In setting the ultimate trend rate, considerations included assumed GDP growth consistent with the assumed future economic conditions inherent in other economic assumptions chosen by the client at the measurement date. After examining historical variability in trend rates, we believe the selected assumptions do not significantly conflict with what would be reasonable based on a combination of market conditions at the measurement date and future expectations consistent with other economic assumptions used, other than the discount rate.
Medicare Part D subsidy trend rates	The rates of increase in per capita Medicare Part D subsidy payments are assumed to equal the plan's assumed trend rates for prescription drug claims.

Assumptions Rationale - Significant Demographic Assumptions

Healthy mortality	Assumptions were selected by the plan sponsor and, as required by U.S. GAAP, represent a best estimate of future experience.
Disabled mortality	Assumptions were selected by the plan sponsor and, as required by U.S. GAAP, represent a best estimate of future experience.
Termination	Termination rates are based on plan sponsor expectations for the future with periodic monitoring of observed gains and losses caused by termination patterns different than assumed.
Disability	Disability rates are based on plan sponsor expectations for the future with periodic monitoring of observed gains and losses caused by disability patterns different than assumed.
Retirement	Retirement rates are based on plan sponsor expectations for the future with periodic monitoring of observed gains and losses caused by retirement patterns different than assumed.
Participation	
■ Participants	The assumed coverage rates for participants and spouses reflect historical experience as well as anticipated future experience based on a 100% employer paid benefit.
■ Covered dependents	The assumed dependent coverage prevalence of future retirees is based on the dependent coverage observed among recent retirees.
■ Covered spouse age	The assumed age difference for spouses of future retirees is based on the age difference observed among recent retirees and general population statistics of the age difference for married individuals of retirement age.

Model Descriptions and Disclosure in Accordance with ASOP No. 56

Quantify

Quantify is the Willis Towers Watson centrally developed, tested and maintained Global actuarial valuation system. It is used to perform valuations of clients' benefit plans.

Quantify provides the ability to process data, calculate benefits and value benefit liabilities, develop results using applicable standards, and generate client reports.

Quantify parameters provide significant flexibility to model populations and plan designs. Various demographic, economic and benefit related assumptions exist for users to model multiple demographic and economic situations.

Plan liabilities are calculated based on standard actuarial techniques, developing actuarially reasonable results using the population and parameters entered. The calculation and presentation of liabilities in Quantify relies on the assumptions used and the reasonability of the assumptions selected.

Quantify incorporates standard liability methodologies that are intended to reasonably reflect a variety of economic or demographic conditions. The model itself does not evaluate any assumptions entered for reasonableness, consistency or probability of occurrence.

Quantify is designed specifically for these purposes, and we know of no material limitations that would prevent the system from being suitable for these intended purposes. The actuaries signing this report have relied on the actuaries who develop, test and maintain this system, and have also performed a limited review of results to ensure that system parameters have been set appropriately and plan provisions coded correctly.

BOND:Link

U.S. BOND:Link is a methodology to assist with the selection of discount rates used in liability and cost measurements related to employee benefit plans. Discount rates are derived by identifying a theoretical settlement portfolio of high-quality corporate bonds sufficient to provide for a plan’s projected benefit payments. The single interest rate is then determined that results in a discounted value of the plan’s benefit payments that equals the market value of the selected bond portfolio.

Updated BOND:Link models are developed monthly as of the last day of the month. The construction of a BOND:Link model relies on bond data collected as of the measurement date. Parameters provide the user the ability to control aspects of the model. The model output allows the user to see the effects of those parameters.

Information regarding quoted bond prices, yields and other bond related data is from Bloomberg Finance L.P.

Published Demographic Tables

Certain demographic tables described above are standard published tables or are based on standard published tables from models developed by organizations with the requisite expertise

AgeDist

AgeDist is a spreadsheet tool that applies relative cost factors by age to average per capita costs (pre and post 65) and census weights to produce age-graded plan costs for pre- and post-65 populations. The average per capita costs and census weights are provided as inputs to the tool which is then combined with a morbidity curve to produce a set of weighted average age-related costs that equal the average. The age-graded costs are used in the actuarial valuation.

The morbidity curve was developed from a broad set of claims data aggregated by age and blended and may not reflect a client's specific morbidity. The model does not evaluate the average per capita costs or census weights for reasonableness or consistency.

The model(s) used for this analysis is designed specifically for these purposes, and we know of no material limitations that would prevent the model(s) from being suitable for these intended purposes.

We are not aware of any material inconsistencies among assumptions used in this work. The model itself does not evaluate any assumptions entered for reasonableness, consistency or probability of occurrence. The calculation and presentation of results relies on the assumptions used and the reasonability of the assumptions selected. The output of the model(s) used in this analysis are considered reasonable based on the aggregation of assumptions used. However, a different set of results could also be considered reasonable based on a range of possible values used for each assumption.

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Appendix B: Summary of principal other postretirement benefit plan provisions

Medical Benefits

Eligibility	Participants are eligible upon retirement after age 55 with ten years of service or attaining age 55 with ten years of service after becoming permanently disabled or age 55 if retired with 20 years of service prior to age 50. Miners with less than ten years at retirement who are permanently and totally disabled as a result of a mine accident will retain a health services card for life.
Dependent eligibility	Eligible dependents are spouse and unmarried children who have not attained age 27.
Survivor eligibility	After the death of retiree or active employee eligible to retire, surviving spouses are eligible until death or remarriage subject to a $2,000 per month earnings limit.
Retiree contributions	None.
Benefits provisions	The UMWA medical plan covers substantially all medical services. Effective for retirements on or after January 1, 1994, a $750 annual per family deductible is in place for non-Medicare-eligible retirees. Copayments are required only for outpatient physician visits ($12 in-network and $20 out-of-network, maximum of $240 per family per 12 months) and for prescription drugs ($5 retail in PPL, $10 out of PPL, no copay mail order). A schedule of allowances for vision care is also provided. Benefits after age 65 are coordinated with Medicare. Expenses associated with the treatment of Black Lung Disease are not covered by this plan.

Future Plan Changes

No future plan changes were recognized in determining postretirement welfare cost.

Changes in Benefits Valued Since Prior Year

There have been no changes in benefits valued since the prior year.

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Appendix C: Results by business unit

American Electric Power
UMWA Postretirement Welfare Plan
Summary of Plan Participants for the 2021 Valuation

		Nonretired Participants	Retired Participants			
		Active Participants	Retirees	Dependent Spouses	Surviving Spouses	Total
225	Cedar Coal Co.	0	48	32	66	146
270	Cook Coal Terminal	27	52	43	2	97
290	Conesville Coal Preparation Company	0	31	26	4	61
	Total	27	131	101	72	304

AMERICAN ELECTRIC POWER
UMWA POSTRETIREMENT WELFARE PLAN
2021 NET PERIODIC POSTRETIREMENT BENEFIT COST

					"Other" Cost					
							Amortizations			
Location	*Accumulated Postretirement Benefit Obligation*	*Expected Net Benefit Payments*	*Fair Value of Assets*	*Service Cost*	*Interest Cost*	*Expected Return on Assets*	*PSC*	*(G)/L*	*Total "Other" Cost*	*Net Periodic Postretirement Benefit Cost*
225 Cedar Coal Co.	22,739,196	1,702,652	0	0	623,975	0	0	2,833	626,808	626,808
Appalachian Power Co. - SEC	**$22,739,196**	**$1,702,652**	**$0**	**$0**	**$623,975**	**$0**	**$0**	**$2,833**	**$626,808**	**$626,808**
270 Cook Coal Terminal	51,131,722	1,407,688	48,003,101	869,244	1,462,109	(2,601,977)	0	6,371	(1,133,497)	(264,253)
AEP Generating Company	**$51,131,722**	**$1,407,688**	**$48,003,101**	**$869,244**	**$1,462,109**	**($2,601,977)**	**$0**	**$6,371**	**($1,133,497)**	**($264,253)**
290 Conesville Coal Preparation Company	14,206,532	756,815	0	0	394,177	0	0	1,770	395,947	395,947
AEP Generation Resources - SEC	**$14,206,532**	**$756,815**	**$0**	**$0**	**$394,177**	**$0**	**$0**	**$1,770**	**$395,947**	**$395,947**
Total	**$88,077,450**	**$3,867,155**	**$48,003,101**	**$869,244**	**$2,480,261**	**($2,601,977)**	**$0**	**$10,974**	**($110,742)**	**$758,502**