TABLE OF CONTENTS

Piazza Report Docket No. 13-0639

STORM EVENT JUNE 24TH through JUNE 26TH, 2013

SECTION	Page(s)
Introduction	1
Executive Summary	1-2
Background and Supporting Information	2-3
Analysis	3-4
Derecho event June 24th 1500 through 2000	5-23
Images 2000 through 2345 hours June 24th	24-39
Thunderstorms 0000 to 1200 hours June 25th	39-88
Images 1215 through 2400 June 25th	89-136
Thunderstorms 0015 to 1300 hours June 26th	137-189
Methodology	190
Wind Speed Maps	191-203
Conclusions	204

ATTACHMENTS

Attachment A…Interruptions with 80 mph or higher winds occurring on June 24th

Attachment B…Interruptions with 70 to 79 mph winds occurring on June 24th

Attachment C…Interruptions with 60 to 69 mph winds occurring on June 24th

Attachment D…Interruptions with 50 to 59 mph winds occurring on June 24th

Attachment E…Interruptions with 60 to 69 mph winds occurring on June 25th

Attachment F…Interruptions with 50 to 59 mph winds occurring on June 25th

Attachment G…Interruptions with less than 50 mph winds on June 24th to 26th

MURRAY AND TRETTEL, INCORPORATED

September 21, 2015

ComEd
Lincoln Centre Two
Two Lincoln Centre
Oakbrook Terrace, Illinois 60181

Re: Testimony for Weather Event June 24th through June 26th, 2013
Docket No. 13-0639

Introduction:

I, Thomas R. Piazza, Certified Consulting Meteorologist and President of Murray and Trettel, Inc. of Palatine, Illinois, have been asked by the Commonwealth Edison Company ("ComEd"), to prepare a report regarding the Severe Weather Event that occurred in ComEd's service territory from June 24th through June 26th, 2013.

Specifically, I will provide the following in this report:

1. A time series of the meteorological events that occurred across ComEd's service territory from approximately 1530 hours on June 24, 2013 through 1300 hours on June 26, 2013.
2. A direct link between the severe weather conditions experienced across ComEd's service territory and the individual outages that occurred by preparing graphics and tables on a more granular scale to directly link wind speeds with specific interruptions. In the process of formulating my conclusions and opinions expressed in this report, I have examined the weather data reports, images, maps, documents and other information and reports listed in Appendix A.

All data, tables, images, and opinions provided by me were derived by using sound meteorological principles.

Executive Summary:

A rapidly moving line of severe thunderstorms (classified as a Derecho by the National Weather service), originating in Central Iowa, moved through eastern Iowa into ComEd's service territory at approximately 1600 hours and then moved at nearly 60 mph across the territory exiting the territory into Indiana around 1930 hours. It produced the following severe weather:

1. Tornados within or near ComEd's service territory …Two rated EF-0, winds speeds 65 to 85 mph and one rated EF-1, wind speeds 86-110 mph
2. Damaging winds…58 to 100 mph
3. Intense lightning… Over 2,700 cloud to ground lightning strokes
4. Rain Amounts…0.10 to 0.75 inch

Following this Derecho event a line of thunderstorms moved out of northeast Iowa and southwest Wisconsin into ComEd's service territory at approximately 0100 hours on June 25, 2013 and departed the service territory by 1100 hours. The most intense storms with this line moved through JoDaviess, Carroll, Stephenson, Winnebago, Boone and McHenry Counties before moving into Wisconsin. A second intense cluster of storms associated with this line developed along I88 in Whiteside County and moved eastward along I-88 departing the service territory into Lake Michigan by 1100 hours.

This thunderstorm event produced the following severe weather:

1. Tornadoes…None
2. Damaging winds…65-70 mph.
3. Hail…0.5 to 1.0 inch
4. Intense lightning…Over 7,160 cloud to ground lightning strokes
5. Torrential rains…1.0 to 2.0 inches of rain

These thunderstorms were followed by new storm development which began approximately 0100 hours on June 26, 2013 and continued through 1100 hours on June 26, 2013. By 0400 hours a solid line of heavy thunderstorms extended from the southeast side of Chicago northwestward though Central and Northern Cook County into Lake, McHenry and Boone Counties. These thunderstorms remained nearly stationary through 0600 hours before slowly weakening and moving out over Lake Michigan by 0800 hours. These storms brought intense lightning and flooding rains especially in areas near and north of I-90.

This thunderstorm event produced the following severe weather:

1. Tornados…None
2. Damaging winds…None
3. Intense lightning… Over 10,350 cloud to ground lightning strokes
4. Damaging Hail…None
5. Torrential rains…Up to 6.0 inches/numerous Flash Flood Warnings issued by the National Weather Service.

Background and Supporting Information:

Radar images are from the National Weather Service Doppler Radar Sites in Davenport, IA ("KDVN") and Romeoville, IL ("KLOT").

Wind speed reports used in this report are either actual measured winds or estimated wind speeds made by the national Weather Service or this author that are based upon the associated damage descriptions for that particular event, using the guidelines outlined in, A Recommendation for an Enhanced Fujita Scale.

The term "wind gust" is defined as the maximum three (3) second wind speed which is measured at ten (10) meters, or 33 feet above the ground. This is the standard National Weather Service surface wind anemometer height. The maximum wind speed gusts determined by this author in this testimony can be assumed to be accurate plus or minus 5 mph.

Outage information was supplied in a spreadsheet file by ComEd. This outage file contained all the outages for the storm event on June 24, 2013, from the Start_Date_Time: 1406 hours on 6/24/2013 through 1300 hours on 6/26/2013. The latitude and longitude for each outage ID in this file pinpoints the location of the associated equipment affected by the severe weather. Therefore, all maximum wind speed gusts and times presented by this author are for the equipment locations supplied by ComEd.

The "Meteorological" time frame of this severe weather event is defined as the time frame that the severe weather, causing the outages, began and ended in the ComEd service territory. This Meteorological Event consisted of numerous severe thunderstorm events throughout ComEd's service territory. The Meteorological Event began at approximately 1530 hours on June 24, 2013 when the line of severe thunderstorms entered the far west end of ComEd's service territory in Rock Island County. The Meteorological Event ended at approximately 1300 hours on June 26, 2013 when the thunderstorms exited the ComEd service territory.

The timelines presented on the images are based on a detailed analysis of reported maximum wind speed measurement times, severe weather and damage report times and radar image times. The presented times for the severe weather reports on the images and in the tables can be expected to be accurate within plus or minus 15 minutes.

All times are Central Daylight Time ("CDT") unless otherwise noted. (Note: All times indicated in the legend on NWS NEXRAD Doppler Radar images are in Greenwich Mean Time ("GMT") which is CDT plus five [5] hours.)

Analysis and Time Series:

A rapidly moving line of severe thunderstorms, (officially determined to be a Derecho), moved out of Iowa into ComEd's service territory between 1500 and 1600 hours and proceeded to move at speeds of 60-65 mph across the territory. It produced the following severe weather:

1. Tornados within or near ComEd's service territory…Two rated EF-0, winds speeds 65 to 85 mph and one rated EF-1, wind speeds 86-110 mph
2. Damaging winds…58 to 100 mph
3. Intense lightning… Over 2,700 cloud to ground lightning strokes

4. Rain Amounts…0.10 to 0.75 inch

The National Weather Service has classified this event as a Derecho. A Derecho is a widespread and long lived windstorm that is associated with a band of rapidly moving showers or thunderstorms. This band of showers and thunderstorms is usually curved in shape (these bowed lines are called bow echoes). This Derecho (see Image 1 below) reached the Mississippi River near the Quad Cities around 1600 hours, then rapidly swept across and affected most of ComEd's service territory. The most intense part of this Derecho (see Image 2 below) affected the Interstate 88 ("I-88") south through the Interstate 80 ("I-80") corridor areas west of the Fox River, and areas south of Interstate 90 ("I-90") east of the Fox River. The Derecho exited the service territory into Indiana by 1930 hours. The Derecho continued eastward through northern Indiana before weakening.

Three (3) tornadoes were reported. One was an EF-1 tornado near Atkinson in Henry County. Wind speeds in EF-1 tornadoes are estimated to be in the range of 86 to 110 mph. Two (2) EF-0 tornados were reported. One touched down near Van Orin in Bureau County and a second near Harmon in Lee County. Wind speeds in EF-0 tornadoes are estimated to be in the range of 65 to 85 mph.

Highest wind speeds near 100 mph reported in Lee County (see Image 3 below). Numerous wind gusts of 60-85 mph were reported in areas where the most intense part of the Derecho affected, specifically; 85 mph in Mendota, 75 mph in Elburn, 80 mph in Mazon, 72 mph in Cortland, 70 mph in Homewood, Inverness, Sterling, Crete, and Bolingbrook.

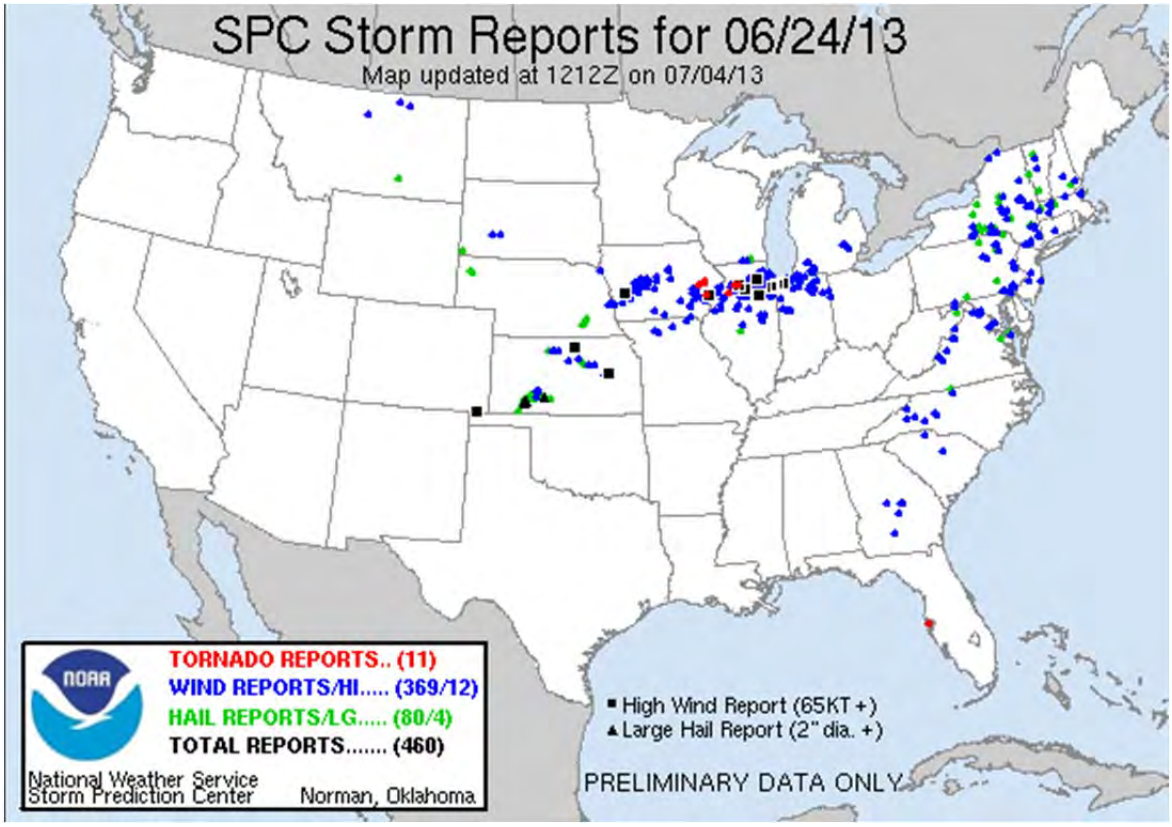

Image 1 Path of June 24, 2013 Derecho (courtesy National Weather Service)

The following series of Images, Image 2 through Image 24 depict the progression of this Derecho across the ComEd service territory:

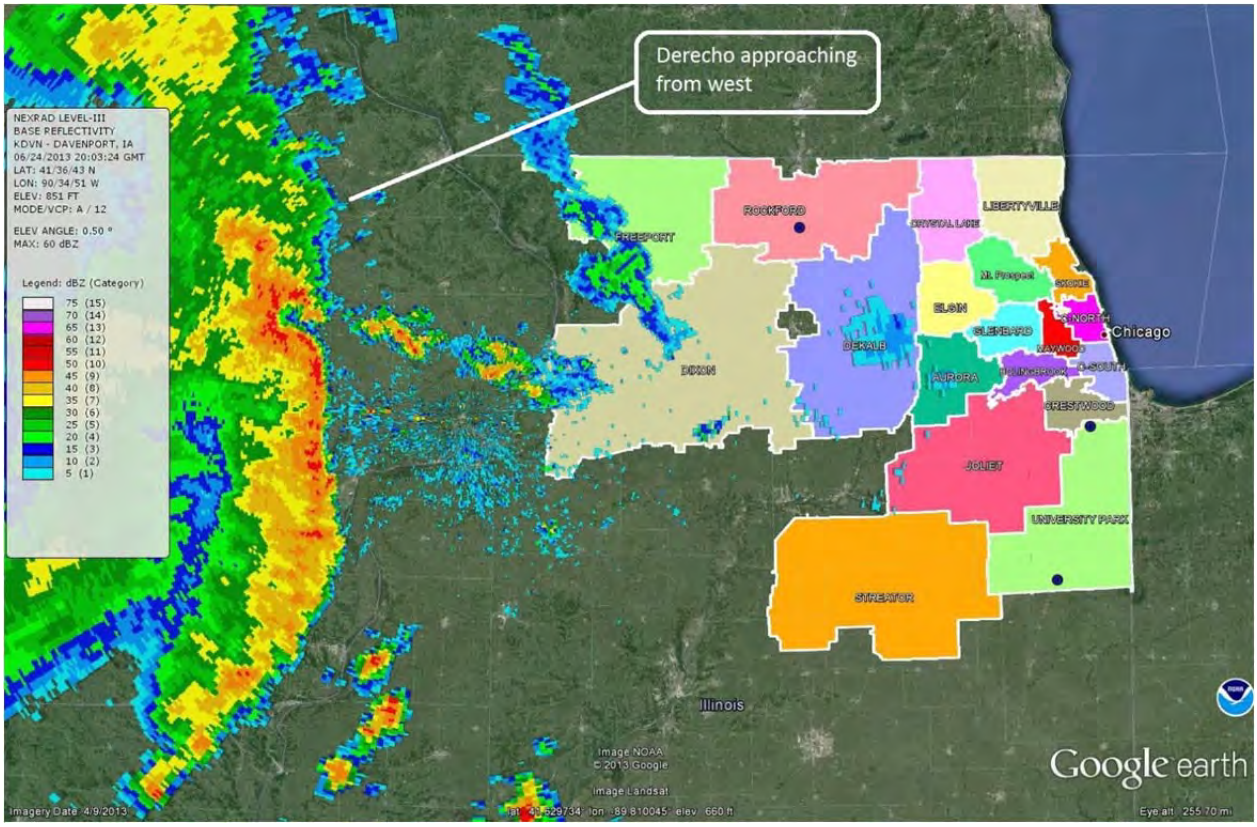

Image 2 KDVN NEXRAD base reflectivity on June 24, 2013 at 1500 hours
Derecho firsts appears on KDVN's radar

Total ComEd Customers Who Lost Power (Cumulative)	Customers Restored (Cumulative)	Customers Still Without Power
1,131	62	1,049

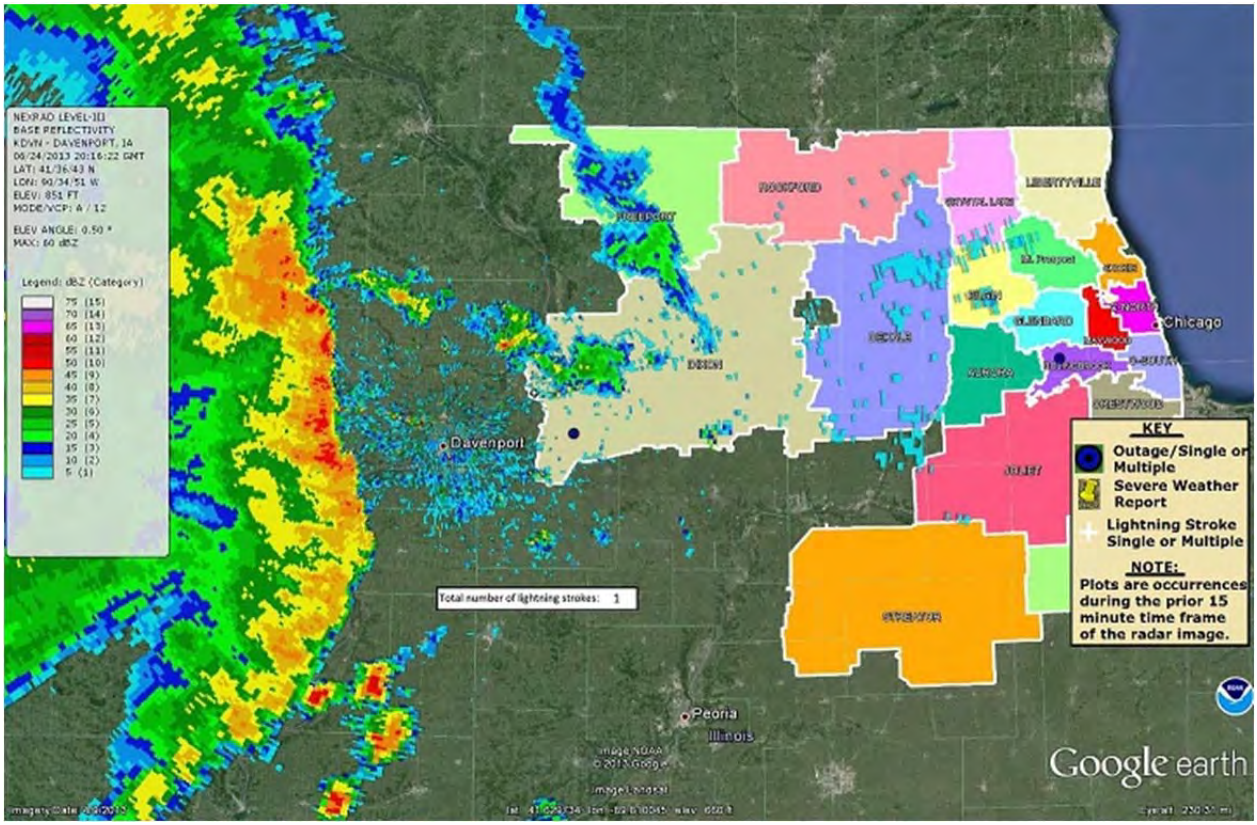

Image 3 KDVN NEXRAD base reflectivity on June 24, 2013 at 1515 hours
Derecho firsts appears on KDVN's radar

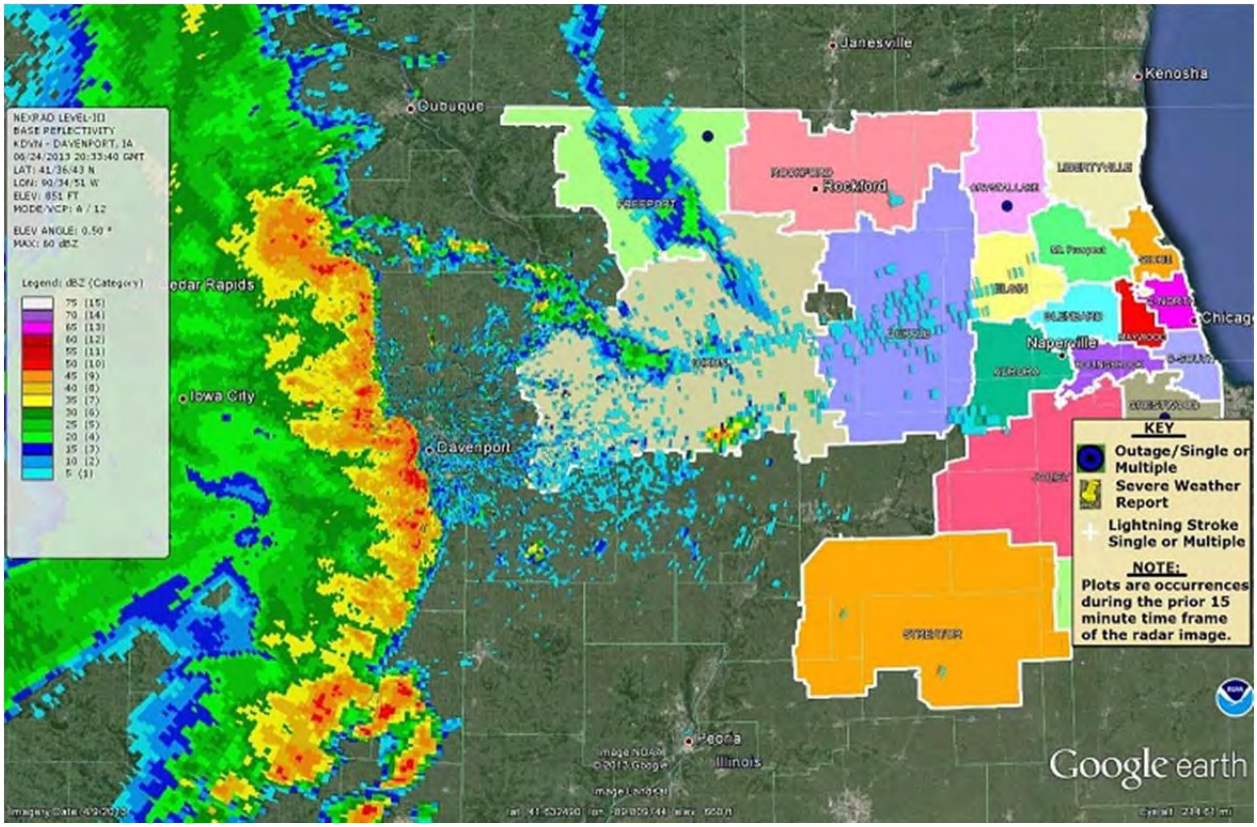

Image 4 KDVN NEXRAD base reflectivity on June 24, 2013 at 1530 hours
Derecho firsts appears on KDVN's radar

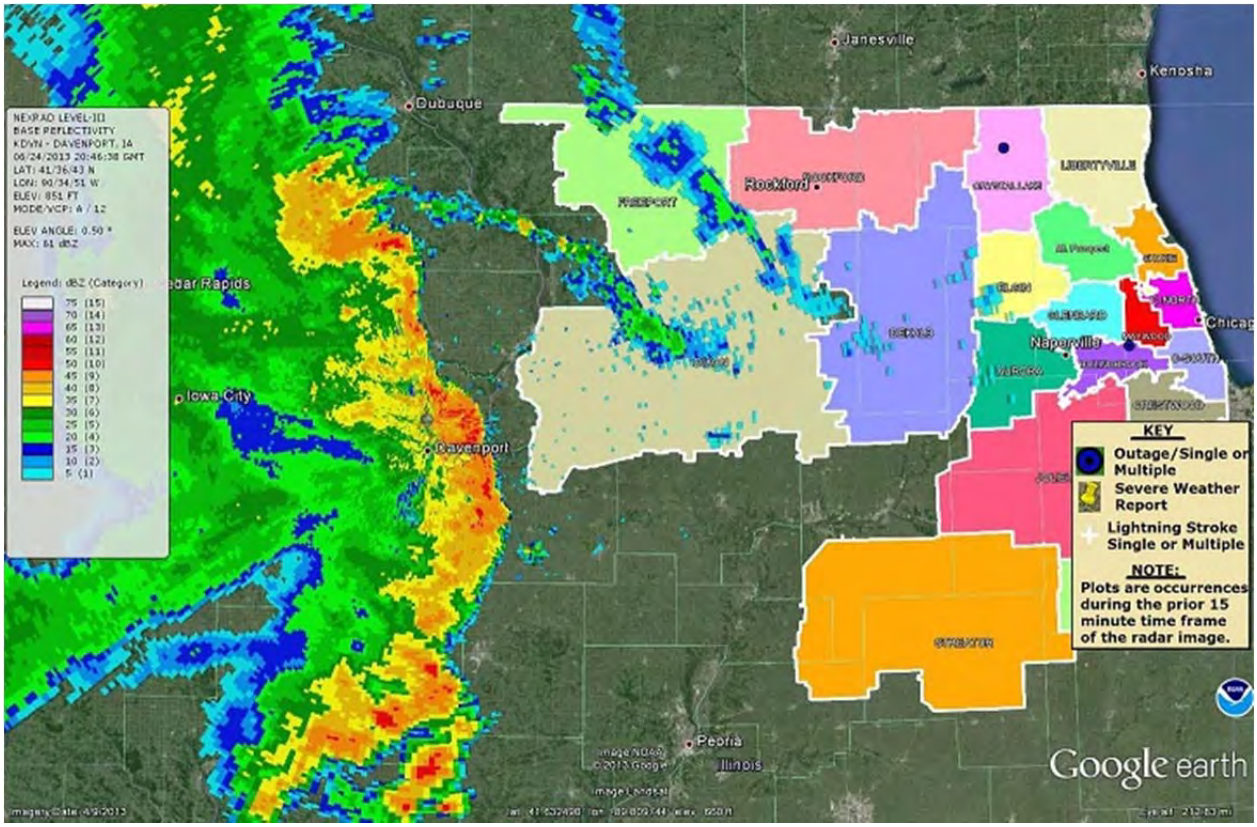

Image 5 KDVN NEXRAD base reflectivity on June 24, 2013 at 1545 hours
Derecho firsts appears on KDVN's radar

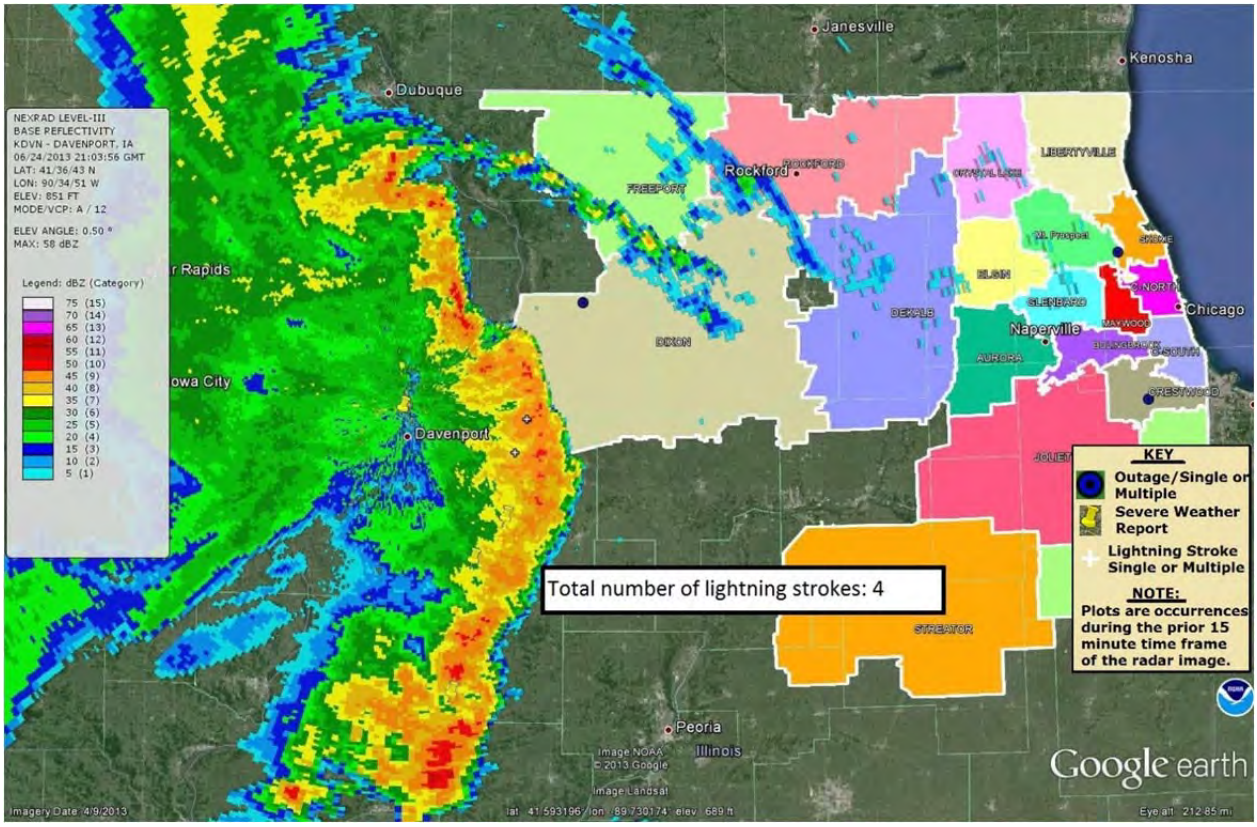

Image 6 KDVN NEXRAD base reflectivity on June 24, 2013 at 1600 hours
Derecho entering ComEd's service territory

Total ComEd Customers Who Lost Power (Cumulative)	Customers Restored (Cumulative)	Customers Still Without Power
2,093	228	1,865

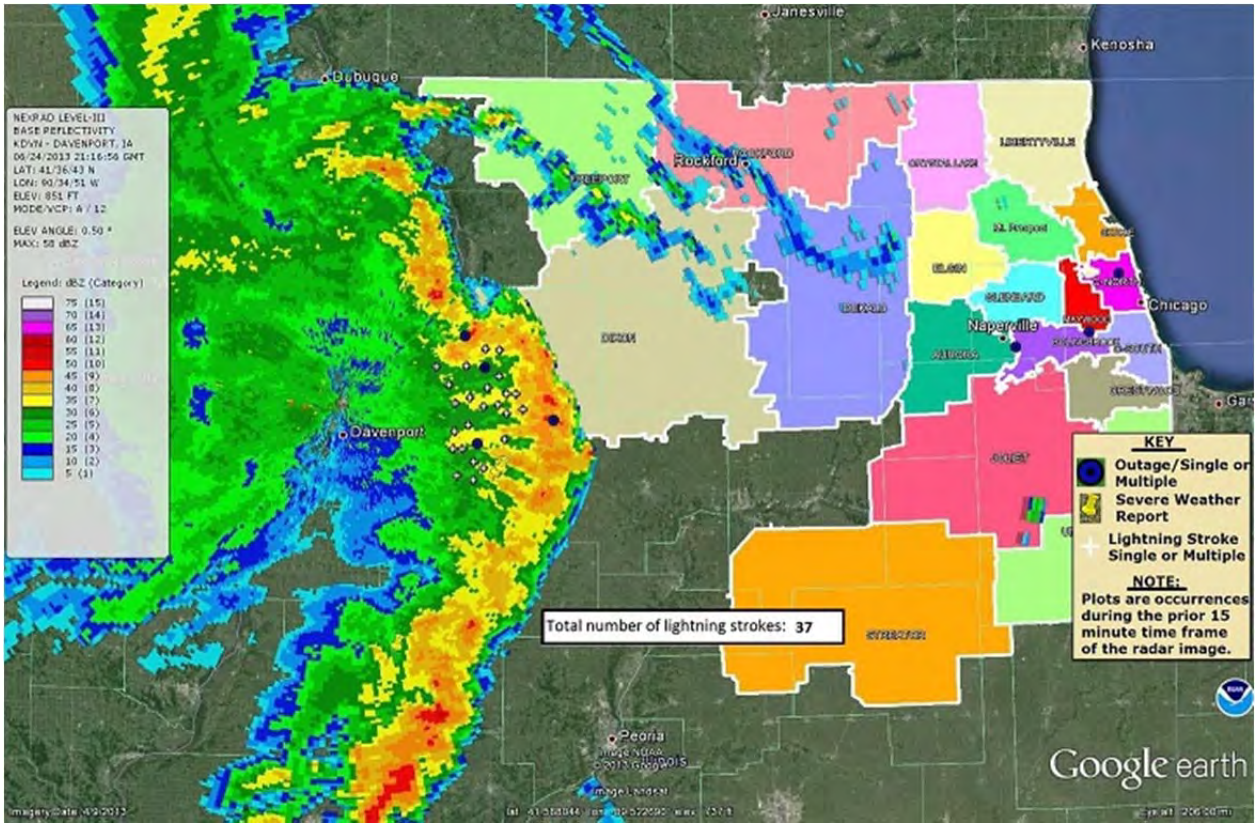

Image 7 KDVN NEXRAD base reflectivity on June 24, 2013 at 1615 hours

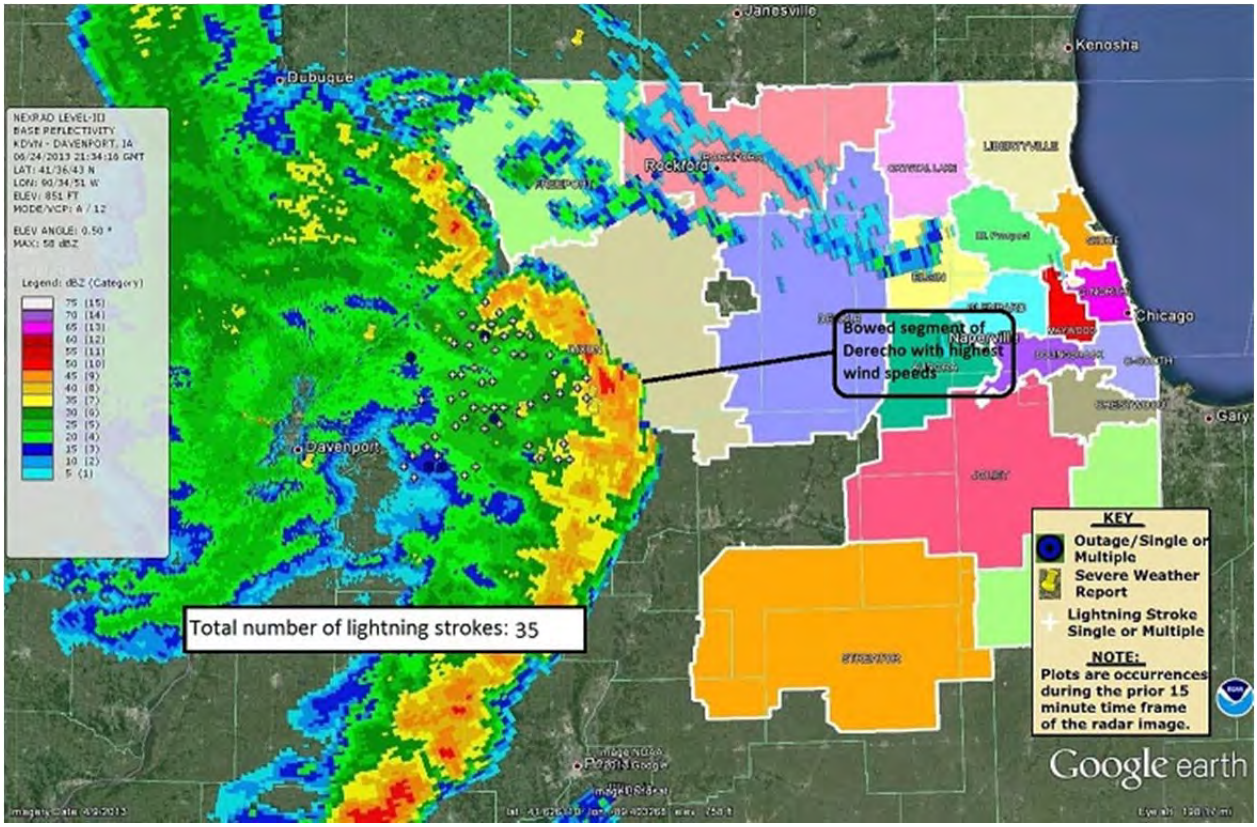

Image 8 KDVN NEXRAD base reflectivity on June 24, 2013 at 1630 hours

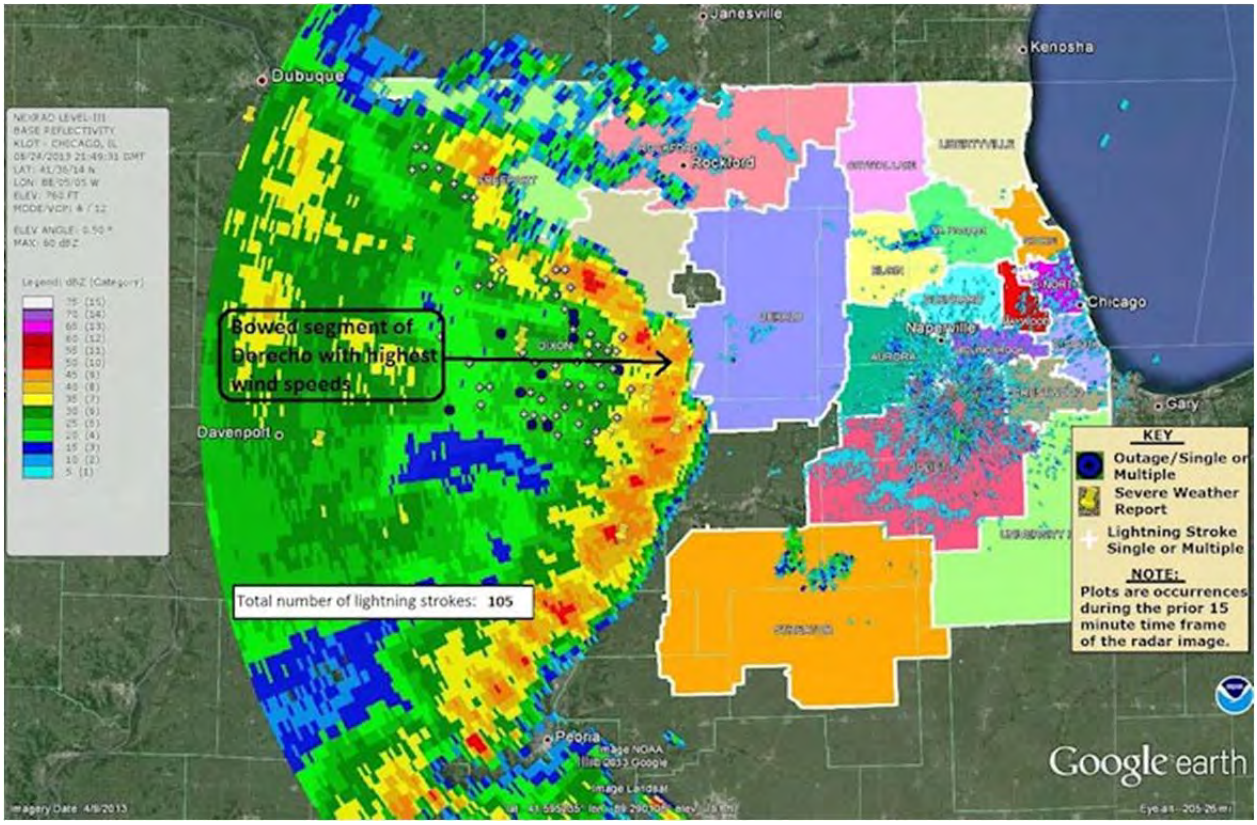

Image 9 KLOT NEXRAD base reflectivity on June 24, 2013 at 1645 hours

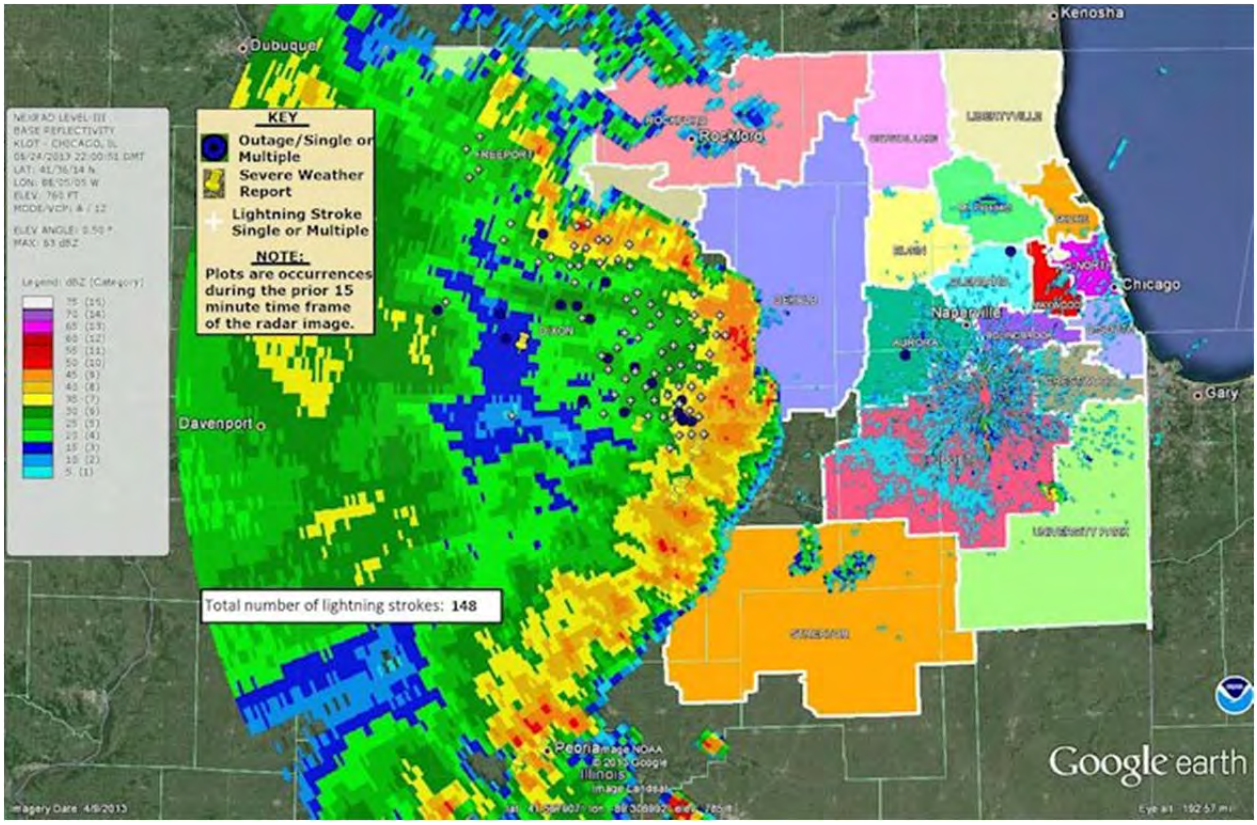

Image 10 KLOT NEXRAD base reflectivity on June 24, 2013 at 1700 hours

Total ComEd Customers Who Lost Power (Cumulative)	Customers Restored (Cumulative)	Customers Still Without Power
7,737	405	7,332

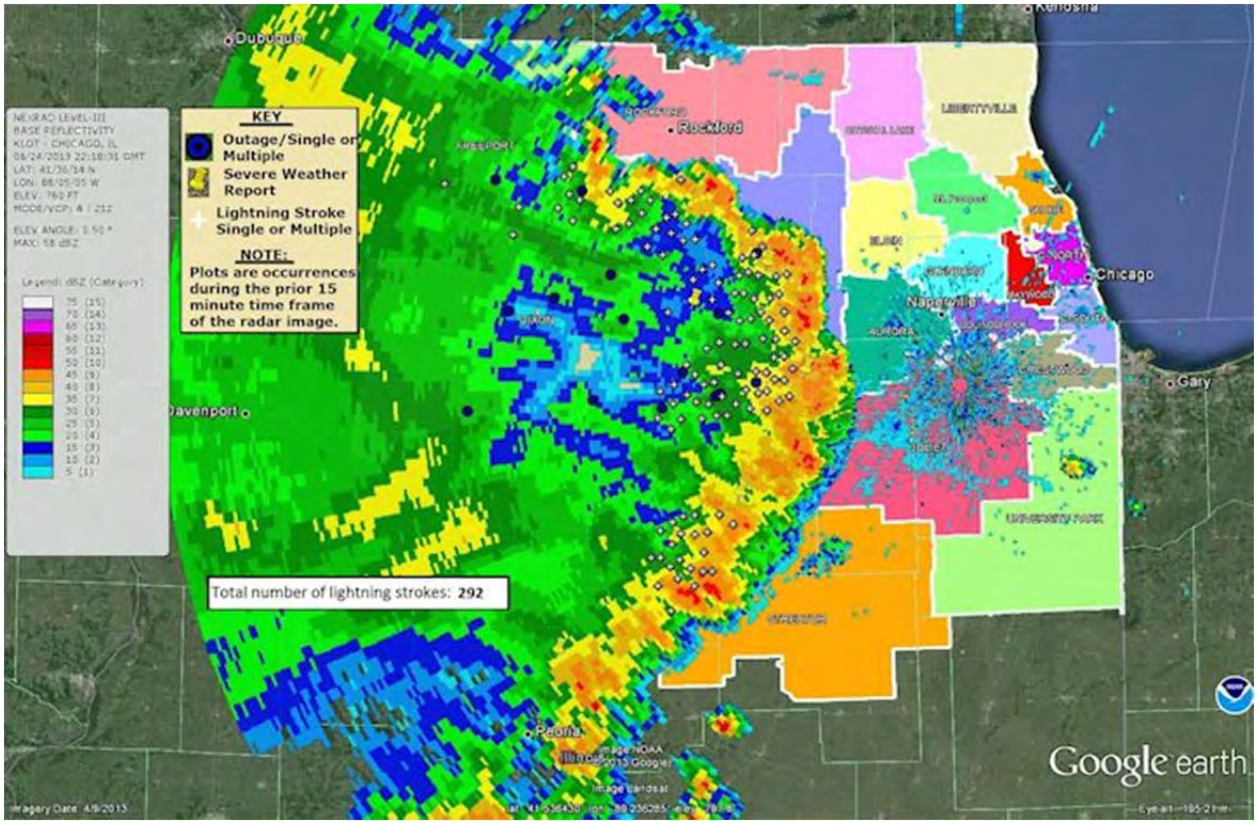

Image 11 KLOT NEXRAD base reflectivity on June 24, 2013 at 1715 hours