



CALCULATION COVER SHEET
For Instructions See
KP-C233

Title: Tornado Frequency Calculation For Station Blackout Coping Analysis

Safety-Related: yes no *THB*

Calculation Package Number: SR - 88 - 001 - Rev 0

Statement of Calculation:

This package documents the review of tornado data for Wolf Creek and the determination of an annual expected frequency of tornadoes of intensity levels F2 and greater per square mile.

Prepared by: Michael D. Hall 10/12/88
Signature and Date

If Safety-Related complete the following section.

Reviewed by: Vernon P. Luckert Date: 10/12/88

Approved by: [Signature] Date: 10/13/88

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CALCULATION WORKSHEET

Nuclear Services Division

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REFERENCES

1. Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors, NUMARC 87-00, November, 1987.
2. Tornado Climatology of the Contiguous United States, NUREG/CR-4461, PNL-5677 May, 1986
3. National Severe Storms Forecast Center Computer Printout "TORPLOT" for Tornadoes within 125 Nautical Miles of Burlington, Kansas, September 8, 1988, L. Grenier.

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TORNADO FREQUENCY SUMMARY

NUMARC 87-00, "Guidelines and Technical Bases for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors", provided a value for the expected frequency of "F2+" tornadoes per square mile for Wolf Creek of 0.0003815.

Using data provided in NUREG/CR-4461, "Tornado Climatology of the Contiguous United States," and data provided by the National Severe Storms Forecast Center, other values were calculated for Wolf Creek for the expected frequency of "F2+" tornadoes per square mile. These values are shown in the following table.

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REGION	AREA OF REGION (m.le ²)	NUMBER OF YEARS OF DATA	NUMBER OF TORNADO EVENTS OF INTENSITY OF $\geq F_2$	ANNUAL FREQUENCY (PER MILE ²)
STATE OF KANSAS	82264	30 (1954-1983)	559	0.0002265
5° LATITUDE-LONGITUDE BOX CENTERED ON 37.5° NORTH 97.5° WEST	94663.8	30 (1954-1983) *	932	0.0003282
125 NAUTICAL MILE RADIUS AROUND BURLINGTON	64918.2	38 (1950-1987)	471	0.0001909
50 NAUTICAL MILE RADIUS AROUND Burlington	10386.9	(38) (1950-1987)	88	0.0002230

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I. Tornado Frequency for the state of Kansas

On Page C.27 of NUREG/CR-4461, "Tornado Climatology of the Contiguous United States", the following information on Kansas and tornadoes in Kansas was provided:

"State area = 82264 sq. mi.

	Tornado Intensity (F-scale)						
	0	1	2	3	4	5	Missing
NUMBER	354	366	306	120	34	5	239

Total number of tornadoes from 1954 through 1983 was 1311.
The total number of segments was 1424."

NUREG/CR-4461 used information for the known tornadoes to account for the missing tornadoes, i.e. calculate the average area for the known tornadoes and then multiply by the total number of tornadoes (pg. 7, 5th paragraph). Similarly, the proportion of tornadoes of intensity F2 or greater will be determined and used to calculate the number of missing tornadoes of intensity F2 or greater.

The number of tornadoes of intensity F0 and F1 is

$$354 + 366 = 720.$$

The number of tornadoes of intensity F2 or greater is

$$306 + 120 + 34 + 5 = 465.$$

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The number of missing tornadoes of intensity f_2 or greater can be calculated by

$$\left(\frac{\text{Number of known tornadoes with intensity } \geq f_2}{\text{Number of known tornadoes}} \right) \text{ Number of missing tornadoes}$$

or

$$\left(\frac{465}{720 + 465} \right) (239) = 93.8 \quad \text{or}$$

94 missing tornadoes with intensity $\geq f_2$.

The total number of tornadoes with intensity $\geq f_2$ is now

$$465 + 94 = 559$$

The annual frequency per square mile for events of intensity of $\geq f_2$ can now be calculated by

$$h_2 = \frac{\# \text{ of events } \geq f_2}{(\# \text{ of years of data})(\text{area})}$$

Where h_2 = annual frequency per square mile for $\geq f_2$ events
 years of data = 30
 Area = area of region = 82264 sq. mi.

$$h_2 = \frac{559}{(30)(82264)} = 0.0002265$$

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II. Tornado frequency for the 5° Box

The USAR, Section 2.1.1.1, second paragraph on page 2-1-1 gives the latitude and longitude for Wolf Creek as 38° 14' 20" N and 95° 41' 20" W, respectively. Wolf Creek falls into the 5° latitude-longitude box centered on 37.5 North and 97.5 West in NUREG/CR-4461, pages D-47 and D-48.

The following information for this region comes from NUREG/CR-4461

" 5° Box AREA = 94663.8 Sq. mi.

The total number of tornado events from 1954 through 1983 was 2212.

Tornado Intensity (F-scale)

	0	1	2	3	4	5	missing
Number	528	626	557	206	64	13	218 "

The total number of tornadoes of intensity F0 and F1

$$528 + 626 = 1154$$

The total number of tornadoes with intensity \geq F2

$$557 + 206 + 64 + 13 = 840$$

Using the proportional method previously discussed for determining the number of missing tornadoes with intensity \geq F2,

$$\left(\frac{840}{1154 + 840} \right) (218) = 91.8 \text{ or } 92$$

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The total number of tornadoes with intensity $\geq F2$ is now

$$840 + 92 = 932$$

The annual frequency, h_2 , of tornado events with intensity $\geq F2$ per square mile is

$$h_2 = \frac{932}{(30)(94663.8)} = 0.0003282$$

III. Tornado Frequency for Region around Burlington

The National Severe Storms Forecast Center, Kansas City, Missouri, was requested to provide tornado data for an area within 125 nautical miles around Burlington Kansas.

The data provided covered 38 years, 1950 through 1987.

The following breakdown was obtained from the data.

	Tornado Intensity (F scale)					
	≤ 1	2	3	4	5	Missing
Number	848	317	83	20	4	139

The Number of tornadoes with intensity $\geq F2$ is

$$317 + 83 + 20 + 4 = 424.$$

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Using the proportional method previously discussed for determining the number of missing tornadoes with intensity $\geq F2$,

$$\left(\frac{424}{848 + 424} \right) (139) = 46.3 \text{ or } 47$$

The total number of tornadoes with intensity $\geq F2$ is now

$$424 + 47 = 471$$

The annual frequency, h_2 , of tornado events with intensity $\geq F2$ per square mile is

$$h_2 = \frac{471}{(38)(\text{AREA})}$$

$$\begin{aligned} \text{where } \text{AREA} &= \pi r^2 \\ &= (3.1416) \left[(125 \text{ n.m.}) \left(\frac{1.15 \text{ mile}}{\text{n.m.}} \right) \right]^2 \\ &= 64918.2 \text{ sq m.} \end{aligned}$$

$$h_2 = \frac{471}{(38)(64918.2)} = 0.0001909$$

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DETERMINE THE ESTIMATED FREQUENCY OF LOSS OF OFF-SITE POWER DUE TO SEVERE WEATHER AS FOLLOWS:

- A. Determine the total amount of snowfall in inches which falls on the site in any year. NOAA data for snowfall are provided in Table 3-3. Label the data used as h_1 .
- B. Determine the expected frequency of "F2+" tornadoes per square mile for the site using plant-specific data. NSSPC data are also provided in Table 3-3. Label the data used as h_2 .
- C. Determine the expected frequency of storms with winds between 75 and 124 mph at the site. NOAA data are also provided in Table 3-3. Label the data used as h_3 .
- D. Determine the expected frequency of hurricanes and tropical storms with significant salt spray for the site. NOAA data for sites vulnerable to the effects of salt spray are also provided in Table 3-3. Label the data used as h_4 .
- E. Calculate the estimated frequency of loss of off-site due to severe weather, f , in events per year.
- F. Use Table 3-4 to determine the Severe Weather Group (SW Group).

Table 3-3

SEVERE WEATHER DATA^b

SITE	SNOWFALL	THUNDER	STORM	SALT SPRA	SITE	SNOWFALL	THUNDER	STORM	SALT SPRA
	(in)	(in)	(in)	(in)		(in)	(in)	(in)	(in)
ARANSAS NUCLEAR ONE	4	0.00040	0.007	0	MONTICELLO	46	0.0001214	0.08	0
AROLD	33	0.000297	0.25	0	NINE MILE POINT	89	0.0000298	0.08	0
BEAVER VALLEY	45	0.000088	0.08	0	NORTH ANNA	15	0.0000867	0.08	0
BELLPORT	4	0.00020	0.08	0	OCHEE	6	0.00008	0.12	0
BIG BAY AT	17	0.000048	0.08	0	UTTER CRIBE	17	0.00008	0.08	0
BLADWOOD	40	0.00008	0.08	0	PALMADRI	40	0.0001845	0.1	0
BLOWN ROCK	4	0.00045	0.08	0	PALO VERDE	5	0.000004	0.125	0
BROWNICE	2	0.00007	0.12	0	PLACI BOTTOM	23	0.00008	0.026	0
BYRON	35	0.00018	0.08	0	PERCY	38	0.00008	0.08	0
CALLAWAY	24	0.00008	0.08	0	PLORNA	42	0.00008	0	0.08
CALVERT CLIFF	1	0.000077	0.08	0	PORT BLAKE	40	0.00008	0.1	0
CATAWA	4	0.00004	0.12	0	PRADRI ISLAND	46	0.000171	0.08	0
CLINTON	26	0.00008	0.1	0	QUAD CITY	48	0.00008	0.15	0
COMANCHE PEAK	4	0.00008	0.08	0	RANCHO SECO	8	0.00008	0.1	0
COKE	48	0.00045	0.1	0	RYAN BEND	8	0.000084	0.08	0
COOPER	30	0.00008	0.1	0	ROBINSON	1	0.000077	0.08	0
CRYSTAL RIVER	0	0.00003	0.1	0	SALINE	23	0.000075	0.045	0
DAVIS-BESSE	38	0.00008	0.11	0	SAH ONOPIS	0	0.0000033	0.08	0
DIABLO CANYON	0	0.00008	0.07	0	SEABOARD	40	0.000084	0.045	0
DREEM	40	0.00008	0.08	0	SEQUOIA	4	0.0001499	0.1	0
FABLEY	0	0.00008	0.08	0	SEVENHAM	26	0.000021	0.08	0
FERRIS	32	0.000079	0.08	0	SKITS TEXAS	0	0.00008	0.12	0
FITZPATRICK	89	0.000027	0.06	0	ST LUCE	0	0.00008	0.15	0
FORT CALHOUN	28	0.00048	0.1	0	SUNBELT	2	0.00008	0.12	0
FORT ST. VRAIN	39	0.00003	0.08	0	SURRY	1	0.00008	0.1	0
GENA	89	0.000084	0.08	0	SURSHAWNA	44	0.00008	0.08	0
GRAND GULF	1	0.00008	0.08	0	THREE MILE ISLAND	33	0.00008	0.027	0
HADDAM BRICK	27	0.00008	0.08	0	TROIAN	7	0.000084	0.14	0
HARRIS	1	0.00002	0.15	0	TURKEY POINT	0	0.00008	0.18	0
HATCH	0	0.00008	0.28	0	VERMONT TANKER	79	0.000071	0.08	0
HOPKINS	21	0.000275	0.08	0	VOOTLS	2	0.00008	0.02	0
INCLAH POINT	29	0.00004	0.08	0	WATSFORD	0	0.00008	0.08	0
KEWALINE	40	0.00008	0.1	0	WATTS BAR	10	0.000402	0.1	0
LASALLE	40	0.00008	1.08	0	WHP-2	53	0.00008	0.08	0
LINCOLN	22	0.00008	0.07	0	W-LP CRIBE	38	0.000081	0.25	0
MADE TANKER	34	0.00008	0.04	0	TANKER BOWE	79	0.00008	0.08	0
MCCLENS	6	0.00008	0.08	0	TECH	48	0.00008	0.08	0
MILLSTONE	27	0.00008	0	0.18					

NOTE (b): NRC STAFF PROVIDED THE DATA IN TABLE 3-3 USING CLIMATOLOGICAL SOURCES CITED IN THE REFERENCES TO THIS PROCEDURE. NUMARC HAS NOT VERIFIED THE ACCURACY OF THIS DATA.

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TORNADO STATISTICS FOR KANSAS

STATE AREA = 82264. SQ MI

THE NUMBER OF TORNADOES FROM 1964 THROUGH 1963 WAS 1311.

THE TOTAL NUMBER OF SEGMENTS WAS 1424

EXPECTED LENGTH = 12.66 MI; EXPECTED WIDTH = 0.130 MI; EXPECTED AREA = 0.203 SQ MI

AVERAGE LENGTH = 8.10 MI; AVERAGE WIDTH = 0.112 MI; AVERAGE AREA = 1.292 SQ MI.

THE TORNADO STRIKE PROBABILITIES FOR THE STATE ARE 3.56E-03 PER YEAR (EXP) AND 7.46E-04 PER YEAR (AVE).

	TORNADO INTENSITY (F - SCALE)						MISSING
	0	1	2	3	4	5	
NUMBER	364	360	380	120	34	5	230
CUMULATIVE TOTAL	364	720	1020	1140	1180	1186	
COND. EXCEEDANCE PROB.	1.00000	0.70127	0.39241	0.13410	0.03291	0.00422	
EXPECTED LENGTH (MI)	2.719	9.340	11.936	16.346	19.000	46.937	
AVERAGE LENGTH (MI)	2.731	6.982	9.483	13.609	16.364	17.167	
NUMBER	170	260	220	110	34	5	613
EXPECTED WIDTH (MI)	0.037	0.077	0.127	0.221	0.327	0.460	
AVERAGE WIDTH (MI)	0.039	0.072	0.123	0.200	0.284	0.432	
NUMBER	160	191	182	90	33	5	767
EXPECTED AREA (SQ MI)	0.270	1.103	1.593	4.531	7.014	9.636	
AVERAGE AREA (SQ. MI)	0.159	0.443	1.230	3.309	4.711	6.329	
NUMBER	147	180	179	96	33	5	777
EXPECTED CLASS STRIKE PROB.	4.66E-06	1.97E-04	2.37E-04	2.66E-04	1.16E-04	2.36E-06	
CLASS STRIKE PROB.	2.75E-06	7.90E-06	1.83E-04	1.98E-04	7.80E-06	1.64E-06	
EXPECTED STRIKE EXCEEDANCE PR	3.56E-03	1.62E-03	8.00E-04	4.17E-04	1.39E-04	2.36E-06	
STRIKE EXCEEDANCE PROB.	7.46E-04	6.58E-04	5.29E-04	2.96E-04	9.36E-06	1.64E-06	

STATISTICS OF THE LENGTH, WIDTH AND AREA DISTRIBUTIONS, ASSUMING LOG-NORMALITY

LENGTH

LOWER 5 PERCENT POINT	1.50E-01	3.10E-01	6.90E-01	1.51E-00	1.66E-00	9.47E-01
MODE	1.24E-01	3.56E-01	1.07E-00	2.77E-00	3.49E-00	1.02E-00
MEDIAN	2.09E-00	4.01E-00	5.96E-00	8.91E-00	1.06E-01	1.31E-01
MEAN	1.26E-01	1.36E-01	1.41E-01	1.60E-01	1.91E-01	4.69E-01
UPPER 5 PERCENT POINT	4.83E-01	5.19E-01	5.16E-01	5.27E-01	6.26E-01	1.61E-02

WIDTH

LOWER 5 PERCENT POINT	5.06E-03	1.03E-02	1.66E-02	3.05E-02	4.12E-02	1.39E-01
MODE	7.26E-03	1.79E-02	3.47E-02	5.64E-02	7.67E-02	2.64E-01
MEDIAN	4.90E-02	7.19E-02	1.04E-01	1.56E-01	2.12E-01	3.98E-01
MEAN	1.30E-01	1.44E-01	1.79E-01	2.52E-01	3.48E-01	4.68E-01
UPPER 5 PERCENT POINT	4.66E-01	4.99E-01	5.78E-01	7.06E-01	1.09E-00	1.14E-00

AREA

LOWER 5 PERCENT POINT	1.08E-03	5.26E-03	2.48E-02	9.26E-02	1.61E-01	8.44E-01
MODE	3.61E-03	9.96E-04	1.49E-02	9.23E-02	2.16E-01	1.53E-00
MEDIAN	1.14E-01	2.51E-01	5.74E-01	1.39E-00	2.26E-00	5.22E-00
MEAN	6.20E-00	3.99E-00	3.56E-00	5.39E-00	7.32E-00	9.64E-00
UPPER 5 PERCENT POINT	1.19E-01	1.20E-01	1.33E-01	2.00E-01	2.62E-01	3.23E-01

Appendix B

TORNADO STATISTICS FOR KANSAS

STATE AREA = 82264. SQ MI

JOINT FREQUENCY TABLES (LENGTH, WIDTH, AND AREA VS F - SCALE)

F-SCALE	LENGTH IN MILES											MISSING
	<0.1	<0.2	<0.5	<1.0	<2.0	<5.0	<10.0	<20.0	<50.0	<100.	>100.	
0	49	24	28	12	18	28	14	8	4	8	8	175
1	22	11	41	18	50	37	39	32	14	8	8	116
2	1	4	28	24	24	32	47	45	38	1	8	78
3	8	8	4	2	9	14	35	32	17	2	1	4
4	8	8	8	6	1	8	5	12	8	2	8	8
5	8	8	8	8	8	1	1	8	3	8	8	8
MISSING	4	8	7	7	5	18	7	8	3	1	8	179

F-SCALE	WIDTH IN MILES											MISSING
	<0.01	<0.02	<0.04	<0.06	<0.12	<0.16	<0.24	<0.32	<0.48	<0.64	>0.64	
0	79	26	11	18	8	1	4	4	1	1	8	284
1	58	39	27	42	29	5	14	11	8	3	8	175
2	4	17	25	48	32	28	19	12	2	3	5	124
3	8	2	7	21	15	3	18	18	7	18	3	24
4	8	8	2	4	8	8	4	4	2	18	1	1
5	8	8	8	8	8	8	8	2	1	1	1	8
MISSING	3	18	8	13	3	8	4	8	8	2	8	198

F-SCALE	AREA IN SQUARE MILES											MISSING
	<.01	<0.02	<0.05	<0.1	<0.2	<0.5	<1.0	<2.0	<5.0	<10.0	>10.0	
0	86	9	12	11	18	7	7	3	5	8	8	287
1	48	12	19	17	29	33	19	8	13	1	8	178
2	3	14	17	14	25	29	27	24	16	7	4	127
3	1	1	2	4	4	12	18	22	17	4	12	26
4	8	8	8	1	3	4	1	4	9	7	4	1
5	8	8	8	8	8	8	8	8	2	2	1	8
MISSING	4	8	8	7	4	9	2	1	2	8	8	282

TORNADO STATISTICS FOR THE 6 DEGREE BOX CENTERED AT 37.5 NORTH, 97.5 WEST. BOX AREA = 94663.8 SQ MI

THE TOTAL NUMBER OF TORNADO EVENTS FROM 1964 THROUGH 1983 WAS 2212.

EXPECTED LENGTH = 18.99 MI; EXPECTED WIDTH = 8.127 MI; EXPECTED AREA = 4.711 SQ MI

AVERAGE LENGTH = 7.48 MI; AVERAGE WIDTH = 8.116 MI; AVERAGE AREA = 1.189 SQ MI

THE TORNADO STRIKE PROBABILITIES FOR THE 6 DEGREE BOX ARE 3.87E-03 PER YEAR (EXPECTED) AND 9.26E-04 PER YEAR (AVERAGE).

	TORNADO INTENSITY (F - SCALE)							MISSING
	0	1	2	3	4	5		
NUMBER	520	620	667	200	64	13	218	
CUMULATIVE TOTAL	520	1164	1711	1917	1981	1994		
COND. EXCEEDANCE PROB.	1.000000	0.73621	0.42126	0.14193	0.03802	0.00562		
EXPECTED LENGTH (MI)	2.398	6.547	18.229	13.818	16.119	26.436		
AVERAGE LENGTH (MI)	2.663	6.476	8.229	12.001	16.020	18.067		
NUMBER	228	428	433	199	63	13	868	
EXPECTED WIDTH (MI)	8.836	8.872	8.132	8.199	8.332	8.423		
AVERAGE WIDTH (MI)	8.837	8.871	8.131	8.189	8.296	8.483		
NUMBER	292	363	361	168	62	11	1876	
EXPECTED AREA (SQ MI)	8.178	8.648	2.818	3.690	6.298	8.874		
AVERAGE AREA (SQ MI)	8.146	8.348	1.241	2.662	4.837	7.233		
NUMBER	193	346	347	167	62	11	1897	
EXPECTED CLASS STRIKE PROB.	3.87E-06	1.68E-04	4.37E-04	2.96E-04	1.32E-04	4.61E-06		
CLASS STRIKE PROB.	3.81E-06	8.47E-06	2.78E-04	2.13E-04	1.88E-04	3.87E-06		
EXPECTED STRIKE EXCEEDANCE PR	3.87E-03	1.89E-03	1.24E-03	5.89E-04	1.88E-04	4.61E-06		
STRIKE EXCEEDANCE PROB.	9.26E-04	8.86E-04	6.78E-04	3.69E-04	1.48E-04	3.87E-06		

STATISTICS OF THE LENGTH, WIDTH AND AREA DISTRIBUTIONS

LENGTH

LOWER 5 PERCENT POINT	1.63E-01	3.82E-01	6.17E-01	1.73E-00	2.94E-00	2.41E-00
MODE	1.61E-01	3.72E-01	9.65E-01	3.31E-00	6.77E-00	4.41E-00
MEDIAN	2.63E-00	3.68E-00	5.36E-00	8.98E-00	1.17E-01	1.46E-01
MEAN	1.18E-01	1.12E-01	1.27E-01	1.46E-01	1.67E-01	2.64E-01
UPPER 5 PERCENT POINT	4.25E-01	4.29E-01	4.65E-01	4.67E-01	4.74E-01	8.78E-01

WIDTH

LOWER 5 PERCENT POINT	6.68E-03	1.11E-02	1.83E-02	3.81E-02	4.68E-02	1.88E-01
MODE	1.84E-02	1.99E-02	3.44E-02	6.79E-02	9.81E-02	3.18E-01
MEDIAN	6.68E-02	7.28E-02	1.81E-01	1.49E-01	2.24E-01	3.82E-01
MEAN	1.27E-01	1.37E-01	1.74E-01	2.39E-01	3.63E-01	4.23E-01
UPPER 5 PERCENT POINT	4.68E-01	4.66E-01	5.82E-01	7.36E-01	1.87E-00	8.88E-01

AREA

LOWER 5 PERCENT POINT	1.64E-03	5.32E-03	1.94E-02	1.84E-01	3.47E-01	1.34E-00
MODE	9.41E-05	1.18E-03	9.62E-03	1.16E-01	6.67E-01	2.62E-00
MEDIAN	1.28E-01	2.34E-01	6.17E-01	1.36E-00	2.73E-00	6.91E-00
MEAN	4.71E-00	3.38E-00	3.79E-00	4.68E-00	6.99E-00	8.87E-00
UPPER 5 PERCENT POINT	1.86E-01	1.83E-01	1.38E-01	1.77E-01	2.16E-01	2.68E-01

Appendix C

TORNADO STATISTICS FOR THE 6 DEGREE BOX CENTERED AT 37.6 NORTH, 97.6 WEST. BOX AREA = 94663.8 SQ MI

JOINT FREQUENCY TABLES (LENGTH, WIDTH, AND AREA VS F - SCALE)

F-SCALE	LENGTH IN MILES											MISSING
	<0.5	<1.0	<2.0	<5.0	<10.0	<20.0	<50.0	<100.	<200.	<400.	>400.	
0	142	14	16	21	18	12	6	0	0	0	0	308
1	126	45	65	65	66	58	17	6	0	0	0	285
2	50	39	60	78	83	77	43	3	0	0	0	124
3	7	4	14	20	54	60	29	1	0	0	0	7
4	0	0	2	8	15	26	10	2	0	0	0	1
5	0	0	0	1	4	2	6	0	0	0	0	0
MISSING	7	0	9	13	6	6	3	1	0	0	0	107

F-SCALE	WIDTH IN MILES											MISSING
	<0.01	<0.02	<0.04	<0.08	<0.12	<0.18	<0.24	<0.32	<0.48	<0.64	>0.64	
0	95	26	38	22	7	1	0	3	1	1	0	326
1	37	58	90	79	32	6	28	17	1	5	0	273
2	0	24	61	66	65	22	36	32	10	6	9	200
3	1	3	9	45	25	7	39	15	10	9	7	58
4	0	0	4	5	6	1	0	6	3	14	3	12
5	0	0	0	0	0	0	0	4	5	1	1	2
MISSING	2	7	5	12	4	0	3	0	0	2	0	103

F-SCALE	AREA IN SQUARE MILES											MISSING
	<0.05	<0.1	<0.2	<0.5	<1.0	<2.0	<5.0	<10.0	<20.0	<50.0	>50.0	
0	140	11	12	10	6	4	4	0	0	0	0	335
1	152	32	46	52	26	18	17	0	0	0	0	281
2	66	33	45	57	42	43	36	17	4	2	0	210
3	7	7	7	23	25	39	36	0	12	1	0	39
4	0	0	1	6	3	10	10	11	4	1	0	12
5	0	0	0	0	0	1	3	4	3	0	0	2
MISSING	12	4	4	7	2	1	2	0	0	0	0	100

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          SSSS SSSS SSSSS S - .SS SSSSS SSSS
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S      S S S S      S S S S S S S
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 ENQUEUED: 08-SEP-88 15:32:09
 PRINTING: 08-SEP-88 15:32:10

PATH=:UDD:TDU:BEVERLY:TORPLOT

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NSSFC /SYSBF Kansas City MO

AOS/V5 REVISION 7.62.00.00
 AOS/V5 XLPT-32 REVISION 7.62.00.00

APPENDIX D



CALCULATION PACKAGE NO	SR-BB-001 Rev D
PAGE	D1 OF _____

Appendix D

NATIONAL SEVERE STORMS FORECAST C. TORNADO DATA

The enclosed tornado listing provides information on all reported tornadoes in the area indicated since 1950. The various entries, and tables are explained below. If you have additional questions, please write or call the National Severe Storms Forecast Center, Room 1728, 601 E. 13th St., Kansas City, Mo. 64106, phone (816) 274-3427.

The item-by-item listing shows the year, month, date and time of occurrence of each tornado in Central Standard Time.

The columns labeled SEQ and SEG indicate the sequence number and segment number of each tornado. Sequence numbers are assigned chronologically within each state. The first tornado in 1973 in Ohio is given sequence number 1 for the state of Ohio that year. Many tornadoes have lengthy paths that cross county or state lines. Some change direction quickly. In such cases the tracks are broken into segments that are denoted by segment numbers. A tornado with 3 segments has the same sequence number, but a different segment number, for each separate segment. The statistics in the tables are based only on the initial touchdown points.

The Latitude and Longitude of the beginning and ending points of each tornado are shown followed by the overall length and width. Deaths and injuries for each segment are listed, followed by Damage Class. Damage Class numbers range from 1 to 9 and provide an estimate of the damage according to the table (#1) below.

The columns labeled FPP provide the Fujita-Pearson scale estimates of Force, Path Length and Path Width. All three scales are logarithmic with values ranging from -1 for the smallest category to +5 for the largest.

The following table (#2) shows the range in each scale. The Path Length and the Path Width values represent estimates as to the actual amount of ground contact for each tornado. For instance, if a tornado had an overall length of 45 miles but made actual ground contact only 60 percent of the time the Path Length scale value would be 4.3.

The AZRAN column indicates the azimuth and range from the center point. 129/83 indicates the tornado touchdown was 129 degrees (southeast) at 83 nautical miles from the center point.

A circular plot of tornado touchdown points is enclosed. The city of interest is at the center of the plot, north is at the top, east at the right hand side, etc. Each digit represents the number of touchdowns in a small square area, about 2 miles on a side. Thus, what might be plotted as 21 actually represents 2 touchdowns in one square and 1 touchdown in the adjacent square.

The four frequency tables provide detailed information about the time of day, time of year and length and width characteristics of tornadoes in the area of interest.

The Path Width vs Path Length table is computed from the P1 and Pw data. Also, the mean path length and mean path areas are computed from the P1 and Pw data. When the length and width scale values are converted back to length and width figures the minimum values in each range are used. For example, a P1 value of 3 is converted to a length of 10 miles in the calculation.

The monthly and hourly distribution tables indicate the favored times of day and year for tornadoes in each area. Monthly and hourly percentages are shown on the hourly distribution table. Mean times are shown for each month and for the entire year. These times should be interpreted and used in conjunction with the hourly percentages in examining the diurnal trend of tornadoes. All times in these tables are Central Standard Time.

The latitude and longitude of the center point of the search program is listed at the upper right hand side of the Hourly Distribution Table. These figures are in degrees and hundredths. The map scale used in the circular plot is compatible with the WSR 57 radar map, 125 nautical mile range.

Table #1 (DAMAGE CLASS)

	1
1	Less than \$50
2	\$50 to \$500
3	\$500 to \$5,000
4	\$5,000 to \$50,000
5	\$50,000 to \$500,000
6	\$500,000 to \$5 million
7	\$5 Million to \$50 Million
8	\$50 Million to \$500 Million

Table #2 (FPP SCALE)

	SCALE	F (mph)	DAMAGE	P1 (miles)	Pw (width)
	-	Less than 40	(little or no damage)	Less than .3	Less than 6
	0	40-72	Light	0.3-1.0	6-17 yards
	1	73-112	Moderate	1.0-3.1	18-55 yards
	2	113-157	Considerable	3.2-9.9	56-175 yards
	3	158-206	Severe	10-31	176-556 yards
	4	207-260	Devastating	32-99	0.3-0.9 miles
	5	261-318	Incredible	100-315	1.0-3.1 miles

Tornadoes within 125 NM of ORLINGTON, MS

Yr	Mo	Day	Time (CST)	Sta	Seq	Total #	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10 ³ ft	Deaths	Injuries	Damage Class	F P P	M2000	Area sq-mi
50	4	28	1700	K5 001	1	3507	9551	3829	9538	9	0	0	0	0	4	1 2 2	36.7 17.	0.00
50	5	5	340	K5 004	2	3937	9537	3951	9531	15	132	0	0	12	5	1 3 3	58.7 15.	3.82
50	5	8	2117	K5 005	1	3924	9739	0	0	0	0	0	0	1	4	1	508.7115.	0.00
50	5	9	1900	K5 010	1	3472	9635	0	0	0	0	0	0	0	4	1	374.7 72.	0.00
50	5	18	130	K5 012	1	3807	9649	3820	9649	13	30	0	0	2	5	3 3 2	360.7 13.	0.77
50	5	24	1730	K5 017	1	3749	9651	0	0	0	0	0	0	0	3	0 0 0	246.7 61.	0.00
50	6	8	2035	K5 018	2	3923	9658	3927	9647	5	12	0	0	0	4	1 2 1	63.7 9.	0.12
50	6	25	1845	K5 020	1	3746	9728	0	0	16	210	1	1	5	5	4 2 4	90.7 16.	6.47
50	7	1	1200	K5 022	1	3842	9705	0	0	0	0	0	0	0	3	0 0 0	252.7 89.	0.00
50	7	1	1200	K5 023	1	3918	9655	0	0	0	0	0	0	1	4	2 0 0	293.7 71.	0.00
50	7	8	2245	K5 025	1	3949	9648	0	0	1	27	0	0	1	4	1 1 0	318.7 86.	0.00
50	7	18	1630	K5 026	1	3741	9531	0	0	0	0	0	0	0	4	1 0 2	512.7108.	0.05
50	5	29	1448	K5 019	1	3623	9516	0	0	1	10	0	0	0	0	1 1 1	167.7 34.	0.00
50	6	9	1825	K5 020	1	3648	9715	0	0	1	30	0	0	0	2	1 1 1	170.7113.	0.02
51	3	2	2030	K5 002	1	3950	9543	0	0	0	0	0	0	0	3	1 2	221.7114.	0.00
51	4	30	2345	K5 009	1	3706	9630	0	0	0	0	0	0	0	2	1 0	359.7 96.	0.00
51	5	2	1930	K5 010	1	3902	9548	0	0	0	0	0	0	0	3	1 0	210.7 78.	0.00
51	5	2	2030	K5 011	1	3924	9524	0	0	0	0	0	0	0	2	1 0	354.7 48.	0.00
51	5	9	1700	K5 013	1	3918	9530	3920	9528	2	0	0	0	0	2	1 1 1	11.7 71.	0.00
51	5	9	2100	K5 014	1	3847	9535	0	0	0	0	0	0	0	2	1 1 1	38.7 7.	0.00
51	5	21	1100	K5 022	1	3902	9658	0	0	0	0	0	0	0	0	2 0 0	11.7 34.	0.00
51	5	25	1430	K5 024	1	3927	9710	0	0	0	0	0	0	0	3	1 1 1	311.7111.	0.00
51	5	25	1600	K5 025	1	3916	9711	3919	9708	4	132	1	0	0	3	1 2 3	18.7 4.	1.09
51	5	30	2250	K5 028	1	3924	9711	0	0	0	0	0	0	0	5	1 2 2	315.7 88.	0.00
51	5	30	2250	K5 029	1	3908	9703	3913	9656	8	0	0	0	0	3	1 2 2	47.7 7.	0.00
51	5	30	2250	K5 030	1	3917	9701	0	0	0	0	0	0	0	3	0	315.7 88.	0.00
51	5	30	2250	K5 031	1	3915	9635	0	0	0	0	0	0	0	3	1 2 2	64.7 7.	0.00
51	5	30	2250	K5 032	1	3921	9627	3924	9619	7	0	0	0	0	3	1 2 2	326.7 78.	0.00
51	5	30	2250	K5 033	1	3924	9602	0	0	0	0	0	0	0	3	1 2 2	64.7 7.	0.00
51	5	30	2250	K5 034	1	3928	9544	0	0	0	0	0	0	0	3	1 2 2	347.7 72.	0.00
51	5	31	2345	K5 035	1	3922	9524	3924	9521	3	132	0	0	0	3	1 3 3	558.7 78.	0.00
51	6	6	2200	K5 045	1	3741	9707	0	0	0	0	0	0	0	3	1 3 3	49.7 3.	0.88
51	6	8	1330	K5 046	1	3825	9537	0	0	0	180	0	0	0	3	1 3 1	244.7 76.	0.00
51	6	8	1700	K5 047	1	3853	9529	0	0	0	0	0	0	0	2	1 0 4	16.7 11.	0.27
51	6	15	1915	K5 048	1	3904	9549	0	0	0	0	0	0	0	3	2 1	22.7 42.	0.00
51	6	17	2100	K5 052	1	3837	9505	0	0	0	30	0	0	0	3	0 0 2	353.7 50.	0.03
51	6	22	200	K5 056	1	3750	9618	0	0	0	0	0	0	0	3	0 0 2	51.7 36.	0.00
51	7	22	50	K5 065	1	3929	9735	3924	9729	7	0	0	0	0	2	2 2	251.7 38.	0.00
51	8	13	250	K5 070	1	3814	9746	0	0	0	0	0	0	0	3	1 2 2	137.7 7.	0.03
51	8	13	250	K5 071	1	3814	9746	0	0	0	0	0	0	0	4	1 2 2	270.7 98.	0.00
51	8	24	730	K5 073	1	3840	9530	0	0	0	0	0	0	0	4	1 2 2	270.7 98.	0.00
51	8	31	1620	K5 075	1	3840	9740	0	0	0	0	0	0	0	3	1 0 2	43.7 36.	0.00
51	8	31	1620	K5 076	1	3840	9657	0	0	0	0	0	0	0	4	1 0 2	286.7 97.	0.00
51	7	4	1100	K5 005	1	3709	9428	0	0	0	30	0	0	0	4	2 0 2	294.7 65.	0.00
51	7	8	2015	K5 004	1	3913	9401	3915	9401	0	0	0	0	0	5	2 0 2	138.7 87.	0.01
51	4	24	2100	K5 008	1	3645	9724	0	0	0	30	0	0	0	4	2 0 2	360.7 2.	0.01
51	6	7	1815	K5 029	1	3627	9545	3629	9539	6	10	0	0	0	3	1 1 1	223.7121.	0.00
51	6	8	1914	K5 032	1	3640	9720	0	0	0	0	0	0	0	4	1 2 1	67.7 5.	0.11
51	9	9	1620	K5 042	1	3637	9501	0	0	2	80	0	0	0	4	1 0 2	220.7123.	0.03
51	10	21	2030	K5 043	1	3632	9704	0	0	0	264	0	0	0	3	1 1 4	162.7102.	0.08
52	4	22	1730	K5 002	1	3911	9645	0	0	0	0	0	0	0	0	1 1 4	213.7122.	1.00
52	5	22	1745	K5 006	3	3859	9533	3904	9443	27	152	0	0	0	0	4 3 3	319.7 76.	0.00
52	6	19	1910	K5 009	1	3711	9725	3713	9722	3	18	0	0	0	5	4 3 3	78.7 28.	0.86
52	6	21	1900	K5 010	1	3908	9509	3908	9441	22	0	0	0	0	4	2 1 2	50.7 3.	0.06

*. before year event occurred within a 2 degree square centered on central point

Tornadoes within 125 mi of DUBLINGTON, MS

yr	Mo	Day	Time (LST)	Sta	Seq	Total #	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	P P P	AZBAN	Area sq.mi
52	8	14	2130	MS 016	1	3641	9701	0	0	0	10	0	0	0	4	2 0 2	293.7 88.	-09
52	11	17	1600	MS 019	1	3940	9552	0	0	0	0	0	0	0	0	1	354.7 86.	-00
52	5	22	1900	MS 005	1	4008	9432	0	0	0	1	200	0	0	2	1 1 3	25.7 24.	-34
52	8	23	20	MS 006	1	3854	9416	3856	9414	0	2	90	8	13	7	2 1 3	57.7 3.	-36
52	4	23	1605	MS 008	1	3841	9316	3842	9314	0	0	15	0	0	0	0 0 1	224.7 114.	-03
52	7	15	1500	MS 020	1	3652	9720	0	0	0	0	0	0	0	3	1 1 1	180.7 115.	-00
53	3	30	1430	MS 001	1	3619	9542	0	0	0	16	0	0	0	0	0 3 3	6.7 14.	-00
53	5	10	200	MS 005	1	3752	9736	3753	9707	42	0	0	0	0	4	1 4 1	142.7 37.	-00
53	5	10	400	MS 006	1	3821	9640	3822	9603	52	0	0	0	0	4	3 4 2	39.7 45.	-00
53	5	10	430	MS 007	1	3720	9640	3726	9638	7	132	0	0	0	4	1 2 3	15.7 6.	1.79
53	5	10	530	MS 008	1	3754	9524	0	0	0	0	60	0	0	2	1 0 3	146.7 24.	-04
53	5	16	1530	MS 009	1	3832	9652	0	0	0	2	66	0	0	3	1 1 3	148.7 86.	-00
53	6	5	1700	MS 015	1	3701	9444	0	0	0	0	0	0	0	4	0 3 1	51.7 11.	-00
53	6	7	2245	MS 019	1	3733	9709	3840	9438	12	0	0	0	0	4	2 1 1	90.7 8.	-00
53	6	19	1355	MS 020	1	3836	9704	3836	9654	0	0	0	0	0	4	2 1 1	3.7 82.	-00
53	8	19	1500	MS 021	1	3936	9536	0	0	0	0	0	0	0	2	0 2 1	249.7 81.	-00
53	6	28	2125	MS 023	1	3745	9716	0	0	0	0	0	0	0	0	0 0 0	327.7 58.	-00
53	6	22	1900	MS 024	1	3903	9622	0	0	0	0	0	0	0	0	0 0 0	252.7 20.	-00
53	6	24	1930	MS 024	1	3738	9805	0	0	0	0	0	0	0	4	0 0 0	312.7 113.	-06
53	7	4	1600	MS 027	1	3930	9730	0	0	0	1	50	0	0	5	0 0 1	254.7 86.	-00
53	7	15	1408	MS 028	1	3750	9725	0	0	0	0	0	0	0	3	1 2 1	57.7 4.	-00
53	8	2	1500	MS 028	1	3943	9647	3945	9643	4	0	0	0	0	4	1 0 3	239.7 113.	-03
53	8	2	1630	MS 030	1	3736	9740	0	0	0	0	75	0	0	3	1 0 0	83.7 68.	-00
53	5	31	1600	MS 002	1	3822	9417	0	0	0	0	0	0	0	3	1 1 0	42.7 3.	-00
53	5	31	1630	MS 007	1	3828	9400	3829	9357	1	0	0	0	0	3	1 0 0	91.7 74.	-00
53	8	3	1700	MS 004	1	3813	9407	0	0	0	0	0	0	0	1	0 0 0	159.7 9.	-00
53	5	10	600	MS 007	1	4013	9532	4003	9532	9	0	0	0	0	3	1 2 1	90.7 2.	-00
53	8	2	1530	MS 043	1	4005	9645	4005	9642	2	0	0	0	0	3	1 1 1	187.7 85.	-04
53	6	5	2020	MS 032	1	3650	9554	0	0	0	2	35	0	0	0	0 0 0	217.7 115.	-00
53	7	8	1540	MS 045	1	3642	9708	0	0	0	0	0	0	0	3	1 0 0	238.7 106.	-00
53	11	18	2130	MS 048	1	3648	9659	0	0	0	0	0	0	0	3	1 0 0	220.7 117.	-00
53	11	19	825	MS 050	1	3645	9785	0	0	0	0	0	0	0	3	1 0 0	7.7 32.	-00
54	3	12	1220	MS 002	1	3935	9528	0	0	0	0	0	0	0	3	1 1 1	242.7 103.	-00
54	3	18	1100	MS 003	1	3726	9736	0	0	0	0	0	0	0	3	1 1 1	281.7 77.	-00
54	3	18	1115	MS 005	1	3848	9658	0	0	0	0	0	0	0	3	1 1 1	300.7 69.	-00
54	3	18	1135	MS 006	1	3902	9655	0	0	0	2	132	0	0	3	1 1 3	310.7 75.	-50
54	3	18	1155	MS 007	1	3822	9633	0	0	0	0	0	0	0	0	1 2 3	281.7 42.	-00
54	3	18	1215	MS 008	1	3837	9612	0	0	0	2	132	0	0	2	1 1 3	314.7 53.	-50
54	3	18	1225	MS 009	1	3845	9607	0	0	0	0	0	0	0	3	1 2 2	327.7 37.	-00
54	3	18	1230	MS 010	1	3843	9558	0	0	0	0	0	0	0	3	1 1 1	334.7 30.	-00
54	3	18	1310	MS 011	1	3854	9542	0	0	0	0	0	0	0	3	1 1 1	339.7 40.	-00
54	3	18	1315	MS 012	1	3847	9533	0	0	0	0	0	0	0	3	1 2 2	11.7 34.	-00
54	3	18	1345	MS 013	1	3951	9533	0	0	0	2	40	0	0	2	1 2	5.7 97.	-19
54	3	18	1330	MS 014	1	3916	9516	0	0	0	0	30	0	0	0	1 2	17.7 65.	-00
54	3	18	1200	MS 015	1	3823	9646	0	0	0	0	10	0	0	3	1 0 1	324.7 85.	-01
54	3	18	1200	MS 016	1	3844	9533	0	0	0	0	0	0	0	0	2 0 2	5.7 86.	-00
54	3	24	2030	MS 017	1	3844	9503	0	0	0	0	0	0	0	3	2 1	45.7 42.	-00
54	3	24	2100	MS 018	1	3743	9531	3757	9544	20	264	0	0	0	4	2 3 4	44.7 19.	10.04
54	3	24	2130	MS 019	1	3752	9537	0	0	0	2	132	0	0	4	1 1 3	177.7 62.	-50
54	3	24	2145	MS 020	1	3710	9450	0	0	0	0	3	0	0	0	1 0 0	148.7 76.	-00
54	4	5	1845	MS 021	1	3911	9653	3917	9646	9	0	0	0	0	0	1 0 0	49.7 9.	-00
54	4	5	1930	MS 022	1	3921	9553	3921	9553	3	30	0	0	0	4	2 1 2	108.7 3.	-19
54	4	10	1830	MS 023	1	3820	9531	0	0	0	0	0	0	0	3	2 1	52.7 10.	-00

*. before year means event occurred within 1/2 square square centered on central point

Tornadoes within 125 NM of BURLINGTON, MS

Yr	Mo	Day	Time (CST)	Sta	Seq	Total # seq	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft.	Deaths	Injuries	Damage Class	F	P	W	Area sq-mi
*54	4	26	1620	KS 026	1	3804	9559	0	0	0	6	0	0	0	3	2	1	1	235.7 17-
54	4	29	1915	KS 027	1	3750	9722	0	0	0	0	0	0	0	0	0	0	0	253.7 83-
*54	4	29	2300	KS 028	1	3718	9542	0	0	0	15	0	0	0	3	0	1	1	189.7 56-
54	5	1	1605	KS 029	1	3805	9800	0	0	0	90	0	0	0	3	2	0	3	265.7 110-
54	5	1	1830	KS 030	1	3713	9540	3118	9541	5	10	0	0	0	4	2	2	3	351.7 5-
54	5	1	1830	KS 031	1	3708	9574	3713	9570	4	0	0	0	0	0	2	2	3	47.7 4-
*54	5	31	1450	KS 033	1	3811	9523	0	0	0	0	0	0	0	0	0	0	0	102.7 14-
*54	5	31	1530	KS 034	1	3730	9531	3750	9444	48	63	0	0	0	4	2	4	3	62.7 42-
*54	5	31	1530	KS 035	1	3730	9531	3750	9444	48	63	0	0	0	4	2	4	3	62.7 42-
*54	5	31	1610	KS 036	1	3853	9443	0	0	0	0	0	0	0	0	0	0	0	49.7 60-
*54	6	11	2000	KS 042	1	3837	9619	0	0	0	0	0	0	0	0	0	0	0	308.7 58-
54	6	15	1230	KS 048	1	3843	9814	0	0	0	0	0	0	0	0	0	0	0	284.7 23-
54	6	23	1615	KS 049	1	3922	9745	5922	9741	3	0	0	0	0	0	1	1	1	90.7 3-
*54	6	30	1830	KS 050	1	3852	9449	0	0	0	0	0	0	0	0	0	0	0	47.7 56-
54	7	1	1508	KS 051	1	3843	9740	0	0	0	0	0	0	0	0	0	0	0	286.7 97-
*54	7	5	1700	KS 052	1	3809	9532	0	0	0	0	0	0	0	0	0	0	0	125.7 9-
54	7	22	1445	KS 053	1	3821	9713	0	0	0	0	0	0	0	0	0	0	0	276.7 71-
54	7	22	2000	KS 054	1	3705	9511	3713	9501	11	132	0	0	0	0	2	3	3	35.7 10-
54	8	5	1631	KS 055	1	3810	9707	3823	9653	17	0	0	0	0	0	2	3	2	40.7 17-
54	8	5	1715	KS 056	1	3803	9757	0	0	0	0	0	0	0	0	0	0	0	264.7 108-
*54	8	5	1830	KS 058	1	3831	9522	0	0	0	60	0	0	0	4	1	1	3	41.7 23-
*54	8	5	2015	KS 059	1	3837	9516	0	0	0	90	0	0	2	4	1	0	3	40.7 30-
54	8	7	1730	KS 060	1	3713	9513	3715	9514	1	120	0	0	0	0	1	0	3	538.7 2-
54	8	8	1830	KS 061	1	3812	9658	3812	9646	5	15	0	0	0	0	2	1	1	90.7 9-
54	8	23	1745	KS 063	1	3857	9745	0	0	0	0	0	0	0	0	0	0	0	294.7 106-
54	8	29	1400	KS 064	1	3822	9740	0	0	0	0	0	0	0	0	0	0	0	275.7 94-
54	9	9	200	KS 065	1	3749	9728	0	0	0	0	0	0	0	0	0	0	0	254.7 88-
54	10	4	1800	KS 066	1	3741	9720	0	0	0	0	0	0	0	0	0	0	0	247.7 85-
54	10	26	5	KS 068	1	3741	9719	0	0	0	30	0	0	0	0	0	0	0	247.7 84-
54	3	24	2200	MO 002	1	3727	9424	3735	9410	3	10	0	0	0	0	1	0	0	54.7 14-
54	3	24	2200	MO 003	1	3707	9452	0	0	0	5	0	0	0	0	0	0	0	143.7 87-
54	3	24	2300	MO 004	1	3649	9347	3649	9347	5	15	0	0	0	0	1	2	1	90.7 5-
54	3	24	2300	MO 005	1	3649	9406	3649	9353	1	15	0	0	0	0	1	1	3	90.7 10-
54	3	24	2300	MO 008	2	3634	9431	3645	9406	2	15	0	0	0	0	2	3	1	61.7 23-
54	5	7	1600	MO 023	1	4005	9430	0	0	0	3	0	0	0	0	0	0	0	26.7 124-
54	5	28	1315	MO 024	1	3815	9308	0	0	0	30	0	0	0	0	0	0	0	133.7 62-
54	5	31	1620	MO 027	1	3750	9429	0	0	0	5	0	0	0	0	0	0	0	27.7 121-
54	6	14	2100	MO 029	1	4002	9429	0	0	0	3	0	0	0	0	0	0	0	27.7 121-
54	6	15	1300	MO 030	1	4003	9516	0	0	0	3	0	0	0	0	0	0	0	10.7 111-
54	9	4	1400	MO 032	1	3802	9434	0	0	0	60	0	0	0	0	1	0	0	103.7 54-
54	3	24	1905	OK 003	1	3656	9706	3658	9704	2	60	0	0	0	0	2	1	3	39.7 3-
54	3	24	2218	OK 007	1	3627	9509	3630	9504	1	15	0	0	0	0	2	2	3	53.7 5-
55	4	27	1720	KS 002	1	3823	9737	3829	9731	8	30	0	0	0	0	4	2	2	38.7 8-
55	4	27	1730	KS 003	1	3802	9741	0	0	0	2	0	0	0	0	0	0	0	263.7 93-
55	4	27	1730	KS 004	1	3848	9735	0	0	0	0	0	0	0	0	0	0	0	281.7 95-
55	4	27	1750	KS 005	1	3823	9725	3831	9718	11	60	0	0	0	0	1	3	3	34.7 10-
55	4	27	1900	KS 007	1	3902	9710	0	0	0	0	0	0	0	0	0	0	0	303.7 88-
*55	5	11	1420	KS 009	1	3714	9542	0	0	0	0	0	0	0	0	0	0	0	181.7 60-
*55	5	11	1843	KS 010	1	3727	9446	0	0	0	0	0	0	0	0	0	0	0	137.7 84-
55	5	26	27	KS 014	1	3838	9547	3819	9455	66	0	0	0	0	0	2	4	2	46.7 57-
55	5	26	1300	KS 015	1	3824	9739	0	0	0	0	0	0	0	0	0	0	0	276.7 93-
55	5	26	1730	KS 016	1	3941	9459	3946	9453	7	66	0	0	0	0	0	0	0	43.7 7-
*55	5	26	1830	KS 017	1	3750	9453	0	0	0	0	0	0	0	0	0	0	0	122.7 45-
55	5	26	1900	KS 018	1	3702	9445	0	0	0	0	0	0	0	0	0	0	0	148.7 85-
*55	5	27	1830	KS 021	1	3813	9508	3829	9446	27	0	0	0	0	0	2	3	2	47.7 24-

* Before year means event occurred within a 2 degree square centered on central point

NO. 100-10000 SR-66-001 Rev. 0
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Tor does within 125. N of BURLINGTON, KS

Tr	No Day	Time (CST)	Sta Seq	Total # seg	Lon begin	Lat begin	Lon end	Lat end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P P	AZRM	Area sq. mi
55	5 27	2025	K5 024	1	3759	9874	0	0	0	0	0	0	4	1	253.1122	-00
55	5 27	2040	K5 026	1	3926	9035	0	0	0	0	0	0	0	0	330.1181	-00
55	5 27	2115	K5 027	1	3755	9725	0	0	0	0	0	0	4	0	257.1184	-00
55	5 27	2115	K5 028	1	3754	9724	0	0	0	0	0	0	0	0	256.1184	-00
55	5 27	2115	K5 029	1	3753	9724	0	0	0	0	0	0	0	0	255.1187	-00
55	5 27	2115	K5 030	1	3745	9725	0	0	0	0	0	0	0	0	250.1187	-00
55	5 27	2115	K5 031	1	3744	9724	0	0	0	0	0	0	0	0	250.1187	-00
55	5 27	2115	K5 032	1	3715	9729	0	0	0	0	0	0	0	0	236.1104	-00
55	5 27	2115	K5 033	1	3714	9728	0	0	0	0	0	0	0	0	235.1104	-00
55	5 27	2115	K5 034	1	3741	9651	0	0	0	0	0	0	0	0	239.1164	-00
55	5 27	2115	K5 035	1	3740	9650	0	0	0	0	0	0	0	0	238.1164	-00
55	5 27	2115	K5 036	1	3716	9649	0	0	0	0	0	0	0	0	223.1179	-00
55	5 27	2115	K5 037	1	3715	9648	0	0	0	0	0	0	0	0	222.1180	-00
55	5 27	2010	K5 038	1	3804	9752	0	0	0	0	0	0	0	0	264.1104	-00
55	6 3	2025	K5 041	1	3753	9807	0	0	0	0	0	0	0	0	260.1117	-00
55	6 4	1900	K5 066	1	3821	9814	0	0	0	0	0	0	0	0	273.1120	-00
55	6 4	1900	K5 067	1	3821	9814	0	0	0	0	0	0	0	0	273.1120	-00
55	6 4	1935	K5 068	1	3904	9746	0	0	0	0	0	0	0	0	297.1109	-00
55	6 4	1945	K5 072	1	3954	9717	0	0	0	0	0	0	0	0	317.1109	-00
55	6 5	120	K5 076	1	3752	9440	0	0	0	0	0	0	0	0	115.1153	-00
55	6 21	1335	K5 087	1	3833	9725	0	0	0	0	0	0	0	0	283.1184	-00
55	6 30	1840	K5 089	1	3933	9738	0	0	0	0	0	0	0	0	311.1120	-00
55	6 30	1935	K5 093	1	3935	9717	0	0	0	0	0	0	0	0	318.1110	-00
55	7 23	1630	K5 095	1	3728	9508	0	0	0	0	0	0	0	0	150.1153	-00
55	9 10	1555	K5 096	1	3738	9659	0	0	0	0	0	0	0	0	240.1171	-00
55	9 21	1540	K5 097	1	3818	9533	0	0	0	0	0	0	0	0	57.1171	-01
55	9 24	1730	H0 003	3	3939	9415	3940	9407	8	75	0	1	5	3 2 0 3	85.1171	1-24
55	9 24	1740	H0 002	1	3918	9415	3920	9410	5	75	0	0	4	2 2 3	49.1171	-50
55	9 24	1800	H0 003	1	3921	9416	0	0	0	0	0	0	0	0	45.1191	-02
55	9 26	1700	H0 017	1	3705	9433	3707	9431	1	15	0	0	1	1 1 1	39.1171	-04
55	9 26	1800	H0 019	1	3920	9340	0	0	0	0	0	0	0	0	55.1115	-00
55	9 27	2100	H0 025	1	3844	9424	0	0	0	0	0	0	0	0	63.1167	-00
55	9 27	2130	H0 029	1	3838	9410	0	0	0	0	0	0	0	0	71.1175	-00
55	10 5	130	H0 030	1	3748	9355	0	0	2	23	0	0	0	0	105.1103	-09
55	10 5	2100	H0 032	1	3642	9718	3644	9716	2	150	0	0	0	0	39.1171	-84
55	5 27	2130	H0 046	1	3651	9720	0	0	0	0	0	0	0	0	226.1115	-00
55	5 27	2200	H0 047	1	3640	9718	0	0	0	0	0	0	0	0	220.1122	-00
55	5 28	130	H0 048	1	3640	9622	0	0	0	0	0	0	0	0	199.1100	-00
56	4 2	2259	K5 008	5	3815	9652	3814	9653	13	150	0	2	5	1 3 3	36.1120	3-25
56	4 27	2115	K5 011	1	3815	9740	0	0	0	0	0	0	0	0	43.1104	27-21
56	4 28	1700	K5 012	1	3752	9443	0	0	0	0	0	0	0	0	283.1195	-00
56	5 10	2140	K5 014	1	3814	9644	0	0	0	0	0	0	0	0	38.1171	-11
56	5 29	2030	K5 019	1	4090	9638	3952	9638	4	0	0	0	0	0	270.1150	-00
56	5 30	2045	K5 022	1	3754	9724	0	0	0	0	0	0	0	0	180.1178	-00
56	6 18	620	K5 024	1	3915	9454	0	0	0	0	0	0	0	0	256.1184	-00
56	6 19	1715	K5 025	1	3937	9637	0	0	0	0	0	0	0	0	31.1171	-01
56	6 22	1400	K5 026	1	3718	9658	0	0	0	0	0	0	0	0	283.1194	-00
56	6 22	2000	K5 028	1	3812	9729	0	0	0	0	0	0	0	0	228.1183	-00
56	6 26	200	K5 030	1	3749	9756	0	0	0	0	0	0	0	0	269.1185	-00
56	7 1	1725	K5 031	1	3814	9700	3818	9652	4	0	0	0	0	0	343.1196	-00
56	7 1	1800	K5 032	1	3848	9511	3848	9507	1	0	0	0	0	0	252.1194	-00
56	7 2	1645	K5 033	1	3724	9717	0	0	0	0	0	0	0	0	57.1171	-00
56	7 2	1500	K5 037	1	3724	9717	0	0	0	0	0	0	0	0	90.1171	-00
56	7 7	2200	K5 038	1	3853	9520	3848	9513	7	0	0	0	0	0	237.1194	-00

.. before year means event occurred within a 2 degree square centered on central point

Tornadoes within 1. F BURLINGTON, KS

Tornadoes within 1.

Tr	Mo	Day	Time (CST)	Sta	Seq	Total #	Lat	Lon	Lat	Lon	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F	P	A	Area sq. mi
56	7	19	1745	KS 044	1	3702	9444	0	0	0	0	0	0	0	0	1	1	148	85
56	7	20	1830	KS 045	1	3833	9529	5724	9441	34	264	0	0	0	0	3	4	141	61
56	7	21	1716	KS 046	1	3801	9721	0	0	0	0	0	0	0	0	2	1	261	80
56	7	21	2112	KS 047	1	3823	9640	0	0	0	0	0	0	0	0	1	1	281	47
56	10	29	1900	KS 057	1	3848	9814	0	0	0	0	0	0	0	0	1	1	286	124
56	12	4	1800	KS 059	1	3946	9457	0	0	0	15	0	0	0	0	0	0	20	98
56	2	24	2230	MO 001	1	3732	9412	0	0	0	30	0	0	0	0	0	0	124	75
56	2	24	2230	MO 002	1	3652	9436	0	0	3	30	0	0	0	0	0	0	148	97
56	2	24	2300	MO 003	1	3718	9346	3723	9343	4	10	0	0	0	0	1	1	59	8
56	4	3	30	MO 011	1	3630	9429	3636	9423	4	11	0	0	0	0	1	1	59	8
56	4	28	300	MO 013	1	3935	9446	0	0	2	10	0	0	0	0	0	0	111	62
56	5	13	1900	MO 014	1	3752	9427	0	0	0	3	0	0	0	0	0	0	45	97
56	7	2	1430	MO 016	1	3923	9411	0	0	0	10	0	0	0	0	0	0	29	8
56	12	4	1920	MO 019	1	3816	9356	3623	9351	9	10	0	0	0	0	2	2	76	4
56	12	4	1930	MO 020	1	3820	9414	3821	9409	4	60	0	0	0	0	2	2	76	4
56	5	29	2136	NE 007	1	4004	9652	4004	9649	2	6	0	0	0	0	4	1	90	2
56	9	3	1700	NE 029	1	4012	9606	0	0	2	0	0	0	0	0	0	0	351	120
56	4	2	1030	OR 004	1	3616	9550	0	0	12	10	0	0	0	0	0	0	184	118
56	4	2	2135	OR 010	2	3623	9642	3624	9641	12	30	0	0	0	0	1	1	5	11
56	4	8	1	OR 019	1	3633	9612	0	0	0	0	0	0	0	0	0	0	194	104
56	5	23	1400	OR 024	1	3638	9536	0	0	0	0	0	0	0	0	0	0	178	96
56	5	30	2144	OR 028	1	3648	9721	0	0	0	0	0	0	0	0	0	0	223	118
56	6	27	1523	OR 038	1	3645	9533	0	0	0	0	0	0	0	0	0	0	181	89
57	4	22	1645	KS 003	1	3917	9707	3920	9704	4	90	0	0	0	0	1	2	5	4
57	4	22	1645	KS 004	1	3917	9707	3920	9704	4	90	0	0	0	0	1	2	5	4
57	5	9	1730	KS 008	1	3821	9816	0	0	1	0	0	0	0	0	0	0	38	7
57	5	9	1800	KS 009	1	3824	9758	3713	9705	4	36	0	0	0	0	0	0	273	212
57	5	16	1243	KS 013	1	3710	9708	3713	9705	4	0	0	0	0	0	0	0	275	108
57	5	16	1445	KS 014	1	3723	9625	0	0	0	0	0	0	0	0	0	0	39	7
57	5	16	1530	KS 015	1	3737	9610	3744	9558	13	132	0	0	0	0	0	0	54	12
57	5	16	1618	KS 016	1	3714	9559	3755	9525	39	60	0	0	0	0	0	0	52	36
57	5	16	1630	KS 017	1	3724	9627	3726	9624	3	6	0	0	0	0	0	0	50	7
57	5	16	1635	KS 018	1	3724	9627	3726	9624	3	6	0	0	0	0	0	0	50	7
57	5	16	1640	KS 019	1	3721	9622	3724	9619	4	6	0	0	0	0	0	0	38	7
57	5	16	1650	KS 020	1	3721	9622	3724	9619	4	6	0	0	0	0	0	0	38	7
57	5	20	1450	KS 026	1	3923	9744	3953	9712	44	120	0	0	0	0	0	0	39	7
57	5	20	1450	KS 027	1	3926	9738	0	0	0	0	0	0	0	0	0	0	509	117
57	5	20	1450	KS 028	1	3931	9738	0	0	0	0	0	0	0	0	0	0	310	119
57	5	20	1450	KS 029	1	3931	9738	0	0	0	0	0	0	0	0	0	0	310	119
57	5	20	1450	KS 030	1	3934	9754	3938	9729	6	0	0	0	0	0	0	0	46	6
57	5	20	1745	KS 031	1	3814	9600	0	0	0	30	0	0	0	0	0	0	270	15
57	5	20	1815	KS 032	1	3810	9610	0	0	1	30	0	0	0	0	0	0	270	15
57	5	20	1937	KS 034	1	3830	9526	387	9520	5	0	0	0	0	0	0	0	260	23
57	5	24	1705	KS 035	1	3724	9718	0	0	0	0	0	0	0	0	0	0	67	5
57	5	24	2208	KS 036	1	3727	9713	0	0	0	0	0	0	0	0	0	0	237	92
57	5	24	2208	KS 037	1	3701	9444	0	0	0	0	0	0	0	0	0	0	237	92
57	5	29	1900	KS 039	1	3856	9751	0	0	0	0	0	0	0	0	0	0	148	86
57	6	13	1900	KS 044	1	3852	9714	3854	9532	2	18	0	0	0	0	0	0	293	110
57	6	13	1945	KS 045	1	3858	9449	0	0	0	0	0	0	0	0	0	0	58	7
57	6	11	2004	KS 046	1	3856	9449	0	0	0	30	0	0	0	0	0	0	553	44
57	6	14	105	KS 048	1	3859	9652	0	0	0	0	0	0	0	0	0	0	44	58
57	6	21	2114	KS 056	1	3804	9759	0	0	0	0	0	0	0	0	0	0	309	71
57	6	21	2209	KS 057	1	3750	9707	3752	9707	2	30	0	0	0	0	0	0	265	109
57	6	21	2330	KS 058	1	3859	9456	3901	9446	9	120	0	0	0	0	0	0	38	7
57	6	29	2300	KS 062	1	3854	9710	0	0	0	6	0	0	0	0	0	0	76	8

*. before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125 NM of SURLINGTON, KS

Yr	Mo	D-DY	Time (CST)	Sta Seq	Total W seq	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P P	SRAN	Area sq-mi
57	4	26	1730	MO 005	1	3736	9417	0	0	0	3	0	0	1	0 0 0	120.7 77.	-00
57	5	20	1700	MO 011	1	3951	9421	3957	9413	7	60	0	0	4	2 1 3	46.7 9.	-90
57	5	20	1937	MO 013	1	3912	9412	3917	9359	12	10	0	0	4	2 3 3	64.7 11.	-25
57	6	7	1600	MO 027	1	4002	9500	0	0	0	0	0	0	2	1 0 1	16.7 112.	-00
57	6	7	2000	MO 028	1	3938	9435	0	0	0	0	0	0	1	0 0 0	31.7 98.	-00
57	6	22	0	MO 033	1	3900	9435	3915	9424	19	0	0	0	2	2 3 0	50.7 17.	-19
57	12	19	1610	MO 042	1	3722	9404	3727	9400	3	0	0	0	0	2 2 2	32.7 6.	-19
57	6	15	1400	NE 031	1	4014	9619	4014	9612	6	0	0	0	0	1 2 1	69.7 6.	-00
57	4	19	140	OK 023	1	3613	9555	0	0	0	0	0	0	3	1 1 1	185.7 22.	-00
57	4	19	145	OK 024	1	3628	9555	3634	9548	9	0	0	0	4	1 2 3	43.7 8.	2.85
57	4	22	2200	OK 036	1	3645	9703	0	0	0	0	0	0	4	0 0 1	216.7 111.	-00
57	4	25	2332	OK 044	1	3618	9540	0	0	0	0	0	0	3	1 1 1	180.7 116.	-00
57	5	20	1745	OK 051	1	3625	9623	0	0	0	0	0	0	4	2 1 1	197.7 114.	-00
57	5	20	1900	OK 054	1	3642	9546	0	0	0	0	0	0	0	1 0 1	183.7 92.	-00
57	5	20	2230	OK 057	1	3632	9528	0	0	0	0	0	0	0	1 1 1	174.7 103.	-00
57	5	20	2300	OK 059	1	3646	9523	0	0	0	0	0	0	1	1 1 1	170.7 87.	-00
57	5	20	2300	OK 060	1	3639	9508	0	0	0	0	0	0	1	1 1 1	164.7 99.	-00
57	5	22	638	OK 063	1	3642	9709	0	0	2	7	0	0	2	0 1 1	217.7 116.	-03
57	5	24	2200	OK 079	1	3657	9448	0	0	1	0	0	0	4	1 1 1	151.7 88.	-00
57	5	29	2337	OK 088	1	3642	9713	0	0	0	0	0	0	1	0 0 1	219.7 118.	-00
57	6	12	30	OK 090	1	3648	9556	0	0	0	0	0	0	4	1 2 0	188.7 87.	-00
57	6	12	740	OK 093	1	3626	9518	3627	9507	8	0	0	0	1	1 2 0	87.7 7.	-00
57	8	14	1730	OK 100	1	3615	9512	0	0	0	0	0	0	0	0 1 1	189.7 121.	-00
57	8	14	1800	OK 101	1	3630	9458	3632	9502	4	264	0	0	3	1 2 4	302.7 4.	2.18
57	4	20	20	KS 051	1	3729	9658	0	0	2	0	0	0	0	1 1 1	234.7 76.	-00
58	4	4	1730	KS 001	1	3933	9559	0	0	1	0	0	0	1	0 1 1	350.7 80.	-00
58	5	31	1845	KS 004	1	3840	9511	0	0	1	18	0	0	4	2 0 2	47.7 55.	-03
58	5	31	1845	KS 005	1	3844	9513	3847	9510	3	0	0	0	4	2 2 1	38.7 4.	-00
58	5	31	2035	KS 006	1	3715	9512	0	0	0	30	0	0	4	3 0 2	159.7 63.	-02
58	6	7	600	KS 008	1	3739	9716	0	0	5	528	0	1	4	3 2 5	245.7 83.	5.00
58	6	10	3745	KS 009	1	3751	9701	3750	9651	9	90	15	5	4	4 2 3	97.7 8.	1.56
58	6	11	2315	KS 010	1	3746	9720	0	0	0	0	0	0	5	2 0 2	250.7 83.	-00
58	6	11	2344	KS 011	1	3743	9708	0	0	0	0	0	0	4	0 2 1	246.7 75.	-00
58	6	12	230	KS 012	1	3811	9610	0	0	0	0	0	0	0	2 0 2	263.7 23.	-00
58	6	12	207	KS 013	1	3925	9556	0	0	0	0	0	0	0	0 0 0	351.7 72.	-00
58	6	12	1608	KS 017	1	3715	9631	0	0	0	0	0	0	0	1 1 1	328.7 72.	-00
58	6	12	1630	KS 019	1	3902	9600	3902	9555	0	60	0	0	4	2 2 3	90.7 4.	-46
58	6	12	1745	KS 020	1	3944	9523	3945	9507	7	60	0	0	8	2 3 1	85.7 12.	+81
58	6	14	2030	KS 023	1	3843	9500	3843	9451	7	9	0	0	0	0 2 1	90.7 7.	-12
58	6	14	2055	KS 024	1	3757	9601	3743	9546	19	0	0	0	4	0 3 1	140.7 18.	-00
58	6	15	300	KS 025	1	3840	1627	0	0	0	0	0	0	0	0 0 0	306.7 44.	-00
58	6	22	1340	KS 027	1	3905	9443	0	0	0	8	0	0	0	1 0 1	41.7 68.	-00
58	6	24	1730	KS 028	1	3829	9614	0	0	2	15	0	0	0	1 1 1	300.7 50.	-06
58	7	3	1500	KS 029	1	3811	9543	0	0	3	10	0	0	0	1 0 1	208.7 3.	-02
58	7	11	45	KS 031	1	3900	9534	0	0	0	0	0	0	0	2 1 1	7.7 46.	-00
58	7	11	103	KS 032	1	3858	9551	0	0	0	0	0	0	0	2 1 1	349.7 42.	-00
58	7	11	120	KS 033	1	3920	9551	0	0	0	0	0	0	0	1 1 1	353.7 66.	-00
58	7	11	200	KS 034	1	3843	9449	0	0	1	0	0	0	0	1 0 1	54.7 50.	-00
58	7	11	235	KS 035	1	3753	9544	0	0	0	0	0	0	0	1 0 1	186.7 21.	-00
58	11	17	500	KS 040	1	3731	9439	0	0	0	0	0	0	0	2 1 1	331.7 65.	-00
58	11	17	930	KS 041	1	3703	9647	3710	9640	9	66	0	0	4	1 2 3	39.7 9.	1.16
58	11	17	945	KS 042	1	3719	9631	3724	9624	4	264	0	0	4	1 2 4	48.7 7.	2.85
58	11	17	945	KS 043	1	3724	9628	0	0	0	0	0	0	0	2 0 0	217.7 62.	-00
58	11	17	1020	KS 044	1	3911	9502	0	0	0	0	0	0	5	2 0 0	28.7 63.	-00
58	11	17	1050	KS 045	1	3805	9554	0	0	0	0	0	0	0	2 29.7 14.	-00	

* before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125 NM of BURLINGTON, KS

Yr	Mo	Day	Time (CST)	Sta	Seq	Total #	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P	SIGAN	Area sq.mi
*56	11	17	1055	K5 046	1	5830	9537	0	0	0	0	0	0	0	0	2	13.7	16.00
*58	11	17	1100	K5 047	1	5837	9525	0	0	0	0	0	0	0	0	2	28.7	26.00
*58	11	17	1110	K5 048	1	5845	9523	0	0	0	0	0	0	0	0	1	24.7	34.00
*58	11	17	1115	K5 049	1	5906	9506	0	0	0	0	0	0	0	0	0	28.7	59.00
*58	5	31	2100	MO 006	1	3757	9432	3759	9425	0	0	110	0	0	0	5	70.7	14.00
*58	5	31	2315	MO 007	1	3653	9412	0	0	0	0	0	0	0	0	4	139.7	108.00
*58	6	15	1750	MO 011	1	3859	9336	3857	9332	4	152	0	0	0	0	2	123.7	4.00
*58	6	24	2135	MO 014	1	3908	9359	0	0	0	0	10	0	0	0	4	56.7	96.00
*58	7	13	2045	MO 017	1	3904	9350	0	0	0	0	10	0	0	0	4	60.7	100.00
*58	7	17	2045	MO 018	1	3752	9426	3752	9420	4	10	0	0	0	0	4	90.7	5.00
*58	9	16	1330	MO 022	1	3705	9436	0	0	0	0	30	0	0	0	5	50.7	102.00
*58	9	16	1530	MO 023	1	3748	9359	3750	9357	2	15	0	0	0	0	5	143.7	86.00
*58	11	17	2200	OK 021	1	3651	9533	3800	9433	9	120	0	0	0	0	5	38.7	3.00
*58	8	20	1520	OK 025	1	3615	9554	0	0	0	0	10	0	0	0	3	176.7	83.00
*58	9	1	1645	OK 028	1	3644	9710	0	0	0	0	6	0	0	0	1	185.7	119.00
*58	11	16	530	OK 031	1	3642	9503	0	0	0	0	0	0	0	0	0	218.7	115.00
*58	11	17	1120	OK 042	1	3642	9503	3644	9500	3	38	0	0	0	0	1	189.7	90.00
*59	2	9	2216	K5 001	1	3712	9438	0	0	0	0	0	0	0	0	0	177.7	83.00
*59	3	25	1730	K5 002	1	3812	9722	0	0	0	0	0	0	0	0	1	50.7	3.00
*59	5	2	1200	K5 003	1	3951	9639	3937	9628	18	30	0	0	0	0	1	141.7	80.00
*59	5	4	1749	K5 013	1	3915	9723	3915	9718	4	30	0	0	0	0	2	269.7	79.00
*59	5	4	1833	K5 016	1	3933	9710	3935	9706	4	30	0	0	0	0	2	149.7	16.00
*59	5	4	1905	K5 017	1	3750	9735	0	0	0	0	0	0	0	0	0	90.7	4.00
*59	5	4	1930	K5 018	1	3745	9720	0	0	0	0	0	0	0	0	0	57.7	4.00
*59	5	4	1930	K5 019	1	3751	9722	0	0	0	0	0	0	0	0	0	244.7	101.00
*59	5	4	1930	K5 020	1	3839	9658	0	0	0	0	0	0	0	0	0	250.7	83.00
*59	5	4	2015	K5 021	2	3901	9618	3901	9607	9	264	0	0	0	0	1	297.7	53.00
*59	5	4	2030	K5 022	1	3955	9549	3955	9538	25	528	0	0	0	0	1	293.7	65.00
*59	5	9	1700	K5 023	1	3719	9536	3724	9530	7	60	0	0	0	0	4	157.7	2.00
*59	5	10	1420	K5 024	1	3808	9725	0	0	0	0	0	0	0	0	5	44.7	7.00
*59	5	17	1635	K5 025	1	3758	9646	0	0	0	0	0	0	0	0	2	266.7	82.00
*59	5	17	1845	K5 026	1	3804	9801	0	0	0	0	0	0	0	0	1	253.7	54.00
*59	5	18	1850	K5 027	1	3849	9537	0	0	0	0	0	0	0	0	4	265.7	111.00
*59	5	18	1900	K5 028	1	3944	9520	0	0	0	0	0	0	0	0	4	2.7	95.00
*59	5	18	1935	K5 029	1	3944	9520	3939	9516	6	264	0	0	0	0	5	168.7	6.00
*59	5	20	1951	K5 031	1	3819	9702	0	0	0	0	0	0	0	0	3	274.7	68.00
*59	5	20	1958	K5 032	1	3810	9702	0	0	0	0	0	0	0	0	0	266.7	64.00
*59	5	26	1900	K5 035	1	3815	9805	0	0	0	0	0	0	0	0	1	271.7	113.00
*59	5	26	1900	K5 036	1	3815	9805	0	0	0	0	0	0	0	0	1	271.7	113.00
*59	5	26	1900	K5 037	1	3821	9810	0	0	0	0	0	0	0	0	0	273.7	113.00
*59	5	26	1925	K5 038	1	3830	9812	0	0	0	0	0	0	0	0	0	278.7	119.00
*59	5	29	1900	K5 046	1	3918	9605	0	0	0	0	60	0	0	0	0	346.7	67.00
*59	5	29	1930	K5 048	1	3949	9654	0	0	0	0	45	0	0	0	0	529.7	110.00
*59	5	29	1930	K5 049	1	3949	9647	0	0	0	0	0	0	0	0	2	532.7	108.00
*59	6	11	1545	K5 051	1	3910	9441	0	0	0	0	0	0	0	0	1	40.7	73.00
*59	6	18	1800	K5 052	1	3830	9612	0	0	0	0	0	0	0	0	1	303.7	29.00
*59	6	18	1930	K5 053	1	3732	9612	0	0	0	0	30	0	0	0	3	210.7	49.00
*59	8	18	1530	K5 057	1	3832	9719	0	0	0	0	15	0	0	0	1	283.7	79.00
*59	9	3	1345	K5 058	1	3725	9442	0	0	0	0	60	0	0	0	5	146.7	83.00
*59	9	27	1800	K5 064	1	3703	9512	3707	9506	7	132	0	0	0	0	2	50.7	6.00

* before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125. JERINGTON, KS

Tr	Mo	Day	Time (CST)	Sta	Seq	Total # seg	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injurious	Damage Class	F P P	KZRN	Area sq.mi		
60	7	22	1557	KS 047	1	37.9	9702	0	0	0	0	0	0	0	1	1	249.7 69.	-00		
60	7	29	1615	KS 048	1	37.3	9646	0	0	0	0	0	0	0	2	0	232.7 66.	-00		
60	7	29	1615	KS 049	1	37.3	9646	0	0	0	0	0	0	0	2	0	232.7 66.	-00		
60	8	28	1944	KS 051	1	37.7	9725	0	0	0	0	0	0	0	3	1	252.7 87.	-00		
60	10	9	1640	KS 052	1	37.9	9651	0	0	0	2	30	0	0	1	1	246.7 68.	-11		
60	11	27	1900	KS 056	1	38.2	9735	0	0	0	0	0	0	0	4	2	276.7 90.	-00		
60	11	27	1910	KS 057	1	38.3	9702	0	0	0	0	0	0	0	3	1	290.7 67.	-00		
60	11	27	1955	KS 058	1	39.3	9739	0	0	0	2	50	0	0	5	3	311.7 123.	-19		
60	11	27	2000	KS 059	1	37.5	9715	37.0	9658	0	20	47.5	0	0	2	2	42.7 20.	-91		
60	11	27	2000	KS 060	1	37.9	9628	37.0	9615	0	15	0	0	0	4	2	43.7 15.	-00		
60	5	5	1650	MO 009	1	37.5	9309	0	0	0	0	4	0	0	3	0	100.7 112.	-00		
60	5	19	1910	MO 016	1	37.06	9351	0	0	0	0	5	0	0	3	1	152.7 79.	-01		
60	5	19	2100	MO 017	1	37.21	9426	0	0	0	1	5	0	0	4	1	69.7 97.	-00		
60	5	19	2215	MO 018	1	38.8	9345	0	0	0	5	0	0	0	3	1	93.7 117.	-00		
60	6	10	1720	MO 021	1	38.08	9313	0	0	0	0	5	0	0	3	1	52.7 102.	-00		
60	6	11	1615	MO 023	1	39.17	9358	0	0	0	0	15	0	0	5	1	60.7 92.	-01		
60	6	29	1820	MO 024	1	39.00	9358	0	0	0	0	30	0	0	4	2	66.7 22.	1.43		
60	6	29	1900	MO 025	1	39.45	9451	39.56	9425	0	25	0	0	0	3	1	180.7 11.	-08		
60	6	29	2000	MO 026	1	40.07	9452	40.06	9452	1	8	0	0	0	4	1	354.7 116.	-00		
60	12	4	2050	MO 034	2	39.15	9403	39.24	9555	8	5	0	0	0	4	1	4.7 118.	-00		
60	5	16	230	NE 003	1	40.09	9557	0	0	0	0	0	0	0	3	1	360.7 120.	-00		
60	5	19	1830	NE 008	1	40.12	9530	0	0	0	0	0	0	0	3	1	2.7 110.	-04		
60	6	14	2200	NE 016	1	40.14	9541	0	0	0	0	44	0	0	3	1	162.7 82.	-00		
60	6	29	1900	NE 035	1	40.04	9535	0	0	0	0	30	0	0	3	1	221.7 117.	-01		
60	2	9	1445	OK 002	1	36.54	9452	36.57	9444	8	0	0	0	0	3	1	168.7 78.	-06		
60	2	9	1545	OK 003	1	36.56	9510	0	0	0	0	0	0	0	4	2	50.7 3.	-41		
60	3	31	1800	OK 006	1	36.46	9718	0	0	0	0	0	0	0	5	2	223.7 114.	-00		
60	4	16	1640	OK 012	1	36.18	9600	0	0	0	0	0	0	0	3	1	49.7 32.	10.42		
60	4	16	2215	OK 014	1	36.58	9521	0	0	0	0	0	0	0	3	1	176.7 820.	-00		
60	4	29	1415	OK 028	1	36.50	9718	0	0	0	0	0	0	0	3	1	45.7 6.	-00		
60	5	5	1850	OK 049	2	36.39	9507	37.00	9437	36	150	0	0	0	5	2	180.7 115.	-00		
60	5	5	1930	OK 054	1	36.14	9531	0	0	0	0	0	0	0	3	1	186.7 103.	-00		
60	5	5	2100	OK 059	1	36.30	9506	36.34	9501	6	0	0	0	0	4	1	185.7 122.	-00		
60	5	18	1700	OK 065	1	36.19	9540	0	0	0	0	0	0	0	3	1	39.7 4.	-13		
60	5	18	1730	OK 066	1	36.32	9555	0	0	0	0	0	0	0	3	1	174.7 117.	-00		
60	5	19	1835	OK 072	1	36.12	9554	0	0	0	0	0	0	0	4	3	274.7 52.	-00		
60	5	19	1900	OK 073	1	36.25	9533	36.28	9530	4	15	0	0	0	3	2	158.7 4.	-56		
60	5	19	1930	OK 076	1	36.18	9526	0	0	0	0	0	0	0	3	1	39.7 6.	3.68		
60	8	7	2315	OK 095	1	36.58	9468	36.54	9446	4	60	0	0	0	4	3	178.7 37.	-00		
61	2	17	1500	KS 001	1	38.18	9647	0	0	0	0	0	0	0	0	0	115.7 45.	-11		
61	2	17	2300	KS 002	1	37.09	9443	37.14	9418	7	264	0	0	0	0	0	115.7 56.	-06		
61	3	5	1745	KS 003	1	37.17	9539	0	0	0	2	0	0	0	3	2	231.7 42.	-00		
61	3	12	1730	KS 004	1	37.55	9449	0	0	0	0	0	0	0	3	2	246.7 32.	-50		
61	3	12	1730	KS 005	1	37.0	9437	0	0	0	0	0	0	0	3	2	232.7 36.	-00		
61	3	26	1530	KS 006	1	37.48	9422	0	0	0	0	0	0	0	0	0	239.7 33.	-00		
61	3	26	1535	KS 007	1	38.01	9618	0	0	0	2	132	0	0	5	2	166.7 11.	-08		
61	3	26	1555	KS 008	1	37.52	9617	0	0	0	0	0	0	0	0	0	260.7 78.	-00		
61	3	26	1600	KS 009	1	37.57	9617	0	0	0	0	0	0	0	0	0	137.7 60.	-11		
61	3	26	1630	KS 010	1	38.03	9538	0	0	0	0	0	0	0	1	0	179.7 35.	-00		
61	3	26	1945	KS 011	1	38.01	9719	0	0	0	0	0	0	0	0	0	36.7 6.	-21		
61	3	26	2000	KS 012	1	37.30	9450	0	0	0	2	30	0	0	2	1	38.7 3.	-50		
61	3	26	2130	KS 013	1	37.39	9540	0	0	0	2	0	0	0	0	0	0	0	0	0
61	4	21	1800	KS 014	1	38.05	9509	38.13	9504	7	15	0	0	0	5	2	0	0	0	
61	4	24	1840	KS 015	1	38.04	9442	38.06	9440	2	90	0	0	0	4	1	0	0	0	

*. before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125. NM of BURLINGTON, KS

Yr	Mo	Day	Time (CST)	Sta	Seq	Total #	Lat	Lon	Lat	Lon	Length miles	Width 10 ⁻³ ft	Deaths	Injuries	Damage Class	F	P	P	AIRRN	Area sq.mi
01	4	30	1710	KS 016	1	3703	9650	0	0	0	30	0	0	0	0	1	0	2	218.7	90.00
01	5	8	2000	KS 017	1	3702	9501	0	0	0	0	0	0	0	0	0	0	0	156.7	79.00
01	5	7	2000	KS 018	1	3706	9501	3711	9500	5	0	0	0	0	0	2	2	1	9.7	5.00
01	5	7	820	KS 019	1	3958	9537	0	0	0	0	0	0	0	0	4	2	1	2.7	104.00
01	5	7	1500	KS 020	1	3907	9506	0	0	0	0	0	0	0	0	0	0	0	27.7	60.00
01	5	7	2015	KS 021	1	3705	9534	0	0	0	0	0	0	0	0	0	0	0	175.7	69.00
01	6	13	1900	KS 027	1	3812	9545	0	0	0	0	0	0	0	0	0	0	0	218.7	4.00
01	6	13	2130	KS 028	1	3718	9444	0	0	1	15	0	0	0	0	0	0	0	184.7	36.00
01	7	13	1445	KS 051	1	3802	9222	0	0	0	0	0	0	0	0	0	0	0	261.7	80.00
01	7	15	1715	KS 032	1	3840	9800	3842	9757	3	0	0	0	0	0	1	1	1	50.7	3.00
01	7	20	1730	KS 034	1	3925	9705	0	0	0	0	0	0	0	0	0	0	0	318.7	96.00
01	7	20	1930	KS 035	1	3725	9743	0	0	0	0	0	0	0	0	0	0	0	243.7	109.00
01	7	20	1935	KS 036	1	3953	9548	0	0	0	0	0	0	0	0	0	0	0	357.7	99.00
01	10	12	1540	KS 038	1	3941	9535	0	0	0	0	0	0	0	0	0	0	0	3.7	87.00
01	10	12	1610	KS 039	1	3919	9547	0	0	0	0	0	0	0	0	0	0	0	356.7	65.00
01	10	12	1630	KS 040	1	3931	9528	0	0	0	0	0	0	0	0	0	0	0	7.7	78.00
01	10	12	1645	KS 041	1	3928	9535	3923	9532	3	0	0	0	0	0	0	2	1	49.7	3.00
01	10	12	1730	KS 042	1	3916	9523	3918	9518	5	0	0	0	0	0	0	0	0	63.7	4.00
01	10	12	1810	KS 043	1	3857	9545	0	0	1	0	0	0	0	0	0	0	0	311.7	66.00
01	10	12	2006	KS 044	1	3907	9512	0	0	0	0	0	0	0	0	0	0	0	23.7	58.00
01	11	2	240	KS 045	2	3717	9454	3725	9445	12	30	0	0	0	0	1	3	2	42.7	11.00
01	3	5	2100	MO 002	1	3747	9350	0	0	2	15	0	0	0	0	0	0	0	107.7	92.00
01	3	12	1810	MO 003	1	3742	9354	0	0	5	0	0	0	0	0	0	0	0	113.7	90.00
01	4	20	1630	MO 010	1	3657	9427	3658	9426	1	15	0	0	0	0	0	0	0	59.7	3.00
01	4	22	200	MO 014	1	3951	9450	0	0	0	0	0	0	0	0	0	0	0	22.7	105.00
01	4	23	226	MO 015	1	3846	9413	0	0	0	15	0	0	0	0	0	0	0	65.7	76.00
01	4	23	1400	MO 016	1	3843	9359	3844	9351	7	15	0	0	0	0	0	0	0	81.7	6.00
01	4	25	30	MO 017	1	3845	9410	0	0	0	0	0	0	0	0	0	0	0	66.7	77.00
01	4	25	100	MO 018	1	3720	9422	3720	9412	9	75	0	0	0	0	0	0	0	90.7	8.00
01	4	30	1930	MO 019	1	3724	9362	0	0	1	75	0	0	0	0	0	0	0	115.7	107.00
01	5	7	1745	MO 020	1	3659	9344	0	0	0	0	0	0	0	0	0	0	0	129.7	120.00
01	5	7	1820	MO 026	2	3923	9337	3920	9355	4	15	0	0	0	0	0	0	0	72.7	7.00
01	7	22	1215	MO 030	1	3858	9330	3825	9325	3	15	0	0	0	0	0	0	0	78.7	9.00
01	7	22	1815	MO 032	1	3855	9330	3858	9325	4	60	0	0	0	0	0	0	0	90.7	4.00
01	7	22	2100	MO 033	1	3850	9408	3853	9406	2	15	0	0	0	0	0	0	0	293.7	3.00
01	3	26	1740	OK 011	2	3633	9620	3700	9558	49	40	0	0	0	0	0	0	0	57.7	2.00
01	3	26	2015	OK 013	1	3646	9650	3649	9642	8	30	0	0	0	0	0	0	0	51.7	43.00
01	4	20	2335	OK 017	1	3651	9538	0	0	0	0	0	0	0	0	0	0	0	65.7	7.00
01	4	21	2215	OK 018	1	3654	9711	3657	9711	3	0	0	0	0	0	0	0	0	178.7	85.00
01	4	24	1915	OK 020	1	3637	9656	0	0	0	0	0	0	0	0	0	0	0	360.7	3.00
01	4	30	1755	OK 025	1	3624	9630	0	0	0	0	0	0	0	0	0	0	0	212.7	114.00
01	5	7	1806	OK 046	1	3630	9642	0	0	0	0	0	0	0	0	0	0	0	200.7	117.00
01	5	7	2105	OK 047	1	3648	9506	3651	9457	3	120	0	0	0	0	0	0	0	205.7	115.00
01	5	8	30	OK 050	1	3633	9642	0	0	0	0	0	0	0	0	0	0	0	67.7	8.00
01	5	8	200	OK 052	1	3615	9315	0	0	0	0	0	0	0	0	0	0	0	206.7	112.00
01	5	21	1940	OK 068	1	3644	9451	0	0	0	0	0	0	0	0	0	0	0	170.7	121.00
01	7	22	1218	OK 078	1	3645	9445	0	0	0	0	0	0	0	0	0	0	0	156.7	98.00
02	5	18	2110	KS 007	1	3905	9532	0	0	0	0	0	0	0	0	0	0	0	153.7	100.00
02	5	27	1545	KS 010	1	3614	9500	0	0	0	0	0	0	0	0	0	0	0	322.7	65.00
02	5	24	1617	KS 011	1	3809	9806	0	0	0	0	0	0	0	0	0	0	0	28.7	68.00
02	5	24	1700	KS 012	1	3803	9811	0	0	0	0	0	0	0	0	0	0	0	267.7	114.00
02	5	24	1700	KS 013	1	3759	9804	0	0	0	0	0	0	0	0	0	0	0	265.7	119.00
02	5	24	1815	KS 014	2	3802	9740	3803	9720	16	0	0	0	0	0	0	0	0	66.7	16.00
02	5	24	1815	KS 015	1	3835	9602	0	0	0	0	0	0	0	0	0	0	0	322.7	27.00

*. before year means event occurred within a 2 degree square centered on central point

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Tornadoes within 125. NM of BURLINGTON, KS

Yr	Mo	Day	Time (CST)	Site	Seq	Total #	Lat	Lon	Lat	Lon	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P P	AIRRN	Area sq-mi
*62	5	26	1915	KS 017	1	3628	9610	0	0	0	0	0	0	0	3	1	302.7	27.0
*62	5	26	1925	KS 018	1	3634	9611	0	0	0	2	60	0	0	0	2	310.7	39.0
*62	5	26	1948	KS 019	1	3658	9542	0	0	0	2	0	0	4	5	359.7	44.0	
*62	5	27	2030	KS 021	1	3950	9718	3953	9714	2	15	0	0	0	3	1	46.7	4.0
*62	5	28	1600	KS 025	1	3820	9607	3823	9605	1	90	0	0	0	5	2	28.7	3.0
*62	5	28	1640	KS 022	1	3850	9554	3856	9547	1	60	0	0	0	5	2	42.7	5.0
*62	5	28	1720	KS 023	1	3918	9532	0	0	0	0	0	0	0	6	1	6.7	6.0
*62	5	31	11	KS 024	1	3942	9536	3948	9536	6	4	0	0	0	2	2	360.7	6.0
*62	5	31	1345	KS 030	1	3948	9538	0	0	0	0	0	0	0	1	1	1.7	94.0
*62	5	31	1345	KS 031	1	3948	9525	0	0	0	0	0	0	0	0	1	8.7	88.0
*62	6	2	1956	KS 016	1	3727	9445	0	0	0	0	0	0	0	3	2	137.7	65.0
*62	6	11	1335	KS 019	1	3806	9629	3804	9628	2	23	0	0	0	0	1	159.7	2.0
*62	6	24	300	KS 017	1	3851	9737	0	0	0	8	0	0	0	3	2	292.7	98.0
*62	7	6	1630	KS 050	1	3801	9628	0	0	0	0	0	0	0	0	0	251.7	39.0
*62	7	11	2220	KS 051	1	3902	9523	0	0	0	0	0	0	0	0	0	16.7	50.0
*62	8	6	1740	KS 054	1	3931	9547	3923	9540	7	290	0	0	3	5	4	146.7	10.0
*62	8	6	1740	KS 055	1	3917	9543	0	0	0	0	0	0	0	5	1	359.7	63.0
*62	8	6	1840	KS 056	1	3911	9534	0	0	0	0	0	0	0	2	2	5.7	57.0
*62	8	6	1840	KS 057	1	3910	9533	0	0	0	0	0	0	0	2	2	6.7	56.0
*62	8	6	1900	KS 058	1	3910	9532	0	0	0	0	0	0	0	2	1	7.7	56.0
*62	8	6	1900	KS 059	1	3847	9515	3845	9511	2	2	0	0	0	5	3	123.7	4.0
*62	8	6	1940	KS 060	1	3846	9520	0	0	0	0	0	0	0	1	1	26.7	38.0
*62	8	6	1940	KS 061	1	3847	9524	0	0	0	0	0	0	0	0	1	22.7	36.0
*62	8	6	2230	MO 003	1	3812	9402	0	0	0	0	5	0	0	4	1	91.7	78.0
*62	5	26	1900	MO 004	1	3921	9432	3922	9432	2	15	0	0	0	4	1	67.7	3.0
*62	5	31	1345	MO 006	1	3957	9500	0	0	0	0	0	0	0	1	0	17.7	108.0
*62	5	31	1345	MO 007	1	3958	9459	0	0	0	0	3	0	0	1	0	17.7	109.0
*62	6	2	1945	MO 009	1	3650	9428	0	0	0	0	5	0	0	4	1	145.7	102.0
*62	6	8	1030	MO 012	1	3846	9347	0	0	0	0	0	0	0	2	1	70.7	94.0
*62	6	9	900	MO 013	1	3653	9406	0	0	0	20	0	0	0	1	0	137.7	111.0
*62	7	5	1900	MO 017	1	3711	9412	0	0	0	0	0	0	0	2	0	132.7	95.0
*62	7	15	100	MO 019	1	3916	9350	0	0	0	3	0	0	0	3	1	56.7	106.0
*62	7	21	725	MO 020	2	3957	9457	3953	9445	5	30	0	0	1	4	1	113.7	10.0
*62	10	6	2000	MO 021	1	3751	9419	3753	9414	1	15	0	0	0	5	1	63.7	4.0
*62	5	30	1630	OK 037	1	3652	9705	0	0	0	0	0	0	0	0	0	219.7	106.0
*62	6	1	1950	OK 038	1	3617	9517	0	0	0	0	0	0	0	0	1	171.7	119.0
*62	6	9	120	OK 055	1	3630	9620	0	0	0	0	0	0	0	0	0	192.7	109.0
*63	4	3	113	KS 001	1	3750	9462	0	0	0	23	0	0	0	3	2	117.7	52.0
*63	4	28	1620	KS 002	2	3948	9619	4000	9555	25	30	0	0	0	2	2	57.7	22.0
*63	4	28	1645	KS 003	1	3950	9617	0	0	0	0	0	0	0	0	1	344.7	100.0
*63	4	28	1645	KS 004	1	3951	9616	0	0	0	0	0	0	0	0	0	345.7	101.0
*63	5	4	1740	KS 005	1	3826	9526	0	0	0	0	0	0	0	2	1	44.7	17.0
*63	5	25	1830	KS 006	1	3734	9717	0	0	0	0	0	0	0	3	0	242.7	86.0
*63	5	25	1830	KS 007	1	3734	9707	0	0	0	0	0	0	2	0	2	240.7	79.0
*63	5	26	1455	KS 008	1	3759	9720	0	0	0	0	0	0	0	0	0	259.7	79.0
*63	5	26	1920	KS 009	2	3727	9458	3731	9462	15	8	0	0	0	4	2	73.7	13.0
*63	6	5	1500	KS 010	1	3751	9805	0	0	0	0	0	0	0	0	0	249.7	122.0
*63	6	5	1500	KS 011	1	3757	9407	0	0	0	0	0	0	0	0	0	252.7	121.0
*63	7	12	2025	KS 018	1	3803	9714	0	0	0	0	0	0	1	2	1	262.7	78.0
*63	8	6	1700	KS 020	1	3759	9557	3749	9542	17	0	0	0	0	2	1	50.7	16.0
*63	8	6	1700	KS 021	1	3758	9807	0	0	0	0	0	0	0	2	1	253.7	121.0
*63	9	4	300	KS 025	1	3904	9520	0	0	0	0	0	0	0	2	1	18.7	53.0
*63	10	20	1845	KS 026	1	3722	9516	0	0	0	0	0	0	0	2	1	159.7	56.0
*63	3	4	900	MO 002	1	3733	9435	0	0	0	5	0	0	0	0	0	273.7	120.0

* before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125 NM of BURLINGTON, KS

Tr	Mo Day	Time (LST)	Sta Seq	Total # seg	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P P	AIRK	Area sq.mi	
*63	4 22	30	MO 005	1	4005	9513	0	0	0	5	0	0	4	1	0	0	11.7/116-
*63	5 15	1	MO 010	1	3932	9419	0	0	0	3	0	0	2	1	0	0	39.7/100-
*63	5 15	200	MO 011	1	3718	9429	0	0	0	3	0	0	2	1	0	0	134.7/80-
*63	5 15	210	MO 012	1	3916	9351	0	0	0	5	0	0	4	1	0	0	54.7/105-
*63	11 22	210	OK 030	1	3630	9644	0	0	0	0	0	0	0	1	1	1	206.7/116-
*64	3 14	1210	KS 001	1	3804	9446	0	0	0	30	0	0	4	2	0	2	103.7/44-
*64	4 2	1800	KS 002	1	3857	9508	3858	9500	7	0	0	0	0	1	2	1	81.7/6-
*64	4 3	1620	KS 003	1	3733	9718	0	0	0	0	0	0	0	2	1	1	242.7/87-
*64	4 12	1526	KS 004	1	3845	9529	5912	9514	33	264	0	3	6	3	4	4	23.7/29-
*64	4 12	1600	KS 006	1	3807	9518	3822	9508	19	264	3	9	5	4	3	4	28.7/17-
*64	4 12	1700	KS 007	1	3701	9520	3704	9519	4	75	0	0	4	1	2	3	28.7/3-
*64	4 12	1810	KS 008	1	3754	9446	3756	9442	1	23	0	0	4	1	2	2	58.7/4-
*64	4 13	1510	KS 009	1	3841	9808	0	0	0	0	0	0	0	1	1	1	283.7/118-
*64	4 13	1620	KS 010	1	3852	9605	0	0	0	0	0	0	0	3	1	1	534.7/42-
*64	4 20	1955	KS 013	1	3927	9705	3936	9657	11	15	0	0	4	2	3	1	34.7/11-
*64	4 20	2145	KS 014	1	3931	9522	0	0	0	0	0	0	4	1	1	1	11.7/78-
*64	4 20	2200	KS 015	1	3944	9511	0	0	0	0	0	0	4	1	1	1	14.7/93-
*64	4 20	2140	KS 016	1	3842	9447	0	0	0	0	0	0	3	2	1	1	56.7/51-
*64	4 20	2300	KS 017	1	3744	9518	3748	9514	5	0	0	0	4	2	2	1	38.7/5-
*64	4 22	1730	KS 020	1	3755	9725	0	0	0	0	0	0	3	2	1	1	257.7/8-
*64	4 22	1730	KS 021	1	3817	9729	0	0	0	0	0	0	3	2	1	1	272.7/85-
*64	4 22	1730	KS 022	1	3825	9703	0	0	0	0	0	2	3	1	1	1	280.7/65-
*64	4 22	1800	KS 023	1	3817	9643	0	0	0	0	0	0	3	2	1	1	274.7/47-
*64	4 22	1800	KS 024	1	3819	9641	0	0	0	0	0	0	0	2	1	1	276.7/47-
*64	4 22	1800	KS 025	1	3821	9639	0	0	0	0	0	3	0	1	0	0	279.7/46-
*64	4 22	1800	KS 026	1	3823	9637	0	0	0	0	0	0	0	1	0	0	299.7/55-
*64	4 22	1800	KS 027	1	3843	9643	0	0	0	0	0	0	3	1	1	1	304.7/52-
*64	4 22	1800	KS 029	1	3845	9639	0	0	0	0	0	0	0	1	0	0	304.7/52-
*64	4 22	1830	KS 030	1	3829	9609	0	0	0	0	0	0	3	1	1	1	311.7/21-
*64	4 22	1830	KS 033	1	3829	9603	0	0	0	0	0	0	3	1	1	1	355.7/26-
*64	4 22	1845	KS 034	1	3840	9544	0	0	0	0	0	1	3	2	1	1	43.7/27-
*64	4 22	1900	KS 035	1	3833	9517	0	0	0	0	0	0	0	1	0	0	63.7/46-
*64	4 22	1900	KS 036	1	3832	9451	0	0	0	0	0	0	3	1	1	1	51.7/50-
*64	4 22	1915	KS 037	1	3835	9448	0	0	0	0	0	0	0	0	0	0	257.7/85-
*64	4 22	1915	KS 038	1	3846	9451	0	0	0	0	0	0	0	0	0	0	280.7/29-
*64	4 23	1730	KS 039	1	3755	9726	0	0	0	0	0	0	0	1	0	0	163.7/38-
*64	4 25	1802	KS 040	1	3819	9637	0	0	0	0	0	0	2	1	1	1	80.7/33-
*64	4 26	1020	KS 041	1	3738	9527	0	0	0	0	0	0	2	1	1	1	41.7/26-
*64	4 26	1545	KS 042	1	3820	9459	0	0	0	0	0	0	0	1	1	1	44.7/49-
*64	4 26	1825	KS 043	1	3834	9519	0	0	0	0	0	0	0	1	1	1	49.7/57-
*64	4 26	1930	KS 044	1	3849	9457	0	0	0	0	0	0	0	1	1	1	56.7/58-
*64	4 26	1940	KS 045	1	3851	9446	0	0	0	0	0	0	0	1	1	1	257.7/87-
*64	4 26	1950	KS 046	1	3846	9439	0	0	0	0	0	0	0	1	1	1	282.7/28-
*64	5 23	1730	KS 058	1	3755	9728	0	0	0	0	0	0	0	1	1	1	310.7/3-
*64	5 25	1802	KS 059	1	3820	9616	0	0	0	0	0	0	4	2	1	1	3.7/86-
*64	5 26	1540	KS 060	1	3940	9536	0	0	0	0	0	0	0	0	0	0	307.7/46-
*64	6 11	1200	KS 069	1	3842	9628	0	0	0	0	0	0	0	1	1	1	175.7/33-
*64	6 13	300	KS 072	1	3842	9628	0	0	0	0	0	0	0	1	1	1	347.7/40-
*64	6 17	1255	KS 073	1	3741	9537	0	0	0	0	0	0	0	1	1	1	245.7/61-
*64	6 18	1810	KS 074	1	3853	9533	0	0	0	0	0	0	2	1	1	1	247.7/58-
*64	6 21	1740	KS 075	1	3748	9651	0	0	0	0	0	0	0	1	1	1	51.7/8-
*64	6 21	1800	KS 076	1	3751	9669	0	0	0	0	0	0	4	3	2	1	302.7/82-
*64	6 21	1910	KS 078	1	3857	9722	3902	9714	9	0	0	0	0	2	1	1	337.7/72-
*64	6 21	1925	KS 079	1	3857	9711	0	0	0	0	0	0	0	1	1	1	
*64	6 21	2320	KS 080	1	3920	9617	0	0	0	0	0	0	0	1	1	1	

* before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125. NM of BURLINGTON, KS

Yr	Mo	Day	Time (CST)	Sta	Seq	Total #	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10" ft	Deaths	Injuries	Damage Class	F	P	AZBRN	Area sq-mi
64	6	22	1430	KS 081	1	3951	9638	0	0	0	0	0	0	0	0	1	1	356-1106-	-00
64	5	22	1510	KS 052	1	3938	9568	0	0	0	0	0	0	0	0	0	0	356-1106-	-00
64	6	22	2000	KS 083	1	3754	9505	0	0	0	0	0	0	0	0	1	1	125-115-	-00
64	8	20	1720	KS 086	1	3952	9532	3954	9529	1	15	0	0	0	0	1	1	49-113-	-05
64	8	20	1730	KS 087	1	3951	9528	0	0	0	0	0	0	0	0	1	1	6-1198-	-05
64	11	15	500	KS 094	1	3739	9604	0	0	0	120	0	0	0	0	2	0	208-1139-	-18
64	4	12	1745	MO 005	1	3940	9425	3945	9422	1	15	0	0	0	0	1	1	25-116-	-04
64	4	12	1830	MO 006	4	3842	9424	3854	9407	8	30	0	10	0	0	3	3	48-118-	-47
64	4	12	2100	MO 007	1	3834	9346	3841	9338	10	30	0	5	0	0	2	2	42-119-	-81
64	4	22	2140	MO 009	1	3814	9413	0	0	0	0	0	0	0	0	0	0	90-1169-	-00
64	5	26	1500	MO 010	1	3907	9407	0	0	0	15	0	0	0	0	1	1	54-1190-	-04
64	6	11	1430	MO 011	1	3926	9409	0	0	0	0	0	0	0	0	0	0	45-1101-	-00
64	6	22	1700	MO 014	1	3946	9451	0	0	0	15	0	0	0	0	0	0	25-1100-	-03
64	7	26	445	MO 017	1	3705	9431	0	0	0	5	0	0	0	0	0	0	161-1189-	-00
64	8	20	1930	MO 018	1	3954	9426	0	0	0	3	0	0	0	0	1	1	30-1115-	-01
64	4	4	2315	OK 008	1	3648	9730	0	0	0	0	0	0	0	0	0	0	225-1123-	-00
64	4	20	1700	OK 011	1	3612	9523	0	0	0	0	0	0	0	0	0	0	173-1123-	-00
64	5	1	1545	OK 019	1	3645	9721	0	0	0	0	0	0	0	0	0	0	222-1120-	-00
64	5	10	2345	OK 037	1	3624	9536	0	0	0	0	0	0	0	0	0	0	178-1130-	-00
64	5	14	1615	OK 041	1	3632	9606	0	0	0	15	0	0	0	0	0	0	189-1124-	-01
64	7	9	1755	OK 043	1	3621	9603	0	0	0	0	0	0	0	0	0	0	189-1114-	-00
65	3	16	1930	KS 003	1	3723	9636	0	0	0	0	0	0	0	0	0	0	221-1167-	-00
65	5	8	1515	KS 009	1	3710	9446	0	0	0	90	0	0	0	0	0	0	184-1164-	-26
65	5	8	1715	KS 010	1	3732	9450	0	0	0	0	0	0	0	0	0	0	265-1175-	-00
65	5	13	2215	KS 015	4	3708	9718	3801	9732	31	30	0	10	0	0	0	0	348-1154-	1.77
65	5	18	2017	KS 022	1	3703	9450	0	0	0	0	0	0	0	0	0	0	150-1182-	-00
65	5	24	1843	KS 022	1	3848	9748	0	0	0	0	0	0	0	0	0	0	289-1105-	-00
65	5	25	1800	KS 036	1	3927	9708	0	0	0	0	0	0	0	0	0	0	317-1199-	-00
65	5	25	1900	KS 037	1	3845	9815	0	0	0	0	0	0	0	0	0	0	284-1124-	-05
65	6	3	530	KS 046	1	3722	9618	3739	9606	6	30	0	0	0	0	0	0	29-1139-	-33
65	6	4	1643	KS 047	1	3750	9750	3754	9744	7	266	0	0	0	0	0	0	50-116-	3.57
65	6	4	1930	KS 048	1	3831	9542	3841	9515	5	60	0	0	0	0	0	0	65-1123-	-61
65	6	21	1500	KS 052	1	3916	9633	0	0	0	0	0	0	0	0	0	0	327-1174-	-00
65	6	27	1605	KS 053	1	3816	9630	0	0	0	0	0	0	0	0	0	0	328-1171-	-00
65	7	9	1500	KS 056	1	3852	9450	0	0	0	0	0	0	0	0	0	0	48-1155-	-00
65	8	27	330	KS 061	1	3906	9445	0	0	0	0	0	0	0	0	0	0	40-1168-	-00
65	9	3	2000	KS 062	1	3739	9718	0	0	0	120	0	0	0	0	0	0	246-1184-	-00
65	9	13	1820	KS 064	1	3935	9509	0	0	0	0	0	0	0	0	0	0	17-1185-	-00
65	9	20	1400	KS 065	1	3948	9510	0	0	0	0	0	0	0	0	0	0	14-1197-	-00
65	9	20	1745	KS 066	1	3706	9730	3713	9724	9	0	0	0	0	0	0	0	34-118-	-00
65	9	20	1822	KS 067	1	3737	9716	3812	9637	43	0	0	0	0	0	0	0	23-1138-	-00
65	9	20	1934	KS 068	1	3736	9718	0	0	0	0	0	0	0	0	0	0	244-1186-	-00
65	9	20	2165	KS 069	1	3843	9506	0	0	0	0	0	0	0	0	0	0	43-1140-	-00
65	4	3	1900	MO 002	1	3719	9533	0	0	0	0	0	0	0	0	0	0	123-1102-	-00
65	4	5	1600	MO 005	1	3719	9418	0	0	0	0	0	0	0	0	0	0	130-1186-	-04
65	4	10	1330	MO 007	1	3929	9502	0	0	0	15	0	0	0	0	0	0	130-1186-	-04
65	4	10	1515	MO 009	1	3947	9425	3952	9416	9	15	0	0	0	0	0	0	22-1181-	-11
65	4	10	1930	MO 012	1	3839	9407	0	0	0	15	0	0	0	0	0	0	54-119-	-28
65	5	26	210	MO 014	1	3846	9420	3849	9409	1	15	0	0	0	0	0	0	71-1178-	-01
65	5	26	215	MO 015	1	3858	9421	3901	9417	4	150	0	0	0	0	0	0	71-119-	-03
65	5	26	300	MO 016	1	3920	9332	0	0	0	0	0	0	0	0	0	0	46-114-	1.27
65	6	4	1520	MO 017	1	3836	9421	0	0	0	0	0	0	0	0	0	0	57-1120-	-00
65	9	20	1830	MO 023	1	3903	9334	3912	9325	13	30	0	0	0	0	0	0	38-111-	-74
65	9	20	2230	MO 025	1	3854	9423	0	0	0	9	0	0	0	0	0	0	57-1173-	-03

* before year means event occurred within a 2 degree square centered on central point

Tornadoes within 175 NM of DUBLINGTON, MS

Tr	No	Day	Time (CST)	Sta	Seq	Total #	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P P	AZGRN	Area sq.mi	
65	3	16	2000	04	003	1	3640	9624	0	0	2	15	0	0	4	2	1	200-1100-	-06
65	4	4	2225	0K	007	1	3638	9720	0	0	1	0	0	0	0	0	1	220-1125-	-00
65	5	4	1400	0K	010	1	3644	9600	0	0	1	20	0	0	5	2	1	190-1191-	-06
65	5	6	2100	0K	029	1	3648	9556	0	0	0	0	0	0	4	1	1	188-1187-	-00
65	5	8	1600	0K	032	1	3630	9612	0	0	0	0	0	0	4	1	1	193-1107-	-00
65	5	15	1500	0K	041	1	3648	9505	0	0	0	0	0	0	2	0	1	161-1191-	-00
65	5	18	1500	0K	042	1	3652	9452	0	0	0	0	0	0	3	2	1	158-1191-	-00
65	6	13	3165	0K	045	1	3619	9513	0	0	0	0	0	0	0	0	1	169-1117-	-00
65	6	13	125	0K	061	1	3650	9722	0	0	0	0	0	0	0	0	1	224-1117-	-00
65	6	13	125	0K	062	1	3650	9722	0	0	0	0	0	0	0	0	1	224-1117-	-00
66	4	19	1525	KS	001	1	3855	9448	3858	9440	3	5	0	0	0	3	2	224-1117-	-00
66	5	11	1345	KS	002	1	3939	9712	3941	9706	2	30	0	0	4	3	2	68-117-	-34
66	5	11	1345	KS	003	1	3934	9632	0	0	0	0	0	0	5	3	1	67-115-	-16
66	5	11	1415	KS	034	1	3939	9640	3940	9623	7	0	0	0	0	0	334-1189-	-00	
66	5	11	1515	KS	005	1	3803	9625	0	0	0	0	0	0	0	2	1	252-1136-	-00
66	5	11	1530	KS	006	1	3802	9614	0	0	0	0	0	0	0	0	265-1129-	-00	
66	5	11	1415	KS	007	1	3910	9548	3912	9537	2	198	0	0	0	0	77-119-	-76	
66	5	11	1700	KS	008	1	3720	9518	0	0	0	0	0	0	4	1	181-1157-	-00	
66	5	15	1740	KS	009	1	3909	9441	0	0	2	0	0	0	0	0	40-1172-	-00	
66	5	16	2100	KS	010	1	3710	9718	0	0	0	0	0	0	0	0	230-1100-	-00	
66	5	20	1745	KS	011	1	3812	9731	0	0	0	0	0	0	0	0	269-1186-	-00	
66	5	20	1745	KS	012	1	3806	9724	0	0	0	0	0	0	2	1	264-1181-	-00	
66	5	20	1845	KS	013	1	3806	9724	0	0	0	0	0	0	0	0	264-1181-	-00	
66	5	20	1845	KS	014	1	3811	9730	0	0	0	0	0	0	0	0	268-1186-	-00	
66	6	7	1730	KS	016	1	3812	9731	0	0	0	0	0	0	2	0	269-1186-	-00	
66	6	8	1737	KS	019	1	3908	9709	3913	9701	4	30	0	0	0	0	51-118-	-26	
66	6	8	1800	KS	020	1	3904	9646	3916	9646	8	198	0	0	0	0	360-112-	3-19	
66	6	8	1900	KS	021	1	3855	9555	3905	9555	21	264	16	16	8	5	57-118-	10-63	
66	6	8	2000	KS	022	1	3910	9511	3916	9450	15	60	0	0	5	4	70-117-	1-81	
66	6	8	1915	KS	023	1	3914	9502	3916	9453	8	0	0	0	4	2	74-117-	-00	
66	6	12	1601	KS	024	1	3903	9527	0	0	0	0	0	0	0	0	12-1150-	-00	
66	6	15	1500	KS	025	1	3728	9727	0	0	0	0	0	0	0	0	241-1196-	-00	
66	6	15	1500	KS	026	1	3728	9727	0	0	0	0	0	0	0	0	241-1196-	-00	
66	8	20	1628	KS	033	1	3936	9730	0	0	1	0	0	0	0	0	314-1117-	-00	
66	9	2	1630	KS	034	1	3912	9742	0	0	1	0	0	0	0	0	314-1117-	-00	
66	4	19	1800	MO	002	1	3933	9406	0	0	2	5	0	0	0	0	302-1110-	-01	
66	5	11	1800	MO	006	1	3913	9358	0	0	0	6	0	0	4	1	36-1123-	-03	
66	5	11	1815	MO	007	1	3727	9434	0	0	0	3	0	0	2	1	54-1199-	-00	
66	5	11	1845	MO	008	1	3728	9417	3728	9414	1	75	0	0	4	2	131-1171-	-00	
66	6	12	1645	MO	020	1	3918	9431	0	0	0	0	0	0	0	0	90-112-	-04	
66	10	14	1425	MO	022	1	3740	9310	3741	9307	2	66	0	0	1	0	40-1184-	-00	
66	5	11	1830	0K	010	1	3610	9554	0	0	2	30	0	0	4	1	67-113-	-37	
66	5	11	1930	0K	011	1	3636	9448	0	0	0	0	0	0	1	2	185-1124-	-11	
66	5	11	1930	0K	012	1	3636	9448	0	0	0	0	0	0	5	1	157-1107-	-68	
66	5	16	2153	0K	016	1	3641	9718	3641	9532	4	15	0	0	2	2	82-117-	-12	
66	6	5	1750	0K	022	1	3650	9724	0	0	2	30	0	0	0	0	220-1121-	-00	
67	6	7	1825	KS	005	1	3946	9541	0	0	0	0	0	0	1	0	224-1118-	-14	
67	6	7	1945	KS	006	1	3804	9750	0	0	0	0	0	0	0	0	560-1192-	-00	
67	6	11	1725	KS	014	1	3906	9600	3925	9547	14	0	0	0	0	0	264-1102-	-00	
67	6	11	1800	KS	015	2	3910	9540	3945	9520	44	0	0	0	5	1	28-1121-	-00	
67	8	29	1600	KS	024	1	3742	9700	0	0	0	0	0	0	5	4	24-1135-	-00	
67	1	24	1150	MO	001	1	3936	9456	3941	9453	6	30	0	0	3	1	243-1170-	-00	
67	1	24	1235	MO	002	1	3927	9416	0	0	2	15	0	0	5	2	23-116-	-36	
67	1	24	1250	MO	003	2	3906	9415	3915	9403	13	18	0	0	4	2	43-1199-	-07	
67	1	24	1250	MO	004	1	3933	9403	0	0	2	30	0	0	6	3	46-113-	1-52	
67	1	24	1250	MO	004	1	3933	9403	0	0	2	30	0	0	4	0	44-1109-	-11	

*. before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125 NM of WASHINGTON, KS

Fr	Mo	Day	Time (CST)	Sta	Seq	Total #	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F	P	AIRAN	Area sq-mi
67	1	27	20	MO 010	1	3701	9410	3704	9406	0	60	0	0	0	5	2	1	47.7	4.17
67	4	16	1945	MO 012	1	3820	9421	3822	9417	0	15	0	0	0	4	1	0	57.7	4.00
67	4	16	1945	MO 013	1	3830	9434	0	0	0	3	0	0	0	1	0	0	73.7	55.00
67	4	16	1945	MO 014	1	3846	9430	0	0	0	3	0	0	0	1	0	0	60.7	64.00
67	4	21	1230	MO 016	1	3937	9435	0	0	0	3	0	0	0	1	1	0	31.7	97.00
67	4	21	1300	MO 017	1	3944	9414	0	0	0	15	0	0	0	3	3	3	37.7	112.00
67	4	21	1320	MO 020	3	3928	9346	3936	9333	14	132	0	0	0	5	3	3	51.7	13.69
67	4	21	1500	MO 024	3	3905	9320	3911	9259	3	30	0	0	0	1	0	0	61.7	108.23
67	4	21	1503	MO 025	1	3906	9339	0	0	0	3	0	0	0	3	1	0	81.7	64.00
67	4	21	1510	MO 026	1	3824	9420	0	0	0	3	0	0	0	3	1	0	57.7	4.00
67	4	21	1920	MO 038	1	3924	9436	3926	9432	0	15	0	0	0	2	0	0	13.7	124.00
67	6	9	2145	MO 039	1	4015	9505	0	0	0	3	0	0	0	3	1	1	142.7	115.00
67	6	10	200	MO 040	1	3643	9413	0	0	0	5	0	0	0	1	0	0	64.7	109.00
67	6	10	1100	MO 041	1	3901	9335	0	0	0	15	0	0	0	1	0	0	44.7	80.00
67	6	12	15	MO 043	1	3911	9429	0	0	0	15	0	0	0	4	1	1	126.7	68.00
67	7	28	300	MO 047	1	3734	9432	0	0	0	6	0	0	0	1	0	0	148.7	6.00
67	8	18	1730	MO 054	1	3844	9421	3839	9417	1	15	0	0	0	2	1	1	101.7	113.00
67	10	24	705	MO 055	1	3752	9320	0	0	0	9	0	0	0	3	1	1	54.7	29.00
67	1	25	2330	OK 002	4	3622	9538	3639	9507	33	0	0	0	2	4	2	1	160.7	98.00
67	1	25	2303	OK 003	1	3642	9500	0	0	0	0	0	0	6	4	2	1	39.7	12.00
67	4	9	1828	OK 006	1	3612	9545	3621	9536	13	0	0	0	0	0	0	1	178.7	121.00
67	4	9	1852	OK 007	1	3613	9536	0	0	0	0	0	0	0	0	0	0	214.7	113.00
67	4	12	230	OK 012	1	3540	9659	0	0	0	15	0	0	0	4	2	0	158.7	99.00
67	5	29	1600	OK 018	1	3642	9454	0	0	0	0	0	0	0	4	1	0	219.7	103.00
67	5	31	1810	OK 019	1	3654	9703	0	0	0	65	0	0	0	4	1	0	178.7	87.00
67	6	11	32	OK 034	1	3647	9538	0	0	0	0	0	0	0	0	0	1	155.7	90.00
67	6	11	136	OK 035	1	3652	9454	0	0	0	0	0	0	0	0	0	0	164.7	111.00
67	9	18	1610	OK 048	1	3628	9502	0	0	0	60	0	0	0	2	0	0	220.7	124.00
67	9	26	1430	OK 049	1	3639	9720	0	0	0	0	0	0	0	0	0	1	54.7	34.00
68	4	16	1900	K5 001	1	3904	9610	3924	9535	30	0	0	0	0	4	2	3	67.7	3.00
68	4	16	1904	K5 002	1	3706	9631	3707	9651	2	14	0	0	0	4	0	1	55.7	9.00
68	4	19	1845	K5 003	1	3735	9615	3740	9606	5	0	0	0	0	0	0	1	321.7	75.00
68	5	2	1950	K5 005	1	3712	9642	0	0	0	0	0	0	0	4	0	0	236.7	99.00
68	5	2	2028	K5 009	1	3718	9724	0	0	0	6	0	0	0	3	5	2	248.7	21.00
68	6	10	1845	K5 010	1	3806	9606	0	0	0	15	0	0	0	4	1	2	148.7	99.00
68	4	19	2100	MO 007	1	3650	9435	0	0	0	30	0	0	0	4	1	2	52.7	5.00
68	5	15	1545	MO 011	1	3850	9403	3853	9358	5	60	0	0	2	2	3	5	27.7	3.00
68	5	15	1600	MO 012	3	3917	9402	3920	9400	3	15	0	0	0	4	1	1	55.7	12.00
68	5	15	1600	MO 013	3	3853	9346	3900	9333	7	15	0	0	0	4	2	3	46.7	4.00
68	5	15	1600	MO 014	1	3903	9333	3906	9329	1	15	0	0	0	4	1	1	135.7	86.00
68	5	15	1700	MC 015	1	3713	9425	0	0	0	15	0	0	0	1	0	0	88.7	75.00
68	6	11	2355	MC 020	1	3816	9405	0	0	0	30	0	0	0	1	0	0	353.7	118.00
68	4	16	1825	ME 001	1	4011	9605	0	0	0	0	0	0	0	3	1	0	219.7	115.00
68	4	19	1600	OK 010	1	3645	9712	0	0	0	15	0	0	0	3	0	1	222.7	114.00
68	5	9	1745	OK 024	1	3649	9716	0	0	0	0	0	0	0	3	0	1	96.7	10.00
68	5	22	2030	OK 039	1	3655	9722	3654	9710	6	30	0	0	0	4	2	2	155.7	84.00
68	5	23	30	OK 040	1	3658	9456	0	0	0	0	0	0	0	3	1	1	73.7	3.00
68	12	18	1300	OK 054	1	3621	9600	3622	9556	1	30	0	0	0	4	2	2	67.7	10.00
69	5	5	1835	K5 002	1	3818	9529	0	0	0	6	0	0	0	3	1	1	20.7	53.00
69	5	7	1300	K5 003	1	3904	9518	0	0	0	2	0	0	0	5	1	1	239.7	115.00
69	5	31	2030	K5 007	1	3715	9745	0	0	0	75	0	0	0	5	1	3	70.7	6.00
69	6	12	1600	K5 008	1	3840	9656	3842	9629	1	11	0	0	6	7	3	1	291.7	98.00
69	5	21	2240	K5 009	1	3849	9738	0	0	0	30	0	0	0	5	4	2	113.7	8.00
69	6	23	1600	K5 010	1	3759	9739	3756	9730	8	210	0	0	6	5	4	2	341.7	87.00
69	6	25	1345	K5 012	1	3936	9617	0	0	0	0	0	0	0	3	1	0		

* before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125. NM of BURLINGTON, KS

Yr	Mo	Day	Time (CST)	Sta Seq	Total # seq	Lat begin	Lat end	Lon	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P P	AIRRM	Area sq.mi
69	7	9	1530	KS 015	1	3909 9644	0	0	0	0	0	0	0	1	318.7 74.	-00
69	7	9	1700	KS 016	2	3857 9506	3859 9458	0	7	0	0	4	5	2 2	72.7 7.	-00
69	4	4	1635	MO 002	1	3836 9422	0	0	0	3	0	0	0	0 0 0	70.7 66.	-00
69	4	4	1720	MO 003	1	3843 9359	0	0	0	45	0	1	5	2 0 2	70.7 85.	-05
69	4	26	1870	MO 005	1	3855 9422	0	0	0	15	0	0	4	3 0 1	56.7 74.	-01
69	4	26	2110	MO 006	1	3751 9416	0	0	0	3	0	0	1	0 0 0	109.7 71.	-00
69	6	22	100	MO 007	1	3911 9436	0	0	0	15	0	0	4	1 0 1	41.7 76.	-01
69	6	22	1640	MO 008	1	3756 9354	0	0	0	3	0	0	0	0 0 0	114.7 93.	-00
69	6	23	2130	MO 012	1	3736 9325	0	0	0	5	0	0	2	0 0 0	109.7 81.	-00
69	6	26	1830	MO 013	2	3911 9438	1918 9429	0	5	30	0	5	4	3 3 2	45.7 10.	-32
69	6	26	1835	MO 014	1	3914 9442	0	0	0	30	0	0	5	2 0 2	37.7 75.	-03
69	6	26	1900	MO 015	1	3917 9417	5919 9410	0	6	30	0	0	4	1 2 2	70.7 6.	-58
69	6	26	1900	MO 016	1	3925 9413	0	0	0	5	0	0	4	1 0 0	44.7 98.	-00
69	7	7	1620	MO 019	1	3909 9434	0	0	0	5	0	0	2	1 0 0	43.7 76.	-00
69	7	7	1705	MO 020	1	3636 9452	0	0	0	6	0	0	5	2 0 1	23.7 80.	-00
69	4	16	1820	OK 007	1	3653 9445	0	0	0	0	0	0	4	1 0 2	158.7 106.	-01
69	4	16	1915	OK 008	1	3654 9444	0	0	0	0	0	0	5	2 0 1	151.7 93.	-00
69	6	23	2203	OK 025	1	3648 9512	0	0	1	0	0	0	3	1 1 1	212.7 95.	-00
70	3	2	2345	KS 002	2	3805 9716	3822 9701	0	23	108	0	0	6	2 3 3	165.7 89.	-00
70	5	8	1830	KS 003	1	3848 9800	0	0	0	0	0	0	0	1 1 1	32.7 22.	4.74
70	5	8	1936	KS 004	1	3902 9758	3909 9752	0	9	30	0	0	4	2 2 2	34.7 8.	-55
70	5	9	1730	KS 006	1	3808 9439	0	0	0	30	0	0	5	2 0 2	97.7 49.	-03
70	5	11	1720	KS 007	1	3856 9800	0	0	0	0	0	0	0	0 0 1	291.7 816.	-00
70	5	11	1815	KS 008	1	3852 9806	0	0	1	60	0	0	4	1 0 3	289.7 119.	-11
70	5	11	1830	KS 009	1	3857 9800	0	0	0	0	0	0	0	1 1 1	292.7 816.	-00
70	6	12	2048	KS 018	1	3710 9727	0	0	2	0	0	0	0	0 1 1	233.7 106.	-00
70	6	19	2130	KS 024	1	3942 9777	0	0	0	0	0	0	0	0 0 0	322.7 112.	-00
*70	11	8	1745	KS 029	1	3905 9538	0	0	1	90	0	0	4	2 1 3	3.7 51.	-17
70	6	12	1535	MO 016	1	3917 9330	0	0	3	0	0	0	0	0 0 0	58.7 119.	-00
70	6	12	1340	MO 017	1	3928 9333	3929 9330	0	2	15	0	0	2	1 1 1	67.7 3.	-08
70	6	12	1855	MO 026	1	3839 9314	0	0	0	6	0	1	4	1 0 1	78.7 117.	-00
70	9	2	1603	MO 033	1	3840 9404	0	0	0	9	0	0	2	0 0 1	71.7 80.	-01
70	10	26	1445	MO 037	1	3650 9424	0	0	0	3	0	0	3	1 0 0	144.7 104.	-00
70	6	15	2235	NE 008	1	4010 9610	0	0	0	0	0	0	0	1 1 1	349.7 118.	-00
70	5	9	2035	OK 009	1	3622 9503	0	0	2	0	0	0	3	1 1 1	165.7 116.	-00
70	6	11	1900	OK 024	1	3637 9509	3650 9505	0	9	45	1	1	5	2 2 2	14.7 13.	-79
70	6	20	1930	OK 030	1	3644 9718	0	0	0	30	0	0	0	0 0 2	221.7 119.	-03
70	9	3	2030	OK 035	1	3654 9504	0	0	0	0	0	0	3	1 1 1	161.7 85.	-60
70	9	3	2215	OK 036	1	3612 9530	3	0	0	0	0	0	0	0 0 0	176.7 122.	-00
71	5	5	1640	KS 003	1	3708 9446	0	0	1	132	0	0	3	2 1 3	146.7 79.	-25
71	5	11	1615	KS 006	1	3702 9451	0	0	1	50	0	0	0	0 0 2	151.7 82.	-18
71	5	17	2305	KS 010	1	3915 9716	0	0	1	0	0	0	3	1 1 0	309.7 97.	-00
71	5	21	1340	KS 012	1	3344 9649	0	0	2	140	0	0	0	1 1 3	300.7 61.	-53
71	5	31	1900	KS 017	1	3848 9439	0	0	0	30	0	0	3	1 0 2	55.7 59.	-05
71	5	31	2030	KS 018	1	3812 9715	3812 9708	0	3	60	0	0	5	2 1 3	90.7 6.	-36
71	5	31	2045	KS 019	1	3814 9709	0	0	0	60	0	0	4	1 0 3	270.7 69.	-10
*71	5	31	2145	KS 020	1	3755 9510	0	0	2	90	0	3	3	1 1 3	128.7 31.	-34
71	6	2	1115	KS 021	1	3752 9741	0	0	0	70	0	0	2	0 0 3	257.7 97.	-05
*71	6	6	2135	KS 023	1	3848 9637	0	0	2	60	0	0	5	3 1 3	308.7 55.	-23
*71	6	6	2125	KS 024	1	3853 9553	0	0	0	0	0	0	0	1 0 0	347.7 40.	-00
71	6	9	2030	KS 026	1	3902 9738	0	0	0	60	0	0	0	1 0 3	298.7 103.	-02
71	6	13	1725	KS 030	1	3810 9745	0	0	0	90	0	1	4	2 0 3	268.7 98.	-09
*71	7	9	1415	KS 033	1	3828 9616	3831 9612	0	4	0	0	0	2	2 2 2	46.7 4.	-00
71	2	4	810	MO 001	1	3659 9431	0	0	0	9	0	0	3	1 0 1	163.7 94.	-00

* before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125. MN of BURLINGTON, KS

Tr	Mo	Day	Time (CST)	Sta	Seq	Total # seq	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P P	AIRRAN	Area sq. mi.
71	2	4	1845	MO 002	1	3716	9406	0	0	0	5	0	0	0	4	1 0 0	127.7 95.	-00
71	5	5	1755	MO 008	1	3705	9434	3707	9420	5	21	1	1	60	6	3 2 2	80.7 13.	-23
71	5	5	1830	MO 010	1	3716	9359	3720	9348	4	15	0	0	0	4	1 2 1	65.7 10.	-13
71	5	31	1935	MO 013	1	3900	9417	0	0	0	5	0	0	0	0	1 0 0	55.7 80.	-00
71	6	2	900	MO 014	1	3837	9356	0	0	0	5	0	0	0	3	1 0 0	74.7 85.	-00
71	6	2	1105	MO 015	1	3720	9425	0	0	0	5	0	0	1	2	1 0 0	132.7 81.	-00
71	6	8	50	MO 016	1	3713	9359	0	0	0	36	0	0	0	4	1 0 2	127.7 102.	-05
71	7	23	1632	MO 023	1	3916	9358	0	0	0	3	0	0	0	0	0 0 0	52.7 101.	-00
71	8	3	1300	MO 024	1	3918	9348	0	0	0	1	0	0	0	0	0 0 0	54.7 106.	-00
71	11	1	1750	MO 026	1	3041	9414	0	0	0	8	0	0	0	4	1 1 1	38.7 110.	-02
71	12	14	2215	MO 027	2	3635	9427	3651	9410	12	30	0	1	3	5	1 3 2	40.7 23.	-69
71	12	14	2340	MO 028	4	3702	9334	3738	9306	34	60	0	0	22	6	2 2 3	32.7 42.	3-87
71	5	30	2230	MO 019	1	4016	9406	0	0	0	0	0	0	0	0	0 0 0	35.7 124.	-00
71	4	25	1956	MO 011	1	3636	9406	0	0	0	0	0	0	0	0	0 0 0	192.7 100.	-00
71	5	5	1650	MO 013	1	3659	9450	0	0	0	0	0	0	0	0	0 0 0	151.7 85.	-00
71	5	5	1708	MO 014	1	3616	9420	3619	9502	8	60	0	0	0	4	2 2 3	78.7 15.	-97
71	5	18	1850	MO 020	1	3625	9355	3627	9527	3	50	0	0	0	3	1 1 1	73.7 7.	-22
71	5	22	245	MO 021	1	3636	9447	3638	9444	3	30	0	0	0	5	2 2 2	50.7 3.	-20
71	5	23	1600	MO 023	1	3630	9512	0	0	0	0	0	0	0	4	1 1 1	167.7 107.	-00
71	5	31	1635	MO 025	1	3621	9355	0	0	0	0	0	0	0	4	1 1 1	186.7 114.	-00
71	6	2	1900	MO 027	1	3651	9427	0	0	0	0	0	0	0	2	1 1 0	226.7 119.	-00
71	6	2	1750	MO 003	1	3736	9402	0	0	0	30	0	0	0	4	2 3 2	204.7 41.	1-34
72	4	19	1750	MO 001	1	3736	9402	0	0	0	20	0	0	0	4	2 3 2	260.7 121.	-02
72	4	30	2000	MO 010	1	3835	9814	0	0	0	9	0	0	0	4	2 1 1	500.7 83.	-26
72	4	30	2115	MO 011	1	3855	9714	0	0	0	1	90	0	6	5	3 0 3	500.7 83.	-00
72	4	30	2115	MO 012	1	3845	9446	0	0	0	70	0	0	0	5	2 2 3	54.7 53.	-00
72	4	30	2216	MO 012	1	3845	9446	0	0	0	10	0	0	0	0	1 0 1	54.2.7 36.	-01
72	7	2	1710	MO 032	1	3848	9355	0	0	0	5	0	0	0	0	1 0 0	40.7 61.	-00
72	8	22	15	MO 040	1	3903	9453	0	0	0	0	0	0	0	4	1 2 1	67.7 5.	-17
72	4	33	2105	MO 003	2	3755	9354	3757	9328	5	15	0	0	1	4	1 2 1	72.7 110.	-00
72	4	33	1416	MO 005	1	3847	9327	0	0	0	15	0	0	0	0	0 0 1	38.7 3.	-03
72	7	2	1530	MO 006	1	3815	9407	3817	9405	2	5	0	0	0	3	0 0 1	28.7 3.	-11
72	7	27	1910	MO 007	1	3802	9402	3805	9400	3	15	0	0	1	4	1 1 1	28.7 108.	-06
72	12	30	130	MO 010	1	3953	9445	0	0	0	15	0	0	0	4	2 2 3	25.7 108.	-49
72	12	30	15	MO 011	1	3639	9403	3642	9401	3	66	0	0	2	4	2 2 3	181.7 118.	-00
72	4	12	2130	MO 001	1	3616	9564	0	0	0	9	0	0	0	3	1 0 1	166.7 112.	-00
72	6	26	1930	MO 019	1	3625	9507	0	0	0	3	0	0	0	4	1 0 0	166.7 112.	-00
72	8	21	1730	MO 026	1	3644	9702	0	0	0	0	0	0	0	0	1 0 0	216.7 111.	-00
72	12	29	1315	MO 030	1	3630	9501	3653	9443	6	9	0	0	0	5	2 2 1	32.7 27.	-13
73	3	8	2020	MO 001	3	3726	9524	3736	9502	23	132	0	0	1	5	2 3 3	60.7 20.	5-79
73	3	13	1700	MO 005	1	3814	9607	3823	9606	10	66	0	0	0	4	2 3 2	360.7 4.	1-30
73	3	13	1820	MO 008	1	3853	9449	3857	9449	4	10	0	0	0	4	0 2 1	5.7 9.	-09
73	4	13	1700	MO 009	1	3811	9609	3819	9612	5	100	0	0	0	3	2 2 3	344.7 8.	1-09
73	4	13	2530	MO 011	1	3953	9528	0	0	0	30	0	0	0	1	2 0 2	6.7 100.	-01
73	4	30	2130	MO 013	1	3927	9514	0	0	0	30	0	0	0	1	0 2 2	16.7 76.	-00
73	4	30	2205	MO 014	1	3720	9718	3726	9713	4	60	0	0	0	4	1 2 3	33.7 7.	-47
73	5	1	1630	MO 015	1	3742	9530	3744	9527	3	120	0	0	0	4	1 2 3	50.7 3.	-73
73	5	6	1630	MO 016	1	3955	9540	0	0	0	40	0	0	0	2	0 0 2	1.7 81.	-02
73	5	13	515	MO 019	2	3736	9524	3747	9748	0	90	0	0	0	5	2 2 3	160.7 40.	-00
73	5	26	1425	MO 021	1	3748	9752	3747	9748	3	30	0	0	0	0	1 2 2	108.7 3.	-22
73	5	26	1515	MO 022	1	3743	9736	3745	9732	3	80	0	0	1	5	3 2 3	58.7 4.	-78
73	5	26	1550	MO 023	1	3700	9615	0	0	0	60	0	0	0	3	2 1 3	200.7 79.	-13
73	6	4	1800	MO 024	1	3742	9537	3744	9551	5	90	0	0	0	5	2 2 3	67.7 5.	1-01
73	6	4	1840	MO 025	1	3753	9512	0	0	0	60	0	0	0	4	2 1 3	135.7 32.	-23
73	6	24	1702	MO 028	1	3707	9612	0	0	0	30	0	0	0	4	1 2 2	200.7 71.	-43
73	9	24	1705	MO 029	1	3726	9525	3735	9535	10	30	0	0	0	5	1 3 2	60.7 18.	-60
73	9	24	1900	MO 030	1	3757	9503	3802	9458	5	18	0	0	0	5	2 2 2	59.7 6.	-17

, before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125. mi JURLINGTON, KS

Yr	Mo	Day	Time (LST)	Sta	Seq	Total # seg	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Dir.°	Injuries	Damage Class	F P P	AFIRM	Area sq.mi	
73	9	24	2004	K5 031	1	3731	9452	0	0	0	2	30	0	0	4	1 1 2	158./ 58.	.11	
73	9	25	1430	K5 032	1	3832	9749	0	0	0	0	0	0	0	5	2 2 2	240./ 102.	.00	
73	9	25	1715	K5 034	2	3903	9735	3954	9652	69	20	20	0	2	7	3 4 2	33./ 61.	2.65	
73	9	25	1630	K5 035	1	3918	9736	3921	9733	4	20	20	0	0	5	2 2 1	38./ 4.	.15	
73	9	25	2330	K5 041	1	3929	9720	3933	9715	4	20	20	0	0	5	2 2 1	44./ 6.	.17	
73	9	26	200	K5 042	1	3921	9705	0	0	0	2	10	0	0	0	5	2 1 1	316./ 93.	.05
73	9	27	1518	K5 043	1	3718	9468	0	0	0	0	0	0	0	4	1 0 2	143./ 70.	.03	
73	9	27	1700	K5 044	1	3749	9502	0	0	0	0	0	0	0	5	2 2 2	129./ 40.	.00	
73	10	11	100	K5 045	1	3718	9890	0	0	0	0	0	0	0	4	1 0 2	243./ 124.	.03	
73	10	11	1630	K5 046	1	3719	9725	0	0	0	0	0	0	0	5	2 0 3	247./ 89.	.08	
73	10	18	200	K5 047	1	3718	9800	0	0	0	0	0	0	0	5	1 0 2	243./ 124.	.02	
73	10	25	200	K5 048	1	3742	9738	0	0	0	0	0	0	0	4	1 0 2	251./ 98.	.01	
73	11	19	2008	K5 053	1	3751	9803	0	0	0	0	0	0	0	4	0 0 1	258./ 114.	.00	
73	11	19	2045	K5 054	1	3824	9730	0	0	0	0	0	0	0	4	0 0 1	277./ 86.	.00	
73	11	20	2200	K5 055	1	3949	9720	0	0	0	0	0	0	0	4	1 0 1	321./ 122.	.00	
73	11	20	55	K5 056	1	3817	9545	0	0	0	1	10	0	0	5	2 0 1	314./ 4.	.02	
73	3	31	1125	MO 007	1	3825	9347	0	0	0	1	15	0	0	3	1 0 0	87./ 90.	.00	
73	4	19	1800	MO 010	1	3942	9432	0	0	0	1	15	0	0	3	2 1 1	38./ 112.	.03	
73	4	19	1930	MO 011	1	3832	9332	0	0	0	30	264	0	0	5	4 2 4	80./ 102.	5.00	
73	4	20	1300	MO 012	1	3805	9345	3809	9341	13	5	5	0	0	3	0 2 0	38./ 5.	.06	
73	4	20	1508	MO 013	1	3755	9350	0	0	0	13	5	0	0	5	1 3 0	102./ 90.	.12	
73	4	20	1310	MO 014	1	3758	9351	3822	9347	1	5	5	0	0	4	2 2 1	38./ 5.	.05	
73	4	20	1430	MO 016	1	3734	9348	0	0	0	15	15	0	0	5	3 1 1	114./ 98.	.03	
73	4	20	1655	MO 017	1	3825	9324	0	0	0	5	15	0	0	4	2 2 1	86./ 108.	.14	
73	4	20	1825	MO 018	1	3919	9330	0	0	0	5	0	0	0	4	2 2 1	57./ 120.	.00	
73	4	20	1705	MO 019	1	3827	9328	3834	9321	10	30	30	0	0	5	3 3 2	38./ 9.	.58	
73	4	20	1715	MO 020	1	3801	9338	3807	9330	10	30	30	0	0	4	1 2 1	46./ 9.	.00	
73	4	20	1800	MO 021	1	3818	9317	3834	9310	17	30	30	0	0	5	3 3 2	19./ 17.	1.00	
73	4	20	1925	MO 022	1	3832	9313	0	0	0	2	15	0	0	2	2 1 1	81./ 117.	.00	
73	4	20	2255	MO 026	2	3842	9311	0	0	0	2	15	0	0	6	2 1 1	77./ 120.	.06	
73	4	21	2135	MO 029	1	3723	9358	3727	9351	2	30	30	0	0	6	3 2 2	54./ 7.	.13	
73	5	1	1330	MO 031	1	3711	9417	0	0	0	5	30	0	0	2	2 2 1	133./ 92.	.28	
73	5	7	1220	MO 037	1	3906	9336	0	0	0	15	15	0	0	3	2 0 1	62./ 110.	.01	
73	5	7	1645	MO 040	1	3737	9325	0	0	0	1	6	0	0	4	2 0 1	43./ 87.	.01	
73	6	16	1545	MO 065	1	3846	9450	0	0	0	6	0	0	0	0	0 1 1	109./ 114.	.03	
73	7	18	1730	MO 068	1	3928	9404	0	0	0	6	0	0	0	6	2 2 2	23./ 100.	.00	
73	9	4	200	MO 071	1	3824	9420	0	0	0	2	15	0	0	0	1 1 1	48./ 101.	.00	
73	9	24	2300	MO 072	1	3712	9351	0	0	0	2	30	0	0	1	1 1 2	125./ 107.	.11	
73	9	27	1430	MO 073	1	3710	9418	0	0	0	0	0	0	0	0	1 1 1	154./ 92.	.00	
73	12	24	1530	MO 079	1	3723	9357	0	0	0	0	0	0	0	0	0 0 0	122./ 97.	.00	
73	3	28	1640	OK 008	1	3852	9524	3656	9454	8	10	10	0	0	4	1 2 1	81./ 24.	.16	
73	4	21	2000	OK 013	1	3656	9502	0	0	0	0	36	0	0	4	1 2 1	162./ 103.	.00	
73	4	21	2040	OK 014	1	3638	9501	3641	9457	5	12	12	0	0	4	1 2 1	47./ 4.	.11	
73	4	30	2125	OK 017	1	3659	9705	0	0	0	0	20	0	0	4	2 0 2	222./ 101.	.02	
73	5	18	1800	OK 023	1	3659	9726	3655	9718	8	10	10	0	0	4	1 2 1	122./ 8.	.16	
73	5	26	1500	OK 028	1	3658	9555	3612	9512	10	30	30	0	0	3	3 0 2	198./ 77.	.02	
73	5	26	1530	OK 030	1	3610	9523	3612	9512	18	18	18	0	0	4	1 3 2	77./ 9.	.39	
73	6	4	1815	OK 041	2	3642	9704	3640	9653	10	30	30	0	0	4	2 3 2	103./ 9.	.59	
73	6	4	1900	OK 044	1	3634	9607	0	0	0	1	15	0	0	3	1 1 1	192./ 102.	.04	
73	6	18	1630	OK 056	1	3625	9620	0	0	0	2	12	0	0	5	3 1 1	196./ 113.	.06	
73	9	4	1358	OK 063	1	3643	9718	3645	9701	6	60	60	0	0	3	1 2 3	82./ 14.	.72	
73	9	24	1920	OK 064	3	3640	9507	3653	9452	18	30	30	0	0	5	3 3 3	47./ 16.	3.07	
73	11	19	2010	OK 072	1	3647	9718	3649	9716	2	45	45	0	0	6	1 1 3	39./ 3.	.25	
73	11	20	1	OK 073	1	3620	9548	0	0	0	0	9	0	0	5	1 0 1	183./ 114.	.01	

* - year means event occurred within a 2 degree square centered on central point

Tornadoes within 125 NM of BURLINGTON, KS

Yr	Mo	Day	Time (CST)	sta	Seq	Total # seg	Lat begin	Lat end	Lon begin	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F	P	F	AIRAN	Area sq.mi
73	11	23	2230	GX	074	1	3616	9515	0	0	1	12	0	0	4	1	1	1	170-1120-	-02
74	5	8	1600	KS	001	7	3838	9642	3940	9530	28	66	0	0	5	2	4	3	42-183-	3-59
74	4	19	1650	KS	003	1	3934	9737	0	0	0	5	0	0	3	1	0	0	312-1120-	-00
74	4	20	5	KS	004	1	3730	9755	3605	9745	20	10	0	0	1	0	3	1	13-136-	-39
74	4	20	1530	KS	006	2	3807	9811	3820	9815	7	30	0	3	4	2	2	3	348-113-	-44
*74	4	20	1650	KS	007	1	3817	9514	0	0	1	60	0	0	4	2	3	3	82-121-	-13
74	5	13	1600	KS	009	1	3806	9806	3621	9712	25	30	0	0	6	1	3	2	70-145-	1-47
74	5	13	1730	KS	010	2	3757	9804	3822	9719	34	30	0	2	6	2	4	2	55-143-	1-98
74	5	13	1945	KS	011	3	3806	9751	3812	9656	20	30	0	2	0	2	3	2	82-144-	1-34
74	5	18	1700	KS	015	1	3740	9730	3755	9650	8	8	0	0	3	0	2	1	65-135-	-12
74	5	30	1900	KS	016	1	3850	9739	0	0	0	0	0	0	0	0	0	0	291-199-	-00
*74	5	30	1700	KS	017	1	3715	9709	0	0	0	0	0	0	0	0	0	0	250-192-	-00
74	6	4	1430	KS	018	1	3808	9634	3749	9617	18	50	0	1	6	2	3	2	145-123-	1-78
74	6	8	1515	KS	020	1	3740	9648	3733	9639	1	60	0	0	0	0	0	1	242-167-	-00
74	6	8	1530	KS	021	1	3820	9812	3824	9809	1	30	0	0	0	0	1	3	334-110-	-33
*74	6	8	1845	KS	022	3	3825	9613	3854	9552	26	528	6	177	7	4	4	3	29-133-	26-83
*74	6	8	1710	KS	023	1	3728	9627	0	0	0	50	0	0	0	0	0	2	218-159-	-01
*74	6	8	2000	KS	024	1	3725	9450	3728	9447	0	60	0	0	0	0	0	3	38-184-	-10
74	8	23	1004	KS	028	1	3750	9718	0	0	0	0	0	0	0	0	0	1	240-189-	-00
74	8	23	1300	MO	001	1	3934	9356	3947	9330	27	30	0	0	0	1	3	2	145-1100-	1-36
74	4	13	1600	MO	002	1	3652	9430	0	0	0	15	0	0	0	0	0	1	64-17-	-22
74	5	13	1830	MO	010	1	3955	9425	3958	9417	7	15	0	0	0	0	0	1	129-1121-	-00
74	5	25	1930	MO	013	1	3658	9343	0	0	0	120	0	0	0	1	3	3	133-1103-	-2-39
74	6	8	2200	MO	015	1	4012	9503	4017	9453	10	0	0	0	0	0	0	0	57-19-	-00
74	6	8	2140	MO	016	1	3704	9407	0	0	0	0	0	0	0	0	0	0	133-1103-	-00
74	6	8	2130	MO	017	1	3651	9424	0	0	1	45	0	0	0	1	1	2	143-1103-	-09
74	6	8	2140	MO	018	1	3654	9420	0	0	2	15	0	0	0	1	1	3	141-1103-	-06
74	5	9	1530	OK	009	1	3618	9517	0	0	1	45	0	0	0	0	0	0	171-1118-	-04
74	5	23	1130	OK	013	1	3633	9450	0	0	1	15	0	0	0	1	1	1	158-1109-	-03
74	6	8	1740	OK	030	1	3620	9553	3624	9550	5	18	0	0	0	2	2	2	31-15-	-18
74	6	8	2114	OK	037	1	3622	9456	3623	9451	1	45	0	0	0	5	3	2	68-13-	-33
74	6	8	2150	OK	038	1	3636	9500	3638	9457	2	30	0	0	0	0	0	0	50-13-	-16
74	8	17	1800	OK	041	1	3648	9555	0	0	1	23	0	0	0	1	0	2	187-187-	-07
74	11	3	230	OK	044	1	3644	9400	0	0	0	0	0	0	0	0	0	0	190-191-	-02
75	6	16	1455	KS	007	1	3825	9706	0	0	0	0	0	0	0	0	0	0	279-168-	-00
75	8	25	1600	KS	012	1	3723	9653	0	0	0	6	0	0	0	0	0	0	228-177-	-01
75	9	10	1650	KS	015	1	3905	9614	0	0	0	0	0	0	0	0	0	0	333-157-	-00
*75	9	10	1910	KS	015	1	3833	9757	3836	9749	2	10	0	0	0	1	1	1	64-17-	-05
75	11	29	1500	KS	016	1	3800	9731	0	0	0	0	0	0	0	0	0	0	261-188-	-00
75	12	13	2305	KS	017	1	3950	9605	3955	9547	1	90	0	0	0	1	3	3	70-115-	-29
75	4	23	1440	MO	002	1	3942	9358	3946	9346	9	120	1	22	6	4	3	3	67-110-	2-31
75	4	24	1550	MO	008	2	3650	9435	3652	9422	7	150	3	0	0	4	3	3	79-111-	2-08
75	11	29	1630	MO	015	1	3946	9451	0	0	3	45	0	0	0	1	2	2	23-1100-	-26
75	11	29	1810	MO	016	1	3914	9350	0	0	8	15	0	0	0	0	0	0	55-1105-	-23
75	12	5	140	MO	017	1	3922	9453	3922	9447	5	8	0	0	0	4	1	2	90-15-	-08
75	12	14	330	MO	018	1	3944	9400	0	0	0	6	0	0	0	1	0	1	41-1119-	-01
75	6	2	1710	ME	038	1	4007	9640	0	0	0	0	0	0	0	0	0	0	338-1122-	-00
75	9	4	135	ME	076	1	4011	9528	0	0	0	0	0	0	0	0	0	0	5-1117-	-00
75	12	13	2540	ME	078	1	4013	9614	0	0	1	15	0	0	0	4	2	0	348-1122-	-03
75	4	24	1800	OK	009	1	3648	9509	3652	9306	5	23	0	0	0	2	2	2	31-15-	-23
76	3	29	1330	KS	002	1	3924	9744	0	0	2	5	0	0	0	0	0	0	306-1118-	-02
76	4	17	1845	KS	008	2	3933	9627	3947	9618	1	84	0	0	0	5	1	3	26-116-	-29
76	6	14	1935	KS	010	1	3727	9658	0	0	0	6	0	0	0	0	0	0	232-177-	-00
76	3	26	1615	MO	008	3	3702	9411	3714	9343	29	12	1	3	5	3	3	3	62-125-	-66

* - before year means event occurred within 2 degree square centered on central point

Tornadoes within 125. MW of BURLINGTON, KS

Yr	No	Day	Time (CST)	Site	Seq	Total # sep	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10 ³ ft	Deaths	Injuries	Damage Class	F P P	AIRAN	Area sq-mi	
76	3	26	1615	MO 009	1	3647	9357	0	0	0	9	136.7/120.	0	0	0	1	0	1	-01
76	4	23	1855	NE 006	1	4001	9640	4006	9631	9	18	54.7/9.	0	0	4	1	2	2	-33
76	2	20	1655	OK 001	1	3644	9624	0	0	0	10	81.7/12.	0	0	3	1	0	1	-01
76	3	4	1215	OK 005	2	3623	9600	3625	9545	9	9	81.7/12.	0	0	5	1	3	1	-02
77	3	11	230	KS 001	1	3755	9524	0	0	0	23	145.7/23.	0	0	4	1	0	2	-01
77	5	4	830	KS 003	1	3746	9529	0	0	0	15	31.7/11.	0	0	5	2	2	1	-14
77	5	4	1130	KS 004	1	3627	9448	3836	9441	4	15	75.7/27.	0	0	5	3	4	3	2.09
77	5	4	1900	KS 005	2	3848	9522	3855	9449	12	90	82.7/7.	0	1	6	2	1	2	-13
77	5	4	1900	KS 006	1	3853	9448	3854	9439	3	21	21.7/2.	0	0	3	1	0	1	-02
77	5	5	1740	KS 007	1	3857	9538	3859	9537	1	9	90.7/5.	0	0	3	1	0	1	-15
77	5	17	1115	KS 008	1	3714	9539	3714	9535	2	30	142.7/71.	0	0	4	1	0	1	-02
77	6	18	1235	KS 012	1	3718	9446	0	0	1	10	142.7/71.	0	0	4	1	0	1	-02
77	5	4	1145	MO 004	2	3826	9433	3848	9415	30	150	33.7/26.	2	15	6	3	3	3	8.54
77	5	4	1315	MO 006	1	3900	9355	3912	9330	13	50	58.7/23.	1	5	6	3	3	2	-75
77	5	4	1345	MO 007	1	3838	9324	3843	9313	11	210	60.7/10.	0	24	7	3	4	4	6.55
77	5	4	1705	MO 008	3	3913	9418	3921	9406	14	90	49.7/12.	0	5	3	4	3	3	2.40
77	5	4	1900	MO 009	3	3919	9400	3926	9307	47	284	80.7/42.	0	1	6	4	4	4	23.91
77	5	4	2055	MO 016	1	3903	9434	0	0	1	30	47.7/71.	0	0	4	0	0	2	-06
77	11	20	915	KS 001	1	3908	9417	0	0	0	0	50.7/85.	0	0	3	0	0	0	-00
78	4	6	1630	KS 002	1	3700	9708	0	0	0	2	156.7/68.	0	0	2	0	0	0	-00
78	5	11	1700	KS 003	1	3837	9459	3836	9446	1	30	223.7/102.	0	0	2	0	0	0	-07
78	5	11	1703	KS 004	1	3749	9623	0	0	0	1	96.7/10.	0	0	2	1	2	2	-00
78	5	11	1737	KS 005	1	3751	9628	0	0	0	1	233.7/42.	0	0	2	0	0	0	-00
78	5	23	1830	KS 007	1	3849	9543	3849	9538	1	9	238.7/44.	0	0	4	0	0	0	-00
78	5	31	1600	KS 011	2	3919	9623	3928	9543	7	390	90.7/4.	0	1	5	2	1	1	-02
78	6	17	1700	KS 012	1	3810	9634	0	0	0	2	74.7/32.	0	0	5	3	2	4	5.47
78	6	17	1815	KS 013	1	3841	9539	3841	9531	4	45	265.7/42.	0	0	5	1	0	2	-00
78	6	17	2020	KS 014	1	3837	9527	0	0	0	1	90.7/6.	0	3	0	0	0	0	-37
78	6	17	2020	KS 015	1	3741	9659	0	0	0	3	25.7/25.	0	0	5	1	0	0	-00
78	6	17	2020	KS 020	1	3825	9718	0	0	0	2	242.7/70.	0	0	5	1	0	0	-00
78	7	7	1814	KS 024	1	3749	9654	0	0	0	2	278.7/77.	0	0	5	1	0	0	-00
78	9	13	1800	KS 026	1	3741	9647	0	0	0	2	353.7/120.	0	0	0	0	0	0	-00
78	9	13	2015	KS 027	1	3759	9601	0	0	0	2	247.7/63.	0	0	0	0	0	0	-00
78	4	5	2140	MO 001	1	3905	9420	0	0	0	15	238.7/62.	0	0	0	0	0	0	-01
78	5	12	1300	MO 003	1	3748	9339	3748	9335	1	30	226.7/22.	0	0	4	0	1	0	-00
78	7	6	1657	NE 032	2	4000	9659	4000	9655	3	30	51.7/81.	0	0	3	1	0	1	-00
78	7	6	1700	NE 033	1	4001	9646	0	0	0	9	90.7/5.	0	0	6	2	2	2	-10
78	9	13	1620	OK 042	1	4009	9614	4010	9608	2	30	335.7/118.	0	0	3	1	1	1	-02
78	4	17	1354	OK 005	1	3644	9708	3647	9659	3	12	78.7/5.	0	0	4	1	0	0	-15
78	4	17	1357	OK 006	1	3649	9707	3653	9700	4	18	67.7/8.	0	0	4	2	2	2	-08
78	4	17	1358	OK 007	1	3646	9712	3651	9702	5	12	54.7/7.	0	0	5	2	2	2	-16
78	4	17	1358	OK 008	1	3652	9707	3659	9657	6	30	58.7/9.	0	0	5	2	2	2	-12
78	5	11	1435	OK 016	1	3634	9723	3655	9719	3	30	49.7/11.	0	0	5	2	2	2	-22
78	5	11	1800	OK 017	1	3653	9555	0	0	0	12	188.7/82.	0	0	4	1	1	1	-02
78	5	11	1900	OK 018	1	3631	9607	0	0	0	3	191.7/105.	0	0	0	0	0	0	-00
78	5	11	2050	KS 001	1	3956	9643	3959	9639	1	45	46.7/4.	0	0	5	1	1	2	-15
79	3	29	1735	KS 002	2	3945	9522	3947	9518	1	15	57.7/4.	0	0	3	0	0	1	-04
79	4	11	1700	KS 005	1	3906	9544	3909	9541	0	9	38.7/4.	0	0	1	0	0	0	-01
79	5	2	1630	KS 010	1	3724	9739	0	0	0	4	242.7/106.	0	0	4	1	0	0	-00
79	6	19	1600	KS 013	1	3942	9730	0	0	0	3	316.7/122.	0	0	4	1	0	0	-00
79	10	18	1650	KS 027	4	3911	9738	3928	9622	28	120	233.7/76.	0	11	4	1	0	2	-00
79	10	18	1740	KS 028	3	3915	9621	3934	9525	54	60	74.7/61.	0	5	4	2	3	3	6.39

* before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125 NM of BURLINGTON, KS

Tr	no	Day	Time (LST)	sta	Seq	Total # sq	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10 ³ ft	Deaths	Injuries	Damage Class	F P P	AIRRN	Area sq-mi
76	10	21	1845	KS 029	1	3934	9520	3936	9518	2	30	0	0	1	5	1 1 2	36.1/ 5-	-17
79	4	11	1925	MO 006	2	3915	9426	3930	9413	20	30	0	0	9	5	2 1 2	34.1/ 18-	1.18
79	10	21	2345	MO 007	3	3650	9355	0	0	2	10	0	0	0	4	1 1 3	135.1/119-	-76
79	3	18	700	OK 001	1	3654	9703	0	0	0	0	0	0	0	4	2 2 0	219.1/103-	-00
79	3	18	905	OK 002	2	3654	9556	3655	9548	7	9	0	0	0	4	3 2 1	81.1/ 6-	-04
79	3	18	1315	OK 003	2	3610	9547	3610	9545	1	10	0	0	0	5	2 1 1	90.1/ 2-	-00
79	8	21	1840	OK 040	3	3622	9642	0	0	0	0	0	0	0	0	-	208.1/122-	-00
80	5	29	1916	KS 002	1	3840	9814	0	0	0	0	0	0	0	4	1 2 -	142.1/ 5-	-00
*80	5	31	1445	KS 005	1	3911	9618	3907	9614	5	0	0	0	0	4	1 2 -	6.1/ 49-	-25
*80	5	31	1555	KS 006	1	3903	9534	0	0	2	66	0	0	0	5	2 1 3	90.1/ 6-	-00
*80	5	31	1640	KS 007	2	3858	9504	3858	9458	1	0	0	0	1	5	2 2 -	292.1/ 97-	-00
80	5	31	2230	KS 012	1	3853	9756	0	0	0	0	0	0	0	3	1 -	20.1/ 12-	-34
80	10	15	1942	KS 018	1	3720	9645	3731	9640	4	45	0	0	4	5	1 2 2	73.1/ 24-	-31
80	5	12	1600	MO 004	1	3907	9329	3914	9300	5	30	0	0	0	5	2 2 2	73.1/ 24-	-31
80	5	12	1612	MO 005	1	3840	9325	3844	9308	15	90	0	0	23	7	5 3 3	104.1/ 8-	-48
80	5	12	1630	MO 006	1	3833	9330	3829	9320	8	30	0	0	0	4	1 2 2	191.1/ 83-	-38
80	4	7	1645	OK 006	1	3652	9600	0	0	1	132	0	0	4	6	5 3 3	50.1/ 22-	3.78
80	4	7	1750	OK 007	4	3627	9512	3641	9451	15	132	0	0	4	5	2 1 3	159.1/117-	-11
80	4	7	1700	OK 008	1	3625	9448	0	0	1	60	0	0	0	5	1 -	332.1/ 55-	-00
*81	4	3	1705	KS 003	1	3903	9614	0	0	0	0	0	0	0	3	1 -	1.1/ 98-	-03
*81	4	3	1800	KS 004	1	3947	9500	0	0	1	10	0	0	0	5	2 1 1	351.1/ 43-	-00
*81	4	13	1735	KS 005	1	3854	9549	0	0	0	0	0	0	0	1	0 -	254.1/ 84-	-00
*81	5	8	1500	KS 006	1	3751	9723	0	0	0	5	0	0	0	0	0 0 0	223.1/ 96-	-03
81	5	17	1505	KS 009	1	3704	9703	0	0	0	0	0	0	0	3	1 0 1	220.1/ 79-	-01
81	5	17	1742	KS 012	1	3713	9645	0	0	0	15	0	0	0	0	0 0 0	294.1/116-	-00
81	5	22	1715	KS 013	1	3901	9258	0	0	0	5	0	0	0	0	0 0 0	3.1/ 68-	-04
81	5	23	1815	KS 014	1	3911	9454	0	0	2	10	0	0	0	2	0 1 1	69.1/ 23-	-04
*81	5	23	1815	KS 015	1	3822	9514	0	0	1	10	0	0	0	5	1 2 2	135.1/ 6-	-37
*81	5	23	1725	KS 017	1	3703	9533	0	0	6	30	0	0	0	0	0 0 2	175.1/ 71-	-01
81	5	23	1740	KS 018	1	3702	9532	0	0	0	15	0	0	0	4	1 0 2	174.1/ 72-	-01
*81	5	25	1550	KS 019	1	3857	9406	0	0	0	5	0	0	0	0	0 0 0	336.1/ 47-	-00
*81	6	19	1810	KS 021	1	3858	9516	3855	9508	6	60	1	0	33	7	3 2 3	156.1/ 7-	-72
*81	6	20	1758	KS 022	1	3851	9445	0	0	0	5	0	0	0	0	0 0 0	50.1/ 57-	-50
81	6	21	300	KS 023	1	3907	9443	0	0	0	5	0	0	0	0	0 0 0	518.1/ 72-	-00
81	6	24	1745	KS 024	1	3942	9632	0	0	0	5	0	0	0	0	0 0 0	336.1/ 94-	-00
81	6	29	1332	KS 026	1	3739	9723	0	0	0	5	0	0	0	0	0 0 0	247.1/ 88-	-00
*81	6	29	1612	KS 027	1	3844	9533	0	0	0	5	0	0	0	0	0 0 0	12.1/ 31-	-00
81	6	29	1700	KS 028	1	3704	9714	0	0	0	5	0	0	0	0	0 0 0	227.1/102-	-00
*81	7	10	845	KS 035	1	3908	9439	0	0	0	45	0	0	9	5	2 0 2	2.1/ 54-	-03
81	4	13	1428	MO 001	1	3937	9515	0	0	2	30	0	0	0	1	0 0 2	12.1/105-	-36
81	4	13	1442	MO 002	1	3928	9458	0	0	2	30	0	0	0	1	0 1 2	18.1/109-	-13
81	4	13	1451	MO 003	1	3928	9433	0	0	2	30	0	0	0	3	1 1 2	12.1/106-	-06
81	4	13	2040	MO 005	2	3901	9312	3910	9240	9	50	0	0	0	5	1 3 3	70.1/ 26-	-56
81	5	23	1553	MO 013	1	3917	9446	3919	9442	4	15	0	0	0	0	0 2 1	57.1/ 4-	-12
81	5	23	1755	MO 014	1	3754	9422	0	0	0	15	0	0	0	0	0 0 1	108.1/ 65-	-01
81	6	15	-45	MO 017	1	3855	9432	0	0	0	15	0	0	0	5	1 1 1	53.1/ 68-	-03
81	6	15	1810	MO 018	1	3844	9316	3845	9313	2	15	0	0	0	5	1 1 1	67.1/ 3-	-08
81	6	19	1943	MO 019	1	3838	9433	3839	9425	3	15	0	0	0	0	0 2 1	81.1/ 6-	-10
81	6	19	2010	MO 020	1	3838	9434	0	0	1	15	0	0	0	0	0 1 1	65.1/ 58-	-03
81	6	20	2230	MO 021	1	3854	9522	0	0	1	15	0	0	0	3	1 1 1	70.1/115-	-03
81	6	21	1758	MO 023	1	3853	9434	0	0	1	15	0	0	0	0	0 1 1	53.1/ 65-	-03
81	6	21	1814	MO 024	1	3902	9436	0	0	1	15	0	0	0	0	0 1 1	46.1/ 70-	-03
81	6	21	1814	MO 025	1	3848	9430	0	0	1	15	0	0	0	0	0 1 1	58.1/ 45-	-03
81	6	21	1838	MO 026	1	3900	9434	0	0	0	15	0	0	0	2	0 0 1	49.1/ 69-	-01

* before year means event occurred within a 2 degree square centered on central point

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Tornadoes within 125. No. WILMINGTON, KS

Yr	No	Day	Time (LST)	Sta	Seq	Total #	Lat deg	Lat begin	Lon	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P P	MIRAN	Area sq mi	
81	6	21	2005	MO	027	1	3829	9436	0	0	0	15	15	0	0	0	0	1	74.7/53-	-03
81	6	22	902	MO	029	1	3726	9421	3727	9417	0	15	15	0	0	0	4	1	75.7/5-	-13
81	6	24	1605	MO	030	1	3655	9423	0	0	0	15	15	0	0	0	0	1	54.7/73-	-03
81	5	17	1425	OK	017	1	3650	9722	3659	9705	18	10	10	0	0	0	0	3	56.7/16-	-36
81	5	17	1630	OK	019	1	3653	9704	0	0	0	3	3	0	0	0	1	1	213.7/21-	-00
81	5	7	1845	OK	024	1	3645	9640	0	0	0	2	2	0	0	0	1	2	208.7/101-	-00
81	5	17	14	OK	027	1	3657	9616	0	0	0	2	2	0	0	0	0	1	200.7/82-	-00
81	5	17	1920	OK	028	1	3659	9614	0	0	0	0	0	0	0	0	2	199.7/79-	-00	
81	5	23	100	OK	043	1	3620	9626	0	0	0	0	0	0	0	0	0	1	198.7/20-	-00
81	5	23	1630	OK	046	1	3652	9539	0	0	0	0	0	0	0	0	0	1	179.7/82-	-00
81	5	23	1800	OK	050	2	3656	9553	3659	9537	15	30	30	0	3	0	2	77.7/13-	-86	
81	5	23	1755	OK	051	1	3657	9542	3659	9536	4	30	30	0	3	5	2	58.7/4-	-25	
81	7	21	1630	OK	068	1	3618	9519	0	0	0	0	0	0	0	0	4	171.7/17-	-00	
82	3	15	1649	KS	001	1	3740	9504	0	0	0	1	90	0	0	0	2	208.7/39-	-17	
82	3	15	1745	KS	002	2	3747	9551	3802	9524	14	150	150	0	0	6	4	55.7/26-	4.26	
82	3	15	1815	KS	003	1	3701	9551	3704	9545	6	90	90	1	1	6	3	58.7/6-	1.31	
82	3	15	1840	KS	004	1	3709	9538	0	0	0	0	0	0	0	0	4	17.7/65-	-00	
82	3	15	1915	KS	005	2	3723	9504	3729	9446	17	180	180	0	3	6	2	61.7/15-	6.08	
82	3	15	2020	KS	007	2	3701	9526	3711	9458	28	50	50	1	6	6	3	66.7/24-	2.67	
82	4	2	1450	KS	012	1	3717	9458	0	0	0	0	0	0	0	0	0	149.7/66-	-00	
82	5	5	1530	KS	016	1	3806	9553	0	0	0	0	0	0	0	0	0	148.7/86-	-00	
82	5	14	1730	KS	020	1	3813	9547	0	0	0	0	0	0	0	0	0	270.7/12-	-00	
82	5	15	2225	KS	022	1	3845	9449	0	0	0	0	0	0	0	0	0	258.7/5-	-00	
82	5	15	2228	KS	023	1	3839	9441	0	0	0	0	0	0	0	0	0	253.7/82-	-00	
82	5	18	2306	KS	024	1	3834	9458	0	0	0	0	0	0	0	0	0	53.7/51-	-00	
82	5	20	400	KS	030	1	3724	9551	0	0	0	0	0	0	0	0	0	62.7/53-	-00	
82	5	20	1645	KS	031	1	3927	9747	0	0	0	0	0	0	0	0	0	59.7/39-	-00	
82	5	20	1623	KS	032	1	3742	9528	0	0	0	2	60	0	0	0	0	320.7/38-	-00	
82	5	20	2015	KS	033	1	3718	9533	0	0	0	0	0	0	0	0	0	189.7/51-	-00	
82	5	25	1530	KS	034	1	3846	9439	0	0	0	0	0	0	0	0	0	174.7/56-	-00	
82	5	28	1700	KS	035	1	3936	9511	0	0	0	0	0	0	0	0	0	56.7/85-	-00	
82	5	28	1705	KS	036	2	3946	9505	3947	9501	3	30	30	0	0	0	0	16.7/85-	-00	
82	5	28	2014	KS	039	2	3835	9400	3838	9538	20	5	5	0	0	0	0	72.7/3-	-21	
82	5	28	2025	KS	040	1	3824	9532	0	0	0	0	0	0	0	0	0	80.7/17-	-19	
82	5	28	2030	KS	041	1	3828	9550	3835	9545	10	15	15	0	0	0	0	35.7/12-	-00	
82	5	30	1504	KS	042	1	3800	9538	0	0	0	0	0	0	0	0	0	38.7/9-	-29	
82	5	30	1618	KS	043	1	3742	9527	0	0	0	0	0	0	0	0	0	170.7/14-	-00	
82	6	8	1915	KS	044	1	3922	9558	3926	9547	10	60	60	0	0	0	0	163.7/34-	-00	
82	6	8	2106	KS	045	1	3917	9531	0	0	0	0	0	0	0	0	0	65.7/9-	1.23	
82	6	8	2125	KS	046	1	3919	9518	0	0	0	0	0	0	0	0	0	7.7/63-	-00	
82	7	9	2318	KS	054	2	3842	9725	3903	9659	33	10	10	0	0	0	0	15.7/67-	-00	
82	10	8	1600	KS	056	1	3722	9622	3724	9618	4	30	30	0	0	0	0	44.7/29-	-64	
82	11	11	1608	KS	057	2	3622	9530	3825	9726	4	30	30	0	0	0	0	58.7/4-	-04	
82	12	1	1920	KS	058	1	3750	9440	0	0	0	0	0	0	0	0	0	46.7/14-	-28	
82	3	15	2145	MO	003	1	3805	9335	3815	9322	16	30	30	0	0	0	0	132.7/63-	-03	
82	4	2	1430	MO	007	1	3903	9411	3908	9407	6	210	210	0	0	0	0	46.7/18-	6.55	
82	4	2	1432	MO	008	1	3908	9408	0	0	0	0	0	0	0	0	0	52.7/6-	1.35	
82	4	2	1507	MO	009	1	3807	9332	0	0	0	0	0	0	0	0	0	53.7/90-	-80	
82	4	2	1515	MO	010	1	3837	9124	0	0	0	0	0	0	0	0	0	94.7/102-	-01	
82	4	2	1525	MO	011	1	3911	9333	0	0	0	0	0	0	0	0	0	78.7/109-	-01	
82	4	2	1735	MO	014	1	3846	9308	0	0	0	0	0	0	0	0	0	61.7/116-	-02	
82	5	14	1726	MO	025	1	3808	9323	0	0	0	0	0	0	0	0	0	75.7/124-	-02	

-.4- before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125 NM of BURLINGTON, KS

Yr	Mo	Day	Time (CST)	Site	Seq	Total # seg	Lat	Lon	Lat	Lon	Length miles	Width 10" ft	Deaths	Injuries	Damage Class	F P P	AIRRN	Area sq-mi	
82	5	14	1728	MO 026	1	3810	9318	0	0	0	15	0	0	0	1	0	0	0	92-1112-
82	5	14	1830	MO 028	1	5827	9303	0	0	0	15	0	0	0	2	1	1	1	84-1124-
82	5	14	1835	MO 029	1	5828	9316	0	0	0	15	0	0	0	1	0	1	1	83-1114-
82	5	14	1835	MO 030	1	5832	9313	0	0	0	15	0	0	0	1	0	1	1	81-1117-
82	5	20	1652	MO 038	1	5825	9419	5827	9416	3	30	50	0	0	5	2	1	2	50-1 3-
82	5	20	1850	MO 039	1	5837	9344	0	0	0	0	0	0	0	2	1	0	1	76-1 94-
82	5	28	1810	MO 040	1	5853	9410	0	0	0	15	0	0	0	1	0	0	1	61-1 81-
82	5	28	1938	MO 041	1	5945	9412	0	0	0	15	0	0	0	3	1	0	1	57-1114-
82	5	28	2030	MO 042	1	5914	9337	0	0	0	15	0	0	0	5	1	1	1	90-1 97-
82	10	8	1505	MO 047	1	5924	9435	0	0	0	15	0	0	0	4	1	0	1	36- 87-
82	12	1	1926	MO 048	2	5750	9435	3757	9420	33	60	0	0	5	1	3	3	24-1 29-	
82	12	1	2000	MO 049	1	5828	9400	0	0	0	15	0	0	0	1	0	1	1	80-1 60-
82	12	1	2155	MO 051	1	5852	9314	0	0	0	15	0	0	0	3	1	0	1	72-1121-
82	3	15	1840	OK 004	1	5640	9619	0	0	0	0	0	0	1	0	0	0	1	198-1 99-
82	3	15	1845	OK 005	1	5635	9619	0	0	0	0	0	0	0	5	2	1	1	197-1105-
82	3	15	1855	OK 006	1	5653	9556	0	0	0	0	0	0	0	1	1	1	1	188-1 82-
82	3	15	1902	OK 007	1	5644	9601	3646	9558	3	55	0	0	7	1	2	2	50-1 5-	
82	3	15	1910	OK 008	1	5649	9551	5655	9540	12	53	0	0	5	2	3	2	56-1 17-	
82	3	15	1915	OK 009	1	5652	9537	0	0	0	0	0	0	0	5	2	1	1	178-1 82-
82	4	2	1445	-OK 015	1	5624	9533	0	0	0	15	0	0	0	5	2	1	1	172-1110-
82	4	2	1500	OK 017	1	5620	9516	0	0	0	3	0	0	0	4	2	0	0	170-1116-
82	9	12	1720	OK 094	1	5640	9718	0	0	0	15	0	0	0	2	1	1	1	220-1122-
82	11	11	1665	OK 096	1	5633	9619	0	0	0	6	0	0	0	4	1	1	1	167-1105-
82	12	24	940	OK 101	1	5632	9504	0	0	0	15	0	0	0	5	1	0	1	164-1106-
82	12	24	1515	KS 002	1	5726	9642	3733	9439	8	30	0	0	10	15	1	0	1	19-1 7-
83	5	6	1750	KS 004	1	5854	9552	5903	9535	18	45	0	0	25	3	2	2	56-1 16-	
83	5	12	1620	KS 011	1	5941	9526	0	0	0	15	0	0	0	4	0	1	1	6-1 88-
83	5	18	1615	KS 012	2	3943	9655	3946	9645	9	5	0	0	0	3	0	2	0	69-1 8-
83	5	18	1625	KS 009	1	3954	9703	0	0	0	5	0	0	0	2	0	0	0	328-1118-
83	5	27	1730	KS 012	1	5818	9551	5822	9550	4	15	0	0	0	5	1	2	1	11-1 4-
83	5	27	1736	KS 013	1	5855	9725	0	0	0	5	0	0	0	2	0	0	0	297-1 91-
83	5	27	1738	KS 014	1	5854	9734	0	0	0	5	0	0	0	2	0	0	0	294-1 97-
83	5	27	1744	KS 015	1	5823	9655	0	0	0	5	0	0	0	3	0	0	0	279-1 59-
83	5	27	1930	KS 016	1	5758	9610	0	0	0	5	0	0	0	4	0	0	0	255-1 28-
83	6	3	215	KS 018	1	5736	9519	3736	9511	7	15	0	0	0	5	1	1	1	90-1 6-
83	6	10	1400	KS 019	1	5854	9741	0	0	0	2	0	0	0	3	0	0	0	293-1102-
83	6	10	1630	KS 020	1	5933	9738	0	0	0	2	0	0	0	3	0	0	0	291-1120-
83	6	10	1816	KS 021	1	5926	9721	0	0	0	2	0	0	0	1	0	0	0	311-1120-
83	6	13	1925	KS 027	1	5946	9521	0	0	0	2	0	0	0	1	0	0	0	313-1106-
83	6	18	1755	KS 028	1	5936	9700	0	0	0	2	0	0	0	2	0	0	0	9-1 53-
83	6	18	1755	KS 029	1	5935	9637	0	0	0	2	0	0	0	4	0	0	0	323-1102-
83	7	31	1310	KS 030	1	5802	9501	0	0	0	3	0	0	0	1	0	0	0	532-1 92-
83	4	29	1955	MO 005	1	5708	9330	0	0	0	30	0	0	0	6	2	1	3	111-1 34-
83	4	29	2023	MO 006	1	5712	9327	3715	9322	5	30	0	0	19	3	2	3	122-1124-	
83	4	29	2120	MO 007	1	5648	9431	0	0	0	15	0	0	0	2	0	1	1	53-1 5-
83	5	1	1555	MO 012	1	5854	9321	0	0	0	15	0	0	0	1	0	0	1	147-1103-
83	3	26	1310	OK 003	1	5648	9509	0	0	0	15	0	0	0	1	0	0	1	70-1116-
83	3	26	1400	OK 004	1	5656	9521	0	0	0	9	0	0	0	4	1	0	1	163-1 90-
83	4	27	1840	OK 006	1	5647	9722	5647	9709	11	30	0	0	0	1	3	2	2	168-1 80-
83	4	27	1850	OK 007	1	5643	9640	0	0	0	15	0	0	0	1	0	0	0	90-1 10-
83	4	27	1915	OK 008	1	5641	9653	0	0	0	15	0	0	0	1	0	0	0	207-1103-
83	4	27	2000	OK 010	1	5650	9646	0	0	0	15	0	0	0	1	0	0	0	212-1109-
83	4	29	1930	OK 015	1	5633	9527	0	0	0	15	0	0	0	6	2	0	1	207-1116-
83	4	29	1930	OK 016	1	5652	9522	0	0	0	15	0	0	0	5	2	1	2	174-1162-
83	5	12	1737	OK 017	1	5655	9725	0	0	0	15	0	0	0	1	0	0	1	170-1 83-

* before year means event occurred within a 2 degree square centered on centre point

Tornadoes within 125 NM of L. ANGLTON, KS

Fr	Mo	Day	Time (CST)	Sta	Seq	Total #	Lat begin	Lon begin	Lat end	Lon end	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F	P	F	Area sq. mi
83	5	12	1805	04 019	1	3647	9721	0	0	0	0	15	0	0	1	0	-	1	221.7118-
83	6	18	2105	04 070	1	3646	9650	0	0	0	0	3	0	0	1	0	-	0	212.7104-
83	6	27	2200	04 075	1	3621	9403	0	0	0	0	30	0	0	5	2	0	2	189.7114-
83	6	27	2220	04 076	2	3622	9552	3624	9545	6	30	3	1	0	4	2	0	2	70.7 6-
*84	2	11	1745	05 003	1	3750	9457	0	0	0	0	3	0	0	3	0	-	-	125.7 42-
*84	2	11	1747	05 002	1	3818	9459	0	0	0	1	9	0	0	5	1	1	1	83.7 33-
*84	2	11	1805	05 003	1	3831	9448	0	0	0	2	6	0	1	4	1	1	1	68.7 45-
*84	3	15	1310	05 005	1	3756	9510	0	0	0	3	3	0	0	1	0	-	0	126.7 30-
*84	3	15	1310	05 004	1	3755	9518	0	0	0	0	3	0	0	1	0	-	0	136.7 26-
*84	4	2	1445	05 006	1	3737	9756	0	0	0	0	3	0	0	1	0	-	0	251.7113-
*84	4	2	1450	05 007	1	3740	9756	0	0	0	0	0	0	0	1	0	-	0	252.7112-
*84	4	2	1500	05 008	1	3722	9741	3725	9741	3	3	0	0	0	3	0	1	0	360.7 3-
*84	4	24	1800	05 010	1	3824	9725	0	0	0	0	45	0	0	3	1	0	2	277.7 82-
*84	4	26	1935	05 012	1	3720	9758	0	0	0	0	0	0	0	5	0	-	0	244.7122-
*84	4	26	1945	05 013	1	3801	9739	0	0	0	0	0	0	0	2	0	-	0	262.7 94-
*84	4	26	2038	05 014	1	3701	9554	0	0	0	0	3	0	0	2	0	-	0	188.7 74-
*84	4	26	2125	05 015	1	3906	9553	0	0	0	0	30	0	0	5	2	0	2	350.7 53-
*84	4	26	2145	05 016	1	3914	9543	3921	9534	11	120	0	0	0	7	2	3	3	45.7 10-
*84	4	26	2220	05 017	3	3924	9526	3948	9505	33	360	0	0	0	7	3	4	4	36.7 29-
*84	4	26	2240	05 018	2	3725	9620	3737	9609	17	60	0	0	0	4	1	3	3	36.7 15-
*84	4	27	25	05 019	1	3723	9455	3729	9449	8	12	0	0	0	5	2	2	3	38.7 8-
*84	4	29	1078	05 020	1	3734	9738	0	0	0	0	3	0	0	1	0	-	0	247.7101-
*84	4	29	1040	05 021	1	3730	9730	0	0	0	0	0	0	0	2	0	-	0	243.7 97-
*84	4	29	1050	05 022	1	3740	9726	0	0	0	0	0	0	0	0	0	-	0	248.7 90-
*84	4	29	1058	05 023	1	3748	9719	0	0	0	0	0	0	0	3	0	-	0	251.7 82-
*84	4	29	1058	05 024	1	3702	9555	0	0	0	0	3	0	0	2	0	-	0	189.7 73-
*84	4	29	1100	05 025	1	3751	9715	0	0	0	0	6	0	0	4	1	0	3	253.7 78-
*84	4	29	1105	05 026	1	3744	9720	0	0	0	0	0	0	0	4	1	-	0	249.7 84-
*84	4	29	1110	05 028	1	3743	9719	0	0	0	2	6	0	0	2	1	3	3	247.7 81-
*84	4	29	1150	05 029	1	3702	9625	0	0	0	3	3	0	0	3	0	-	0	206.7 80-
*84	4	29	1154	05 030	1	3719	9640	0	0	0	0	0	0	0	1	0	-	0	220.7 72-
*84	4	29	1338	05 031	1	3704	9703	0	0	0	0	9	0	0	4	1	0	3	223.7 96-
*84	4	29	1425	05 033	1	3730	9722	0	0	0	0	0	0	0	0	0	-	0	241.7 93-
*84	4	29	1425	05 032	1	3825	9624	0	0	0	0	30	0	0	5	0	0	2	288.7 35-
*84	4	29	1440	05 034	1	3733	9719	3742	9717	10	3	3	0	0	4	1	3	2	10.7 9-
*84	6	3	1945	05 037	1	3802	9735	0	0	0	0	6	0	0	3	0	0	1	262.7 91-
*84	6	7	1533	05 038	1	3949	9543	3959	9526	18	90	0	0	0	6	2	3	3	52.7 16-
*84	6	8	1926	05 040	1	3714	9659	0	0	0	0	0	0	0	1	0	-	0	226.7 86-
*84	6	8	1928	05 041	1	3715	9705	0	0	0	0	0	0	0	1	0	-	0	229.7 89-
*84	6	8	1930	05 042	1	3724	9656	0	0	0	0	0	0	0	1	0	-	0	230.7 78-
*84	6	8	2046	05 043	1	3704	9656	0	0	0	1	15	0	0	1	0	1	1	221.7 92-
*84	6	9	1345	05 044	1	3846	9644	0	0	0	0	0	0	0	0	0	-	0	303.7 39-
*84	6	13	1835	05 050	1	3755	9752	0	0	0	0	15	0	0	1	0	0	1	260.7105-
*84	6	13	1935	05 051	1	3747	9805	0	0	0	0	0	0	0	1	0	-	0	257.7117-
*84	6	22	1445	05 053	1	3732	9726	0	0	0	0	15	0	0	0	0	0	1	243.7 93-
*84	6	22	1455	05 054	1	3733	9729	0	0	0	0	0	0	0	0	0	-	0	244.7 95-
*84	10	5	1517	05 058	1	3851	9731	0	0	0	0	7	0	0	0	0	-	0	293.7 93-
*84	10	5	1920	05 059	1	3756	9701	0	0	0	0	1	0	0	0	0	-	0	254.7 66-
*84	10	31	1825	05 061	1	3830	9538	0	0	0	1	30	0	0	5	1	2	2	4.7 36-
*84	10	31	1940	05 062	1	3914	9507	0	0	0	1	30	0	0	1	1	2	2	24.7 66-
*84	10	31	2040	05 063	1	3758	9713	0	0	0	0	1	0	0	0	0	-	0	258.7 74-
*84	4	27	145	04 006	1	3740	9429	0	0	0	0	15	0	0	0	0	-	0	121.7 66-
*84	6	7	2130	04 016	1	3952	9406	0	0	0	1	30	0	0	5	2	2	2	37.7122-
*84	6	8	1650	04 018	1	4012	9502	0	0	0	0	15	0	0	0	1	0	1	14.7122-

*.s. before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125. NM of BURLINGTON, KS

Yr	No Day	Time (CST)	Site Seq	Total # seq	Lat begin	Lon begin	Lat and Lon	Length miles	Width 10's ft	Deaths	Injuries	Damage Class	F P P	AIRAM	Area sq.mi
84	6 8	1702	MO 019	1	4012	9452	0 0	1	15	0	0	4	1 1 1	18./1124.	.03
84	6 7	1800	ME 016	1	4006	9607	0 0	0	15	0	0	3	1 0 1	350./1114.	.01
84	7 5	1930	ME 048	1	4001	9648	0 0	0	12	0	0	5	1 0 1	334./1119.	.02
84	3 15	1538	OK 002	1	3641	9458	0 0	2	9	0	0	1	0 1 1	160./199.	.03
84	3 15	1602	OK 003	1	3637	9459	0 0	0	6	0	0	1	1 1 1	161./1103.	.00
84	4 26	2300	OK 018	2	3620	9604	5622 9556	7	264	0	5	1	1 2 4	73./17.	3.88
84	6 26	2309	OK 019	1	3628	9553	0 0	0	5	0	0	5	2 1 0	185./1106.	.00
84	4 27	1400	OK 022	1	3637	9446	3638 9444	2	6	0	0	3	0 1 3	58./12.	.02
*85	3 3	2145	KS 001	1	3720	9516	0 0	0	1	0	0	6	0 1 1	160./158.	.00
*85	4 13	1305	KS 003	1	3830	9549	0 0	0	9	0	0	3	0 1 1	339./117.	.00
85	7 24	1610	KS 032	1	3807	9649	0 0	0	1	0	0	3	0 1 1	263./154.	.00
85	8 3	1714	KS 013	2	3853	9727	3856 9720	2	120	0	0	3	0 1 2	61./16.	.49
85	8 3	1700	KS 014	1	3853	9729	0 0	0	1	0	0	5	0 1 0	295./193.	.00
85	8 6	1648	KS 015	1	3846	9814	3842 9809	6	120	0	0	5	1 2 3	136./16.	1.46
*85	8 17	1718	KS 016	1	3848	9624	0 0	2	15	0	0	5	1 1 1	315./148.	.06
*85	8 17	1723	KS 017	1	3643	9615	0 0	0	1	0	0	0	0 1 0	318./139.	.00
*85	8 17	1828	KS 018	1	3827	9615	0 0	0	1	0	0	0	0 1 0	296./130.	.00
85	8 23	1400	KS 019	1	3804	9757	0 0	0	1	0	0	4	0 1 0	265./1108.	.00
85	5 26	1735	MO 005	1	3945	9430	0 0	0	15	0	0	0	0 1 1	31./1106.	.01
85	5 26	1815	MO 006	1	3924	9419	0 0	0	15	0	0	0	0 1 1	42./194.	.01
85	5 29	1315	MO 007	1	3647	9422	0 0	0	30	0	0	5	1 0 2	144./1108.	.03
85	5 29	1400	MO 008	1	3653	9423	0 0	1	30	0	0	5	1 1 2	142./1102.	.06
85	5 30	1624	MO 009	3	3936	9456	3931 9440	15	15	0	5	5	1 3 1	112./133.	.44
85	5 30	1628	MO 010	1	3935	9429	0 0	0	15	0	0	5	1 1 1	144./198.	.01
85	6 17	2156	MO 012	1	3949	9451	0 0	0	1	0	0	0	0 1 1	34./198.	.00
85	6 21	1809	MO 013	1	3945	9411	0 0	0	1	0	0	0	0 1 1	32./1102.	.00
85	2 22	215	OK 001	1	3627	9542	0 0	0	1	0	0	5	1 1 1	180./1107.	.00
85	4 19	2330	OK 008	1	3628	9700	0 0	0	1	0	0	5	1 1 1	281./1124.	.00
85	4 30	1345	OK 017	1	3618	9510	0 0	0	1	0	0	5	1 1 1	168./1119.	.00
85	6 14	2255	OK 028	1	3618	9551	0 0	0	1	0	0	5	1 1 1	184./1116.	.00
*86	4 7	1735	KS 001	1	3803	9608	3803 9608	0	15	0	0	5	1 0 1	0./10.	.00
*86	4 7	1801	KS 002	2	3803	9405	3753 9544	22	30	0	0	5	2 3 2	121./119.	1.27
*86	4 7	1755	KS 003	1	3753	9541	3753 9541	0	15	0	0	0	0 1 0	0./10.	.00
*86	4 7	1840	KS 004	1	3750	9501	3730 9501	15	15	0	0	0	0 1 0	0./10.	.00
*86	4 7	1846	KS 005	1	3717	9455	3717 9455	0	15	0	0	0	0 1 0	0./10.	.00
*86	4 7	1855	KS 006	1	3734	9507	3734 9507	0	15	0	0	0	0 1 0	0./10.	.00
*86	4 7	1856	KS 007	1	3734	9505	3734 9505	0	15	0	0	0	0 1 0	0./10.	.00
*86	4 7	1919	KS 008	1	3721	9505	3721 9505	0	15	0	0	4	1 0 1	0./10.	.00
86	4 7	1926	KS 009	2	3819	9651	3821 9649	1	15	0	0	0	0 1 0	38./13.	.04
86	4 7	1945	KS 010	1	3706	9438	3706 9438	1	15	0	0	3	1 0 1	0./10.	.00
86	5 6	2030	KS 013	2	3852	9669	3855 9630	17	60	0	0	5	1 3 3	79./115.	1.97
86	5 8	1935	KS 014	1	3727	9751	0 0	1	15	0	0	3	1 1 1	246./1113.	.03
86	5 8	1946	KS 015	1	3730	9755	0 0	1	15	0	0	3	1 1 1	248./1115.	.04
86	5 16	1500	KS 020	1	3922	9717	3924 9705	10	30	0	0	4	1 2 2	78./19.	.62
*86	5 27	1200	KS 022	1	3756	9512	0 0	2	15	0	0	4	1 1 1	128./129.	.06
*86	5 27	1210	KS 023	1	3758	9510	0 0	1	15	0	0	4	1 1 1	123./129.	.03
86	6 10	1702	KS 024	1	3704	9630	0 0	0	15	0	0	3	0 1 1	209./180.	.00
86	7 6	1724	KS 025	1	3723	9659	0 0	0	3	0	0	0	0 1 0	231./180.	.00
86	9 10	1823	KS 029	1	3950	9733	0 0	0	7	0	0	2	0 1 1	292./194.	.01
86	9 22	1520	KS 031	1	4003	9520	0 0	1	24	0	0	5	0 1 2	9./107.	.05
86	9 22	1530	KS 032	1	3949	9545	0 0	0	7	0	0	4	0 1 1	358./195.	.00
86	4 7	1840	MO 001	1	3705	9434	3705 9434	0	15	0	0	0	1 0 1	0./10.	.00
86	4 7	1845	MO 002	1	3705	9431	3705 9431	0	15	0	0	2	1 0 1	0./10.	.00
86	4 7	2200	MO 003	1	3633	9418	3633 9418	0	15	0	0	0	1 0 1	0./10.	.00
86	10 2	2250	MO 016	1	3815	9326	3815 9316	7	15	0	0	5	1 1 1	53./110.	.23

* before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125 NM of BURLINGTON, KS

Yr	Mo	Day	Time (CST)	Sta	Seq	Total # rep	Lat begin	Lon	Lat and	Lon	Length miles	Width 10 ³ ft	Deaths	Injuries	Damage Class	F P P	AIRAN	Area sq.mi
86	4	7	1744	OK 00	1	3629	9520	3627	9514	6	30	0	0	0	5	2 2 2	113.7	5.34
86	5	14	1313	OK 011	1	3656	9548	0	0	1	15	0	0	0	0	0 1 1	194.7	78.03
86	9	29	785	OK 038	1	3631	9544	0	0	2	30	0	0	1	5	2 1 2	181.7	125.11
87	5	18	1607	KS 004	1	3827	9623	3829	9621	2	90	0	0	0	6	2 2 3	38.7	3.50
87	5	18	1635	KS 005	1	3814	9615	0	0	0	15	0	0	0	5	1 2 1	291.7	28.01
87	5	27	1451	KS 006	1	394	9532	3949	9532	7	30	0	0	0	5	1 2 2	21.7	6.42
87	5	27	1530	KS 007	1	3959	9521	0	0	1	30	0	0	0	5	1 1 2	8.7	106.06
87	6	22	1330	KS 010	1	3822	9727	0	0	0	9	0	0	0	2	0 0 1	276.7	84.00
87	6	22	1440	KS 011	1	3859	9624	0	0	0	15	0	0	0	0	0 0 1	307.7	42.00
87	6	22	1549	KS 012	1	3759	9651	0	0	0	15	0	0	0	4	1 0 1	131.7	53.00
87	6	27	1716	KS 013	1	3726	9450	0	0	0	15	0	0	0	5	1 1 1	140.7	63.00
87	6	28	520	KS 015	1	3921	9727	0	0	0	9	0	0	0	5	0 1 1	309.7	106.00
87	7	5	535	KS 016	1	3742	9720	0	0	1	60	0	0	2	5	1 1 1	248.7	85.17
87	7	5	545	KS 017	1	3735	9706	0	0	1	30	0	0	0	5	1 1 2	239.7	79.06
87	7	5	1900	KS 018	1	3731	9701	0	0	0	15	0	0	0	5	2 1 1	230.7	77.01
87	7	7	1254	KS 019	1	3859	9555	0	0	0	3	0	0	0	0	0 0 0	348.7	46.00
87	11	15	300	OK 023	1	3640	9510	0	0	0	15	0	0	0	4	2 1 0	165.7	97.00
87	5	10	2200	OK 004	2	3659	9737	3723	9707	38	150	0	20	0	2 4 1	45.7	34.00	
87	5	25	2315	OK 012	2	3643	9717	3703	9724	23	198	80	273	280	5 3 4	344.7	21.679	
87	5	25	2359	OK 013	5	3653	9709	3727	9645	44	264	2	29	273	5 4 4	79.7	39.1683	
87	4	2	50	OK 012	9	3649	9658	3806	9553	106	120	0	59	29	4 4 3	36.7	92.5323	
87	4	3	1937	OK 012	4	3646	9658	3806	9553	40	120	0	44	59	4 3 2	49.7	55.914	
87	9	27	1800	OK 063	2	3827	9530	3859	9424	69	132	0	1	207	5 4 3	58.7	60.1743	
87	4	15	1645	KS 023	7	3910	9458	3917	9425	28	45	0	12	1	4 3 3	28.7	18.00	
87	5	7	1345	KS 008	2	3954	9458	0	0	0	0	0	0	0	0	1 1 1	18.7	105.00
87	4	12	1630	KS 004	2	3914	9501	3923	9452	13	132	1	22	0	3 3 3	38.7	11.327	
87	4	10	1440	KS 008	3	3925	9507	3940	9445	26	0	0	11	0	3 3 3	48.7	23.00	
87	5	15	1445	KS 010	2	3838	9439	3838	9436	2	0	0	0	0	4	1 1 1	90.7	2.00
87	4	4	1600	KS 011	3	3821	9446	3831	9430	18	60	0	1	0	5	2 3 3	51.7	16.210
87	5	18	1435	KS 011	7	3921	9506	3952	9436	11	30	0	6	0	4	1 3 7	51.7	45.65
87	3	13	1530	OK 004	2	3648	9708	3727	9640	51	75	0	42	1	6	2 3 1	28.7	147.754
87	9	25	1936	KS 016	9	3821	9601	4031	9631	118	30	3	3	42	7	3 5 2	28.7	147.673
87	3	15	2050	KS 001	5	3732	9448	3803	9342	62	180	2	8	0	7	3 4 4	59.7	61.2138
87	3	15	2045	KS 002	2	3719	9439	3721	9430	8	120	0	0	0	4	1 1 1	74.7	7.194

*. before year means event occurred within a 2 degree square centered on central point

Tornadoes within 125. NM of OURLINGTON, KS

	Path length scale (mi)					MSG	SUM
	0	1	2	3	4		
0:	196	33	12	7	0	0	110 358
1:	155	117	76	27	2	0	112 489
2:	43	77	75	43	12	0	67 317
3:	4	12	30	24	9	2	2 83
4:	0	0	6	10	4	0	0 20
5:	0	0	0	2	2	0	0 4
MSG:	9	9	12	0	0	0	110 140
SUM:	407	248	211	113	29	2	401 1411

	Path length scale (mi)					MSG	SUM
	0	1	2	3	4		
0:	194	131	60	20	2	0	407
1:	14	123	59	47	5	0	248
2:	7	73	60	54	12	1	211
3:	3	20	45	34	10	1	113
4:	0	5	7	11	6	0	29
5:	0	0	1	1	0	0	2
MSG:	34	226	12	3	0	0	126 401
SUM:	252	578	244	170	35	2	130 1411

Path Width Scale

	Path width scale (mi)					MSG	SUM
	0	1	2	3	4		
0:	153	153	23	6	0	0	23 358
1:	81	234	84	53	8	0	29 489
2:	12	113	95	68	5	1	23 317
3:	0	13	30	28	11	1	0 83
4:	0	0	3	10	7	0	0 20
5:	0	0	0	1	3	0	0 4
MSG:	6	65	9	4	1	0	55 140
SUM:	252	578	244	170	35	2	130 1411

	area scale (log10(area)+5)									
	1	2	3	4	5	6	7	8	9	10
0:	61	69	42	21	0	0	0	0	0	0
1:	12	81	114	90	19	0	0	0	0	0
2:	1	11	62	98	36	3	0	0	0	0
3:	0	0	6	28	29	6	0	0	0	0
4:	0	0	0	0	13	5	0	0	0	0
5:	0	0	0	0	1	3	0	0	0	0

F Scale

National Severe Storms Forecast Center

Kansas City MO 64106

Frequency Tables for Tornadoes within 1/2 NM of BURLINGTON, KS

36.23 95.68

Distribution by month and date

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	SUM
JAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	1	0	0	0	0	7
FEB	0	0	0	2	0	0	0	0	5	0	3	0	0	0	0	0	2	0	0	1	0	1	0	3	0	0	0	0	0	0	17	
MAR	0	2	1	2	3	0	0	3	0	0	1	4	3	4	20	2	0	18	0	0	0	0	0	11	1	15	0	1	2	1	5	99
APR	0	18	7	7	5	1	17	0	3	5	2	10	12	0	2	16	6	0	13	24	12	23	5	5	4	21	13	7	24	12	274	
MAY	7	5	0	21	14	5	14	12	18	9	27	7	8	7	16	16	12	19	16	30	3	7	18	12	14	29	28	14	12	17	30	447
JUN	5	7	4	12	6	3	12	32	6	9	18	14	10	8	10	2	8	9	10	3	21	17	3	6	2	7	6	1	9	3	263	
JUL	5	4	1	2	7	5	4	3	6	0	7	2	3	0	3	0	1	2	2	4	5	8	2	1	0	2	1	1	2	0	1	82
AUG	0	3	4	0	4	11	2	2	0	0	0	0	2	3	0	0	4	2	0	5	3	1	3	1	1	0	1	1	2	0	2	57
SEP	2	2	5	0	0	0	0	2	4	1	1	3	0	0	2	1	1	0	7	1	2	0	7	5	5	6	0	1	0	63		
OCT	0	2	0	2	3	1	0	2	0	0	2	7	0	1	1	0	0	3	0	1	3	0	0	1	1	2	0	0	2	0	3	37
NOV	1	1	0	0	0	0	2	0	0	2	0	0	0	0	2	1	14	1	4	4	0	1	1	0	0	0	5	0	3	0	43	
DEC	4	0	0	4	1	0	0	0	0	0	0	0	2	3	0	0	0	1	1	0	0	0	0	2	0	1	0	0	1	2	0	22

Date of initial touchdown using Central Standard Time

National Severe Storms Forecast Center
 Kansas City MO 64106

Frequency Tables for Tornadoes within 125.MM of BURLINGTON, KS

38-23 95-68

Hourly Distribution - CST

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	SUM	PCT	Mean Time	
JAN	1	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	2	7	0.	1441
FEB	0	0	1	0	0	0	0	0	2	0	0	0	0	0	2	2	1	2	1	0	0	0	3	3	17	1.	1912	
MAR	0	2	1	0	0	0	1	0	2	1	5	8	9	2	6	9	10	9	8	11	8	3	4	99	7.	1725		
APR	9	6	3	1	0	0	0	0	0	7	6	1	13	20	17	24	37	43	36	7	20	12	12	274	19.	1612		
MAY	7	5	10	4	3	2	2	2	2	0	4	7	20	27	34	48	59	58	62	26	32	23	10	447	32.	1815		
JUN	6	7	6	5	0	1	3	1	0	3	1	3	4	12	10	16	19	28	34	43	21	20	13	7	263	19.	1846	
JUL	2	4	2	1	1	3	0	2	1	0	0	4	1	5	9	11	13	6	7	4	1	4	1	82	6.	1741		
AUG	2	0	2	1	0	0	0	1	0	0	1	0	0	1	2	4	9	16	9	5	1	2	0	1	37	4.	1746	
SEP	0	1	3	1	1	0	0	1	3	0	0	0	1	3	5	6	7	8	8	5	3	1	2	2	63	4.	1737	
OCT	1	2	2	0	0	0	1	0	0	1	0	0	1	2	3	6	2	6	4	4	0	1	1	1	37	3.	1829	
NOV	3	0	3	0	0	3	0	0	1	4	3	4	2	0	0	2	3	2	1	3	6	1	2	0	43	3.	1651	
DEC	1	2	0	1	0	0	0	0	0	1	0	0	0	1	0	1	1	1	1	4	2	1	1	4	22	2.	2103	
SUM	32	29	33	14	5	9	5	9	9	10	14	23	30	51	75	100	138	178	176	177	87	86	64	47	1411	100.	1815	

PCT 2. 2. 2. 1. 0. 1. 0. 1. 0. 1. 1. 1. 2. 2. 4. 5. 7. 10. 13. 12. 13. 6. 6. 5. 3. 100.

Hour of initial touchdown in Central Standard Time

Tornadoes within 125. NM radius of JRLINGTON, KS

Following for global area within 125. NM radius of 38.23 95.68

The average F-scale is 1.16 which corresponds to 79. mph.
 The average PL-scale is 1.12376; The average PL type path length is 3.258; True average length is 5.197
 The average PW-scale is 1.34758; The average PW type path width is .035; True average width is .080
 The average area using average PL & PW computed by $10^{.45 * (1 + PL) - 3.3}$ is .017
 The summation of the individual areas computed from PL & PW 260.55 divided by 1006 yields average area of .259
 The average area scale is 3.69845; The average area scale type area is .050
 The average length times the average width is .414
 True average length = 5.20
 True average width = .080
 True average area = .892

Probability =	.2923E-03	Mean Return Interval is	3420.97		
For winds exceeding 40 mph	prob =	.2923E-03	Mean Return Interval is	3420.97	based on 811 events
For winds exceeding 73 mph	prob =	.2901E-03	Mean Return Interval is	3447.35	based on 618 events
For winds exceeding 113 mph	prob =	.2578E-03	Mean Return Interval is	3878.50	based on 302 events
For winds exceeding 158 mph	prob =	.1826E-03	Mean Return Interval is	5475.83	based on 91 events
For winds exceeding 207 mph	prob =	.1942E-04	Mean Return Interval is	10613.76	based on 22 events
For winds exceeding 261 mph	prob =	.2089E-04	Mean Return Interval is	47878.09	based on 4 events

	F-0	F-1	F-2	F-3	F-4	F-5
Average PL length	.45	.94	2.02	4.71	8.91	17.78
Average PW width	.01	.02	.03	.06	.13	.24
Average PL & PW area	.01	.09	.29	1.17	5.82	4.67
Average based on #	247.00	377.00	247.00	81.00	20.00	4.00
Average path length	1.11	2.85	6.82	15.04	25.71	39.92
Average path width	.02	.06	.09	.19	.36	.35
Average true area	.03	.25	.88	3.17	10.08	12.92
Average based on #	193.00	316.00	211.00	69.00	18.00	4.00

The following is for local area (two degrees square centered on latitude 38.23 longitude 95.68)

True average length = 6.96
 True average width = .104
 True average area = 1.504

Probability =	.4022E-03	Mean Return Interval is	2486.17		
For winds exceeding 40 mph	prob =	.4022E-03	Mean Return Interval is	2486.17	based on 153 events
For winds exceeding 73 mph	prob =	.4004E-03	Mean Return Interval is	2497.80	based on 126 events
For winds exceeding 113 mph	prob =	.3613E-03	Mean Return Interval is	2767.72	based on 70 events
For winds exceeding 158 mph	prob =	.2609E-03	Mean Return Interval is	3832.98	based on 21 events
For winds exceeding 207 mph	prob =	.1519E-03	Mean Return Interval is	6583.79	based on 8 events
For winds exceeding 261 mph	prob =	.4902E-04	Mean Return Interval is	20401.78	based on 2 events

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Tornado plots within 125. NM of BURLINGTON, KS

Total 1411

Total may differ from path length & path width
matrix because not all events have Pl & PW scale recorded

36.23 95.68

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PAGE	D34 of _____

4.5 Effects of Loss of Ventilation

The purpose of this evaluation is to determine the average steady state temperature in areas containing equipment necessary to achieve and maintain safe shutdown during a station blackout.

There are six heating ventilation and air conditioning (HVAC) systems at WCGS. They are (Section 9.4, Ref. 4)

- o Control Building HVAC
- o Fuel Building HVAC
- o Auxiliary Building
- o Turbine Building HVAC
- o Radwaste Building HVAC
- o Containment HVAC

The turbine and radwaste building HVAC systems serve no safety related functions or equipment (pg. 9.4-47 and 9.4-56, Ref. 4). Safety related equipment in the containment is designed to withstand a loss of coolant accident event which far exceeds containment conditions during a station blackout (pg. 7-18, Ref. 3). The fuel building contains no safety related equipment for the reactor.

Hence, loss of ventilation to the two remaining buildings, the control building and auxiliary building, are addressed below.

Control Building

Loss of control building HVAC will not adversely affect control room habitability as explained in NUMARC 87-00 (pg. 2-13, Ref. 3), for the coping duration of four hours.

The NUMARC conclusion is based on supporting data that the control room complex steady state air temperature will not exceed 120°F.

NUMARC 87-00 also states that the control room complex instrumentation indications and associated logic cabinets which the operator relies upon to cope with a station blackout will remain below 120°F provided cabinet doors are opened within 30 minutes following the station blackout event.

The cabinet doors are opened to dissipate heat generated by operating equipment during the four hour coping period. The cabinets which require that their doors be opened meet the following set of criteria,

- (1) Contain safety related equipment required to maintain decay heat removal during the station blackout, and
- (2) Generate appreciable heat during the station blackout, and
- (3) Would have enhanced equipment cooling if the cabinet door is opened.

For WCGS, only safety related equipment is relied upon to cope with a station blackout for four hours. Table 3-11(B)-3 of the USAR listed all safety related cabinets, panels, control boards, and racks. Of the safety related "cabinets" listed, the majority can be excluded from further consideration because they are:

- (1) Light and control switchboards not generating appreciable heat, or
- (2) Relays and terminal blocks not generating appreciable heat, or
- (3) Equipment and instrumentation not required for maintaining decay heat removal.

(Instrumentation required to maintain decay heat removal is listed in Table 7.5-4 and Table 7.5-5 of the USAR. The equipment required are the turbine-driven auxiliary feedwater pump and steam generator relief valves.)

The remaining cabinets are listed in Table 4-5. Table 4-5 also includes the NSSS and BOP demultiplexers, which are not safety related or required instrumentation to maintain safe shutdown. They are included per WCNOG request.

All the equipment identified in Table 4-5, are located in the control room cabinet area, room 3605. The cabinet area is shown in Figure 1.2-25 of the USAR. The large size of the room, ample air circulation and limited sources of heat generation, support for WCGS, the general NUMARC conclusion that the area steady state air temperature will not exceed 120°F.

Of the cabinets list in Table 4-5, Westinghouse recommends that the Westinghouse supplied equipment cabinet doors remain closed. This recommendation is based on equipment qualification tests with the cabinet doors closed, which show sufficient cabinet cooling for the coping duration; and the knowledge that opening the cabinet doors would eliminate the forced or natural circulating air flow inside the cabinets ("chimney effect"). The equipment qualification tests were performed at 120°F for two 12 hour cycles (Ref. 29). Loss of the "chimney effect" will reduce the air flow over the components and hence reduce the component cooling.

In summary, loss of control building ventilation can be tolerated for the four hour coping duration. The action required is that certain vital control cabinet doors should be opened within 30 minutes.

Turbine-Driven Auxiliary Feedwater Pump Room

Loss of auxiliary building ventilation will only have an adverse impact on locations where a large heat source is present during the station blackout and where decay heat removal equipment is present. The only location subject to these conditions is the turbine-driven auxiliary feedwater pump room (room number 1331). The following is a calculation of room 1331 ambient steady

state temperature during a station blackout. It is shown that the room air temperature will stay below the 150°F turbine-pump design specifications, provided actions are taken to open doorways to enhance air circulation.

The calculations below follow the NUMARC 87-00 guidelines except where noted.

Room 1331 Geometry

The auxiliary turbine room geometry is shown in Figure 4-2. The room walls are assumed to be 12 inches thick and the ceiling 14 inches thick. The room dimensions are approximately 16 by 28.75 by 24.75 feet. The total wall and ceiling surface area is

$$\begin{aligned} A_w &= 2(24.75)(28.75 + 16) + (28.75)(16) \\ &= 2,675 \text{ ft}^2 = 248 \text{ m}^2 \end{aligned}$$

Room 1331 has one door of width 4.25 ft and height 7.25 ft (Ref. 18 and 19).

The auxiliary turbine room 1331 ambient air temperature is nominally 50°F with a maximum of 113°F (Table 3-11(B)-1, Ref. 4). The maximum air temperature shall be used as the initial air temperature in the calculation. The initial wall temperature also will be assumed at 113°F.

Room 1331 Heat Sources

The sources of heat in room 1331 are (Table 3.6-4, Sheet 37, Ref. 4),

- o Auxiliary Feedwater Turbine
- o Auxiliary Feedwater Pump
- o Steam Line to the Turbine (91-DBC-4")
- o Steam Line from the Turbine (048-HBC-10")
- o Condensate Recovery Tank Line Vent (078-HBD-4")

The heat generated by the turbine is determined by using the formula developed in NUMARC 87-00 (pg. 7-20, Ref. 3) which approximates the turbine as a sphere:

$$Q = 0.1(2 + 37.0(T_s - T_{air})^{1/4}D^{3/4})D(T_s - T_{air}) \\ + 1.4 \times 10^{-7} (T_s^4 - T_{air}^4)$$

where

Q = The heat generation rate of the turbine in watts

D = The equivalent diameter of the turbine in meters

T_s = The surface temperature of the turbine in °K

T_{air} = The air temperature of the room at station blackout onset in °K

The turbine surface temperature is assumed to be the maximum operating temperature of the steam, 565°F (569°K) (Ref. 20). The effect of insulation on the turbine, which reduces the surface temperature, is neglected. The initial air temperature is 113°F (318°K).

The equivalent diameter of the turbine is estimated from its weight. The turbine weight is 3,000 lbm (Ref. 20). The density of steel is 488 lbm/ft³ (Ref. 21). The turbine solid volume is 3000/488 = 6.14 ft³. Estimating the internal air volume as 2 ft³ gives a net turbine volume of 8.14 ft³. The equivalent spherical diameter is

$$D = (6V/\pi)^{1/3} = (6(8.14)/\pi)^{1/3}$$

$$D = 2.50 \text{ ft} = 0.761 \text{ meter}$$

Now the turbine heat generation can be calculated from the above formula.

$$Q = 0.1 [2 + 37.0 (569-318)^{1/4} (0.761)^{3/4}] (0.761) (569-318) \\ + 1.4 \times 10^{-7} (0.761)^2 [(569)^4 - (318)^4]$$

$$Q = 2,330 + 7,669 = 9,999 \text{ watt (34,100 Btu/hr)}$$

This is a very conservative calculation, because

- o The insulation will reduce the surface temperature and hence both the radiation and convection terms in the formula.
- o The steam temperature will most likely be less than 565°F. Depressurization of the steam generators, called for in the procedures (Appendix B), will reduce the inlet steam temperature below 565°F.

The turbine driven pump is passing condensate at a maximum temperature of 95°F (Ref. 20). This temperature is below the air temperature of 113°F. Hence, the pump will not be a heat source in the room. The cooling effect of the pump on the room is neglected.

The heat generated by the three high energy pipe lines in the room can be calculated several ways. First a calculation is done using the NUMARC formula, then the piping design specifications are used to show that the NUMARC formula overpredicts the heat input. The piping design specifications are used in the final evaluation.

The NUMARC formula for heat generation from pipes is (pg. 7-19, Ref. 4).

$$Q = (0.1[0.4 + 15.7(T_s - T_{air})^{1/6} D^{1/2} \\ + 170.3(T_s - T_{air})^{1/3} D](T_s - T_{air}) + 1.4 \times 10^{-7} \epsilon (T_s^4 - T_w^4)) L$$

where

Q = The heat generation rate of the pipe in watts

D = The diameter of the pipe in meters

T_s = The surface temperature of the pipe in °K

T_{air} = The air temperature of the room at station blackout onset in °K

L = The length of the pipe in meters

T_w = The surface temperature of the wall in °K

The lengths of piping in room 1331 are obtained from isometric drawings Figure 3.6-1 Sheet 46 and Sheet 49 of the USAR (Ref. 4).

for 91-DBC-4"

$$L = (5 + 5 + 11.25 + 8.65 + 14.44 + 3 + 8.74 + 4) \text{ ft}$$

$$L = 60.1 \text{ ft} = 18.3 \text{ meter}$$

for 048 - HBC - 10"

$$L = (4 + 6.92 + 17.6 + 2 (1.75) + 2 (9.18)) \text{ ft}$$

$$L = 50.4 \text{ ft} = 15.4 \text{ meter}$$

•
for 078- HBD - 4"

$$L = (23.5 + 3 + 10.5) \text{ ft}$$

$$L = 37 \text{ ft} = 11.3 \text{ meter}$$

The pipe nominal inside and outside diameters obtained from Crane (Ref. 22), are given in Table 4-6.

The piping insulation and fluid temperature characteristics from Appendix D of Ref. 23, are also given in Table 4-6. The total outside diameter is calculated from:

$$\begin{aligned} D_I &= D_p + 2(t_I) \\ &= 4.5 + 2(2.5) \\ &= 9.5 \text{ inch} = 0.241 \text{ meter} \end{aligned}$$

The insulated surface temperature of the pipe can be calculated for the initial room conditions by a conduction heat balance through the pipe (pg. 100, Ref. 21)

$$Q = \frac{(T_F - T_{final}^*)}{\frac{1}{\pi D_I L h} + \frac{\epsilon n (D_I/D_{PO})}{2\pi L k_I} + \frac{\epsilon n (D_{PO}/D_{PI})}{2\pi L k_p}}$$

where the notation is defined in Table 4-6. The final steady state air temperature (T_{final}^*) is assumed to be 150°F. This assumption is confirmed later when T_{final} is actually calculated. The pipe and insulation thermal conductivities are obtained from Ref. 21 and Ref. 23. The natural convection heat transfer coefficient is estimated from the simplified correlation for air (pg. 206, Ref. 21).

$$h = 0.25 [(T_S - T_{final}^*)/D_I]^{1/4} \text{ Btu/hr ft}^2\text{°F}$$

Finally the surface temperature of the insulation is

$$T_S = T_{final}^* + Q/\pi D_I L h$$

Solving iteratively for T_s gives the initial surface temperatures in Table 4-6 and the heat generation in Table 4-7.

Now the steady state heat generation from the pipes can be calculated using the formula developed by NUMARC. The wall temperature is equal to the initial air temperature, hence all the variables are given in Table 4-6. The calculation is

$$\begin{aligned}
 Q &= (0.1 [0.4 + 15.7 (370-318)^{1/6} (0.241)^{1/2} \\
 &+ 170.3 [(370-318)^{1/3} (0.241)] (370-318) \\
 &+ 1.4 \times 10^{-7} (0.241) [(370)^4 - (318)^4]) (18.3)
 \end{aligned}$$

$$Q = 21,300 \text{ watt} = 72,700 \text{ Btu/hr}$$

The resultant heat generations are summarized in Table 4-7. The NUMARC formula gives heat generation an order of magnitude greater than the steady state estimate.

A third estimate of the heat generation can be made by restricting the heat flow to below the design specification for the pipes. This value is 65 Btu/hr ft^2 at the insulation surface (Ref. 23). The total heat generation for nominal conditions is simply

$$\begin{aligned}
 Q &= (65 \text{ Btu/hr ft}^2) \pi D_1 L \\
 &= (65) (\pi) (9.5/12) (60.1) \\
 &= 9,720 \text{ Btu/hr} = 2,850 \text{ watt}
 \end{aligned}$$

The design specification heat generations are also listed in Table 4-7.

The NUMARC calculations give values five to seven times higher than the design specifications. One factor contributing to conservative values using the NUMARC formula is treatment of radiative heat transfer as black body radiation. The "grey" insulation cladding the piping will significantly reduce radiative heat transfer from that predicted for a black body. Another factor is using the initial air temperature in calculating the convective heat transfer. As the room air temperature increases the convective heat transfer will decrease. The NUMARC formula conservatisms are appropriate in larger room applications, as shown in NUMARC 87-00. However, for WCGS it is conservative and more appropriate to use twice the insulation design specification in calculating the piping heat generation. The piping heat generation used in the room heat-up calculations are also shown in Table 4-7. (Note that the turbine heat generation estimate includes all the NUMARC formula conservatisms stated above.)

Room 1331 Air Temperature

The final steady state temperature of the room is determined by returning to the NUMARC methodology.

The final temperature with the door remaining closed, is (pg. 7-15, Ref. 3)

$$T_{\text{final}} = T_w + (Q_T/A_w)^{3/4}$$

The final temperature with the door passage open, is calculated from (pg. 7-17, Ref. 3).

$$T_{\text{final}} = 4 + T_w + Q_T^{3/4} / [A_w^{3/4} + 16.18 F^{0.8653}]$$

where

T_{final} = The final steady state air temperature °K

T_w = Wall temperature in °K

Q_T = Total heat generation in Watt

A_w = Wall and ceiling surface area in m^2

F = Door passage factor $H^{3/2} W$ in $m^{5/2}$

H = Door height in meters

W = Door width in meters

The total heat generation is the sum of the heat generated by the turbine and three pipes

$$\begin{aligned} Q_T &= 1,999 + 5,700 + 6,920 + 2,400 \\ &= 25,020 \text{ watts} \end{aligned}$$

Door passage factor is

$$\begin{aligned} F &= [(7.25 \text{ ft})(0.3048 \text{ m/ft})]^{3/2} (4.25 \text{ ft})(0.3048 \text{ m/ft}) \\ &= 4.255 \text{ m}^{5/2} \end{aligned}$$

Again, the wall temperature is assumed equal to the initial air temperature, 113°F (318°K).

The final temperature with the door closed is

$$\begin{aligned} T_{\text{final}} &= 318 + (25,020/248)^{3/4} \\ &= 350 \text{ }^\circ\text{K} (170^\circ\text{F}) \end{aligned}$$

The final temperature with the door passages open is

$$\begin{aligned} T_{\text{final}} &= 4 + 318 + (25,020)^{3/4} / [(245)^{3/4} + 16.18 (4.2555)^{0.8653}] \\ &= 339^\circ\text{K} (150^\circ\text{F}) \end{aligned}$$

The wall area in this calculation was reduced by 3 square meters to account for the wall area occupied by the opened door.

The above open door formula is valid since the total heat generation is between 24,000 and 100,000 watts, and the initial to final temperature difference is 21°C, which is between 0°C and 50°C (pg. E-12, Ref. 3).

It should be noted that the above formula with the door open assumes the air temperature outside the door is constant at 113°F. The room outside the door is a corridor to the turbine building, feed pump valve room (1327), and two motor auxiliary feedwater pump rooms (1325 and 1326). Opening the doors to these four rooms will be required to ensure that the corridor remains below 113°F. The maximum temperature of the adjacent rooms is 104°F (Table 3.11(B)-1, Ref. 4), 9°F below the assumed corridor temperature of 113°F. Hence with all corridor doors open, the assumption of constant 113°F temperature air outside room 1331 is conservative.

The final air temperatures for room 1331 are summarized in Table 4-8. For the auxiliary feedwater pump to operate, the design specifications (Ref. 20) require a temperature of less than 150°F. NUMARC reviewed equipment operability (Appendix F of Ref. 3) and determined that a turbine generator with electronic governors can operate in environments up to 160°F.

The calculated room air temperature is 170°F with the door closed and 150°F with all corridor doors open. An additional reference is a 48 hour test of the turbine-driven pump without room ventilation, and the door closed, starting at nominal ambient conditions. This test shows the room temperature to reach 142°F (Table 3.11(B)-1 of Ref. 4 and Ref. 25).

In summary, the turbine driven-auxiliary feedwater pump will be operable following a loss of ventilation provided all doors in the adjacent corridor are opened.

TABLE 4-5

Potential Cabinets Requiring Open Door
During A Station Blackout

<u>Description</u>	<u>Component Number</u>	<u>Room Number</u>	<u>Spec. Number</u>
BOP Instrument Racks	RP053AA, RP053AB, RP053AC RP053BA, RP053BB, RP053BC	3605	Ref. 28 J-110
RVLIS Equipment	RP068, SB078, SB079	3605	Ref. 29 ESE-51
Subcooling Monitor	RP081A, RP081B	3605	Ref. 29 ESE-46A
ESFAS Cabinets	SA036A, SA036B, SA036C SA036D, SA036E	3605	Ref. 28 J-104
Solid State Protection System*	SB029A through D SB032A through D	3605	Ref. 29 ESE-16
Process Protection Cabinets*	SB037, SB038, SB041, SB042	3605	Ref. 29 ESE-13
BOP Demultiplexer for Control Board Annunciators	RK045A, RK045B, RK045C	3605	Ref. 28 J-108
Westinghouse Demultiplexer*	SB046	3605	Ref. 29 ESE-16
Westinghouse Nuclear Instrumentation NIS*	SE054A through D	3605	Ref. 29 ESE-10

* Westinghouse Supplied Cabinets

TABLE 4-6

Room 1331 Piping Data

	<u>Units</u>	<u>91-DBC-4"</u>	<u>048-HBC-10"</u>	<u>078-HBD-4"</u>
Pipe Inside Diameter (D_{PI})	inch	4.0	10.0	4.0
Pipe Outside Diameter (D_{PO})	inch	4.5	10.75	4.5
Insulation Thickness (t_I)	inch	2.5	1.5	1.0
Insulation Diameter (D_I)	inch(m)	9.5(0.241)	13.75 (0.349)	6.5 (0.165)
Pipe Length (L)	ft(m)	60.1(18.3)	50.4(15.4)	37(11.3)
Fluid Temperature (T_F)	°F	565	260	212
Air Temperature (T_{air})	°F(°K)	113(318)	113(318)	113(318)
Assumed final air				
Temperature (T_{final}^*)	°F	150	150	150
Heat Transfer Coef. (h)	Btu/hr/ft ² °F	1.06	0.79	0.87
Insulation Conductivity (k_I)	Btu/hr/ft°F	0.0333	0.0333	0.0333
Pipe Conductiity (k_P)	Btu/hr/ft°F	25	25	25
Surface Temperature (T_S)	°F(°K)	206(370)	182(356)	172(351)

TABLE 4-7

Piping Heat Generation In Room 1331

	<u>Units</u>	<u>91-DBC-4"</u>	<u>048-HBC-10"</u>	<u>076-HRD-4"</u>
Nominal Steady State	Btu/hr(watt)	6,050(1772)	3,345(980)	852(250)
NUMARC Formula	Btu/hr(watt)	72,700(21,300)	58,400(17,100)	17,400(5,090)
Design Specifications	Btu/hr(watt)	9,750(2,850)	11,800(3,460)	4,090(1,200)
Values used in heatup calculation (2 times Design Spec.)	Btu/hr(watt)	19,500(5,700)	23,600(6,920)	8,180(2,400)

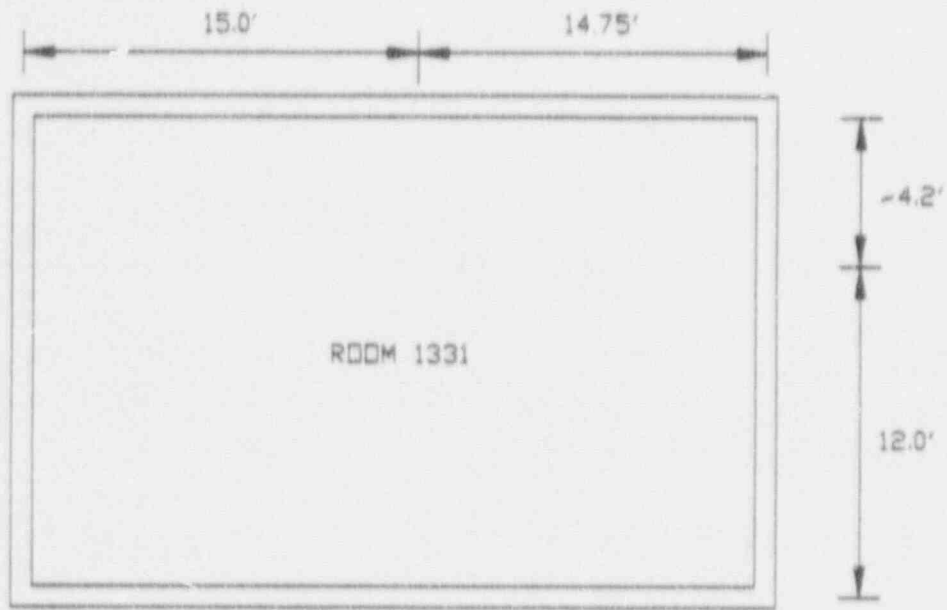
TABLE 4-8

Room 1331 Maximum Air Temperature

<u>Requirement</u>	<u>Temperature</u>
Turbine design specification (Ref. 20)	150°F
Turbine with electronic governor equipment operability (Ref. 3)	160°F
<u>Calculated</u>	
NUMARC formula with door closed	170°F
NUMARC formula with doors open	150°F



SIDE VIEW



TOP VIEW

REFERENCES: FIGURE 1.2-11, 1.2-16, 3.6-1(46), 3.6-1(49)
OF USAR (REF. 4)

FIGURE 4-2 AUXILIARY TURBINE-DRIVEN FEEDWATER PUMP ROOM
DIMENSIONS (ROOM 1331)

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