# MINING AND QUARRYING TRENDS

### By Jean K. Moore

### Domestic survey data were prepared by the author and each of the statistical assistants who has responsibility for the commodities indicated.

The mining and quarrying trends shown in this report were calculated from nonfuel mineral data reported to the U.S. Geological Survey (USGS) by mining and quarrying companies operating in the United States. The data for 1998 were reported on the Mine, Development, and Mineral Exploration Supplement, a statistical survey conducted by the USGS, and on the production surveys for some more widely produced nonfuel mineral commodities, such as sand and gravel, for which the available data is extracted from computer files. Additional data for 1998 were derived from annual USGS production and consumption surveys of nonfuel mineral producers; these surveys covered 58 nonfuel mineral commodities produced in the United States.

Nonfuel minerals exclude coal, petroleum, coke, and related products.

As shown in this report, mining and quarrying data for 1998 include the annual data for construction sand and gravel and crushed and dimension stone. From 1981 to 1993, these mineral commodities were surveyed biennially and appeared alternately in this report. The inclusion of both sets of data in this report results in essentially a complete coverage of nonfuel mineral production in the United States. Comparisons of the 1994 to 1998 data with previously reported annual data, however, are not possible.

The data in the following tables are reported according to the primary product of a mine or operation. The primary product is usually determined by the product with the highest total value for the year. In some instances, the values of two products at the same operation are so close that the products are coproducts. To account for the data without double counting, however, a product of lesser value is considered to be a byproduct.

Total domestic mining of nonfuel mineral materials amounted to 6 billion metric tons in 1998 compared with 5.9 billion tons in 1997. These materials included 4 billion tons of crude ore mined or quarried and 1.9 billion tons of mine waste and ore from development. Of the nonfuel mineral materials mined, 55% was for the production of industrial minerals and 45% was for the production of metals. Overall, 97% of nonfuel minerals was mined and quarried at surface level, and 3% was mined underground.

Total surface mining and quarrying for industrial minerals amounted to 3.2 billion tons, about 9% above that of 1997. Crude ore mined at these surface operations was 2.8 billion tons, and 426 million tons was waste and ore from development. Underground mining for industrial minerals amounted to only 109 million tons, of which nearly all was crude ore.

Total surface mining for metal ores came to 2.6 billion tons, a 7% decrease compared with that of 1997. Of the 2.6 billion tons, about 1.1 billion tons was crude ore mined and 1.5 billion tons was waste and ore from development. Underground mining of metal ores amounted to only 53 million tons, of which 94% was crude ore.

The major States in which mining for nonfuel minerals took place were, in order of total material handled, Nevada, Arizona, Florida, Minnesota, California, New Mexico, Michigan, Utah, Texas, and Ohio. These 10 States accounted for about 65% of the nonfuel minerals mined in the United States. Virtually all nonfuel mining in these States was conducted from the surface.

### TABLE 1 MATERIAL HANDLED AT SURFACE AND UNDERGROUND MINES IN THE UNITED STATES, BY TYPE OF ORE 1/

#### (Million metric tons)

	Surface 2/			Und	erground 3/			All mines	
Type of ore and year	Crude ore	Waste 4/	Total	Crude ore	Waste 4/	Total	Crude ore	Waste 4/	Total
Metals:									
1994	900	1,530	2,430	37	1	38	937	1,530	2,460
1995	922	1,580	2,500	53	2	55	975	1,580	2,560
1996	1,160	1,590 r/	2,760 r/	49 r/	3	51	1,210	1,600 r/	2,810 r/
1997	1,170	1,630 r/	2,800 r/	52 r/	3	56 r/	1,220 r/	1,630 r/	2,860 r/
1998	1,100	1,510	2,610	50	3	53	1,150	1,510	2,670
Industrial minerals:									
1994	2,270	425	2,690	104	(5/)	104	2,370	425	2,790 r/
1995	2,350	455	2,800	104	3	106	2,450	458	2,910
1996	2,430	434	2,860	108	3	111	2,530 r/	437	2,970
1997	2,520	408 r/	2,920 r/	110 r/	(5/)	111 r/	2,630	408 r/	3,030
1998	2,750	426	3,180	108	1	109	2,860	427	3,290
Metals and industrial minerals:									
1994	3,170	1,950	5,120	140 r/	1	142	3,310	1,950	5,260
1995	3,270	2,030	5,300	156	5	161	3,420	2,040	5,460
1996	3,590	2,030 r/	5,610 r/	156 r/	6	162	3,740	2,030 r/	5,780 r/
1997	3,690	2,040 r/	5,730 r/	163 r/	4 r/	166 r/	3,850 r/	2,040 r/	5,890 r/
1998	3,860	1,940	5,790	158	4	162	4,020	1,940	5,960

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.2/ Includes materials from wells, ponds, and pumping operations.

3/ Includes solution mining.

4/ Includes ore and waste from development operations.

5/ Less than 1/2 unit.

## TABLE 2 MATERIAL HANDLED AT SURFACE AND UNDERGROUND MINES IN THE UNITED STATES IN 1998, BY COMMODITY AND STATE 1/

(Thousand metric tons)

Coule ore         Waste 4/         Total         Code ore         Waste 4/         Total           Copper         627,000         520,000         1150,000         W         W         W         627,000         520,000         550,000         550,000         550,000         956,000         956,000         956,000         956,000         956,000         956,000         956,000         956,000         110,000         627,000         24,200         79,600         24,200         79,600         28,200         108,000           Total         100,000         1,510,000         26,100,00         3,100         53,400         1,510,000         2,670,00         W         W         W         108,000         1,610,000         2,670,00         W         W         140,00         V         1,840         V         1,340         1,21,000         1,340		Surface 2/			Uı	nderground 3	3/	All mines		
Meal ares:         copper         627,000         520,000         1,150,000         W         W         W         627,000         5         200,000         5         1,150,000           Gold         225,000         725,000         442,000         W         W         W         213,000         5         220,000         5         1,000         442,000         442,000         442,000         442,000         442,000         442,000         442,000         442,000         5,020         78,600         78,600         42,000         442,000         1,000         1,510,000         2,610,000         50,400         3,010         3,3400         1,510,000         2,610,000         40,900         1,210,000         1,510,000         2,610,000         40,900         1,210,000         1,410,000         50,400         3,010         3,3400         1,510,000         2,610,000         1,410,00         50,500         76,700,00         Mus         1,440         4,600         1,400         4,600         1,400         1,400         4,600         1,400         1,400         1,400         1,400         1,400         1,400         1,400         1,400         1,400         1,400         1,400         1,400         1,400         1,400         1,4000         1,5		Crude ore	Waste 4/	Total	Crude ore	Waste 4/	Total	Crude ore	Waste 4/	Total
	Metal ores:									
	Copper	627,000	520,000	1,150,000	W	W	W	627,000 5/	520,000 5/	1,150,000
Iron         213,000         229,000         442,000         W          W         229,000         442,000          W         229,000         442,000          W         V <th< td=""><td>Gold</td><td>226,000</td><td>735,000</td><td>961,000</td><td>4,530</td><td>670</td><td>5,200</td><td>230,000</td><td>736,000</td><td>966,000</td></th<>	Gold	226,000	735,000	961,000	4,530	670	5,200	230,000	736,000	966,000
Trac         W         W         W         W         V         L100         6.120         4.290         1.100         6.1200         1.00000         1.00000         1.00000         1.00000         1.00000         1.00000         1.00000         1.00000         1.00000         1.00000         1.00000         1.00000         2.670.000           Instrint         Barrie         29         W         9.29         N         -         -         -         9.39         W         9.20           Clays         1.4100         W         1.400         W         1.400         W         1.400         W         1.340	Iron	213,000	229,000	442,000	W		W	213,000 5/	229,000	442,000
	Zinc		W	W	4,920	1,100	6,020	4,920 6/	1,100 6/	6,020
	Other 7/	38,600	27,000	65,600	40,900	1,240	42,200	79,600	28,200	108,000
	Total	1,100,000	1,510,000	2,610,000	50,400	3,010	53,400	1,150,000	1,510,000	2,670,000
Barlie         929         W         928         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·<         ·< <td>Industrial minerals:</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	Industrial minerals:									
	Barite	929	W	929 8/				929	W	929
	Clays	41,100	35,600	76,700	W	W	W	41,100 5/	35,600 5/	76,700
	Diatomite	1,400	W	1,400 8/				1,400	W	1,400
	Feldspar 9/	1,340	W	1,340 8/				1,340	W	1,340
	Garnet	63		63				63		63
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Gypsum	16,400	4,600	21,000	2,660	W	2,660 8/	19,000	4,600 5/	23,600
	Mica (scrap)	206	W	206 8/				206	W	206
Pumice I0/         583         W         583         V $   -$	Phosphate rock	172,000	W	172,000				172,000	W	172,000
	Pumice 10/	583	W	583 8/				583	W	583
Sand and gravel:         1,050,000         W         1,050,000         -         -         -         -         -         1,050,000         W         1,050,000           Industrial         28,600         -         28,600         -         -         -         28,600         -         28,600         -         28,600         -         28,600         -         10,200         10,200         -         10,200         -         10,200         -         10,200         -         10,200         -         10,200         -         10,200         -         10,200         -         10,200         -         10,200         -         10,200         -         10,200         -         10,200         -         11,200         15,500,000         114,000         1,580,000         114,000         1,580,000         114,000         15,500,00         2,500         2,310         2,750,000         2,80,000         13,700         369         14,100         25,300         27,00,00         2,950,000         -         -         34         -         34         -         34         -         34         -         34         -         34         -         34         -         34         -         34 <td< td=""><td>Salt</td><td>4,980</td><td></td><td>4,980</td><td>31,000</td><td>W</td><td>31,000 8/</td><td>36,000</td><td>W</td><td>36,000</td></td<>	Salt	4,980		4,980	31,000	W	31,000 8/	36,000	W	36,000
	Sand and gravel:	_ `								
	Construction	1,050,000	W	1,050,000 8/				1,050,000	W	1,050,000
	Industrial	28,600		28,600				28,600		28,600
	Soda ash				10,200		10,200	10,200		10,200
	Stone:				,		,	,		,
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Crushed	1,420,000	114,000	1,530,000	50,400	353	50,800	1,470,000	114,000	1,580,000
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Dimension	1.150	554	1.710	39		39	1.190	554	1.750
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Talc and pyrophyllite	813	1.540	2,350	W	W	W	813 5/	1.540 5/	2.350
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Tripoli	80		80				80		80
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Zeolites			34				34		34
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Other 11/	11.500	270.000	281.000	13,700	369	14.100	25,300	270,000	295.000
Grand total $3.860.000$ $1.940.000$ $5.790.000$ $158.000$ $3.730$ $162.000$ $4.020.000$ $1.940.000$ $5.960.000$ States: $Alabama$ $65.500$ $6.310$ $71.800$ W $-$ W $65.500$ $5/$ $19.400$ $5/$ $6.510$ $5/$ $19.400$ $5/$ $5/00$ $1/000$ $1/3.800$ $M$ $M$ $18.900$ $M$ $M$ $M$ $19.400$ $5/700$ $57.00$ $57.00$ $57.00$ $57.00$ $57.00$ $57.00$ $57.00$ <	Total	2.750.000	426.000	3.180.000	108.000	722	109.000	2.860.000	427.000	3.290.000
States:         Mabama         65,500         6,310         71,800         W          W         65,500         5/         6,310         71,800           Alabama         46,500         19,400         65,900         W         W         W         46,500         5/         19,400         5/         19,400         5/         19,400         5/         19,400         5/         19,400         5/         19,400         5/         19,400         5/         19,400         5/         19,400         5/         19,400         5/         50,200         5,700         55,900            50,200         5,700         55,900            50,200         5,700         55,900            14,100         666         14,800            14,100         666         14,800            2,560          2,560          2,560          2,560          2,560          2,560          2,560          2,560          2,560         102,000         14,400         14,50         17,70,7	Grand total	3.860.000	1.940.000	5.790.000	158,000	3.730	162.000	4,020,000	1.940.000	5.960.000
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	States:		1 1	- / /	/	- ,		, ,		
Alaska46,50019,40065,900WWW $46,500$ 5/19,4005/65,900Arizona474,000W474,000W474,000W18,900W18,900W493,000W493,000Arkansas50,2005,70055,90050,2005,70055,900California228,00086,000314,000WWW228,0005/86,0005/314,000Connecticut14,10066614,80014,10066614,800Delaware2,5602,5602,5602,5602,560Florida269,000W269,0008/17W178/269,000W269,000Georgia85,60015,200101,0001,450W14,508/87,10015,2005/102,000Hawaii5,0903775,4605,0903775,460Ilinois101,0005,440107,0004,430314,470106,0005,470111,000Indiana77,5005,05082,6003,990W3,9908/81,5005,5505/86,000Iowa47,9004,60052,50067,20416,76054,6004,64059,300Kansas31,8002,13033,9003,670W3,670 <td< td=""><td>Alabama</td><td>65,500</td><td>6,310</td><td>71,800</td><td>W</td><td></td><td>W</td><td>65,500 5/</td><td>6,310</td><td>71,800</td></td<>	Alabama	65,500	6,310	71,800	W		W	65,500 5/	6,310	71,800
Arizona         474,000         W         474,000         8/         18,900         W         18,900         8/         493,000         W         493,000           Arkansas         50,200         5,700         55,900           50,200         5,700         55,900           California         228,000         86,000         314,000         W         W         W         228,000         5/         86,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         5/         84,000         14,000         666         14,800           -         2,560          2,560          2,560          2,560          2,560         102,000         W         269,000         W         269,000         W         269,000         W         269,000         377         5,460         14,000         27,300         5/         68,900         111	Alaska	46.500	19,400	65,900	W	W	W	46,500 5/	19,400 5/	65,900
Arkansas $50,200$ $5,700$ $55,900$ $$ $$ $$ $50,200$ $5,700$ $55,900$ California $228,000$ $86,000$ $314,000$ WWW $228,000$ $5/$ $86,000$ $5/$ $314,000$ Connecticut $14,100$ $666$ $14,800$ $$ $$ $$ $14,100$ $666$ $14,800$ Delaware $2,560$ $$ $2,560$ $$ $$ $2,560$ $$ $2,560$ $$ $2,560$ Florida $269,000$ W $269,000$ W $269,000$ W $269,000$ W $29,000$ V $29,000$ Hawaii $5,090$ $377$ $5,460$ $$ $$ $$ $5,090$ $377$ $5,460$ Idaho $41,000$ $27,300$ $68,300$ $641$ W $641.8/$ $41,600$ $27,300.5/$ $68,900$ Illinois $101,000$ $5,440$ $107,000$ $4,430$ $31$ $4,470$ $106,000$ $5,470$ $11.000$ Indiana $77,500$ $5,050$ $82,600$ $3,990$ $W$ $3,990$ $8/$ $81,500$ $5,050$ $46,600$ Iowa $47,900$ $4,600$ $52,500$ $6,720$ $41$ $6,760$ $54,600$ $4,640$ $59,300$ Kansas $31,800$ $2,130$ $33,900$ $3,670$ W $3,670$ $8/$ $35,400$ $2,130$ $5/$ $37,600$ Kansas $31,800$ $2,110$ $35,200$ $17,500$ $123$ $17,600$ $68,50$	Arizona	474.000	W	474,000 8/	18,900	W	18.900 8/	493,000	W	493.000
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Arkansas	50,200	5,700	55,900				50,200	5,700	55,900
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	California	228,000	86,000	314,000	W	W	W	228,000 5/	86,000 5/	314,000
Delaware2,5602,5602,5602,560Florida269,000W269,0008/17W178/269,000W269,000Georgia85,60015,200101,0001,450W1,4508/87,10015,2005/102,000Hawaii5,0903775,4605,0903775,460Idaho41,00027,30068,300641W6418/41,60027,3005/68,900Illinois101,0005,440107,0004,430314,470106,0005,470111,000Indiana77,5005,05082,6003,990W3,9908/81,5005,0505/86,600Iowa47,9004,60052,5006,720416,76054,6004,64059,300Kentucky50,9004,25055,20017,50012317,60068,5004,37072,800Louisiana14,70055215,30014,80011,70037512,100Maryland35,8002,41038,200WWW35,8005/2,4105/38,200Massachusetts26,0001,07027,100WWW26,0005/1,0705/27,100Miseota220,000165,000385,00015,2001,6	Connecticut	14,100	666	14,800				14,100	666	14,800
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Delaware	2,560		2,560				2,560		2,560
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Florida	269.000	W	269,000 8/	17	W	17 8/	269,000	W	269,000
Hawaii5,0903775,4605,0903775,460Idaho41,00027,30068,300641W641 8/41,60027,300 5/68,900Illinois101,0005,440107,0004,430314,470106,0005,470111,000Indiana77,5005,05082,6003,990W3,990 8/81,5005,050 5/86,600Iowa47,9004,60052,5006,720416,76054,6004,64059,300Kansas31,8002,13033,9003,670W3,670 8/35,4002,130 5/37,600Kentucky50,9004,25055,20017,50012317,60068,5004,37072,800Louisiana14,70055215,30014,80011,70037512,100Maine11,70037512,10011,70037512,100Maryland35,8002,41038,200WWW35,800 5/2,410 5/38,200Massachusetts26,0001,07027,100WWW26,000 5/1,070 5/27,100Michigan163,000W163,000885,000220,000165,000385,000Mississippi15,2001,03016,30015,2001,03016,300Mississippi74,200 <td< td=""><td>Georgia</td><td>85,600</td><td>15,200</td><td>101,000</td><td>1,450</td><td>W</td><td>1,450 8/</td><td>87,100</td><td>15,200 5/</td><td>102,000</td></td<>	Georgia	85,600	15,200	101,000	1,450	W	1,450 8/	87,100	15,200 5/	102,000
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Hawaii	5.090	377	5,460			·	5.090	377	5,460
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Idaho	41,000	27,300	68,300	641	W	641 8/	41,600	27,300 5/	68,900
Indiana         77,500         5,050         82,600         3,990         W         3,990         8/         81,500         5,050         5/         86,600           Iowa         47,900         4,600         52,500         6,720         41         6,760         54,600         4,640         59,300           Kansas         31,800         2,130         33,900         3,670         W         3,670         8/         35,400         2,130         5/         37,600           Kentucky         50,900         4,250         55,200         17,500         123         17,600         68,500         4,370         72,800           Louisiana         14,700         552         15,300         14,800          14,800         29,500         552         30,100           Maine         11,700         375         12,100           11,700         375         12,100           Maryland         35,800         2,410         38,200         W         W         35,800         5/         2,410         5/         38,200           Massachusetts         26,000         1,070         27,100         W         W         26,000         5/         1,070	Illinois	101.000	5,440	107.000	4.430	31	4.470	106.000	5.470	111.000
Iowa         47,900         4,600         52,500         6,720         41         6,760         54,600         4,640         59,300           Kansas         31,800         2,130         33,900         3,670         W         3,670         8/         35,400         2,130         5/         37,600           Kentucky         50,900         4,250         55,200         17,500         123         17,600         68,500         4,370         72,800           Louisiana         14,700         552         15,300         14,800          14,800         29,500         552         30,100           Maine         11,700         375         12,100            11,700         375         12,100           Maryland         35,800         2,410         38,200         W         W         35,800         5/         2,410 5/         38,200           Massachusetts         26,000         1,070         27,100         W         W         26,000 5/         1,070 5/         27,100           Minesota         220,000         165,000         385,000            220,000         165,000         385,000	Indiana	77.500	5.050	82,600	3,990	W	3.990 8/	81,500	5.050 5/	86,600
Kansas         31,800         2,130         33,900         3,670         W         3,670         8/         35,400         2,130         5/         37,600           Kentucky         50,900         4,250         55,200         17,500         123         17,600         68,500         4,370         72,800           Louisiana         14,700         552         15,300         14,800          14,800         29,500         552         30,100           Maine         11,700         375         12,100           11,700         375         12,100           Maryland         35,800         2,410         38,200         W         W         35,800         5/         2,410         5/         38,200           Massachusetts         26,000         1,070         27,100         W         W         26,000         5/         1,070         5/         27,100           Michigan         163,000         W         163,000         W         163,000         W         163,000         W         163,000         M         163,000         M         163,000         M         163,000         M         163,000         M         163,000         M         163,	Iowa	47.900	4,600	52,500	6.720	41	6.760	54,600	4,640	59,300
Kentucky         50,900         4,250         55,200         17,500         13         17,600         68,500         4,370         72,800           Louisiana         14,700         552         15,300         14,800          14,800         29,500         552         30,100           Maine         11,700         375         12,100           11,700         375         12,100           Maryland         35,800         2,410         38,200         W         W         35,800         5/         2,410 5/         38,200           Massachusetts         26,000         1,070         27,100         W         W         26,000 5/         1,070 5/         27,100           Michigan         163,000         W         163,000 8/         741          741         163,000         W         163,000           Minesota         220,000         165,000         385,000            220,000         165,000         385,000           Missesippi         15,200         1,030         16,300            220,000         165,000         385,000           Missesuri         74,200         6,420	Kansas	31.800	2,130	33,900	3.670	W	3.670 8/	35,400	2.130 5/	37.600
Louisiana         14,700         552         15,300         14,800          14,800         29,500         552         30,100           Maine         11,700         375         12,100           11,700         375         12,100           Maryland         35,800         2,410         38,200         W         W         35,800         5/         2,410         5/         38,200           Massachusetts         26,000         1,070         27,100         W         W         26,000         5/         1,070         5/         27,100           Michigan         163,000         W         163,000 8/         741          741         163,000         W         163,000           Minesota         220,000         165,000         385,000            220,000         165,000         385,000           Missouri         74,200         1,030         16,300            220,000         163,000         16,300           Missouri         74,200         6,420         80,600         11,500         33         11,500         85,600         6,460         92,100	Kentucky	50,900	4.250	55,200	17,500	123	17.600	68,500	4.370	72,800
Maine         11,700         375         12,100           11,700         375         12,100           Maryland         35,800         2,410         38,200         W         W         35,800         5/         2,410         5/         38,200           Massachusetts         26,000         1,070         27,100         W         W         26,000         5/         1,070         5/         27,100           Michigan         163,000         W         163,000         W         163,000         W         163,000         W         163,000         M         163,000         163,000         385,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000         163,000	Louisiana	14.700	552	15.300	14,800		14,800	29,500	552	30.100
Maryland         35,800         2,410         38,200         W         W         W         35,800         2,410         5/         38,200           Massachusetts         26,000         1,070         27,100         W         W         W         26,000         5/         1,070         5/         27,100           Michigan         163,000         W         163,000         8/         741          741         163,000         W         163,000           Minesota         220,000         165,000         385,000            220,000         165,000         385,000           Missispipi         15,200         1,030         16,300            15,200         1,030         16,300           Missouri         74.200         6.420         80.600         11.500         33         11.500         85.600         6.460         92.100	Maine		375	12.100				11,700	375	12.100
Massachusetts         26,000         1,070         27,100         W         W         W         26,000         5/         1,070         5/         27,100           Missachusetts         26,000         1,070         27,100         W         W         W         26,000         5/         1,070         5/         27,100           Michigan         163,000         W         163,000         8/         741          741         163,000         W         163,000           Minesota         220,000         165,000         385,000            220,000         165,000         385,000           Mississippi         15,200         1,030         16,300            15,200         1,030         16,300           Missouri         74,200         6,420         80,600         11,500         33         11,500         85,600         6,460         92,100	Marvland	35.800	2.410	38.200	W	W	W	35,800 5/	2,410 5/	38.200
Michigan         163,000         W         163,000         %         163,000	Massachusetts	26 000	1,070	27,100	w	w	w	26,000 5/	1.070 5/	27,100
Minesota         220,000         165,000         385,000           220,000         165,000         385,000           Mississippi         15,200         1,030         16,300           220,000         165,000         385,000           Mississippi         15,200         1,030         16,300           15,200         1,030         16,300           Missouri         74,200         6,420         80,600         11,500         33         11,500         85,600         6,460         92,100	Michigan	163 000	1,070 W	163 000 8/	741		741	163,000	w	163 000
Mississippi         15,200         1,030         16,300            15,200         1,030         16,300           Missouri         74,200         6,420         80,600         11,500         33         11,500         85,600         6,450         92,100	Minnesota	220,000	165 000	385,000			, +1	220.000	165.000	385,000
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Mississippi		1 030	16 300				15,200	1.030	16 300
11,500   11,500   55   11,500   05,000   0,400   72,100	Missouri	74,200	6,420	80,600	11,500	33	11,500	85,600	6,460	92,100

See footnotes at end of table.

#### TABLE 2--Continued MATERIAL HANDLED AT SURFACE AND UNDERGROUND MINES IN THE UNITED STATES IN 1998, BY COMMODITY AND STATE 1/

#### (Thousand metric tons)

		Surface 2/			nderground 3	3/		All mines	
	Crude ore	Waste 4/	Total	Crude ore	Waste 4/	Total	Crude ore	Waste 4/	Total
StatesContinued:									
Montana	36,900	51,600	88,500	1,120	W	1,120 8/	38,000	51,600 5/	89,700
Nebraska	19,100	542	19,700	W	W	W	19,100 5/	542 5/	19,700
Nevada	207,000	644,000	851,000	3,160	W	3,160 8/	211,000	644,000 5/	855,000
New Hampshire	12,800	352	13,200				12,800	352	13,200
New Jersey	38,400	1,670	40,000				38,400	1,670	40,000
New Mexico	W	W	W	16,400	W	16,400 8/	16,400 6/	W	16,400
New York	80,700	5,190	85,900	3,940	W	3,940 8/	84,600	5,190 5/	89,800
North Carolina	95,200	11,100	106,000				95,200	11,100	106,000
North Dakota	10,700	W	10,700 8/				10,700	W	10,700
Ohio	128,000	7,450	135,000	3,440	W	3,440 8/	131,000	7,450 5/	139,000
Oklahoma	51,800	3,600	55,400	W	W	W	51,800 5/	3,600 5/	55,400
Oregon	42,200	2,580	44,800	45	(12/)	46	42,300	2,580	44,900
Pennsylvania	111,000	8,050	119,000	3,320	23	3,340	115,000	8,070	123,000
Rhode Island	3,710	179	3,890				3,710	179	3,890
South Carolina	44,000	7,280	51,200				44,000	7,280	51,200
South Dakota	19,800	7,590	27,400	449	(12/)	449	20,300	7,590	27,900
Tennessee	68,400	5,670	74,000	8,470	581	9,050	76,800	6,250	83,100
Texas	179,000	10,700	190,000	W	W	W	179,000 5/	10,700 5/	190,000
Utah	112,000	W	112,000 8/	W	W	W	112,000 5/	W	112,000
Vermont	10,700	1,020	11,700	W		W	10,700 5/	1,020	11,700
Virginia	74,900	7,000	81,900	W	W	W	74,900 5/	7,000 5/	81,900
Washington	65,100	1,710	66,800	W		W	65,100 5/	1,710	66,800
West Virginia	14,000	1,140	15,100	1,540	W	1,540 8/	15,500	1,140 5/	16,700
Wisconsin	66,600	2,510	69,100				66,600	2,510	69,100
Wyoming	13,800	3,210	17,100	9,180	35	9,220	23,000	3,250	26,300
Undistributed 13/	200,000	793,000	993,000	22,900	2,860	25,800	223,000	796,000	1,020,000
Total	3,860,000	1,940,000	5,790,000	158,000	3,730	162,000	4,020,000	1,940,000	5,960,000

W Withheld to avoid disclosing company proprietary data.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes materials from wells, ponds, and pumping operations.

3/ Includes solution mining.

4/ Includes ore and waste from development operations.

5/ Excludes materials from underground operations.

6/ Excludes materials from surface operations.

7/ Includes beryllium, gold-silver, lead, magnesium metal, molybdenum, platinum and palladium, rare-earth metal concentrates, silver, tin, titanium, uranium, and metals indicated by symbol W.

8/ Excludes waste from mining operations and ore and waste from development operations.

9/ Includes aplite.

10/ Excludes volcanic cinder and scoria; included with crushed and broken stone.

11/ Includes abrasives, boron minerals, bromine, emery, greensand marl, iodine, iron oxide pigments, kyanite, lithium minerals, magnesite, magnesium compounds, olivine, perlite, potash, sericite, sulfur (Frasch), vermiculite, wollastonite, and industrial minerals indicated by symbol W.

12/ Less than 1/2 unit.

13/ Includes Colorado and States indicated by symbol W.

#### TABLE 3 UNIT VALUE OF PRINCIPAL MINERAL PRODUCTS AND BYPRODUCTS OF SURFACE AND UNDERGROUND MINES IN THE UNITED STATES IN 1998 1/

#### (Dollars per metric ton)

		Surface		1	Underground			All mines	
-	Principal			Principal			Principal		
	mineral	By-		mineral	By-		mineral	By-	
Type of ore and commodity	product	product	Total	product	product	Total	product	product	Total
Metals:				-	<u>^</u>			-	
Copper 2/	4.68	0.56	5.24	W	W	W	4.68	0.56	5.24
Gold	12.63	0.35	12.98	68.27	1.14	69.41	13.70	0.36	14.06
Iron	9.46		9.46	W		W	9.46		9.46
Zinc	W	W	W	45.17	W	45.17	45.17	W	45.17
All 3/	7.86	0.66	8.51	26.25	5.16	31.42	8.66	0.85	9.51
Industrial minerals:									
Abrasives	7,861.44		7,861.44				7,861.44		7,861.44
Clays	40.25	W	40.25	W		W	40.25	W	40.25
Diatomite	129.47		129.47				129.47		129.47
Feldspar 4/	21.39	W	21.39				21.39	W	21.39
Garnet	102.40		102.40				102.40		102.40
Gypsum	6.94		6.94	6.80		6.80	6.92		6.92
Iodine	15,255.01		15,255.01				15,255.01		15,255.01
Iron oxide pigments	142.84		142.84				142.84		142.84
Mica (scrap)	31.42	W	31.42				31.42	W	31.42
Phosphate rock	6.46	W	6.46				6.46	W	6.46
Pumice 5/	21.59		21.59				21.59		21.59
Salt	W		W	18.47	W	18.47	18.47	W	18.47
Sand and gravel:									
Construction	4.56	0.02	4.59				4.56	0.02	4.59
Industrial	17.06	0.66	17.72				17.06	0.66	17.72
Soda ash				82.39	W	82.39	82.39	W	82.39
Stone:									
Crushed	5.38	(6/)	5.39	5.50		5.50	5.39	(6/)	5.39
Dimension	185.11	0.37	185.47	221.45		221.45	186.30	0.36	186.65
Talc and pyrophyllite	32.34	W	32.34	W		W	32.34	W	32.34
Tripoli	212.93		212.93				212.93		212.93
All 7/	6.27	0.04	6.31	18.14	0.65	18.79	6.71	0.06	6.77
Excluding sand and gravel and stone	16.70	0.26	16.96	29.06	1.22	30.29	19.00	0.44	19.44
All metals and industrial minerals 3/7/	6.72	0.21	6.93	20.73	2.09	22.82	7.26	0.29	7.55
Excluding sand and gravel and stone	9.49	0.58	10.07	27.75	3.07	30.82	10.83	0.77	11.60

W Withheld to avoid disclosing company proprietary data; included in appropriate "Average."

1/ Values calculated from unrounded data; may not add to totals shown because of independent rounding.

2/ With increased adoption of leaching technology there may be less distinction between ore and waste. Significant tonnages of low-grade material, formerly classified as waste are now being considered as low-grade leachable ore by some companies, resulting in a large shift in the ore to waste ratios and a reduction in ore value.

3/ Includes values of beryllium concentrate, gold-silver ore, lead, magnesium metal, molybdenum, platinum and palladium, rare-earth metal concentrate, silver, titanium, and metals indicated by symbol W.

4/ Includes aplite.

5/ Excludes volcanic cinder and scoria; included with crushed and broken stone.

6/ Less than \$0.005.

7/ Includes values of asbestos, barite, boron minerals, bromine, emery, greensand marl, kyanite, lithium minerals, magnesite, magnesium compounds, olivine, perlite, potash, sericite, sulfur (Frasch), vermiculite, wollastonite, zeolites, and industrial minerals indicated by symbol W.

TABLE 4
NUMBER OF DOMESTIC METAL AND INDUSTRIAL MINERAL MINES IN THE UNITED STATES IN 1998,
BY COMMODITY AND MAGNITUDE OF CRUDE ORE MINED 1/

	Total	Less than	1,000 to	10,000 to	100,000 to	1,000,000 to	More than
	number	1,000	10,000	100,000	1,000,000	10,000,000	10,000,000
Type of ore and commodity	of mines	tons	tons	tons	tons	tons	tons
Metal ores:							
Bervllium	2	1			1		
Copper	20	2				5	13
Gold	78			8	18	47	5
Gold-silver	1					1	
Iron	12			1	2	1	8
Lead	9				7	2	
Magnesium metal	3			1	1	- 1	
Molybdenum	3					3	
Platinum and palladium	1				1		
Rare earth metal concentrates	1			1			
Silver	3			1	2		
Tin	1	1					
Titanium	5			1	2	1	1
Uranium	9	7	1	1		1	
Zinc	12	7		1	8	3	
Total		11	1	15	42	64	27
Industrial minerals:		11	1	15	42	04	21
Abrasives	7	7					
Barita	- 7	1					
Baron minorals		1	1		5		
Bromine	- 4	1		2		1	
			165	207			
Distomite	12	11	105	597	115		
Emany	1			0	4		
Eillery Feldemen 2/	1	1					
Feldspar 2/			2	3	4		
Garnet	- 4		1	3			
	3	2	1				
Gypsum	60	1	5	13	41	2	
Iodine	4	3	1				
Iron oxide pigments	2	2	1	1			
Kyanite	2			1	1		
Lithium minerals	3	1	1	1			
Magnesite					1		
Magnesium compounds	6		2	1	2	1	
Mica (scrap)	10	1	6	3			
Olivine	3			3			
Perlite	10		4	3	3		
Phosphate rock	18					8	10
Potash	8			2	1	5	
Pumice 3/	14		4	9	1		
Salt	69	2	4	9	43	11	
Sand and gravel:							
Construction	7,420	100	1,150	3,890	2,140	144	
Industrial	127		4	54	68	1	
Sericite	1		1				
Soda ash	7				3	4	
Stone:							
Crushed		115	243	1,060	1,750	389	1
Dimension	176	54	87	35			
Sulfur (Frasch)	2				1	1	
Talc and pyrophyllite	18	2	5	6	5		
Tripoli	6	1	2	3			
Vermiculite	10			10			
Wollastonite	2			1	1		
Zeolites	7	2	3	2			
Total	12,300	307	1,690	5,520	4,190	567	11
Grand total	12,400	318	1,690	5,530	4,230	631	38

 1/ Data are rounded to three significant digits; may not add to totals shown.

 2/ Includes aplite.

 3/ Excludes volcanic cinder and scoria; included with crushed stone.

#### TABLE 5 TWENTY-FIVE LEADING METAL AND INDUSTRIAL MINERAL MINES AND QUARRIES IN THE UNITED STATES IN 1998, IN ORDER OF OUTPUT OF CRUDE ORE

Type of ore and name of				
mine, quarry or operation 1/	State	Operator	Commodity	Mining method
Metal ores:				
Morenci	Arizona	Phelps Dodge Corp.	Copper-molybdenum ore	Open pit.
Tyrone	New Mexico	do.	Copper ore	Do.
Minntac	Minnesota	USX Corp.	Iron ore	Do.
Sierrita	Arizona	Cyprus Amax Minerals Co.	Copper-molybdenum ore	Do.
Bingham Canyon	Utah	Kennecott Utah Copper Corp.	do.	Do.
Carlin Mines Complex (15)	Nevada	Newmont Gold Co.	Gold ore	Open pit and stoping.
Hibbing Taconite Co.	Minnesota	Cleveland-Cliffs, Inc.	Iron ore	Open pit.
Bagdad	Arizona	Cyprus Amax Minerals Co.	Copper ore	Do.
Empire Iron Mining Partnership	Michigan	Cleveland-Cliffs, Inc.	Iron ore	Do.
Cyprus Miami (Inspiration)	Arizona	Cyprus Amax Minerals Co.	Copper ore	Do.
LTV Steel Mining Co.	Minnesota	Cleveland-Cliffs, Inc.	Iron ore	Do.
Ray	Arizona	ASARCO Incorporated	Copper ore	Do.
Round Mountain	Nevada	Round Mountain Gold Corp.	Gold ore	Do.
National Steel Pellet Co.	Minnesota	National Steel Pellet Co.	Iron ore	Do.
Mission Complex	Arizona	ASARCO Incorporated	Copper ore	Open pit and stoping.
Tilden Mining Co.	Michigan	Cleveland-Cliffs, Inc.	Iron ore	Open pit
San Manuel	Arizona	BHP Copper Co.	Copper-molybdenum ore	Caving and in-situ leaching
Continental	Montana	Montana Resources Inc.	do.	Open pit.
Fort Knox	Alaska	Fairbanks Gold Mining Inc.	Gold ore	Do.
Chino	New Mexico	Phelps Dodge Corp.	Copper-molybdenum ore	Do.
Thunderbird	Minnesota	EVTAC Mining	Iron ore	Do.
Barrick Goldstrike	Nevada	Barrick Goldstrike Mines, Inc.	Gold ore	Open pit and stoping.
Robinson	do.	BHP Copper Co.	Gold and copper ore	Open pit.
Northshore Mining Co.	Minnesota	Cleveland-Cliffs, Inc.	Iron ore	Do.
Florida Canyon	Nevada	Florida Canyon Mining, Inc.	Gold ore	Do.
Industrial minerals:				
Florida mines (6)	Florida	IMC Phosphates	Phosphate rock	Do.
Florida mines (2)	do.	Cargill Fertilizer Inc.	do.	Do.
South Pasture	do.	C F Industries Inc.	do.	Do.
Aurora	North Carolina	PCS Phosphate Co	do.	Do.
F.E.C. Quarry	Florida	CSR America Inc.	Stone	Open quarry.
Reed Quarry	Kentucky	Vulcan Materials Co.	do.	
Georgetown	Texas	Texas Crushed Stone	do.	Do.
Calcite Operation	Michigan	Michigan Limestone Operators	do.	Do.
Beckmann	Texas	Martin Marietta Aggregates	do.	Do.
White Rock Quarries (1)	Florida	Vecellio & Grogan Inc	do.	Dredging.
Stoneport Quarry	Michigan	LTV Steel Co.	do.	Open quarry.
Mill Creek Ouarry	Oklahoma	Meridian Aggregate Co.	do.	Do.
Point of Mountain	Utah	Monroc Inc.	Sand and gravel	Open pit.
Thornton	Illinois	General Dynamics Materials Service Corp.	Stone	Open quarry.
McCook 378	do.	Vulcan Materials Co.	do.	Do.
IMC-Carlsbad	New Mexico	IMC Kalium	Potash	Stoping.
Crushed Limestone Operation	Missouri	Tower Rock Stone Co.	Stone	Open quarry.
Pennsuco	Florida	Tarmac America Inc.	do.	Dredging.
Bridgeport	Texas	Texas Industries, Inc., Bridgeport Stone Co.	do.	Open quarry.
Cape Sandy	Indiana	Mulzer Crushed Stone Co., Inc.	do.	Do.
Norcross	Georgia	Vulcan Materials Co.	do.	Do.
Mount Jordan	Utah	Geneva Rock Products Co. Inc.	Sand and gravel	Open pit.
Reed Quarry Barge	Arkansas	Vulcan Materials Co.	Stone	Open quarry.
Perch Hill	Texas	Gifford, Hill, and Co., Inc.	do.	Do.
Chico	do.	Pioneer Concrete of America	do.	Do.

1/ Owing to commodity reporting differences, the rank of individual mining operations may not be available.

#### TABLE 6 TWENTY-FIVE LEADING METAL AND INDUSTRIAL MINERAL MINES AND QUARRIES IN THE UNITED STATES IN 1998, IN ORDER OF OUTPUT OF TOTAL MATERIAL HANDLED

Type of ore and mine, quarry				
or operation 1/	State	Operator	Commodity	Mining method
Metal ores:				
Morenci	Arizona	Phelps Dodge Corp.	Copper-molybdenum ore	Open pit.
Barrick Goldstrike	Nevada	Barrick Goldstrike Mines, Inc.	Gold ore	Open pit and stoping.
Bingham Canyon	Utah	Kennecott Utah Copper Corp.	Copper-molybdenum ore	Open pit.
Chino	New Mexico	Phelps Dodge Corp.	do.	Do.
Twin Creeks	Nevada	Newmont Gold Co.	Gold ore	Do.
Carlin Mines Complex (15)	do.	do.	do.	Open pit and stoping.
Tyrone	New Mexico	Phelps Dodge Corp.	Copper ore	Open pit.
Mission Complex	Arizona	ASARCO Incorporated	do.	Open pit and stoping.
Minntac	Minnesota	USX Corp.	Iron ore	Open pit.
LTV Steel Mining Co.	do.	Cleveland-Cliffs, Inc.	do.	Do.
Robinson	Nevada	BHP Copper Co.	Gold and copper ore	Do.
Cyprus Miami (Inspiration)	Arizona	Cyprus Amax Minerals Co.	Copper ore	Do.
Ray	do.	ASARCO Incorporated	do.	Do.
Sierrita	do.	Cyprus Amax Minerals Co.	Copper-molybdenum ore	Do.
Empire Iron Mining Partnership	Michigan	Cleveland-Cliffs, Inc.	Iron ore	Do.
Round Mountain	Nevada	Round Mountain Gold Corp.	Gold ore	Do.
Cortez	do.	Placer Dome (U.S.) Inc.	do.	Do.
Bagdad	Arizona	Cyprus Amax Minerals Co.	Copper ore	Do.
Lone Tree	Nevada	Newmont Gold Co.	Gold ore	Do.
Hibbing Taconite Co.	Minnesota	Cleveland-Cliffs, Inc.	Iron ore	Do.
Tilden Mining Co.	Michigan	do.	do.	Do.
Mesquite	California	Newmont Gold Co.	Gold ore	Do.
McCoy/Cove	Nevada	Echo Bay Mines Ltd.	do.	Do.
Golden Sunlight	Montana	Placer Dome (U.S.) Inc.	do.	Do.
Thunderbird	Minnesota	EVTAC Mining	Iron ore	Do.
Industrial minerals:		Ŭ		
Florida mines (6)	Florida	IMC Phosphates	Phosphate rock	Do.
Florida mines (2)	do.	Cargill Fertilizer Inc.	do.	Do.
Boron	California	U.S. Borax Inc.	Boron	Do.
South Pasture	Florida	C F Industries Inc.	Phosphate rock	Do.
Aurora	North Carolina	PCS Phosphate Co	do.	Do.
F.E.C. Quarry	Florida	CSR America Inc.	Stone	Open quarry.
Reed Quarry	Kentucky	Vulcan Materials Co.	do.	Do.
Georgetown	Texas	Texas Crushed Stone	do.	Do.
Calcite Operation	Michigan	Michigan Limestone Operators	do.	Do.
Beckmann	Texas	Martin Marietta Aggregates	do.	Do.
White Rock Quarries (1)	Florida	Vecellio & Grogan Inc.	do.	Dredging
Nichols	do.	Agrifos LLC	Phosphate rock	Open pit.
Stoneport Quarry	Michigan	LTV Steel Co.	Stone	Open quarry.
Mill Creek Quarry	Oklahoma	Meridian Aggregate Co.	do.	Do.
Thornton	Illinois	General Dynamics Materials Service Corp.	do.	Do.
McCook 378	do.	Vulcan Materials Co.	do.	Do.
Point of Mountain	Utah	Monroc Inc.	Sand and gravel	Open pit.
Crushed Limestone Operation	Missouri	Tower Rock Stone Co.	Stone	Open quarry.
IMC-Carlsbad	New Mexico	IMC Kalium	Potash	Stoping.
Pennsuco	Florida	Tarmac America Inc.	Stone	Dredging
Bridgeport	Texas	Texas Industries, Inc., Bridgeport Stone Co.	do.	Open quarry.
Cape Sandy	Indiana	Mulzer Crushed Stone Co., Inc.	do.	Do.
Norcross	Georgia	Vulcan Materials Co.	do.	Do.
Reed Quarry Barge	Arkansas	do.	do.	Do.
Mount Jordan	Utah	Geneva Rock Products Co. Inc.	Sand and gravel	Open pit.

1/ Owing to commodity reporting differences, the rank of individual mining operations may not be available.

# TABLE 7MARKETABLE PRODUCT AND ORE TREATED OR SOLD AT SURFACE AND UNDERGROUND MINESIN THE UNITED STATES IN 1998, BY SELECTED COMMODITY AND STATE 1/

	Marketable product			Ore treated or sold			
	Surface U	nderground	Total	Surface U	Inderground	Total	
Metal ores:							
Copper	1,920 2/	W	1,920	653,000 3/	W	653,000	
Gold	4 2/	W	4	233,000	4,550	238,000	
Iron ore	63,200 2/	W	63,200	207,000 3/	W	207,000	
Molybdenum	W	W	W	16,900 3/	W	16,900	
Zinc	W	798 4/	798	W	12,100 5/	12,100	
Industrial minerals:							
Barite	W		W	929		929	
Clays	41,100 2/	W	41,100	41,100 3/	W	41,100	
Diatomite	725		725	1,390		1,390	
Feldspar 6/	1,330		1,330	1,330		1,330	
Garnet	63		63	63		63	
Gypsum	16,400	2,660	19,000	16,400	2,660	19,000	
Iodine	1		1	1		1	
Iron oxide pigments	29		29	29		29	
Magnesium compounds	415		415	W		W	
Mica (scrap)	150		150	206		206	
Phosphate rock	44,200		44,200	172,000		172,000	
Potash	W	3,760 4/	3,760	W	W	W	
Pumice 7/	583		583	583		583	
Salt	W	35,600 4/	35,600	W	35,600 5/	35,600	
Sand and gravel:							
Construction	1,080,000		1,080,000	1,080,000		1,080,000	
Industrial	28,600		28,600	28,600		28,600	
Soda ash		10,200	10,200		10,200	10,200	
Stone:							
Crushed	1,460,000	50,400	1,510,000	1,460,000	50,400	1,510,000	
Dimension	1,160	39	1,200	1,160	39	1,200	
Talc and pyrophyllite	1,160 2/	W	1,160	1,160 3/	W	1,160	
Tripoli	80		80	80		80	
Vermiculite	160		160	W		W	
Zeolites	34		34	34		34	
States:							
Alabama	68,000 2/	W	68,000	68,000 3/	W	68,000	
Alaska	16,100 2/	W	16,100	39,900 3/	W	39,900	
Arizona	58,500 2/	W	58,500	501,000 3/	W	501,000	
Arkansas	50,500		50,500	50,500		50,500	
California	198,000 2/	W	198,000	232,000 3/	W	232,000	
Colorado	55,600	33	55,700	72,100 3/	W	72,100	
Connecticut	14,100		14,100	14,100		14,100	
Delaware	2,560		2,560	2,560		2,560	
Florida	138,000	17	138,000	270,000	17	270,000	
Georgia	93,100	1,450	94,500	93,500	1,450	95,000	
Hawaii	5,870		5,870	5,870		5,870	
Idaho	26,100 2/	W	26,100	41,400	644	42,000	
Illinois	107,000	4,430	111,000	107,000	4,430	111,000	
Indiana	84,000	3,990	87,900	84,000	3,990	87,900	
lowa	51,300	6,720	58,000	51,300	6,720	58,000	
Kansas	33,800	3,680	37,400	33,800	3,680	37,400	
Kentucky	51,200	17,500	68,700	51,200	17,500	68,700	
Louisiana	14,700	14,600	29,300	14,700	14,600	29,300	
Maine	11,800		11,800	11,800		11,800	
Maryland	37,300 2/	W	37,300	37,300 3/	W	37,300	
Massachusetts	26,900 2/	W	26,900	26,900 3/	W	26,900	
Michigan	132.000 2/	W	132.000	164.000 3/	W	164.000	

#### (Thousand metric tons)

See footnotes at end of table.

#### TABLE 7--Continued MARKETABLE PRODUCT AND ORE TREATED OR SOLD AT SURFACE AND UNDERGROUND MINES IN THE UNITED STATES IN 1998, BY SELECTED COMMODITY AND STATE 1/

	Ν	Iarketable product		Ore treated or sold			
	Surface	Underground	Total	Surface	Underground	Total	
StatesContinued:							
Minnesota	101,000		101,000	215,000		215,000	
Mississippi	15,600		15,600	15,600		15,600	
Missouri	75,300	5,360	80,600	75,300	11,500	86,700	
Montana	13,200 2/	W	13,200	37,000	1,120	38,100	
Nebraska	21,500 2/	W	21,500	21,500 3/	W	21,500	
Nevada	35,800	2	35,800	218,000	3,140	221,000	
New Hampshire	12,900		12,900	12,900		12,900	
New Jersey	42,300		42,300	42,300		42,300	
New Mexico	18,500	2,250	20,800	W	16,500	16,500 8/	
New York	84,700 2/	W	84,700	81,200	4,290	85,400	
North Carolina	89,800		89,800	96,500		96,500	
North Dakota	10,800		10,800	10,800		10,800	
Ohio	132,000	3,280	135,000	132,000	3,280	135,000	
Oklahoma	52,700 2/	W	52,700	52,700 3/	W	52,700	
Oregon	42,300	45	42,300	42,500	45	42,600	
Pennsylvania	112,000	3,320	115,000	112,000	3,320	115,000	
Rhode Island	3,730		3,730	3,730		3,730	
South Carolina	40,300		40,300	45,000		45,000	
South Dakota	16,200	(9/)	16,200	21,400	449	21,900	
Tennessee	70,400	5,000	75,400	70,400	8,730	79,100	
Texas	191,000 2/	W	191,000	191,000 3/	W	191,000	
Utah	58,600 2/	W	58,600	113,000 3/	W	113,000	
Vermont	10,800 2/	W	10,800	10,800 3/	W	10,800	
Virginia	79,800 2/	W	79,800	81,300 3/	W	81,300	
Washington	65,600 2/	W	65,600	66,300 3/	W	66,300	
West Virginia	14,200	1,540	15,700	14,200	1,540	15,700	
Wisconsin	67,700		67,700	67,700		67,700	
Wyoming	14,000	9,180	23,200	14,000	9,180	23,200	

#### (Thousand metric tons)

W Withheld to avoid disclosing company proprietary data.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes marketable product from underground operations.

3/ Includes ore treated at underground operations.

4/ Includes marketable product from surface operations.

5/ Includes ore treated from surface operations.

6/ Includes aplite.

7/ Excludes volcanic cinder and scoria; included with crushed and broken stone.

8/ Excludes ore treated from surface operations.

9/ Less than 1/2 unit.

#### TABLE 8 MINING METHODS USED AT SURFACE OPERATIONS IN THE UNITED STATES, BY COMMODITY, IN 1998

(Percentage of total material handled)

	Preceded by	Not preceded by
Type of one and commodity	unning and	hlasting 1/
Metal ores:	Diasting	Diasting 1/
Barullium	100	
Copper	100	
Gold	97	3
Gold-silver	100	
Iron	95	5
	95	6
Magnesium metai	100	
Rare-earth metals	100	
Tin	100	
 Titanium	100	100
Uranium		100
	100	100
	97	3
Industrial minerals:	)1	5
Abrasives	100	
Barite	30	61
Boron minerals	100	
Bromine		100
Clavs		100
Diatomite	15	85
Emery	100	
Feldspar 2/	46	54
Garnet	57	43
Greensand marl		100
Gypsim	96	4
Iodine		100
Iron oxide pigments	82	18
Kvanite	100	
	58	42
Magnesite	100	
Magnesium compounds	30	70
Mica (scrap)	46	54
Olivine	68	32
Perlite	21	79
Phosphate rock	6	94
Potash		100
Pumice 3/	18	82
Salt		100
Sand and gravel:		100
Construction		100
Industrial		100
Sericite	100	
Stone:	100	
Crushed	99	1
Dimension	5	95
Sulfur (Frasch)		100
Talc and pyrophyllite	79	21
Tripoli	96	4
Vermiculite	2.	98
Wollastonite	100	
Zeolites	100	
All	50	50
All metals and industrial minerals	71	29

1/ Includes drilling and cutting without blasting, dredging, and mechanical excavation and nonfloat washing, and other surface mining methods.

2/ Includes aplite.

3/ Excludes volcanic cinder and scoria; included with crushed and broken stone.

TABLE 9

#### EXPLORATION ACTIVITY IN THE UNITED STATES IN 1998, BY METHOD, COMMODITY, AND STATE 1/

#### (Meters)

	Churn	Diamond drilling	Percussion drilling	Rotary and reverse circulation drilling	Other	Trenching	Total
Commodities:	uning	unning	uning	unnig	uning	Trenening	1000
Gold		181,000	20,300	443,000	W	2,270	647,000
Lead		2,710	3,720				6,430
Platinum metal		853					853
Zinc		65,100	W				65,100
Other 2/	(3/)	20,500	110,000	365,000	11,700	153	507,000
Total	(3/)	271,000	134,000	807,000	11,700	2,420	1,230,000
Percent of total	(4/)	22	11	66	1	(4/)	100
States:							
Alaska		44,400		15,400		335	60,200
California		W		30,900	W		30,900
Colorado		6,330	3,720	115,000	W	168	125,000
Nevada		85,500	16,500	267,000		1,770	371,000
South Dakota		65,300	3,800	18,200	(4/)		87,300
Tennessee		30,400	W				30,400
Utah		1,280		W	(4/)		1,280
Undistributed 5/	(3/)	37,500	110,000	361,000	11,700	153	520,000
Total	(3/)	271,000	134,000	807,000	11,700	2,420	1,230,000

W Withheld to avoid disclosing company proprietary data; included with "Other" or "Undistributed."

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Includes beryllium concentrate, boron minerals, copper, diatomite, iron, perlite, silver, stone, talc and pyrophyllite, titanium, uranium, vermiculite, wollastonite, and commodities indicated by symbol W.

3/ Withheld to avoid disclosing company proprietary data; included with "Other drilling."

4/ Less than 1/2 unit.

5/ Includes Arizona, Idaho, Minnesota, Montana, New Mexico, New York, North Carolina, Oregon, South Carolina, Vermont, Virginia, Washington, Wyoming, and States indicated by symbol W.