Previous

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 20

PROJECT *Jet Propulsion Laboratory*
LOCATION *Corner of Mountain View & Lincoln*
GEOLOGIST *C. Kreller*
DRILLING CO *Lang Exploratory Drilling*
DATE (start/finish) *03/06/95 - 03/28/95*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1165.1*
TOTAL DEPTH (ft) *1008*
APPROX. DEPTH TO WATER (ft bgs) *187.0*

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
1000	#16 Bentonite/#3 Sand mix	SC-498-01	X	0.0		N	0.0		ML	As above
1005									SM	SILTY SAND: Light reddish brown; About 85% fine to coarse sand, subrounded; 15% non-plastic fines; micaceous; no odor; abundant weathered material present; (weathered material is granitic in composition).
1010										Cobble/Boulder zone; very hard drilling; cuttings made up of mostly feldspar and quartz; weathered material present that looks granitic.
										Total Depth of Borehole = 1008 ft bgs
1015										
1020										
1025										
1030										
1035										
1040										
1045										
1050										

Summary Casing Installation Log

Well No. MW-20
Job No. WB650

Client Foster Wheeler Environmental Corp.
Site JPL
Project Description groundwater investigation

Well Information

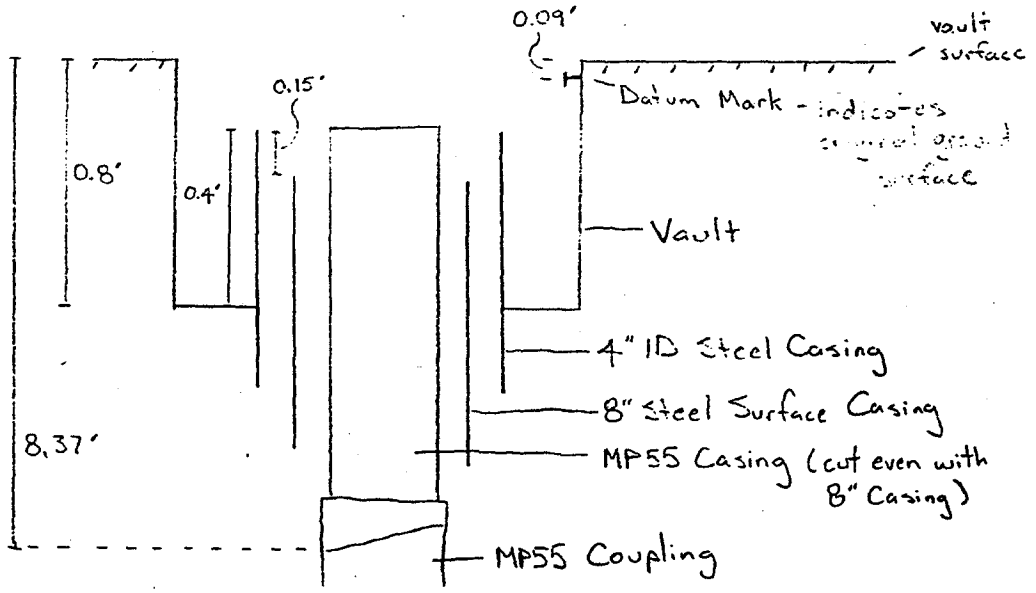
Reference Datum ground surface
Elevation of Datum 0.00 ft.
Position of MP Casing Top above / below Datum ~~0.00~~ 1.63 ft. above datum
Position of MP Casing Bottom Below Datum 934.14 ft. below datum
Well Description MP38 with MP55 top section
Other References

Log Information

Designed By DGM Date May 3 / 95
Approved By Colin Kreller Date May 9 / 95
Checked By Colin Kreller Date May 9 / 95
Computer File No. MW20 Date Tue May 09 10:40:39 1995

Sketch of Wellhead Completion

- 1.8 ft square subgrade completion



Legend for Casing Installation Log

Well No. MW-20
Job No. WB650

MP 38 Casing	Description	Quantity
	MP38 CASING 10 FT. 0225F10	080
	MP38 PACKER STIFFENED 0237F05	015
	MP38 CASING 5 FT. 0225F05	009
	MP38 CASING 2 FT. 0225F02	008
	MP38 CASING 1 FT. 0225F01	003
	MP38 END CAP 0223	001
	MAGNETIC COLLAR	005

MP 38 Casing	Description	Quantity
	MP38 REGULAR COUPLING 0221	096
	MP38 MEASUREMENT PORT 0222	014
	MP38 PUMPING PORT 0224	005

Backfill

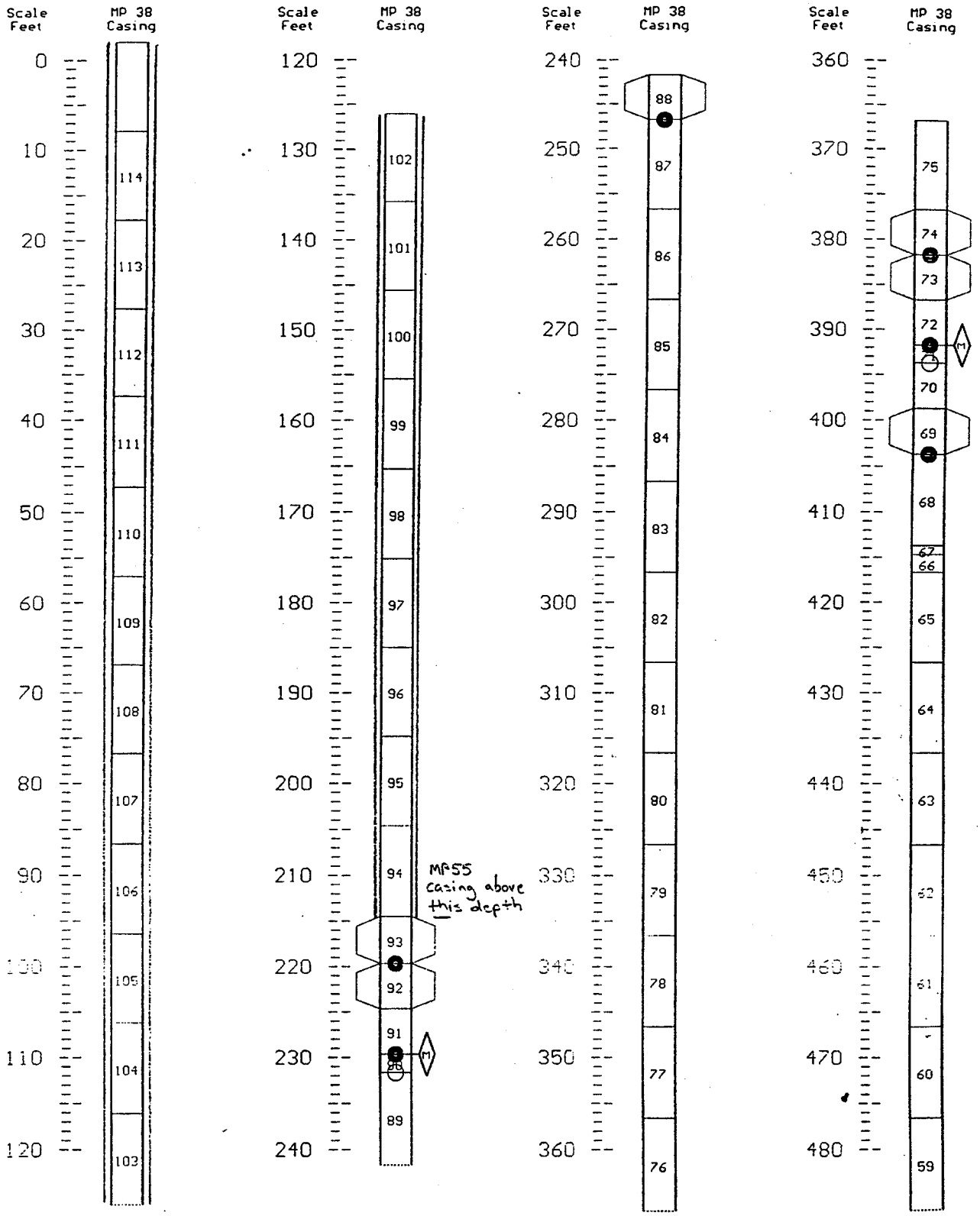
Well Casing

MILD STEEL PIPE

STAINLESS STEEL SCREE

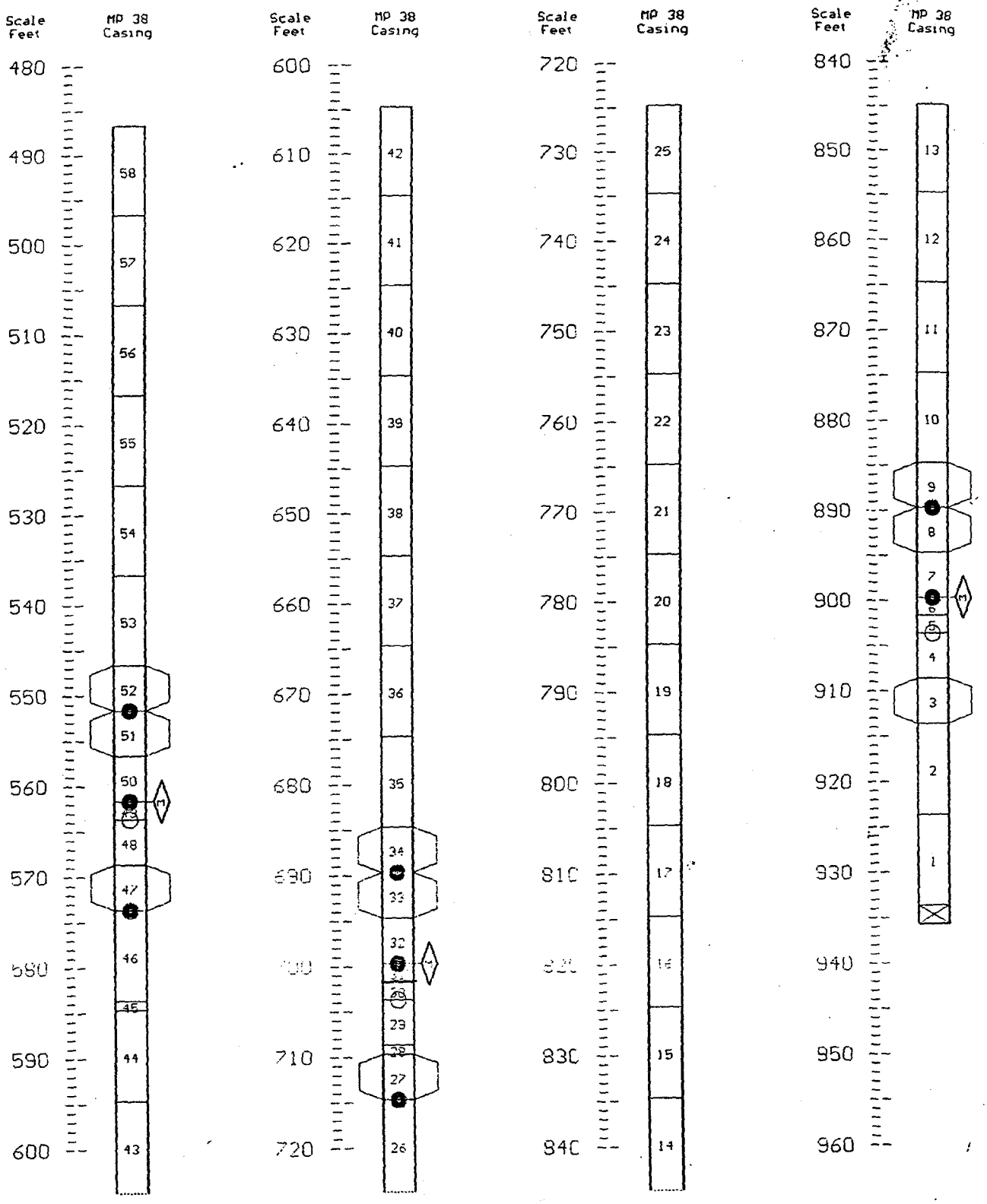
Summary Casing Inst. Log Date: Thu May 18 10:46:21 1995 Page: 1

Job No. WB650 Foster Wheeler Environmental Corp. Well No. MW-20



Summary Casing Inst. Log Date: Thu May 18 12:14:43 1995 Page: 2

Job No. WB650 Foster Wheeler Environmental Corp. Well No. MW-20



WELL MW-21

BORING LOG AND WELL COMPLETION DIAGRAM
WESTBAY MP CASING INSTALLATION LOG

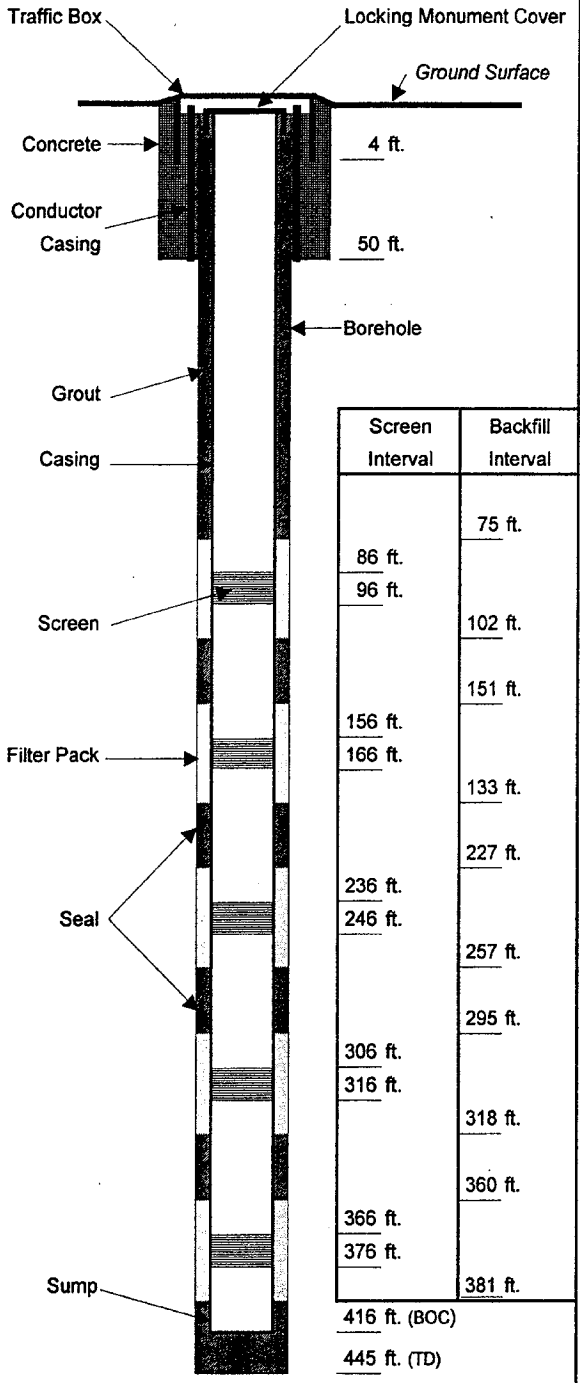
WELL CONSTRUCTION LOG

WELL NUMBER: MW-21

WELL TYPE: Deep Multiport Groundwater Monitoring Well

SURFACE ELEV (ft. above MSL): 1059.36

CASING ELEV (ft. above MSL): 1058.99



Screen Interval	Backfill Interval
	75 ft.
86 ft.	
96 ft.	
	102 ft.
	151 ft.
156 ft.	
166 ft.	
	133 ft.
	227 ft.
236 ft.	
246 ft.	
	257 ft.
	295 ft.
306 ft.	
316 ft.	
	318 ft.
	360 ft.
366 ft.	
376 ft.	
	381 ft.

DRILLING SUMMARY

DATE COMPLETED:	2/8/95 to 2/28/95
DRILLING COMPANY:	Lang Exploratory Drilling
DRILLING RIG TYPE:	Mud Rotary
TOTAL DEPTH DRILLED:	445 ft.

CONSTRUCTION DETAILS

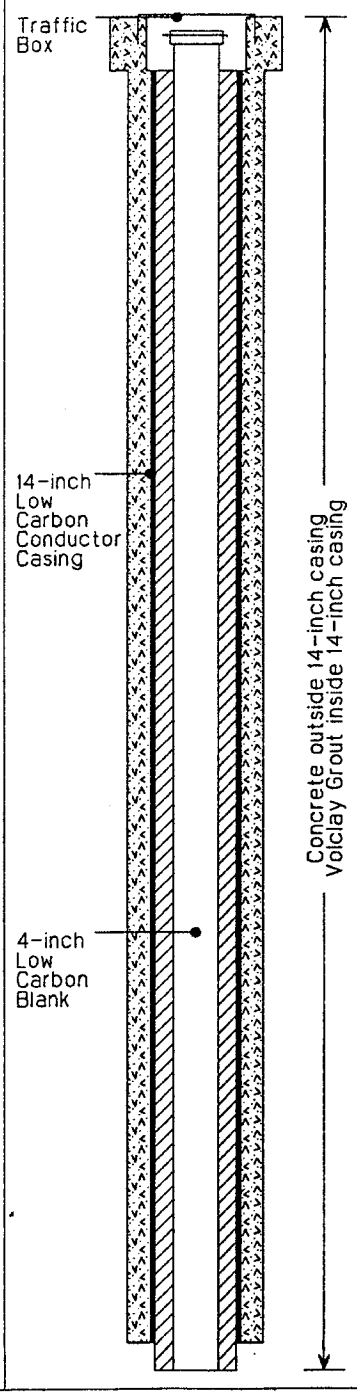
BOREHOLE DIAMETER: (CONDUCTOR CASING)	15.75 in.
CONDUCTOR CASING DIAMETER:	14 in.
CONDUCTOR CASING LENGTH:	50 ft.
BOREHOLE DIAMETER:	9.875 in.
TOTAL WELL DEPTH:	416 ft.
BLANK CASING TYPE:	Low Carbon Steel
BLANK CASING DIAMETER:	4 inch
TOTAL BLANK CASING LENGTH:	366 ft.
SCREEN TYPE:	Stainless Steel
SCREEN SLOT SIZE:	0.010 inch
INDIVIDUAL SCREEN LENGTH:	10 ft.
SUMP LENGTH:	40 ft.
PROTECTIVE CASING STICKUP:	None
GROUT MATERIAL:	Volclay Grout
SEAL MATERIAL:	1:1 Bentonite & Sand mix
FILTER MATERIAL:	#2 Sand
COMMENTS:	

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 21

PROJECT *Jet Propulsion Laboratory*
LOCATION *Oak Grove Park*
GEOLOGIST *V. Richards*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *01/25/95 - 02/02/95*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1059.1*
TOTAL DEPTH (ft) *445*
APPROX. DEPTH TO WATER (ft bgs) *47.8*



Depth (ft)	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
0		0.0	D	N	0.0		SP	POORLY GRADED SAND WITH GRAVEL: Light gray/brown; 70% fine to coarse sand, subangular; 20% fine to coarse gravel; subangular to subrounded; 5% non-plastic fines.
5								Color changed to red brown/brown; gravel composed of igneous and metamorphic materials.
								Color changed to tan/light brown
10								
15								
20		0.0	SM	N	0.0		SM	SILTY SAND: Brown; about 70% fine to medium sand; 25% low-plastic fines; 5% fine to coarse gravel, subangular to subrounded.
25								
30		0.0	D	N	0.0		SP SM	POORLY GRADED SAND WITH SILT: Reddish brown/brown; About 85% medium to fine sand, subangular; 10% low-plastic fines; 5% fine gravel, subangular to subrounded.
35		0.0	D	N	0.0		SM	SILTY SAND: Brown; about 60% fine to medium sand; 35% low-plastic fines; 5% fine to coarse gravel, subangular to subrounded.
40								As above except with gravel; 60% sand; 25% low-plastic fines; 15% fine to coarse gravel.
45		0.0	D	N	0.0			POORLY GRADED SAND WITH GRAVEL: Brown; About 65% fine to coarse sand, subangular; 30% fine to coarse gravel, subangular to subrounded; 5% cobbles; trace non-plastic fines.
							SP	
50		0.0	M	N	0.0			Wet sand encountered; stopped drilling with bucket auger; conductor casing to 49 feet bgs.
		0.0		N	0.0			

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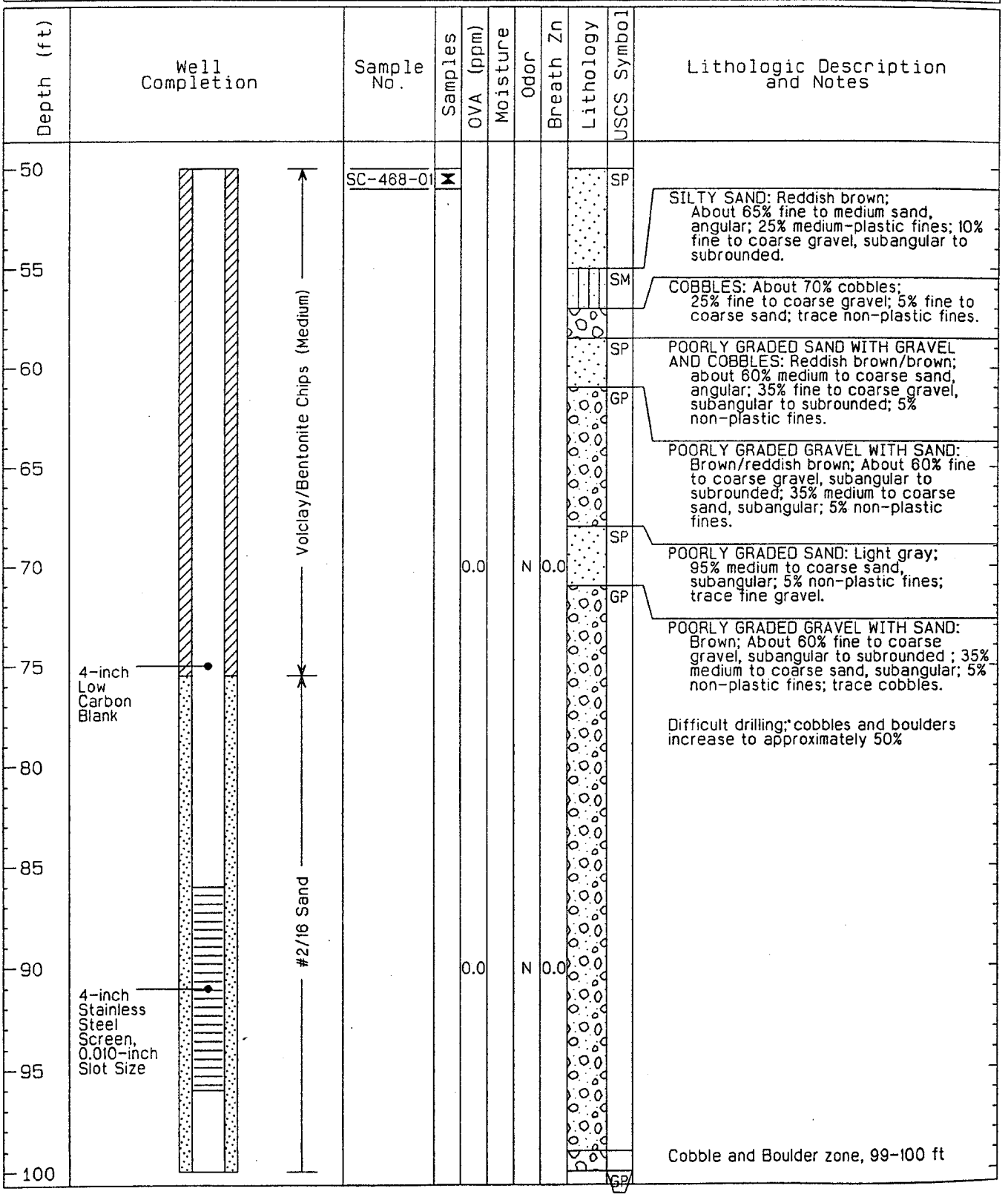

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SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1059.1*
TOTAL DEPTH (ft) *445*
APPROX. DEPTH TO WATER (ft bgs) *47.8*

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
100	#2/16 Sand	SC-468-02	✖	0.0		N	0.0		GP	As above; Grab sample of soil cuttings collected at 100-101 feet bgs.
105										
110				0.0		N	0.0			
115										
120	#16 Bentonite/#3 Sand mix (1:1)									
125	4-inch Low Carbon Blank									Hard drilling - suspect cobble/boulder zone approximately 1 foot thick
130				0.0		N	0.0			
135										
140										
145										
150				0.0		N	0.0			

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DATE (start/finish) *01/25/95 - 02/02/95*

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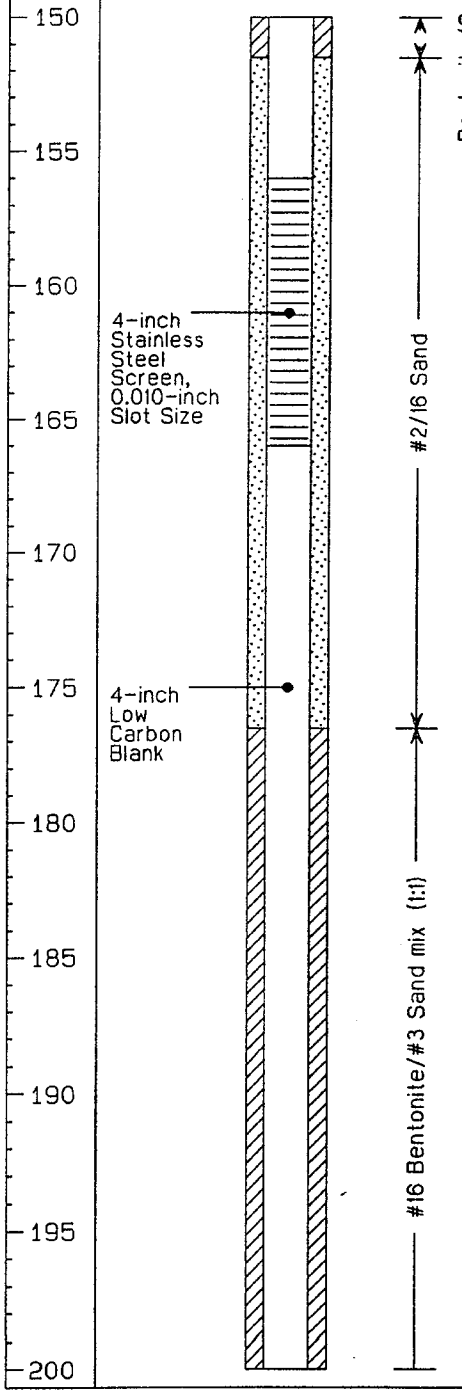

Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
150								GP	
155									As above except an increase in % of cobbles and boulders.
160									SILTY GRAVEL WITH SAND: About 50% fine to coarse gravel, subangular to subrounded; 30% fine to coarse sand, subangular; 20% low-plastic fines.
165									POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel, subangular to subrounded; 35% medium to coarse sand, subangular; 5% non-plastic fines.
								GM	SILTY GRAVEL WITH SAND: Dark reddish brown; About 50% fine to coarse gravel, subangular to subrounded; 30% fine to coarse sand, subangular; 20% low-plastic fines.
170			0.0		N	0.0		GP	
								GM	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel, subangular to subrounded; 35% medium to coarse sand, subangular; 5% non-plastic fines.
175								GP	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel, subangular to subrounded; 30% fine to coarse sand, subangular; 20% low-plastic fines.
180								GM	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel, subangular to subrounded; 35% medium to coarse sand, subangular; 5% non-plastic fines.
								GP	
185									SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel, subangular to subrounded; 30% fine to coarse sand, subangular; 20% low-plastic fines.
190			0.0		N	0.0		GM	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel, subangular to subrounded; 35% medium to coarse sand, subangular; 5% non-plastic fines.
								GP	
195									Thin interbedded silty gravel zones.
200									

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TOTAL DEPTH (ft) *445*
APPROX. DEPTH TO WATER (ft bgs) *47.8*

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
200		SC-470-01	⧗	0.0		N	0.0		GP	As above; Grab sample of soil cuttings collected at 200-201 feet bgs.
205									GM	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel, subangular to subrounded; 30% fine to coarse sand, subangular; 20% low-plastic fines.
									GP	
210				0.0		N	0.0		GM	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel, subangular to subrounded; 35% medium to coarse sand, subangular; 5% non-plastic fines.
									GP	
215										SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel, subangular to subrounded; 30% fine to coarse sand, subangular; 20% low-plastic fines; dark reddish brown matrix.
220										POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel, subangular to subrounded; 35% medium to coarse sand, subangular; 5% non-plastic fines.
225	4-inch Low Carbon Blank									
230				0.0		N	0.0			
										As above
235									GM	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel, subangular to subrounded; 30% fine to coarse sand, subangular; 20% low-plastic fines.
									GP	
240	4-inch Stainless Steel Screen, 0.010-inch Slot Size									POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel, subangular to subrounded; 35% medium to coarse sand, subangular; 5% non-plastic fines.
245										
250				0.0		N	0.0			

#16 Bentonite/#3 Sand mix (1:1)

#2/16 Sand

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 21

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LOCATION *Oak Grove Park*
GEOLOGIST *V. Richards*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *01/25/95 - 02/02/95*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1059.1*
TOTAL DEPTH (ft) *445*
APPROX. DEPTH TO WATER (ft bgs) *47.8*

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
250									GP	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low-plastic fines.
255	#2/16 Sand								GM, GP	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines.
260									GM, GP	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low-plastic fines.
265									GP	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines.
270	#16 Bentonite/#3 Sand mix (1:1)			0.0		N	0.0		GM, GP	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low-plastic fines. POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines.
275	4-inch Low Carbon Blank								GM	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low- plastic fines.
280									GP	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines; material derived from igneous/metamorphic source
285										SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low-plastic fines.
290				0.0		N	0.0			POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines; material derived from igneous/metamorphic source
295	#2/16 Sand								GM, GP, GM	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low-plastic fines.
300									GP	POORLY GRADED GRAVEL WITH SAND: Brown; about 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines.

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 21

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LOCATION *Oak Grove Park*
GEOLOGIST *V. Richards*
DRILLING CO *Lang Exploratory*
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APPROX. DEPTH TO WATER (ft bgs) *47.8*

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
300		SC-471-01	⧗	0.0		N	0.0		GP	Grab sample of soil cuttings collected at 300-301 feet bgs.
305										
310	4-inch Stainless Steel Screen, 0.010-inch Slot Size; #2/16 Sand			0.0		N	0.0			POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines; material derived from igneous/metamorphic source
315										
320										
325	4-inch Low Carbon Blank									As above
									GM	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low-plastic fines.
									GP	
330	#16 Bentonite/#3 Sand mix (1:1)			0.0		N	0.0			POORLY GRADED GRAVEL WITH SAND: Brown; about 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines; material derived from igneous/metamorphic source
335										
340										
345										
350				0.0		N	0.0			

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Monitoring Well 21

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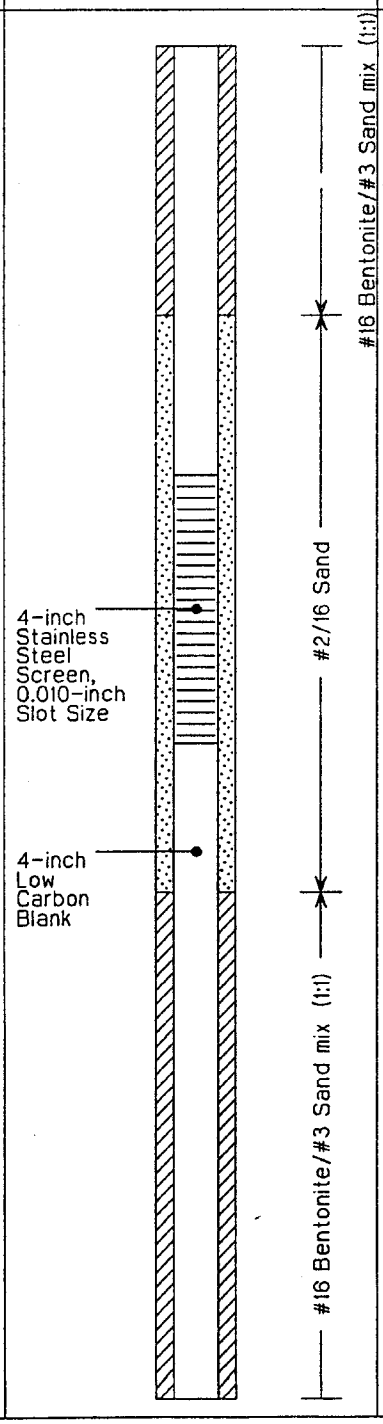

Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
350								GP	POORLY GRADED GRAVEL WITH SAND: Brown; about 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines; material derived from igneous/metamorphic source
355									
360									
365								GM	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low-plastic fines.
								GP	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines; material derived from igneous/metamorphic source
370			0.0		N	0.0			
375									
								SP	POORLY GRADED SAND WITH SILT: Reddish brown/brown; About 90% medium to fine sand; 10% low-plastic fines.
380									
385									
390			0.0		N	0.0			
395									
400									

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APPROX. DEPTH TO WATER (ft bgs) *47.8*

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
400		SC-472-01	✖	0.0		N	0.0		SP	As above; Grab sample of soil cuttings collected at 400-401 feet bgs.
									GP	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines; material derived from igneous/metamorphic source
405									GM	SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low-plastic fines.
	4-inch Low Carbon Blank								GP	
410				0.0		N	0.0		GM	
									GP	POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines; material derived from igneous/metamorphic source
415	4-inch Low Carbon End Cap									SILTY GRAVEL WITH SAND: Dark reddish brown; 50% fine to coarse gravel; 30% fine to coarse sand; 20% low-plastic fines.
420	#16 Bentonite/#3 Sand mix (1:1)									POORLY GRADED GRAVEL WITH SAND: Brown; About 60% fine to coarse gravel; 35% medium to coarse sand; 5% non-plastic fines; material derived from igneous/metamorphic source
425										BASEMENT: Granodiorite; crystalline.
430				0.0		N	0.0			
435										
440										
445										Total Depth of Borehole = 445 ft bgs
450										

Summary Casing Installation Log

Well No. MW-21
Job No. WB650

Client Jet Propulsion Laboratory
Site Oak Grove Park Pasadena CA
Project Description Groundwater Investigation

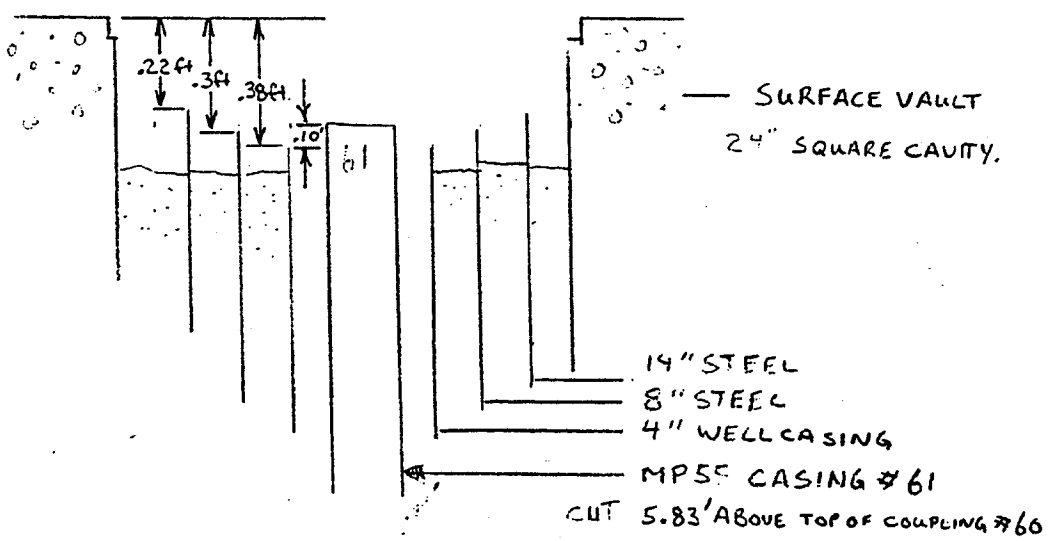
Well Informaton

Reference Datum ground surface
Elevation of Datum 0.00 ft.
Position of MP Casing Top above / below Datum 0.10 ft. above datum
Position of MP Casing Bottom Below Datum 404.44 ft. below datum
Well Description MP38 in 4-inch steel 5 screens
Other References
Installed March 14, 1995
Packers sealed March 15, 1995

Log Informaton

Designed By D LARSSEN **Date** FEB. 23, 1995
Approved By M. CUTLER V RICHARDS **Date** MAR 13, 1995
Checked By K SEEDHOUSE V RICHARDS **Date** MAR 13 1995.
Computer File No. 650MW21 **Date** Thu Apr 06 16:52:59 1995

Sketch of Wellhead Completion



Legend for Casing Installation Log

Well No. MW-21
Job No. WB650

MP Log	Description	Quantity
	MP38 CASING 10 FT. 0225F10	026
	MP38 CASING 2 FT. 0225F02	008
	MP38 PACKER STIFFENED 0237F05	015
	MP38 CASING 5 FT. 0225F05	012
	MP38 END CAP 0223	001
	MAGNETIC COLLAR	005

MP Log	Description	Quantity
	MP38 REGULAR COUPLING 0221	041
	MP38 MEASUREMENT PORT 0222	015
	MP38 PUMPING PORT 0224	005

Geo 1

Back Fill

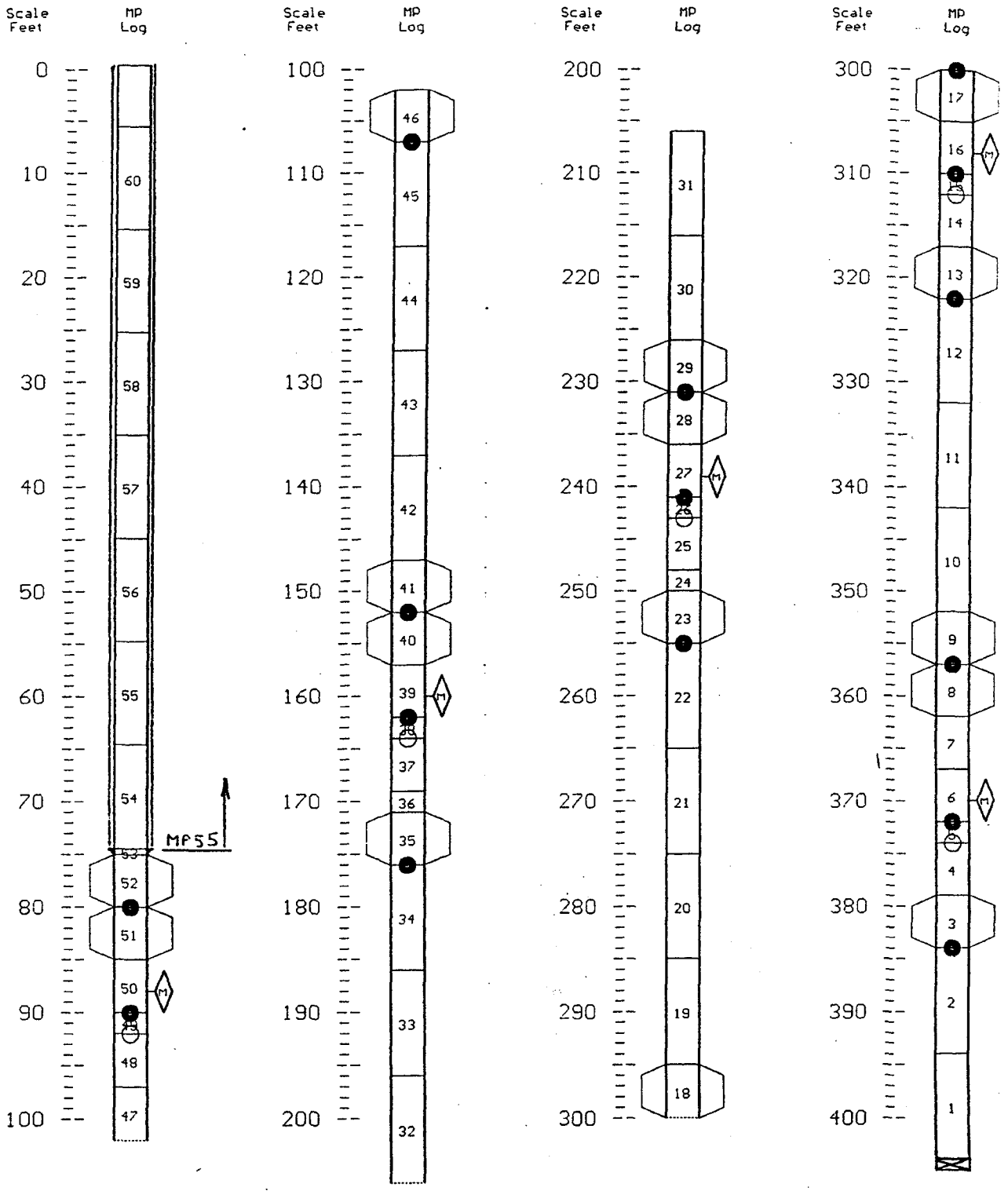
Well Casing

MILD STEEL PIPE

STAINLESS STEEL SCREEN

Summary MP Casing Log Date: Fri Apr 28 08:46:19 1995 Page: 1

Job No. WB650 Jet Propulsion Laboratory Well No. MW-21



WELL MW-22

BORING LOG AND WELL COMPLETION DIAGRAM
WESTBAY MP CASING INSTALLATION LOG

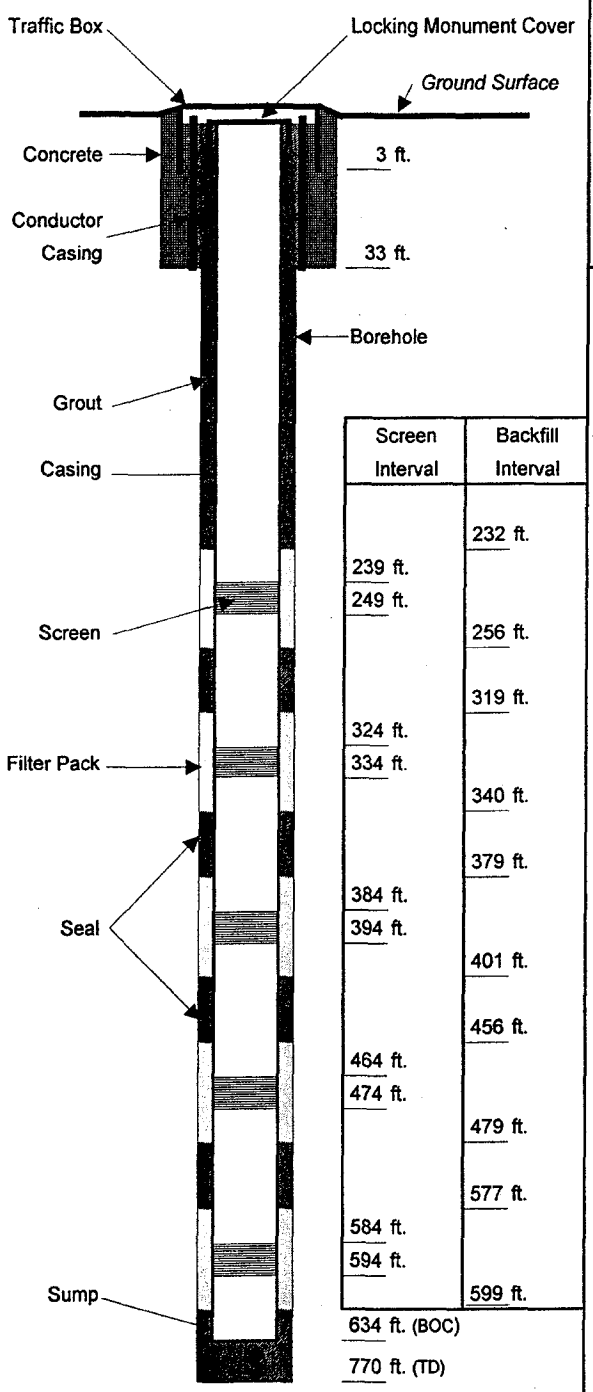
WELL CONSTRUCTION LOG

WELL NUMBER: MW-22

WELL TYPE: Deep Multiport Groundwater Monitoring Well

SURFACE ELEV (ft. above MSL): 1177.28

CASING ELEV (ft. above MSL): 1176.81



Screen Interval	Backfill Interval
	232 ft.
239 ft.	
249 ft.	
	256 ft.
	319 ft.
324 ft.	
334 ft.	
	340 ft.
	379 ft.
384 ft.	
394 ft.	
	401 ft.
	456 ft.
464 ft.	
474 ft.	
	479 ft.
	577 ft.
584 ft.	
594 ft.	
	599 ft.

DRILLING SUMMARY

DATE COMPLETED:	7/23/97 to 7/31/97
DRILLING COMPANY:	Lang Exploratory Drilling
DRILLING RIG TYPE:	Mud Rotary
TOTAL DEPTH DRILLED:	770 ft.

CONSTRUCTION DETAILS

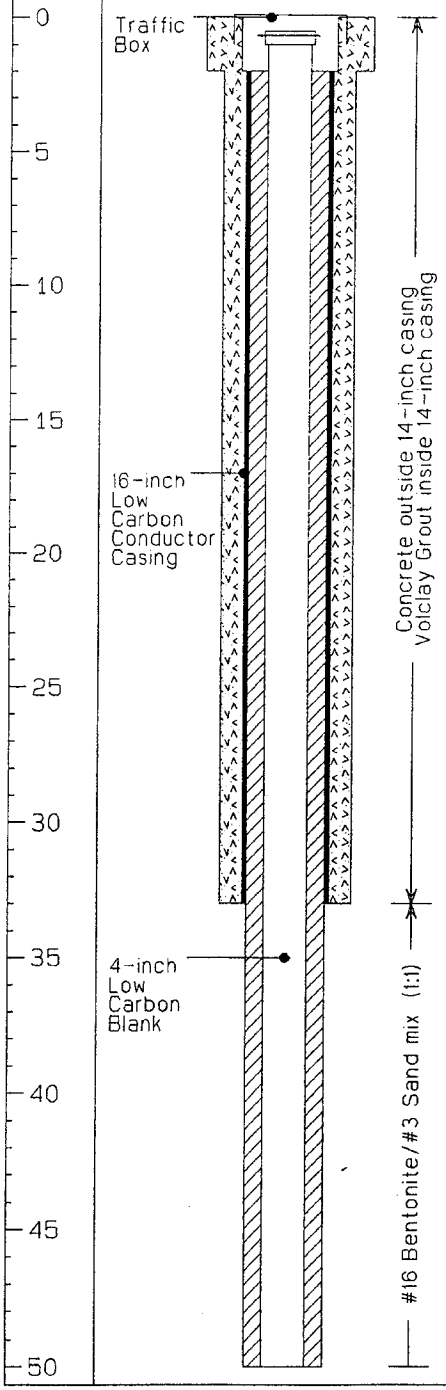
BOREHOLE DIAMETER: (CONDUCTOR CASING)	18.5 in.
CONDUCTOR CASING DIAMETER:	16 in.
CONDUCTOR CASING LENGTH:	33 ft.
BOREHOLE DIAMETER:	9.875 in.
TOTAL WELL DEPTH:	634 ft.
BLANK CASING TYPE:	Low Carbon Steel
BLANK CASING DIAMETER:	4 inch
TOTAL BLANK CASING LENGTH:	584 ft.
SCREEN TYPE:	Stainless Steel
SCREEN SLOT SIZE:	0.010 inch
INDIVIDUAL SCREEN LENGTH:	10 ft.
SUMP LENGTH:	40 ft.
PROTECTIVE CASING STICKUP:	None
GROUT MATERIAL:	Volclay Grout
SEAL MATERIAL:	1:1 Bentonite & Sand mix
FILTER MATERIAL:	#2 Sand
COMMENTS:	

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 22

PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 180*
GEOLOGIST *T. Blaney, B.G. Randolph*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
0				SL	N				Drilled pilot hole for conductor casing w/bucket auger rig.
				SL	N			GP	ASPHALT - Pavement (0.4 feet thick)
								SP	POORLY GRADED GRAVEL WITH SAND: (asphalt base material).
5									POORLY GRADED SAND: fine to coarse sand with some fine gravel and trace silt, orange brown, (backfill materials to 18 feet from where an old underground storage tank had been removed).
10									
15									
				SL	N				POORLY GRADED SAND: fine to coarse sand with some fine gravel, light to dark orange-brown, micaceous.
20									
25									
				SL	N			GP	SANDY GRAVEL: fine to coarse gravel and cobbles with fine to coarse sand. orange brown to gray-brown.
30									Started mud rotary drilling at 33 feet.
	SC-22-01	⧗							Grab sample of soil cuttings from 33 feet. (sample number SC-22-01)
								SP	POORLY GRADED SAND: 100% fine to coarse subangular sand; micaceous, light orange brown to light brown.
35			0.2		N	0.0			
			0.0		N	0.0			POORLY GRADED SAND: 90% fine to coarse, angular to subangular sand; 10% fine gravel; micaceous, light brown.
40			0.0		N	0.0			POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse, angular to subangular sand; 25% fine to coarse gravel; micaceous, light brown.
45			0.0		N	0.0			POORLY GRADED SAND WITH GRAVEL: 60% fine to coarse, angular to subangular sand; 40% fine to coarse gravel; micaceous, light brown.
								GP	COBBLES AND BOULDERS: (46.5 to 48 feet) Granitic.
								SP	POORLY GRADED SAND WITH GRAVEL: Same as above.
50			0.0		N	0.0			

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Monitoring Well 22

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DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
50									SP	POORLY GRADED SAND: 95% fine to coarse, subangular to subrounded sand; 5% fine gravel; maximum size = 1/2", micaceous, light orange brown.
55				0.0		N	0.0			
									GP	COBBLES AND BOULDERS: (56 to 58 feet)
									SP	POORLY GRADED SAND: 90% fine to coarse, subangular to subrounded sand; 10% fine gravel; micaceous, light orange brown.
60				0.0		N	0.0			POORLY GRADED SAND WITH GRAVEL: 65% fine to coarse, subangular to subrounded sand; 35% fine to coarse, angular to subangular gravel; micaceous, light brown.
65										
									GP	COBBLES: (68.5 to 70 feet)
70				0.0		N	0.0		SP	POORLY GRADED SAND WITH GRAVEL: 65% fine to coarse, subangular to subrounded sand; 35% fine to coarse, angular to subangular gravel; maximum size = 1", micaceous, light orange brown.
75	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)									
									GP	COBBLES: (77 to 78 feet)
									SP	POORLY GRADED SAND WITH GRAVEL: Same as above.
80				0.0		N	0.0			
									GP	COBBLES: (81 to 82 feet)
									SP	POORLY GRADED SAND WITH GRAVEL: Same as above.
85										
									GP	COBBLES: (87.5 to 89.5 feet) Granitic and dioritic.
90				0.0		N	0.0		SP	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse, angular to subrounded sand; 25% fine to coarse, angular to subrounded gravel; maximum size = 1", micaceous, light brown.
95										
100				0.0		N	0.0			

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DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
100		SC-22-02	✖						SP	Grab sample of soil cuttings at 100 feet. (Sample SC-22-02)
									GP	COBBLES: (101 to 102.5 feet), Material appears to be granodiorite to diorite.
									SP	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse, angular to subrounded sand; 25% fine to coarse, angular to subrounded gravel; gravels are predominantly orthoclase rich, pinkish color; maximum size = 1", micaceous, light brown.
105										
									GP	
110				0.0		N	0.0		SP	COBBLES: (108 to 109.5 feet).
										POORLY GRADED SAND WITH GRAVEL: Same as above.
115										
120				0.0		N	0.0			POORLY GRADED SAND WITH GRAVEL: 60% fine to coarse, angular to subrounded sand; 40% fine to coarse, angular to subrounded gravel; micaceous, light brown.
125	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)									POORLY GRADED SAND: 90% fine to coarse, subangular to subrounded sand; 10% fine to coarse, subangular gravel; maximum size = 1", micaceous, light brown to light orange brown.
									GP	COBBLES: (127.5 to 128.5 feet).
130				0.0		N	0.0		SP	POORLY GRADED SAND WITH GRAVEL: Same as above.
									GP	COBBLES: (132.5 to 133.5 feet).
									SP	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse, subangular to subrounded sand; 10% fine to coarse, angular to subrounded gravel; micaceous, light brown to light orange brown.
135										
140				0.0		N	0.0			POORLY GRADED SAND WITH GRAVEL: Same as above with trace non-plastic fines.
145										
									GP	COBBLES: (146.5 to 147.5 feet).
									SP SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 75% sand; 15% fine gravel; 10% non-plastic fines; light brown.
150				0.0		N	0.0			

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DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

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SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
150									SP	
									SM SP	POORLY GRADED SAND WITH GRAVEL: 70% fine to coarse, angular to subrounded sand; 25% fine to coarse, subangular to subrounded gravel; maximum size = 1/2", 5% non-plastic fines; light brown. *Drilling Mud Parameters: Mud Weight: 9.0 lbs/gal Viscosity: 39 seconds Sand Content: 2%*
155										
160						N	0.0		SM	SILTY SAND: 60% fine to coarse, subangular to subrounded sand; 40% non-plastic fines; micaceous, brown.
									SP	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse, angular to subrounded sand; 25% fine to coarse, angular to subrounded gravel; maximum size = 1.5", micaceous, light brown.
165									GP	COBBLES AND BOULDERS: (166.5 to 168.0 feet)
									SP	POORLY GRADED SAND WITH GRAVEL: Same as above.
170									GP	COBBLES AND BOULDERS: (173 to 174 feet).
									SP	POORLY GRADED SAND WITH GRAVEL: Same as above.
175	4-inch Low Carbon Blank									
180	#16 Bentonite/#3 Sand mix (1:1)					N	0.0			
									GP	COBBLES AND BOULDERS: (181.5 to 182.5 feet).
									SP	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse, angular to subrounded sand; 25% fine to coarse, angular to subrounded gravel; trace fines; micaceous, light brown.
185										
190										
195										
									GP	COBBLES: (198.5 to 199.5 feet).
200									SP	

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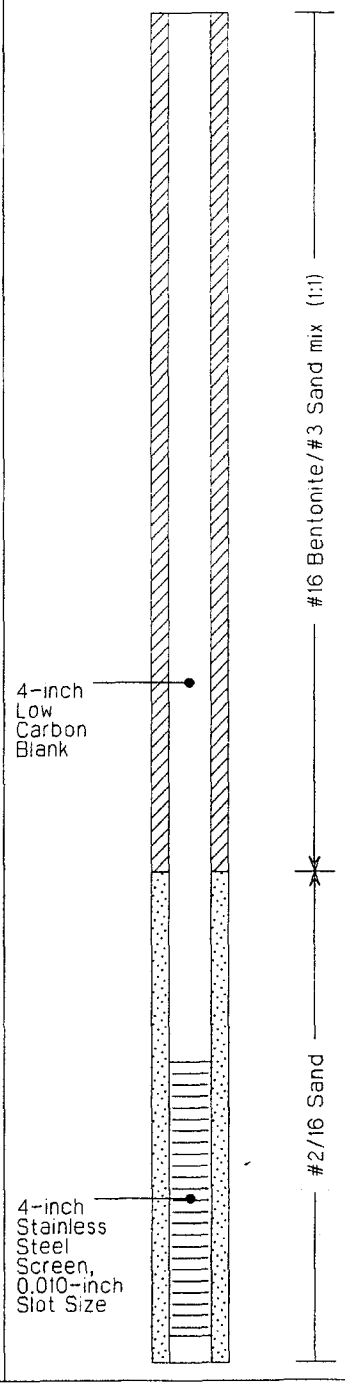
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____



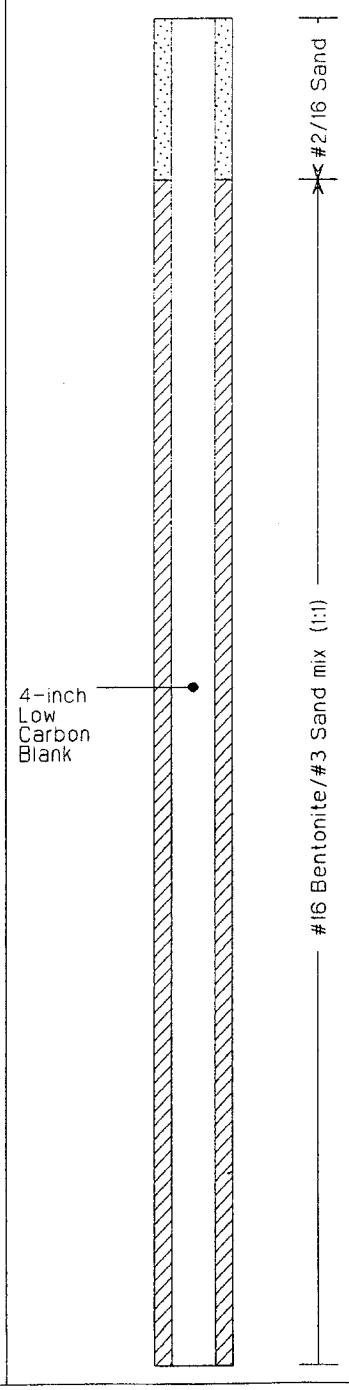
Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
200	SC-22-03	✖	0.0		N	0.0		SP	Grab sample of soil cuttings at 200 feet. (Sample SC-22-03)
								GP	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, angular to subrounded sand; 15% fine to coarse, angular to subrounded gravel; 5% non-plastic fines; maximum size = 1/2", micaceous, light brown.
								SP	
205								GP	
								SP	COBBLES: (202.0 to 203.5 feet). dioritic.
									POORLY GRADED GRAVEL WITH SAND: 60% fine to coarse, subangular to rounded gravel; 40% fine to coarse sand; maximum size = 1.5" micaceous, brown.
210								GP	POORLY GRADED SAND WITH GRAVEL: 85% fine to coarse, subangular to subrounded sand; 15% fine to coarse, subangular to subrounded gravel; maximum size = 1", micaceous, light brown.
								SP	
215									COBBLES: (210.5 to 212.0 feet), dioritic.
									POORLY GRADED SAND WITH GRAVEL: Same as above.
220					N	0.0		GP	COBBLES: (220.0 to 222.0 feet).
								SP	POORLY GRADED SAND WITH GRAVEL: Same as above.
225								GP	COBBLES: (224.5 to 225.5 feet).
								SP	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to rounded sand; 15% fine to coarse gravel; 5% non-plastic fines; maximum size = 1.5", micaceous, light brown.
230									DIRECTIONAL SURVEY at 230 Feet: 0.5 degrees from vertical.
235								SM	SILTY SAND: 70% sand; 30% non-plastic fines; maximum size = 1/8", micaceous, brown.
								SP SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 75% sand; 15% gravel; 10% non-plastic fines; maximum size = 1", micaceous, brown.
240					N	0.0		SP	POORLY GRADED SAND WITH GRAVEL: 80% sand; 15% gravel; 5% non-plastic fines; light brown.
245								SM	SILTY SAND: 70% sand; 30% non-plastic fines; brown.
								SP	POORLY GRADED SAND WITH GRAVEL: 80% sand; 15% gravel; 5% non-plastic fines; brown.
								SM	SILTY SAND WITH GRAVEL: 70% sand; 15% gravel; 15% low-plastic fines; brown.
250									

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 22

PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 180*
GEOLOGIST *T. Blaney, B.G. Randolph*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
250								SM	SILTY SAND WITH GRAVEL: 70% sand; 15% gravel; 15% low-plastic fines; brown.
								ML	SANDY SILT: 65% low to medium-plastic fines; 35% fine to coarse, subangular to subrounded sand; trace fine gravel; maximum size = 1/2", micaceous, brown
255								SM	SILTY SAND WITH GRAVEL: 70% fine to coarse, subangular to subrounded sand; 15% fine to coarse gravel; 15% low-plastic fines; micaceous, brown.
								SP SM	POORLY GRADED SAND WITH SILT: 90% fine to medium sand; 10% non to low-plastic fines; trace fine gravel; maximum size = 1/8", micaceous, brown.
260					N	0.0			
								SP	POORLY GRADED SAND: 90% fine to medium, subangular to subrounded sand; 5% non-plastic fines; 5% fine gravel; maximum size = 1/2", micaceous, brown.
265									
270									*Drilling Mud Parameters: Mud Weight: 9.5 lbs/gal Viscosity: 39 seconds Sand Content: 2%*
275								SM	SILTY SAND: 85% fine to coarse sand; 15% non-plastic fines; trace fine gravel; maximum size = 1/4", micaceous, brown.
280					N	0.0			
								ML	SILTY SAND: 60% fine to coarse sand; 40% non-plastic fines; trace fine gravel; maximum size = 1/4", micaceous, brown.
									SILT WITH SAND: 80% low-plastic fines; 20% fine to coarse subangular sand; micaceous, brown.
285								SM	SILTY SAND: 75% fine to coarse, subangular to rounded sand; 25% non to low-plastic fines; micaceous, brown.
290									
295									SILTY SAND: 60% subangular to rounded sand; 40% non to low-plastic fines; micaceous, brown.
300									Directional Survey at 300 Feet: 0.5 degrees from vertical.

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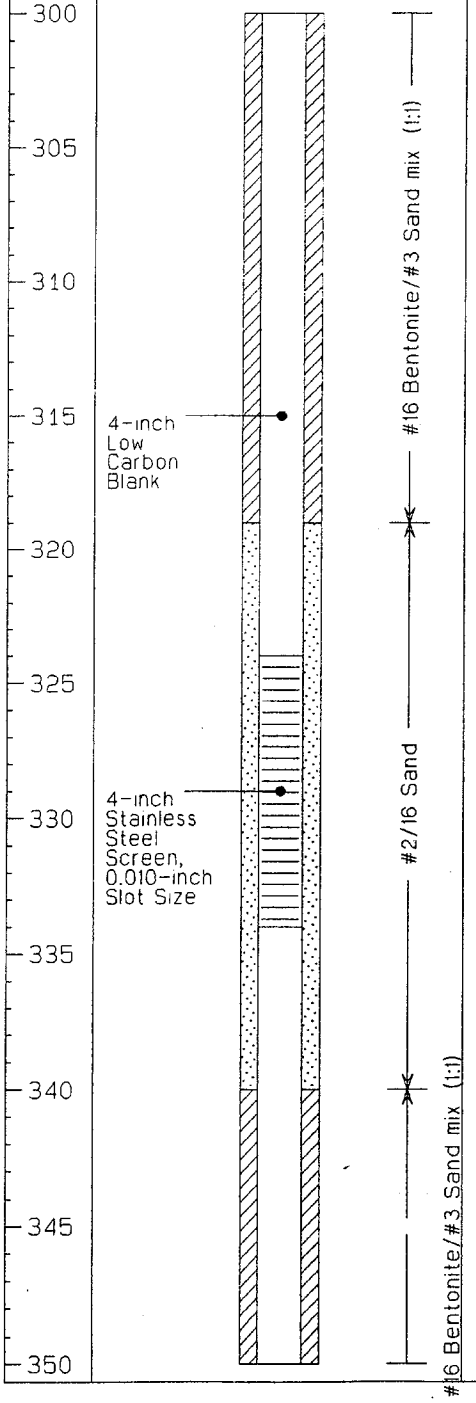
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
300	SC-22-04	⧗	0.0		N	0.0		SM	Grab sample soil cuttings at 300 feet. (Sample SC-22-04) SILTY SAND: 60% fine to coarse, subangular to rounded sand; 40% non to low-plastic fines; maximum size = 1/4", micaceous, brown.
305								SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse sand; 10% non-plastic fines; 5% fine to coarse gravel; maximum size = 1", micaceous, brown.
310								SP	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse sand; 20% fine to coarse, subangular to subrounded gravel; 5% non-plastic fines; maximum size = 1", micaceous, brown.
								SM	
315								ML	SILTY SAND: 65% fine to coarse sand; 35% non-plastic fines; maximum size = 1/4", micaceous, brown. SILT WITH SAND: 75% low-plastic fines; 25% fine to medium sand; maximum size = 1/8", micaceous, brown.
320					N	0.0		SP	POORLY GRADED SAND: 95% fine to coarse, subangular to subrounded sand; 5% non-plastic fines; trace gravel; maximum size = 1/4", micaceous, light brown.
325								SP SM SP	POORLY GRADED SAND WITH SILT: 80% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 10% fine to coarse, angular to subrounded gravel; maximum size = 1.5", micaceous, brown.
330									POORLY GRADED SAND WITH GRAVEL: 85% fine to coarse, subangular to subrounded sand; 15% fine to coarse gravel; maximum size = 1.5", micaceous, brown.
335								SP SM SP	POORLY GRADED SAND WITH SILT: 85% sand; 10% non-plastic fines; 5% fine gravel; light brown. POORLY GRADED SAND WITH GRAVEL: 85% sand; 15% gravel; maximum size = 1/2", brown.
								SM SP	SILTY SAND: 75% sand; 25% non-plastic fines.
340					N	0.0			POORLY GRADED SAND WITH GRAVEL: 85% sand; 15% gravel; maximum size = 1.5", brown.
								SM	SILTY SAND: 60% fine sand; 40% non to low-plastic fines; light brown.
345								SP SM SP	POORLY GRADED SAND WITH SILT: 85% sand; 10% non-plastic fines; 5% fine gravel; light brown. POORLY GRADED SAND WITH GRAVEL: 85% sand; 15% gravel; light brown.
350									

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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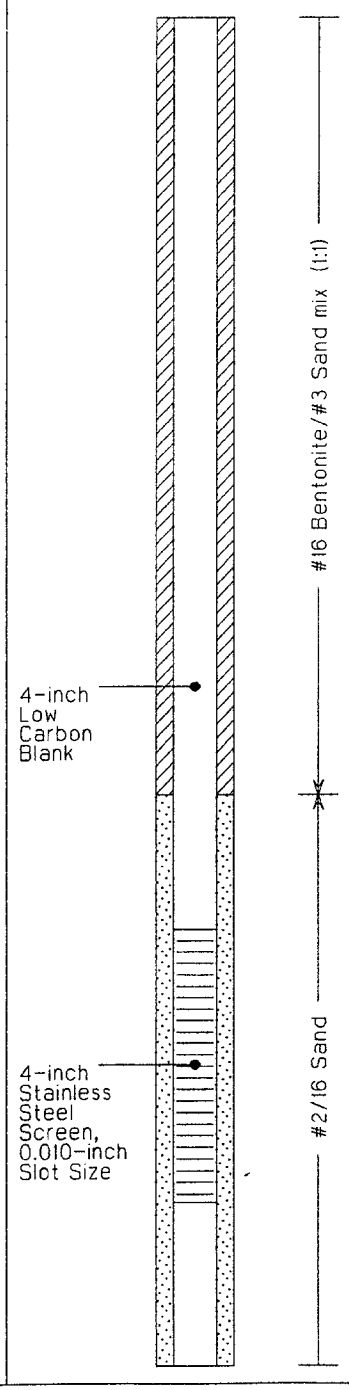
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
350								SP, SP, SM	SILTY SAND: 75% sand; 25% non to low-plastic fines; maximum size = 1/8", micaceous, brown.
355								ML, SP, SM	SILT WITH SAND: 75% low-plastic fines; 25% fine to coarse sand; trace fine gravel. POORLY GRADED SAND WITH SILT: 85% fine to coarse sand; 10% non-plastic fines; 5% fine gravel; maximum size = 1/2", micaceous, light brown.
360					N	0.0		SP, GP, SM	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse sand; 20% fine to coarse, angular to subrounded gravel; micaceous, light brown. COBBLES: (362 to 363 feet) SILTY SAND: 80% fine to coarse subangular sand; 20% low-plastic fines; micaceous, brown.
365								SP	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse sand; 20% fine to coarse, angular to subrounded gravel; micaceous, light brown.
370								SM	SILTY SAND: 65% fine to coarse, subangular to subrounded sand; 35% non to low-plastic fines; trace gravel; maximum size = 1/2", micaceous, brown.
375								SP	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to subrounded sand; 15% fine to coarse gravel; 5% non-plastic fines; maximum size = 1.0", micaceous, light brown.
380					N	0.0		SP, SM, SP	POORLY GRADED SAND WITH SILT: 90% fine to coarse sand; 10% non-plastic fines; trace gravel. POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to subrounded sand; 15% fine to coarse gravel; 5% non-plastic fines; maximum size = 1", micaceous, light brown.
385									
390									
395								SM	SILTY SAND: 75% fine to coarse sand; 25% low-plastic fines; maximum size = 1/8", micaceous, brown.
400									

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DRILLING CO *Lang Exploratory*
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SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____

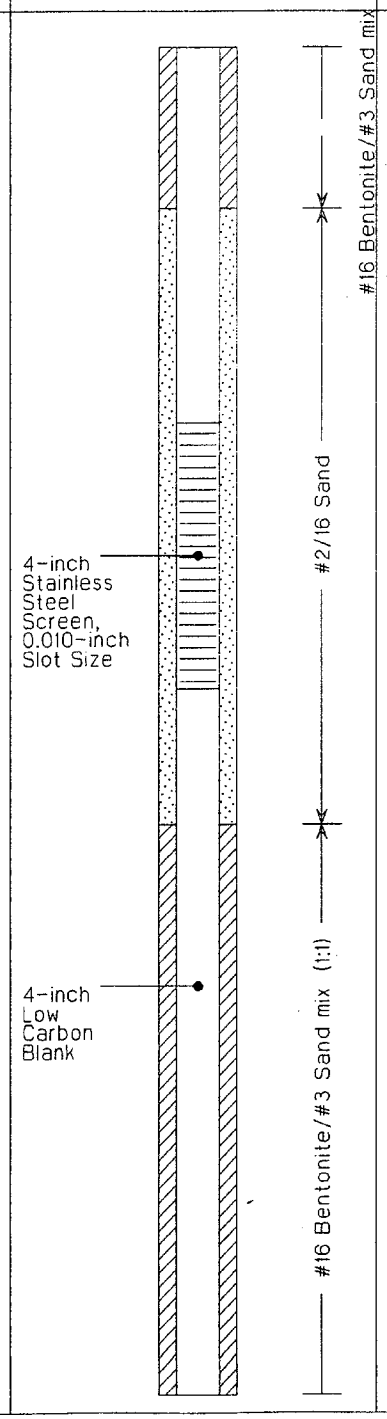
Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
400	#2/16 Sand; #16 Bentonite/#3 Sand mix (1:1); 4-inch Low Carbon Blank	SC-22-05	X	0.0		N	0.0		SM	Grab sample of soil cuttings at 400 feet. (Sample SC-22-05)
										SILTY SAND: 75% fine to coarse sand; 25% low-plastic fines; micaceous, brown.
405									ML	SILT WITH SAND: 75% low-plastic fines; 25% fine to medium sand; maximum size = 1/8", micaceous, red brown.
									SM	SILTY SAND: 55% fine to coarse sand; 45% low-plastic fines; maximum size = 1/8", micaceous, red brown.
410										SILTY SAND: Same as above with a color change to medium brown.
415									ML	SILT WITH SAND: 80% low-plastic fines; 20% fine to coarse, subangular to subrounded sand; maximum size = 1/8", micaceous, orange brown.
									SM	SILTY SAND: 55% fine to coarse sand; 45% low-plastic fines; maximum size = 1/8", micaceous, red brown.
420						N	0.0			SILTY SAND: Same as above with a color change to light brown.
425										SILTY SAND: 75% fine to coarse sand; 25% low-plastic fines; micaceous, light brown.
430									SP SM	POORLY GRADED SAND WITH SILT: 90% fine to coarse sand; 10% non-plastic fines; trace gravel; maximum size = 1", micaceous, light orange brown.
435										
440						N	0.0			POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine gravel; maximum size = 1/2", micaceous, orange brown.
										COBBLES:
445									SP	POORLY GRADED SAND WITH GRAVEL: 85% sand; 15% gravel; orange brown.
									SP SM	POORLY GRADED SAND WITH SILT: 85% sand; 10% non-plastic fines; 5% fine gravel; orange brown.
450									SM	DIRECTIONAL SURVEY at 450 feet: 1.0 degree from vertical.

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 22

PROJECT: Jet Propulsion Laboratory
LOCATION: Parking Lot North of BLDG 180
GEOLOGIST: T. Blaney, B.G. Randolph
DRILLING CO: Lang Exploratory
DATE (start/finish): 07/23/97 - 07/31/97

DRILLING METHOD: Reverse Circulation Mud Rotary
SAMPLING METHOD: Grab Sample from Shaker Screen
SURFACE ELEVATION: 1177.28
TOTAL DEPTH (ft): 770
APPROX. DEPTH TO WATER (ft bgs):



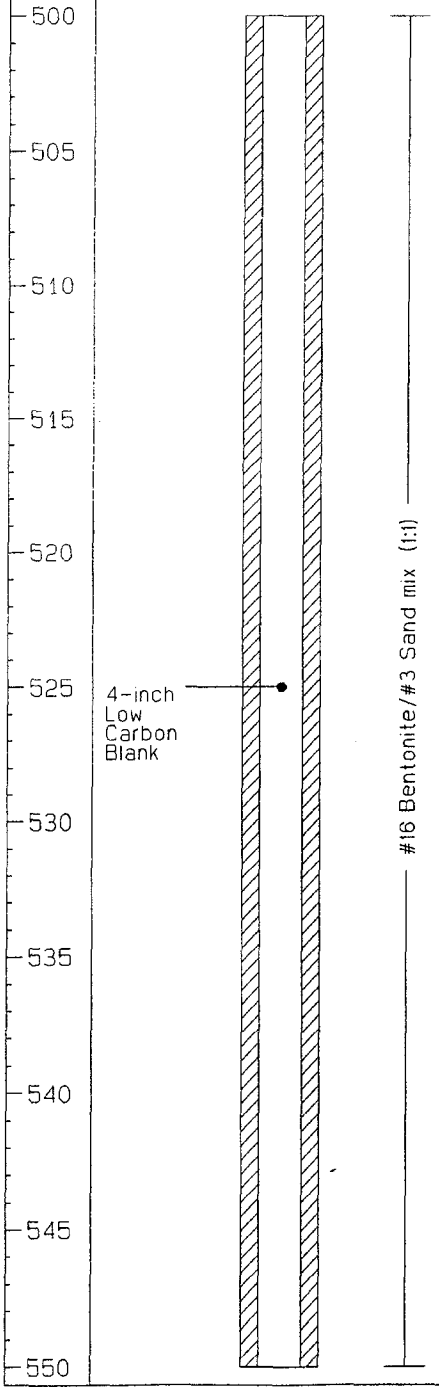
Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
450								SM	SILTY SAND: 70% fine to coarse, subangular to subrounded sand; 30% non-plastic fines; trace gravel; maximum size = 1", micaceous, brown. COBBLES: (450 to 450.5 feet), Granitic.
455								SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse sand; 10% non-plastic fines; 5% coarse gravel; maximum size = 1.5", micaceous, light brown.
								SM	SILTY SAND: 70% fine to coarse, subangular to subrounded sand; 30% non-plastic fines; trace gravel; micaceous, brown.
460					N	0.0		SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse sand; 10% non-plastic fines; 5% coarse gravel; micaceous, light brown.
465								SM	SILTY SAND: 75% fine to coarse sand; 20% non-plastic fines; 5% fine to coarse gravel; maximum size = 1", micaceous, light orange brown.
								SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse sand; 10% non-plastic fines; 5% coarse gravel; maximum size = 1.75", micaceous, light brown.
								GP	COBBLES: (467 to 469 feet)
470								SP SM	POORLY GRADED SAND WITH SILT: Same as above.
								SM	SILTY SAND: 70% fine to coarse, subangular to subrounded sand; 30% non-plastic fines; micaceous, light orange brown.
475									
480					N	0.0		ML	SANDY SILT: 80% non to low-plastic fines; 20% fine to coarse sand; trace gravel; maximum size = 1/2", micaceous, brown.
485								SM	SILTY SAND: 70% fine to coarse sand; 30% non-plastic fines; trace fine gravel; maximum size = 1/2", micaceous, light orange brown.
490									
495									
500									

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 22

PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 180*
GEOLOGIST *T. Blaney, B.G. Randolph*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
500	SC-22-06	⧗	0.0		N	0.0		SM	Grab sample soil cuttings at 500 feet. (Sample SC-22-06) SILTY SAND: 80% fine to coarse sand; 20% non-plastic fines; trace fine gravel; micaceous, light orange brown.
505									
510								ML	SANDY SILT: 65% low-plastic fines; 30% fine to coarse, subangular to subrounded sand; 5% fine gravel; maximum size = 1/2", micaceous, brown.
								SM	SILTY SAND: 75% fine to coarse, subangular to rounded sand; 25% non to low-plastic fines; trace fine gravel; maximum size = 1/2", micaceous, reddish brown. Same as above with increasing fines to 45%.
515									
520					N	0.0			Same as above with decreasing fines to 20%.
								GP	COBBLES AND BOULDERS: (521 to 522 feet).
								SM	SILTY SAND: Same as above with decreasing fines to 15%.
525								SP/SM	POORLY GRADED SAND WITH SILT: 90% fine to medium sand; 10% non-plastic fines; trace gravel; maximum size = 1/2", micaceous, light orange brown.
530									
535									POORLY GRADED SAND WITH SILT: Same as above.
540					N	0.0		SM	SILTY SAND: 65% fine to coarse sand; 35% non to low-plastic fines; trace fine gravel; maximum size = 1/4", micaceous, brown.
545								SP/SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 75% fine to coarse sand; 15% fine to coarse gravel; 10% non-plastic fines; maximum size = 1", micaceous, light orange brown. COBBLES: (548.5 to 549 feet).
550									

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 22

PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 180*
GEOLOGIST *T. Blaney, B.G. Randolph*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____

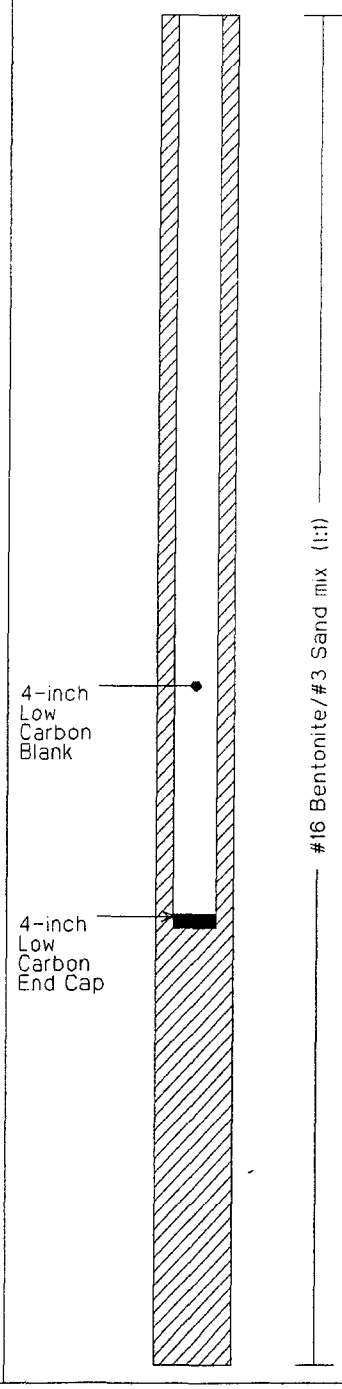
Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
550									SP SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 75% fine to coarse sand; 15% fine to coarse gravel; 10% non-plastic fines; maximum size = 1", micaceous, light orange brown.
555										
560	#16 Bentonite/#3 Sand mix (1:1)					N	0.0			
565									GP	COBBLES AND BOULDERS: (564.5 to 566.5 feet).
									SM	SILTY SAND: 70% fine to coarse, subangular to subrounded sand; 30% non-plastic fines; trace fine gravel; maximum size = 1/4", micaceous, light orange brown.
570	4-inch Low Carbon Blank									
575									SP SM	SILTY SAND WITH GRAVEL: 65% fine to coarse, subangular to subrounded sand; 20% non-plastic fines; 15% fine to coarse, subangular to subrounded gravel; maximum size = 1/", micaceous, light brown.
580	#2/16 Sand					N	0.0		SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse sand; 10% non-plastic fines; 5% fine gravel; maximum size = 1/2", micaceous, light orange brown.
									ML	SILTY SAND: 65% fine to coarse, subangular to subrounded sand; 30% non-plastic fines; 5% fine gravel; micaceous, light orange brown.
585									SM	SANDY SILT: 60% non-plastic fines; 40% fine to coarse, subangular to subrounded sand; maximum size = 1/4", micaceous, brown.
									SP SM	SILTY SAND: 65% fine to coarse, subangular to subrounded sand; 30% non-plastic fines; 5% fine gravel; micaceous, light orange brown.
590	4-inch Stainless Steel Screen, 0.010-inch Slot Size									POORLY GRADED SAND WITH SILT: 90% fine to coarse sand; 10% non-plastic fines; maximum size = 1/4", micaceous, light orange brown.
										COBBLES AND BOULDERS: (593 to 593.5 feet).
595	ite/#3 Sand mix (1:1)								ML	SILT WITH SAND: 80% low plastic fines; 20% fine to coarse sand; maximum size = 1/4", micaceous, reddish brown.
600										DIRECTIONAL SURVEY at 600 Feet: 1.5 degrees from vertical.

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 22

PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 180*
GEOLOGIST *T. Blaney, B.G. Randolph*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
600	SC-22-07	⧗	0.0		N	0.0		ML	Grab sample soil cuttings at 600 feet. (Sample SC-22-07)
605									SILT WITH SAND: 80% low-plastic fines; 20% fine to coarse sand; maximum size = 1/4", micaceous, reddish brown.
610									
615								SM	SILTY SAND: 55% fine to coarse sand; 45% non to low-plastic fines; maximum size = 1/4", micaceous, gray brown.
								SP SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 75% fine to coarse sand; 15% fine to coarse gravel; 10% non-plastic fines; maximum size = 1.5", micaceous, grayish brown.
620					N	0.0		ML	POORLY GRADED SAND WITH SILT: 85% fine to coarse sand; 5% fine to coarse gravel; 10% non-plastic fines; micaceous, grayish brown.
625									SANDY SILT: 55% non to low-plastic fines; 45% fine to coarse sand; maximum size = 1/4", micaceous, brown.
630								SM	SILTY SAND: 70% fine to medium, subangular to rounded sand; 30% non-plastic fines; micaceous, medium brown.
								ML	SILT: 90% non to low-plastic fines; 10% fine to medium, subangular to rounded sand; maximum size = 1/8", micaceous, greenish-gray brown.
635									SANDY SILT: 60% non to low-plastic fines; 40% fine to coarse, subangular to rounded sand; micaceous, gray brown.
640					N	0.0			
								SM	SILTY SAND: 60% fine to coarse, subangular to rounded sand; 40% non-plastic fines; micaceous, tannish brown.
645								ML	SANDY SILT: 65% non to low-plastic fines; 35% fine to medium, subangular to subrounded sand; micaceous, grayish brown.
650									Hard Drilling: Increased drill chatter.

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 22

PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 180*
GEOLOGIST *T. Blaney, B.G. Randolph*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
650	#16 Bentonite/#3 Sand mix (1:1)								ML	
655										SANDY SILT: 65% non to low-plastic fines; 35% fine to medium, subangular to subrounded sand; maximum size = 1/4' micaceous, grayish brown.
660						N	0.0			Hard Drilling: Increased drill chatter; Partly decomposed cobbles of igneous rock, granite/diorite, between 654 and 654.5 feet.
665										SANDY SILT: 60% non to low-plastic fines; 30% fine to medium, subangular to rounded sand; 10% partialy decomposed subrounded gravel; maximum size = 3/4", micaceous, grayish brown.
670										SANDY SILT: Same as above with a color change to gray.
675										
680						N	0.0			SANDY SILT: Same as above
									GP	COBBLES AND BOULDERS: (681.5 to 683 feet).
									ML	SANDY SILT: Same as above.
685										
690									GP	COBBLES AND BOULDERS: (689 to 694 feet), Increase in orthoclose content from 692 to 693 feet, Possible intrusive material.
695									ML	SILT WITH SAND: 70% non to low-plastic fines; 25% fine to coarse sand; 5% fine to coarse gravel; maximum size = 1.5", micaceous, gray.
700										

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 22

PROJECT: Jet Propulsion Laboratory
LOCATION: Parking Lot North of BLDG 180
GEOLOGIST: T. Blaney, B.G. Randolph
DRILLING CO: Lang Exploratory
DATE (start/finish): 07/23/97 - 07/31/97

DRILLING METHOD: Reverse Circulation Mud Rotary
SAMPLING METHOD: Grab Sample from Shaker Screen
SURFACE ELEVATION: 1177.28
TOTAL DEPTH (ft): 770
APPROX. DEPTH TO WATER (ft bgs):

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
700	#16 Bentonite/#3 Sand mix (1:1)	SC-22-08	⧗	0.0		N	0.0		ML	Grab sample soil cuttings at 700 feet. (Sample SC-22-08)
									GP	COBBLES AND BOULDERS: (701 to 702 feet).
									ML	SILT WITH SAND: 70% non to low-plastic fines; 25% fine to coarse sand; 5% fine to coarse gravel; maximum size = 1.5", micaceous, gray. Gravels have oxidation stains.
705									GP	COBBLES AND BOULDERS: (704 to 705.5 feet).
710										COBBLES AND BOULDERS: (706.5 to 708 feet), Increased drill chatter. BOULDERS: (708 to 716 feet), Granitic; gray/white; some chips appear to have slickensides.
715									ML	SILT: 90% low to medium plastic fines; 5% fine to coarse sand; 5% fine to coarse gravel; maximum size = 1", micaceous, grey white.
720						N	0.0		GP	BOULDERS: (720.5 to 723.5 feet), Granitic; gray/white; Increased drill chatter.
725									ML	SANDY SILT: 65% low to medium-plastic fines; 30% fine to medium, subangular to rounded sand; 5% fine to coarse gravel; maximum size = 1", micaceous, gray to tan.
									GP	COBBLES AND BOULDERS: (728 to 729 feet), Granitic; gray/white.
730									ML	SANDY SILT: Same as above.
735									GP	COBBLES AND BOULDERS: (734.5 to 736 feet).
									ML	SANDY SILT: Same as above, silts becoming lighter gray; Interbedded with small cobbles.
740						N	0.0			
745										SANDY SILT: Same as above, Interbedded with small cobbles.
750										

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 22

PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 180*
GEOLOGIST *T. Blaney, B.G. Randolph*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/23/97 - 07/31/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1177.28*
TOTAL DEPTH (ft) *770*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
750	#16 Bentonite/#3 Sand mix (1:1)								ML	SILT WITH SAND: 75% low to medium-plastic fines; 20% fine to coarse sand; 5% fine to coarse gravel; maximum size = 2", micaceous, greenish grey.
									GP	COBBLES AND BOULDERS: (752 to 754.5 feet), Igneous; black and white.
755									ML	SILT WITH SAND: Same as above with a color change to light gray.
									GP	COBBLES AND BOULDERS: (756.5 to 759 feet).
760						N	0.0		BR	BEDROCK: Weathered, fracture filled. High in ferromagnesiam minerals and orthoclose (759 to 763 feet).
765										
770										TOTAL DEPTH DRILLED: 770 feet.
775										
780										
785										
790										
795										
800										

Summary MP Casing Log

Well No. MW-22
Job No. WB650

Client Foster Wheeler - NASA JPL
Site Pasadena, CA
Project Description OU-1 Additional Work

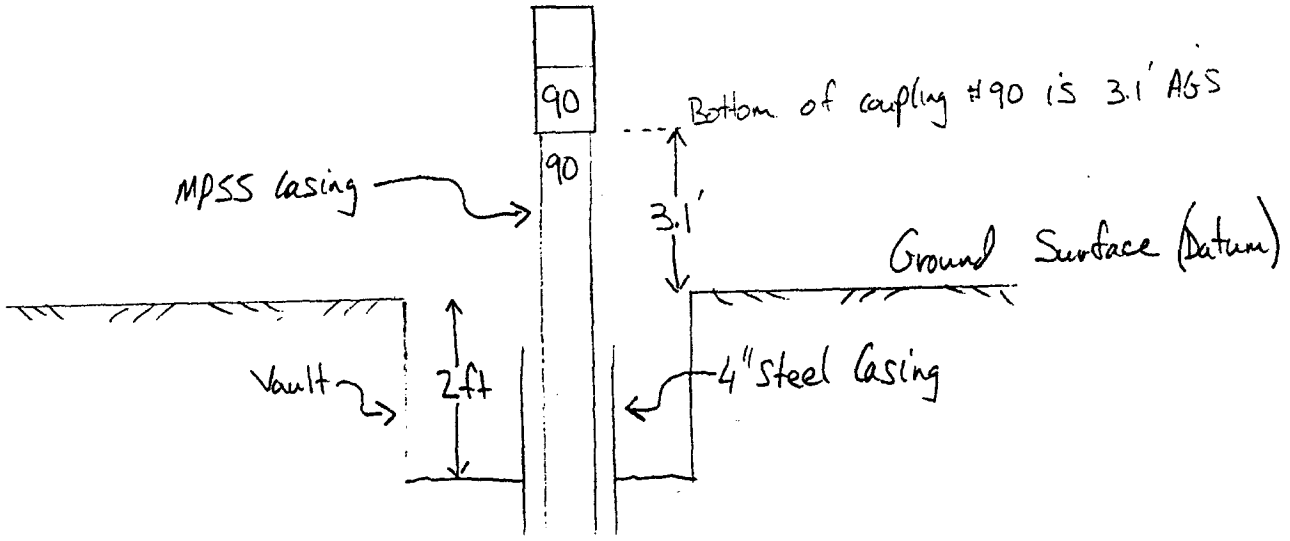
Well Information

Reference Datum Ground Level
Elevation of Datum 0.00 ft.
Position of MP Casing Top above / below Datum 0.00 ft. above datum
Position of MP Casing Bottom Below Datum 621.14 ft. below datum
Well Description Plastic MP38
Other References
Port positions as in FW fax July 30/97
Magnetic Collars 1-ft above M-Ports

Log Information

Designed By DMc Date Aug 8/97
Approved By T. Blaney Date Aug 20/97
Checked By D. Mc Date Aug 20/97
Computer File No. MW22 Date Mon Aug 18 16:02:08 1997

Sketch of Wellhead Completion



Legend for Casing Installation Log

Well No. MW-22
Job No. WB650

MP Log	Description	Quantity
	MP38 CASING 10 FT. 0225F10	044
	MP38 PACKER STIFFENED 0237F05	015
	MP38 CASING 5 FT. 0225F05	018
	MP38 CASING 2 FT. 0225F02	010
	MP38 CASING 1 FT. 0225F01	003
	MP38 END CAP 0223	001
	MAGNETIC COLLAR	005

MP Log	Description	Quantity
	MP38 REGULAR COUPLING 0221	069
	MP38 TO MP55 ADAPTER COUPLING 022001	001
	MP38 MEASUREMENT PORT 0222	015
	MP38 PUMPING PORT 0224	005

Geo 1

Geo 2

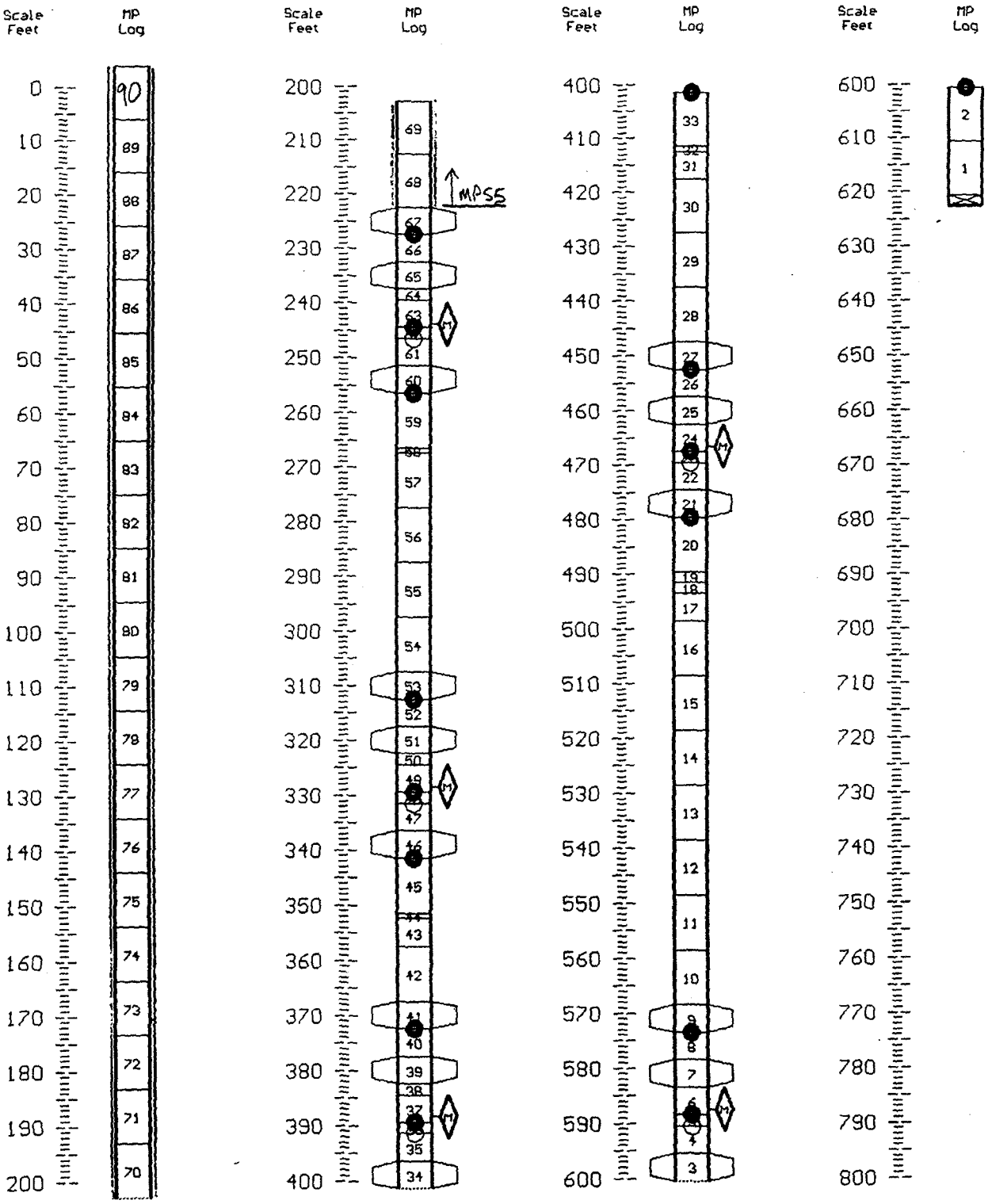
Well Casing

MILD STEEL PIPE

STAINLESS STEEL SCREEN

Summary MP Casing Log Date: Thu Sep 11 12:31:34 1997 Page: 1

Job No. WB650 Foster Wheeler - NASA JPL Well No. MW-22



WELL MW-23

BORING LOG AND WELL COMPLETION DIAGRAM
WESTBAY MP CASING INSTALLATION LOG

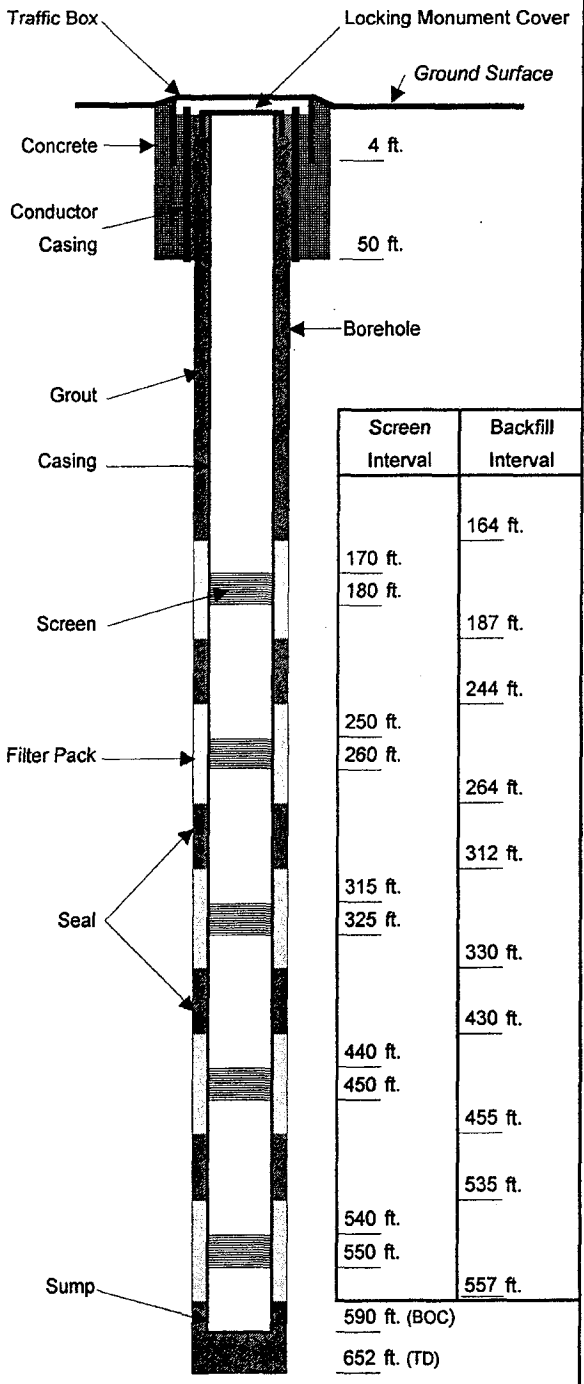
WELL CONSTRUCTION LOG

WELL NUMBER: MW-23

WELL TYPE: Deep Multiport Groundwater Monitoring Well

SURFACE ELEV (ft. above MSL): 1109.02'

CASING ELEV (ft. above MSL): 1108.34'



Screen Interval	Backfill Interval
	164 ft.
170 ft.	
180 ft.	
	187 ft.
	244 ft.
250 ft.	
260 ft.	
	264 ft.
	312 ft.
315 ft.	
325 ft.	
	330 ft.
	430 ft.
440 ft.	
450 ft.	
	455 ft.
	535 ft.
540 ft.	
550 ft.	
	557 ft.

590 ft. (BOC)

652 ft. (TD)

DRILLING SUMMARY

DATE COMPLETED:	2/8/95 to 2/28/95
DRILLING COMPANY:	Lang Exploratory Drilling
DRILLING RIG TYPE:	Mud Rotary
TOTAL DEPTH DRILLED:	652 ft.

CONSTRUCTION DETAILS

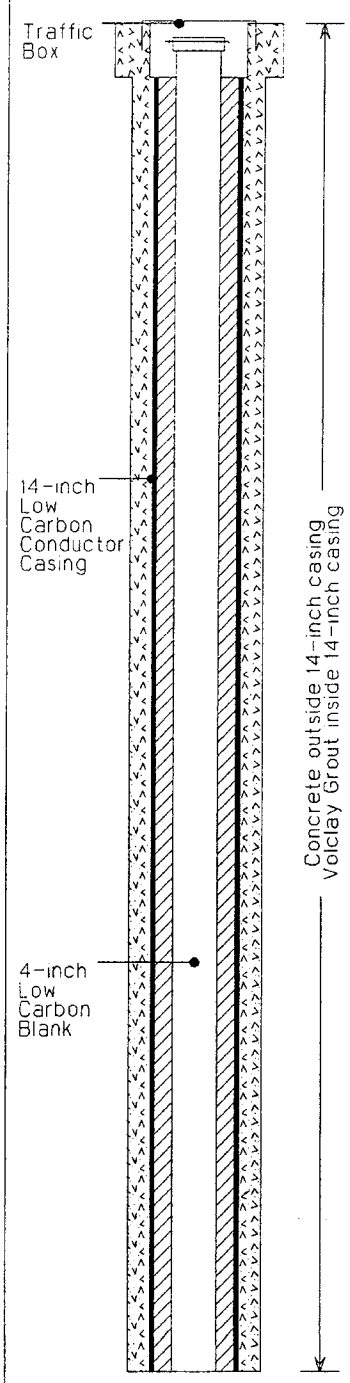
BOREHOLE DIAMETER: (CONDUCTOR CASING)	18.5 in
CONDUCTOR CASING DIAMETER:	16 in
CONDUCTOR CASING LENGTH:	50 ft.
BOREHOLE DIAMETER:	12.25 in
TOTAL WELL DEPTH:	590 ft.
BLANK CASING TYPE:	Low Carbon Steel
BLANK CASING DIAMETER:	4 inch
TOTAL BLANK CASING LENGTH:	540 ft.
SCREEN TYPE:	Stainless Steel
SCREEN SLOT SIZE:	0.010 inch
INDIVIDUAL SCREEN LENGTH:	10 ft.
SUMP LENGTH:	40 ft.
PROTECTIVE CASING STICKUP:	None
GROUT MATERIAL:	Volclay Grout
SEAL MATERIAL:	1:1 Bentonite & Sand mix
FILTER MATERIAL:	#2 Sand
COMMENTS:	

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

PROJECT: Jet Propulsion Laboratory
LOCATION: Parking Lot North of BLDG 233
GEOLOGIST: B.G. Randolph, T. Choi, T. Blaney
DRILLING CO: Lang Exploratory
DATE (start/finish): 07/10/97 - 07/16/97

DRILLING METHOD: Reverse Circulation Mud Rotary
SAMPLING METHOD: Grab Sample from Shaker Screen
SURFACE ELEVATION: 1109.02
TOTAL DEPTH (ft): 652
APPROX. DEPTH TO WATER (ft bgs): _____



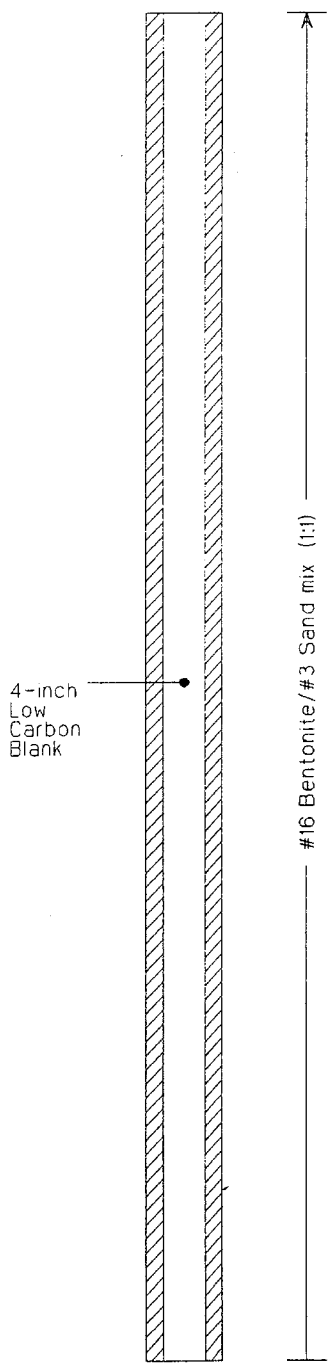
Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
0				SL	N				Drilled pilot hole for conductor casing with bucket auger rig.
				SL	N			GP	ASPHALT - Pavement (0.4 feet thick).
								SP	POORLY GRADED GRAVEL WITH SAND (asphalt base material).
5									POORLY GRADED SAND: fine to medium sand with silt, dark orange brown, micaceous.
									Same as above with occasional pieces of gravel.
10									Small cobbles at 5 feet.
									Same as above with some gravel.
15									
				SL	N				
20									POORLY GRADED SAND: Same as above.
25									Same as above with some fine gravel.
				SL	N				
									Same as above with some coarse gravel.
30									Cobbles at 30 feet.
35			0.2		N	0.0			
			0.0		N	0.0			POORLY GRADED SAND: Same as above.
40			0.0		N	0.0			
45			0.0		N	0.0			Same as above with some silt.
50			0.0		N	0.0		SM	SILTY SAND: fine to medium sand; dark orange to medium brown.

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 233*
GEOLOGIST *B.G. Randolph, T. Choi, T. Blaney*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/10/97 - 07/16/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1109.02*
TOTAL DEPTH (ft) *652*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
50		SC-23-1	X						SM	Grab sample of soil cuttings from 50.5 feet (sample SC-23-01). Started mud rotary drilling at 50.5 feet. SILTY SAND: fine to medium sand; dark orange to medium brown.
55				0.0		N	0.0		SP	POORLY GRADED SAND: 100% fine to medium, angular to subrounded sand; maximum size = 1/8", micaceous, light brown.
60				0.0		N	0.0			POORLY GRADED SAND: 90% fine to coarse, angular to subrounded sand; 10% fine subangular gravel; micaceous, maximum size = 1/8", light orange brown.
65										
70				0.0		N	0.0			POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to subrounded sand; 20% fine subangular to subrounded gravel; maximum sixe = 1/2", micaceous, orange brown. POORLY GRADED SAND: 90% medium sand; 10% fine subangular to subrounded gravel.
75									GP	COBBLES: (78 to 79 feet).
80				0.0		N	0.0		SP	POORLY GRADED SAND: Same as above.
85									GP	POORLY GRADED GRAVEL WITH SAND: 65% poorly graded, angular to subrounded gravel and cobble chips; 35% fine to coarse, angular to subrounded sand; maximum size = 1.5", light brown sand. Cobble zone with high mafic content.
90				0.0		N	0.0			BOULDERS: very low rpms on drill bit; chips are angular and appear to be granitic and dioritic. Same as above: Drill head bouncing.
95									SP	POORLY GRADED SAND: 95% fine to coarse, subangular to subrounded sand; 5% fine subangular gravel; micaceous, maximum size = 1/2", light brown. COBBLES: (98 to 99 feet).
100				0.0		N	0.0			

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 233*
GEOLOGIST *B.G. Randolph, T. Choi, T. Blaney*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/10/97 - 07/16/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1109.02*
TOTAL DEPTH (ft) *652*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
100		SC-23-2	⧗						SP	Grab sample of soil cuttings from 100 feet. (sample SC-23-02)
										POORLY GRADED SAND WITH GRAVEL: 85% fine to coarse, subangular to subrounded sand; 15% fine subangular gravel; micaceous, light brown.
105										
110				0.0		N	0.0			DIRECTIONAL SURVEY at 110 feet: 0 degrees from vertical.
115										COBBLES: (115.5 to 116.5 feet), 30% of material is mafic.
120				0.0		N	0.0			POORLY GRADED SAND: 90% fine to coarse, subangular to subrounded sand; 10% fine to coarse, angular to subangular gravel; micaceous, maximum size = 3/4", light brown.
125	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)								SP GP	INTERBEDDED POORLY GRADED SAND (AS ABOVE) AND GRAVEL AND COBBLE BEDS:
										COBBLES: (124.5 to 130 feet), 51% angular gravels; 49% fine to coarse sand.
130				0.0		N	0.0			*Drilling Mud Parameters: Mud Weight: 9.5 lbs/gal Viscosity: 32 seconds Sand Content: 3%*
										COBBLES: (133 to 134.5 feet), Increased drill chatter.
135										COBBLES: (136 to 136.5 feet).
										Interbedded sand and thin gravel and cobble beds.
140				0.0		N	0.0			GRAVEL: (140 to 143 feet), Increased drill chatter.
145									SP	POORLY GRADED SAND WITH GRAVEL: 65% fine to coarse, subangular to subrounded sand; 35% fine to coarse, subangular to subrounded gravel; micaceous, maximum size = 3/4", light brown.
150				0.0		N	0.0		GP	

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DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/10/97 - 07/16/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1109.02*
TOTAL DEPTH (ft) *652*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
150									GP	COBBLES: (150 TO 153): 70% fine angular mafic gravel; 30% fine to coarse sand.
155	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)								SP	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to subrounded sand; 20% fine angular to subrounded gravel; maximum size = 1/2", micaceous, light brown.
160						N	0.0			
165									GP	POORLY GRADED GRAVEL WITH SAND: 60% fine angular mafic gravel; 40% fine to coarse, subangular to subrounded sand; maximum size = 1", black and light brown.
170										
175	4-inch Stainless Steel Screen, 0.010-inch Slot Size; #2/16 Sand								SP	POORLY GRADED SAND WITH GRAVEL: 90% fine to coarse, subangular to subrounded sand; 10% fine subangular to subrounded gravel; micaceous light brown.
180						N	0.0			GRANITIC BOULDER: (179 to 181 feet).
										POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to subrounded sand; 20% fine gravel; maximum size = 0.5", micaceous, brown.
185										POORLY GRADED SAND WITH GRAVEL: 90% fine to coarse, subangular to subrounded sand; 10% fine angular gravel; micaceous, brown. Clasts of quartz, feldspar, amphibole/pyroxene.
190	#16 Bentonite/#3 Sand mix (1:1)								SM	SILTY SAND: 70% fine to coarse sand; 30% non-plastic fines; maximum size = 1/8", micaceous, brown.
195									SP	POORLY GRADED SAND: 90% fine to coarse, angular to subangular sand; 10% fine angular to subrounded gravel; maximum size = 1/2", micaceous, brown.
200										

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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PROJECT *Jet Propulsion Laboratory*
LOCATION *Parking Lot North of BLDG 233*
GEOLOGIST *B.G. Randolph, T. Choi, T. Blaney*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/10/97 - 07/16/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1109.02*
TOTAL DEPTH (ft) *652*
APPROX. DEPTH TO WATER (ft bgs) _____

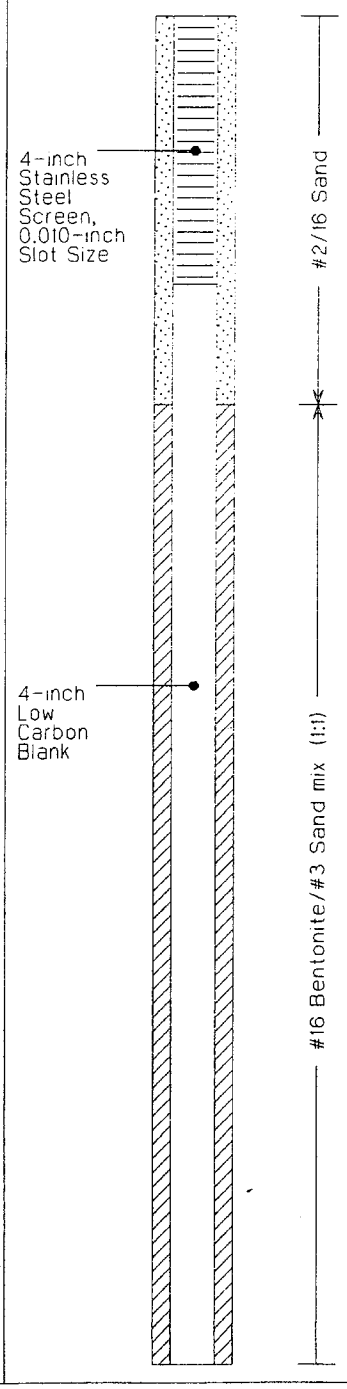
Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
200		SC-23-3	⧗	0.0		N	0.0		SP	Grab sample of soil cuttings from 200 feet. (sample SC-23-03)
205										POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, angular to subangular sand; 20% fine to coarse, subangular to subrounded gravel; maximum size = 1/2", micaceous, light brown.
										COBBLES: (207 to 208 feet), 40% mafic.
									SM	SILTY SAND: 85% fine to coarse, subangular to subrounded sand; 15% non-plastic fines; maximum size = 0.4", micaceous, brown.
210										SILTY SAND: 70% fine to coarse, angular to subangular sand; 30% non-plastic fines; micaceous, brown.
									SP	POORLY GRADED SAND: 90% fine to coarse, angular to subrounded sand; 10% fine to coarse, angular to subangular gravel.
215										
220						N	0.0			COBBLES: (219 to 220 feet), 20% coarse angular mafic gravel.
									SM	
225	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)									SILTY SAND: 60% fine to medium, subangular to subrounded sand; 40% non-plastic fines; micaceous, brown.
230										
235										
									ML	SANDY SILT: 60% low-plastic fines; 40% fine subangular to subrounded sand.
									SM	SILTY SAND: 60% fine to medium, subangular to subrounded sand; 40% non-plastic fines; micaceous, brown.
240						N	0.0			
									SP	POORLY GRADED SAND: 90% fine to coarse, subangular to subrounded sand; 10% fine subangular gravel; maximum size = 1/2".
245	#2/16 Sand									
250										

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

PROJECT: Jet Propulsion Laboratory
LOCATION: Parking Lot North of BLDG 233
GEOLOGIST: B.G. Randolph, T. Choi, T. Blaney
DRILLING CO: Lang Exploratory
DATE (start/finish): 07/10/97 - 07/16/97

DRILLING METHOD: Reverse Circulation Mud Rotary
SAMPLING METHOD: Grab Sample from Shaker Screen
SURFACE ELEVATION: 1109.02
TOTAL DEPTH (ft): 652
APPROX. DEPTH TO WATER (ft bgs): _____



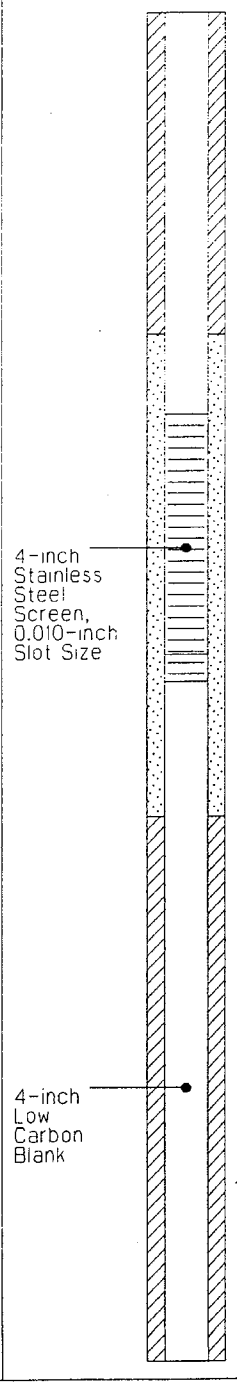
Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
250								SP	DIRECTIONAL SURVEY at 250 feet: 1 degree from vertical. POORLY GRADED SAND: 90% fine to coarse, subangular to subrounded sand; 10% fine subangular gravel; maximum size = 1/2". COBBLES: (254 to 256 feet).
255									
260					N	0.0		SP SM	POORLY GRADED SAND WITH SILT: 80% fine to coarse, subangular to subrounded sand; 20% non-plastic fines; maximum size 1/4", micaceous, light brown.
265								SP	POORLY GRADED SAND: 90% fine to coarse, subangular to subrounded sand; 5% fine subrounded gravel; 5% non-plastic fines; maximum size = 1.0", micaceous, light brown.
270								ML	SANDY SILT: 70% non-plastic fines; 30% fine to medium sand.
								SP	POORLY GRADED SAND: 90% fine to coarse, subangular to subrounded sand; 5% fine subrounded gravel; 5% non-plastic fines; maximum size = 1.0", micaceous, light brown. POORLY GRADED SAND: 90% fine to coarse, subangular to subrounded sand; 10% fine subrounded gravel.
275								SM	SILTY SAND: 75% fine to coarse, subangular to subrounded sand; 20% non-plastic micaceous fines; 5% subangular gravel; maximum size = 1/4", brown.
280					N	0.0		SP	POORLY GRADED SAND WITH GRAVEL: 85% fine to coarse, subangular to subrounded sand; 15% subangular gravel.
285								ML	SANDY SILT: 70% non-plastic fines; 30% fine to medium subrounded sand; maximum size = 1/8", brown.
290								SP	POORLY GRADED SAND WITH GRAVEL: 70% fine to coarse sand; 30% fine to coarse, angular to subangular gravel.
295								ML	SILT WITH SAND: 80% non-plastic fines; 20% fine to medium sand.
300								SP SM	POORLY GRADED SAND WITH SILT: 80% fine to coarse, angular to subangular sand; 10% fine to coarse, angular to subrounded gravel; 10% non-plastic fines.

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

PROJECT: Jet Propulsion Laboratory
LOCATION: Parking Lot North of BLDG 233
GEOLOGIST: B.G. Randolph, T. Choi, T. Blaney
DRILLING CO: Lang Exploratory
DATE (start/finish): 07/10/97 - 07/16/97

DRILLING METHOD: Reverse Circulation Mud Rotary
SAMPLING METHOD: Grab Sample from Shaker Screen
SURFACE ELEVATION: 1109.02
TOTAL DEPTH (ft): 652
APPROX. DEPTH TO WATER (ft bgs): _____



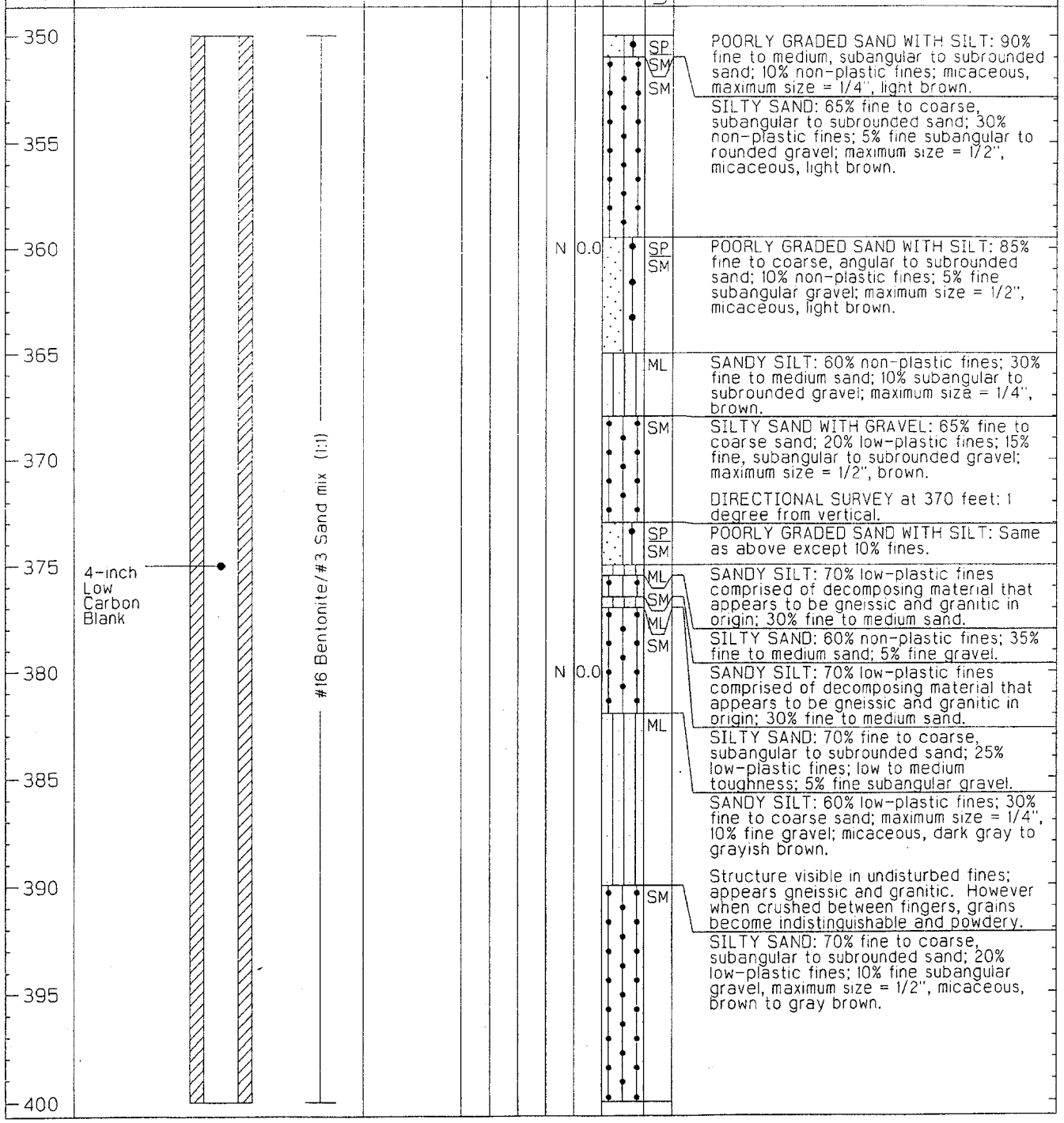
Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
300	SC-23-4	✕	0.0		N	0.0		SP SM	Grab sample of soil cuttings from 300 feet. (Sample SC-23-04) SILTY SAND: 60% fine to coarse, angular to rounded sand; 40% non-plastic fines.
305									
								ML	SILT WITH SAND: 80% non-plastic fines; 20% fine to medium sand.
								SP SM	POORLY GRADED SAND WITH SILT and SILTY SAND.
310								ML	SILT WITH SAND: 80% non-plastic fines; 20% fine to medium sand.
								SP SM	POORLY GRADED SAND WITH SILT: 80% fine to coarse, angular to subangular sand; 10% fine to coarse, angular to subrounded gravel; 10% non-plastic fines. SILTY SAND: 60% fine to coarse, angular to rounded sand; 40% non-plastic fines.
315									
320					N	0.0			Interbedded sand with gravel and silty sand: typically <2 feet thick.
325								ML	SILT: 90% low-plastic fines; 10% fine sand; brown. Color change in fines to reddish brown. SILT: 90% low-plastic fines; 10% fine to medium sand; reddish brown.
330								SM	SILTY SAND: 60% fine to coarse subangular sand; 40% low-plastic fines; maximum size = 1/4", micaceous, reddish brown. Grain size increasing.
335									
340					N	0.0			SILTY SAND: 70% fine to coarse subangular sand; 30% low-plastic fines; micaceous, reddish brown.
								SP SM	POORLY GRADED SAND WITH SILT: 90% fine to coarse, angular to subrounded sand; 10% non-plastic fines; maximum size = 1/4", micaceous, light brown.
345								SM	SILTY SAND: 65% fine to coarse, angular to subrounded sand; 35% non-plastic fines; micaceous, light brown.
350								SP SM	

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

PROJECT: Jet Propulsion Laboratory
LOCATION: Parking Lot North of BLDG 233
GEOLOGIST: B.G. Randolph, T. Choi, T. Blaney
DRILLING CO: Lang Exploratory
DATE (start/finish): 07/10/97 - 07/16/97

DRILLING METHOD: Reverse Circulation Mud Rotary
SAMPLING METHOD: Grab Sample from Shaker Screen
SURFACE ELEVATION: 1109.02
TOTAL DEPTH (ft): 652
APPROX. DEPTH TO WATER (ft bgs):

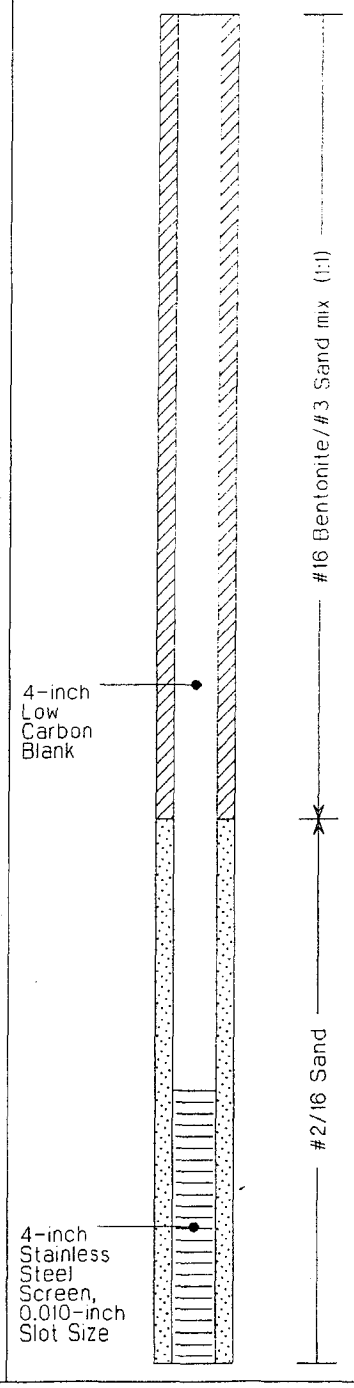


FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

PROJECT: Jet Propulsion Laboratory
LOCATION: Parking Lot North of BLDG 233
GEOLOGIST: B.G. Randolph, T. Choi, T. Blaney
DRILLING CO: Lang Exploratory
DATE (start/finish): 07/10/97 - 07/16/97

DRILLING METHOD: Reverse Circulation Mud Rotary
SAMPLING METHOD: Grab Sample from Shaker Screen
SURFACE ELEVATION: 1109.02
TOTAL DEPTH (ft): 652
APPROX. DEPTH TO WATER (ft bgs):



Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
400	SC-23-5	X	0.0		N	0.0		SM	Grab sample of soil cuttings from 400 feet. (Sample SC-23-05) SILTY SAND: Same as above.
405								ML	SILT: 95% low-plastic fines, micaceous, low to medium toughness, near plastic limit, 5% fine to medium sand; maximum size < 1/8", micaceous, brown.
410									
415								SM	SILTY SAND: 75% fine to coarse, subangular to subrounded sand; 20% low-plastic fines; 5% angular gravel; maximum size = 1/2", micaceous, brown.
								SP SM	POORLY GRADED SAND WITH SILT: 90% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; decomposing, micaceous, trace subangular gravel; maximum size = 1/4", micaceous, brown.
420					N	0.0			
425								SM	
430									SILTY SAND: 75% fine to coarse, subangular to subrounded sand; 20% non-plastic fines; micaceous, 5% angular gravel; maximum size = 1/2", brown.
435									SILTY SAND: Same as above except 30% non-plastic fines.
440					N	0.0			
445								ML	SANDY SILT: 60% low-plastic fines; 30% medium subangular to subrounded sand; 10% fine subangular gravel; micaceous.
								SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% subangular to subrounded gravel; micaceous, maximum size = 1/2", light brown.
450									

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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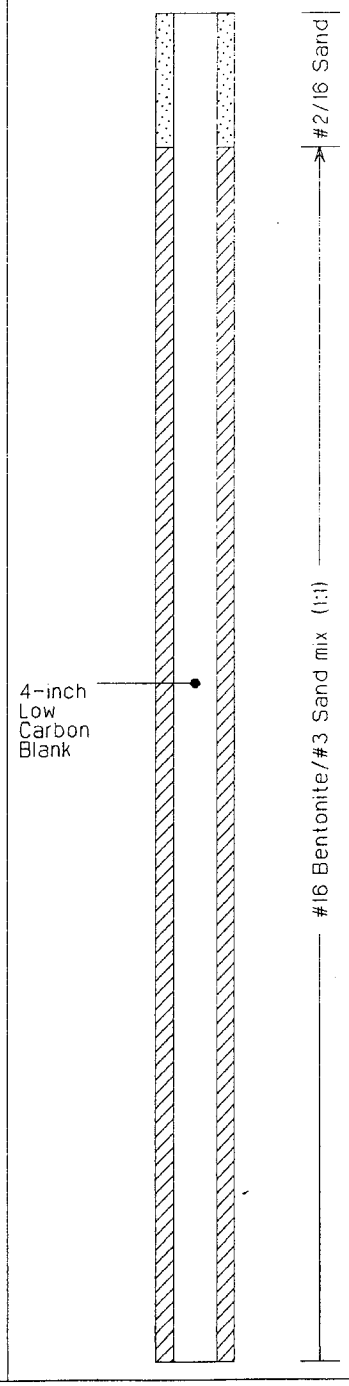
LOCATION *Parking Lot North of BLDG 233*
GEOLOGIST *B.G. Randolph, T. Choi, T. Blaney*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/10/97 - 07/16/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1109.02*
TOTAL DEPTH (ft) *652*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	USCS Symbol	Lithologic Description and Notes
450						SP	
						SM/ML	SILT WITH SAND: 80% low-plastic fines; 20% fine to medium, subangular to subrounded sand; micaceous, maximum size = 1/8", brown.
						SP/SM	POORLY GRADED SAND WITH SILT: 85% medium subangular to subrounded sand; 10% low-plastic fines; micaceous, gray and black; 5% fine subangular gravel; maximum size = 1/4", light brown.
455							
460				N	0.0		
						ML	SILT: 95% low-plastic fines; 5% medium subangular to subrounded sand; micaceous.
465							
							SANDY SILT: 60% low-plastic fines; 35% fine to medium, subangular to subrounded sand; 5% fine subangular gravel; maximum size = 1/8", micaceous, brown to light brown.
470						SP/SM	POORLY GRADED SAND WITH SILT: 90% fine to coarse, angular to subrounded sand; 10% low-plastic fines; maximum size = 1/4", light brown, micaceous.
475							
							POORLY GRADED SAND WITH SILT: 80% fine to coarse, angular to subrounded sand; 10% low-plastic fines; 10% subangular gravel; maximum size = 1/2", light brown, micaceous.
480				N	0.0		
						ML	SANDY SILT: 60% low-plastic fines, low to medium toughness, micaceous, 40% fine to coarse, angular to subrounded sand; maximum size = 1/2", light brown.
485						SM	SILTY SAND: 60% fine to coarse, angular to subrounded sand; 35% low-plastic fines; micaceous, 5% subangular to subrounded gravel; maximum size = 1/4", light brown.
							GRAVEL: (488 to 488.5 feet), Coarse angular gravel; light brown.
490						SP/SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% low-plastic fines; 5% fine subangular gravel; maximum size = 1/2", light brown.
495							POORLY GRADED SAND WITH SILT: 75% fine to coarse, subangular to subrounded sand; 15% fine subangular gravel; 10% low-plastic fines; light brown.
500							

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

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LOCATION *Parking Lot North of BLDG 233*
GEOLOGIST *B.G. Randolph, T. Choi, T. Blaney*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/10/97 - 07/16/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1109.02*
TOTAL DEPTH (ft) *652*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
500		SC-23-6	✖	0.0		N	0.0		SP SM	Grab sample of soil cuttings from 500 feet. (Sample SC-24-06) POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% low-plastic fines; 5% fine subangular gravel; light brown.
505									SM	MAFIC COBBLES: (504 to 506 feet), 60% of the material consist of angular mafic clasts; 40% flat angular mafic/dioritic chips.
510									ML	SILTY SAND: 70% fine to coarse, subangular to subrounded sand; 25% low-plastic fines; 5% angular to subangular gravel; maximum size = 1/2", light brown. SILT: 90% low-plastic fines; micaceous, decomposing granitics, gray, 10% fine to medium subangular sand; brown.
515										SILT: 75% low-plastic fines; micaceous, gray (decomposing granitics), 25% fine to coarse subangular sand; brown.
520						N	0.0			
525	4-inch Low Carbon Blank									
530									GP ML	DIRECTIONAL SURVEY at 530 feet: 1 degree from vetical. SILT: 75% low-plastic fines; micaceous, gray (decomposing granitics and gneisses), 25% fine to coarse subangular sand; maximum size = 1.5", brown. COBBLES: (531 to 532.5 feet).
535										SILT: 90% low-plastic fines; micaceous, gray (decomposing granitics and gneisses), 10% fine to medium subangular sand; brown.
540						N	0.0			SILT WITH SAND: 80% low-plastic fines; gray and brown, 20% fine to medium subangular sand; maximum size = 1/8", brown.
545	4-inch Stainless Steel Screen, 0.010-inch Slot Size								SM SP SM ML	SILTY SAND WITH GRAVEL: 45% sand; 40% low-plastic fines; 15% fine gravel; light brown. POORLY GRADED SAND WITH SILT: 85% sand; 10% low-plastic fines; 5% fine gravel; light brown. SILT: 90% low-plastic fines; 10% fine sand; grayish brown.
550									GP	

#16 Bentonite/#3 Sand mix (1:1)

#2/16 Sand

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

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GEOLOGIST *B.G. Randolph, T. Choi, T. Blaney*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/10/97 - 07/16/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1109.02*
TOTAL DEPTH (ft) *652*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
550									GP	POORLY GRADED GRAVEL WITH SAND: 60% angular gravel; 40% fine to coarse angular sand. BOULDER: (549 to 554 feet).
555	#2/16 Sand								ML	
560						N	0.0			SILT WITH SAND: 85% low plastic fines; grey, 15% fine to medium, angular to subangular sand; grayish brown, maximum size = 1/8".
565										
570	4-inch Low Carbon Blank									SILT WITH SAND: 70% low-plastic fines; medium tough, 25% fine to coarse, angular to subrounded sand; 5% fine angular gravel; maximum size = 1/4", grayish brown. NOTE: angular sands appear to be remnants of decomposing igneous and metamorphic rocks.
575	#16 Bentonite/#3 Sand mix (1:1)									
580						N	0.0			SILT: 95% low-plastic fines; severly seritized igneous and metamorphic materials, slightly micaceous; 5% fine to coarse angular sand; maximum size = 1/8", brownish gray.
585									GP	SILT WITH SAND: 85% low-plastic fines; severly seritized igneous and metamorphic materials, 10% fine to coarse, angular to subangular sand; 5% fine angular gravel; maximum size = 1/4", orange brown. BOULDERS: (586 to 592.5 feet).
590	4-inch Low Carbon End Cap								ML	SILT WITH SAND: 95% low-plastic fines; severly seritized igneous and metamorphic materials, 5% fine to coarse, angular to subangular sand; maximum size = 1/2", orange brown.
595										
600										

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 23

PROJECT: Jet Propulsion Laboratory
LOCATION: Parking Lot North of BLDG 233
GEOLOGIST: B.G. Randolph, T. Choi, T. Blaney
DRILLING CO: Lang Exploratory
DATE (start/finish): 07/10/97 - 07/16/97

DRILLING METHOD: Reverse Circulation Mud Rotary
SAMPLING METHOD: Grab Sample from Shaker Screen
SURFACE ELEVATION: 1109.02
TOTAL DEPTH (ft): 652
APPROX. DEPTH TO WATER (ft bgs): _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
600	#16 Bentonite/#3 Sand mix (1:1)	SC-23-7	X	0.0		N	0.0		ML	Grab sample of soil cuttings from 600 feet. (Sample SC-23-07)
605									GP	SILT WITH GRAVEL: 85% low-plastic fines; slightly cohesive, medium toughness, seritized, blue-gray; 10% fine angular to subangular mafic gravel; 5% fine to coarse, subangular to subrounded mafic sand; maximum size = 1/2", blue-grey.
610										GRANITIC BOULDER: (602.5 to 613 feet), Cuttings consist of 90% fine to coarse, angular felsic pink sand; 5% low-plastic fines; decomposing light gray, 5% fine angular gravel; maximum size = 3/4".
615									ML	SILT WITH SAND: 75% low-plastic fines; decomposed, white to light gray, medium toughness, 20% fine to coarse, angular to subangular sand; 5% fine angular gravel; maximum size = 1/2", light gray, cohesive in work sample.
620						N	0.0			NOTE: fines described above consist mostly of severely seritized feldpars and felsics.
625									SM	SILTY SAND WITH GRAVEL: 55% fine to coarse, angular to subangular sand; 25% fines; (as described above), white, decomposing, 20% fine to coarse, angular to subangular, felsic gravel; maximum size = 1/2", brown.
630										
635									GP	COBBLES: (632 to 639 feet).
640						N	0.0		SM	SILTY SAND: 75% fine to coarse, angular to subangular mafic felsic sand; 15% fines; chloritic, greenish gray, 10% mafic gravel.
645									ML	SILT: 90% low-plastic fines; black and white, 10% fine to coarse angular sand; maximum size = 1/4", dark gray.
									SP	POORLY GRADED SAND WITH GRAVEL: 60% fine to coarse sand; 40% fine to coarse gravel.
650									BR	

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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DRILLING CO *Lang Exploratory*
DATE (start/finish) *07/10/97 - 07/16/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1109.02*
TOTAL DEPTH (ft) *652*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
650	#16 Bentonite/#3 Sand mix (1:1)	SC-23-8							BR	BEDROCK: phaneritic granitics; 45% mafics, amphibiole and pyroxene; 65% felsics, quartz, feldspar; Feldspars have subtle blue/gray tint; top foot heavily innundated by apalitic felsic dikes.
655										DIRECTIONAL SURVEY at 650 feet: 2 degrees from vertical.
										Grab sample of soil cuttings from 651 feet (Sample SC-23-08)
										TOTAL DEPTH DRILLED: 652 feet.
660										
665										
670										
675										
680										
685										
690										
695										
700										

Summary MP Casing Log

Well No. MW-23
Job No. WB650

Client JPL \ Foster Wheeler
Site Jet Propulsion Laboratory
Project Description groundwater investigation

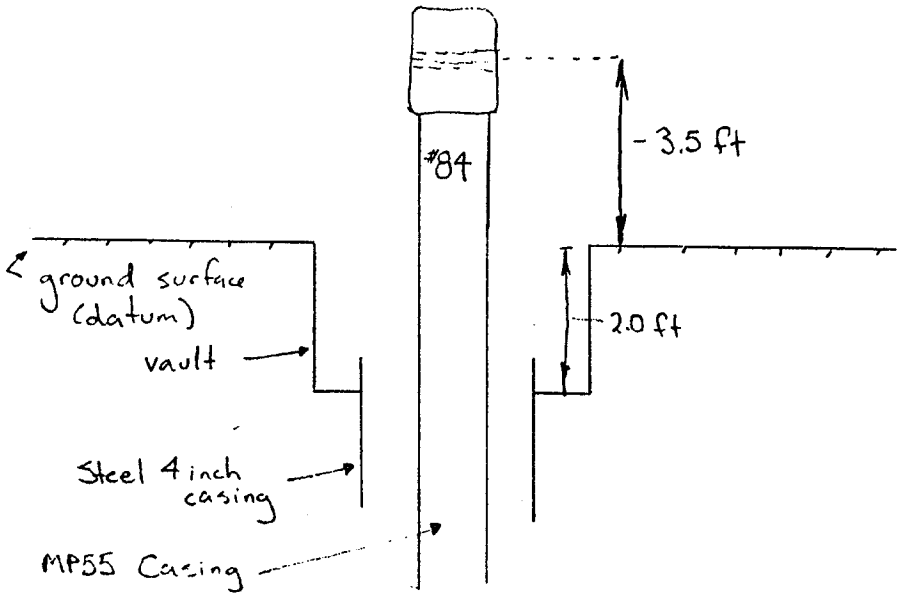
Well Information

Reference Datum top of 4-inch steel casing
Elevation of Datum 0.00 ft.
Position of MP Casing Top above / below Datum 2.07 ft. below datum
Position of MP Casing Bottom Below Datum 574.14 ft. below datum
Well Description MP38 \ MP55
Other References
MP38 w\ MP55 top section
installed in 4-inch steel casing

Log Information

Designed By DL **Date** Aug 18 / 97
Approved By Tom Blaney **Date** Aug 27 / 97
Checked By DGM **Date** Aug 27 / 97
Computer File No. MW23 **Date** Mon Aug 18 15:43:42 1997

Sketch of Wellhead Completion



Legend for Casing Installation Log

Well No. MW-23
Job No. WB650

MP Log	Description	Quantity
	MP38 CASING 10 FT. 0225F10	040
	MP38 PACKER STIFFENED 0237F05	015
	MP38 CASING 5 FT. 0225F05	017
	MP38 CASING 2 FT. 0225F02	009
	MP38 CASING 1 FT. 0225F01	002
	MP38 END CAP 0223	001
	MAGNETIC COLLAR	005

MP Log	Description	Quantity
	MP38 REGULAR COUPLING 0221	062
	MP38 TO MP55 ADAPTER COUPLING 022001	001
	MP38 MEASUREMENT PORT 0222	015
	MP38 PUMPING PORT 0224	005

Geo 1

Geo 2

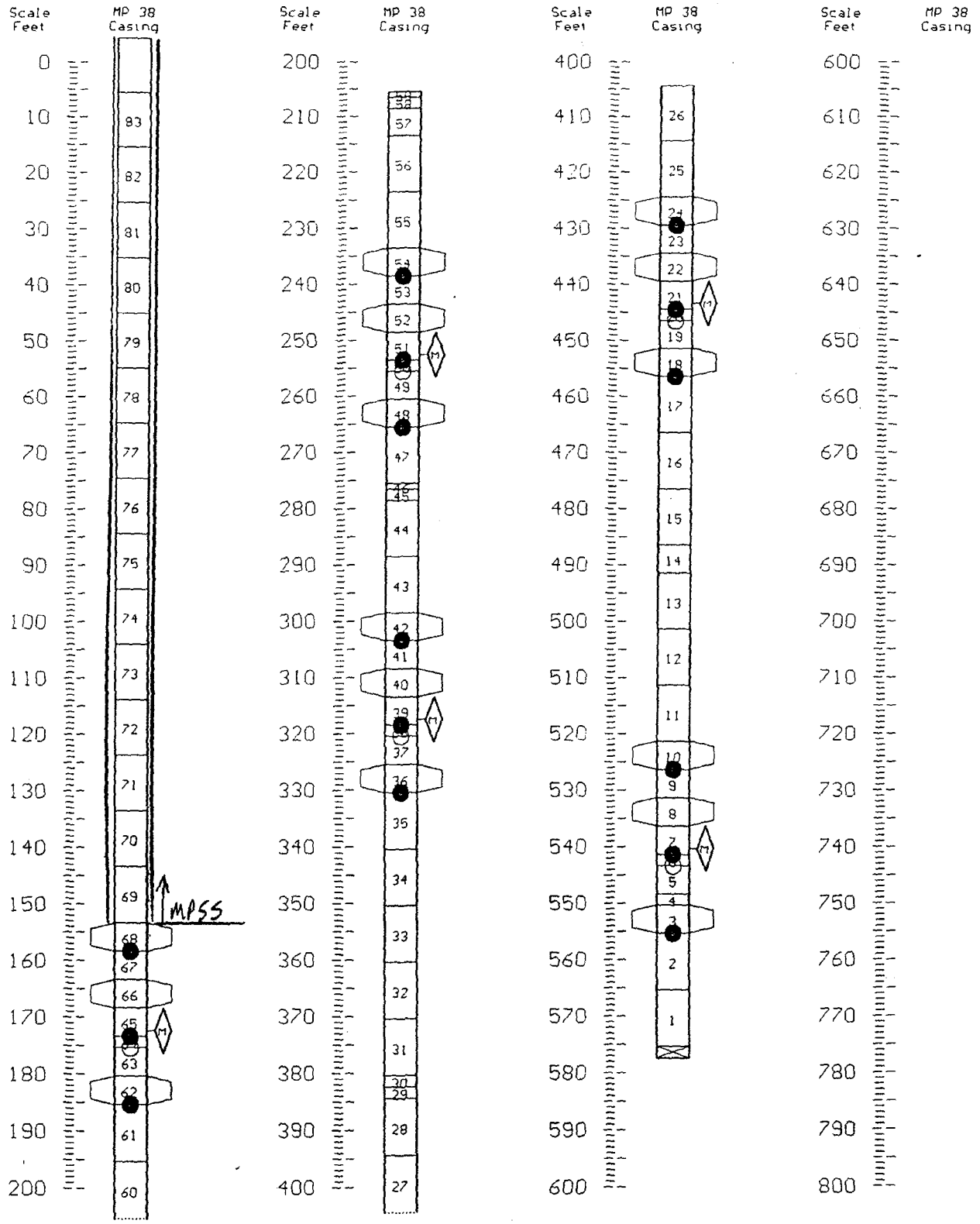
Well Casing

STAINLESS PIPE

STAINLESS STEEL SCREEN

Summary MP Casing Log Date: Tue Sep 23 13:51:53 1997 Page: 1

Job No. WB650 JPL \ Foster Wheeler Well No. MW-23



WELL MW-24

BORING LOG AND WELL COMPLETION DIAGRAM
WESTBAY MP CASING INSTALLATION LOG

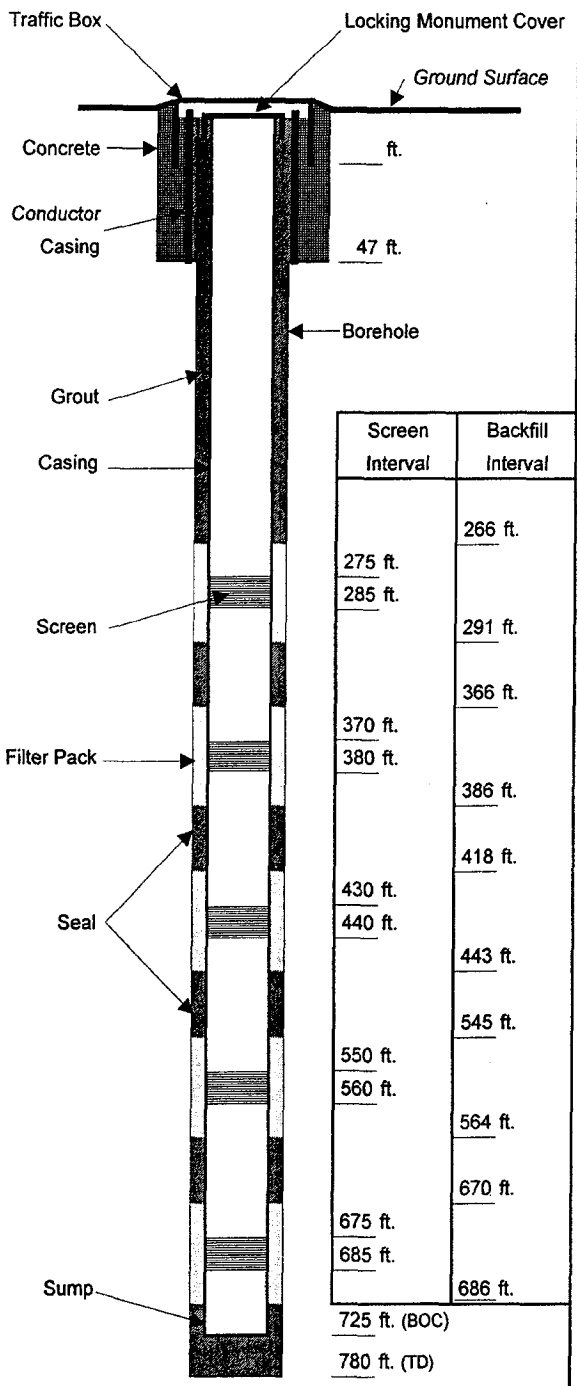
WELL CONSTRUCTION LOG

WELL NUMBER: MW-24

WELL TYPE: Deep Multiport Groundwater Monitoring Well

SURFACE ELEV (ft. above MSL): 1201.28

CASING ELEV (ft. above MSL): 1200.91



Screen Interval	Backfill Interval
	266 ft.
275 ft.	
285 ft.	
	291 ft.
	366 ft.
370 ft.	
380 ft.	
	386 ft.
	418 ft.
430 ft.	
440 ft.	
	443 ft.
	545 ft.
550 ft.	
560 ft.	
	564 ft.
	670 ft.
675 ft.	
685 ft.	
	686 ft.

DRILLING SUMMARY

DATE COMPLETED:	6/24/97 to 7/5/97
DRILLING COMPANY:	Lang Exploratory Drilling
DRILLING RIG TYPE:	Mud Rotary
TOTAL DEPTH DRILLED:	780 ft.

CONSTRUCTION DETAILS

BOREHOLE DIAMETER: (CONDUCTOR CASING)	18.5 in
CONDUCTOR CASING DIAMETER:	16 in
CONDUCTOR CASING LENGTH:	47 ft.
BOREHOLE DIAMETER:	12.25 in
TOTAL WELL DEPTH:	725 ft.
BLANK CASING TYPE:	Low Carbon Steel
BLANK CASING DIAMETER:	4 inch
TOTAL BLANK CASING LENGTH:	675 ft.
SCREEN TYPE:	Stainless Steel
SCREEN SLOT SIZE:	0.010 inch
INDIVIDUAL SCREEN LENGTH:	10 ft.
SUMP LENGTH:	40 ft.
PROTECTIVE CASING STICKUP:	None
GROUT MATERIAL:	Volclay Grout
SEAL MATERIAL:	1:1 Bentonite & Sand mix
FILTER MATERIAL:	#2 Sand
COMMENTS:	

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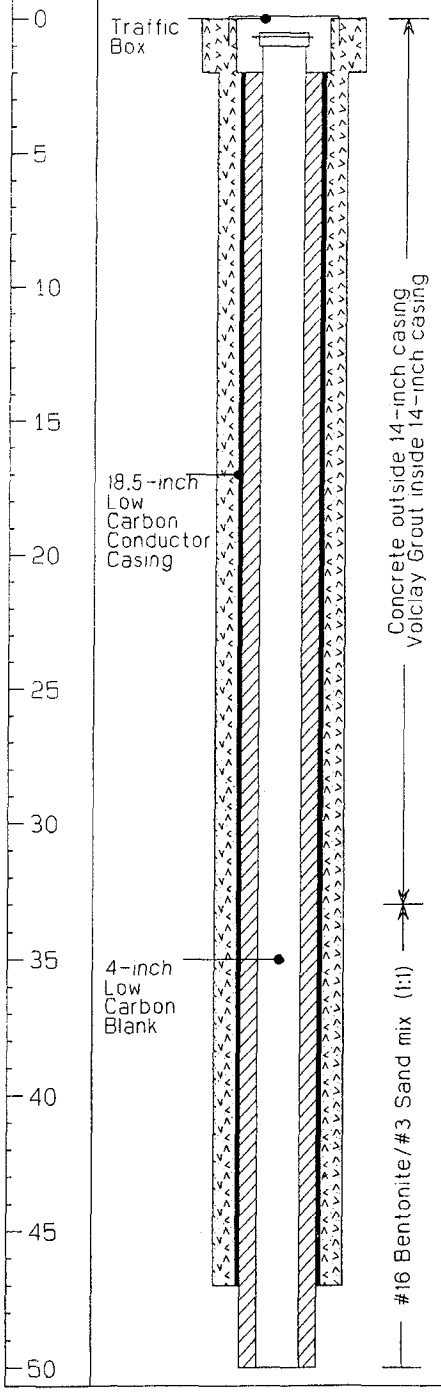
DATE (start/finish) *6/24/97 to 7/5/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	USCS Symbol	Lithologic Description and Notes
0				SL	N			Drilled pilot hole for conductor casing w/bucket auger rig.
				SL	N		SP/GP	ASPHALT - Pavement (0.5 feet thick).
5								GRAVELLY SAND: fine to coarse sand; mottled greenish brown and dark orange brown, (fill).
								GRAVELLY SAND: fine to medium sand with some coarse sand and trace silt, mottled greenish brown and dark orange brown, micaceous.
10							SP	POORLY GRADED SAND: fine to coarse sand with some fine to coarse gravel; light orange brown to orange brown, micaceous.
15							SP/GP	GRAVELLY SAND AND SANDY GRAVEL: Alternating thin lenses of fine to coarse sand and fine to coarse gravel with trace silt and occasional cobbles; light orange brown to orange brown, micaceous.
				SL	N		SP	POORLY GRADED SAND: fine to coarse sand with fine gravel and occasional coarse gravel; trace silt; orange brown, micaceous.
25				SL	N			
30							SM	SILTY SAND: fine to medium sand with some coarse sand and fine gravel; trace silt; orange brown, micaceous.
							SP	POORLY GRADED SAND: fine to medium sand with some coarse sand; trace silt and fine gravel; orange brown, micaceous.
35			0.2		N	0.0		Occasional pieces of coarse gravel and small cobbles from 34 to 36 feet.
			0.0		N	0.0		
							SP/SM	POORLY GRADED SAND AND SILTY SAND: Alternating thin lenses of fine to medium sand with silt and trace coarse sand; dark orange brown, micaceous, and fine to medium sand with some coarse sand and occasional pieces of fine gravel; dark orange brown, micaceous.
40			0.0		N	0.0		
								Small cobble at 44 feet.
45			0.0		N	0.0		Begin mud rotary drilling at 47.5 feet.
	SC-24-1	⧗						Grab sample of soil cuttings from 47.5 feet. (sample number SC-24-01)
50			0.0		N	0.0	SP	

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DATE (start/finish) *6/24/97 to 7/5/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
50									SP	POORLY GRADED SAND: 95% medium to coarse, angular to subangular sand; 5% fine subangular gravel; maximum size = 1/2", micaceous, orange brown.
55				0.0		N	0.0			
60				0.0		N	0.0			POORLY GRADED SAND WITH GRAVEL: 55% medium to coarse, angular to subangular sand; 45% fine to coarse, angular to subangular gravel; micaceous, light orange brown.
65										POORLY GRADED SAND WITH GRAVEL: 65% medium to coarse, angular to subangular sand; 35% fine to coarse, angular to subangular gravel; maximum size = 1.5", micaceous, light orange brown.
70				0.0		N	0.0			*Drilling Mud Parameters: Mud Weight: 9.0 lbs/gal Viscosity: 43 seconds*
75	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)								GP	COBBLES AND BOULDERS: (74 to 76 feet), Granitic and dioritic in composition.
									SP	POORLY GRADED SAND WITH GRAVEL: 55% medium to coarse, angular to subangular sand; 45% fine to coarse gravel; micaceous, light orange brown.
80				0.0		N	0.0			
									GP	COBBLES AND BOULDERS: (83 to 84.5 feet).
85									SP	POORLY GRADED SAND WITH GRAVEL: 55% medium to coarse, angular to subangular sand; 45% fine to coarse gravel; micaceous, light orange brown.
90				0.0		N	0.0			
95										POORLY GRADED SAND WITH GRAVEL: Same as above.
100				0.0		N	0.0			

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SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
100		SC-24-2	✖						SP	Grab sample of soil cuttings from 100 feet. (Sample SC-24-02)
105										POORLY GRADED SAND WITH GRAVEL: 65% fine to coarse, angular to subangular sand; 30% fine to coarse, angular to subrounded gravel; 5% non-plastic fines; maximum size = 1.5", micaceous, light orange brown.
110				0.0		N	0.0			
									SM	SILTY SAND: 75% fine sand; 25% non-plastic fines; dark orange brown.
									SP	POORLY GRADED SAND: 90% fine to coarse, angular to subrounded sand; 10% fine angular to subangular gravel; maximum size = 3/4", micaceous, orange brown.
115										
120				0.0		N	0.0			POORLY GRADED SAND: Same as above.
125	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)									
130				0.0		N	0.0		GP	COBBLES AND BOULDERS: (128.5 to 135 feet).
135									SP	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to subrounded sand; 15% fine to coarse, subangular to subrounded gravel; 5% non-plastic fines; maximum size = 1/2", micaceous, light orange brown.
140				0.0		N	0.0			
145										
150				0.0		N	0.0			DIRECTIONAL SURVEY at 150 feet: 0.5 degree from vertical.

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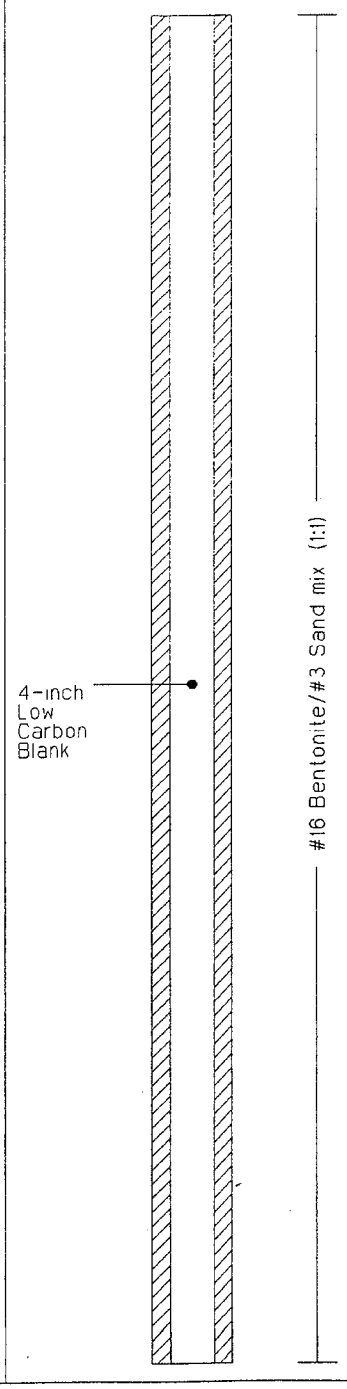
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
150									SP	SILTY SAND: 75% fine to coarse, subangular to subrounded sand; 15% non-plastic fines; 10% fine gravel; maximum size = 1/2", micaceous, dark orange brown.
									SM	
									SP	POORLY GRADED SAND: 85% fine to coarse, subangular to subrounded sand; 10% fine subangular to subrounded gravel; 5% non-plastic fines; maximum size = 3/4", micaceous, light orange brown.
155										
160						N	0.0			
									GP	POORLY GRADED GRAVEL WITH SAND: 95% fine to coarse gravel; 5% coarse sand; maximum size = 1.5", micaceous, light orange brown.
									SP	POORLY GRADED SAND WITH GRAVEL: 60% fine to coarse, subangular to subrounded sand; 40% fine to coarse, subangular to subrounded gravel; maximum size = 1.0", micaceous, light orange brown.
165										
									GP	COBBLES AND BOULDERS: (167 to 170 feet), Dioritic.
170										POORLY GRADED GRAVEL WITH SAND: 60% fine to coarse, subangular to subrounded gravel; 40% fine to coarse, subangular to subrounded sand; maximum size = 2.0", micaceous, light orange brown.
175	4-inch Low Carbon Blank									
									SP	POORLY GRADED SAND WITH GRAVEL: 60% fine to coarse sand; 40% fine gravel; maximum size = 3/4", micaceous, light orange brown.
									GP	COBBLES AND BOULDERS: (178 to 182 feet).
180						N	0.0			
									SP	POORLY GRADED SAND WITH GRAVEL: 65% fine to coarse, angular to subrounded sand; 35% fine to coarse, subangular to subrounded gravel; maximum size = 1.5", micaceous, light orange brown. *Drilling Mud Parameters: Mud Weight: 9.1 lbs/gal Viscosity: 41 seconds*
185										
190										
195									GP	POORLY GRADED GRAVEL WITH SAND: 80% fine to coarse, angular to subangular gravel; 20% fine to coarse subrounded sand; maximum size 1.5", micaceous, light orange brown.
200										

#16 Bentonite/#3 Sand mix (1:1)

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DATE (start/finish) *6/24/97 to 7/5/97*

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SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
200		SC-24-3	⧗	0.0		N	0.0		GP	Grab sample of soil cuttings from 200 feet. (Sample SC-24-03)
									SP	POORLY GRADED SAND WITH GRAVEL: 70% fine to coarse, subangular to subrounded sand; 30% fine subrounded gravel; maximum size = 3/4", micaceous, light orange brown.
205									GP	POORLY GRADED GRAVEL WITH SAND: 80% fine to coarse, angular to subangular gravel; 20% fine to coarse subrounded sand; maximum size = 1.0", micaceous, light orange brown.
210										
									SP	POORLY GRADED SAND WITH GRAVEL: 70% fine to coarse, angular to subangular sand; 30% fine to coarse subrounded gravel; maximum size = 1/2", micaceous, light orange brown.
215										
220						N	0.0			BOULDER: Hard drilling.
										COBBLE or BOULDER: Hard drilling.
225	4-inch Low Carbon Blank									
230	#16 Bentonite/#3 Sand mix (1:1)									BOULDER: Dioritic.
									GP	POORLY GRADED GRAVEL WITH SAND: 60% fine to coarse, angular to subrounded gravel; 40% fine to coarse, subangular to subrounded sand; maximum size = 2", micaceous, light orange brown.
235										
240						N	0.0			COBBLES and BOULDERS at 243 feet.
245									SP	POORLY GRADED SAND WITH GRAVEL: 60% fine to coarse sand; 40% fine to coarse, angular to subrounded gravel; maximum size = 2.5", micaceous, light brown.
									GP	COBBLES: (248 to 250 feet).
250									SP	

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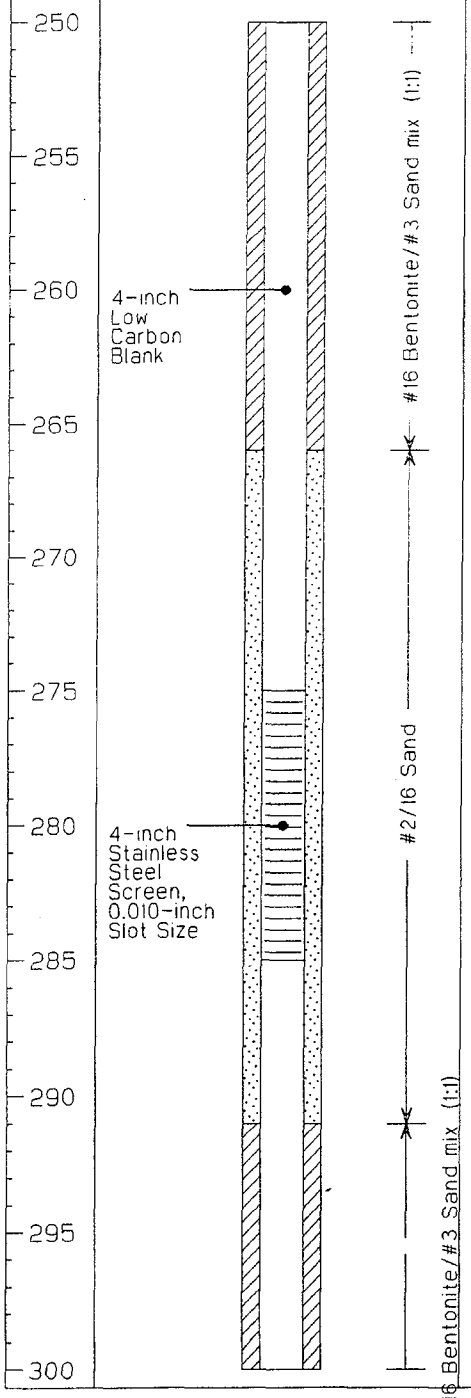

Depth (ft)	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
250							SP	POORLY GRADED SAND WITH GRAVEL: 60% fine to coarse sand; 40% fine to coarse, angular to subrounded gravel; maximum size = 2.5", micaceous, light brown.
255							GP	COBBLES and BOULDERS: (255 to 257 feet).
							SP	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse sand; 20% fine to coarse, angular to subrounded gravel; 5% non-plastic fines; micaceous, light brown.
260				N	0.0			
265							GP	COBBLES or BOULDERS: (264 to 265 feet), Granitic.
							SP	POORLY GRADED SAND WITH GRAVEL: Same as above. *Drilling Mud Parameters: Mud Weight: 8.8 lbs/gal Viscosity: 39 seconds* Increased drill chatter.
270								
275								
280				N	0.0			POORLY GRADED SAND WITH GRAVEL: Same as above. Increased drill chatter. COBBLES and BOULDERS. COBBLES and BOULDERS/
285								
290							GP	POORLY GRADED GRAVEL WITH SAND: 65% fine to coarse, angular to subrounded gravel; 30% fine to coarse, subangular to subrounded sand; 5% non-plastic fines, maximum size = 1.5", micaceous, light brown.
295								
300								

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APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
300		SC-24-4	⧗	0.0		N	0.0		GP	Grab sample of soil cuttings from 300 feet. (Sample SC-24-04)
									SP SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 70% fine to coarse, angular to subrounded sand; 20% fine to coarse, subangular to subrounded gravel; 10% non-plastic fines; maximum size = 1/2", micaceous, brown.
305									SP	POORLY GRADED SAND: 85% fine to coarse, subangular to subrounded sand; 10% fine to coarse, subangular to subrounded gravel; 5% non-plastic fines; maximum size = 3/4", micaceous, orange brown.
310										
315									ML	SILT WITH SAND: 75% non-plastic fines; 25% fine to coarse, subangular to rounded sand; maximum size = 1/8", micaceous, gray brown.
									SM	SILTY SAND: 70% fine to coarse, subangular to rounded sand; 30% non-plastic fines; maximum size = 1/4", micaceous, gray brown.
320						N	0.0		SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine subangular to subrounded gravel; micaceous, light brown.
325	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)									*Increased drill chatter.*
										POORLY GRADED SAND WITH SILT AND GRAVEL: 75% fine to coarse, subangular to subrounded sand; 15% fine to coarse, subangular to subrounded gravel; 10% non-plastic fines; maximum size = 1", micaceous, light brown.
330									SP	POORLY GRADED SAND: 100% fine to coarse, subangular to rounded sand; maximum size = 1/4", micaceous, orange brown to light brown.
335										POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to subrounded sand; 20% fine subangular to subrounded gravel; maximum size = 1/2", micaceous, tan brown.
340						N	0.0			
345									SM	SILTY SAND: 75% fine to coarse, subangular to subrounded sand; 25% non-plastic fines; micaceous, orange brown.
350									SP SM	

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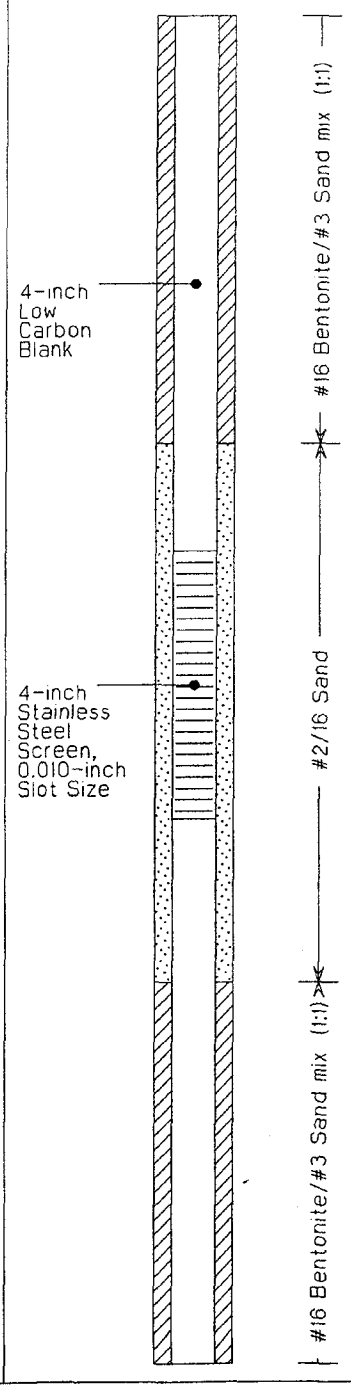
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____



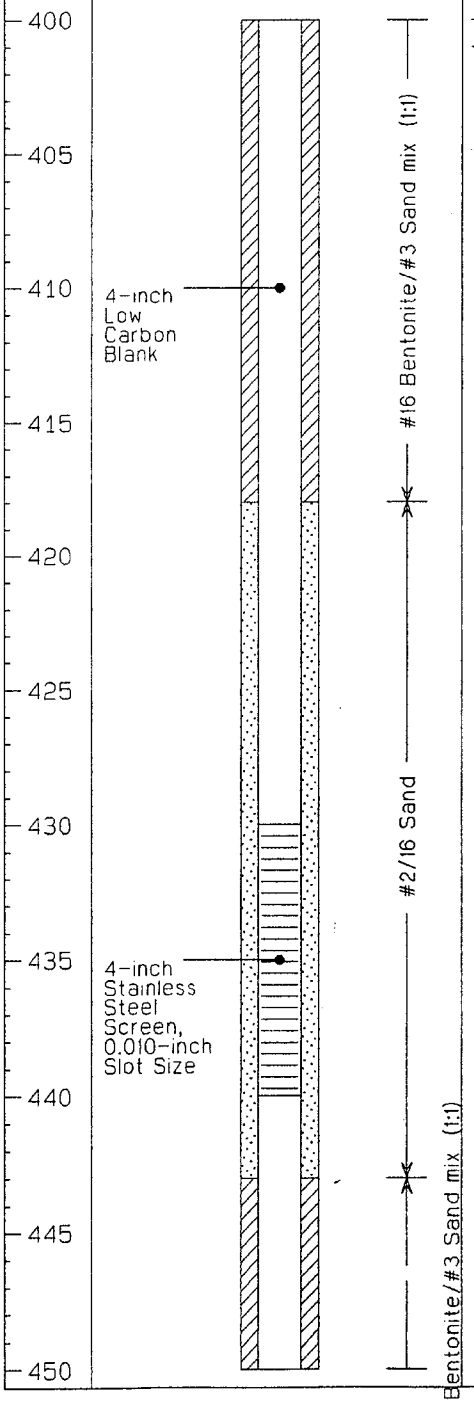
Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
350								SP SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 65% fine to coarse, subangular to subrounded sand; 25% fine subangular to subrounded gravel; 10% non-plastic fines; maximum size = 1/2", micaceous, light brown.
355									DIRECTIONAL SURVEY at 350 feet = 0.5 degree from vertical.
								SM	SILTY SAND WITH GRAVEL: 50% fine to coarse, subrounded to subangular sand; 35% non-plastic fines; 15% fine subangular gravel; maximum size =1/2", micaceous, light brown.
360					N	0.0			*Drilling Mud Parameters: Mud Weight: 9.2 lbs/gal Viscosity: 39 seconds*
365									
								ML SM	SANDY SILT: 90% non-plastic fines; 10% fine to coarse, subangular to subrounded sand; maximum size = 1/8", micaceous, brown.
370									SILTY SAND WITH GRAVEL: 50% fine to coarse, subrounded to subangular sand; 35% non-plastic fines; 15% fine subangular gravel; maximum size =1/2", micaceous, light brown.
								SP	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to rounded sand; 15% fine to coarse subangular gravel; 5% non-plastic fines; maximum size = 1", micaceous, light brown.
375									
380					N	0.0			COBBLES and BOULDERS
385									POORLY GRADED SAND WITH GRAVEL: Same as above.
390									Same as above.
395								SM	SILTY SAND: 80% fine to coarse, subangular to subrounded sand; 15% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 3/4", micaceous, orange brown.
400								SP	

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 24

PROJECT *Jet Propulsion Laboratory*
LOCATION *Aero Road*
GEOLOGIST *B.G. Randolph, T. Choi, T. Blaney*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *6/24/97 to 7/5/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____



Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
SC-24-5	✖	0.0		N	0.0		SP	Grab Sample of soil cuttings from 400 feet. (Sample SC-24-05)
							SM	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to rounded sand; 15% fine to coarse subangular gravel; 5% non-plastic fines; maximum size = 1", micaceous, light brown.
								SILTY SAND: 75% fine to coarse, subangular to subrounded sand; 20% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 1", micaceous, brown.
							SP	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to rounded sand; 15% fine subangular gravel; 5% non-plastic fines; maximum size = 1/2", micaceous, light brown.
							SM	
				N	0.0		SP	SILTY SAND: 75% fine to coarse, subangular to subrounded sand; 20% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 1", micaceous, brown.
							SM	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to rounded sand; 15% fine subangular gravel; 5% non-plastic fines; maximum size = 1/2", micaceous, light brown.
								SILTY SAND: 75% fine to coarse, subangular to rounded sand; 20% non-plastic fines, 5% fine subangular to subrounded gravel; maximum size 1/2", micaceous, light brown.
								Drilling Mud Parameters: Mud Weight: 9.2 lbs/gal Viscosity: 39 seconds
								SILTY SAND: Same as above.
				N	0.0		SP	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to rounded sand; 15% fine to course, subangular to subrounded gravel; 5% non-plastic fines; maximum size = 3/4", micaceous, light brown.
							SM	SILTY SAND: 75% fine to coarse, subangular to rounded sand; 20% non-plastic fines; 5% fine subangular to subrounded gravel; maximum size 1/2", micaceous, light brown.
							ML	

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DATE (start/finish) *6/24/97 to 7/5/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
450									ML SM	SILT WITH SAND: 80% non-plastic fines; 20% fine to coarse, subangular to subrounded sand; maximum size = 1/4", micaceous, orange brown.
									SP SM	SILTY SAND: 75% fine to coarse, subangular to rounded sand; 20% non-plastic fines; 5% fine subangular to subrounded gravel; maximum size 1/2", micaceous, light brown.
455									ML	POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to subrounded sand; 15% fine to coarse, subangular to subrounded gravel; 5% non-plastic fines; maximum size = 3/4", micaceous, light brown.
460						N	0.0		SP SM	SILTY SAND: 75% fine to coarse, subangular to rounded sand; 20% non-plastic fines; 5% fine subangular to subrounded gravel; maximum size = 1/2", micaceous, light brown.
465										SILT WITH SAND: 85% non-plastic fines; 15% fine to medium sand; maximum size = 1/8", micaceous, grayish brown.
									SP	POORLY GRADED SAND: 95% fine to coarse, subangular to rounded sand; 5% non-plastic fines; maximum size = 1/8", micaceous, orange brown.
470									ML	SILTY SAND: 65% fine to coarse, subangular to rounded sand; 35% non-plastic fines; maximum size = 1/8", micaceous, light brown.
475	4-inch Low Carbon Blank #16 Bentonite/#3 Sand mix (1:1)									POORLY GRADED SAND: 95% fine to coarse, subangular to rounded sand; 5% non-plastic fines; maximum size = 1/8", micaceous, orange brown.
									SP	SILT: 95% non-plastic fines; 5% fine to coarse, subangular to subrounded sand; max size = 1/8", micaceous, greenish brown.
480						N	0.0		SM	POORLY GRADED SAND: 95% fine to coarse, subangular to rounded sand; 5% non-plastic fines; max size = 1/8", micaceous, orange brown.
485										SILTY SAND: 85% fine to coarse, subangular to rounded sand; 15% non-plastic fines; maximum size = 3/16", micaceous, grayish brown.
490										
495									SP SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 65% fine to coarse, subangular to subrounded sand; 25% fine subangular to subrounded gravel; 10% non-plastic fines; maximum size = 1/2", micaceous, light brown.
500										

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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DRILLING CO *Lang Exploratory*
DATE (start/finish) *6/24/97 to 7/5/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
500		SC-24-6	✖	0.0		N	0.0		SP SM	Grab sample of soil cuttings from 500 feet. (sample SC-24-06) POORLY GRADED SAND WITH SILT AND GRAVEL: 65% fine to coarse, subangular to subrounded sand; 25% fine subangular to subrounded gravel; 10% non-plastic fines; maximum size = 1/2", micaceous, light brown.
505										
510										POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to rounded sand; 10% non-plastic fines; 5% fine subangular to subrounded gravel; maximum size = 1/2", micaceous, light brown.
515										
520						N	0.0			POORLY GRADED SAND WITH SILT: Same as above.
525	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)									POORLY GRADED SAND WITH SILT: Same as above.
530										
535										POORLY GRADED SAND WITH SILT: Same as above.
540						N	0.0		SM	SILTY SAND: 75% fine to coarse, subangular to subrounded sand; 25% non-plastic fines; maximum size = 1/8", micaceous, brown.
									SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to rounded sand; 10% non-plastic fines; 5% fine subangular to subrounded gravel; maximum size = 1/2", micaceous, light brown.
545	#2/16 Sand								SM	Increased drill chatter and small granitic cobbles.
									SP SM	SILTY SAND: 60% fine to coarse, subangular to subrounded sand; 40% non-plastic fines; maximum size = 1/8", micaceous, dark brown.
550										

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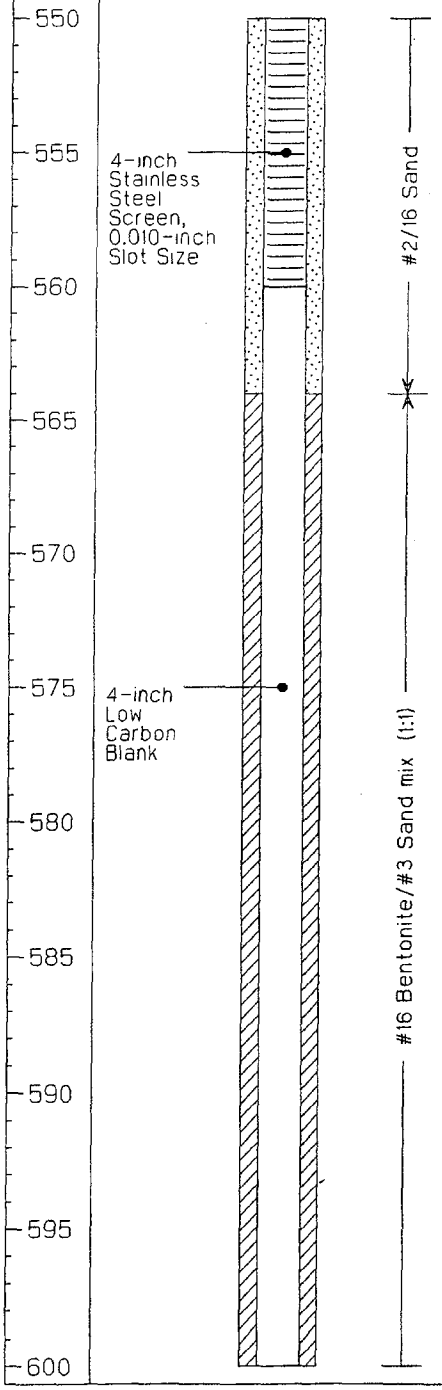
DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
550							SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to rounded sand; 10% non-plastic fines; 5% fine subangular to subrounded gravel; maximum size = 1/2", micaceous, light brown.
555								
				N	0.0		SM	SILTY SAND: 80% fine to coarse, subangular to subrounded sand; 20% non-plastic fines; maximum size = 1/8", micaceous, greenish brown.
560							SP SM	POORLY GRADED SAND WITH SILT: 85% fine to course, subangular to rounded sand; 10% non-plastic fines; 5% fine subangular to subrounded gravel; maximum size = 1/2", micaceous, light brown.
565							ML	SILT WITH SAND: 75% non-plastic fines; 25% fine to coarse, subangular to rounded sand; micaceous, light brown.
							SM	SILTY SAND: 75% fine to coarse, subangular to subrounded sand; 20% non-plastic fines; 5% fine subangular to subrounded gravel; maximum size = 1/2", micaceous, brown.
570							SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine subanglular to subrounded gravel; maximum size = 1/4", micaceous, light brown.
575								*Drilling Mud Parameters: Mud Weight: 9.2 lbs/gal Viscosity: 38 seconds*
				N	0.0			
580								
585								POORLY GRADED SAND WITH SILT: Same as above.
								GRANITIC COBBLES: (588.5 feet).
590							ML	SANDY SILT: 65% non-plastic fines; 35% fine to coarse, subangular to subrounded sand; maximum size = 1/8", micaceous, grayish brown.
							SM	SILTY SAND: 85% fine to coarse, subangular to rounded sand; 15% non-plastic fines; maximum size 1/8", micaceous, brown.
595							SP SM	Same as above with an increase in non-plastic fines to 30%.
								POORLY GRADED SAND WITH SILT: 85% fine to coarse sand; 10% non-plastic fines; 5% fine gravel; maximum size = 1/4", micaceous, light brown.
600								

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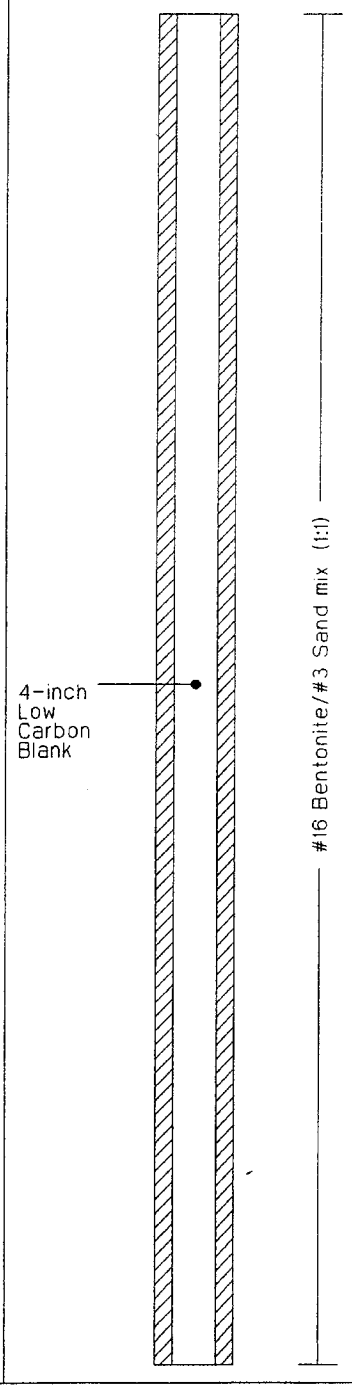
DATE (start/finish) *6/24/97 to 7/5/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____



Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
600	SC-24-7	⧗	0.0		N	0.0		SP SM	Grab sample of soil cuttings from 600 feet. (sample SC-24-07)
								SP	Increased drill chatter; granitic and dioritic cobbles and boulders.
605								SP SM	POORLY GRADED SAND WITH GRAVEL: 75% fine to coarse, subangular to subrounded sand; 20% fine to coarse, subangular to subrounded gravel; 5% non-plastic fines; maximum size = 1/2", micaceous, light brown.
								SM	
610								SP SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 65% fine to coarse, subangular to subrounded sand; 25% fine subangular to subrounded gravel; 10% non-plastic fines; maximum size = 1/2", micaceous, light brown.
615									SILTY SAND: 75% fine to coarse, subangular to rounded sand, 20% non-plastic fines, 5% fine subangular to subrounded gravel; maximum size 1/4", micaceous, brown.
620					N	0.0			POORLY GRADED SAND WITH SILT AND GRAVEL: 65% fine to coarse, subangular to subrounded sand; 25% fine subangular to subrounded gravel; 10% non-plastic fines; maximum size = 1/2", micaceous, light brown.
									Increased drill chatter, dioritic cobbles.
625									POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 3/4", micaceous, grayish brown.
								ML	COBBLES: Granitic.
630								SP SM	SANDY SILT: 60% non-plastic fines; 40% fine to coarse, subangular to rounded sand; maximum size = 1/8", micaceous, light brown.
									POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 3/4", micaceous, grayish brown.
								GP	
635								SP SM	*Drilling Mud Parameters: Mud Weight: 9.2 lbs/gal Viscosity: 37 seconds*
640					N	0.0			POORLY GRADED GRAVEL WITH SAND: 60% fine to coarse, angular to subrounded gravel; 35% fine to coarse, subangular to rounded sand; 5% non-plastic fines, maximum size = 1.5".
645									POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 3/4", micaceous, grayish brown.
650									

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 24

PROJECT *Jet Propulsion Laboratory*
LOCATION *Aero Road*
GEOLOGIST *B.G. Randolph, T. Choi, T. Blaney*
DRILLING CO *Lang Exploratory*
DATE (start/finish) *6/24/97 to 7/5/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
650									SP SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 3/4", micaceous, grayish brown.
655										
660	4-inch Low Carbon Blank; #16 Bentonite/#3 Sand mix (1:1)					N	0.0			
665									SP	POORLY GRADED SAND: 85% fine to coarse, subanglular to subrounded sand; 10% fine to coarse, subangular to subrounded gravel; 5% non-plastic fines; maximum size = 1.0", micaceous, light brown.
670										POORLY GRADED SAND WITH GRAVEL: 80% fine to coarse, subangular to subrounded sand; 15% fine to coarse, subangular to subrounded gravel; 5% non-plastic fines; maximum size = 3/4", micaceous, light brown.
675	#2/16 Sand								SP SM	
									ML	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 1/2", micaceous, brown.
680	4-inch Stainless Steel Screen, 0.010-inch Slot Size					N	0.0		SP SM	SANDY SILT: 70% non-plastic fines; 30% fine to coarse, subangular to rounded sand; maximum size = 1/8", micaceous, grayish brown.
685									SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 1/2", micaceous, brown.
690	#16 Bentonite/#3 Sand mix (1:1)									SILTY SAND: 60% fine to coarse, subangular to rounded sand; 40% non-plastic fines; maximum size 1/8", micaceous, brown. *Drilling Mud Parameters:* *Mud Weight: 9.4 lbs/gal* *Viscosity: 35 seconds* Drilling slow - few cuttings
695									SP	POORLY GRADED SAND: 95% fine to coarse, subangular to rounded sand; 5% non-plastic fines; maximum size = 1/8", micaceous, greyish brown.
700									SM	

FOSTER WHEELER ENVIRONMENTAL CORPORATION

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SAMPLING METHOD *Grab Sample from Shaker Screen*
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TOTAL DEPTH (ft) *780*
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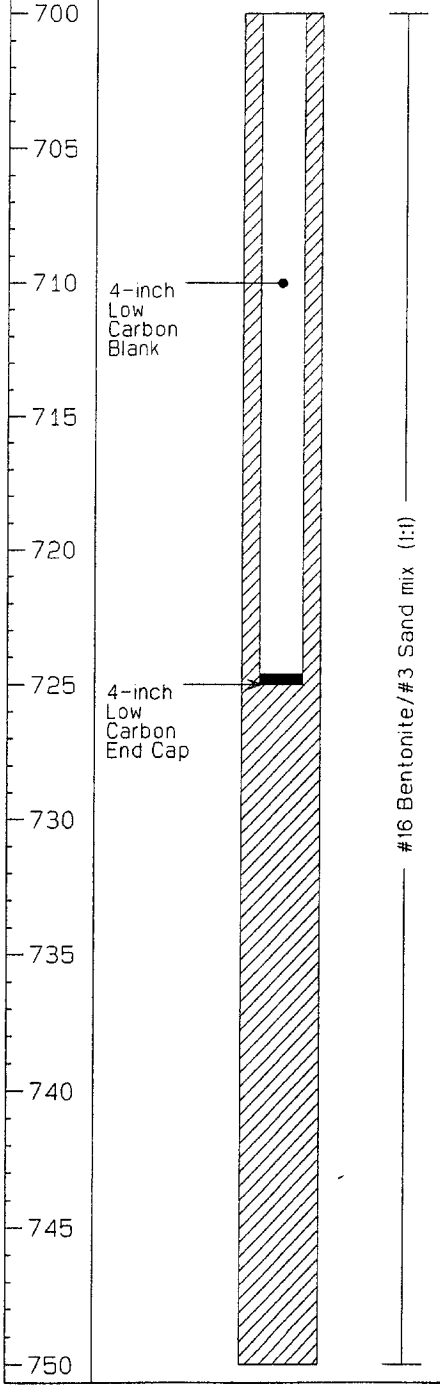

Depth (ft)	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
700	SC-24-8	⧗	0.0		N	0.0		SM	Grab sample of soil cuttings at 700 feet. (sample SC-24-08)
705									SILTY SAND: 65% fine to coarse, subangular to rounded sand; 30% non-plastic fines; 5% fine to coarse gravel; maximum size 1/8", micaceous, gray brown.
710									Granitic and dioritic cobbles.
715								SP SM SM	POORLY GRADED SAND WITH SILT: 85% fine to coarse, subangular to subrounded sand; 10% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 1.0", micaceous, dark brown.
720					N	0.0			SILTY SAND: 65% fine to coarse, subangular to rounded sand; 30% non-plastic fines; 5% fine to coarse, subangular to subrounded gravels; maximum size 1/8", micaceous, gray brown.
725									
730								SP SM SM	POORLY GRADED SAND WITH SILT AND GRAVEL: 75% fine to coarse, subangular to subrounded sand; 15% fine to coarse, subangular to subrounded gravel; maximum size = 3/4", 10% non-plastic fines; micaceous, dark brown.
735									SILTY SAND: 60% fine to coarse, subangular to rounded sand; 40% non-plastic fines; maximum size = 1/8", micaceous, brown.
								ML SM ML	SILT WITH SAND: 85% non-plastic fines; 15% fine to coarse, subangular to rounded sand; maximum size = 1/8", micaceous, grayish brown.
740					N	0.0			SILTY SAND: 60% fine to coarse, subangular to rounded sand; 40% non-plastic fines; maximum size = 1/8", micaceous, brown.
									SILT: 95% non-plastic fines; 5% fine to coarse, subangular to rounded sand; maximum size = 1/8", micaceous, grayish brown.
745									SILT: Same as above; sand content increases to 15% between 745 feet and 746 feet.
750									

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Monitoring Well 24

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DRILLING CO *Lang Exploratory*
DATE (start/finish) *6/24/97 to 7/5/97*

DRILLING METHOD *Reverse Circulation Mud Rotary*
SAMPLING METHOD *Grab Sample from Shaker Screen*
SURFACE ELEVATION *1201.28*
TOTAL DEPTH (ft) *780*
APPROX. DEPTH TO WATER (ft bgs) _____

Depth (ft)	Well Completion	Sample No.	Samples	OVA (ppm)	Moisture	Odor	Breath Zn	Lithology	USCS Symbol	Lithologic Description and Notes
750	#16 Bentonite/#3 Sand mix (1:1)								ML	SILT: 95% non-plastic fines; 5% fine to coarse, subangular to rounded sand; maximum size = 1/8", micaceous, grayish brown.
755									SM, ML, SM	SILTY SAND: 60% fine to coarse, subangular to rounded sand; 40% non-plastic fines; maximum size = 1/8", micaceous, medium brown.
										SILT: 95% non-plastic fines; 5% fine to coarse, subangular to rounded sand; maximum size = 1/8", micaceous, grayish brown.
760						N	0.0			SILTY SAND: 60% fine to coarse, subangular to rounded sand; 40% non-plastic fines; maximum size = 1/8", micaceous, medium brown.
									ML	SANDY SILT: 70% non-plastic fines; 30% fine to coarse, subangular to rounded sand; maximum size = 1/8", micaceous, grayish brown.
765									SM, ML	SILTY SAND: 65% fine to coarse, subangular to subrounded sand; 35% non-plastic fines; maximum size = 1/8", micaceous, medium brown.
770									SM	SANDY SILT: 70% non-plastic fines; 30% fine to coarse, subangular to rounded sand; maximum size = 1/8", micaceous, gray brown.
775										SILTY SAND: 65% fine to coarse, subangular to rounded sand; 30% non-plastic fines; 5% fine to coarse, subangular to subrounded gravel; maximum size = 3/4", micaceous, light brown.
780		SC-24-9	⧗							Grab sample of soil cuttings from 780 feet. (Sample SC-24-09)
										DIRECTIONAL SURVEY at 780 feet: 1 degree from vertical.
										Total depth drilled: 780 feet.
785										
790										
795										
800										

Summary MP Casing Log

Well No. MW-24
Job No. WB650

Client JPL \ Foster Wheeler
Site Jet Propulsion Laboratory
Project Description groundwater investigation

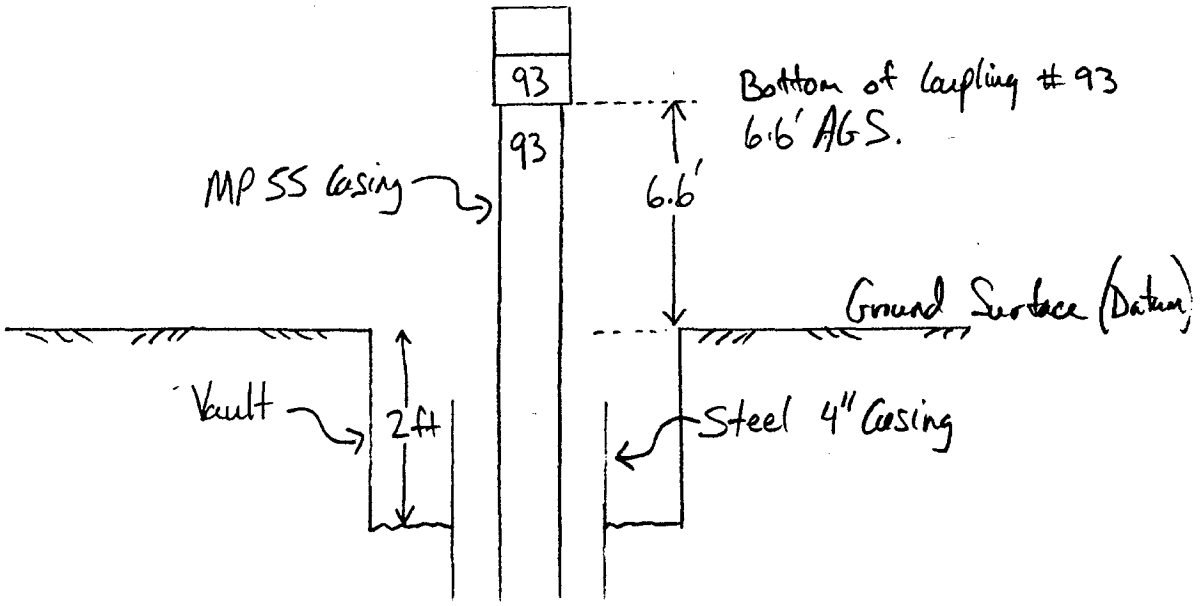
Well Information

Reference Datum top of 4-inch steel casing
Elevation of Datum 0.00 ft.
Position of MP Casing Top above / below Datum 6.92 ft. above datum
Position of MP Casing Bottom Below Datum 700.14 ft. below datum
Well Description MP38 \ MP55
Other References MP38 w\ MP55 top section installed in 4-inch steel casing

Log Information

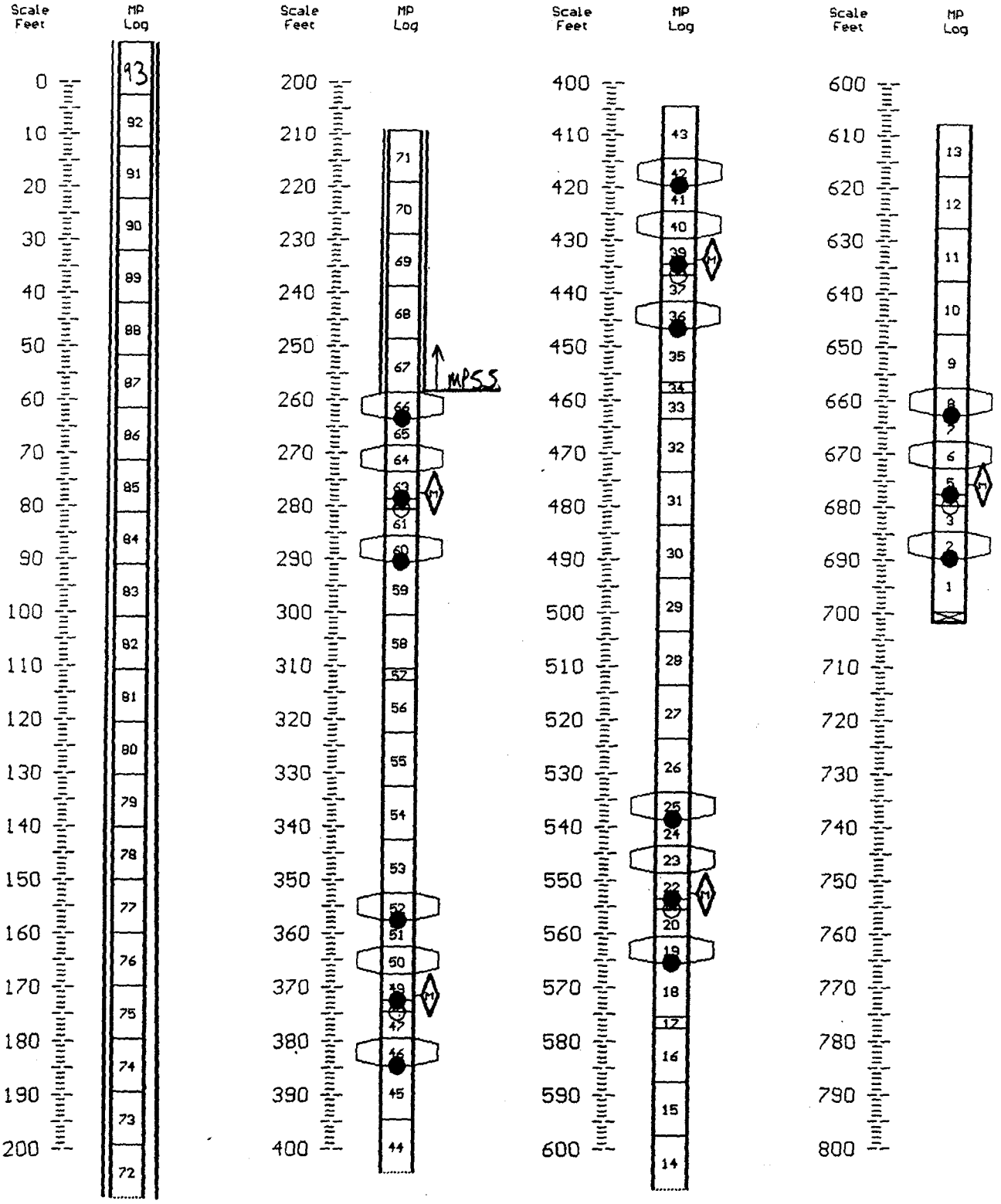
Designed By DGM **Date** July 29/97
Approved By J. Brenner **Date** July 29/97
Checked By JM **Date** July 29/97
Computer File No. MW24 **Date** Tue Jul 29 15:06:54 1997

Sketch of Wellhead Completion



Summary MP Casing Log Date: Thu Sep 11 12:41:55 1997 Page: 1

Job No. WB650 JPL \ Foster Wheeler Well No. MW-24



APPENDIX C

GEOPHYSICAL LOGS FOR JPL GROUNDWATER MONITORING WELLS

welenco

ELECTRIC LOG

FILING NO.

COMPANY BEYLIK DRILLING, INC

WELL MW-3

FIELD JPL PASADENA

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC. ____ TWP. ____ RGE. ____

OTHER SERVICES:
GAMMA-GUARD
CALIPER

Permanent Datum: G.L., Elev. ____
Log Measured From G.L., ____ Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ____
D.F. ____
G.L. ____

Date	1-25-90			
Run No.	ONE			
Depth—Driller	730'			
Depth—Logger	729'			
Btm. Log Inter.	728'			
Top Log Inter.	22'			
Casing—Driller	10½" @ 22'	@	@	@
Casing—Logger	22'			
Bit Size	9 7/8"			
Type Fluid in Hole	BENTONITE MUD			
	–			
Dens. | Visc.	N/A	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	PIT			
R_m @ Meas. Temp.	9.6 @ 75°F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	11.4 @ 75°F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M |	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	0 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	L103 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. CUTLER	MR. CALDWELL	MR. MELCHIOR	MR. TOMCZYK

Fold Here This Heading and Log Conform To API RP 31

REMARKS

Changes in Mud Type or Additional Samples

Date	Sample No.	Depth—Driller	Type Fluid in Hole	Dens. | Visc.	ph | Fluid Loss ml	Source of Sample	R_m @ Meas. Temp.	R_{mf} @ Meas. Temp.	R_{mc} @ Meas. Temp.	Source: R_{mf} | R_{mc}	R_m @ BHT	R_{mf} @ BHT	R_{mc} @ BHT
							@ °F	@ °F	@ °F		@ °F	@ °F	@ °F

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole
NORMALS	108'	0-1000 OHM-M	0-200 OHM-M

Equipment Data

Run No.	Tool Type	Pad Type	Tool Position	Other
@ °F				
@ °F ONE	NORMALS	–	FREE	
@ °F				
@ °F				
@ °F				
@ °F				

RESISTIVITY ohms. m²/m

RESISTIVITY ohms. m²/m

SHORT NORMAL 16 Inch 0 1000 / 0 200

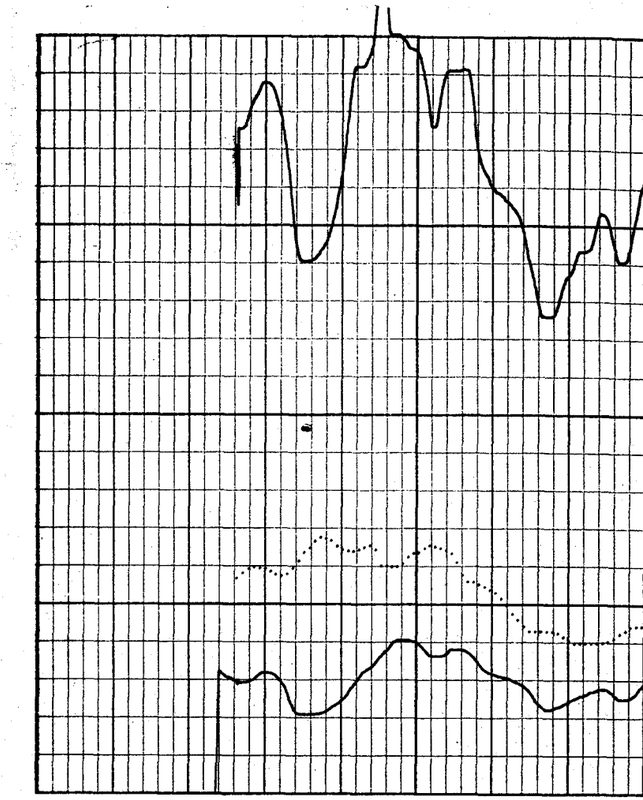
LONG NORMAL 64 Inch 0 1000 / 0 200

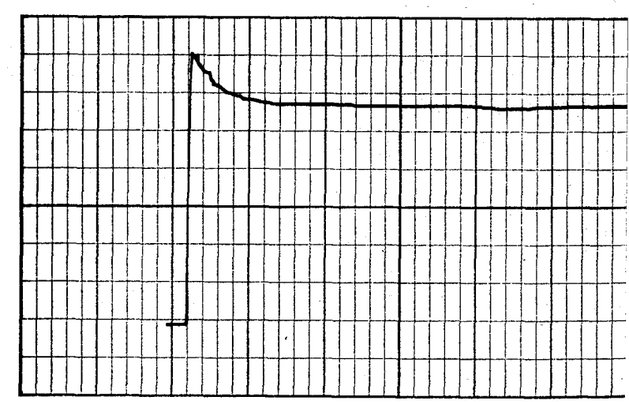
RESISTANCE Detail Curve

Depths

SPONTANEOUS POTENTIAL millivolts

20 + -





SCALE CHANGE
Long Normal – AM 64"
Single Point Curve
Short Normal – AM 16"
SP Curve
1000
0
200
0
100
200
300
400

Long Normal — AM 64"
Short Normal — AM 16"
FIRST READING
500
600
700
SP Curve

welenco

GAMMA-GUARD LOG

FILING NO.

COMPANY BEYLIK DRILLING, INC

WELL MW-3

FIELD JPL PASADENA

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC. TWP. RGE.

OTHER SERVICES:
E-LOG
CALIPER

Permanent Datum: G.L. Elev.
Log Measured From G.L. Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B.
D.F.
G.L.

Date	1-25-90			
Run No.	ONE			
Depth—Driller	730'			
Depth—Logger	729'			
Btm. Log Inter.	728'			
Top Log Inter.	0'			
Casing—Driller	10½" @ 22'	@	@	@
Casing—Logger	22'			
Bit Size	9 7/8"			
Type Fluid in Hole	BENTONITE MUD			
	–			
Dens. | Visc.	N/A	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	PIT			
R_m @ Meas. Temp.	9.6 @ 75 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	11.4@ 75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M |	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	0 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	L103 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. CUTLER	MR. CALDWELL	MR. MELCHIOR	MR. TOMCZYK

EQUIPMENT DATA

LOGGING DATA		
Run No.	ONE	
Log Type	GR-G	
Speed Ft./Min.	35	
T.C. Sec.	–	
Sens. Settings	200/300	
Zero Div. L or R	3L	
API Units/Div.	10	
Log Start Time	–	
Log End Time	–	
Pumping Rate	–	
Fluid Level	–	
Formation Factor	7.00	

Gamma Ray		
Run No.	ONE	
Tool Model No.	MW-1	
Diameter	3"	
Detector Model No.	–	
Type	SCINT.	
Length	4"	

General	
Hoist Truck No.	L103 BFL
Instrument Truck No.	L103 BFL
Tool Serial No.	77-82

RESISTIVITY ohms. m²/m

GUARD

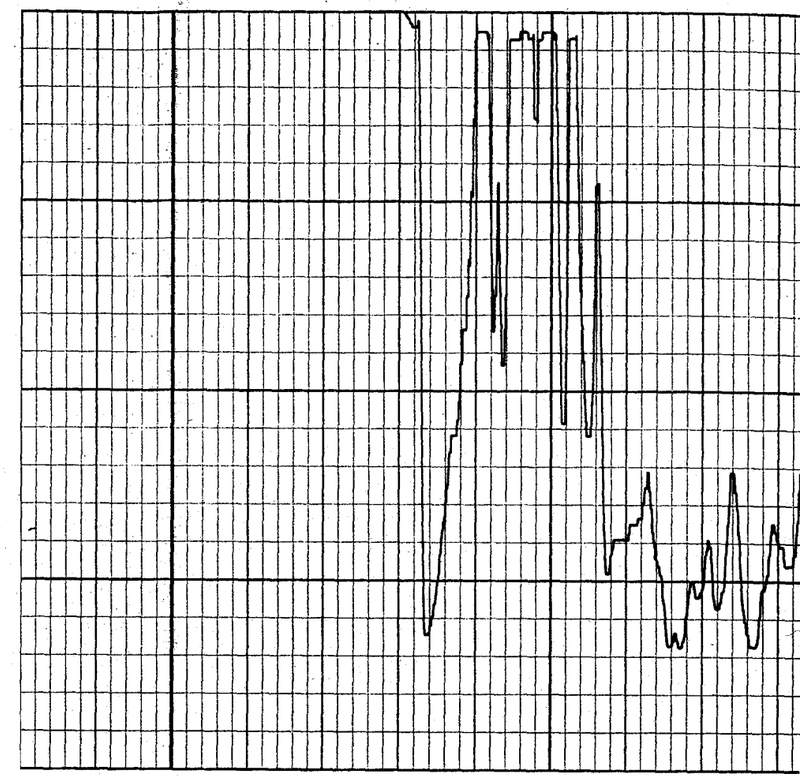
0 500 1000 1500 2000

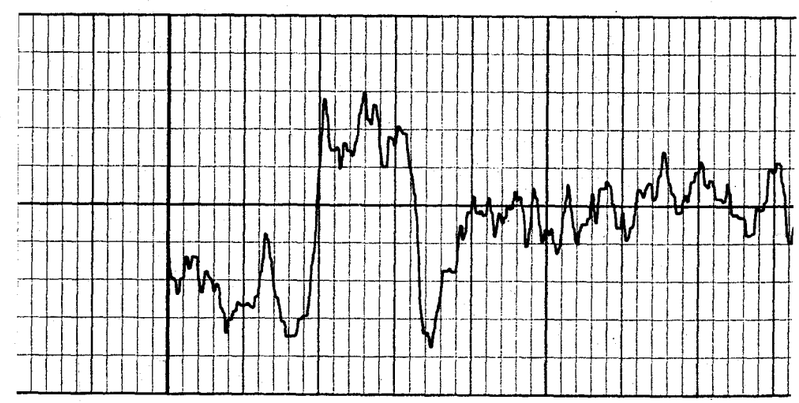
0 100 200 300 400

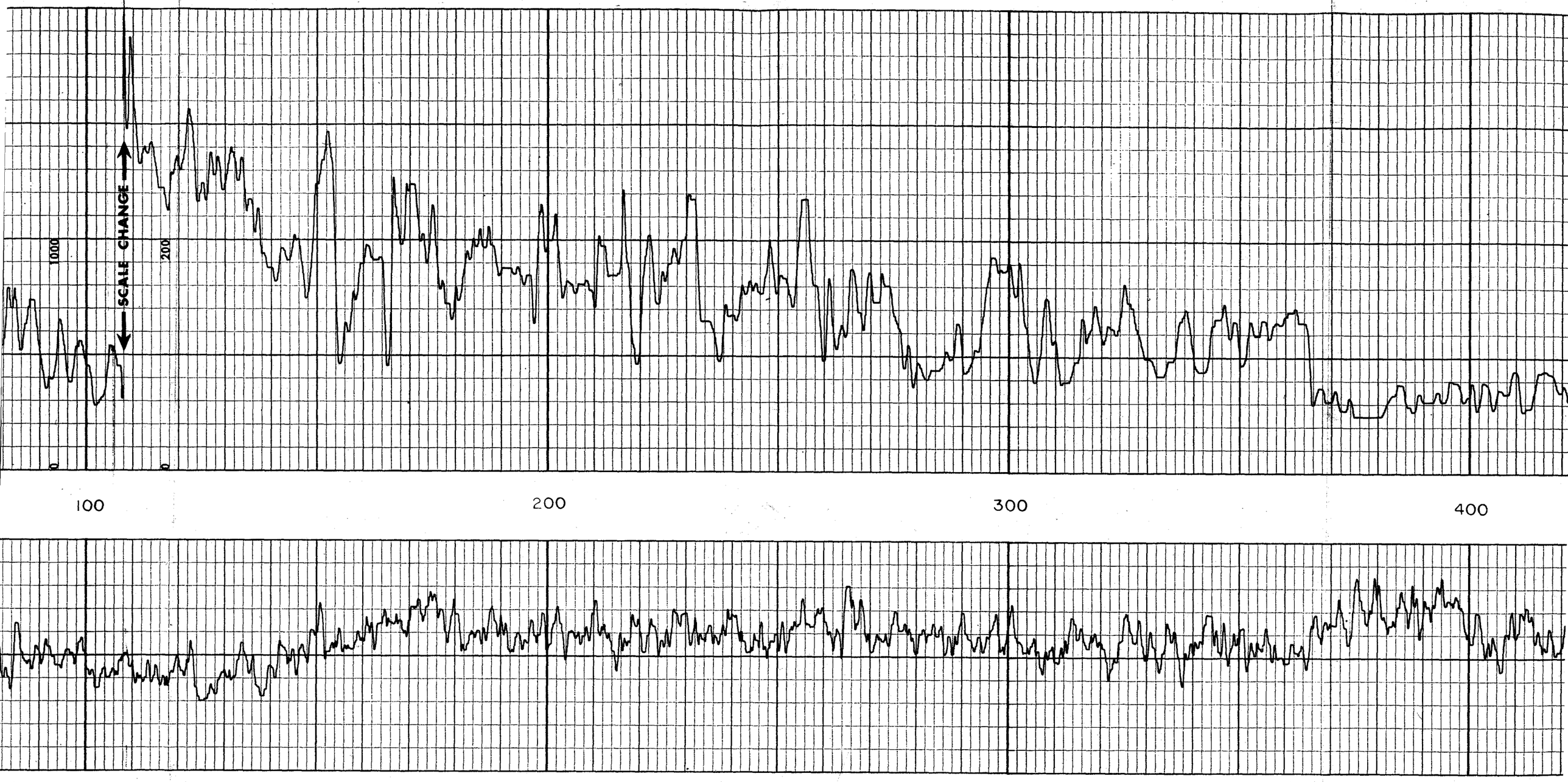
Depths

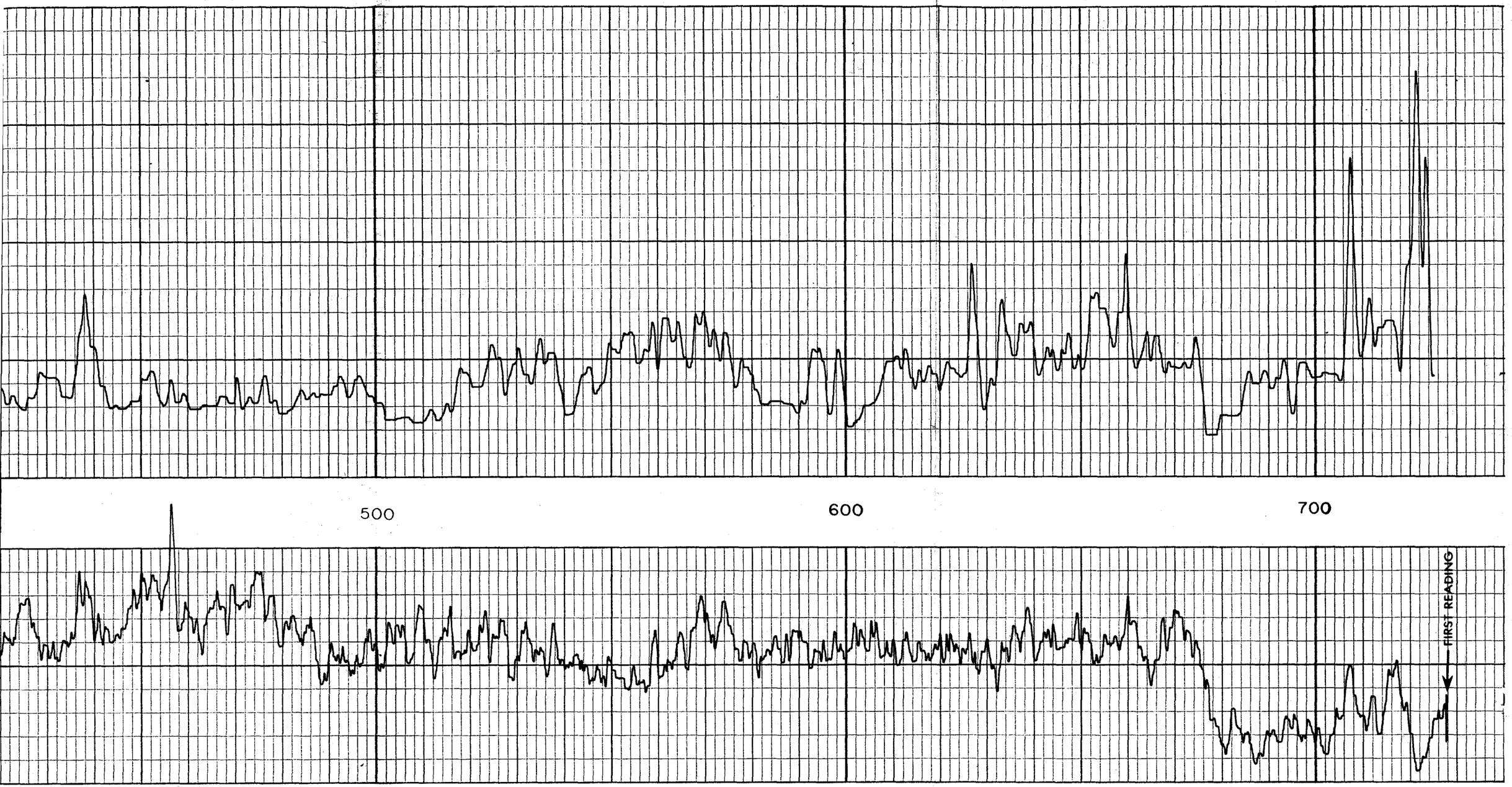
GAMMA-RAY API Units

30 130






SCALE CHANGE
1000
0
200
0
100
200
300
400


500
600
700
FIRST READING

welenco

ELECTRIC LOG

FILING NO.

COMPANY BEYLIK DRILLING, INC.

WELL MW-4

FIELD JPL PASADENA

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC. ____ TWP. ____ RGE. ____

OTHER SERVICES:
GAMMA-GUARD
SONIC/VDL

Permanent Datum: G.L. , Elev. ____
Log Measured From G.L. , ____ Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B. ____
D.F. ____
G.L. ____

Date	2-7-90			
Run No.	ONE			
Depth—Driller	605'			
Depth—Logger	605'			
Btm. Log Inter.	603'			
Top Log Inter.	18'			
Casing—Driller	16" @ 18'	@	@	@
Casing—Logger	18'			
Bit Size	12 1/4"			
Type Fluid in Hole	BENTONITE MUD			
	–			
Dens. | Visc.	N/A	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	MUD TANK			
R_m @ Meas. Temp.	11.0 @ 75 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	11.4 @ 75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M |	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	15 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	L103 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. CUTLER	MR. BARNES		

This Heading and Log Conform To API RP 31

Fold Here

REMARKS

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole
NORMALS	120'	0-1000 OHM-M	0-200 OHM-M

Equipment Data

Run No.	Tool Type	Pad Type	Tool Position	Other
ONE	NORMALS	–	FREE	

Changes in Mud Type or Additional Samples

Date | Sample No.	Depth—Driller	Type Fluid in Hole	Dens. | Visc.	pH | Fluid Loss	Source of Sample	R_m @ Meas. Temp.	R_{mf} @ Meas. Temp.	R_{mc} @ Meas. Temp.	Source: R_{mf} | R_{mc}	R_m @ BHT	R_{mf} @ BHT	R_{mc} @ BHT
–			–	– ml		@ °F	@ °F	@ °F	–	@ °F	@ °F	@ °F

CONSULTANTS: EBASCO ENVIRONMENTAL

RESISTIVITY ohms. m²/m

SHORT NORMAL 16 Inch: 0 – 1000

LONG NORMAL 64 Inch: 0 – 1000

RESISTIVITY ohms. m²/m

0 – 200

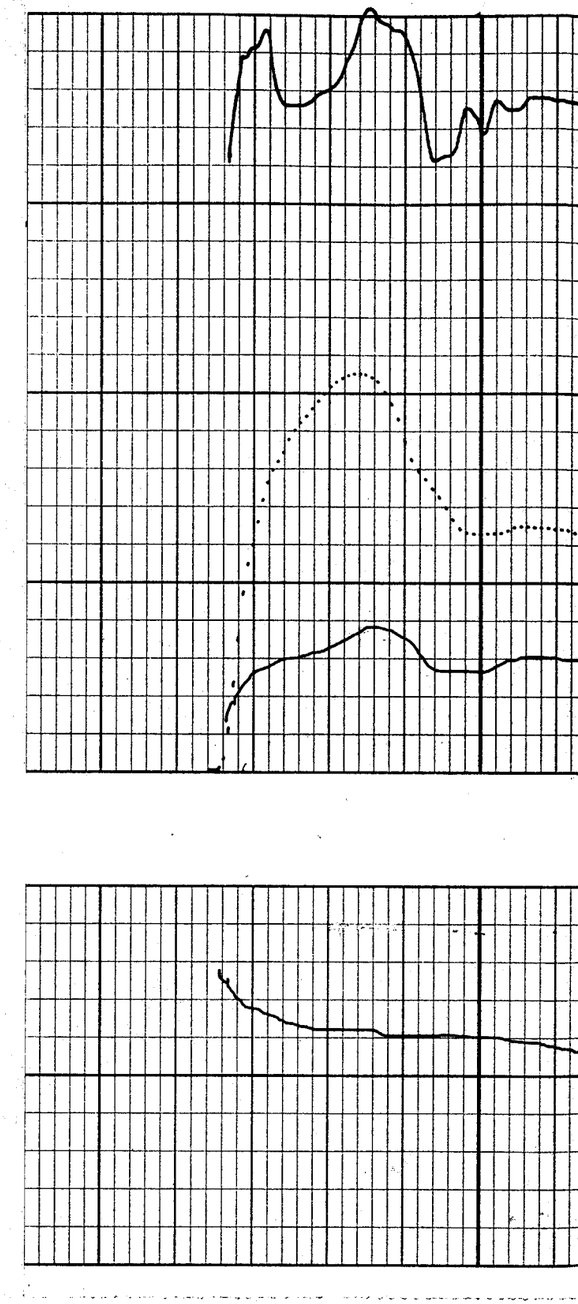
0 – 200

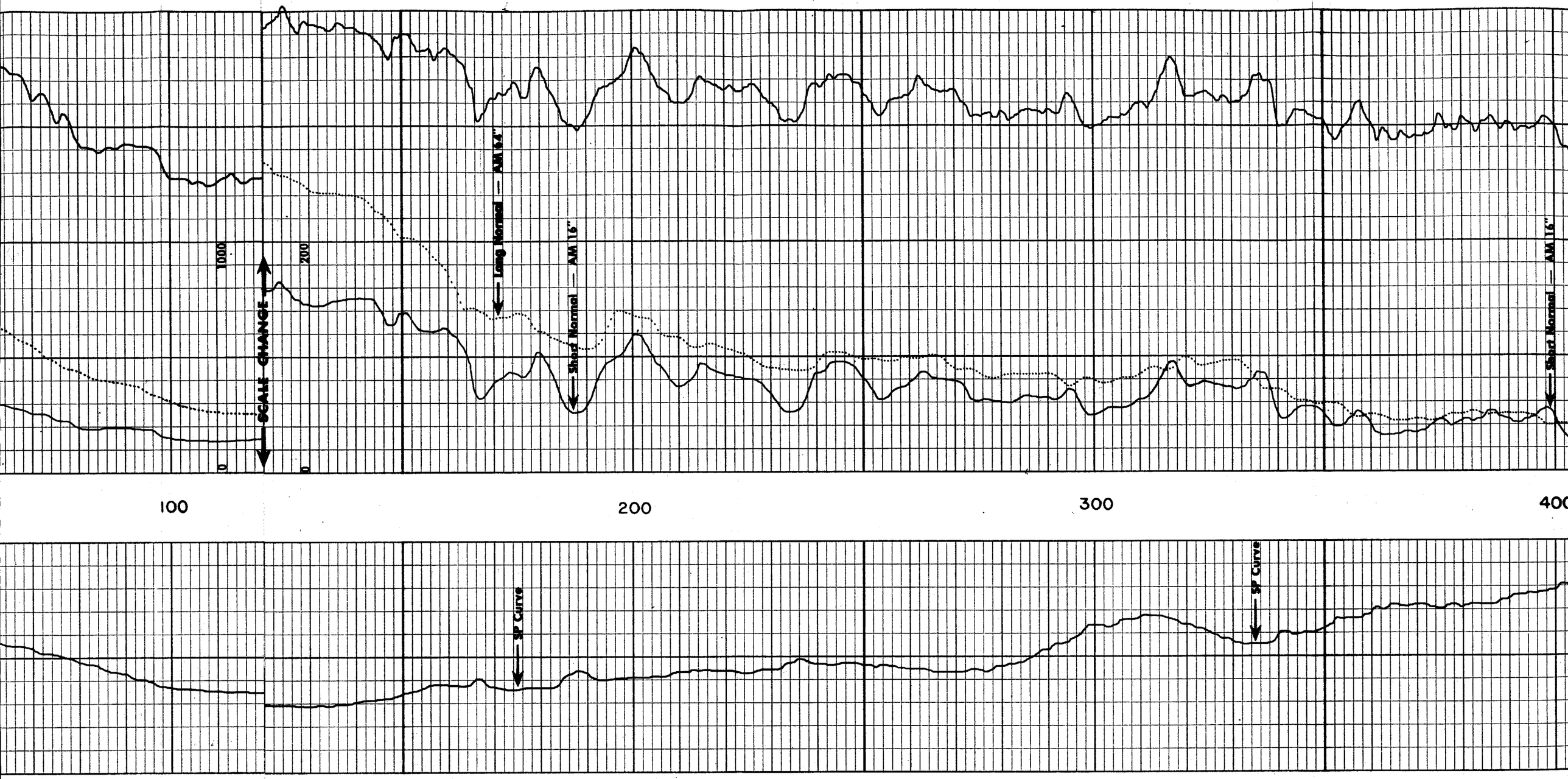
RESISTANCE Detail Curve

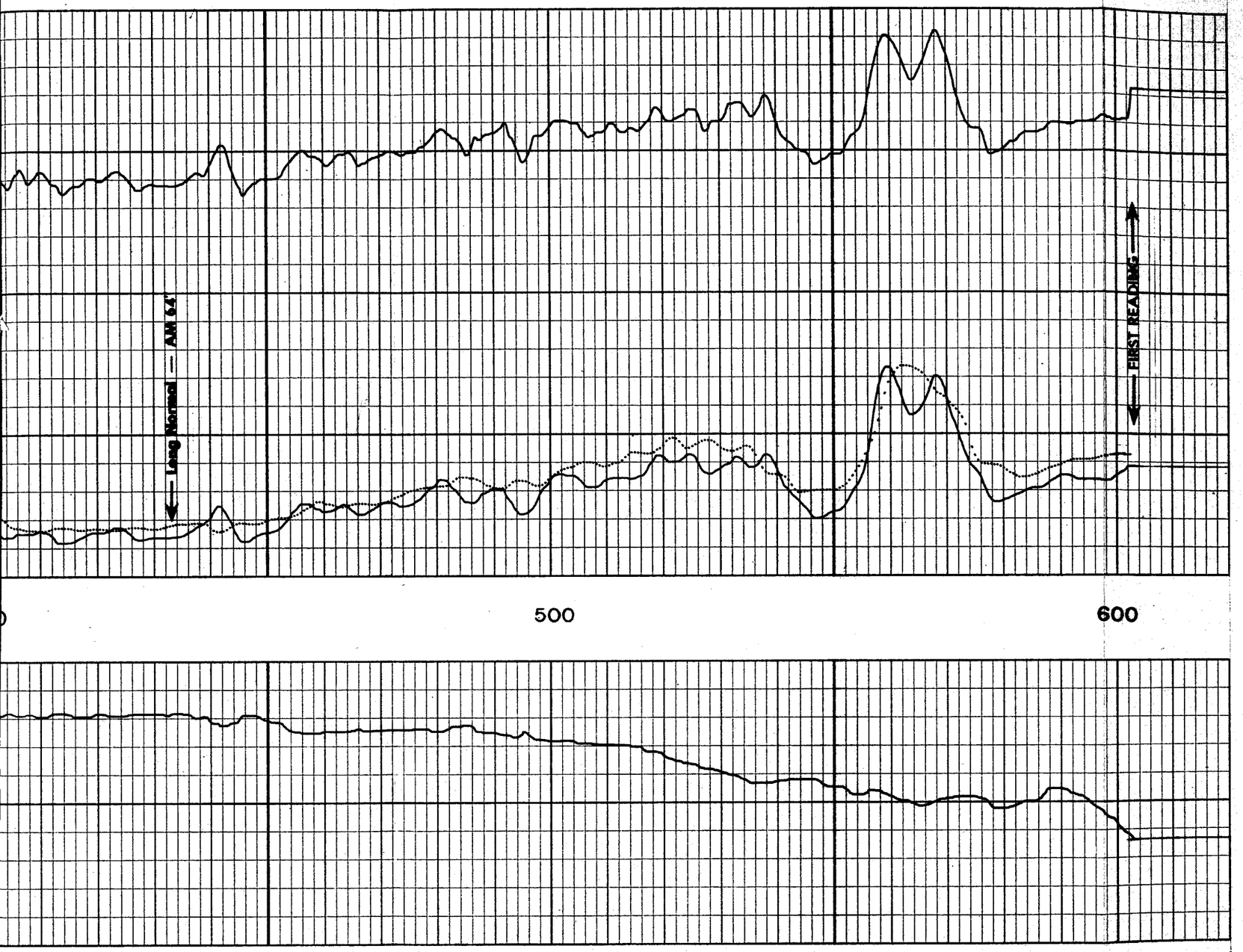
Depths

SPONTANEOUS POTENTIAL millivolts

20 + –




1000
0
200
0
SCALE CHANGE
Long Normal — AM 64"
Short Normal — AM 16"
Short Normal — AM 16"
SP Curve
SP Curve
100
200
300
400


Long Normal — AM 64'
FIRST READING
500
600

welenco

GAMMA-GUARD LOG

FILING NO.

COMPANY BEYLIK DRILLING, INC.

WELL MW-4

FIELD JPL PASADENA

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC. TWP. RGE.

OTHER SERVICES:
E-LOG
SONIC/VDL

Permanent Datum: G.L. Elev.
Log Measured From G.L. Ft. Above Perm. Datum
Drilling Measured From G.L.

Elev.: K.B.
D.F.
G.L.

Date	2-7-90			
Run No.	ONE			
Depth—Driller	605'			
Depth—Logger	605'			
Btm. Log Inter.	604'			
Top Log Inter.	0'			
Casing—Driller	16" @ 18'	@	@	@
Casing—Logger	18'			
Bit Size	12 1/4"			
Type Fluid in Hole	BENTONITE MUD			
	–			
Dens. | Visc.	N/A	|	|	|
pH | Fluid Loss	N/A | ml	| ml	| ml	| ml
Source of Sample	MUD TANK			
R_m @ Meas. Temp.	11.0 @ 75 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	11.4 @ 75 °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	N/A @ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}	M |	|	|	|
R_m @ BHT	N/A @ °F	@ °F	@ °F	@ °F
Time Since Circ.	15 HOURS			
Max. Rec. Temp.	N/A °F	°F	°F	°F
Equip. | Location	L103 | BFL	|	|	|
Recorded By	D.L. CRAIG			
Witnessed By	MR. CUTLER	MR. BARNES	DR. MELCHIOR	

EQUIPMENT DATA

LOGGING DATA	
Run No.	ONE
Log Type	GR-G
Speed Ft./Min.	35
T.C. Sec.	–
Sens. Settings	200/300
Zero Div. L or R	3L
API Units/Div.	10
Log Start Time	–
Log End Time	–
Pumping Rate	–
Fluid Level	–
Formation Factor	7.00

Gamma Ray	
Run No.	ONE
Tool Model No.	MW-1
Diameter	3"
Detector Model No.	–
Type	SCINT.
Length	4"

General	
Hoist Truck No.	L103 BFL
Instrument Truck No.	L103 BFL
Tool Serial No.	77-82

RESISTIVITY ohms. m²/m

GUARD

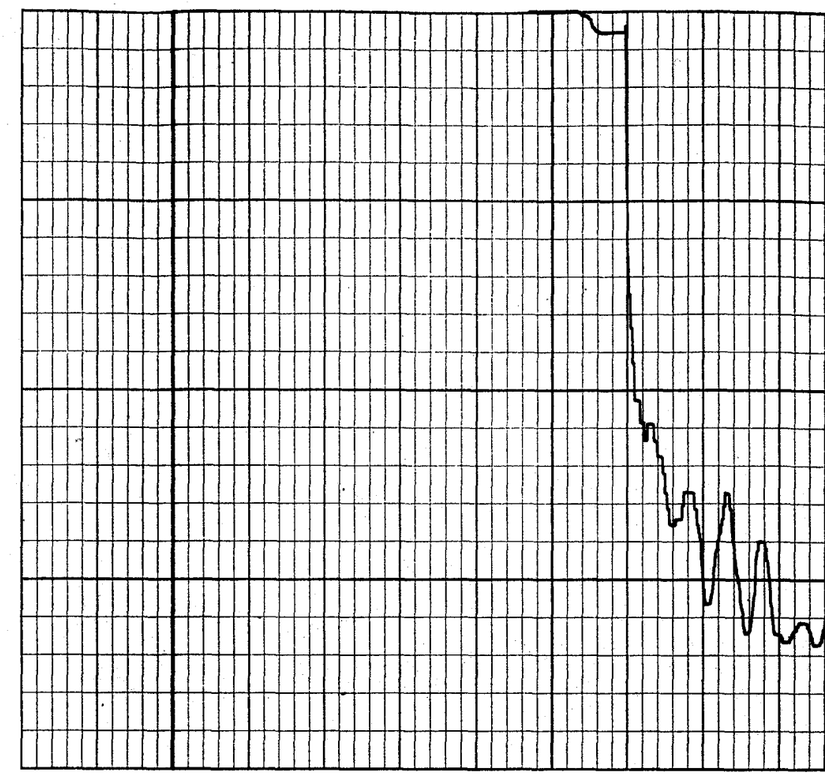
0 500 1000 1500 2000

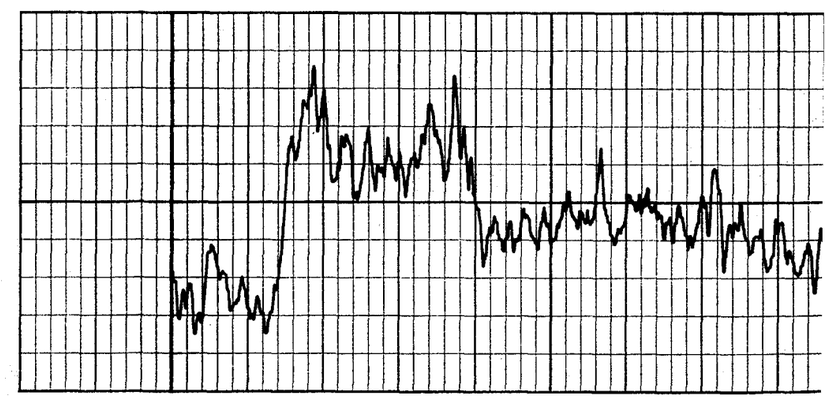
0 100 200 300 400

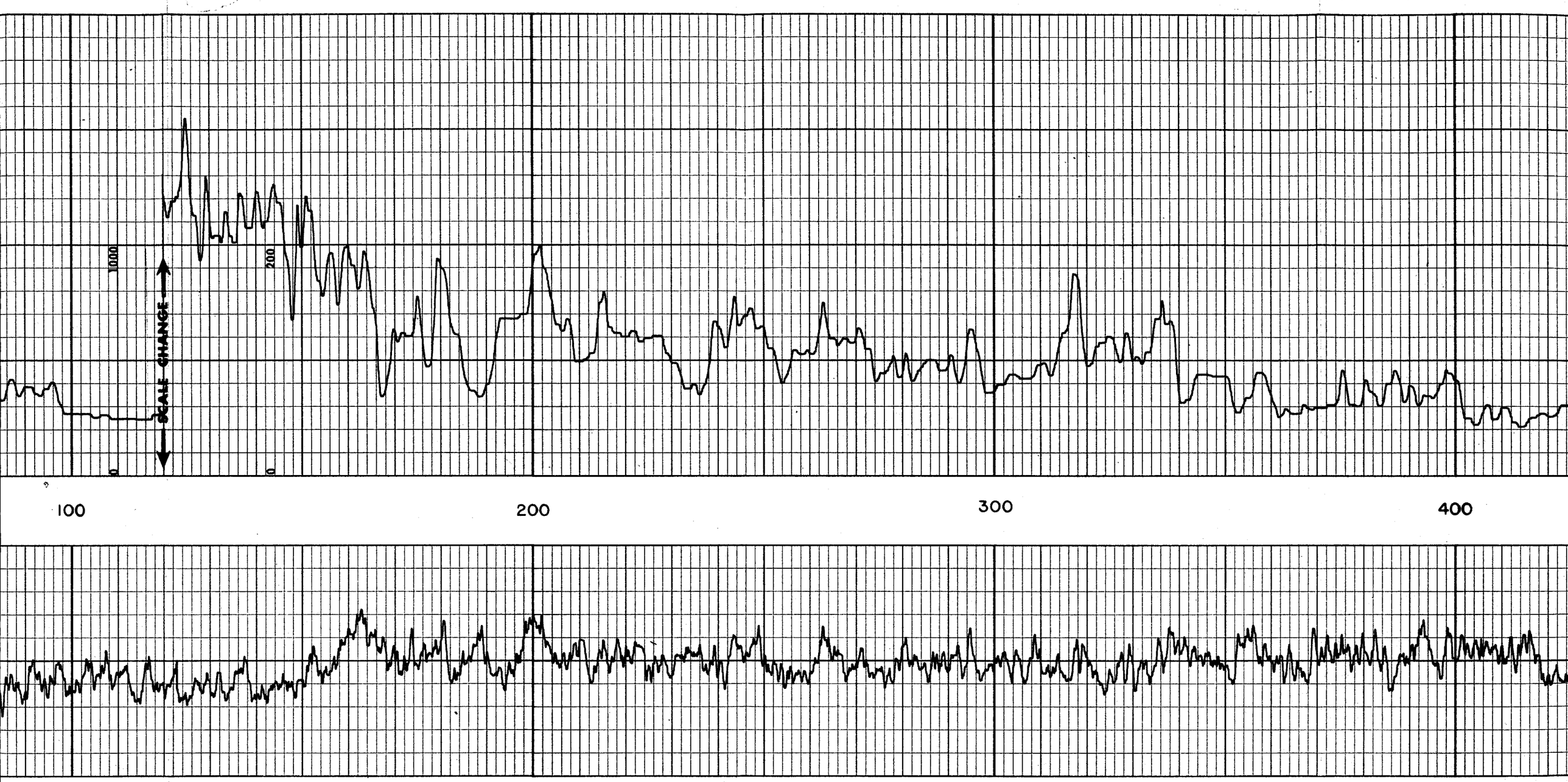
Depths

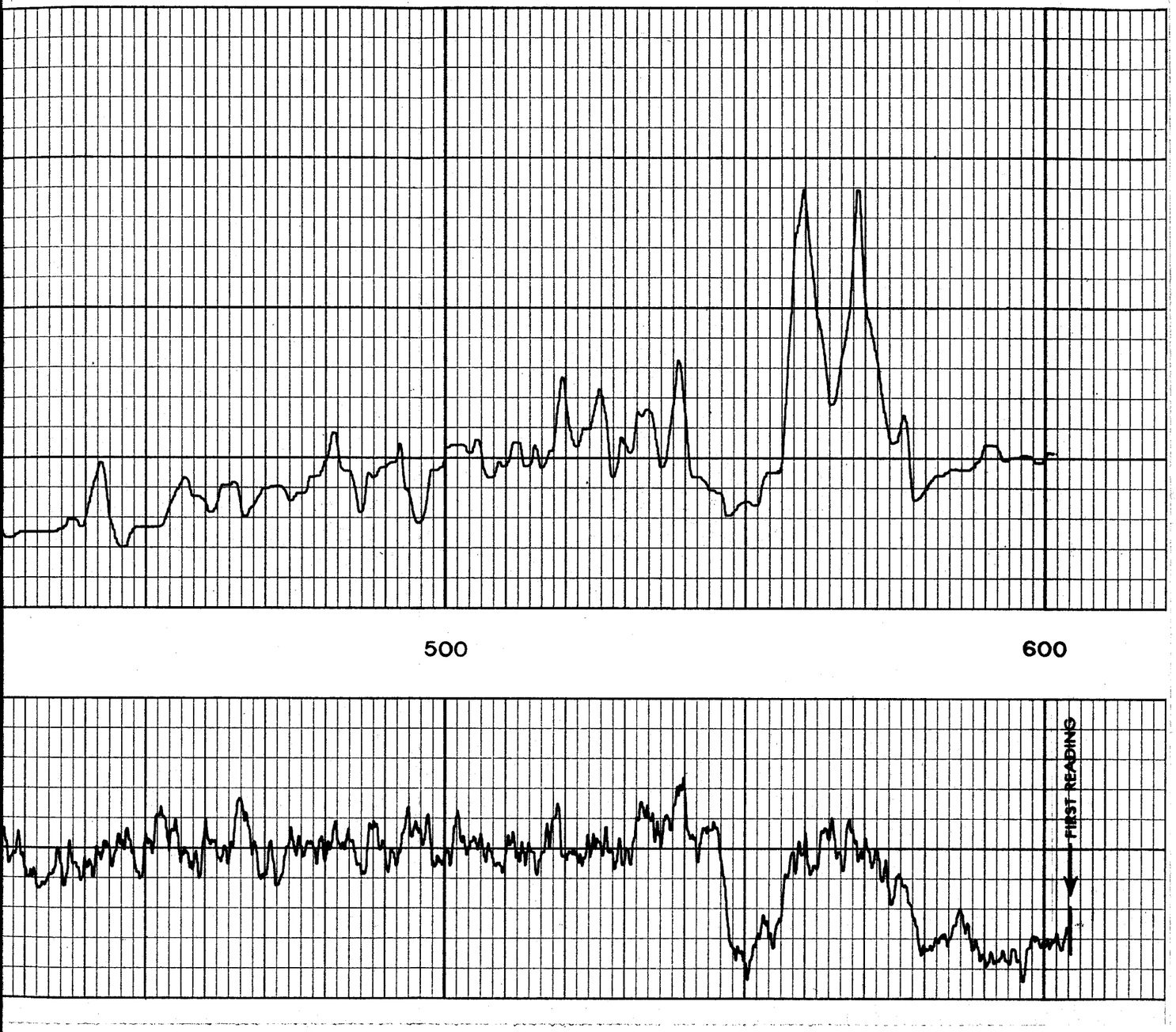
GAMMA-RAY API Units

30 130






1000
200
SCALE CHANGE
100
200
300
400



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welenco

Gamma-Ray Neutron Log

COMPANY BEYLIK DRILLING
WELL MW-5
FIELD JET PROPULSION LAB.
STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:
SEC. TWP. RGE.

OTHER SERVICES: NONE

PERMANENT DATUM: GROUND LEVEL ELEV.
LOG MEASURED FROM G.L. 0 FT. ABOVE PERM. DATUM
DRILLING MEASURED FROM GROUND LEVEL

ELEV.: K.B. D.F. G.L.

DATE	2-13-90		
RUN NO.	ONE		
TYPE LOG	GR/NEUTRON		
DEPTH-DRILLER	145'		
DEPTH-LOGGER	145'		
BOTTOM LOGGED INTERVAL	143'		
TOP LOGGED INTERVAL	0'		
TYPE FLUID IN HOLE	WATER		
MAX. REC. TEMP., DEG. F.	N/A		
RECORDED BY	RIDDER		
WITNESSED BY	--		

RUN NO.	BORE-HOLE RECORD BIT	FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
1	11"	SURFACE	145'	11"	DUAL	SURFACE	145'
				8"	WALL	"	"

EQUIPMENT DATA

Gamma Ray		Neutron	
Run No.	ONE	Run No.	ONE
Tool Model No.	COSMOS	Log Type	N/N
Diameter	1 11/16"	Tool Model No.	COSMOS
Detector Model No.	--	Diameter	1 11/16"
Type	GEIGER	Detector Model No.	--
Length	18"	Type	He3
Distance to N. Source	6'	Length	6"
		Source Model No.	71-1
		Serial No.	243
		Spacing	13"
		Type	Am241Be
		Strength	

General

Hoist Truck No.	DV-1
Instrument Truck No.	DV-1
Tool Serial No.	210

LOGGING DATA

General Run No.	Depths From	To	Speed Ft./Min.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units per Log Div.
1	0'	142'	15	5	100/909	2L	10

Neutron Run No.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API N. Units per Log Div.
1	2	1000/740	13L	20

Reference Literature:

Remarks:

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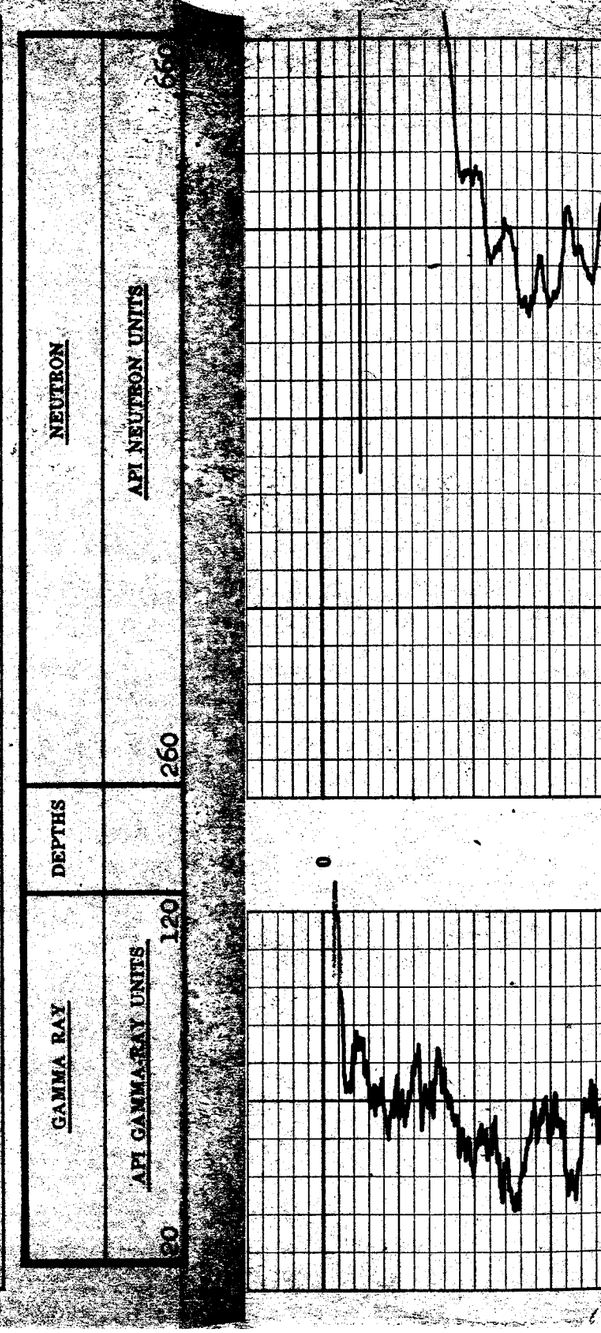

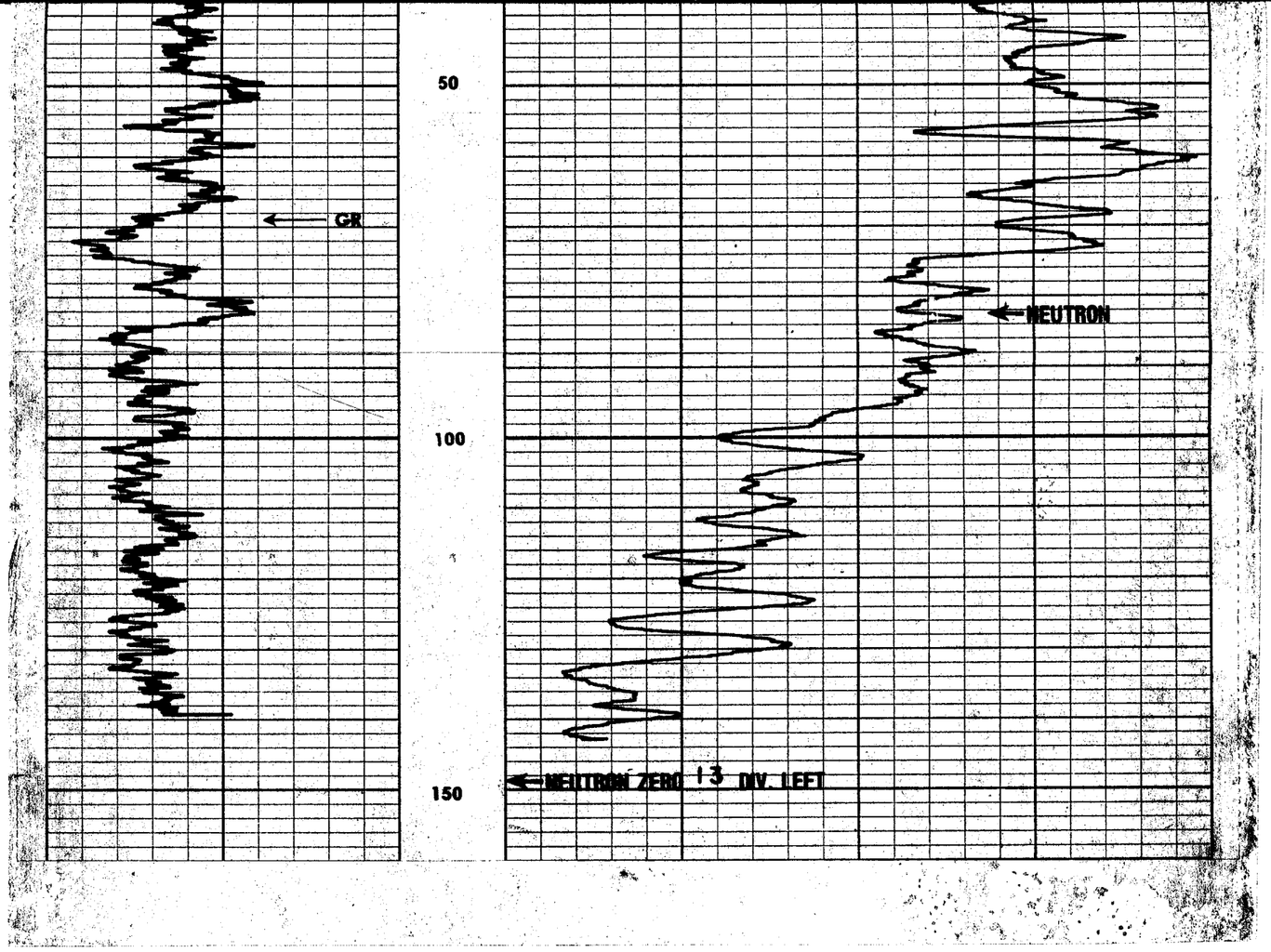
50
100
150
GR
NEUTRON
NEUTRON ZERO 13 DIV. LEFT

welenco

Gamma-Ray Neutron Log

COMPANY: BEYLIK DRILLING, INC.

WELL: MW-6

FIELD: JPL PASADENA

STATE: CALIFORNIA COUNTY: LOS ANGELES

LOCATION: WEST LOT

SEC. TWP. RGE.

OTHER SERVICES: NONE

PERMANENT DATUM: G.L. ELEV.

LOG MEASURED FROM: G.L. FT. ABOVE PERM. DATUM

DRILLING MEASURED FROM: G.L.

ELEV.: K.B. D.F. G.L.

DATE	2-24-90		
RUN NO.	ONE		
TYPE LOG	GAMMA-NEUTRON		
DEPTH-DRILLER	247'		
DEPTH-LOGGER	246'		
BOTTOM LOGGED INTERVAL	245'		
TOP LOGGED INTERVAL	0'		
TYPE FLUID IN HOLE	WATER		
MAX. REC. TEMP., DEG. F.	N/A		
RECORDED BY	D.L. CRAIG		
WITNESSED BY	MR. PAPENGUTH	MR. CUTLER	MR. R. BEYLIK

RUN	BORE-HOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	11"	0'	247'	8"	–	0'	247'
				11"	–	0'	247'

EQUIPMENT DATA

Gamma Ray		Neutron	
Run No.	ONE	Run No.	ONE
Tool Model No.	GNC27XL5A	Log Type	N-N
Diameter	1 11/16"	Tool Model No.	GNC27XL5A
Detector Model No.	–	Diameter	1 11/16"
Type	GEIGER	Detector Model No.	–
Length	18"	Type	He 3
Distance to N. Source	6'	Length	6"
		Source Model No.	71-1
		Serial No.	930
		Spacing	13"
		Type	Am24 1Be
		Strength	3 Ci

General

Hoist Truck No.	L103 BFL
Instrument Truck No.	L103 BFL
Tool Serial No.	951

LOGGING DATA

Gamma Ray								Neutron			
Run No.	Depths From	Depths To	Speed Ft/Min.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API G.R. Units per Log Div.	T.C. Sec.	Sens. Settings	Zero Div. L or R	API N. Units per Log Div.
1	245'	0'	30	3	100/909	3L	10	1	100/114	5L	30

Reference Literature:

Remarks: CONSULTANTS: EBASCO ENVIRONMENTAL

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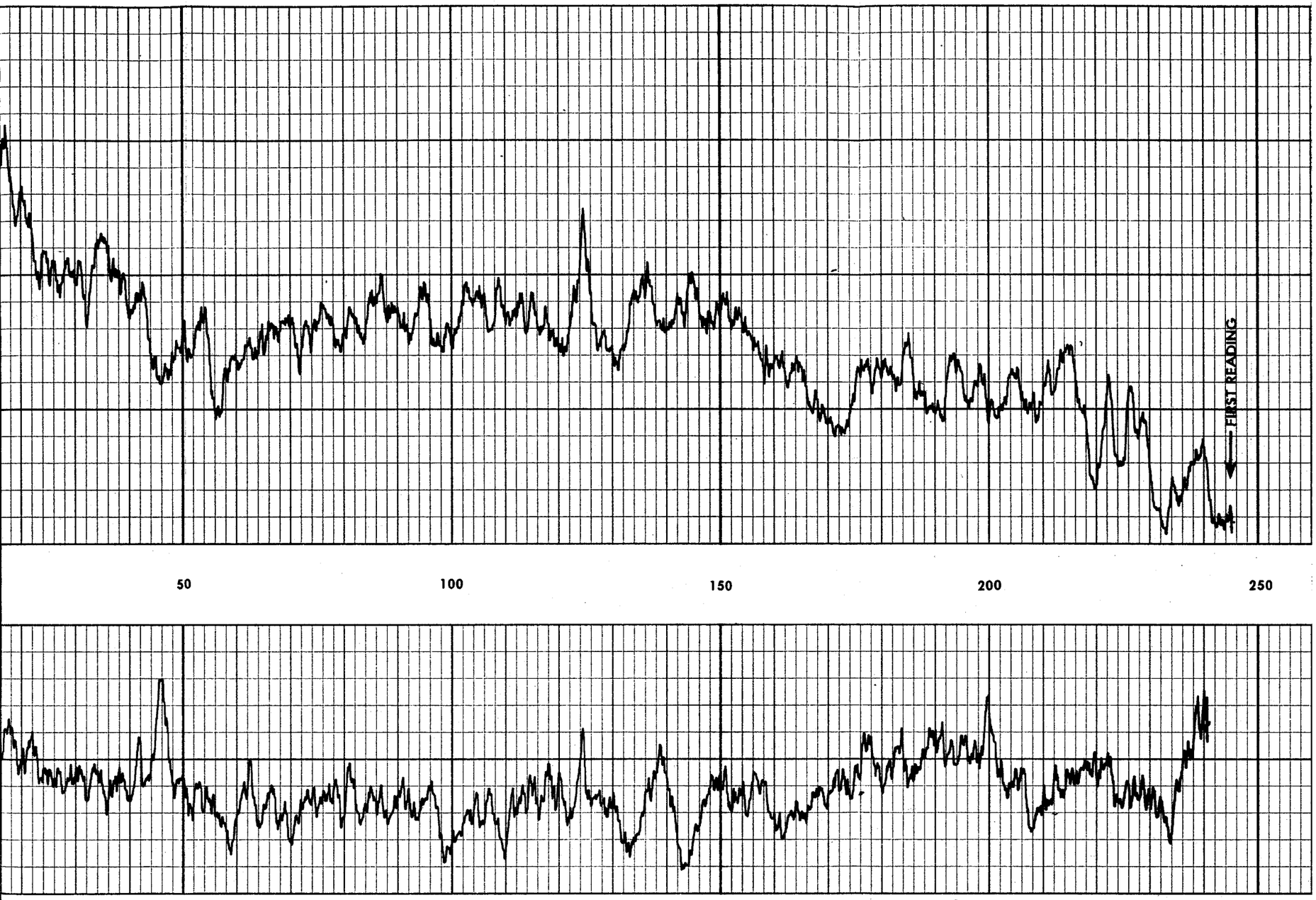

FIRST READING
50
100
150
200
250

welenco

Gamma-Ray Neutron Log

COMPANY BEYLIK DRILLING

WELL MW-7

FIELD JET PROPULSION LAB.

STATE CALIFORNIA COUNTY LOS ANGELES

LOCATION:

SEC. TWP. RGE.

OTHER SERVICES: NONE

PERMANENT DATUM: GROUND LEVEL ELEV.

LOG MEASURED FROM G.L. 0 FT. ABOVE PERM. DATUM

DRILLING MEASURED FROM GROUND LEVEL

ELEV.: K.B. D.F. G.L.

DATE	3-5-90
RUN NO.	ONE
TYPE LOG	GR/NEUTRON
DEPTH-DRILLER	275'
DEPTH-LOGGER	274'
BOTTOM LOGGED INTERVAL	273'
TOP LOGGED INTERVAL	0'
TYPE FLUID IN HOLE	WATER
MAX. REC. TEMP., DEG. F.	N/A
RECORDED BY	RIDDER
WITNESSED BY	M. CUTLER

RUN NO.	BORE-HOLE RECORD BIT	FROM	TO	CASING RECORD SIZE	WGT.	FROM	TO
1	11"	G.L.	275'	8"	DUAL	G.L.	275'
				11"	WALL	G.L.	275'

EQUIPMENT DATA

Gamma Ray		Neutron	
Run No.	ONE	Run No.	ONE
Tool Model No.	COSMOS	Log Type	N/N
Diameter	1 11/16"	Tool Model No.	COSMOS
Detector Model No.	--	Diameter	1 11/16"
Type	GEIGER	Detector Model No.	--
Length	18"	Type	He3
Distance to N. Source	6'	Length	6"
		Source Model No.	71-1
		Serial No.	243
		Spacing	13"
		Type	Am241Be
		Strength	5Ci.

General

Hoist Truck No.	DV-1
Instrument Truck No.	DV-1
Tool Serial No.	210

LOGGING DATA

General

Run No.	Depths From	Depths To	Speed Ft/Min.	T.C. Sec.	Sens. Settings
1	273'	0'	15	4	100/909

Gamma Ray

	Zero Div. L or R	API G.R. Units per Log Div.	T.C. Sec.	Sens. Settings
	3L	10	4	500/128

Neutron

	Zero Div. L or R	API N. Units per Log Div.
	19L	60

Reference Literature:

Remarks:

Fold Here

NEUTRON

API NEUTRON UNITS

2340

1140

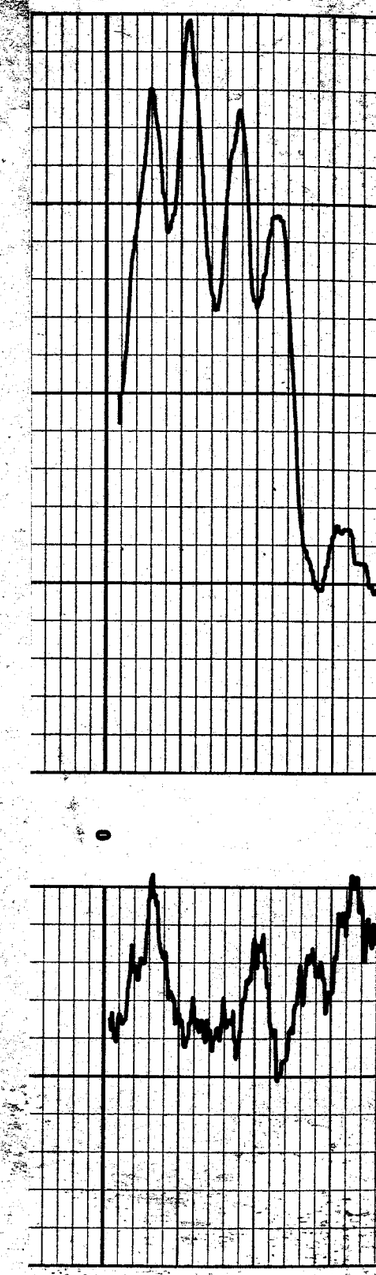
DEPTHS

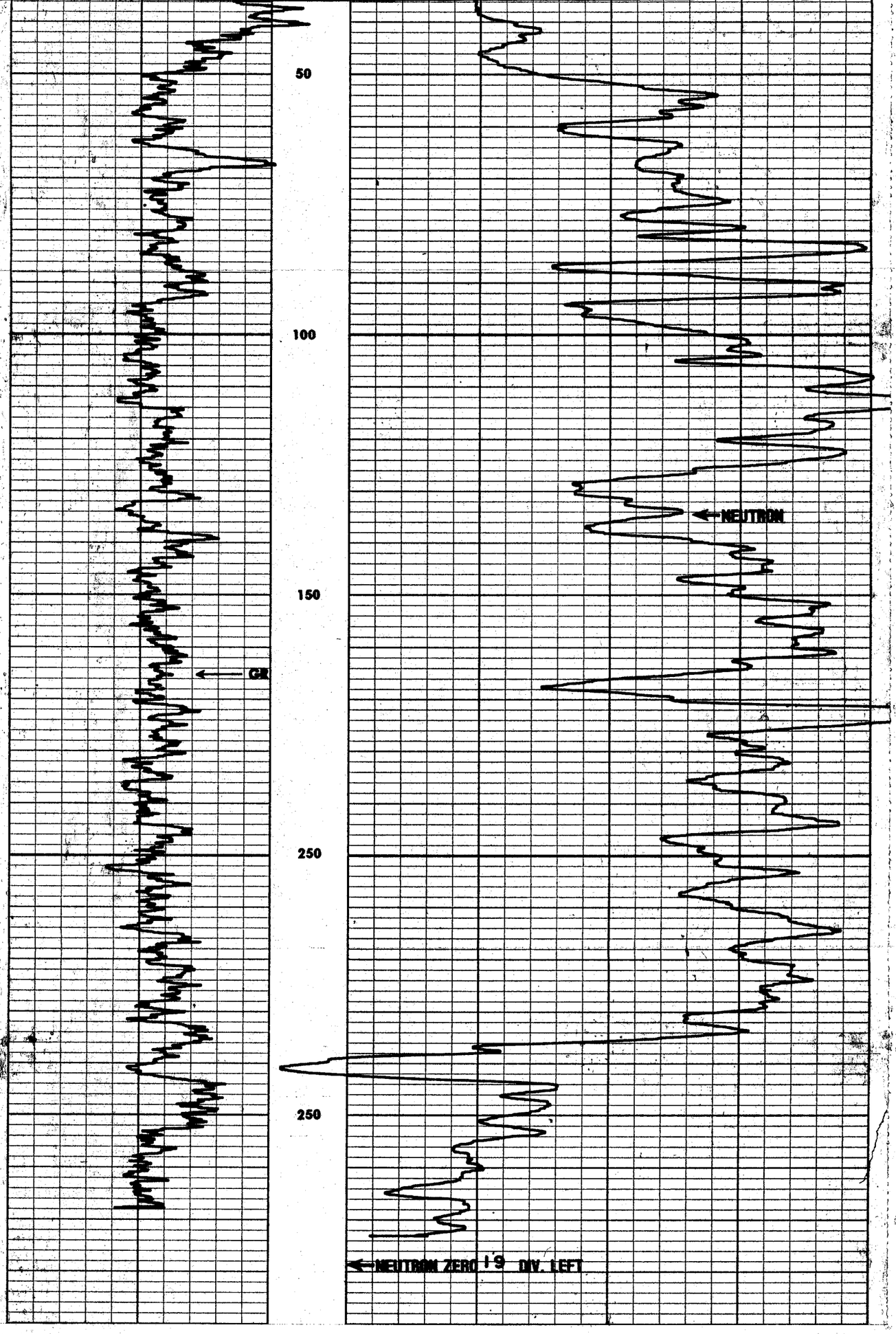
GAMMA RAY

API GAMMA-RAY UNITS

130

30




50
100
150
250
250
GR
NEUTRON
NEUTRON ZERO 19 DIV. LEFT

WELENCO INC.

GEOPHYSICAL SURVEYS

GAMMA-RAY LOG

COUNTY:LOS ANGELES CA.
FIELD:JPL PASADENA
LOCATION:JPL MAIN CAFETERIA
WELL:EMW-8
COMPANY:LAYNE ENVIRONMENTAL
EBASCO

COMPANY LAYNE ENVIRONMENTAL
WELL EMW-8
FIELD JPL PASADENA
COUNTY LOS ANGELES STATE CA.

LOCATION
JPL MAIN CAFETERIA

Sec. Twp. Rge.

Other Services
NONE

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K.B.
D.F.
G.L.

Date	10/28/92		
Run No.	ONE		
Depth-Driller	220′		
Depth-Logger	220′		
Btm Log Interval	219′		
Top Log Interval	0′		
Type Log	GAMMA-RAY		
Type Fluid in Hole	WATER		
Salinity PPM CL	N/A		
Density	N/A		
Level	197′		
Max Rec. Temp.	N/A		
Operating Rig Time	--		
Recorded By	RIDDER		
Witnessed By	ROB TWEIDT		
Job Tkt. No.	19401		

CASING RECORD

Size	Wgt	From	To
10"	DUAL	G.L.	220′

TUBING RECORD

Size	Wgt	From	To

CWP DRS 1.2616

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

EQUIPMENT DATA

Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
ONE	13	GUARD	FREE	

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	GAMMA RAY BKG CPS	GAMMA RAY STD CPS

Fold Here

Changes in Mud Type or Additional Samples

Date	Sample No	Depth Driller	Type Fluid	Dens	Visc	pH	Fluid Loss	Source of Sample	Rm @ Meas Temp	Rmf @ Meas Temp	Rmc @ Meas Temp	Source RMF	Source Rmc	Rm @ BHT	Rmf @ BHT	Rmc @ BHT

REFERENCE LITERATURE:

REMARKS:

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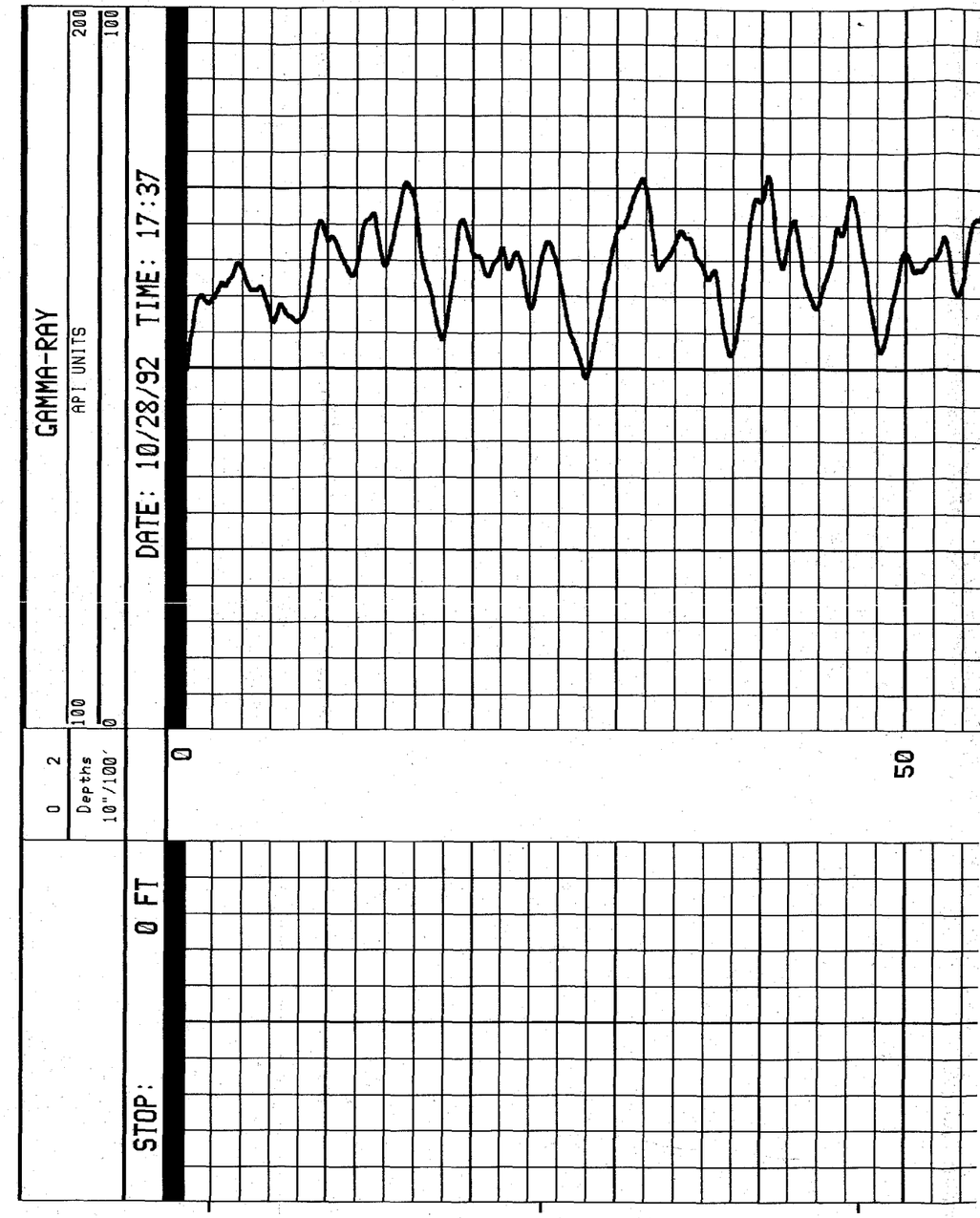
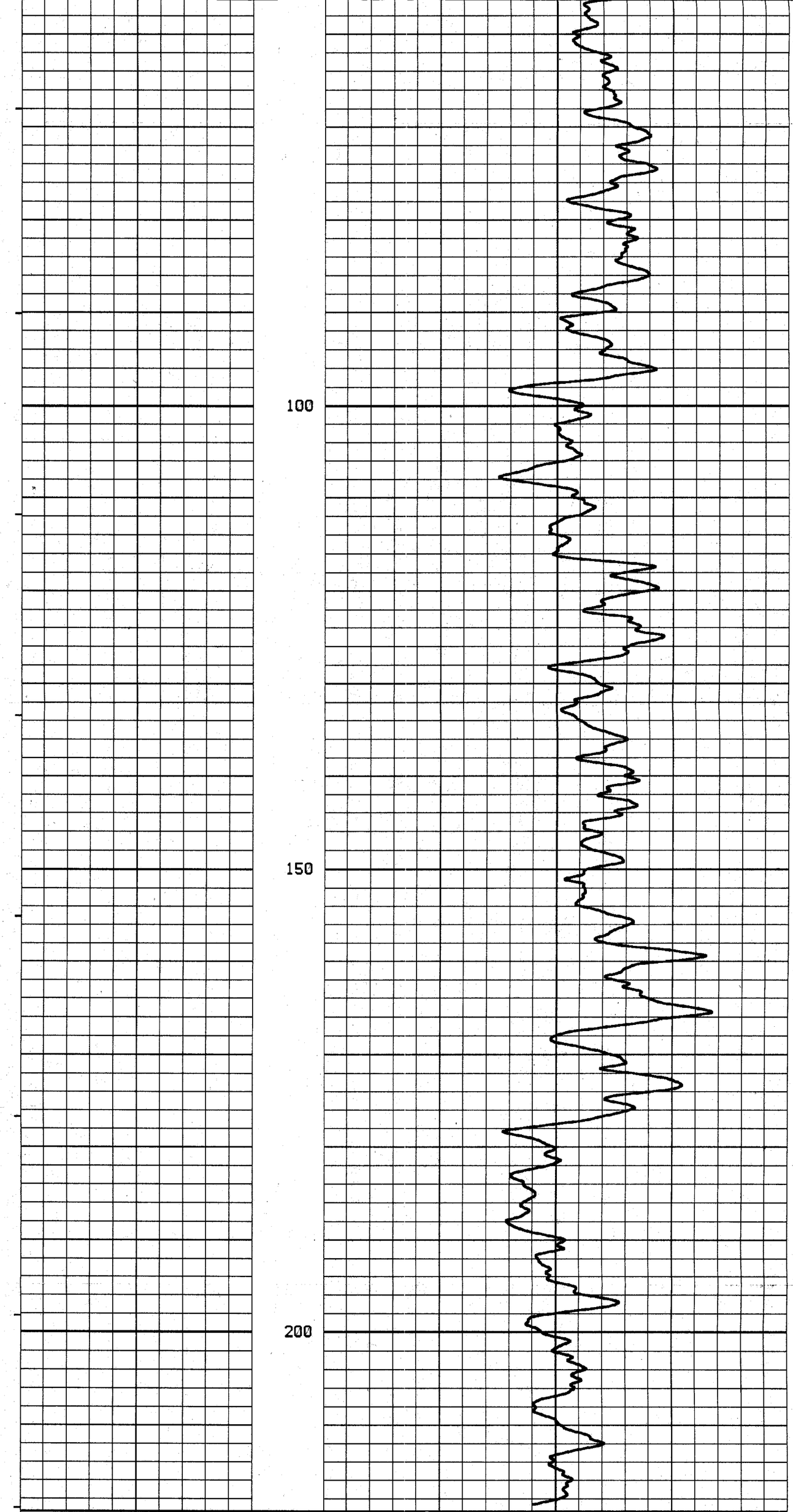
WELENCO INC.





START: 219 FT

DATE: 10/28/92 TIME: 17:26

0 2

Depths

GAMMA-RAY

100 API UNITS 200

welenco

GAMMA-RAY LOG

FILING NO.

COMPANY LAYNE ENVIRONMENTAL
WELL EMW-9
FIELD ARROYO SECO
COUNTY LOS ANGELES STATE CALIFORNIA

LOCATION: JPL: PASEDENA

OTHER SERV: NONE

JOB NO. 19391

SEC N/A TWP N/A RGE N/A

PERMANENT DATUM: G.L. ELEV:

LOG MEASURED FROM G.L. FT ABOVE PERM DATUM
DRILLING MEASURED FROM G.L.

ELEVATION:
KB. N/A
DF. N/A
GL. N/A

DATE	10-22-92		
TYPE OF LOG	GAMMA-RAY		
RUN NO.	ONE		
DEPTH - DRILLER	68'		
DEPTH - LOGGER	69'		
BOTTOM LOGGED INT	69'		
TOP LOGGED INT	0'		
TYPE FLUID IN HOLE	WATER		
DENSITY	N/A		
LEVEL	27'		
MAX TEMP DEG F	N/A		
OPERATING RIG TIME	.5 HR.		
RECORDED BY	LAPORTE		
WITNESSED BY	R. TWEIDT		

RUN	BORE HOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
ONE	9 5/8	0'	69'	9"	DUAL	0'	69'

EQUIPMENT DATA

Run No.	ONE	
Tool Model No.	G27X4LD	
Diameter	1.9"	
Detector Model No.		
Type		
Length		

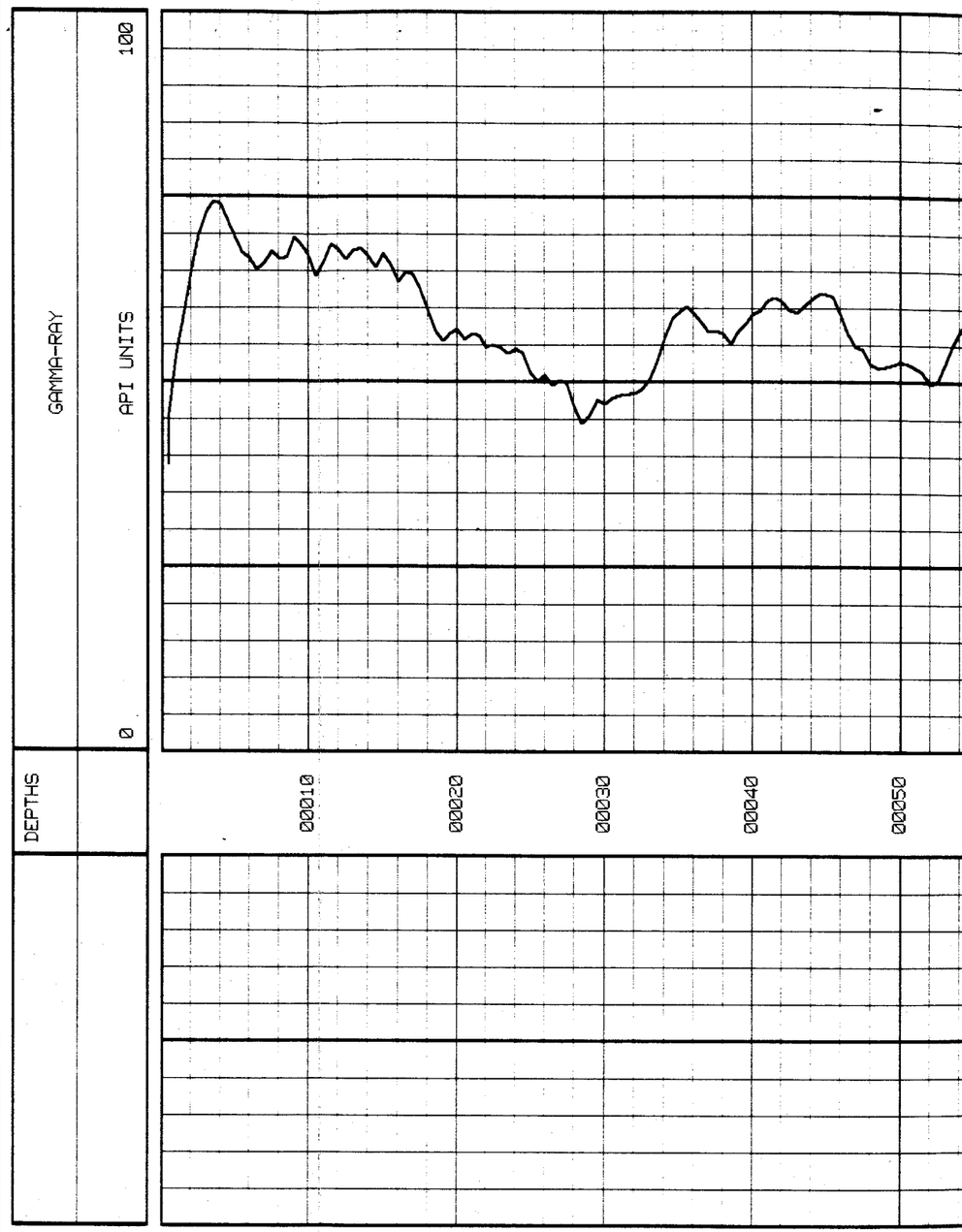
LOGGING DATA

Run No.	ONE	
Log Type	GAMMA-RAY	
Speed Ft./Min.	10	
T.C.Sec.	6	
Sens. Settings	100/888	
Zero Div. L or R		
API Units/Div.	5/DIV	
Log Start Time		
Log End Time		
Pumping Rate		
Fluid Level		
Formation Factor		

General

Hoist Truck No.	L-03
Instrument. Truck No.	L-03
Tool Serial No.	

Remarks:



100
API UNITS
0
GAMMA-RAY
00060
00070
DEPTHS

welenco

GAMMA-RAY LOG

FILING NO.	COMPANY LAYNE ENVIRONMENTAL WELL EMW-10 FIELD ARROYO SECO COUNTY LOS ANGELES STATE CALIFORNIA	
JOB NO. 19398	LOCATION: JPL: PASEDENA SOUTH ENTRANCE SEC N/A TWP N/A RGE N/A	OTHER SERV: NONE

PERMANENT DATUM: G.L. ELEV:

LOG MEASURED FROM G.L. FT ABOVE PERM DATUM

DRILLING MEASURED FROM G.L.

ELEVATION:
KB. N/A
DF. N/A
GL. N/A

DATE	10-30-92		
TYPE OF LOG	GAMMA-RAY		
RUN NO.	ONE		
DEPTH - DRILLER	170'		
DEPTH - LOGGER	170'		
BOTTOM LOGGED INT	169'		
TOP LOGGED INT	0'		
TYPE FLUID IN HOLE	WATER		
DENSITY	N/A		
LEVEL	N/A		
MAX TEMP DEG F	N/A		
OPERATING RIG TIME	.5 HR.		
RECORDED BY	LAPORTE		
WITNESSED BY	R. TWEIDT		

RUN	BORE HOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
ONE	9 5/8"	0'	170'	9"	DUAL	0'	170'

EQUIPMENT DATA

Run No.	ONE	
Tool Model No.	G27X4LD	
Diameter	1.9"	
Detector Model No.		
Type		
Length		

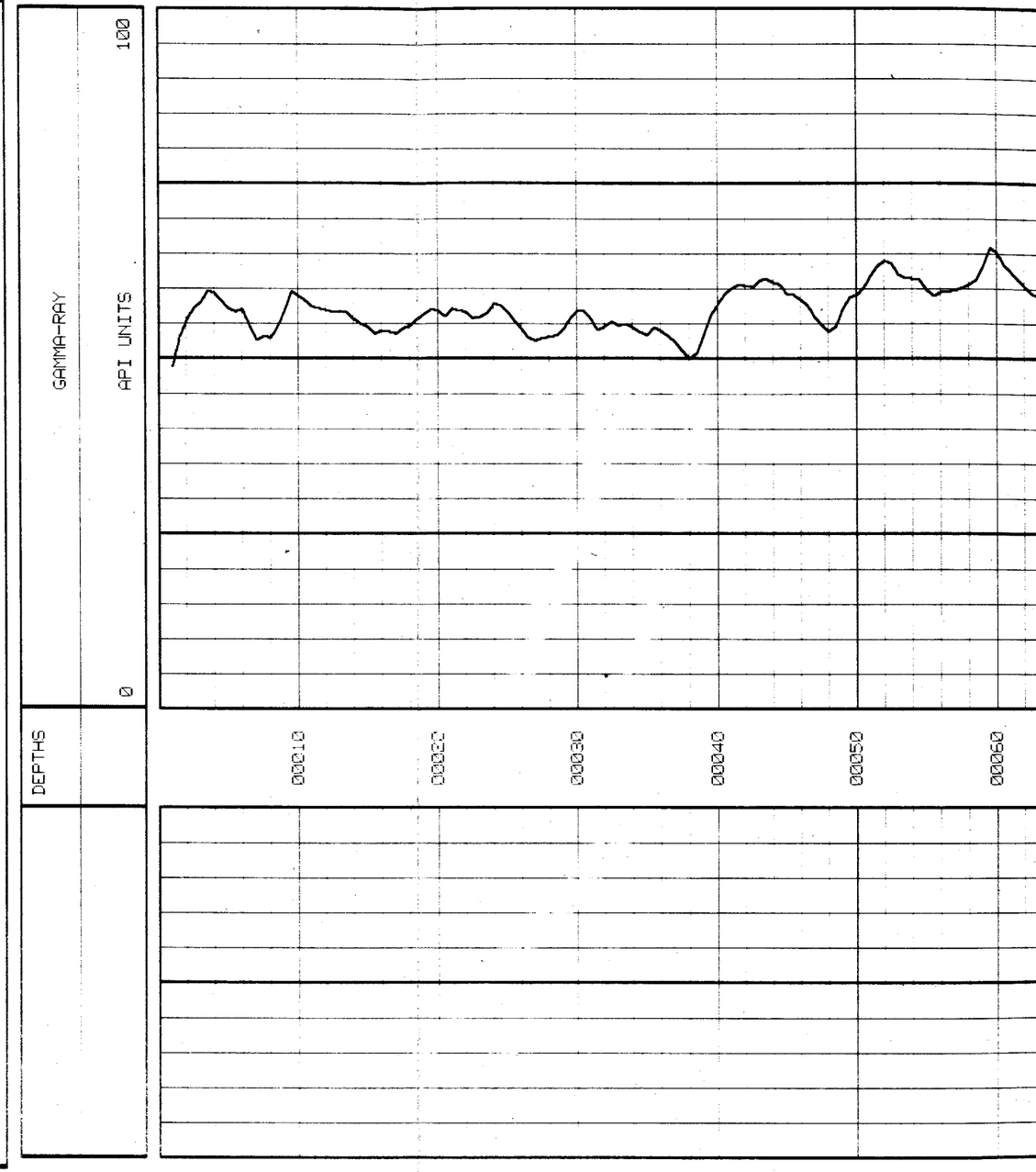
LOGGING DATA

Run No.	ONE	
Log Type	GAMMA-RAY	
Speed Ft./Min.	10	
T.C.Sec.	6	
Sens. Settings	100/888	
Zero Div. L or R		
API Units/Div.	5/DIV	
Log Start Time		
Log End Time		
Pumping Rate		
Fluid Level		
Formation Factor		

General

Hoist Truck No.	L-03	
Instrument. Truck No.	L-03	
Tool Serial No.		

Remarks:



FIRST READING @ 169'
-GAMMA-RAY
100
API UNITS
0
GAMMA-RAY
00070
00080
00090
00100
00110
00120
00130
00140
00150
00160
00170
DEPTHS

welenco

ELECTRIC LOG

FILING NO.	COMPANY	LAYNE ENVIRONMENTAL
	WELL	EMW-11
	FIELD	ARROYO SECO
	COUNTY	LOS ANGELES STATE CALIFORNIA
JOB NO. 19408	LOCATION: JPL: PASEDENA	OTHER SERV: CALIPER
	SEC N/A TWP N/A RGE N/A	

Permanent Datum: G.L. Elev: K.B. N/A
Log Measured From G.L. Ft Above Perm Datum D.F. N/A
Drilling Measured From G.L. G.L. N/A

Date	11-11-92	
Run No.	ONE	
Depth - Driller	697'	
Depth - Logger	696'	
Btm. Log Inter.	695'	
Top Log Inter.	32'	
Casing-Driller	16" at 26'	
Casing-Logger	N/A at	
Bit Size	9 7/8"	
Type Fluid In Hole	BENTONITE	
Dens. / Visc.	N/A / N/A	
pH / Fluid Loss	N/A / N/A ml	
Source of Sample	PIT	
Rm at Meas.Temp	11.3 at 75 F	
Rmf at Meas.Temp	12.1 at 75 F	
Rmc at Meas.Temp	N/A at F	
Source: Rmf Rmc	MEAS / N/A	
Rm at BHT	N/A at F	
Time Since Circ.	1 HR.	
Max. Rec. Temp.	N/A F	
Equip / Location	L-03 / L.A.	
Recorded By	LAPORTE	
Witnessed By	B. RANDOLPH	

This Heading and Log Conform To API RP 31

Fold Here

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

Equipment Data: Run No. ONE | Tool Type ELECTRIC | PadType FREE | Tool Pos | Other

Changes in Mud Type or Additional Samples: Date | Sample No. | Depth-Driller | Type Fluid in Hole | Dens. | Visc. | ph | Fluid Loss ml | Source of Sample | Rm at Meas. Temp. | Rmf at Meas. Temp. | Rmc at Meas. Temp. | Source: Rmf Rmc | Rm at BHT | Rmf at BHT | Rmc at BHT

REMARKS:

RESISTANCE ohms

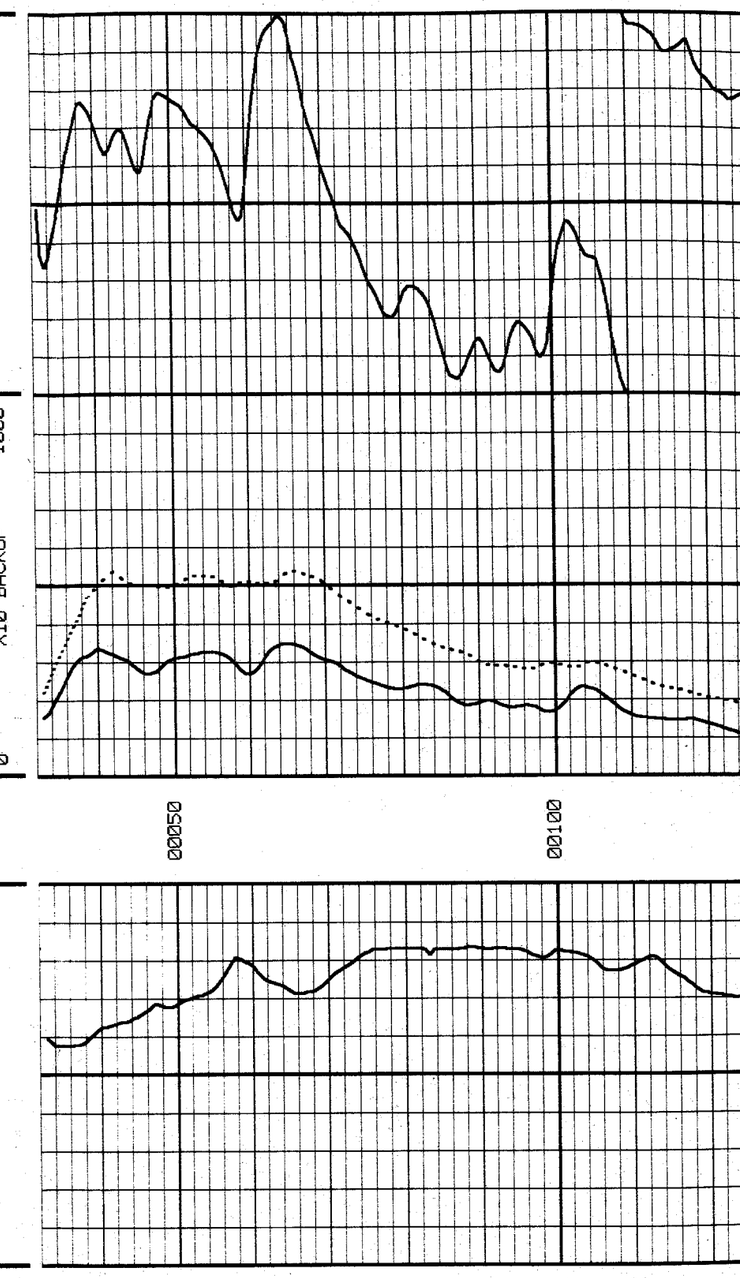
SINGLE POINT Detail Curve

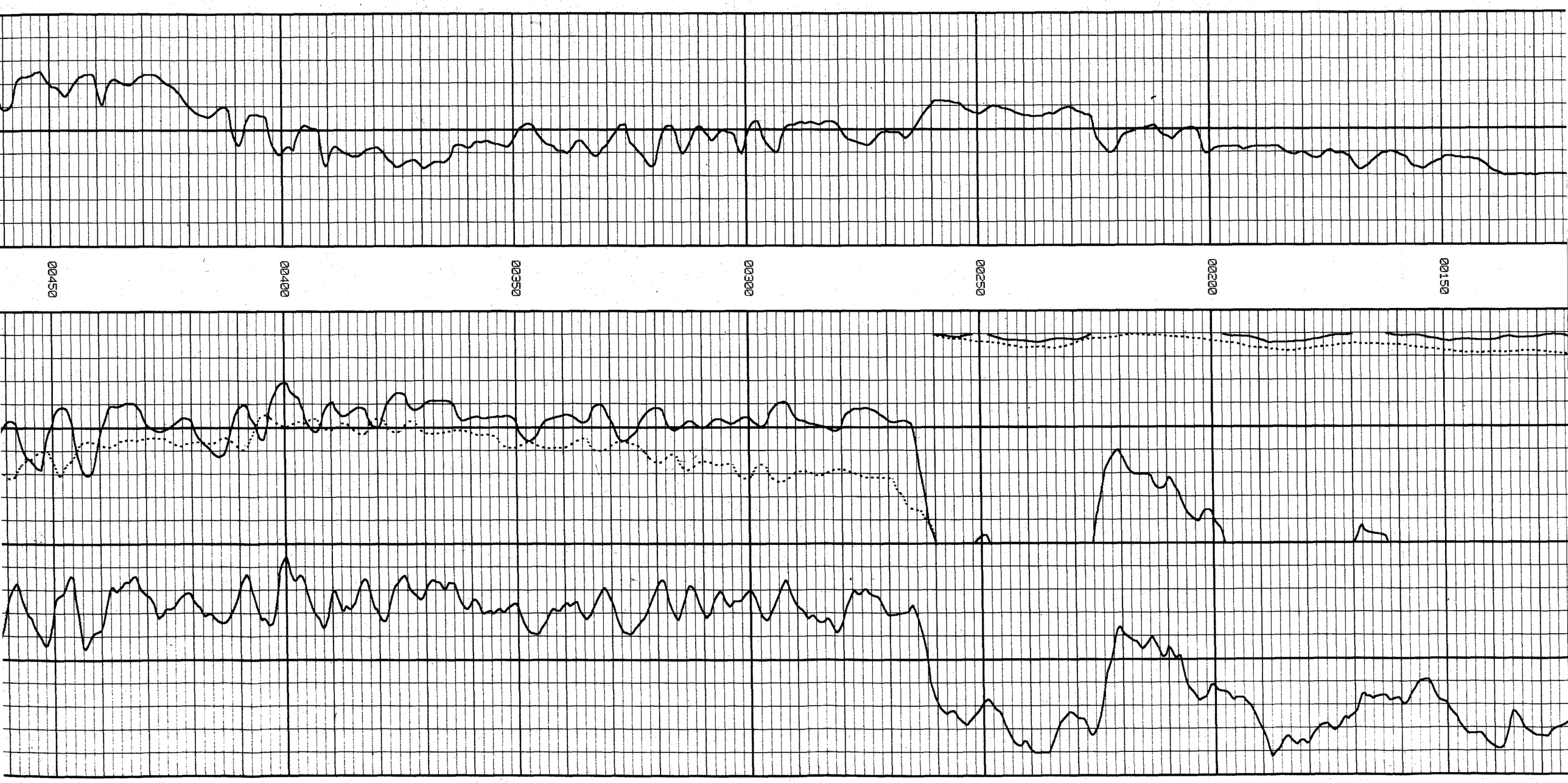
RESISTIVITY ohmmeters2 /meter

SHORT NORMAL 16 Inch 0 100
X10 BACKUP 0 1000
LONG NORMAL 64 Inch 0 100
X10 BACKUP 0 1000

DEPTHS 00050 00100

SPONTANEOUS POTENTIAL millivolts - + 10




00450
00400
00350
00300
00250
00200
00150

-SINGLE POINT
FIRST READING @ 695'
-16 INCH
-64 INCH
-SP CURVE
00500
00550
00600
00650
00700
0
X10 BACKUP
1000
0
64 Inch
LONG NORMAL
100
Detail Curve
SINGLE POINT
0
X10 BACKUP
1000
0
16 Inch
SHORT NORMAL
100
ohmmeters2/meter
RESISTIVITY
ohms
RESISTANCE
DEPTHS
10
millivolts
SPONTANEOUS POTENTIAL

welenco

GAMMA-RAY/CALIPER LOG

FILING NO.

COMPANY LAYNE ENVIRONMENTAL
WELL EMW-11
FIELD ARROYO SECO
COUNTY LOS ANGELES STATE CALIFORNIA

LOCATION: JPL: PASEDENA

OTHER SERV: E-LOG

JOB NO. 19408

SEC N/A TWP N/A RGE N/A

PERMANENT DATUM: G.L. ELEV:

LOG MEASURED FROM G.L. FT ABOVE PERM DATUM
DRILLING MEASURED FROM G.L.

ELEVATION:
KB. N/A
DF. N/A
GL. N/A

DATE	11-11-92		
TYPE OF LOG	GAMMA/CALIPER		
RUN NO.	ONE		
DEPTH - DRILLER	697'		
DEPTH - LOGGER	696'		
BOTTOM LOGGED INT	695'		
TOP LOGGED INT	0'		
TYPE FLUID IN HOLE	BENTONITE		
DENSITY	N/A		
LEVEL	FULL		
MAX TEMP DEG F	N/A		
OPERATING RIG TIME	1 HR.		
RECORDED BY	LAPORTE		
WITNESSED BY	B. RANDOLPH		

RUN	BORE HOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
ONE	9 7/8"	26'	697'	26"	COND	0'	26'

EQUIPMENT DATA

	ONE	TWO
Run No.		
Tool Model No.	G27X4LD	
Diameter	1.9"	1 3/8"
Detector Model No.		
Type		
Length		

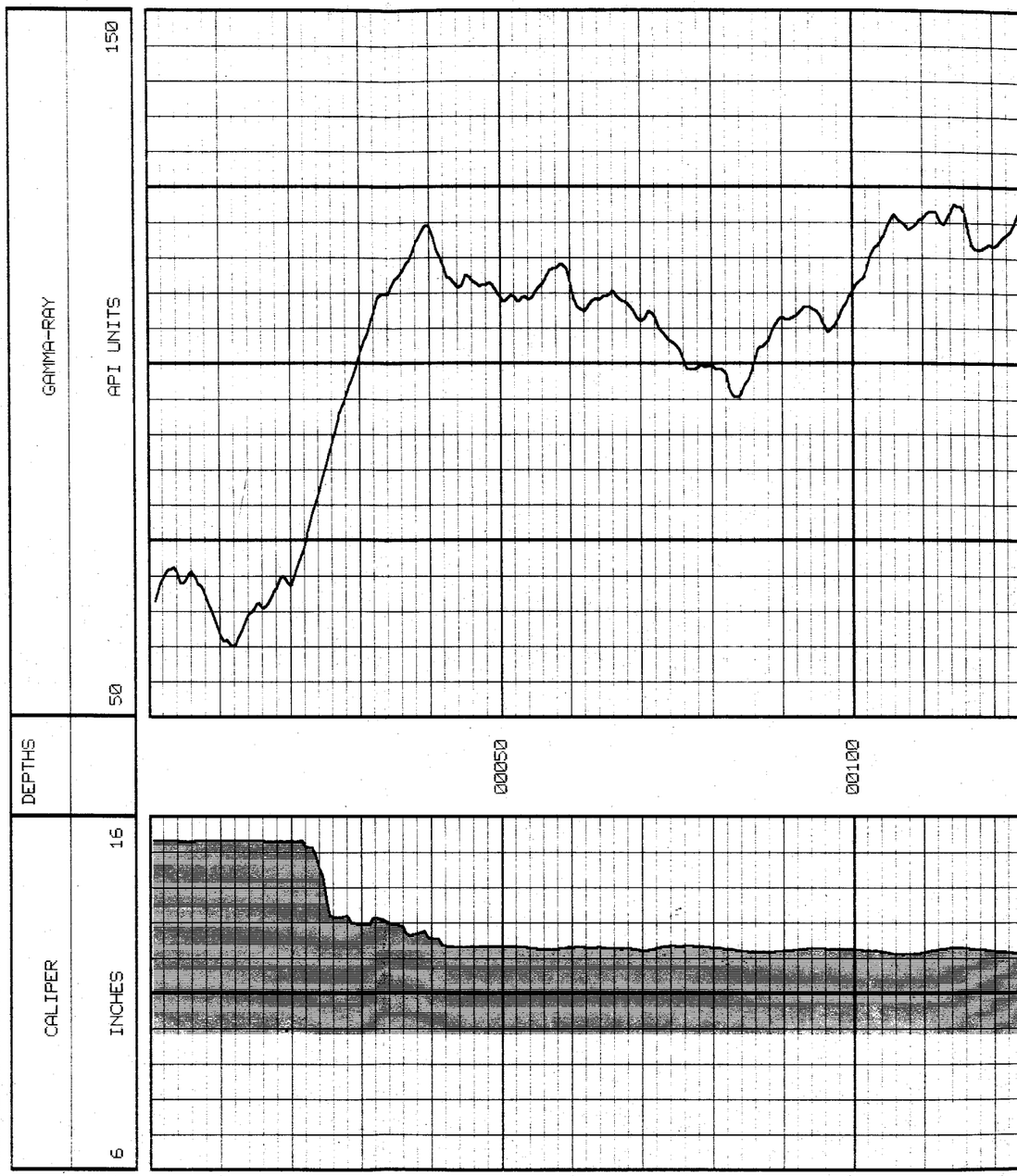
LOGGING DATA

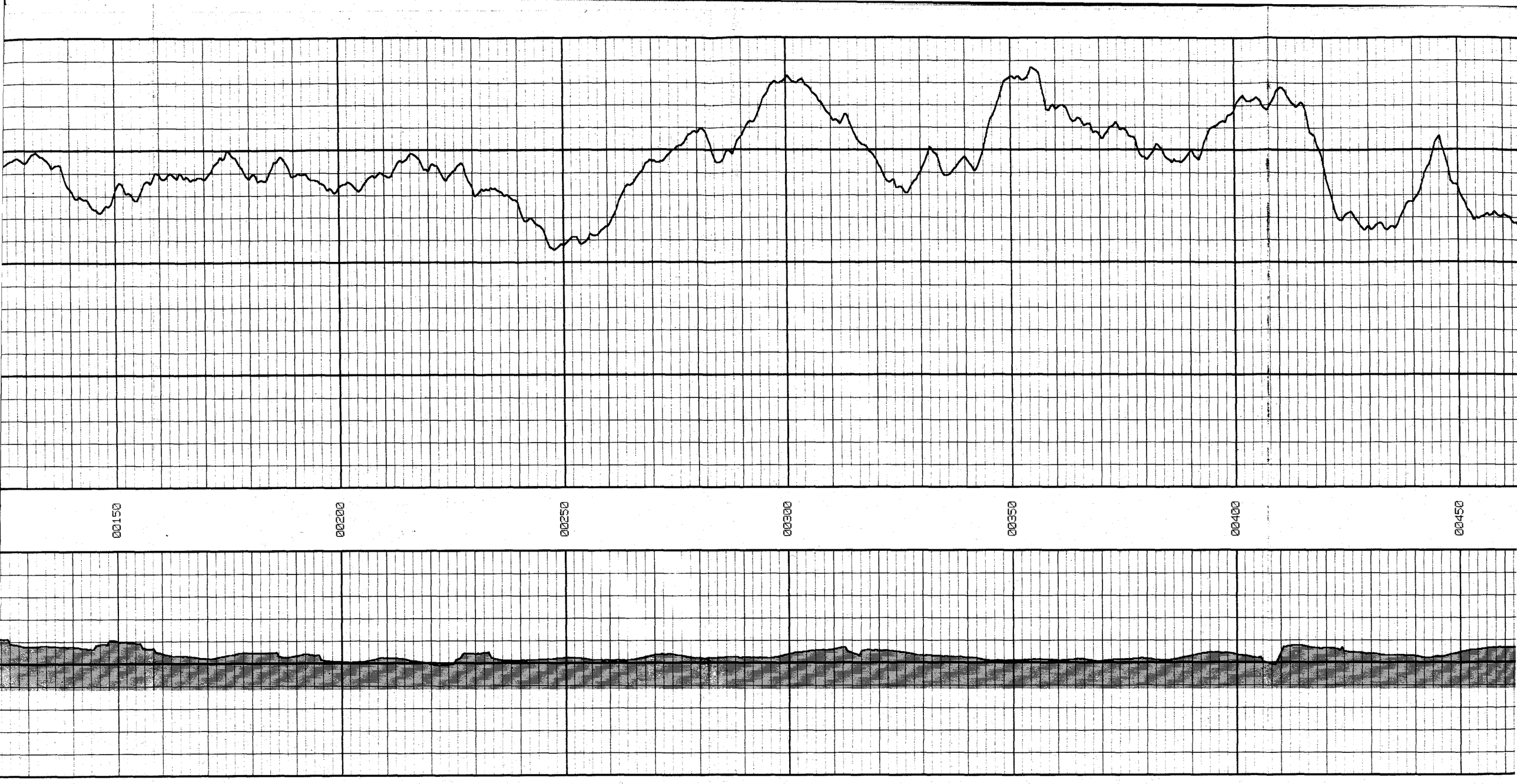
	ONE	TWO
Run No.		
Log Type	GAMMA-RAY	CALIPER
Speed Ft./Min.	10	20
T.C.Sec.	6	2
Sens. Settings	100/888	500/250
Zero Div. L or R		
API Units/Div.	5/DIV	1 INCH
Log Start Time		
Log End Time		
Pumping Rate		
Fluid Level		
Formation Factor		

General

Hoist Truck No.	L-03	
Instrument. Truck No.	L-03	
Tool Serial No.		

Remarks:




00150
00200
00250
00300
00350
00400
00450

GAMMA-RAY
FIRST READING @ 695'
150
API UNITS
50
GAMMA-RAY
00500
00550
00600
00650
00700
DEPTHS
CALIPER
16
INCHES
6
CALIPER

ELECTRIC LOG

welenco

COUNTY:LOS ANGELES CA.
FIELD:JPL
LOCATION:BLGD 302
WELL:MW-12
COMPANY:BEYLIK DRILLING

COMPANY BEYLIK DRILLING
WELL MW-12
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
BLGD 302

Sec. Twp. Rge.

Other Services
GR/GRD
GR/GRD

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL 0 Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K. B.
D. F.
G. L.

Date	3/8/94							
Run No.	ONE							
Depth-Driller	672′							
Depth-Logger	672′							
Btm Log Interval	671′							
Top Log Interval	28′							
Casing Driller	16" @ 17′		@		@		@	
Casing Logger	NOT REACHED							
Bit Size	12.25"							
Type Fluid in Hole	BENTONITE							
Density / Viscosity	N/A	N/A						
pH / Fluid Loss	N/A	N/A cc		cc		cc		cc
Source of Sample	PIT							
Rm @ Meas. Temp.	17.2 @ 75 °F		@	°F	@	°F	@	°F
Rmf @ Meas. Temp.	17.6 @ 75 °F		@	°F	@	°F	@	°F
Rmc @ Meas. Temp.	N/A @ N/A °F		@	°F	@	°F	@	°F
Source of Rmf and Rmc	MEAS	N/A						
Rm @ BHT	N/A @ N/A °F		@	°F	@	°F	@	°F
Time: End Circulation	13:30							
Time: Logger on bottom	16:13							
Max Rec Temp Deg. F	N/A °F			°F		°F		°F
Equip No. / Location	L-14	L.A.						
Recorded By	RIDDER							
Witnessed By	M. CUTLER							

CWP DRS 1.26IG

Scale Changes: Scale Up Hole / Scale Down Hole

Type Log	Depth	Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
		ONE	T-130	NORMAL	FREE	

EQUIPMENT DATA

CALIBRATION DATA

Run No.	16" Normal Zero	Induction Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	BKG CPS	STD CPS
	o	o	o	o	o	o	o	o

Changes in Mud Type or Additional Samples

Fold Here

Date / Sample No
Depth Driller
Type Fluid
Dens / Visc
pH / Fluid Loss
Source of Sample
Rm @ Meas Temp
Rmf @ Meas Temp
Rmc @ Meas Temp
Source RMF / Rmc
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
REFERENCE LITERATURE:

REMARKS:

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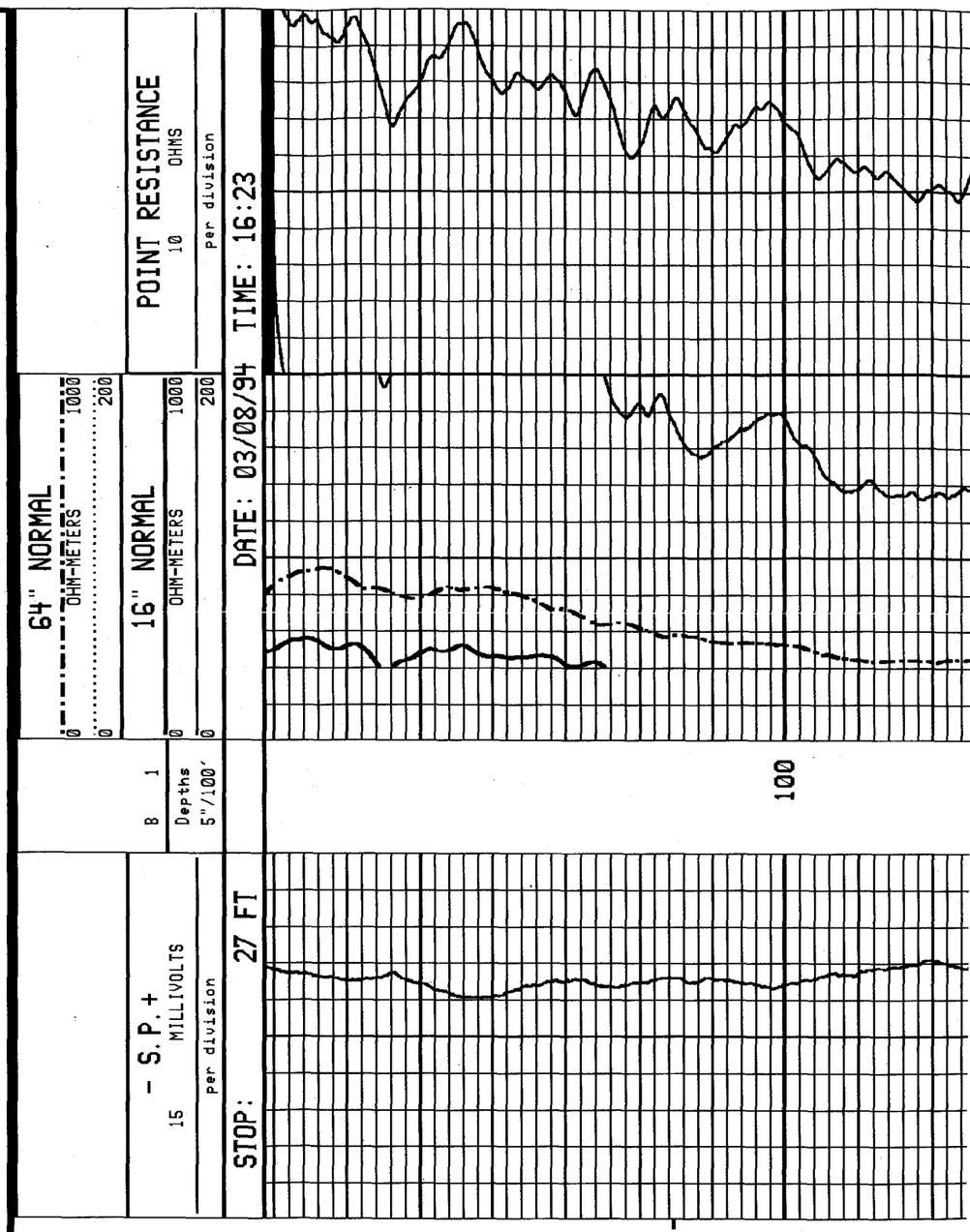
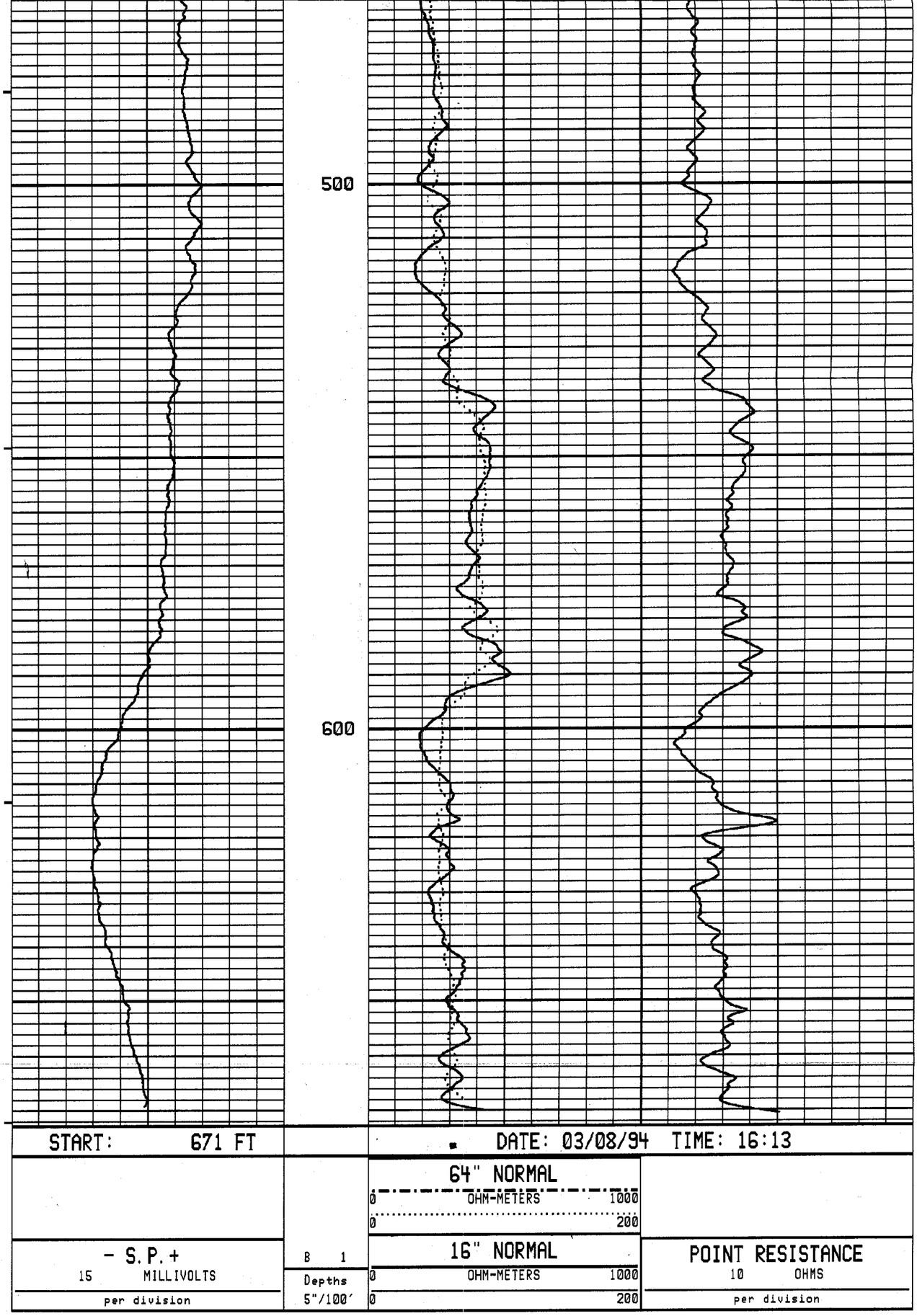


200
300
400


500
600
START: 671 FT
DATE: 03/08/94 TIME: 16:13
64" NORMAL
0 OHM-METERS 1000
0 200
- S.P. +
15 MILLIVOLTS
per division
B 1
Depths
5"/100'
16" NORMAL
0 OHM-METERS 1000
0 200
POINT RESISTANCE
10 OHMS
per division

GUARD RESISTIVITY
GAMMA-RAY LOG

COUNTY: LOS ANGELES CA.
FIELD: JPL
LOCATION: BLGD 302
WELL: MW-12
COMPANY: BEYLIK DRILLING

COMPANY BEYLIK DRILLING
WELL MW-12
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
BLGD 302
Sec. Twp. Rge.

Other Services
E-LOG
CALIPER

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL 0 Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K. B.
D. F.
G. L.

Date	3/8/94			
Run No.	ONE			
Depth-Driller	672'			
Depth-Logger	672'			
Btm Log Interval	671'			
Top Log Interval	0'			
Casing Driller	14" @ 17'	@	@	@
Casing Logger	NOT REACHED			
Bit Size	12.25"			
Type Fluid in Hole	BENTONITE			
Density / Viscosity	N/A N/A			
pH / Fluid Loss	N/A N/A cc	cc	cc	cc
Source of Sample	PIT			
Rm @ Meas. Temp.	17.2 @ 75 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	17.6 @ 75 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS N/A			
Rm @ BHT	N/A @ N/A °F	@ °F	@ °F	@ °F
Time: End Circulation	13:30			
Time: Logger on bottom	16:13			
Max Rec Temp Deg. F	N/A °F	°F	°F	°F
Equip No. / Location	L-14 L.A.			
Recorded By	RIDDER			
Witnessed By	M. CUTLER			

CWP DRS 1.2616

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

EQUIPMENT DATA

Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
ONE	13	GUARD	FREE	121

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	BKG CPS	STD CPS
	o	o	o	o	o			

Fold Here

Changes in Mud Type or Additional Samples

Date / Sample No	Depth Driller	Type Fluid	Dens / Visc	pH / Fluid Loss	Source of Sample	Rm @ Meas Temp	Rmf @ Meas Temp	Rmc @ Meas Temp	Source RMF / Rmc	Rm @ BHT	Rmf @ BHT	Rmc @ BHT
					o	o	o	o		o	o	o

REFERENCE LITERATURE:

REMARKS:

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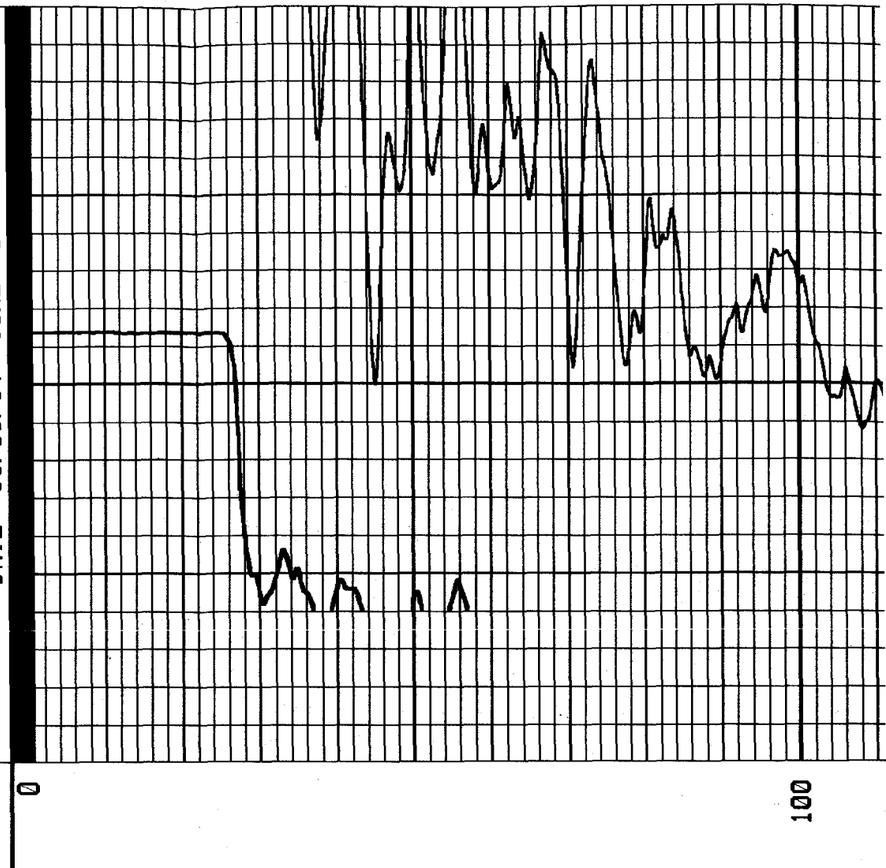
GUARD RESISTIVITY
Ohm-Meters
0 2000
0 400

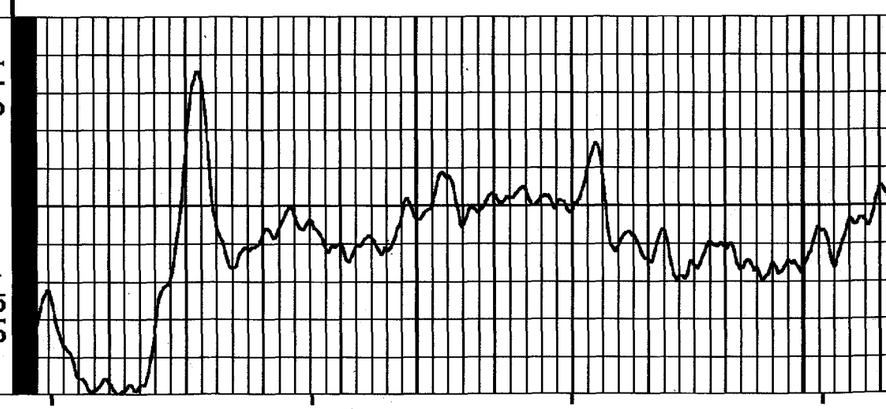
B 2
Depths 5"/100'

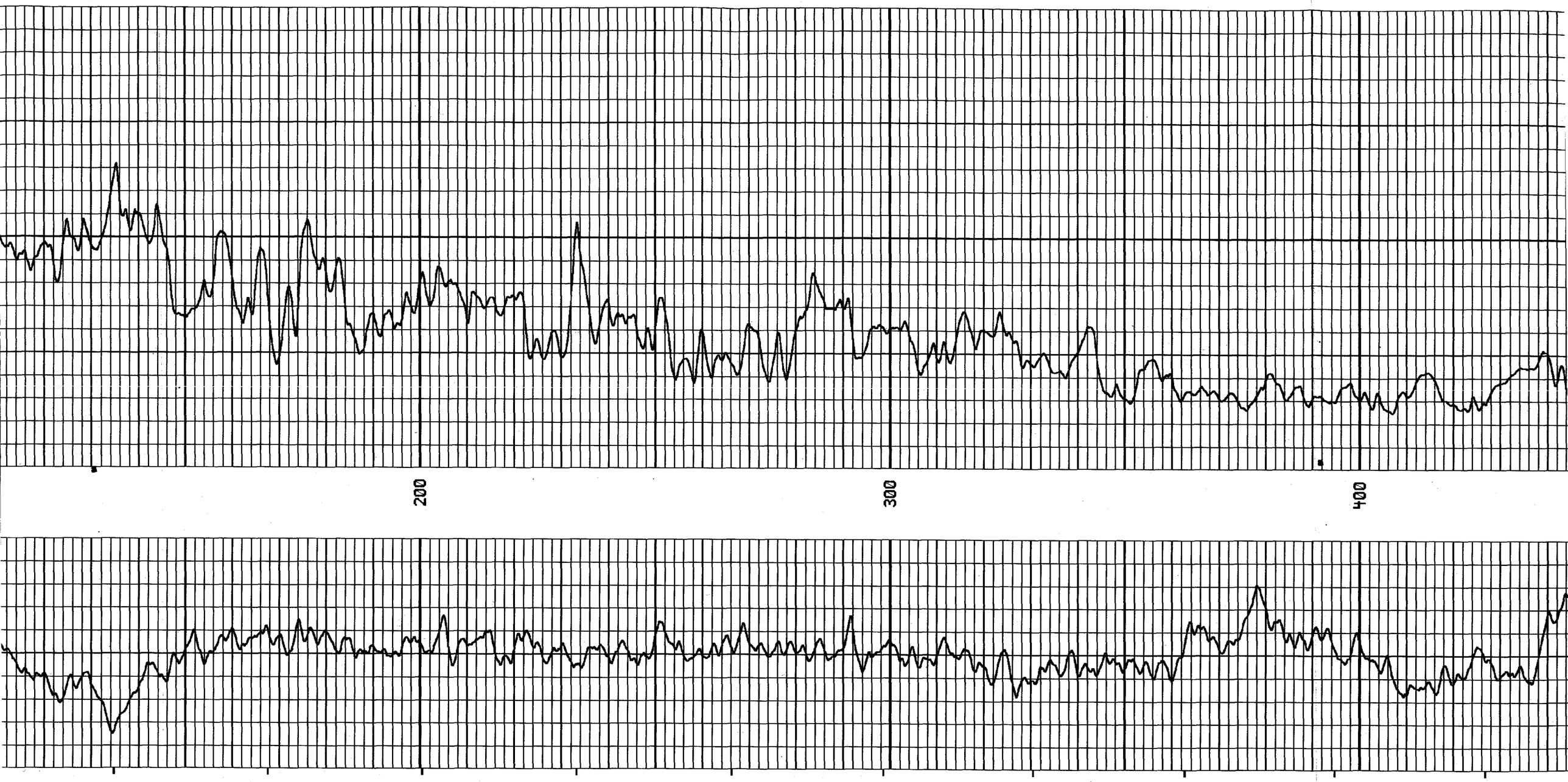
DATE: 03/08/94 TIME: 17:02

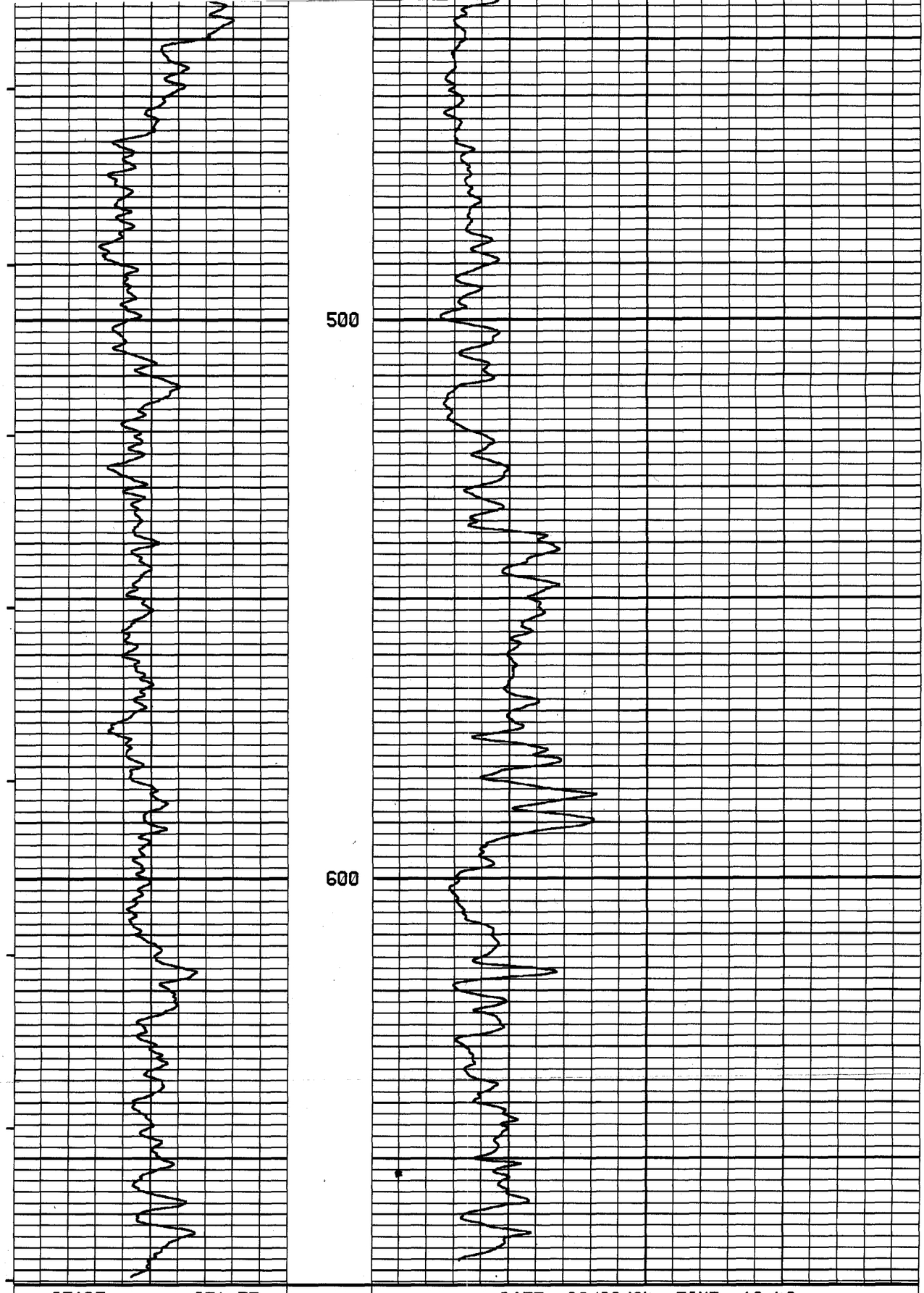


GAMMA-RAY
API Units
140 240
140 40

STOP: 0 FT




200
300
400



START: 671 FT		DATE: 03/08/94 TIME: 16:40
GAMMA-RAY	B 2	GUARD RESISTIVITY
140 API Units 240	Depths	0 Ohm-Meters 2000
40 140	5"/100'	0 400

GAMMA-RAY LOG

welenco

COUNTY: LOS ANGELES CA.
FIELD: JPL
LOCATION: BLDG 114
WELL: MW-13
COMPANY: BEYLIK DRILLING

COMPANY BEYLIK DRILLING
WELL MW-13
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
BLDG 114
Sec. Twp. Rge.

Other Services
NONE

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL 0 Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K.B.
D.F.
G.L.

Date	4/2/94		Type Fluid in Hole	WATER/AIR		
Job Tkt.	Run No.	ONE	Dens.	Visc.	N/A	N/A
Depth-Driller	240′		Time Well Ready	12:38		
Depth-Logger	239′		Logger on Bottom	12:38		
Btm Log Interval	239′		Equip.	Location	L-14	L.A.
Top Log Interval	0′		Recorded By	RIDDER		
Max Rec. Temp.	N/A		Witnessed By	N. CUTLER		

BOREHOLE RECORD

Run No	Bit	From	To
ONE	8.75"	G.L.	239′

TUBING RECORD

Size	Wgt	From	To

CASING RECORD

Size	Wgt	From	To
9 5/8"	DRIVE PIPE	G.L.	235′

LINER

Size	Wgt	From	To

CWP DRS 1.2616

Fold Here

Changes in Mud Type or Additional Samples

Date	Sample No	Depth	Type Fluid	Dens	Visc	pH	Fluid Loss	Source of Sample	Rm @ Meas Temp	Rmf @ Meas Temp	Rmc @ Meas Temp	Source RMF	RMC	Rm @ BHT	Rmf @ BHT	Rmc @ BHT
									o	o	o			o	o	o

REFERENCE LITERATURE:

REMARKS:

Scale Changes

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
ONE	13	GUARD	FREE	121

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	BKG CPS	STD CPS
	o	o	o	o	o	o	o	o

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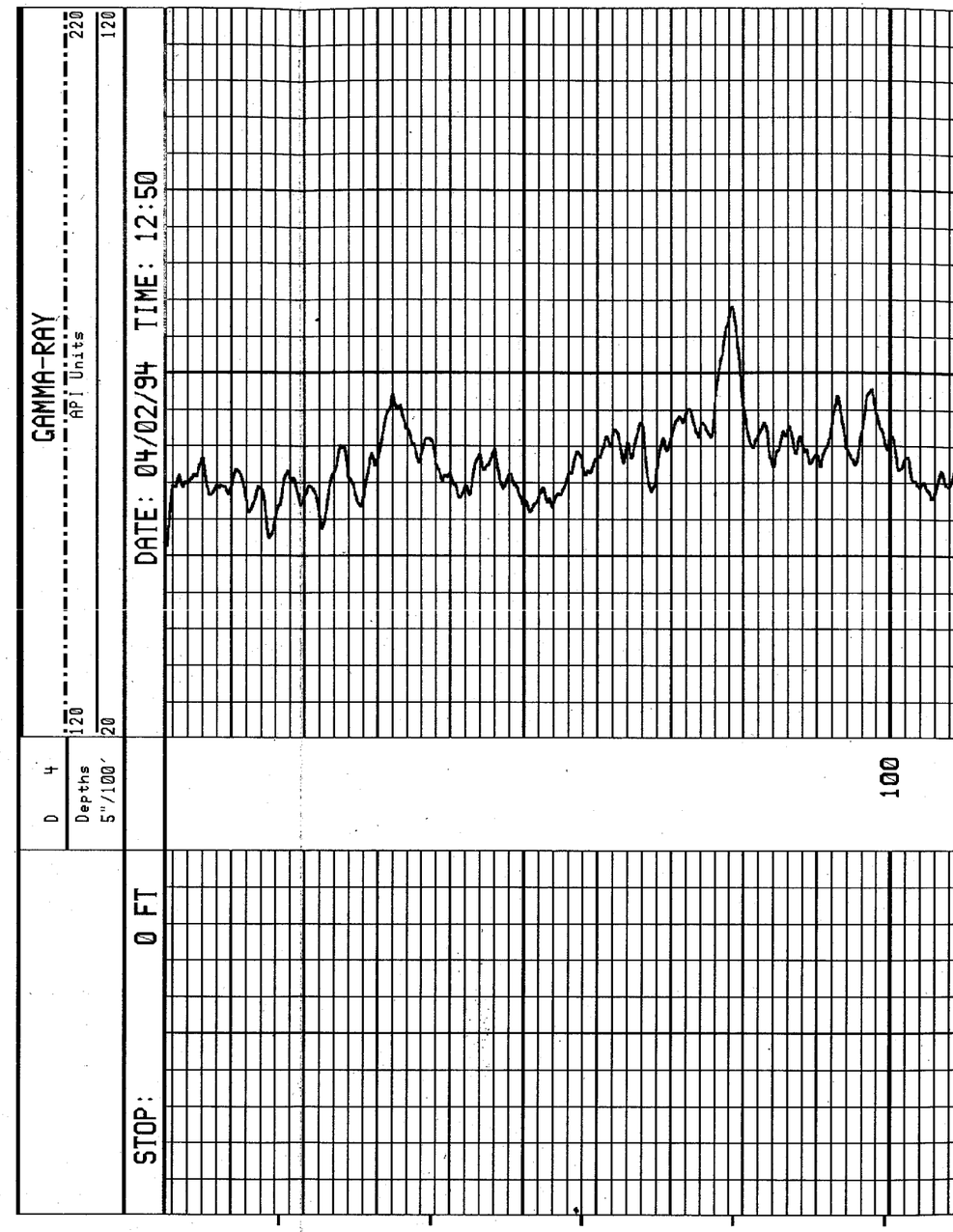
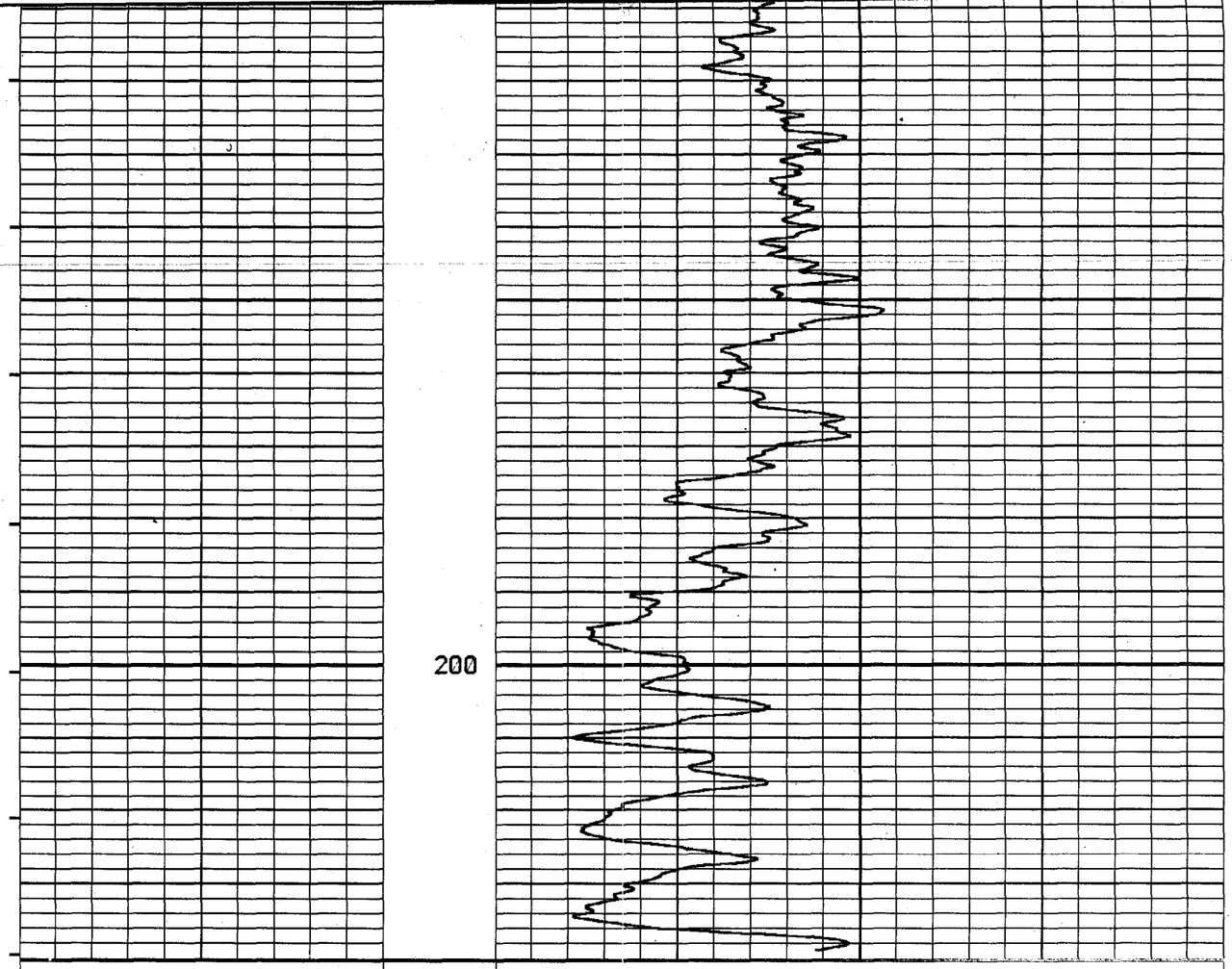
Welenco





START: 239 FT

DATE: 04/02/94 TIME: 12:38

D 4

Depths
5"/100'

GAMMA-RAY

120 API Units 220

20 120

ELECTRIC LOG

welenco

COUNTY: LOS ANGELES CA.
FIELD: JPL
LOCATION: WEST PARKING LOT
WELL: MW-14
COMPANY: BEYLIK DRILLING

COMPANY BEYLIK DRILLING
WELL MW-14
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
WEST PARKING LOT
Sec. Twp. Rge.

Other Services
GR/GRD
CALIPER

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K.B.
D.F.
G.L.

Date	3/24/94			
Run No.	ONE			
Depth-Driller	656′			
Depth-Logger	656′			
Btm Log Interval	656′			
Top Log Interval	25′			
Casing Driller	16" @ 18′	@	@	@
Casing Logger	NOT REACHED			
Bit Size	12.25"			
Type Fluid in Hole	BENTONITE			
Density / Viscosity	N/A N/A			
pH / Fluid Loss	N/A N/A cc	cc	cc	cc
Source of Sample	PIT			
Rm @ Meas. Temp.	17.2 @ 75 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	17.0 @ 75 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS N/A			
Rm @ BHT	N/A @ N/A °F	@ °F	@ °F	@ °F
Time: End Circulation	13:00			
Time: Logger on bottom	16:44			
Max Rec Temp Deg. F	N/A °F	°F	°F	°F
Equip No. / Location	L--14 L.A.			
Recorded By	RIDDER			
Witnessed By	M. CUTLER			

CWP DRS 1.2616

Fold Here

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

Changes in Mud Type or Additional Samples

Date / Sample No.
Depth Driller
Type Fluid
Dens. / Visc.
pH / Fluid Loss
Source of Sample
Rm @ Meas Temp
Rmf @ Meas Temp
Rmc @ Meas Temp
Source RMF / Rmc
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
REFERENCE LITERATURE:

EQUIPMENT DATA

Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
ONE	T-130	NORMAL	FREE	

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	BKG CPS	STD CPS

REMARKS:

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Welenco

64" NORMAL
OHM-METERS
0 2000
0 200

16" NORMAL
OHM-METERS
0 2000
0 200

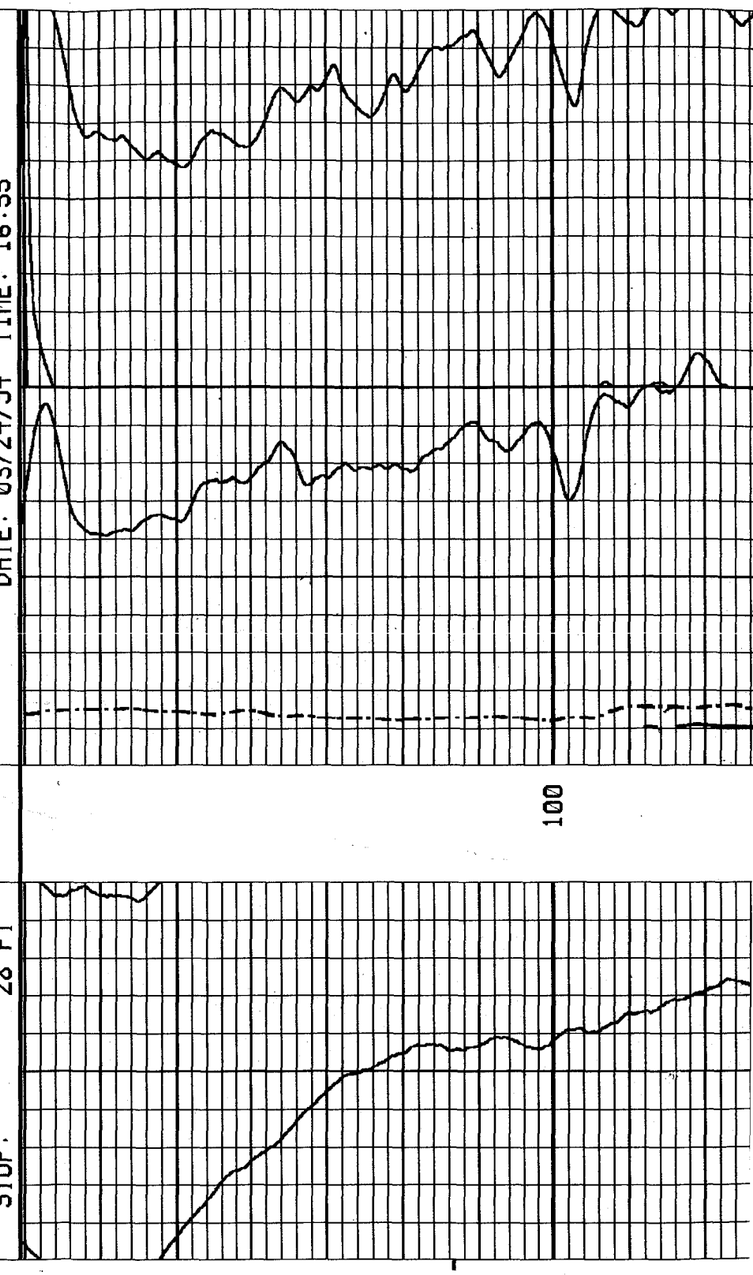
POINT RESISTANCE
OHMS
7
per division

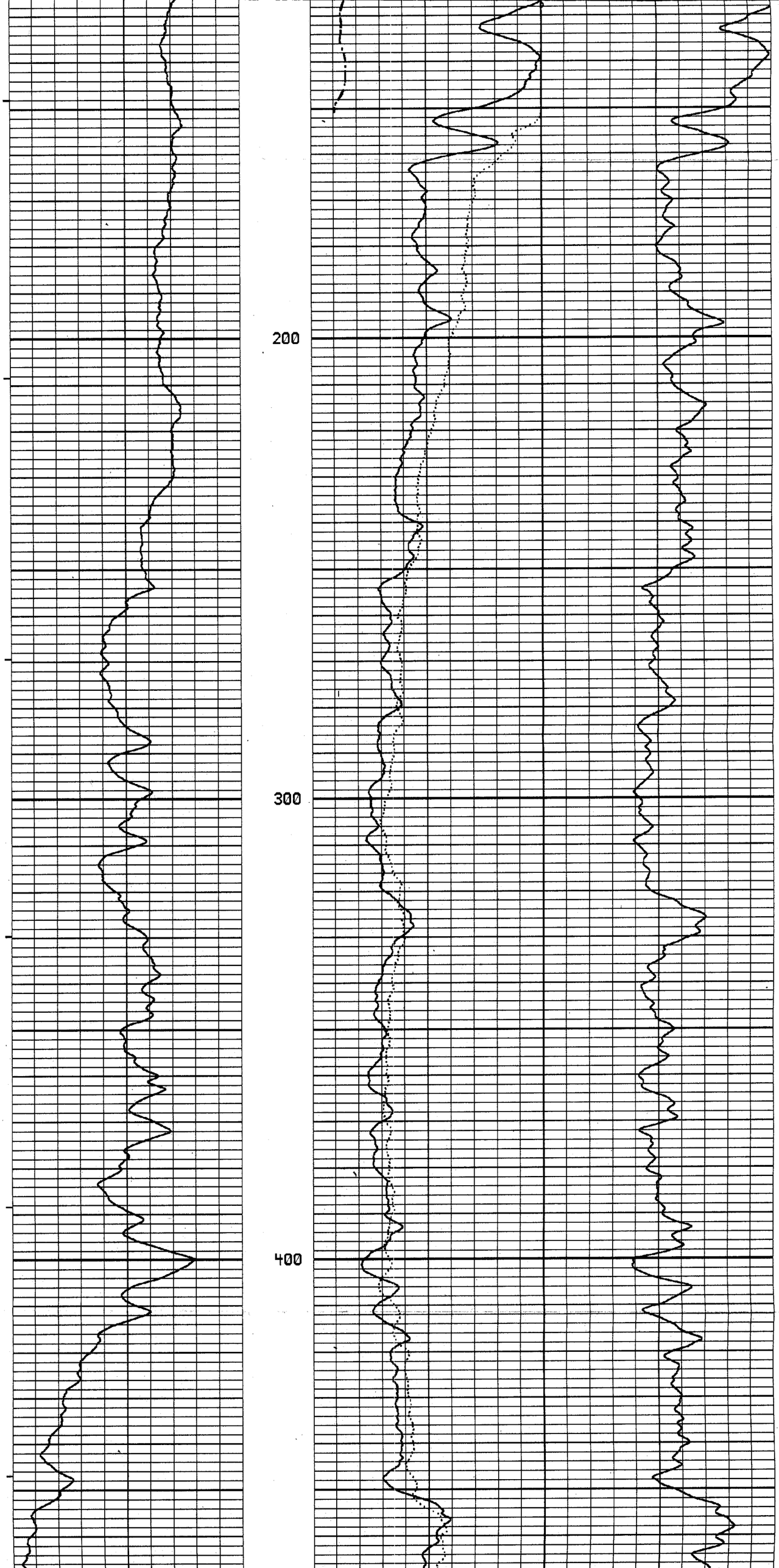
B 14
Depths
5"/100′

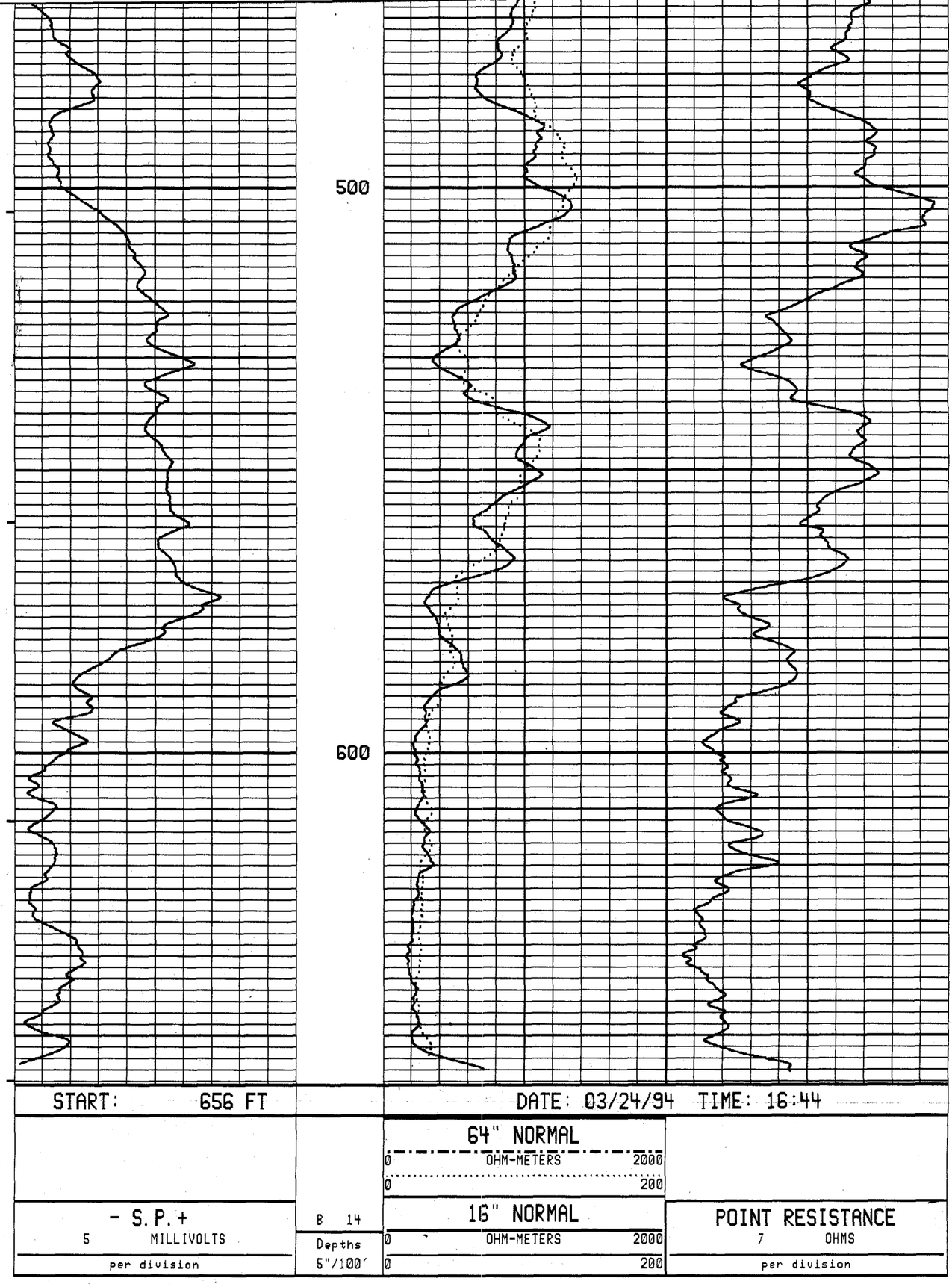
- S.P. +
MILLIVOLTS
5
per division

DATE: 03/24/94 TIME: 16:55

STOP: 28 FT




200
300
400


500
600
START: 656 FT
DATE: 03/24/94 TIME: 16:44
64" NORMAL
0 OHM-METERS 2000
0 200
- S.P. +
5 MILLIVOLTS
per division
B 14
Depths
5"/100'
16" NORMAL
0 OHM-METERS 2000
0 200
POINT RESISTANCE
7 OHMS
per division

[redacted]

GUARD RESISTIVITY
GAMMA-RAY LOG

COUNTY: LOS ANGELES CA.
FIELD: JPL
LOCATION: WEST PARKING LOT
WELL: MW-14
COMPANY: BEYLIK DRILLING

COMPANY BEYLIK DRILLING
WELL MW-14
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
WEST PARKING LOT

Sec. Twp. Rge.

Other Services
E-LOG
CALIPER

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K.B.
D.F.
G.L.

Date	3/24/94			
Run No.	ONE			
Depth-Driller	656′			
Depth-Logger	656′			
Btm Log Interval	656′			
Top Log Interval	7′			
Casing Driller	16" @ 18′	@	@	@
Casing Logger	18′			
Bit Size	12.25"			
Type Fluid in Hole	BENTONITE			
Density I Viscosity	N/A N/A			
pH I Fluid Loss	N/A N/A cc	cc	cc	cc
Source of Sample	PIT			
Rm @ Meas. Temp.	17.2 @ 75 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	17.0 @ 75 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS N/A			
Rm @ BHT	N/A @ N/A °F	@ °F	@ °F	@ °F
Time: End Circulation	13:00			
Time: Logger on bottom	16:44			
Max Rec Temp Deg. F	N/A °F	°F	°F	°F
Equip No. I Location	L--14 L.A.			
Recorded By	RIDDER			
Witnessed By	M. CUTLER			

CWP DRS 1.2616

Fold Here

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

EQUIPMENT DATA

Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
ONE	13	GUARD	FREE	121

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	BKG CPS	STD CPS

Changes in Mud Type or Additional Samples

Date I Sample No.	Depth Driller	Type Fluid	Dens I Visc	pH I Fluid Loss	Source of Sample	Rm @ Meas Temp	Rmf @ Meas Temp	Rmc @ Meas Temp	Source RMF I Rmc	Rm @ BHT	Rmf @ BHT	Rmc @ BHT
					o	o	o	o		o	o	o

REFERENCE LITERATURE:

REMARKS:

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Welenco

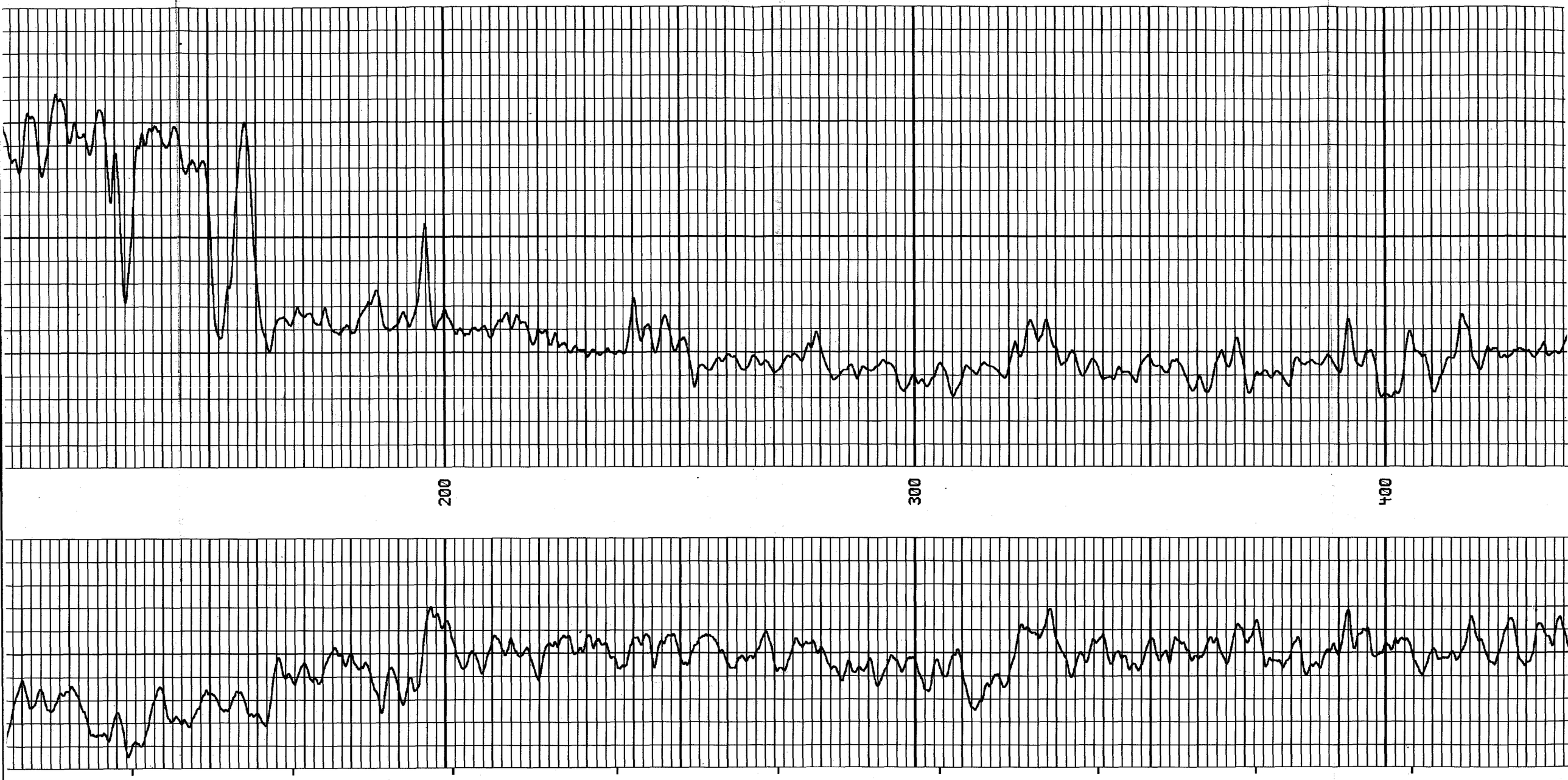
GUARD RESISTIVITY
Ohm-Meters
0 2000
0 400

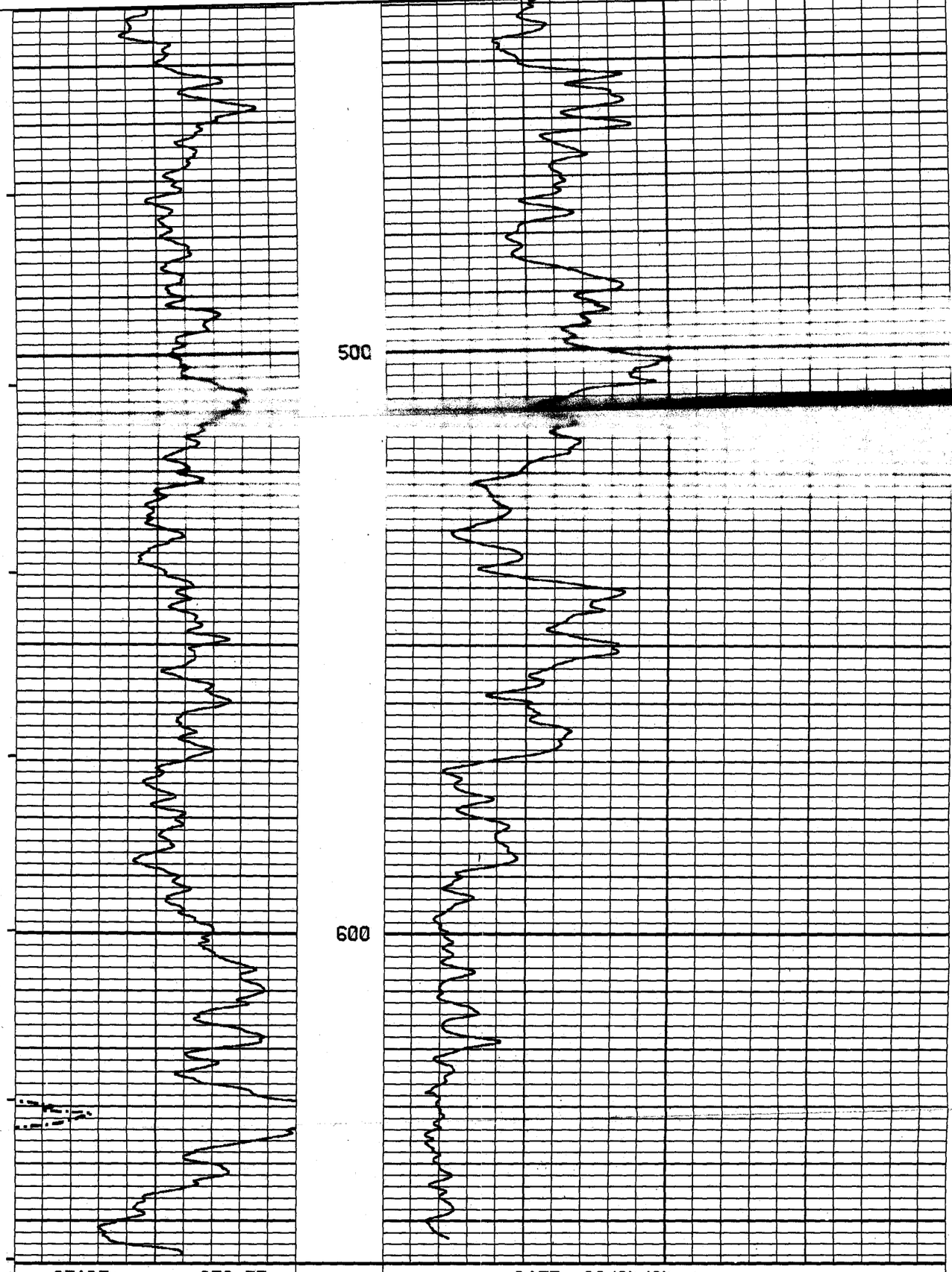
B 15.
Depths
5"/100′

GAMMA-RAY
API Units
170 270
70 170

DATE: 03/24/94 TIME: 17:35

STOP: 7 FT


200
300
400



START: 656 FT		DATE: 03/24/94
GAMMA-RAY	8 15	GUARD RESISTIVITY
170 API Units 270	Depths	0 Ohm-Meters 2000
70 170	5"/100'	0 400

GAMMA-RAY LOG

welenco

COUNTY:LOS ANGELES CA.
FIELD:JPL
LOCATION:JPL LABS. NORTH OF 210 F
WELL:MW-15
COMPANY:BEYLIK DRILLING
EBASCO

COMPANY BEYLIK DRILLING
WELL MW-15
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
JPL LABS. NORTH OF 210 FWY
Sec. Twp. Rge.

Other Services
NONE

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K.B.
D.F.
G.L.

Date	2/26/94			
Run No.	ONE			
Depth-Driller	77'			
Depth-Logger	64'			
Btm Log Interval	64'			
Top Log Interval	0'			
Casing Driller	10" @ T.D.	@	@	@
Casing Logger	N/A			
Bit Size	10"			
Type Fluid in Hole	AIR			
Density / Viscosity	N/A N/A			
pH / Fluid Loss	N/A N/A cc	cc	cc	cc
Source of Sample	N/A			
Rm @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS N/A			
Rm @ BHT	N/A @ N/A °F	@ °F	@ °F	@ °F
Time: End Circulation	--			
Time: Logger on bottom	18:21			
Max Rec Temp Deg. F	N/A °F	°F	°F	°F
Equip No. / Location	L-14 L.A			
Recorded By	LAPORTE			
Witnessed By	M. CULTER			

CWP DRS 1.2616

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

EQUIPMENT DATA: Run No. ONE | Tool No. GUARD | Tool Type | Tool Pos. FREE | Gamma Ray Tool No. 121

CALIBRATION DATA: Run No. | 16"Normal Int. Cal Zero | 16"Normal Loop Cal | Induction Tool Zero | Induction Tool Cal | GAMMA RAY API SCALE | BKG CPS | STD CPS

Fold Here

Changes in Mud Type or Additional Samples

Date / Sample No	Depth Driller	Type Fluid	Dens / Visc	pH / Fluid Loss	Source of Sample	Rm @ Meas Temp	Rmf @ Meas Temp	Rmc @ Meas Temp	Source RMF / Rmc	Rm @ BHT	Rmf @ BHT	Rmc @ BHT
					o	o	o	o		o	o	o

REFERENCE LITERATURE:

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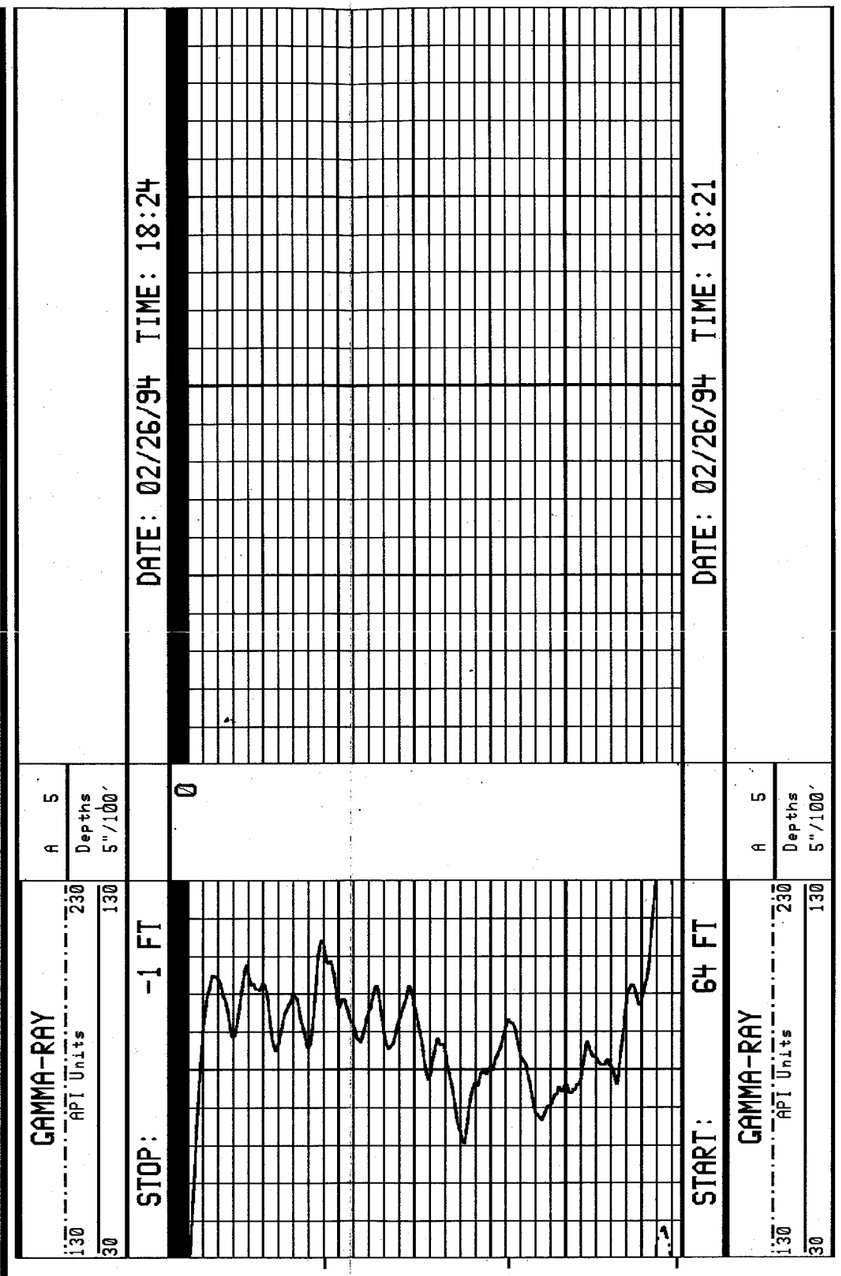
Welenco



GAMMA-RAY LOG

welenco

COUNTY: LOS ANGELES CA.
FIELD: JPL
LOCATION: BLDG 138
WELL: MW-16
COMPANY: BEYLIK DRILLING

COMPANY BEYLIK DRILLING
WELL MW-16
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
BLDG 138
Sec. N/A Twp. N/A Rge. N/A

Other Services
NONE

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K.B. N/A
D.F. N/A
G.L. N/A

Date	3/19/9			
Run No.	ONE			
Depth-Driller	282′			
Depth-Logger	282′			
Btm Log Interval	281′			
Top Log Interval	0′			
Casing Driller	10" @ 282′	@	@	@
Casing Logger	N/A			
Bit Size	10"			
Type Fluid in Hole	AIR/WATER			
Density I Viscosity	N/A N/A			
pH I Fluid Loss	N/A N/A cc	cc	cc	cc
Source of Sample	N/A			
Rm @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS N/A			
Rm @ BHT	N/A @ N/A °F	@ °F	@ °F	@ °F
Time: End Circulation	N/A			
Time: Logger on bottom	14:41			
Max Rec Temp Deg. F	N/A °F	°F	°F	°F
Equip No. I Location	L-14 L.A.			
Recorded By	RIDDER			
Witnessed By	--			

CWP DRS 1.2616

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

EQUIPMENT DATA

Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
ONE	13	GUARD	FREE	121

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	BKG CPS	STD CPS

Fold Here

Changes in Mud Type or Additional Samples
Date I Sample No
Depth Driller
Type Fluid
Dens I Visc
pH I Fluid Loss
Source of Sample
Rm @ Meas Temp
Rmf @ Meas Temp
Rmc @ Meas Temp
Source RMF I Rmc
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
REFERENCE LITERATURE:

REMARKS:

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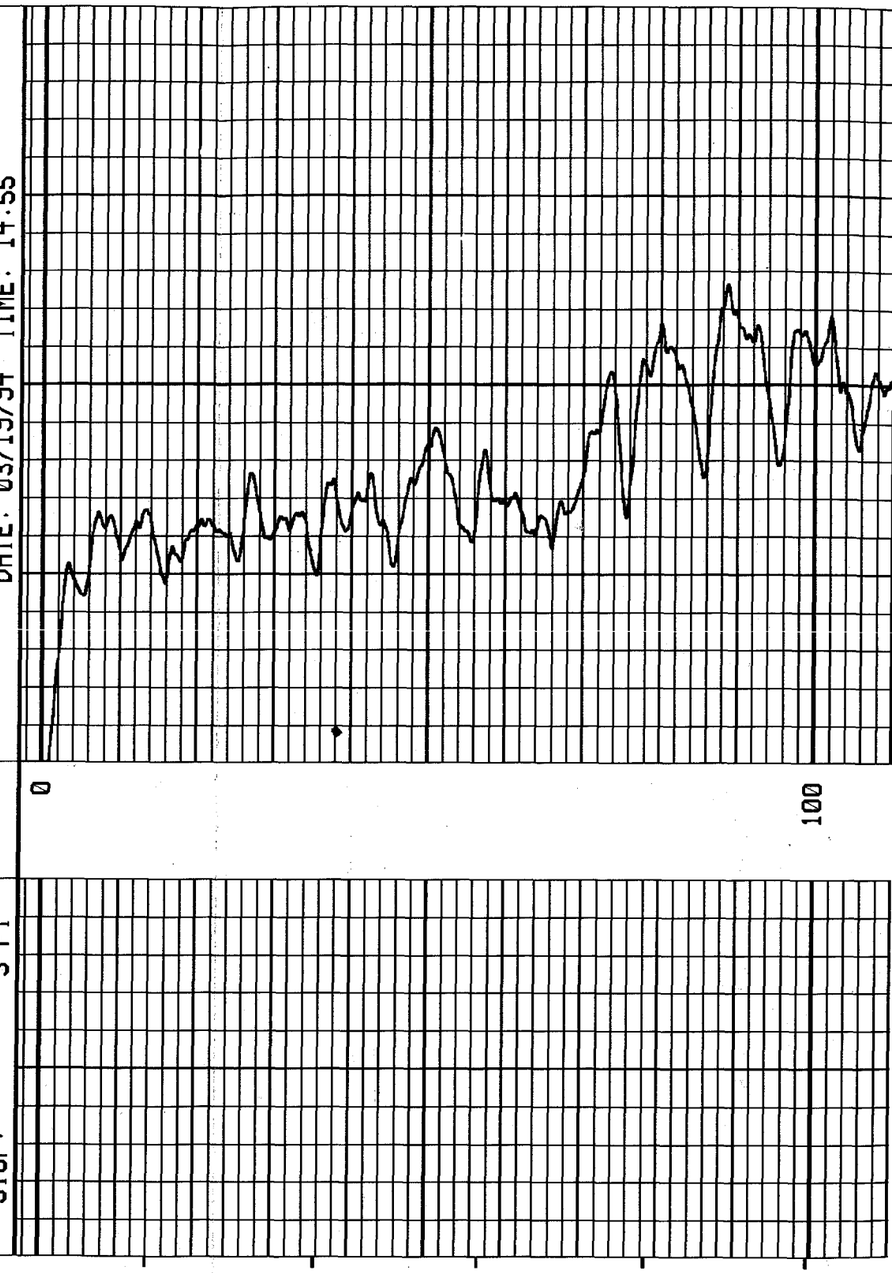
Welenco

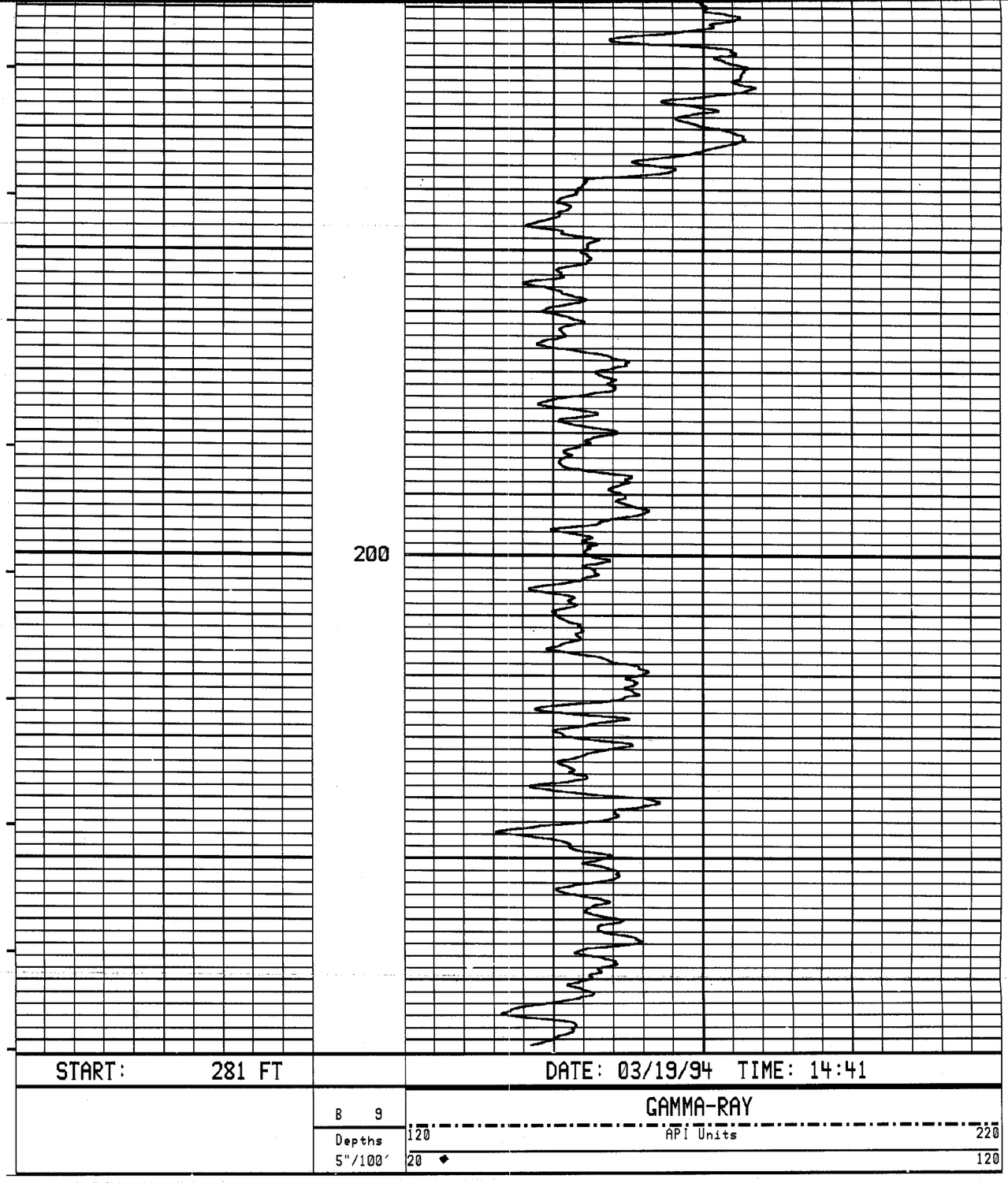
GAMMA-RAY
API Units
120 220
20 120

B 9
Depths
5"/100′

DATE: 03/19/94 TIME: 14:55



STOP: -3 FT


200
START: 281 FT
DATE: 03/19/94 TIME: 14:41
B 9
Depths
5"/100'
GAMMA-RAY
120
API Units
220
20
120

ELECTRIC LOG

weltenco

COUNTY: LOS ANGELES CA.
FIELD: JPL
LOCATION: CASITAS AND HARRIET
WELL: MW-17
COMPANY: LANG EXPLORATORY DRILLING

COMPANY LANG EXPLORATORY DRILLING
WELL MW-17
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
CASITAS AND HARRIET
Sec. Twp. Rge.

Other Services
CR/GRD
CALIPER

Permanent datum GROUND LEVEL Elev.
Log Measured From GROUND LEVEL Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K.B.
D.F.
G.L.

Date	4-7-95			
Run No.	ONE			
Depth-Driller	835′			
Depth-Logger	834′			
Btm Log Interval	833′			
Top Log Interval	45′			
Casing Driller	14" @ 50′	@	@	@
Casing Logger	50′			
Bit Size	12.25"			
Type Fluid in Hole	WATER			
Density / Viscosity	N/A N/A			
pH / Fluid Loss	N/A N/A cc	cc	cc	cc
Source of Sample	PIT			
Rm @ Meas. Temp.	21.5 @ 75 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	21.5 @ 75 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS N/A			
Rm @ BHT	N/A @ N/A °F	@ °F	@ °F	@ °F
Time: End Circulation	N/A			
Time: Logger on bottom	3:45 PM			
Max Rec Temp Deg. F	N/A °F	°F	°F	°F
Equip No. / Location	L-14 L.A.			
Recorded By	LAPORTE			
Witnessed By	V. RICHARDS			

CWP-DRS 1.2816

Scale 5"/100′
Scale Up Hole
Scale Down Hole

Type Log
Depth
Date
Run No.
Depth Driller
Type Fluid

EQUIPMENT DATA

Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
ONE	T-130	NORMAL	FREE	

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	3KG CPS	STD CPS

Fold Here

Changes in Mud Type or Additional Samples
Date / Sample No
Depth Driller
Type Fluid
Dens / Visc
pH / Fluid Loss
Source of Sample
Rm @ Meas Temp
Rmf @ Meas Temp
Rmc @ Meas Temp
Source RMF / Rmc
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
REFERENCE LITERATURE:

REMARKS:

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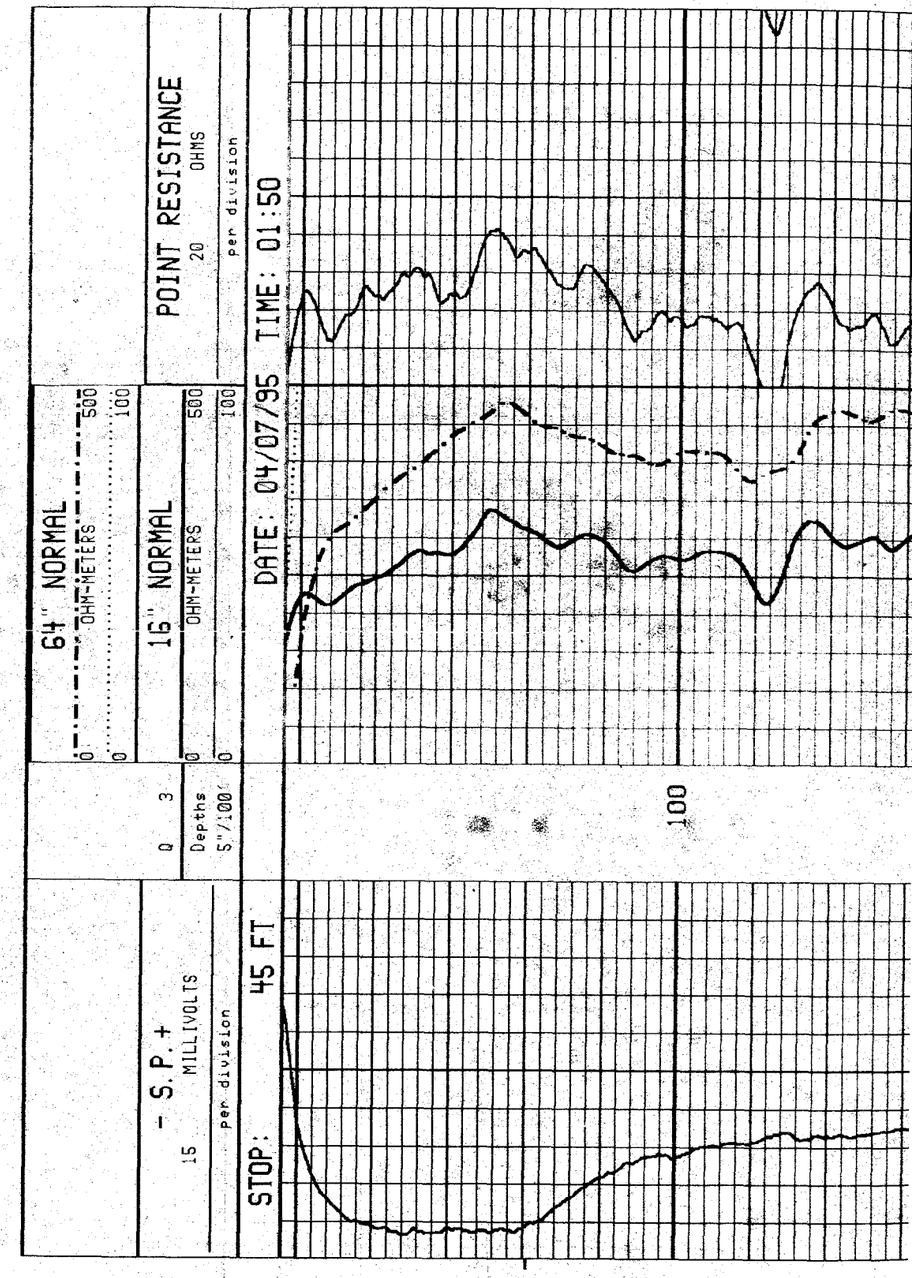
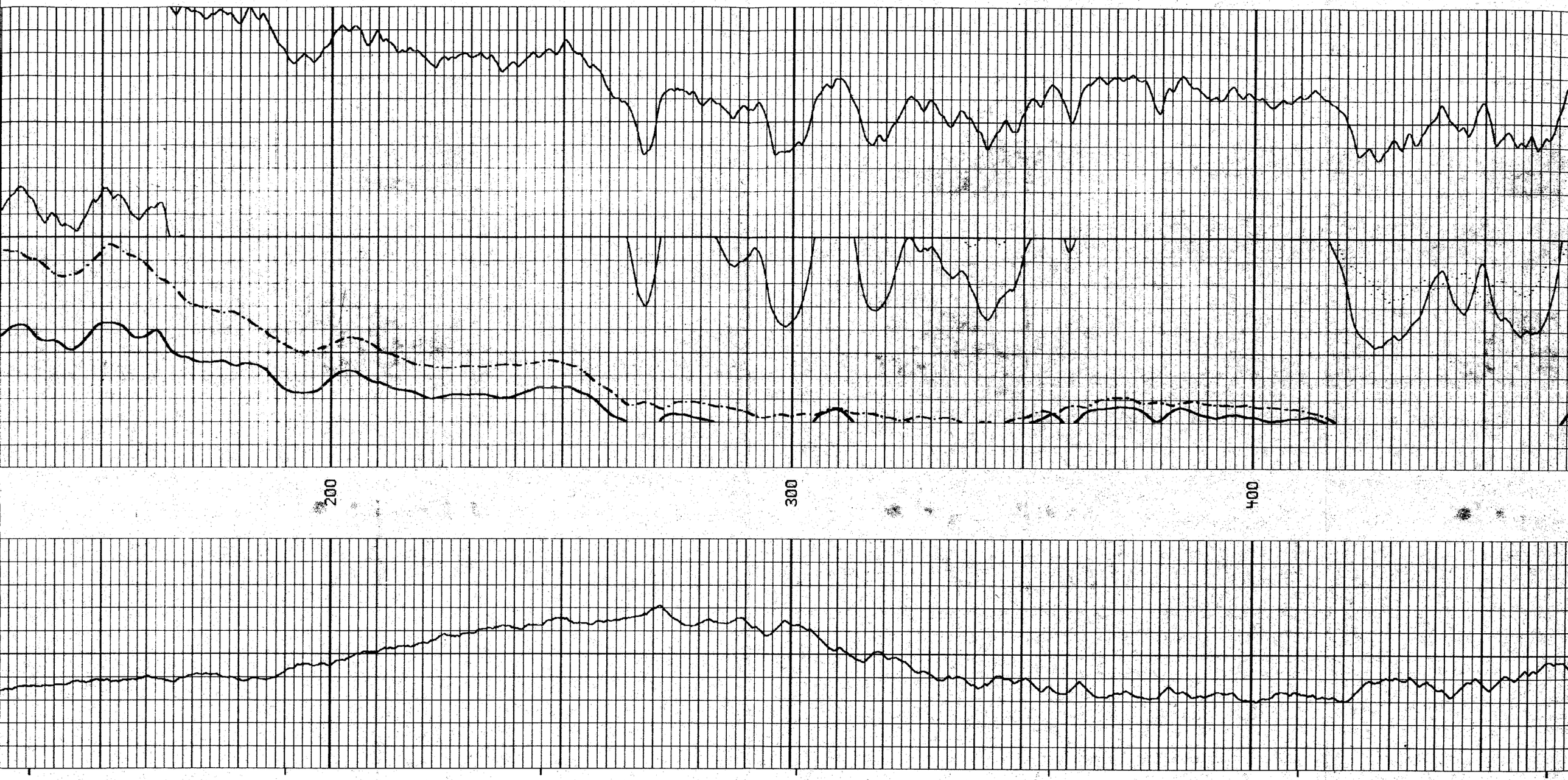
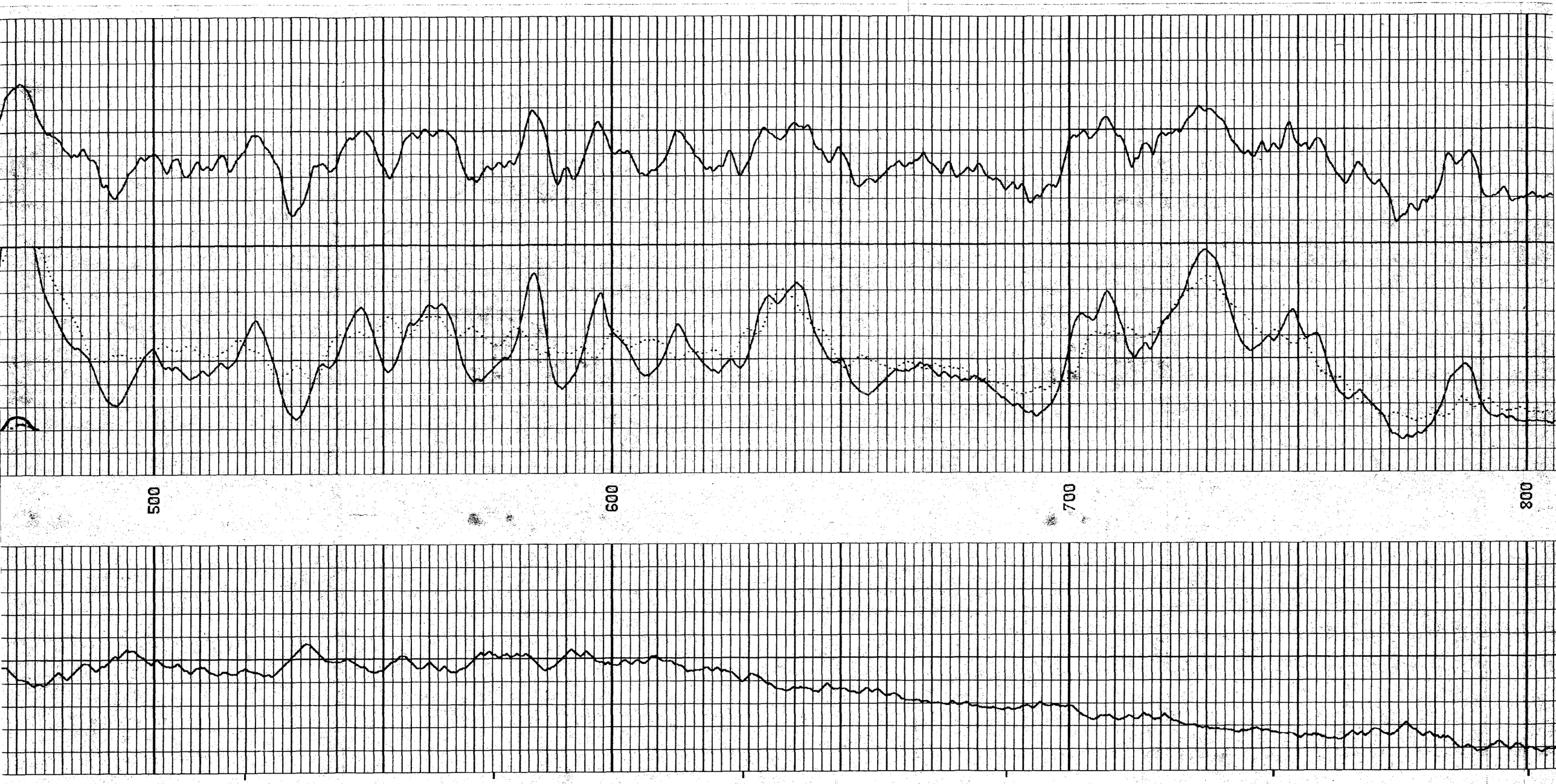
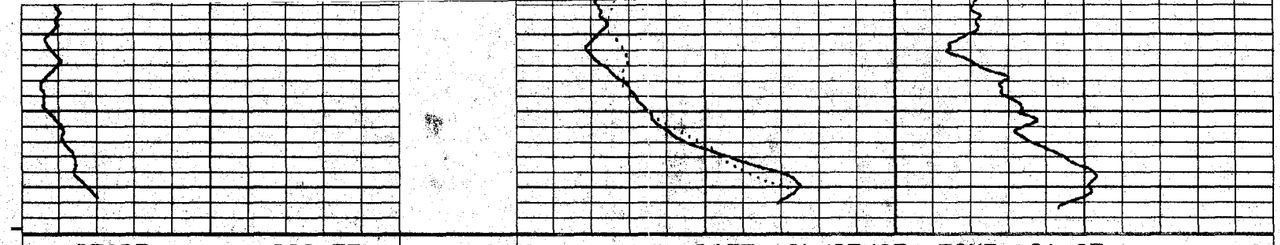
Welenco




200
300
400


500
600
700
800



START: 833 FT

DATE: 04/07/95 TIME: 01:35

64" NORMAL

0 OHM-METERS 500

0 100

- S.P. +

15 MILLIVOLTS

per division

0 3

Depths

5"/100'

16" NORMAL

0 OHM-METERS 500

0 100

POINT RESISTANCE

20 OHMS

per division

GUARD RESISTIVITY
GAMMA-RAY LOG

COUNTY: LOS ANGELES CA.
FIELD: JPL
LOCATION: CASITAS AND HARRIET
WELL: MW-17
COMPANY: LANG EXPLORATORY DRILLING

COMPANY LANG EXPLORATORY DRILLING
WELL MW-17
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
CASITAS AND HARRIET
Sec. Twp. Rge.

Other Services
E-LOG
CALIPER

Permanent datum GROUND LEVEL — Elev.
Log Measured From GROUND LEVEL — Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K. B.
D. F.
G. L.

Date	4-7-95			
Run No.	ONE			
Depth-Driller	835′			
Depth-Logger	835′			
Btm Log Interval	835′			
Top Log Interval	37′			
Casing Driller	14" @ 50′	@	@	@
Casing Logger	50′			
Bit Size	12.25"			
Type Fluid in Hole	WATER			
Density / Viscosity	N/A N/A			
pH / Fluid Loss	N/A N/A cc	cc	cc	cc
Source of Sample	PIT			
Rm @ Meas. Temp.	21.5 @ 75 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	21.5 @ 75 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	N/A @ N/A °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS N/A			
Rm @ BHT	N/A @ N/A °F	@ °F	@ °F	@ °F
Time: End Circulation	N/A			
Time: Logger on bottom	4:30 PM			
Max Rec Temp Deg. F	N/A °F	°F	°F	°F
Equip No. / Location	L-14 L.A.			
Recorded By	LAPORTE			
Witnessed By	V. RICHARDS			

Fold Here

CWP DRS 1: 2616

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

Run No. ONE | Tool No. 13 | Tool Type GUARD | Tool Pos. FREE | Gamma Ray Tool No. 121

EQUIPMENT DATA

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	BKG CPS	STD CPS
	o	o	o	o	o	o	o	o

Changes in Mud Type or Additional Samples

Date / Sample No.	Depth Driller	Type Fluid	Dens / Visc	pH / Fluid Loss	Source of Sample	Rm @ Meas Temp	Rmf @ Meas Temp	Rmc @ Meas Temp	Source RMF / Rmc	Rm @ BHT	Rmf @ BHT	Rmc @ BHT
					o	o	o		o	o	o	o

REFERENCE LITERATURE:

REMARKS:

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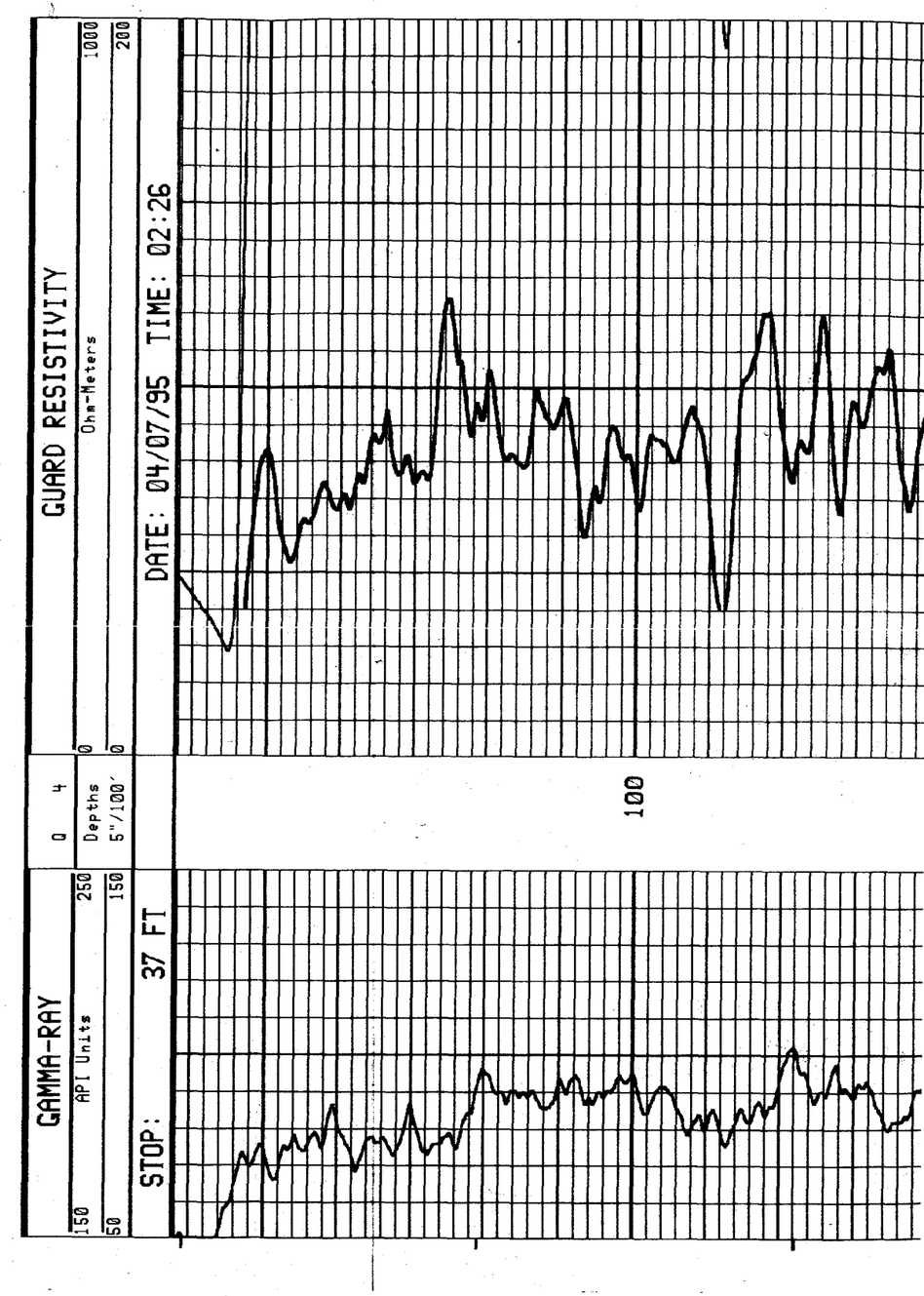
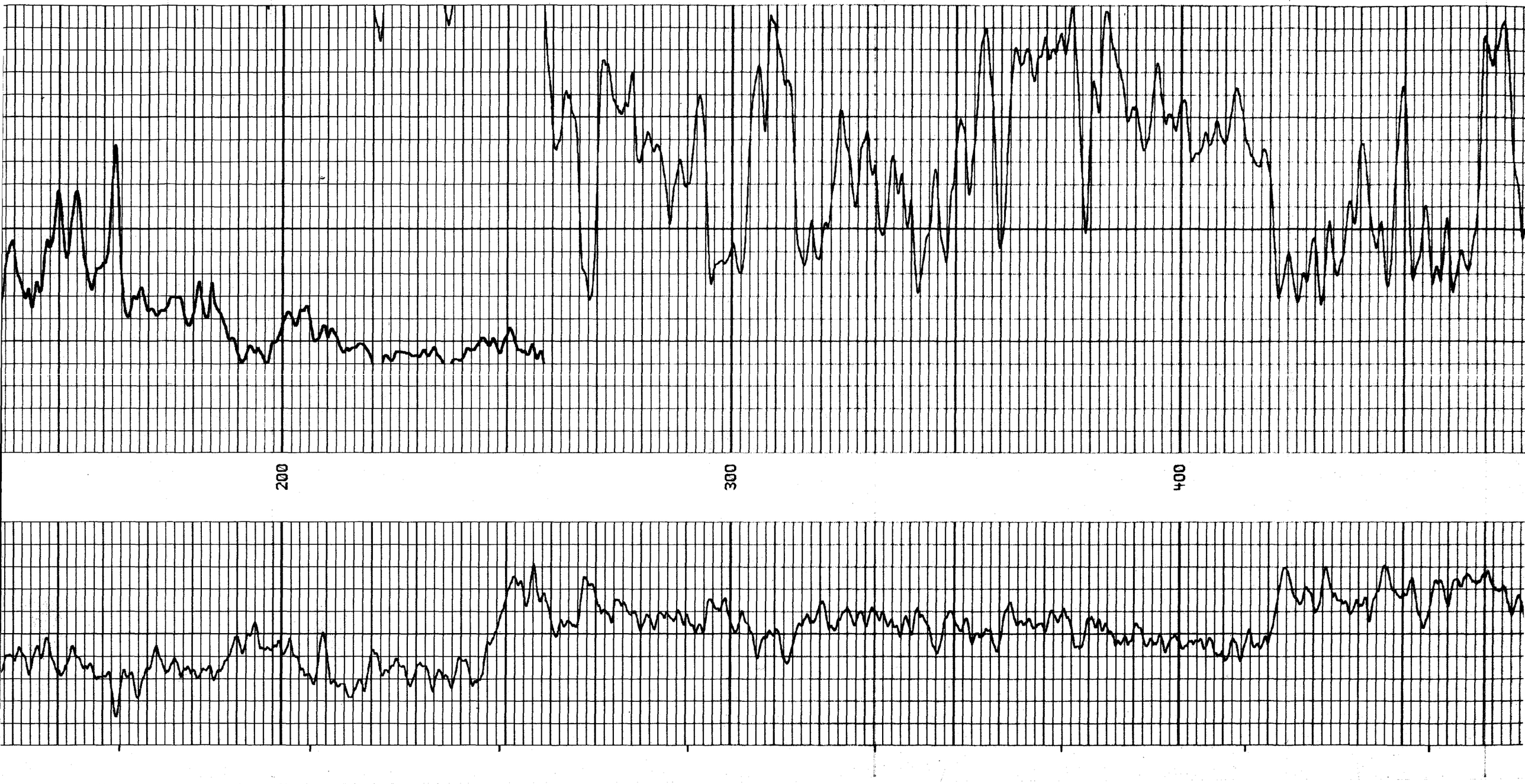
Welenco

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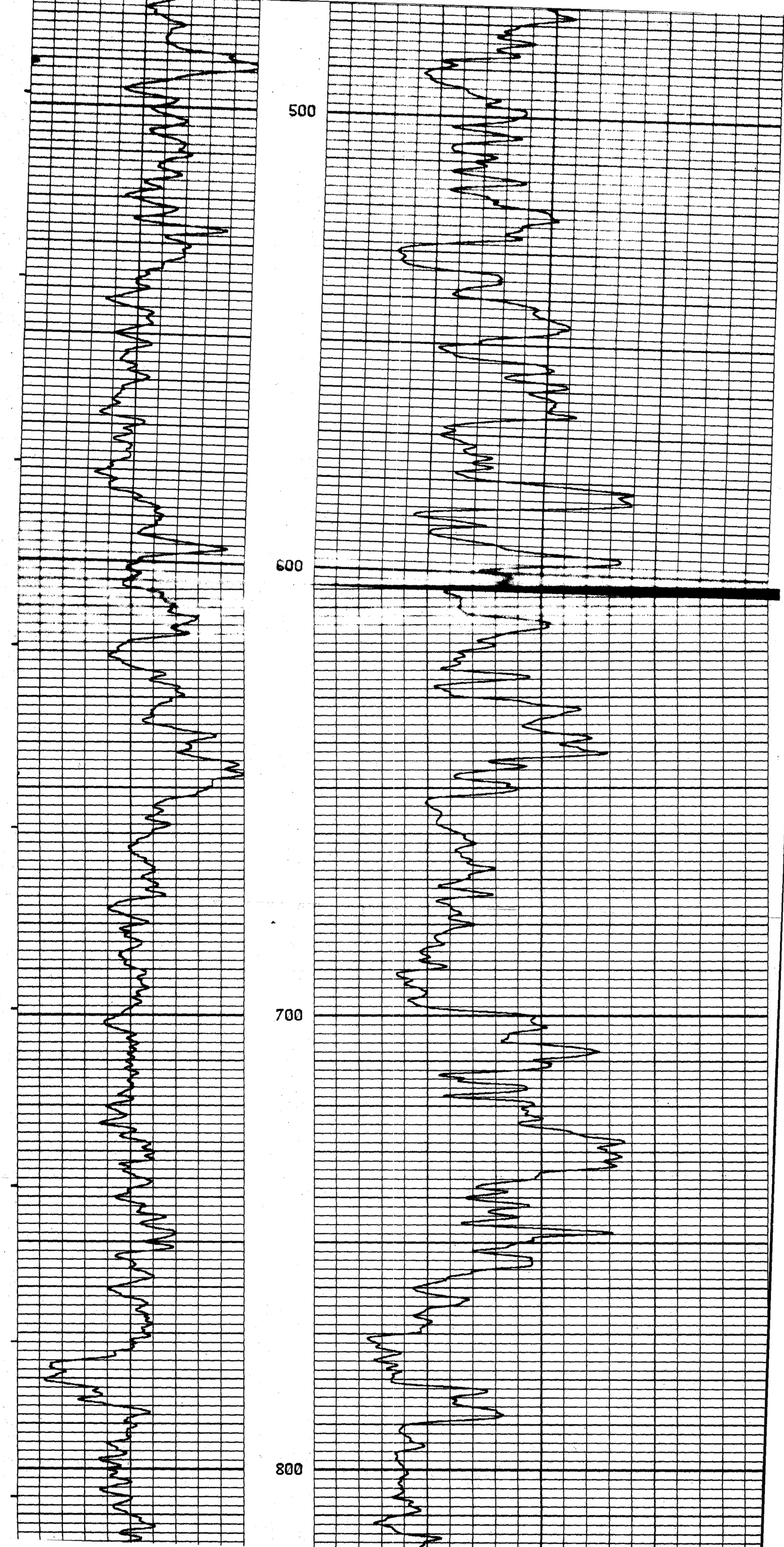
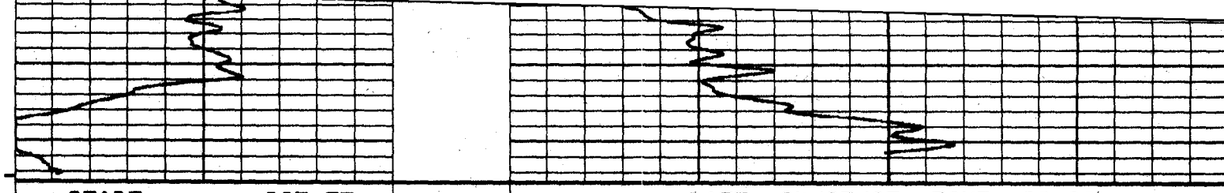

500
600
700
800



START: 835 FT

DATE: 04/07/95 TIME: 02:06

GAMMA-RAY			Q 4	GUARD RESISTIVITY	
150	API Units	250	Depths	0	Ohm-Meters
50		150	5"/100'	0	

[redacted]

ELECTRIC LOG

welenco

COUNTY: LOS ANGELES CA.
FIELD: JPL
LOCATION: ALTADENA @ FLORECITA
WELL: MW-18
COMPANY: LANG EXPLORATORY DRILLING

COMPANY LANG EXPLORATORY DRILLING
WELL MW-18
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
ALTADENA @ FLORECITA
Sec. Twp. Rge.

Other Services
GR/GRD
CALIPER

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL 0 Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K. B.
D. F.
G. L.

Date	4/25/95			
Run No.	ONE			
Depth-Driller	825′			
Depth-Logger	825′			
Btm Log Interval	825′			
Top Log Interval	50′			
Casing Driller	14" @ 50′	@	@	@
Casing Logger	50′			
Bit Size	12.25"			
Type Fluid in Hole	BENTONITE			
Density / Viscosity	N/A N/A			
pH / Fluid Loss	N/A N/A cc	cc	cc	cc
Source of Sample	PIT			
Rm @ Meas. Temp.	10.5 @ 75 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	10.5 @ 75 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	N/A @ N/ °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS N/A			
Rm @ BHT	N/A @ N/A °F	@ °F	@ °F	@ °F
Time: End Circulation	4/24/95			
Time: Logger on bottom	7:28			
Max Rec Temp Deg. F	N/A °F	°F	°F	°F
Equip No. / Location	L-14 L.A.			
Recorded By	RIDDER			
Witnessed By	V. RICHARD			

CWP DRS 1.2616

Scale Changes: Type Log | Depth | Scale Up Hole | Scale Down Hole

EQUIPMENT DATA

Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
ONE	T-130	NORMAL	FREE	

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	BKG CPS	STD CPS

Fold Here

Changes in Mud Type or Additional Samples
Date / Sample No
Depth Driller
Type Fluid
Dens / Visc
pH / Fluid Loss
Source of Sample
Rm @ Meas Temp
Rmf @ Meas Temp
Rmc @ Meas Temp
Source RMF / Rmc
Rm @ BHT
Rmf @ BHT
Rmc @ BHT
REFERENCE LITERATURE:

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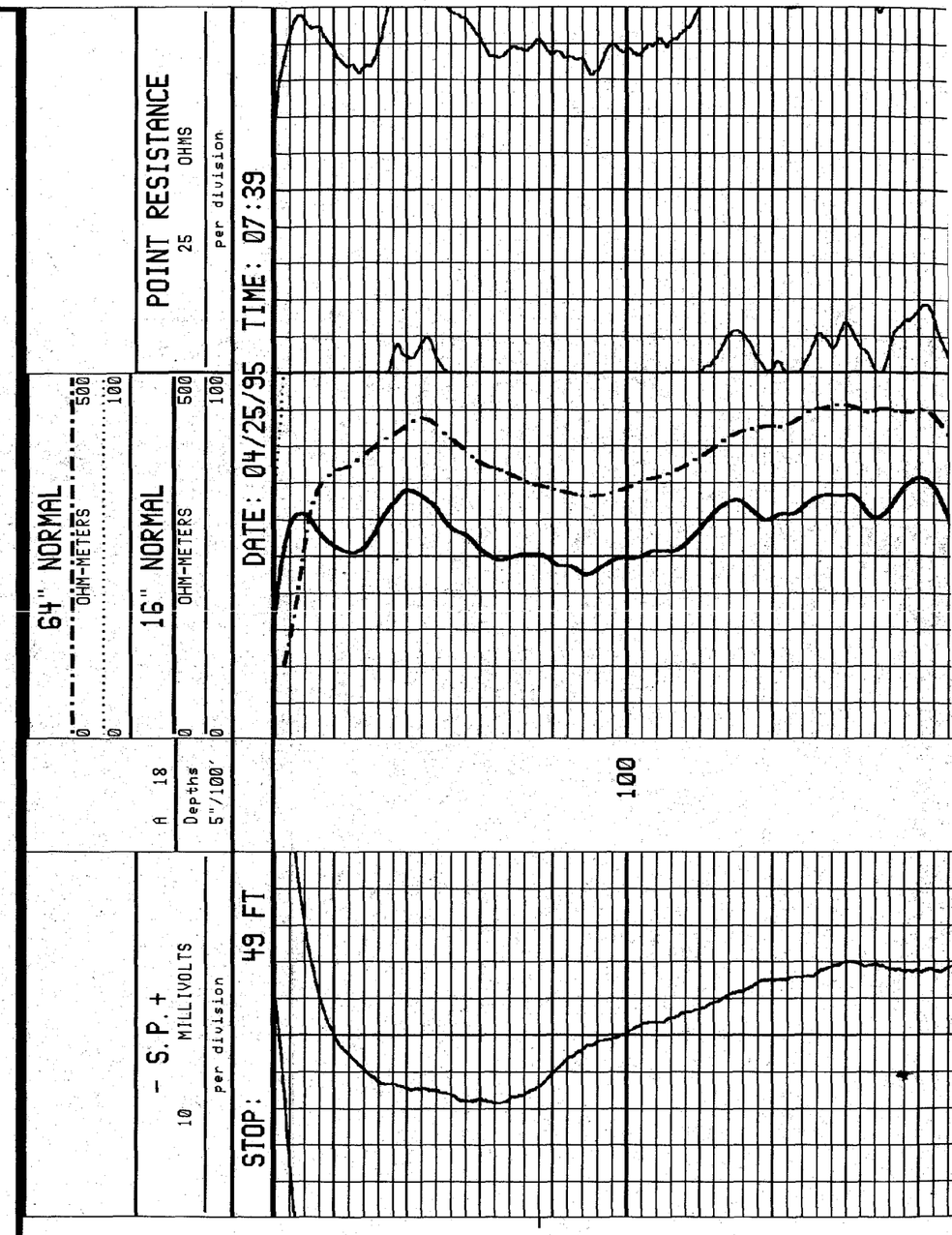

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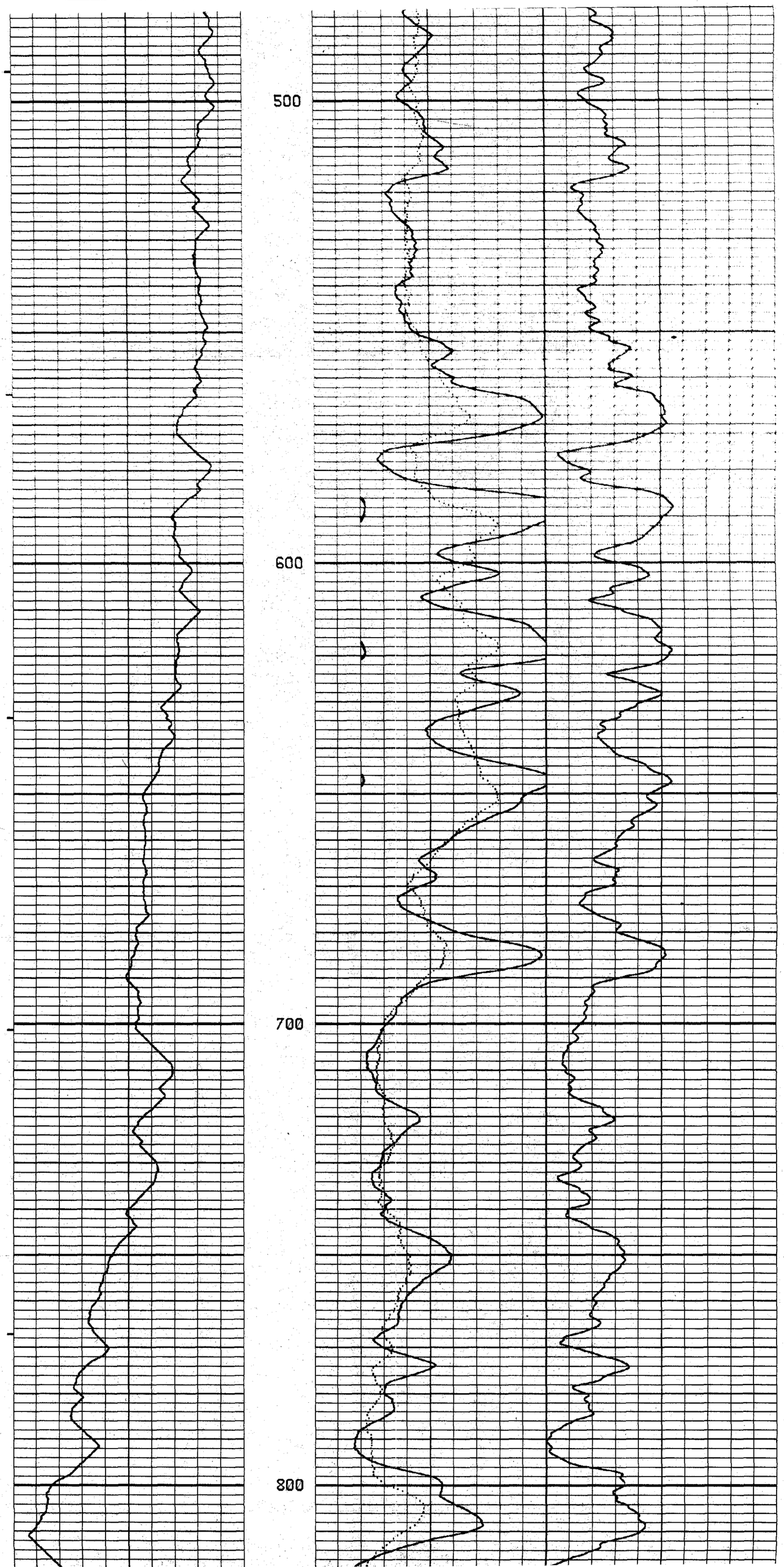
500
600
700
800

START: 825 FT		DATE: 04/25/95 TIME: 07:28	
		64" NORMAL 0 OHM-METERS 500 0 100	
- S.P. + 10 MILLIVOLTS per division	A 18 Depths 5"/100'	16" NORMAL 0 OHM-METERS 500 0 100	POINT RESISTANCE 25 OHMS per division

GUARD RESISTIVITY
GAMMA-RAY LOG

COUNTY: LOS ANGELES CA.
FIELD: JPL
LOCATION: ALTADENA @ FLORECITA
WELL: MW-18
COMPANY: LANG EXPLORATORY DRILLING

COMPANY LANG EXPLORATORY DRILLING
WELL MW-18
FIELD JPL
COUNTY LOS ANGELES STATE CA.

LOCATION
ALTADENA @ FLORECITA
Sec. Twp. Rge.

Other Services
E-LOG
CALIPER

Permanent datum GROUND LEVEL Elev. N/A
Log Measured From GROUND LEVEL 0 Above Perm. Datum
Drilling Measured From GROUND LEVEL

Elev.: K.B.
D.F.
G.L.

Date	4/25/95			
Run No.	ONE			
Depth-Driller	825′			
Depth-Logger	825′			
Btm Log Interval	825′			
Top Log Interval	45′			
Casing Driller	14" @ 50′	@	@	@
Casing Logger	50′			
Bit Size	12.25"			
Type Fluid in Hole	BENTONITE			
Density I Viscosity	N/A N/A			
pH I Fluid Loss	N/A N/A cc	cc	cc	cc
Source of Sample	PIT			
Rm @ Meas. Temp.	10.5 @ 75 °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	10.5 @ 75 °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	N/A @ N/ °F	@ °F	@ °F	@ °F
Source of Rmf and Rmc	MEAS N/A			
Rm @ BHT	N/A @ N/A °F	@ °F	@ °F	@ °F
Time: End Circulation	4/24/95			
Time: Logger on bottom	7:28			
Max Rec Temp Deg. F	N/A °F	°F	°F	°F
Equip No. I Location	L-14 L.A.			
Recorded By	RIDDER			
Witnessed By	V. RICHARD			

CWP DRS 1.2616

Scale Changes: Scale Up Hole / Scale Down Hole

Type Log / Depth

EQUIPMENT DATA

Run No.	Tool No.	Tool Type	Tool Pos.	Gamma Ray Tool No.
ONE	13	GUARD	FREE	121

CALIBRATION DATA

Run No.	16" Normal Zero	16" Normal Int. Cal	Induction Loop Cal	Induction Tool Zero	Induction Tool Cal	GAMMA RAY API SCALE	BKG CPS	STD CPS
	o	o	o	o	o	o	o	o

Fold Here

Changes in Mud Type or Additional Samples

Date I Sample No	Depth Driller	Type Fluid	Dens I Visc	pH I Fluid Loss	Source of Sample	Rm @ Meas Temp	Rmf @ Meas Temp	Rmc @ Meas Temp	Source RMF I Rmc	Rm @ BHT	Rmf @ BHT	Rmc @ BHT
					o	o	o		o	o	o	o

REFERENCE LITERATURE:

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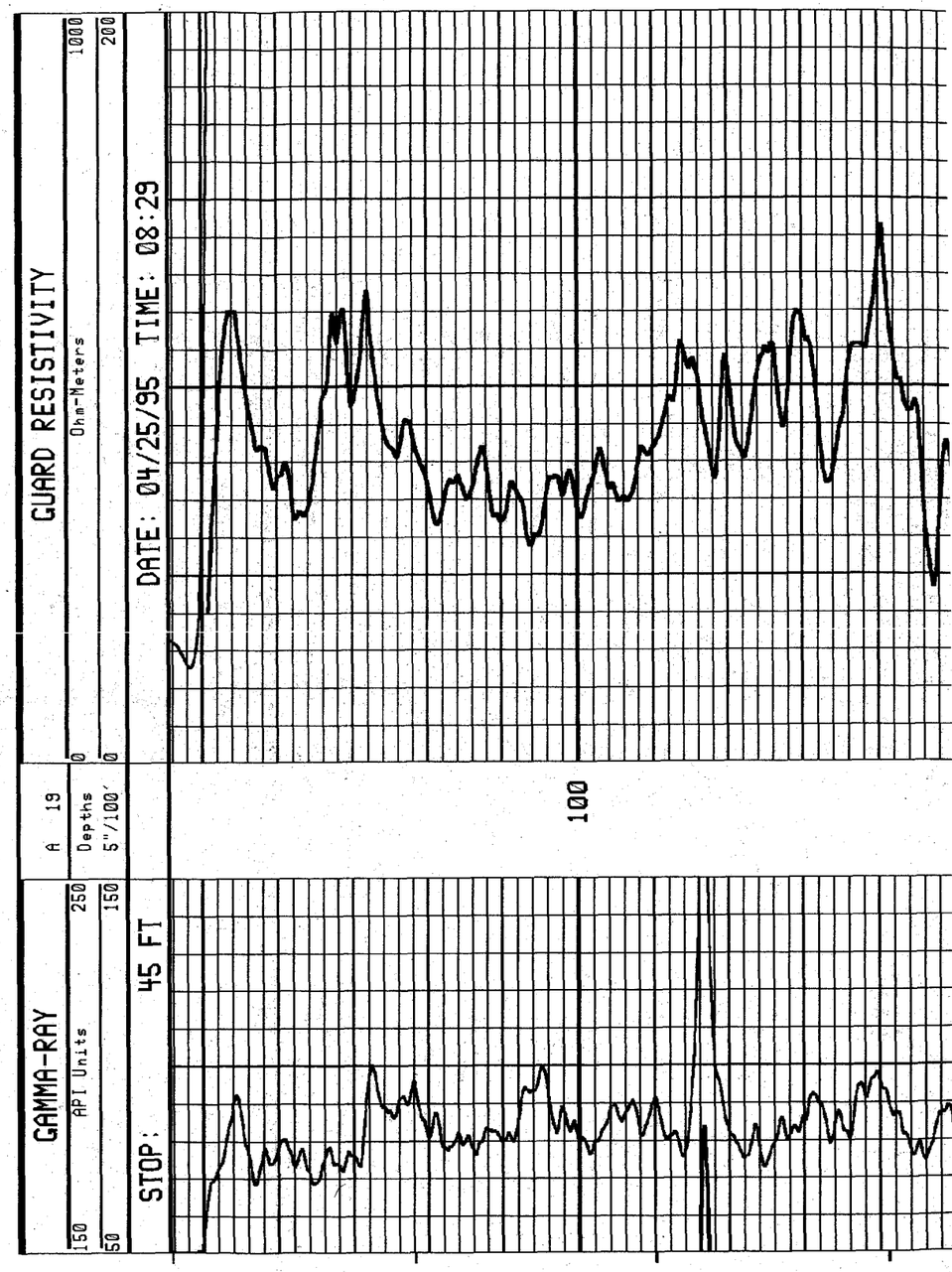

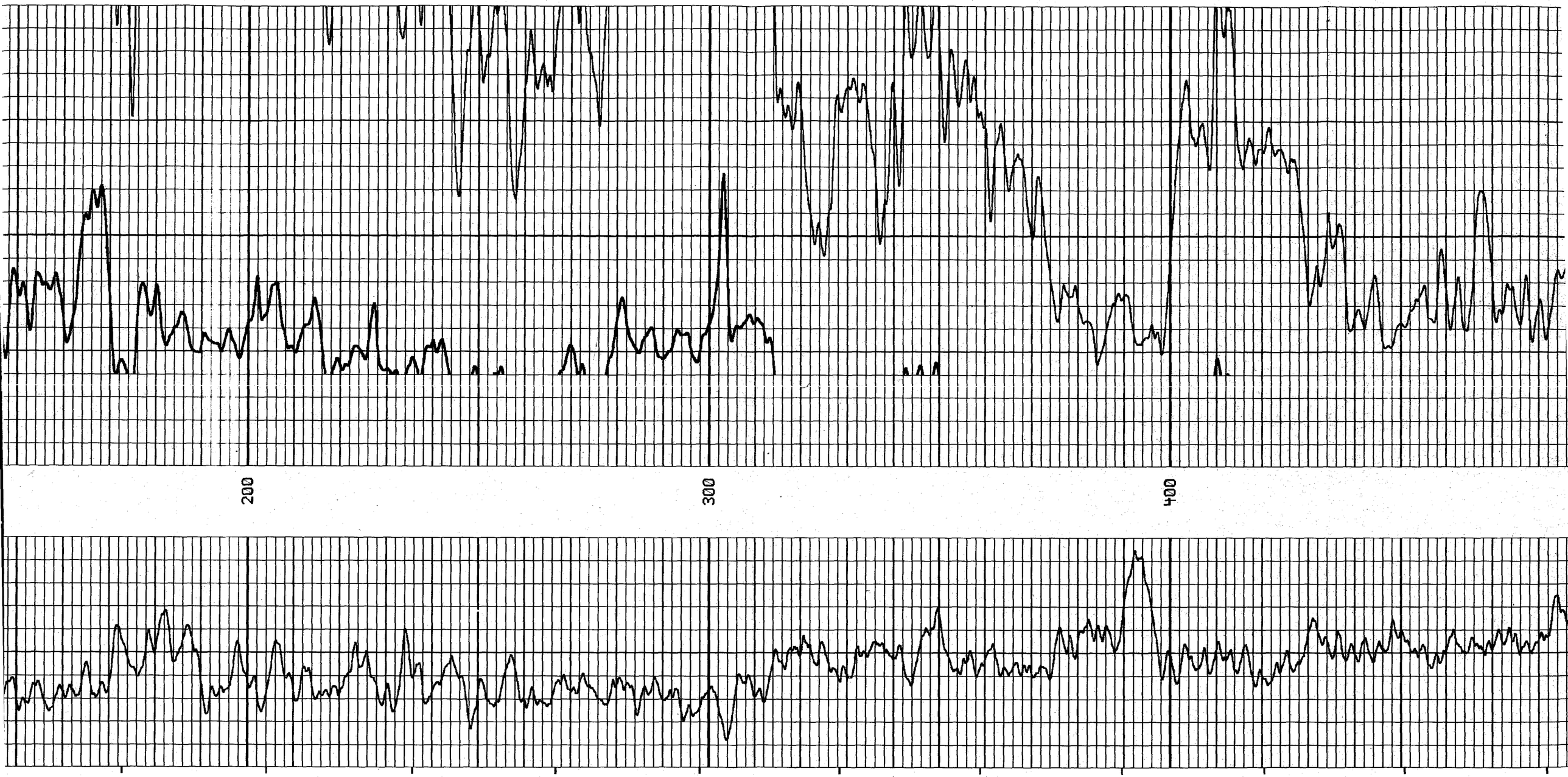
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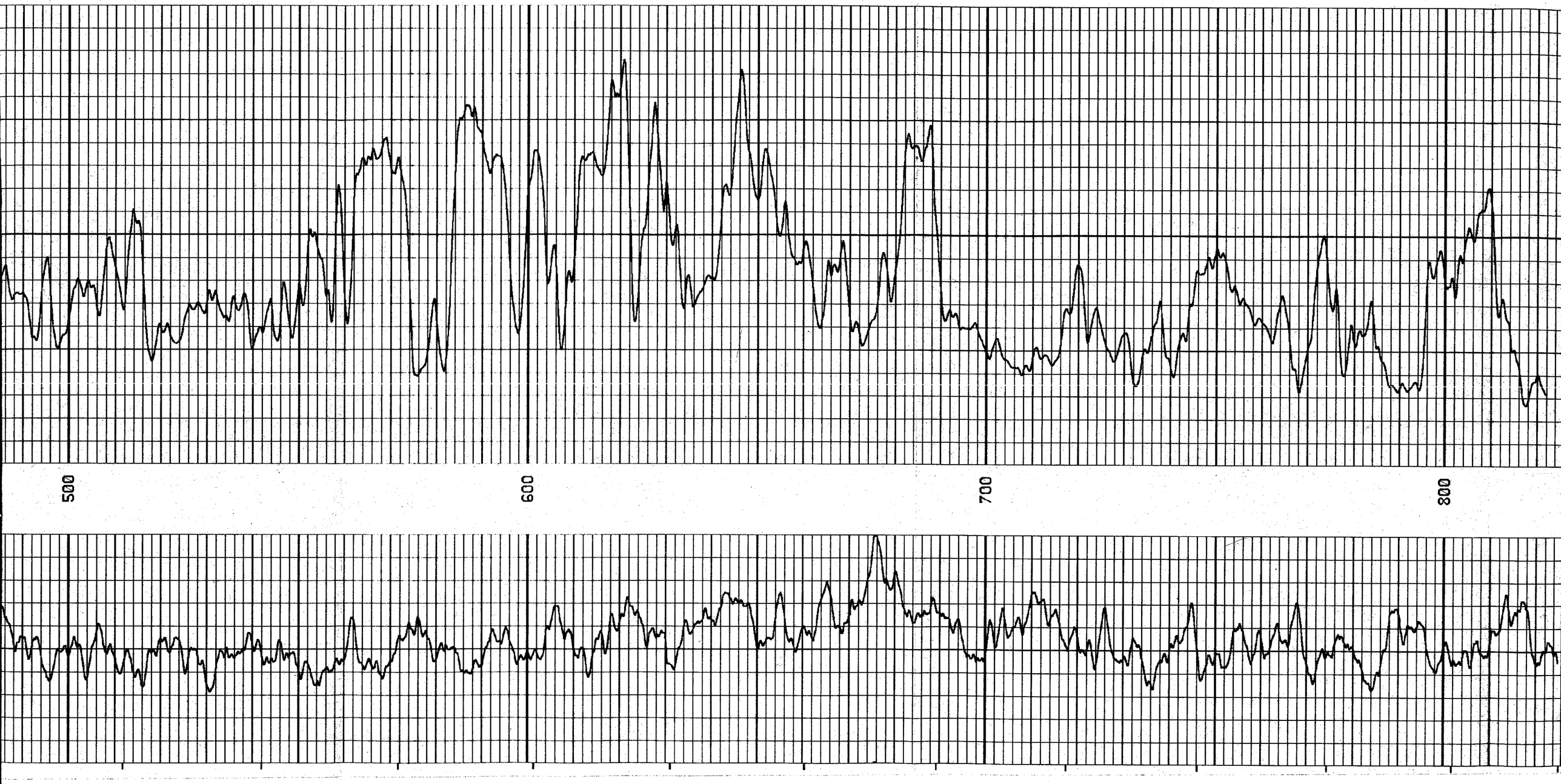
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