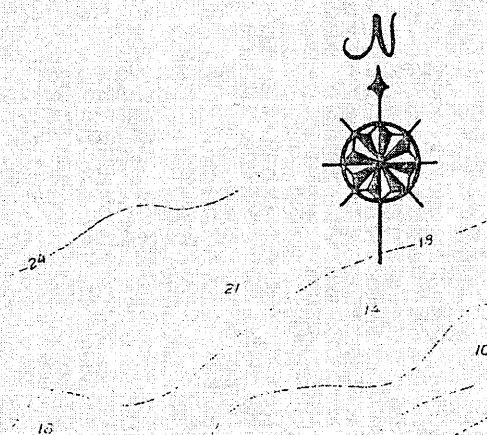
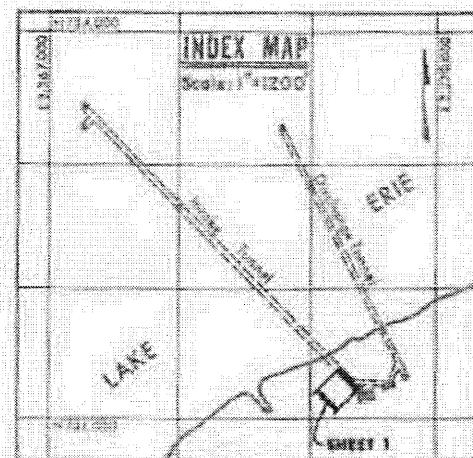


Location Map
Perry Nuclear Power Plant

Figure 2D-1



SYMBOLS

(1/2)" HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE

1 1/2" DISCONTINUOUS IRON BED

1 1/2" HARD, LIGHT GREY SANDY SHALE TO SILTSTONE BED

10/160-2" DISCONTINUOUS IRON BED WITHIN GREY BED

FRACTURE

FAULT

BEDDING PARTING

VERTICAL JOINT

INCLINED JOINT

BEDDINGS, STRIKE AND DIP

MOISTURE ALONG BEDDING PARTING

SEEPAGE FROM FEATURE

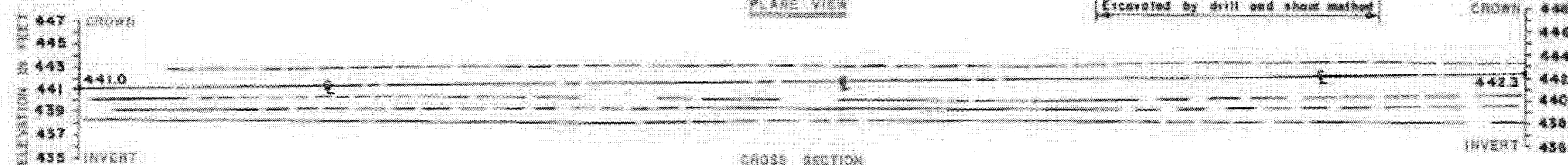
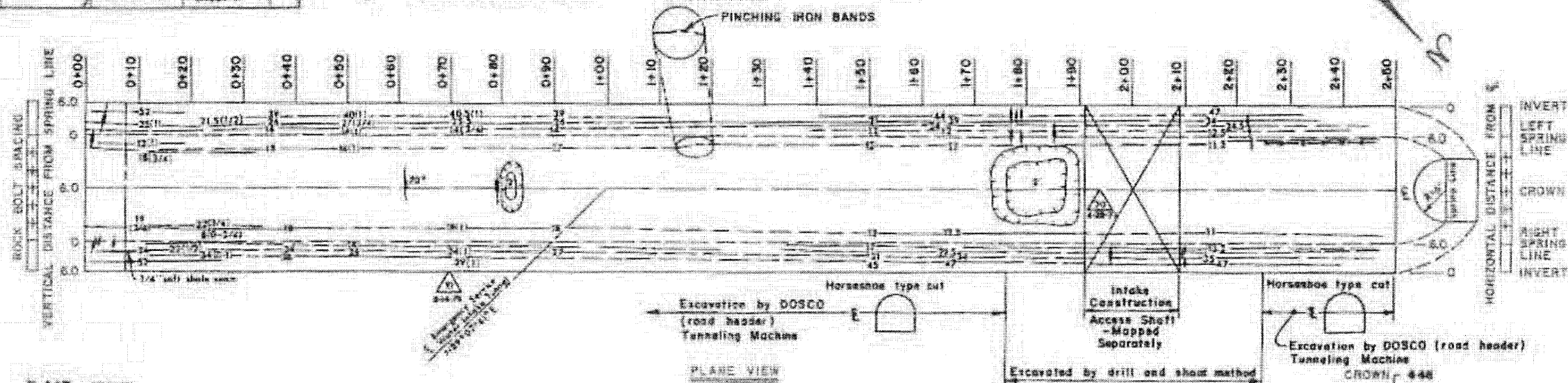
OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN

METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE

*Notes:

Number (v) in parentheses indicates bed thickness.

Number preceding parenthesis indicates inches above or below spring line of station of measurement.



STATION	1+00	1+20	1+40	1+60	1+80	2+00
ESTIMATED ROCK CONDITION (TERZAGHI NO.)	1-5	1-5	1-5	1-5	1-5	1-5
TEMPORARY SUPPORT SYSTEM	3" x 8"	3" x 7"	3" x 8"	3" x 8"	3" x 8"	3" x 8"
BEDDING SPACING	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only
FRACTURE SPACING	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only
WATER CONDITION	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only
DEPTH OF COVER	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only	Bedding fractures only

EXCAVATION PROGRESS

ESTIMATED ROCK CONDITION (TERZAGHI NO.)

TEMPORARY SUPPORT SYSTEM

BEDDING SPACING

FRACTURE SPACING

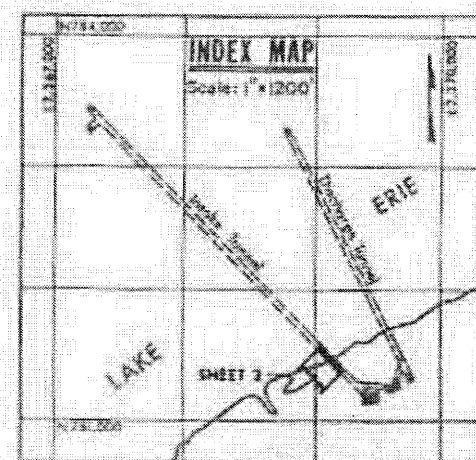
WATER CONDITION

DEPTH OF COVER

PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations

Figure 2D-2 (Sheet 1 of 24)

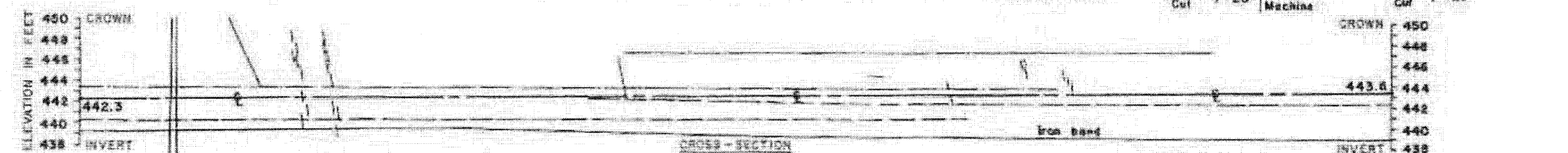
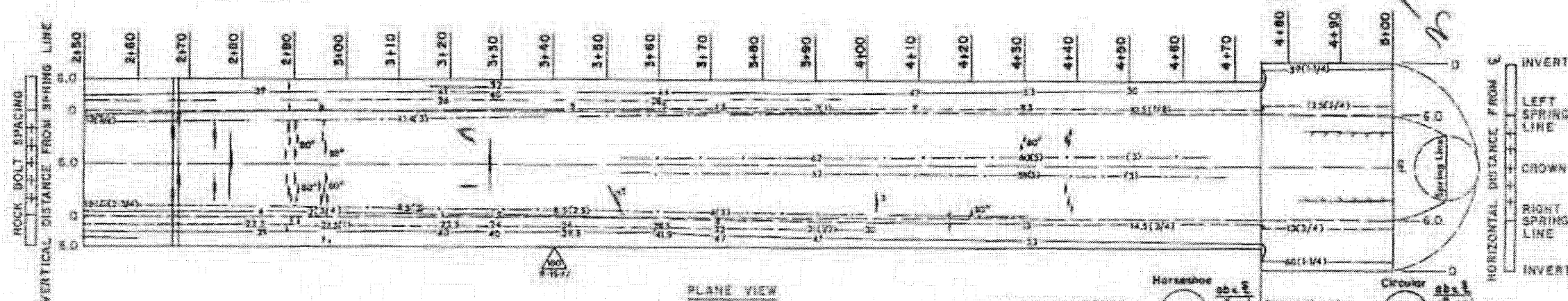


SYMBOLS

1/4" HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 1/10-2" DISCONTINUOUS IRON BED
 1/2" HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 1/16-1/8" DISCONTINUOUS IRON BED WITHIN GREY BED
 FRACTURE ZONE
 FAULT
 BEDDING PARTING
 VERTICAL JOINT
 INCLINED JOINT
 BEDDING, STRIKE AND DIP

MOISTURE ALONG BEDDING PARTING
 SEEPAGE FROM FEATURE
 OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 METHANE GAS, MAXIMUM PERCENT I.E.L. WITH DATE OF OCCURRENCE

**Note:*
 Number(s) in parentheses indicates bed thickness
 Number preceding parenthesis indicates inches above or below spring line of station of measurement.

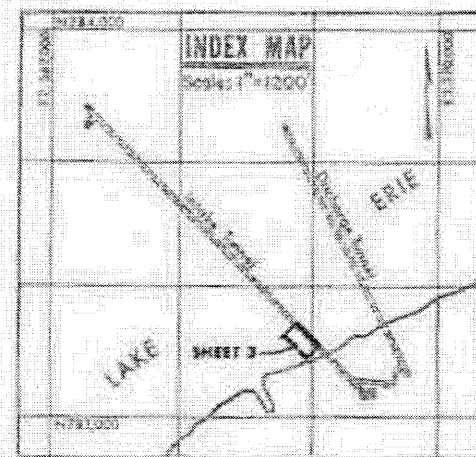


No. 4		No. 5		No. 6		No. 7		No. 8		No. 9		No. 10		No. 11		No. 12	
1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"	1'-5"
1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"	1'-10"
Not pertinent																	
Not pertinent																	

EXCAVATION PROGRESS
 ESTIMATED ROCK CONDITION (TERZAGHI NO.)
 TEMPORARY SUPPORT SYSTEM
 BEDDING SPACING
 FRACTURE SPACING
 WATER CONDITION
 DEPTH OF COVER

(Rev. 12 1/03)
PERRY NUCLEAR POWER PLANT

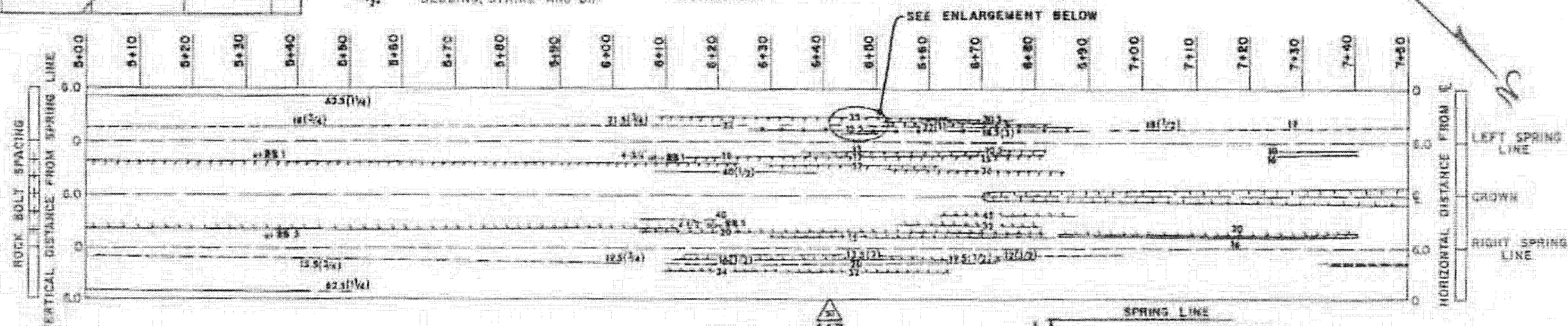
Geologic Map of
 Tunnel Excavations
 Figure 20-2 (Sheet 2 of 24)



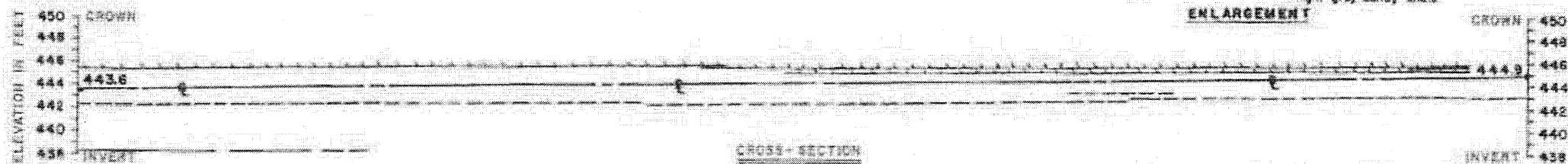
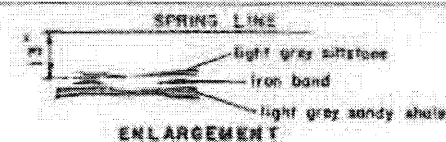
- SYMBOLS**
- (1/4)" HARD, TAN. BROWN, CHERTY, IRON BED OR LAMINAE
 - 12/8-21" DISCONTINUOUS IRON BED
 - 12/11" HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 - 12/20-26" DISCONTINUOUS IRON BED WITHIN GREY BED
 - ⚡ FRACTURE
 - FAULT
 - BEDDING PARTING
 - VERTICAL JOINT
 - INCLINED JOINT
 - BEDDING, STRIKE AND DIP

- MOISTURE ALONG BEDDING PARTING
- SEEPAGE FROM FEATURE
- OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
- METHANE GAS, MAXIMUM PERCENT (L.E.L. WITH DATE OF OCCURRENCE)

*Notes:
Number(s) in parentheses indicates bed thickness.
Number preceding parenthesis indicates inches above or below spring line at station of measurement.



PLANE VIEW



12/20	12/20	12/20	12/20	12/20	12/20
No. 4					
5 Rock bolts @ 2' centers in 12" spaced					
2-3.5' water allowed by water mesh					
1'-4"					
Bedding fracture, only					
No inflow					
Slight moisture in known along bedding fracture					
3 Rock bolts @ 2' centers in 12" spaced					
12.5' water allowed by water mesh					

EXCAVATION PROGRESS

ESTIMATED ROCK CONDITION (TERZAGHI NO.)

TEMPORARY SUPPORT SYSTEM

BEDDING SPACING

FRACTURE SPACING

WATER CONDITION

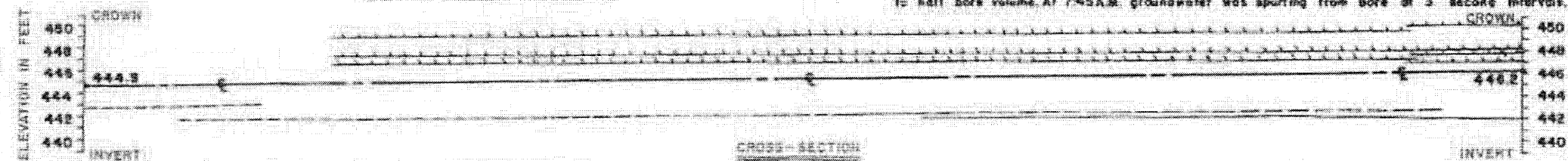
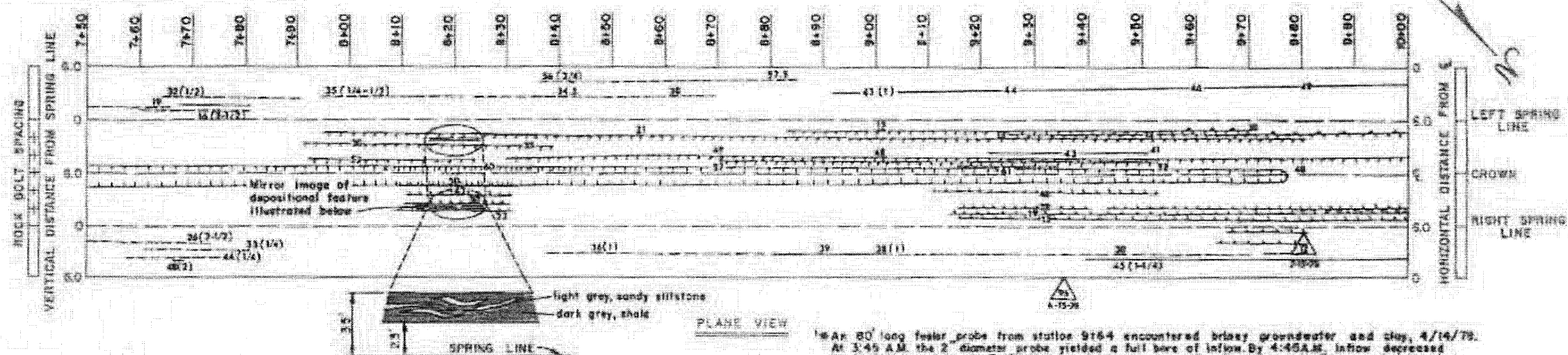
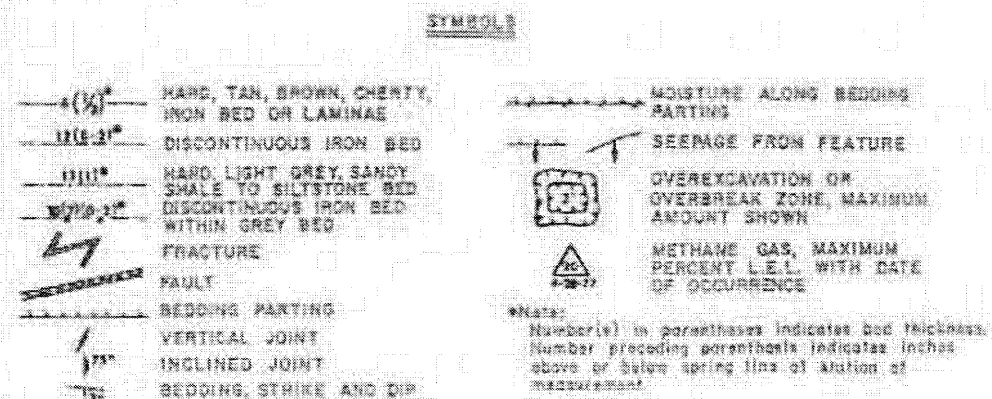
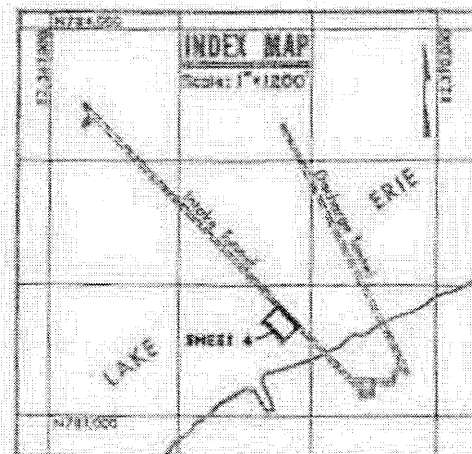
DEPTH OF COVER

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations

Figure 2D-7 (Sheet 3 of 24)



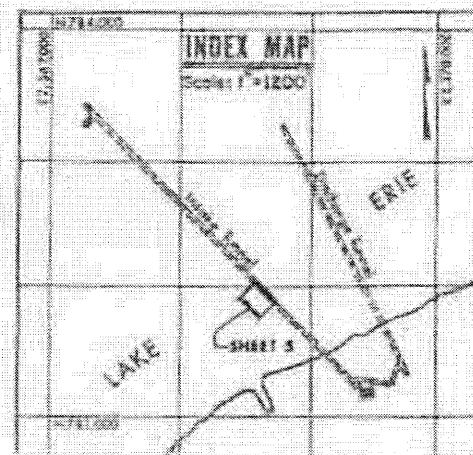
3'-6"	3'-6"	3'-6"	3'-6"	3'-6"	3'-6"
No. 4-8 Cased steel along bedding fracture near crown					
3 Rock bolts @ 8' spacing in ribs covered 2-3.5' square spaced by wire mesh					
1'-4"	1'-2"	1'-8"	1'-10"	1'-10"	1'-10"
bedding fracture only					
Moisture along bedding fracture near crown			Moisture along bedding fracture near crown		
Seepage out of rock bolts w/ iron staining			Slight moisture along 20% of bedding fractures and rock bolts		
5.5' water			11.5' water		
ONLY subsurface (chis)			ONLY subsurface (chis)		

EXCAVATION PROGRESS
 ESTIMATED ROCK CONDITION (TERZAGHI NO.)
 TEMPORARY SUPPORT SYSTEM
 BEDDING SPACING
 FRACTURE SPACING
 WATER CONDITION
 DEPTH OF COVER



PERRY NUCLEAR POWER PLANT

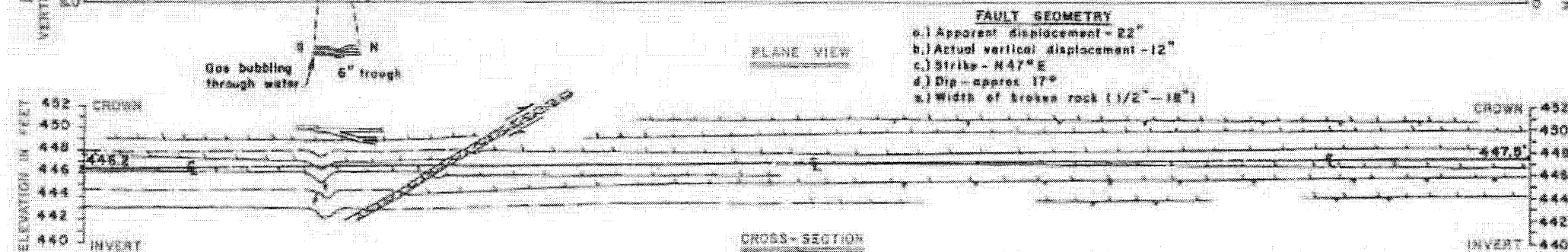
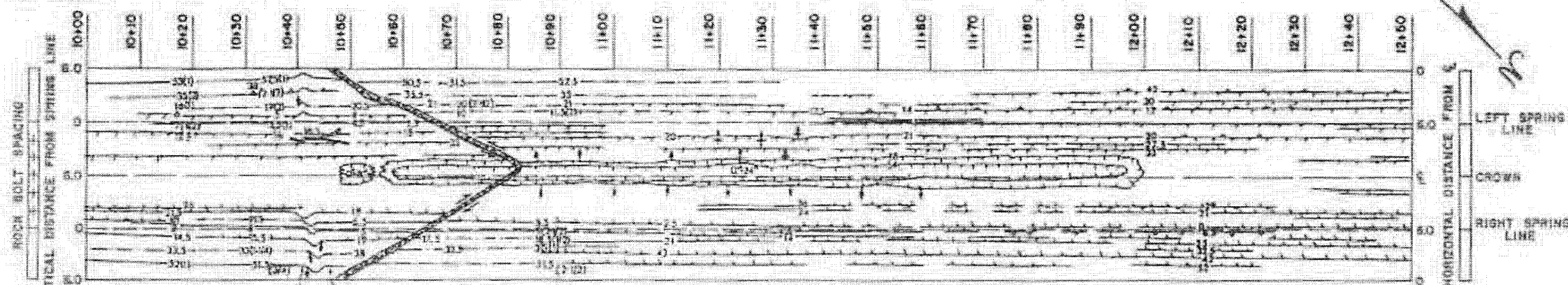
Geologic Map of
 Tunnel Excavations
 Figure 2D-2 (Sheet 4 of 24)



- SYMBOLS**
- 1 1/2" HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 - 10-12" DISCONTINUOUS IRON BED
 - 12-14" HARD, LIGHT GREY SANDY SHALE TO SILTSTONE BED
 - 10-12" DISCONTINUOUS IRON BED WITHIN GREY BED
 - FRACTURE
 - FAULT (with sense of motion)
 - BEDDING PARTING
 - VERTICAL JOINT
 - INCLINED JOINT
 - BEDDING, STRIKE AND DIP

- MOISTURE ALONG BEDDING PARTING
- SEEPAGE FROM FEATURE
- OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
- METHANE GAS, MAXIMUM PERCENT I.E.L. WITH DATE OF OCCURRENCE

* Note:
Number(s) in parentheses indicates bed thickness.
Number preceding parenthesis indicates inches above or below spring line at station of measurement.



- FAULT SEOMETRY**
- a.) Apparent displacement - 22"
 - b.) Actual vertical displacement - 12"
 - c.) Strike - N 47° E
 - d.) Dip - approx 17°
 - e.) Width of broken rock (1 1/2" - 18")

No. 5-6		No. 7-8		No. 9-10		No. 11-12		No. 13-14	
5 rock bolts at 2' centers in steel ribs at 3-3.5' centers		0-24" of overbreak between rock bolts no 2-4		5 rock bolts at 2' centers in steel ribs at 3-3.5' centers spanned by wire mesh		full chauling		5 rock bolts at 2' centers in ribs at 3.5' centers spanned by wire mesh	
7-10"		1'-2"		2'-2"		approx. 6'-14"		8'-15"	
No inflows		Bedding fractures 1/2 to 1/8" thick highly fractured fault zone w/ gouge		Bedding fractures only, spaced as above		Slight inflow from rock bolts		Slight moisture along approx. 20% of bedding fractures and rock bolts	
11.7' subsurface (shale)		water flowing from chauling		2' inflows at approx. 1 gal/min		3.5' water 100.3' subsurface (shale)			

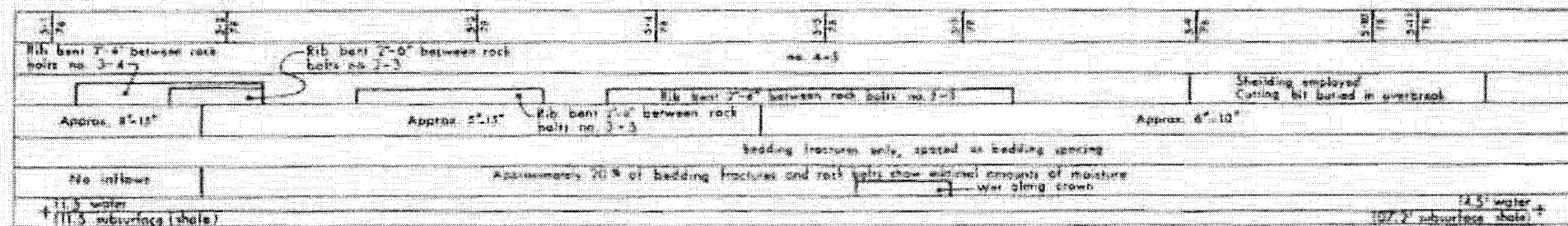
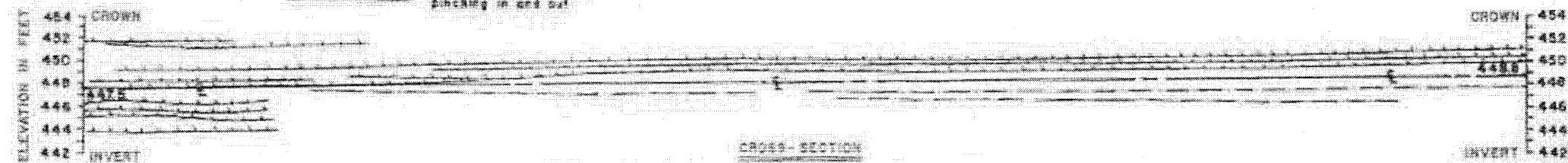
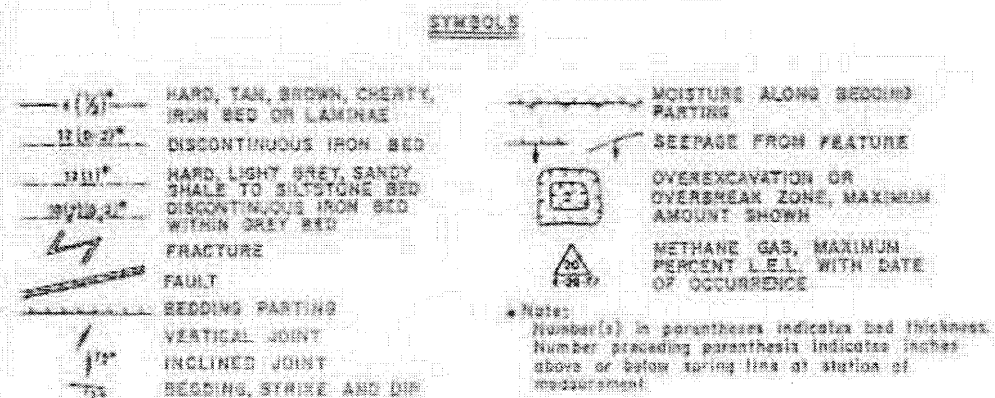
EXCAVATION PROGRESS
ESTIMATED ROCK CONDITION (TERZAGHI NO.)
TEMPORARY SUPPORT SYSTEM
BEDDING SPACING
FRACTURE SPACING
WATER CONDITION
DEPTH OF COVER

(Rev. 12/1/03)

PERRY NUCLEAR POWER PLANT

Geologic Map of Tunnel Excavations

Figure 20-2 (Sheet 5 of 24)



EXCAVATION PROGRESS	
ESTIMATED ROCK	
CONDITION (TERZAGHI NO.)	
TEMPORARY SUPPORT	
SYSTEM	
NEEDING SPACING	
FRACTURE SPACING	
WATER CONDITION	
DEPTH OF COVER	

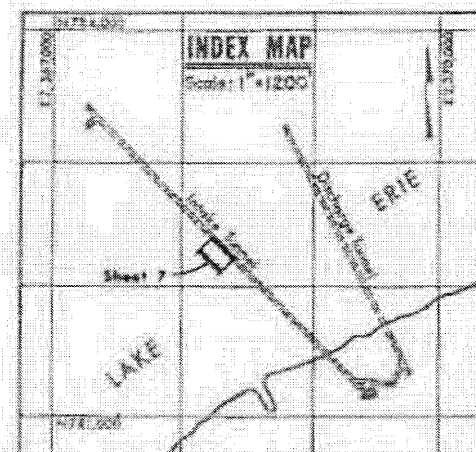
REV. 12-1-83



PERRY NUCLEAR POWER PLANT

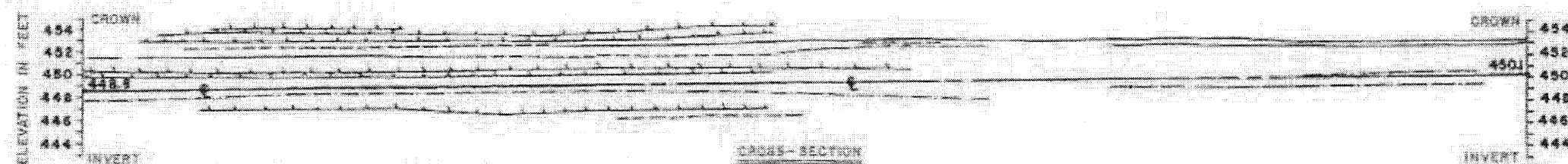
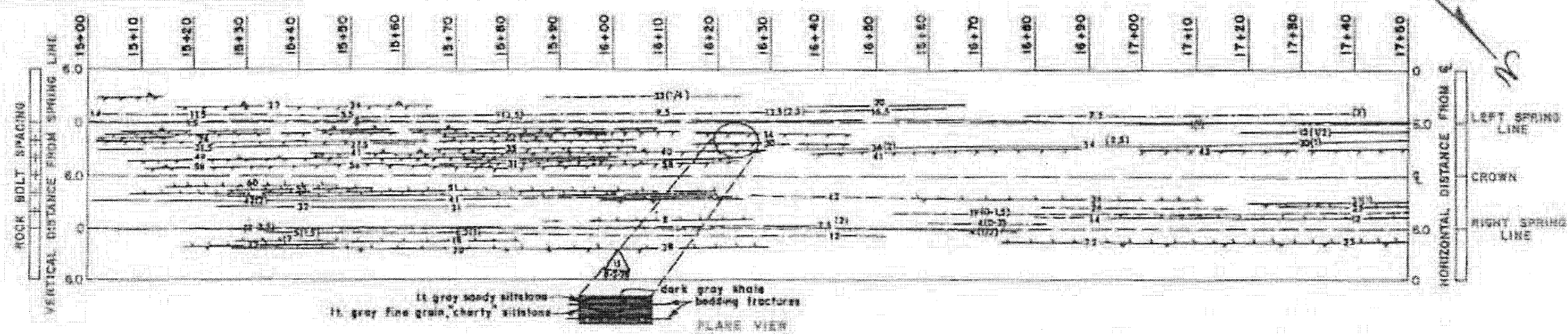
Geologic Map of Tunnel Excavations

Figure 2D-2 (Sheet 6 of 24)



- SYMBOLS**
- $\frac{1}{2}$ " HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 - 12(2-3)" DISCONTINUOUS IRON BED
 - 17(1)" HARD, LIGHT GRAY, SANDY SHALE TO SILTSTONE BED
 - 25(12-2)" DISCONTINUOUS IRON BED WITHIN GRAY BED
 - ⚡ FRACTURE
 - FAULT
 - BEDDING PARTING
 - VERTICAL JOINT
 - INCLINED JOINT
 - BEDDING, STRIKE AND DIP

- MOISTURE ALONG BEDDING PARTING
 - SEEPAGE FROM FEATURE
 - 30 OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 - 40 METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE
- * Note: Number(s) in parentheses indicates bed thickness. Number preceding parenthesis indicates inches above or below spring line at station of measurement.



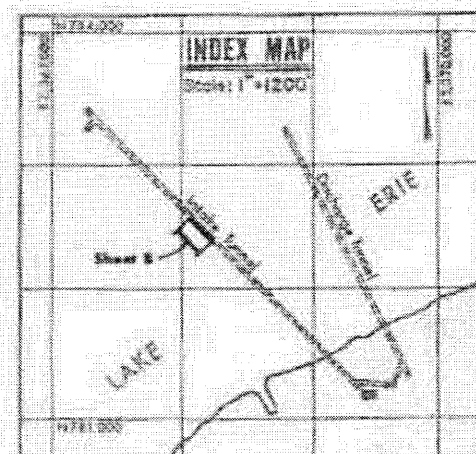
0+00	0+10	0+20	0+30	0+40
No. 4-5				
Slight scaling from crown along entire length of excavation (0'-2' overbreak)				
2 rock bolts at 7' centers in steel ribs or 3.5' to 4.0' centers, spaced by wire mesh				
Approx. 6"-10"	8"-9"		6"-10"	
Bedding fractures only				
Approx. 20% of bedding fractures show minimal moisture				
Approx. 10% of bedding fractures show moisture				
14.5' water 107.2' subsurface (shale)				
10.3' water 103.9' subsurface (shale)				

EXCAVATION PROGRESS
ESTIMATED ROCK
CONDITION (TERZAGHI NO. 1)
TEMPORARY SUPPORT
SYSTEM
BEDDING SPACING
FRACTURE SPACING
WATER CONDITION
DEPTH OF COVER

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations
Figure 2D-2 (Sheet 7 of 24)

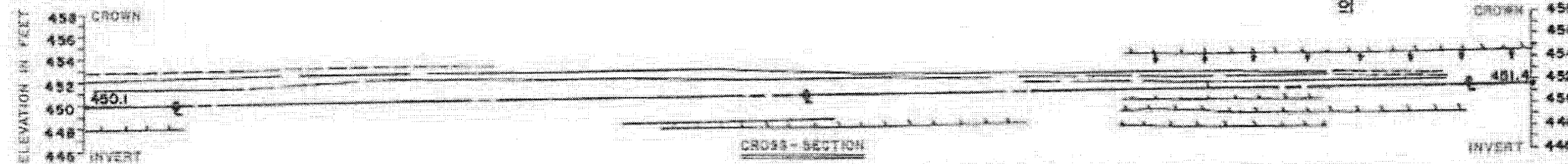
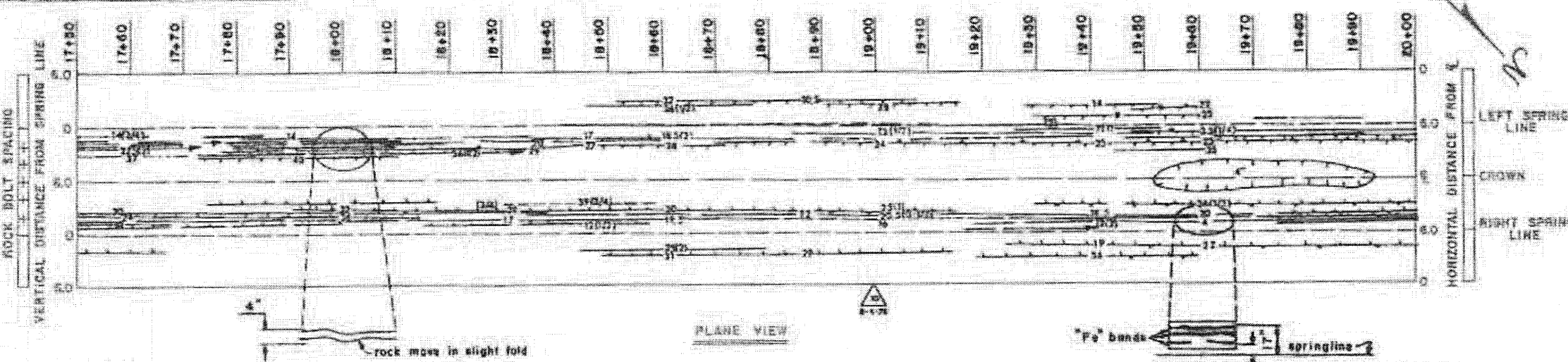


SYMBOLS

(X) HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 12 10 37 DISCONTINUOUS IRON BED
 12 11 HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 12 12 20 DISCONTINUOUS IRON BED WITHIN GREY BED
 12 13 FRACTURE
 12 14 FAULT
 12 15 BEDDING PARTING
 12 16 VERTICAL JOINT
 12 17 INCLINED JOINT
 12 18 BEDDING, STRIKE AND DIP

MOISTURE ALONG BEDDING PARTING
 SEEPAGE FROM FEATURE
 OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE

*Note:
 Number(s) in parenthesis indicates bed thickness
 Number preceding parenthesis indicates inches above or below spring line of station of measurement.



12 17	12 18	12 19	12 20	12 21
as 4	Slight scaling along crown for series length (between rock bolt 2 & 4)		Slight scaling from roof (0'-4')	as 4
	3 rock bolts at 2.0' centers in steel ribs at 2.5' to 4.0' centers, spanned by wire mesh		Some ribs at 4.0' centers	
	Approx. 8"	Approx. 4" to 10"	4" to 8"	
	Bedding fractures only			
	Traces of moisture along a couple bedding fractures			Slight moisture on approx. 60% of the excavation
11.5' water				11.5' water
101.5' subsurface (shale)				101.5' subsurface (shale)

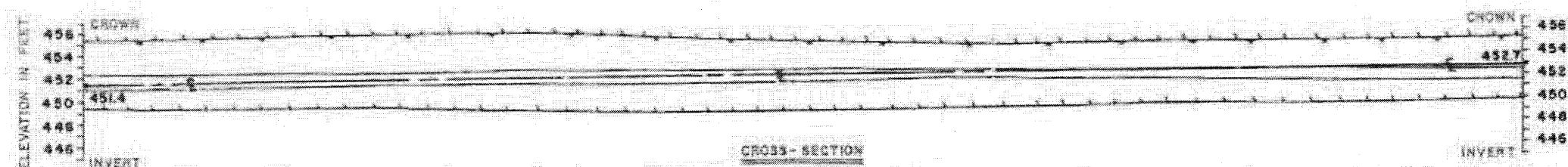
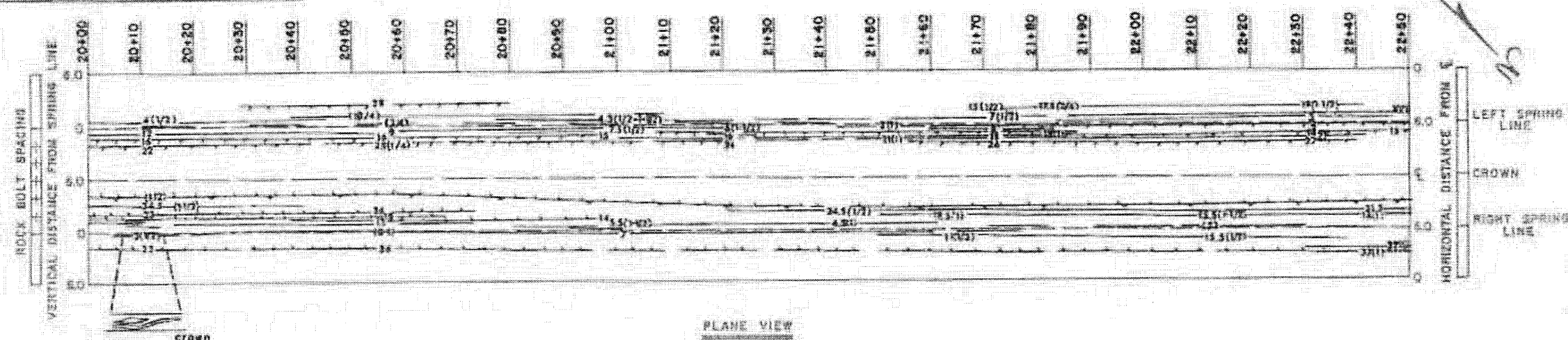
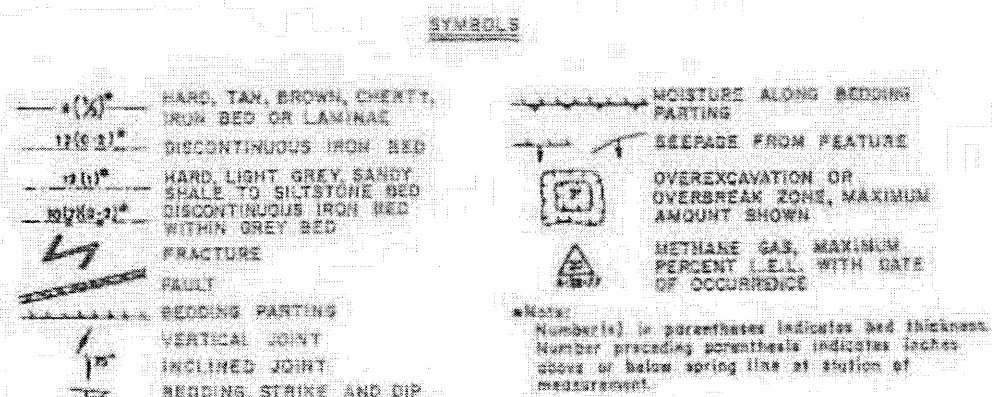
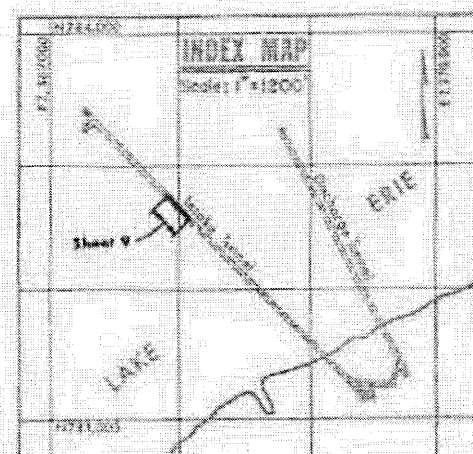
EXCAVATION PROGRESS
 ESTIMATED ROCK CONDITION (TERZAGHI NO.)
 TEMPORARY SUPPORT SYSTEM
 BEDDING SPACING
 FRACTURE SPACING
 WATER CONDITION
 DEPTH OF COVER

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations

Figure 2D-2 (Sheet 8 of 24)



2.25 7.5	3.5 7.5	4.1 7.5	4.1 7.5	7.5
No. 1			No. 2	
3 rock bolts at 2' centers in steel ribs at 4' centers supported by wire mesh			3 rock bolts at 2' centers in steel ribs at 2.5'-4.0' centers supported by wire mesh	
5'-8'			4'-8'	
Bedding fractures only				
Slight moisture from open parting along east wall for entire length				
17.5 water 191.8 subsurface (shale)			17.5 water 186.5' subsurface (shale)	

EXCAVATION PROGRESS
ESTIMATED ROCK
CONDITION (TERZAGHI NO.)
TEMPORARY SUPPORT
SYSTEM
BEDDING SPACING
FRACTURE SPACING
WATER CONDITION
DEPTH OF COVER

(Rev. 12 1/03)

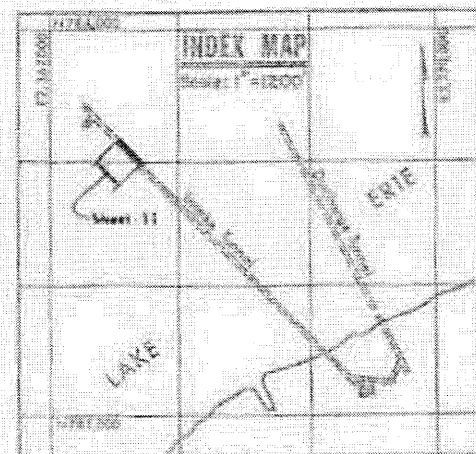


PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations

Figure 20-2 (Sheet 9 of 24)

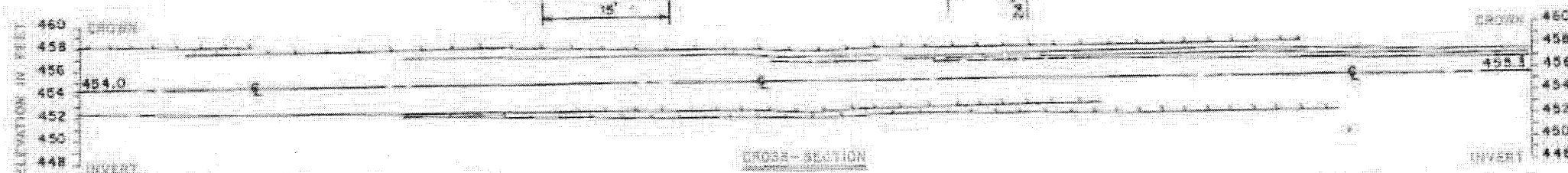
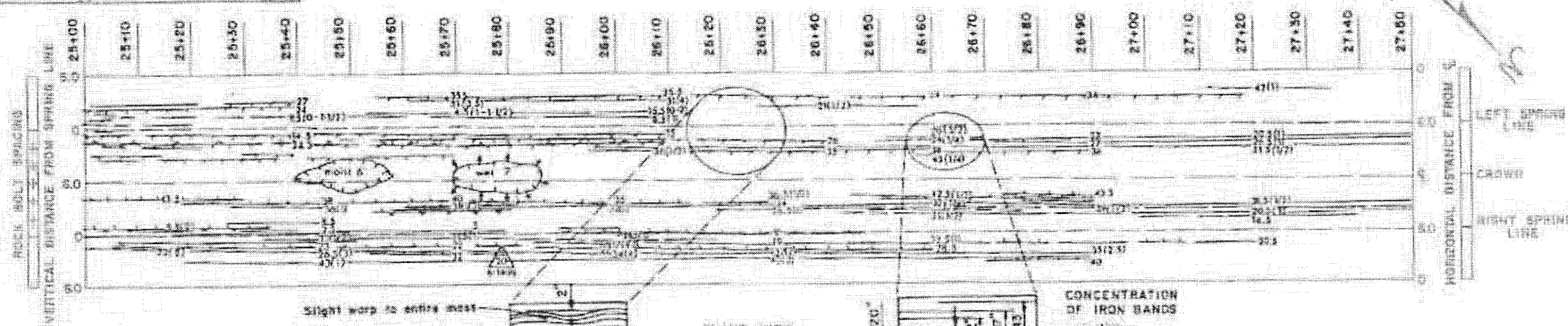




- SYMBOLS**
- 1/2" HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 - 1/2" DISCONTINUOUS IRON BED
 - 1/2" HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 - 1/2" DISCONTINUOUS IRON BED WITHIN GREY BED
 - 1/2" FRACTURE
 - 1/2" FAULT
 - 1/2" BEDDING PARTING
 - 1/2" VERTICAL JOINT
 - 1/2" INCLINED JOINT
 - 1/2" BEDDING, STRIKE AND DIP

- 1/2" MOISTURE ALONG BEDDING PARTING
- 1/2" BEARING FROM FEATURE
- 1/2" OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
- 1/2" METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE

* Note:
Numerical in parentheses indicates bed thickness.
Number preceding parenthesis indicates inches above or below spring line of station of measurement.



Slight overbreak along entire section 0' - 6' deep max 2'		Slight overbreak along entire section 0' - 6'		Slight overbreak along entire section 0' - 6'	
16' - 0' overbreak in crown max 1'	1' - 7'	1' - 7'	1' - 7'	1' - 7'	1' - 7'
Additional rock bolts and ribs added to prohibit additional overbreaks		Additional rock bolts and ribs added to prohibit additional overbreaks		Additional rock bolts and ribs added to prohibit additional overbreaks	
Slight dip from overbreak in crown		Slight moisture along bedding fractures		No seepage	
3' - 5' water		3' - 5' water		3' - 5' water	
140' surface (thole)		140' surface (thole)		140' surface (thole)	

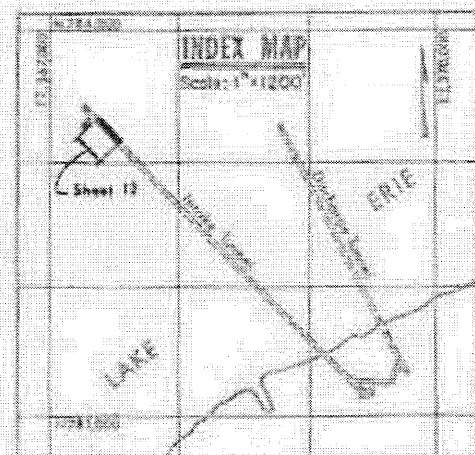
EXCAVATION PROGRESS
ESTIMATED ROCK CONDITION (VERTICAL RD.)
TEMPORARY SUPPORT SYSTEM
BEDDING SLIPAGE
FRACTURE SLIPAGE
WATER CONDITION
DEPTH OF COVER

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

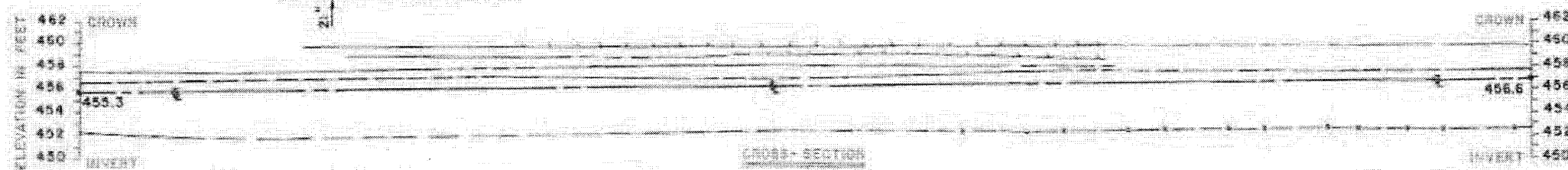
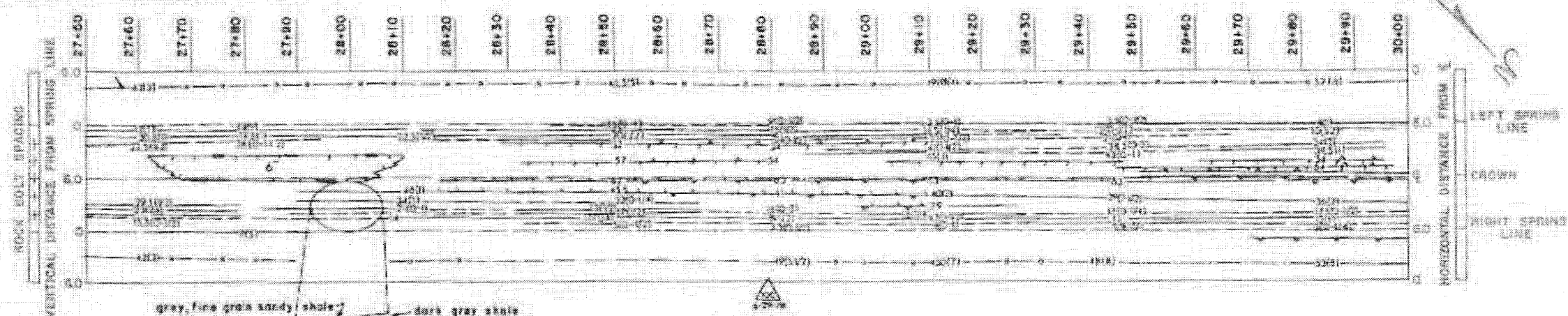
Geologic Map of
Tunnel Excavations

Figure 2D-2 (Sheet 11 of 24)



- SYMBOLS**
- HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAR
 - DISCONTINUOUS IRON BED
 - HARD, LIGHT GREY, SANDY SHALE TO SILTYSTONE BED
 - DISCONTINUOUS IRON BED WITHIN GREY BED
 - FRACTURE
 - FAULT
 - BEDDING PARTING
 - VERTICAL JOINT
 - INCLINED JOINT
 - BEDDING, STRIKE AND DIP

- MOISTURE ALONG BEDDING PARTING
 - SEEPAGE FROM FEATURE
 - OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 - METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE
- * Note: Number(s) in parentheses indicates bed thickness. Number preceding parenthesis indicates inches above or below spring line at station of measurement.



Overhead 6" deep limited by bottom of steel ribs and bearing parallel to tunnel bearing		Light overbreak along entire section in crown		5 rock bolts at 2' centers in steel ribs or 4' centers supported by wire mesh	
1 rock bolt at 2' centers in steel ribs or 4' centers supported by wire mesh		2 rock bolts at 2' centers in steel ribs or 4' centers supported by wire mesh		3 rock bolts at 2' centers in steel ribs or 4' centers supported by wire mesh	
Bedding fractures only, spaced as above		Slight moisture from all bedding fractures		Slight moisture from bedding and fracture in crown	
10' x 10' water		10' x 10' water		10' x 10' water	
10' x 10' water		10' x 10' water		10' x 10' water	

EXCAVATION PROGRESS
ESTIMATED ROCK
CONDITION (PERCENTAGE)
TEMPORARY SUPPORT
SYSTEM
BEDDING SPACING
FRACTURE SPACING
WATER CONDITION
DEPTH OF COVER

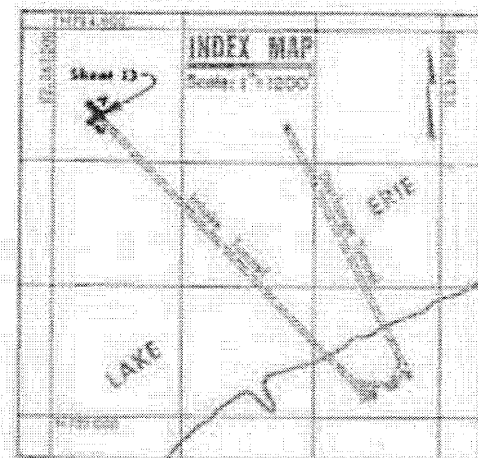
(Rev. 12 1/03)



PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations

Figure 2D-2 (Sheet 12 of 24)

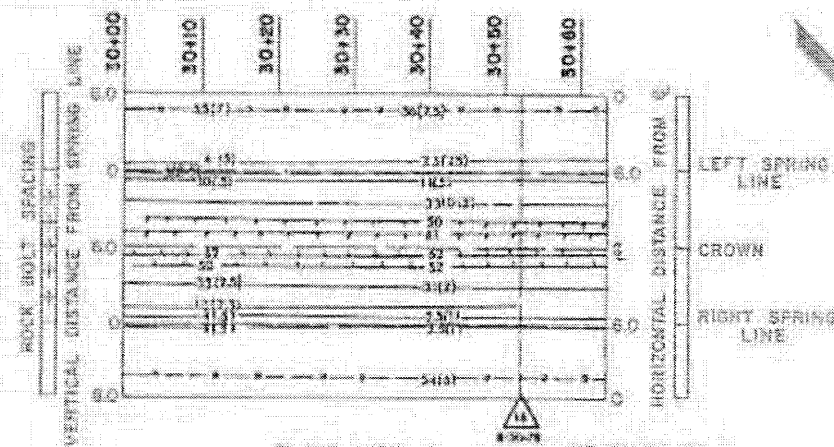


SYMBOLS

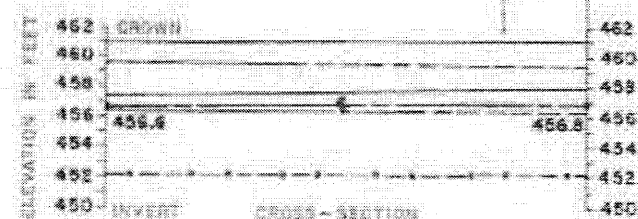
1/2" = 1' HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 1/2" = 1' DISCONTINUOUS IRON BED
 1/2" = 1' HARD, LIGHT GREY, SANDY SHALE TO SLTSTONE BED
 1/2" = 1' DISCONTINUOUS IRON BED WITHIN GREY BED
 1/2" = 1' FRACTURE
 1/2" = 1' FAULT
 1/2" = 1' BEDDING PARTING
 1/2" = 1' VERTICAL JOINT
 1/2" = 1' INCLINED JOINT
 1/2" = 1' BEDDING, STRIKE AND DIP

MOISTURE ALONG BEDDING PARTING
 SEEPAGE FROM FEATURE
 OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE

*Note: Numbers in parentheses indicate bed thickness. Number preceding parenthesis indicates inches above or below spring line at station of measurement.



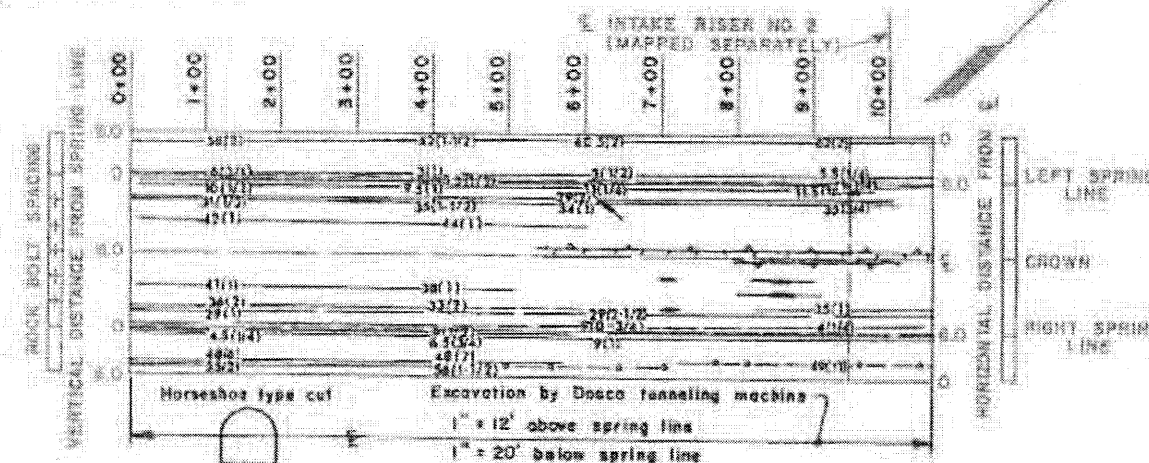
PLANE VIEW A



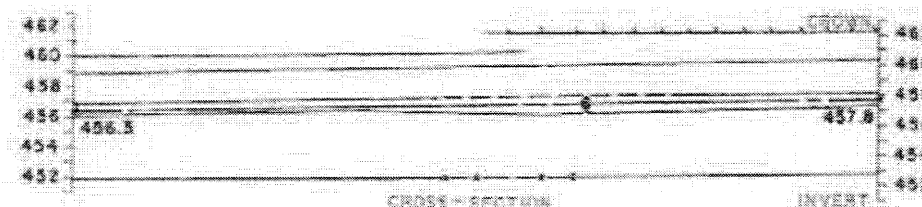
CROSS-SECTION A

EXCAVATION PROGRESS	ESTIMATED ROCK CONDITION (TERZAGHI NO.)
1/2" = 1' Slight overbreak along entire section	1/2" = 1' 1/2
1/2" = 1' 3 rock bolts at 2' centers in steel ribs at 4' centers spaced by wire mesh	1/2" = 1' 1/2
1/2" = 1' 4' - 6'	1/2" = 1' 1/2
1/2" = 1' Bedding fractures only, spaced as above	1/2" = 1' 1/2
1/2" = 1' Slight moisture along all bedding fractures	1/2" = 1' 1/2
1/2" = 1' 22.5' loose water	1/2" = 1' 22.5'
1/2" = 1' 91.5' subsurface (slate)	1/2" = 1' 91.5'

TEMPORARY SUPPORT SYSTEM
 BEDDING SPACING
 FRACTURE SPACING
 WATER CONDITION
 DEPTH OF COVER



PLANE VIEW B



CROSS-SECTION B

EXCAVATION PROGRESS	ESTIMATED ROCK CONDITION (TERZAGHI NO.)
1/2" = 1' Slight overbreak along entire section	1/2" = 1' 1/2
1/2" = 1' 3 rock bolts at 2' centers in steel ribs at 4' centers, spaced by wire mesh	1/2" = 1' 1/2
1/2" = 1' 4' - 6'	1/2" = 1' 1/2
1/2" = 1' Bedding fractures only, spaced as above	1/2" = 1' 1/2
1/2" = 1' Slight moisture along all bedding fractures	1/2" = 1' 1/2
1/2" = 1' 22.5' loose water	1/2" = 1' 22.5'
1/2" = 1' 91.5' subsurface (slate)	1/2" = 1' 91.5'

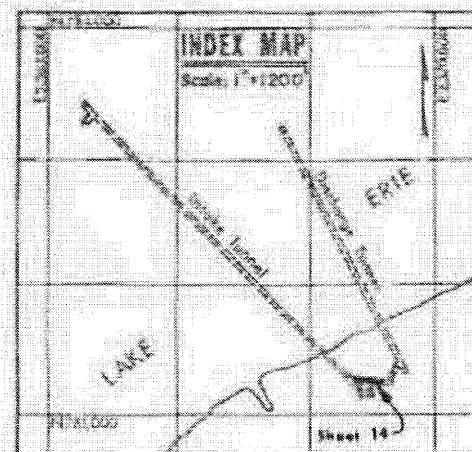
TEMPORARY SUPPORT SYSTEM
 BEDDING SPACING
 FRACTURE SPACING
 WATER CONDITION
 DEPTH OF COVER



PERRY NUCLEAR POWER PLANT

Geologic Map of
 Tunnel Excavations

Figure 20-2 (Sheet 13 of 24)

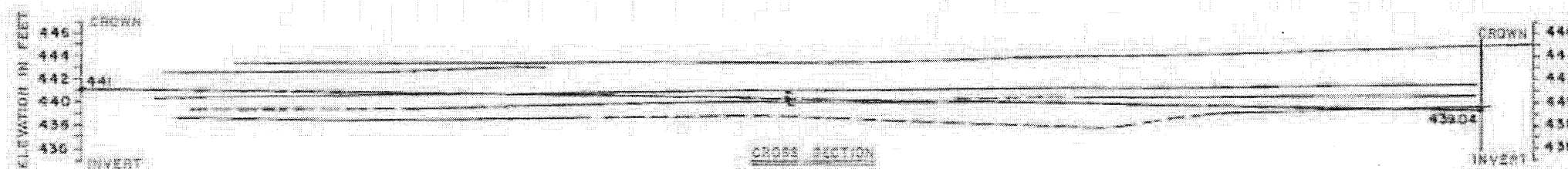
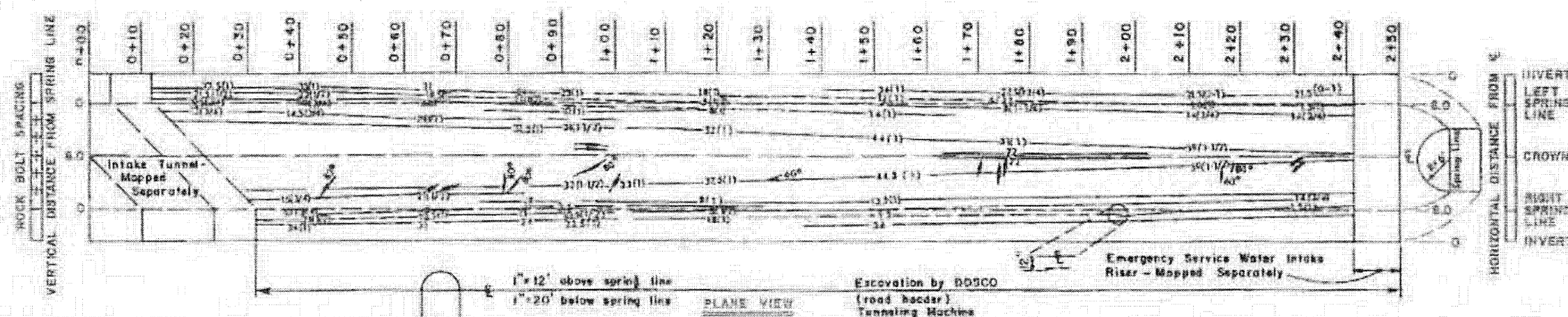


SYMBOLS

(X) HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 2/5-2 DISCONTINUOUS IRON BED
 13(1) HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 10(7X2-2) DISCONTINUOUS IRON BED WITHIN GREY BED
 FRACTURE
 FAULT
 BEDDING PARTING
 VERTICAL JOINT
 INCLINED JOINT
 BEDDING, STRIKE AND DIP

MOISTURE ALONG BEDDING PARTING
 SEEPAGE FROM FEATURE
 OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE

* Note: Number in parentheses indicates bed thickness. Number preceding parentheses indicates inches above or below spring line at station of measurement.



EXCAVATION PROGRESS									
ESTIMATED ROCK CONDITION (VERBAGE NO.)									
TEMPORARY SUPPORT SYSTEM									
BEDDING SPACING									
FRACTURE SPACING									
WATER CONDITION									
DEPTH OF COVER									
1'	Widely spaced 10'-20'	1'-10'	1'-6"	2'-2"	1'-6"	1'-6"	1'-5"	2'-7"	7'-6"
No seepage									
Sources: 53.5' at intake and 27.5' at riser; 112.5' at shaft									
Sources: 53.5' at intake, 27.5' at riser, 112.5' at shaft									

EXCAVATION PROGRESS
 ESTIMATED ROCK
 CONDITION (VERBAGE NO.)
 TEMPORARY SUPPORT
 SYSTEM
 BEDDING SPACING
 FRACTURE SPACING
 WATER CONDITION
 DEPTH OF COVER

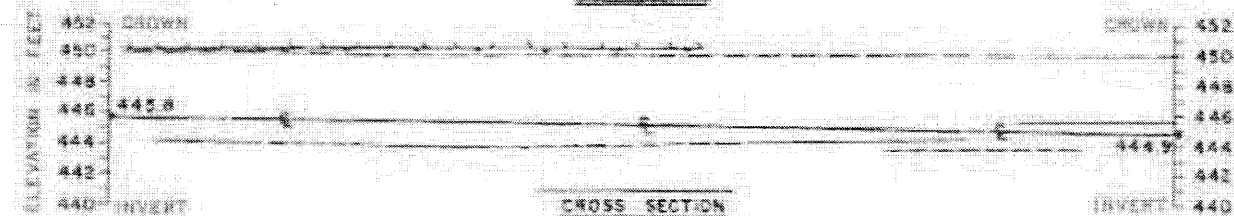
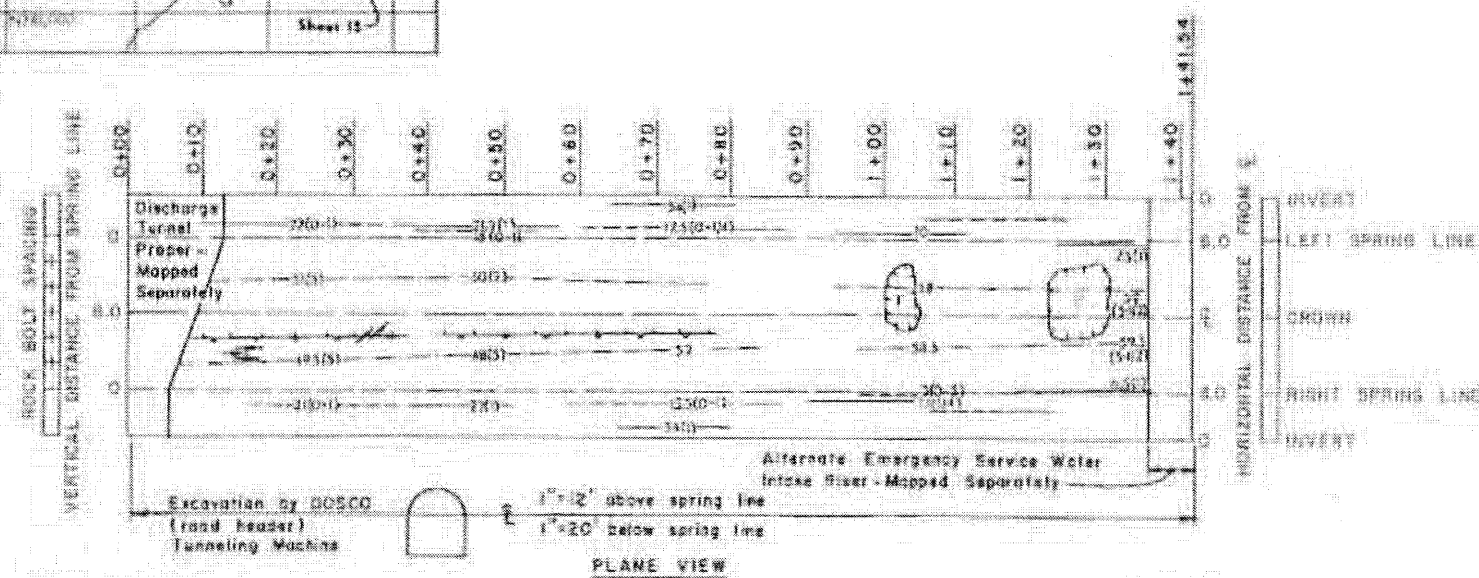
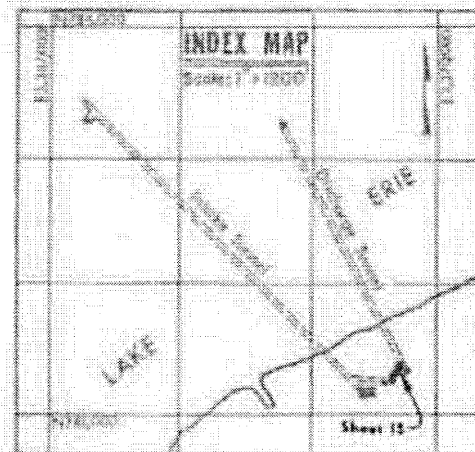
(Rev. 12 1/03)



PERRY NUCLEAR POWER PLANT

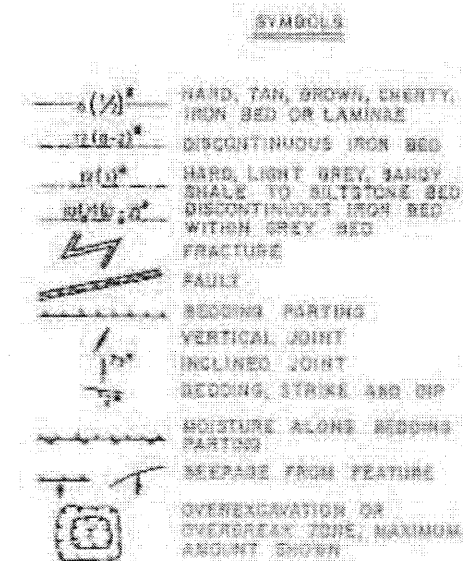
Geologic Map of
 Tunnel Excavations

Figure 2D-2 (Sheet 14 of 24)



Excavation Progress	Estimated Rock Condition (Terzaghi No.)	Temporary Support System
1/2" x 1/2"	2	1/2" x 1/2" rock bolts at 3' centers in steel ribs at 10' x 11' centers, spanned by wire mesh
3" x 2"	3	3" x 2" rock bolts at 3' centers in steel ribs at 10' x 11' centers, spanned by wire mesh
4" x 2"	4	4" x 2" rock bolts at 3' centers in steel ribs at 10' x 11' centers, spanned by wire mesh
Approx. 1/2" x 1/2" rock bolts	5	Approx. 1/2" x 1/2" rock bolts at 3' centers in steel ribs at 10' x 11' centers, spanned by wire mesh
Approx. 1/2" x 1/2" rock bolts	6	Approx. 1/2" x 1/2" rock bolts at 3' centers in steel ribs at 10' x 11' centers, spanned by wire mesh
Approx. 1/2" x 1/2" rock bolts	7	Approx. 1/2" x 1/2" rock bolts at 3' centers in steel ribs at 10' x 11' centers, spanned by wire mesh
Approx. 1/2" x 1/2" rock bolts	8	Approx. 1/2" x 1/2" rock bolts at 3' centers in steel ribs at 10' x 11' centers, spanned by wire mesh
Approx. 1/2" x 1/2" rock bolts	9	Approx. 1/2" x 1/2" rock bolts at 3' centers in steel ribs at 10' x 11' centers, spanned by wire mesh
Approx. 1/2" x 1/2" rock bolts	10	Approx. 1/2" x 1/2" rock bolts at 3' centers in steel ribs at 10' x 11' centers, spanned by wire mesh

Excavation Progress
Estimated Rock Condition (Terzaghi No.)
Temporary Support System
Bedding Spacing
Fracture Spacing
Water Condition
Depth of Cover



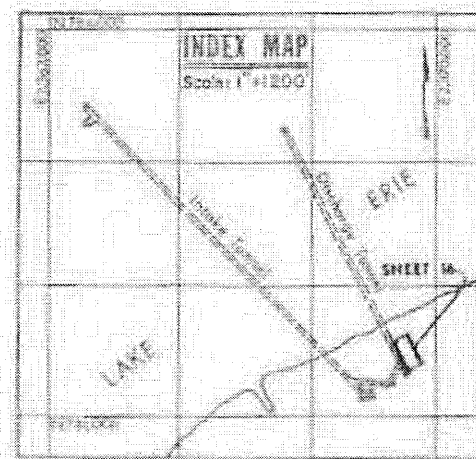
Notes:
Number(s) in parentheses indicate bed thickness.
Number preceding parentheses indicates inches above or below spring line at station of measurement.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

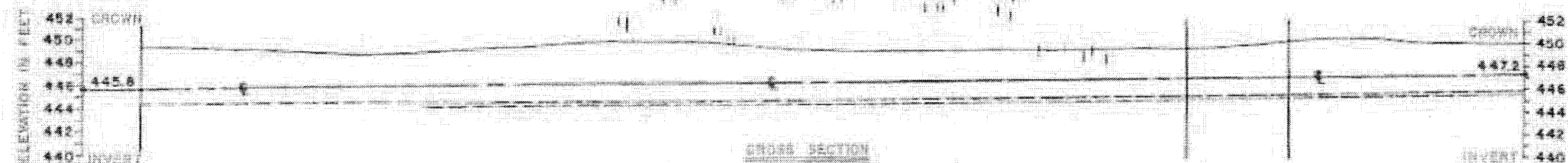
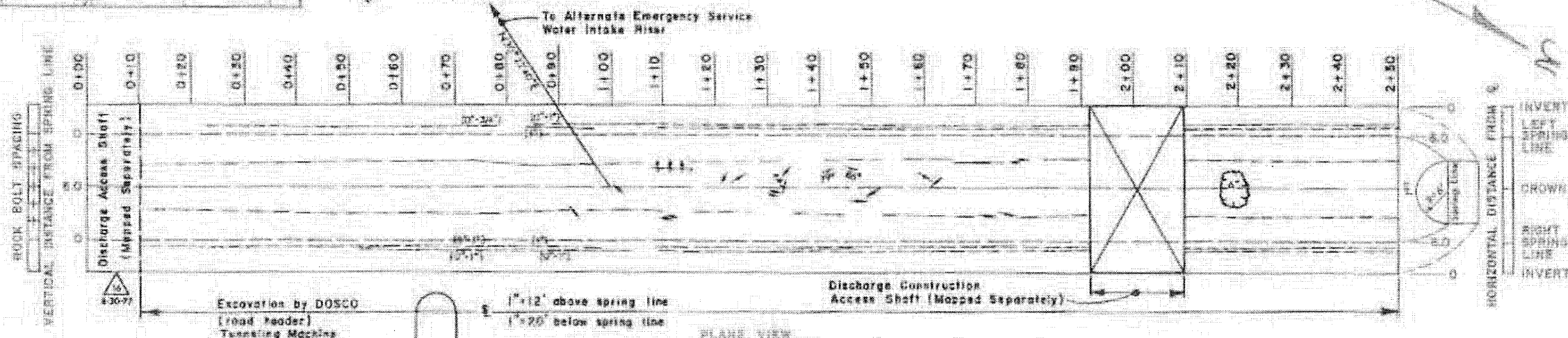
Geologic Map of
Tunnel Excavations

Figure 2D-2 (Sheet 15 of 24)



SYMBOLS

- 1/2" (1/2)" HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 - 1/2" (1/2)" DISCONTINUOUS IRON BED
 - 1/2" (1/2)" HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 - 1/2" (1/2)" DISCONTINUOUS IRON BED WITHIN GREY BED
 - 1/2" (1/2)" FRACTURE
 - 1/2" (1/2)" FAULT
 - 1/2" (1/2)" BEDDING PARTING
 - 1/2" (1/2)" VERTICAL JOINT
 - 1/2" (1/2)" INCLINED JOINT
 - 1/2" (1/2)" BEDDING, STRIKE AND DIP
 - 1/2" (1/2)" MOISTURE ALONG BEDDING PARTING
 - 1/2" (1/2)" SEEPAGE FROM FEATURE
 - 1/2" (1/2)" OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 - 1/2" (1/2)" METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE
- * NOTE: Number(s) in parentheses indicates bed thickness. Number preceding parentheses indicates inches above or below spring line at station of measurement.



no. 4									
5 rock bolts at 7' centers in steel ribs at 15' centers, spaced by wire mesh									
2'-6"	1'-6"	1'-6"	2'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	2'-6"
No seepage									
Seepage out of spring 0' above springline on west wall									
No seepage									
Noted substantial amount of moisture in downhole. May be from melting ice									
Approx. 35% moisture									
2.5% Seepage out of spring 0' above springline on west wall									
Approx. 35% moisture									
2.5% Seepage out of spring 0' above springline on west wall									

EXCAVATION PROGRESS
ESTIMATED ROCK
CONDITION (INTERIM NO.)
TEMPORARY SUPPORT
SYSTEM
BEDDING SPACING
FRACTURE SPACING
WATER CONDITION
DEPTH OF COVER

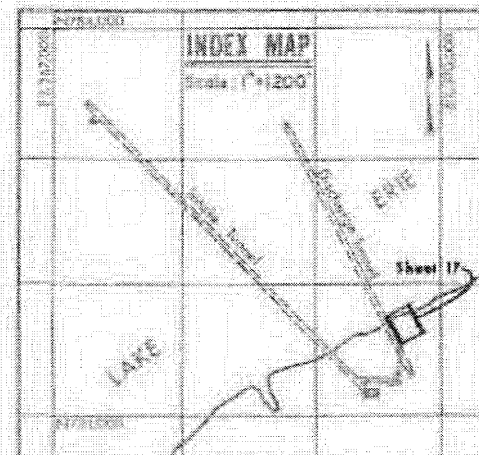
(Rev. 12 1/03)



PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations

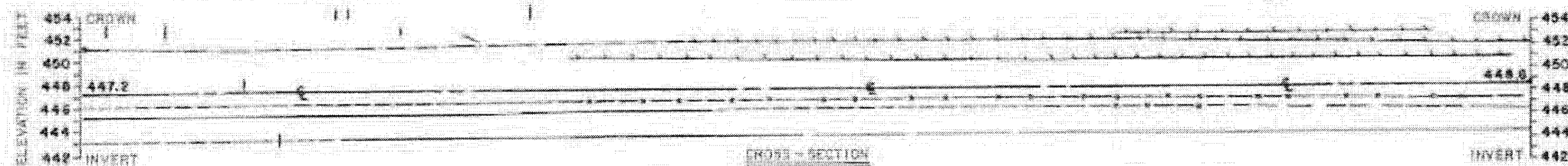
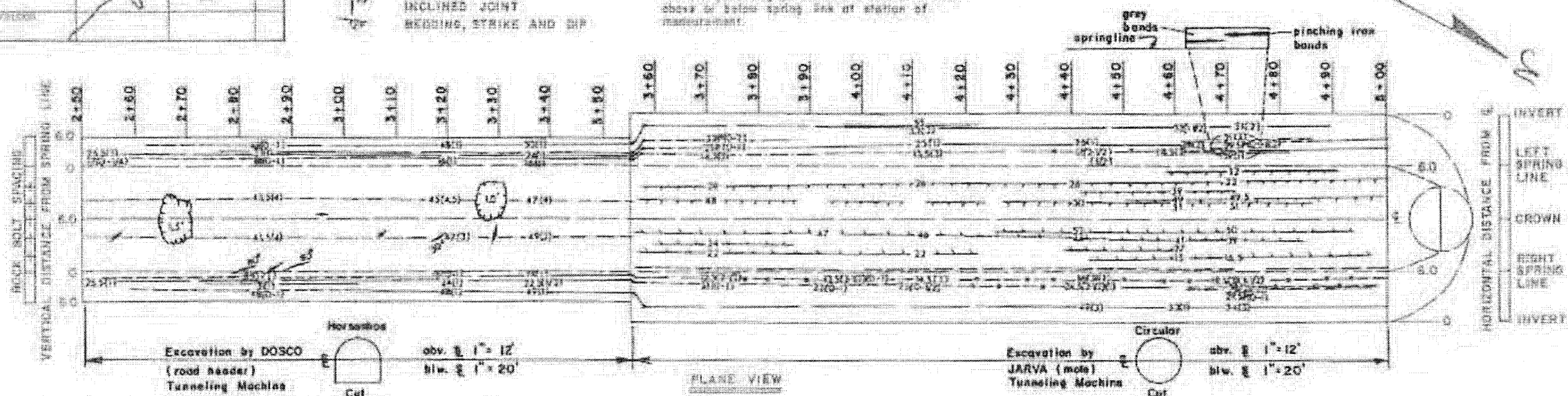
Figure 20-2 (Sheet 15 of 24)



- SYMBOLS**
- 14" HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 - 12(5-2)" DISCONTINUOUS IRON BED
 - 12(1)" HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 - 15(1/2-2)" DISCONTINUOUS IRON BED WITHIN GREY BED
 - 15" FRACTURE
 - FAULT
 - BEDDING PARTING
 - VERTICAL JOINT
 - INCLINED JOINT
 - BEDDING, STRIKE AND DIP

- MOISTURE ALONG BEDDING PARTING
- SEEPAGE FROM FEATURE
- OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN

* Note:
Number(s) in parentheses indicates bed thickness.
Number preceding parentheses indicates inches above or below spring line of station of measurement.



20'	15'	10'	5'	0'	5'	10'	15'	20'
No. 4								
5 rock bolts at 2' centers in steel ribs at 30'±3.5' centers, spanned by wire mesh								
1'-4"	1'-5"	1'-6"	1'-8"	1'-10"	1'-12"	1'-14"	1'-16"	1'-18"
Approx. 5'±0'	Approx. 8'	Approx. 11'	Jointing less apparent in smooth circular bore excavation			Bedding fractures only, spaced as above		
No inflow								
Approx. 24' limestone & 14' glacial till + 11.8' shale						Approx. 2' of bench + 122' of shale		

EXCAVATION PROGRESS
ESTIMATED ROCK
CONDITION (TERZAGHI NO.)
TEMPORARY SUPPORT
SYSTEM
BEDDING SPACING
FRACTURE SPACING
WATER CONDITION
DEPTH OF COVER

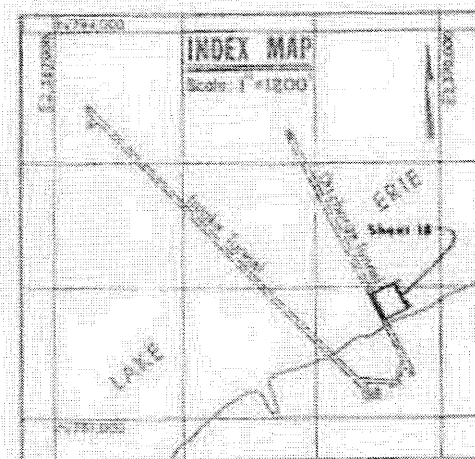
(Rev. 12 1/03)



PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations

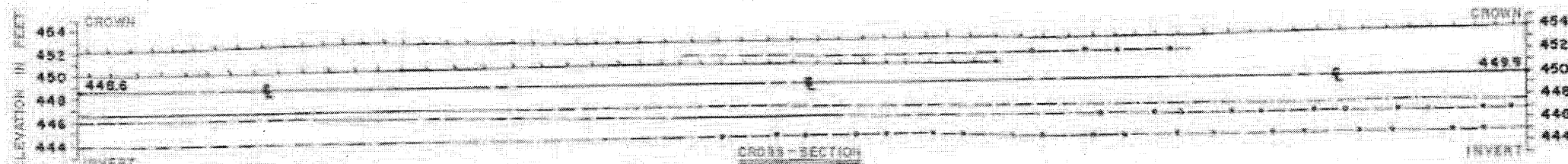
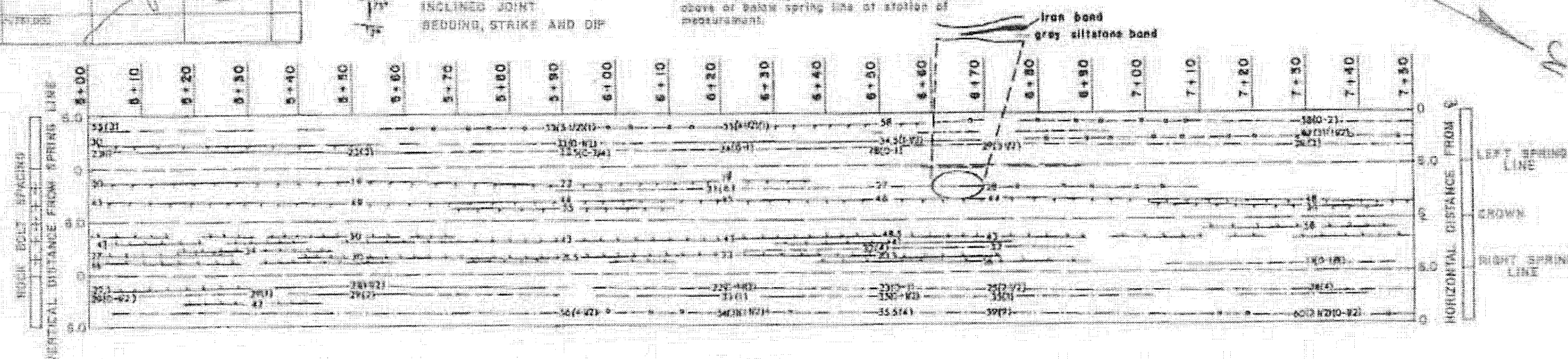
Figure 2D-2 (Sheet 17 of 24)



- SYMBOLS**
- $\frac{1}{4}$ " HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 - $\frac{1}{2}$ "-2" DISCONTINUOUS IRON BED
 - 1"2" HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 - $\frac{1}{2}$ "-2" DISCONTINUOUS IRON BED WITHIN GREY BED
 - Fracture
 - Fault
 - Bedding Parting
 - Vertical Joint
 - Inclined Joint
 - Bedding, Strike and Dip

- Moisture Along Bedding Parting
- Seepage from Feature
- Overexcavation or Overbreak Zone, Maximum Amount Shown
- Methane Gas, Maximum Percent L.E.L. with Date of Occurrence

Note: Numerical in parentheses indicates bed thickness. Number preceding parentheses indicates inches above or below spring line at station of measurement.



CROWN		INVERT	
454	452	444	442
450	448	440	438
446	444	436	434
442	440	432	430
438	436	428	426
434	432	424	422
430	428	420	418
426	424	416	414
422	420	412	410
418	416	408	406
414	412	404	402
410	408	400	398
406	404	396	394
402	400	392	390
398	396	388	386
394	392	384	382
390	388	380	378
386	384	376	374
382	380	372	370
378	376	368	366
374	372	364	362
370	368	360	358
366	364	356	354
362	360	352	350
358	356	348	346
354	352	344	342
350	348	340	338
346	344	336	334
342	340	332	330
338	336	328	326
334	332	324	322
330	328	320	318
326	324	316	314
322	320	312	310
318	316	308	306
314	312	304	302
310	308	300	298
306	304	296	294
302	300	292	290
298	296	288	286
294	292	284	282
290	288	280	278
286	284	276	274
282	280	272	270
278	276	268	266
274	272	264	262
270	268	260	258
266	264	256	254
262	260	252	250
258	256	248	246
254	252	244	242
250	248	240	238
246	244	236	234
242	240	232	230
238	236	228	226
234	232	224	222
230	228	220	218
226	224	216	214
222	220	212	210
218	216	208	206
214	212	204	202
210	208	200	198
206	204	196	194
202	200	192	190
198	196	188	186
194	192	184	182
190	188	180	178
186	184	176	174
182	180	172	170
178	176	168	166
174	172	164	162
170	168	160	158
166	164	156	154
162	160	152	150
158	156	148	146
154	152	144	142
150	148	140	138
146	144	136	134
142	140	132	130
138	136	128	126
134	132	124	122
130	128	120	118
126	124	116	114
122	120	112	110
118	116	108	106
114	112	104	102
110	108	100	98
106	104	96	94
102	100	92	90
98	96	88	86
94	92	84	82
90	88	80	78
86	84	76	74
82	80	72	70
78	76	68	66
74	72	64	62
70	68	60	58
66	64	56	54
62	60	52	50
58	56	48	46
54	52	44	42
50	48	40	38
46	44	36	34
42	40	32	30
38	36	28	26
34	32	24	22
30	28	20	18
26	24	16	14
22	20	12	10
18	16	8	6
14	12	4	2
10	8	0	0

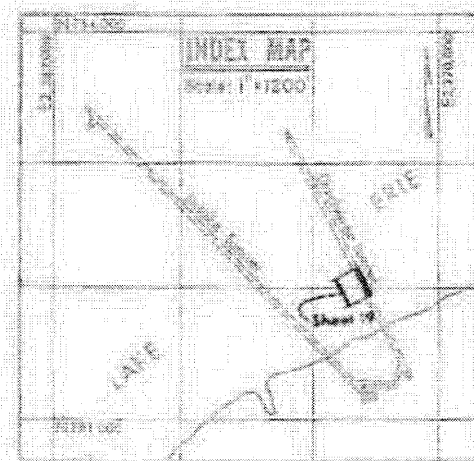
EXCAVATION PROGRESS
ESTIMATED ROCK
CONDITION (TERMINAL NO.)
TEMPORARY SUPPORT
SYSTEM
BEDDING SPACING
FRACTURE SPACING
WATER CONDITION
DEPTH OF COVER

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

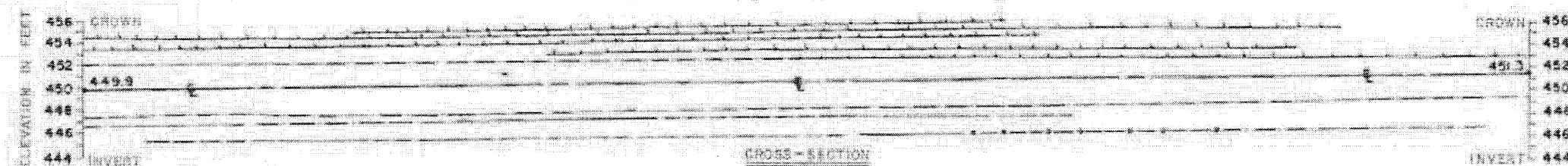
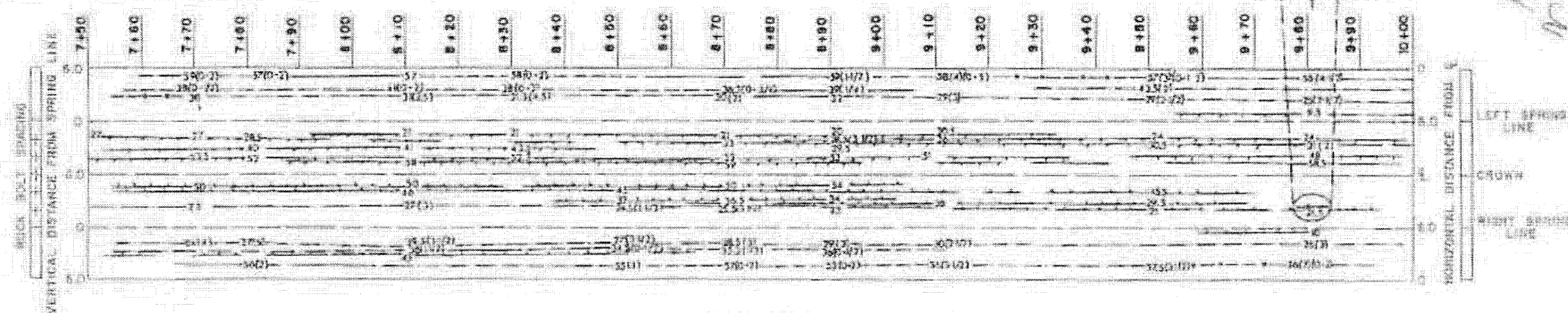
Geologic Map of
Tunnel Excavations

Figure 2D-2 (Sheet 18 of 24)



- SYMBOLS**
- 4(1/2)" HARD, TAN, BROWN, CHERTY IRON BED OR LAMINAE
 - 12(2-4)" DISCONTINUOUS IRON BED
 - 12(3)" HARD LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 - 12(2)2(2)" DISCONTINUOUS IRON BED WITHIN GREY BED
 - 4" FRACTURE
 - FAULT
 - BEDDING PARTING
 - VERTICAL JOINT
 - INCLINED JOINT
 - BEDDING STRIKE AND DIP

- MOISTURE ALONG BEDDING PARTING
 - SEEPAGE FROM FEATURE
 - OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 - METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE
- NOTES:**
 Numerical in parentheses indicates bed thickness.
 Number preceding parentheses indicates inches above or below spring line at station of measurement.



4.5' long water	7.5' long water
116.1' subsurface (whole)	111.7' subsurface (there)
No. 4	
Stack bolts at 2' centers in steel ribs at 1'-6" centers, covered by wire mesh	
4" x 12"	
Bedding fractures only, spaced as above	
No reflow	

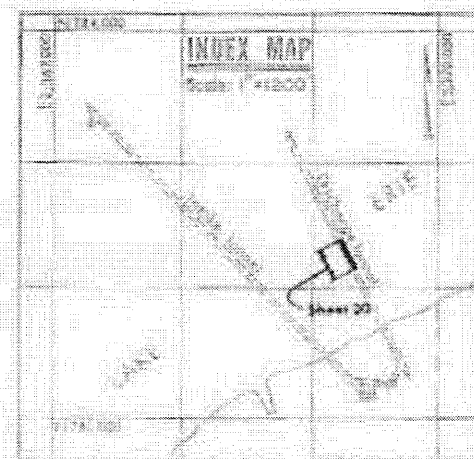
EXCAVATION PROGRESS
 ESTIMATED ROCK
 CONDITION (TERZAGHI NO.)
 TEMPORARY SUPPORT
 SYSTEM
 BEDDING SPACING
 FRACTURE SPACING
 WATER CONDITION
 DEPTH OF COVER



(Rev. 12 1/63)
PERRY NUCLEAR POWER PLANT

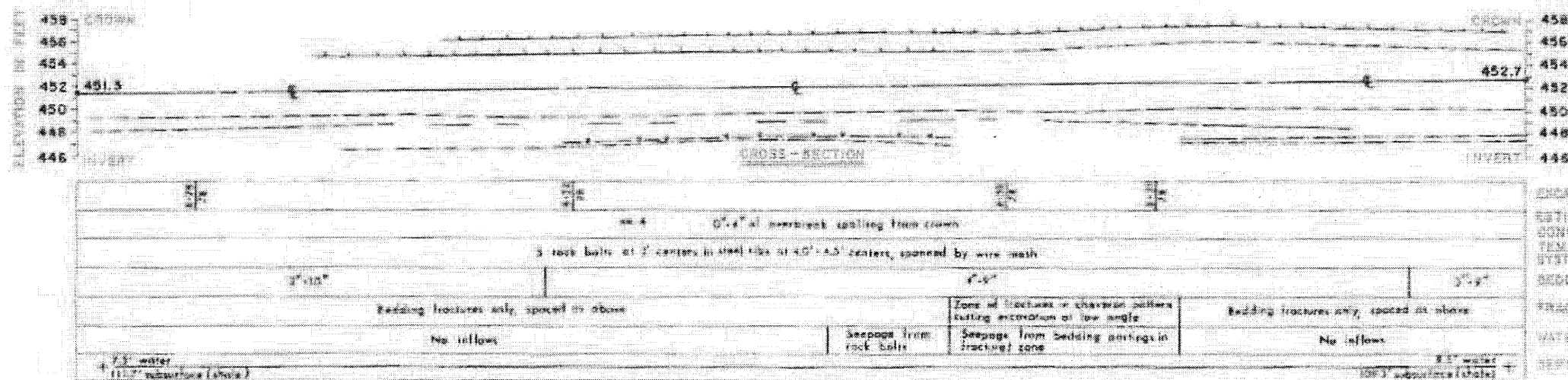
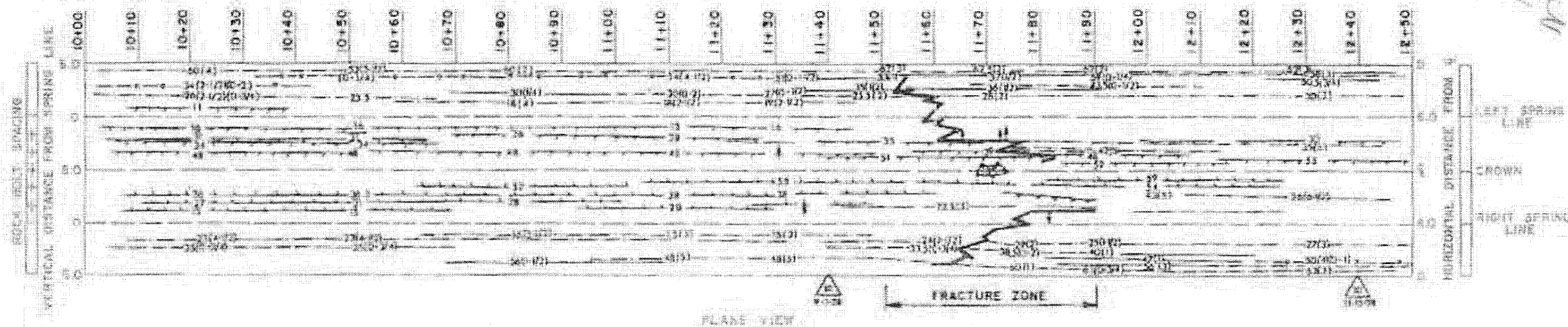
Geologic Map of
 Tunnel Excavations

Figure 20-2 (Sheet 19 of 24)



- SYMBOLS**
- $1/2$ " HARD, TAN, BROWN, CHESTY, IRON BED OR LAMINAE
 - $1/2$ " DISCONTINUOUS IRON BED
 - $1/2$ " HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 - $1/2$ " DISCONTINUOUS IRON BED WITHIN GREY BED
 - FRACTURE
 - POINT
 - BEDDING PARTING
 - VERTICAL JOINT
 - INCLINED JOINT
 - BEDDING STRIKE AND DIP

- MISTURE ALONG BEDDING PARTING
 - SEEPAGE FROM FEATURES
 - OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 - METHANE GAS, MAXIMUM PERCENT LEL WITH DEPTH OF OCCURRENCE
- Notes:
Numbers in parentheses indicate bed thickness.
Numbers preceding parentheses indicate inches above or below spring line at station of overbreak.



EXCAVATION PROGRESS

ESTIMATED ROCK CONDITION (TERZAGHI NO.)

TEMPORARY SUPPORT SYSTEM

BEDDING SPACING

FRACTURE SPACING

WATER CONDITION

DEPTH OF COVER

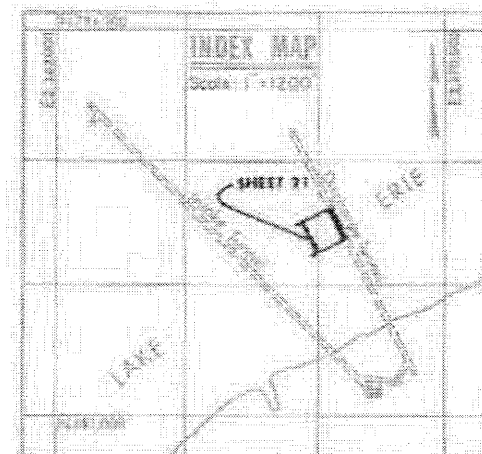
(Rev. 12-17-03)



PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations

Figure 2D-2 (Sheet 20 of 24)

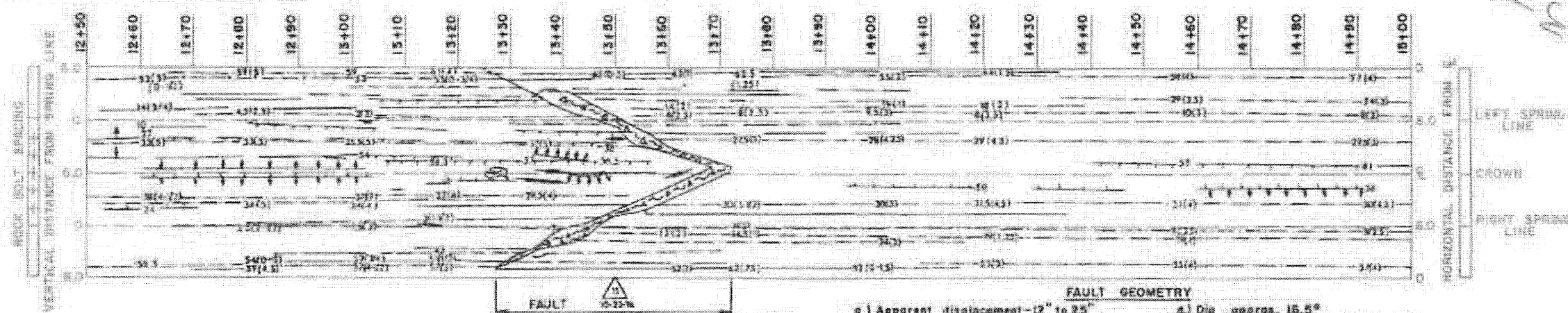


1/2" HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 12 1/2" DISCONTINUOUS IRON BED
 12 1/2" HARD LIGHT GREY SANDY SHALE TO SILTYSTONE BED
 12 1/2" DISCONTINUOUS IRON BED WITHIN GREY BED
 FRACTURE
 FAULT (with sense of motion)
 BEDDING PARTING
 VERTICAL JOINT
 INCLINED JOINT
 BEDDING STRIKE AND DIP

SYMBOLS

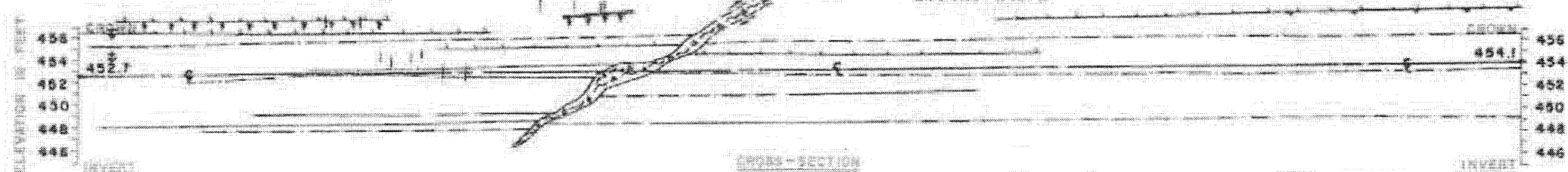
MOISTURE ALONG BEDDING PARTING
 SEEPAGE FROM FEATURE
 OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE

*Note:
 Number(s) in parentheses indicates bed thickness.
 Number preceding parenthesis indicates inches above or below spring line of station of measurement.



FAULT GEOMETRY

a.) Apparent displacement - 12" to 25" d.) Dip approx. 15.5°
 b.) Actual vertical displacement - 8 1/2" to 11 1/2" e.) Width of broken rock (1 1/2" to 24")
 c.) Strike - N66°E



no. 4		no. 4-a		no. 5	
5 rock bolts at 2' centers in steel ribs at 3.5' - 4' centers, spanned by wire mesh		Full shoring employed		5 rock bolts at 2' centers in steel ribs at 3.5' - 4' centers spanned by wire mesh	
Bedding fractures spaced as above, joints widely spaced		Ribs at 2' centers		Bedding fractures only, spaced as above	
Most bedding fractures where indicated		Several minor inflows in fractured areas		Several dripping flows along shoring	
8.5' water		101.9' subsurface (shale)		14.5' water	

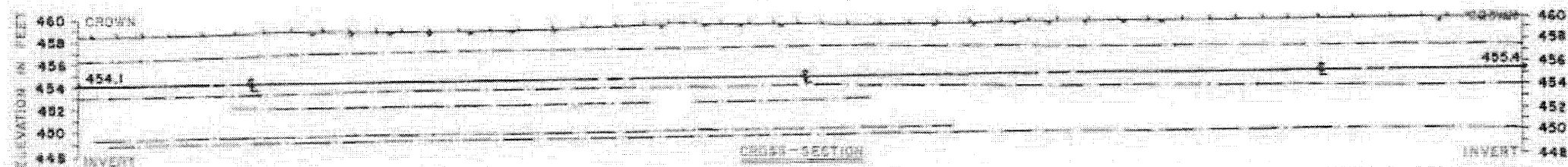
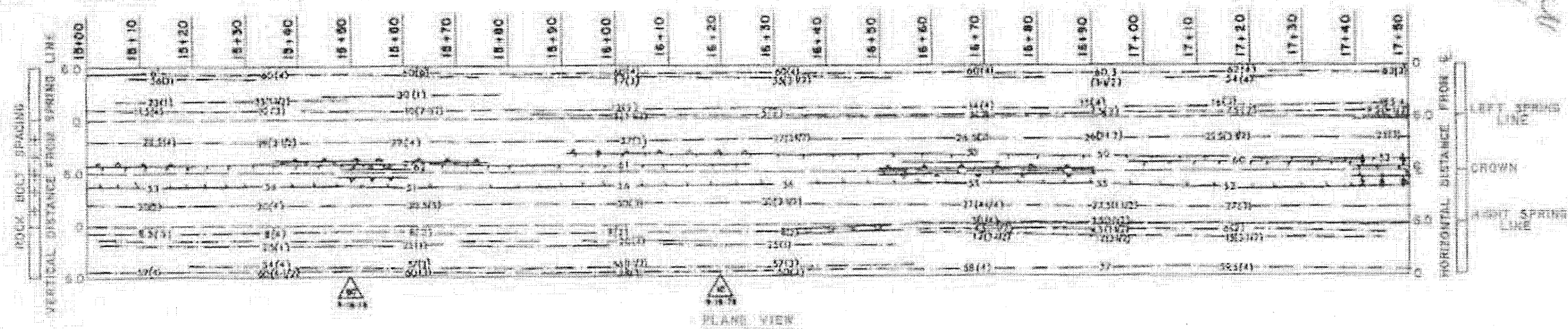
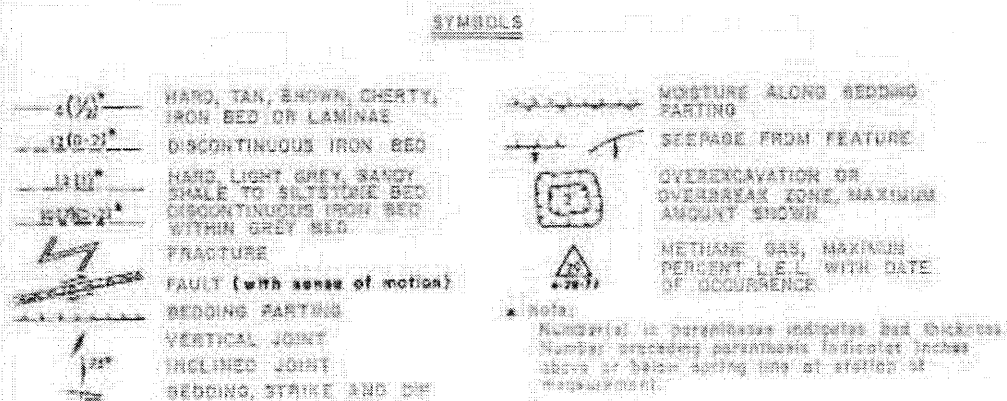
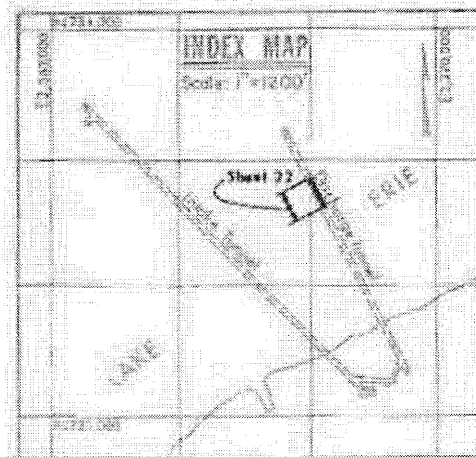
EXCAVATION PROGRESS
 ESTIMATED ROCK CONDITION (TERZAGHI NO.)
 TEMPORARY SUPPORT SYSTEM
 BEDDING SPACING
 FRACTURE SPACING
 WATER CONDITION
 DEPTH OF COVER



PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations

Figure 20-2 (Sheet 21 of 24)



Slight overbreak along entire excavation (0"-6")				ea. 4
3 rock bolts at 2 centers in steel ribs or 40'-42' centers spanned by wire mesh				
3'-9"	4'-2"		1'-10"	
Bedding fractures only, spaced at above				
Moisture from bedding parting	Moisture from bedding parting	Moisture from bedding parting	Moisture from bedding parting	Moisture from bedding parting
12(1)" water	12(1)" water	12(1)" water	12(1)" water	12(1)" water
12(1)" subsurface (shale)	12(1)" subsurface (shale)	12(1)" subsurface (shale)	12(1)" subsurface (shale)	12(1)" subsurface (shale)

EXCAVATION PROGRESS
 ESTIMATED ROCK
 CONDITION (TERZAGHI NO.)
 TEMPORARY SUPPORT
 SYSTEM
 BEDDING SPACING
 FRACTURE SPACING
 WATER CONDITION
 DEPTH OF COVER

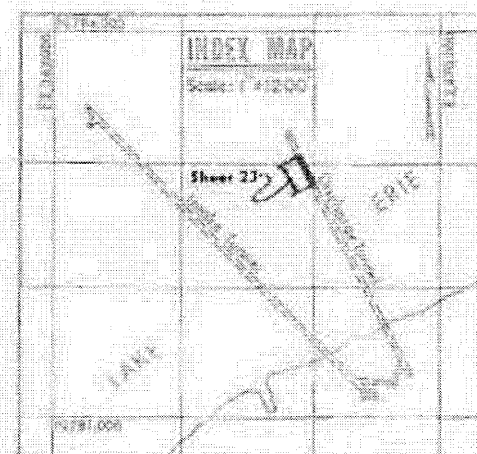
(Rev. 12 1/03)



PERRY NUCLEAR POWER PLANT

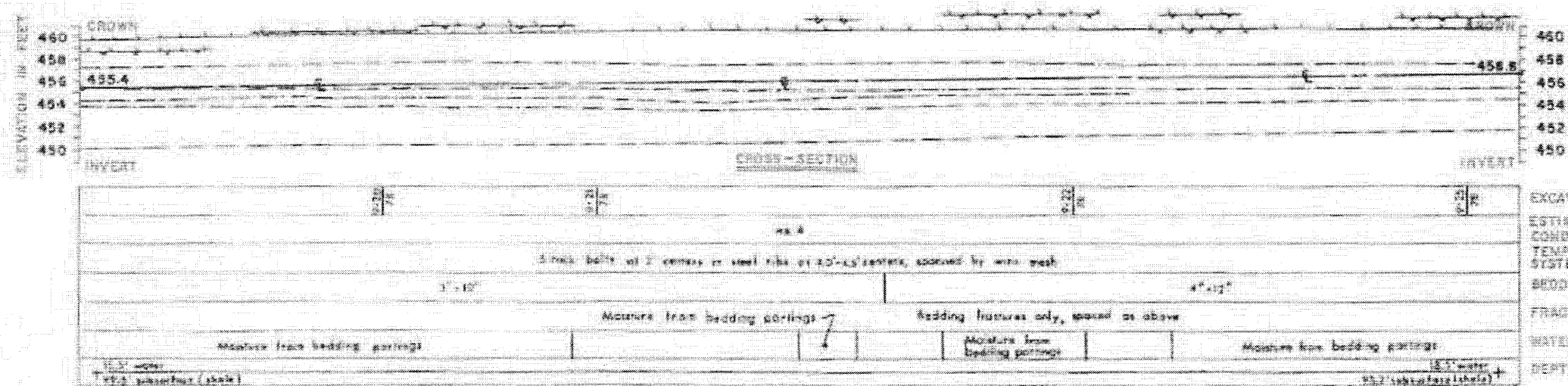
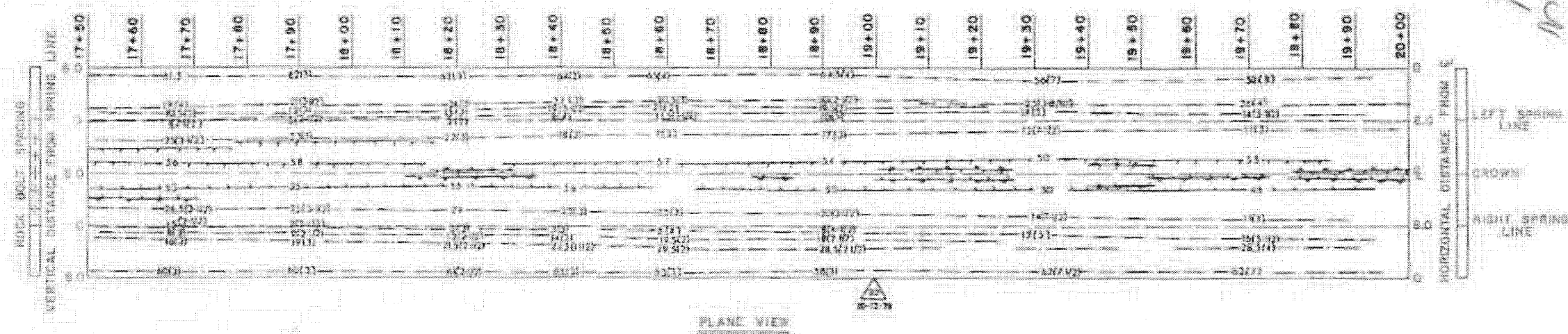
Geologic Map of
 Tunnel Excavations

Figure 2D-2 (Sheet 22 of 24)



- SYMBOLS**
- 1/2" HARD, TAN, BROWN, CHERTY, IRON BED OR LAMINAE
 - 1/2" DISCONTINUOUS IRON BED
 - 1/2" HARD, LIGHT GREY, SANDY SHALE TO SILTSTONE BED
 - 1/2" DISCONTINUOUS IRON BED WITHIN GREY BED
 - 1/2" FRACTURE
 - 1/2" FAULT
 - 1/2" BEDDING PARTING
 - 1/2" VERTICAL JOINT
 - 1/2" INCLINED JOINT
 - 1/2" BEDDING STAIRS AND DIP

- MOISTURE ALONG BEDDING PARTING
 - SEEPAGE FROM FEATURE
 - OVEREXCAVATION OR OVERBREAK ZONE, MAXIMUM AMOUNT SHOWN
 - METHANE GAS, MAXIMUM PERCENT L.E.L. WITH DATE OF OCCURRENCE
- Notes:**
 Numbers in parentheses indicate bed thickness.
 Number preceding parenthesis indicates inches above or below spring line at station of measurement.

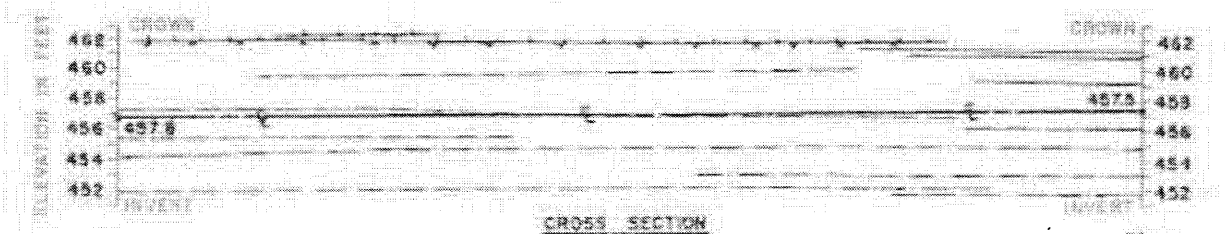
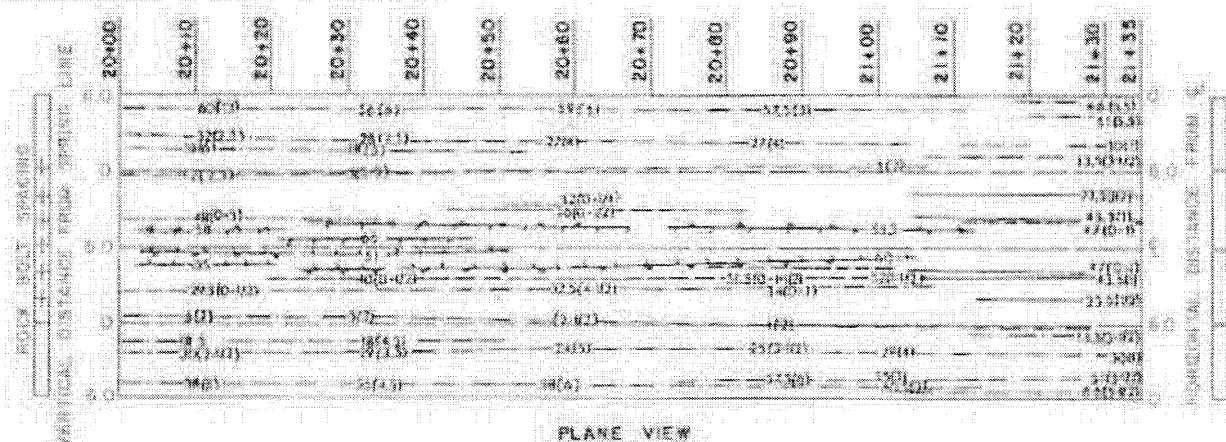
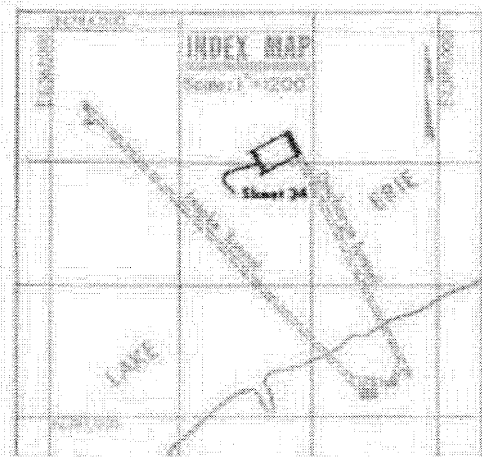


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

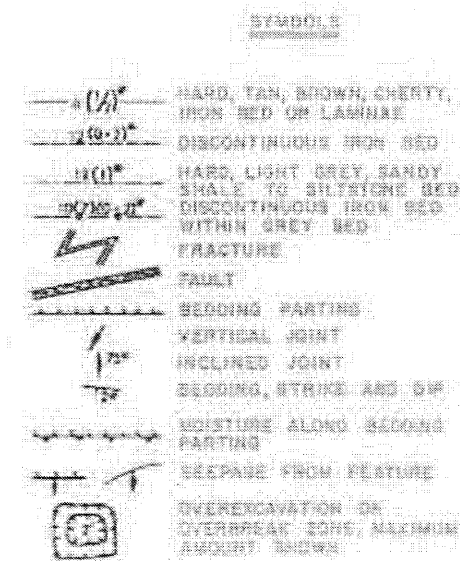
Geologic Map of
Tunnel Excavations

Figure 2D-2 (Sheet 23 of 24)



Slight overbreak along entire excavation (8'-1')	
1-inch bolts at 2' centers, in steel ribs at 4'-2.5' centers, spaced by wire mesh	
2'-10"	
Bedding partings only, spaced as above	
Slight moisture along bedding partings, where indicated	
18.5' water + 2.5' subsurface (shale)	2.5' water + 2.5' subsurface (shale)

EXCAVATION PROGRESS
ESTIMATED ROCK CONDITION (TERMINAL) 40.1
TEMPORARY SUPPORT SYSTEM
BEDDING SPACING
FRACTURE SPACING
WATER CONDITION
DEPTH OF COVER



Note:
Number(s) in parentheses indicates feet thickness.
Number preceding parentheses indicates inches above or below spring line at station of measurement.

(Rev. 12 1/83)

PERRY NUCLEAR POWER PLANT

Geologic Map of
Tunnel Excavations
Figure 20-2 (Sheet 24 of 24)