TABLE 1r

NBS-34 Table 1, pages 2 and 3 -Ionization Potentials and Limits (in eV) (First 30 Elements only)

Z	Element	Spectrum																					*Z*
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX	XXI	
1	H	13.598																					1
2	He	24.587	54.416																				2
3	Li	5.392	75.638	122.451																			3
4	Be	9.322	18.211	153.893	217.713																		4
5	B	8.298	25.154	37.93	259.368	340.217																	5
6	C	11.26	24.383	47.887	64.492	392.077	489.981																6
7	N	14.534	29.601	47.448	77.472	97.888	522.057	667.029															7
8	O	13.618	35.116	54.934	77.412	113.896	138.116	739.315	871.387														8
9	F	17.422	34.97	62.707	87.138	114.24	157.161	185.182	953.886	1103.09													9
10	Ne	21.564	40.962	63.45	97.11	126.21	157.93	207.27	239.09	1195.8	1362.16												10
11	Na	5.139	47.286	71.64	98.91	138.39	172.15	208.47	264.18	299.87	1465.09	1648.66											11
12	Mg	7.646	15.035	80.143	109.24	141.26	186.5	224.94	265.9	327.95	367.53	1761.8	1962.61										12
13	Al	5.986	18.828	28.447	119.99	153.71	190.47	241.43	284.59	330.21	398.57	442.07	2085.98	2304.08									13
14	Si	8.151	16.345	33.492	45.141	166.77	205.05	246.52	303.17	351.1	401.43	476.06	523.5	2437.68	2673.11								14
15	P	10.486	19.725	30.18	51.37	65.023	220.43	263.22	309.41	371.73	424.5	479.57	560.41	611.85	2816.94	3069.76							15
16	S	13.36	23.33	34.83	47.3	72.68	89.049	280.93	328.23	379.1	447.09	504.78	564.65	651.63	707.14	3223.84	3494.1						16
17	Cl	12.967	23.81	39.61	53.46	67.8	97.03	114.193	348.28	400.05	455.62	529.26	591.97	656.69	749.74	809.39	3658.43	3946.19					17
18	Ar	15.759	27.629	40.74	59.81	75.02	91.007	124.319	143.456	422.44	478.68	538.95	618.24	686.09	755.73	854.75	918	4120.78	4426.11				18
19	K	4.341	31.625	45.72	60.91	82.66	100	117.56	154.86	175.814	503.44	564.13	292.09	714.02	787.13	861.77	968	1034	4610.96	4933.93			19
20	Ca	6.113	11.871	50.908	67.1	84.41	108.78	127.7	147.24	188.54	211.27	591.25	656.39	726.03	816.61	895.12	947	1087	1157	5129.05	5469.74		20
21	Se	6.54	12.8	24.76	73.47	91.66	111.1	138	158.7	180.02	225.32	249.832	685.89	755.47	829.79	926							21
22	Ti	6.82	13.58	27.491	43.266	99.22	119.36	140.8	168.5	193.2	215.91	265.23	291.497	787.33	861.33	940.36							22
23	V	6.74	14.65	29.31	46.707	65.23	128.12	150.17	173.7	205.8	230.5	255.04	308.25	336.267	895.58	974.02							23
24	Cr	6.766	16.5	30.96	49.1	69.3	90.56	161.1	184.7	209.3	244.4	270.8	298	355	384.3	1010.64							24
25	Mn	7.435	15.64	33.667	51.2	72.4	95	119.27	196.46	221.8	243.3	286	314.4	343.6	404	435.3	1136.2						25
26	Fe	7.87	16.18	30.651	54.8	75	99	125	151.06	235.04	262.1	290.4	330.8	361	392.2	457	489.5	1266.1					26
27	Co	7.86	17.06	33.5	51.3	79.5	102	129	157	186.13	276	305	336	379	411	444	512	546.8	1403				27
28	Ni	7.635	18.168	34.17	54.9	75.5	108	133	162	193	224.5	321.2	352	384	430	464	499	571	607.2	1547			28
29	Cu	7.726	20.292	36.83	55.2	49.9	103	139	166	199	232	266	368.8	401	435	484	520	557	633	671	1698		29
30	Zn	9.394	17.964	39.722	59.4	82.6	108	134	174	203	238	274	310.8	491.7	454	490	542	579	619	698	738	1856	30

NOTES:

1) The ionization potentials are in electron volts (eV) for each spectrum.
2) The elements are arranged in order of increasing atomic numbers, Z.
3) The successive stages of ionization are indicated at the heading of each column: I, denoting the first spectra (neutral atoms); II, second spectra (single ionized atoms}, etc.
4) The amount of energy required to remove a single electron is based upon an ambient energy level the planet is experiencing at the present time. A billion years ago, that ambient level would have been very much higher.
5) Viewing the table, those higher energy levels would have been the time in the past the element ionizes. The highest limit, therefore would be the time an element first ionizes in a higher ambient.

6) Multiplying any level in Table 1r by 1.6147 produces the time of that level, e.g. oxygen was first able to bond at level VIII 1,407 MYA (1.6147 x 871.387).
7) An anomaly surfaces when small incremental jumps of energy suddenly a become large jump as highlighted. See Table 3r and Figures 1r & 2r for the 8 elements of concern.