

Exhibit 1: Description of NorthWestern Corporation Program of Research and Experimentation

NorthWestern Corporation, doing business as NorthWestern Energy, respectfully requests an experimental license authorizing the deployment of the equipment with the operating parameters specified in this application. NorthWestern Energy is responsible for providing electricity and natural gas to approximately 673,000 customers in 297 communities covering two-thirds of the State of Montana, eastern South Dakota and Yellowstone National Park in Wyoming.

The requested license will authorize NorthWestern Energy to continue its previous research and experimentation in Philipsburg, Montana, as part of a smart grid grant from the Department of Energy (the “DoE”) (Award No. DE-OE0000190). The original experiment began in February 2012 and can be found under FCC File # 0018-EX-PL-2012. The current application requests one base station site and 15 temporary-fixed sites in Philipsburg, Montana.

In addition, NorthWestern Energy respectfully requests two base station sites and 10 temporary-fixed sites for locations inside Yellowstone National Park, where NorthWestern Energy provides electric service. The Yellowstone Sites will share the same frequency characteristics as the Philipsburg, Montana sites. The Yellowstone sites are part of a separate initiative led by NorthWestern Energy with the support of the Department of Interior’s National Park Service. The purpose of this initiative is research and experimentation on the use of SCADA technologies, and eventual deployment of these technologies, to improve power quality and delivery in Yellowstone National Park. A complete environmental assessment and endorsement from the National Park Service can be found at the following URL:
<http://parkplanning.nps.gov/document.cfm?parkID=111&projectID=47258&documentID=56164>

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The Philipsburg, Montana fixed site listed below is part of the Pacific Northwest Smart Grid Demonstration Project (“PNW SGDP”). NorthWestern Energy is one of several major utility participants in this project and the sites established pursuant to the license sought by this application will be used in that project. The overall project is coordinated by The Battelle Memorial Institute, Pacific Northwest Division, located in Richland, WA. The contact information for the project leads from the respective organizations at NorthWestern Energy, Battelle and the DoE, is provided at the end of this exhibit.

As part of the PNW SGDP, NorthWestern Energy is working with Battelle to test the usefulness of these frequencies for real time communications to remote smart grid devices. This includes point-to-multipoint wireless communications to capacitor banks, reclosers, voltage regulators and voltage sensors. This specific project is focused on improving power quality, power efficiency and outage restoration to rural customers in Montana along an unusually long distribution line. Remote access to power monitoring devices allows the division engineers to rapidly locate the section of line that has the fault and thereby dramatically reduce the time to resolve outages.

The Yellowstone sites are part of a separate project to research and develop means, using smart grid technologies, to improve power quality and delivery in the somewhat unique ecosphere of Yellowstone National Park. The National Park Service has become concerned with extended power outages within the Park, and desires to see SCADA-based improvements to the operation of the electrical grid within the Park to minimize these outages.¹ Because of the environmentally protected nature of the Park, the goal of the research and development is to find the least invasive data communications technology option available. In the environmental assessment, the National Park Service supports NWE's recommendation to use lower frequencies for this purpose as outlined in this application. NorthWestern Energy has provided electrical service to the Park since the 1950s. To provide this service, NorthWestern Energy has seven electric substations within the Park. The two base stations requested by this application would be operated from two of those seven substations.

NorthWestern Energy has chosen the frequencies subject to this application because of its extensive distribution electrical grid, and these frequencies provide the signal reach required to more efficiently conduct this experimentation by using NorthWestern Energy's existing land mobile radio and microwave towers (rather than needing to construct new costly towers) and existing backhaul facilities. This experimentation will not involve the sale, rental or distribution of devices to consumers or end users, or any commitment by any consumer or end user. It will be solely used to test and evaluate the ability of the system to support NorthWestern Energy's private remote data needs.

The management of NorthWestern Energy's electrical grid involves challenges not encountered by companies serving either flat or densely populated areas. NorthWestern Energy has one of the most challenging service territories in the United States. The utility's electric system has more than 30,500 miles of transmission and distribution lines and its natural gas system includes approximately 7,800 miles of transmission and distribution pipelines and storage facilities. In large portions of this territory, there are no viable communications options that meet the core requirements. The experimentation will assist NorthWestern Energy in determining whether lower band terrestrial radio facilities can efficiently support these modern distribution control systems.

To conduct this experimentation, NorthWestern Energy requests the use of up to 4 (500 kHz) channels between 174 MHz and 216 MHz. The equipment will be TDD, IP-based and will provide actual test data on the usefulness of these frequencies in supporting smart grid devices. The experimentation will involve 3 fixed base station locations in total at NorthWestern Energy's tower locations listed below communicating with up a total of 25 temporary-fixed units (15 temporary-fixed sites supported by Philipsburg fixed site, 5 temporary-fixed devices supported by the Norris Substation fixed site and 5 temporary-fixed units supported by the Old Faithful substation site). The three fixed sites are described below.

¹ National Park Service, *Electric Transmission/Distribution System Communication and Automation Plan, Environmental Assessment, NorthWest Energy Plan EA*, at page 1 (available at: <http://parkplanning.nps.gov/document.cfm?parkID=111&projectID=47258&documentID=56164>).

<u>Location</u>	<u>Latitude</u>	<u>Longitude</u>
Rumsey Mountain 10 Miles East Of Philipsburg, Montana (Rumsey Tower)	46-15-44.7 N	113-14-50.2 W
19.5 miles northeast of the Old Faithful Lodge located At 1 Grand Loop Rd., Yellowstone National Park Wyoming 82190 (Norris Substation)	44-43-15N	110-40-40W
0.4 miles southwest of the Old Faithful Lodge located At 1 Grand Loop Rd., Yellowstone National Park Wyoming 82190 (Old Faithful Substation)	44-27-15N	110-50-12W

Each temporary-fixed station will communicate with its associated base station. A temporary-fixed station may be as far as 40.23 km from the base station and will use a directional, yagi or similar antenna mounted on a utility pole to communicate with the base station.

The base station radio is the FullMAX BS1000. The temporary-fixed service station is the FullMAX FS4000. Each will operate at a maximum TPO of 10 watts. Base stations will use omni or 120° sector antennas up to 11.15 dBi. Temporary-fixed stations will use directional or yagi or similar antennas providing gains of up to 11.15 dBi. Below is a list of the pertinent technical parameters:

Station Class	Emission Designator	Authorized Power
Temporary-Fixed station	500KA7D	79.43 W (ERP)
Base Stations	500KA7D	79.43 W (ERP)

In the Form 442 application, the temporary-fixed stations are listed as mobile.

NorthWestern Energy's choice of the specific frequencies requested in this application is based upon a thorough review of frequency usage that may be impacted by the proposed experimentation. NorthWestern Energy has satisfied itself that the use of the requested frequencies, as proposed in this application, will not cause harmful interference to incumbent television stations. NorthWestern Energy recognizes the secondary nature of operations conducted pursuant to the requested experimental license and NorthWestern Energy will not transmit on any channel or in a manner that causes harmful interference to the reception of an incumbent television station licensee. NorthWestern Energy also recognizes the requirement to

prior coordinate its use of these frequencies with the Society of Broadcast Engineers in Indianapolis and NorthWestern Energy will abide by that requirement.

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