



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

July 20, 2021

Jason T. Regg  
Jacinda B. Woodward

**REQUEST FOR MANAGEMENT DECISION – EVALUATION 2020-15754 – COAL PLANT INDUSTRIAL HYGIENE**

Attached is the subject final report for your review and management decision. Your written comments, which addressed your management decision and actions planned for 6 of the 11 recommendations, have been incorporated into the report. Please advise us of your management decision in response to the remaining recommendations within 60 days from the date of this report. 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  
Assistant Inspector General  
(Audits and Evaluations)

MHP:FAJ  
Attachment

cc (Attachment):

TVA Board of Directors  
James R. Dalrymple  
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Jill M. Matthews  
Donald Moul  
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OIG File No. 2020-15754



Office of the Inspector General

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# *Evaluation Report*

To the Director, Safety and  
the Senior Vice President,  
Power Operations

# COAL PLANT INDUSTRIAL HYGIENE

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Evaluation Auditor  
Meghan H. Petty

Evaluation 2020-15754  
July 20, 2021

## **ABBREVIATIONS**

AL	Action Level
CFR	Code of Federal Regulations
IH	Industrial Hygiene
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limits
PO	Power Operations
TSP	Tennessee Valley Authority's Safety Procedure
TVA	Tennessee Valley Authority

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MEMORANDUM DATED JULY 14, 2021, FROM JASON T. REGG AND  
JACINDA B. WOODWARD TO DAVID P. WHEELER



# Evaluation 2020-15754 – Coal Plant Industrial Hygiene

## EXECUTIVE SUMMARY

### Why the OIG Did This Evaluation

According to the Occupational Safety and Health Administration, one of the root causes of workplace injuries, illnesses, and incidents is the failure to identify or recognize hazards that are present or could have been anticipated. The Tennessee Valley Authority's (TVA) industrial hygiene (IH) program is intended to identify, evaluate, and control health hazards to which TVA employees may be exposed in a timely manner.

Due to the risk of worker exposure to health hazards at TVA generation facilities, we performed evaluations of coal, gas, and hydro plant IH. This report summarizes our evaluation of IH at coal plants.<sup>i</sup> The objectives of this evaluation were to determine if (1) health hazards were identified and evaluated, and (2) appropriate actions were taken by TVA management when adverse conditions were identified.

### What the OIG Found

We found TVA's IH planning and assessment process had weaknesses that resulted in some hazards not being identified and evaluated. Specifically, we identified the following IH process weaknesses: (1) TVA relied on limited information to identify health hazards; (2) there was no formal evaluation of the risks posed by hazards identified; (3) IH plans did not prioritize hazards for control; and (4) incomplete monitoring efforts, which allowed for misalignment between plans and exposure assessments as well as limited coverage for retiring plants.

We also found TVA did not take appropriate actions to address some adverse conditions identified during assessments. We determined actions were not taken to address four occurrences of elevated silica.<sup>ii</sup> We also determined some employees were not notified of hazard exposures or actions taken to address their exposures, as required by the Occupational Safety and Health Administration. In addition, we identified opportunities for improvement related to handling of IH issues in the contractor population.

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<sup>i</sup> Our evaluations, *Gas Plant Industrial Hygiene* and *Hydro Plant Industrial Hygiene*, will be reported under Evaluations 2020-15755 and 2020-15756, respectively.

<sup>ii</sup> According to OSHA, crystalline silica is a common mineral found in the earth's crust, and exposure to silica can result from cutting, sawing, grinding, drilling, and crushing stone, rock, concrete, brick, block, and mortar. Breathing in very small crystalline silica particles ("respirable crystalline silica") may cause multiple diseases, including silicosis, lung cancer, chronic obstructive pulmonary disease, and kidney disease. According to TVA, silica is present at coal plants in coal byproducts (such as ash and dust) as well as limestone used in pollution control systems.



# Evaluation 2020-15754 – Coal Plant Industrial Hygiene

## EXECUTIVE SUMMARY

### What the OIG Recommends

We recommend TVA management take actions regarding (1) IH planning, (2) silica exposures, (3) employee exposure notifications, and (4) handling of IH issues in the contractor population. Our detailed recommendations are listed in the body of this report.

### TVA Management Comments

Prior to issuing their formal response, TVA management reviewed the draft report and provided informal comments that have been incorporated into the final report as appropriate. In their formal response, TVA management provided planned actions to address 6 of the 11 recommendations. See the Appendix for TVA management's complete response.

### Auditor's Response

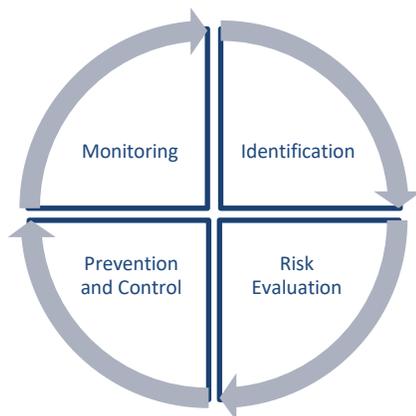
We concur with the planned actions that were provided to address 6 of the recommendations.

## **BACKGROUND**

According to the Occupational Safety and Health Administration (OSHA), industrial hygiene (IH) is the science of protecting and enhancing the health and safety of people at work and in their communities. One of the root causes of workplace injuries, illnesses, and incidents is the failure to identify or recognize hazards that are present or could have been anticipated. Therefore, a critical element of any effective safety and health program is a proactive, ongoing process to identify and evaluate such hazards.

OSHA's *Recommended Practices for Safety and Health Programs* provides a framework for addressing safety and health issues, which include identification, assessment, prevention, control, and monitoring of hazards. OSHA recommends addressing the hazards with greatest risk first, but employers have an ongoing obligation to control all serious recognized hazards and to protect workers. A risk assessment helps employers understand hazards in the context of their own workplace and prioritize hazards for permanent control.

**Illustration 1: Risk Assessment Model  
Based on OSHA's Recommended Practices**



Source: OIG Created

Illustration 1 provides a high-level summary of the steps that OSHA recommends in the form of a risk assessment model. First, employers should identify and document all known and suspected hazards. After identification, OSHA recommends understanding and evaluating the hazards identified and the types of incidents that could result from worker exposure to those hazards. Then, employers should prioritize hazards for prevention and control as well as develop, implement, and update a hazard control plan.<sup>1</sup> Once implemented, the program should be monitored periodically to identify needed program improvements.

According to OSHA, an ongoing assessment

of plant hazards is necessary as work environments and processes change, equipment or tools become worn, maintenance is neglected, or housekeeping practices decline.

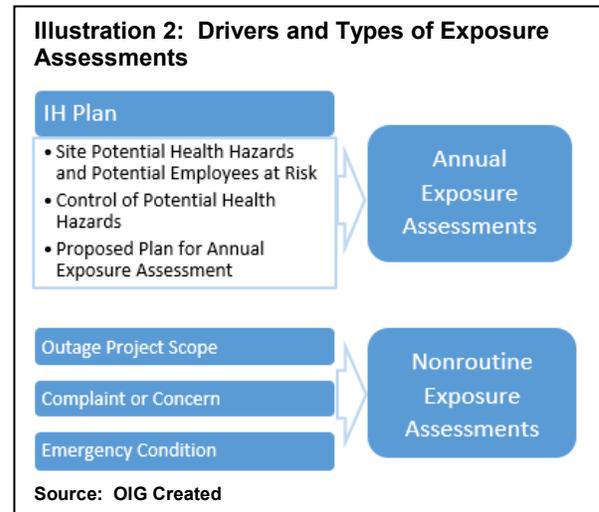
### **TVA's IH Program**

The Tennessee Valley Authority's (TVA) Safety Procedure (TSP) 18.900, *Implement Industrial Hygiene Activities*, is intended to provide a (1) process for identifying, evaluating, and controlling health hazards to which TVA employees may be exposed in a timely manner and (2) framework for planning, budgeting, prioritizing, executing, and evaluating IH activities, strategies, and services. In addition, TVA has IH safety

<sup>1</sup> According to OSHA, a hazard control plan describes how the selected controls will be implemented.

procedures for individual health hazards such as arsenic, asbestos, extreme heat, hexavalent chromium, lead, noise, and silica.<sup>2</sup>

According to TVA, annual IH plans are developed and executed to anticipate, recognize, evaluate, and control workplace conditions that may cause illness. As shown in Illustration 2, according to the IH program manager, annual exposure assessments are conducted based on the annual IH plan and are designed to assess normal conditions at the plants. The IH plans include a list of potential site hazards and employees at risk, controls for the identified potential health hazards, and a proposed testing plan for the annual exposure assessment. In addition, according to the IH program manager, TVA managers, contractors, or other personnel may request IH assessments to address nonroutine



hazards such as specific hazards related to outage projects, complaints or concerns, or emergency conditions. TVA established contracts with vendors to perform IH assessments that document monitoring performed, results, and recommendations. TVA plant management is responsible for addressing findings and recommendations as well as tracking actions taken to satisfy IH vendor recommendations and exposure investigations.

As of January 1, 2017, TVA operated 8 coal plants: Allen Fossil Plant, Bull Run Fossil Plant, Cumberland Fossil Plant, Gallatin Fossil Plant, Johnsonville Fossil Plant, Kingston Fossil Plant, Shawnee Fossil Plant, and Paradise Fossil Plant. TVA provided 167 IH assessments (18 routine and 149 nonroutine) conducted between January 1, 2017, and June 30, 2020, at coal plants. In that time frame, TVA closed 3 coal plants: Johnsonville (December 2017), Allen (June 2018), and Paradise (February 2020).

Due to the risk of worker exposure to health hazards at TVA generation facilities, we performed evaluations of coal, gas, and hydro plant IH. This report summarizes our evaluation of IH at coal plants.<sup>3</sup>

<sup>2</sup> According to OSHA, crystalline silica is a common mineral found in the earth's crust, and exposure to silica can result from cutting, sawing, grinding, drilling, and crushing stone, rock, concrete, brick, block, and mortar. Breathing in very small crystalline silica particles ("respirable crystalline silica") may cause multiple diseases, including silicosis, lung cancer, chronic obstructive pulmonary disease, and kidney disease. According to TVA, silica is present at coal plants in coal byproducts (such as ash and dust) as well as limestone used in pollution control systems.

<sup>3</sup> The other evaluations, *Gas Plant Industrial Hygiene* and *Hydro Plant Industrial Hygiene*, will be reported under Evaluations 2020-15755 and 2020-15756, respectively.

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

The objectives of this evaluation were to determine if (1) health hazards were identified and evaluated, and (2) appropriate actions were taken by TVA management when adverse conditions are identified. The scope of the evaluation was coal plant IH assessments performed and potential hazards identified from January 1, 2017, to June 30, 2020. To achieve our objectives, we:

- Reviewed relevant OSHA regulations and guidance to gain an understanding of required and recommended practices.<sup>4</sup>
- Reviewed related TVA safety procedures, including:
  - TVA-TSP-18.900, *Implement Industrial Hygiene Activities*
  - TVA-TSP-18.902, *Arsenic*
  - TVA-TSP-18.903, *Asbestos Management and Exposure Control*
  - TVA-TSP-18.906, *Heat Stress*
  - TVA-TSP-18.908, *Hearing Conservation*
  - TVA-TSP-18.909, *Lead*
  - TVA-TSP-18.913, *Silica*
  - TVA-TSP-18.915, *Hexavalent Chromium*
  - TVA-TSP-18.917, *Hazard Communication*
  - TVA-SPP-18.004, *Contractor Safety Management*
- Interviewed Safety, Power Operations, and IH vendor personnel to gain an understanding of IH regulations, programs, and processes.
- Conducted keyword searches or obtained information from various sources related to employee concerns or issues,<sup>5</sup> and reviewed recordable and serious injuries data from TVA's medical case management system to detect any unidentified IH hazards.
- Conducted an employee survey to (1) determine if hazards identified in IH plans reflected working environments encountered by employees and (2) gain feedback about employee satisfaction and potential gaps in IH program effectiveness. To conduct the survey, we judgmentally selected five site medical personnel and ten chairpersons of site health and safety committees. We also selected a statistical, random sample 248 from the remaining 894 coal plant employees. We obtained 88 responses, a 33-percent response rate. We selected the sample using rate of occurrence sampling with a 95-percent confidence level. The achieved precision

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<sup>4</sup> OSHA's *Recommended Practices for Safety and Health Programs* include seven core program elements. Our evaluation relates to "hazard identification and assessment," "hazard prevention and control," and "program evaluation and improvement" core elements. Additional program elements such as "management leadership," "worker participation," "education and training," and "communication and coordination for host employers, contractors, and staffing agencies" were not within the scope of this evaluation.

<sup>5</sup> Employee concerns or issues were obtained from the Office of the Inspector General's confidential connection for reporting fraud, waste, and abuse (EmPowerline), nonnuclear employee concerns, OSHA complaints, and condition reports. Condition reports document how problems were found, analyzed, and fixed in TVA's corrective action program.

- was outside our desired range; therefore, we did not project the results of the sample to the population.
- Reviewed all 24 annual IH plans developed during the scope of our evaluation to determine health hazards identified by TVA.
  - Reviewed the 167 assessment reports and identified 81 contained both adverse conditions and recommendations from the IH vendors. For recommendations issued in response to adverse conditions, we corresponded with safety consultants and other relevant personnel to identify actions taken by TVA to remediate the conditions. We requested additional documents to verify actions were completed, as appropriate.
  - Compared the assessment reports to listed hazards identified by TVA to determine if all identified hazards were evaluated.
  - Selected 5 employees with documented exposure to hazards and requested medical files be reviewed to determine if letters were included in the files. In addition, we followed up with the 5 employees to determine if they were notified by TVA of their hazard exposures.

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 determined (1) TVA's IH planning and assessment process had weaknesses that resulted in some hazards not being identified and evaluated, and (2) TVA did not take appropriate actions when some adverse conditions were identified during assessments. In addition, we identified opportunities for improvement related to handling of IH issues in the contractor population.

Prior to issuing their formal response, TVA management reviewed the draft report and provided informal comments that have been incorporated into the final report as appropriate.

### **IH PROCESS WEAKNESSES RESULTED IN SOME HAZARDS NOT BEING IDENTIFIED AND EVALUATED**

We determined TVA's IH planning and assessment process had weaknesses that resulted in some hazards not being identified and evaluated. As shown on page 1, the planning process should identify all hazards and evaluate risks associated with the hazards to develop a hazard control prevention plan. The stated purposes of TVA's IH annual plans are to determine the extent of employee exposure to hazards and determine controls to reduce exposures to "acceptable levels of risk." However, TVA does not conduct a formal, documented, risk assessment of health hazards at its coal plants; rather, risks are considered informally to prioritize hazards for annual exposure assessments. As a result, we found certain hazards were not identified and/or evaluated.

We identified the following IH process weaknesses: (1) TVA relied on limited information to identify health hazards, (2) there was no formal evaluation of the risks posed by hazards identified, (3) IH plans did not prioritize hazards for control, and (4) incomplete monitoring efforts allowed misalignment between plans and exposure assessments as well as limited coverage for retiring plants.

### **TVA Used Limited Information to Identify Health Hazards**

To identify hazards, OSHA recommends employers collect existing information about workplace hazards, inspect the workplace for safety hazards, identify health hazards, conduct incident investigations, and identify hazards associated with emergency and nonroutine situations. OSHA also indicates workers are often best positioned to identify safety and health concerns and program shortcomings, such as emerging workplace hazards, unsafe conditions, close calls/near misses, and actual incidents. TVA maintains information from hazardous chemical lists, employee complaints and concerns, condition reports, and injuries that could help identify hazards. These sources were not cited by safety consultants or the IH program manager as information used to identify health hazards at coal plants. TVA's identification process consisted primarily of input from the IH program manager and safety consultants.

We interviewed safety consultants and reviewed several sources of existing information recommended by OSHA. We also conducted an employee survey to assess the state of the IH program and to obtain feedback on specific conditions or areas at the plants. Eighty percent of survey respondents indicated that TVA adequately protected employees from health hazards. However, we identified additional health hazards that were not documented as hazards in IH plans including:

- A biological hazard (mold).
- Physical hazards (extreme heat and radiation<sup>6</sup>).
- Chemical hazards (ammonia, hydrogen, nitric acid, nitrogen oxide, and pebble lime).

In addition, hazardous chemical lists identified between 150 and 1,500 chemicals at each site, but do not indicate whether the chemicals would pose risks to employee health. It should be noted two IH-related employee injuries in our evaluation scope involved pebble lime and nitric acid, which were not listed in the IH plans.

### **TVA Did Not Conduct a Formal Risk Evaluation of IH Hazards**

After identification, OSHA recommends evaluating each hazard by considering the (1) severity of potential outcomes and likelihood that an event or exposure will occur and (2) number of workers who might be exposed. TVA's IH plans list potential hazards, location of hazards, and potential exposed employees. However, the plans do not evaluate the severity and likelihood of an event or exposure from the hazard. While the IH program manager indicated some of the above-identified hazards were considered low risk, our review of injuries, discussions with safety consultants, and

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<sup>6</sup> A respondent to our survey indicated employees may interact with radiation in equipment, meters, and other sources used onsite. Radiation is also naturally occurring in coal. According to the IH program manager, TVA's previous monitoring of coal ash indicated the radiation present was within regulated limits.

input from the employee survey indicate the risks may be higher. For example, ammonia was considered low risk by the program manager; however, safety consultants noted it as one of the most significant risks at certain sites. Potential leaks of ammonia, nitrogen, and sulfur dioxide were also reported in the survey as concerns by employees at Bull Run.

### Plans Did Not Prioritize Hazards

According to OSHA, an effective plan would prioritize the hazards based on evaluated risk, addressing serious hazards first. However, as discussed in the previous section, TVA does not conduct a formal risk evaluation of the hazards, and therefore, the plans do not prioritize the hazards for control.

### TVA's Monitoring Efforts Are Incomplete

OSHA recommends a program evaluation be conducted at least annually to monitor how well the program is performing and identify any needed improvements. TVA's monitoring efforts are limited to annual planning and exposure assessments. We found TVA's annual exposure assessments were misaligned with identified hazards in the IH plans, and the monitoring efforts lacked coverage of certain retiring plants as they neared closure. These areas of weakness may have been detected if a program evaluation were conducted periodically.

#### Annual Exposure Assessments Did Not Align With IH Plans

TVA generally conducted assessments at its operational coal plants annually; however, the hazards assessed did not always align with the hazards identified in IH plans. For example, while the IH plans included mercury as a hazard, it was not assessed at any plant during our evaluation scope. Also, the following hazards were assessed that were not identified in the plans: ammonia, calcium oxide, fiberglass, formaldehyde, hydrogen (ventilation), mold, and refractory ceramic fibers.

#### Limited IH Coverage for Retiring Plants

Between January 1, 2017, and June 30, 2020, TVA closed 3 coal plants: Allen, Johnsonville, and Paradise. We found TVA did not consistently plan for or assess health hazards for retiring plants as they neared closure.<sup>7</sup> Table 1 below, summarizes closure and assessment dates for retired plants.

**Table 1: Closure and Assessment Dates**

Coal Plant	Date of Closure Announcement	Official Closure Date	Most Recent IH Plan (Fiscal Year)	Most Recent Annual Assessment
Allen	August 2014	Jun 2018	2016	July 2016
Johnsonville	April 2011	Dec 2017	2018	May 2017
Paradise	Feb 2019	Feb 2020	2018	October 2018

As shown above, Allen did not consistently have annual IH plans or assessments leading up to the plant retirement. Paradise did not receive annual plans or annual

<sup>7</sup> According to Generation Projects and Fleet Services, responsibility for safety is transferred to Generation Construction after closure. Generation Projects and Fleet Services oversees decommissioning and demolition activities including adherence to contractor safety and health plans as well as periodic IH assessments.

assessments in 2019 or 2020 despite continuing to generate power and maintaining most of its staffing.<sup>8</sup>

TVA plans to continue reducing its coal fleet, with Bull Run slated for closure in December 2023, and the remaining plants retiring by 2035. In response to our employee survey, we received feedback from two respondents regarding hazardous conditions to employee health while Bull Run is generating. Plant management was both aware of and taking actions to mitigate the identified hazards.<sup>9</sup> The risk of employees encountering health hazards at retiring plants may be exacerbated by degrading equipment and changing processes as the plant closure date nears.

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Weaknesses in TVA's planning and assessment process are likely due to the time-intensive nature of OSHA's recommended practices, which could be difficult to achieve with the breadth of responsibility for the 1 full-time IH employee. According to the IH program manager, he currently manages the IH plans for approximately 50 coal, gas, and hydro generating plants; 3 nuclear generating plants; and other business units such as Transmission and Facilities, when necessary. According to safety personnel, when the current program was developed, TVA anticipated four IH positions. We reviewed IH staffing since 2010 and found two positions were staffed at one point, but one was lost to attrition when a manager retired in 2016.

Limited identification, evaluation, planning, and monitoring of health hazards could leave TVA employees and contractors vulnerable to potentially overlooked or insufficiently mitigated health hazards.

### **Recommendations**

We recommend the Director, Safety:

- Conduct a formal, documented, risk assessment of health hazards at coal plants that includes robust hazard identification, risk evaluation, and prioritization and update IH plans as necessary.

**TVA Management's Comments** – Corporate Safety will implement this recommendation by documenting the process, tools, and subject matter expertise used by TVA's IH program manager to conduct hazard identification, risk evaluation, and prioritization of health hazards. See the Appendix for TVA management's complete response.

- Periodically monitor the effectiveness of the IH program to include the alignment of hazards and exposure assessments.

**TVA Management's Comments** – Corporate Safety will implement this recommendation by documenting the current process and incorporating relevant changes in the next TVA-TSP-18.900 revision. See the Appendix for TVA management's complete response.

<sup>8</sup> Paradise Units 1 and 2 were shuttered in 2017 and Unit 3 retired in February 2020.

<sup>9</sup> We did not verify actions for all identified hazards. We received details of actions taken for the hazards we deemed to be the highest risk.

- Evaluate the broad job responsibilities and duties of IH and determine if staffing levels are appropriate to ensure proper coverage and effective implementation of needed program changes.

**TVA Management's Comments** – Corporate Safety agrees with this recommendation. See the Appendix for TVA management's complete response.

We recommend the Senior Vice President, Power Operations (PO), in coordination with Director, Safety:

- Develop a plan for monitoring and controlling significant health hazards at retiring plants.

**TVA Management's Comments** – Power Operations and Corporate Safety agree with the recommendation. See the Appendix for TVA management's complete response.

**Auditor's Comments** – We agree with TVA management's planned actions.

## **TVA DID NOT APPROPRIATELY ADDRESS SOME ADVERSE CONDITIONS IDENTIFIED DURING ASSESSMENTS**

We determined TVA did not take appropriate actions to address some adverse conditions identified during assessments. Specifically, TVA did not take actions to address four occurrences of elevated silica found in annual exposure assessments. We also determined some employees were not notified of hazard exposures or actions taken to address their exposures, as required by OSHA.

### **TVA Did Not Take Appropriate Actions to Address Four Silica Exposures**

Based on our review of available information and narratives of actions taken, we found TVA did not take appropriate actions to address findings of elevated silica in 4 assessments. When an employee has an exposure above regulated levels, TVA-TSP-18.913, *Silica*, requires use of controls until exposures are controlled to below action level (AL).<sup>10</sup> Where controls are not sufficient to reduce exposures below PEL, OSHA requires respirators to be worn by personnel. In addition, any employee who is or may be exposed 30 days or more a year must be included in a medical surveillance program.

We reviewed all 167 IH assessment reports, of which 81 contained adverse conditions and corresponding recommendations. We asked safety consultants to identify actions taken to address the 31 assessments with recommendations to TVA<sup>11</sup> and provide documentation, where available. Although limited documentation exists to provide evidence of actions taken, safety consultants provided narratives of actions taken based on their recollection of events.

<sup>10</sup> AL means a concentration for a specific substance that initiates certain required activities such as exposure monitoring and medical surveillance. Permissible exposure limit (PEL) means a concentration for a specific substance to which an employer shall ensure no employee is exposed.

<sup>11</sup> The remaining 50 assessments contained recommendations to contract employers.

We found TVA did not take the actions recommended by IH vendors in response to silica exposures and/or in some cases did not take actions according to OSHA regulations.

- A sample from Cumberland in September 2017 exceeded the silica AL for a heavy equipment operator moving limestone. The IH vendor issued recommendations that included (1) reducing exposures to or below the AL prior to June 2018 and (2) repeating sampling at 6-month intervals in accordance with regulations until results are shown to be below the AL. TVA indicated there was no explanation for the exceedance and no additional control measures (such as respirator use while conducting the work activity) were put in place, but the cab where the operator worked was cleaned in 2021. In addition, TVA did not resample heavy equipment operators' exposure to silica as recommended.
- A sample from Paradise in July 2017 exceeded the silica PEL after likely exposure to coal ash. The IH program manager indicated TVA did not conduct additional sampling or implement controls as recommended by the IH vendor because 2 of 3 units were shut down and it was not a prudent use of resources to continue sampling. However, the TVA Board of Directors did not approve the Paradise plant closure until February 2019.
- A sample from Kingston in June 2018 exceeded the silica PEL after likely exposure during welding and grinding activities. A condition report related to the event indicated additional ventilation was needed. According to the site safety consultant, a local ventilation exhaust system was purchased in 2018, but was never installed. A second ventilation system was purchased in March 2021. According to the safety consultant, the new system was installed in May 2021.
- A sample from Kingston in August 2019 exceeded the silica PEL after likely exposure to coal dust. PO personnel acknowledged the employee was working in "a dusty area of the plant" but also questioned whether the employee contaminated the monitoring device since the reading was over six times the PEL. The safety consultant and IH program manager concluded the sample was an outlier based on comparison to other samples in the area and after an interview with the affected employee. While the IH assessment did not include a recommendation to resample, OSHA regulations require additional sampling to demonstrate future employee exposures below AL. We found no additional sampling was conducted for silica exposure in this area or for this work activity.

As of February 2021, TVA did not have any employees in a medical surveillance program as a result of silica exposures. Due to the lack of repeated sampling, it is unclear whether employees conducting the work activities above continued to be exposed 30 days or more and should have been medically surveilled.

Insufficiently mitigated health hazards may result in employee injuries and illnesses. According to the IH program manager, TVA will assess worse-case conditions for all dust exposures (to include silica) in summer 2021 and will include heavy equipment operators.

## **Some Employees Were Not Notified Of Hazard Exposures or Actions Taken to Address Their Exposures**

We determined some employees were not notified of hazard exposures or actions taken to address their exposures, as required by OSHA. OSHA requires that employers provide written notice to employees (1) when exposed to certain health hazards and (2) of actions to remedy exceedances.<sup>12</sup> TVA-TSP-18.900 includes provisions for a signed notification letter to be placed in the employee's medical file, and tracking in TVA's condition report system of actions taken in response to exposure investigations.

We selected 5 employees with documented exposure to hazards within the past 3 years and requested medical files be reviewed to determine if employee exposure letters were included in the files. According to a TVA nurse practitioner, none of the employees' exposures were documented in their medical records. In addition, we reached out to 5 employees to confirm their receipt of notification and found 2 were not notified, 2 were notified, and 1 could not recall. A Safety employee indicated the requirement to retain letters in the employee medical file was included in the safety procedure to drive accountability.

We also found no indication TVA is providing employees with written notice of actions to remedy exceedances. Such information is not included in notification letters provided by the IH vendor, and there is no requirement in TVA-TSP-18.900 to notify the employee of the actions taken to remedy exceedances through other means.

Without evidence that TVA met its regulatory requirement to notify employees of exposures and actions taken, TVA may be subject to potential violations, fines, and a reduction in its ability to controvert future workers compensation or other medical claims.

### **Recommendations**

We recommend the Director, Safety:

- Align TVA-TSP-18.900 and/or the appropriate hazard specific procedures with regulatory language to address written notice to employees of actions taken to address exposures.

**TVA Management's Comments** – Corporate Safety agrees with this recommendation. See the Appendix for TVA management's complete response.

We recommend the Senior Vice President, PO, in coordination with the Director, Safety:

- Assess work activities that can produce silica hazards at each of TVA's coal plants to identify any that would result in exposures above the AL and take appropriate actions to protect employees exposed.

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<sup>12</sup> Examples of regulations related to employee notifications include Title 29, Code of Federal Regulations (CFR) Part 1910, *Occupational Safety and Health Standards* (29 CFR §§ 1910.1026(d)(4)) regarding hexavalent chromium and (29 CFR §§ 1910.1053(d)(6)) regarding silica.

**TVA Management's Comments** – Power Operations and Corporate Safety agree with this recommendation. See the Appendix for TVA management's complete response.

- Reinforce the need to document exposure investigations, including actions taken or justifications when actions are not needed.

**TVA Management's Comments** – Power Operations and Corporate Safety agree with this recommendation. See the Appendix for TVA management's complete response.

- Take steps to include signed employee exposure letters in employee medical files.

**TVA Management's Comments** – Power Operations and Corporate Safety agree with this recommendation. However, Corporate Safety noted the specific language will be removed during the next TVA-TSP-18.900 revision to align with regulatory language. See the Appendix for TVA management's complete response.

**Auditor's Comments** – We agree with TVA management's planned actions.

## OPPORTUNITIES FOR IMPROVEMENT

We also identified opportunities for improvement related to handling of IH issues in the contractor population. Specifically, we identified opportunities for improvement related to clarifying responsibilities for (1) IH recommendations issued to contract employers, (2) exposure notifications for contract employees, and (3) TVA's monitoring of actions taken by contractors to address IH recommendations. Without providing clear responsibilities and oversight, TVA runs the reputational risk of being seen as a contributor to IH potential violations of laws and regulations and contractor health claims.

### IH Recommendations Issued to Contract Employers

Contract employers routinely use TVA's IH vendors to assess hazards at TVA coal plants, but the safety procedure does not establish protocols for communications between contract employers and TVA. More than half (95 of 167) of the assessments conducted at coal plants and stored in TVA's IH tracking system were issued to contract employers. TVA-TSP-18.900 does not require contractors to provide IH assessment reports and does not specifically provide guidance for TVA's handling of the documents or responsibilities regarding the assessments' findings and recommendations issued to contractors.

### Exposure Notifications for Contract Employees

We identified eight instances where contract employees were monitored and found to be exposed above ALs during TVA IH assessments. In five instances, TVA provided the assessment to the contract employer. In three instances, safety consultants indicated TVA directly contacted the contract employee. TVA-TSP-18.900 does not address this situation. However, according to TVA's Office of General Counsel, TVA would notify the contract employer, who would be responsible for notifying the contractor employees it manages.

### TVA's Monitoring of Contractor IH Recommendations

TVA-SPP-18.004, *Contractor Safety Management*, indicates contract employers assume direct responsibility for the safety and health of all personnel under its supervision, including subcontractors. We reviewed two of TVA's managed task contracts that use IH vendors for exposure assessments and noted TVA had clauses to provide for review of the safety and health practices. However, TVA personnel indicated TVA does not periodically audit, validate, or otherwise verify if contractors appropriately address recommendations from IH vendors.

### Recommendations

We recommend the Director, Safety:

- Revise TVA-TSP-18.900 to identify when TVA should receive IH exposure assessments issued to contractors as well as define associated responsibilities for any adverse conditions identified in such reports.

**TVA Management's Comments** – Corporate Safety will implement this recommendation in the next revision of the TSP to identify the situations in which TVA receives a copy of IH results and to clarify the responsibilities of the contractor and/or TVA in such a situation. See the Appendix for TVA management's complete response.

- Revise TVA-TSP-18.900 to require TVA notify contract employers of any contractor exposures identified by TVA's IH program.

**TVA Management's Comments** – Corporate Safety will implement this recommendation in the next revision of the TSP to make clear that the contractor is responsible for IH exposure assessments for contractor employees, and to provide a solution for situations in which contractor employee information is inadvertently captured when IH conducts assessments of TVA employees. See the Appendix for TVA management's complete response.

- Consider amending TVA-TSP-18.900 to require TVA conduct periodic monitoring of actions taken by contract employers to address adverse conditions identified in IH exposure assessments.

**TVA Management's Comments** – Corporate Safety agrees with the recommendation. Corporate Safety will work with Supply Chain to review TVA's contract oversight procedures and determine the best method of periodically monitoring how contractors are fulfilling their contractual obligations to address adverse conditions. See the Appendix for TVA management's complete response.

**Auditor's Comments** – We agree with TVA management's planned actions.

July 14, 2021

David P. Wheeler, WT 2C-K

CORPORATE SAFETY AND POWER OPERATIONS RESPONSE TO 30 DAY REQUEST FOR COMMENTS - DRAFT EVALUATION 2020-15754 - COAL PLANT INDUSTRIAL HYGIENE (IH)

TVA Corporate Safety and Power Operations would like to extend thanks to the OIG team that conducted this evaluation and for its review of Coal Plant Industrial Hygiene (IH). We trust that this time and effort will serve to improve TVA's efforts to help protect the health of workers at TVA's facilities.

In response to the OIG memorandum dated June 11, 2021, Corporate Safety and Power Operations have reviewed your draft evaluation and have the following comments and responses.

#### **Comments on the Evaluation**

##### IH Process Weaknesses Resulted in Hazards not Being Identified and Evaluated

TVA's safety program, which includes the industrial hygiene program, strives to develop and continuously improve a program that contains the necessary elements to identify and protect employees from hazards in the workplace. While TVA's industrial hygiene program is a very comprehensive subset of the TVA safety program, TVA realizes there is always room for improvement.

#### **Response to Recommendations**

Corporate Safety provides the following responses to the recommendations set forth in the evaluation.

##### IH Process Weaknesses Resulted in Hazards not Being Identified and Evaluated

The Director, Safety:

- Conduct a formal, documented risk assessment of health hazards at coal plants that includes robust hazard identification, risk evaluation, and prioritization and update IH plans as necessary.
  - Corporate Safety will implement this recommendation by documenting the process, tools, and subject matter expertise used by TVA's IH program manager to conduct hazard identification, risk evaluation, and prioritization of health hazards.

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- Periodically monitor the effectiveness of the IH program to include the alignment of hazards and exposure assessments.
  - Corporate Safety will implement this recommendation by documenting the current process and incorporating relevant changes in the next TVA-TSP-18.900 revision.
- Evaluate the broad job responsibilities and duties of IH and determine if staffing levels are appropriate to ensure proper coverage and effective implementation of needed program changes.
  - Corporate Safety agrees with this recommendation.

The Senior Vice President, Power Operations (PO), in coordination with the Director of Safety:

- Develop a plan for monitoring and controlling significant health hazards at retiring plants.
  - Power Operations and Corporate Safety agree with the recommendation.

TVA Did Not Appropriately Address Some Adverse Conditions

The Director, Safety:

- Align TVA-TSP-18.900 and/or the appropriate hazard specific procedures with regulatory language to address written notice to employees of actions taken to address exposures.
  - Corporate Safety agrees with this recommendation.

The Senior Vice President, Power Operations (PO), in coordination with the Director of Safety:

- Assess work activities that can produce silica hazards at each of TVA's coal plants to identify any that would result in exposures above the AL and take appropriate actions to protect employees exposed.
  - Power Operations and Corporate Safety agree with this recommendation.
- Reinforce the need to document exposure investigations, including actions taken or justifications when actions are not needed.
  - Power Operations and Corporate Safety agree with this recommendation.
- Take steps to include signed employee exposure letters in employee medical files.
  - Power Operations and Corporate Safety agree with this recommendation. However, Corporate Safety would like to note that this specific language will be removed during the next TVA-TSP-18.900 revision to align with regulatory language.

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Opportunities for Improvement

The Director, Safety:

- Revise TVA-TSP-18.900 to identify when TVA should receive IH exposure assessments issued to contractors as well as define associated responsibilities for any adverse conditions identified in such reports.
  - Corporate Safety will implement this recommendation in the next revision of the TSP to identify the situations in which TVA receives a copy of IH results when contractors use IH services through TVA's preferred vendors, and to clarify the responsibilities of the contractor and/or TVA in such a situation.
- Revise TVA-TSP-18.900 to require TVA to notify contract employers of any contractor exposures identified by TVA's IH program.
  - Corporate Safety will implement this recommendation in the next revision of the TSP to make clear that the contractor is responsible for IH exposure assessments for contractor employees, and to provide a solution for situations in which contractor employee information is inadvertently captured when IH conducts assessments of TVA employees.
- Consider amending TVA-TSP-18.900 to require TVA to conduct periodic monitoring of actions taken by contract employers to address adverse conditions identified in IH exposure assessments.
  - Corporate Safety agrees with the recommendation. Corporate Safety will work with Supply Chain to review TVA's contract oversight procedures and determine the best method of periodically monitoring how contractors are fulfilling their contractual obligations to address adverse conditions.

Thank you for the time to allow us to review and provide feedback on the draft evaluation.



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Director, Safety  
Resource Management & Operations Services



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