

of industry continued to be hit, so much so that Llewellyn put his efforts into that challenge.

“As mining people. We must continue to expand our technical know-how and make better use of it. In today’s context however, that is not enough,” said Llewellyn. “We must also improve the public image of mining.”

The mineral industry dealt with falling demand that followed sharp declines in auto production, housing, appliances and other consumer goods.

John F. Havard assumed the role of SME President in 1976. He put much of his focus on the educational aspects of mining engineering.

“Today’s mining engineer needs a more intensive education — including such newer subjects as rock mechanics and computer sciences — and even more important, he needs additional training to enable him to communicate clearly, to negotiate and administer labor contracts, to cope with complex safety and environmental laws and to understand the political and public relations aspects of the job,” said Havard.

Donald O. Rausch took over as SME President in 1977. The effects of recession and inflation were the topics of the day, but Rausch looked deeper to the lack of a nonfuels energy policy. He said America was in need of a policy that would support a domestic mineral policy. He also focused on improving communications within SME. The Society’s membership in 1977 was 22,472.

Outside of the SME offices, things were bleak. The year-long depression of the copper industry was marked by layoffs, shut downs and mine closures. Collapse of the nickel market and the passing of the Surface Mining Control and Reclamation Act added to the doldrums.

As the 1978 SME President, Robert S. Shoemaker,

## The 1980’s —hard times with a golden lining

The early part of the decade was marked by worldwide problems and economic difficulties. In 1980, President Jimmy Carter ordered the failed military mission to rescue hostages in the U.S. Embassy in Iran, Mt. Saint Helens, WA erupted killing 60 people and the Soviets and Mujaheddin guerrillas clashed in Afghanistan after the Soviet invasion. Later in the year, Ronald Reagan was elected president, defeating Carter. The first launch of a space shuttle (Columbia) occurred in 1981. Also in 1981, the first IBM-PC’s begin to roll off the lines. In 1982, Argentina invaded the Falkland Islands and Mexico’s economy was in collapse. In 1980, the U.S. unemployment rate stood at 7.1 percent, and by 1982 the rate increased to 9.7 percent.

1980 marked SME’s first full year in its new office building in Littleton, CO. The new facility was dedicated in November 1979. Claude L. Crowley was executive director of SME in 1980 and remained in that position throughout the decade. SME’s membership stood at about 26,000 throughout this period (1980-1982).

Throughout the decade, SME continued to carry out its mission of information transfer for the mining industry with the continued publication of *Mining Engineering* magazine, the annual *Transactions* of the Society for

Mining, Metallurgy and Exploration and numerous books on mining.

These were difficult years for the mining indus-

try. Most U.S. mineral producers were being squeezed between stagnating metal prices and rising costs. Most facets of the mining industry suffered a major recession, and almost every major mining industry research and development facility was closed. Recessionary conditions in the Western World in the early 1980s resulted in a slowdown in new mine development, and major new base metal projects were scarce worldwide.

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**Anamax Mining Company’s copper recovery plant in Sahuarita, AZ, around 1980.**



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In the 1982 Annual Review (*Mining Engineering*, May

William R. Yernberg,  
Associate Editor

1983), the situation was summed up with the headline "Mining industry hits bottom." The article noted, "It was the worst of times for the mining industry, perhaps since the great depression." 1982 saw mineral prices strike 30-month lows, while companies struggled to stay in the black by closing mines and laying off massive numbers of employees.

In 1980, there was a copper industry strike, energy shortages and troubles in the iron ore and uranium industries. There was also much discussion about a U.S. nonfuels mineral policy, and there was considerable corporate interest in mining company mergers. 1980 production figures for 68 minerals showed that 42 of them decreased. During his presidential campaign in 1980, Ronald Reagan announced that he would form a strategic minerals task force to determine U.S. access to strategic and critical minerals.

Exploration activities in 1980 also felt the effects of the unstable economic conditions. Following the Three-Mile-Island accident in 1979, the price for yellowcake dropped. In 1982, copper was being offered at a five-year low of 55 cents/lb.

It was against this backdrop that Nelson Severinghaus Jr., president of Franklin Limestone, became the president of SME at the Annual Meeting in Las Vegas. In a 1980 interview in *Mining Engineering*, Severinghaus echoed industry frustration and put much of the blame for the mining industries problems on "government overregulation." He said, "We must have the cooperative participation of our government" and noted, "We are not being heard."

At that time, the mining industry was expressing much resistance to the increased environmental regulation that had become law. Severinghaus blamed "environmental extremism" for much of the regulation that he believed was hurting the industry.

As a result of several environmental disasters in the 1970s, the U.S. Congress passed the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) in 1980. The law created a special tax that funds a trust fund, commonly known as Superfund, to be used to investigate and clean up abandoned or uncontrolled hazardous waste sites, which included numerous mining sites.

At the 1981 SME Annual Meeting in Denver, CO, Alfred Weiss, assumed the presidency of SME. Weiss pointed out that the "U.S. minerals industry has certainly been threatened by government regulation." However, Weiss noted that many of his colleagues had "focused on factors over which we in the industry have little control." These included external factors such as environmental and safety regulations. Weiss said, "The industry must instead focus on internal factors such as increased emphasis on research and development, technological innovations, exploration and cost control."

Maurice Fuerstenau became the 1982 president at the SME Annual meeting in Dallas, TX. Fuerstenau's focus was more on education issues. He expressed concern about whether the [mining] industry could assimilate the 700 students that were graduating from mining schools each year. He also expressed concern about a dwindling number of mining faculty at mining schools.

Not all was bleak in the industry. On the brighter side, the outlook for coal continued to improve, fueling expectations that a long-awaited boom was at hand. In 1980, U.S. coal production rose 6.9 percent to 750 Mt (826 million st), primarily because of higher oil prices and the setbacks in the nuclear industry as a result of Three Mile Island.

Another bright note was the gold industry. Through much of the 20th century, the gold mining industry was in decline in many countries. It was not until a dramatic price rise in 1980 that the industry experienced another transformation. Old mines were revived and exploration activity exploded. The average gold price in 1980 was \$19.7/g (\$612/oz), compared with 9.83/g (\$306/oz) in 1979 and 6.27/g (\$195/oz) in 1977. Gold peaked briefly at \$24.4/g (\$760/oz) on Jan. 16, 1980.

Because of the increase in the gold price, Western World gold production almost doubled during the 1980s, rising from 962 t (31 million oz) in 1980 to around 1.744 kt (56 million oz) by the end of the decade. A new era of gold rushes occurred, with prospectors swarming to alluvial deposits in various countries including Brazil, Venezuela and the Philippines. Serra Pelada in Brazil proved to be one of the richest placer deposits ever found, yielding 13 t (420,000 oz) in 1983 alone.

The application of new technologies to the mining, milling and recovery processes also contributed to the gold boom. They enabled the development of orebodies that would previously have been considered uneconomic, notably in Nevada, which eventually accounted for more than 60 percent of U.S. production by the late 1980s.

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**SME presidents 1980-1984 — from left to right: Nelson Severinghaus; Alfred Weiss; Maurice C. Fuerstenau; Louis Kuchinic, Jr.; and Frederic L. Kadey, Jr.**



### **Mid-1980s (1983-1986) — “Mining industry begins a slow comeback”**

The mid-1980s featured continued economic troubles worldwide. In 1983, President Reagan announced the defense plan called Star Wars, Sally Ride became the first American woman in space and the U.S. embassy in Beirut was bombed. In 1984, Reagan won re-elected in a landslide. Also in 1984, a toxic gas leak from Union Carbide plant in Bhopal, India, killed 2,500 people. Leaded gas was officially banned in the United States in 1985. Also in 1985 the U.S. became the world’s biggest debtor nation, with a deficit of \$130 billion. In 1986, the Challenger space shuttle exploded, the worst nuclear disaster ever occurred in Chernobyl and the Iran Contra Scandal was first reported. In 1983, the U.S. unemployment rate stood at 9.6 percent.

SME’s membership in 1983 was about 28,730. However, because of the ongoing economic issues facing the mining industry, membership began to slip and, by 1986, membership decreased to about 25,740. Throughout the mid-1980s SME continued to publish valuable books for the mining industry. In 1983, the *Fifth Edition of Industrial Minerals and Rocks* was released, and in 1985, the *SME Mineral Processing Handbook*, edited by N.L. Weiss, was published. Both books became classic references for mining and processing engineers, respectively. In 1984 SME began publication of the *Minerals & Metallurgical Processing* journal, which remains today a valuable forum for mineral processing papers.

Despite the continued economic problems, there were signs of a possible recovery in the economy, and beginning in 1983 the U.S. mining industry began a slow comeback. Compared with 1982, the value of nonfuel mineral output increased by 8 percent to \$21.2 billion in 1983. Surges in the mineral consuming sectors, such as construction and automobile manufacturing, helped the mining industry recover. Raw steel production in 1983 rose 14 percent. Precious metals continued to increase, with gold production up 11 percent above 1982’s production. And, after a dismal period, the coal industry gradually recovered in the second half of 1983. Precious metals continued to dominate, and there was much interest in cyanide heap leach technology.

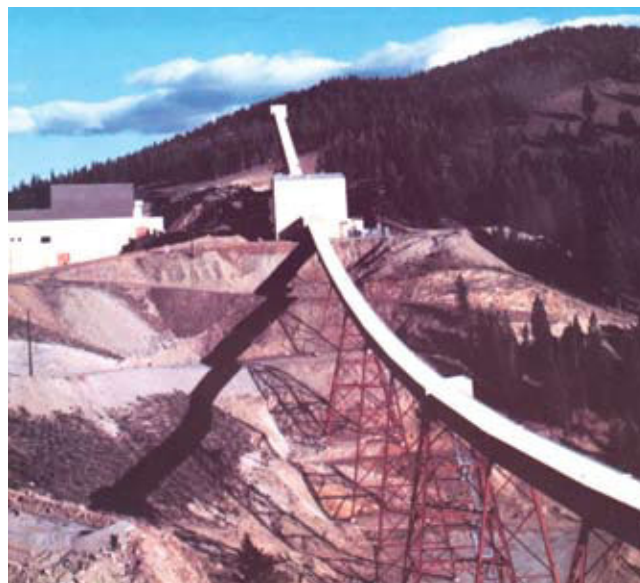
At the 1983 SME Annual Meeting in Atlanta, GA Louis Kuchinic, president of Controlled Resources and Wise Oil and Gas Exploration, became SME’s president. Kuchinic focused on communication issues and stated,

“We must work through our professional societies to educate the public that engineering is comparable to law and medicine.”

Even with the slow economic recovery in the United States, the domestic mining industry was beginning to face deeper problems, such as stronger foreign competition, radical changes in demand and obsolete facilities. It was becoming obvious that the U.S. mineral facilities would need to modernize and streamline to adapt.

In 1984, the demand for nonfuel minerals steadily improved each quarter. New housing starts rose and automakers were turning out 15 percent more cars and 30 percent more trucks than in 1983. Nevertheless, many mining companies were still experiencing difficulties, and there were indications in 1984 that a strong dollar and increased imports were slowing the U.S. mining industries’ recovery. In 1984, steel production rose 10 percent but remained well below production levels found in the late 1970s. Coal production rose 14 percent in 1984 and the precious metals industry continued on a roll. The industrial minerals sector also continued to improve year by year. The U.S. unemployment rate dropped to 7.5 percent in

**Despite low molybdenum prices in 1984, Amoco developed the Thompson Creek mine in Idaho as a low-cost producer of molybdenum.**



1984, but this did not seem to help the mining industries' employment picture.

Frederic Kadey, Jr., predicted an industry upturn when he took over the SME presidency at the 1984 Annual Meeting in Los Angeles, CA. Kadey said, "There is no doubt that this worldwide recession has reduced the need for just about all minerals." However, he said he was optimistic and noted, "with the economic upturn, we will see the minerals industry improve." Kadey noted, "The minerals industry typically lags behind the economy and the economy was improving."

However, a year later in 1985, as reported in *Mining Engineering*, most U.S. metal mining operations were still experiencing difficulties despite increased housing starts and increased auto production. This was attributed to newer engineered materials, emphasis on multi-unit housing and downsizing of motor vehicles. Recognizing the continued difficulties of the U.S. mining industry, many corporations made major efforts to retrench by selling, closing and spinning off operations and renegotiating labor contracts. The strong dollar encouraged imports and made exporting more difficult.

**Over a five-year period, Codelco spent \$350 million annually on expansions in the late 1980s, including Chuquicamata, shown here.**



The 1985 SME Annual Meeting was held in New York, where Thomas Falkie, president of Berwind Natural Resources, became the SME president. In light of the continued difficulties in the mining industry, Falkie urged "creative marketing of mineral commodities and more financial sophistication." He noted the cyclic nature of mining and said, "Mining people tend to be overly optimistic when times are good and overly pessimistic when times are bad."

Gold prices dropped to an average of 10.2/g (\$317/oz) in 1985. However, despite this, 1985 was another big year for gold exploration and development. In the United States, raw steel production fell 4 percent, and iron ore production fell 7 percent. Copper production remained unchanged in 1985. However, U.S. coal consumption reached new heights in that year.

In 1986, despite the fact that the U.S. economy passed

the \$4 trillion mark, the value of metals production in the U.S. remained unchanged. Copper production rose slightly in 1986, but steel production dropped another 7 percent with the quantity of imported steel rising 33 percent. U.S. gold production, on the other hand, was up a staggering 45 percent as the price of gold rose to \$11.8/g (\$368/oz) in 1986.

A. Tobey Yu, vice president of operations, Hewitt-Robins, became the 1986 president of SME at the Annual Meeting in New Orleans, LA. Yu challenged SME to "foster needed engineering innovation and creativity." Yu blamed much of the problems in the industry on over-supply caused by overexpansion in the past, particularly in Third World countries. "Billions were spent to build mammoth plants and facilities," he said. Yu noted, for example, "copper sold for \$1.50/lb in 1980 and dropped to 60 cents/lb in 1986, but during that time Chile's copper production increased by 80 percent."

### Late 1980s (1987-1989) — "Mining industry optimism and signs of better times"

The largest stock-market drop in Wall Street history occurred on "Black Monday" — Oct. 19, 1987 — when the Dow Jones Industrial Average plunged 508.32 points, losing 22.6 percent of its total value. That fall far surpassed the one-day loss of 12.9 percent that began the great stock market crash of 1929 and foreshadowed the Great Depression. Also in 1987, President Reagan announced the United States' first trillion-dollar budget. In 1988, work was begun on the Chunnel, connecting Great Britain and France. It would become the world's longest undersea tunnel. Also in that year, the Iran-Iraqi war ended, the Soviets withdrew from Afghanistan and George H.W. Bush defeated Michael Dukakis in the presidential race. In 1989, the Berlin wall was torn down; the Exxon Valdez oil disaster occurred in Alaska; students protested in Tiananmen Square, Beijing, China; and the United States invaded Panama to oust Manuel Noriega. In 1989, president Bush authorized \$300 billion tax dollars to prop up the collapsing savings and loan industry. The U.S. unemployment rate was 6.2 percent in 1987.

Despite the stock market collapse, the U.S. economy grew steadily and the value of domestically processed minerals rose slightly, and metal prices rose sharply by the end of 1987. A number of mining and metal companies experienced increased profitability, fostering more optimism about the future. This occurred despite a 10 percent drop in new housing starts and a 9 percent drop in new car production. Raw steel production rose 7 percent and coal production was up 2 percent. Interest in precious metals surged and U.S. gold mining was up 30 percent to 150 t (4.9 million oz). The gold price in 1987 averaged \$14.3/g (\$446/oz), up from \$11.8/g (\$368/oz) in 1986.

This modest 1987 recovery in the U.S. mining industry permitted increases in exploration expenditures, and favorable market conditions allowed the gains to be sustained through 1988. *Mining Engineering's* 1988 An-

**SME presidents 1985-1989 — from left to right: Thomas V. Falkie, A. Tobey Yu, Bruce A. Kennedy, Haydn H. Murray and Robert E. Murray.**



nual Review pointed out that “despite the October 1987 worldwide stock market crash, by nearly all measures the performance of the U.S. minerals industry was strong. The weak U.S. dollar the strong growth in worldwide capital spending increased U.S. exports.”

At the 1987 SME Annual Meeting in Denver, CO, Bruce Kennedy, Asamera Minerals, assumed the duties of president of SME. Kennedy said, “There is no doubt the U.S. mining industry is shrinking in size, and I believe it will shrink further still. SME must push forward with its goal to increase international involvement from the Society.”

Because the U.S. mining industry was shrinking, SME’s membership in 1987 sunk to about 23,765, and by 1989, membership was about 20,054, a loss of 20 percent throughout the decade.

In 1988, the U.S. economy resumed its steady growth. The value of metals produced from U.S. ores rose 40 percent to \$10 billion, and the value of industrial metals rose 6 percent to \$20 billion. Increasing economic activity finally stimulated prices of most metals. U.S. coal production rose 5 percent to 870 Mt (960 million st). In 1988, gold production was up 33 percent to 205 t (6.6 million oz).

At the 1988 SME Annual Meeting in Phoenix, AZ, SME President Haydn Murray echoed the optimism that was building in the mining industry. Murray said, “With gold leading the way, the metals are in a growth mode. Copper and lead prices are on the rise and one can feel again an optimism in the metals sector of the mining industry.” In addition, he pointed out that coal production

continues to increase. Murray warned, however, that the minerals industry faces some big challenges in the next few years. “Among other things, we need to overcome high labor and environmental costs,” he said. We can do this by “developing innovative and improved mining and processing techniques,” he said.

Robert Murray became the 1989 SME president at the 1989 SME Annual Meeting in Las Vegas. Murray noted that, in the world marketplace, the “U.S. is less competitive with foreign commodities and goods.” Murray blamed “overregulation and overtaxation, federal deficit spending and lack of corporate loyalty by many businesses for their employees” for much of the problems facing the mining industry.

Worldwide economic growth and capital spending led to tight metal markets in 1989. The U.S. economy grew steadily, and the value of metals produced from U.S. ores rose 14 percent to \$11.6 billion in 1989. In 1989, gold production was up 19 percent to 233 t (7.5 million oz). Because of the economic growth, the U.S. unemployment rate dropped to 5.3 percent.

The SME Annual Review for 1989 (*Mining Engineering*, May 1990) summed up the decade for the mining industry by stating the following: “The U.S. mining industry finished the traumatic 1980s with strong economic performance. The U.S. mining companies that survived the decade had weathered economic changes that, at one point, reduced industry employment by 40 percent, drove oil companies to divest or liquidate mineral companies and led to substantial write-offs of reserves.” ■

## The 1990s — politics and the environment

At the beginning of the 1990s, Communism fell and signaled the end of the Cold War. The world rejoiced but also watched and waited to see how those countries would restructure themselves.

The 1990 SME Annual Meeting was held at the Salt Palace Center in Salt Lake City, UT. The keynote session featured Alistair Frame, chairman of RTZ; Paul Queneau, professor of metallurgy at the University of Utah; and TS Ary, director of the U.S. Bureau of Mines. The SME Board of Directors voted to hire a Manager of Public Information and Education to be the GEM Program coordinator. This person was to collect and disseminate information that could be used by individual members and Local

Sections to interface with government personnel and the general public.

Roshan Bhappu, president of Mountain States R&D International, became 1990 SME President. He was optimistic in his March interview with *Mining Engineering* managing editor, Tim O’Neil. “The world mining industry is in a relatively healthy state, with higher than expected metal prices and production often at full capacity,” Bhappu said. “There is considerable optimism that this favorable state of affairs will continue at least for the next two or three years.”

Georgene Renner,  
Senior Editor