



OFFICE OF INSPECTOR GENERAL

U.S. Department of Energy

AUDIT REPORT

DOE-OIG-24-30

September 2024

**WESTERN AREA POWER
ADMINISTRATION WOULD BENEFIT
FROM IMPROVEMENTS TO ITS
MANAGEMENT OF CRITICAL SPARE
PARTS**



Department of Energy
Washington, DC 20585

September 24, 2024

MEMORANDUM FOR THE ADMINISTRATOR, WESTERN AREA POWER
ADMINISTRATION

SUBJECT: Audit Report: *Western Area Power Administration Would Benefit From
Improvements to Its Management of Critical Spare Parts*

The attached report discusses our audit of Western Area Power Administration's (WAPA) management of its critical spare parts inventory. Reliability of WAPA's electrical system is essential to the North American electrical grid. We initiated this audit to determine whether WAPA adequately managed its critical spare parts inventory. We found that WAPA lacked a comprehensive critical spare parts program to adequately manage its spare parts inventory.

The attached report contains two recommendations that, if fully implemented, would help ensure that critical spare parts, including consumables, are available when needed to reduce the risk of long-term outages. Management fully concurred with our recommendations.

We conducted this audit from November 2023 through August 2024 in accordance with generally accepted government auditing standards. We appreciated the cooperation and assistance received during this audit.

A handwritten signature in black ink, appearing to read "Teri L. Donaldson".

Teri L. Donaldson
Inspector General

cc: Deputy Secretary
Chief of Staff



Department of Energy Office of Inspector General

Western Area Power Administration Would Benefit From Improvements to Its Management of Critical Spare Parts (DOE-OIG-24-30)

WHY THE OIG PERFORMED THIS AUDIT

As one of the Department of Energy's Power Marketing Administrations, Western Area Power Administration (WAPA) supports the Department's priority for a resilient, reliable, and secure North American electricity system. WAPA operates and maintains a service area that covers 15 states, 1.3 million square miles, and includes an integrated 17,000 circuit-mile, high-voltage transmission system. The reliability of WAPA's system is essential to the North American electric grid.

We initiated this audit to determine whether WAPA adequately managed its critical spare parts inventory.

What Did the OIG Find?

We found that WAPA lacked a comprehensive critical spare parts program to adequately manage its spare parts inventory. Specifically, we found that while WAPA has a program for maintaining its critical assets, it was unable to demonstrate that it had specified the critical parts needed for each critical asset, identified the critical spare parts in inventory, established sparing levels and reorder points for critical spare parts, or staged the critical spare parts at strategic locations.

We attributed these issues to WAPA officials' assumption that their current Asset Management and Maintenance Programs are adequate to ensure reliability of critical assets. WAPA also relies heavily on the knowledge and experience of its employees in each region to know what spare parts are on hand and where they should be located. While an Asset Management Program is useful for prioritizing equipment for replacement, a critical spare parts program with documented policies, procedures, and processes in place would ensure critical spare parts are identified, available, and located where needed in the event of failures or when experienced employees are not immediately available.

What Is the Impact?

The lack of a comprehensive critical spare parts program at WAPA could increase the risk for extended outages. The highly interconnected nature of the U.S. power system means that a disturbance to any part of the system has a greater potential for affecting the whole system.

What Is the Path Forward?

To address the issues identified in this report, we have made two recommendations that, if fully implemented, would help ensure that critical spare parts, including consumables, are available when needed to reduce the risk of long-term outages.

BACKGROUND

Western Area Power Administration (WAPA) operates and maintains approximately 17,000 circuit-miles of high-voltage transmission lines; more than 300 substations/switchyards and associated power system controls; and communication and electrical facilities. WAPA serves a diverse group of nearly 700 wholesale customers, including more than two dozen military installations, Department of Energy National Laboratories, municipalities, cooperatives, public utility and irrigation districts, Federal and state agencies, and Native American tribes. In turn, WAPA's customers provide service to more than 40 million Americans from the Desert Southwest to the Canadian border and from the lakes of Minnesota to the California coastline. WAPA has divided this service territory into five regions, which report to its Headquarters in Lakewood, Colorado.

WAPA's mission is to safely provide reliable, cost-based hydropower and transmission to its customers and the communities it serves. To efficiently control risk and help ensure the availability of critical assets, industry experts champion the use of a critical spare parts management program to maintain and repair equipment during both planned and unexpected outages. See Appendix 2 for summaries of reports from various organizations, industry experts, and oversight bodies highlighting the importance of a critical spare parts management program for utility companies and administrations. For example, industry research groups and best practices suggest power providers may better ensure the availability of critical spare parts by taking into consideration the shelf life of the various parts as well as the lead times to obtain or replace them.

WAPA's Asset Management strategy integrates all assets into risk-based methodologies to strategically inform capital investments; maximize the value of the assets; correlate asset maintenance history, health indices, and consequence values to drive risk-based decisions; and use asset population and performance data to inform best maintenance practices. WAPA has identified three classes of critical assets that would be most disruptive if they failed: 1) transmission lines; 2) circuit breakers; and 3) transformers. In response to our draft report, WAPA officials stated they define critical spares at the asset level, not at the subcomponent level. WAPA officials added that they use in-service spare transformers operating in parallel that add redundancy to the system in case of failure or scheduled or unscheduled maintenance of one of the units.

A critical spare can be defined as an asset or part needed to return critical assets to service following normal and reasonably anticipated wear and tear, as well as credible failures that would not normally be predicted via monitoring and trending programs, with sufficient advance warning to allow for procurement activities and reasonable lead times for needed replacement. We initiated this audit to determine whether WAPA adequately managed its critical spare parts inventory.

LACK OF A CRITICAL SPARE PARTS PROGRAM

We found that WAPA lacked a comprehensive critical spare parts program to adequately manage its spare parts inventory. Based on our research, a comprehensive critical spare parts program

would provide a risk-based strategy for ensuring critical spare parts, including consumables, are available when needed to reduce the risk of long-term outages. For example, one industry research group stated that the availability of spare and replacement items is required to enable adequate support of critical equipment. These spare and replacement items or critical spares may include replacements at the equipment level, part-level items, and consumables necessary to support maintenance activities and contingency plans associated with critical equipment. While WAPA has an Asset Management Program and uses an Enterprise Asset Management (EAM) system for maintaining its critical assets, WAPA was unable to demonstrate that it had:

- Specified the critical parts needed for each critical asset;
- Identified the critical spare parts in inventory;
- Established spare inventory levels and reorder points for critical spare parts; and
- Staged the critical spare parts at strategic locations.

Specification of Critical Spare Parts

WAPA has not specified the critical parts for all its critical assets and could not provide us with a listing of critical spare parts when asked for one. An industry research group reported that the parts, components, and consumables that are most important to the functionality of critical assets should be evaluated and classified as critical or non-critical. WAPA's procedure guide, *Managing WAPA's Assets*, states that each asset record shall have an asset priority number assigned to it. For example, a priority code of "4" would designate the equipment as critical, meaning that its failure could result in a serious loss of system reliability or revenue. WAPA officials stated they do not use that function in its EAM system. As part of its internal operations, WAPA regularly evaluates the adequacy of its management control systems. From those reviews, WAPA found that some users have been entering some technical specifications for its critical assets into the EAM system, but the data fields are insufficient to fully specify the critical individual parts required for the asset. Furthermore, there is no standard template for listing the specifications, leaving data entry to the discretion of the individual employees resulting in incomplete data.

Critical Spare Parts in Inventory

WAPA has not accurately identified critical spare parts and consumables in its inventory as recommended by industry experts. WAPA officials said they do not classify spare parts as critical or non-critical. WAPA internal reviews also found that WAPA does not have a standard procedure for recording and tracking spares. WAPA's EAM system has the functionality to link parts in inventory to a larger asset, and if this is done, the part's status would be the same as the asset's status (i.e., if an asset was identified as critical, an associated required part for that asset would also carry that designation). However, only two of WAPA's five regions are using this functionality. The internal reviews also discovered that parts are sometimes tracked in separate databases, or not at all, if bought for a specific work order. Also, some warehouses were not recording the additional spare parts in inventory that came along with equipment purchased from

the manufacturer although these parts are being used as such. Furthermore, a series of internal inventory reviews performed over the 2-year period, leading up to calendar year 2020 and covering 13 of WAPA's warehouse locations, revealed that WAPA had 16 percent fewer items on hand than were recorded in the EAM system.

Critical Spare Inventory Levels and Reorder Points

WAPA was unable to provide the spare inventory levels and reorder points for critical spare parts and supplies. WAPA's *Property Management Program Guide* states that WAPA is to maintain necessary inventories using an effective automated system to manage stock levels and costs. WAPA's procedure guide, *Stock Replenishment*, requires WAPA's warehouses to establish a reorder point for stock items based on local requirements. The Program Manager for WAPA's EAM system confirmed that WAPA's procedure guides do not address setting reorder points for stock items. Instead, we were told that, currently, warehouse staff manually run reports to determine inventory levels and identify parts that need to be reordered based upon historical knowledge. In response to our draft report, WAPA officials confirmed that its EAM system has the capability to automatically reorder stock items that have reached their minimum inventory level; however, WAPA is not using that system capability for several reasons, including budget implications and difficulties in establishing a reorder point that would apply to all regions across WAPA. While we recognize these concerns, WAPA could still use the EAM system to notify personnel when stock levels of critical parts are nearing the levels it set by warehouse staff while considering the financial and regional factors.

Strategic Locations

Since it has not identified its critical spares, WAPA could not show that it had critical spare parts available at strategic locations where they would be needed to prevent extended outages due to inoperable critical assets. Industry experts found that strategically locating critical spares allows for faster restoration following damage to critical transmission equipment. Determining these locations requires knowing multiple aspects of the operating environment and equipment specifications. WAPA officials stated that its personnel have knowledge of where spare parts could be obtained, if needed. For example, they could use parts purchased for construction projects that have not been installed yet, borrow parts from another region, or find spare parts in the "bone yards" of retired but still functional assets. However, an internal review noted that there was no standard procedure for requesting or exchanging spares from one region to another. Often these sources of spare parts are not documented in the EAM system; therefore, there is no record of the true number of usable spares in each region.

WAPA officials think that their current programs and collective expertise are adequate to ensure reliability of critical assets. They stated that WAPA's Asset Management Program considers the availability of spare parts in the risk scores as being sufficient. However, after discussions with WAPA personnel, we learned that the risk scores only consider the availability of spare mobile transformers. While an Asset Management Program is useful for prioritizing equipment for replacement, a critical spare parts program with documented policies, procedures, and processes in place would help ensure critical spare parts are identified, available, and located where needed in the event of failures.

WAPA has not implemented a standardized system across its 46 active warehouses in 5 regions to account for and provide visibility of all spare parts that could be available to repair or replace an asset experiencing an outage. Instead, as previously mentioned, WAPA relies heavily on the knowledge and experience of its employees in each region to know what spare parts to have on hand, and where spare assets and parts should be and are located. For example, WAPA relies on employee knowledge of items in its “bone yards” of equipment, construction projects not yet started, and the extra parts that came with new equipment as a solution to repairs and replacements. However, a WAPA internal review identified that there is a significant amount of unused and undocumented equipment at substation yards or in warehouse cabinets that are only known to the local foremen.

In response to our draft report, WAPA officials stated that they participate in Edison Electric Institute’s Spare Transformer Equipment Program and Spare Connect Program to promote equipment sharing following emergency events. However, WAPA’s development of a comprehensive critical spare parts program would show how the steps it has taken to address reliability work together, and such a program would have a bearing on determining which critical spare parts are needed to keep WAPA’s critical assets operating. The program would consider the steps that WAPA has already addressed such as the redundancies in place and partner programs that WAPA participates in. Further, assessing and identifying the critical parts within the critical asset is a best practice across the power providing industry, and assessing the criticality of spare parts is an important aspect of a proactive maintenance strategy.

RISK OF EXTENDED UNPLANNED OUTAGES

The National Research Council and other industry experts have long proposed the stockpiling of spare transformers and other critical equipment as emergency replacements for critical units that do not currently have secure spares. These stockpile proponents assert that a stockpile of critical spares is essential to minimizing the potential impacts of a widespread transformer outage.

For example, a 2014 report, *Considerations for a Power Transformer Emergency Spare Strategy for the Electric Utility Industry*, prepared by the Electric Power Research Institute for the U.S. Department of Homeland Security, discusses outages due to high-impact, low-frequency events such as intentional malicious events (e.g., physical attacks, cyber-attacks, coordinated attacks, electromagnetic pulse weapons, etc.); natural disasters (e.g., hurricanes, earthquakes, severe geomagnetic disturbances, etc.); and non-intentional or accidental events (e.g., nuclear power plant accidents). Although WAPA has not experienced any extended unplanned outages, this report recommends the evaluation and enhancement of operational and planning practices to address such outages although they are difficult to predict and may not occur.

Extreme weather events such as hurricanes, wildfires, ice storms, flooding, and heat waves are growing in frequency, duration, and intensity, putting stress on already overloaded and aging national electrical infrastructure. The U.S. electric power system consists of an integrated system of generators, bulk-power transmission lines, substations, and lower voltage distribution lines that provide power to consumers. The highly interconnected nature of this system allows for economies of scale and increased reliability; however, the highly interconnected system also

means that a disturbance to any part of the system has a greater potential for affecting the whole system. If there is an extended outage on WAPA's system, it could impact millions of Americans, including many disadvantaged communities.

Current supply chain restraints make stocking decisions even more important. The Government Accountability Office's report, *ELECTRICITY GRID: DOE Could Better Support Industry Efforts to Ensure Adequate Transformer Reserves* (GAO-23-106180, August 2023), finds that power utilities may have to wait up to 7 years after ordering power transformers due to supply chain restraints that have impacted manufacturing. Additionally, the Department's report, *Large Power Transformers and the U.S. Electric Grid* (April 2014), notes that high-voltage bushings have a long lead time, extending up to 5 months. High-voltage bushings are usually customized for each power transformer, and there are limited bushing manufacturers in the U.S. Further, a WAPA internal review noted that WAPA was not tracking its spare bushings consistently, and sometimes not all, due to the EAM system's limited capability for specifying unique parts. The review also noted that bushings have been failing more often than their historical rates, which could further lead to a shortage with no way to replace them immediately. WAPA officials stated they were concerned with the supply chain challenges, and they are actively tracking the lead times of the assets impacted and planning accordingly. However, they also stated that their tracking is geared toward ordering for projects and not maintenance, and there is no requirement for the regions to adjust their ordering process to ensure the parts that have long lead times are being ordered timely. Lastly, their concerns were not limited to lead time for new transformers but also items like steel, concrete, asphalt, construction rebar, aluminum wire, steel wire, and fiber optic cable, which are all in high demand throughout the U.S.

RECOMMENDATIONS

We recommend that the Administrator, WAPA, determine whether WAPA would benefit from following leading industry practices by:

1. Identifying critical spare parts for its critical assets; and
2. Developing a comprehensive risk-based critical spare parts program to include identifying the critical spare parts in inventory, establishing sparing levels and reorder points for those critical spare parts, and staging the critical spare parts at strategic locations.

MANAGEMENT RESPONSE

Management fully concurred with our recommendations. Management stated that it will develop criteria to be used in determining and classifying subcomponents of critical assets to be defined as critical spare parts. WAPA will then develop criteria for classifying subcomponents of critical assets to determine if they are regarded as critical per management's definition. These activities are planned to be completed by March 31, 2025. WAPA will also determine if it benefits the reliability of the power system to develop a program for the ordering, tracking, and warehousing of identified critical spare parts beyond WAPA's current practices. This action is expected to be completed by June 30, 2025.

Although management concurred with the report's recommendations, it stated that the recommendations were partly based on studies that highlighted industry challenges, threats, vulnerabilities, risks, and mitigation strategies, some of which have been considered and implemented by WAPA. Additionally, management stated that it employs leading industry strategies that include a robust Asset Management Program; use of an EAM system throughout WAPA's regions; and participation in Edison Electric Institute's transformer sparing forums and Spare Connect Program. Management highlighted proactive measures that it has recently taken, which include an internal review of its warehousing and sparing program that will be used in a continuous process improvement initiative. Finally, management stated that it commissioned the Electric Power Research Institute to complete an asset management maturity assessment that will address the next evolution of its asset management program.

Management's comments are included in Appendix 3.

AUDITOR COMMENTS

We consider management's comments and corrective actions to be responsive to our recommendations. Our report did incorporate many of the highlights that WAPA management mentioned in its response. We acknowledged that WAPA has an Asset Management Program that evaluates assets based upon probability of failure, health index, and consequence of failure, and that uses an EAM system. We also recognized that WAPA participated in industry programs that promote equipment sharing. We commend WAPA's commissioning of an independent assessment of the maturity of its asset management system.

These highlights validate the importance of benchmarking WAPA's inventory management systems and performance against best practices. As WAPA found in its internal review, there were issues identified within its EAM system and the tracking of spare parts throughout WAPA's regions. Our report cites credible experts and industry partners that have published guidance demonstrating that a critical spare parts program is an industry standard and best practice. A comprehensive critical spare parts program works together with asset reliability by determining where and how many critical spare parts should be on hand to keep WAPA's critical assets operating. With a critical spare parts program, WAPA could better evaluate the appropriate sparing levels, reorder points, and staging of critical spare parts at strategic locations by identifying and tracking the critical or non-critical spare parts in inventory.

Appendix 1: Objective, Scope, and Methodology

OBJECTIVE

We initiated this audit to determine whether Western Area Power Administration (WAPA) adequately managed its critical spare parts inventory.

SCOPE

The audit was performed from November 2023 through August 2024 at WAPA locations in Lakewood, Colorado, and Loveland, Colorado. The scope of our audit covered WAPA's management of its critical spare parts inventory. The audit was conducted under Office of Inspector General project number A23CH015.

METHODOLOGY

To accomplish our audit objective, we:

- Reviewed applicable laws, regulations, WAPA's policies and procedures, and Department of Energy guidance related to management of critical spare parts inventory;
- Reviewed prior reports related to the management of critical spare parts inventory;
- Reviewed reports from industry experts related to the management of critical spare parts inventory;
- Interviewed WAPA personnel regarding the management of critical spare parts inventory; and
- Interviewed Bonneville Power Administration Internal Audit regarding its recent report on critical spare parts.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that 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 objective. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objective. We assessed internal controls and compliance with laws and regulations necessary to satisfy the audit objective. In particular, we assessed the control activities components as well as implementation of control activities. However, because our review was limited to this internal control component and underlying principle, it may not have disclosed all internal control deficiencies that may have existed at the time of this audit. We did not rely on computer-processed data to satisfy our audit objective.

Management officials waived an exit conference on September 19, 2024.

Appendix 2: Related Reports

Government Accountability Office

- [*ELECTRICITY GRID: DOE Could Better Support Industry Efforts to Ensure Adequate Transformer Reserves*](#) (GAO-23-106180, August 2023). The Government Accountability Office (GAO) reports that electric utilities and the Department of Energy face several challenges to ensuring that large power transformers—both in use and in reserve—are available in adequate numbers to maintain a resilient electricity grid. Key challenges faced by electric utilities and the Department in ensuring adequate transformer reserves include long manufacturing lead times, manufacturing capacity constraints, materials and components shortages, labor shortages, foreign competition, logistical challenges, purchase costs, lack of consistent standards, and threats to spares. GAO reports that the Department has identified options for addressing the supply chain challenges that affect utilities' ability to ensure adequate reserves but has not developed plans that specify how to implement these options. Without plans to guide the Department's efforts to address supply chain challenges and to facilitate solutions to ensure adequate reserves, these efforts could stall or remain incomplete, leaving critical grid infrastructure vulnerable. GAO made two recommendations to the Department to establish plans, including timeframes for developing solutions and support for addressing transformer supply chain challenges, guiding its support for utilities, and facilitating greater participation in industry sharing efforts.

Department of Energy Office of Electricity Delivery and Energy Reliability

- [*Large Power Transformers and the U.S. Electric Grid*](#) (April 2014). The Department's Office of Electricity Delivery and Energy Reliability assessed the procurement and supply environment of large power transformers. The report states that large power transformers have long been a concern for the U.S. electricity sector because the failure of a single unit can cause temporary service interruption and lead to collateral damage, and it could be difficult to quickly replace it. Key industry sources have identified the limited availability of spare large power transformers as a potential issue for critical infrastructure resilience in the U.S.

Electric Power Research Institute

- [*Plant Support Engineering: Critical Spares—Program Development*](#) (Report No. 1019162, December 2009). The Electric Power Research Institute's report provides a generic process for identification of critical spare items. The guidance is intended to help licensees to define a critical spare at their facilities, develop a program that identifies those critical items required to support critical plant equipment, and ensure that these spares are available to support plant operations.
- [*Considerations for a Power Transformer Emergency Spare Strategy for the Electric Utility Industry*](#) (September 2014). The Electric Power Research Institute discusses the importance of having an emergency spares program to prepare for and recover rapidly from a high-impact, low-frequency event (e.g., physical attacks, cyber-attacks, coordinated attacks, electromagnetic pulse weapons, etc.); natural disasters (e.g.,

Appendix 2: Related Reports

hurricanes, earthquakes, severe geomagnetic disturbances, etc.); and non-intentional or accidental events (e.g., nuclear power plant accidents). The Electric Power Research Institute reports that power transformers are a critical part of any spares strategy. Additionally, the report describes the criteria for effective emergency spare transformers, outlines scenarios for spares storage and creation in terms of these criteria, and compares and assesses these criteria and scenarios.

Tennessee Valley Authority Office of Inspector General

- Audit Report on [*Gas Plant Critical Spare Parts*](#) (Evaluation 2022-17400, July 2023). The Tennessee Valley Authority's (TVA) Office of Inspector General (OIG) conducted an evaluation to determine if TVA adequately identified, stocked, and maintained critical spare parts for its gas plants. The OIG found most gas plant critical components had not been evaluated to identify critical spare parts. The OIG identified the following contributing factors: 1) limited resources dedicated to reviewing existing components to identify critical spare parts; 2) not having governing procedures defining the process for identifying critical spare parts; and 3) incomplete inventory data in TVA's system of record for inventory, asset, and location information. The OIG found not all identified critical spare parts were in stock or set to reorder once used. Additionally, the OIG found some improvements were needed to properly store and maintain critical spare parts, and improvements are needed to maintain the useful life of certain items such as those with electronic components or requiring preventive maintenance while in storage.
- Audit Report on [*Transmission, Power Supply and Support — Critical Spare Parts*](#) (Evaluation 2019-15647, February 2020). TVA OIG reported that TVA was not effectively managing its critical spare parts needed to reduce the recovery time after events that affected the transmission system as required by its policies. Specifically, TVA's OIG looked at TVA's storm restoration materials, such as critical materials with long lead times, that must be immediately available to restore its transmission system. TVA's OIG found inaccurate inventory counts of storm restoration materials, improperly identified storm restoration materials, and incorrect reorder points for storm restoration material.

North American Electric Reliability Corporation

- [*2020 ERO Enterprise Compliance Monitoring and Enforcement Program Implementation Plan*](#) (September 2019). This North American Electric Reliability Corporation report discusses several risk scenarios facing the Electric Reliability Organization Enterprise. The risk scenarios include aging infrastructure coupled with less than adequate maintenance; failure of large power transformers due to the effects of a geomagnetic disturbance or other weather-related effect; and any type of intentional (or unintentional) physical or cybersecurity breach, including the impacts of an electromagnetic pulse. The report recommends having a spare equipment strategy identify critical spare equipment as part of a national or regional inventory and account for the transportation and logistics requirements for replacing critical assets. A spare

Appendix 2: Related Reports

equipment strategy leads to better contingency planning; possibly faster response times for restoration and recovery; and strengthening the resiliency for responding to potential physical threats and vulnerabilities.

Congressional Research Service

- [*The Smart Grid and Cybersecurity - Regulatory Policy and Issues*](#) (Congressional Research Service Report R41886, June 2011). This report discusses whether the existing requirements of current law adequately assure the cybersecurity and reliable operation of the U.S. electricity grid today and the Smart Grid of tomorrow. While recovering from a significant cyber-attack will likely be very difficult, the report states that maintaining a ready inventory of critical spare parts near key installations would likely prove useful to quickening recovery efforts from some types of attack.
- [*Electric Utility Infrastructure Vulnerabilities: Transformers, Towers, and Terrorism*](#) (Congressional Research Service Report R42795, April 2004). This report discusses physical and cyber vulnerabilities in the electric transmission and distribution system, and it analyzes Government and industry roles in protecting infrastructure as well as restoring damaged systems. The report proposes having a stockpile of spares that are available immediately to speed up recovery. The report's subsection, *Critical Spare Parts Stockpile*, states, "The National Research Council, [the North American Electric Reliability Corporation], and other groups have long proposed the stockpiling of spare transformers and other critical equipment as emergency replacements for critical units that do not currently have secure spares. These stockpile proponents assert that, since it is difficult to completely prevent a high-voltage transformer attack, a stockpile of critical spares is essential to minimizing the potential impacts of a widespread transformer outage."

Electric Generation Performance Branch, Consumer Protection and Safety Division, California Public Utilities Commission

- [*The Audit of the Oakland Power Plant*](#) (October 2007). The Consumer Protection and Safety Division audited the Oakland Power Plant and identified potential violations of various standards in its preliminary report. One of the potential violations was the lack of adequate inventory of critical spare parts onsite for the jet engines used in power generation. Although the spare parts for the jet engines are easily obtainable, the report states that the lack of available spare parts onsite could delay repair work during outages and prolong the amount of time the plant is down. The report expresses concern because the engines are critical to the electric grid when demand is high.

Appendix 3: Management Comments



Department of Energy
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228-8213

September 12, 2024

MEMORANDUM FOR JENNIFER L. QUINONES
DEPUTY INSPECTOR GENERAL
DEPARTMENT OF ENERGY, OFFICE OF INSPECTOR GENERAL

FROM: TRACEY A. LEBEAU
ADMINISTRATOR AND CHIEF EXECUTIVE OFFICER

SUBJECT: WAPA Management Response to DOE OIG Draft Report, "Western Area Power Administration Would Benefit from Improvements to its Management of Critical Spare Parts" (A23CH015)

Thank you for the opportunity to review and comment on the subject draft report. The following details actions planned by the Western Area Power Administration (WAPA) to address the OIG's recommendations noted in the draft report.

We would like to highlight that the subject draft report provided recommendations partly based on studies that highlighted industry challenges, threats, vulnerabilities, risks, and mitigation strategies, some of which have been considered and/or implemented by WAPA. However, the draft report did not cite any instances of WAPA non-compliance with accepted industry standards (IEEE, ASTM, NESC, NERC, FERC, etc.), or DOE, or other Federal requirements or regulations for management of critical spare parts. It should also be noted that although the report highlights studies and research groups addressing the benefit for developing a critical spare parts program, there were no references to leading power transmission industry practices for a spare parts program, as suggested in the recommendation.

Some leading industry strategies currently in practice by WAPA include:

- A robust Asset Management Program that rates all critical assets based on health, risk, probability of failure, and consequence of failure;
- An Enterprise Asset Management System (EAM) used for company-wide tracking of warehoused assets across several warehouses throughout all WAPA's regions;
- WAPA's participation in industry transformer sparing forums such as Edison Electric Institute (EII) Spare Transformer Equipment Program (STEP); and
- WAPA's Participation in EII Spare Connect Program.

In addition, WAPA has been taking proactive measures in improving their spares program through the following actions:

- An internal review of our warehousing and sparing program was conducted in 2023 which WAPA will take into consideration through a Continuous Process Improvement (CPI) initiative which has begun this year.

Appendix 3: Management Comments

2

- WAPA commissioned the Electric Power Research Institute (EPRI) to complete an asset management maturity assessment this year. The findings of the EPRI assessment will be addressed into our next steps/overall asset management program evolution.

As noted below, WAPA will give consideration if it would benefit from the following recommended practices as cited in the report.

The Department of Energy, Office of Inspector General (DOE OIG) recommended that the Administrator, WAPA, determine whether WAPA would benefit from following leading industry practices by:

Recommendation 1: Identifying critical spare parts for its critical assets.

Management Response:

WAPA concurs with the recommendation but does not find this recommendation to be a “leading industry practice” based on the findings of the report. To address this recommendation, WAPA will first develop criteria used for determining and classifying subcomponents of critical assets to be defined as a critical spare part.

WAPA will develop criteria for classifying subcomponents of critical assets to determine if they are regarded as “critical” per its definition. WAPA will use this criterion to identify spare parts. These actions will be completed by March 31, 2025.

Recommendation 2: Developing a comprehensive risk-based critical spare parts program to include identifying the critical spare parts in inventory, establishing sparing levels and reorder points for those critical spare parts, and staging the critical spare parts at strategic locations.

Management Response:

WAPA concurs with the recommendation. WAPA will determine if it is to the benefit of the reliability of the power system to develop a program for the ordering, tracking, and warehousing of identified critical spare parts beyond its current practices. These actions will be completed by June 30, 2025.

If you have any questions regarding this response, please contact Lisa Hansen, Vice President of Governance and Policy at (720) 962-7613 or hansen@wapa.gov.

FEEDBACK

The Office of Inspector General has a continuing interest in improving the usefulness of its products. We aim to make our reports as responsive as possible and ask you to consider sharing your thoughts with us.

Please send your comments, suggestions, and feedback to OIG.Reports@hq.doe.gov and include your name, contact information, and the report number. You may also mail comments to us:

Office of Inspector General (IG-12)
Department of Energy
Washington, DC 20585

If you want to discuss this report or your comments with a member of the Office of Inspector General staff, please contact our office at 202-586-1818. For media-related inquiries, please call 202-586-7406.