Comparison of SPEARn Y-values (Heights)

Alignment Engineering Group October 2002

Units: meters

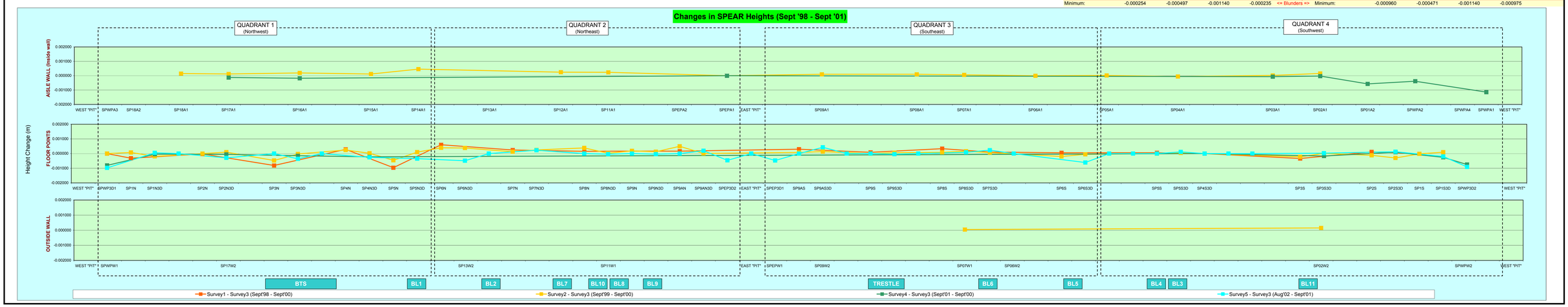
			delta 1		delta 2		delta 3		delta 4	
			(Note: Removed Girders G) HEIGHTS.OUT 9/14/1998 E:\YARD\SPEAR\ADJUST\SRV6\		(Note: Removed Girders G) HEIGHTS.OUT 9/20/1999 E:\YARD\SPEAR\ADJUST\SRV12\		REDONE: Actual survey was SEPT 2000 (Note: Removed Girders G) DEFORM2.OUT 6/7/2001 Sep-00 E:\YARD\SPEAR\ADJUST\SRV14\		REDONE: Two heights were fixed (Note: Removed Girders G) LEVEL.OUT 9/28/2001 E:\YARD\SPEAR\ADJUST\SRV1\		Incoherent loops eliminated in adjustment (Note: Didn't need to remove Girders G) LEVELS.OUT 8/16/2002 E:\YARD**SPEAR2**\ADJUST\SRV1\	
EPR1							EPR1	1998.885434 1998.882713				
EPR10							EPR10	1998.958622 1998.955901				
EPR2							EPR2	1998.889247 1998.886526				
EPR3							EPR3	1998.892809 1998.890088				
EPR4							EPR4	1998.892240 1998.889519				
EPR5							EPR5	1998.898181 1998.895460				
EPR6							EPR6	1998.889378 1998.886657				
EPR7							EPR7	1998.942835 1998.940114				
EPR8							EPR8	1998.947662 1998.944941				
EPR9							EPR9	1998.943307 1998.940586				
HBL10N10											HBL10N10	1998.944674 1998.944442
HRLN020											HRLN020	1998.950584 1998.950352
HRLN030											HRLN030	1998.959874 1998.959642
HRLN040											HRLN040	1998.959259 1998.959027
HRLN060											HRLN060	1998.966599 1998.966367
HRLN070											HRLN070	1998.952119 1998.951887
HRLN080											HRLN080	1998.957844 1998.957612
HRLN090											HRLN090	1998.955539 1998.955307
HRLN100											HRLN100	1998.942739 1998.942507
HRLN115											HRLN115	1998.949579 1998.949347
HRLS020											HRLS020	1998.949167 1998.948935
HRLS030											HRLS030	1998.907336 1998.907104
HRLS040											HRLS040	1998.901969 1998.901737
HRLS050											HRLS050	1998.922264 1998.922032
HRLS080											HRLS080	1998.933184 1998.932952
HSP0N			HSP0N 1998.985883 1998.985883							
HSP10N			HSP10N 1999.014757 1999.014757							
HSP10S			HSP10S 1999.019573 1999.019573							
HSPNE			HSPNE 1998.976494 1998.976494							
HSPSE			HSPSE 1998.978392 1998.978392							
NSP1N3D							NSP1N3D	1998.943693 1998.940972		
SP01A1					SP01A1 2000.290855 2000.290912					
SP01A2	a	53					SP01A2	2000.534899 2000.532178	SP01A2 2000.530746 2000.531609	
SP01HF							SP01HF	1999.716836 1999.714115		
SP02A1	a	51			SP02A1 2000.128853 2000.128910		SP02A1	2000.131473 2000.128752	SP02A1 2000.127866 2000.128729	
SP02W2	w	51			SP02W2 2000.497600 2000.497657		SP02W2	2000.500228 2000.497507		
SP03A1	a	49			SP03A1 2000.262106 2000.262163		SP03A1	2000.264862 2000.262141	SP03A1 2000.261214 2000.262077	
SP04A1	a	45			SP04A1 2000.216811 2000.216868		SP04A1	2000.219647 2000.216926		
SP05A1	a	42			SP05A1 2000.249192 2000.249249		SP05A1	2000.251955 2000.249234		
SP06A1	a	39			SP06A1 2000.262566 2000.262623		SP06A1	2000.265349 2000.262628		
SP06W2	w	38			SP06W2 2000.542719 2000.542776					
SP07A1	a	36			SP07A1 2000.188802 2000.188859		SP07A1	2000.191519 2000.188798		
SP07W1	w	36			SP07W1 2000.569087 2000.569144		SP07W1	2000.571819 2000.569098		
SP08A1	a	34			SP08A1 2000.230059 2000.230116		SP08A1	2000.232735 2000.230014		
SP09A1	a	30			SP09A1 2000.129780 2000.129837		SP09A1	2000.132457 2000.129736		
SP09W2	w	30			SP09W2 2000.352050 2000.352107					
SP0N					SP0N 1998.986040 1998.986097					
SP10A1					SP10A1 2000.206869 2000.206926		SP10A1	2000.106522 2000.103801		
SP10E					SP10E 1999.014450 1999.014507					
SP10N					SP10N 1999.014760 1999.014817					
SP10S					SP10S 1999.019459 1999.019516		SP10S	1999.022170 1999.019449		
SP11A1	a	22			SP11A1 2000.217297 2000.217354		SP11A1	2000.219840 2000.217119		
SP11W1	w	22			SP11W1 2000.397016 2000.397073					
SP12A1	a	20			SP12A1 2000.178188 2000.178245		SP12A1	2000.180721 2000.178000		
SP13A1	a	17			SP13A1 2000.272885 2000.272942		SP13A1	2000.180346 2000.177625		
SP13W2	w	16			SP13W2 2000.600125 2000.600182					
SP14A1	a	14			SP14A1 2000.250911 2000.250968		SP14A1	2000.253232 2000.250511		
SP15A1	a	12			SP15A1 2000.220346 2000.220403		SP15A1	2000.223006 2000.220285		
SP15G							SP15G	1999.710036 1999.707315		
SP16A1	a	9			SP16A1 2000.268904 2000.268961		SP16A1	2000.271491 2000.268770	SP16A1 2000.267730 2000.268593	
SP17A1	a	6			SP17A1 2000.256654 2000.256711		SP17A1	2000.259310 2000.256589	SP17A1 2000.255602 2000.256465	
SP17W2	w	6			SP17W2 2000.487076 2000.487133					
SP18A1	a	4			SP18A1 2000.222652 2000.222709		SP18A1	2000.225283 2000.222562	SP18A1 2000.254309 2000.255172	
SP18A2	a	2							SP18A2 2000.523312 2000.524175	
SP1N	f	2	SP1N 1999.030264 1999.030264		SP1N 1999.030595 1999.030652		SP1N	1999.033298 1999.030577		
SP1N3D	f	2			SP1N3D 1998.940690 1998.940747		SP1N3D	1998.943658 1998.940937	SP1N3D 1998.940034 1998.940897	SP1N3D 1998.941221 1998.940989
SP1S	f	56	SP1S 1999.024701 1999.024701		SP1S 1999.024644 1999.024701		SP1S	1999.027443 1999.024722		
SP1S3D	f	56			SP1S3D 1998.976967 1998.977024		SP1S3D	1998.979651 1998.976930	SP1S3D 1998.975811 1998.976674	SP1S3D 1998.976966 1998.976734
SP2N	f	5	SP2N 1999.022705 1999.022705		SP2N 1999.022665 1999.022722		SP2N	1999.025448 1999.022727		
SP2N3D	f	5			SP2N3D 1998.956770 1998.956827		SP2N3D	1998.959449 1998.956728	SP2N3D 1998.955811 1998.956674	SP2N3D 1998.956671 1998.956439
SP2S	f	53	SP2S 1999.016631 1999.016631		SP2S 1999.016343 1999.016400		SP2S	1999.019238 1999.016517		
SP2S3D	f	53			SP2S3D 1998.950183 1998.950240		SP2S3D	1998.953260 1998.950539	SP2S3D 1998.949766 1998.950829	SP2S3D 1998.950897 1998.950665
SP3N	f	8	SP3N 1999.004521 1999.004521		SP3N 1999.004803 1999.004860		SP3N	1999.008052 1999.005331		
SP3N3D	f	8			SP3N3D 1998.943198 1998.943255		SP3N3D	1998.946005 1998.943284	SP3N3D 1998.942277 1998.943140	SP3N3D 1998.943159 1998.942927
SP3S	f	50	SP3S 1999.017895 1999.017895		SP3S 1999.017950 1999.016007		SP3S	1999.020949 1999.018228		
SP3S3D	f	50			SP3S3D 1998.972000 1998.972057		SP3S3D	1998.974763 1998.971904	SP3S3D 1998.971014 1998.971877	SP3S3D 1998.972300 1998.972068
SP4N	f	11	SP4N 1999.014647 1999.014647		SP4N 1999.014547 1999.014604		SP4N	1999.017080 1999.014359		
SP4N3D	f	11			SP4N3D 1998.941657 1998.941714		SP4N3D	1998.944414 1998.941693	SP4N3D 1998.940610 1998.941473	SP4N3D 1998.941668 1998.941436
SP4S3D	f	46	SP4S3D 1998.952589 1998.952589		SP4S3D 1998.952532 1998.952589		SP4S3D	1998.955310 1998.952589	SP4S3D 1998.951726 1998.952589	SP4S3D 1998.952821 1998.952589
SP5N	f	13	SP5N 1999.015303 1999.015303		SP5N 1999.015752 1999.015809		SP5N	1999.018984 1999.016263		
SP5N3D	f	13			SP5N3D 1998.967522 1998.967579		SP5N3D	1998.970200 1998.967479		SP5N3D 1998.967364 1998.967132
SP5S	f	44	SP5S 1999.029968 1999.029968		SP5S 1999.029847 1999.029904		SP5S	1999.032634 1999.029913		
SP5S3D	f	44			SP5S3D 1998.939402 1998.939459		SP5S3D	1998.942135 1998.939414		SP5S3D 1998.939761 1998.939529
SP6N	f	15	SP6N 1999.012523 1999.012523		SP6N 1999.012255 1999.012312		SP6N	1999.014641 1999.011920		
SP6N3D	f	15			SP6N3D 1998.948020 1998.948077		SP6N3D	1998.950418 1998.947697		SP6N3D 1998.947441 1998.947209
SP6S	f	40	SP6S 1999.032147 1999.032147		SP6S 1999.031836 1999.031893		SP6S	1999.034812 1999.032091		
SP6S3D	f	40			SP6S3D 1998.908432 1998.908489		SP6S3D	1998.911260 1998.908539		SP6S3D 1998.908161 1998.907929
SP7N	f	18	SP7N 1998.992894 1998.992894		SP7N 1998.992720 1998.992777		SP7N	1998.995373 1998.992652		
SP7N3D	f	18			SP7N3D 1998.942540 1998.942597		SP7N3D	1998.945069 1998.942348		SP7N3D 1998.942808 1998.942576
SP7S3D	f	37	SP7S3D 1998.951656 1998.951656		SP7S3D 1998.951561 1998.951618		SP7S3D	1998.954274 1998.951553		SP7S3D 1998.952015 1998.951783
SP8N	f	21	SP8N 1999.024125 1999.024125		SP8N 1999.024299 1999.024356		SP8N	1999.026692 1999.023971		
SP8N3D	f	21			SP8N3D 1998.948164 1998.948221		SP8N3D	1998.950920 1998.948199		SP8N3D 1998.948390 1998.948158
SP8S	f	35	SP8S 1999.017421 1999.017421		SP8S 1999.017112 1999.017169		SP8S	1999.019809 1999.017088		
SP8S3D	f	35			SP8S3D 1998.961576 1998.961633		SP8S3D	1998.964195 1998.961474		SP8S3D 1998.961793 1998.961561
SP9A							SP9A	1999.037673 1999.034952		
SP9AN	f	25	SP9AN 1998.981382 1998.981382		SP9AN 1998.981657 1998.981714		SP9AN	1998.983938 1998.981217		
SP9AN3D	f	26			SP9AN3D 1999.010206 1999.010263		SP9AN3D	1999.012978 1999.010257		SP9AN3D 1999.010682 1999.010450
SP9AS	f	29	SP9AS 1999.035169 1999.035169		SP9AS 1999.034891 1999.034948		SP9AS	1999.037592 1999.034871		
SP9AS3D	f	29			SP9AS3D 1999.007428 1999.007485		SP9AS3D	1999.010068 1999.007347		SP9AS3D 1999.008009 1999.007777
SP9N	f	23	SP9N 1998.999471 1998.999471		SP9N 1998.999432 1998.999489		SP9N	1999.002025 1998.999304		
SP9N3D	f	23			SP9N3D 1998.950182 1998.950239		SP9N3D	1998.952834 1998.950113		SP9N3D 1998.950306 1998.950074
SP9S	f	32	SP9S 1999.003745 1999.003745		SP9S 1999.003590 1999.003647		SP9S	1999.006379 1999.003658		
SP9S3D	f	32			SP9S3D 1998.945033 1998.945090		SP9S3D	1998.947753 1998.945032		SP9S3D 1998.945225 1998.944993
SPEP3D1	f	28					SPEP3D1	1998.899022 1998.896301		SPEP3D1 1998.896062 1998.895830
SPEP3D2	f	27					SPEP3D2	1998.883068 1998.880347		SPEP3D2 1998.880121 1998.879889
SPEPA1	a	27					SPEPA1	2000.742027 2000.739306		
SPEPA2	a	25					SPEPA2	2000.681825 2000.679104		
SPEPW1	w	28					SPEPW1	2000.953079 2000.950358		
SPNE					SPNE 1998.976684 1998.976741					
SPR5							SPR5	1998.878635 1998.875914		
SPSE					SPSE 1998.978707 1998.978764					
SPWEST0					SPWEST0 1998.975131 1998.975188					
SPWP3D1	f	1					SPWP3D1	1998.888143 1998.885422	SPWP3D1 1998.883753 1998.884616	SPWP3D1 1998.884679 1998.884447
SPWP3D2	f	57					SPWP3D2	1998.900197 1998.897476	SPWP3D2 1998.895865 1998.896728	SPWP3D2 1998.896802 1998.896570
SPWPA1	a	58					SPWPA1	2000.494708 2000.491987	SPWPA1 2000.489984 2000.490847	
SPWPA2	a	55					SPWPA2	2000.394696 2000.391975	SPWPA2 2000.390727 2000.391590	
SPWPA3	a	1							SPWPA3 2000.545360 2000.546223	
SPWPA4	a	57							SPWPA4 2000.714192 2000.715055	
SPWPW1	w	1							SPWPW1 2001.006348 2001.007211	
SPWPW2	w	57							SPWPW2 2000.985167 2000.986030	
WPR1							WPR1	1998.896994 1998.894273		
WPR10							WPR10	1998.950915 1998.948194		
WPR11							WPR11	1998.950990 1998.948269		
WPR2							WPR2	1998.904958 1998.902237		
WPR3							WPR3	1998.898443 1998.895722		
WPR4							WPR4	1998.899490 1998.896769		
WPR5							WPR5	1998.897579 1998.894858		
WPR6							WPR6	1998.890715 1998.887994		
WPR7							WPR7	1998.957698 1998.954977		
WPR8							WPR8	1998.951212 1998.948491		
WPR9							WPR9	1998.948188 1998.945467		

Progressive Changes meters

	delta 1	delta 2	delta 3	delta 4
SP01A2			-0.000569	
SP02A1	-0.000158	-0.000023		
SP02W2	-0.000150			
SP03A1	-0.000022	-0.000064		
SP04A1	-0.000058			
SP05A1	-0.000015			
SP06A1	0.000005			
SP07A1	-0.000061			
SP07W1	-0.000046			
SP08A1	-0.000102			
SP09A1	-0.000101			
SP10A1	-0.103125			
SP10S	-0.000067			
SP11A1	-0.000235			
SP12A1	-0.000245			
SP13A1	-0.095317			
SP14A1	-0.000457			
SP15A1	-0.000118			
SP16A1	-0.000191	-0.000177		
SP17A1	-0.000122	-0.000124		
SP18A1	-0.000147	0.032610		
SP1N	0.000388	-0.000075		
SP1N3D	0.000190	-0.000040	0.000092	
SP1S	0.000000	0.000021		
SP1S3D		-0.000094	-0.000256	0.000060
SP2N	0.000017	0.000005		
SP2N3D		-0.000099	-0.000054	-0.000235
SP2S	-0.000231	0.000117		
SP2S3D		0.000299	0.000090	0.000036
SP3N	0.000339	0.000471		
SP3N3D		0.000029	-0.000144	-0.000213
SP3S	0.000112	0.000221		
SP3S3D		0.000015	-0.000165	0.000191
SP4N	-0.000043	-0.000245		
SP4N3D		-0.000021	-0.000220	-0.000037
SP4S3D	0.000000	0.000000	0.000000	
SP5N	0.000506	0.000454		
SP5N3D		-0.000100		
SP5S	-0.000064	0.000009		
SP5S3D		-0.000045		
SP6N	-0.000211	-0.000392		
SP6N3D		-0.000380		
SP6S	-0.000254	0.000198		
SP6S3D		0.000050		
SP7N	-0.000117	0.000125		
SP7N3D		-0.000249		
SP7S3D	-0.000038	-0.000065		
SP8N	0.000231	-0.000385		
SP8N3D		-0.000022		
SP8S	-0.000252	-0.000081		
SP8S3D		-0.000159		
SP9A	0.000332	-0.000497		
SP9AN3D		-0.000006		
SP9AS	-0.000221	-0.000077		
SP9AS3D		-0.000138		
SP9N	0.000018	-0.000185		
SP9N3D		-0.000126		
SP9S	-0.000098	0.000011		
SP9S3D		-0.000058		
SPEP3D1				
SPEP3D2				
SPNE				
SPR5				
SPSE				
SPWP3D1			-0.000806	-0.000169
SPWP3D2			-0.000748	-0.000158
SPWPA1			-0.001140	
SPWPA2			-0.000385	

Changes from 2000/2001 "DEFORM2" Survey meters
SURVEY I - SURVEY 3

	SURV1-SURV3	SURV2-SURV3	SURV4-SURV3	SURV5-SURV3
SP01A2			-0.000569	
SP02A1	0.000158	-0.000023		
SP02W2	0.000150			
SP03A1	0.000022	-0.000064		
SP04A1	0.000058			
SP05A1	0.000015			
SP06A1	-0.000005			
SP07A1	0.000061			
SP07W1	0.000046			
SP08A1	0.000102			
SP09A1	0.000101			
SP10A1	0.103125			
SP10S	0.000067			
SP11A1	0.000235			
SP12A1	0.000245			
SP13A1	0.095317			
SP14A1	0.000457			
SP15A1	0.000118			
SP16A1	0.000191	-0.000177		
SP17A1	0.000122	-0.000124		
SP18A1	0.000147	0.032610		
SP1N	-0.000313	0.000075		
SP1N3D		0.000190	-0.000040	0.000052
SP1S	-0.000021	0.000021		
SP1S3D		0.000094	-0.000256	-0.000196
SP2N	-0.000022	-0.000005		
SP2N3D		0.000099	-0.000054	-0.000289
SP2S	0.000114	0.000117		
SP2S3D		-0.000299	0.000090	0.000126
SP3N	-0.000810	-0.000471		
SP3N3D		-0.000029	-0.000144	-0.000357
SP3S	-0.000333	-0.000221		
SP3S3D		0.000015	-0.000165	0.000026
SP4N	0.000288	0.000245		
SP4N3D		0.000021	-0.000220	-0.000257
SP4S3D	0.000000	0.000000	0.000000	0.000000
SP5N	-0.000960	-0.000454		
SP5N3D		0.000100		-0.000347
SP5S	0.000055	0.000009		
SP5S3D		0.000045		0.000115
SP6N	0.000603	0.000392		
SP6N3D		0.000380		-0.000488
SP6S	0.000056	-0.000198		
SP6S3D		0.000050		-0.000610
SP7N	0.000242	0.000125		
SP7N3D		0.000249		0.000228
SP7S3D	0.000103	0.000065		0.000230
SP8N	0.000154	0.000385		
SP8N3D		0.000022		-0.000041
SP8S	0.000333	0.000081		
SP8S3D		0.000159		0.000087
SP9A	0.000165	0.000497		
SP9AN3D		0.000006		0.000193
SP9AS	0.000298	0.000077		
SP9AS3D		0.000138		0.000430
SP9N	0.000167	0.000185		
SP9N3D		0.000126		-0.000039
SP9S	0.000087	-0.000011		
SP9S3D		0.000058		-0.000039
SPEP3D1				-0.000471
SPEP3D2				-0.000458
SPNE				
SPR5				
SPSE				
SPWP3D1			-0.000806	-0.000975
SPWP3D2			-0.000748	-0.000906
SPWPA1			-0.001140	
SPWPA2			-0.000385	

	Survey 1 September 14, 1998	Survey 2 September 20, 1999	Survey 3 September 15, 2000	Survey 4 September 28, 2001	Survey 5 August 16, 2002
Maximum:	0.000506	0.000471	0.032610	0.000191	
Minimum:	-0.000254	-0.103125	-0.001140	-0.000235	
Maximum:	0.000506	0.000471	0.000090	0.000191	<= Excluding =>
Minimum:	-0.000254	-0.000497	-0.001140	-0.000235	<= Blunders =>

Maximum:	0.000603	0.103125	0.032610	0.000430
Minimum:	-0.000960	-0.000471	-0.001140	-0.000975
Maximum:	0.000603	0.000497	0.000090	0.000430
Minimum:	-0.000960	-0.000471	-0.001140	-0.000975