



Memorandum from the Office of the Inspector General

January 24, 2017

Robert M. Deacy, Sr., LP 5D-C
John J. McCormick, Jr., BR 4D-C

REQUEST FOR MANAGEMENT DECISION – EVALUATION 2016-15390 – JOHN SEVIER FOSSIL PLANT DEMOLITION PROGRAM

John Sevier Fossil Plant (JSF) is the first in the series of planned plant retirements to enter the demolition phase of the Tennessee Valley Authority's (TVA) Decommissioning, Deactivation, Decontamination, and Demolition (D4) process. In the demolition phase, the plant, associated equipment, facilities, and structures are removed. Demolition also includes creating conditions for proper site drainage and establishing vegetation. TVA contracted with Brandenburg Industrial Service Company¹ (Brandenburg) to perform the demolition at JSF.

We initiated this evaluation due to inherent safety risks associated with the demolition phase of deconstruction and TVA's lack of recent experience in fossil plant demolition. Our objective was to determine whether demolition activities at JSF adhere to safety principles found in the TVA D4 Program Guide² and are in compliance with selected safety criteria established in Brandenburg's Health and Safety Plan (HASP) for JSF.

During our evaluation, we found TVA and Brandenburg met most safety requirements established in TVA's D4 Program Guide and Brandenburg's HASP for JSF. However, we determined (1) Brandenburg was not in compliance with hazard identification requirements outlined in its HASP, and (2) D4 Overview training records were not maintained at JSF by Brandenburg for 6 of 25 sampled Brandenburg employees. We also noted potential safety hazards that were corrected subsequent to our site visit.

We recommend the Senior Vice President, Generation Construction, Projects and Services develop (1) a monitoring plan to verify Brandenburg or future D4 contractor is in compliance with its HASP and (2) a process to verify employees attend required training and the D4 contractor maintains all training records.

TVA management agreed that Brandenburg was not in compliance with hazard identification requirements outlined in its HASP. However, management disagreed with our recommendation of developing a monitoring plan because they already perform

¹ Brandenburg specializes in demolition and environmental remediation, which includes asbestos abatement, hazardous material removal, soil remediation, asset recovery, and site preparation.

² TVA developed a guide to establish a standardized approach to the plant retirement process.

periodic reviews of contractor safety plans. Instead of developing a monitoring plan, management suggested focusing the recommendation on bringing safety observations into compliance with the HASP or revising the HASP. In addition, TVA management disagreed that Brandenburg was required to maintain training records for training that was administered by TVA but agreed with the recommendation. See the Appendix for TVA management's complete response.

We believe TVA management should further develop a monitoring plan to focus on continuous or more frequent monitoring endeavors to verify the D4 contractor is in compliance with its HASP. Also, we disagree with TVA management's opinion that Brandenburg is not required to maintain D4 Overview training records.

BACKGROUND

TVA refers to decommissioning, deactivation, decontamination, and demolition as D4 for its plant retirement program. Generation Construction describes the components of D4 as follows:

- Decommissioning involves removal of ash, hazardous materials, records, office furniture, etc.
- Deactivation is the process of severing power and piping to the plant to provide a cold, dark, and dry structure to the demolition contractor.
- Decontamination encompasses abatement of asbestos and removal of remaining hazardous materials prior to demolition.
- Demolition includes removal of the plant, associated equipment, facilities, and structures; creating conditions for proper site drainage; and establishing vegetation.

TVA developed a D4 Program Guide to establish a standardized approach to the plant retirement process. One of the key outcomes of TVA's D4 program is to perform each of the four stages in a safe manner. TVA stated it is prioritizing the safety of all personnel and has safety goals of zero fatalities and zero recordable injuries. A major challenge for the D4 program will be demolishing these assets with no injuries due to the inherent risks and safety challenges associated with plant demolition.

As shown in Table 1 on the following page, JSF is the first in the series of planned plant retirements to enter the demolition phase. JSF was completed in 1957 and supplied electricity through 2012. TVA released an environmental assessment in April 2015 that concluded demolition to a "brownfield"³ state would have the least environmental impact of any other alternatives considered. Other alternatives were less acceptable due to both short-term and long-term impacts and maintenance cost.

³ Brownfield is a condition that consists of demolishing the plant and related structures, backfilling the powerhouse basement, and grading and seeding the site for natural drainage, leaving the site suitable for future industrial development.

| Units | Planned Demolition Dates |
|---|--------------------------|
| John Sevier 1-4 | Began January 2016 |
| Paradise Coal Wash Plant | Began September 2016 |
| Widows Creek Fossil 1-8 | Begins October 2017 |
| Colbert Fossil 1-5 | Begins March 2018 |
| Paradise Fossil 1-2* | Begins July 2019 |
| Johnsonville Fossil 1-10 | Begins August 2019 |
| Allen Fossil 1-3 | Begins September 2019 |
| * TVA plans to continue operating Paradise Fossil Unit 3. | |

Table 1

TVA selected Brandenburg to perform demolition activities at JSF. TVA's D4 Program Guide required Brandenburg to develop and implement a site-specific safety plan. Accordingly, Brandenburg created a HASP to provide a healthy and safe work environment for employees directly involved in D4 activities at JSF. Brandenburg's HASP includes, but is not limited to, safety and health training, communication, and monitoring criteria to be followed in the performance of D4 activities.

We initiated this evaluation due to inherent safety risks during demolition activities and TVA's lack of recent experience in fossil plant demolition.

OBJECTIVE, SCOPE, AND METHODOLOGY

Our objective was to determine whether demolition activities at JSF adhere to safety principles found in the TVA D4 Program Guide and are in compliance with selected safety criteria established in Brandenburg's HASP for JSF. The scope included safety procedures in place during the demolition phase of JSF.

To achieve our objective, we:

- Reviewed TVA's D4 Program Guide and Brandenburg's HASP to gain an understanding of safety criteria established for the D4 program and the demolition phase at JSF.
- Selected safety requirements from Brandenburg's HASP based on the requirements we felt were related to our objective, clearly verifiable, and not requiring technical expertise, in order to determine whether Brandenburg was complying with the selected criteria.
- Visited JSF on September 15-16, 2016, and observed conditions and demolition activities being performed both inside and outside the plant.

- Reviewed the risk analysis, environmental review, and safety review required by the D4 Program Guide, and the engineering survey required by the HASP to verify they were completed.
- Randomly selected 25 of 83 Brandenburg employee records and selected 3 Brandenburg subcontract personnel⁴ records in order to determine if Brandenburg met medical and training requirements. We interviewed 27 of the 28 personnel⁵ noted above and 3 additional Brandenburg employees to (1) gain their perspectives on demolition safety practices and (2) determine if TVA and Brandenburg were providing them with appropriate direction and support.
- Selected 1 week in the middle of the demolition phase to verify (1) the completion of one Safety Task Analysis Card (STAC) each day and two Safety Assessment Cards (SAC)⁶ each week by craft employees,⁷ (2) the completion of one daily SAC by oversight personnel, (3) daily project reports, and (4) daily safety inspections were completed.

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

FINDINGS

During our evaluation, we found most safety requirements established in TVA's D4 Program Guide and Brandenburg's HASP for JSF were met. We visited JSF on September 15-16 and noted the following positive observations during our site visit:

- Professionalism and emphasis on safety exhibited by TVA and Brandenburg supervision.
- Meeting attended by Brandenburg personnel that included stretching, hazard reminders, and a safety briefing.
- Personal protective equipment worn by all site personnel.
- Gas tanks secured in upright position with safety caps in place.
- Prevalence of fire extinguishers.
- Frequent communication by site personnel.
- Hydration reminders throughout the site.

⁴ We selected 100 percent of subcontract personnel on Brandenburg's August 25, 2016, roster. Upon arrival at the site, we noted Brandenburg added 1 additional subcontract employee from HazTek Inc.

⁵ We did not interview 1 employee due to operational constraints in the field.

⁶ According to Brandenburg, the STAC is a tool employees use to identify and list the steps of their assigned task and hazards associated with that task. The SAC is a tool to assess work behaviors and suggest improvements for unsafe work practices or behaviors.

⁷ We included Brandenburg craft employees and Brandenburg subcontract personnel from Winter Environmental, HazTek Inc., and AtWork Personnel Services in our population of craft personnel.

However, we determined (1) Brandenburg was not in compliance with hazard identification requirements outlined in its HASP, and (2) D4 Overview training records were not maintained at JSF by Brandenburg for 6 of 25 Brandenburg employees⁸ sampled. We also noted potential safety hazards, including an unlabeled canister, uncapped fence posts, and a tripping hazard from a large metal plate that were corrected subsequent to our site visit.

BRANDENBURG NOT IN COMPLIANCE WITH HASP

Brandenburg's HASP for JSF states (1) each craft employee will be required to complete two SACs each week along with one STAC each day, and (2) oversight personnel will complete at least one SAC each day. We examined (1) STACs for 111 craft personnel, and (2) SACs for 106 craft personnel⁹ and 6 oversight personnel who were onsite the week of June 6, 2016.

We found some Brandenburg craft personnel did not meet the STAC and SAC requirements for the week of June 6, 2016. Our evaluation found 55 percent of craft personnel did not complete daily STACs, 26 percent¹⁰ of craft personnel did not complete at least two SACs, and 83 percent (5 of 6) of oversight personnel did not complete daily SACs for this selected week. Accordingly, Brandenburg is not in compliance with this safety reporting element of the HASP, which was approved by TVA and intended to promote workplace safety. Lack of compliance under this requirement could lead to lapses in safety awareness on the job.

SOME D4 TRAINING RECORDS NOT MAINTAINED

TVA's D4 Program Guide requires Overview training for demolition personnel who will be on site during demolition work. Further, Brandenburg's HASP requires training records to remain onsite for TVA review. We determined Brandenburg did not maintain all D4 Overview training records. During our site visit on September 15, Brandenburg was unable to provide D4 Overview training records for 6 of 25 Brandenburg employees included in our sample. Accordingly, Brandenburg was not in compliance with its policy of retaining training records onsite.

POTENTIAL SAFETY HAZARDS

During our site walk-through on September 16, we noted potential safety hazards that could cause injury or vehicle damage including (1) an unlabeled canister containing non-potable water (Figure 1 on the following page); (2) uncapped fence posts with exposed, sharp corners along a common walkway (Figure 3 on the following page); and (3) corners of a large metal plate were not flush with the ground, with one corner extending up to approximately 1 foot above ground level (Figure 5 on report page 7). Brandenburg agreed these conditions presented potential safety hazards and corrected the conditions by

⁸ TVA subsequently provided training records for these employees.

⁹ For SAC compliance, we excluded the 5 craft personnel who were not present at least 3 days.

¹⁰ Eight SACs were missing the name and/or date and could not be counted as completed. Consequently, the number of employees who met the SAC requirement may have been higher.

(1) labeling the non-potable water canister (Figure 2 below), (2) installing protective caps on fence posts we identified (Figure 4 below), and (3) mechanically flattening the metal plate to lessen the likelihood of injury or vehicle damage (Figure 6 on the following page).

BEFORE

AFTER

Figure 1: Unlabeled Canister

Figure 2: Labeled Canister



Figure 3: Uncapped Fence Post

Figure 4: Capped Fence Post



BEFORE

Figure 5: Metal Plate With Raised Corners



AFTER

Figure 6: Flattened Metal Plate



RECOMMENDATIONS

We recommend the Senior Vice President, Generation Construction, Projects and Services:

1. Develop a monitoring plan to verify Brandenburg or future D4 contractor is in compliance with its HASP.

TVA Management's Comments – TVA management agreed that Brandenburg was not in compliance with hazard identification requirements outlined in the HASP. However, in response to our recommendation, management stated periodic reviews of contractor safety plans are already performed in accordance with the D4 Program Guide and TVA Safety Manual, and do not believe another monitoring plan is required. Rather than developing a monitoring plan, management suggested the recommendation should focus on bringing safety observations into compliance with the HASP, or revising the HASP.

See the Appendix for TVA's complete response.

Auditor's Response – While we agree with management's plan to evaluate the benefits of revising the HASP to focus on the quality of safety observations, we believe TVA management should further develop a monitoring plan to focus on continuous or more frequent monitoring endeavors to verify the D4 contractor is in compliance with its HASP.

2. Develop a process to verify employees attend required training and the D4 contractor maintains all training records.

TVA Management's Comments – TVA management agreed with our recommendation but stated the D4 Program Guide does not require Brandenburg to maintain D4 Overview or other TVA administered training. Therefore, management requested the removal of the statement regarding Brandenburg not being in compliance with their policy of retaining training records on site. Management also stated that the D4 Program Guide addresses some elements of the recommendation, but they will revise this guide, and possibly other documents, to require a more comprehensive approach to tracking and documenting training.

See the Appendix for TVA's complete response.

Auditor's Response – We agree with management's plan to revise the D4 Program Guide and other documents to require a more comprehensive approach to tracking and documenting training. However, we disagree with TVA management's opinion that Brandenburg is not required to maintain D4 Overview training records. The TVA JSF Plant Specific Training and Orientation Plan indicated training records, including training administered by TVA, will be maintained on site and readily available upon request. Additionally, TVA provided all D4 Overview training records we were unable to locate at JSF, and we have revised the body of the report accordingly.

Additional TVA Management's Comments – TVA management also offered additional comments regarding zero recordable injuries, no environmental events, and updated SAC statistics.

See the Appendix for TVA's complete response.

Auditor's Response – We did not verify the validity of management's comments regarding recordable injuries, environmental events, or updated SAC statistics.

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Your written comments, which addressed your planned actions to verify employees attend required training and to maintain training records, have been incorporated into the report. Please advise us of your management decision for Recommendation 1 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 need additional information, please contact Christopher E. Sheets, Senior Auditor, at (865) 633-7362 or E. David Willis, Director, Evaluations, at (865) 633-7376. We appreciate the courtesy and cooperation received from your staff during the evaluation.



David P. Wheeler
Assistant Inspector General
(Audits and Evaluations)
ET 3C-K

CES:FAJ
Attachment

cc (Attachment):

TVA Board of Directors
Robertson D. Dickens, WT 4D-K
Joseph P. Grimes, LP 6A-C
William D. Johnson, WT 7B-K
Dwain K. Lanier, MR 6D-C
Justin C. Maierhofer, WT 7B-K
Richard W. Moore, ET 4C-K
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OIG File No. 2016-15390



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

January 5, 2017

Mr. David P. Wheeler
Assistant Inspector General
Office of Inspector General
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Dear Mr. Wheeler:

2016-15390-JOHN SEVIER FOSSIL PLANT DEMOLITION PROGRAM - RESPONSE

Thank you for taking the time to evaluate the John Sevier Fossil Plant demolition program. We appreciate the cordial and cooperative manner in which the evaluation was conducted and welcome the opportunity for independent program reviews. The findings and recommendations contained in this draft report will be used to strengthen our D4 program as we are always open to continuous improvement opportunities.

We have reviewed the draft report and have the following observations, comments and requested changes:

Page 5 – Brandenburg Not in Compliance with HASP

- We agree with the findings contained in this section

Page 5 – Some D4 Training Records Not Maintained

- Brandenburg is not required to maintain records of the D4 Overview Training that is administered by TVA. The employee training section of the HASP (Paragraph 4.3 on page 8) pertains to Brandenburg training, not TVA training (The HASP is a Brandenburg document). This also means that Brandenburg is only required to keep copies of their own training records on site.
- The D4 Program Guide (a TVA document) requires that all personnel involved in D4 work at each site receive the TVA administered D4 Overview Training, but does not require that the training records be kept on site. We do agree that maintaining the records on site is appropriate, and we plan to do that going forward, but the D4 Program Guide does not require it.
- Of the 6 personnel for whom D4 Overview Training records could not be located on site, all 6 records have now been located.
- We recommend that this paragraph be revised to incorporate the above information and the statement removed regarding Brandenburg not being in compliance with its policy of retaining training records onsite.

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Recommendation 1 – Develop a monitoring plan to verify Brandenburg or future D4 contractor is in compliance with its HASP

- The D4 Safety Manager and site safety professional already perform periodic reviews of the contractor safety plans in accordance with The D4 Program Guide, paragraph 6.4, and with the TVA Safety Manual. Therefore, we do not believe that another monitoring plan is required. Examples of monitoring include the following:
 - A comprehensive safety program assessment was conducted at JSF on Brandenburg's program, including the HASP. This was completed in early May of 2016 and issued to Brandenburg in early June of 2016. One of the findings was that participation in the safety STAC and SAC card process was Unsatisfactory being only at 65%. Since that time participation has increased to an average of 98-100% or better. The increase in participation by the workforce is displayed and updated monthly and displayed in the Brandenburg meeting room.
 - Brandenburg's JSA process was also reviewed during the assessment and improvements have been made.
- Instead of developing a monitoring plan we suggest that the recommendation should focus on bringing safety observations into compliance with the HASP, or revise the HASP. Our current plan is to evaluate the overall benefits of revising the HASP to focus on the quality of safety observations made, with a goal for an average number of total observations to be submitted each week based on number of personnel on site.

Recommendation 2: Develop a process to verify employees attend required training and the D4 contractor maintains all training records.

- We agree with this recommendation to ensure program wide compliance. Brandenburg already has a site specific document, "TVA JSF Plant Specific Training & Orientation Plan," that thoroughly addresses training documentation requirements. Also, the D4 Program Guide currently addresses some elements of this recommendation but we will revise this guide and possibly other documents as well to require a more comprehensive approach to tracking and documenting training.

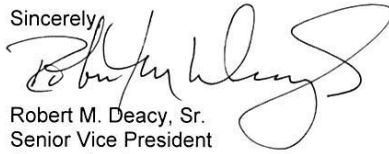
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In addition to our responses and suggestions to the specific findings and recommendations of the report we offer the following additional comment:

- We received a lot of positive feedback during the evaluation that might warrant additional emphasis in the report. We suggest that the following findings be considered for inclusion:
 - There have been zero recordable injuries and no environmental events to date for the John Sevier Fossil Plant demolition project. This demonstrates the effectiveness of the TVA D4 safety program to date as compared with industry demolition experience where recordable injury rates are high and fatalities are not uncommon.
 - The total number of safety observations recorded by Brandenburg for the week ending December 10, 2016 were at a cumulative total of 5,857, with a cumulative SAC card participation rate of 97%. Safety observations are a key element in the TVA D4 program.

In addressing the suggested changes to your draft report please feel free to contact Richard Simmons for any questions or clarifications.

Sincerely,



Robert M. Deacy, Sr.
Senior Vice President
Generation Construction, Projects and Services