Washington Public Power Supply System
P.O. Box 968 3000 George Washington Way Richland, Washington 99352 (509) 372-5000

Docket 50-508

December 21, 1982
G03-82-1313

Mr. G. W. Knighton, Chief
Licensing Branch No. 3
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: NUCLEAR PROJECT 3
FIGURES FOR ACCEPTANCE REVIEW QUESTIONS

Reference: a) Telecon between A. Vietti (NRC) and K. Cook (Supply System), November 23, 1982.

b) Letter #G03-82-1085, G. D. Bouchey to J. D. Kerrigan, dated October 22, 1982.

During the referenced telephone conversation the Supply System was requested to resubmit certain figures provided as part of our responses to NRC Acceptance Review Questions in reference b).

The figures for our response to Question #241.1 have been incorporated into the FSAR in Amendment 1. Thus the reviewer for this question should have these figures available now in good quality copy. The applicable FSAR figure numbers are: 2.5-110, 112, 113, 114, 115, 116, 118.

Attached you will find 11"x17" copies of the figures for our responses to Questions 241.2, 241.3 and 241.6, as requested. Also attached is a corrected copy of our response to Question 241.10, showing clearly the form of equation (1) and the definition of Rd.

Boo!

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PDR ADOCK 05000508
A PDR

Should you require further information or clarification the Supply System point of contact for this matter is Mr. K. W. Cook, Licensing Project Manager (206/482-4428, ext. 5436).

Sincerely,

GDBouchey

G. D. Bouchey, Manager
Nuclear Safety and Regulatory Programs

GDB/jn

cc: D. J. Chin - Ebasco NYO
J. A. Adams - NESCO
D. Smithpeter - BPA
A. Vietti - NRC
Ebasco - Elma
WNP-3 Files - Richland

Attachment 1-34
2266A

Question No.

247.10 (3.8.4.4) Describe in detail the procedure you used for calculating the subgrade stiffness that was used in MSC/NASTRAN for the analysis of the Category I Tank Enclosure Structure, and provide the values of the geotechnical parameters for staff review. Also provide the foundation loading results and factors of safety with respect to sliding and overturning of this structure for SSE conditions and reference results to Subsection 2.5.4.

Response

The subgrade stiffness for the analysis of the Category I Tank Enclosure Structure was calculated using

(1) $$Ks = \frac{2.16G}{Rd\,(1-\mu)\sqrt{A}}$$

where: Ks = Modulus of subgrade reaction

G = 330 Ksi from Figure 2.5-121

μ = 0.40 from Table 2.5-16

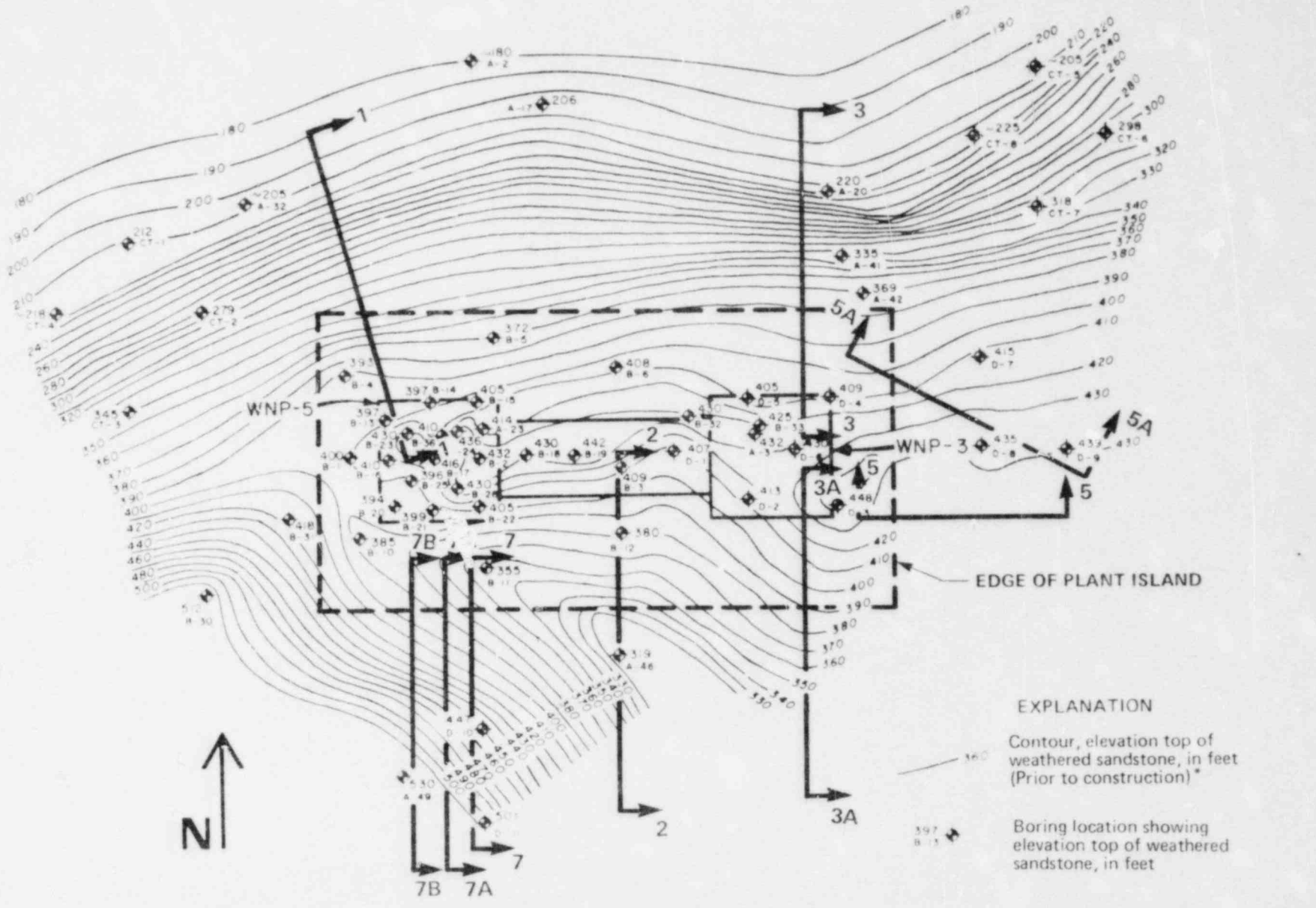
A = Area but to a maximum of $10m^2$

Rd = reduction factor which varies from 5 to 20 to convert from laboratory data to field data.

Equation (1) was obtained from "Dynamics of Bases and Foundations" by D. D. Barker, McGraw Hill, 1962.

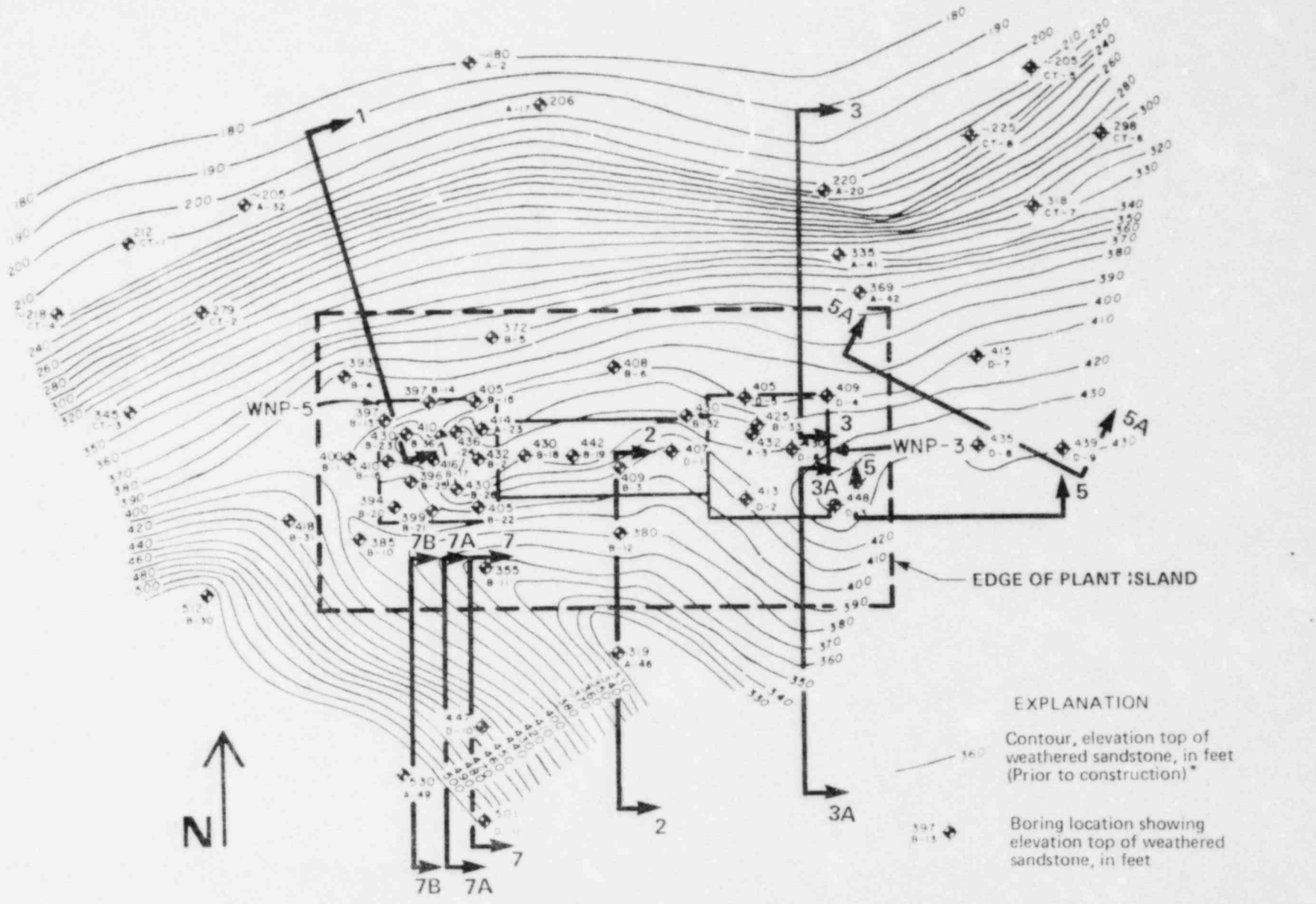
Substituting the indicated values into Equation (1) and using the maximum reduction factor for conservatism, a value for Ks of 500 $\#/in^3$ was determined and used in the static analysis for the Tank Enclosure Structure.

The factors of safety against sliding and overturning for the Tank Enclosure Structure and respectively, 1.6 and 1.5 (see Subsection 3.7.2.14) for SSE condition. The maximum bearing pressure (also due to SSE) is $6.0^K/ft^2$. The bearing capacity of weathered sandstone, on which the tank enclosure structure is founded, is $50^K/ft^2$ (factor of safety is 8.3).



ATTACHMENT 1
(NRC QUESTION 241.6)

PLANT LOCATION CONTOUR MAP
TOP OF WEATHERED SANDSTONE



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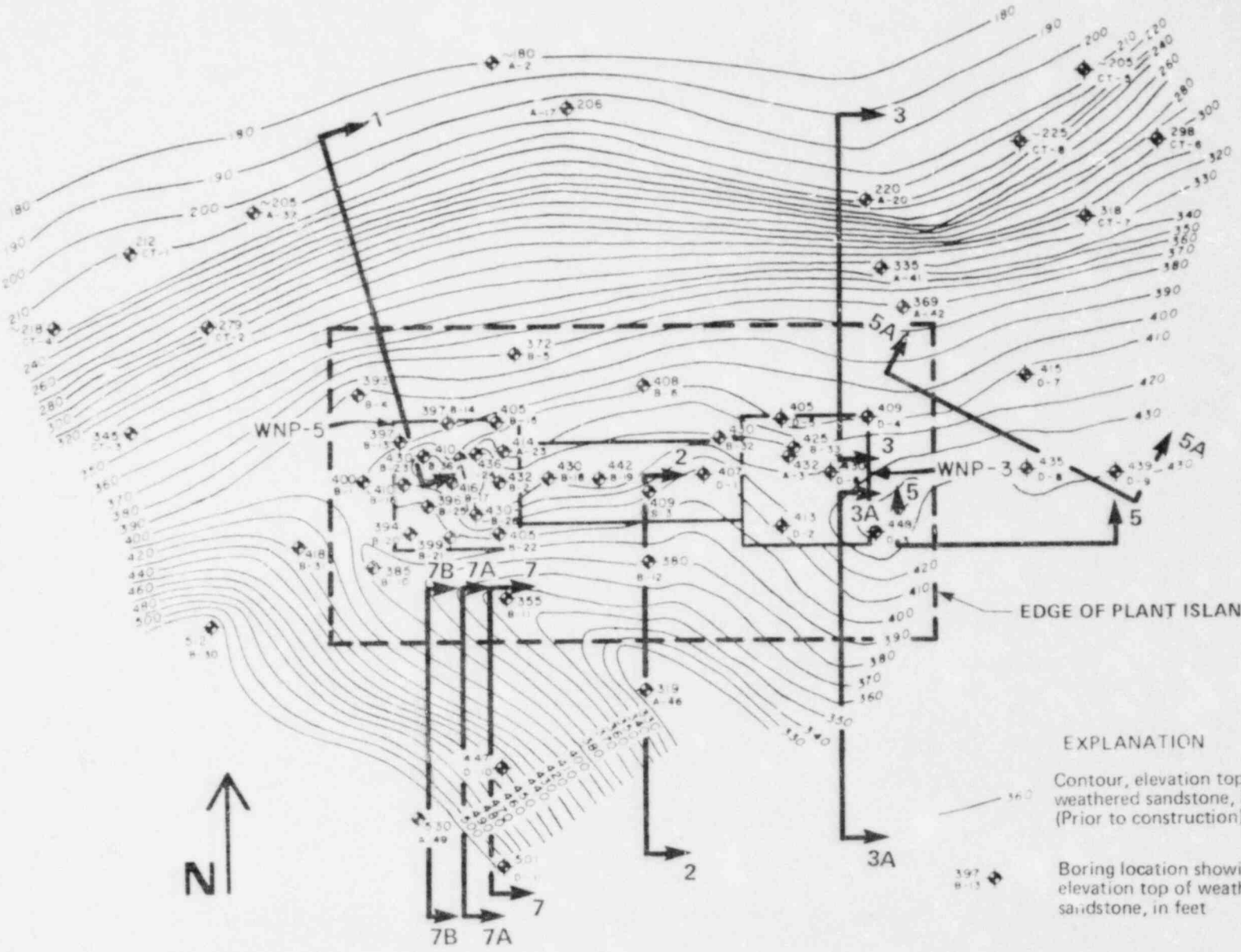

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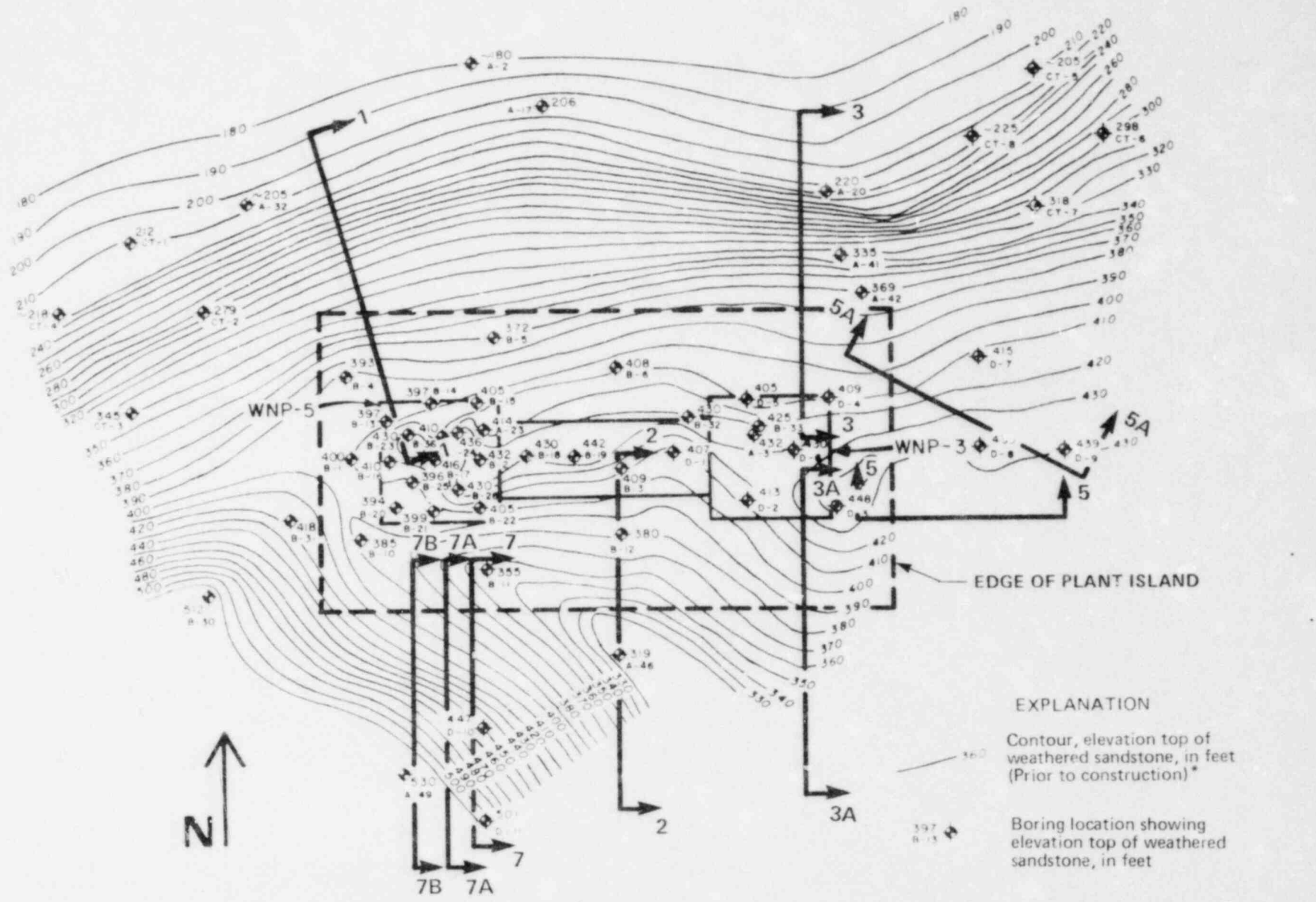

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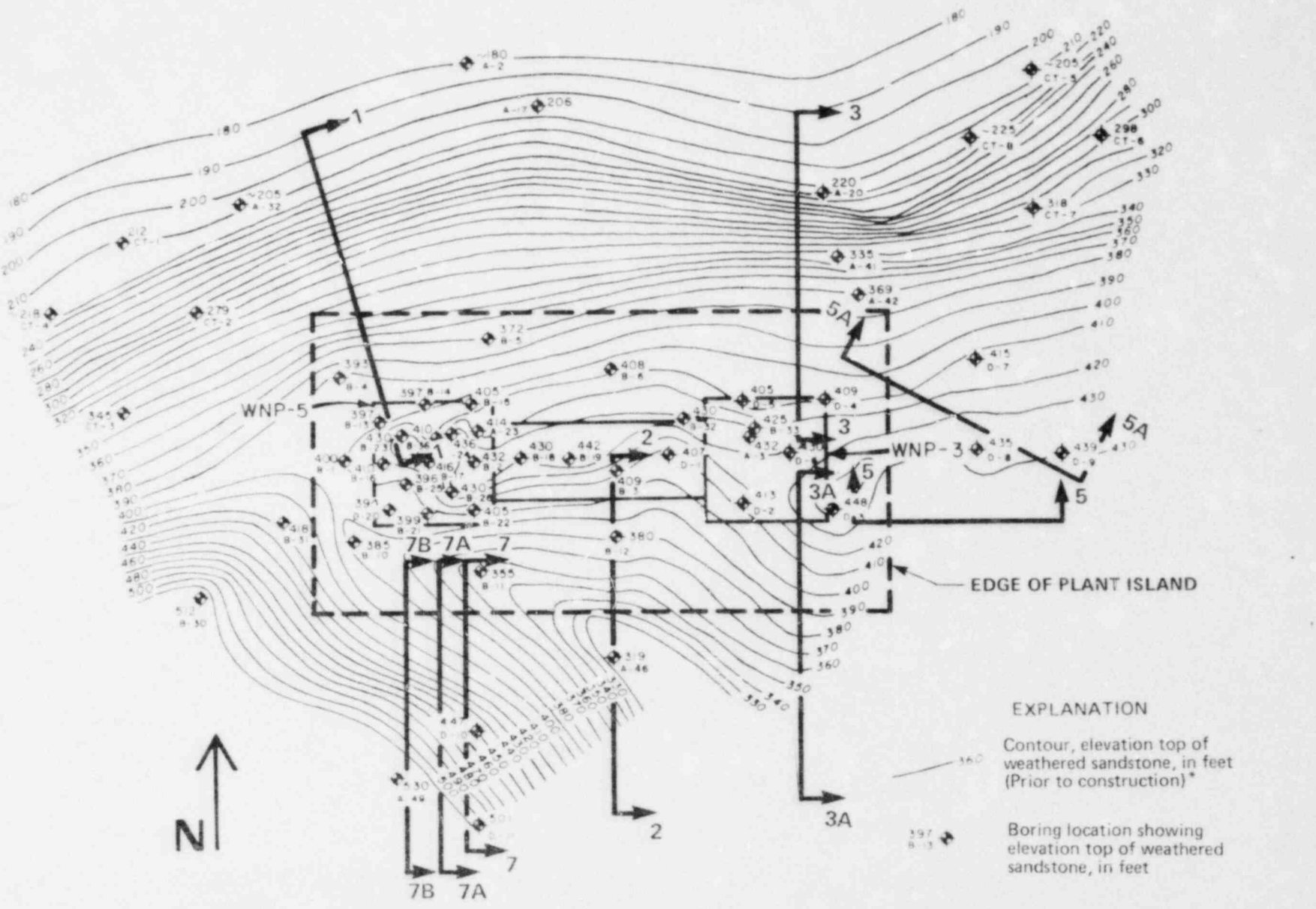

ATTACHMENT 1
(NRC QUESTION 241.6)

PLANT LOCATION CONTOUR MAP
TOP OF WEATHERED SANDSTONE

CATEGORY I STRUCTURE	FOUNDATION DIMENSIONS (AS-BUILT)	FOUNDATION ELEVATIONS (MSL)	DESCRIPTION OF FOUNDATION BASE AND DEPTH TO FRESH SANDSTONE	FOUNDATION LOADING		ALLOWABLE BEARING CAPACITY		FACTOR OF SAFETY	
				Static K/Ft^2	Dynamic K/Ft^2	Static K/Ft^2	Dynamic K/Ft^2	Static	Dynamic
Condensate/Refueling Water Tank Foundation	175'-0 x 66'-0	Top El 390.00'	5'-0 Thick Mat on Weathered Sandstone 40' to Fresh Sandstone	2.5	6.0	50.0	50.0	20.0	8.3
Dry Cooling Tower & Control Bldg.	85'-0 x 272'-0	Top El 390.00'	4'-0 Thick Mat on Weathered Sandstone 35' to Fresh Sandstone	2.1	4.6	50.0	50.0	23.8	10.9
Shield Building, Containment, Int. Structure, Fuel Handling Bldg. Reactor Aux Bldg on common mat	298'-0 x 310'-0	Top El 335.00'	9'-0 Thick Mat Located in Fresh Sandstone	13.6	17.7	85.0	85.0	6.3	4.8

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Condensate/Refueling Water Tank Foundation	175'-0 x 66'-0	Top El 390.00'	5'-0 Thick Mat on Weathered Sandstone 40' to Fresh Sandstone	2.5	6.0	50.0	50.0	20.0	8.3
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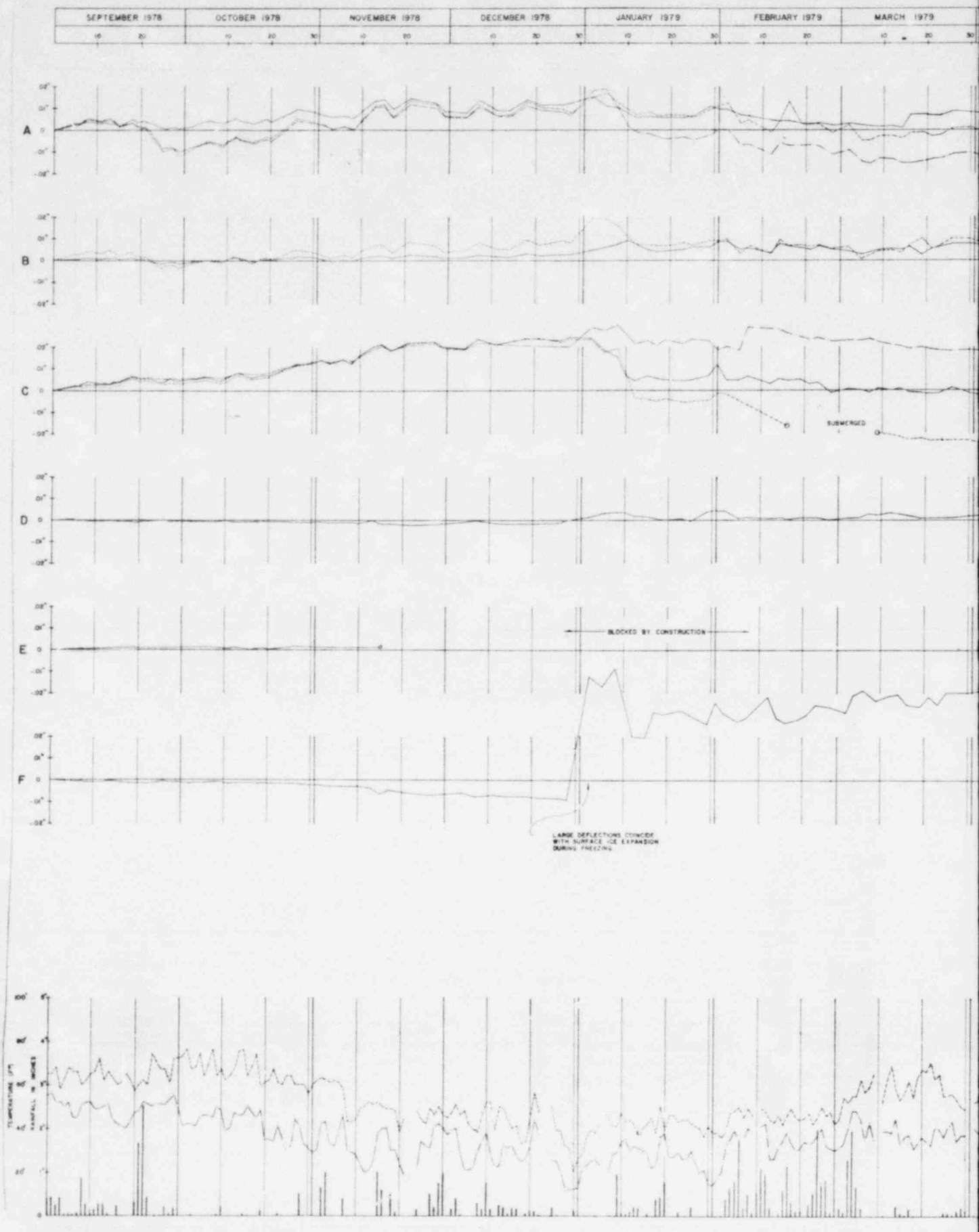
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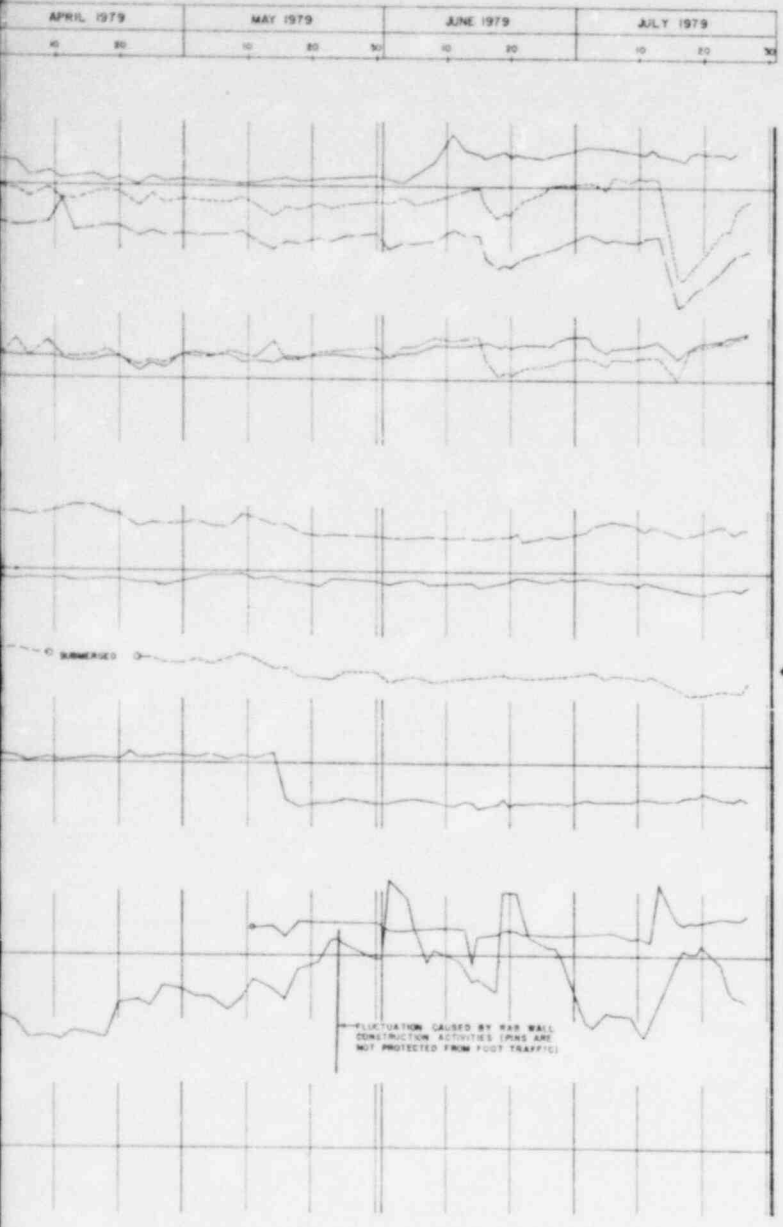
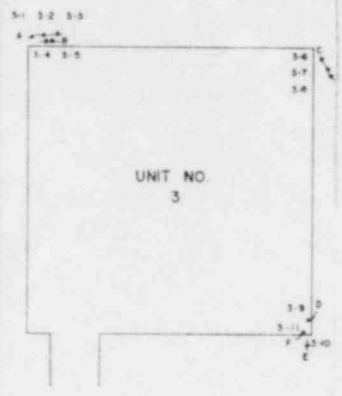
LARGE DEFLECTIONS COINCIDE WITH SURFACE ICE EXPANSION DURING FREEZING





PLAN VIEW

MEASUREMENTS DISCONTINUED DUE TO PERMANENT CONSTRUCTION

LEGEND:

CRACK	PIN SET NUMBER	LINE LEGEND
A	3-1	
A	3-2	
A	3-3	
B	3-4	
B	3-5	
C	3-6	
C	3-7	
C	3-8	
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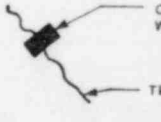
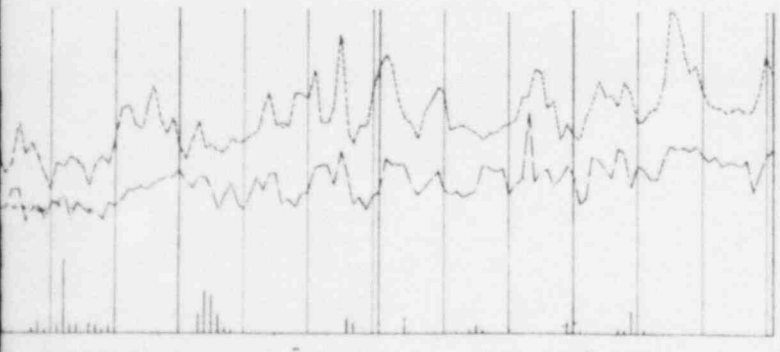
E	3-10	
F	3-11	

LEGEND FOR NRC QUESTION 241.2

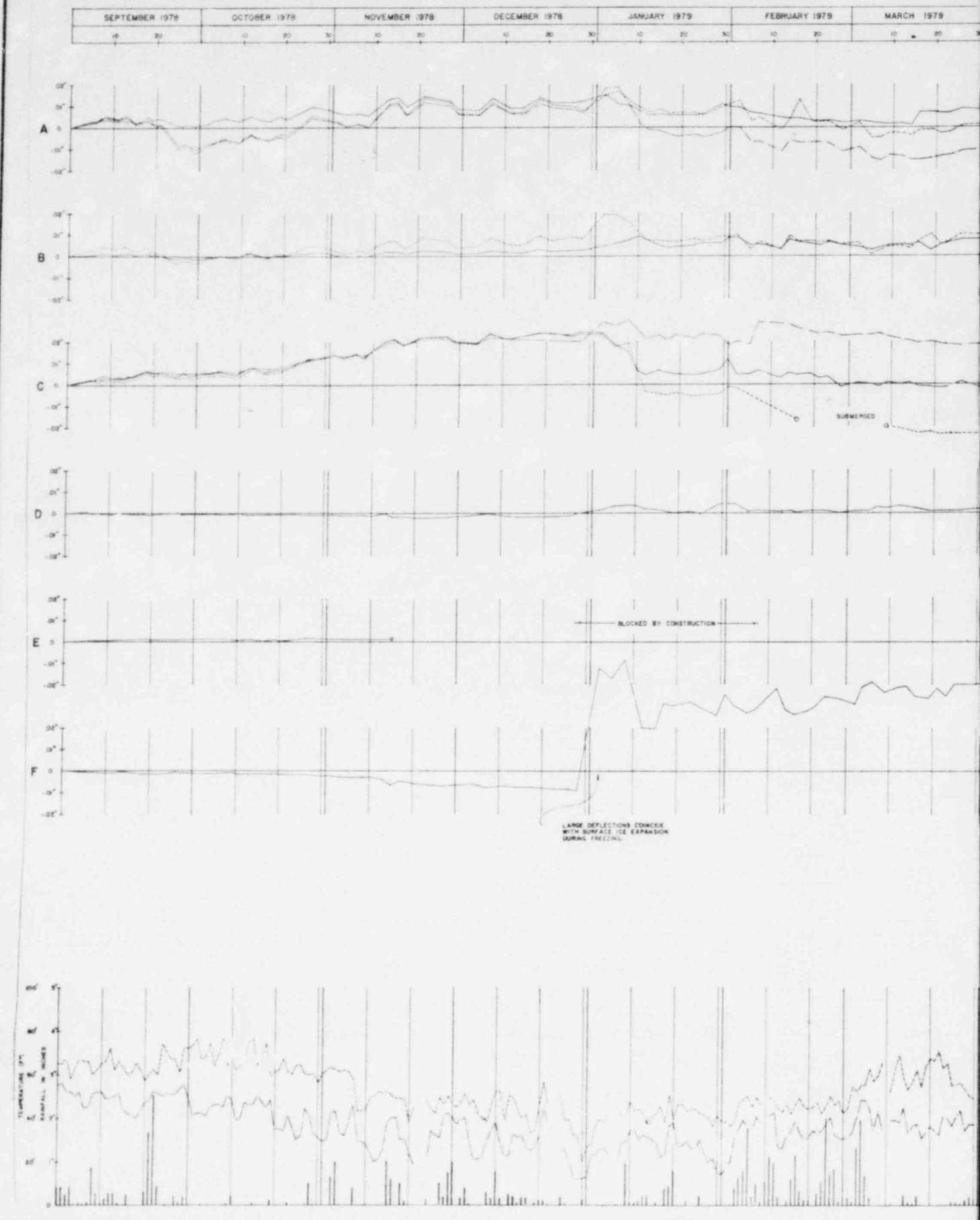




ATTACHMENT II

(NRC QUESTION 241.2)

CRACK MONITORING
UNIT NO. 3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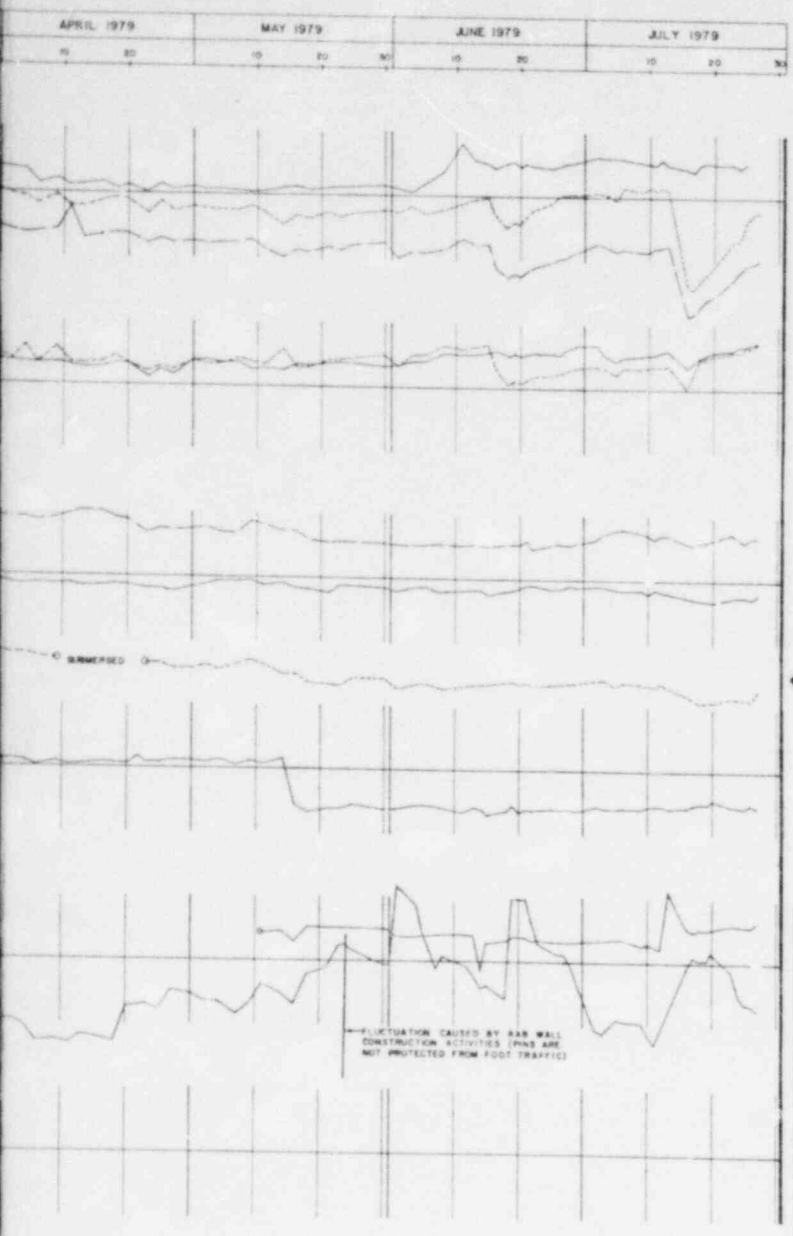

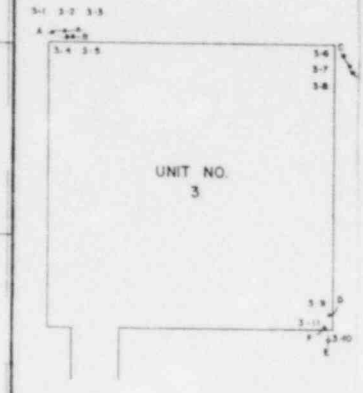

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LEGEND

CRACK	PIN SET NUMBER	LINE LEGEND
A	3-1	———
A	3-2	———
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C	3-7	———
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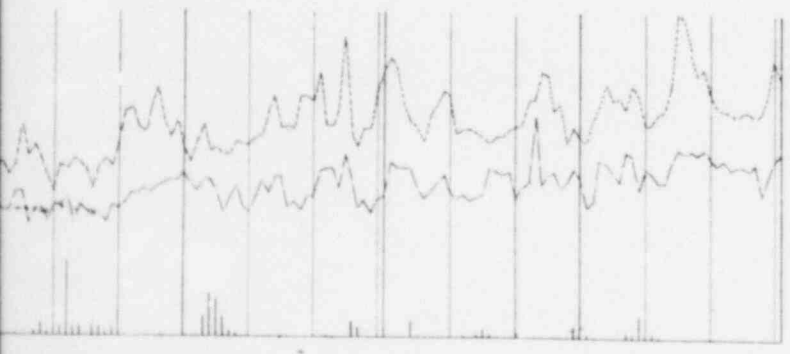
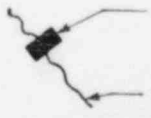
F	3-11	———



LEGEND FOR NRC QUESTION 241.2



ATTACHMENT II
(NRC QUESTION 241.2)

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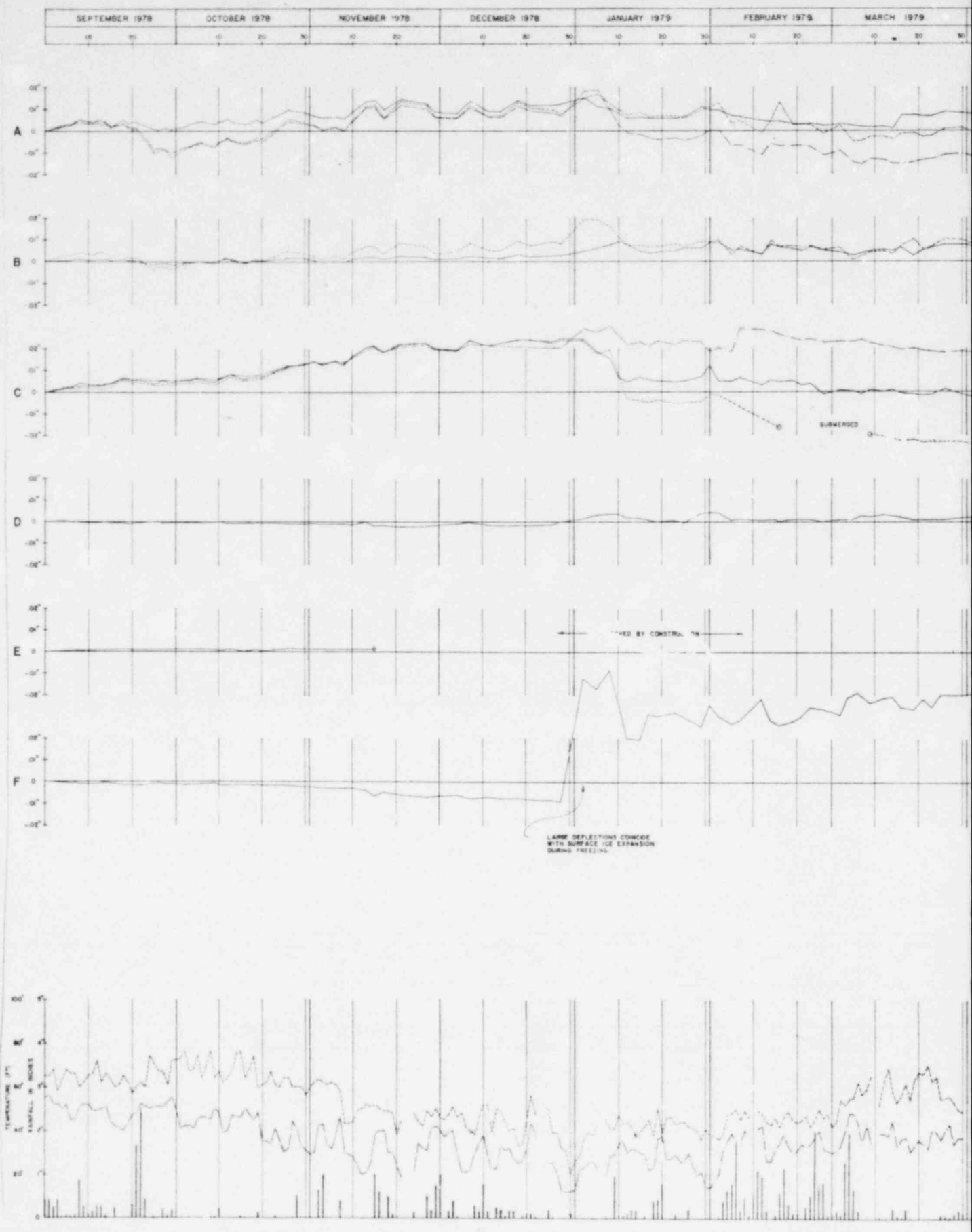
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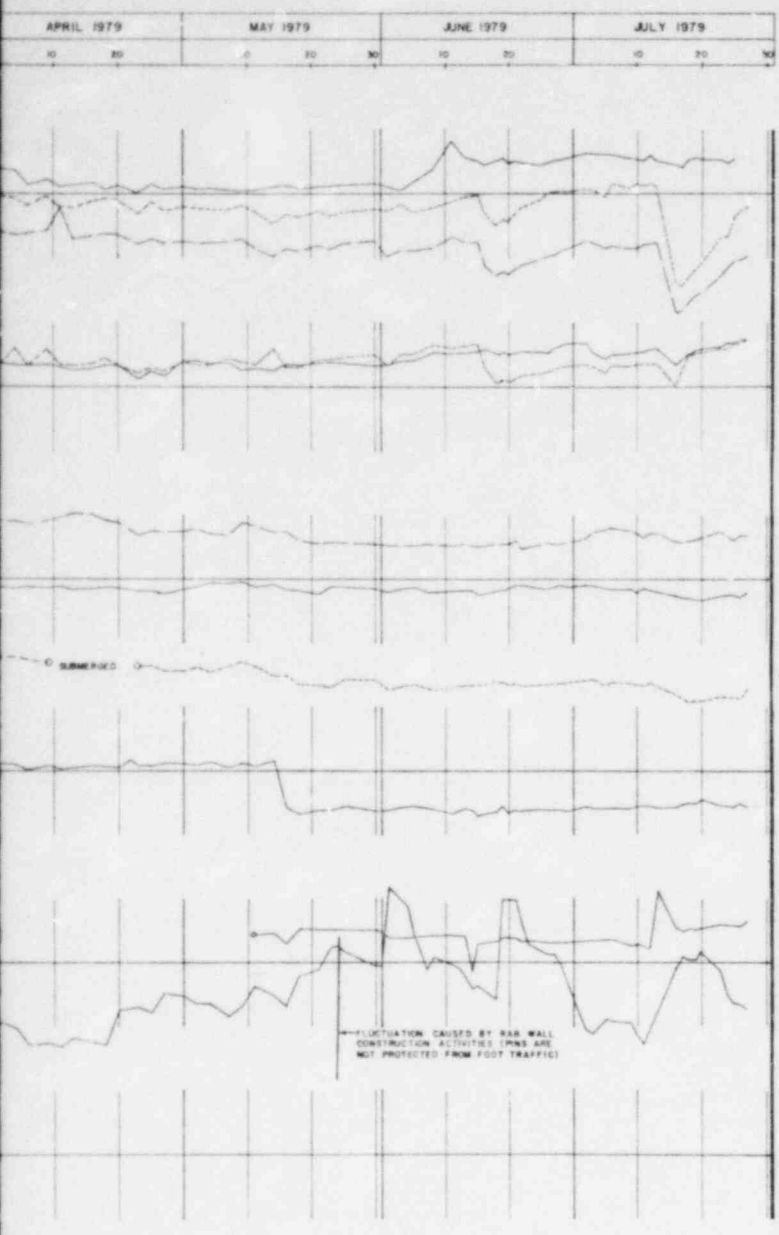
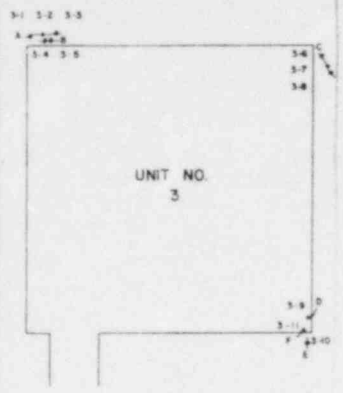
LARGE DEFLECTIONS COINCIDE WITH SURFACE ICE EXPANSION DURING FREEZING





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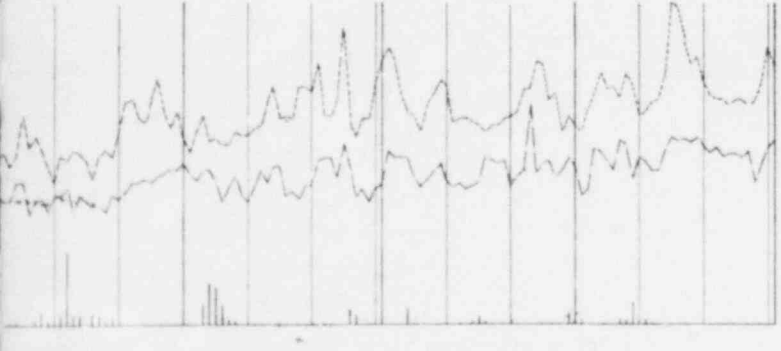
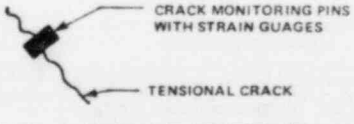
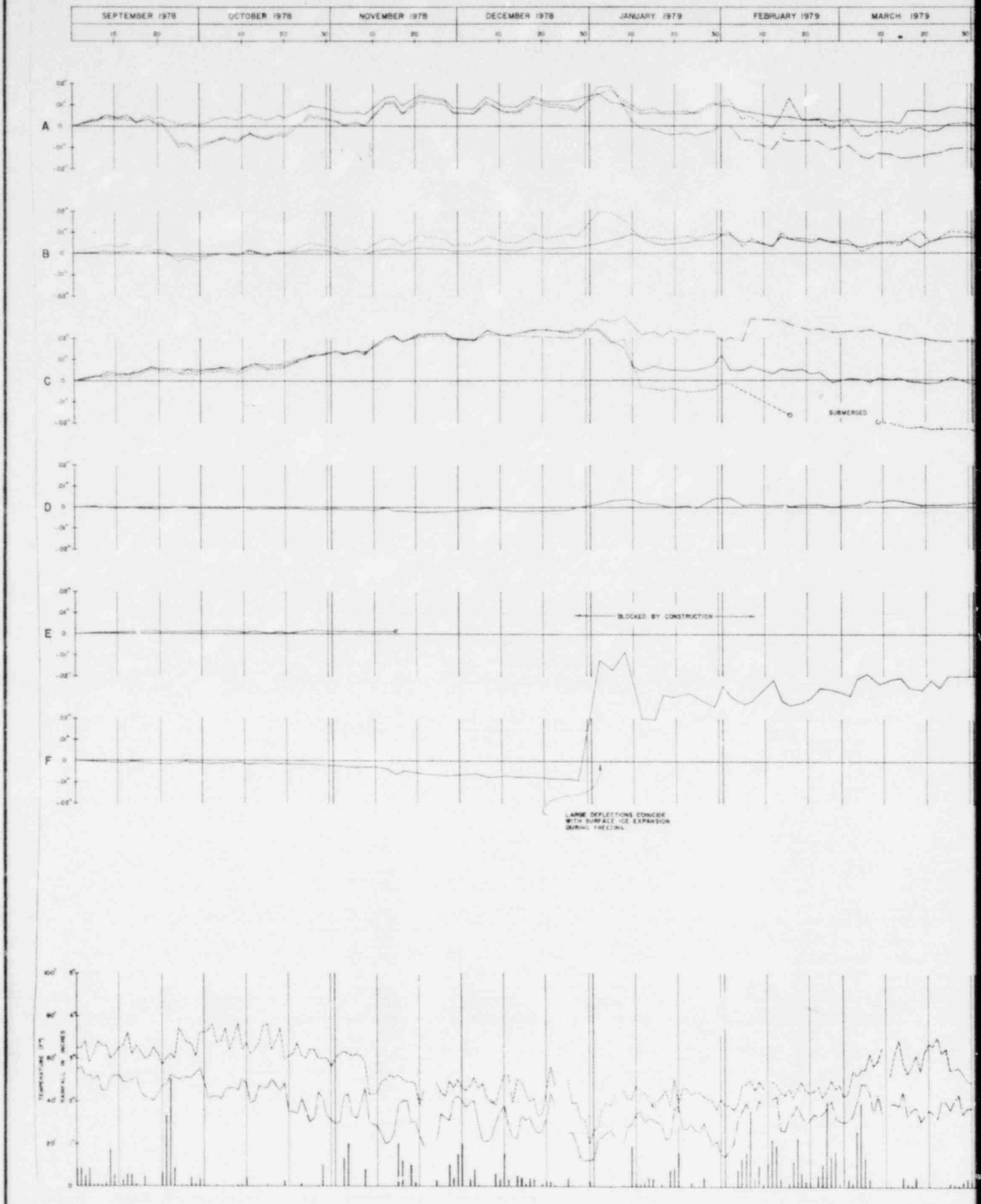
B	3-5	———
C	3-6	———
C	3-7	———
	3-8	———
D	3-9	———
E	3-10	———
F	3-11	———



LEGEND FOR NRC QUESTION 241.2



ATTACHMENT II
(NRC QUESTION 241.2)
CRACK MONITORING
UNIT NO. 3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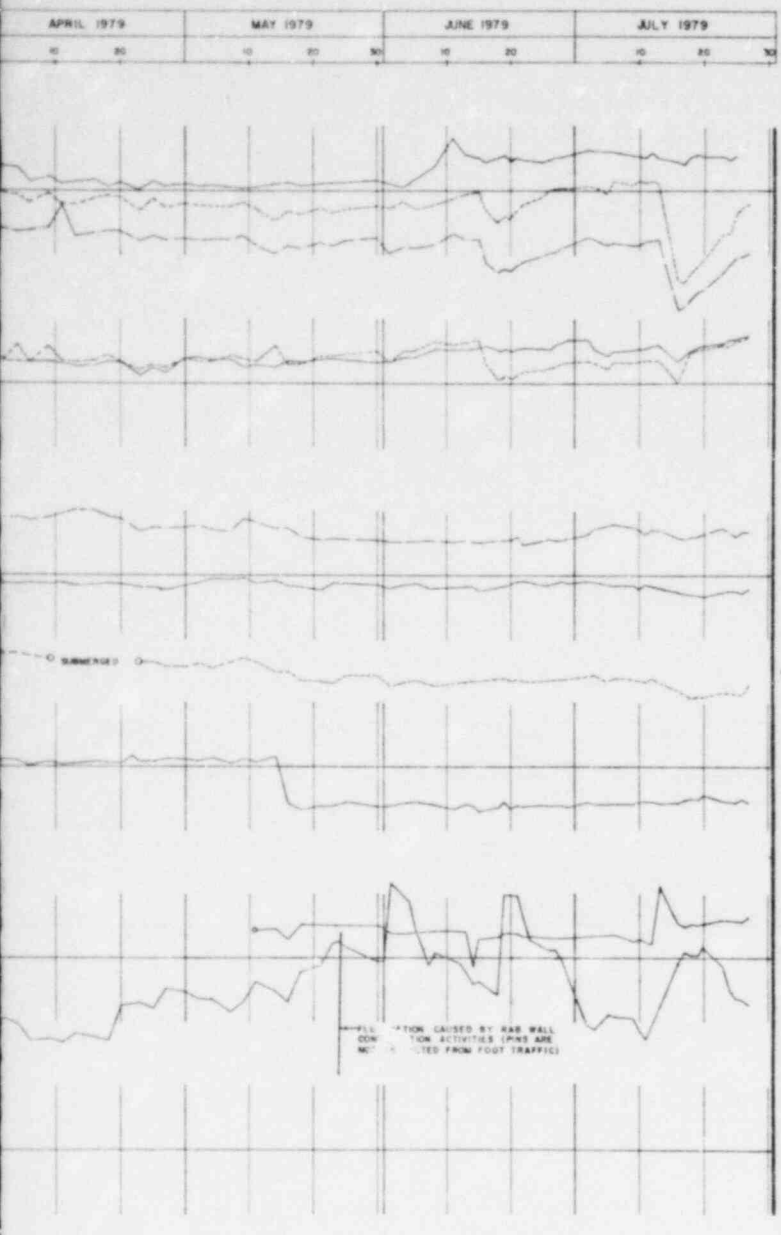

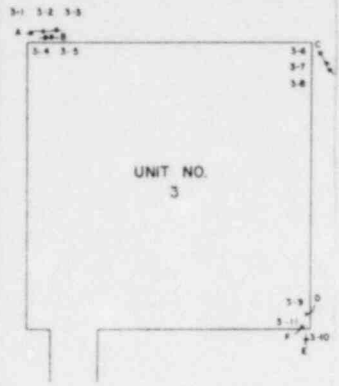

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MEASUREMENTS DISCONTINUED DUE TO PERMANENT CONSTRUCTION

LEGEND:

CRACK	PIN SET NUMBER	LINE LEGEND
A	3-1	
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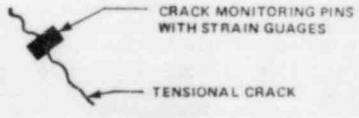
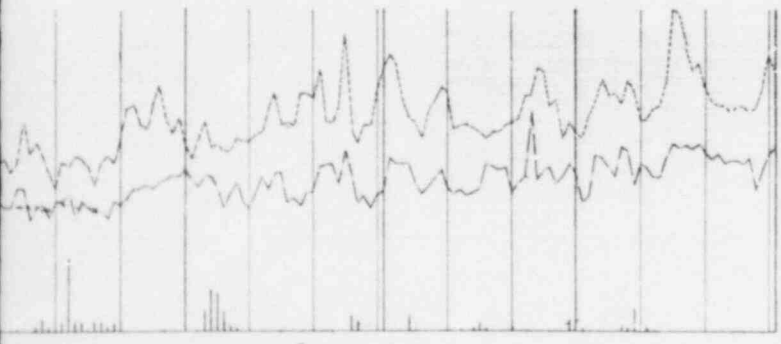
F	3-11	

LEGEND FOR NRC QUESTION 241.2

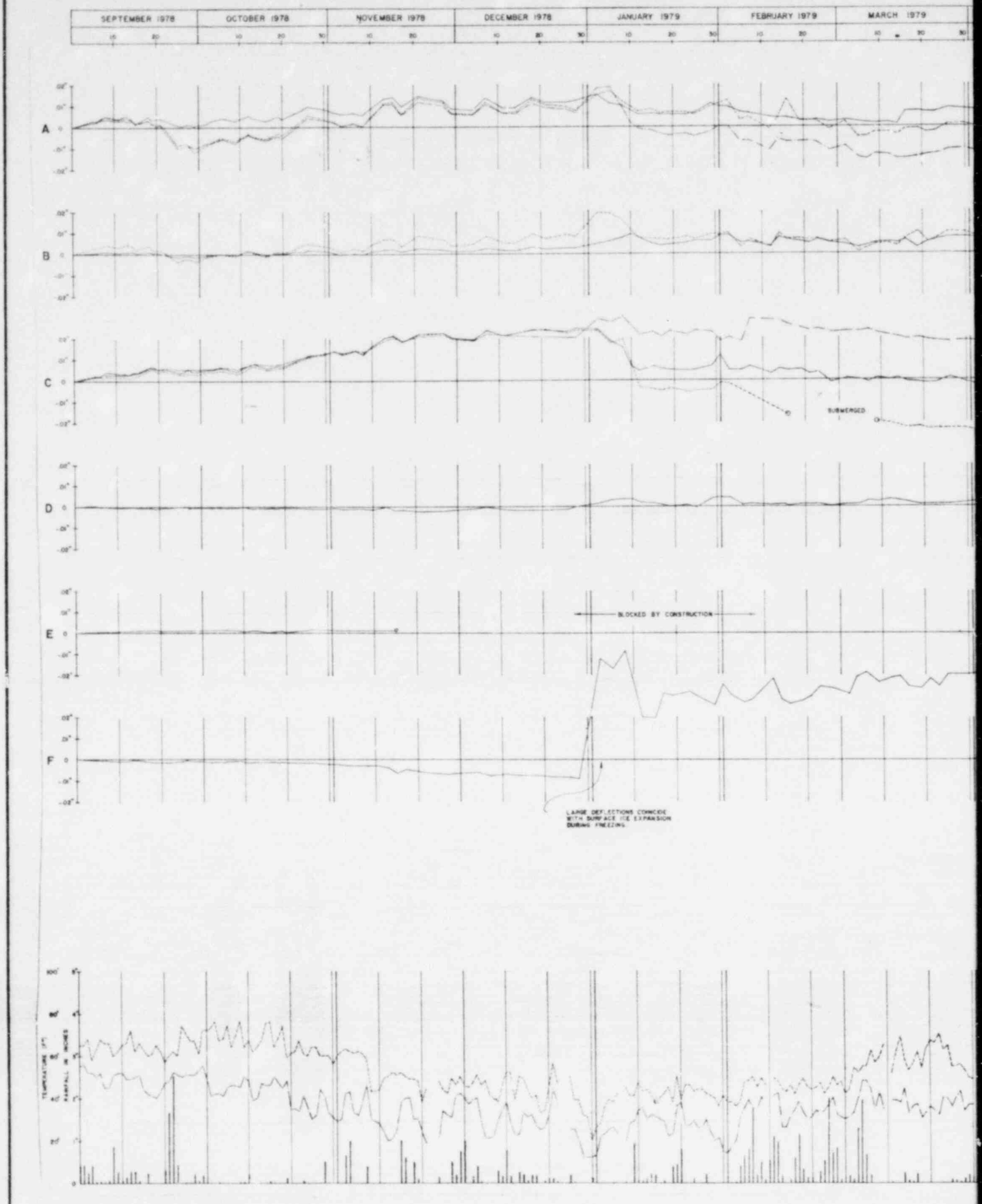




ATTACHMENT II

(NRC QUESTION 241.2)

CRACK MONITORING
UNIT NO. 3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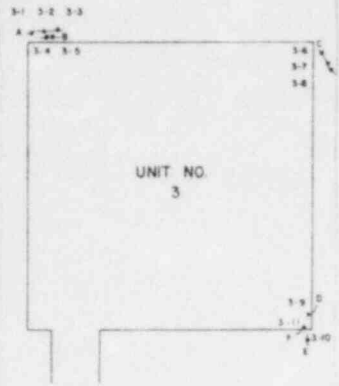
BLOCKED BY CONSTRUCTION
LARGE DEFLECTIONS COINCIDE WITH SURFACE ICE EXPANSION DURING FREEZING
TEMPERATURE (F)
RAINFALL IN INCHES



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MEASUREMENTS DISCONTINUED DUE TO PERMANENT CONSTRUCTION

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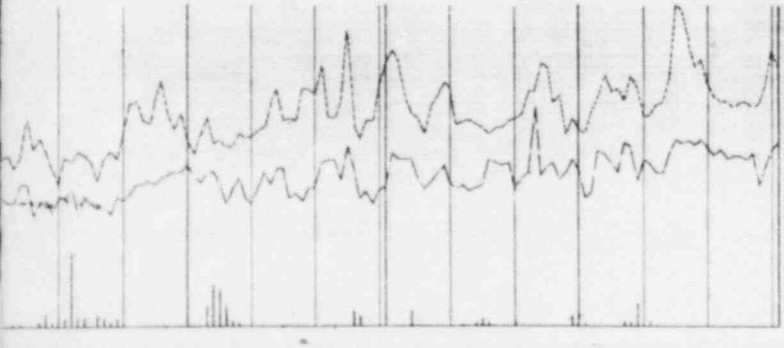

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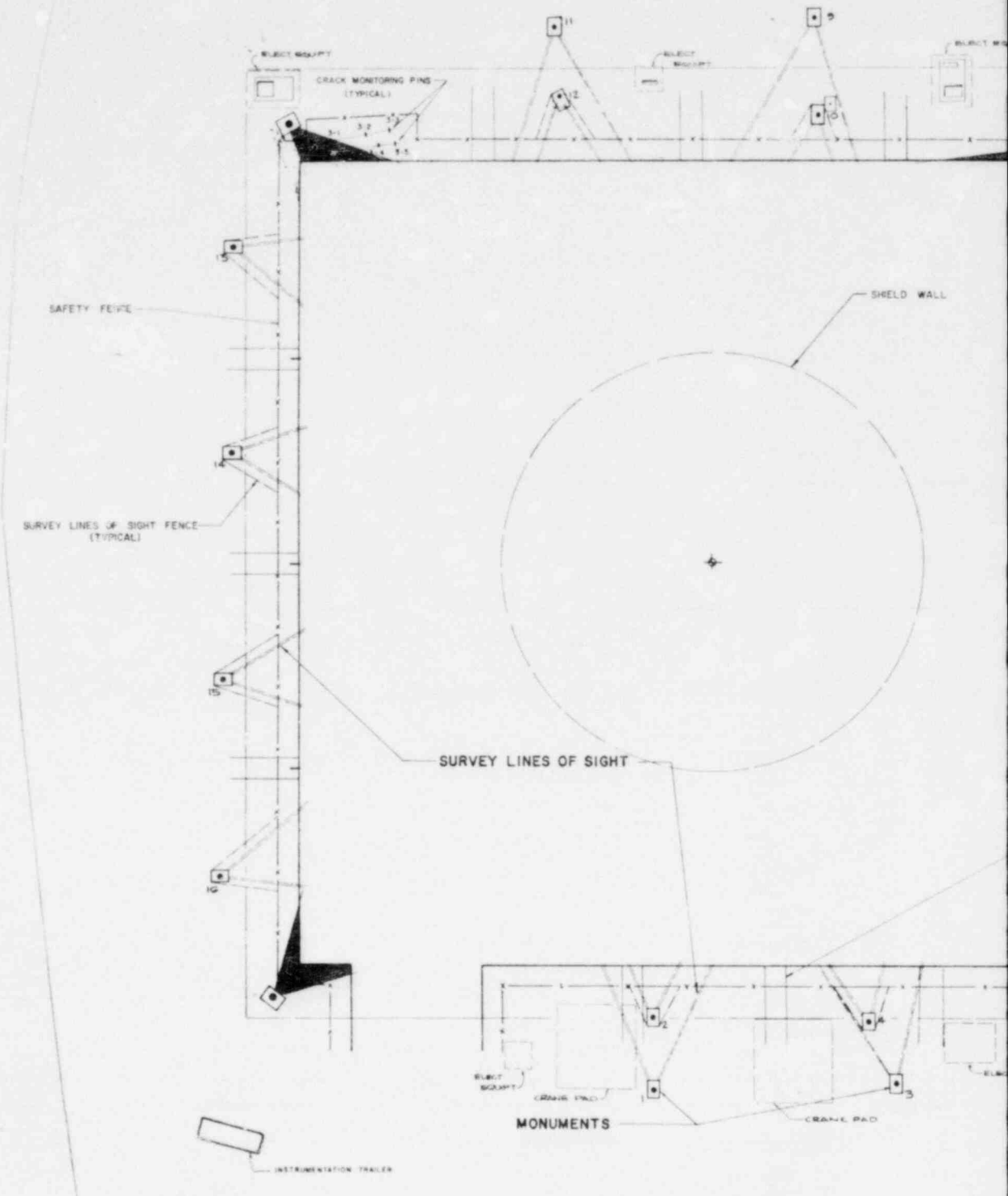
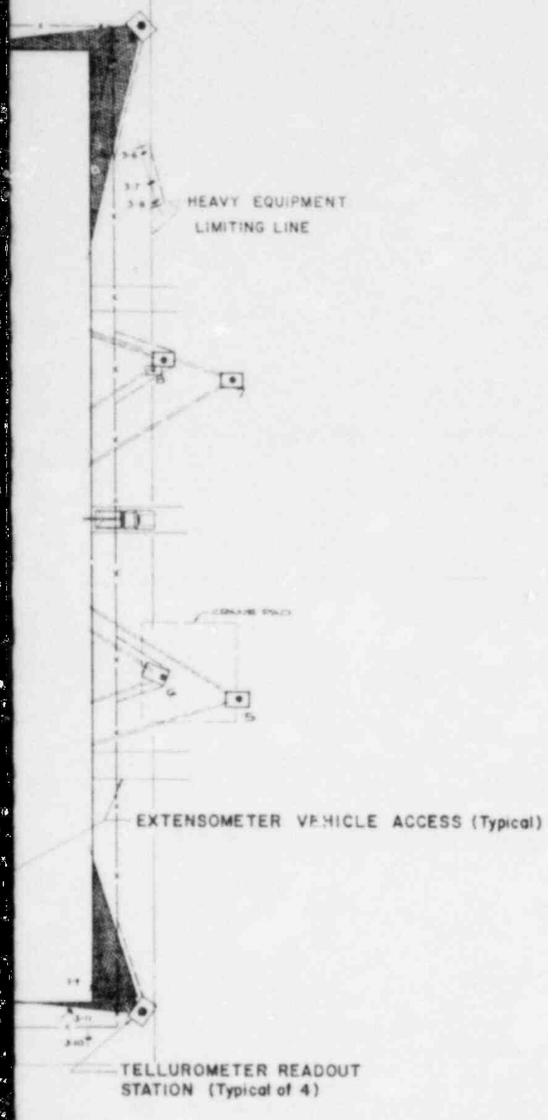

CRACK MONITORING PINS (TYPICAL)
SAFETY FENCE
SURVEY LINES OF SIGHT FENCE (TYPICAL)
SHIELD WALL
SURVEY LINES OF SIGHT
MONUMENTS
CRANE PAD
INSTRUMENTATION TRAILER

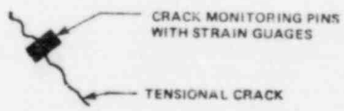
UNIT 3
1" = 20'



NOTES:

1) TELLUROMETER READINGS CANNOT BE TAKEN IN DENSE FOG OR HEAVY RAINS. SCHEDULE WILL VARY ACCORDING TO WEATHER CONDITIONS.

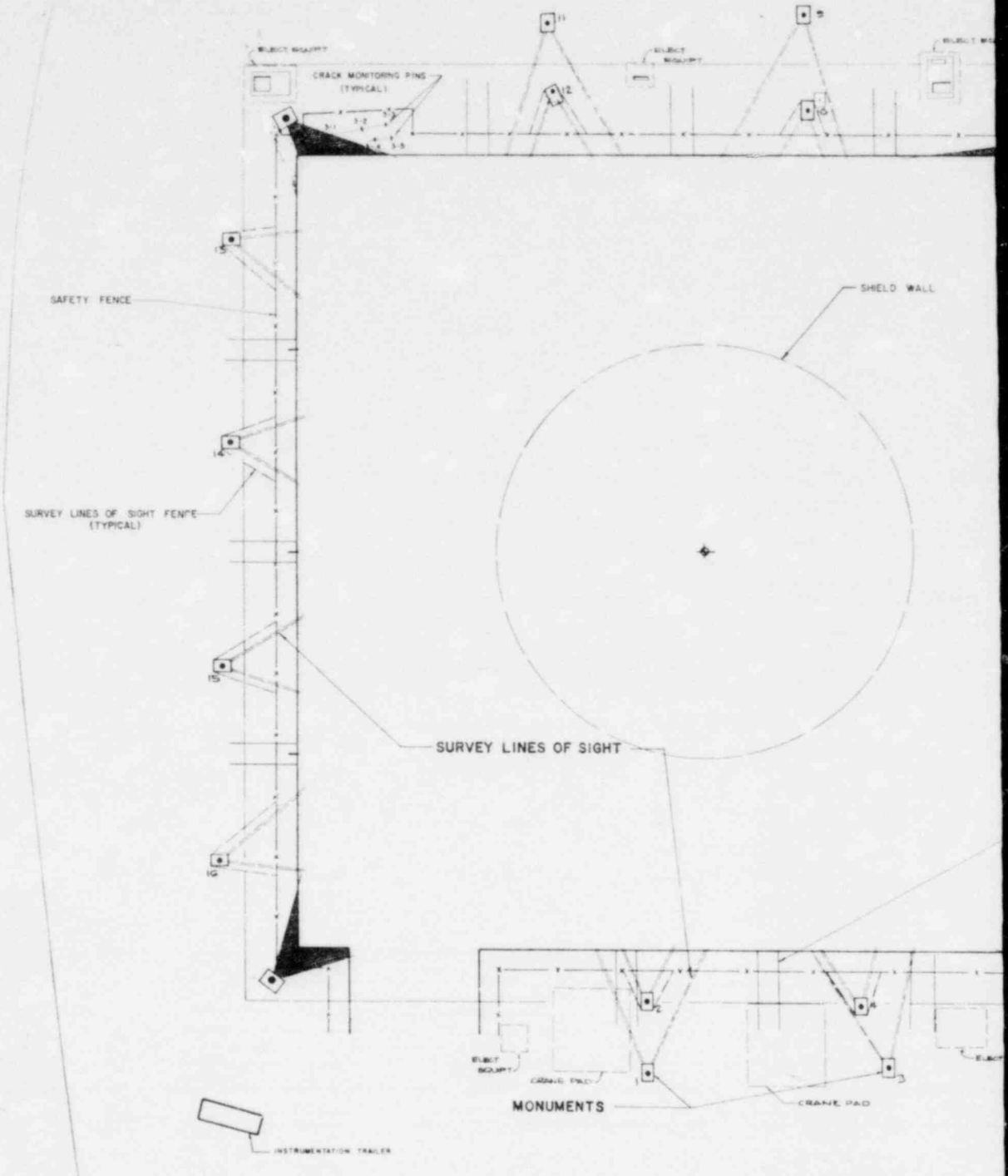
LEGEND FOR NRC QUESTION 241.2



ATTACHMENT I

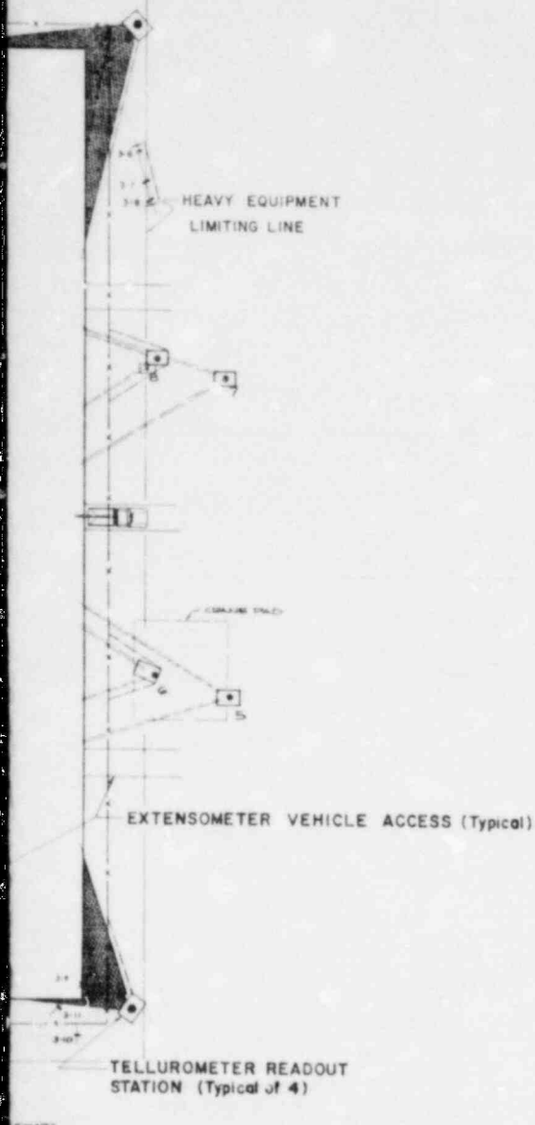
(NRC QUESTION 241.2)

INFORMATION DRAWING
INSTRUMENTATION LOCATIONS
(WORKMAN SAFETY RELATED)


CRACK MONITORING PINS (TYPICAL)
SAFETY FENCE
SURVEY LINES OF SIGHT FENCE (TYPICAL)
SHIELD WALL
SURVEY LINES OF SIGHT
MONUMENTS
CRANE PAD
INSTRUMENTATION TRAILER

UNIT 3

1" = 20'



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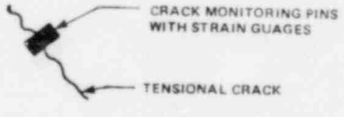
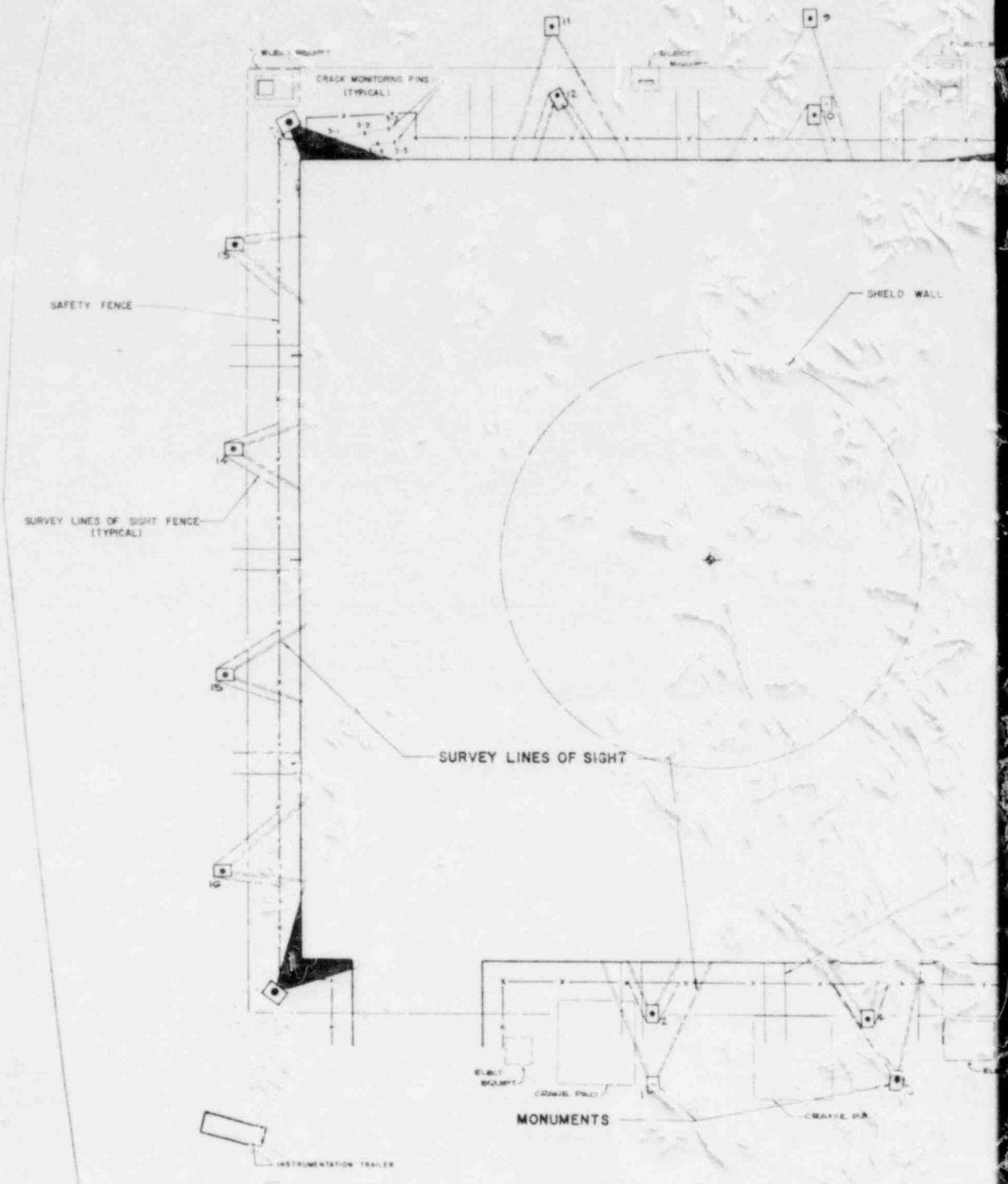
LEGEND FOR NRC QUESTION 241.2



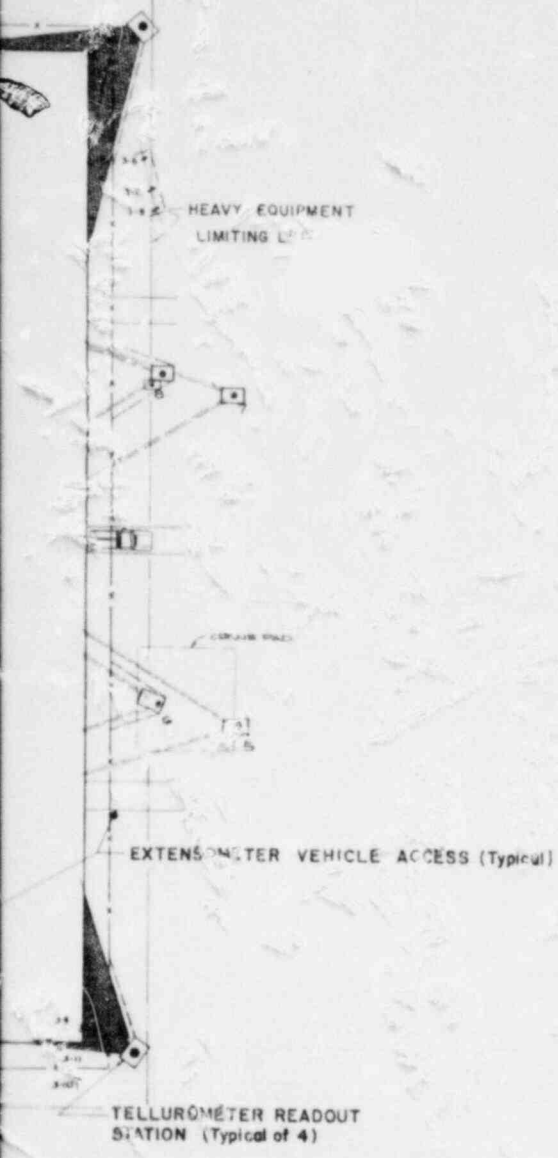
ATTACHMENT I

(NRC QUESTION 241.2)

INFORMATION DRAWING
INSTRUMENTATION LOCATIONS
(WORKMAN SAFETY RELATED)


CRACK MONITORING PINS (TYPICAL)
SAFETY FENCE
SURVEY LINES OF SIGHT FENCE (TYPICAL)
SHIELD WALL
SURVEY LINES OF SIGHT
MONUMENTS
INSTRUMENTATION TRAILER

UNIT 3
1" = 20'



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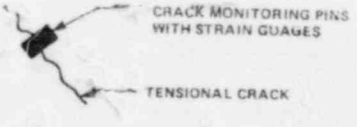
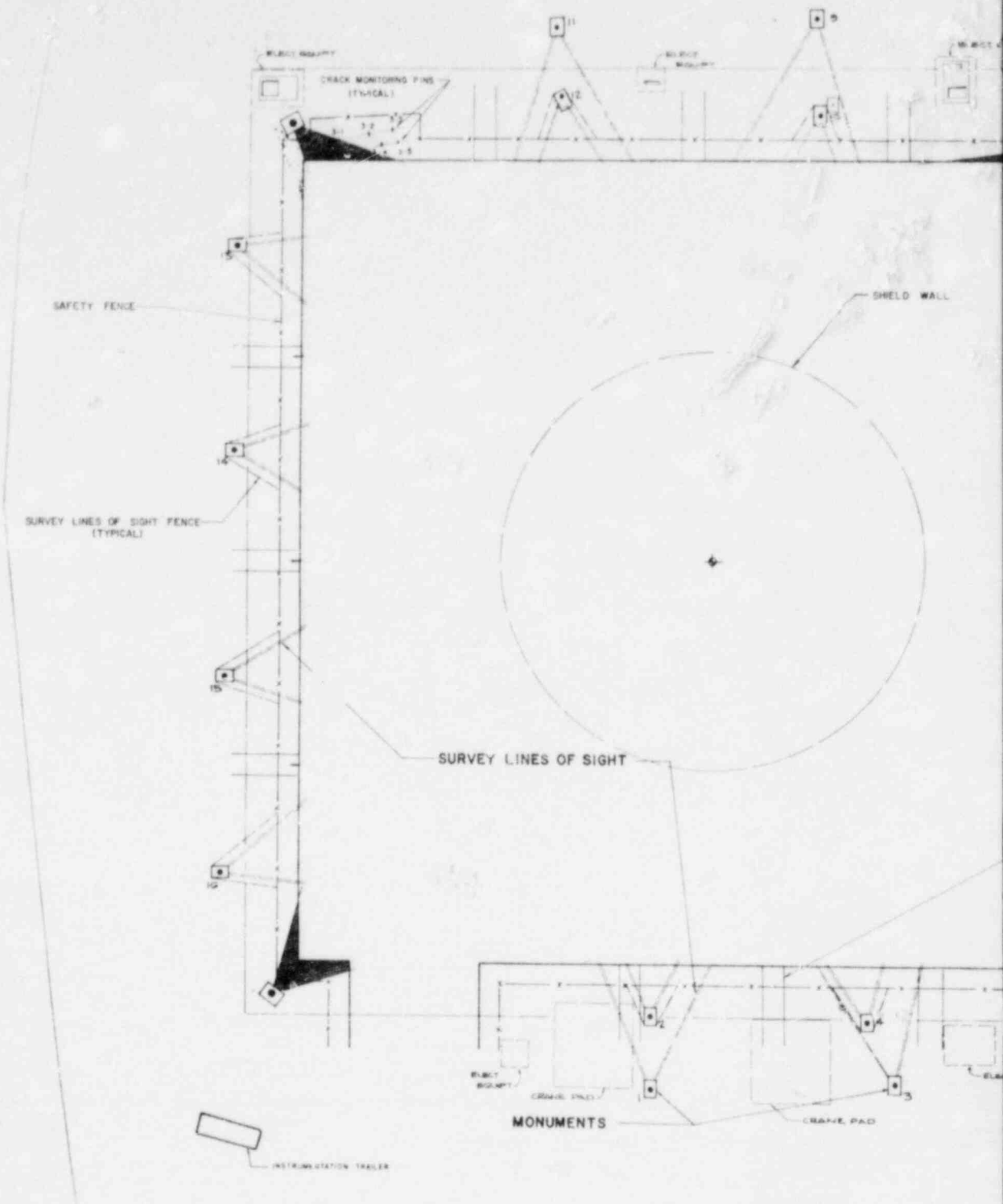
LEGEND FOR NRC QUESTION 241.2

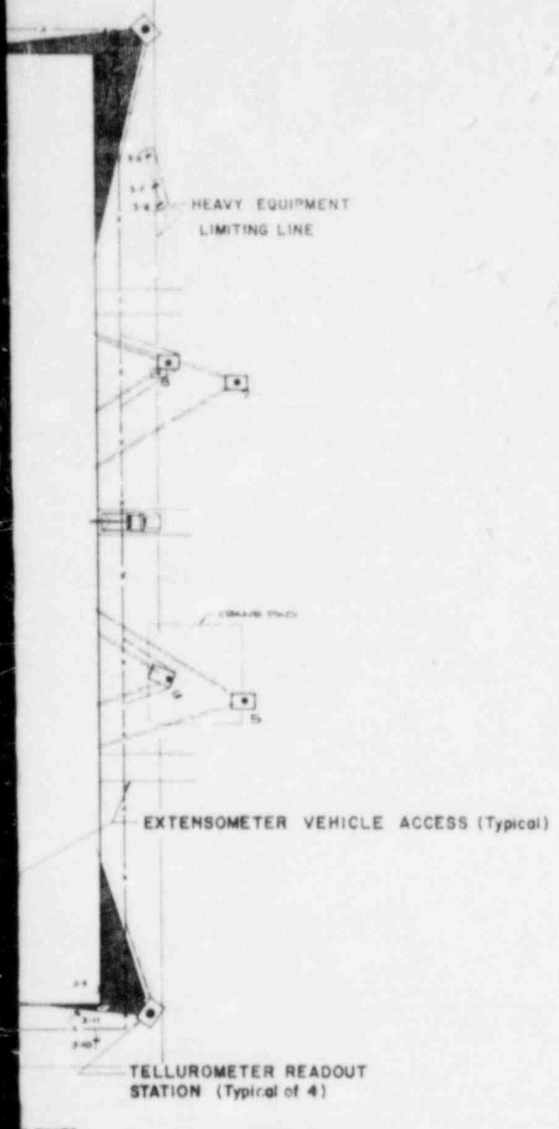


ATTACHMENT I
(NRC QUESTION 241.2)

INFORMATION DRAWING
INSTRUMENTATION LOCATIONS
(WORKMAN SAFETY RELATED)


CRACK MONITORING PINS (TYPICAL)
SAFETY FENCE
SURVEY LINES OF SIGHT FENCE (TYPICAL)
SHIELD WALL
SURVEY LINES OF SIGHT
MONUMENTS
CRANE PAD
INSTRUMENTATION TRAILER

UNIT 3
1" = 20'



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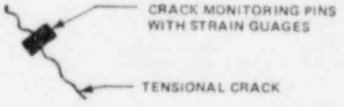
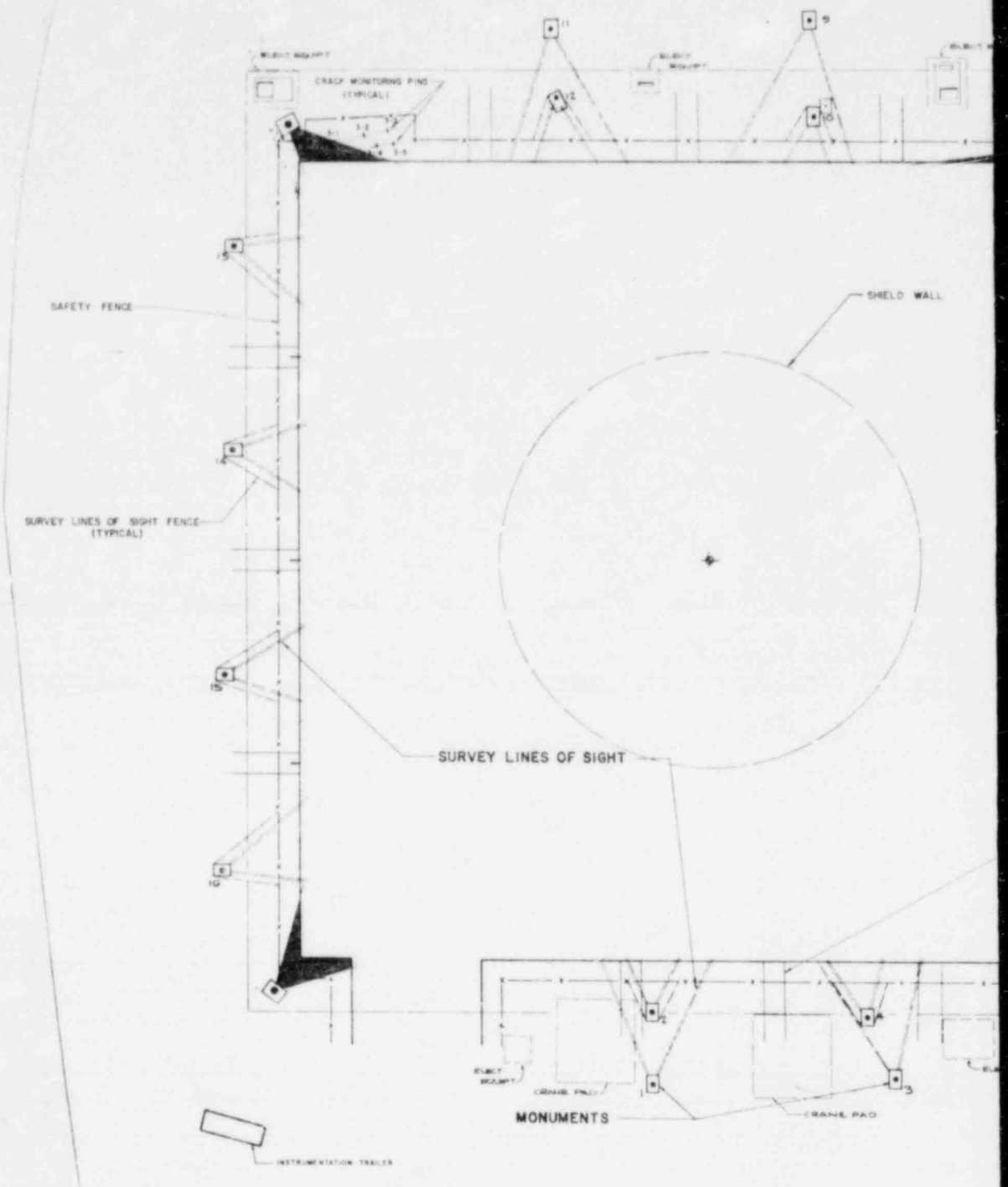
LEGEND FOR NRC QUESTION 241.2



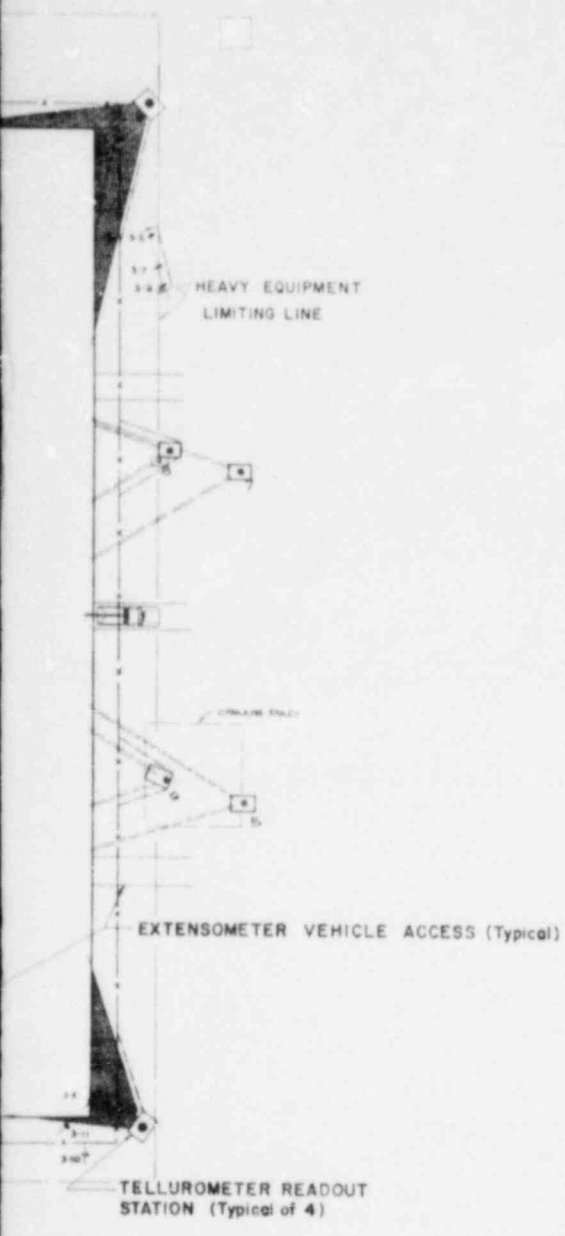
ATTACHMENT I

(NRC QUESTION 241.2)

INFORMATION DRAWING
INSTRUMENTATION LOCATIONS
(WORKMAN SAFETY RELATED)


CRACK MONITORING PINS (TYPICAL)
SAFETY FENCE
SHIELD WALL
SURVEY LINES OF SIGHT FENCE (TYPICAL)
SURVEY LINES OF SIGHT
MONUMENTS
CRANE PAD
INSTRUMENTATION TRAILER

UNIT 3
1" = 20'



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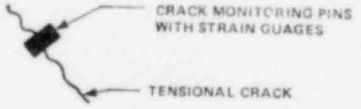
LEGEND FOR NRC QUESTION 241.2



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(NRC QUESTION 241.2)

INFORMATION DRAWING
INSTRUMENTATION LOCATIONS
(WORKMAN SAFETY RELATED)