BRIAN FURUMASU, P.E.

SENIOR PROJECT MANAGER

YEARS OF EXPERIENCE

38

EDUCATION

> Executive MBA, University of Oregon, 1993
> M.S., Electrical Engineering, Thesis: HVDC Insulator Contamination, Washington State University, 1976
> B.S., Electrical Engineering, Washington State University, 1975

AREAS OF EXPERTISE

> HVAC / HVDC systems
> Reactive compensation
> Shunt and series capacitors
> Insulation coordination
> System security
> Information technology

LICENSING

> P.E., Electrical: Oregon

AFFILIATIONS

> Senior Member, IEEE

PUBLICATIONS

> "Considerations for Investigation and Reliability Improvement of SVC Systems," M.A. Reynolds PE, B.C. Furumasu PE, and W.H. Litzenberger, IEEE T&D Conference, April 2014.
> "The Upgrade of the Northern Terminal of the Pacific NW-SW HVdc Intertie Celilo Converter Station (USDOE-BPA)," B.C. Furumasu, M.A. Reynolds, D.J. Kell, K.A. Mitsch, CIGRE US National Committee, 2013 Grid of the Future Symposium, Boston MA. October 2013.
> "The Pacific Inter Tie Celilo Up-rate Project – Paper 24," Dan Kell, Karl Mitsch, Brian Furumasu, CIGRE HVDC and Power Electronics to Boost Network Performance, Brasilia Brazil, October 2-3, 2013.
> "Thyristor Controlled Series Compensation Prototype Installation at

EXPERIENCE SUMMARY

Mr. Furumasu specializes in high voltage transmission engineering for HVAC and HVDC systems. During his career with the Bonneville Power Administration, he was involved in the development and design of reactive compensation, HV and EHV equipment engineering, and compliance with North American Electric Reliability Corporation (NERC) reliability standards. He has specialized experience in high-voltage equipment insulation coordination, reactive compensation, and HVDC substation technology. His experience also includes utility research and development, including collaboration with manufacturers on FACTS technology, development of metal oxide protective systems for series capacitors, and characterizing the electrical environment under HVDC transmission lines. Mr. Furumasu was a chief information officer and senior manager at BPA responsible for leading organizational and policy changes involving the leading and realignment of IT, establishing a power market research group during the de-regulation of the wholesale electricity market, and establishing a corporate NERC Compliance Oversight Office.

Bonneville Power Administration, System Operating Limit (S-N) Path 3 Thermal Study, Oregon

Project Manager

Bonneville Power Administration, Celilo 500 kV HVDC Converter Terminal Replacement, The Dalles, Oregon

Technical Lead responsible for studies and technical specifications for main circuit high voltage equipment. The Celilo HVDC converter station is being upgraded with a new converter to support the future overall rating increase in the Pacific DC Intertie. BPA selected POWER for its specialized HVDC expertise to assist with the selection of a 'best value purchase' for this significant investment and upgrade project which ultimately will improve reliability and maintainability for nearly 300 million homes. POWER's Owner's Engineering scope of work included analytical HVDC system studies and support, development of detailed technical specifications, vendor proposal review, and Real Time Digital Simulations. Post award activities include review of design documents, factory testing, and commissioning testing.

Bonneville Power Administration, I-5 500 kV Technical Feasibility Comparison, Northwestern US

Project Manager for a study to compare overhead and underground options for a new 70-mile, 500 kV transmission line along the Interstate 5 Corridor between Washington and Oregon. Defined the scope of work and organized the implementation of the work plan for the comparison of underground and overhead project components. Also coordinated data gathering and technical

the Slatt 500 KV Substation," J. Urbanek, R. Piwko, E. Larson, B. Damsky, B. Furumasu, W. Mittelstadt, IEEE PES Summer Power Meeting, Seattle, WA, July 1992.

> "Design and Installation of 500 KV Back-to-Back Shunt Capacitor Banks," B.C. Furumasu, R.M. Hasibar, IEEE PES Winter Power Meeting, New York, N.Y., February 1991.

> "Comparison of RTV Silicone Rubber Coatings Under Artificial Contamination in Fog Chamber," R. Gorur, G. Karady, A. Jagota, M. Shah, B. Furumasu, IEEE PES Winter Power Meeting, New York, N.Y., February 1991.

> "Measurements of Capacitor Switching Transients," B.C. Furumasu, T&D Conference Panel Session, September 1986.

> "Bonneville Power Administration's Experience with Gas Insulated Substation Technology," B.C. Furumasu, BPA's Third Annual TCPPE Seminar, February 1986.

> "Managing the Transition from AIS to GIS Technology," B.C. Furumasu, International GIS Symposium, Toronto, Ontario, Canada, September 1985.

> "Corona Performance of the Bonneville Power Administration's HVDC Test Line to +600 KV," T.D. Bracken, R.D. Stearns, B.C. Furumasu, V.L. Chartier, Minnesota Power Systems Conference, Minneapolis, MN, October 1978.

> "Field and Ion Current Measurements in Regions of High Charge Density Near Direct Current Transmission Lines," T.D. Bracken & B.C. Furumasu, Conference on Cloud Physics and Atmospheric Electricity of the American Meteorological Society, August 1978.

> "Contamination Mechanisms for HVDC Insulators," R.G. Olsen, B.C. Furumasu, & D.P. Hartmann, IEEE PES Winter Power Meeting, New York, N.Y., February 1977.

discussions with client. The report, required for BPA's NEPA application and sole sourced to POWER based on expertise in transmission design and operating practices for EHV underground lines, outlined comparative technical requirements and cost estimates for the overhead and underground options. Due to prohibitive costs and technical requirements for the underground option, BPA chose an overhead route.

Clean Line Energy Partners, Plains & Eastern HVDC Line, Multiple Locations

Lead Studies Engineer responsible for oversight of all electrical studies performed on the project. Worked with the client to identify technical engineering needs including identifying required studies of insulation and electrical clearances, economic conductor selection, and EMF/EMI performance for the transmission line. Worked with the client to establish parameters for these studies to best serve the project objectives. The project is an 800-mile, 600 kV HVDC transmission line from the Oklahoma panhandle to Memphis, Tennessee. POWER developed conceptual design information including preliminary design criteria, conductor and OPGW selection, proposed and alternative structures, structure foundations, and structure spotting/line design. POWER also performed preliminary studies for insulation and electrical clearances, economic conductor selection, and EMF/EMI performance.

Great River Energy, Dickinson HVDC Ground Electrode Study, Minnesota

Project Manager for a ground electrode study at Great River Energy's Dickinson HVDC Converter Station. The Client experienced dc ground currents when the converter station was operated in ground return mode at higher power levels, affecting equipment in several substations. POWER reviewed the subsurface geology in the vicinity of the existing electrode using local well data, performed time domain electromagnetic (TDEM) field measurements to verify the soil resistivity, and developed a model to simulate existing and alternate electrode configurations. The study presented various electrode configurations, with a recommendation to build a second electrode at a site at least two miles away from the existing one, and to operate both sites in parallel such that they share the converter earth return current approximately equally.

Jacobs Engineering, United States Government, Power Reliability Study, Fort Belvoir, Virginia

Project Manager The United States Government (USG) requested that POWER Engineers, Inc. (POWER) perform a cost and reliability study to evaluate several plans of electric service from Dominion Virginia Power and to propose alternative plans of service with the goal of increasing the reliability of the utility service from Dominion Virginia Power to the Central Utility Plant that feeds the government's facility campus.

The reliability study objective was to develop and provide reliability and cost analysis for alternate electric service configurations that could replace the existing configuration and increase utility service reliability. POWER based its power system reliability analysis on IEEE Standard 493-1997 "IEEE Recommended Practice for the Design of Reliable Industrial and Commercial

Power Systems." The study took into consideration multiple alternative electrical service configuration options detailed in the request for proposal (RFP) and created six configuration options which were analyzed for both reliability and total life cycle cost.

Lansing Board of Water & Light, Substation Communications Study, Michigan

Engineering Consultant responsible for NERC compliance and cybersecurity. POWER provided conceptual design, specification, and recommendations for communication systems to connect 13 existing and one new substation in a new wide-area network. POWER assessed existing locations to determine utility communications requirements for various applications including SCADA, system protection, billing and metering, and workforce mobility. POWER then studied both widely-accepted and emerging technologies, including communications processors, communications multiplexers, fiber optics, network interface equipment, and wireless solutions for applicability and compliance with IEEE, IEC, and NERC CIP standards, and recommended solutions for future implementation.

Los Angeles Department of Water and Power, Power System Reliability Evaluation, California

Senior Engineer for a study to evaluate LADWP's Power System Reliability Plan. POWER performed a third-party assessment of the PSRP and provided recommendations to support the utility in seeking increased funding for reliability improvements. Mr. Furumasu was Lead Engineer for assessing the Substation and Transmission sectors program and reviewer for the Distribution sector. Assembled a team of POWER's top experts to review equipment that was identified in the PSRP for replacement and develop recommendations on the quantity and timeframe for replacements of specific substation and transmission, including recommendations to accelerate replacements in some cases.

Portland General Electric, Round Butte to Bethel 230 kV Black Start Study, Oregon

Project Manager responsible for directing an ATP study to determine/confirm the steady state performance and the switching surge performance of PGE's Round Butte to Bethel 230 kV line during black start procedures. The black start operation involved starting up all three hydro generators at Pelton to energize the 230 kV Round Butte Substation. The analysis included ATP calculation of the steady state transmission line voltages with various combinations of the Pelton and Round Butte generators used for the system energization during black start procedures and also for switching performance for both dead line energization and high speed reclosing onto a trapped line charge. The 230 kV line (98.7 miles in total length) was modeled in six 15-mile sections and two 4.5-mile sections. The analysis indicated that PGE's black start operating procedure to energize the line using a combination of the Pelton and Round Butte generators is achievable, and does maintain the steady state voltage and switching surge performance within the design parameters of this transmission line when energized from the Round Butte Substation.

Public Service Company of New Mexico, Rio Puerco SVC

Owner's Engineer, New Mexico

Project Engineer responsible for coordinating system planning studies for SVC sizing and calculations of the AC harmonic impedance, as well as performing the fault study at Rio Puerco 345 kV substation. Also developed technical performance requirements for the SVC device, which were integrated into the request for proposals (RFP) document and a participated on the proposal evaluation team and vendor negotiations that ultimately resulted in the award of the project to an SVC EPC contractor. Post-award support will include reviewing design studies and technical document, responding to SVC EPC contractor technical questions, factory acceptance testing of SVC equipment, and commissioning of the SVC facility. PNM sought an efficient and cost effective solution to regulate transmission voltage and mitigate voltage limitations to fully utilize the thermal capability of the bulk transmission system. POWER performed power flow and transient stability studies to determine the appropriate sized SVC for the system, developed the SVC technical specification and bid package and supported PNM in the evaluation of the SVC contractor's proposals through to an award.

Southern California Edison, Eldorado-Ivanpah 220 kV Transmission Line Project, California

Project Engineer responsible for providing conductor temperature back-check and coordinating electrical studies. POWER performed transmission line design for a 34-mile double circuit 220 kV transmission line. Where the new line crosses higher voltage lines, special tubular H structures were designed to route the circuits under the existing lines. For a secondary communications line, overhead ground wire on the Eldorado Lugo 500 kV Line was replaced with optical ground wire. POWER also provided owner's engineering and construction management services.

Starwood Energy Group Global, LLC, Starwood/PowerBridge Mead-Adelanto Project (MAP) HVDC Upgrade, California

Project Engineer responsible for evaluating the existing transmission line insulators for adequate insulation coordination properties for 500 kV DC operation and for assessing the condition of the insulators continued use in the AC to DC transmission line conversion. Preliminary project efforts also included developing conceptual plans for converting the existing AC operated Mead-Adelanto transmission line to DC, which was supported by DC converter stations and AC substations layout diagrams and the anticipated AC transmission lines needed to connect to the existing AC substation in the local transmission grid. The existing Mead-Adelanto Project HVAC 500 kV Transmission System links the SRP System in the Phoenix, Arizona, region to the Mead area with interconnection to WAPA. This major 202-mile system is being analyzed for the possible conversion of an HVAC operation to a significantly higher capacity +/- 500 kV HVDC Bipolar operating transmission system. Drawing on our HVDC-specific expertise, the client hired POWER to perform upfront project analysis as well as guide them in future planning. A significant benefit of HVAC to HVDC conversion is creating new capacity without construction of a difficult-to-permit new transmission line and its consequential unintended environmental impacts.

Terra-Gen Power LLC, Dixie Valley Transmission Line ATC

Calculations, California

Senior Studies Engineer responsible for interpreting the NERC Standards and Open Access Transmission Tariff (OATT) as it applies to Terra Gen Power LLC's Dixie-Valley Transmission Line. The analysis resulted in a report that describes the methodology for calculating the Total Transfer Capability (TTC) and Available Transfer Capability (ATC) for the 230 kV Dixie Valley Transmission Line. POWER developed methodology for calculating Total Transfer Capability and Available Transfer Capability for Terra-Gen Power's Dixie Valley 230 kV Transmission Line. This line transfers power from the Dixie Valley geothermal plant near Fallon, Nevada, to Southern California Edison's Oxbow-Bishop Control 115 kV Substation. Based on the analysis, a Rated System Path Methodology was selected and a description of the necessary steps to calculate TTC and ATC were developed.

RES, Talbot Wind Farm 230 kV Transmission Line

Provided the engineering for selecting the phase conductors, OHGW and OPGW to meet specified loss requirements, conducted the insulation coordination studies, and directed tower grounding studies. The loss calculations were performed using the ATP application. Recommendations for the suspension insulators and electrical clearances for this H-frame structure resulted from the insulation coordination studies. Upon completion of the transmission line design, performed electric and magnetic field, audible noise, RI and TVI calculations to determine the electrical performance of the line.

Plains & Eastern Clean Line Energy Partners, +/- 600 kV HVDC Transmission Line Project – Preliminary Metallic Return Conductor Design, Multiple States

Project Engineer responsible for working with the client to develop a preliminary design for a metallic return conductor and insulation requirements for an 800 mile +/- 600 kV HVDC line with a 3100 Ampere rating that can be used for continuous monopole operation. This project included developing the operating considerations and the duty cycle parameters needed for the preliminary design. The recommendations included the number and range of conductor sizes that can accommodate the thermal and mechanical requirements needed for the application. This effort also included doing the analysis to specify the required insulation levels and clearances.

PREVIOUS WORK HISTORY

Quality Plus Engineering, NERC CIP Program, Oregon

NERC CIP Program Manager responsible for NERC CIP compliance evaluations for registered NERC utilities. Also responsible for compliance violation, settlement resolution and compliance documentation.

Bonneville Power Administration, Reliability Compliance Officer, Oregon

As Reliability Compliance Officer, established Agency policy, process and roles for a newly created governance organization. Integrated NERC

compliance function into the Agency's existing governance structure. Performed internal audit of NERC standards for compliance. Managed alleged violation and settlements of non-compliance issues.

After the compliance function described above was completed, the group performed an internal self audit of NERC standards to prepare for a WECC Compliance Audit of the NERC Reliability Standards.

BPA's NERC Compliance Office managed the WECC Compliance Audits and any subsequent findings or alleged violations that needed to be resolved with WECC. This office also managed alleged violation and settlements of non-compliance issues which occurred in the course of operating under the areas registered with NERC.

Specific milestone activities:

1. Prepared and led BPA through two WECC Compliance audits.

2. Coordinated the agency's efforts in a vegetation violation of the NERC FAC Reliability Standard, taking over a year to achieve compliance and work through sanction and settlement negotiations.

3. On multiple occasions, made compliance assessements of whether an event was a self reportable alleged reliability compliance violation.

Bonneville Power Administration, Pacific Intertie Upgrade & Expansion, Oregon

Member of engineering teams responsible for the design of the 1989 Expansion Project to add a parallel converter to the existing Celilo converter station and a member of the 1985 Upgrade Project to add a serial valve group to the existing Celilo converters. Responsible for the development of technical specifications for shunt reactive and AC and DC filter equipment, vendors technical proposal evaluation, design review, and manufacturing and installation testing requirements for the equipment. The Expansion Project added two 12-pulse converters to operate in parallel with the original mercury arc valve groups and the 100-kilovolt thyristor valve groups added in the 1985 upgrade. This increased the system's capacity to 2000 MW to 3100 MW at ±500 kV. The Upgrade Project added two 100 kV thyristor valve groups in series with the original mercury arc groups. This increased the system's voltage from ±400 kV to ±500 kV and raised the capacity from 1600 MW to 2000 MW. First completed in 1970, the system runs 846 miles from BPA's Celilo Converter Station on the Columbia River at The Dalles, Oregon, to Los Angeles Department of Water and Power's Sylmar Converting Station near Los Angeles.

Bonneville Power Administration, Control Center Software Manager

As Manager for the design and maintenance of control center software, with responsibility for automated tools to support BPA's dispatch and scheduling function. This group developed the performance specifications for automation tools, lead procurement and award for applications, and integrated and maintained the applications on site. The applications include SCADA, AGC, data acquisition for control center and scheduling functions,

and scheduling applications. Responsibilities included sponsoring a risk analysis study for the SCADA and AGC systems to identify vulnerabilities and put into place a corrective action plan to resolve vulnerabilities. The completed risk analysis and formulated action plans were subsequently used as the foundation for DOE required system certification and accreditation (C&A) under NIST guidelines. The C&A included a tested disaster recovery plan.

Bonneville Power Administration/PNNL & SCE Subcontractor, Transmission Business Line (TBL) Y2K Project Manager

Developed and implemented a plan to identify, evaluate, and tested over 700 operational and business applications that could be adversely affected by the Y2K problem, completing this effort by March 1999. Worked with the States of Idaho, Montana, Oregon and Washington to coordinate disaster recovery plans for the Y2K transition. Given the critical nature of many of TBL's computer systems and their impact on the transmission systems reliability, BPA mounted an aggressive public communications strategy. Addressed over 100 public meetings, and newspaper/radio/TV interviews to convey factual information and confidence about BPA and the electric utility industry efforts to keep the lights on through this millennium transition. BPA consultant to Pacific NW National Laboratories for providing Y2K training in Vienna, Austria and Moscow, Russia for IT systems associated with Soviet designed nuclear reactors. Consulted two months for Southern California Edison supporting the State Department in evaluating the Y2K risk for power systems in the former Soviet Union countries of Ukraine, Armenia, and Georgia.

Bonneville Power Administration, Security Coordinator Project Manager

Coordinated complex negotiations for BPA's hosting of this newly conceived transmission system reliability function with 14 NW control area utilities, NERC, WSCC, and the NW Power Pool. The name of this function changed to Reliability Coordinators with the Energy Policy Act of 2005 and new NERC Reliability Standards. As project manager, put into place the real time modeling tools and communications to support the Security Coordinator function. This included the design and implementation of an advanced computer system to monitor and model the NW portion of the WSCC transmission grid. Completed project within schedule and budget.

Bonneville Power Administration, Manager, Market Research

Led a newly formed organization to determine the kinds of information that BPA needed to support decision making for the sales organization in the competitive deregulated environment. Initiated and directed an employee task force to define the Market Research organization structure needed to support its account executives and market segment managers. This effort clarified the organization's mission and work priorities. Clarity in the organization's purpose and client information needs to be successful in a competitive market created by deregulation. Developed the organization structure to carry out the findings of the task force, defined the positions descriptions and filled the positions. This group contributed to BPA's success in transitioning a new deregulated environments, which had elements of competition and regulatory oversight structure.

Bonneville Power Administration, FACTS Thyristor-Controlled Series Capacitor Project

BPA's Project Manager for developing a new type of series capacitor to enhance the operation of electrical systems using Flexible AC Transmission Systems (FACTS) technology. The EPRI-sponsored project with GE, PGE and BPA made a technological first by installing GE-developed thyristor valves with series capacitors on BPA's 500 kV transmission system at the Slatt Substation. The new thyristor-controlled series capacitor (TCSC) technology uses sophisticated valve controls that allow the capacitor bank to be switched very quickly, thus optimizing real power flows, enhancing system stability, and damping sub-synchronous resonance. The TCSC technology has significant implications for how utilities upgrade or expand their systems. With improved power flow, utilities can better use their existing transmission lines, thereby eliminating or postponing the expense of new transmission lines. Mr. Furumasu's team was responsible for recommending a site for the TCSC device to demonstrate control features, device protection features and sub-synchronous resonance damping in turbine generators. He was also responsible for design review, component testing, installation and rigorous field testing of the installed TCSC device.

Bonneville Power Administration, Supervisor High Voltage Practices Group

Lead the development and interpretation of BPA's high voltage policies, practices, standards, electrical characteristics and electrical performance requirements for design of BPA's transmission system including high voltage equipment research and development. This group provided the technical specifications for all substation equipment and the insulation requirements for substation and transmission lines. A strategic focus of this position was to evaluate and establish long term goals for BPA in the areas of EHV AC and DC substation and transmission systems.

Bonneville Power Administration, High Voltage Engineer

Planning and high voltage technical experience gained in this position. The High Voltage Practices group was located in the System Planning organization and provided consulting and engineering solutions during the planning stages of projects. Examples included investigation and recommendations for the Malin Dynamic Voltage Support Project, providing technical support for the HVDC Voltage Upgrade and HVDC Expansion projects at Celilo for the Pacific NW-SW HVDC Intertie projects, providing technical solutions leading to the Taft gas insulated substation (GIS) for the Colstrip project.

Developed broad expertise in both series and shunt reactive compensation. Represented BPA on IEEE standards activities as an active member on the Capacitor Subcommittee and the Shunt and Series Capacitor working groups (WG). Chaired the WG to rewrite the Series Capacitor Std that update the standard by including metal oxide varistors as a protective device for series capacitor banks. Reactive compensation experience included developing the AC and DC filter requirements for the HVDC Voltage Upgrade and Expansion projects and developed BPA's first static var compensator (SVC) specification.

General experience in preparing technical requirements and recommendations on insulation levels and electrical characteristics for high voltage equipment such as shunt and series capacitors, transformers, surge arrestors, transmission lines and other substation equipment. Performed engineering studies of transmission line and substation equipment as needed to provide engineering specifications, investigated equipment failure investigations to determine root cause, and managed R&D projects to develop new HVAC and HVDC equipment. Specific R&D projects managed included evaluation of metal oxide series capacitor protection using GE and Westinghouse products; also, developed a new design configuration for 115 kV back-to-back switched shunt capacitor banks, procured by BPA in 1986.

Bonneville Power Administration, Studies Engineer

Performed EMTP studies of power system transients and other electrical phenomena. Developed a practical knowledge of electric power equipment which help in subsequent design, failure investigations, HV equipment maintenance support and in developing technical requirements for EHV equipment and systems.

Bonneville Power Administration, Electrical Environment Characterization, Oregon

Lead Engineer for a research and development project to determine the environmental characteristics of electric and ion fields of transmission lines. Working with Dr. T. Dan Bracken, a Lead BPA physicist specializing in electrical effects, the project was designed to characterize the electric environment beneath a test line capable of ± 600 kV. Engineering responsibilities included designing the measurement package, which included designing and fabricating a solid state pico-ampere meter for measuring ion currents, installing an instrumentation trailer under the DC test line, verifying instrumentation measurement accuracy and conducting experiments to acquire data for analyzing electric and ion fields and their interaction.

Bonneville Power Administration, IT Security Analysis and Compliance, Oregon

Chief Information Officer responsible for developing and implementing mandatory system-wide federal security measures. Responsible for redefining BPA's policy and IT architecture to conform to the requirements of the Federal Information Security Management Act and National Institute of Standards and Technology Special Publication 800-53, which establish mandatory IT security measures for federal agencies. The agency's IT consolidation involved redesigning the enterprise-wide network and infrastructure, establishing hardware and software standards across the enterprise and implementing change management practices for 500 federal and contractor employees. In August 2004, he was recognized by Secretary of Energy Spencer Abraham for outstanding contributions to Expanded Electronic Government initiatives under President Bush's Management Agenda e-Gov objectives.

Bonneville Power Administration, Transmission System Planning, Oregon

Held multiple positions in the Transmission System Planning and High Voltage Equipment Engineering for AC and DC applications including the following:

- Branch Chief Quality Assurance
- Project Manager for Thyristor Controlled Series CapacitorSection
- Chief for the High Voltage Practices Section
- Senior Technical Engineer – Capacitor equipment specialist and High Voltage Equipment Engineer
- Chaired the IEEE Series Capacitor Working Group – BPA technical expert, led the industry in the development of series capacitor equipment International technical expert in EHV capacitor equipment and its application
- Lead engineer for thyristor valves, AC/DC filters and capacitive reactive requirements for the Pacific Intertie Voltage Upgrade and Expansion Projects

Bonneville Power Administration, Corporate IT Consolidation and Restructuring, Oregon

CIO for Pacific Northwest's largest wholesale power and transmission utility. Responsible for consolidation of four business line IT groups into one central organization. The consolidation impacted over five hundred federal and contract employees. The consolidated IT organization reduced the annual capital and expense budget of $97M by 25 percent. The following major steps were planned and implemented over a two year period.

- Established an Agency Prioritization Steering Committee as a decision making body for all IT investments
- Created a Project Management Office into the IT organization to provide disciplined management oversight and controls for the IT project portfolio
- Established a BPA Software License Position to review all software licenses, to negotiate technology contracts and manage compliance. This action sunset high-risk contracts and was a key factor in mitigation overall risk in technology acquisition and implementation.
- Established a Chief Technical Officer position to define and implement new IT architecture and hardware/software standards
- Implemented NIST 800-53, a risk framework for managing federal IT systems

Secretary of Energy recognized BPA's IT program for outstanding contributions to Expanded Electronic Government initiatives under the President's Management Agenda.