MINUTES OF MEETING

THE BOARD OF DIRECTORS OF

THE TENNESSEE VALLEY AUTHORITY RETIREMENT SYSTEM

September 12, 2018

[Edited to remove personal information of members and retirees and proprietary or other confidential information pursuant to TVARS Confidentiality Policy]

The regular quarterly meeting of the Board of Directors (Board) of the TVA Retirement System (System) was held on Wednesday, September 12, 2018, at 12:52 p.m., EDT, at the TVA Knoxville Office Complex, WT Plaza 402, Knoxville, Tennessee.

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The following directors were present: Brian M. Child, Chair; Tammy W. Wilson, Vice Chair (via telephone); Samuel J. DeLay; Christopher L. Hinton; James W. Hovious; Leonard J. Muzyn; and Allen E. Stokes (via telephone). Also present were Patrick D. Brackett, Executive Secretary; William B. Jenkins, Jr., Assistant Secretary; Sally R. Weber, Manager, Retirement Operations; Chris A. Stinnett, Sr. Analyst, Investment & Risk Management; and W. Colby Carter, Senior Counsel.

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478-1 Each director was notified in a memorandum dated September 4, 2018, of the regular quarterly meeting to be held on September 12, 2018. A copy of the notice from the Executive Secretary is filed as Exhibit 478-1.

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478-2 (A-6540). The Chair recognized the service of Leonard Muzyn and Allen Stokes as directors on the System Board whose terms will be ending on October 31, 2018.

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478-3 (A-6541). The Executive Secretary's report included the following:

- The Executive Secretary provided to the Board the proposed budget for the System for fiscal year 2019.
- The Executive Secretary informed the Board that the location of the December quarterly meeting will be moved from Knoxville to Chattanooga.

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478-4 (A-6542). There were no items to report from the Senior Counsel.

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478-5 (A-6543). As a part of the Consent Agenda, the Board approved the minutes for the meetings reported below in A-6544, A-6545, A-6546, and A-6547, and accepted the reports as of June 30, 2018, listed below in A-6548, A-6549, A-6550, and A-6551.

- A-6544 Meeting No. 473 held March 29, 2018
- A-6545 Special-Called Meeting No. 475 held May 23, 2018
- A-6546 Meeting No. 476 held June 15, 2018
- A-6547 Special-Called Meeting No. 477 held July 31, 2018
- A-6548 Treasurer's Report (filed as Exhibit 478-5(a))
- A-6549 Investment Performance Report prepared by Wilshire Associates Incorporated (Wilshire) (filed as Exhibit 478-5(b))
- A-6550 Report of retirements approved (filed as Exhibit 478-5(c))
- A-6551 Quarterly review for the TVA Savings and Deferral Retirement Plan (401(k) Plan) prepared by Fidelity Investment Institutional Services Company (Fidelity) (filed as Exhibit 478-5(d))

478-6 (A-6552). The Investment Committee report consisted of the items reported below at A-6553, A-6554, A-6555, A-6556, A-6557, A-6558, A-6559, A-6560, and A-6561, and of the following items:

- The Board was provided and took note of the quarterly report on investment policy statement non-compliance items. A copy of the report, dated June 30, 2018, is filed as Exhibit 478-6(a).
- The Board was provided and took note of information regarding asset allocation and investment manager asset transfers during the second quarter of 2018. A copy of this information is filed as Exhibit 478-6(b).
- The Board was provided and took note of information on due diligence meetings and conference calls between System staff and investment managers and service providers for the period May 2018 through August 2018. A copy of the information is filed as Exhibit 478-6(c).
- The Board was provided an update on the funded status of the System through June 2018. A copy of the asset-liability monitor report is filed as Exhibit 478-6(d).
- The Board reviewed and discussed the quarterly 401(k) Plan Discussion Guide from Aon, the System's 401(k) Plan consultant, covering the following: market information, performance of the investment funds in the 401(k) Plan's lineup, manager updates, and fee analysis. On September 6, 2018, the Investment Committee met with Aon and the System staff to review the quarterly 401(k) Plan Discussion Guide. A copy of the Guide is filed as Exhibit 478-6(e).
- Under the System's asset allocation policy, there is a target of 5% for private credit and 10% for private real assets. On September 6, 2018, Wilshire's private market consultants provided the Investment Committee with a private credit and private real assets portfolio update, including an update on the strategic implementation of the portfolio, potential manager recommendations in the pipeline for consideration, and the current composition and performance of the System's private real assets portfolio. A copy of Wilshire's private credit and private real assets portfolio update, including performance of the current portfolio, is filed as Exhibit 478-6(f).
- On September 6, 2018, Wilshire provided the Investment Committee with updated risk-return information for the System's current asset allocation policy using Wilshire's updated 10-year, 20-year, and 30-year asset class assumptions as of June 30, 2018. A copy of Wilshire's report on the System's asset allocation policy expected risk and return is filed as Exhibit 478-6(g).
- On September 6, 2018, the Investment Committee was provided and discussed with Wilshire and System investment staff information on several investment managers

and their portfolios and strategies. A copy of the Investment Manager Product Discussion List is filed as Exhibit 478-6(h).

• The Board was provided and took note of net internal rate of return (net IRR) performance information as of March 31, 2018, for all of the funds in the System's private equity portfolio compared to both vintage year IRRs for each fund and public market equivalent annualized performance. A copy of the report from Wilshire is filed as Exhibit 478-6(i).

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478-7 (A-6553). The System staff reviewed with the Board the performance of Aon as the consultant for the 401(k) and provided information to the Board on the annual fee under the second year of the three-year letter agreement with Aon for 401(k) Plan consulting services, which runs from July 1, 2018, to June 30, 2019. A copy of the current letter agreement between Aon and the System is filed as Exhibit 478-7.

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478-8 (A-6554). On September 6, 2018, the Investment Committee discussed with HarbourVest Partners the overall strategic plan, and received an update on the 2018 and 2019 tactical plans, for the System's private equity investments through the HarbourVest Summit Hill Fund. After discussion and review of HarvourVest's strategic and tactical plans, and upon the recommendation of the Investment Committee, the Board approved a commitment of \$300 million for the 2019 tranche investment in the HarbourVest Summit Hill Fund and authorized the Executive Secretary to take any actions necessary to implement this action. A copy of the HarbourVest presentation dated September 2018 is filed as Exhibit 478-8.

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478-9 (A-6555). On September 6, 2018, the Investment Committee met and discussed with Wilshire and the System investment staff the System's high-yield bond portfolio within the

System's opportunistic fixed income allocation. Upon the recommendation of Wilshire and the Investment Committee, the Board approved the termination of Oaktree Capital Management (Oaktree) as an investment manager of the System, the selection of Loomis Sayles & Company (Loomis) as a new investment manager of the System, the reallocation of the assets in Oaktree's high-yield bond portfolio to Loomis, which will manage the assets in a high-yield bond full discretion strategy, and an update of the policy index with a high-yield benchmark reflective of the investment strategy of the total high-yield bond portfolio. As a part of this approval, the Board authorized the Executive Secretary to take any actions necessary to implement the reallocation of the high-yield bond portfolio from Oaktree to Loomis. A copy of a memo from Wilshire to the Board on the System's high-yield bond portfolio and recommendation is filed as Exhibit 478-9.

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478-10 (A-6556). As a part of the build out of the private real assets and private credit portfolios under the System's asset allocation policy, the System staff discussed with the Board the process involved from start to finish in implementing a private investment approved by the Board, including the legal documentation involved as a part of the investment. In order to help expedite the process given the number of upcoming private investments that will be made by the System, the Board approved the following resolution regarding certain provisions within the investment management agreements between the System and the approved managers for private investments:

WHEREAS, under Sections 4(1) and 4(2) of the TVA Retirement System Rules and Regulations (TVARS Rules), the TVA Retirement System Board of Directors (TVARS Board) may designate and select, with the approval of TVA, investment managers for the System's assets upon such terms and conditions and at such compensation as may to the TVARS Board seem appropriate; and

WHEREAS, Section 4(3) of the TVARS Rules contains provisions that must be included, or may be included, in the agreements with investment managers designated and selected by the TVARS Board; and

WHEREAS, Section 4(3) provides that the TVARS Board may waive the requirements that the following two provisions be included in any investment management agreement covering a limited partnership or private equity arrangement to the extent necessary due to the nature of such investments and as permitted by applicable law and by any applicable trust agreement: (i) the investment manager shall have authority to direct the trustee to make investments only in securities and property of the kind in which investments are permitted under the trust agreement; and (ii) the investment manager shall be held to the standard of care and diligence which applies to a corporate trustee of a pension trust governed by the laws of the State of New York or the state of the residence of an appropriate corporate trustee appointed hereunder or the state of the residence of the investment manager;

BE IT RESOLVED, that when the TVARS Board approves the selection of an investment manager for a private investment through a limited partnership fund or other private equity arrangement, the TVARS Board hereby delegates to the Executive Secretary the authority to determine and negotiate the terms and conditions of the System's private investment in such limited partnership fund or private equity arrangement; and

BE IT FURTHER RESOLVED, that such delegation shall include the authority of the Executive Secretary to waive the two provisions required for investment management agreements under Section 4(3) of the TVARS Rules described above to the extent the Executive Secretary determines it is necessary due to the nature of such private investment and as permitted by applicable law and the System's master trust agreement and provided the Executive Secretary notifies the TVARS Board of any such waiver.

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478-11 (A-6557). On September 6, 2018, the Investment Committee met and discussed with Wilshire and the System investment staff the System's 2.25% target allocation to Global REITs. Currently, the System has a passive investment strategy through a Global REIT index fund managed by Mellon Capital Management (Mellon), and Wilshire discussed with the Investment Committee the benefits of active management in this asset class and the analysis that U.S. REITs will continue to outperform Global REITs over the long-term. Upon the recommendation of Wilshire and the Investment Committee, the Board approved the selection of CenterSquare Investment Management (CenterSquare) as a new investment manager of the

System and the reallocation of the System's assets in Mellon's global REIT index fund to the U.S. REIT portfolio managed by CenterSquare. As a part of this approval, the Board authorized the Executive Secretary to take any actions necessary to implement the reallocation of the System's REIT portfolio from Mellon to CenterSquare. A copy of a memo from Wilshire to the Board on the System's REIT portfolio and recommendation is filed as Exhibit 478-11.

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478-12 (A-6558). On September 6, 2018, the Investment Committee met and discussed with Wilshire's private market consultants, and the System investment staff, additional manager recommendations for the implementation of the System's investment allocation of 5% to private credit. After discussion, and upon the recommendation of Wilshire and the Investment Committee, the Board approved Ares Capital Management (Ares) as an investment manager of the System for private credit and a \$35 million commitment to the Ares Senior Direct Lending Fund (Direct Lending Fund), and authorized the Executive Secretary to take any actions necessary to implement the appointment of Ares and the investment in the Direct Lending Fund. A copy of a memo from Wilshire to the Board on Ares is filed as Exhibit 478-12.

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478-13 (A-6559). On September 6, 2018, the Investment Committee met and discussed with Wilshire's private market consultants, and the System investment staff, additional manager recommendations for the implementation of the System's investment allocation of 5% to private credit. After discussion, and upon the recommendation of Wilshire and the Investment Committee, the Board approved Pathlight Capital (Pathlight) as an investment manager of the System for private credit and a \$30 million commitment to the Pathlight Capital Fund I (Pathlight Fund), an opportunistic asset-based loan fund, and authorized the Executive Secretary

to take any actions necessary to implement the appointment of Pathlight and the investment in the Pathlight Fund. A copy of a memo from Wilshire to the Board on Pathlight is filed as Exhibit 478-13.

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478-14 (A-6560). On September 6, 2018, the Investment Committee met and discussed with Wilshire's private market consultants, and the System investment staff, additional manager recommendations for the implementation of the System's investment allocation of 5% to private credit. After discussion, and upon the recommendation of Wilshire and the Investment Committee, the Board approved Perceptive Credit Advisors (Perceptive) as an investment manager of the System for private credit and a \$20 million commitment to the Perceptive Credit Opportunities Fund II (Credit Opportunities Fund), and authorized the Executive Secretary to take any actions necessary to implement the appointment of Perceptive and the investment in the Credit Opportunities Fund. A copy of a memo from Wilshire to the Board on Perceptive is filed as Exhibit 478-14.

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478-15 (A-6561). On September 6, 2018, the Investment Committee met and discussed with Wilshire's private market consultants, and the System investment staff, additional manager recommendations for the implementation of the System's investment allocation of 10% to private real assets, of which non-core real estate is currently targeted at 20% (or 2% of the total fund). After discussion, and upon the recommendation of Wilshire and the Investment Committee, the Board approved Long Wharf Capital (Long Wharf) as an investment manager of the System for private real estate and a \$40 million commitment to Long Wharf Real Estate Partners VI (Real Estate Fund), and authorized the Executive Secretary to take any actions

necessary to implement the appointment of Long Wharf and the investment in the Real Estate Fund. A copy of a memo from Wilshire to the Board on Long Wharf is filed as Exhibit 478-15.

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478-16 (A-6562). The Retirement Committee report consisted of items reported below at A-6563, A-6564, A-6565, and A-6566, and of the following item:

• From July 1, 2018, to August 31, 2018, System members with cash balance accounts and benefits were given the option to elect to receive future retirement benefits through the 401(k) Plan only and also to elect to transfer their cash balance account value to the 401(k) Plan with all elections effective as of October 1, 2018. The Executive Secretary provided the Board a report on the number of System members who made these elections and the dollar amount of the transfer from the System to the 401(k) Plan pursuant to these elections. A copy of this report is filed as Exhibit 478-16.

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478-17 (A-6563). Upon the recommendation of the Retirement Committee, the Board approved a 1-year renewal of Mercer's Statement of Work to provide actuarial services to the System for fiscal year 2019, and delegated to the Executive Secretary the authority to take any actions necessary to effect that approval. A copy of Mercer's Statement of Work is filed as Exhibit 478-17.

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478-18 (A-6564). Prior to the meeting, the Board discussed the System's actuarial valuation assumptions with Mercer, the System's actuary. After a discussion, upon the recommendation of the Retirement Committee and Mercer, the Board voted to approve the actuarial assumptions to be used in the valuation of the System's liability and benefit calculations as of September 30, 2018. The actuarial assumptions approved by the Board include the following: (a) a 6.75% assumed rate of return on investments of the System's assets consistent with the previous year; (b) an assumed rate of inflation of 2.25% consistent with the previous

year; (c) cash balance benefit cash out election rate of 25% based on actual participant experience consistent with the previous year; and (d) for liability valuation and minimum contribution requirements, use of the following mortality tables with increased load for females and updated projection scale: (i) for the base table, the RP-2014 table with a 5% load for males and 10% load for females based on actual plan experience, and (ii) for the mortality improvement scale, the MSS-2018 scale developed by Mercer based on Social Security data and Mercer research. A copy of Mercer's actuarial assumptions review presentation dated September 12, 2018, is filed as Exhibit 478-18.

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478-19 (A-6565). Pursuant to Section 6C1 of the TVARS Rules and Regulations, the Board considered an appeal of the disability retirement application of [redacted], a current TVA employee. After review and discussion of the medical evaluation, human resources information, and an independent medical review, the Board disapproved [redacted]'s disability retirement application. A copy of the disability retirement application materials is filed as Exhibit 478-19.

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478-20 (A-6566). The following proposal to amend Section 9B3 of the TVARS Rules and Regulations was placed on the agenda by Directors DeLay, Hovious, and Muzyn for discussion and consideration by the Board:

BE IT RESOLVED, that Section 9B3 of the Rules and Regulations of the TVA Retirement System is amended to add the language underlined as follows:

SECTION 9

- 9. Contributions to the System
- B. TVA's Contributions

3. The "accrued liability" is the amount by which the present value of all benefits payable from contributions of TVA on account of all members and beneficiaries, as determined actuarially each year, exceeds the balance in the Accumulation Account as provided in section 10, and the present value of the aforesaid normal contribution to be made on account of such members during the remainder of their active service. Immediately following the valuation as of June 30, 1963, and following each annual valuation thereafter, the actuary engaged by the board shall compute the "accrued liability contribution," which shall be the percent of the total annual compensation of all members which, if paid over a period of 42 years beginning July 1, 1963, or the remainder thereof, would liquidate within such period the accrued liability as determined by the respective valuation. Provided, however, that for fiscal years after 2005, the "accrued liability contribution" shall be the percent of the total annual compensation of all members which, if paid over a period of 30 years, would liquidate within such period the accrued liability as determined by the respective valuation. Provided, however, that for fiscal years after 2016, the "accrued liability contribution" shall be a nominal contribution amount, which, if paid over 30 years, would liquidate within such period the accrued liability as determined by the respective valuation. Provided, however, that for fiscal years after 2018, the "accrued liability contribution" shall be a nominal contribution amount, which, if paid over a 20-year closed amortization period, would liquidate within such period the accrued liability as determined by the respective valuation.

After discussion, Director Muzyn made a motion to amend Section 9B3 as proposed. The motion received a second from Director DeLay. The motion to amend Section 9B3 failed by a roll call vote of 4 to 3. Directors DeLay, Hovious, and Muzyn voted for the motion, and Directors Child, Hinton, Stokes, and Wilson voted against the motion.

Director statements submitted regarding the vote

Statement of Director Muzyn:

Now that another three months have passed "to allow for further discussion and analysis of the GAO report and given Mercer's current work analyzing the long-term funding policy of the System," I would like to reintroduce the amendment I introduced at the June quarterly meeting. The only changes are to reflect the passage of an additional three months.

Current TVARS Rules require the use of a rolling 30-year amortization period for the accrued liability. This is analogous to refinancing your house with a new 30 year mortgage every year so that you never have to pay off the loan. The March 2017 GAO report to Congress titled "Tennessee Valley Authority: Actions Needed to Better Communicate Debt Reduction Plans and Address Billions in Unfunded Pension Liabilities" states that TVA officials have told the GAO that TVA

has a goal to fully fund its pension within 20 years. The report also states that a 15 to 20 year closed amortization period, which will actually pay off the entire accrued liability within the 15 to 20 year period, is the maximum period recommended by a Blue Ribbon Panel commissioned by the Society of Actuaries.

A motion to approve this same rule amendment was made and seconded by Leonard Muzyn and Jim Hovious at the June 15, 2017 board meeting. A motion to table the vote on the proposed amendment "to allow for further discussion and analysis of the GAO report and given Mercer's current work analyzing the long-term funding policy of the System" was made and seconded by Brian Child and Tammy Wilson. The motion to table passed by a 4-3 vote. The board has now had a year and three months to further discuss and analyze this rule amendment.

Further supporting the need for this rule amendment, the TVARS Investment Committee received a "Pension Plan Analysis" on May 23, 2018 from Bridgewater which stated that the pension plan only has a 60%-80% chance of being fully funded in 20 years using an optimistic 6%-8% average return. The current funding plan does not provide the certainty of full funding promised to the GAO and expected by retirees. The fiduciary role of the TVARS board requires the TVARS board to request adequate funding from TVA. Not requesting adequate TVARS funding would be negligent, and now a year and six months have passed since the GAO report was received.

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478-21 (A-6567). The Election Committee report consisted of the items reported below at A-6568 and A-6569, and of the following item:

• The Election Committee provided the Board the list of applications received by the System from retirees who are interested in being considered for the 7th Director position and discussed with the Board a process for reviewing the candidates and selecting a number for further consideration and interviews.

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478-22 (A-6568). The Election Committee presented, and the Board accepted, the results of the election that ended September 5, 2018. Since none of the four candidates received a majority of the votes, pursuant to the TVARS Rules and Regulations, a runoff election will be held between the two candidates who received the most votes, Julia Koella and Michael Belcher. The runoff election will be held from September 24, 2018, to October 10, 2018. A copy of the certified election results from Election America is filed as Exhibit 478-22.

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478-23 (A-6569). The following proposal to amend Section 3(2)(a) of the TVARS Rules and Regulations to provide for the election of the 7th director by retirees and to remove the previously adopted carryover provision for the 7th director was placed on the agenda by Directors DeLay, Hovious, and Muzyn for discussion and consideration by the Board:

BE IT RESOLVED, that Section 3(2)(a) of the Rules and Regulations of the TVA Retirement System is amended to delete the language marked through and to add the language underlined as follows:

SECTION 3

3. Administration of the System

2. a. The board shall consist of seven members, three of whom shall be elected by and from the membership of the System, three of whom shall be appointed by TVA, and one of whom shall be a retiree selected by a majority vote of the other sixelected by the retired members of the System effective with the term beginning November 1, 2018. Except for the members of the initial board who were designated for staggered terms of one, two, and three years, respectively, the term of each director shall be three years. Each term shall be deemed to expire with the end of the day preceding the respective anniversary date of the establishment of the System, and all appointments and elections except those made to fill vacancies for unexpired terms shall be effective on such anniversary dates; provided however, in the event the three elected directors and the three appointed directors do not select a seventh director by the expiration of the seventh director's term, then the current sitting seventh director (i) shall continue to serve as a member of the board for an additional one (1) year or until such time as the six directors select the seventh director by a majority vote, if earlier, and (ii) during such continuation period, such seventh member shall be restricted from voting on amendments to these Rules and Regulations and the Deferral Plan Provisions, with the exception of any amendments required by IRS rules or related to the tax-qualified status of the System and Deferral Plan. Any vacancy on the board shall be filled by election or appointment, as the case may be, for only the unexpired portion of the predecessor's term.

After discussion, the Election Committee by a 2 to 1 vote made a motion to approve the proposed amendment to Section 3(2)(a) of the TVARS Rules and Regulations. The motion failed by a roll call vote of 4 to 3. Directors DeLay, Hovious and Muzyn voted for the motion, and Directors Child, Hinton, Stokes and Wilson voted against the motion.

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478-24 (A-6538). The Audit Committee had no items to report.

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478-25. Following the Board's regular business and meeting agenda items, Directors DeLay, Hovious, and Muzyn added for discussion and consideration by the Board a proposal to amend the TVARS Governance Policy to provide for open meetings and listening sessions before meetings. Following discussion of the proposal, Director DeLay made a motion to approve the amendment to the TVARS Governance Policy. The motion received a second from Director Muzyn.

Director Child made an intervening motion to postpone the Board's vote on the proposed amendment to the TVARS Governance Policy to the December quarterly meeting to allow for further discussion around open meetings. The motion to postpone received a second from Director Hinton. The motion to postpone passed by a roll call vote of 4 to 3. Directors Child, Hinton, Stokes, and Wilson voted for the motion to postpone, and Directors DeLay, Hovious, and Muzyn voted against the motion to postpone.

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478-26. Following the previous new business item, Directors DeLay, Hovious, and Muzyn added for discussion and consideration by the Board a proposal to amend Section 3(2)(a) of the TVARS Rules and Regulations to prohibit any individual to serve as a Board director who is or was a participant in TVA's supplemental executive retirement plan (SERP). Following discussion of the proposal, Director Hovious made a motion to approve the amendment to Section 3(2)(a) of the TVARS Rules and Regulations. The motion received a second from Director Muzyn.

Director Child made an intervening motion to postpone the Board's vote on the proposed amendment to the TVARS Rules and Regulations to the December quarterly meeting to allow for further discussion around Director restrictions. The motion to postpone received a second from Director Hinton. The motion to postpone passed by a roll call vote of 4 to 3. Directors Child, Hinton, Stokes, and Wilson voted for the motion to postpone, and Directors DeLay, Hovious, and Muzyn voted against the motion to postpone.

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478-27. Following the previous new business item, Directors DeLay, Hovious, and Muzyn added for discussion and consideration by the Board another proposal to amend Section 3(2)(a) of the TVARS Rules and Regulations to prohibit the 7th Director retiree from receiving any compensation or remuneration from TVA, any TVA distributor, or any entity doing business with TVA. Following discussion of the proposal, Director Hovious made a motion to approve the amendment to Section 3(2)(a) of the TVARS Rules and Regulations. The motion received a second from Director Muzyn.

Director Child made an intervening motion to postpone the Board's vote on the proposed amendment to the TVARS Rules and Regulations to the December quarterly meeting to allow for further discussion around Director restrictions. The motion to postpone received a second from Director Hinton. The motion to postpone passed by a roll call vote of 4 to 3. Directors Child, Hinton, Stokes, and Wilson voted for the motion to postpone, and Directors DeLay, Hovious, and Muzyn voted against the motion to postpone.

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The meeting was adjourned at 1:56 p.m., EDT.

Executive Secretary

Chair

Brian M. Wild