Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
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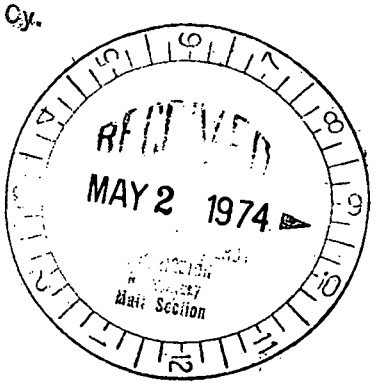
Regulatory File Cy.

April 26, 1974



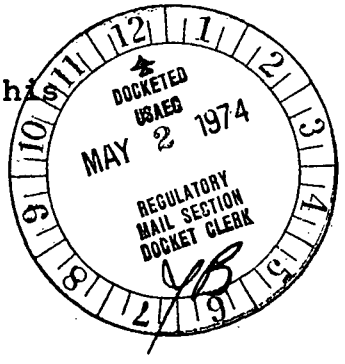
Mr. D. L. Ziemann, Chief
Operating Reactors - Branch 2
Directorate of Licensing
Office of Regulation
U.S. Atomic Energy Commission
Washington, D.C. 20545

Subject: Dresden Unit 2 - Amendment No. 3 to the Full-Term Operating License Application, AEC Dkt 50-237

Dear Mr. Ziemann:

In response to your letter dated February 22, 1974, attached is Amendment No. 3 to the Dresden Station Unit 2 Application for Conversion from Provisional to Full-Term Operating License. The analyses discussed in the attached amendment were done using the criteria established in your letter. They do not, in our judgement, reflect a realistic evaluation of possible off-site radiation doses in the event of the postulated accidents. Chapter 14 of the Dresden Station Units 2 and 3 Final Safety Analysis Report describes the possible doses from the postulated accidents based on a realistic analysis. In our judgement, the analysis in the Final Safety Analysis Report should be used as the basis for evaluating the adequacy of the plant safeguards.

Three (3) signed originals and 37 copies of this amendment are submitted for your review.



Very truly yours,

J. S. Abel
Nuclear Licensing Administrator
Boiling Water Reactors

SUBSCRIBED and SWORN to
before me this 26th day
of April, 1974.

Brenda Pannes
Notary Public

3885

529.1

DRESDEN STATION UNIT 2

Application for Conversion from

Provisional to Full-Term Operating License

AMENDMENT NO. 3

(Response to AEC Questions Dated February 22, 1974)

COMMONWEALTH EDISON COMPANY

529.2

Question 1. Provide an updated evaluation of the loss-of-coolant, steam line break, and refueling accidents using Regulatory Guides 1.3, 1.5, and 1.25, respectively. In the analyses submitted, provide the specific values for the following parameters:

a. The exclusion area radius in meters.

b. The low population zone radius in meters.

c. The X/Q values used for each time period specified in Regulatory Guide 1.3 and the bases for those values.

d. The specific values of all other parameters used in the equations for calculating the accident doses.

Response. 1.0 Accident Re-evaluation.

A re-evaluation of the loss-of-coolant (LOCA), steam line break (SLBA), and refueling (fuel handling) accidents (FHA) was made utilizing Regulatory Guides 1.3, 1.5, and 1.25, respectively. A dose assessment of these accidents was made at three points of interest:

a. at the exclusion area radius of 800 meters

b. at the low population area radius of 8000 meters

c. at a special point of interest (hereafter called SPOI) 1300 meters northeast of the station on a river bluff, 100 feet in elevation above the station grade elevation.

The radiation dose received in a two hour period was evaluated for points on the exclusion radius and the SPOI. The dose received during the complete course of the accident (30 days) was calculated for points on the low population zone radius.

The operating power level was taken as 2527 Mwth.

The release point for gaseous effluents for the LOCA and FHA was taken to be the 310 foot

high (94.4 meter) stack. For the SPOI, which is 100 feet above plant grade elevation, a reduced stack height of 210 feet (64 meters) was used.

1.1 Loss-Of-Coolant Accident

1.1.1 Plant-related assumptions

Equilibrium noble gas and iodine fission product activities were calculated for the Dresden-2 station from the basic data given in TID-14844, Table I. During the LOCA, 100% of the equilibrium radioactive noble gas inventory and 25% of the equilibrium radioactive iodine is assumed to be available for leakage from the containment (Reg. Guide 1.3). The containment is assumed to leak at the Technical Specification limit of 1.6 weight percent per day. This leakage into the reactor building is then exhausted thru the standby gas treatment system (SBGTS) without mixing in the reactor building. 90% of the iodine is assumed to be removed by SBGTS charcoal adsorbers. The SBGTS is exhausted thru a 310 foot (94.4 meters) stack.

1.1.2 Site meteorology assumptions

Values of normalized atmospheric concentration factors (X/Q) were taken from curves in Reg. Guide 1.3. The following specific data were used: For the first half hour of the accident, a fumigation condition was assumed to exist. Values of X/Q corresponding to the appropriate release elevation and downwind range for this situation were taken from Figure 1(E). For the 0.5 - 8 hr period (0.5 - 2 hr period for points within the LPZ radius), the most conservative atmospheric condition was chosen from the envelope of Pasquill diffusion categories displayed in Figure 1A. For the 8-24 hr, 1-4 day and 4-30 day interval, appropriate values of X/Q were selected from Figures 1(B), 1(C), and 1(D), respectively. Numerical values used in the present evaluation are given in Table 1.1.2-1.

1.1.3 Other dose assessment assumptions
External whole body gamma doses were calculated using the "infinite cloud model" and the gamma energy release per disintegration for all species considered as given in TID-14844, Table IV.

Internal doses to an adult thyroid due to inhalation of radioiodine were calculated assuming a breathing rate of 10 m^3 for the first 8 hours, 10 m^3 for the next 16 hours, and then 20 m^3/day for the remainder of the accident. Thyroid-dose-per-curie-inhaled conversion factors were taken from TID-14844, Table III.

1.1.4 LOCA dose assessment
The radiation doses at the present points of interest due to a LOCA are given below.

Location (time duration)	Whole body dose, rem	Thyroid data, rem
Exclusion zone radius (2 hrs)	6	100
SPOI (2 hrs)	6	108
LPZ radius (30 days)	2	79

All are well within 10CFR100 guidelines.

TABLE 1.1.2-1

Normalized atmospheric concentration factors (X/Q) used in LOCA dose assessment.

	X/Q, sec/m^3		
location:	exclusion radius	low population zone	special point of interest
downwind distance:	800 m.	8000 m.	1300 meters NW
effective release height:	94.4 m.	94.4 m.	64 m.
Time interval after accident:			
0 - 0.5 hrs (fumigation)	$1.46X10^{-4}$	$1.94X10^{-5}$	$1.365X10^{-4}$
0.5 - 2 hrs	$1.82X10^{-5}$	---	$2.71X10^{-5}$
0.5 - 8 hrs		$5.81X10^{-6}$	
8 - 24 hrs		$1.58X10^{-6}$	
1 - 4 days		$5.47X10^{-7}$	
4 - 30 days		$1.63X10^{-7}$	

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1.2 Fuel Handling Accident

1.2.1 Source term

The present evaluation assumes 145 fuel rods to be damaged (approximately complete 3 fuel assemblies). Previous estimates of 1 to 9 assemblies being damaged were made for Dresden-2 (Staff Safety Evaluation, Docket No. 50-237, Section 4.2), La Salle County Station (Staff Safety Evaluation, Docket No. 50-373, Section 10.3) and Wm. H. Zimmer Nuclear Power Station (Staff Safety Evaluations, Docket 50-358, Section 4.3).

The damaged fuel was assumed to have operated at a power density corresponding to the average power level of 2527 MWth multiplies by a peaking factor of 1.5. The equilibrium activity of noble gases and radioiodines was assumed to decay for 24 hours prior to the accident. The gap activity, consisting of 10% of the total noble gas activity and 10% of the total radioiodine in fuel rod, is released under water from the damaged fuel rods.

A decontamination factor DF of 100 was assumed for radioiodine released to the water. A DF of 1 was assumed for the noble gases.

Airborne radioiodine is assumed to be of 75% inorganic and 25% organic form.

Noble gases and airborne radioiodine are exhausted thru the SBGTS filters which have a removal efficiency of 90% for inorganic and 70% for inorganic forms of iodine. The SBGTS exhausts thru the 310 foot (94.4 m) stack.

All radioactivity is assumed to be exhausted within two hours of the accident.

1.2.2 Site meteorology assumptions

The same assumptions as indicated in Sections 1.1.2 and Table 1.1.2-1 were used for the present analysis.

1.2.3 Other dose assessment assumptions

The same assumptions as indicated in Section 1.1.3 were used for the present analysis.

1.2.4 Fuel handling accident dose assessment
The radiation doses at the present points of interest are underlined below.

Location	Whole body dose, rem	Adult thyroid dose, rem
Exclusion area radius	<1	4
SPOI	<1	4
LPZ radius	<1	1

All are well within 10CFR100 guidelines.

1.3 Steam Line Break Accident

1.3.1 Source term assumptions

The main steam line is assumed to rupture outside of the reactor building and discharge to the atmosphere until the main steam isolation valves close. The closure time is required to be between 3 and 5 seconds (Tech Specs, Table 3.7.1). For the present analysis, a 5.5 second closure time was assumed.

Noble gases were assumed to exist in the reactor corresponding to an escape rate from the fuel of 0.1 curie/sec after 30 minutes decay.

For purposes of the radiological dose assessment, the steam line break is assumed to result in a blowdown of about 30,000 lb of reactor water. This blowdown was determined using the WARLOC model which has been previously described in Dresden Station Special Report No. 37.

The reactor water is assumed to contain 5 microcuries of I-131 per milliliter (ml). This concentration is equivalent to the dose from 20 microcuries of total Iodine per ml of water which is the Dresden Unit 2 Technical Specification limit (Section 3.6.B.1). These data, both the blowdown rate and radioiodine concentrations are very conservative. All the radioiodine discharged from the break is assumed to be airborne.

1.3.2 Meteorology assumptions

The radioactive release was assumed to occur within two hours at a height of thirty meters with a fumigation condition. Values of X/Q were selected from Figure 1 of Reg. Guide 1.5 to correspond to the above phenomenon. Specifically, the numerical values of X/Q used are:

at exclusion area radius (800 m.), 4.20×10^{-4}

at LPZ radius (8000 m.), 5.73×10^{-5}

The special point of interest, SPOI, (1300 m. NE, 100 feet above plant grade elevation) required special consideration. The elevation of this point is essentially the same as that of the release. Hence, a X/Q was calculated by assuming that the present situation corresponds a ground level release, stable Pasquill class F conditions, and a wind speed of 1 meter/sec. No building wake effect was considered. For the SPOI, the resulting X/Q used was equal to 4.25×10^{-4} sec/m^3.

1.3.3 Other dose assessment assumptions

The same assumptions as indicated in Section 1.1.3 were used in the present analysis.

1.3.4 Steam line break dose assessment

The radiation doses at the present points of interest are indicated below.

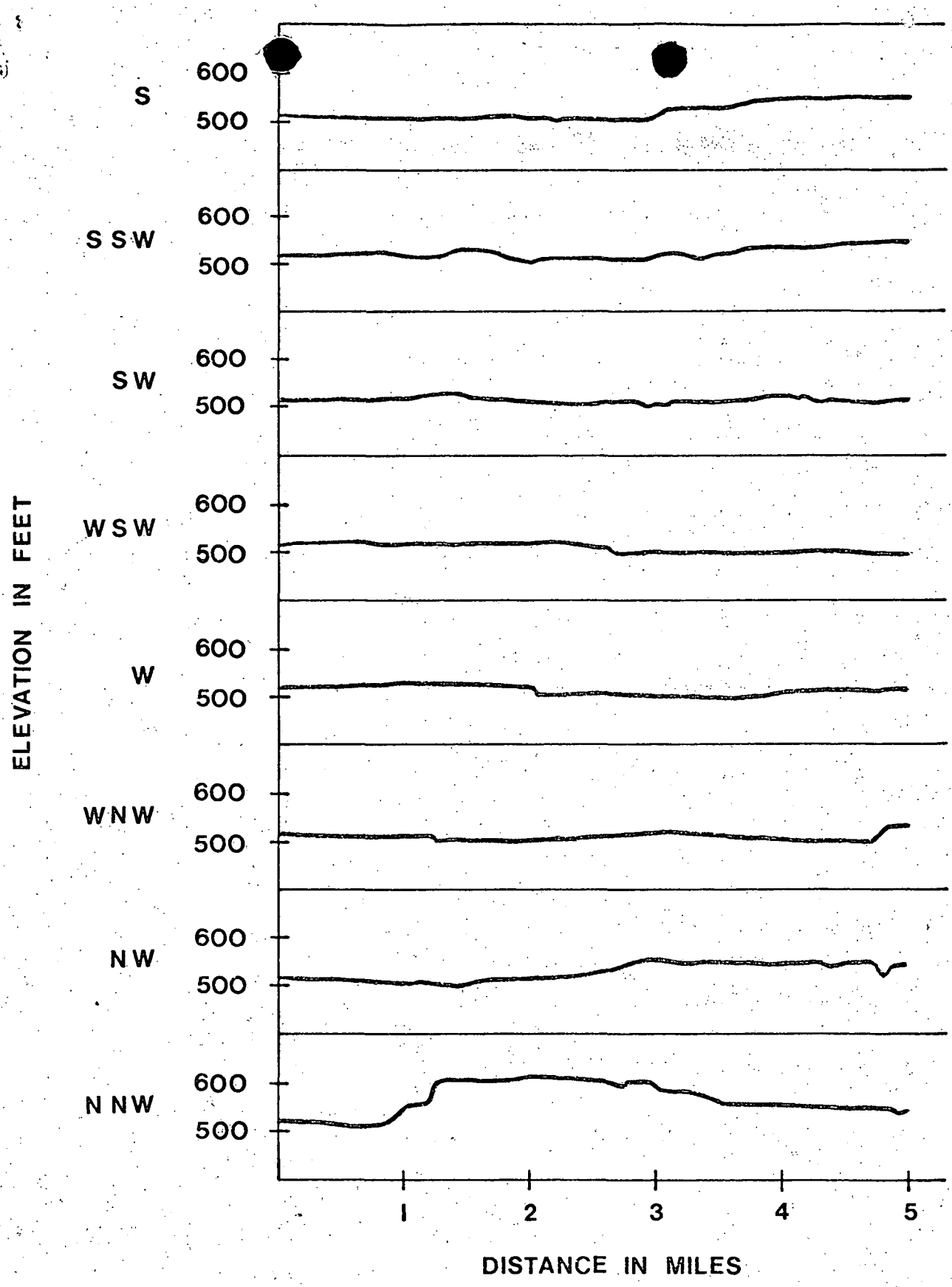
Location	Whole body dose, rem	Adult thyroid dose, rem
Exclusion area radius	<1	16.2
SPOI	<1	16.2
LPZ radius	<1	2.3

529.10

Question 3. Provide topographic cross sections in the 16 compass point sectors radiating from the plants to a distance of five miles.

Response. The required information is shown on the attached two sheets.

529.11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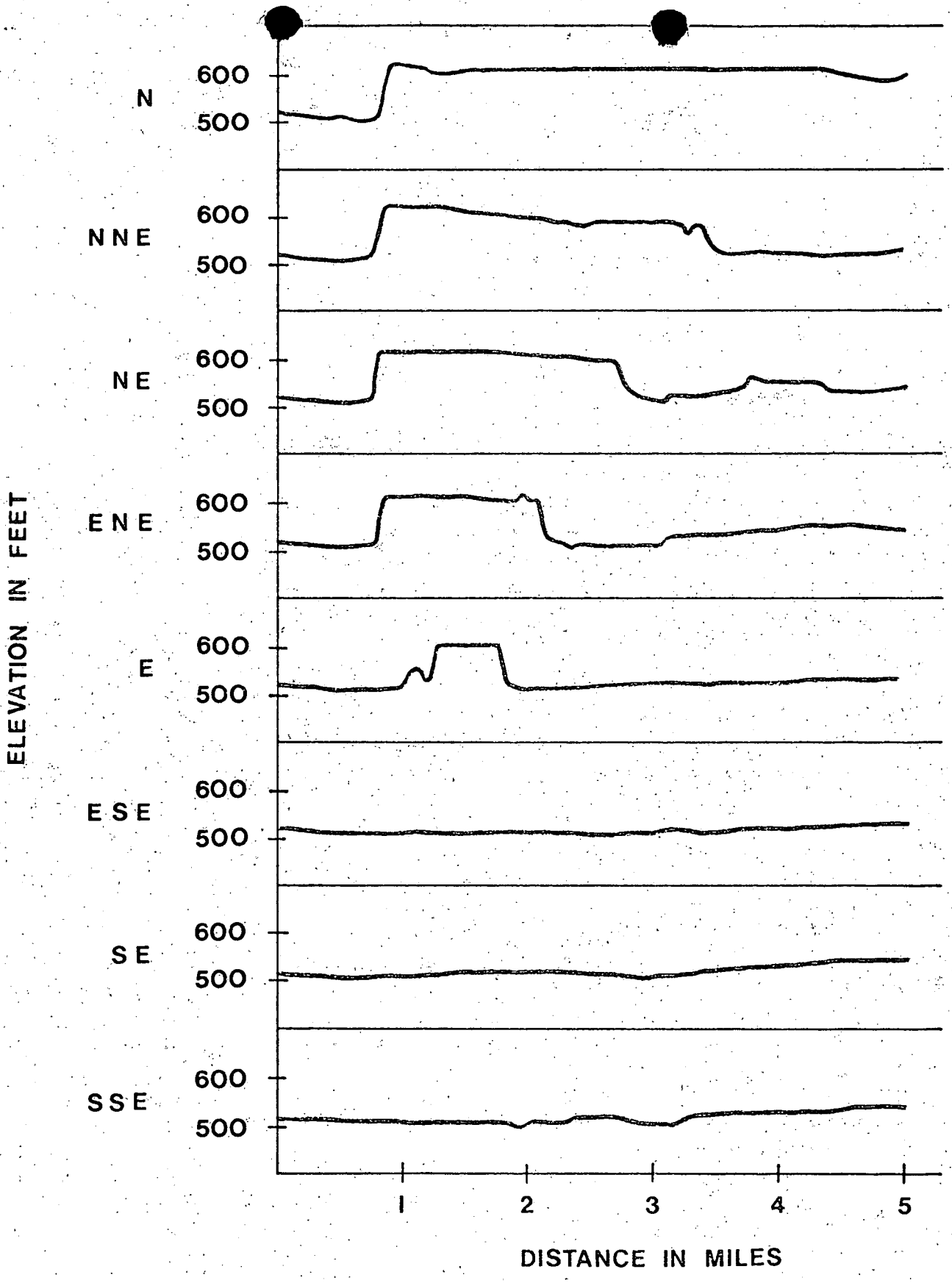
DISTANCE IN MILES

529.12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