AM-82-212

American Mineralogist, Volume 68, pages 255–261, 1983

The crystal structure of sulfoborite, $Mg_3SO_4(B(OH)_4)_2(OH)F$

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Abstract

Sulfoborite, $Mg_3SO_4(B(OH)_4)_2(OH)F$, is orthorhombic, space group *Pnma* with a = 10.132, b = 12.537 and c = 7.775Å (all ±0.001Å). There are four formula units in the unit cell. The crystal structure has been solved using Sayre's equation. All atoms including hydrogens have been located and refined by least squares to an R-value of 0.044. The magnesium ions are of two types; $MgO_2F(OH)_3$ and $MgOF(OH)_4$. The two types of octahedra share an edge and/or corners among themselves. The sulphate tetrahedron shares corners with both types of octahedra and these three units form crude sheets centered about the mirror planes. The sheets are jointed by the boron tetrahedra into a three-dimensional structure. Three hydrogen atoms do not participate in hydrogen bonding, the remaining two form normal hydrogen bonds.

Introduction

The original descriptions of sulfoborite indicated a chemical formula of $Mg_6H_4(BO_3)_4SO_4{\cdot}7H_2O$ (Naupert and Wense, 1893) and orthorhombic symmetry with point group *mm*2 (Bücking, 1893). The mineral has been studied several times since 1893 and no agreement as to the chemical composition was evident. Lobanova (1968) proposed the formula $Mg_6B_4O_{10}(SO_4)_2{\cdot}9H_2O$ even though his published analysis indicated 4.7% fluorine and 0.34% chlorine. Braitsch (1961) suggested $Mg_6SO_4(BO_2OH)_4{\cdot}8H_2O$ as the formula and confirmed by single crystal X-ray diffraction the orthorhombic symmetry. He could not distinguish between the space groups *Pcmn* and $Pc2_1n$. Kondrat'eva (1964) analyzed several samples and confirmed the Lobanova formula. More recently, Ostrovskaya (1967) used infrared spectroscopy to demonstrate the presence of hydroxyl and the absence of water indicating that previous analyses had incorrectly equated OH to H_2O. In addition, it was concluded that the boron was tetrahedrally and not trigonally coordinated.

The major differences between these proposed formulae lie in the amounts of water of hydration, hydroxyl and hydrogen. At the time this work was begun, we were not aware of Ostrovskaya's paper and we felt that a crystal structure determination was the only way to resolve these questions. Since the mineral contains only light elements, it was hoped that the hydrogen atoms could be located and refined. The resulting structure would, in addition to resolving the question of the chemistry of sulfoborite, provide some interesting information about hydrogen bonding and the role of fluorine and hydroxyls in this structure. A preliminary report of the structure analysis was presented by Giese and Penna (1968). Ioryish *et al.* (1976) have published an independent structure determination which differs from that of Giese and Penna in being less accurate, in apparently misidentifying one of the anions and in not locating the hydrogen atoms. For these very important reasons, the structure is reported here.

0003–004X/83/0102–0255$02.00

H	K	L	FO	FC
0	0	2	9.97	-6.17
0	0	4	137.64	143.70
0	0	6	10.40	9.34
0	0	8	87.94	92.98
0	0	10	5.18	4.37
1	0	1	10.31	8.58
1	0	2	47.15	-47.32
1	0	3	34.74	-35.12
1	0	4	55.52	57.59
1	0	5	30.02	-30.64
1	0	6	29.92	31.26
1	0	7	2.70	11.00
1	0	8	33.28	33.75
1	0	9	12.11	11.94
1	0	10	20.92	21.05
2	0	0	58.34	52.45
2	0	1	50.59	-46.02
2	0	2	72.80	-66.96
2	0	3	15.15	15.06
2	0	4	23.06	19.23
2	0	5	50.12	-50.52
2	0	6	56.75	-57.51
2	0	7	9.45	-9.38
2	0	8	56.30	57.54
2	0	9	52.20	-53.75
2	0	10	5.44	-4.06
3	0	1	170.08	177.74
3	0	2	12.02	10.81
3	0	3	190.31	195.86
3	0	4	2.37	1.65
3	0	5	20.43	20.51
3	0	6	13.15	-12.01
3	0	7	24.80	24.07
3	0	8	2.32	1.28
3	0	9	58.52	59.94
3	0	10	12.76	-14.09
4	0	0	40.21	-37.59
4	0	1	22.95	21.73
4	0	2	45.95	43.29
4	0	3	78.29	78.62
4	0	4	70.38	-69.31
4	0	5	51.23	-49.69
4	0	6	4.88	4.07
4	0	7	69.08	69.70
4	0	8	10.49	10.01
4	0	9	14.79	14.41
4	0	10	21.31	20.35
5	0	1	19.36	19.21
5	0	2	4.17	-3.67
5	0	3	56.40	-54.08
5	0	4	[illegible]	1.39
5	0	5	6.29	3.52
5	0	6	35.59	-36.70
5	0	7	2.16	.39
5	0	8	25.70	-26.15
5	0	9	[illegible]	28.58
5	0	10	[illegible]	-12.19
6	0	0	112.68	-112.26
6	0	1	51.54	-50.06
6	0	2	165.13	[illegible]
6	0	3	61.33	60.13
6	0	4	52.18	-51.77
6	0	5	30.73	-30.89
6	0	6	90.84	90.54
6	0	7	10.49	-9.07
6	0	8	6.63	1.39
6	0	9	12.51	-11.11
7	0	1	22.27	19.85
7	0	2	16.48	-17.65
7	0	3	17.63	-18.64
7	0	4	33.93	33.42
7	0	5	15.79	-14.75
7	0	6	30.38	30.01
7	0	7	8.52	-4.98
7	0	8	2.67	.61
7	0	9	20.99	21.31
8	0	0	63.41	-69.42
8	0	1	27.23	27.78
8	0	2	48.08	49.01
8	0	3	2.64	-.57
8	0	4	50.46	-47.75
8	0	5	16.98	[illegible]
8	0	6	19.55	19.30
8	0	7	23.59	-22.91
8	0	8	6.07	-3.06
8	0	9	10.29	-9.98
9	0	1	66.71	64.86
9	0	2	33.88	31.07
9	0	3	47.23	46.49
9	0	4	15.97	-16.48
9	0	5	6.79	6.70
9	0	6	2.38	-.90
9	0	7	10.98	12.08
9	0	8	23.54	-22.97
10	0	0	29.22	[illegible]
10	0	1	61.56	63.34
10	0	2	3.63	2.99
10	0	3	8.02	-6.76
10	0	4	10.48	-9.39
10	0	5	13.50	11.86
10	0	6	11.26	-9.77
10	0	7	6.65	-6.49
11	0	1	6.96	7.31
11	0	2	2.81	.36
11	0	3	18.84	-17.94
11	0	4	12.61	12.01
11	0	5	10.42	-9.60
11	0	6	24.19	-21.71
12	0	0	60.15	64.44
12	0	1	28.44	28.04
12	0	2	5.96	5.33
12	0	3	6.23	-5.50
12	0	4	24.14	23.98
12	0	5	23.82	23.95
13	0	1	16.88	16.56
13	0	2	3.32	-2.04
13	0	3	5.01	4.06
13	0	4	19.13	19.89
14	0	0	10.77	9.35
14	0	1	25.93	25.58
14	0	2	19.01	-17.72
0	1	1	19.01	16.06
0	1	3	89.08	-95.58
0	1	5	4.03	5.19
0	1	7	16.06	-15.74

H	K	L	FO	FC
0	1	9	4.41	5.45
1	1	1	60.19	58.14
1	1	2	78.82	-83.55
1	1	3	16.35	-15.64
1	1	4	15.10	13.63
1	1	5	34.89	35.24
1	1	6	37.36	38.01
1	1	7	2.57	1.01
1	1	8	15.14	14.67
1	1	9	3.55	.83
1	1	10	[illegible]	-8.13
2	1	0	23.01	22.39
2	1	1	7.41	5.31
2	1	2	58.63	-55.60
2	1	3	28.96	-29.63
2	1	4	2.94	3.85
2	1	5	23.43	23.20
2	1	6	17.21	-16.76
2	1	7	22.15	21.68
2	1	8	3.37	[illegible]
2	1	9	28.70	29.27
2	1	10	5.02	4.17
3	1	1	13.13	-10.17
3	1	2	74.43	-75.08
3	1	3	37.43	-35.75
3	1	4	31.70	-28.89
3	1	5	22.25	-22.81
3	1	6	7.78	8.62
3	1	7	2.05	-.37
3	1	8	4.07	-2.90
3	1	9	[illegible]	[illegible]
3	1	10	26.10	-25.80
4	1	0	20.46	22.42
4	1	1	17.89	14.41
4	1	2	34.70	33.02
4	1	3	28.21	-27.76
4	1	4	45.32	41.27
4	1	5	17.73	[illegible]
4	1	6	[illegible]	[illegible]
4	1	7	34.87	34.50
4	1	8	30.74	30.78
4	1	9	2.84	.41
4	1	10	9.42	-9.02
5	1	1	2.22	1.06
5	1	2	22.90	-23.72
5	1	3	17.44	-17.89
5	1	4	12.12	-10.90
5	1	5	26.67	-24.63
5	1	6	50.33	[illegible]
5	1	7	7.23	7.44
5	1	8	15.07	14.73
5	1	9	9.90	8.87
5	1	10	2.68	.17
6	1	0	11.22	-10.58
6	1	1	48.55	-48.60
6	1	2	49.38	-52.13
6	1	3	15.96	-13.10
6	1	4	5.94	-5.56
6	1	5	28.35	-26.51
6	1	6	44.27	-44.61
6	1	7	17.27	17.21
6	1	8	3.78	2.42
6	1	9	15.97	-15.63
7	1	1	51.98	50.98
7	1	2	43.48	-44.21
7	1	3	5.72	-5.36
7	1	4	5.24	5.83
7	1	5	8.45	7.82
7	1	6	8.54	8.18
7	1	7	12.51	12.30
7	1	8	9.52	7.91
7	1	9	9.61	9.17
8	1	0	2.07	.62
8	1	1	50.50	-50.29
8	1	2	3.10	-1.53
8	1	3	16.80	[illegible]
8	1	4	9.71	-8.60
8	1	5	4.49	-2.67
8	1	6	10.14	-9.94
8	1	7	36.43	35.99
8	1	8	5.90	4.37
8	1	9	7.07	6.81
9	1	1	11.38	-11.11
9	1	2	20.11	-20.15
9	1	3	41.37	-43.23
9	1	4	20.82	-19.66
9	1	5	36.41	-35.37
9	1	6	5.81	4.75
9	1	7	3.23	-2.30
9	1	8	4.94	5.41
10	1	0	8.99	9.99
10	1	1	11.82	11.40
10	1	2	34.37	35.46
10	1	3	14.01	-13.92
10	1	4	10.29	-9.29
10	1	5	10.25	-10.01
10	1	6	9.17	8.57
10	1	7	22.08	22.33
10	1	8	16.48	16.09
11	1	1	4.30	-2.73
11	1	2	14.27	-14.73
11	1	3	6.50	-6.03
11	1	4	3.24	-11.37
11	1	5	19.33	18.56
11	1	6	30.13	-33.98
11	1	7	13.16	-12.82
12	1	0	2.99	.28
12	1	1	17.63	-17.47
12	1	2	40.44	-40.90
12	1	3	5.97	5.99
12	1	4	21.54	[illegible]
12	1	5	3.71	[illegible]
13	1	1	3.11	2.97
13	1	2	2.82	-2.21
13	1	3	2.73	.93
14	1	0	[illegible]	.64
14	1	1	13.88	14.50
0	2	0	46.19	-37.39
0	2	2	10.20	-7.90
0	2	4	4.16	4.27
0	2	6	19.49	-20.42
0	2	8	22.06	-21.64
0	2	10	27.14	17.95
1	2	1	58.34	-58.36
1	2	2	65.06	-62.58

H	K	L	FO	FC
1	2	3	8.79	-8.41
1	2	4	4.35	4.03
1	2	5	3.73	3.93
1	2	6	6.41	6.79
1	2	7	26.62	27.69
1	2	8	[illegible]	-3.35
1	2	9	36.86	-37.87
1	2	10	2.76	1.15
2	2	0	99.73	-111.70
2	2	1	23.92	23.22
2	2	2	35.50	35.59
2	2	3	62.19	-61.15
2	2	4	74.92	76.96
2	2	5	66.13	67.10
2	2	6	9.44	9.74
2	2	7	26.15	-27.07
2	2	8	24.06	-24.54
2	2	9	4.16	-4.42
2	2	10	2.97	-.18
3	2	1	28.54	-28.22
3	2	2	2.97	-1.45
3	2	3	12.28	-13.63
3	2	4	19.25	18.85
3	2	5	20.07	19.90
3	2	6	16.02	-16.49
3	2	7	39.07	-38.57
3	2	8	23.04	23.45
3	2	9	22.33	-22.37
3	2	10	9.43	-9.29
4	2	0	104.14	-112.20
4	2	1	46.02	46.09
4	2	2	21.05	-18.31
4	2	3	57.50	-47.80
4	2	4	16.93	17.65
4	2	5	2.56	1.27
4	2	6	6.55	6.00
4	2	7	3.02	-.77
4	2	8	29.51	-30.47
4	2	9	12.05	[illegible]
4	2	10	13.23	-13.43
5	2	1	11.17	-9.25
5	2	2	35.95	34.87
5	2	3	8.14	-6.27
5	2	4	23.15	-23.37
5	2	5	45.65	44.48
5	2	6	12.58	-6.07
5	2	7	21.95	20.66
5	2	8	16.09	16.21
5	2	9	13.55	-13.25
5	2	10	15.55	-15.58
6	2	0	35.83	-38.30
6	2	1	16.07	-15.55
6	2	2	3.28	.79
6	2	3	9.25	-9.76
6	2	4	10.36	-10.77
6	2	5	23.62	22.95
6	2	6	4.04	-1.25
6	2	7	18.54	18.83
6	2	8	19.64	-18.39
6	2	9	17.73	-16.48
7	2	1	42.28	-41.19
7	2	2	29.72	-28.89
7	2	3	12.65	-12.43
7	2	4	20.63	-18.54
7	2	5	8.84	8.25
7	2	6	17.79	18.41
7	2	7	20.65	-19.96
7	2	8	4.32	-3.09
7	2	9	13.34	-13.18
8	2	0	33.71	-35.83
8	2	1	67.83	-69.64
8	2	2	3.68	2.44
8	2	3	10.91	9.40
8	2	4	51.98	53.29
8	2	5	5.49	3.08
8	2	6	15.68	14.16
8	2	7	9.77	7.43
8	2	8	3.16	-2.62
8	2	9	24.02	-25.14
9	2	1	7.89	7.57
9	2	2	15.71	15.89
9	2	3	3.46	2.42
9	2	4	2.97	-.25
9	2	5	6.85	5.61
9	2	6	14.06	-14.27
9	2	7	12.85	11.85
9	2	8	16.79	-12.87
10	2	0	13.00	12.13
10	2	1	29.96	-29.64
10	2	2	11.90	-10.00
10	2	3	3.41	-3.60
10	2	4	14.32	-13.77
10	2	5	4.69	-3.37
10	2	6	21.93	21.98
10	2	7	5.38	-3.53
11	2	1	3.03	-.61
11	2	2	10.20	9.22
11	2	3	21.55	-22.45
11	2	4	24.45	23.86
11	2	5	9.87	8.30
11	2	6	8.79	[illegible]
12	2	0	2.63	-2.44
12	2	1	13.46	-13.09
12	2	2	15.88	-16.46
12	2	3	2.97	[illegible]
12	2	4	25.76	[illegible]
13	2	1	23.97	-25.30
13	2	2	25.29	-25.27
13	2	3	3.75	2.47
14	2	0	4.12	-2.70
14	2	1	21.25	-23.20
14	2	2	6.66	-6.37
0	3	1	86.82	87.36
0	3	3	63.49	-50.34
0	3	5	59.46	54.14
0	3	7	62.63	-65.43
0	3	9	20.37	20.42
1	3	1	53.12	-52.52
1	3	2	73.32	76.89
1	3	3	3.93	.99
1	3	4	7.59	2.69
1	3	5	42.38	-43.94
1	3	6	35.39	-36.05
1	3	7	21.78	-23.34
1	3	8	3.75	-3.50

H	K	L	FO	FC
1	3	9	15.63	-15.29
1	3	10	4.35	3.98
2	3	0	27.73	27.80
2	3	1	80.56	79.48
2	3	2	15.84	15.53
2	3	3	24.23	-20.71
2	3	4	62.41	63.44
2	3	5	36.99	37.38
2	3	6	4.95	-3.54
2	3	7	45.95	-47.55
2	3	8	45.36	46.66
2	3	9	[illegible]	1.84
2	3	10	5.22	-5.70
3	3	1	20.60	-20.07
3	3	2	49.77	50.78
3	3	3	3.56	2.91
3	3	4	5.92	-2.49
3	3	5	15.89	15.53
3	3	6	30.17	-30.28
3	3	7	[illegible]	-14.96
3	3	8	14.16	-14.23
3	3	9	3.86	2.88
3	3	10	15.28	16.41
4	3	0	68.35	69.32
4	3	1	37.58	-34.11
4	3	2	95.23	-94.42
4	3	3	60.71	58.19
4	3	4	16.07	14.70
4	3	5	7.92	-7.72
4	3	6	34.25	-34.25
4	3	7	19.89	-19.77
4	3	8	[illegible]	6.95
4	3	9	7.32	-7.45
4	3	10	32.85	-32.67
5	3	1	8.79	7.85
5	3	2	35.62	35.45
5	3	3	25.62	24.93
5	3	4	17.08	16.14
5	3	5	38.60	38.06
5	3	6	30.52	-30.09
5	3	7	10.17	6.65
5	3	8	13.17	-13.38
5	3	9	7.39	8.14
5	3	10	11.05	11.55
6	3	0	16.88	15.52
6	3	1	43.94	-43.28
6	3	2	27.23	-26.44
6	3	3	64.41	62.64
6	3	4	16.56	14.77
6	3	5	46.04	-45.62
6	3	6	[illegible]	-2.11
6	3	7	9.32	6.87
6	3	8	6.67	6.43
6	3	9	24.66	-24.51
7	3	1	34.49	-34.95
7	3	2	46.82	45.60
7	3	3	17.37	17.13
7	3	4	7.88	-7.50
7	3	5	13.33	-12.02
7	3	6	3.59	-3.14
7	3	7	15.53	-14.72
7	3	8	12.89	-12.27
7	3	9	21.41	-21.10
8	3	0	9.42	-9.33
8	3	1	8.06	-5.05
8	3	2	12.13	11.36
8	3	3	42.20	41.74
8	3	4	8.06	7.83
8	3	5	33.01	-31.95
8	3	6	24.19	24.71
8	3	7	8.19	7.86
8	3	8	3.34	-.49
8	3	9	19.51	-20.88
9	3	1	12.17	11.46
9	3	2	17.61	17.67
9	3	3	8.79	8.51
9	3	4	14.06	12.52
9	3	5	20.16	-19.95
9	3	6	8.84	-8.60
9	3	7	12.54	-13.77
9	3	8	31.08	-33.23
10	3	0	3.52	.84
10	3	1	15.42	16.05
10	3	2	24.32	23.91
10	3	3	13.93	-18.69
10	3	4	3.32	.37
10	3	5	21.26	21.38
10	3	6	16.40	-16.86
10	3	7	17.75	-17.55
11	3	1	4.98	4.20
11	3	2	13.60	13.63
11	3	3	16.63	16.77
11	3	4	13.92	13.39
11	3	5	14.64	-14.74
11	3	6	24.87	-26.72
12	3	0	30.05	30.30
12	3	1	15.43	12.91
12	3	2	9.49	-8.61
12	3	3	7.53	-8.30
12	3	4	3.47	1.40
12	3	5	8.53	-7.55
13	3	1	13.03	12.44
13	3	2	5.03	5.45
13	3	3	2.93	1.90
14	3	0	14.54	-15.66
14	3	1	26.18	25.45
0	4	0	129.66	128.17
0	4	2	90.75	-86.85
0	4	4	125.28	-128.58
0	4	6	15.77	15.74
0	4	8	19.43	-19.74
0	4	10	21.26	22.50
1	4	1	15.35	16.76
1	4	2	65.44	-63.96
1	4	3	33.23	-33.05
1	4	4	11.04	-12.09
1	4	5	31.13	-32.46
1	4	6	5.81	-5.11
1	4	7	4.02	-1.98
1	4	8	4.11	3.27
1	4	9	4.20	3.71
1	4	10	3.37	-.27
2	4	0	50.07	-44.86
2	4	1	69.56	69.21
2	4	2	14.06	13.36

H	K	L	FO	FC
2	4	3	35.27	-36.62
2	4	4	73.49	-74.42
2	4	5	55.05	55.82
2	4	6	14.94	-15.34
2	4	7	31.98	-32.24
2	4	8	2.63	-1.28
2	4	9	8.65	9.42
2	4	10	7.96	7.57
3	4	1	61.12	-56.99
3	4	2	13.41	11.55
3	4	3	16.78	16.49
3	4	4	3.78	1.50
3	4	5	75.54	-74.92
3	4	6	12.43	-11.21
3	4	7	30.18	-30.23
3	4	8	2.67	-1.12
3	4	9	25.03	26.48
3	4	10	13.41	-14.32
4	4	0	16.35	17.91
4	4	1	111.56	114.78
4	4	2	29.77	28.71
4	4	3	65.44	-62.77
4	4	4	41.02	-39.73
4	4	5	7.52	7.94
4	4	6	11.18	-10.91
4	4	7	25.15	-25.31
4	4	8	15.77	15.79
4	4	9	35.50	36.58
4	4	10	8.79	7.76
5	4	1	9.09	-7.52
5	4	2	14.79	14.01
5	4	3	72.10	-70.56
5	4	4	26.15	24.78
5	4	5	22.90	-23.40
5	4	6	9.64	-9.33
5	4	7	17.44	-17.33
5	4	8	3.39	-2.85
5	4	9	5.74	4.80
6	4	0	62.12	65.80
6	4	1	12.16	12.53
6	4	2	46.08	-45.58
6	4	3	6.62	[illegible]
6	4	4	51.63	-50.67
6	4	5	12.24	11.12
6	4	6	25.94	-25.40
6	4	7	40.89	-40.68
6	4	8	12.65	13.43
6	4	9	8.14	[illegible]
7	4	1	32.02	32.60
7	4	2	31.28	-30.53
7	4	3	5.27	-4.94
7	4	4	9.22	8.94
7	4	5	11.44	-10.76
7	4	6	4.54	4.84
7	4	7	2.95	-1.37
7	4	8	18.22	-19.04
7	4	9	17.79	17.50
8	4	0	8.51	-5.50
8	4	1	8.10	8.89
8	4	2	54.35	-53.13
8	4	3	36.00	33.90
8	4	4	7.09	-1.73
8	4	5	17.41	-17.08
8	4	6	55.70	-55.40
8	4	7	8.48	8.19
8	4	8	16.26	15.71
9	4	1	2.50	-2.88
9	4	2	32.79	32.76
9	4	3	10.52	-10.70
9	4	4	14.80	-14.96
9	4	5	33.60	-32.36
9	4	6	3.02	-.97
9	4	7	16.62	-15.30
9	4	8	24.97	-24.73
10	4	0	57.92	61.62
10	4	1	[illegible]	-4.59
10	4	2	10.12	-10.08
10	4	3	34.76	35.13
10	4	4	16.31	15.38
10	4	5	51.30	-49.75
10	4	6	22.21	-21.56
10	4	7	14.76	14.26
11	4	1	11.38	-10.26
11	4	2	1.63	6.42
11	4	3	36.43	-36.94
11	4	4	20.31	19.92
11	4	5	26.18	-26.26
11	4	6	9.73	-9.02
12	4	0	7.44	3.19
12	4	1	16.71	-18.13
12	4	2	5.89	-3.49
12	4	3	35.63	35.27
12	4	4	24.20	-23.18
12	4	5	13.45	-13.45
13	4	1	21.68	20.71
13	4	2	7.41	-7.35
13	4	3	1.85	7.31
0	5	1	54.53	55.91
0	5	3	3.80	-.96
0	5	5	42.07	-41.55
0	5	7	34.24	35.82
0	5	9	25.53	-25.57
1	5	1	59.68	59.60
1	5	2	68.20	-69.60
1	5	3	2.94	.85
1	5	4	15.85	15.09
1	5	5	40.17	40.38
1	5	6	30.68	31.42
1	5	7	3.11	1.03
1	5	8	19.30	20.00
1	5	9	10.66	9.97
1	5	10	8.43	-8.28
2	5	0	87.54	-89.24
2	5	1	42.15	-41.87
2	5	2	28.53	28.17
2	5	3	19.95	19.47
2	5	4	66.30	-65.86
2	5	5	18.32	-18.23
2	5	6	30.60	30.86
2	5	7	50.51	51.71
2	5	8	37.79	-37.98
2	5	9	7.83	7.88
2	5	10	24.08	24.50
3	5	1	9.06	8.39
3	5	2	49.54	-49.64

H	K	L	FO	FC
3	5	3	26.65	-24.98
3	5	4	18.52	-19.14
3	5	5	4.63	-4.40
3	5	6	14.64	14.32
3	5	7	3.30	-2.46
3	5	8	3.73	.99
3	5	9	6.27	6.07
3	5	10	21.82	-21.30
4	5	0	49.08	-50.53
4	5	1	11.54	10.50
4	5	2	121.63	124.74
4	5	3	26.05	-25.88
4	5	4	30.83	[illegible]
4	5	5	2.98	[illegible]
4	5	6	43.41	42.19
4	5	7	29.77	30.28
4	5	8	7.01	-6.29
4	5	9	6.54	6.83
4	5	10	23.94	24.57
5	5	1	2.28	.95
5	5	2	19.42	-20.23
5	5	3	18.12	-19.30
5	5	4	13.37	-12.70
5	5	5	20.69	-19.36
5	5	6	50.95	50.31
5	5	7	5.32	5.46
5	5	8	10.81	10.51
5	5	9	9.30	9.06
6	5	0	22.58	-22.63
6	5	1	9.12	6.29
6	5	2	5.34	3.84
6	5	3	51.88	-52.26
6	5	4	19.64	-17.95
6	5	5	21.16	20.81
6	5	6	11.86	-9.44
6	5	7	10.83	-9.83
6	5	8	6.83	-7.05
6	5	9	10.40	10.29
7	5	1	51.25	51.38
7	5	2	37.54	-37.50
7	5	3	8.38	7.85
7	5	4	3.80	3.41
7	5	5	9.40	8.30
7	5	6	12.50	12.66
7	5	7	20.72	20.52
7	5	8	9.99	9.00
7	5	9	11.72	11.05
8	5	0	28.44	30.16
8	5	1	10.96	9.93
8	5	2	23.11	-23.12
8	5	3	33.54	-32.89
8	5	4	16.82	16.92
8	5	5	38.14	37.63
8	5	6	24.53	-23.30
8	5	7	4.33	2.97
8	5	8	17.91	17.65
9	5	1	4.80	4.64
9	5	2	17.58	-16.56
9	5	3	22.85	-22.62
9	5	4	13.90	-13.04
9	5	5	25.88	-24.91
9	5	6	7.31	5.97
9	5	7	12.47	11.93
10	5	0	57.17	61.53
10	5	1	11.98	12.35
10	5	2	5.54	-5.28
10	5	3	31.90	-32.16
10	5	4	32.45	32.90
10	5	5	11.72	10.91
10	5	6	17.49	-16.94
10	5	7	9.38	9.67
11	5	1	19.13	19.71
11	5	2	6.24	-5.18
11	5	3	9.08	-8.92
11	5	4	3.28	-2.85
11	5	5	7.83	-7.04
11	5	6	16.02	15.23
12	5	0	7.35	7.97
12	5	1	22.78	-22.95
12	5	2	14.11	-13.85
12	5	3	3.78	-3.27
12	5	4	5.21	-3.40
12	5	5	3.55	-1.08
13	5	1	23.85	24.16
13	5	2	11.41	-11.10
13	5	3	6.97	5.19
0	6	0	107.90	-107.57
0	6	2	44.44	-47.20
0	6	4	21.82	-21.46
0	6	6	24.05	-22.58
0	6	8	20.99	-20.89
0	6	10	18.92	-19.12
1	6	1	58.77	58.00
1	6	2	62.93	-60.97
1	6	3	67.85	66.66
1	6	4	24.49	-25.44
1	6	5	57.81	57.72
1	6	6	16.98	-16.85
1	6	7	49.91	50.67
1	6	8	25.14	-25.16
1	6	9	13.88	-14.04
1	6	10	10.70	-11.68
2	6	0	14.76	10.80
2	6	1	16.10	14.91
2	6	2	55.48	54.17
2	6	3	3.28	-3.95
2	6	4	106.04	109.66
2	6	5	70.76	70.89
2	6	6	41.33	40.99
2	6	7	4.79	4.05
2	6	8	3.95	-3.41
2	6	9	11.20	11.18
2	6	10	10.05	9.60
3	6	1	66.14	-68.17
3	6	2	3.47	2.88
3	6	3	37.39	-36.88
3	6	4	12.26	11.29
3	6	5	4.89	2.43
3	6	6	8.86	-8.34
3	6	7	37.19	-35.16
3	6	8	19.86	16.65
3	6	9	16.91	-16.85
3	6	10	6.03	-4.85
4	6	0	9.78	7.45
4	6	1	7.35	6.01

H	K	L	FO	FC
4	6	2	53.37	52.40
4	6	3	53.29	-51.33
4	6	4	72.29	72.93
4	6	5	26.18	-26.15
4	6	6	40.48	39.73
4	6	7	14.96	-14.88
4	6	8	2.80	-.83
4	6	9	1.78	-.14
5	6	1	40.91	40.67
5	6	2	39.46	[illegible]
5	6	3	37.95	37.52
5	6	4	3.46	1.22
5	6	5	62.87	61.76
5	6	6	18.92	17.58
5	6	7	36.73	35.93
5	6	8	30.63	31.37
5	6	9	8.23	-6.94
6	6	0	53.64	-55.51
6	6	1	11.31	-10.91
6	6	2	25.63	-26.14
6	6	3	9.01	-8.50
6	6	4	16.03	-15.47
6	6	5	23.04	22.00
6	6	6	7.35	-5.55
6	6	7	17.50	17.19
6	6	8	15.01	-13.68
6	6	9	14.90	-14.59
7	6	1	16.37	16.30
7	6	2	36.35	-35.91
7	6	3	36.04	36.07
7	6	4	31.00	-29.17
7	6	5	42.95	42.55
7	6	6	3.20	-.27
7	6	7	8.22	8.72
7	6	8	13.67	-13.32
8	6	0	9.75	-7.82
8	6	1	44.42	-45.06
8	6	2	25.92	26.42
8	6	3	15.50	13.96
8	6	4	62.14	61.70
8	6	5	21.42	21.59
8	6	6	26.36	24.92
8	6	7	20.48	18.88
8	6	8	3.10	.87
9	6	1	33.16	-33.39
9	6	2	7.35	[illegible]
9	6	3	5.98	5.68
9	6	4	6.81	5.20
9	6	5	3.30	-.93
9	6	6	5.42	3.60
9	6	7	12.91	-12.33
10	6	0	11.50	11.98
10	6	1	22.39	-21.19
10	6	2	9.22	9.50
10	6	3	21.38	-20.43
10	6	4	21.00	20.02
10	6	5	20.14	-19.80
10	6	6	20.89	21.31
11	6	1	7.72	8.82
11	6	2	4.10	3.79
11	6	3	16.98	16.39
11	6	4	11.35	-10.98
11	6	5	29.65	28.84
12	6	0	5.23	1.09
12	6	1	3.37	-3.67
12	6	2	14.99	-13.97
12	6	3	12.47	-13.01
12	6	4	2.69	-1.16
13	6	1	4.01	-3.62
13	6	2	26.04	-26.46
0	7	1	9.27	8.74
0	7	3	43.23	44.83
0	7	5	15.23	16.44
0	7	7	3.04	-.70
0	7	9	2.76	-.24
1	7	1	37.00	-37.97
1	7	2	39.46	40.19
1	7	3	3.82	2.96
1	7	4	2.43	1.81
1	7	5	18.82	-19.01
1	7	6	42.56	-42.24
1	7	7	7.19	-7.22
1	7	8	6.45	-5.16
1	7	9	8.62	8.25
1	7	10	2.72	-1.05
2	7	0	54.70	-54.43
2	7	1	7.71	6.88
2	7	2	57.79	59.86
2	7	3	14.40	14.52
2	7	4	20.79	-20.96
2	7	5	19.10	-18.25
2	7	6	18.58	19.01
2	7	7	23.82	-23.95
2	7	8	11.13	-10.71
2	7	9	21.81	-22.66
3	7	1	8.06	8.45
3	7	2	58.00	59.44
3	7	3	12.63	13.55
3	7	4	19.47	20.15
3	7	5	28.39	27.87
3	7	6	6.57	-6.91
3	7	7	10.74	-9.81
3	7	8	4.37	.87
3	7	9	11.05	10.62
4	7	0	43.35	-44.55
4	7	1	19.38	-18.46
4	7	2	10.62	-10.26
4	7	3	35.72	35.38
4	7	4	49.94	-50.72
4	7	5	8.51	-7.98
4	7	6	25.57	24.82
4	7	7	24.32	-24.00
4	7	8	30.20	-29.71
4	7	9	4.94	-4.45
5	7	1	7.91	-7.79
5	7	2	20.00	20.13
5	7	3	3.29	2.80
5	7	4	2.94	-1.83
5	7	5	15.41	14.36
5	7	6	34.92	-33.69
5	7	7	15.07	-13.49
5	7	8	25.09	-25.02
5	7	9	13.67	-12.26
6	7	0	6.85	7.31
6	7	1	17.70	16.59

H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC	H	K	L	FO	FC
6	7	2	49.22	30.16	4	8	9	1.85	-1.39	4	9	2	14.47	-14.78	4	10	2	39.70	-41.00	5	11	4	[illegible]	2.99	8	12	2	24.74	-22.95	3	14	6	3.11	2.55
6	7	3	27.62	28.11	5	8	1	5.79	[illegible]	4	9	3	14.45	-14.68	4	10	3	[illegible]	-17.27	5	11	5	26.87	26.32	8	12	3	6.61	5.52	4	14	0	6.11	-6.24
6	7	4	9.18	8.42	5	8	2	9.13	9.06	4	9	4	18.53	18.09	4	10	4	5.66	4.48	5	11	6	21.84	-30.72	8	12	4	7.40	6.62	4	14	1	10.61	-9.27
6	7	5	13.76	12.43	5	8	3	42.19	-41.48	4	9	5	13.63	-14.20	4	10	5	4.28	1.22	5	11	7	4.49	2.18	8	12	5	13.32	-12.99	4	14	2	5.94	4.09
6	7	6	29.56	29.47	5	8	4	11.55	11.55	4	9	6	7.96	-7.65	4	10	6	15.18	-14.45	6	11	0	17.35	16.36	9	12	1	32.33	31.48	4	14	3	13.07	-11.87
6	7	7	8.86	-8.67	5	8	5	12.56	-13.78	4	9	7	27.05	26.63	4	10	7	10.98	10.04	6	11	1	23.24	-22.64	9	12	2	16.88	[illegible]	4	14	4	37.96	37.77
6	7	8	3.02	.18	5	8	6	14.25	-13.13	4	9	8	28.64	27.86	4	10	8	28.83	-28.15	6	11	2	6.22	-5.11	9	12	3	17.04	[illegible]	4	14	5	15.57	-15.58
7	7	1	49.74	-49.90	5	8	7	3.02	-2.24	5	9	1	2.63	.31	5	10	1	22.68	-22.74	6	11	3	52.28	52.72	9	12	4	4.81	[illegible]	5	14	1	4.73	4.19
7	7	2	36.70	37.00	5	8	8	10.61	-10.40	5	9	2	24.45	-24.47	5	10	2	11.80	11.49	6	11	4	22.21	21.28	10	12	0	26.53	26.98	5	14	2	13.32	12.84
7	7	3	4.50	3.44	6	8	0	34.33	32.54	5	9	3	20.18	-20.18	5	10	3	6.14	-5.79	6	11	5	21.69	-21.13	10	12	1	4.16	4.64	5	14	3	19.05	18.22
7	7	4	8.99	-8.61	6	8	1	26.96	-26.23	5	9	4	21.84	-22.08	5	10	4	18.26	-18.50	6	11	6	4.34	3.86	10	12	2	5.20	-3.01	5	14	4	4.92	-4.75
7	7	5	18.78	-18.66	6	8	2	61.58	61.01	5	9	5	22.69	-22.43	5	10	5	18.91	17.20	6	11	7	3.15	10.60	0	13	1	29.01	-29.30	5	14	5	28.27	27.25
7	7	6	3.68	-2.62	6	8	3	39.03	38.29	5	9	6	34.63	34.30	5	10	6	7.76	-7.93	7	11	1	28.14	-27.96	0	13	3	2.44	-7.14	6	14	0	13.52	[illegible]
7	7	7	10.14	-9.24	6	8	4	63.15	-61.82	5	9	7	5.63	-5.16	5	10	7	16.44	15.57	7	11	2	29.81	29.02	0	13	5	21.13	-22.45	6	14	1	3.64	-3.48
7	7	8	14.63	-12.89	6	8	5	20.73	-20.17	5	9	8	4.75	-3.74	5	10	8	4.71	4.71	7	11	3	10.87	10.45	0	13	7	16.82	16.80	6	14	2	15.20	-15.99
8	7	0	3.98	2.93	6	8	6	40.73	39.44	6	9	0	16.95	17.57	6	10	0	8.53	[illegible]	7	11	4	6.35	-5.55	1	13	1	21.56	22.09	6	14	3	8.25	-8.15
8	7	1	39.04	38.35	6	8	7	2.52	-9.99	6	9	1	44.76	-41.92	6	10	1	4.55	-4.17	7	11	5	11.35	-10.13	1	13	2	32.21	-31.74	6	14	4	3.21	3.77
8	7	2	21.51	-21.79	6	8	8	9.25	-7.41	6	9	2	21.08	-21.09	6	10	2	9.29	-10.29	7	11	6	2.65	-3.23	1	13	3	2.26	1.48	7	14	1	2.94	-2.60
8	7	3	15.61	-13.02	7	8	1	22.20	21.78	6	9	3	14.31	12.23	6	10	3	11.70	-11.76	8	11	0	5.87	[illegible]	1	13	4	7.70	6.85	7	14	2	20.76	-20.45
8	7	4	12.93	12.50	7	8	2	20.70	-20.38	6	9	4	13.67	13.73	6	10	4	10.05	10.07	8	11	1	3.97	-2.20	1	13	5	12.84	13.34	7	14	3	10.85	14.77
8	7	5	4.86	-4.48	7	8	3	6.62	-5.60	6	9	5	14.15	-13.28	6	10	5	20.44	19.94	8	11	2	6.18	5.68	1	13	6	22.23	20.97	8	14	0	13.89	-13.39
8	7	6	7.63	-5.89	7	8	4	14.93	15.41	6	9	6	25.59	-25.08	6	10	6	7.07	-5.97	8	11	3	22.97	23.48	1	13	7	9.77	-8.28	8	14	1	[illegible]	-14.93
8	7	7	[illegible]	-30.86	7	8	5	12.78	-12.37	6	9	7	29.60	28.76	6	10	7	10.82	10.77	8	11	4	16.14	14.55	2	13	0	39.69	-39.20	8	14	2	9.55	9.55
9	7	1	4.25	4.07	7	8	6	7.41	6.71	6	9	8	1.86	11.24	7	10	1	45.87	-45.78	8	11	5	27.06	-25.97	2	13	1	21.76	-21.69	0	15	1	2.76	-.55
9	7	2	19.12	18.72	7	8	7	1.77	-.13	7	9	1	22.10	20.49	7	10	2	20.77	-20.76	9	11	1	4.25	[illegible]	2	13	2	19.34	18.25	0	15	3	19.05	19.13
9	7	3	34.27	35.19	7	8	8	7.49	-6.86	7	9	2	29.72	-29.75	7	10	3	20.08	-19.47	9	11	2	15.62	[illegible]	2	13	3	5.83	4.84	0	15	5	[illegible]	-3.85
9	7	4	19.08	18.99	8	8	0	52.98	-54.94	7	9	3	5.59	-5.65	7	10	4	7.50	-5.86	9	11	3	20.92	20.54	2	13	4	29.72	-30.78	1	15	1	11.12	-10.47
9	7	5	24.54	24.29	8	8	1	33.24	33.42	7	9	4	4.50	-4.27	7	10	5	9.63	-8.32	9	11	4	12.94	[illegible]	2	13	5	5.49	-5.22	1	15	2	21.77	22.34
9	7	6	8.34	-7.47	8	8	2	27.92	28.51	7	9	5	4.16	-4.15	7	10	6	14.08	14.00	9	11	5	15.25	15.12	2	13	6	22.42	21.63	1	15	3	3.36	2.08
9	7	7	8.09	7.51	8	8	3	2.42	1.34	7	9	6	9.51	9.53	7	10	7	22.10	-21.41	10	11	0	20.51	-20.76	2	13	7	36.00	[illegible]	1	15	4	6.48	6.93
10	7	0	9.43	-10.16	8	8	4	45.59	-45.00	7	9	7	9.81	13.93	8	10	0	31.15	-32.15	10	11	1	5.81	5.38	3	13	1	3.94	[illegible]	1	15	5	13.28	-12.76
10	7	1	20.25	19.84	8	8	5	1.66	1.13	8	9	0	9.71	10.37	8	10	1	32.82	-32.06	10	11	2	2.80	2.51	3	13	2	27.09	-27.35	2	15	0	13.10	-20.73
10	7	2	40.61	-41.51	8	8	6	7.67	6.23	8	9	1	39.33	-38.86	8	10	2	9.27	-8.11	10	11	3	12.89	12.35	3	13	3	19.59	[illegible]	2	15	1	7.15	6.88
10	7	3	4.41	3.81	8	8	7	15.18	-14.61	8	9	2	10.85	-10.21	8	10	3	14.19	-7.29	11	11	1	7.05	-7.27	3	13	4	14.84	[illegible]	2	15	2	23.81	22.02
10	7	4	4.30	2.89	9	8	1	24.01	22.54	8	9	3	6.41	4.91	8	10	4	33.79	33.26	0	12	0	92.35	92.62	3	13	5	6.88	[illegible]	2	15	3	14.53	14.54
10	7	5	15.54	15.32	9	8	2	26.28	26.28	8	9	4	4.25	-3.25	8	10	5	5.15	4.28	0	12	2	65.66	67.58	3	13	6	6.37	[illegible]	2	15	4	5.62	-4.28
10	7	6	11.89	-13.65	9	8	3	10.64	9.76	8	9	5	14.03	-13.55	8	10	6	8.58	6.39	0	12	4	31.25	-30.14	3	13	7	6.55	[illegible]	2	15	5	7.53	-6.39
11	7	1	20.85	-20.79	9	8	4	8.36	-8.34	8	9	6	19.62	-19.70	9	10	1	13.89	-14.79	0	12	6	45.78	47.86	4	13	0	5.62	[illegible]	3	15	1	3.58	-2.33
11	7	2	4.14	-2.89	9	8	5	11.29	-11.16	8	9	7	22.32	21.64	9	10	2	4.41	3.41	0	12	8	5.48	5.50	4	13	1	3.33	[illegible]	3	15	2	26.33	25.29
11	7	3	7.09	5.96	9	8	6	5.19	-4.51	9	9	1	8.84	8.70	9	10	3	12.46	12.20	1	12	1	4.67	5.28	4	13	2	57.42	[illegible]	3	15	3	2.91	1.15
11	7	4	2.81	8.07	10	8	0	23.51	24.61	9	9	2	10.14	-9.97	9	10	4	5.32	4.35	1	12	2	12.34	-11.17	4	13	3	15.38	-15.61	3	15	4	1.81	-.18
11	7	5	3.98	4.10	10	8	1	47.55	47.96	9	9	3	15.53	-14.80	9	10	5	3.43	2.84	1	12	3	22.56	-22.88	4	13	4	23.85	-22.44	3	15	5	10.17	10.20
12	7	0	14.89	16.21	10	8	2	13.42	13.53	9	9	4	5.83	-4.87	10	10	0	32.92	-33.69	1	12	4	17.08	17.68	4	13	5	3.10	1.99	4	15	0	11.93	-12.00
12	7	1	18.26	18.63	10	8	3	13.97	-13.55	9	9	5	19.23	-18.38	10	10	1	15.87	-14.11	1	12	5	[illegible]	-14.14	4	13	6	21.26	20.75	4	15	1	1.73	-.80
12	7	2	5.96	4.67	10	8	4	11.29	-10.97	9	9	6	11.64	10.56	10	10	2	25.31	-24.92	1	12	6	[illegible]	17.91	5	13	1	2.31	2.57	4	15	2	2.90	.71
12	7	3	9.32	9.00	10	8	5	2.64	1.53	10	9	0	4.36	1.62	10	10	3	9.39	-8.19	1	12	7	3.17	-2.91	5	13	2	15.18	-14.89	4	15	3	19.74	19.09
12	7	4	29.34	28.46	10	8	6	2.74	-2.41	10	9	1	3.98	-3.57	10	10	4	19.18	-19.35	2	12	0	26.87	-24.64	5	13	3	10.49	-10.50	4	15	4	22.04	-20.48
13	7	1	24.29	-24.45	11	8	1	1.73	2.07	10	9	2	12.46	11.64	11	10	1	7.13	-6.80	2	12	1	15.79	13.62	5	13	4	5.35	-5.13	5	15	1	5.45	-6.08
0	8	0	216.54	228.49	11	8	2	4.92	4.46	10	9	3	18.48	-17.91	11	10	2	3.88	-3.33	2	12	2	15.93	15.49	5	13	5	6.13	-5.63	5	15	2	13.32	13.72
0	8	2	61.79	-62.31	11	8	3	23.07	-23.67	10	9	4	14.60	-14.13	11	10	3	3.10	.49	2	12	3	17.52	-16.72	5	13	6	36.96	36.10	5	15	3	4.11	4.02
0	8	4	26.39	28.11	11	8	4	15.02	14.41	10	9	5	2.68	-1.76	0	11	1	55.86	56.38	2	12	4	42.67	-43.65	6	13	0	22.81	-22.61	5	15	4	6.15	5.60
0	8	6	22.03	-22.33	12	8	0	32.09	31.96	11	9	1	14.75	14.03	0	11	3	14.59	-14.75	2	12	5	6.45	5.03	6	13	1	3.50	-.80	6	15	0	10.91	-10.63
0	8	8	[illegible]	49.02	12	8	1	19.77	18.36	11	9	2	12.02	-11.63	0	11	5	44.42	46.21	2	12	6	3.95	.29	6	13	2	8.82	-7.97	6	15	1	7.52	7.35
1	8	1	10.42	11.48	12	8	2	6.44	-5.95	11	9	3	12.22	-11.95	0	11	7	38.48	-38.47	2	12	7	32.15	-30.87	6	13	3	30.12	-30.47	6	15	2	7.15	6.72
1	8	2	31.63	-31.09	12	8	3	2.69	-.76	11	9	4	7.93	-7.34	1	11	1	30.00	-30.25	3	12	1	53.27	53.02	6	13	4	19.62	-19.50	6	15	3	10.52	10.22
1	8	3	24.21	-24.51	0	9	1	39.56	40.25	12	9	0	17.30	-17.25	1	11	2	28.52	29.29	3	12	2	9.92	9.52	6	13	5	8.92	8.34	7	15	1	15.85	-15.93
1	8	4	14.27	14.01	0	9	3	59.24	-61.94	12	9	1	3.77	-2.77	1	11	3	6.49	-6.81	3	12	3	53.83	55.54	7	13	1	27.87	27.84	7	15	2	22.06	22.28
1	8	5	20.63	-20.68	0	9	5	36.48	36.47	12	9	2	18.02	17.54	1	11	4	5.29	5.73	3	12	4	3.77	-3.89	7	13	2	20.89	-20.43	0	16	0	51.28	50.27
1	8	6	9.61	8.06	0	9	7	6.05	-5.01	0	10	0	45.76	-45.07	1	11	5	5.68	-21.28	3	12	5	8.69	-7.31	7	13	3	5.68	5.43	0	16	2	42.08	-41.03
1	8	7	4.01	-.29	0	9	9	14.16	14.68	0	10	2	16.05	16.22	1	11	6	31.11	-31.18	3	12	6	2.73	-.27	7	13	4	2.81	-.70	0	16	4	25.93	-27.05
1	8	8	8.75	8.19	1	9	1	27.19	25.87	0	10	4	3.93	-2.63	1	11	7	16.03	-15.79	3	12	7	7.28	7.10	7	13	5	3.11	-.74	1	16	1	9.42	9.29
1	8	9	10.51	10.33	1	9	2	53.05	-54.26	0	10	6	3.10	1.64	1	11	8	4.08	-3.16	4	12	0	20.52	20.47	8	13	0	19.56	18.93	1	16	2	16.45	-16.00
2	8	0	38.53	38.47	1	9	3	4.19	-.39	0	10	8	23.63	-23.73	2	11	0	18.36	18.44	4	12	1	48.92	47.81	8	13	1	6.11	5.53	1	16	3	14.12	-14.55
2	8	1	39.85	-41.17	1	9	4	5.07	3.53	1	10	1	47.32	-47.04	2	11	1	39.47	39.60	4	12	2	5.98	-4.78	8	13	2	13.79	-13.55	1	16	4	4.82	-3.33
2	8	2	41.52	-41.25	1	9	5	29.09	29.68	1	10	2	20.09	-19.60	2	11	2	17.50	16.93	4	12	3	13.92	-12.14	8	13	3	19.04	-18.63	2	16	0	13.63	12.99
2	8	3	46.39	47.05	1	9	6	14.15	14.09	1	10	3	21.30	-23.69	2	11	3	14.62	-13.57	4	12	4	20.18	-19.91	8	13	4	12.34	10.57	2	16	1	24.03	-24.22
2	8	4	4.08	-1.46	1	9	7	5.23	4.95	1	10	4	4.37	3.45	2	11	4	30.08	30.05	4	12	5	14.44	13.42	9	13	1	8.62	-7.75	2	16	2	16.62	-15.58
2	8	5	29.13	-28.94	1	9	8	12.51	12.90	1	10	5	2.52	1.30	2	11	5	12.64	13.59	4	12	6	13.47	-13.87	9	13	2	12.04	-12.01	2	16	3	34.25	34.50
2	8	6	44.76	-45.77	1	9	9	19.73	18.73	1	10	6	15.15	14.76	2	11	6	4.27	1.68	4	12	7	7.05	5.34	0	14	0	44.44	-44.67	2	16	4	9.83	-9.60
2	8	7	10.21	10.71	2	9	0	6.33	-5.73	1	10	7	2.82	-.53	2	11	7	35.06	-35.08	5	12	1	2.39	1.12	0	14	2	3.38	-2.54	3	16	1	9.29	-9.84
2	8	8	37.53	36.77	2	9	1	12.03	11.94	1	10	8	2.60	.81	2	11	8	23.45	23.14	5	12	2	4.29	3.22	0	14	4	10.87	-10.72	3	16	2	8.23	7.79
2	8	9	33.25	-32.89	2	9	2	24.98	-24.36	2	10	0	72.77	-73.41	3	11	1	2.95	1.29	5	12	3	27.78	-27.27	0	14	6	5.29	-2.62	3	16	3	5.12	-4.95
3	8	1	32.13	32.31	2	9	3	40.57	-41.37	2	10	1	6.10	-5.78	3	11	2	42.02	41.11	5	12	4	2.41	-.52	1	14	1	5.25	4.60	3	16	4	4.90	-4.45
3	8	2	11.73	11.12	2	9	4	12.07	-11.94	2	10	2	21.39	-21.61	3	11	3	4.88	4.23	5	12	5	11.69	-13.01	1	14	2	19.17	-18.16	4	16	0	18.65	17.95
3	8	3	54.35	55.96	2	9	5	12.78	11.87	2	10	3	15.68	-16.33	3	11	4	9.60	10.09	5	12	6	18.97	-17.60	1	14	3	19.09	17.77	4	16	1	16.39	-15.23
3	8	4	3.67	-3.15	2	9	6	17.87	-17.71	2	10	4	26.23	25.12	3	11	5	18.53	18.97	5	12	7	7.09	6.84	1	14	4	11.30	-11.06	4	16	2	6.67	5.79
3	8	5	28.12	-27.27	2	9	7	7.71	7.22	2	10	5	20.98	21.05	3	11	6	11.34	-9.76	6	12	0	99.17	100.13	1	14	5	31.30	31.60	4	16	3	1.86	21.11
3	8	6	5.45	-4.25	2	9	8	15.80	-15.68	2	10	6	3.65	2.78	3	11	7	10.31	-10.35	6	12	1	15.93	14.91	1	14	6	2.86	1.62	5	16	1	3.21	-1.56
3	8	7	4.72	-3.26	2	9	9	18.60	18.47	2	10	7	19.39	-19.36	3	11	8	3.68	-2.22	6	12	2	11.20	9.81	2	14	0	18.13	-17.84	5	16	2	10.87	10.75
3	8	8	6.91	-5.82	3	9	1	9.18	8.62	2	10	8	28.01	-27.87	4	11	0	15.25	14.34	6	12	3	1.65	-.87	2	14	1	9.78	-9.76	6	16	0	6.02	3.94
3	8	9	36.04	36.23	3	9	2	27.32	-28.05	3	10	1	13.00	-13.49	4	11	1	16.28	-15.21	6	12	4	13.20	13.34	2	14	2	14.73	14.91	0	17	1	10.96	8.74
4	8	0	11.74	8.87	3	9	3	16.91	-16.19	3	10	2	3.90	2.86	4	11	2	47.94	-47.16	6	12	5	9.99	9.73	2	14	3	8.04	6.80	1	17	1	19.61	17.37
4	8	1	17.73	-16.65	3	9	4	5.97	-6.09	3	10	3	5.58	1.02	4	11	3	32.94	33.32	6	12	6	4.89	.51	2	14	4	44.94	45.20	1	17	2	24.88	-23.65
4	8	2	22.42	22.22	3	9	5	1.48	-.86	3	10	4	5.46	4.43	4	11	4	2.91	1.54	7	12	1	12.09	11.89	2	14	5	10.05	19.28	2	17	0	5.71	-4.57
4	8	3	46.47	46.71	3	9	6	21.41	21.11	3	10	5	13.89	14.15	4	11	5	12.80	-11.58	7	12	2	10.89	-9.98	2	14	6	21.89	21.50	2	17	1	3.56	2.29
4	8	4	40.80	-39.84	3	9	7	2.43	-1.17	3	10	6	3.82	-2.94	4	11	6	14.98	-14.27	7	12	3	7.00	-6.14	3	14	1	22.33	-23.16	2	17	2	19.95	-17.97
4	8	5	56.78	-56.62	3	9	8	1.73	8.68	3	10	7	26.40	-24.47	4	11	7	13.60	-13.88	7	12	4	19.55	20.22	3	14	2	3.85	3.37	3	17	1	5.93	4.93
4	8	6	3.34	-2.78	3	9	9	7.15	7.04	3	10	8	10.44	9.94	5	11	1	9.70	9.06	7	12	5	15.98	-15.53	3	14	3	8.08	-6.85	0	0	0	0.00	0.00
4	8	7	43.33	42.43	4	9	0	3.65	12.24	4	10	0	64.41	-64.87	5	11	2	17.41	17.88	8	12	0	6.00	5.23	3	14	4	[illegible]	-.65	0	0	0	0.00	0.00
4	8	8	10.40	10.48	4	9	1	13.39	-12.85	4	10	1	5.37	5.22	5	11	3	17.21	17.19	8	12	1	13.92	13.34	3	14	5	4.11	3.92	0	0	0	0.00	0.00