

Mineral Industry Surveys

For information, contact:

Peter H. Kuck, Nickel Commodity Specialist
U.S. Geological Survey
989 National Center
Reston, VA 20192
Telephone: (703) 648-4965, Fax: (703) 648-7757
E-mail: pkuck@usgs.gov

Barbara J. McNair (Data)
Telephone: (703) 648-7952
Fax: (703) 648-7975
E-mail: bmcnair@usgs.gov

Internet: <http://minerals.usgs.gov/minerals>

NICKEL IN MARCH 2004

Reported domestic consumption in March, on a daily average basis, was 4% less than that of February, according to the U.S. Geological Survey. Average daily nickel consumption of cathode, pellets, briquets, and ferronickel for stainless steel was 60.2 metric tons per day (t/d)—14% less than the 70.1 t/d (revised) for February 2004, but 3% greater than the 58.6 t/d (revised) for March 2003. Consumption of >99.8% nickel metal to make superalloys (like INCONEL 718 and Waspaloy) increased by 8% from February levels, on a daily average basis. Consumption to make corrosion-resistant, but less-stress-resistant nickel-base alloys (like INCONEL 600 and Nickel 200) rose by 3%. Sales to plating companies averaged 35.3 t/d, 31% more than the revised February sales figure of 26.9 t/d.

On March 31, U.S. consumer stocks of cathode, pellets, briquets, and powder totaled 1,630 metric tons (t)—2% less than the 1,660 t (revised) on February 29, but 17% more than the 1,390 t (revised) reported for yearend 2003. Stocks in London Metal Exchange (LME) warehouses worldwide totaled 14,724 t on March 31—10% greater than the 13,370 t on February 29. Data collected by the International Nickel Study Group indicated that, at the end of February, world nickel producers (excluding those in Austria, China, The Former Yugoslav Republic of Macedonia, Serbia, and the Ural area of Russia) had 98,700 t of nickel in primary products in stock, of which 67,200 t, or 68%, was Class I material (electrolytic cathode, pellets, briquets, rondelles, powder, etc.). The other 31% was Class II materials (ferronickel, oxide sinter, and East Asian utility nickel—products with a nickel content of less than 99%).

The United States imported 19,450 t of primary nickel in the first 2 months of 2004, 15% more than the 16,900 t for the corresponding period of 2003. Class I materials accounted for 83% of total primary nickel imports received during the first 2 months of 2004. Trade data for March will appear in a subsequent report.

Goro project still on hold despite high nickel prices

In December 2002, Inco Limited suspended development work on its Goro laterite mining and processing complex in New Caledonia because of escalating costs. Work was halted

after the project's capital costs were forecast to rise above \$2.1 billion—\$700 million more than the original estimate of \$1.4 billion. Inco has an 85% interest in the project, with the Government of France's Bureau de Recherches Géologiques et Minières (BRGM) holding the remaining 15%.

The Goro project has undergone extensive review and redesign since January 2003. SNC-Lavalin Group Inc. and Foster Wheeler (Qld) Pty Ltd. are aiding Inco in the review. In December 2003, Goro Nickel SA—Inco's New Caledonian subsidiary—awarded a \$39.5 million contract to the two engineering and construction companies for help in the review and planning activities. In early 2004, the design of the hydrometallurgical processing complex was simplified, reducing construction cost estimates by \$500 million. The redesigned plant will occupy a smaller area, resulting in considerable savings in concrete, steel, and piping. The current capital cost estimate is \$1.85 billion. France has agreed to finance \$350 million of the project's direct costs. France also will help finance the building of a regional power station.

A consortium of Japanese companies led by Sumitomo Metal Mining Co., Ltd. is interested in acquiring a 20- to 25%-interest in Goro. Discussions are currently underway with Inco. The final decision on restarting the project is to be made in October 2004. If approved and no serious construction delays occur, Goro could be producing nickel and cobalt by mid-2007. The plant would have a nameplate capacity of 60,000 metric tons per year (t/yr) of nickel. Ramp-up to full capacity is expected to take 3 years. The capacity of the redesigned plant is 9% greater than the 55,000 t/yr estimated for the previous design. Goro has enormous resources, allowing the operation to be incrementally expanded over time. Inco geologists estimate that Goro has 57 million metric tons (Mt) of proven and probable reserves averaging 1.52% nickel and 0.12% cobalt. Inco also has identified 95 Mt of additional resources (Hand, 2004).

Reference Cited

Hand, Scott, 2004, Remarks—Update on findings to date of Phase Two of Goro project review: Inco Limited conference call, Toronto, Ontario, Canada, May 25, 14 p. and 34 slides.

TABLE 1
CONSUMPTION OF NICKEL (EXCLUSIVE OF SCRAP), BY FORM AND USE¹

(Metric tons, nickel content)

Period	Cathodes, pellets, briquets, and powder	Ferronickel	Oxide-sinter, salts, and other forms	Total	Total year to date
2003:					
March	4,400 ^r	653	29	5,080 ^r	15,500 ^r
April	4,860 ^r	400	46	5,310 ^r	20,800 ^r
May	4,400 ^r	524	25	4,950 ^r	25,700 ^r
June	4,130 ^r	498	43	4,670 ^r	30,400 ^r
July	4,240 ^r	900	25	5,170 ^r	35,600 ^r
August	4,320 ^r	873	28	5,220 ^r	40,800 ^r
September	4,320 ^r	844	28 ^r	5,190 ^r	46,000 ^r
October	4,840 ^r	911	32 ^r	5,780 ^r	51,800 ^r
November	4,420 ^r	1,190	30	5,640	57,400 ^r
December	4,130 ^r	902	30	5,060 ^r	62,500 ^r
January-December	53,400 ^r	8,620	412	62,500 ^r	XX
2004:					
January	4,290 ^r	595	34	4,920 ^r	4,920 ^r
February	4,930 ^r	446	26	5,410 ^r	10,300 ^r
March:					
Steel:					
Stainless and heat resisting	1,350	515	W	1,870	5,770
Alloy (excludes stainless)	W	--	--	W	W
Superalloys	948	--	W	948	2,600
Copper-nickel alloys	W	--	--	W	W
Electric, magnetic, and expansion alloys	12	--	--	12	34
Other nickel & nickel alloys	W	--	W	W	W
Cast iron	W	--	--	W	W
Electroplating (sales to platers)	1,090	--	--	1,090	2,690
Chemical and chemical uses	W	--	--	W	W
Other uses	1,590	--	34	1,620	4,780
Total reported	5,000 ²	515	34	5,540	15,900
Total all companies (calc) ³	XX	XX	XX	8,530	24,400
2004: January-March	14,200	1,560	96	15,900	XX
2003: January-March	13,800	1,570	125	15,500	XX

^rRevised. W Withheld to avoid disclosing company proprietary data; included in "Other uses" category. XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Of consumption, 4,140 metric tons were consumed as cathodes and pellets, the remainder as briquets and powder.

³Figures represent calculated apparent consumption; based on the revised proportion of reported primary consumption (65.01%) to apparent primary consumption for 2001.

TABLE 2
ENDING STOCKS OF NICKEL (EXCLUSIVE OF SCRAP) HELD BY CONSUMERS, BY FORM AND USE ^{1,2}

(Metric tons, nickel content)

Period	Cathodes, pellets, briquets, and powder		Ferronickel	Oxide-sinter, salts, and other forms	Total
2003:					
March	1,190 ^r		148	37 ^r	1,370 ^r
April	1,380 ^r		50	48	1,470 ^r
May	1,340 ^r		58	42	1,440 ^r
June	1,800 ^r		102	73	1,970 ^r
July	1,480 ^r		91	57	1,630 ^r
August	1,670 ^r		140	51	1,860 ^r
September	1,280 ^r		99	52	1,430 ^r
October	1,360 ^r		109	60	1,530 ^r
November	1,410 ^r		227	59	1,690 ^r
December	1,390 ^r		260	46	1,700 ^r
2004:					
January	1,380 ^r		186	55	1,620 ^r
February	1,660 ^r		112	46	1,810 ^r
March:					
Steel (stainless, heat resisting and alloy)	499		(3)	(3)	499
Nonferrous alloys ⁴	1,110		(3)	(3)	1,110
Foundry (cast irons)	(3)		--	--	(3)
Chemical (catalysts, ceramics, plating salt, etc.) and unspecified uses	16		109	24	149
Total	1,630		109	24	1,760

^rRevised. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Stocks held by companies that consume nickel in more than one end-use category are credited to the major category. Stocks are subject to revisions owing to inventory adjustments.

³Included in the "Chemical and unspecified uses" category.

⁴Includes superalloys, nickel-copper and copper-nickel alloys, permanent magnet alloys, and other nickel alloys.

TABLE 3
CONSUMPTION AND ENDING STOCKS OF PURCHASED SECONDARY NICKEL, BY USE¹

(Metric tons, nickel content)

Period	Consumption			Stocks		
	Ferrous scrap ²	Nonferrous scrap ³	Total scrap	Ferrous scrap ²	Nonferrous scrap ³	Total scrap
2003:						
March	6,420	649	7,070	2,930	105	3,040
April	5,310	674	5,980	3,210	93	3,310
May	4,920	773	5,690	3,150	102	3,250
June	4,030	645	4,680	3,100	109	3,210
July	4,340	682	5,020	3,370	105	3,480
August	4,770	755	5,530	3,310	115	3,430
September	3,810	739	4,540	3,290	108	3,400
October	5,350	763	6,110	3,110	101	3,210
November	4,960	674	5,630	2,950	97	3,050
December	4,930	653	5,590	2,810	85	2,900
January-December	57,600	8,410	66,000	XX	XX	XX
2004:						
January	5,050	693 ^r	5,750 ^r	2,700	78 ^r	2,780
February	4,780	707 ^r	5,490 ^r	2,710	78 ^r	2,790
March	5,590	920	6,510	3,210	77	3,280
January-March	15,400	2,320	17,700	XX	XX	XX

^rRevised. XX Not applicable.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Nickel content is calculated from an average nickel content and the reported gross weight of scrap.

³Combined consumption and stocks of aluminum-base, copper-base, and nickel-base scrap.

TABLE 4
U.S. IMPORTS FOR CONSUMPTION OF NICKEL, BY COUNTRY¹

(Metric tons, nickel content)²

Period and country of origin	Cathodes pellets, and briquets	Powder and flakes	Ferro-nickel	Metal-lurgical-grade oxide	Waste and scrap	Stainless steel scrap	Chemicals	Total ³	Total year to date ⁴	Wrought nickel
2003:										
February	7,060	954	916	8	323	424	269	9,960	18,300	115
March	17,400	1,130	1,310	34	420	476	309	21,100	39,400	93
April	7,770	678	1,700	--	496	533	321	11,500	50,900	64
May	6,160	933	1,530	7	412	461	378	9,880	60,800	37
June	10,800	368	692	(5)	226	408	327	12,800	73,600	41
July	6,240	294	1,840	11	352	420	312	9,470	83,000	49
August	7,420	762	913	(5)	477	475	544	10,600	93,600	62
September	9,990	1,030	1,180	(5)	570	744	248	13,800	107,000	48
October	7,270	565	1,010	20	326	715	255	10,200	118,000	34
November	7,030	625	932	--	318	889	324	10,100	128,000	28
December	6,230	860	471	(5)	530	821	284	9,190	137,000	34
January-December	99,300	9,130	13,100	90	4,790	6,690	3,790	137,000	XX	660
2004:										
January	7,360	829	1,040	40	489	933	435	11,100	11,100	77
February:										
Australia	681	40	--	--	--	--	--	721	1,400	--
Brazil	100	--	--	--	10	21	--	131	609	--
Canada	4,230	428	--	161	247	719	--	5,780	12,200	--
Colombia	--	--	299	--	--	1	--	300	559	--
Dominican Republic	--	--	647	--	--	1	--	648	1,430	--
Finland	233	40	--	--	--	1	243	517	1,230	--
France	97	--	--	--	145	--	15	257	468	2
Germany	--	1	--	--	77	--	27	105	202	10
Japan	--	3	--	--	3	--	69	75	192	19
Mexico	--	--	--	--	6	236	44	286	496	--
New Caledonia	--	--	125	--	--	--	--	125	125	--
Norway	1,560	--	--	--	--	--	--	1,560	1,570	--
Russia	235	186	--	--	--	--	--	421	779	--
South Africa	--	80	--	--	--	--	--	80	100	--
Sweden	--	8	--	--	--	1	--	9	12	--
United Kingdom	2	40	--	--	96	--	6	144	479	(5)
Venezuela	--	--	--	--	52	1	--	53	69	--
Zimbabwe	60	--	--	--	--	--	--	60	321	--
Other	--	8	1	--	31	34	81	155	286	18
Total	7,200	834	1,070	161	667	1,020	485	11,400	22,600	49
2004: January-February	14,600	1,660	2,110	201	1,160	1,950	921	22,600	XX	126
2003: January-February	13,000	1,880	1,520	18	664	745	494	18,300	XX	168

XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²The nickel contents are assumed to be as follows: metallurgical-grade oxide (77%), waste and scrap (50%), and stainless steel scrap (7.5%). The chemicals category includes chlorides (25%); sulfates (22%); other salts (22%); supported catalysts (22%); and oxide, sesquioxide, and hydroxide (65%).

³Excludes wrought nickel.

⁴May include revisions for prior months.

⁵Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 5
U.S. EXPORTS OF NICKEL, BY COUNTRY¹

(Metric tons, nickel content)²

Period and country of destination	Cathodes pellets, and briquets	Powder and flakes	Ferro- nickel	Metal- lurgical- grade oxide	Waste and scrap	Stainless steel scrap	Chemicals	Total ³	Total year to date	Wrought nickel
2003:										
February	24	84	13	7	948	5,050	261	6,380	10,700	462
March	46	113	5	13	770	5,150	243	6,340	17,100	629
April	78	86	8	19	894	2,880	466	4,430	21,500	149
May	30	59	11	11	836	2,380	379	3,710	25,200	147
June	90	47	29	33	516	2,310	276	3,300	28,500	143
July	87	95	27	2	510	3,570	393	4,690	33,200	148
August	56	77	37	1	792	3,040	301	4,300	37,500	162
September	107	106	18	51	707	2,350	223	3,560	41,100	148
October	133	153	12	4	1,010	3,270	276	4,850	45,900	141
November	210	127	1	5	819	1,600	371	3,130	49,000	102
December	44	92	10	4	809	3,190	441	4,590	53,600	72
January-December	996	1,100	181	161	9,460	37,800	3,900	53,600	XX	2,890
2004:										
January	52	129	15	5	657	2,370	399	3,630	3,630	153
February:										
Australia	--	2	--	--	--	1	(4)	3	3	--
Belgium	--	8	--	--	--	--	2	10	53	--
Canada	--	34	--	--	461	195	249	939	1,920	8
China	--	2	--	--	9	628	9	648	1,040	(4)
Finland	--	17	--	--	--	445	--	462	913	--
Germany	--	9	--	--	--	2	2	13	32	1
India	--	(4)	--	--	11	55	--	66	161	--
Italy	--	(4)	--	--	--	--	(4)	1	8	(4)
Japan	--	15	--	(4)	13	65	16	109	191	2
Korea, Republic of	1	6	--	--	--	666	9	682	1,500	6
Mexico	62	5	--	--	(4)	3	10	80	138	13
Netherlands	--	1	--	--	--	11	32	44	118	6
South Africa	--	2	--	--	--	--	2	4	14	--
Spain	--	--	--	--	--	--	(4)	(4)	(4)	--
Sweden	--	--	--	--	8	--	12	20	53	--
Taiwan	1	6	--	(4)	--	319	1	327	594	--
United Kingdom	(4)	1	--	4	20	2	2	29	87	2
Other	21	58	--	13	18	154	50	311	561	16
Total	85	166	--	17	540	2,550	396	3,750	7,380	54
2004:January-February	137	295	15	22	1,200	4,920	795	7,390	XX	207
2003:January-February	116	142	23	17	1,800	8,110	528	10,700	XX	1,050

XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²The nickel contents are assumed to be as follows: metallurgical-grade oxide (77%), waste and scrap (50%), and stainless steel scrap (7.5%). The chemicals category includes chlorides (25%); sulfates (22%); other salts (22%); supported catalysts (22%); and oxide, sesquioxide, and hydroxide (65%).

³Excludes wrought nickel.

⁴Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF NICKEL ALLOYS, BY COUNTRY¹

(Metric tons, gross weight)

Period and country of origin	Unwrought alloyed ingot	Bars, rods and profiles	Wire	Plates and sheets	Foil	Tubes and pipes	Other alloyed articles	Total	Total year to date
2003:									
February	167	158	356	264	11	93	140	1,190	2,480
March	129	209	600	308	(2)	148	163	1,560	4,040
April	184	245	697	316	6	204	266	1,920	5,950
May	181	204	504	328	7	206	195	1,630	7,580
June	150	156	579	244	35	292	102	1,560	9,140
July	130	266	554	277	30	305	168	1,730	10,900
August	151	78	469	319	32	322	154	1,530	12,400
September	48	239	406	211	10	115	95	1,120	13,500
October	204	307	443	305	15	162	95	1,530	15,000
November	195	239	331	210	23	89	156	1,240	16,300
December	314	169	388	215	45	704	147	1,980	18,300
January-December	1,910	2,520	5,750	3,330	214	2,770	1,770	18,300	XX
2004:									
January	102	278	286	193	14	134	133	1,140	1,140
February:									
Australia	38	1	--	--	--	--	(2)	39	77
Belgium	--	--	(2)	--	--	--	--	(2)	1
Canada	20	(2)	1	--	--	3	5	29	48
China	--	--	--	--	--	--	18	18	53
France	60	1	82	9	--	3	2	157	211
Germany	13	99	79	196	8	44	11	450	721
Italy	--	35	--	--	--	(2)	65	100	194
Japan	5	--	5	1	--	309	(2)	320	331
Mexico	--	--	--	--	--	--	46	46	101
Netherlands	--	--	--	--	--	--	10	10	22
South Africa	20	--	--	--	--	--	--	20	68
Sweden	--	38	186	5	--	5	--	234	507
United Kingdom	9	36	3	39	--	9	50	146	334
Other	(2)	4	6	1	--	1	31	43	84
Total	165	214	362	251	8	374	238	1,610	2,750
2004: January-February	267	492	648	444	22	508	371	2,750	XX
2003: January-February	221	410	783	595	11	226	231	2,480	XX

XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 7
U.S. EXPORTS OF NICKEL ALLOYS, BY COUNTRY¹

(Metric tons, gross weight)

Period and country of destination	Unwrought alloyed ingot	Bars, rods and profiles	Wire	Plates and sheets	Foil	Tubes and pipes	Other alloyed articles	Total	Total year to date
2003:									
February	1,160	419	93	215	38	168	374	2,460	4,380
March	226	615	113	399	214	150	307	2,020	6,400
April	600	743	158	315	14	182	292	2,300	8,700
May	857	950	82	295	44	184	256	2,670	11,400
June	180	980	94	521	21	163	280	2,240	13,600
July	750	553	72	223	25	263	216	2,100	15,700
August	708	707	112	344	30	228	201	2,330	18,000
September	597	623	80	281	52	140	271	2,040	20,100
October	206	802	55	396	55	255	253	2,020	22,100
November	274	621	121	382	49	254	208	1,910	24,000
December	379	571	69	350	107	203	199	1,880	25,900
January-December	6,660	7,960	1,190	3,960	661	2,420	3,050	25,900	XX
2004:									
January	522	731	155	366	9	118	231	2,130	2,130
February:									
Australia	22	12	--	--	--	3	3	40	78
Belgium	22	46	(2)	1	--	--	1	70	252
Canada	(2)	73	20	21	4	36	60	214	416
France	224	82	(2)	30	(2)	2	(2)	338	716
Germany	22	26	7	18	7	3	3	86	153
India	--	2	--	3	1	(2)	2	8	10
Ireland	(2)	(2)	(2)	2	--	--	(2)	2	7
Italy	67	44	12	3	--	2	(2)	128	275
Japan	139	51	6	90	(2)	4	1	291	392
Korea, Republic of	10	13	1	33	--	2	(2)	59	133
Mexico	(2)	1	70	34	1	61	88	255	487
Netherlands	--	7	--	(2)	(2)	5	1	13	47
Singapore	--	2	1	1	--	(2)	1	5	29
Spain	2	(2)	--	--	--	--	(2)	2	17
Sweden	1	(2)	(2)	6	--	--	1	8	22
Switzerland	12	1	3	18	(2)	1	--	35	48
Taiwan	4	2	1	3	--	4	54	68	74
United Kingdom	13	299	2	31	(2)	12	1	358	719
Other	5	116	32	49	2	37	83	324	559
Total	543	777	155	343	15	172	299	2,300	4,430
2004: January-February	1,070	1,510	310	709	24	290	529	4,430	XX
2003: January-February	1,880	793	231	452	50	399	567	4,380	XX

XX Not applicable. -- Zero.

¹Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 8
NICKEL CONSUMPTION IN CAST AND WROUGHT PRODUCTS

	Percent	
	Wrought	Cast
March 2004:		
Stainless and heat resisting steels	66	34
Alloy steels	100	(1)
Superalloys	89	11
Copper-nickel alloys	99	1
Other nickel-base alloys	100	(1)

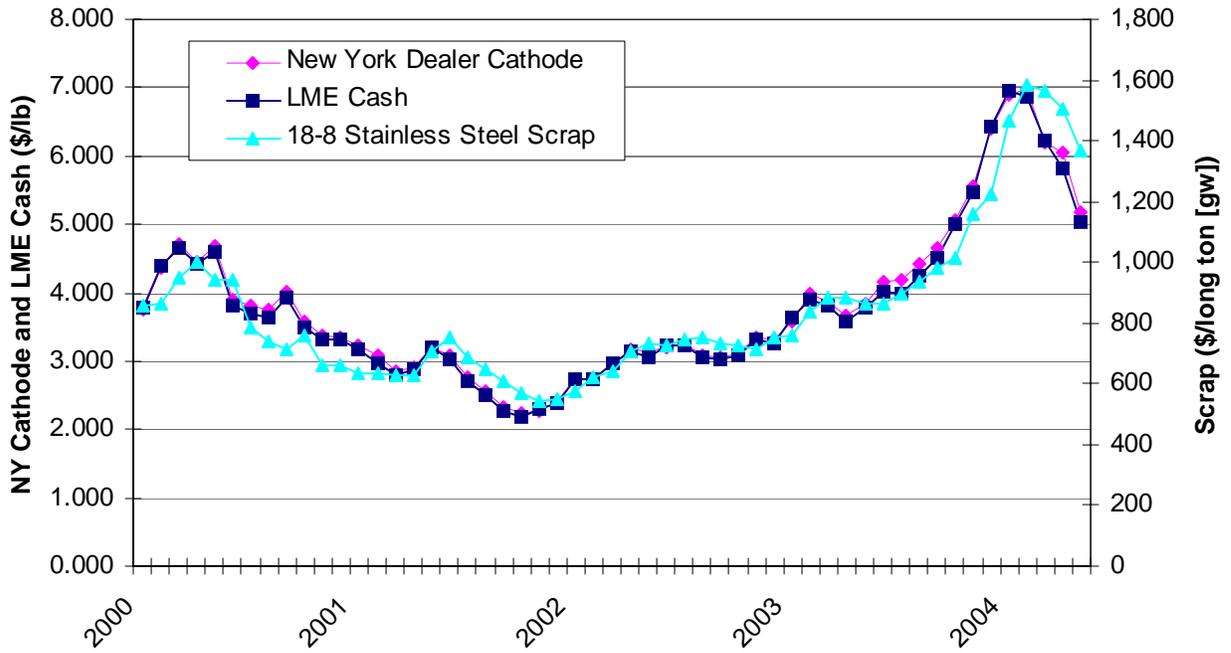
¹Less than 1/2 unit.

TABLE 9
NICKEL PRICES

Date	Platts Metals Week				American Metal Market,
	Cathode NY Dealer \$/lb.	LME Cash mean ¹ \$/t	LME Cash mean ¹ \$/lb.	18/8 Stainless steel scrap Free market \$/long ton (gw)	18/8 Stainless steel scrap Pittsburgh \$/long ton (gw)
2003:					
Average for month of:					
April	3.655	7,910.125	3.588	885	885
May	3.826	8,330.625	3.779	839	861
June	4.155	8,874.762	4.026	874	867
July	4.178	8,797.391	3.990	893	897
August	4.418	9,351.375	4.242	918	935
September	4.668	9,965.341	4.520	978	985
October	5.066	11,047.174	5.011	1,041	1,013
November	5.568	12,086.500	5.482	1,153	1,160
December	6.390	14,162.500	6.424	1,262	1,222
Yearly average	4.446	9,629.469	4.368	961	942
2004:					
Average for week ending:					
April 2	6.53-6.68	14,108.500	6.400	1,385-1,425	1,550-1,575
April 9	6.63-6.85	14,123.750	6.406	1,350-1,400	1,475-1,500
April 16	6.01-6.70	13,073.125	5.930	1,425-1,475	1,475-1,500
April 23	5.89-6.08	12,536.000	5.686	1,425-1,475	1,475-1,500
April 30	5.22-5.77	11,338.500	5.143	1,350-1,375	1,475-1,500
May 7	5.22-5.38	11,120.625	5.044	1,375-1,400	1,360-1,375
May 14	5.05-5.25	10,680.000	4.844	1,250-1,275	1,360-1,375
May 21	5.04-5.19	10,869.500	4.930	1,225-1,250	1,360-1,375
May 28	5.43-5.65	11,803.500	5.354	1,225-1,250	1,360-1,375
Average for month of:					
January	6.900	15,326.548	6.952	1,517	1,463
February	6.968	15,145.125	6.870	1,537	1,585
March	6.203	13,715.000	6.221	1,458	1,563
April	6.056	12,848.125	5.828	1,397	1,503
May	5.185	11,118.289	5.043	1,281	1,367

¹Mean of the cash buyer price and the cash seller and settlement price.

2000-2004 AVERAGE MONTHLY PRICES
 (Derived from Metals Week and American Metal Market quotations)



2000-2004 STOCKS

