

**SOUTH DAKOTA – 1999 Mineral Summary**  
**Production, Exploration and Environmental Issues**

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<http://www.state.sd.us/denr/DES/mining/mineprg.htm>

**Production**

*Gold:* Gold production continued to decline in South Dakota in 1999. The gold mines in the northern Black Hills produced 320,287 ounces of gold in 1999. This represented an 18% drop in the amount of gold produced in 1998, but gold continued to remain the leading mineral commodity in South Dakota in terms of value. The average price of gold in 1999 was \$278.98, yielding a gross value of about \$89.3 million. While the amount of gold produced in 1999 dropped by 18% from the previous year, the lower gold price caused a 22% drop in gross value. Table 1 compares production figures for 1998 and 1999 at the active large scale gold operations in South Dakota. The mines are surface heap leach operations with the exception of Homestake.

Table 1 – Gold Production in South Dakota – 1998 and 1999		
Company	1999 Production (ounces)	1998 Production (ounces)
Brohm Mining Corp.	365	2,297
Homestake Mining Company	212,700 (187,287 U) (25,413 OC)	277,402 (117,446 U) (159,956 OC)
Wharf Resources (USA), Inc.	107,222	110,176
Total	<b>320,287</b>	<b>389,875</b>
Estimated Value	<b>\$89,353,667</b>	<b>\$114,658,339</b>

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

Production from the Homestake Open Cut decreased from 159,956 ounces in 1998 to 23,185 ounces in 1999. The reason for the decrease is that Homestake completed mining in the Open Cut in September 1998, and the only production in 1999 came from stockpiled ore. Meanwhile, production increased in the underground mine from 117,446 ounces in 1998 to 181,515 ounces in 1999. This was due to Homestake instituting its new underground mining plan.

Wharf and Brohm were the only other companies to report gold production in 1999. Wharf reported gold production of 107,222 ounces in 1999, a slight decrease from the 110,176 ounces reported in 1998. Brohm produced only 365 ounces in 1999, which were recovered from residual gold in process solutions early in the year.

These three mines also produced silver as a by-product in the gold recovery process. A total of 65,759 ounces of silver was recovered in 1999. At an average price of \$5.22, the value of the silver was \$343,262. This is a decrease from the 90,609 ounces and \$501,974 value reported in 1998.

The Golden Reward Mine remained under temporary cessation and produced no gold. LAC Minerals' Richmond Hill Mine is no longer producing gold and the mine is now undergoing final reclamation.

There are currently 12 mine permits that cover seven large scale gold mining operations in the state. No new mine permits or mine permit amendments were issued to large scale gold operations in 1999.

*Other Industrial Minerals:* Other industrial mineral production for 1999 is summarized in Table 2. During the 1999 reporting period, 491 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 40 mine permits that covered the mining of other minerals such as slate, bentonite, placer gold, and dimension stone. Figure 1 shows the location of permitted and licensed mine operations, including large scale gold mines, in South Dakota.

Mineral	Production (Tons)
Bentonite	74,000
Dimension Stone	660,163
Gypsum	53,057
Limestone	3,753,982
Iron Ore	43,112
Mica Schist	6,729
Pegmatite Minerals	7,152
Placer Gold	213
Quartzite	2,880,488
Shale	214,800
Slate	889
Sand & Gravel	14,642,823

Source: Annual reports submitted by mining companies

Sand and gravel was the major non-metallic industrial mineral commodity produced with 14,642,823 tons reported removed. Sand and gravel is produced in nearly every county in South Dakota and is used mainly for road construction projects.

The second largest non-metallic mineral commodity produced in 1999 was limestone with 3,753,982 tons produced. Dakotah Cement alone produced 1,217,911 tons of limestone. It also produced 201,701 tons of shale, 53,057 tons of gypsum, and 36,914 tons of sand.

Sioux quartzite was the third largest non-metallic industrial mineral commodity produced with 2,880,488 tons reported removed. It 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 660,163 tons of granite was mined by Dakota Granite Company and Cold Spring Granite Company from quarries near Milbank, 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 industrial minerals produced in lesser amounts in 1999 include bentonite, iron ore, mica schist, pegmatite minerals (feldspar, mica, rose quartz), placer gold, and slate.

## Exploration

Exploration activities in the state slowed in 1999, primarily due to lower gold prices. Two exploration permits were granted during the year. Wharf Resources permitted 1,454 drill holes and completed 125 reverse circulation and diamond core drill holes in the vicinity of their existing operations in Lawrence County. Wharf is exploiting disseminated epithermal gold deposits in the Bald Mountain mining district. Exploration drilling in Wharf's American Eagle area is reported to have increased Wharf's gold reserves by 60,000 ounces to 1,028,000 ounces. Homestake Mining Company continued operations at their underground mine in Lead throughout 1999, but completed no surface exploration activities. Apex Minerals received an exploration permit in Custer County to explore for placer gold and associated detrital heavy minerals in Oligocene terrace gravel deposits. The Apex permit involves trenching and channel sampling, followed by sample analysis at their facility in Newell, South Dakota. Currently, 113 exploration permits remain active in South Dakota primarily for gold and silver exploration within the northern Black Hills.

## Environmental Issues

*Brohm Mining's Gilt Edge and Anchor Hill Projects:* In the early part of the year, Dakota Mining Corporation (Brohm's parent corporation) was hopeful that it could still mine Phase 2 of the Anchor Hill Pit sometime in 1999. They were in the process of settling a lawsuit with environmentalist groups and were working with the US Forest Service to submit an operating plan. However, because of the drop in gold prices and delays in obtaining Forest Service approval for Phase 2, Dakota's creditors would not continue to finance the mining operation. As a result, Dakota Mining Corporation filed for bankruptcy in Canada in July 1999. The bankruptcy was filed just days before the settlement agreement was reached with the environmentalist groups.

Due to the bankruptcy and environmental problems at the site, the state intervened. The first state action taken was to prevent a discharge of acid water from the mine site. Governor William J. Janklow authorized the department to pay for water treatment from the state's Regulated Substance Response Fund. By doing this, the state did not need to use the reclamation bond to pay for water treatment, thus preserving it to do actual reclamation work. The water treatment plant was brought back into operation on July 27, 1999 and continued operating through the end of 1999. Since July, Brohm personnel have been working with the department to successfully treat acid water at the site. The volume of acid water has been reduced from about 150 million gallons in July to 129 million gallons by the end of the year. There is now enough room at the site to collect and store acid drainage from a 100-year storm event.

The US Bureau of Reclamation, through an interagency agreement with EPA, prepared a site closure plan. In general, the plan is to:

1. Partially remove the Ruby waste rock dump as pit backfill;
2. Cap and revegetate the remainder of the Ruby waste rock dump in place;
3. Seal historic underground mine workings;
4. Partially backfill the mine pits;
5. Cap the mine pits, as necessary; and
6. Remove spent ore from the leach pad for pit backfill and cap construction.

When acid mine drainage was discovered at the mine site in 1993, Brohm did not have money to increase its reclamation bond to cover the costs of acid mine drainage mitigation. The best the state could get from Brohm was an additional \$1 million in cash to add to the bond and a promissory note. While Brohm was

complying with a state order to mitigate the acid mine drainage at the mine, it developed a mine plan for a new gold deposit near the existing mine called the Anchor Hill project. Brohm proposed to use the cash flow and the low sulfide rock from this project to concurrently cap and reclaim the acid producing areas of the mine. The state granted a permit for this project in 1996, but with the following conditions to increase the cash portion of the reclamation bond:

1. Brohm had to deposit cash bonds with the state before any new areas were disturbed;
2. Brohm had to leave all interest from the bond in a state account; and
3. Brohm had to deposit one percent of gross gold sales in a state account.

Before Dakota Mining's bankruptcy, Brohm complied with the permit conditions and made progress in increasing the cash portion of the reclamation bond to over \$6 million by mining Phase I of the Anchor Hill project. However, after the bankruptcy, Brohm had no more money to add to the cash bond. After reviewing cost estimates to close the mine, it was clear there would be a shortfall in reclamation funding due to the promissory note not being met.

During the 2000 legislative session, Governor Janklow introduced several measures to the legislature to obtain funding to make up the shortfall in reclamation funding. He asked the legislature to use \$8 million of tobacco settlement money to make up the shortfall. However, the legislature did not want to use tobacco settlement money for mine reclamation. Governor Janklow then introduced a bill that would require the other mining companies to help as emergency response contractors and indemnify them as agents of the state. Because of mining industry opposition, the bill died in committee. Finally, Governor Janklow proposed a bill to increase the severance tax on gold, with the increase going into a reclamation fund. This bill also died in committee.

With no other legislative options available, Governor Janklow had no choice but to ask EPA to place the mine site on the Superfund National Priority List. The state is currently working with EPA to have the site listed and begin reclamation work sometime this summer.

*Reclamation at Richmond Hill Mine:* The pit impoundment, backfilled with acid-generating rock and covered with a low-permeability capping system, continued to exceed expectations in 1999. Four seasons of monitoring data show that only minimum 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 found during several inspections of the pit impoundment by the department and LAC contractors. Only minor erosion was noted on a few portions of the impoundment. A dense, self-sustaining vegetative cover is becoming established on the pit impoundment and waste dump area.

The capped leach pads are also performing well. No signs of settling or slumping were found on the leach pads. Only minor erosion was noted in several areas. A good vegetative cover is becoming established. Monitoring data shows that the capping systems are effective in reducing water infiltration into the spent ore. Because of the low metal concentrations in the pad effluent, LAC believes that passive treatment may be feasible for long-term water treatment. A pilot plant has been constructed to test passive treatment, and test results are so far encouraging.

Ground and surface water quality around the mine site continues to improve. Biological assessments of Squaw Creek below the mine show that the stream is healthy. At the end of 1999, LAC discontinued water treatment for the winter since the volume of water requiring treatment had been reduced to minimal levels. Only seasonal water treatment will be conducted, starting in the summer of 2000. Because of

decreased water treatment and reclamation requirements at the site, LAC reduced its workforce to three employees at the end of the year.

Performance monitoring data is on file at the DENR and is available to the public.

*Inactive and Abandoned Mines:* The department continued working with the US Forest Service, the Bureau of Land Management (BLM), and EPA in the process of reclaiming two historic abandoned mine sites in the northern Black Hills. Both of these mines have open adits and shafts, acid mine drainage, eroding streamside tailings, and small sulfide waste rock piles.

An engineering evaluation/cost analysis has been completed by the US Forest Service to evaluate and select remedial alternatives for the Minnesota Ridge Mine located about four miles northeast of Rochford. The Forest Service, EPA, and the department are currently reviewing the various remedial alternatives and costs. It is uncertain at this time if EPA funding will be available for the private portions of the mine site. The US Forest Service may begin reclamation on the public land portions as early as next summer.

BLM has started reclamation of the Belle Eldridge Mine located about 1.5 miles southeast of Deadwood. Last fall, the BLM contractor regraded the waste rock pile and removed about 10,000 to 12,000 cubic yards of tailings and placed them in a temporary storage area. This summer, the tailings will be placed in a capped repository near the mine site. A wetland may be constructed to passively treat acid water discharging from the mine opening and an acid seep.

### Mine Locations in South Dakota

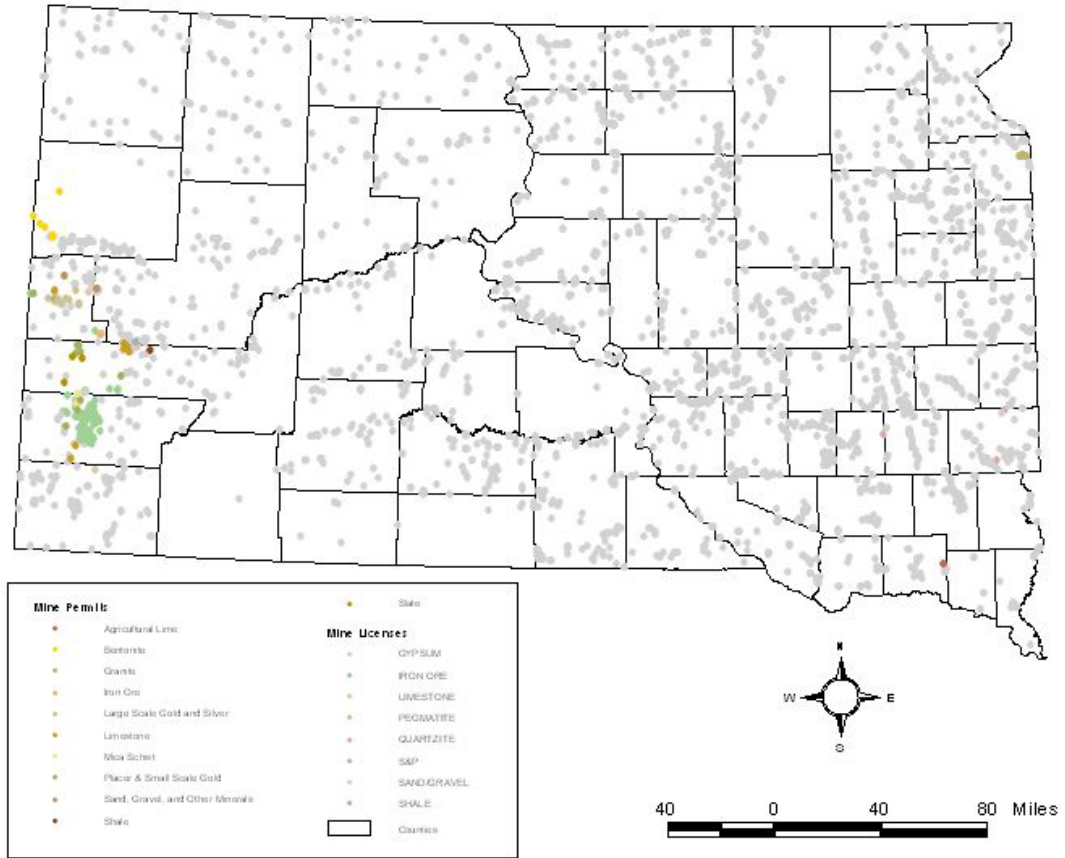


Figure 1 – Mine Locations