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|---|---|
| MANGAN, C. V. | Niagara Mohawk Power Corp. |

| RECIP. NAME | RECIPIENT AFFILIATION |
|---|---|
| ADENSAM, E. G. | BWR Project Directorate 3 |

SUBJECT: Forwards "Methodology for Combined Radwaste & Reactor Bldg Vent Accident X/Q Values at Control Room Ventilation Air Intakes," in response to NRC concerns raised during 860731 meeting re control room habitability analysis.

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MANGAN,C.V.   Niagara Mohawk Power Corp.
RECIP.NAME   RECIPIENT AFFILIATION
ADENSAM,E.G.   BWR Project Directorate 3

SUBJECT: Forwards "Methodology for Combined Radwaste & Reactor Bldg Vent Accident X/Q Values at Control Room Ventilation Air Intakes," in response to NRC concerns raised during 860[illegible] meeting re control room habitability analysis.

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| | BWR RSB | 1 | 1 | | | |
| INTERNAL: | ADM/LFMB | 1 | 0 | IE/DEPER/EPB | 3 | 3 |
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| | NRR PWR-B ADTS | 1 | 1 | NRR/DHFT/MTB | 1 | 1 |
| | NRR/DSRO/IB | 1 | 1 | NRR/DSRO/RSIB | 1 | 1 |
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NIAGARA MOHAWK

NIAGARA MOHAWK POWER CORPORATION/300 ERIE BOULEVARD WEST, SYRACUSE, N.Y. 13202/TELEPHONE (315) 474-1511

August 7, 1986
(NMP2L 0808)

Ms. Elinor G. Adensam, Director
BWR Project Directorate No. 3
U.S. Nuclear Regulatory Commission
7920 Norfolk Avenue
Washington, DC 20555

Dear Ms. Adensam:

Re: Nine Mile Point Unit 2
Docket No. 50-410

Enclosed is a summary report on the method of development of the Nine Mile Point Unit 2 X/Q values. This report responds to NRC staff questions raised during the July 31, 1986 meeting relative to the control room habitability analysis.

After your review we would be pleased to discuss any questions on the report at your earliest convenience.

Sincerely,

CVMangan

C.V. Mangan
Senior Vice President

NLR/meg
Attachment
(1910G)

xc: W. A. Cook Resident Inspector
Project File (2)



A003
1/1

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

| | | |
|---|---|---|
| In the Matter of | ) | |
| Niagara Mohawk Power Corporation | ) | Docket No. 50-410 |
| (Nine Mile Point Unit 2) | ) | |

## AFFIDAVIT

C. V. Mangan, being duly sworn, states that he is Senior Vice President of Niagara Mohawk Power Corporation; that he is authorized on the part of said Corporation to sign and file with the Nuclear Regulatory Commission the documents attached hereto; and that all such documents are true and correct to the best of his knowledge, information and belief.

C. V. Mangan

Subscribed and sworn to before me, a Notary Public in and for the State of New York and County of Onondaga, this 7th day of August, 1986.

Janis M. Macro
Notary Public in and for
Onondaga County, New York

My Commission expires:
JANIS M. MACRO
Notary Public in the State of New York
Qualified in Onondaga County No. 4784555
My Commission Expires March 30, 1987

INTRODUCTION AND SUMMARY

This report provides the methodology and data used in the calculation of the Nine Mile Point-Unit 2 (NMP2) combined radwaste and reactor building vent X/Q values at the control room air intakes.

The combined radwaste and reactor building vent X/Q value calcualtions were performed using site specific meteorological data. Building wake effects determined through the application of wind tunnel tests to the NMP2 site were also used in these calculations. These X/Q values were calculated using two different accident scenarios--(1) all NMP2 site buildings are standing, and (2) only the seismically qualified NMP2 site buildings are standing. The radiological consequences of the postulated DBA LOCA use the most conservative X/Q value resulting from the two different accident scenarios.

FSAR Sections 2.3.4 and 2.3.5 summarize in detail the accident X/Q values to the EAB and the LPZ from the main stack and combined radwaste and reactor building vent.

Since the main stack is more than twice as high as all adjacent structures, so that the stack plume will be unaffected by the nearby structures. Therefore, the accident X/Q values for the main stack to the control room air intakes are calculated with the same methodology as those used for the EAB and LPZ. (See FSAR Section 2.3)

# METHODOLOGY FOR COMBINED RADWASTE AND REACTOR BUILDING VENT ACCIDENT X/Q VALUES AT THE CONTROL ROOM VENTILATION AIR INTAKES

## I. INTRODUCTION

A release of radioactivity following an accident at the Unit 2 nuclear reactor may reach the atmosphere via (1) the combined radwaste and reactor building vent or (2) the main stack. After dispersion in the atmosphere, the radioactive material may enter the main control room via the fresh air intakes.

The combined radwaste and reactor building vent releases have been analyzed by Dr. James Halitsky using the procedures and methodology described in Section III. All of the conversion factors, assumptions, references, and intermediate calculations are detailed in this report.

## II. PLANT ARRANGEMENT

Figure 1 shows the plant arrangement for the all buildings stand scenario. Figure 2 shows the plant arrangement for the seismic buildings stand scenario. In both figures, the fresh air intakes are shown by small circles and numbers; the numbering scheme is given in Table 1. The documentation of seismic and non-seismic buildings, their dimensions and the location of the fresh air intakes were obtained from the plot plans and the building drawings of References 1, 2, and 3.

Figures 1 and 2 represent the combined radwaste and reactor building vent release, with the 16 sectors centered at the release point and oriented to true North (14.5° clockwise from plant North).

The terrain in the plant area is flat with a grade elevation of 261-ft. MSL. The only large structure nearby is the natural draft cooling tower whose center is about 1,000 ft. south of the reactor building.

The combined radwaste and reactor building vent release configuration is a 5-ft. x 19-ft. rectangular duct terminating at elevation of 447-ft. or 186-ft. (56.7 m) above grade. The release is assumed to have zero exit velocity (Reference 4).

## III. COMBINED RADWASTE AND REACTOR BUILDING VENT ANALYSIS

Dispersion near buildings is strongly affected by disturbances created by the buildings. Conventional Gaussian equations cannot be used because the dispersion coefficients and the mean velocities vary in space in an unknown manner. Reliance must be placed on information derived from measurements of dispersion around buildings resembling the subject buildings. The most detailed of such measurements are obtained in wind tunnel model tests. It is believed that normalized concentrations ($K_C$ values) from model tests will give reliable predictions of full scale concentrations under neutral stability conditions in the absence of heat in the effluent, if geometric and dynamic similarity are preserved in model and full scales and minimum Reynolds Number criteria are met.

## Conversion of $K_c$ to $Xu_{200}/Q$

The definition of $K_c$ is

$$K_c(x/L,\ y/L,\ z/L) \quad = \quad A(Xu/Q) \qquad (1)$$

where:

$K_c$ = concentration coefficient (dimensionless)

$X$ = real concentration ($Ci\ m^{-3}$)

$A$ = reference building area ($m^2$)

$u$ = reference wind speed ($m\ s^{-1}$)

$Q$ = release rate ($Ci\ s^{-1}$)

$L$ = reference length (m)

$x,y,z$ = receptor coordinates (m)

In model testing, X is measured at a variety of receptor locations for known Q, u and A, and $K_c$ is computed at each point by Equation 1. Isopleths of $K_c$ are then drawn through the field along designated surfaces.

When predicting Xu/Q for a new full-scale configuration that satisfies the similarity requirements, Equation 1 may be rewritten as

$$Xu/Q = K_c/A \tag{1a}$$

where:

$K_c$ = the model test value at the normalized full scale receptor location x/L, y/L, z/L

x,y,z = full scale receptor coordinates

L = full scale reference length

A = full scale reference area

It is implied that u is measured at the same normalized elevation as in the model test.

The most extensive body of data describing concentrations in the cavity region of a building resembling the Unit 2 reactor building, is the set of $K_c$ isopleths for the EBR-II containment structure in Reference 5. The shape of the EBR-II containment is an 80-ft. hemisphere on a 58-ft. vertical cylinder of the same diameter. The reference length was the diameter D = 80 ft., the reference elevation for wind speed was z = 160 ft., and the full scale roughness length in the logarithmic wind profile was 0.0492 ft.

The Unit 2 base diameter is 171 ft. (52.1 m); therefore, the linear scale factor is $171/80 = 2.138$ and the equivalent lengths are cylinder height = 124 ft., (37.8 m), wind speed reference height = 342 ft. (104.2 m) and roughness height = 0.105 ft. (0.032 m). The reference area in the model tests was the cross-section in a vertical plane through the building center. The equivalent area for Unit 2 is computed by adding one-half the cross-sectional area of the hemisphere ($1/2 \pi r^2$) plus the area of the base height times the diameter). Substituting the equivalent Unit 2 values, the area is equal to $1/2 \pi (85.5)^2 + 124 \times 171 = 32{,}687$ ft.$^2$ (3,037 m$^2$).

In calculating Xu/Q for a new building for a reference height other than the equivalent EBR-II reference height, the following adjustment factor, based on the logarithmic wind profile must be used:

$$u_{new}/u_{old} = (\ln z_{new}/z_o)/(\ln z_{old}/z_o). \quad (2)$$

For the Unit 2 anemometer at $z_{new}$ = 200 ft., Equation 2 becomes:

$$u_{200}/u = (\ln 200/0.105)/(\ln 342/0.105) = 0.934 \quad (2a)$$

Combining Equations 1a and 2a and using A = 3,037 m$^2$ gives:

$$Xu_{200}/Q\ (m^{-2}) = (Xu/Q)(u_{200}/u) = (K_c/3{,}037)\ (0.934)$$

$$Xu_{200}/Q = 3.1 \times 10^{-4}\ K_c \quad (3)$$

B. <u>Conversion of EBR-II Isopleths to Unit 2 Scale</u>

The first step in using the EBR-II $K_c$ isopleths is to select those which most plausibly represent Unit 2 flow conditions. The shapes of the two containment structures are not identical, as seen in Figure 3 where the equivalent EBR-II containment is superimposed on the Unit 2 reactor building. The lack of a dome on Unit 2 will create a different $K_c$ pattern in the vicinity of the combined radwaste and reactor building vent release.

The selection technique was to ignore local disturbances, adopt the isopleths which are in general conformity with source location on the building, and adjust for the effect of major buildings as a final step.

Gases released from the combined radwaste and reactor building vent will be caught in the airflow over the roof and will descend into the reactor building cavity before passing downwind. In this respect, the gas will behave in a similar manner to the EBR-II top release (Figure 10 of Reference 5). The expected behavior in easterly and westerly winds is illustrated in smoke photographs Nos. 6, 7, and 8 of Figure 6 of Reference 5. In northerly and southerly winds, where the vent is displaced laterally from the centerline, a strong asymmetry in high concentrations exists aloft, but the concentrations at lower elevations are more symmetrically distributed, as may be seen in the isopleths of Figure 14 of Reference 5. The asymmetry due to lateral source displacement is also seen in the smoke photographs of Figure 7 of Reference 5, but the effect at lower elevations is exaggerated because of the lower

release point. Since the vent release is nearer the elevation of the top of the dome (Figure 10 isopleths) than the top of the cylinder (Figure 14 isopleths), the former were selected as representative of the combined radwaste and reactor building vent releases in all wind directions.

Thus, use of the EBR-II $K_c$ isopleths, with adjustments to reflect local wake dispersion, appear to offer reasonable estimates of Unit 2 isopleths.

To make the transition from the normalized distance scales of Reference 5 to the real scale (1 in = 207 ft.) of Figures 1 and 2, Figure 4 was prepared and used as an overlay for transcribing the isopleth contours. The reactor building diameter (171 ft.) was the basis for the conversion, and adjustment was made for the drawing scales of the Reference 5 figure.

Figure 4 for combined radwaste and reactor building vent releases, contains provision for variable roof height of the downwind buildings. Reference 1 calls for X/Q values at the interiors of non-seismic buildings at ground level. This condition cannot be fulfilled without knowledge of the interior air flow. It was assumed that interior concentrations would be the same as roof-level concentrations at standing buildings because of infiltration and forced ventilation. The Unit 2 buildings were assigned to three roof-height groups corresponding to $z/D$ = 0.25, 0.50 and 0.75.

The grouping is shown in Table 2. The four sets of isopleths in Figure 4 represent plume concentrations at ground and at elevations of 43 ft., 86 ft. and 128 ft., corresponding to the above fractions. They were constructed from the isopleths in Figure 10 of Reference 5.

Using the aforementioned methodology, the $K_c$ isopleths obtained for the combined radwaste and reactor building vent are presented in Figures 5-20 for the all buildings stand scenario, and in Figures 21-36 for the seismic buildings stand scenario. Specific attention should be given to the control room air intakes (locations indicated in Figures 1 and 2).

The site specific $K_c$ values by wind direction determined from Figures 5-20 (all buildings stand scenario), and Figures 21-36 (seismic buildings stand scenario), have been tallied for the control room air intake locations in Table 4 (all buildings stand) and Table 5 (seismic buildings stand).

C. <u>Determination of 0.5% Sector-Dependent X/Q Values</u>

Accident X/Q values at the control room building fresh air intakes due to releases from the combined radwaste and reactor building vent are calculated using onsite meteorological data and site-specific wind direction dependent $K_c$ values. These 0.5% accident X/Q values are calculated for two scenarios; all buildings stand and seismic buildings stand.

In order to determine the 0.5% probability sector-dependent X/Q values, the onsite meteorological tower data are employed. A detailed description of the tower, the meteorological instruments and accuracies, along with the data recovery, is given in Section 2.3 of the Nine Mile Point Unit 2 FSAR, Reference 6.

Wind direction and speed data for the five-year period, January 1974 through December 1976 and November 1978 through October 1980, are used from the 200-ft. tower level transmitted by Reference 6. Wind direction data from 100-ft. instrumentation are substituted for missing 200-ft. directions. A cumulative frequency distribution of the reciprocal of the wind speed ($1/u_{200}$) is calculated for each of the 16-22.5° sectors in 1 mph wind speed increments by the MES program named SECTOR. Calms are conservatively assigned a wind speed of 1 mph. Calm hours with no directions are distributed in proportion to the number of 1 to 3 mph wind speeds in each 22.5° sector. For each of the distributions, the 0.5% probability value of $1/u_{200}$ is determined by conservatively enveloping the data points according to the methodology suggested by Markee in Reference 7. The 0.5% $1/u_{200}$ by sector and the corresponding wind speed, $u_{200}$, are listed in Table 3.

The application of the sector-dependent, site-specific $K_c$ values by wind direction for the control room building fresh air intakes (Tables 4 and 5) and the use of the wind direction dependent 0.5% $1/u_{200}$ values in Equation 3 permit the calculation of wind dependent 0.5% X/Q values. The highest 0.5% X/Q value independent of wind direction is used as the 0.5% accident X/Q value at the fresh air intake. This 1-hour 0.5% accident X/Q value is assumed to represent the 0-2 hour 0.5% accident X/Q.

D. <u>Interpolation of the 0-2 Hour 0.5% X/Q Values to Longer Time Periods</u>

The use of site-specific meteorological data combined with sector-dependent $K_c$ values allows for the determination of annual X/Q values. The annual X/Q values at the fresh air intakes are calculated from the frequency of $1/u_{200}$ in 1 mph increments for each sector multiplied by the corresponding sector-dependent $K_c$ value and the appropriate conversion factor of $3.1 \times 10^{-4}$.

The sum of the $K_c$ values divided by the wind speed for each of the 1 mph categories multiplied by the corresponding wind speed frequency (f) for all 16 sectors is the annual average X/Q value for the fresh air intake release-scenario combination.

$$\text{Annual X/Q} = \sum_{\substack{\text{sector} = 1 \\ 1-16}}^{16} \; \sum_{\substack{u = 1 \\ u-u_{max}}}^{u = \text{maximum}} K/U \; f \; \text{conversion factor} \qquad (4)$$

Using these annual X/Q values and the 0-2 hour 0.5% X/Q values, the intermediate time period X/Q values are logarithmically interpolated.

<u>Results</u>

The control room air intake X/Q values for the combined radwaste and reactor building vent release are presented in Table 7.

## References


1. Letter from A. R. Capellini (Stone & Webster Engineering Corp.) to M. Kramer (Meteorological Evaluation Services, Inc.) dated June 3, 1983.

2. Letter from A. R. Capellini to J. Halitsky dated June 10, 1983.

3. Letter from N. Rademacher (Niagara Mohawk Power Corp.) to M. Kramer dated June 29, 1983.

4. Letter from M. Kramer to J. Halitsky dated June 28, 1983.

5. Halitsky, J., J. Golden, P. Halpern and P. Wu (1963): Wind Tunnel Tests of Gas Diffusion from a Leak in the Shell of a Nuclear Power Reactor and from a Nearby Stack. NYU Dept. of Met. and Ocean. GSL Rept. 63-2.

6. Niagara Mohawk Power Corporation: Nine Mile Point Nuclear Station - Unit 2 - Final Safety Analysis Report, January 1983.

7. Markee E. H. and Levine J. R.: Probabilistic Evaluations of Atmospheric Diffusion Conditions for Nuclear Facility Design and Siting. In proceedings of the American Meteorological Society Conference on Probability and Statistics in Atmospheric Sciences, Las Vegas, NV, 1977, p 146-150.

TABLE 1

IDENTIFICATION OF FRESH AIR INTAKES

| Fresh Air Intake No. | Location | Distance (m) From Containment Surface |
|---|---|---|
| 4a | Control Room Bldg. - East Wall High | 39 |
| 4b | Control Room Bldg. - East Wall Low | 39 |
| 9 | Control Room Bldg. - West Wall High | 57 |
| 10 | Control Room Bldg. - West Wall Low | 48 |

NINE MILE POINT UNIT 2 RELEASE CHARACTERISTICS

| Parameter | Combined Radwaste and Reactor Building Vent |
|---|---|
| Release Height Above Grade | 57.0<br>187.0 |
| Exit Diameter | 3.4*<br>11.0* |

*Equivalent diameter for the rectangular vent.

TABLE 2

GROUPING OF BUILDING ACCORDING TO HEIGHT

| Bldg. No. | Bldg. Name | Parapet Height H (ft.) | Bldg. H/D | Assigned H/D |
|---|---|---|---|---|
| 3 | Turbine | 120.0 | 0.70 | 0.75 |
| 4 | Radwaste | 81.6 | 0.48 | 0.50 |
| 5 | Screenwell | 78.8 | 0.46 | 0.50 |
| 8 | Control Room | 70.5 | 0.41 | 0.50 |
| 14 | Condensate Storage | 59.0 | 0.35 | 0.25 |
| 15 | Switchgear Penthouse | 57.8 | 0.34 | 0.25 |
| 18 | Switchgear | 36.0 | 0.21 | 0.25 |
| 19 | Diesel Generator | 31.0 | 0.18 | 0.25 |

TABLE 3

0.5% PROBABILITY SECTOR DEPENDENT (200-FT WIND SPEED)$^{-1}$
JANUARY 1974 THROUGH DECEMBER 1976 AND
NOVEMBER 1978 THROUGH OCTOBER 1980

| Wind Direction Sector (°) | 0.5% (1/ u200) (sec/m) | Equivalent $u_{200}$ (m/sec) | (mph) |
|---|---|---|---|
| 360.0 | 0.497 | 2.0 | 4.5 |
| 22.5 | 0.476 | 2.1 | 4.7 |
| 45.0 | 0.533 | 1.9 | 4.2 |
| 67.5 | 0.447 | 2.2 | 5.0 |
| 90.0 | 0.533 | 1.9 | 4.2 |
| 112.5 | 0.476 | 2.1 | 4.7 |
| 135.0 | 0.678 | 1.5 | 3.3 |
| 157.5 | 0.699 | 1.4 | 3.2 |
| 180.0 | 0.799 | 1.3 | 2.8 |
| 202.5 | 0.658 | 1.5 | 3.4 |
| 225.0 | 0.639 | 1.6 | 3.5 |
| 247.5 | 0.722 | 1.4 | 3.1 |
| 270.0 | 0.799 | 1.3 | 2.8 |
| 292.5 | 0.639 | 1.6 | 3.5 |
| 315.0 | 0.559 | 1.8 | 4.0 |
| 337.5 | 0.466 | 2.2 | 4.8 |

TABLE 4

VALUES OF $K_c$ AT THE FRESH AIR INTAKES
COMBINED RADWASTE AND REACTOR BUILDING VENT RELEASE - ALL BUILDINGS STAND

| Ventilation Air Intake | Wind Direction | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW |
| Control Room Building | | | | | | | | | | | | | | | | |
| West Wall | | | | | | | | | | | | | | | | |
| High | 2.0 | 2.0 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Low | 2.2 | 2.2 | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.[illegible] |
| East Wall | | | | | | | | | | | | | | | | |
| High | 1.9 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 |
| Low | 1.9 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 |

TABLE 5

VALUES OF $K_C$ AT THE FRESH AIR INTAKES
COMBINED RADWASTE AND REACTOR BUILDING VENT RELEASE - SEISMIC BUILDINGS STAND

| Ventilation Air Intake | Wind Direction | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | NNE | NE | ENE | E | ESE | SE | SSE | S | SSW | SW | WSW | W | WNW | NW | NNW |
| Control Room Building | | | | | | | | | | | | | | | | |
| West Wall | | | | | | | | | | | | | | | | |
| High | 0.0 | 2.0 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Low | 0.0 | 2.5 | 2.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.[illegible] |
| East Wall | | | | | | | | | | | | | | | | |
| High | 2.3 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 |
| Low | 2.3 | 1.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.0 |

TABLE 6

VENTILATION AIR INTAKE X/Q VALUES

COMBINED RADWASTE AND REACTOR BUILDING VENT RELEASE
($SEC/M^3$)

| All Building Stand Ventilation Air Intake | Time Period (Hours) 0-2 | 0-8 | 8-24 | 24-96 | 96-720 |
|---|---|---|---|---|---|
| Control Room Building | | | | | |
| West Wall | | | | | |
| High | 3.08E-04 | 1.90E-04 | 1.50E-04 | 8.87E-05 | 4.20E-05 |
| Low | 3.39E-04 | 2.11E-04 | 1.66E-04 | 9.88E-05 | 4.70E-05 |
| East Wall | | | | | |
| High | 2.93E-04 | 1.72E-04 | 1.32E-04 | 7.42E-05 | 3.25E-05 |
| Low | 2.93E-04 | 1.72E-04 | 1.32E-04 | 7.42E-05 | 3.25E-05 |
| Seismic Building Stand Ventilation Air Intake | | | | | |
| Control Room Building | | | | | |
| West Wall | | | | | |
| High | 2.95E-04 | 1.65E-04 | 1.24E-04 | 6.58E-05 | 2.68E-05 |
| Low | 3.69E-04 | 2.13E-04 | 1.62E-04 | 8.92E-05 | 3.80E-05 |
| East Wall | | | | | |
| High | 3.54E-04 | 2.05E-04 | 1.56E-04 | 8.65E-05 | 3.70E-05 |
| Low | 3.54E-04 | 2.05E-04 | 1.56E-04 | 8.65E-05 | 3.70E-05 |

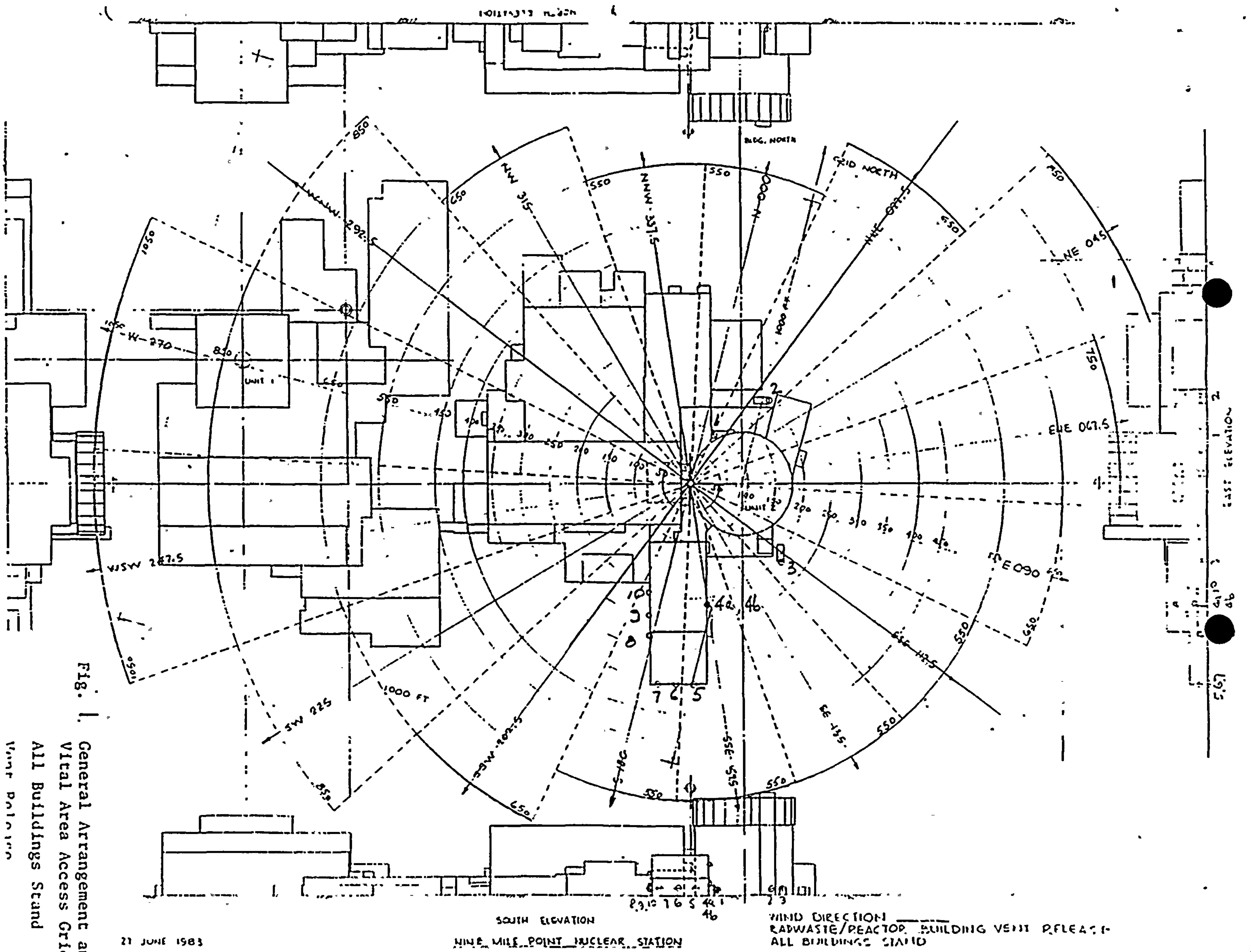



Fig. 1. General Arrangement and Vital Area Access Grid All Buildings Stand Vent Release

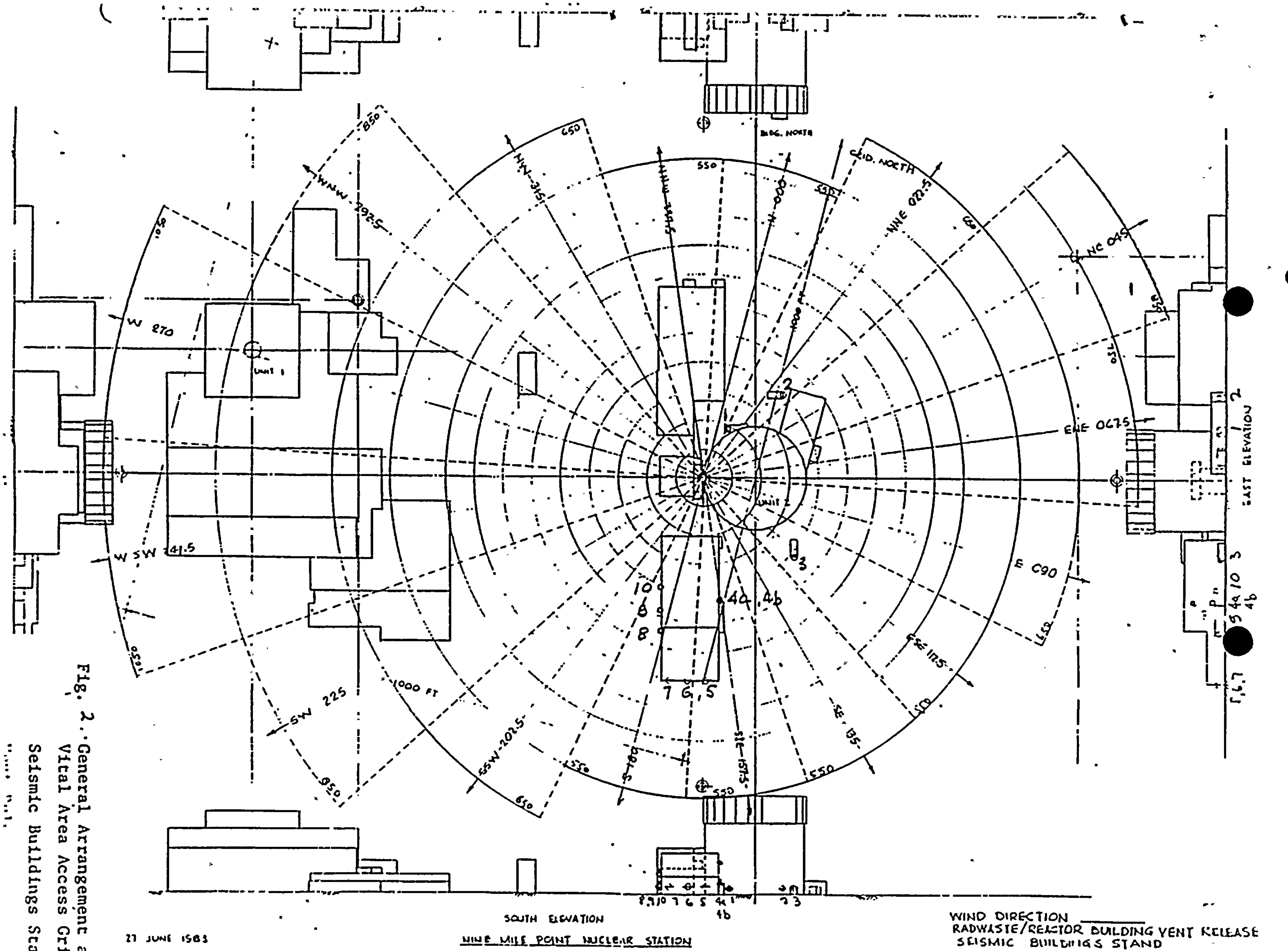



Fig. 2. General Arrangement and Vital Area Access Grid Seismic Buildings Stand

Figure 3

# BUILDING CONFIGURATION IN RELEASE AND INTAKE AREA

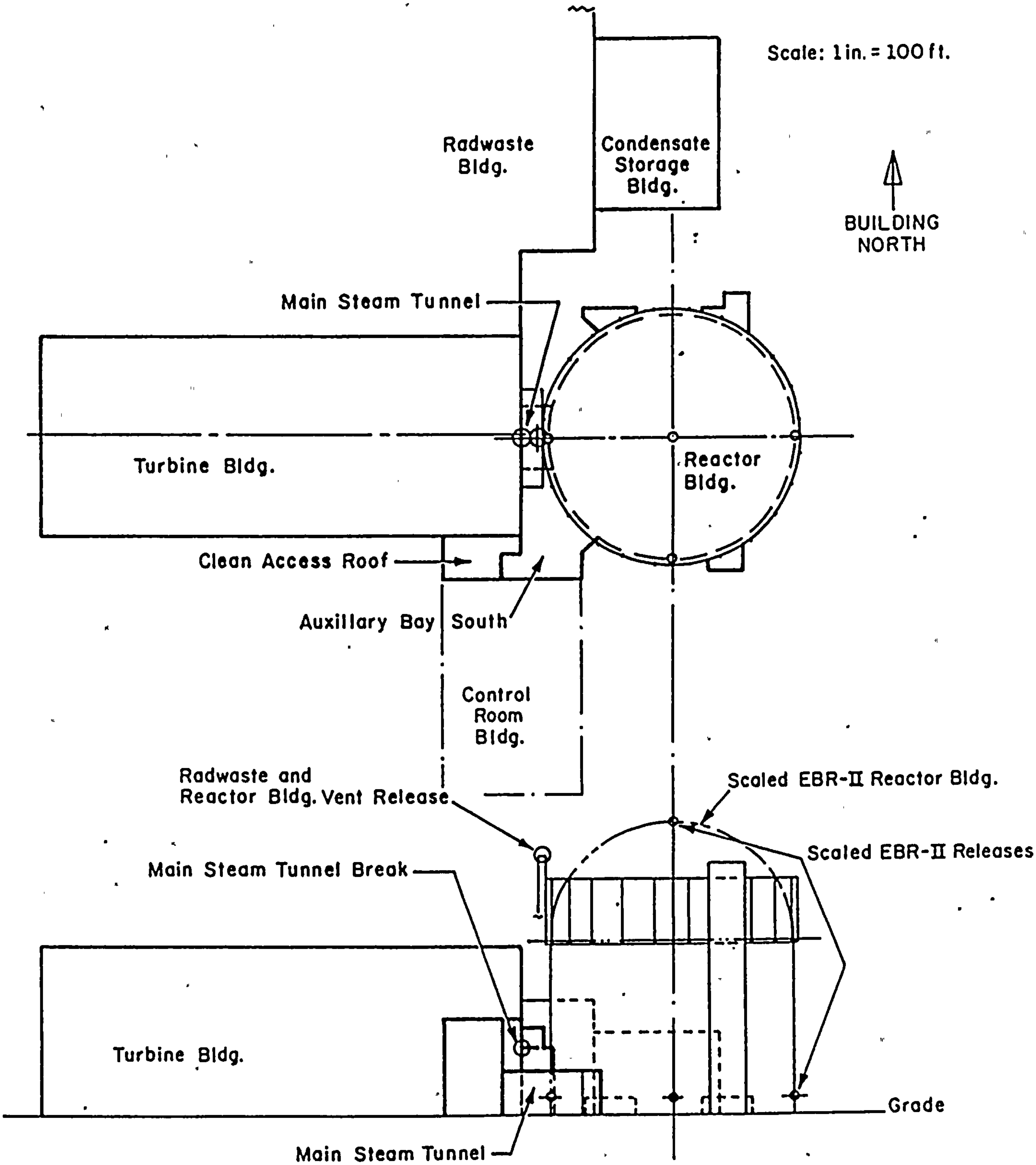
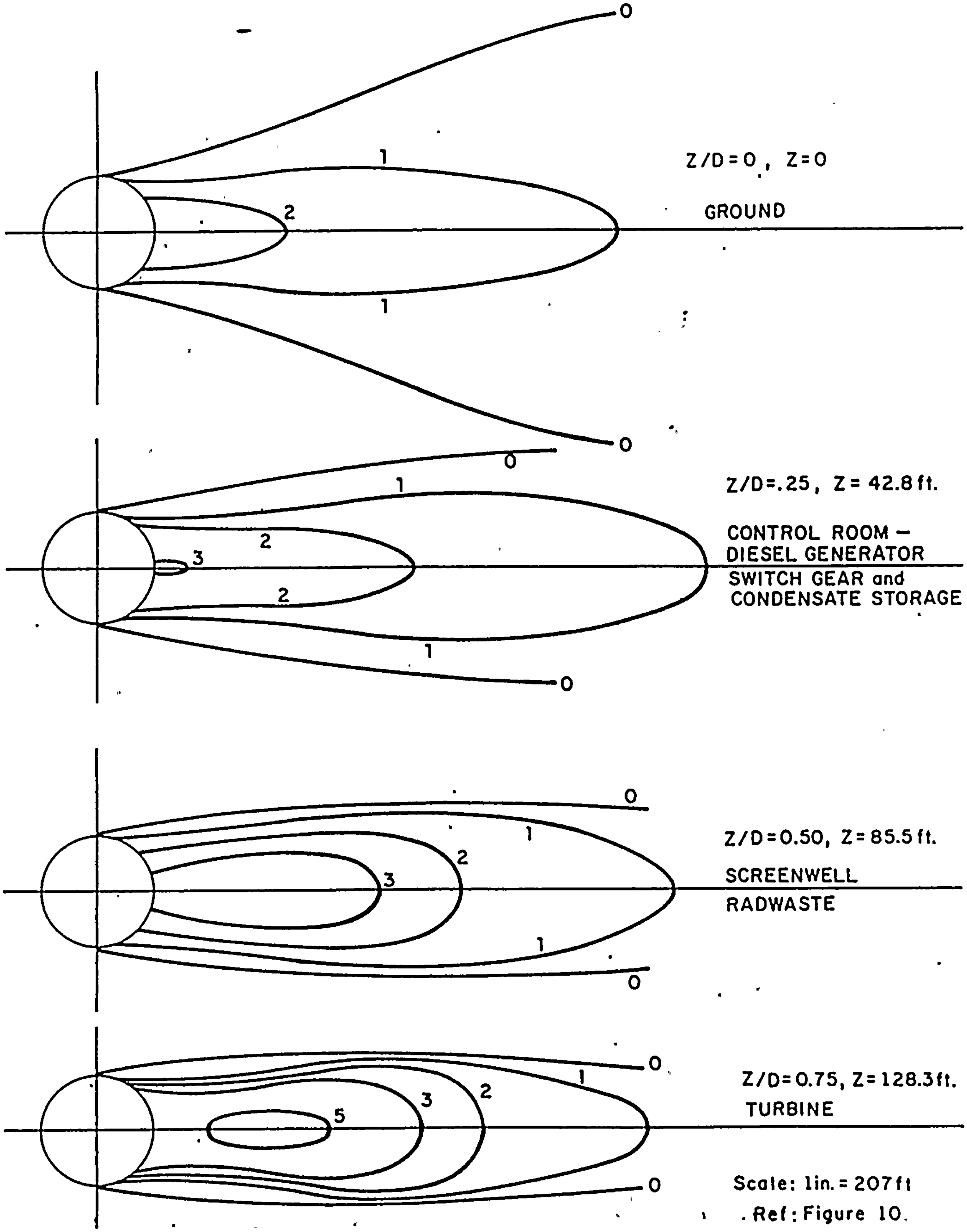


Figure 4

# EQUIVALENT EBR-II $K_c$ ISOPLETHS FOR TOP RELEASE




Scale: 1in.=207ft

Ref: Figure 10.

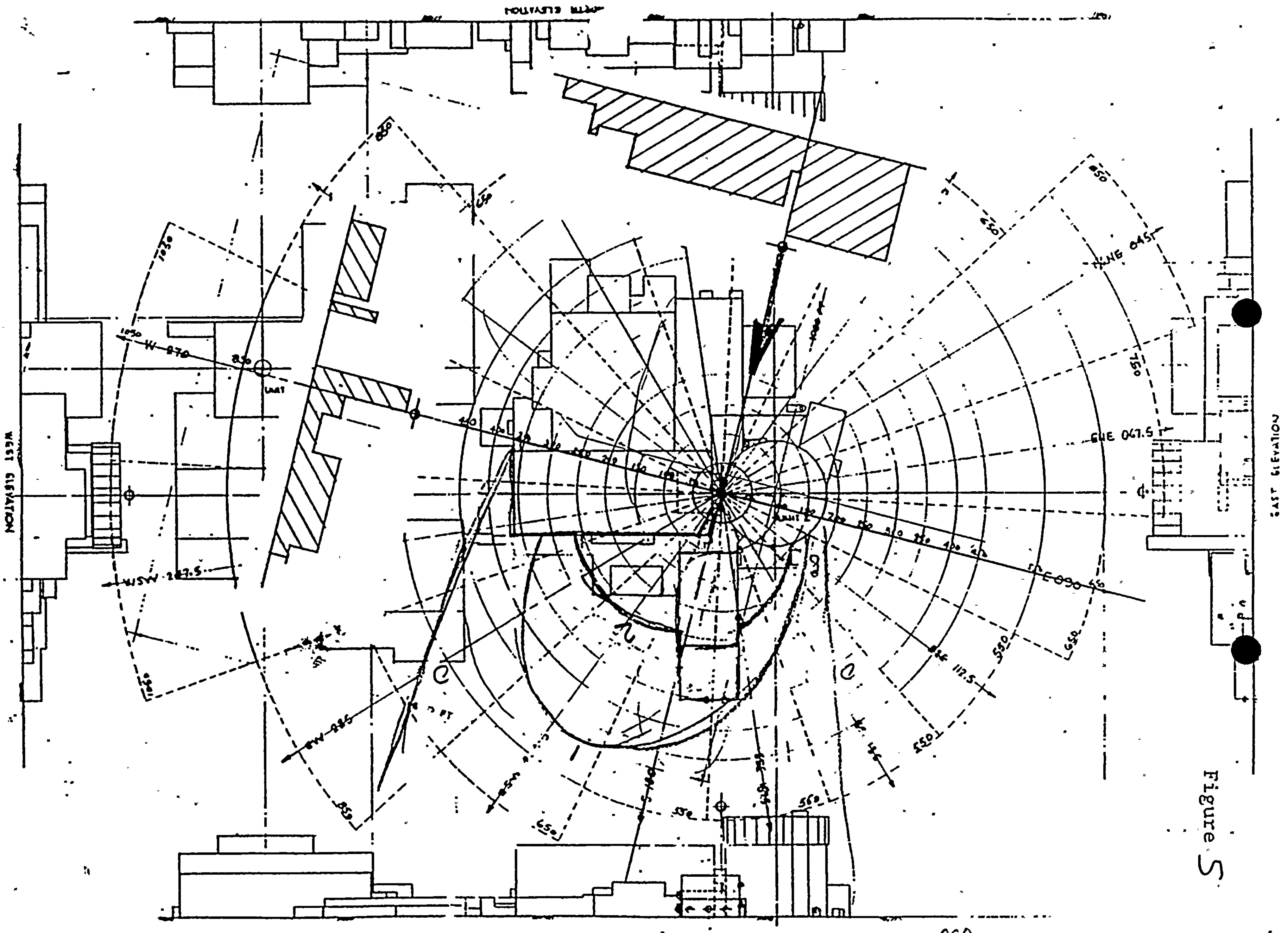
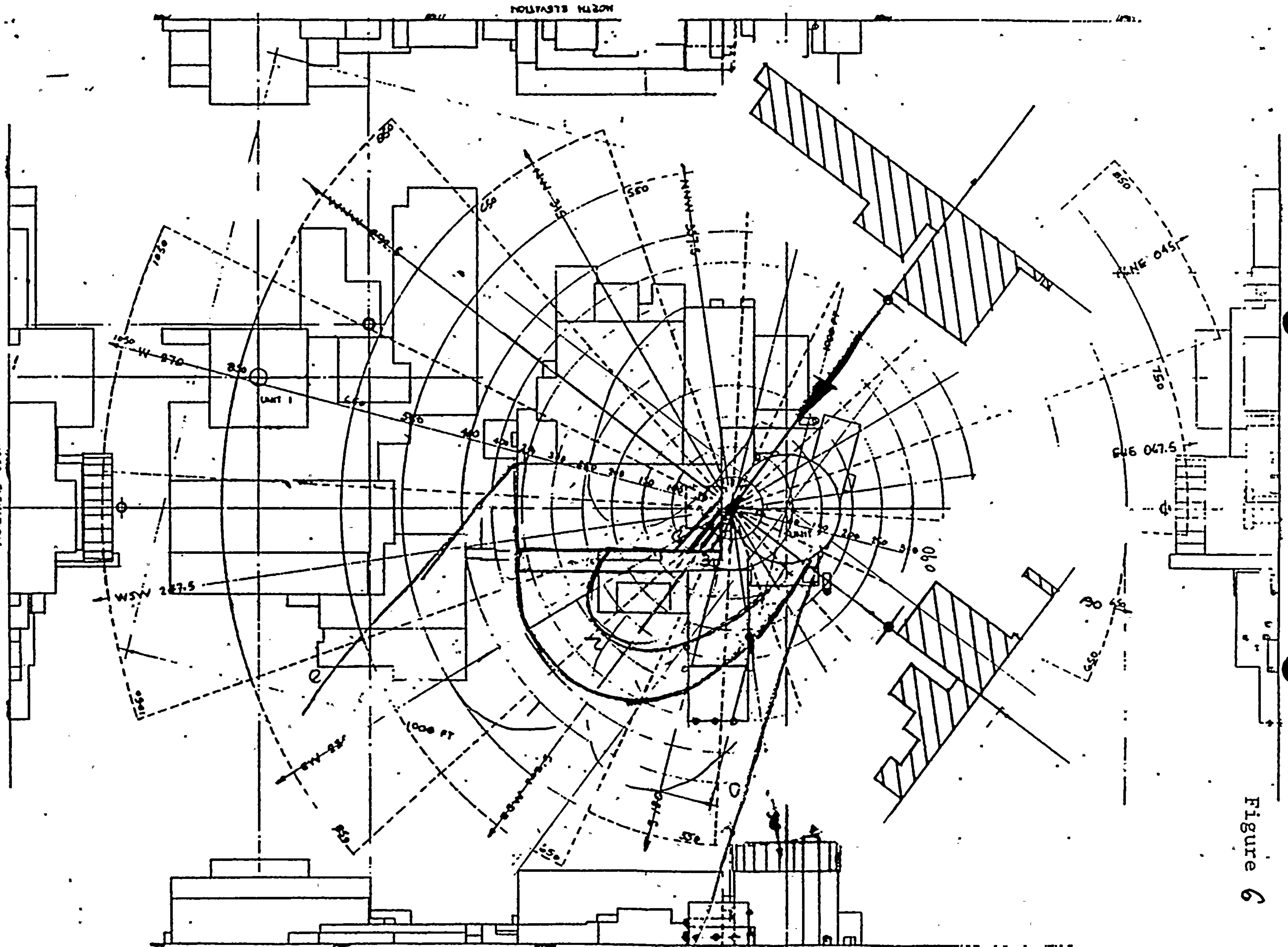



Figure 5

J. HALITSKY 21 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 000
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND




SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J. HALITSKY 27 JUNE 1983

WIND DIRECTION 022.5
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

Figure 6

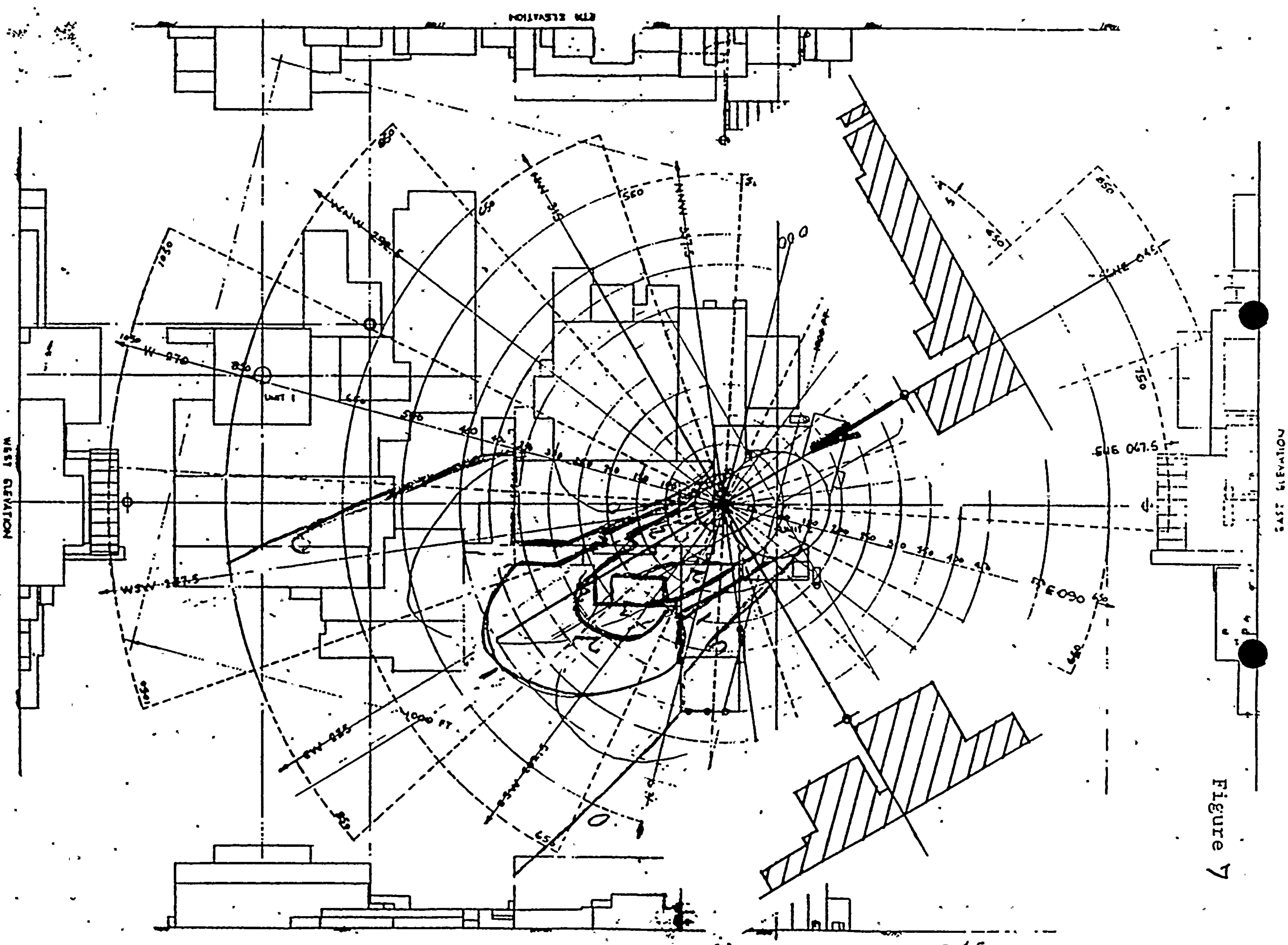


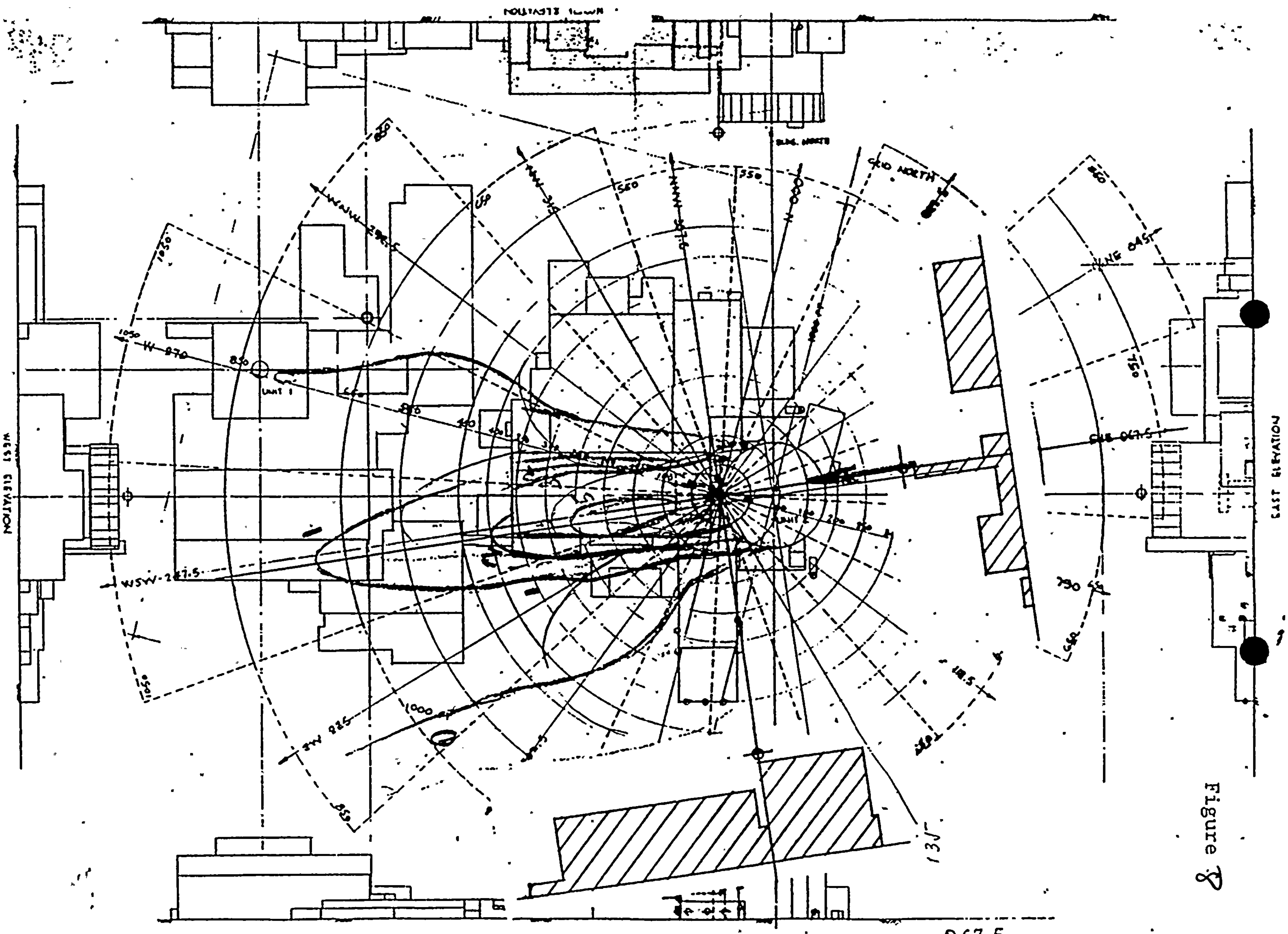

Figure 7

SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J. HALITSKY 27 JUNE 1983

WIND DIRECTION 045
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

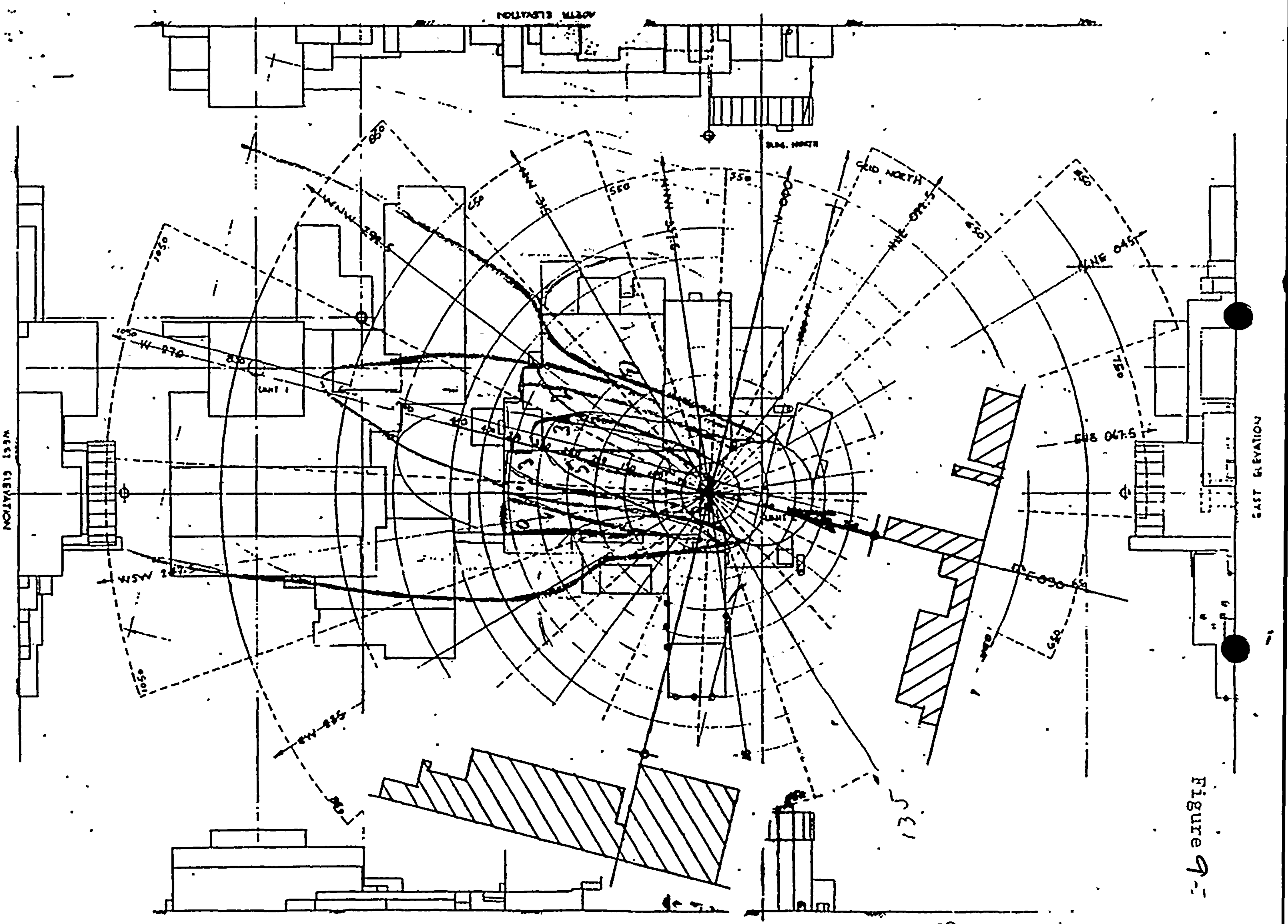



J. HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 067.5
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

Figure 8




SOUTH ELEVATION

J HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 090
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

Figure 9

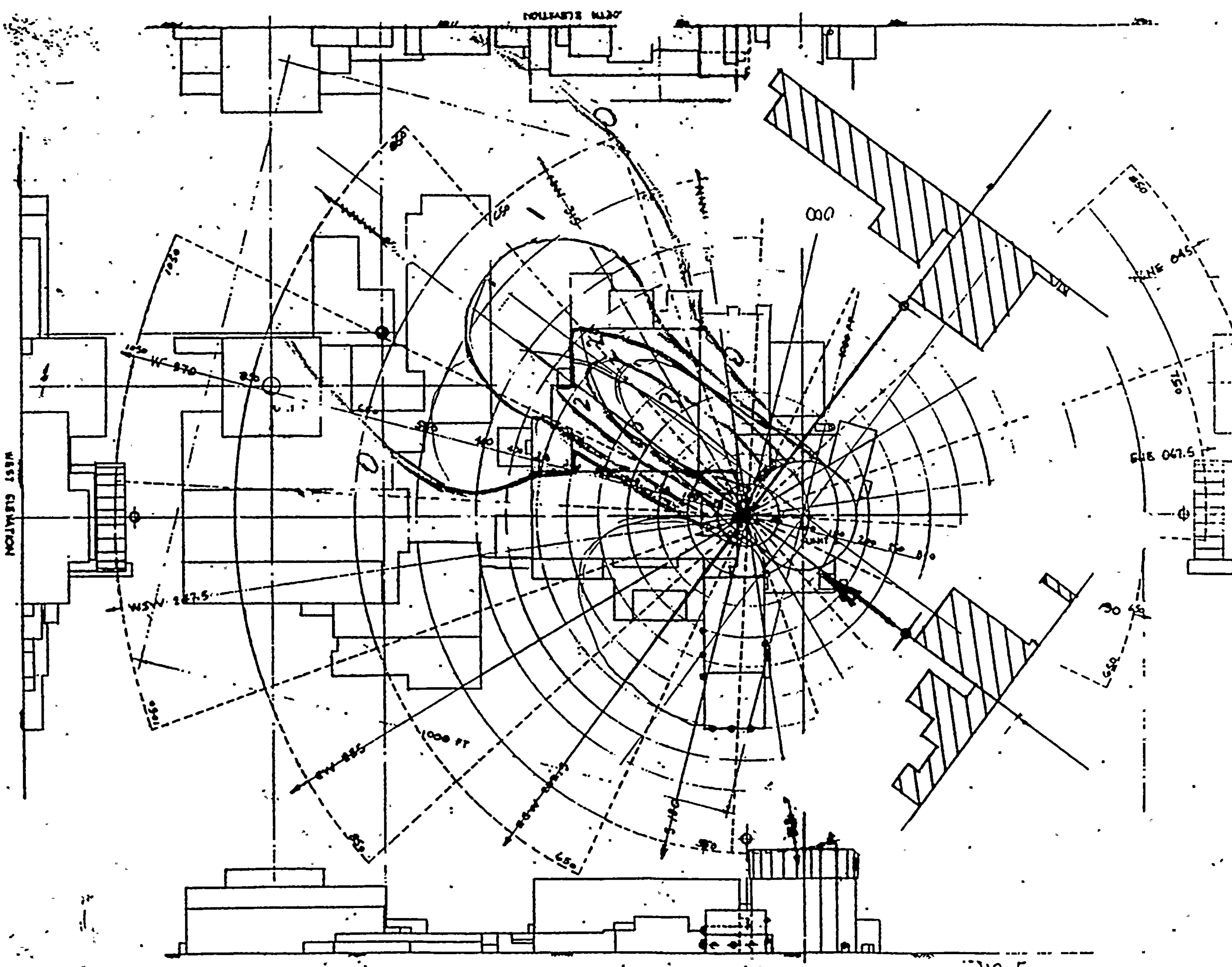



Figure 10:

J. HALITSKY 27 JUNE 1968

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 112.5
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

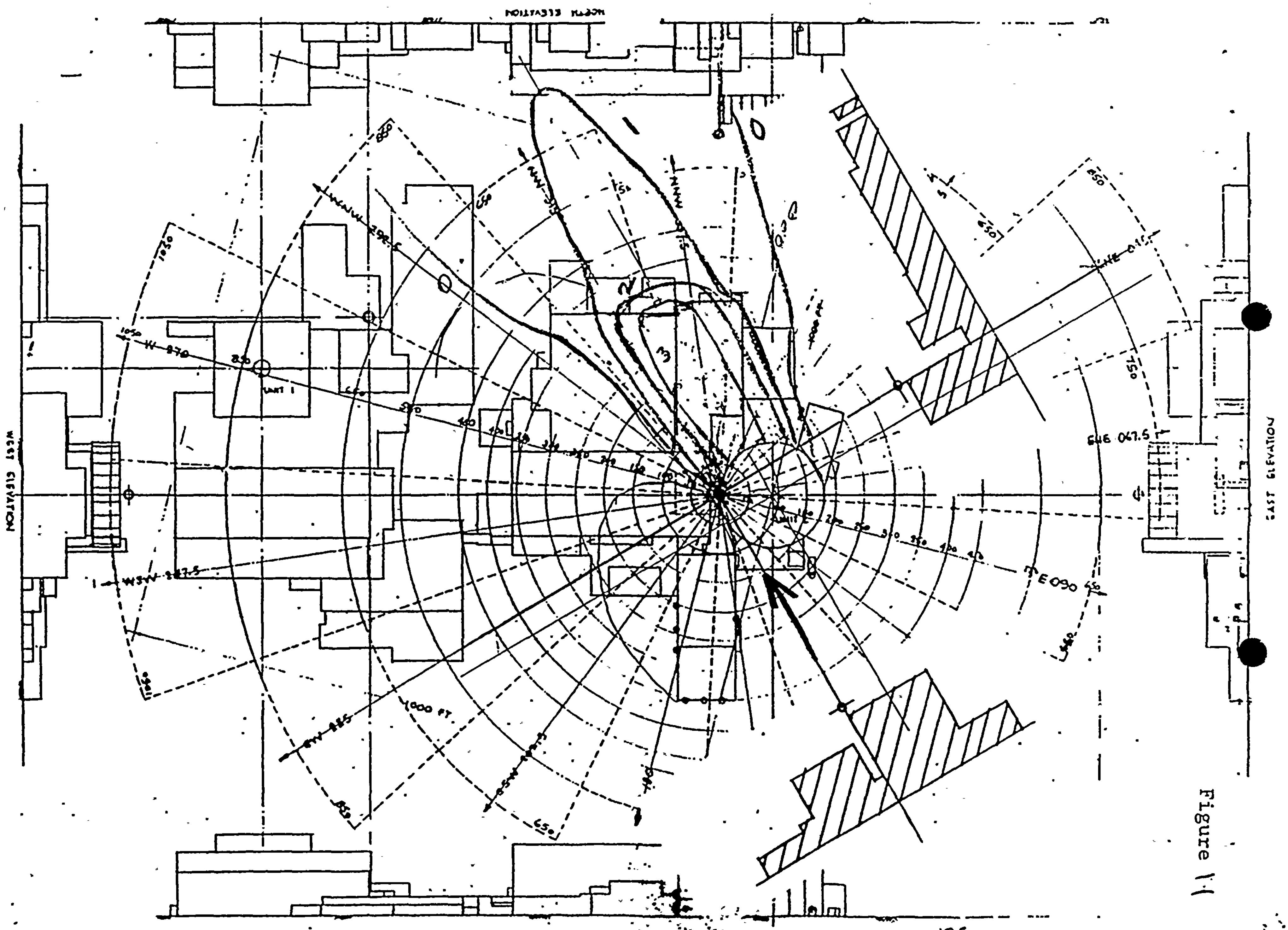
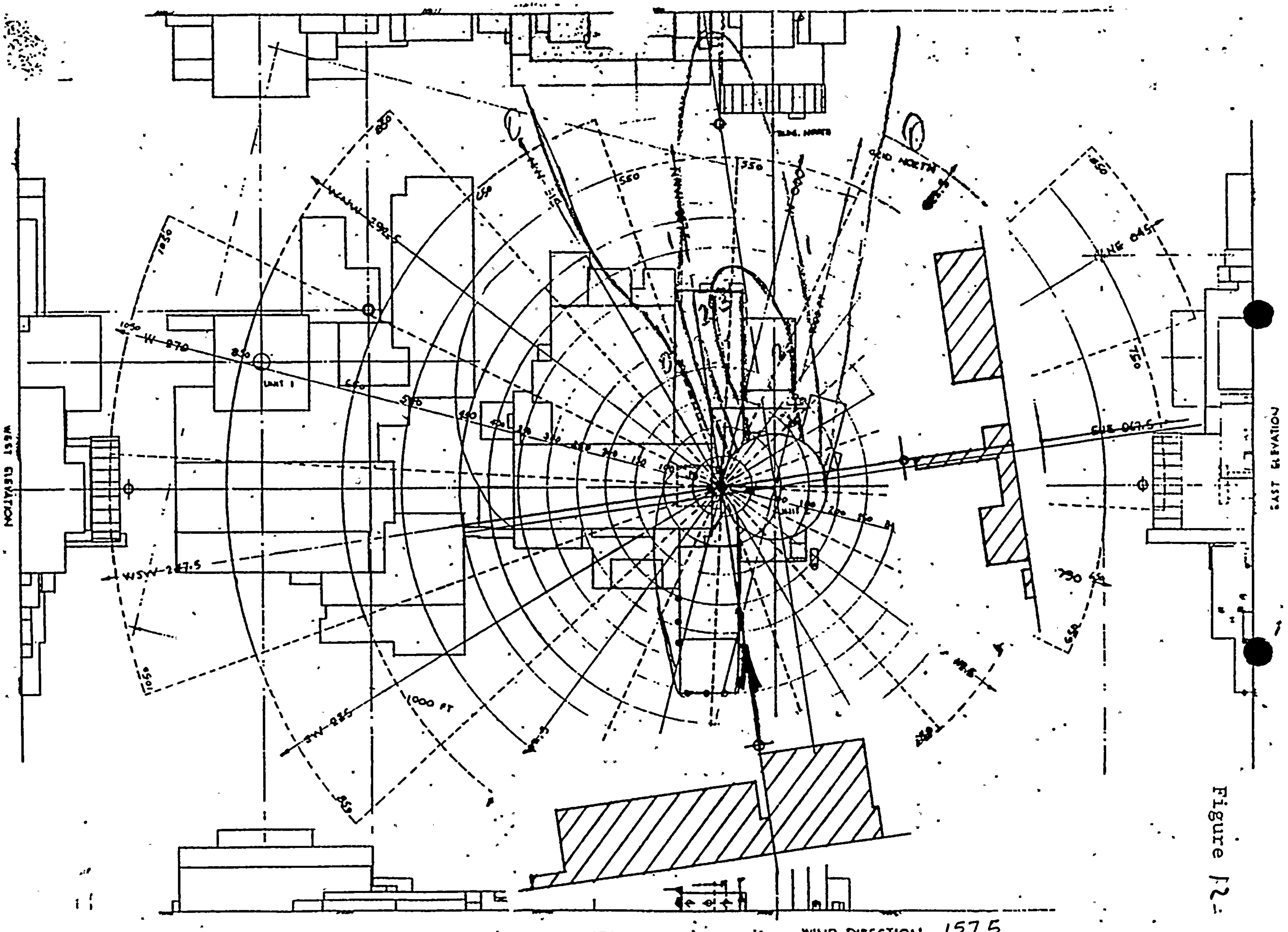



Figure 11

WIND DIRECTION 135
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

S. HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION




J. HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 157.5
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

Figure 12

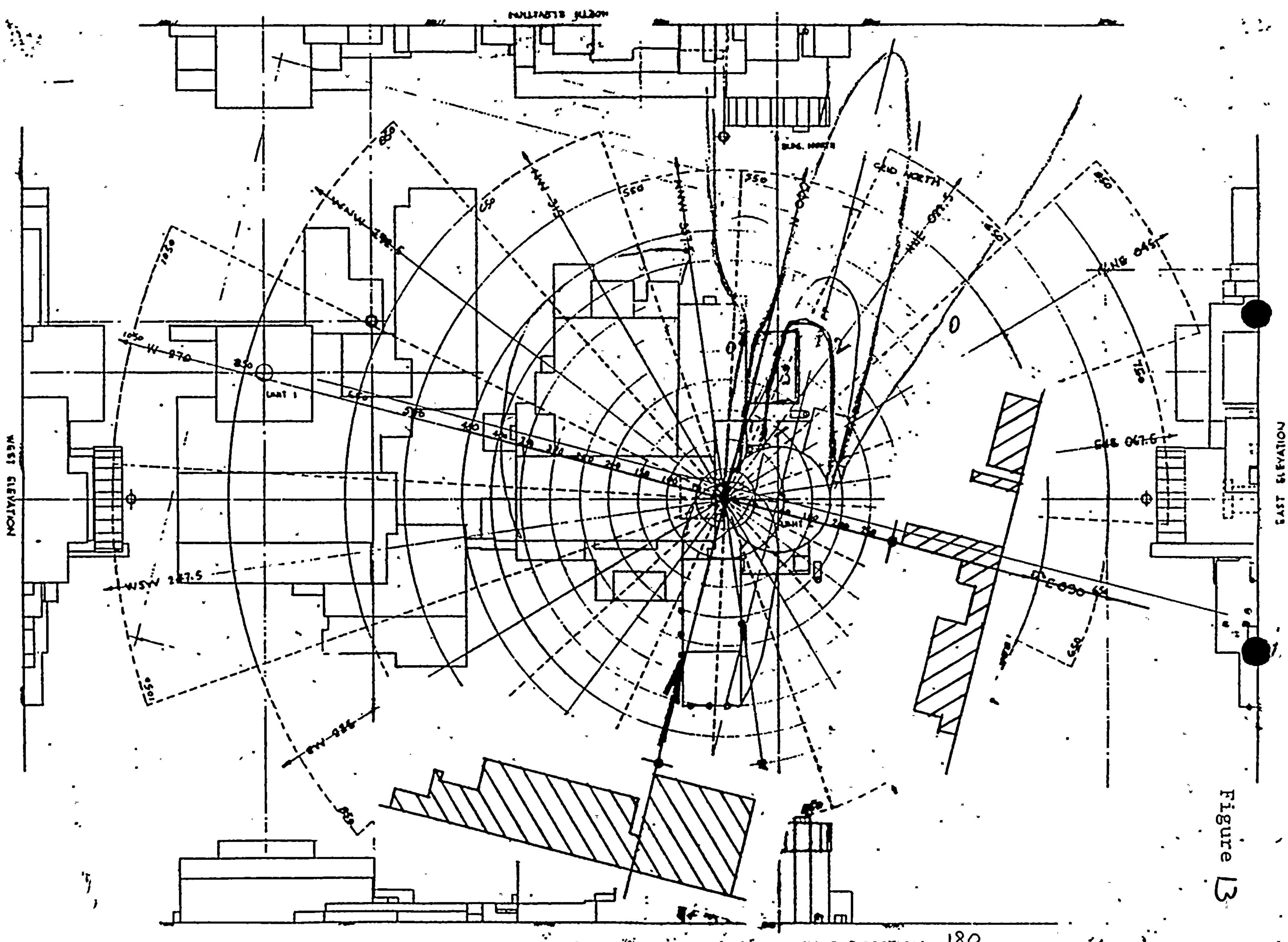
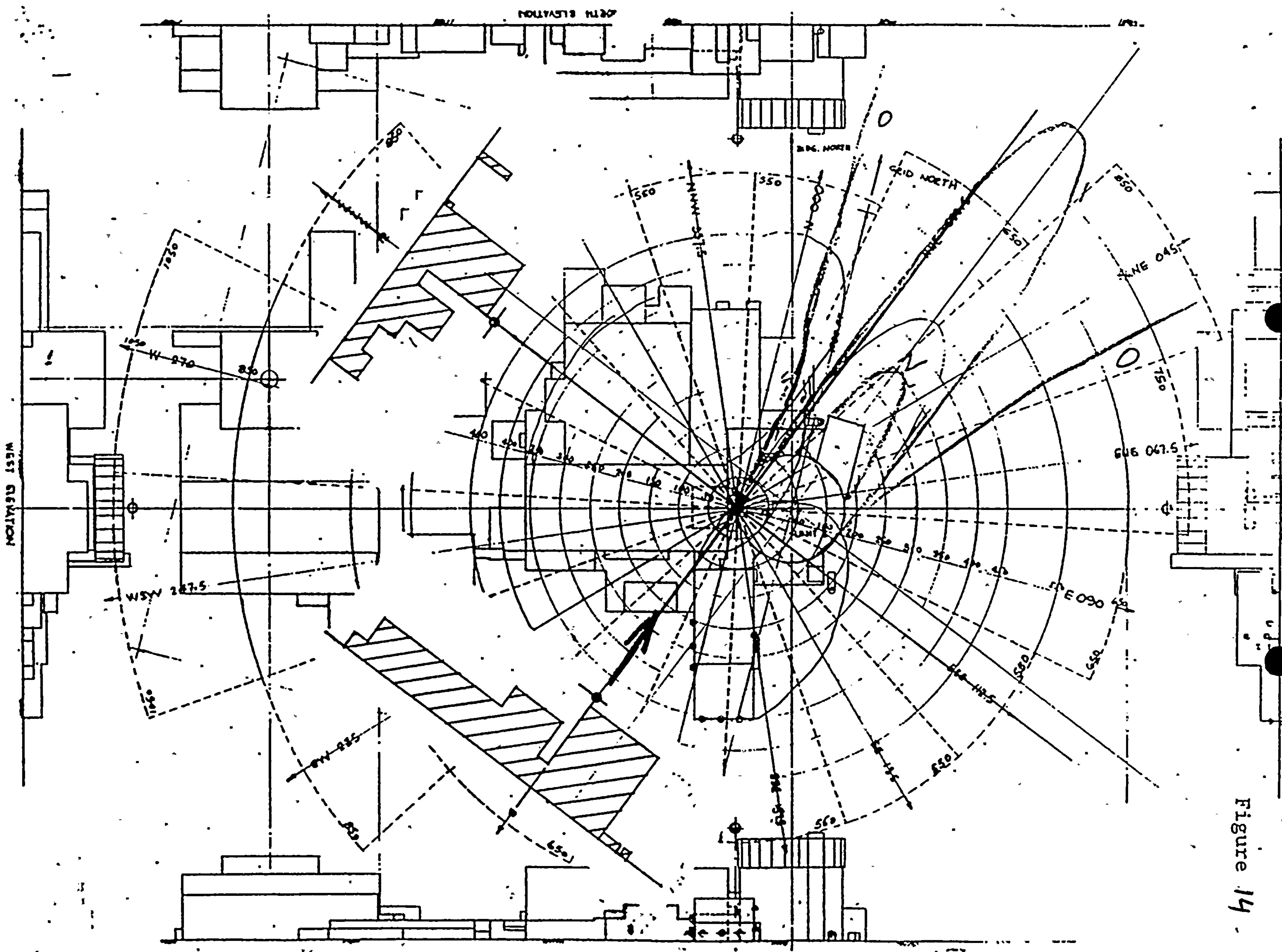



Figure 13

J. HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 180
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND




SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J. HALITSKY 27 JUNE 1968

WIND DIRECTION 202.5
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

Figure 14

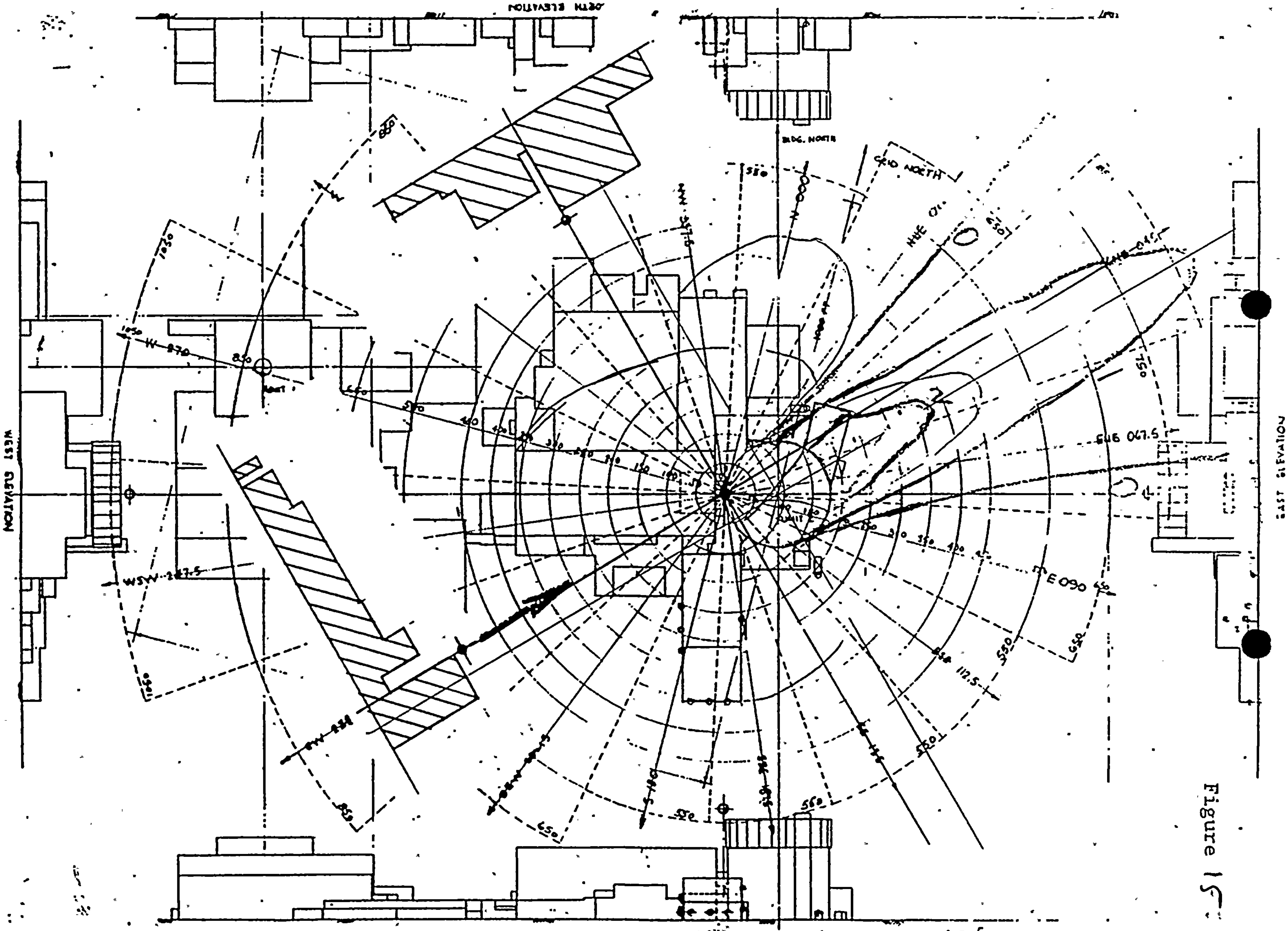


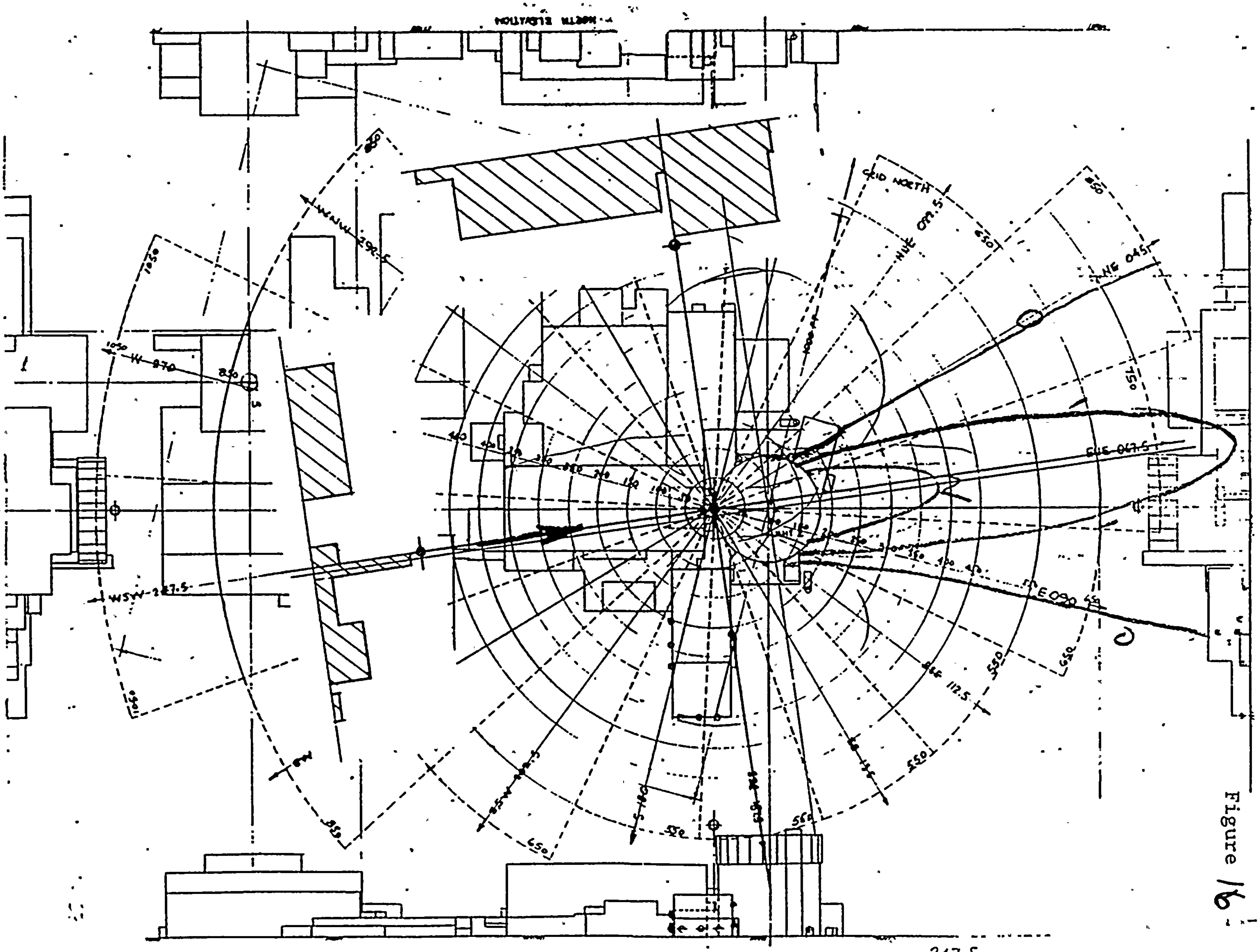

Figure 15

SOUTH ELEVATION

S. HALITSKY 27 JUNE 1963

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 225
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND




J HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 247.5
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

Figure 16

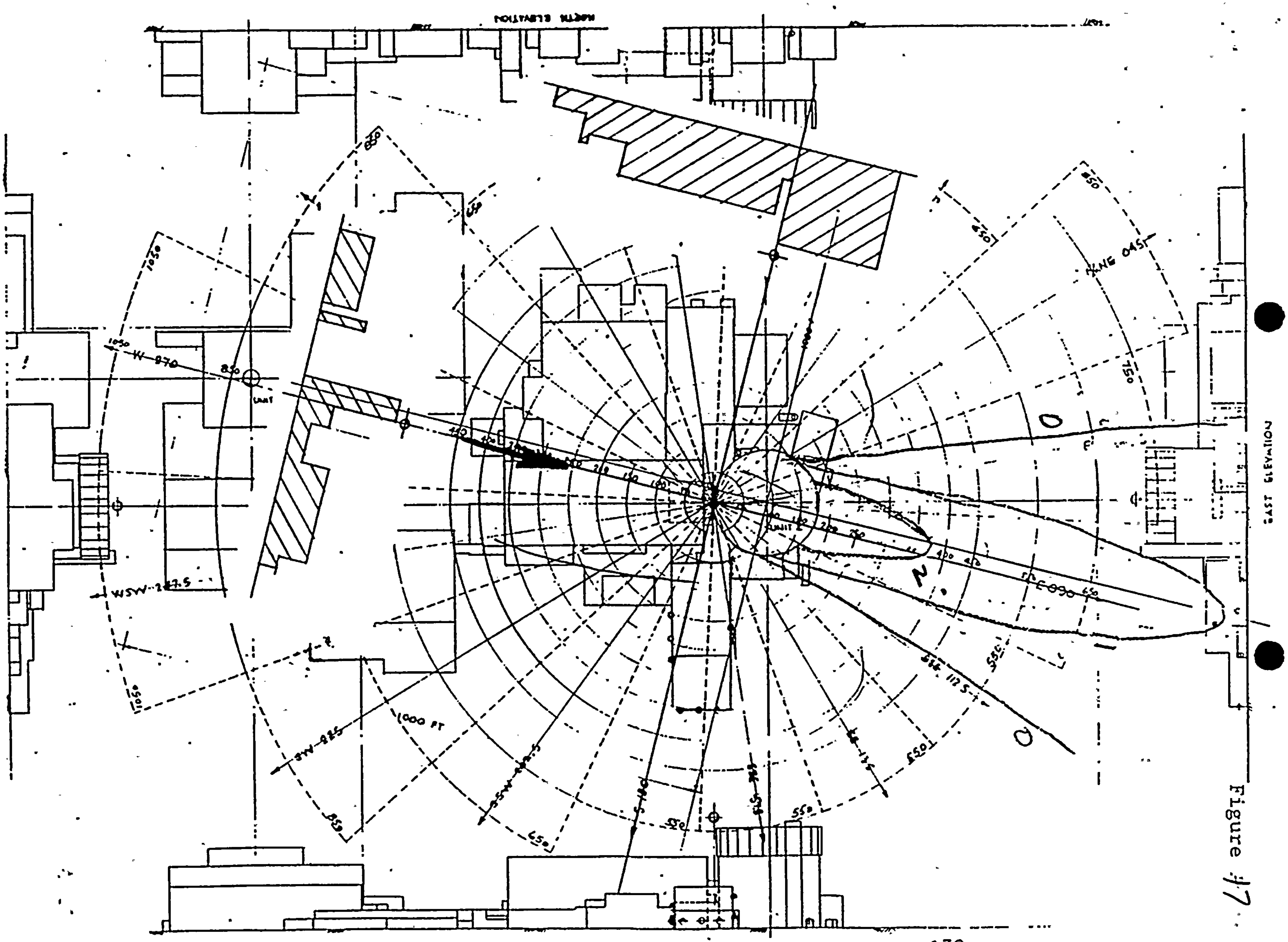



Figure 17

SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J HALITSKY 27 JUNE 1983

WIND DIRECTION 270
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

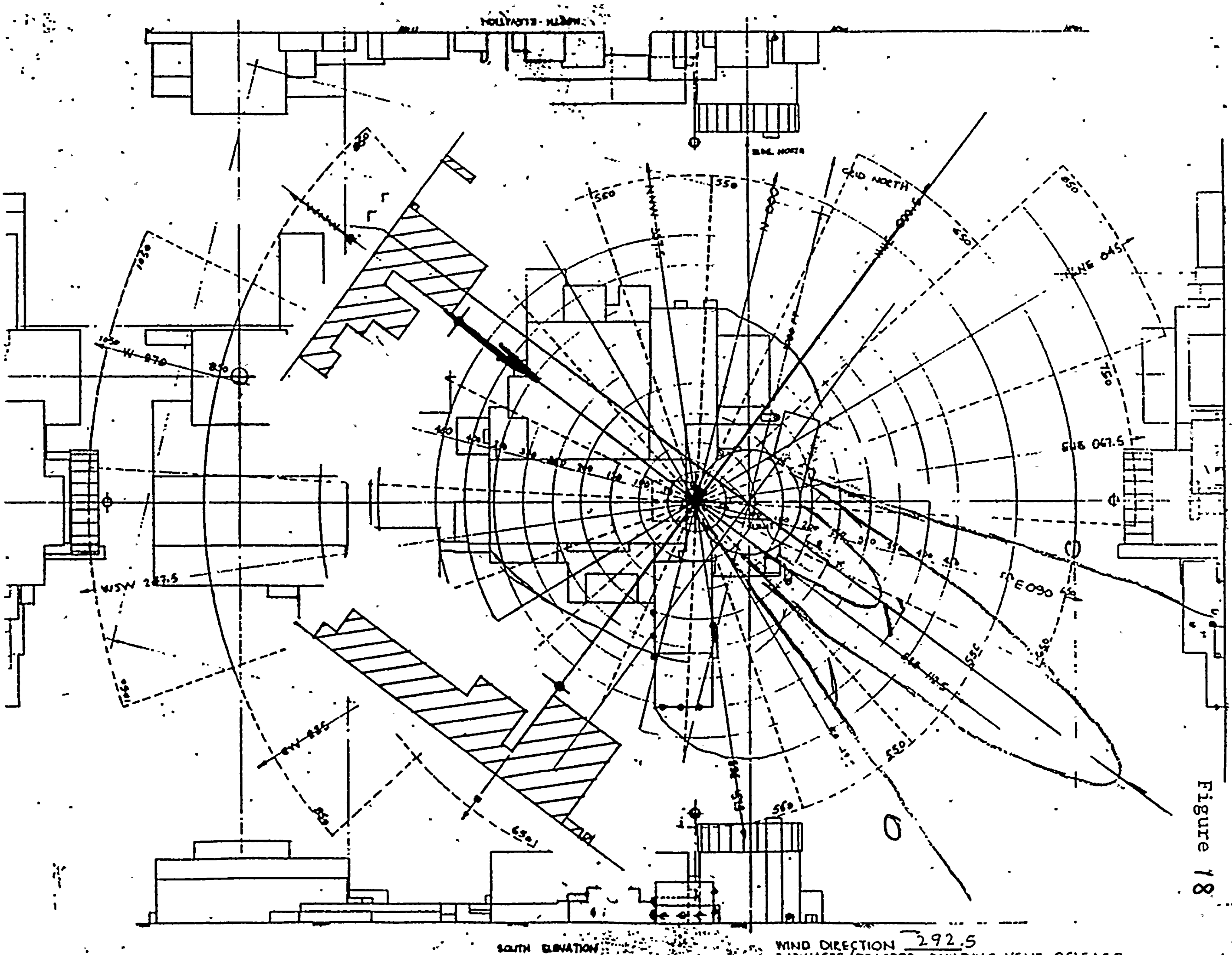



Figure 18

J. HALITSKY 27 JUNE 1968

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 292.5
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

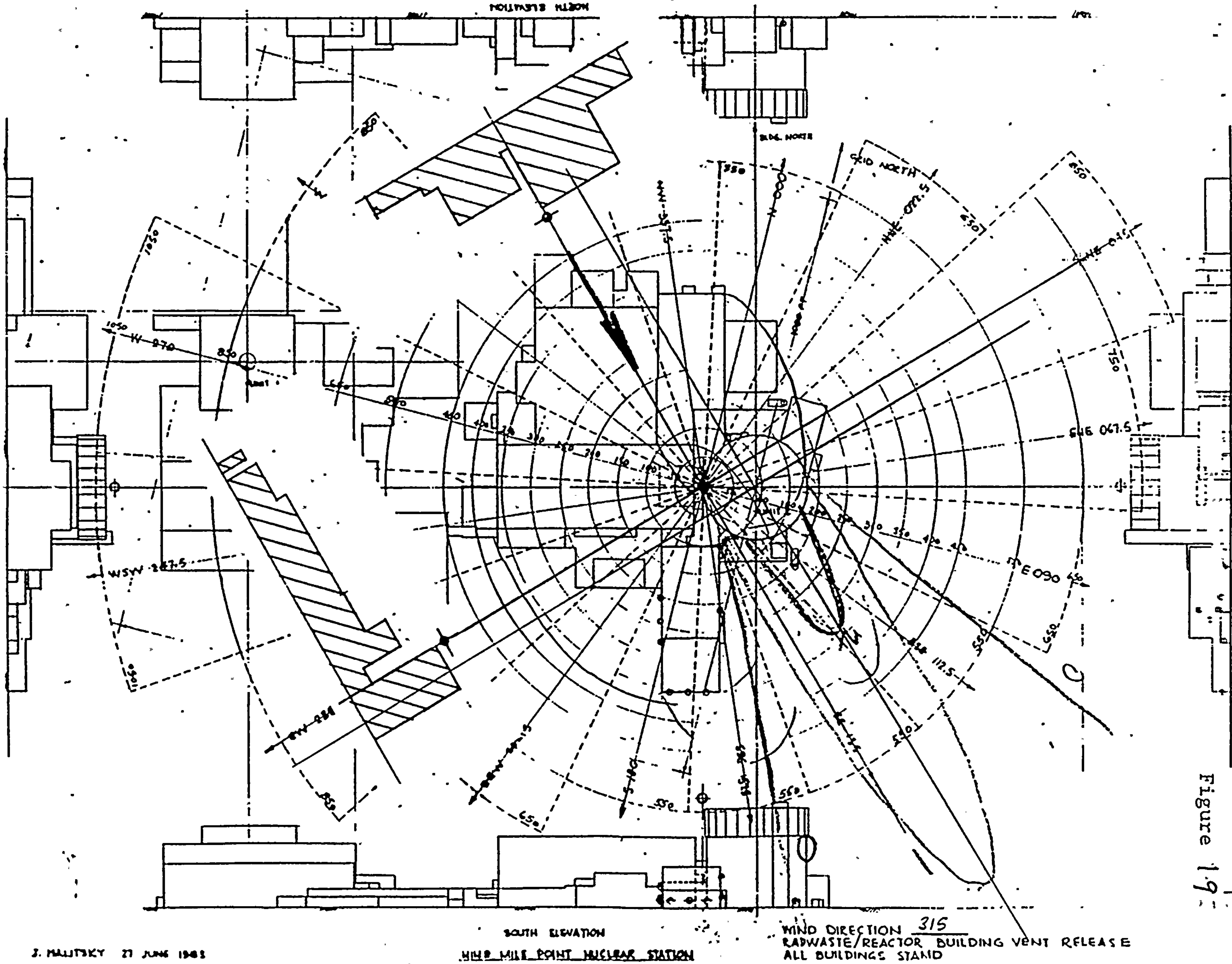

NORTH ELEVATION
EAST ELEVATION
SOUTH ELEVATION
GRID NORTH
BLDG. NORTH
W 270
WSW 247.5
E 090
ENE 067.5
NE 045
NNE 022.5
N 000
SE 135
S 180
SW 225
J. MALITSKY 27 JUNE 1983
NINE MILE POINT NUCLEAR STATION
WIND DIRECTION 315
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

Figure 1.9

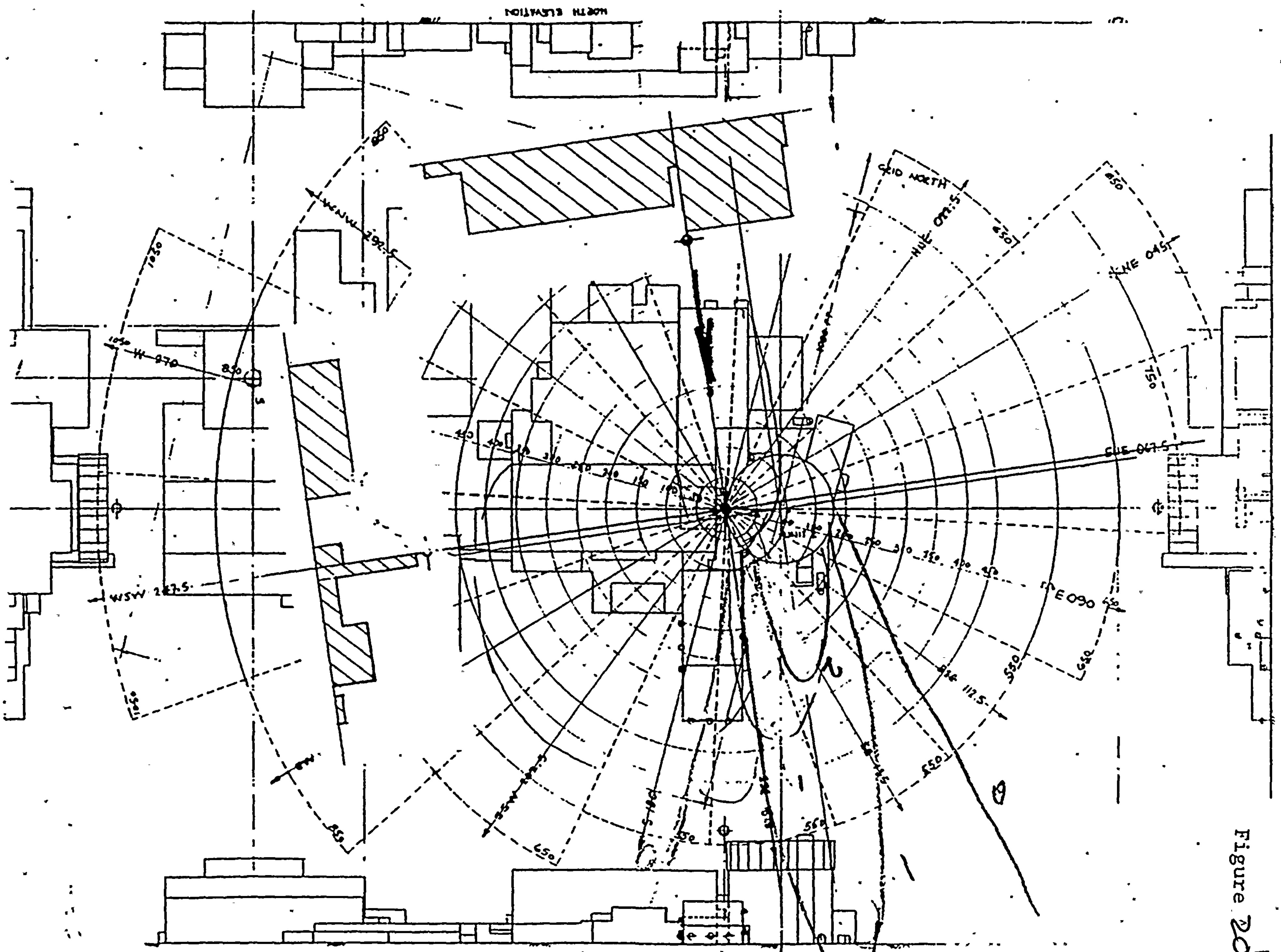
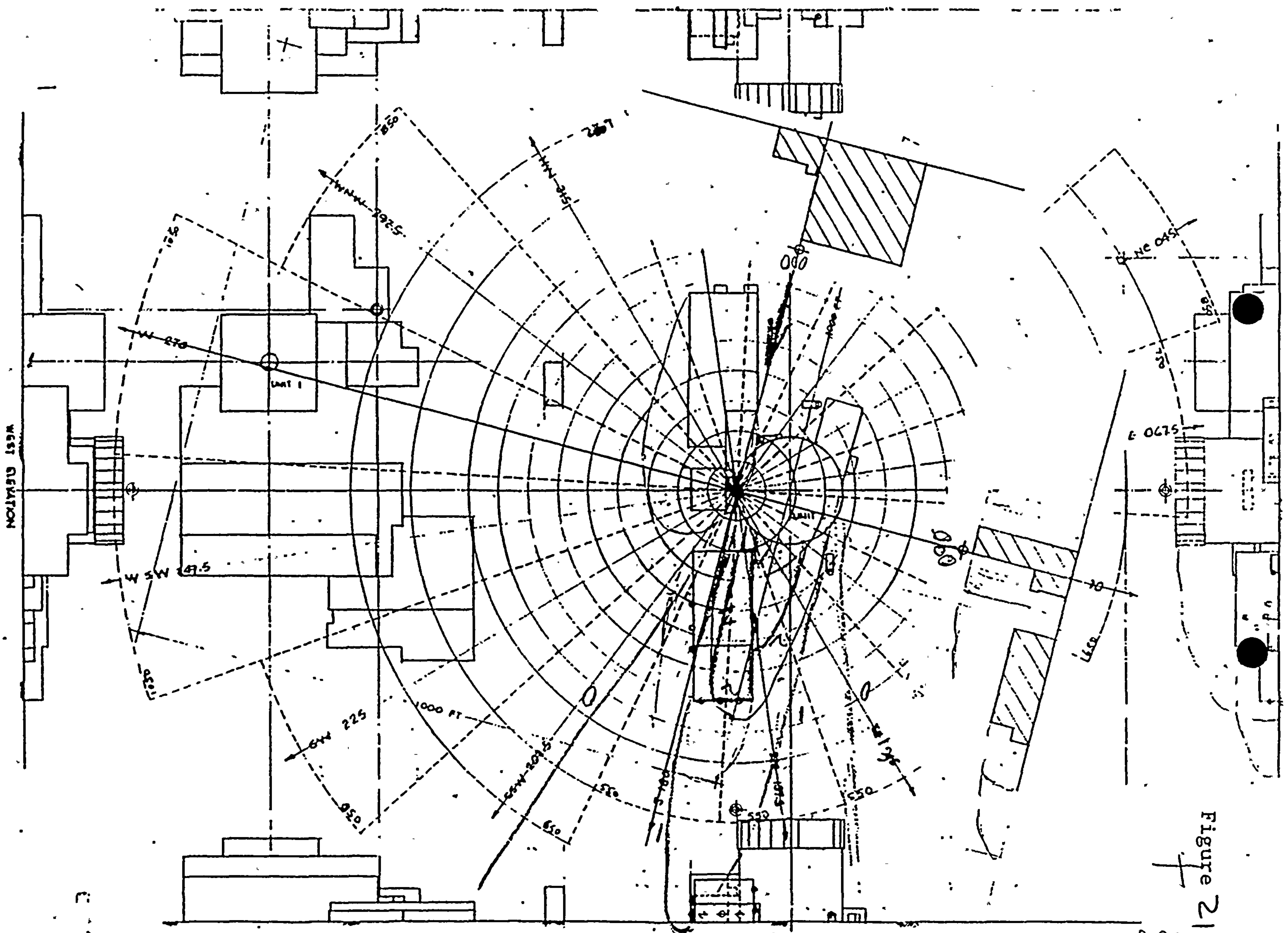



Figure 20

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 337.5
RADWASTE/REACTOR BUILDING VENT RELEASE
ALL BUILDINGS STAND

J HALITSKY 27 JUNE 1983



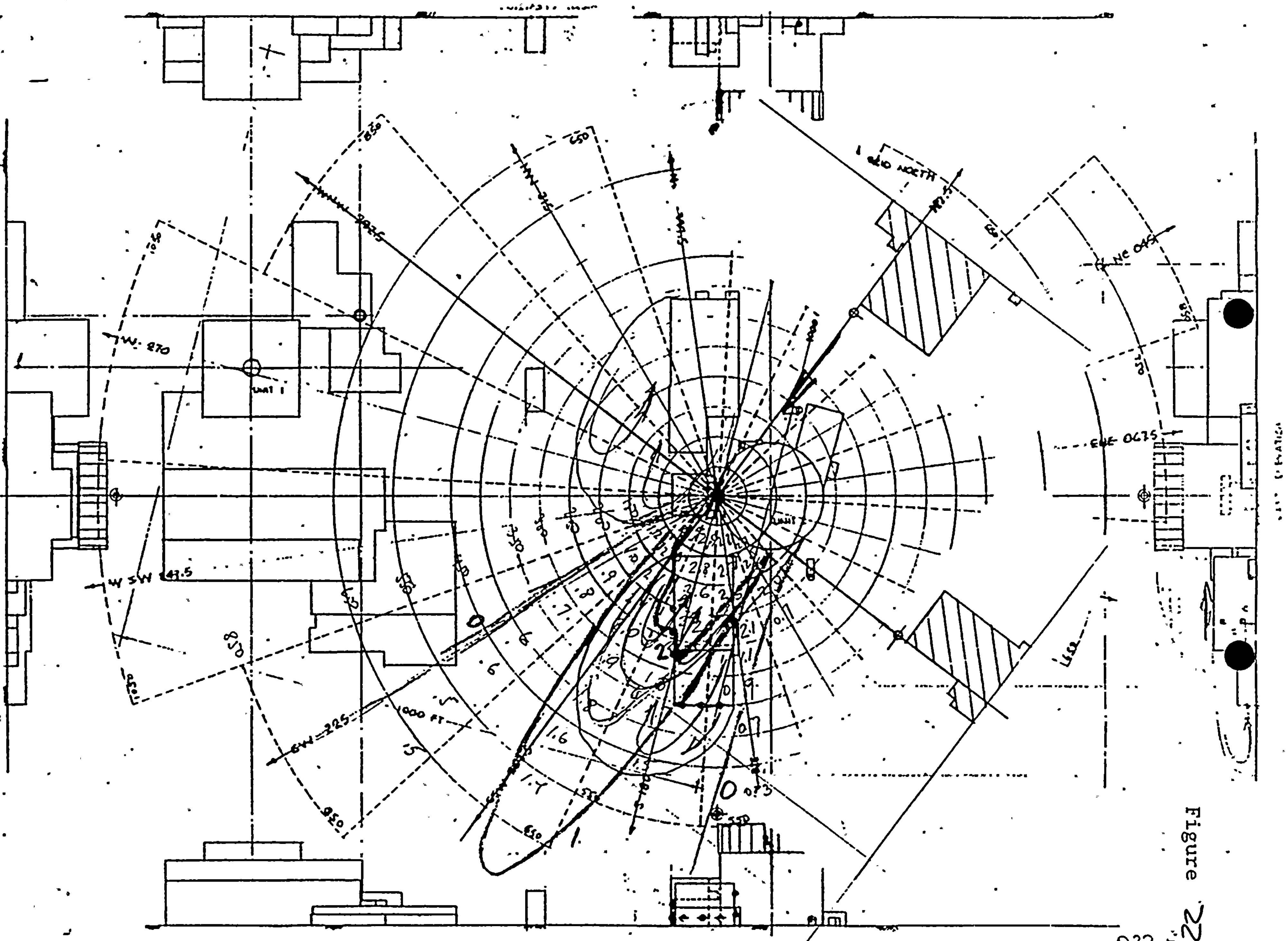

SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J HALITSKY 27 JUNE 1985

WIND DIRECTION 000
RADWASTE/REACTOR BUILDING VENT RELEA
SEISMIC BUILDINGS STAND

Figure 2




SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J. HALITSKY 27 JUNE 1983

Figure 22

WIND DIRECTION 022.5
RADWASTE/REACTOR BUILDING VENT RELEAS[E]
SEISMIC BUILDINGS STAND

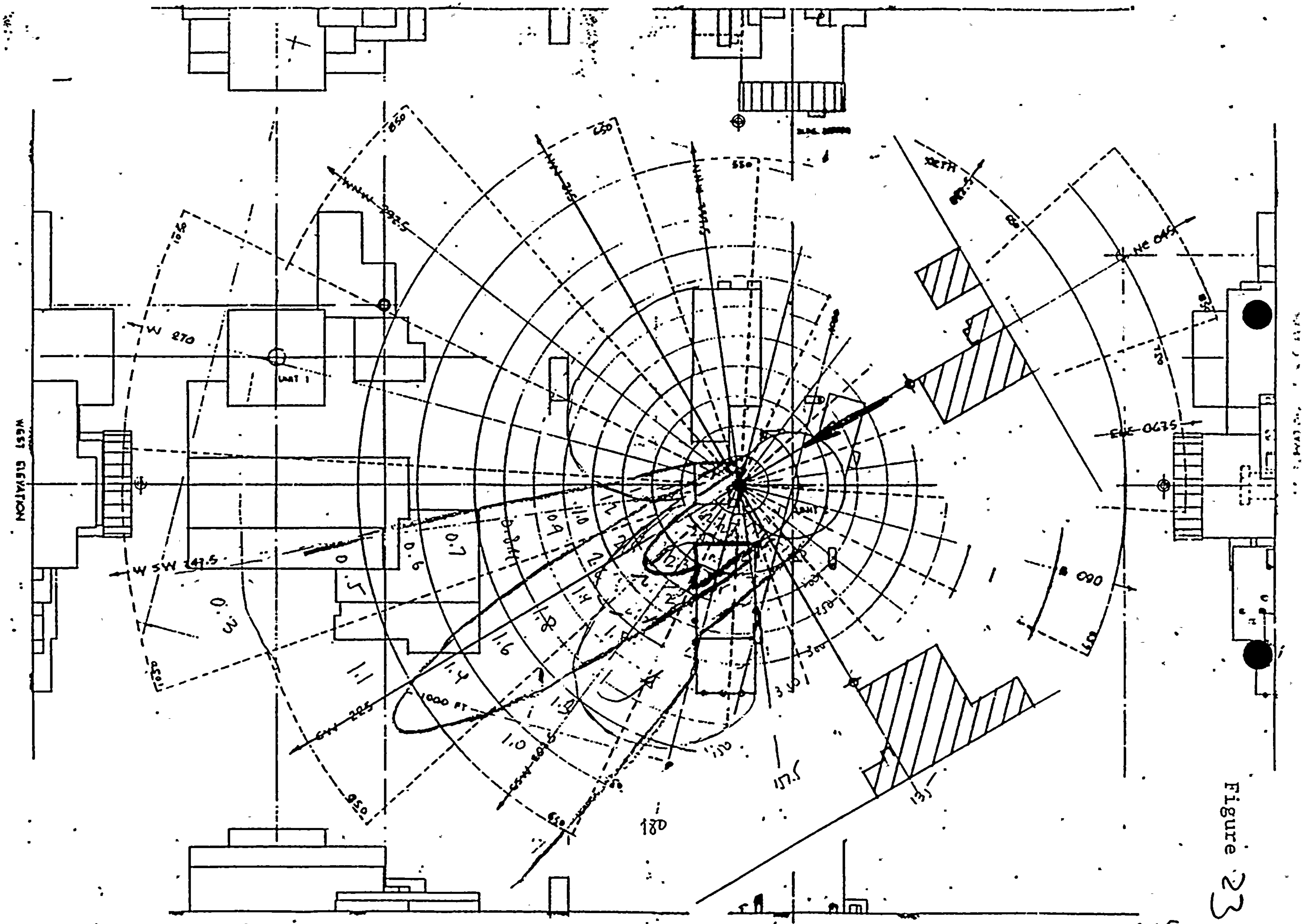



Figure 23

SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J HALITSKY 27 JUNE 1983

WIND DIRECTION 045
RADWASTE/REACTOR BUILDING VENT RELEA
SEISMIC BUILDINGS STAND

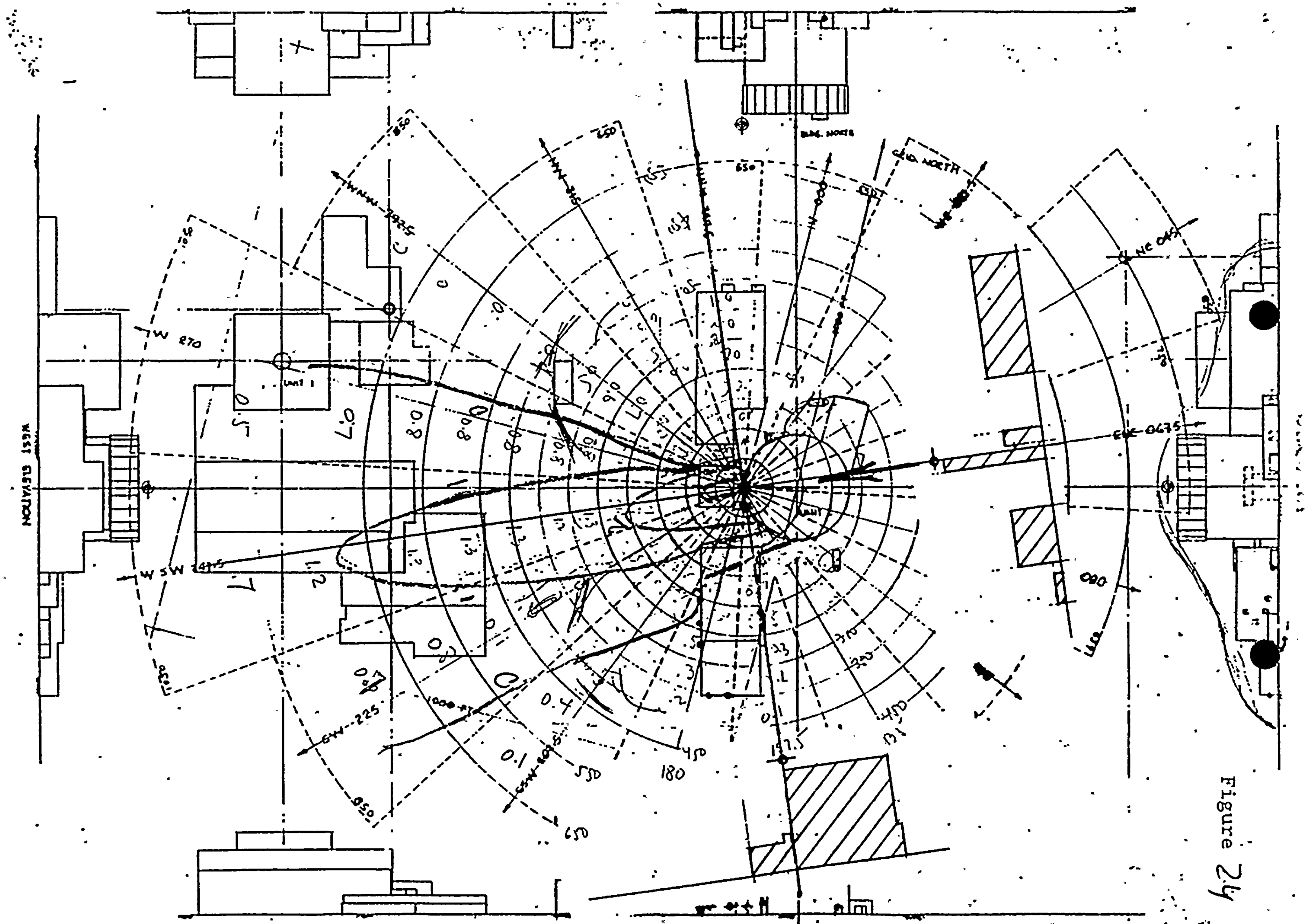



Figure 24

J. HALITSKY 27 JUNE 1983

SOUTH ELEVATION
NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 067.5
RADWASTE/REACTOR BUILDING VENT RELEASE
SEISMIC BUILDINGS STAND

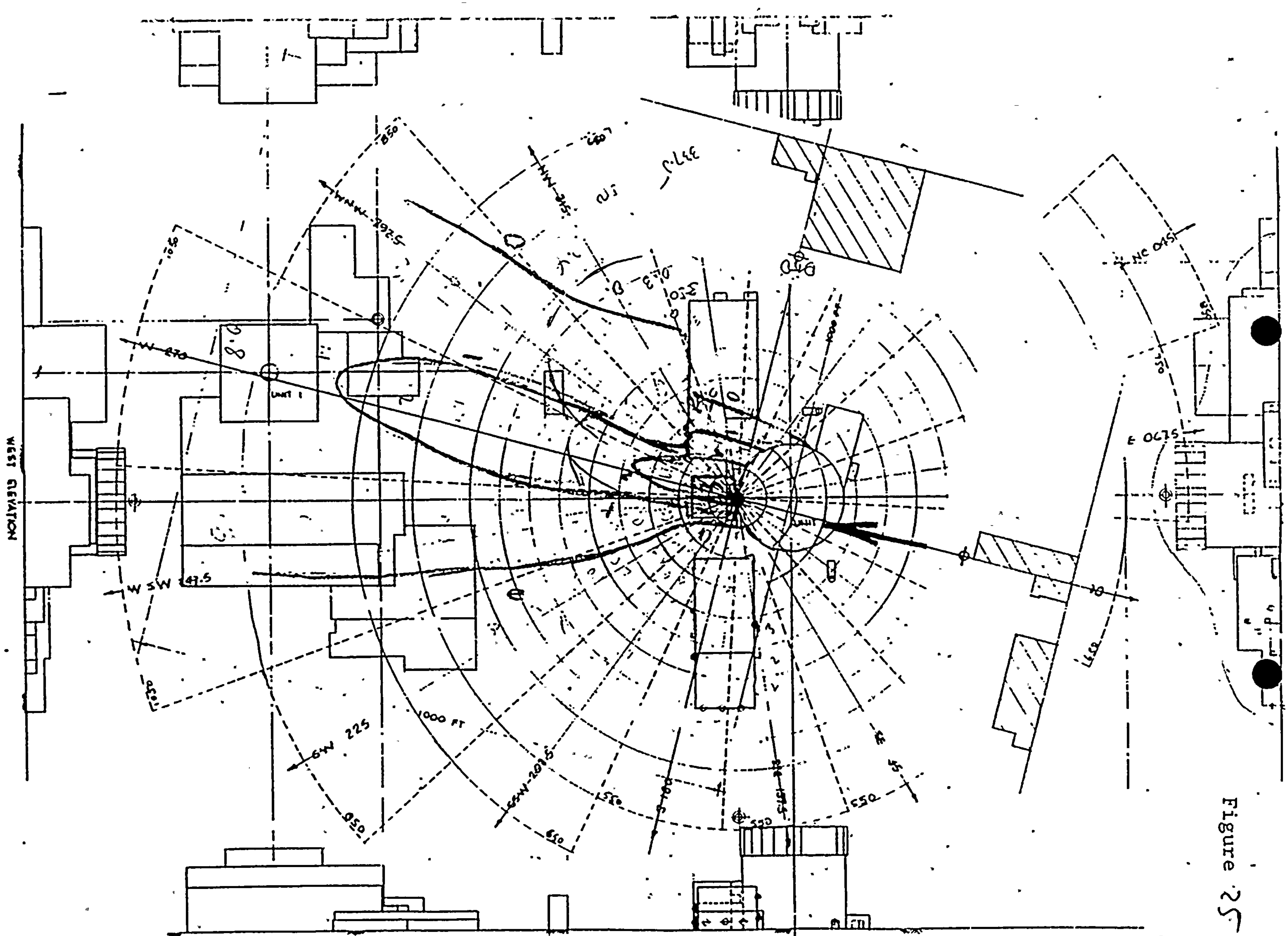



Figure 25

SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 090
RADWASTE/REACTOR BUILDING VENT RELEA[SE]
SEISMIC BUILDINGS STAND

J HALITSKY 27 JUNE 1983

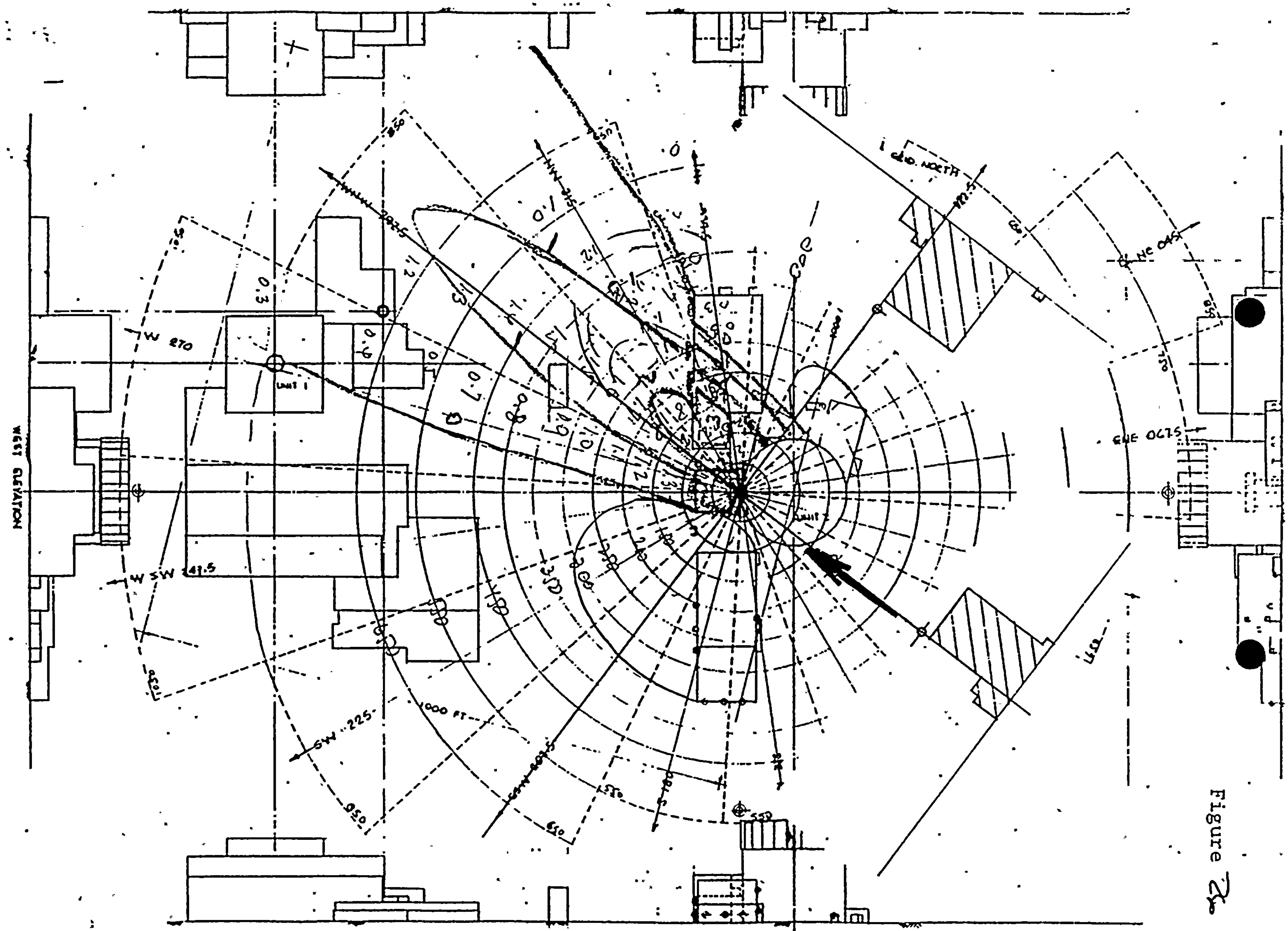
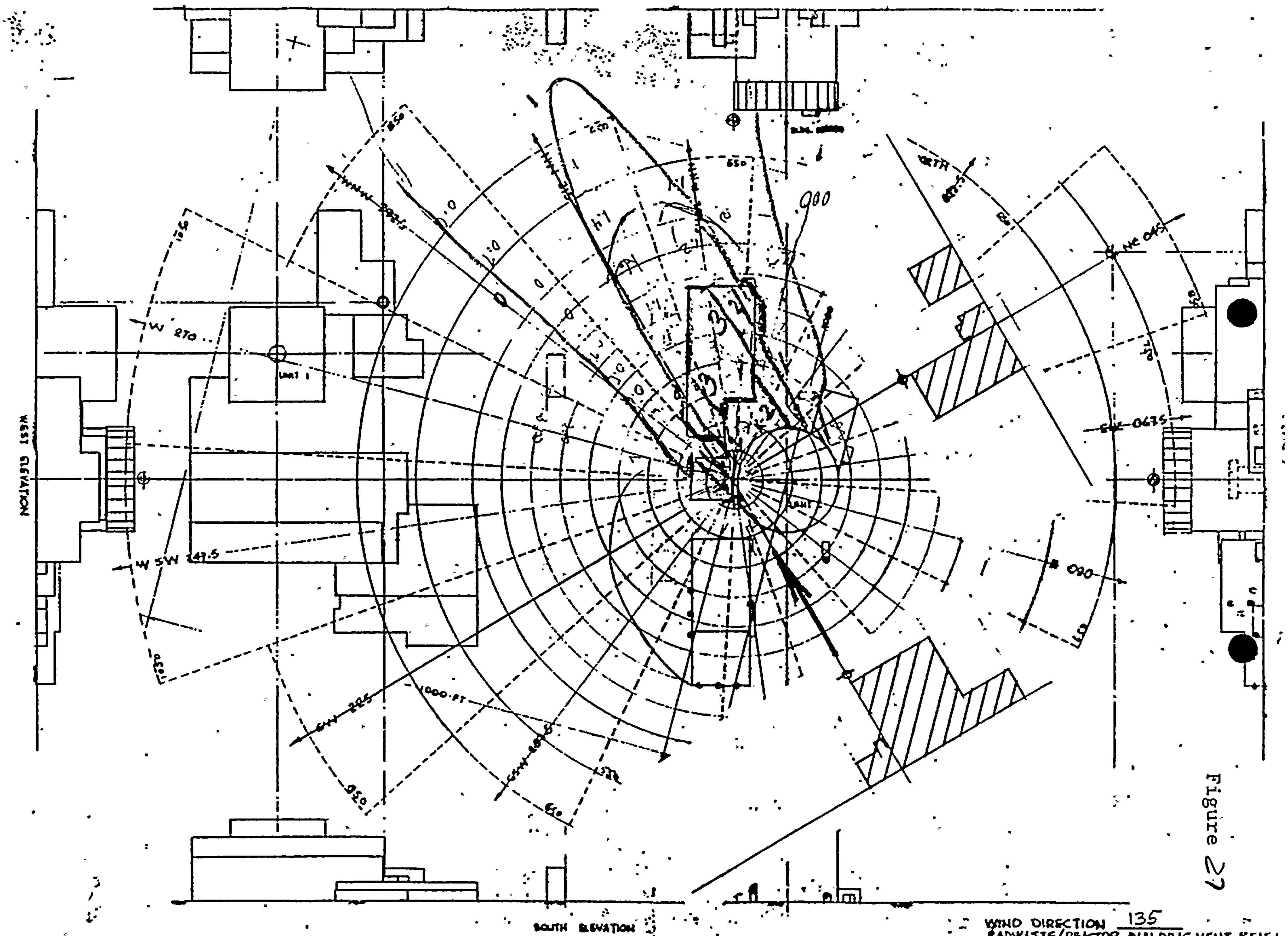



Figure 26

J. HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 112.5
RADWASTE/REACTOR BUILDING VENT KELE
SEISMIC BUILDINGS STAND




E HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 135
RADWASTE/REACTOR BUILDING VENT RELEA
SEISMIC BUILDINGS STAND

Figure 27

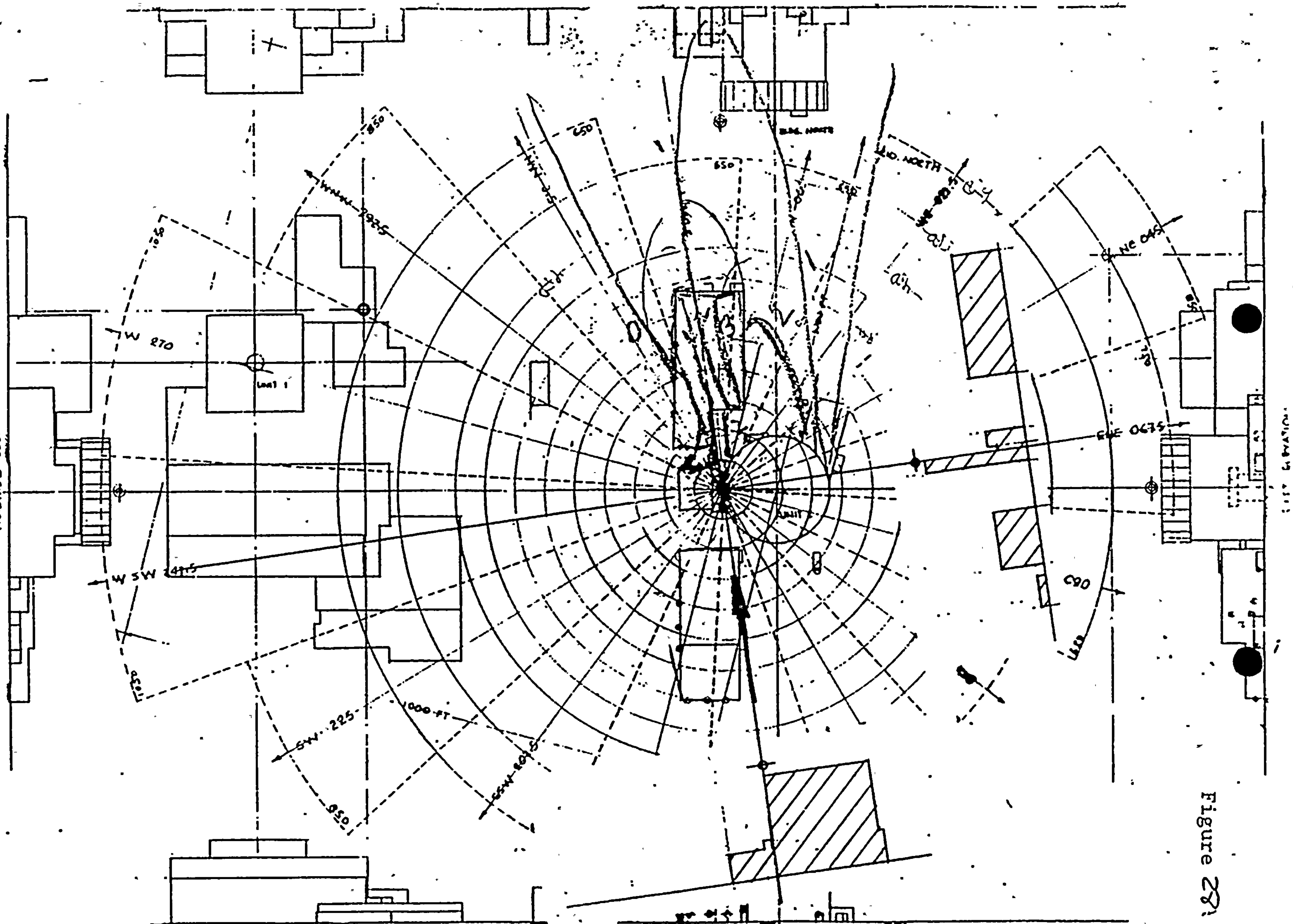
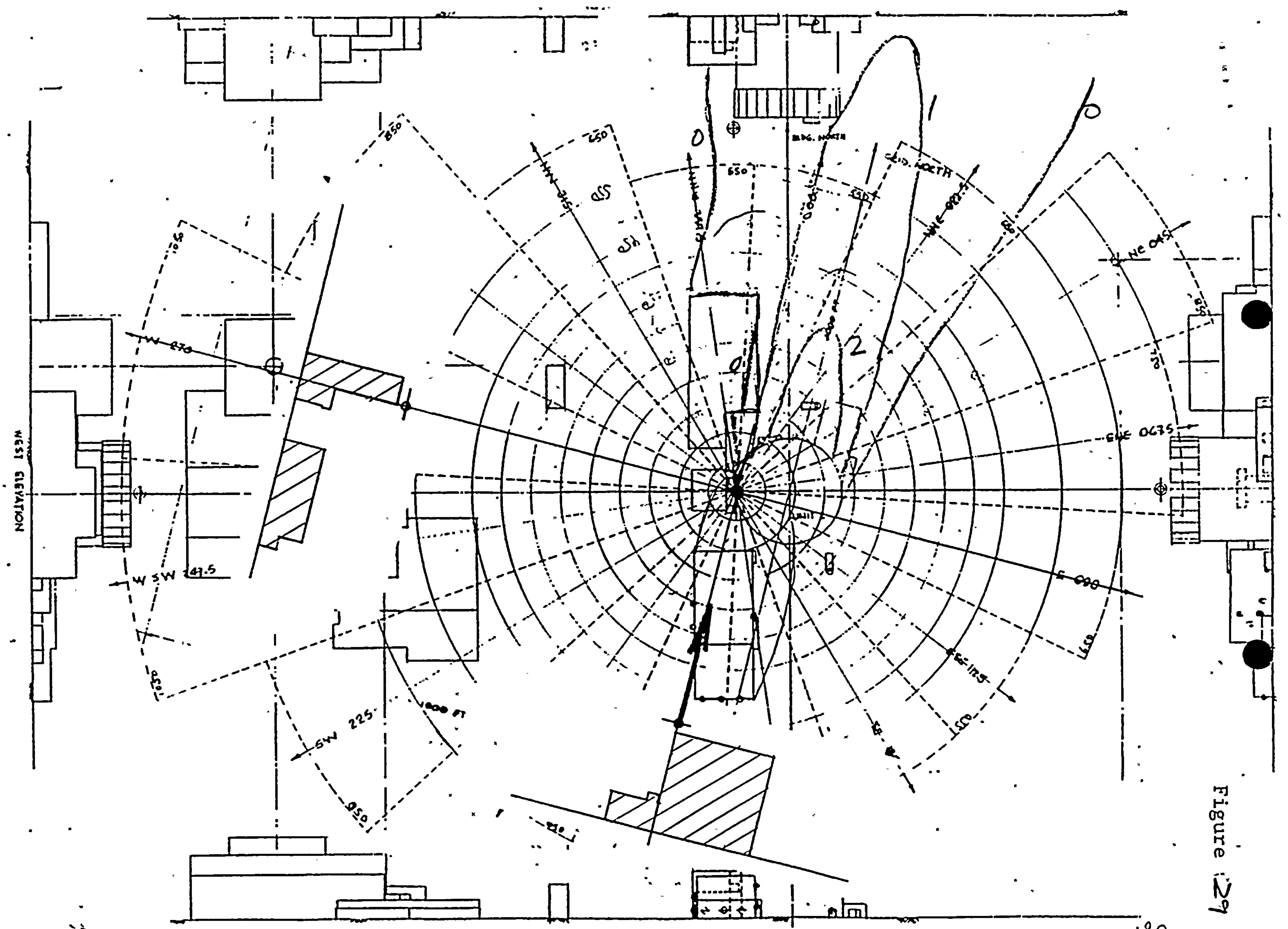



Figure 27

WIND DIRECTION 157.5
RADWASTE/REACTOR BUILDING VENT RELEA
SEISMIC BUILDINGS STAND

NINE MILE POINT NUCLEAR STATION

J. HALITSKY 27 JUNE 1983




SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J HALITSKY 27 JUNE 1983

WIND DIRECTION 180
RADWASTE/REACTOR BUILDING VENT RELEA
SEISMIC BUILDINGS STAND

Figure 29

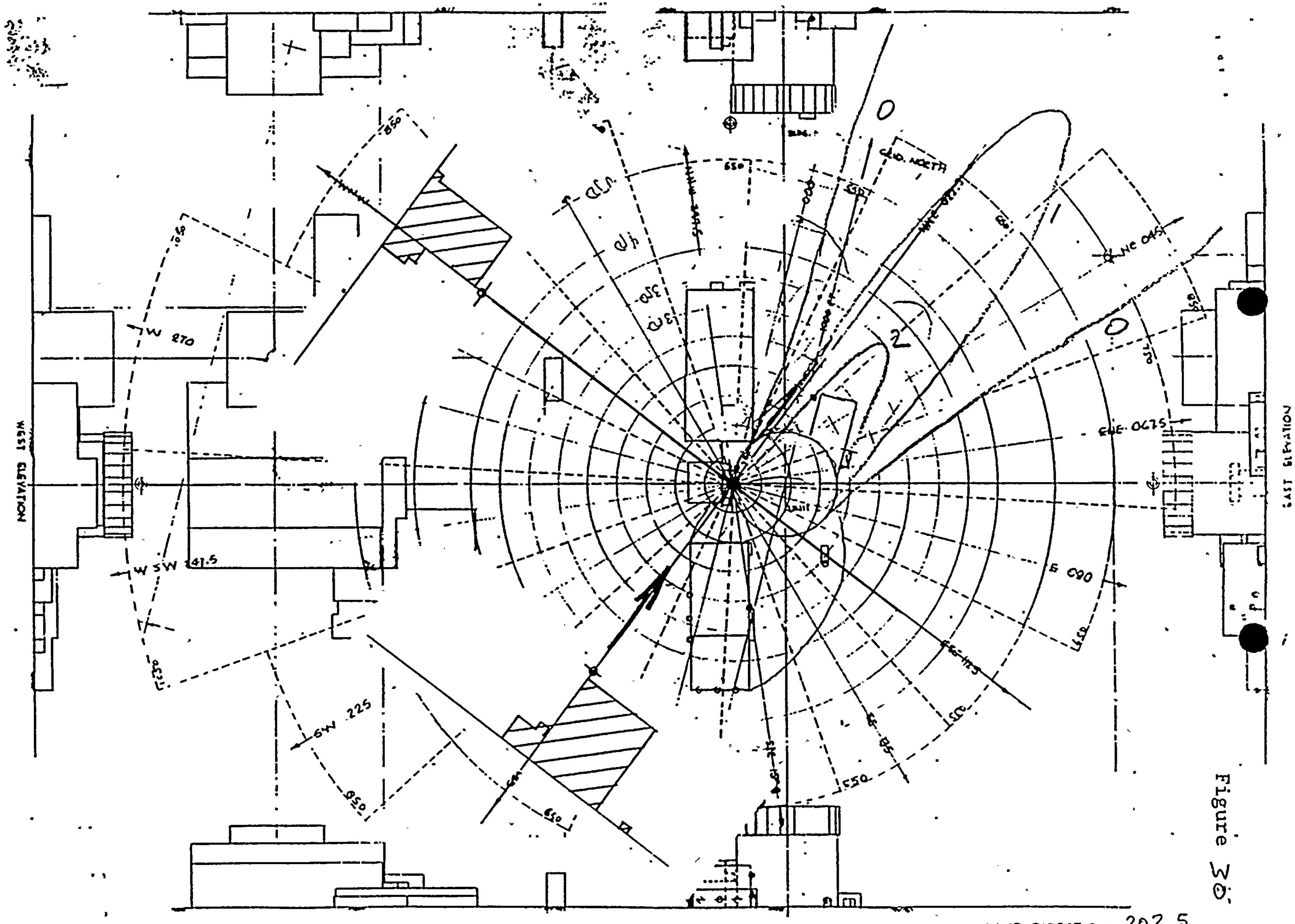


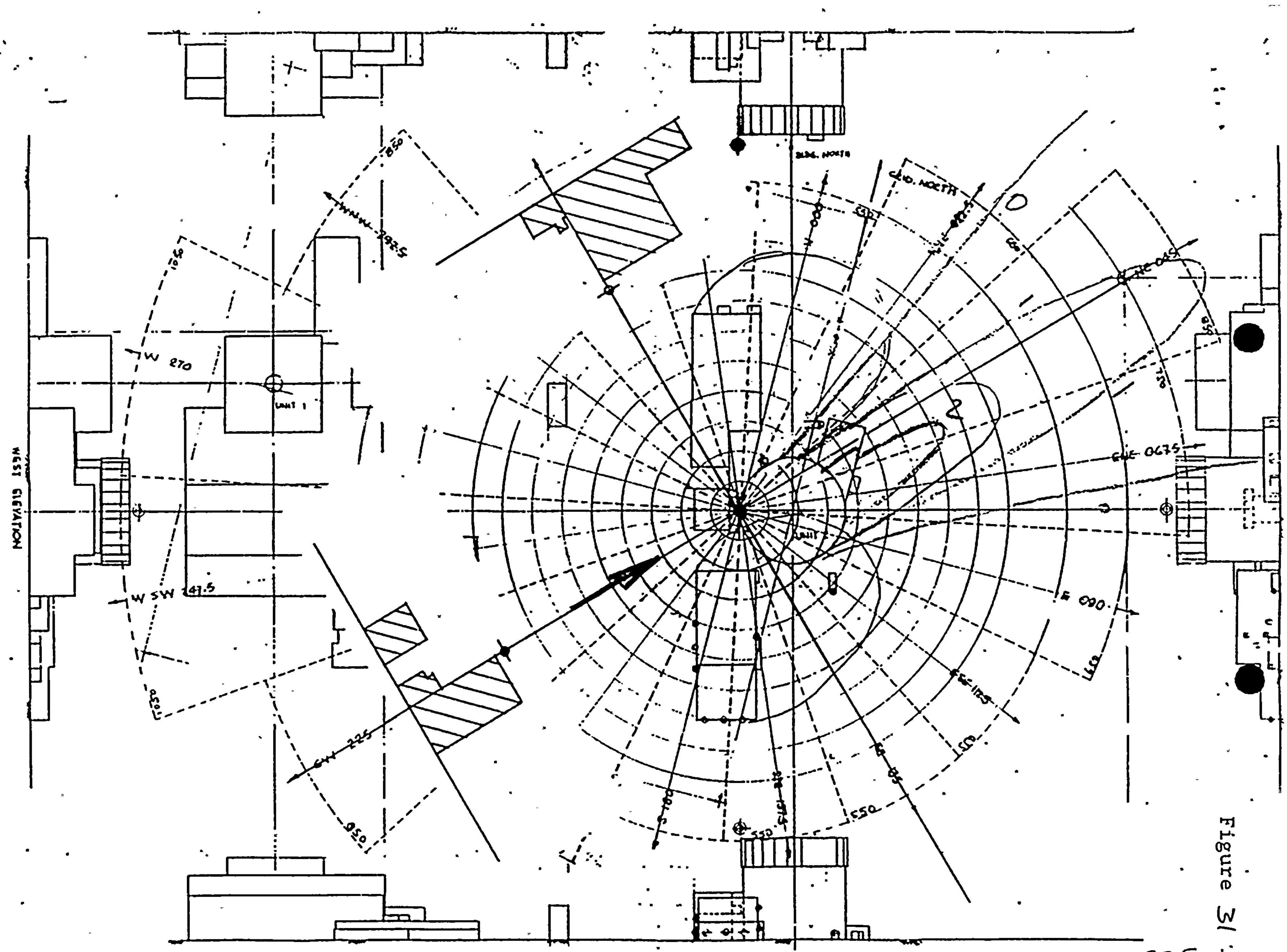

Figure 30

SOUTH ELEVATION

J HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 202.5
RADWASTE/REACTOR BUILDING VENT RELEASE
SEISMIC BUILDINGS STAND



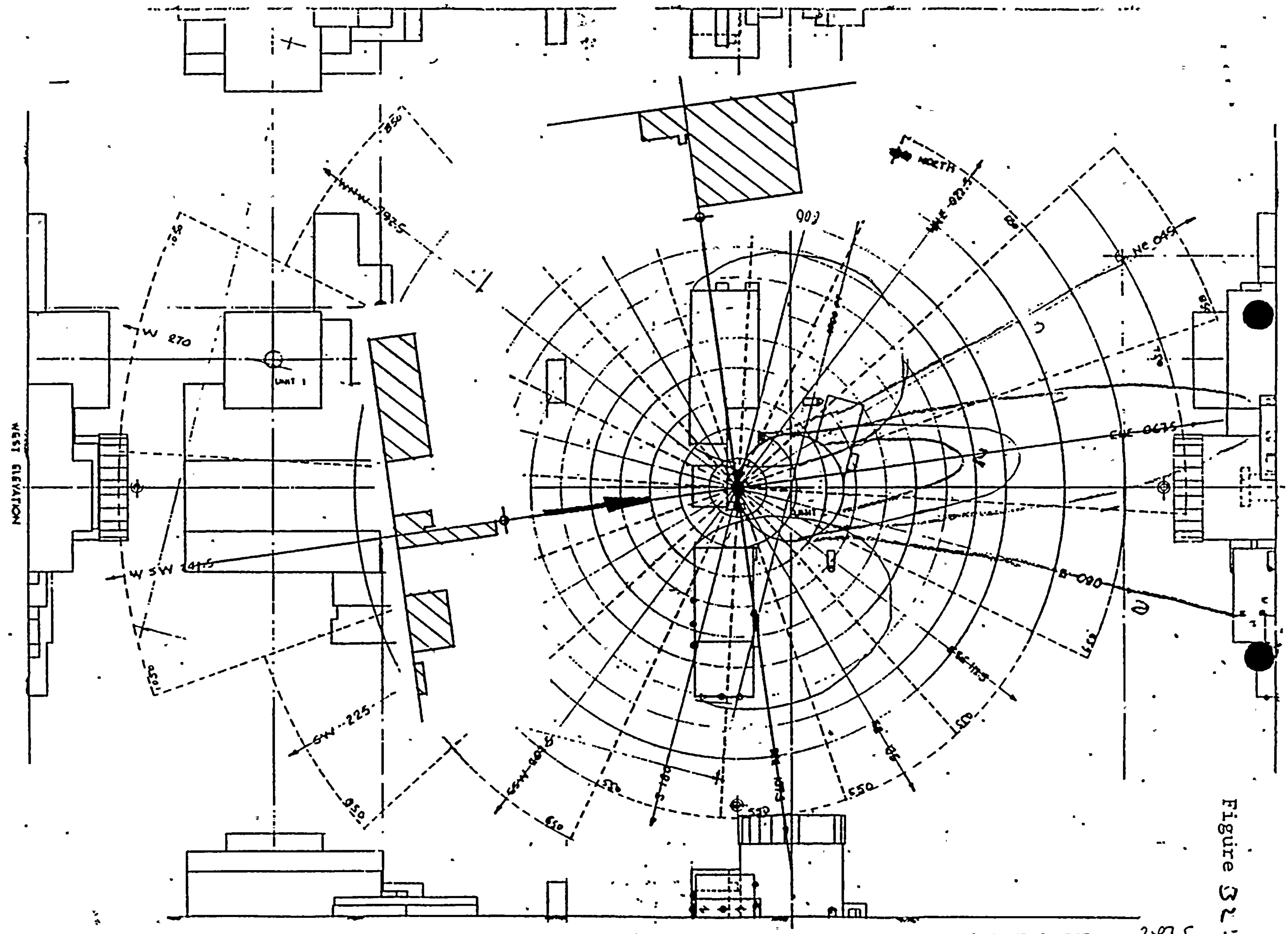

SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J HALITSKY 27 JUNE 1983

WIND DIRECTION 225
RADWASTE/REACTOR BUILDING VENT RELEA
SEISMIC BUILDINGS STAND

Figure 31




SOUTH ELEVATION

J HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 247.5
RADWASTE/REACTOR BUILDING VENT RELEAS
SEISMIC BUILDINGS STAND

Figure 32

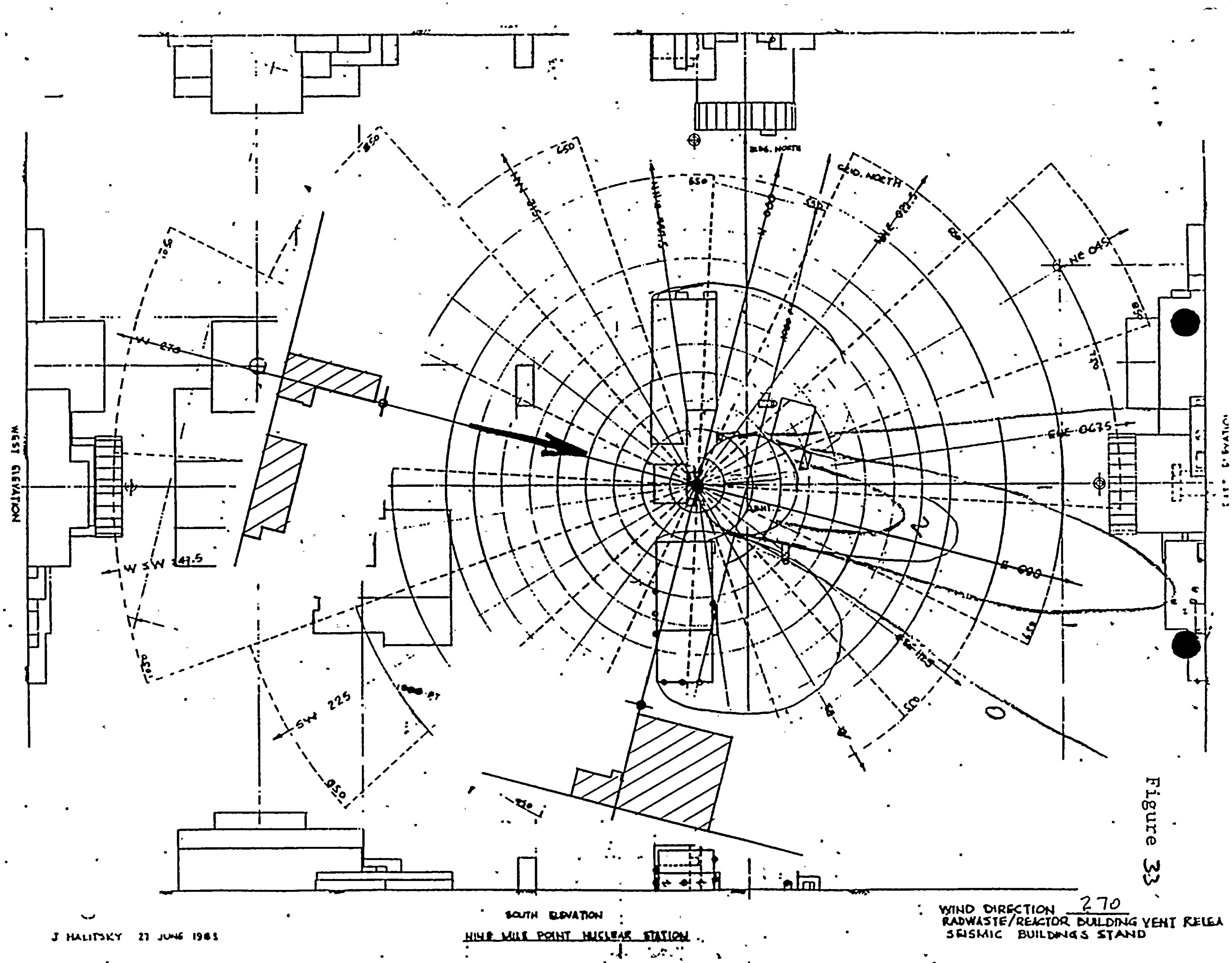
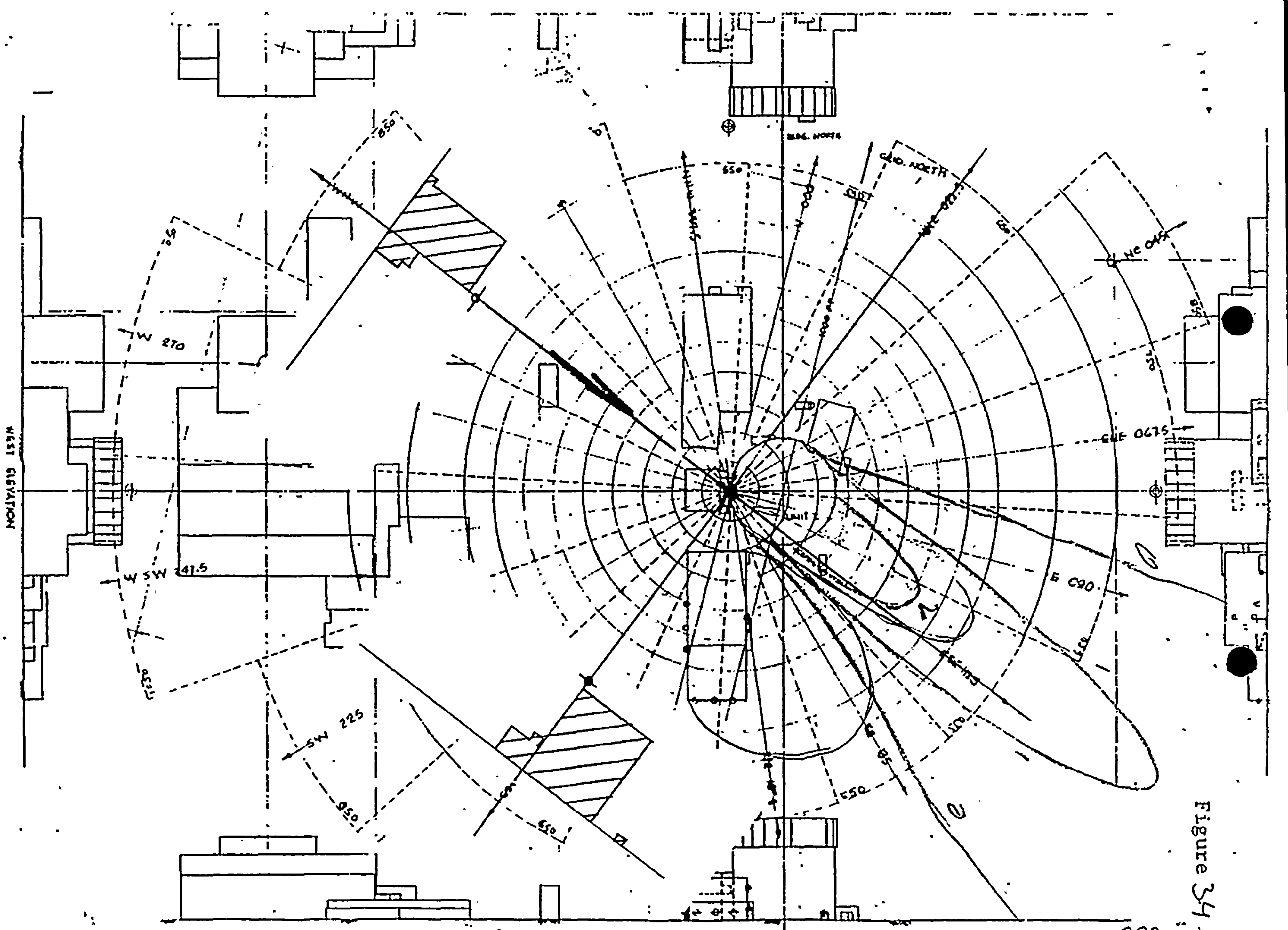

WEST ELEVATION
SOUTH ELEVATION
W 270
WSW 247.5
SW 225
NE 045
ENE 067.5
E 090
BLDG. NORTH
GRID. NORTH
650
950
WIND DIRECTION 270
RADWASTE/REACTOR BUILDING VENT RELEA
SEISMIC BUILDINGS STAND
J HALITSKY 27 JUNE 1983
NINE MILE POINT NUCLEAR STATION

Figure 33




SOUTH ELEVATION

NINE MILE POINT NUCLEAR STATION

J HALITSKY 27 JUNE 1983

WIND DIRECTION 292.5
RADWASTE/REACTOR BUILDING VENT RELEA
SEISMIC BUILDINGS STAND

Figure 34

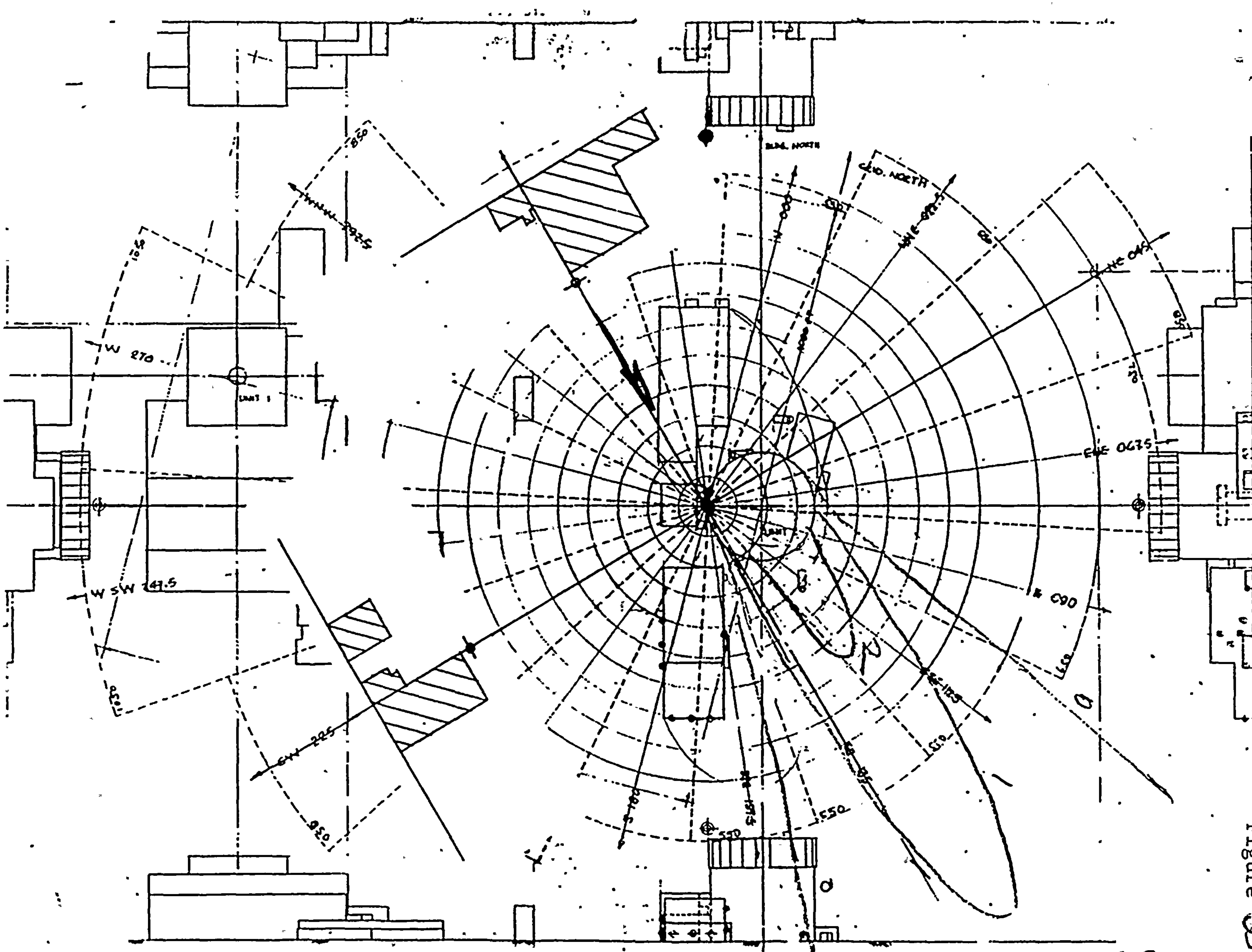



Figure 35

SOUTH ELEVATION

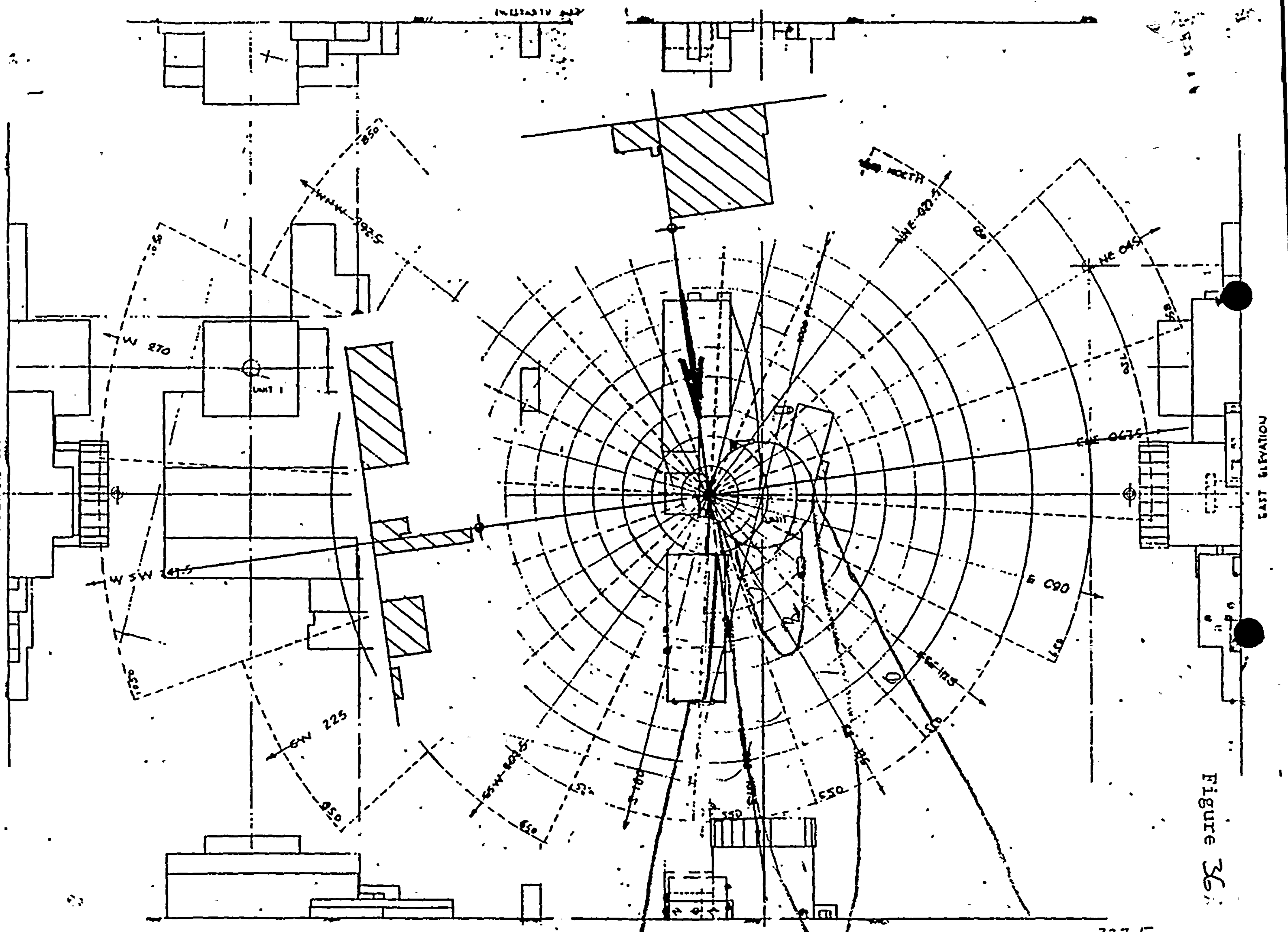
NINE MILE POINT NUCLEAR STATION

J HALITSKY 27 JUNE 1983

WIND DIRECTION 315

RADWASTE/REACTOR BUILDING VENT RELEASE

SEISMIC BUILDINGS STAND




SOUTH ELEVATION

J. HALITSKY 27 JUNE 1983

NINE MILE POINT NUCLEAR STATION

WIND DIRECTION 337.5
RADWASTE/REACTOR BUILDING VENT RELEASE
SEISMIC BUILDINGS STAND

Figure 36