Memorandum from the Office of the Inspector General

July 8, 2021

Thomas B. Marshall
Tony McMutuary

REQUEST FOR MANAGEMENT DECISION – EVALUATION 2020-15752– ORGANIZATIONAL EFFECTIVENESS – SEQUOYAH NUCLEAR PLANT CHEMISTRY/ENVIRONMENTAL

Attached is the subject final report for your review and management decision. Your written comments, which addressed your management decision and actions planned or taken for one of the 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.

Information contained in this report may be subject to public disclosure. Please advise us of any sensitive information in this report that you recommend be withheld.

If you have any questions or wish to discuss our findings, please contact Justin B. Franklin, Auditor, at (865) 633-7363 or Lisa H. Hammer, Director, Evaluations – Organizational Effectiveness, at (865) 633-7342. We appreciate the courtesy and cooperation received from your staff during the evaluation.

David P. Wheeler
Assistant Inspector General
(Audits and Evaluations)

JBF:FAJ
Attachment
cc (Attachment):
TVA Board of Directors
Danny Bost
Susan E. Collins
Megan T. Flynn
David B. Fountain
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Timothy Rausch
William C. Reneau
Wilson Taylor III
OIG File No. 2020-15752

Office of the Inspector General

Evaluation Report

To the Site Vice President,
Sequoyah Nuclear Plant,
and to the Senior Manager,
Sequoyah Nuclear Plant
Chemistry/Environmental

ORGANIZATIONAL EFFECTIVENESS – SEQUOYAH NUCLEAR PLANT CHEMISTRY/ ENVIRONMENTAL

Auditor
Justin B. Franklin

Evaluation 2020-15752
July 8, 2021

ABBREVIATIONS

CFAM	Corporate Functional Area Manager
CHDP	Chemistry Department Procedure
Chemistry	Chemistry/Environmental
CR	Condition Report
ESOMS	Electronic Shift Operations Management System
NRC	Nuclear Regulatory Commission
ODCM	Off-site Dose Calculation Manual
QA	Nuclear Quality Assurance
SQN	Sequoyah Nuclear Plant
TVA	Tennessee Valley Authority
WBN	Watts Bar Nuclear Plant

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EXECUTIVE SUMMARY

Why the OIG Did This Audit

Organizational effectiveness, as defined in this evaluation, is the ability of an organization to achieve its mission and goals. Due to the importance of alignment between strategy, team engagement, and operational performance, the Office of the Inspector General is conducting organizational effectiveness evaluations of business units across the Tennessee Valley Authority (TVA). This evaluation focuses on Sequoyah Nuclear Plant (SQN) Chemistry/Environmental (Chemistry), which is an organization in TVA Nuclear.

As part of TVA Nuclear, SQN Chemistry is tasked with (1) maintaining the chemical operating environment for all plant systems (including fuel assemblies) in such a manner that systems and equipment will meet or exceed their designed lifetimes, (2) meeting all applicable regulatory requirements, (3) avoiding adverse effects to nuclear fuel, and (4) minimizing plant dose rates, while establishing and maintaining a positive nuclear safety culture. The objective of this evaluation was to identify factors that could impact SQN Chemistry's organizational effectiveness. Specifically, we identified behavioral and operational factors that affect organizational effectiveness.

What the OIG Found

During the course of our evaluation, we identified behaviors that had a positive impact on SQN Chemistry. These included relationships with most management. However, we also identified behavioral risks related to accountability, relationships within and outside Chemistry, low morale, and ethics. In addition, we identified risks to operations that have hindered SQN Chemistry's effectiveness. These risks were related to the physical work environment, monitoring effluents[i] and collecting required samples, and inaccurate sample documentation.

Based on our observations, we assessed SQN Chemistry's level of risk related to behaviors and operations and determined risk in both areas was "high." Ratings are reflected in the table on the following page:

[i] Effluents are defined by the Nuclear Regulatory Commission as liquid or gaseous waste containing plant-related, licensed radioactive material, emitted at the boundary of the facility (e.g., buildings, end-of-pipe, stack, or container) as described in the final safety analysis report.

Audit Evaluation 2020-15752 – Organizational Effectiveness – Sequoyah Nuclear Plant Chemistry/Environmental

EXECUTIVE SUMMARY

	Low Risk	Medium Risk	High Risk
Behaviors			X
Operations			X

What the OIG Recommends

We recommend the Senior Manager, SQN Chemistry, working with the SQN Site Vice President, address the behavioral and operational risks identified in this report. Our detailed recommendations are listed in the body of this report.

TVA Management's Comments

TVA management described actions taken to address one of our recommendations. In addition, management provided actions to partially address concerns related to physical work conditions and relationships within and outside SQN Chemistry, but did not provide actions with regard to monitoring effluents and collecting required samples and inaccurate sample documentation. See Appendix B for TVA management's complete response.

Auditor's Response

We agree with TVA management's actions planned and actions taken.

BACKGROUND

Organizational effectiveness, as defined in this evaluation, is the ability of an organization to achieve its mission and goals. Due to the importance of alignment between strategy, team engagement, and operational performance, the Office of the Inspector General is conducting organizational effectiveness evaluations of business units across the Tennessee Valley Authority (TVA). This evaluation focuses on Sequoyah Nuclear Plant (SQN) Chemistry/Environmental (Chemistry), which is an organization in TVA Nuclear.

As part of TVA Nuclear, SQN Chemistry is tasked with (1) maintaining the chemical operating environment for all plant systems (including fuel assemblies) in such a manner that systems and equipment will meet or exceed their designed lifetimes, (2) meeting all applicable regulatory requirements, (3) avoiding adverse effects to nuclear fuel, and (4) minimizing plant dose rates, while establishing and maintaining a positive nuclear safety culture. SQN Chemistry's responsibilities align with TVA Nuclear's vision of achieving and sustaining top industry performance, which is supported by its core principles related to nuclear safety, operational focus, process adherence, standards of excellence, and being a learning organization.

SQN Chemistry is comprised of two departments:

- Technical Support and Programs primarily includes chemists who are responsible for one or more assigned chemistry program areas. These areas include analytical methods, quality assurance/quality control, radio-analytical methods, online monitoring, effluents,[1] primary system chemistry, secondary system chemistry, auxiliary system chemistry (e.g., closed cooling water, raw cooling water, and auxiliary boiler water), chemistry/counting instrumentation, post-accident sampling, chemistry data management, and chemical hygiene.[2] Technical Support and Programs personnel are also responsible for the trending of data, oversight of the program area, program optimization and recommendations, and corrective action plan development, coordination, and implementation.
- Nuclear Chemistry is primarily comprised of technicians, who are responsible for sampling and analysis of plant systems, first-line chemistry data review and assessment, documentation of laboratory and sampling activities, and participation in laboratory quality assurance/quality control activities. Nuclear Chemistry's other responsibilities include interfacing with Chemistry management staff and Operations shift personnel, promptly responding to chemistry problems and notifying duty chemistry supervisory personnel, and, if necessary, notifying operations shift/unit management.

[1] Effluents are defined by the Nuclear Regulatory Commission (NRC) as liquid or gaseous waste containing plant-related, licensed radioactive material, emitted at the boundary of the facility (e.g., buildings, end-of-pipe, stack, or container) as described in the final safety analysis report.

[2] Chemical hygiene relates to the maintenance of laboratory procedures, equipment and personal protective equipment, and safe work practices that are capable of protecting employees who work in nuclear chemistry laboratories.

Activities within SQN Chemistry are regulated by the NRC, which is the United States regulator for commercial nuclear plants. The NRC ensures the safe use of radioactive materials while protecting the people and the environment. The NRC sets forth the expectation that individuals and organizations performing or overseeing regulated activities establish and maintain a positive safety culture commensurate with the safety and security significance of their activities and the nature and complexity of their organizations and functions. TVA Nuclear, in its Nuclear Operating Model, states that the nuclear fleet must, without exception, consistently meet the highest standards of excellence and performance, including embracing the traits of a healthy nuclear safety culture, with the overarching responsibility for protecting the health and safety of the public.

According to the NRC's inspection procedure for conducting an independent NRC safety culture assessment, assessing the safety culture includes identification of behavioral consistencies with respect to individuals' perception of their organization's norms.[3] The NRC's Safety Culture Policy Statement includes a list of nine traits found in a positive safety culture, including leadership safety values and actions, problem identification and resolution, personal accountability, work processes, continuous learning, an environment for raising concerns, effective safety communications, respectful work environment, and a questioning attitude.

As of September 16, 2020, SQN Chemistry consisted of 22 individuals, including 12 employees and 2 supervisors in Nuclear Chemistry, 6 employees and 1 supervisor in Technical Support and Programs, and the senior manager.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of this evaluation was to identify factors that could impact SQN Chemistry's organizational effectiveness. We assessed operations as of February 2021[4] and culture at the time of our interviews and fieldwork, which occurred from September 21 through November 3, 2020. To complete the evaluation, we:

- Reviewed (1) TVA Nuclear's fiscal year 2020 through fiscal year 2022 Business Plan to obtain an understanding of the fleet's initiatives and risks, (2) Nuclear Safety Review Board[5] reports from March and August of 2020, (3) July 2020 SQN Nuclear Safety Culture Bubble Chart,[6] and (4) Chemistry

[3] According to the NRC, norms of an organization consist of underlying, usually unwritten, rules for behavior that establish how things are done and may or may not coincide with the organization's stated policies and procedures.

[4] After we initially assessed SQN Chemistry operations, we identified a May 2021 condition report (CR) documenting an operational issue coinciding with those we identified earlier that we included in our report.

[5] The Nuclear Safety Review Board is a standing committee of senior TVA managers and non-TVA advisors who advise the Chief Nuclear Officer on the adequacy and implementation of TVA's nuclear safety policies and programs and evaluates those policies and programs for compliance with regulatory activities.

[6] The Nuclear Safety Culture Bubble Chart is a measurement of the site's performance of the traits of a healthy nuclear safety culture.

Department Performance Assessments from October through November of 2019 and February through July of 2020.

- Reviewed TVA values and competencies (see Appendix A) for an understanding of cultural factors deemed important to TVA.
- Reviewed select Nuclear Power Group Standard Programs and Processes, and other documentation to gain an understanding of processes.
- Reviewed a select NRC Regulatory Guide and select NRC Regulations among other NRC documentation.
- Conducted individual interviews with 21[7] of 22 individuals within SQN Chemistry. We analyzed the interview results to identify themes related to factors that could affect organizational effectiveness.
- Accessed Maximo[8] to obtain SQN Chemistry CR,[9] documenting issues related to (1) Nuclear Quality Assurance (QA) Elevations,[10] (2) Corporate Functional Area Manager (CFAM),[11] Elevations[12] and Escalations,[13] (3) Human Performance Events, and (4) laboratory and equipment conditions.
- Assessed the overall effectiveness of SQN Chemistry in behavioral and operational aspects based on TVA's Business Operating Model.
- Identified 183 individuals with whom SQN Chemistry interacts to get their perception of the organization through surveys. We did not include the results of the survey due to a low response rate.

This evaluation was performed in accordance with the Council of the Inspectors General on Integrity and Efficiency's *Quality Standards for Inspection and Evaluation*.

OBSERVATIONS

During the course of our evaluation, we identified behaviors that had a positive impact on SQN Chemistry. These included relationships with most management. However, we also identified behavioral risks related to accountability, relationships within and outside Chemistry, low morale, and ethics. In addition, we identified

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7 One individual was on medical leave at the time interviews were conducted.

8 Maximo is TVA's Enterprise Asset Management system.

9 A CR is a mechanism, either paper or electronic, used to document an issue. The computer-generated form, within Maximo, is used to document the identification, evaluation, and resolution of conditions.

10 An Elevation is a process used by QA to bring issues requiring further action to management in a timely manner.

11 The CFAM is responsible for understanding industry standards and methods of excellence and maintaining functional processes aligned to these best practices, ensuring adherence to governance, and is the owner of governance and oversight as well as the technical expert with the highest level of authority for the area across the fleet.

12 A CFAM Elevation letter is sent to the Plant Manager or responsible director-to address functional area or cross-functional issues and assesses a functional area if progress is slow or effectiveness is challenged.

13 A CFAM Escalation letter is sent to the Site Vice President to address functional area or cross-functional issues and assesses the functional, cross-functional, and/or organizational effectiveness of an area, using fleet resources.

risks to operations that have hindered SQN Chemistry's effectiveness. These risks were related to the physical work environment, monitoring effluents and collecting required samples, and inaccurate sample documentation.

BEHAVIORAL FACTORS AFFECTING SQN CHEMISTRY

According to the Society for Human Resource Management (SHRM),[14] employee engagement relates to the level of an employee's connection and commitment to the organization. In addition, SHRM specifies drivers of employee engagement, including commitment of leaders, trust in leadership and positive relationships with supervisors. TVA, in its Business Operating Model, states that engagement is one component of effective execution. TVA has also developed competencies intended to define common characteristics that set the tone for how work is to be performed in the organization. Defined behaviors are associated with the competencies to provide guidance as to how employees can demonstrate their commitment to TVA values. Furthermore, as stated previously, the NRC sets forth expectations for maintaining a positive safety culture. While individuals generally expressed having positive interactions with most of their management, many individuals expressed concerns regarding accountability, perceived negative relationships within and outside of Chemistry, and low morale and ethics.

Relationships With Management

During our interviews, we noted positive feedback pertaining to relationships, trust, and communication with first-line and middle management.[15] Most employees indicated they had a positive relationship with, and trusted, their first-line and middle management. In addition, most employees felt comfortable going to their first-line and middle management with a concern or difference of opinion. When asked about communication, most employees indicated that communication was positive with their first-line and middle management. Specific examples included management was good at delivering information and that a supervisor tries to have WebEx calls with employees once per week. When asked what works well in their area, some responses indicated management or leadership. Examples provided included management being good to work for, certain members of management being good choices for their position, and management being successful in dealing with different personalities.

Although the majority of individuals commented positively about their first-line and middle management, over half of those interviewed indicated concerns related to accountability within SQN Chemistry. While no specific examples were given, negative comments about accountability included the perceptions of management not taking a stand or SQN Chemistry in general not owning up to its mistakes.

Relationships With Others Within and Outside Chemistry

Two-thirds of those interviewed, including management, indicated that relationship or work-related issues exist between departments within SQN Chemistry. One example provided included the perception that technicians have

[14] SHRM is a membership organization for Human Resource professionals.

[15] When asked about upper management, employees did not provide a response.

more work than the chemists. A couple of individuals indicated that the chemists either try to tell technicians how to do their work or try to tell technicians what to do. Further, a couple of individuals indicated their perception that the technicians believe they are more knowledgeable than the chemists or that the technicians believe the chemists are not doing their jobs.

When asked about interactions with groups outside of SQN Chemistry, over half of those interviewed indicated relationship concerns with plant personnel. A couple of individuals indicated their belief that the plant did not have a high opinion of SQN Chemistry or that SQN Chemistry was the first to be punished and the last to receive praise. Several individuals specifically indicated relationship concerns with SQN Operations. For example, one individual indicated their perception that Operations personnel do not see the value of SQN Chemistry, while another individual indicated communication with SQN Operations needed improvement. A driving factor of some of the relationship issues between SQN Chemistry and Operations appears to be the aftereffects of some missed samples, with the perception that each side was blaming the other.

Low Morale and Ethical Concerns Expressed by Individuals

When asked about morale, more than 75 percent of those interviewed, including management, expressed negative comments about morale or indicated morale needed improvement within SQN Chemistry. Operational concerns, such as frustration with the air conditioning system in the lab and samples not being taken as described below, were expressed as drivers of negative morale. Another driver of low morale, mentioned by a few employees, was poor attitudes among SQN Chemistry employees. In addition, several individuals, including some management, indicated concerns when asked about the ethical culture within SQN Chemistry.[16] Specifically, a couple of individuals mentioned complacency as an ethical concern. Examples included the perception that pockets of complacent behavior in Chemistry have grown over time, which is the biggest cause of mistakes, and individuals take shortcuts in doing their work.

OPERATIONAL RISKS

While most individuals, including employees and management, indicated they had enough resources to do their jobs, we identified risks to operations that have hindered SQN Chemistry's effectiveness. These risks were related to the physical work environment of the chemistry lab, monitoring effluents and collecting required samples, and inaccurate sample documentation.

Physical Work Environment Conditions

Over half of the individuals interviewed indicated concerns with conditions in the chemistry lab. Concerns expressed were related to maintaining acceptable temperatures in the lab due to problems with the lab's air conditioning system and contamination levels in the lab. A review of CRs confirmed air conditioning related problems in the chemistry lab occurring as early as 2012. Some

[16] Ethical culture, as defined in this evaluation, refers to the shared concept of right and wrong behavior in the workplace.

individuals indicated the lab had experienced temperatures of 90 degrees and higher due to these problems. Further, a couple of individuals expressed concern about the impact overall lab conditions had on employees related to heat or contamination levels in the lab. One example provided mentioned SQN Chemistry having to implement stay times because the lab was so hot. Another example indicated that SQN Chemistry personnel did not adequately rinse areas after handling radioactive samples, and that radioactive samples were not being disposed of in the correct sinks resulting in contamination of clean areas, which can cause unplanned exposure.

In addition to the impact the lab conditions had on Chemistry employees, several individuals, including management, indicated that elevated temperatures affected the operability of lab instrumentation used to analyze samples. Specific examples mentioned that lab instrumentation either has failed, is failing, or is not working right due to elevated temperatures. It was also indicated that the elevated temperatures have a long-term effect on the lab instrumentation due to the length of time in that heated environment. According to Chemistry Department Procedure (CHDP) 109, Chemistry QA/QC,[17] "temperature and humidity of the chemistry lab shall be controlled and monitored to enhance stable instrument response." We identified several CRs confirming the temperature's effect on instrumentation. According to one CR from November 2020, elevated temperatures were a contributing factor in the failure of the lab chiller, creating an inability to analyze samples for sodium, T-metals, and silica. Due to instrumentation either failing or not working right, a couple of individuals indicated that SQN Chemistry has had to send radioactive samples to Watts Bar Nuclear Plant (WBN) Chemistry for analysis.

In addition, a couple of individuals expressed concerns related to sawdust or powders in the chemistry lab. Examples included sawdust from maintenance work that is contaminating lab instrumentation, and chemical reagent powders being on the surface of certain equipment. According to CHDP-109, "dust in the chemistry lab shall be controlled to minimize the potential of sample contamination." An October 2020 CR described equipment with visible lead dust accumulation, while a December 2020 CR identified a layer of dust in the lab due to maintenance work.

July 2020 documentation rating the status of various nuclear safety culture traits included SQN Chemistry in the discussion of SQN's acceptable, yet declining, state of the "problem identification and resolution" safety culture trait. Specifically, the rating was "based on discussion regarding heat levels and out of service equipment-we did not get ahead of this; temperature in Chemistry labs is a long standing unresolved issue." According to SQN Chemistry management, a new air conditioning system was installed and operating as of March 9, 2021.

[17] CHDP-109 ensures that all TVA Nuclear Chemistry Programs meet 10 CFR 50 Appendix B "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," which includes providing suitable environmental conditions such as cleanliness and temperature levels for identified equipment to prevent damage or deterioration.

Failure to Adequately Monitor Effluents and Collect Required Samples
During our interviews, various individuals expressed concerns with missed sampling related to (1) a nonfunctional radiation monitor and (2) diesel generator fuel oil. In addition, CRs documenting concerns from internal nuclear oversight could indicate long-term performance issues within SQN Chemistry.

Missed Samples During Radiation Monitor Nonfunctionality
Over a third of the individuals we interviewed discussed an instance when required sampling was not performed when a radiation monitor became nonfunctional. A September 12, 2020, CR noted that, while reviewing older log entries in Electronic Shift Operations Management System (ESOMS), a SQN Chemistry technician found that a radiation monitor had been nonfunctional since September 4, 2020. The nonfunctional radiation monitor, should have triggered compensatory sampling. However, as a result of not identifying the issue timely, required samples to maintain compliance with SQN's Off-site Dose Calculation Manual (ODCM)[18] were not taken between September 5, 2020, and September 12, 2020, which resulted in effluent releases to the environment without monitoring of radioactivity levels. According to another CR related to this issue, SQN Chemistry failed to have a "questioning attitude" [19] about the status of the radiation monitor.

To prevent an instance of this nature from recurring, management implemented a process for SQN Chemistry personnel to review the Operations ESOMS logs to identify whether Operations had documented any radiation monitors as nonfunctional. Subsequent to the implementation of this process, we identified a May 2021 CR documenting that SQN Chemistry had again missed samples when radiation monitors became nonfunctional. According to the CR, SQN Chemistry missed two noble gas samples, another form of effluents, when the radiation monitors were bypassed and became nonfunctional. According to the CR, when these particular monitors are nonfunctional, SQN Chemistry is to perform noble gas samples every twelve hours per ODCM requirements. In this instance, SQN Chemistry management indicated that Operations had notified a SQN Chemistry technician by telephone and had logged the nonfunctionality in ESOMS. However, initiation of sampling did not occur until the next day, resulting in required samples not being taken to properly monitor effluents for the second time in less than a year.

One of the factors that make up the "work processes" safety culture trait is work management. Work management consists of implementing a process to plan, control, and execute work activities while keeping nuclear safety as the top priority. The issues with this particular work process indicate a risk of having recurrences of improper effluent monitoring.

[18] The ODCM contains the methodology by which Chemistry establishes its radiological effluents (discharges) monitoring program in order for the site to comply with NRC and the Environmental Protection Agency's regulations.

[19] As mentioned earlier, a "questioning attitude" is a safety culture trait included in the list of traits found in a positive safety culture as indicated by the NRC.

Missed Diesel Generator Fuel Oil Samples

A few individuals we interviewed indicated concerns related to another instance when sampling was not completed. According to the SQN Surveillance Instruction, as well as an NRC Commitment Tracking Sheet, SQN Chemistry was to begin increased sampling of diesel generator fuel oil in March 2020 as part of their license renewal. However, a June 16, 2020, CR stated the additional samples were not collected from March 2020 through May 2020. The CR indicated the missed sampling was related to procedure use and adherence, as well as a lack of a clear process to ensure samples were collected when the time came for the commitment to be fulfilled.

Internal Nuclear Oversight Concerns

The issues described above indicate failures to adequately monitor effluents and collect required samples that could cause SQN to be unaware of potential environmental or other hazards at the site. During our review, we identified CRs expressing concerns from internal nuclear oversight related to missed samples and procedure use and adherence, which could indicate long-term performance issues within SQN Chemistry. Specifically,

- A CR referencing a QA Elevation dated October 27, 2020, indicated that Chemistry management had not proactively addressed the effects of changes on the conduct of chemistry, leading to missed samples, among other things. A contributing factor, according to the CR, was a failure to leverage performance improvement analysis tools to drive programmatic excellence.
- A CR referencing a CFAM Elevation to Chemistry management dated February 28, 2019, indicated Chemistry Leaders had not taken adequate action to establish and sustain a culture of excellence in procedure use and adherence. Procedure use and adherence was indicated as a factor in the missed diesel generator fuel oil samples noted above.
- A CR referencing a QA Elevation to Chemistry management submitted January 10, 2018, discussed missed samples, among other things, and indicated that Chemistry Management had not consistently reinforced high standards of performance for Chemistry Supervisors to prevent reoccurrence of deviations in the conduct of chemistry.
- A March 13, 2015, a CR was created to document and track a CFAM escalation from February 20, 2015. According to the CR, there had been human performance and lack of engagement issues within the SQN Chemistry department occurring “since October 2014.” One of the causes, according to the CR, were gaps in procedure use and adherence.

Learning from mistakes and addressing lessons learned is part of what makes up a learning organization as it relates to the “continuous learning” NRC safety culture trait.

Inaccurate Sample Documentation

As previously stated, issues with lab instrumentation resulted in radioactive samples being sent to WBN Chemistry for analysis. We were provided data by

both SQN Chemistry and WBN Chemistry indicating that WBN Chemistry analyzed ten samples for SQN Chemistry. We obtained shipping documentation for ten chemistry samples shipped from SQN to WBN on November 10, 2020. While the shipping documentation was addressed to WBN, and the radioactive samples were sent to WBN, the Exempt Quantity Checklist contained the information for a shipment sent to an off-site lab in South Carolina. The Exempt Quantity Checklist provides information related to the shipment, including verification that those receiving the shipment are authorized to do so and that the shipment meets applicable regulatory criteria. Without the completed checklist, there is no evidence that someone verified the samples met the requirements for radioactive materials to be shipped.

We compared the sample results and dates contained in the data provided by SQN Chemistry and WBN Chemistry to the shipping documentation and identified the following discrepancies:

- Shipping documentation showed a sample dated October 29, 2020, but the data provided by WBN or SQN did not contain a corresponding sample for that date. According to SQN Chemistry management, WBN Chemistry informed them that a sample dated October 21, 2020, should have been dated October 29, 2020. However, the analysis results for the sample were not entered in SQN Chemistry data.
- Shipping documentation showed a sample dated November 7, 2020, but the data provided by SQN or WBN did not contain a corresponding sample. An email from WBN Chemistry to SQN Chemistry indicated that a sample WBN Chemistry recorded as November 9, 2020, might have been the November 7, 2020, sample shown on the shipping documentation. However, SQN Chemistry management accepted the explanation because the sample times matched.
- One sample dated November 10, 2020, from SQN Chemistry's data did not have a corresponding sample in the shipping documentation or in WBN Chemistry's data. SQN Chemistry management indicated that the sample was mistakenly recorded as analyzed by WBN Chemistry and that quality control evidence suggested the sample was analyzed at SQN.
- WBN Chemistry's data showed one sample, dated October 30, 2020, with the same results as a sample dated October 31, 2020, in SQN Chemistry's data. According to an email from WBN Chemistry, the October 30, 2020, date was incorrect and it should have been October 31, 2020.

CONCLUSION

SQN Chemistry has a direct impact on the success of TVA Nuclear because of its responsibilities to help SQN plant systems meet or exceed their designed lifetimes and comply with applicable regulatory requirements. Interviews with individuals disclosed risks that have impacted SQN Chemistry's effectiveness and ability to meet its responsibilities in support of SQN's mission. Behavioral risks identified were related to accountability, relationships within and outside

Chemistry, low morale and ethics. In addition, we identified operational risks related to the physical work environment, monitoring effluents and collecting required samples, and inaccurate sample documentation.

As mentioned previously, the NRC set forth expectations and defined traits related to the establishment and maintenance of a positive safety culture. The risks identified in this report suggest issues with four of the nine NRC safety culture traits. Based on these factors and SQN Chemistry's importance to maintaining the chemical operating environment for all nuclear plant systems, we rated the level of risk of both behaviors and operations as high. Addressing the concerns identified in this report could help SQN Chemistry better meet its responsibilities in support of Nuclear's vision and TVA's mission.

RECOMMENDATIONS

We recommend the Senior Manager, SQN Chemistry, working with the SQN Site Vice President:

- Address concerns related to accountability.

  TVA Management's Comments – TVA management stated it has rolled out the nuclear fleet's revised accountability model. The model is based on communicating clear expectations, ensuring capability, developing proficiency, and being responsible for results. See Appendix B for TVA management's complete response.

  Auditor's Response- We agree with TVA management's actions taken.

- Address concerns related to relationship problems from both within and outside SQN Chemistry.

  TVA Management's Comments – TVA management stated the actions associated with establishing a healthy accountability model partially address this recommendation. Actions to fully address this recommendation are being developed. See Appendix B for TVA management's complete response.

  Auditor's Response- We agree with TVA management's actions planned and taken.

- Develop a plan to monitor lab conditions and implement corrective actions as necessary.

  TVA Management's Comments – TVA management stated the actions associated with establishing a healthy accountability model partially address this recommendation. Additionally, a heating, ventilation, and air conditioning upgrade in the Chemistry lab is complete, including a post-installation clean up. SQN has secured funding to purchase several pieces of lab equipment to replace older and less reliable equipment. SQN is in the process of upgrading the Chemistry breakroom to improve the work environment and expects the work to be completed by September 30, 2021. See Appendix B for TVA management's complete response.

Auditor's Response - We agree with TVA management's actions planned and taken. However, management's comments did not address developing a plan to monitor lab conditions going forward.

- Examine processes and procedures, roles and responsibilities, and past missed sample events to identify gaps in Chemistry's collection of samples and monitoring of effluents and take corrective actions as necessary.

  TVA Management's Comments – TVA management stated that actions to address this recommendation are being developed. See Appendix B for TVA management's complete response.

- Implement changes to reduce errors in Chemistry sample results and shipping data.

  TVA Management's Comments – TVA management stated that actions to address this recommendation are being developed. See Appendix B for TVA management's complete response.

TVA Values	
Safety	We share a professional and personal commitment to protect the safety of our employees, our contractors, our customers, and those in the communities that we serve.
Service	We are privileged to be able to make life better for the people of the Valley by creating value for our customers, employees, and other stakeholders. We do this by being a good steward of the resources that have been entrusted to us and a good neighbor in the communities in which we operate.
Integrity	We conduct our business according to the highest ethical standards and seek to earn the trust of others through words and actions that are open, honest, and respectful.
Accountability	We take personal responsibility for our actions, our decisions, and the effectiveness of our results, which must be achieved in alignment with our company values.
Collaboration	We are committed to fostering teamwork, developing effective partnerships, and valuing diversity as we work together to achieve results.

TVA Leadership Competencies

Accountability and Driving for Results

Continuous Improvement

Leveraging Diversity

Adaptability

Effective Communication

Leadership Courage

Vision, Innovation, and Strategic Execution

Business Acumen

Building Organizational Talent

Inspiring Trust and Engagement

TENNESSEE VALLEY AUTHORITY

PO Box 2000, Soddy-Daisy, Tennessee 37384

June 30, 2021

TO: David P. Wheeler, Assistant Inspector General

FROM: Thomas B. Marshall, Vice President, Sequoyah Nuclear Plant

RE: Organizational Effectiveness Response to OIG Evaluation 2020-15752

We appreciate the efforts taken by the evaluation team in conducting this evaluation. We value the feedback from our employees and agree with the recommendations the evaluation team provided in the report. We are developing actions to fully address all the recommendations and have initiated the following actions to immediate address some of the recommendations:

Recommendation: Address concerns related to accountability.
Actions taken: We rolled out of the nuclear fleet's revised accountability model NPG-SPP-01.9, Healthy Accountability Model. The model is based on communicating clear expectations (Set), ensuring capability (Teach), developing proficiency (Practice), and be responsible for results (Own). Each department head communicated the model to his/her direct reports, who then ensured each supervisor had a discussion with his/her direct reports. This roll out was completed by each department on site by April 2, 2021.

Recommendation: Address concerns related to relationship problems from both within and outside SQN Chemistry.
Actions taken: The actions associated with establishing a healthy accountability model partially address this recommendation. Actions to fully address this recommendation are being developed.

Recommendation: Develop a plan to monitor lab conditions and implement corrective actions as necessary.
Actions taken: The actions associated with establishing a healthy accountability model partially address this recommendation. Additionally, a heating, ventilation, and air conditioning upgrade in the Chemistry lab is complete including a post-installation clean up. We have secured funding to purchase several pieces of lab equipment to replace older and less reliable equipment. The new equipment is targeted to be on site by Sept 30, 2021. We are in the process of upgrading the Chemistry breakroom to improve the work environment, we expect the work to be complete by Sept 30, 2021.

Recommendation: Examine processes and procedures, roles and responsibilities, and past missed sample events to identify gaps in Chemistry's collection of samples and monitoring of effluents and take corrective actions as necessary.
Actions taken: Actions to address this recommendation are being developed.

Recommendation: Implement changes to reduce errors in Chemistry sample results and shipping data.
Actions taken: Actions to address this recommendation are being developed.

Please contact me if you have any questions or would like to discuss further.

Respectfully,

Thomas B. Marshall
Site Vice President
Sequoyah Nuclear Plant
OPS 4A-SQN

TBM:DCS
cc: William C. Reneau, POB 2A-SQN
Tony McMutuary, POB 2A-SQN