PRODUCTION LOGGING SERVICES, INC.

INJECTION PROFILE, TOP PERF. & PACKER CHECK

Company	CHEVRON U.S.A.
Well	SKR 598-08-01
Field	SKINNER RIDGE
County	GARFIELD
State	COLORADO

Company CHEVRON U.S.A.
Well SKR 598-08-01
Field SKINNER RIDGE
County GARFIELD State COLORADO
Location: API # :
941' FNL & 483' FWL
SEC 8 TWP 05S RGE 98W
Other Services

Permanent Datum	G.L.	Elevation 6766'	Elevation
Log Measured From	K.B. 12' ABOVE PERM. DATUM		K.B. 6778'
Drilling Measured From	K.B.		D.F. 6777
			G.L. 6766'

Date	20-JUNE-2019
Run Number	ONE
Depth Driller	6027'
Depth Logger	3300' G.D.A.
Bottom Logged Interval	3300'
Top Log Interval	SURFACE
Open Hole Size	
Type Fluid	
Density / Viscosity	
Max. Recorded Temp.	
Estimated Cement Top	
Time Well Ready	
Time Logger on Bottom	
Equipment Number	#21
Location	VERNAL
Recorded By	J.R. HACKING
Witnessed By	BYRON DALE

Borehole Record			Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
				2 3/8"	4.7#	0'	2774'
				ON/OFF	TOOL	2774'	2776'
				PACKER		2776'	2780'
				2 3/8"	4.7#	2780'	2819'

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String				
Production String	4 1/2"	11.6#	0'	6026'
Liner				
P.B.T.D.				5931'

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All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

THANK YOU FOR USING P.L.S.

REMARKS: Ran radioactive water tracer surveys to determine intervals of injection and to check for channeling above injection zone.

Found no indication of channeling above the top perforated interval at 2810'-2815' (SQZD). R/A water tracer surveys check top perforated interval at 2810'-2815' (SQZD) and packer O.K.

Found fluid exit through intervals shown

Perforated Interval:	Percent Fluid Exit	Distance from Ejector Port to Detector is 1
2810'-2815' (SQZD)	0%	
2900-2930'	14%	
2960'-3010'	73%	
3030'-3050'	5%	
3060'-3090'	6%	
3120'-3142'	0%	
3160'-3190'	0%	
3234'-3264'	0%	
3266'-3276'	0%	
3284'-3308'	0%	

REMARKS:

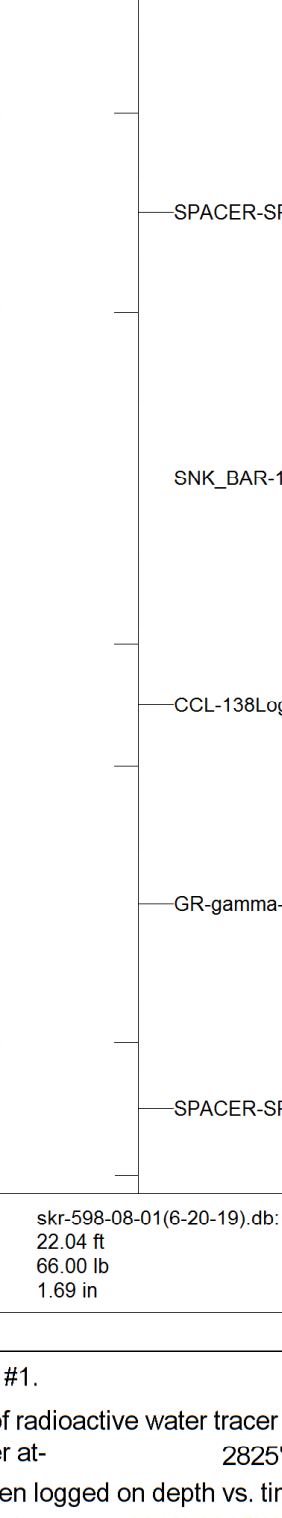
Metered Injection Rate -	2850 B/D
Tubing Pressure -	364 P.S.I.
Casing Pressure -	0 P.S.I.
P.L.S. Downhole Injection Rate -	2764 B/D
All Depths Correlated to-	HALLIBURTON C.B.L. DATED 7-7-2008

Due to slow movement of fluid inside casing and length of injection zones, several slugs of I-131 radioactive water tracer were injected into the casing to obtain fluid velocities between perforated intervals.

Radioactive tracer slug #1 was injected into the flowstream just below the tubing packer at- 2825'
This slug was then logged on Depth VS. Time as it moved downhole past the top perforated interval at- 2810'-2815' (SQZD)
This was done to check for channeling above the injection zone. R/A tracer checks top perforated interval and packer OK.

All Radioactive tracer slugs were injected into the wellbore between perforated intervals to obtain fluid velocities for fluid injection percentage exit profile.

Radioactive tracer used was I-131 radioactive water tracer. All gamma ray surveys were ran at 50'-60' per minute with the time constant set at 1.

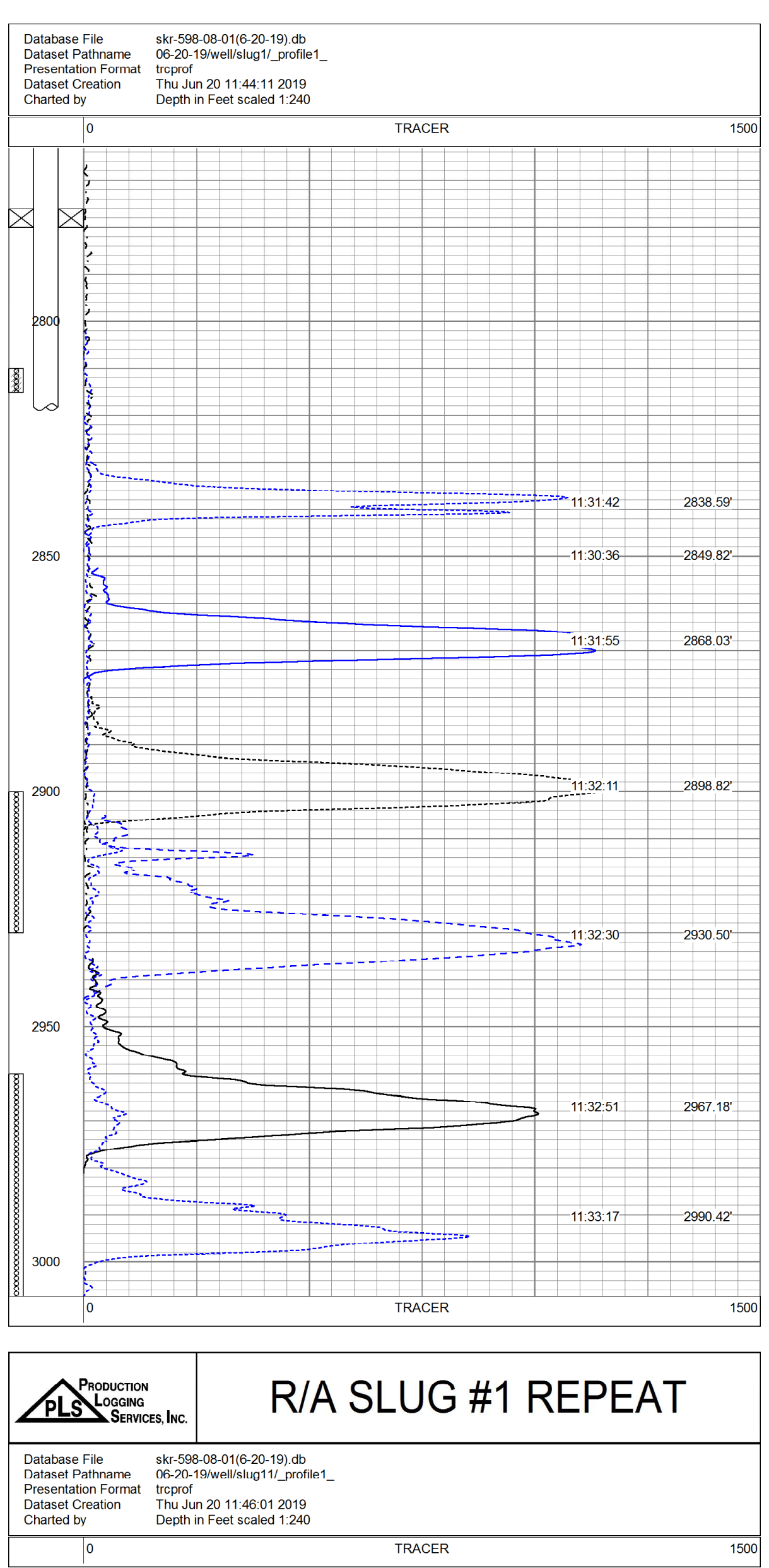


Sensor	Offset (ft)	Description	Length (ft)	O.D. (in)	Weight (lb
		CHD-AES (000001) Cable Head	1.04	1.69	2.00
		SNK_BAR-137x5	5.00	1.38	27.00
		SPACER-SPC	3.00	1.38	
		SNK_BAR-137x5	5.00	1.38	27.00
CCL	6.67	CCL-138Log (138L)	1.83	1.38	5.00
GR	2.80	GR-gamma-ray (138H)	4.17	1.38	5.00
		SPACER-SPC	2.00	1.38	

Dataset: skr-598-08-01(6-20-19).db: 06-20-19/well/AFTERGR/pass1
Total length: 22.04 ft
Total weight: 66.00 lb
O.D.: 1.69 in

REMARKS: R/A Tracer Slug #1.
A 1.0 MCi slug of radioactive water tracer was injected into the flowstream just below the tubing packer at- 2825'
This slug was then logged on depth vs. time as it moved downhole past top perforated intervals at- 2810'-2815'(SQZ)
R/A Tracer checks top perforated interval OK. This slug was also used to obtain 100 percent downhole injection rate and to obtain fluid velocities between perforated intervals at:
2810'-2815', 2900'-2930' & 2960'-3010'

Database File skr-598-08-01(6-20-19).db
Dataset Pathname 06-20-19/well/slug1/_profile1_
Presentation Format trcprof
Dataset Creation Thu Jun 20 11:44:11 2019
Charted by Depth in Feet scaled 1:240



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R/A SLUG #1 REPEAT

Database File skr-598-08-01(6-20-19).db
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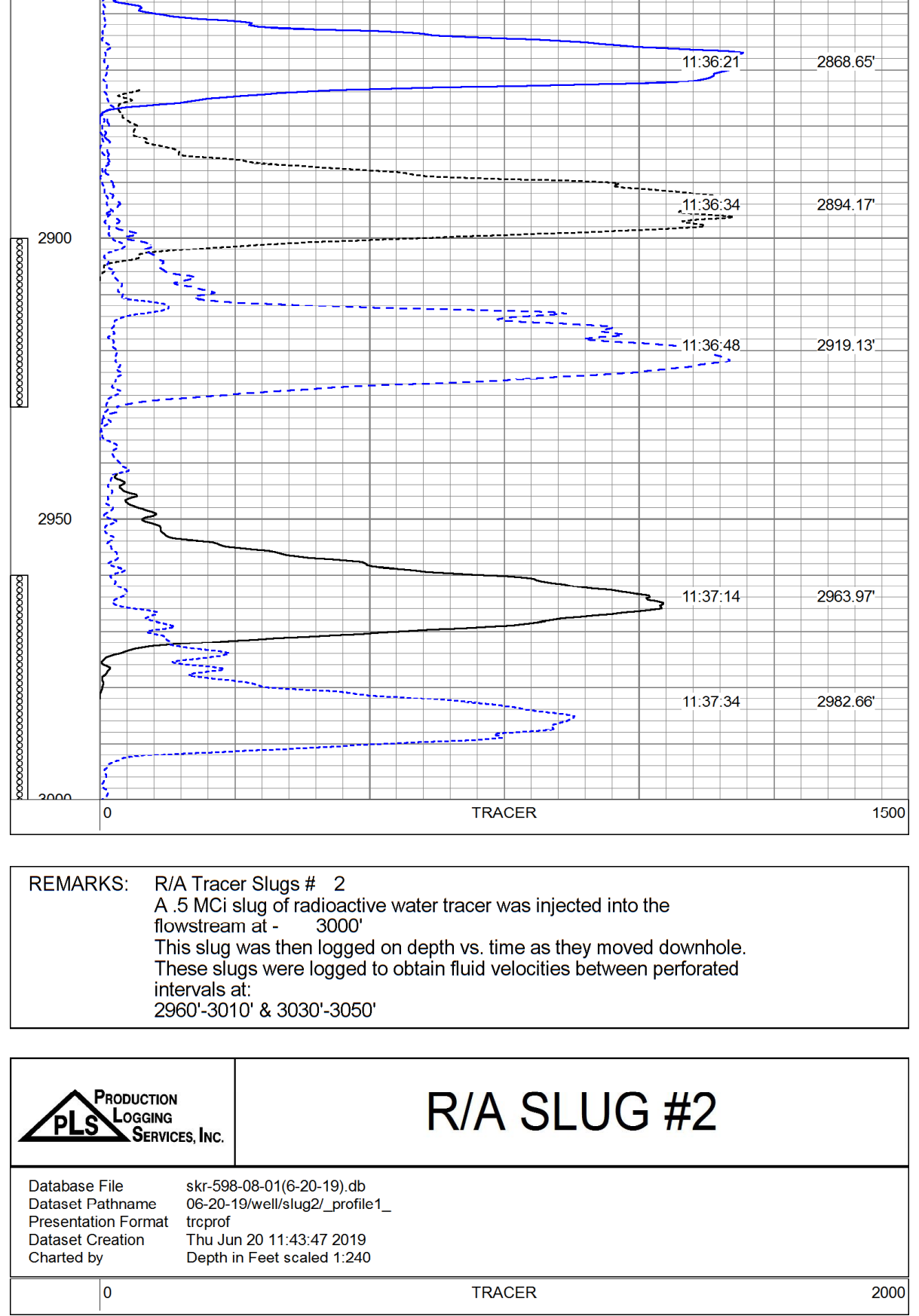
Presentation Format trcprof
Dataset Creation Thu Jun 20 11:46:01 2019
Charted by Depth in Feet scaled 1:240



REMARKS: R/A Tracer Slugs # 2
A .5 MCi slug of radioactive water tracer was injected into the flowstream at - 3000'
This slug was then logged on depth vs. time as they moved downhole.
These slugs were logged to obtain fluid velocities between perforated intervals at:
2960'-3010' & 3030'-3050'

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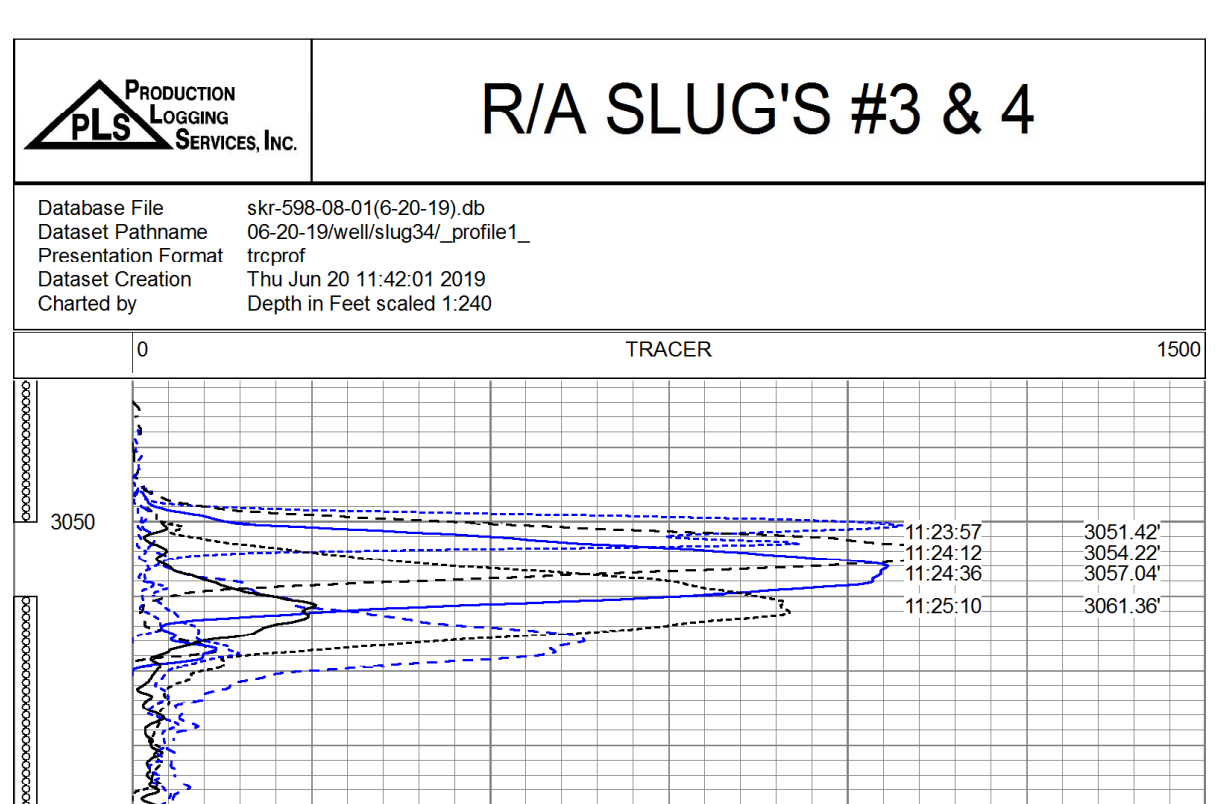
R/A SLUG #2

Database File skr-598-08-01(6-20-19).db
Dataset Pathname 06-20-19/well/slug2/_profile1_
Presentation Format trcprof
Dataset Creation Thu Jun 20 11:43:47 2019
Charted by Depth in Feet scaled 1:240



REMARKS: R/A Tracer Slugs # 3 & 4
A .5 MCi slug of radioactive water tracer was injected into the flowstream at - 3051' & 3103'
This slug was then logged on depth vs. time as they moved downhole.
These slugs were logged to obtain fluid velocities between perforated intervals at:
3030'-3050', 3060'-3090' & ZERO FLOW

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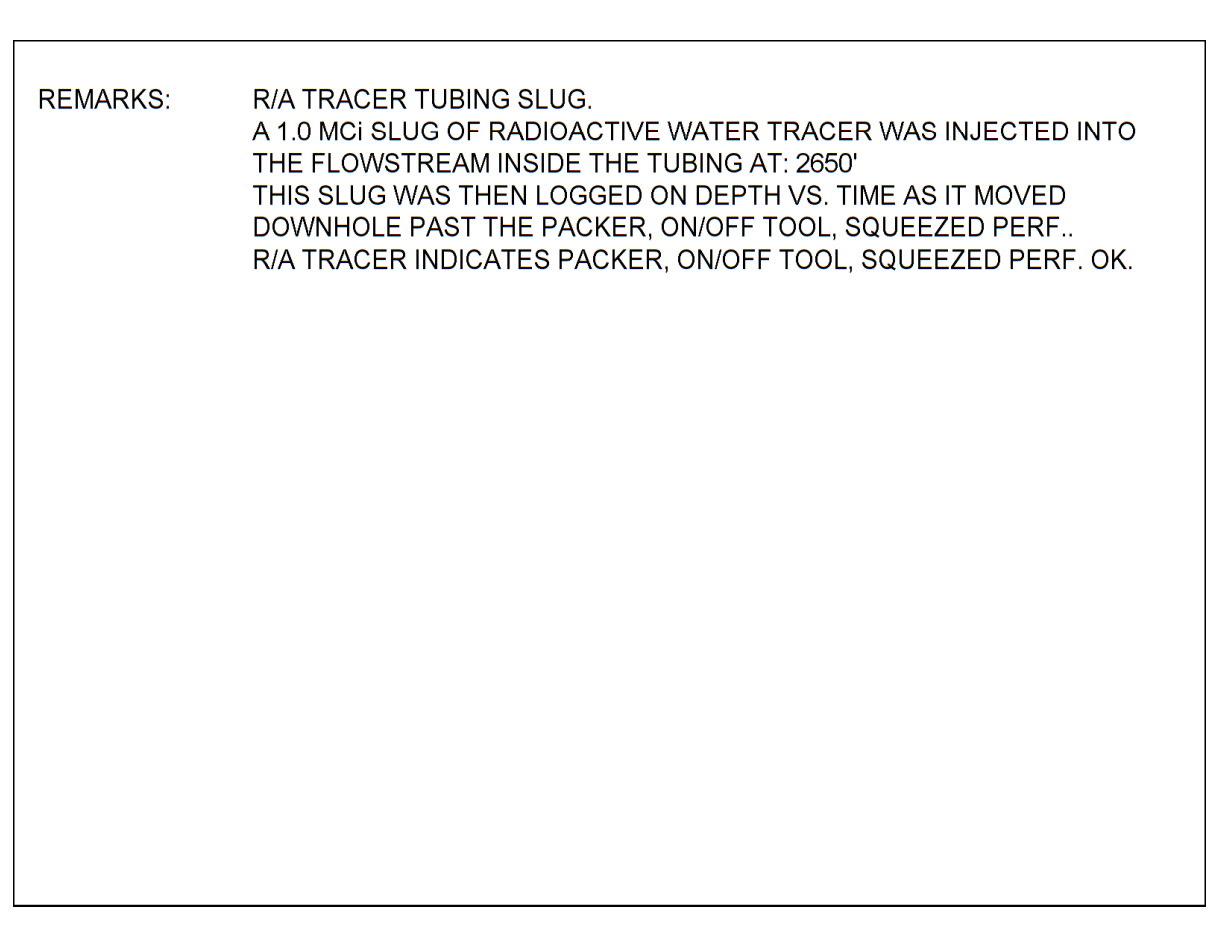
R/A SLUG'S #3 & 4

Database File skr-598-08-01(6-20-19).db
Dataset Pathname 06-20-19/well/slug34/_profile1_
Presentation Format trcprof
Dataset Creation Thu Jun 20 11:42:01 2019
Charted by Depth in Feet scaled 1:240



REMARKS: R/A TRACER TUBING SLUG.
A 1.0 MCi SLUG OF RADIOACTIVE WATER TRACER WAS INJECTED INTO THE FLOWSTREAM INSIDE THE TUBING AT: 2650'
THIS SLUG WAS THEN LOGGED ON DEPTH VS. TIME AS IT MOVED DOWNHOLE PAST THE PACKER, ON/OFF TOOL, SQUEEZED PERF..
R/A TRACER INDICATES PACKER, ON/OFF TOOL, SQUEEZED PERF. OK.

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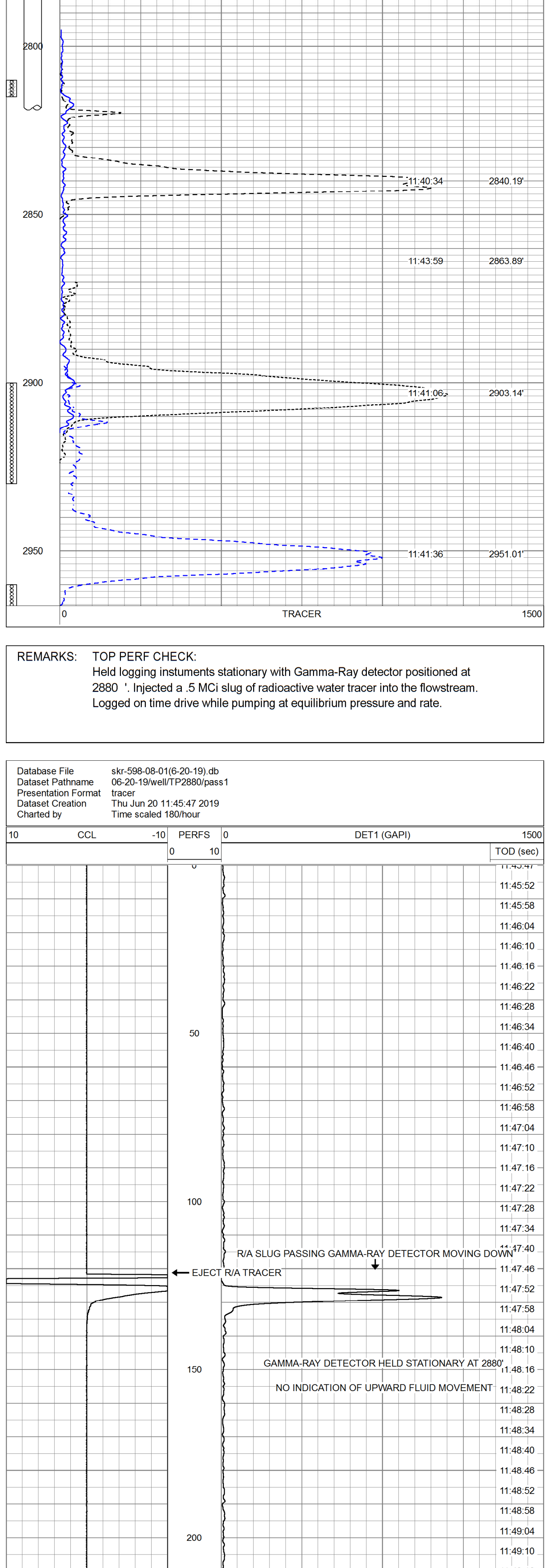
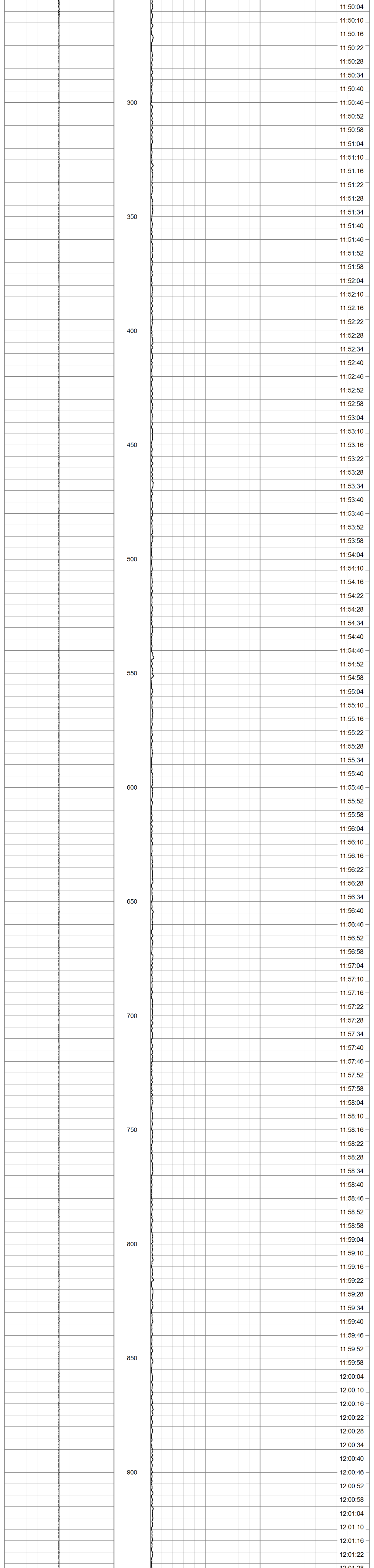
TBG SLUG

Database File skr-598-08-01(6-20-19).db
Dataset Pathname 06-20-19/well/tbg/_profile1_
Presentation Format trcprof
Dataset Creation Thu Jun 20 11:46:43 2019
Charted by Depth in Feet scaled 1:240



REMARKS: TOP PERF CHECK:
Held logging instuments stationary with Gamma-Ray detector positioned at 2880 '. Injected a .5 MCi slug of radioactive water tracer into the flowstream.
Logged on time drive while pumping at equilibrium pressure and rate.

Database File skr-598-08-01(6-20-19).db
Dataset Pathname 06-20-19/well/TP2880/pass1
Presentation Format tracer
Dataset Creation Thu Jun 20 11:45:47 2019
Charted by Time scaled 180/hour



REMARKS: A GAMMA-RAY/CCL LOG WAS RAN AFTER THE TOP PERF CHECK/PACKER CHECK WAS COMPLETED. WHILE LOGGING ON DEPTH VS. TIME, DROPPED GAMMA-RAY DETECTOR BELOW TOP PERFORATION AND LOGGED UP PAST PACKER, MAKING TWO SEPARATE PASSES.

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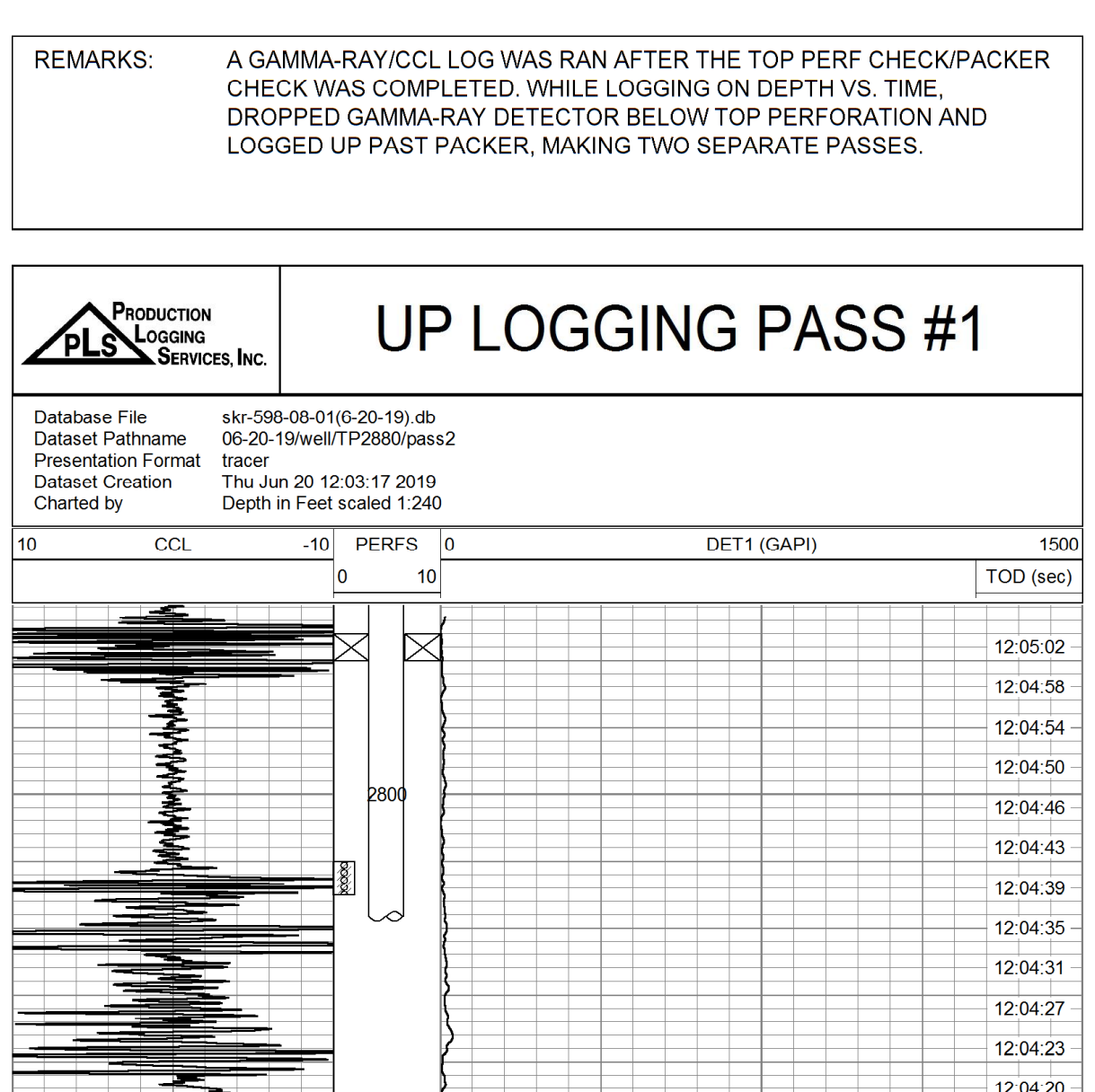
UP LOGGING PASS #1

Database File skr-598-08-01(6-20-19).db
Dataset Pathname 06-20-19/well/TP2880/pass2
Presentation Format tracer
Dataset Creation Thu Jun 20 12:03:17 2019
Charted by Depth in Feet scaled 1:240



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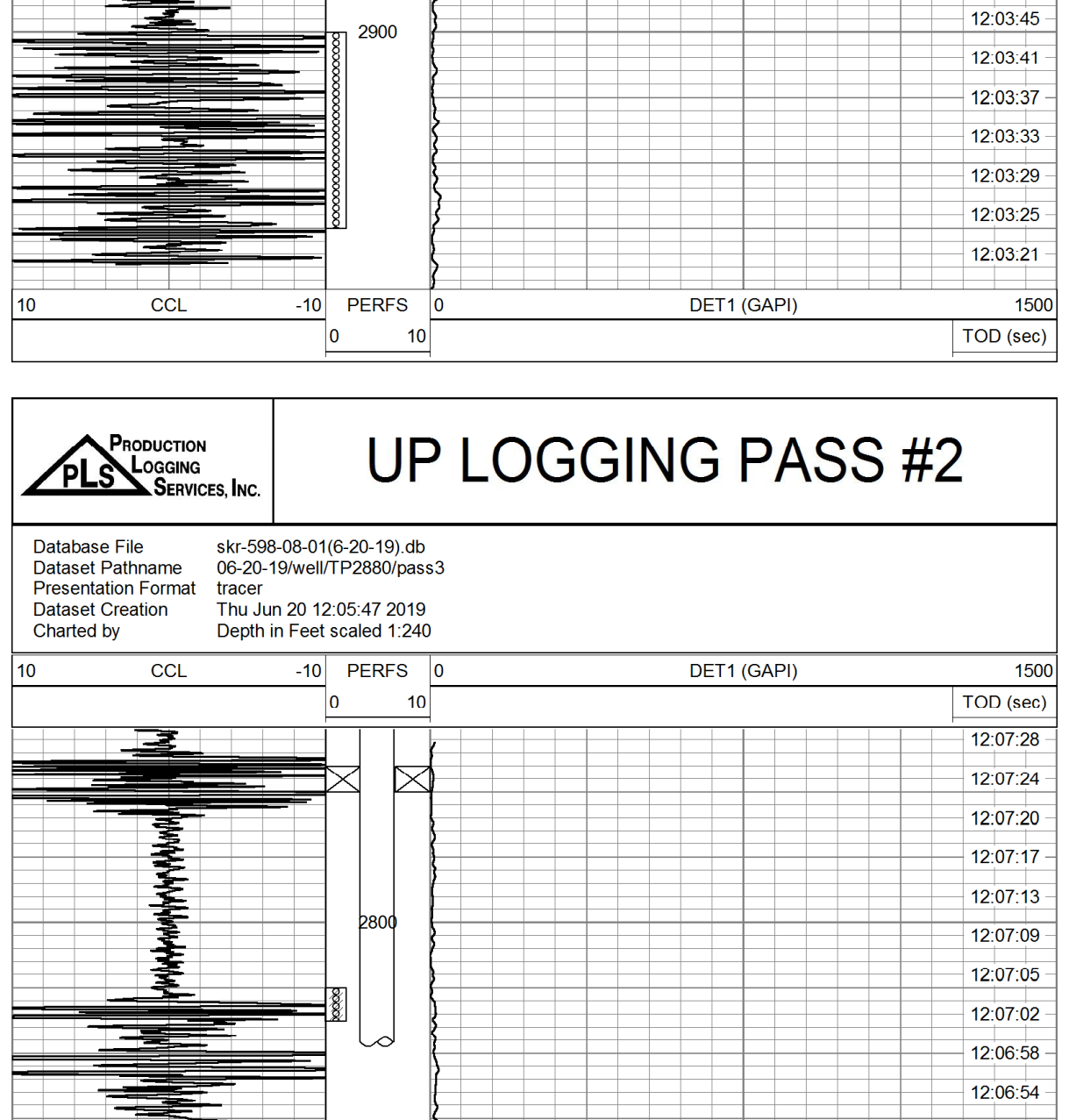
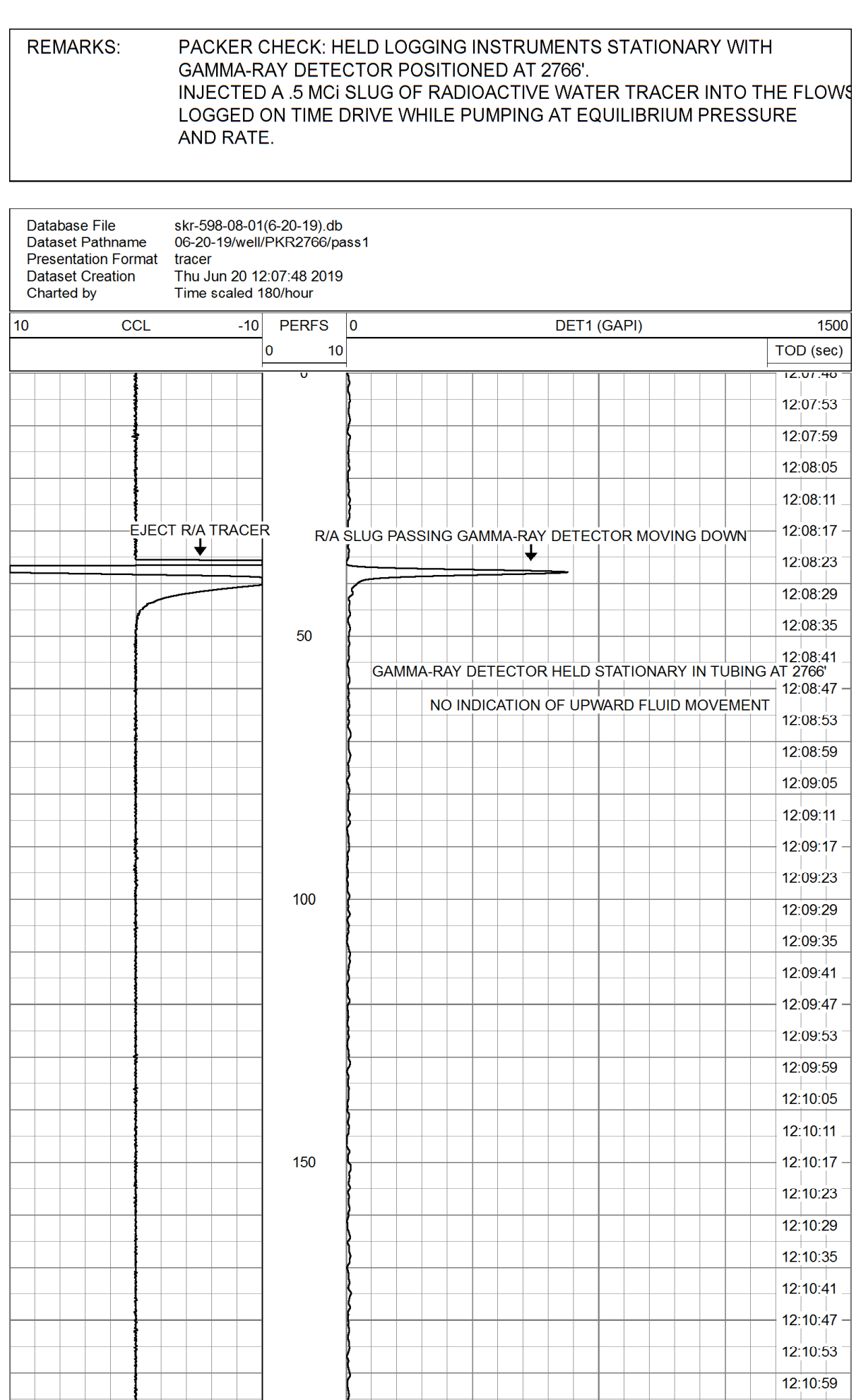
UP LOGGING PASS #2

Database File skr-598-08-01(6-20-19).db
Dataset Pathname 06-20-19/well/TP2880/pass3
Presentation Format tracer
Dataset Creation Thu Jun 20 12:05:47 2019
Charted by Depth in Feet scaled 1:240



REMARKS: PACKER CHECK: HELD LOGGING INSTRUMENTS STATIONARY WITH GAMMA-RAY DETECTOR POSITIONED AT 2766'.
INJECTED A .5 MCi SLUG OF RADIOACTIVE WATER TRACER INTO THE FLOWS
LOGGED ON TIME DRIVE WHILE PUMPING AT EQUILIBRIUM PRESSURE AND RATE.

Database File skr-598-08-01(6-20-19).db
Dataset Pathname 06-20-19/well/PKR2766/pass1
Presentation Format tracer
Dataset Creation Thu Jun 20 12:07:48 2019
Charted by Time scaled 180/hour



REMARKS: A GAMMA-RAY/CCL LOG WAS RAN AFTER THE TOP PERF CHECK/PACKER CHECK WAS COMPLETED. WHILE LOGGING ON DEPTH VS. TIME, DROPPED GAMMA-RAY DETECTOR BELOW TOP PERFORATION AND LOGGED UP PAST PACKER, MAKING TWO SEPARATE PASSES.

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UP LOGGING PASS #1

Database File skr-598-08-01(6-20-19).db
Dataset Pathname 06-20-19/well/PKR2766/pass2
Presentation Format tracer
Dataset Creation Thu Jun 20 12:20:22 2019
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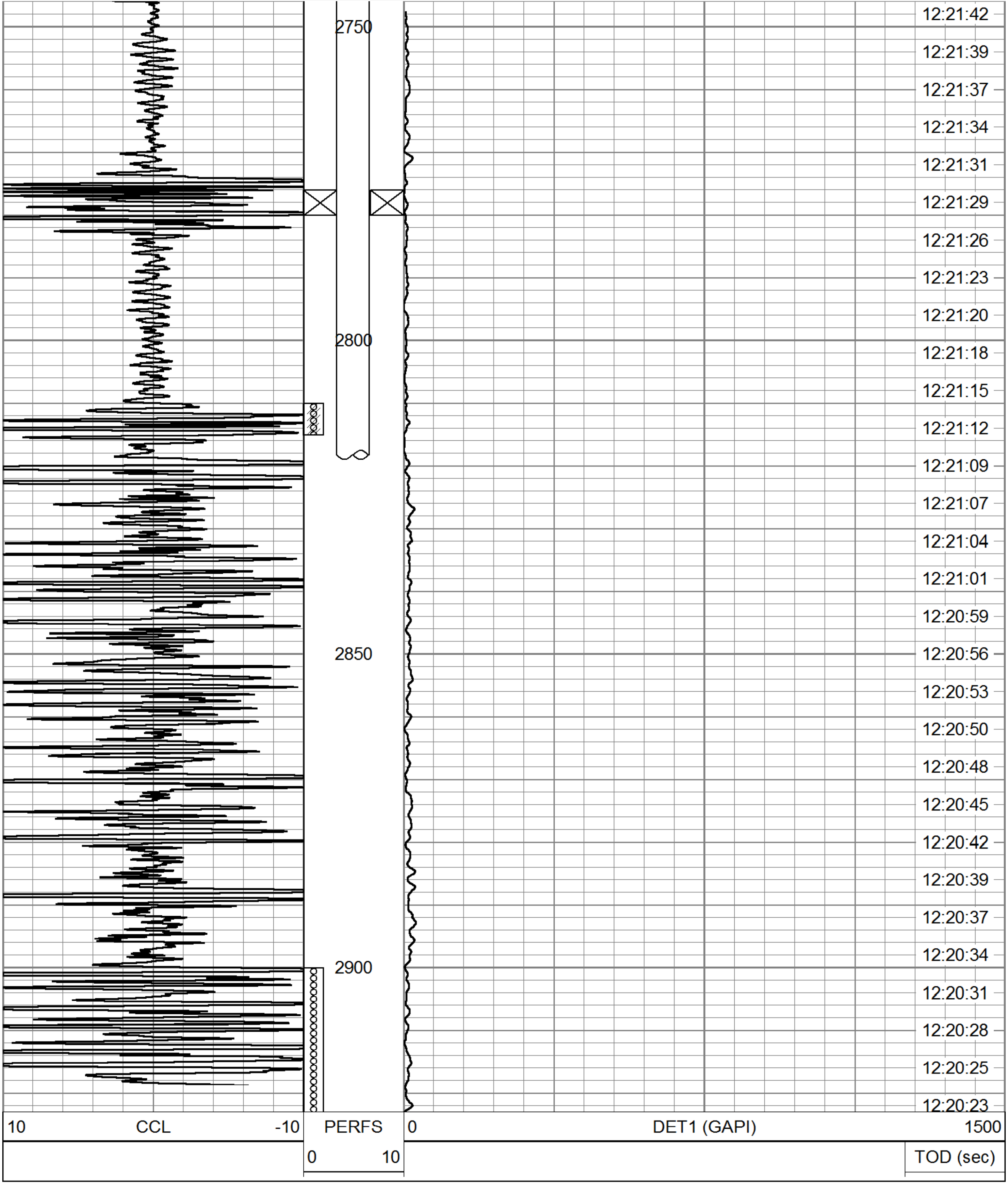

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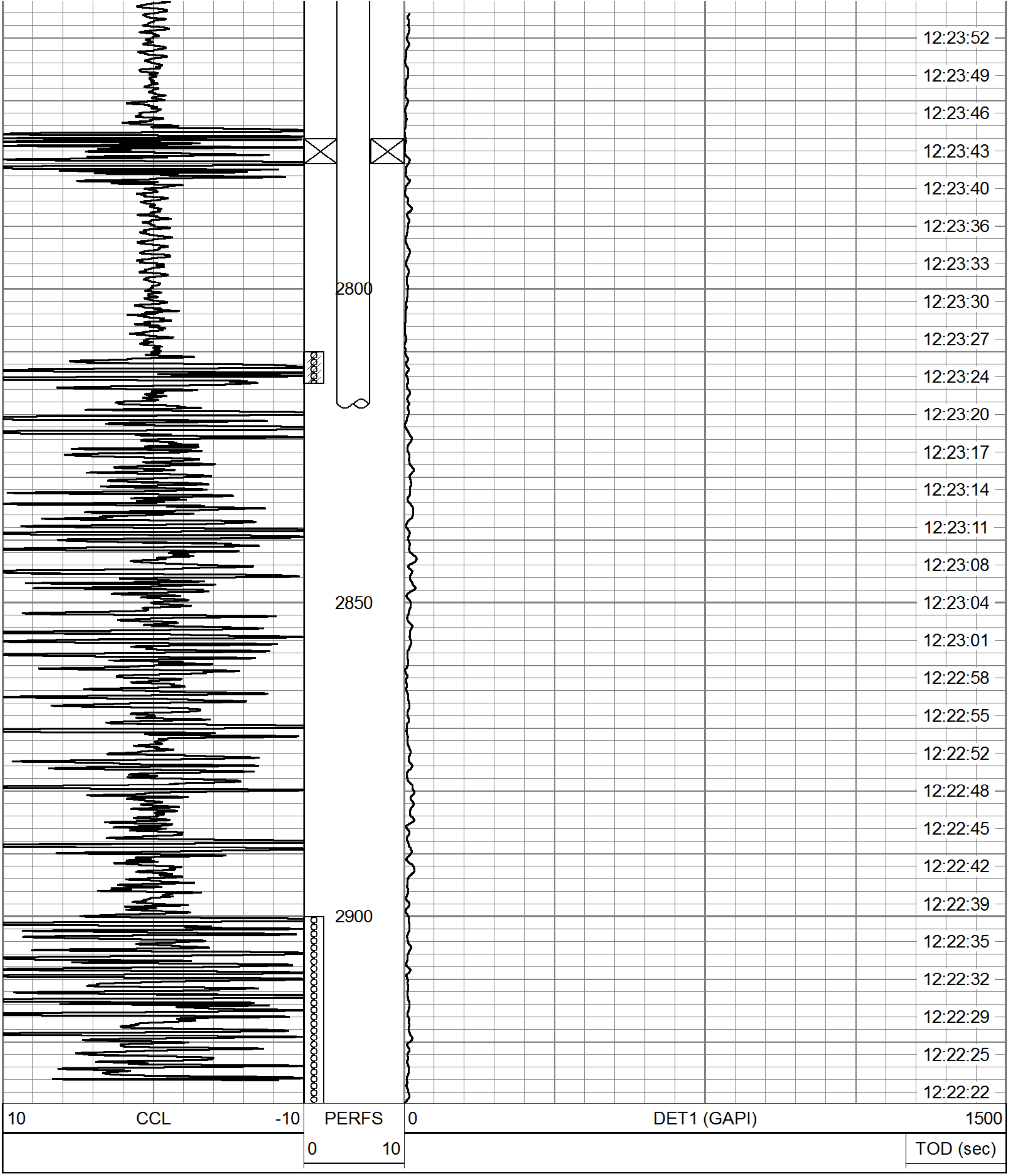
UP LOGGING PASS #2

Database File skr-598-08-01(6-20-19).db
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