John Young

From: John Young [john_young@nmenv.state.nm.us]
Sent: Monday, November 15, 2004 9:51 AM
To: David E. Broxton
Cc: john young; Cobrain Dave; Whitacre Thomas; Michael Dale
Subject: RE: R-6 Well Design

Dave and Tom,

Based on the provided information and the discussion with Tom (11/15/04), we believe the well design looks adequate. Please keep us (including Michael) posted on the screening data and the progress of the intermediate well adjacent to R-6.

john

-----Original Message-----
From: David E. Broxton [mailto:broxton@lanl.gov]
Sent: Monday, November 15, 2004 8:37 AM
To: john_young@nmenv.state.nm.us
Cc: Thomas J. Whitacre; mjohansen@doeal.gov; katzman@lanl.gov; vaniman@lanl.gov; Mark Everett; John McCann; spearson@lanl.gov
Subject: R-6 Well Design

John,

Sorry I missed your call Friday afternoon. I was at the Fax machine sending you the preliminary borehole geophysical logs at the time.

Attached are PDF files showing the proposed R-6 design, bore geophysics logs, and a map of water-level declines in the area. We made some modifications to the earlier design I sent you Friday. Based on evaluation of the full suite of geophysical logs, we moved the top of the sand pack and the well screen up closer to the water table.

There were no direct measurements of depth to the regional water table because R-6 was drilled by mud rotary techniques. The regional zone of saturation occurs below 1182 ft depth according to Schlumberger's interpretation of the geophysical logs. Schlumberger also reported a wet zone between 1158 and 1182 ft, but it is only about 80% saturated. The predicted depth to the water table, based on water table maps for the plateau and on water levels in nearby wells, was 1151 ft in the SAP. We feel the Schlumberger interpretation of the geophysical logs is the most reliable site-specific estimate of depth to water. We are basing the R-6 well design on their pick of 1182 ft as the depth of the regional water table.

Based on an expected water level decline rate of 0.9 ft/y, we designed the well with a 20 ft screen, the bottom of which extends 46 ft below the water table. This screen length gives the well a useful lifetime of approximately 50 years. According to Schlumberger, the screen and sand pack are located near the top of most favorable porous rocks in the saturated zone. Evaluation of cuttings and geophysical logs suggest to us the screen and sand pack are within a single hydrostratigraphic unit - the older fanglomerates. It now seems unlikely that there is any Totavi sediments beneath the water table at R-6.

LANL TA-2 (R-6 Groundwater well)

10792

Please call me or Tom Whitacre if you have any further questions
about this well design.

Dave
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David E. Broxton
Earth and Environmental Sciences Division
Hydrology, Geochemistry, and Geology Group
Los Alamos National Laboratory
Mail Stop T003
Los Alamos, NM 87545

Phone: (505) 667-2492
Cell Phone: (505) 699-0950
Fax: (505) 665-8737
e-mail: broxton@lanl.gov
****

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R6WellDesign.pdf

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Dave
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David E. Broxton
Earth and Environmental Sciences Division
Hydrology, Geochemistry, and Geology Group
Los Alamos National Laboratory
Mail Stop T003
Los Alamos, NM 87545

LANL TA-21 (R-6, Groundwater)

Phone: (505) 667-2492
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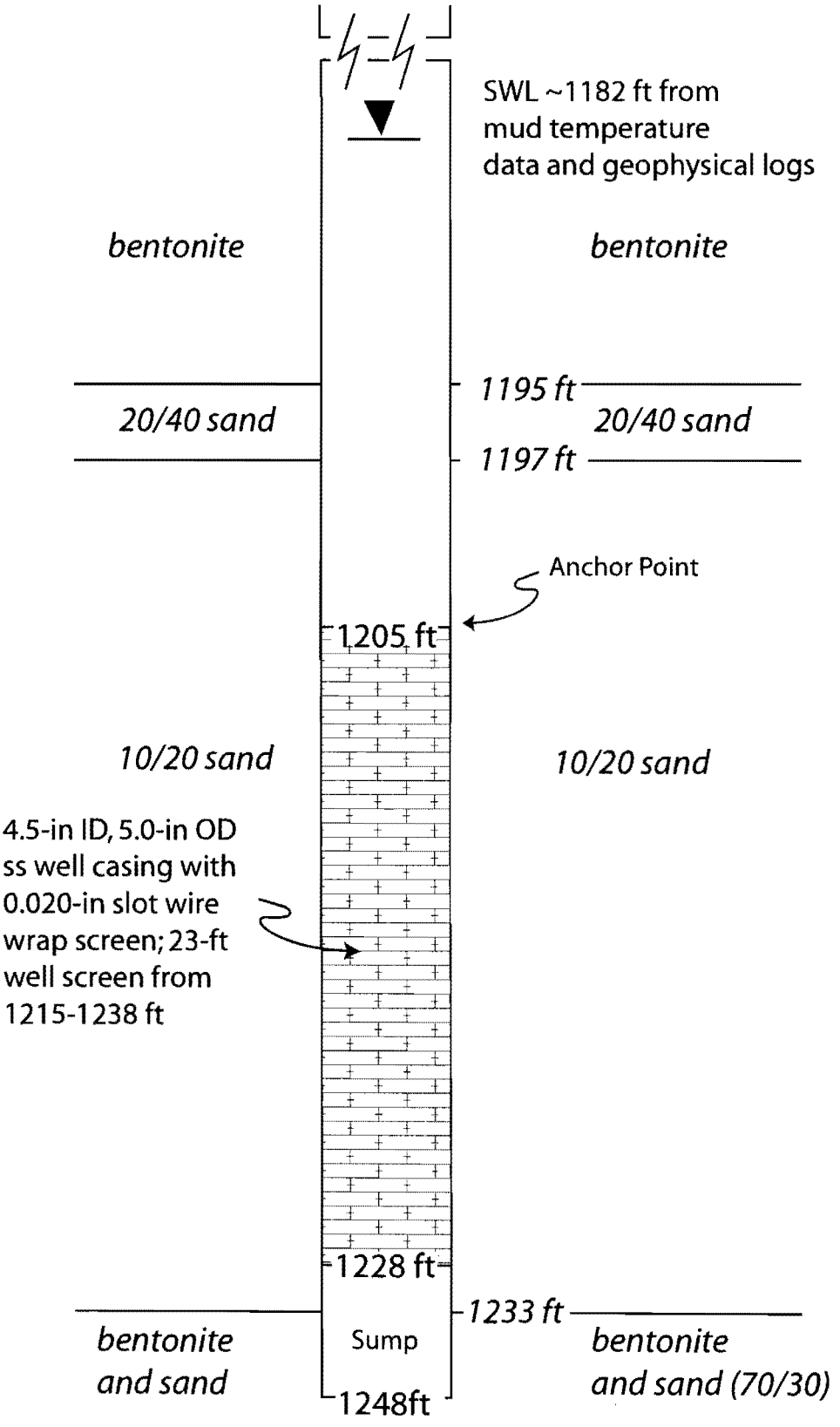
Fax: (505) 665-8737
e-mail: broxton@lanl.gov
****

R-6 Proposed Well Design



Drawing Not To Scale

1303 ft = Borehole TD

11/13/04

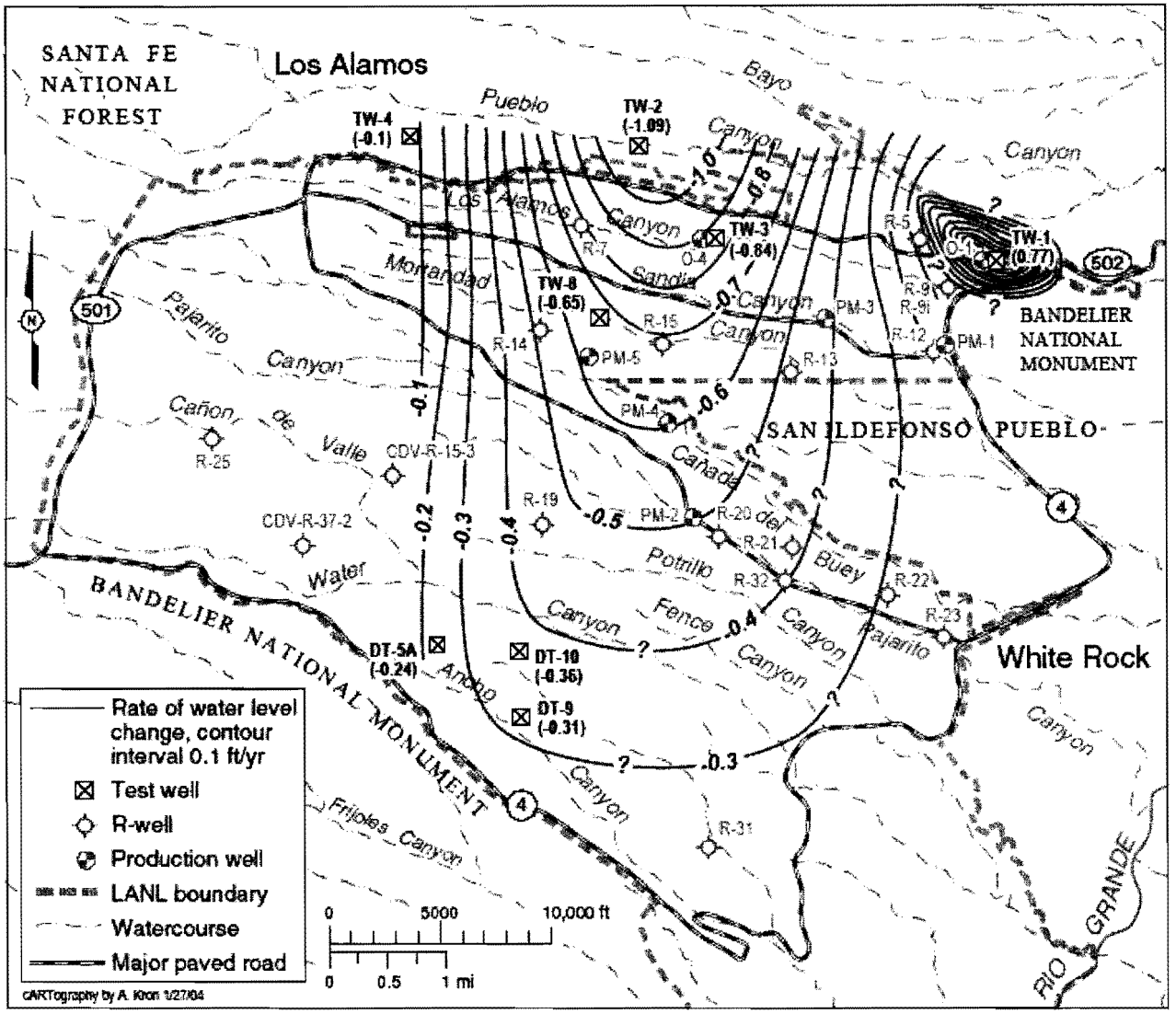
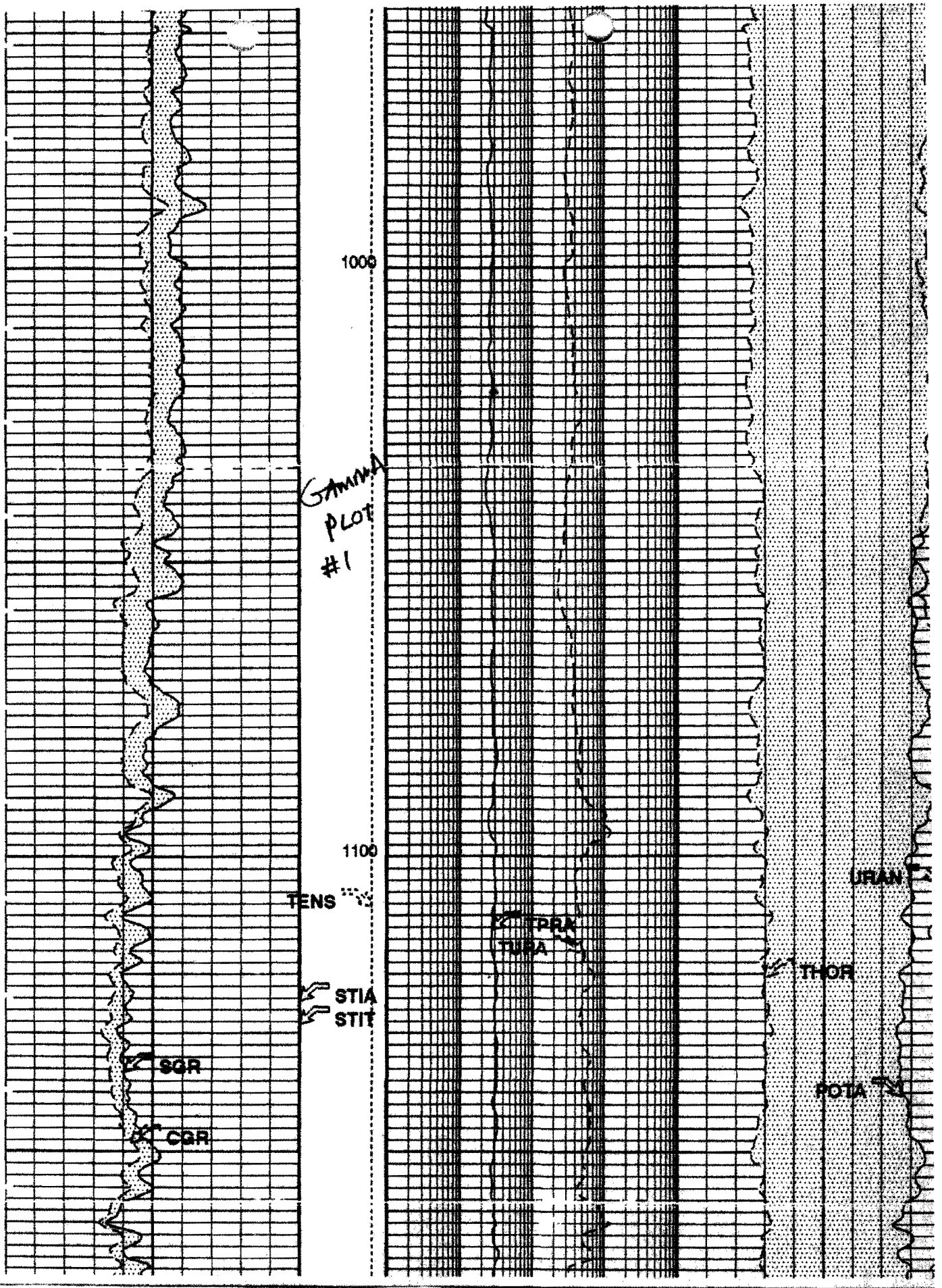
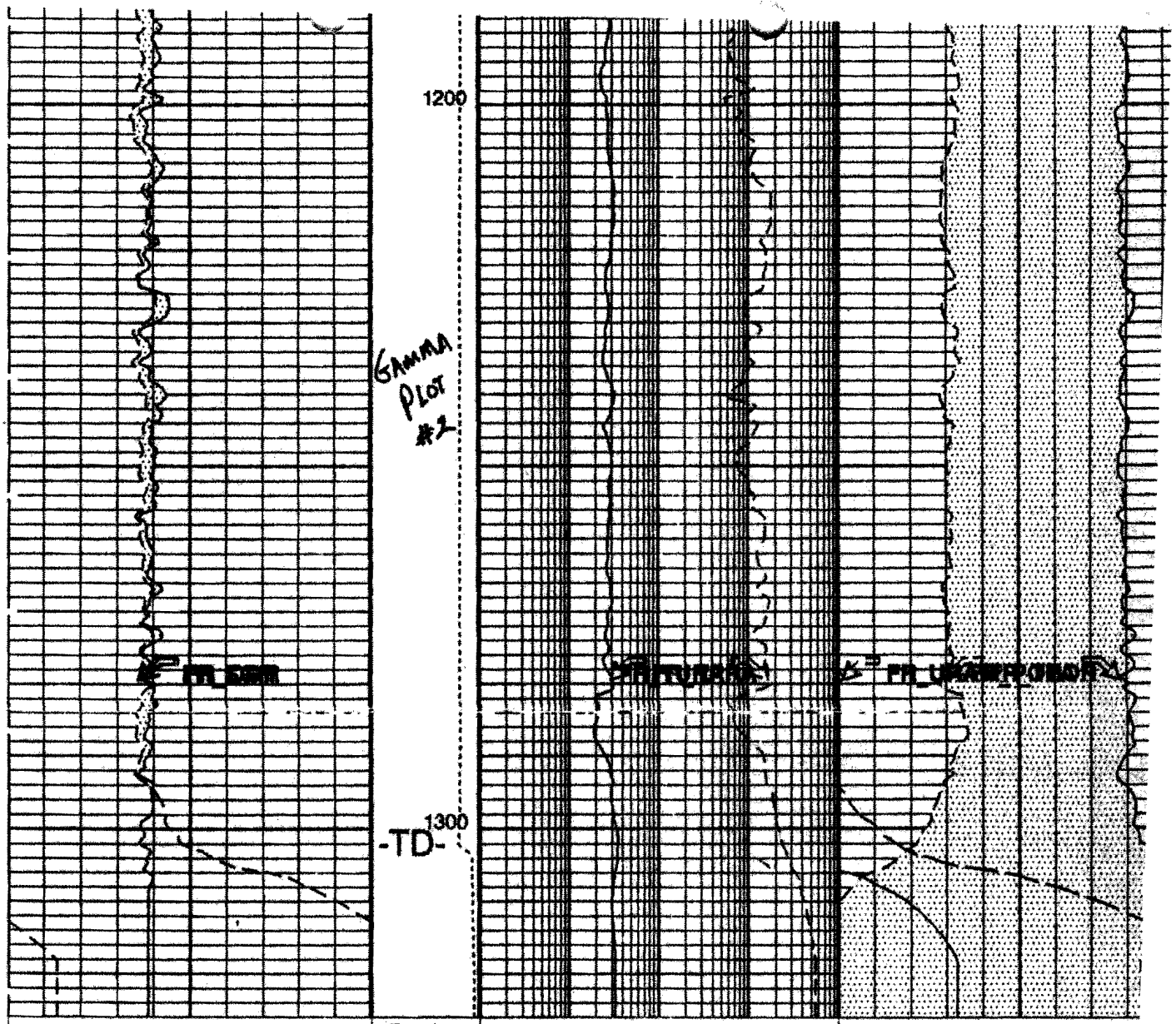


Figure 14. Map showing annual rate of change of water level in test wells, 1992–2003 (ft/yr).

From:

Koch, R. J., D. B. Rogers, N. J. Tapia, S. G. McLin, 2004, Manual and Transducer Groundwater Levels from Test Wells at Los Alamos National Laboratory, 1992–2003. Los Alamos National Laboratory Report LA-14132-MS.


1000
GAMMA PLOT #1
1100
TENS
STIA
STIT
SGR
CGR
PRA
TURA
THOR
URAN
POTA

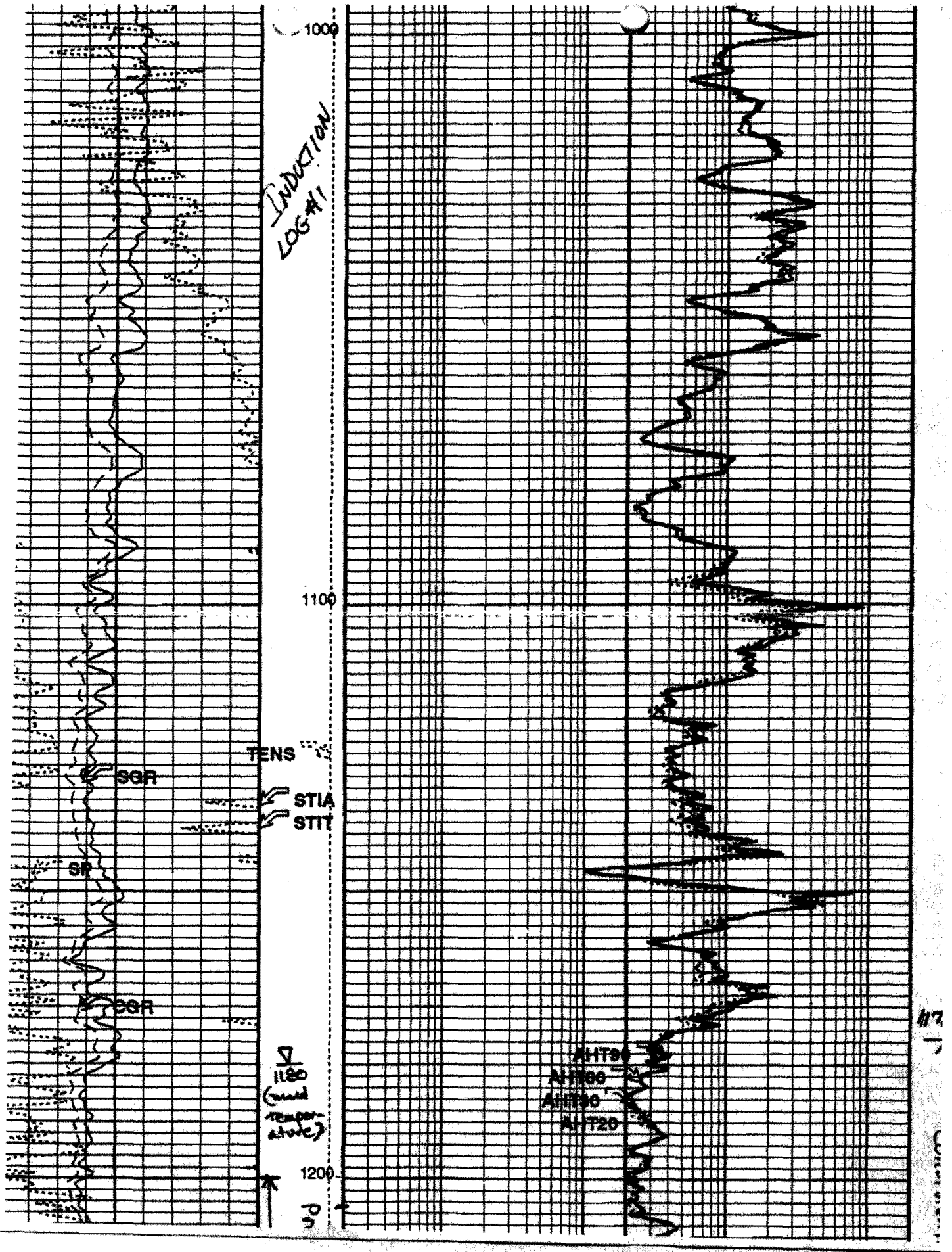


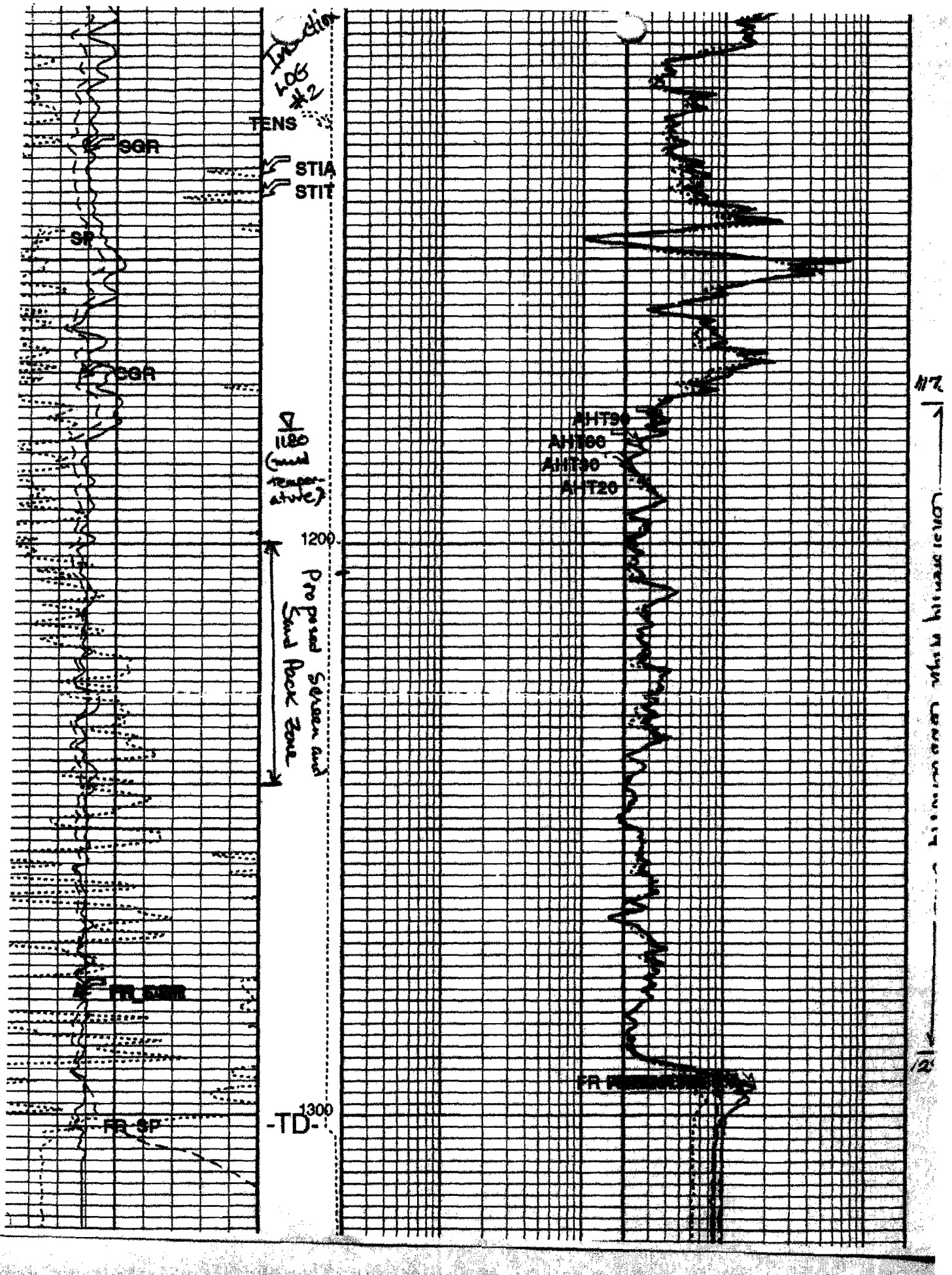
Computed Gamma Ray (CGR)	Tension (TENS)	TURA (TURA)	Potassium (POTA)
0 (GAPI) 200	(LBF) 4000 0	0.01 (---) 100	-0.05 (---)
Spectroscopy Gamma Ray (SGR)	**Stuck Stretch (STIT)**	**Thorium Potassium Ratio (TPRA)**	**Thorium (THOR)**
0 (GAPI) 200	0 (F) 50	0.1 (---) 1000	20 (PPM)
Area1 From CGR to SGR	Cable Drag From STIA to STIT		Uranium (URAN) 20 (PPM)
	Tool ToL Drag From D3T to STIA		Area2 From THOR to POTA

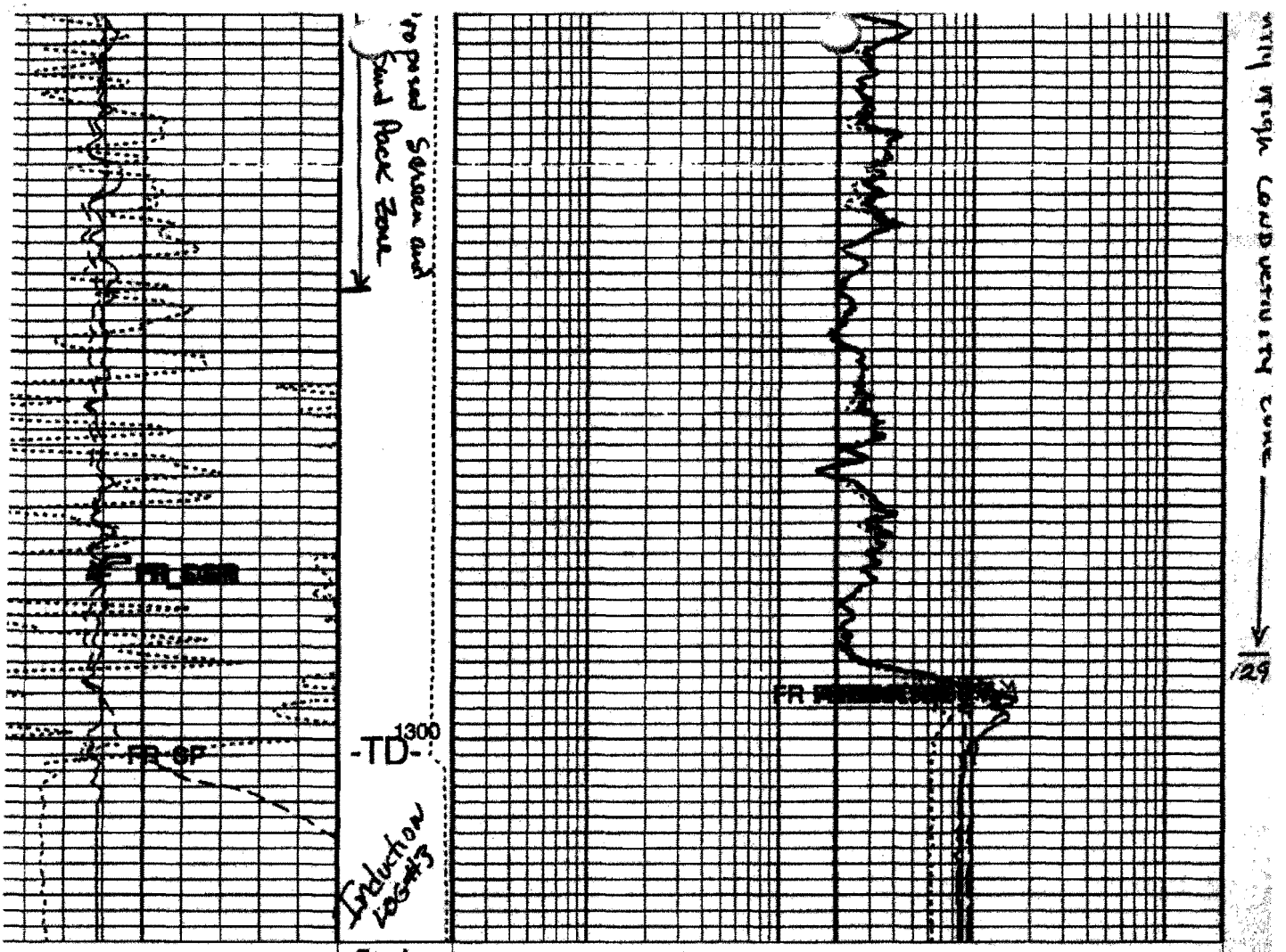
PIP SUMMARY

Time Mark Every 60 S

Parameters


1000
INDUCTION LOG #1
1100
TENS
SGR
STIA
STIT
SP
CGR
1180 (mud temperature)
1200
AIHT90
AIHT60
AIHT30
AIHT20


Induction Log #2
TENS
SGR
STIA
STIT
SP
CGR
1180 (Bottom temperature)
AHT90
AHT60
AHT30
AHT20
1200
Proposed Screen and Sand Pack Zone
FR SGR
FR SP
-TD-
1300



Computed Gamma Ray (CGR) (GAPI) 200	Tension (TENS) (LBF) 4000 0	AIT-H 20 Inch Investigation (AHT20) (OHMM) 0.2 2000
		← WETTER (more conductive)
		→ dry (more resistant)
SP (SP) (MV) 20	Stuck Stretch (STIT) 0 (F) 50	AIT-H 30 Inch Investigation (AHT30) (OHMM) 0.2 2000
Spectroscopy Gamma Ray (SGR) (GAPI) 200	Cable Drag From STIA to STIT	AIT-H 60 Inch Investigation (AHT60) (OHMM) 0.2 2000
	Tool/Tot. Drag From D3T to STIA	AIT-H 90 Inch Investigation (AHT90) (OHMM) 0.2 2000

PIP SUMMARY

Time Mark Every 60 S

AIT-H Answer Product Processing Summary. Data taken with Tool # 398 (AHTNO)

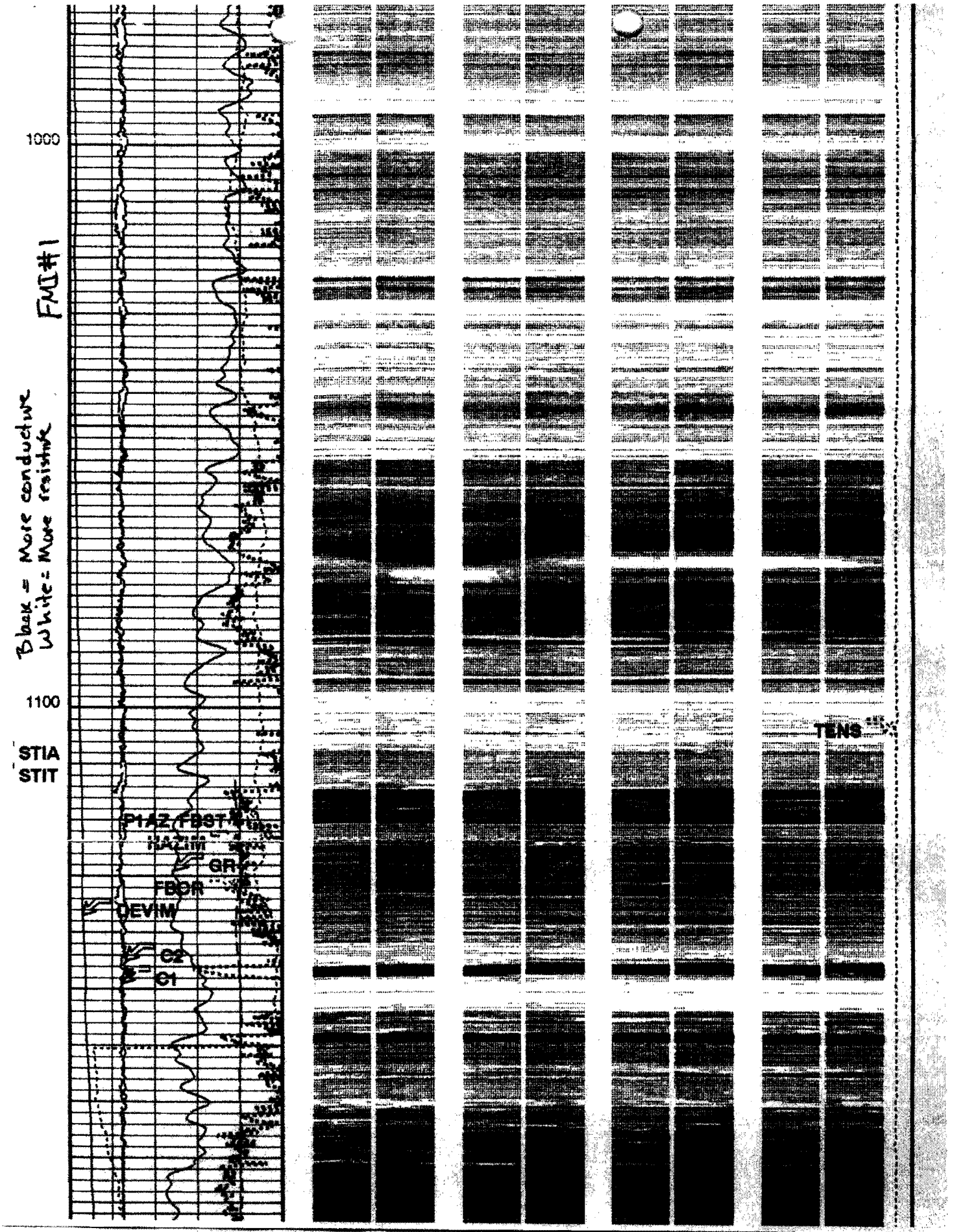
***** Borehole Correction *****

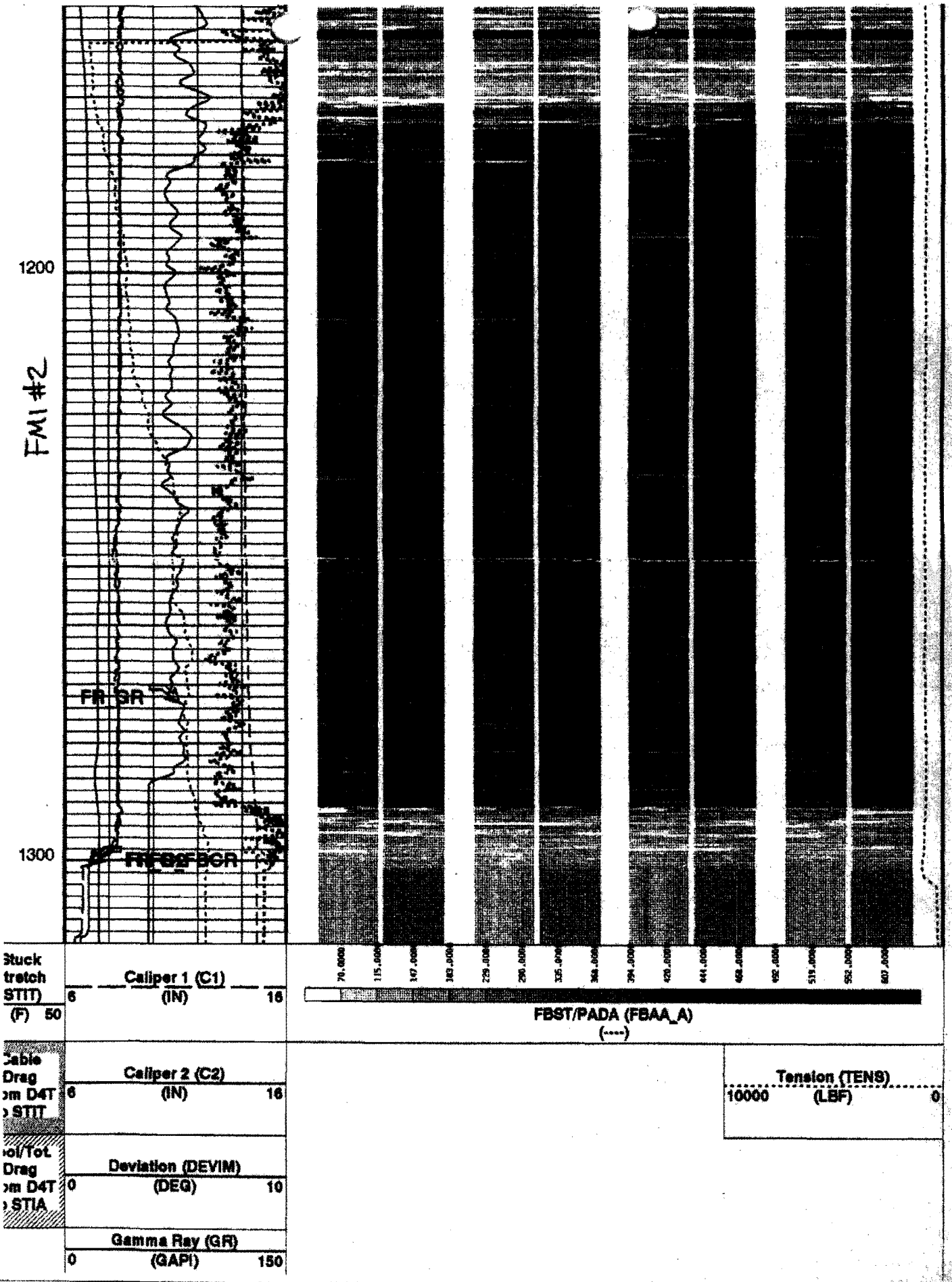
ective Electrical Diameter computed. Borehole mud resistivity taken as input (see GRSE parameter)

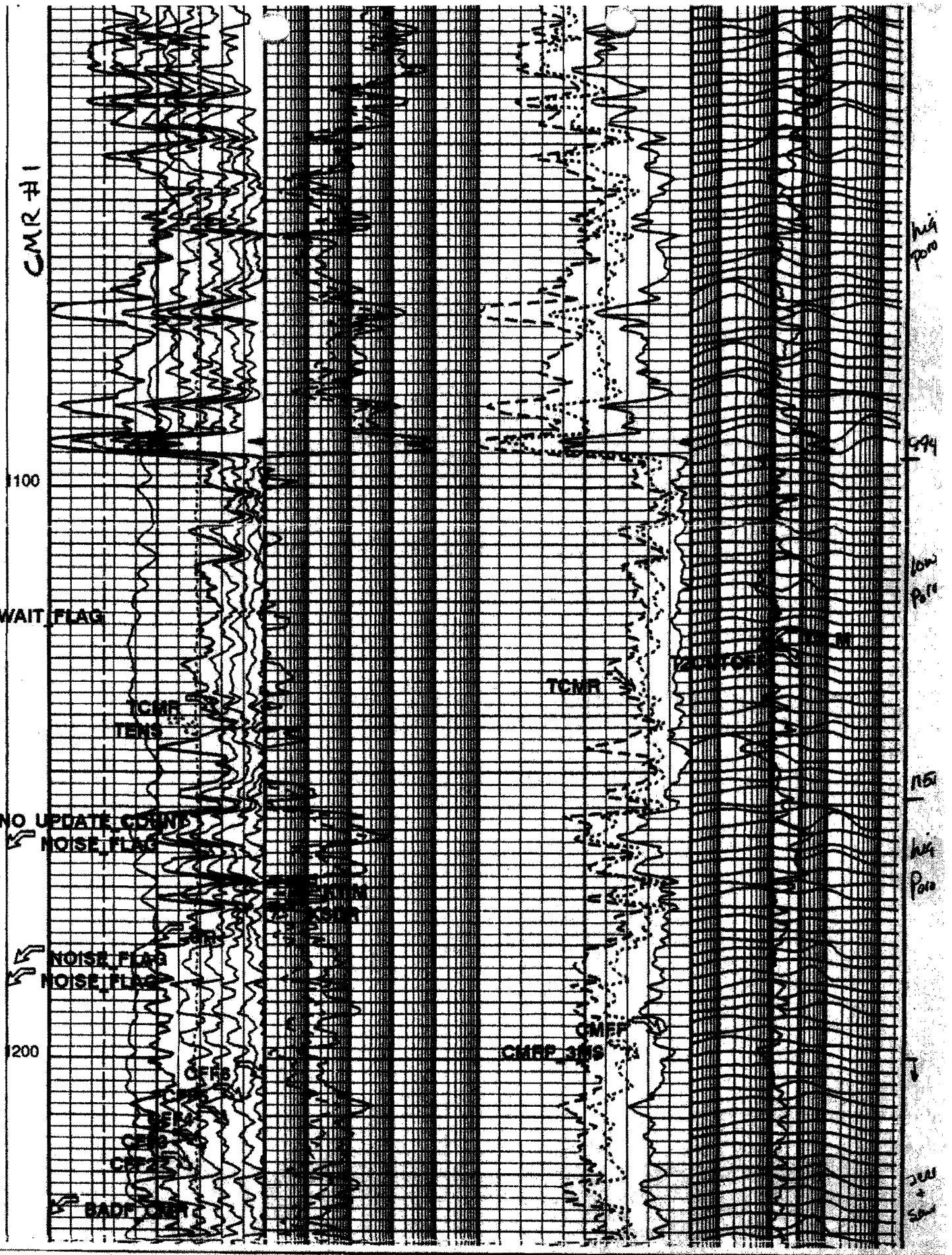
Mud Resistivity Factor (AHMRF) is 1.00000 and was computed at following depth (AHMRD) 0.00 FT

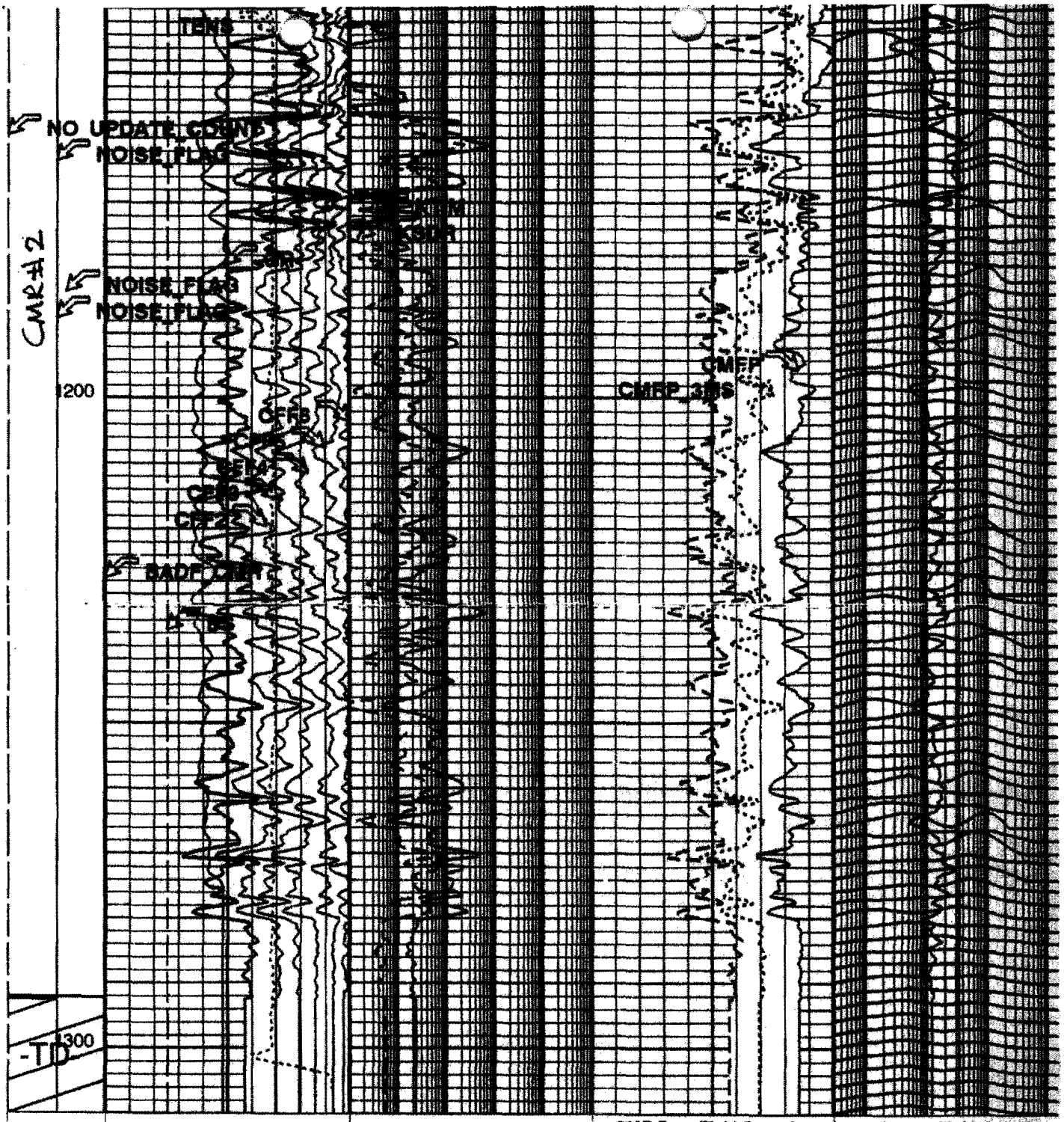
ol is run in ECCENTERED mode with a tool stand-off of 0.13 IN. Bit Size is 8.50 IN.

***** Input Selections to AIT-H Answer Product Processing *****

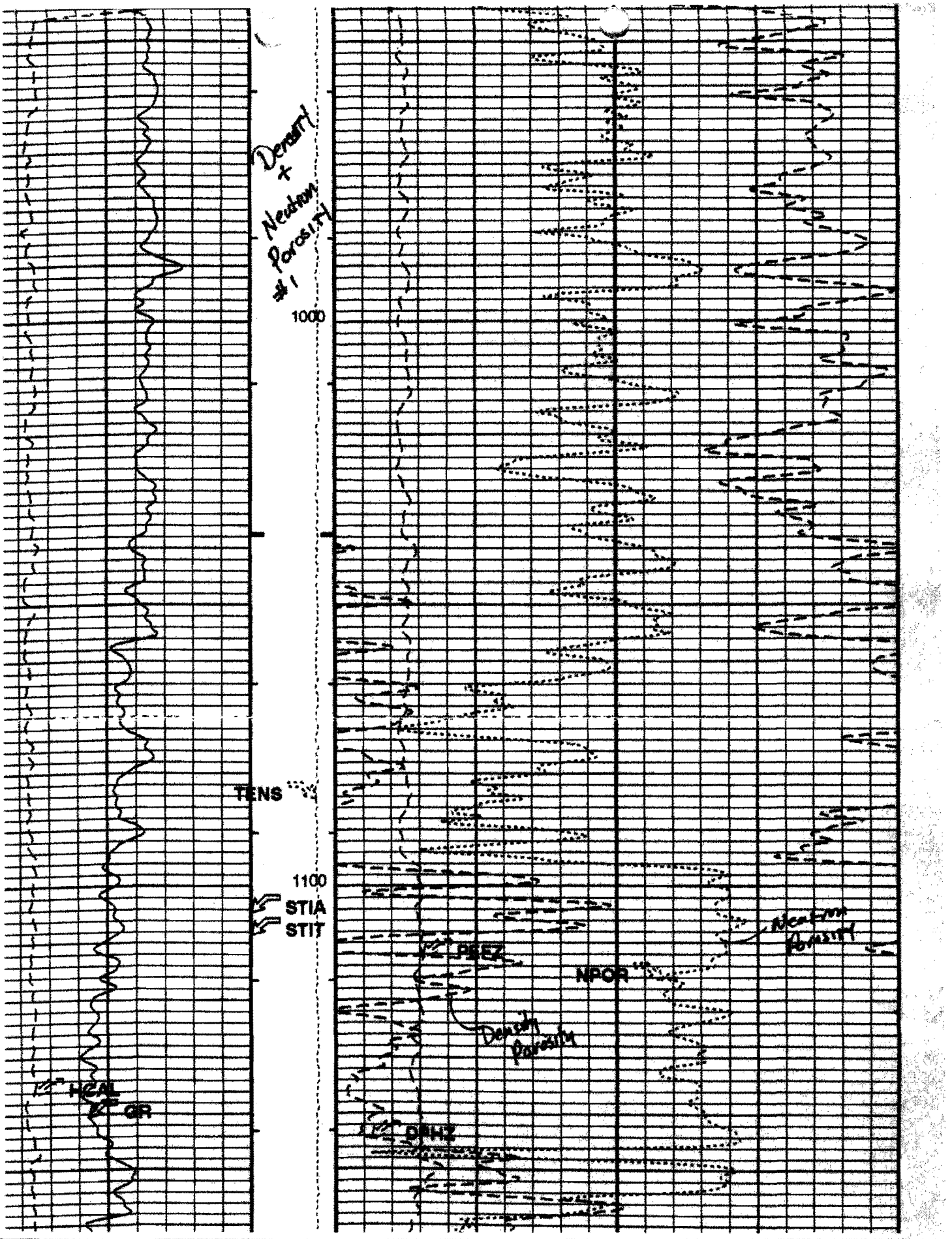

1000
1100
FMI #1
Black = More conductive
White = More resistive
STIA
STIT
P1AZ
FBOR
GR
FBOR
DEVIM
C2
C1
TENS

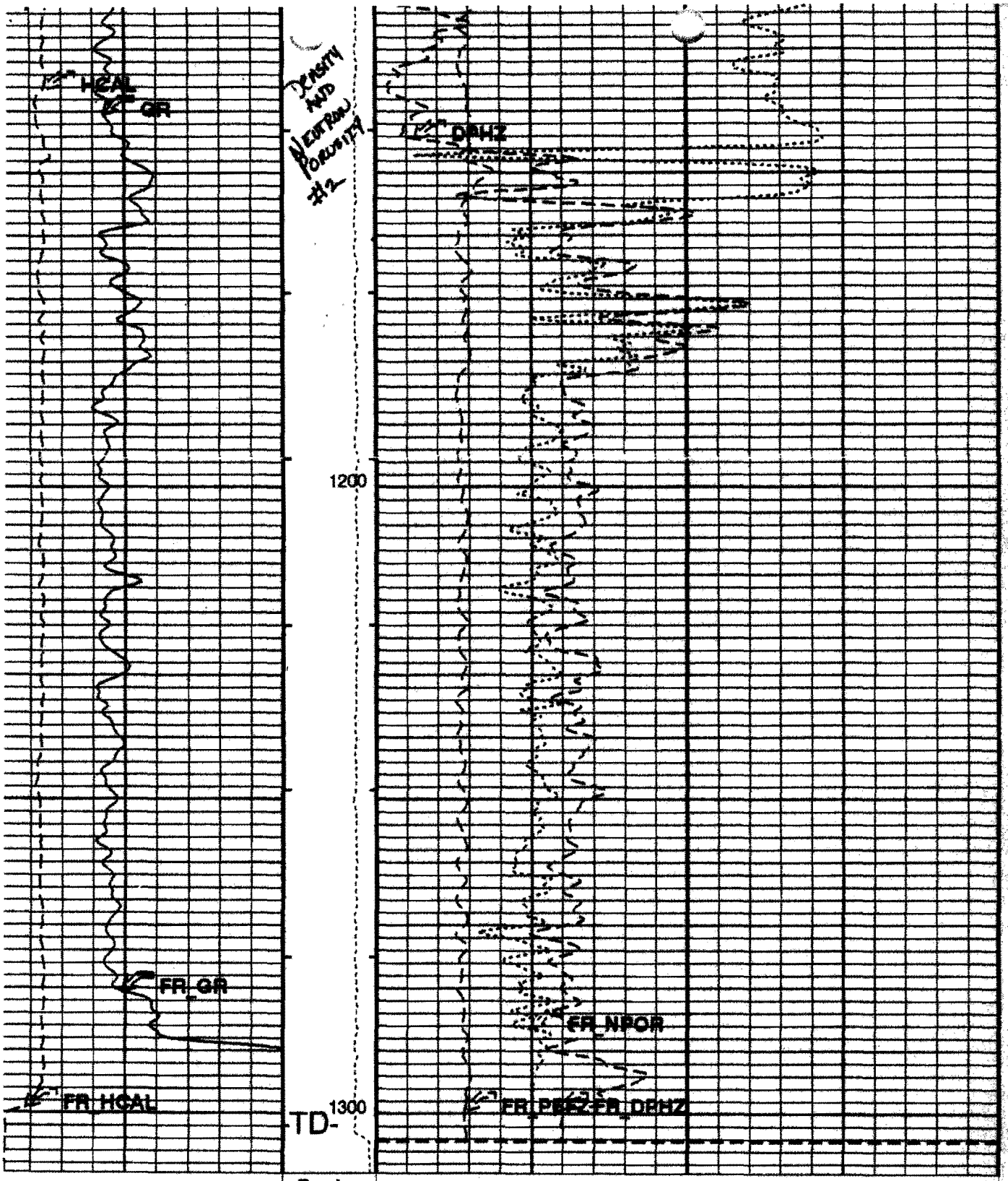

FMI #2
1200
1300
FR SR
FR SR
Caliper 1 (C1)
6 (IN) 16
FBST/PADA (FBAA_A)
(----)
Caliper 2 (C2)
6 (IN) 16
Tension (TENS)
10000 (LBF) 0
Deviation (DEVIM)
0 (DEG) 10
Gamma Ray (GR)
0 (GAPI) 150


CMR #1
1100
WAIT_FLAG
TCMR
TEMS
NO UPDATE COUNT
NOISE_FLAG
NOISE_FLAG
NOISE_FLAG
1200
CMFF
CMFP_3MS
BADF_CNT



Bad Hole Flag	Bit Size (BS) 6 (IN) 16	SDR Permeability (KSDR) 0.1 (MD) 10000	CMR Free Fluid Porosity (CMFF) 0.4 (V/V) 0	Bound Fluid Cutoff (T2CUTOFF) 0.3 (MS) 30(
Insuff. WT Flag	CMR Free Fluid Porosity for T2 Cutoff 2 (CFF2) 0.4 (V/V) 0	Timur/Coates Permeability (KTIM) 0.1 (MD) 10000	CMR 3ms Porosity (CMRP_3MS) 0.4 (V/V) 0	T2 Logarithmic Mean (T2LM 0.3 (MS) 30(
Caution Moderate Noise	Gamma Ray (GR) 0 (GAPI) 200		Total CMR Porosity (TCMR) 0.4 (V/V) 0	T2 Distribution (T2_DIST) 0 (US)
Noise Out of	Tension (TENS) 4000 (LBF) 0		Capillary Bound Fluid Porosity	


Density + Neutron Porosity #1
1000
TENS
1100
STIA
STIT
PEEZ
NPOR
Neutron Porosity
Density Porosity
HCAL
GR
DPHZ


HCAL
GR
DPHZ
DENSITY AND NEUTRON POROSITY #2
1200
FR_GR
FR_NPOR
FR_HCAL
FR_PEFZ
FR_DPHZ
TD
1300
Gamma Ray (GR)
(GAPI)
200
Tension (TENS)
(LBF)
4000
0
Std. Res. Density Porosity (DPHZ)
0.5
(V/V)
-0.1
Caliper (HCAL)
(IN)
16
Stuck Stretch (STIT)
0
(F)
50
Alpha Processed Neutron Porosity (NPOR)
0.5
(V/V)
-0.1