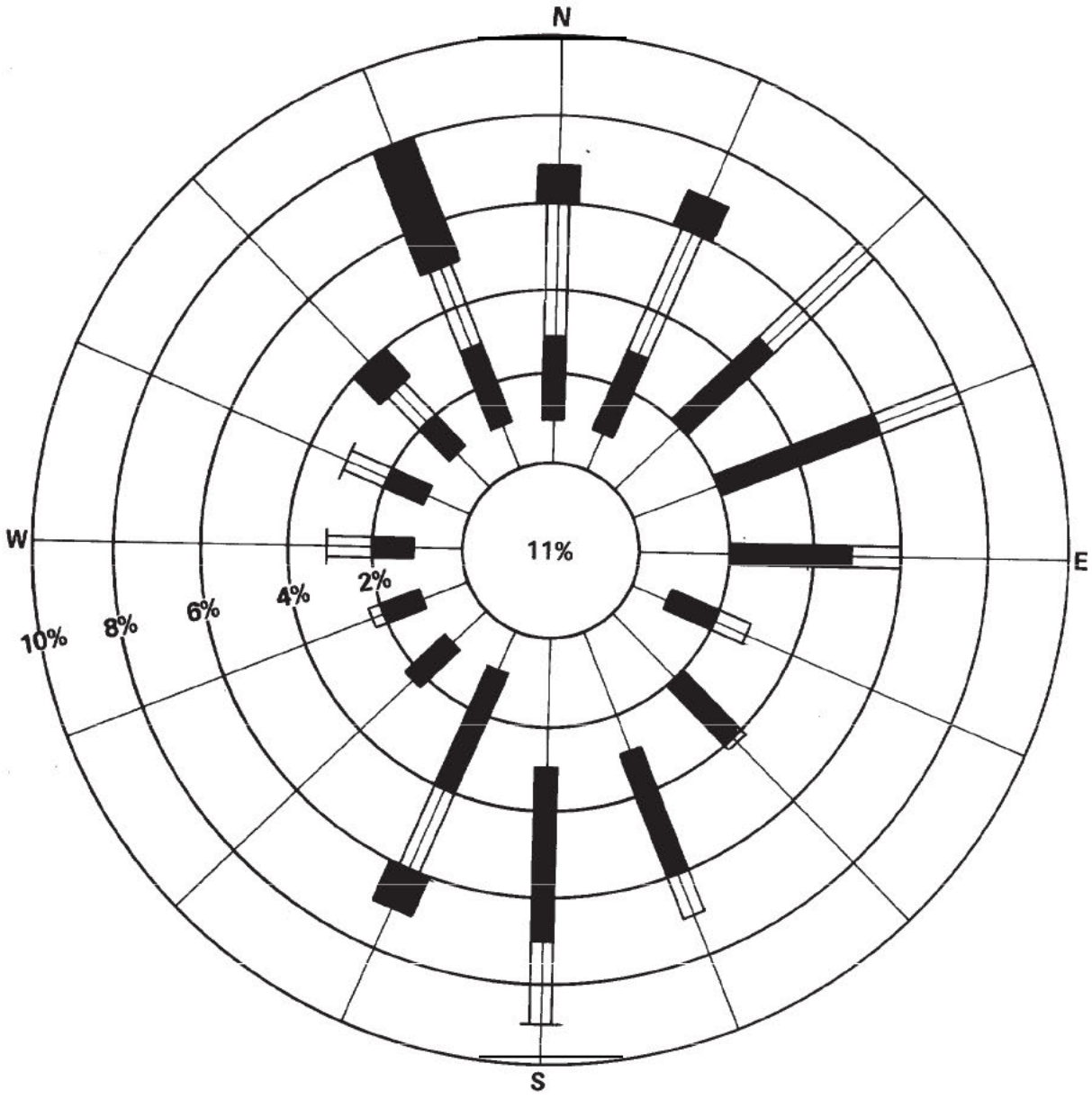
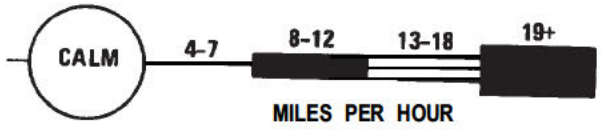
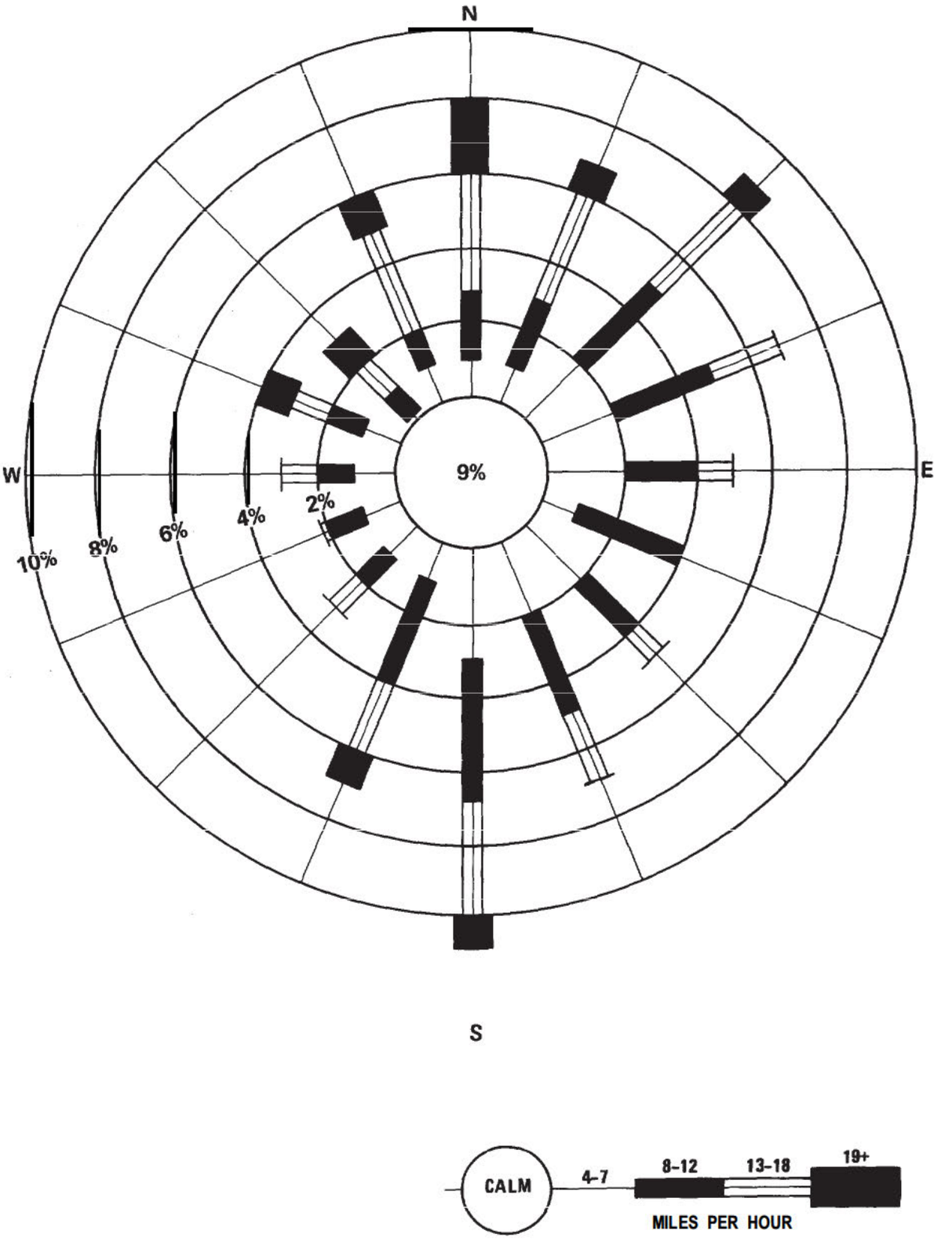
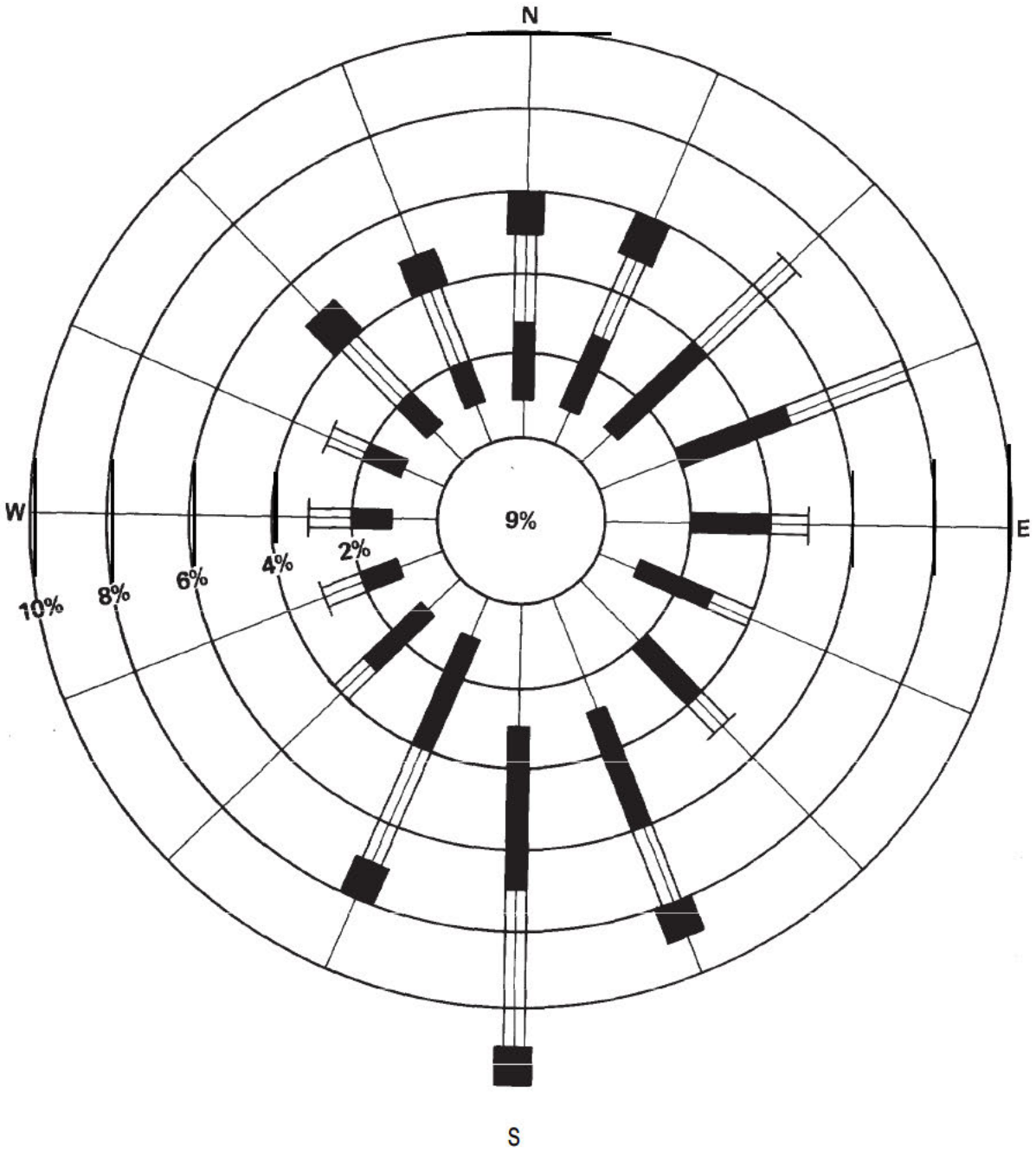


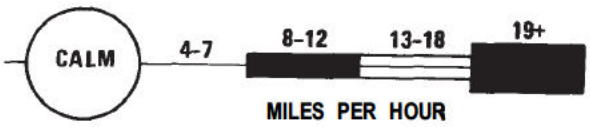


LOUISIANA 'OWER & LIGHT CO. Waterford Steam Electric Station	JANUARY WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA	Figure 2.3-I

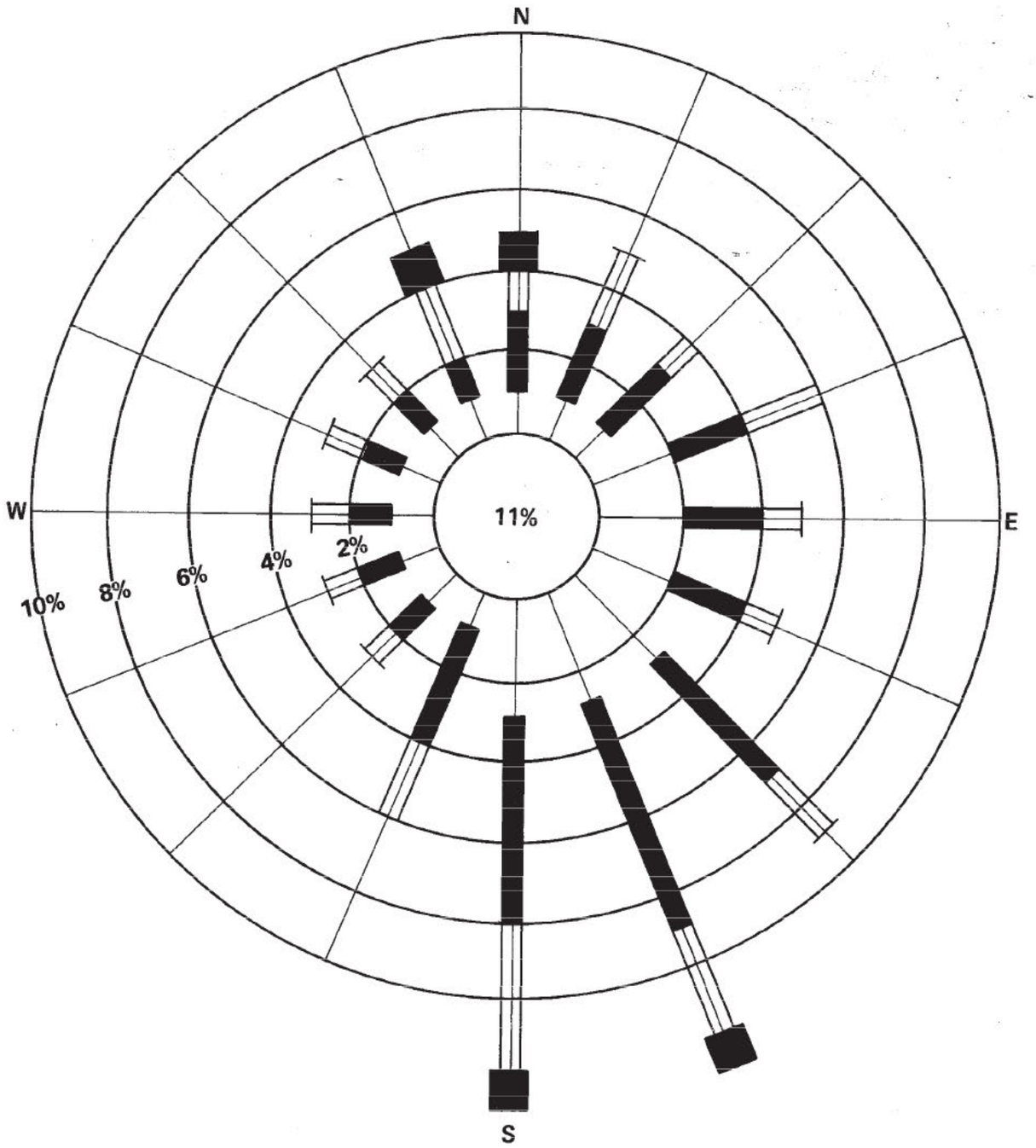


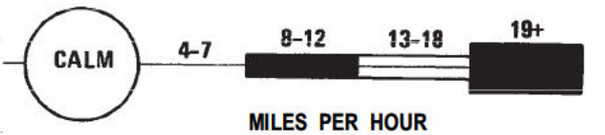
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	FEBRUARY WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA	Figure 2.3–2



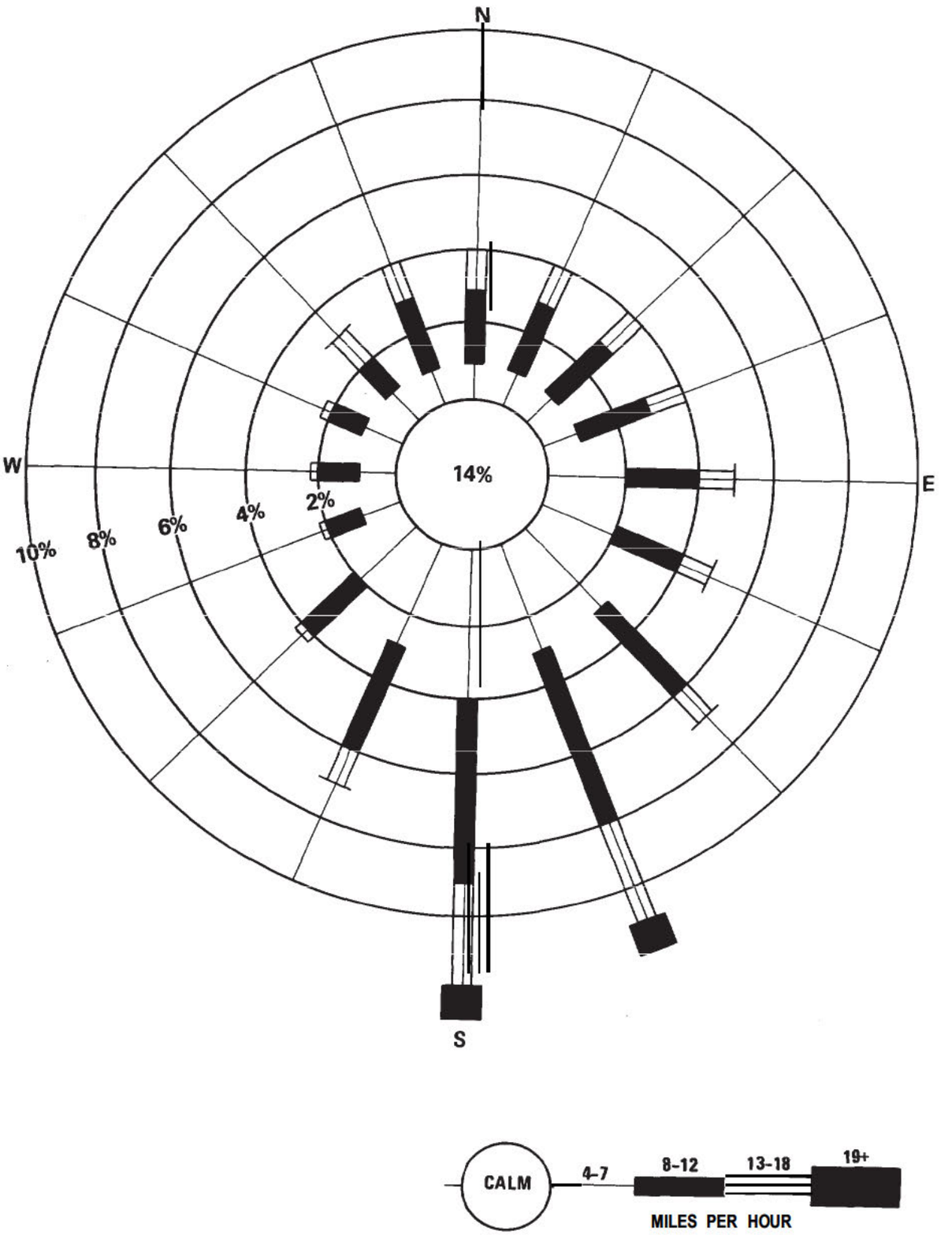


LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**MARCH WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA**	Figure 2.3-3

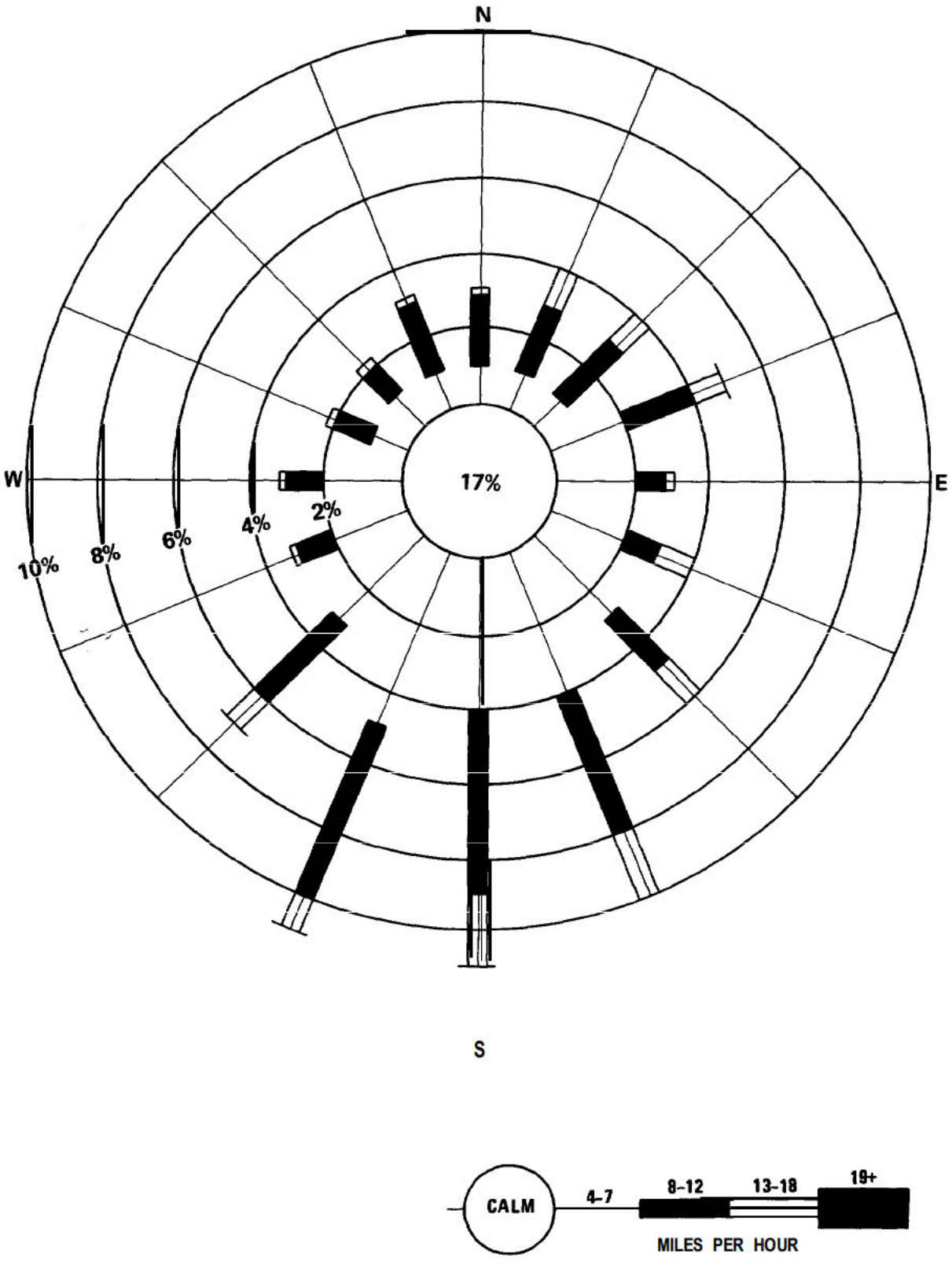




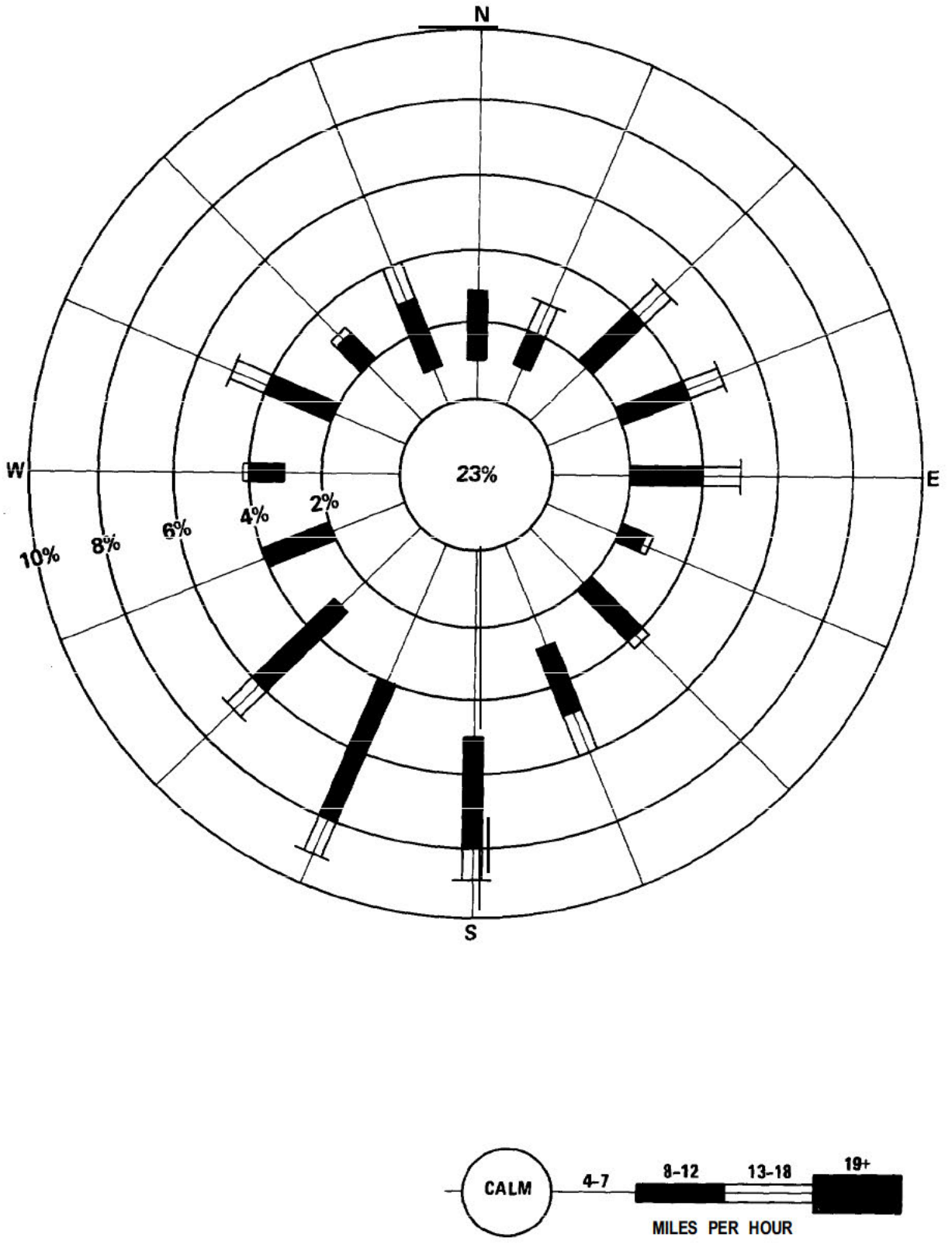
LOUISIANA r-lOWER & LIGHT CO. Waterford Steam Electric Station	APRIL WIND ROSE MOISANT **INTERNATIONAL AIRPORT** **NEW ORLEANS, LOUISIANA**	Figure 2.3–4



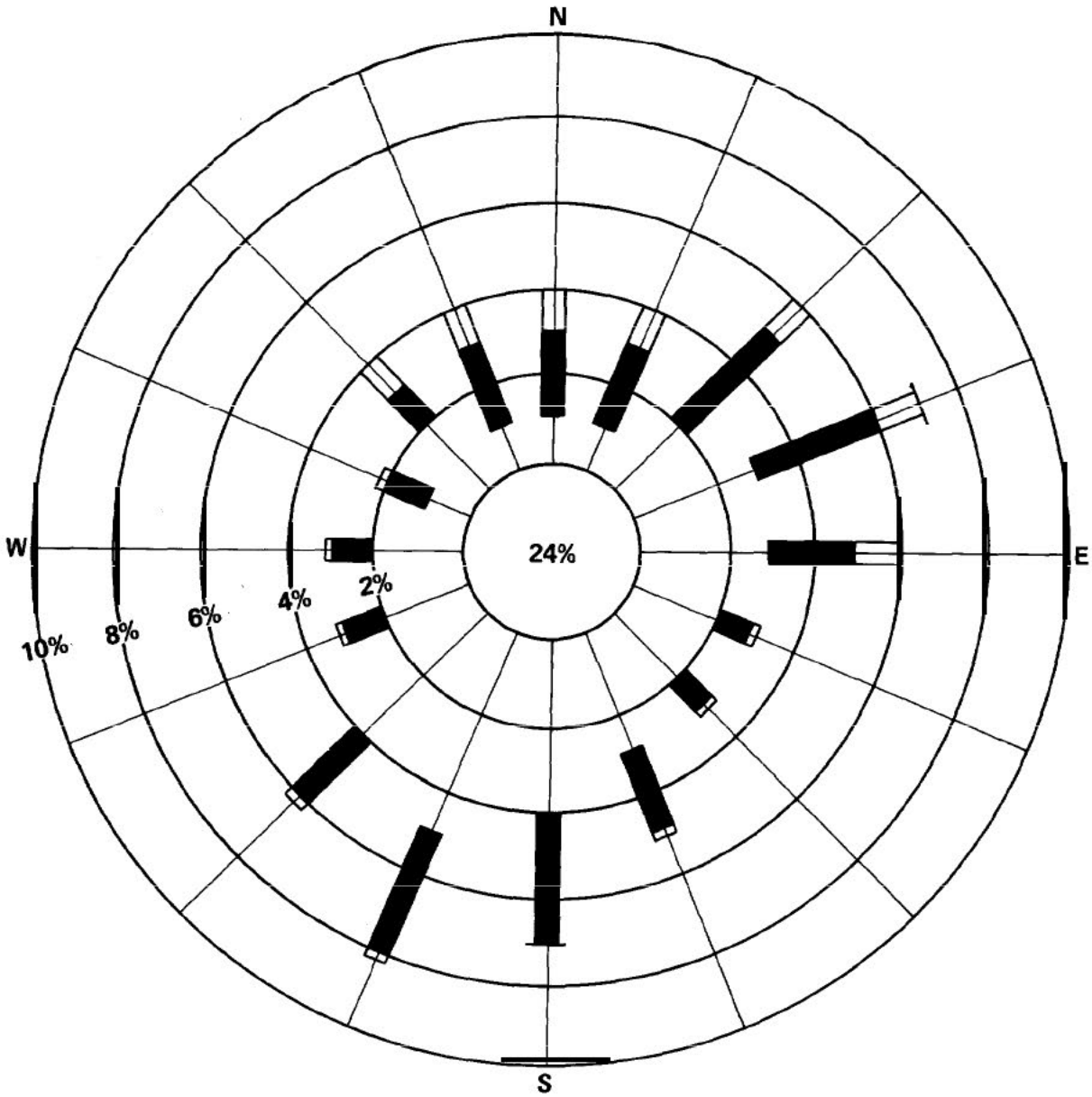
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**MAY WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA**	Figure 2.3-5

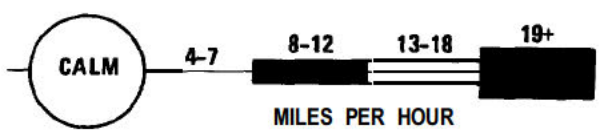


LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	JUNE WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA	Figure 2.3-6

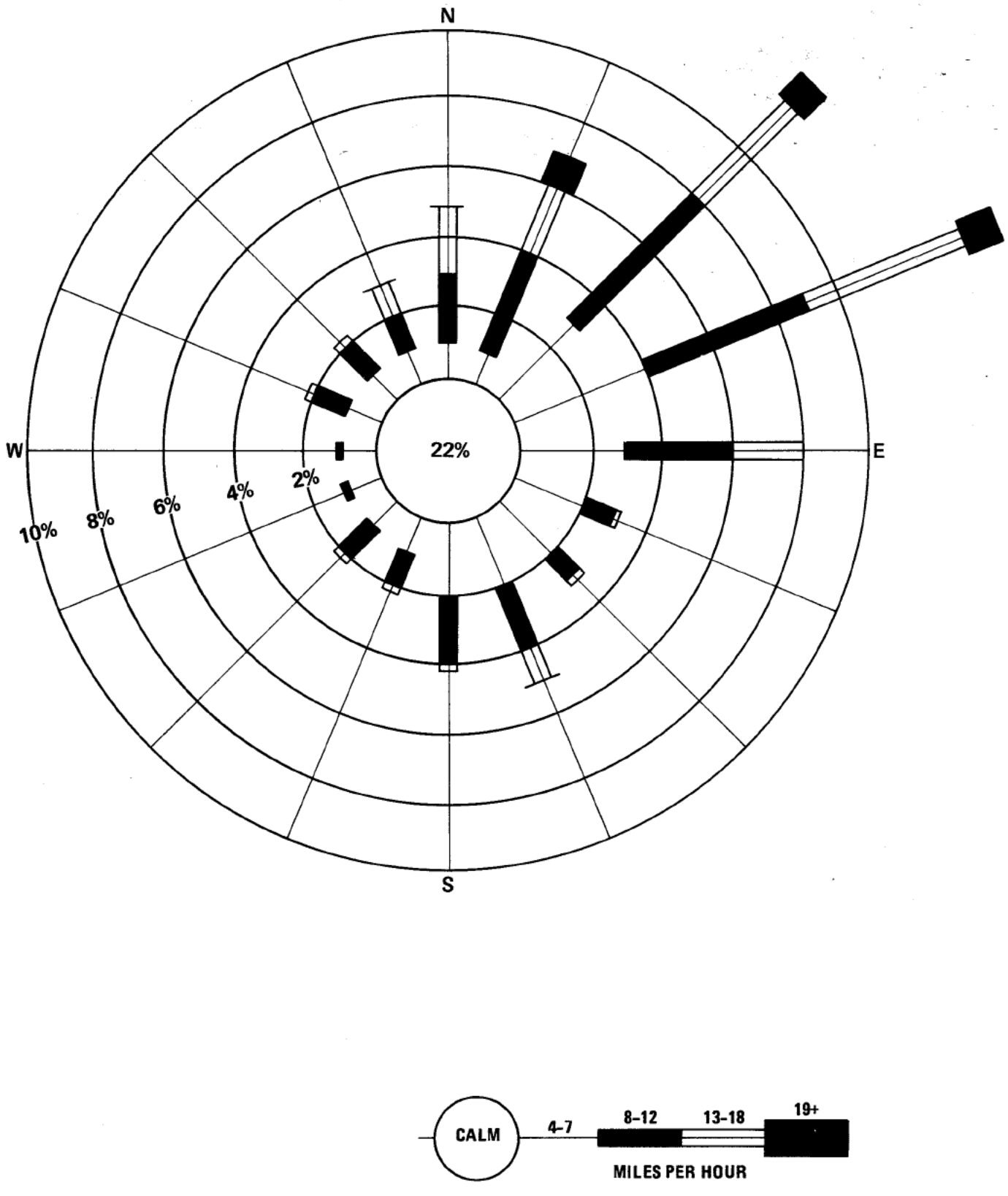


LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	JULY WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA	Figure 2.3-7

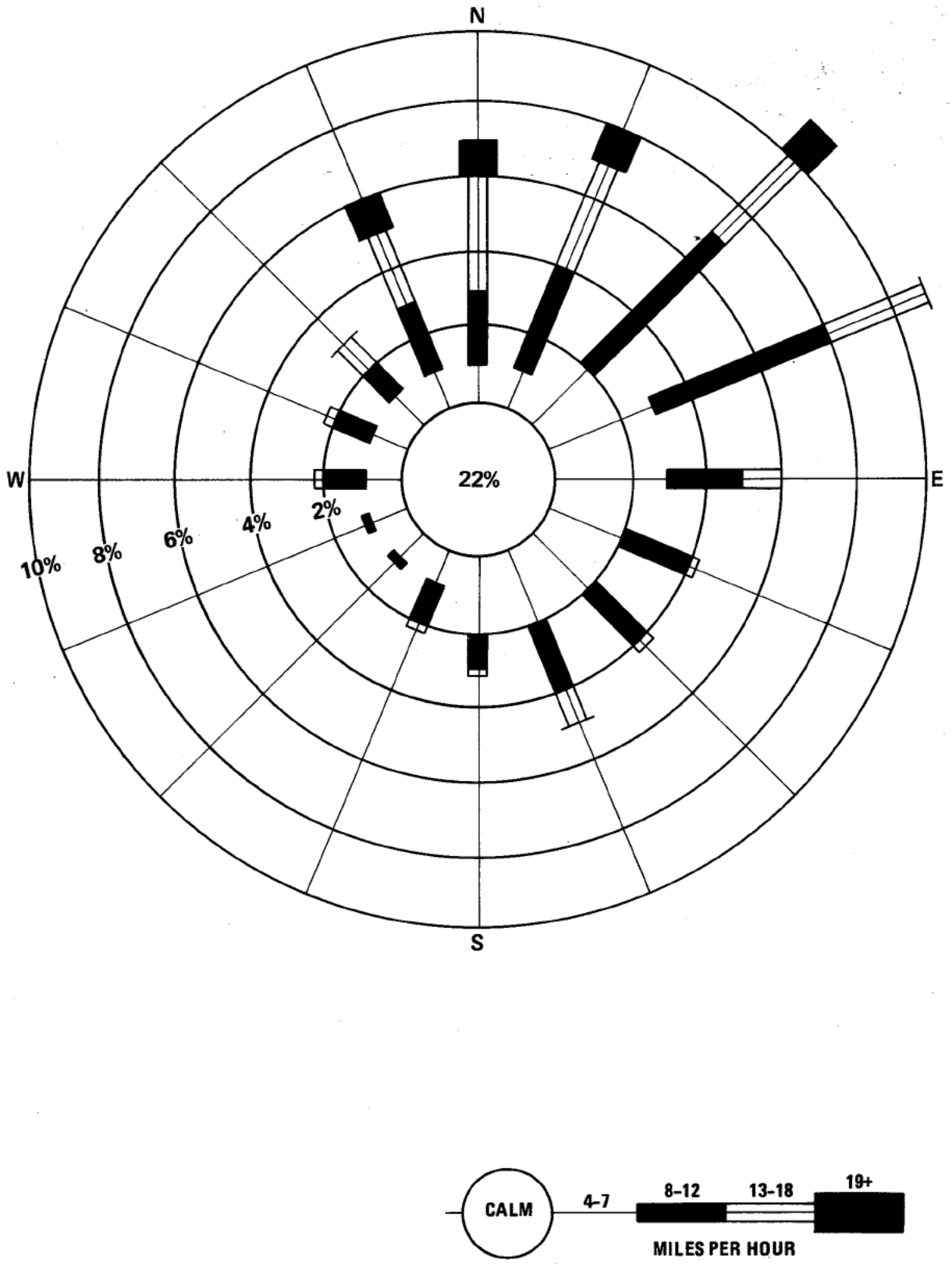




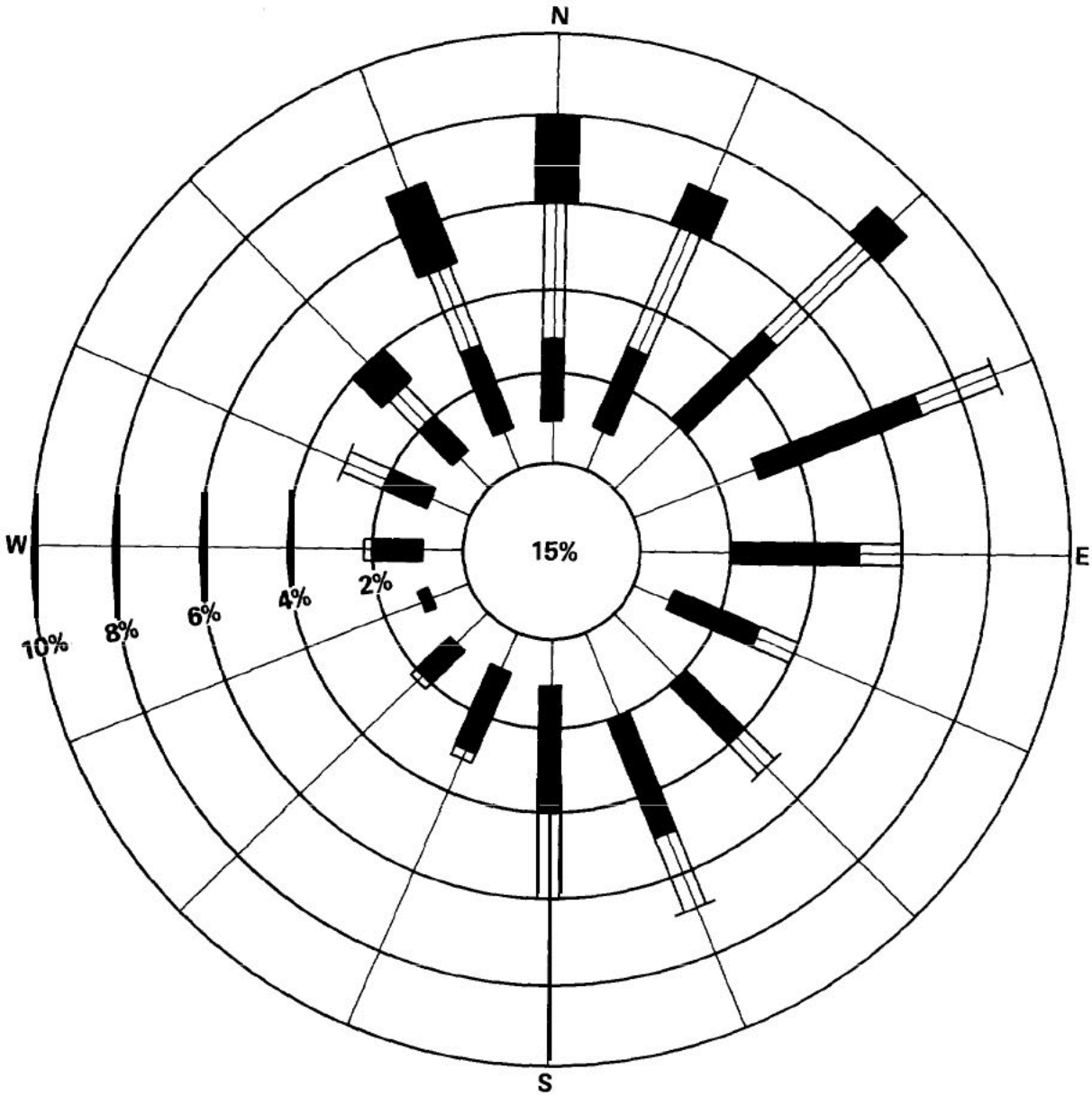
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	AUGUST WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA	Figure 2.3-8

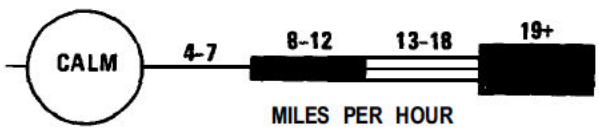


LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	SEPTEMBER WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA	Figure 2.3–9

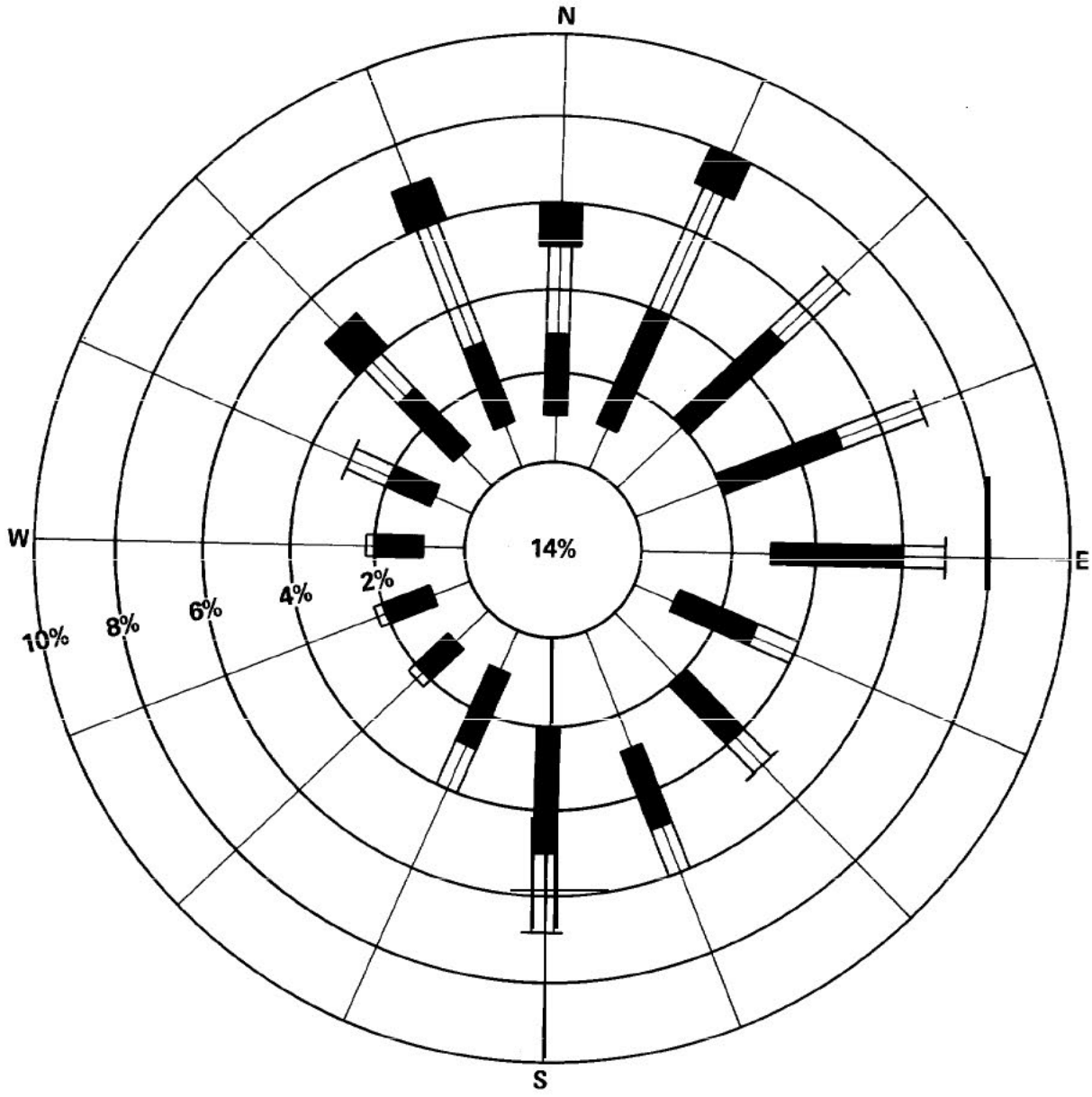


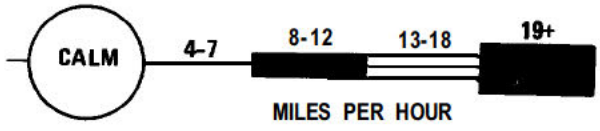
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	OCTOBER WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA	Figure 2.3–10





LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	NOVEMBER WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA	Figure 2.3-I 1

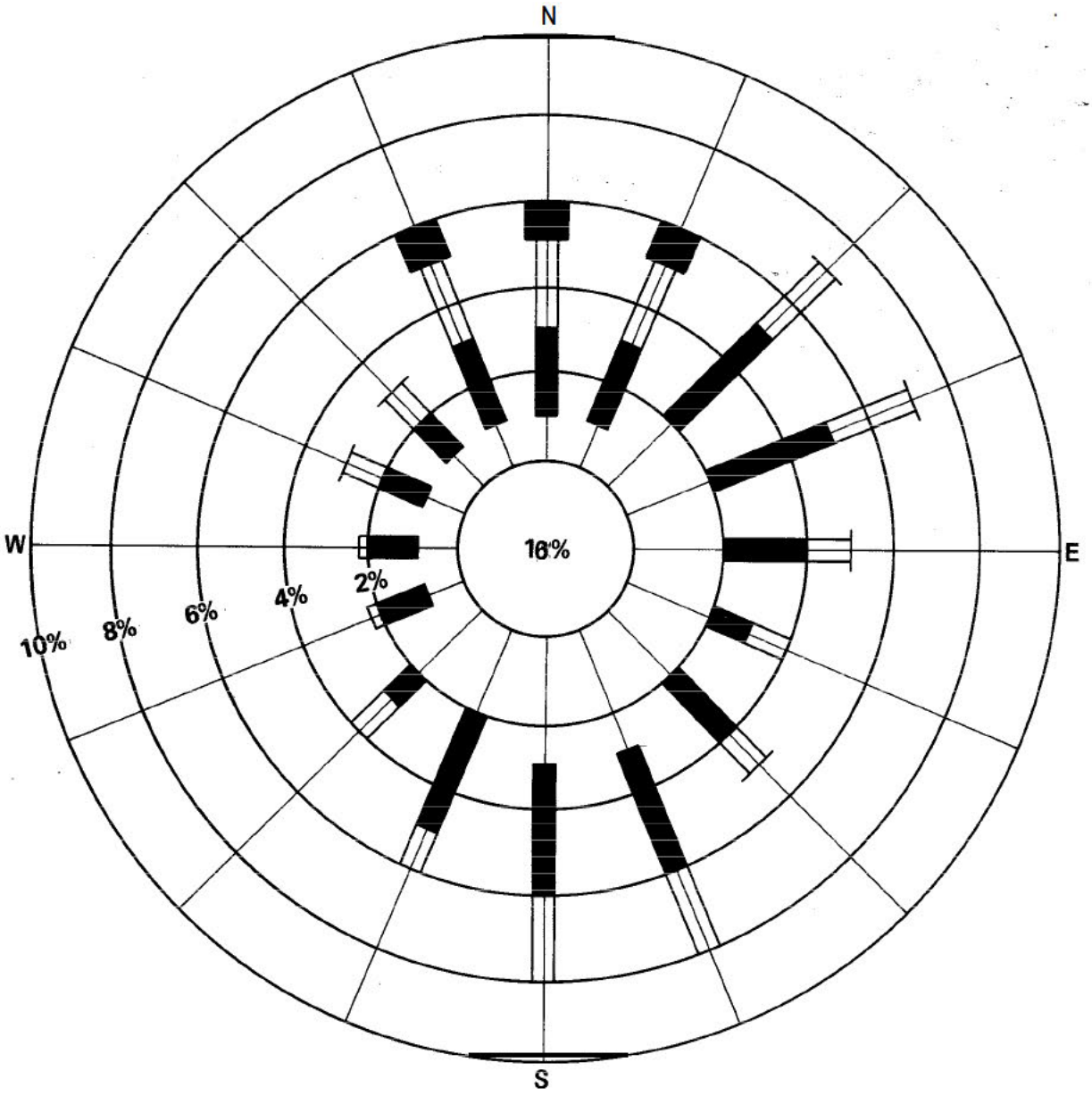


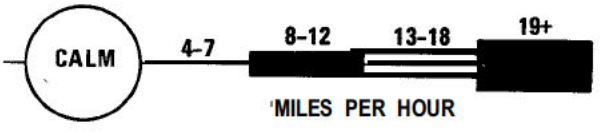


LOUISIANA
POWER & LIGHT CO.
Waterford Steam
Electric Station

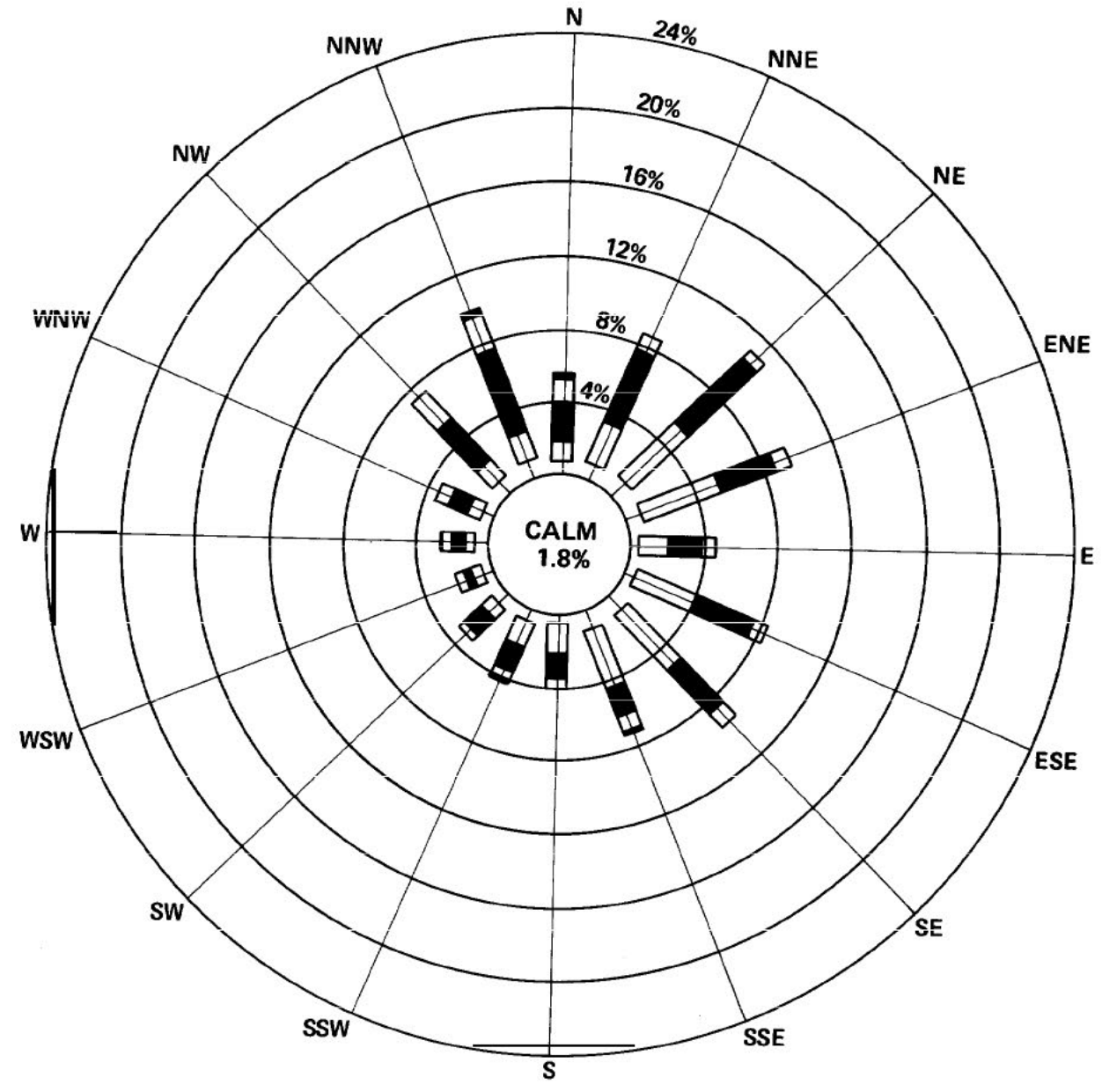
DECEMBER WIND ROSE
MOISANT INTERNATIONAL AIRPORT
NEW ORLEANS, LOUISIANA

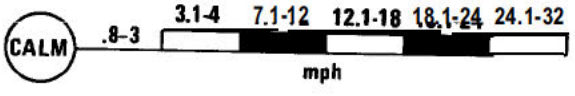
Figure
2.3–12





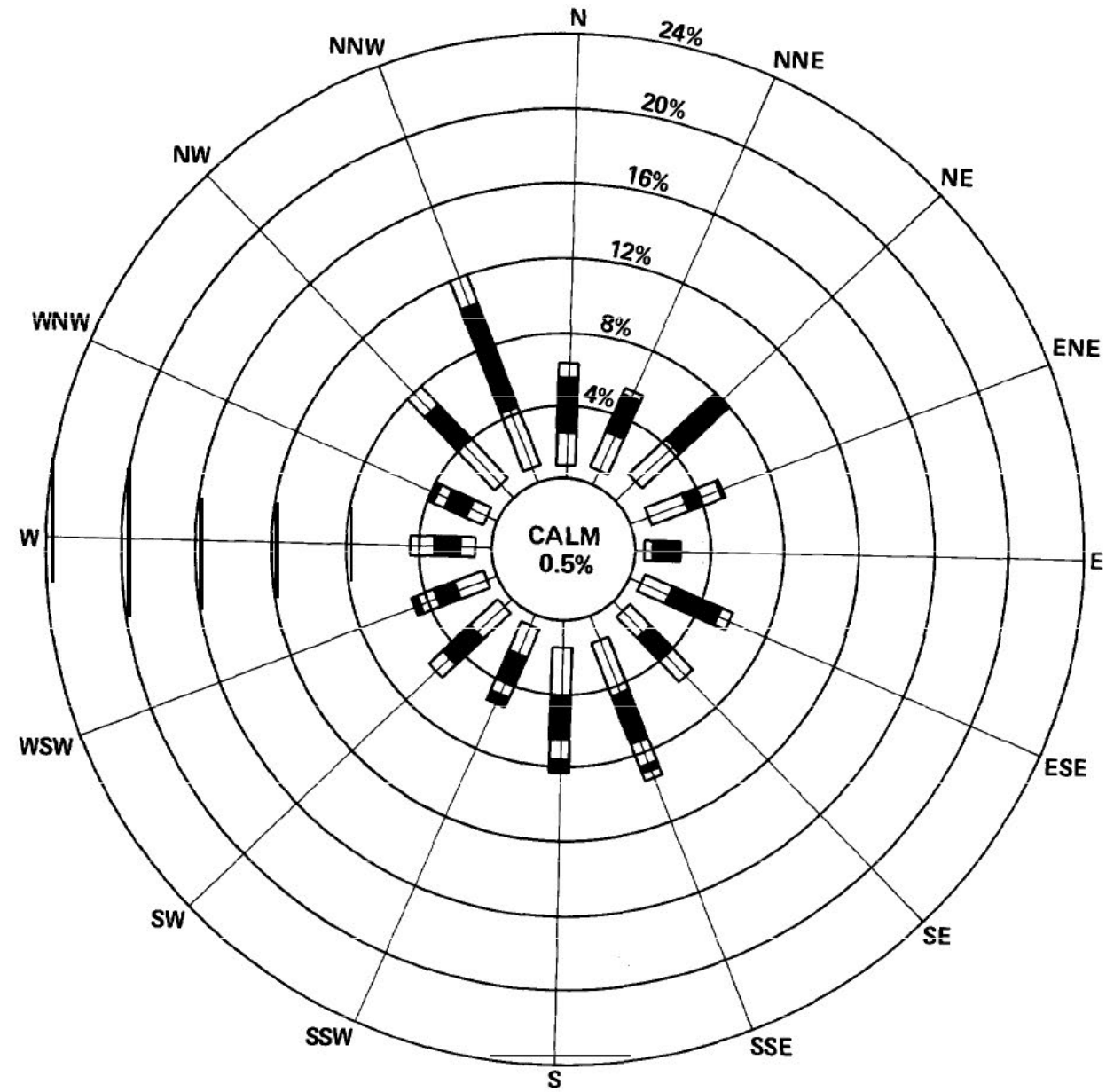
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	ANNUAL WIND ROSE MOISANT INTERNATIONAL AIRPORT NEW ORLEANS, LOUISIANA	Figure 2.3-13





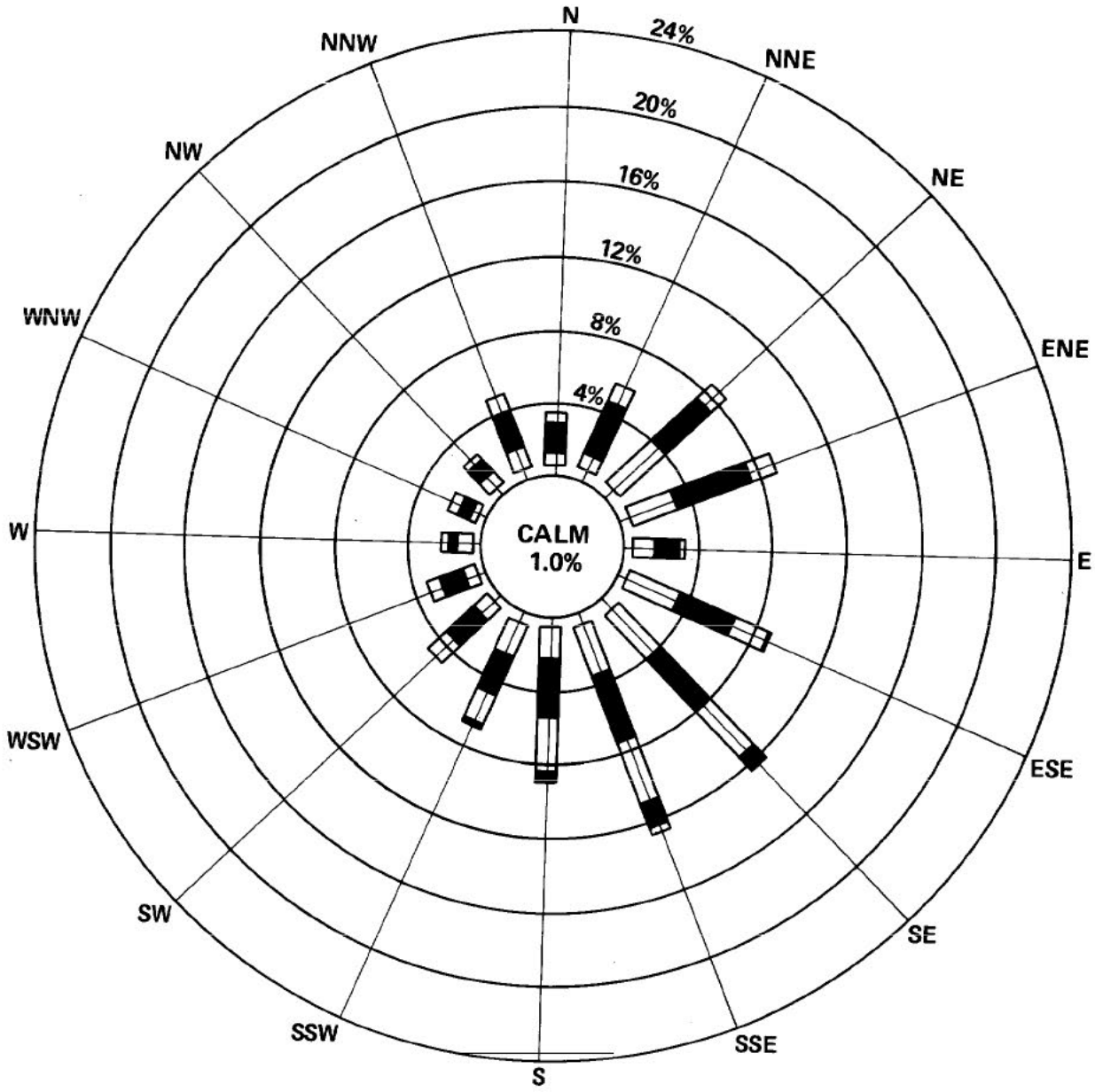
2734 OBSERVATIONS

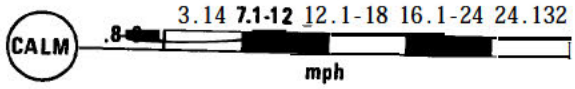
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	ON-SITE WIND ROSE – JANUARY 1973-1975 & 1978	Figure 2.3-14



2585 OBSERVATIONS

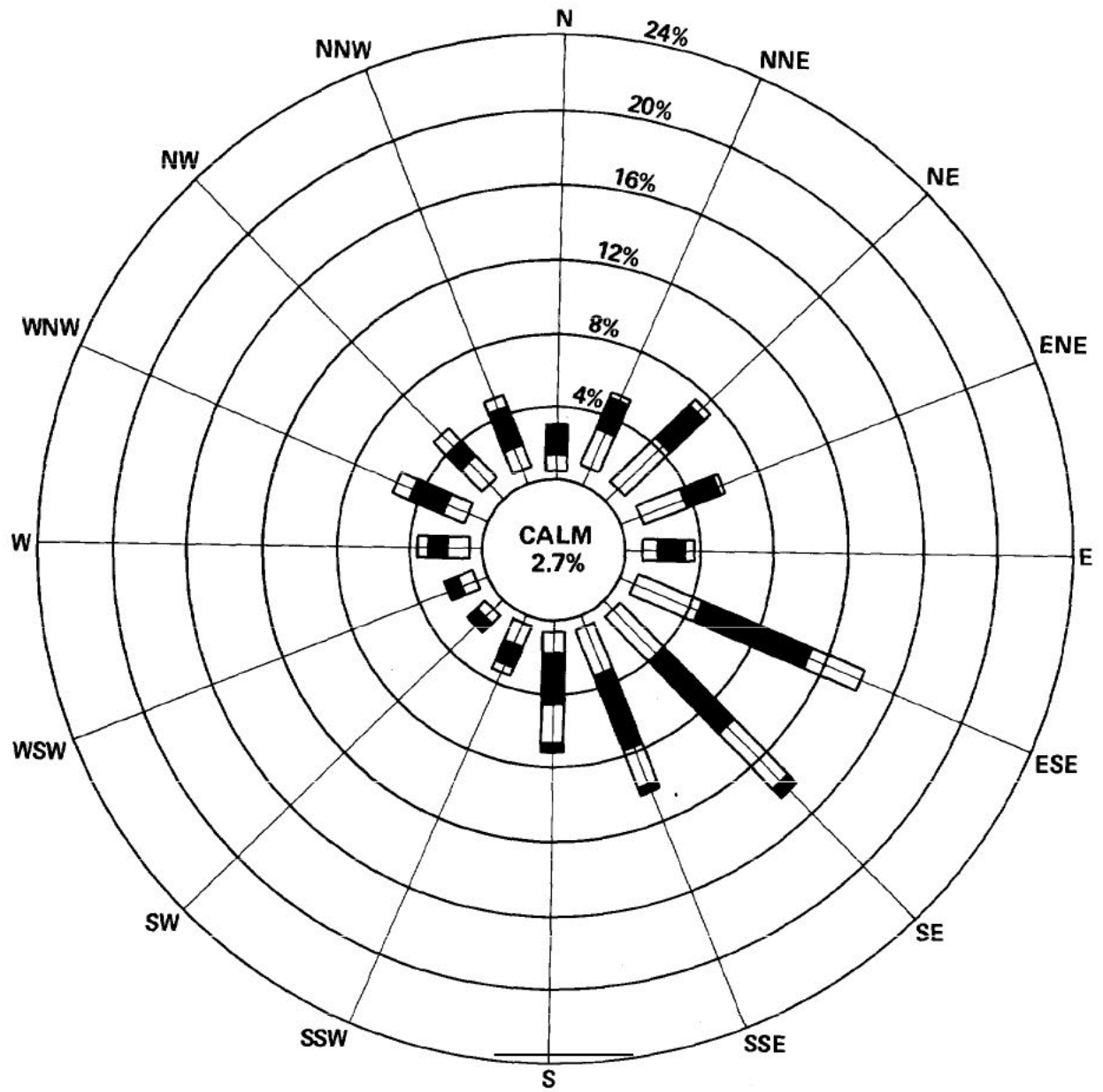
LOUISIANA 'OWER & LIGHT CO. Waterford Steam Electric Station	**ON-SITE WIND ROSE – FEBRUARY 1973-75 & 1977-78**	Figure 2.3-15

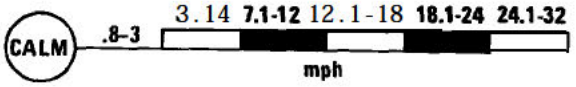




2706 OBSERVATIONS

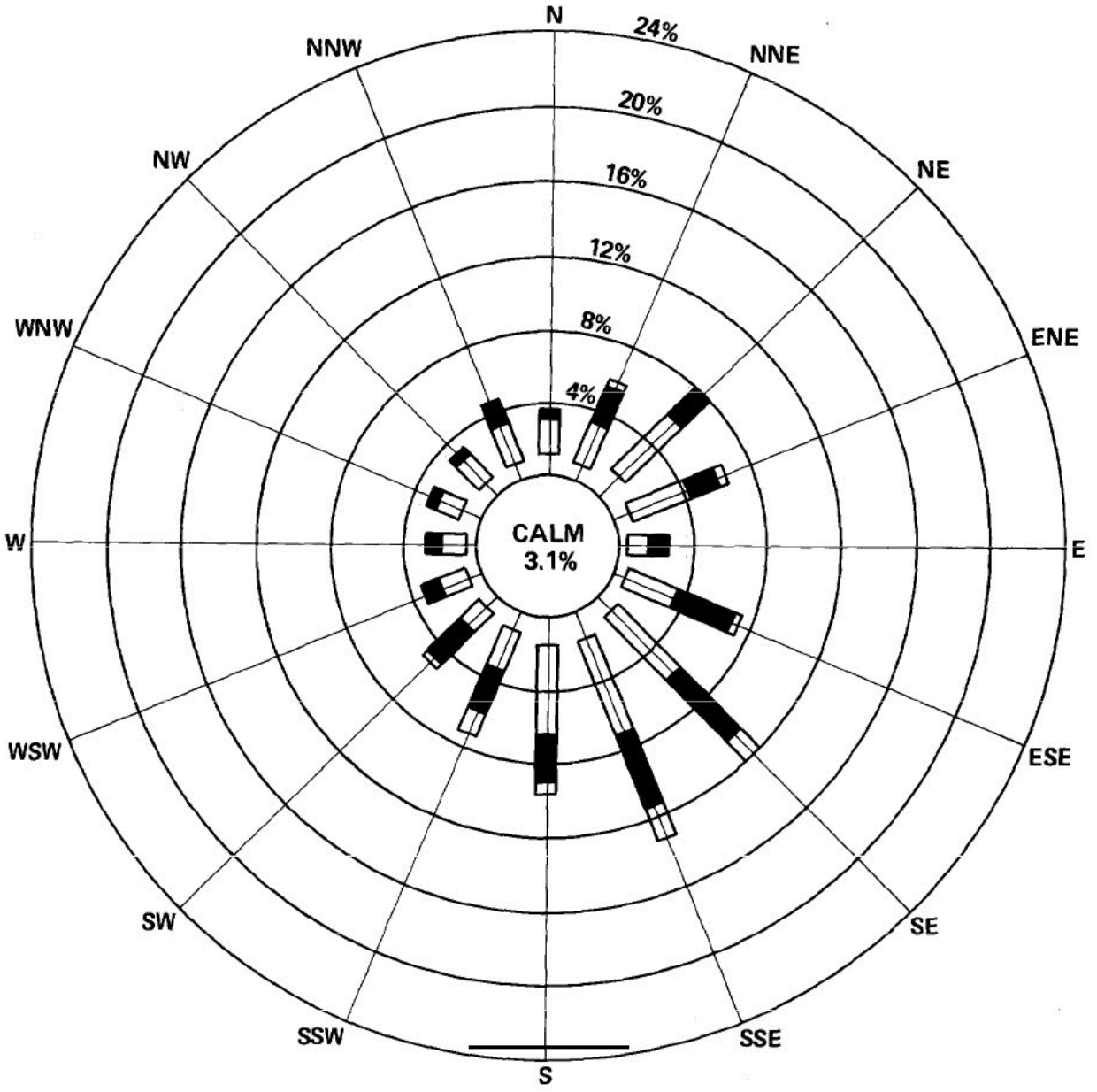
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	ON-SITE WIND ROSE – MARCH 1973-75 & 1977	Figure 2.3–16

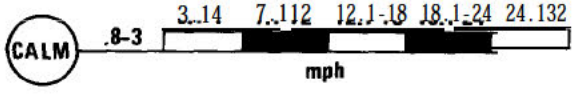




2751 OBSERVATIONS

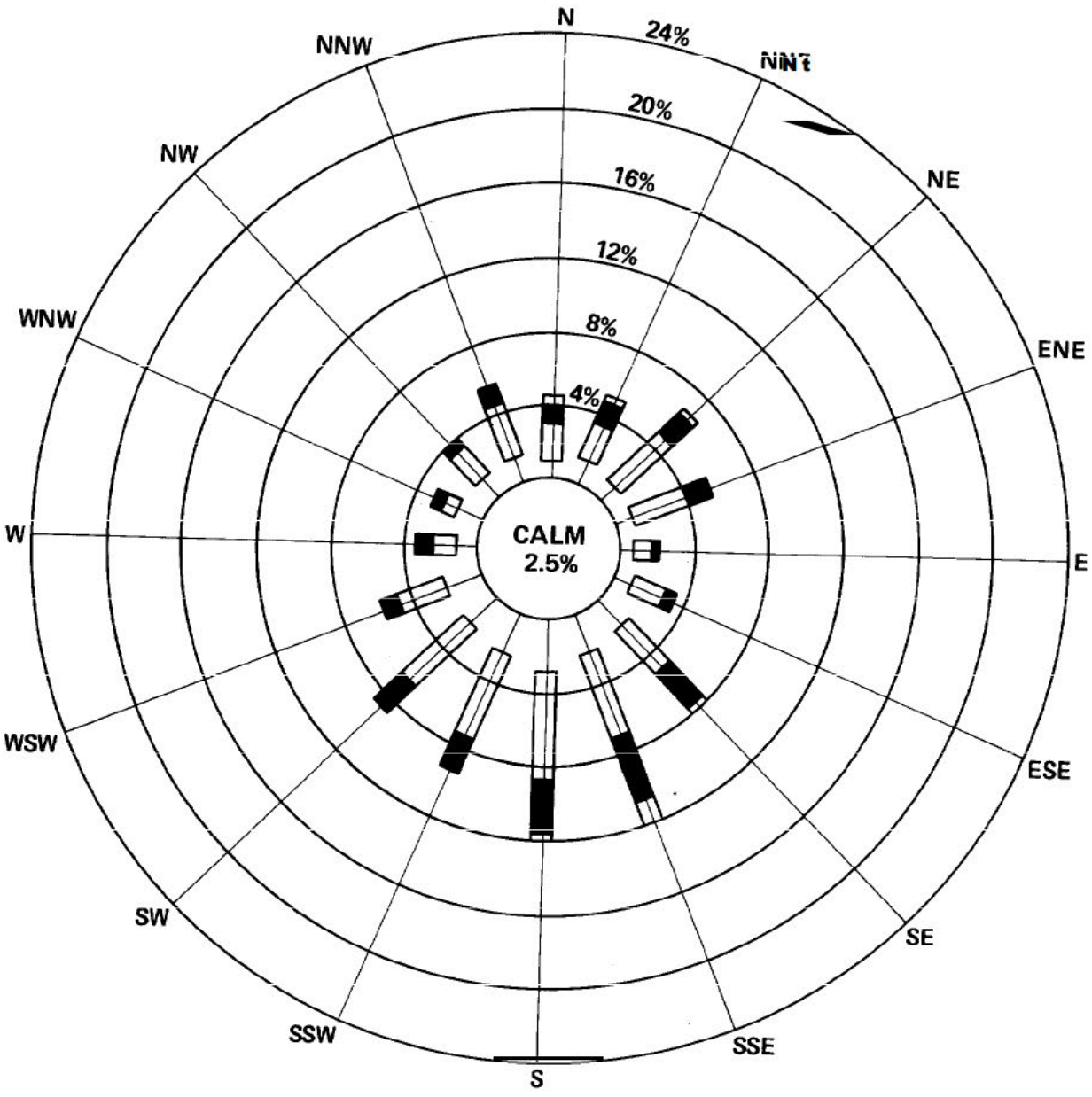
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	ON-SITE WIND ROSE – APRIL 1973-75 & 1977	Figure 2.3-i 7'

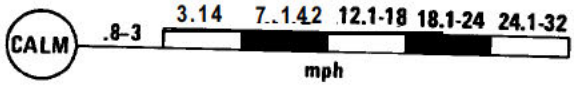




2790 OBSERVATIONS

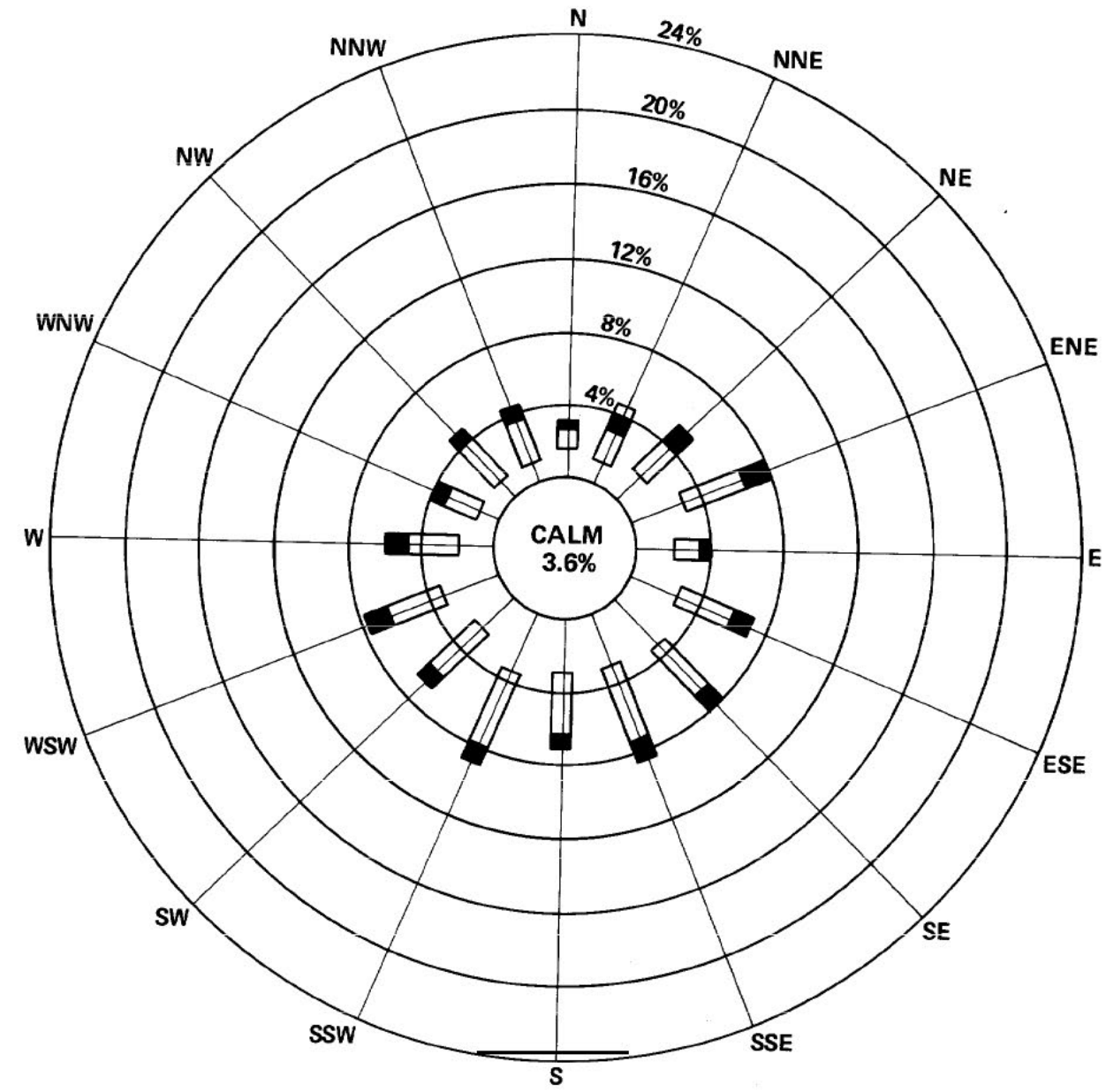
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	ON-SITE WIND ROSE – MAY 1973-75 & 1977	Figure 2.3-I 8

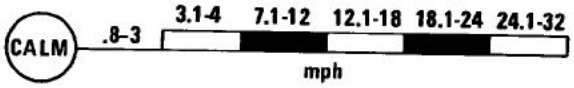




2716 OBSERVATIONS

LOUISIANA OWER & LIGHT CO. Waterford Steam Electric Station	ON-SITE WIND ROSE – JUNE 1973-75 & 1977	Figure 2.3–19



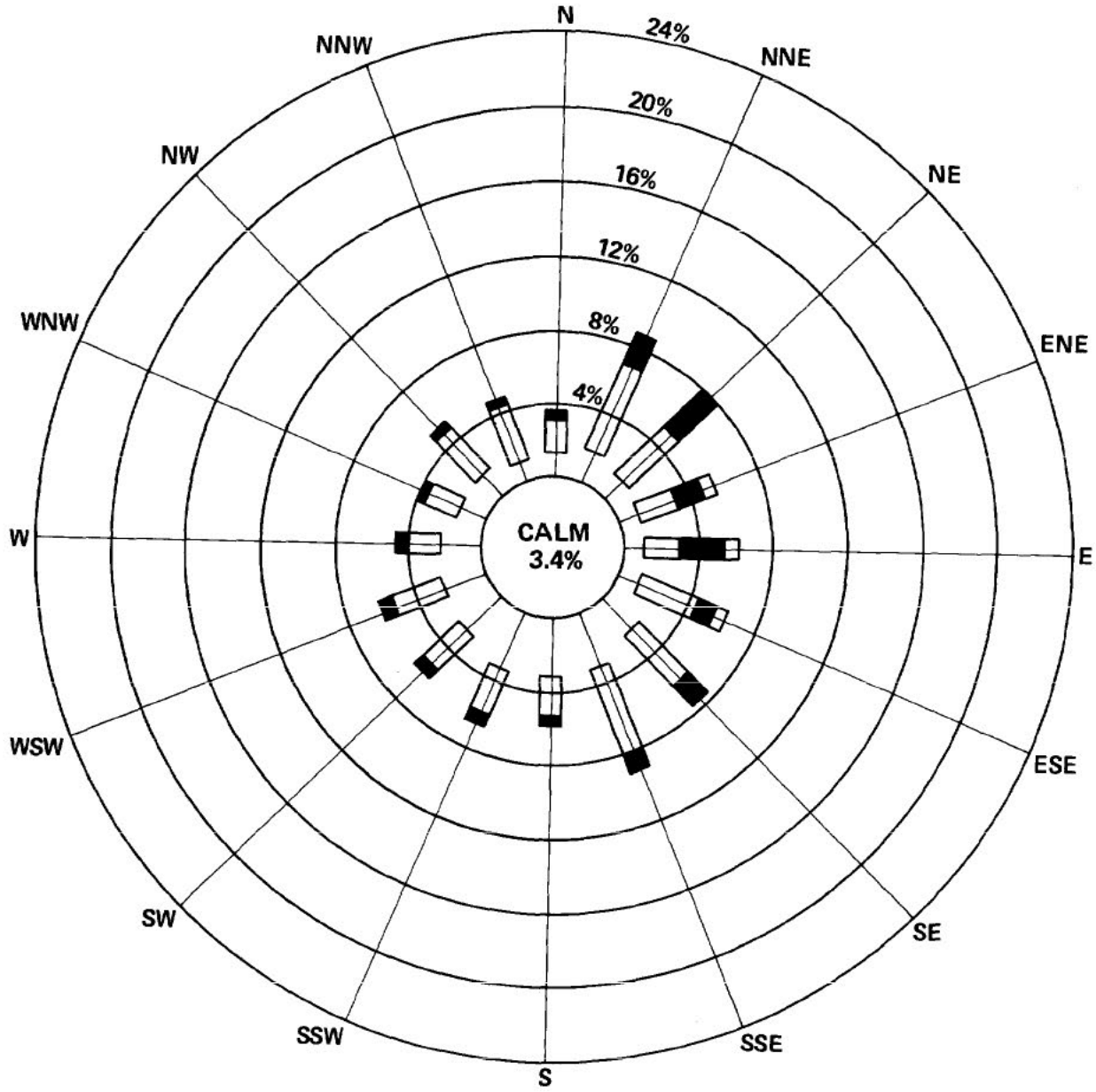


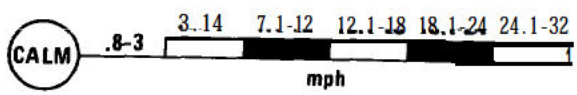
2886 OBSERVATIONS

LOUISIANA POWER & LIGHT CO.
Waterford Steam Electric Station

ON-SITE WIND ROSE – JULY 1972-74 & 1977

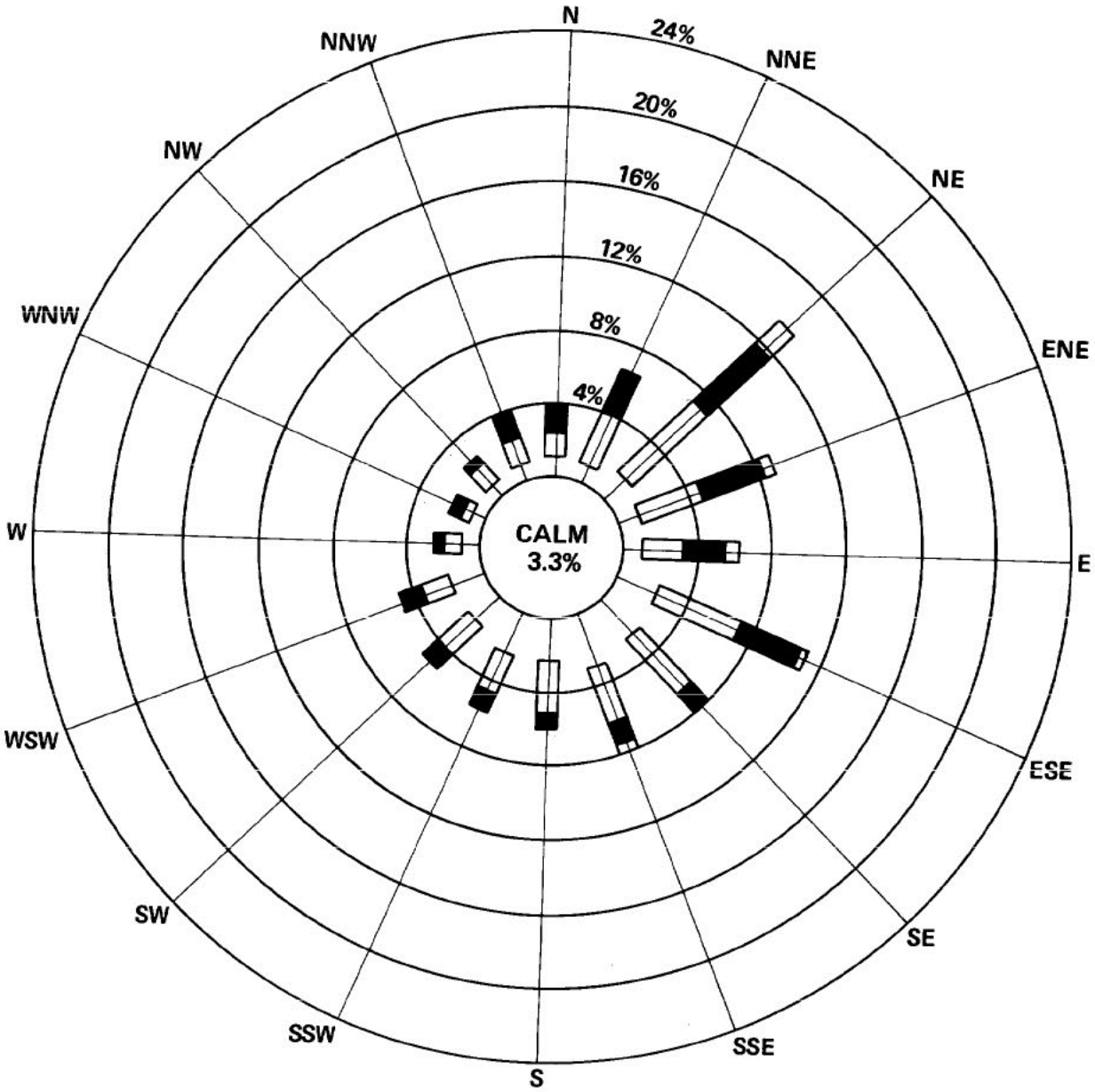
Figure 2.3-20

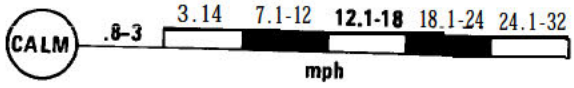




2746 OBSERVATIONS

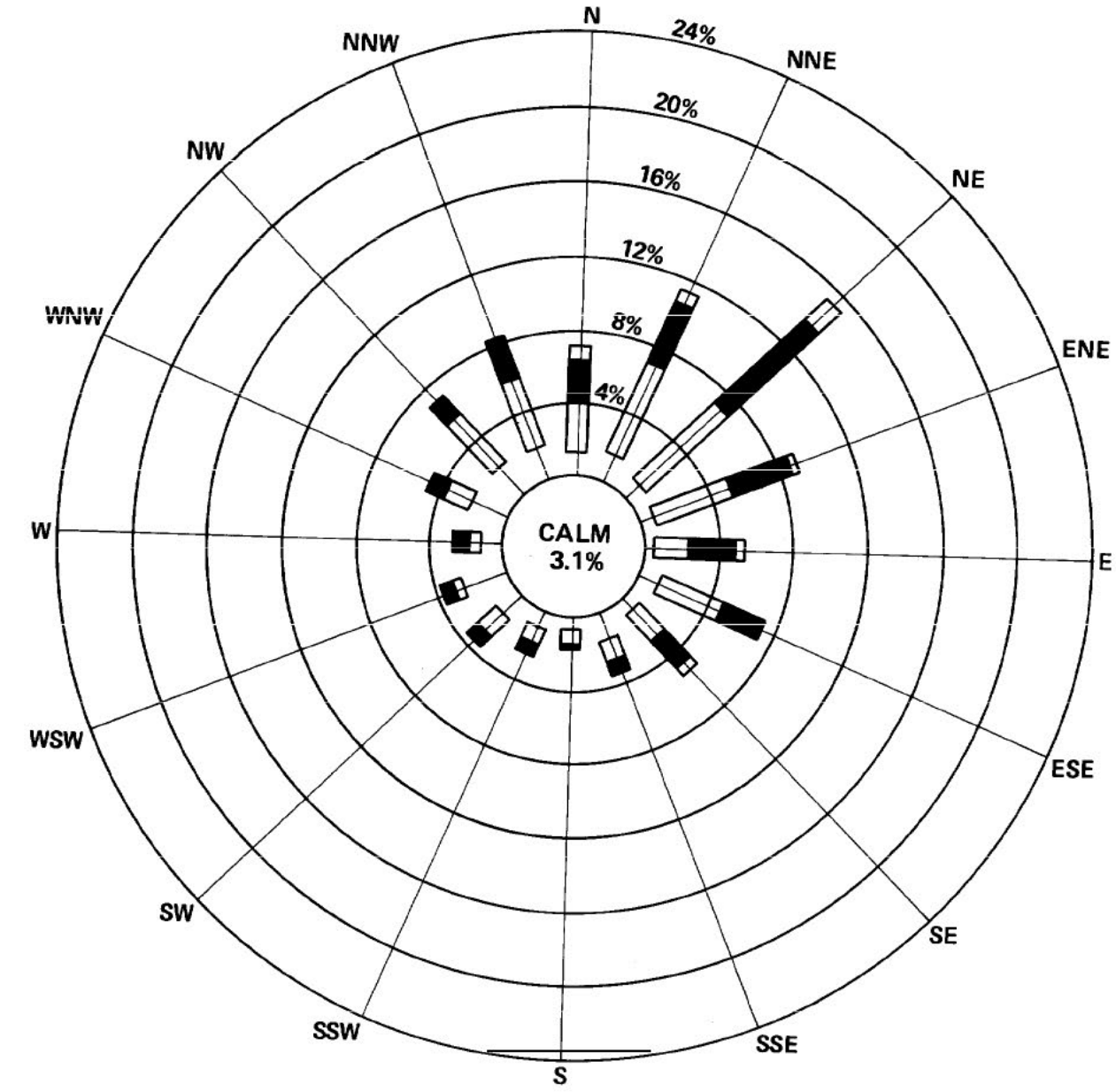
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	ON-SITE WIND ROSE – AUGUST 1972-74 & 1977	Figure 2.3-21

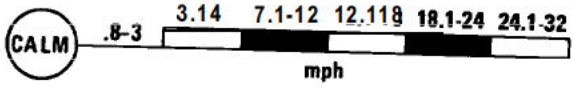




2616 OBSERVATIONS

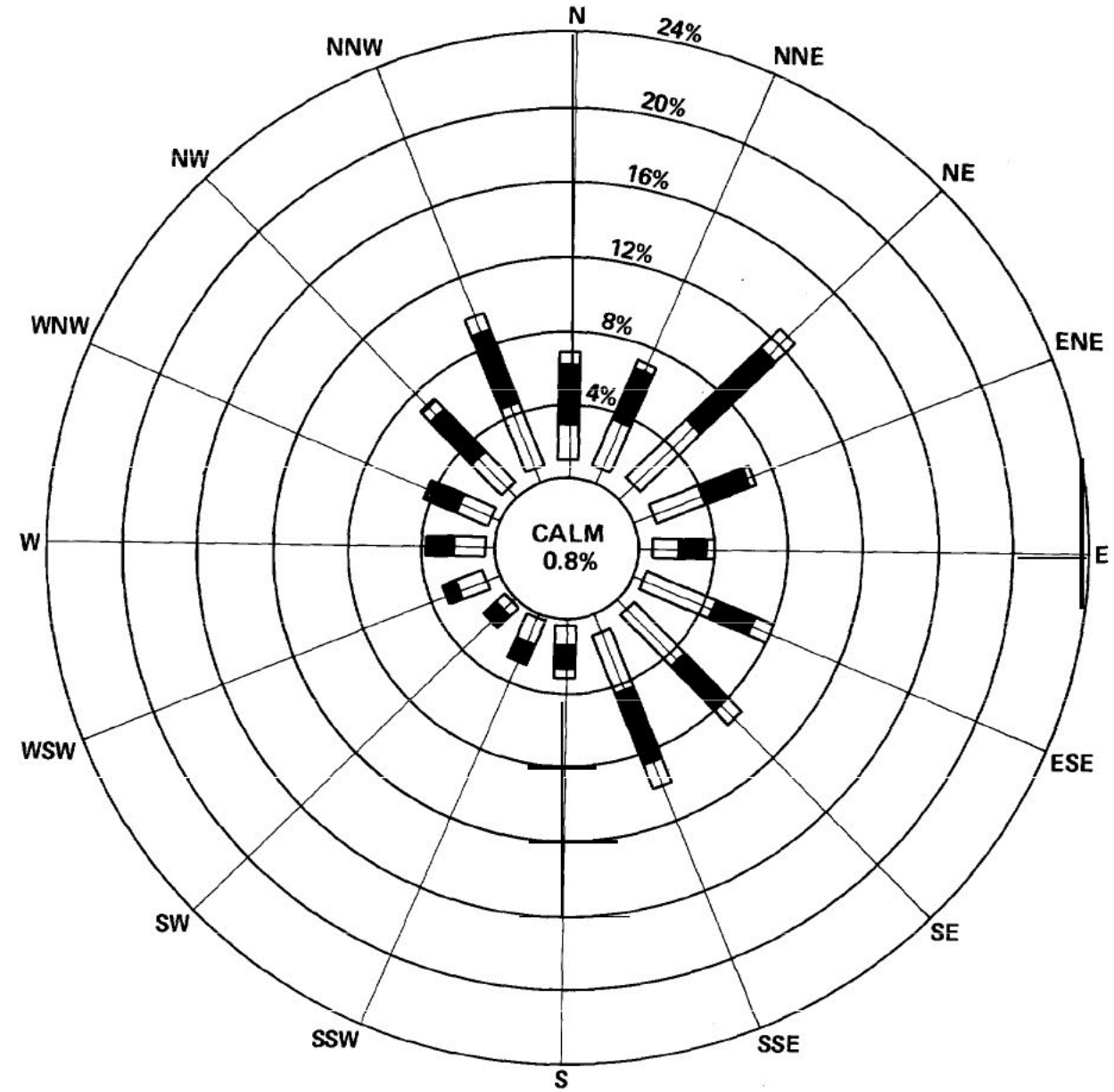
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	ON-SITE WIND ROSE – SEPTEMBER 1972-74 & 1977	Figure 2.3-22





2647 OBSERVATIONS

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**ON-SITE** WIND ROSE – OCTOBER 1972-74 & 1977	Figure 2.3-23

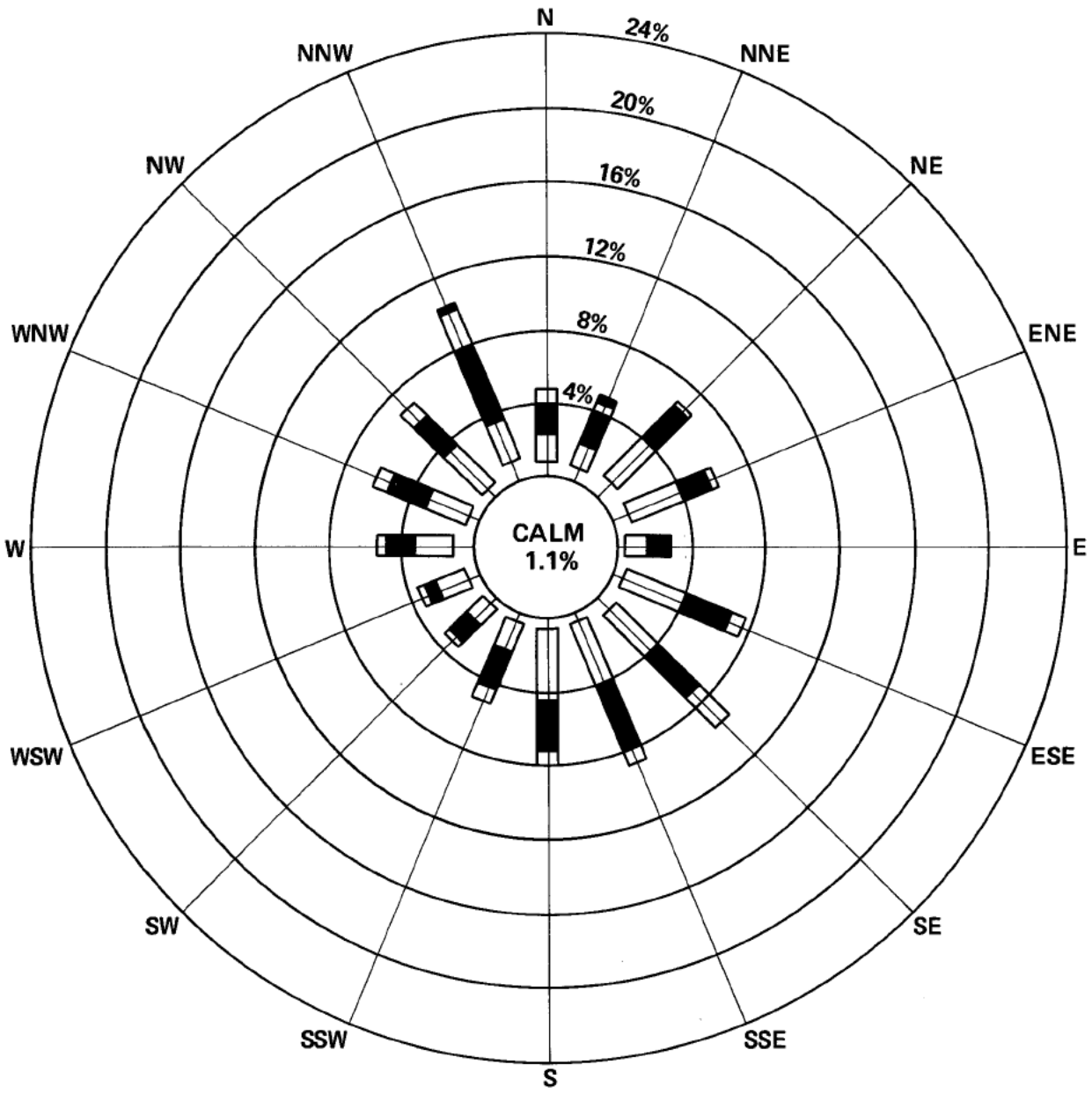


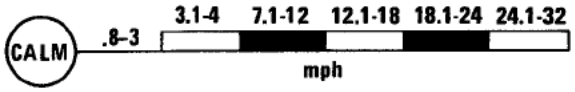
2731 OBSERVATIONS

LOUISIANA
POWER & LIGHT CO.
Waterford Steam
Electric Station

ON-SITE WIND ROSE – NOVEMBER 1972-74 & 1977

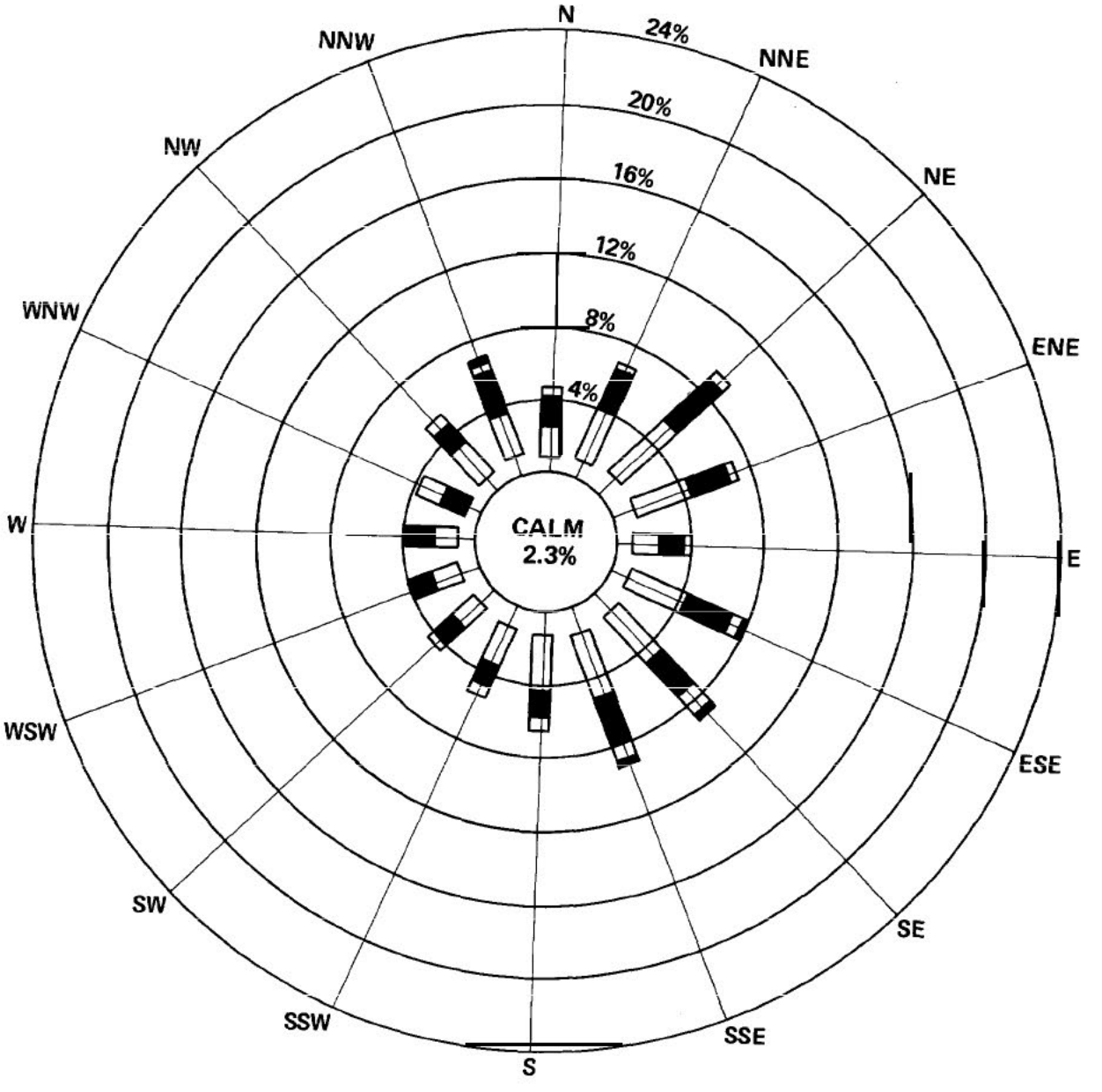
Figure
2.3-24

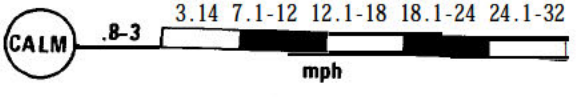




2843 OBSERVATIONS

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	ON-SITE WIND ROSE – DECEMBER 1972-74 & 1977	Figure 2.3–25



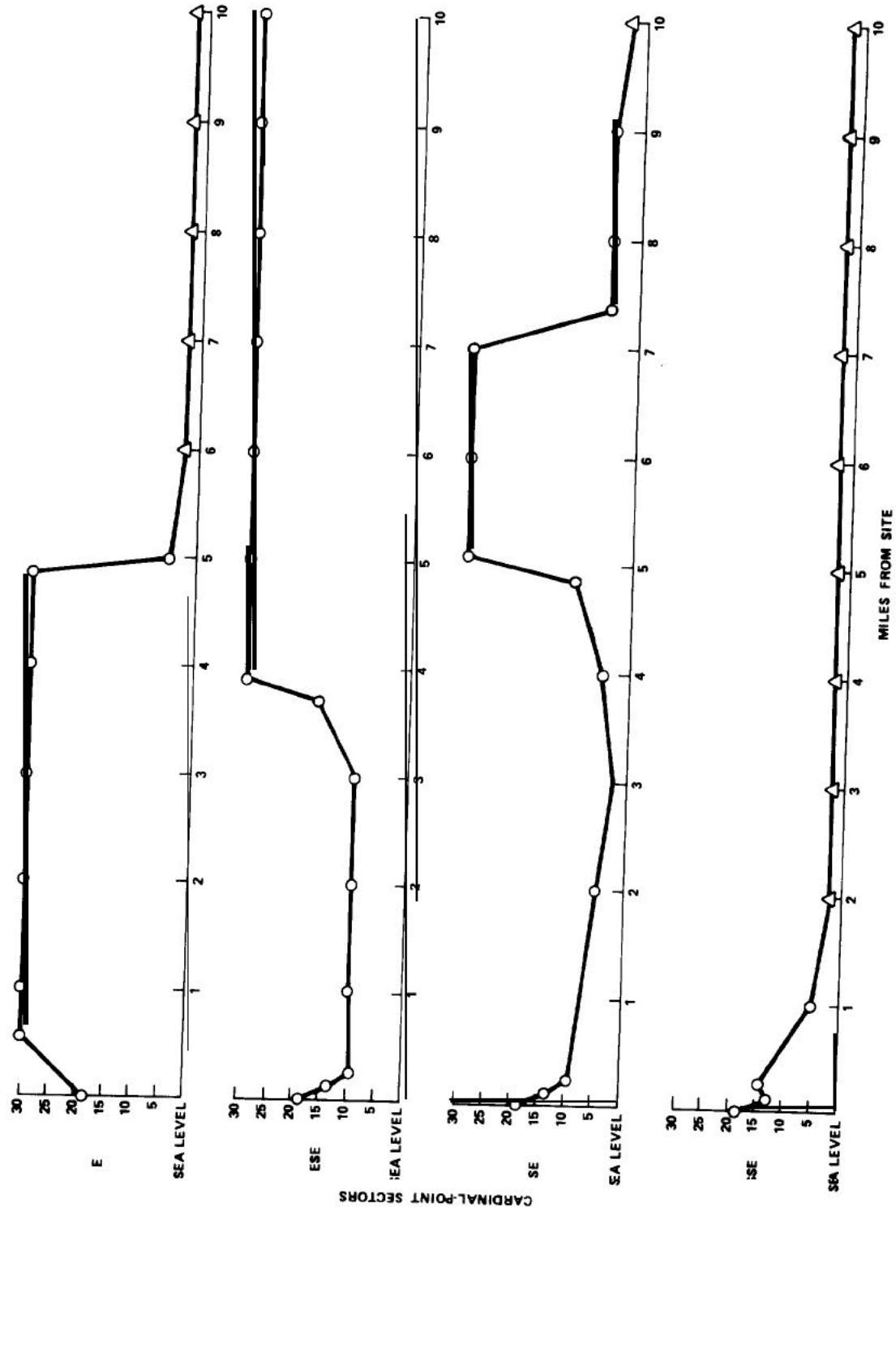


32751 OBSERVATIONS

LOUISIANA
POWER & LIGHT CO.
Waterford Steam
Electric Station

ON-SITE WIND ROSE – ANNUAL 1972-75 & 1977-78

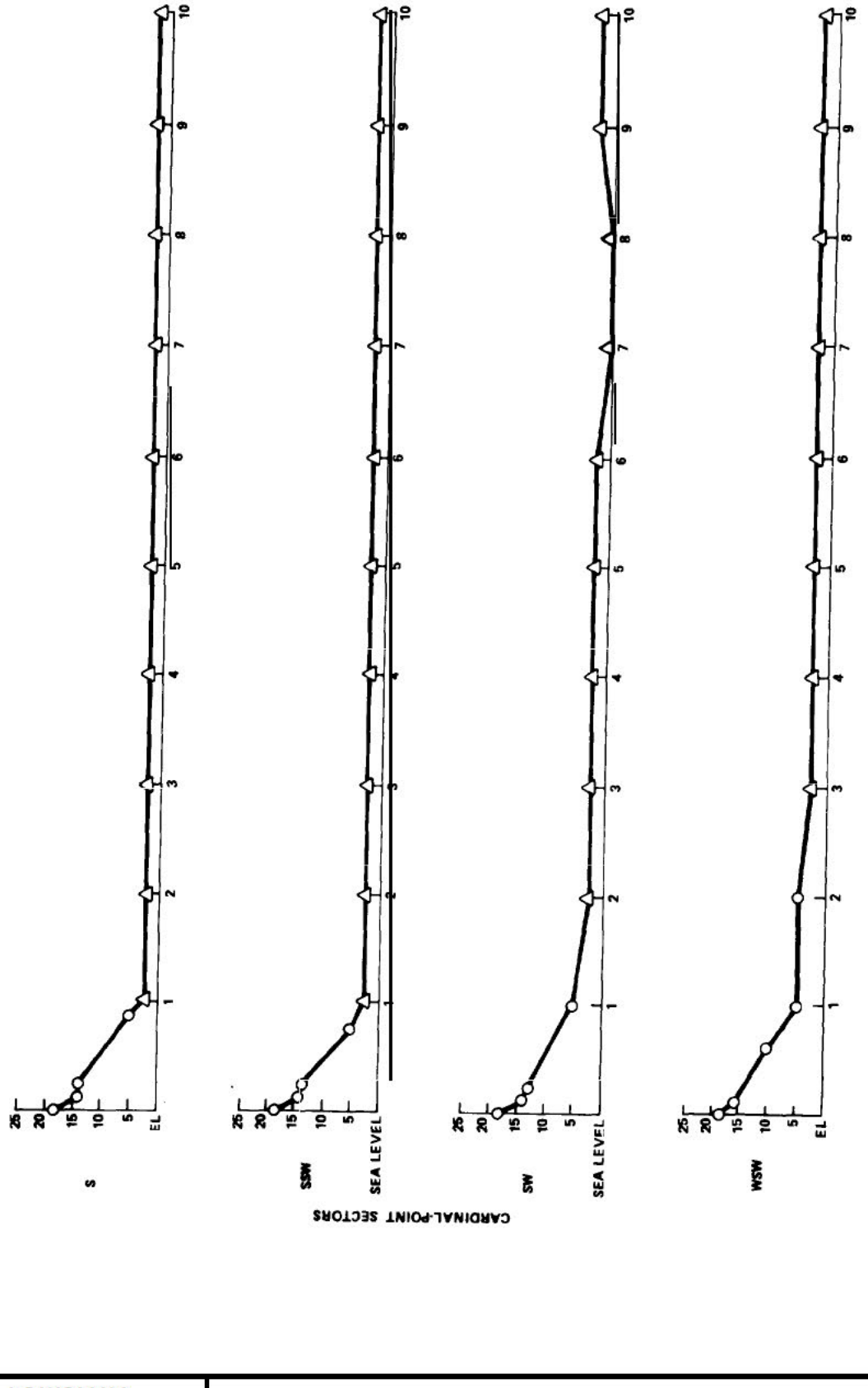
Figure
2.3-26



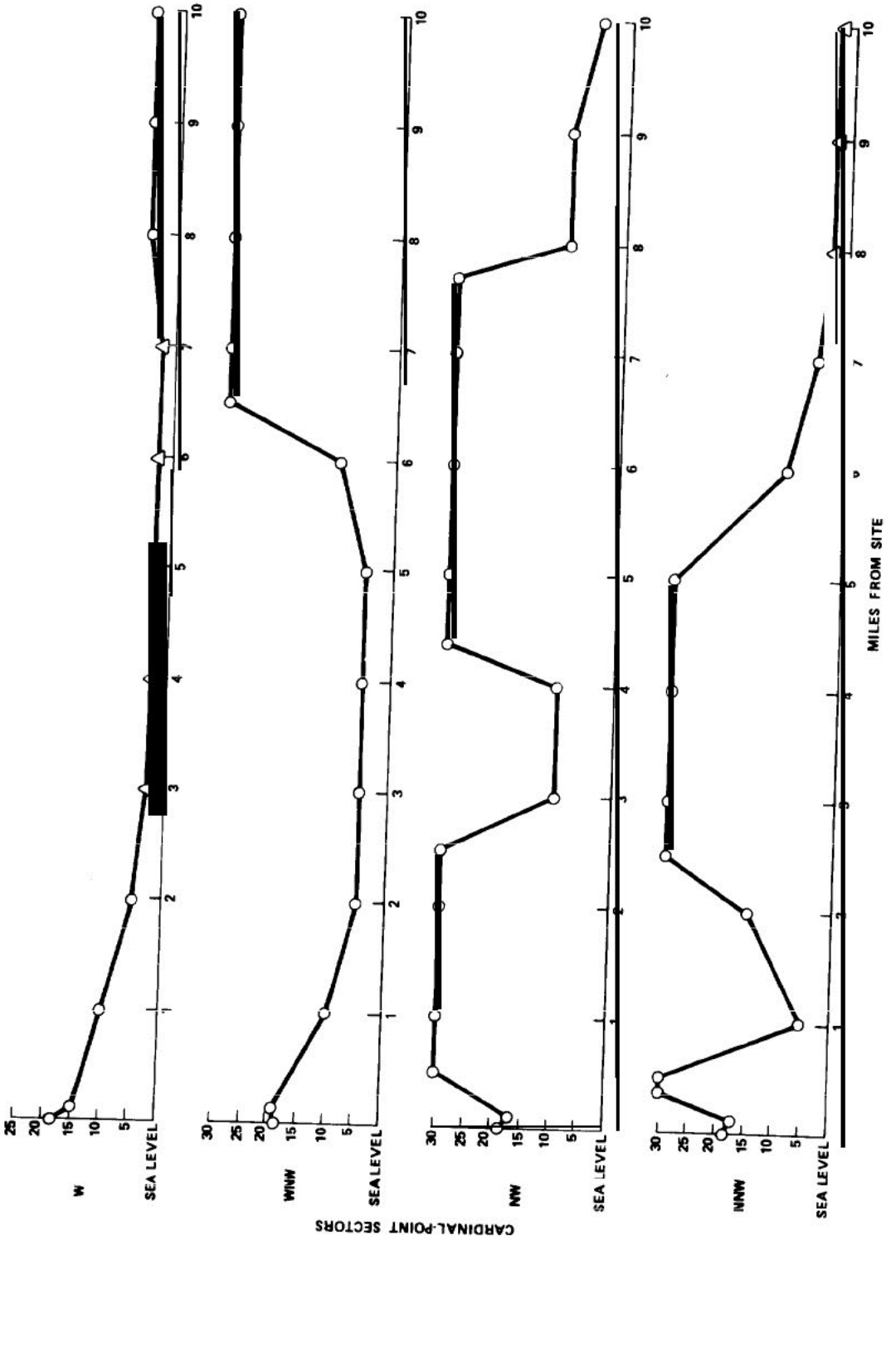
LOUISIANA
POWER & LIGHT CO.
Waterford Steam
Electric Station

MAXIMUM TOPOGRAPHIC ELEVATION VS. DISTANCE
FROM CENTERLINE OF PLANT
SHEET 2 OF 4

Figure
2.3-27b



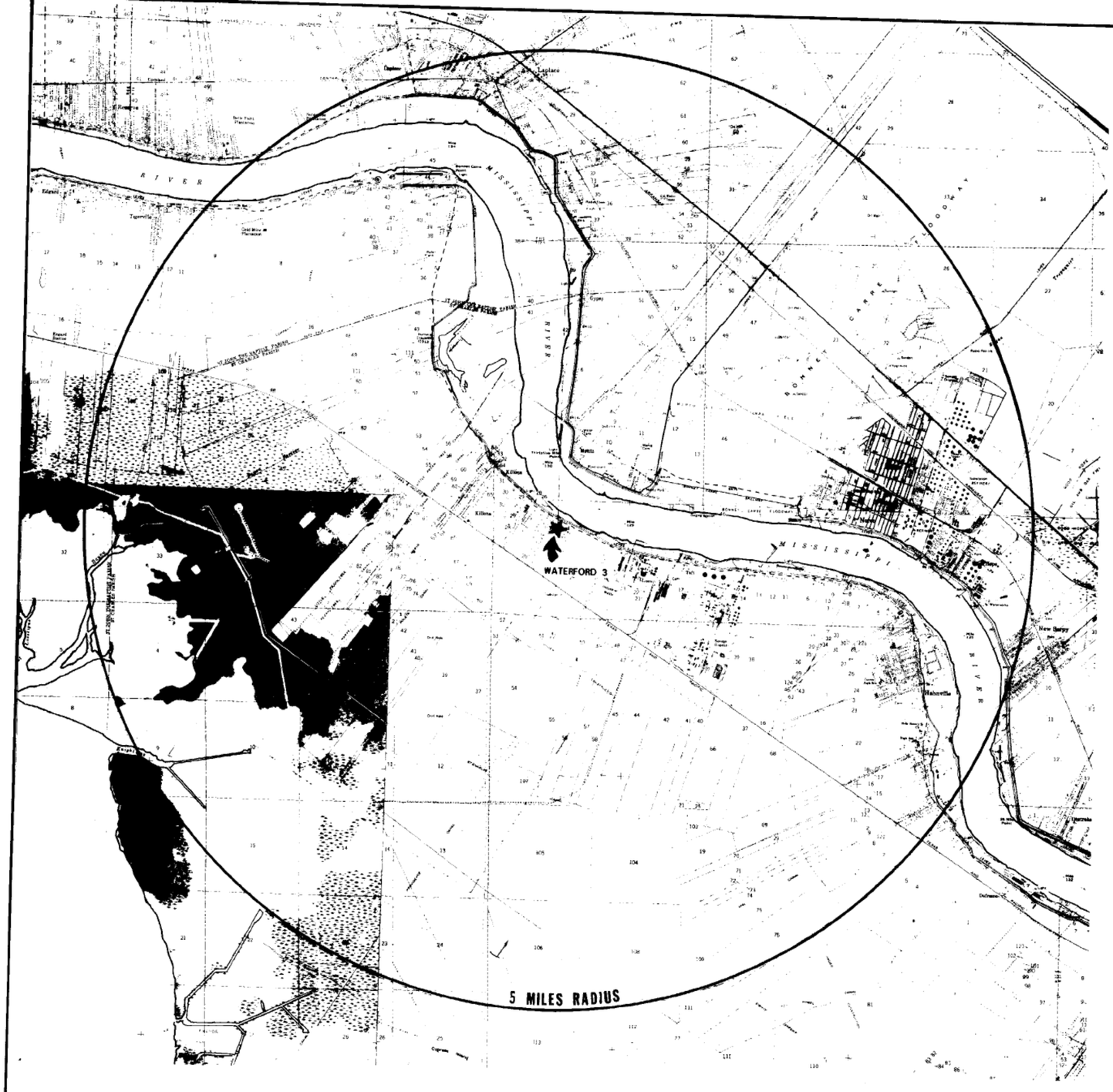
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	MAXIMUM TOPOGRAPHIC ELEVATION VS. DISTANCE FROM CENTERLINE OF PLANT SHEET 3 OF 4	Figure 2.3-27c

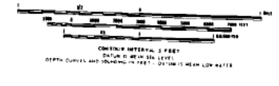


LOUISIANA
OWER & LIGHT CO.
Waterford Steam
Electric Station

MAXIMUM TOPOGRAPHIC ELEVATION VS. DISTANCE
FROM CENTERLINE OF PLANT
SHEET 4 OF 4

Figure
2.3-27d



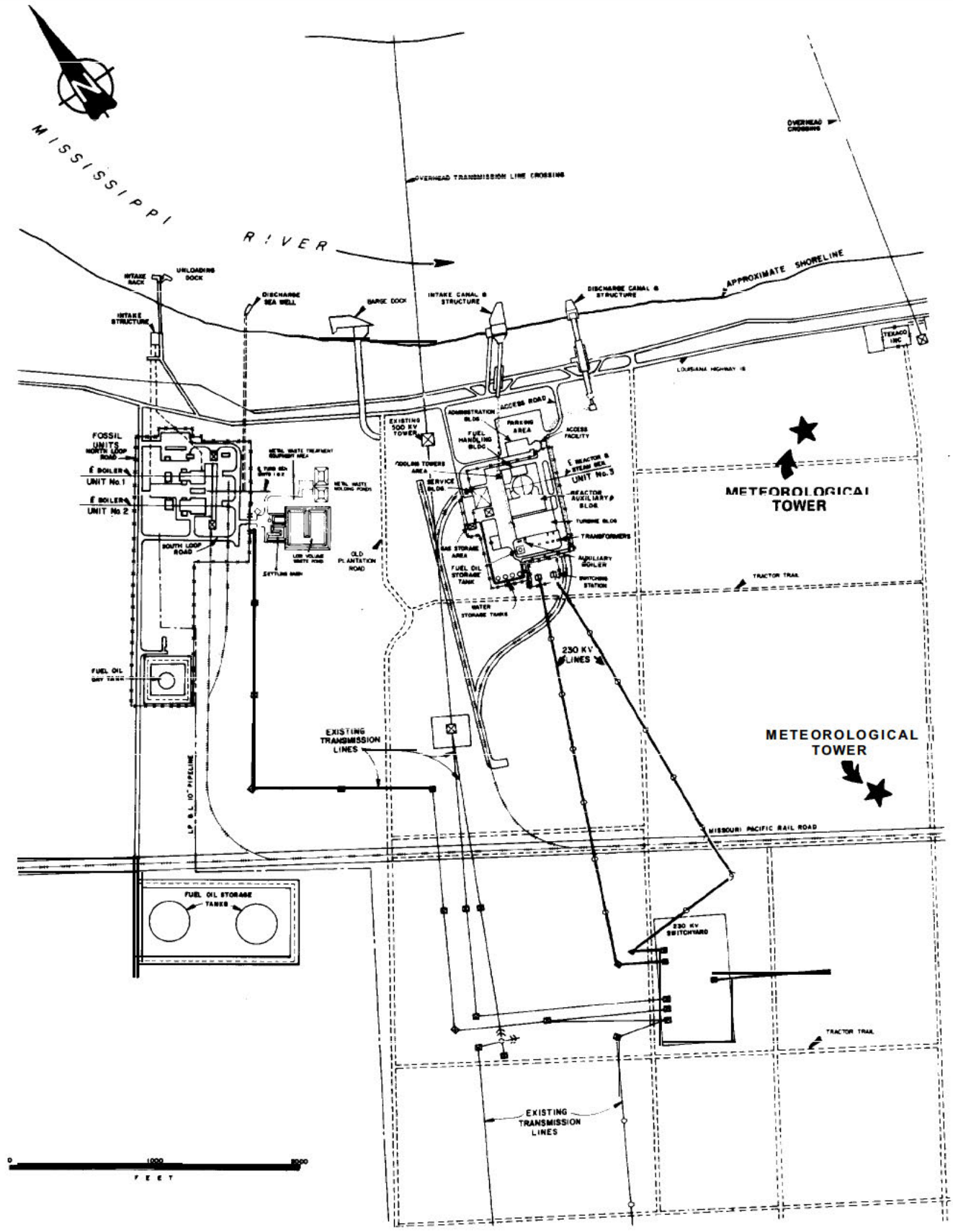


LOUISIANA POWER & LIGHT CO.

Waterford Steam Electric Station

TOPOGRAPHIC FEATURES WITHIN 5 MILES OF SITE

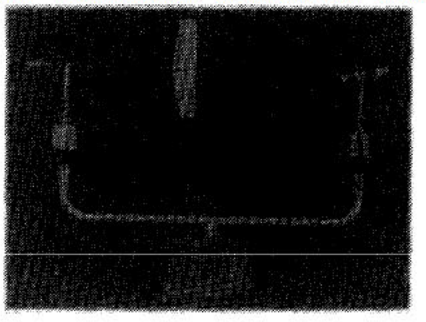
FIGURE 2.3-28



LOUISIANA POWER & LIGHT CO. **Waterford Steam Electric Station**	LOCATION OF METEOROLOGICAL TOWER	**Figure 2.3-29**

W1034 LOW THRESHOLD RECORDING WIND SYSTEM

Wind



ORDERING SPECIFICATIONS

W1034 Low Threshold Recording Wind System

- W1034-360-A Low Threshold Recording Wind System; complete with Model W103 A/3L Anemometer with lightweight cups and frictionless tachometer. Model W104 Lightweight Vane, WT1034-360 HF Translator, REW 2P-12V/12V Two Pen Potentiometric Strip Chart Recorder, 6 speeds, 115 and 230 VAC. 60 Hz; less cable. charts and crossarm
- W1034-360-B Low Threshold Recording Wind System. Same as above except with W101 DGO R Recorder (12 VDC and 115 VAC)
- W1034-540-A Low Threshold Recording Wind System. Same as item 1 except W104 2 Wind Vane and WT1034-540-HF Translator supplied
- W1034-540 B Low Threshold Recording Wind System. Same as above except with W101-DGO R Recorder (12 VDC and 115 VAC)

Note: Use following schedule for ordering any of the above systems with other options:

1. W103-B anemometer with DC generator in lieu of W103-A with high frequency tachometer
2. "SS" Stainless Steel Cups in lieu of "L" or "S" types
3. O-cup assemblies (S or L) in lieu of 3-cup
4. Brass sensor housing in lieu of aluminum

W1034 System Components and Accessories

Anemometers

- W103-A/3L 3-cup anemometer with lightweight cups and low torque high frequency tachometer
- W103-B/3S J-cup anemometer with standard weight cups and DC generator
- "3L" 3-cup assembly only–lightweight
- "3S" 3-cup assembly only-standard weight
- "3SS" 3-cup assembly only–stainless steel
- "6L" 6-cup assembly only–lightweight
- "6SS" 6-cup assembly only–stainless steel

Note: To substitute any cup assembly in lieu of "3L" supplied as standard, replace 3L in the model number with cup type desired and add differential cost to W103 price. To substitute Brass housing for standard aluminum, specify brass after number and add $35.00 to price.

Vanes

- W104 Lightweight Vane, with 1000 ohm low torque wire wound potentiometer, single wiper. 3 gap
- W104-2 Lightweight Vane, with 1000 ohm low torque wire wound potentiometer, dual wiper
- W104-V spare tail assembly with counter weight

Translators (installed in recorder)

- WT1034-360-HF Translator, for high frequency tachometer wind speed sensor, 0-50 and O-100 MPH, and 0.360" wind direction
- WT1034-540-HF Translator, for high frequency tachometer wind speed sensor, O-50 and 0-100 MPH, and O-540" wind direction
- WT1034-360-DC Translator, for DC generator type wind speed sensor, O-50 and 0-100 MPH, and O-360' direction.
- WT1034-540-DC Translator, for DC generator type wind speed sensor, O-50 and O-100 MPH, and O-540' direction.

(NOTE: If translator in separate box is desired use model no. WTB 1034, instead of WT 1034. If rack mounted. use WTR instead of WT 1034.)

Recorders

- REW 2P 12V/12V Potentiometric Strip Chart Recorder, without translator, 115/230 VAC, 60 Hz chart drive. Chart speeds: 1, 2. 6, 12, 29.5 and 59"/hr. (see p. 176 for full specifications. 50 Hz available)
- W101-DGO-R Strip Chart Recorder. 12 VDC or 115 VAC. Chart speeds 15, 30. and 45 mm/hr., supplied as standard.

Accessories

- W1034-AR Automatic Range Shift, for wind speed; changes range from low to high and visa versa when wind speed reaches limit. Ranges can be specified by customer. For example, low range O-10 MPH full scale and high range 0.100 MPH. Range being recorded is indicated by event pen.
- W1034-CA Cross Arm Assembly, holds cups and vane assemblies (not wired)
- W1034-CAW Cross Arm Assembly, pre-wired.
- W1034-TM Telescoping Portable Mast, 15 feet high; includes guying wires and pins.
- W1034-C Cable, 7 conductor, to connect sensors to translator or recorder.

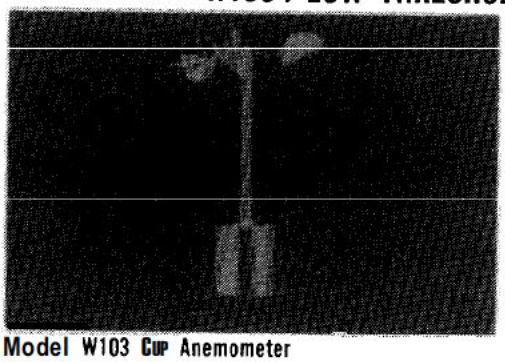
Chart Paper

- C1034-360-M-R; O-50 and O-100 MPH, 0-360°; 15, 30 and 45 mm/hr., 100' roll.
- C1034-540-M-R: O-50 and O-100 MPH, 0-540°, 15. 30 and 45 mm/hr., 100' roll
- RCEW 12V/12V/100/360; 0-100 MPH, O-360"; 1. 2 and 6 inches/hr., 65' roll.
- RCEW 12V/12V/100/540; 0.100 MPH, 0.540"; 1. 2 and 6 inches/hr., 65' roll.

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	W1034 LOW THRESHOLD RECORDING WIND SYSTEM	Figure 2.3–30

W1034 LOW THRESHOLD RECORDING WIND SYSTEM

Wind



Model W103 Cup Anemometer

DESCRIPTION

A high response, low threshold wind system which offers the optimum in versatility and economy. Design features of the cup anemometer and single fin aerodynamic vane permit a choice of sensor options to meet program needs and budgetary requirements. Electronic signal conditioning packages are available for any combination of sensor options. Anemometer and vane housings are cast from a special aluminum alloy . nd are aged before machining. Surfaces are anodized after machining. Sealed and shielded stainless steel permanently lubricated bearings and stainless steel precision ground shafts are used exclusively. Cannon connectors, mounted on the base of the housing, support the sensors as well as providing for electrical connection. Thus, after initial installation, sensors can be removed for routine maintenance by simply uncoupling the Cannon connector. Brass housings are available as an option for use in extremely corrosive marine environments.

Basic components of the W1034 Low Threshold Wind System are

a Model W103 Lightweight Cup Anemometer, with high frequency frictionless tachometer or DC generator.

b. Model W104 Lightweight Vane. with single or dual wipers.

c. Model WT1034/360 (x) or WT1034/540-(x) Translators.

d. Model W101 DGO, Two Pen, Dual Channel Galvanometric Strip Chart Recorder (DC only) or Model REW 2P 12V/12V, two pen, potentiometric strip chart recorder for AC operation

Descriptions and specifications for the various options of each of the basic components of the system are given below

Model W103 Cup Anemometer

Options available with the Model W103 Cup Anemometer include 5 different cup assemblies and 2 types of speed transducers Cup assemblies can be 3 cup or staggered 6 cup Three cup assemblies are supplied as standard and are best suited for most applications Six cup assemblies eliminate pulsing at low wind velocities Material used in the construction of the cups includes high tweight metallized butyrate, standard weight polycarbonate, plastic or stainless steel. Transducers available are a frictionless high frequency tachometer providing a pulsed square wave output signal or, where maximum sensitivity is not required, a low torque DC generator.

a Cup Assemblies 3 Cup Type

1) "3L" Cup Assembly, Lightweight – For low threshold applications Cups are formed from 0.010" thick metalized butyrate suspended on a tubular stainless steel frame. The cups are conical shaped with a 2" diameter Turning radius of the assembly is 2¾" Wieght of an individual cup. including supporting frame, is 5 grams. Weight of the complete assembly, including the central hub, is 18 grams

2) "3S" Cup Assembly, Standard Wieght – For general purpose application. Molded of durable lexan plastic, 0.030" thick Cup diameters are 3" and assembly turning radius is 3½". Complete cup assembly weight, including central hub, is 42 grams.

3) "3SS" Cup Assembly, Stainless Steel – Cups and supporting frame made of stainless steel. Two inch diameter cups are made of 0.025" thick stainless steel Turning radius of the assembly is 2¾" Weight of the assembly. including central hub. is 63 grams.

b Cup Assemblies – 6 Cup Type (U.S. Pat No. 3,541,855). Eliminate pulsing and reduce errors due to non-horizontal wind flow

1) "6L" Cup Assembly – Staggered 6-cup assembly constructed of same material as "3L" cups Weight of assembly is 31 grams.

2) "6SS" Cup Assembly – Staggered B-cup assembly constructed of stainless steel and similar to "3SS" assemblies. Weight of "6SS" cups is 128 grams

c. Speed Transducers

1) High Frequency Tachometer – For low threshold applications, a unique frictionless tachometer employing a high frequency oscillator and receiver is used to precisely measure wind speed The oscillator, transmitter and receiver are encapsulated in a small cube of epoxy for total protection against the environment. The transmitter and receiver are separated by a 1/8 inch space in which a thin notched disc of aluminum, attached to the sensor shaft, is free to rotate. As each notch in the disc passes between the transmitter and receiver, a -12 volt square wave pulse is produced. Discs are notched to provide fourteen output pulses per revolution. An input of 12 volts DC, 10 mA is required to power the tachometer circuitry. The output pulse tram is fed into a frequency to analog converter in the wind system translator to permit data recording or telemetry The operating temperature range of the high frequency tachometer is 30 to +140°F.

The high frequency tachometer embodies several distinct advantages over the commonly used light chopper systems. There are no light bulbs or photocells to burn out; power consumption is low, and the system is insensitive to moisture condensation or dust deposition. The solid state tachometer is essentially free from maintenance with a life of well over five years when operated continuously.

2) DC Generator – Long life DC generators can be supplied where starting torque is not critical. Generators have a life of three to four years and have an approximate output of 500 mV at 50 MPH

SPECIFICATIONS

W103 Cup Anemometer

- Size 16¾"h x 7"d overall
- Cup Assemblies

Type	Cup Diameter	Turning Radius	Weight (grams)
"3L" Lightweight	2"	3⅝"	18
"3S" Standard Weight	3"	4"	42
"3SS" Stainless Steel	2"	3⅝"	63
"6L" Lightweight, 6 cup	2"	3⅝"	37
"6SS" Stainless, 6 cup	2"	3⅝"	128

. Transducers

Frictionless High Frequency Tachometer – 12 VDC, 10 mA input. -12 VOC square wave output; 14 pulses/RPM standard

DC Generator – Approx. 500 mVDC at 50 MPH

- Accuracy 1% or 0 15 MPH, whichever is greater

. Construction Anodized aluminum and stainless steel

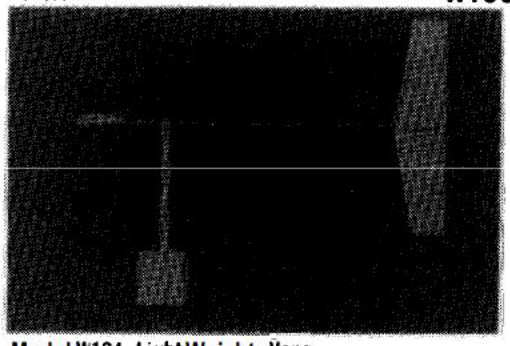
. Bearings Sealed and shielded precision stainless steel

- Response Characteristics

High Frequency Tachometer Transducer	Threshold (MPH) 3-Cup	Threshold (MPH) 6-Cup	Distance Constant (Ft) 3-Cup	Distance Constant (Ft) 6-Cup
Model "L" Cups	06	06	5	73
Model "S" Cups	08	N/A	74	N/A
Model "SS" Cups	n9	09	143	21.1
DC Generator Transducer	**3-Cup**	**6-Cup**	**3-Cup**	**6-Cup**
Model "L" Cups	IO	IO	5	8
Model "S" Cups	I I	N/A	8	N/A
Model "SS" Cups	I I	N/A	15	N/A

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	W1034 LOW THRESHOLD RECORDING WIND SYSTEM	Figure 2.3-31

W1034 LOW THRESHOLD RECORDING WIND SYSTEM



Model W104 Light Weight Vane

The Model W104 Lightweight Vane features a special low density, high structural strength foam plastic tail coated with a high density epoxy and banded to a stainless steel rod. Weight of the entire tail assembly, including rod, is 35 grams. A stainless steel counterbalance, located close to the center of rotation, permits maximum response to wind fluctuations with minimum overshoot. The tad has an airfoil shape Tall dimensions are approximately 4" wide x 12" high x ¼" thick at the center and 1/8" thick at the tip. The center of the tad is normally located 12 inches from the axis of rotation.

The vane rotates on a stainless steel shaft mounted in miniature stainless steel precision bearings.

1000 ohm low torque potentiometers, supplied with one wiper for 0 to 360' applications and with two wipers for 0 to 540° systems, are standard. Other resistances are available on special order.

W104 Light Weight Vane

- Response Characteristics:

Wire Wound Pot	Dead Band (Degrees)	Damping Ratio	Distance Constant (ft)
1 wiper	3	0.4-m-~-	-3 5
2 wipers	0	0.4	-3 5

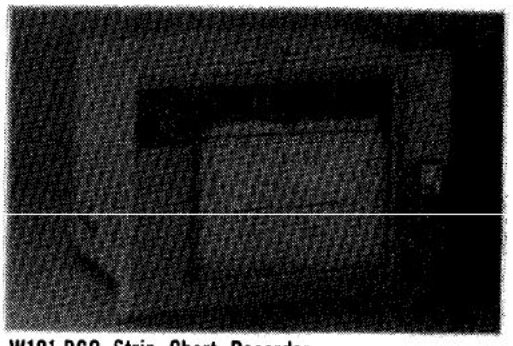
- Threshold 0 75 mph
- Potentiometer Linearity 0.5% std . . 0 25% special
- Resolution 0.72 degree
- Material Tail plastic; housing - aluminum; shaft, bearings & counter balance stainless steel
- Size Overall -21½"h x 21"l Tail- 4"W x 12"H x ¼" Thick at center & 1/8" at tip; airfoil
- . Weiyht Tad and supporting arm, 35 yms. Complete assembly. 1.6 lhs.

Translators

Stabilized power to operate the wind sensors; signal conditioning and ranging of the sensor outputs; and Impedance matching to recording systems are provided by the Model WT1034 Translator. Translators are available with either 0 to 360" or 0 to 540" output range for wind direction. Ranges to 0 to 50 mph and 0 to 100 mph are normally provided for wind speed. Other ranges can be obtained on special order. Automatic range switching, with an event pen to indicate the range, is also available as an option.

All circuitry is solid state, employing the latest in integrated circuitry design. Linearity is ±0.1%. The units may be operated from either 12 VOC or 115 VAC, 50160 Hz.

When purchased as a complete wind system. translators are built into the recorders. If sensors are to be used separately or with data logging or telemetry systems, separate enclosures for the translators are provided.



W101-DGO Strip Chart Recorder

The W101-DGO Strip Chart Recorder has dual galvanometric movements, one for recording wind speed and one for wind direction. The recorder has a 12 VOC chart drive.

Overall chart width is 11" with scales of 4¾" for wind speed and 4-5/16" for wind direction. Chartlength is 100 feet. Speeds of 15MM/hr., 30mm/hr., or 45mm/hr. may he obtained by changing the notched disc in the clock mechanism.

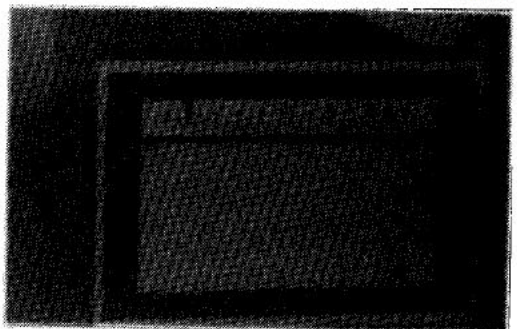
Chart paper is advanced by means of a pulse motor chart drive mechanism. Pulses for the motor are controlled by a contactless high frequency switch. Timing is provided by a precision battery operated clock which rotates a notched disc between the switch poles. Each time a notch passes between the switch poles, an output square wave pulse is generated. The number of notches on the disc determines the pulse motor stepping rate. Current dram for the chart drive circuitry is 10 mA. An AC/DC power supply is provided so that the recorder may also be operated on 115 VAC. 60 Hr.

Galvanometer movements require 6 mA for full scale deflection. Accuracy is 1.5% of full scale.

SPECIFICATIONS

W101-DGO Dual Galvanometric Recorder

• Recorder Movements	Galvanometric (0-6 mA)
. Accuracy	1.5%
• Chart Drive	
12 VOC Model	Pulse motor with DC clock; 10 mA current drain
. Chart Speeds	
12 VOC Model	15, 30, and 45mm/hr.
• Chart Length	100 feet rolls
• Power	12 VDC/115 VAC
. Weight	61% lbr.



REW 2P-12V/12V Two Pen Potentiometric Recorder, supplied as standard for AC systems.

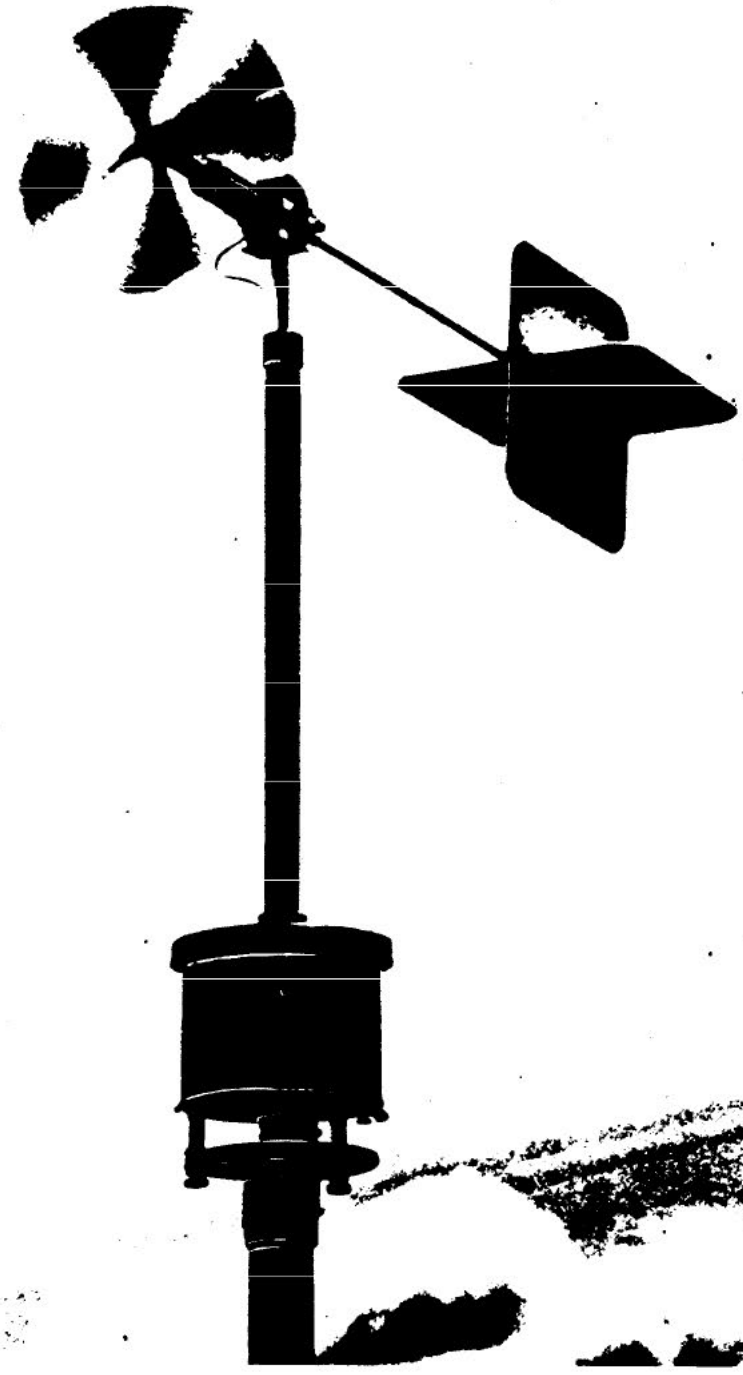
See p. 176 for spacificatianr

Ordering Specifications on following page.

SPECIFICATIONS: GILL ANEMOMETER BIVANE MODEL NO. 21001

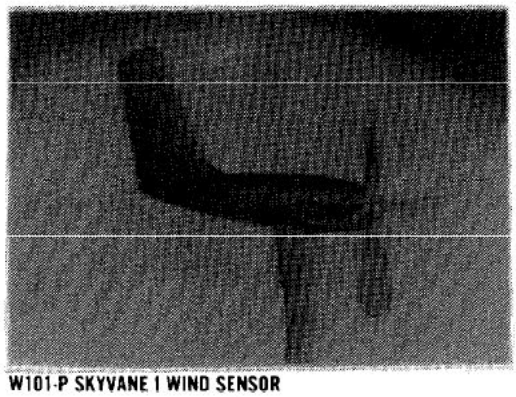
RANGE:	AZIMUTH – 360 DEGREES MECHANICAL, 355-359 ELECTRICAL (CONTINUOUS ROTATION). ELEVATION – PLUS/ MINUS 50 DEGREES.-WIND SPEED – O-50 MPH
THRESHOLD:	THRESHOLD SENSITIVITY OF VANE 0.3-0.5 MPH. THRESHOLD SENSITIVITY OF PROP-t-LLER 0.3-0.5 MPH.
DYNAMIC RESPONSE:	DAMPED NATURAL WAVELENGTH OF VANE 19.0 FEET (5.8 METERS). THEORETICAL UNDAMPED NATURAL WAVELENGTH OF VANE 14.8 FEED (4.5 METERS). 63% CRITICALLY DAMPED (DAMPING RATIO H = .63). MAXIMUM OVERSHOOT FOR SINUSOIDAL FLUCTUATIONS 2% (ACTION OF PROPELLER IMPROVES RESPONSE OVER BIVANE CHARACTERISTICS). DISTANCE CONSTANT OF PROPELLER 2.4 FEET (0.74 METERS). (DISTANCE CONSTANT = WIND PASSAGE FOR PROPELLER TO REACH 63% OF STEP-WISE CHANGE.) SEE DYNAMIC RESPONSE CURVES.
SIGNAL OUTPUT:	VANE: PLUS/MINUS 0.5 MILLIAMP THROUGH 1400 OHMS FROM PRECISION LOW TORQUE POTENTIOMETERS WHEN USED WITH POWER SUPPLY TRANSLATOR. LINEARITY 0.5%. LIFE EXPECTANCY 20 MILLION CYCLES (2-4 YEARS NORMAL USE). PROPELLER: O-5 MILLIAMPS THROUGH 60 OHMS FROM MINIATURE D.C. TACHOMETER GENERATOR. LIFE EXPECT-ANCY 1000 MILLION REVOLUTIONS (3-4 YEARS NORMAL OPERATION). POWER SUPPLY TRANSLATOR HAS PROPER DAMPING AND CALIBRATION CIRCUITS FOR VANE POTENTIO-METERS AND TACHOMETER GENERATOR:
WEIGHT:	OVERALL NET WEIGHT 6 POUNDS. SHIPPING WEIGHT APPROXIMATELY 25 POUNDS.
DIMENSIONS:	OVERALL HEIGHT 33 INCHES. OVERALL LENGTH OF VANE AND PROPELLER 33 INCHES. DIAMETER OF PROPELLER 9 INCHES. DIAMETER OF BASE 6 1/2 INCHES. MOUNTS ON STANDARD 1 1/2 PIPE.

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	**SPECIFICATIONS FOR THE GILL ANEMOMETER BIVANE – MODEL NO. 21001**	Figure 2.3-33



LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	PHOTOGRAPH OF THE GILL ANEMOMETER BIVANE – MODEL NO. 21002	Figure 2.3-34

Wind



W101-P SKYVANE I WIND SENSOR

DESCRIPTION

The W101 P Skyvane I Wind Sensor is the latest mode, of our rugged and top-quality professional a n d industrial grade wind sensor with exi ellent response and performance characteristics It is now available with a variety of options to permit application as the sensor f o r battery operated wind stations, data logging systems, wind displays, and t e l e m e t r y stations The sensor features reinforced fiberglass and epoxy plastic construction to provide ruggedness and light weight. All materials used are corrosion resistant. Universal mounts have been incorporated in the internal design o f the sensor to permit installation o f either an AC generator, DC generator. or a frictionless high frequency tachometer f o r wind speed measurements. Single or dual wiper 1000 Ohm long life conductive plastic potentiometers housed in the base of the sensor are supplied as standard for 360° or 540" wind direction measurements Conductive plastic potentiometers provide infinite resolution and a lifetime about 10 times that of wire wound potentiometers Other resistance range potent,"-meters or A C selsyn motors a r e available o n special o r d e r Matching translators for signal conditioning of any of the combinations of transducers listed above are available

Wind speed is measured by means of a four-bladed Fiberglas reinforced propeller mounted on a rotating shaft. The propeller shaft can be coupled to a six pole AC generator, a DC genera,",. or the notched disk of a high frequency tachometer, depending on the option selected for measuring wind speed.

For general purpose applications, an AC generator is most commonly supplied The absence of brushes provides for long life and a relatively low starting threshold. The AC generator has some loss of linearity at low wind speeds (< 5 MPHI.

The DC generator is used in applications where a rectifier circuit is not practical, It has excellent linearity but somewhat higher starting threshold due to brush friction.

For the most exacting requirements, a frictionless high frequency tachometer is recommended It yields the lowest starting threshold. A light weight, notched aluminum disk attached to the propeller shaft is rotated between the oscillator and receiver of a high frequency tachometer. The oscillator and receiver are separated by a 1/8" gap and are encapsulated together with the solid state electronics in a small plastic cube. As each notch in the metal disc passes between the oscillator and receiver, a square wave pulse is generated. 14 pulses/revolution is standard. 12 VDC applied to the tachometer yields an output pulse of slightly fess than 12 VDC. 6 VDC tachometers or tachometers with more than 14 pulses/revolution can also be supplied on special order

Starting speed with an AC generator is -1 MPH with complete tracking at 3 MPH It is slightly lower for the high frequency tachometer

Translators are available as signal conditioning units to enable data from the W101 P to be input into strip chart recorders, data logging, and telemetry systems.

Solid state electronics on printed circuit boards provide signal conditioning and ranging. Translators must be selected to match the sensor transducers A stabilized power supply is provided for operation at 12 VDC or 115 AC. 60 Hz. 220 VAC 50/60 Hz is available.

Wind direction can be recorded as o-360° full scale or 0-540° (0 -90 -180 270 -360 -90 -180°) depending up"" the translater used. The 0540 system provides a voltage shift that moves a recorder pen 360° upscale or downscale whenever the pen reaches either edge of the chart. This eliminates painting of strip charts when the wind direction is about north.

Translators have a range doubling switch in the wind speed circuit for convenience in changing scales.

APPLICATION

A general-purpose wind sensor for use with strip chart recorders, data logging, and telemetry systems. Excels where rugged environmental conditions exist.

SPECIFICATIONS

W101-P Skyvane I Wind Sensor

. Size	29" long x 31 ¼" high
. Propeller	4 blades, 13¾" diameter, Fiberglas reinforced plastic
. Starting Speed	-1 mph
• Complete Tracking	3 mph
• Maximum Speed	200 mph
. Wind Speed Transmitter	AC generator. DC generator, or high frequency tachometer
. Distance Constant (30 mph)	Nominally 6 2 '
. Accuracy	1 mph below 25 mph; ' 5% above 25mph
• Time Constant (30 mph)	Nominally 0.145 sec
. Wind Direction Transmitter	2" diam., 1000 ohm infinite resolution conductive plastic potentiometer, 356 ' 1 standard Others on special order.
. Weight	12 lbs.; shipping 20 lbs

Translators

. Size	11¾" W x 6"H x 6½"D
. Current Drain	Nominally 20 mA at 12 VDC
• Power Requirement	12 VDC or 115 VAC. 50160 Hz (230 VAC on special order)
. Input Signals	
Wind Speed	AC Generator O-18 VAC (100 mphl DC Generator. O-13.3 VDC (100 mph) HF Tachometer O-26.000 pulses/min. (100 mph)
Wind Direction	0 6.5 VDC across 1000 ohms
. Output Signals	O-I VDC (adjustable to 5 VDC) (other outputs on special order)
. Weight	4% lbs.; Shipping: 8 lbs

ORDERING SPECIFICATIONS

Sensors

. W101-P-AC/360 Skyvane I Wind Sensor, with AC generator and O-360' potentiometer (single wiper)

. W101-P-AC/540 Skyvane I Wind Sensor, with AC generator and 0.540' potentiometer (dual wipers)

• W101-P-HF/360 Skyvane I Wind Sansor, with high frequency tachometer and O-360' potentiometer (single wiper)

• W101-P-HF/540 Skyvane I Wind Sensor, with high frequency tachometer and O-540' potentiometer (dual wipers)

. W101-P-DC/360 Skyvane I Wind Sensor, with DC generator and 0-360° potentiometer (single wiper)

• W101-P-DC/540 Skyvane I Wind Sansor, with DC generator and 0-540° potentiometer (dual wipers)

To substitute a 115 VAC Selsyn motor in lieu of the potentiometer. replace 360 or 540 in above model numbers with the letter S and increase price by $25.00.
(Example: W101-P-AC/S,)

. W101.M 10' Mast.

. W101-MA Mast Adapts,.

Translators (In box)

. WTB101-AC/360 Translator, for use with W101-P-AC/360 sensor, 12 VDC or 115 VAC, 50/60 Hz.

• WTB101-AC/540 Translator, for use with W101-P-AC/540 sensor. 12 VDC or 114 VAC. 50/60 Hz.

• WTB101-HF/360 Translator, for use with W101-P-HF/360 sensor. 12 VDC or 115 VAC, 50/60 Hz.

• WTB101-HF/540 Translator, for use with W101-P-HF/540 sensor. 12 VDC or 115 VAC. 50/60 Hz.

• WTB101-DC/360 Translator, for use with W101-P-DC/360 sensor, 12 VDC or 115 VAC, 50/60 Hz.

• WTB101-DC/540 Translator. for use with W101-P-DC/540 sensor, 12 VDC or 115 VAC. 50/60 Hz.

(Translators also available in card configuration for rack mounting — use Model No. WTR101- in lieu of WTB101-.)

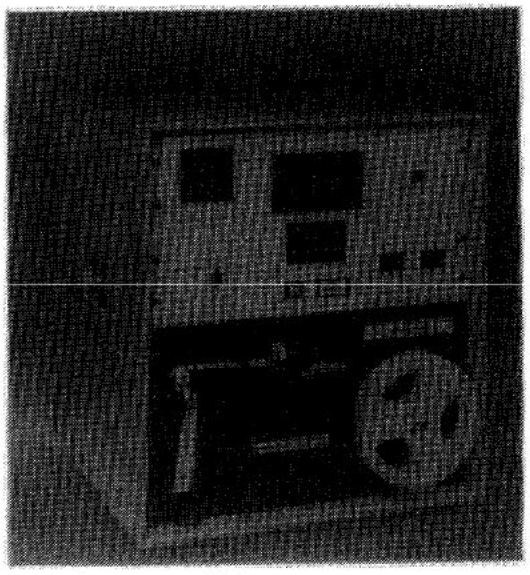
All Prices F.O.B. Sacramento

LOUISIANA POWER & LIGHT CO.
Waterford Steam Electric Station

SPECIFICATION OF THE W101-P SKYVANE I WIND SENSOR

Figure 2.3-35

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	PHOTOGRAPH OF THE W101-P SKYVANE I WIND SENSOR	Figure 2.3-36



M731 DIGITAL DATA LOGGER

DESCRIPTION

The M731 Digital Data Logger is a complete data recording system. It accepts a wide variety oi analog for digital) signals and records them in computer compatible format on either paper tape or magnetic tape. The latest developments in solid state integrated circuitry are utilized. This enables the system to achieve the ultimate in reliability at low cost.

The M731 Data Logger consists of a signal processing section and a recorder. The signal processing section contains a 20-channel multiplexer, analog to digital converter, time code generator, parity generator, and an output register. Either a paper tape punch or a magnetic tape deck is provided for recording the data. This digital data logger is a complete link between sensors of many types and a computer. Some examples of parameters that may be recorded when converted by transducers to voltage signals are temperature, wind direction, wind speed, solar radiation, pressure, displacement, position and water quality. The data logger can also accept digital data (shaft encoders, precipitation counting, rate, etc.), when requested. as an option.

There are three modes of operation: single channel (SC); single scan (SS); and continuous. In the "single scan" mode the logger makes one complete scan at a rate of one channel per second and is then idle until the start of the next scan. The interval between scans is switch-selectable at 1. 2, 5, 10, 20. 30. or 60 minutes. The length of the scan is also switch-selectable in terms of the number of channels scanned before going into the idle mode. Each scan starts at channel number one and continues through the channel number set on the thumbwheel switch labelled "last channel."

In the "continuous" mode the logger scans all channels in sequence at the rate of one channel per second "Continuous" scanning ceases only when the "stop" button is pushed. Othersampling rates are available upon request as an option. Switch selectable sampling rates of 1. 2. 5. and 10 channels per second (as illustrated) are also available as an option.

In either "single scan" or "continuous" modes time is recorded at the beginning of each scan.

The "single channel" mode is used to display (not record) the level of any channel's input.

The scanning is accomplished by high performance reed switches. These switches are designed to switch low level signals with a minimum of thermal offset due to switch contacts.

An integration type of analog to digital converter is used. The converter generates a BCD output of 12 bits plus sign. Its input impedance is greater than 100 megohms. The accuracy is 0.1% of reading ± 1 millivolt at 70°F with a temperature coefficient of .005%/°F when operating over a temperature range +32°F to 140°F. Operating outside of these temperature limits is possible with reduced accuracy. The standard input voltage range is ± one volt full scale. Other inputs can be provided for on special order.

Punched paper tape is often used as a recording medium because of its computer compatibility and economy. Either IBM or ASCII code may be specified.

Incremental or continuous magnetic tape recorders are also available. IBM, BCD seven-track 556 bpi format is standard. IBM nine-track 800 bpi format is available as an option.

APPLICATION

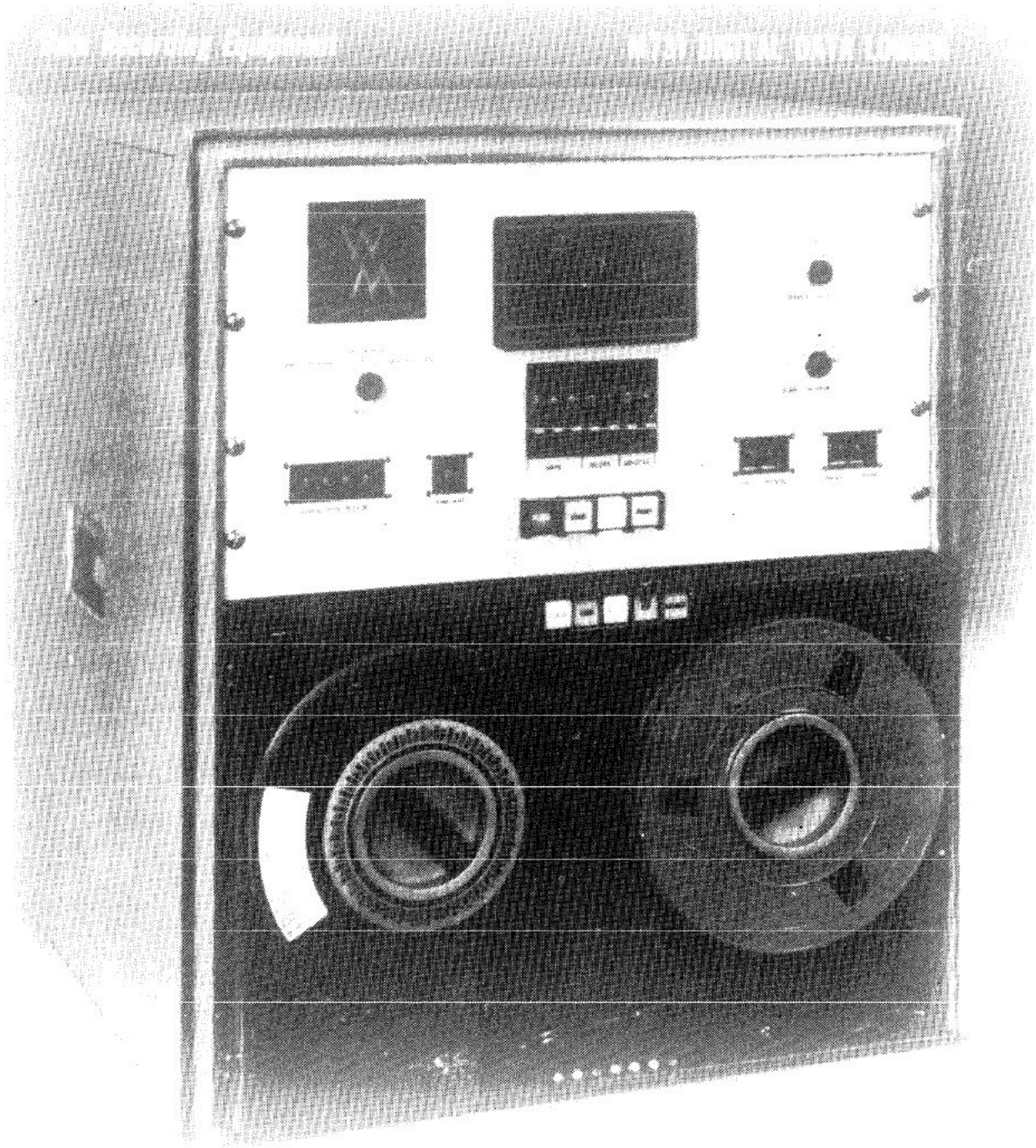
The M731 Data Logger is designed to record up to 20 channels of analog (or digital) data over long periods of unattended operation. The capacity of the magnetic tape recorder is so great that it will seldom limit the duration of a data recording operation. The capacity of the paper tape recorder is much less but very adequate for many requirements. Recording duration for some typical input conditions are as follows:

Number of Channels	Scan Interval (Min.)	Recording Duration (days) 950' Paper	1200' Mag.	Inter-Record Gap Interval
20 + Time	60	51		
	10	8	610....	.1x/day
	5	4	313	
	1	.8	62	
	60	51		
	10	8	352..	..1x/hr
	5	4		
	1	.8	2520	
10 + Time	60	91		
	10	15	819..	.1x/day
	5	7	421	
	1	1.5	86	
	60	89		
	10	15	503...	. .1x/hr
	5	7	318	
	1	1.5	81	

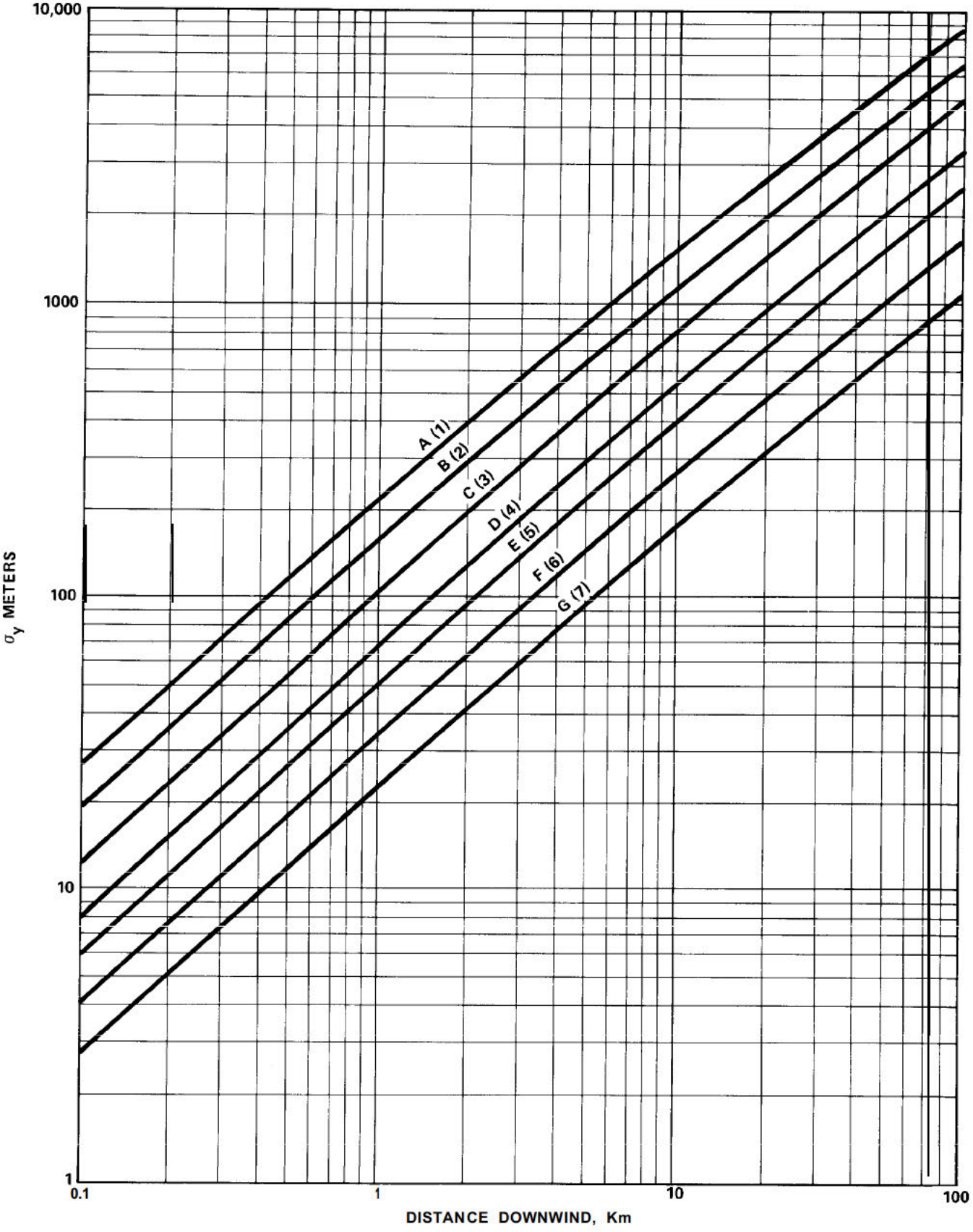
This data logger was designed for the highest possible reliability and great flexibility to meet the requirements of a wide variety of applications including those requiring long term unattended data logging operations. All components ware selected with the same requirements in mind.

To prevent power failures from interrupting the record, a stand-by power supply which will start automatically upon power failure is available as an option.

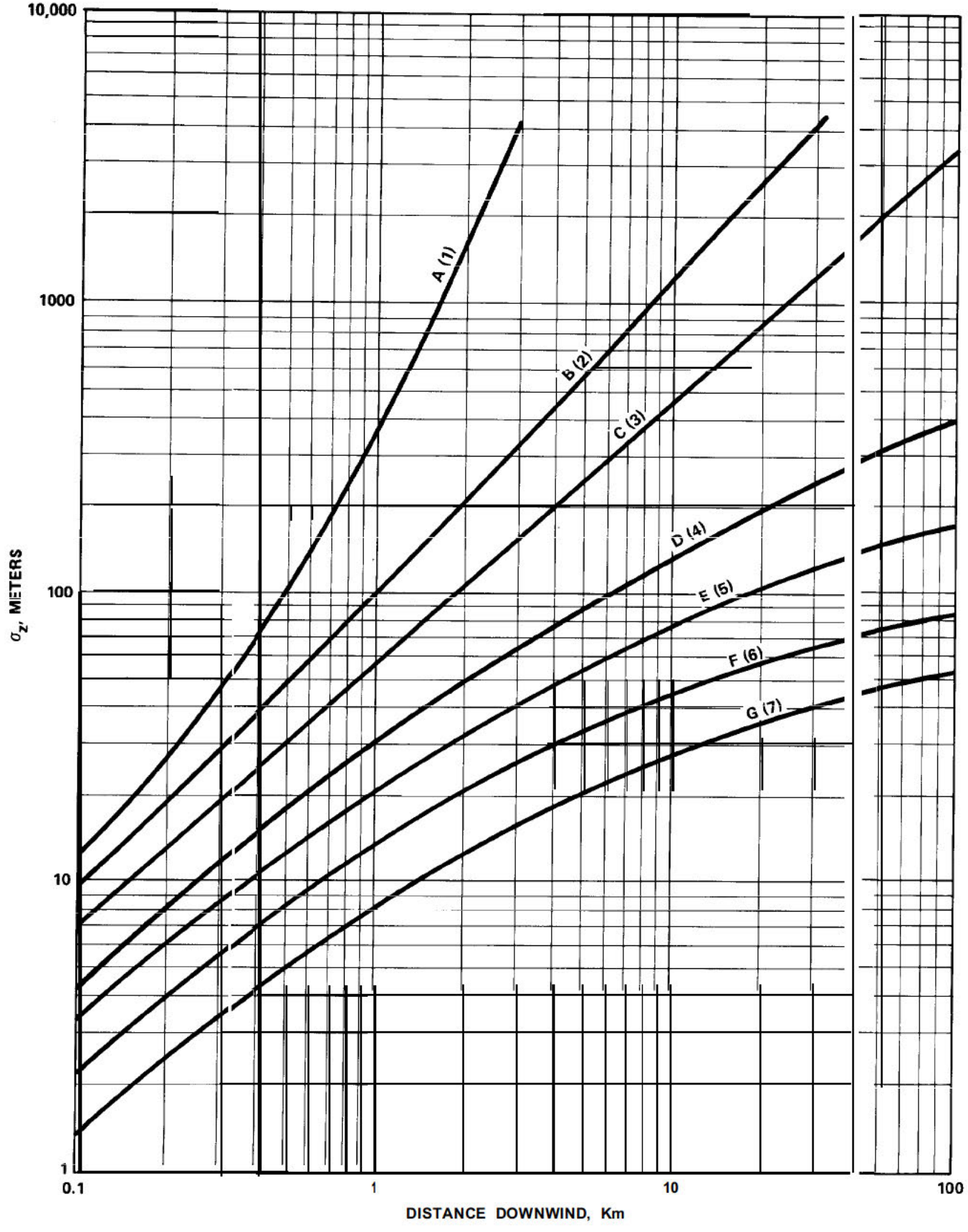
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	SPECIFICATIONS OF THE M731 DIGITAL DATA LOGGER	Figure 2.3–37



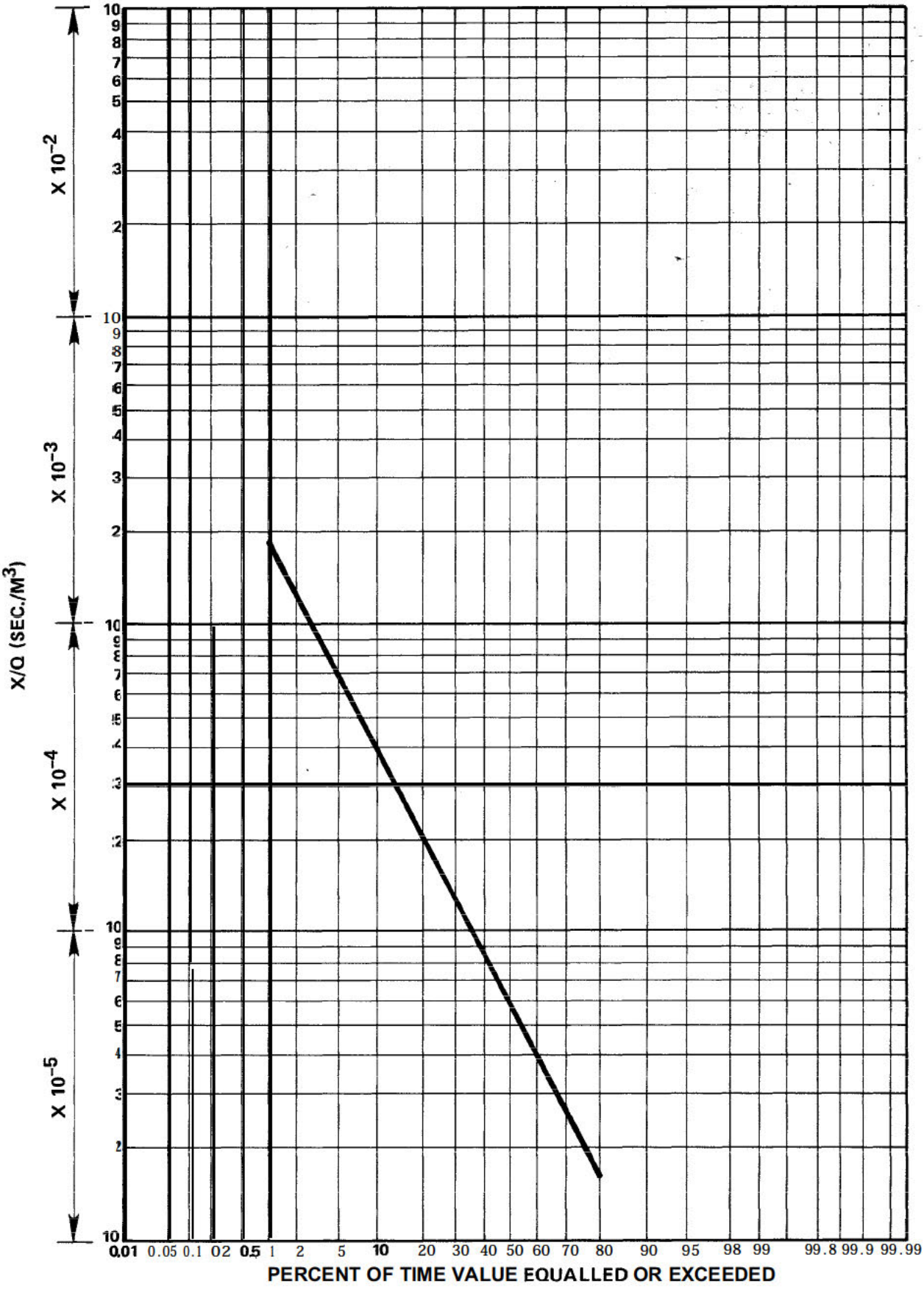
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	PHOTOGRAPH OF THE M731 DIGITAL DATA LOGGER	Figure 2.3-38



LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	HORIZONTAL DISPERSION COEFFICIENTS	Figure 2.3-39



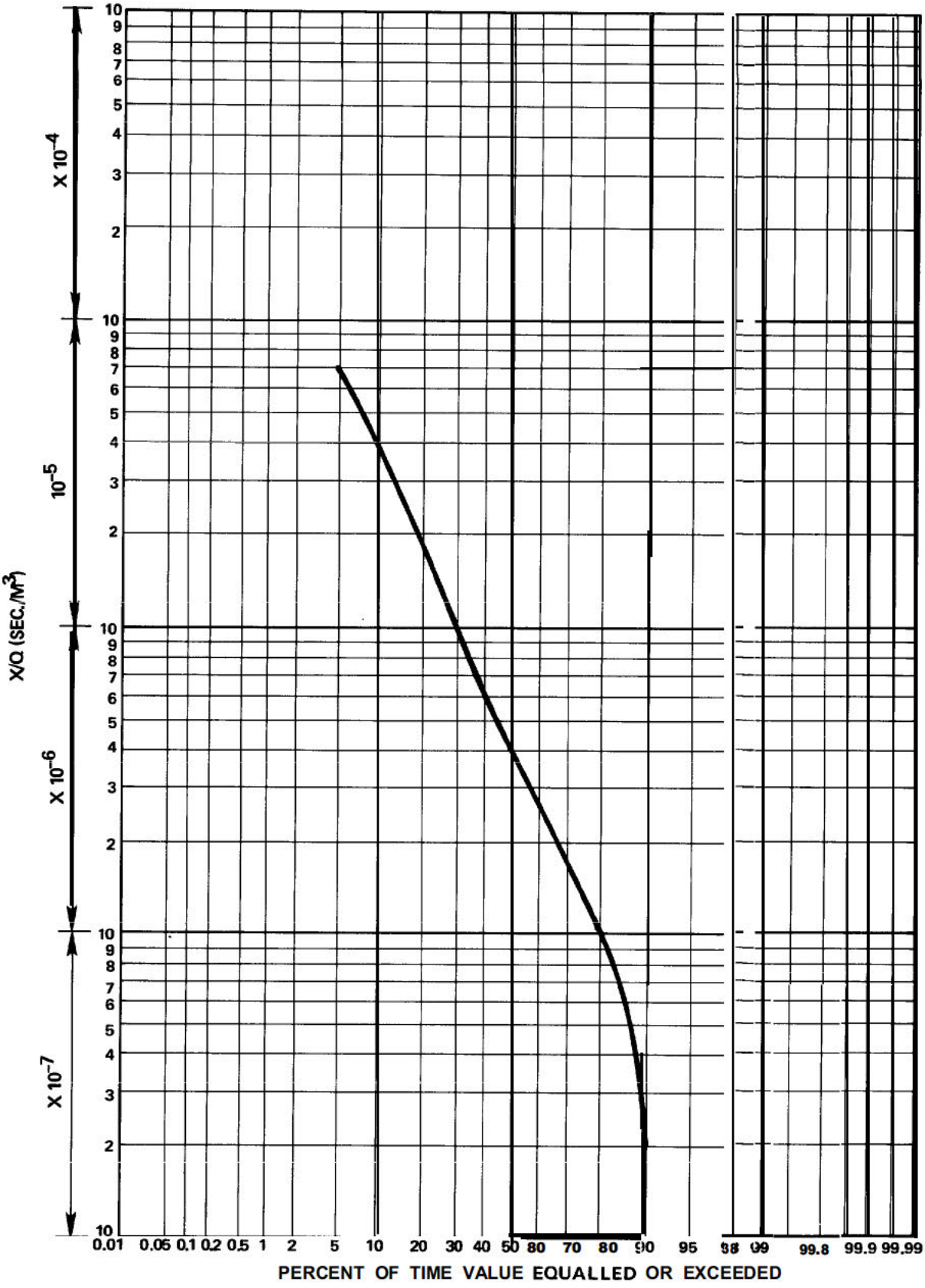
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	VERTICAL DISPERSION COEFFICIENTS	Figure 2.3-40



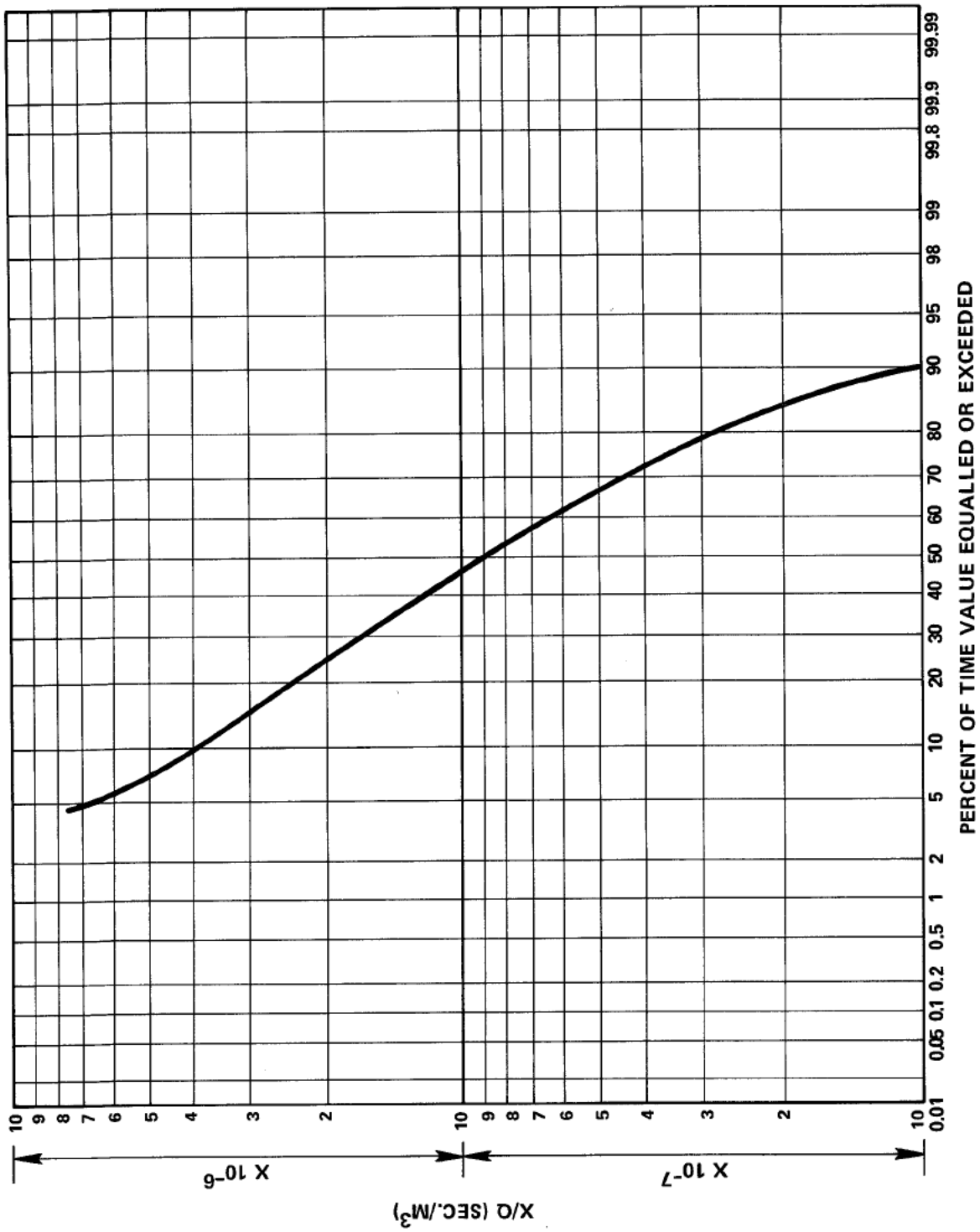
LOUISIANA
POWER & LIGHT CO.
Waterford A Steam

DIRECTIONALLY INDEPENDENT - CUM. FREQ. DISTRIBUTION OF X/Q AT THE MIN. SITE BND'Y – JULY 1972 - JUNE 1975 & FEB. 1977 – FEB. 1978 - 1 HOUR PERIOD

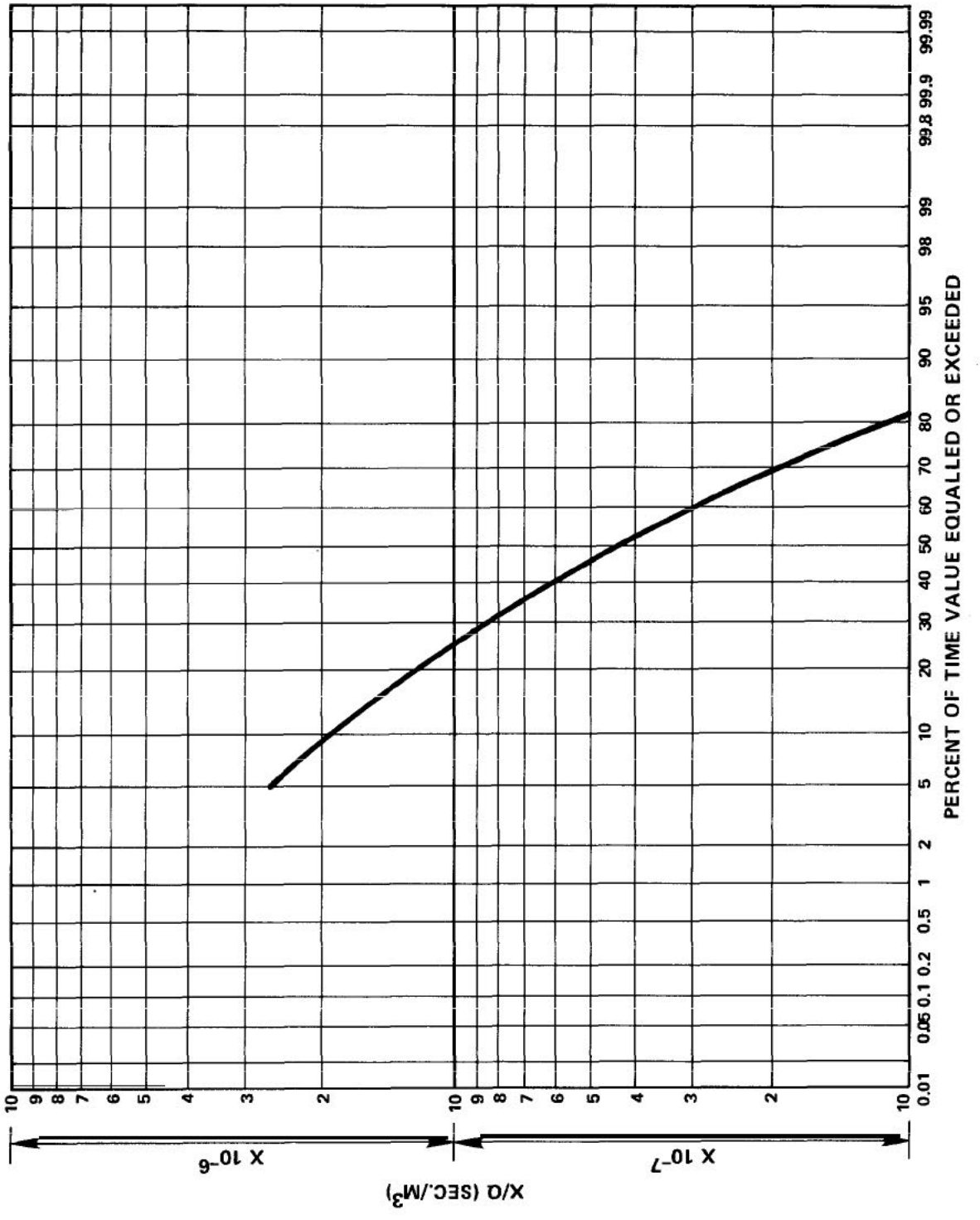
Figure
2.3–41



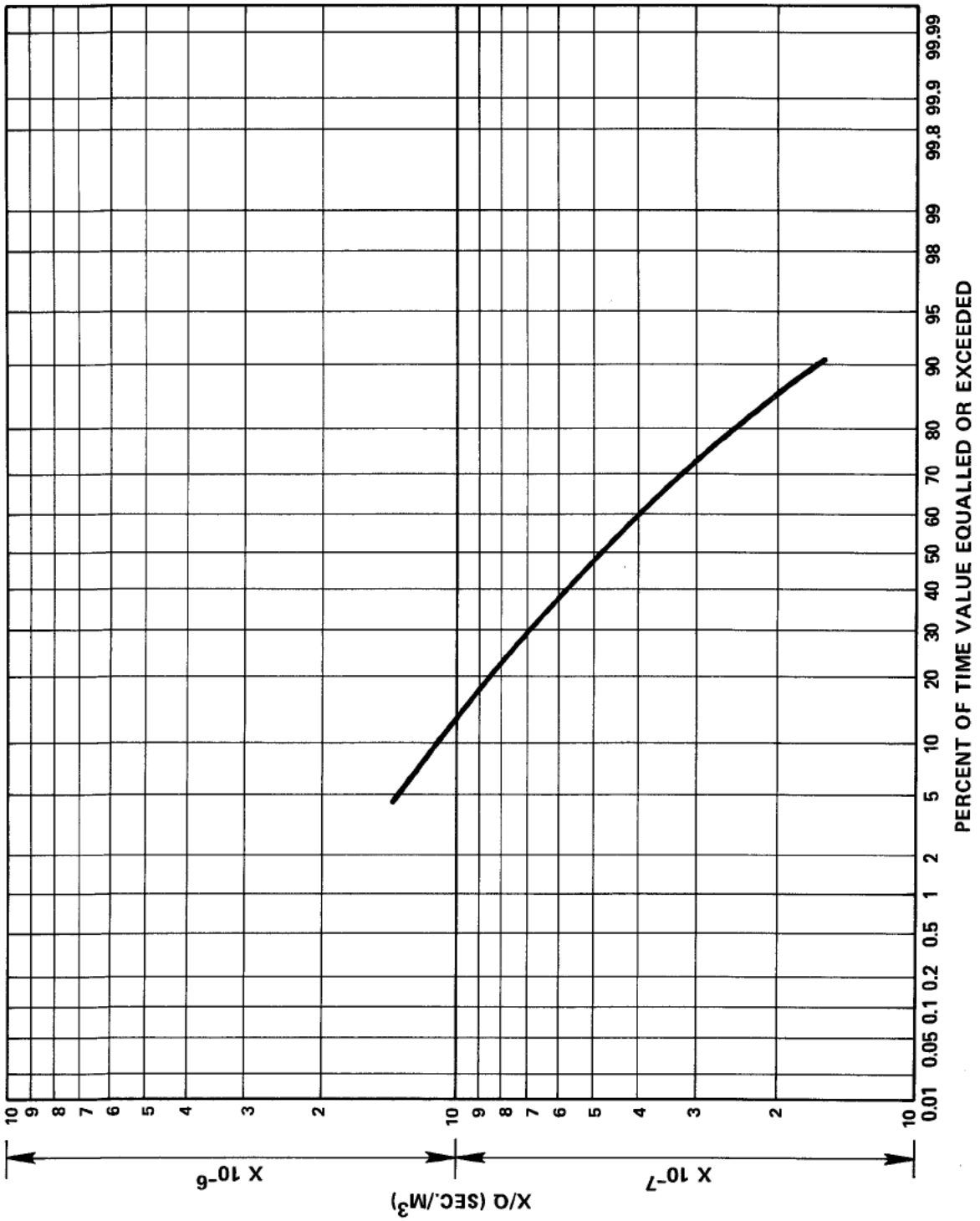
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	DIRECTIONALLY INDEPENDENT- CUM. FREQ. DISTRIBUTION OF X/Q AT THE OUTER BOUNDARY OF THE LOW POP. ZONE JULY 1972 - JUNE 1975 & FEB. 1977 – FEB. 1978 - 8 HOUR PER.	Figure 2.3-42



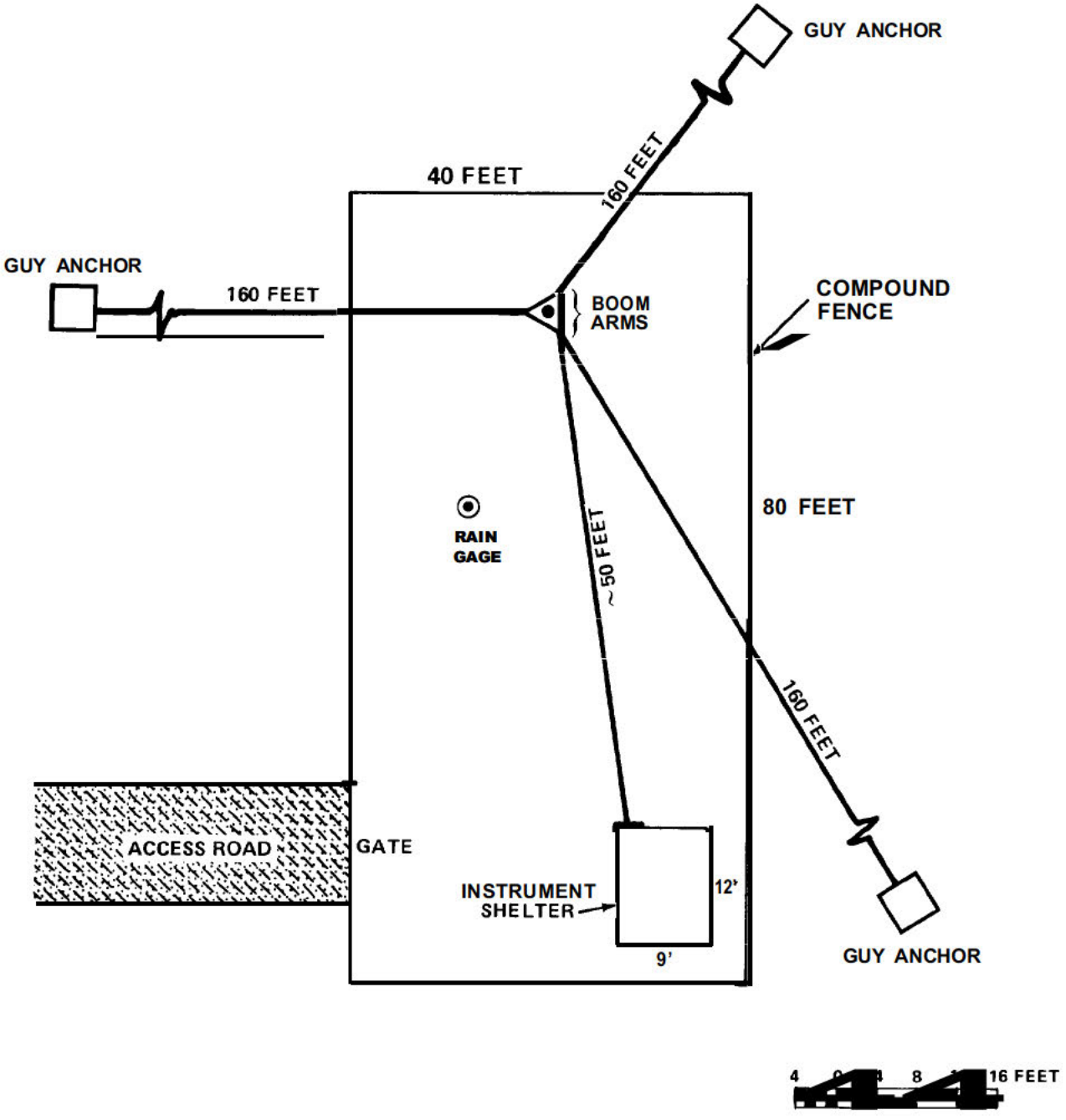
LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	DIRECTIONALLY INDEPENDENT - CUM. FREQ. DISTRIBUTION OF X/Q AT THE OUTER BOUNDARY OF THE LOW POP. ZONE JULY 1972 - JUNE 1975 & FEB. 1972 - FEB. 1978 – 16 HOUR PER.	Figure 2.3–43



LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	DIRECTIONALLY INDEPENDENT - CUM. FREQ. DISTRIBUTION OF X/Q AT THE OUTER BOUNDARY OF THE LOW POP. ZONE JULY 1972 - JUNE 1975 & FEB. 1972 - FEB. 1978 – 3 DAY PER.	Figure 2.3-44



LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	DIRECTIONALLY INDEPENDENT - CUM. FREQ. DISTRIBUTION OF X/Q AT THE OUTER BOUNDARY OF THE LOW POP. ZONE JULY 1972 - JUNE 1975 & FEB. 1972 – FEB. 1978 - 26 DAY PERIOD	Figure 2.3–45



NOTE
GUY ANCHOR LOCATIONS HAVE NOT BEEN FINALIZED.

LOUISIANA POWER & LIGHT CO. Waterford Steam Electric Station	DIAGRAM OF PRIMARY METEOROLOGICAL TOWER COMPOUND	Figure 2.3-46

Security Related Information
Figure Wittheld Under 10 CFR 2.390

REVISION 2 (12/88)

LOUISIANA POWER & LIGHT CO.
Waterford Steam Electric Station #3

LOCATIONS OF PRIMARY AND BACKUP METEOROLOGICAL MONITORING SYSTEMS

FIGURE 2.3-47

Security Related Information
Figure Wittheld Under 10 CFR 2.390

REVISION 14 (12/05)

WATERFORD STEAM
ELECTRIC STATION "3

SOURCE AND RECEPTOR LOCATIONS
FOR CONTROL ROOM ATMOSPHERIC
DISPERSION CALCULATIONS

FIGURE 2.3-48