



Memorandum from the Office of the Inspector General

July 24, 2015

James R. Dalrymple, LP 3K-C

REQUEST FOR FINAL ACTION – EVALUATION 2015-15265 – HYDRO GENERATION
OBSOLETE EQUIPMENT

Based on the Tennessee Valley Authority's (TVA) aging equipment and the risk of parts being unavailable, we scheduled a review of Hydro Generation obsolete equipment. The objective of our review was to determine if Hydro Generation is effectively managing obsolete equipment.

During our review, we found Hydro Generation could be more effectively managing obsolete equipment. We found there is no documented guidance to specify how obsolete equipment should be managed. In addition, we found obsolete equipment has extended outage durations. We also found some Equipment Condition Assessments (ECA) include an "Availability of Spare Parts" indicator, which measures the availability and willingness of the original equipment manufacturer (OEM) to support existing, installed equipment with parts and service; however, it is not included in the ECA for all equipment.

We recommend the Senior Vice President, Power Operations:

- Consider a formalized procedure to manage obsolete equipment.
- Add "Spare Parts Availability" indicator on all Hydro Generation ECAs to identify obsolete equipment.

TVA management agreed with the finding and recommendations. Power Operations will add the following requirements to the Power Operations asset health procedure: (1) that all Hydro Generation assets that are identified in the ECA as being obsolete must have disposition identified to address the obsolescence and (2) for an obsolescence indicator to be added to all Hydro Generation ECAs. Please see the Appendix for TVA management's complete response.

The Office of Inspector General concurs with TVA management's response.

BACKGROUND

According to TVA, though hydroelectric power is only about 10 percent of TVA's power generation capacity, its value to the TVA system cannot be measured by megawatts alone. Hydropower has other advantages that make it extremely valuable in an

increasingly competitive utility industry where low-cost generation and reliable service are critical priorities. TVA has 29 conventional hydropower plants with 109 individual units, which play a vital role in achieving TVA's mission of providing affordable and reliable electricity, managing a thriving river system, and supporting sustainable economic development.

The 2014 Hydro Generation Enterprise Risk Management summary included Hydro Asset Material Condition as an increasing risk and stated that hydro assets range in age from 40 to 100-plus years old. The average age for TVA's 109 hydro units is 60-plus years old. Additionally, the Enterprise Risk Management summary stated that about half of the fleet is due for major rehab or hydromodernization. TVA's hydromodernization program addresses the reliability issues of an aging fleet and provides additional hydroelectric capacity.

OBJECTIVE, SCOPE, AND METHODOLOGY

Based on TVA's aging equipment and the risk of parts being unavailable, we scheduled a review of Hydro Generation's obsolete equipment. The objective of our review was to determine if Hydro Generation is effectively managing obsolete equipment. For purposes of this review, obsolete equipment is defined as any working or in-service piece of Hydro Generation equipment that the manufacturer is no longer making.

To achieve our objective, we (1) interviewed Hydro Generation personnel and performed site observations to determine how obsolete equipment is being identified and managed, (2) reviewed documentation to determine how obsolete equipment is being tracked and managed, and (3) determined if formal actions are being taken to address obsolete equipment.

We judgmentally selected 5 hydro plants to interview site personnel and perform site observations. In selecting these plants, we considered plant age, plant location, and information regarding plant asset condition and modernization. Hydro plants visited were (1) Ocoee Dam Group, (2) Chickamauga Dam Group, (3) Wilson Dam, (4) Pickwick Landing Dam, and (5) Kentucky Dam.

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

FINDING

During our review, we found Hydro Generation could be more effectively managing obsolete equipment. Specifically, we found there is no documented guidance to specify how obsolete equipment should be managed. In addition, we found obsolete equipment has extended outage durations. We also found some ECAs include an "Availability of Spare Parts" indicator, which measures the availability and willingness of the OEM to support existing, installed equipment with parts and service; however, it is not included in the ECA for all equipment.

MANAGEMENT OF OBSOLETE EQUIPMENT COULD BE MORE EFFECTIVE

During our review, we found Hydro Generation could be more effectively managing obsolete equipment. TVA does not have a Standard Program and Procedure, Engineering Guidance Document, or other type of documentation that formally documents the approach to the handling of obsolete equipment. Without a standardized approach, there is no consistency in how obsolete equipment is managed.

TVA does not proactively identify obsolete equipment. During interviews with some plant managers, we were informed that they do not know something is obsolete until it breaks. However, according to TVA personnel, there have been limited instances when vendors have notified TVA that a piece of equipment was being discontinued or was no longer being supported. We also found there is no formal procedure to disseminate information throughout Hydro Generation if equipment is found to be obsolete. According to Power Operations management, system engineers and business support representatives are notified when obsolete equipment is identified, but the information may not be passed along to the plants. Additionally, some system engineers keep spreadsheets updated with the equipment at each site as a means of quickly determining what sites use interchangeable parts.

While TVA does not consistently identify obsolete equipment in a proactive manner, TVA does have an approach for addressing obsolete equipment. These include (1) replacing obsolete equipment with compatible equipment or new equipment from an alternate vendor, (2) repairing/remanufacturing parts when possible, (3) purchasing parts on the secondary market (not from OEM) when available, or (4) saving “hand-me-down” spare parts from one plant to use at another when equipment needs to be replaced.

We found forced outages have been extended as a result of obsolete equipment management. We asked plant managers at the sites we visited if they were aware of any forced outages or if outages had been extended due to obsolete equipment. Two of the five plant managers were aware of outages that had been extended because of obsolete equipment not being readily available. TVA Power Operations management acknowledged there is a possibility of forced outages occurring due to obsolete equipment. Inconsistent handling and identification of obsolete equipment and delaying upgrades at hydro plants could cause increased and extended outages.

Hydro Generation uses ECAs to determine the condition of major equipment and systems as well as physical and material condition of Hydro Operations. Some ECA's include an “Availability of Spare Parts” indicator, which measures the availability and willingness of the OEM to support existing, installed equipment with parts and service; however, it is not included in the ECA for all equipment. The indicator mainly applies to electronic equipment that typically reaches obsolescence at a quicker rate than mechanical equipment. Adding this indicator to all hydro ECAs could help identify obsolete equipment.

We recommend the Senior Vice President, Power Operations:

- Consider a formalized procedure to manage obsolete equipment.

- Add "Spare Parts Availability" indicator on all Hydro Generation ECA's to identify obsolete equipment.

TVA Management's Comments – TVA management agreed with the finding and recommendations. Power Operations will add the following requirements to the Power Operations asset health procedure: (1) that all Hydro Generation assets that are identified in the ECA as being obsolete must have disposition identified to address the obsolescence and (2) for an obsolescence indicator to be added to all Hydro Generation ECAs. Please see the Appendix for TVA management's complete response.

Auditor's Comments – The Office of the Inspector General concurs with TVA management's response.

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This report is 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 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 that you recommend be withheld. If you have any questions or need additional information, please contact Kristin S. Leach, Senior Auditor, at (423) 785-4818 or Gregory R. Stinson, Director, Evaluations, at (865) 633-7367. We appreciate the courtesy and cooperation received from your staff during the evaluation.



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TVA Board of Directors
OIG File No. 2015-15265

July 22, 2015

Robert E. Martin, ET 3C-K

**REQUEST FOR COMMENTS - DRAFT EVALUATION 2015-15265 - HYDRO GENERATION
OBSOLETE EQUIPMENT**

In response to your memorandum dated June 24, 2015, below is Power Operations' response to the recommendations.

Power Operations agrees with the Office of the Inspector General recommendations in Audit 2015-15265. We recognize there are deficiencies in how we manage obsolete equipment that require attention to reduce TVA's risk associated with available generation. The actions below will help to further align to our strategic objectives, risk tolerance, and financial goals.

Recommendation

- Consider a formalized procedure to manage obsolete equipment.

Response

Power Operations will address the management of obsolete equipment in the Hydro Generation fleet by adding the requirements listed below to the Power Operations asset health procedure which is currently in development and forecast to be issued in the second quarter of FY16.

Power Operations will add the requirement that all Hydro Generation assets that are identified in the Equipment Condition Assessment (ECA) as being obsolete must have a disposition identified to address the obsolescence. The prioritization of the disposition will follow the appropriate business prioritization process.

Recommendation

- Add "Spare Parts Availability" indicator on all Hydro Generation ECAs to identify obsolete equipment.

Response

Power Operations will address the management of obsolete equipment in the Hydro Generation fleet by adding the requirements listed below to the Power Operations asset health procedure which is currently in development and forecast to be issued in the second quarter of FY16.

Power Operations will add the requirement for an obsolescence indicator for all Hydro Generation ECAs. The indicator will be applied to ECAs in the FY16 assessment cycle.

Robert E. Martin
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We appreciate the insights provided by this assessment. Please let us know if you require additional information.



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