REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:8207280121 DOC.DATE: 82/07/22 NOTARIZED: NO DOCKET #
FACIL:50-438 Bellefonte Nuclear Plant, Unit 1, Tennessee Valley Au 05000438
50-439 Bellefonte Nuclear Plant, Unit 2, Tennessee Valley Au 05000439
AUTH.NAME AUTHOR AFFILIATION
MILLS,L.M. Tennessee Valley Authority
RECIP.NAME RECIPIENT AFFILIATION
ADENSAM,E. Licensing Branch 4

SUBJECT: Forwards data for use in development of Class 9 accident analyses for facilities,in response to NRC 810821 request. Info includes data on groundwater transport evacuation times & responses re gaseous & liquid releases.

DISTRIBUTION CODE: B001S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 90
TITLE: PSAR/FSAR AMDTS and Related Correspondence

NOTES: See "82 Reports

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	A/D LICENSNG	1	0	LIC BR #4 BC	1	0
	LIC BR #4 LA	1	0	HERNAN,R. 01	1	1
INTERNAL:	ELD/HDS2	1	0	IE FILE	1	1
	IE/DEP EPDS 35	1	1	IE/DEP/EPLB 36	3	3
	NRR/DE/CEB 11	1	1	NRR/DE/EQB 13	3	3
	NRR/DE/GB 28	2	2	NRR/DE/HGEB 30	2	2
	NRR/DE/MEB 18	1	1	NRR/DE/MTEB 17	1	1
	NRR/DE/QAB 21	1	1	NRR/DE/SAB 24	1	1
	NRR/DE/SEB 25	1	1	NRR/DHFS/HFEB40	1	1
	NRR/DHFS/LQB 32	1	1	NRR/DHFS/OLB 34	1	1
	NRR/DHFS/PTRB20	1	1	NRR/DSI/AEB 26	1	1
	NRR/DSI/ASB 27	1	1	NRR/DSI/CPB 10	1	1
	NRR/DSI/CSB 09	1	1	NRR/DSI/ETSB 12	1	1
	NRR/DSI/ICSB 16	1	1	NRR/DSI/PSB 19	1	1
	NRR/DSI/RAB 22	1	1	NRR/DSI/RSB 23	1	1
	NRR/DST/LGB 33	1	1	REG FILE 04	1	1
	RGN2	2	2	RM/DDAMI/MIB	1	0
EXTERNAL:	ACRS 41	16	16	BNL(AMDTS ONLY)	1	1
	DMB/DSS (AMDTS)	1	1	FEMA-REP DIV 39	1	1
	LPDR 03	1	1	NRC PDR 02	1	1
	NSIC 05	1	1	NTIS	1	1

TOTAL NUMBER OF COPIES REQUIRED: LTTR 64 ENCL 59

TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

July 22, 1982

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Ms. Adensam:

In the Matter of the Application of	)	Docket Nos. 50-438
Tennessee Valley Authority	)	50-439

This is in response to R. L. Tedesco's August 21, 1981 letter to H. G. Parris requesting TVA's assistance in the development of the class 9 accident analyses for the Bellefonte Nuclear Plant. On April 15, 1982, a meeting was conducted by Dino Scaletti of your staff to further define TVA's participation in this matter. As a result of that meeting, TVA agreed to provide the NRC with a data package for use in the analyses.

The information being transmitted includes data on groundwater transport (Enclosure 1), site specific meteorological conditions (Enclosure 2 and a data tape being supplied separately), evacuation times (Enclosure 3), transient and special populations (Enclosure 4), and responses to questions concerning gaseous and liquid releases (Enclosure 5). Please note that the evacuation time estimates contained in Enclosure 3 are of preliminary nature and are intended solely for your use in the class 9 accident analyses. Also note that different sources were used in compiling the special population data contained in Enclosures 3 and 4. These two data sets should be compared when developing your analyses.

If you have any questions concerning this matter, please get in touch with W. T. Watters at FTS 858-2691.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills

L. M. Mills, Manager
Nuclear Licensing

B001

Enclosures
cc: See page 2

8207280121 820722
PDR ADOCK 05000438
A PDR

Director of Nuclear Reactor Regulation July 22, 1982

cc: U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

ENCLOSURE 1

GEOHYDROLOGIC BASIS FOR GROUND-WATER PATHWAY ANALYSIS

The folowing information provides the basis for estimating the radiological consequences of a Class 9 accident at Bellefonte Nuclear Plant via ground-water pathways.

Description of Site Geohydrology

The Bellefonte site is underlain by the Chickamauga Group (Ordivician Age) consisting of limestone and interbedded shale. These units dip to the southeast at approxmiately 17°, and have a total thickness of about 1400 feet. The Chickamauga is overlain by a thin veneer of residual clay and silt, averaging approximately 10 feet in thickness.

Occasional open fractures and solution cavities were observed within the upper 20 feet of bedrock during foundation exploratory drilling. Below this zone few cavities or fractures were encountered. The average bedrock porosity within the limits of exploration drilling is estimated to be about 0.01. This is based upon the ratio of total fracture-cavity thickness to the total bedrock drilling footage. Borehole packer tests were conducted in exploratory holes to measure bedrock hydraulic conductivity as described in Section 2.5.13 of the BLNP FSAR. Results of these tests are presented in Attachment 1. Hydraulic conductivity values range from less than 0.01 ft/d (approxmiate lower limit of measurement precision) to 10.8 ft/d, with 92 percent of the values being less than 1.0 ft/d.

The water table within the site vicinity conforms in a subdued manner to topography, sloping from the ridges and upland areas toward Town Creek embayment and Guntersville Reservoir (see Attachment 2). Ground-water levels have been monitored monthly since 1973 in the six wells shown on Attachment 3. Hydrographs for these wells and for Guntersville Reservoir along with monthly precipitation records are given in Attachment 4. Generalized high and low water table contour maps are presented in Attachments 5 and 6, respectively. These figures indicate that under both minimum and maximum ground-water level conditions, the hydraulic gradient in the immediate vicinity of the reactors is toward Town Creek embayment. There are no private ground water wells between the plant and Town Creek as indicated on Attachment 7.

Ground-Water Travel Time Analysis

In the event of a Class 9 accident, a core melt would release radiological contaminants to the ground water environment directly beneath the reactor basemat at approximately elevation 588 ft MSL. This would place the release within saturated limestone-shale bedrock where the core mass would be subject to ground water leaching. In the absence of interdictive measures, radionuclides would be transported by natural ground water movement down gradient to Town Creek embayment where they would be dispersed within Guntersville Reservoir. No ground water users would be affected since (1) there are no water wells along the contaminant flowpath, and (2) there are no large ground water withdrawals in the site vicinity which could create gradient reversals such that contaminants could migrate to wells.

The average travel time of radiological contaminants from the reactor to Town Creek embayment was estimated using the following form of Darcy's Law,

$$\bar{v} = K\nabla h/\phi$$

where,

$\bar{v}$ = average ground-water seepage velocity (L/T)

K = hydraulic conductivity (L/T)

∇h= hydraulic gradient (dimensionless)

ϕ = effective porosity (dimensionless)

The following parameters and assumptions were used in the analysis:

(1) Hydraulic conductivity of bedrock (K) = 2.3 ft/d. This represents the second highest measured conductivity value as indicated in Attachment 1.

(2) Average bedrock porosity (ϕ) = 0.01.

(3) Hydraulic gradient (∇h) = 0.01. The hydraulic gradient was conservatively estimated on the basis of the maximum ground-water elevation recorded at the site, i.e., elevation 622 ft MSL measured at well WT-2 on 8/73; the minimum (winter) Town Creek stage of 593 ft MSL as indicated in the reservoir operation schedule (Attachment 8); and the minimum distance (2400 ft) between the reactors and Town Creek. That is, $\nabla h = (622 - 593)/2400 = 0.01$.

(4) No hydrodynamic dispersion of contaminants during transport.

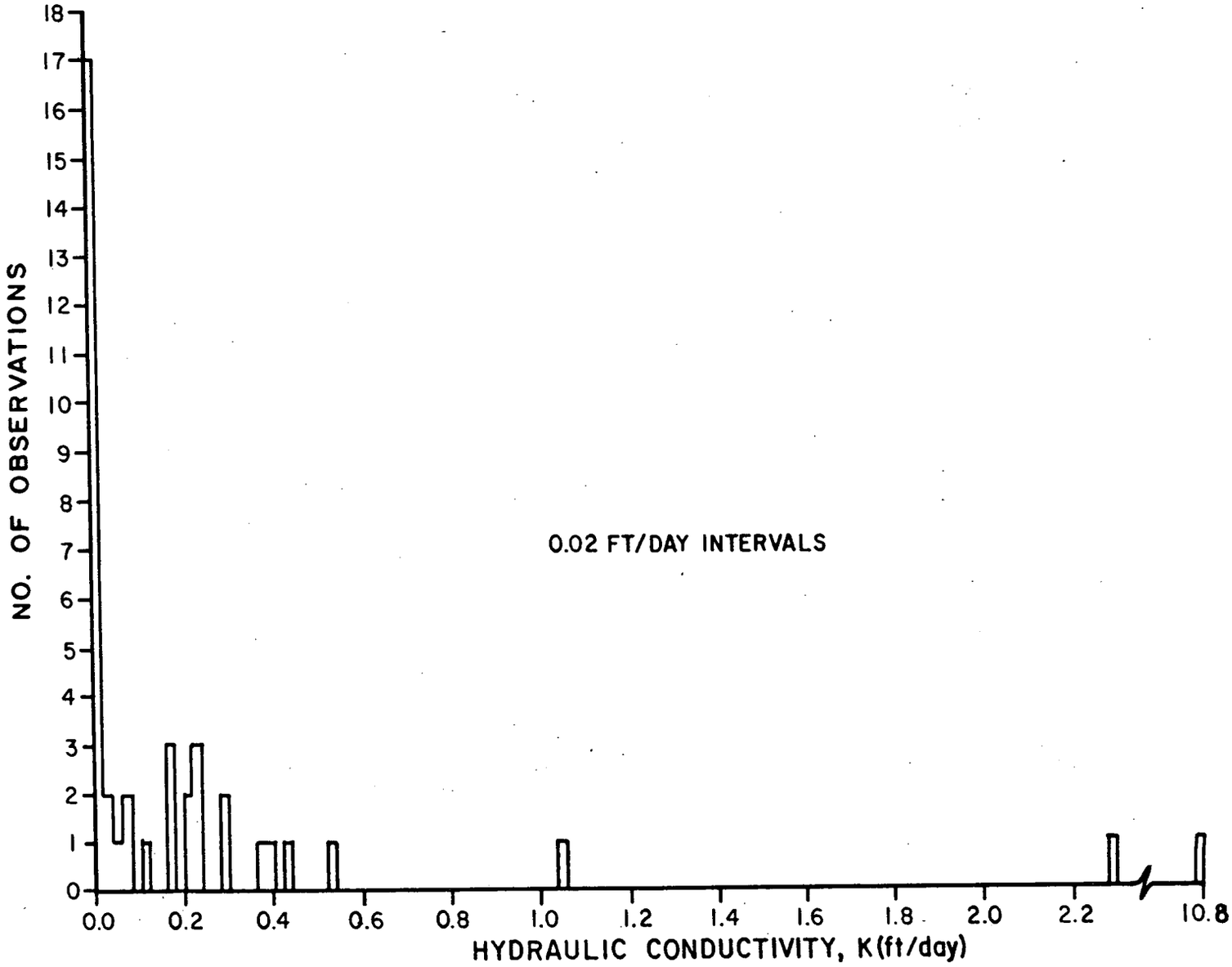
(5) No attenuation of contaminants through geochemical reaction with the transporting medium. This assumption is reasonable for bedrock since little or no geochemical reaction would be expected for transport through rock fractures or solution cavities. However, significant contaminant adsorption and/or ion exchange could be expected in the soil and sediments which underlie Town Creek embayment. However, since the thickness and sorptive characteristics are not known, we conservatively assume no contaminant attenuation in these materials.

Under the above worst-case conditions, the average ground-water seepage velocity is estimated to be,

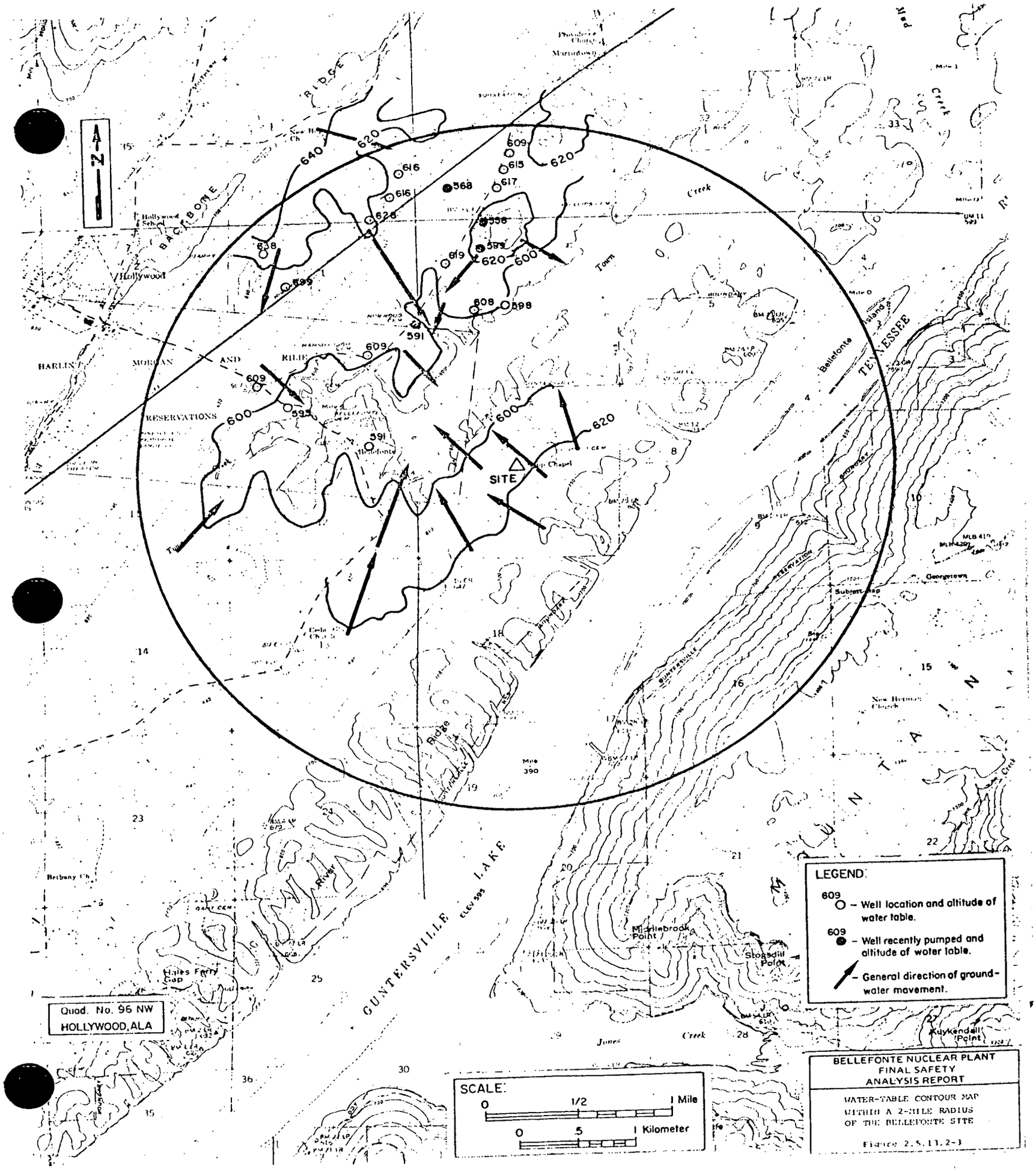
$$\bar{v} = K\nabla h/\phi = (2.3)(0.01)/(0.01) = 2.3 \text{ ft/d.}$$

The average time of travel (t) of contaminants moving with the average ground-water velocity between the reactor and Town Creek is,

$$t = L/\bar{v} = 2400/2.3 = 1044 \text{ days} \approx 3 \text{ years.}$$



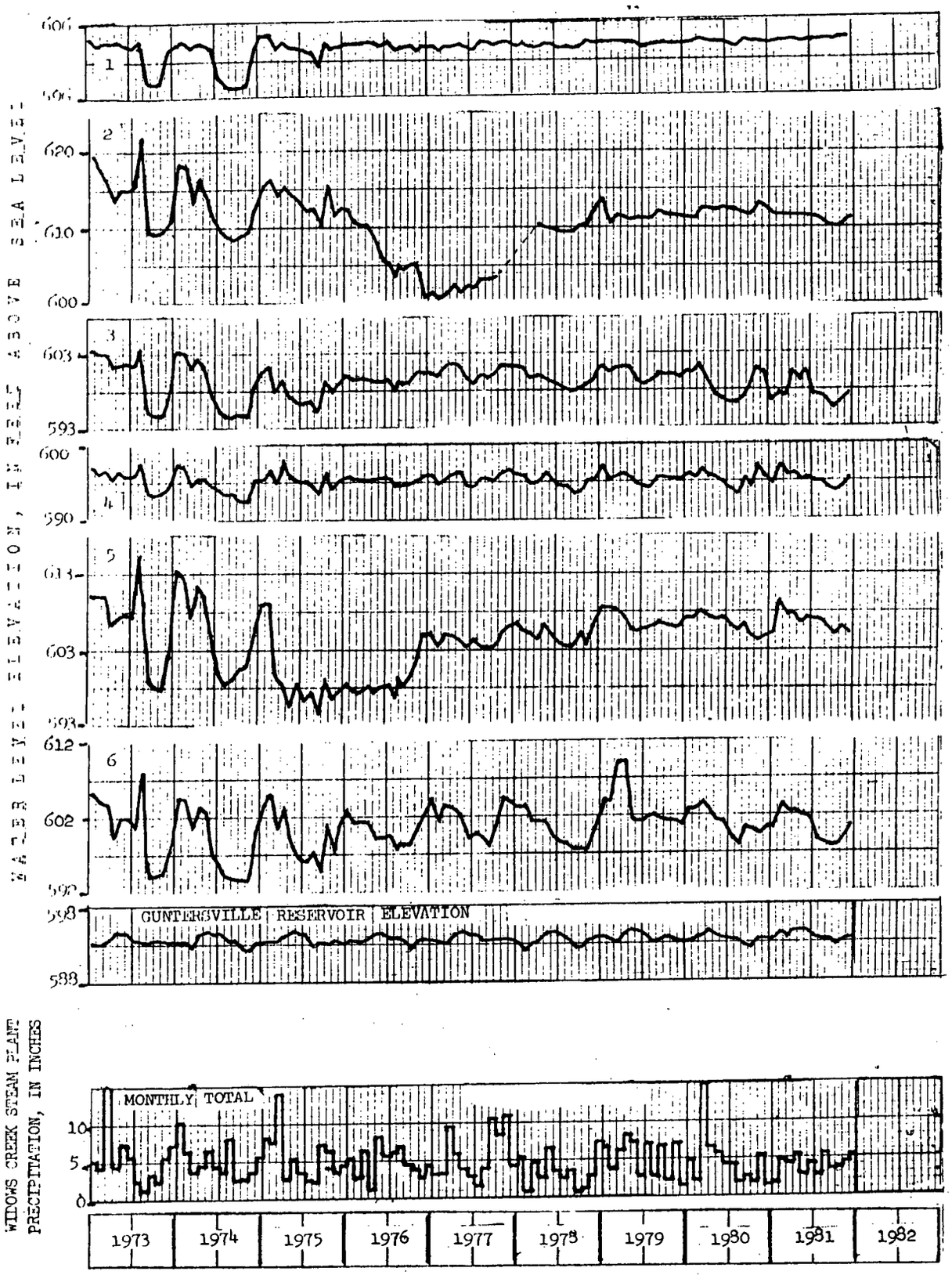
Attachment 1: Bellefonte Nuclear Plant Histogram of Field Hydraulic Conductivity Measurements



BELLEFONTE NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

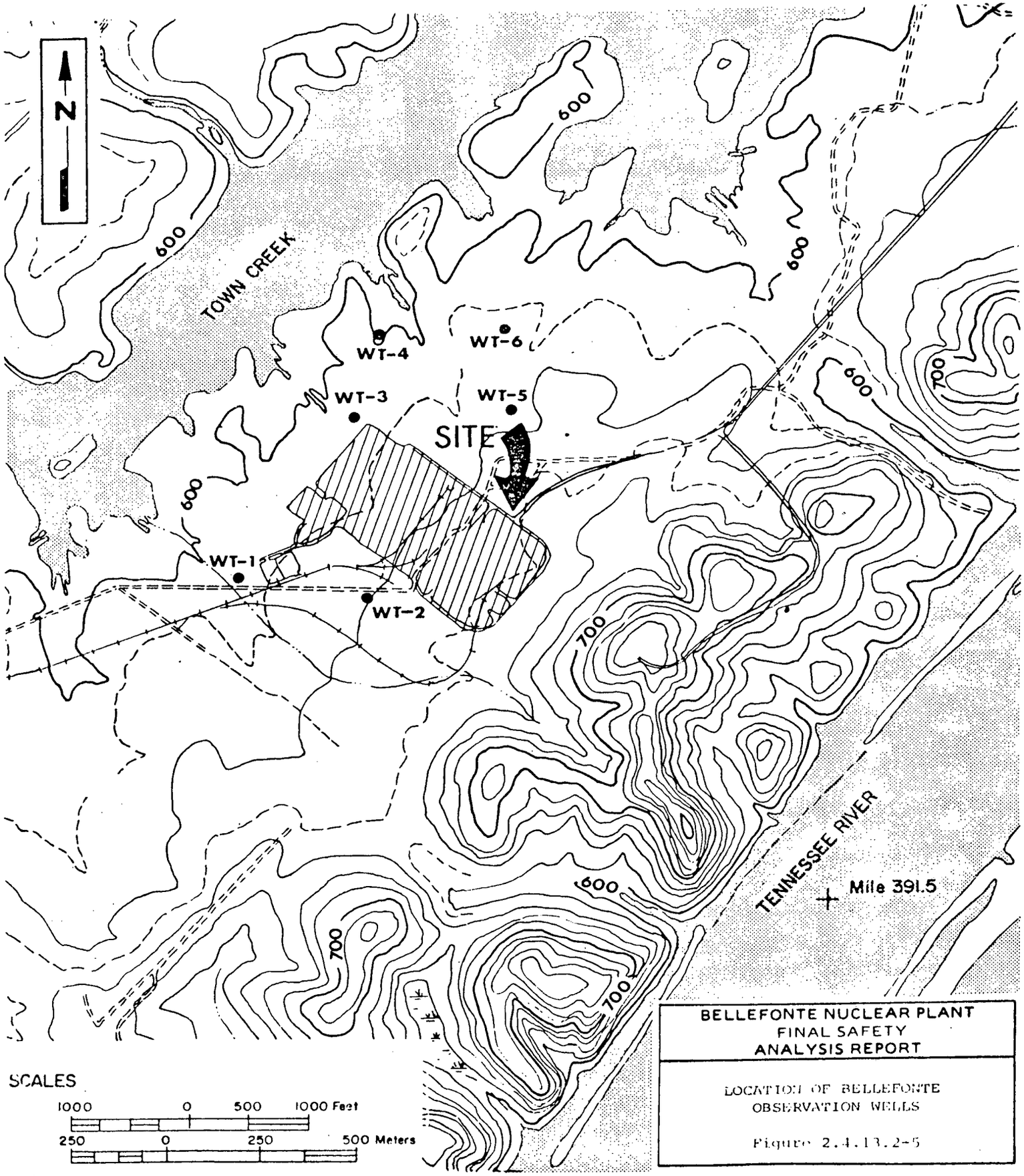
WATER-TABLE CONTOUR MAP
WITHIN A 2-MILE RADIUS
OF THE BELLEFONTE SITE

Figure 2.5.13.2-3



Hydrograph of ground-water elevations, reservoir elevations, and precipitation. Bellefonte Nuclear Plant, 1973-81.

PROVISIONAL
SUBJECT TO REVISION

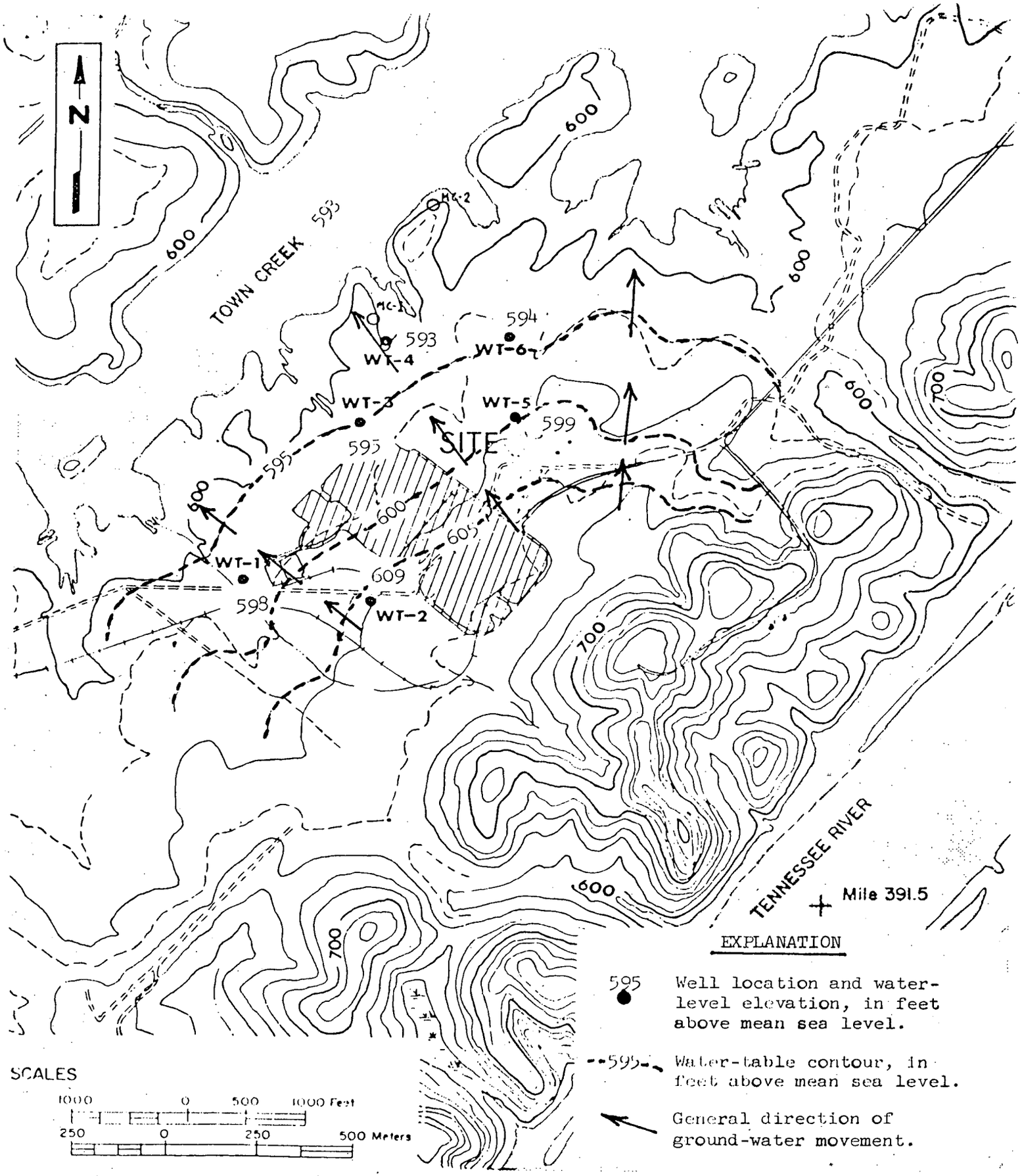


BELLEFONTE NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

LOCATION OF BELLEFONTE
OBSERVATION WELLS

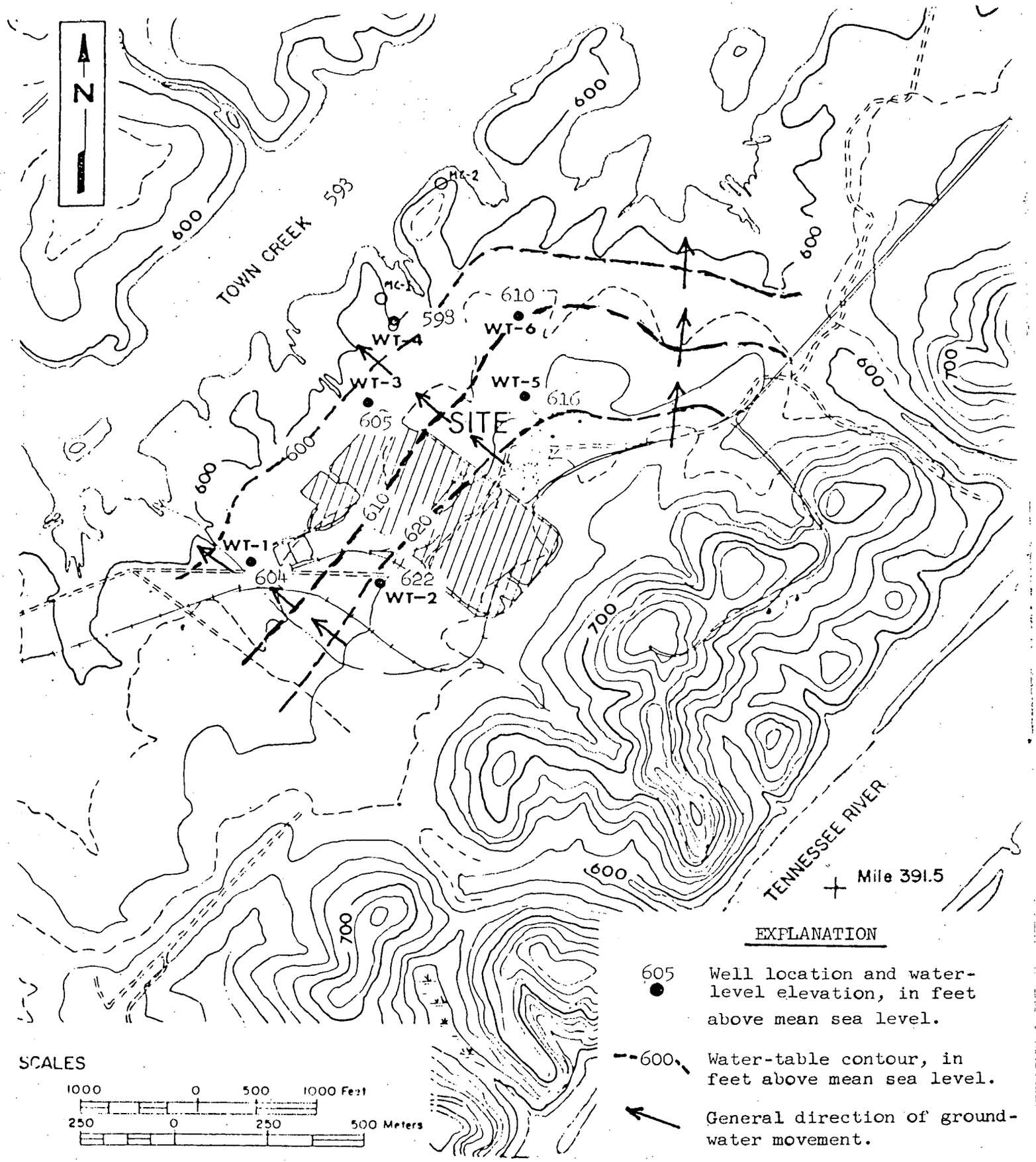
Figure 2.4.13.2-5

Attachment 3

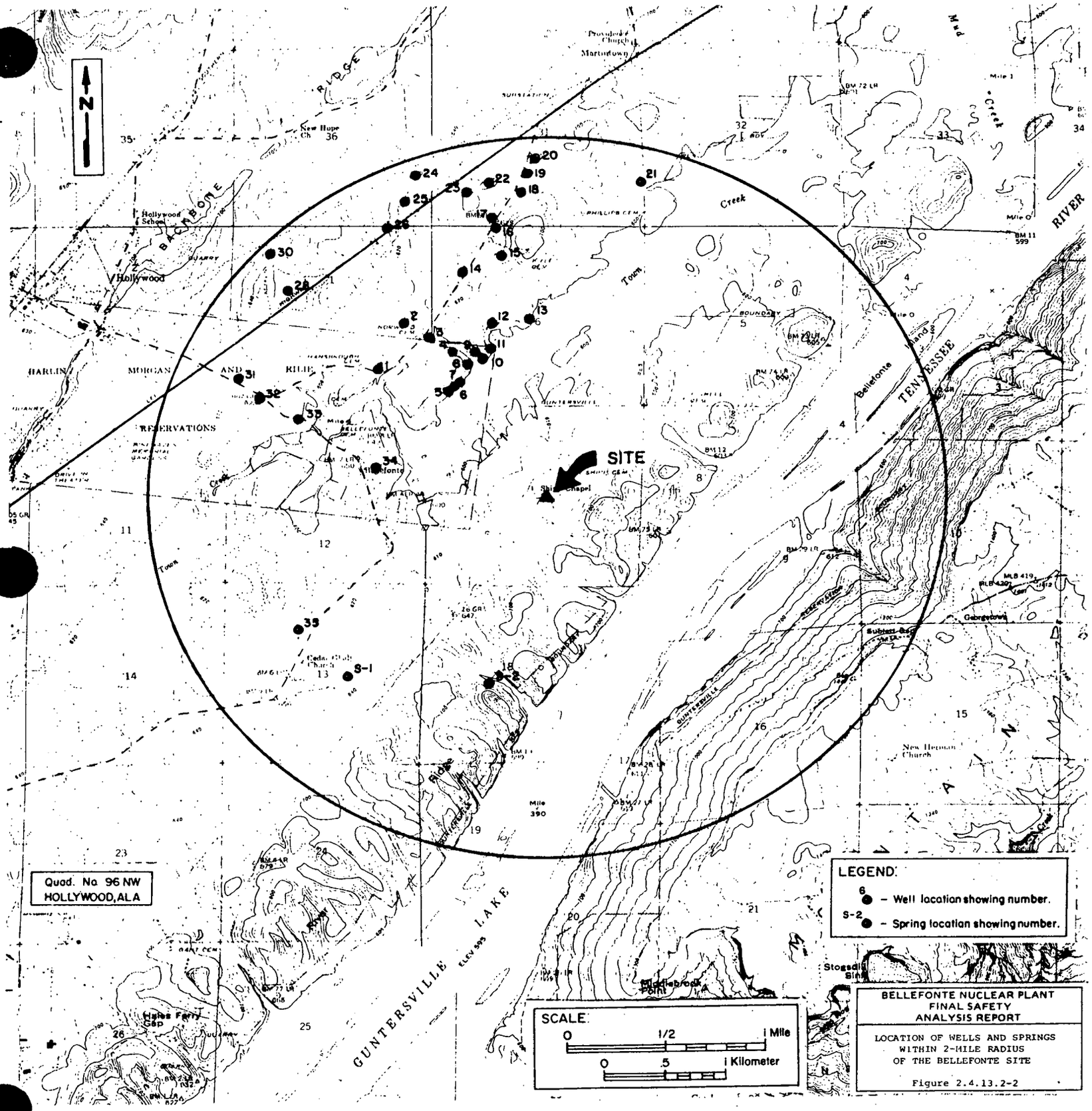


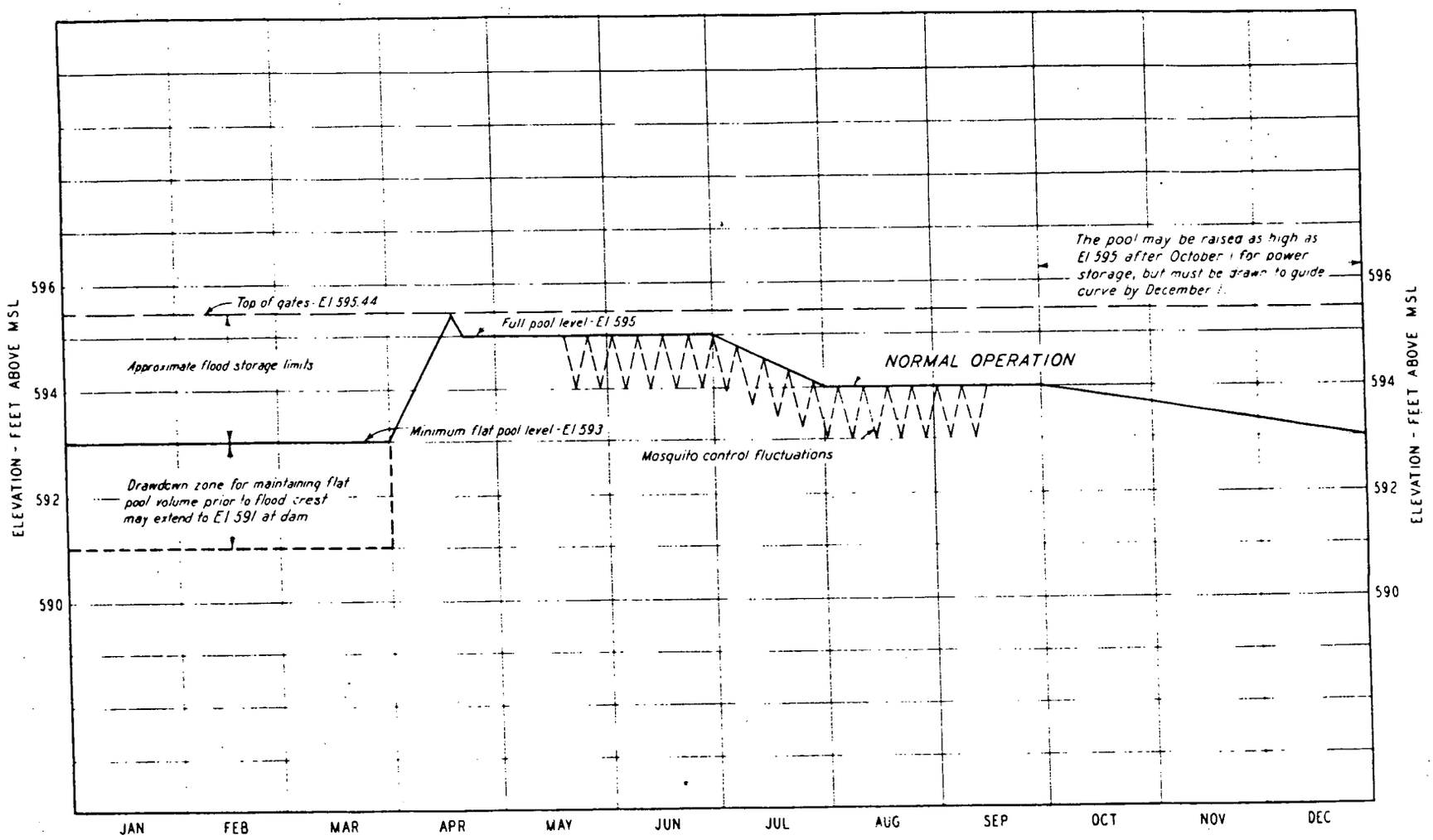
Generalized low water-table contour map, Bellefonte Nuclear Plant, Aug. 21, 1974.

Attachment 5



Generalized high water-table contour map, Bellefonte Nuclear Plant, Aug. 28, 1973.


N
SITE
Quad. No. 96 NW
HOLLYWOOD, ALA
LEGEND:
6 – Well location showing number.
S-2 – Spring location showing number.
SCALE:
0 1/2 1 Mile
0 .5 1 Kilometer
BELLEFONTE NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT
LOCATION OF WELLS AND SPRINGS
WITHIN 2-MILE RADIUS
OF THE BELLEFONTE SITE
Figure 2.4.13.2-2
GUNTERSVILLE LAKE
TENNESSEE RIVER
Hollywood
Bellefonte
Mud Creek
Town Creek
BACKBONE RIDGE
HARLIN MORGAN AND RILEY RESERVATIONS
Hales Ferry Gap
Middlebrook Point
Stoggsville
Georgetown
New Hermon Church
Cedar Gap Church
Hollywood School
New Hope Ch
Martinsville
Shiloh Chapel



NOTES:
Elevations apply only at dam
Maximum level assumed for design of dam - El 605.0

THIS DWG SUPERSEDES 6-PS-1-321G505R2

MULTIPLE-PURPOSE RESERVOIR OPERATIONS

GUNTERSVILLE PROJECT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER MANAGEMENT

RECOMMENDED	APPROVED
Robert A. Shelton	Edward F. Jacobs

KNOXVILLE	7-8-77	6	WSD	321A1618

ENCLOSURE 2

BELLEFONTE SPECIAL DATA SET
SEPTEMBER 1, 1980 TO AUGUST 31, 1981
METHODS FOR ESTIMATING VALUES TO REPLACE MISSING DATA

Values for one or more parameters were missing from 260 of the 8760 hourly observations in the period selected for the Bellefonte special data set (September 1, 1980 through August 31, 1981).

Values to replace these missing values have been estimated and included in the data set before creation of the data tape in the NRC format.

The following is a list of abbreviations or acronyms which appear in this explanation of methods used, or in data headings.

BLN	Bellefonte Nuclear Plant.
DT1	Change in temperature with height (Delta-T/Delta-h) from the 110 m to 10 m levels at BLN.
DT2	Change in temperature with height from the 110 m to 60 m levels at BLN.
DT3	Change in temperature with height from the 60 m to 10 m levels at BLN.
F	Used as a subscript to denote first available observation after an outage.
FROPA	Frontal passage.
L	Lower (used as a subscript).
LT	Lower temperature in °F (BLN temperature at 10.21 m).
LWD	Lower wind direction (BLN wind direction at 10.55 m).
LWS	Lower wind speed in miles/hour (BLN wind speed at 10.55 m).
M	Middle (used as a subscript).
MT	Mid-level temperature in °F (BLN temperature at 59.44 m).
MWD	Mid-level wind direction (BLN wind direction at 59.56 m).
MWS	Mid-level wind speed in miles/hour (BLN wind speed at 59.56 m).
N	Number of missing observations.
O_F	First available value for O after outage.

O	Missing meteorological parameter.
O_P	Last available value for O before outage.
P	Used as a subscript to denote last value immediately preceding an outage.
Rain	Hourly rainfall value (inches).
U	Upper (used as a subscript).
UT	Upper temperature in °F (BLN temperature at 108.20 m).
UWD	Upper wind direction (BLN wind direction at 110.25 m).
UWS	Upper wind speed in miles/hour (BLN wind speed at 110.25 m).
WCV	Widows Creek - valley station, located about 17 miles upriver.
X_F	First available value for X after outage.
X	Missing x-component of wind speed/direction.
X_P	Last available value for X before outage.
Y_F	First available value for Y after outage.
Y	Missing y-component of wind speed/direction.
Y_P	Last available value for Y before outage.

Note: Times are referred to in the following format - year:Julian day:hour. As an example, "81:010:0200" is 2 a.m. on the 10th day of 1981 (January 10, 1981).

The following is a description of the procedures used in estimating values for missing meteorological parameters:

Method A

Applied to one-hour data outages only.

1. For all values except wind direction: Take value for previous hour and value for succeeding hour and average.

$$O = \frac{O_P + O_F}{2}$$

2. For wind direction: Take wind vector for previous hour and for succeeding hour. Divide each into its x and y-components. Average and convert back to polar coordinates to find resulting wind direction.

$$X = \frac{X_P + X_F}{2}$$

$$Y = \frac{Y_P + Y_F}{2}$$

Method B

This method was designed to supply values for an extended continuous outage of mid-level temperatures (81:307:0800 to 81:309:1400).

The mid-level temperature was estimated 3 ways, and a weighted (2:1:1) average of the values for each hour was computed. The averaging appeared to smooth out minor irregularities between hours.

1. Assume that the temperature change with height is constant across the entire 110 m - 10 m layer.

$$DT1 = \frac{UT - LT}{h_U - h_L} (100 \times 5/9)$$

Calculate the resulting mid-level temperature (MT_1) from

$$MT_1 = UT - .87768 (DT1),$$

where MT_1 is MT estimated by method 1.

This relationship is derived from the definition of DT2 and the heights of the temperature sensors.

$$DT2 = \frac{UT - MT}{h_U - h_M} (100 \times 5/9),$$

where h_U = 108.20 meters and

h_M = 59.44 meters

Thus: $DT2 = \frac{UT - MT}{48.76} (100 \times 5/9)$

Therefore: $.87768 (DT2) = UT - MT,$

and rearranging: $MT = UT - .87768 (DT2)$

This method assumes DT1 = DT2.

2. Take the last available DT2 (for the same hour of the day) before the outage and the first available DT2 (for the same hour of the day) after the outage. Perform a linear interpolation to establish an estimated DT2 for the hour and day desired.

$$\frac{DT2_P - DT2_F}{N + 1} = \text{Increment (INC)}$$

$DT2_1 = DT2_P - INC$, for first day,

$DT2_2 = DT2_P - 2(INC)$, for 2nd day,

$DT2_3 = DT2_P - 3(INC)$, for 3rd day,

where P = Value immediately preceding outage

and F = First value after outage.

For each of the estimated DT2's, calculate the corresponding MT_2:

$MT_2 = UT - .87768\ (DT2)$,

where MT_2 is MT calculated by method 2.

3. Take the last available DT3 (for the same hour of the day) before the outage and the first available DT3 (for the same hour of the day) after the outage. Perform a linear interpolation to establish an estimated DT3 for the hour desired.

$$\frac{DT3_P - DT3_F}{N + 1} = \text{increment (INC)}$$

$DT3_1 = DT3_P - INC$

$DT3_2 = DT3_P - 2(INC)$

$DT3_3 = DT3_P - 3(INC)$

For each of the interpolated DT3s, calculate the corresponding MT_3

$MT_3 = LT + .88614\ (DT3)$,

where MT_3 is MT calculated by method 3.

This relationship is derived from the definition of DT3, and the heights of the middle and lower level temperature sensors (59.44 and 10.21 meters respectively).

$$DT3 = \frac{MT - LT}{h_M - h_L}\ (100 \times 5/9)$$

Thus: $$DT3 = \frac{MT - LT}{49.23}\ (100 \times 5/9)$$

Therefore: $.88714\ DT3 = MT - LT$,

and rearranging: $MT = LT + .88614\ (DT3)$

4. $$MT = \frac{2\ MT_1 + MT_2 + MT_3}{4}$$

Method C

This is a variation of method A, applied to a multi-hour outage where the values are expected to increase or decrease in a quasi-linear manner.

1. For all parameters except wind direction and rainfall: take the difference between the last available value (O_P) and the first available value (O_F).

   Divide by N + 1

$$\frac{O_P - O_F}{N + 1} = INC$$

$$O_1 = O_P - INC, \text{ for first missing hour,}$$

$$O_2 = O_P - 2(INC), \text{ for second hour,}$$

   or in general: $O = O_P - (INC) \times (\text{Number of hours since the outage})$.

2. For wind direction, apply (1) above to the x and y components, then convert back to polar coordinates. For MWS and LWS, check against the corresponding 60 m or 10 m values at WCV, bearing in mind that at very low wind speeds considerable meander exists.

3. For rainfall, check hour by hour against WCV rainfall. Include a period of time before and after the outage equal in length to the outage, and form a linear regression equation:

$$rain_{(BLN)} = B + M\ (rain_{(WCV)}). \quad \text{Set } B = 0.$$

   (B is the Y-intercept and M is the slope of the regression line.) Check results against relative humidity (BLN), solar radiation (WCV), and the synoptic situation.

Method D

For a multi-hour outage of the upper or lower level temperatures when there is reason to believe that a quasi-linear trend may not be a reasonable assumption.

1. For the first of the 2 delta-T values involving the level,* take the last available delta-T for the same hour of the day before the outage and the first available delta-T for the same hour of the day after the outage. Linearly interpolate between these values to establish an estimated value for the missing hour. For DT1, DT2, or DT3 (illustrated with DT1):

$$\frac{DT1_P - DT1_F}{N + 1} = INC$$

$$DT1_1 = DT1_P - INC, \text{ for first day}$$

$$DT1_2 = DT1_P - 2(INC), \text{ for second day}$$

$$DT1_3 = DT1_P - 3(INC), \text{ for third day}$$

Using this value and the appropriate temperature from one of the other levels, the missing temperature may be estimated. Use the following table to select the appropriate equation:

Missing Value	Delta-T Statistic	Equation[b.]
UT	DT2	UT = MT + .87768 (DT2)
UT	DT1	UT = LT + 1.76382 (DT1)
LT	DT3	LT = MT - .88614 (DT3)
LT	DT1	LT = UT - 1.76382 (DT1)

b. These equations are derived from the definitions of DT1, DT2, or DT3, and the heights of the appropriate temperature sensor levels.

*DT1 and DT2 for a missing upper level temperature; and DT1 and DT3 for a missing lower level temperature.

2. Repeat D.1 for the second delta-T interval involving the missing level.

3. Average the results of D.1 and D.2 above. For lower level, compare with WCV values as an additional check.

Method E

Multi-hour outage of lower wind speed (LWS).

1. For the hour before and the hour after the outage, compute:

$$a = \frac{UWS}{MWS} \quad \text{and} \quad b = \frac{MWS}{LWS}.$$

2. Form the ratio a/b for each of those two hours.

3. Average the ratio values in (2).

4. For the missing hours, calculate the assumed ratio $\frac{MWS}{LWS}$ from the value derived in (3).

$$\frac{UWS}{MWS} \div (\text{assumed } a/b) = \left(\frac{MWS}{LWS}\right)_{\text{estimated}}$$

5. Estimated LWS from the results of (4): $MWS \div \left(\frac{MWS}{LWS}\right)_{\text{estimated}} = LWS_{\text{estimated}}$

Example: LWS missing 81:099:1000-1500

	0900	1000	1100	1200	1300	1400	1500	1600
UWS	9.9	11.5	7.6	8.9	7.5	7.1	6.5	5.4
MWS	9.6	9.8	6.0	8.2	7.2	6.5	6.0	5.1
LWS	6.6	6.8	3.8	6.1	5.6	4.8	4.5	4.4
a = UWS/MWS	1.03	1.17	1.27	1.09	1.04	1.09	1.08	1.06
b = MWS/LWS	1.45	1.44	1.57	1.35	1.28	1.35	1.33	1.16
a/b =	0.71	0.81	0.81	0.81	0.81	0.81	0.81	0.91

(estimated or assumed values are underlined)

$(a/b)_{0900} = 0.71$; $(a/b)_{1600} = 0.91$; $\frac{0.71 + 0.91}{2} = 0.81$;

assume $\overline{a/b} = 0.81$ for missing hours.

Note: This method was applied only to situations with little wind direction change, no FROPA (synoptic charts), and no stability category changes. In addition, values were compared to WCV 10 m wind speeds as a further check for consistency.

Method F

This was applied to the 81:138:2000-81:140:0900 outage, which involved several parameters, some for only part of that period.

1. MWS missing for 3 hours (138:2000-2200). Compared with WCV 60 m wind speed to estimate the short term linear regression relationship.
2. MWD missing, same period. Used short-term linear regression relationship with WCV 60 m wind direction to estimate MWD.
3. LWS missing, same period. Compared with WCA 10 m wind speed to estimate the short-term linear regression relationship.
4. LWD missing, same period. Used short-term linear regression relationship with WCV 10 m wind direction to estimate LWD.
5. Rain missing, same period. Estimated by comparison with WCV, hour by hour. Also noted the synoptic situation. Since the dewpoint was missing, no relative humidity information was available.
6. MT missing for 2 hours (138:2000-2100). Noted the temperature changes at WCV 60 m for the same time period, and applied to last available temperature before the outage to estimate the most probable MT values.
7. LT and UT missing for same 2 hours. DT3 was estimated by linear regression with the WCV 60 m - 10 m delta-T/delta-h values, using available values from 138:1700 to 139:0100. LT was then estimated, using the equation LT = MT - .88614 (DT3).

   DT2 was estimated by linear regression with DT3, using available values from 138:1700 to 139:0100. UT was then estimated, using the equation UT = MT + .87768 (DT2).
8. UWD missing for same 2 hours. Established a relationship with MWD over the 4 hours before and the 4 hours after the outage time period. Applied the relationship to estimate values for the missing data.

9. UWS missing for entire 38 hours. The available UWS-MWS pairs from 138:0100 to 140:2400 were used to obtain the constants in the linear regression equation:

$$UWS = .9315 + 1.11\ (MWS);\ (R^2 = .9485)$$

This equation was used to estimate the missing values. The first UWS after the outage ended appeared to be incorrect (too low). A value was also estimated in the same manner to replace it.

Method G

This method was used to generate estimates for multi-hour simultaneous outages of all three temperature measurements. The method was used for 2 cases, identified by the following time periods:

a. 80:351:1000 to 80:352:1300

b. 80:366:2300 to 81:002:1200

1. Estimated LT by linear regression with the WCV 10 m temperature. For example, case a (using the available pairs from 350:0100 to 353:2400):

$$LT = .6846 + .988 \text{ (WCV 10 m temperature)}$$

$$(R^2 = .9905).$$

2. Established an estimated DT3 by linear regression with the WCV 60 m - 10 m delta-T/delta-h.

   For example, case a:

$$DT3 = .08 + .8267 \text{(WCV 60 m - 10 m delta-T)}$$

$$(R^2 = .55)$$

3. Estimated DT2 (hour by hour) with method B(2).

4. The estimated LT and DT3 were used to estimate MT from:

$$MT = LT + .88614\ DT3$$

5. The estimated values of MT from step (4) and DT2 from step (3) were used to estimated UT from:

$$UT = MT + .87768\ DT2$$

6. The estimates were checked for consistency and meteorological likelihood. A few hours of case b required small adjustments to smooth the lower temperature curve.

Method H

Hourly rainfall value missing.

1. Estimated no rain (0.00) based on:

   a. Synoptic situation,

   b. Low relative humidity, and

   c. No rain at WCV.

2. Estimated rain values if there was measurable rain at WCV. See method C.3 for estimated amounts.

Belle Foute Special Data Set - Sept. 1, 1980 / Aug 31, 1981
Estimated values to replace missing data

Method	Year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
A	80	254	1000	5.8	35	5.2	38	4.6	45	73.57	74.24	75.43	
C	80	269	0500	4.1	280	3.4	254	2.5	267	68.44	68.80	69.23	0.00
			0600	5.6	246	4.4	238	3.1	252	68.23	68.64	69.07	0.00
			0700	7.1	224	5.4	229	3.7	242	68.01	68.48	68.92	0.02
			0800	8.6	211	6.4	223	4.3	235	67.80	68.32	68.76	0.25
			0900										0.16
C/H	80	276	1300	11.0	268	10.2	272	8.0	268	67.49	68.49	69.59	0.00
			1400	11.9	315	11.1	318	8.4	313	65.19	66.16	67.15	0.00
H			1500										0.00
A	80	282	1100						196				
C/H	80	284	1300	7.0	214	6.9	220	5.7	203	74.38	75.55	76.61	0.00
			1400	9.0	226	8.7	232	7.0	211	76.64	77.80	78.86	0.00
			1500	11.1	233	10.5	239	8.2	217	78.89	80.04	81.10	0.00
H			1600										0.00
A/H	80	286	1400	9.2	334	8.6	339	7.3	338	60.46	61.49	62.26	0.00
H			1500										0.00
H	80	290	1300										0.00
			1500										0.00
			1600										0.00
B	80	307	0800								44.05		
			0900								46.77		
			1000								51.74		
			1100								56.62		
			1200								62.19		
			1300								66.71		
			1400								69.14		
			1500								70.41		
			1600								70.19		

Belle Fonte special DATA SET - Sept 1, 1980 / Aug 31, 1981
Estimated VALUES to replace missing DATA

Method	Year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
B	80	307	1700								68.12		
			1800								65.71		
			1900								63.61		
			2000								62.16		
			2100								59.83		
			2200								58.29		
			2300								56.60		
			2400								56.25		
		308	0100								55.83		
			0200								55.49		
			0300								54.34		
			0400								53.72		
			0500								53.27		
			0600								53.16		
			0700								53.06		
			0800								53.90		
			0900								58.06		
			1000								61.23		
			1100								64.60		
			1200								67.34		
			1300								69.55		
			1400								70.38		
			1500								70.14		
			1600								70.24		
			1700								69.43		
			1800								68.45		
			1900								67.70		
			2000								66.67		

Belle Fonte Special Data Set - Sept 1, 1980 / Aug 31, 1981
Estimated Values to replace missing Data

Method	Year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
B	80	308	2100								65.55		
			2200								64.15		
			2300								62.55		
			2400								63.03		
		309	0100								63.11		
			0200								62.57		
			0300								61.72		
			0400								60.40		
			0500								58.89		
			0600								57.40		
			0700								55.99		
			0800								56.48		
			0900								59.13		
			1000								61.17		
			1100								63.02		
			1200								65.90		
			1300								67.66		
			1400								66.94		
C/H	80	320	0300	10.2	36	7.6	32	4.7	30	56.50	56.64	56.92	0.00
			0400	10.5	34	7.8	29	4.9	27	56.42	56.64	56.96	0.00
			0500	10.7	31	7.9	27	5.0	26	56.35	56.64	57.01	0.00
			0600	11.0	28	8.1	25	5.2	24	56.28	56.64	57.05	0.00
			0700	11.3	26	8.3	23	5.4	22	56.20	56.63	57.09	0.00
			0800	11.6	24	8.5	21	5.6	20	56.13	56.63	57.13	0.00
			0900	11.8	22	8.6	19	5.7	19	56.06	56.63	57.18	0.00
			1000	12.1	20	8.8	18	5.9	17	55.98	56.63	57.22	0.00
H			1100										0.00

Belle Fonte special DATA SET – Sept 1, 1980 / Aug 31, 1981
Estimated VALUES to replace missing DATA

Method	Year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
C/H	80	323	1300	15.2	347	13.5	348	10.5	346	37.69	38.63	39.53	0.00
			1400	15.9	353	14.0	355	10.7	353	37.83	38.75	39.62	0.00
			1500	16.5	360	14.4	002	10.8	360	37.96	38.88	39.72	0.00
			1600	17.2	005	14.9	008	11.0	007	38.10	39.00	39.81	0.00
H			1700										0.00
A	80	325	1000	3.6	30	3.3	354	3.2	342	34.80	35.62	36.56	
C/A/H	80	332	0100	21.9	130	18.7	129	12.7	128	42.47	43.23	43.85	0.00
C/H			0200	19.0	136	14.7	134	9.5	136				0.00
C	80	338	0500								29.41		
			0600								29.28		
A	80	342	0100						96				
A	80	345	1400	14.1		9.7		7.2					
A	80	349	1600				352						
G	80	351	1100							47.65	48.19	49.29	
			1200							49.20	49.71	50.59	
			1300							49.56	50.33	51.29	
			1400							50.20	51.02	52.19	
			1500							48.49	49.41	50.29	
			1600							47.02	47.84	48.50	
			1700							45.46	46.19	46.70	
			1800							43.30	43.99	44.50	
			1900							41.72	42.33	42.91	
			2000							40.93	41.40	41.91	
			2100							40.12	40.50	41.01	
			2200							39.80	40.10	40.61	
			2300							40.02	39.30	39.81	
			2400							38.82	38.37	38.81	
		352	0100							37.94	37.31	37.82	

Page ___

Belle Fourche Special Data Set - Sept 1, 1980 / Aug 31, 1981
Estimated Values to replace missing Data

Method	Year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
G	80	352	0200							37.56	36.51	37.02	
			0300							36.84	36.25	36.62	
			0400							37.26	36.18	36.62	
			0500							37.00	35.88	36.32	
			0600							36.52	35.35	35.72	
			0700							36.42	34.43	34.72	
			0800							34.27	33.10	33.32	
			0900							34.11	33.84	34.72	
			1000							35.05	35.26	36.22	
G/A			1100						50	36.67	37.41	38.51	
			1200							38.95	39.78	40.81	
			1300							40.62	41.51	42.61	
A/H	80	364	1100	2.2	306	1.9	270	2.1	328	43.20	43.12	43.80	0.00
C/G/H	80	366	2300	9.2	213	6.8	205	2.7	209	46.67	46.57	41.97	0.00
			2400	8.8	214	6.6	212	2.3	238	45.10	44.97	39.26	0.00
G/H	81	001	0100							42.15	41.97	36.54	0.00
			0200							40.17	40.08	35.06	0.00
			0300							37.84	37.81	32.98	0.00
			0400							36.62	36.23	32.88	0.00
			0500							35.31	35.16	31.30	0.00
			0600							34.35	33.96	30.51	0.00
			0700							35.02	34.72	29.33	0.00
			0800							35.52	35.25	30.51	0.00
			0900							36.02	35.86	32.88	0.00
			1000							36.00	35.99	36.24	0.00
			1100							37.63	38.77	39.30	0.00
			1200							38.47	39.52	40.39	0.00
E/G/H			1300					13.3		38.36	39.32	40.19	0.00

Belle Fourche Special Data Set - Sept 1, 1980 / Aug 31, 1981
Estimated Values to replace missing Data

Method	Year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
E/G/H	81	001	1400					13.9		37.20	38.15	39.01	0.00
			1500					12.3		35.70	36.67	37.53	0.00
			1600					10.4		35.72	36.67	37.53	0.00
			1700					8.4		36.36	37.08	37.82	0.00
			1800					10.2		36.48	36.98	37.72	0.00
			1900					10.8		36.57	37.10	37.63	0.00
			2000					6.7		36.96	37.49	38.02	0.00
			2100					7.1		37.06	37.59	38.12	0.00
			2200					8.4		37.06	37.59	38.12	0.00
			2300					8.0		37.55	38.08	38.61	0.00
			2400					10.8		36.77	37.29	38.02	0.00
		002	0100					12.3		36.46	36.98	37.72	0.00
			0200					10.8		36.46	36.98	37.72	0.00
			0300					10.8		36.07	36.59	37.33	0.00
			0400					13.1		35.08	35.60	36.34	0.00
			0500					12.5		35.34	35.08	34.86	0.00
			0600					7.0		35.62	34.57	32.79	0.00
			0700					3.7		35.27	34.05	30.42	0.00
E/G			0800					3.3		34.86	33.37	30.02	
			0900					8.0		34.44	33.17	33.58	
			1000					7.0		35.63	35.86	37.03	
			1100					5.3		36.75	37.88	39.21	
			1200					6.1		39.33	40.41	41.58	
A	81	003	0100						226				
A	81	015	0700						35				
A	81	021	0900						208				
A	81	021	2000						001				
A	81	024	1800						87				

Belle Foute Special Data Set - Sept 1, 1980 / Aug 31, 1981
Estimated values to replace missing data

Method	Year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
C	81	024	2000						002				
			2100						348				
A	81	028	2200						126				
A	81	028	2400						216				
A	81	029	0400						238				
A	81	035	1500	13.6		12.4		9.8					
A	81	037	0800						236				
A	81	037	2000						323				
C	81	041	1300	53.5	135	40.8	131	26.3	129				
			1400	50.8	134	38.4	129	24.0	128				
A/H	81	082	1200	13.1	347	11.9	349	9.5	352	40.18	41.10	42.04	0.00
A	81	086	2100				199						
A	81	089	2100						23				
A	81	090	1500			14.6							
A	81	096	0600					2.3	228				
D	81	097	0900									56.14	
			1000									62.01	
			1100									63.62	
			1200									65.42	
			1300									66.86	
			1400									67.89	
			1500									69.14	
E	81	099	1000					6.8					
			1100					3.8					
			1200					6.1					
			1300					5.6					
			1400					4.8					
			1500					4.5					

Belle Fonte special DATA SET - Sept 1, 1980 / Aug 31, 1981
Estimated VALUES to replace missing DATA

method	year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
A	81	111	0700	9.4		8.5	35	7.0	33	53.00	53.82	54.78	
A	81	117	1000	1.7	111	1.8	353	2.2	337	67.05	67.33	68.32	
F	81	138	2000	12.9	204	10.8	212	5.8	208	75.02	74.97	72.62	0.01
			2100	23.0	200	19.9	208	16.6	198	64.05	64.61	64.26	0.20
			2200	18.5		15.8		11.9					0.00
			2300	7.0									
			2400	5.3									
		139	0100	3.0									
			0200	13.9									
			0300	14.7									
			0400	9.5									
			0500	8.5									
			0600	8.3									
			0700	8.4									
			0800	8.4									
			0900	6.7									
			1000	15.4									
			1100	14.5									
			1200	15.4									
			1300	13.8									
			1400	16.6									
			1500	15.8									
			1600	17.1									
			1700	16.9									
			1800	9.0									
			1900	7.1									
			2000	7.3									
			2100	9.0									

Belle Fourche Special Data Set - Sept 1, 1980 / Aug 31, 1981
Estimated Values to replace missing Data

Method	Year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
F	81	139	2200	13.7									
			2300	9.7									
			2400	9.7									
		140	0100	8.8									
			0200	9.5									
			0300	8.9									
			0400	8.8									
			0500	10.5									
			0600	10.7									
			0700	7.5									
			0800	8.4									
			0900	9.4									
Replaces bad Tape Value			1000	9.8									
H	81	146	1200										0.00
			1300										0.01
H	81	152	1000										0.17
A/H	81	159	1300	10.6		9.7		7.5					0.00
C/H	81	163	0600	3.7	31	3.7	21	2.8	005	70.85	71.15	71.57	0.00
			0700	3.1	26	3.1	357	2.4	351	70.98	71.28	71.76	0.00
			0800	2.4	360	2.4	282	1.9	324	71.10	71.41	71.94	0.00
H			0900										0.00
C/H	81	191	2000	6.9	225	6.1	202	4.4	181	83.00	83.06	83.28	0.00
			2100	6.2	211	5.1	183	3.8	168	79.16	79.29	79.49	0.00
			2200	5.4	74	4.2	138	3.1	149	75.31	75.51	75.70	0.00
C	81	193	1800					4.2	256	89.33	89.96	90.32	
			1900	6.3	315	5.7	319	3.3	244	88.28	88.77	88.27	
			2000	4.3	304	3.7	300	2.5	197	87.22	87.57	86.22	

Belle Fonte Special Data Set – Sept 1, 1980 / Aug 31, 1981
Estimated values to replace missing Data

Method	Year	day	hour	UWS	UWD	MWS	MWD	LWS	LWD	UT	MT	LT	RAIN
A*	81	230	0800								71.15		
C			0900	6.7	46	6.0	41	4.8	356	70.55	71.41	71.99	0.24
			1000	6.3	80	5.5	71	4.4	332	70.71	71.68	72.31	0.17
			1100	5.9	127	4.9	126	4.0	300	70.86	71.94	72.62	0.03
			1200										0.00
C	81	236	1000							71.96	72.61	73.44	
			1100							74.34	74.91	75.73	
			1200							76.77	77.22	78.01	
			1300							79.19	79.52	80.30	
A/H	81	238	0600	6.3	37	5.6	41	3.8	45	66.64	66.63	66.79	0.00
H	81	243	1400										0.00
			1500										0.00

* Replaces 72.71, which should have been LR'd

MAGNETIC TAPE
METEOROLOGICAL DATA

LOCATION: Bellefonte Nuclear Plant
PERIOD OF RECORD: September 1, 1980 - August 31, 1981

Meteorological Value

I6	Identifier
I2	Year
I3	Julian Day
I4	Hour
F5.1	Upper Measurements: Level = 108.20 meters (m)
F5.1	Wind Direction (degrees)
F5.1	Wind Speed (mps)
F5.1	-
F5.1	Ambient Temperature (^{o}C)
F5.1	-
F5.1	-
F5.1	Intermediate Measurements: Level = 59.44 (m)
F5.1	Wind Direction (degrees)
F5.1	Wind Speed (mps)
F5.1	-
F5.1	Ambient Temperature (^{o}C)
F5.1	-
F5.1	-
F5.1	Lower Measurements: Level = 10.21 (m)
F5.1	Wind Direction (degrees)
F5.1	Wind Speed (mps)
F5.1	-
F5.1	Ambient Temperature (^{o}C)
F5.1	-
F5.1	-
F5.1	Temp Diff (Upper-Lower) (^{o}C/100 m)
F5.1	Temp Diff (Upper-Inter) (^{o}C/100m)
F5.1	Temp Diff (Inter-Lower) (^{o}C/100m)
F5.1	Precipitation (mm)
F5.1	-
F5.1	-
F5.1	-
F5.1	-

```
1  3200 BYTES #BELLEFONTE NUCLEAR PLANT - DATA RECORDED WITH NOVA COMPUTER SYSTEM -SPECIAL DATASET SEPT 1, 1980 TO #
             #AUG 31, 1981 LOCATION OF METEOROLOGICAL TOWER UTM ZONE 16   N3842210 E599270 METERS. MEASUREMENTS: U#
             #PPER LEVEL WIND DIR(DEG) 110.3 METERS,  WIND SPEED(MPS) 110.3 METERS,TEMP(D C) 108.2 METERS; INTERME#
             #DIATE LEVEL WIND DIR(DEG) 59.6 METERS, WIND SPEED(MPS) 59.6 METERS,TEMP(D C) 59.4 METERS: LOWER     #
             #LEVEL WIND DIR(DEG) 10.6 METERS, WIND SPEED(MPS) 10.6 METERS, TEMP(D C) 10.2    METERS. TEMPERATURE #
             #DIFFERENCE: UPPER-LOWER,UPPER-INTERMEDIATE,INTERMEDIATE-    LOWER (DEG C/100METERS). RAINFALL(MM). H#
             #OURS OF ESTIMATED VALUES - UPPER: WIND  DIR 47, WIND SPEED 88, TEMP 103; INTERMEDIATE: WIND DIR 50, #
             #WIND SPEED 53, TEMP 172; LOWER: WIND DIR 66, WIND SPEED 84, TEMP 120; RAINFALL 89                  #
             #     180245 100 1082 2030   36       257            594 2030   24       258            102  800    6#
             #       253            5   -2   11    0                          180245 200 1082 1960   33       251#
             #           594 2110   20       253            102  350    6       241            11   -4   26    0#
             #                          180245 300 1082 1980   46       246            594 2100   32       248    #
             #       102 2310   16       241            5   -4   13    0                          180245 400 1082#
             # 1930   48       239            594 1970   35       242            102 2010   13       236           #
             #    3   -5   11    0                          180245 500 1082 1940   55       235            594 1980#
             #   44       238            102 1950   23       238            -3   -7    0    0                    #
             #     180245 600 1082 1970   32       230            594 2160   18       232            102 2700    8#
             #       227            3   -5   11    0                          180245 700 1082 2070   17       226#
             #           594 2690   10       227            102 1390    3       220            5   -4   15    0#
             #                          180245 800 1082 1710   15       230            594 1410    7       230    #
             #       102  200    4       229            1    0    2    0                          180245 900 1082#
             # 2010   10       235            594 3140    9       238            102 3200   10       243           #
             #   -9   -6  -11    0                          1802451000 1082 2310   17       250            594 2330#
             #   16       255            102 2260   15       262            -12  -10  -13    0                    #
             #     1802451100 1082 1560   20       268            594 1810   21       272            102 1310   18#
             #       281            -14  -10  -17    0                          1802451200 1082 1620   30       281#
             #           594 1620   30       286            102 1500   25       295            -15  -11  -19    0#
             #                          1802451300 1082 1810   45       294            594 1750   44       300    #
             #       102 1580   37       312            -18  -13  -23    0                          1802451400 1082#
```

```
                # 2130   44      307          594 2160   41      313          102 2190   35      323          #
                # -17  -13  -21   0                      1802451500 1082 1870   52      309          594 1840#
                #  47      315          102 1790   36      326          -17  -13  -22   0                    #

2  3200 BYTES #     1802451600 1082 1890   56      310          594 1850   47      316          102 1870   36#
                #     326          -17  -13  -20   0                      1802451700 1082 1450   92      283#
                #          594 1480   62      288          102 1450   38      296          -14  -11  -17   0#
                #                    1802451800 1082 1520   76      271          594 1540   50      276    #
                #     102 1770   34      281          -10  -9  -11   0                    1802451900 1082#
                # 1740   50      268          594 1830   38      273          102 1820   25      277    #
                #  -9   -9   -9   0                      1802452000 1082 2010   21      264          594 2070#
                #  19      268          102 2010   10      270          -6   -8   -4   0                    #
                #     1802452100 1082 2080   24      261          594 2100   17      264          102 1820    9#
                #     266          -5   -8   -2   0                      1802452200 1082 2140   13      258#
                #          594 2130    9      262          102  770    9      260          -2   -7    3   0#
                #                    1802452300 1082 2090   29      257          594 2100   21      259    #
                #     102 1850    9      255          1   -5    8   0                    1802452400 1082#
                # 1880   32      254          594 1960   20      256          102 1920    8      252    #
                #  3   -3    8   0                      180246 100 1082 2150   28      247          594 2300#
                #  25      247          102 2440   11      242          5    1   10   0                    #
                #     180246 200 1082 1890    7      242          594  740    8      242          102  910    4#
                #     233          9    0   17   0                      180246 300 1082  540    9      235#
                #          594  330   12      233          102 3200    5      228          8    5   10   0#
                #                    180246 400 1082  570    9      227          594  370   14      225    #
                #     102   40    5      226          0    4   -3   0                    180246 500 1082#
                # 1790    7      228          594  540   10      223          102  230    5      224    #
                #  4    8   -1   0                      180246 600 1082  720   10      222          594  400#
                #  17      220          102  390    8      222          0    3   -2   0                    #
                #     180246 700 1082  390   18      217          594  220   16      217          102  200    9#
                #     220          -4    0   -7   0                      180246 800 1082  540   10      217#
                #          594  410   11      219          102  300    8      224          -6   -4   -8   0#
```

```
                 #                    180246 900 1082  100    7      223          594 290    9      227    #
                 #      102  150    9      232           -10   -9  -11    0                     1802461000 1082#
                 # 250    7      235           594   50    9      239          102 200    9      245        #
                 # -11   -9  -12    0                    1802461100 1082 2320   11      248          594 2470#
                 #  11      252          102 2560   11      258          -10   -9  -12    0                 #

3  3200 BYTES #     1802461200 1082 2160   23      256          594 2250   22      261          102 2360   21#
                 #      268          -12  -11  -14    0                     1802461300 1082 1780   25      279#
                 #           594 1680   25      284          102 1440   21      293          -15  -11  -19    0#
                 #                    1802461400 1082 1810   32      301          594 1800   30      308    #
                 #      102 2360   26      316           -15  -13  -18    0                     1802461500 1082#
                 # 1840   33      312           594 1820   32      317          102 1780   26      327        #
                 # -15  -12  -19    0                    1802461600 1082 2000   38      299          594 2000#
                 #  34      304          102 1970   26      309           -9   -9  -10    0                 #
                 #     1802461700 1082 3530   48      256          594 3500   37      259          102 3560   28#
                 #      262          -6   -5   -6    0                     1802461800 1082 3180   26      230#
                 #           594 3210   21      233          102  690   17      236          -6   -7   -6    0#
                 #                    1802461900 1082  710   21      229          594  630   16      231    #
                 #      102 2170    9      230           -1   -3    2    0                     1802462000 1082#
                 # 1660   21      229           594 2410   18      228          102 2510    9      226        #
                 #   3    2    4    0                    1802462100 1082  250   25      225          594  210#
                 #  20      225          102  200   16      224           1    1    1    0                 #
                 #     1802462200 1082  350   42      216          594  340   34      219          102  310   24#
                 #      223          -7   -7   -7    0                     1802462300 1082  430   31      214#
                 #           594  500   28      218          102  460   20      221          -7   -8   -7    0#
                 #                    1802462400 1082  630   13      215          594  800    9      219    #
                 #      102 2630    8      220           -5   -7   -4    0                     180247 100 1082#
                 # 2220   11      213           594 2450   11      215          102 2130    8      215        #
                 #  -2   -3   -1    0                    180247 200 1082 3260    8      210          594 3260#
                 #  11      213          102 2440    9      215           -4   -5   -4    0                 #
                 #     180247 300 1082  500   12      207          594  310   13      210          102  290   10#
```

ENCLOSURE 3

BELLEFONTE NUCLEAR PLANT 10-MILE EMERGENCY PLANNING ZONE

EVACUATION TIME ESTIMATES

FOR THE YEAR 2020 (PRELIMINARY)

Please Note! The estimates contained herein are preliminary in nature and are intended solely for use in the Class 9 Accident Analyses.

Considerations:

1. The transient population numbers (recreational and industrial) were added to the permanent population totals. This will cause some over-estimation of the total population as a large fraction of the transient population resides in the 10-mile area.

2. Evacuation sectors and routes have not been defined at this time. The quadrants were chosen so that the total area of Scottsboro is contained in one quadrant. The Tennessee River was also considered; it is not expected that any of the evacuation routes would require that the river be crossed. The quadrants were chosen so that essentially all of the area north of the river is contained in two quadrants and the land area south of the river is contained in the other two quadrants.

3. A radial evacuation of the 10-mile area is assumed.

4. The times given in the estimates begin with the warning of the public with a prompt notification system.

Methodology:

The lack of well-defined evacuation sectors and routes precludes the possibility of an exact analysis. The method used to obtain the evacuation time estimates was to compare the quadrants in the Bellefonte 10-mile emergency planning zone (EPZ) to areas of similar population and development in evacuation studies that had been previously performed. The time estimates used for comparison were those that had been prepared for the Browns Ferry, Sequoyah, and Midland plants.

The adverse weather estimates were made by using a multiplier obtained from the Browns Ferry evacuation time study. The same percentage increase that was determined for the Browns Ferry estimates was used for the Bellefonte estimates. The reasons for using the Browns Ferry adverse weather estimates as a comparison were the relatively close proximity of the plants and the physical similarity of the two sites.

The special facility populations were also compared to those in the Browns Ferry study because of the physical and political similarities in the two areas.

EVACUATION TIME ESTIMATES (2020)

Quadrant	Normal Conditioning	Adverse Conditioning
I	4 hours	5 hours
II	3 hours	3.5 hours
III	3 hours	3.5 hours
IV	3 hours	3.5 hours

Special Populations:

A listing of the special populations is attached. It consists of 11 schools, 2 nursing homes, 1 hospital, 2 jails, and 5 daycare centers. We expect that the evacuation of the school populations could be completed within the timeframe estimated for the general population by use of school buses. The other facilities will have to be evaluated in terms of manpower and vehicles available to aid in the evacuation of these facilities. We expect that the evacuation times for the hospital, nursing homes, and jails could exceed the time estimates for the general population because of the need for specialized personnel and vehicles. The children at the daycare centers would be picked up by parents in most cases. However, special arrangements would have to be made to evacuate children whose parents are distant from the 10-mile EPZ.

2020 POPULATION ESTIMATES

	Permanent Population	Transient Population	Total Population
Quadrant I	24,800	6,300	31,100
Quadrant II	2,019	4,730*	6,749
Quadrant III	4,030	700	7,330
Quadrant IV	6,276	1,032	7,308

*Includes Bellefonte Nuclear Plant

BELLEFONTE NUCLEAR PLANT

2020 Population Distribution
Within 10 Miles of the Site

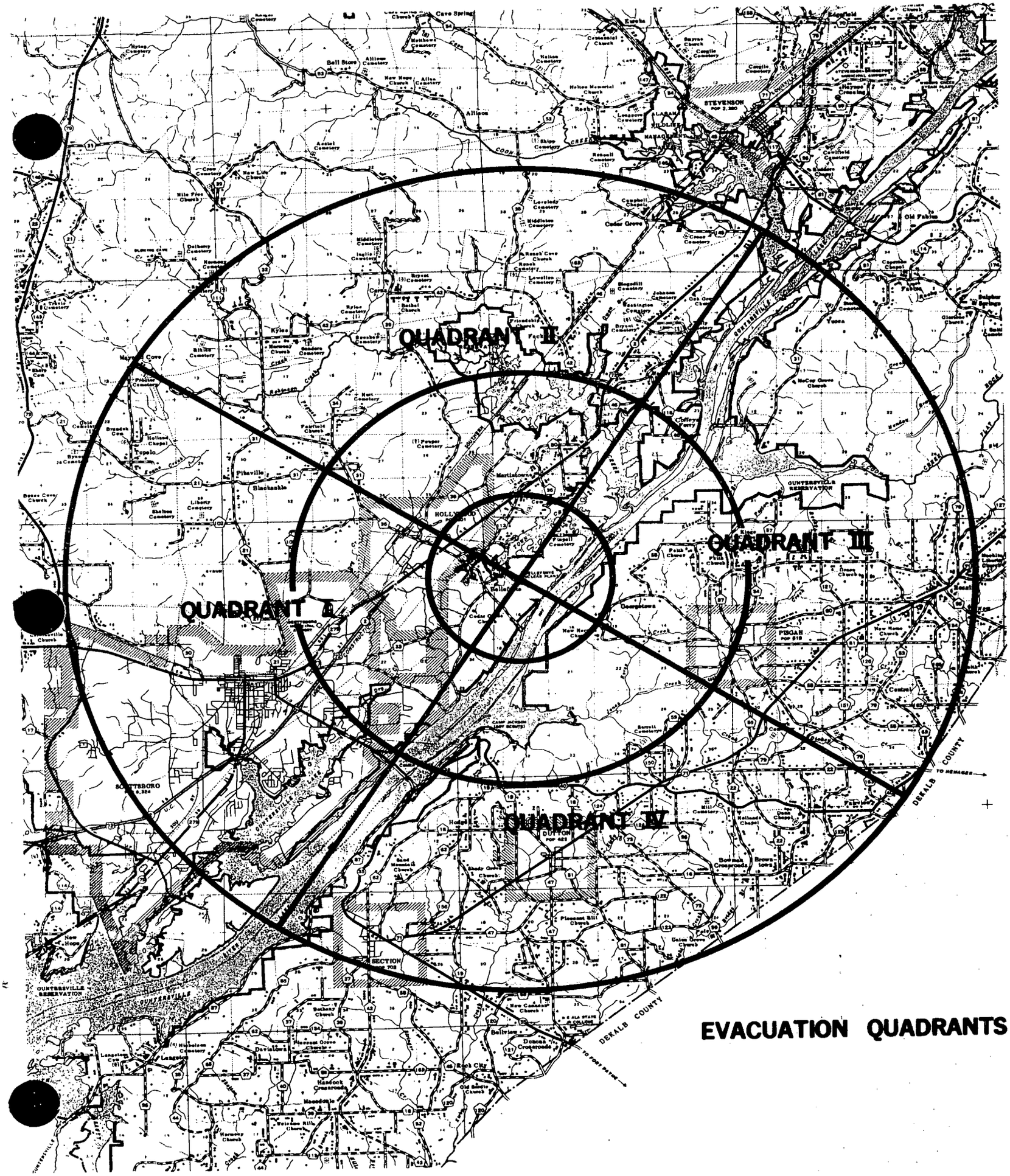
	Total	Miles from site 0-1	1-2	2-3	3-4	4-5	5-10
N	501	0	46	167	37	0	251
NNE	687	0	28	89	310	57	203
NE	196	0	0	0	4	16	176
ENE	142	0	0	0	4	57	81
E	1,832	0	0	57	28	134	1,613
ESE	1,860	0	0	8	32	195	1,625
SE	836	0	0	4	0	20	812
SSE	621	0	0	0	0	12	609
S	2,862	0	0	0	0	154	2,708
SSW	1,957	0	0	0	24	93	1,840
SW	932	0	4	130	85	632	81
WSW	21,826	0	0	215	223	280	21,108
W	1,160	0	0	187	195	439	339
WNW	882	8	28	658	49	85	54
NW	480	0	24	114	8	199	135
NNW	351	4	41	61	61	28	156
TOTAL	37,125	12	171	1,690	1,060	2,401	31,791

2020 Estimated Peak Hour
Recreation Visits Within 10 Miles of Site

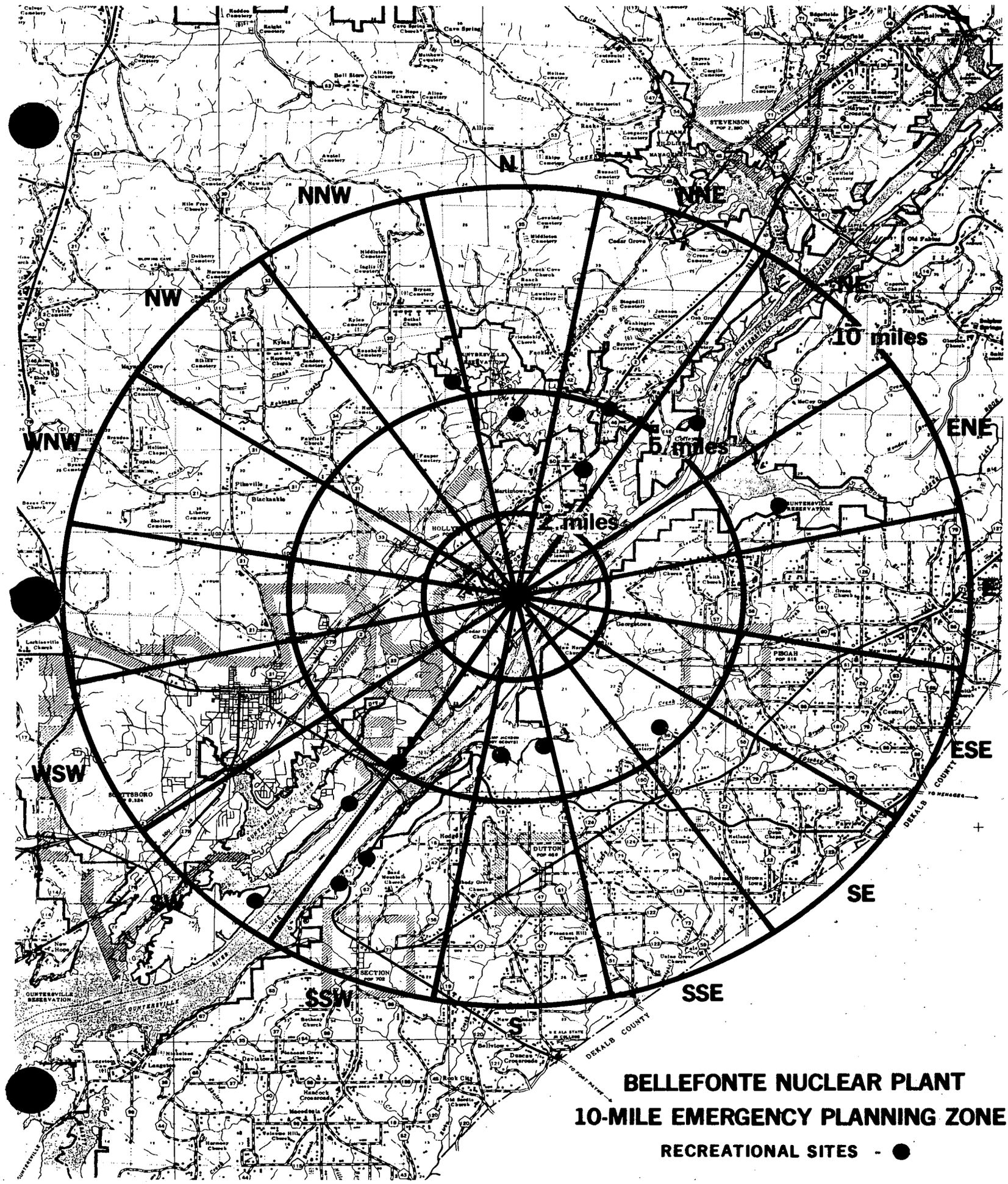
		Miles from site					
	Total	0-1	1-2	2-3	3-4	4-5	5-10
N	240	0	0	0	0	240	0
NNE	1,820	0	0	0	1,740	80	0
NE	441	0	0	0	0	0	441
ENE	235	0	0	0	0	0	235
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	75	0	0	0	75	0	0
SSE	0	0	0	0	0	0	0
S	172	0	32	0	0	140	0
SSW	785	0	0	0	0	100	685
SW	1,981	0	0	0	0	0	1,981
WSW	0	0	0	0	0	0	0
W	32	0	16	0	16	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	670	0	0	0	0	0	670
TOTAL	6,451	0	48	0	1,831	560	4,012

SPECIAL FACILITIES

FACILITY	ADDRESS		ENROLLMENT/ POPULATION
SCHOOLS			
Brownwood Elementary	305 Bingham St., Scottsboro, AL 35768		459
Caldwell Elementary School	905 S. Market St., Scottsboro, AL 35768		581
Dutton School Grades 1-8	Dutton, AL		217
Hollywood Jr. High School Grades (K-8)	Hollywood, AL 35752		294
Jackson County Tech. School	Hollywood, AL 35752	250am - 200pm	450
Nelson Elementary School	202 Ida Moody Rd., Scottsboro, AL 35768		340
Page Elementary School	305 S. Scott St., Scottsboro AL 35768		601
Pisgah School (K-12)	Pisgah, AL 35765		689
Scottsboro High School	102 Legion Dr., Scottsboro, AL 35768		936
Scottsboro Jr. High School	1601 Jefferson St., Scottsboro, AL 35768		564
Section School, (K-12)	Section, AL 35771		657
DAYCARE/NURSERY SCHOOLS			
Scottsboro-Jackson County Child Development Center	Scottsboro, AL 35768		80
Amerikid	404 Scottsboro Plaza, Scottsboro, AL 35768		50
Calvary Baptist Church	County Park Road, Scottsboro, AL 35768		60
Tiny Tots Kindergarten	827 Market St., Scottsboro, AL 35768		50
Jackson County Developmental Center (Mentally Handicapped)	Scottsboro, AL 35768		56
JAILS			
Jackson County Jail	Courthouse, Scottsboro, AL 35768		45
City of Scottsboro Police Dept. Jail	City Hall, Scottsboro, AL 35768		5
(All other municipalities involved bring their prisoners to Jackson County Jail.)			
HOSPITALS			
Jackson County Hospital	Woods Cove Road, Scottsboro, AL 35768		116
NURSING HOMES			
Jackson County Nursing Home	Woods Cove Road, Scottsboro, AL 35768		50
Scottsboro Nursing Home	Woods Cove Road, Scottsboro, AL 35768		82



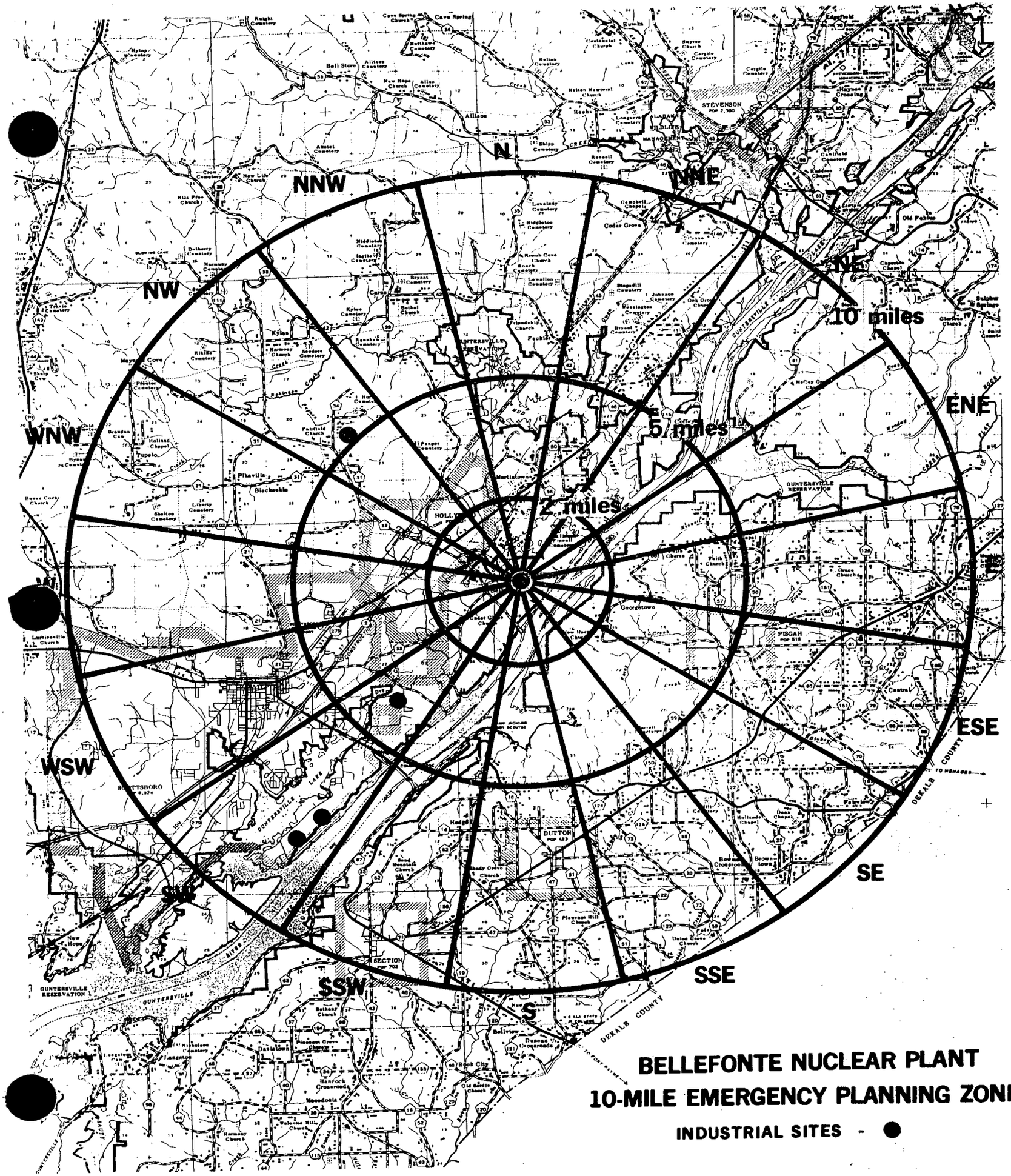
EVACUATION QUADRANTS



BELLEFONTE NUCLEAR PLANT

10-MILE EMERGENCY PLANNING ZONE

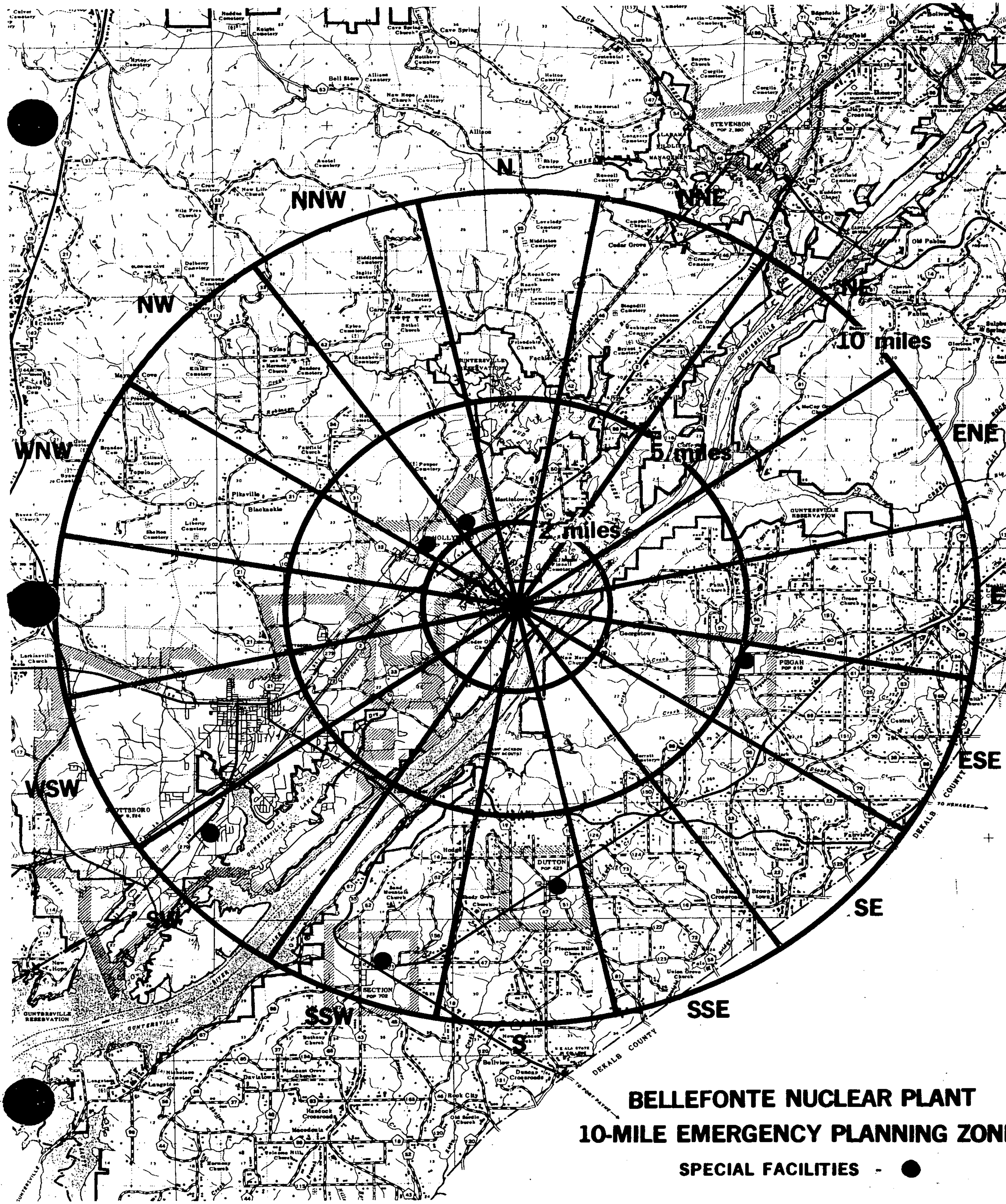
RECREATIONAL SITES - ●



BELLEFONTE NUCLEAR PLANT

10-MILE EMERGENCY PLANNING ZONE

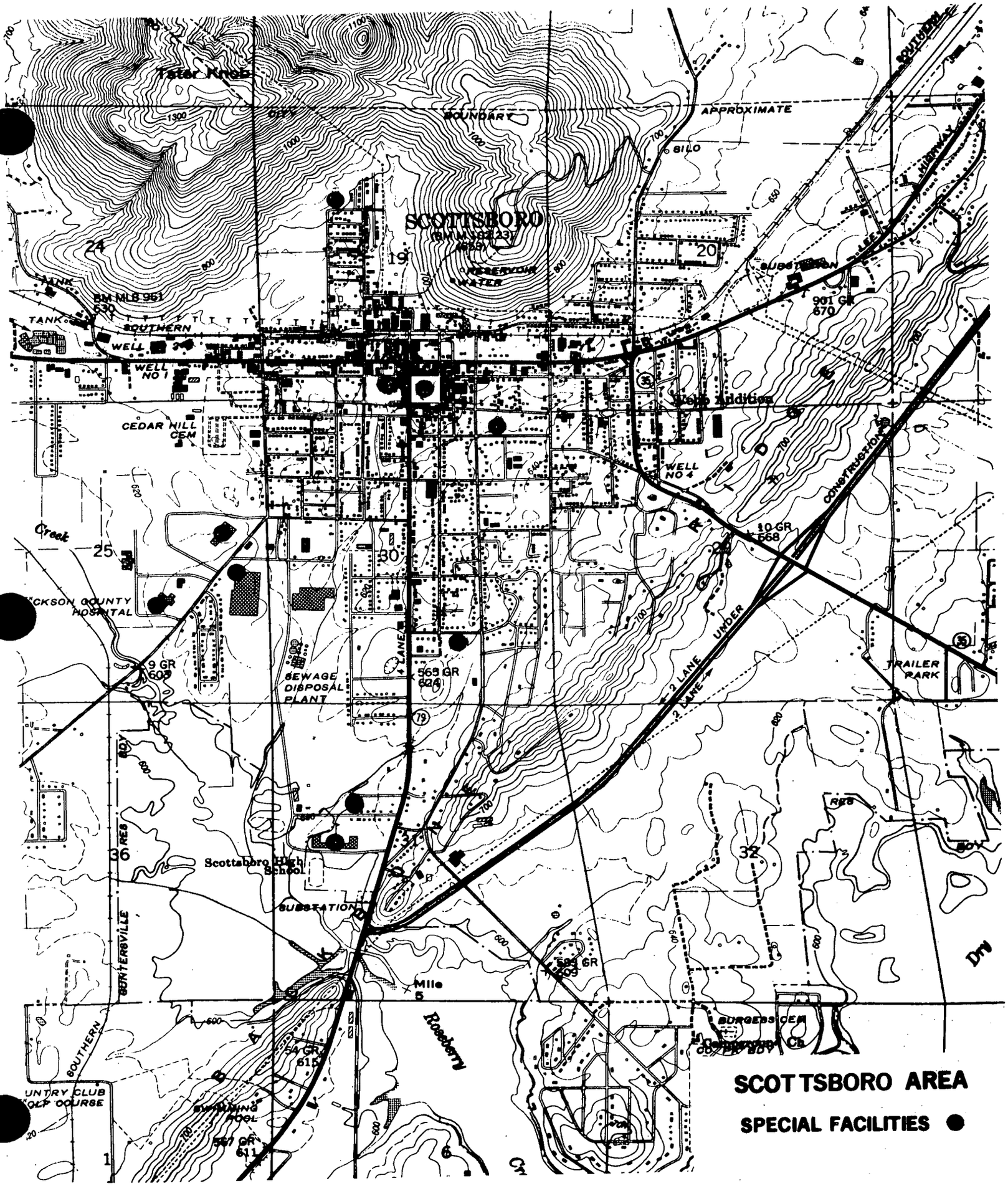
INDUSTRIAL SITES - ●



BELLEFONTE NUCLEAR PLANT

10-MILE EMERGENCY PLANNING ZONE

SPECIAL FACILITIES - ●



SCOTTSBORO AREA

SPECIAL FACILITIES ●

ENCLOSURE 4

ESTIMATED EXISTING TRANSIENT AND SPECIAL POPULATIONS
WITHIN THE BELLEFONTE NUCLEAR PLANT AREA

Transient Populations

The estimate of transient populations within 10 miles of the plant is composed of visitors to reservoir recreation areas and employees of local industry. Transient populations at recreation areas are expressed in estimates of 1980 peak hour attendance, the latest available year, by sector and are contained in the attached Table A. As indicated in the table, the estimated peak hour attendance for all recreation areas within 10 miles of the plant is 6,005 and would be expected to occur during the summer on a weekend or holiday. Since many of the recreation visits are to use the reservoir, the visitors to a particular area may not be there but somewhere on the reservoir.

There are 16 manufacturing firms employing a total of 2,478 persons within 10 miles of the plant. Most of these firms are located in Scottsboro and 10 of them have at least 50 employees. As indicated in the attached Table B, there are approximately 2,300 persons present during the week on the day shift.

Special Populations

The estimate of special populations within 20 miles of the plant is composed of those facilities which house persons on either a temporary or long-term basis and that may need special handling in the event of an emergency. These facilities include hospitals, nursing homes, group groups, camps, and jails. As indicated in the attached Table C, there are 17 known

facilities of this nature within 20 miles of the plant. Given current capacities, the maximum total number of persons that may be housed in those facilities is approximately 700.

TABLE A

1980 Estimated Peak Hour
Recreation Visits Within 10 Miles of Bellefonte Nuclear Plant

		Miles from site					
	Total	0-1	1-2	2-3	3-4	4-5	5-10
N	90	0	0	0	0	90	0
NNE	2,003	0	0	0	1,968	35	0
NE	479	0	0	0	0	0	479
ENE	90	0	0	0	0	0	90
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	30	0	0	0	30	0	0
SSE	0	0	0	0	0	0	0
S	183	0	10	0	0	173	0
SSW	712	0	0	0	0	35	677
SW	2,153	0	0	0	0	0	2,153
WSW	0	0	0	0	0	0	0
W	10	0	5	0	5	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	255	0	0	0	0	0	255
TOTAL	6,005	0	15	0	2,003	333	3,654

TABLE B

MANUFACTURING FIRMS WITHIN 10 MILES
OF BELLEFONTE NUCLEAR PLANT

Name	Distance (Mileage Zone) From Plant Site	Direction From Plant Site	Employees (Day Shift)
Graphic Arts Printing	4-5	ESE	45
Dover Mills	4-5	ESE	455
Maples Industries	4-5	WSW	126[1]
Fieldcrest Mills	4-5	WSW	178[2]
Jackson County Advertiser	6-7	WSW	10
Beard's Quick Freeze	6-7	WSW	11
Forest Products	6-7	WSW	35
Patrick Lumber	6-7	WSW	50
Benham Mills	6-7	WSW	460
Webb Concrete	7-8	WSW	11
Bellefonte Corp	7-8	WSW	46
Lozier Corp	7-8	WSW	81
Word Lumber	7-8	WSW	139
Ballet Fabrics	7-8	WSW	168[3]
Gay-Tred Mills	7-8	WSW	235[4]
Halstead Industries	9-10	WSW	236[5]
TOTAL			2,286

1. Total employment is 131.
2. Total employment is 200.
3. Total employment is 310.
4. Total employment is 250.
5. Total employment is 244.

TABLE C

FACILITIES HOUSING SPECIAL POPULATIONS WITHIN 20 MILES OF BELLEFONTE NUCLEAR PLANT*

Name	Distance (Mileage Zone) From Plant Site	Direction From Plant Site	Capacity
Hollywood City Jail	2-3	WNW	3
Camp Jackson	4-5	S	173
Oak Lodge Women's Residence	6-7	WSW	9
Jackson County Group Home	6-7	WSW	14
Scottsboro City Jail	6-7	WSW	30
Jackson County Jail	6-7	WSW	72
[illegible]ted Methodists Children's Home	7-8	WSW	8
Jackson County Nursing Home	7-8	WSW	50
Scottsboro Nursing Home	7-8	WSW	82
Jackson County Hospital	7-8	WSW	166
Haymon's Foster Home	9-10	SSW	5
Henagar City Jail	10-11	ESE	4
Stevenson City Jail	11-12	NNE	9
North Jackson Hospital	12-13	NNE	58
Ider City Jail	14-15	W	8
Rainsville City Jail	16-17	SSE	8
Fyffe City Jail	18-19	S	3
TOTAL			702

*Those facilities which house persons on either a temporary or long-term basis and that may need special handling in the event of an emergency.

ENCLOSURE 5

BELLEFONTE NUCLEAR PLANT

RESPONSES TO QUESTIONS

CONCERNING GASEOUS AND

LIQUID RELEASES

A. The applicant should provide the following information, which is necessary to estimate population and maximum exposed individual doses due to gaseous releases. This information should reflect 1981-1982 data.

1. Within 80 km of the reactor the total projected year 2010 population, (based on 1980 census), annual meat production (Kg/yr), annual milk production (liters/yr), and vegetable production (Kg/yr) with separate data for leafy (e.g. lettuce) and nonleafy (e.g. corn) vegetables.

Response to A.1--The 2020 population distribution within 80 km of BLN is given in Table A-1. No meat production or vegetable production data are currently available. However, TVA's radiological assessment for populatiou doses is based on the assumption that enough beef and vegetables are grown in a given sector annulus to supply the needs of that region based on Regulatory Guide 1.109 intake rates for average individuals. Milk production data are given in Table A-2.

2. Fraction of year leafy vegetables are grown.

Response to A.2--Leafy vegetables are grown about 75 percent of the year.

3. Fraction of ingested crop from garden.

Response to A.3--TVA assumes that all nearest-resident locations have home-use gardens. Residents are assumed to consume vegetables per Regulatory Guide 1.109 intake rates for maximum individuals.

4. Fractions of year cows and goats are on pasture.

Response to A.4--See Table A-3.

5. Fraction of daily intake of cows and goats derived from pasture food while on pasture.

Response to A.5--Milch animals are assumed to receive all their food from the pasture while on pasture.

6. Fraction of year beef cattle are on pasture.

Response to A.6--Beef animals are assumed to graze on pasture 100 percent of the year.

7. Absolute or relative humidity over growing season.

Response to A.7--The actual data sets for the site and for Chattanooga both show an average value of about 12 g/m^3 for the March through November portion of the year.

8. Average temperature over growing season.

Response to A.8--The average temperature over the growing season is about 66 degrees Fahrenheit. This is based on March through November monthly average temperatures for Chattanooga in Table 2.3.2-35 of the FSAR.

9. Reconfirmation that data in Tables 4.6-1 and 5.2-3 are valid.

Response to A.9--See the revised Table 4.6-1 in Table A-4 and Table 5.2-3 in Table A-3.

10. Description of and basis for models used to calculate maximum-exposed individual and population doses resulting from gaseous releases.

Response A.10--See OLER Section 5.2.4.2 Gaseous Pathways.

B. The applicant should provide the following information, which is necessary to estimate population and maximum-exposed individual doses due to liquid releases. This information should reflect 1981-1982 data.

1. Projected year 2010 population (based on 1980 census) to 80 km.

Response to B.1--See Table B-2.

2. Locations and estimates of commercial vertebrate and invertebrate fishing catches and sport vertebrate and invertebrate fishing catches (Kg/yr) downstream of plant (to 80 km). Include bases for each estimate and reresenttive dilution factors and transit times for discharge to each location.

Response to B.2--See Table B-1.

3. Locations and estimates of recreational use downstreams including shoreline, boating, and swimming uses (to 80 km). Include bases for each estimate and representative dilution factors and transit times for discharge to each locations.

Responses to B.3--See Table B-1.

4. Downstream locations and estimate of drinking water intakes (to 80 km). Include bases for each estimate and representative dilution factors and transit times for discharge to location.

Response to B.4--See Table B-2.

5. Irrigation rate (liters/m/month), crop yield, (kg/m), annual production (Kg/yr), and growing period for irrigated land using water withdrawn within 80 km downstream of plant. Also, include downstream location of irrigation water intakes and representative dilution factors and transit times for discharge to each location.

Response to B.5--TVA is not aware of any irrigation within 80 km of BLN.

6. Description of and bases for models used to calculate maximum exposed individual and population doses resulting from liquid releases.

Response to B.6--See Table B-3.

7. Estimate the water area (in percent) within 80 kilometers.

Response to B.7--TVA has estimated this to be less than 5 percent of the total area within 80 kilometers.

TABLE A-1 (1 of 12)

BELLEFONTE NUCLEAR PLANT

1980 Population Distribution
Within 10 Miles of the Site

	Total	Miles from site 0-1	1-2	2-3	3-4	4-5	5-10
N	368	0	33	123	27	0	185
NNE	507	0	21	66	228	42	150
NE	145	0	0	0	3	12	130
ENE	105	0	0	0	3	42	60
E	1,353	0	0	42	21	99	1,191
ESE	1,374	0	0	6	24	144	1,200
SE	618	0	0	3	0	15	600
SSE	459	0	0	0	0	9	450
S	2,114	0	0	0	0	114	2,000
SSW	1,446	0	0	0	18	69	1,359
SW	687	0	3	96	63	465	60
WSW	16,119	0	0	159	165	207	15,588
W	856	0	0	138	144	324	250
WNW	652	6	21	486	36	63	40
NW	355	0	18	84	6	147	100
NNW	259	3	30	45	45	21	115
TOTAL	27,417	9	126	1,248	783	1,773	23,478

TABLE A-1 (2 of 12)

BELLEFONTE NUCLEAR PLANT

1990 Population Distribution
Within 10 Miles of the Site

	Total	Miles from site 0-1	1-2	2-3	3-4	4-5	5-10
N	432	0	39	145	32	0	216
NNE	596	0	25	78	268	49	176
NE	170	0	0	0	4	14	152
ENE	123	0	0	0	4	49	70
E	1,590	0	0	49	25	117	1,399
ESE	1,614	0	0	7	28	169	1,410
SE	726	0	0	4	0	18	704
SSE	539	0	0	0	0	11	528
S	2,484	0	0	0	0	134	2,350
SSW	1,699	0	0	0	21	81	1,597
SW	807	0	4	113	74	545	71
WSW	18,939	0	0	187	194	243	18,315
W	1,006	0	0	162	169	381	294
WNW	766	7	25	571	42	74	47
NW	417	0	21	99	7	172	118
NNW	306	4	35	53	53	25	136
TOTAL	32,214	11	149	1,468	921	2,082	27,583

TABLE A-1 (3 of 12)

BELLEFONTE NUCLEAR PLANT

2000 Population Distribution
Within 10 Miles of the Site

	Total	Miles from site 0-1	1-2	2-3	3-4	4-5	5-10
N	458	0	41	154	34	0	229
NNE	631	0	26	83	284	52	186
NE	180	0	0	0	4	15	161
ENE	130	0	0	0	4	52	74
E	1,685	0	0	52	26	124	1,483
ESE	1,710	0	0	7	30	179	1,494
SE	769	0	0	4	0	19	746
SSE	571	0	0	0	0	12	559
S	2,632	0	0	0	0	142	2,490
SSW	1,800	0	0	0	22	86	1,692
SW	855	0	4	120	78	578	75
WSW	20,068	0	0	198	206	257	19,407
W	1,066	0	0	172	178	404	312
WNW	812	7	26	606	45	78	50
NW	442	0	22	105	7	183	125
NNW	324	4	37	56	56	26	145
TOTAL	34,133	11	156	1,557	974	2,207	29,228

TABLE A-1 (4 of 12)

BELLEFONTE NUCLEAR PLANT

2010 Population Distribution
Within 10 Miles of the Site

	Total	Miles from site 0-1	1-2	2-3	3-4	4-5	5-10
N	478	0	43	161	35	0	239
NNE	658	0	27	87	296	54	194
NE	188	0	0	0	4	16	168
ENE	136	0	0	0	4	54	78
E	1,757	0	0	54	27	129	1,547
ESE	1,784	0	0	7	31	187	1,559
SE	802	0	0	4	0	20	778
SSE	596	0	0	0	0	13	583
S	2,745	0	0	0	0	148	2,597
SSW	1,877	0	0	0	23	90	1,764
SW	892	0	4	125	81	604	78
WSW	20,931	0	0	207	215	268	20,241
W	1,112	0	0	179	186	421	326
WNW	847	7	27	633	47	81	52
NW	461	0	23	110	7	191	130
NNW	338	4	39	58	58	27	152
TOTAL	35,602	11	163	1,625	1,014	2,303	30,486

TABLE A-1 (12)

BELLEFONTE NUCLEAR PLANT

2020 Population Distribution
Within 10 Miles of the Site

	Total	Miles from site 0-1	1-2	2-3	3-4	4-5	5-10
N	501	0	46	167	37	0	251
NNE	687	0	28	89	310	57	203
NE	196	0	0	0	4	16	176
ENE	142	0	0	0	4	57	81
E	1,832	0	0	57	28	134	1,613
ESE	1,860	0	0	8	32	195	1,625
SE	836	0	0	4	0	20	812
SSE	621	0	0	0	0	12	609
S	2,862	0	0	0	0	154	2,708
SSW	1,957	0	0	0	24	93	1,840
SW	932	0	4	130	85	632	81
WSW	21,826	0	0	215	223	280	21,108
W	1,160	0	0	187	195	439	339
WNW	882	8	28	658	49	85	54
NW	480	0	24	114	8	199	135
NNW	351	4	41	61	61	28	156
TOTAL	37,125	12	171	1,690	1,060	2,401	31,791

TABLE A-1 (1 of 12)

BELLEFONTE NUCLEAR PLANT

2030 Population Distribution
Within 10 Miles of the Site

	Total	Miles from site 0-1	1-2	2-3	3-4	4-5	5-10
N	520	0	47	174	38	0	261
NNE	716	0	30	93	322	59	212
NE	205	0	0	0	4	17	184
ENE	1 148	0	0	0	4	59	85
E	1,911	0	0	59	30	140	1,682
ESE	1,939	0	0	8	34	203	1,695
SE	873	0	0	4	0	21	847
SSE	648	0	0	0	0	13	636
S	2,986	0	0	0	0	161	2,825
SSW	2,042	0	0	0	25	97	1,919
SW	970	0	4	136	89	657	85
WSW	22,765	0	0	225	233	292	22,014
W	1,209	0	0	195	203	458	353
WNW	921	9	30	687	51	89	56
NW	501	0	25	119	8	208	141
NNW	366	4	42	64	64	30	162
TOTAL	38,720	13	178	1,763	1,105	2,504	33,157

TABLE A-1 (7 o)

1980 Population Distribution
Within 50 Miles of the Site

	Total	0-10	10-20	20-30	30-40	40-50
N	15,663	368	1,100	937	9,757	3,501
NNE	24,278	507	5,054	7,061	4,656	7,000
NE	105,603	145	2,875	8,700	8,099	85,784
ENE	241,622	105	3,462	7,673	37,137	193,245
E	33,515	1,353	3,773	2,935	16,380	9,074
ESE	32,698	1,374	3,103	3,014	17,109	8,098
SE	32,899	618	4,558	8,200	5,623	13,900
SSE	26,016	459	6,200	7,107	4,150	8,100
S	53,390	2,114	3,217	5,755	7,313	34,991
SSW	50,855	1,446	2,089	4,075	26,870	16,375
SW	39,656	687	1,050	4,710	17,629	15,600
WSW	39,726	16,119	825	9,045	4,743	8,994
W	163,109	856	1,113	4,382	130,250	26,508
WNW	34,152	652	540	1,755	20,373	10,832
NW	20,049	355	520	950	5,440	12,784
NNW	41,762	259	400	700	13,056	27,347
TOTAL	954,993	27,417	39,859	76,999	328,585	482,133

TABLE A-1 (8 of 12)

1990 Population Distribution
Within 50 Miles of the Site

	Total	0-10	10-20	20-30	30-40	40-50
N	16,884	432	1,292	1,070	10,530	3,560
NNE	27,916	596	5,940	8,630	5,200	7,550
NE	115,304	170	3,290	10,464	9,210	92,170
ENE	262,003	123	4,050	9,740	40,060	208,030
E	37,009	1,590	4,394	3,545	17,430	10,050
ESE	37,394	1,614	3,610	3,450	19,410	9,310
SE	37,516	726	5,300	9,490	6,050	15,950
SSE	28,823	539	7,210	8,260	4,360	8,454
S	58,664	2,484	3,750	6,690	8,250	37,490
SSW	62,259	1,699	2,440	4,910	35,010	18,200
SW	50,531	807	1,311	6,230	23,303	18,880
WSW	47,606	18,939	997	10,970	6,060	10,640
W	205,234	1,006	1,307	5,481	164,050	33,390
WNW	42,019	766	630	2,180	25,650	12,793
NW	21,648	417	610	1,073	5,924	13,624
NNW	47,445	306	469	620	14,630	31,420
TOTAL	1,098,255	32,214	46,600	92,803	395,127	531,511

TABLE A-1 (9 [illegible])

2000 Population Distribution
Within 50 Miles of the Site

	Total	0-10	10-20	20-30	30-40	40-50
N	18,904	458	1,370	1,132	11,658	4,286
NNE	28,783	631	6,300	8,530	5,422	7,900
NE	117,529	180	3,573	11,262	6,030	96,484
ENE	274,120	130	4,280	11,310	41,500	216,900
E	38,540	1,685	4,610	3,890	17,820	10,535
ESE	39,850	1,710	3,780	3,530	20,680	10,150
SE	40,239	769	5,550	9,940	6,490	17,490
SSE	30,299	571	7,300	8,650	4,678	9,100
S	59,492	2,632	3,920	7,000	8,570	38,580
SSW	60,702	1,800	2,570	5,420	43,160	19,570
SW	61,646	855	1,576	7,760	29,075	22,380
WSW	53,505	20,068	1,090	13,362	7,150	11,835
W	232,990	1,066	1,394	6,150	186,420	37,960
WNW	47,117	812	670	2,450	29,120	14,065
NW	22,594	442	650	1,161	6,233	14,108
NNW	51,844	324	490	850	15,750	34,430
TOTAL	1,191,182	34,133	49,123	102,397	439,756	565,773

TABLE A-1 (10 of 12)
2010 Population Distribution
Within 50 Miles of the Site

	Total	0-10	10-20	20-30	30-40	40-50
N	19,726	478	1,428	1,249	11,900	4,581
NNE	31,990	658	6,570	10,132	6,160	8,470
NE	127,535	188	3,737	12,340	11,220	100,050
ENE	281,650	136	4,450	11,840	42,430	222,794
E	39,740	1,757	4,800	4,093	18,120	10,970
ESE	42,088	1,784	3,930	3,774	21,800	10,800
SE	42,385	802	5,753	10,330	6,840	18,660
SSE	31,791	596	7,840	8,985	4,760	9,610
S	62,536	2,745	4,080	7,280	8,891	39,540
SSW	83,939	1,877	2,680	5,960	52,580	20,842
SW	74,093	892	1,860	9,510	35,615	26,216
WSW	58,661	20,931	1,180	15,320	8,260	12,970
W	256,402	1,112	1,450	6,740	205,770	41,330
WNW	51,547	847	702	2,690	32,143	15,165
NW	23,354	461	680	1,239	6,484	14,490
NNW	55,167	338	520	897	16,798	36,614
TOTAL	1,282,604	35,602	51,660	112,379	489,861	593,102

TABLE A-1 (11 of 12)
2020 Population Distribution
Within 50 Miles of the Site

	Total	0-10	10-20	20-30	30-40	40-50
N	20,735	501	1,490	1,348	12,580	4,816
NNE	33,527	687	6,850	11,180	6,080	8,730
NE	132,426	196	3,890	13,050	12,270	103,020
ENE	288,092	142	4,640	12,340	43,290	227,680
E	40,862	1,832	4,980	4,180	18,460	11,410
ESE	44,050	1,860	4,080	3,940	22,700	11,470
SE	44,681	836	5,975	10,740	7,190	19,940
SSE	33,186	621	7,880	9,330	5,210	10,145
S	64,412	2,862	4,240	7,550	9,200	40,560
SSW	107,191	1,957	2,790	6,552	73,370	22,522
SW	87,072	932	2,180	11,430	42,160	30,370
WSW	63,620	21,826	1,280	17,104	9,400	14,010
W	279,105	1,160	1,505	7,300	223,560	45,580
WNW	55,632	882	734	2,910	34,916	16,190
NW	24,108	480	700	1,316	6,738	14,874
NNW	58,600	351	545	950	17,836	38,918
TOTAL	1,377,299	37,125	53,759	121,220	544,960	620,235

TABLE A-1 (12 of 12)
2030 Population Distribution
Within 50 Miles of the Site

	Total	0-10	10-20	20-30	30-40	40-50
N	21,675	520	1,550	1,453	13,240	4,912
NNE	37,286	716	7,140	12,340	7,190	9,900
NE	137,841	205	4,056	13,890	13,440	106,250
ENE	295,319	148	4,841	12,910	44,230	233,190
E	42,099	1,911	5,176	4,332	18,790	11,890
ESE	46,225	1,939	4,230	4,086	23,780	12,190
SE	45,225	873	6,218	11,170	7,570	19,743
SSE	34,950	648	8,390	9,700	5,500	10,712
S	66,347	2,986	4,400	7,850	9,520	41,591
SSW	112,140	2,042	2,900	7,250	75,620	24,328
SW	101,591	970	2,571	11,800	50,670	35,580
WSW	69,645	22,765	1,400	19,410	10,810	15,260
W	305,399	1,209	1,570	7,940	244,750	49,930
WNW	60,435	921	766	3,150	38,217	17,381
NW	24,929	501	730	1,394	7,027	15,277
NNW	62,275	366	561	1,013	18,972	41,363
TOTAL	1,463,730	38,720	56,499	129,688	589,326	649,497

TABLE A-2

BELLEFONTE NUCLEAR PLANT ANNUAL MILK PRODUCTION

MILK PRODUCTION FOR EACH SECTOR ELEMENT (MILLION POUNDS)

SECTOR	1305.	2414.	4023.	5633.	7242.	12070.	24140.	40234.	56327.	72420.
N	1.45E-03	4.35E-03	7.25E-03	1.01E-02	1.30E-02	1.09E-01	8.88E-01	4.87E 00	6.32E 00	8.28E 00
NNE	1.53E-03	4.59E-03	7.65E-03	1.07E-02	1.38E-02	1.15E-01	4.42E-01	7.69E-01	1.70E 00	4.32E 00
NE	1.45E-03	4.35E-03	7.25E-03	1.01E-02	1.30E-02	1.09E-01	4.51E-01	9.01E-01	1.50E 00	4.11E 00
ENE	1.45E-03	4.35E-03	7.25E-03	1.01E-02	1.30E-02	1.09E-01	7.35E-01	1.42E 00	3.98E 00	1.40E 01
E	1.28E-03	3.84E-03	6.40E-03	8.96E-03	1.15E-02	9.60E-02	1.37E 00	2.06E 00	3.84E 00	6.54E 00
ESE	1.36E-03	4.08E-03	6.80E-03	9.52E-03	1.22E-02	1.02E-01	1.56E 00	2.40E 00	3.04E 00	4.25E 00
SE	1.45E-03	4.35E-03	7.25E-03	1.01E-02	1.30E-02	1.09E-01	1.63E 00	2.20E 00	2.00E 00	4.30E 00
SSE	1.36E-03	4.08E-03	6.80E-03	9.52E-03	1.22E-02	1.02E-01	1.61E 00	2.63E 00	1.63E 00	1.74E 00
S	1.53E-03	4.59E-03	7.65E-03	1.07E-02	1.38E-02	1.15E-01	1.43E 00	2.71E 00	3.11E 00	3.73E 00
SSW	1.45E-03	4.35E-03	7.25E-03	1.01E-02	1.30E-02	1.09E-01	7.82E-01	2.21E 00	2.64E 00	3.77E 00
SW	1.45E-03	4.35E-03	7.25E-03	1.01E-02	1.30E-02	1.09E-01	6.55E-01	1.69E 00	2.41E 00	4.49E 00
WSW	1.45E-03	4.35E-03	7.25E-03	1.01E-02	1.30E-02	1.09E-01	5.42E-01	1.87E 00	3.21E 00	4.87E 00
W	1.79E-03	5.37E-03	8.95E-03	1.25E-02	1.61E-02	1.34E-01	4.42E-01	1.68E 00	3.69E 00	4.58E 00
WNW	1.53E-03	4.59E-03	7.65E-03	1.07E-02	1.38E-02	1.15E-01	4.42E-01	1.43E 00	4.38E 00	9.35E 00
NW	1.45E-03	4.35E-03	7.25E-03	1.01E-02	1.30E-02	1.09E-01	4.34E-01	2.84E 00	1.06E 01	1.47E 01
NNW	1.45E-03	4.35E-03	7.25E-03	1.01E-02	1.30E-02	1.09E-01	5.33E-01	5.72E 00	8.74E 00	9.63E 00

TABLE A-3

POINT	SECTOR	DISTANCE (M)	ELEVATION (M)	ANIMAL FEEDING FACTOR
MILK COW - ADULT	N	2019.	22.	.53
MILK COW - ADULT	N	2362.	4.	.53
MILK COW - ADULT	NNE	2057.	-9.	.53
MILK COW - ADULT	NNE	2362.	-2.	.53
MILK COW - ADULT	NNE	4267.	22.	.79
MILK COW - ADULT	NNE	4267.	22.	1.00
MILK COW - ADULT	NNE	6629.	22.	.79
MILK COW - ADULT	NNE	6858.	22.	.83
MILK COW - CHILD	NNE	7468.	22.	.83
MILK COW - ADULT	ENE	4763.	257.	.25
MILK COW - ADULT	ENE	6287.	235.	.67
MILK COW - INFANT	ENE	6782.	235.	.29
MILK COW - CHILD	ENE	6896.	235.	.48
MILK COW - ADULT	E	3353.	254.	.46
MILK COW - ADULT	E	4877.	241.	.25
MILK COW - ADULT	E	5486.	254.	.25
MILK COW - ADULT	E	6248.	235.	.67
MILK COW - ADULT	E	6553.	235.	.42
MILK COW - ADULT	E	7010.	235.	.42
MILK COW - ADULT	E	7010.	235.	.35
MILK COW - ADULT	E	7010.	235.	.40
MILK COW - CHILD	E	7391.	235.	.49
MILK COW - ADULT	ESE	7468.	235.	.42
MILK COW - ADULT	SE	3886.	223.	.35
MILK COW - CHILD	S	7430.	223.	.63
MILK COW - ADULT	SW	7734.	-2.	.67
MILK COW - CHILD	WNW	6477.	10.	.54
MILK COW - ADULT	NW	1638.	-2.	.25
MILK COW - ADULT	NW	6706.	16.	1.00
MILK COW - ADULT	NNW	1753.	-2.	.25
MILK COW - CHILD	ENE	6896.	235.	1.00
MILK GOAT - CHILD	ENE	6706.	235.	.10

TABLE A-4

ESTIMATED ANNUAL DOSES (MREM/YR) PER UNIT AT SITE BOUNDARY

Sector	Site Boundary Distance (meters)	Gaseous	Tank	Total
N	922	9E-2*	2E-10	9E-2
NNE	1,029	1E-1	-	1E-1
NE	1,135	8E-2	8E-12	8E-2
ENE	1,638	3E-2	5E-13	3E-2
E	1,158	2E-2	8E-12	2E-2
ESE	1,025	2E-2	4E-11	2E-2
SE	1,059	3E-2	2E-11	3E-2
SSE	1,162	4E-2	8E-12	4E-2
S	1,524	3E-2	7E-13	3E-2
SSW	1,379	8E-2	-	8E-2
SW	1,337	1E-1	-	1E-1
WSW	1,250	4E-2	-	4E-2
W	831	3E-2	6E-10	3E-2
WNW	762	2E-2	1E-9	2E-2
NW	701	8E-2	2E-9	8E-2
NNW	777	5E-2	1E-9	5E-2

*9E-2 = 9×10^{-2}

TABLE B-1

Environmental Data

Reach Location[1]	Name of Reach	Commercial Fishing(kg/yr)	Sport Fishing(kg/yr)	Shoreline Use(h/yr)	Boating Use(h/yr)	Swimming Use(h/yr)	Transit Time(h)	Dilution[2] factor
417.5-392.0	Guntersville Lake Above Bellefonte Site	8.8E+4	2.4E+5	4.7E+5	5.2E+5	1E+5	-	-
392.0-373.0	Guntersville Lake Below Bellefonte Site	1.3E+5	3.5E+5	4.2E+6	4.7E+6	8.9E+5	194.1	9.4E-5
373.0-349.0	Guntersville Lake Above Guntersville Dam	1.7E+5	4.7E+5	9.8E+6	1.1E+7	2.1E+6	62.2	5.2E-5
349.0-294.0	Wheeler Lake Above Browns Ferry Site	1.7E+5	4.7E+5	3.6E+6	4.0E+6	7.6E+5	103.9	4.9E-5

[1]Miles from Ohio River. Bellefonte Nuclear Plant is at river mile 392.0
[2]Relative concentration (CM/CO) per ft^3 released calculated to reach midpoint

TABLE [illegible]-2

PUBLIC WATER SUPPLY DATA

TRM Location	1970 Population Served	Name of Water Supply	Dilution Factor*	Travel Time(h)	
649.2	459700	Knoxville Util. Board	-	-	
601.3	18000	Lenoir City	-	-	
592.2	5100	Loudoun	-	-	
568.2	7900	Kingston	-	-	
553.0	200	Camp John Knox	-	-	
529.9	300	Watts Bar Resort	-	-	
528.0	0	Watts Bar Nuclear Plant	-	-	
503.8	12300	Dayton	-	-	
484.5	0	Sequoyah Nuclear Plant	-	-	
473.0	2000	ICI America, Inc. (VAAP)	-	-	
473.0	900	C. F. Industries, Inc.	-	-	
470.5	4000	E. I. Dupont, Company	-	-	
465.3	610700	Chattanooga	-	-	
418.0	4400	South Pittsburg	-	-	
413.6	3400	Bridgeport	-	-	
407.6	500	Widows Creek Steam Plant	-	-	
405.2	500	Mead Paper Board	-	-	
392.0	0	Bellefonte Nuclear Plant	-	-	
385.8	38700	Scottsboro	1.2E-4	12.4	
382.1	18600	Sand Mountain Water Authority	9.2E-5	19.9	within 80km
368.2	125	Christian Youth Camp	5.9E-5	47.7	
358.0	14900	Guntersville	4.9E-5	68.2	
334.5	4500	N. E. Morgan Co., Water & Fire			
334.2	168600	Huntsville			
330.2	10000	Redstone Arsenal			
324.2	0	Redstone Arsenal			
306.0	84600	Decatur			
294.0	0	Browns Ferry Nuclear Plant			
283.0	500	U.S. Plywood-Champion Paper			
274.9	50	Wheeler Dam			

TABLE [illegible] Cont.

PUBLIC WATER SUPPLY DATA

TRM Location	1970 Population Served	Name of Water Supply	Dilution Factor*	Travel Time (h)
259.6	14100	Muscle Shoals		
259.5	2700	TVA-NFDC		
254.3	21100	Sheffield		
245.0	520	Colbert Steam Plant		
239.3	3900	Cherokee		
238.7	350	U.S. Steel Agri-Chemicals, Inc.		
217.4	0	Yellow Creek Nuclear Plant		
206.8	2400	Hardin Co., Water District		
193.5	1900	Tri-County Utility District		
158.0	1100	Clifton		
101.9	170	Foote Mineral Co.		
100.5	6100	New Johnsonville		
100.4	13300	Camden		
100.0	375	Johnsonville Steam Plant		
98.5	900	E. I. Dupont		
95.5	700	Consolidated Aluminum Corporation		
94.5	250	Inland Container Corporation		
79.5	120	Bass Bay Resort		
39.3	4300	Jonathan Creek Water District		
28.5	9100	North Marshall Water District		
23.6	650	Grand Rivers		
17.8	600	B. F. Goodrich Chemical Co.		
17.4	106	AIRCO Carbide		
16.8	592	AIRCO Alloys		
16.7	510	Air Products and Chemicals		
1.1	69800	Paducah (River Mouth)		

*Relative concentration factor (CM/CO) per ft^3 released

TABLE B-3 (1 of 5)

The dose to the j th organ from m radionuclides,

D_j, is described by

$$D_j = \sum_{i=1}^{m} D_{ij}, \text{ rem} \qquad (2.16)$$

$$= \sum_{i-1}^{m} (DCF)_{ij} \times I_i, \text{ rem} \qquad (2.17)$$

where:

D_{ij} = dose to the jth organ from the ith radionuclide, rem.

j = the organ of interest (bone, GI tract, thyroid, liver or total body)

$(DCF)_{ij}$ = adult ingestion dose commitment factor for the jth organ from the ith radionuclide, rem/μCi, see Table 2.1.

I_i = activity ingested of the ith radionuclide, μCi.

I_i for water ingested is described by

$$I_i = \frac{A_i \; V \; n}{Fd}, \text{ μCi} \qquad (2.18)$$

and for fish ingestion I_i is described by

$$I_i = \frac{A_i \; B_i \; M}{Fd}, \text{ μ Ci} \qquad (2.19)$$

TABLE B-3 (2 of 5)

where:

A_i = activity released of jth radionuclide during the release period, μCi.

V = average rate of water consumption (2000 ml/d).

n = number of days during the release period (d).

F = total river flow at location of interest for period, ml.

d = fraction of river flow available for dilution

B_i = fish concentration factor, $\frac{\mu Ci/g}{\mu Ci/ml}$

M = amount of fish eaten during period (fraction of year x 50 lb/year x 453.6 g/lb)

TABLE B-3 (3 of 5)

TABLE 2.1

DOSE COMMITMENT AND FISH CONCENTRATION FACTORS

NUCLIDE	RADIOLO. HALF-LIFE (DAYS)	BIOLOGICAL HALF-LIFE (DAYS)	EFFECTIVE HALF/LIFE (DAYS)	HUMAN DOSE COMMITMENT FACTORS (REM/UCI) BONE	GI TRACT	THYROID	TOTAL BODY	LIVER	FISH CONCENTRATION FACT. STABLE	RADIOLO.	BIOLOGICAL HALF-LIFE DAYS
H-3	4.43E+03	1.00E+01	9.98E+00	9.77E-05	1.05E-04	1.05E-04	1.05E-04	1.05E-04	1.00E+00	1.00E+00	0.0
C-14	2.09E+06	1.00E+01	1.00E+01	2.84E-03	5.68E-04	5.88E-04	5.68E-04	5.68E-04	4.55E+03	4.55E+03	0.0
NA-24	6.33E-01	1.10E+01	5.99E-01	1.70E-03	1.70E-03	1.70E-03	1.70E-03	1.70E-03	1.00E+02	1.00E+02	0.0
P-32	1.43E+01	2.57E+02	1.35E+01	1.93E-01	2.17E-02	7.47E-03	7.46E-03	1.20E-02	1.00E+05	*2.50E+04	0.0
K-40	4.60E+11	5.80E+01	5.80E+01	3.45E-02	0.0	3.45E-02	3.45E-02	3.45E-02	2.50E+03	2.50E+03	0.0
CR-51	2.78E+01	6.16E+02	2.66E+01	3.21E-06	6.69E-04	1.59E-06	2.66E-06	2.66E-06	2.00E+02	2.00E+02	0.0
MN-54	3.03E+02	1.70E+01	1.61E+01	8.83E-04	1.40E-02	8.83E-04	8.72E-04	4.57E-03	4.00E+02	4.00E+02	0.0
MN-56	1.07E-01	1.70E+01	1.06E-01	2.04E-05	3.67E-03	2.04E-05	2.04E-05	1.15E-04	4.00E+02	4.00E+02	0.0
FE-55	9.50E+02	8.00E+02	4.34E+02	2.75E-03	1.09E-03	2.74E-04	4.43E-04	1.90E-03	1.00E+02	1.00E+02	0.0
FE-59	4.56E+01	8.00E+02	4.31E+01	4.34E-03	3.40E-02	3.81E-03	3.91E-03	1.02E-02	1.00E+02	1.00E+02	0.0
CO-58	7.13E+01	9.50E+00	8.33E+00	1.69E-03	1.51E-02	1.69E-03	1.67E-03	7.45E-04	5.00E+01	2.08E+01	1.00E+02
CO-60	1.92E+03	9.50E+00	9.45E+00	4.73E-03	4.02E-02	4.73E-03	4.72E-03	2.14E-03	5.00E+01	4.75E+01	1.00E+02
NI-65	1.07E-01	6.67E+02	1.07E-01	5.26E-04	1.74E-03	3.27E-05	3.13E-05	6.86E-05	1.00E+02	1.00E+02	0.0
CU-64	5.31E-01	8.00E+01	5.27E-01	3.91E-05	7.10E-03	3.91E-05	3.91E-05	8.33E-05	5.00E+01	5.00E+01	0.0
ZN-65	2.45E+02	9.33E+02	1.94E+02	4.84E-03	9.70E-03	7.13E-03	6.96E-03	1.54E-02	2.00E+03	1.42E+03	1.00E+02
ZN-69M	5.75E-01	9.33E+02	5.75E-01	1.55E-04	2.91E-03	3.64E-05	3.64E-05	4.09E-04	2.00E+03	1.14E+01	1.00E+02
ZN-69	3.96E-02	9.33E+02	3.96E-02	1.03E-05	2.96E-06	1.37E-06	1.37E-06	1.97E-05	2.00E+03	7.92E-01	1.00E+02
BR-82	1.48E+00	8.00E+00	1.25E+00	2.26E-03	2.59E-03	2.26E-03	2.26E-03	2.26E-03	4.20E+02	4.20E+02	0.0
BR-83	1.00E-01	8.00E+00	9.68E-02	3.55E-05	5.79E-05	3.55E-05	4.02E-05	4.02E-05	4.20E+02	4.20E+02	0.0
BR-84	2.21E-02	8.00E+00	2.20E-02	6.04E-05	4.09E-10	6.04E-05	5.21E-05	5.21E-05	4.20E+02	4.20E+02	0.0
BR-85	2.08E-03	8.00E+00	2.08E-03	5.17E-07	1.00E-21	5.17E-07	2.14E-06	2.14E-06	4.20E+02	4.20E+03	0.0
KR-83M	7.75E-02	1.00E+00	7.19E-02	0.0	1.46E-04	0.0	0.0	0.0	1.00E+00	1.00E+00	0.0
KR-85M	1.83E-01	1.00E+00	1.55E-01	0.0	3.30E-03	0.0	0.0	0.0	1.00E+00	1.00E+00	0.0
KR-85	3.93E+03	1.00E+00	1.00E+00	0.0	4.62E-02	0.0	0.0	0.0	1.00E+00	1.00E+00	0.0
RB-86	1.87E+01	4.50E+01	1.32E+01	9.83E-03	4.16E-03	9.83E-03	9.83E-03	2.11E-02	2.00E+03	2.00E+03	0.0
RB-88	1.24E-02	4.50E+01	1.24E-02	3.34E-05	8.36E-16	8.34E-05	3.21E-05	6.05E-05	2.00E+03	2.00E+03	0.0
RB-89	1.07E-02	4.50E+01	1.07E-02	2.86E-05	2.33E-18	2.86E-05	2.82E-05	4.01E-05	2.00E+03	2.00E+03	0.0
SR-89	5.27E+01	1.30E+04	5.25E+01	3.08E-01	4.94E-02	9.22E-03	8.84E-03	8.84E-03	3.00E+01	1.04E+01	1.00E+02
SR-90	1.01E+04	1.30E+04	5.68E+03	7.58E+00	2.19E-01	1.76E+00	1.86E+00	1.86E+00	3.00E+01	2.97E+01	1.00E+02
SR-91	4.03E-01	1.30E+04	4.03E-01	5.67E-03	2.70E-02	1.92E-04	2.29E-04	2.29E-04	3.00E+01	1.20E-01	1.00E+02
SR-92	1.13E-01	1.30E+04	1.13E-01	2.15E-03	4.26E-02	6.89E-05	9.30E-05	9.30E-05	3.00E+01	3.39E-02	1.00E+02
SR-93	5.56E-03	1.30E+04	5.56E-03	6.39E-05	1.89E-03	8.90E-06	8.90E-06	8.90E-06	3.00E+01	1.67E-03	1.00E+02
Y-90	2.67E+00	1.40E+04	2.67E+00	9.62E-06	1.02E-01	2.57E-07	2.58E-07	2.58E-07	2.50E+01	2.50E+01	0.0
Y-91M	3.47E-02	1.40E+04	3.47E-02	9.09E-08	2.67E-07	1.72E-09	3.52E-09	3.52E-09	2.50E+01	2.50E+01	0.0
Y-91	5.88E+01	1.40E+04	5.86E+01	1.41E-04	7.76E-02	3.66E-06	3.77E-06	3.77E-06	2.50E+01	2.50E+01	0.0
Y-92	1.47E-01	1.40E+04	1.47E-01	8.45E-07	1.48E-02	2.47E-08	2.47E-08	2.47E-08	2.50E+01	2.50E+01	0.0
Y-93	4.29E-01	1.40E+04	4.29E-01	2.68E-06	8.50E-02	5.51E-08	7.40E-08	7.40E-08	2.50E+01	2.50E+01	0.0
ZR-95	6.55E+01	4.50E+02	5.72E+01	3.04E-05	3.09E-02	6.38E-06	6.60E-06	9.75E-06	3.33E+00	3.33E+00	0.0
ZR-97	7.08E-01	4.50E+02	7.07E-01	1.68E-06	1.05E-01	1.55E-07	1.55E-07	3.39E-07	3.33E+00	3.33E+00	0.0
NB-95M	3.75E+00	7.60E+02	3.73E+00	5.86E-07	3.55E-02	2.88E-07	2.88E-07	4.63E-07	3.00E+04	3.00E+04	0.0
NB-95	3.50E+01	7.60E+02	3.35E+01	6.22E-06	2.10E-02	1.83E-06	1.86E-06	3.46E-06	3.00E+04	3.00E+04	0.0
NB-97	5.00E-02	7.60E+02	5.00E-02	4.90E-08	2.10E-03	4.60E-09	4.60E-09	1.27E-08	3.00E+04	3.00E+04	0.0

*This effective concentration factor includes an adjustment of 0.25 for the fraction of the toal phosphorus found in edible portions.

TABLE B-3 (4 of 5)

TABLE 2.1

DOSE COMMITMENT AND FISH CONCENTRATION FACTORS

NUCLIDE	RADIOLO. HALF-LIFE (DAYS)	BIOLOGICAL HALF-LIFE (DAYS)	EFFECTIVE HALF/LIFE (DAYS)	HUMAN DOSE COMMITMENT FACTORS (REM/UCI) BONE	GI TRACT	THYROID	TOTAL BODY	LIVER	FISH CONCENTRATION FACT. STABLE	RADIOLO.	BIOLOGICAL HALF-LIFE DAYS
RU-103	3.96E+01	7.30E+00	6.16E+00	1.35E-04	2.16E-02	7.98E-05	7.95E-05	7.97E-05	1.00E+01	1.00E+01	0.0
RU-106	3.68E+02	7.30E+00	7.16E+00	2.75E-03	1.79E-01	3.50E-04	3.48E-04	3.48E-04	1.00E+01	1.00E+01	0.0
RH103M	3.96E-02	7.30E+00	3.94E-02	1.67E-07	1.21E-04	4.99E-08	4.99E-08	7.21E-07	1.00E+01	1.00E+01	0.0
AG110M	2.53E+02	5.00E+00	4.90E+00	1.60E-04	5.04E-02	8.78E-05	8.79E-05	1.48E-04	2.00E+00	2.00E+00	0.0
SB-124	6.02E+01	3.80E+01	2.33E+01	2.80E-03	7.95E-02	6.79E-06	1.11E-03	5.30E-05	1.00E+00	1.00E+00	0.0
SB-125	9.95E+02	3.80E+01	3.66E+01	1.79E-03	1.97E-02	1.82E-06	4.26E-04	2.40E-05	1.00E+00	1.00E+00	0.0
TE125M	5.80E+01	1.50E+01	1.19E+01	2.69E-03	1.07E-02	8.06E-04	3.59E-04	9.71E-04	4.00E+02	4.00E+02	0.0
TE127M	1.09E+02	1.50E+01	1.32E+01	6.77E-03	2.27E-02	1.73E-03	8.25E-04	2.42E-03	4.00E+02	4.00E+02	0.0
TE-127	3.92E-01	1.50E+01	3.82E-01	1.10E-04	8.68E-03	8.15E-05	2.38E-05	3.95E-05	4.00E+02	4.00E+02	0.0
TE129M	3.41E+01	1.50E+01	1.04E+01	1.15E-02	5.79E-02	3.95E-03	1.32E-03	4.29E-03	4.00E+02	4.00E+02	0.0
TE-129	4.77E-02	1.50E+01	4.75E-02	3.14E-05	2.37E-05	2.41E-05	7.65E-06	1.18E-05	4.00E+02	4.00E+02	0.0
TE131M	1.25E+00	1.50E+01	1.15E+00	1.73E-03	8.40E-02	1.34E-03	7.05E-04	8.46E-04	4.00E+02	4.00E+02	0.0
TE-131	1.72E-02	1.50E+01	1.72E-02	1.97E-05	2.79E-06	1.62E-05	6.22E-06	8.23E-06	4.00E+02	4.00E+02	0.0
TE-132	3.24E+00	1.50E+01	2.66E+00	2.52E-03	7.71E-02	1.80E-03	1.53E-03	1.53E-03	4.00E+02	4.00E+02	0.0
TE-134	2.92E-02	1.50E+01	2.91E-02	2.10E-05	8.93E-05	2.00E-05	1.57E-05	2.13E-05	4.00E+02	4.00E+02	0.0
I-129	6.31E+09	1.38E+02	1.38E+02	3.10E-03	0.0	9.61E+00	1.24E-02	2.81E-03	5.00E+01	5.00E+01	1.00E+00
I-130	5.17E-01	1.38E+02	5.17E-01	7.56E-04	1.92E-03	1.89E-01	8.80E-04	2.23E-03	5.00E+01	1.70E+01	1.00E+00
I-131	8.05E+00	1.38E+02	7.61E+00	4.16E-03	1.57E-03	1.95E+00	3.41E-03	5.95E-03	5.00E+01	4.45E+01	1.00E+00
I-132	9.42E-02	1.38E+02	9.41E-02	2.03E-04	1.02E-04	1.90E-02	1.90E-04	5.43E-04	5.00E+01	4.30E+00	1.00E+00
I-133	8.46E-01	1.38E+02	8.41E-01	1.42E-03	2.22E-03	3.63E-01	7.53E-04	2.47E-03	5.00E+01	2.29E+01	1.00E+00
I-134	3.61E-02	1.38E+02	3.61E-02	1.06E-04	2.51E-07	4.99E-03	1.03E-04	2.98E-04	5.00E+01	1.74E+00	1.00E+00
I-135	2.78E-01	1.38E+02	2.77E-01	4.43E-04	1.31E-03	7.65E-02	4.23E-04	1.16E-03	5.00E+01	1.09E+01	1.00E+00
XE 133M	2.26E+00	1.00E+00	6.93E-01	0.0	2.45E-02	0.0	0.0	0.0	1.00E+00	1.00E+00	0.0
XE-133	5.27E+00	1.00E+00	8.41E-01	0.0	2.58E-02	0.0	0.0	0.0	1.00E+00	1.00E+00	0.0
XE 135M	1.08E-02	1.00E+00	1.07E-02	0.0	3.29E-04	0.0	0.0	0.0	1.00E+00	1.00E+00	0.0
XE-135	3.83E-01	1.00E+00	2.77E-01	0.0	1.00E-02	0.0	0.0	0.0	1.00E+00	1.00E+00	0.0
CS-134	7.47E+02	7.00E+01	6.40E+01	6.22E-02	2.59E-03	1.20E-01	1.21E-01	1.48E-01	2.00E+03	2.00E+03	1.00E+00
CS-135	1.10E+09	7.00E+01	7.00E+01	1.96E-02	0.0	8.06E-03	8.06E-03	1.30E-02	2.00E+03	2.00E+03	1.00E+00
CS-136	1.37E+01	7.00E+01	1.15E+01	6.51E-03	2.92E-03	2.03E-02	1.85E-02	2.57E-02	2.00E+03	1.86E+03	1.00E+00
CS-137	1.10E+04	7.00E+01	6.96E+01	7.97E-02	2.11E-03	7.26E-02	7.14E-02	1.09E-01	2.00E+03	2.00E+03	1.00E+00
CS-138	2.24E-02	7.00E+01	2.24E-02	5.52E-05	4.65E-10	5.72E-05	5.40E-05	1.09E-04	2.00E+03	4.38E+01	1.00E+00
BA-139	5.76E-02	6.50E+01	5.75E-02	9.70E-05	1.72E-04	3.07E-06	2.84E-06	6.91E-08	4.00E+00	4.00E+00	0.0
BA-140	1.28E+01	6.50E+01	1.07E+01	2.03E-02	4.13E-02	1.23E-03	1.33E-03	2.55E-05	4.00E+00	4.00E+00	0.0
LA-140	1.68E+00	5.00E+02	1.67E+00	2.50E-06	9.25E-02	3.09E-07	3.33E-07	1.26E-06	2.50E+01	2.50E+01	0.0
LA-141	1.63E-01	5.00E+01	1.62E-01	3.90E-07	9.60E-03	2.03E-08	2.03E-08	9.91E-08	2.50E+01	2.50E+01	0.0
CE-141	3.25E+01	5.63E+02	3.07E+01	9.36E-06	2.42E-02	7.72E-07	7.18E-07	6.33E-06	2.50E+01	2.50E+01	0.0
CE-143	1.39E+00	5.63E+02	1.38E+00	1.65E-06	4.56E-02	3.56E-08	1.35E-07	1.22E-03	2.50E+01	2.50E+01	0.0
CE-144	2.84E+02	5.63E+02	1.89E+02	4.88E-04	1.65E-01	2.64E-05	2.62E-05	2.04E-04	2.50E+01	2.50E+01	0.0
PR-143	1.36E+01	7.50E+02	1.34E+01	9.20E-06	4.03E-02	4.60E-07	4.56E-07	3.69E-06	2.50E+01	2.50E+01	0.0
PR-144	1.20E-02	7.50E+02	1.20E-02	3.01E-08	4.33E-15	1.54E-09	1.53E-09	1.25E-08	2.50E+01	2.50E+01	0.0
ND-147	1.11E+01	6.56E+02	1.09E-01	6.29E-06	3.49E-02	4.55E-07	4.35E-07	7.27E-06	2.50E+01	2.50E+01	0.0
PM-147	9.57E+02	6.56E+02	3.89E+02	7.60E-05	1.33E-02	2.89E-06	2.89E-06	7.10E-06	2.50E+01	2.50E+01	0.0
PM-149	2.21E+00	6.56E+02	2.20E+00	1.54E-06	4.86E-02	8.87E-08	8.87E-08	2.15E-07	2.50E+01	2.50E+01	0.0
PM-151	1.16E+00	6.56E+02	1.16E+00	6.74E-07	3.17E-02	5.91E-08	5.91E-08	1.17E-07	2.50E+01	2.50E+01	0.0
SM-151	3.18E+04	6.56E+02	6.43E-02	6.09E-05	4.37E-03	1.56E-06	1.56E-06	1.19E-05	2.50E+01	2.50E+01	0.0
SM-153	1.95E+00	6.56E+02	1.94E+00	1.03E-06	3.58E-02	6.66E-08	6.66E-08	7.16E-07	2.50E+01	2.50E+01	0.0

TABLE B-3 (5 of 5)

TABLE 2.1

DOSE COMMITMENT AND FISH CONCENTRATION FACTORS

NUCLIDE	RADIOLO. HALF-LIFE (DAYS)	BIOLOGICAL HALF-LIFE (DAYS)	EFFECTIVE HALF-LIFE (DAYS)	HUMAN DOSE COMMITMENT FACTORS (REM/UCI) BONE	GI TRACT	THYROID	TOTAL BODY	LIVER	FISH CONCENTRATION FACT. STABLE	RADIOLO.	BIOLOGICAL HALF-LIFE DAYS
SM-156	3.92E-01	6.56E-02	3.92E-01	4.63E-07	5.86E-03	5.33E-08	5.33E-08	5.33E-05	2.50E+01	2.50E+01	0.0
EU-155	6.61E+02	6.35E+02	3.24E+02	5.75E-05	1.35E-02	3.35E-06	3.35E-06	1.22E-05	2.50E+01	2.50E+01	0.0
EU-156	1.54E+01	6.35E+02	1.50E+01	1.31E-05	1.02E-01	1.65E-06	1.65E-06	1.06E-05	2.50E+01	2.50E+01	0.0
W-187	9.96E-01	1.00E+00	4.99E-01	1.03E-04	2.82E-02	2.70E-05	3.01E-05	1.03E-04	1.20E+03	1.20E+03	0.0
NP-239	2.35E+00	3.90E+04	2.35E+00	1.19E-06	2.40E-02	7.74E-08	6.45E-08	1.19E-06	1.00E+01	1.00E+01	0.0