



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

August 20, 2021

Jason T. Regg  
Jacinda B. Woodward

**REQUEST FOR FINAL ACTION – EVALUATION 2020-15756 – HYDRO PLANT  
INDUSTRIAL HYGIENE**

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 Christopher E. Sheets, Senior Auditor, at (865) 633-7362 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)

CES:FAJ

Attachment

cc (Attachment):

TVA Board of Directors  
James R. Dalrymple  
Buddy Eller  
David B. Fountain  
T. Daniel Lunsford  
Jeffrey J. Lyash  
Jill M. Matthews  
Donald A. Moul  
Ronald R. Sanders II  
Michael D. Skaggs  
Kay W. Whittenburg  
OIG File No. 2020-15756



Office of the Inspector General

# *Evaluation Report*

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

## **HYDRO PLANT INDUSTRIAL HYGIENE**

---

Evaluation Auditor  
Christopher E. Sheets

Evaluation 2020-15756  
August 20, 2021

## **ABBREVIATIONS**

IH	Industrial Hygiene
OSHA	Occupational Safety and Health Administration
PO	Power Operations
TSP	Tennessee Valley Authority Safety Procedure
TVA	Tennessee Valley Authority

## **TABLE OF CONTENTS**

EXECUTIVE SUMMARY .....	i
BACKGROUND.....	1
OBJECTIVE, SCOPE, AND METHODOLOGY .....	2
FINDINGS AND RECOMMENDATIONS .....	4
IH PROCESS WEAKNESSES RESULTED IN SOME HAZARDS NOT BEING IDENTIFIED AND EVALUATED.....	4
TVA TOOK APPROPRIATE ACTIONS TO ADDRESS IDENTIFIED ADVERSE CONDITIONS; HOWEVER, EXPOSURES WERE NOT DOCUMENTED AS REQUIRED .....	9
OPPORTUNITIES FOR IMPROVEMENT .....	9

## **APPENDIX**

MEMORANDUM DATED AUGUST 12, 2021, FROM JASON T. REGG AND  
JACINDA B. WOODWARD TO DAVID P.WHEELER



# Evaluation 2020-15756 – Hydro 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 hydro 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 determined 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 identified hazards; (3) IH plans did not prioritize hazards; and (4) incomplete monitoring efforts allowed misalignment between procedures, plans, and exposure assessments.

We also determined TVA took appropriate actions to address adverse conditions, which were identified during assessments at hydro plants; however, TVA did not maintain employee notification records as required by internal procedures. In addition, we identified opportunities for improvement related to clarifying responsibilities for notification and monitoring of contractor actions taken to address IH recommendations.

### What the OIG Recommends

We made 9 recommendations to management regarding (1) IH planning, (2) IH annual assessments, (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.

<sup>i</sup> Our other evaluations, *Coal Plant Industrial Hygiene*, was reported under Evaluation 2020-15754, July 20, 2021, and *Gas Plant Industrial Hygiene*, will be reported under Evaluation 2020-15755.



# Evaluation 2020-15756 – Hydro Plant Industrial Hygiene

## EXECUTIVE SUMMARY

### TVA Management's Comments

In response to our draft report, TVA management provided additional information about the IH program and agreed to each of the 9 recommendations. See the Appendix for TVA management's complete response.

### Auditor's Response

We concur with the planned actions that were provided to address 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 includes 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.

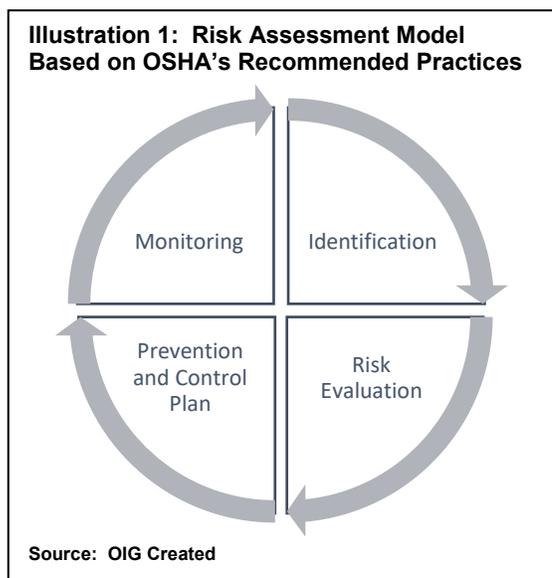


Illustration 1 provides a high-level summary of the steps that OSHA recommends in the form of a risk assessment model. First, employers should identify and document all known and suspected hazards. After identification, OSHA recommends understanding and evaluating the hazards identified and the types 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 procedures for individual health hazards

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

such as arsenic, asbestos, noise, extreme heat, hexavalent chromium, lead, and silica.

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

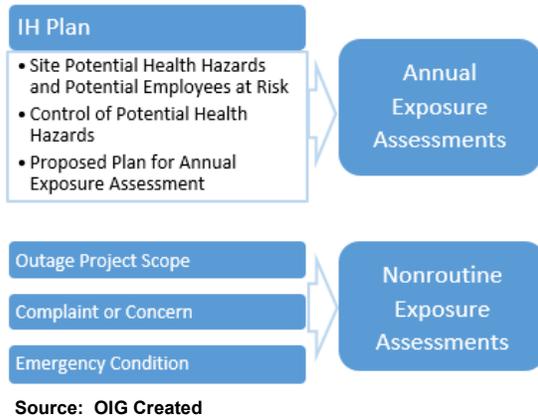
hazards such as specific hazards related to outage projects, complaints or concerns, or emergency conditions. TVA established contracts with vendors to perform IH assessments that document monitoring performed, results, and recommendations. TVA plant management is responsible for addressing findings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

As of January 1, 2017, TVA operated 29 power-generating dams and 1 pumped-storage plant that encompass TVA's hydro generation capabilities. Between January 1, 2017, and June 30, 2020, TVA performed or contracted for 78 routine (11) and nonroutine (67) IH assessments at 25 hydro plants. 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 hydro plants.<sup>2</sup>

## **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 were identified. The scope of the evaluation was hydro IH assessments performed and potential hazards identified from January 1, 2017, to June 30, 2020. To achieve our objectives, we:

**Illustration 2: Drivers and Types of Exposure Assessments**



<sup>2</sup> Our other evaluations, *Coal Plant Industrial Hygiene*, was reported under Evaluation 2020-15754, July 20, 2021, and *Gas Plant Industrial Hygiene*, will be reported under Evaluation 2020-15755.

- Reviewed relevant OSHA regulations and guidance to gain an understanding of required and recommended practices.<sup>3</sup>
- Reviewed related TVA safety procedures, including:
  - TVA-SPP-18.004, *Contractor Safety Management*
  - 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-18.916, *Respiratory Protection*
- Interviewed Safety, Power Operations (PO), and IH contractor 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>4</sup> and reviewed recordable and serious injury data from TVA’s medical case management system to detect any unidentified IH hazards.
- Reviewed all 12 IH plans prepared for hydro plants during our evaluation scope to determine health hazards identified by TVA.
- Conducted an employee survey to (1) determine if hazards identified in IH plans reflect working environments encountered by employees and (2) gain feedback about employee satisfaction and potential gaps in IH program effectiveness. We received data and feedback from 114 of 248 hydro personnel.
- Reviewed 35 of 78 assessments to compare assessments to the list of hazards identified by TVA to determine if all identified hazards were evaluated.
  - Selected all 11 of the routine assessments.
  - Judgmentally selected 24 of the 67 nonroutine assessments according to the following characteristics:
    - Nine based on employee concerns.
    - Seven based on 5 or more adverse conditions.

---

<sup>3</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>4</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.

- Two based on measurable recommendations.
- Six based on adverse conditions with no applicable recommendations.
- Reviewed the 35 selected assessments and identified 29 that contained both adverse conditions and recommendations from the IH vendors. For recommendations issued in response to adverse conditions, we corresponded with plant management to determine actions taken in response to IH contractor recommendations. We requested documentation to verify actions were completed, as appropriate.
- Judgmentally selected 5 employees with documented exposure to hazards and requested medical files be reviewed to determine if employee exposure letters were included in the files.

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 TVA's IH planning and assessment process had weaknesses that resulted in some hazards not being identified and evaluated. We also determined TVA took appropriate actions to address adverse conditions, which were identified during assessments at hydro plants; however, TVA did not maintain employee notification records as required by internal procedures. In addition, we identified opportunities for improvement related to clarifying responsibilities for notification and monitoring of contractor actions taken to address IH recommendations.

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

As shown on page 1, TVA-TSP-18.900 provides for an annual planning and assessment process to identify, evaluate, and control health hazards to which employees may be exposed in a timely manner. Further, the purpose of TVA hydro IH plans is to determine the extent of employee exposure to hazards and determine controls to reduce exposures to "acceptable levels of risk." However, TVA did not conduct a formal, documented risk assessment of health hazards at its hydro plants; rather, risks were considered informally to assess hazards for a limited number of biennial exposure assessments. As a result, we determined TVA's hydro IH planning and assessment process had weaknesses that resulted in some hazards not being identified and 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 identified hazards; (3) IH plans did not prioritize hazards; and (4) incomplete monitoring efforts allowed misalignment between procedures, plans and exposure assessments.

### **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 employee complaints and concerns, condition reports, and injuries that could help identify hazards. However, these sources were not cited by safety consultants or the IH program manager as information used to identify health hazards at hydro plants. TVA's identification process consisted primarily of input from the IH program manager and safety consultants, with limited employee participation in the process.

We surveyed hydro employees to assess the state of the IH program and to include feedback on specific conditions or areas at hydro plants. Most hydro employees responding to the survey indicated TVA adequately protected employees from health hazards. However, some employees identified specific concerns that were not captured in IH plans, including:

- **Apalachia Hydro** – Although prior management took action to encapsulate asbestos up to 6 feet in the power house, employees remain concerned that asbestos located above the encapsulation is in a friable<sup>5</sup> condition. Employees stated the asbestos has a high chance of being disturbed and poses a danger to employee health. Employees also stated asbestos is present in other parts of the plant that have not been assessed by IH during our evaluation scope. Plant management stated it will follow up with TVA Safety for recommendations.
- **Nottely Hydro** – An employee is concerned about an ongoing, ammonia-like scent in the sump pump room that is always present and varies in strength. Plant management stated they were unaware of this condition and generated a work order to have the area professionally tested using a dosimeter.
- **Raccoon Mountain Pumped Storage Facility** – Employees indicated the prevalence of mold is increasing and 1 employee indicated mold is causing health issues. Hydro management stated there are projects in place to address mold concerns in the surge chamber and visitor center break room, and they will assess the remaining areas identified by employees.

Using limited information to identify IH hazards could lead to unsafe conditions that are not identified in a timely manner.

### **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

---

<sup>5</sup> Friable means that material can be crumbled with hand pressure and is therefore likely to emit airborne fibers if disturbed.

will occur and (2) number of workers who might be exposed. TVA's hydro IH plans list potential hazards, location of hazards, and potential exposed employees. However, there was no formal document to evaluate the severity and likelihood of an event or exposure from the hazard. While the IH program manager or safety consultants indicated some of the identified hazards were considered low risk, input from employees indicated the risks may be higher as previously noted.

### **IH Plans Did Not Prioritize IH Hazards**

According to OSHA, an effective plan would prioritize the hazards based on evaluated risk, addressing serious hazards first. TVA's hydro IH plans listed controls for each identified hazard. 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 on an annual basis to monitor how well the program is performing and identify any needed improvements. As stated above, TVA-TSP-18.900 requires TVA to assess implementation of the IH plan/exposure assessment annually. However, we identified (1) assessments were not completed as frequently as required, and (2) assessments did not align with IH plans.

### **Exposure Assessments Were Not Completed as Frequently as Required**

We determined the frequency of the exposure assessments were not aligned with the procedure. TVA-TSP-18.900 states TVA will prepare, execute, and evaluate IH plans and exposure assessments annually. Instead, according to TVA, it conducts hydro plant assessments biennially. In addition, TVA focused its IH resources on the larger hydro plants with greater employee populations and conducted limited or no assessments for approximately half of the hydro fleet. TVA Hydro and Safety personnel stated hazards are fairly standard across the hydro fleet; however, due to limited resources, TVA's approach to assessing IH hazards is limited to larger plants since these plants represent a worst-case exposure scenario. As a result, TVA did not conduct routine IH assessments at 19 of 30 hydro plants between January 1, 2017, and June 30, 2020. Additionally, of the 19 hydro plants, (1) 5 plants did not receive any IH assessments, (2) 8 plants only received 1 nonroutine assessment each in which coverage was limited to IH hazards in specific areas of the plant, and (3) the remaining 6 plants received 2 to 12 nonroutine assessments.

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

We determined the hazards assessed did not always align with the hazards included in IH plans. As mentioned earlier, TVA-TSP-18.900 requires TVA to develop and execute annual IH plans and exposure assessments tailored to the potential exposures present in the organization. However, while the IH plans included mercury as a hazard, it was not assessed at any plant during our evaluation scope and hazards, such as noise, mold, and lead, were identified as hazards, but were not assessed on a consistent basis. Hydrogen gas was not identified as an IH hazard in the plans, but ventilation was assessed to ensure adequate airflow would prevent the buildup of hydrogen gas at 7 plants.

- - - - -

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

**TVA Management's Comments** – TVA management stated that TVA strives to continuously improve its IH program to ensure employees are protected from health hazards in the workplace. TVA management also stated OSHA's *Recommended Practices for Safety and Health Programs*, noted on page 1 of the report, is designed to be used in a wide variety of small- and medium-sized business settings. According to TVA management, TVA's facilities constitute a large business setting and TVA has conducted more than 80,000 samples over almost 50 years to ensure hazards and risks are identified, evaluated, and employees are adequately protected. Additionally, TVA management stated OSHA regulations do not require monitoring at a specified time frequency, and a fixed monitoring schedule does not guarantee worker protection. TVA management further stated TVA has protected employees from hazards listed in this report (mercury, noise, mold, and lead) by either assessing the hazard and determining it is not a risk, implementing controls to manage the hazard, or performing site specific or representative sampling on an as-needed basis to monitor any exposure. See the Appendix for TVA management's complete response.

**Auditor's Response** – We focused our efforts on the most recent 3.5 year period, January 1, 2017, through June 30, 2020, of IH data available to capture a current snapshot of TVA's IH practices. Although TVA highlighted OSHA's

statement regarding the applicability of its guidance to small- and medium-sized business settings, OSHA's *Recommended Practices for Safety and Health Programs* states larger employers, who have more complex work processes and hazards, may require a more formal and detailed program. While TVA provided information for the exclusion or selective monitoring of known health hazards, TVA has not documented their risk-based approach to assessing these hazards nor the historical context supporting their methodology in a formal, documented manner as recommended below. The risk of losing the undocumented information is elevated because much of the knowledge related to the program resides with the single IH employee.

### **Recommendations**

We recommend the Director, Safety:

- Conduct a formal, documented risk assessment of health hazards at hydro 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.

- Conduct IH assessments of hydro sites that had limited or no coverage since January 1, 2017.

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

- Determine the appropriate assessment cycle frequency for hydro plants and update TVA-TSP-18.900, if necessary.

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

- Periodically monitor the effectiveness of the IH program to include the alignment of IH plans 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.

- 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.

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

We recommend the Senior Vice President, PO, complete actions to address employee identified issues related to: (1) asbestos at Apalachia Hydro, (2) gas smell at Nottely Hydro, and (3) mold at Raccoon Mountain.

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

## **TVA TOOK APPROPRIATE ACTIONS TO ADDRESS IDENTIFIED ADVERSE CONDITIONS; HOWEVER, EXPOSURES WERE NOT DOCUMENTED AS REQUIRED**

Based on our review of documentation, we determined TVA took appropriate actions to address adverse conditions, which were identified during assessments at hydro plants. For example, (1) Guntersville Hydro posted hearing-protection signage in areas that exceed a specific decibel threshold, and (2) the Fort Loudoun Hydro group<sup>6</sup> corrected moisture intrusion and remediated mold based on IH vendor recommendations. However, we determined TVA does not document employee exposures as required. TVA-TSP-18.900 includes provisions for a signed exposure-notification letter to be placed in the employee's medical file.

We judgmentally selected 5 employees with documented exposure to hazards 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. A Safety employee indicated the requirement to retain letters in the employee medical file was included in the safety procedure to drive accountability.

### **Recommendation**

We recommend the Senior Vice President, PO, take steps to include signed exposure letters in employee medical files.

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

## **OPPORTUNITIES FOR IMPROVEMENT**

We identified opportunities for improvement related to TVA (1) clarifying responsibilities regarding contract employers addressing IH recommendations and (2) 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 potential violations of IH regulations and contractor health claims.

---

<sup>6</sup> According to TVA management, the Fort Loudoun Hydro group includes Fort Loudoun, Fontana, and Melton Hill hydro plants.

### IH Recommendations Issued to Contract Employers

Contract employers use TVA's IH vendors to assess hazards at TVA hydro plants, but the safety procedures do not establish protocols for communications between contract employers and TVA. 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 contract employers.

### 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 that 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.

- 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.

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

August 12, 2021

David P. Wheeler, WT 2C-K

CORPORATE SAFETY AND POWER OPERATIONS RESPONSE TO 30 DAY REQUEST FOR COMMENTS - DRAFT EVALUATION 2020-15756 - HYDRO PLANT INDUSTRIAL HYGIENE (IH)

TVA Corporate Safety and Power Operations would like to extend thanks to the Office of the Inspector General (OIG) team that conducted this evaluation of Hydro Plant Industrial Hygiene (IH). The health and safety of our workforce and the public is TVA's top priority. We appreciate the TVA Office of the Inspector General team's insights in their report since it provides us an opportunity to further strengthen our health and safety efforts. Although documentation of current processes needs to be improved, the findings identified do not result in the health or safety of our workers being compromised and TVA continues to meet Occupational Safety and Health Administration (OSHA) standards.

In response to the OIG memorandum dated July 13, 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 Some Hazards not Being Identified and Evaluated

TVA strives to continuously improve its industrial hygiene program to ensure employees are protected from health hazards in the workplace.

According to an October 18, 2016 OSHA Trade Release, OSHA's Recommended Practices for Safety and Health Programs, noted on page 1 of the draft evaluation report, states, "The recommendations are advisory only and do not create any new legal obligations or alter existing obligations created by OSHA standards or regulations" and according to the OSHA web site is designed to be used in a wide variety of small and medium-sized business settings.

Given that TVA's facilities constitute a large business setting, TVA conducts extensive monitoring of industrial hygiene hazards. TVA has conducted more than 80,000 samples over almost 50 years to ensure hazards and risks are identified, evaluated, and that employees are adequately protected. The OIG evaluated information from a limited three year time period, and in cases where contaminants had not been evaluated during that timeframe, they may have been previously eliminated or controlled to prevent employee exposure. In addition, historical monitoring at one facility may be representative for exposures at another facility and additional monitoring may not be required. The lack of capturing a health hazard in an IH plan does not indicate that the hazard was not previously reviewed, controlled, or eliminated just as a lack of sampling for hazards is not evidence that the hazard was present in the workplace.

David P. Wheeler  
Page 2  
August 12, 2021

For instance, on page 7 of the draft evaluation report, the OIG reported that the hazards such as noise, mold, and lead were not assessed on a consistent basis and that while the IH plans included mercury as a hazard, it was not assessed at any plant during the evaluation scope.

For the hazards listed in the OIG report, TVA has protected employees by one of the following methods: assessed the hazard and determined it is not a risk; implemented controls to manage the hazard; or performed site specific or representative sampling on an as needed basis to monitor any exposure.

OSHA regulations do not require monitoring at a specified time frequency and monitoring according to such a fixed schedule does not guarantee worker protection. Instead, additional monitoring occurs when work environment, processes, or equipment change. For example, lead is not a hazard in the workplace until something containing the lead is disturbed; therefore, lead monitoring typically occurs during cutting or grinding operations that may disturb lead based paint and coatings. It would not be unusual to have several years lapse at a plant without lead monitoring. Potential hazards at TVA facilities may also occur during non-routine times. For that reason, monitoring outside of the scope of routine assessments may occur during special projects, outages, emergent work, or due to employee feedback.

Further information for the hazards listed above is set out below.

Noise - During the OIG evaluation period, 38 personal time weighted average noise samples were completed. From 2012 to 2020, TVA has conducted 240 personal time weighted average noise samples within the hydro business unit. This does not include hundreds of area noise monitoring during these same time periods. Evaluation of the data has consistently proven that no further action is necessary to protect employees from noise hazards.

Mold - In the OIG evaluation period, three indoor air quality assessments were performed in hydro (and 15 across TVA) based on employee feedback. From 2013 to 2021, TVA has performed 33 indoor air quality assessments. Of the 33, eight were within the hydro organization. Sampling for mold is based on employee feedback or visible presence of mold and is not always covered during operational IH plans.

Lead - In the evaluation period, three personal exposure lead assessments were completed. Results were below detectable limits. From 2011 to 2020, TVA has taken 87 personal samples for inorganic lead at multiple hydro sites during projects where lead was potentially disturbed. Within the hydro and coal fleet, TVA has taken approximately 500 lead samples on personnel performing work where a lead exposure may potentially occur. The three operational assessments (in the evaluation period as noted) were taken as verification to confirm that sampling outside of work activities that have the potential to disturb lead is of no value to employee protection.

David P. Wheeler  
Page 3  
August 12, 2021

Mercury - TVA has worked to eliminate mercury in plant environments. In some components where mercury is unable to be eliminated, such as older gauges and instruments (e.g. thermostats, thermometers, switches, etc.), mercury is contained and does not present an exposure risk to employees. As allowed by OSHA's Hierarchy of Controls, administrative work practice controls and personal protective equipment reduce and/or eliminate exposure to mercury if an accidental spill were to occur. Therefore, monitoring is not necessary.

#### Response to Recommendations

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

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

The Director, Safety:

- Conduct a formal, documented risk assessment of health hazards at hydro 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.
- Conduct IH assessment of hydro sites that had limited or no coverage since January 1, 2017.
  - Corporate Safety agrees with this recommendation.
- Determine the appropriate assessment cycle frequency for hydro plants and update TVA-TSP-18.900, if necessary.
  - Corporate Safety agrees with this recommendation.
- 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):

- Complete actions to address employee identified issues related to: (1) asbestos at Apalachia Hydro, (2) gas smell at Nottely Hydro, and (3) mold at Raccoon Mountain.
  - Power Operations agrees with the recommendation.

David P. Wheeler  
Page 4  
August 12, 2021

TVA Took Appropriate Actions To Address Identified Adverse Conditions; However, Exposures Were Not Documented as Required

The Senior Vice President, Power Operations (PO):

- Take steps to include signed employee exposure letters in employee medical files.
  - Power Operations agrees with the recommendation.

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.
- 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.



Jason T. Regg  
Director, Safety  
Resource Management & Operations Services



Jacinda B. Woodward  
Senior Vice President  
Power Operations

JTR:GLH:SAH

cc: James R. Dalrymple, BR 4D-C  
David B. Fountain, WT 6A-K  
T. Daniel Lunsford, BCT 1A-BVT  
Donald A. Moul, WT 7B-K

Ronald R. Sanders II, MR 5E-C  
Michael D. Skaggs, WT 7B-K  
Kay W. Whittenburg, MR 3A-C  
OIG File No. 2020-15756