WHITE—DIVISION OF WATER RESOURCES
CANARY—CLIENT'S COPY
PINK—WELL DRILLER'S COPY

PRINT OR TYPE ONLY
DO NOT WRITE ON BACK

STATE OF NEVADA
DIVISION OF WATER RESOURCES

WELL DRILLER'S REPORT

Please complete this form in its entirety in accordance with NRS 534.170 and NAC 534.340

OFFICE USE ONLY
Log No. 66250
Permit No.
Plan.

NOTICE OF INTENT NO. 10533

1. OWNER U. S. Department of Energy - Yucca Mt. ADDRESS AT WELL LOCATION
MAILING ADDRESS P. O. Box 98608
Las Vegas, Nevada 89193-608

2. LOCATION NE ¼ NE ¼ Sec. 10 T 13 N/S R 49 E MDM Nye County
PERMIT NO. M/O-501 (Issued by Water Resources) N/A (Parcel No.) N/A (Subdivision Name)

3. WORK PERFORMED
[X] New Well [ ] Replace [ ] Recondition
[ ] Deepen [ ] Abandon [ ] Other

4. PROPOSED USE Scientific Investigation
[ ] Domestic [ ] Irrigation [ ] Test
[ ] Municipal/Industrial [X] Monitor [ ] Stock

5. WELL TYPE
[ ] Cable [X] Rotary [ ] RVC
[ ] Air [ ] Other

6. LITHOLOGIC LOG

Material	Water Strata	From	To	Thickness
See attached				

RECEIVED
APR 23 1993
Div. of Water Resources
Branch Office - Las Vegas, NV

Date started May 27, 1992
Date completed March 11, 1993

7. WELL TEST DATA
TEST METHOD: [ ] Bailer [ ] Pump [ ] Air Lift

	G.P.M.	Draw Down (Feet Below Static)	Time (Hours)
No test performed			

8. WELL CONSTRUCTION
Depth Drilled 1686 Feet Depth Cased 52.24 Feet

HOLE DIAMETER (BIT SIZE)

		From		To	
22	Inches	0	Feet	52.24	Feet
12-1/4	Inches	52.24	Feet	1659	Feet
4.380	Inches	1659	Feet	1686	Feet

CASING SCHEDULE

Size O.D. (Inches)	Weight/Ft. (Pounds)	Wall Thickness (Inches)	From (Feet)	To (Feet)
16	65	1/2	0	52.24

Perforations:
Type perforation N/A
Size perforation
From feet to feet
From feet to feet
From feet to feet
From feet to feet
From feet to feet

Surface Seal: [X] Yes [ ] No
Depth of Seal 52.24 feet
Placement Method: [ ] Pumped [X] Poured
Seal Type: [X] Neat Cement [ ] Cement Grout [ ] Concrete Grout

Gravel Packed: [ ] Yes [X] No
From feet to feet

9. WATER LEVEL
Static water level 1601 feet below land surface
Artesian flow No N/A G.P.M. N/A P.S.I.
Water temperature N/A °F Quality N/A

10. DRILLER'S CERTIFICATION
This well was drilled under my supervision and the report is true to the best of my knowledge.
Name Reynolds Electrical & Engineering Co. (Contractor)
Address P. O. Box 98521, Las Vegas, NV 89193-8521 (Contractor)
Nevada contractor's license number issued by the State Contractor's Board 1469
Nevada driller's license number issued by the Division of Water Resources, the on-site driller
Signed Richard R Sawards (By driller performing actual drilling on site or contractor)
Date April 5, 1993

Rev. 3-91)

USE ADDITIONAL SHEETS IF NECESSARY

(O)-627

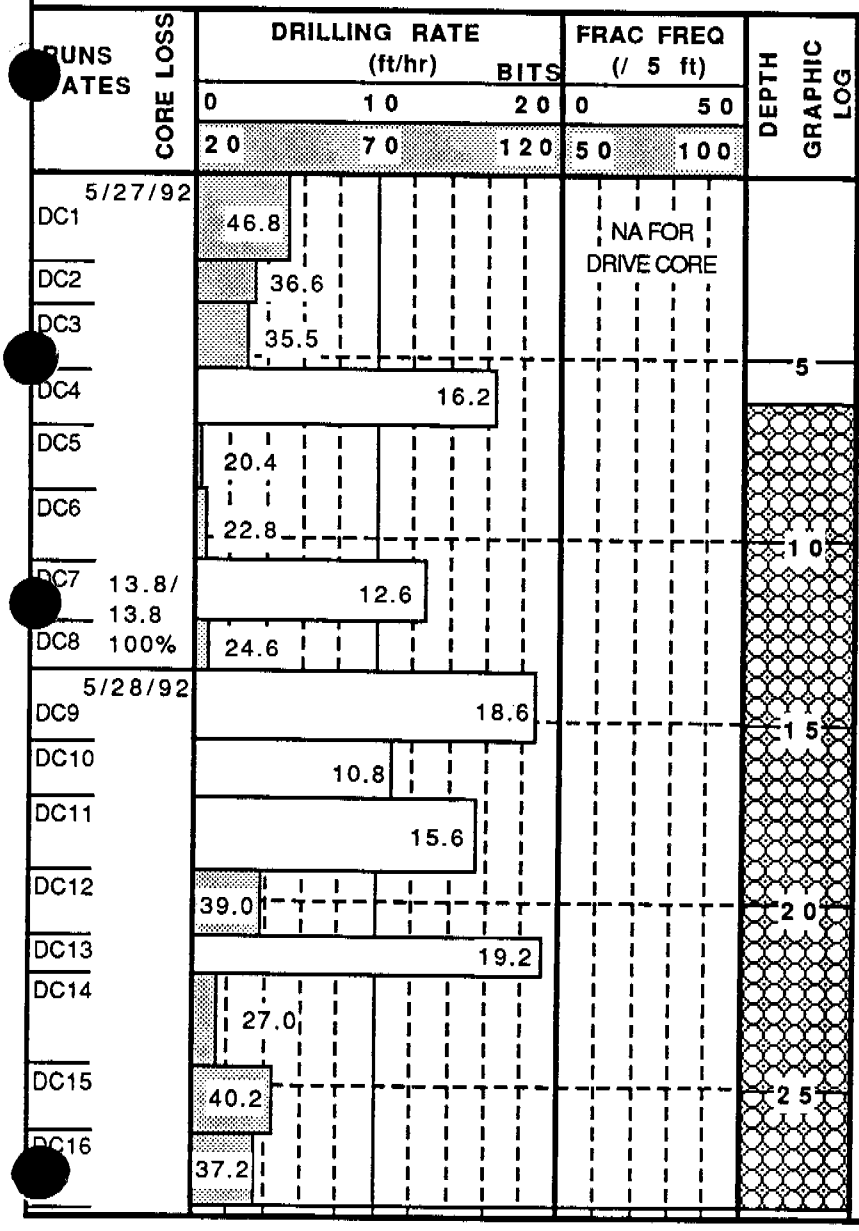
YUCCA MOUNTAIN SITE CHARACTERIZATION PROJECT
PRELIMINARY FIELD COMPOSITE BOREHOLE LOG

BOREHOLE ID: UE-25UZ#16
STUDY PLAN NO: 8.3.1.2.2.1
CORE SIZE: HQ/2.25"
DRILL DATES: 5/27/92 - 3/11/93
GROUND ELEV: 4000.97 ft
COORDINATES: N: 760,535.32'
E: 564,856.90'
TOTAL DEPTH: 1686.2'
ANGLE FROM VERT: NA **BEARING:** NA

ALLUVIUM
NONWELDED
PARTIALLY WELDED
DENSELY WELDED
VITROPHYRE
BEDDED TUFF
LITHOPHYSAL

FINAL LOG DATE: 4/1/93

Logging by Drilling Support Division, Drilling Support and Sample Management Dept. T&MSS

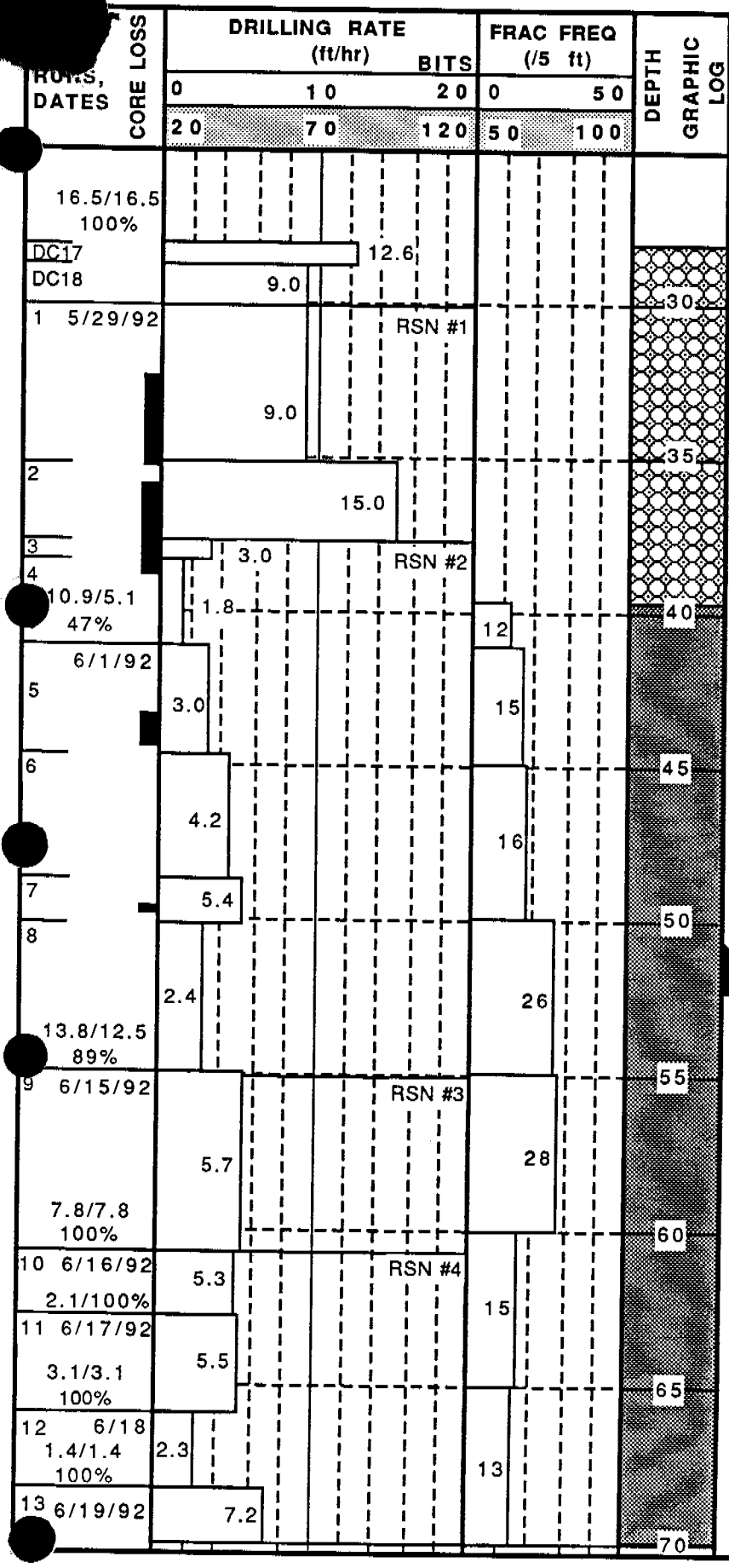


LITHOLOGY/REMARKS

0.0 - 6.0 Fill material for building drill pad

DRIVE CORE FROM SURFACE TO 30.3

6.0 - 39.7 Alluvium: silt- to pebble-sized fragments of ashflow tuff with surficial tan clay



LITHOLOGY/REMARKS

@ 30.3 BEGIN CORING

from 29.9 to 39.7: fragments of ashflow tuff, densely welded, devitrified; less than 10% phenocryst of sanidine and minor biotite; less than 10% lithophysae up to 3cm long

@39.7 ALLUVIUM/TIVA CANYON CONTACT COLUMNAR UNIT

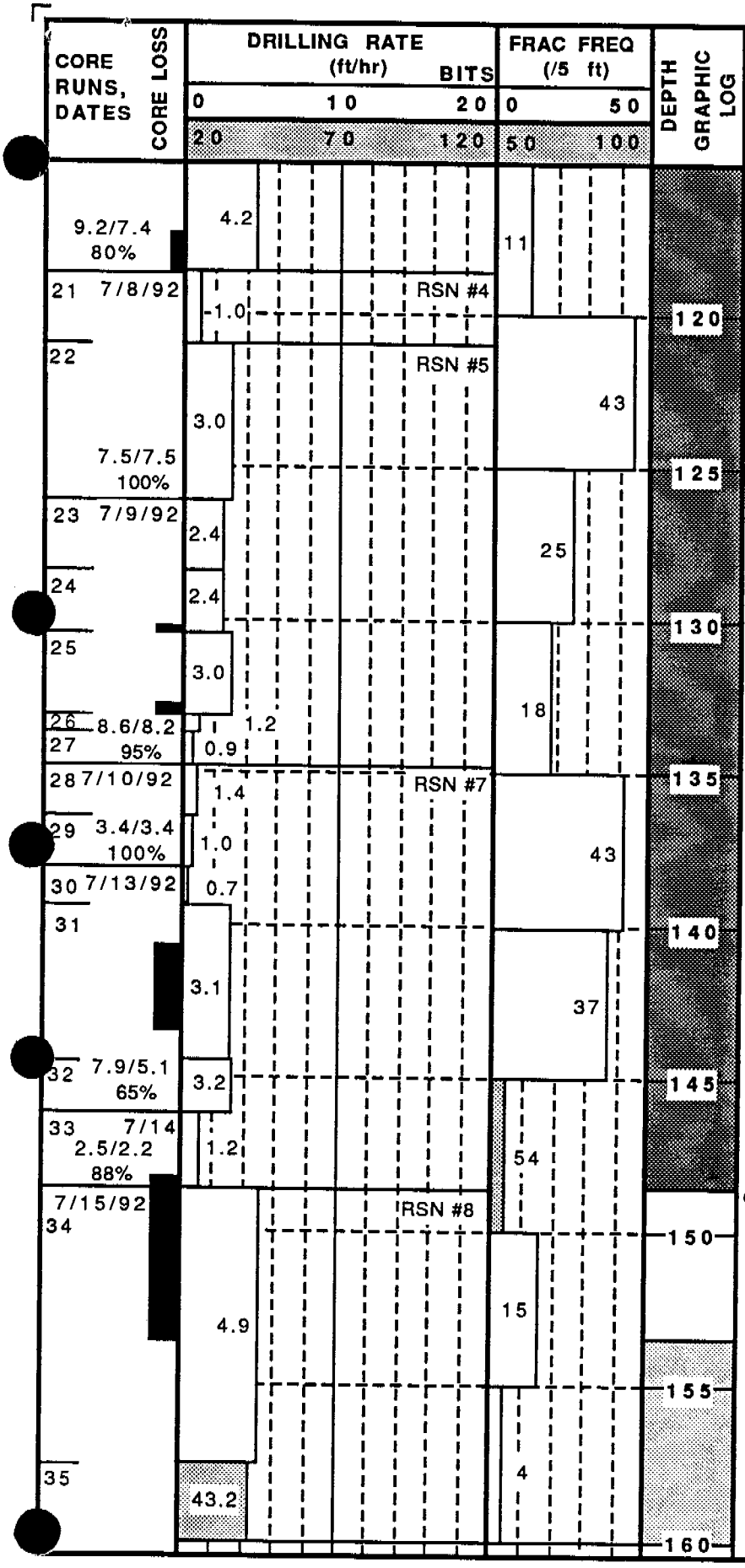
39.7 - 60.0 Tuff, ashflow: blackish red, densely welded, vitric; 5% pumice; 2-3% phenocrysts of sanidine; 5-10% lithophysae up to 6cm in diameter with vapor-phase minerals

16-inch casing set and cemented to a depth of 52.2 ft

60.0 - 67.0 Tuff, ashflow: grayish red to blackish red, densely welded, devitrified; 3% pumice, light gray; phenocrysts, 6-10%, sanidine; 2% lithophysae with minor vapor-phase mineralization; contains minor calcite along fractures

67.0 - 110.0 Tuff, ashflow: grayish red, densely welded, devitrified; 1-2% pumice, light gray; phenocrysts, 6-10% sanidine; contains minor calcite along fractures and on clay coatings

CORE RUNS, DATES	CORE LOSS	DRILLING RATE (ft/hr) 0 10 20 / 20 70 120	BITS	FRAC FREQ (/5 ft) 0 50 / 50 100	DEPTH	GRAPHIC LOG	LITHOLOGY/REMARKS
		7.2		11	75		
14			RSN #4	17			
		4.8		7	80		
17.9/17.9 100% 6/22/92 15					85		
		2.4		19			
6.1/5.7 93% 6/23/92 16		3.0		19	90		
17		2.3		18	95		
7.2/7.2 100% 6/25/92 18			RSN #5		100		
		5.4		10			
19		7.2		8	105		
10.9/8.8 81% 6/26/92 20					110		110.0 - 138.2 Tuff, ashflow: color grading to pale red; 5% pumice fragements increasing with depth; larger fragments altered to soft, moderate reddish orange swelling clay in botryoidal form
		4.2		19	115		



LITHOLOGY/REMARKS

Rig repairs 6/27-7/8/92

138.2 - 140.7 Tuff, ashflow: pale red to light brownish gray, densely welded, devitrified; 1-2% pumice, light gray, <1cm; some, up to 2cm, are altered to moderate pink, soft swelling clay; <1% lithics, < 1cm; 6-8% phenocrysts, primarily sanidine and <1% dark brown sphene (?)

140.7 - 144.5 Tuff, ashflow: breccia zone, calcite cement, fragments from sand size up to several cms

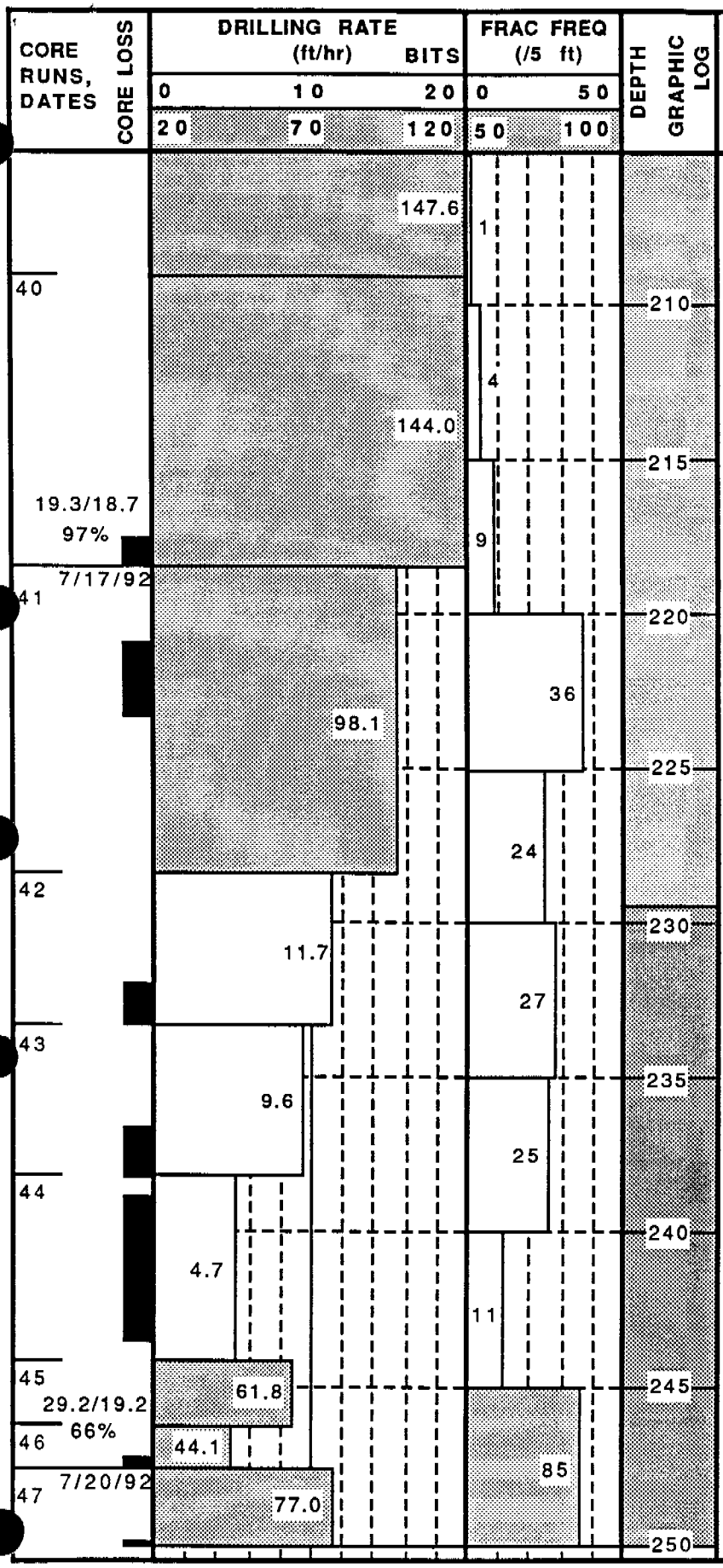
144.5 - 148.6 Tuff, ashflow: pale red to light brownish gray, devitrified, moderate to dense welding; <1% lithics, <1cm; 5% phenocrysts, predominantly sanidine; <5% pumice, several mm thick, flattened 5-6:1, vitric grayish pink

@148.6 COLUMNAR/SHARDY BASE CONTACT (?)

148.6 - 153.6 unrecovered interval, no description

153.6 - 160.7 Tuff, ashflow: pale red grading to grayish orange in partial to nonwelded tuff, 5% pumice increases to 20% near the base; 5% phenocrysts primarily sanidine; <1% lithics; abundant yellow brown glass shards

CORE RUNS, DATES	CORE LOSS	DRILLING RATE (ft/hr) 0 10 20 / BITS 20 70 120	FRAC FREQ (/5 ft) 0 50 / 50 100	DEPTH	GRAPHIC LOG	LITHOLOGY/REMARKS
35		43.2	10	165		160.7 - 162.9 Tuff, ashflow: light brown grading to pinkish gray, nonwelded, vitric; 40% grading to 15% pumice; 20%-30% lithics 162.9 - 165.9 Tuff, ashflow: light brown, nonwelded, vitric; 2-3% pumice, light gray; 35-40% lithics, 1-5mm - 1 cm; 1% phenocrysts, primarily sanidine 165.9 - 173.3 Tuff, ashflow: light brown grading to pale orange, nonwelded, vitric; <1% pumice, ~2mm; <1% lithics
36		162.0	14	170		
			11	175		173.3 - 180.2 Tuff, bedded: pale yellowish brown to very light gray, nonwelded, vitric; 50% combined pumice and lithic fragments
37		148.2	11	180		
			15	185		180.2 - 186.7 Tuff, ashflow: light brown, nonwelded, vitric; 15-20% pumice, light gray, vitric, increasing with depth; ~1.5cm; 5% lithics, ~1mm; phenocrysts, minor sanidine
38		162.0	10	190		186.7 - 188.8 Tuff, bedded: very light gray, nonwelded, vitric, pumice ~2mm; 5% lithics, 0.5cm 188.8 - 193.4 Tuff, ashflow: light brown, nonwelded, vitric; 10-15% pumice, light gray vitric; 5-10% lithics, 2mm - 1cm; <5% phenocrysts, sanidine, quartz, and biotite
50.6/44.7 88%			8	195		193.4 - 229.3 Tuff, ashflow: very light gray to white, nonwelded, vitric; ~5-10% pumice, white, vitric; 5% lithics, 5% phenocrysts, sanidine, quartz, and bronze biotite
39 7/16/92		147.6	1	200		
			17	205		



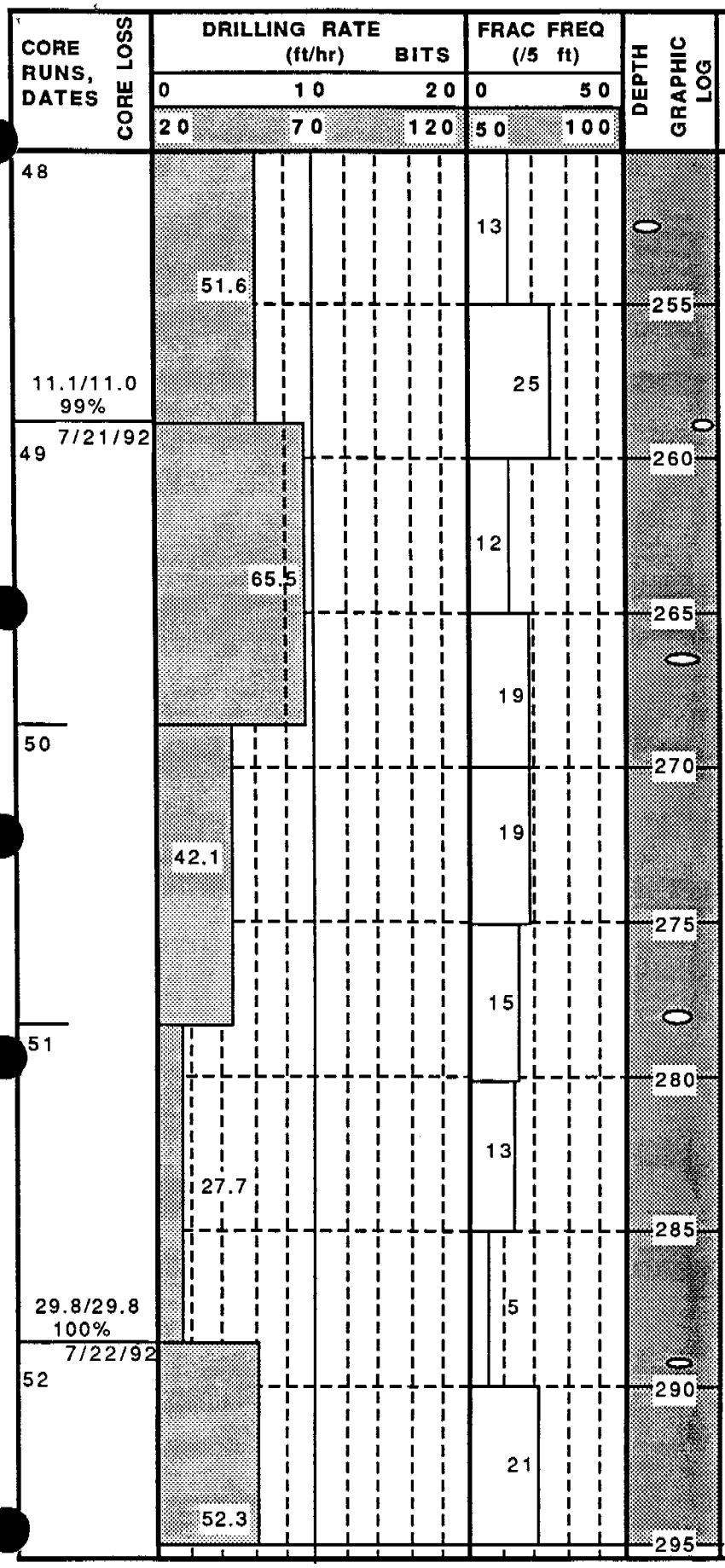
LITHOLOGY/REMARKS

@217.7 Color changed from white to moderate orange pink; 5-10% pumice fragments, ~2mm-2cm, grayish orange pink; 5% lithic fragments, medium dark gray groundmass with very light gray pumice fragments

229.3 **TOP TOPOPAH CAPROCK ZONE**

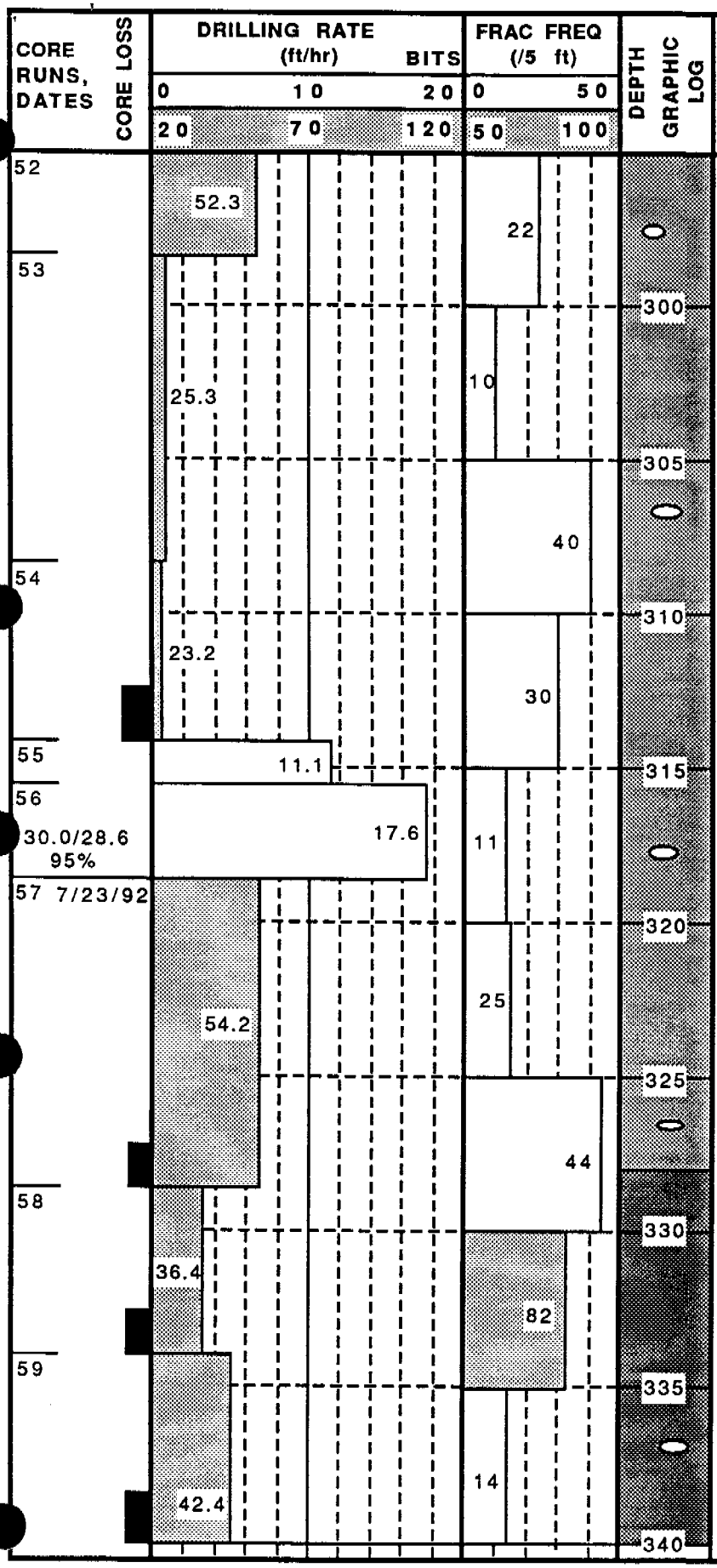
229.3 - 231.7 Tuff, vitrophyric: dusky red, moderately welded, vitric; 10% phenocrysts, sanidine with altered biotite

231.7 - 250.0 Tuff, ashflow: grayish red, moderately welded, vitric; 10% phenocrysts of sanidine and altered biotite; 1% lithics



LITHOLOGY/REMARKS

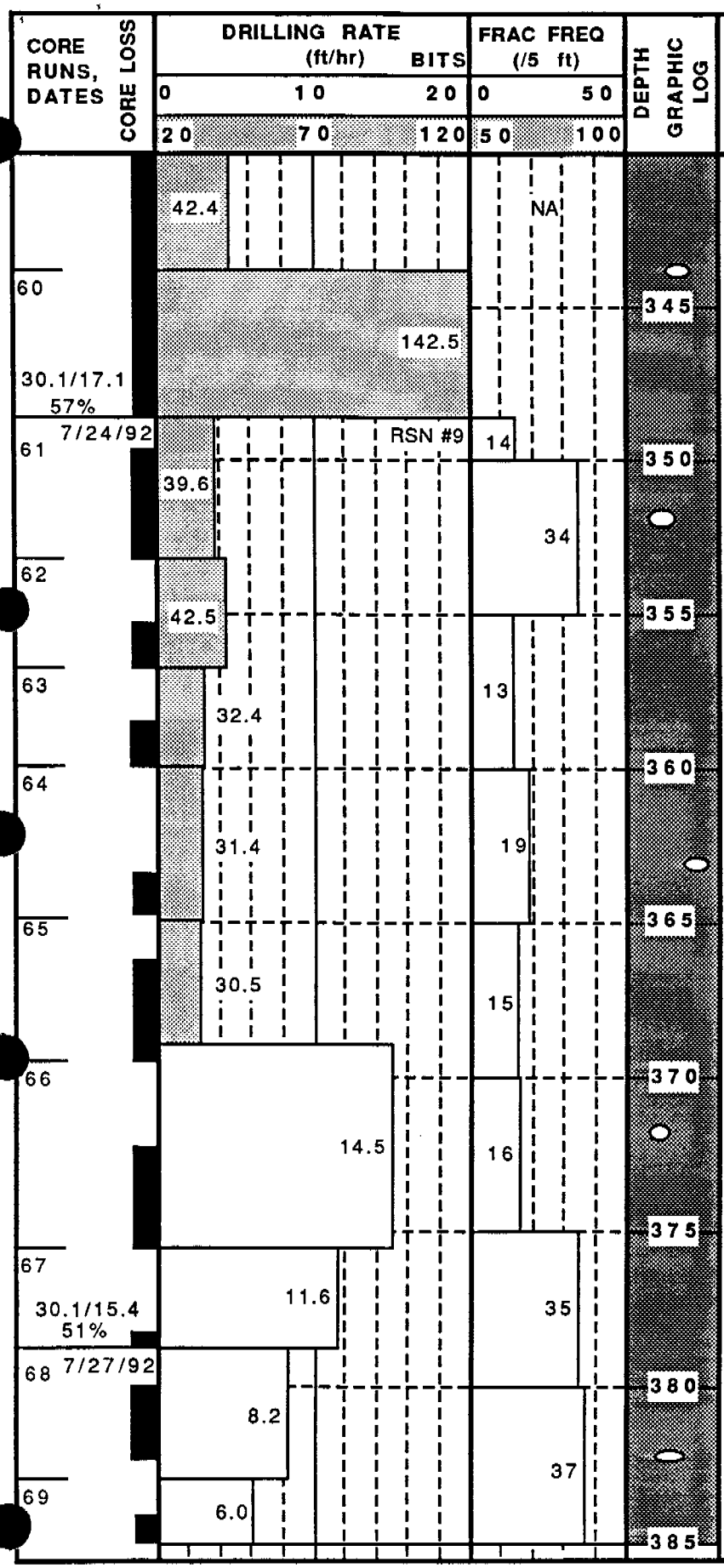
250.0 - 328.6 Tuff, ashflow: pale red, moderately welded, vitric; 12% phenocrysts, sanidine and plagioclase with altered biotite; 1% lithics, pink and light gray; 1% lithophysae; 5% pumice, bluish white, 3mm-5cm; pumice fragments weathered and common near fractures

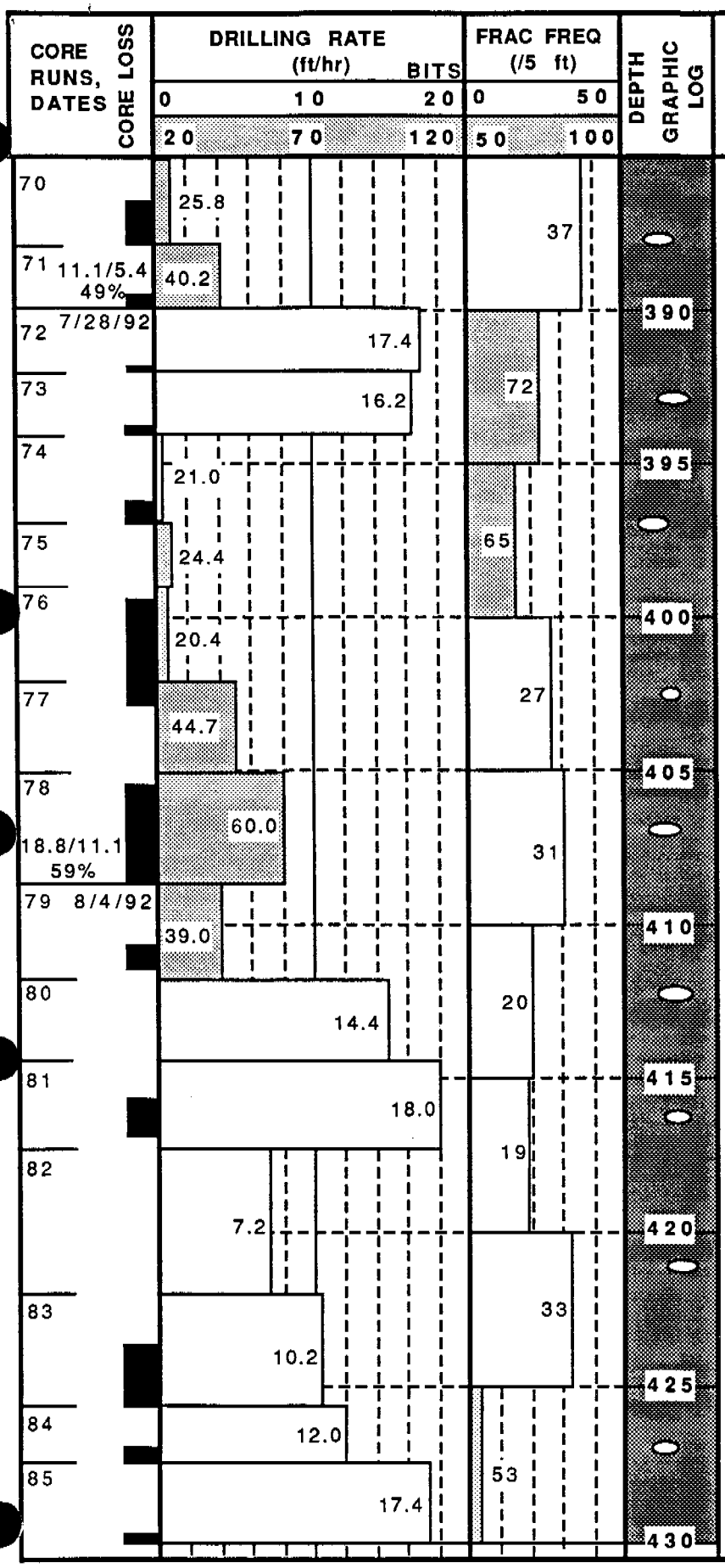


UE-25UZ#16

LITHOLOGY/REMARKS

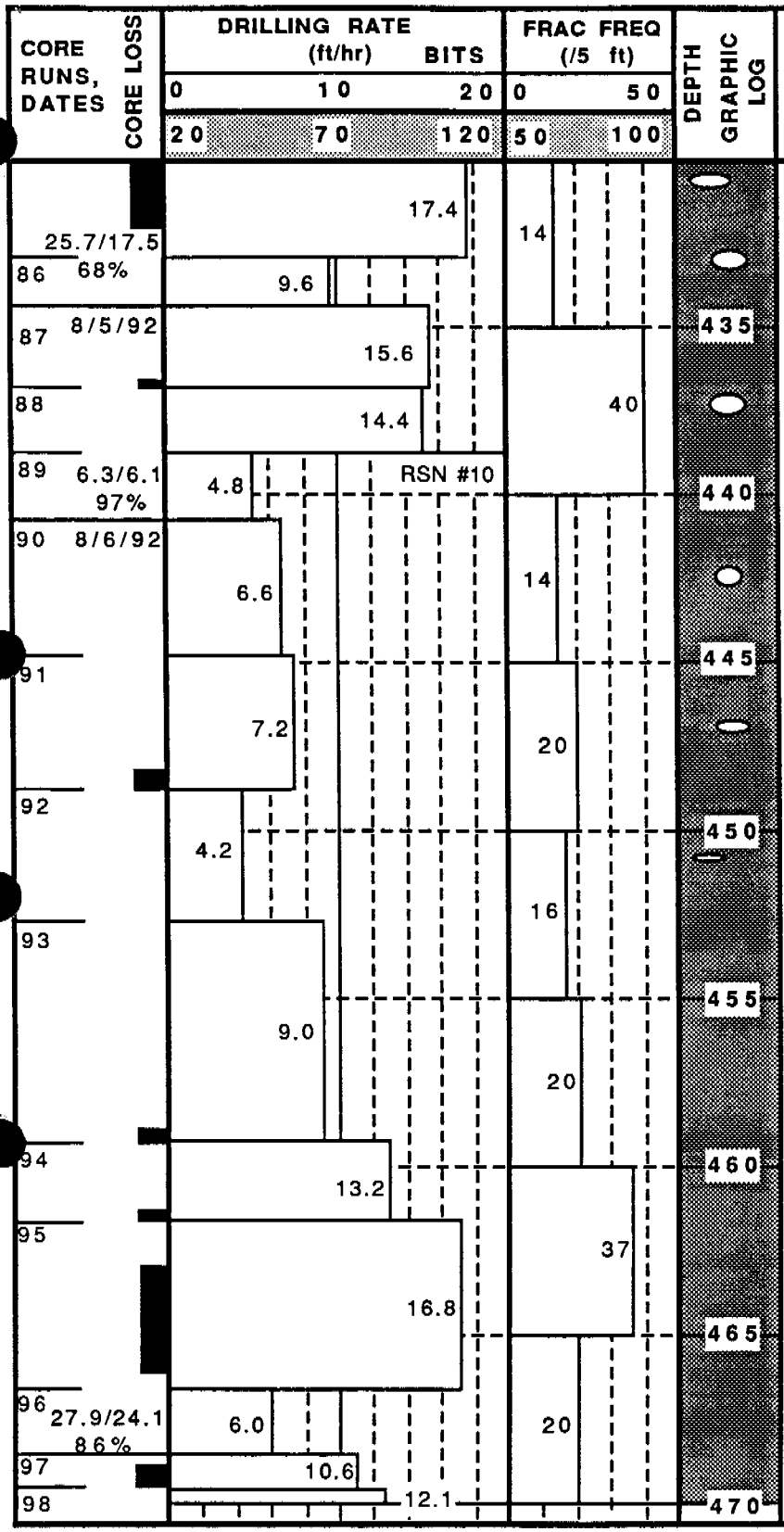
328.6 - 451.4 Tuff, ashflow: light brownish gray; densely welded; devitrified; 5% pumice, light gray to grayish-brown; 12% phenocrysts, sanidine, plagioclase, and altered biotite, 1-5% lithophysae, locally up to 10%


CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH
GRAPHIC LOG
LITHOLOGY/REMARKS
60
61
62
63
64
65
66
67
68
69
30.1/17.1
57%
7/24/92
30.1/15.4
51%
7/27/92
42.4
142.5
RSN #9
39.6
42.5
32.4
31.4
30.5
14.5
11.6
8.2
6.0
NA
14
34
13
19
15
16
35
37
345
350
355
360
365
370
375
380
385



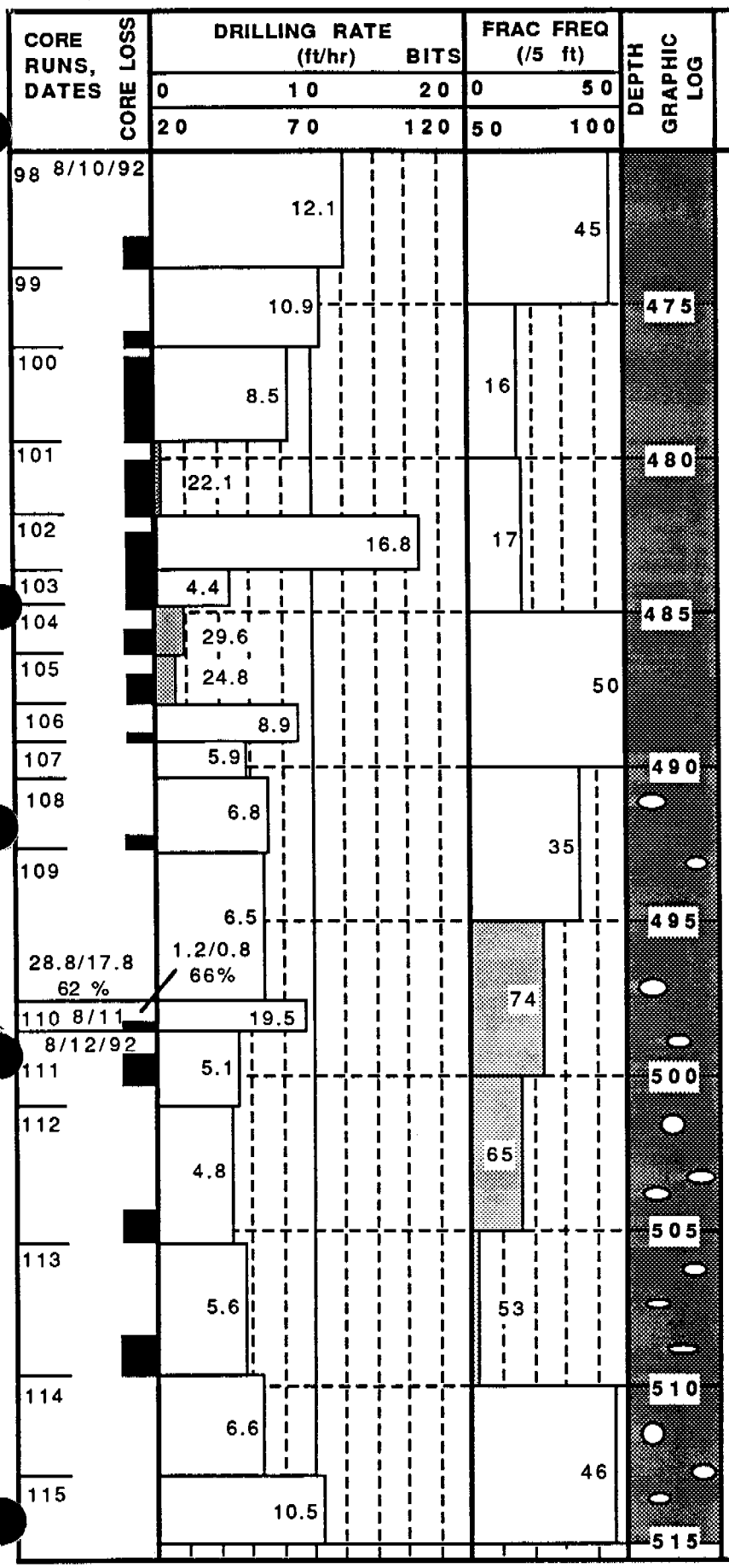
LITHOLOGY/REMARKS

@ 419.8 Light-brown phenocryst rich (up to 15%) lappili- to boulder-sized pumice fragments



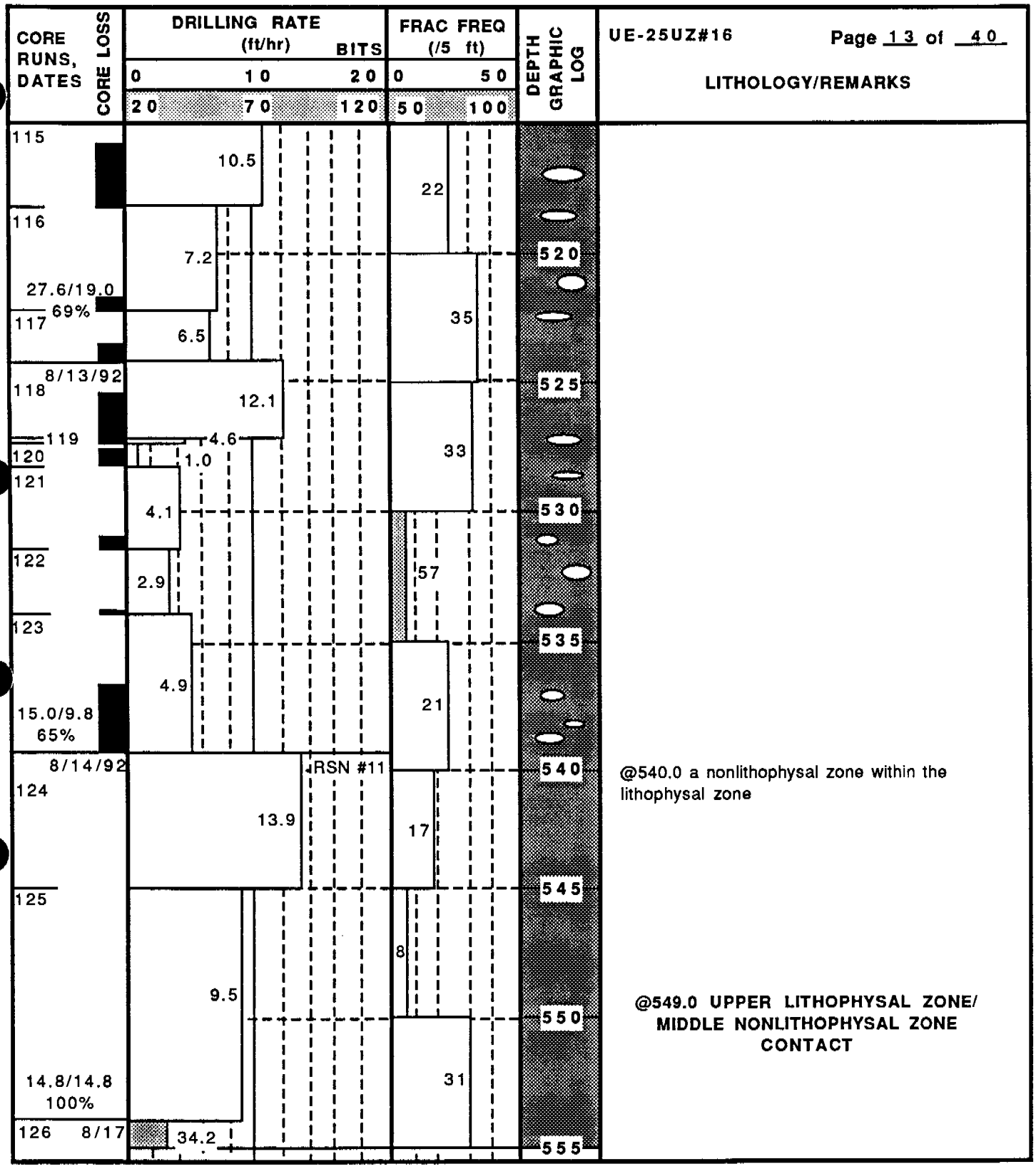
LITHOLOGY/REMARKS

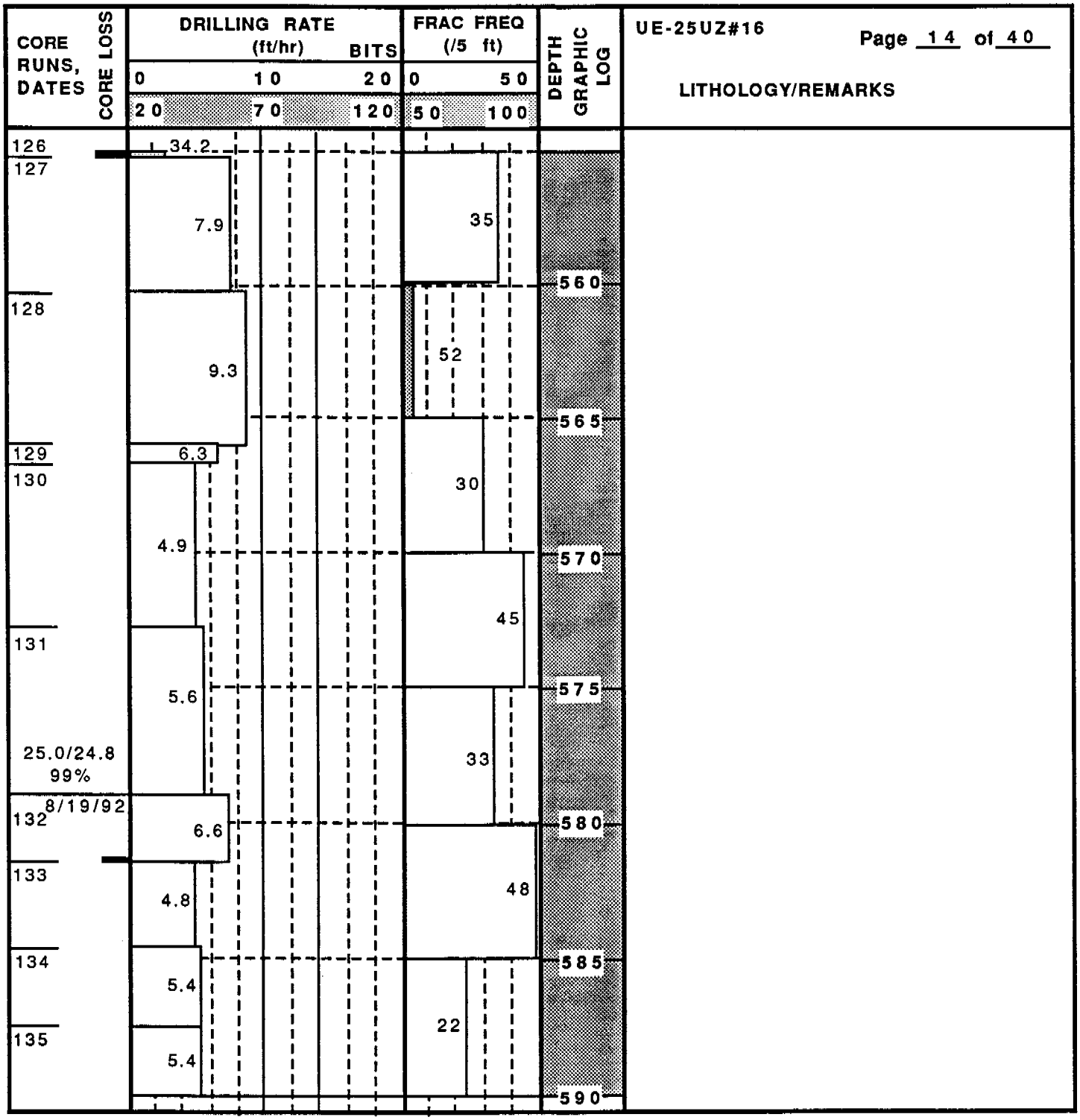
451.4 - 489.5 Tuff, ashflow: grayish-pink and reddish-brown, mottled, densely welded, devitrified; 1-5% grayish-red pumice fragments up to 3cm long; minor rhyolite lithics



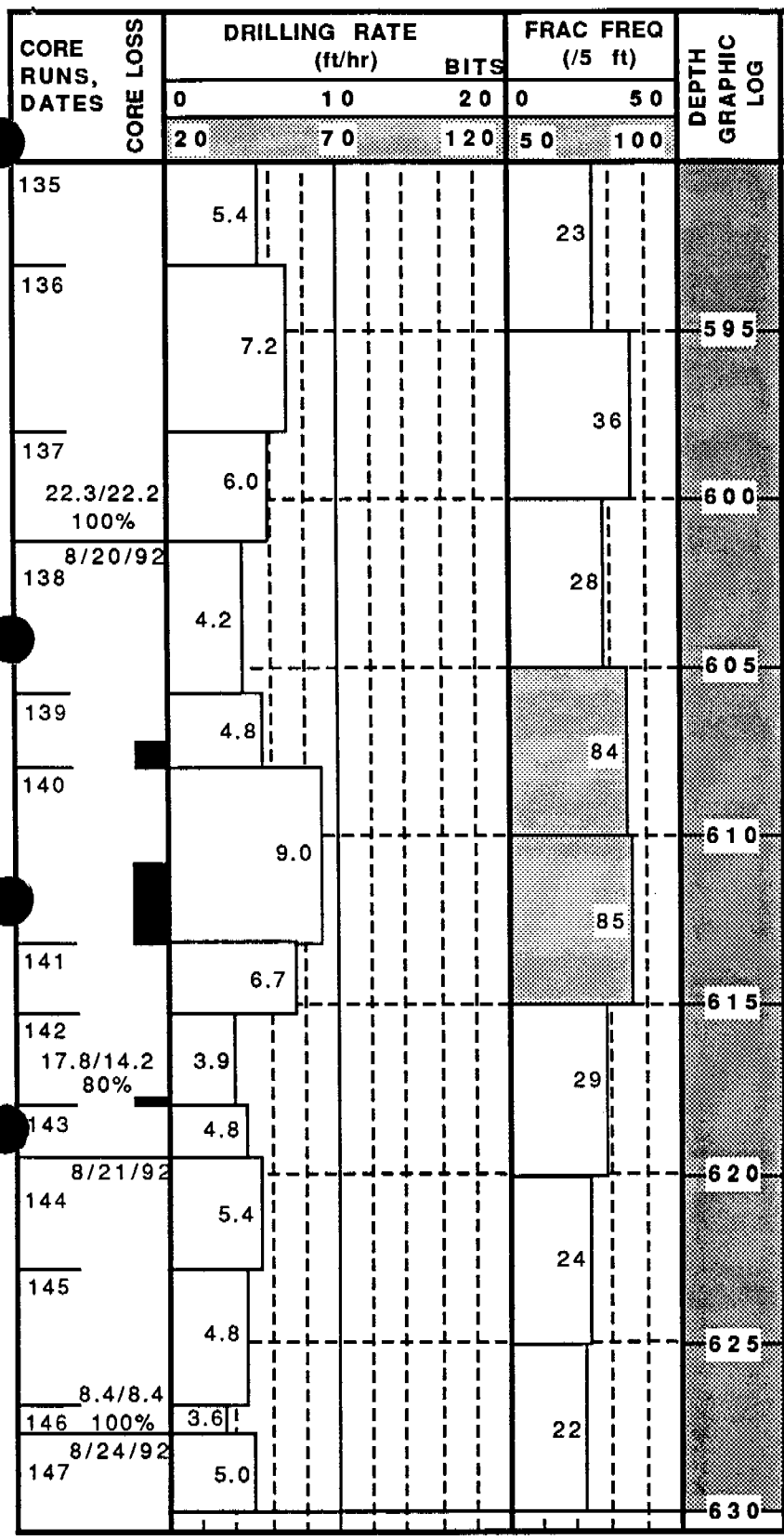
LITHOLOGY/ REMARKS

489.5 - 554.0 Tuff ashflow: grayish pink and moderately reddish brown, mottled, densely welded, devitrified; < 5% phenocrysts of sanidine and minor biotite; 12% lithophysae with vapor-phase mineralization and 10% void space


CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH GRAPHIC LOG
LITHOLOGY/REMARKS
115
116
117
118
119
120
121
122
123
124
125
126
27.6/19.0
69%
8/13/92
15.0/9.8
65%
8/14/92
14.8/14.8
100%
8/17
10.5
7.2
6.5
12.1
4.6
1.0
4.1
2.9
4.9
13.9
9.5
34.2
RSN #11
22
35
33
57
21
17
8
31
520
525
530
535
540
545
550
555
@540.0 a nonlithophysal zone within the lithophysal zone
@549.0 UPPER LITHOPHYSAL ZONE/ MIDDLE NONLITHOPHYSAL ZONE CONTACT

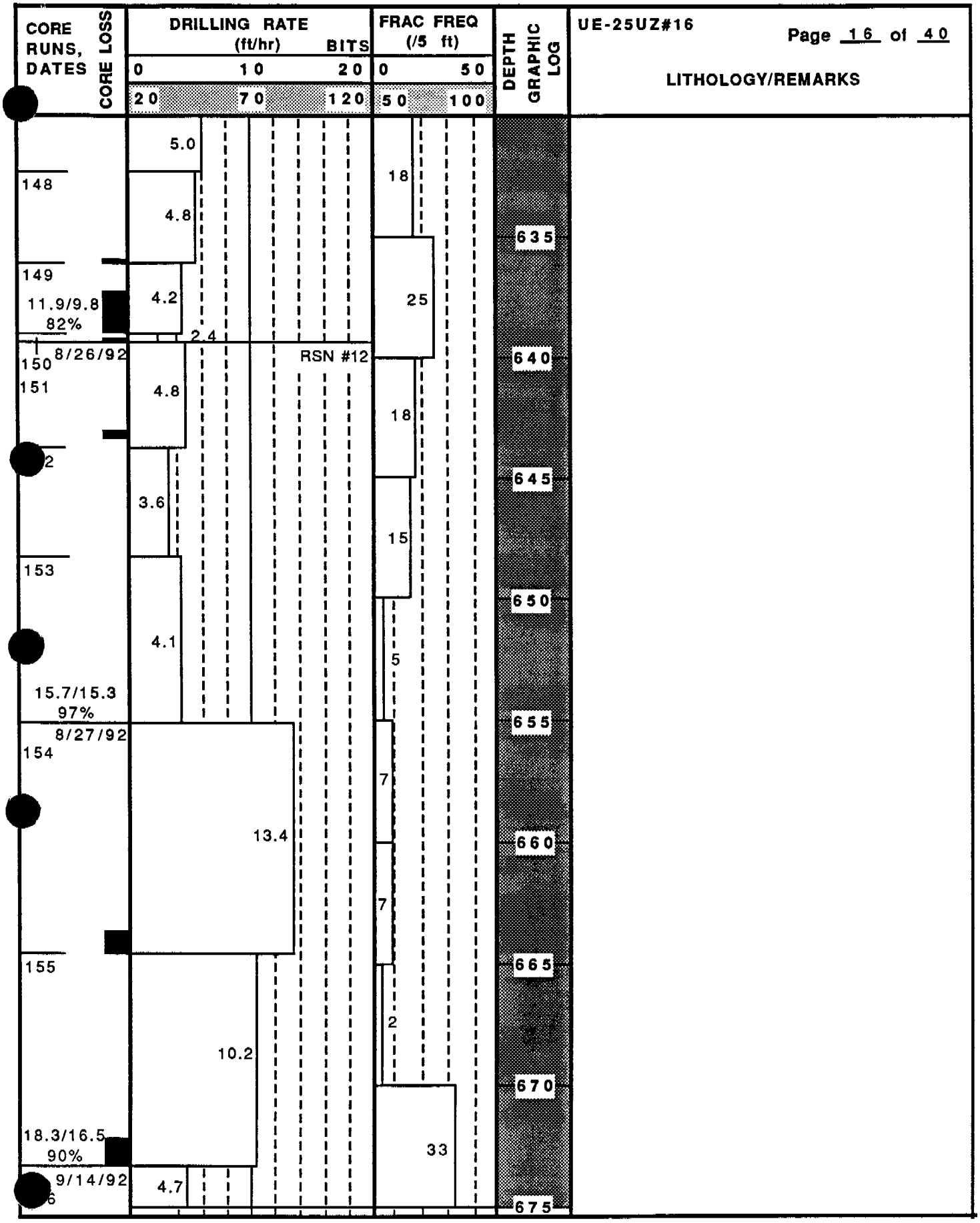

CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH
GRAPHIC LOG
UE-25UZ#16
Page 14 of 40
LITHOLOGY/REMARKS
126
127
128
129
130
131
132
133
134
135
34.2
7.9
9.3
6.3
4.9
5.6
6.6
4.8
5.4
5.4
35
52
30
45
33
48
22
560
565
570
575
580
585
590
25.0/24.8
99%
8/19/92

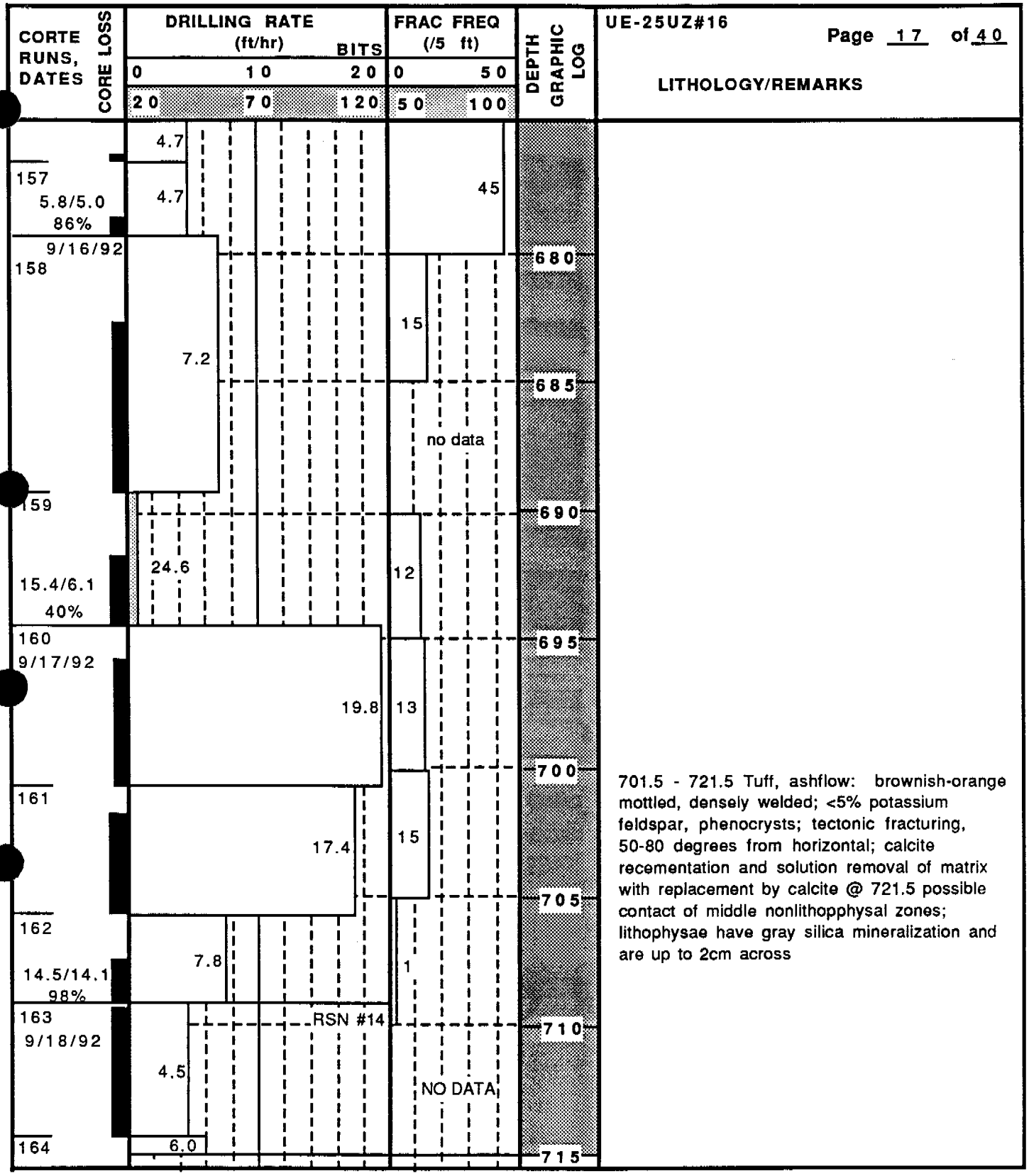
UE-25UZ#16 Page 15 of 40

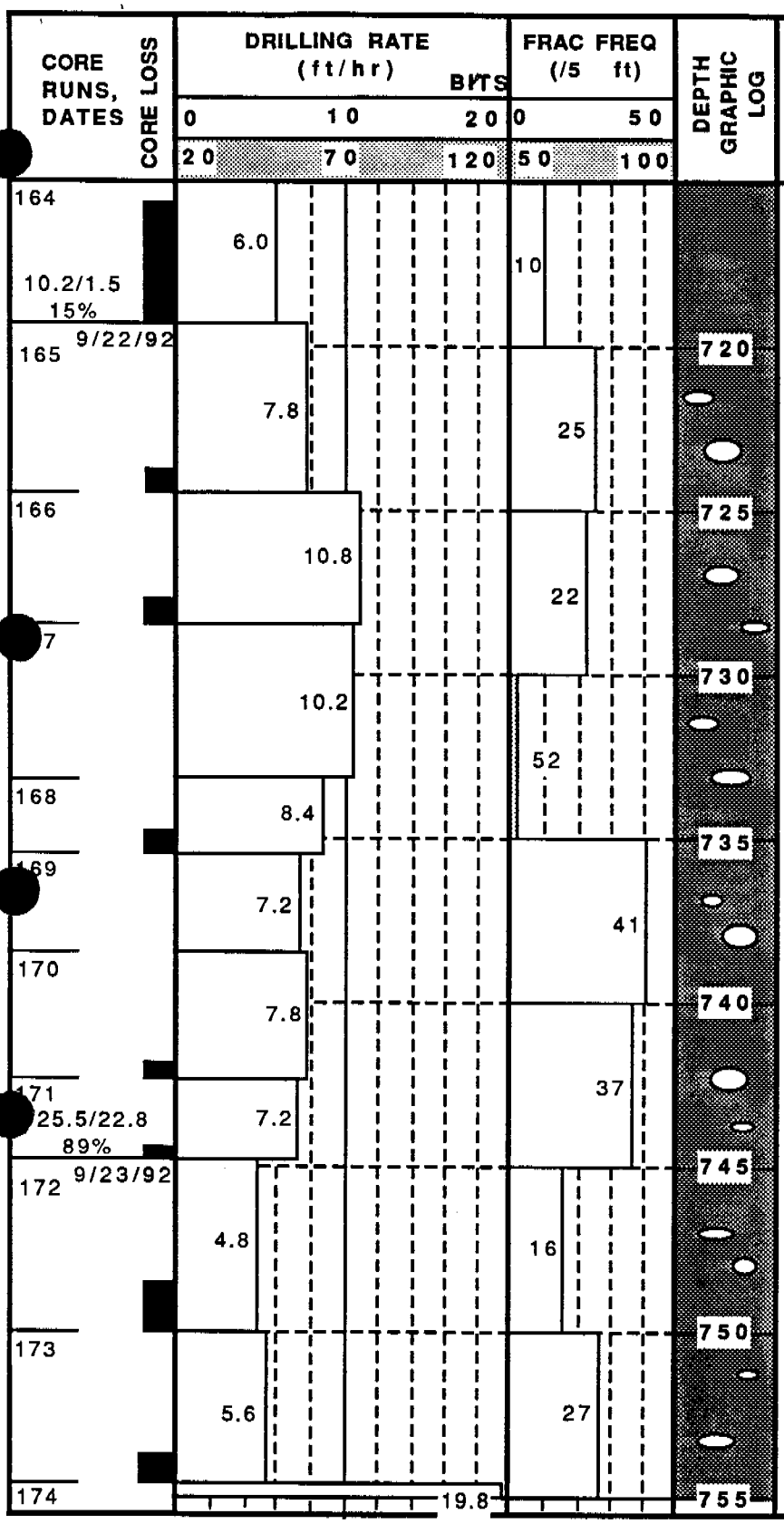


LITHOLOGY/REMARKS

@ 621.6 Closely spaced planar parallel fractures or joints with clay and manganese dendrites on fracture surfaces


CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH
GRAPHIC LOG
UE-25UZ#16
Page 16 of 40
LITHOLOGY/REMARKS
148
149
11.9/9.8
82%
150
8/26/92
151
152
153
15.7/15.3
97%
8/27/92
154
155
18.3/16.5
90%
9/14/92
156
5.0
4.8
4.2
2.4
4.8
3.6
4.1
13.4
10.2
4.7
RSN #12
18
25
18
15
5
7
7
2
33
635
640
645
650
655
660
665
670
675

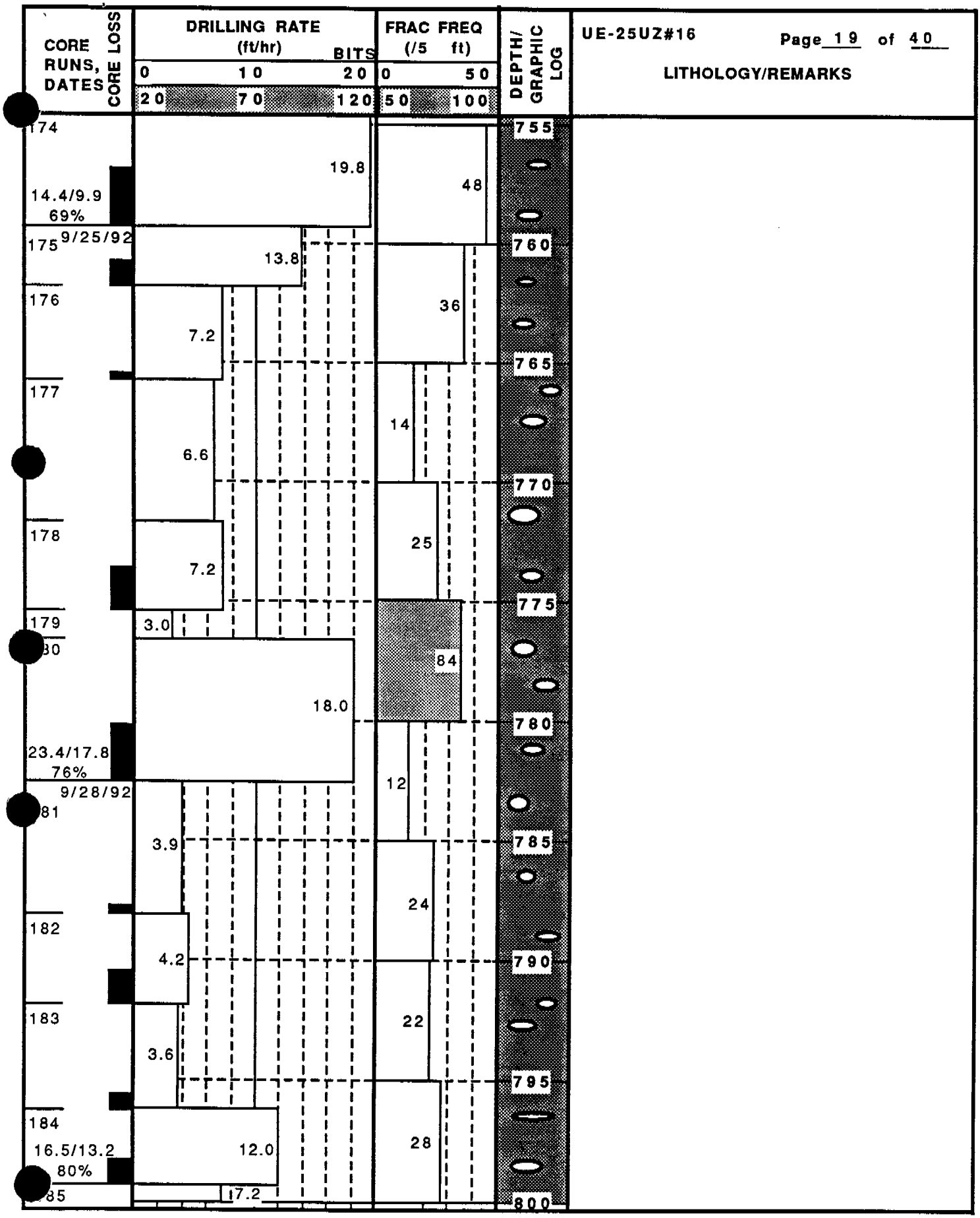

CORTE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH
GRAPHIC LOG
LITHOLOGY/REMARKS
157
5.8/5.0
86%
9/16/92
158
159
15.4/6.1
40%
160
9/17/92
161
162
14.5/14.1
98%
163
9/18/92
164
4.7
4.7
7.2
24.6
19.8
17.4
7.8
4.5
6.0
RSN #14
45
15
no data
12
13
15
1
NO DATA
680
685
690
695
700
705
710
715
701.5 - 721.5 Tuff, ashflow: brownish-orange mottled, densely welded; <5% potassium feldspar, phenocrysts; tectonic fracturing, 50-80 degrees from horizontal; calcite recementation and solution removal of matrix with replacement by calcite @ 721.5 possible contact of middle nonlithopphysal zones; lithophysae have gray silica mineralization and are up to 2cm across

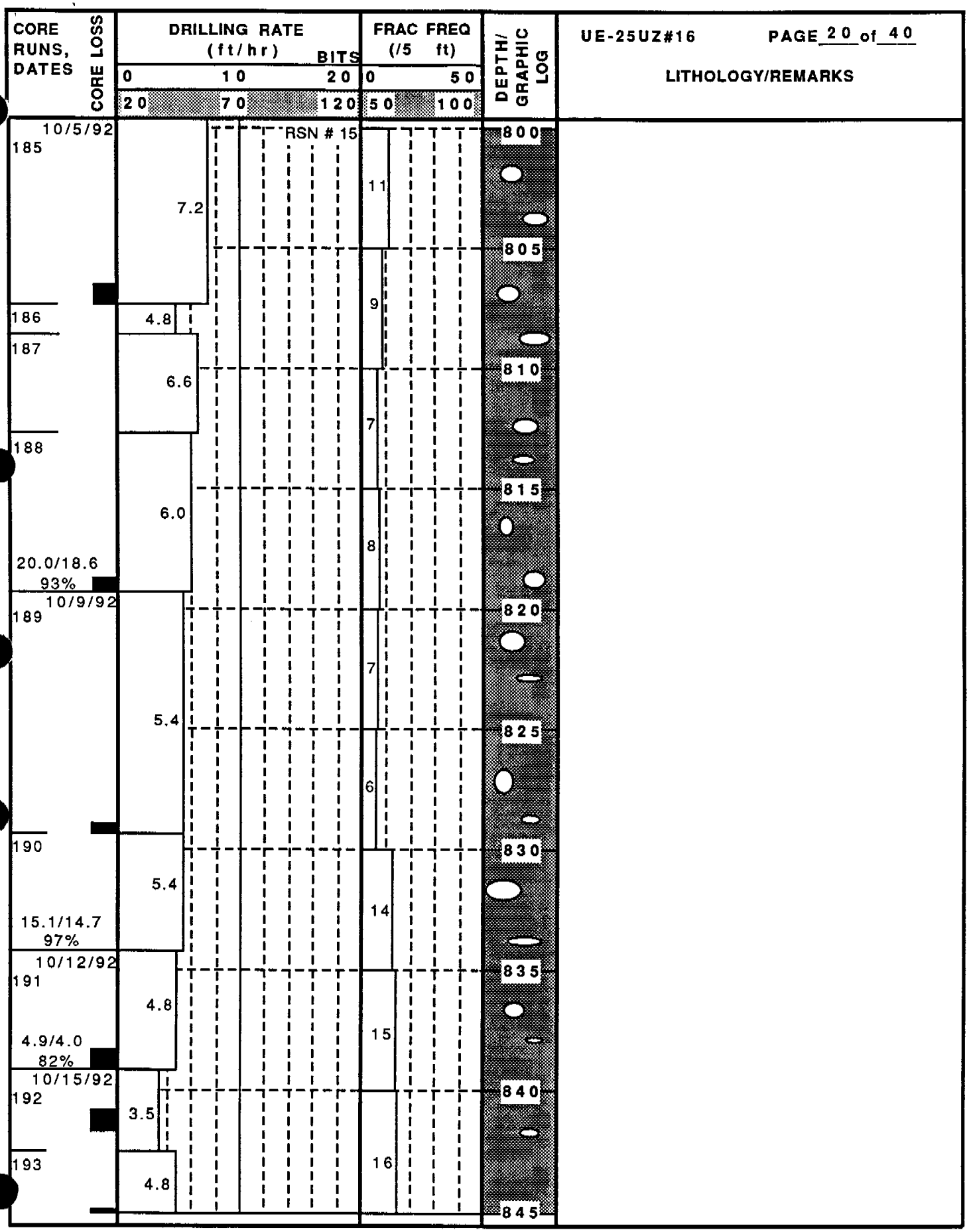


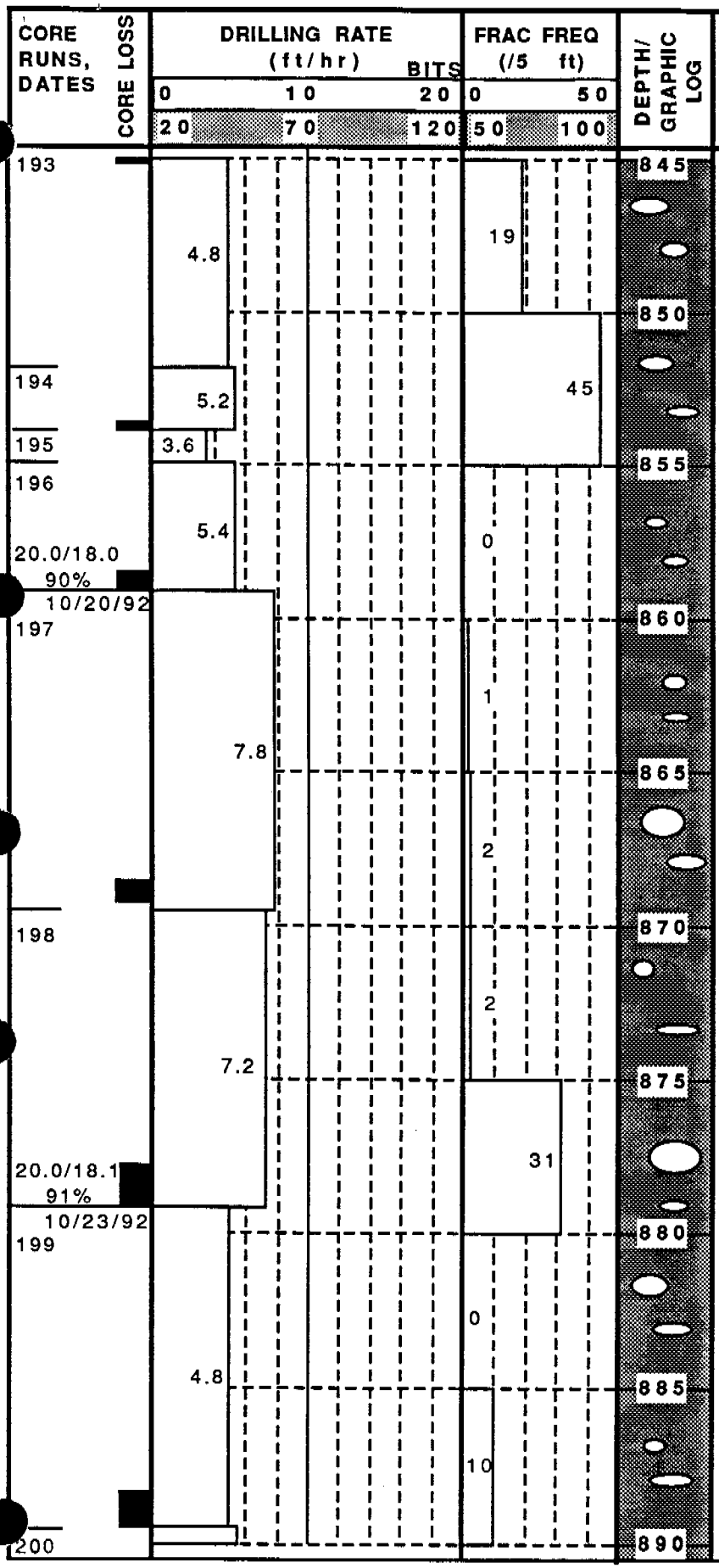
LITHOLOGY/REMARKS

@721.5 MIDDLE NONLITHOPHYSAL ZONE/LOWER LITHOPHYSAL ZONE CONTACT

721.5 - 851.0 Tuff, ashflow: brownish-orange and medium gray mottled, densely welded, devitrified; <5% K-feldspar phenocrysts; 1% gray pumice; 15% lithophysae up to 5cm across partially to completely filled with 95% light gray silica, up to 5cm across; <1% biotite phenocrysts at 735.5 ft


CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH/ GRAPHIC LOG
UE-25UZ#16
Page 19 of 40
LITHOLOGY/REMARKS
174
14.4/9.9
69%
9/25/92
175
176
177
178
179
180
23.4/17.8
76%
9/28/92
181
182
183
184
16.5/13.2
80%
185
19.8
13.8
7.2
6.6
7.2
3.0
18.0
3.9
4.2
3.6
12.0
17.2
48
36
14
25
84
12
24
22
28
755
760
765
770
775
780
785
790
795
800

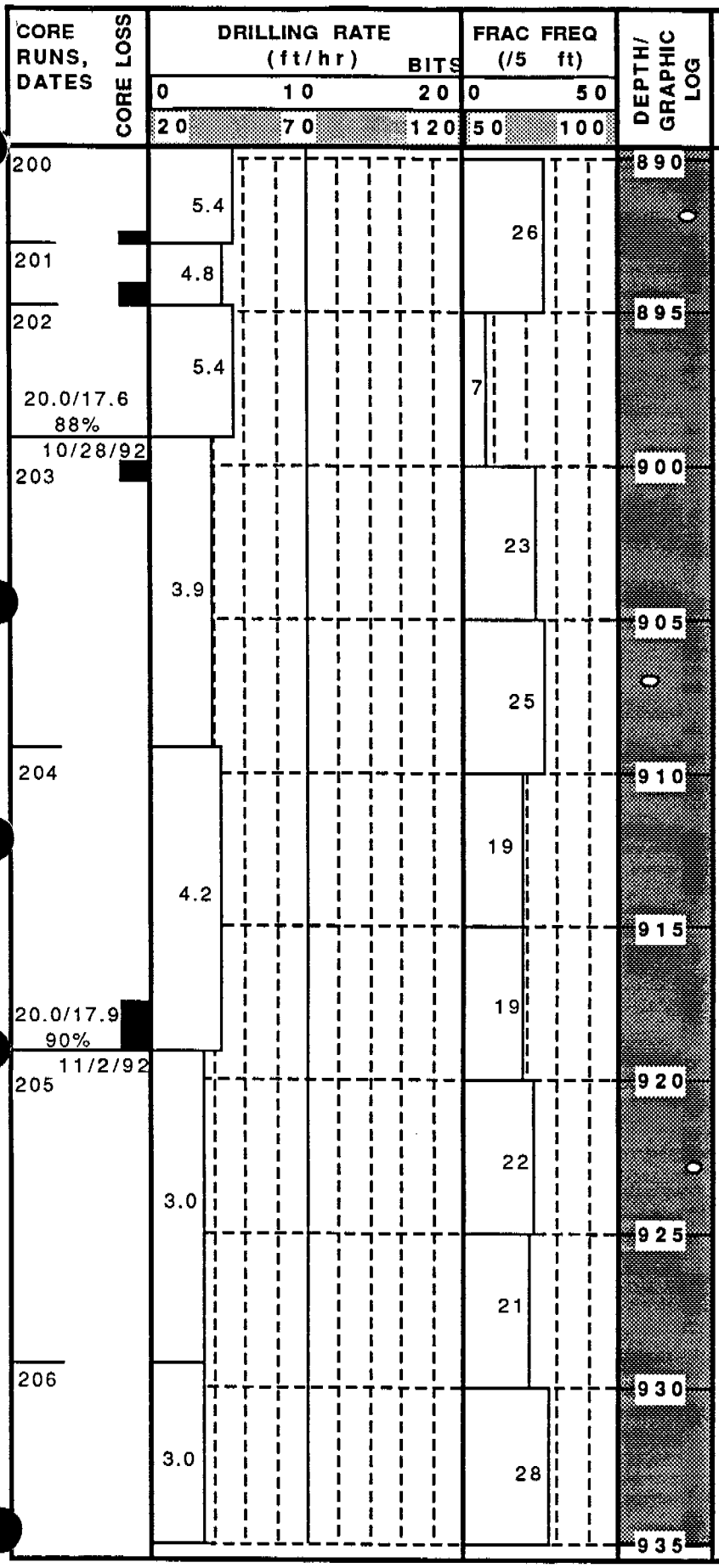

CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH/ GRAPHIC LOG
LITHOLOGY/REMARKS
RSN # 15
10/5/92
185
186
187
188
20.0/18.6
93%
10/9/92
189
190
15.1/14.7
97%
10/12/92
191
4.9/4.0
82%
10/15/92
192
193
7.2
4.8
6.6
6.0
5.4
5.4
4.8
3.5
4.8
11
9
7
8
7
6
14
15
16
800
805
810
815
820
825
830
835
840
845



LITHOLOGY/REMARKS

from 839.2 to 851.0: occasional calcite hairline fractures and breccia zones upto 1cm

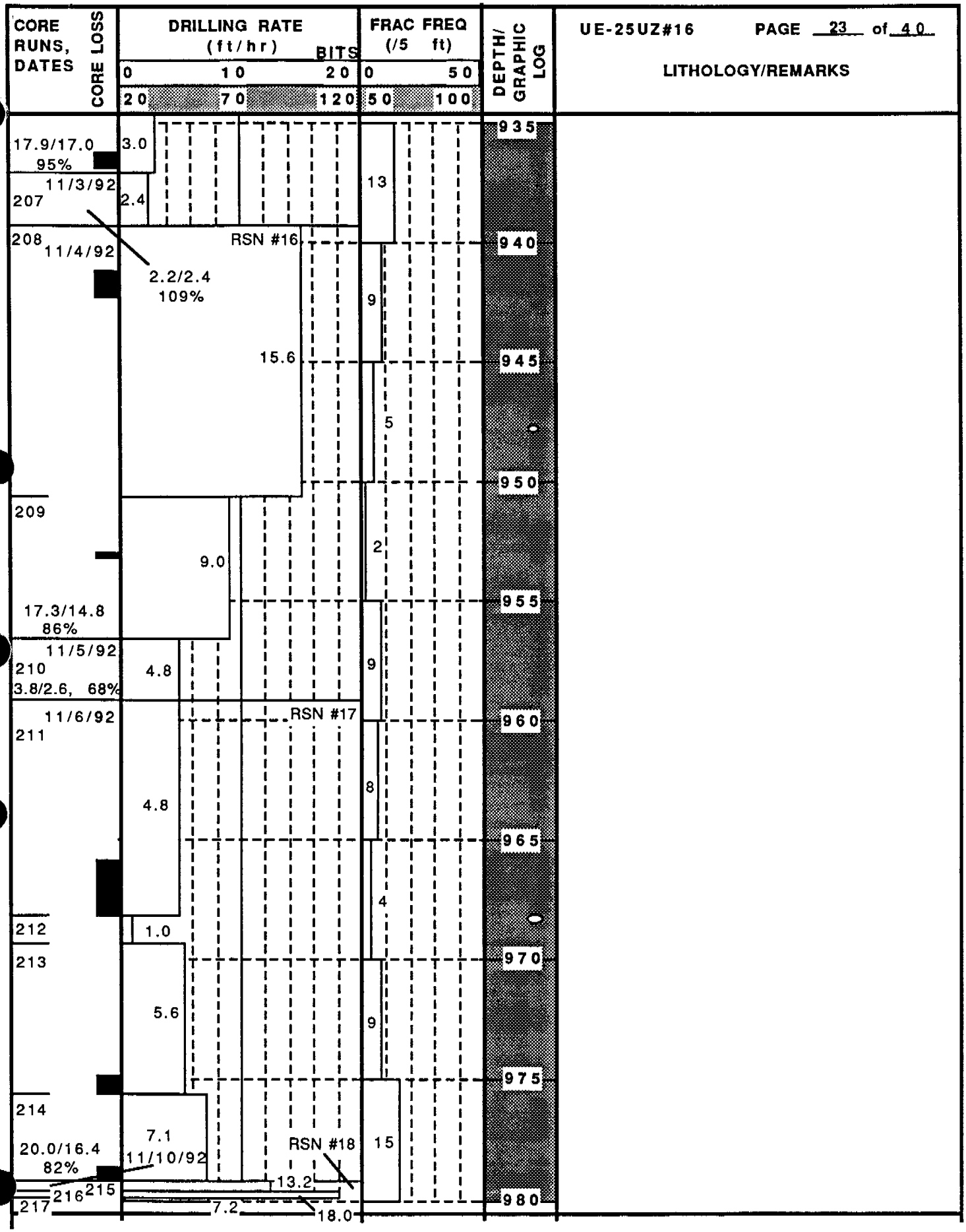
851.0 - 915.0 Tuff, ashflow: pale red purple, densely welded, devitrified; 5% lithics, pale pink; 15-20% pumice, light red purple; 1% phenocrysts sanidine; 10% lithophysae, filled and decreasing in number and size with depth

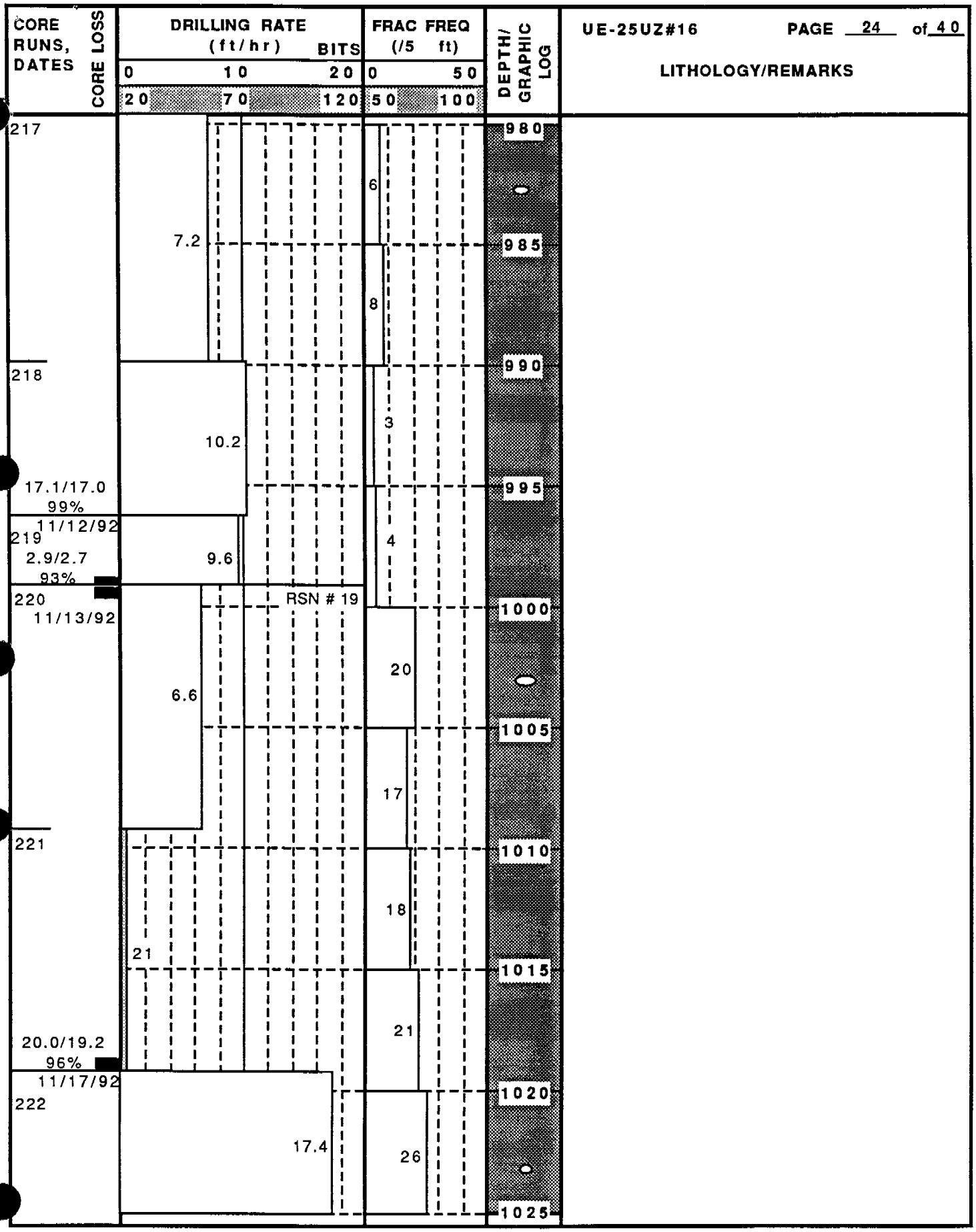


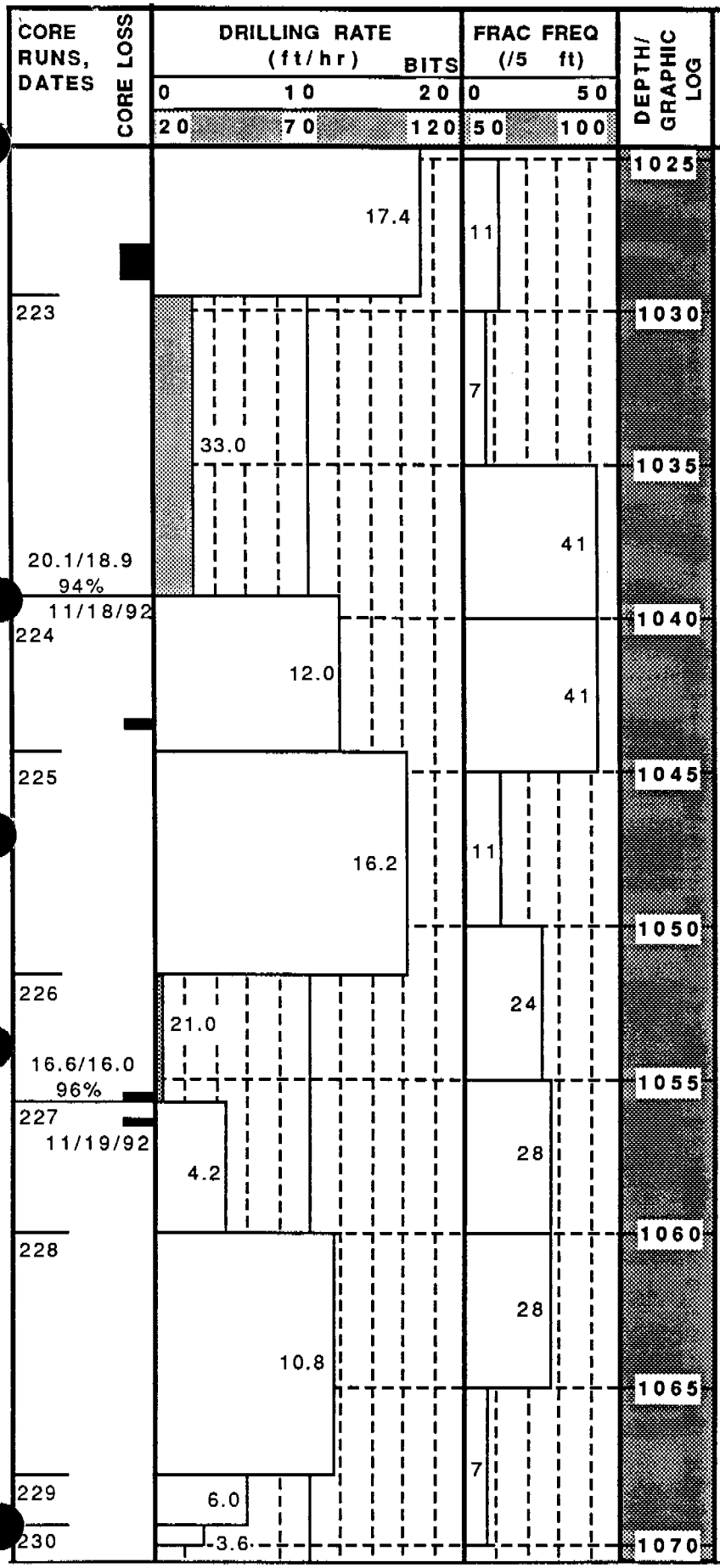
LITHOLOGY/REMARKS

@915.0 LOWER LITHOPHYSAL ZONE/ LOWER NONLITHOPHYSAL ZONE CONTACT

915.0 - 1043.0 Tuff, ashflow: pale red, mottled with light brown and light brownish gray, densely welded, devitrified; < 5% pumice, pale red to light gray, flattened, devitrified; <1% lithics, light gray to very light gray, (mm to cm in size); < 3% phenocrysts, sanidine; <1% lithophysae (cm in size) with vapor-phase mineralization, fractures coated with vapor-phase mineralization


CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH/ GRAPHIC LOG
UE-25UZ#16
PAGE 23 of 40
LITHOLOGY/REMARKS
17.9/17.0
95%
11/3/92
207
208
11/4/92
2.2/2.4
109%
209
17.3/14.8
86%
11/5/92
210
3.8/2.6, 68%
11/6/92
211
212
213
214
20.0/16.4
82%
7.1
11/10/92
216
215
217
RSN #16
RSN #17
RSN #18
3.0
2.4
15.6
9.0
4.8
4.8
1.0
5.6
13.2
7.2
18.0
13
9
5
2
9
8
4
9
15
935
940
945
950
955
960
965
970
975
980

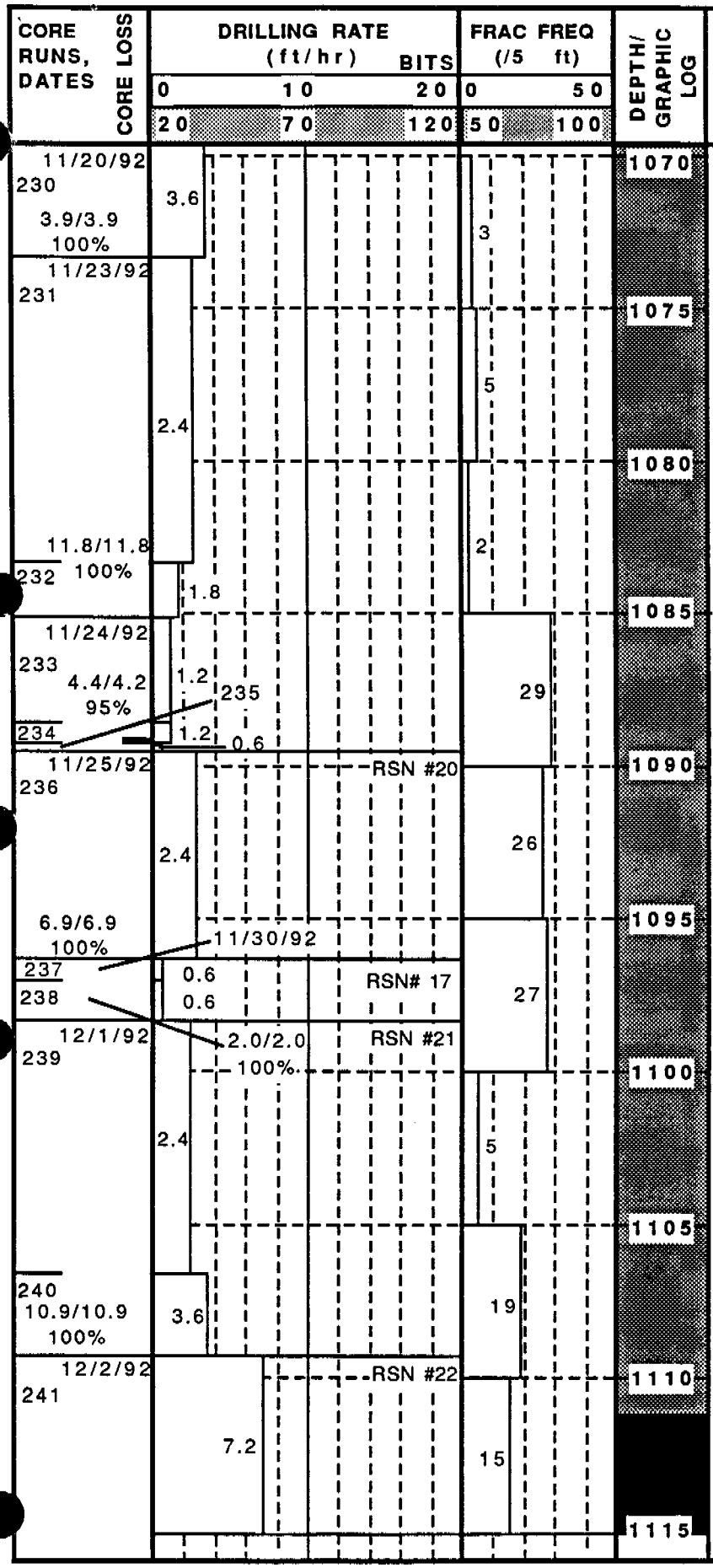

CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH/ GRAPHIC LOG
LITHOLOGY/REMARKS
217
7.2
6
8
980
985
990
218
10.2
3
17.1/17.0
99%
995
11/12/92
219
2.9/2.7
93%
9.6
4
220
11/13/92
RSN # 19
1000
6.6
20
1005
17
221
1010
18
21
1015
21
20.0/19.2
96%
11/17/92
222
1020
17.4
26
1025



LITHOLOGY/REMARKS

1043.0 - 1060.0 Tuff, ashflow: reddish orange to orangish brown, becoming more vitric; occasional veinlets and microveinlets filled mainly with silica and zeolites: 5% lithics, mm to 2 cm white to light gray to gray; 5% sanidine and 1 % biotite phenocrysts

1060.0 - 1080.0 Tuff,ashflow: brickred to brown motled orange to pale yellow; occasional microveinlets filled mainly with silica and zeolites; 3% sanidine and about 1% biotite phenocrysts; matrix altering to clay; 5% lithic fragments, light gray to white rhyolite lithics, some display flow banding; other lithics, gray to dark gray rhyolite with up to 10% biotite, many of these clasts display alteration rims



LITHOLOGY/REMARKS

@1080.0 LOWER NONLITHOPHYSAL ZONE/ SMECTITE ZONE CONTACT

from 1080.0 to 1081.0: pervasive clay altered zone

1081.0 - 1096.4 Tuff,ashflow: brickred to brown motled orange to pale yellow; occasional microveinlets filled mainly with silica and zeolites; 3% sanidine and about 1% biotite phenocrysts; matrix altering to clay; 5% lithic fragments, light gray to white rhyolite lithics, some display flow banding; other lithics, gray to dark gray rhyolite with up to 10% biotite, many of these clasts display alteration rims

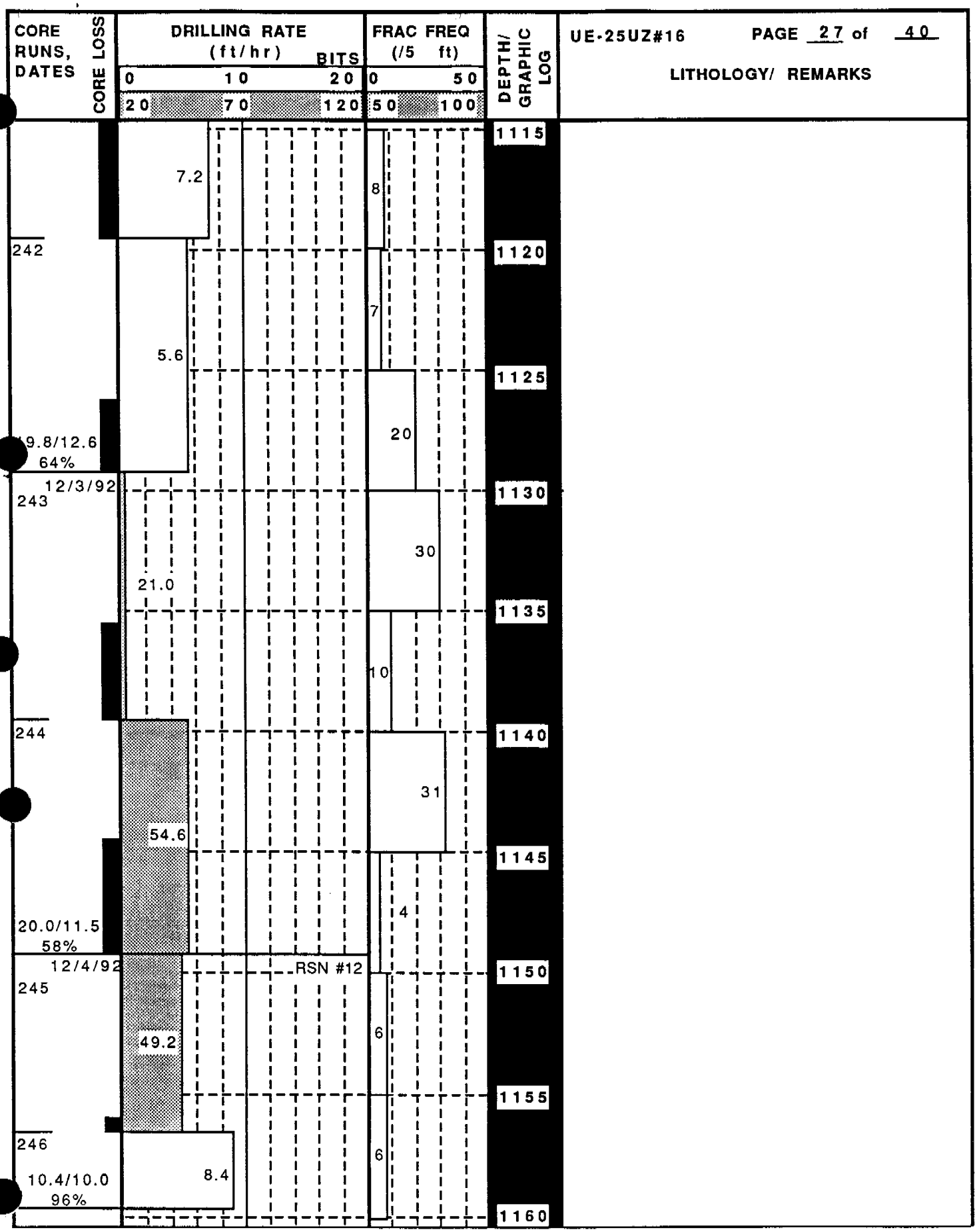
1096.4 - 1111.2 Tuff, ashflow: reddish dark brown to grayish dark brown molted orange to pale yellow; occassional microveinlets filled mainly with silica and zeolites; 3% sanidine and about 1% biotite; 5% lithic fragments, light gray to white rhyolite lithics

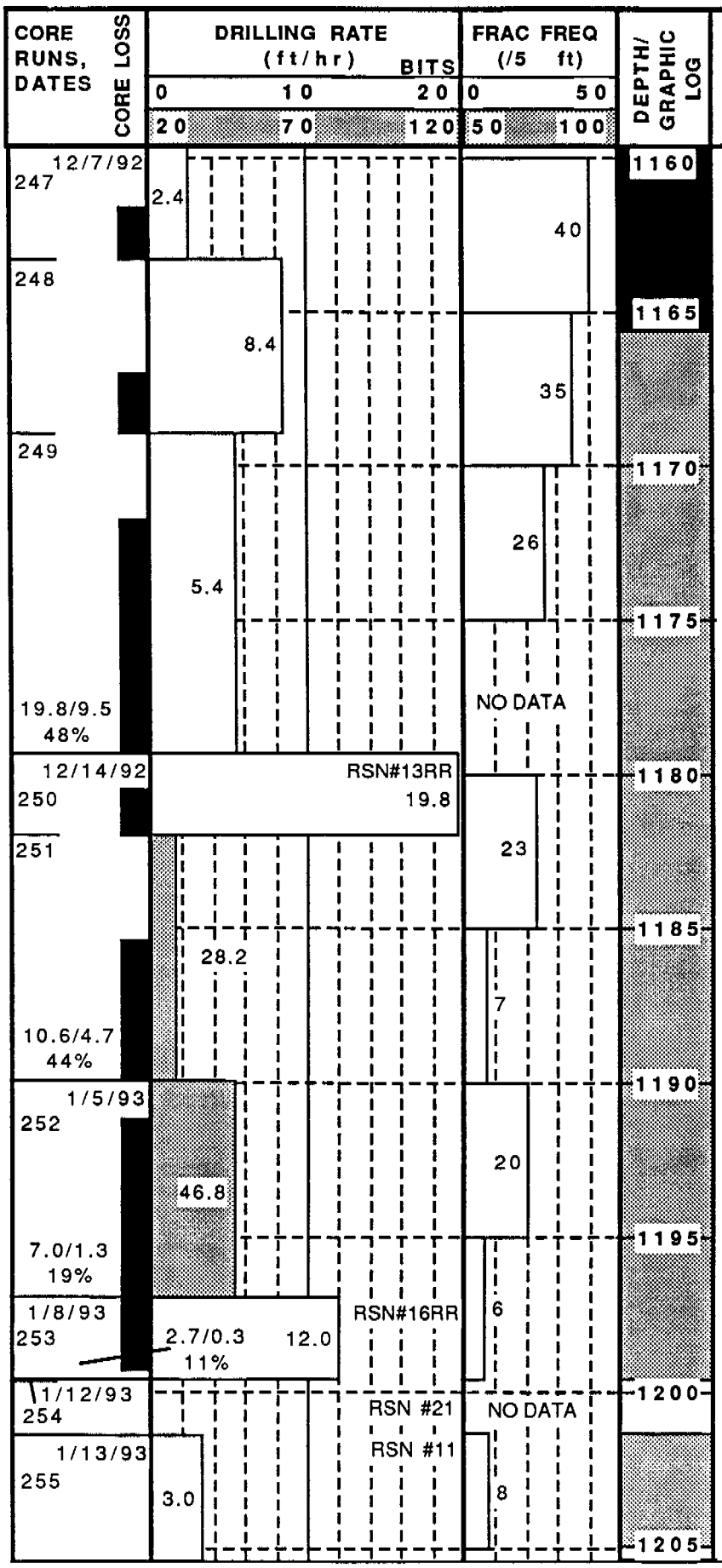
@ 1106.0 10% lithic zone; 1mm to 5 cm, distinct alteration rims around lithics

from 1107.8 to 1111.2: alternating and unaltered pervasively clay altered zones, up to 0.5 ft thick; 5% lithics; 1% MnO

@1111.2 SMECTITE ZONE/VITROPHYRE CONTACT

1111.2 - 1165.2 Tuff, ashflow: vitrophyre; dark gray, densely welded, glassy, rhyolitic; blue silica coating fractures, about half of the fractures are open


CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH/ GRAPHIC LOG
LITHOLOGY/ REMARKS
7.2
8
242
5.6
7
19.8/12.6
64%
12/3/92
243
21.0
20
30
10
244
54.6
31
20.0/11.5
58%
12/4/92
245
RSN #12
49.2
4
6
246
8.4
6
10.4/10.0
96%
1115
1120
1125
1130
1135
1140
1145
1150
1155
1160



LITHOLOGY/ REMARKS

@1165.6 VITROPHYRE/PARTIALLY WELDED ZONE

1165.6 - 1201.3 Tuff, ashflow: moderate orange pink, partially welded, devitrified; <1% pumice, very pale orange, vitric; 5% lithics, rhyolitic, dark brownish gray, angular, a few mm to 1 cm; 3% phenocrysts, sanidine, clear, fragmented subhedral to euhedral

Note: Run 252 was drilled on 12/14/92, but as stick in the hole until 1/5/93

Core Run 254: 1199.6 - 1199.6. Fishing fragments on bottom of hole; REECo reamed down the hole to 1201.3; therefore, no core was attempted from 1199.6 - 1201.3

@1201.3 PARTIALLY WELDED/CALICC HILLS CONTACT

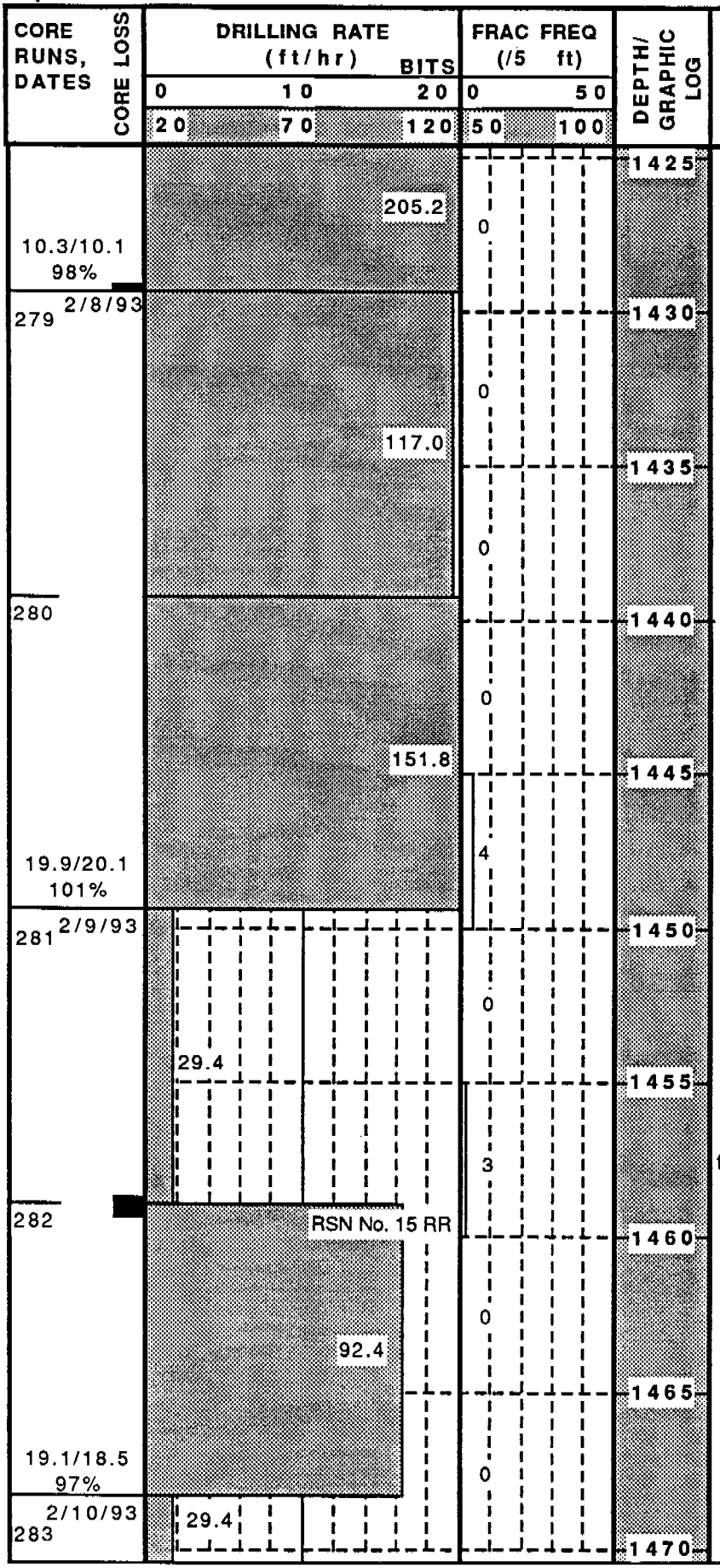
CORE RUNS, DATES	CORE LOSS	DRILLING RATE (ft/hr) BITS	FRAC FREQ (/5 ft)	DEPTH/ GRAPHIC LOG	LITHOLOGY/ REMARKS
		0 10 20 / 20 70 120	0 50 / 50 100		
		3.0	6	1205	1201.3 - 1260.0 Tuff, ashflow: yellowish gray, partially welded, devitrified; 25% pumice, pinkish gray, vitric; 5% lithics fragments, rhyolitic, medium gray to dark gray, vitric, angular, a few mm to 1cm; 3% phenocrysts, euhedral sanidine and black biotite, and anhedral smoky quartz
10.2/10.2 100%				1210	
1/13/93 256		3.6	3	1215	
10.2/10.2 100%			3	1220	
1/14/93 257		4.2	10	1225	
			1	1230	
258		4.2	2	1235	
17.3/17.3 100%			19		
1/19/93 259		4.8	9	1240	
				1245	from1244.0 to 1250.0: increase in size of lithic fragments and pumice, up to 3cm
10.1/10.1 100%			6		
260		9.6		1250	@ 1250 Damp core, pumice altering to clay

CORE RUNS, DATES	CORE LOSS	DRILLING RATE (ft/hr) 0 10 20 / BITS 20 70 120	FRAC FREQ (/5 ft) 0 50 / 50 100	DEPTH/ GRAPHIC LOG	LITHOLOGY/ REMARKS
1/20/93		9.6	3	1250	from 1250 to 1256.5: fining downward of lithics and pumice
			9	1255	from 1256.5 to 1258.5: lithic-rich zone increasing .downward to 1258.5
261		4.2	10	1260	
			1	1265	
262		6.0	0	1270	
			4	1275	
29.9/29.9 100%					
1/25/93 263		46.8	4	1280	@ 1279.5 large lithic fragments, up to 4-cm wide
			0	1285	
264		39.6	8	1290	
				1295	

CORE RUNS, DATES	CORE LOSS	DRILLING RATE (ft/hr) BITS	FRAC FREQ (/5 ft)	DEPTH/ GRAPHIC LOG	LITHOLOGY/ REMARKS
		0 10 20 / 20 70 120	0 50 / 50 100		
20.1/20.1 100% 1/26/93 265		39.6	4	1295	1295.0 - 1300.2 Tuff, ashflow: white, partially to nonwelded, devitrified; 10% pumice, very pale orange to pale yellowish orange, vitric; 5% lithic fragments, rhyolitic, dark brownish gray angular, a few mm to 1cm; 5% phenocrysts, 2% clear quartz, 2% sanadine, 1% black biotite; damp with altered groundmass and pumice
		120.6	12	1300	1300.2 - 1329.3 Tuff, ashflow: partially to nonwelded, devitrified; 20-25% pumice, pinkish-gray to moderate pink, vitric to partially devitrified; 5-10% lithic fragments, rhyolitic, moderate brown to blackish brown, angular to subrounded, 1mm to 1cm; 1% phenocrysts, 1% clear anhedral quartz, trace subhedral sanidine, trace anhedral black biotite
266 20.0/20.0 100%		119.4	5	1305	
			3	1310	
			3	1315	
1/27/93 267		55.2	1	1320	
			1	1325	
268 20.0/20.0 100%		73.8	3	1330	1329.3 - 1339.1 Tuff, ashflow: grayish yellow, partially to nonwelded, devitrified; 25% pumice, white, vitric; 5% lithic fragments (locally up to 25%), rhyolitic, blackish brown to grayish red, subangular to subrounded, 1mm to 1cm; 1% phenocrysts, 1% clear subhedral quartz
			9	1335	
269		123.0		1340	

CORE RUNS, DATES	CORE LOSS	DRILLING RATE (ft/hr) BITS	FRAC FREQ (/5 ft)	DEPTH/ GRAPHIC LOG	LITHOLOGY/ REMARKS
		0 10 20 / 20 70 120	0 50 / 50 100		
1/29/93 269	10.2/9.5 93%	123.0	4	1340	1339.1 - 1475.4 Tuff, ashflow: pale reddish brown, partially to nonwelded, devitrified; 25-35% pumice, pale greenish yellow, grayish orange pink, or pinkish gray, vitric to partially devitrified; 5% lithic fragments, rhyolitic, grayish brown to moderate brown, subrounded, few mm; 1% phenocrysts, 1% clear quartz, subhedral to anhedral, 1mm, trace clear sanidine, euhedral, 1mm, trace black biotite, subhedral, 1mm
			8	1345	
2/1/93 270		33.6	5	1350	
			2	1355	
271		49.8	1	1360	
			2	1365	
272		43.8	1	1370	
				1375	
273	29.8/29.6 99%	63.0	2		
274 2/3/93		67.8	0	1380	
				1385	

CORE RUNS, DATES	CORE LOSS	DRILLING RATE (ft/hr) BITS	FRAC FREQ (/5 ft)	DEPTH/ GRAPHIC LOG	LITHOLOGY/ REMARKS
		0 10 20 / 20 70 120	0 50 / 50 100		
		67.8	0	1385	
275				1390	
		36.0	0		
				1395	
19.9/19.9 100%			0		
2/4/93 276		RSN No. 12 RR		1400	
		121.8	0		
				1405	
			0		
277				1410	
		118.2	0		
				1415	
20.0/20.0 100%			0		
2/5/93 278				1420	
		205.2	0		
				1425	
10.3/10.1 98%			0		
				1430	

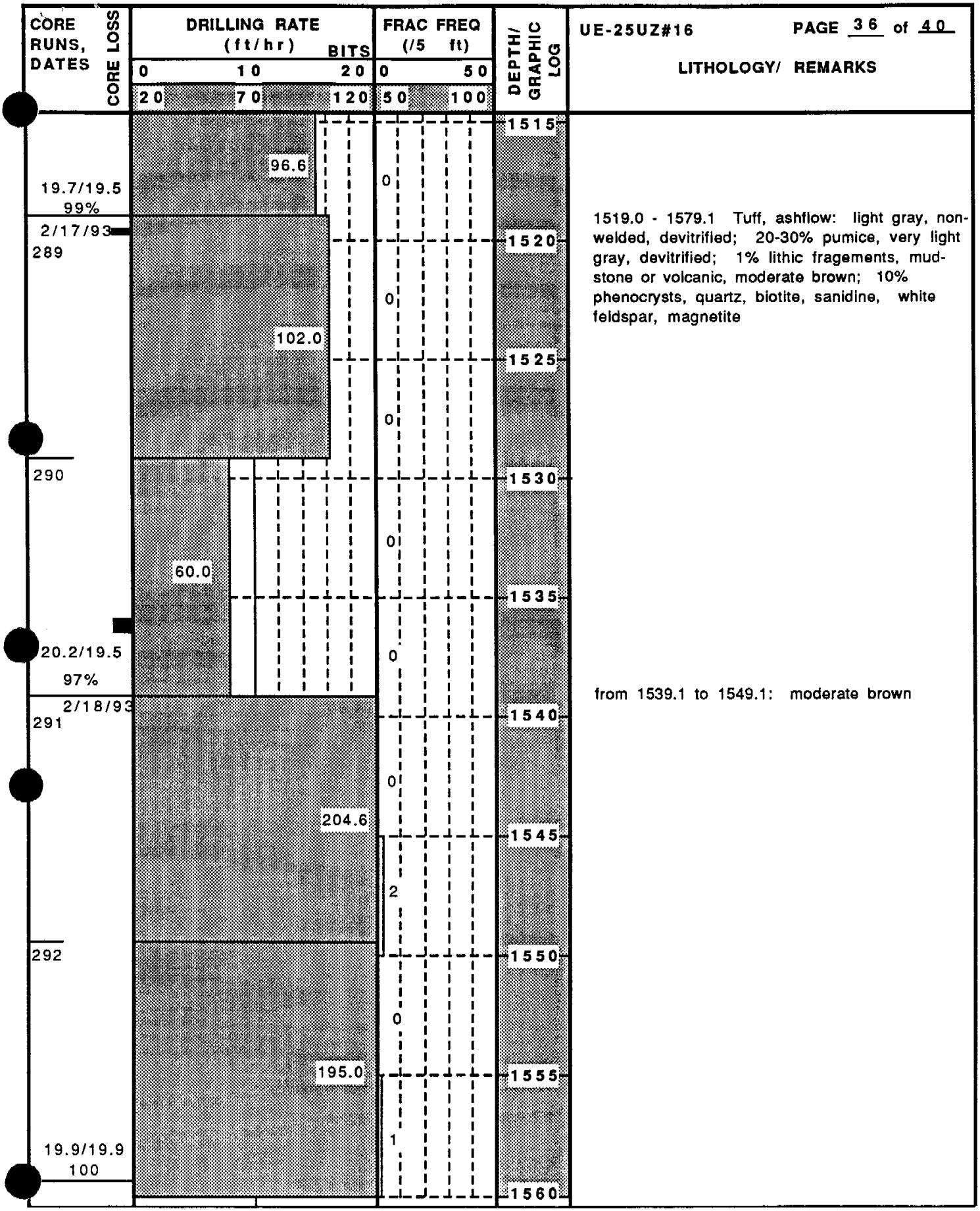


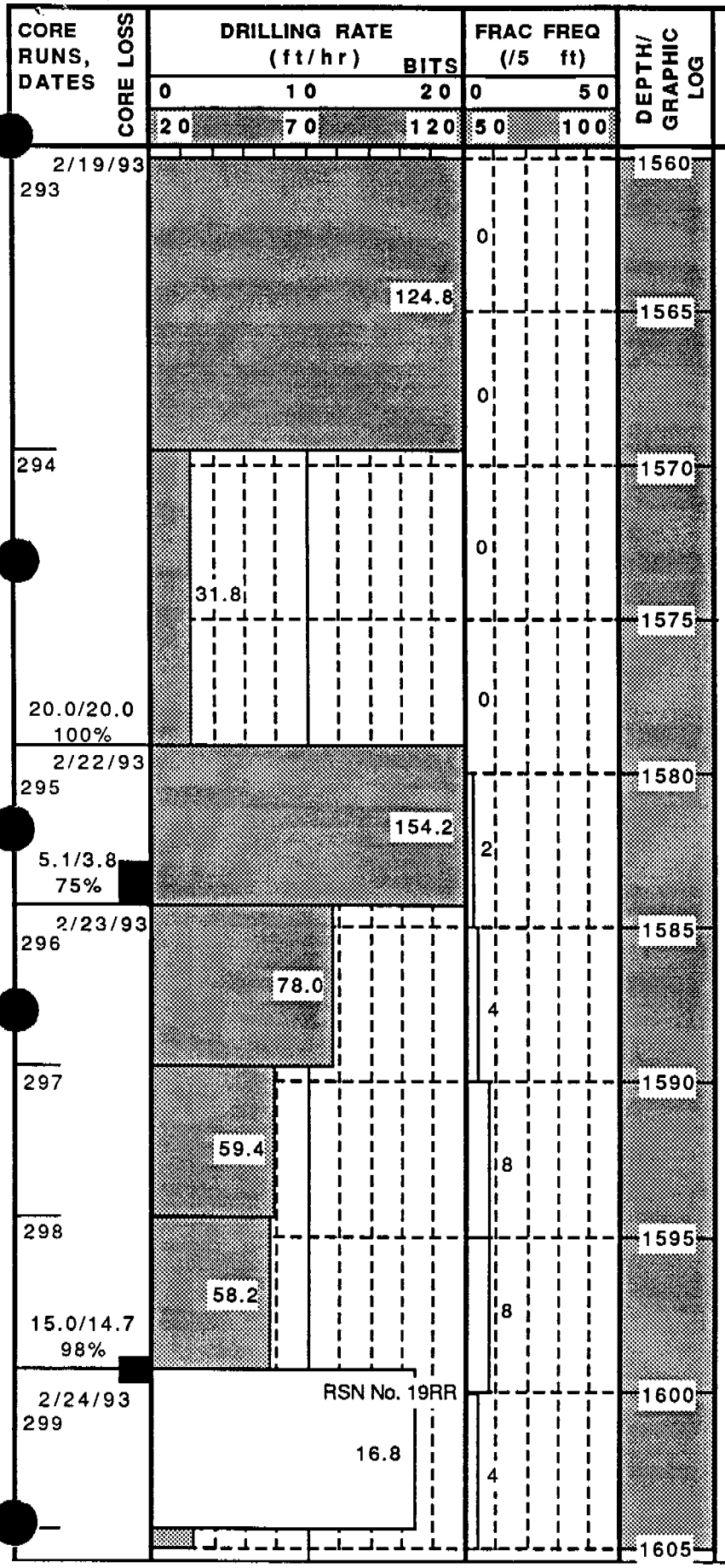
LITHOLOGY/ REMARKS

from 1457.9 to 1458.8: Pervasively silicified zone

1469.4 - 1470.3 Tuff, ashflow: grayish yellow-green to pale olive colored zones with moderate reddish-brown colored alteration of pumice fragments

CORE RUNS, DATES	CORE LOSS	DRILLING RATE (ft/hr) 0 10 20 / BITS 20 70 120	FRAC FREQ (/5 ft) 0 50 / 50 100	DEPTH/ GRAPHIC LOG	LITHOLOGY/ REMARKS
2/10/93 283		29.4	0	1470	
				1475	1474.5 - 1475.4 Tuff ashflow: grayish yellow-green to pale olive colored zones with moderate reddish-brown colored alteration of pumice fragments
284	11.0/10.8 102%	25.2	0		1475.4 - 1499.3 Tuff, ashflow: moderate reddish-orange to grayish-pink, nonwelded; 20-30% pumice, pale greenish yellow to pinkish-gray, vitric to partially devitrified; 1% lithic fragments, silicified volcanics, moderate brown, subrounded, 1mm to 1 cm; 5-10% phenocrysts, 3-7% clear quartz, 2% sanidine, trace to 1% black quartz; gradational contact with above unit
2/11/93 285			0	1480	
			0	1485	
286		40.2	0	1490	
			1	1495	
	20.2/20.2 100%				
2/16/93 287		151.2	0	1500	CALICO HILLS/PROW PASS MEMBEF CONTACT @ 1499.3
			0	1505	1499.3 - 1519.0 Tuff, ashflow: Pinkish gray , non to partly welded, devitrified; 25-30% pumice, mostly very light gray, devitrified; 5-10% phenocrysts, quartz, phlogopite, sanidine
288		96.6	0	1510	
				1515	

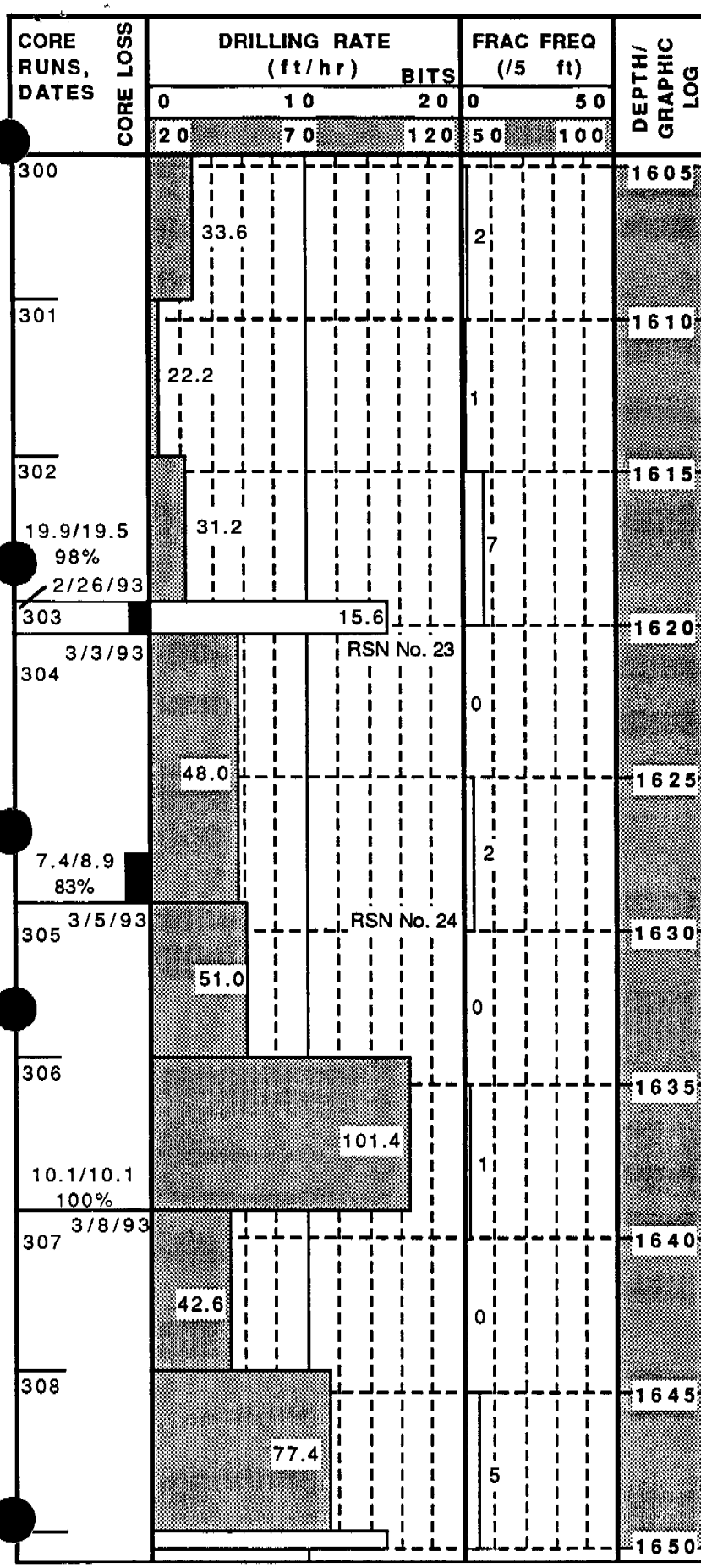

CORE RUNS, DATES
CORE LOSS
DRILLING RATE (ft/hr)
BITS
0 10 20
20 70 120
FRAC FREQ (/5 ft)
0 50
50 100
DEPTH/ GRAPHIC LOG
UE-25UZ#16
PAGE 36 of 40
LITHOLOGY/ REMARKS
19.7/19.5
99%
2/17/93
289
290
20.2/19.5
97%
2/18/93
291
292
19.9/19.9
100
96.6
102.0
60.0
204.6
195.0
0
0
0
0
0
2
0
1
1515
1520
1525
1530
1535
1540
1545
1550
1555
1560
1519.0 - 1579.1 Tuff, ashflow: light gray, non-welded, devitrified; 20-30% pumice, very light gray, devitrified; 1% lithic fragements, mud-stone or volcanic, moderate brown; 10% phenocrysts, quartz, biotite, sanidine, white feldspar, magnetite
from 1539.1 to 1549.1: moderate brown



LITHOLOGY/ REMARKS

1579.1 - 1609.4 Tuff, ashflow: pale brown, partly welded, devitrified; 25% pumic, light gray to light brown, partly to completely devitrified; 1% lithic fragements, mudstone, dark redish brown; 15-20% phenocrysts, quartz, sanidine, biotite, magnetite

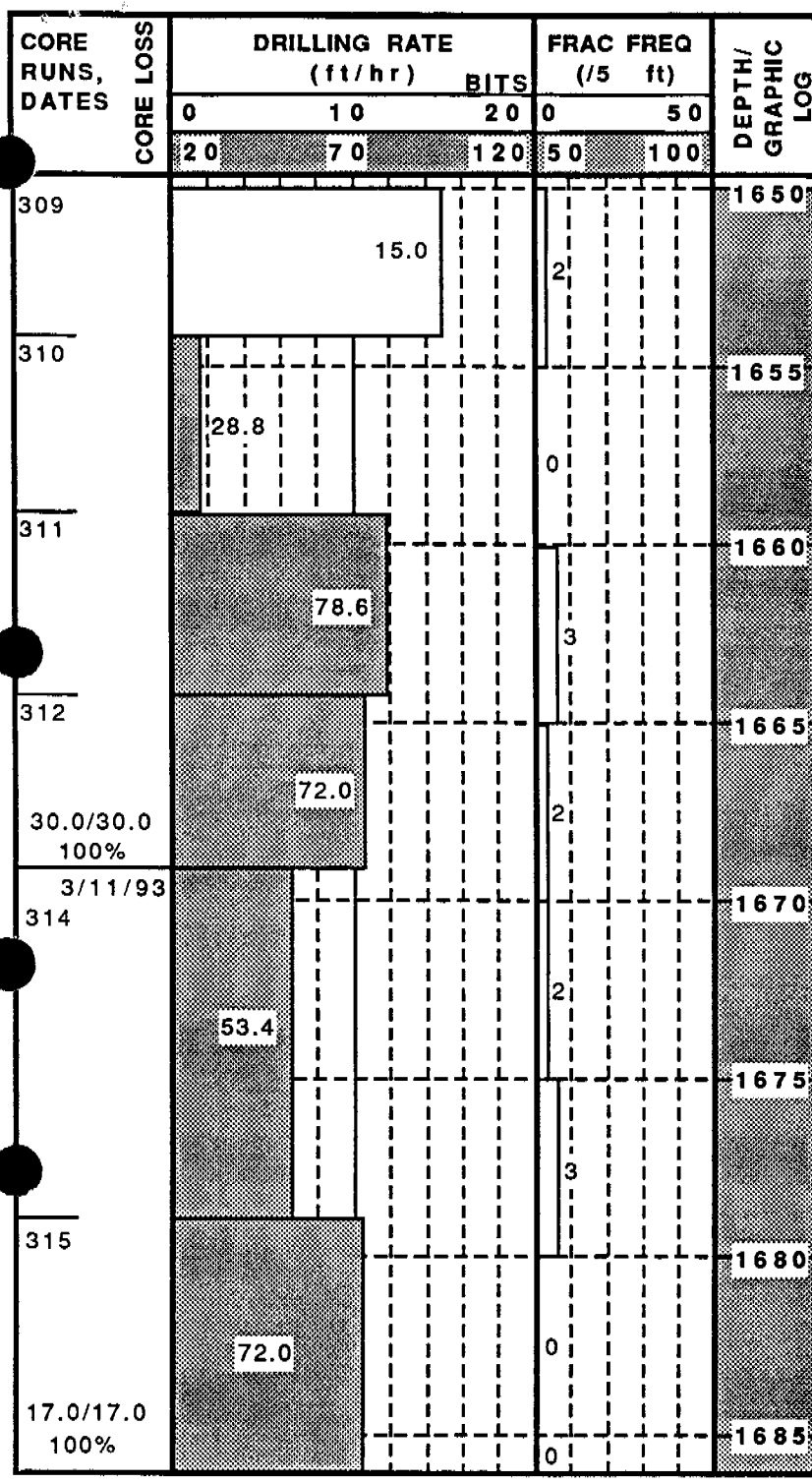
Becomming moderate reddish orange



LITHOLOGY/ REMARKS

1609. 4- 1639.2 Tuff, ashflow: moderate reddish brown, non to moderately welded, devitrified; 5% pumice, moderate reddish orange, devitrified; >1% lithic fragements; 20-25% phenocrysts, 20% milky to clear quartz, 3-8% sanidine, 1% magnetite, >1% biotite.

1639.2 - 1649.3 Tuff, ashflow: moderate red, moderately welded, devitrified; 15% pumice, very light gray, devitrified; 1% lithic fragements, mudstone, moderate reddish brown; 15% phenocrysts, 13% clear quartz, 1% sanidine, 1% magnetite



LITHOLOGY/ REMARKS

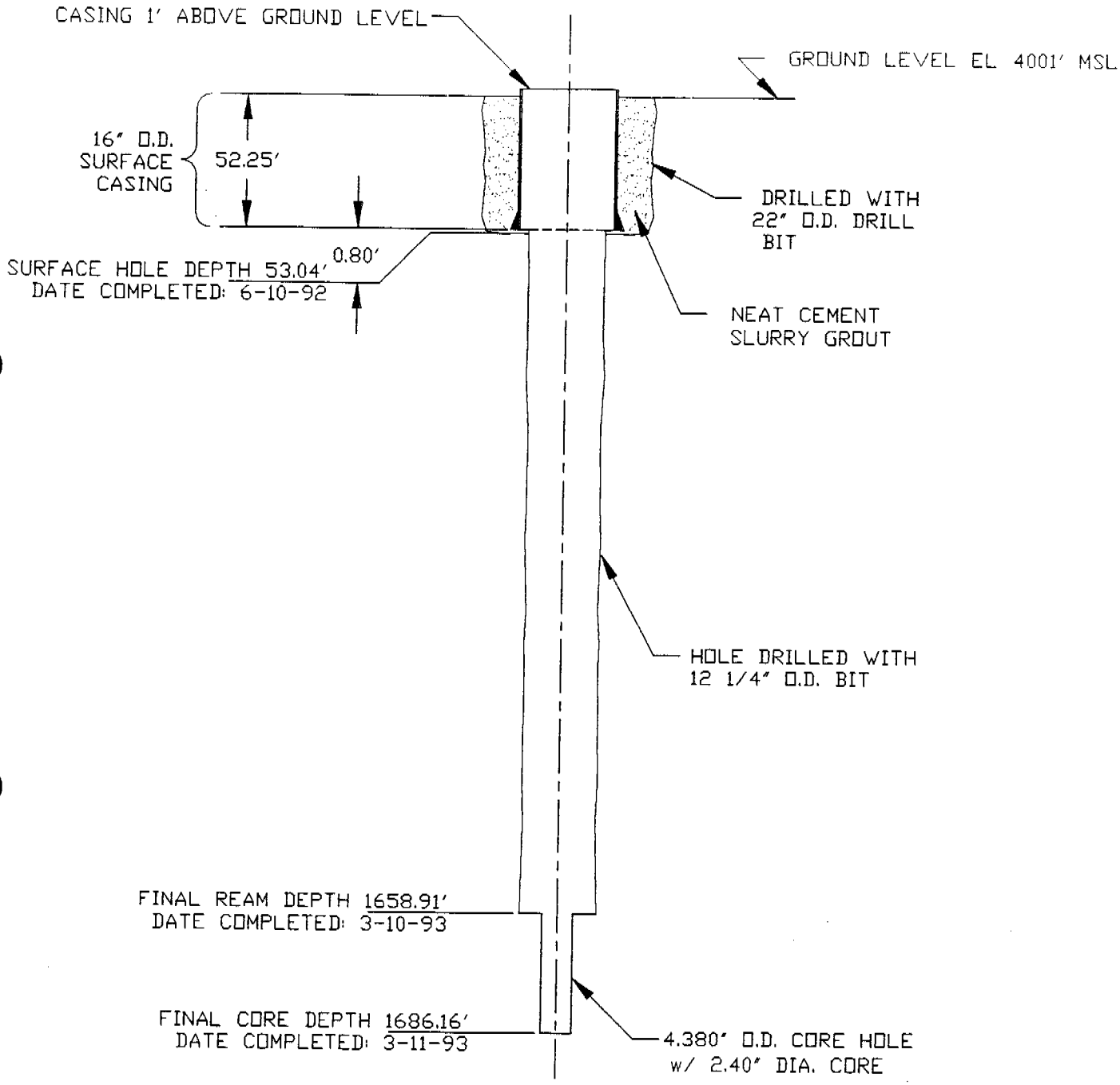
1649.3 - 1669.2 Tuff, ashflow: pale reddish brown, nonwelded, devitrified; 5% pumice, grayish pink, devitrified; >1% lithic fragments; 10% phenocrysts, 5% clear quartz, 2% sanidine, 2% biotite, 1% magnetite

1669.2 - 1689.2 Tuff, ashflow: moderate reddish brown, moderately welded, devitrified; 1-5% pumice, white, devitrified; 5% lithic fragements, mudstone, dark reddish brown; 25% phenocrysts, 23% clear quartz, 1% biotite, 1% magnetite

TOTAL DRIVE CORE: 30.3 FT
TOTAL CORE CUT: 1,654.2 FT
TOTAL CORE RECOVERED: 1,423.9 FT
PERCENT CORE RECOVERED: 86%

T.D. 1686.2 ft

RSN No.	Serial Number	Bit Type	Manufactor	Description
DS	N/A	Drive Sampler	Acker	
L-1	2S24189	Carbonado	Christensen	RSN No. L-1 - Carbonado, 4-6 stones/ct., No airways
L-2	2S22902	Carbonado	Christensen	RSN No. L-2 - Carbonado, 25 stones/ct., 10 airways (1/8 x 1/8) wide x deep
L-3	2S24194	Strata Pac	Christensen	RSN No. L 3 - Strata Pac, 18 PDC's, 1/4" Dia; 12 airways
L-4	L-87048	Carbonado	Christensen	RSN No. L-4 - Carbonado
L-5	L96595	Strata Pac	Longyear	RSN No. L-5 - Strata Pac, 16 PDC's, 1/4" Dia; 12 airways
L-6	2S25766	Strata Pac	Christensen	RSN No. L-6 - Strata Pac, 18 PDC's, 1/4" Dia; 10 airways (3/16 x 1/8) wide x de
L-7	2S25771	Diamond	Christensen	RSN No. L-7 - Diamond, 25 stones/ct, 10 airways(1/8 x 1/8) widexdeep, surface
L-8	L96594	Strata Pac	Longyear	RSN No. L-8 - Strata Pac, 16 PDC's, 1/4" Dia; 12 airways(1/16 x 1/4) wide x de
L-9	2S24190	Carbonado	Christensen	RSN No. L-9 - Carbonado, 4-6 stones/ct., 8 airways
L-10	2S24191	Carbonado	Christensen	RSN No. L-10 - Carbonado, 4-6 stones/ct., 8 airways
L-11	2S26868	Strata Pac	Christensen	RSN No. L-11 - Strata Pac, 18 PDC's, 1/4" Dia: 12 airways(3/16 x 1/8) wide x d
L-12	2S25767	Strata Pac	Christensen	RSN No. L-12 - Strata Pac, 18 PDC's, 1/4" Dia; 12 airways(3/16 x 1/8) wide x d
L-13	2S28390	Strata Pac	Christensen	RSN No. L-13 - Strata Pac, 18 PDC's, 5/16" Dia; 12 airways (1/8 x 1/8) wide x dee
L-14	2S28769	Carbonado	Christensen	RSN No. L-14 - Carbonado, 4-6 stones/ct., 8 airways
L-15	2S28385	Strata Pac	Christensen	RSN No. L-15 - Strata Pac, 18 PDC's, 5/16" Dia; 12 airways (3/16 x 1/8) wide x de
L-16	2S28384	Strata Pac	Christensen	RSN No. L-16 - Strata Pac, 18 PDC's, 5/16" Dia; 12 airways (3/16 x 1/8) wide x de
L-17	L-96512	Carbonado	Longyear	RSN No. L-17 - Surface Set, No airways
L-18	2S24193	Strata Pac	Christensen	RSN No. L-18 - Strata Pac, 18 PDC's, 5/16" Dia; 12 airways (3/16" x 3/16") wid
L-19	2S26867	Strata Pac	Christensen	RSN No. L-19 - Strata Pac, 18 PDC's, 5/16" Dia; 12 airways (3/16" x 3/16") wid
L-20 as RSN No. L-17RR				
L-21	2S28387	Surface Set	Christensen	RSN No. L-21 - Surface Set, 10 airways
L-22	0117806	Strata Pac	Chris-Hugh	RSN No. L-22 - Strata Pac, 12 PDC's, 1/2" Dia; 10 Airways
L-23	2S28308	Strata Pac	Christensen	RSN No. L-23 - Strata Pac, 18 PDC's, 5/16" Dia; 12 airways (3/16" x 3/16") wid
L-24	2S31024	Strata Pac	Christensen	RSN No. L-24 - Strata Pac, 18 PDC's, 5/16" Dia; 12 airways (3/16" x 3/16") wid



UE-25 UZ-16 (VSP-2)
VERTICAL SEISMIC PROFILE BOREHOLE

NOTE: NOT TO SCALE 4-7-93

SURFACE COORDINATES
N 760535.32
E 564856.90

RSN