

REVIEWED BY

M. L. Marsden P. J. Yen

APPROVED BY

C. J. J. J.

1.0 APPLICABILITY

This procedure is used to estimate the atmospheric dispersion factor (X/Q) using Green Bay National Weather Service Meteorological Data when Kewaunee Nuclear Power Plant Meteorological Data is not available.

2.0 PRECAUTIONS

2.1 This procedure is to be used only when the following minimum meteorological parameters are not available from the Kewaunee Nuclear Power Plant Meteorological tower.

- One wind speed indication (60 meter elevation or 10 meter elevation).
- One wind direction indication (60 meter elevation or 10 meter elevation).
- Vertical Temperature Difference indication or Sigma Theta.

2.2 Meteorological data must be re-evaluated every 30 minutes or whenever significant changes occur, to determine if X/Q must be recalculated.

2.3 When determining Xu/Q for a point of interest that falls between two isopleths on an overlay, select the value of Xu/Q that corresponds to the isopleth lying closest to the plume centerline.

If a point of interest lays between an isopleth and plume centerline, select the value of Xu/Q that corresponds to the nearest mile marker on the centerline.

2.4 The WIND DIRECTION CIRCLE on the Base Map may appear to the user to be shifted 180 degrees. This is not an error. The WIND DIRECTION CIRCLE reflects the direct use of wind direction information.

3.0 REFERENCES

- 3.1 NRC Regulatory Guide 1.145, Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants, August 1979.
- 3.2 NRC Regulatory Guide 1.23, Rev 1 (Proposed), Meteorological Programs In Support of Nuclear Power Plants, September 1980.

4.0 INSTRUCTIONS

4.1 Call the National Weather Service Station at Green Bay ()
for meteorological parameters I.A, B, C and D on Form ENV-3D.1.

4.2 Call Point Beach Nuclear Plant () for meteorological parameters
II.A & B on Form ENV-3F.1.

4.3 Determine the stability class from step III of Form ENV-3F.1.

4.4 Place the ground level overlay for the stability class determined in
step 4.3 on the Base Map.

4.5 Align the centerline of the overlay with the wind direction value
on the base map wind direction circle.

NOTE: Use local wind direction if available. Use Green Bay wind
direction (parameter I.A on Form ENV-3F.1), if not available
at the plant.

4.6 Record points of interest in the path of the plume in column 1 of
Form ENV-3F.2 and record the corresponding sector in column 2.

4.7 Determine the distance from the release point to each point of interest
and record in column 3 of Form ENV-3F.2 (Base Map Scale: 2 inches =
1 mile).

4.8 Record local wind speed (parameter II.B on Form ENV-3F.1) in m/sec
in column 4 of Form ENV-3F.2 (wind speed is the same for all points
of interest).

NOTE: If local wind speed is not available, use Green Bay wind
speed (parameter I.B on Form ENV-3F.1).

4.9 Calculate impact time (IT) using the formula on Form ENV-3F.2 and
record in column 5.

4.10 Determine X_u/Q for each point of interest from the overlay and record
in column 6 of Form ENV-3F.2.

4.11 Calculate X/Q using the formula on Form ENV-3F.2 and record in column 7.

4.12 Determine if lake breeze exists using Form ENV-3F.3. If lake breeze
conditions exist, implement special field monitoring in accordance
with EP-ENV-3A, section 6.0.

FORM ENV-3F.1
METEOROLOGICAL DATA WORKSHEET

DATE _____ TIME _____

I. Meteorological Parameters (Green Bay)

<u>Parameter Description</u>	<u>Parameter Name</u>	<u>Parameter Indication</u>
A. Wind Direction	WD(GB)	_____ Degrees
B. Wind Speed	WS(GB) _____ Knots x 0.515 =	_____ meters/sec.
C. Opaque Cloud Cover	CLCVR	_____ (tenths)
D. Cloud Ceiling	CLCEG	_____ (feet)
E. Observation Time of above		_____ (time)

II. Meteorological Parameters (Point Beach)

A. Wind Direction	WD(PB)	_____ Degrees
B. Wind Speed	WS(PB) _____ mph x 0.447 =	_____ meters/sec

III. Stability Class

A. Determine the Insolation Class Number (INCLNO) from the below table.

_____ INCLNO

DATE	HOUR OF DAY From/To (Military Time)*													
	0001	0601	0701	0801	0901	1001	1101	1201	1301	1401	1501	1601	1701	2400
1/5-1/22	1	1	1	1	2	2	2	2	2	1	1	1	1	
1/23-2/6	1	1	1	1	2	2	2	2	2	1	1	1	1	
2/7-2/21	1	1	1	2	2	2	2	2	2	2	1	1	1	
2/22-3/8	1	1	1	2	2	2	3	2	2	2	1	1	1	
3/9-3/23	1	1	2	2	2	3	3	3	2	2	2	1	1	
3/24-4/7	1	1	2	2	3	3	3	3	3	2	2	1	1	
4/8-4/22	1	1	2	3	3	3	3	3	3	3	2	1	1	
4/23-5/7	1	2	2	3	3	3	3	3	3	3	2	2	1	
5/8-5/22	1	2	2	3	3	3	4	3	3	3	2	2	1	
5/23-6/6	1	2	2	3	3	4	4	4	3	3	2	2	1	
6/7-6/21	1	2	2	3	3	4	4	4	3	3	2	2	1	
6/22-7/6	1	2	2	3	3	4	4	4	3	3	2	2	1	
7/7-7/21	1	2	2	3	3	4	4	4	3	3	2	2	1	
7/22-8/5	1	2	2	3	3	3	4	3	3	3	2	2	1	
8/6-8/20	1	2	2	3	3	3	3	3	3	3	2	2	1	
8/21-9/4	1	1	2	3	3	3	3	3	3	3	2	1	1	
9/5-9/19	1	1	2	2	3	3	3	3	2	2	2	1	1	
9/20-10/4	1	1	2	2	2	3	3	3	2	2	2	1	1	
10/5-10/19	1	1	1	2	2	2	3	2	2	2	2	1	1	
10/20-11/3	1	1	1	2	2	2	3	2	2	2	2	1	1	
11/4-11/18	1	1	1	2	2	2	2	2	2	2	2	1	1	
11/19-12/3	1	1	1	1	2	2	2	2	2	2	1	1	1	
12/4-12/18	1	1	1	1	2	2	2	2	2	2	1	1	1	
12/19-1/4	1	1	1	1	2	2	2	2	2	2	1	1	1	

* If daylight savings time is in effect, subtract 1 hour from local time.

FORM ENV-3F.1 (cont'd)
METEOROLOGICAL DATA WORKSHEET

DATE _____ TIME _____

- B. Determine Net Radiation Index (NRADI) from opaque cloud cover (CLCVR step I.C above), cloud ceiling (CLCEG - step I.D above), isolation class number (INCLNO - step III.A above), and the below table:

NRADI

NRADI During Daytime (function of CLCVR and CLCEG) and
Nighttime Conditions

Daytime				Nighttime***
CLVR	CLCEG			
	< 7,000 ft	7,000-15,000 ft	>16,000 ft	
0/10	NRADI = ICLNO			NRADI = -2
1/10				
2/10				
3/10				
4/10				
5/10	NRADI* = ICLNO -2 NRADI* = ICLNO -1			NRADI** = -1
6/10				
7/10				
8/10				
9/10				
10/10	NRADI = 0			

* If NRADI is less than 1, set NRADI equal to 1.

** If CLCVR is 10/10 and CLCEG is less than 7000 ft, NRADI equals 0.

*** Nighttime is defined as that period of time from 1 hour before sunset to one hour after sunrise (see TABLE ENV-3F).

- C. Determine the Stability Class from wind speed in meters per second (WS(PB) step II.B above) and Net Radiation Index (NRADI - step III.B above) from the below table:

NOTE: If WS(PB) is not available, use WS(GB) from step I.B above.

STABILITY CLASS

Stability Class as a Function of NRADI and Wind Speed

WS m/sec	NRADI						
	4	3	2	1	0	-1	-2
0-0.77	A	A	B	C	D	F	G
0.78-1.80	A	B	B	C	D	F	G
1.81-2.83	A	B	C	D	D	E	F
2.84-3.35	B	B	C	D	D	E	F
3.36-3.86	B	B	C	D	D	D	E
3.87-4.89	B	C	C	D	D	D	E
4.90-5.41	C	C	D	D	D	D	D
5.42-5.92	C	C	D	D	D	D	D
> 5.92	C	D	D	D	D	D	D

RELEASE WORKSHEET

DATE _____ TIME _____

[illegible]

$$\star \text{ IT} = \text{D/WS} \times 27$$

$$** X/Q = \frac{(X_u/Q)}{(WS)}$$

FORM ENV-3F.3

LAKE BREEZE EFFECT WORKSHEET

DATE _____ TIME _____

- I. Is local wind direction (WDPB - step II.B on Form ENV-3F.1) between 20° and 170° clockwise?

No - No Lake Breeze

Yes - Proceed to step II

- II. Is Green Bay wind direction (WDGB - step I.B on Form ENV-3F.1) between 210° and 330° clockwise?

No - No Lake Breeze Effect

Yes - Lake Breeze Effect

SUNRISE AND SUNSET AT MILWAUKEE, WISCONSIN
CENTRAL STANDARD TIME

NO. 1322

DAY	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.	
	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM	Rise AM	Set PM
1	7 23	4 26	7 07	5 04	6 28	5 41	5 34	6 17	4 46	6 52	4 15	7 24	4 16	7 34	4 42	7 13	5 16	6 27	5 48	5 33	6 26	4 44	7 03	4 19
2	7 23	4 29	7 06	5 05	6 26	5 42	5 33	6 19	4 45	6 53	4 15	7 24	4 17	7 34	4 43	7 12	5 17	6 25	5 50	5 32	6 27	4 43	7 04	4 18
3	7 23	4 29	7 05	5 07	6 25	5 43	5 31	6 20	4 43	6 54	4 15	7 25	4 17	7 34	4 44	7 11	5 18	6 23	5 51	5 30	6 28	4 42	7 05	4 18
4	7 23	4 30	7 04	5 08	6 23	5 44	5 29	6 21	4 42	6 55	4 14	7 26	4 18	7 34	4 45	7 09	5 19	6 22	5 52	5 28	6 29	4 40	7 06	4 18
5	7 23	4 31	7 03	5 09	6 22	5 46	5 27	6 22	4 41	6 57	4 14	7 27	4 18	7 33	4 46	7 08	5 20	6 20	5 53	5 26	6 31	4 39	7 07	4 17
6	7 23	4 32	7 01	5 11	6 20	5 47	5 26	6 23	4 39	6 58	4 13	7 27	4 19	7 33	4 47	7 07	5 21	6 18	5 54	5 25	6 32	4 38	7 03	4 17
7	7 23	4 33	7 00	5 12	6 18	5 48	5 24	6 24	4 38	6 59	4 13	7 28	4 20	7 33	4 48	7 05	5 22	6 16	5 55	5 23	6 33	4 37	7 09	4 17
8	7 23	4 34	6 59	5 13	6 16	5 49	5 22	6 26	4 37	7 00	4 13	7 29	4 20	7 32	4 49	7 04	5 23	6 15	5 56	5 21	6 35	4 36	7 10	4 17
9	7 22	4 35	6 58	5 15	6 15	5 50	5 20	6 27	4 36	7 01	4 13	7 29	4 21	7 32	4 51	7 03	5 24	6 13	5 58	5 20	6 36	4 35	7 11	4 17
10	7 22	4 37	6 56	5 16	6 13	5 52	5 19	6 28	4 34	7 02	4 12	7 30	4 22	7 31	4 52	7 01	5 25	6 11	5 59	5 18	6 37	4 33	7 12	4 17
11	7 22	4 38	6 55	5 17	6 11	5 53	5 17	6 29	4 33	7 03	4 12	7 30	4 23	7 31	4 53	7 00	5 26	6 09	6 00	5 16	6 38	4 32	7 12	4 17
12	7 21	4 39	6 54	5 19	6 10	5 54	5 15	6 30	4 32	7 04	4 12	7 31	4 23	7 30	4 54	6 59	5 28	6 08	6 01	5 15	6 40	4 31	7 13	4 17
13	7 21	4 40	6 52	5 20	6 08	5 55	5 14	6 31	4 31	7 05	4 12	7 31	4 24	7 30	4 55	6 57	5 29	6 06	6 02	5 13	6 41	4 30	7 14	4 17
14	7 21	4 41	6 51	5 21	6 06	5 56	5 12	6 33	4 30	7 06	4 12	7 32	4 25	7 29	4 56	6 56	5 30	6 04	6 03	5 11	6 42	4 29	7 15	4 18
15	7 20	4 42	6 50	5 23	6 04	5 58	5 10	6 34	4 29	7 08	4 12	7 32	4 26	7 29	4 57	6 54	5 31	6 02	6 05	5 10	6 44	4 26	7 16	4 18
16	7 20	4 43	6 48	5 24	6 03	5 59	5 09	6 35	4 28	7 09	4 12	7 33	4 27	7 28	4 58	6 53	5 32	6 00	6 06	5 08	6 45	4 28	7 16	4 18
17	7 19	4 45	6 47	5 25	6 01	6 00	5 07	6 36	4 27	7 10	4 12	7 33	4 27	7 27	4 59	6 51	5 33	5 59	6 07	5 06	6 46	4 27	7 17	4 18
18	7 19	4 46	6 45	5 27	5 59	6 01	5 06	6 37	4 26	7 11	4 12	7 33	4 28	7 27	5 00	6 50	5 34	5 57	6 09	5 05	6 47	4 26	7 18	4 19
19	7 18	4 47	6 44	5 28	5 57	6 02	5 04	6 38	4 25	7 12	4 12	7 33	4 29	7 26	5 01	6 48	5 35	5 55	6 09	5 03	6 49	4 25	7 18	4 19
20	7 17	4 48	6 42	5 29	5 56	6 04	5 02	6 39	4 24	7 13	4 12	7 34	4 30	7 25	5 03	6 47	5 36	5 53	6 11	5 02	6 50	4 24	7 19	4 19
21	7 17	4 50	6 41	5 30	5 54	6 05	5 01	6 41	4 23	7 14	4 12	7 34	4 31	7 24	5 04	6 45	5 37	5 51	6 12	5 00	6 51	4 24	7 19	4 20
22	7 16	4 51	6 39	5 32	5 52	6 06	4 59	6 42	4 22	7 15	4 13	7 34	4 32	7 23	5 05	6 43	5 38	5 50	6 13	4 58	6 52	4 23	7 20	4 20
23	7 15	4 52	6 38	5 33	5 50	6 07	4 58	6 43	4 21	7 16	4 13	7 34	4 33	7 22	5 06	6 42	5 40	5 48	6 14	4 57	6 53	4 22	7 20	4 21
24	7 14	4 54	6 36	5 34	5 48	6 08	4 56	6 44	4 21	7 17	4 13	7 34	4 34	7 21	5 07	6 40	5 41	5 46	6 16	4 55	6 55	4 22	7 21	4 22
25	7 14	4 55	6 35	5 36	5 47	6 09	4 55	6 45	4 20	7 18	4 14	7 35	4 35	7 21	5 08	6 39	5 42	5 44	6 17	4 54	6 56	4 21	7 21	4 22
26	7 13	4 56	6 33	5 37	5 45	6 11	4 53	6 46	4 19	7 18	4 14	7 35	4 36	7 20	5 09	6 37	5 43	5 42	6 18	4 53	6 57	4 20	7 22	4 23
27	7 12	4 57	6 31	5 38	5 43	6 12	4 52	6 47	4 18	7 19	4 14	7 35	4 37	7 18	5 10	6 35	5 44	5 41	6 19	4 51	6 58	4 20	7 22	4 24
28	7 11	4 59	6 30	5 39	5 41	6 13	4 50	6 49	4 18	7 20	4 15	7 35	4 38	7 17	5 11	6 34	5 45	5 39	6 21	4 50	6 59	4 19	7 22	4 24
29	7 10	5 00	6 29	5 40	5 40	6 14	4 49	6 50	4 17	7 21	4 15	7 35	4 39	7 16	5 12	6 32	5 46	5 37	6 22	4 48	7 00	4 19	7 22	4 25
30	7 09	5 01			5 38	6 15	4 47	6 51	4 17	7 22	4 16	7 34	4 40	7 15	5 13	6 30	5 47	5 35	6 23	4 47	7 02	4 19	7 23	4 26
31	7 08	5 03			5 36	6 16			4 16	7 23			4 41	7 14	5 15	6 29			6 24	4 46			7 23	4 27

Add one hour for Daylight Saving Time if and when in use.