MINUTES OF THE TECHNOLOGY COMMITTEE MEETING

BOARD OF DIRECTORS
MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, INC.

March 13, 2024

The Technology Committee of the Board of Directors of the Midcontinent Independent System Operator, Inc. ("MISO" or "Company") convened by Webex video conference beginning at 9:30 a.m. (EDT). The following Committee members were present: Theresa Wise (Chair), H.B. Doggett, Mark S. Johnson, Nancy Lange, Jeff Lemmer, and Robert F. Lurie. Directors Phyllis E. Currie, Barbara J. Krumsiek and Todd M. Raba were also present.

Attending the meeting were John R. Bear, Chief Executive Officer and Director; Clair J. Moeller, President and Chief Operating Officer; Andre T. Porter, Senior Vice President, Chief Strategy Officer, and General Counsel; Todd Ramey, Senior Vice President, Markets & Digital Strategy; Jennifer Curran, Senior Vice President, Planning & Operations and Chief Compliance Officer; Todd P. Hillman, Senior Vice President and Chief Customer Officer; Eric Miller, Vice President and Chief Information Security Officer; Renuka Chatterjee, Vice President, Operations; Greg Jones, Executive Director, Digital Technology Architecture & Engineering; J.T. Smith, Executive Director, Market Operations; Mark Wyatt, Executive Director, Data & Analytics; Price Marr, Executive Director, Standards & Assurance; Jacob Krouse, Managing Assistant General Counsel; and Karl Zobrist, Counsel to the Board.

1. <u>Minutes</u>

The minutes of the Committee meeting of December 5, 2023 were approved.

2. <u>Security & Digital Technology Operations</u>

Mr. Miller stated that Critical System Availability performance through 2023 met the Target metrics under the short-term incentive compensation plan, despite reportable downtime in November. Performance under the Number of Critical System Incidents Exceeding 30 Minutes was at the Excellent level. He advised that through February 2024 there has been no downtime and no critical system incidents have occurred. Regarding the four Other Availability Metrics, Mr. Miller described MISO public website issues that occurred in December which affected performance under Customer Facing Applications – Portals.

He advised that MISO hosted a two-day physical security conference with other RTOs and ISOs that discussed best practices and evolving technologies. The Company also hosted a classified homeland defense workshop that addressed coordination and critical infrastructure protection (CIP) issues. He noted that MISO's security team visited the Muscatatuck Urban Training Center in southern Indiana to meet with U.S. Army and National Guard representatives regarding their cyber training capabilities.

Mr. Miller responded to questions from the Committee, stating that the MISO physical security conference only included attendees from grid operators, not asset owners. Addressing Mr. Doggett's inquiry, Mr. Hillman advised that the MISO website performance issues in December did not result in any calls from users.

3. Digital Technology 2023 Recap and Strategic Look Ahead

Mr. Jones summarized the system upgrades that occurred in 2023 to the Inter-Control Center Communication Protocol (ICCP), the Energy Management System (EMS), and the emergency communication system. Describing the Company's systems as vast and complex, he stated that last year's upgrades touched every major system at MISO. He noted that the significant number of changes that the Company implemented last year represent continued progress in its ability to balance complex modifications with stable operations.

Key enhancements included advances in the Market System Enhancement (MSE) Initiative, a new communication system operator interface, and an Application Program Interface (API) management service. Mr. Jones noted that except for the EMS model load event that occurred in March 2023, MISO's critical systems were upgraded without any major impact to operations. The Company acted to mitigate a repeat of the EMS event, and the June 2023 model load occurred without incident.

He also reviewed changes in the cloud-based environments which included adoption of the Microsoft Azure cloud computing platform. This migration is consistent with the Company's cloud strategy and will save an estimated $3 million over the next four years. Mr. Jones also reviewed the new MISO Transmission Expansion Plan (MTEP) portal which provides enhanced tools for customers.

In response to Mr. Lemmer's questions, Mr. Jones reviewed how the Company measures the effectiveness of upgrades. He and Mr. Smith addressed Ms. Lange's inquiry, describing the improvements in system security and flexibility that have occurred. Responding to Ms. Wise's comments regarding other opportunities, Mr. Jones stated that the Company's digital strategy enhancements support longer term plans to move beyond the MSE Initiative, to comply with FERC Order 881 regarding ambient adjusted transmission line ratings, and to continue data and analytics development.

He introduced Mr. Wyatt who described in detail MISO's technology lifecycle sustainment process and how it will support the enhancements described by Mr. Jones. Mr. Wyatt noted specific efforts that will be focused on use cases related to the short-term reserve product that is used to mitigate system events, as well as a solution that can determine when generating units or transmission lines will return to service after outages. Responding to Mr. Johnson's questions, he stated that MISO and Microsoft are working together on a number of use cases.

Mr. Wyatt also summarized work on Order 881 compliance issues, as well as the MSE's Day-Ahead and Real-Time Market Clearing Engines. He reviewed the Model Manager Phase 3 project, highlighting the risks posed by the July 2025 implementation deadline. He noted that MISO's strategic partners General Electric, Siemens, and Microsoft are involved in aspects of these efforts. Addressing Mr. Raba's inquiry, he stated that the cost of Order 881 compliance is estimated at $12-15 million, and that MISO's independent market monitor ("IMM") has stated that the benefits of ambient adjusted line ratings are in the range of $30-$60 million annually.

Mr. Bear commented that these tools will help the Company to assist with congestion management as the tranches of the Long-Term Transmission Plan are developed, as well as potential national interest electric transmission corridors.

4. Market System Enhancement Initiative

Mr. Jones stated that except for the Day-Ahead Market Clearing Engine (MCE) goal, all 2023 MSE deliverables were met. These included the EMS upgrade, the Model Manager Phase 2 integration, Phase 2 of the nGEM (next generation markets) core development, and the completion of factory acceptance testing and delivery of the Real-Time MCE for the Reliability Assessment and Commitment process. The MSE finished 2023 slightly under budget at $14.8 million (-6.0%).

He reviewed the MSE timeline for 2024, noting that the initiative is on schedule to be completed by 2025 and that its estimated benefits remain at $430 million. Mr. Jones advised that the Day-Ahead MCE is now scheduled to complete parallel operations in the second quarter of 2024 when the retirement of the legacy clearing engine will begin.

In response to Mr. Lurie's question, Mr. Jones stated that artificial intelligence will not have any effect on the MSE schedule, but will be utilized as the Company's digital strategy is pursued. He advised that the modularity characteristics of the MSE improvements will provide benefits as the Day-Ahead and Real-Time MCE projects are completed, addressing Ms. Krumsiek's inquiry.

Mr. Jones reviewed the year-end 2023 Dashboard, noting the Day-Ahead MCE delay until May 2024, as previously discussed. Mr. Smith stated that implementing the Day-Ahead MCE in collaboration with the vendor to ensure the best quality is more important than meeting a deadline. He also discussed issues related to the three Model Manager phases, noting that Phase 3 is to be implemented during the third quarter. Mr. Jones responded to other questions from the Committee regarding the 2024 MSE schedule and efforts to address issues of concern.

Responding to Mr. Doggett's question regarding the IMM's comment in its report to the Markets Committee concerning poor information on transmission flows, Mr. Smith stated that the issue related to data submitted by a market participant via the ICCP and that it was not attributable to MISO's systems.

5. Committee Charter Revisions

Mr. Krouse presented minor revisions that management proposed to the Committee's charter, advising that there were no substantive changes in its duties and responsibilities. He noted that under the Board's Principles of Corporate Governance, each committee reviews its charter on a three-year cycle.

There being no questions from the Directors, upon a motion properly seconded, the Committee approved the revisions to the charter.

6. Review of the 2023 Committee Self-Assessment

Mr. Zobrist stated that there no disagreements regarding any of the propositions put to the Committee and that there were positive comments regarding Ms. Wise's leadership as Committee chair.

He reviewed comments that were made regarding the Committee keeping abreast of current developments, with issues of artificial intelligence and MISO's grid operations being cited. Mr. Zobrist noted comments by Directors regarding the Committee's attention to cybersecurity risks which he recommended be discussed in closed session because of system security concerns. There were no comments regarding the survey itself which reflected the consolidation of several topics to shorten the self-assessment.

Directors generally expressed satisfaction with the work of the Committee and its attention to the implementation of the MSE initiative and its oversight of cybersecurity and related technology issues.

7. Action Items and Work Plan

Mr. Miller advised that there were no pending action items and that no new action items were requested today.

He noted that the December 2024 meetings of the Board and its committees will be in Texas.

8. New Business.

There was no new business.

9. Public Comments.

There were no public comments.

There being no further business before the Committee, it adjourned at 10:35 a.m. The Committee met in closed session to discuss confidential system security, vendor contracts, and business continuity and disaster recovery matters from 10:42 a.m. to 11:55 a.m.

Theresa Wise, Chair

Approved: ________________, 2024