



Memorandum from the Office of the Inspector General

September 18, 2012

Peyton T. Hairston, Jr., WT 7B-K

REQUEST FOR FINAL ACTION – AUDIT 2011-14158 – CRAFT LABOR SHORTAGE
RISK MITIGATIONS COULD BE IMPROVED

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 within one year from the date of this memorandum when final action is complete.

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, please contact Amy R. Rush, Audit Manager, at (865) 633-7361 or Lisa H. Hammer, Director, Operational Audits, at (865) 633-7342. We appreciate the courtesy and cooperation received from your staff during the audit.

Robert E. Martin

Robert E. Martin
Assistant Inspector General
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Attachment
cc: See page 2

Peyton T. Hairston, Jr.
Page 2
September 18, 2012

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OIG File No. 2011-14158



Office of the Inspector General

Audit Report

To the Senior Vice President,
Diversity and Labor Relations

CRAFT LABOR SHORTAGE RISK MITIGATIONS COULD BE IMPROVED

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Audit 2011-14158
September 18, 2012

ABBREVIATIONS

D&LR	Diversity and Labor Relations
ERM	Enterprise Risk Management
FGD&C	Fossil Generation Development and Construction
FPG	Fossil Power Group
FY	Fiscal Year
GC	Generation Construction
IRP	Integrated Resource Plan
NC	Nuclear Construction
NPG	Nuclear Power Group
SVP	Senior Vice President
TEICC	Tennessee Energy, Industry, and Construction Consortium
TVA	Tennessee Valley Authority

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
BACKGROUND.....	1
OBJECTIVE, SCOPE, AND METHODOLOGY	2
FINDINGS	3
CONCLUSION.....	14
RECOMMENDATIONS	15
MANAGEMENT’S RESPONSE AND OUR EVALUATION.....	16

APPENDIX

MEMORANDUM DATED SEPTEMBER 7, 2012, FROM PEYTON T. HAIRSTON, JR., TO ROBERT E. MARTIN



Audit 2011-14158 – TVA Craft Labor Staffing

EXECUTIVE SUMMARY

As part of our annual audit plan, we audited Tennessee Valley Authority's (TVA) craft labor staffing, which was identified by TVA as one of its top five risks in two risk categories: (1) talent management and (2) capacity expansion and construction. Our audit objective was to assess TVA's plans to mitigate the risks and potential effects of craft labor shortages and evaluate TVA's performance to date. Our audit scope included the mitigation plans as defined in TVA's Enterprise Risk Management (ERM) document dated July 13, 2011, and additional mitigations for contractor craft labor within the Generation Construction, Coal Operations, Gas Operations, Nuclear Construction, and Nuclear Power Group (NPG) organizations.ⁱ Our objectives were to assess TVA's (1) mitigation of craft labor risks associated with (a) competition from other companies and (b) a shrinking labor pool and (2) process for identifying craft labor risks. We focused on TVA's plans with regard to the contractor craft workforce.

TVA's craft labor workforce is comprised of annual employees and contractor labor. Craft labor includes, but is not limited to, laborers, boilermakers, bricklayers, machinists, electrical workers, ironworkers, equipment operators, painters, steamfitters, and roofers. Annual craft employees are salary employees responsible for performing operations and maintenance as well as modifications. TVA uses two types of contractor craft labor. Staff augmented craft supplement the TVA workforce and are under the supervision of a TVA employee. This type of craft may be brought in to assist with operations and maintenance or modifications if the skill level or the amount of work exceeds the ability or number of annual craft employees. Managed task craft are managed by a supplier who is providing services to TVA. This type of craft is utilized for some maintenance and modification and all construction projects at TVA. Both types of craft are necessary to help TVA achieve its future long-term goals as contained in its Integrated Resource Plan (IRP).

TVA's Administrative Services is responsible for building and maintaining the quality and effectiveness of TVA's workforce. As part of this responsibility, Administrative Services' Diversity and Labor Relations (D&LR) organization negotiates labor agreements with the Tennessee Valley Trades and Labor Council. The risk of craft labor shortage was identified and included on TVA's fiscal year 2011 ERM document. TVA mitigation actions for addressing craft labor risk included (1) scheduling of nuclear and fossil outages that enable a steady stream of work to the already existing labor workforce; (2) craft training programs; (3) benchmarking with the Utility, Building, and Construction Industry

ⁱ When this review was initiated, the organizations in scope were Fossil Generation Development and Construction (FGD&C), Fossil Power Group (FPG), Nuclear Generation Development and Construction, and NPG. During this review, TVA announced an organizational realignment, which affected the organization names.



Audit 2011-14158 – TVA Craft Labor Staffing

EXECUTIVE SUMMARY

Employer Association for additional mitigation actions; and (4) increasing compensation and benefits marginally above market levels and/or utilizing other crafts with the skill sets necessary for the job.

Based on our review of TVA's plans and actions to mitigate the risk and potential effects of craft labor shortages, we determined plans and actions were inadequate to aid in the achievement of future goals as identified in TVA's IRP. Specifically, we determined risk mitigation actions related to competition needs improvement and deficiencies existed in risk planning and mitigation related to the shrinking labor pool. In addition, we noted improvements could be made to the process for assessing and monitoring risk related to craft labor.

TVA has passed the management of craft labor risk to contractors, unions, and other organizations. In our opinion, TVA, as part of its economic development mission, has an obligation to participate in efforts to replenish shrinking craft labor pools. In addition, to achieve long-term future goals as identified in TVA's IRP, it is necessary to develop actions for attracting and retaining craft labor and/or look for alternative solutions to achieve those goals.

We recommend the Senior Vice President, D&LR, in conjunction with Generation Construction, Coal Operations, Gas Operations, Nuclear Construction, and NPG:

1. Obtain more accurate and useful contractor craft data to utilize in the outage planning process.
2. With respect to the risk of craft labor shortages arising from competition:
 - Implement actions to monitor and/or mitigate the risk rather than rely on outside parties to do so.
 - Consider performing and centralizing labor studies for TVA projects.
3. Monitor training of craft and apprenticeship records to determine whether the mitigation action is adequately addressing the risk of craft labor shortages. In lieu of monitoring, consider implementing Electric Power Research Institute Standardized Task Evaluations.
4. Reassess the risk severity and mitigation strategies to verify risk severity and determine whether additional/alternative mitigation actions need to be implemented to align with current management initiatives such as Diet and Exercise.
5. Update the ERM documentation to only reflect those mitigation strategies that are planned to be utilized or are being utilized.



Audit 2011-14158 – TVA Craft Labor Staffing

EXECUTIVE SUMMARY

6. With respect to the risk of craft labor shortages arising from a shrinking labor pool, identify:
 - Additional options for attracting new entrants to the trades and labor workforce.
 - Opportunities where craft labor could be reduced.
7. Collaborate with Risk Management to avoid duplication of risk across ERM categories and assess whether gaps occur in mitigation strategies.
8. Establish an internal process for monitoring the risk, severity, and mitigation actions when changes occur in the business environment and on a more frequent basis than semiannually.
9. Institute a process for transferring knowledge and building relationships within and outside TVA from the Senior Program Manager, D&LR, to other individuals within D&LR.

TVA management agreed with the findings and recommendations but took exception to a quote used in the report. We have addressed management's comment. See the Appendix for TVA's complete response.

BACKGROUND

Tennessee Valley Authority's (TVA) craft labor workforce is comprised of annual employees and contractor labor. Craft labor includes, but is not limited to, laborers, boilermakers, bricklayers, machinists, electrical workers, ironworkers, equipment operators, painters, steamfitters, and roofers. Annual craft employees are salary employees responsible for performing operations and maintenance as well as modifications. TVA uses two types of contractor craft labor. Staff augmented craft supplement the TVA workforce and are under the supervision of a TVA employee. This type of craft may be brought in to assist with operations and maintenance or modifications¹ if the skill level or the amount of work exceeds the ability or number of annual craft employees. Managed task craft are managed by a supplier who is providing services to TVA. This type of craft is utilized for some maintenance and modification and all construction² projects at TVA. Both types of craft are necessary to help TVA achieve its future long-term goals as contained in its Integrated Resource Plan (IRP). Annual and contractor craft labor are each represented by a trades and labor council. While annual employees are not required to belong to a union, contractors for TVA projects equal to or exceeding \$250,000 and subcontractors for projects equal to or exceeding \$100,000 are required by contractual agreement with TVA to hire union labor.³ Contractor craft labor, regardless of whether utilized for managed task or staff augmentation, are selected from the same union halls.

TVA's Administrative Services organization is responsible for building and maintaining the quality and effectiveness of TVA's workforce. As part of this responsibility, Administrative Services' Diversity and Labor Relations (D&LR) organization negotiates labor agreements for work performed by contractors with the Tennessee Valley Trades and Labor Council, which is composed of individuals representing fifteen international unions. Specifically, for contractor craft, D&LR negotiates a long-term Project Maintenance and Modification Agreement and a long-term Construction Project Agreement with the Council. These project agreements define the terms and conditions of the workers covered by the agreements and require the provisions will be binding upon the contractor and the Council unions during the agreements' term and renewal.

Specific requirements outlined in the project agreements include, but are not limited to, the payment of prevailing wages to contractor craft and restrictions related to geographical and craft jurisdictions. Geographical jurisdictions refer to the defined area a union is chartered to organize or represent. Craft jurisdiction refers to the performance of certain types of work only by members of the union

¹ Maintenance and modification work, as defined, includes maintenance, renovation, modification, addition, and/or repair to existing plants and transmission facilities. All work directly related to the mechanical operation of the plant that does not involve the addition of new capacity is considered as maintenance or modification.

² Construction, as defined, includes construction work at a new or existing plant site directly related to the construction of new generating capacity or transmission construction.

³ TVA is not required by statute or regulation to utilize union labor.

who are skilled in that craft area. Project agreements state unions should (1) strongly encourage represented individuals to transfer or move between TVA projects and (2) make exception to any agreements by setting one-time agreements, if necessary, to ensure work is properly staffed. Instances may occur where TVA must utilize craft outside the local unions, referred to as travelers, and/or substitutions⁴ of craft. In order to utilize these types of craft, TVA must discuss this with the Council.

The risk of craft labor shortage was identified and included on TVA's fiscal year (FY) 2011 Enterprise Risk Management (ERM)⁵ document. Specifically, the risk was defined by D&LR as the "risk to TVA construction and maintenance projects associated with regional shortages of qualified craft labor used by TVA vendors." According to recent news articles and governmental statistics, this risk has been identified as an industry-wide issue. TVA's documented mitigation actions for addressing craft labor risk included (1) scheduling of nuclear and fossil outages that enable a steady stream of work to the already existing labor workforce, (2) craft training programs, (3) benchmarking with the Utility, Building, and Construction Industry Employer Association for additional mitigation actions, and (4) increasing compensation and benefits marginally above market levels and/or utilizing other crafts with the skill sets necessary for the job.

OBJECTIVE, SCOPE, AND METHODOLOGY

As part of our annual audit plan, we audited TVA's craft labor staffing, which was identified by TVA as one of its top five risks in two risk categories: (1) talent management and (2) capacity expansion and construction. Our audit objective was to assess TVA's plans to mitigate the risks and potential effects of craft labor shortages and evaluate TVA's performance to date. Our audit scope included the mitigation plans as defined in TVA's ERM document dated July 13, 2011, and additional mitigations for contractor craft labor within the Generation Construction (GC), Coal Operations, Gas Operations, Nuclear Construction (NC), and Nuclear Power Group (NPG) organizations.⁶

Our objectives were to assess TVA's (1) mitigation of craft labor risks associated with (a) competition from other companies and (b) a shrinking labor pool and (2) process for identifying craft labor risks. We focused on TVA's plans with regard to the contractor craft workforce.

To achieve our objective we:

- Interviewed TVA Administrative Services, Financial Services, GC, Coal Operations, NC, and NPG personnel to gain an understanding of the risk

⁴ Substitution of craft refers to substituting craft with a similar skill set who belong to a different union.

⁵ The intent of TVA's ERM process is to provide a common risk management assessment process and methodology at TVA.

⁶ When this review was initiated, the organizations in scope were FGD&C, FPG, Nuclear Generation Development and Construction, and NPG. During this review, TVA announced an organizational realignment, which affected the organization names. We selected these organizations because they utilize the largest contractor craft labor workforce.

identification and mitigation process including mitigation plans and actions to address the risk of craft labor shortage.

- Surveyed international representatives for unions considered by TVA to have critical craft labor positions⁷ to obtain an understanding of their role in reducing the risk of craft labor shortages and to identify concerns related to labor availability.
- Obtained and reviewed TVA Standard Programs and Processes to gain an understanding of staffing and workforce planning and enterprise risk management.
- Obtained and reviewed project agreements to gain an understanding of staffing and workforce planning and labor requirements.
- Obtained and reviewed available ERM risk assessment data for FY 2000 through July 2011⁸ to determine past and present mitigation plans for craft labor shortages. In addition, we obtained ERM risk information for FY 2012 to determine whether there were any additional mitigation plans.
- Obtained documentation including outage data and craft labor studies for recent TVA projects to determine whether any potential or actual labor shortages had been identified and associated mitigation actions.
- Researched craft labor trending statistics by means of U.S. Census Bureau, Tennessee Department of Education, U.S. Bureau of Labor Statistics, state energy consortiums, and newspaper articles.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

FINDINGS

There are two driving factors behind the risk of craft labor shortages: (1) competition for labor from other companies including, but not limited to, other utilities and (2) a shrinking labor pool due to retirements and decreases in the number of entrants to the trades and labor profession. Based on our review of TVA's plans and actions to mitigate these risks and their potential effects, we determined plans and actions were inadequate to aid in the achievement of long-term future goals as identified in TVA's IRP. Specifically, we determined risk mitigation actions related to competition need improvement and deficiencies existed in risk planning and mitigation related to the shrinking labor pool. In

⁷ These critical positions include pipefitter/welders, boilermaker/welders, electricians, and ironworkers.

⁸ We did not review ERM documentation for 2000 and 2005 due to the unavailability of the documentation. According to TVA's Chief Risk Officer, prior to 2006 limited and sporadic risk management documentation was available.

addition, we noted improvements could be made to the process for assessing and monitoring risk related to craft labor shortages.

Mitigation Actions for Shortages Due to Competition Need Improvement

As stated above, external craft labor is obtained from local and nonlocal unions through contractors. Incentives for attracting contractor craft may include increased pay and lengthier work schedules, which allow the individual to stay in one place for a longer period of time. Two of D&LR's actions for mitigating the risk of craft labor shortages address these incentives. Based on discussions with TVA personnel, staffing shortages have been mitigated by these actions; however, we noted reliance was placed on outside parties to monitor competition risk and carry out mitigation actions. In addition, certain mitigation actions conflicted with TVA's Diet and Exercise initiative.⁹

Reliance Placed on Outside Parties to Mitigate and Monitor Risk Due to Competition

Rather than assessing and monitoring the internal and external business environments to identify potential craft labor shortages resulting from competing projects, TVA relies on contractors to monitor competition risk. Specifically, TVA relies heavily on information obtained and provided by its contractors and union halls to monitor the risk of potential shortages. TVA utilizes the information to schedule outages and other operational and construction projects. Monitoring competition risk is an important component in determining the severity and likelihood of craft labor shortages.

TVA's outage optimization team, comprised of employees in GC,¹⁰ conducts periodic meetings to create detailed outage schedules with input from contractors and union halls as well as TVA organizations such as NC, NPG, and Generation. The outage optimization team obtains manpower information from TVA's alliance partners¹¹ to create outage schedules for the next 4 years. According to the outage optimization team, nuclear outages have priority and are scheduled prior to fossil plant outages. D&LR personnel informed us if there was a forced outage, craft labor would be moved from the planned outage job to work the forced outage. The outage optimization team also stated nuclear personnel may not provide them with complete contractor craft data due to their inability to obtain this information. Specifically, one reason provided for this lack of data is that contractors subject to fixed price contracts may not provide craft data because they are not obligated to provide such information. Providing accurate and complete data to the outage optimization team permits effective creation of schedules to allow for mitigation of craft labor shortages.

⁹ TVA's Diet and Exercise initiative was announced on February 9, 2012. This initiative included making changes within cost areas to provide immediate savings or cost reductions and sustaining those cost-reduction programs to maintain TVA's health.

¹⁰ These participants were formerly FPG and FGD&C employees.

¹¹ Alliance partners are contractors who have formed a partnership with TVA. Information is gathered from them as well as other contractors to aid in the determination of the outage schedule.

TVA directs contractors to complete labor studies for construction projects exceeding a certain dollar threshold. We reviewed craft labor studies prepared by contractors responsible for certain TVA projects to determine whether shortages were expected. Labor studies included statistics for the number of craft required to complete the project, probability of craft labor shortages, utilization of traveler craft rather than local craft, and indications of potential use of substitute craft. A craft labor study recently completed as part of the Sequoyah Steam Generator Replacement project mentioned shortages were expected to occur in the pipefitter craft. This was confirmed by the Senior Program Manager, D&LR, who stated D&LR was currently working with the unions to implement an agreement which would allow for substitutions of boilermakers for pipefitters¹² on the Sequoyah Steam Generator Replacement project.

These labor studies, which are created for certain projects, only provide (1) a snapshot of known internal and external competing projects at a specific moment in time and (2) information based on the projected length of the project. A centralized labor study constructed and updated by TVA on an ongoing basis could provide more valuable information related to potential labor shortages and to aid in planning of all TVA projects. In addition, duplication of effort could be reduced, which creates opportunities for cost savings.

As stated previously, one of the actions TVA is utilizing to mitigate the risk of craft labor shortages is the substitution of one craft with another craft having a similar type of skill sets necessary for the job. To substitute craft, training may be necessary to enhance the skill set of the individual. Craft training programs, another TVA mitigation action, designed to increase the skill set of the craft, including substituted craft, are provided by the unions. According to TVA management, there is concern related to the skill level of current craft; therefore, the potential for concerns related to substitute craft exists. This could pose a risk of decreased productivity considering substitute craft may not be as qualified to perform jobs. TVA contributes monies to the craft training programs; however, there is limited monitoring¹³ of skills training performed by TVA.

According to the Senior Program Manager, D&LR, the Electric Power Research Institute Standardized Task Evaluation program would be a good option for TVA to effectively measure the skill level of craft employees. The program is designed to (1) help utilities reduce training costs, (2) make more efficient use of supplemental workers, (3) improve training records management, and (4) help workforce provider organizations streamline their qualification procedures. Without monitoring the craft training mitigation action, it would be difficult to determine whether both substitutions and craft training are adequately mitigating the risk.

¹² Boilermakers are utilized within fossil operations, whereas pipefitters are utilized within nuclear operations. These types of craft share a similar skill set, however, work in different environments.

¹³ According to the Senior Program Manager, D&LR, the NPG tests craft labor in the areas of welding and rigging. In addition, we noted there was limited monitoring of apprentices as discussed below.

Mitigation Actions Conflict with TVA's Diet and Exercise Initiative

TVA uses two primary tools to mitigate the risk of shortages due to competition: the scheduling of planned outages and increasing compensation and benefits. As discussed below, these tools sometimes conflict with TVA's Diet and Exercise initiative.

The primary tool utilized by TVA to mitigate the risk of craft labor shortages due to competition is outage scheduling. To aid in the scheduling of planned outages, discussions among TVA personnel, including the outage optimization team, occur. As stated previously, the outage optimization team is comprised of employees in GC,¹⁴ and their responsibilities include conducting periodic meetings to create detailed outage schedules with input from contractors and union halls as well as TVA organizations such as NC, NPG, and Generation. In addition, a D&LR employee semiannually holds informal discussions with other utilities in the Southeast about existing projects and scheduling to avoid bidding issues between competitors and shortages of craft labor during outages. The outage optimization team, according to TVA personnel, currently is working to lengthen outage schedules so that craft can transition from one job to the next to provide a steady stream of work for the existing contractor craft labor workforce in the Tennessee Valley.

Another tool utilized by TVA to mitigate the risk of competition is the increase of compensation and benefits. Agreements between TVA and the Council require TVA to pay prevailing wage rates¹⁵ and establish the methodology of calculating those rates. While TVA is required to pay prevailing wage rates, there are certain circumstances where TVA may pay in excess of these rates referred to as premium pay. This may occur when there are craft shortages for existing projects. For example, during the Lagoon Creek Combined Cycle Plant construction project, there was a shortage of welders, which led TVA to increase compensation to attract welders to complete the project. D&LR personnel stated they prefer this action to be the exception rather than the rule.

Inconsistencies exist between the outage scheduling and increased compensation and benefits mitigation actions and TVA's Diet and Exercise initiative. As stated previously, TVA's Diet and Exercise initiative included making changes within cost areas¹⁶ to provide immediate savings or cost reductions and sustaining those cost-reduction programs to maintain TVA's health. Current mitigation actions designed to attract and retain contractor craft labor do not align with TVA's current cost-cutting efforts, which include decreasing contractor costs. According to the Senior Program Manager, D&LR, core contractor craft employees have been cut back at several nuclear plants and almost completely removed at multiple fossil plants as part of the Diet and

¹⁴ These participants were formerly FPG and FGD&C employees.

¹⁵ Prevailing rate is defined in TVA Standard Programs and Processes 11.1.6, "Contractor Workforce Management," as ". . . a minimum rate of compensation, based on relevant data, determined to be most common for workers performing similar work in a particular locality."

¹⁶ These cost areas include nonfuel inventory, overtime, vacancies, management consultants, and managed task and staff augmentation contractors.

Exercise initiative. Reductions also include decreasing the number of contractors used during outages. Cost-saving actions similar to this could increase the risk of future craft labor shortages due to the potential loss of contractor craft to projects outside of TVA. Utilizing more of the annual workforce during outages rather than contractor craft labor could also result in decreased productivity and lengthened outage and project schedules in the short-term due to the reliance on annual craft that may have to refresh certain skill sets. While outage scheduling and increased compensation and benefits mitigation actions may be valid, the actions may no longer be a viable option based on the inconsistency with TVA's Diet and Exercise initiative. In addition, we determined, based on discussions with TVA personnel and review of ERM documentation, no efforts had been made to reassess the risk severity or mitigation strategies for craft labor staffing.

Mitigation Plans for Shrinking Labor Pool Risk Are Deficient

TVA is currently lacking in strategies to mitigate the risk of a shrinking labor pool. According to TVA's ERM document, mitigation plans for addressing this risk consist of (1) craft training programs and (2) benchmarking with the Utility, Building, and Construction Industry Employer Association for additional mitigation strategies. However, we noted the first mitigation was ineffective and the second was not being performed. We noted there were two additional actions taken with regard to mitigating this risk; however, these actions were limited and in our opinion, do not adequately mitigate the risk. Specifically, actions include contributing monies to the Helmets to Hardhats program and partaking in discussions with trades and labor educators and graduates.

Craft Training Programs Mitigation is Ineffective and Does Not Address Shrinking Labor Pool Risk

TVA contributes monies to craft training programs, which include skills training for apprentices; however, contractors and unions are relied on to provide the training. According to two of the surveyed union representatives, much of this training is performed on the job. D&LR personnel stated discussions are held with the unions, contractors, and Building and Trades Association as to the importance of apprenticeship programs to cultivate the craft. In addition, TVA agreements include language allowing for up to 33-1/3 percent of work on TVA projects to be performed by apprentices. However, we noted there was limited monitoring performed by TVA of the training programs. Without monitoring, TVA does not know whether the risk is being managed.

According to D&LR personnel, in the past the unions submitted quarterly apprenticeship program reports to TVA for review; however, those reports have not been submitted in over 10 years. Instead, a specific target percentage has been set by TVA for jobs to utilize a certain percentage of apprentices. This target is being monitored for TVA's alliance partners who primarily work TVA outages; however, the 20-percent target set by TVA is not being met. Explanations provided by TVA personnel for the lack of apprentices were (1) reductions in craft labor staffing levels negatively affect the number of apprentices because they are generally the first to be dismissed and (2) the

hours of work and associated compensation levels do not provide enough money to maintain cost of living. In addition, we noted union memberships are on the decline, which may also affect the apprenticeship program.¹⁷ According to surveyed union representatives, apprentices drop out of the apprenticeship program due to a lack of commitment or discipline, because work is considered too difficult, lack of work within the Valley, or due to drug and alcohol abuse. Furthermore, the general consensus among some TVA personnel in Generation and a union representative we surveyed is the younger generation is more interested in jobs that require a college education rather than learning a trade.

According to a 2007 Edison Electric Institute presentation,¹⁸ the traditional approach to acquiring necessary craft labor has generally been to rely on independent contractors to acquire workers from a deep and liquid pool. However, in the emerging craft labor market, contractors and labor supply sources may not, on their own, create solutions in time to meet utility needs. Furthermore, the presentation stated both craft labor and contractors perceive workloads to be a temporary spike and are likely to be weak partners in craft labor solutions that seek to expand supply because their best risk/return solution is to maximize existing supply/capabilities. In addition, we determined craft training programs for apprentices only focus on the individuals who have already decided to join the trades and labor workforce and are not designed to attract new entrants.

Benchmarking Mitigation Action Was Not Being Performed

TVA's ERM document also contains a mitigation strategy related to benchmarking with the Utility, Building, and Construction Industry Employer Association for additional mitigation actions. We interviewed TVA personnel responsible for risk ownership, risk management, and benchmarking; and none could provide an explanation as to the existence of the association or any additional benchmarking. In addition, we performed Internet and TVA Intranet searches and could not confirm the existence of the association. D&LR personnel stated this mitigation action could refer to the informal meetings they have with other utilities within the Southeast as noted previously or the benchmarking performed to determine prevailing wages. Based on discussions, no benchmarking was performed to identify additional mitigation actions.

Additional Mitigation Actions Were Limited in Mitigating Risk

Additional actions taken by TVA to mitigate the risk of a shrinking labor pool include contributions to the Helmets to Hardhats program as well as speaking to local trades and labor educators and graduates. In January 2012, TVA began contributing to the Helmets to Hardhats program, which aids in the attraction of former military personnel to the trades and labor profession. Since these efforts just began, we were not able to discern whether this program was achieving its intended purpose. We were also informed by D&LR personnel that the Senior

¹⁷ Data was obtained from the U.S. Bureau of Labor Statistics for 2009 through 2011.

¹⁸ Scott Madden Management Consultants, *Planning Strategically for the Workforce of the Future – EEI Strategic Issues Roundtable*, February 7-9, 2007.

Program Manager, D&LR, attends graduation ceremonies at local trades and labor schools to discuss the benefits of the profession and potential careers with TVA's contractors. The Senior Program Manager, D&LR, also attends Southeastern Manpower Tripartite Alliance meetings to discuss craft labor with industrial owners, contractors, and labor organizations. In addition, NC personnel responsible for the construction of Bellefonte Nuclear Plant stated contact had been made with local trades and labor schools to discuss curriculum. While these efforts may be beneficial to TVA, they are limited and only focus on individuals who have made the decision to enter the trades and labor workforce.

TVA personnel also informed us that in the past, TVA had representation at the Tennessee Energy, Industry, and Construction Consortium (TEICC) meetings. Participation in the TEICC included discussions and actions for educating middle and high school students, as well as parents, about the benefits of the trades and labor profession. However, participation in the consortium no longer occurs. While participation in the TEICC would be beneficial to TVA, we noted middle and high school participation in career technical programs only increased approximately 7 percent as of 2011¹⁹ since the commencement of the TEICC in 2007. Of that increase, there was approximately a 19-percent increase in high school student participation in trades and industrial programs; however, there was over a 40-percent decline in the number of middle school students participating in career technical programs. This indicates that while participation in the TEICC meetings would be beneficial, it should not be the only action taken by TVA to mitigate the risk of a shrinking labor pool. Also, we noted there has been no TVA participation in state consortiums outside Tennessee.

While TVA personnel admit potential craft labor shortages are a concern for the industry, the above actions do not appear to take into consideration the fact that craft labor shortages are an impending problem for TVA's long-term future. Rather, the above actions focus more on the quantity and quality of the current craft labor workforce within the next few years. Due to the aging workforce and the fact that enrollment within the trades and labor arena is decreasing, there is a risk that individuals with the skill set needed to maintain TVA's fleet will disappear. According to the U.S. Census Bureau (as shown in Table 1), the population enrolled in vocational programs, including trades and labor, has significantly decreased over the past several years. Despite the slight upswing in 2009, which a CNBC news article attributes to the economy, the numbers continued to drop in 2010.

¹⁹ This information was obtained from the Tennessee Department of Education.

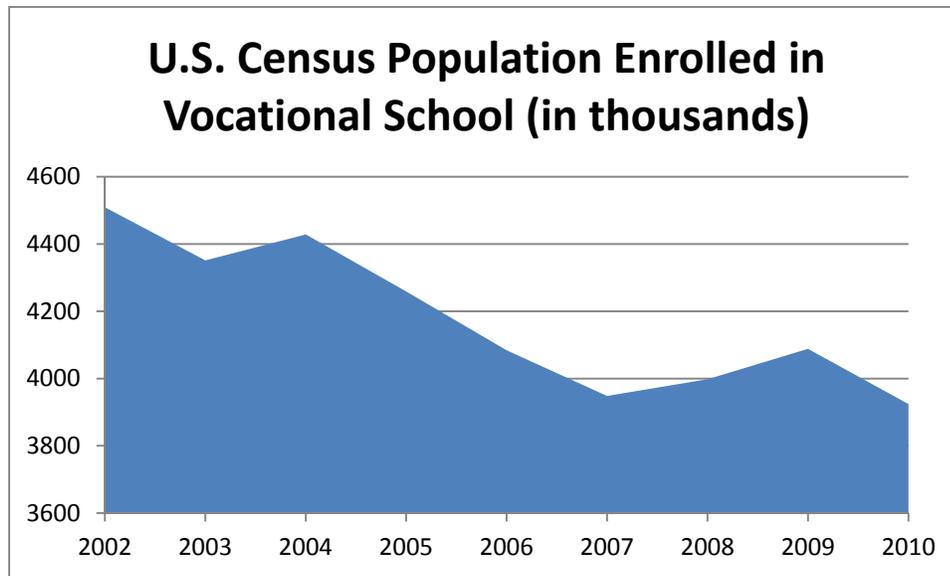


Table 1

In addition to the decline in the vocational school enrollment, the utility industry is faced with the fact that approximately 53 percent of its workforce is close to or of the retirement age.²⁰ This, along with the fact that the highest number of individuals enrolled in vocational schools is near or of retirement age and the lowest number of enrollees, excluding those 65 and older, are 15 to 24²¹ years of age, may be concerning to TVA's future operation (see Table 2).

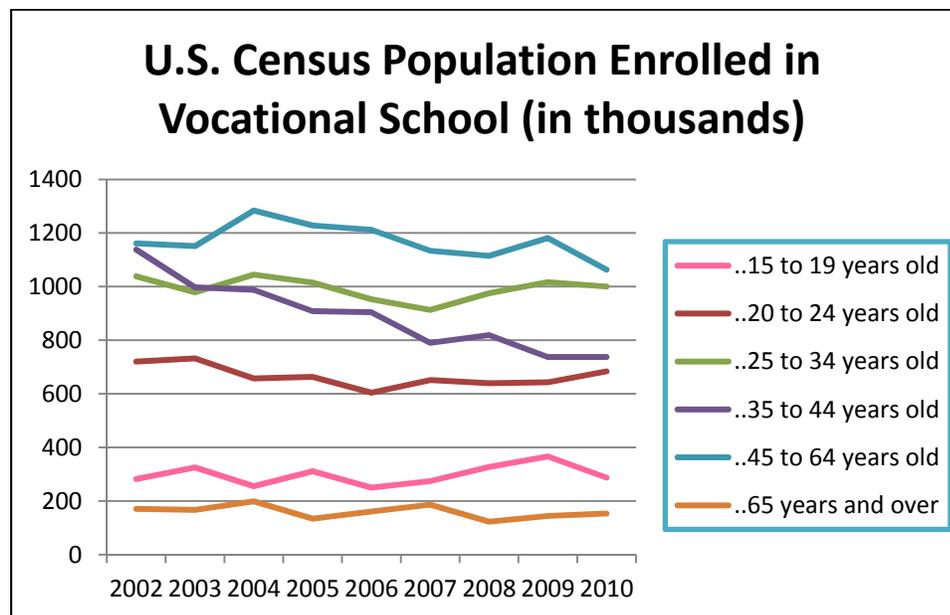


Table 2

²⁰ As of 2008, this was the percentage of potential utility workforce retirements reported by the U.S. Bureau of Labor Statistics, Career Guide to Industries, 2010-2011 edition.

²¹ According to U.S. Census Bureau data, individuals enrolled in school below the college level are not asked about vocational enrollment.

This also poses a risk to the construction industry, which could be detrimental to TVA's future plans for constructing facilities to add to TVA's generation. According to an advertisement for the Helmets to Hardhats program, the former Senior Vice President (SVP), Communications, who is currently the SVP, D&LR,²² "We have a skilled labor shortage in the construction industry. One of the biggest challenges we face is the shortage of qualified skilled craftsmen to do maintenance work and outage work so that our power plants will run efficiently all of the time in order to meet the growing needs for reliable, low-cost energy." TVA's IRP,²³ which guides the Chief Executive Officer in energy resource planning and selection, included plans for:

- Increasing the contribution of nuclear generation 1,150 to 5,900 megawatts with the first new unit after Watts Bar Nuclear Plant coming online no sooner than 2018.
- Using natural gas as an intermediate supply source, which may include constructing additional combined-cycle plants.

U.S. Bureau of Labor Statistics' employment projections for 2010 through 2020 state "Industries and occupations related to health care, personal care and social assistance, and construction are projected to have the fastest job growth between 2010 and 2020." Specifically, one job in the construction industry expected to have a higher than average growth rate is the pipefitter that TVA utilizes.²⁴ This is concerning since (1) there are fewer individuals entering the trades and labor workforce, (2) approximately 53 percent of the workforce is near or at retirement age, and (3) TVA is already experiencing shortages of pipefitter/welders as previously stated. According to the 2007 Watts Bar Unit 2 labor study, both pipefitters and electrical crafts presented the greatest staffing concern, and it was likely that at least 50 percent travelers would be needed to reach the peak requirements for each of these crafts. The Sequoyah Steam Generator Replacement Project labor study also stated staffing concerns with these types of craft. These factors could jeopardize TVA's future plans for increasing generation through construction of facilities as documented in the IRP.

Risk Identification and Assessment Process Needs Improvement

The risk identification and assessment process for the craft labor staffing risk needs improvement. Specifically, we determined (1) organizations did not collaborate effectively with respect to risk identification and mitigation and (2) risks, including the effectiveness or progression of mitigation actions, were not monitored. In addition, we identified a lack of knowledge transfer for positions crucial to risk management.

²² The SVP, D&LR, served as the SVP, Communications, from March 2006 through April 2007.

²³ The TVA Board of Directors approved the IRP on April 14, 2011.

²⁴ Fossil and Nuclear personnel identified 'at-risk' positions at TVA as being pipefitter/welders, boilermaker/welders, electricians, and ironworkers. These positions are vital not only to the operation and maintenance of TVA's facilities but also to the construction planned by TVA.

Lack of Collaboration Regarding Risk Identification and Mitigation Actions

According to the TVA's ERM Guidelines, "Many risks affect multiple organizations within TVA. These "cross-cutting" risks require appropriate communication and coordination across SBUs. The ERM organization will promote and facilitate cross-cutting risk discussions to enhance TVA's ability to effectively manage the risks." Coordination of these "cross-cutting" risks could help decrease potential duplication of efforts across TVA and improve prioritization of enterprise-wide risks. As stated previously, the craft labor shortage risk was identified on TVA's ERM as one of the top five risks in two categories. Specifically, the risk was identified by D&LR as the risk of staffing resources for outages and projects and categorized as a talent management risk. By identifying the risk, D&LR was assigned as "owner" of the risk, even though all TVA operating organizations are affected by craft shortages. The risk was also identified by GC, formerly FGD&C, as the risk of contractor craft quality and availability and categorized as a capacity expansion and construction risk. Of the top five risks listed on the ERM under these categories, the craft labor staffing risk was ranked fourth in the talent management category, whereas, it was ranked as the top risk in capacity expansion and construction. According to TVA's ERM document, there were no mitigation plans provided for the risk identified by GC. This is not in accordance with TVA's ERM Guidelines which state, "If it is decided that a risk should be mitigated, an action plan must be developed to ensure that the organization's risk management plans are executed . . . Each risk mitigation plan must have detailed actions that support it. Each action in the plan must be clearly defined, measurable, and have clear accountability."

We also noted one of the mitigation strategies for addressing craft labor shortage was also identified as a risk on the ERM. As stated previously, D&LR identified four mitigation activities including (1) scheduling outages to enable a steady stream of work to the already existing labor force in the Tennessee Valley, (2) craft training programs, (3) benchmarking with the Utility, Building, and Construction Industry Employer Association for additional mitigation actions, and (4) increasing compensation and benefits marginally above market levels and/or utilizing other crafts with the desired skill sets. Of these four mitigation activities, outage scheduling is the primary tool used to mitigate the risk of craft shortages from competition. However, this mitigation was also ranked as one of the top five risks in the internal processes and procedures risk category.

To effectively mitigate the risk, collaboration must exist. While D&LR is instrumental in getting the right people, the operating organizations must communicate their long-term needs, as well as identify alternative mitigation strategies to reduce the need for craft labor. To prevent duplication of efforts regarding risk assessment and associated mitigation actions, organizations should collaborate on risks and associated mitigation plans. This collaboration process would help determine the severity of the risk and whether there are gaps in mitigation strategies.

Assessment of Risk Severity Needs Improvement

Monitoring of risk severity and related effectiveness and progression of mitigation actions did not occur for the craft labor shortage risk. We noted during our review TVA did not know the number of contractors it employed. Without knowing the number of contractors utilized by TVA, we question how the risk and its severity were determined. As stated previously, certain actions for mitigating craft labor risk were not performed by TVA. Instead, TVA relies on the contractors to monitor and mitigate the risk of a craft labor shortage. Without monitoring the mitigation actions, it would be difficult for TVA to determine whether craft labor was still a risk and if so, the severity of the risk. TVA's ERM Guidelines state strategic business units will be responsible for periodically reviewing treatment plans to measure their progress, effectiveness, and appropriateness. However, we noted mitigation strategies are only being reviewed on a semiannual basis as stated in the ERM Guidelines. In addition, according to page 15 of *Enterprise Risk Management Best Practices: From Assessment to Ongoing Compliance*,²⁵ "An ERM program will not be effective if it is designed and implemented but not monitored after initial completion." The accuracy of the ERM document is imperative in TVA's risk assessment process to ensure ". . . proper prior planning prevent[s] poor performance . . .", the Six Ps of success.²⁶

In addition to the above, we noted the craft labor mitigation actions did not consider the risk of a shrinking labor pool. All mitigation actions assume a craft labor pool exists; however, as noted previously, that may not be the case. One of the reasons for this assumption could be that TVA's ERM guidelines state organizations should measure each risk probability of occurrence in the next 3 to 5 years. Given the predicted shortage of craft labor, future planned construction noted in TVA's IRP, and the time horizon associated with both, consideration of the risk probability of occurrence outside of that time period may be necessary. In addition, since the existence of a craft labor pool is an uncertainty for which TVA has no control, it is necessary for TVA to identify alternative mitigation strategies within the control of the organization. These may include identifying opportunities for implementing new technology and maximizing process efficiencies as well as other strategies for reducing the need for craft labor.

Lack of Knowledge Transfer for Positions Crucial to Risk Mitigation

Based on discussions with TVA personnel, reliance for carrying out risk mitigation actions was placed on the Senior Program Manager, D&LR, with limited assistance from the affected organizations. This individual attends meetings and events pertaining to craft labor, negotiates and administers project labor agreements, and serves as the primary point of contact for the unions. The current incumbent was previously a General Manager in the Fossil Operations and Outage Improvement organizations. Knowledge and experience gained

²⁵ Anne M. Marchetti, *Enterprise Risk Management Best Practices: From Assessment to Ongoing Compliance*.

²⁶ The Six Ps of success were mentioned as a way to ensure success by TVA's Chief Executive Officer in the May 25, 2012, edition of *TVA Today*.

from having this operational background is beneficial with regard to maintaining TVA relationships with unions and contractors. According to D&LR personnel, there is no individual assigned to assume responsibilities in the event the current incumbent is not able to perform his job duties. This is important since the job has been identified as crucial due to the building of relationships with contractor and union personnel as well as knowledge transfer related to project agreements.

CONCLUSION

Craft labor is vital to the success of TVA. It is one of the main components utilized in the maintenance and construction of TVA plants and will continue to be a factor in TVA's future plans. Because of this, craft labor shortage risk was identified by TVA as one of its top risks to be mitigated. Despite this, there are differing opinions as to whether TVA is currently experiencing craft labor staffing shortages. Some TVA personnel believe there is currently no risk associated with craft labor shortages because the current supply of workers seems to exceed the demand; however, others believe the already shrinking craft labor pool is being stretched to its limits by TVA and other competitors vying for labor necessary to complete planned or unexpected projects. These differing opinions could play a role in TVA's current cost-cutting initiatives. If contractor costs are cut too deeply, the Diet and Exercise initiative may undermine the current mitigation actions for addressing craft labor shortages.

TVA has passed the management of craft labor risk related to the shrinking labor pool to contractors, unions, and other outside organizations. While future craft labor shortages have been identified as an industry problem, little or no action has been taken by TVA to address this risk. Because TVA does not know how many contractors it actually employs, we question whether TVA realizes the severity of the craft labor shortage risk. In our opinion, TVA, as part of its economic development mission, has an obligation to participate in efforts to replenish shrinking craft labor pools. In addition, to achieve future long-term goals as identified in TVA's IRP, it is necessary to develop actions for attracting and retaining craft labor and/or look for alternative solutions to achieve those goals.

RECOMMENDATIONS

We recommend the Senior Vice President, D&LR, in conjunction with GC, Coal Operations, Gas Operations, NC, and NPG:

1. Obtain more accurate and useful contractor craft data to utilize in the outage planning process.
2. With respect to the risk of craft labor shortages arising from competition:
 - Implement actions to monitor and/or mitigate the risk rather than rely on outside parties to do so.
 - Consider performing and centralizing labor studies for TVA projects.
3. Monitor training of craft and apprenticeship records to determine whether the mitigation action is adequately addressing the risk of craft labor shortages. In lieu of monitoring, consider implementing Electric Power Research Institute Standardized Task Evaluations.
4. Reassess the risk severity and mitigation strategies to verify risk severity and determine whether additional/alternative mitigation actions need to be implemented to align with current management initiatives such as Diet and Exercise.
5. Update the ERM documentation to only reflect those mitigation strategies that are planned to be utilized or are being utilized.
6. With respect to the risk of craft labor shortages arising from a shrinking labor pool, identify:
 - Additional options for attracting new entrants to the trades and labor workforce.
 - Opportunities where craft labor could be reduced.
7. Collaborate with Risk Management to avoid duplication of risk across ERM categories and assess whether gaps occur in mitigation strategies.
8. Establish an internal process for monitoring the risk, severity, and mitigation actions when changes occur in the business environment and on a more frequent basis than semiannually.
9. Institute a process for transferring knowledge and building relationships within and outside TVA from the Senior Program Manager, D&LR, to other individuals within D&LR.

MANAGEMENT'S RESPONSE AND OUR EVALUATION

TVA management agreed with the findings and recommendations but took exception to the usage of a quote included in the report, which was obtained from a Helmets to Hardhats brochure. Specifically, management believed the quote was included to justify one of the findings and took exception to including the quote since it was made more than 5 years ago. While the quote is not the basis of our findings, it was utilized to support the fact that craft labor shortages have been not only a TVA risk, but an industry risk for the past several years. By using the quote from the brochure, it was our intent to credit D&LR personnel for recognizing craft labor shortage as a risk.

September 7, 2012

Robert E. Martin, ET 3C-K

REQUEST FOR COMMENTS – DRAFT AUDIT 2011-14158 – CRAFT LABOR SHORTAGE RISK
MITIGATIONS COULD BE IMPROVED

TVA management has reviewed the report of the OIG's audit regarding TVA's craft labor staffing. Based on the findings and recommendations listed in the report, Diversity and Labor Relations (D&LR) in coordination with Nuclear, Nuclear Construction (NC), Generation, and Generation Construction (GC) plans to proceed as indicated in the table below.

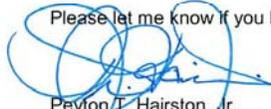
On page 11 of the report, a quote made by me was included to justify one of the findings. Management takes exception to including the quote since it was made more than five years ago. If it is necessary to include a quote, it is preferred that the audit team schedule an appointment with management.

TVA's Management Response to Recommendations		
OIG Recommendation	TVA Management's Planned Action	Estimated Implementation Date
1. Obtain more accurate and useful contractor craft data to utilize in the outage planning process.	D&LR will collaborate with the operating groups in an effort to more accurately capture data for the outage planning process. The Outage Optimization teams will continue to be utilized. D&LR will also reach out to the various operating groups and request full participation on all teams.	December 2012
2. With respect to the risk of craft labor shortages arising from competition: <ul style="list-style-type: none"> Implement actions to monitor and/or mitigate the risk rather than rely on outside parties to do so. Consider performing and centralizing labor studies for TVA projects. 	TVA will develop the monitoring capabilities in-house or utilize the services of a labor consultant who is currently providing a similar service to TVA's competitors.	March 2013
3. Monitor training of craft and apprenticeship records to determine whether the mitigation action is adequately addressing the risk of craft shortages. In lieu of monitoring, consider implementing Electric Power Research Institute (EPRI) Standardized Task Evaluations.	D&LR will work with the operating groups and the unions to gain acceptance of EPRI's model. Once an agreement is established, the plan is to implement the EPRI evaluations model.	August 2013
4. Reassess the risk severity and mitigation strategies to verify risk severity and determine whether additional/alternative mitigation actions need to be implemented to align with current management initiatives such as Diet & Exercise.	D&LR is in the process of updating the associated risk severity, consequence, and mitigation actions as part of the 4th Quarter TVA risk assessment update. D&LR will coordinate risk severity, consequence, and mitigation actions with other organizations that also identify a similar risk on their risk maps.	September 2012
5. Update the ERM documentation to only reflect those mitigation strategies that are planned to be utilized or are being utilized.		September 2012

Robert E. Martin
Page 2
September 7, 2012

<p>6. With respect to the risk of craft labor shortages arising from a shrinking labor pool, identify:</p> <ul style="list-style-type: none"> • Additional options for attracting new entrants to the trades and labor workforce. • Opportunities where craft labor could be reduced. 	<p>TVA management will identify additional opportunities to increase the labor pool and reduce craft labor where possible.</p>	<p>Ongoing</p>
<p>7. Collaborate with Risk Management to avoid duplication of risk across ERM categories and assess whether gaps occur in mitigation strategies.</p>	<p>D&LR will collaborate with Risk Management to reduce duplication and coordinate risk severity, consequence, and mitigation actions with other organizations that also identify a similar risk on their risk maps.</p>	<p>September 2012</p>
<p>8. Establish an internal process for monitoring the risk, severity, and mitigation actions when changes occur in the business environment and on a more frequent basis than semiannually.</p>	<p>D&LR will implement an internal process for monitoring the risk, severity, and mitigation actions on a more routine basis.</p>	<p>December 2012</p>
<p>9. Institute a process for transferring knowledge and building relationships within and outside TVA from the Senior Program Manager, D&LR, to other individuals with D&LR.</p>	<p>An additional employee has been assigned to the Senior Program Manager, D&LR in an effort to begin the knowledge transfer process.</p>	<p>Ongoing</p>

Please let me know if you have questions.



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