USE OF PROBABLISTIC WEATHER FORECASTS BY UTILITIES

Mark T. Carroll, Murray and Trettel, Inc.

On January 13, 2002, the American Meteorological Society
Council adopted the "Enhancing Weather Information with
Probability Forecasts" Policy Statement. The statement is
as follows:

> Much of the informational content of meteorological
> data, models, techniques and forecaster thought
> processes is not being conveyed to the users of weather
> forecasts. Making and disseminating forecasts in
> probablistic terms would correct a major portion of
> this shortcoming. It would allow the user to make
> decisions based on quantified uncertainties with
> resulting economic and social benefits. Widespread
> implementation of probability forecasts would require
> forecasters to become familiar with user needs, and
> users to be educated on probability forecasts and how
> to make optimum use of this new information. The
> American Meteorological Society endorses probability
> forecasts and recommends their use be substantially
> increased.

Although the AMS endorsement of probablistic forecasting is
recent, some utilities, including nuclear utilities have
been utilizing weather forecasts based upon this approach
for decades.

Utilities have specific needs that are often not met by the
information available to the general public. Forecast
products have been developed that provide the information
utilities need in order to operate efficiently.

Examples of probablistic storm warnings will be provided.
Some warnings utilize a probablistic color code system which
indicates the significance of a weather situation to the
users operation as opposed to indicating severity of the
storm (what may be severe to some may not be to others).

The success of the probability forecast is dependent upon
the training and education of the forecasters and the
forecast users. The forecasters must understand the users
needs and the user must understand the meaning and purpose
of the probability forecast.

Forecasting with Probability Factors

Utilities have utilized weather forecasts from private weather
consulting companies since the 1950's. In the 1960's, forecasts
provided to utilities included probability factors. Probability
forecasts allow meteorologists to provide the users with more
information than is available on television, radio or the
internet. Most people are familiar with probability as it
relates to precipitation, however probability factors can be
utilized for any forecast parameter.

The probability forecast not only allows the meteorologist to
inform the client of the weather that he is predicting to occur,
but also provides the client with an alternate forecast (if what
I am forecasting does not occur, the weather conditions will
likely be ....). One may view this type of probability
forecasting as a primary and a secondary forecast. As an
example, a primary forecast of an 80 percent chance of 2 to 4
inches of snow along with a secondary forecast of a 20 percent
chance of 3 to 5 inches of snow indicates that the meteorologist
is 80 percent certain that 2 to 4 inches of snow will fall,
however, if the forecaster is incorrect, there will likely be
slightly more snow (this is the 20 percent probability for 3 to 5
inches of snow). Any weather parameter or weather related factor
can be forecast in the same way.

Figure 1 is an example of a severe storm warning form utilized by
Murray and Trettel, Incorporated. This form is used by various
types of clients, including electric utilities.

Combinations of forecast probabilities can be utilized to provide
forecast information. If a forecast for the start time of
precipitation indicates a 60 percent probability of precipitation
beginning between 1 p.m. and 3 p.m. and a 40 percent probability
of precipitation beginning between 3 p.m. and 5 p.m., the
meteorologist is indicating that precipitation is likely to begin
between 1 and 3 p.m. (more likely between 2 and 3 p.m. because
the alternate forecast is for a later time period), however, if
the forecast is incorrect, the start time will be later rather
than earlier. The following examples interpret meteorologists
forecasts based upon probability combinations:

     TIME OF BEGINNING OF PRECIPITATION

TIME BLOCK   PROBABILITY COMBINATIONS

1-3 PM	60%	70%	80%	90%	100%
3-5 PM	40%	30%	20%	10%	

| Probable Start Time | 2-3 pm | 2-3 pm | 2 pm | 2 pm | 2 pm |

MURRAY and TRETTEL
INCORPORATED
Certified Consulting Meteorologists
NORTHFIELD, ILLINOIS

Chicago Phone: Northfield Phone:
(773)-273-5600   (847)-446-7800

Date: _____
Time: _____
Given By: _____
Received By: _____

STORM WARNING :   Thunderstorm   Lightning   Wind   Warning Current

Rain   Snow   Ice   _____   from_____, _____ to _____, _____

(Time)   (Day)   (Time)   (Day)

A. OPERATIONAL COLOR CODE (see back)   Probability Factor (chances out of 10)

- 1. Black (Major trouble) · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 2. Red (Significant trouble) · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 3. Yellow (Little or limited trouble) · · · · · · 1 2 3 4 5 6 7 8 9 10
- 4. Green (No trouble) · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10

B. TYPE OF WEATHER

- 5. None · 1 2 3 4 5 6 7 8 9 10
- 6. Isolated Thunderstorm(s) (T) · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 7. General Thunderstorms (T) · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 8. Squall Line(s) · · · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 9. Potential Tornado · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 10. Local High Winds (gusts over 40 mph) · · · 1 2 3 4 5 6 7 8 9 10
- 11. General High Winds (average over 30 mph) 1 2 3 4 5 6 7 8 9 10
- 12. Rain (R) · 1 2 3 4 5 6 7 8 9 10
- 13. Rainshower(s) (RW) · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 14. Drizzle (L) · 1 2 3 4 5 6 7 8 9 10
- 15. Freezing Rain (Ice = ZR) · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 16. Freezing Drizzle (Ice = ZL) · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 17. Sleet (Ice Pellets = E) · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 18. Wet Snow (S) · · · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 19. Heavy Snow (over 4 inches = S+) · · · · · 1 2 3 4 5 6 7 8 9 10
- 20. Very Heavy Snow (over 8 inches = S++) 1 2 3 4 5 6 7 8 9 10
- 21. Combination: Rain-Ice-Snow · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 22. Borderline: Rain-Ice (R, ZR) · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 23. Borderline: Rain-Snow (R, S) · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 24. Borderline: Snow-Ice (S, ZR) · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 25. Borderline: Drizzle-Ice (L, ZL) · · · · · · 1 2 3 4 5 6 7 8 9 10
- 26. _____ · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 27. _____ · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 28. _____ to _____ · · · · 1 2 3 4 5 6 7 8 9 10
- 29. _____ to _____ · · · · 1 2 3 4 5 6 7 8 9 10

C. TIME OF BEGINNING

- 30. 11 a.m. - 1 p.m. · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 31. 11 p.m. - 1 a.m. · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 32. 1 - 3 a.m.   37. 1 - 3 p.m. · · · · · · 1 2 3 4 5 6 7 8 9 10
- 33. 3 - 5 a.m.   38. 3 - 5 p.m. · · · · · · 1 2 3 4 5 6 7 8 9 10
- 34. 5 - 7 a.m.   39. 5 - 7 p.m. · · · · · · 1 2 3 4 5 6 7 8 9 10
- 35. 7 - 9 a.m.   40. 7 - 9 p.m. · · · · · · 1 2 3 4 5 6 7 8 9 10
- 36. 9 - 11 a.m.   41. 9 - 11 p.m. · · · · · 1 2 3 4 5 6 7 8 9 10

D. DURATION

- 42. Brief · 1 2 3 4 5 6 7 8 9 10
- 43. Less than 3 hrs. · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 44. 3 - 6 hrs.   47. 18 - 24 hrs. · · · · · 1 2 3 4 5 6 7 8 9 10
- 45. 6 - 12 hrs.   48. over 24 hrs. · · · · · 1 2 3 4 5 6 7 8 9 10
- 46. 12 - 18 hrs. · 1 2 3 4 5 6 7 8 9 10

E. STORM CHARACTERISTICS

- 49. Slight · 1 2 3 4 5 6 7 8 9 10
- 50. Moderate · 1 2 3 4 5 6 7 8 9 10
- 51. Locally Severe · · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 52. Generally Severe · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 53. Prolonged · 1 2 3 4 5 6 7 8 9 10
- 54. Compounded by wind · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 55. 1 - 5/10 of area affected · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 56. 6 - 9/10 of area affected · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 57. All of area affected · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 58. Continuous (steady) · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 59. Intermittent (off and on) · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10

E. STORM CHARACTERISTICS - cont'd.   Probability Factor (chances out of 10)

- 60. Total Amount of Rain: _____ · · · · 1 2 3 4 5 6 7 8 9 10
- 61. Critical rate of fall (time): _____ to _____ 1 2 3 4 5 6 7 8 9 10
- 62. Critical rate of fall (amt.): _____ inch per _____ 1 2 3 4 5 6 7 8 9 10

F. TEMPERATURE

- 63. Remaining below 32°F · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 64. Holding near 32°F · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 65. Holding above 32°F · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 66. Falling during storm · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 67. Rising during storm · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 68. Going below 32° by _____ to _____ · 1 2 3 4 5 6 7 8 9 10
- 69. Rising above 32° by _____ to _____ · 1 2 3 4 5 6 7 8 9 10

G. WIND

- 70. North   75. North
- 71. South   74. becoming   76. South
- 72. East   77. East
- 73. West   78. West
- 79. Wind direction probability · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 80. Speed _____ mph to _____ mph · · 1 2 3 4 5 6 7 8 9 10
  becoming _____ mph to _____ mph 1 2 3 4 5 6 7 8 9 10
- 81. Gusts to 30 mph · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 82. Gusts to 40 mph · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 83. Gusts to 50 mph · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 84. Gusts to 60 mph · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 85. Gusts over 60 mph · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 86. Strong shifting winds · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 87. Gradual wind shift · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 88. Drifting winds · · · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10

H. COMMENTS

- 89. Major trouble condition · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 90. Trouble restricted - local · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 91. Borderline trouble condition · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 92. Little trouble expected · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 93. Occasional cloud-to-ground lightning · · · 1 2 3 4 5 6 7 8 9 10
- 94. Frequent cloud-to-ground lightning · · · · 1 2 3 4 5 6 7 8 9 10
- 95. Main trouble due to lightning · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 96. Main trouble due to wind · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 97. Trouble due to lightning and wind · · · · · 1 2 3 4 5 6 7 8 9 10
- 98. Series of thunderstorms moving
  from _____ at _____ mph · · 1 2 3 4 5 6 7 8 9 10
- 99. Slight glazing · · · · · · · · · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 100. Rapid accumulation of ice · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 101. Icing heavier to _____ · · · · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 102. Preventive heating indicated · · · · · · · · 1 2 3 4 5 6 7 8 9 10
- 103. Rapid accumulation of snow · · · · · · · · 1 2 3 4 5 6 7 8 9 10

- 104. REMARKS _____
  _____
  _____
  _____
  _____

J. LOG

- 105. Warning USEFUL.
- 106. Warning NOT useful.*
  *Reason _____
  _____

*N.B. All warnings and details contained herein are made subject to the inherent limitations of the science of Meteorology. Because of this, these warnings and the details therein should be considered supplementary to, and are not intended to replace other pertinent weather information or road condition reports. As the probability factors herein illustrate, there is a margin of error in all weather forecasting that must be acknowledged and accounted for.

The above scenario indicates that precipitation will not begin
before 1 p.m. or after 5 p.m. Increasing probability of the
beginning time of 1 to 3 p.m. indicates increasing likelihood of
precipitation beginning in the middle of the time block (2 p.m.).

        TIME OF BEGINNING OF PRECIPITATION

TIME BLOCK   PROBABILITY COMBINATIONS

| 1-3 PM | 40% | 30% | 20% | 10% | |
| 3-5 PM | 60% | 70% | 80% | 90% | 100% |

| Probable Start Time | 3-4 pm | 3-4 pm | 4 pm | 4 pm | 4 pm |

The above scenario indicates that precipitation will not begin
before 1 p.m. or after 5 p.m. Increasing probability of the
beginning time of 3 to 5 p.m. indicates increasing confidence of
precipitation beginning in the middle of the time block (4 p.m.).

        DURATION OF PRECIPITATION

DURATION   PROBABILITY COMBINATIONS

| 3-6 Hours | 60% | 70% | 80% | 90% | 100% |
| 6-12 Hours | 40% | 30% | 20% | 10% | |

| Average Duration | 5-6 hrs | 4-5 hrs | 4-5 hrs | 4-5 hrs | 4-5 hrs |
| Maximum Duration | 12 hrs | 12 hrs | 10 hrs | 8 hrs | 6 hrs |

The above example indicates that precipitation duration will be
at least 3 hours and in no case greater than 12 hours.
Increasing probability in the 3 to 6 hour duration indicates the
increasing confidence in the 4 to 5 hour duration.

        DURATION OF PRECIPITATION

DURATION   PROBABILITY COMBINATIONS

| 3-6 Hours | 40% | 30% | 20% | 10% | |
| 6-12 Hours | 60% | 70% | 80% | 90% | 100% |

| Average Duration | 6-7 hrs | 7-8 hrs | 8-10 hrs | 8-10 hrs | 8-10hrs |
| Maximum Duration | 12 hrs | 12 hrs | 12 hrs | 12 hrs | 12 hrs |

The above example indicates that precipitation duration will be
at least 3 hours and will not exceed 12 hours. Increasing
probability in the 6 to 12 hour duration indicates the increasing
confidence in the 6 to 12 hour probability.

Operational Color Code

A color code system, using probability factors, can be used to
indicate the severity of a weather situation. Different clients
have different concerns. A prediction of 6 inches of dry snow
would have a great impact for a department of transportation, but
may have only a limited effect on an electric utility (6 inches
of wet snow would likely impact transmission lines).

The purpose of the color code is to give a maximum amount of
information in a minimum amount of time. It makes the subtle
transition from a "meteorological forecast" to an "operational
interpretation." The color code is an extra step to provide not
only the weather forecast but also the interpretation of the
effect of that forecast on operational problems for the client.
It is designed primarily for supervisory personnel and presents
weather forecasts in terms that are quick and easy to use and
interpret, yet effective in results.

The colors used are green, yellow, red and black. Their
explanation and description are given below. The color code is
given in terms of Probability Factors, expressing the probability
of occurrence of the various color combinations.

Condition Green: The weather pattern is unfavorable for the
                    development of "trouble conditions. This
                    color is used in combination with yellow or
                    red to indicate the certainty of the forecast
                    When green is used in combination with
                    another color, the probability factors of the
                    various colors will total 100%.

Condition Yellow: The weather pattern is favorable for the
                    development of meteorological conditions that
                    indicate the need for a weather warning,
                    however, the forecast weather conditions are
                    expected to be of the type and intensity that
                    will have little or limited effect on client
                    operations.

Condition Red: The weather pattern is favorable for the
                    development of meteorological conditions that
                    indicate a need for a weather warning and the
                    forecast weather conditions are expected to
                    be of the type and intensity that will have a
                    significant effect on client operations.

Condition Black: The weather pattern is favorable for the
                     development of meteorological conditions that
                     indicate the need for a weather warning and
                     the forecast weather conditions are expected
                     to be of the type and intensity that will
                     have a major effect on client operations.

Using probability factors in combination with the above color
codes, the user can get a quick indication of the severity of the
situation before learning the details of the forecast. The
following color code combinations indicate the meteorologist's
interpretation of the effect of the expected weather on client
operations:

G6Y4 (Green 60%, Yellow 40%) - Borderline situation. No trouble
     expected.

Y6G4 (Yellow 60%, Green 40%) - Borderline situation. Localized
     problems possible.

Y7G3 through Y10 (Yellow 70%, Green 30% through Yellow 100%)
     Increasing forecaster confidence of localized problems.

Y9R1 through Y6R4 (Yellow 90%, Red 10% through Yellow 60%, Red
40%) 100% chance of some trouble as yellow decreases and red
     increases. Forecaster is indicating decreasing confidence
     of which it will be, a yellow condition or a red condition.

R7Y3 through R10 (Red 70%, Yellow 30% through Red 100%)
     Forecaster is indicating increasing confidence in
     significant trouble. 100% chance of trouble.

R6B4 through R10 (Red 60%, Black 40% through Red 100%)
     100% probability of significant trouble with the forecaster
     leaning toward significant but possible major trouble. As
     the probability of black decreases, the forecasters
     confidence in a red condition is increasing.

R6B4 through B10 (Red 60%, Black 40% through Black 100%)
     Major trouble with increasing forecaster confidence.

Brief summary of color code:

     Green - No trouble expected.
     Yellow - Little or limited effect.
     Red - Significant trouble
     Black - Major Storm

Many clients utilize the color code for their operations. An
electric utility may hold over maintenance crews if the forecast
indicates a red condition (significant trouble). The same
utility may retain a small percentage of the crew if a yellow
condition (limited trouble) is indicated by the forecast.

Education

Meteorologists must have an understanding not only of the
implications of the color code and probablistic forecast, but
must also understand the operations of their clients. As
mentioned earlier, what may be a red condition (significant
trouble) for one client may be a yellow condition (little or
limited trouble) for another client. In addition to the type of
operations performed by individual clients, the meteorologist
must know the location or locations that are critical to the
client while determining the color code and weather forecast
information. Some utilities may cover large service areas,
however population density may dictate the how the forecaster
wishes to present color code portion of the forecast.

The client utilizing the forecast must also be educated.
Numerous probability forecasts of color code, precipitation type,
beginning time, duration, storm characteristics, temperature and
wind can be confusing unless the user is familiar with the
information the meteorologist is attempting to convey. In some
cases, clients have been utilizing probability forecasts for
decades and are familiar with the information being provided.
Users that are utilizing probablistic forecasts for the first
time must have the concept explained to them. Those providing
the forecasts should meet with new clients (and in some cases old
clients as much turnover exists in today's economic climate) to
explain the concept of probability forecasts. Training sessions
can be held for individual clients or groups of clients.
Forecast examples should be presented. Even clients that have
been utilizing probability forecasts for many years can benefit
from getting an explanation of probablistic forecasting from a
professional meteorologist.

Examples

The following pages are examples of probability based forecasts
that have been provided by Murray and Trettel. Each client often
dictates the format of the forecast or warning form. Space does
not permit providing all types of forecasts currently being
provided.

Example 1 is a Snow and Ice Warning provided by Murray and
Trettel to the Village of Winnetka, IL in March, 1950. The
probability forecast approach was not in place at Murray and
Trettel at this time. Probability factors as provided in
examples 2 and 3 began in the 1960's.

Example 2 is an example of Snow and Ice Warning provided to
numerous clients in northeast Illinois in January 1999. This
storm produced over 20 inches of snow in some locations. The
page following the Snow/Ice Warning is a snowfall report
indicating snowfall amounts throughout northeast Illinois for the
storm which began on 1/1/99. The snowfall report includes Lake
Effect snow that fell prior to the main system snow (indicated by
the 10 a.m. Friday snow began time).

Example 3 is a Severe Storm Warning form currently being utilized
by some electric utilities.

Example 4 is an example of a Severe Storm Warning with a color
code of Red 7, Black 3 (Red 70%, Black 30%). This warning calls
for isolated thunderstorms with local high winds. The start time
will be 4 p.m. (no earlier than 3 p.m., no later than 7 p.m.),
the duration will be approximately 3 hours (not more than 6
hours). Winds will be from the southwest, shifting to the
northwest at 20 to 25 miles per hour and gusting to 50 miles per
hour. Locally severe storms will cover 1/10 to 5/10 of the
service area and will be intermittent. The main trouble will be
due to lightning and wind.

Conclusion

The recent Policy Statement from the American Meteorological
Society concerning Probability Forecasts supports forecasting
principles and techniques utilized by private sector
meteorologists for over 35 years. The philosophy and knowledge
exist to expand probablistic forecasting. The next step is to
educate forecasters and users.

MURRAY & TRETTEL

Industrial Meteorologists

127 NORTH DEARBORN STREET
CHICAGO 2, ILLINOIS

Forecast Time _9:40 PM_
Day _FRIDAY_
Date _MAR 10, 195_
District _Winnetka_
Area (_Rogers_)

TYPE OF STORM

☐	1	Blizzard
☒	2	Snow Storm
☐	3	Snow to Ice
☐	4	Snow to Rain
☐	5	Ice Storm
☐	6	Ice to Rain
☐	7	Ice to Snow
☐	8	Rain to Ice
☐	9	Rain to Snow
☐	10	Special Ice Problem

DURATION (EXCEPT SNOW SHOWERS)

☐	11	Less than 3 hours
☐	12	3-6 hours
☒	13	6-12 hours
☐	14	12-18 hours
☐	15	18-24 hours
☐	16	Over 24 hours

SNOW TYPE

☐	17	Drifting (over 25 m.p.h.)
☐	18	Dry (below 30ºF)
☐	19	Fluffy
☐	20	(Becoming)
☒	21	Wet (30º-34ºF)
☐	22	Melting (over 34ºF)

	SNOW BY		PLOWABLE (1-3") BY	
☐ 23	Mon.	☐ 44	Mon.
☐ 24	Tues.	☐ 45	Tues.
☐ 25	Wed.	☐ 46	Wed.
☐ 26	Thurs.	☐ 47	Thurs.
☒ 27	Fri.	☐ 48	Fri.
☐ 28	Sat.	☐ 49	Sat.
☐ 29	Sun.	☐ 50	Sun.
☐ 30	1-3	☐ 51	1-3
☐ 31	2-4	☐ 52	2-4
☐ 32	3-5	☐ 53	3-5
☐ 33	4-6	☐ 54	4-6
☐ 34	5-7	☐ 55	5-7
☐ 35	6-8	☐ 56	6-8
☐ 36	7-9	☐ 57	7-9
☒ 37	8-10	☐ 58	8-10
☐ 38	9-11	☐ 59	9-11
☐ 39	10-12	☐ 60	10-12
☐ 40	11-1	☐ 61	11-1
☐ 41	12-2	☐ 62	12-2
☐ 42	A.M.	☐ 63	A.M.
☒ 43	P.M.	☐ 64	P.M.

SNOWFALL (EXCEPT SNOW SHOWERS)

☐	65	Less than 2 inches
☒	66	1-3 inches
☐	67	2-4 inches
☐	68	3-6 inches
☐	69	4-7 inches
☐	70	6-9 inches
☐	71	8-12 inches
☐	72	10-15 inches
☐	73	12-18 inches
☐	74	Over 18 inches

TYPE OF RAIN

☐	75	Hard Freezing (below 25º)
☐	76	Freezing (25º-32º)
☐	77	Borderline (30º-35º)
☐	78	(Becoming)
☐	79	Cold (35º-40º)
☐	80	Warm (over 40º)

EFFECTS OF RAIN

☐	81	Brief Icing
☐	82	Prolonged Icing
☐	83	None
☐	84	Part Washout of New Snow
☐	85	Total • • " "
☐	86	• " " all Snow

	RAIN BY			ICE BY	
☐ 87	Mon.		☐ 108	Mon.
☐ 88	Tues.		☐ 109	Tues.
☐ 89	Wed.		☐ 110	Wed.
☐ 90	Thurs.		☐ 111	Thurs.
☐ 91	Fri.		☐ 112	Fri.
☐ 92	Sat.		☐ 113	Sat.
☐ 93	Sun.		☐ 114	Sun.
☐ 94	1-3		☐ 115	1-3
☐ 95	2-4		☐ 116	2-4
☐ 96	3-5		☐ 117	3-5
☐ 97	4-6		☐ 118	4-6
☐ 98	5-7		☐ 119	5-7
☐ 99	6-8		☐ 120	6-8
☐ 100	7-9		☐ 121	7-9
☐ 101	8-10		☐ 122	8-10
☐ 102	9-11		☐ 123	9-11
☐ 103	10-12		☐ 124	10-12
☐ 104	11-1		☐ 125	11-1
☐ 105	12-2		☐ 126	12-2
☐ 106	A.M.		☐ 127	A.M.
☐ 107	P.M.		☐ 128	P.M.

SPECIAL ICING PROBLEMS

☐	129	Wet Snow Freezing
☐	130	Slush Freezing
☐	131	Sleet (Ice Pellets)

RECOMMENDATIONS

☐	132	Plow as usual
☐	133	Sand or salt
☐	134	Plow for Washout
☐	135	Plow in preparation for ice
☐	136	Salt ineffective (below 15ºF
☐	137	Watch your temp. (Borderline

WIND

☐ 138	N				☐ 144
☒ 139	E	☐ 143	Shifting	☐ 145
☒ 140	S		to	☐ 146
☐ 141	W			☐ 147
☐ 142	None			

WEATHER UP TO 24 HRS AFTER

☐	148	Sunny
☒	149	Cloudy
☐	150	Thawing Days (above 40ºF)
☐	151	Thawing Nights (above 40ºF)
☐	152	Melting Days (above 32ºF)
☐	153	" Nights (" •)
☐	154	Below Freezing Days
☐	155	" " Nights
☐	156	Below 10º All Day
☐	157	Windy (over 25 m.p.h.)

SNOW SHOWERS (AFTER MAIN STORM)

☐	158	Brief Snow Squall
☐	159	Cont. Snow Showers
☐	160	Occasional Snow Showers
☐	161	Light (less than 1 inch)
☐	162	Moderate (1-3 inches)
☐	163	Heavy (4-6 inches)
☐	164	Beginning before Daybreak
☐	165	" " Noon
☐	166	" " Sunset
☐	167	" " Midnight
☐	168	Same Day
☐	169	Next Day
☐	170	Ending within 6 hours
☐	171	Ending within 12 hours
☐	172	No end in sight.

HIGHWAY DEPT. NOTES AND COMMENTS

Depth of new snow _____

Total depth of snow _____

Condition of streets _____

Comments on Advice _____

☒ 173 REMARKS _CHANCE FOR RAIN & SLEET MIXED WITH SNOW IN AM_

MURRAY & TRETTEL, INC. *Certified Consulting Meteorologists*

114 West Frontage Road • Northfield, IL 60093 / Northfield 847-446-7800 • Chicago 773-273-5600

DATE **1-1-99** TIME: **12:45 pm** GIVEN BY: **TRP** RECEIVED BY _____

SNOW - ICE STORM WARNIN

☐ 1. **SPECIAL OCCASION ALERT:** Possible trouble conditions developing: see Remarks - details will follow

*WARNING: (details below)

A. Storm Warning: Operational Color Code

Probability Factor (Chances out of 10)

☐ 2. Condition Yellow (Little or Limited Effect).......... 1 2 3 4 5 6 7 8 9 10
☐ 3. Condition Red (Significant trouble) 1 2 3 4 5 6 7 8 9 10
☒ 4. Condition Black (Major "Storm" Trouble)........... 1 2 3 4 5 6 7 8 9 (10)
☐ 5. Condition Green (No trouble)..... 1 2 3 4 5 6 7 8 9 10

B. Type of Precipitation

☐ 6. None............................ 1 2 3 4 5 6 7 8 9 10
☒ 7. Snow 1 2 3 4 5 6 7 8 9 (10)
☐ 8. Snow Showers and or Flurries.... 1 2 3 4 5 6 7 8 9 10
☐ 9. Lake Snow...................... 1 2 3 4 5 6 7 8 9 10

☒ 10. Snow-dry...................... 1 2 3 4 5 6 7 8 9 (10)
☐ 11. Snow-wet...................... 1 2 3 4 5 6 7 8 9 10
☐ 12. Snow Melting 1 2 3 4 5 6 7 8 9 10
☐ 13. _____ becoming _____ 1 2 3 4 5 6 7 8 9 10

☐ 14. Freezing Rain (Glaze) 1 2 3 4 5 6 7 8 9 10
☐ 15. Freezing Drizzle (Glaze)....... 1 2 3 4 5 6 7 8 9 10
☐ 16. Borderline: Snow-Rain......... 1 2 3 4 5 6 7 8 9 10
☐ 17. Borderline: Glaze-Rain........ 1 2 3 4 5 6 7 8 9 10
☐ 18. Borderline: Snow-Glaze........ 1 2 3 4 5 6 7 8 9 10
☐ 19. Borderline: Drizzle-Freezing Drizzle 1 2 3 4 5 6 7 8 9 10

C. Time of Beginning: (SYSTEM SNOW)

☐ 20. 11 a.m.- 1 p.m. 1 2 3 4 5 6 7 8 9 10
☐ 21. 11 p.m. - 1 a.m. 1 2 3 4 5 6 7 8 9 10

☐ 22. 1-3 a.m.... ☐ 27. 1-3 p.m......... 1 2 3 4 5 6 7 8 9 10
☐ 23. 3-5 a.m.... ☒ 28. 3-5 p.m......... 1 2 3 4 5 6 (7) 8 9 10
☐ 24. 5-7 a.m.... ☒ 29. 5-7 p.m......... 1 2 (3) 4 5 6 7 8 9 10
☐ 25. 7-9 a.m.... ☐ 30. 7-9 p.m......... 1 2 3 4 5 6 7 8 9 10
☐ 26. 9-11 a.m.. ☐ 31. 9-11 p.m........ 1 2 3 4 5 6 7 8 9 10

D. Duration:

☐ 32. Brief - Spotty - Intermittent........ 1 2 3 4 5 6 7 8 9 10
☐ 33. Less than 3 hours................ 1 2 3 4 5 6 7 8 9 10
☐ 34. 3-6 hrs. ☐ 37. 18-24 hrs....... 1 2 3 4 5 6 7 8 9 10
☐ 35. 6-12 hrs.. ☒ 38. Over 24 hrs.... 1 2 3 4 5 6 7 8 9 (10)
☐ 36. 12-18 hrs...................... 1 2 3 4 5 6 7 8 9 10

E. Snowfall Accumulation

☐ 39. Little or none.................. 1 2 3 4 5 6 7 8 9 10
☐ 40. Less than 2 inches............. 1 2 3 4 5 6 7 8 9 10
☐ 41. 1-3 inches.................... 1 2 3 4 5 6 7 8 9 10
☐ 42. 2-4 inches.................... 1 2 3 4 5 6 7 8 9 10
☐ 43. 3-5 inches.................... 1 2 3 4 5 6 7 8 9 10

☐ 44. 4-7 inches.................... 1 2 3 4 5 6 7 8 9 10
☒ 45. 7-10 inches................... 1 2 (3) 4 5 6 7 8 9 10
☒ 46. 10-15 inches.................. 1 2 3 4 5 6 (7) 8 9 10

F. Temperature: **20**

☒ 48. Remaining below 32°.......... 1 2 3 4 5 6 7 8 9 (10)
☐ 49. Holding near 32°............. 1 2 3 4 5 6 7 8 9 10
☐ 50. Holding above 32°........... 1 2 3 4 5 6 7 8 9 10
☐ 51. Going below 32° by ____ to ____ 1 2 3 4 5 6 7 8 9 10
☐ 52. Going below ____° by ____ to ____ 1 2 3 4 5 6 7 8 9 10

☐ 53. Falling during storm............ 1 2 3 4 5 6 7 8 9 10
☐ 54. Rising during storm............ 1 2 3 4 5 6 7 8 9 10
☐ 55. Rising above 32° by ____ to ____ 1 2 3 4 5 6 7 8 9 10
☐ 56. Rising above ____° by ____ to ____ 1 2 3 4 5 6 7 8 9 10

G. Wind:

☐ 57. North ☒ 62. North
☐ 58. South ☐ 63. South
☒ 59. East ☒ 61. Becoming ☐ 64. East
☐ 60. West ☐ 65. West

Probability Factor (Chances out of
☒ 66. Wind direction probability......... 1 2 3 4 5 6 7 (8) 1
☒ 67. Speed **10** to **20** mph....... 1 2 3 4 5 6 7 (8) 9 1
     becoming **20** to **30** mph... 1 2 3 4 5 6 7 8 9 1
☒ 68. Wind gusts **30** to **40** mph 1 2 3 4 5 6 (7) 8 9 1
☒ 69. Increasing..................... 1 2 3 4 5 6 7 8 9
☐ 70. Decreasing.................... 1 2 3 4 5 6 7 8 9
☒ 71. Drifting Wind (over 20 mph)...... 1 2 3 4 5 6 7 8 9 (1)

H. Recommendations and Comments

☐ 72. Little or no trouble expected.... 1 2 3 4 5 6 7 8 9 1
☐ 73. Alert supervisors only........... 1 2 3 4 5 6 7 8 9 1
☒ 74. Prepare crews for spreading ... 1 2 3 4 5 6 7 8 9
☒ 75. Prepare crews for plowing 1 2 3 4 5 6 7 8 9 (1)

☐ 76. No rush hour trouble........... 1 2 3 4 5 6 7 8 9 1
☐ 77. Morning rush hour trouble...... 1 2 3 4 5 6 7 8 9 1
☐ 78. Evening rush hour trouble...... 1 2 3 4 5 6 7 8 9 1
☐ 79. Pre-spread for rush hour........ 1 2 3 4 5 6 7 8 9 1

☐ 80. Local icing (intersection-bridges-via) 1 2 3 4 5 6 7 8 9
☒ 81. Snow packing................... 1 2 3 4 5 6 7 8 9
☒ 82. Rapid accumulation of Snow... 1 2 3 4 5 6 (7) 8 9
☒ 83. Drifting Snow.................. 1 2 3 4 5 6 7 8 9 (1)
☒ 84. General Glazing................ 1 2 3 4 5 6 7 8 9

☐ 85. Icing due to cold pavement..... 1 2 3 4 5 6 7 8 9 1
☐ 86. No icing - pavement too warm. 1 2 3 4 5 6 7 8 9 1
☐ 87. Borderline trouble condition...... 1 2 3 4 5 6 7 8 9 1
☐ 88. On edge of trouble to the____ 1 2 3 4 5 6 7 8 9 1
☒ 89. Snow intermittent (off and on) 1 2 3 4 5 6 (7) 9 1
☒ 90. Alternate periods of Rain-Snow-Ice 1 2 (3) 4 5 6 7 8 9 1

I. Weather Following Storm:

☐ 91. Freezing nights, thawing days. 1 2 3 4 5 6 7 8 9 1
☐ 92. Temps holding below 32°F..... 1 2 3 4 5 6 7 8 9 1
☒ 93. Cold wave (Below 15°F)........ 1 2 3 4 5 6 (7) 8 9 1
☐ 94. Sub-zero cold wave............ 1 2 3 4 5 6 7 8 9 1
☐ 95. Slowly rising temps........... 1 2 3 4 5 6 7 8 9 1

☐ 96. Drifting winds (over 20 mph).... 1 2 3 4 5 6 7 8 9 1
☒ 97. Drifting winds subsiding within **BY 3PM MON** 1 2 3 4 5 6 (7) 8 9 1
☐ 98. Drifting winds continuing beyond 24 hrs.................... 1 2 3 4 5 6 7 8 9 1
☒ 99. Snowshowers (little or no accum.) 1 2 3 4 5 6 (7) 8 9 1

☐ 100. Snowshowers
  ☐ a. Less than 1 inch............. 1 2 3 4 5 6 7 8 9 1
  ☐ b. More than 2 inches (see remarks) 1 2 3 4 5 6 7 8 9 1
  ☐ c. Beginning____to____ 1 2 3 4 5 6 7 8 9 1
  ☐ d. Lasting____to____hrs. 1 2 3 4 5 6 7 8 9 1

☒ 101. Remarks **LONG DURATION HEAVIEST SNOW 3AM SAT - 6AM SUN. SNOW DIMINISHING TO FLURRIES MIDDAY SUN.**

LOG: ☐ 102. Warning EFFECTIVE
☐ 103. Warning NOT effective

REASON: _____

MURRAY AND TRETTEL, INC. - SNOWFALL REPORT
847-446-1420 (fax)

To:

Day: SATURDAY

Date: 01/02/99

	Snow Began	Snow Ended	Amount/Inches
O'HARE FIELD	10AM FRI	6:07PM SUN	21.6 "
GLENVIEW			18 "

Other Snowfall Amounts:
Location	Amount/Inches
ALGONQUIN	14 "
AURORA - WEST	12 "
BROOKFIELD	17 "
BURBANK	17 "
CHI BOT GARDEN	12.5 "
CRESTWOOD	14 "
DOWNERS GROVE	16 "
ELGIN	14 "
GLENWOOD	16 "
JOLIET	15 "
LAGRANGE PARK	15 "
LAKE VILLA	18 "
OLYMPIA FIELDS	16 "
ORLAND PARK	14 "
MC HENRY	11 "
MIDWAY AIRPORT	21 "
MUNDELEIN	14 "
NAPERVILLE (SO)	11 "
PARK FOREST	12 "
STREAMWOOD	12 "
WAUKEGAN	20 "
WHEELING	18 "

MURRAY AND TRETTEL, INCORPORATED

Meteorologist   MTC

MURRAY and TRETTEL
INCORPORATED
Certified Consulting Meteorologists
NORTHFIELD, ILLINOIS

Chicago Phone: Northfield Phone:
(773)-273-5600 (847)-446-7800

Date: _____
Time: _____
Given By: _____
Received By: _____

STORM WARNING : Thunderstorm Lightning Wind   **Warning Current**
Rain Snow Ice _____   from _____ , _____ to _____ , _____
(Time) (Day) (Time) (Day)

A. OPERATIONAL COLOR CODE (see back) Probability Factor (chances out of 10)
- ☐ 1. Black (Major trouble) - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 2. Red (Significant trouble) - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 3. Yellow (Little or limited trouble) - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 4. Green (No trouble) - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10

B. TYPE OF WEATHER
- ☐ 5. None - 1 2 3 4 5 6 7 8 9 10
- ☐ 6. Isolated Thunderstorm(s) (T) - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 7. General Thunderstorms (T) - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 8. Squall Line(s) - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 9. Potential Tornado - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 10. Local High Winds (gusts over 40 mph) - - 1 2 3 4 5 6 7 8 9 10
- ☐ 11. General High Winds (average over 30 mph) 1 2 3 4 5 6 7 8 9 10

- ☐ 12. Rain (R) - - - - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 13. Rainshower(s) (RW) - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 14. Drizzle (L) - - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10

- ☐ 15. Freezing Rain (Ice = ZR) - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 16. Freezing Drizzle (Ice = ZL) - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 17. Sleet (Ice Pellets = E) - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 18. Wet Snow (S) - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 19. Heavy Snow (over 4 inches = S+) - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 20. Very Heavy Snow (over 8 inches = S++) - 1 2 3 4 5 6 7 8 9 10
- ☐ 21. Combination: Rain-Ice-Snow - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 22. Borderline: Rain-Ice (R, ZR) - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 23. Borderline: Rain-Snow (R, S) - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 24. Borderline: Snow-Ice (S, ZR) - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 25. Borderline: Drizzle-Ice (L, ZL) - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 26. _____ - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 27. _____ - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 28. _____ to _____ - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 29. _____ to _____ - - - 1 2 3 4 5 6 7 8 9 10

C. TIME OF BEGINNING
- ☐ 30. 11 a.m. - 1 p.m. - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 31. 11 p.m. - 1 a.m. - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 32. 1 - 3 a.m. ☐ 37. 1 - 3 p.m. - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 33. 3 - 5 a.m. ☐ 38. 3 - 5 p.m. - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 34. 5 - 7 a.m. ☐ 39. 5 - 7 p.m. - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 35. 7 - 9 a.m. ☐ 40. 7 - 9 p.m. - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 36. 9 - 11 a.m. ☐ 41. 9 - 11 p.m. - - - - 1 2 3 4 5 6 7 8 9 10

D. DURATION
- ☐ 42. Brief - 1 2 3 4 5 6 7 8 9 10
- ☐ 43. Less than 3 hrs. - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 44. 3 - 6 hrs. ☐ 47. 18 - 24 hrs. - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 45. 6 - 12 hrs. ☐ 48. over 24 hrs. - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 46. 12 - 18 hrs. - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10

E. STORM CHARACTERISTICS
- ☐ 49. Slight - 1 2 3 4 5 6 7 8 9 10
- ☐ 50. Moderate - - - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 51. Locally Severe - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 52. Generally Severe - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 53. Prolonged - - - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 54. Compounded by wind - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10

- ☐ 55. 1 - 5/10 of area affected - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 56. 6 - 9/10 of area affected - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 57. All of area affected - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 58. Continuous (steady) - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 59. Intermittent (off and on) - - - - - - - - - 1 2 3 4 5 6 7 8 9 10

E. STORM CHARACTERISTICS - cont'd. Probability Factor (chances out of 10)
- ☐ 60. Total Amount of Rain: _____ - - 1 2 3 4 5 6 7 8 9 10
- ☐ 61. Critical rate of fall (time): ____ to ____ 1 2 3 4 5 6 7 8 9 10
- ☐ 62. Critical rate of fall (amt.): _____ inch per ____

F. TEMPERATURE
- ☐ 63. Remaining below 32°F - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 64. Holding near 32°F - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 65. Holding above 32°F - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 66. Falling during storm - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 67. Rising during storm - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 68. Going below 32° by ____ to ____ - 1 2 3 4 5 6 7 8 9 10
- ☐ 69. Rising above 32° by ____ to ____ - 1 2 3 4 5 6 7 8 9 10

G. WIND
- ☐ 70. North
- ☐ 71. South   ☐ 74. becoming
- ☐ 72. East
- ☐ 73. West
- ☐ 75. North
- ☐ 76. South
- ☐ 77. East
- ☐ 78. West
- ☐ 79. Wind direction probability - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 80. Speed _____ mph to _____ mph - - 1 2 3 4 5 6 7 8 9 10
  becoming _____ mph to _____ mph 1 2 3 4 5 6 7 8 9 10
- ☐ 81. Gusts to 30 mph - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 82. Gusts to 40 mph - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 83. Gusts to 50 mph - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 84. Gusts to 60 mph - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 85. Gusts over 60 mph - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10

- ☐ 86. Strong shifting winds - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 87. Gradual wind shift - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 88. Drifting winds - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10

H. COMMENTS
- ☐ 89. Major trouble condition - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 90. Trouble restricted - local - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 91. Borderline trouble condition - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 92. Little trouble expected - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 93. Occasional cloud-to-ground lightning - - 1 2 3 4 5 6 7 8 9 10
- ☐ 94. Frequent cloud-to-ground lightning - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 95. Main trouble due to lightning - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 96. Main trouble due to wind - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 97. Trouble due to lightning and wind - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 98. Series of thunderstorms moving
  from _____ at _____ mph - - 1 2 3 4 5 6 7 8 9 10
- ☐ 99. Slight glazing - - - - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 100. Rapid accumulation of ice - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 101. Icing heavier to _____ - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 102. Preventive heating indicated - - - - - - - 1 2 3 4 5 6 7 8 9 10
- ☐ 103. Rapid accumulation of snow - - - - - - - 1 2 3 4 5 6 7 8 9 10

- ☐ 104. REMARKS _____
_____
_____
_____

J. LOG
- ☐ 105. Warning USEFUL.
- ☐ 106. Warning NOT useful.*
  *Reason _____
_____

N.B. All warnings and details contained herein are made subject to the inherent limitations of the science of Meteorology. Because of this, these warnings and the details therein should be considered supplementary to, and are not intended to replace other pertinent weather information or road condition reports. As the probability factors herein illustrate, there is a margin of error in all weather forecasting that must be acknowledged and accounted for.

MURRAY and TRETTEL
INCORPORATED
Certified Consulting Meteorologists
NORTHFIELD, ILLINOIS

Chicago Phone: Northfield Phone:
(773)-273-5600   (847)-446-7800

Date: **Sample**
Time: _____
Given By: _____
Received By: _____

STORM WARNING : (Thunderstorm) (Lightning) (Wind)   Warning Current
Rain   Snow   Ice _____

from **3PM, MON** to **9PM, MON**
(Time) (Day) (Time) (Day)

A. OPERATIONAL COLOR CODE (see back)
Probability Factor: (chances out of 10)

- [X] 1. Black (Major trouble) - - - - - - - - - - 1 2 ③ 4 5 6 7 8 9 10
- [X] 2. Red (Significant trouble) - - - - - - 1 2 3 4 5 6 ⑦ 8 9 10
- [ ] 3. Yellow (Little or limited trouble) - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 4. Green (No trouble) - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10

B. TYPE OF WEATHER
- [ ] 5. None - - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [X] 6. Isolated Thunderstorm(s) (T) - - - - - - 1 2 3 4 5 6 ⑦ 8 9 10
- [ ] 7. General Thunderstorms (T) - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 8. Squall Line(s) - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [X] 9. Potential Tornado - - - - - - - - - 1 2 ③ 4 5 6 7 8 9 10
- [X] 10. Local High Winds (gusts over 40 mph) - - - 1 2 3 4 5 6 ⑦ 8 9 10
- [ ] 11. General High Winds (average over 30 mph) 1 2 3 4 5 6 7 8 9 10

- [ ] 12. Rain (R) - - - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 13. Rainshower(s) (RW) - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 14. Drizzle (L) - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10

- [ ] 15. Freezing Rain (Ice = ZR) - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 16. Freezing Drizzle (Ice = ZL) - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 17. Sleet (Ice Pellets = E) - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 18. Wet Snow (S) - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 19. Heavy Snow (over 4 inches = S+) - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 20. Very Heavy Snow (over 8 inches = S++) - 1 2 3 4 5 6 7 8 9 10
- [ ] 21. Combination: Rain-Ice-Snow - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 22. Borderline: Rain-Ice (R, ZR) - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 23. Borderline: Rain-Snow (R, S) - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 24. Borderline: Snow-Ice (S, ZR) - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 25. Borderline: Drizzle-Ice (L, ZL) - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 26. _____ - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 27. _____ - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 28. _____ to _____ - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 29. _____ to _____ - - - 1 2 3 4 5 6 7 8 9 10

C. TIME OF BEGINNING
- [ ] 30. 11 a.m. - 1 p.m. - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 31. 11 p.m. - 1 a.m. - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 32. 1 - 3 a.m.   [ ] 37. 1 - 3 p.m. - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 33. 3 - 5 a.m.   [X] 38. 3 - 5 p.m. - - - 1 2 3 4 5 6 ⑦ 8 9 10
- [ ] 34. 5 - 7 a.m.   [X] 39. 5 - 7 p.m. - - 1 2 ③ 4 5 6 7 8 9 10
- [ ] 35. 7 - 9 a.m.   [ ] 40. 7 - 9 p.m. - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 36. 9 - 11 a.m.   [ ] 41. 9 - 11 p.m. - - 1 2 3 4 5 6 7 8 9 10

D. DURATION
- [ ] 42. Brief - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [X] 43. Less than 3 hrs. - - - - - - 1 2 3 4 5 ⑥ 7 8 9 10
- [X] 44. 3 - 6 hrs.   [ ] 47. 18 - 24 hrs. - - - 1 2 3 ④ 5 6 7 8 9 10
- [ ] 45. 6 - 12 hrs.   [ ] 48. over 24 hrs. - - 1 2 3 4 5 6 7 8 9 10
- [ ] 46. 12 - 18 hrs. - - - - - - - 1 2 3 4 5 6 7 8 9 10

E. STORM CHARACTERISTICS
- [ ] 49. Slight - - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 50. Moderate - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [X] 51. Locally Severe - - - - - - - 1 2 3 4 5 6 ⑦ 8 9 10
- [X] 52. Generally Severe - - - - - - 1 2 ③ 4 5 6 7 8 9 10
- [ ] 53. Prolonged - - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 54. Compounded by wind - - - - 1 2 3 4 5 6 7 8 9 10

- [X] 55. 1 - 5/10 of area affected - - - - - 1 2 3 4 5 6 ⑦ 8 9 10
- [X] 56. 6 - 9/10 of area affected - - - 1 2 ③ 4 5 6 7 8 9 10
- [ ] 57. All of area affected - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 58. Continuous (steady) - - - - 1 2 3 4 5 6 7 8 9 10
- [X] 59. Intermittent (off and on) - - - 1 2 3 4 5 6 7 8 9 ⑩

E. STORM CHARACTERISTICS - cont'd.
Probability Factor: (chances out of 10)

- [ ] 60. Total Amount of Rain: _____ - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 61. Critical rate of fall (time): ____ to ____ 1 2 3 4 5 6 7 8 9 10
- [ ] 62. Critical rate of fall (amt.): _____ inch per ____

F. TEMPERATURE
- [ ] 63. Remaining below 32°F - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 64. Holding near 32°F - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 65. Holding above 32°F - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 66. Falling during storm - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 67. Rising during storm - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 68. Going below 32° by ____ to ____ 1 2 3 4 5 6 7 8 9 10
- [ ] 69. Rising above 32° by ____ to ____ 1 2 3 4 5 6 7 8 9 10

G. WIND
- [ ] 70. North   [X] 74. becoming   [X] 75. North
- [X] 71. South   [ ] 76. South
- [ ] 72. East   [ ] 77. East
- [X] 73. West   [X] 78. West
- [X] 79. Wind direction probability - - - - - - - 1 2 3 4 5 6 7 ⑧ 9 10
- [X] 80. Speed **20** mph to **25** mph - - 1 2 3 4 5 6 7 ⑧ 9 10
  becoming ____ mph to ____ mph 1 2 3 4 5 6 7 8 9 10
- [ ] 81. Gusts to 30 mph - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [X] 82. Gusts to 40 mph - - - - - - - - 1 2 ③ 4 5 6 7 8 9 10
- [X] 83. Gusts to 50 mph - - - - - - - 1 2 3 4 ⑤ 6 7 8 9 10
- [X] 84. Gusts to 60 mph - - - - - - - 1 ② 3 4 5 6 7 8 9 10
- [ ] 85. Gusts over 60 mph - - - - - - 1 2 3 4 5 6 7 8 9 10

- [X] 86. Strong shifting winds - - - - - - - 1 2 3 4 5 6 7 ⑧ 9 10
- [ ] 87. Gradual wind shift - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 88. Drifting winds - - - - - - - - 1 2 3 4 5 6 7 8 9 10

H. COMMENTS
- [X] 89. Major trouble condition - - - - - - 1 2 ③ 4 5 6 7 8 9 10
- [X] 90. Trouble restricted - local - - - - - - 1 2 3 4 5 6 ⑦ 8 9 10
- [ ] 91. Borderline trouble condition - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 92. Little trouble expected - - - - - - 1 2 3 4 5 6 7 8 9 10
- [X] 93. Occasional cloud-to-ground lightning - - - 1 2 3 4 5 ⑥ 7 8 9 10
- [X] 94. Frequent cloud-to-ground lightning - - - - 1 2 3 ④ 5 6 7 8 9 10
- [ ] 95. Main trouble due to lightning - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 96. Main trouble due to wind - - - - - 1 2 3 4 5 6 7 8 9 10
- [X] 97. Trouble due to lightning and wind - - - - 1 2 3 4 5 6 7 8 9 ⑩
- [ ] 98. Series of thunderstorms moving
  from _____ at _____ mph - - 1 2 3 4 5 6 7 8 9 10
- [ ] 99. Slight glazing - - - - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 100. Rapid accumulation of ice - - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 101. Icing heavier to _____ - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 102. Preventive heating indicated - - - - 1 2 3 4 5 6 7 8 9 10
- [ ] 103. Rapid accumulation of snow - - - - 1 2 3 4 5 6 7 8 9 10

- [ ] 104. REMARKS **R7B3** _____

J. LOG
- [ ] 105. Warning USEFUL.
- [ ] 106. Warning NOT useful.*
  *Reason _____

***N.B.** All warnings and details contained herein are made subject to the inherent limitations of the science of Meteorology. Because of this, these warnings and the details therein should be considered supplementary to, and are not intended to replace other pertinent weather information or road condition reports. As the probability factors herein illustrate, there is a margin of error in all weather forecasting that must be acknowledged and accounted for.*