

STATEMENT OF  
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U.S. DEPARTMENT OF ENERGY  
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Ranking Member Cantwell, Members of the Committee, I appreciate the opportunity to testify today. My name is John Hairston. I am the Chief Administrative Officer of the Bonneville Power Administration (Bonneville). Bonneville is a Federal power marketing administration within the United States of America, Department of Energy, which markets electric power from 31 Federal hydroelectric projects and some non-Federal projects in the Pacific Northwest. Bonneville operates and maintains an extensive high voltage electricity transmission system that integrates with every major electric utility in the Pacific Northwest, as well as with California and Canada.

Bonneville plays a critical role in responding to any disaster affecting the region's electricity grid. In my testimony today, I will describe how Bonneville is protecting its electricity infrastructure and how it is preparing to respond to a potentially massive Cascadia Subduction Zone earthquake.

### **Bonneville's Seismic Mitigation Program**

Bonneville has been hardening its electricity transmission system and investing in seismic-related research for more than 20 years. We began by assessing which areas and components of the power system are most vulnerable to significant damage from an earthquake and other natural disasters. These comprehensive assessments have informed Bonneville's multi-faceted seismic mitigation strategy and have allowed it to prioritize how, where and when to upgrade or reinforce critical facilities and equipment. In recent years, Bonneville has seismically hardened a control center, substation control houses (including hardening nonstructural components such as battery backup systems), microwave buildings, a telecommunications building and a critical equipment storage facility, and updated its seismic design policy for new facilities. We have also distributed our most critical functions among geographically diverse operating centers staffed 24/7 with independent information technology systems. This helps ensure Bonneville can operate these critical control functions solely from one site if necessary.

Protecting high-voltage transformers, an essential component to operating the electricity system, is also a top priority. In 2014, Bonneville completed a decades-long project,

which involved anchoring approximately 500 transformer, reactor and station service units in high-risk seismic hazards areas west of the Cascades, from the southern Oregon border to Canada.

Bonneville also was the first in the country to deploy state-of-the-art base isolation technology designed to protect high-voltage power transformers during an earthquake. Base isolation is a growing method for protecting structures during an earthquake. As part of a multiyear research project funded by its Technology Innovation Office, Bonneville partnered with the Multidisciplinary Center for Earthquake Engineering Research (MCEER) at State University of New York at Buffalo to test the performance of base isolation technology and then install it on an operation unit. In September 2013, Bonneville moved to the deployment phase of the project, where we outfitted a 460-kilovolt transformer with four friction pendulum base isolators. The isolators consist of two 24-by-24 inch steel square plates that are stacked with an articulated slider between the concave surfaces so that during an earthquake the plates and slider move relative to each other and provide isolation between the ground motion and the transformer. Eventually, Bonneville could retrofit transformers in high-risk areas with base isolators and make it a standard for transformer units installed in new substations. Base isolators could be a relatively inexpensive upgrade that could make the Northwest power system less vulnerable and save the region hundreds of millions of dollars in replacement costs.

Electricity will be critical to the region's recovery in the event of a Cascadia earthquake. Whether hardening facilities, protecting power system equipment or researching the latest seismic mitigation tools and technologies, Bonneville takes its responsibility of shoring up its assets extremely seriously.

### **Preparing for Disaster**

As the Chief Administrative Officer, I oversee Bonneville's Office of Security and Continuity of Operations, which implements the Bonneville-wide program for physical, personnel, information and infrastructure security; emergency management; and continuity of operations. This office ensures Bonneville is resilient and able to quickly

recover from events that cause operational disruptions. With that goal in mind, Bonneville recently actively participated in two emergency planning activities.

#### Clear Path IV

In April 2016, Bonneville participated in the Clear Path IV Energy-Focused Disaster Response Exercise hosted by the U.S. Department of Energy (DOE) Office of Electricity Delivery and Energy Reliability (OE) in Portland, OR, and Washington, DC. The exercise scenario consisted of a magnitude 9.0 earthquake and subsequent tsunami occurring along the 700-mile long Cascadia Subduction Zone (CSZ), causing considerable damage to Washington, Oregon, and northern California. The exercise scenario was designed to test regional dependencies in the energy sector.

Several objectives were identified for this exercise including examining energy sector roles and responsibilities within response plans such as the DOE Energy Response Plan, State Emergency Management Plans, State Energy Assurance Plans, and industry response plans and prioritizing the restoration of energy systems.

The two-day exercise began in Portland with an examination of the regional response operations. Bonneville staff engaged in the tabletop exercise that examined the field coordination required to restore electric power and fuel supplies in the affected states. The afternoon session included a workshop to develop a framework for power restoration and recovery.

The exercise was a positive step forward in developing the national energy emergency response capability and served as an important forum for building and strengthening linkages between government and industry. The exercise also identified improvements that can be made with respect to coordination between the Federal Emergency Management Agency (FEMA) and other critical federal agency components that must work together to quickly respond to a catastrophic event. Bonneville will continue to work with DOE OE and its regional energy partners to address the gaps that were identified by participating in this exercise.

We believe DOE helps most with coordination and assistance with the acquisition and logistics of out-of-region resources (such as fuel, major critical spare parts and air assets to evaluate grid condition). We have learned from experience that during real-time events mutual assistance is helpful and welcomed. For example, Bonneville provided mutual assistance in response to Superstorm Sandy and sent transmission line crews and maintenance equipment to the east coast by military transport. During the event, DOE through Emergency Support Function (ESF) #12 helped expedite support by working with Department of Transportation and Department of Defense to facilitate inter state movement of large maintenance equipment.

### Cascadia Rising

In June 2016, Bonneville participated in the largest FEMA exercise ever conducted in the region. Building from the energy sector specific Clear Path IV exercise, Cascadia Rising simulated a 9.0 magnitude earthquake generated by the CSZ fault. The exercise was designed to stress the capabilities and infrastructure of cities and counties as well as state, tribal and Federal resources, many whom were active participants in the exercise, to respond to a large-scale disruptive event.

As part of Cascadia Rising, Bonneville held a four-day exercise with its core emergency response personnel and two-hour table-top exercises for field staff across our service territory. Certain concessions were necessary to make such an intricate and ambitious exercise work. The scenario created by FEMA was modified by Bonneville's continuity of operations staff to stress our transmission and power systems. One of the principal Bonneville-specific scenarios in the exercise was that no power would be available west of the Cascade Mountains. Bonneville exercised four separate Incident Management Teams, one on each day, simulated to be physically located in Spokane, Wash. These teams worked in close coordination with our Spokane-area Munro Control Center dispatchers to prioritize and execute initial assessment and response. A multi-year project which BPA completed to alternate facilities, technology systems and documentation of power and transmission activities, allowed Bonneville to effectively transfer complete

control of the electric grid to a site hundreds of miles from the potentially affected area. In addition, we have worked with our Federal partners (US Army Corps of Engineers and US Bureau of Reclamation) to develop a Coordinated Continuity Plan to manage basic operations of the Columbia and Snake rivers from east of the Cascades if operational capability from the Portland area is interrupted.

If the events of the Cascadia Rising exercise actually occur, Bonneville recognizes that it cannot simply rely upon its own capabilities to resolve an enormous crisis spread across multiple states. Conducting successful response operations in the aftermath of a Cascadia Subduction Zone disaster hinges on the effective coordination and integration of governments at all levels – cities, counties, state agencies, Federal officials, the military, tribal nations – as well as non-government organizations and the private sector. That is one reason why the Cascadia Rising exercise so important - it helped train and test this whole community approach to complex disaster operations together as a joint team.

With this in mind, Bonneville, along with Western Area Power Administration, Southwestern Power Administration and DOE developed an operational plan to respond to a national energy emergency. In addition, Bonneville is part of the Western Region Mutual Assistance Agreement with 44 other utilities to facilitate the rapid exchange of resources when responding to regional emergencies. A recent effort has produced an additional coalition with the utilities in our service territory as well as utilities in the 12 western states and two Canadian provinces (British Columbia and Alberta) known as the Western Regional Mutual Assistance Group. This entity exists to facilitate the coordination of resources in the western United States and Canada to fulfill requests for a regional or national response event.

The purpose of the Cascadia Rising exercise was to test our coordinated plans, uncover issues and learn how to better manage through highly stressful situations. We learned a lot and identified some gaps. At the end of the exercise, Bonneville planners gathered recordings from exercise evaluators, participant feedback forms and field personnel

discussions and identified key lessons learned. The following initial recommendations have emerged:

1. Continue to understand and utilize the Incident Command System (ICS) within Bonneville by deploying an implementation plan and determining how different workgroups would interact with, report to, or make requests of the Incident Management Team.
2. Continue to understand the unique challenges of Cascadia Subduction Zone Earthquake scenarios by identifying geographically dispersed critical resources, determining equipment needs and training for field crews, and exploring complex and technical damage assessments across large areas susceptible to aftershocks.
3. Continue to enhance Bonneville internal and external coordination and collaboration.
4. Minimize the potential for communication and information loss by testing and training on the various types of communication equipment available, adding amateur radio to expand interoperable communications capability, and assessing lessons learned from the impact of losing critical business systems.
5. Continue to improve Bonneville's exercise program by developing and refining the test, training and exercise program, utilizing continuity coordinators to act as subject matter experts on planning teams to assist in developing realistic, increasingly more complex exercises and prioritizing employee participation.
6. Continue to develop the Incident Management Team by enhancing the current recruitment program to expand the pool of potential team members and their geographic diversity, and increasing the level of training and number of exercises for incident management team members.

Cascadia Rising and Clear Path IV proved to be successful exercises for Bonneville insofar as they allowed employees and workgroups to practice their training and test our implementation plans. Bonneville will continue to participate in these types of emergency response exercises so we become well-practiced and operationally ready to face a real-life situation.

#### Our Most Important Asset

We are nothing without our people – our employees need to be ready and available to provide the critical response activities necessary to keep the Federal Columbia River power grid operational. In any disruption, from a winter storm to the Cascadia Subduction Zone Earthquake scenarios, the sooner employees feel family and property are safe, the sooner they can return to work. For the last four years, Bonneville has emphasized personal and family preparedness throughout the workforce by conducting interactive presentations that provide useful tips on topics such as family reunification plans, building an emergency kit or managing stress. We have monthly emails to employees with simple, incremental things they can do each month to enhance their readiness - on-line awareness training, and an emergency notification service to provide timely information or instructions – on-line resources for additional information and we notify each employee in writing annually of their responsibilities in a disruptive incident.

### **CONCLUSION**

Our investments to make Bonneville a more resilient organization, from hardening our infrastructure to the time that we take to prepare and practice how we respond to disaster will ultimately help us limit damages to our electric power system and help the region more quickly recover from a major disaster. This concludes my prepared remarks. I would be happy to respond to any questions from the Committee.