



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

September 19, 2019

Laura J. Campbell, MR 3M-C  
David M. Czufin, LP 4A-C  
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**REQUEST FOR MANAGEMENT DECISION – EVALUATION 2018-15601 – NUCLEAR  
OUTAGE MATERIAL MANAGEMENT**

The Tennessee Valley Authority (TVA) Nuclear fleet accounts for roughly 40 percent of TVA's generating mix, making nuclear an integral part of its power system. According to the International Atomic Energy Agency, "Nuclear power plant outage management is a key factor for good, safe, and economic nuclear power plant performance." Good outage management practices include, among others, the coordination of available resources. Due to the risk of incorrectly dispositioning materials,<sup>1</sup> we initiated an evaluation of nuclear outage material management. Our objective was to determine if TVA is managing designated outage material following an outage to maximize use and minimize cost.

We determined TVA generally managed designated outage materials to maximize use and minimize cost. However, we identified opportunities for improvement related to (1) documentation for material returns and (2) a TVA inventory database control.

We recommend TVA management (1) communicate material return documentation expectations to individuals with responsibilities in the return process and (2) remediate issues with the inventory database control.

TVA management agreed with the recommendations in this report. See the Appendix for TVA management's complete response.

**BACKGROUND**

TVA Nuclear's fleet accounts for roughly 40 percent of TVA's generating mix, making nuclear an integral part of its power system. According to the International Atomic Energy Agency, "Nuclear power plant outage management is a key factor for good, safe, and economic nuclear power plant performance." Good outage management practices include, among others, the coordination of available resources.

TVA designates and tracks work specific to outages by coding relevant work orders (WO) in its work management system. Material required to accomplish the work is added to the WOs as they are prepared. The identified material is either redeployed, if available, or purchased. Material owners are responsible for initiating the returns process when

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<sup>1</sup> TVA inventory guidance states material disposition includes returning material to stock, redeploying within TVA, sending out for investment recovery, and returning to vendor.

(1) work is completed and materials are left over, (2) a WO is canceled and material has already been purchased for the work, or (3) a WO is rescheduled and the next scheduled date for performance of the work is greater than 30 days in the future.

TVA Standard Programs and Processes (SPP) 04.024, *Returning Material to Inventory*, states proper disposition of material will be handled in one of four ways: return to stock, redeploy within TVA, send for investment recovery, or return to vendor. The SPP requires material owners to document information necessary to determine the appropriate disposition method for the material upon return. In general, an item may be returned to stock if there is (1) forecasted usage within the next 3 years based on historical activity and the item has an established approved reorder rule or (2) there is a valid WO reservation in TVA's Enterprise Asset Management (EAM) system. If an item has no forecasted usage at the site within the next 3 years but has forecasted usage at another TVA location within the next 3 years, the material should be redeployed to that location. In cases where the item has no forecasted usage at the site or within the TVA fleet within the next 3 years and is not needed to maintain the required inventory balance, the material could be returned to the vendor if possible or turned over to Investment Recovery.<sup>2</sup>

Due to the risk of incorrectly dispositioning materials, we initiated an evaluation of nuclear outage material management.

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

The objective of our evaluation was to determine if TVA is managing designated outage material following an outage to maximize use and minimize cost. The scope of our evaluation was designated outage material for seven outages completed between November 2016 and May 2018. To achieve our objectives we:

- Interviewed Financial Services, Information Technology (IT), TVA Nuclear, and Supply Chain personnel and reviewed pertinent SPPs, including the following, to identify materials management policies and expectations.
  - TVA-SPP-04.021, *TVA Inventory Management Process*
  - TVA-SPP-04.050, *Investment Recovery*
  - TVA-SPP-04.024, *Returning Material to Inventory*
- Reviewed a sample of designated outage material to determine if TVA was utilizing opportunities to redeploy material. We judgmentally selected the ten highest dollar outage material return transactions, which had subsequent repurchases<sup>3</sup> to determine if the returned material could have been redeployed to avoid the purchase.

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<sup>2</sup> The goal of the Investment Recovery process is to maximize TVA's recovered costs while minimizing the administrative costs associated with dispositioning inventory items.

<sup>3</sup> We removed items with issue and transfer transactions in the system following the return or prior to the purchase to focus only on items in stock at the time of repurchase.

- Reviewed documentation to determine if (1) TVA subsequently repurchased designated outage materials that were surplus and (2) those items were surplus in accordance with TVA-SPP-04.021, *TVA Inventory Management Process*.
- Reviewed a sample of outage material returns to determine if they were processed according to procedure and if alternatives for disposal or disposition were considered, when appropriate. Using rate of occurrence estimation sampling with a 95-percent confidence level, we statistically selected 41 of 780 outage material return transactions over \$3,000 to determine if documentation was maintained in accordance with procedure.

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 determined TVA generally managed designated outage materials to maximize use and minimize cost. However, we identified opportunities for improvement related to (1) material return documentation and (2) a TVA inventory database control.

### **TVA GENERALLY MANAGED DESIGNATED OUTAGE MATERIAL TO MAXIMIZE USE AND MINIMIZE COST**

We found TVA generally managed designated outage materials to maximize use and minimize cost. Specifically, we found (1) no instances where TVA missed material redeployment opportunities for designated outage materials and (2) all outage items designated for surplus and subsequently repurchased were warranted.

We reviewed the ten highest dollar outage items returned to inventory that had subsequent purchases within 3 years to determine if TVA dispositioned the outage material appropriately. We found none of the purchases resulted from failure to redeploy outage material. We also reviewed all outage material designated for surplus and later repurchased and found the repurchases were warranted. We found 2,233 designated outage material items were surplus, and 94 were subsequently repurchased within a 3-year window.<sup>4</sup> All 94 items were reviewed and designated as surplus based on stocking level, historical usage, and active reservations at the time of designation, in accordance with TVA-SPP-04.021, *TVA Inventory Management Process*.

### **OPPORTUNITIES FOR IMPROVEMENT**

During our review, we identified opportunities for improvement related to (1) documentation for material returns and (2) a TVA inventory database control.

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<sup>4</sup> The total purchase cost of those items was \$7,655.

### **Lack of Material Return Documentation Could Result In Improper Material Disposition**

TVA-SPP-04.021, *TVA Inventory Management Process*, states the Inventory Specialist<sup>5</sup> is responsible for reviewing all required information to determine the appropriate disposition. The process requires the material owner to use the designated return form, original issue ticket, or provide written justification to initiate the return, surplus, or scrap process. Regardless of the form of documentation used, the procedure requires specific details regarding (1) the reason for the return and (2) future potential use for the material. The documentation should accompany the returned material and be maintained by the Site Materials Manager or designee for a period of 5 years.

We found material return forms were not maintained as required for designated outage material. Specifically, TVA could not provide any required documentation for 4 of our sample of 41 return transactions. For the remaining 37 transactions, sites provided only issue or return tickets. While procedural guidance allows for the use of an original issue ticket to verify a return, neither the issue ticket nor the return ticket alone includes all information required by procedure to make appropriate disposition decisions.

Without all required information regarding items returned following an outage, there is an increased risk that equipment will be improperly dispositioned.

### **WO Control Not Working as Intended**

We found a TVA inventory data base control related to material reservations is not operating as intended. TVA's EAM system utilizes electronic WOs for planning and execution of necessary maintenance work. Work scheduled for an outage is included on WOs coded specifically for those respective outages. Typical practice is for an overarching "Parent" WO to document an issue and state what outcome is required. Individual Task WOs are created to define specific material and labor needs to complete the work defined. Material needed to accomplish the work can be reserved to the Task WOs. Upon closure of the WO, the system releases the reservation for unused material, and the material is available for use toward other work.

TVA Nuclear personnel informed us a control was implemented in 2015 to prevent the closure of Parent WOs as long as their associated Task WOs remained open to ensure material reservations did not remain in EAM following closure of the Parent WO. However, we found examples of closed Parent WOs with open associated Task WOs. Additionally, site personnel provided examples of closed Parent WOs with open Task WOs that had active material reservations.

Supply Chain personnel were aware of the issue and had developed a manual workaround; however, IT was not aware of the issue. According to Supply Chain personnel, a weekly report tracks closed Parent WOs with open Task WOs tied to

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<sup>5</sup> Effective November 2018, this requirement was relocated under TVA-SPP-04.024, *Returning Material to Inventory*, and the responsibility to review required material return information belongs to the Inventory Analyst position.

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them. Site personnel informed us that resolving issues with WO status is a manual process that involves contacting the scheduler to close the Task WO. While the reports are a workaround that site personnel can use to monitor stranded reservations, the manual process (1) introduces risk that available material could be overlooked and (2) costs Supply Chain personnel time.

**RECOMMENDATIONS**

We recommend the Senior Vice President, Engineering and Operations Support, and Vice President, Supply Chain, communicate material return documentation expectations to individuals with responsibilities in the return process.

We recommend the Chief Information Officer, IT, remediate the WO control disallowing closure of a Parent with open Task WOs.

**TVA Management's Comments** – TVA management agreed with the recommendations in this report. See the Appendix for TVA management's complete response.

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This report is for your review and management decision. Please advise us of your management decision within 60 days from the date of this report. If you have any questions, please contact Lucas W. Cotter, Auditor, at (423) 785-4826 or E. David Willis, Director, Evaluations at (865) 633-7376. We appreciate the courtesy and cooperation received from your staff during the evaluation.



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Assistant Inspector General  
(Audits and Evaluations)  
WT 2C-K

LWC: FAJ  
cc (Attachment):

TVA Board of Directors  
Clifford L. Beach, Jr., WT 7B-K  
Andrea S. Brackett, WT 5D-K  
Robertson D. Dickens, WT 9C-K  
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OIG File No. 2018-15601

September 16, 2019

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RESPONSE TO REQUEST FOR COMMENTS ON DRAFT EVALUATION 2018-15601 –  
NUCLEAR OUTAGE MATERIAL MANAGEMENT

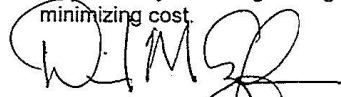
In accordance with the request dated August 16, 2019, TVA has reviewed the subject draft report 2018-15601 and accepted the evaluation, conclusions, and recommendations.

TVA finds the opportunities for improvement and recommendations appropriate to improve the effectiveness of Nuclear Outage Material Management to achieve our fiscal responsibilities in support of the Nuclear Vision to Achieve and Sustain Top Industry Performance.

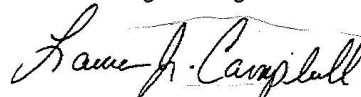
In the draft report, OIG made two specific recommendations. In the first recommendation on communicating material return expectations, TVA Nuclear and TVA Supply Chain agree the need to reinforce material return documentation expectations to the individuals with responsibilities in return process.

In the second OIG recommendation, TVA agrees an action is required to prevent closing a Parent Work Order with Child Work Order still open - potentially stranding material tied to the Child Work Order.

The TVA team places a high value on the effectiveness of the organization and the responsibility to manage designated outage material following an outage to maximize use and minimizing cost.



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