

THE MINERAL INDUSTRY OF NORTH DAKOTA

This chapter has been prepared under a Memorandum of Understanding between the U.S. Geological Survey and the North Dakota Geological Survey for collecting information on all nonfuel minerals.

In 2000, the estimated value¹ of nonfuel mineral production for North Dakota was \$42 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 3.4% increase from that of 1999² and followed a 6% increase in 1999 from 1998.

In 2000, North Dakota's leading nonfuel mineral by value was construction sand and gravel. This high-volume, low-value commodity accounted for about four-fifths of the State's nonfuel mineral production value. Lime was second by value, and crushed stone was third. In 1999, construction sand and gravel (up \$2.6 million) led the State's increase, moderated slightly by small decreases in lime and industrial sand and gravel (table 1).

The following narrative information was provided by the North Dakota Geological Survey³ (NDGS). During 2000, there were 53 surface mines in operation, as reported to the North Dakota State Soil Conservation Committee (SSCC). (The SSCC collects production data by volume, unlike the USGS, which collects data by mass or metric tons produced.) Based on these reports, 74 hectares (ha) were affected. The quantity of minerals mined included 1.38 million cubic meters (m³) of sand and gravel, 71,100 m³ of clay, 28,600 m³ of crushed stone, and 2,400 m³ of scoria, totaling 1.94 million m³ of mineral material. From 53 pits ranging in size from more than 0.1 ha to 9 ha, a total of 183,000 m³ of overburden was disturbed.

More than 90% (about 64,000 m³) of the clay mined in North Dakota was used in the manufacture of bricks at the Hebron Brick Plant in Morton County. The brick plant was established in 1904 and has been undergoing significant modification in recent years (Murphy, 1995). In 2000, the plant produced 34.7 million bricks.

Leonardite is an oxidized lignite. Currently, Georesources,

¹The terms "nonfuel mineral production" and related "values" encompass variations in meaning, depending upon the minerals or mineral products. Production may be measured by mine shipments, mineral commodity sales, or marketable production (including consumption by producers) as is applicable to the individual mineral commodity.

All 2000 USGS mineral production data published in this chapter are preliminary estimates as of July 2001 and are expected to change. For some mineral commodities, such as construction sand and gravel, crushed stone, and portland cement, estimates are updated periodically. To obtain the most current information, please contact the appropriate USGS mineral commodity specialist. A telephone listing of the specialists may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals/contacts/comdir.html>, by using MINES FaxBack at (703) 648-4999 from a fax machine with a touch-tone handset (request Document #1000 for a telephone listing of all mineral commodity specialists), or by calling USGS information at (703) 648-4000 for the specialist's name and number. All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>; facsimile copies may be obtained from MINES FaxBack.

²Values, percentage calculations, and rankings for 1999 may vary from the Minerals Yearbook, Area Reports: Domestic 1999, Volume II, owing to the revision of preliminary 1999 to final 1999 data. Data for 2000 are preliminary and are expected to change; related rankings may also change.

³Edward C. Murphy, Geologist, authored the text of State mineral industry information submitted by the North Dakota Geological Survey.

Inc. of Williston and American Colloid Co. of Scranton are the only leonardite mining operations in North Dakota. The two companies produced a combined total of approximately 24,400 metric tons (t) of leonardite in 2000. Leonardite is processed and used as a dispersant and viscosity control in oil well drilling muds, as a stabilizer for ion-exchange resins in water treatment, and as a soil conditioner.

The SSCC, as designated by the State legislature, continues to administer the Surface Mining Report Law, which requires any person conducting surface mining operations for minerals other than coal to comply with the reporting requirements of North Dakota Century Code Chapter 38-16. Minerals included under the law are cement rock, clay, gravel, limestone, manganese, molybdenum, peat, potash, pumicite, salt, sand, scoria, sodium sulfate, stone, zeolite, or other minerals (except coal). The SSCC has the regulatory authority to administer the reporting requirement, while the actual regulatory authority for most of these mining activities rests with the NDGS. The law requires that any person or company that within one calendar year removes 7,650 m³ (10,000 cubic yards) or more of earthen materials or products (including overburden) affecting 0.2 ha (0.5 acre) or more in combined mining operations must report the particulars of its surface mining activities. Some small operators cooperate by voluntarily submitting summary reports to the SSCC, although they are not required to by law. Nevertheless, because not all operations report, the aforementioned summary of surface mining statistics is a conservative estimate of the amount of nonfuel minerals mined in North Dakota in 2000.

The coal gasification plant located near Beulah continues to operate an anhydrous ammonia plant. The plant, in operation since spring 1997, has the capacity to produce 1,070 metric tons per day of anhydrous ammonia. The plant averaged 574 metric tons per day during 2000. Total production of anhydrous ammonia in 2000 was 195,000 t. In 2000, the gasification plant also produced more than 3.5 million liters (ML) of krypton and xenon, more than 13,700 t of phenol, more than 14,200 t of cresylic acid, more than 31.6 ML of naphtha, and almost 3.8 ML of methanol. Ammonium sulfate production from the stack gas scrubber was about 124,000 t in 2000.

The NDGS continued the process of entering all geologic information from its subsurface mineral program into a computerized database. This information is being used for a number of purposes, including redefining the State's lignite and uranium resources and generating useful information on the State's nonfuel minerals (clay stone, leonardite, and sand and gravel).

Reference Cited

Murphy, E.C., 1995, North Dakota clays—A historical review of clay utilization in North Dakota: North Dakota Geological Survey Miscellaneous Series, no. 79, 18 p.

TABLE 1
NONFUEL RAW MINERAL PRODUCTION IN NORTH DAKOTA 1/ 2/

(Thousand metric tons and thousand dollars)

Mineral	1998		1999		2000 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	42	W	54	W	54	W
Gemstones	NA	3	NA	3	NA	3
Sand and gravel, construction	10,700	30,400	11,700	33,000	11,700	34,000
Combined values of lime, peat (1998-99), sand and gravel (industrial), stone [crushed limestone, volcanic cinder, miscellaneous (1999), crushed volcanic cinder and miscellaneous (1998, 2000)], and values indicated by symbol W	XX	7,860 r/	XX	7,580	XX	7,970
Total	XX	38,300 r/	XX	40,600	XX	42,000

p/ Preliminary. r/ Revised. NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined Values" data. XX Not applicable.

1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

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

TABLE 2
NORTH DAKOTA: CRUSHED STONE SOLD OR USED, BY KIND

Kind	1998				1999			
	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value	Number of quarries	Quantity (thousand metric tons)	Value (thousands)	Unit value
Limestone	--	--	--	--	1	W	W	W
Volcanic cinder and scoria	1	W	W	W	1	W	W	W
Miscellaneous stone	5	W	W	W	5	W	W	W
Total or average	XX	W	W	W	XX	W	W	W

W Withheld to avoid disclosing company proprietary data. XX Not applicable. -- Zero.

TABLE 3
NORTH DAKOTA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 1999,
BY USE 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Concrete aggregate, graded			
Concrete aggregate, coarse	W	W	\$3.96
Bituminous aggregate, coarse	W	W	3.96
Railroad ballast	W	W	3.96
Coarse and fine aggregates, graded road base or subbase	W	W	3.39
Unspecified, reported 2/	W	W	3.31
Total or average	W	W	3.33

1/ Excludes limestone, miscellaneous stone, and volcanic cinder and scoria to avoid disclosing company proprietary data.

2/ Reported production without a breakdown by end use.

TABLE 4
NORTH DAKOTA: CONSTRUCTION SAND AND GRAVEL SOLD OR USED IN 1999,
BY MAJOR USE CATEGORY 1/ 2/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate (including concrete sand)	112	\$614	\$5.48
Asphaltic concrete aggregates and other bituminous mixtures	503	2,050	4.08
Road base and coverings 3/	1,300	3,040	2.33
Fill	149	254	1.70
Other miscellaneous uses 4/	18	111	6.17
Unspecified: 5/			
Reported	160	272	1.70
Estimated	9,400	27,000	2.87
Total or average	11,700	33,000	2.83

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

2/ To avoid disclosing company proprietary data, no district tables were produced in 1999.

3/ Includes road and other stabilization (cement).

4/ Includes railroad ballast and ice and snow control.

5/ Reported and estimated production without a breakdown by end use.