SOUTH DAKOTA - 1996 Mineral Summary
Production, Exploration and Environmental Issues

T.V. Durkin, E.H. Holm, B.A. Regynski
South Dakota Department of Environment & Natural Resources
Office of Minerals and Mining
http://www.state.sd.us/denr/DES/mining/mineprg.htm

Production

Gold: The gold mines in the northern Black Hills produced 558,896 ounces of gold in 1996, which just about equaled the amount produced during the previous year. Gold remained the leading mineral commodity in South Dakota in terms of value. The average price of gold in 1996 was $387.76, yielding a gross value of about $217 million. The table below lists production figures at the four active large scale gold operations in South Dakota. All mines are surface heap leach operations with the exception of Homestake.

	1996 (ounces)	1995 (ounces)
Homestake	407,324 (284,126 U) (123,198 OC)	402,867 (311,022 U) (91,845 OC)
Wharf Resources	106,394	96,608
Brohm Mining	23,748	10,011
Golden Reward	21,430	49,569
TOTAL	**558,896**	**559,055**

Key: U - Homestake's Underground Operation
OC - Homestake's Open Cut Surface Operation

In January 1996, the state issued a new mine permit for Brohm Mining Corporation's Anchor Hill Project, which is a fully owned subsidiary of Dakota Mining Corporation. The project will yield about 8.6 million tons of ore and 240,000 ounces of gold over a six year period. The permit incorporates stringent requirements for characterizing the reactivity of ore and waste rock and for preventing acid mine drainage. Brohm's Anchor Hill Project offers the added benefit of improving upon a previously permitted reclamation plan to mitigate acid mine drainage at the company's adjacent Gilt Edge Mine, which was permitted in 1986 and is now in its closure stage.

In November 1996, Wharf Resources submitted a mine permit application for their Clinton Project, which involves 23.8 million tons of ore, 55.4 million tons of waste, and 679,936 ounces of proven and probable total gold reserves. The project is currently scheduled for hearing in front of the state Board of Minerals and Environment this summer and, if permitted, would continue production through 2007.

Homestake Mining Company began construction on the third lift of its Grizzly Gulch tailings dam. The raise is estimated to provide additional storage capacity until 2013.

The Golden Reward Mine entered a period of temporary cessation in December 1996 in order to resolve land ownership issues and complete permitting of additional reserves.

Non-Metallic Industrial Minerals: During the 1996 reporting period, 435 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.

Sand and gravel was the major non-metallic industrial mineral commodity produced with 13,334,448 tons reported removed. Sand and gravel is produced in nearly every county in South Dakota and is used mainly for road construction projects.

Sioux quartzite was the next largest non-metallic industrial mineral commodity produced with 2,595,053 tons reported removed. It is quarried from four locations in south-eastern 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.

Pegmatite mining, mainly in the southern Black Hills, produced 9,520 tons of pegmatite minerals such as feldspar, mica, and rose quartz.

The South Dakota Cement Plant reported mining 1,965,293 tons of limestone, 148,734 tons of shale, and 36,923 tons of gypsum.

Dimension Stone: A total of 158,000 tons of granite was mined by Dakota Granite Company and Cold Spring Granite Company from quarries near Milbank, South Dakota. Due to its beauty, Milbank Granite is used primarily by the building industry and for decorative stone purposes. Much of it goes to international markets. Total sales from 1996 production was $19.5 million.

Exploration

Nine exploration permits were issued in 1996 to the following companies: Wharf Resources, Naneco Minerals Inc., Golden Reward Mining Company, REM Company, and Lew and April Wight. Primary minerals explored were gold and silver. A total of 701 test holes, two bulk samples, and one exploration drift were permitted for exploration in Lawrence and Pennington Counties. Diamond core drilling methods will be used for holes drilled up to 15,000 feet in depth. Reverse circulation, percussion, and rotary drilling methods will be used for shallow holes.

In addition to routine fill-in and step-out drilling at existing mines, a renewed exploratory interest was noted in a geologically complex Precambrian iron formation-hosted gold deposit south of Rochford, South Dakota. This site has undergone extensive exploration by other operators in the past and is currently being explored by Naneco Minerals. Results continue to indicate that the deposit, if it were to progress to a mine, would primarily be an underground operation.

Environmental Issues

No notices of violation were issued to mining companies during 1996, which underscores a continued effort on the behalf of industry and the department to promote environmentally responsible mining in South Dakota.

Based on 1996 performance monitoring results at LAC Minerals' Richmond Hill Mine, reclamation efforts to mitigate acid mine drainage problems that developed in 1992 were highly successful. Three and one half million tons of reactive waste rock were relocated from a valley-fill depository, backfilled in the pit from which it was originally mined, and capped in order to isolate the waste from surface runoff and prevent soluble contaminants from degrading ground water. Relocation and capping was completed in 1995. The reclaimed pit impoundment was fitted with numerous performance monitoring devices designed to track the long term success of remedial measures. Results from gravity and barrel lysimeters, heat dissipation units, neutron probes, piezometers, pore gas (oxygen and CO_2) monitoring, temperature probes, water quality and aquatic monitoring, and cap settlement surveys, all indicate that the reclaimed site is performing better than expected. In June 1996, the Department of Environment and Natural Resources (DENR) approved LAC's closure plan for its three leach pads. Pad closure activities were largely completed in 1996. They included amending spent ore in one heap with alkaline material and capping all three pads.

Brohm Mining Corporation continued efforts to reclaim acid mine drainage at their Gilt Edge Mine, which included treating and discharging acid water collected from the base of the waste rock depository and stored in the pits. Active treatment by a water treatment plant was the most effective way of treating and discharging acid waters at Brohm in 1996. In 1997, forced air evaporation will be pursued as a significant supplemental, less expensive method of reducing acid water stored in the pits. Backfilling of the Gilt Edge mine pits with non-reactive material from the Anchor Hill project began in 1996 and will continue.

A significant amount of reclamation took place at the large scale gold mines in 1996. By the end of the year, 432 acres of land affected by surface mining were reclaimed. Due to concerns over the cumulative impacts of mining in the Black Hills, a law was passed in 1992 requiring that 500 acres of land attributable to surface mining for gold be reclaimed by September 1, 1997. If the 500 acre reclamation requirement is not met by that time, no new permits or amendments to existing permits for surface gold mines can be issued. The DENR projects that 500 acres will have been reclaimed by the September deadline. At that time, the state Board of Minerals and Environment will review the effectiveness of the reclamation standards set forth in South Dakota's mining laws and regulations.