BAFFLE LOCATIONS AT HANFORD

Eanna E. Flanagan and Kip S. Thorne

7 October 1998

The following are the tables of baffle locations at the LIGO Hanford site, which were provided to CBI Servies, Inc., in LIGO Technical Direction Memorandum LIGO−C962252−00−B, and which were used by them in installing the baffles into the LIGO Beam Tubes.

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Version 8′ (Final)

Baffle Locations at Hanford: Short Table
Part A: Mid Station to Corner Station

[by Kip Thorne, 07 October 1996]
[based on calculations by Eanna Flanagan and Kip Thorne]

At Hanford the total numbers of baffles are:

FS Baffles: 458
NS Baffles: 134

The following table shows the locations of the baffles and of the field welds in each of the two identical arms at Hanford, MOVING FROM THE MID STATION TOWARD THE CORNER STATION, as Computed on 01 July 1996 using the Mathematica Notebooks "BaffleLocations6.ma" and "TableGeneration2.ma", followed by a displacement of baffle 189 toward the midstation by 1.4cm based on "LocationAdjustment.ma" (05 July 1996) and as augmented with separations and tolerances on 08 October 1996 using the Mathematica Notebook "ToleranceTable3". (This document is the same as version 8, except that it’s label has been changed from "preliminary" to "final".)

The columns are as follows:

Column 1: "Number" −− Baffle’s identifying number, or "GS" for girth seam

Column 2: "Location" −− Distance of baffle vertex or girth seam from the beam tube axes vertex, in meters [Nominal Value]

Column 3: "Type" −− Baffle type

"V-PP": -- vertex of baffle butts up against the
edge of a port-pump avoidance zone
THE GATE-VALVE ABUTTMENTS [FS BAFFLES 1, 190, 191,
296] ARE MANDATORY, AS ARE THE AZ ABUTTMENTS OF ALL
FS BAFFLES FROM BAFFLE 73 THROUGH 224; all other
abuttments are nominal

Column 6: "Previous Field Weld" -- The previous, adjacent field weld and the
present baffle

Column 7: "Seprn" -- Separation of the previous, adjacent field weld from the
vertex of the present baffle [Nominal Value; in meters]

Column 8: "Next Field Weld" -- The present baffle and the next, adjacent field weld

Column 9: "Seprn" -- Separation of the next, adjacent field weld from the
vertex of the present baffle [Nominal Value; in meters]

Column 10: "BafflePair" -- The pair of baffles whose separation is given
in the next column

Column 11: "Seprn" -- Separation of the baffle vertices for the pair
in the previous column; in meters

Column 12: "Tol" -- Tolerance on the separation [the separation can
be larger than that of the previous column by no
more than this amount; it can be smaller by any
desired amount]

Column 13: "BafflePair" -- Same as Column 10

Column 14: "Seprn" -- Same as Column 11

Column 15: "Tol" -- Same as Column 12

Number	Location	Type	Lean	Butt	Previous Field Weld	Seprn	Next Field Weld	Seprn	Baffle Pair	Seprn	Tol	Baffle Pair	Seprn	
190	2007.750	FS	T	V-GV			{ 190, FW}	0.254				{ 190, 169}	14.050	0
FW	2007.500													
189	2007.130	NS	T		{FW, 189}	0.369			{ 190, 189}	0.623	0.02	{ 189, 168}	14.430	0
188	2006.640	NS	T	V-PP					{ 189, 188}	0.493	0.02			
187	2006.250	NS	T						{ 188, 187}	0.392	0.10			
186	2005.760	NS	T						{ 187, 186}	0.484	0.03			
185	2005.260	NS	T						{ 186, 185}	0.504	0.03			
184	2004.730	NS	T						{ 185, 184}	0.524	0.03			
183	2004.190	NS	T						{ 184, 183}	0.546	0.03			
182	2003.620	NS	T						{ 183, 182}	0.568	0.04			
181	2003.030	NS	T						{ 182, 181}	0.592	0.04			
180	2002.410	NS	T						{ 181, 180}	0.616	0.04			

166	1990.120	NS	T								{ 167, 166}	1.106	0.07						
165	1988.970	NS	T								{ 166, 165}	1.151	0.07						
164	1987.770	NS	T								{ 165, 164}	1.199	0.08						
163	1986.520	NS	T								{ 164, 163}	1.248	0.08						
162	1985.220	NS	T								{ 163, 162}	1.300	0.08						
161	1983.860	NS	T								{ 162, 161}	1.354	0.09						
160	1982.450	NS	T								{ 161, 160}	1.410	0.09						
159	1980.990	NS	T								{ 160, 159}	1.468	0.10						
158	1979.460	NS	T						{ 158, FW}	1.415	{ 159, 158}	1.529	0.10	{ 168, 158}	13.240	0			
FW	1978.040																		
157	1977.870	FS	T	V-AZ	{FW, 157}	0.177					{ 158, 157}	1.592	0.10	{ 157, 149}	16.870	0			
156	1975.460	NS	T								{ 157, 156}	2.405	0.06	{ 156, 148}	16.900	0			
155	1973.650	NS	T								{ 156, 155}	1.816	0.06						
154	1971.750	NS	T								{ 155, 154}	1.894	0.06						
153	1969.780	NS	T								{ 154, 153}	1.975	0.06						
152	1967.720	NS	T								{ 153, 152}	2.059	0.06						
151	1965.570	NS	T								{ 152, 151}	2.147	0.07						
150	1963.330	NS	T								{ 151, 150}	2.239	0.07						
149	1961.000	NS	T								{ 150, 149}	2.335	0.07	{ 157, 149}	16.870	0			
148	1958.560	FS	T	E-AZ					{ 148, FW}	0.330	{ 149, 148}	2.435	0.08	{ 148, 142}	17.220	0			
FW	1958.230																		
147	1955.130	NS	T		{FW, 147}	3.096					{ 148, 147}	3.426	0.10	{ 147, 141}	16.890	0			
146	1952.590	NS	T								{ 147, 146}	2.544	0.10						
145	1949.940	NS	T								{ 146, 145}	2.647	0.10						
144	1947.190	NS	T								{ 145, 144}	2.754	0.10						
143	1944.330	NS	T								{ 144, 143}	2.865	0.10						
142	1941.340	NS	T						{ 142, FW}	2.925	{ 143, 142}	2.981	0.10	{ 148, 142}	17.220	0			
FW	1938.420																		
141	1938.240	FS	T	V-AZ	{FW, 141}	0.177					{ 142, 141}	3.102	0.10	{ 141, 137}	15.410	0			
140	1933.610	NS	T								{ 141, 140}	4.632	0.10	{ 140, 136}	14.670	0			
139	1930.160	NS	T								{ 140, 139}	3.451	0.10						
138	1926.570	NS	T								{ 139, 138}	3.592	0.10						
137	1922.830	NS	T								{ 138, 137}	3.739	0.10	{ 141, 137}	15.410	0			
136	1918.940	FS	T	E-AZ					{ 136, FW}	0.330	{ 137, 136}	3.892	0.10	{ 136, 133}	15.350	0			
FW	1918.610																		
135	1912.920	NS	T		{FW, 135}	5.683					{ 136, 135}	6.013	0.08	{ 135, 132}	14.310	0			
134	1908.360	NS	T								{ 135, 134}	4.567	0.07						
133	1903.590	NS	T						{ 133, FW}	4.796	{ 134, 133}	4.766	0.07	{ 136, 133}	15.350	0			
FW	1898.800																		
132	1898.620	FS	T	V-AZ	{FW, 132}	0.177					{ 133, 132}	4.973	0.07	{ 132, 129}	14.750	0			
131	1892.530	NS	T								{ 132, 131}	6.090	0.10	{ 131, 128}	13.210	0			
130	1888.270	NS	T								{ 131, 130}	4.259	0.10						
129	1883.870	NS	T								{ 130, 129}	4.403	0.10	{ 132, 129}	14.750	0			
128	1879.310	FS	T	E-AZ					{ 128, FW}	0.330	{ 129, 128}	4.553	0.10	{ 128, 126}	14.070	0			
FW	1878.980																		
127	1871.250	NS	T		{FW, 127}	7.730					{ 128, 127}	8.060	0.10	{ 127, 125}	12.260	0			
126	1865.250	NS	T						{ 126, FW}	6.075	{ 127, 126}	6.006	0.10	{ 128, 126}	14.070	0			
FW	1859.170																		
125	1858.990	FS	T	V-AZ	{FW, 125}	0.177					{ 126, 125}	6.252	0.10	{ 125, 123}	13.560	0			
124	1850.990	NS	T								{ 125, 124}	8.005	0.10	{ 124, 122}	11.300	0			
123	1845.430	NS	T								{ 124, 123}	5.558	0.10	{ 125, 123}	13.560	0			
122	1839.690	FS	T	E-AZ					{ 122, FW}	0.330	{ 123, 122}	5.743	0.10	{ 122, 120}	14.350	0			

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 112   1748.270  NS  T        {FW,  112}   11.840  { 112, FW}   7.975   { 113,  112}   12.170   0.10
FW     1740.300
 111   1740.120  FS  T  V-AZ  {FW,  111}   0.177                        { 112,  111}   8.152    0.10
 110   1728.270  NS  T                                                  { 111,  110}   11.850   0.10
 109   1720.820  FS  T  E-AZ                       { 109, FW}   0.330   { 110,  109}   7.451    0.10
FW     1720.490
 108   1708.300  NS  T        {FW,  108}   12.190  { 108, FW}   7.624   { 109,  108}   12.520   0.10
FW     1700.680
 107   1700.500  FS  T  V-AZ  {FW,  107}   0.177                        { 108,  107}   7.801    0.10
 106   1681.190  FS  T  E-AZ                       { 106, FW}   0.330
FW     1680.860
FW     1661.050
 105   1660.870  FS  T  V-AZ  {FW,  105}   0.177
 104   1641.570  FS  T  E-AZ                       { 104, FW}   0.330
FW     1641.240
FW     1621.430
 103   1621.250  FS  T  V-AZ  {FW,  103}   0.177
 102   1601.940  FS  T  E-AZ                       { 102, FW}   0.330
FW     1601.620
FW     1581.800
 101   1581.630  FS  T  V-AZ  {FW,  101}   0.177
 100   1562.320  FS  T  E-AZ                       { 100, FW}   0.330
FW     1561.990
FW     1542.180
 99    1542.000  FS  T  V-AZ  {FW,  99}    0.177
 98    1522.700  FS  T  E-AZ                       { 98, FW}    0.330
FW     1522.370
FW     1502.560
 97    1502.380  FS  T  V-AZ  {FW,  97}    0.177
 96    1483.070  FS  T  E-AZ                       { 96, FW}    0.330
FW     1482.740
FW     1462.930
 95    1462.750  FS  T  V-AZ  {FW,  95}    0.177
 94    1443.450  FS  T  E-AZ                       { 94, FW}    0.330
FW     1443.120
FW     1423.310
 93    1423.130  FS  T  V-AZ  {FW,  93}    0.177
 92    1403.820  FS  T  E-AZ                       { 92, FW}    0.330
FW     1403.500
FW     1383.680
 91    1383.510  FS  T  V-AZ  {FW,  91}    0.177
 90    1364.200  FS  T  E-AZ                       { 90, FW}    0.330
FW     1363.870
FW     1344.060
 89    1343.880  FS  T  V-AZ  {FW,  89}    0.177   { 89, FW}    19.630
FW     1324.250
FW     1304.440
 88    1304.260  FS  T  V-AZ  {FW,  88}    0.177   { 88, FW}    19.630
FW     1284.620
FW     1264.810
 87    1264.630  FS  T  V-AZ  {FW,  87}    0.177   { 87, FW}    19.630
FW     1245.000
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FW     1046.880
FW     1027.070
 81    1026.740  FS  A  E-AZ  {FW,  81}    0.330   { 81, FW}    19.480
FW     1007.260
FW     987.443
 80    987.114   FS  A  E-AZ  {FW,  80}    0.329   { 80, FW}    19.480
FW     967.631
FW     947.819
 79    947.489   FS  A  E-AZ  {FW,  79}    0.329   { 79, FW}    19.480
FW     928.007
FW     908.195
 78    907.866   FS  A  E-AZ  {FW,  78}    0.330   { 78, FW}    19.480
FW     888.383
FW     868.571
 77    868.242   FS  A  E-AZ  {FW,  77}    0.330   { 77, FW}    19.480
FW     848.759
FW     828.947
 76    828.617   FS  A  E-AZ  {FW,  76}    0.330   { 76, FW}    19.480
FW     809.135
FW     789.323
 75    788.994   FS  A  E-AZ  {FW,  75}    0.329   { 75, FW}    19.480
FW     769.511
FW     749.699
 74    749.370   FS  A  E-AZ  {FW,  74}    0.329   { 74, FW}    19.480
FW     729.887
FW     710.075
 73    709.746   FS  A  E-AZ  {FW,  73}    0.329   { 73, FW}    19.480
FW     690.263
 72    671.840   FS  A        {FW,  72}    18.420  { 72, FW}    1.389   { 73,  72}     37.910   0.10
FW     670.451
FW     650.639
 71    636.064   FS  A        {FW,  71}    14.570  { 71, FW}    5.237   { 72,  71}     35.780   0.10
FW     630.827
FW     611.015
 70    602.297   FS  A        {FW,  70}    8.718   { 70, FW}    11.090  { 71,  70}     33.770   0.10
FW     591.203
FW     571.391
 69    570.427   FS  A  E-AZ  {FW,  69}    0.964   { 69, FW}    18.850  { 70,  69}     31.870   0.10
FW     551.579
 68    540.458   FS  A        {FW,  68}    11.120  { 68, FW}    8.691   { 69,  68}     29.970   0.10
FW     531.767
 67    512.166   FS  A        {FW,  67}    19.600  { 67, FW}    0.211   { 68,  67}     28.290   0.10
FW     511.955
FW     492.143
 66    485.457   FS  A        {FW,  66}    6.686   { 66, FW}    13.130  { 67,  66}     26.710   0.10
FW     472.331
 65    460.243   FS  A        {FW,  65}    12.090  { 65, FW}    7.724   { 66,  65}     25.210   0.10
FW     452.519
 64    436.439   FS  A        {FW,  64}    16.080  { 64, FW}    3.732   { 65,  64}     23.800   0.10
FW     432.707
 63    413.968   FS  A        {FW,  63}    18.740  { 63, FW}    1.073   { 64,  63}     22.470   0.10
FW     412.895
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55	271.817	FS	A		{FW, 55}	2.394				{ 56, 55}	14.400	0.04
54	258.239	FS	A				{ 54, FW}	3.840	{ 55, 54}		13.580	0.04
FW	254.399											
53	245.440	FS	A		{FW, 53}	8.959	{ 53, FW}	10.850	{ 54, 53}		12.800	0.04
FW	234.587											
52	233.374	FS	A		{FW, 52}	1.213				{ 53, 52}	12.070	0.03
51	222.000	FS	A				{ 51, FW}	7.225	{ 52, 51}		11.370	0.03
FW	214.775											
50	211.277	FS	A		{FW, 50}	3.498				{ 51, 50}	10.720	0.03
49	201.168	FS	A				{ 49, FW}	6.205	{ 50, 49}		10.110	0.03
FW	194.963											
48	191.639	FS	A		{FW, 48}	3.324				{ 49, 48}	9.529	0.02
47	182.656	FS	A				{ 47, FW}	7.505	{ 48, 47}		8.983	0.02
FW	175.151											
46	174.187	FS	A	E-AZ	{FW, 46}	0.964				{ 47, 46}	8.469	0.02
45	166.289	FS	A							{ 46, 45}	7.898	0.10
44	158.838	FS	A				{ 44, FW}	3.499	{ 45, 44}		7.451	0.10
FW	155.339											
43	151.810	FS	A		{FW, 43}	3.529				{ 44, 43}	7.028	0.10
42	145.180	FS	A							{ 43, 42}	6.630	0.09
41	138.926	FS	A				{ 41, FW}	3.399	{ 42, 41}		6.254	0.08
FW	135.527											
40	133.026	FS	A		{FW, 40}	2.501				{ 41, 40}	5.900	0.08
39	127.461	FS	A							{ 40, 39}	5.565	0.07
38	122.211	FS	A							{ 39, 38}	5.250	0.07
37	117.259	FS	A				{ 37, FW}	1.544	{ 38, 37}		4.952	0.06
FW	115.715											
36	112.588	FS	A		{FW, 36}	3.127				{ 37, 36}	4.671	0.06
35	108.181	FS	A							{ 36, 35}	4.407	0.06
34	104.024	FS	A							{ 35, 34}	4.157	0.05
33	100.103	FS	A							{ 34, 33}	3.921	0.05
32	96.404	FS	A				{ 32, FW}	0.501	{ 33, 32}		3.699	0.05
FW	95.903											
31	92.915	FS	A		{FW, 31}	2.988				{ 32, 31}	3.489	0.04
30	89.623	FS	A							{ 31, 30}	3.291	0.04
29	86.518	FS	A							{ 30, 29}	3.105	0.04
28	83.589	FS	A							{ 29, 28}	2.929	0.03
27	80.826	FS	A							{ 28, 27}	2.763	0.03
26	78.220	FS	A				{ 26, FW}	2.129	{ 27, 26}		2.606	0.03
FW	76.091											
25	75.762	FS	A	E-AZ	{FW, 25}	0.329				{ 26, 25}	2.459	0.03
24	73.498	FS	A							{ 25, 24}	2.263	0.08
23	71.360	FS	A							{ 24, 23}	2.138	0.08
22	69.340	FS	A							{ 23, 22}	2.020	0.07
21	67.432	FS	A							{ 22, 21}	1.908	0.07
20	65.630	FS	A							{ 21, 20}	1.803	0.06
19	63.927	FS	A							{ 20, 19}	1.703	0.06
18	62.318	FS	A				{ 18, FW}	0.555	{ 19, 18}		1.609	0.06
FW	61.763											
17	60.799	FS	A	E-AZ	{FW, 17}	0.964				{ 18, 17}	1.520	0.05
16	59.426	FS	A							{ 17, 16}	1.372	0.10
15	58.127	FS	A							{ 16, 15}	1.300	0.10

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 1      45.746   FS  A  V-GV  {FW,  1}     0.254                        { 2,  1}       0.589    0.05
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Version 8′ (Final)

Baffle Locations at Hanford: Short Table
Part B: Mid Station to End Station

[by Kip Thorne, 07 October 1996]
[based on calculations by Eanna Flanagan and Kip Thorne]

At Hanford the total numbers of baffles are:

FS Baffles: 458
NS Baffles: 134

The following table shows the locations of the baffles and of the Girth Seam field welds in each of the two identical arms at Hanford, MOVING FROM THE MID STATION TOWARD THE END STATION, as Computed on 01 July 1996 using the Mathematica Notebooks "BaffleLocations6.ma" and "TableGeneration2.ma", followed by a displacement of baffle 189 toward the midstation by 1.4cm based on "LocationAdjustment.ma" (05 July 1996) and as augmented with separations and tolerances on 08 October 1996 using the Mathematica Notebook "ToleranceTable3". (This document is the same as version 8, except that it’s label has been changed from "preliminary" to "final".)

The columns are as follows:

Column 1: "Number" -- Baffle’s identifying number, or
"GS" for girth seam

Column 2: "Location" -- Distance of baffle vertex or girth seam from the
beam tube axes vertex, in meters [Nominal Value]

Column 3: "Type" -- Baffle type

Column 4: "Lean" -- The direction the baffle face leans:
"T" -- toward the beam tube axes vertex
"A" -- away from the beam tube axes vertex

Column 5: "Butt" -- This column identifies baffles that butt up
against an avoidance zone:
"E-GV": -- end of baffle’s base butts up against
a gate valve
"V-GV": -- vertex of baffle butts up against a
gate valve
"V-AZ": -- vertex of baffle butts up against the

vertex of the present baffle [Nominal Value; in meters]

Column 8: "Next Field Weld" -- The present baffle and the next, adjacent field weld

Column 9: "Seprn" -- Separation of the next, adjacent field weld from the vertex of the present baffle [Nominal Value; in meters]

Column 10: "BafflePair" -- The pair of baffles whose separation is given in the next column

Column 11: "Seprn" -- Separation of the baffle vertices for the pair in the previous column; in meters

Column 12: "Tol" -- Tolerance on the separation [the separation can be larger than that of the previous column by no more than this amount; it can be smaller by any desired amount]

Number	Location	Type	Lean	Butt	Previous Field Weld	Seprn	Next Field Weld	Seprn	Baffle Pair	Seprn	Tol
FW	2027.000										
191	2028.130	FS	T		{FW, 191}	1.131	{ 191, FW}	14.000			
FW	2042.130										
FW	2056.460										
192	2056.790	FS	T	E-AZ	{FW, 192}	0.330	{ 192, FW}	19.480			
FW	2076.270										
FW	2096.080										
193	2096.410	FS	T	E-AZ	{FW, 193}	0.329	{ 193, FW}	19.480			
FW	2115.890										
FW	2135.700										
194	2136.030	FS	T	E-AZ	{FW, 194}	0.330	{ 194, FW}	19.480			
FW	2155.520										
FW	2175.330										
195	2175.660	FS	T	E-AZ	{FW, 195}	0.329	{ 195, FW}	19.480			
FW	2195.140										
FW	2214.950										
196	2215.280	FS	T	E-AZ	{FW, 196}	0.329	{ 196, FW}	19.480			
FW	2234.760										
FW	2254.580										
197	2254.910	FS	T	E-AZ	{FW, 197}	0.329	{ 197, FW}	19.480			
FW	2274.390										
FW	2294.200										
198	2294.530	FS	T	E-AZ	{FW, 198}	0.329	{ 198, FW}	19.480			
FW	2314.010										
FW	2333.820										
199	2334.150	FS	T	E-AZ	{FW, 199}	0.329	{ 199, FW}	19.480			
FW	2353.640										
FW	2373.450										
200	2373.780	FS	T	E-AZ	{FW, 200}	0.329	{ 200, FW}	19.480			

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 205    2571.900   FS   T   E-AZ   {FW,  205}    0.329    { 205, FW}    19.480
FW      2591.380
FW      2611.190
 206    2611.520   FS   T   E-AZ   {FW,  206}    0.330    { 206, FW}    19.480
FW      2631.000
FW      2650.820
 207    2651.150   FS   T   E-AZ   {FW,  207}    0.329    { 207, FW}    19.480
FW      2670.630
FW      2690.440
 208    2690.770   FS   T   E-AZ   {FW,  208}    0.330    { 208, FW}    19.480
FW      2710.250
FW      2730.060
 209    2730.390   FS   T   E-AZ   {FW,  209}    0.329    { 209, FW}    19.480
FW      2749.880
FW      2769.690
 210    2770.020   FS   T   E-AZ   {FW,  210}    0.330    { 210, FW}    19.480
FW      2789.500
FW      2809.310
 211    2809.640   FS   T   E-AZ   {FW,  211}    0.329    { 211, FW}    19.480
FW      2829.130
FW      2848.940
 212    2849.270   FS   T   E-AZ   {FW,  212}    0.330    { 212, FW}    19.480
FW      2868.750
FW      2888.560
 213    2888.890   FS   T   E-AZ   {FW,  213}    0.329    { 213, FW}    19.480
FW      2908.370
FW      2928.180
 214    2928.510   FS   T   E-AZ   {FW,  214}    0.330    { 214, FW}    19.480
FW      2948.000
FW      2967.810
 215    2968.140   FS   T   E-AZ   {FW,  215}    0.329    { 215, FW}    19.480
FW      2987.620
FW      3007.430
 216    3007.760   FS   T   E-AZ   {FW,  216}    0.329    { 216, FW}    19.480
FW      3027.240
FW      3047.060
 217    3047.390   FS   T   E-AZ   {FW,  217}    0.330    { 217, FW}    19.480
FW      3066.870
FW      3086.680
 218    3087.010   FS   T   E-AZ   {FW,  218}    0.329    { 218, FW}    19.480
FW      3106.490
FW      3126.300
 219    3126.630   FS   T   E-AZ   {FW,  219}    0.330    { 219, FW}    19.480
FW      3146.120
FW      3165.930
 220    3166.260   FS   T   E-AZ   {FW,  220}    0.329    { 220, FW}    19.480
FW      3185.740
FW      3205.550
 221    3205.880   FS   T   E-AZ   {FW,  221}    0.330    { 221, FW}    19.480
FW      3225.360
FW      3245.180
 222    3245.510   FS   T   E-AZ   {FW,  222}    0.330    { 222, FW}    19.480
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FW	3443.300										
FW	3463.110										
228	3465.820	FS	T	{FW, 228}	2.716	{ 228, FW}	17.100	{ 227, 228}	32.230	0.10	
FW	3482.920										
229	3496.210	FS	T	{FW, 229}	13.290	{ 229, FW}	6.518	{ 228, 229}	30.390	0.10	
FW	3502.730										
FW	3522.540										
230	3524.870	FS	T	{FW, 230}	2.328	{ 230, FW}	17.480	{ 229, 230}	28.660	0.10	
FW	3542.360										
231	3551.900	FS	T	{FW, 231}	9.540	{ 231, FW}	10.270	{ 230, 231}	27.020	0.10	
FW	3562.170										
232	3577.380	FS	T	{FW, 232}	15.210	{ 232, FW}	4.599	{ 231, 232}	25.480	0.10	
FW	3581.980										
233	3601.410	FS	T	{FW, 233}	19.430	{ 233, FW}	0.379	{ 232, 233}	24.030	0.10	
FW	3601.790										
FW	3621.600										
234	3624.080	FS	T	{FW, 234}	2.472	{ 234, FW}	17.340	{ 233, 234}	22.660	0.10	
FW	3641.420										
235	3645.450	FS	T	{FW, 235}	4.031	{ 235, FW}	15.780	{ 234, 235}	21.370	0.10	
FW	3661.230										
236	3665.600	FS	T	{FW, 236}	4.372	{ 236, FW}	15.440	{ 235, 236}	20.150	0.10	
FW	3681.040										
237	3684.610	FS	T	{FW, 237}	3.565	{ 237, FW}	16.250	{ 236, 237}	19.000	0.10	
FW	3700.850										
238	3702.530	FS	T	{FW, 238}	1.674			{ 237, 238}	17.920	0.10	
239	3719.430	FS	T			{ 239, FW}	1.238	{ 238, 239}	16.900	0.10	
FW	3720.670										
240	3735.360	FS	T	{FW, 240}	14.700	{ 240, FW}	5.113	{ 239, 240}	15.940	0.10	
FW	3740.480										
241	3750.390	FS	T	{FW, 241}	9.916	{ 241, FW}	9.896	{ 240, 241}	15.030	0.10	
FW	3760.290										
242	3764.570	FS	T	{FW, 242}	4.276			{ 241, 242}	14.170	0.10	
243	3777.930	FS	T			{ 243, FW}	2.171	{ 242, 243}	13.360	0.10	
FW	3780.100										
244	3790.530	FS	T	{FW, 244}	10.430	{ 244, FW}	9.380	{ 243, 244}	12.600	0.10	
FW	3799.910										
245	3802.420	FS	T	{FW, 245}	2.504			{ 244, 245}	11.880	0.10	
246	3813.620	FS	T			{ 246, FW}	6.100	{ 245, 246}	11.210	0.10	
FW	3819.720										
247	3824.190	FS	T	{FW, 247}	4.468			{ 246, 247}	10.570	0.10	
248	3834.160	FS	T			{ 248, FW}	5.378	{ 247, 248}	9.966	0.10	
FW	3839.540										
249	3843.560	FS	T	{FW, 249}	4.021			{ 248, 249}	9.398	0.10	
250	3852.420	FS	T			{ 250, FW}	6.929	{ 249, 250}	8.863	0.10	
FW	3859.350										
251	3860.780	FS	T	{FW, 251}	1.429			{ 250, 251}	8.358	0.10	
252	3868.660	FS	T					{ 251, 252}	7.881	0.10	
253	3876.090	FS	T			{ 253, FW}	3.070	{ 252, 253}	7.432	0.10	
FW	3879.160										
254	3883.100	FS	T	{FW, 254}	3.939			{ 253, 254}	7.009	0.09	
255	3889.710	FS	T					{ 254, 255}	6.609	0.08	
256	3895.940	FS	T			{ 256, FW}	3.032	{ 255, 256}	6.232	0.08	

268	3948.070	FS	T							{ 267,	268}	3.082	0.03
269	3950.980	FS	T							{ 268,	269}	2.906	0.03
270	3953.720	FS	T							{ 269,	270}	2.741	0.03
271	3956.300	FS	T					{ 271,	FW}	2.108	{ 270,	271}	2.585	0.03
FW	3958.410													
272	3958.740	FS	T	E-AZ	{FW,	272}	0.329				{ 271,	272}	2.437	0.02
273	3961.010	FS	T								{ 272,	273}	2.271	0.05
274	3963.150	FS	T								{ 273,	274}	2.143	0.05
275	3965.170	FS	T								{ 274,	275}	2.022	0.04
276	3967.080	FS	T								{ 275,	276}	1.908	0.04
277	3968.880	FS	T								{ 276,	277}	1.801	0.04
278	3970.580	FS	T								{ 277,	278}	1.700	0.04
279	3972.190	FS	T					{ 279,	FW}	0.549	{ 278,	279}	1.604	0.03
FW	3972.740													
280	3973.700	FS	T	E-AZ	{FW,	280}	0.964				{ 279,	280}	1.514	0.03
281	3975.090	FS	T								{ 280,	281}	1.393	0.07
282	3976.410	FS	T								{ 281,	282}	1.317	0.06
283	3977.660	FS	T								{ 282,	283}	1.244	0.06
284	3978.830	FS	T								{ 283,	284}	1.176	0.05
285	3979.940	FS	T								{ 284,	285}	1.111	0.05
286	3980.990	FS	T								{ 285,	286}	1.050	0.05
287	3981.990	FS	T								{ 286,	287}	0.993	0.04
288	3982.920	FS	T								{ 287,	288}	0.938	0.04
289	3983.810	FS	T								{ 288,	289}	0.887	0.04
290	3984.650	FS	T								{ 289,	290}	0.838	0.04
291	3985.440	FS	T								{ 290,	291}	0.792	0.03
292	3986.190	FS	T								{ 291,	292}	0.748	0.03
293	3986.900	FS	T								{ 292,	293}	0.707	0.03
294	3987.570	FS	T								{ 293,	294}	0.668	0.03
295	3988.200	FS	T					{ 295,	FW}	0.302	{ 294,	295}	0.632	0.02
FW	3988.500													
296	3988.750	FS	T	V-GV	{FW,	296}	0.254				{ 295,	296}	0.556	0.02

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