

STATE OF ILLINOIS
ILLINOIS COMMERCE COMMISSION

COMMONWEALTH EDISON COMPANY :
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 :
Petition to determine the applicability of : No. 11-0588
Section 16-125(e) liability to events caused by the :
Summer 2011 storm systems. :

Direct Testimony of
THOMAS R. PIAZZA
Certified Consulting Meteorologist
and President and CEO
Murray and Trettel, Inc.

1 Q. **What is your name, title, and business address?**

2 A. My name is Thomas R. Piazza. I am a Certified Consulting Meteorologist and the
3 President and CEO, of Murray and Trettel, Inc. My business address is 600 N. 1st Bank
4 Dr., Palatine, Illinois 60067.

5 Q. **What is Murray & Trettel, Inc.?**

6 A. Murray and Trettel, Inc. is a private meteorological consulting company. Founded in
7 1946, we are one of the oldest and most respected private meteorological consulting
8 companies in the United States. Murray and Trettel is a long-standing corporate member
9 of the American Meteorological Society, of which I personally am also a member. Over
10 the past half century, we have received many awards including the American
11 Meteorological Society's Award for Outstanding Services to Meteorology by a
12 Corporation.

13 Murray and Trettel's mission is to provide sound advice, information and service
14 to our clients on past, current, and future weather conditions; on meteorological and air
15 quality instruments and measurement; on meteorological data quality assurance and
16 reporting; and on atmospheric modeling and deposition at and near nuclear power
17 stations. We accomplish this through traditional weather analysis and forecasting,
18 ambient and in-situ measurement, instrument services in the field, remote data
19 acquisition, studies, and reports. Our Weather Command® Operational Forecast
20 Division operates 24 hours a day, 365 days a year, and employs a total of sixteen
21 professional meteorologists on staff at Weather Command®.

22 Q. **What is your personal professional experience?**

23 A. I have a BS in Meteorology and have more than 36 years of experience as a professional
24 meteorologist. I joined Murray and Trettel in 1975 after four years of experience as a
25 Weather Officer in the U.S. Air Force. In 1987, I was named President of the
26 Operational Forecast Division, in 1991 Executive Vice President of the company, and in
27 2001 President and CEO. Through a rigorous certification process administered by the
28 American Meteorological Society, I became a Certified Consulting Meteorologist (CCM)
29 in March 2010. I hold Certification Certificate 661. A resume is attached hereto as
30 ComEd Exhibit (“Ex.”) 4.01.

31 **Q. What is the purpose of your rebuttal testimony?**

32 A. The purpose of my testimony is to present to the Illinois Commerce Commission (“ICC”)
33 reports prepared by Murray and Trettel, under my direction and control, which are
34 attached hereto as ComEd Exs. 4.02 through 4.07. These reports provide a detailed
35 description of the weather events that occurred during the storms on June 8-9, June 21,
36 June 30-July 1, July 11, July 22-23, and July 27-28, 2011 and demonstrates, using radar
37 images, how the electric service interruptions occurring during the 2011 Storm Systems
38 correlated directly with the severe weather that occurred during those events.

39 **Q. Before you address each individual storm system that is the subject of this**
40 **proceeding, can you provide an overview of the weather pattern for the period June-**
41 **July 2011?**

42 A. Yes. Two large-scale atmospheric circulation drivers were essentially neutral during
43 June and July. First, the equatorial Pacific was in an ENSO-neutral state, which means
44 La Niña had officially ended even though atmospheric circulation anomalies still

45 reflected some aspects of La Niña. Second, the Pacific/North American (“PNA”) pattern
46 was also neutral and thus not a significant player in the nation's weather this same period.

47 However, two other large-scale atmospheric circulation drivers were influential
48 during June and July 2011. The first was the North Atlantic Oscillation (“NAO”) pattern,
49 which was negative for most of the period. This was characterized by high pressure over
50 Greenland and low pressure over the eastern part of Canada. In June and July, a negative
51 NAO is typically associated with warmer-than-normal temperatures and drier-than-
52 normal conditions in the Southern Plains and Southeastern states, cooler-than-normal
53 weather in the Northwestern and Northern Plains states, and wetter-than-normal
54 conditions in the Northern Plains and Midwestern states. The second atmospheric
55 circulation index was the Arctic Oscillation (“AO”) pattern, which was slightly negative
56 for most of the month of June and the first half of July, then near zero the latter half of
57 July. In June and July, a negative AO is with higher pressures over the North Pole
58 regions. Therefore, with no other major circulation driver working to offset the NAO and
59 the AO, the weather pattern over the United States caused by the NAO and AO drivers
60 persisted. In most years, the weather patterns across North America will persist for 7 to
61 14 days and then shift. However, when individual macro-scale circulation drivers
62 dominate with no other competition to offset or mitigate them from time to time,
63 extended periods of much above or much below normal regional weather conditions
64 persist across the United States, and for that matter, elsewhere in the Northern
65 Hemisphere.

66 **Q. How did these drivers affect the weather pattern in the United States in June and**
67 **July 2011?**

68 A. As a result, for most of June and July 2011, there was a persistent dome of high pressure
69 that covered the eastern two thirds of the United States, roughly from just east of the
70 Rocky Mountains to the eastern seaboard. For much of this period, the center of high
71 pressure was located over East Central Texas, Southwestern Arkansas and Northeastern
72 Louisiana. The effects of this resulted in near record to record heat over the Central and
73 Southern Plains (such as Kansas, Oklahoma and Texas) where there was a major drought.
74 This "heat ridge" pumped hot and often humid air northward into Northern Illinois.
75 Meanwhile, to the north of this hot and dry boundary, where conditions were cooler and
76 quite moist (such as North and South Dakota and Minnesota), rain was in abundance and
77 in some cases excessive. In between these two extremes, (Nebraska and Iowa) rainfall in
78 most cases was close to normal.

79 During this period, at night, meteorological phenomena will often occur over the
80 Plains called the "Low Level Jet." Although common, this jet may have been enhanced
81 this year due to the excessive hot and dry conditions described above over the Central
82 and Southern Plains, and due to the persistent large scale circulation, it frequented the
83 same location. This jet, basically 5,000 feet above the surface, is caused by the
84 differential cooling of the western portions of the Plains compared to that of the east.
85 Thus the low level jet is strongest at night and weakens in the morning as heating once
86 again takes place. On the nose of the low level jet, air in the atmosphere is pushed
87 upward and is vital for the generation of thunderstorms. Most often, thunderstorms will
88 form in a clustered shape, known as a mesoscale convective complex ("MCC") or system
89 ("MCS") depending on size. These convective systems are subsequently carried by the
90 mid and upper level winds which flow between the dome of high pressure over the

91 central and southern states and the low pressure system in Canada. On many days, this
92 flow resembled an arc across the Northern US, which is referred to as the “ring of fire”.

93 **Q. What, in sum, does your report regarding the June 8-9, 2011 storms, ComEd Ex.**
94 **4.02, conclude?**

95 A. The June 8-9 Storm System consisted of several waves of severe weather events. The
96 first event was a bowed line of severe thunderstorms with damaging winds that moved
97 across Southern Wisconsin between 8:00 p.m. and 11:00 p.m. on June 8th. While the
98 most severe part of this line remained in Wisconsin; a “gust front” developed south and
99 southeast of this line of storms that brought damaging winds to sections of ComEd’s
100 service territory, primarily north of Interstate I-90 (“I-90”), between 8:00 p.m. and 9:30
101 p.m. Behind this gust front, the initial line of storms brought pockets of severe weather
102 as it crossed ComEd’s service territory between 8:00 p.m. on June 8th and 1:00 a.m. on
103 June 9th. Following this line, there were three more lines of storms that moved across
104 ComEd’s service territory between 1:00 a.m. and 10:00 a.m. on June 9th. These resulted
105 in additional pockets of damaging winds, heavy rains, damaging hail, and intense
106 lightning. Finally, as demonstrated in the radar images in my report, the path of severe
107 weather that occurred during the June 8-9 Storm System is consistent with the resulting
108 damage reports and outages. (ComEd Ex. 4.02, Images 4-55).

109 **Q. What, in sum, does your report regarding the June 21, 2011 storm, ComEd Ex. 4.03,**
110 **conclude?**

111 A. The June 21 Storm System consisted of one primary line of severe thunderstorms, which
112 was most intense between 6:00 p.m. and 9:00 p.m. Even though there were several
113 clusters of thunderstorms that affected ComEd’s territory late in the afternoon and

114 evening on June 21st, all the severe weather and damage reports were associated with the
115 line of storms that originated in West Central Illinois and moved across the southeast half
116 of the territory (southeast of a line from Zion to Princeton). The storms produced two EF-
117 1 tornadoes, damaging winds with wind gusts between 60 and 80 mph, and intense
118 lighting. As demonstrated in the radar images in my report, the path of severe weather
119 that occurred during the June 21 Storm System is consistent with the resulting damage
120 reports and outages. (ComEd Ex. 4.03, Images 9-26).

121 **Q. What, in sum, does your report regarding the June 30-July 1, 2011 storms, ComEd**
122 **Ex. 4.04, conclude?**

123 A. The June 30-July 1 Storm Systems consisted of a very unusual severe thunderstorm event
124 due to the north to south-southwest movement of the thunderstorms cells. Between
125 7:00 p.m. and 10:00 p.m. on June 30th, two west to east lines of severe storms moved
126 from offshore of Wisconsin southward along the Lake Michigan shoreline and progressed
127 inland over the City of Chicago. Over ComEd's far eastern service territory, these storms
128 produced damaging winds with wind gusts from 60 mph to over 90 mph and large
129 damaging hail. As demonstrated in the radar images in my report, the path of severe
130 weather that occurred during the June 30-July 1 Storm System is consistent with the
131 resulting damage reports and outages. (ComEd Ex. 4.04, Images 3-39).

132 **Q. What, in sum, does your report regarding the July 11, 2011 storm, ComEd Ex. 4.05,**
133 **conclude?**

134 A. The July 11 Storm System had all the characteristics of a progressive "Derecho", which
135 is a fast-moving widespread and long-lived windstorm that is associated with a band of
136 rapidly moving showers or thunderstorms. This Derecho reached the Mississippi River

137 about 6:00 a.m. hours on July 11th, then rapidly swept across and affected all of ComEd's
138 service territory north of Interstate 80 ("I-80"), including all of Southern Wisconsin. It
139 reached the Chicago Metropolitan area about 8:00 a.m. on July 11th and was east of the
140 area by 9:00 a.m. It only slightly decreased in intensity by the time it reached Ohio
141 around 11:00 a.m. on July 11th. This Derecho continued all the way to the East Coast by
142 late in the day on July 11th. This Derecho produced damaging winds with gusts from 60
143 mph to over 80 mph, intense lightning and brief torrential rains. From a meteorological
144 perspective, considering the severity of the winds, short time frame of the event, and the
145 geographic area of coverage, I would rank this Derecho as the worst severe weather event
146 to affect ComEd's service territory in over fifteen (15) years. As demonstrated in the
147 radar images in my report, the path of severe weather that occurred during the July 11
148 Storm System is consistent with the resulting damage reports and outages. (ComEd Ex.
149 4.05, Images 4-18).

150 **Q. What, in sum, does your report regarding the July 22-23, 2011 storm, ComEd Ex.**
151 **4.06, conclude?**

152 **A.** Following two days of high temperatures near 100 degrees across Northern Illinois, the
153 July 22-23 Storm System was highlighted by excessive lightning and flash flooding. The
154 most severe part of this event occurred from 11:30 p.m. on July 22nd until 3:00 a.m. on
155 July 23rd. This line of storms expanded from the Chicago Loop along the I-90 corridor
156 back to Rockford. Over the next two hours there were several thunderstorm cells that
157 moved along the I-90 corridor. After 5:00 a.m. on July 23rd, a new area of thunderstorms
158 moved out of Iowa into Illinois mainly near and north of Interstate 88 ("I-88"). The most
159 intense of these storms occurred west of Interstate 39 ("I-39") for these storms weakened

160 as they moved eastward, primarily I-88 southward. Most of these thunderstorms
161 diminished by 10:00 a.m. on July 23rd. There were over 46,000 lightning strokes, with
162 17,406 strokes occurring in a single 60 minute time frame. In addition, Flash Flood
163 Warnings were issued by the National Weather Service for all or portions of; Winnebago,
164 Ogle, Boone, Lee, Dekalb, McHenry, Kane, Will, Dupage, Lake, and Cook Counties. As
165 demonstrated in the radar images in my report, the path of severe weather that occurred
166 during the July 22-23 Storm System is consistent with the resulting damage reports and
167 outages. (ComEd Ex. 4.06, Images 1-35).

168 **Q. What, in sum, does your report regarding the July 27-28, 2011 storm, ComEd Ex.**
169 **4.07, conclude?**

170 **A.** The July 27-28 Storm System was comprised of two lines of severe thunderstorms that
171 moved from the Freeport Region east-southeastward through the I-90/ I-88 corridor into
172 South-Central Cook County. These two lines caused damaging winds, intense lightning
173 (over 18,400 in a two hour window) and torrential rains. In addition, there was “training”
174 of numerous clusters of heavy thunderstorms over sections of the Freeport, Dixon and
175 Rockford Regions that brought excessive amounts of rainfall (3 to nearly 10 inches) that
176 caused Flash Flooding. Further, there were two unconfirmed tornadoes near Galena,
177 Illinois. As demonstrated in the radar images in my report, the path of severe weather
178 that occurred during the July 27-28 Storm System is consistent with the resulting damage
179 reports and outages. (ComEd Ex. 4.07, Images 1-72).

180 **Q. Do you adopt these reports as part of this testimony?**

181 **A.** Yes, I do.

182 Q. **Does this complete your direct testimony?**

183 A. Yes, it does.