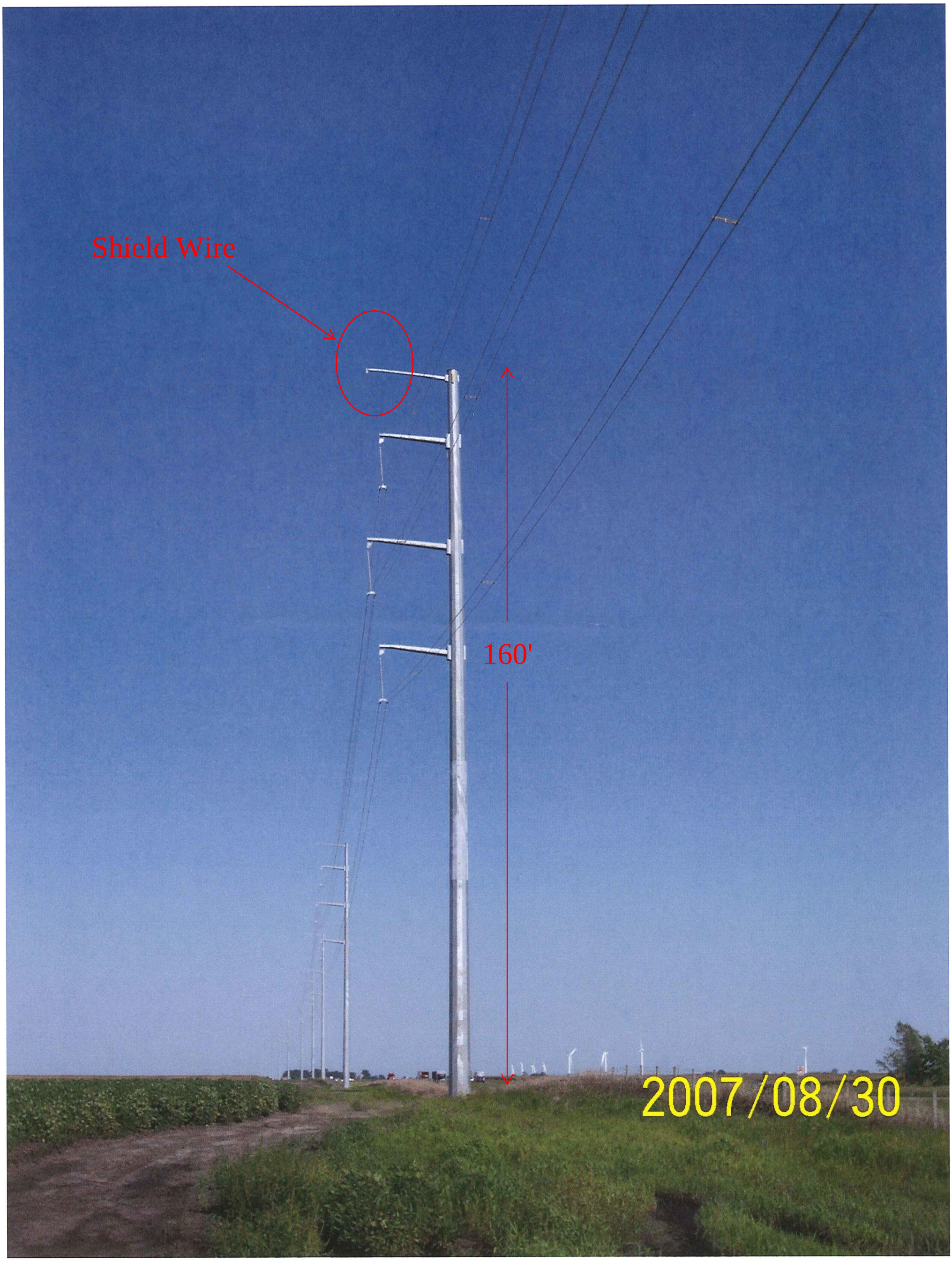
Helicopter Use In Work Zones

Guard Wire Re-stringing project along I-90 in District 7B


Shield Wire
160'
2007/08/30

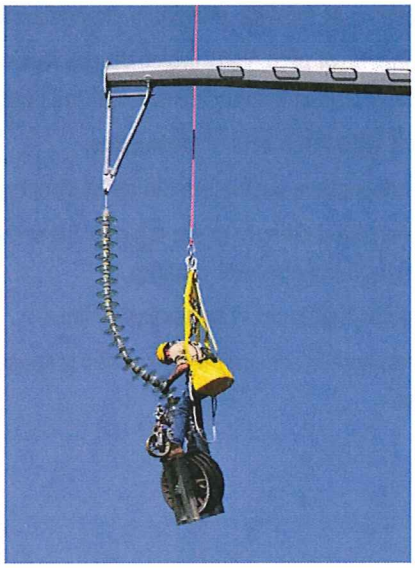
Helicopters used to string fiber optic shield wire on transmission line

HELICOPTERS WILL BE USED to access transmission structures to replace the top wire (shield wire) with fiber optic communication wire on the Sioux Falls-Lakefield transmission line. The new wire will be used for control and communication between substations. The existing conductor and steel towers will remain in place.

An aerial utility contractor will begin work on the project in December 2011. Helicopters will fly in close proximity to the transmission structures along approximately 90 miles of Interstate 90 between Sioux Falls, South Dakota, and Lakefield, Minnesota. Some project work will be completed using conventional crews and bucket trucks.

Here is a step-by-step overview of the process.

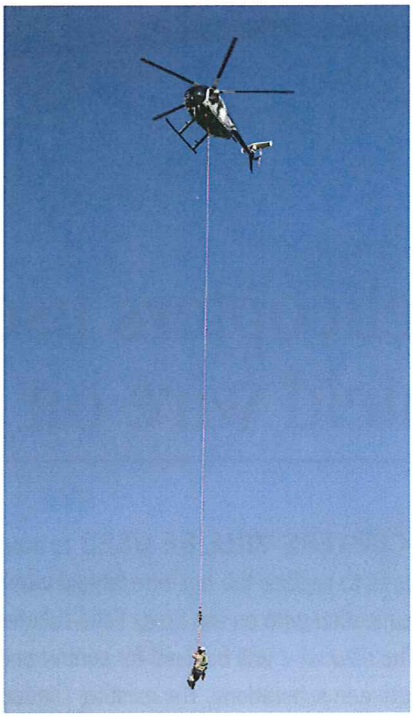
1. Utility linemen will prepare the existing line by welding brackets on selected structures and installing protective guard structures at road and other crossings.
2. Utility linemen will be transported to each structure via helicopter, where they will hang stringing wheels. The existing shield wire will then be pulled through the wheels.
3. Using the existing shield wire, the new fiber optic wire will be pulled in under controlled tension.
4. The new shield wire is terminated at the ends of each pulley using conventional crews and bucket trucks.
5. Using the helicopter, the stringing wheels are removed from each arm, and the new fiber optic wire is fastened to the structure arms and attachments, including dampers to minimize vibrations of the shield wire, are added.



Above. A utility lineman attaches a spacer between transmission conductor.

Left. A utility lineman suspended from a cable attached to a helicopter hangs a stringing wheel.

Working from a platform attached to a helicopter, a utility lineman attaches a spacer between transmission conductor.



A utility lineman suspends from a cable attached to a helicopter.

Benefits

Stringing transmission conductor using helicopters has numerous benefits, including:

- Decreases total project construction time
- Allows work in remote or inaccessible locations
- Reduces environmental impact
- Minimizes right-of-way intrusion
- Minimizes matting in sensitive areas

Terms to know

Conductor: A wire made up of multiple aluminum strands around a steel core that together carry electricity.

Circuit: A continuous electrical path along which electricity can flow from a course, like a power plant, to where it is used, like a home. A transmission circuit consists of three phases with each phase on a separate set of conductors.

Single circuit: A circuit with three sets of conductors.

Double circuit: Two independent circuits on the same structure with each circuit made up of three sets of conductors.

Shield wire: A wire connected directly to the top of a transmission structure to protect conductors from a direct lightning strike, minimizing the possibility of power outages.

Structure: Towers or poles that support transmission lines.

Right-of-way: Land area legally acquired for a specific purpose, such as the placement of transmission facilities and for maintenance access.

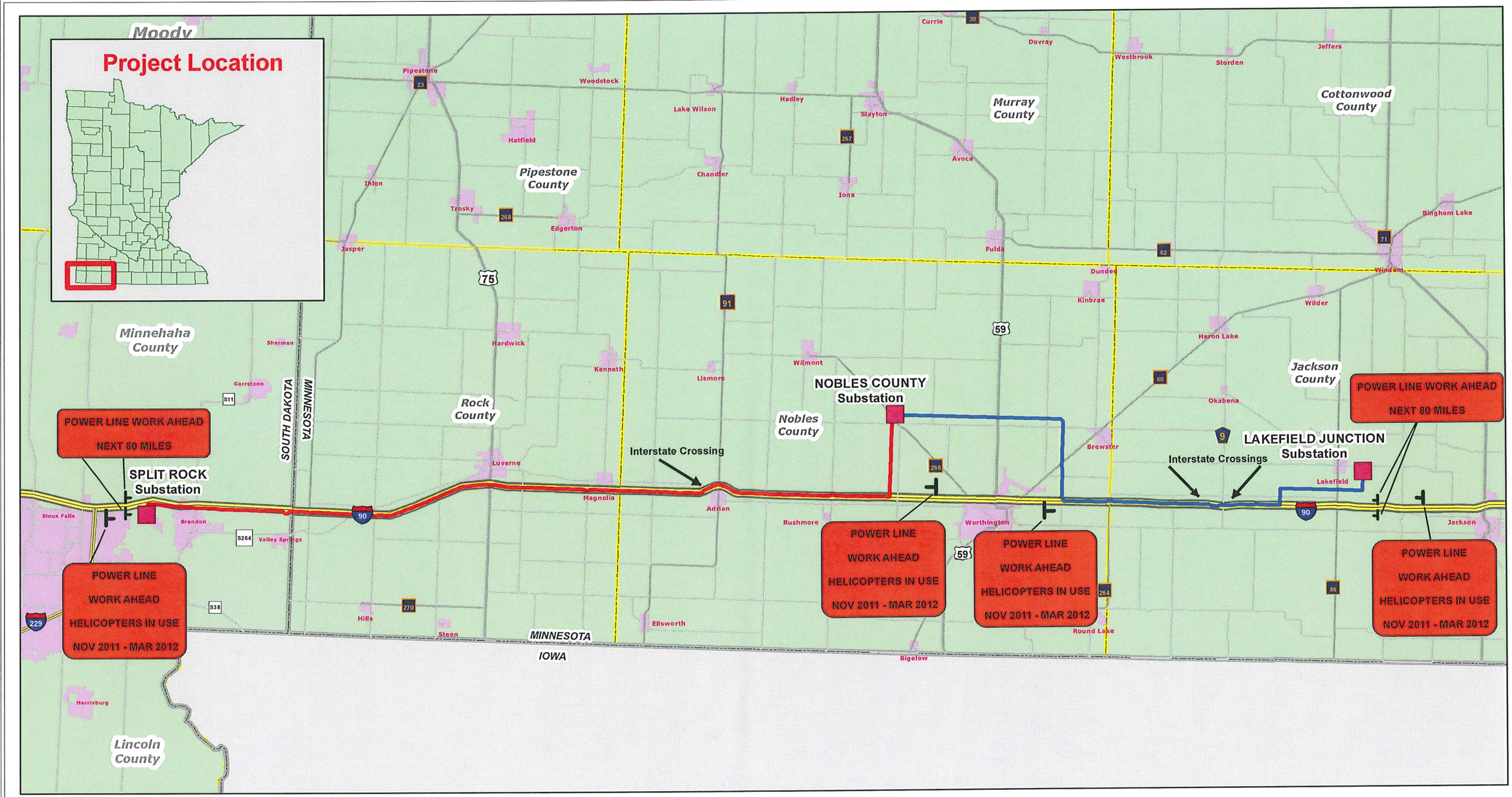
Contact us

Tim Carlsgaard
(612) 330-7697
timothy.s.carslgaard@xcelenergy.com

Erin Klegstad
(612) 330-5701
erin.a.klegstad@xcelenergy.com


POWER LINE
WORK AHEAD
HELICOPTERS IN USE
NOV 2011 - MAR 2012


POWER LINE WORK AHEAD
NEXT 80 MILES



Shield Wire Installation Project
Xcel Energy Line #0953
Split Rock Substation to Lakefield Junction Substation

Legend

- Nobles County Sub to Lakefield Junction Sub (To be completed post ITC project)
- Split Rock Sub to Nobles County Sub
- Xcel Energy Substation
- County Boundary
- City or Town

0 5 10 20 Miles

Xcel Energy® RESPONSIBLE BY NATURE™

N

DISCLAIMER: This information is believed to be correct but is subject to change and is not warranteed.

DATE: October, 2011