

**SOUTH DAKOTA – 2002 Mineral Summary  
Production, Exploration and Environmental Issues**

E.H. Holm, T. Cline Jr., M.R. Nelson  
South Dakota Department of Environment & Natural Resources  
Minerals and Mining Program  
<http://www.state.sd.us/denr/DES/mining/mineprg.htm>

**Production**

*Gold:* After an increase in gold production in 2001, production decreased markedly in 2002. Golden Reward Mining Company, Homestake Mining Company and Wharf Resources Inc. produced 118,511 ounces of gold in 2002. This represented a 59 percent decrease in the amount of gold produced compared to 2001. The main reason for the decrease was the closure of the historic Homestake Mine at Lead, South Dakota. Gold continued to remain the leading mineral commodity in South Dakota in terms of value. The average price of gold in 2002 was \$309.73, yielding a gross value of about \$36.7 million. This was 53 percent lower than the 2001 gross value of \$78.4 million. Table 1 compares gold production for 2001 and 2002 from the active large scale gold operations in South Dakota. The mines are surface heap leach operations, with the exception of Homestake.

<b>Table 1 – Gold Production in South Dakota – 2001 and 2002</b>		
Company	2002 Production (ounces)	2001 Production (ounces)
Golden Reward Mining Co., LP	50	0
Homestake Mining Company	36,334	185,307
LAC Minerals (USA), LLC	0	0
Wharf Resources (USA), Inc.	82,127	104,019
Total	<b>118,511</b>	<b>289,326</b>
Estimated Value	<b>\$36,706,412</b>	<b>\$78,413,133</b>

Homestake and Wharf also produced silver as a by-product of the gold recovery process. A total of 59,015 ounces of silver was recovered in 2002. At an average price of \$4.59, the value of the silver was \$270,879. This is a decrease from the 156,592 ounces and \$684,307 value reported in 2001.

Homestake continued closure activities at its historic gold mine in Lead during 2002. The mine was closed at the end of 2001 due to low gold prices, high production costs, and lower than expected ore grades. On January 18, 2002, the last ore was milled and on February 13, 2002, the mill was shut down forever. The mill processed 167.62 million tons of ore and produced 39.61 million ounces of gold and 9 million ounces of silver during its long history. In June 2002, demolition of the mill facilities began. Homestake demolished 25 structures in the mill complex, completing demolition in November. The company then began an extensive soils testing program of the mill site. These tests will help Homestake determine recontouring and mill foundation removal plans for the site which will take place in 2003.

Homestake also continued decommissioning the underground mine. The underground mine was placed in a care and maintenance mode as discussions continued on whether to convert the mine to a national underground laboratory to study neutrinos.

Wharf Resources (USA), Inc. completed the bulk of required reclamation at its Golden Reward Mine during 2002. The company announced in 2001 that it would close the Golden Reward Mine and begin final reclamation. The mine is owned by Wharf Resources and has been in temporary cessation for the past five years. Wharf began reclamation activities in April 2002 by backfilling two pits with spent ore and waste rock. A stream channel was constructed through one of the backfilled pits. After the spent ore was removed from the leach pad, the asphalt liner was ripped and the area was recontoured. Golden

Reward placed topsoil on the regraded areas and completed seeding in November 2002. A total of 3.3 million cubic yards of material was moved during the project. Demolition of the crusher building and truck shop was completed in August. About 194 acres were reclaimed during 2002.

There are currently 11 mine permits that cover seven large scale gold mining operations in South Dakota. Wharf Resources, the only gold mine still actively mining in South Dakota, holds four of these permits. No new mine permits or mine permit amendments were issued to large scale gold operations in 2002.

*Industrial and Other Minerals:* Industrial and other mineral production for 2002 is summarized in Table 2.

During the 2002 reporting period, 474 companies had active mine licenses in South Dakota. An operator must obtain a license to mine for sand, gravel, pegmatite minerals, materials used in the process of making cement or lime, and rock to be crushed and used in construction. There were also 35 mine permits that covered the mining of other minerals such as slate, bentonite, placer gold, and dimension stone.

<b>Table 2 – 2002 Non-Metallic Mineral Production</b>	
Mineral	Production (Tons)
Bentonite	50,000
Dimension Stone	369,900
Gypsum	44,000
Iron Ore	49,203
Limestone	3,587,594
Mica Schist	5,548
Pegmatite Minerals	5,707
Placer Gold Ore	87
Quartzite	3,384,612
Shale	236,952
Slate	1,068
Sand & Gravel	13,470,591

Source: Annual reports submitted by mining companies

Sand and gravel was the major non-metallic mineral commodity produced during 2002 with 13,470,591 tons reported. Sand and gravel is produced in nearly every county in South Dakota and is used mainly for road construction projects.

Limestone was second and Sioux quartzite was third in terms of non-metallic mineral commodities tonnage produced during 2002. Limestone production was reported at 3,587,594 tons and Sioux quartzite was reported at 3,384,612 tons. Limestone is produced in the Black Hills of western South Dakota and is used primarily in the production of cement and in construction projects. Sioux quartzite is quarried from four locations in southeastern South Dakota. Most of the quartzite is crushed and used in construction. Some larger blocks are used for rip-rap, railroad ballast, and occasionally for decorative purposes.

A total of 369,900 tons of granite was mined by Dakota Granite Company and Cold Spring Granite Company from quarries near Milbank in northeastern South Dakota. Due to its beauty and distinctive red color, the “mahogany” granite is used primarily for floor tiles, monuments, and building construction. Much of it goes to international markets.

Other minerals produced in smaller amounts during 2002 include bentonite, iron ore, mica schist, pegmatite minerals (feldspar, mica, rose quartz), placer gold, and slate.

## **Exploration**

Gold exploration activities in South Dakota were limited due to continued low gold prices and other factors. None of the large scale gold mines conducted exploration activities in 2002. Only one exploration permit was issued during 2002 for a small placer mining operation.

## **Environmental Issues**

*Gilt Edge Mine:* The Gilt Edge Mine was an open pit heap leach gold mine operated by Brohm Mining Company. The company abandoned the site after its parent, Dakota Mining, declared bankruptcy in 1999. The site was placed on the Superfund National Priorities List in 2000, and the state and EPA are currently in the process of reclaiming the mine.

The focus of reclamation activity at the mine during 2002 was on capping the Ruby waste rock dump, the major source of acid mine drainage at the site. The majority of the capping system was completed by the end of the year. A one to two foot liner bedding layer was placed over the regraded depository. After the bedding layer was completed, 304,000 square yards (or 62.9 acres) of 80-mil Linear Low Density Polyethylene (LLDPE) geomembrane liner and geotextile were placed over the bedding layer.

As the liner was completed, drain layer material was placed over the geotextile. About 150,000 cubic yards of crushed rock were used for the drain layer. Some of the drain layer material came from rock brought to the mine site from a nearby highway reconstruction project. By the end of the year, the drain layer was completed, and cover soil was placed over the drain layer on the upper portion of the dump. Geomembrane liner and riprap were also placed in 4,000 feet of perimeter diversion ditches. Plans are to complete cover soil placement and seed the dump in spring 2003.

Water treatment continued at the mine site during the first part of 2002. In August, the water treatment plant was shut down in order to convert it from a caustic system to a high density sludge lime treatment system. The plant conversion, which will be completed in June 2003, will lower water treatment costs at the site. Acid water is currently being stored in the mine pits until the water treatment plant is operating again.

Plans for completing reclamation of the rest of the site, including the mine pits and heap leach pad, are currently being prepared by EPA and the state.

*Reclamation at Richmond Hill Mine:* The Richmond Hill Mine, an open pit heap leach gold mine that developed an acid mine drainage problem during operations, continues to show improvement. The bulk of reclamation was completed by the mine operator, LAC Minerals (USA), LLC, in the mid-1990s. The performance of the pit impoundment, backfilled with acid-generating rock and covered with a low permeability capping system, continued to perform as designed. Monitoring data shows that only minimal amounts of oxygen and water are being detected in the impoundment. This indicates the cap is effective in limiting oxygen and water infiltration and is preventing acid generation. No signs of settling or slumping were detected during routine surveys of the pit impoundment. A dense, self-sustaining vegetative cover has become established on the pit impoundment and most of the waste depository area.

The capped leach pads also continue to perform well. Monitoring data shows that the capping systems are effective in reducing water infiltration into the spent ore. No signs of settlement or cracking were found during routine surveys of the leach pads. A dense, self-sustaining cover is becoming established on the leach pads.

LAC resumed water treatment in 2002 after treating no water in 2001. The company treats water on a periodic basis based on the amount of water needing treatment and the pond storage capacities at the mine

site. Effluent from the leach pads is collected and stored in the former process ponds and treated prior to discharge. About 4.7 million gallons were treated with a reverse osmosis unit and discharged by the end of the year. LAC plans to continue water treatment in 2003.

Ground and surface water quality around the mine site is closely monitored. Ground water impacted by acid mine drainage prior to mine reclamation is steadily improving. Monitoring wells generally show decreasing trends in sulfate and metal concentrations and increasing pH. Biological assessments of a creek below the mine show that the stream remains healthy and supports a viable cold water fishery.