



Memorandum from the Office of the Inspector General

September 19, 2019

Drew T. Reid, SHF 1A-WPK

REQUEST FOR FINAL ACTION – EVALUATION 2019-15571 – ORGANIZATIONAL EFFECTIVENESS – SHAWNEE FOSSIL PLANT

Attached is the subject final report for your review and final action. Your written comments, which addressed your management decision and actions planned or taken, have been included in the report. Please notify us when final action is complete. 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 audits that remain unresolved after 6 months from the date of report issuance.

If you have any questions or wish to discuss our findings, please contact Amy R. Rush, Evaluations Manager, at (865) 633-7361 or Lisa H. Hammer, Director, Evaluations – Organizational Effectiveness, at (865) 633-7342. We appreciate the courtesy and cooperation received from your staff during the audit.

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

ARR:KDS
Attachment

cc (Attachment):

TVA Board of Directors
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OIG File No. 2019-15571



Office of the Inspector General

Evaluation Report

To the Plant Manager,
Shawnee Fossil Plant

ORGANIZATIONAL EFFECTIVENESS – SHAWNEE FOSSIL PLANT

Auditor
Amy R. Rush

Evaluation 2019-15571
September 19, 2019

ABBREVIATIONS

EFOR	Equivalent Forced Outage Rate
FY	Fiscal Year
OIG	Office of Inspector General
PO	Power Operations
SHF	Shawnee Fossil Plant
TVA	Tennessee Valley Authority

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Evaluation 2019-15571 – Organizational Effectiveness – Shawnee Fossil Plant

EXECUTIVE SUMMARY

Why the OIG Did This Evaluation

Organizational effectiveness, as defined in this evaluation, is the ability of an organization to achieve its mission and goals. To achieve and sustain organizational effectiveness, there should be alignment between strategy, team engagement, and operational performance. Specifically, values and behaviors that drive good performance should be embedded throughout the organization's business processes and exemplified by the individuals that manage and work in the organization. The Tennessee Valley Authority's (TVA) 2018 Risk Assessment Summary recognized that (1) workforce strategy and management risksⁱ and (2) workplace environment risksⁱⁱ could negatively affect the performance environment.

Due to the importance of alignment between strategy, team engagement, and operational performance, the Office of the Inspector General is conducting organizational effectiveness evaluations of business units across TVA. This evaluation focuses on Shawnee Fossil Plant (SHF), which is a coal plant within TVA's Power Operations (PO). PO's mission is to provide low-cost, reliable generation while keeping people safe and ensuring compliance with environmental regulations. The objective of this evaluation was to identify strengths and risks that could impact SHF's organizational effectiveness.

What the OIG Found

During the course of our evaluation, we identified strengths that positively affected the day-to-day activities of SHF personnel. These strengths related to (1) organizational alignment, (2) teamwork within working groups and with other SHF departments, (3) effective leadership, (4) positive ethical culture, and (5) resources necessary for job execution. However, we also identified a risk that could impact SHF's effectiveness and its continued ability to meet its responsibilities in support of PO's mission. This risk related to inadequate asset maintenance activities.

ⁱ Workforce strategy and management risks include failure to maintain key leadership positions, ineffective talent management, and performance management shortfalls.

ⁱⁱ Workplace environment risks include lack of organizational adaptability, lack of inclusion and employee engagement, and inappropriate workplace incidents.



Evaluation 2019-15571 – Organizational Effectiveness – Shawnee Fossil Plant

EXECUTIVE SUMMARY

Based on our findings and using TVA's Business Operating Model, we assessed SHF's level of risk in the areas of alignment, execution, and engagement. As shown in the table below, we determined:

- Alignment risk is rated low based on alignment of management and employee goals, which supported SHF's initiatives, and alignment of SHF's initiatives to PO's and TVA's goals and missions.
- Engagement risk is rated low. The majority of employees cited teamwork within their departments and with other SHF departments as being positive. In addition, most employees cited positive relationships with first-line and middle management and indicated they trusted and felt comfortable reporting concerns to upper management. Many employees also indicated that engagement with others was the driver behind positive morale at SHF and believed a positive ethical culture existed at SHF.
- Execution risk is rated medium because of concerns related to inadequate asset maintenance activities. While many employees indicated having the necessary resources for execution of job responsibilities, several individuals had concerns with staffing, receipt of materials, accountability, and/or the clearance process in relation to accomplishment of SHF maintenance activities.

	Low Risk	Medium Risk	High Risk
Alignment	X		
Engagement	X		
Execution		X	

What the OIG Recommends

We recommend the Plant Manager, SHF, address the staffing, materials, accountability, and clearance process issues affecting asset maintenance.

TVA Management's Response

TVA management described actions planned to address our recommendations. See Appendix B for management's complete response.

Auditor's Response

We agree with management's planned actions.

BACKGROUND

Organizational effectiveness, as defined in this evaluation, is the ability of an organization to achieve its mission and goals. To achieve and sustain organizational effectiveness, there should be alignment between strategy, team engagement, and operational performance. Specifically, values and behaviors that drive good performance should be embedded throughout the organization's business processes and exemplified by the individuals that manage and work in the organization.

In recent years, the Tennessee Valley Authority (TVA) has faced internal and external economic pressures and implemented cost-cutting measures in an attempt to keep rates low and reliability high while continuing to fulfill its broader mission of environmental stewardship and economic development. TVA's 2018 Risk Assessment Summary recognized that (1) workforce strategy and management risks¹ and (2) workplace environment risks² could negatively affect the performance environment. Due to the importance of alignment between strategy, team engagement, and operational performance, the Office of the Inspector General is conducting organizational effectiveness evaluations of business units across TVA. This evaluation focuses on Shawnee Fossil Plant (SHF), which is one of six coal plants within TVA's Power Operations (PO).

PO's mission is to provide low-cost, reliable generation while keeping people safe and ensuring compliance with environmental regulations. Goals are set forth in TVA's fiscal year (FY) 2019 through FY2021 business plan summary and PO's FY2019 through FY2021 business plan. These include key metrics, such as total spend, which includes capital, nonfuel operations and maintenance expenditures along with changes in nonfuel inventory. Reliability metrics include the equivalent forced outage rate (EFOR),³ seasonal EFOR,⁴ and equivalent availability factor,⁵ which are indicators of asset availability. Other measures include significant human performance events,⁶ environmental violations of significance,⁷ and environmental noncompliance.⁸

¹ Workforce strategy and management risks include failure to maintain key leadership positions, ineffective talent management, and performance management shortfalls.

² Workplace environment risks include lack of organizational adaptability, lack of inclusion and employee engagement, and inappropriate workplace incidents.

³ EFOR reflects the percentage of hours within a defined period that the asset was not available to operate due to an unplanned event.

⁴ Seasonal EFOR reflects performance during peak demand seasons when replacement costs are typically higher.

⁵ The equivalent availability factor reflects the percentage of available capacity within a defined period.

⁶ An event that occurs because of latent error or active error related to industrial safety, clearance, regulatory event, radiation exposure, or coal, gas, hydro, or transmission facility operation.

⁷ Events or actions resulting in an official notification of violation from a regulatory agency, a consent order, fines, or penalties.

⁸ Events or actions required to be reported internally, such as conducting work without the proper permit, that do not meet the violation of significance criteria.

While SHF began commercial operation in 1953, the last unit was placed in service in 1955. SHF currently contains nine generating units with a summer net capacity of 1,206 megawatts. In April 2011, TVA entered into agreements with the Environmental Protection Agency and with several states and environmental groups to address claims under the Clean Air Act. As part of those agreements, TVA added scrubbers and a Selective Catalytic Reduction system to Units 1 and 4. These additions were installed in 2018. According to TVA documentation, SHF also switched the fuel blend used to operate the plant, which dropped SHF's average operating cost. These changes were recognized in *POWER Magazine*,⁹ which named SHF as one of its top 2018 Plants.

As of February 15, 2019, SHF was comprised of three departments: Operations, Maintenance, and Engineering:

- According to PO's Standard Programs and Processes (SPP) 10.0003, *Power Operations Conduct of Operations*, the Operations department is responsible for the safe and efficient operation of generating units including monitoring and inspecting plant equipment and reporting any abnormal operating condition as well as writing and issuing clearances.¹⁰ SHF Operations personnel consist of unit operators (UO) and assistant unit operators (AUO) who report to shift operations supervisors and yard operations personnel who report to a yard operations supervisor.
- According to PO-SPP-06.000, *Power Operations Conduct of Maintenance*, the Maintenance department is responsible for maintaining assets safely, effectively, and efficiently. Maintenance ensures standards for material condition are met by the effective planning, scheduling, and execution of maintenance. The maintenance department is primarily comprised of various craft personnel including boilermakers, instrument mechanics, machinists, electricians, steamfitters, and laborers who report to maintenance supervisors.
- According to TVA documentation, including the *Conduct of Engineering Roles and Responsibilities*, the Engineering department is tasked with supporting equipment reliability through inspection of systems and components and resolution of problems with plant equipment. This responsibility includes system performance monitoring to allow for proactive detection of system or component performance problems. Within the engineering department, there are engineers and technicians who report to the engineering manager.

Management changes occurred prior to the commencement of our evaluation. These included filling the Assistant Operations Manager and the Operations Manager positions in April 2018, selection of the Plant Manager, effective October 2018, and temporary selection of the Maintenance Manager in January 2019. As

⁹ <https://www.powermag.com/clean-air-program-makes-shawnee-power-plant-a-winner-2/>. *POWER Magazine* reports on business operations and legal and regulatory news as well as operations and maintenance information affecting the power industry.

¹⁰ Clearances are established when energy sources including electrical, mechanical, and/or hydraulic have been isolated and tagged before servicing, maintenance, or modifications.

of February 19, 2019, SHF had 206 employees, including a plant manager, temporary maintenance manager, assistant operations manager, an operations manager, an engineering manager, and two business support representatives. SHF Operations consisted of 113 employees, Maintenance consisted of 78 employees, and Engineering consisted of 8 employees.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of this evaluation was to identify strengths and risks that could impact SHF's organizational effectiveness. We assessed operations as of June 2019 and culture at the time of our interviews and fieldwork, which occurred during March 2019. To complete the evaluation, we:

- Reviewed SHF's and PO's FY2019 through FY2021 business plan and TVA's FY2019 through FY2021 Business Plan Summary to gain an understanding of SHF's initiatives and associated planned actions to determine whether initiatives aligned with those of PO and TVA.
- Reviewed TVA values and competencies (see Appendix A) for an understanding of cultural factors deemed important to TVA.
- Reviewed select (1) TVA and PO Standard Programs and Processes and other documentation to gain an understanding of processes and (2) laws and regulations to gain an understanding of the requirements of the organization.
- Examined FY2018 and FY2019, through May, financial information to gain understanding of expenditures used in support of the work environment.
- Conducted individual interviews with 188 individuals,¹¹ including management and analyzed the results to identify themes related to strengths and risks that could affect organizational effectiveness.
- Reviewed and analyzed the FY 2018 performance documentation for all of SHF's management and specialist employees¹² for alignment with department and organizational goals.
- Examined operational information, including condition reports¹³ related to scrubbers included in TVA's asset management system for FY2018 through June 20, 2019, SHF staffing information for FY2014 through June 20, 2019, and performance indicators for calendar year 2018 and 2019 through May to gain additional understanding of strengths and risks within SHF.
- Interviewed support personnel including those in Safety and Environmental to identify strengths and risks that could affect organizational effectiveness.

¹¹ Eighteen individuals were not interviewed due to scheduling conflicts or preference.

¹² We excluded performance management documentation for trades and labor personnel. According to TVA documentation, effective calendar year 2018, performance management documentation for trades and labor employees was discontinued.

¹³ Condition reports are created to record how problems are found, analyzed, and solved.

- Assessed the overall effectiveness of SHF in the following areas, as included in TVA's Business Operating Model:
 - Alignment – How well the organization coordinates the activities of its many components for the purpose of achieving its long-term objectives—this is grounded in an understanding of what the organization wants to achieve, and why.
 - Engagement – How the organization achieves the highest level of performance from its employees.
 - Execution – How well the organization achieves its objectives and mission.

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

OBSERVATIONS

During the course of our evaluation, we identified strengths that positively affected the day-to-day activities of SHF personnel and performance. However, we also identified a risk that could impact SHF's effectiveness and its continued ability to meet its responsibilities in support of PO's mission.

STRENGTHS

During the course of our interviews and data analyses, we identified strengths that positively affected the day-to-day activities of SHF personnel and performance. These strengths related to (1) organizational alignment, (2) teamwork within working groups and with other SHF departments, (3) effective leadership, (4) positive ethical culture, and (5) resources necessary for execution of job responsibilities.

Organizational Alignment

In general, our assessment of performance management documentation for all SHF employees revealed that performance goals cascaded from the Plant Manager to management and specialist employees. We reviewed goals for management and select employees and generally found those goals supported SHF's initiatives. In addition, SHF's initiatives and associated planned actions aligned with PO's and TVA's goals and initiatives and supported PO's and TVA's missions.

Teamwork within Working Groups and With Other SHF Departments

The majority of employees interviewed described interactions within their departments and with other SHF departments as being positive. This strength is consistent with TVA's collaboration value, which includes, among other attributes, teamwork. In addition, most employees indicated they trusted their coworkers to perform their jobs well. Many employees indicated that engagement with others was the driver behind the positive morale at SHF.

Effective Leadership

TVA has five defined levels of management including first line supervisors, middle managers, directors and general managers, executives, and C-suite management. As indicated previously, most individuals at SHF report to a supervisor who is considered their first-line leadership. Most of these individuals indicated having positive relationships with their first-line leaders. Specifically, most employees provided positive comments pertaining to first-line leadership in the areas of communication, trust, and recognition. In addition, most employees indicated they felt comfortable reporting concerns or sharing a differing opinion with their first-line management.

Operations and Maintenance management is considered middle management for most employees in the organization. When asked about relationships with middle management, most employees felt positive about their interactions with middle management. Many employees also indicated they trusted middle management and felt safe reporting concerns or sharing differing opinions with them. In addition, several individuals indicated they trust upper management¹⁴ and/or felt comfortable reporting concerns or sharing differing opinions with upper management.

Positive Ethical Culture

Employees and management are charged with conducting business according to the highest ethical standards and seeking to earn the trust of others through words and actions that are open, honest, and respectful. The majority of employees interviewed indicated there is a positive ethical culture.¹⁵ A few individuals also provided examples of ethical actions and/or behaviors in their organization.

Resources Necessary for Execution of Job Responsibilities

The majority of individuals believed they had the tools, training, and certifications necessary for their jobs. When asked about problems affecting job execution, many Operations personnel and several individuals in the Maintenance and Engineering departments indicated they had no issues related to job execution. When asked what is working well in completing jobs, many individuals indicated that teamwork, coworkers, and/or management is working well, which is consistent with responses related to interactions with others, noted previously in this report.

¹⁴ Upper management would be the plant manager for most employees; however, the plant manager serves as first-line leadership for the SHF management team and middle management for a few employees.

¹⁵ Ethical culture is the “shared concept of right and wrong behavior in the workplace that reflects the true values of the organization and shapes the ethical decision making of its members” as defined in S. P. Robbins & T. A. Judge, *Organizational Behavior*, 18th edition, 2019.

RISK

During the course of our evaluation, we identified a risk that, if not addressed, could impair SHF's effectiveness and its continued ability to meet its responsibilities in support of PO's mission. This risk related to inadequate asset maintenance activities. While many individuals commented positively on execution of job responsibilities, several individuals discussed concerns related to maintaining SHF assets. Specifically, several employees indicated maintenance-related activities were not being completed timely or not being performed due to various reasons, including lack of staffing in SHF Operations and Maintenance departments.

As noted previously, SHF's maintenance department is responsible for material conditions through effective planning, scheduling, and execution of maintenance activities. In some instances, before maintenance personnel can achieve these responsibilities, Operations personnel must remove equipment from service, which includes tagging the equipment for repair and isolating the equipment from energy sources through utilization of the appropriate clearance process. Several individuals indicated (1) a lack of manpower in various departments including Operations, the department responsible for issuing clearances, and/or (2) delays in getting clearances or work orders issued, which could contribute to inadequate asset maintenance. In addition, several individuals indicated that preventive maintenance, which includes periodic servicing activities designed to reduce the likelihood of equipment failure, is not being completed due to lack of maintenance staffing.

We asked SHF personnel for information pertaining to the preventive or corrective maintenance backlogs, but were not provided the information as this data was not tracked by the plant. We examined SHF maintenance information provided by Generation Services personnel and determined there were (1) increases in the nonoutage corrective maintenance backlog from December 2018 to May 2019 and (2) increases in the average age of safety work orders in April and May 2019. According to PO personnel, PO is currently realigning their work management program¹⁶ and plans to identify specific work management metrics that drive reliability and critical asset health. SHF personnel confirmed that PO personnel were developing maintenance metrics to monitor performance and provide indicators on condition of equipment, but there was currently no data.

Furthermore, several individuals mentioned having issues with the scrubbers. As stated previously, TVA added air pollution control equipment, which included scrubbers, to the plant in 2018. Scrubber concerns reported through condition reports included issues with scrubber alarms and the vacuum breakers on the

¹⁶ Realignment of the work management program includes a maintenance strategy initiative. As part of that initiative, TVA personnel are tracking certain metrics at a high level, including critical preventive maintenance compliance and critical preventive maintenance backlog, to understand the current state, which will allow them to address gaps within maintenance. According to TVA personnel, these metrics are reported to executive management.

sump pump. Several individuals also indicated that manpower was not increased despite the added responsibilities related to the additional equipment. Addressing issues with the scrubber takes focus away from completion of preventive maintenance activities. Not performing timely preventive maintenance could lead to emergent issues with other equipment and further increase the maintenance workload. According to TVA headcount information, staffing at SHF has generally declined since September 2014, from 246 employees to 208 as of June 20, 2019.

Other contributing factors affecting the timely completion of asset maintenance activities include issues with receipt of materials, accountability, and/or the clearance process. While the majority of individuals believed they had the tools, training, and certifications necessary for their jobs, some Maintenance personnel indicated issues with obtaining or having necessary parts or supplies. According to several of these employees, this has resulted in work being delayed in some instances. In addition, most employees provided positive comments related to leadership; however, several employees mentioned a lack of accountability for a few employees, which they believe affects completion of job duties. Specifically, several Maintenance and Operations employees indicated that lack of motivation is not addressed by management. Furthermore, a few Operations personnel mentioned issues with the clearance system including navigating the system used to issue clearances or lack of information, such as drawings used to assist with tagging of equipment, in the system. As of May 2019, SHF had not met asset reliability metrics, including its EFOR, seasonal EFOR, and equivalent availability factor. Reasons for not meeting these metrics primarily include emerging projects and aging of assets.

CONCLUSION

While interviews with employees revealed the existence of organizational alignment, teamwork within working groups and with other SHF departments, effective leadership, a positive ethical culture, and resources necessary for execution of job responsibilities, improvements could be made to aid in achievement of the Power Operations' mission. Specifically, addressing factors contributing to inadequate asset maintenance activities could further improve SHF's support of the PO mission.

Based on our findings and using TVA's Business Operating Model, we assessed SHF's level of risk in the areas of alignment, execution, and engagement. We determined:

- Alignment risk is rated low based on alignment of management and employee goals, which supported SHF's initiatives, and alignment of SHF's initiatives to POs' and TVA's goals and missions.
- Engagement risk is rated low. The majority of employees cited teamwork within their departments and with other SHF departments as being positive. In addition, most employees cited positive relationships with first-line and middle management and indicated they trusted and felt comfortable reporting

concerns to upper management. Many employees also indicated that engagement with others was the driver behind positive morale at SHF and believed a positive ethical culture existed at SHF.

- Execution risk is rated medium because of concerns related to inadequate asset maintenance activities. While many employees indicated having the necessary resources for execution of job responsibilities, several individuals had concerns with staffing, receipt of materials, accountability, and/or the clearance process in relation to accomplishment of SHF maintenance activities.

RECOMMENDATION

We recommend the Plant Manager, SHF (1) address the staffing, materials, accountability, and clearance process issues affecting asset maintenance and (2) implement metrics to enhance tracking of asset maintenance activities.

TVA Management's Comments – SHF management is working with Power Operations' leadership on a work management initiative that will focus on improvements that support the first recommendation and conduct of maintenance scorecards that will include metrics for improved visibility of the activities being performed. See Appendix B for management's complete response.

Auditor's Response – We agree with management's planned actions.

TVA Values	
Safety	We share a professional and personal commitment to protect the safety of our employees, our contractors, our customers, and those in the communities that we serve.
Service	We are privileged to be able to make life better for the people of the Valley by creating value for our customers, employees, and other stakeholders. We do this by being a good steward of the resources that have been entrusted to us and a good neighbor in the communities in which we operate.
Integrity	We conduct our business according to the highest ethical standards and seek to earn the trust of others through words and actions that are open, honest, and respectful.
Accountability	We take personal responsibility for our actions, our decisions, and the effectiveness of our results, which must be achieved in alignment with our company values.
Collaboration	We are committed to fostering teamwork, developing effective partnerships, and valuing diversity as we work together to achieve results.

TVA Leadership Competencies

Accountability and Driving for Results
Continuous Improvement
Leveraging Diversity
Adaptability
Effective Communication
Leadership Courage
Vision, Innovation, and Strategic Execution
Business Acumen
Building Organizational Talent
Inspiring Trust and Engagement



Tennessee Valley Authority, Shawnee Fossil Plant, 7900 Metropolis Lake Rd, West Paducah, KY 42086

Organizational Effectiveness Evaluation 2019-15571 - Organizational Effectiveness
Shawnee Fossil Plant

Shawnee Fossil Plant Management Comments:

An organizational effectiveness evaluation of TVA's Shawnee Fossil Plant was conducted by the Inspector General's office.

With regards to the Strengths identified, we concur that organizational alignment, teamwork, effective leadership, positive ethical culture, and providing the resources necessary for execution of job responsibilities have been areas we would consider strengths that drive the site to perform well.

In reference to the Recommendations, the following is a summary to (1) address the staffing, materials, accountability, and clearance process issues affecting asset maintenance and (2) implement metrics to enhance tracking of asset maintenance activities.

1. Address the Staffing, materials, accountability, and clearance process issues affecting asset maintenance.

Response Action

The Shawnee Plant Manager will evaluate each aspect listed in this recommendation. Shawnee leadership is working with Power Operations leadership on a work management initiative that will focus on improvements that support the recommendation.

2. Implement metrics to enhance tracking of asset maintenance activities.

Response Action

The Shawnee Plant Manager will evaluate the implementation of additional tracking capabilities with maintenance activities. Shawnee leadership is working with Power Operations leadership on work management and conduct of maintenance scorecards that will include these metrics for improved visibility of the activities being performed.

The employees at Shawnee Fossil understand the importance of alignment between strategy, team engagement, and operational performance and strive for the values and behaviors that produce excellence each day. We appreciate the opportunity to highlight the team's strengths and continue on our improvement areas as we provide our Mission of Service to the TVA Valley.

A handwritten signature in black ink, appearing to read 'D. Reid'.

Drew Reid
Plant Manager – Shawnee Fossil Plant