



**Memorandum from the Office of the Inspector General**

July 30, 2014

James R. Dalrymple, LP 3K-C

**REQUEST FOR MANAGEMENT DECISION – EVALUATION 2013-15135 – ACTIONS TO ADDRESS COAL PLANT SYSTEMS AND PROGRAMS WITH POOR RATINGS**

Attached is the subject final report for your review and action. Your written comments to the draft report have been incorporated in the report. Please advise us of your planned actions in response to our findings within 60 days of the date of this 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.

Information contained in this report may be subject to public disclosure. Please advise us of any sensitive information in this report which you recommend be withheld.

If you have any questions, please contact Janell B. Cunio, Auditor, at (423) 785-4811 or Gregory R. Stinson, Director, Evaluations, at (423) 633-7367. We appreciate the courtesy and cooperation received from your staff during this review.

*Robert E. Martin*

Robert E. Martin  
Assistant Inspector General  
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Attachment

cc (Attachment):

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TVA Board of Directors  
OIG File No. 2013-15135



Office of the Inspector General

# *Evaluation Report*

To the Senior Vice President,  
Power Operations

## **REVIEW OF ACTIONS TO ADDRESS COAL PLANT SYSTEMS AND PROGRAMS WITH POOR RATINGS**

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Audit Team

Janell B. Cunio  
John A. Jacosalem  
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Evaluation 2013-15135

July 30, 2014

## **ABBREVIATIONS**

CY	Calendar Year
FPG	Fossil Power Group
MRC	Management Review Committee
TVA	Tennessee Valley Authority

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MEMORANDUM DATED JULY 9, 2014, FROM JAMES R. DALRYMPLE TO  
ROBERT E. MARTIN



# Evaluation 2013-15135 – Actions to Address Coal Plant Systems and Programs With Poor Ratings

## EXECUTIVE SUMMARY

### Why the OIG Did This Evaluation

During a prior review of how Tennessee Valley Authority (TVA) organizations assess the condition of its assets, we learned asset condition assessments done by the Fossil Power Group (FPG) had determined some generation assets are in poor condition. As a follow up to the prior work, we initiated a review to determine whether TVA is taking actions to address FPG systems and programs with poor ratings. For the purpose of this report, poor ratings are defined as those designated red or yellow. Red ratings indicate unacceptable performance and require excess monitoring and resources to maintain or operate. Yellow ratings indicate performance needs improvement and require additional attention.

### What the OIG Found

We found actions<sup>i</sup> were taken to address some programs and systems with poor health. We identified that 785 out of 1,617 programs and systems within FPG had been rated red or yellow and randomly selected 35 programs and systems for detailed review. Actions taken by FPG to address the poor health resulted in an improvement in color rating or overall health of 17 programs and systems. However, there was no upgraded color rating or improvement in system health for 18 systems. Of these 18 systems, 7 had no actions completed while 11 had some actions completed without improvement in system health. The major reason cited for not completing actions was lack of funding.

We also found system health reports were not completed or documented, and required program health reports could not be provided. Additionally, FPG-SPP-09.045, Performance of Engineering Programs Standard Processes and Procedures, (program health report process) and FPG-SPP-09.030.03, Standard Programs and Processes, (system health report process) were superseded by engineering guidance documents, which have no requirements, only recommendations. This will potentially increase the number of health reports not completed or not completed in a timely manner. The absence of accurate and timely equipment health reports could make it more difficult for TVA to effectively manage equipment reliability risk.

<sup>i</sup> For the purpose of this report, actions are defined as completed Capital Projects, Problem Evaluation Reports, Work Orders, and Action Tracking Actions.



# Evaluation 2013-15135 – Actions to Address Coal Plant Systems and Programs With Poor Ratings

## EXECUTIVE SUMMARY

### What the OIG Recommends

We recommend the Senior Vice President, Power Operations:

- Document justification when actions are not taken to address systems and programs with red and yellow ratings.
- Reinforce the importance of consistent documentation of system health reports.
- Consider the potential impact of eliminating the requirement to do asset health assessments on TVA's non-nuclear asset condition risk and determine a schedule for completing health assessments that will adequately mitigate the risk of equipment failure.

### TVA Management's Comments

TVA management responded that they will incorporate our feedback into their review effort to have a consistent approach to system health with appropriate documentation. See the Appendix for TVA's complete response.

## **BACKGROUND**

Engineering programs are focused, corporate-led, engineering work efforts requiring a systematic approach for implementation, monitoring, and improvement over an extended period of time. FPG-SPP-09.045, Performance of Engineering Programs Standard Processes and Procedures, (program health report process) provides guidance for implementing and managing Tennessee Valley Authority's (TVA) Fossil Power Group (FPG) Engineering Programs. According to the program health report process, engineering programs serve as a conscience for the organization and provides governance for plant assets and program performance needs to be continually assessed to ensure that each program's performance is meeting its objective and therefore providing appropriate value to TVA.

System health reports are the primary programmatic documents FPG engineers utilize annually to monitor the status of plant systems and components. FPG-SPP-09.030.03, System Health Reports Standard Programs and Processes, (system health reports process) provides a standardized, systematic approach for preparation, review, approval, and documentation when performing system health reports. According to TVA, information gathered from the system health reports is used in risk assessments of asset performance as well as project justification and ranking of the capital portfolio.

## **PROGRAM HEALTH REPORTS**

The program health reports process requires that program health reports be completed twice a year and assigned a color rating based on performance. Program health reports color ratings are defined as follows:

- Green (Acceptable) – Program performance is meeting defined processes, and small areas of improvement are identified and actions are in place.
- Yellow (Needs Improvement) – Program performance is not meeting defined processes and requires a Recovery Action Plan with appropriate correct actions identified and entered into the Corrective Action Program.
- Red (Unsatisfactory/Significant Weaknesses) – Program performance does not meet management expectation or is not implemented at the plan and requires a Recovery Action Plan with appropriate corrective actions identified and entered into the Corrective Action Program.

The program health report process requires identification of issues impacting program health, development of Corrective Action Programs to resolve the issues, and return the program to acceptable performance for all programs rated red or yellow. Presentation to the plant Management Review Committee (MRC) at first opportunity is also required for programs rated red or yellow to ensure plant management is aware of program issues and to obtain sponsorship for identified corrective actions.

The tables below show a breakdown of the program health report color ratings for Calendar Year (CY) 2011 through 2012, overall and by plant.<sup>1</sup>

**Table 1: Coal Program Health Rating Totals**

<b>Green</b>	70	34%
<b>Yellow</b>	121	59%
<b>Red</b>	15	7%

**Table 2: Coal Program Health Color Rating Breakdown by Plant**

Plant	Color Rating					
	Green		Yellow		Red	
<b>Allen</b>	0	--	17	85.0%	3	15.0%
<b>Bull Run</b>	7	38.9%	10	55.6%	1	5.6%
<b>Colbert</b>	6	30.0%	12	60.0%	2	10.0%
<b>Cumberland</b>	8	40.0%	11	55.0%	1	5.0%
<b>Gallatin</b>	7	36.8%	12	63.2%	0	--
<b>John Sevier</b>	7	58.3%	5	41.7%	0	--
<b>Johnsonville</b>	10	52.6%	7	36.8%	2	10.5%
<b>Kingston</b>	6	31.6%	11	57.9%	2	10.5%
<b>Paradise</b>	4	20.0%	14	70.0%	2	10.0%
<b>Shawnee</b>	9	47.4%	9	47.4%	1	5.3%
<b>Widows Creek</b>	6	30.0%	13	65.0%	1	5.0%

## SYSTEM HEALTH REPORTS

System health reports are assigned color ratings based on system health that includes issues such as risk assessments, late or deferred preventive maintenance on critical components, and safety deficiencies. The color ratings were defined<sup>2</sup> as follows:

- Green (Acceptable) – Requires no additional attention at this time.
- Blue (Watch) – Current activities/performance actions in progress are appropriate and on schedule, and system components require attention.
- Yellow (Needs Improvement) – Gaps exists and additional attention is needed.
- Red (Not Acceptable) – Requires excessive monitoring/resources to maintain or operate.

Site system engineers are responsible for preparing and documenting the system health reports for assigned systems, presenting the report to the MRC according to the reporting frequencies as defined in the system health reports process, and ensuring corrective actions are initiated as a result of the review. These actions

<sup>1</sup> These tables are based on data collected from the overall population before exclusions explained later in the Objective, Scope, and Methodology section of this report. Also, the data was obtained with only the program health reports available. Details on missing program health reports can be found in the Findings section.

<sup>2</sup> These definitions have since been removed to allow system engineers flexibility in assigning ratings.

are documented in a Maximo Problem Evaluation Report or an Action Tracking Action. Additional system health reports process requirements are as follows:

- The MRC reviews all action items for systems rated red.
- Site Engineering Managers ensure that system health reports are accurate and timely with action items to improve the system health rating.
- The MRC reviews all system health reports and approved action plans for red and yellow systems.

The tables below show a breakdown of the system health report color ratings for CY2011 through CY2012, overall and by plant.<sup>3</sup>

**Table 3: Coal System Health Rating Totals**

Green	365	26%
Blue	397	28%
Yellow	418	30%
Red	231	16%

**Table 4: Coal System Health Color Rating Breakdown by Plant**

Plant	Color Ratings							
	Green		Blue		Yellow		Red	
Allen	5	5.0%	18	17.8%	29	28.7%	49	48.5%
Bull Run	7	13.5%	10	19.2%	23	44.2%	12	23.1%
Colbert	21	28.4%	24	32.4%	19	25.7%	10	13.5%
Cumberland	4	10.5%	1	2.6%	16	42.1%	17	44.7%
Gallatin	44	40.4%	47	43.1%	15	13.8%	3	2.8%
John Sevier	0	--	4	30.8%	8	61.5%	1	7.7%
Johnsonville	4	3.9%	30	29.4%	59	57.8%	9	8.8%
Kingston	142	34.1%	126	30.2%	101	24.2%	48	11.5%
Paradise	11	10.3%	39	36.4%	34	31.8%	23	21.5%
Shawnee	120	37.9%	86	27.1%	91	28.7%	20	6.3%
Widows Creek	7	8.6%	12	14.8%	23	28.4%	39	48.1%

<sup>3</sup> These tables are based on data collected from the overall population before exclusions explained later in the Objective, Scope, and Methodology section of this report.

## **OBJECTIVE, SCOPE, AND METHODOLOGY**

During a prior review of how TVA organizations assess the condition of its assets, we learned that asset condition assessments done by FPG determined some generation assets are in poor condition. As a follow up to the prior work, we initiated a review to determine whether TVA is taking actions to address FPG systems and programs with poor ratings. For the purpose of this report, poor ratings are defined as those designated red or yellow. We reviewed system and program health reports completed in CY2011 through CY2012.

In order to achieve our objective, we:

- Reviewed processes and procedures and interviewed key TVA personnel to determine what steps the organization is required to take for red and yellow health reports.
- Selected a sample of 35 out of 442 red and yellow system and program health reports for CY2011 through CY2012 to determine if actions were being taken. For the purpose of this report, actions are defined as completed Capital Projects, Problem Evaluation Reports, Work Orders, and Action Tracking Actions.
- Reviewed recent reports, if available, for the 35 sample reports to determine if the health of the system or program had improved.

We initially selected a sample of 54 red and yellow system and program health reports for CY2011 through CY2012 for testing. Information received throughout the review, as well as TVA's decisions to idle coal units, required the original population and resulting sample to be reduced. The following units were excluded: (1) Allen 1-3; (2) Colbert 1-5; (3) John Sevier 1-4; (4) Johnsonville 1-10; (5) Shawnee 1, 4, 10; (6) and Widows Creek 1-8. Additionally, one other restriction on the sample for the system health reports was discovered during our testing. According to TVA personnel, it is possible that not all plants were using PlantView<sup>4</sup> to store system health reports. The population of system health reports was obtained from a listing pulled from PlantView, so there is the potential our population was not all inclusive. TVA personnel confirmed there was not a way to identify reports that were kept outside the PlantView system.

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

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<sup>4</sup> According to the PlantView manual, PlantView is software that serves to track, assess, and communicate equipment/system problems. Information, such as Predictive Maintenance data, visual observations, testing, etc., are entered against specific components. This places information from various sources in a single location, allowing easy assessment of the overall health of that component thereby ensuring the proper actions are chosen for resolution. Because all organizations have access to PlantView, it is considered the "ultimate communication tool" for ensuring well-informed decisions are made.

## **FINDINGS**

We found actions were taken to address 17 of the 35 programs and systems with poor health that resulted in an improvement in health and/or color rating; however, we found there was no upgraded color rating or improvement in system health for 18 systems. Of these 18 systems, 7 had no actions completed while 11 had some actions completed without an improvement in system health. We also found system health reports were not completed or documented, and required program health reports could not be provided that could lead to inaccurate monitoring and poor decision making. Additionally, the program health reports process and system health reports process were superseded by engineering guidance documents, which have no requirements, only recommendations. The absence of accurate and timely equipment health reports could make it more difficult for TVA to effectively manage equipment reliability risk.

### **ACTIONS HAVE BEEN TAKEN TO ADDRESS SOME PROGRAMS AND SYSTEMS WITH POOR HEALTH**

We found 17 programs and systems had an upgraded color rating or improvement in system health as a result of actions completed. However, we found that for some systems, actions needed to improve system health were not taken. We found 18 systems with red and yellow ratings that did not have an upgraded color rating or improvement in system health. Of these 18 systems, 7 had no actions completed while 11 had some actions completed without improvement in system health. The major reason cited for not completing additional actions was lack of funding. For example, according to a TVA system engineer, actions to address 2 systems with a yellow rating had not been funded since 2008. Information gathered from the system health reports is used by TVA in risk assessments of asset performance as well as project justification and ranking of the capital portfolio. It is reasonable to believe that pushing back and failing to fund actions to address system health increases TVA's risk of equipment failure.

### **SYSTEM HEALTH REPORTS WERE NOT COMPLETED OR DOCUMENTED AS REQUIRED**

We found system health reports were not completed as required by the system health reports process.<sup>5</sup> The system health reports process provides guidance for the reporting frequencies of required systems. The system health reports process also requires system engineers to use PlantView to prepare and document the system health reports.

We found 18 out of 33 (54.5 percent) of the sample system health reports were not completed according to the reporting frequency on the system health reports process. On average, the update for these system health reports was 183 days

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<sup>5</sup> The system health reports process was superseded by an engineering guideline document in September 2013.

past due. Some of the reasons system health reports were not completed include system engineers getting off schedule due to additional projects, putting update scheduling on hold due to a potential system health reports process revision, and recent outages. Failing to complete system health reports as required limits TVA's ability to make the best possible decisions about equipment repairs.

There is also a concern that system engineers are not documenting system health reports consistently. The PlantView Program Manager indicated system engineers are not consistently using the same tool and other formats may be used instead of PlantView to store system health reports. Inconsistent documentation of system health reports could lead to inaccurate monitoring of coal plant systems.

## **REQUIRED PROGRAM HEALTH REPORTS COULD NOT BE PROVIDED**

We found TVA could not provide program health reports as required by the program health reports process. The program health report process requires program health reports are completed twice a year for 15 programs. We asked TVA to provide copies of the completed reports for CY2011 through CY2012. TVA was able to provide 22 of the 60 (37 percent) required program health reports. However, TVA could not provide the other 38 (63 percent) reports.

**Table 5: Required Program Health Reports for CY2011 Through CY2012<sup>6</sup>**

	<b>Required Reports</b>	<b>Provided</b>	<b>Not Provided</b>
<b>CY2011</b>	30	14	16
<b>CY2012</b>	30	8	22

## **REDUCING HEALTH REPORT REQUIREMENTS TO RECOMMENDATIONS COULD MAKE IT HARDER TO MANAGE EQUIPMENT RELIABILITY RISK**

The program health reports process has recently been in transition from a Standard Processes and Procedures to a guidance document. According to TVA management, they have been working under the assumption since 2012 that the program health reports process will become a guidance document. The guidance document gives recommendations instead of requirements. The October 2013 draft of the Engineering Guidance Document no longer stated program health reports are completed twice a year and leaves the frequency up to the General Manager, Compliance and Fleet Support. The system health reports process was also superseded by an Engineering Guidance Document in September 2013.

<sup>6</sup> Program health reports contain color ratings for each plant involved in that program. The 136 red and yellow programs from which our sample was selected is the sum of individual plant ratings included in the 60 program health reports.

TVA has identified asset condition of non-nuclear generation as a Key Enterprise Risk in fiscal year 2014.<sup>7</sup> Replacing health report processes with engineering guidance documents could make managing this risk more difficult. This will potentially increase the number of health reports not completed or not completed in a timely manner. The major reason cited for not taking actions to address poor health was lack of funding. This makes it imperative that updated health information be available to make the best decisions for the fleet. The absence of accurate and timely equipment health reports could make it more difficult for TVA to effectively manage equipment reliability risk.

## **RECOMMENDATIONS**

We recommend the Senior Vice President, Power Operations:

- Document justification when actions are not taken to address systems and programs with red and yellow ratings.
- Reinforce the importance of consistent documentation of system health reports.
- Consider the potential impact of eliminating the requirement to do asset health assessments on TVA's non-nuclear asset condition risk and determine a schedule for completing health assessments that will adequately mitigate the risk of equipment failure.

**TVA Management's Comments** – TVA management responded that they will incorporate our feedback into their review effort to have a consistent approach to system health with appropriate documentation. They also stated system health reporting, with appropriate assessments and documentation, will continue to be a priority in the future. See the Appendix for TVA's complete response.

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<sup>7</sup> TVA's recent enterprise risk management risk process identified ten key enterprise risks, one of which was non-nuclear generation asset condition.

July 9, 2014

Robert E. Martin, ET 3C-K

**REQUEST FOR COMMENTS – DRAFT EVALUATION 2013-15135 – ACTIONS TO ADDRESS  
COAL PLANT SYSTEMS AND PROGRAMS WITH POOR RATINGS**

We appreciate the opportunity to provide further comments on the draft report of TVA's management of coal plant systems and programs dated June 9, 2014.

Responses for recommendations are summarized below.

What the OIG Recommends:

We recommend the Senior Vice President, Power Operations:

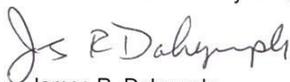
- Document justification when actions are not taken to address systems and programs with red and yellow ratings.
- Reinforce the importance of consistent documentation of system health reports.
- Consider the potential impact of eliminating the requirement to do asset health assessments on TVA's non-nuclear asset condition risk and determine a schedule for completing health assessments that will adequately mitigate the risk of equipment failure.

Response:

All coal plants are currently utilizing system health reports as part of our ongoing evaluation of asset condition. Going forward, we are working with the Operations Support organization to standardize these reports to ensure accurate prioritization of plant improvement projects and other initiatives across the fleet. We will incorporate your feedback into this review effort to ensure we have a consistent approach to system health with appropriate documentation.

While many of the SPPs quoted in the evaluation report have been retired and are no longer applicable, system health reporting is part of our strategy for long-term asset management. As such, system health reporting, with appropriate assessments and documentation, will continue to be a priority in the future.

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



James R. Dalrymple  
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July 9, 2014

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