

BPA Policy 130-9

Functional Statement for Transmission Services

Leadership and Authority

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1. Transmission Services

Transmission Services provides reliable open access, nondiscriminatory transmission service on the Bonneville Power Administration (BPA) transmission network for utilities, generators, and power marketers consistent with various regulatory requirements. This is done through marketing and selling transmission products and services, both regulated and unregulated. Transmission Services provides asset management services for the transmission assets of Federal Columbia River Power System (FCRPS) including transmission system planning, design, construction, operations, and maintenance.

1.1 Transmission Chief of Staff (TA) Function

A. **The Chief of Staff (CS)** is the Manager of the Transmission Chief of Staff (TA) function and reports directly to the Senior Vice President of Transmission Services (SVP) for Bonneville Power Administration (BPA). The CS is a principal manager and senior policy advisor to the SVP and to the Transmission executive team regarding the strategic direction and execution of Transmission initiatives and operations. The CS is also the chairperson of the Transmission Internal Operation Manager (IOM) Team and serves as the SVP-designated point of contact for other BPA-wide organizations and committees.

The CS manages and oversees approved Transmission initiatives to ensure that business line goals and objectives are translated and integrated into comprehensive project and action plans that can be successfully executed. The CS is also responsible for the business line’s internal operations, including Aircraft Services (TAA), Business Operations (TAB), and Transmission Strategy and Business Management (TAS) to ensure that Transmission Services’ strategic objectives are achieved in accordance with statutory and contractual obligations.

1. **Aircraft Services (TAA)** manages and oversees BPA’s aircraft maintenance and operations, including coordinating and scheduling flight requests to support Transmission Services’ field operations and construction activities. TAA ensures that aviation policy aligns with with BPA’s business and transmission reliability and availability needs, and is responsible for aviation safety.
2. **Business Operations (TAB)** plans, directs, implements, executes, and improves T’s internal business operations. TAB oversees the day-to-day coordination and integration of business activities, liaises with Corporate functions, and manages product & service deliveries as agreed upon. TAB also develops and implements internal business process improvements and evaluates and report on external program compliance requirements. The Business Operations organization is responsible for the following functions:
 - a) **Financial Management** - TAB serves as the point-of-contact with Finance and other related committees for the Senior Vice President of Transmission Services and Transmission executive team. TAB participates in fiscal planning and budgeting exercises to ensure program requirements are identified and funded for each

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budget cycle. Supports asset management and other internal teams to develop and present information used in overall fiscal programming decisions. Conducts studies and reviews to determine reasons for project delays and other trends, and develops decision packages presenting options and recommendations to decision makers.

b) **Risk and Compliance Management** - TAB monitors, evaluates, implements, and reports on Transmission internal controls and other processes related to regulatory requirements and policies, such as Reliability Compliance, Delegations of Authority, and A123 internal controls. Represents the Senior Vice President of Transmission Services and Transmission executive team on related committees.

c) **Communications** - TAB serves as the point-of-contact with Corporate Communications for the Senior Vice President of Transmission Services and for the Transmission executive team. This function identifies, develops and executes on executive communications to supervisors and frontline employees regarding the SVP’s objectives. TAB provides meeting logistics support (agenda prep, material coordination) for large or senior-level Transmission meetings (e.g., All -T Managers meeting, Transmission Management Committee, Tier 2 Leadership meetings). TAB develops channels of information and communicates Transmission Services’ objectives across multiple target audiences.

3. **Transmission Strategy & Business Management (TAS)** centralizes, plans, and manages the business case analysis, cost analysis, and integration of Transmission Strategic Portfolio proposals and objectives. This function develops and implements a standardized objectives-based project management approach to ensure reliable and consistent outcomes based on factors such as available resources, cross-functional and portfolio integration requirements, effectiveness of cost and project management controls, and level of effort required for project completion. The group provides centralized oversight and management of in-flight projects and coordinates on process improvement and program evaluation activities to ensure timely completion within project scope, cost, and schedule.

2. Engineering and Technical Services (TE) Organization

Engineering and Technical Services is responsible for implementing the transmission capital program, providing technical support for the transmission maintenance program and providing real property services to the agency. Services supporting the capital program include project management, engineering, design, specifications, contract construction management, construction inspection and commissioning services. Projects include transmission lines, substations, control and protection systems, telecommunication facilities and nonelectric facilities. Services supporting transmission maintenance include developing maintenance standards, field and laboratory testing services, specialized technical training, equipment failure analysis, high level equipment and systems expertise, spare parts sourcing, and development of advanced maintenance techniques. Services supporting internal operations include establishing and application of engineering

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standards, NERC compliance collection and reporting of asset data, project management of regulatory deadlines, and technical expertise for application of compliance requirements. Real property services include acquiring land for projects, surveying, and mapping, Geographical Information System (GIS) and photogrammetry, right-of-way permitting, managing encroachments, market value assessment and danger tree management. Technical experts promote the development and integration of advanced technologies to improve system reliability and reduce costs. The Vice President for Engineering and Technical Services provides cost management, project and service contract management support to project managers and performance managers in Engineering and Technical Services.

The Vice President for Engineering and Technical Services reports to the Senior Vice President, Transmission Services. TE employees have a significant external engagement role through participation in various NERC, WECC and customer engineering forums.

1. **Transmission Engineering Internal Operations (TEB)** The internal operations function’s focus is on understanding the entire Transmission Engineering and Technical Services (TE) business and how to assure TE delivers consistent and predictable outcomes. The internal operations function focuses on improving our ability to manage our capacity (resources and dollars) and our demand (products and services). The organization is responsible to provide dashboards and other reporting needs to improve how the organization operates. The organization will facilitate the improvement of TE’s policies, process, and procedures while maintaining focus on managing change. The organization is responsible for the change initiative portfolio management, project management, change management, and business process management.
 - a) **Transmission Engineering Business Intelligence & Integrity (TEBI)** supports all functions and activities for successful implementation/execution of the capital, reimbursable, and expense programs by providing the review, analysis, reporting, and management of key metrics, and information. The staff works in partnership across Transmission Services and with cross-agency functional groups, including but not limited to: Finance, Supply Chain, Work Place Services, Environment / Fish and Wildlife, IT, and Security.
 - b) **Transmission Engineering Policy & Governance (TEBP)** is the centralized authority and manager of programs and processes associated with Transmission Services’ technical standards and specifications for planning, design, materials & equipment, construction, and maintenance. It provides leadership and guidance on standardization policy, programs, and priorities and facilitates alignment of BPA standards and specifications with industry best practices. Policy and Governance manages the processes and procedures for identification, introduction, development, review, and approval of new and revised technical standards; Transmission Engineering & Technical Services (TE)-business policies, processes, and procedures; and oversees compliance with, and the exceptions process for technical standards and TE-business policies, processes, and procedures. Responsibilities include representing TE as the Reliability Standard Owner by establishing and maintaining compliance with NERC and WECC reliability standards through technical expertise and authoritative advice, project management of updating

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reliability standards within regulatory deadlines, and data collection and reporting. The Reliability Standard Owner for TE is accountable and authorized to provide support as needed to Engineering and Technical Services. The organization also provides leadership and consistency in root cause analysis efforts within TE.

- c) **Transmission Engineering Resource & Work Planning (TEBW)** is responsible to develop, implement, and improve strategies and systems for planning and scheduling work and resources that consider power system priorities and that optimize the use of employee skills, resources and outages consistent with agency strategic direction. The organization provides centralized, coordinated system-wide work planning and evaluation services that ensure TE’s maintenance, sustain and expand programs are conducted in a manner that is cost effective and efficient. This function is responsible for establishing a coordinated work plan that is based on system priorities; providing strategic coordination of equipment outages that result in increased productivity and transmission system availability and ensuring resources are balanced with workload. The organization is responsible for forecasting and identifying resource constraints and recommending mitigation solutions.
2. **Substation Engineering (TEE)** is responsible for the engineering and design of substation facilities. This includes the control, protection and data acquisition associated with these facilities, the outdoor equipment, and for the specifications for high voltage equipment.
- a) **Project Engineering High Voltage & Project Engineering Low Voltage (TEEH & TEEL)** is responsible for the scoping of all substation projects; application engineering, and technical leadership for all protective relaying, data systems, RAS systems associated with these facilities; ancillary substation components and systems necessary for the operation and maintenance of the substation, including equipment specifications. Project Engineering is also responsible for incorporating new technology into our designs, including participation on equipment evaluation teams, product testing, and completion of complex standards. The Project Engineers are responsible for providing construction specifications for all Substation projects.
 - b) **Substation Engineering Customer Design & Substation Engineering Sustain Design (TEEC & TEES)** are responsible for the review and submittal of design packages to support substation projects. This includes material acquisition, COR duties, contract writing, and participation in smaller scale scoping, equipment evaluation projects, and modifications to minor standards.
3. **Transmission Lines & Civil Works Engineering (TEL)** supports the expansion, maintenance, and operation of BPA’s transmission-related facilities. The organization consists of four separate and distinct work areas: Transmission Line Engineering; Structural/Civil Engineering; Transportation Engineering; and Project Engineering. Collectively these groups provide a wide range of services that focus on the engineering, design, specifications, standards, construction, and asset support of transmission lines and fiber optic lines. Engineering, design and construction services are also provided in support of substation and telecom facilities needs such as site development, structural components, specifications,

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and strain bus. Responsibilities include support of BPA’s Wireless Program. Responsibilities include transmission line and fiber optic line reference data to support planning, operations, and maintenance activities. Additional services include emergency response to transmission line, fiber optic line, and substation failures and the expertise to assist maintenance to get the transmission line, fiber optic line, or substation back in operation.

- a) **Transmission Line Engineering (TELC)** provides complex component and electrical engineering support, analysis, and expertise associated with the engineering, design, and asset support of BPA transmission lines, fiber optic lines, and related projects. Component design includes engineering and technical support for transmission line conductor, fiber optic cable, insulators, conductor hardware, and accessories for the main grid and customer service transmission lines and fiber optic lines. This function also determines the thermal capacity, maximum operating temperatures, and the allowable current ratings for all BPA transmission lines. Electrical design includes engineering, and technical support for corona, grounding, and field effects; right-of-way management; airway marking/lighting; lightning protection and grounding; corrosion engineering; high voltage insulation, electrical phasing and transposition requirements. The group also provides engineering and quality assurance/control support for the specification and purchase of critical transmission line components; assists in the development of BPA and industry-related policies, guidelines, and standards; provides engineering support to transmission line maintenance and asset management functions; and participates in research and development projects/programs. Additional services include emergency response to transmission line and fiber optic line failures and the expertise to assist maintenance to get the transmission line or fiber optic line back in operation.

- b) **Transmission Sctructual & Civil Engineering (TELD)** provides a variety of services for the development of new facilities and the asset management and maintenance of existing facilities. Structural services include the structural analyses required for the design and maintenance of all the transmission lines, substations, and buildings within the BPA system. This includes design of any new structures that may be required for a new project; analyses of existing structures or existing designs to determine possible new loadings as new demands are placed on structures (e.g., fiber optics, Power Control System (PCS) antennas, new roofs); structural analyses of buildings and communications facilities; design of footings for structures; analyses of seismic capabilities of facilities on the BPA system and the retrofit or upgrade of facilities to enable the system to survive major earthquakes.; Site development for substations, and other facilities in the BPA system; design for storm water and oil spill containment in substations. Additional services include emergency response to transmission line, fiber optic line, or substation failures and the expertise to assist maintenance to get the transmission line, fiber optic line, or substation back in operation.

- c) **Transmission Transportation Engineering (TELF)** provides a variety of services for the development of new facilities, and the asset management and maintenance of existing

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facilities. These services include the reconnaissance, engineering, design, and construction administration of transmission line and fiber optic line access roads, and substation and radio site entrance roads. In addition, provide geotechnical services, including landslide stabilization, foundation investigations, and soils analyses; engineering, design, and maintenance of bridges, culverts, etc. Provide engineering and design assistance to land owners effecting BPA's transportation systems. (Example: Forest Service, Washington State DNR, private owners, etc.) Additional services include emergency response to transmission line or fiber optic line failures and the expertise to assist maintenance to get the transmission line or fiber optic line back in operation.

d) **Transmission Project Engineering (TELP)** provides project engineering leadership, analysis, and expertise associated with the engineering and design of BPA transmission lines, fiber optics lines and related projects, as well as some direct project management, COTR duties, and support during construction. Responsible for the project construction design documents and specifications. Specific areas of responsibility include new transmission lines and fiber optics line construction projects, transmission line upgrades, asset management support, maintenance support, customer service projects, modifications of existing transmission line and fiber optics line facilities, BPA's wireless program and direct support to its planning, engineering, and maintenance functions. Develops and executes process and policy changes to enhance the support that they provide and to improve system reliability. In addition, leads the scoping and project planning for all transmission lines and fiber optics lines projects; Chairs BPA's facilities naming committee. Additional services include emergency response to transmission line or fiber optic line failures and the expertise to assist maintenance to get the transmission line or fiber optic line back in operation.

4. **Systems Engineering (TEN)** is responsible for the application engineering, design and technical leadership for Remedial Action Scheme (RAS) control systems, Telecommunication Systems, Telecommunication Network design and Facility Engineering.

a) **Facilities Engineering (TENF)** provides mechanical engineering, architectural services, and technical support for BPA nonelectric facilities (Substation control and relay houses, Telecommunication sites, Maintenance Headquarters, Control Centers, and miscellaneous support buildings), as well as fuel storage system, and engine generators. Engineering services includes Heating, Ventilation, Air Conditioning (HVAC) systems, cranes, water and sewer systems, and building structure and roofs. When appropriate and necessary, Project management services are also provided as assigned by the Facilities Engineering Manager and the Project Management Manager.

- 1) In addition, Mechanical engineering services include development and maintenance of Standards and guides.
- 2) Architectural services include architectural design for new facility construction and replacement work at existing facilities. Responsibilities cover buildings and personnel work environments throughout the agency, including commercial offices, light

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industrial shops, control centers, control/relay houses, communications site buildings, as well as storage and equipment spaces.

- 3) In addition, Architectural engineering services include development of architectural Standards for non-electric assets for non-electrical facilities within the agency and providing interpretations to management on building related code compliance issues and providing Building Code compliance consultancy.
 - b) **Project Engineering Telecommunications (TENP)** is responsible for the application engineering, scoping, design and technical leadership associated with the upgrades or additions made to the Telecommunication system. Responsibilities also include review of contract design work, development of standards and construction specifications for all Telecommunication projects, and participation on equipment and technology evaluation teams.
 - c) **Network & Support Engineering (TENN)** is responsible for frequency interference analysis, upkeep of radio frequency licenses, technical advice and consultation on national telecommunications policy and legislation. Responsibilities also include design and management of operational telecommunication circuit data, expert systems analysis, recommendation of network additions based upon capacity, and the architecture and design of networks necessary to support system upgrades and additions.
 - d) **RAS Engineering (TENR)** is responsible for RAS controllers, Control Center RAS Systems, application engineering, and technical leadership associated with the upgrades or additions made to BPA’s Remedial Action Schemes. RAS Engineering is also responsible for researching, evaluating, selecting, and incorporating new technologies, devices and equipment into RAS systems. As a Subject Matter Expert (SME) participate in equipment evaluation teams, product testing, and development and completion of complex RAS Standards and Policies.
5. **Project Management Office (TEP)** Project Management groups (Substations, Transmission Lines, and Telecommunications & Facilities) are responsible to apply project management practices, process and tools to facilitate execution of capital work, and expense work associated with capital work, through various organizations. Groups are responsible to deliver approved work (scope), within approved budget and approved schedule, through project team members. Project management practice includes, but not limited to, continuous monitoring and reporting on scope, schedule, budget, and variance thereof, as well as mitigating the causes of variance.
- a) **Project Management Substations Team (TEPS)** TEPS is the ‘Substations’ arm of the Project Management organization for Transmission Engineering & Technical Services. Providing project management services for project work that is primarily (but not exclusively) associated with the Substation arena.

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- b) **Project Management Transmission Lines Team (TEPL)** TEPL is the ‘Transmission Lines’ arm of the Project Management organization for Transmission Engineering & Technical Services. Providing project management services for project work that is primarily (but not exclusively) associated with Transmission Lines.
 - c) **Project Management Telecommunications Facilities & Security Team (TEPF)** TEPF is the ‘Telecommunications & Facilities’ arm of the Project Management organization for Transmission Engineering & Technical Services. Providing project management services for project work that is primarily (but not exclusively) associated with either Telecommunications or Facilities work.
6. **Real Property Services (TER)** provides services to our stakeholders across BPA including Transmission, Environment Fish and Wildlife, Power and the Executive Office. TER solves and manages unique and complex project challenges that are sensitive to the context of the land, natural resources, engineering and the environment by providing technical services in the areas of realty, survey, mapping, forestry, GIS, photogrammetry and remote sensing, appraisal services, land title and records management, and the administration of BPA’s land asset information system of record.
- a) **Real Property Operations (TERO)** supports the day-to-day business of BPA’s real property services. This includes providing cross-functional support and collaboration both within Real Property Services and across BPA. TERO supports TER’s critical operational areas including, estimating, work requests, billing, land title and records management, appraisal services, and the administration of BPA’s Land Asset Information System.
 - b) **Realty (TERR)** manages BPA’s realty program. TERR acquires manages and disposes of real property and interest in real property on behalf of Bonneville Power Administration. The program provides assistance, advice, policy, oversight, monitoring, and coordination for the protection, management, planning, conservation, development, and utilization of real property and real property interests for Bonneville Power Administration.
 - c) **Geomatics (TERG)** provides the measurement, analysis and display of BPA assets in relation to the surface of the Earth, its physical features and the built environment. TERG provides land and engineering surveys, remote sensing, photogrammetry, cartography, and administration of BPA’s geographic information systems (GIS) program.
7. **Commissioning & Testing (TET)** is responsible for all engineering in the field during substation construction projects. Whether the equipment is constructed by in house or contract construction crews, TET verifies the accuracy of the design, relay settings and logic, wiring, and the manufacturer’s specifications for each piece of equipment. TET is responsible to ensure that each piece of equipment or system is working properly before being placed into service.

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- a) **Field Testing & Energization (TETC)** provide start-up and commissioning of substation equipment. This equipment ranges from new relays or SCADA to complete 500Kv substation builds. The commissioning engineers coordinate the various phases of substation construction work including outages, step plans, trip checks and redlines. The engineers are responsible for the quality and correctness of the new substation equipment.
 - b) **Systems & Communications Testing (TETD)** provides start-up and commissioning of substation and control center communication facilities, which includes radios (microwave, Ultra High Frequency (UHF), and Very High Frequency (VHF)), high capacity optical networks, multiplex equipment, transfer trip, Remedial Action Schemes (RAS), SCADA, event recorders, telephone systems, fiber optic systems, and control center display and alarming verification testing. T&E engineers coordinate the various phases of project construction work including laboratory testing, substation control and protection systems testing, event and alarm commissioning, and telecommunication facilities commissioning working with project managers, designers, system operators, BPA construction and maintenance crews, construction inspectors, and contractors. Engineering technicians provide high voltage equipment testing, wiring and cable verifications, control and relay verifications, SCADA and annunciation verifications and communications support for radio, transfer trip, RAS, control, fiber optics, networking, back-to-back system testing, and simulation.
 - c) **Test & Evaluation Services (TETE)** ensures that new equipment matches factory specifications and BPA standards. They evaluate new substation control equipment, telecom equipment. They act as the call center for field questions related to substation equipment and manager and test PMU and Metering program.
 - d) **Specialty Services (TETS)** provides multiple support functions to commissioning substation equipment. Transformer Technicians perform Oil processing for new and existing large transformer banks. High voltage testing technicians ensure that outdoor equipment falls within manufacturer specifications. Relay settings engineers and technicians provide relay settings and checks for new relay projects. Communications engineers and technicians travel the system and cutover analog communication systems to digital systems.
8. **Technical Services (TEZ)** is responsible for application engineering, design and maintenance support, and technical leadership for maintenance and repair functions for transmission lines, fiber optic cables, and outdoor and indoor substation equipment. Services provided include diagnostics, analytics, quality management, and special studies for transmission line and substation facilities.
- a) **Application Engineering & Analytics (TEZE)** Responsibilities include support of substation high voltage facilities and equipment by resolving technical problems, malfunction and failure analysis, developing action plans for systemic issues, and providing engineering analysis for parts and materials in support of maintenance and construction. Other responsibilities include technical services in support of HV

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substation equipment operation and maintenance, guidance and direction on HV equipment application, assuring uniform applications of technical policies and procedures defined by standards and guides, and analyzing equipment health and risk using asset data and asset management methodology.

Provides technical input to planning and design functions for the development of end of life replacements, conceptual designs, estimates, and final plans of service. Additional responsibilities include determining configuration and ratings for HV equipment, insulation coordination; evaluating equipment performance and safety implications, investigating equipment failures and determining necessary actions, and initiating equipment design changes necessary for compliance with safety and reliability standards.

Other services include determining minimum emergency stocking levels for HV equipment; participation in accident reviews, technical support of training for substation engineers and apprentice and journeyman electricians, subject matter expert input for the content of BPA work standards and maintenance standards, providing a wide range of analytical services and quality control verification/inspections for acquisition of HV equipment.

b) **Asset Reliability, Performance & Maintenance (TEZM)** Provides technical support services for maintenance and repair of transmission and substation HV facilities and equipment.

1) **Transmission Line Maintenance Services** includes technical leadership of system-wide transmission line maintenance functions and leadership for the Transmission Line Maintenance (TLM) Functional Team. Services include technical support for the maintenance and restoration of BPA’s transmission lines and fiber optic cables, malfunction and failure analysis, developing action plans to address systemic issues, coordinating and developing TLM work standards, maintenance standards, and Performance Level Guides for use by BPA's Transmission Field Services staff. Assures effective asset performance and reliability are achieved through cost effective maintenance and repair of BPA’s transmission line facilities, fiber optic cables, and corrosion mitigation and grounding systems. Develops and implements transmission line maintenance tools and training for BPA's Transmission Field Services crews located in regional and district offices.

2) **Substation Maintenance Services** includes technical leadership of system-wide substation maintenance functions and the Substation Maintenance Functional Team. Responsibilities include support of substation high voltage facilities in the areas of developing and maintaining standards and procedures for Operations & Maintenance (O&M), informing replacement plans on operational experience with equipment, resolving technical problems, and providing technical guidance for electrical spare parts and materials in support of maintenance. Assures effective asset performance and reliability are achieved through cost effective maintenance and repair of BPA’s substation facilities. Other responsibilities include developing equipment restoration

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and repair strategies in response to system emergencies, providing engineering and technical services in support of HV substation equipment, guidance and direction on HV equipment application, assuring uniform applications of technical policies and procedures defined by standards and guides, and analyzing and evaluating substation maintenance performance against established goals and objectives developed through asset management and RCM methodology.

- 3) **Parts and Library services** provides the coordination of equipment and spare parts for maintenance and repair, and management of equipment and technical documents and standards necessary for the operation and maintenance of transmission facilities.
 - 4) **Other services** include technical support for worker safety, investigating equipment failures and determining necessary actions, and reporting for Western Electric Coordinating Council (WECC) and North American Electric Reliability Corporation (NERC) reliability standards compliance, external customer support, participation in accident reviews, technical support of training for substation apprentice and journeyman electricians, managing the content of BPA Work Standards, and quality management verification/inspection of maintenance practices and records. Other services include technical support for worker safety, determining minimum emergency stocking levels for HV substation and transmission line equipment and parts, participation in accident reviews, technical support of training for apprentice and journeyman, and SME input for BPA Work Standards
- c) **Protection, Control & Instrumentation (TEZP)** Provides support of substation Protection, Control, & Instrumentation (PCI) equipment by resolving technical problems, malfunction and failure analysis, developing action plans for systemic issues, providing technical guidance for spare parts management and providing engineering analysis for equipment and materials in support of maintenance and construction. Other responsibilities include technical services in support of PCI equipment, guidance and direction on PCI equipment application, fault studies , relay setting optimization, assuring uniform applications of technical policies and procedures defined by standards and guides, and analyzing equipment health and risk using asset data and asset management methodology. Provides technical input to planning and design functions for the development of end of life replacements, conceptual designs, estimates, and final plans of service. Additional responsibilities include determining configuration and application for PCI equipment, managing system modeling data for protective relaying coordination; evaluating equipment performance and safety, investigating equipment failures and determining necessary actions, and initiating equipment design changes necessary for compliance with safety and reliability standards. Other services provided are determining minimum emergency stocking levels for PCI equipment, participation in accident reviews, technical leadership of the SPC functional team, subject matter expert input for the content of BPA work standards and maintenance standards, reporting for Western Electric Coordinating Council (WECC) and North American Electric Reliability

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Corporation (NERC), external customer support, technical training for field work force technical support for training of trainee and journeyman craftsmen, and providing a wide range of analytical services for application of PCI equipment. These services include expert analysis, consultation, and troubleshooting support for complex protective relaying problems in the field, asset management and reliability based maintenance support, coordination of equipment and spare parts, managing fault analysis modeling data and software user, evaluation and quality assurance testing of sample protection and control equipment, and specialized testing via real time digital simulation.

Other services include technical input for worker safety concerns, and PCI device calibration, configuration and settings data management.

- d) Diagnostics, Metrology & Labs (**TEZT**) provides Field Testing, High Voltage Laboratory, High Current Laboratory, Chemistry Laboratory, Mechanical Laboratory, and Geo-tech Laboratory services. Collectively, these services provide acceptance testing of components, hardware and materials associated with BPA’s power transmission system, diagnostic tests for asset health assessment, staged system testing for commissioning new electrical facilities, managing or conducting research and development for improvements in transmission facility equipment. Some services are provided as collaborative efforts with Colleges and Universities, National laboratories, Department of Energy, other researchers, research institutes, and (if available) through reimbursable contracts and agreements with external entities.
 - 1) **Calibration services** provides application engineering, design, and technical leadership for test and measurement systems, maintains BPA's standards for measurement assurance and trace-ability, provides mobile calibration laboratory service to BPA field locations, and repairs field test and measurement equipment.
 - 2) **Special Studies services** provides modeling and transient response analysis of power system and components via electro-magnetic transients program (EMTP) studies to understand dynamic transient response to switching and power system events, identify components and automatic controls tasked beyond capabilities, and enable the engineering of solutions or mitigation.

3. Transmission Field Services (TF)

The **Transmission Field Services (TF)** organization is responsible for managing field operations and maintenance and construction of BPA’s high-voltage electrical transmission system and for providing safe, reliable, and cost-effective service to customers. These responsibilities include physical field operations, maintenance, and construction of BPA’s electric and non-electric plant facilities in the BPA service area.

The Vice President for Transmission Field Services reports to the Senior Vice President of Transmission Services and provides advice and support to Transmission Field Services managers and employees. The Senior Operations and Maintenance Managers each have oversight for several Districts and are responsible for key policy formulation and decisions for long- and short-range

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strategic planning for the Transmission System. Through their own staffs and the Districts, the Senior Operations and Maintenance Managers ensure that Transmission Field Services achieves a safe power system for employees and the public; reliable electric service for customers; and cost-effective operation, maintenance, and replacement of the BPA power system.

District Offices are responsible for implementing field operations and maintenance and construction activities within the BPA Districts, and for the operation and maintenance of the BPA transmission system including buildings, grounds, mobile equipment and rights-of-way.

Field substation operations develop and coordinate outages and outage plans for district O&M, construction, switching, inspections and customer needs. Substation maintenance inspects, maintains, and repairs substation equipment, and builds assigned projects.

TLM inspects, maintains and repairs lines and rights-of-ways, and builds assigned projects. District engineers and field engineers oversee inspection, maintenance, and repair of control protection and metering systems used in the control and protection of HV facilities, and inspection, maintenance, and repair of communication data and control facilities. Facility maintenance inspects, maintains, and repairs buildings and grounds.

1. **Transmission Field Services Internal Operations (TFB)** is responsible for the internal operations for the Field Services Organization.
 - a) **Business Controls and Information (TFBI)** is responsible for the development, maintenance, and enhancement of processes for asset data management, regulatory compliance reporting, performance reporting, quality management, and shared information for all of Transmission Field Services. This function is responsible for oversight of Transmission’s Operations and Maintenance (O&M) Program asset data management used to provide an accessible, reliable, comprehensive asset register.
 - b) **Technical Training (TFBT)** coordinates technical and continuing education training needs for electrical apprentices (substation operator, electrician, and lineman), electrical crafts trainees (PSC, SPC, labs, data systems and instrumentation), non-electrical craft apprentices (heavy mobile equipment mechanic, electrical rigger, machinist), and fully-qualified journeymen and craftsmen of the preceding trades/disciplines. TFBT provides apprenticeship program coordination and record maintenance and second-level supervision of the electrical apprentices. TFBT assists Transmission Field Services regions in apprentice first-level supervisory duties, works with TF managers to determine journey-level continuing education needs, assists the regions and Construction in coordinating compliance and regulatory training schedules, and coordinates, develops, and implements continuing education training for individual electrical/nonelectrical trades/crafts.
 - c) **Vegetation Management (TFBV)** is responsible for the development and implementation of the TF Vegetation Management programs, which include managing rights-of-way, substation vegetation, and danger trees. TFBV Natural Resource Specialists (NRS) are co-located in the TF Districts and work collaboratively with Transmission Line Maintenance (TLM) crews to implement these programs.

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2. **Construction and Maintenance Services (TFH)** provides central electrical and general craft services for new and upgraded electrical facilities and manages equipment loan pools for Transmission Services. Specific TFH responsibilities include restoration of failed or damaged facilities in emergencies in concert with the districts, developing work and outage step plans, and ensuring that project preliminary designs meet BPA standards for constructability. This organization includes the following functions:
 - a) **Central Electrical Services** builds substations, upgrades substation electrical equipment, splices cable, and assembles and installs switchboards.
 - b) **General Craft Services** is responsible for field and shop painting and welding services, shop carpentry, machining, and sheet metal services including fabrication of switchboard panels and outdoor electrical parts.

4. System Operations (TO) Organization

Is responsible for the safe, reliable operation and dispatch of the high-voltage transmission system and interconnected generation. Responsibilities include operating and managing two regional control centers and representing BPA on operations and other issues with regional and national groups. TO is also responsible for sponsoring and supporting:

Technology Innovation within the operations arena. TO staff support congestion management initiatives by providing planning, scoping, and project management activities on projects that lead to improvements to the tools available for the reliable operation of BPA’s transmission system.

1. **The Internal Operations Management Office (TOI)** is responsible for planning, managing and leading programs, systems and work processes which are critical to the operational performance of day-to-day System Operations activities. The office ensures regulatory compliance related to those standards affecting Transmission System Operations in support of overall organizational program delivery. TOI includes two subgroups: Organizational Delivery and Performance (TOII) and R&D—Strategy.
 - a) **Organizational Delivery and Performance (TOII)** focuses on special project/program management initiatives, compliance, and policy-related issues, including scheduling and process delivery for all programs and initiatives critical to the safe and reliable operations of the Transmission System Operations organization and across BPA. The Organizational Performance team provides monitoring, reporting, and trend analyses.
 - b) **R&D – Strategy** addresses long-term operational strategies.
 - c) **Contestion & Dispatch Support:** The department also develops products and services which support improvements in the management of transmission operations, including information and process integration, advanced visualization methods, and deployment of new or enhanced information systems. These specialized systems typically involve commercial aspects of power and transmission operations, energy markets, hydro and transmission dispatching, integration of renewable resources, and real-time power system management.

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2. Operations Support (TOO) is responsible for supporting the safe, reliable, and open-access operation of the high-voltage transmission system and interconnected generation. TOO provides products and specialized technical and operational support for dispatch of the transmission system, including coordination with other internal groups, public utility customers and constituents, Western Interconnection utilities, and regional and national reliability entities. TOO develops and manages all near-term System Operating Limits (SOLs), and Total Transfer Capabilities (TTCs). TOO provides outage coordination support and is tasked with facilitating and planning for complex outages. TOO develops control center automation requirements or provides primary power system technical oversight for Automatic Generation Control (AGC), Balancing Authority (BA) operations responsibilities, protection Underfrequency Load Shedding, Under-voltage Load Shedding and reactive switching scheme settings, SCADA, Remedial Action Schemes (RAS), disturbance monitoring and reporting systems. TOO directly supports the development of standards, guides, procedures and agreements for safe and reliable interconnected electric utility operations within the Western Interconnection. TOO provides technical study and analysis of the impacts of renewable energy on balancing reserves and on rate cases. TOO provides system-modeling analyses in the Planning of Operations time horizon, creates operational nomograms, and provides specialized operational studies to support BPA, regional or national reliability compliance activities. TOO plans and develops the Operations Procedures and Reliability Criteria and reviews and prepares responses to project requirements and contracts. TOO supports power-system automation efforts, as well as support to specialized research-and-development projects, capital and expense projects, and Transmission Asset Management processes. They provide technical expertise for NERC and WECC Compliance standards, including the development of standards, documentation of compliance, and identification of potential standard violations. They provide programmatic oversight for the development, tracking, scheduling, coordination and process support for NERC required training of System Operations personnel.

a) Operations Control (TOOC) provides products and specialized technical and operational support for dispatch of the transmission system, including coordination with other internal groups, public utility customers and constituents, western interconnection utilities, and regional and national reliability entities. They develop control center automation requirements or provide primary technical oversight for Automatic Generation Control (AGC), Balancing Authority (BA) operations responsibilities, protection Under-frequency Load Shedding, Under-voltage Load Shedding and reactive switching scheme settings, SCADA, Remedial Action Schemes (RAS), disturbance monitoring and reporting systems. They directly support the development of standards, guides, procedures and agreements for safe and reliable interconnected electric utility operations within the Western Interconnection. They provide technical study and analysis of the impacts of renewable energy on balancing reserves and on rate cases. They plan and develop the Operations Procedures and Reliability Criteria and review and prepare responses to project requirements and contracts. They support power system automation efforts, as well as provide support to specialized research and development projects, capital and expense. They provide technical expertise for NERC

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and WECC Compliance standards, including the development of standards, documentation of compliance, and identification of potential standard violations.

b) Operations Planning (TOOP) provides products and specialized technical and operational support for dispatch of the transmission system, including coordination with other internal groups, public utility customers and constituents, western interconnection utilities, and regional and national reliability entities. They develop and manage all near-term System Operating Limits (SOLs) including voltage SOLs, and Total Transfer Capabilities (TTC). They provide outage coordination support, tasked with facilitating and planning for complex outages. They directly support the development of procedures and agreements for safe and reliable interconnected electric utility operations within the Western Interconnection. They provide system modeling analyses in the Planning of Operations time horizon and create operational nomograms and provide specialized operational studies to support BPA, regional or national reliability compliance activities. They plan and develop the Operations Procedures and Reliability Criteria and review and prepare responses to project requirements and contracts. They may be called on to provide support to specialized research and development projects, capital and expense projects. They provide technical expertise for NERC and WECC Compliance standards, including the development of standards, documentation of compliance, and identification of potential standard violations.

3. Real-Time Operations (TOR) is responsible for the safe and reliable operation of the BPA footprint for Transmission Operator (TOP) and Balancing Authority (BA) functions. TOR oversees the Munro and Dittmer Control Center dispatchers (NERC Certified System Operators), real-time study engineers, BPA Outage Office, and the Real-Time Operations training group. TOR is responsible for scheduling and facilitating all work that impacts the reliability of the BPA TOP/BA footprint.

a) Dittmer Dispatch (TORD) operates and controls the part of the BPA transmission system that is assigned by the Real-Time Operations Director and also controls federal generation. Responsibilities include providing a safe work environment for field crews; controlling voltage on the transmission system; setting and enabling Remedial Action Scheme (RAS) controls; and coordinating transmission and communication system outages for its part of the BPA transmission system to allow for the construction, maintenance, and repair of facilities. Dittmer Dispatch determines priorities and directs field crews in the emergency restoration of electric service; authorizes and provides emergency assistance to others; authorizes and requests emergency assistance from others; and coordinates BPA system operations with interconnected utilities. Dittmer Dispatch also provides comprehensive backup capability to the Munro Control Center. During transmission system emergencies, Dittmer Dispatch exercises broad authority to purchase, hire, and arrange for loans of equipment, materials, and resources as needed. Dittmer Dispatch also arranges for the delivery or receipt of power or energy to prevent disruption of service or to restore interrupted service.

b) Munro Dispatch (TORM) operates and controls that part of the BPA transmission system assigned by the Real-Time Operations Director and also controls federal generation in abnormal situations. Responsibilities include providing a safe work

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environment for field crews; controlling voltage on the transmission system; setting and enabling Remedial Action Scheme (RAS) controls; and coordinating transmission and communication systems outages for its part of the BPA transmission system to allow for construction, maintenance, and repair activities. Munro Dispatch determines priorities and directs field crews in the emergency restoration of electric service; authorizes and provides emergency assistance to others; authorizes and makes emergency requests from others; and coordinates BPA system operations with interconnected utilities. Munro Dispatch also provides comprehensive backup capability to the Dittmer Control Center. During transmission system emergencies, Munro Dispatch exercises broad authority to purchase, hire, and arrange for loans of equipment, materials, and resources. Dittmer Dispatch also arranges for the delivery or receipt of power or energy to prevent disruption of service or to restore interrupted service.

- c) **The BPA Outage Office (TORO)** has offices in both Dittmer and Munro Control Centers with each having jurisdiction over specific transmission facilities within the BPA footprint and serves as the central coordination point for scheduling, coordinating, and processing outage requests on the BPA transmission system. TORO ensures outages are coordinated, scheduled, and processed in accordance with all NERC, WECC, and Peak RC requirements. This includes ensuring that accurate transmission capacities are posted to the Open Access Same-time Information System (OASIS) in a timely manner. OASIS is an Internet-based system for obtaining services related to electric power transmission in North America.

Outage requests affecting WECC transfer paths or BPA internal flowgates are coordinated and scheduled to ensure the highest reliability of the transmission grid while, at the same time, optimizing transmission capacity for BPA’s customers. TORO plays a critical role in this by helping to ensure that transmission outages are coordinated to meet BPA’s maintenance and capital program obligations on the transmission system. TORO also coordinates both federal and non-federal generator outages within the BPA Balancing Authority (BA). Coordination with BPA’s federal partners at the Bureau of Reclamation (BOR) and Corps of Engineers (COE) ensures the most efficient use of the Federal Columbia River Power System (FCRPS) for BPA’s customers and the region. TORO coordinates transmission outages between other Transmission Operators (TOPs) within the Western Interconnection to ensure the safety and reliability of the region’s transmission grid. Outages are coordinated and scheduled with safety as the number one priority.

- d) **Real-Time Studies (TORS)** study engineers provide real-time system assessment of the current security of the power system and unplanned events, perform near-time and look-ahead studies to send to BPA’s Reliability Coordinator (Peak RC) and participate in R&D projects related to technology improvements for both BPA and the industry. Real-Time Study team members perform rotating shifts on the Dispatch floor.

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4. Substation Operations (TOZ) provides substation operations technical expertise and leadership for the operation of BPA substations including the development of standards, policies, and procedures. Responsibilities include development and revision of BPA’s Switching and Clearance Procedures and access to energized facilities as well as development and maintenance of the Operations Technical Manual. The Substation Operations organization provides leadership oversight to the Substation Operations Apprentice Craft Committee and to the Operations Functional Team.

1. Control Center Hardware Design & Maintenance (TOH) is responsible for the design, project management, implementation, monitoring, operation, regulatory compliance, and maintenance of BPA's Dittmer Control Center real-time control and data acquisition computers, control center network and infrastructure support equipment. They are responsible for implementing, monitoring, operating, and maintaining power system control telecommunications equipment located at the Control Centers. They manage the Control Center Network and the digital telecommunications system Network Management System. They monitor the operational performance of the BPA microwave telecommunications system, analyze and evaluate system performance data and outage time and determine the network availability. They initiate action necessary to preserve the integrity and availability of these systems. They provide around-the-clock monitoring, analysis and resolution of problems or alarm conditions on the real-time control equipment and the system-wide telecommunications network. They establish requirements for control equipment and telecommunications system changes and recommends additions or replacement of poor performing systems or equipment. They control the implementation of hardware changes and modifications. They are responsible for and manage the Dittmer Critical Area physical security system and are responsible for implementing cyber security policies and requirements for the Control Center Network and power system control systems. They are responsible to manage, operate, design, document, administer, and audit the control center systems, network and communication gear in accordance with regulatory and compliance standards required of BPA. They are also responsible for the development of applicable standards at the regional and national level.

a) Control Center Hardware Design/Standards, Monitoring & Administration (TOHD) provides engineering, design, technology research and development, project management, standards development, implementation of cyber security policies and requirements, hardware system administration, and around the clock functional control system monitoring. They are responsible for project management and design of hardware control systems used to operate or support the operations of the BPA transmission system. They evaluate and analyze future trends and needs and research and develop solutions. They develop, recommend and sponsor project plans for additional or replacement systems needed by the control centers. They collect, propose, and develop control center hardware standards to promote a more efficient operation and maintenance of real-time control systems. They document, coordinate and implement cyber security policies and requirements that govern the control center hardware organization. As a function, they provide hardware system administration by understanding and managing the day to day operations of the real-time control systems and supporting infrastructure systems. They

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are responsible for round the clock functional control system monitoring (CSM), analysis, and resolution of problems on the real-time control equipment and system-wide telecommunications network. 24X7, personnel monitor the control system, dispatch field personnel to trouble spots and track their activities. They take trouble calls from computer system users and dispatch appropriate technical personnel to resolve those problems. They interface with technical people from other utilities to resolve data link or communications problems. They solve control and telecommunications system problems and are authorized to call-out maintenance personnel/system experts to solve complex problems.

- b) **DDC Data System Hardware Maintenance (TOHH)** provides 24-hour hardware maintenance support for the Dittmer Control Center systems. This function provides system hardware maintenance, troubleshooting, repair, emergency response, client support, system energization/acceptance testing. DSH is responsible for the, implementation, monitoring, operation and maintenance of BPA’s Control Center real-time control and data acquisition computers, control center network and infrastructure support equipment. They manage the Control Center Network, analyze and evaluate system performance data and outage time and determine the network availability. They initiate action necessary to preserve the integrity and availability of these systems and monitor, analyze and provide resolution of problems or alarm conditions on the real-time control equipment. They control the implementation of hardware changes and modifications, implement cyber security policies and requirements on the Control Center Network and are responsible for and manage the Control Center Critical Area physical security systems.
 - c) **Control Center Power System Control (PSC) Maintenance (TOHP)** provides 24-hour telecommunications maintenance support for the Dittmer and Munro Control Center systems. This is a critical function that is responsible for implementing, monitoring, operating and maintaining power system control telecommunications equipment located at the Control Centers. They manage the digital telecommunications system Network Management System. They monitor the operational performance of the BPA microwave telecommunications system via the Badger and Microwave Monitor systems, they analyze and evaluate system performance data and outage time and determine the network availability. They initiate action necessary to preserve the integrity and availability of these systems.
2. **The Internal Operations Management Office (TOI)** is responsible for planning, managing and leading programs, systems and work processes which are critical to the operational performance of day-to-day System Operations activities. The office ensures regulatory compliance related to those standards affecting Transmission System Operations in support of overall organizational program delivery. TOI includes two subgroups: Organizational Delivery and Performance (TOII) and R&D—Strategy.
- a) **Organizational Delivery and Performance (TOII)** focuses on special project/program management initiatives, compliance, and policy-related issues, including scheduling and process delivery for all programs and initiatives critical to the safe and reliable operations of

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the Transmission System Operations organization and across BPA. The Organizational Performance team provides monitoring, reporting, and trend analyses.

b) **R&D – Strategy** addresses long-term operational strategies.

3. Congestion & Dispatch Support (TOK) develops products and services supporting improvements in the management of transmission operations. TOK focuses on information and process integration, advanced visualization methods, and deployment of new or enhanced information systems. Systems developed and supported by TOK typically involve commercial aspects of power and transmission operations, energy markets, hydro and transmission dispatching, integration of renewable resources, and real-time power system management. TOK services include electrical engineering, energy and transmission scheduling, information systems development and maintenance, organizational change management, and project management.

4. Operations Support (TOO) is responsible for supporting the safe, reliable, and open-access operation of the high-voltage transmission system and interconnected generation. TOO provides products and specialized technical and operational support for dispatch of the transmission system, including coordination with other internal groups, public utility customers and constituents, Western Interconnection utilities, and regional and national reliability entities. TOO develops and manages all near-term System Operating Limits (SOLs), and Total Transfer Capabilities (TTCs). TOO provides outage coordination support and is tasked with facilitating and planning for complex outages. TOO develops control center automation requirements or provides primary power system technical oversight for Automatic Generation Control (AGC), Balancing Authority (BA) operations responsibilities, protection Underfrequency Load Shedding, Under-voltage Load Shedding and reactive switching scheme settings, SCADA, Remedial Action Schemes (RAS), disturbance monitoring and reporting systems. TOO directly supports the development of standards, guides, procedures and agreements for safe and reliable interconnected electric utility operations within the Western Interconnection. TOO provides technical study and analysis of the impacts of renewable energy on balancing reserves and on rate cases. TOO provides system-modeling analyses in the Planning of Operations time horizon, creates operational nomograms, and provides specialized operational studies to support BPA, regional or national reliability compliance activities. TOO plans and develops the Operations Procedures and Reliability Criteria and reviews and prepares responses to project requirements and contracts. TOO supports power-system automation efforts, as well as support to specialized research-and-development projects, capital and expense projects, and Transmission Asset Management processes. They provide technical expertise for NERC and WECC Compliance standards, including the development of standards, documentation of compliance, and identification of potential standard violations. They provide programmatic oversight for the development, tracking, scheduling, coordination and process support for NERC required training of System Operations personnel.

a) **Operations Control (TOOC)** provides products and specialized technical and operational support for dispatch of the transmission system, including coordination with other internal groups, public utility customers and constituents, western interconnection utilities, and

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regional and national reliability entities. They develop control center automation requirements or provide primary technical oversight for Automatic Generation Control (AGC), Balancing Authority (BA) operations responsibilities, protection Under-frequency Load Shedding, Under-voltage Load Shedding and reactive switching scheme settings, SCADA, Remedial Action Schemes (RAS), disturbance monitoring and reporting systems. They directly support the development of standards, guides, procedures and agreements for safe and reliable interconnected electric utility operations within the western interconnection. They provide technical study and analysis of the impacts of renewable energy on balancing reserves and on rate cases. They plan and develop the Operations Procedures and Reliability Criteria and review and prepare responses to project requirements and contracts. They support power system automation efforts, as well as provide support to specialized research and development projects, capital and expense. They provide technical expertise for NERC and WECC Compliance standards, including the development of standards, documentation of compliance, and identification of potential standard violations.

b) Operations Planning (TOOP) provides products and specialized technical and operational support for dispatch of the transmission system, including coordination with other internal groups, public utility customers and constituents, western interconnection utilities, and regional and national reliability entities. They develop and manage all near-term System Operating Limits (SOLs) including voltage SOLs, and Total Transfer Capabilities (TTC). They provide outage coordination support, tasked with facilitating and planning for complex outages. They directly support the development of procedures and agreements for safe and reliable interconnected electric utility operations within the western interconnection. They provide system modeling analyses in the Planning of Operations time horizon and create operational nomograms and provide specialized operational studies to support BPA, regional or national reliability compliance activities. They plan and develop the Operations Procedures and Reliability Criteria and review and prepare responses to project requirements and contracts. They may be called on to provide support to specialized research and development projects, capital and expense projects. They provide technical expertise for NERC and WECC Compliance standards, including the development of standards, documentation of compliance, and identification of potential standard violations.

6. Real-Time Operations (TOR) is responsible for the safe and reliable operation of the BPA footprint for Transmission Operator (TOP) and Balancing Authority (BA) functions. TOR oversees the Munro and Dittmer Control Center dispatchers (system operators), real-time study engineers, Dittmer and Munro outage offices, and the Real-Time Operations training group. TOR is responsible for scheduling and facilitating all work that impacts the reliability of the BPA TOP/BA footprint.

a) Dittmer Dispatch (TORD) operates and controls the part of the BPA transmission system that is assigned by the System Operations manager and also controls federal generation. Responsibilities include providing a safe work environment for field crews; controlling

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voltage on the transmission system; directing and controlling power system stability controls; and coordinating transmission and communication system outages for its part of the BPA transmission system to allow for the construction, maintenance, and repair of facilities. TORD determines priorities and directs field crews in the emergency restoration of electric service; authorizes and provides emergency assistance to others; authorizes and requests emergency assistance from others; and coordinates BPA system operations with interconnected utilities. Dittmer Dispatch provides comprehensive backup capability to the Munro Control Center and is responsible for managing the Dispatcher Training Program. During transmission system emergencies, the Dittmer Dispatch organization exercises broad authority to purchase, hire, and arrange for loans of equipment, materials, and resources as needed. The Dittmer Control Center also arranges for the delivery or receipt of power or energy to prevent disruption of service or to restore interrupted service.

- b) **Munro Dispatch (TORM)** operates and controls that part of the BPA transmission system assigned by the System Operations manager and also controls federal generation in abnormal situations. Munro Dispatch provides a safe work environment for field crews; controls voltage on the transmission system; and coordinates transmission and communication systems outages for its part of the BPA transmission system for construction, maintenance, and repair activities. TORM determines priorities and directs field crews in the emergency restoration of electric service; authorizes and provides emergency assistance to others; authorizes and makes emergency requests from others; and coordinates BPA system operations with interconnected utilities. The Munro Control Center also provides comprehensive backup capability to the Dittmer Control Center. During transmission system emergencies, TORM exercises broad authority to purchase, hire, and arrange for loans of equipment, materials, and resources. TORM also arranges for the delivery or receipt of power or energy to prevent disruption of service or to restore interrupted service. Additionally, TORM provides hardware support for the systems within the Munro Control Center, the building and grounds.
- c) **The BPA Outage Office (TORO)** has offices in both Dittmer and Munro Control Centers — with each having jurisdiction over specific transmission facilities within the BPA footprint — and serves as the central coordination point for scheduling, coordinating, and processing outage requests on the BPA transmission system. TORO coordinates transmission outages between other Transmission Operators (TOPs) within the Western Interconnection to ensure the safety and reliability of the region’s transmission grid. Outages are coordinated and scheduled with safety as the number one priority.
- d) **Real-Time Studies (TORS)** study engineers provide real-time system assessment of the current security of the power system and unplanned events, perform near-time and look-ahead studies to send to BPA’s Reliability Coordinator (Peak RC) and participate in R&D projects related to technology improvements for both BPA and the industry. Real-Time Study team members perform rotating shifts on the Dispatch floor.

7. Real-Time Control Systems (TOS) is responsible for the planning, analysis, design, engineering, delivery, and maintenance support of systems used to provide safe and reliable real-time

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control, dispatch, analysis, management, and protection of the transmission system. These systems, which are typically located within the system operations control centers, are used for 24x7 support of the power system. The group ensures that these critical systems conform to appropriate industry and regulatory requirements. The team also participates in and supports the development of applicable standards at the regional and national level. TOS also provides project and planning support and is responsible for asset planning, project management direction and oversight for control center systems and projects. Additionally, TOS provides life-cycle support for Energy Management Systems (EMS) used in support of BPA’s Control Centers and provides life-cycle support for non-EMS used in support of BPA’s Control Centers (engineering, design, operations and maintenance support, and technical leadership for systems which provide logging and outage management, integrating operational utility data, alarm monitoring and control, and other decision-support systems).

- a) **Operations and Dispatch Support (TOSD)** provides life-cycle support for used in support of BPA’s Control Centers. This includes engineering, design, operations and maintenance support and technical leadership for systems which provide logging and outage management, integrate operational utility data, alarm monitoring and control, and other decision support systems. Responsibility also includes lead for applicable cyber security functions and supplemental project support.
 - b) **Energy Management Systems (EMS) (TOSE)** provides life-cycle support for Energy Management Systems (EMS) used in support of BPA’s Control Centers. This includes engineering, design, operations and maintenance support and technical leadership for systems such as Supervisory Control and Data Acquisition (SCADA), Automatic Generation Control (AGC), on-line power flow and state estimation, systems which provide real-time operational data and dispatcher training environments which simulate the real world. Responsibility also includes applicable cyber security functions and supplemental project support.
 - c) **Control Center Project & Planning (TOSP)** support is responsible for asset planning, project management direction and oversight, project management and project staff for control center systems and projects. Also serves as the Control Center lead for asset management, workload prioritization processes and represents organization in technology innovation efforts.
- 8. Substation Operations (TOZ)** provides substation operations technical expertise and leadership for the operation of BPA substations including the development of standards, policies, and procedures. Responsibilities include development and revision of BPA’s Switching and Clearance Procedures and access to energized facilities as well as development and maintenance of the Operations Technical Manual. The Substation Operations organization provides leadership oversight to the Substation Operations Apprentice Craft Committee and to the Operations Functional Team.

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5. Planning and Asset Management (TP) Organization

The Vice President (VP) for Transmission Planning and Asset Management reports to the Senior Vice President (SVP) of Transmission Services and serves as BPA’s Chief Engineer and Reliability Officer providing direction, advice and support to BPA and external stakeholders including State delegates and Public Utilities Commissions (PUC’s) regarding the changing industry and regulatory requirements along with monitoring current and future impacts on the BPA Grid.

1. **Planning and Asset Management** is responsible for overseeing the transmission system asset management program to promote the reliability, compliance, efficiency and economical lifecycle of all transmission system physical assets. TP oversees the development of both near and long-term activities and investments needed to meet BPA’s long-term objectives and the development of capital and expense multi-year asset management strategies, plans, and budget forecasts. This is accomplished by evaluating the current condition and capability of the transmission system and evaluating the ability to meet predicted demands, desired performance, risks to meeting performance targets and least life cycle costs. Additionally, TP oversees the development and implementation of the transmission system asset management system framework, including the development and implementation of asset management standards, policies, processes, procedures, and functions. TP Subject Matter Experts (SMEs) provide technical and procedural perspective to the development of BPA policies, business practices, internal processes and standards, technology innovation, and take part in a number of cross-agency teams.

2. **Internal Operations and Asset Management** is a function under TP responsible for Planning and Asset Management (TP) internal operations management (IOM) and the Transmission Asset Management program. This function is responsible for managing the formulation and implementation of policies, strategies, and practices associated with transmission short and long-term planning and studies, and asset management program of Bonneville’s transmission grid, facilities and related assets. Specifically, the program elements include TP-wide responsibility for internal business and risk management consulting; North American Electric Corporation (NERC) reliability standards and compliance oversight; business continuity and transmission emergency response; direction and oversight of all other TP related internal operating issues including operations excellence initiatives, budgets, and serving as the centralized authority and manager of programs, policies, processes, and budgets associated with Transmission Services’ Asset Management program. In addition to the Internal Operations Management responsibilities, this function is responsible for Transmission Asset Management consisting of the Transmission Asset Manager and two organizations: Strategy and Program Management (TPO) and Asset Management Oversight and Program Support (TPW).

3. **Customer Service Engineering (TPC)** is the technical interface between Transmission Services and its customers. TPC provides technical and procedural support for other Transmission Service groups in TE, TP and TS. TPC provides subject matter experts (SMEs) to Customer Forums, Joint Operating Committees, Rate Cases and other forms of outreach. The TPC Manager is responsible for compliance with BPA’s Large and Small Generator Interconnection

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Procedures with the Line and Load Interconnection Procedures (LLIP), the Customer Service Reliability Program and the Reliability Standards Owner (RSO) function for all of Planning and Asset Management (TP).

- a) **Customer Service Engineering – Contract Administration (TPCC)** manages customer interconnection and integration requests submitted under the LGIP, the SGIP, and LLIP, overseeing compliance with the Open Access Transmission Tariff (OATT) procedures and BPA business practices. Process Administrators coordinate the scoping and study review meetings with customers, Customer Service Engineers (CSEs) and other BPA organizations, maintain compliance timelines, manage contract drafting and review processes, documentation and take curative action when needed. TPCC manages customer requests for non-OATT projects such as the construction or replacement of new or upgraded transmission facilities; communications upgrades; construction and maintenance contracts in support of BPA’s wireless and fiber programs; and laboratory services and other short-term customer-driven projects. TPCC develops, implements, and manages the full lifecycle of all short-term contract actions related to OATT and non-OATT customer-driven projects in compliance with A-123, business practices and BPA’s Contract Management Lifecycle Policies and Procedures. TPCC’s technology and project management team develops and manages integrated project documentation and information systems, tracking projects from request to close-out. The team manages information acquisition, tracking, reporting and storage in support of project management oversight and compliance for all TPC’s Projects Funded in Advance (PFIA) capital projects both OATT and non-OATT, for BPA’s fiber and wireless programs, and to assist other workgroups with their project management and compliance needs.

- b) **Customer Service Engineering, Western and Eastern Engineering (TPCV and TPCF)** organizations work directly with the management and staff of BPA’s customers to develop and coordinate plans of service and project timelines needed to maintain and enhance reliable transmission service in support of regional load growth. CSEs lead the internal coordination of BPA’s processes across all impacted work groups to seek and obtain capital approval and schedules for projects, both customer-driven and BPA-led. The CSEs provide expertise in reviewing alternative plans of service and coordination and strategy meetings both within BPA and externally. They work jointly with customers to develop long-range plans, to maintain accurate meter diagrams and calculate accurate metering losses, and provide technical assistance. TPCF/V are responsible for writing short-term OATT and non-OATT agreements for signature by Transmission Account Executives and the TPC Manager. The CSEs research and document asset ownership and maintenance responsibility, and support TPC’s Customer Service Reliability Program. The TPCV team includes the Interconnection Process Leads for the Large and Small Generator Interconnection Procedures Line and Load Interconnection, and the Lead for the Sale of Facilities and Low Voltage Delivery sales programs. TPCV also validates system losses across the FCRTS. TPCV provides technical oversight and contracting management to BPA’s fiber and wireless programs.

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c) **Customer Service Reliability Program (TPCR)** manages the interface between BPA and the region to implement NERC reliability standards and associated initiatives with consistent processes; ensures consistent treatment of BPA customers and its federal partners for NERC reliability standards; and creates and manages the contracts establishing Reliability Standards roles and responsibilities. TPCR coordinates across BPA to ensure a strategic path to standards development, tracks NERC reliability standards and initiatives that impact BPA and its customers, and monitors potential customer/BPA impacts from actions contemplated or taken by FERC, NERC, WECC and other entities. TPCR is the Reliability Standard Owner for all requirements implemented within the TP organization, provides support to the agency Reliability Officer as requested, and leads initiatives with cross-agency impact.

2. **Long Term Planning (TPL)** is responsible for providing leadership, strategic guidance, and analytical capability for the Bonneville Power Administration on an array of long-term (5-20 years) and short-term (0-14 months) commercial, and/or regional activities that may impact its transmission infrastructure decisions. Long Term Planning represents BPA in regional and intra-regional transmission planning processes including ColumbiaGrid, Western Electricity Coordinating Council (WECC), Transmission Expansion Planning Policy Committee (TEPPC), Northern Tier Transmission Group (NTTG), California Independent System Operator (CAISO) and West Connect.

Duties performed include providing interface, direction and being a point of contact between Transmission Planning and Asset Management and ColumbiaGrid on implementation of the Planning and Expansion Functional Agreement. Long Term Planning performs scenario analysis and production cost analysis to develop strategies supporting BPA’s long-term objectives and to inform capital investment decisions. Scenarios are used to test Northwest, West Wide and WECC transmission infrastructure plans in order to address the question of how alternate futures can impact these plans. Long Term Planning communicates results of BPA project evaluations and proposes modification to plans of service, including non-wires solutions, in order to mitigate impacts and capture regional benefits.

Long Term Planning performs short-term commercial Available Transfer Capability (ATC) Base Cases and associated scenario analysis. Long Term Planning also supports Transmission Marketing & Sales in a variety of efforts, including, but not limited to ATC calculation, Inter-regional coordination, development of new products and services, Network Open Season (NOS) and its successor, Transmission Service Request Study and Expansion Process (TSEP).

3. **Communications and Grid Modeling (TPM)** is responsible for supporting Transmission Services’ Asset Management Program, planning and implementation. Areas of responsibility include: Communications and Control Planning, Grid Modeling and development of Remedial Action Scheme (RAS) Asset Strategy and implementation.

a) **Communications and Control Planning (TPMC)** is responsible for developing plans of services for upgrades, replacements, and expansion to BPA’s operational communications system including fiber optic and digital/analog radio systems which support voice, data, control, protection, and Remedial Action Scheme (RAS) circuits for BPA’s transmission

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system. TPMC provides technical support for network transmission, network interconnections, generation integration, and customer service projects in alignment with Asset Management Strategies. TPMC also coordinates with regulatory groups and internal groups to develop telecommunications guidelines and standards.

- b) **Grid Modeling (TPMG)** is responsible for developing the transmission model base cases used for various study purposes including: planning, operations, interconnections, customer service projects, and commercial calculations for the short-term horizon including Existing Transmission Commitments (ETC). The base cases are coordinated using consistent data requirements, reporting procedures, and modeling tools as approved by the regional reliability organization. TPMG also is responsible for dynamic generation model reporting and verification and maintains the BPA System Electrical Data Book that supports the equipment parameters used in the powerflow base cases, short-circuit and state estimation tools. TPMG sponsors and supports Technology Innovation projects within the planning arena.
4. **Strategy and Program Management (TPO)** is responsible for establishing and ensuring implementation of Transmission asset management strategies and developing a multi-year integrated plan relating to system expansion, upgrades and additions, replacement, and maintenance. Responsibilities include establishing strategic objectives, financial targets, and performance standards in alignment with the agency’s strategic direction. TPO establishes asset condition assessment requirements and project prioritization criteria, specific condition assessment data requirements, and performance metrics. TPO tracks, manages and monitors integrated program strategies and plans based on asset and transmission system performance; monitors long-term plan execution and asset capabilities; evaluates and designs methods for prioritizing asset-related spending; identifies and promotes process improvements that result in program efficiencies, and evaluates risks to ensure assets are managed in a manner consistent with BPA priorities including safety and regulatory compliance.
- a) **Reliability Centered Maintenance – RCM (TPOR)** is responsible for reviewing, evaluating, and recommending maintenance and replacement strategies based on RCM analysis and equipment failure history. Additional functions performed include designing, implementing and supporting maintenance work management systems and equipment trouble reporting systems. The RCM group works closely with Asset Management, Engineering, and Field Services to develop performance measures for transmission assets.
5. **Transmission Planning (TPP)** is responsible for planning BPA’s transmission system and providing guidance to Transmission Services’ asset investment strategy. Responsibilities include developing expansion plans for system reinforcements to meet transmission system needs for load growth, adequate transfer capability, requests for generation interconnections, line and load interconnections, and long-term firm transmission service. TPP assesses transmission system performance using North American Electric Reliability Corporation (NERC) reliability standards and Western Electricity Coordinating Council (WECC) criteria; and develops a long range transmission expansion plan to meet the expansion needs of BPA’s transmission system. TPP develops plans-of-service including non-wires solutions to reinforce load service areas, flow

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gates, and interties to facilitate customer service requests; define project requirements and develops and coordinates associated Project Requirement Diagrams (PRD's); obtains cost estimates; and develops business cases to support the project approval process. TPP coordinates projects through BPA's Transmission Planning Process under Attachment K (FERC Order 890) and through sub-regional planning organizations such as Columbia Grid. TPP supports the Transmission Marketing and Sales organization through available transfer capability (ATC) calculations; conducting feasibility, impact, and facility studies for interconnection requests; analysis of long-term transmission service requests; and other customer requests. TPP supports Network Open Season (NOS) process which includes conducting Cluster Studies and developing expansion plans to accommodate long-term firm transmission service requests. TPP participates in industry groups and organizations such as North American Electric Reliability Corporation (NERC), Western Electricity Coordinating Council (WECC), Federal Energy Regulatory Commission (FERC), Department of Energy (DOE) and Regional and Sub-Regional Planning Organizations. They develop and validate power system models including: models for loads, generators, DC transmission, Static Var Compensator (SVC) and other control devices. TPP represents BPA on issues pertinent to transmission planning through participation in regional and national groups. In addition, TPP sponsors, develops and supports Technology Innovation (TI) within the planning arena.

- a) **Transmission Reliability Planning (TPPA)** is responsible for expansion planning for reliability to comply with NERC TPL standards but also may work on matrix teams with SMEs in TPPB and TPPC to perform various transmission planning activities. This includes planning for load growth while meeting existing long-term transmission service obligation.
 - b) **Transmission Service Planning (TPPB)** is responsible for transmission customer requested planning to comply with the Open Access Transmission Tariff (OATT), but also may work on matrix teams with SMEs in TPPA and TPPC to perform various transmission planning activities. This includes addressing new long-term firm transmission service requests for PTP customers and evaluating resource forecast for NT customers.
 - c) **Transmission Infrastructure Development Planning (TPPC)** is responsible infrastructure development planning to support the Transmission Services' asset investment strategy, but also may work on matrix teams with SMEs in TPPA and TPPB to perform various transmission planning activities. This includes developing plans of services for system expansion, preparing business cases for funding requests and assessing and developing non-wires solutions, and coordinate expansion project with sustain projects.
6. **Asset Management Oversight and Program Support (TPW)** is responsible for supporting Transmission Services' asset management program, planning, portfolio management and implementation. Functions performed consist of three primary areas of responsibility; estimating, asset management program and portfolio coordination, analysis and business support.
- a) **Business Support and Analysis team** provides technical systems, data support, and business process and analysis support for Transmission's asset management program.

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This function administers, coordinates and documents asset management decision-making related processes, and procedures, and manages the demand planning process. Duties include overseeing Transmission Asset Management related Office of Management and Budget's (OMB) Circular A-123 implementation and key controls. Responsibilities also include administration and management of the following activities: facilitating the creation and update of process design and associated quality assurance reviews; providing business and program analysis to support required management reviews and reporting; coordinating logistics and establishing internal operating compliance guidance for Transmission Services' Asset Management Program; ensuring adequate record-keeping to demonstrate compliance; conducting quality assurance reviews; and tracking asset program performance. In addition to other Planning and Asset Management organizations, the Asset Management organizations work closely with Engineering, Field Services, Operations, Agency Asset Management, and Finance.

- b) **Estimating (TPWE)** develops detailed cost estimates and typical estimate models in accordance with industry standards; performs cost analysis, estimate versus actuals and trending analysis for estimates; updates the estimates and processes based on estimate performance in accordance with engineering and supply chain organizations.
- c) **Program Coordination (TPWP)** executes the Transmission asset portfolio management process including implementing the asset management work plan and ensuring BPA maximizes value for the ratepayers. Duties performed include reviewing, and coordinating the investment portfolio nominations and training, managing portfolio changes, overseeing the development of business cases for completeness and conformation with Transmission and agency policies and procedures; managing incremental and/or defunding requests; monitoring near term program implementation.

6. Transmission Marketing and Sales (TS) Organization

Transmission Marketing and Sales (TS) provides open access to the Federal Transmission System (FTS) consistent with transmission tariffs approved by Federal Energy Regulatory Commission (FERC) Open Access Transmission Tariff (OATT). Responsibilities include leading the development and administration of long-term and short-term transmission services and providing ratemaking support and margin management for Transmission marketing and sales including market intelligence, research, and analysis, which is used with other information to set cost and revenue targets. TS applies sound process management, decision support and data stewardship practices in managing the business processes, information, and tools necessary to conduct Transmission commercial business effectively. TS manages the reservation and sale of all Transmission services associated with the Transmission tariff in a nondiscriminatory manner, and ensures commercial compliance oversight and direction for all transmission commercial functions.

- 1. **Transmission Sales (TSE)** leads the negotiation, development, and administration of long-term and short-term Transmission services. TSE Account Executives (AEs) are the point of contact for

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Transmission customers, coordinating communications outreach and providing leadership on customer-related issues.

- a) **Transmission Account Services (TSES)** provides expertise and support to the AEs on Transmission customer issues including contract development and finalization, contract quality control review, analysis, customer issue resolution and front-office contract administration. AEs coordinate customer account teams with agency representatives to resolve and manage customer accounts and issues. TSES coordinates the implementation of contract templates, liaises with Customer Support Services, and guides customers through the Transmission service application process. TSES also supports processes linked to all TS requests, such as rollover and competing requests.
2. **Transmission Policy and Strategy (TSP)** provides leadership and direction on the formulation of rules and strategies in support of BPA’s governing practices consistent with regulatory requirements, federal law, and BPA’s OATT.
 - a) **Transmission Policy Development and Analysis (TSPD)** develops, analyzes and implements the business practices and policies associated with BPA’s marketing and sale of Transmission and ancillary services, as governed by the BPA OATT and other contracts.

Major activities include development, interpretation and maintenance of BPA’s OATT, Available Transfer Capacity (ATC) policy development and analysis, development of new Transmission products in coordination with subject matter experts across BPA, analysis of policy implications of new Transmission uses, active engagement in external policy forums, and regular interaction with staff at FERC on technical issues associated with the OATT.
 - b) **Commercial Business Assessment (TSPQ)** develops and designs rates for Transmission and ancillary services based on OATT and other non-OATT products. TSPQ develops revenue forecasts for Transmission Services based on OASIS information, market information and past trends. In addition TSPQ, provides market research on business fundamentals driving sales of Transmission capacity, and conducts quantitative and business analysis in support of commercial business transactions. TSPQ develops rates policy and provides revenue information to guide executive business decisions. TSPQ also provides support for the development of financial information for variance reporting, auditing, A-123, Settlement for Colville, and develops reports for billing information.
 3. **Commercial System Management (TSR)** manages the business processes, information, and tools required to conduct Transmission commercial business effectively. TSR provides administration and maintenance support of the Transmission Services commercial business systems, and supports all workgroups within TS.
 - a) **Commercial System Process and Implementation (TSRF)** defines, measures, and monitors processes, implementation and systems for TS commercial business. TSRF participates in and monitors activities of industry regulatory and standards development organizations, representing and supporting BPA’s commercial Transmission business at these forums. TSRF's goal is continuous improvement in response to industry standards, new technology, and efficiency improvements.

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- b) **Commercial System Production Support (TSRS)** coordinates testing, training (internal and external), desk procedures and process maps for TS systems, providing administration and maintenance support of all TS commercial business systems and support for all workgroups within TS. TSRS also oversees the TS change management process, and documents all system enhancements and issue resolutions. TSRS ensures that all external postings for FERC Standards of Conduct, curtailments, products, prices, and organizational information comply with regulatory requirements, and provides technical leadership to TS managers, employees, and customers (internal and external) for contract path modeling, single-source data entry validation, and end-user reporting requirements approved by FERC. TSRS provides input and expertise to the Transmission Marketing Policy and Strategy organization regarding updates and changes required for business practices, policies and procedures. TSRS also provides reservation and scheduling customer support: documenting work processes, procedures, desk manuals, and artifacts containing details relating to scheduling operations, as well as controls for the ancillary service market.
- c) **Compliance Support** analyzes scheduling operations, OASIS management, and long-term, short-term, and Conditional Firm ATC management to ensure compliance with external regulations and WECC business practices. The Compliance Support organization provides input and expertise to the Commercial System and Transmission Scheduling organizations in the development of procedures to ensure compliance with all relevant policies, practices, and timelines. Compliance Support operates a system of internal controls that provides reasonable assurance that systems and processes are efficient, accurate, and performing to specifications.
- d) **Web Support** ensures that the Transmission website complies with agency standards, archives outdated information, posts new information, designs and builds new web pages for clients throughout Transmission Services. Web Support maintains the Transmission business practice and desk procedure sites for the various scheduling functions, and collaborate with the agency Web Master in the rebuild of the Agency website.
4. **Transmission Scheduling (TSS)** manages BPA's Transmission scheduling and provides reservation transaction processing and analytical support for the long-term and short-term Transmission marketing interface via OASIS, consistent with BPA's transmission tariff, business practices and procedures. OASIS Management, Pre-Schedule, After-the-Fact and Capacity Desk (TSSP) coordinates system outages, processes Transmission reservations, and schedules requests according to published timelines, consistent with Transmission business practices and BPA's OATT. OASIS Management (Reservation Desk) performs OASIS management duties consistent with all policies, practices, and timelines. The Reservation Desk is responsible for confirmation of reservations, processing the Transmission request queue, and coordination of studies, and manages long-term, short-term, and Conditional Firm ATC. The Capacity Desk coordinates all planned and unplanned system outages with the Transmission Operations Outage Office within prescribed timelines, and updates the Known Constraint external web page with outage information for customer review. The day-to-day weekly Pre-Schedule function ensures that pre-schedule checkout with adjacent Balancing Authority Areas is

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accurate and timely, and that day-ahead energy and Transmission levels are balanced. The After-the-Fact function provides comprehensive analysis of customer transactions for Transmission products and services: investigation, reconciliation, reporting and resolution of discrepancies involving scheduled Transmission activities and billing disputes with BPA customers and Balancing Authority Areas in compliance with WECC scheduling and business practices. After-the-Fact liaises with the Customer Support Services organization to furnish settlement-quality data for billing and other reporting requirements. TSSP also provides input and expertise in the development of emergency and Continuity of Operations (COOP) planning and exercises, maintenance of emergency plans. In collaboration with Commercial System Production Support, the OASIS Management, Capacity Desk, Scheduling and After-the-Fact desk subject matter experts (SMEs) ensure the ongoing documentation of all new and revised procedures.

- a) **Real-Time Scheduling (TSSM/TSST)** provide around-the-clock support to ensure that BPA balances the net scheduled interchange with adjacent Balancing Authority Areas accurately, and that energy and Transmission levels are balanced. Real-Time also operates the hourly Transmission market, implements transactions, meets compliance obligations, manages paths prior to flow, and provides after-hours operation for capacities, OASIS, and issue resolution. Real-Time develops, operates, and maintains systems and processes that support congestion relief as prescribed by Transmission Operations dispatch and technical operations. TSST has real-time schedulers based at the Dittmer Scheduling Center and TSSM has real-time schedulers based at the Munro Scheduling Center to support continuous dual-location 24-hour Transmission scheduling.

8. Review

BPA Functional Statements are reviewed and updated as required due to changes in delegations of authority, statutory changes, or organizational changes.

9. Revision History

Version	Issue Date	Description of Change
1.0	08/04/2016	Initial Version for Migration to new BPA Internal Library
2.0	09/12/2017	Updated TO Functional Statement
3.0	05/14/2019	Updated TE portion per Michelle Wilber

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