



Memorandum from the Office of the Inspector General

October 24, 2022

Brian M. Child

REQUEST FOR FINAL ACTION – EVALUATION 2020-15747 – POWER SUPPLY PLAN

Attached is the subject final report for your review and final action. Your written comments, which addressed your management decision and actions planned or taken, have been included in the report. Please notify us when final action is complete. In accordance with the Inspector General Act of 1978, as amended, the Office of the Inspector General is required to report to Congress semiannually regarding evaluations that remain unresolved after 6 months from the date of report issuance.

If you have any questions or wish to discuss our findings, please contact Leslie A. Franks, Senior Auditor, at (865) 633-7330 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)

LAF:FAJ

Attachment

cc (Attachment):

TVA Board of Directors
Buddy Eller
David B. Fountain
Eric R. Grau
Jim R. Hopson
Jeffrey J. Lyash
Jill M. Matthews
John M. Thomas III
Ben R. Wagner
OIG File No. 2020-15747



Office of the Inspector General

Evaluation Report

To the Vice President,
Enterprise Planning

POWER SUPPLY PLAN

Evaluation Team
Leslie A. Franks
J. Lauren Pionke

Evaluation 2020-15747
October 24, 2022

ABBREVIATIONS

EP	Enterprise Planning
F&H	Fuels and Hedging
FY	Fiscal Year
KIF	Kingston Fossil Plant
MCT	Marshall Combustion Turbine Plant
MMBtu	Metric Million British Thermal Unit
PPA	Purchased Power Agreement
SEPA	Southeastern Power Administration
SPP	Standard Programs and Processes
SQN	Sequoyah Nuclear Plant
TVA	Tennessee Valley Authority

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
BACKGROUND.....	1
OBJECTIVE, SCOPE, AND METHODOLOGY	2
FINDINGS AND RECOMMENDATIONS	3
INACCURATE INPUTS USED TO DEVELOP TVA'S POWER SUPPLY PLAN.....	4
INACCURATE BURN FORECASTS.....	8

APPENDIX

MEMORANDUM DATED OCTOBER 17, 2022, FROM BRIAN M. CHILD TO
DAVID P. WHEELER



Evaluation 2020-15747 – POWER SUPPLY PLAN

EXECUTIVE SUMMARY

Why the OIG Did This Evaluation

The Tennessee Valley Authority's (TVA) Enterprise Planning (EP) organization engages in long-term generation and capacity planning to support TVA's mission of providing low-cost, reliable electricity. TVA's capacity plan is designed to ensure resource adequacy while working to minimize cost to customers and develop a long-term strategy for the TVA power system. Long-term generation planning allows for the optimal use of available resources to meet the future energy needs across TVA's service area, factoring in operating area and system constraints. Collectively, the capacity and generation plans are referred to as the Power Supply Plan.

Due to the importance of power supply planning to TVA's fuel cost forecasting and operational decision-making, we conducted an evaluation to determine whether TVA is using accurate inputs to develop the Power Supply Plan.

What the OIG Found

We tested seven inputs to the Power Supply Plan, including two key inputs, and determined six were inaccurate. Specifically, we found errors in the (1) fuel costs, (2) load forecast, (3) Southeastern Power Administration hydro generation forecast, (4) solar purchased power agreement contract terms, (5) coal ancillary services, and (6) demand response capacities and costs. We also noted an opportunity for improvement related to the level of detail contained in the documentation available to guide the load forecasting process.

Due to the complex nature of TVA's power supply planning models and forecasting methodologies, we were unable to determine the overall impact of the errors identified on the Power Supply Plan. While the impacts we were able to quantify were low, having errors in six of seven inputs we reviewed indicates there could be risk to the integrity of information being provided to and by TVA's Power Supply Plan.

Additionally, various personnel raised concerns regarding the reliability of information being provided by TVA's Power Supply Plan, specifically in the burn forecast.



Evaluation 2020-15747 – POWER SUPPLY PLAN

EXECUTIVE SUMMARY

What the OIG Recommends

We recommend the Vice President, EP, take action to correct errors and address deficiencies identified and implement controls to prevent recurrence. Our detailed recommendations are listed in the body of this report.

TVA Management's Comments

In response to the draft report, the Vice President, EP, agreed with our recommendations and provided ongoing, completed, or planned actions to address the recommendations. See the Appendix for management's complete response.

Auditor's Comments

We agree with TVA management's planned, ongoing, and completed actions in response to our recommendations.

BACKGROUND

The Tennessee Valley Authority's (TVA) Enterprise Planning (EP) organization engages in long-term generation and capacity planning to support TVA's mission of providing low-cost, reliable electricity. The capacity plan is designed to ensure resource adequacy while working to minimize cost to TVA customers and develop a long-term strategy for the TVA power system. Generation planning allows for the optimal use of available resources to meet future energy needs across TVA's service area, factoring in operating area and system constraints. Collectively, the capacity and generation plans are referred to as the Power Supply Plan.

The Power Supply Plan spans a 20-year planning horizon and is utilized by TVA staff, management, executives, and the Board of Directors in various forms to drive capital and fuel budgeting, annual business planning, long-range financial planning, fuel and purchased power contracting, integrated resource planning, calculation of TVA's fuel cost adjustment, and other internal and external communications. The Power Supply Plan is produced semiannually and considers a multitude of inputs, including, but not limited to:

- **Forecasted Load** – According to EP, the energy forecast is the most important component of the Power Supply Plan, as TVA must be able to supply enough power to meet the electrical needs of its customers. The load forecast (1) takes into account historical usage data for its directly served and local power company customers and (2) is modeled around regional economics, demographics, energy efficiencies of electrical appliances in homes and businesses, weather patterns, and distributed energy resources (e.g., solar installations, electric vehicles, and energy efficiency programs).
- **Fuel Costs** – As a key driver of the Power Supply Plan, expected costs for coal, natural gas, and nuclear fuel over the planning horizon provide the majority of changes in variable operating costs. Plants with relatively lower operating costs are utilized more often while plants with higher operating costs are utilized less in an effort to meet demand in a cost-effective and reliable manner.
- **Environmental Outlook** – The environmental outlook for TVA influences many decisions, particularly the timing of asset additions and retirements within the Power Supply Plan, with the most common decision being whether to idle or control¹ coal plants. A more stringent regulatory environment can alter the decisions and/or timing of decisions around TVA's assets.
- **Reserve Margin** – The reserve margin is the amount of firm capacity resources² held in reserve above the anticipated peak demand, ensuring the continued ability to provide enough generation to meet customers' electricity demand. TVA's reserve margin serves as risk mitigation when deviation from

¹ Emissions control technologies can be installed at coal plants to limit the emission of toxic air pollutants in compliance with environmental regulations.

² Firm capacity resources are those that are assured to be available over a defined period of time.

the resource plans occur, such as abnormal weather, unforeseen generation or transmission unavailability, or error in demand forecasts.

- **Construction and Large Capital Costs** – The estimated construction costs for new assets and major capital projects are important factors in evaluating current and future generation options. The costs to construct new plants and perform major capital projects influence the decisions of both what type generation asset to build and how long to retain existing assets.

Utilities are experiencing an era of unprecedented change. Options to meet energy needs are expanding, customer expectations are evolving, and regulations aimed at greenhouse gas reduction continue to impact the industry. Additionally, technology is enabling improved generation, a smarter grid, and new ways to reduce energy consumption. In this evolving and rapidly changing environment, a robust forecasting framework is needed to handle increased complexity and uncertainty in the marketplace and support informed, timely decision-making to maintain low rates and financial health.

Due to the importance of power supply planning to TVA's fuel cost forecasting and operational decision-making, we conducted an evaluation of TVA's Power Supply Plan.

OBJECTIVE, SCOPE, AND METHODOLOGY

The objective of our evaluation was to determine whether TVA is using accurate inputs to develop the Power Supply Plan. The scope of the evaluation was limited to select inputs in the fiscal year (FY) 2021 budget Power Supply Plan.³ To achieve our objective, we:

- Conducted interviews with EP personnel and contributors to and users of the Power Supply Plan throughout TVA to (1) gain an understanding of the related processes, controls, data collection and analysis techniques, and forecasting methodologies and (2) identify any potential risks or concerns.
- Obtained and reviewed the following procedures to gain an understanding of TVA's power supply planning process:
 - TVA Standard Programs and Processes (SPP) 33.000, *Resource Planning*
 - TVA-SPP-33.100, *Capacity Planning*
 - TVA-SPP-33.200, *Long Term Generation Planning*
- Obtained and reviewed the files, models, data, calculations, and market information used to develop TVA's Power Supply Plan to (1) gain an in-depth understanding of forecast inputs, processes, methodologies, underlying assumptions, and risks and (2) select inputs for testing.

³ The semiannual publications of the long-term Power Supply Plan include the strategic Power Supply Plan, developed in the fall, and the budget Power Supply Plan, developed in the spring.

- Judgmentally selected and tested seven power supply plan inputs to assess the accuracy of the data used to develop the plan. Testing of the selected inputs included data analyses, system and model walk-throughs, contract reviews, performing recalculations, and validating data against source documentation.
 - We judgmentally selected two of nine key inputs⁴ (fuel costs and forecasted load) for testing based on information obtained during interviews with EP personnel. We randomly selected one coal, gas, and nuclear unit to test the accuracy of the fuel costs in the Power Supply Plan. Our selection for testing included Kingston Fossil Plant (KIF) Unit 1, Marshall Combustion Turbine Plant (MCT), and Sequoyah Nuclear Plant (SQN) Unit 1.
 - We randomly selected five of 103⁵ additional inputs: (1) solar purchased power agreement (PPA) contract terms and updates, (2) coal ancillary services, (3) Southeastern Power Administration (SEPA)⁶ hydro generation forecast, (4) PPA and SEPA minimum and maximum capacities, and (5) demand response.
- Performed additional work to address concerns raised during the course of our evaluation related to the reliability of TVA's Power Supply Plan information and potential impacts of inaccurate planning. To address these concerns, we (1) conducted interviews with TVA management and power supply plan users throughout the agency and (2) obtained and analyzed additional data pertaining to capacity planning and burn forecast⁷ model accuracy.

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

FINDINGS AND RECOMMENDATIONS

We tested seven inputs used to develop the Power Supply Plan and determined six of the seven were inaccurate, including two key inputs. We also noted an opportunity for improvement related to the level of detail contained in the documentation available to guide the load forecasting process. Additionally, concerns were raised by various personnel regarding the reliability of information being provided by TVA's Power Supply Plan, specifically in the burn forecast.

⁴ The nine key inputs, as identified by EP, are (1) load forecast, (2) environmental outlook, (3) asset strategy, (4) reserve margin, (5) fuel costs, (6) construction and large capital costs, (7) asset operating characteristics, (8) hydro system generation, and (9) distributed energy resources.

⁵ The population of 103 inputs was based on our analysis of TVA's power supply planning documentation.

⁶ SEPA is responsible for marketing electric power generated at reservoirs operated by the United States Army Corps of Engineers.

⁷ The burn forecast is a power supply plan product detailing the amount of coal expected to be burned at TVA's coal plants.

INACCURATE INPUTS USED TO DEVELOP TVA'S POWER SUPPLY PLAN

We tested seven inputs used to develop TVA's FY 2021 budget Power Supply Plan, including two key inputs, and determined six were inaccurate. Specifically, we found (1) fuel costs tested were incorrect or some values used to calculate fuel costs were inconsistently applied and unable to be verified, (2) models providing information to the load forecast contained minor inaccuracies, (3) some values used to develop the SEPA hydro generation input were incorrect, (4) various contract terms from the majority of solar PPAs reviewed were inaccurate, (5) incorrect values were used in calculating the coal ancillary services input, and (6) winter and summer program capacities and costs for two interruptible power programs were incorrect. Additionally, we noted an opportunity for improvement related to the level of detail contained in the documentation available to guide the load forecasting process.

Fuel Costs

The delivered fuel cost for power generation includes the price of the commodity, costs associated with transporting the commodity from the source to the plant, the cost of reagents consumed in required emissions control systems, and reagent transportation costs. We tested the August 2020 coal, gas, and nuclear fuel cost calculations for KIF Unit 1, MCT, and SQN Unit 1,⁸ respectively. We determined KIF and MCT fuel costs were incorrect, and some values used to project SQN fuel reload costs were inconsistently applied and unable to be verified.

Coal Costs

We determined the KIF Unit 1 fuel cost used in the Power Supply Plan was inaccurate due to (1) the incorrect coal type being used, (2) unweighted rail transportation costs, and (3) outdated ammonia reagent pricing.

We compared the fuel cost calculated by the responsible input owners to the cost in the Power Supply Plan and noted a difference. Based on our calculations, we determined the Power Supply Plan model used the incorrect coal type⁹ in some of KIF's fuel costs calculations, which resulted in inaccurate fuel prices being used. Although controls and review processes in place were intended to ensure data integrity, TVA personnel were unaware the Power Supply Plan model was calculating and using its own delivered fuel cost instead of the cost calculated by the input owner.

We also determined KIF's rail transportation costs could be more accurately captured in the fuel cost calculations if transportation rates were weighted to better represent all contracts supplying coal to the site. The delivered cost of Illinois Basin coal to KIF was based on one contracted transportation rate of

⁸ This included the forecasted costs of the next fuel reload (reload 24 cycle 25).

⁹ The Illinois Basin coal type used in the model calculations was not the low chlorine Illinois Basin coal burned at KIF.

\$15.99 per ton; however, there were multiple mines servicing KIF with rail rates varying from about \$14 to \$21 per ton. Additionally, we noted the ammonia reagent cost information included in the August 2020 fuel cost calculation was based on May pricing data rather than updated June information available at that time.

Based on the information above, we concluded the fuel costs for KIF Unit 1 used in the Power Supply Plan were incorrect. We determined the fuel cost was understated by approximately 2 percent or \$0.04 per metric million British thermal units (MMBtu).

Gas Costs

We determined the fuel cost for MCT used in the Power Supply Plan was inaccurate due to incorrect transportation and inflation rates used in the calculation. The pipeline commodity rate (i.e., transportation rate) used in the fuel cost calculation was \$0.18 per MMBtu, while source documentation and information provided by the data owner supported a rate of \$0.16 per MMBtu. Additionally, the pipeline fuel retention charge of 0.95 percent used in the calculation was no longer in effect at the time as it had been superseded by a rate of 0.41 percent. We also noted that a revision was made to TVA's inflation and escalation forecast during development of the FY 2021 budget Power Supply Plan; however, the update was not reflected in the gas cost calculation. Based on our recalculations, we determined the fuel cost was overstated by approximately 2 percent or \$0.03 per MMBtu.

Nuclear Fuel Costs

We found some values used to calculate fuel costs for the SQN Unit 1 fuel reload were applied inconsistently throughout the process. For example, fuel rod assembly weights used to calculate total material needed differed from the weights used to calculate unit material costs, resulting in inaccurate material needs and/or costs. The input owner was unable to confirm which values should have been used; due to this, we were unable to determine the correct fuel costs for SQN Unit 1.

Load Forecast

TVA's load forecast is a complex process encompassing multiple forecasts to anticipate demand expected (1) from directly served and local power company customers, (2) to be added due to the adoption of electric vehicles, and (3) to be lost to solar installations in homes and businesses. We reviewed the models and calculations feeding the load forecast process and noted some minor discrepancies. Specifically, we found (1) demand for 4 of 57 directly served customers did not align with supporting documentation, (2) load from the interdivisional¹⁰ subset of directly served customers was double counted in the forecast, (3) the electric vehicle forecast contained an hourly model that misallocated annual demand based on an incorrect number of working and non-working days, and (4) one of the models projecting solar generation in

¹⁰ Interdivisional accounts represent nongenerating TVA sites.

homes and businesses did not account for leap years in its energy calculations. Based on our calculations, we determined the errors identified overstated the directly served load forecast by less than 1 percent.

Additionally, we noted an opportunity for improvement related to the level of detail contained in the documentation available to guide the load forecasting process. We requested process documentation and were provided a draft document containing incomplete edits and some instructions that were no longer relevant. Enhanced documentation for a process involving multiple data owners, models, calculations, and subprocesses could assist in preventing errors and preserving knowledge transfer.

SEPA Hydro Generation Forecast

TVA purchases power from SEPA, generated at Cumberland River hydro plants. We determined TVA's forecast of hydro generation expected from SEPA was inaccurate. We identified incorrect minimum capacity values used in October through December 2020 calculations and unsupported minimum and maximum capacity monthly values used in calculations for years 2023 through 2047. Additionally, we identified inaccurate monthly energy values calculated for September 2020, October through December 2021, and January through December 2022.

Solar PPA Contract Terms

We determined solar PPA contract terms used in the Power Supply Plan were inaccurate. We reviewed contracts for all 13 solar PPAs and identified incorrect inputs in the Power Supply Plan for 8 of them. The discrepancies identified included incorrect rates for 8 PPAs, one incorrect agreement end date, and one incorrect nameplate capacity and associated expected annual energy output.

Coal Ancillary Services

Ancillary services, such as load regulation,¹¹ operating reserves,¹² and voltage support,¹³ ensure reliability and support the transmission of electricity from generation sites to customer loads. We determined secondary reserves¹⁴ for 11 of 26 coal units were calculated incorrectly due to incorrect capacity values used in the calculations. Additionally, we noted one of the incorrect capacities was used in a separate operating characteristic¹⁵ input to the Power Supply Plan, which was not included in the scope of this evaluation.

¹¹ Load regulation entails having generation and nongeneration resources raise and lower output to maintain power balance.

¹² Operating reserves are standby power or demand reduction that can be called on with short notice to deal with an unexpected mismatch between generation and load.

¹³ Voltage support refers to the ability to produce or absorb reactive power and the ability to maintain a specific voltage level.

¹⁴ Secondary reserves are resources that can be available within 90 minutes.

¹⁵ Operating characteristics are data that describe specific attributes of a generating asset.

Demand Response Capacities and Costs

Demand response programs, including interruptible power rates, offer financial incentives to encourage consumers to reduce or shift their electricity usage during peak periods. TVA's EnergyRight® Solutions¹⁶ offers two interruptible power programs, IP5 and IP30, providing monthly demand credits in exchange for load curtailment. We determined IP5 program capacity values used in the Power Supply Plan for FYs 2022 through 2039 were incorrect. We also found one IP5 customer was inadvertently left out of the calculation, resulting in incorrect winter and summer program capacities and costs for FYs 2021 through 2039. Additionally, an incorrect demand value was used in June 2021 for one IP30 customer, resulting in inaccurate summer program costs for FYs 2021 through 2039.

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Due to the complex nature of TVA's power supply planning models and forecasting methodologies, we were unable to determine the overall impact of the errors identified on the Power Supply Plan. Although TVA has review processes in place intended to ensure the accuracy of its underlying plan assumptions, the controls appear to have had a limited effect on preventing and identifying errors. While the impacts we were able to quantify were low, having errors in six of seven inputs we reviewed indicates there could be risk to the integrity of information being provided to and by TVA's Power Supply Plan.

Recommendations

We recommend the Vice President, EP:

- Take action to correct the errors identified in the fuel cost, load forecast, SEPA hydro generation forecast, solar PPA contract terms, coal ancillary services, and demand response inputs to the Power Supply Plan.

TVA Management's Comments – TVA management agreed with the recommendation and stated EP, in conjunction with Power Supply Plan input providers, has significantly enhanced the power supply planning process since FY 2021, and most of the items noted in the draft report were corrected during the normal review process. Management also indicated remaining adaptations will be incorporated in FY 2023. See the Appendix for TVA management's complete response.

Auditor Response – We concur with TVA's completed and planned actions.

- Improve review processes to identify and correct errors in inputs.

TVA Management's Comments – TVA management agreed with the recommendation and indicated EP facilitates multiple review meetings to encourage discussion and feedback and will continue to review enhancement and verification efforts for the Power Supply Plan process as part of their continuous improvement efforts. In addition, Digital Transformation and

¹⁶ TVA's EnergyRight® Solutions suite offers a balanced, targeted portfolio of energy efficiency, electrification, and demand response offerings.

Digital Finance are multi-year initiatives that will help incorporate more data automation steps to reduce errors. See the Appendix for TVA management's complete response.

Auditor Response – We concur with TVA's ongoing and planned actions.

- Review the design of forecasting models to ensure they are operating as intended.

TVA Management's Comments – TVA management agreed with the recommendation and stated EP reviewed and improved the design of the forecast models in September 2021 and will continue to evaluate as part of their continuous improvement efforts. See the Appendix for TVA management's complete response.

Auditor Response – We concur with TVA's completed and ongoing actions.

- Consider implementing weighted transportation costs for coal deliveries coming from multiple sources to more accurately represent costs.

TVA Management's Comments – TVA management agreed with the recommendation and stated a weighted average transportation rate based on the preceding 12 months of actual coal deliveries will be implemented in FY 2023. See the Appendix for TVA management's complete response.

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

- Develop detailed documentation to guide the load forecasting process.

TVA Management's Comments – TVA management agreed with the recommendation and stated the team will review and update process documentation in FY 2023. See the Appendix for TVA management's complete response.

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

INACCURATE BURN FORECASTS

One product of the Power Supply Plan is the coal burn forecast, which details the amount of coal expected to be burned at TVA coal plants and is provided to Fuels and Hedging (F&H) personnel to aid in their fuel procurement decisions. However, according to F&H personnel, the burn forecasts provided have been inaccurate to the point of being unreliable for use in fuel purchasing decisions, because the forecasts consistently understate the amount of coal TVA is expected to burn versus how much they actually burn. As an example, documentation was provided showing the August 2020 forecast underestimated coal burn by 625,000 tons or 68 percent. This discrepancy between planning and operations poses a risk to TVA of being short on coal.

To mitigate the risk of inadequate fuel purchases based on inaccurate burn forecasts, F&H personnel have implemented an informal process to adjust the burn forecast information produced by the Power Supply Plan. These

adjustments are based on historical actual burn data, known operational constraints, and the subject matter expertise of F&H personnel. We obtained and reviewed 11 months of burn forecasts, adjusted forecasts, and actual burn data for May 2020 through March 2021 and found the majority of the adjusted forecasts made by F&H were closer to actuals (within 17 percent) than the burn forecasts (which were within 34 percent) produced by the Power Supply Plan. Interviews indicated numerous discussions have taken place between F&H and EP regarding the burn forecast inaccuracies and revised forecasts; however, little progress has been made to true up the differences.

EP implemented a review process to assess model accuracy by rerunning the Power Supply Plan model given known actuals after the fact. We reviewed the results of all model reruns available dating back to 2017 and noted that, even given known data, the model still demonstrated a tendency to under forecast coal burn. Additionally, we found that 16 of the 18 model reruns we reviewed were more inaccurate than the initial forecasts by at least 50 gigawatt hours.

Recommendation

We recommend the Vice President, EP, in conjunction with F&H, assess the accuracy of the coal burn forecast and make changes as needed.

TVA Management's Comments – EP agreed with the recommendation and stated, in collaboration with F&H, actions have been and will continue to be taken, to improve the accuracy of the coal burn forecast and improve processes and communication. See the Appendix for TVA management's complete response.

Auditor's Response – We concur with TVA's completed and ongoing actions.

David P. Wheeler, WT 2C-K
October 17, 2022

October 17, 2022

David P. Wheeler, WT 2C-K

RESPONSE TO REQUEST FOR COMMENTS - DRAFT EVALUATION 2020-15747 - POWER
SUPPLY PLAN

This letter is in response to the Draft Evaluation 2020-157474 - Power Supply Plan. TVA management appreciates the efforts put forth by David Willis, Leslie Franks, and the team to conduct this evaluation. The OIG draft evaluation reviewed the FY21 Budget Power Supply Plan, which was delayed from April 2020 until August 2020, to better understand the volatile global COVID impacts on our plans. Enterprise Planning, in conjunction with our input providers, has significantly refined our processes and approach over the last two years since the draft evaluation began.

As noted by the OIG, TVA's power supply planning models and forecasting methodologies are complex. Twice a year, tens of millions of data points representing hourly, daily, monthly, and yearly forecasts for 20 years are submitted by subject matter experts across the agency as part of the Power Supply Plan (PSP) forecasting process. Enterprise Planning (EP) facilitates kick-off meetings, input review meetings, and common-sense review meetings throughout each cycle to encourage debate, discussion, and feedback on the PSP process, approach, and assumptions. Organizations across the agency provide inputs for the PSP. EP expects those inputs to be reviewed and approved internally before submission, and draft results are provided to stakeholders for their review and feedback before finalization.

The OIG draft evaluation concluded that six errors were found via data analyses, system and model walk-throughs, contract reviews, performing recalculation, and validating against source documentation. EP believes most of these errors are more aptly described as inconsistencies as inputs and assumptions cannot be prescriptive but rather a product of careful consideration by subject matter experts for a specific use case. EP estimated these inconsistencies would not have significantly impacted overall model results, and that estimate corresponds with the OIG draft evaluation that "the impacts we were able to quantify were low." We acknowledge, however, that a lack of alignment in data streams moving from the input providers to EP's models could increase the risk to the integrity of the information being provided to and by TVA's PSP, and we agree with the OIG's recommendations as noted in the attached.

Thank you for the opportunity to review and respond. Please let us know if you have any further questions.

Brian M. Child

David P. Wheeler, WT 2C-K
October 17, 2022

Brian Child
Vice President, Enterprise Planning
WT 9C-K

cc: Eric Grau, MR BA-C
Candy Kelly, MR 3M-C
Nathan Mathis, OCP 7A-NST
John Thomas, MR 6D-C
OIG File No: 2020-15747

David B. Fountain, WT 6A-K
Clifton Lowry, WT 4C-K
Chris McCreary, MR 3H-C
Tracy Underdown, MR 2D-C

Attachment A – Page 1 of 2
David P. Wheeler, WT 2C-K
October 17, 2022

Audit 2020 -15747
Power Supply Plan - Enterprise Planning
Response to Request for Comments

Recommendation 1:

Take action to correct the errors identified in the fuel cost, load forecast, SEPA hydro generation forecast, solar PPA contract terms, coal ancillary services, and demand response inputs to the Power Supply Plan (PSP).

Response: We agree with the OIG's recommendation. Enterprise Planning (EP), in conjunction with the Power Supply Plan input providers, has significantly enhanced the power supply planning process since FY21. Most of the items noted in the OIG draft evaluation were corrected during our normal review processes. Remaining adaptations to correct items identified by the OIG draft evaluation will be incorporated in FY23.

Recommendation 2:

Improve review processes to identify and correct errors in inputs.

Response: We agree with the OIG's recommendation. EP, along with our input providers, strives for excellence in our products and services. We facilitate multiple kick-off meetings, input review meetings, and common-sense review meetings throughout each cycle to encourage debate, discussion and feedback on the PSP process, approach, and assumptions. We will continue reviewing enhancement and verification efforts for the PSP process as part of our continuous improvement efforts. Further, Digital Transformation and Digital Finance are multi-year initiatives that will help us incorporate more data automation steps to reduce errors.

Recommendation 3:

Review the design of forecasting models to ensure they are operating as intended.

Response: We agree with the OIG's recommendation. EP reviewed and improved the design of the forecast models through our internal review process in September 2021, and we will continue to evaluate as part of our continuous improvement efforts.

Recommendation 4:

Consider implementing weighted transportation costs for coal deliveries coming from multiple sources to more accurately represent costs.

Response: We agree with the OIG's recommendation. EP and Fuels and Hedging (F&H) will enhance our processes by using a weighted average transportation rate based on the preceding 12 months of actual deliveries to all coal sites for the rail transportation costs in FY23.

Recommendation 5:

Develop detailed documentation to guide the load forecasting process.

Attachment A – Page 2 of 2
David P. Wheeler, WT 2C-K
October 17, 2022

Response: We agree with the OIG's recommendation. Process documentation for the load forecasting process exists. In FY23, the team will review and update the current process documents.

Recommendation 6:

We recommend the Vice President, EP, in conjunction with F&H, assess the accuracy of the coal burn forecast and make changes as needed.

Response: We agree with the OIG's recommendation. EP and F&H have been working on forecasted coal burn since before the OIG draft evaluation. The teams have established weekly calls to discuss strategic coal efforts, rotated team members between the EP and the F&H teams to share knowledge and identify opportunities on both sides, and collectively developed risk adjustments and initiatives around stochastic backtesting, all with the very pointed goal of improving the accuracy of the coal burn forecast. EP and F&H will continue to strive to improve the accuracy of the coal burn forecast and improve processes and communication.