

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 2001, the estimated value¹ of nonfuel mineral production for North Dakota was \$39 million, based upon preliminary U.S. Geological Survey (USGS) data. This was about a 12% increase from that of 2000² and followed a 13.6% decrease in 2000 from 1999.

In 2001, North Dakota's leading nonfuel mineral by value continued to be construction sand and gravel. This high-volume, low-value commodity accounted for about three-fourths of the State's nonfuel mineral production value. Lime was second by value, and crushed stone was third. In 2000, construction sand and gravel (down \$5.2 million) accounted for most of the State's decrease, moderated slightly by a small increase in common clays (table 1).

The following narrative information was provided by the North Dakota Geological Survey³ (NDGS). During 2001, there were 65 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, 115 hectares (ha) were affected. The quantity of minerals mined included 1.51 million cubic meters of sand and gravel, 1.4 million cubic meters of clay, 24,600 cubic meters (m³) of scoria, and 5,510 m³ of crushed stone, totaling 2.94 million cubic meters of mineral material. From 53 pits ranging in size from more than 0.1 ha to 9 ha, a total of about 221,000 m³ of overburden was disturbed.

Most of the clay mined in North Dakota during this period (about 90%—1.3 million cubic meters) was used to construct dikes and raise roads in the flooded area of Devils Lake. Water levels in this closed-basin lake have risen over 8 meters since 1993 and caused more than \$300 million in damages to homes, businesses, and roads. Typically, the Hebron Brick Plant in Morton County is the largest consumer of clay in North Dakota.

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 2001 USGS mineral production data published in this chapter are preliminary estimates as of August 2002 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. Specialist contact information may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals/contacts/comdir.html>; alternatively, specialists' names and telephone numbers may be obtained by calling USGS information at (703) 648-4000 or by calling the USGS Earth Science Information Center at 1-888-ASK-USGS (275-8747). All Mineral Industry Surveys—mineral commodity, State, and country—also may be retrieved over the Internet at URL <http://minerals.usgs.gov/minerals>.

²Values, percentage calculations, and rankings for 2000 may differ from the Minerals Yearbook, Area Reports: Domestic 2000, Volume II, owing to the revision of preliminary 2000 to final 2000 data. Data for 2001 are preliminary and are expected to change; related rankings may also change.

In 2001, the Hebron Brick Company mined 70,700 m³ of clay, at least half of which was kaolinite.

Leonardite is an oxidized lignite. Currently, Georesources, 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 47,500 metric tons (t) of leonardite in 2001. 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, continued 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 had 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 1 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 operators of smaller operations cooperate by voluntarily submitting summary reports to the SSCC, although they are not required to do so 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 2001.

The coal gasification plant located near Beulah continued to operate an anhydrous ammonia plant. The plant, in operation since spring 1997, has the capacity to produce 1,200 metric tons/per day (t/d) of anhydrous ammonia. The plant averaged 854 t/d during 2001. Total production of anhydrous ammonia in 2001 was 312,000 t. In 2001, the gasification plant also produced more than 3.1 million liters (ML) of krypton and xenon, approximately 13.3 ML of phenol, 11.2 ML of cresylic acid, 12.8 ML of naphtha, and about 1.4 billion liters of nitrogen. Ammonium sulfate production from the stack-gas scrubber in 2001 was more than 120,000 t. In 2001, the plant shipped about 22,400 million standard cubic feet of CO₂ for use in enhanced oil field recovery.

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).

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

(Thousand metric tons and thousand dollars)

Mineral	1999		2000		2001 p/	
	Quantity	Value	Quantity	Value	Quantity	Value
Clays, common	54	W	79	W	79	W
Gemstones	NA	3	NA	3	NA	3
Lime	W	W	176	7,010	175	10,600
Sand and gravel:						
Construction	11,700	33,000	10,600	27,800	10,600	28,200
Industrial	W	W	1	W	1	W
Combined values of peat (1999), stone [crushed stone, crushed limestone, volcanic cinder, miscellaneous (1999- 2000), crushed volcanic cinder and miscellaneous (2001)], and values indicated by symbol W	XX	7,580	XX	410	XX	472
Total	XX	40,600	XX	35,200	XX	39,300

p/ Preliminary. 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	1999				2000			
	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	1	W	W	W
Volcanic cinder and scoria	1	W	W	W	2	W	W	W
Miscellaneous stone	5	W	W	W	3	W	W	W
Total or average	XX	W	W	W	XX	W	W	W

W Withheld to avoid disclosing company proprietary data; not included in "Total." XX Not applicable.

TABLE 3
NORTH DAKOTA: CRUSHED STONE SOLD OR USED BY PRODUCERS IN 2000, BY USE 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Construction:			
Concrete aggregate, graded:			
Bituminous aggregate, coarse	W	W	W
Railroad ballast	W	W	W
Coarse and fine aggregates, graded road base or subbase	W	W	W
Special, other fillers or extenders	W	W	W
Unspecified, reported 2/	W	W	W
Total or average	W	W	W

W Withheld to avoid disclosing company proprietary data; not included in "Total."

1/ Withheld limestone, miscellaneous stone, and volcanic and scoria from total 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 2000,
 BY MAJOR USE CATEGORY 1/

Use	Quantity (thousand metric tons)	Value (thousands)	Unit value
Concrete aggregate and concrete products	133	\$767	\$5.77
Asphaltic concrete aggregates and other bituminous mixtures	231	547	2.37
Road base and coverings	4,090	9,020	2.20
Road stabilization (cement)	66	154	2.33
Other miscellaneous uses 2/	162	434	2.68
Unspecified: 3/			
Reported	528	1,450	2.74
Estimated	5,400	15,400	2.85
Total or average	10,600	27,800	2.37

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

2/ Includes fill, snow and ice control, and railroad ballast.

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