

Memorandum from the Office of the Inspector General

September 19, 2017

Laura A. Green, BR 5A-C Scott D. Self, SP 3A-C

REQUEST FOR MANAGEMENT DECISION – AUDIT 2017-15455 – SURPLUS AND DISPOSAL OF INFORMATION TECHNOLOGY EQUIPMENT

Attached is the subject final report for your review and management decision. You are responsible for determining the necessary actions to take in response to our findings. Please advise us of your management decision within 60 days from the date of this report.

If you have any questions or wish to discuss our findings, please Melissa L. Conforti, Senior Auditor, at (865) 633-7383 or Scott A. Marler, Director (Acting), Information Technology Audits, at (865) 633-7352. We appreciate the courtesy and cooperation received from your staff during the audit.

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David P. Wheeler Assistant Inspector General (Audits and Evaluations) ET 3C-K

MLC:BSC Attachment cc (Attachment):

TVA Board of Directors
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Office of the Inspector General

<u>Audit Report</u>

To the Vice President, Supply Chain, and to the Vice President and Chief Information Officer, Information Technology

SURPLUS AND DISPOSAL OF INFORMATION TECHNOLOGY EQUIPMENT

ABBREVIATIONS

CFR Code of Federal Regulations

COC Chattanooga Office Complex

CRT Cathode Ray Tubes

HDC Hartsville Distribution Center

HPAM Hewlett Packard Asset Manager

IT Information Technology

KOC Knoxville Office Complex

NIST National Institute of Standards and Technology

OCP One Century Place

PC Personal Computer

PII Personally Identifiable Information

SM Service Management

SPP Standard Programs and Processes

TVA Tennessee Valley Authority

WI Work Instruction

TABLE OF CONTENTS

EXECUTIVE SUMMARY	
BACKGROUND	1
FINDINGS	2
SURPLUS IT EQUIPMENT NOT PROPERLY SANITIZED, TRACKED, AND PROCESSED Sanitization Process Needs Improvement Surplus IT Equipment Not Tracked Surplus IT Equipment Not Properly Processed	2 4
BADGE ACCESS CONTROL REVIEWS NOT BEING PERFORMED AS REQUIRED BY POLICY	5
INCOMPLETE DISPOSAL PROCESS OF CATHODE RAY TUBES	5
RECOMMENDATIONS	6
APPENDICES	

- A. OBJECTIVES, SCOPE, AND METHODOLOGY
- B. MEMORANDUM DATED SEPTEMBER 15, 2017, FROM SCOTT D. SELF AND LAURA A. GREEN TO DAVID P. WHEELER



Audit 2017-15455 – Surplus and Disposal of Information Technology Equipment

EXECUTIVE SUMMARY

Why the OIG Did This Audit

The Tennessee Valley Authority (TVA) has Standard Programs and Processes (SPP) and Work Instructions (WI) that define the process to retire information technology (IT) equipment (e.g., desktop computers, laptops, printers, network equipment, and external storage devices), which is referred to as surplus and disposal. The process provides for surplus equipment to be turned over to IT and delivered to a surplus processing area, where sanitization or destruction of the hard drive is to occur. TVA's IT personnel from field and corporate sites across the Valley redeploy, donate, or ship the surplus IT equipment to the Investment Recovery organization at TVA's Hartsville Distribution Center for sale or recycle.

Data stored on IT equipment remains on the equipment unless effective data sanitization techniques are used or the equipment is physically destroyed. An effective surplus process includes data sanitization that ensures confidential and sensitive data is not disclosed to reduce the risk of potential loss of confidential business information and assets and personally identifiable information. In addition, TVA is to comply with environmental regulations related to surplus and disposal of IT equipment.

We last performed an audit of the surplus and disposal of IT equipment in 2008ⁱⁱ and found the surplus and disposal process of IT equipment did not adequately protect TVA resources or track the disposition of surplus equipment. The IT equipment surplus process has since been decentralized and related systems have changed since 2008. We scheduled this audit due to the risk of (1) protected information disclosure and (2) environmental compliance and regulatory compliance violations associated with the surplus and disposal of IT equipment.

What the OIG Found

We found weaknesses with TVA's policies, procedures, and process to surplus and dispose of IT equipment, including (1) surplus IT equipment was not properly sanitized, tracked, and processed; (2) badge access control reviews of areas holding surplus IT equipment were not being performed as required by policy; and (3) processes for the surplus and disposal of cathode ray tubes do not address environmental regulations to prevent release of the lead into the environment.

TVA-SPP-12.002, TVA Information Management Policy.

IT-WI-12.08.10, Replacement, Redeployment, Storage, Removal, and Update of IT Equipment.

Audit Report 2008-11714, Disposal of Surplus Computer Equipment, February 11, 2009.

Protected information disclosure includes the willful and accidental disclosure of confidential or sensitive business information and assets and personally identifiable information.



Audit 2017-15455 – Surplus and Disposal of Information Technology Equipment

EXECUTIVE SUMMARY

What the OIG Recommends

We recommend the Vice President and Chief Information Officer, IT:

- 1. Update policies and procedures related to surplus to include all devices that have the capability to store data.
- 2. Sanitize hard drives and include the wipe certificate documenting that sanitization was performed in the corresponding surplus ticket as required in IT-WI-12.08.10.
- 3. Consider implementing a formal verification of the sanitization process to ensure data is removed from equipment that may contain data.
- Implement a process to ensure devices are accurately tracked in the inventory system throughout the surplus process as part of the equipment lifecycle process.
- 5. Ensure surplus equipment is properly processed as classified in accordance with IT-WI-12.08.10 as part of the equipment lifecycle process.
- 6. Ensure reviews of physical access are performed by TVA management in a timely manner (at least annually) to ensure compliance with TVA policy in conjunction with TVA's Police and Emergency Management.
- Incorporate environmental regulations into the surplus and disposal process in conjunction with TVA's Environmental Compliance and Operations.

TVA Management's Comments

In response to our draft audit report, TVA management agreed with our audit findings and recommendations. See Appendix B for TVA management's complete response.

BACKGROUND

The Tennessee Valley Authority (TVA) has Standard Programs and Processes (SPP) and Work Instructions (WI) that define the process to retire information technology (IT) equipment (e.g., desktop computers, laptops, printers, network equipment, and external storage devices), which is referred to as surplus and disposal. The process provides for surplus equipment to be turned over to IT and delivered to a surplus processing area, where sanitization or destruction of the hard drive is to occur. TVA's IT personnel from field and corporate sites across the Valley redeploy, donate, or ship the surplus IT equipment to the Investment Recovery organization at TVA's Hartsville Distribution Center (HDC) for sale or recycle.

The HDC has a warehouse dedicated to storage of surplus IT equipment. Throughout the process, TVA tracks the surplus IT equipment in the Hewlett Packard Asset Manager (HPAM) system to document what equipment is assigned to whom. Services, such as retiring an asset, are tracked in a service management (SM) system.

Data stored on IT equipment remains on the equipment unless effective sanitization techniques are used or the equipment is physically destroyed. An effective surplus process includes data sanitization that ensures confidential and sensitive data is not disclosed to reduce the risk of potential loss of confidential business information and assets and personally identifiable information (PII). In addition, TVA is to comply with environmental regulations related to surplus and disposal of IT equipment.

We last performed an audit of the surplus and disposal of IT equipment in 2008.² The previous audit found the surplus and disposal process of IT equipment did not adequately protect TVA resources or track the disposition of surplus equipment. The IT equipment surplus process has since been decentralized, and related systems have changed since 2008. We scheduled this audit due to the risk of (1) protected information disclosure³ and (2) environmental compliance and regulatory compliance violations associated with the surplus and disposal of IT equipment. See Appendix A for our objectives, scope, and methodology.

Audit 2017-15455 Page 1

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TVA-SPP-12.002, TVA Information Management Policy. TVA-SPP-04.050, Investment Recovery.

IT-WI-12.08.10, Replacement, Redeployment, Storage, Removal, and Update of IT Equipment.

Audit Report 2008-11714, Disposal of Surplus Computer Equipment, February 11, 2009.

Protected information disclosure includes the willful and accidental disclosure of confidential or sensitive business information and assets and PII.

FINDINGS

In summary, we found weaknesses with TVA's policies, procedures, and process to surplus and dispose of IT equipment. Specifically, we found the (1) surplus IT equipment was not properly sanitized, tracked, and processed; (2) badge access control reviews of areas holding surplus IT equipment were not being performed as required by policy; and (3) processes for the surplus and disposal of cathode ray tubes (CRT) do not address environmental regulations to prevent release of the lead into the environment.

SURPLUS IT EQUIPMENT NOT PROPERLY SANITIZED, TRACKED, AND PROCESSED

We performed walkthroughs of TVA's surplus IT equipment in the Knoxville Office Complex, Chattanooga Office Complex, One Century Place (in Nashville, Tennessee), and HDC and judgmentally selected 52 devices to determine if the devices (1) had been sanitized, (2) were accurately tracked in TVA's inventory systems, and (3) were properly processed. We found (1) TVA's sanitization process needs improvement, (2) most devices were not tracked in TVA's inventory systems, and (3) some devices were not properly processed.

Sanitization Process Needs Improvement

An effective surplus process includes data sanitization that ensures TVA confidential and TVA sensitive data is not disclosed. We found TVA's sanitization process needs improvement. Specifically, we determined some (1) hard drives were not sanitized, and (2) devices did not have wipe certificates documenting they had been sanitized.

Hard Drive Sanitization

We recovered 54 hard drives from our sample of 51 devices containing hard drives. We verified the 1 remaining device contained no hard drive and had been factory reset. Our forensic examination of the 54 hard drives revealed:

- Eleven hard drives had not been sanitized and contained readable data.
 These were at risk of unauthorized disclosure of TVA data due to not being sanitized. One of the hard drives not sanitized contained PII and TVA confidential data.
- One hard drive was examined, and we could not determine if it had been sanitized.
- Four hard drives could not be examined due to hard drive failure; accordingly, we could not determine if they were sanitized.
- Thirty-eight hard drives were sanitized and contained no readable data.

Table 1 on the following page shows the details of the types of equipment examined.

Equipment Type	Not Sanitized	Unable to Determine	Sanitized	Total
Authentication Manager	1	0	0	1
Desktop	5	1	17	23
Laptop	0	0	21	21
Network Server	0	2	0	2
Plotter	1	1	0	2
Printer	3	0	0	3
Wide Area Application Engine	<u>_1</u>	<u>_1</u>	<u>0</u>	<u>2</u>
Total	11	5	38	54

Table 1

As Table 1 shows, only desktop and laptop computers had hard drives sanitized among the devices we sampled. We noted best practices from the Environmental Protection Agency⁴ and National Institute of Standards and Technology⁵ (NIST) included deleting information before donating or recycling used electronics. The electronics included hard copy storage, networking devices, mobile devices, equipment, magnetic media, peripherally attached storage, optical media, flash memory-based storage devices, and random access memory and read-only memory based storage devices. TVA only has WIs for sanitization of personal computers (PC), end-user data desktop equipment (IT-WI-12.08.10), and magnetic tapes (IT-WI-12.12.005, Magnetic Tape Disposal). The exclusion of devices that may contain data (such as servers, switches, handheld scanners, tablets, printers, and plotters) from policies and procedures could result in TVA data not being securely erased before the device is sent to Investment Recovery and the unauthorized disclosure of TVA data.

Wipe Certificates

TVA's sanitization process requires (1) verification of the serial number and documentation of the method of sanitization and (2) a wipe certificate documentation that contains pertinent information such as the tool and version used for sanitization. We found 4 of the devices had no wipe certificate documentation included in the ticket in TVA's SM system to document that sanitization was performed. The lack of wipe certificate documentation was a repeat finding from our 2008 audit.

We also noted that a NIST best practice included performing a final verification that sanitization was completed on a sample of media before final processing. Although IT-WI-12.08.10 requires verification that the sanitization was documented in HPAM, it does not require performing a final verification that sanitization was completed on a sample of media before final processing. Performing a final verification on a sample of media would help ensure sanitization is completed on all devices.

Electronics Donation and Recycling. (May 22, 2017). Retrieved January 12, 2017, from https://www.epa.gov/recycle/electronics-donation-and-recycling.

⁵ NIST Special Publication 800-88 (Revision 1), Guidelines for Media Sanitization, December 2014.

Surplus IT Equipment Not Tracked

We found that the 39 of the 52 devices we selected during our walkthroughs were not accurately tracked in the HPAM and SM systems, as shown in Table 2.

Status	Count
Device accurately recorded in the HPAM and SM systems.	13
Device not recorded in the HPAM and SM systems.	16
Device not recorded in SM system, and physical status was incorrect in the HPAM system.	7
Device not recorded in SM system.	6
Device not recorded in SM system, and no surplus ticket recorded in HPAM and SM systems.	3
Device not recorded in HPAM system, and no surplus ticket recorded in HPAM and SM systems.	2
No surplus ticket recorded in HPAM and SM systems.	2
No surplus ticket recorded in HPAM and SM systems, and physical access was incorrect.	1
Device not recorded in SM system, no surplus ticket in HPAM and SM systems, and physical status was incorrect.	1
Device physical status as recorded in the HPAM and SM systems did not match.	<u>1</u>
TOTAL	52

Table 2

In addition, we obtained IT asset inventory records for surplus equipment, including ready to be donated, recycled, or sold from November 1, 2015, through November 1, 2016, from TVA's IT. We identified 46 of 8,716 surplus records were coded as "recovery unsuccessful-device location unknown." This closure code is used when the location field is not populated. The location field documents the equipment's physical location. We selected 5 of these 46 surplus records for analysis. Three of the 5 surplus records had no comments to explain the location or status of the equipment.

Proper tracking of IT equipment prevents inadvertent disclosure of data and loss of equipment. We noted similar issues with tracking equipment and updating the correct status in our 2008 audit.

Surplus IT Equipment Not Properly Processed

IT-WI-12.08.10 provides guidance on TVA's PC lifecycle program. The guidance includes a PC Model Disposal Reference classifying model numbers of PCs to be processed for donation, recycling, redeployable, or outage. For the laptops and desktops identified in our walkthroughs for testing, we determined if they were located in the proper location according to the PC disposal classification. We found 10 of 44 laptops and desktops tested were in the wrong physical location for their PC classification. Specifically, 4 of them should have been donated or held for outage but were located in the HDC warehouse where items are sold or recycled. Four others should have been recycled or redeployed but were located where items are processed to be donated or held for outage only. The remaining 2 were classified as donation but located in processing areas for redeployment and shipment to the HDC. This may result in purchasing PCs that otherwise could have been avoided by redeploying existing PCs.

BADGE ACCESS CONTROL REVIEWS NOT BEING PERFORMED AS REQUIRED BY POLICY

Electronic badge readers are utilized at the walkthrough locations for physical access. TVA-SPP-14.200, Physical Access and Visitor Management, requires review and verification of access permissions of users to be performed, at a minimum, annually to validate only authorized personnel have access. We found the required reviews for each of the walkthrough locations were not being performed or were not completed in a timely manner. We notified TVA management, and badge access control reviews were subsequently performed for the Knoxville Office Complex, Chattanooga Office Complex, and at One Century Place.

INCOMPLETE DISPOSAL PROCESS OF CATHODE RAY TUBES

We found processes for the surplus and disposal of CRTs do not address environmental regulations to prevent release of the lead into the environment related to recycling and disposing CRTs. During our walkthroughs, we observed at least 14 monitors that used CRTs to display images at the HDC surplus IT equipment warehouse.

We found 1 pallet containing 4 CRTs was labeled as containing CRTs and having an implosion hazard (see Figure 1).



Figure 1: Labeled CRTs

However, none of the other pallets containing CRTs were labeled (see examples at Figure 2).





Figure 2: Unlabeled CRTs

Executive Order 13693⁶ requires agencies promote electronics stewardship, including employing environmentally sound practices with respect to the agency's disposition of all agency excess or surplus electronic products. Title 40, Code of Federal Regulations, Part 261 (40 CFR §261)⁷ requires CRTs be processed and labeled as hazardous waste unless the dates of accumulation are recorded and 75 percent of the CRTs by weight are recycled annually. TVA did not meet either of these criteria. According to TVA personnel, equipment is being stored in TVA's HDC warehouse for potential sale or recycling, but TVA has not recycled equipment in approximately 2 years. In addition, TVA did not document the dates of accumulation for the CRTs.

Environmental sustainability is not only part of TVA's mission but noncompliance with regulations could result in potential fines and a negative impact on TVA's public image. Compliance with 40 CFR §261 was a repeat finding from our 2008 audit.

RECOMMENDATIONS

We recommend the Vice President and Chief Information Officer, IT:

- 1. Update policies and procedures related to surplus to include all devices that have the capability to store data.
- Sanitize hard drives and include the wipe certificate documenting that sanitization was performed in the corresponding surplus ticket as required in IT-WI-12.08.10.
- 3. Consider implementing a formal verification of the sanitization process to ensure data is removed from equipment that may contain data.
- 4. Implement a process to ensure devices are accurately tracked in the inventory system throughout the surplus process as part of the equipment lifecycle process.
- 5. Ensure surplus equipment is properly processed as classified in accordance with IT-WI-12.08.10 as part of the equipment lifecycle process.
- Ensure reviews of physical access are performed by TVA management in a timely manner (at least annually) to ensure compliance with TVA-SPP-14.200 in conjunction with TVA's Police and Emergency Management.
- 7. Incorporate environmental regulations, including 40 CFR §261 and Executive Order 13693, into the surplus and disposal process in conjunction with TVA's Environmental Compliance and Operations.

Executive Order 13693: Planning for Federal Sustainability in the Next Decade, March 25, 2015.

⁷ 40 CFR §261 – Identification and Listing of Hazardous Waste.

TVA Management's Comments – In response to our draft audit report, TVA management agreed with our audit findings and recommendations. See Appendix B for TVA management's complete response.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives were to determine whether the Tennessee Valley Authority's (TVA) (1) process used to surplus and dispose of information technology (IT) equipment is adequate and ensures confidential and sensitive data is not disclosed, and (2) disposal process meets environmental regulations. Our scope included (1) IT equipment records in TVA's service management (SM) system from November 1, 2015, through November 1, 2016, and (2) real-time surplus IT equipment in process at four TVA locations (Knoxville Office Complex [KOC]; Chattanooga Office Complex [COC]; One Century Place [OCP] in Nashville, Tennessee; and Hartsville Distribution Center [HDC]).

To achieve our objectives, we:

- Reviewed relevant TVA policies, procedures, and documents (such as Standard Programs and Processes [SPP] and Work Instructions [WI]) related to the surplus and disposal process and created a process flowchart.
 - TVA-SPP-04.050, Investment Recovery
 - TVA-SPP-12.002, TVA Information Management Policy
 - TVA-SPP-12.100, NERC Critical Infrastructure Protection Cyber Security
 - TVA-SPP-14.200, Physical Access and Visitor Management
 - IT-WI-12.08.10, Replacement, Redeployment, Storage, Removal, and Update of IT Equipment
 - IT-WI-12.12.005, Magnetic Tape Disposal
 - EG.SPP.05.009, ENVIRONMENTAL GUIDANCE Universal Waste
 - TVA's 2016 Strategic Sustainability Performance Plan
- Identified applicable environmental and best practices and performed a gap analysis of TVA policies, procedures, and documents addressing the surplus and disposal process.
 - Environmental Protection Agency's Electronics Donation and Recycling¹
 - Federal Trade Commission's Disposing of Old Computers²
 - Executive Order 13693: Planning for Federal Sustainability in the Next Decade, March 25, 2015
 - Title 40, Code of Federal Regulations, Part 261 Identification and Listing of Hazardous Waste
 - National Institute of Standards and Technology's Special Publication 800-88 (Revision 1), Guidelines for Media Sanitization, December 2014

Electronics Donation and Recycling. (May 22, 2017). Retrieved January 12, 2017, from https://www.epa.gov/recycle/electronics-donation-and-recycling.

Disposing of Old Computers. (September 01, 2016). Retrieved January 12, 2017, from https://www.consumer.ftc.gov/articles/0010-disposing-old-computers.

- Conducted interviews with TVA personnel responsible for handling surplus IT equipment and environmental compliance.
- Performed physical walkthroughs of TVA's surplus IT equipment located at KOC, COC, OCP, and HDC to identify the policies, processes, and practices followed by TVA and to physically observe methods to access the areas used to process surplus IT equipment.
- Reviewed the physical security and obtained a listing of individuals with access to the TVA HDC vehicle gate and the KOC, COC, and OCP surplus processing areas. Also, we requested the most recent access review performed for these areas to determine if electronic access was reasonably restricted and monitored appropriately.
- Judgmentally selected a sample of 51 devices physically observed that contained a total of 54 hard drives (see Table 1) and 1 tablet for testing, during our walkthroughs of KOC, COC, and HDC. The 51 devices containing hard drives were selected based on the (1) type of equipment and (2) phase of the surplus and disposal process. We tested to determine whether TVA followed policy to dispose of or surplus IT equipment such as (1) verifying the status was correctly recorded in TVA's Hewlett Packard Asset Manager and SM systems, and (2) IT equipment that was capable of retaining data had been cleaned of TVA data. In addition, we selected 1 tablet to verify it had been factory reset and correctly recorded in TVA's Hewlett Packard Asset Manager and SM systems. Since this was a judgmental sample, the results of the sample cannot be projected to the population.

			кос		
Equipment Type	COC	KOC	Donations	HDC	Total
Desktop	3	9	3	7*	22
Laptop	5	6	4	6	21
Printer	0	1	1	1	3
Wide Area Application Engine	0	1*	0	0	1
Authentication Manager	0	0	0	1	1
Network Server	0	0	0	1*	1
Plotter	0	0	0	2	2
Tablet	<u>0</u>	<u>1</u>	<u>0</u>	0	<u>_1</u>
Total	8	18	8	18	52

* 51 devices contained the 54 hard drives observed (the tablet did not contain a hard drive).
1 desktop computer, the wide area application engine, and the network server each contained 2 hard drives.

Table 1

- Performed exception based testing to determine if any of the hard drives tested that were not sanitized contained personally identifiable information or TVA confidential information.
- Analyzed all surplus IT equipment records from TVA's SM system from November 1, 2015, through November 1, 2016, to determine records maintained in the SM. During the period, 8,716 surplus IT equipment records were shown in the SM.

- Determined 46 of 8,716 surplus IT equipment records were classified as "recovery unsuccessful-device location unknown." This closure code is used when the location field is not populated for the asset. We judgmentally selected the first 5 records from the 46 for further analysis. Since this was a judgmental sample, the results of the sample cannot be projected to the population.
- Reviewed the memorandum of understanding between TVA and 5R Processing, Inc. (TVA's recycling vendor) to understand the memorandum's requirements.
- Performed a web search of TVA IT equipment to determine if surplus IT equipment was available to purchase online.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

September 15, 2017

David P. Wheeler, ET 3C-K

RESPONSE TO REQUEST FOR COMMENTS – DRAFT AUDIT 2017-15455 – SURPLUS AND DISPOSAL OF INFORMATION TECHNOLOGY EQUIPMENT

Our response to your request for comments regarding the findings of the subject draft report is attached. Please let us know if your staff has any concerns with TVA's comments to address the documented recommendations.

We would like to thank Scott Marler, Melissa Conforti, and the audit team for their professionalism and cooperation in conducting this audit. If you have any questions, please contact Krystal Brandenburg at (423) 751-6039 or David Halicks at (423) 751-4880.

Scott D. Self Chief Information Officer

Information Technology SP 3A-C

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Richard W. Moore, ET 4C-K Philip D. Propes, MP 3B-C Jason T. Regg, BR 5A-C Elizabeth Russell, SP 2D-C Michael D. Skaggs, WT 7B-K Anthony M. Smith, MP 2H-C Mark G. Spivey, MP 5C-C John M. Thomas III, MR 6D-C OIG File No. 2017-15455

DRAFT AUDIT 2017-15455 Surplus and Disposal of Information Technology Equipment Response to Request for Comments

ATTACHMENT A Page 1 of 1

	Recommendation	Management Response
1	Update policies and procedures related to surplus to include all devices that have the capability to store data.	Management agrees.
2	Sanitize hard drives and include the wipe certificate documenting that sanitization was performed in the corresponding surplus ticket as required in IT-WI-12.08.10.	Management agrees.
3	Consider implementing a formal verification of the sanitization process to ensure data is removed from equipment that may contain data.	Management agrees.
4	Implement a process to ensure devices are accurately tracked in the inventory system throughout the surplus process as part of the equipment lifecycle process.	Management agrees.
5	Ensure surplus equipment is properly processed as classified in accordance with IT-12.08.10 as part of the equipment lifecycle process.	Management agrees.
6	Ensure reviews of physical access are performed by TVA management in a timely manner (at least annually) to ensure compliance with TVA-SPP-14.200 in conjunction with TVA's Police and Emergency Management.	Management agrees.
7	Incorporate environmental regulations, including 40 CFR 261 and Executive Order 13693, into the surplus and disposal process in conjunction with TVA's Environmental Compliance and Operations.	Management agrees.