



Memorandum from the Office of the Inspector General

April 12, 2019

Robert M. Deacy, SR, LP 5D-C
Jacinda B. Woodward, LP 3K-C

**REQUEST FOR FINAL ACTION – EVALUATION 2018-15579 – COAL PLANT
EMERGENCY PREPAREDNESS AND RESPONSE**

Attached is the subject final report 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.

If you have any questions or wish to discuss our findings, please contact Meghan H. Petty, Senior Auditor, at (423) 785-4812 or E. David Willis, Director, Evaluations, at (865) 633-7376. We appreciate the courtesy and cooperation received from your staff during the evaluation.

David P. Wheeler
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WT 2C-K

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Attachment
cc (Attachment):

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OIG File No. 2018-15579



Office of the Inspector General

Evaluation Report

To the Senior Vice President,
Generation Construction, Projects
and Services and Facilities
Management, and to the
Senior Vice President, Power
Operations

COAL PLANT EMERGENCY PREPAREDNESS AND RESPONSE

Evaluation Auditor
Meghan H. Petty

Evaluation 2018-15579
April 12, 2019

ABBREVIATIONS

C&EM	Crisis and Emergency Management
CCR	Coal Combustion Residuals
CCR Rule	Disposal of Coal Combustion Residuals from Electric Utilities
CPG 101	Comprehensive Preparedness Guide
CR	Condition Report
DHS	U.S. Department of Homeland Security
EPR	Emergency Preparedness and Response
GCP&S	Generation Construction, Projects and Services
GETS	Government Emergency Telecommunications Service
NIMS	National Incident Management System
OSHA	Occupational Safety and Health Administration
PA	Public Address
PPM	Parts Per Million
PO	Power Operations
SVP	Senior Vice President
SPP	Standard Programs and Processes
TVA	Tennessee Valley Authority
WebEOC	Web-Based Emergency Operations Center
WPS	Wireless Priority Service

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Evaluation 2018-15579 – Coal Plant Emergency Preparedness and Response

EXECUTIVE SUMMARY

Why the OIG Did This Evaluation

The Tennessee Valley Authority (TVA) could be impacted by a wide spectrum of emergency incidents such as natural, man-made/technological, or terroristic occurrences. In recent years, there have been a number of emergency incidents at TVA's coal plants, including a coal silo failure at Cumberland Fossil Plant and an employee fatality at Shawnee Fossil Plant. TVA's Emergency Management Program is intended to ensure TVA organizations respond effectively and consistently to all incidents.

Due to the importance of an effective response in the event of an emergency, we conducted an evaluation of emergency preparedness and response at TVA coal plants. The objectives of our evaluation were to determine if (1) emergency response plans at coal plants were up to date and (2) required systems were available and functional.

What the OIG Found

We found the majority of emergency plans for active and retired coal plants were not reviewed on a timely basis or were not up to date. Specifically, we found (1) three of six emergency plans for active coal plantsⁱ were not reviewed timely based on TVA's requirement for an annual review, and all six contained inaccurate contact information; (2) two of four emergency plans for retiredⁱⁱ coal plants were not reviewed timely and plans were not executable because of changed plant conditions; and (3) 14 of 15 emergency action plans required for coal combustion residuals storage facilities were not reviewed on a timely basis.

We also found some systems required in emergency response plans were not functional. Specifically, we observed functional issues with emergency alerting and notification systems at two of the three plants we visited. Additionally, we noted two user aidsⁱⁱⁱ were unavailable to anticipated TVA users at most active plants.

In addition, we found limited emergency lighting in administrative areas and planned incident command posts during site visits at three plants.

ⁱ As of August 1, 2018, TVA had six active coal plants: Bull Run, Cumberland, Gallatin, Kingston, Shawnee, and Paradise.

ⁱⁱ TVA retired four coal plants in the prior 5 years: Allen, Colbert, Johnsonville, and Widows Creek.

ⁱⁱⁱ Emergency plans provide for services to assist the incident management team in external communications such as the Government Emergency Telecommunications Service, Wireless Priority Service, and Web-Based Emergency Operations Center.



Evaluation 2018-15579 – Coal Plant Emergency Preparedness and Response

EXECUTIVE SUMMARY

What the OIG Recommends

We recommend the Senior Vice President, Power Operations (1) review and update out-of-date site emergency plans, (2) develop transitional emergency plans for retired plants, (3) remediate functional issues with emergency response systems, (4) improve availability of two user aids at coal plants, and (5) evaluate the adequacy of emergency lighting in planned incident command posts and administrative areas of active coal plants and make modifications where necessary.

TVA Management's Comments

In response to our draft report, TVA management stated that actions have been, or will be, taken to address the recommendations. See Appendix B for management's complete response.

Auditor's Response

We concur with TVA management's planned and completed actions and will verify completion prior to closing the recommendations.

BACKGROUND

The Tennessee Valley Authority (TVA) could be impacted by a wide spectrum of emergency incidents such as natural, man-made/technological, or terroristic occurrences. In recent years, there have been a number of emergency incidents at TVA's coal plants, including a coal silo collapse at Cumberland Fossil Plant and an employee fatality at Shawnee Fossil Plant. TVA's Emergency Management Program is intended to ensure its organizations respond effectively and consistently to all incidents.

The U.S. Department of Homeland Security (DHS) issues guidance and best practices on emergency management for all levels of government as well as the private and nongovernmental sectors. In 2004, DHS released its original guide to incident management—known as the National Incident Management System (NIMS)—to provide a common approach to sharing resources, coordinating and managing incidents, and communicating information. NIMS guidance suggests incidents are best handled at the lowest possible organizational level. According to TVA, as an incident grows in complexity and/or size, TVA sites and organizations may require activation of other external response agencies for assistance.

Accordingly, TVA established emergency response plans at multiple organizational levels, including a site plan for each of TVA's coal plants, a Power Operations (PO) emergency plan—Standard Programs and Processes (SPP), PO-SPP-35.001, *Power Operations Emergency Plan*—and an agency level plan—TVA-SPP-35.100, *Agency Emergency Response Plan (AERP)*. TVA-SPP-35.200, *Emergency Preparedness Programs*, indicates emergency programs should address the following areas, among others:

- Compliance with applicable laws and authorities.
- Prevention and mitigation strategies to limit or control the consequences, extent, or severity of an incident.
- Incident management structures consistent with the Incident Command System.
- Identification of threats, hazards, and risks.
- Written emergency plans, processes, and procedures.
- Facilities and equipment to execute the program, including redundant capabilities.
- Mutual aid or agreements for maintaining effective interfaces.

TVA-SPP-35.000, *Emergency Management*, establishes roles and responsibilities for nonnuclear emergency management programs. TVA's Crisis and Emergency Management (C&EM) group is responsible for the establishment, maintenance, and implementation of TVA emergency management activities. Each organization is responsible for emergency management and response programs within their respective organizations, with oversight of emergency plans provided by C&EM.

According to TVA-SPP-35.200, emergency preparedness program coordinators establish their programs to adhere to the provisions of this SPP and ensure the programs are reviewed, maintained, and implemented to provide operational readiness for effective emergency response.

Site emergency response plans define roles and responsibilities of plant personnel, provide for emergency response facilities, identify user aids¹ for the incident management team, and detail emergency reporting and notification requirements. The fire brigade at coal plants serve as emergency responders, and fire brigade leaders are the initial incident commanders for on-site emergencies. Attachments to the site plans provide contact information for off-site emergency support, offsite TVA contacts, federal contacts, and on-site contacts.

Site plans are designed to be multi-hazards plans, with specific appendices providing details regarding specific emergency scenarios. For example, emergency plans detail notification protocols for fires, hazardous material releases (to include ammonia), and failures of on-site coal ash storage facilities. An emergency action plan is required by the Disposal of Coal Combustion Residuals from Electric Utilities (commonly referred to as the CCR Rule),² for certain ash storage facilities.

According to site plans, priorities for emergency reporting and notifications are to (1) warn others, (2) summon emergency responders, and (3) make notifications. The plans provide for emergency notification systems to be used to warn employees of emergency conditions. According to Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations §1910.165, "Employee alarm systems," employee alarm systems shall provide warning for necessary emergency action as called for in the emergency action plan, or for reaction time for safe escape of employees from the workplace or the immediate work area or both. OSHA requires employers to maintain all employee alarm systems in operating condition except when undergoing repairs or maintenance.

DHS also issued guidelines for the development and maintenance of emergency plans, commonly referred to as the *Comprehensive Preparedness Guide (CPG) 101*. *CPG 101* indicates plan reviews should be a recurring activity, and in no case should any part of the plan go for more than 2 years without being reviewed and revised. *CPG 101* advises planning teams to consider reviewing and updating the plan after certain events including major incidents and changes in operational resources (e.g., policy, personnel, organizational structures, management processes, facilities, equipment). The guidelines caution:

¹ Emergency plans provide for services to assist the incident management team in external communications such as the Government Emergency Telecommunications Service (GETS), Wireless Priority Service (WPS), and Web-Based Emergency Operations Center (WebEOC).

² The CCR Rule was adopted by the Environmental Protection Agency in response to a large coal ash spill at TVA's Kingston Fossil Plant in 2008. The Rule addresses the risks from the disposal of coal ash generated from the combustion of coal at electric utilities and independent power producers.

Plans must not be placed on a shelf to collect dust!

Whenever possible, training and exercise must be conducted for each plan to ensure that current and new personnel are familiar with the priorities, goals, objectives and courses of action.

Plan maintenance is also critical to the continued utility of the plans an organization has developed. A number of operations have had setbacks due to old information, ineffective procedures, incorrect role assignments, and outdated laws.

Due to the importance of an effective response in the event of an emergency, we conducted an evaluation of emergency preparedness and response (EPR) at TVA coal plants.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objectives of our evaluation were to determine if (1) emergency response plans at coal plants were up to date and (2) required systems were available and functional. The scope of our evaluation included the plans in effect as of August 1, 2018, and systems included in plans for alerting employees to emergency conditions and making emergency notifications. To achieve our objectives we:

- Reviewed the following SPPs, DHS guidance, and federal regulations to gain an understanding of the EPR process and requirements:
 - TVA-SPP-35.000, *Emergency Management*
 - TVA-SPP-35.100, *Agency Emergency Response Plan*
 - TVA-SPP-35.200, *Emergency Preparedness Programs*
 - PO-SPP-35.001, *Power Operations Emergency Plan*
 - PO-SPP-35.002, *Power Operations Emergency Response Teams Program*
 - Generation Construction, Projects and Services (GCP&S) SPP-27.6.1, *GCP&S Emergency Preparedness for CCR Units*
 - DHS guidance, including NIMS and *CPG 101*
 - OSHA 29 Code of Federal Regulations §1910.165, “Employee alarm systems”
- Interviewed PO, C&EM, and GCP&S personnel to gain an understanding of the EPR processes and systems.
- Obtained and reviewed emergency response plans for active TVA coal plants,³ in effect as of August 1, 2018, to identify (1) the most recent review dates, (2) contact information, and (3) required emergency response systems.

³ As of August 1, 2018, TVA had six active coal plants: Bull Run, Cumberland, Gallatin, Kingston, Shawnee, and Paradise.

- Obtained and reviewed emergency response plans for retired⁴ TVA coal plants in effect as of August 1, 2018, to identify the most recent review dates.
- Verified the accuracy of the contact information included in the active plant emergency response plans.
- Conducted site visits for a judgmentally selected sample of active coal plants to test availability and functionality of required systems. We ranked the active coal plants by population at risk in the event of an ammonia release, number of personnel onsite, coal ash wet storage volume, and power-producing capability in order to identify the plants at highest risk. Based on these factors, we visited three fossil plants: Cumberland, Gallatin, and Shawnee. For these sites, we:
 - Observed tests of required alerting and notification systems listed in the emergency response plans as provided in Appendix A.
 - Interviewed a selection of emergency responders⁵ to identify current or unresolved issues with alerting and notification systems.
- Reviewed access records for the GETS, WPS, and WebEOC to determine whether these user aids were available to appropriate users at active coal plants.
- Conducted keyword searches in Maximo⁶ and reviewed relevant condition reports (CR)⁷ as well as associated work orders to identify CRs generated related to emergency systems. We used the CRs to corroborate observations and reported issues in interviews.

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 AND RECOMMENDATIONS

We found the majority of site emergency plans for active and retired coal plants were not reviewed on a timely basis or were not up to date. We observed functional issues with emergency systems at two of three plants we visited, and we determined two user aids were not available. In addition, we identified issues with emergency lighting at administrative areas and planned incident command posts.

⁴ TVA retired four coal plants in the prior 5 years: Allen, Colbert, Johnsonville, and Widows Creek.

⁵ We judgmentally selected approximately 20 percent of responders. Plants self-selected from the emergency responders available the day we visited.

⁶ Maximo is TVA's work management system.

⁷ CRs are created to record how problems are found, analyzed, and resolved. We searched for conditions reported between January 1, 2017, and August 1, 2018, with keywords for systems related to our evaluation.

MOST EMERGENCY PLANS FOR COAL PLANTS WERE NOT REVIEWED ON A TIMELY BASIS OR WERE NOT UP TO DATE

We found the majority of emergency plans for active and retired coal plants were not reviewed on a timely basis or were not up to date. Specifically, we found (1) three of six emergency plans for active coal plants were not reviewed timely, and all six contained inaccurate contact information; (2) two of four retired plant emergency plans were not reviewed timely and were not executable due to changed plant conditions; and (3) 14 of 15 emergency action plans for coal combustion residuals (CCR) storage facilities were not reviewed on a timely basis.

Emergency Plans for Active Coal Plants Were Not Reviewed on a Timely Basis for Three Plants and Were Not Up to Date for Any of the Plants

TVA-SPP-35.200, *Emergency Preparedness Programs*, Section 3.7, requires annual review of site emergency plans. The PO Program Manager for EPR assigned action tracking items in Maximo to each plant as a reminder to review emergency plans in a timely manner. We reviewed emergency plans in effect for all coal plants as of August 1, 2018, and found three of six active plant plans (Gallatin, Shawnee, and Paradise Fossil Plants) had not been reviewed within the past year. Gallatin's plan was dated January 2017; Shawnee's plan was dated July 2017; and Paradise's plan was dated September 2016. Gallatin, Shawnee, and Paradise each marked the action to review the plans as complete in January 2018 even though they were not completed.

Due to the risk of incorrect information and role assignments in emergency plans negatively impacting a response, we called contact information listed in emergency response plans for active plants. All six emergency plans needed updates to contact information. Specifically, we found 30 percent of off-site support contacts and approximately 50 percent of on-site contacts had errors. The errors included incorrect phone numbers and contact names as well as phone numbers identified as not preferred by the organization for reporting emergencies. For example, we found:

- Incorrect phone numbers for TVA's Balancing Authority,⁸ an environmental spill response hotline, and the Federal Bureau of Investigation's Knoxville Office.
- Incorrect contacts for three plant managers as well as three operations managers.
- Nonpreferred phone numbers for reporting emergencies to the Tennessee Department of Environment and Conservation, TVA Security and Emergency Management, and TVA's Information Technology Customer Operations Center.

⁸ TVA's balancing authority ensures that power system demand and supply are finely balanced. This balance is needed to maintain the safe and reliable operation of the power system.

Recommendations

We recommend the Senior Vice President (SVP), PO, review and update (1) emergency plans at Gallatin, Shawnee, and Paradise and (2) contact information contained in active plant emergency response plans.

TVA Management's Comments – In response to our draft report, TVA management stated site emergency response plans have been updated at all coal plants and a cadence for future reviews has been established. See Appendix B for management's complete response.

Auditor Response – We concur with TVA management's actions and will verify completion prior to closing the recommendation.

Emergency Plans for Two Retired Coal Plants Were Not Reviewed on a Timely Basis and Were Not Executable

According to PO-SPP-35.001, *Power Operations Emergency Plan*, each facility has its own site-specific emergency plan. The PO Program Manager for EPR indicated nonoperating sites owned by PO also require site specific emergency plans. As discussed above, TVA-SPP-35.200, *Emergency Preparedness Programs*, Section 3.7, requires annual review of emergency plans. In recent years, TVA retired Allen, Colbert, Johnsonville, and Widows Creek Fossil Plants. We reviewed emergency plans in effect for all coal plants as of August 1, 2018, and found two of four retired plant plans were not reviewed on a timely basis and were not executable.

We found GCP&S maintains current plans for Colbert and Widows Creek; however, plans in place for Johnsonville and Allen were established by PO while the plants were operational. Specifically:

- Johnsonville's emergency response plan was effective as dated June 2016, and the plant ceased operations in December 2017.
- Allen's most recent emergency response plan was dated February 2017, and the plant ceased operations in March 2018.

We determined the plans for Allen and Johnsonville were not executable due to limited staffing maintained during the transition into decommissioning. According to both site emergency plans, fire brigade members are the first responders for fires and emergencies involving hazardous materials. In addition, according to the PO Program Manager for EPR, fire brigade members are also trained in CPR and First Aid and can respond to medical emergencies. Fire brigade leaders are identified as the incident commanders of on-site responses to emergencies. However, we determined as of September 2018, there were no qualified fire brigade leaders or members at any of the retired plants.

A TVA manager confirmed the plans were not executable due to limited staffing maintained during the transition into decommissioning. For example, the manager indicated at Allen there were approximately 15 employees at the site, which is manned 20 hours a day. At times, only a guard is on shift. Therefore, it

would be impossible to implement the emergency plan if the fire brigade is required for emergency response.

According to PO-SPP-35.002, *Power Operations Emergency Response Teams Program*, Section 3.2.1, when staffing levels no longer support a full fire brigade, the site may obtain written approval from senior management to revise the contract with the off-site fire department, and convert to emergency response liaison and incipient coverage. Once approved, PO-SPP-35.002 indicates a written transition plan should be developed.

We also identified a gap in responsibility for the site emergency plans during site transition from PO and GCP&S. According to the PO Program Manager for EPR, GCP&S should be responsible for plans when the plant ceases operations. However, GCP&S managers indicated they cannot take ownership of the emergency plan until the plant is formally transferred to their group, which is about 1 year after the plant ceases operation.

Recommendation

We recommend the SVP, PO, develop transitional emergency response plans for retired plants that are feasible with limited staff and designate the organization responsible for maintaining and executing the plans at each phase after operations cease.

TVA Management's Comments – In response to our draft report, TVA management stated site-specific transitional emergency response plans will be developed for retiring plants as plant closures are scheduled. See Appendix B for management's complete response.

Auditor Comments – We concur with TVA management's planned actions and will verify selected site-specific plans prior to closing the recommendation.

Emergency Action Plans Required for CCR Storage Facilities Were Not Reviewed on a Timely Basis

We found emergency action plans required for CCR storage facilities were not reviewed on a timely basis by TVA. GCP&S-SPP-27.6.1, *GCP&S Emergency Preparedness Program for CCR Units*, Section 3.1.3, indicates emergency action plans should have a documented annual review for appropriateness, accuracy, and adequacy to remain current. We reviewed emergency action plans for CCR storage facilities as of September 2018, and found there were no documented annual reviews for 14 of the 15 facilities requiring emergency action plans. We communicated our observations to GCP&S management in November 2018 and confirmed in February 2019 that GCP&S had revised the plans for all 15 facilities.

SOME SYSTEMS IN EMERGENCY RESPONSE PLANS WERE NOT AVAILABLE OR FUNCTIONAL

We found some systems in emergency response plans were not functional. Specifically, we observed functional issues with emergency systems at two of the

three plants we visited. Additionally, we found two user aids were unavailable to anticipated users at the coal plants.

Required Emergency Systems Were Not Functional

Emergency alerting and notification systems are critical in informing employees of life-threatening conditions. We reviewed emergency response plans for active plants to identify systems used to notify and alert employees or other responders. In total, we identified seven systems for testing at each site. Descriptions of the tested systems and their functions are provided in Appendix A.

We visited Cumberland, Gallatin, and Shawnee to observe tests of emergency response systems in September 2018. We observed functional issues with one system tested at Gallatin and five systems tested at Cumberland as shown in Table 1 below:

Emergency Response Systems Functioning as Intended			
System	Cumberland	Gallatin	Shawnee
Ammonia Alert	Yes	Yes	Yes
Chemical Alert	No	Yes	Yes
Fire Alert	No	Yes*	Yes*
General/Tornado Alert	Yes	Yes	Yes
Public Address (PA)	No	Yes	Yes
In-Plant Phones	No	No	Yes
Radios	No	Yes	Yes

*Auditor observed functional alerts; however, there were issues in the fire alert systems.

Table 1

To determine whether the observed functional issues had been previously identified, we searched Maximo for relevant CRs and found 52 related reports. Of those, 8 had no associated corrective actions and 14 had corrective actions outstanding. All but 1 with outstanding corrective actions were past due. While not all outstanding CRs corresponded directly to the issues we observed, three of the systems had issues identified during on-site testing that were previously reported to site management.

Chemical Alert

According to site emergency plans, if a chemical event or accident poses an immediate threat to the safety of employees and contractors onsite, the chemical alert should be sounded. At Cumberland, we observed failure of the chemical alert to properly announce in the following locations: dry fly ash silos, limestone unloading area, and southeast of the coal pile near the ammonia farm.

Due to the importance of the chemical alert system and its observed failure at Cumberland, our office issued a memo on October 4, 2018, alerting management and providing details of the observed functional issues. In response to our memo, TVA management stated (1) Cumberland's system was repaired as of October 23, 2018; (2) tests were conducted at remaining coal plants, and

deficiencies would be repaired and verified by November 30, 2018;⁹ and (3) a standard planned maintenance action was created for monthly chemical alert testing.

Fire Alert

According to site emergency plans, if a fire event or accident poses an immediate threat to the safety of employees and contractors onsite, the fire alert should be sounded. At Cumberland, we observed inoperable fire-alert speakers in certain locations. We also observed issues with the fire-alert systems at Gallatin and Shawnee. According to TVA personnel, an actual fire in certain areas would not result in an alert because the systems are being overridden to silence the constant false alerts.

In addition, we were informed at both Cumberland and Gallatin that there are false fire alerts.¹⁰ When exposed to false fire alerts, employees may become desensitized to the sound of the fire alert, slowing their reaction times.

PA

The PA system facilitates instructions from the control room in the event of emergency. For example, site emergency plans direct incident commanders to make announcements over the PA system to evacuate the facility in the event of a chemical spill, accident, fire, and/or natural disaster. At Cumberland, we observed inaudible PAs in certain locations. Also, we noted the PA system at Shawnee was functional as designed; however, unlike at Cumberland and Gallatin, the PA system was audible only within the powerhouse. This could limit information available to workers in remote areas of the plant in the event of emergency.

In-Plant Phones

Site emergency plans direct all personnel to dial the emergency phone number from a plant phone to inform the control room or shift operations supervisor upon discovery or suspicion of an emergency or security issue. While operations employees carry hand-held radios, according to operations personnel, the phone system would be the primary method of communication for certain maintenance employees. During our site walkdowns, we randomly tested phones for a dial tone in the powerhouse. At Cumberland, we found instances where phones in the powerhouse did not have a dial tone. The functional issue with powerhouse phones was confirmed in interviews where eight of nine responders indicated phones are not consistently operational.¹¹ At Gallatin, phones we tested were operational with the exception of the Unit 1/2 passenger elevator.

⁹ According to information provided by TVA, testing was performed but repairs are ongoing as of February 2019.

¹⁰ We corroborated false fire alerts at these sites through CRs 1314631, 1367992, and 1414734, which relate to this issue.

¹¹ We corroborated functional issues with powerhouse phones through CRs 1433492, 1433489, 1433493, 1433488, and 1433486, which directly relate to this issue.

Radios

Hand-held radios are a primary communication source in the event of an emergency. At Cumberland, we observed difficulty getting coverage for the radios in certain plant locations; in particular, the subbasement and the fire equipment coordinator office area. Interviewees reported such coverage issues were not limited to those areas. At Cumberland and Gallatin, employees also reported the need for replacement batteries at the site because they would not hold a charge throughout a shift.

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In summary, the functional issues we identified with the emergency response systems in conjunction with the number of outstanding and past due CRs indicate a lack of emphasis on keeping the systems functional. Without functional alerting and notification systems there is an increased risk to employee safety.

Recommendation

We recommend the SVP, PO, remediate functional issues with required emergency systems including the chemical alert, fire alert, PA system, phones, and radios.

TVA Management's Comments – In response to our draft report, TVA management stated functional issues identified will be assessed and a strategy will be established to address the existing nonfunctional emergency response systems by April 1, 2020. See Appendix B for management's complete response.

Auditor Response – TVA management subsequently informed us their intent was to complete their assessment and remediation of the nonfunctional emergency response issues by April 1, 2020. Based on this time frame, we concur with TVA management's planned actions.

User Aids Were Not Available to Personnel at Coal Plants

Site emergency response plans identify three user aids for the incident management team to make external notifications:

- GETS cards to prioritize calls made over landlines.
- WPS to prioritize calls made over cell phones.
- WebEOC for documenting and sharing incident information logs.

We did not test functionality for these systems because they are not owned or maintained by TVA. Therefore, we reviewed the three systems to determine if they were available for anticipated users at the six active coal plants and found GETS was unavailable at four plants and WPS was unavailable at five plants.

For small events, site emergency plans state the incident commander is normally the shift operations supervisor. In the case of a larger event, the plant manager may appoint a more experienced incident commander or assume the role

personally. We determined only 1 of 51 shift operation supervisors have an issued GETS card and no shift operations supervisors had a WPS-enabled device. Similarly, we identified only one of six active plant managers have an issued GETS card, or a WPS-enabled device.¹² Plants are provided a common username for the WebEOC system, which allows access to it for all relevant personnel.

The emergency response plans do not identify personnel responsible for maintaining access to the user aids. PO's Program Manager for EPR, who is responsible for coordinating GETS and WPS access with DHS, acknowledged difficulty in managing access to these systems, especially for WPS after TVA allowed employees to use their own cellular devices.

Recommendation

We recommend the SVP, PO, establish plant personnel responsible for maintaining GETS and WPS access and coordinate access through DHS.

TVA Management's Comments – In response to our draft report, TVA management stated GETS and WPS will be assigned for each site by November 1, 2019. See Appendix B for management's complete response.

Auditor Response – We concur with TVA management's planned actions.

ADDITIONAL INFORMATION

In addition to the findings discussed above, during our site visits, we found no emergency lighting in the corridors or stairways leading to exits in the administrative areas at all three sites. In addition, the incident command posts identified in the emergency plans often did not have adequate or functioning emergency lighting. For example, Shawnee's Electric Control Building Control Room lights were mostly broken or nonfunctioning. At Cumberland and Gallatin, there were no emergency lights installed in the Outage Command Centers. Illustrations below show inadequate lighting in administration areas (Illustration 1) and planned incident command posts (Illustration 2). Inadequate emergency lighting could impact the ability of plant management and employees to safely evacuate and coordinate response in the event of an emergency.

¹² The same plant manager had access to both systems.

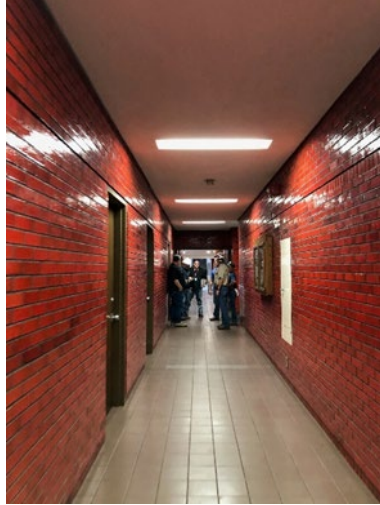


Illustration 1: First Floor Main Corridor at Cumberland



Illustration 2: Electric Control Building Control Room Emergency Lights

We discussed our observations related to inadequate and nonfunctioning lighting with the PO Fire Protection Program Managers. Program managers indicated corporate oversight of preventive maintenance work orders for emergency signage and lighting did not formally exist until October 2018. With revisions to TVA-SPP-18.121, *Fixed Fire Protection and Detection Subsystems – Inspection, Testing, and Maintenance*, PO Program Managers have responsibility for tracking compliance with the preventive maintenance of emergency signage and lighting.

Recommendation

We recommend the SVP, PO, evaluate the adequacy of emergency lighting in planned incident command posts and administrative areas of active plants, and make modifications where necessary.

TVA Management’s Comments – In response to our draft report, TVA management stated the adequacy of the emergency lighting in the identified command post[s] and administrative area[s] of the active coal plants will be evaluated against applicable governing standards and if necessary, modifications will be made to emergency lighting by April 1, 2020. See Appendix B for management’s complete response.

Auditor Response – We concur with TVA management’s planned actions.

Emergency Response Systems Functionally Tested	
Response System	Description/Purpose
Ammonia Alert (Sensors, Video Cameras, and Digital Control System Alert)	Ammonia is a strong irritant to eyes, nose, and throat. According to emergency response plans, the level considered immediately dangerous to life and health is 300 parts per million (ppm) and individuals need to be evacuated at 200 ppm. To provide early warning and to minimize exposure from releases, ammonia sensors are located in areas where releases are most likely to occur. If any of these sensors are triggered or if the concentration exceeds 30 ppm at any location for more than 5 minutes, a site-wide emergency alert will be declared. An alarm triggered by an ammonia sensor will also trigger an alarm on the Digital Control System monitor in plant control rooms. Sensors in and around the ammonia tank farm are connected to controls that automatically activate a water fogging system.
Chemical Alert	If a chemical event or accident poses an immediate threat to the safety of employees and contractors onsite, the chemical alert should be sounded.
Fire Alert	If a fire event or accident poses an immediate threat to the safety of employees and contractors onsite, the fire alert should be sounded.
General/ Tornado Alert	If a tornado or other event or accident poses an immediate threat to the safety of employees and contractors on site, the general/tornado alert should be sounded.
Public Address	If an event or accident poses an immediate threat to the safety of employees and contractors onsite, the public address system is used, in conjunction with the appropriate alarms, to provide detailed instructions to those in harm's way.
In-Plant Phones	Emergency response plans direct all personnel to dial the emergency phone number from a plant phone to inform the Control Room upon discovery or suspicion of an emergency or security issue.
Radios	Hand-held radios are a primary communication source in the event of an emergency.

April 5, 2019

David P. Wheeler, WT 2C-K

**MANAGEMENT RESPONSE - DRAFT EVALUATION 2018-15579 – COAL PLANT
EMERGENCY PREPAREDNESS AND RESPONSE**

This is in response to your memorandum dated March 7, 2019. First, we want to thank your team for the professional manner in which this audit was conducted. After review of the draft evaluation, we are providing our response to the Recommendations regarding Coal Plant Emergency Preparedness and Response.

Recommendations

1. We recommend the Senior Vice President (SVP), PO, review and update (1) emergency plans at Gallatin, Shawnee, and Paradise and (2) contact information contained in active plant emergency response plans.

Response

Site emergency response plans have been updated at all coal plants. A cadence for future reviews has been established.

2. We recommend the SVP, PO, develop transitional emergency response plans for retired plants that are feasible with limited staff and designate the organization responsible for maintaining and executing the plans at each phase after operations cease.

Response

Site-specific transitional emergency response plans will be developed for retiring plants.
Owner - William Rose
Due Date - As plant closures are scheduled

3. We recommend the SVP, PO, remediate functional issues with required emergency systems including the chemical alert, fire alert, PA system, phones, and radios.

Response

The functional issues identified will be assessed and a strategy will be established to address the existing non-functional emergency response systems as identified in the draft report which are the chemical alert, fire alert, PA system, in-plant phones and radio systems.

Owner - Curtis Rodenhaber
Due Date - April 1, 2020

David P. Wheeler
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4. We recommend the SVP, PO, establish plant personnel responsible for maintaining GETS and WPS access and coordinate access through DHS.

Response

GETS and WPS will be assigned for each site.
Owner - William Rose
Due Date - November 1, 2019

5. We recommend the SVP, PO, evaluate the adequacy of emergency lighting in planned incident command posts and administrative areas of active plants, and make modifications where necessary.

Response

The adequacy of the emergency lighting in the identified incident command post and administrative area of the active coal plants will be evaluated against applicable governing standards and if necessary, modifications will be made to emergency lighting in planned incident command posts and administrative areas of active coal plants.
Owner - Todd Butler
Due Date - April 1, 2020

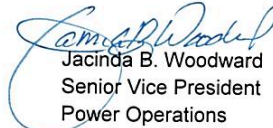
6. Fourteen of fifteen emergency action plans required for coal combustion residuals storage facilities were not reviewed on a timely basis.

Response

All Generation Construction Projects & Services and Facilities Management emergency action plans have been updated.

Thank you for allowing us to provide these comments. If you need additional information, please let us know.

Robert M. Deacy
Senior Vice President
Generation Construction Projects &
Services and Facilities Management
LP 5D-C


Jacinda B. Woodward
Senior Vice President
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LP 3K-C

cc: See Page 3

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