

# NEVADA

## Mining Association

### 2010 Sustainability Report

February 2010





Photo: Mike Sevon, courtesy Nevada Natural Heritage Program

## Table of Contents

<b>President’s Message</b>	<b>3</b>
<b>Mining in Nevada</b>	<b>4</b>
<b>Sustainability and Nevada’s Mining Industry</b>	<b>7</b>
<b>About the Nevada Mining Association</b>	<b>9</b>
<b>Protecting the Environment</b>	<b>13</b>
Environmental Management	13
Water Management	18
Air Emissions	21
Mine Closure	27
<b>Economic Contributions</b>	<b>32</b>
Direct Contributions	32
Indirect Contributions	32
Long-Term Economic Sustainability	33
<b>Working in Mining</b>	<b>36</b>
Employee Recruitment, Development, and Retention	36
Increasing Diversity in Mining	37
Occupational Health and Safety	38
<b>Community Impact</b>	<b>41</b>
Community Investment	41
Public Services	42
Indigenous Peoples	44
<b>Looking to the Future</b>	<b>46</b>
The Future of Mining in Nevada	46
Sustainability Trends	46

## President's Message

It is with great pleasure that the Nevada Mining Association provides you with our inaugural industry sustainability report. While many of our member companies regularly produce individual reports on their sustainability performance, this is the first attempt to produce a comprehensive overview of mining's impact in Nevada.

As the Silver State's founding industry, mining has been an integral part of Nevada's economic, social and cultural history for more than 150 years. Nonetheless, the industry is still greatly misunderstood and the contributions of the state's mining companies, suppliers, employees and their families are often under-appreciated. Mining has evolved tremendously over the past several years and Nevada is now not just a leading producer of precious metals and industrial minerals, but a global industry leader in safety and environmental responsibility.

Most of the state's primary ore bodies are located in rural areas, far from the urban populations. Although Las Vegas and Reno are home to many primary and regional headquarters as well as suppliers and vendors who support the mining industry, the physical distance between Nevada's most populous areas and mine sites means that most Nevadans lack direct experience with the mining industry or an understanding of its social and environmental responsibility practices.

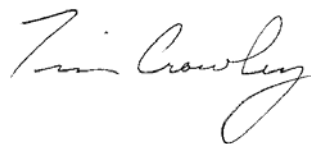
This report is intended to provide insight and information on mining and mining companies, and enhance its readers' understanding of the industry's current role in promoting sustainable development in our communities and the state as a whole. It has been prepared with reference to the Global Reporting Initiative's G3 Guidelines, an international standard for best practice in sustainability reporting.

We've attempted to be as transparent as possible about the opportunities and challenges that mining offers Nevada, and hope to showcase our achievements and areas for ongoing improvement in our approach to key social and environmental issues.

It is our hope that this report will become an annual publication and that, as we refine our approach and data collection processes, future editions of this report will be more comprehensive and detailed. We welcome your feedback on this effort and encourage you to contact us with your views on this year's report, and how we might improve it in future years by sending an email to: [info@nevadaming.org](mailto:info@nevadaming.org).

Thank you for taking the time to read about this essential and historic industry.

Sincerely,



**Tim Crowley**  
President,  
Nevada Mining Association

## At a Glance: Mining in Nevada

- **\$6.26 billion in total** production value (second largest in nation after Arizona)
- **Ranked third best region in the world for mining** development by the Fraser Institute (behind Québec and Wyoming), which rates the mineral development potential of a jurisdiction under its current policies
- **Minerals produced:** gold, silver, copper, aggregates, barite, diatomite, dolomite, gypsum, geothermal water, limestone, lithium carbonate, magnesium oxide, molybdenum, perlite, precious opals, salt, silica sand, and specialty clays.
- **More than 100 companies** are actively mining or exploring for mineral resources.
- **49 major metals and industrial minerals mines**, in all counties in Nevada
- **Six state and four federal regulatory agencies** overseeing mining activity
- **Nevada is the fourth largest gold-producing region in the world** (after China, South Africa, and Australia), accounting for **8 percent of total global gold production each year**.
- **Significant global source of lithium** (used in rechargeable batteries) and **barite** (used to drill for oil and natural gas).
- **75 percent of gravel and sand used for construction** in Las Vegas is produced in Nevada
- **Second only to California in geothermal energy production** in the United States

## Mining in Nevada

### Part of Nevada's History

Mining has been integral to Nevada's history, from Native American use of its mineral wealth to fashion arrowheads, spear points, and tools to today's modern industrial mining operations. In fact, Nevada's silver deposits were the key to statehood: A driving force in the state's economy in the mid-nineteenth century, they were a major reason for Nevada's admission into the United States in 1864. While gaming and tourism now dominate the state's economy, Nevada remains a nationally and internationally significant source of metals and minerals.

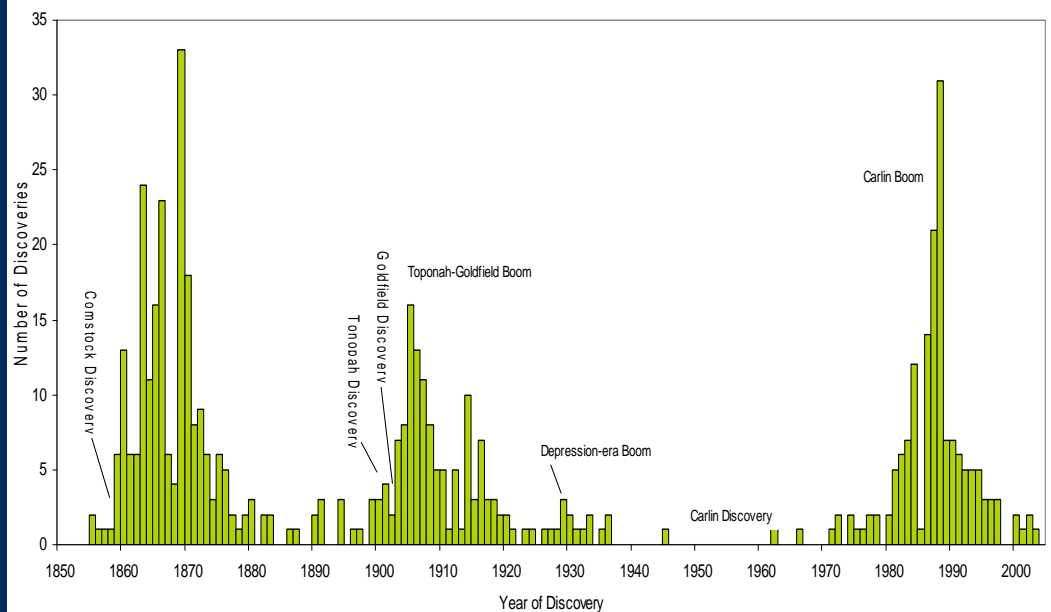
The history of mining in Nevada clearly illustrates the industry's cyclical nature (see figure below). Finding ways to translate the economic boost from mining operations into long-term, sustained economic development remains a key challenge for our industry.

### Timeline of Mining Activities in Nevada

- |               |   |
|---------------|---|
| Early history | Native Americans mine deposits of obsidian, agate, jasper, and quartz to fashion arrowheads, spear points, and various cutting and scraping tools.                                    |
| 1849–1880s    | The '49ers discover gold on their way to the California gold fields. Comstock Lode silver ore deposit is found in Virginia City.  |
| 1900s–1920s   | The first mining renaissance begins. More silver and gold is discovered in Tonopah and Goldfield. Copper mining begins near Ely.  |
| 1903–1970s    | World wars and industrial expansion revive significant demand for base metals. In 1962, the Carlin Trend gold deposit is discovered, sparking a resurgence in precious metals mining. |
| 1980s–present | Current mining boom begins.   |

## Nevada Mining Districts and Deposits Discovery Rate, 1850–2004

Source: Nevada Bureau of Mines and Geology



## The Mining Industry Today

Mining has evolved significantly from the Gold Rush, when individual miners used simple technologies to extract metal from ore. The modern, industrial mining industry took shape in Nevada in the 1980s, when higher gold prices and new recovery technologies led to the development of several large gold mining operations in the central, northern, and eastern regions of the state. Since then, Nevada has been one of the world's major gold-producing regions, providing 8 percent of all gold produced annually and transforming the United States into a net exporter of gold.

While gold production accounts for the lion's share of the total value of mining production in Nevada, silver and copper continue to be produced in significant quantities. In fact, the state still provides 20 percent of U.S. silver (1.4 percent of total global production), living up to its nickname of "the Silver State."

Industrial minerals are a much smaller percentage of the revenues generated by mining in Nevada, several are of strategic national or international importance. For example, Nevada possesses one of only three lithium mines in the world. Lithium is a key ingredient in rechargeable batteries used to power electronics, including the batteries used in hybrid vehicles. Global demand for lithium is expected to grow in coming years as automobile manufacturers produce more hybrid cars.

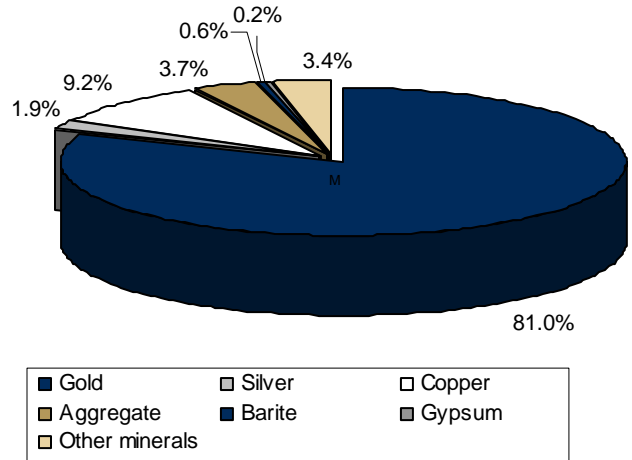
Barite, used as a weighting agent for oil and gas drilling rigs, is another significant industrial material. Most of the barite consumed in the U.S. comes from mines in Elko and Lander counties.

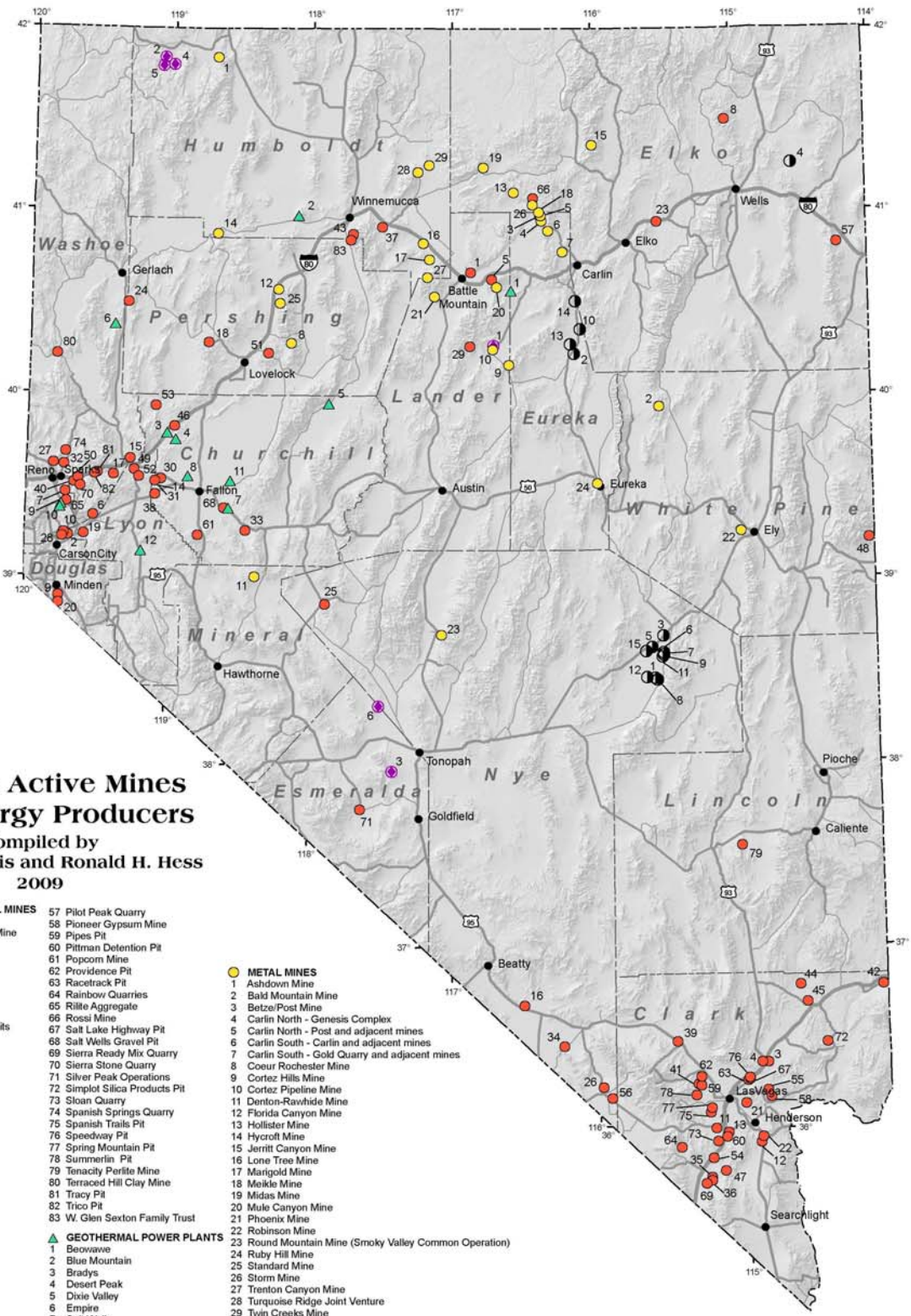
Geothermal energy is another important new resource. At present, geothermal plants in Nevada produce 1.38 million megawatt hours per year of electricity—or enough to power 80,000 homes. By some estimates, this figure could increase to as much as 2000 megawatt hours of electricity and more than a billion dollars in revenue for the state by 2025.

Over the past three decades, the mining industry has invested more than \$30 billion dollars in exploration, operations, and equipment in Nevada. This foundation for the industry, and the existence of vast, still-unexplored mineral resources, holds promise for continued mineral development in the state's future.

### Minerals Mined in Nevada, By Value

Nevada Bureau of Mines and Geology, 2008





# Nevada Active Mines and Energy Producers

Compiled by David A. Davis and Ronald H. Hess 2009

**INDUSTRIAL MINERAL MINES**

- 1 3D Pit
- 2 Adams Claim Gypsum Mine
- 3 Apex Landfill Pit
- 4 Apex Quarry
- 5 Argenta Mine
- 6 Basaltite Dayton Pit
- 7 Bella Vista Pit
- 8 Big Ledge Mine
- 9 Biny Materials Pit
- 10 Black and Red Cinder Pits
- 11 Blue Diamond Pit
- 12 Boulder Ranch Quarry
- 13 Cactus Pit
- 14 Celite Mine
- 15 CEMEX Pairite Pit
- 16 Cinder Cone Pit
- 17 Clark Mine
- 18 Colorado Mines
- 19 Dayton Materials
- 20 Dressler Pit
- 21 East Pit
- 22 El Dorado Quarry
- 23 Elburz Pit
- 24 Empire Quarry
- 25 Gabbs Mine
- 26 Gamebird Pit
- 27 Golden Valley Pit
- 28 Goni Pit
- 29 Greystone Mine
- 30 Hazen Pit
- 31 Hazen Pit
- 32 Hidden Canyon Pit
- 33 Huck Salt
- 34 IMV Pits
- 35 Jean Pit
- 36 Jean Quarry
- 37 Kramer Hill Quartzite Quarry
- 38 Lahontan Pit
- 39 Lee Canyon Sand and Gravel Pit
- 40 Lockwood Quarry
- 41 Lone Mountain Pits
- 42 Mesquite Community Pit
- 43 MIN-AD Mine
- 44 Moapa (CEMEX) Pit
- 45 Moapa (Ready Mix) Pit
- 46 Moltan Mine
- 47 Money Pit
- 48 Mount Moriah Quarry
- 49 Mull Lane Pit
- 50 Mustang Pit
- 51 Nassau Mine
- 52 Nevada Cement Mine
- 53 Nightingale Pit
- 54 North Jean Lake Pit
- 55 PABCO Gypsum-Apex Pit
- 56 Pahump Community Pit

**METAL MINES**

- 57 Pilot Peak Quarry
- 58 Pioneer Gypsum Mine
- 59 Pipes Pit
- 60 Pittman Detention Pit
- 61 Popcorn Mine
- 62 Providence Pit
- 63 Racetrack Pit
- 64 Rainbow Quarries
- 65 Ritte Aggregate
- 66 Rossi Mine
- 67 Salt Lake Highway Pit
- 68 Salt Wells Gravel Pit
- 69 Sierra Ready Mix Quarry
- 70 Sierra Stone Quarry
- 71 Silver Peak Operations
- 72 Simplot Silica Products Pit
- 73 Sloan Quarry
- 74 Spanish Springs Quarry
- 75 Spanish Trails Pit
- 76 Speedway Pit
- 77 Spring Mountain Pit
- 78 Summerlin Pit
- 79 Tenacity Perlite Mine
- 80 Terraced Hill Clay Mine
- 81 Tracy Pit
- 82 Trico Pit
- 83 W. Glen Sexton Family Trust

**GEOTHERMAL POWER PLANTS**

- 1 Beowawe
- 2 Blue Mountain
- 3 Bradys
- 4 Desert Peak
- 5 Dixie Valley
- 6 Empire
- 7 Salt Wells
- 8 Soda Lake
- 9 Steamboat - Binary
- 10 Steamboat - Flash
- 11 Stillwater
- 12 Wabuska

**GEMSTONE MINES**

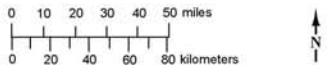
- 1 Blue Ridge Turquoise Mine
- 2 Bonanza Opal Mine
- 3 Lone Mountain Turquoise Mine
- 4 Rainbow Ridge Opal Mine
- 5 Royal Peacock Opal Mine
- 6 Royal Blue Turquoise Mine

**OIL FIELDS**

- 1 Ashdown Mine
- 2 Bald Mountain Mine
- 3 Betze/Post Mine
- 4 Carlin North - Genesis Complex
- 5 Carlin North - Post and adjacent mines
- 6 Carlin South - Carlin and adjacent mines
- 7 Carlin South - Gold Quarry and adjacent mines
- 8 Coeur Rochester Mine
- 9 Cortez Hills Mine
- 10 Cortez Pipeline Mine
- 11 Denton-Ravwide Mine
- 12 Florida Canyon Mine
- 13 Hollister Mine
- 14 Hycraft Mine
- 15 Jarritt Canyon Mine
- 16 Lone Tree Mine
- 17 Marigold Mine
- 18 Meikle Mine
- 19 Midas Mine
- 20 Mule Canyon Mine
- 21 Phoenix Mine
- 22 Robinson Mine
- 23 Round Mountain Mine (Smoky Valley Common Operation)
- 24 Ruby Hill Mine
- 25 Standard Mine
- 26 Storm Mine
- 27 Trenton Canyon Mine
- 28 Turquoise Ridge Joint Venture
- 29 Twin Creeks Mine

**OIL FIELDS**

- 1 Bacon Flat
- 2 Blackburn
- 3 Currant
- 4 Deadman Creek
- 5 Duckwater Creek
- 6 Eagle Springs
- 7 Ghost Ranch
- 8 Grant Canyon
- 9 Kale Spring
- 10 North Willow Creek
- 11 Sand Dune
- 12 Sans Spring
- 13 Three Bar
- 14 Tomera Ranch
- 15 Trap Spring



This map was printed on an electronic plotter directly from digital files. Dimensional calibration may vary between electronic plotters and X and Y directions on the same plotter, and paper may change size; therefore, scale and proportions may not be exact on copies of this map.

nbmg For sale by:  
Nevada Bureau of Mines and Geology  
2175 Raggio Pkwy.  
Reno, Nevada 89512  
ph. (775) 784-6691, ext. 2  
www.nbmg.unr.edu; nbmgstats@unr.edu

Compiled by Nevada Bureau of Mines and Geology (www.nbmg.unr.edu) and the Nevada Division of Minerals (www.minerals.state.nv.us).  
Source: NBMG Special Publications MI-2008, *The Nevada Mineral Industry 2008* and P-20, *Major Mines of Nevada 2008*.

# Sustainability and Nevada’s Mining Industry

What does “sustainability” mean for an industry that relies upon a finite resource? Sustainability, in its simplest form, is about working in ways that recognize the potential social, environmental, and economic opportunities and challenges created by mining operations and their supply chains and strive for a net positive benefit. Ultimately, it’s about seeking ways to transform limited geological resources into sustained—and sustainable—development.

## The Business Case for Sustainability

Good sustainability performance is critical to the success of the mining industry in Nevada. Poor management of our social, economic, and environmental impacts undermines our social license to operate and the corporate reputations of our member companies. It can increase our costs through litigation and fines, and can impact profitable development of mining operations. On the other hand, striving for improvement and innovation in addressing our social and environmental responsibilities can reduce costs, enhance relationships with our stakeholders, and leave a lasting positive legacy for our industry.

## Material Issues

What sustainability issues matter most? To our member companies? To our stakeholders in Nevada? Table 1 summarizes the industry’s material issues—and the opportunities and challenges they pose.

Sustainability Opportunities and Challenges		
	Opportunities	Challenges
<b>Environment</b>	<ul style="list-style-type: none"> <li>Maintain compliance with Nevada’s rigorous state and federal environmental regulations</li> <li>Support development of renewable energy sources to meet operational energy needs and reduce carbon emissions</li> <li>Support development and implementation of sustainable technologies for heavy equipment</li> <li>Innovate in biodiversity management and water use</li> </ul>	<ul style="list-style-type: none"> <li>Continue to reduce the impacts of mining operations and their supply chains on water, air, and land</li> <li>Protect valuable habitat and wildlife, and mitigate impacts where unavoidable</li> <li>Continue to reduce, or even eliminate, atmospheric mercury emissions</li> <li>Reduce the overall footprint of mining operations</li> <li>Explore use of natural land forms when reclaiming land for mine closure</li> </ul>
<b>Workforce</b>	<ul style="list-style-type: none"> <li>Contribute directly to economic development through local recruitment and provide well-paid employment opportunities with comprehensive benefits</li> </ul>	<ul style="list-style-type: none"> <li>Recruit qualified employees with the necessary technical knowledge and skills</li> <li>Continue to increase participation of women and minorities throughout the workforce</li> </ul>

	<b>Opportunities</b>	<b>Challenges</b>
<b>Workforce (cont'd)</b>	<ul style="list-style-type: none"> <li>• Provide excellent professional development and career advancement programs that build human capital</li> </ul>	<ul style="list-style-type: none"> <li>• Help employees transition to new career opportunities after mine closure</li> <li>• Continually improve occupational health and safety performance</li> </ul>
<b>Economic Contributions</b>	<ul style="list-style-type: none"> <li>• Maintain a healthy and growing industry presence in Nevada that provides important, long-term contributions to state revenues</li> <li>• Purchase local goods and services and stimulate broader economic development</li> <li>• Advocate for regulatory change to allow use of site facilities for new economic opportunities during operations and after closure</li> </ul>	<ul style="list-style-type: none"> <li>• Support economic diversification and comprehensive planning for sustainable communities beyond mine closure</li> <li>• Minimize the economic impacts associated with the cyclical nature of the industry</li> </ul>
<b>Community Impact</b>	<ul style="list-style-type: none"> <li>• Make high-impact social investments in consultation with local communities</li> <li>• Encourage employee volunteerism</li> <li>• Support and participate in partnerships for problem-solving and social and economic development</li> <li>• Contribute to infrastructure development in rural areas</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce strain on local government services in rural and remote areas</li> <li>• Support enhanced community vision and planning for long-term social and economic development</li> <li>• Improve relationships with indigenous peoples</li> <li>• Improve public understanding of the mining industry and its modern practices within an increasingly urban state</li> </ul>

The members of the Nevada Mining Associations strive for sustainability in their own businesses. NvMA supports members by sharing best practices that strengthen these efforts and by providing a platform for collaboration to expand their impact.



## Members of the Nevada Mining Association

### Operating Members

Allied Gold, Ltd  
 Argonaut Gold Inc  
 Atlantic Richfield  
 Barrick Gold of North America  
 Chemical Lime Co.  
 Coeur-Rochester, Inc Mine  
 CR Reward Corp  
 EP Minerals, LLC  
 Firstgold Corp  
 Fronteer Development, USA, Inc  
 General Moly, Inc  
 Goldcorp-Marigold Mining Co  
 Graymont Western US, Inc  
 Gryphon Gold Corporation  
 Isabella Pearl, LLC  
 Jipangu International , Florida  
 Canyon Mining, Inc  
 Kennecott-Rawhide Mining  
 Company Denton-Rawhide Mine  
 Kinross Gold USA, Inc  
 Ledcor Industries (USA) Inc  
 Martin Marietta Materials  
 Meridian Gold Inc  
 M-I LLC  
 Mud Camp Mining  
 Nevada Copper Corp.  
 Newcrest Resources, Inc  
 Newmont Mining Corporation  
 Ormat Technologies, Inc  
 PABCO Building Products, LLC  
 Rodeo Creek Gold, Inc  
 Round Mountain Gold Corp  
 Royal Gold, Inc  
 Sierra Nevada Construction, Inc  
 Small Mine Development, LLC  
 U.S. Gold Corporation

## About the Nevada Mining Association

The Nevada Mining Association (NvMA) strives to maintain a business environment that encourages exploration, development, and production of minerals in Nevada now, and in the future. We accomplish this by bringing the industry together to speak with one voice and follow best practices in the areas of regulatory affairs, policy, education, safety, environmental, human resources, and public outreach. By pooling our individual resources and working collectively with our stakeholders, we are able to strengthen our impact.

Our 250 members include precious metal, base metal, and industrial mineral mining companies; mineral exploration and development companies; geothermal energy companies; suppliers of goods and services to the mining industry; and individuals interested in mining in Nevada (see “Members of the Nevada Mining Association”).

*“Many people know about the large mine operators in northeastern and central Nevada. The industry, however, is much broader and encompasses security specialists in Las Vegas, environmental engineers in Sparks, mine processors in North Las Vegas, machinists in Elko, heavy machinery distributors in Henderson, hydrogeologists in Carson City, tire vendors in Tonopah and many more.”*

**—Tim Crowley, President , Nevada Mining Association**

### History

The Nevada Mine Operators Association was founded in 1912 to improve labor and safety practices. Building on this success, the association took on its current form in 1952, when it expanded to include suppliers and service providers as well as mine operators.

### NvMA Governance

The Nevada Mining Association is administered by a president and a small staff that oversees day-to-day operations. Nine member-led committees define and implement the association’s strategy and key activities in specific issue areas:

- Education Committee
- Environmental Committee
- Government Affairs Committee
- Human Resources Committee
- Mine Safety and Health Committee
- Public Lands Committee
- Public Outreach Committee
- Suppliers Club
- Taxation Committee

### Sustainability Role

The Nevada Mining Association facilitates individual company and collective industry sustainability efforts by:

- **Providing a forum** for our members to share knowledge of best practices. For instance, the Mine Safety and Health Committee meets monthly to

*“Recently, the suppliers committee decided to get more involved in sustainability. We’ve started to look for ways to make a contribution – through support for the McCaw School of Mines and NvMA’s education workshops, for example. We are talking with the chairs of other committees about things we can do to support the operating members as vendors. We’re ready to help where we can, and we’ve got the people power to do it.”*

**—Steve Antonini, Supplier Club Chair**

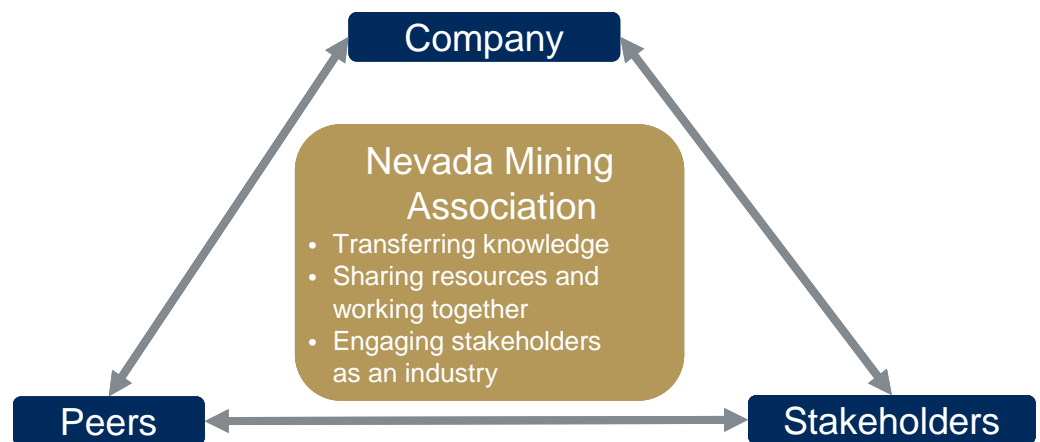
## Members of the Nevada Mining Association

### Vendor Members

3M Mining & Mineral Extraction EBO  
 Ad Wear, Inc  
 Aledge Technologies, Inc  
 Advantage Flight Solutions, LLC  
 Agru America, Inc  
 Air Resource Specialists, Inc  
 Ambassador IXL Manufacturing, Inc  
 AMEC Earth & Environmental – Inc  
 American Mining Insurance Co  
 American Salvage, Inc  
 Ames Construction, Inc  
 Anglo-Gold Ashanti North America  
 Aqua Hydrogeologic Consulting  
 Arnold Machinery Co  
 Atlantis Casino Resort Spa  
 Baird Hanson Williams LLP  
 Bakercorp  
 Basic Chemical Solutions LLC  
 Big R Manufacturing  
 Blue Moon Promotions  
 Bodell Construction Company  
 Brag Crone & Rigging  
 Brown & Caldwell  
 Bucyrus International, Inc  
 C.R. Drake & Sons  
 Canyon Construction Company  
 Cascade Earth Sciences  
 Cashman Equipment Co.  
 Cate Equipment Company  
 Cemeration USA, Inc  
 Centerra (U.S.) Inc  
 Chambers Group, Inc  
 Cherokee Chemical  
 Conestoga-Rovers & Associates, Inc  
 Contech Construction Products, Inc  
 Craftsman Homes  
 Crowell & Moring LLP  
 Cyanco  
 D & D Tire Inc  
 Diepenbrock Harrison  
 DMC Mining Services  
 Duke Jets, LLC  
 Dumas Contracting, USA, Inc

organize training opportunities for mining personnel and develop ways in the industry can enhance safety.

- **Sharing resources** to develop and implement collaborative initiatives to address sustainability challenges faced by the industry. For example, in 2008, the industry joined together to fund a study to better understand fugitive mercury emissions from mine sites.
- **Providing a platform** for industry-level communication and engagement with key stakeholders and participation in public policy advocacy. One example is the quarterly meetings with state and federal regulators hosted by NvMA committees to discuss environmental, health and safety, land use, and other issues.
- **Recognizing members' sustainability achievements.** For example, by paying tribute to the most incident free operations in the state. The association annual meeting also serves as the forum for the state reclamation awards for innovation in restoring mined lands.



### Our Stakeholders

Our pursuit of sustainability requires that we listen to—and work with—a variety of stakeholders, including:

- Our host communities and local governments
- State and federal policy makers
- State agencies
- Federal agencies
- Our employees
- Nonprofit organizations
- Schools and universities
- The general public

### Participating in Public Policy

NvMA believes it is important for the industry to actively participate in developing sound legislation and regulation on the issues that affect us: taxation, environmental regulation, access to land and water, mine closure, primary and secondary education, health care, labor, and more. The Nevada state legislature is only convened every two years; we believe that the association should take these infrequent opportunities to inform legislators about the industry and the impacts of potential legislation. Because Nevada state legislators meet only

### Vendor Members (Con't)

Elkhorn Holdings, Inc  
Elko Convention & Visitors Authority  
Elko Wire Rope & Mining Supply  
Energy Laboratories, Inc  
Environmental Management Associates  
Environmental Support Services  
Folsom Associates  
Gemcom (USA) Inc  
Geomega, Inc  
Gold Canyon Mining and Construction  
Gold Summit Corp, USA  
Golden Gate Petroleum  
Golden West Industries  
Granite Construction Company  
GroundProbe North America LLC  
H2H Associates  
Harrison Western Construction Corporation  
HC Itasca Denver, Inc  
High Desert Supply  
High Voltage, Inc  
Industrial Handling Equipment, Inc  
Intermountain Electronics, Inc  
Isabella Pearl, LLC  
JS Redpath Corp  
Jack Doheny Supplies and Rentals  
Jackson Kelly, PLLC  
JBR Environmental Consultants, Inc  
JCH Environmental Insurance Brokers  
Johnson Matthey, Inc  
Kafoury, Armstrong & Company  
Kappes, Cassiday & Associates  
Kennametal Tricon Metals & Services  
Kiewit Pacific Co  
Kimley-Horn and Associates, Inc  
Knight Piesold and Company  
Lee Brothers Automotive, Inc  
Legarza Exploration  
Legend, Inc

biannually, we believe that the association should provide them with information about the industry and impact of potential legislation. When specific issues arise or bills are drafted, we develop a consensus on an industry position with our members, which we communicate to legislators. The NvMA Government Affairs Committee monitors legislative and regulatory issues and acts as a liaison with federal, state, and local officials.

NvMA also has a political action committee (PAC) that makes contributions to political candidates in Nevada who are open to engaging with our members—even if they hold opinions on key issues that differ from ours. The NvMA PAC raises funds separate from membership dues, and an advisory committee composed of contributing companies decides how to spend the money. In 2009, NvMA's PAC contributed roughly \$65,000 to political candidates.

The association generally considers federal government affairs to be beyond our scope of influence. However, we recognize that issues at the federal level can significantly affect our members and are of interest to Nevadans. When we offer an opinion on these issues, we typically communicate through the National Mining Association ([www.nma.org](http://www.nma.org)), which represents the interests of the mining industry at the federal level.

LeTourneau Technologies America, Inc.  
Lumos & Associates  
McClelland Laboratories, Inc  
Marphil-Monnett Associates, Inc  
Mercury Waste Solutions  
Modular Space  
MWH  
Nalco Company  
National Security Technologies  
Nevada Cement Company  
Nevada Insurance Agency  
Northern Nevada Equipment  
OMG! Promotions  
P & F Distributors  
P & H MinePro Services  
Parsons Behle & Latimer  
Patton Boggs LLP  
Pele Nevada LLC  
Pinion Exploration & Construction, Inc  
Pro Group Recycling Solutions  
PSC Environmental Services  
PSC Industrial Services  
Q & D Construction  
R.E. Monks Construction, LLC  
Rain for Rent  
Red Lion  
Reliable Controls Corporation  
Renewable Energy Group  
Richied & Associates  
Ritchie Bros Auctioneers  
Rockland Manufacturing Co.  
Sandvik Mining and Construction  
Schlumberger Water Services

Sierra Geosynthetic Services, Inc  
Smith Power Products, Inc  
Soil-Tech, Inc  
Southwest Energy LLC  
SRK Consulting (U.S.) Inc  
Stanley Convergent Security  
Start Pac  
Sukut Construction  
Summit Engineering Corp  
Sunrise Engineering Corp  
Sure Steel, Inc  
Teco Pneumatic, Inc  
Tele-Fonika Cable Americas Corp.  
Tetra Tech  
The Mahoney Group  
The Mines Group, Inc  
Timberline Drilling, Inc  
Timothy Olson Law Firm  
URS Washington Division  
Vslдор Fiber Optics  
Valdor Technology International  
Vision Building Systems, LLC  
Volvo Construction Services  
W.S. Tyler  
Waters Vacuum Truck Service  
Wear-Concepts, Inc  
Wedco, Inc  
Wells Fargo Insurance Services, Inc  
Wes Construction  
West Coast Environmental & Engineering  
Western Cultural Resource Management, Inc.  
Western Environmental Testing Laboratory

## Our Position on Nevada's Tax Policy

The global financial crisis and a subsequent state budget gap in 2008 have made taxation policy in Nevada a high-profile issue. To make up for the budget shortfall and continue to provide necessary services to the state's growing population, some interest groups and individuals have proposed an increase in taxes on business, and specifically an increase in taxes on mining.

The NvMA has consistently supported adequate funding for education, social services, and public safety programs, and we believe that public needs should be sufficiently funded through a broad-based business tax. Currently, Nevada mines pay all the state taxes that most other businesses in Nevada pay plus an industry-specific property tax called the Net Proceeds of Minerals Tax (NPOMT). (For more information, see Economic Contributions, p. 27) The mining industry's support for broad-based taxes has existed since 2002 when it adopted the following tax policy, which the Nevada Mining Association stands behind today:

- The Nevada Mining Association recognizes that Nevada's state government faces future funding challenges because of its narrow tax base and increasing demands on state services caused by significant population growth. Under existing structures, the state's general fund will not keep pace with these new demands for state services.
- The association strongly believes that any new taxes must be broad-based, include all sectors of the Nevada economy, and apportioned according to the taxpayer's ability to pay.
- The state must not seek any new single-source taxes, such as new or increased taxes solely on the gaming, mining, or insurance industries.
- The mining industry will pay its fair share of any new taxes in the same manner, and to the same extent, as any other Nevada business.
- Finally, these new taxes should not be aimed at any individual citizens or companies, and appropriate safeguards or exemptions should be put in place to help Nevada's small business owners.

The Nevada Mining Association is committed to working with legislators to address the budget shortfall and modify the state's tax policy. To ameliorate the current strain on Nevada's economy and state budget, the mining industry is in the process of pre-paying its 2009 estimated tax at the time of publication.



## At a Glance: Mine Permitting

Government agencies involved in permitting, approval, and oversight of mining projects in Nevada include:

### County

County and city governments (building, business, planning, zoning, and special use)

### State

Department of Business and Industry

Department of Conservation and Natural Resources, Division of Environmental Protection Bureaus

- Air Quality
- Mine Regulation and Reclamation
- Safe Drinking Water
- Waste Management
- Water Pollution Control
- Water Resources Bureau

Department of Transportation

Department of Wildlife

Division of Industrial Relations

Historic Preservation Office

Mine Safety and Training Sections

State Fire Marshal Division

State Health Division

The Nevada Commission on Mineral Resources provides information and administers the Nevada's abandoned mine lands program.

### Federal

Mine Safety and Health Administration

U.S. Department of the Interior Bureau of Land Management

U.S. Department of Justice Bureau of Alcohol, Tobacco, Firearms, and Explosives

U.S. Fish and Wildlife Service

U.S. Forest Service

U.S. Army Corps of Engineers

## Protecting the Environment

### Environmental Management

The large footprint of mining operations makes environmental stewardship a key sustainability issue for the industry. Important aspects of this responsibility are addressing our actual and potential impacts to land, water, and air; reducing resource use; developing more sustainable technologies; applying best practice in mine closure; and working to maintain, enhance, and restore habitat.

### COMPANY PRACTICES

Nevada Mining Association member companies strive to protect the environment and maintain ecosystem health through:

- Compliance with state and federal laws and regulations
- Management systems and procedures that help us meet legal and regulatory requirements, minimize impact, and monitor and continually improve our environmental performance
- Specific environmental performance improvement initiatives at our operations and with suppliers
- Effective reclamation of disturbed sites to leave healthy and productive post-mining landscapes as part of our environmental legacy
- Partnerships to address environmental issues with government agencies and other stakeholders, such as environmental NGOs

*"We've gone from being an industry with minimal regulation to one of the most regulated in the country. Our on-the-ground performance is much better compared to even 20 years ago. We have incredible tools and technology now that enable us to evaluate and mitigate impacts and to reduce emissions and releases. We are always looking for opportunities to improve our operations. As technology evolves, we are continually researching how to best utilize it to improve the safety and efficiency of our operations."*

*—Doug Barto, Environmental Committee Chair*

### Compliance with Laws and Regulations

The mining industry in Nevada is heavily regulated and subject to a comprehensive set of federal, state, and county laws and regulations designed to prevent or minimize environmental impacts. Because of this high level of expectation and oversight, compliance with regulations is a critical aspect of individual company sustainability efforts.

This framework requires thorough analysis – before, during, and after operation - of potential impacts to surface and groundwater, air, soil, plants, wildlife, aquatic organisms, archaeological resources, human health, social conditions, and economic conditions by technical experts and scientists. The resulting data is used to develop plans to prevent or mitigate these impacts. All mining operations submit comprehensive environmental management plans and applications to regulatory agencies for review and approval prior to issuance of permits for exploration, construction, operations, and closure. Public review and input are incorporated into state and federal regulatory review processes at multiple points to ensure that all significant issues associated with a project, and public concerns, have been addressed.

Because of the preponderance of public lands (87 percent of land area) in Nevada, most companies must meet the requirements of the National Environmental Policy Act (NEPA). NEPA analysis requires completion of a formal Environmental Impact Assessment or Statement as part of the permitting process.

Regular reporting to regulatory agencies on many aspects of environmental performance and resource management, and inspections by regulatory officials, are required throughout the life of a mining project.

Obtaining the necessary permits and permissions (see figure below) to develop a mine requires a significant investment of both time and money. Once an economical mineral deposit is identified, it can take up to 10 years to conduct studies and obtain permits before a mine is constructed. In some cases, more than \$1 billion dollars may be invested before any minerals or metals are produced. In other words, mining is a risky investment and significant hurdles must be overcome before a mine begins production.

### Partial List of Typical Permits and Approvals Required for a Large Scale Mine in Nevada

Phase	Exploration	Construction and Operations		Closure
<b>Permit and Approval Required</b>	<ul style="list-style-type: none"> <li>• Plan of Operations</li> <li>• Mining Reclamation Permit</li> <li>• Permit for Temporary Use of Water for Exploration Holes</li> <li>• Temporary Final Closure Plan</li> <li>• Permanent Final Closure Plan</li> <li>• Approval for Final Closure</li> </ul>	<ul style="list-style-type: none"> <li>• Plan of Operations Approval</li> <li>• Environmental Impact Assessment Record of Decision</li> <li>• Mine Registry</li> <li>• Notices of Opening and Commencement</li> <li>• Air Quality Operating Permits (Construction, Operations)</li> <li>• NDPEs Stormwater Permits (Construction, Operations)</li> <li>• Water Pollution Control Permit (Construction, Operations)</li> <li>• Groundwater Discharge Permit</li> <li>• Mining Reclamation Permit</li> <li>• Approval to Operate a Solid Waste System</li> <li>• Hazardous Waste Management Permit</li> <li>• Underground Injection Control Permit</li> <li>• Drinking Water Supply Permit</li> <li>• Permit to Appropriate Public Waters</li> </ul>	<ul style="list-style-type: none"> <li>• Permit to Construct Dam</li> <li>• Dredging Permit</li> <li>• Industrial Artificial Pond Permit</li> <li>• Septic System Permit</li> <li>• Abatement of Hazardous Conditions Approval</li> <li>• Fire and Life Safety Approval</li> <li>• Historic Preservation Clearance</li> <li>• Right of Way Encroachment Permit</li> <li>• Permit to Purchase, Transport, or Store Explosives</li> <li>• Right of Way for Utilities</li> <li>• Road Access Permit</li> <li>• Endangered Species Act Permit</li> <li>• Special Use Permits (county and U.S.)</li> <li>• Permit to Discharge Dredged/ Fill Material (404)</li> <li>• Building Permit</li> <li>• Business License</li> <li>• County General Plan Approval</li> <li>• Zoning Change for Industrial Use</li> </ul>	<ul style="list-style-type: none"> <li>• Tentative Permanent Closure Plan</li> <li>• Final Permanent Closure Plan</li> <li>• Approval for Final Closure</li> </ul>

**Management Systems**

Many of our member companies use formal management systems to meet the requirements of applicable laws and regulations, integrate evolving best practices, and strive for continuous improvement in environmental performance. Management systems typically include the elements in the figure below.



**Performance Improvement Initiatives**

Member companies have undertaken a number of innovative initiatives to reduce their environmental impacts, often enhancing overall performance. Cashman Equipment’s new LEED-certified headquarters, for example, shows how even an industrial machinery company can increase the sustainability of its operations.



Cashman’s new LEED-certified corporate headquarters, Henderson, Nevada

## Going for Green: LEED Certification at Cashman Equipment

After more than 25 years in North Las Vegas, Nevada Mining Association member Cashman Equipment Company found itself searching for a new home that would provide enough space as well as cutting-edge technology and tooling to deliver world class customer support.

Cashman is the main Caterpillar equipment dealer in Nevada and one of the largest privately-owned employers in the state. The company provides new and used equipment, parts and services to most mining operations.

When the opportunity to find new headquarters arose, Chairman and CEO MaryKaye Cashman (a long-time supporter of energy independence) seized the opportunity to make a commitment to sustainability. The result was Cashman's new Leadership in Energy and Environmental Design (LEED) Gold certified corporate headquarters in Henderson, just outside of Las Vegas – the largest industrial LEED Gold campus in Nevada. The 308,000-square-foot, seven-building facility covers 53 acres, and features a large parts warehouse and several repair shops. It also has:

- Xeriscaping with native desert plants, to minimize water use for landscape maintenance.
- A geothermal heating and cooling system with 65 miles of underground pipe.
- Aluminum solar shades to prevent sun from entering the building and dark glass panels that allow people to see out, but limit the heat entering the building.
- Sensors that control the window shades, closing or opening them, depending on outside conditions and time of day.
- Ambient lighting that minimizes energy use.
- Training room floors made with post-consumer waste, in this case, recycled glass.
- Larger spaces, like the 1+ acre service shop featuring 20 bays and the adjacent parts warehouse, that utilize Solatubes in the ceiling and retractable glass doors to bring in natural light.
- Optimized zone control, in which large work areas found between the parts warehouse and the service bays are separated by high speed doors, controlled by sensors on fork trucks.

At the beginning of the process, few Cashman employees were familiar with LEED certification; however, the more the company considered pursuing certification, the more it made good financial and environmental sense. In fact, the process prompted a profound culture change, even before construction began. A new internal green team formed and launched a communications campaign to increase employee awareness of and participation in sustainability practices like recycling.

One of the unique characteristics of the LEED process is the close collaboration it encourages between the owner, the architect and the general contractor to obtain the best results. MaryKaye and Mike Pack, Cashman's president and COO, met weekly with the architect and general contractor onsite to discuss progress and challenges encountered.

*"LEED Certification isn't something you can just jump into halfway through. All of the minute details are very carefully planned out before construction. We spent three years planning every aspect of the new building before we broke ground: identifying the right suppliers, manufacturers and contractors to do the work. You truly have to have an entire team wholeheartedly committed to sustainability or it won't work"*  
- **Kate Graziano, Cashman Equipment Company**

The new building has provided significant benefits: for Cashman, the environment (see below), and local communities. For example, more than 40% of building materials came from suppliers and manufacturers within a 500 mile radius of the campus, creating local economic benefit. Cashman will also receive 30% savings on annual property taxes, and the geothermal heating/cooling system is expected to provide a return on investment in energy cost savings within five to seven years.

### Environmental Benefits

- 45% less energy used due to the geothermal heating and cooling system
- 30% less water consumed through efficient irrigation, retention ponds, and low-flow fixtures
- 814 tons of this site's construction debris went to local recyclers, thereby diverting it from a landfill. That's over 80% of all waste material
- 20% of all materials used on the project are post-consumer recycled.
- More than 30 species of native plants appropriate for xeriscape, minimizing the need for water.
- All woodwork is Forest Stewardship Council (FSC) certified

One of the building's major design achievements was striking a delicate balance between allowing in natural light – and keeping the building environment cool in the desert heat. Special window glazing on the 3,500 panels of glass (more than an acre total) blocks some of the heat generated so more than 75% of employees can enjoy abundant natural lighting and a direct line of sight to the outdoors. The windows are also equipped with automatic shades controlled by sensors that monitor the angle of the sun to rise and fall accordingly throughout the day.

Employees have also reaped the benefits of the new headquarters: many of the building's features are designed to provide a better working environment. Enhancements like these speak highly to the company's culture of caring for employees and have contributed to high morale.

With its new headquarters, Cashman is setting a new bar for sustainability amongst suppliers of industrial goods and services.





### Effective Reclamation and Productive Post-Closure Landscapes

Before any ground is disturbed, mining companies must ensure that adequate funds are available to complete reclamation and remediation of exploration and mining sites. In Nevada this process takes the form of bonds and sureties held by the Nevada Department of Environmental Protection, the Division of Minerals, the U.S. Bureau of Land Management, and the U.S. Forest Service. This provides assurance to the public that, should a company be unable to fulfill the activities required for reclamation and closure of a mine, funds are available to regulatory agencies to complete these tasks. Bond amounts are determined through development of comprehensive reclamation plans that detail the engineering, construction and environmental costs required to physically and chemically stabilize, reclaim, and restore areas disturbed by mining. Reclamation plans and cost estimates are prepared following detailed state and federal regulatory guidelines and must be approved by these agencies prior to project approval.

#### PERFORMANCE Reclamation Bonding

- \$1.234 billion total bond funds held for exploration and mining
- Current bond pool equates to more than \$10,000 per acre placed in trust for reclamation

### Partnerships for Environmental Protection, Conservation, and Enhancement

Developing and implementing an effective strategy to address an environmental concern sometimes requires collaboration with other stakeholders, such as government agencies and community organizations. Partnerships allow us to benefit from the skills and resources our partners possess, and ensure the participation of all parties necessary to achieve success. We discuss several additional examples of partnerships between the industry and stakeholders on environmental protection and enhancement initiatives in the following sections.

### INDUSTRY INITIATIVES

NvMA's environmental affairs committee helps our membership keep abreast of new developments in state and federal environmental regulations, and provides a channel for members to provide input on these developments to the appropriate authorities. Recent activities for the environmental committee have included:

- **Providing information to the U.S. EPA** concerning the development of national regulations on mercury emissions for the mining industry at the agency's request.
- **Developing a better reference for soil testing** in the event of a cyanide spill.
- **Standardizing the process for calculating remediation bonds** to allow for comparison and verification by the state.
- **Meeting with the Western Governors' Committee** to discuss the implications of likely addition of the sage grouse to the Endangered Species List.
- **Discussing potential consequences** for the industry of the recent U.S. EPA decision to regulate greenhouse gases with the Nevada Department of Environmental Protection to keep members informed of expectations for management and reduction.

## At a Glance: Water Regulation

### Water Quantity

In Nevada companies pursuing new mining projects must apply for water use permits from the Nevada Division of Environmental Protection Bureau of Mining Regulation and Reclamation as a part of the project's Plan of Operations.

The division's Department of Water Resources administers all surface and groundwater in the state. Companies can acquire water only through permits, which requires evaluation of the impact to proposed surface and groundwater withdrawals before permits are issued.

### Water Quality

Discharge of water from mining operations is regulated by the State of Nevada and by federal statutes, such as the Clean Water Act and Safe Drinking Water Act.

Mining operations are required to obtain several permits, which set guidelines for controlling water pollution through establishment of discharge standards. These permits include National Pollution Discharge Elimination System permits (which regulate point sources for pollution) and Stormwater Pollution Prevention plans in case of overflow. These permits set limits on the amounts of particular substances that can be discharged in water, to protect public and environmental health.

## Water Management

Water is essential for human existence, ecosystem health, wildlife, and various kinds of economic activity. It is also a limited resource. Wise use, management, and conservation are critical to balancing and meeting these needs—especially in an arid state like Nevada, where rainfall averages 7.5 inches per year (the driest in the nation) and water is particularly scarce.

### *Water Quantity*

Water is used throughout the mining process; without an economical water supply, the growth of the mining industry in Nevada over the past three decades would not have been possible. The acquisition of rights and permits to appropriate water for these uses are critical steps in large-scale mine development. The table below shows typical water use at a mine.

Water Use at Mines		
Ore Extraction	Processing	Other
<ul style="list-style-type: none"> <li>Dewatering</li> <li>Dust suppression</li> <li>Mine cooling</li> </ul>	<ul style="list-style-type: none"> <li>Dust suppression</li> <li>Ore milling</li> <li>Heap-leaching</li> </ul>	<ul style="list-style-type: none"> <li>Workforce drinking and sanitary needs</li> <li>Mechanical maintenance</li> </ul>

The scale of water use varies across mining operations depending on the mineral being recovered and the recovery process.

### *Water Quality*

Some individual mine sites may have increased concentrations of specific metals and salts in water used in—or runoff from—mine sites. Acid mine drainage (AMD) is a phenomenon that can occur when rock containing sulfides is exposed to air and water. The water can become acidic and often carries elevated levels of toxic metals. AMD occurs most frequently in association with metals mines and can affect water quality.

Another water-quality concern during and after mine closure, pit lakes are created when mining is completed in a pit and dewatering pumps are turned off, allowing groundwater to flow back into the pit. Similar concerns about the acidity and concentration of heavy metals in these water bodies arise in association with metals mines.

Changes in water quality and quantity can affect not only human health but also wildlife habitat and ecosystem health (see case studies below). There are a significant number of federally-listed endangered and threatened species in Nevada—and most of these are “water-dependent species.” Environmental impact assessment processes often intensively focus on biodiversity issues in Nevada, and as a consequence, operating plans require significant dedication to design of mitigation and management efforts.

### **COMPANY PRACTICES**

Mining companies use a variety of techniques to reduce, conserve, and recycle water from mining processes—and to reuse it to meet other needs, such as irrigation or restoring it (if of acceptable quality) to the groundwater system. Some techniques include:

- Using saline water that is unsuitable for agriculture or domestic use for processing ore



Photo courtesy Mike Sevon, Nevada Natural Heritage Program

- Using groundwater pumped from mining excavations for processing
- Re-use and recycling of water for ore processing to reduce the total water required
- Returning water to surface waters or to groundwater systems via infiltration ponds or reinjection into aquifers after treatment to ensure it meets water-quality standards

Companies also implement protective management measures and technologies to avoid or minimize impacts on water quality and meet regulatory standards. These include:

- Testing to determine the potential for acid mine drainage from waste dumps, leach piles, and tailings
- Design of management strategies and technical solutions to prevent acid mine drainage and the acidification of pit lakes. Detailed management plans aimed at mitigating and minimizing exposure to air and water of sulfide minerals in waste rock and processed ore, and thereby prevent acid mine drainage, are created by mining companies and reviewed and approved by regulatory agencies. Similar plans are created for pit lakes
- Use of water treatment plants to treat dewatering water prior to discharge either to surface or groundwater

## Cyanide Use and Management

Cyanide, a chemical comprised of carbon and nitrogen, occurs naturally as part of sugars in certain plant foods. A concentrated, solid form of cyanide known as sodium cyanide that is extremely effective in extracting gold, silver, and copper concentrate from ore is used for this purpose in some mining operations. Sodium cyanide is dissolved in water, forming a dilute solution that is then dripped onto heaps of crushed ore removed from the mine that is placed in lined piles, commonly called heaps (process known as “heap leaching”), or mixed with ore in enclosed tanks containing. The cyanide solution attaches to minute particles of gold in the rock to form a water-soluble, gold-cyanide compound from which the gold can later be recovered. The resulting solution containing the metal is collected and processed to extract the metal and return it to solid form, from which it can be further refined. The cyanide solution is recycled and reused in the extraction process.

While cyanide can be poisonous when inhaled, ingested or absorbed through the skin, mine operators have developed stringent standards and practices to minimize risks to workers, the environment, and communities.

- Stringent measures are implemented to prevent **workers** from being exposed to concentrated hydrogen cyanide gas during heap-leaching or tank-leaching processes. Employee training and emergency response plans are put into place to prepare workers to respond quickly to exposure to cyanide fumes or spillage of cyanide or cyanide-containing solutions. This training and preparation, along with strict controls, minimize the possibility and impact of exposure.
- Leaks into the **environment** are usually quickly contained and cleaned up. Cyanide breaks down in sunlight, and when exposed to air and surface water, it forms hydrogen cyanide gas, which is quickly diluted and degraded by ultra-violet rays from the sun. To prevent any release into the environment, mines take precautions such as constructing containment areas around tanks, using liners beneath leach pads and ponds, and installing leak detection and collection systems.
- **Community** exposure to sodium cyanide or hydrogen cyanide gas is rare— however, accidents can occur, most during transport to and from mine sites. Specific safety and environmental requirements and emergency response plans for transporters and emergency responders, coordinated with public agencies; radio communication with drivers; and satellite tracking of trucks helps to mitigate potential exposures to employees and communities.

Heap-leach sites are monitored and reclaimed to deter spills, even long after mine closure. For example, Barrick has been monitoring the Alligator Ridge (formerly a Placer Dome site) heap-leach pad for 10 years following the site’s closure.

### The International Cyanide Management Code

A majority of gold and silver mines in Nevada are certified to the International Cyanide Management Code (ICMC). The Code is a voluntary industry program developed by mining companies, cyanide manufacturers, financial institutions, NGOs, and governments to provide guidance on the manufacture, transport, storage, and use of cyanide to protect workers, the environment, and communities near mining operations.

Mining companies must meet a series of principles and objectives, including worker safety, environmental protection, emergency response planning, training, and stakeholder communication to ensure they are managing the use of cyanide to the highest standards. Their compliance is independently audited and certified by the ICMC. A number of NvMA members adhere to the code, as does cyanide producer and supplier CYANCO. In fact, many are already starting a cycle of recertification: Goldcorp’s Marigold mine was the first to complete its recertification in 2009.

To learn more, visit: [www.cyanidecode.org](http://www.cyanidecode.org).

## Wildlife Protection and Conservation

Operating a mine responsibly requires dedication and careful thought about how mining activities will impact local residents – both human and non-human alike. Mining companies apply many measures to conserve and protect wildlife and wildlife habitat from physical or chemical harm resulting from their operations, and many times also take specific steps to mitigate unavoidable impacts and even enhance habitat near the mine to offset impacts occurring within the mine area itself.

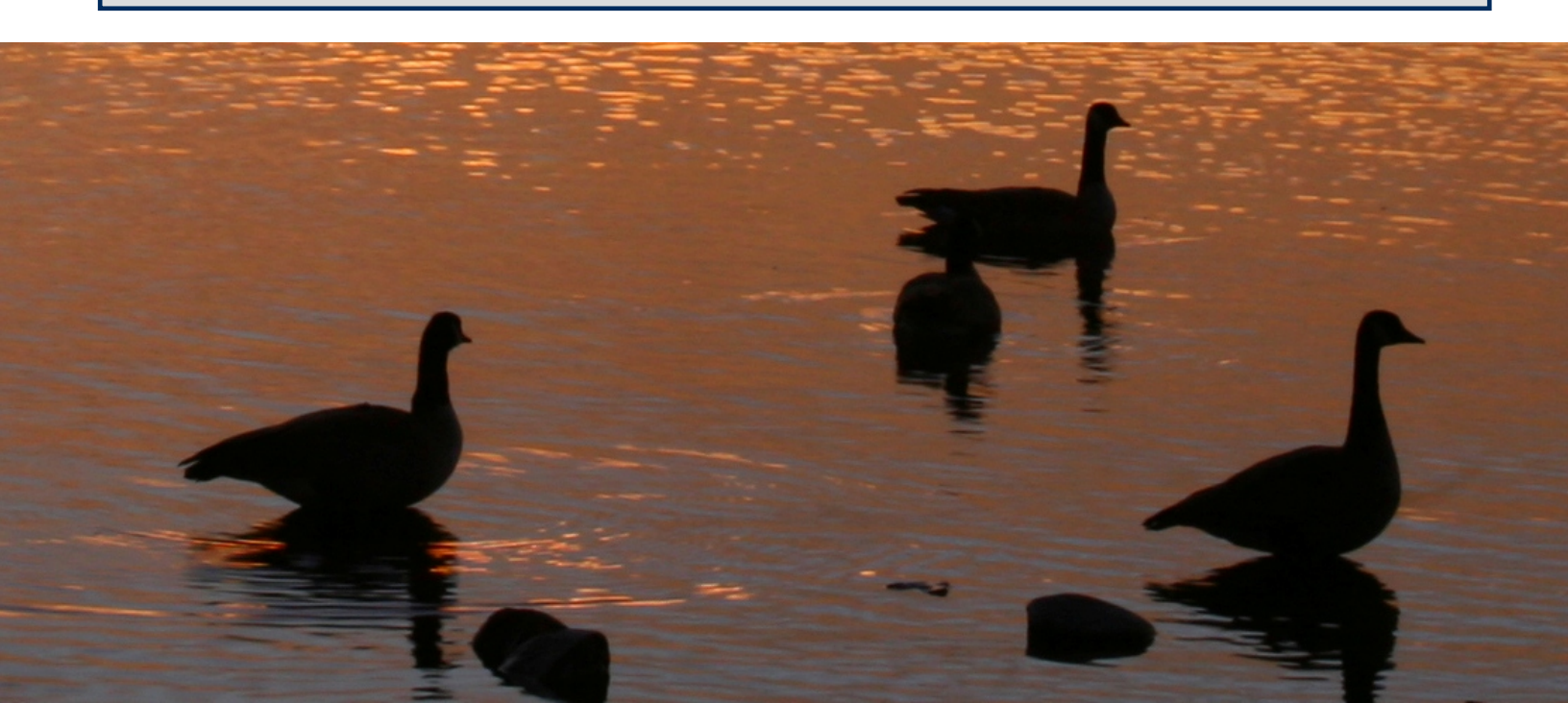
Wildlife conservation begins with understanding both the local populations and habitat, and modern mines expend a great deal of effort completing studies on both prior to and while expanding operations. For example, many of today's mines are built on or around historic mine operations, where older mine features such as adits and shafts often provide habitat for bats. These features, however, also may threaten the safety of other wildlife and the general public. A common mitigation measure enacted by mines in cooperation with regulatory agencies and neighbors is to secure them while preserving their value to bat populations, utilizing features such as bat gates to prevent access by humans and large animals, while still allowing bats to continue to benefit from the shelter they provide.

Chemicals used in mining are carefully managed to help avoid adverse effects on wildlife. For example, cyanide solution from leach pads is collected in lined ponds that are either netted or employ floating, high-density polyethylene "bird balls" to keep birds out. High fences are also built around these ponds to keep larger animals from accessing them. Companies minimize ponding on the surface of leach pads through regular inspections and rotation of lines, use of low-drip tubes and emitters, and when possible, solution is conveyed in closed pipelines rather than open flow, lined ditches. All of these measures serve to keep wildlife from coming into contact with chemicals used to process ore.

Often, protection and mitigation measures can have a net positive impact on wildlife habitat, such as improving freshwater resources to draw animals away from the processed water used in operations. Enhancements include: diverting a portion of unused water to a new location, or working with partners on neighboring ranch and public lands to improve spring site flows or access. At Ruby Hill mine, for example, water and native species planted during concurrent reclamation were attracting higher numbers of deer to the site – but to reach these reclaimed areas, deer would often cross one of the mine's main haul roads. The company developed a new watering location on another side of the mine to help minimize risks to both deer and truck operators working at the mine.

Collaboration with local landowners and regulatory agencies continues during site closure. As land is reclaimed, careful consideration is given to the seed mixes used to re-vegetate the site, typically using only native blends with high value to wildlife. Within a single site, this can involve careful planning to match plant species with such things as elevation, aspect, precipitation range, and use of different land features that mimic local topography. Ongoing monitoring then provides important information about which species and techniques are most successful and likely to be used in similar situations.

Any natural resource extraction by definition impacts the environment. However, it is the manner in which these activities are carried out that is crucial in minimizing adverse effects. The array of mitigation and conservation measures being employed at today's mines serve as an example of how wildlife can co-exist, and often even flourish in and around mine sites.





## Air Emissions

Reducing or eliminating air emissions is another important aspect of managing the environmental impact of mines, and one of particular importance to the local stakeholders who live near our mines.

### *Air Quality*

Air quality permits are obtained from regulatory agencies before ground is broken on any mining project. Mining companies submit substantial studies identifying the potential sources of emissions and the equipment that will be used to control them.

Mining operations can generate dust from mining and mineral processing operations and associated truck traffic, releasing particulates, nitrous oxide, sulfur dioxide, and carbon monoxide from the equipment used to mine and process ore minerals. These emissions can generate smog and other forms of air pollution that may impact local air quality.

### COMPANY PRACTICES

Most air emissions are regulated by the U.S. Environmental Protection Agency under its ambient air-quality standards. Best practices at mine sites involve evaluating the level of likely emissions, taking steps to reduce or eliminate them through the use of management practices or technical controls, and monitoring the sources from which they may be generated to ensure compliance with regulatory standards. The table below shows common practices used to control emissions.

Management Practices: Air Emissions				
	Dust	Nitrous Oxide	Sulfur Oxide	Carbon Monoxide
<b>Source</b>	Haul trucks, crushers, conveyors, stockpiles, and blasting	Diesel Engines in Heavy Equipment, Plant/Mill Equipment	Diesel engines in heavy equipment	Diesel engines in heavy equipment
<b>Management Practices</b>	<ul style="list-style-type: none"> <li>Applying water to roads</li> <li>Use of dust collection systems and mist sprays at point sources</li> <li>Chemical surfactants</li> </ul>	<ul style="list-style-type: none"> <li>New Tier 2 diesel engines and lower sulfur diesel</li> <li>Filters, scrubbers, and other pollution control devices at processing facilities.</li> </ul>	<ul style="list-style-type: none"> <li>Emissions from diesel engines are reduced by catalytic control systems, effective preventive and repair maintenance to keep engines running at high efficiency and ensure pollution control features operating, use of computerized fleet management and routing systems using real time GPS data to reduce fuel consumption, and effective haul road maintenance that reduces fuel consumption.</li> </ul>	

### *Mercury Emissions*

Processes used to remove gold from ore can also result in the release of mercury contained in the ore. Controlling mercury emissions from gold mining has been the objective of a major partnership between the gold industry and federal and state government agencies, discussed in detail in the case study on below.

## Reducing Mercury Emissions

In 2000, gold mining operations submitted their first reports on mercury emissions following their addition to the US EPA's Toxic Release Inventory. Prior to this date, mercury emissions had not been consistently quantified for the industry, as permit requirements and measurement and reporting of emission varied from state to state. While cumulatively coal plants as a whole are the largest source of mercury releases into the air in the United States, the TRI data indicated that some gold mining operations were among the largest individual facilities emitting atmospheric mercury.

Mercury is a naturally occurring element and it is released through the atmosphere by a variety of natural processes as well as by human activities. Mercury is a toxic of particular concern, as it tends to persist in the environment and is bio-accumulative, meaning that it can build up in human and animal tissues over time. It is known to affect the nervous systems of humans and wildlife alike. In mining, mercury can be emitted though ore processing.

In response to these findings, four companies (Barrick, Newmont, Placer Dome and Independence) sat down with the US EPA and the Nevada Division of Environmental Protection (NDEP) to discuss how to reduce atmospheric mercury emissions. At the time, there was a broad continuum of existing controls in place at mining operations. Rather than undergo a lengthy and costly rule-making process to regulate the implementation of controls, these companies agreed to voluntarily take steps to reduce emissions. What followed was the Voluntary Mercury Air Emissions Reduction Program (VMRP), a partnership between companies, the NDEP and the U.S. EPA. This voluntary approach also allowed companies considerable flexibility in implementing reduction measures, permitting them to find the right individual balance between reduction in emissions, and the remaining life of older facilities to implement such controls.

These voluntary actions were tremendously successful in immediately reducing emissions. Companies quickly surpassed the goals of 33% reduction by 2003 and 50% reductions by 2005 set at the start of the program, achieving a 40% reduction in emissions by 2003 and 75% by 2005. Extensive measurement and testing were also completed to improve the accuracy of information about mercury emissions.

In 2006 the industry worked with NDEP to develop a mandatory mercury control program applicable to all precious metals mining operations. The Nevada Mercury Control Program established a process to determine and implement Maximum Achievable Control Technology (MACT) for all thermal sources at mining operations. MACT must be implemented by 2011. Some companies have already done so.

Stakeholders have expressed some continuing concerns and interests. These include:

- The inclusion of fugitive emissions from waste rock and heap leaching. The Nevada Mining Association and NDEP provided funding for a study in 2009 to begin to quantify these emissions to consider how they might be addressed in the existing program. Early results suggest that such emissions account for 10-20% of the total mercury emitted at a sites.
- Reporting discrepancies
- Proper disposal of captured mercury in control systems
- Continued high emissions and even increases despite program controls
- More frequent stack monitoring and ambient air monitoring to capture fugitive emissions.

In 2008, the US EPA began to consider whether or not to regulate mercury emissions from gold mining at a federal level as part of a long-running lawsuit brought by the Sierra Club on the Clean Air Act. This action has created uncertainty for the NDEP program and even delayed companies' willingness to invest in potentially costly control technologies which may later be supplanted should the EPA propose different measures. Advocates for federal regulation argue that it is needed to address perceived gaps or weaknesses in Nevada's program, and to provide a framework of protection for states currently without controls.

Consensus on a standard remains an ongoing process. However, transparency and willingness to collaborate have been its hallmarks, with significant support and input provided by gold mining companies to the NDEP and US EPA, laying a foundation of continued success and collaboration going forward.



Photo courtesy Barrick Gold

### *Climate Change*

Climate change is an important emerging issue for our industry. Mining is energy intensive. In recent years, high energy costs, paired with a desire to reduce carbon emissions, have driven mining companies in Nevada to seek alternative solutions to their energy needs. These solutions include installing solar arrays, developing heat exchange systems, changing practices to be more efficient, and even building an entire power plant. Companies are partnering with developers of new technologies to advance innovative energy saving techniques and use of renewable energy.

Nevada's geothermal, solar, and wind resources could meet the energy needs of the mining industry, reduce CO<sub>2</sub> emissions, and provide a new source of economic development as well. The Humboldt Pershing Sustainable Development committee, for example, is working toward bringing renewable energy to Nevada as part of economic diversification efforts related to the mining industry.

### **Energy Efficiency**

Over the last decade, mining companies and suppliers in Nevada have been looking for opportunities to reduce energy use—and finding many ways to reap savings from lower costs.

- **Lighting:** Many companies have changed lighting fixtures in offices, warehouses, and on mine sites to high efficiency models. With an eye toward preventing waste, old fixtures are often only replaced if necessary, while high efficiency lighting is used in all new development.
- **Air systems:** In offices and warehouses, heating, ventilation, and air conditioning units are being replaced with high efficiency models, but a bigger impact is in changing the way mines are ventilated. Air is used in mines to both power equipment and, for below-the-surface operations, to ventilate underground rooms. Quick identification and repair of leaks in the air system can save significant amounts of energy by keeping air flow high and therefore reducing the amount of time the air compression system is operating. In addition, ventilation of underground rooms, once constant throughout the mine site, is now targeted to only the areas where workers are present.
- **Transportation:** Mining companies are replacing trucks and truck engines with energy efficient models and converting to biodiesel when possible. For underground operations, this conversion is both a greener and a safer option—it reduces carbon emissions while protecting workers from exhaust fumes. Companies are also innovating to eliminate the use of trucks entirely. One company has installed a six-mile-long over-land conveyor to transport more than 10,000 tons of ore per day from the pit to the milling site.
- **Putting common sense into practice:** Like many other industries, once mining companies started looking for energy savings, they found that opportunities abounded. Roads coming out of pits can be graded to a gentler slope, requiring less fuel to ascend. Tanks that supply liquids can be elevated to exploit gravity instead of using pumps. Insulation can be increased to save heating and cooling costs. Small changes in standard practice can drastically increase efficiency, and combine to create significant savings.
- **Use of alternative energy sources:** Much of Nevada's environment is high desert, making it an ideal location for solar. Barrick Gold's Western 102 Power Plan, for example, pairs a 115 megawatt traditional power generation system and 8 acres of solar photovoltaic panels, to provide power to the Goldstrike mine nearby. The state also offers a wealth of geothermal





Photo courtesy Barrick Gold

resources. Mining companies are increasingly seeking ways to employ these renewable resources. Mining operations are often located away from settled areas and therefore away from an established electrical grid. Small solar arrays in these distant areas can provide power for lights, radio towers, and the like. Some companies have also built solar arrays large enough to offset traditional power use at the mine or at office buildings (see case study below).

Geothermal water is another renewable energy source being tapped to power operations and heat facilities. Although still in nascent stages, advances in technology are enabling mining companies to exploit the hot water often found in mines for minor power generation. New “modular power plants” convert hot ground water into clean electrical power while cooling the water for further use in operations. Geothermal water is also used to heat buildings and sidewalks and provide hot water.

#### PERFORMANCE

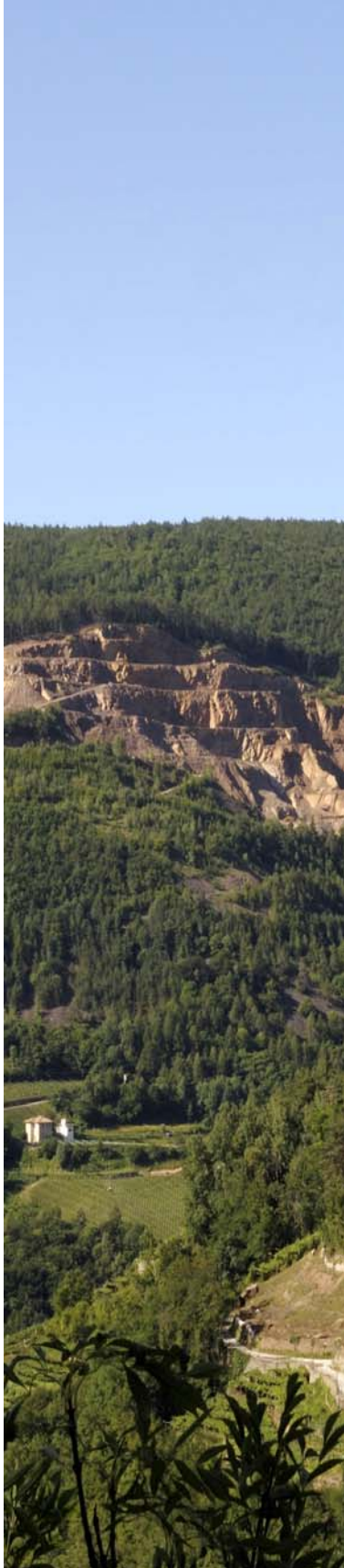
- In 2008, the industry emitted 3164.9 lbs/ year of mercury from processing and 102.9 tons per year as a co-product. This is a 35% decrease and 5% increase, respectively, from 2007.
- The mining industry used a total of 2,693,739,188 Kwh of energy in 2009; 2.58 million Kwh in the northern service territory (mostly gold and silver mining) and 116 million in the southern service territory (largely aggregates & construction materials).

### Renewable Sources: Mining’s Energy Future

The renewable energy market in Nevada is still nascent. The state lacks utility-scale solar arrays and wind farms, and development of large geothermal power plants is in its infancy. Land ownership disputes, an underdeveloped grid system and energy infrastructure, and strict environmental requirements for the 67 percent of Nevada land controlled by the BLM are barriers to significant advancement in renewable energy generation in the state. In addition, access to inexpensive coal-fired energy minimizes the perceived need, and financial incentive, for development of renewable energy options.

Significant energy users like mining companies have an opportunity to advance renewable energy generation and supply in Nevada by creating large-scale demand and exploring investments in renewable energy projects. There is great potential synergy between renewable energy and former mine sites, which have existing electrical infrastructure, landscaped surface areas, and access roads that would facilitate establishment of solar arrays or other renewable technology. Re-purposing these facilities for renewable energy generation would reduce the required capital for infrastructure development and avoid disturbance of additional land for generation sites.

Mining companies are well-positioned to explore the benefits of renewable power, to foster mechanisms that enable its expansion, and to remove of structural impediments



## Mine Closure

Commitment to sustainability does not end with production; responsible mine closure processes that attend to potential environmental and community impacts, and allow for productive post-closure land uses are the legacy our mines leave behind. Abandoned mines or improperly addressed environmental issues damage our industry’s reputation and social license to operate.

### COMPANY PRACTICES

To build a mine is to create a plan—a plan for where and when to dig, where to site water, power and transportation infrastructure, how long to operate, and what to do when operations cease. Environmental impacts must be managed during mining operations, and addressed for decades—even centuries—after closure.

Mining companies in Nevada undergo a lengthy and robust permitting process with state agencies such as the Bureau of Land Management, the Forest Service, and the Nevada Department of Environmental Protection. Part of this process is securing a separate permit for appropriate and complete mine reclamation, the activity to restore and re-slope the mined area to a pre-determined condition set out during the planning process.

To establish baselines, mining companies conduct rigorous environmental analyses to understand and assess conditions such as plant density, soil composition, and hydrological conditions, among others. These baseline conditions—along with the plan for the size, type, and length of operation of the mine—inform the estimated cost of conducting reclamation after mine closure. Mining companies are required to set aside this amount as a “reclamation bond”, ensuring that proper reclamation is funded no matter the economic state of the company at the time of mine closure. As noted in the Environmental Management section above, mining companies in the state of Nevada have a combined posted reclamation bond amounts in excess of \$1.2 billion.

A company takes steps throughout the mining process to minimize the area affected, reclaim land, and protect the environment as mining activities progress. Monitoring continues beyond the conclusion of operations.

The mining industry and state environmental agencies work in partnership to continually advance the science and technology behind reclamation processes. Closed mines are graded and replanted to look as though no mine ever existed. Buildings are removed, and plant and animal life is reintroduced. All this is done with an eye on the environmental baselines established before the mine was opened. Despite these significant efforts to leave the land as minimally impacted as possible, aspects of the process remain challenging. For this reason, the annual Excellence in Mine Reclamation Awards recognize companies who have achieved a high level of performance or innovation in reclamation practices (see case study p.29).

## Key Activities in Mine Closure

### Planning & Design

- Create plans for reclamation and closure
- Set aside budget for concurrent reclamation
- Define anticipated future land use
- Submit reclamation bonds
- Undergo permitting reviews and approvals
- Conduct studies to assess baseline conditions

### Construction & Operations

- Update reclamation/ closure plans annually to reflect operational changes & environmental considerations
- Avoid/ minimize disturbance
- Conduct concurrent reclamation
- Support economic diversification
- Review reclamation estimates

### Closure

- Contour land forms after reclamation
- Prepare & re-vegetate ground
- Remove buildings
- Remove chemicals
- Treat and seal heap leach/ tailings
- Provide workforce assistance

### Post-Closure

- Monitor success of re-vegetation, water quality

Closure presents both challenges and opportunities for companies operating in Nevada, particularly in terms of environmental protection and the socioeconomic effects of closure on host communities, as summarized in the table below.

<b>Challenges and Opportunities in Mine Closure</b>			
<b>Environmental</b>		<b>Community</b>	
<b>Challenges</b>	<b>Opportunities</b>	<b>Challenges</b>	<b>Opportunities</b>
<ul style="list-style-type: none"> <li>• Preventing acid mine drainage, siltation, and other impacts on surface or groundwater quality</li> <li>• Ensuring long-term water quality in pit lakes</li> <li>• Reclaiming vegetation</li> </ul>	<ul style="list-style-type: none"> <li>• Creating habitat beneficial to native vegetation and wildlife</li> </ul>	<ul style="list-style-type: none"> <li>• Transitioning employees to new jobs</li> <li>• Controlling effect on local tax revenue</li> <li>• Controlling effect on local economic activity (spending on goods and services and employee income)</li> </ul>	<ul style="list-style-type: none"> <li>• Identifying new opportunities economic activity using land and infrastructure developed for mining</li> <li>• Assisting in economic diversification and development of alternative industries and livelihoods</li> </ul>

Nevada’s dry environment reduces some of the environmental challenges associated with mine closure. Scarce precipitation in the high Nevada desert reduces the likelihood of runoff, including drainage from heap leaching and tailing facilities and erosion of restored land features.

Current regulations require mining companies to remove all buildings, facilities, and utilities as part of the reclamation process, precluding the possibility of using these facilities to create new economic opportunities or to meet community needs. For example, many sites may hold potential for renewable energy, and existing electrical sub-stations may power host communities after mine closure. Many NvMA members are exploring opportunities to use former mine sites for development of new industries—often in concert with other stakeholders (see Economic Contributions, p. 31)

**PERFORMANCE**

- At the end of 2008, approximately 114, 578 acres, or 0.16 percent of the total land surface of Nevada has been disturbed by mining.

**INDUSTRY INITIATIVES**

One key challenge related to the historical presence of mining is cleanup of abandoned mine lands. Nevada is home to over 200,000 abandoned mine features that pose risks to public health and safety. While these features were created by past operations, today’s mining industry has supported state and federal regulatory agencies in their efforts to address the risks associated with these legacy sites (see case study, p. 30).

## The Excellence in Mining Reclamation Awards

Reclaiming a mine site after operations have ceased is as important a step in the mining process as building or operating the mine. Permitting processes and bonds ensure that all mining companies in Nevada are held to a strict standard for site reclamation. Some companies go beyond these requirements to make advances in responsible mine closure practices. To recognize these companies' achievements the U.S. Bureau of Land Management; U.S. Forest Service; Nevada Division of Minerals; Nevada Division of Environmental Protection; and Nevada Division of Wildlife established the Nevada Excellence in Mining Reclamation Awards.

The awards acknowledge innovative, proactive, and responsible reclamation practices. Although the awards categories change from year to year, standard criteria detailed below are used to select the winners. Selection committees, composed of representatives from the above state and federal agencies, seek to reward companies that excel in any of the following categories:

- Erosion Control: Limiting surface soil movement, directing surface water, optimizing stability, and applying other erosion control methods
- Aesthetic Quality: Enhancing the appearance of the surrounding natural landscape
- Stabilization: Eliminating the mine's potential to adversely impact public safety or the environment, including planning for resistance to chemical change or physical disintegration.
- Toxic Waste Control: Reducing the escape of toxic wastes from the project site through the treatment or stockpile of material with the potential for generating toxic by-products
- Re-vegetation: Exceeding the reclamation plan criteria or comparable vegetative cover on an adjacent similar site by re-planting the land disturbed by exploration or operation.
- Shaping: Re-shaping and re-sloping to blend well with surrounding natural landforms.
- Wildlife Habitat Improvement: Improving and/or enhancing vegetative cover and/or forage for the benefit of wildlife species.
- Post-Mine Land Use: Supporting activities or uses which are beneficial to the citizens of the state of Nevada or the land owner through use of the reclaimed area.
- Water Quality: Improving the quality of the subsurface and/or surface water.
- Riparian Area Protection Enhancement: Improving the quality and quantity of existing riparian areas and/or establishing new riparian areas.
- Agency Cooperation and/or Coordination: Cooperating and/or coordinating with State or Federal agencies above and beyond normal working relationships.

The awards serve to promote the development of better operational and reclamation plans; highlight best practices and raise the level of industry performance; and increase public awareness of and interest in the positive steps taken by mining companies to protect the environment; and encourage innovation in environmental stewardship.

In 2008, Nevada's Excellence in Mining Reclamation Awards given to the El Paso Corporation, for its Comstock Mill Site Leadership in Reclamation, and the Newmont Mining Corporation, for its Lone Tree Mine Wildlife Habitat Enhancement.

## Making Historic Mining Sites Safe

Nevada's rich mining heritage has played a key role in the history and economy of the state. However, past mining operations have also left a troubling legacy in the form of abandoned mine shafts and other features which are hazardous to public safety. An estimated 200,000 to 300,000 of these features are scattered throughout the landscape, the highest number for any state in the nation. (A large portion is small, shallow excavations).

Some of these historic sites date back as early as the 1800s, when techniques to secure such facilities, protect the environment, and safeguard public health, did not exist or were not as advanced as they are today. Injuries, and even fatalities, have occurred as exposure to the elements and subsequent decay have destabilized abandoned mine sites.

The Nevada Abandoned Mine Lands (AML) Program was established in 1987 and administered by the Nevada Division of Minerals, identifies abandoned mine features, assesses the risks they may pose to the environment, public health and safety, and takes steps to secure them. It is the most extensive abandoned mine program in the country and has been successful in securing over 14,000 hazardous features in partnership with landowners, mine operators, county and government agencies, and community organizations.

The program consists of several activities:

- **Landscape surveys** are conducted to identify abandoned mine features, determine the hazards they pose, and, where possible, identify the responsible landowner or claimant.
- Some abandoned mine features have become important **habitat for bat populations**. The Division of Minerals works with state and federal conservation agencies to decide if permanent closure may have a negative impact on bat habitat; if so, measures may be taken to secure the site in ways that enhance the habitat. For example, by constructing bat gates or cupolas.
- When features need to be **permanently closed**, and there is a known landowner, the Division will notify them of their responsibilities and follow up to ensure that they take steps to secure the site. These may include permanently sealing the future using backfill or expansive polyurethane foam, fencing the area and putting up warning signs. When there is no identifiable landowner, the Division, Bureau of Land Management or US Forest Service will make sure the site is closed.
- The Division of Minerals also runs a **public awareness campaign** that includes billboards, public service announcements, school presentations, and other events aimed at warning the public of the dangers of abandoned mine features.

An important part of the AML program's success story is the participation of the Boy Scouts of America. Since 1992, 94 Eagle Scout projects have resulted in 488 secured sites and 60 repaired fences.

Despite its effectiveness, the AML program faces a number of challenges:

- First, its reliance on mining fees results in a **lack of consistent funding**. Obtaining such funds for abandoned mine cleanup is a key issue for mining law reform.
- Second, it is challenging to **attract talent**. The shortage of earth scientists in the US impacts land management agencies and regulators as well as the mining industry
- Abandoned mine cleanup can be difficult **on lands with mixed public/ private ownership**, as public funds may only be used on public lands
- While **good Samaritan laws** allow companies, individuals, and civic groups to assist in securing abandoned mine features, lingering concerns about permission from owners and liability inhibit many from taking action.
- A low level of public **awareness about the risk associated with abandoned mine features**.
- And finally, securing abandoned features is a monumental challenge – only 5% of the total estimated sites in Nevada have been made safe. Eventually, these sites will also require maintenance to ensure they do not endanger public health.

The mining industry supports the AML program financially through mining claim fees, and fees assessed for new mining operations. Companies have also contributed equipment, operator time, transportation and fuel to assist with backfilling. Additional opportunities to increase involvement of the industry in the future may include:

- Supporting and promoting the Eagle Scout AML program by encouraging participation of employees and their families
- Helping to distribute outreach materials
- Developing a program for safety personnel to participate in community outreach, possibly with the assistance of the Nevada Mining Association safety committee.

For more information, visit [minerals.state.nv.us](http://minerals.state.nv.us) or [http://www.blm.gov/wo/st/en/prog/more/Abandoned\\_Mine\\_Lands.html](http://www.blm.gov/wo/st/en/prog/more/Abandoned_Mine_Lands.html).



## Looking Ahead

In 2010 and beyond, key environmental issues for the industry are likely to include:

- **Reducing greenhouse gas emissions.** The industry may explore opportunities to save electricity and fuel through improved heavy machinery efficiency, reducing emissions by using alternative fuels such as biodiesel, and using cogeneration techniques at processing facilities to capture heat from processing for additional energy supply.
- Continued work with wildlife agencies and stakeholders to **develop management plans for wildlife species** as sage grouse and mule deer.
- **Continuous improvement in water management.** Striving for greater efficiency in water use, protection of existing water quality, and balancing the needs of various water users are critical issues. Nevada's rapidly growing population, particularly in urban areas, is placing increased pressure on rural watersheds to meet urban needs, even if they are hundreds of miles away. Coupled with future growth in the industry, pressure on water resources will make water management—individually and in collaboration with stakeholders—a priority for mining.
- **Learning to use the BLM's new adaptive management plan process.** This process is intended to adjust environmental protection measures in response to impacts over the life of a mine.

## At a Glance: Mining Taxation

Mining companies pay three kinds of state and county taxes in addition to federal taxes. These include:

The **Net Proceeds of Mines (NPOM) Tax**, which has existed for decades and was increased from 3.65 percent to 5 percent in 1989. Mining is one of only four industries in Nevada with an industry-specific tax that must be paid in addition to conventional business taxes. More than half of NPOM tax revenue goes to the Nevada General Fund and is distributed on a per capita basis throughout the state. The remainder goes to the county in which the minerals were produced.

**Property taxes**, which are paid on property, plants, and facilities, stay almost exclusively in the counties and special tax districts where mines are located.

**Sales and use taxes** are primarily distributed throughout the state on a per capita basis, while a small amount goes to the state's General Fund and to school districts statewide on a per pupil basis. Because modern mining is a capital intensive business that spends significant amounts on sophisticated equipment and supplies, sales taxes are the largest tax obligation for the industry.

## Economic Contributions

Mining's contributions to Nevada's economy are a key component of our collective corporate responsibility as an industry. We support economic development directly, through our operations, supply chain, and payment of taxes, and indirectly by stimulating broader economic growth. However, the cyclical nature of commodity prices and finite nature of the minerals we extract require that we work closely with our stakeholders to take advantage of the opportunities mining provides to create long-term, sustainable economic value.

### Direct Contributions

The mining industry contributes directly to Nevada's economy in a variety of ways: by providing jobs, paying state and local taxes, and purchasing goods and services from local suppliers and contractors. In particular:

- **Mining creates high-paying jobs.** The average annual earnings for mining employees is \$69,300 (\$78,600 in metal mining), as compared to statewide average earnings of a little less than \$43,000.
- **Mining pays more taxes per employee than most other industries.** On average, the industry pays more than \$14,000 more in state and local taxes per employee than other industries. In 2008, mine operators alone paid approximately \$224 million in total taxes (not including personal or corporate taxes paid by industry employees or suppliers).

### NAVIGATING THE FINANCIAL CRISIS

In 2008, the financial crisis created economic instability around the world, including for Nevada and the mining industry. At its start, the recession deepened ongoing shortages of equipment and materials, and most commodity prices slumped. However, energy prices, a major cost for mining, declined.

Gold prices remained steady during the financial turmoil in the second half of 2008 and reached new highs in 2009. As gold mining represents 81.5 percent of Nevada's mineral production, these price increases have buoyed the industry and have been critical in supporting local economies in northern and northeastern Nevada. Thanks to the growth of the gold industry, mining produced \$2.5 billion in direct value added to Nevada's economy in 2008. In addition, while employment in most industries shrank dramatically over the last year, employment in mining increased modestly.

### Indirect Contributions

Mining operations in Nevada also generate significant indirect economic impact, creating economic growth in businesses outside of the industry's direct supply chain, and developing of infrastructure and services in communities around the state.

- To develop or expand mines, mining companies **make investments in infrastructure and services that can also benefit their host communities.** Examples include road construction and improvements to utility services such as water and power supply. Mines also often bring enhanced telecommunications infrastructure, particularly to rural areas, which lag behind more urban parts of the state in their access to high-speed communications.



- Through the influx of workers associated with new and expanding mines, mining also **stimulates the growth of the housing industry and related trades in rural towns where employees live**. In many cases mining companies have provided assistance to employees for home purchases. Some companies have pursued innovative initiatives to ensure adequate housing for employees. Newmont, for instance, struggled to find adequate housing for employees in Battle Mountain. Through a four-party agreement with county officials and the Lander County Economic Development Authority, Newmont helped renovate a trailer park that will provide housing for employees and community members, and will help stabilize tax revenues for the county and stimulate business in town.
- The presence of mining operations **stimulates growth of local businesses, even those outside mining's direct supply chain**. As workers relocate to take jobs, they generate demand for goods and services such as retail, service providers, entertainment, and recreation. This business growth creates additional jobs and can attract other long-term industries.

### PERFORMANCE

In 2008, the mining industry:

- Directly employed 14,600 people
- Paid \$1.01 billion dollars in employee compensation
- Generated more than 51,850 total jobs in Nevada and states supplying goods and services to the industry (or 3.55 indirect jobs per every direct employment opportunity)
- Generated over \$10 billion in total economic activity, including both direct and indirect effects
- \$2.5 billion in direct economic value added to Nevada's economy through operations, employment, increased household income, and state economic output)
- Paid over \$300 million in state and local taxes (see box)

Source: John Dobra, University of Nevada at Reno 2008

### Long-Term Economic Sustainability

While mining has played, and will continue to play, a significant role in Nevada's economy, we share our stakeholders' concerns about economic dependence on the industry. Mining is a particularly cyclical industry, creating significant growth when mineral prices are high, but also periodically undergoing significant downturns resulting in elevated unemployment, lower tax revenues, and economic contraction. These impacts are felt strongly in rural communities where mining is a significant economic engine. We believe that the solution is in diversification through the attraction and growth of other industries that require similar skill sets. These complementary industries, such as manufacturing, construction, and renewable energy, can absorb excess workforce capacity and create diversified economic growth in Nevada. Our industry is committed to working with our host communities, business partners, and other stakeholders to address these concerns and look for opportunities to stimulate long-term, sustainable growth during downturns and beyond mine closure.





## COMPANY PRACTICES

Supporting economic diversification is important to offset potential negative effects of downturns in the industry and of mine closure, and to position the state for continued growth. Individual Nevada Mining Association Members facilitate economic diversification by:

- Helping suppliers identify business opportunities outside of the mining industry. Many of the suppliers that mining companies work with can supply other industries, both within Nevada and in nearby states.
- Retraining displaced workers and providing outplacement services, including coaching, resume writing, interview skills, and networking for employees affected by mine closure. For example, when the Jerritt Canyon Mine closed, leading to layoffs of more than 400 employees, Newmont helped the majority of the affected employees secure opportunities at other sites in the state. Through this “labor pool realignment,” workers avoided extended unemployment, other companies addressed labor shortages at their mines, and the industry retained the employees.

## INDUSTRY INITIATIVES

Representatives from mining companies and industry suppliers are active in many state and local community economic development organizations that seek to attract new businesses and industries. These organizations provide a mechanism for several mining companies to work together in support of economic sustainability and include the:

- Elko County Economic Diversification Authority (formerly the Northeastern Nevada Partnership)
- Humboldt-Pershing Sustainable Development Partnership
- Lander County Sustainable Development Committee
- Smoky Mountain Development Team

In the case study below, we share some of achievements and challenges of the Elko County Economic Diversification Authority (ECEDA),

See <http://www.northernnevadapartnership.com/index.shtml> for more information.

## Sustainable Economic Development in Elko

The mining industry has had a significant hand in developing some of Nevada's towns and cities, an impact one clearly sees in the Northern Nevada city of Elko. In 1993, Elko was selected as the "Best Small Town in America", and much of the city's infrastructure and quality of life is directly related to the presence of the mining industry. As cities like Elko mature, however, new opportunities will be necessary to sustain prosperity and growth.

In the 1980s and 90s, Elko grew rapidly as the mining industry developed nearby mines and invested in roads, utility infrastructure, water and sanitation provision, housing development, schools, parks, and other community services to support new populations of employees. As mine operations often stretch into the decades, working to ensure safety, stability, and a high quality of life for employees and local community members makes good business sense for mining companies. However, the industry's ability to invest in development is limited by the finite nature of mineral resources: eventually the mines will close.

Although gold mining in Elko is currently thriving, a decade ago the price for an ounce of gold had declined to a low of \$300. Nevada's mining industry was able to keep operations stable and retain jobs during this downturn, but growth ceased and mining companies suspended exploration for new mine sites. This period of stabilization was a "reality check" for the town of Elko, highlighting its reliance on a single industry. In response, the mining industry partnered with the government, community organizations, and other businesses to form the Elko County Economic Diversification Authority (ECEDA), a group that identifies and pursues opportunities for industrial development and economic diversification.

Developers have financed the construction of large buildings within city limits that mining companies then lease—in addition to providing tax revenue, these multi-use buildings will be an attraction to other industries looking for existing facilities in the future. More recently, Elko County finished construction on the Northeastern Nevada Regional Railport.; a 60 acre trans-loading facility and 500 acre industrial park that will eventually be home to six industrial tenants and create an estimated 1,400 jobs.

ECEDA seeks to draw strategic new industries— such as metal fabrication, metal recycling, food processing, transportation, construction and small- and medium-sized manufacturing—that are offer goods and services for current mining operations but also diversification that contributes to economic stability. The symbiotic relationship between these complementary industries and mining allows mining companies to procure goods and services from businesses within the community, and other industries to tap into a skilled workforce, whose talents and abilities are transferrable from mining to these new endeavors and may provide a pool of labor after closure.

In the recent recession, Elko's job market continued to grow, as did construction, while the rest of Nevada found itself in an economic downturn. Mining companies' and the Nevada Mining Association's commitment to the community of Elko remains strong. New and growing investment in the community from these new economic endeavors will enhance the future of an already thriving town.

## At a Glance: Jobs in Mining

Jobs in the mining industry typically fall into three categories.

### **Professional occupations:**

These highly technical and specialized positions include geologists, and engineers in mining, metallurgical, civil, chemical, environmental, hydrological, industrial, technology, and mechanical fields. These employees are generally involved in the entire mine life cycle, from exploration to closure.

### **Extraction, transportation, and material moving and processing occupations:**

The workers in these occupations operate the equipment used to extract and process ore. Most of these occupations are unique to underground or surface mining operations.

### **Construction, installation, maintenance, and repair occupations:**

Many other workers, who are not directly involved in the extraction process, work in these occupations in and around wells, mines, and quarries to support extraction. Jobs include mechanics, electricians, and carpenters.

## Working in Mining

Our workforce is the backbone of the mining industry; without our employees we could not operate mines in Nevada. Employment also represents one of the most direct ways for member companies to contribute to economic development and the creation of human capital in host communities.

### Employee Recruitment, Development, and Retention

#### *Recruitment and Development*

The mining business has evolved dramatically from its early days in Nevada, from an industry which required simple tools and often dangerous manual labor to a technical and mechanized business that requires a wide variety of employees who work in highly specialized and increasingly technical positions. However, attracting qualified employees can be difficult, particularly when high commodity prices increase competition for employees to bring new operations online. The industry faces a labor shortage in the next five to ten years, as much of the current mining workforce nears retirement age. Studies by professional societies anticipate that approximately 50 percent of the current minerals and energy workforce in the United States will retire over the next decade.

The rural location of many mining operations can also be an obstacle to recruitment: small populations with limited skills make local recruitment difficult. Conversely, attracting employees from urban areas to rural operations can be complicated by limited housing, infrastructure, and differences in quality of life. Investing in employee development programs assists with our recruitment efforts – both by offering attractive opportunities to current employees and by supporting the development of a capable labor pool in our host communities.

#### *Retention*

The cyclical nature of the industry complicates employee retention. Downturns sometimes require temporary or permanent site closures, causing employment to fluctuate with the commodity cycle. Consequently, some qualified individuals are deterred from seeking employment in the industry, and others who lose their positions may seek opportunities in other sectors.

Workforce recruitment, retention, and development efforts are critical to ensure that the mining industry continues to operate efficiently and to create economic value in Nevada.

### **COMPANY PRACTICES**

Company practices to increase employee recruitment, retention and development include:

- **Partnerships with local colleges and technical training facilities**, to assist residents in obtaining the skills required to work in the mining industry. Companies provide financial support, access to training infrastructure, or employee mentors and trainers.
- **Scholarships and temporary or part-time employment for students** during their course of study to help them gain on-the-job experience, with preferential recruitment at the end of these programs. For example, the industry has provided scholarships for students of the Mackay School of Mines at the University of Nevada, Reno.
- **Professional development opportunities for current employees** such as hands-on and classroom training, to increase professional competencies, improve familiarity with new technology and build new skill sets.

- **Programs in leadership and personnel management, project management, safety, and financial management.** Sometimes the best way for people to gain new skills is to transfer their existing knowledge to new situations. For example, in Newmont’s Developmental Assignment Program (DAP), participating employees temporarily transfer to Newmont sites outside their home countries, where they share or learn best practices in health and safety, community development, and operations and environmental management. In turn, their visits to host mines provide for cross-cultural exchanges of information. Nevadans participating in this program have worked at sites in Peru and credit the experience with assisting in their career development by offering broader operational experience.
- **Financial support for employees’ secondary and lifelong educational pursuits.** In addition to helping employees become more productive in their current roles, these development programs also provide employees with a broader range of skills and more employment opportunities both within and outside of the mining sector.
- **Excellent health care benefits,** including paid health insurance for employees and their families as well as employee wellness programs such as noncash incentives for meeting annual wellness goals.

#### **INDUSTRY INITIATIVES**

There is a high level of collaboration within the mining industry in Nevada to address recruiting challenges through workforce development programs for individuals who seek employment in the sector. One of these initiatives is the Great Basin College Mine Maintenance Training Program (below).

#### **Increasing Diversity in Mining**

Diversity is vital to sustaining and strengthening our workforce. Although women now comprise an estimated 25 percent of the workforce in a mine in Nevada—up from an estimated 5 percent in the 1970s—mining companies are still challenged to recruit more women into this traditionally male field. Historical reasons for preventing women from participating in mining, such as strenuous physical labor and safety issues, have been dramatically reduced through technological advances, and the ripples of labor laws enacted three decades ago are steadily—if slowly—being felt. Mining is no longer considered a gendered occupation, yet opportunities to encouraging women to enter mining remain.

#### **COMPANY PRACTICES**

Most Nevada mining companies actively recruit female employees, and have designed flexible work practices to encourage women to seek employment in the industry. Many also have equal remuneration policies to ensure wage equality.

#### **INDUSTRY INITIATIVES**

We are undertaking many efforts to increase both the gender and ethnic diversity of our industry, many of which begin with K-12 educational programs (see Community Impact, p. 40) and continue through the college level (see Great Basin College Mine Maintenance Training Program case study).

## Great Basin College Mine Maintenance Training Program

In the late 1980s, a boom in mining activity resulted in exponential growth in demand for skilled mine employees in Nevada. Newmont Mining Corporation's staffing requirements alone grew sevenfold in only three years. To fill short-term demand, workers were brought west from coal mining areas in the Eastern U.S., but relocation resulted in high turnover rates. The state needed a way to increase local populations' technical skills for mine employment. Newmont and the Great Basin College (GBC) partnered to create the Great Basin College Mine Maintenance Training Program—fulfilling the mining company's need for skilled workers while providing jobs for local residents.

With a main campus in Elko, four branch campuses, and 13 satellite centers, GBC serves six of Nevada's largest rural counties within 62,000 square miles, an area with more than 120,000 residents. The college is dedicated to making the achievement of an associate's or bachelor's degrees available to communities in rural Nevada.

The Mine Maintenance Training Program is crafted specifically to match industry needs. The Program was originally sponsored by, and designed in partnership with, Newmont. In the 1990s, industry partnership was expanded to include 15 companies under the non-profit coordinating body, Manpower Training Cooperative. The companies offered scholarships to each high school senior that the college had recruited into the Program, and the students split their time between the classroom and a job with the company that had provided the scholarship.

The Program continues to have significant industry involvement. All instructors have mining experience, and each educational track has an advisory committee from the industry. Mining companies also support the Program through donations or long-term loans of mining equipment too expensive for the college's budget.

As the Program evolved, training was streamlined into a summer of work with a mining company, followed by the one-year classroom-based degree program. Classes are now open to students who have not received scholarships, and some graduates have gone on to work in other industries. Ongoing research, sponsored by Newmont, into the current needs of mining companies has been used to further develop and evolve the curriculum, ensuring that students emerge with relevant skills and abilities.

The Program supports Nevada's economy by ensuring companies can recruit sufficient skilled workers and that locals have the training necessary to access high-paying jobs in their region. As local towns and cities seek economic diversification, these pools of skilled laborers attract new industries and employers. In addition, recruitment of women into the Program is working to create gender parity in mining in Nevada.

### Occupational Health and Safety

One of our members' most important responsibilities is the protection of their employees' health and safety. "Safety First" is a philosophy widely shared by all members of the mining industry. We are committed to high levels of performance and continuous improvement in safety on the job and in the overall health and welfare of our employees.

#### COMPANY PRACTICES

It is a basic responsibility for our members to comply with all federal and state level regulations for health and safety and to cooperate with the Mine Safety & Health Administration and the Mine Safety and Training Section to the best of our ability. However, while compliance with laws and regulations is important, we measure our success by striving for health and safety performance above and beyond compliance. Companies in the mining industry undertake additional steps (in addition to those required by state and federal regulations) to improve health and safety in ways that are most appropriate for their businesses, employees, and corporate cultures.

- **Formal health and safety management programs** at member company mines are designed to integrate protective measures and practices into how

## Mine Safety Regulations

Mine safety is highly regulated both by the state and federal governments.

### Federal Legislation

**The Federal Mine Safety and Health Act**, passed in 1977, requires regular inspections of all surface mines, mandatory training, creation of rescue teams for all underground mines, involvement of mine employees and their representatives in health and safety

**The Mine Improvement and New Emergency Response Act of 2006** contains a number of provisions to improve safety and health in America's mines.

**The Mining Safety & Health Administration (MSHA)**, a division of the U.S. Department of Labor conducts inspections and investigations at mine sites to ensure compliance with these acts. When inspectors and investigators observe violations, they issue citations and orders to mine operators that require them to make corrections. MSHA also investigates mine accidents, complaints of discrimination related to employee health and safety rights, reports of hazardous conditions, and criminal violations; improves safety and health standards; and reviews mine operators' operational plans and health and safety education and training programs.

### State Regulations

Within Nevada, the Mine Safety and Training Section (MSATS) in the state's Department of Business and Industry regulates mine health and safety. The mission of MSATS, created in 1909, is to establish and determine mine operator compliance with state and federal mine safety regulations and assist mine operators in achieving such compliance through training programs, consultation, and technical assistance.

employees perform their daily jobs. We seek to protect and encourage the overall health and well-being of our employees, both on and off the job.

- We invest heavily in **ongoing training and evaluations** to ensure that employees understand safety practices, which are built into processes and procedures associated with mine operations.
- **Certification of health and safety management systems** to the Occupational Health and Safety Audit System (OHSAS) 18001 standard.

## INDUSTRY INITIATIVES

The industry collaborates on health and safety training and resources—for example, the Mine Safety & Health Committee of NvMA organizes regular trainings on topics, such as conducting sampling to monitor particulates, noise, and mercury vapors. Because safety and health are critical across the industry, whether companies are members of NvMA or not, we offer these trainings to all interested parties. We also seek to leverage the greater experience of many of our larger members, who have been able to devote more resources to developing best practices, when training smaller, less experienced companies.

NvMA also seeks to develop strong relationships with industry regulators responsible for safety. We invite MSHA representatives to participate in many of our meetings so that we can discuss new and potential regulations, performance concerns, and general questions in a collaborative environment. MSHA representatives also serve as judges in our mine safety competitions, which builds their knowledge of our capabilities as well as our challenges.

## PERFORMANCE

Despite our best efforts and significant improvement over the last two decades, accidents do occur and occasionally result in injuries or even fatalities. As of the third quarter of 2009, there were 108 days lost due to nonfatal occupational injuries. The industry also had one fatality in 2009. We deeply regret the loss of this individual as well as the impact of injury and illness on other employees and their families. We believe that any injury, illness, or fatality resulting from employment in mining is unacceptable and will continue to seek improvement to reduce or eliminate these incidents.

### Fatalities and Days Lost, Nevada Mining Industry 2006-2009

	2009 *	2008	2007	2006
Fatalities	1	3	2	0
Non-Fatal Days Lost	108	162	144	159
Total Working Days	558740	739483.5	712868	668327
	* Preliminary Data			

Mine Safety and Health Administration

## Mine Safety Competitions

Two people lie unconscious on top of a 70 foot high drill mast. A team of safety experts rig a series of ropes and harnesses to scale the mast. Once at the top, they carefully maneuver the unconscious people into stretchers and lower them to the mine floor below. Nearby, a panel of expert judges-watches closely, rating the team on its performance.

Each year, mine emergency response teams (ERT) representing mining companies operating in Nevada come together to compete against each other for awards of excellence in emergency response. Competitions are held for both surface and underground mining operations—the first surface competition was held twenty three years ago. The teams are graded on written test responses, as well as actions witnessed during scenarios such as the one described above. They are required to be expert in rescue techniques, knowledge of chemicals and what to do in the event of exposure, CPR and first aid, and emergency equipment use, among other skills. Teams showcase their skills and abilities, and learn new techniques and best practices from each other. Although each team's scenario lasts just an hour or two, the competition stretches over two to three days.

Many of these teams are lucky enough to go years on end without putting their skills in to practice outside of the competitions. Each mine's emergency response team is comprised of volunteers - and companies grant time in these employees' schedules for training. They meet throughout the year to practice and learn about ongoing developments in emergency response. Many mine safety volunteers find involvement on these teams to be among the most rewarding aspects of their jobs. Many extend their dedication and service to their local communities, running ambulances and supporting local emergency response departments.

When an emergency occurs, these employees are expected to leave their posts immediately and respond, whether the emergency is at their mine or a neighboring site. Under the terms of a Mutual Aid Agreement, mining companies in Nevada have committed to sending emergency response teams whenever an emergency occurs at any mine in the state. This Agreement not only commits resources to emergency situations, it furthers training and promotes sharing of best practices. Each team trains at sites around the state in order to be familiar with operations, emergency procedures, and the working structures of the teams they would be supporting.

Best practice sharing is also promoted through the emergency response subcommittee of the Nevada Mining Association's Safety and Health Committee. Emergency response team captains attend monthly subcommittee meetings, engaging in topical discussions and creating an informal network for learning. Miners and mining companies are also committed to working together to elevate proactive prevention practices, a strategy which generates the biggest gains in mine safety.

Emergency response teams are prepared to respond to any emergency, and mine safety competitions serve to ensure that they are equipped to spring into action when required. These teams are as ready to rescue trapped miners or contain a chemical spill as they are to resuscitate a heart attack victim. But the ultimate mine safety success would be an emergency response team that was only activated for training and competition, and a mine that operated day in and day out with no emergencies at all.





## Community Impact

Mining can transform the communities where we work and live: Our operations bring both new opportunities and new challenges to our host communities. Part of our responsibility is to work with communities to take advantage of the benefits mining can offer, and to find ways to minimize potential negative impacts on their way of life. This responsibility goes beyond providing jobs and paying taxes to such issues as assisting local government in meeting increased demand for public services and infrastructure. It means that, as corporate citizens in our host communities, we have an obligation to contribute to their overall well-being and development.

### Community Investment

#### COMPANY PRACTICES

Our operating members, suppliers and vendors are committed to making strong contributions to our host communities through donations of time and resources in community programs and services that support local education, health care, arts, social programs, and community infrastructure such as parks and recreational areas.

While the mining industry has a large presence in rural parts of Nevada, many of the Nevada Mining Association's members are also active contributors to the state's urban communities. For example, Barrick employees have helped to raise funds in Las Vegas for AIDS of Nevada, the largest AIDS service organization in Nevada. As the company explains, "Barrick doesn't actually operate in Las Vegas, but we have historic ties to the state of Nevada and to addressing this health issue at our operations." Many mining suppliers in Las Vegas, Reno, and Carson City also make philanthropic contributions in these cities.

#### PERFORMANCE Industry Philanthropic Contributions in 2009

- NvMA's five largest members alone reported a total of **\$3,299,000 in philanthropic contributions** made in 2009.
- **The Nevada Mining Association also made \$65,000 in donations** independent of our membership.

Source: John Dobra, 2010.

#### INDUSTRY INITIATIVES

The mining industry is heavily invested in supporting K-12 education in Nevada. One of the many challenges we face as an industry is an outdated perception of mining—many individuals still think jobs in mining are highly dangerous and unskilled. By bringing our core competencies to the classroom, we are helping to improve public understanding of modern mining, prepare the next generation of employees, and provide all resident schoolchildren with a solid understanding of math and science, as well as exposing them to career opportunities. By working together as an industry, we are able to extend our reach across more regions and to pool our resources to increase our impact.

The Nevada Mining Association supports this commitment through its educational website [www.nvmineraleducation.org](http://www.nvmineraleducation.org), which contains age-appropriate information for students and educational resources for teachers and parents. NvMA's Education Committee also organizes multiple educational programs in partnership with our members, such as scholarships, educational mineral workshops for teachers, classroom presentations, and career fairs. We are exploring ways to measure the effect of the semiannual training that we offer to teachers in Nevada. Direct interaction with professionals can inspire students,



and we are exploring more opportunities to mentor and teach children directly in the school setting.

### Enhancing Public Services

Mining, like any industry, often requires access to public services to support business activity. Healthcare is one example. To protect the health and safety of their workers, mining operations must have reliable access to emergency medical personnel. To meet this need, our members often employ or establish private medical response teams, which are also available to support the medical needs of communities. Our members also invest in existing health care facilities and programs that provide essential services to our workers and their families, and by extension, to the communities where we work. Below we highlight one example of how a member company has worked with community members to address concerns about the adequacy of public services to address new demands created by mining.



Photos courtesy Northern Nevada Partnership

## **Mining Education: The McCaw School of Mines and the K-12 Earth Science Mineral Education Curriculum**

Standing on five acres of land in Henderson, Nevada, the McCaw School of Mines offers a day of hands-on learning to fourth graders from southern Nevada. While these students live in a state whose history, present, and future is closely linked to the mining industry, many of them live too far from a mine site to visit. Driven by the vision of two fourth-grade teachers and sustained by ongoing investments by the NvMA, the McCaw School of Mines brings the mine to them.

On a typical field trip to McCaw, students find themselves standing in the center of a scaled open pit mine, surrounded by tiered walls and scaled representations of mining equipment. They explore model tunnels and shafts, load ore into carts, and learn about the “drill, blast, muck” process of extracting ore from rock. Four educational rooms allow them to identify minerals, examine antique and new mining equipment, learn about products that contain mined minerals, and experience the operation of modern mining techniques via computer. The school's grounds include an antique drilling rig more than 40 feet high, a Caterpillar mining truck, a model train, and a full-sized caboose that houses the school's collection of fluorescent minerals. The facilities are designed to make learning about minerals and mining both educational and enjoyable through hands-on experience and exposure to real-life applications of science.

Teachers schedule the field trip as part of the weeklong mining curriculum embedded in the Nevada History unit, and the lessons of the day align with state educational requirements for fourth-grade science, social studies, and history. The McCaw School of Mines Foundation raises funds each year to ensure that all of southern Nevada's fourth-grade classes have access to a trip to the school. There is no charge for the field trip, and the foundation provides transportation to all visiting classes. More than 150 fourth-grade class field trips are taken to the school each year, and more than 55,000 students have visited since it opened in 1997.

Specially selected fourth- and fifth-grade “student docents” from the McCaw Elementary School act as tour guides to the visiting classes. These docents highlight aspects of mining, such as safety, environmental impacts and reclamation, and the viability of mining as a career for women. Several docents have gone on to enroll in the Mackey School of Earth Science and Engineering at the University of Nevada, Reno. A recent graduate of the University of Notre Dame credited her achievement of a degree in computer science under full scholarship, in part, to her experience as a docent. She plans to further the mission of the school by helping to redesign the website.

Some teachers volunteer to bring information on mining and minerals to their students beyond the weeklong mining curriculum offered in fourth grade. The K-12 Earth Science Mineral Education Curriculum is a three-day workshop offered to teachers throughout Nevada and beyond. Held in both northern and southern Nevada, the workshop costs less than \$40 and provides participants extensive resources and information on minerals, earth science, and mining to use in their classrooms. The resulting units fulfill state requirements for all subject standards, including English, math, science, and social studies.

Much like the McCaw School of Mines, the program provides teachers and their students information otherwise unavailable on mining in Nevada and the importance of mined minerals to daily life. Up to 150 teachers participate each year, and most of the curriculum's instructors are industry experts. Teachers, who experience both classroom learning and an opportunity to visit a mine site, can receive university credit or professional development credit for attending the workshop.

The Nevada Mining Association supports programs like these to advance awareness of the benefits and impacts of mining on communities in Nevada. Students who learn about minerals and mining become ambassadors within their schools and families, and carry what they have learned into adulthood and out into the world. They grow into a more informed voting populace and have a stronger awareness of the broad range of mining-related careers open to them in their home state. What begins as an exciting earth science lesson has the potential to lead to more interest in—and more informed opinions about—mining for a lifetime.

## "The Friendliest Town on the Loneliest Highway" Grows with Mining

Mining has the potential to bring tremendous economic growth to towns and rural areas. Areas impacted by the opening and operation of a mine will see an increased tax base, access to new jobs, and company investment in the community. However, communities are also concerned about the changes that will affect their town as it grows and the industry evolves. Members of the NvMA seek to facilitate growth responsibly and to engage affected communities throughout the process.

Eureka, population 600, is a small town about to undergo a growth spurt due to the increased presence of mining. General Moly, a U.S.-based mineral company engaged in the exploration, development, and mining of molybdenum, expects to open the Mt. Hope Mine outside of Eureka within the next few years. Although a large gold mine is already in operation just miles from Eureka, many of its employees are drawn from communities as much as 110 miles away. The opening of Mt. Hope will likely have a dramatic effect on the face and shape of Eureka.

Established in the mid-1800s, Eureka is perched on the edge of a canyon in the high desert of central Nevada. Local residents are proud of the diversity of natural, historic, and economic resources available in the area—the link to the “Old West” is visible in the more-than-century-old brick buildings lining the downtown streets—and the community is committed to retaining the town’s charm and quality of life through conscientious management of growth and resources.

As it prepares to open Mt. Hope, General Moly has made strides to build a strong relationship with members of the Eureka community. The company opened a store front on the main street and encourages residents to drop in with questions and concerns. In addition, General Moly holds “open house” community meetings, focus groups, and mine tours to create a dialogue and facilitate the exchange of information with town residents. Through these meetings, the company has become aware of both concerns and opportunities it will face in development of the mine and its peripheral needs. One key concern is the effect of planned population growth. In response, General Moly is working with the town to ensure that public facilities and services, such as local schools, are able to support the increased population, and new housing has been sited away from the historic downtown so as not to impact the aesthetic of the area.

The company has also identified innovative ways to address community needs. When trees needed to be cleared to develop the new housing subdivision for example, General Moly turned them into firewood to heat the homes of local seniors. And when Eureka’s superintendent of schools identified the need to light the high school football field, the company enlisted their vendors and suppliers, as well as the local power company, to have lights installed within three months. Investments such as these intend to communicate that the company sees itself as a community member—one that is committed to acting as a responsible, responsive partner.

The addition of General Moly’s Mt. Hope Mine will bring economic development to Eureka. It will spur the development of new infrastructure, facilitate new business opportunities, bring in new tax revenues to fund town and county services, and increase wages throughout the community. Through General Moly’s conscientious efforts, the Mt. Hope Mine will open to a town that feels respected by the company and welcomes it as a positive addition to the community.

### Indigenous People

Nevada is home to several Native American nations, including the Western Shoshone, Paiute, and Washoe. Some of these communities’ claims to land are not formally recognized by the United States government. At times, these unresolved disputes have contributed to contentious relationships and even lawsuits between the mining industry and Nevada’s Native American populations. We recognize the special history and relationship between Native peoples and land and believe that protecting traditional values and uses of land, and providing opportunities for indigenous people to benefit from mining in ways appropriate to their cultures are part of our responsibility towards these important host communities. There is much opportunity to improve the industry’s relationship with indigenous peoples, and many of our members are seeking more collaborative and constructive ways to work with Native American nations as partners in mining. These include:

- **Establishing ongoing, constructive dialogue** between mining companies and Native nations affected by mining operations or exploration. For example, Barrick's Cortez Gold mine has made a commitment to discuss and consider any issue that may concern Western Shoshone communities in regular forums. Each meeting agenda is prepared by the host tribe or band, with limited input from the company, to ensure that the community's priorities are the focus of discussion.
- **Protecting cultural heritage sites and addressing actual or potential impacts of operations on traditional ways of life.** Impacts are often related to land use and can include access to and disruption of culturally and spiritually significant sites. The Bureau of Land Management, which authorizes public land use for mining is legally obligated to consider tribal concerns and interests when planning new land use actions. Nevada Mining Association Members frequently work with indigenous communities to identify specific sites and lands that should be protected from development. At Round Mountain mine, for instance, Kinross Gold Corporation has worked in partnership with local Western Shoshone communities to complete a detailed cultural resource inventory in the vicinity of a proposed transportation and utility corridor.
- **Creating opportunities for indigenous peoples to participate in economic benefits from mining** and ensure that the jobs and revenues created by operations improve the lives of the people who have the strongest ties to the land and are most impacted by its disturbance. Company policies on local hiring, pre-vocational training, mentorship, and cross-cultural awareness help to ensure that indigenous people benefit from mining operations. Newmont actively recruits members of the Western Shoshone tribes and bands in Nevada for employment opportunities to benefit local indigenous communities.





## Looking to the Future

### Industry Trends

The mining industry depends on continual exploration to identify new mineral resources to open new mines and extend the life of existing operations. Despite its long history of mining, Nevada still possesses considerable mineral reserves and its untapped geologic potential continues to make the state one of the most prospective mineral provinces in the world. For example, estimates of gold reserves have remained at 10-12 years of projected production consistent for the past two decades, maintained by constant exploration. This trend indicates that Nevada is nowhere near running out of gold.

Demand for Nevada's substantial deposits of silver, molybdenum, copper, tungsten, lithium, uranium, and industrial minerals such as gypsum, diatomaceous earth, and limestone is likely to grow significantly over the coming years. Exploration suggests that companies are investing now to develop these new resources: exploration spending in 2008 totaled \$158 million dollars. This represents a significant annual investment in the state of Nevada.

Exploration and capital investment in mineral resources by US and foreign companies is mobile - it will be directed to areas with the highest likelihood of a superior return on investment. While the quality of the mineral resources impacts this selection process, the regulatory environment and taxation regime also play significant role. The long-term vitality of Nevada's mining industry depends to a great extent on maintenance of a balanced business climate to attract such investment.

### Sustainability Trends

Mining is likely to remain an important part of Nevada's economy for many years to come. However, social and environmental trends will pose new opportunities and challenges for our industry in the future. These include:

- **Energy generation and climate change.** Mining requires energy, and industry growth will increase demand. However, we recognize our responsibility to address climate change through initiatives to reduce energy consumption and develop renewable energy as a means of meeting our operational needs, and those of our host communities, while reducing emissions. Fortunately, there is significant potential to in Nevada to develop renewable energy. According to the chairman of the Federal Energy Regulatory Commissions, aggressive energy efficiency programs and of the state's abundant wind, solar, and geothermal resources could provide all of the Nevada's energy in the next 15 to 20 years. The challenge lies in taking steps to realize this potential.
- **Water.** As the driest state in the nation and one of its fastest growing, Nevada faces major challenges in balancing various demands for water – from the residential population, tourism, agriculture, conservation and mining industry. Increasing efficiency of water use in our operations and supply chain, and working with partners in civil society and government to conserve water resources will be important for the future of the mining industry and the state.
- **Urbanization.** Nevada is an increasingly urban state. For example, 72 percent of Nevadans now live in the Las Vegas Metro area. These demographic changes will not only place new demands on natural resource,



but they will also change the stakeholder landscape for mining. Engaging with urban stakeholders is important for the industry to increase knowledge about mining – a largely rural economic activity – and to understand evolving expectations about the social and environmental performance of the industry. Additionally, the industry’s workforce will increasingly have to be recruited from urban settings.

Tackling these future challenges will require continued industry collaboration – amongst our membership and with our partners and stakeholders. Our 150 year history in the state is a strong foundation for such partnership today and in the future. Like all good partnerships, it requires shared decision-making to meet challenges and seize the opportunities, both present and future. In the coming years, the Nevada Mining Association will continue to play a key role in facilitating communication and collaboration to foster responsible, and sustainable, growth for the mining industry in Nevada.