



Memorandum from the Office of the Inspector General

May 16, 2019

Jacinda B. Woodward, LP 2K-C

REQUEST FOR FINAL ACTION – EVALUATION 2018-15581 – COAL PLANT WORK MANAGEMENT

In February 2016, the Tennessee Valley Authority (TVA) entered into Contract No. 11050 with Reliability Management Group (RMG)¹ to deploy a sustainable work management process to proactively maintain plant reliability. According to Power Operations (PO) Standard Programs and Processes 07.001, *Power Operations Work Management*, work management is a deliberate process in which work is identified, planned, scheduled, executed, and documented. Due to the importance of maintaining equipment in good operating condition and concerns raised during past Office of the Inspector General reviews,² we initiated an evaluation to determine if (1) Coal Operations fully implemented the work management process improvements recommended by RMG and (2) performance metrics indicated the changes had improved work management. The scope of the evaluation included coal plants where the RMG work management project was completed under Contract No. 11050.

We were unable to determine if Coal Operations fully implemented work management process improvements recommended by RMG because there were no formal recommendations made for coal plants. While RMG did not provide recommendations to TVA for coal plants, we reviewed work management metrics and determined that one metric improved while RMG was onsite while others had mixed results. However, performance declined in the 6 months after RMG left at several sites.

Although TVA spent approximately \$2.6 million with RMG, work under Contract No. 11050 was terminated before implementation was completed. Furthermore, TVA did not continue to monitor all of the metrics established while RMG was onsite to determine if actions were effective over time. According to TVA, they are currently in the process of establishing detailed implementation plans to improve work management. Establishing detailed plans with consistent metrics could help improve work management for the coal sites.

We recommend the Senior Vice President, PO, (1) consider tracking metrics after the completion of an initiative to determine if actions were effective and (2) continue development of detailed implementation plans for work management.

¹ RMG provides consulting and training services to assist clients in capturing their business objectives and results.

² Evaluation 2015-15329, Kingston Fossil Plant Organizational Effectiveness, March 10, 2016, and Evaluation 2016-15357, Bull Run Fossil Plant Organizational Effectiveness, March 30, 2016.

In response to our draft report, TVA management provided planned actions to address the recommendations by defining the schedule for calculating, communicating, and archiving metrics related to specific initiatives and continuing plans to implement an initiative to develop and sustain scalable work management processes. See the Appendix for TVA management's complete response.

BACKGROUND

According to PO Standard Programs and Processes 07.001, *Power Operations Work Management*, work management is a deliberate process in which work is identified, planned, scheduled, executed, and documented. According to a September 2015 TVA work management presentation, the program ensures plants:

- Maximize generation.
- Maintain high equipment reliability.
- Maximize outage efficiency.
- Reduce non-fuel operations and maintenance costs.

TVA entered into Contract No. 10465 with RMG, effective August 11, 2015. Under the contract, RMG was to provide PO with consulting services related to routine maintenance work management principles. The services included working with PO personnel to review work processes for routine maintenance and developing a detailed implementation plan for improved work management processes. The scope of work included integrating existing PO initiatives and revising current routine maintenance processes. The contract stated that the effort would remain a TVA-driven initiative with RMG operating in an advisory and support role. The contract had a termination date of September 30, 2016, and TVA paid RMG about \$199,000 under the contract.

TVA subsequently entered into Contract No. 11050 with RMG, effective February 8, 2016. Under this contract, RMG was to deploy a sustainable work management process to proactively maintain plant reliability by (1) identifying routine maintenance work activities (preventive or corrective), (2) prioritizing the activities, (3) scheduling the activities for the appropriate time and duration, (4) documenting and closing work activities, and (5) assessing work activities to ensure effective implementation. Deliverables in the contract included (1) alignment between PO leadership and site personnel on what a better routine maintenance work process looked like, (2) field coaching and training to encourage understanding and compliance to the revised process, and (3) process metrics to assess progress. The contract was for a maximum of \$3.6 million and had a termination date of December 31, 2017. While the contract included coal, gas, and hydro plants, RMG completed on-site work for Kingston, Bull Run, Gallatin, and Cumberland Fossil Plants, and partial on-site work for both the Eastern and Western Gas Regions and the Shawnee Fossil Plant. Work under the contract was canceled in February 2017. In total, TVA paid RMG about \$2.6 million for the services provided.

Due to the importance of maintaining equipment in good operating condition and concerns raised during past Office of the Inspector General reviews, we initiated an evaluation to determine if Coal Operations fully implemented work management process improvements

recommended by RMG and performance metrics indicated the changes had improved work management.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of this evaluation was to determine if (1) Coal Operations fully implemented the work management process improvements recommended by RMG and (2) performance metrics indicated the changes had improved work management. The scope of the evaluation included coal plants where the RMG work management project was completed under Contract No. 11050. Those plants were Kingston, Bull Run, Gallatin, and Cumberland Fossil Plants.

To achieve our objective, we:

- Reviewed TVA Contract Nos. 10465 and 11050 with RMG to determine the contracts' scope of work, deliverables, and other contract terms.
- Interviewed PO personnel and reviewed TVA documentation to identify RMG recommendations and actions taken to address those recommendations.
- Reviewed coal plant metric data to determine if work management performance improved after RMG completed work at coal plants.

This evaluation was performed in accordance with the Council of the Inspectors General on Integrity and Efficiency's *Quality Standards for Inspection and Evaluation*.

FINDINGS

We were unable to determine if Coal Operations fully implemented work management process improvements recommended by RMG because there were no formal recommendations made for coal plants. According to TVA personnel, the work management project was intended to be a collaborative process that involved RMG, but was to be driven by TVA. While RMG did not provide recommendations to TVA for coal plants, we reviewed work management metrics and determined that one metric improved while RMG was onsite while others had mixed results. However, performance declined in the 6 months after RMG left at several sites.

In the April 2016 Work Management Initiative Monthly Report detailing work management initiative information, three metrics were listed that would be measured going forward: (1) Percent Emergent Work, (2) Backlog Clean-up Progress, and (3) Schedule Compliance. However, only the emergent work metric has continued to be tracked by TVA. According to TVA personnel, the backlog clean-up metric was specific to the work management initiative and there was no expectation it would continue after RMG completed their work. Additionally, TVA was unable to provide data related to the schedule compliance metric due to a transition in scheduling tools.

We reviewed the emergent work metric, and selected additional metrics that covered the same work management areas tracked while RMG was performing work, (1) Non-Outage Corrective Maintenance Backlog and (2) Critical Component Preventive Maintenance

Compliance, to determine if work management performance improved. We determined that one metric improved while RMG was onsite; however, the other two had mixed results.³

- Emergent and Sponsored Work Hours⁴ made some improvements while RMG was onsite at three of four plants; however, performance declined at those plants in the following 6 months.
- Non-Outage Corrective Maintenance Backlog (similar to the Backlog Clean-up Progress), in general, improved starting several months before RMG was onsite and continued to improve over the time frame that RMG was onsite for all four plants; however, the performance declined in the following 6 months at three of four plants.
- Critical Component Preventive Maintenance Compliance (similar to Schedule Compliance) was mostly positive at one of four plants; however, the remaining three plants had mixed performance while RMG was onsite and in the following 6 months.

In 2018, TVA identified four core metrics to measure work management going forward: (1) Late Active (Overdue) Preventive Maintenance, (2) Preventive Maintenance Due Date Compliance, (3) Schedule Adherence, and (4) Total Open Work Orders. These metrics were slightly different but tracked similar areas to those tracked by TVA starting in 2015 and the ones tracked while RMG was onsite.

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Since RMG did not provide formal recommendations and TVA did not continue monitoring all of the metrics established while RMG was onsite, it is difficult to determine what value TVA received from the \$2.6 million paid for RMG to deploy a sustainable work management process. Through early 2018, work management performance in the above metrics continued to show mixed results indicating a lack of lasting improvements. To improve work management, TVA plans to develop detailed implementation plans in 2019.

RECOMMENDATIONS

We recommend the Senior Vice President, PO, (1) consider tracking metrics after the completion of an initiative to determine if actions were effective and (2) continue development of detailed implementation plans for work management.

TVA Management's Comments – In response to our draft report, TVA management provided planned actions to address the recommendations that include (1) defining the schedule for calculating, communicating, and archiving metrics related to specific initiatives and (2) implementing an initiative to develop and sustain scalable work management processes that will include site-specific gap analysis and mitigation strategies.

³ We obtained metric data from TVA's intranet.

⁴ According to TVA, Emergent and Sponsored Work Hours is the same metric as the emergent work metric identified in the April 2016 Work Management Initiative Monthly Report.

Auditor's Response – We concur with TVA management's planned actions for the recommendations.

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This report is for your review and final action. Your written comments, which addressed your management decision and actions planned, have been included in the report. In accordance with the Inspector General Act of 1978, as amended, the Office of the Inspector General is required to report to Congress semiannually regarding evaluations that remain unresolved after 6 months from the date of report issuance.

If you have any questions or wish to discuss our observations, please contact Deana D. Scoggins, Senior Auditor, at (423) 785-4822 or E. David Willis, Director, Evaluations, at (865) 633-7376. We appreciate the courtesy and cooperation received from your staff during the evaluation.



David P. Wheeler
Assistant Inspector General
(Audits and Evaluations)
WT 2C-K

DDS:FAJ
Attachment

cc (Attachment):

- TVA Board of Directors
- Clifford L. Beach Jr., WT 7B-K
- Janet J. Brewer, WT 7C-K
- Robertson D. Dickens, WT 9C-K
- Kris G. Edmondson, LP 2K-C
- Dwain K. Lanier, MR 6D-C
- Jeffrey J. Lyash, WT 7B-K
- Justin C. Maierhofer, WT 7B-K
- Jill M. Matthews, WT 2C-K
- Sherry A. Quirk, WT 7C-K
- Ronald R. Sanders II, MR 5E-C
- Michael D. Skaggs, WT 7B-K
- Rebecca C. Tolene, WT 7B-K
- OIG File No. 2018-15581

May 3, 2019

David P. Wheeler, WT 2C-K

REQUEST FOR COMMENTS – EVALUATION 2018-15581 – COAL PLANT WORK
MANAGEMENT

We appreciate the opportunity to provide comments and details on the Office of Inspector General's (OIG) evaluation report of TVA's coal plant work management evaluation (2018-15581) dated April 8, 2019.

OIG Recommendations to the Senior Vice President, Power Operations:

1. Consider tracking metrics after the completion of an initiative to determine if actions were effective.
2. Continue development of detailed implementation plans for work management.

Recommendation #1

Consider tracking metrics after the completion of an initiative to determine if actions were effective.

Response

Power Operations (PO) recognizes that having the ability to historically analyze past performance of initiative metrics will allow the organization to identify opportunities for improvement, streamline gap analyses, and perform effectiveness reviews relative to the specific initiative. Included in the detailed implementation plan for work management (Recommendation #2) will be a defined schedule for metric calculations, communication, and archiving. Dependent on business needs, the frequency of archiving could change over time, but the archiving interval of metrics will correlate to the metric reporting window. (i.e. if metrics are reported on a monthly basis, the metrics will be archived monthly. If business drives metrics to be reported quarterly, the metrics will be archived quarterly.)

Due Date: August 1, 2019

Owner: Shannon Hodge

Recommendation #2

Continue development of detailed implementation plans for work management.

Response

Within Coal's Operational Improvement Plan for FY20-22, work management is an identified focus with an assigned fleet sponsor to drive progress.

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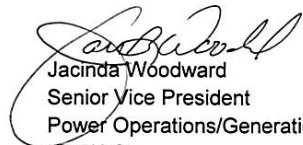
PO will begin implementing an initiative in FY19 to develop and sustain scalable work management processes for each fuel technology. The deliverables of this initiative will include, but are not limited to:

- Work Management Key Principles Fleet Metrics
- Site Specific Gap Analysis
- Mitigation Strategies
- Right-Sized Fleet and Site Strategies

Relative to the findings of this evaluation, Coal Operations understands that there are varying drivers at each site for work management performance. The gap analyses will determine site specific mitigation strategies, which will ultimately address the root causes of inconsistent work management performance. Coal Operations, based on the gap analyses, will also be able to determine which metrics directly correlate to positive performance within work management, thus driving the development of key principles fleet metrics. This effort will be ongoing through FY20.

Due Date: November 1, 2019
Owner: Shannon Hodge

Please let us know if you have any questions or need additional information.



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LP 2K-C

JBW: KGE
cc: Clifford L. Beach Jr., WT 7B-K
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