Geological Survey

❖ *Mission and Philosophy*

The Geological Survey's mission is to promote the beneficial and environmentally sound use of Wyoming's vast geologic, mineral and energy resources while helping protect the public from geologic hazards. By providing accurate information and expanding knowledge through the application of geologic principles, the Geological Survey contributes to economic growth and improvement in the quality of life for Wyoming's citizenry.

The Geological Survey believes in professional, responsive, accountable and dedicated service to the public, to other government entities and to its own employees. It takes pride in providing information that is timely, objective, accurate and complete. Because of its limited resources, the Geological Survey strives for continued innovation, creativity and efficiency.

❖ *Results of outcomes*

In FY00, the geologic staff of the Geological Survey conducted 17 field or laboratory projects; prepared 52 in-house articles, reports and maps on those and other investigations, gave 77 talks or briefings, wrote 22 invited technical papers for outside entities and responded to at least 11,098 inquiries, all related to mineral and energy resources, geology and (or) geologic hazards in Wyoming. In addition, the staff of the Publications Section responded to at least 5,613 inquiries, published or distributed 29 new titles (24,250 individual copies) and sold 14,137 reports and maps, returning $113,340 to the general fund from the sale of these publications.

As a measure of the Geological Survey's success in helping existing mineral industries continue their production and exploration and further their development (Objective I.A.), the production of key minerals showed substantial growth. Due to depressed commodity prices, primarily for oil, natural gas and coal, the total mineral valuation for FY00 of $3.436 billion declined 14 percent from the 1999 valuation of $4.017 billion. Although coal production failed to meet the Geological Survey's prediction due to low prices, the state's production of coal grew from 318 million tons per year in FY99 to 328 million tons per year in FY00, a 3.2 percent increase. Uranium production was up to 2.8 million pounds in the face of very low prices. Coalbed methane is continuing to show rapid growth, with a present production rate of about 450 mmcf gas per day, almost three times last year's rate. Conventional gas production rates were up as well, showing growth for the sixth straight year. A new limestone aggregate quarry began production from a Geological Survey-promoted location near Hartville in Platte County, with about 60,000 tons produced in the first year. Of the five Geological Survey-pro-

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Year established and reorganized
Established1901, reorganized 1933 and 1969

Statutory references
W.S. 9-2-801, 9-2-803 through 9-2-810

Number of authorized personnel
16 full-time, three part-time, five at-will employee contract

Organizational structure
Organized as Sections and Units: Coal, Geologic Hazards, Geologic Mapping, Industrial Minerals and Uranium, Metals and Precious Stones, Oil and Gas, and Publications Sections; Supportive Services, Computer Services and Laboratory Units.

Clients served
General public, business and industry, state and local agencies, universities, federal agencies, agencies in other states and foreign

Budget information

General funds	$967,272
Federal funds	105,225
Total	**$1,072,497**

moted, value-added or alternative uses for currently extracted minerals, which are use of carbon dioxide, limestone, low-Btu gas, glass manufacture and decorative stone production, carbon dioxide shows the greatest potential for adding to the state's economic outlook through application in enhanced oil recovery. These five uses were all promoted by the Geological Survey in FY00. In the limestone category, a decorative stone quarry was permitted in the state. Production is pending, with construction for a processing facility expected to begin in FY01. The processing facility may provide 40 jobs. An additional decorative stone quarry for granite is still in the permitting process and will produce stone feedstock for the processing facility and allow further expansion of the employee base. Glass manufacture is still in the analysis stage, with possible industrial users comparing the cost of Wyoming glass beverage containers with aluminum containers.

To help meet its objective of helping Wyoming's existing mineral industries, the Geological Survey participated in the third Wyoming Natural Gas Fair and participated in four coalbed methane forums. The Geological Survey continued its participation in a joint industry/government study that is seeking to identify safe ways to concurrently develop trona and natural gas that both underlie the trona patch in southwestern Wyoming. The Geological Survey continued to promote the manufacture of glass within Wyoming, so as to provide a value-added use for some of the soda ash that is already produced within the state; continued to promote value-added uses for carbon dioxide, low-Btu natural gas, limestone, and stone produced in Wyoming; continued to provide geologic information for incorporation into the Oil and Gas Conservation Commission's online petroleum database and its Underground Injection Control Program; added data on additional oil and gas fields into the Geological Survey's database of petroleum reservoirs; and supplied core analysis data to the Oil and Gas Conservation Commission for incorporation in its database. To assist the coal industry, the Geological Survey continued to encode stratigraphic and chemical data on Wyoming coals for incorporation into the Geological Survey's database as well as the U.S. Geological Survey's National Coal Resource Data System, and continued work on a joint government and industry assessment of the trace element content of Wyoming coals.

The Geological Survey attempts to attract new geologic-, mineral-, and energy-related industries to Wyoming (Objective I.B.). Wyoming's first zeolite mine halted production in FY00 due to extended test marketing. Decorative stone production has been growing, with production in FY00 of 314 tons. Coalbed methane production increased from 41.7 billion cubic feet in FY99 to an estimated 125 billion cubic feet in FY00. The Geological Survey has been involved in the promotion of all three of these industries. In particular, the Geological Survey created a coalbed methane map that has been very popular with companies and individuals trying to learn about this resource, and this map is being updated quarterly in order to make current data readily available to interested parties. The new coalbed methane informational pamphlet (Informational Pamphlet 7) has been of great assistance to companies trying to pass information to citizens concerned about the coalbed methane project in the Powder River Basin.

To help meet its objective of attracting development of undeveloped or underdeveloped mineral resources occurring in Wyoming (Objective I.B), the Geological Survey continued its exploration for and investigations of diamond, gold, silver, platinum, palladium, base metals (copper, iron, nickel, titanium, and cobalt), dimension stone, zeolites, silica sand, other gemstones (rubies, sapphires, pyrope garnet, peridot, jade, cordierite and chromian diopside), zirconium, mineral pigments, abrasives (garnet), limestone, ballast, marble and industrial iron. A new bulletin "Gemstones, Semi-Precious Stones, Lapidary Materials, Ornamental Stones and Other Unique Minerals and Rocks of Wyoming" is now available as Bulletin 71. The Geological Survey has made increasing use of the Internet to disseminate new information regarding the state's resources for the diamond project and precious metals. In FY00, the Geological Survey Web site received more than 10,000 hits. Additionally, the Geological Survey has re-established the annual geological forum on the University of Wyoming (UW) campus, with the Department of Geology and Wyoming Geological Association as cohosts, to promote the dissemination of geologic information about Wyoming and its resources.

In spite of depressed gold prices, interest and exploration activity in Wyoming's gold resources has remained fairly strong. Industry interest in gemstones, titanium and diamonds continues at a substantial level. Platinum and palladium is seeing increased interest as a result of Geological Survey efforts, with more than 1,000 mining claims filed in Albany and Carbon counties in the past year.

As a measure of the Geological Survey's success in identifying and preventing decisions or actions that might adversely affect Wyoming's geologic, mineral and energy resources (Objective I.C.), the Geological Survey's information, advice or concerns about unwise management or wasteful uses of these resources were heeded 86 percent of the time in FY00, up from 74 percent in FY99. Although there was no new production of natural gas from beneath the trona patch (Objective I.C.), industry and government recommended withdrawal of some trona acreage, based upon a technical study for safety reasons, and created a set of special criteria for shallow gas drilling in and near the trona resource area. The Bureau of Land Management (BLM) is currently generating a National Environmental Policy Act (NEPA) document to act upon the technical committee's recommendations for deep gas drilling. The shallow gas drilling project has proceeded, and some commercial production may begin in FY01. The Geological Survey is par-

ticipating with BLM, U.S. Forest Service, United States Geological Survey (USGS), Department of Energy (DOE) and other state agencies in the Wyoming Oil and Gas Resource Assessment (WOGRA) project to generate a standard resource assessment that all federal agencies can refer to in making land use decisions.

To help meet the objective of identifying and preventing adverse decisions related to the state's geologic, mineral and energy resources, the Geological Survey reviewed 186 scoping statements, environmental assessments, environmental impact statements, siting applications, management plans, proposed rules and regulations of other agencies and other documents brought to its attention. During FY00, the State of Wyoming became a cooperating agency in the preparation of two major NEPA documents, the Coalbed Methane Drainage Environmental Assessment and the Powder River Basin Oil and Gas Environmental Impact Statement. The Geological Survey has been and will continue assisting in the preparation of these documents. The Geological Survey continued to assist the Office of State Lands and Investments by alerting it to new oil and gas wells offsetting state leases, with assessments of the mineral, energy and paleontological resources underlying proposed sales and exchanges of state lands and with the review of applications for fossil-removal permits as well as inspections of permitted fossil-removal quarries. The Geological Survey continued to assist the Wyoming Oil and Gas Conservation Commission by providing it with subsurface geologic information and continued to provide estimates of production and prices of taxable minerals for use by the Consensus Revenue Estimating Group.

As a measure of success in raising the awareness, knowledge and understanding of the state's geology and geologic hazards and their relevance to the protection of Wyoming's citizenry, property and natural resources from harm or damage (Objective II.A.), the Geological Survey's information, advice or concerns were addressed 86 percent of the time in preparation of NEPA and planning documents. The Geological Survey's interactive Web site for earthquakes received 7,226 hits during the past year, allowing citizens to learn about earthquake history, locations, frequency and mitigation measures.

To help meet the objective of raising awareness of the effects that geology and geologic hazards might have on the protection of Wyoming's citizenry, property and natural resources (Objective II.A.), the Geological Survey reviewed 186 scoping statements, environmental assessments, environmental impact statements, siting applications, management plans, proposed rules and regulations of other agencies and other documents brought to its attention. The Geological Survey worked with the State Engineer's Office and the University of Wyoming to finalize a geologic, geohydrologic and geochemical database for the Little Snake River Drainage Basin Project, which was completed in FY00. The Geological Survey assisted in the generation of wellhead protection delineation reports for 100 communities in the state. The Geological Survey continued with its ongoing initiative to map the geology (both 1:100,000- and 1:24,000-scale) of the more populated areas of the state, and published 10 geologic maps.

The state geologist or other Geological Survey geologists remained involved with many interdisciplinary projects, programs or groups, which include Abandoned Mined Land Technical Review Committee, Aquifer Vulnerability to Agricultural Contamination Team, Governor's Multi-hazard Mitigation Task Force, Interstate Oil and Gas Compact Commission, Policy and Technical Committees for the Concurrent Development of Trona/Oil and Gas Group, Subcabinet for Natural Resources, Wellhead Protection Plan Advisory Committee and Delineation Work Group, Western States Seismic Policy Council, Wyoming Emergency Management Agency's Design Exercise Team, Wyoming Geographic Information Advisory Committee, Wyoming Source Water Protection Advisory Council, Wyoming Ambient Groundwater Quality Monitoring Advisory Committee, UW Civil Engineering Geographic Information System (GIS) projects and Wyoming Water Plan Scoping Team.

In addition, the state geologist assisted in protecting correlative rights and preventing waste of oil and natural gas resources as a commissioner on the Wyoming Oil and Gas Conservation Commission. As a member of the Wyoming Board of Professional Geologists and as secretary-treasurer, the state geologist helped protect the public through licensure of professional geologists. And, as a member of the Consensus Revenue Estimating Group, the state geologist helped provide the governor and Legislature with estimates of production and prices for oil, gas and other mineral commodities produced in Wyoming. The state geologist will be the state representative on the new Joint Powers Board that has been created in the Powder River Basin to deal with coalbed methane issues and will work with the person in the newly created coalbed methane coordinator position.

❖ *Strategic plan changes*

The Geological Survey did not make any changes to its strategic plan in FY00. In FY01, the Geological Survey anticipates adding coalbed methane as a separate objective in order to reflect the importance of this growing resource.

Goal I: Diversify and strengthen the state's economy by supporting the responsible and innovative exploration and use of Wyoming's geologic, mineral and energy resources.

Objective I.A.: Help the coal, oil and gas, industrial minerals, uranium and other existing mineral industries in Wyoming to continue their production,

exploration and further development within the state.

Objective I.B.: Contribute substantially to attracting new geologic-, mineral- and energy-related industries.

Objective I.C.: Contribute to the identification and prevention of decisions or other actions that would be contrary to the beneficial and wise use of the state's geologic, mineral, and energy resources.

Goal II: Better protect Wyoming's citizenry, property and natural resources from harm or damage associated with geologic processes or geologic hazards and increase the use of geologic science in meeting societal needs.

Objective II.A.: Raise awareness, knowledge and understanding of the state's geology and geologic hazards, emphasizing ways to avoid or mitigate the potential harm or damage that may result as a consequence of living or developing on or near specific geological features, materials or terrains.

Geological Survey organization chart