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October 1, 1984

Mr. H. R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. NUCLEAR REGULATORY COMMISSION
Washington, D. C. 20555

Attention: Mr. J. R. Miller, Chief
Operating Reactors, Branch 3

Gentlemen:

DOCKET NOS. 50-266 AND 50-301
METEOROLOGICAL AND DOSE ASSESSMENT SYSTEM DESCRIPTION
POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2

As we committed in our letter dated March 8, 1984, this submittal provides the current status and a description of the new meteorological monitoring system for our Point Beach Nuclear Plant, Units 1 and 2. A description of the dose assessment portion of the program will be provided when the vendor problems with the new computer system, discussed in our letter dated October 1, 1984, are resolved.

The meteorological (MET) system is nearing completion. The equipment for the primary and backup towers and the strip chart recorders in the control room are fully operational. The inland tower has been erected, the power supply for instrumentation is available, a dedicated telephone line for transmission of signals to the control room is installed, and a three-pen strip chart recorder is mounted in the control room for display of inland tower wind speed, wind direction, and sigma theta data. To complete the installation of the MET system, the actual instrumentation on the inland tower must be installed and calibrated, and the final telemetry line connections must be made. One additional strip chart recorder will also be installed in the control room to accommodate reference temperature and solar radiation data.

We have discovered potential problems in the way the inland tower foundation was laid which may require tower disassembly and reconstruction of the tower foundation. However, we still expect to complete the inland tower installation during October 1984 as previously scheduled. Attachment 1 is a description of the complete meteorological monitoring system.

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The Class A model and its associated software are essentially complete, except for integration and checkout on the new computer system. These latter activities cannot be completed until after delivery of the new computer as discussed in our October 1 letter. Much of the required cabling is in place, except for a few short runs and the computer terminations which are dependent on installation of the new computer.

The Software Design Report (SDR) for the Class A model has been prepared. However, the contractor who developed the model considers the SDR to contain proprietary information and is in the process of developing a non-proprietary version. When this is available, we will forward both versions of the SDR along with a request for withholding from public disclosure in accordance with 10 CFR 2.790.

Should you have any questions concerning this information, please call us.

Very truly yours,

C. W. Fay

Vice President-Nuclear Power

C. W. Fay

Attachments

Copy to NRC Resident Irspector

ATTACHMENT 1

METEOROLOGICAL MONITORING SYSTEM

A. INTRODUCTION

The new meteorological monitoring (MET) system at the Point Beach Nuclear Plant is designed to fulfill the requirements of NUREG-0737, Item III.A.2.2, "Meteorological Data". The real-time data will be used as an input to the Class A model to help provide estimates of radiation doses resulting from routine or emergency radioactive releases from the plant.

B. MONITORING TOWER LOCATIONS

Care was taken in selecting monitoring sites to avoid local topographic features and man-made structures which could significantly bias meteorological measurements. All towers are separated from nearby obstructions by distances equal to at least ten times the obstruction height in order to minimize disturbances in the wind field being measured. All instrument booms extend at least two tower widths from the tower and are oriented into the predominant wind direction. Temperature sensor aspirator shields are pointed horizontally, to the north, to minimize the tower's effect on measurements and the intake of precipitation.

A significant meteorological phenomenon affecting areas bordering a large body of water is the lake breeze. This phenomenon, as well as gradient onshore stable flow, can result in the formation of a thermal internal boundary layer (TIBL) which can adversely affect the dispersion of atmospheric contaminants under certain conditions. The effect of Lake Michigan upon meteorology in the vicinity of Point Beach was a major consideration in siting the individual monitoring towers. Figure 1 is a map showing the location of each of the tower sites.

The primary monitoring tower consists of the original 45-meter tower instrumented with new equipment at the 10 and 45-meter levels. This tower is located approximately 850 meters south-southeast of the plant, about 40 meters inland of the Lake Michigan shoreline. The 45-meter level of the primary tower approximates the height of elevated plant releases. The 10-meter level is designed to provide meteorological data representative of ground level releases. This tower's location is such that it should almost always be in the same meteorological regime as the plant with respect to localized lake effects. Figure 2 illustrates the upgraded primary tower site layout.

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The backup monitoring tower is located approximately 500 meters northwest of the plant and approximately 300 meters inland of the Lake Michigan shoreline. This tower is instrumented at the 10-meter level to provide backup information in the event of a failure at the primary tower. The backup tower site was chosen so that it would usually be in the same meteorological regime as the plant with respect to localized lake effects. Figure 3 illustrates the backup tower site layout.

The inland tower is located approximately 14.5 kilometers west of the plant. This location was chosen and the tower designed to provide information on the penetration of lake breezes inland from the shoreline. Figure 4 illustrates the inland tower site layout.

C. MONITORED PARAMETERS AND INSTRUMENTS

Table 1 presents a summary of the monitored parameters and the range of the instruments. Wind speed and wind direction are measured at the 10-meter level at all three towers and also at the 45-meter level of the primary tower. Wind speed is monitored using a light chopper/ tachometer type system. Wind direction is measured using a linear potentiometer-wind vane arrangement. Sigma theta is computed digitally at the tower sites from each 10-meter level wind direction signal by a microprocessor circuit.

Reference and differential temperature equipment consist of a four-lead platinum resistance temperature device (RTD) at each of the two monitoring levels at the primary tower (10 and 45 meters) and at a height of 4 meters at the inland site (reference temperature only). The RTD's are located within mechanically aspirated thermal radiation shields to ensure exposure to a representative air sample and are connected to linear bridges which provide signal conditioning and analog output signals.

Precipitation is measured at the backup tower site using a heated, tipping-bucket rain gauge. A wind shield surrounds the precipitation gauge to effectively lower wind speed over the collection funnel which allows representative collection of even light snowfalls. The contact closure signals provided by the precipitation gauge are accumulated by the signal conditioner located at the tower site which produces an analog output signal.

Solar radiation is measured at the inland site (4-meter level) using an Epply black and white pyranometer. The pyranometer signal (which is temperature compensated) is processed by a translator circuit to produce an appropriate analog output.

The analog output from each parameter's signal conditioner is input to a telemetry transmitter for transmission to the plant control room. Each telemetry transmitter is capable of multiplexing up to nine channels of analog data, digitally formatting and transmitting the information as frequency shift keyed (FSK) to receivers located at the Point Beach control room. Private signal cables are used for linking the primary and backup site transmitters with the control room receivers. A dedicated, voice grade telephone line has been installed and will be used as the data link for the inland tower.

The telemetry receivers act to de-multiplex and convert the FSK signals to analog (0 to 10 volts dc) signals. Each parameter is then input to a servo-potentiometric strip chart recorder.

Ultimately these signals will be input to the new computer system. The MET data will be recorded and will be available for display on the new computer system CRT's in the control room, the technical support center, and the emergency operations facility. (See my letter dated October 1, 1984 for current computer system information.)

D. STATUS/ALARM SYSTEM

In addition to the monitored meteorological data, status information will be transmitted to the new plant computer when it becomes available. Each day, at a pre-determined time, a local timer activates a zero and span cycle at each monitoring tower location. The zero and span checks simulate low and high sensor outputs of selected monitoring parameters and are used to identify instrument malfunctions and circuit drift. During the zero-span cycle a status signal will be sent from the monitoring towers, via the telemetry system, to the new computer system to flag site

parameters which are not presenting valid data. This "out-of-service" signal may also be actuated manually during equipment malfunction, repair, or calibration to indicate invalid data transmission.

Status signals are currently generated to indicate receipt of telemetry carrier signal from each site. In addition, temperature sensor aspirators are equipped with a system which transmits an alarm signal in the event of a cut-off in flow.

E. SUPPORT EQUIPMENT

An 8 x 10 foot shelter is provided at each monitoring tower site for housing the signal conditioning equipment. Climate control is provided by electric resistance heating and a thermostatically controlled ventilating system. Temperature extremes are indicated by a mercury-in-glass min/max thermometer.

All signal conditioning circuits, telemetry cards, and necessary power supplies are contained in modular card cages within the shelters.

F. SYSTEM INSPECTIONS AND EQUIPMENT CALIBRATIONS

Zero and span results are checked against their nominal values on a daily basis. Monitoring tower sites are visually inspected at least monthly. This monthly inspection checks the physical integrity of the site, checks the visual appearance of the sensors for any obvious signs of weather damage or faulty operation, and verifies that the signal conditioning equipment is operating properly.

The sensors and instrumentation are calibrated semiannually to ensure the accuracy of the system. Calibrations are also performed after major equipment malfunctions, equipment modifications, and equipment replacements.

ATTACHMENT 1

TABLE 1

POINT BEACH NUCLEAR PLANT
METEOROLOGICAL MONITORING SYSTEM
PARAMETER SUMMARY

Sensor Location	Parameter	Range (Units)
Primary Tower		
45m level	wind speed	0-108 mph
	wind direction	0-540 degrees
	aspirator flow alarm	on-off
45-10m level	temperature difference	-10 to 10°F
10m level	wind speed	0-108 mph
	wind direction	0-540 degrees
	aspirator flow alarm	on-off
	reference temperature	-30 to 120°F
	sigma theta	0-108 degrees
ground level	zero/span status	on-off
Backup Tower		
10m level	wind speed	0-108 mph
	wind direction	0-540 degrees
	sigma theta	0-108 degrees
ground level	precipitation	0-10 inches
	zero/span status	on-off
Inland Tower		
10m level	wind speed	0-108 mph
	wind direction	0-540 degrees
	sigma theta	0-108 degrees
4m level	reference temperature	-30 to 120°F
	solar radiation	0-2 cal./cm^2-min.
	aspirator flow alarm	on-off
ground level	zero/span status	on-off

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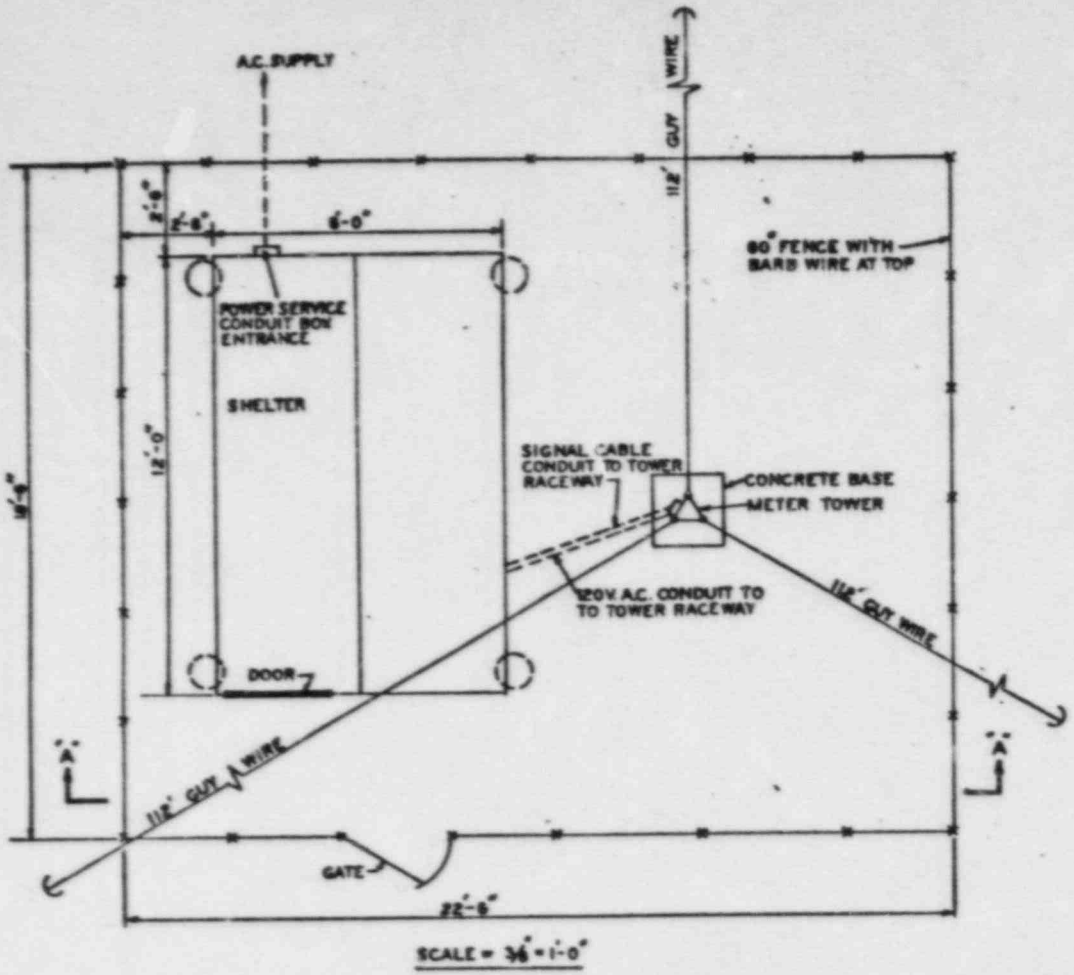

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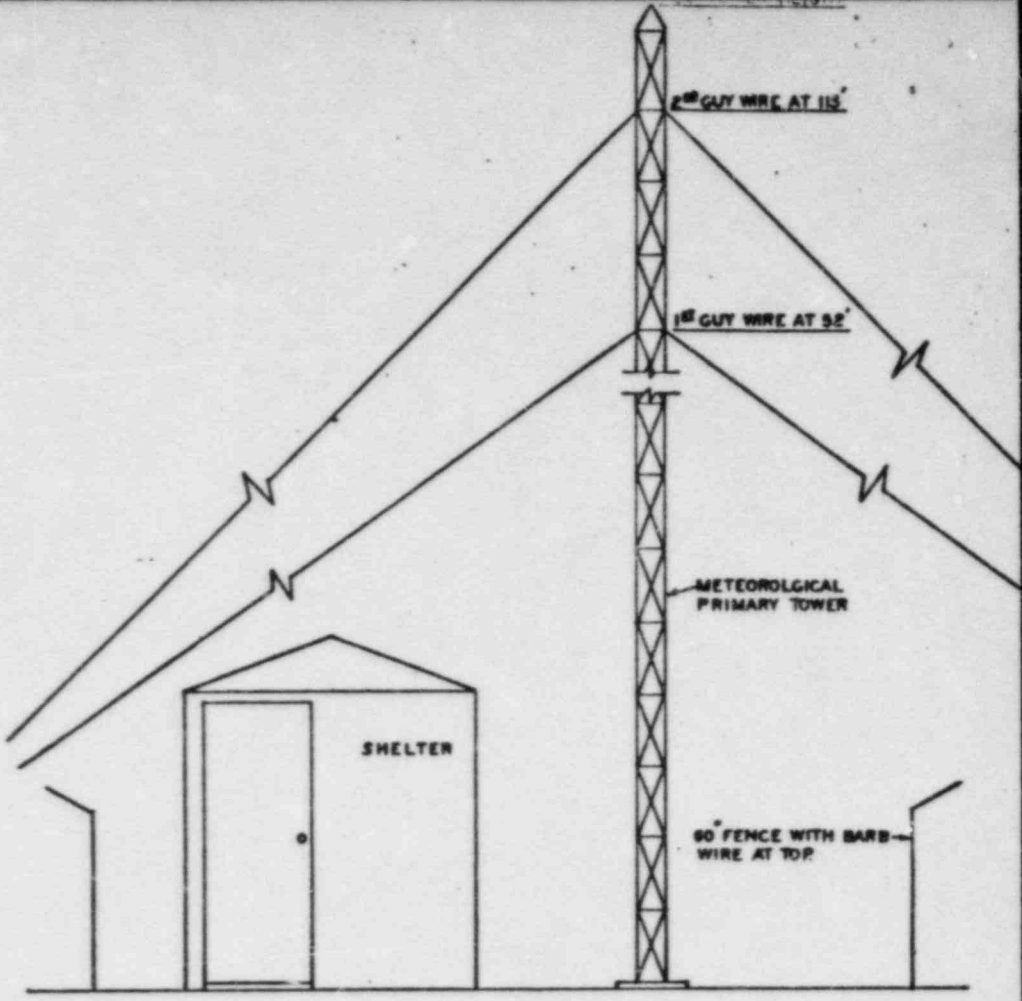
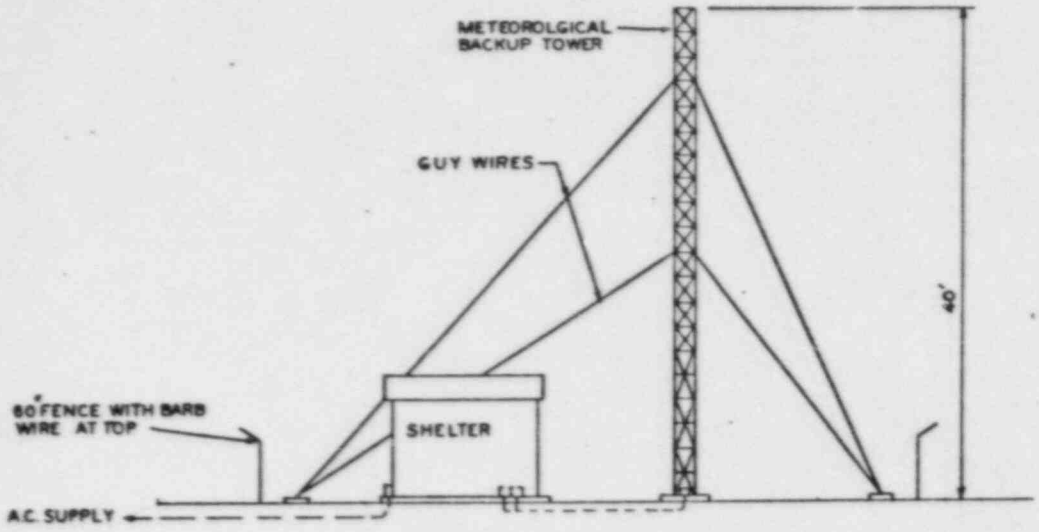
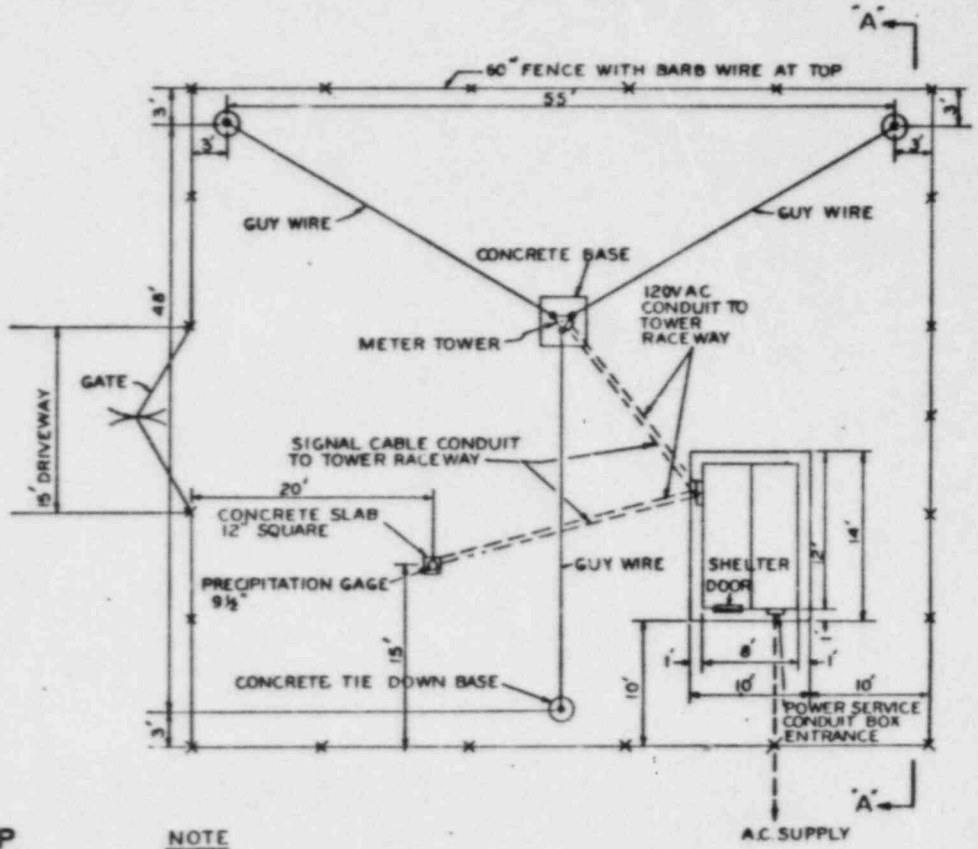


ELEVATION "A-A"
(NOT TO SCALE)

FIGURE 2
POINT BEACH NUCLEAR PLANT
METEOROLOGICAL MONITORING SYSTEM
PRIMARY TOWER SITE LAYOUT



ELEVATION "A-A"



NOTE
LENGHT OF GUY WIRES APPROX 32 FEET

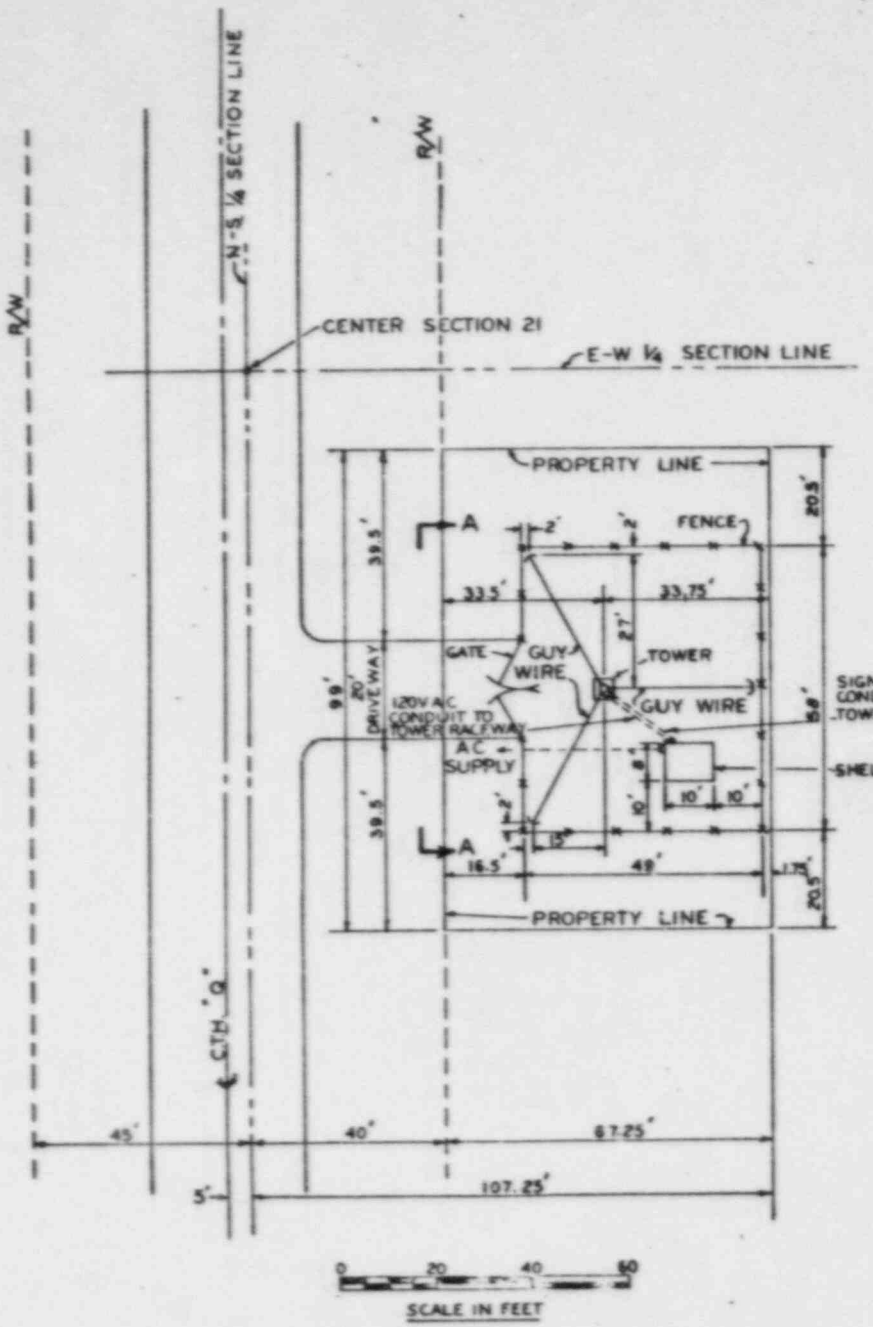
PLAN VIEW

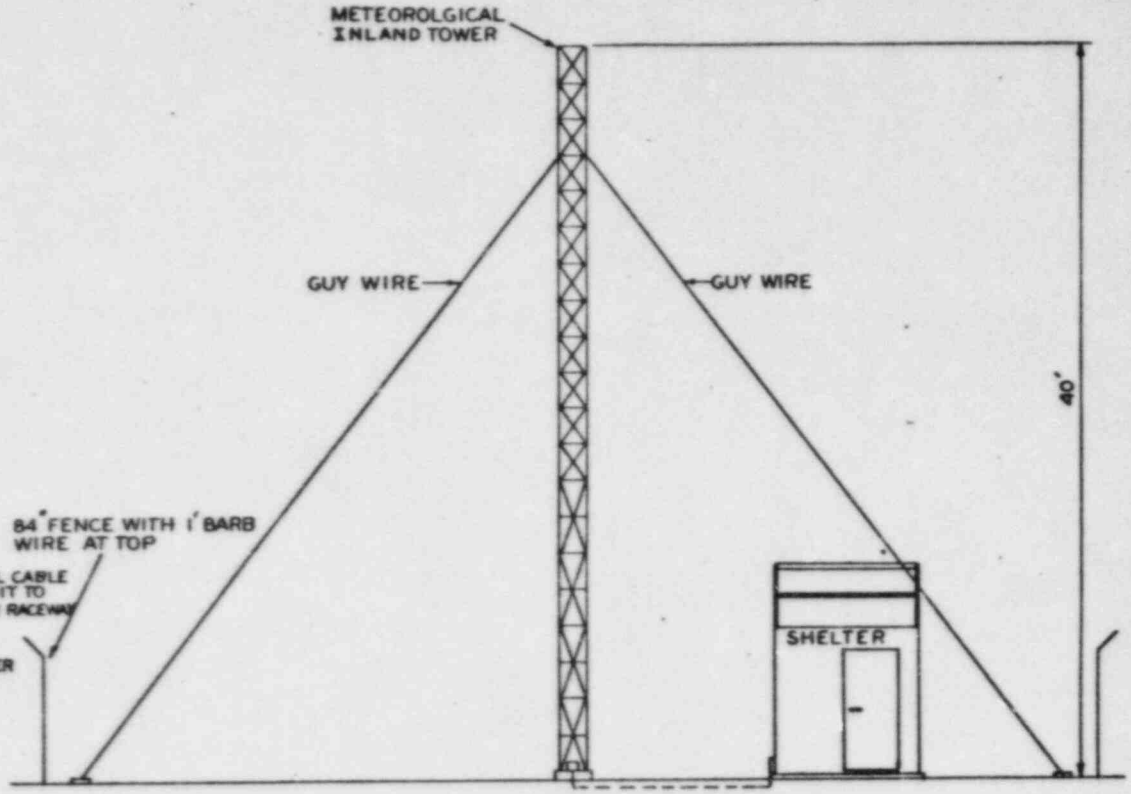
FIGURE 3

POINT BEACH METEOROLGICAL BACKUP TOWER, SHELTER AND ACCESS (SITE 2)

0 5 10 15 20

SCALE IN FEET





ELEVATION "A-A"

POINT BEACH INLAND TOWER, SHELTER AND ACCESS - SITE 3

FIGURE 4