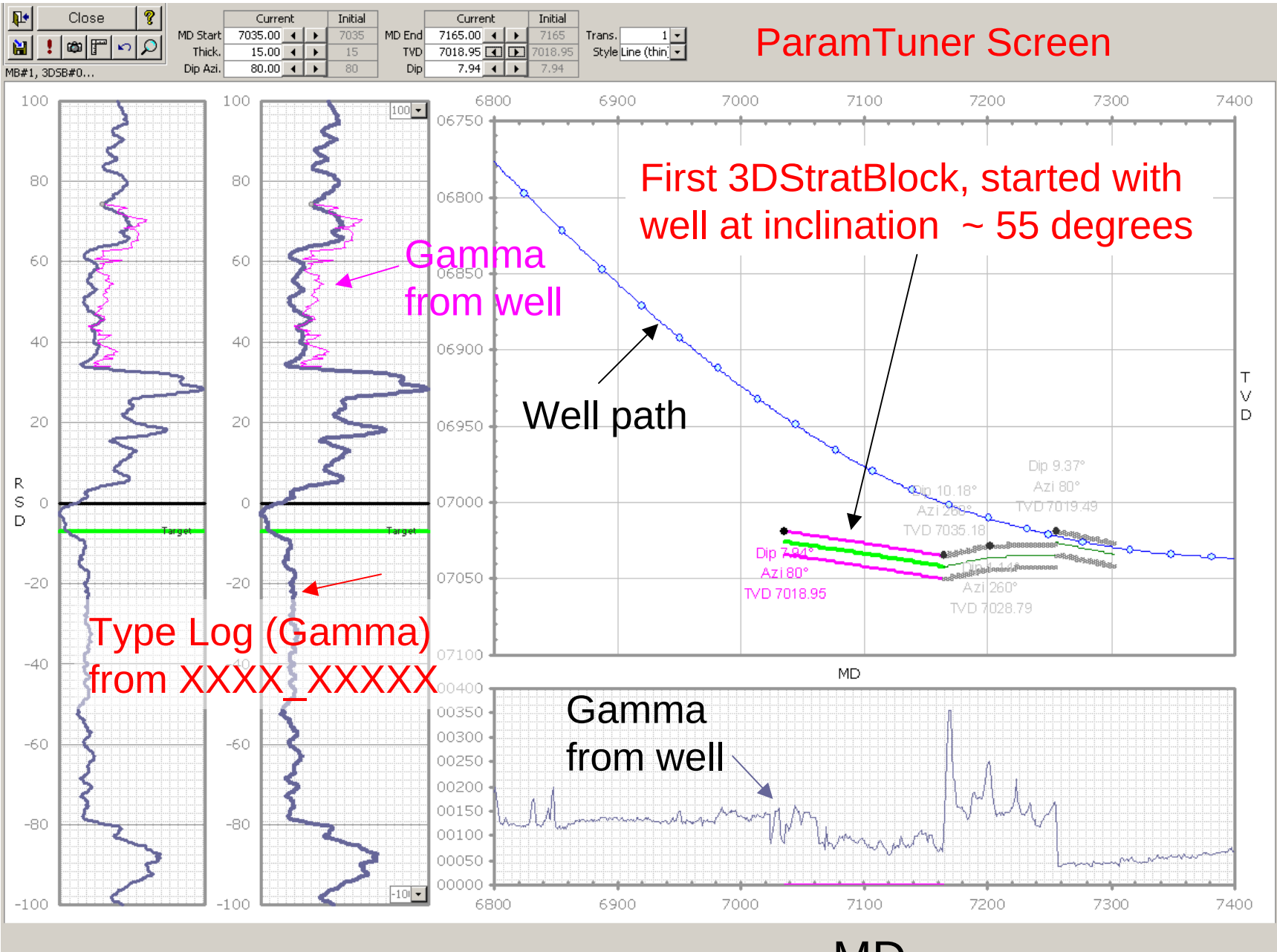


Geosteering Example Using SES 3.1

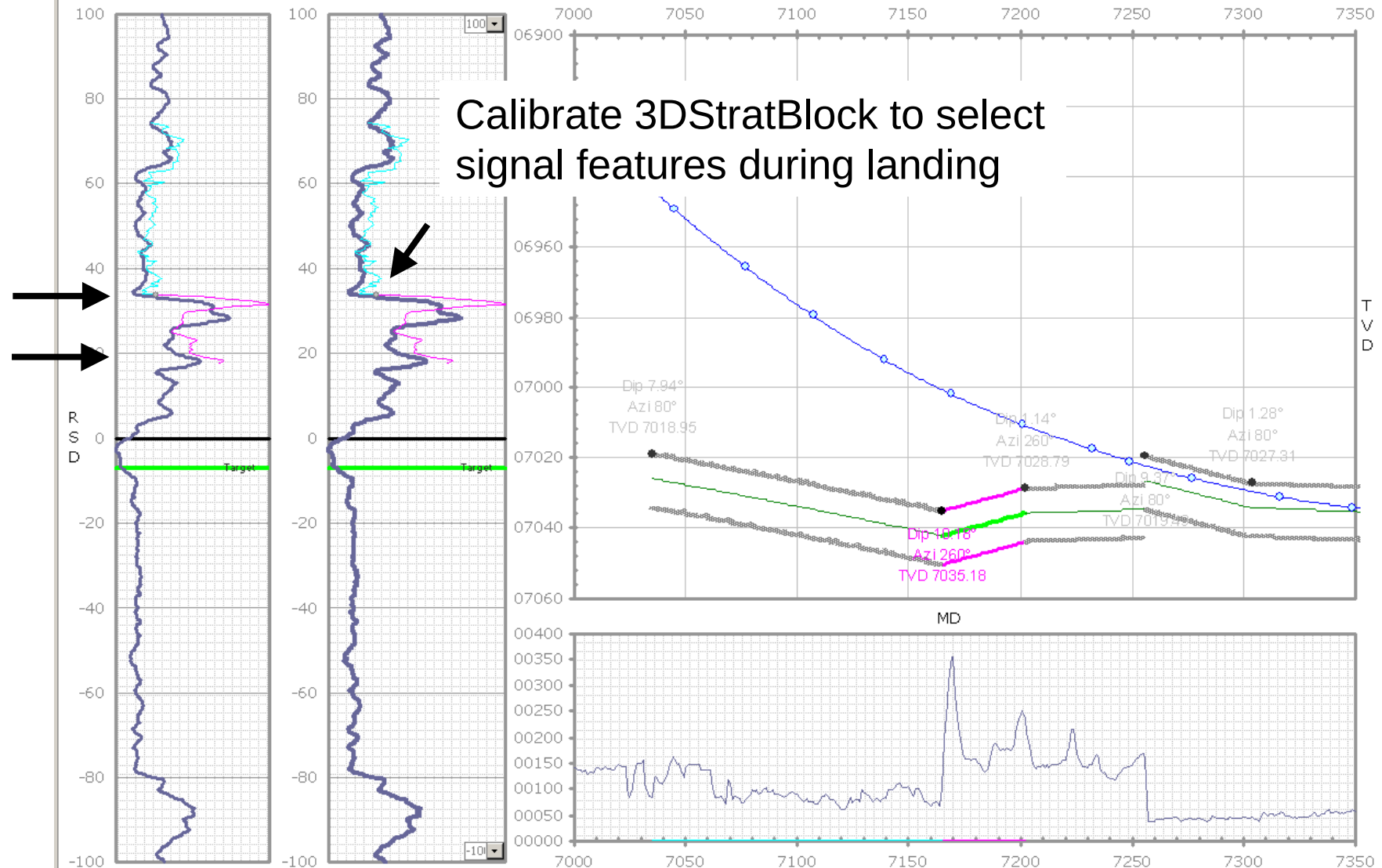
10/9/2007

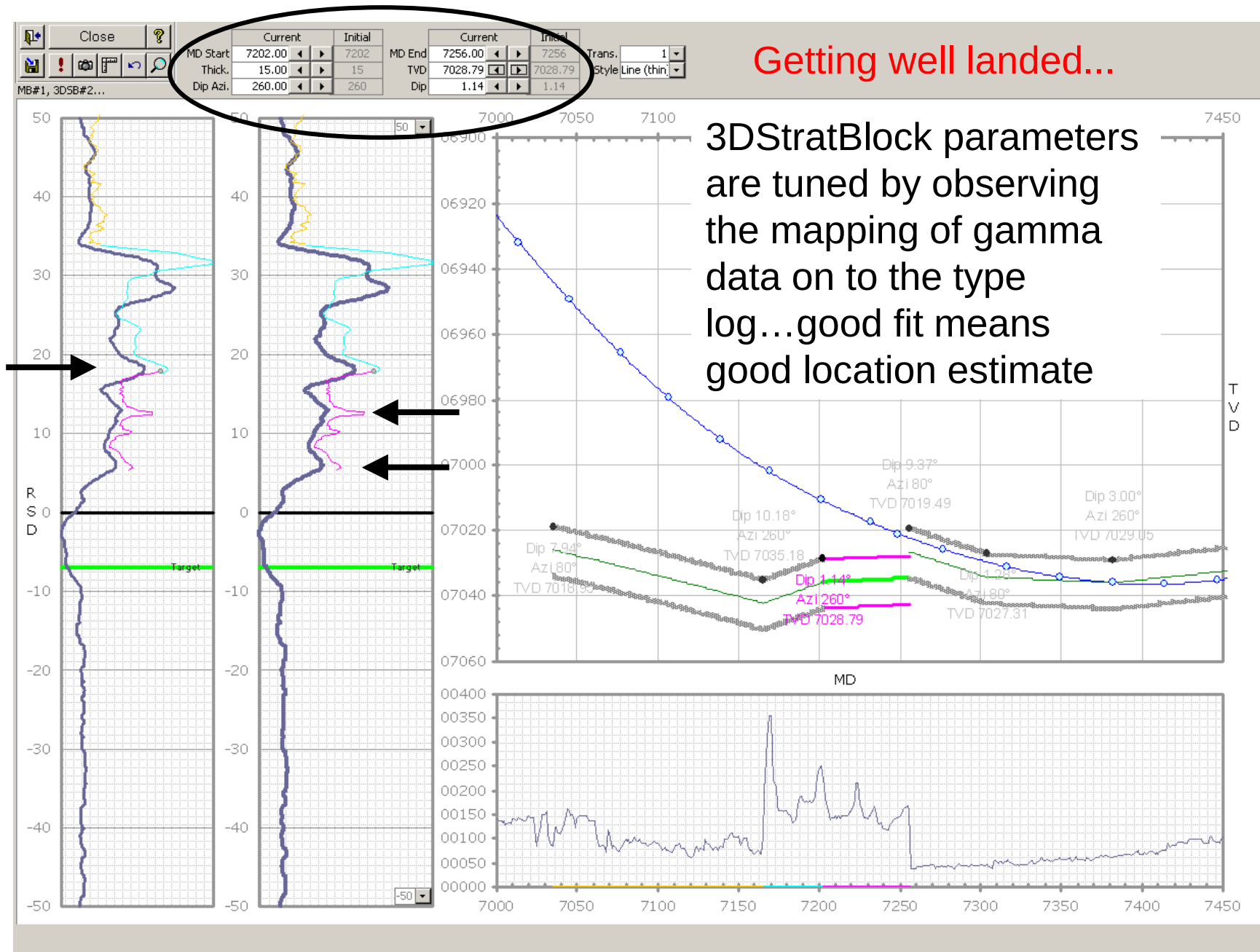
Stoner Engineering LLC

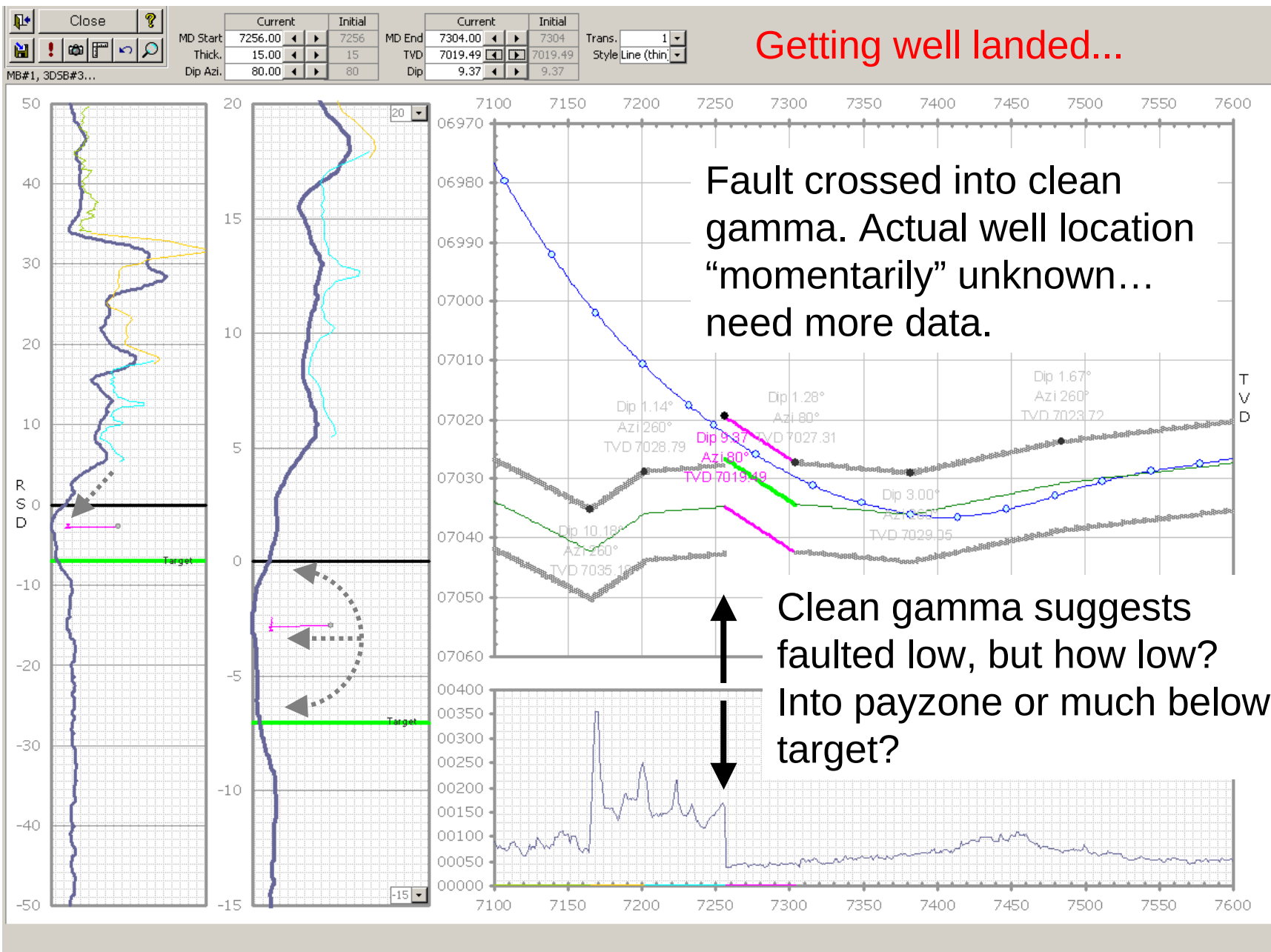
ParamTuner Screen



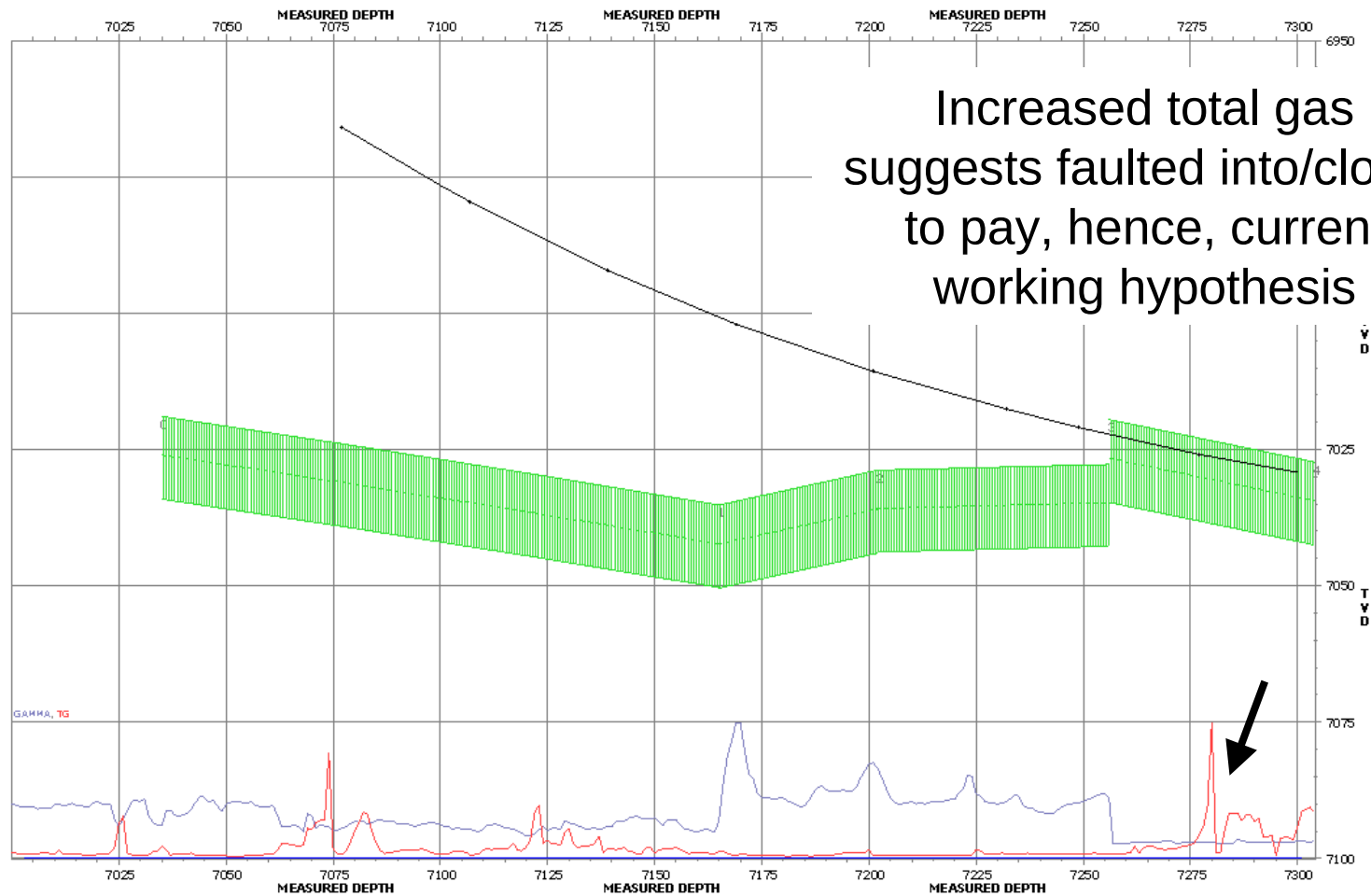
		Current	Initial			Current	Initial		
MD Start		7165.00	7165	MD End		7202.00	7202	Trans.	1
Thick.		15.00	15	TVD		7035.18	7035.18	Style	Line (thin)
Dip Azi.		260.00	260	Dip		10.18	10.18		





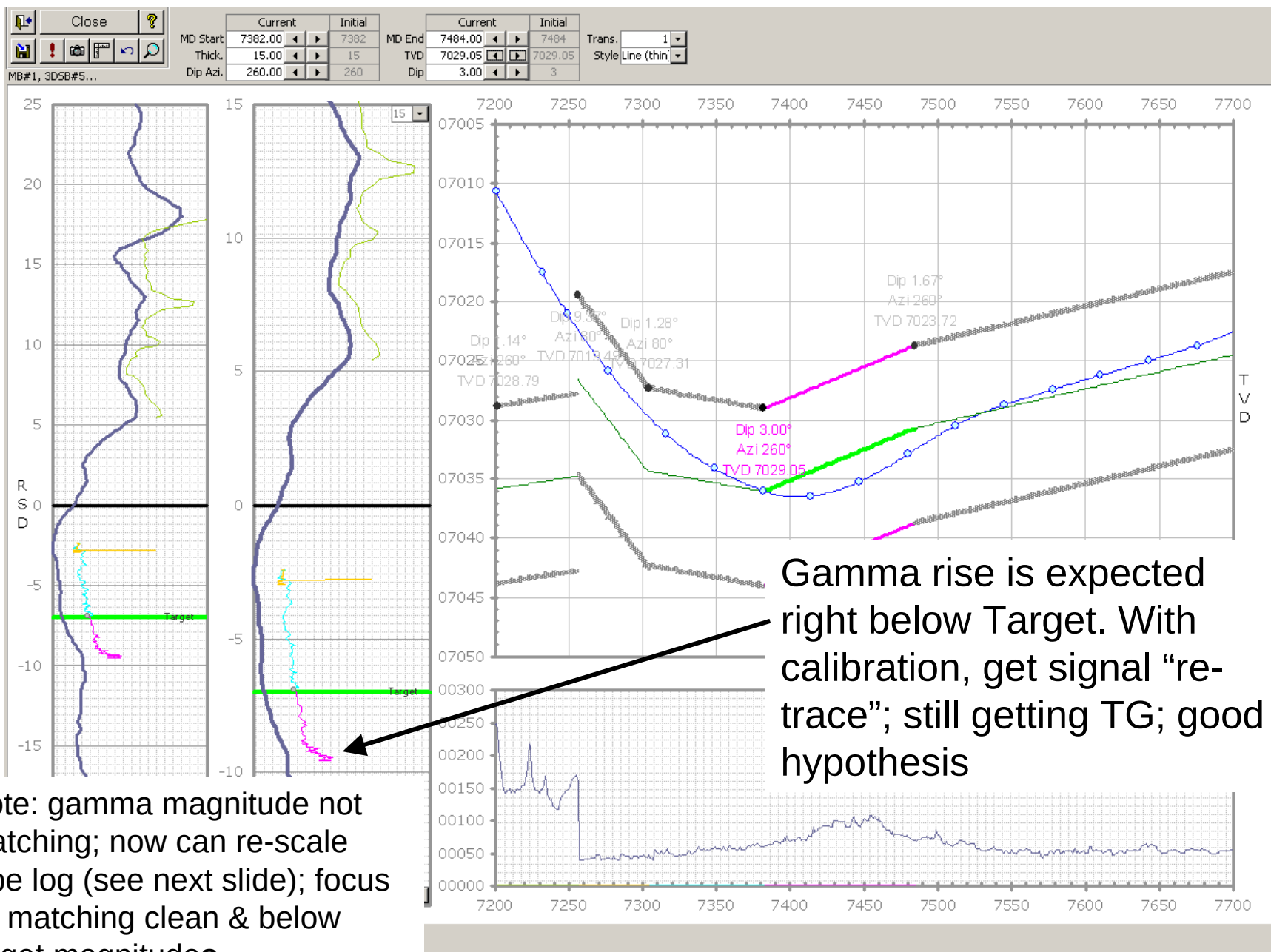


Cross-Section Screen

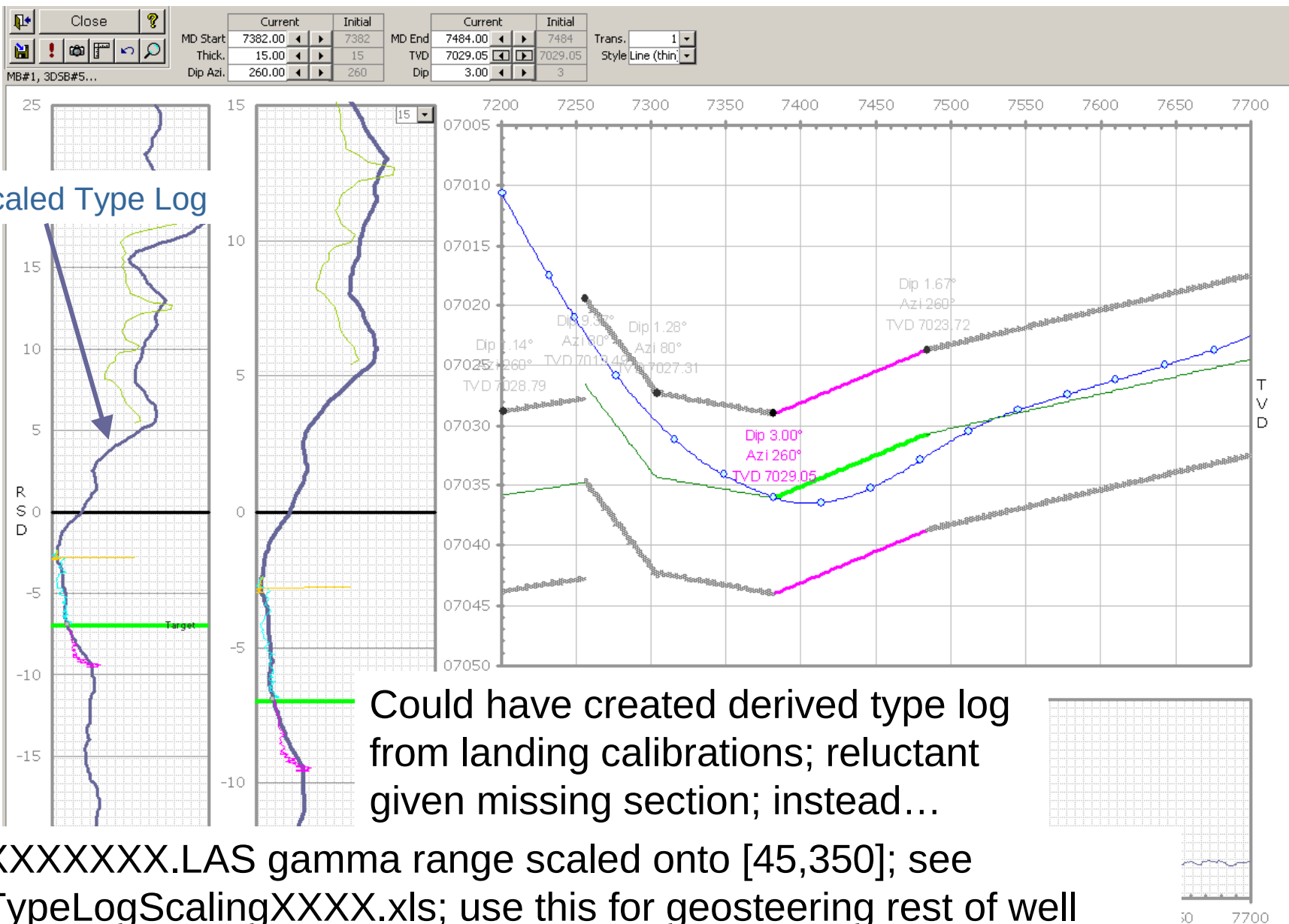


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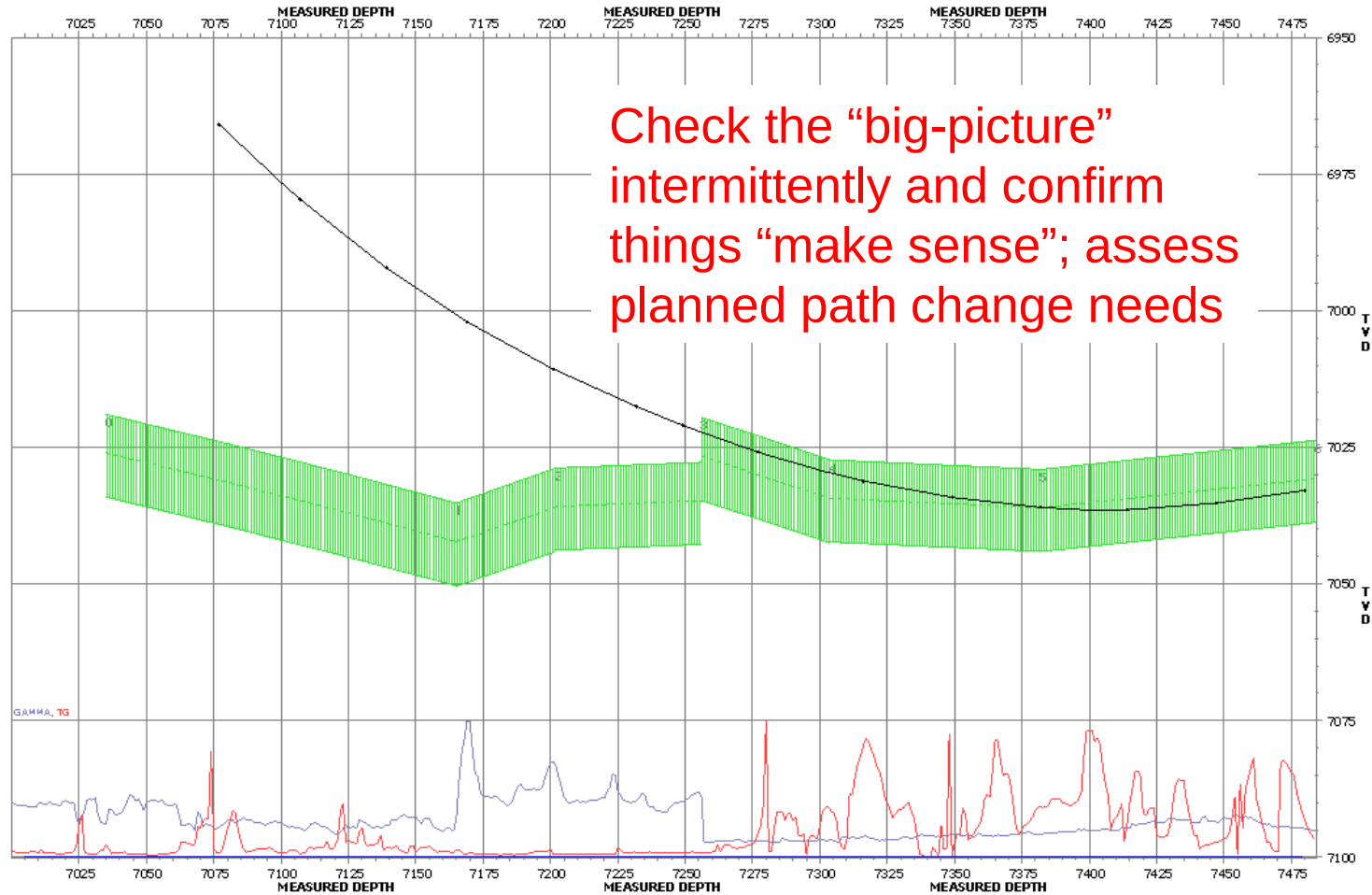
www.makinhole.com



Note: gamma magnitude not matching; now can re-scale type log (see next slide); focus on matching clean & below target magnitudes

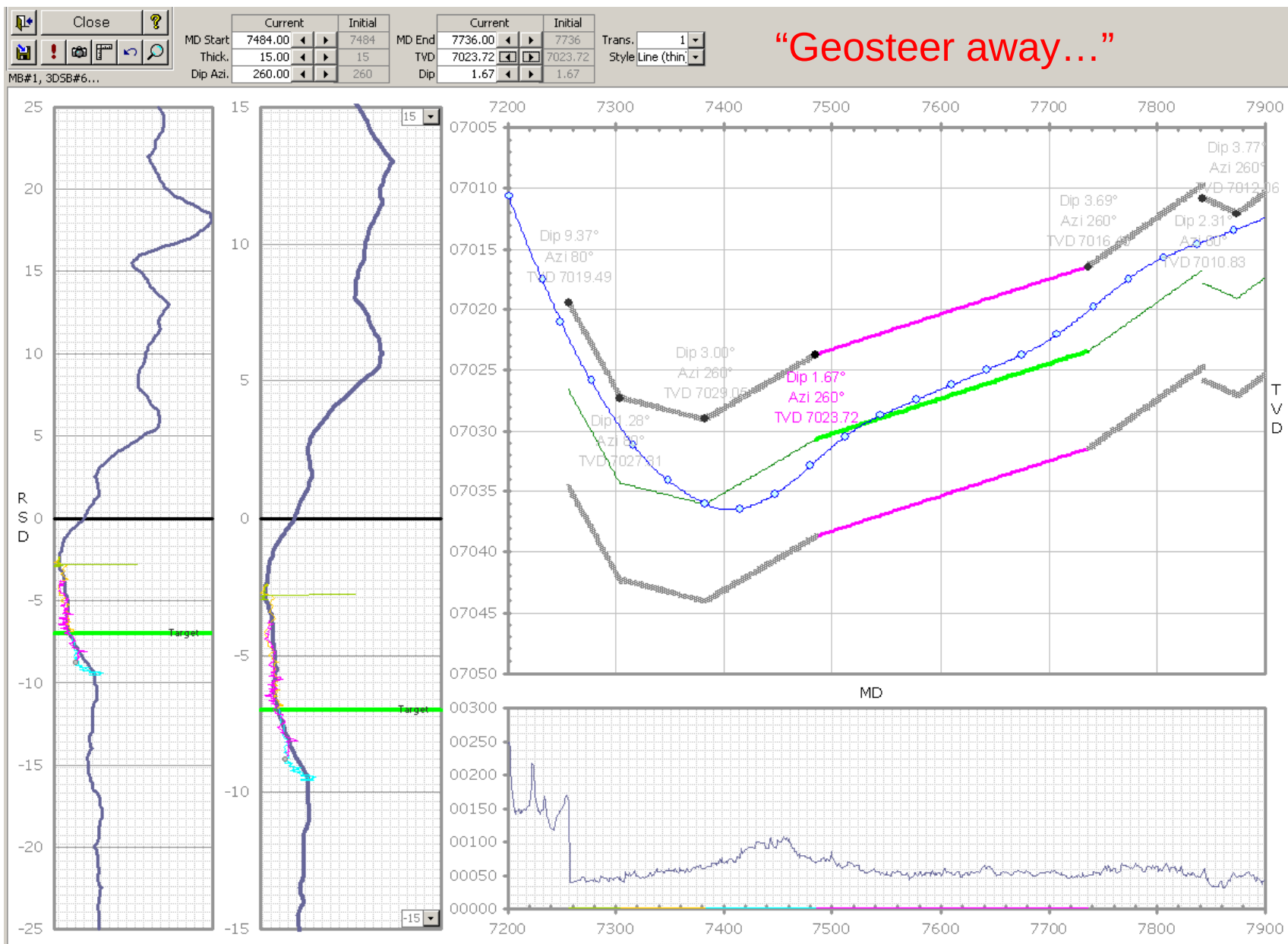


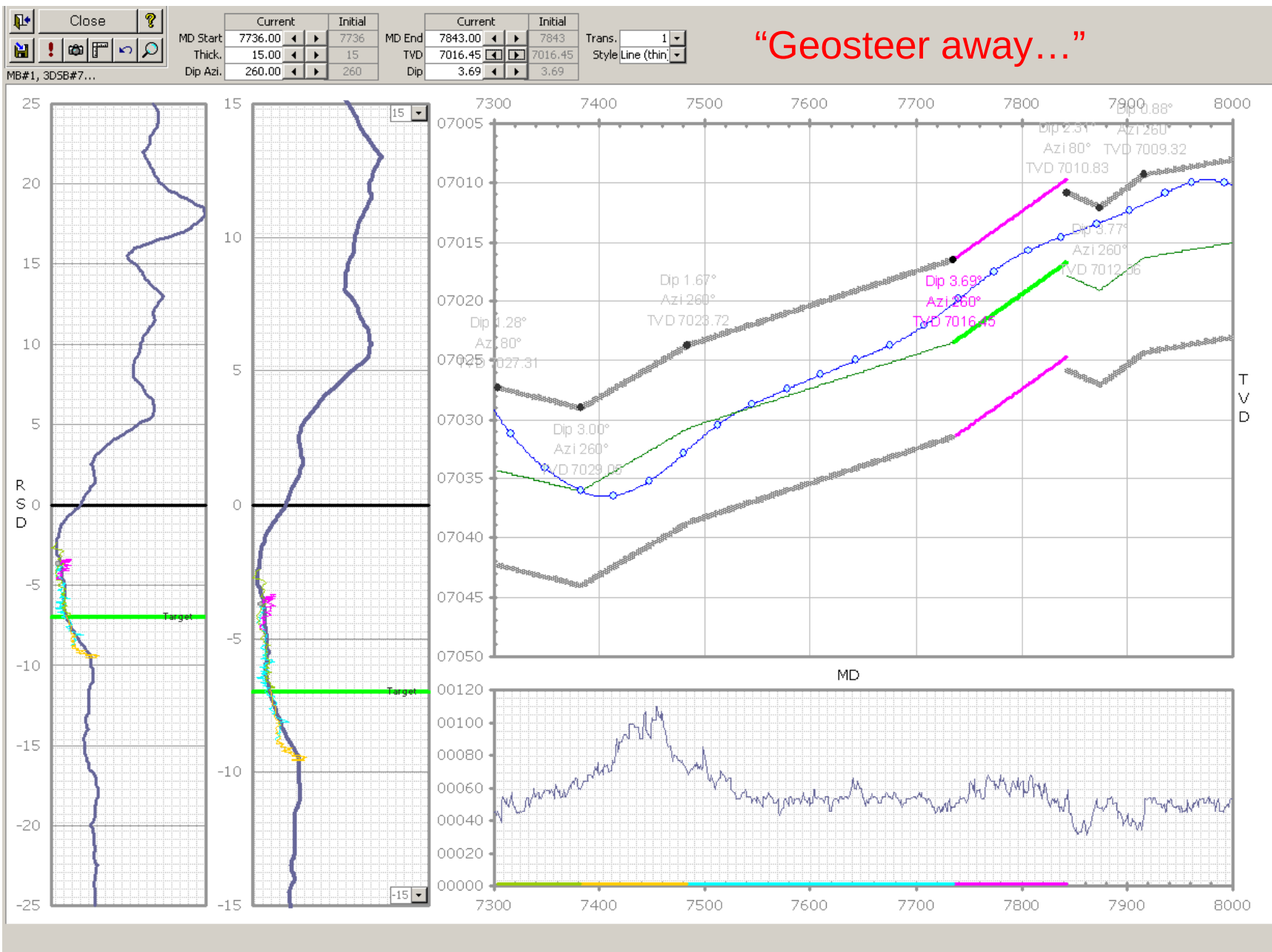
Cross-Section Screen

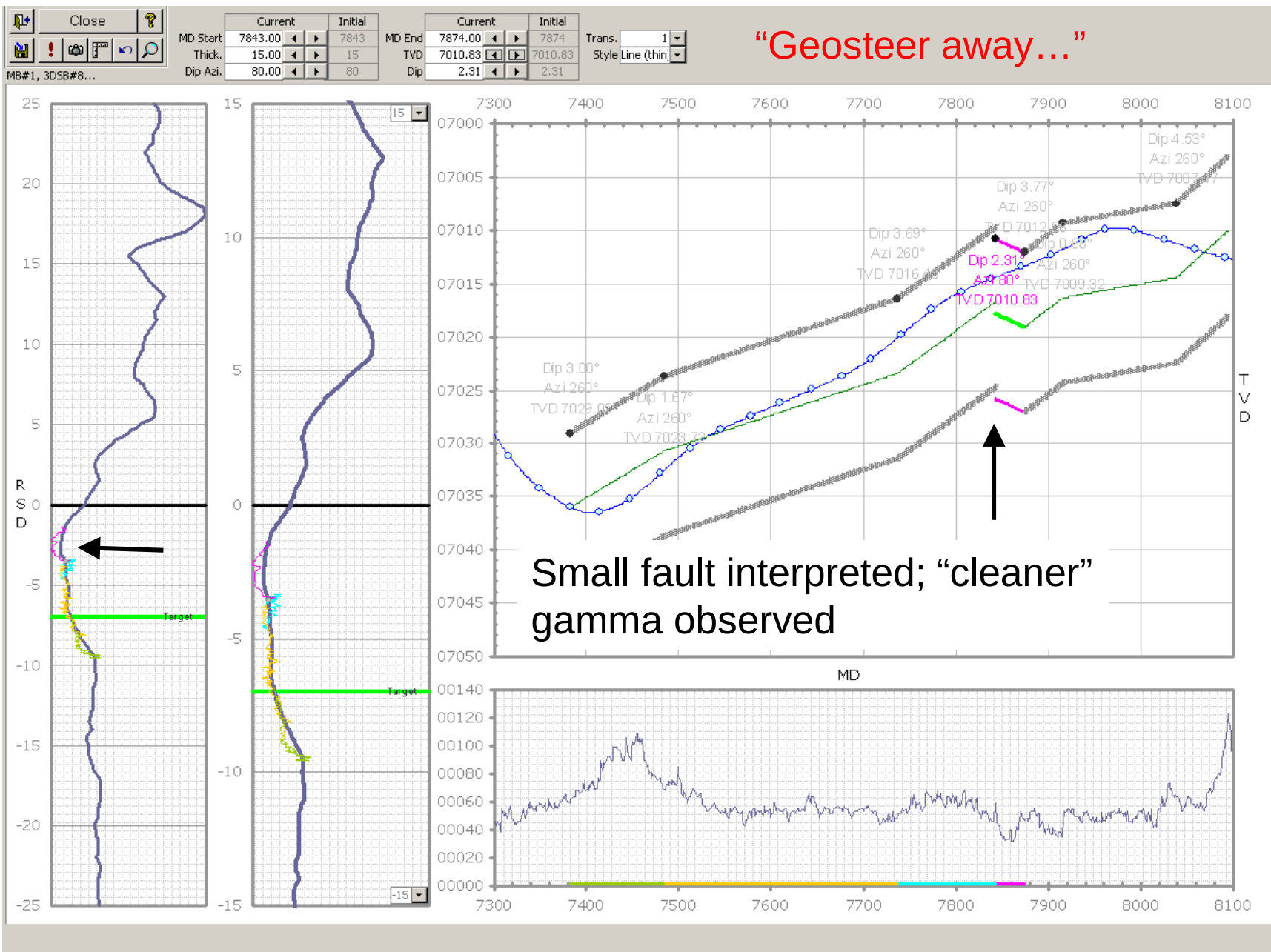


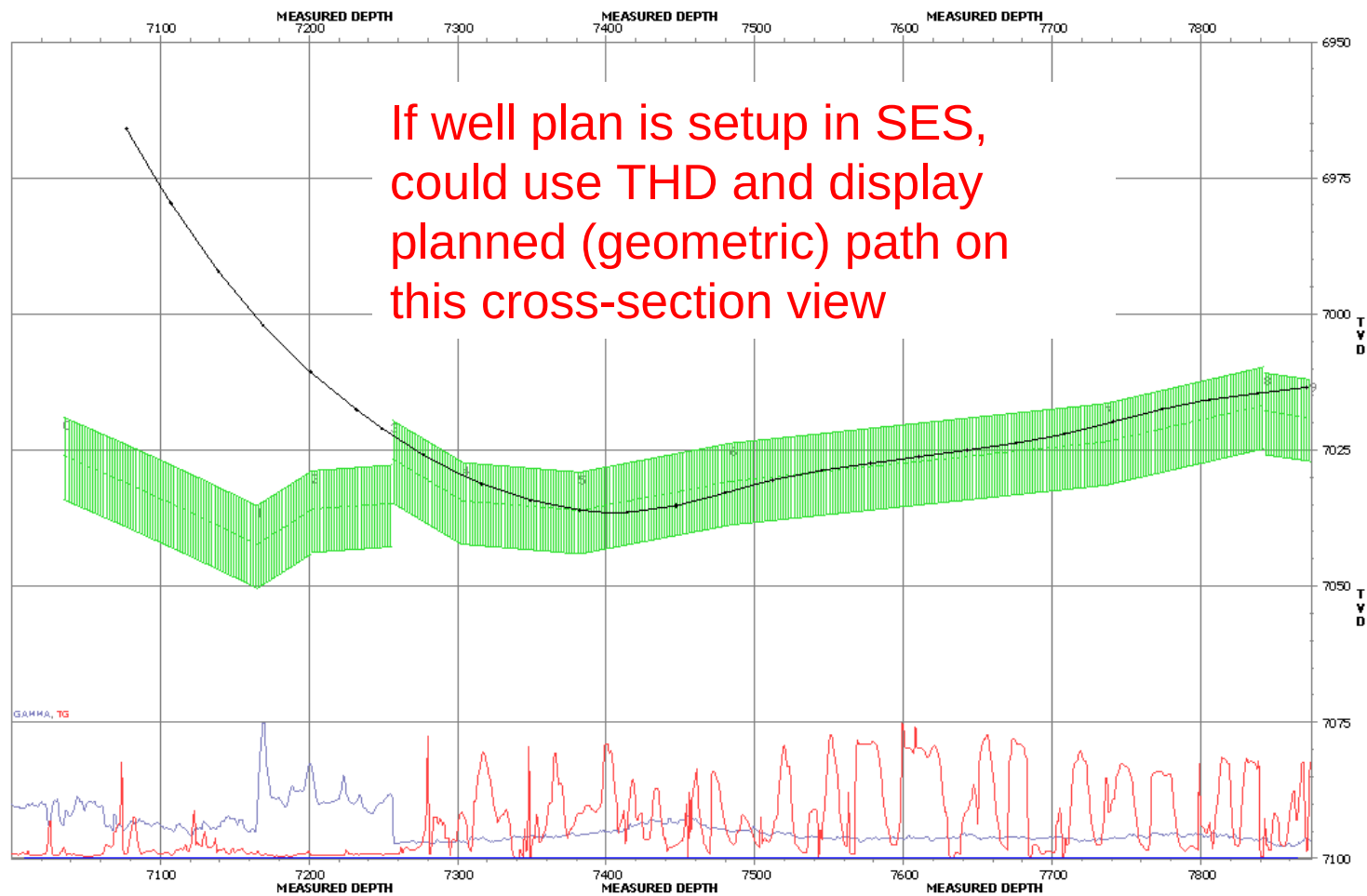
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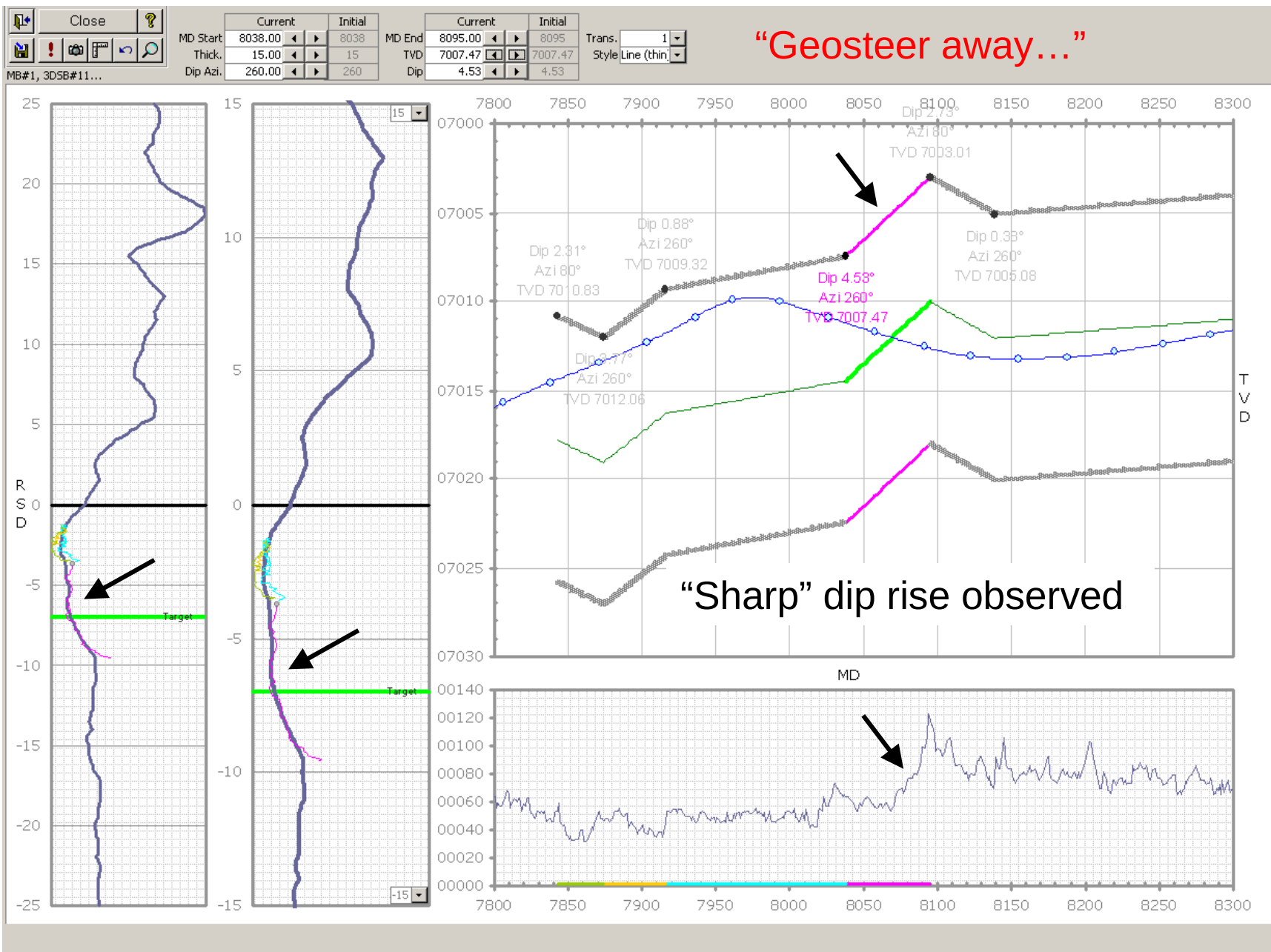
www.makinhole.com

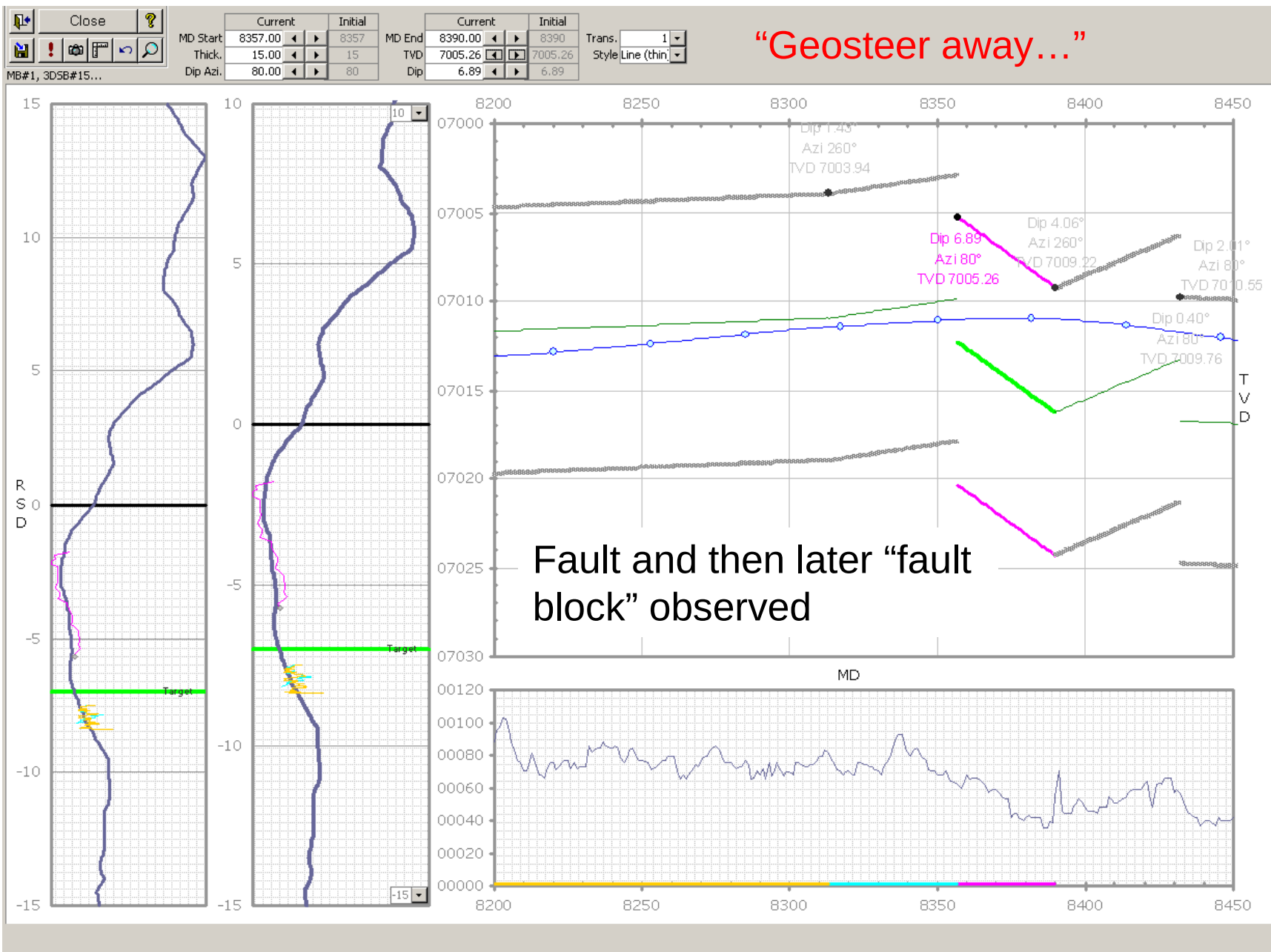


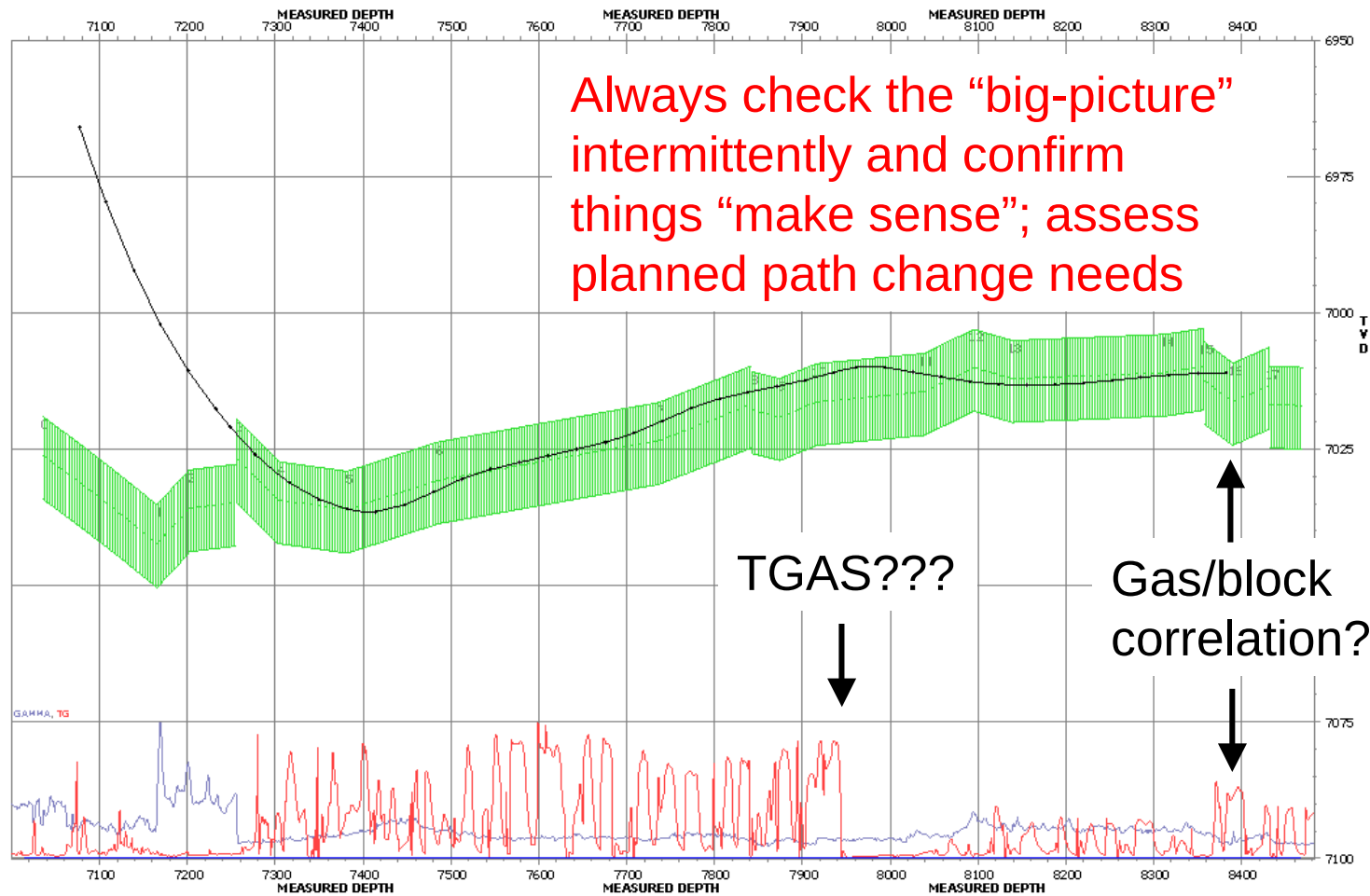






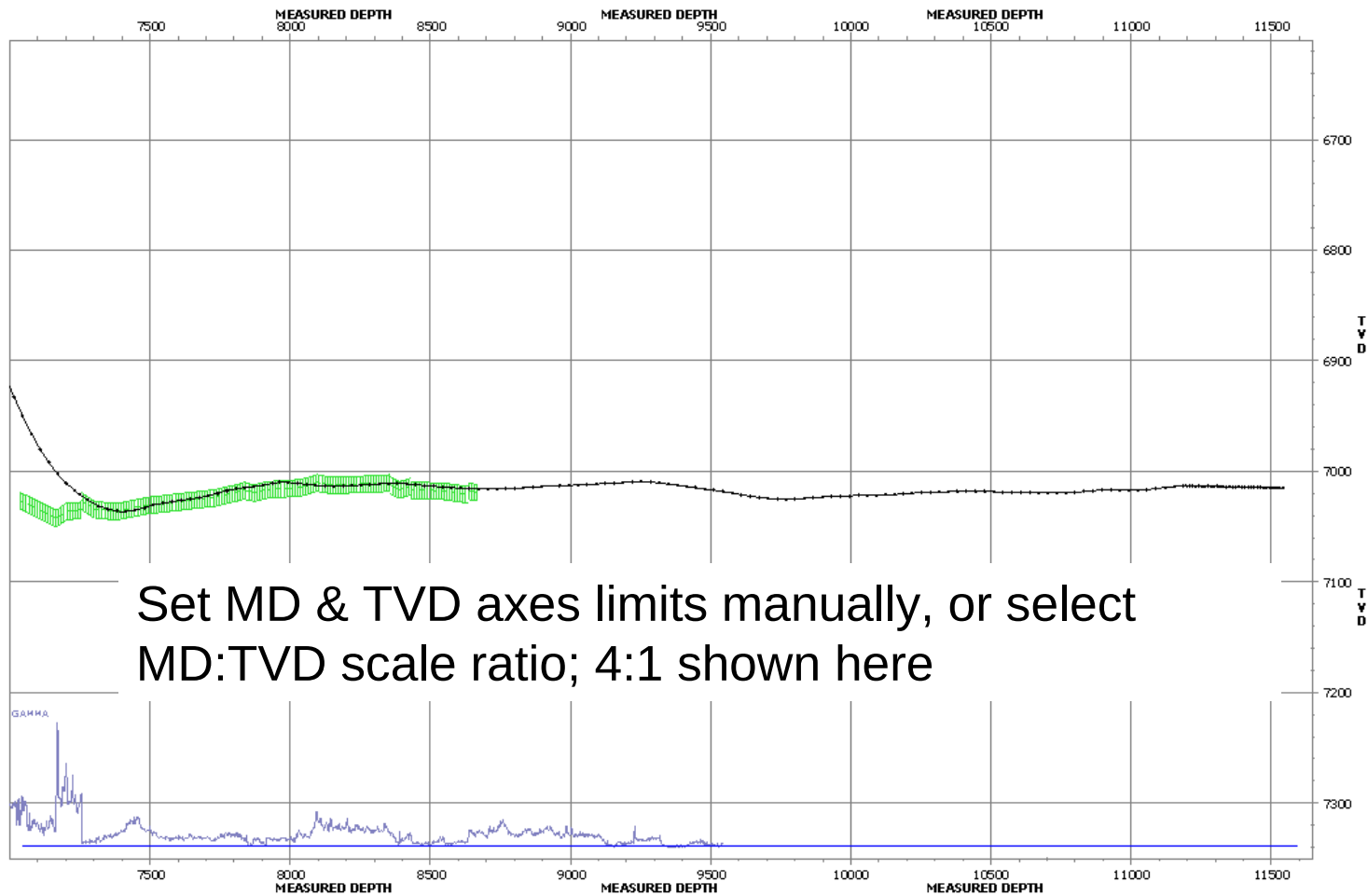






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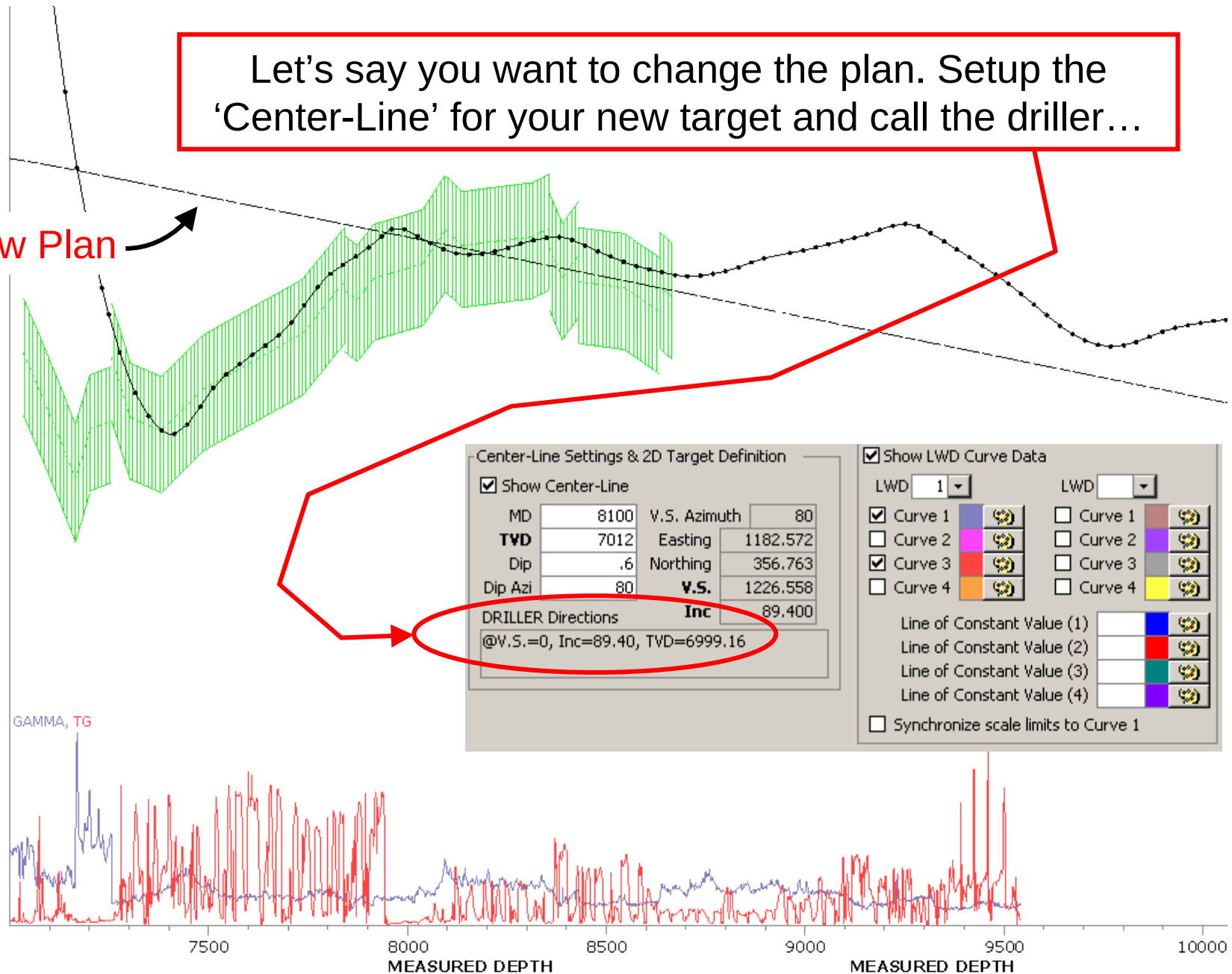


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Let's say you want to change the plan. Setup the 'Center-Line' for your new target and call the driller...

New Plan



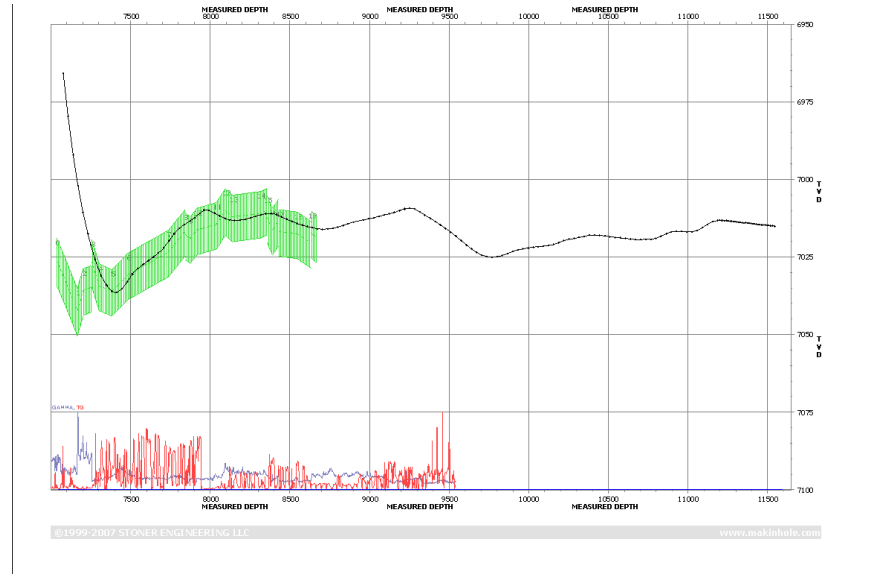
Export Coordinates of Zone Top (@RSD=0) to transfer to other software

MD	TVD	N	E	3DStratBlock	X	Y	Z
7035	7018.9502	72.5695	176.8708	0	1826172.9	16284664	-1738.9502
7078.3333	7024.1045	80.5106	212.9968	0	1826209	16284672	-7024.1045
7121.6667	7029.5278	88.0855	251.1447	0	1826247.1	16284679	-7029.5278
7165	7035.1841	95.6116	290.9988	0	1826287	16284687	-7035.1841
7165	7035.1802	95.6116	290.9988	1	1826287	16284687	-7035.1802
7183.5	7031.9995	98.8107	308.4199	1	1826304.4	16284690	-7031.9995
7202	7028.7886	102.0386	326.0073	1	1826322	16284693	-7028.7886
7202	7028.79	102.0386	326.0073	2	1826322	16284693	-7028.79
7220	7028.4414	105.2013	343.2393	2	1826339.2	16284696	-7028.4414
7238	7028.0908	108.3798	360.5578	2	1826356.6	16284699	-7028.0908
7256	7027.7397	111.5672	377.9162	2	1826373.9	16284703	-7027.7397
7256	7019.4902	111.5672	377.9162	3	1826373.9	16284703	-7019.4902
7280	7023.3931	115.8667	401.1771	3	1826397.2	16284707	-7023.3931
7304	7027.314	120.3548	424.5142	3	1826420.5	16284711	-7027.314
7304	7027.3101	120.3548	424.5142	4	1826420.5	16284711	-7027.3101
7330	7027.8872	125.5096	449.8291	4	1826445.8	16284717	-7027.8872
7356	7028.4658	130.9318	475.1793	4	1826471.2	16284722	-7028.4658
7382	7029.0454	136.6061	500.5138	4	1826496.5	16284728	-7029.0454
7382	7029.0498	136.6061	500.5138	5	1826496.5	16284728	-7029.0498
7416	7027.2725	144.6228	533.5453	5	1826529.5	16284736	-7027.2725
7450	7025.4971	153.0764	566.4463	5	1826562.4	16284744	-7025.4971
7484	7023.7241	161.1944	599.3679	5	1826595.4	16284752	-7023.7241
7484	7023.7202	161.1944	599.3679	6	1826595.4	16284752	-7023.7202
7534.4	7022.2593	174.0449	647.979	6	1826644	16284765	-7022.2593
7584.8	7020.8022	188.8625	696.1085	6	1826692.1	16284780	-7020.8022
7635.2	7019.3462	203.897	744.1764	6	1826740.2	16284795	-7019.3462

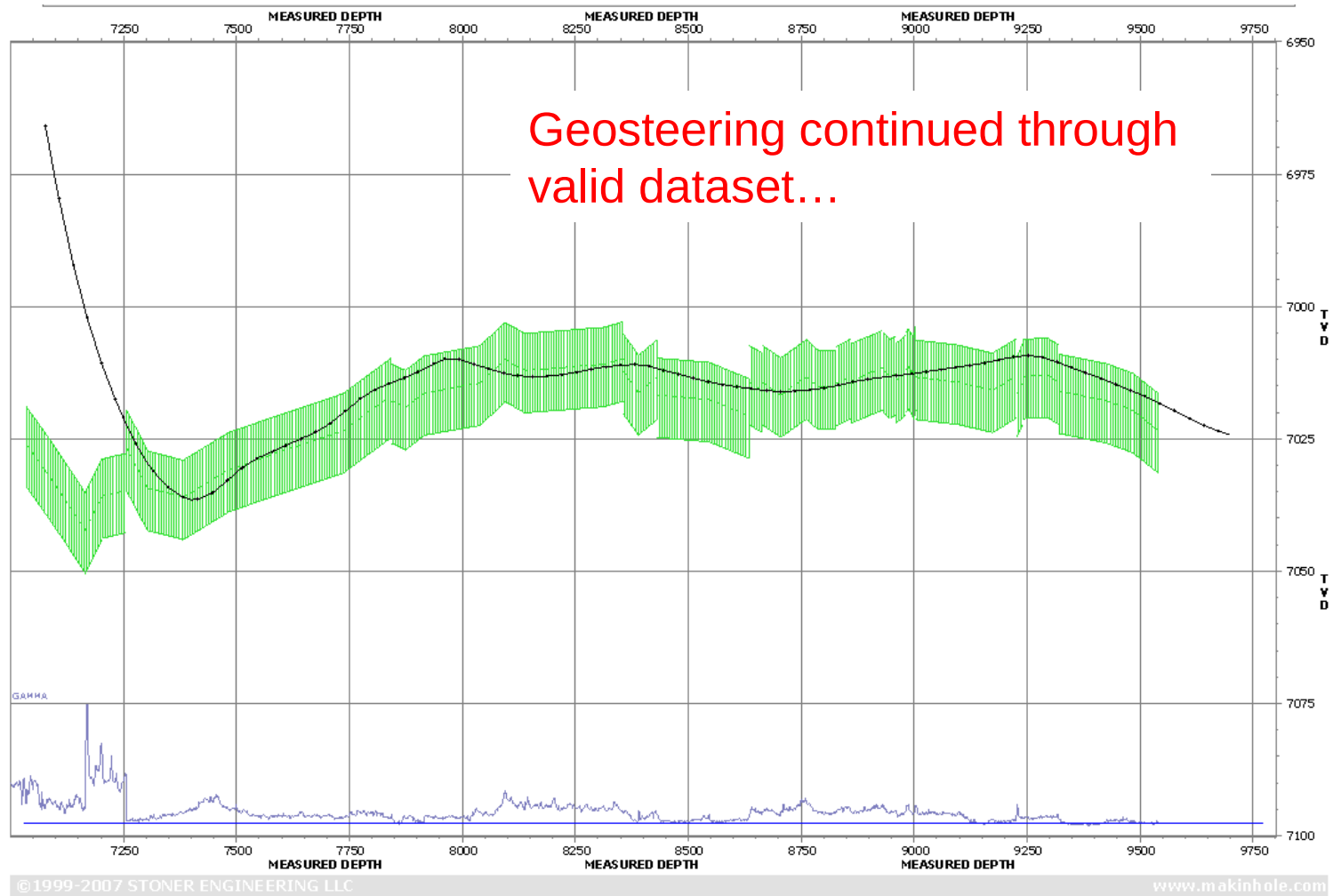
Export table of In/Out-of-Zone flag for Reservoir Simulation

MD	TVD	N	E	RelativeZone(0=InZone;1=AboveZone;-1=BelowZone;...)
7000	6923.743	66.1637	149.0668	
7014	6932.055	68.7169	160.0386	
7045	6949.4777	74.3943	185.0385	1
7077	6965.9083	80.2648	211.857	1
7100	6976.5652	84.3806	231.8159	1
7107	6979.5959	85.58	238.0107	1
7139	6992.1737	91.0922	266.9067	1
7169	7002.0379	96.3017	294.7495	1
7200	7010.4262	101.6883	324.0987	1
7201	7010.669	101.8634	325.0528	1
7232	7017.5629	107.319	354.7779	1
7249	7020.9667	110.3257	371.16	1
7277	7025.9007	115.3245	398.2625	0
7300	7029.1898	119.5883	420.6225	0
7316	7031.1596	122.6983	436.193	0
7349	7034.1502	129.4467	468.3533	0
7382	7035.9923	136.6061	500.5138	0
7400	7036.491	140.7434	518.0237	0
7414	7036.4391	144.1287	531.6076	0
7447	7035.2011	152.3291	563.5462	0
7480	7032.8704	160.2646	595.4915	0
7500	7031.3055	165.0334	614.8512	0
7512	7030.471	168.0383	626.4388	0
7545	7028.715	177.0934	658.1202	0
7578	7027.4194	186.8442	689.6201	0
7600	7026.5881	193.3566	710.6176	0
7610	7026.2189	196.3002	720.1675	0
7643	7024.9809	206.326	751.5826	0
7676	7023.6852	217.034	782.7693	0
7700	7022.5181	225.09	805.3464	0
7708	7022.0384	227.7803	812.8652	0

- Geologists familiar with the play and privy to all data sources can produce the most-likely interpretation(s)
- 3D Technical geosteering software (SES), when correctly applied, may enable a quantum leap of interpretation confidence compared to legacy geosteering methods that rely only on drafting tools

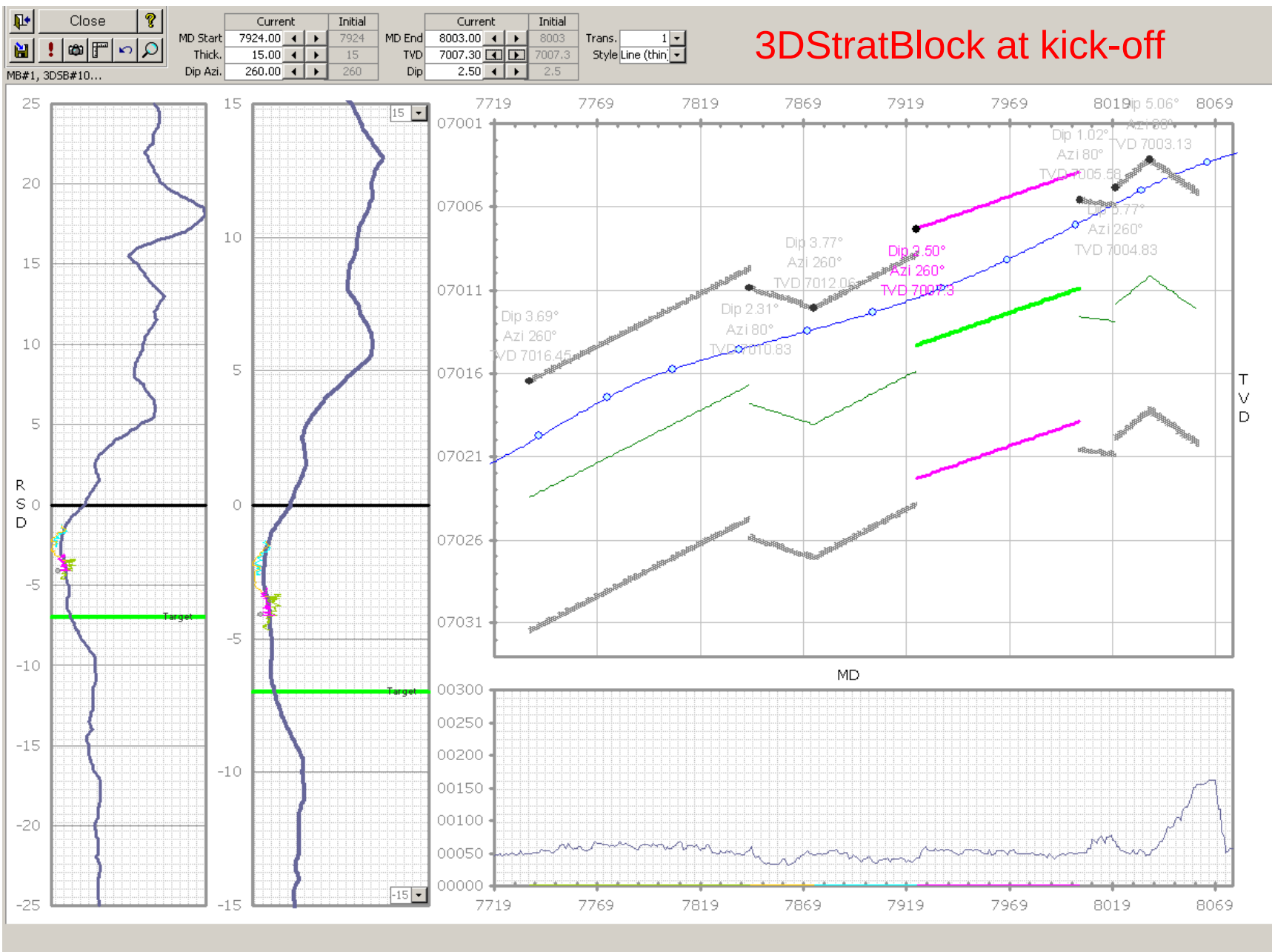


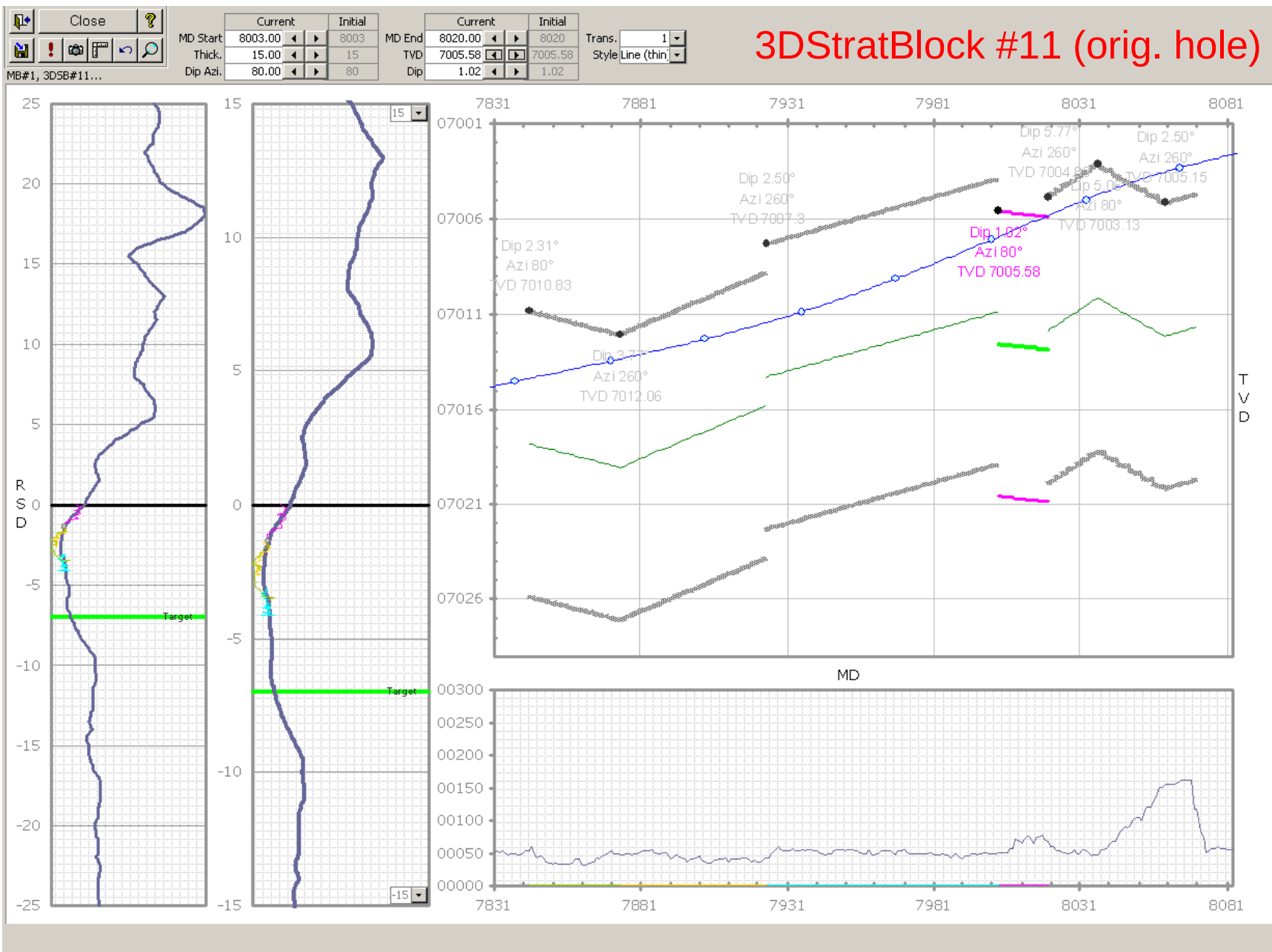
Mike Stoner, Ph.D.
Founder & Managing Director
Stoner Engineering LLC
www.makinhole.com

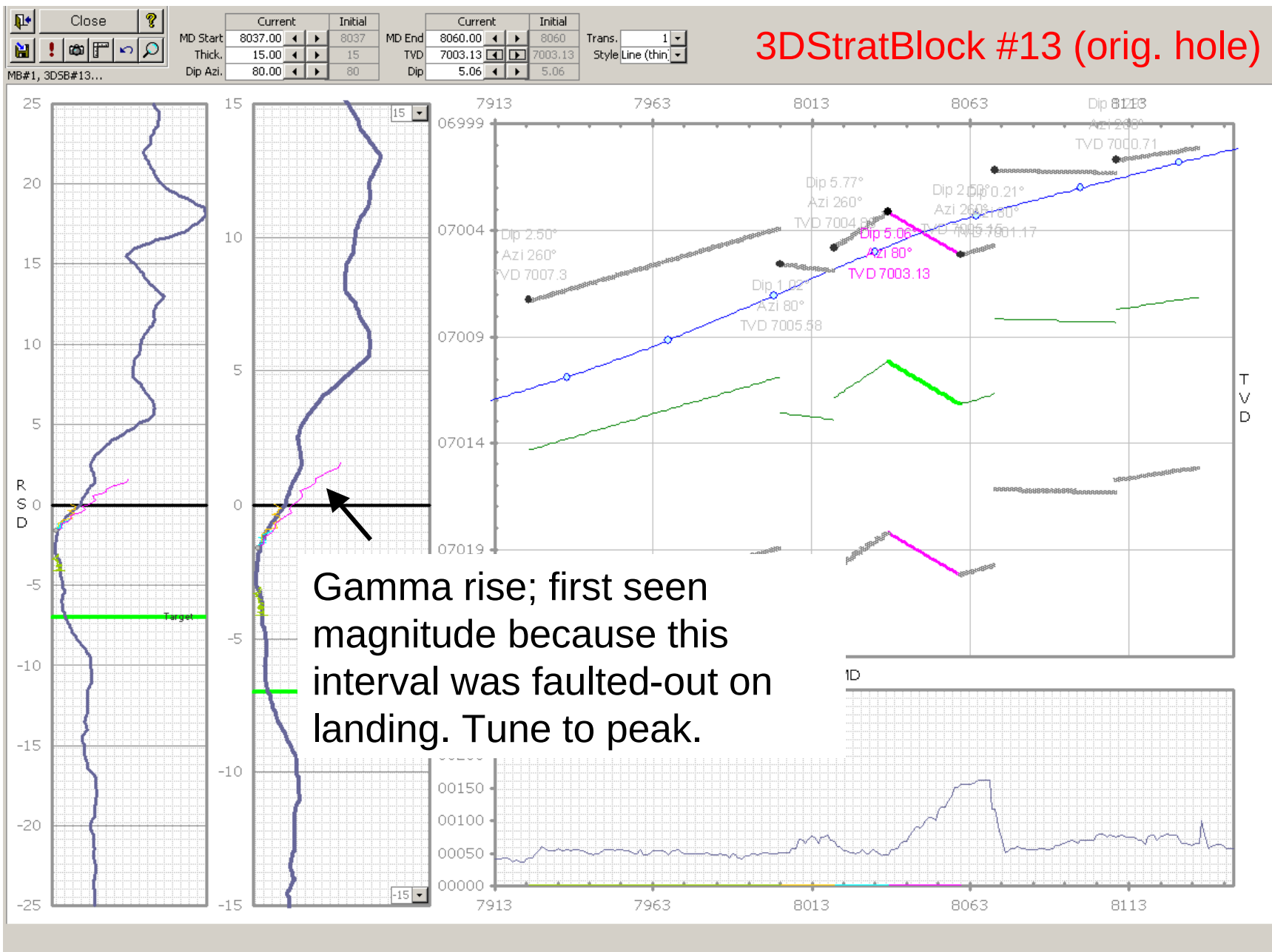


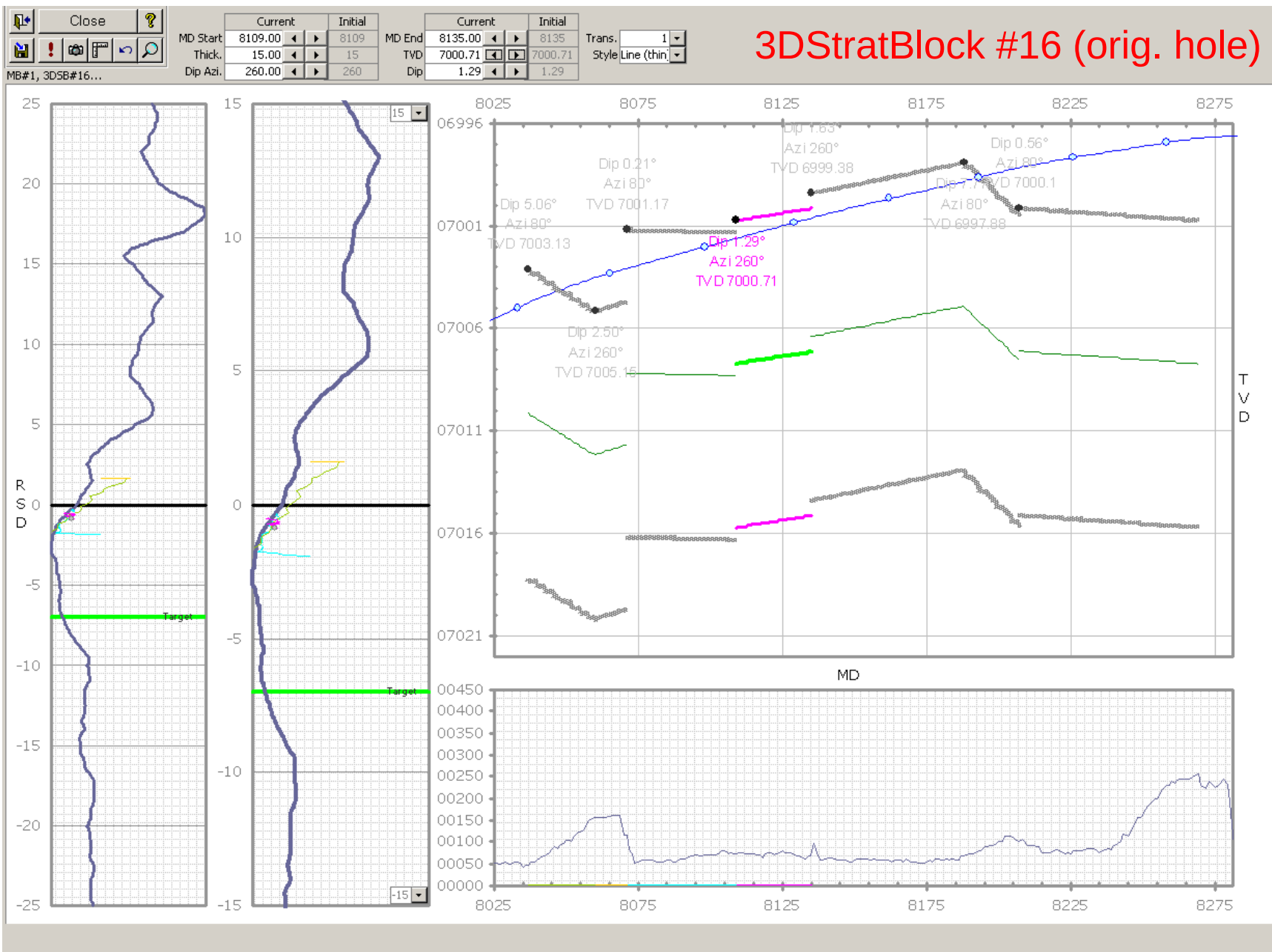
New Information

- Last hole was a Sidetrack
- Now geosteer Original Hole Data and observe interpretation differences (if any)
- Could Technical Geosteering have helped eliminate the sidetrack?

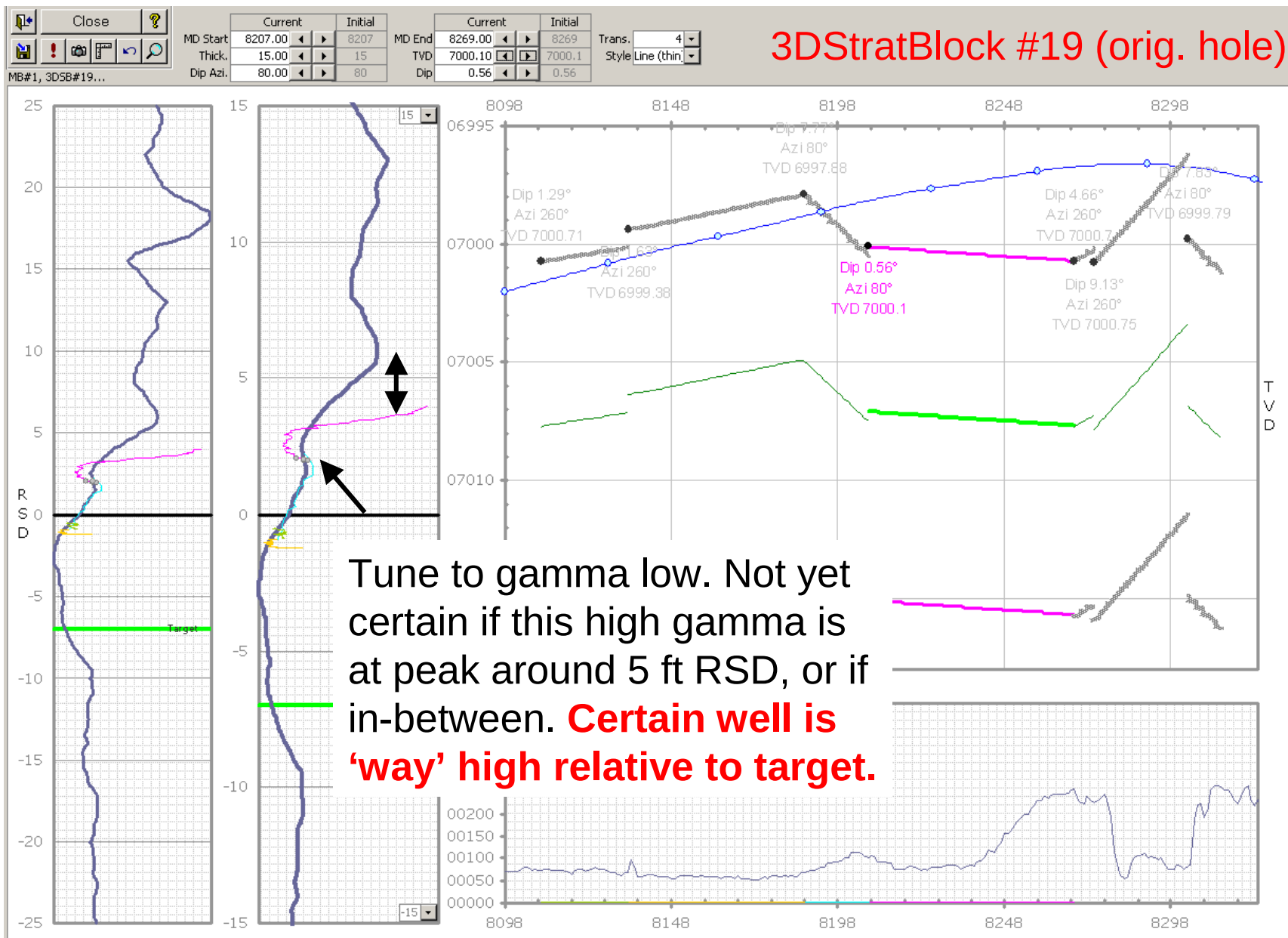


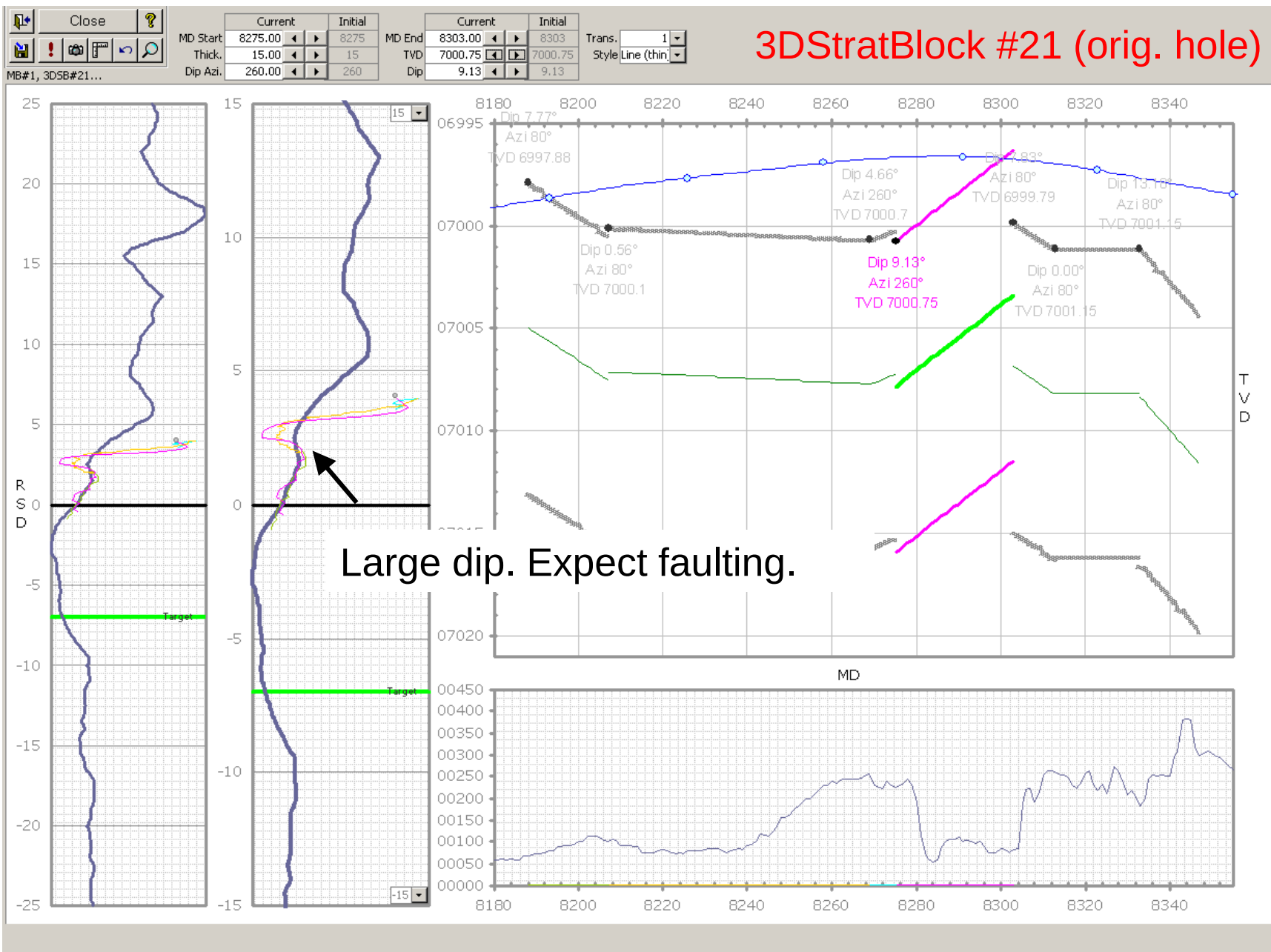


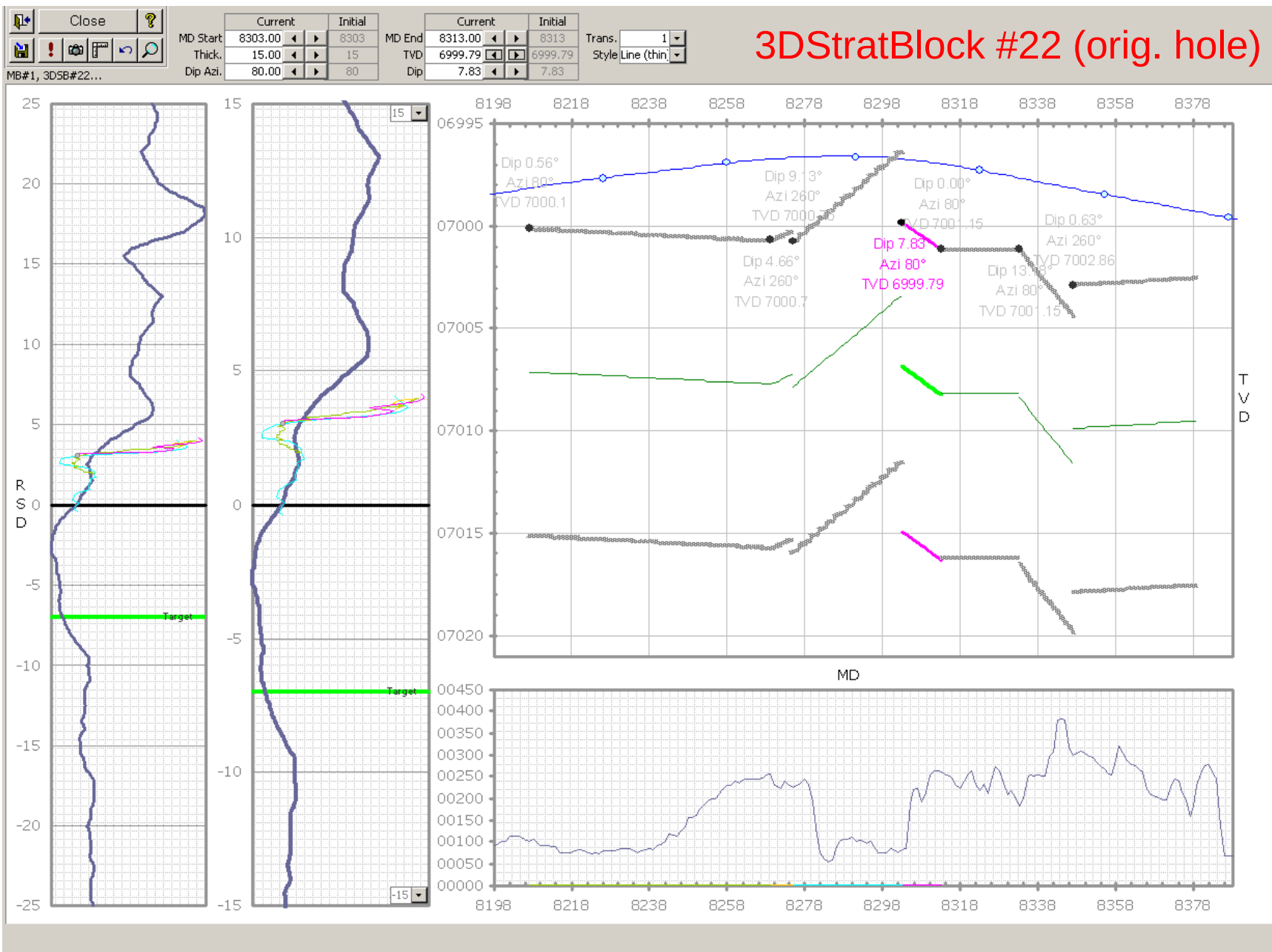


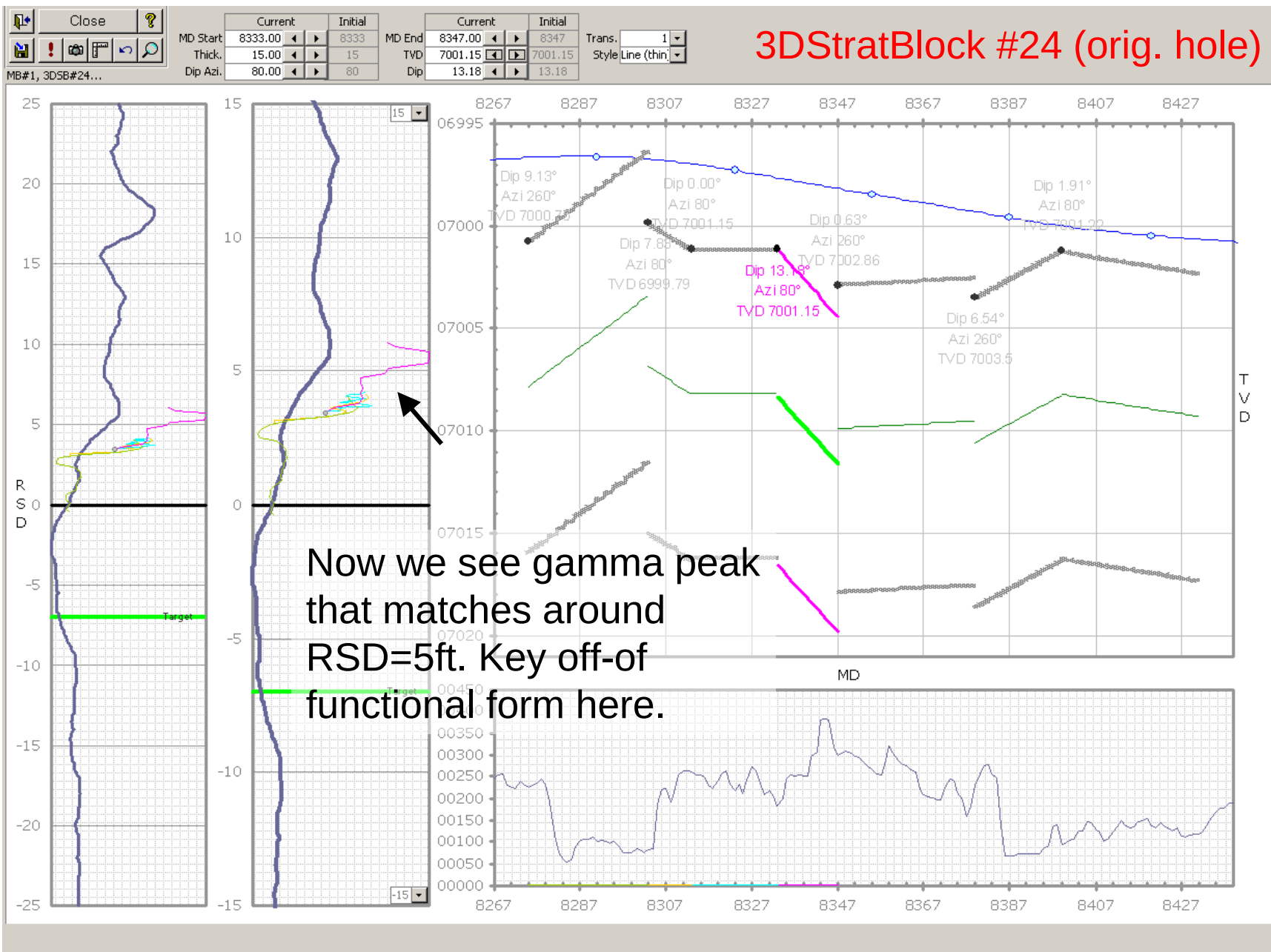


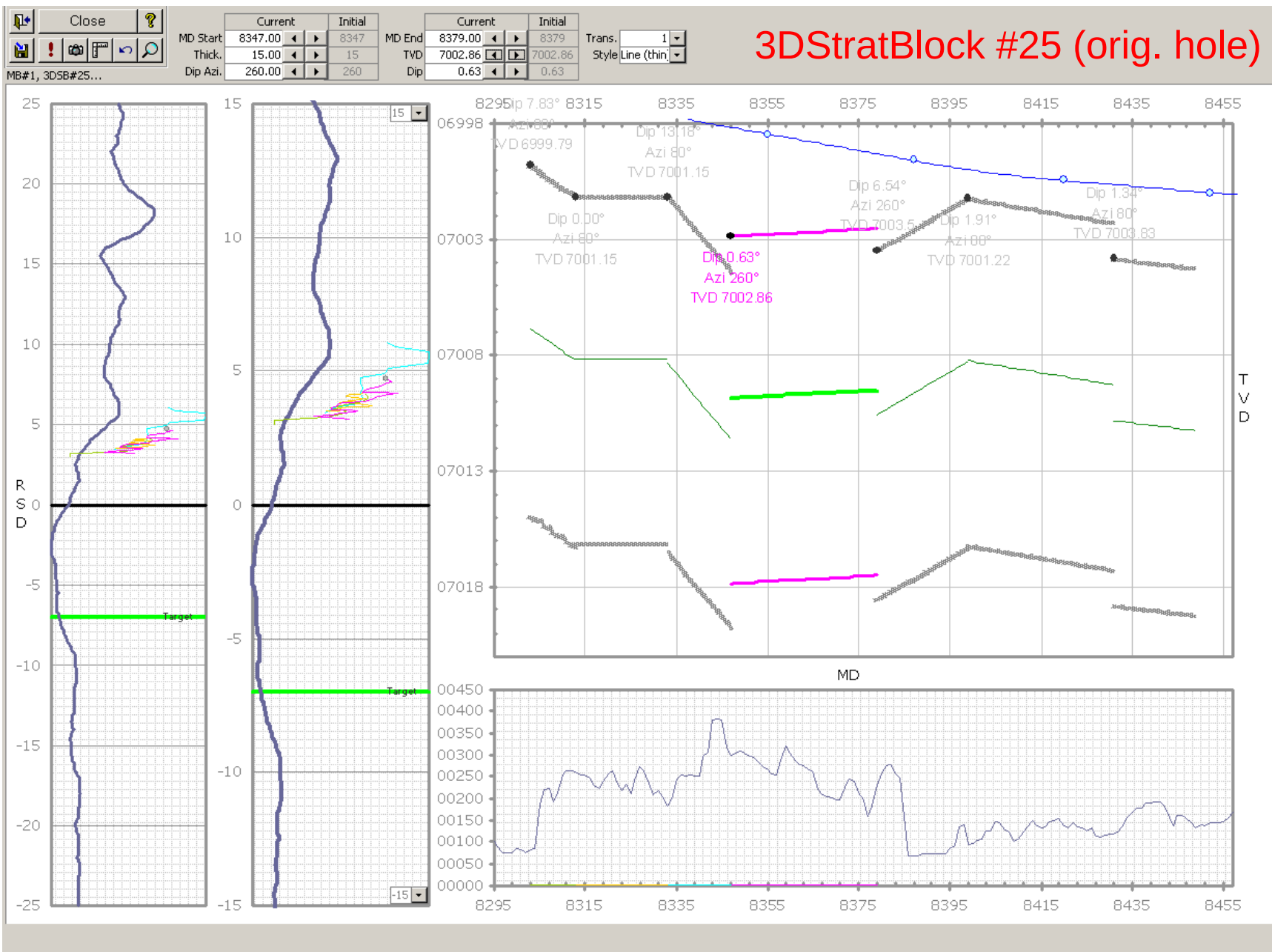
3DStratBlock #19 (orig. hole)

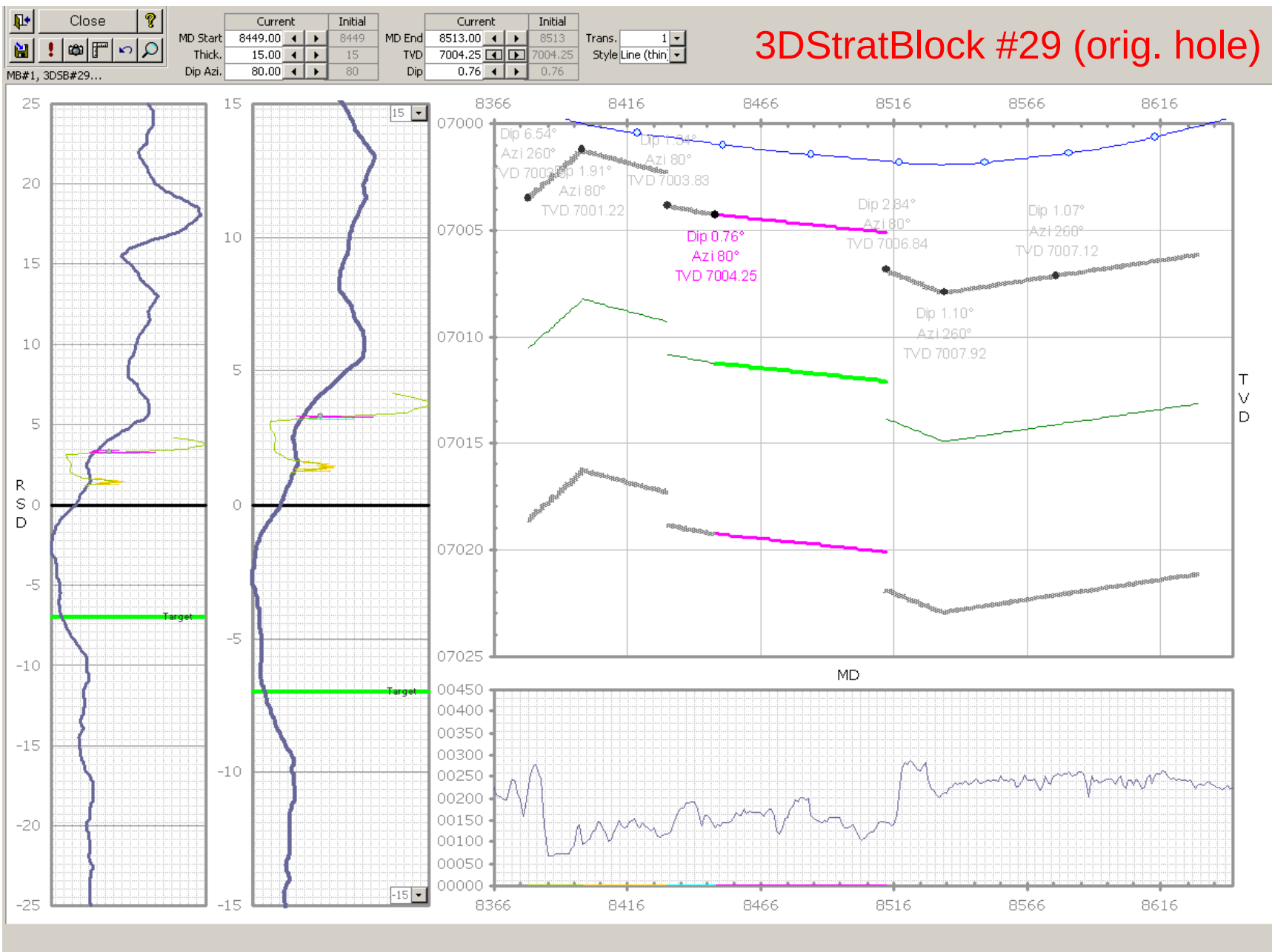


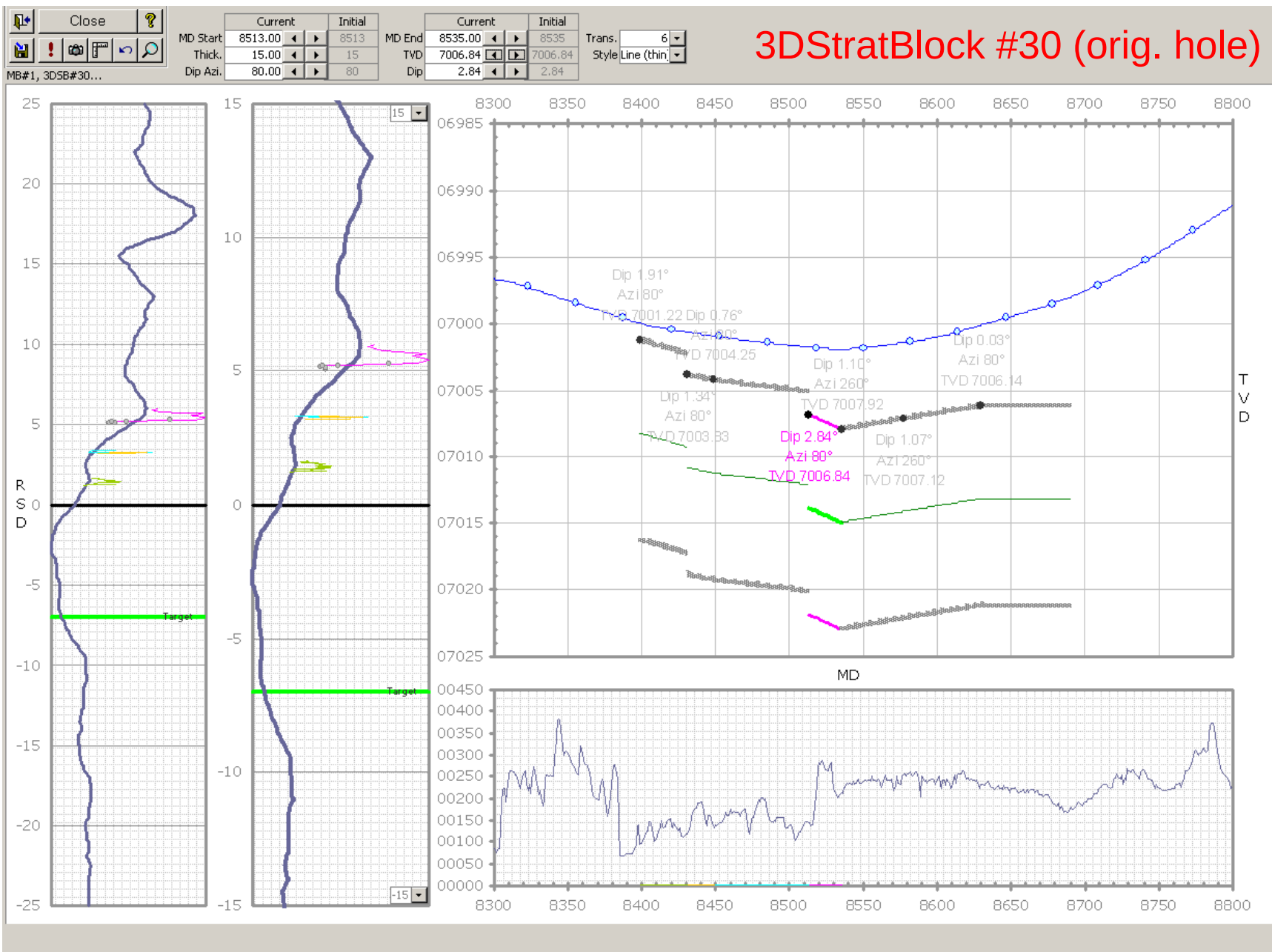


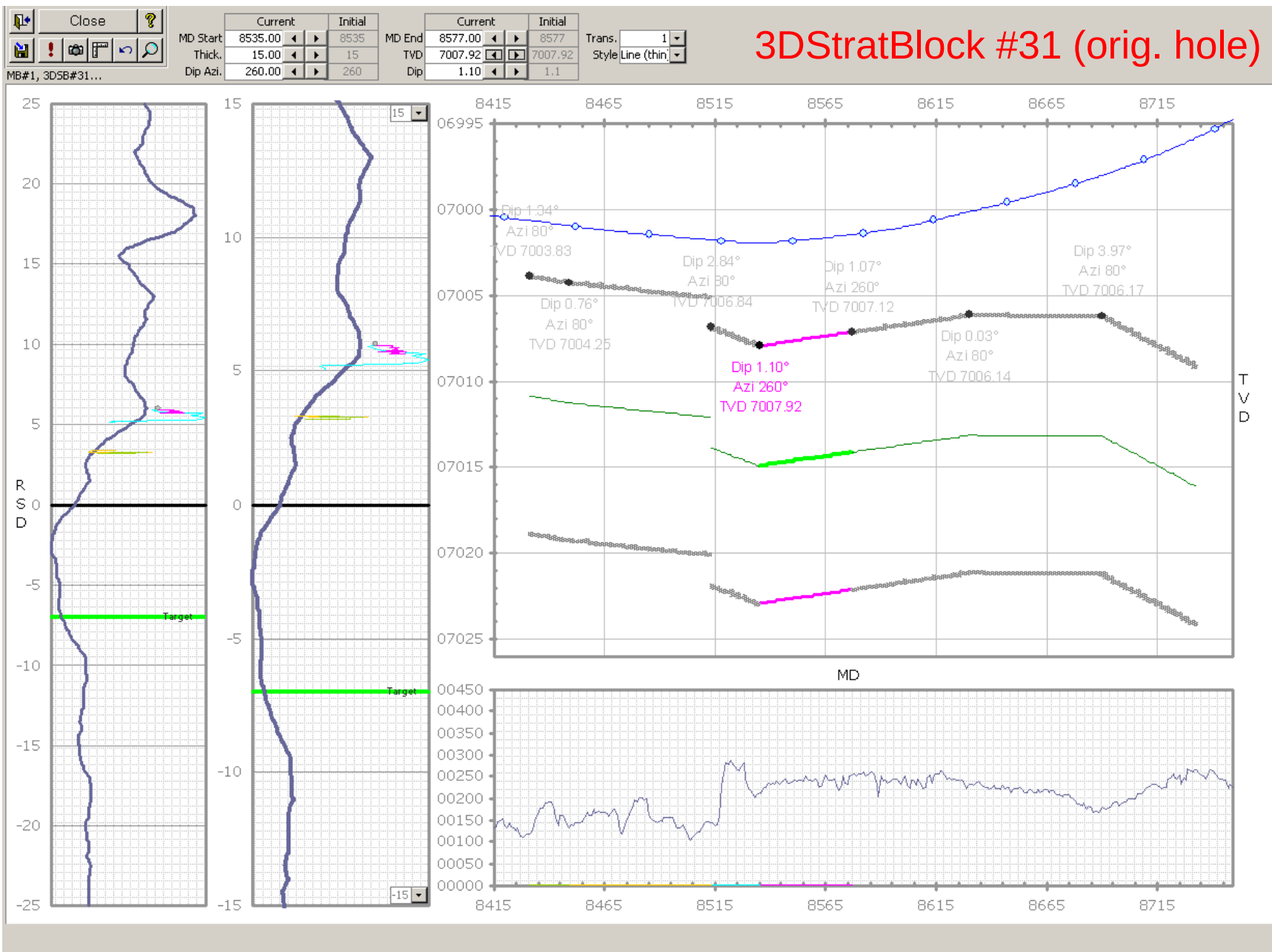


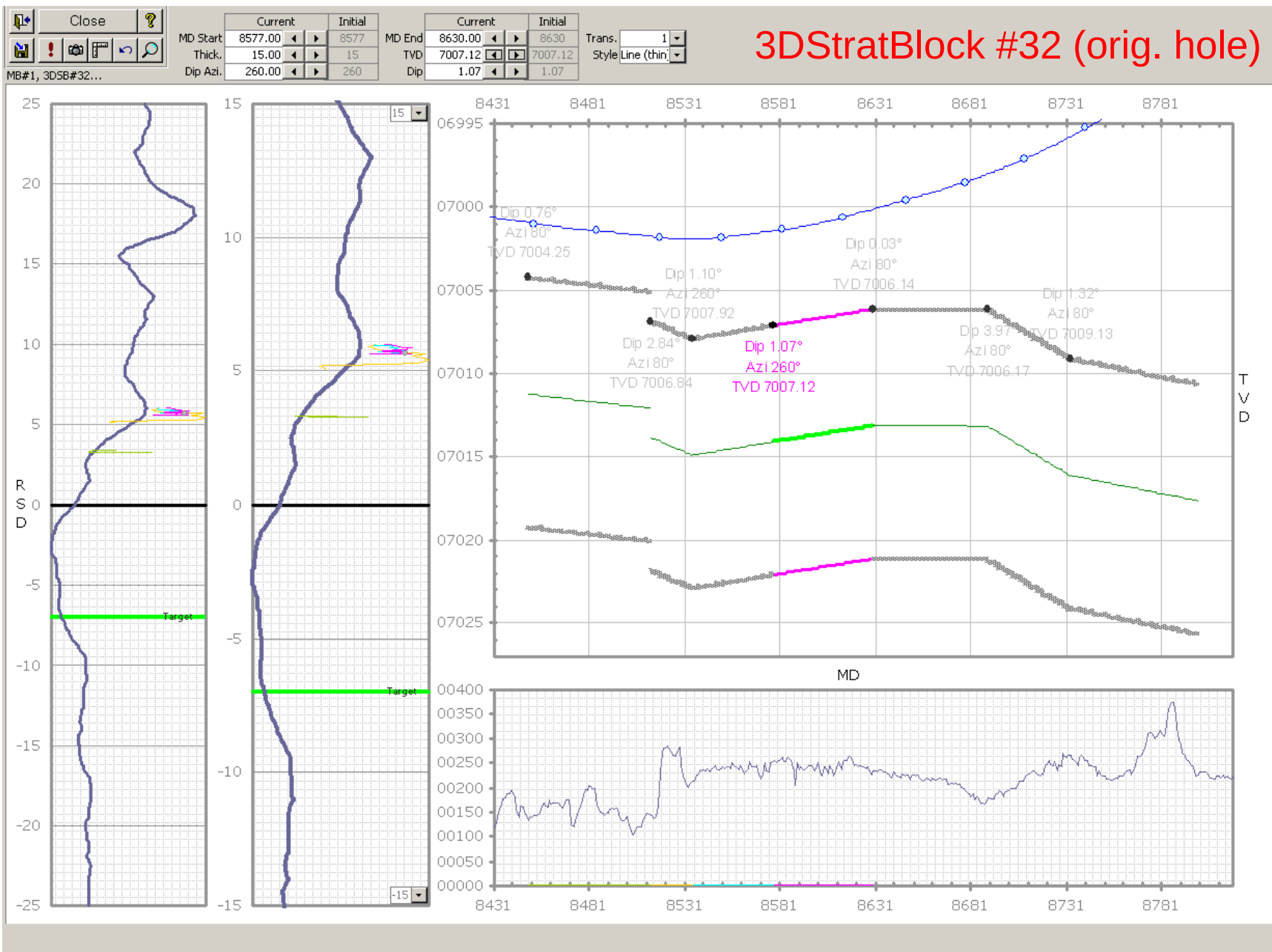


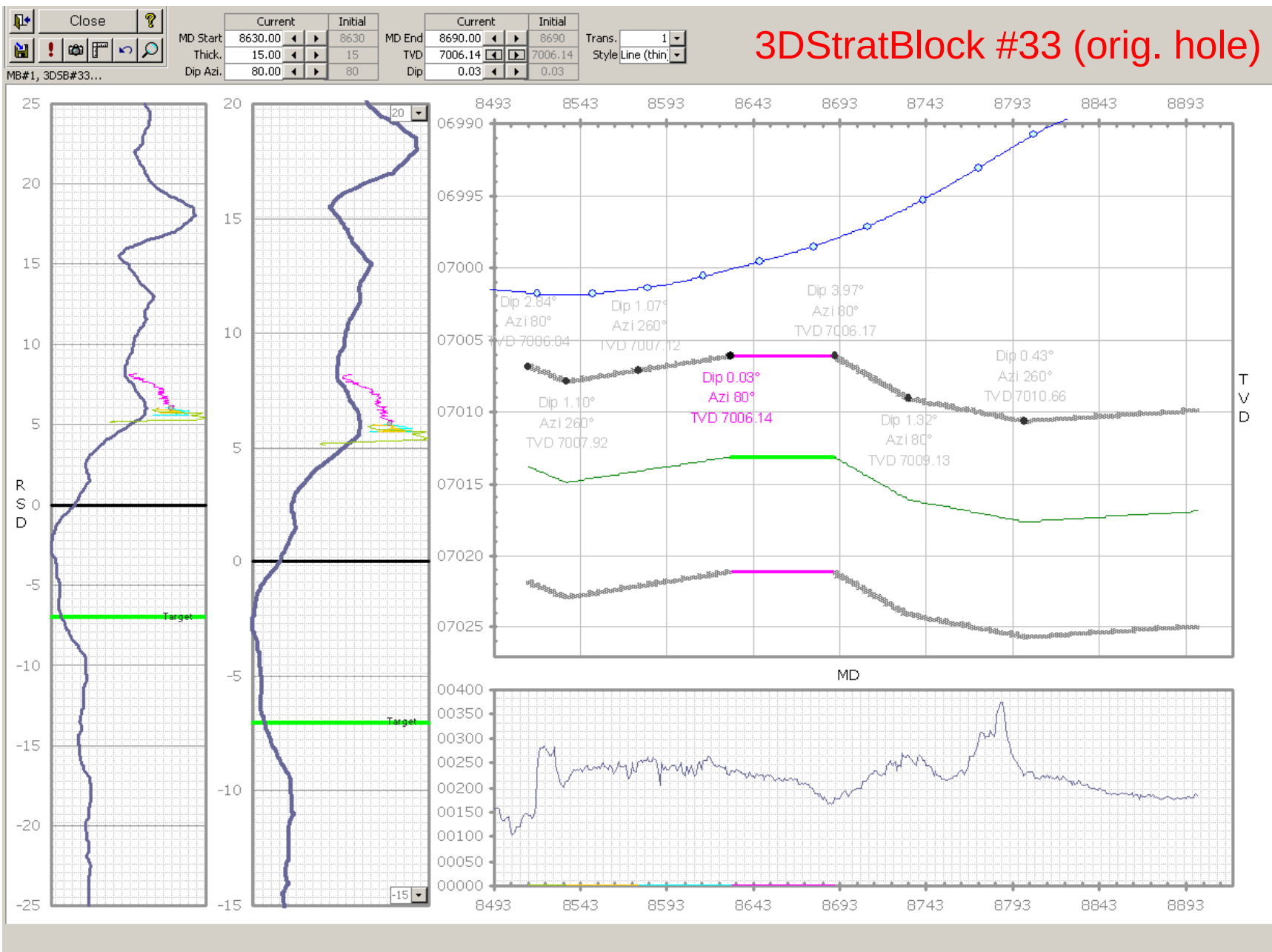


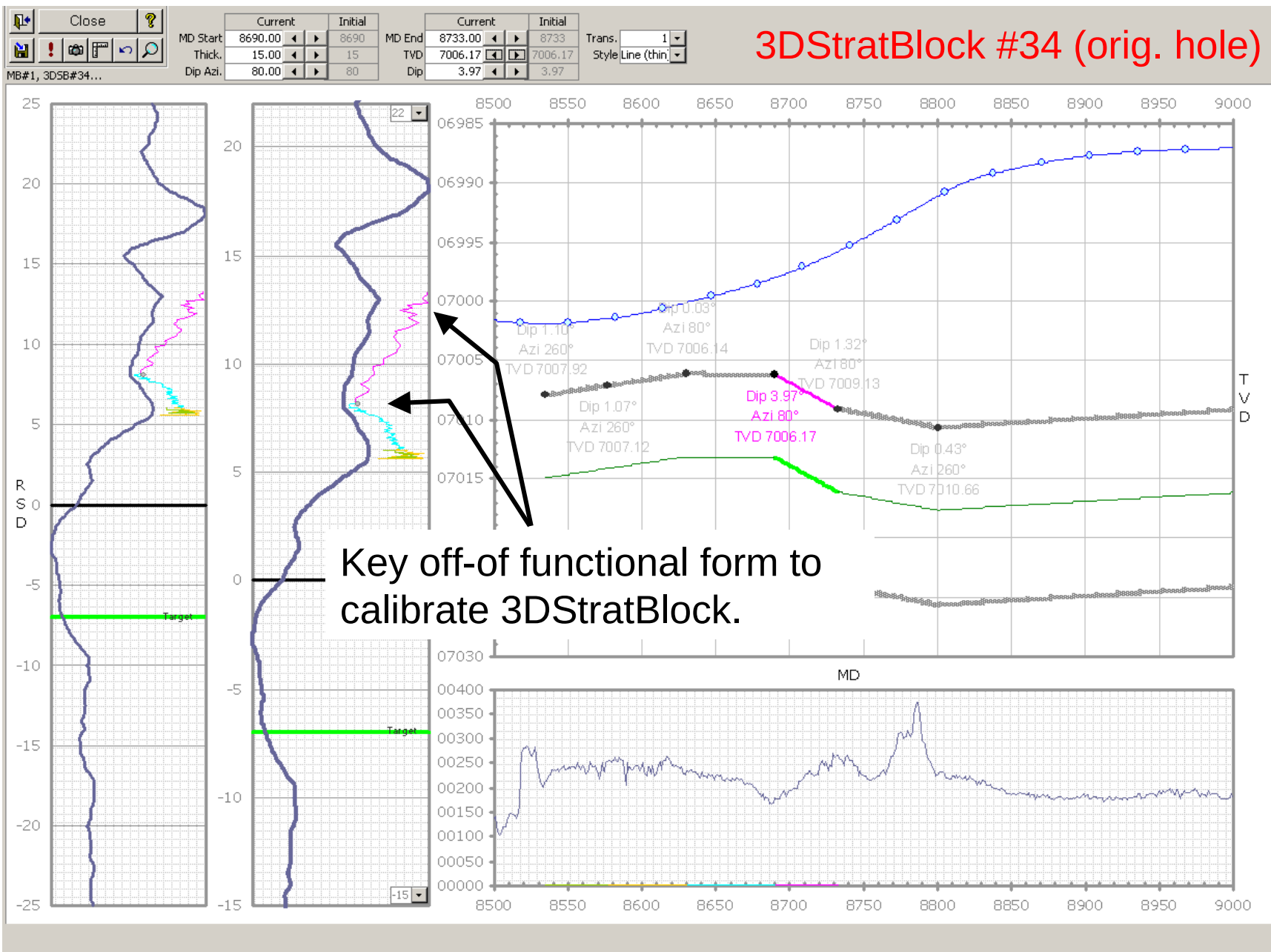


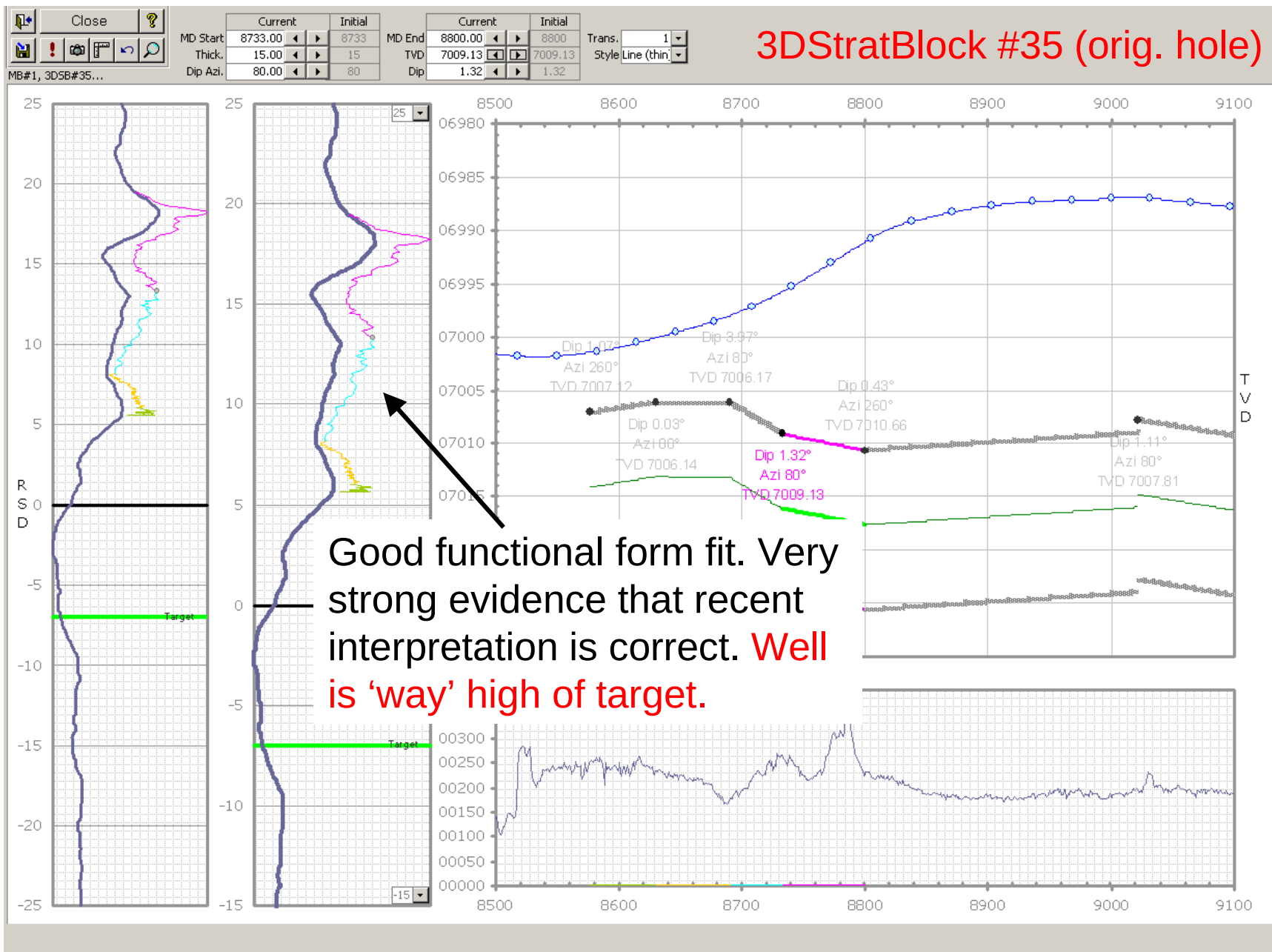


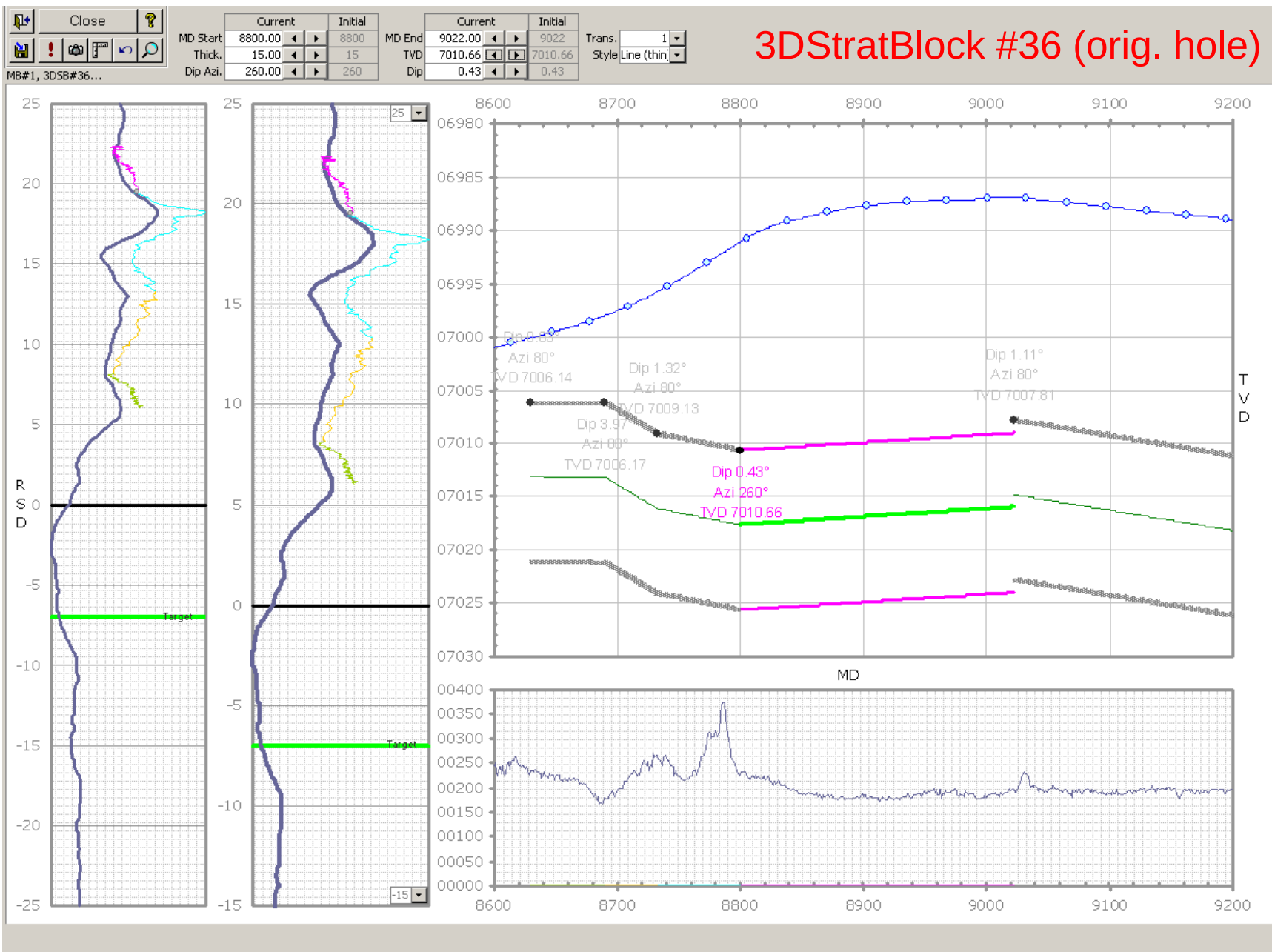




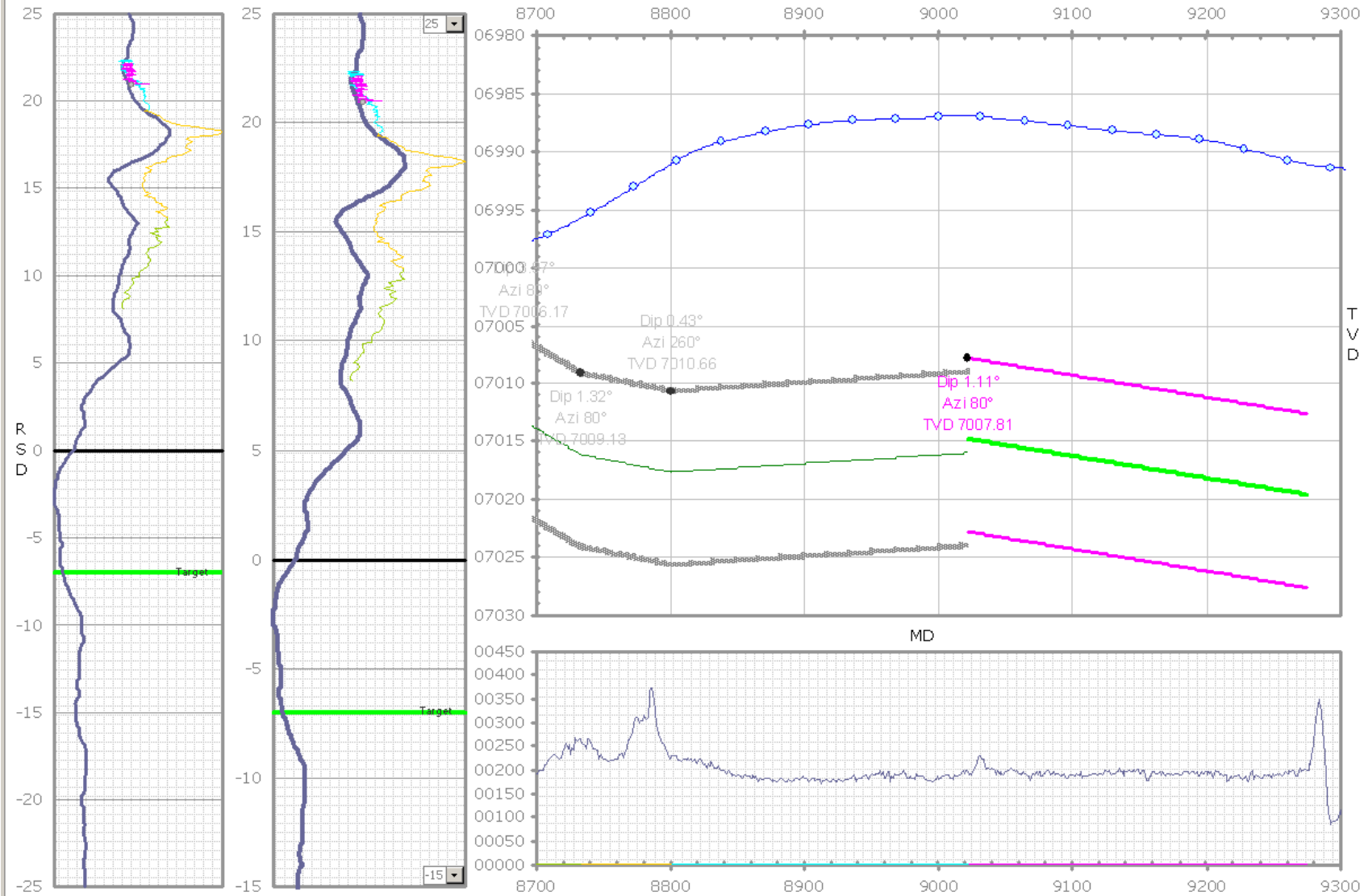


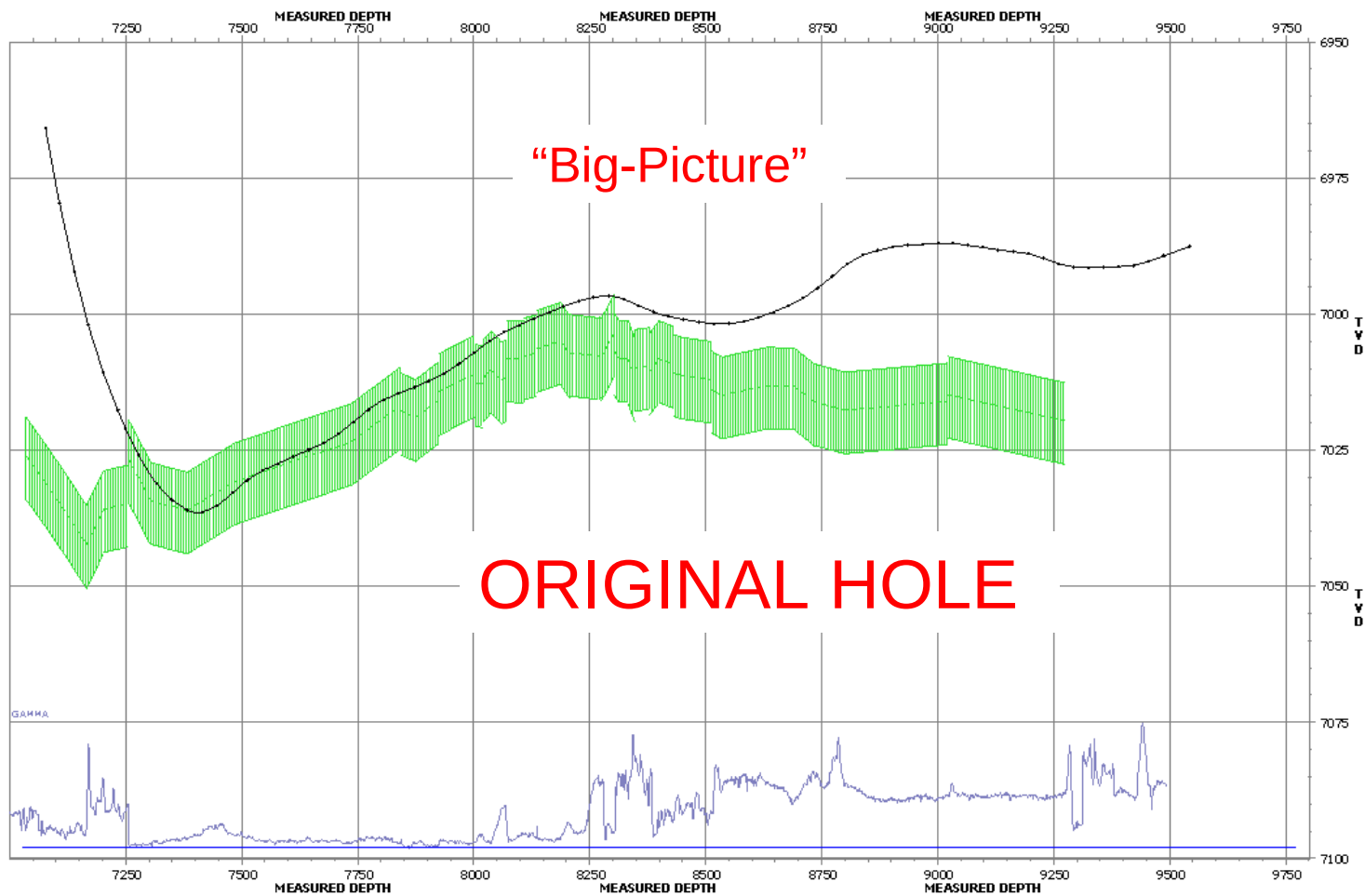






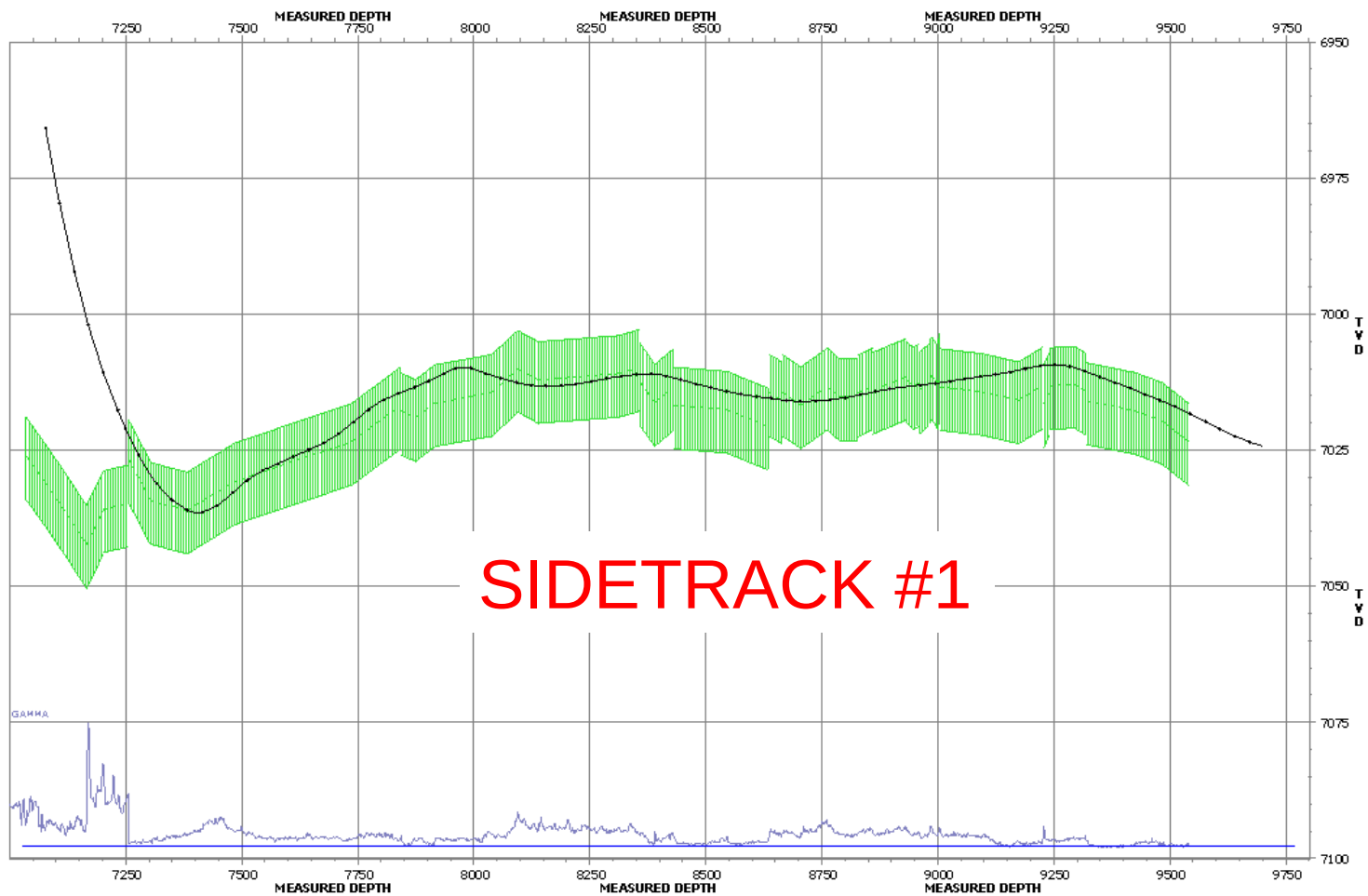
Close		<table border="1"> <thead> <tr> <th>Current</th> <th>Initial</th> </tr> </thead> <tbody> <tr> <td>MD Start 9022.00</td> <td>9022</td> </tr> <tr> <td>Thick. 15.00</td> <td>15</td> </tr> <tr> <td>Dip Azi. 80.00</td> <td>80</td> </tr> </tbody> </table>		Current	Initial	MD Start 9022.00	9022	Thick. 15.00	15	Dip Azi. 80.00	80	<table border="1"> <thead> <tr> <th>Current</th> <th>Initial</th> </tr> </thead> <tbody> <tr> <td>MD End 9275.00</td> <td>9275</td> </tr> <tr> <td>TVD 7007.81</td> <td>7007.81</td> </tr> <tr> <td>Dip 1.11</td> <td>1.11</td> </tr> </tbody> </table>		Current	Initial	MD End 9275.00	9275	TVD 7007.81	7007.81	Dip 1.11	1.11	Trans. 1
Current	Initial																					
MD Start 9022.00	9022																					
Thick. 15.00	15																					
Dip Azi. 80.00	80																					
Current	Initial																					
MD End 9275.00	9275																					
TVD 7007.81	7007.81																					
Dip 1.11	1.11																					
				Style Line (thin)																		





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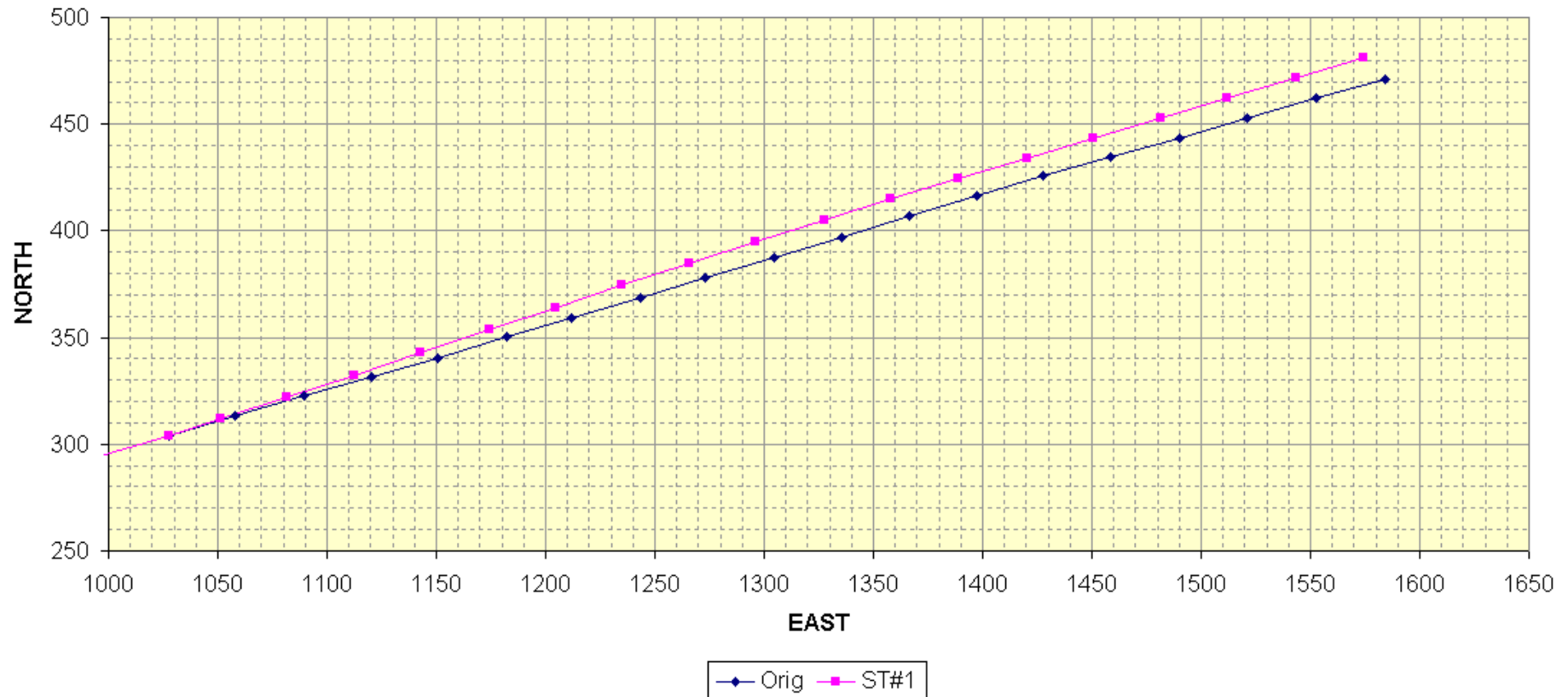


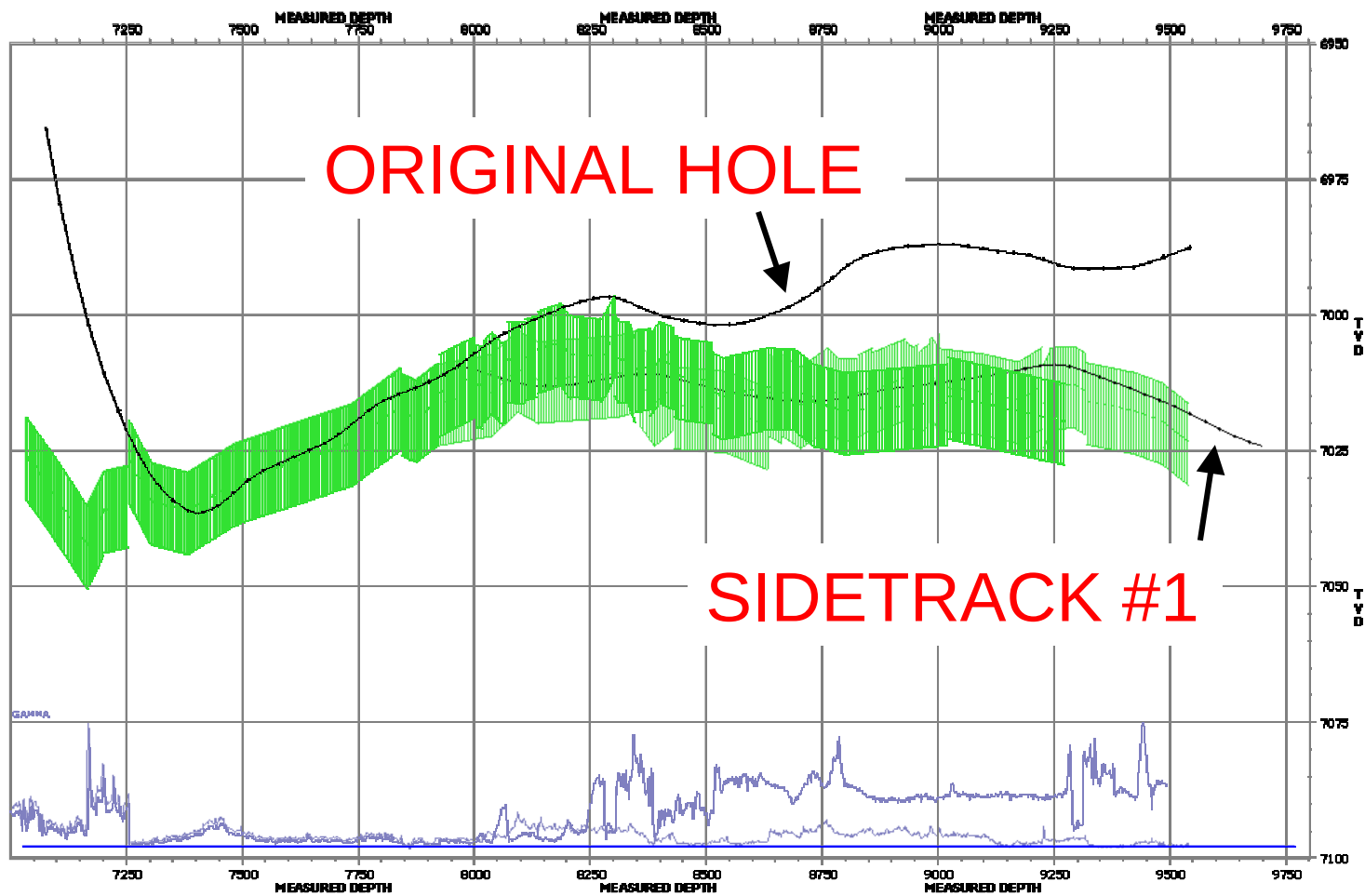
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Why does SIDETRACK payzone location differ from ORIGINAL hole payzone location?

- Technical Geosteering is a method of estimation. There is uncertainty. Interpretation accuracy is dependent on accuracy of type log.
- A sidetrack samples a different part of the reservoir. It may be that reservoirs are (much?) more 'complex' than usually thought, even over short lateral distances.





SES 3.1 (OCT 2007)

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