Nuclear Power Update

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In the early 1970s, the mining world was on the verge of a second wave of a uranium exploration and production. The first wave occurred in the 1950s and centered on the military applications of the metal. The second wave, this time for the generation of electricity, saw annual U.S. production increase to 43 million pounds (Mlb) of U₃O₈ in response to the euphoria about this new form of energy—euphoria driven by the Organization of the Petroleum Exporting Countries (OPEC)-induced oil “shortages” (Cameco).†

By 1979, prices for uranium hit in excess of $40/lb on “perceived” scarcity and predictions that it was headed to $100 or more. Early in the 1980s, this second wave crashed on the disappointment of Three Mile Island, sagging electricity demand growth, and reduced expectations for the industry.

The large inventories of uranium amassed in anticipation of 1,000 nuclear plants were liquidated and prices declined for the next two decades, hitting a low of about $7/lb. The United States shut down its uranium production industry, decommissioning and reclaiming 22 of 26 mills and some 300 mines (DOE).

We are now in the third wave, with exploration expenditures and newly formed junior mining companies increasing at an almost exponential rate. Once again, prices are rising and, once again, U.S. and foreign production of uranium is increasing.

It may be too early to tell with absolute confidence if the new wave will be any different, but contrasted with five years ago, we see governments and opinion leaders all over the world rediscovering the environmental, energy security, and cost benefits that nuclear energy has delivered and promised to deliver to mankind.

As of April 2006, a total of 441 nuclear power plants are operating in 30 countries around the world, supplying 16 percent of the world’s electricity (Fig. 1). Twenty-seven new nuclear plants are under construction in 13 countries (Fig. 2).

Nuclear energy is our nation’s largest source of emission-free electricity and our second largest source of power. Currently, there are 103 commercial nuclear power plants producing electricity in the United States, located at 64 sites in 31 states, and they supply about 20 percent of the electricity produced in the United States (Fig. 3). They are, on average, 24 years old and are licensed to operate for 40 years with an option to renew for an additional 20 years.

Nuclear energy contributes to national energy security as an integral part of the U.S. energy mix and is a secure energy source that the nation can depend on. Unlike some other energy sources, nuclear energy is not subject to unreliable weather and unpredictable cost fluctuations.
New This Year...

The Society is implementing association management software to enable more customized and cost-effective delivery of benefits to members. SEG members will soon receive information on how to pay dues for 2007. To save administrative costs, we encourage you to pay your dues on-line at http://dues.segweb.org.

- A membership renewal form may also be downloaded from this site.
- Please remember to update your Member Profile.

The success of this initiative will be greatly influenced by your cooperation.

Thank you for helping us to serve you better!

On-line Membership Renewal and Dues Payment

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The proposal to induct R.A.F. Penrose came from a member of the Geological Society of America, perhaps not surprising since GSA benefited significantly from the Penrose estate and has honored their benefactor with both a Penrose Medal and Penrose Conference. Interestingly, the SEG was first to award its Penrose Medal in 1924, followed three years later by the GSA, but both chose the same inaugural recipient in Thomas Chrowder Chamberlin, who was interested mainly in glacial geology. Penrose was interested mainly in glacial geology and the origin of the Earth. In 1927, he became President of the GSA. Although an economic geologist by training and profession, Penrose clearly had wide-ranging interests within the earth sciences. This breadth of interest was shared by many of his peers in the Society and accounts for the close relationship between SEG and GSA, as well as SEG and AIME (then the American Institute of Mining and Metallurgical Engineers). In tracing the development of the SEG over nearly a century, one sees that the overall growth of the organization can be largely attributed to individuals who were fervent about the aims and objectives of the Society. This “directed growth” has manifested itself in more recent years through major events such as the merger of the Economic Geology Publishing Company with the SEG and the construction of the headquarters building in Littleton, Colorado. While membership of the Society has grown to over 4,000 in 87 countries, we see a decline in the number of university departments with economic geology programs, fewer mentorship opportunities for young professionals, and an increasing number of independently employed economic geologists. These trends provide the Society with the opportunity to better fill the educational needs of professionals and students alike.

Against this background, I am pleased to draw your attention to John Dow’s Presidential Perspective on p. 5, in which he announces the development of the lower level of the SEG building into an educational/conference facility. Our charge is to deliver educational programs to all members and to continue to make the SEG relevant to everyone with an interest in economic geology, much as R.A.F. Penrose and 142 charter members of the Society envisioned 86 years ago.

Northwest Mining Association Meeting (NWMA)
SEG SESSION

Wednesday morning, December 6, 2006
Morning Session: 8:00 am – 11:15 am

Topic Area: Mineral Deposits, Geology & Exploration

Session Chair: Tommy B. Thompson (SEG Fellow 1976), Director, CREG, Mackay School of Earth Sciences and Engineering, Reno, NV
Stuart F. Simmons (SEG Fellow 1985), will present his talk on "The Geological Attributes of Epithermal Vein Deposits Relevant to Exploration in the Western USA and Mexico".

Session Description: In continuing a strong tradition of providing excellence in technical programming, Tommy Thompson will chair the SEG session and kick off the geologic program for the 2006 conference. The revitalization of the industry has sparked resurgence in metals and deposit model interest across the globe, and the SEG session will showcase some of the gems that have emerged from this boom.
In this Presidential Perspective I want to highlight some additional messages coming out of the Society’s Keystone Conference held in May this year.

Keystone brought together more than 100 graduate students from around the world along with a number of mining and exploration companies eager to meet and get to know them better. The conference provided a forum for students to articulate the career issues of greatest concern to them. The students produced a White Paper which summarized a number of ways SEG can improve the service provided to student members and to enhance the relationships between earth science students and the industry which will eventually employ many of them. The student White Paper, compiled by Dave Broughton, appears on page 21 of this Newsletter.

What was most surprising to me was the relative lack of knowledge of current SEG programs and research grants by the current generation of graduate students. The Society has 45 student chapters around the world and we award generous research grants each year. Yet we need to improve the ways we communicate these programs and particularly SEG Foundation opportunities to earth science students because at the moment the messages do not seem to be getting through. Most of the student delegates made it to Keystone without being aware of much of this activity. It is time to expand the activities of the Student Affairs Committee to better engage the current generation of students. I also believe that SEG leadership should assist student chapters, more than we have been doing, to improve their contact with professional geologists and mining companies in their local areas. My very strong impression is that the students at Keystone see SEG as the professional society most relevant to their needs. We need to ensure we respond strongly to their feedback.

For those who see SEG more as a learned society and not as an organization for industry advocacy and activism, I encourage you to think again. Economic geology education is on the verge of extinction within the United States and Europe despite a booming global demand for metals and minerals. As members know, SEG already has a spectrum of professional programs in place. These include conferences, field trips, visiting lecturers and generous research grants; the framework for providing member services is clearly there. However, it is time for this Society to take a more active leadership role in promoting our profession aggressively to new generations of students.

For me there were some other important outcomes from Keystone. One was a reminder of the importance of having some kind of plenary session whenever the Society convenes major meetings of its members. Because we are spread so broadly round the world we have few formal opportunities as a Society to discuss current issues and concerns of members. The wrap-up session at Keystone provided an excellent summary of conference highlights and take-home messages as well as valuable guidance to the Society as to where its leadership effort should be applied.

Another important outcome was the challenge to each conference attendee to go home committed to doing something personally to improve the relationships between economic geologists in academia and industry. For an employer, this could be a commitment to spend more time with your local SEG student chapter, to take on summer interns next year, or to encourage your exploration and mine geologists to join SEG and pay their annual dues. For an academic, this could be a commitment to invite local mining and exploration companies to get more involved in your student activities, to encourage your students to get vacation experience in the mining industry, or to invite guest lecturers on topics such as mineral economics or social license. Individual SEG members could agitate within our own organization to see some of these changes implemented.

Finally, I am delighted with the enthusiastic support from the Society’s Executive Committee and Foundation trustees for the plan to build a new education center in the lower floor of the SEG headquarters building in Littleton. When this headquarters building was initially constructed with funding from an anonymous donor, the lower level was not fitted out. But it was always intended that the space would eventually be used to promote ongoing professional development activities for Society members. Construction is now underway to complete a lecture theater, separate seminar rooms, and state-of-the-art audiovisual facilities by March 2007. This facility will be used to deliver short courses and other programs in economic geology to support the continuing professional development of earth scientists around the world. Courses can either be delivered live or webcasted to remote participants. Delivery of such courses was another action item to come out of the Keystone conference.

There has been considerable interest in this facility from other societies in the Denver area so it is likely this new center can become a focal point for meetings of the geological community in Colorado.

This last year has been a challenging period for SEG as we manage the professional issues of an industry transitioning from a recent down-cycle to a period which promises robust growth. There are exciting times ahead and we must be ready for them.
CLOSING IN ON ANOTHER BANNER YEAR!

The SEG Foundation is closing in on what promises to be another banner year. This column is being prepared toward the end of the third quarter 2006, but readers will be seeing it early in the fourth quarter. It may be a bit premature to discuss results for the year, but a progress report is certainly in order. Following are a few of the highlights through the first three-quarters of the year.

Contributions and Fund-Raising. SEG Foundation contributions received through August 31 total $122,126, and have already surpassed the 2005 total of $96,344. The goal of the SEGF Fund Raising Committee is to reach $150,000 by year-end. To carry out its mission, the Foundation depends on the strong financial support of SEG members and industry partners. The importance of contributions is illustrated in the accompanying table, which summarizes all contributions to the Society and the Foundation, including the SEG Canada Foundation, from 2003 through August 31, 2006.

As can be seen from the table, the Foundation and the Society, especially, have enjoyed very generous corporate support. For the Society, corporate contributions far outweigh individual contributions. The 100th Anniversary Economic Geology volume and the SEG 2006 Conference were supported entirely by corporate contributions. The Foundation actively participated in the fund raising campaigns for both projects. For the Foundation, however, individual contributions significantly exceed corporate contributions, in large part because of the extraordinary generosity of three individuals (“Anonymous Member,” and Messrs Fipke and Blusson).

The Foundation’s investment portfolio is also an important source of funds, and contributions are a significant component of its growth. At August 31, the market value of the Foundation’s investment portfolio was $4.78 million compared with $4.63 million at year-end 2005. Contributions to the Foundation plus income from its investment portfolio have allowed the Foundation to consistently increase its year-over-year support of “worthwhile projects in economic geology.”

Student Programs. The SEGF Student Research Grants program is now in its tenth year and has grown every year since its inception. This year the program was budgeted at $150,000 and a total of $128,245 was awarded—excluding US$14,645 awarded by the C. Fipke and S. Blusson Student Research Grants program. The Foundation expects to provide over $400,000 for student programs in 2007. The Student Research Grants program is the flagship of the Foundation’s student programs and has grown far beyond original expectations.

As reported and described in the July 2006 issue (p. 20–21) of the SEG Newsletter, the Foundation is establishing two new student programs: the SEGF Graduate Student Fellowship program and the SEGF Student Field Trip program. The Foundation expects to announce the first graduate student fellowships early in the second quarter of 2007, for students pursuing graduate studies in September 2007. Individual fellowships will range from $10,000 to $20,000 for a year of graduate study. The Foundation is committing up to $200,000 in seed money for this program, with the expectation that corporate sponsorships will materially expand the program going forward. Detailed information is available at: <http://www.segweb.org/StudentFellowshipAwards.htm>.

At the recent SEG 2006 Conference in Keystone, Borden Putnam proposed that a Student Field Trip Fund be established to provide support for students to visit major mines and mining districts. To make this happen, Borden and others pledged a total of $30,000 to initially fund the program.
Moving quickly on this initiative, the first SEGF Student Field Trip has been organized and will be held January 5–14, 2007. The trip will visit six major porphyry copper deposits in Chile, and will be led by Professors William Chávez of the New Mexico Institute of Mining and Technology and Erich Petersen of the University of Utah. Bill and Erich are very familiar with Chilean porphyry copper deposits (and other types of deposits as well) and have led numerous, acclaimed student field trips to Chile (and elsewhere). The Foundation will provide funding to cover the bulk of transportation and lodging costs for students so that the personal cost to a student will be relatively inexpensive. The SEGF field trips are open to all SEG student members. Further information is available at the SEGF website: <http://www.segweb.org/???>

For 2007, the Foundation expects to provide over $400,000 for student programs, including the SEGF Student Research Grants program, the two new programs discussed above, and the continuing student programs (including subsidy of student dues and student chapter support). This is an unprecedented level of support, made possible by a financially strong Foundation built almost entirely on generous contributions from SEG members and industry partners. The Foundation, and the students who benefit, are indeed grateful for this strong support. Your continuing support is greatly appreciated—and essential!
ELECTRICITY PRODUCTION


Countries generating the largest percentage of their electricity from nuclear energy were as follows: France, 78 percent; Lithuania, 72 percent; Slovakia, 55 percent; Belgium 55 percent; Sweden, 52 percent; Ukraine, 51 percent; Bulgaria, 42 percent; Switzerland 40 percent; Armenia, 39 percent; Slovenia, 38 percent; Republic of Korea, 38 percent; Hungry, 34 percent; Germany, 32 percent; Czech Republic, 31 percent; and Japan, 29 percent. In total, 16 countries relied on nuclear energy to supply at least one-quarter of their total electricity (NEI).

Power plant reliability is measured by capacity factor—the percentage of electricity actually produced compared to the total potential electricity that the plant is capable of producing. The average capacity factor for U.S. nuclear plants was 89.7 percent in 2005, compared to coal at 70.8 percent, natural gas at a range of 16.6 to 38.2 percent (depending on the kind of plant), heavy oil steam turbine at 26.2 percent, hydro at 29.6 percent, wind at 32.1 percent, solar at 22.4 percent, and geothermal at 73.4 percent (NEI).

Economic efficiency is the most important measure because it indicates how a plant uses scarce resources and what the value of those resources is. Economic efficiency is measured using production cost. Production cost is the cost of operating the plant—including fuel, labor, materials, and services—to produce 1 kWh of electricity. Nuclear power has the lowest production cost of the major sources of “baseload” electricity, with production cost of 1.68 cents/kWh. Coal has a cost of 1.9 cents/kWh, natural gas, 5.87 cents/kWh; and petroleum, 5.39 cents/kWh. Production costs of non-“baseload” energy sources are hydro, 0.5 cents/kWh; wind, 0.2 cents/kWh; and solar, 2.48 cents/kWh (NEI).

Over the past 15 years, even though no new nuclear reactors have been brought on line or added to the U.S. electricity grid, the total amount of electricity produced by U.S. nuclear plants has increased by 35.5 percent (NEI). This increase has been the result of higher capacity factors and is equivalent to having added 26 new 1,000-megawatt power plants to the national grid (Fig. 4). An increased capacity factor (the percentage of time that a reactor is operated at its full capacity) results in an increase in the production of electricity by nuclear plants.

FIGURE 2. A report of nuclear plants that are currently under construction.

FIGURE 3. Nuclear power plants operating in the United States.
drive up the cost of electricity produced requirements. Strict clean air standards and clean air regulations provide valuable protection against tighter environmental advantages in the long run. Although renewable energy sources are likely to take an increasing share of incremental electricity supply in many markets (whether for government subsidies or consumer choice), it is likely that new nuclear plants can be competitive with other generation technologies and offer the most economical way to generate baseload electricity—even without consideration of the geopolitical and environmental advantages. (WNA).

There have been several studies which assess the relative costs of generating electricity by new plants using different technologies by producing levelized cost comparisons. The various key parameters for new nuclear plants are well understood. In particular, capital costs and also the period of construction must be kept as low as possible and financing secured at reasonable rates. Where this is achieved, it is clear that new nuclear plants can be competitive with other generation technologies and provide better predictability of low cost power prices for their operations in the long run.

**INDUSTRIAL SAFETY**

For years, America’s commercial nuclear energy industry has ranked among the safest places to work in the United States. In 2005, nuclear’s industrial safety accident rate—which tracks the number of accidents that result in lost work time, restricted work or fatalities—was 0.24 per 200,000 worker-hours. U.S. Bureau of Labor statistics show that it is safer to work at a nuclear power plant than in the manufacturing sector, which an accident rate of 1.6, or even in real estate, at 1.2, and finance industries, 0.5. (USBLs)

Even if you lived right next door to a nuclear power plant, you would still receive less radiation each year than you would receive in just one round-trip flight from New York to Los Angeles. You would have to live near a nuclear power plant for over 2,000 years to get the same amount of radiation exposure that you get from a single diagnostic medical X-ray (NEI).

**ENVIRONMENTAL PROTECTION**

Critics may assert that uranium mines inevitably pollute the environment and the effects of Chernobyl and

**CAPITAL COSTS**

Construction costs of nuclear plants during the 1980s and 1990s in the United States were high compared to what the industry believes is possible today. Regulatory delays, redesign requirements, retrofitting, and difficulties in construction management and quality control inflated costs. Many plants were also completed at a time of high inflation, which dramatically compounded the impact of delays.

Because nuclear plants have relatively high capital costs but low marginal operating costs, they operate most economically at very high load factors while meeting the demand for baseload electricity. The justification for nuclear energy is now sound, based on economics alone. Nuclear power has always been characterized by a combination of higher construction and lower operating costs as compared to fossil energy. The key development in the “new economics” of nuclear power is that, both costs considered, nuclear power has now become less expensive than fossil and any other form of electric energy generation. A new report from the World Nuclear Association (WNA)。“The New Economics of Nuclear Power,” concludes, “new nuclear power plants offer the most economical way to generate baseload electricity—even without consideration of the geopolitical and environmental advantages.”

On a worldwide basis, reactors are now operated more efficiently than ever. Capacity factors have increased in the United States to over 90 percent (in 2004), with a similar trend occurring throughout the rest of the world (NEI).

Nuclear power plants have achieved increasingly higher capacity factors with the same or greater levels of safety. The average capacity factor for the U.S. plants in operation in 1980 was 56.3 percent; in 1990, 66 percent; and in 2005, 89.6 percent (NEI).

But nuclear power plants also have other, unique advantages.

First, the cost of electricity from a nuclear power plant is stable and predictable. The cost does not fluctuate over time. In contrast, power plants fueled by natural gas are extremely sensitive to changes in natural gas prices, because fuel represents approximately 90 percent of the cost of the electricity they produce. Since 2001, for example, the price of natural gas has doubled. This has increased the price of electricity from gas-fired power plants dramatically. Nuclear power plants do not suffer from that kind of price volatility, which is extremely painful to consumers, large and small.

Second, nuclear power plants do not produce air pollution. Because they are emission-free, nuclear power plants provide valuable protection against tighter environmental standards and clean air requirements. Strict clean air standards drive up the cost of electricity produced from coal-, gas- or oil-fired power plants. In some cases, environmental requirements may make it impossible to increase output from existing fossil-fueled capacity, or to build new plants that burn fossil fuels.

**FIGURE 4.** Increase in U.S. nuclear plant output over the last 15 years.

Equivalent to 26 new 1,000-megawatt power plants

*Increase in U.S. Nuclear Plant Output (1990-2005)*

Source: Global Energy Decisions / Energy Information Administration

*Year: 1990, 576.9; 2005, 782.0*
Three Mile Island make the use of nuclear energy impractical. Uranium mining is highly regulated, must have environmental approvals prior to commencing, and must comply with all environmental, safety, and occupational health conditions applicable, with external audits. Increasingly, these are governed by international standards. The International Organization for Standardization (ISO), based in Geneva, has developed a number of world standards for quality management and for environmental management (ISO).

The nuclear industry has an excellent safety record, with some 12,000 reactor years of operation spanning five decades. The Chernobyl disaster was the result of faulty Soviet design and not applicable to western reactors, or any reactor that might be built today. There has been much confusion about the real consequences of the accident, including implications for health, the environment, nuclear safety, society, and the economies of countries affected by the accident. According to the most authoritative material available on the matter, a UN study, the Chernobyl death toll is 56 (United Nations Scientific Committee on the effects of Atomic Radiation “NSCEAR” (http://wwwUNSCEARorg/unscear/en/chernobyl.html)). While devastating, it was certainly far less than other industrial accidents such as an airplane accident or even a natural disaster.

With respect to Three Mile Island, there were no deaths and no injuries or detectable health impacts from the accident beyond the initial stress-related effects. Applying the accident’s lessons resulted in important and continuing improvement in the performance of all nuclear power plants.

Of all energy sources, nuclear energy has perhaps the lowest impact on the environment, especially in relation to kilowatts produced, because nuclear plants do not emit harmful gases, require a relatively small area, and effectively mitigate other impacts. In other words, nuclear energy is the most “eco-efficient” of all energy sources because it produces the most electricity in relation to its minimal environmental impact (NEI). There are no significant adverse effects to water, land, habitat, species, and air resources. Water discharged from a nuclear power plant contains no harmful pollutants and meets regulatory standards for temperature designed to protect aquatic life.

Nuclear energy is an emission-free energy source because it does not burn anything to produce electricity. Nuclear power plants produce no gases such as nitrogen oxide or sulfur dioxide that could threaten our atmosphere by causing ground-level ozone formation, smog, and acid rain. Nor does nuclear energy produce carbon dioxide or other greenhouse gases suspected of causing global warming.

Throughout the nuclear fuel cycle, the small volume of waste by-products actually created is carefully contained, packaged, and safely stored.

Furthermore, leading environmentalists, including the co-founder of Greenpeace and the former chairman of Friends of the Earth, have endorsed nuclear energy as the only large-scale, non-emitting, affordable energy source that can address both global warming and sustainable development (WNA and NEI).

**SPENT FUEL DISPOSAL**

Used nuclear fuel looks and feels the same as when it was new; it is a hard ceramic pellet about the size of the tip of a little finger. Used, it is simply too weak to power a nuclear reactor economically. It is less fissionable, that is, less capable of undergoing a nuclear chain reaction. But it is also more radioactive. The fuel rods—metal tubes in which the pellets are inserted when they are manufactured—help to contain this radiation. The rods are grouped into bundles to create fuel assemblies, which are loaded into the reactor.

Used nuclear fuel cannot explode and does not burn. Uranium mined from the ground is less than 1 percent fissionable and must be enriched to 4 percent in order to be used in a nuclear reactor. The uranium would have to be 90 percent enriched to be used as a weapon (WNA and NEI). Also, nuclear fuel does not burn when used in a nuclear reactor. In fact, it is not flammable.

The environmental policies and practices at nuclear power plants are unique in having successfully prevented significant harmful impacts on the environment since the start of the commercial nuclear industry more than 40 years ago. As a result, the nuclear energy industry is the only industry established since the industrial revolution that has managed and accounted for virtually all of its by-product material. By reducing, eliminating, or managing their waste, nuclear facilities have prevented or lessened adverse impacts on water, land, habitat, species, and air from releases or emissions in the production of electricity. Throughout the nuclear fuel cycle, the small volumes of nuclear by-products actually created are carefully contained, packaged, and safely stored. As a result of improved process efficiencies, the average volume of waste generated at nuclear power plants has decreased significantly in the past two decades.

The long-term sustainability of nuclear energy is dependent on resolving the issue of disposing of spent fuel. If all of the spent fuel produced from all of America’s commercial nuclear power plants since the first plant started operating nearly 40 years ago were to be collected, the total quantity would fit on a single football field 15 feet deep (Fig. 5).

A single 1,000-megawatt nuclear reactor (which produces enough energy to support a city of about a half-million people) produces only about 20 tons of spent fuel per year. Because of its high density, this quantity of spent fuel (20 tons) has about the same volume as a standard midsize automobile (NEI).

By law, spent fuel from domestic nuclear power plants and the plutonium in the fuel has always belonged to the U.S. government. In the 1960s and 1970s, utilities expected to be able to send the spent fuel to a reprocessing facility after about 1.5 to 2 years storage in the cooling pools onsite. President Carter restricted this option because of concern about plutonium proliferation. As a result, in the 1980s utilities were forced to expand the storage space onsite by “re-racking” their storage racks in the storage pools. Subsequently, in the 1990s, a number of plants started using large, metal, spent fuel storage casks onsite (NEI).

In 1982, Congress charged the Department of Energy (DOE) to start accepting spent fuel for long-term storage beginning January 31, 1998. To pay for a permanent repository, an
interim storage facility, and the trans-
portation of used fuel the Nuclear Waste
Policy Act established the Nuclear Waste
Fund. This law required the utilities to
collect a fee for the government. Through-
out the various government administra-
tions since that time, DOE has con-
tinued to move back the projected date
when they can accept spent fuel. Since
1982, electricity consumers have paid
into the fund a fee of one-tenth of a
cent for every nuclear-generated kilo-
watt-hour of electricity consumed (WNA,
NEI, DOE). Through 2004, customer
commitments plus interest totaled more
than $24 billion. At the same time, DOE
has been spending the “waste fund”
money for purposes not directly related
to spent fuel storage. As a result, a
number of utilities successfully sued
DOE to require them to take the spent
fuel as a contractual obligation.

In the 1990s, the utilities realized
that DOE would be unable to meet their
needs with re-racking and onsite stor-
age. Some of these utilities have initi-
ated private projects with Indian commu-
nities, as sovereign entities, to allow
interim storage until the DOE waste
repository is available.

Federal legislation mandates a cen-
tralized geologic repository. The Nuclear
amendments require or authorize the
U.S. Department of Energy to do the fol-
lowing: (1) locate, build, and operate a
deep, mined geologic repository for
high-level waste; (2) locate, build, and
operate a “monitored retrievable stor-
age” facility; and (3) develop a trans-
portation system that safely links U.S.
nuclear power plants, the interim stor-
age facility, and the permanent reposi-
tory.

Congress approved and the President
signed into law the Yucca Mountain
Development Act (House Joint
Resolution 87, Public Law 107-200),
which completed the site selection pro-
cess mandated by the Nuclear Waste
Policy Act and approved the develop-
ment of a repository at Yucca
Mountain. The continued delays by the
government in establishing the perma-
nent repository means that nuclear
plants must store more used fuel than
expected and longer than originally
intended. By 2010, the earliest opening
date for a repository, 78 plants will
have no room left in their used fuel
pools (NEI).

GOVERNMENTAL SUPPORT

Comprehensive energy legislation
passed last year in the United States
that provides the incentives and fund-
ing for nuclear energy programs and
new plants; it is now up to the industry
to advance these efforts. President
Bush’s American Competitiveness
Initiative is in response to the work-
force dilemma. The program introduced
this year commits more than $136 bil-
lion over 10 years to increase invest-
ments in research and development,
strengthen education, and encourage
entrepreneurship and innovation
(WNA, NEI).

Another bill would create an
Advanced Research Projects Agency-
Energy within DOE to reduce America’s
dependency on foreign energy by 20
percent during the next 10 years. The
third bill authorizes 10 percent
increases annually at principal federal
agencies supporting science, math, and
engineering research.

The Energy Policy Act of 2005 rein-
states and extended the Price-Anderson
Act for another 20 years—the longest
extension Congress has ever granted.
The Price-Anderson Act provides no-
fault insurance to benefit the public
in the event of a nuclear power plant
accident.

There is a greater opportunity today
for expanded nuclear power than there
has been in the past 20 years.
Congressional leaders have expressed
the opinion that the nuclear energy
industry is at a special time in view of
the support by leaders who know we
have an energy problem (NEI, WNA).

These same governmental leaders have
stated that the United States is unlikely
to build natural gas, biomass, coal,
wind, solar, or hydropower facilities for
various reasons, ranging from high
costs to supply shortages and environ-
mental considerations. This is prime
time for nuclear power. Congress under-
stands that the renewal of nuclear
power is critical to our economic and
national security.

Among the challenges are staying
the course on new construction, contin-
uing fiscal responsibility in spending
research, and development of resources
(In its fiscal 2007 budget request, the
Department of Energy seeks an 18% increase in nuclear research and devel-
opment), and addressing the industry’s
human resources needs (the nuclear
energy industry’s average worker age is
at about 50 years old [DOE, NEI]).
Another challenge is a viable course on
waste disposal. Completion of the re-
pository is a strong objective.

WEAPONS DISPOSAL

Since March 1993, 250 metric tons (t)
of uranium from weapons have been
transformed into fuel for nuclear
power plants (USEC). That’s the equiv-
alent of 10,000 dismantled nuclear
weapons. This is the result of the
United States and the Russian
Federation signing an agreement on
the disposition and purchase of 500 t
of highly enriched uranium from dis-
mantled Russian nuclear weapons, the
equivalent of 20,000
nuclear warheads.
MARKET DEVELOPMENTS

Although the spot uranium price has nearly doubled since this time last year, worldwide uranium output has exhibited only a small increase.

What is obvious is that even though the spot price for uranium has quadrupled since mid-2003, when it was only $10.90/lb, the uranium production sector has been caught in an unfortunate situation in which it is attempting to play catch-up with growing reactor requirements after years of low-priced inventories left most producers struggling to survive and unable to invest in new exploration and production (UxC, TTech, Cameco).

World uranium production increased to over 108 Mlb in 2005, up 3 percent from 105 Mlb in 2004 (Fig. 6). This level of output is far shy of estimated world uranium requirements of about 175 Mlb for 2005 (WNA, NEI).

For more than 20 years, demand (i.e., consumption) has exceeded primary supply. This trend makes it imperative to find new sources of primary supply.

The fundamental economic principles of the uranium mining industry are the same as for any other commodity: excess supply leads to lower prices, which in turn leads to decreased production; shortages lead to higher prices, which then lead to increased production. The one major difference in the uranium mining industry, however, is that lead times are significantly longer than for other commodities: demand changes extremely slowly and it takes years, not months, to bring on new sources of supply (Cameco).

In 2005, two countries—Canada and Australia—accounted for 51 percent of world production, while six countries accounted for 83 percent of world production (Fig. 7). The United States (which is the world’s largest consumer of uranium at approx. 56 Mlb per year) produced only 2.7 Mlb in 2005. U.S. demand accounts for one-third of total world demand.

At present, uranium consumption far exceeds production. In fact, supply from mines accounts for about 60 percent of consumption, with the remainder coming from secondary sources (NEI, WNA, UxC, INI) (Fig. 8).

The “gap” between primary production and demand has been made up from these so-called “secondary” sources: excess inventories, including U.S. government inventories held by the Department of Energy; depleted uranium “tails”; reprocessed uranium; mixed oxide fuel; and high-enriched uranium (HEU) that is extracted from nuclear weapons and “down-blended” to a concentration that is suitable for use a commercial reactor.

This last source of secondary supply (downblended HEU) now plays a major role in meeting current demand. Under the terms of the so-called “Megatons to Megawatts” or “HEU Agreement” between Russia and the United States signed in 1993, Russia agreed to dismantle approximately 20,000 nuclear warheads and extract the high-enriched uranium contained in these missiles. The downblended from the dismantled Soviet nuclear warheads now supplies at least 30 percent of total U.S. demand for uranium and 40 percent of U.S. demand for enrichment (Cameco, USEC, NEI). More importantly, the HEU Agreement has, to date, resulted in the removal of over 10,000 nuclear warheads from Russia’s stockpile and generated approximately $5 billion that has been used for environmental clean-up and improving security at Russian nuclear facilities. The HEU Agreement expires in 2013 and may not be renewed (Cameco, UxC, NEI).
Annual uranium consumption is fairly predictable at about 176 Mlb, with an expected growth rate of about 2 percent per year (Cameco, UxC). Supply, on the other hand, is less predictable and is divided here into three categories: (1) existing primary mine production, (2) secondary sources—from military materials, excess inventories, and recycled product, and (3) required new supply—to be filled in part by projects currently under development, including Cameco’s Cigar Lake and Inkai projects, Paladin’s Langer Heinrich mine, and BHP Billiton’s possible expansion of Olympic Dam operations.

There is no doubt that additional new production will be required, and while there are properties identified to potentially fill the gap, the major unanswered questions are as follows: (1) What is the price required to bring these properties into production, and (2) What is the timing by which that production could be supplied to the market?

The spot price for uranium was first published in August of 1968 (Fig. 9). At that time, the price was $6/lb; over the next decade, the price rose to an all-time high of over $43 in the late 1970s. Beginning in 1978, the price began a steep decline and for the 20-year period 1983 to 2003, remaining below $20/lb U₃O₈. The price bottomed out in December 2000, when it dropped to $7.10/lb U₃O₈. Today’s current spot market price is $52/lb U₃O₈ (as of September 7, 2006). (UxC, TTech)

Although the current spot market price of uranium may seem high, in inflation-adjusted dollars the price is still far below the prices seen in the late 1970s and early 1980s (Fig. 10). In today’s dollars the spot price for uranium would exceed $100/lb to equal the uranium prices of the late 1970s. Higher prices have led to increased expenditures for uranium exploration and a modest increase in production, but recovery of the industry will require sustained higher prices.

OUTLOOK FOR NUCLEAR ENERGY

The outlook for the U.S. nuclear power industry, both short- and long-term, continues to improve. The last decade has seen steady improvements in safety, reliability, and output from the fleet of 103 operating nuclear units in the United States; continuing progress in the government’s program to build a permanent disposal facility for spent nuclear fuel, and major progress toward construction of new nuclear power plants.

The International Atomic Energy Agency has significantly increased its projection of world nuclear-generating capacity. It now anticipates at least 60 new plants will be constructed in the next 15 years, making 430 GWe in place by 2020—130 GWe more than projected in 2000 and 17 percent more than in 2005. The change is based on specific plans and actions in a number of countries, including China, India, Russia, Finland, and France, coupled with the changed outlook owing to the Kyoto Protocol. This would give nuclear power a 17 percent share in electricity production in 2020. The fastest growth is in Asia.

The industry has also benefited from consolidation. Ownership and operating responsibility has shifted to large generating companies with nuclear power as their core business. The 10 largest nuclear operating companies in the United States now operate 70 of the 103 operating nuclear reactors.

Most U.S. nuclear power plants are well positioned for competition. Measured by total going-forward costs—operating and maintenance costs, fuel costs, ongoing capital requirements, taxes, and general and administrative expenses—most nuclear units can compete in a deregulated, competitive electricity market.
Cost is not, however, the sole determinant of whether a nuclear unit will be able to compete. Other factors can have a significant effect on the market value of a nuclear plant including whether there is a surplus generation capacity in a region and, if there is, how long is that surplus expected to last; whether there are clean air constraints that will drive up the cost of increasing electricity production from existing coal-, gas-, or oil-fired capacity or building new plants that burn fossil fuels, and whether there are transmission constraints into the region that limit the amount of power that can be imported and thus increase the value of in-region generation.

In addition to their value as reliable producers of low-cost bulk electricity, existing nuclear units have substantial additional value because of trends in the fossil fuel markets. The existing nuclear plants represent a valuable hedge against volatility in the natural gas market. Natural gas prices to electric generators have doubled over the last 12 months and returned to previous levels. This price instability has a major impact on the cost of electricity produced by gas-fired power plants. Nuclear units provide a high level of forward price stability, because their operating costs are predictable and stable. This is primarily due to the fact that fuel costs of a nuclear plant make up only a small percentage of operating costs in contract to fossil fuel generation.

What this means is that new uranium deposits must be discovered and developed in time to meet the needs of an expanding industry. The United States consumes about 56 Mb of uranium each year, but produces only 3 Mb (DOE, NEI, WNA, UxCo). So, the United States is currently a net importer and sources a majority of its supplies from geopolitically stable regions like Australia and Canada to meet the domestic gap between supply and demand. Russia supplies about one-third of United States demand. This import dependency wasn’t always the case. The United States actually once led the western world in production.

Uranium is an abundant element, some 40 times more common than silver. In the United States, most production comes from in-situ recovery or ISR operations such as Smith Ranch/Highland in Wyoming, Crow Butte in Nebraska, and Vasquez, Kingsville Dome and Alta Mesa in Texas.

There is great potential for uranium production to further increase from both ISR and conventional deposits, particularly in the western states. The mines might be small by international standards but, collectively, they will be able to contribute significantly to U.S. demand.

There is also great potential for many more discoveries with the current third wave of global uranium exploration. Little exploration has been done for the past two decades. We should remember that during that second wave of exploration mentioned previously, sufficient uranium was discovered in a five-year period to supply the industry for 30 years.

So, there is no shortage of uranium in the world, only a shortage of known economic deposits. It is this new, third exploration cycle that, over the next decade, will find the orebodies required to power the world’s growing reactor fleet. Over 400 new uranium exploration and development companies have been formed during the last few years.
years to explore and develop uranium deposits worldwide. A large amount of money has been raised through private and public stock offerings to fund these companies.

CONCLUSION

So, to conclude, it is abundantly clear that all forms of energy will be required to improve the quality of life for mankind. Nuclear power is an essential part of that mix and will be increasingly integral to America’s and the world’s energy future. With electricity demand growing, the highly volatile price of fossil fuels, concern about the environment, and energy security, the only really practical solution is increased and broader application of nuclear energy.

Electricity produced through nuclear energy is safe, clean, reliable and affordable. Uranium is abundant, but more discoveries are needed to fuel the world’s growing fleet of reactors.

Therein lies the challenge and the opportunity for those of us in the mining industry. With political will, we believe nuclear power can continue to play a key role in America’s energy security in the coming centuries.

Our future—both economically and environmentally—depends on it.

REFERENCES


(TTech) TradeTech, LLC: http://www.uranium.info/


(USEX) United States Enrichment Corporation: http://www.usec.com/

(UxC) Ux Consulting Company LLC: http://www.uxc.com/

The XI Congreso Geológico Chileno was held August 7–11, 2006, at the Universidad Católica del Norte in Antofagasta, Chile. Technical sessions on economic geology occupied a prominent position within the program of the congress, not surprising considering that Antofagasta lies in the heart of the world’s most prolific porphyry copper province. The SEG sponsored two short courses in connection with the Congress and both were very successful.

A pre-congress short course entitled Geología y Geoquímica Ambiental para el Manejo de Desechos Mineros (Geology and Environmental Geochemistry for Mine Waste Management), taught by Bernhard Dold (University of Lausanne, Switzerland) was held from August 4–6. The course reached the limit of its capacity with 30 participants from Chile, Peru, Bolivia, Mexico, and Argentina. An unusual but welcome statistic was that 75% of the participants were female.

The course included classes on the basics of environmental geochemistry as well as on strategies on prevention and environmental reclamation. The complex chemical and microbiological processes within tailings and waste-rock deposits—highly relevant also for supergene copper enrichment, generation of exotic copper mineralization, and other ore-forming processes—were explained with numerous examples from tailings impoundments in Peru and Chile. The course included a field trip, during which the marine shore tailings deposit of Chañaral (Dold, 2006) was visited. At Chañaral, a several-kilometer-wide beach consisting of porphyry copper tailings originating from the Potrerillos and El Salvador mines was accumulated between 1938 and 1975. This site has been considered one of the Pacific’s most polluted beaches by the United Nations Environmental Programme (1983).

REFERENCES
The SEG sponsored a gold deposits workshop as part of the Congreso Geológico de Chile, held in Antofagasta, Chile. Building on previous SEG-sponsored offerings of the course in Russia and China, the workshop took place August 12 and 13 and was attended by almost 100 participants representing exploration professionals, faculty, and, importantly, a large number of graduate students.

Attendees received a workshop volume that provided copies of the graphics presented by the four authors, with talks divided into four half-day sessions. Richard J. Goldfarb opened the workshop by defining and discussing the characteristics of a class of gold systems now called “orogenic gold deposits,” emphasizing their tectonic settings, the timing of mineralization and metamorphism, and the structural nature of this important class of gold deposits. Craig J.R. Hart followed with a detailed description of intrusion-related gold systems, including discussions of intrusion-related ore deposit variations and respective geologic models, and their exploration characteristics.

Steve L. Garwin provided a review and update on disseminated sedimentary rock-hosted gold systems, emphasizing the significant variations in ore deposit styles from a northern Nevada perspective, tempered with examples from around the world. Appropriately, Noel C. White mopped up by giving a detailed background discussion of epithermal gold deposits, giving participants a dose of palatable geochemistry and abundant examples of the variations observed in epithermal systems worldwide, including some examples of modern geothermal systems.

Importantly, besides the presentations, participants enjoyed lively discussions, notably between the authors. This setting allowed professionals, faculty, and students to benefit from the enormous experience of four scientists recognized for their excellence in economic geology, and their collective, if not entertaining, abilities to disseminate information to interested geologists.
SEG International Exchange Lecturer
Douglas Kirwin Visits Japan

Yasushi Watanabe (SEG 1993 F)

SEG International Exchange Lecturer Douglas Kirwin arrived in Japan on June 12. He spoke to students at Hokkaido University on July 18 and at Akihabara Convention Hall in Tokyo on July 20. The latter talks were aimed mainly at geologists working for mining and exploration companies.

The topics Doug presented are as follows:

Hokkaido University
- Hydrothermal Breccias—Textures, Processes, and Mineralization
- The Discovery and Exploration History of the Giant Oyu Tolgoi Porphyry Copper-Gold Deposit

Akihabara Convention Hall, Tokyo
- The Discovery and Exploration History of the Giant Oyu Tolgoi Porphyry Copper-Gold Deposit
- Overpressured Volatiles and Fluids in Intrusion-Hosted Mineral Deposits

Forty attendees were present at the Akihabara Convention Hall, where recent publications from SEG were exhibited. After the lectures, Doug gave a keynote speech at the IMA 2006 Kobe Meeting.

ANATOMY OF A TILTED PORPHYRY Cu BATHOLITH AND ITS HYDROTHERMAL ALTERATION FEATURES, YERINGTON, NEVADA (U.S.A) —

Instructors: John Dilles, Oregon State University Dick Tosdal, MDRU

Full course: March 22–30, 2007

The course revolves around a field trip and mapping exercise at Yerington, Nevada, where Jurassic porphyry Cu, related deposits, and volcanic and plutonic complex are exposed in cross section because of Tertiary extension. The course is an opportunity to enhance skills in detailed field geologic mapping techniques for recording age, structural, and igneous information as well as hydrothermal veining, mineralization, and alteration. Mapping exercises are in porphyry Cu and skarn deposits. A field trip through the Yerington Batholith, volcanic cover rocks, porphyry Cu, and related Na-Ca alteration and Fe oxide-Cu (Au) systems complete the course.

Cost and registration information available at www.mdru.ubc.ca. Contact John Dilles (dillesj@geo.oregonstate.edu) or Dick Tosdal (mdru@eos.ubc.ca) for details. Deadline for registration is March 1, 2007.

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The first International SEG Student Chapter Conference was held in conjunction with the third biennial SEG meeting, Wealth Creation in the Minerals Industry, in Keystone, Colorado, on May 13, 2006. More than 100 students participated in a one-day meeting that included a lunch-time forum discussion on the future of the SEG from a student’s perspective, and how the SEG can enhance its programs for young geologists and better work with SEG student chapters. A summary of the students’ discussions and recommendations to the SEG in moving forward was published in the July SEG Newsletter (p. 34–35). Craig McClung, who is currently completing his Ph.D., was one of the representatives for the student group at the Keystone meeting and contributed to the published report on the Student Chapter Conference. In this column, Craig shares his views on mentoring and the future of the SEG.

During the recent Keystone meeting, it became clear that the future of our industry and the SEG is not located in the first-world countries, but rather in second- and third-world countries. This leads one to ask where the SEG is active and what roles can the SEG play in less developed or emerging countries? Take, for example, the African continent, which contains a large number of world-class ore deposits. However, in contrast to this great mineral wealth and the comparatively large number of geologists active in the field of economic geology, only 92 professional SEG members, or ~3% of the membership, reside in Africa. The vast majority (75 or ~82%) of these members live in South Africa. A comparison of the number of SEG student chapters in second- or third-world countries to those in the first-world countries yields a similar picture. Once again, looking at Africa, there is only one SEG student chapter on the entire continent. The SEG is under-represented in Africa and probably in other developing countries. A similar situation, but to a lesser extent, is true for the continents of Asia and South America.

At the Keystone meeting, I was surprised to learn that although only one Indian student was present, there are only seven professional SEG members in the whole of India. I was also stunned to learn that many of the students who attended the Keystone conference do not have SEG student chapters at their institutions because they do not have enough people to form a chapter, the financial means to support a chapter or, as with our Indian friends, they do not have mentors available to them. Of additional concern is that some students said that their local SEG student chapters are inactive due to a lack of funding or lack of mentoring.

Given the previously unsurpassed growth of the Asian markets, can the SEG afford to let the future of our industry slip through our fingers because the students of today lack access to the Society? I firmly believe that the SEG cannot afford to let this opportunity pass us by and am encouraged to see that I am not alone in this belief. During the first International SEG Student Chapter Conference, the students asked for the creation of a mentoring program. In response to this request, the SEG mentoring committee is currently in the advanced stages of developing a website-based mentoring program proposal that will allow young geologists access to professionals and facilitate the mentoring process.

According to Webster’s Dictionary, a mentor is a “wise and trusted advisor or guide.” In addition to this definition, I would add that the term “mentor” describes someone who is willing to selflessly take a less experienced individual, be it a student or young professional, and introduce them to the intricacies of business, etc. With regard to the future of the SEG, I see a mentor as anyone willing to take a student under his or her wing to counsel, instruct, or advise the student or young professional in the scientific and business aspects of the minerals industry. I also envisage the role of the mentor to include the involvement of the student in the SEG.

I benefited from the mentoring process as an undergraduate student. In those early days I was a young, enthusiastic geology student with a strong interest in ore deposits but no contacts in the business. Fortunately, one individual at the U.S. Geological Survey took a chance on me. He took me under his wing and mentored me until I completed a master’s degree. As a result of this mentoring relationship and other interactions, I have gained a substantial amount of confidence, experience, and knowledge. I have also received numerous opportunities to travel, an introduction to the SEG, and similar geological societies, and gained an understanding as to how science and the minerals business are run. I am fortunate that I continue to be mentored by similar like-minded individuals who help mold and develop my skills and me.

On that note, I am pleased to add my name to the website-based SEG mentoring initiative to offer mentorship to students who seek assistance. I hope that this will help in the continued growth and development of our industry. I firmly believe that it is my duty to not only pass on my knowledge and skills, but to support and encourage the next generation just as the previous generation has done for me. In the words of the astronaut Neil Armstrong, mentoring can be described as “…one small step for man and one giant leap for mankind.” Mentoring may only bring small rewards to the mentor, but the benefits to the industry, society, and the next generation are limitless. To reiterate the words of the student representatives at the SEG Keystone Conference,

“Remember—the students of today are the workforce, the managers, the researchers and the CEO’s of tomorrow!”

Let us join together and show the leaders of tomorrow that we support them, because the students are not only the future of the minerals industry, but also of the SEG!
More than US$150,000 will be available from the SEG Foundation and the SEG Canada Foundation for Student Grants in 2007. These grants provide support for graduate student research projects leading to master’s or doctoral degrees, and for exceptional BS Honors or “BS Título” projects. Individual grants typically range up to US$5,000, although up to $10,000 may be awarded for particularly meritorious projects. Students in mineral resource study programs throughout the world are eligible and encouraged to apply. Application forms may be downloaded from the SEG website:

<http:www.segweb.org/GrantApp07.pdf>

They may be submitted for any one of the awards, but will be considered for all awards. Applications must be postmarked no later than February 1, 2007. Awards will be announced by April 30, 2007.

### Hugh E. McKinstry Fund
$100,000 will be available from this Fund to support “study, research and teaching of the science of economic geology or for related projects,” including field or laboratory research by graduate students or geologists on study-leave from their employment.

### Hickok-Radford Fund
One or two grants ranging up to $10,000 will be awarded to support field-based research and directly related laboratory studies as applied to metallic mineral deposits, with preference given to projects located in Alaska, northern Canada, and other regions north of latitude 60 N, or for projects at very high elevations elsewhere, or at extreme southern latitudes. Applicants must be enrolled in a full-time program of study at a degree-granting university or college. Consideration will be given to an applicant’s record of leadership and extracurricular activities, including athletics.

### Newmont Mining Corporation Grants
$15,000 will be available to support research projects worldwide related to the geology, mineralization, and metallogeny of gold deposits. Emphasis is placed on research with a strong field component, with funds available for directly related laboratory work. Several individual grants of $3,000 to $5,000 each will be made.

### Hugo Dummett Mineral Discovery Fund
Up to $5,000 will be available to support applied economic geology research, including the development of new exploration technology and techniques, and the dissemination of related results through publications, lectures, short courses, workshops, and conferences.

### Alberto Terrones L. Fund
$10,000 will be available to provide financial support to one or two qualifying students from Mexico, Peru, and other Latin American countries to pursue graduate studies leading to a master’s or doctoral degree at universities in the United States or Canada. The grants may be used for tuition costs, university fees, to support thesis research, or for any other bona fide expense directly related to pursuing a graduate study program in applied economic geology or geological engineering while regularly enrolled as a graduate student at an MS or PhD degree-granting university.

### Timothy Nutt Memorial Fund
Grants from this fund will range up to $1,000 to provide financial support for geology students and young economic geologists located in Zimbabwe or in Southern Africa, with ties to Zimbabwe. The fund may be used to support SEG student chapter activities, travel to meetings, field trips, and for research or study grants, technical lectures or any other activities approved by the SEG Regional Vice President for Africa.

### Society of Economic Geologists Canada Foundation Fund
A total of C$50,000 will be available from this fund to support research studies by Canadian or non-Canadian students on mineral deposits or districts in Canada; non-Canadian projects at Canadian universities; non-Canadian students studying at Canadian universities, or Canadian students doing research at foreign universities.

How to Apply: Awards are intended to fund specific expenses related to student research projects leading to the aforementioned degrees or courses of study. The awards are competitive and based primarily on project merit. Applicants must describe what the project is, why the research is important and how it is to be done, and include an appropriate estimate of expenses that will be incurred on the project. Applicants requesting financial support for non-research expenses from the Alberto Terrones L. Fund must include a statement describing the need and purposes of their request. Contact information:

**Chairman**

SEG Student Research Grants

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INTRODUCTION

The first International SEG Student Chapter Conference was held in Keystone, Colorado, on May 13, 2006, immediately prior to SEG 2006 – Wealth Creation in the Minerals Industry. The student chapter conference was a major SEG- and industry-supported initiative that brought together over 100 students from 27 countries to present posters on their research results, meet and mentor with industry, academic, and government economic geologists, and discuss issues affecting them as students, SEG members, and future members of the economic geology profession.

The discussions took place largely during a lunchtime forum focusing on the following suggested topics: workforce, SEG student chapters, SEG student grants, SEG technical content, and ethics. After sharing ideas and responses at individual tables, each student table chose a spokesperson to summarize their discussions for the entire delegation. At the conclusion of the presentation, John Dow made a short speech acknowledging and thanking the students for their ideas and insights, and committed the SEG executive committee to consideration and, where appropriate, implementation of the students’ suggestions.

GENERAL RESPONSE TO THE CONFERENCE

Students overwhelmingly expressed their gratitude toward the SEG and companies that provided unprecedented financial and logistical support in organizing and funding the student conference as well as the opportunity for real student input into future SEG programs and policies. While subsidized student attendance at geological conferences is not uncommon, Keystone clearly set a new standard, and the SEG was strongly commended for its efforts in making the students a focus and providing a forum for their views. The students strongly encouraged the SEG to incorporate similar events into future SEG meetings and more generally to sustain and build upon the momentum generated at Keystone.

With regard to the specific organization of the conference and its mentoring events, several suggestions were made. The large number of student posters made it difficult to visit and discuss each poster with its presenter within the single day allotted. This schedule mainly was conceived to incorporate the poster awards into the Saturday evening dinner. Also, because the majority of the non-student Keystone attendees arrived after the close of the student conference, some students suggested that dedicated poster time slots during the main conference would increase their interaction with other attendees. “Best poster” voting could be postponed until later in the conference.

The Saturday student conference was preceded by a Friday evening icebreaker and mentoring event sponsored by Newmont Corp. This event was highly successful. It provided a...
welcoming and informal social opportunity for students to unwind from their travels, meet their fellow students, and hear both collectively and on an informal, individual basis from a large number of Newmont geologists. The event benefited greatly from its extended, informal time frame which allowed abundant time for all participants to mingle. Newmont successfully showcased itself and its people, and SEG is heartily encouraged to foster similar such events at future conferences.

The student conference was followed by a pre-dinner mentoring event, at which several SEG members related anecdotes of mentors and mentoring benefits in their careers (see Mentoring column, July 2006 SEG Newsletter). Students welcomed the chance to meet and mentor with members of the economic geology profession. They also agreed that real benefits arise when individuals take under their wing a less experienced colleague or student and begin a longer-term process of listening, consultation, sharing of views, and the like. In providing a forum both for highlighting the benefits of mentoring and for initiating such relationships, the SEG underscored the need for this process in a profession where so many future practitioners have been unable to accumulate first-hand industry or field experience with seasoned geologists. The SEG should regularly incorporate mentoring events into its meetings.

**WHITE PAPER DISCUSSION TOPICS**

1. Workforce

The following questions were provided as suggestions for group discussion:

From your perspective, how do SEG and the minerals industry as a whole attract the best students into the field of economic geology? How many of you have worked for the minerals industry or had internships with a mining company? Do you think part-time employment or internships would be attractive to students and help bring more students to economic geology? How might SEG help encourage companies to hire more students as part-time or interns?

Against the backdrop of the recent exploration and mining industry “depression,” and the coincident downsizing or closure of many economic geology education programs, it was not surprising to hear that most student delegates had little or no industry experience. This shortfall of incoming, trained field practitioners is beginning to be addressed by company and survey hires, summer jobs and internships, and reinvigorated academic programs. However, the students felt that the SEG could follow its own lead at Keystone and take on a much-needed role in bridging the gap between potential employers and students, and between industry and academia.

Specifically, the SEG could act as a “middleman” for employment and educational opportunities, and

1. Continue to include sponsored student representation and involvement in SEG meetings, and encourage companies to directly meet and mentor students at events such as the Keystone icebreaker,

2. Continue and expand field-based training programs such as SEG short courses to improve skills, and include company- or SEG-sponsored student slots within such programs,

3. Improve the ease of access of student chapter and student member contact information on the SEG website, and encourage companies to recruit on campuses by posting links to campus career days, job fairs, etc.,

4. Encourage the choice of economic geology as a career, and attract the best and brightest students to geology/exploration, beginning at the public school level but focusing on high schools and 1st year undergraduates; this could take the form of SEG members participating in 1st year science and geology freshmen week activities, and “meet a geologist” guest teaching roles during Earth Science or Mining Week activities.

In short, although the SEG must maintain its prime role as a learned society, students believe that it can ensure its own future, and the future of economic geology as a profession, by adopting a more direct advocacy role in bridging the industry-academia gap.

2. SEG student chapters:

The following questions were provided as suggestions for group discussion:

How many of you belong to an SEG student chapter, or to an institution that has a chapter? If you do, is your chapter active, with regular meetings, technical presentations, field trips, etc.? If not, is there a faculty member who would be an appropriate advisor/coordinator? What can you learn from other students at the conference with regards their chapters and activities? What can SEG do to foster and support more active and rewarding chapters? Should membership of the SEG ($10 per annum) be a requirement for belonging to an SEG student chapter?

Outside of North America and to a lesser extent Australia, many students and
institutions do not have an active or existing student chapter. This is due to a variety of reasons, including lack of student numbers, lack of professor(s) to sustain the chapter during cyclical student enrolment, lack of student awareness and initiative, and lack of SEG promotion. There is a need for chapters in South America, Africa (notably Ghana, DRCongo, Zambia), Asia, and India. The most common issue for existing chapters was their inability to fund field trips.

The following suggestions were put forward:

1. Target appropriate SEG members - professors and industry personnel - capable of initiating and advising student chapters
2. Encourage students to bring information to their countries and institutions, in part by sponsoring their attendance at SEG meetings.
3. Promote corporate sponsorship and mentorship of chapters.
4. Take a more proactive approach in promoting, initiating, and sustaining chapters, in part through Regional Vice Presidents and Student Affairs Committee members.
5. Promote and facilitate networking among chapters through the internet, where chapters could share strategies for starting and running chapters, field trips, fund raising, passing on information to next generation of students, etc.
6. Encourage cooperative chapters or chapter activities with SGA, AUSIMM, AIPG and other learned and/or professional societies.
7. Foster better communications between chapters, chapters-SEG, and chapters-industry via the SEG webpage, which could include more prominent student chapter links, discussion groups, chat lines, etc.
8. Establish a Student Chapter Liaison Committee comprised of student representatives from major geographic areas, to provide a student voice, help inform and coordinate student chapters and chapter activities, and work with the Student Affairs Committee on issues of interest to students.
9. Increase funding for student and student chapter field trips, promote field trip exchanges between chapters in different regions or countries, promote regular “open house” mine/exploration site visits for students and student chapters, and include dedicated student slots on field trips and short courses. These suggestions resulted at Keystone in the initiation and generous subscription of a student field trip fund.

There was a mixed response as to whether membership in the SEG should be a requirement for membership in a student chapter. Perhaps as a minimum, SEG student chapter executives should be members. The additional dues that can encourage chapter membership by non-economic geology students, which in some institutions provide otherwise unavailable critical mass for successful chapter operation. For some students in Africa, Asia, and South America, the membership issue was more one of ease of payment, and an alternative to credit cards was requested. Some students also requested that the SEG account for international exchange rates and economic disparities in setting fee structures for membership, publications, and conference/field trip fees.

Finally, it was asked whether the transition rate from student to regular membership was satisfactory, and if not, how the SEG could improve its return on investment.

3. SEG student grants:

The following questions were provided as suggestions for group discussion:

How many of you have received a student grant from the SEG? For those of you who have not received a grant, have you applied? For those of you who have obtained a grant, did it significantly help you with your academic career? Why or why not? How could SEG make the grants program more attractive? What should we be doing as a society to ensure this program works as well as possible? Should membership of the SEG ($10 per annum) be a requirement for receiving an SEG student grant?

There was a strongly positive response regarding the grants from the recipients, and from those aware of the program. There was also general agreement that grants should require SEG membership. However, the program was viewed as poorly advertised, especially outside North America and Australia, where many students were unaware of its existence. This may account for a perception of the program as being too weighted toward North America.

Suggestions included sending annual e-mails, hard copies of announcements, forms, etc to students and faculty/industry liaisons, and utilizing the regional VP and proposed student executives to improve awareness. Students also requested that the SEG allow recipients to use grant funds to defray costs for other than direct research, specifically tuition, travel, and living expenses.

4. SEG technical content:

The following questions were provided as suggestions for group discussion:

What is attractive about SEG to students: Economic Geology (the journal)? the SEG Newsletter? other publications? student grants? SEG meetings or sessions at other meetings? the financial support provided to your SEG Student Chapter (including financial help for field trips)? Did the SEG International and Distinguished Lecturers visit your institution in the past year? What...
offers the best value for you in terms of SEG? What can the Society do to make more technical content available to you that is useful? To what extent should digital content be provided, and what is the most viable format?

In response, the SEG journal, newsletter, and technical publications are well-regarded, but there was a general request to make these easier and cheaper for students to obtain. In particular, the lack of student (as opposed to member) discount for books compares unfavorably with AAPG, SEPM, and other societies. Students indicated that a searchable digital database of the entire SEG library (not just the journal) was highly desirable, perhaps online as pdfs, and that student chapter electronic and hard copy libraries were also desired. Some students suggested that it be possible to publish and, for the traveling lecturers, lecture in languages other than English, particularly Spanish, Chinese, and Russian. This counters a long-term Anglicization trend in publishing and international conferences, but could be considered for web-based journal abstracts and, where possible, lectures.

The SEG traveling lecturers were regarded as poorly advertised and have not visited some institutions represented at the conference. There was also thought to be a conspicuous absence or low proportion of lecturers and conferences in Africa, South America, and Asia. This tied in with a view that the SEG should decentralize from the United States and Canada, and have more proactive and visible regional VPs and Student Affairs Committee members, visiting or communicating with universities and chapters on a regular basis.

While appreciative of the high scientific standards of the SEG, some students felt it too difficult to publish, and suggested incorporating student papers in a student section of the journal and newsletter. The SEG should also accommodate descriptive research, particularly from developing countries with inherently lower capabilities for high-cost modern science, and should be more accepting of controversial and cross-over (other fields) papers. Finally, students recommended that the SEG broaden its content beyond metal deposits to possibly include industrial minerals, economics, social license, new technologies, and sustainability.

5. Ethics:
The following questions were provided as suggestions for group discussion:

The SEG is a learned society with goals detailed in the SEG strategic plan (link: http://www.segweb.org/Strategy.pdf). The SEG differs from other professional associations and accreditation bodies such as AUSIMM or AIG, and, unlike those associations, its strategic plan does not deal with ethics. Should it? If so, can we provide draft language—or at least the key principles—that should be addressed concerning ethics in the strategic plan? Any other comments on the plan?

These topics received little mention during the discussions, probably because of time constraints and their position on the last page of the handout. As might be expected, the few opinions expressed differed widely—some students were in favor of the SEG taking a role in ethics issues, others were not.

SUMMARY

Student delegates would like to sincerely thank the SEG and corporate sponsors for their initiative and generous support in putting on the student chapter conference at Keystone.

The conference and this white paper are viewed as the first step in a dialogue among students, as future practitioners in economic geology, the SEG, industry, and government. Highlights of the students’ suggestions include better communication with respect to SEG services and programs, establishment of a student liaison committee, upgrading the SEG website to a more user-friendly and useful resource, enhanced support of student chapters, field trips, and access to publications, and a more proactive SEG role in bridging industry-student (academia) gap with respect to employment and mentoring. The students look forward to discussing their viewpoints and suggestions with the SEG, and to follow-up student chapter conferences at future SEG meetings.
The University of British Columbia SEG student chapter undertook a field trip to New Zealand from April 20 to May 7. The trip was organized and led by Ken Hickey, a research associate in the Mineral Deposit Research Unit at the University of British Columbia. Eight industry representatives and a mix of 15 students and research staff from UBC participated in the trip, with participants originating from Canada, United States, Mexico, Chile, Thailand, Switzerland, Australia and New Zealand.

The trip covered much of the island-continent’s diverse geological features and provided participants with a unique opportunity to observe magmatic and hydrothermal processes responsible for Au mineralization in ancient and modern convergent margin settings.

After assembling in Auckland City, we drove south to the Hauraki gold field, a collection of over 50 epithermal gold deposits hosted in a 40 × 200 km corridor of andesitic, dacitic, and rhyolitic Miocene-Pliocene volcanic rocks along the Coromandel Peninsula. For our two days touring the Coromandel area, Jeff Mauk (University of Auckland) led a review of epithermal mineralization in the Hauraki gold field, including tours of the Karangahake and Golden Cross epithermal systems. While in the Coromandel area, we also had a tour of Newmont Mining Corp’s world-famous Martha Hill mine in Waihi. Brian Arkell, the mine’s chief geologist, organized and led the tour.

Unfortunately, extremely bad weather prevented us from making the trip out to White Island, and we drove on to Rotorua (in pouring rain) to tour the Taupo Volcanic Zone (TVZ), a ~60- km-wide active rift characterized by extensive rhyolitic volcanism and extremely high heat flow. From Rotorua we visited the Waipatua and Orakeikorako geothermal fields where we observed boiling mud, geysers, fumaroles, collapse craters, hydrothermal eruption deposits, and real-time sinter formation. The Champagne Pool was a highlight.

From Taupo we moved on to Tongariro National Park, where three large andesitic stratovolcanoes, Mt Tongariro, Mt Ngauruhoe, and Mt Ruapehu, form the southern termination of the TVZ.

The South Island portion of our trip began with a relaxing afternoon at one of Marlborough’s best known wineries. The following morning we drove on to Reefton via the 100-km-long Wairau Valley. This valley is the geographic expression of the Wairau fault, a major active transient fault accommodating the oblique convergence of the Pacific and Indo-Australian tectonic plates. In Reefton we visited a mesothermal gold project owned by OceanaGold. Nick Whetter and Craig McIntosh from Oceana Gold gave us a presentation showing us representative sections of mineralized drill core.

We then drove to the city of Greymouth on the west coast and had a self-guided tour of the large Grey River Gold Dredge (originally the Kaniere dredge). This dredge began operating the Hokitika area in 1938, but has been on the Grey River since the early 1980s. On our drive down the west coast, the physiographic expression of the Alpine fault—the onshore boundary between the Pacific and Indo-Australian plates—was clearly evident as a linear feature separating the 3 km high Southern Alps from the low relief coastal plain. Being able to put your hand on major plate boundary was an awesome experience for trip participants.

Following a drive eastward over the Haast Pass, we had a day’s R & R in Queenstown, and then drove through central Otago where we looked at exposures of polydeformed Otago schist and visited old alluvial gold workings.

Our last major geological stop of the trip was Macraes gold mine, a mesothermal gold deposit operated by OceanaGold. We were given an excellent presentation by three of the company’s geologists—Lindsay Maw, Jonathan Moore, and Sean Aldrich. The mine, which is New Zealand’s largest gold mine, has been in operation for 10 years and has produced 2 Moz of gold.

The trip was a great educational and social experience and we thank the following people and organizations whose various generous contributions made the trip possible: Chester Millar, Barrick Gold Corp., Shane Ebert, Kaminak Gold Corp., Brilliant Mining Corp., Kingsgate Consolidated Ltd., Equity Engineering Ltd., Mikkel Schau, Ed Balon, The Geological Association of Canada, SEG, Jeff Mauk, Julie Rowland, and OceanaGold.
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ANGOLA

Petra Diamonds Ltd. has discovered the 50th kimberlite at its Alto Culu project in northeastern Angola. With 60 targets drilled, this represents a success rate of 83%. Approximately 26,000 m of core drilling has been completed from 190 holes. Bulk samples are being taken from the prioritized kimberlites.

BOTSWANA

Tsodilo Resources Ltd., following extensive drilling for economic kimberlites at its Newdico and Gcwihaba projects in northwest Botswana, has confirmed two more kimberlite targets at anomalies A41 and C15 within a cluster of 25 kimberlites in the Nxau Nxau region of the Newdico-Ngamiland project area. Tsodilo has an 89% stake in Newdico (16,800 km² under diamond license) and Trans Hex Group, a South African diamond mining and marketing company, holds the remaining 11%. The southern Gcwihaba project area (6,703 km² under diamond license and 3,780 km² under base and precious metals licenses) is 100% held by Tsodilo. C15, which is located approximately 20 km from the Namibia border and 2 km north of anomaly A41, has a coincident magnetic and gravity high displaying good isolation and suggests that the kimberlite is slightly elongate, measuring approximately 250 m north-south and 400 m east-west. Drilling has demonstrated that the C15 has many similarities to the A15 kimberlite evaluated in late 2005. A range of pink to deep purple peridotitic pyrope garnets as well as orange-colored eclogitic pyrope garnets have been identified. This abundance of garnet differentiates C15 and A15 from the predominantly ilmenite-rich kimberlites in the Nxau Nxau field and may represent a different generation of kimberlite intrusion.

BURKINO FASO

AXMIN has sold its 100% interest in the 109,896-oz Bouroum Permit gold reserves to a subsidiary of High River Gold Mines Ltd for a total of US$3.300M. The remainder of the Bouroum Permit and the two adjacent permits, Yeou and Ankouma, are subject to an exploration joint venture between the Axmin and High River Gold whereby High River Gold may earn 100% interest in the three permits by spending US$1.500 million on exploration over three years.

CENTRAL AFRICAN REPUBLIC

AXMIN Inc has completed prefeasibility studies and has initiated a full feasibility study on its Passendro gold discovery, which is designed to produce 200,000 oz/y over a five-year initial mine life. Total resources exceed 2.6 Moz, including reserves of over 1.1 Moz at 2.6 g/t, with a probable reserve of 13.74 million tonnes (Mt) grading 2.59 g/t Au for a total of 1.143 Moz. AXMIN is currently undertaking an intensive drill program designed to develop sufficient additional reserves to sustain a minimum eight year mine life.

COTE D’IVOIRE

Cluff Gold Plc has completed 62 holes totaling 5,700 m of drilling at the Angovia gold project. Established mineralized trends have been confirmed by infill drilling results. Mineralization remains open along strike and down dip of the four satellite deposits drill-tested to date. Near-surface oxide ore from all satellite deposits is treatable in a central heap leach plant. Best intercepts are ARCA9 with 47 m @ 2.62 g/t Au, ARCC122 with 3 m @ 38.99 g/t Au (including 1 m @ 114.37 g/t Au), and ARCA118 with 1 m @ 48.33 g/t Au.

DEMOCRATIC REPUBLIC OF CONGO

Metorex is still accelerating its copper and cobalt activities in the Shaba Province despite the fighting that broke out after transitional president Joseph Kabila failed to achieve an outright win in recent elections. The Ruashi I project is expected to be at full capacity (10,000 tpa of copper and 1,000 tpa of cobalt) within the next three months. The copper concentrate that is produced at Ruashi is transported by truck or rail across the border into Zambia where it is processed at Metorex’s Sable processing plant in Kabwe. Metorex will also fast track its Ruashi II project, which has estimated production capacity of 45,000 tpa of copper and 3,500 tpa of cobalt. The original estimated start date of July 2009 has been moved forward to the first quarter of 2008.

ERITREA

Nevsun Resources has finalized metallurgical test work data for the three phases of the future mining planned at its Bisha project. The major metal recoveries from each of the three Bisha ores include 87% gold recovery from the oxide ore, 92% copper recovery from the copper supergene ore, 85% copper and 83.5% zinc recovery from the primary ore. The open pit Bisha mine will commence with milling the surface oxide ores for two years, followed by the three years of milling copper supergene ore with a further five years of zinc-copper primary sulphide ores.

GHANA

AngloGold Ashanti, the world’s third largest gold miner, has sold its Bibiani gold operation to Central African Gold (CAG) for US$40M in cash. The mine had a stated reserve of 100,000 oz of gold and a resource of 900,000 oz at the end of 2005. According to the 2005 AngloGold Annual Report, the mine produced 115,000 oz in 2005 at cash costs of $305/oz. The mine however moved to a tailings-only operation this year but had been studying the possibility of recommencing operations in the main open pit at Bibiani by way of a cut-back that would allow extraction of ore down to 60 m below the current pit floor. CAG says it will re-open the underground mine at Bibiani in the second half of next year. AngloGold produced 6.2 Moz in 2005 at total cash costs of $281/oz, it owns two other mines in Ghana, Iduaprim, and Obuasi.

Ashanti, Gold Fields, and Golden Star, all of whom have significant gold
mining operations or projects in the country, may be affected by water shortages which might start to have power and cost implications. During the June quarter, AngloGold Ashanti’s Ghana operations produced 147,000 oz of gold out of the company’s total production of 1.41 Mt. Obuasi produced 97,000 oz, Iduapriem 41,000 oz, and Bibiani 9,000 oz. Gold Fields operates the Tarkwa and Damang mines. Tarkwa is the biggest gold producer in Ghana producing 676,800 oz in the 12 months to end June 2006, while Damang produced 248,000 oz during the same period. Golden Star has the Bogoso/Prestea and Wassa operations, $0.7 to $1.4 million.

**LESOTHO**

European Diamonds is undertaking a bulk sampling program at the main diamond pipe at Liqhobong. It is currently producing from the satellite pipe and recently sold 16,500 carats for $691,000 (average $42/ct) which includes quality yellow diamonds.

Gem Diamonds, an unlisted company, has raised $200M from London investors to revitalize the Letseng le Terae diamond mine. De Beers established the mine in the 1980s but closed it shortly afterwards. Letseng was re-launched by JCI and currently treats 2.4 Mtpa from a satellite pipe, which Gem Diamonds hopes to double, and also to begin mining the main pipe. Letseng is noted for the large diamonds it produces, and although most of the production is more modest gems, the discovery of a large stone increases the average price so far achieved to $1,200 per carat.

**MALI**

Nevsun Mali Exploration and African Metals have signed a memorandum of agreement to pool their interest in five diamond concessions in Western Mali. African Metals holds 100% interest in three diamond concessions, the Kenieba Nord, Kenieba Sud, and Soumala, and a 95% interest in the Medinandi Sud and Soumala, and a 95% interest in the Medinandi Sud concession. Nevsun holds 100% interest in the Dar Salam concession. Of the 30 known kimberlite pipes on Kenieba, at least nine are known to be diamondiferous.

AXMIN Inc. has reported that a follow up 4,240 m reverse circulation drilling program has confirmed the continuity of potentially economic grades of gold mineralization over the central 1,000 m of their 5,000 m long Kofi South gold mineralized structure in the Loulo area of Mali. The mineralization is associated with disseminated and fracture-hosted sulfides, within a subvertical structure that lies at the contact between massive quartzites and finer grained graywackes and phyllites. The 1,000-m-long mineralized structure remains open at both ends and at depth. In addition, there are parallel structures, all of which lie within the 5,000 m Kofi South anomaly. Results include 6.3 g/t Au over 15 m, 2.9 g/t Au over 25 m, 2.4 g/t Au over 25 m, 2.7 g/t Au over 15 m, 4.3 g/t Au over 9 m, and 13.1 g/t Au over 7 m.

Etruscan announced a new gold discovery at Diba located 15 km south of the Sadiola gold mine in Mali West. Gold mineralization was confirmed in saprolite by auger drilling over an area measuring 2.5 km in length and 300 to 500 m in width. The mineralized zone is defined by single sample auger values in saprolite exceeding 0.1 g/t with the highest sample returning 49.6 g/t of gold. Deeper multisample augering has encountered up to 114.0 g/t of gold at a vertical depth of 30 m. The best intercept to date returned 12 m of 12.6 g/t and the hole ended at 30 m depth in mineralization with 10.0 g/t gold over the last 1.5 m.

North Atlantic Resources has acquired the 72 km² Sitakili gold project which is located less than 15 km east of the 15 Moz Loulo gold mine operated by Randgold Resources and less than 7 km from the 1 Moz Tabakoto-Segala gold mine operated by Nevsun Resources. Sitakili is 55 km south of the company’s Diokeba and Kantelo gold projects and adjacent to the 10 Moz Sadiola gold mine operated by AngloGold-Iamgold. A total of 3,036 soil samples have been collected and 3,324 m of drilling from 169 holes has verified that gold is concentrated in saprolite and bedrock coincident with the artisanal workings and gold in soil anomalies. Five large anomaly clusters with strike lengths of up to 2,000 m were defined in the soil sampling program. Five smaller anomalies were also identified.

**MOZAMBIQUE**

Mumbai-based JSW Steel Ltd. will pay $6M to purchase the 200-Mt coal mines in Mozambique. The cost of coal from the mine after royalty payments will be between $48 and $50 a ton, less than the current market price of about $114 a ton. JSW Steel is India’s third-largest producer of the alloy.

JSE-listed junior exploration company Miranda Minerals has signed an agreement to acquire Molebogeng, which held a number of issued prospecting rights, mainly in coal, diamond, and gold exploration but also a tantalite mining concession in the Zambezi province.

Australian junior miner Riversdale Mining has concluded negotiations to acquire tenements over an area of 204,000 ha in the lower Zambezi coal basin. The tenements are adjacent to areas held by Companhia Vale do Rio Doce (CVRD). The areas are located in four distinct packages, including those in the center of the Moatize subbasin coal province which may be one of the largest known, undeveloped coking- and thermal-coal provinces in the world. Coal crops out on many of the licences and the initial focus of exploration and development will be on the licence areas adjoining the concessions on which CVRD has already made significant coal discoveries.

**NAMIBIA**

TEAL Exploration & Mining Inc. has reported results that indicate the continuation of higher grade zones of gold mineralization at its Otjikoto gold project. Otjikoto is situated within TEAL’s 100%-owned Otavi exploration area, which totals 3,084 km² in north-central Namibia, where the company discovered sheeted, vein-hosted, gold mineralization. The gold occurs as “free” and often coarse grains within predominantly pyrrhotite-magnetite-pyrite veins. These new results, together with those reported in April 2006, have motivated additional drilling to define the resource potential of this mineralization. TEAL has a current inferred resource base of some 890,000 oz of gold that relates to 24.5 Mt at a grade of 1.13 g/t gold, which has been modeled from near-surface to a depth of approximately 150 m. Management believes the deposit is potentially open pittable. Since October 2005, 39 boreholes have been drilled totaling 9,300 m as part of its current Otjikoto resource expansion program. Recent...
borehole results, specifically holes OT64, OT98, OT104, OT105, and OT110, have returned higher grade intersections over significant intervals. The current 890,000-oz resource is based on data from some 107 boreholes and relates to 24.5 Mt at a grade of 1.13 g/t gold. The gold cutoff grade used for this resource estimation was 0.5 g/t gold.

Namdeb, Namibia’s diamond mining company, has returned reduced net profits for the six months to end June 2006. It aims to increase its diamond production to achieve the 10-M carat target set for 2010, by investing more to extend the life of its declining land-based mining operations. In the six months of 2006, marine activities accounted for 537,000 cts, while land based operations produced 544,000. The stone size is also decreasing. In the first half of 2005, the average carat size per stone sold was 0.46 which has decreased to 0.43. Net profit for the half of 2006 dropped to N$40M from N$146M during the same period in 2005.

Rio Tinto’s Rossing uranium mine, which is in the Namib desert 70 km inland of Swakopmund, expects to produce 3,500 tof uranium this year compared to 3,700 tin 2005. It is investing US$120M to increase output to 4,500 t soon and to extend its the life of the mine by 10 years to 2020 and possibly beyond.

**SENEGAL**

Harmony has entered into a joint venture with AXMIN Inc to explore three gold permits, the 341 km² Sonkounkou permit, Sabodala NW, and Heremakono. Harmony will spend US$4M over three years to earn a 50% interest. The permits lie within the prolific Kédougou-Kéniéba inlier of the Birrimian close to the border between Mali and Senegal. At the Sonkounkou permit, one target includes an abandoned artisanal excavation on a quartz vein from which a grab sample yielded 17 g/t Au, while a silicified wall-rock sample yielded 13 g/t Au. In a second target, the area is underlain by a complex of felsic volcanics, basic intrusives, and sediments within which occur zones of silification and quartz veins trending northeast. Grab samples of quartz vein and silicified felsitic surface float within and adjacent to the anomaly give results that include 77 g/t Au, 17 g/t Au, 10 g/t Au, 5.7 g/t Au, 4.7 g/t Au, and 3.5 g/t Au as well as five additional samples lying in the range of 0.5 to 1.3 g/t Au. At the Sabodala NW permit a zone of quartz stockworks of at least 12 m width has been identified within a zone of abandoned artisanal workings occurring over a 120 m strike length. Resources at Sabodala now exceed 2.2 Moz, up 75% on the previous announcement of January 2006.

**SIERRA LEONE**

AXMIN has reported results from the first five drill holes at the historic Kaomahun prospect within the Nimini Hills West permit. Two adjacent structures have been tested with results including 9.5 g/t Au over 5 m, 7.4 g/t Au over 6.75 m, 46.5 g/t Au over 2.35 m, and 66.6 g/t Au over 2 m. Drilling is in the vicinity of earlier surface trenching where trench results include 2.55 g/t Au over 24 m (Trench 001) and 5.81 g/t Au over 46 m (Trench 012).

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African Rainbow Minerals and LionOre Mining International—the co-owners of the Nkomati nickel mine—have approved a 60,000 tpm chrome ore mining and processing operation. During the last year, Nkomati has been mined and produced about 300,000 t of lumpy and chip chrome ore from the exposed resource in Put 3. Based on the current reserve statement, the chrome mine will operate for at least 5 years.

Gold Fields is investing US$640M to deepen its Driefontein and Kloof mines. This will extend its South African production to at least 2035, in the process creating the world’s two deepest gold mines. At Driefontein, Gold Fields is to extend its No. 9 subvertical shaft to 4,121 m and at Kloof, shaft deepening will be to an average depth of 3,827 m and a maximum of 4,020 m. Gold Fields has an annual gold production of 0.24 million oz. The mine currently mills 400 tpd of underground ore at an average grade of 4.24 g/t. The mine currently mills 600 tpd of underground ore at an average grade of 4.0 g/t and uranium resources of 6.8 Mlb at 0.6% Cu. Equinox will commerce an exploration programme including 10,000 m of RC drilling, to test the newly defined Kanga anomalies.

Impala Platinum has signed an agreement whereby Mmakau Mining will buy a 7.5% stake in Marula platinum mine in the eastern Bushveld. This agreement raises BEE (Black Economic Empowerment) ownership in Marula to 22.5%.

Simmer & Jack has successfully completed the first phase of a bankable feasibility study on its Ezulwini uranium project 40 km southwest of Johannesburg. According to the first phase of the study, the project is financially viable and technically possible, putting the life of mine at approx. 20 years. Gold reserves are expected to offset significantly the extraction costs of the uranium deposits with indicated gold resources of 3.1 Moz at 4.0 g/t and uranium resources of 6.8 Mlb at 1.77 lb/t or 0.81 kg/t. The project area is based around the old Randfontein Estates No. 4 shaft where there are multiple gold reef formations. The orebody on which the study was completed is concentrated in the Upper and Middle Elsburg Reefs.

Western Platinum, in which Lonmin’s BEE partner, Incwala, has an 18% stake has acquired the Messina platinum mine in the northeastern Bushveld Complex. Western Platinum has signed a seven-year, $300 million facility to acquire and re-finance the debt at Messina and output has already increased since the takeover.

African Eagle Resources plc has announced further results from its ongoing resource definition at Mkushie copper mines. Best drill-hole intercepts include 27m at 2.1% Cu, 61m at 1.4% Cu, 52m at 1.3% Cu, 132 at 0.5% Cu, and 73m at 0.6% Cu. Equinox Mineral has delineated geophysical anomalies that extend over a strike length of 2 km immediately to the south of the planned Lumwana copper project. Lumwana remains open in three directions. It contains some 3bn lbs of copper. The Lumwana process plant is 5 km away. Equinox will commerce an exploration programme including 10,000 m of RC drilling, to test the newly defined Kanga anomalies.

Omega Corp has discovered a 13 Mlb uranium resource at Kariba, where hydroelectric power is available at a low price. Four drill rigs are on site relatively close to one another. The company has the bulk of all the key anomalies in the Bungua area, which was showing particular promise. Historically, uranium had been found at Bungua in 1957. Extensive drilling exploration is also taking place at Mutanga, where the openpit would be 60 m deep. There was also considerable potential to increase the resource at dibwe. Alkalai-leach technology would be used to process the uranium ore and a uranium recovery rate of 80% is anticipated.

Caledonia Mining has purchased the Blanket gold mine. The mine has proven and probable mineral reserves totally 3.2 Mt with an average grade of 4.24 g/t. The mine currently mills 600 tpd of underground ore at an average grade of 4.1 g/t and produces an average of 2,100 oz/pm of gold.
silicified felsic meta-intrusive float, found within the zone, assayed up to 4.5 gpt Au, plus greater than 150 gpt Ag. Additional drill targets exist on the property.

Linux Gold announced that it has commenced drilling at its Granite Mt. project on the Seward Peninsula. Hole NWG-01 on the Gossan Ridge prospect encountered sheared and veined altered volcanioclastic and interbedded rhyolite to rhyodacite. Felsic units are from 1 to 10 ft thick and contain pyrite, pyrrhotite, and bismuthinite in carbonate-altered quartz veins and veinlets and as disseminated grains. It is estimated that 80 to 85% of the entire drilled section is mineralized. The intrusive rocks are also mineralized, with disseminated pyrite replacing biotite and pyrite and bismuthinite in quartz-carbonate veinlets.

Full Metal Minerals and Metallica Resources announced completion of their porphyry Cu-Au-Mo exploration programs on the Alaska Peninsula project. Work included geological mapping, geochemical sampling, ground-based geophysics and approximately 1,000 m of diamond drilling on the Bee Creek prospect. Previous exploration encountered 0.25% Cu, 0.011% Mo and 0.062 gpt Au over 152 m. Work in 2005 identified several IP chargeability highs that were the focus of 2006 drilling.

EASTERN INTERIOR

Kinross Gold announced second-quarter results from the Fort Knox mine. The mine produced 99,437 oz of Au at a cost of $267/oz. The company also announced that it has submitted initial draft permits to conduct a valley leach system as part of its overall operations at Fort Knox. The operation will be constructed in five stages using 130 million tons (Mt) of run-of-mine rock from the Fort Knox pit and at least 29 Mt of ore from the Barnes Creek and Fish Creek stockpiles. Details relating to the project can be acquired at www.dnr.state.ak.us/mlw/mining/large mine/fortknox.

FreeAu Ventures Limited announced results from trenching at its Cleary Hill mine on its Golden Summit project. Trenching along a 185-ft strike length of 4?- to 18?-wide vein returned 39.5 gpt Au, including a 75 ft section grading 83.4 gpt Au. On the nearby Wackwitz vein, trenching discovered a new 5-ft-wide zone averaging 16.4 gpt Au over 235 ft including 85 ft grading 34.8 gpt Au. In addition, a newly discovered 10- to 15-ft-wide shear zone 50 ft to the south of the Wackwitz vein returned 2.2 gpt Au over 220 ft.

AngloGold Ashanti announced that International Tower Hill Mines Ltd. has acquired an option for all of AngloGold’s Alaska mineral properties. AngloGold Ashanti has sold 100% interest in the Livengood, West Pogo, Coffee Dome, Gilles, Caribou, and Blackshell properties, while Tower Hill will issue 19.99% of its issued shares and spend $10M on future exploration. In addition, AngloGold also granted Tower Hill the exclusive option to acquire a 60% interest in each of its LMS and Terra projects by incurring $3M of exploration expenditure on each project within four years. Drilling from 2006 at LMS includes 2.81 m at 34.8 gpt Au in hole C06-20, 1.90 m true width averaging 60.3 gpt Au in hole C06-21, and 4.53 m true width averaging 51.5 gpt Au in hole C06-23.

Full Metal Minerals announced acquisition of the 40-Mile project from JV partner Doyon Ltd. The most advanced project is the Lead Creek high-grade target, where limited diamond drilling included 9.6 m averaging 724.6 gpt Ag, 6.4% Pb, and 0.3% Zn. In addition, 28 gossan samples collected over 760 m of strike at the Fish Creek pit averaged 11.6% Zn, 0.13% Pb and 18.7 gpt Ag. At LWM prospect seven gossan grab samples averaged 5.0% Zn, 11.85% Pb, 0.5% Cu, and 105.4 gpt Ag. Planned exploration in 2006 includes 1,500 m of diamond drilling, ground-based gravity geophysical surveys and reconnaissance mapping and sampling.

ALASKA RANGE

Nevada Star Resource Corp. announced that Anglo American Exploration (USA), Inc. has withdrawn from its JV on Nevada Star’s MAN Alaska Cu-Ni-PGE project. The 2-year JV consisted of $3M worth of exploration on the Fish Lake and Dunite Hill prospects. Work funded during this period included geophysical and geochemical surveys and 10,281 ft of diamond drilling on the Fish Lake prospect.

Full Metal Minerals announced additional results from its Lucky Shot Au project. Significant intervals include 4.53 m true width averaging 51.5 gpt Au in hole C06-17, 1.20 m true width averaging 134.5 gpt Au in hole C06-19, 2.51 m true width averaging 60.3 gpt Au in hole C06-21, 1.90 m true width averaging 21.3 gpt Au in hole C06-20, 3.48 m true width averaging 32.8 gpt Au in hole C06-23, and 1.68 m true width averaging 39.5 gpt Au. The company has added an additional drilling rig to the program.
and has increased the program from 60 to 80 holes totaling 15,000 m.

**SOUTHEAST ALASKA**

Kennecott (70.3%) and Hecla (29.7%) announced second-quarter production from Greens Creek. The cash cost per ounce of Ag at Greens Creek for the quarter was a negative $2.28/oz Ag. The average grade of ore mined during the quarter was 13.73 opt Ag. During the second quarter, the mine produced 1,751,597 oz Ag, 12,613 oz Au, 4,022 t Pb, and 12,408 t of Zn. Total production costs for the quarter were $1.22/oz of Ag produced. This year’s exploration program has defined a new resource in the West Gallagher zone that remains open to expansion.

Coeur d’Alene Mines had some welcome news for its Kensington mine project last month. The U.S. District Court dismissed a suit challenging the company’s Army Corps of Engineers 404 permit relating to tailings disposal. The company also was notified that the Kensington project has been chosen to receive the prestigious 2006 Hardrock Mineral Community Outreach and Economic Security Award presented by the BLM. Meanwhile, back at the farm, capital investment at Kensington totaled $20.9M and included mill construction, underground work and 23,000 ft of development drilling.

Bravo Venture Group Inc. reported that several multi-ounce Au surface samples were recovered at its Woewodski Island project. Metallic screen fire assays range from 0.021 to 14.27 opt Au. Visible Au has been located in float and narrow bedrock veins along 400 m of Blue Quartz Creek. Similar narrow veins elsewhere on the island are hosted in east-north-east trending subparallel structures up to 10 m in width.

Niblack Mining announced additional results from its Niblack massive sulfide project. Hole LO-165, intersected 56.02 m grading 3.85 gpt Au, 48 gpt Ag, 0.92% Cu and 2.70% Zn over a true width of approx. 53 m. Drill hole LO-168 intersected 53.19 m grading 3.85 gpt Au, 59 gpt Ag, 0.80% Cu and 3.56% Zn. Hole LO-171 yielded 3.96 m of 2.86 gpt Au, 71 gpt Ag, 0.63% Cu, and 15.05% Zn. Drilling has also identified a near-surface Au-oxide zone at Lookout where hole LO-175 intersected 27 m grading 3.12 gpt Au and 89 gpt Ag, and 4.60 m grading 11.99 gpt Au and 125 gpt Ag.

**CHINA**

As part of an Apex-Falconbridge alliance, Apex Minerals NL has commenced a 1,000-m diamond drilling program on the Qiongheba porphyry Cu-Au target which is located within its G2 Cu-Au license in eastern Xinjiang. Four to five 200- to 250-m-deep vertical holes are planned to investigate a broad zone of intense surface alteration covering an area of over 5 km². Dipole-dipole IP and ground magnetic surveys are also underway on the property to optimize the location of two holes that are intended to test an extension to the alteration that appears to dip below shallow cover.

Dynasty Gold Corp. has commenced an estimated 5,000-m drill program for orogenic gold deposits on the Red Valley Au property, Qinghai Province. Drilling will test anomalous geochemical and geophysical responses that correspond with favorable geological units, alteration, and structure over a 16 km × 500 m zone. The US$1.1M exploration budget for the project is being funded from the proceeds of a US$2M private placement by AngloGold Ashanti that provides 9% equity in the company. Dynasty Gold Corp. also reported results from the first seven drill holes on the Qi-2 deposit, part of a 10,000-m drill program within the Hatu project aimed at upgrading the Qi-2 resources (913,000 oz) to reserves. Significant intersections include DHD003: 2 m @ 9.12 g/t Au and 9 m @ 3.39 g/t Au, RCH001: 2 m @ 5.21 g/t Au, RCH002: 3 m @ 4.54 g/t Au, RCH003: 11 m @ 1.83 g/t Au, and RCH004: 4 m @ 2.33 g/t Au.

Georgia Ventures Inc. has commenced a diamond drill program on the epithermal Bogutu Main Au zone, one of several epithermal gold occurrences located on its Towerstone Cu-Au Xinjiang Autonomous Region. The company can earn up to 85% in the project, which covers an area of approx. 300 km² along the Tien Shan mineral belt.

Goldrea Resources Corp. has signed a JV (Weihai JV) with the China Shandong No. 3 Mineral and Geological Exploration Institute that includes 8 exploration licenses covering 90 km² south and west of the existing licenses held by the Rushan Goldrea Gold Corp., a JV between Goldrea and the City of Rushan (Daye JV). Goldrea Resources Corp has agreed to spend RMB14M (C$1.4M) over 4 years, to earn a 70% interest in the JV with RMB2M (C$200K) going directly to the 3rd Brigade to “facilitate” the transfer of the licenses to the JV.

Magnus International Resources has completed a detailed ground geophysics survey on the Huidong Au exploration project and has commenced an initial 10-hole drill program in the Huidong East and Huidong South target areas of the project.

Minco Mining & Metals Corp. has reported on its latest exploration on the Yangshan gold belt in Southern Gansu Province, China. Regional mapping and detailed stream sediment sampling (3,036 samples) were completed over an area of 913 km². The program is focused on 13 wholly owned exploration licenses in the Qinling gold triangle on or near the Yangshan gold belt. Forty-five anomalous zones have been identified.

Red Dragon Resources Corp. has commenced a drill program on their Liaoning Au project, testing IP anomalies that extend over 2 km along strike from an area of previous limited under-ground workings. Gold mineralization in the area is associated with pyritic quartz stockwork and veins. Previous trench sampling by Red Dragon returned 7m @ 2.99 g/t Au. Red Dragon has also completed a recent mapping and sampling program on the Weixi Zn project, Yunnan Province. Pb-Zn mineralization has been mapped within three separate zones, with the main mineralized horizon having been indicated to extend over 5 km of strike length in intermittent outcrop, with widths ranging from several meters to over 100 m. Mineralization is hosted mainly by limestone breccias and calc-areous sandstones. The highest values from outcrop were at the northern end of the “main zone” before going into overburden, and returned 20.84% Zn, 27.55% Pb, and 146 g/t Ag over 5 m. An initial 10,000-m drill program is planned for September.

Silk Road Resources Ltd. has commenced a 4,000-m DDH program on its...
Exploration Reviews

Xiahe property, Gansu Province, China. The program will test 6 prospects, beginning with Loghe, identified during reconnaissance last season.

Silverbcorp Metals Inc. has reported a significant increase in the mineral resource at the Ying mine. The current measured + indicated resource stands at 811,620 t @ 1,535 g/t Ag, 26.48% Pb, and 8.61% Zn, while the inferred resource is 1,246,013 t @ 1,426 g/t Ag, 25.47% Pb and 9.38% Zn.

Sino Gold Ltd announced drilling has resumed at White Mountain (Sino Gold 80%), 230 km SE of Changchun, Jilin Province. The program is further testing mineralization within the major northeast-trending fault zone that is open along strike and at depth. Based on early results, Sino has indicated they are confident that the initial 460,000-oz resource (3Mt @ 4.5 g/t Au) will increase. Best intersections this season include Hole BDDS43: 12.6 m @ 4.9 g/t Au from 251.5 m, BDDS44: 3.7 m @ 1.4 g/t Au from 340.0 m and 4.2 m @ 2.0 g/t Au from 345.8 m, BDDS45: 10.0 m @ 19.1 g/t Au from 217.8 m, BDDS48: 19.5 m @ 3.1 g/t Au from 224.5 m, including 10.0 m @ 4.3 g/t Au from 229.5 m, and BDDS50: 18.0 m @ 3.1 g/t Au from 279.0 m, including 11.0 m @ 4.1 g/t Au from 279.0. Recent metallurgical test work indicated that the gold is non-refractory and recoveries of approximately 85% should be achievable. With continuing good results, a prefeasibility study is planned for the second half of 2006.

Sparton Resources Inc. has signed a Letter of Intent with the Shijiazhuang Comprehensive Geological Brigade (“SCGB”) of Hebei Province PRC to acquire a 75% interest in the Yangjiagou precious metals project located in western Hebei. Sparton will invest a total of 10 million RMB (approximately $1.5M) to maintain its 75% interest. Yangjiagou is part of the historically productive Wutai-Taihang gold belt where several precious metals deposits are currently being mined. The area is covered by a 17.46 km² exploration licence and contains numerous old trenches, pits, and small shallow underground workings which recovered large quantities of precious metals during the Ming Period (1368–1644 AD). Most of the good surface showings were excavated during this time.

Rox Resources Ltd has released further drill results from the Nam Yen prospect at its Pha Luang lead-zinc project. Twenty-two holes have been drilled with 17 reported as achieving significant results, including 33 m @ 11.4% combined Pb + Zn and 19 g/t Ag, from 4 m, 27 m @ 10.5% combined Pb + Zn and 23 g/t Ag, from 3 m, and 19 m @ 8.6% combined Pb + Zn and 10 g/t Ag from 17 m. Exploration is planned to commence in November at the end of the current wet season, which will include further drilling at Nam Yen and the drill testing of at least another 5 prospects.

Pan Australian Resources Ltd has commenced a scoping study to assess the relative merits of the development options for the Ban Houayxai gold deposit following the intersection of high-grade mineralization in step-out drilling during the 2006 resource drilling program. The latest assay results from that program have identified a new zone of shallow high-grade mineralization 500 m to the northwest of the existing ore reserve. Best intersections include 18 m @ 17.2 g/t Au from surface (including 4 m @ 75 g/t Au from 12 m, 28 m @ 4.4 g/t from 22 m to end of hole (including 12 m @ 9.1 g/t Au from 38 m. The current oxide and primary mineral resource estimate for Ban Houayxai is 5.9 Mt @ 1.1 g/t Au for 216,000 oz of contained Au (COG = 0.5 g/t). The oxide component (mineralization amenable to heap leaching) is 3.6 Mt @ 1.1g/t Au for 126,000 oz of contained gold. Ban Houayxai is one of three oxide gold deposits that contribute to the mineral resource and ore reserve for the Phu Bia gold mine and is located 45 km west of the Phu Bia process plant site. To date, mining has been solely focused on the Phu Kham gold cap; Ban Houayxai is planned to be mined during the third year of operations and ore trucked to the Phu Bia process facility.

Asian Gold Corp. has reported results from the first 10 drill holes (KDPH6 to15) of the Phase 2, 18-drill program on the Khongor porphyry Cu-Au prospect. All 10 holes intersected mineralization. Better intersections include KDPH06: 60.8 m @ 0.39% Cu and 0.11 g/t Au, KDPH07: 100.0 m @ 0.29% Cu and 0.07 g/t Au, KDPH08: 61.3 m @ 0.34% Cu and 0.11 g/t Au, KDPH09: 59.4 m @ 0.87% Cu and 0.27 g/t Au, KDPH13: 44.2 m @ 0.77% Cu and 0.19 g/t Au, and KDPH14: 54.4 m @ 0.24% Cu and 0.04 g/t Au. Mineralization is open to the west, east, and south and drill testing these areas will be the focus of a subsequent Phase 3 drill program.

QGX Ltd. has announced a NI 43-101 compliant report containing the first resource estimate for the 100%-owned Barun Naran coal project located in southern Mongolia. The estimate outlines a measured and indicated coal resource of 107.5 Mt and an additional 48 Mt of inferred resource. Resources have been estimated for only 11 of the 24 seams with the remaining 13 awaiting coal-quality data which could add in excess of 50 Mt of additional resources. QGX are continuing with infill and step-out drilling to increase the size of the resource. QGX obtained the Barun Naran license in late 2002 and began work in April of 2005. As of June 2006, QGX had drilled over 215 holes to delineate and characterize the coal. QGX’s other main asset is the Central Valley zone (CVZ) of the Golden Valley project located in western Mongolia. The CVZ contains 409,000 oz gold, 3,634,000 oz Ag and 385 Mlb Cu in measured and indicated, and an additional 693,000 oz Au, 3,270,000 oz Ag and 270 Mlb Cu in inferred resources.

Lafayette Mining has received permission for stage 3 commissioning of its polymetallic processing facility at Rapu Rapu. Stage 3 is the final regulatory approval required from The Department of Environment and Natural Resources to ramp up production from the plant, following receipt of a Temporary Lifting Order on July 10 and successful completion of stage 1 and 2 commissioning. The project was suspended by the DENR following two incidents in late 2005 involving release of minor volumes of low-level contaminated liquid.

Medusa Mining Limited has raised A$3.356M via the placement of 5,593,334 ordinary shares at an issue price of A$0.60 per share to further its
exploration in the Philippines. Medusa intends to complete the 3W shaft in the Co-O mine which will facilitate drilling of the Central vein at depth. Drilling will also be conducted for parallel veins north and south and extensions to the west and east of the Co-O mine vein zone. Medusa is hopeful that it can increase the resource to more than 1 Moz in 2007. The company is also undertaking underground exploration on the Tambis project with the aim of defining new resources and developing supplemental ore sources.

Mindoro Resources Ltd has released results from recent drilling of the Kay Tanda Au-Ag zone, located within the Archangel project. Better intersections include KT-28: 6 m @ 6.96 g/t Au (including 2 m @ 18.85 g/t Au and 4.35 g/t Ag); KT-29: 62 m @ 0.55 g/t Au from surface (including 14 m @ 1.23 g/t Au); KT-33: 54 m @ 0.39 g/t Au, and KT-34: 26 m @ 0.35 g/t Au. Results have also been reported from RC drilling on the Pulang Lupa epithermal Au-Ag zone, adjacent to the Kay Tanda zone. Highlights include PL-07: 20 m @ 0.64 g/t Au, 5.52 g/t Ag, PL-08: 3 m @ 6.11 g/t Au, 2.95 g/t Ag, PL-09: 7 m @ 2.16 g/t Au, 25.91 g/t Ag, PL-10: 53 m @ 0.59 g/t Au, 2.69 g/t Ag (including 9 m @ 1.69 g/t Au), PL-11: 16 m @ 0.63 g/t Au, 6.77 g/t Ag, PL-12: 16 m @ of 0.61 g/t Au, 1.93 g/t Ag, PL-13: 24 m @ 0.72 g/t Au, PL-17: 28 @ 1.47 g/t Au, and PL-19: 6 m @ 0.98 g/t Au, and 81.82 g/t Ag.

Sur American Gold Corp. has commenced drilling at its Tagpura Cu-Au project in Compostela Valley, Eastern Mindanao. Bench mapping and sampling within the former Tagpura open pit has returned 40 m @ 1.62% Cu, 0.85 g/t Au and 4.1 g/t Ag, less than 150 ms vertically above where drilling is initially focussed. The Tagpura Cu-Au system comprises three known Cu-Au deposits—Tagpura, Maangob, and Kalamatan—spanning a strike length of approximately 7 km. The first two deposits are predominately skarn related massive sulfide Cu-Au deposits. Kalamatan, however, is a typical Philippine porphyry Cu-Au deposit. The historic Tagpura copper project reserve (non NI-43-101 compliant) is reported as 75.6 Mt @ 0.44% Cu, 0.5 g/t Au and 4.0 g/t Ag.

TVI Pacific Inc announced it has completed additional exploration drilling on the Balabag property, located in Zamboanga del Norte. A total of 7 additional drill holes (BDDH 7 to 14) have been completed (14 in total). Interesting intersections from the latest drilling includes 8.12 m @ 6.63 g/t Au and 267.35 g/t Ag from 15.28 m, and 5.45 m @ 3.9 g/t Au and 255.77 g/t Ag from 27.95 m. TVI Pacific Inc. has also announced an independent technical report on the Gossan resource at the Canatanu mine. New technical work now estimates the Gossan resource at 2.55 Mt @ 2.43 g/t Au and 64 g/t Ag. An optimized pit to extract the proven and probable mineable reserve is estimated to contain 1.29 Mt @ 2.27 g/t Au and 62.27 g/t Ag.

**TIBET**

Continental Minerals Corp. and Great China Mining Inc. have completed 28 DD holes at the Xietongmen porphyry Cu-Au deposit. The current drilling is testing all sides of the deposit, defining the eastern and southern limits as well as stepping out farther to the north and to the west. Holes that are achieving better than 100 m @ >1 g/t AuEq (assuming US$1.25/lb copper and US$450/oz gold) include 6087: 180.5 m @ 0.52% Cu, 0.64 g/t Au (1.62 g/t AuEq), 6093: 130.8 m @ 0.54% Cu, 0.43 g/t Au (1.47 g/t AuEq), 6094: 165 m @ 0.38% Cu, 1.14 g/t Au (1.86 g/t AuEq), 6096: 160.3 m @ 0.37% Cu, 0.48 g/t Au (1.18 g/t AuEq), and 6098: 159.5 m @ 0.37% Cu, 0.88 g/t Au (1.59 g/t AuEq). Continental also raised CAN$11.5 million in August for further exploration through a one year convertible secured promissory note purchased by Taseko Mines Limited.

**TASMANIA**

Data released by the Australian Bureau of Statistics show that Tasmania has experienced the strongest growth in mineral exploration expenditure of any Australian jurisdiction over the last two years in raw, trend, and seasonally adjusted terms. In trend terms, expenditure has increased 327% to $A6.4M from the March 2004 to the March 2006 quarter, while in raw terms the increase has been 394% to $A8.4M over the same interval. Tasmania’s share of total national expenditure has increased from 1.02% to 3.47% in raw terms over the period. The Tasmanian government has announced the TasExplore project, a $A5M, four-year program of geoscientific data acquisition and promotion. Activities in 2006–2007 will include a 70,000-line-km, 200-m line spacing, aeromagnetic and radiometric survey of northeast Tasmania and Flinders Island and geological mapping in central northern Tasmania. The 3-D geological model of Tasmania will be updated toward the end of the project.

Lefroy Resources Limited has announced a further shallow high-grade gold intersection updip of previously stope material and outside the previously defined inferred resource at the Pinafore reef at Lefroy. One hole intersected 27 m of 4.3 g/t Au from 71 m, including 2 m of 28.2 g/t. The intersection is part of a zone that is being evaluated for its open-cut mining potential. Another intersection at the City of Launceston reef returned 2 m @ 13.27 g/t Au. A bulk sample was drilled from the Pinafore reef for metallurgical testing.

Allegiance Mining NL has announced that it is reviewing the possibility of treating ore from the Avebury nickel mine at a plant owned by a...
third party. If negotiations are successful, the company expects that production of nickel concentrate would be likely to commence in the first quarter of 2007. Two holes into the North Viking deposit intersected true widths of 7.9 m @ 3.9% Ni and 77 m @ 1.0% Ni. Other drilling results suggest potential to extend the Avebury resource to the east.

Bass Metals Limited has announced further significant extensions from the latest four holes at the Mount Charter Au-Ag-base metals prospect with a best intersection of 72 m @ 1.8 g/t Au, 73 g/t Ag, 0.8% Zn, and 0.2% Pb from 17 m. The drilling program has been completed and assay results are awaited from the final two holes before a resource calculation is completed. Drilling has started on a further 13 targets identified on the Hellyer mine lease, with the first hole intersecting significant alteration in the Hellyer hanging-wall position.

The Beaconsfield gold mine JV has announced a significant gold intersection in a hole at Middle Arm Gorge, approximately 2 km SE of the Beaconsfield gold mine. A mineralized shear assayed 0.20 g/t Au over 4.8 m from 587.15 m and 0.8 m of adjacent wall rocks up-hole analyzed 4.8 g/t. The structure has the characteristics of the Tasmania reef (Beaconsfield gold mine) at its western end.

Stellar Resources Limited has announced results from three new holes at the Alpine prospect, 10 km S of Corinna: 49 m @ 0.39% Cu from 42 m, 86 m @ 0.5% Cu from 62 m, and 41 m of 0.48% Cu from 29.8 m. Zinifex Limited added 1.9 Mt to the Rosebery resource (before mining depletion of 0.7 Mt) during the year to 31 March 2006. Drill intersections have an average width of 8 m and grades of 15% Zn, 4.8% Pb, 0.4% Cu, 156 g/t Ag, and 2.3 g/t Au. Zinifex has substantially increased the exploration and development budget at Rosebery by an additional $A19M over the next three years.

Frontier Resources Ltd (formerly TasGold) announced a number of narrow intersections of gold mineralization at shallow depths in hornfelsed Mathinna Group turbidites at the Panama prospect, near Golconda in NE Tasmania. Best results were 0.5 m at 5.8 and 7.5 g/t Au in separate holes. Assays are awaited on sulfide-bearing granodiorite, intersected in two holes at the Gold Crest prospect, 2 km to the NE, where a third hole is planned.

Van Dieman Mines has announced that it intends to commence alluvial tin and gemstone mining later this year at the Scotia deposit near Gladstone in NE Tasmania and has an off-take agreement for tin concentrate and marketing of gemstones. A gemstone market has been identified for the spinel by-product.

QUEENSLAND

BMA Gold Ltd have intersected new mineralized zones at the Twin Hills deposit including 33 m @ 5.7 g/t Au and 5 m @ 14.3 g/t Au immediately to the east of the known deposits. Drilling has intersected a shallow zone of mineralization that is potentially an offset extension of Area 1 and a high-grade zone that may represent the high-grade feeder system to Area 3. Should additional drilling continue to prove successful, these zones could add significant new production sources to the 309 operation.

The latest figures from Conquest Mining Limited at Silver Hill include indicated and inferred resources estimated at a total of 3.8 Mt at 1.76 g/t Au, 82 g/t Ag, and 0.56% Cu; for 215,000 oz Au, 10 Moz Ag, and 21,400 t Cu. The following recent drilling is not included in these figures. Hole HC06RC39 intersected a zone of sulfide mineralization from 53 m depth with 28 m @ 4,350 g/t Ag, 0.71 g/t Au, and 5.9% Cu. Hole HC06RC74 (100 m east of the recent high-grade hole HC06RC39) intersected 24 m @ 10.6 g/t Au from 80 m depth. The hole finished in 6.95 g/t Au, and has since been extended to 116 m. All assays are from preliminary 4-m composite samples. Further assays are awaited for the interval 104–116 m depth. Encouraging results were also intersected in hole HC06RC72 with 32 m @ 1.66 g/t Au, 28.8 g/t Ag, and 0.37% Cu from 104 m depth.

In August, CopperCo Limited announced a new discovery of oxide mineralization delineated to the northwest of Flying Horse to be known as Flying Horse Extended. Best results included 31 m @ 2.0% Cu from 47 m, and 25 m @ 1.48% Cu from 59 m. Drilling has now confirmed that the mineralization extends 200 m NW of the Flying Horse orebody and is up to 100 m wide. Further infill results confirm continuity along the Mount Clarke extended zone. Best results include 37 m @ 1.52% Cu from 20 m, and 11 m @ 1.40% Cu from 45 m.

Copper Strike Ltd has announced assay results from the last four holes of a nine-hole program which have further opened up the potential for significant Zn-Pb-Ag mineralization at Chloé, located 20 km southwest of Einasleigh.
in North Queensland. The best result was in drill hole CH07 which intersected 8 m containing combined 8.7% Zn + Pb and 87 g/t Ag.

Diatreme Resources Ltd has completed 12 RC holes (totaling 1,050 m) at the Oaky Creek copper prospect (12 km NW of Clermont). Some of the drill holes intersected strata-bound massive pyrite and chalcopyrite mineralization within a banded, siliceous ironstone unit. Best assay result was obtained from drill hole OCR004, with 5 m @ 1.47% Cu from 44 m depth.

Encouraging gold zones were intersected within silica and sulfide-altered tonalite during a 6 RC drill hole (totaling 910 m) program at the Yarrol gold prospect (25 km southeast of Monto). Significant intersections include 4 m at 1.9 g/t Au from 143 m depth (YARC93), 2 m at 3.3 g/t Au from 93 m depth (YARC93), and 32 m at 0.37 g/t Au from 27 m depth (YARC92).

Fourteen RC drill holes totalling 2,605 m have been completed at the Mount Cannaindah Cu-Au project (Queensland Ores Ltd). Assay results have been received for six holes and confirm results obtained from nearby historic drilling. Significant intersections include 14 m @ 3.84 g/t Au, 0.80% Cu, and 25 g/t Ag, and 34 m @ 0.70 g/t Au, 1.96% Cu, and 34 g/t Ag. Further drilling is planned to provide information on structure and post-ore intrusive dikes and obtain metallurgical test samples. Mount Cannaindah contains indicated and inferred resources of 6.5 Mt @ 1% Cu, 0.3 g/t Au, and 18 g/t Ag.

NEW SOUTH WALES

The NSW Department of Mineral Resources reports that the state has now moved into third place behind Western Australia and Queensland when rated by exploration expenditure, with over A$29M spent in the March quarter, a 66% increase on the same period in 2005. Much of the increase will be spent on exploration for copper and coal.

Following the commencement of production at Barrick’s Cowal open-cut gold mine in April (planned annual output of 270 Koz from a reserve of 47.5 Mt @ 1 g/t Au), Straits Resources has announced the go-ahead for their Hillgrove underground Sb-Au mine with production to commence early next year at an initial annual rate of 10 Kt Sb and 20 Koz Au (90 Koz Au equiv. annual rate). It is expected that in time the mine will become the largest Sb producer in the world outside China.

A number of explorers in the Lachlan fold belt (“LFB”) have had success recently. Tritton Resources (currently mining the Tritton Cu-Au massive sulfide deposit east of Cobar where the initial resource was 14 Mt @ 2.7% Cu and 0.3 g/t Au) has been drilling the sulfide zone beneath the mined-out Murrawombe oxide Cu deposit (located 20km N of Tritton) with positive results including 107 m @ 1.7% Cu from 290 m depth.

Also in the LFB but closer to the regional center of Orange, the Newmont-Alkane JV has intersected interesting gold mineralization in an initial shallow drilling program at McPhillamys prospect on the Moorilda project, where recent holes include 24 m @ 2.03 g/t Au from 4 m depth and 81 m @ 0.60 g/t Au from surface. To the north of Orange and following recent drilling success, Golden Cross Resources has announced an increase in the resource at its Copper Hill Cu-Au porphyry style deposit to 136 Mt @ 0.33% Cu and 0.32 g/t Au (4.7 Moz Au equiv. contained metal), and has intersected encouraging Cu-Au mineralization at the Copper Hill North prospect 400 m N of the main deposit.

There have been several developments in the same district as the Cowal gold mine. Newcrest (operator of the major Cadia-Ridgeway Au-Cu mine near Orange) has announced the results of drilling at its Marsden porphyry Au-Cu project, including 85 m @ 0.91 g/t Au and 1.1% Cu, and 171 m @ 0.82 g/t Au and 0.70% Cu. Also, Goldminco has revised the resource at The Dam project to 27.7 Mt @ 0.6 g/t Au and 0.4% Cu.

New England fold belt explorer Malachite Resources has attracted Newmont as a JV partner for its flagship Tooloom gold project, and has announced further high-grade poly-metallic drill intersections at its Conrad Ag project where recent holes testing the King Conrad section of the lode system have included 4 m @ 278 g/t Ag, 0.72% Cu, 2.61% Pb, 0.99% Zn, 0.68% Sn, and 13 g/t In (767 g/t Ag equiv.). Recent drilling at Conrad has recorded potentially significant levels of indium (up to 63 ppm) in the massive sulfide veins, with current In prices at triple the current Ag price.

SOUTH AUSTRALIA

Oxiana has announced that it will proceed with the construction of the Prominent Hill Cu-Au mine, located 650 km from Adelaide and 130 km NW of Olympic Dam in the Gawler craton. The $775M project has an initial mine life of 10 years with an annual proposed production of 8 Mtpa. The mine resource is currently 79.2 Mt at 1.24% Cu and 0.58 g/t Au. Annual production from the open pit material is estimated for the first four years at 104,000 t of Cu, 115,000 oz gold and 400,000 oz silver contained in concentrates from a conventional Cu-Au flotation plant. Metallurgical test work indicates recoveries of 86% for Cu and 77% for Au. The concentrate will contain an estimated 45% Cu, 19 g/t Au, and 57g/t Ag, with production costs at US 73c/lb after gold and silver credits. First ore to the mill is planned for 1 July 2008 with first commercial production in September 2008.

The surface outline of the pit is planned to be 1.2 km wide by 1.4 km long by 480 m deep. Known mineralization occurs 800 m along strike and to a depth of 700 m and is currently open to the east and west and at depth. Current resources are 118.7 Mt at 1.3% Cu and 0.5 g/t Au (with contained metal of 1.54 Mt copper and 1.87 Moz Au). The eastern gold-only zone comprises 22.5 Mt at 1.24 g/t Au, containing 900,000 oz gold.

Mineralization is associated with haematite-rich hydrothermal breccias that have undergone intense multi-phase iron-sericite-silica alteration within a volcanic environment. Host rocks are interpreted as sediments and volcanics in contrast to the predominantly granite at Olympic Dam. Both deposits are considered directly associated with the Gawler Range Volcanics and associated Hiltaba Suite magmatic event at c. 1600 Ma.

NORTHERN TERRITORY

North Australian Diamonds has recovered diamonds from bulk sampling of a previously untested pipe at the Merlin diamond mine in the McArthur basin. The previously known but untested Perceval pipe returned a grade of 57 carats per hundred tonnes with 3 diamonds in excess of 1 ct, these being 1.72 cts, 1.32 cts and 1.08 cts.

Westgold Resources NL has acquired 100% of the Explorer 108 Zn-Pb prospect after intersecting significant mineralization in altered dolomite and volcanic rocks at a location 90 km SW of Tennant Creek.
Significant intersections include 70 m at 5.4% Zn, 2.7% Pb, 16.6 g/t Ag from 280 m; 8 m at 15.7 g/t Au, 1.9% Zn, 4.4% Pb, 24.1 g/t Ag from 388 m; and 12 m at 2.2% Zn, 1.4% Pb, 7.3 g/t Ag from 400 m. The drilling confirms a well-developed Zn rich mineralized system below 200 m of cover, which remains open in all directions. Other drilling at the Explorer 142 Cu-Au prospect returned a significant intersection of 20 m @ 3.1% Cu, 0.24 g/t Au, 0.006% Bi, and 0.09% Co from 471 m.

**VICTORIA**

The first gold bar from Bendigo Mining’s Kangaroo Flat mine was poured on 13 July, marking the first gold production from the Bendigo gold field since 1954. Drilling during the quarter defined the Greater Garrard reef over 800 m, including an intersection of 11 m @ 17 g/t Au, discovered the Railway reef with an intersection of 12 m @ 10 g/t Au and unexpectedly encountered mineralization in the synclinal position of the Deborah Line (the majority of historical production is associated with anticlinal positions).

Underground diamond drilling by Ballarat Goldfields continued to identify extensive gold mineralization associated with the Mako fault near the Blue Whale fault including 2 holes containing 2 m @ 31.2 g/t and 9 m @ 7.7 g/t, respectively. Results from drill testing of two targets in close proximity to the planned decline confirmed high-grade gold mineralization at both target locations, with a best result of 3 m @ 11.9 g/t.

Leviathan Resources reported that an intersection of 12.3 m @ 12.5 g/t Au/t on the northeast flank of the Wildwood prospect has led to a significant reappraisal of the prospect. A diamond hole on the northwest flank of the Wal Wal target, a 3-km basalt dome, returned 0.8 m @ 6 g/t Au/t from 179.3 m. A diamond hole drilled beneath an aircore Au-As anomaly at Tandarra, under shallow (30–100 m deep) nonmineralized cover, recorded low-level gold mineralization in rocks with similar fold structures, rock types, quartz veining and alteration to the Bendigo gold field.

At the Wirrawilla project of Perseverance Corporation, drilling has extended the zone of economically significant mineralization to greater than 800 m. Significant intersections included 9.4 m @ 4.2 g/t Au; 11.1 m @ 3.4 g/t Au and 8.0 m @ 3.0 g/t Au. Interpretation indicates strong potential to develop additional major ore shoots at depth. Significant intersections, e.g., 16.0 m @ 3.5 g/t Au and 1.2 m @ 10.5 g/t Au; 4.3 m @ 3.1 g/t Au and 5.0 m @ 4.7 g/t Au; 10.0 m @ 2.2 g/t Au, in RC and diamond drilling have significantly upgraded the potential of the Farley’s area.

At Ararat, where Newcrest Exploration Ltd is earning 70% from Range River Gold, Newcrest received encouraging results at Petticoat Gully, 9 m @ 0.97 g/t Au and 1,558 ppm As from 62 m, and 5 m @ 1.2 g/t Au and 1,840 ppm As from 108 m in adjacent holes. At Langi Logan, strong secondary Au anomalism and ferruginous quartz veining was encountered in two holes, including 1 m @ 0.73 g/t Au and 5,400 ppm As at the bottom of hole.

**WESTERN AUSTRALIA**

De Grey Mining is claiming the discovery of a new volcanicogenic massive sulfide-style belt in the Tabba Tabba greenstone belt, approximately 60 km S of Port Hedland in the Pilbara. Drilling of geophysical anomalies within a felsic volcanic unit intersected Zn-Pb-Cu-AgAu mineralization at a number of prospects along a 15-km strike length. Reverse circulation drilling at its most advanced prospect, Orchard Tank, returned 17 m @ 4.6% Zn, 1.8% Pb, 124 g/t Ag, 0.8 g/t Au, and 0.2% Cu from 165 m; 16 m @ 3.8% Zn, 1.8% Pb, 167 g/t Ag, 1.2 g/t Au, and 0.2% Cu from 118 m; and 7 m @ 4.4% Zn, 1.6% Pb, 212 g/t Ag, 1.3 g/t Au, and 0.2% Cu from 165 m. Drilling at 3 other locations along strike have also produced encouraging results.

New drilling by JV partners SIPA Resources and CBH Resources at the Panorama Zn-Cu VMS project in the Pilbara, 120 km SE of Port Hedland is firming up the size and shape of the Kangaroo Caves deposits. The best intersections include 9 m at 13.3% Zn and 1.9% Pb from 63 m, followed by 56 m at 6.8% Zn and 1% Cu from 95 m in the same hole. An update of the existing resource at Kangaroo Caves (1.7 Mt @ 9.8% Zn and 0.6% Cu) is expected to help in getting economic support for plans to develop the Sulphur Springs deposit, located 6 km north. Sulphur Springs has a resource of 13.8 Mt at 3.7% Zn, 1.4% Cu and 21 g/t Ag, including a high-grade zone of 8.5 Mt at 5.2% Zn, 1.9% Cu, and 25 g/t Ag.

**NEW ZEALAND**

In the Taupo Volcanic Zone, Glass Earth Ltd defined a 2.2 x 0.7 km coincident geophysical and geochemical anomaly at its Tahunaatara epithermal gold prospect. A 357-m drill hole intersected 70-m true width of adularia-sillimanite-smectite-quartz-chalcedony alteration hosting pyrite, arsenopyrite, and trace gold.

In the South Island, OceanaGold completed additional drilling at the Supreme orogenic gold prospect, 2.5 km S of Globe-Progress in the Reefton gold field, to bring the total number of holes to 15 for 1,716 m. The mineralized structure has an average thickness of 12 m and dips moderately to the SE. A preliminary inferred resource of approximately 60,000 oz Au has been estimated. OceanaGold and Climax Mining Ltd have announced plans to merge and undertake JV development of the Dinkidi Au-Cu porphyry deposit in the Philippines.

Ophir Gold Ltd completed a 17-hole diamond and RC drilling program at its Wai-iti orogenic gold prospect at Ophir, 70 km NW of the Macraes gold mine. Shear zone-hosted gold mineralization was intersected over a strike length of 350 m and from surface to a depth of 70 m, and is open-ended along strike and at depth. Key intersections included 7 m @ 5.79 g/t Au, 6 m @ 4.47 g/t Au, and 5 m @ 6.23 g/t Au.

Australasia Gold Ltd drilled 8 RC holes totalling 671 m into a paleochannel target at the Weatherstones placer gold deposit in Otago, and intersected grades mostly between 0.1 and 1 g/t Au, with a peak value of 5.5 g/t Au, in the contact zone of the gravels with base-mant chert.

**PAPUA NEW GUINEA**

New drilling by JV partners Madison Minerals and Buffalo Gold at the Mt Kare gold prospect near Porgera in the PNG Central Highlands returned significant intersections, including 114.8 m @ 4 g/t Au, 9.1 m @ 13 g/t Au, and 56 m @
can be produced at Maskwa. Drilling at Mustang’s Mayville property, 35 km north of the Maskwa deposit, has partially outlined a large, low-grade, copper-nickel deposit called the M2 zone. With over 70 drill holes completed, M2 has been intersected over a 1.2-km strike length and remains open along strike and at depth. Mustang recently commissioned an independent mineral resource calculation for M2.

Copper-zinc producer Hudbay Minerals boosted exploration spending to $10M per year for 2005 through to 2007. The company has been focusing on drilling airborne geophysical targets in the Flin Flon, Snow Lake, and Hargrave Lake-Moose Lake areas as well as structural and geological targets around existing and past-producing mines. Hudbay also has a number of small known deposits in the Snow Lake area that have been the subject of additional drilling and are returning some positive results. Recently negotiated option agreements with junior explorers Margor Resources and Halo Resources on some highly prospective Hudbay properties will stimulate base metal exploration in the Flin Flon-Snow Lake belt.

In August, San Gold Corporation poured its first gold bars at the rejuvenated Rice Lake mine in Bissett in southeastern Manitoba. The mine and 1100-tpd mill, purchased from Harmony Gold in 2004, commenced commercial production in April. The Rice Lake mine contains total measured and indicated reserves of 1.15 Mt grading 8.9 g/t Au. The company also brought the San Gold #1 deposit into production this year. Located just east of Bissett and accessed by a new decline, San Gold #1 contains 257,000 t of 7.5 g/t Au and will supply additional feed to the Rice Lake mill. There are two other gold zones along strike of the San Gold #1 deposit that could supply future mill feed. In addition, San Gold discovered the Cartwright zone located 1 km west of the mill property in the spring which is returning grades and thicknesses similar to the Rice Lake mine.

Rolling Rock Resources acquired the Monument Bay gold project in northeastern Manitoba from partners Bema Gold and Wolfden Resources. Since 1999, drilling by Wolfden and Bema had considerably expanded the gold resource outlined by previous operators. An NI 43-101 compliant technical report prepared on behalf of Rolling Rock determined the Monument Bay property contains an inferred mineral resource of 3.379 Mt grading 6.456 g/t Au, at a 3 g/t Au cutoff. Rolling Rock intends to carry out additional drilling to improve the geological model and mineral resource estimate and expand the resource along strike.

NOVA SCOTIA

Acadian Gold Corp. continues to cut impressive gold intersections at its Beaver Dam property, located in the central part of the eastern Meguma terrane. Drill holes of particular note include BD2006-56, which intersected 27.0 m grading 2.50 g/t Au, and BD2006-70, which intersected 49.0 m grading 2.12 g/t Au. To date, Acadian has drilled over 120 holes with a high percentage intersecting wide intercepts, supporting the potential for a bulk tonnage, open-pit gold mine at this site. Drilling is currently continuing as an evaluation program proceeds to further investigate the potential of developing Beaver Dam as an open pit. In addition, Acadian has filed its 43-101 compliant resources, reserve, and feasibility study for its Scotia mine project at Gays River. Start-up work is underway.

Burnt Point Resources Inc. is drilling 32 holes (3,800 m) on its porphyry-style, Cu-Mo-Au deposit in eastern Cape Breton Island. The deposit is hosted by the late Precambrian, Coxheath plutonic-volcanic belt, where large zones of agrillic alteration containing pyrophylite, alunite, topaz, diaspore, and kaolinite are being targeted.

D.D.V. Gold Ltd., a wholly owned subsidiary of Atlantic Gold NL, is continuing its feasibility study on its 90,000 ounce-per-year open-pit Touquoy Gold project. In addition, the company is conducting an extensive RAB drill program throughout various parts of the Meguma terrane of southern Nova Scotia looking for additional Touquoy-style, disseminated, and vein gold mineralization.

Fundy Gypsum Company Ltd. near Windsor is drilling to extend its open-pit resource, and Moose River Resources has discovered additional vein and disseminated gold reserves in the Moose River gold district. Candor Ventures Corp. is investigating a “major alteration-fault zone” which contains chalcopyrite and bornite mineralization at its Black River project near Riverdale, Colchester County. Xstrata Coal and its Xstrata Donkin...
Mine Development Alliance have uncapped the entrance to the Donkin tunnels and intend of commence dewatering and rehabilitation of the decline at their Cape Breton project site. This will allow Xstrata and its partners to pursue evaluation and feasibility of mining the estimated 200 Mt Donkin thermal and metallurgical coal resource located off the coast of Cape Breton Island in the Sydney coalfield.

**NEW BRUNSWICK**

Freewest Resources Canada Inc. announced that a 120-kg representative sample of diamond drill core from the Clarence Stream Central zone has been sent to Mintek in South Africa to conduct a bench-scale mineral beneficiation test. In anticipation of eventual commercial production, a new haul road is being constructed to access the Central zone and other proximal gold deposits of the Main zone. Assay results from recent diamond drilling completed at Clarence Stream included 40.6 g/t Au over 0.3 m in hole CS06-208 from the proximal West zone; 34.5 g/t Au over 0.5 m in hole CS06-212 from the proximal Cox zone; and 15.2 g/t Au over 5.0 m in hole AD06-86 from the distal AD-MW zone.

El Nino Ventures Inc. announced that it has entered into an option agreement with Falconbridge Limited (now Xstrata) to explore for base metals in northern New Brunswick. The Vancouver-based company has an opportunity to earn a 50% interest in Falconbridge’s mineral properties covering 108,800 ha in the Bathurst Mining Camp. El Nino is required to spend $5.0 million on exploration by March 31, 2008, with a minimum expenditure of $2.5M by March 31, 2007. Approximately 24,000 m of diamond drilling comprising about 34 diamond drill holes is anticipated to be completed during the first year of the program.

Stratabound Minerals Corp. recently drilled 17 holes (1,362 m) on its Elmtree Gold property near Bathurst in northern New Brunswick. The drilling program was successful in finding three significant new zones of gold and base metal mineralization. Hole 2 encountered grades of 1.98 g/t Au, 43.1 g/t Ag, 1.83% Zn, 2.29 % Pb, and 1.34% Sb over its full 9.1-m length.

**NEWFOUNDLAND AND LABRADOR**

Puma Exploration reported assays of 3.470 g/t Ag and 30 % Pb from a surface sample taken from the Cullinan showing on its Nicholas-Denys property in northern New Brunswick. This showing, located approximately 200 m north of the Henry zone, occurs in several parallel, massive sulfide veins varying between 10 to 30 cm in thickness. Significant precious metal values were obtained from two surface samples from the Great Northern showing located 1.4 km to the west of the Henry deposit.

Blue Note Metals Inc. reported that it has completed the acquisition of the Caribou and Restigouche mines from Canzino Ltd., a wholly owned subsidiary of Breakwater Resources Ltd. Proceeds of the $75M raised by Blue Note will be used to begin the process of restarting the Caribou mine in 2007.

GeodeX Minerals Ltd. reported a drill-hole intersection on the Sisson Brook property in central New Brunswick of 306.6 m grading 0.06% WO3 and 0.03% Mo.

Exploration for uranium has grown dramatically, driven by steady increases in prices, and the Central mineral belt (CMB) of Labrador is now the major focus for uranium exploration in eastern Canada. The most advanced projects in the district focus upon deposits initially discovered and partly developed in the late 1970s. Aurora Energy Resources holds the Michelin deposit, a large disseminated uranium deposit hosted by felsic metavolcanic rocks. Recent work area has recognized the importance of structural controls, leading to downdip and downplunge drilling that has now increased the total resource to almost 36 Mlb U3O8, of which 22 Mlb are measured and indicated. The company plans to further test the Michelin resource and several other newly discovered zones in 2006. Another important CMB project is at Moran Lake, where Crosshair Resources continues to explore the C Zone deposit, which presently contains a measured resource of about 4 Mlb U3O8. Crosshair interprets the Moran Lake C Zone as a uraniferous IOCG-type deposit and is also exploring several other targets with similar characteristics. An updated resource estimate will be released later in 2006.

Other companies emphasizing IOCG-type models in this part of Labrador include Monster Copper and Santoy Resources. Labrador also includes Mesoproterozoic sedimentary sequences of similar age to the Athabasca Basin, and some of these are now attracting exploration for unconformity-style deposits by Consolidated Abaddon Resources. Grassroots exploration programs are underway in many other parts of Labrador. These programs include those by Bayswater Uranium Corporation in Archean terranes, and Silver Spruce Resources in the Mesoproterozoic Grenville Province.

The island of Newfoundland is less well known as a uranium district, but it also has potential. Altius Resources and JNR Resources are exploring for sandstone-hosted (“roll-front”) deposits in the Carboniferous Deer Lake basin of western Newfoundland. Here, exploration in the late 1970s discovered numerous high-grade boulders, containing up to 11.5% U3O8, 2.5% Ag, and 404 g/t Au. In 2006, geophysical surveys and a drilling program will seek the bedrock source of this alluring material. In southern Newfoundland, Commander Resources and Bayswater Uranium Corporation continue to explore the Hermitage Flexure area, where Commander Resources has reported assays up to 3.1% U3O8. Mineralization here mostly occurs along the contact between felsic volcanic and metasedimentary rocks, and exploration is still at an early stage; initial indications suggest strata-bound mineralization. Hot Rock Uranium Corporation is also active in the Hermitage Flexure region and in western Newfoundland, near Stephenville. With the opening of Inco’s Voisey’s Bay mine in 2005, Newfoundland and Labrador is now a major world supplier of nickel. Voisey’s Bay will also produce large amounts of copper and cobalt. Exploration for nickel in Labrador continues in 2006 at Voisey’s Bay and at several other sites. The continued potential of Voisey’s Bay for expansion is underlined by a recent intersection from the Reid Brook zone of 75 m grading 2.9% Ni. Other targets are Mesoproterozoic mafic intrusions, notably those containing troctolite and...
olivine gabbro. Celtic Minerals commenced drilling in July on its West Voisey’s Bay property, where several deep conductors are interpreted to be hosted in a buried continuation of the main Voisey’s Bay Intrusion. In western Labrador, Brilliant Mining is drilling geophysical targets on the margin of the Michikamau Intrusion, which is known to host low-grade orthomagmatic sulphide mineralization at surface. Also in western Labrador, Gallery Resources intersected orthomagmatic sulphide mineralization in a thick sill assigned to the Mesoproterozoic Shabogamo Intrusive Suite. Although copper and nickel contents are low, their 2005 discovery highlights an interesting new exploration environment. Cornerstone Resources holds several nickel properties in Labrador, and is actively seeking Joint Venture partners. Several other important Ni-Cu-Co targets in Labrador defined by the exploration boom of the late 1990s are not being explored in 2006. Prominent among these are the Pants Lake Intrusions, widely considered to be the closest analogues to Voisey’s Bay in Labrador. Disseminated mineralization is widespread in this area, and work in the late 1990s defined thin massive sulphide zones, one of which contained over 11% Ni. Renewed exploration of this area is anticipated in the coming years. The island of Newfoundland has received less attention for Ni-Cu-PGE exploration, but potential environments exist among mid-Paleozoic mafic intrusions, where several magmatic sulphide showings are known. Ni-PGE showings are also known in Mesoproterozoic anorthisite complexes in western Newfoundland.

Near the scenic village of Grey River, on the island’s south coast, Playfair Mining is actively exploring a hydrothermal vein deposit that has an historic resource of almost 0.5 Mt grading 0.97% WO₃. Surface and underground drilling in 2006 is aimed at increasing the total resource, focusing on the area below the present adit. Playfair Mining is also exploring the tungsten potential of the Granite Lake region of the central Newfoundland. Tungsten and molybdenum showings also occur in other parts of southern Newfoundland, where they are mostly associated with post-tectonic granites of Devonian age.

**EUROPE**

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Europe’s most notable exploration news in the third quarter of 2006 comes not in the form of drill intercepts and hard data, but the striking difference in the effects of business environments on fostering mineral development and jobs between the regions. Mine construction at Agnico Eagle’s major new Suirikku-sikko Au mine in Finland progresses quietly and smoothly, and the Finnish government invests funds in its junior companies, whereas in Bulgaria, both Dundee and Euromax suffer from various political and other roadblocks to progress, stalling their investments. Meanwhile, Rosia Montana shows encouraging steps toward final approvals for an eventual major mine development.

**ARMENIA**

Dundee Precious Metals agreed to acquire 80% of Vatrin Inc for approximately $32M in cash and investment commitments. The latter, through Deno Gold Mining Company, owns the Kapan Cu mine, southern Armenia. Kapan’s 1989-era Soviet C1+C2 resource, based on 290 km of drilling and 32 km of channel sampling, comprises the Cu-rich Central deposit (2.9 Mt of 0.99% Cu) and the polymetallic Shahumyan deposit (12.4 Mt 0.56% Cu, 2.5% Zn, 0.2% Pb, 50 g Ag, and 2.5 g Au), which remains open at depth and possibly along strike. At Shahumyan, vein arrays covering 2.5 × 1.5 km in size are hosted in strongly altered dacite, andesite, and basalts. Central is a quartz-carbonate-sulfide (chalcopyrite and pyrite) vein array with porphyry affinity. Dundee plans to expand the current 300,000 tonnes per year underground operation and introduce open-pit mining to reach the milling capacity of over 1 Mt per year—perhaps an “insurance policy” for its Cu production should Bulgaria continue to make its much-needed Chelopech expansion possible.

**AZERBAIJAN**

Anglo-Asian Minerals reports encouraging intercepts at it high-sulfidation Gedabek AuAg(Cu) target, including 50 m of 2.40 g Au, 9.79 g Ag, and 0.12% Cu.

**BULGARIA**

The extended commodities boom has seen Bulgaria’s exploration news marred by erosion of its once-sound national resource policy and efforts at rule-of-law. The Ministry of Environment and Waters, local law enforcement agencies, and dubious groups such as “Green Balkans” thwart Dundee Precious Metals and Euromax Resources with a mix of legal actions, selective law enforcement, and bureaucratic impasses.

The Bulgarian Court denied Dundee’s claim that the Ministry had failed to rule on the Kumovgrad Au environmental impact assessment within allowable time limits. Dundee will appeal and considers action in international courts. In the face of a similar impasse on permitting their Chelopech AuCu expansion, as well as citing the “weakening market for arsenic-bearing concentrate,” Dundee could face slowdowns in Chelopech production and Bulgaria may well see these investment dollars go elsewhere.

Euromax Resources, having already overturned two dubiously founded court orders against its exploration program at Popintsi-Petelovo Au, went on the offensive and launched a defamation suit against parties that allegedly published inaccurate and defamatory statements about Euromax’s work at Popintsi Au.

Nonetheless, Euromax returned notable trench results at Popintsi, including 131 m @ 2.1 g Au in trench P5, as well as some very encouraging results at the Nadezhda zone of its intrusion-related Trun Au target, western Bulgaria. At Nadezhda, silicification and narrow vein stockwork occur close to a dacite porphyry dike hosted in a 2.5 × 1.5 km equigranular granodiorite complex. The mineralized zone has now been traced discontinuously over a strike length of 1,500 m, width of up to 70 m, and a vertical elevation range of 300 m. Channel sampling in newly excavated trenches has been completed over 300 m of strike, with the better results, at a 1 g/t cut-off grade, including...
20 m @ 10.5 g/t Au including 3 m at 59 g Au. Visible gold is locally abundant and to the surprise of the region’s geologists, was somehow missed by the millennia of civilizations that so carefully prospected and mined gold elsewhere in the Balkans.

**CYPRUS**

Eastern Mediterranean triggered a preliminary feasibility study on Kirou CuZn, where JORC-compliant resources now are 4.4 million tonnes (Mt) at 0.84% Cu equiv. (Cu + Zn).

**IBERIA-SPAIN**

Rio Narcea’s regional exploration at Ossa Morena (Spain and Portugal) focused on evaluation of nickel and gold stream sediment anomalies. In addition, continued evaluation has outlined new targets at Guigarro-Chocolatero Au, one of several gold targets along the Bodonal-Cala gold belt, evaluated for large Fe-Cu-Au systems. Drill testing of new targets is planned for the third quarter of 2006.

**IBERIA-PORTUGAL**

Eurozinc now holds 2,683 km², covering most of the Iberian pyrite belt from the Spanish border in the southeast to the Lousal mine in the northwest, a distance of over 100 km. The five concessions cover the favorable stratigraphy that hosts, and is on strike of, the Neves-Corvo, Aljustrel, Lousal, Juliana and Sao Domingo mines. Targets identified from re-processing of geophysical and geologic data will be prioritized and drill-tested starting sometime in the 4th quarter of 2006, continuing through 2007. The company has committed US$10M to mine-site and regional exploration.

**ROMANIA**

Carpathian Gold Inc. continues to intersect and expand AuCu mineralization at its Cnolic porphyry target, Apuseni mountains, including 546 m at 0.61 g Au/t and 0.30% Cu. This Au(Cu) porphyry has now been traced over an area of roughly 400 × 400 m and is associated with a magnetic high.

European Goldfield’s has established a clear path to applying for permits to develop its 80%-owned Certej Au deposit (reserves of 27.7 Mt at 2.0 g Au and 11.6 g Ag). It recently completed all necessary Environmental Impact Assessments (Levels I and II) for the Certej project, and is now actively conducting various additional studies in support of its permit application. European Goldfields already holds a mining permit for Certej.

**Greece**

Juniors move forward with optimism in Greece: Frontier Pacific announced the award of an engineering contract to Aker Kvaerner Engineering Services Ltd. for updated capital cost and produced a schedule for the Perama Hill Au deposit. European Goldfields reports that SRK’s new minable reserve estimate for the Skouries CuAu porphyry deposit, based on updated metal price forecasts and an optimized mine plan, now totals 146.2 Mt, 0.83 g/t Au, and 0.54% Cu.

**Slovakia**

Touringan Gold Corporation discovered a new 20-m-wide tectonized epithermal silicified breccia-vein system during drilling in the immediate vicinity of the proposed tailings facility at Kremnica South, which may be a continuation of the Šturec Au epithermal vein system.

**Finland**

Most significant news from Finland is the formal announcement by Agnico-Eagle Mines Ltd of plans to open the Suurikkuusikko (Kittilä) gold mine. Construction started in June and the mine is expected to be in production by mid-2008. Reserves are 14.2 Mt @ 5.16 g Au, and planned production is 150,000 oz per year with a mine life of 13 years.

Nordic Mines added resources at Laivakangas, western Finland, which now contains measured 0.38 Mt @ 2.33 g Au, indicated 1.06 Mt @ 2.4g Au, and inferred 6.96 Mt @ 2.4 g Au. Dragoon Mining NL has started underground drilling at Orivesi mine, and reports of intercepts including 3.5 m @ 11.1 g and 1.5 m @ 22.1 g Au. Mining is now expected to re-start at Orivesi in early 2007.

A prefeasibility study at the Keivitsa property of Scandinavian Minerals Ltd. in northern Finland indicates a combined proven and probable reserve of 66.8 Mt @ 0.295% Ni, 0.427% Cu, 0.014% Co, 0.141 g Au, 0.196 g Pd, and 0.303 g Pt (cutoff at 0.18% Ni). Vulcan Resources Ltd has acquired the Haukialo deposit in NE Finland where the resource estimate is 27 Mt @ 0.24% Ni, 0.36% Cu, 1.0 g PGE. A new domestic company, Magnus Minerals Ltd, acquired 21 base metal properties in SW and central Finland, including the closed Aijala, Kangasjärvi, Metsämonttu, and Orijärvi Zn-Cu, and Hälvälä and Makola Ni-Cu mines.

North American Palladium took over the Arctic platinum project JV in northern Finland from GoldFields to update this potentially large PGE mining project. In uranium, Cooper Minerals Inc has extended its activity by buying the Namura Finland Oy which holds tenements to over 27 known U occurrences in central and northern Finland.

Sunrise Diamonds plc reports locating another diamondiferous kimberlite pipe from the Kuusamo cluster in NE Finland. Sunrise has also got into a JV with Nordic Diamonds Ltd under which the former may earn up to a 75% interest in claims covering 16 of the 20 known kimberlite pipes in the Kuavi-Kuopio area of south-central Finland.

European Diamonds plc reports that from a 502-t sample of kimberlite from the Lahtojoki pipe, 74 carats of diamonds greater than 1 mm in size have...
been recovered, and that the grade for the 502 t is 14.77 carats per hundred tonnes.

As an indication of government support for the private mining sector in Finland, Finnish Industry Investment Ltd, which is fully owned by the state, has since April 2006 invested EUR 1.25M in Belvedere Resources Ltd, EUR 290.000 in Scan Mining Ab, and EUR 1.5M Vulcan Resources Ltd. All of these junior companies have their main activities in Finland, Belvedere being diversified into gold and base metals, Vulcan in base metals, and Scan Mining in gold.

**SWEDEN**

Lundin Mining Corp. (90%) and International Gold Exploration (10%) work in the Norrlden massive sulfide, comprised of two closely spaced, steeply dipping massive sulfides extending to 225 m depth. Indicated plus inferred resources total about 1.6 Mt of 4.5% Zn, 0.4% Pb, 0.8% Cu, 0.8 g Au and 59 g Ag. Ongoing exploration will target the open downdip extension about 500 m below surface with TEM surveys and two phases of drilling.

While testing the edge of a combined TEM-magnetic anomaly at Copperstone, Lundin Mining discovered a new zone of copper-rich sulfide called Sandberget, 5.5 km northwest of the Eva massive sulfide. Hole LSB06001 intercepted 2.1% Cu over 3 m at 66.85 m depth, hosted by strongly altered felsic volcanic rocks and associated with strata-bound pyrrhotite and chalcopyrite stringers, commonly associated with massive sulfides. Assays show a 30-m-thick horizon with anomalous copper values and minor gold enrichment suggesting that the intersected strata-bound copper mineralization could be the proximal edge of a new massive sulfide center represented by the main geophysical anomaly. Additional drilling is planned.

At Lundin Mining’s Zinkgruvan PbZnAg mine in southern Sweden, significant Zn-Pb, Ag sulfide mineralization was drill-intercepted from a surface exploration hole at 797.3 m below surface, including 6.1 m @14.3% Zn, 4.8% Pb, and 110 g/t Ag. This intercept is located over 100 m horizontally and over 150 m vertically below the nearest defined mine resource.

At Vargbacken Au, Mawson Resources Ltd. determined that at a lowered cutoff grade of 0.6 g Au, the following mineral resources are calculated at Vargbacken: indicated resource: 1.2 Mt @ 1.44 g Au plus inferred resource of 0.9 Mt @ 1.68 g/t gold. Vargbäcken is covered by a 25-year mining license granted initially in October 2003. Gold at Vargbäcken is visible, free, and coarse grained, and occurs in multiple structures within a 30- to 40-m-wide gold mineralized halo. The footprint of the resource was up to 430 m long × 200 m deep × 90 m wide; however, scout drilling, geophysics, and rock chip sampling have extended the mineralized zone over 1 km to the north and south 8 km trend controlled by Mawson around Vargbäcken.

Northland Resources Inc. announces the results of the most recent drilling at the Central zone of its 100%-owned Barsele Au project in Sweden. Five holes were completed, the best being hole 06005 which returned 2.97g Au over 19 m from 107 m. Northland’s technical team is currently planning the next phase of drilling at Barsele, scheduled to begin late August. Northland’s Skirrståskäbben Au prospect is a direct continuation of the Au-mineralized trend that hosts Barsele and forms part of the Barsele project area. Northland has been carrying out Base of Till (BOT) sampling and review of historical data drilling and has found two targets to date.

Tumi Resources is active at Sala Ag in the Bergslagen district; Sala was Europe’s largest silver producer since the 16th century and ceased production in the early part of the 20th century. Greater than 200 Moz Ag at grades of up to 7,000 g Ag were mined from 107 m. Northland’s technical team is currently planning the next phase of drilling at Barsele, scheduled to begin late August. Northland’s Skirrståskäbben Au prospect is a direct continuation of the Au-mineralized trend that hosts Barsele and forms part of the Barsele project area. Northland has been carrying out Base of Till (BOT) sampling and review of historical data drilling and has found two targets to date.

**TURKEY**

Mediterranean Resources announced additional drill results in both the T-6 and Karsibayır mineralized zones on the...
Tac Au property held under option from Teck Cominco’s Turkish subsidiary TCAM, ranging from 26.6 m of 0.77 g Au, to 1 m of 48.5 g Au.

Eldorado Gold’s drilling at the Dogrudere porphyry-type CuAu anomaly, AS target showed widespread weak CuAu mineralization; continued work will focus on surface mapping and rock sampling in key areas to the south of the Dogrudere anomaly.

Odyssey Resources has now completed 69 holes in four zones at Tavsan Au, including 20 holes in the Main zone which contained up to 20 m of gold-bearing jasperoid; one hole had 1.75 g/t gold over 10 m, including 1 m @ 4.70 g/t Au. The Sivri, Incal, Main, and End zones are generally flat-lying zones of gold-mineralized jasperoid and, therefore, the intercepts are considered to represent true thickness. An independent resource estimate is expected during the third quarter.

Aldridge Minerals Inc. acquired a second license for lateritic nickel (“Gurlek”) located only about 10 km east of Aldridge’s Ayranci license and about 160 km east of the advanced Caldag Ni project, western Turkey. Aldridge also signed a strategic alliance and option agreement with Anatolia Minerals Development Ltd. and its Turkish subsidiary for exploration and development of the Yenipazar AuAgCuPbZn VMS deposit in central Turkey. Northfield Inc. signed an option agreement to acquire up to a 75% Aldridge’s epithermal Derinkoy AuAg property covering an area of 9,000 ha located in the region of Artvin, in northeastern Turkey.

Cloudbreak Resources Ltd. began a 2,500-m reverse-circulation drilling program on the Ikiztepe-Sarp CuMoAu tenement in Turkey to test known porphyry Cu-Mo-Au, epithermal Au and Cu-Mo-Au skarn targets. Cloudbreak completed six holes/550 m at Karanlikkoy epithermal gold target, where previous work defined a road cut outcrop with chip-channel samples of 23.2 m @ 3.37 g Au, including 1.6 m @ 24.24 g Au in partly silicified schist. Five new licenses were acquired with JV partners Anatolia Minerals, bringing the total Ikiztepe-Sarp property package to 337.7 square km².

Arianna acquired the Goveli AuAg target from Newmont. Recent exploration indicates the presence of a 4-km-long and up to 1-km-wide gold system in mid-Triassic to Cretaceous marble in contact with Precambrian basement; peak grades reported from historic rock-chip samples 2.4 g/t. Goveli is located 60 km southeast of Arianna’s Sindirgi AuAg target.

**UKRAINE**

Eurogold’s 70 drill holes confirm the tenor and width of the upper parts of the Saulyk epithermal Au deposit; notable are several intersections at deeper levels of the deposit, including 5 m of 32.7 g/t Au.

**MÉXICO**

Country correspondent: 
Erme Enriquez (SEG 1985) 
Geotech Exploration Services, S.A de CV

Capstone Mining Corp. has announced the opening of the old San Roberto mine at its Cozamin project, located in the Zacatecas mining district. Metallurgical tests indicate proven recoveries of 85% Cu, 53% Pb, and 45% Zn from low-grade ore coming from development of the mine. The Cozamin mine reported resource estimate at a 1% cutoff graded at 2.76 million indicated tonnes containing 152.15 Mlb Cu and 7.58 Moz Ag, with inferred resources on the order of 3.09 million tonnes (Mt), containing 151.26 Mlb Cu and 7.86 Moz Ag. Commercial production was scheduled to start by the end of September.

Canasil Resources Inc. commenced a diamond drill program at three of its properties in Mexico. Five holes were drilled at the old La Esperanza property during August. Hole ES-06-02 intersected the mineralized vein at a drill depth of 100.22 to 107.74 m for a drill intercept of 7.52 m (true width 4.30 m), with an average grade of 210 g/t Ag, 1.25% Zn, and 1.03% Pb. A central higher grade zone of 2.49 m (true width 1.42 m) of the vein, from 101.68 to 104.17 m, returned average assays of 458 g/t Ag, 2.2% Zn, and 2.31% Pb.

Excellon Resources Inc. announced that drilling has intercepted 12 m of solid massive sulfides and sulfide-rich breccia in Hole LP 301 on Excellon’s 100%-owned Platosa property in Durango. Hole LP 301 is 100 m beyond the northwestern limit of the Guadalupe Manto as outlined in the NI 43-101 A mineral resource estimate was prepared by an independent geological and mining consultant. Holes LP 288 and LP 293, which intercepted 20 and 15 m of similar mineralization, respectively (see press release of August 28, 2006), lie over 80 m to the southeast of LP 301.

New discoveries have been made by Endeavour Silver Corp. at its Porvenir mine within the Guanacevi mine project. Five drill holes reported indicate a substantial thickening of the Santa Cruz vein beyond the northwest end of the Porvenir mine and at depth. These drill intercepts represent an opportunity for bulk underground mining of high-grade Ag mineralization. The intercepts are over an area of more than 50 m along strike and more than 200 m downdip of the vein.

Great Panther Resources Ltd has acquired two operating mines in Mexico, the historic Guanajuato mining district located in central Mexico and the Topia mine in north-central Mexico. Silver equivalent production is expected to be approx. 1.2 Moz in 2006, increasing to 3.4 equiv. oz in 2007 and 3.6 Moz in 2008. Operating costs are targeted to be approx. US$4.00/oz in 2007 and US$3.75/oz in 2008. The company announced its plan to acquire the advanced stage Km 66 Ag-Au-Pb-Zn project located in eastern Durango state. The project hosts significant potential for a bulk tonnage deposit that is accessible by paved highway, within 100 km of the Penoles smelter in Torreon. The Guanajuato Ag-Au mine has been in production since the 1600s and has produced more than 1.2 billion oz of Ag over the past 400 years. The Topia Ag-Pb-Zn mine has an historic reserve of 360,000 t averaging 480 g Ag/t, 0.6 grams Au/t, 2.7% Pb, and 3.0% Zn, sufficient for five years at planned production rates.

Kimber Resources continues drilling on the Carmen deposit, focusing on drilling infill holes to close gaps and step-out holes to test the limits of the deposit. The most notable hole, MTR-363, returned 18 m of 17.70 g/t Au equiv., including 4.0 m of 70.67 g/t Au equiv. This hole was targeting part of the Los Hilos structure located in the eastern part of Carmen, where there is an area of about 100 m across with little drilling. Results from Carotare.
deposit include two core holes and one reverse circulation hole all from Carotare East. Most notable was CTC-04, which returned 14.95 m of 6.10 g/t Au equiv., including an interval of 2.95 m of 16.10 g/t Au equiv.

Linear Gold Corp. (LRR.TSX) announced that it has identified additional Cu-Au mineralization in the Caracol zone at Linear’s 100%-owned Ixhuatan project in Chiapas, Mexico. The Caracol zone is located approximately 2 km NNE of the Campamento gold deposit within the same mineral concession. Best results from the drilling are 1.0% Cu and 1.0 g/t Au over 30.6 m cut by Hole IXNA-13 from 221.8 m depth located within a thicker 109.7-m interval that grades 0.5% Cu and 0.5 g/t Au beginning at 142.7 m depth; 0.5% Cu and 0.2 g/t Au over 25.8 m cut by Hole IXNA-10 from 94 m depth within a greater interval of 174.5 m that grades 0.3% Cu and 0.2 g/t Au.

MAG Silver Corp. and Industrias Peñoles S.A. de C.V. announced that drilling will begin very shortly on the Valdecañas vein discovery. The second hole drilled in December 2005 in the Valdecañas vein intersected 6.35 m (20.8 ft), carrying 1,798 g/t Ag (57.8 oz), 2.91 g/t Au, 3.43% Pb, and 5.51% Zn. The initial diamond drill program is expected to involve 18 holes and 15,000 m of drilling. Permits have recently been received. The Valdecañas vein is the westernmost known mineralized occurrence in the Fresnillo district and represents a significant expansion of this prolific district’s footprint.

Nevada Pacific Gold Ltd has received trenching results for the Revancha area, located near the southeastern extent of the currently defined Rocío trend in Sinaloa state. The geology of the area consists primarily of andesite rocks with two geological units similar to those found at the company’s Magistral gold mine located 15 km to the northeast. Mineralization identified is found in the andesite package within vein structures that strike north-northwest and dip steeply to the west. These structures are interpreted to have a strike length of more than 2,000 m. Strong anomalous Au and Ag values have been detected from soils and trench samples. A drilling program was expected to start by the middle of August.

Orko Silver Corp. continues to have success with its diamond drilling program at the La Preciosa project in Durango. Three holes drilled south of the La Abundancia oreshoots reported positive Ag and Au values. The results expand vein intersections and ore shoots in the Abundancia vein 100 m farther to the south of previously reported drilling.

Paramount Gold Mining Corp. announced the first round of results from its ongoing drill program at the San Miguel project located near Temoris, Chihuahua. These first nine drill holes represent initial testing on the San Luis, Montecristo, and La Blanca zones, which are three of the over 10 known mineralized zones located at San Miguel. Two of the three zones reported very significant intercepts of Au and Ag mineralization and included bonanza Au of 35.5 g/t Au, with 17 g/t Ag over 4.0 m in hole SL-02 at San Luis, and 0.39 g/t Au and 80.62 g/t Ag over 19.5 m in hole MC-01 at Montecristo.

Scorpio Mining Corp. reported drill results from an additional nine holes into the Hoog zone, a recently discovered, large mineralized body located adjacent to the Nuestra Senora deposit, in the Sinaloa state, and situated approx. 20 m from the main decline ramp. Of the 24 holes drilled and reported to date, all have been successful at intersecting significant mineralization, with the majority of holes reporting very wide intersections.

Silver Dragon Resources continues its drill program at the Cerro de las Minas project in Durango state. Holes show high-grade Ag and base metals mineralization over the Puro Corazon mantos and skarn structures. Individual mantos have returned over 1.4 kilos Ag, 30% Pb, 21% Zn, and 0.11% Cu. The main Cerro de Las Minas mine comprises a circular skarn with small chimneys and manto structures carrying high-grade mineralization aligned to the Fresnillo Ag belt in central Mexico.

Soho Resources Corp. launched an 18,000-m diamond drilling program starting in July at its Tahuehueto project in Durango state. The goal is to expand currently identified resources at the Creston zone (5,500 m of drilling) and El Rey zone (3,500 m of drilling), as well as drill test to depth resources at three other zones, namely Cinco de Mayo (2,000 m), El Creston South extension (4,000 m), and the Santiago zone (3,000 m).

Exploration activity in Mexico has increased significantly and the writer apologizes for not including all the active exploration companies and for the omission errors in this short report.

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**NORTHERN EURASIA**

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**FAR EAST**

The Amur region issued several licenses to the subsidiaries of Norilsk Nickel to explore for copper, molybdenum, and gold in its northern part. Norilsk Nickel will explore the 200 km² Tuganakh prospect with expected resources of 22,000 Tm and 17 Ta. Polysus Gold will invest into the 890 km² Arbinskiy prospect, expected to host 200 Ta, 50,000 Tm, and 2,000,000 Ta Cu.

Dalnevostochnaya Company, also a subsidiary of Norilsk Nickel, will explore a 370-km² Takhatmygdo prospect with no officially stated resources of Cu or Au. Dambuki placer mine decided to explore hard-rock Au opportunities at the Utrennee ore field. Amur Minerals is exploring the Kun-Manie Ni-Cu sulfide deposit, reportedly containing 209,000 t of nickel and 58,500 t of copper.

In Khabarovsk, Amur Minerals has also received a license to explore for gold and copper in the Anadzhakan area territory. Polymetal secured a license to explore for lode gold and silver at the Arkinskaya field, located 70 km northwest of the company’s Khakandzha deposit. The anticipated resources to Russian standards are 20 t of gold (640,000 oz). Polymetal purchased 100% of Albasino Resources, which holds the license for the Albasino gold deposit, from Dalnevostochny Ye资源 for $7M. The deposit, discovered in 1989, has two main ore zones with reserves of 9.175 t (295,000 oz), grading 9.9 g/t Au, and 3.603 t (116,000 oz), grading 6.2 g/t, respectively.

In Primorye, the Russian Mining Company won auctions for the rights to the Primorskoye and Salyut gold and silver deposits. Primorskoye has 205,000 t of ore reserves and
resources for 2,309 t Au and 35.7 t Ag in the C1+C2 category, and 7.5 t Au and 102 t Ag in P1 category. Salyut has P1-P2 resources of 12.3 t Au and 1,958.5 t Ag.

In Magadan, the Russian-Chinese Geotsentr JV is exploring the Igumenovskoe deposit, which occurs in the southern part of the Natailka trend. The company is talking about producing about 2 t Au per year, although there is no approved reserve. Bar Gold acquired a Chai-Yurinya license. This asset changed many hands. It attracts attention mostly because of its associated placer that produced 200 t Au historically. The search for adequate bedrock source was so far unsuccessful. Ovoca Gold purchased a 74% stake in Ayax Prospectors Artel Company for US$1M in cash and Euro 2.75M in shares. The principal target is Goltsosvoe silver deposit with C1+C2 silver reserves of 74.314 Moz, located some 70 km south of Dukat silver mine.

In Chukotka, Chukotgold won the licenses for Tumannoye and Elvineyskoye gold deposits. Chukotak Mining Company, controlled by Bema Gold Corp, won an auction for the Western and Eastern zones near Kupol deposit. At Kupol itself, Bema Gold Corp announced the initial results from the 2006 exploration drilling program. Fifty-two holes total 18,484 m have been completed to date of the original 20,000m 2006 drilling program. Two new zones of high grade mineralization in the southern portion of the property were identified, including intercepts of 6.30 m grading 50.62 g/t Au and 8.5 g/t Au and 20 g/t Ag.

In Taimyr, the Chernogorskoie Mining Company, most likely associated with Norilsk Nickel, acquired a license for the Chernogorskoie deposit. It is located in the immediate vicinity to the producing Norilsk-1 deposit. Its expected resource of 600 t PGM was previously considered uneconomic.

In Krasnoyarsk, Vasiliyevsky Rudnik (100% owned by Angara Mining plc) reported a discovery of small Arkhangelskoye deposit, containing 3.5 to 4 t Au, located 3 km from the Vasilyevskaya recovery plant. Polymetal has received a discovery certificate to the new Anenskoye gold field, containing some 1.168 Mt of ore and 9,992 t Au (321,000 oz), grading 8.5 g/t Au and 20 g/t Ag.

**URALS**

Polymetal received an exploration license for the Rudnichny property in Sverdlovsk region. Forecast resources are estimated at 15 t gold with average grade of 1 to 2 g/t. The property is located just 2 km north of Polymetal’s operating Vorontsovskoye deposit.

**KYRGYZSTAN**

The saga continues with the 2.5 Moz Jerooy gold deposit. In July, Austria-registered GLOBAL G.O.L.D. received a license to develop the deposit. Oxus Gold plc, a previous owner, is seeking a lawsuit against the new owner.

Lero Gold Corp has reached an agreement with Gold Fields for private placement. Lero has agreed to spend at least Cdn$2.0M of the private placement funds on further exploration of the Company’s Taldybulak copper-gold porphyry project in Talas region.

**SIBERIA**

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**SOUTH AMERICA**

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**PERU**

Exploration activity for gold, copper, silver, and zinc in Peru continues at a strong pace. After much discussion, mining companies operating in Peru have agreed with the new Peru government to make annual voluntary “windfall” payments to the government to be used for social programs. The amount is tied to commodity prices, based on profit and represents about 3.75% of after-tax profits. The 2006 amount will be about US$15M.

Bear Creek Mining announced an updated resource on their Corani Ag deposit in southern Peru. Based on 236 drill holes at a cutoff of 16 g/t Ag, the measured and indicated resource is 256.5 Moz Ag (127.4 Mt @ 56.9 g/t Ag, 0.9% Pb, and 0.51% Zn). Drilling continues and a scoping study is in progress. IMC and Hochschild have signed an agreement to develop the Pallancata Ag-Au property in southern Peru. Hochschild will gain 60% by funding development of the mine with a resource of 2.7 Mt @ 445 g/t Ag and 1.7 g/t Au (36.8 Moz Ag and 147,000 oz Au). Fortuna Silver Mines announced an updated resource on their Caylloma Ag mine in southern Peru of 10.5 Moz. Reserves stand at about 24 Moz Ag.

A preliminary economic assessment on Northern Peru Copper’s Galeno Cu-Mo-Au indicated (504 Mt @ 0.54% Cu, 0.12 g/t Au, and 0.015% Mo) and inferred (554 Mt @ 0.39% Cu, 0.09 g/t Au, and 0.010% Mo) resource, using $1.20 Cu, showed an NPV(8) of $548M and an IRR of 21.7% with C-1 cash cost of $0.49 and capex of $853M. Subsequent to the assessment, a new indicated mineral resource estimate, based on 45,110 m drilling in 141 holes, is 765 Mt @ 0.49% Cu, 0.11 g/t Au, and 0.014% Mo. A prefeasibility study is in
progress. Oro Candente continues to advance its Cañaríaco Cu deposit. A June 2006 scoping study estimated an annual cash flow of US$76M over a 25-year mine life, a capex of US$210M (60,000 tpd), and NPV(_8) of US$149M using $1.25 Cu on the current inferred resource of 489 Mt @ 0.45% Cu. Drilling continues. The sale of the Cordillera de Las Minas JV properties of CVRD and Antofagasta has generated much interest, with the winning bidder expected to be named soon. The most advanced properties include Antilla (114 Mt @ 0.71% Cu) and Cotobambas (68 Mt @ 0.74% Cu and 0.46 g/t Au).

At La Granja, work by Rio Tinto includes sulphide leaching studies on the arsenical copper ore and community programs with drilling slated to start soon. Xstrata continues to advance its Las Bambas copper project in southern Peru and is close to completing the planned 100,000-m 2006 drill program. Like Rio Tinto, Xstrata is putting much emphasis and effort on community and social programs in hopes of avoiding social problems like those experienced by Newmont and Buenaventura at Yanacocha. Amera Resources continues to advance its Cocha red-bed Cu-Ag property in Peru. Soil sampling has defined a 2.2 × 0.75-km Cu-Ag anomaly open along strike. Previous work returned 80 m @ 0.8% Cu and 10 g/t Ag in rock chip sampling. Latest drilling by Chariot Resources on its Marcona Cu project returned up to 80 m @ 2.39% Cu, 64 m @ 2.03% Cu, and 38 m @ 8.14% Cu. Chariot has commenced a regional exploration program on the Marcona claim package. Work by Cambior at its La Arena Cu and Au property has outlined a combined Au oxide and underlying Au-Cu porphyry resource of 140Mt @ 0.44 g/t Au and 0.48% Cu at cutoff grades of 0.19 g/t Au for the oxides and 0.3% Cu equiv for the sulphide ore. Recent drilling by Norsemont on the Constancia Cu property has returned up to 159 m @ 1.12% Cu, 56 m @ 1.23% Cu, and 82 m @ 1.10% Cu.

Votorantim has optioned Solitario’s Bongara MVT Zn project located in northern Peru. Votorantim can earn up to 70% by spending US$18 M within nine years, including spending US$1 M in the first year. Drilling by Solex on its Princesa Ag-Pb-Zn property in SE Peru returned up to 24.45 m @ 1,605 g/t Ag, 0.87% Pb and 0.76% Zn. Work by partners Southwestern Resources and Newmont on their Liam JV has encountered widespread limestone-hosted (breccia and replacement) Ag-Pb-Zn mineralization. Sampling of the 2.5-km × 5 to 50-m-wide Numa West body averaged 432 g/t Ag, 3.20% Pb, and 2.83% Zn.

Drilling of 5 holes by Paramount Gold on its optioned Linda gold property returned up to 12.70 m @ 2.75 g/t Au and 6.35 m @ 1.22 g/t Au. More drilling is planned. Drilling of 15 holes totalling 1,508 m by Canadian Shield on the Humajala gold property has returned up to 45 m @ 1.16 g/t Au and 21 m @ 1.38 g/t Au. Results from a 10-hole drill program by Romarco Minerals and NDR on their Cori Puncho gold project located in southern Peru has returned up to 26 m @ 2.14 g/t Au. Surface channel sampling by Plexmar Resources on its Bolsa de Diabio has returned up to 635 g/t Au over 2 m and 263 g/t Au over 2 m in veins up to 1 m wide. Sulldien has obtained a court order to enforce the arbitration decision giving them 100% control and ownership of the hotly contested Shahuindio gold property located in northern Peru. Current resource is 1.5 Moz Au (55.2 Mt @ 0.85 g/t Au).

Canadian junior Murgor Resources is active in Peru, having optioned several ex-AngloGold properties including the Pumayacu alkalic system located in the remote frontier region east central Peru. Continued drilling at Pinaya by Acero-Martín has returned up to 103 m @ 1.28 g/t Au and 1.21%, 64.8 m @ 1.03% Cu, and 81 m @ 1.08 g/t Au. Drilling continues. Drilling by Goldmarca Limited on the Condor Gold project in northern Peru has returned up to 40 m @ 8.9 g/t Au and 58 m @ 3.0 g/t Au. Previous work (including 45,800 m drilling) by TVX outlined a resource of 53.8 Mt @ 1 g/t Au or 1.7 Moz gold. Drilling continues.

CHILE

Chile Cu production in the first half of 2006 reached US$14.4 billion, 74.6% higher than the US$8.26 billion in the past-year period. However, Cu production will be impacted in the second half of the year by a rock blast accident that damaged the tunnel for a conveyor to the crusher system in the Chuquicamata mine, with initial production losses of 960 tpd of fine Cu and 40 t of Mo, representing a reduction of about 70% of total output. Chuquicamata represents over 2% of the world’s Cu production. Also, Cu production will be impacted by the decision of the majority of workers at La Escondida mine, the world largest Cu mine, to vote for a strike in demand of new contract benefits in line with soaring global Cu prices. The strike had lasted over two weeks at the time of this writing, and La Escondida had to declare force majeure on shipments, and shut down operations for two days.

Meanwhile, Chilean environmental authority Conama gave the final nod to Barrick’s Pascua Lama Au-Ag project on the border with Argentina. Barrick plans to start the construction once Argentinean authority gives their approval to the project.

Chilean copper mining company Doña Ines de Collahuasi has solicited geothermal exploration permits from Region I authorities. Collahuasi would invest about US$1.1M, somewhat reflecting the need to look for new sources of energy in Chile, which at present is strongly dependent on natural gas supply from neighboring countries. Antofagasta Minerals issued a US$400M offer to acquire the 39% interest that Equatorial Mining holds on El Tesoro copper cathode operation in Sierra Gorda area in Antofagasta Region. In addition, Antofagasta will enter into an option agreement with AMP, the Australian Investments and Pension funds, the majority shareholder in Equatorial, to purchase 19.99% of the latter. El Tesoro open-pit mine produced 98,121 t of cathodes in 2005. Chilean iron ore miner Santa Barbara started production in its La Japonesa mine, located in Region III, northern Chile. La Japonesa targeted 1.5 Mtpy output, plus an additional 1 Mtpy from near by deposits.

Meridian Gold acquired 100% interest in Minera Florida, which operates the Pedro Valencia mine, located approx. 120 km southwest of Santiago, in the historic Alhue district. In 2005, Pedro Valencia produced 70,000 oz Au at a cash operating cost of about US$820/oz Au. Aur Resources completed a feasibility study for the Hypogene Cu-Au project beneath the current Andacollo Cu mine, located south of La Serena. The deposit’s proven and probable reserves are 423 Mt of ore grading 0.38% Cu and 0.13 gpt Au. The study indicated that at a US$1.20/lb Cu...
Exploration Reviews (Continued)

price and US$ 440/oz Au price, the Hypogene deposit could be developed at a rate of 68,700 t/yr Cu, and 57,900 oz/yr Au for a mine life of 21 years.

Pan Pacific Copper, a JV between Japan’s Mitsui Mining and Smelting and Nippon Mining and Metals, acquired the Regalito project, located 115 km south of Copiapo in Region III. Regalito has measured and indicated resources for 628 Mt grading 0.43% Cu, and inferred resources for 131 Mt of 0.41% at a 0.25% COG. Initial investment is expected to be about US$700M, and could start production by 2011 at a rate of roughly 100,000 tpy of cathodes over 20 years. Chilean state copper miner Codelco awarded contracts for the development of the Gaby project in Region II, northern Chile. The project construction started in February this year and is expected to take 23 months for completion, with an initial investment of US$766M. Gaby minable reserves are 584 Mt at 0.41%, and the mine will produce 1.9 Mt of fine Cu over a 14-year mine-life. Global Hunter reported that its Corona de Cobre project, located about 60 km north of La Serena, holds resources for 8.49 Mt at 0.61% acid soluble Cu, or 52,163 t of leachable Cu. This estimate includes 1.6 Mt at 0.49% ASCu at Las Posadas, one of several targets in the Corona de Cobre project. In the surrounding areas, Latitude (formerly Latin American Copper), after the results intersected on past May, drilled an additional 2,500 m on the property. Two holes intersected IOCG-type mineralization, bearing 74 Mt @ 1.6% Cu and 0.37 gpt Au from 138.7 to 212 m and 76 Mt @ 1.61% Cu and 0.33 gpt Au from 102 to 178 m. Latitude is planning a new round of drilling during the current year.

Also, due north of La Serena, Mandalay is currently developing an extensive trenching and geological mapping program at its sediment-hosted La Quebrada project, located 25 m north of La Serena. The program is designed to target two favorable calcareous sedimentary units that host disseminated primary chalcocite, covellite, bornite, and chalcopyrite. Highlights from the trenching include 15 m @ 0.99% Cu, 47.5 m @ 1.08% Cu, 27 m @ 1.05% Cu, and 67 m @ 0.66% Cu. Drilling in its Volcan project in the high Andes of the Region III, Andina intersected 362 m @ 1.09 gpt Au on El Dorado West zone.

Other highlights of recent drilling include 304 mts @ 0.92 gpt Au, including 176 m @ 1.06 gpt Au, and 98 m @ 1.34 gpt Au. Volcan’s East and Central zones have indicated resources of 459,800 oz Au in 14.3 Mt @ 1 gpt Au, and an additional inferred resource of 773,400 oz in 27 Mt @ 0.89, using a 0.5 gpt cutoff. Andina Minerals also completed 900 m of core drilling at its Aroma project, located 95 km East of Arica, to test a series of Au-Co-Mo anomalies previously outlined in the project, and drilled 900 m in the Anacore project, located 120 km southeast of Arica, to test the geological environment underlying an extensive high sulfidation-type epithermal system. Global Copper initiated a 7,800 m drill program at its Relincho porphyry Cu project, located about 50 km east of Vallenar. Previous work at Relincho estimated indicated resources at 184 Mt @ 0.59 Cu and 0.204% Mo, and inferred resources of 101 Mt @ 0.51% Cu and 0.017% Mo at a 0.4% cog.

ARGENTINA

Despite some localized anti-mining demonstrations in southern Argentina’s Chubut province, several companies are actively exploring and having interesting results in southern Argentina. Anglo Gold is considering heap leaching low-grade stockpiled material at its Cerro Vanguardia Au mine. The stockpile contains 6 Mt of 1.3 gpt Au. The Company also has budgeted US$15M for a four-year mine site exploration program. Cerro Vanguardia produced 228,000 oz Au in 2005, and is reported to have probable and proven reserves for 1.34 Moz Au, and additional measured and indicated resources for 32.6 Mt @ 3.14 gpt Au.

Alumbrera mine life has been extended to 2016 by means of additional drilling at the mine, which confirmed 40 Mt of additional ore reserves, containing 120,000 t Cu and 0.4 Moz Au. Total reserves now stand at 400 Mt @ 0.45% Cu and 0.49 gpt Au. Marifil Mines is planning a 5,000-m drill program on its Esperanza sediment-hosted Cu-Ag deposit in Neuquen. Initial drilling in early 1990s by MIM outlined about 1.5 Mt @ 0.5% Cu. Mineralization includes chalcocite, Ag sulfosalts, and Cu oxides based on the size of alteration and mineralization patterns, Marifil is expecting to delineate a deposit of 30 to 50 Mt of +0.4% Cu. Exeter Resources completed a drilling program at its Verde Ag project in southern Argentina, which shows Ag mineralization in six epithermal veins. The Veta Norte comprises a 600-m-long vein and a less exposed quartz stockwork zone. The Veta Sur zone includes 6 outcrop Ag-bearing quartz veins within a 1-km-wide target area. Exeter drilling in La Cabeza property has revealed an additional 5 veins, bearing 2.6 mts @ 2.5 gpt Au, 1 m 55.5 gpt Au, 3 m @ 24 gpt Au, 1 m @ 64.1 gpt Au, and 3 m @ 15.8 gpt Au. In addition, Exeter drilling in its Cerro Moro project intersected a new high-grade Au-Ag vein, 2.5 km away from previous drilling. The hole intersected 10 m @ 15.4 gpt Au and 790 gpt Ag. Aquiline Resources intersected in La Viuda area on its Calcatreu project 4 m @ 2.04 gpt Au and 5.3 gpt Ag, 5 m @ 4.42 gpt Au, and 7.6 gpt Ag, 8 m @ 1.43 gpt Ag and 4.8 gpt Ag. Aquiline has completed 367 holes totaling 42,260 m of drilling on the Calcatreu project. The Supreme Court of Canada awarded the ownership of the Navidad Ag property to Aquiline Resources in a dispute with IMA Exploration. Navidad is located in the Chubut province, where IMA announced a significant Ag and base-metal discovery at the project, including indicated resources of 93.4 Mt @ 102 gpt Ag and 1.41 Pb, using a 50 gpt Ag.

Minera Andes has identified new high grade Au-Ag veins in the San Jose project. Underground drilling intersected a system which is parallel to the Frea Vein, including an intersection of 4.16 m @ 2.12 gpt Au and 610 gpt Ag. The underground mine in Santa Cruz province in southern Argentina is planned to produce 3.1 Moz per year Ag and 61,000 Moz/yr Au over 4.3 years. Minera Andes drilling at Los Azules porphyry Cu project has returned intervals of significant enriched Cu in a target area of about 2,500 × 1,500 m that was outlined by previous drilling. The leach cap extends from about 60 mts to as much as 174 m depth. Significant reported results includes 87.35 m @ 0.83 % Cu, 42 m @ 1.13% Cu, 158.7 @ 0.51% Cu, 117.65 @ 0.63%, 221.15 @ 1.62% Cu, and 173.3 m @ 1% Cu. Alexander Mining completed a 192 holes drill program, for a total of 15, 296 m., at its El Leon Cu-Ag project in Salta province.
Leon’s El Cobre and El Plomo areas hold combined indicated and inferred oxide resources of 5.42 Mt @ 0.64% Cu and 18 gpt Ag, or 24,360 t of Cu and 2.99 Moz Ag. Alexander also began the construction of a leach test pilot plant.

**SOUTHEASTERN UNITED STATES**

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Gold exploration in the Southeastern United States is resuming after a protracted dry period of minimal activity. The southeast represents the first American gold rush in the early 1800s and North Carolina was the first documented gold discovery in 1799. In the 1980s and early 1990s, South Carolina was a major gold-producing region with production from the Ridgeway mine, the Haile mine, the Brewer mine, and Barite Hills. All are an epithermal type of gold deposits.

In July, Erin Ventures (TSX Venture: EV) announced that it entered into a strategic alliance with Triangle Minerals, Inc. (“TMI”), a North Carolina-based corporation, to acquire, explore, and develop specifically targeted mineral properties of merit. The Deep River gold-copper porphyry target in North Carolina is the primary focus of exploration. Drilling is planned for the fall.

Also in July, Gold Summit (TSX VENTURE: GSM.V) signed umbrella agreements allowing access to two gold districts in the Carolinas. In North Carolina, the Bear Creek area, covering approximately 300 km², contains numerous gold occurrences over a 6.5-km NE trend of volcanic and sedimentary rocks. Individual occurrences are characterized by linear zones of quartz-pyrite alteration. Soil sampling by the syndicate in 1997 produced anomalies in five separate areas with values ranging between 30 and 8,500 ppb gold. One anomaly has soil samples averaging 1,000 ppb over a surface width of 25 m, approximately perpendicular to strike. At another location, a vein, mined by open cut and shafts, was described by qualified mining engineers and assayers in 1903 archives, with assays “running from $12 to $354 per ton” having “an average width of 15 ft for 1,200 ft in length, at $20 per ton.” Land acquisition is in progress.

In South Carolina, quartz-sericite-pyrite alteration occurs along three NE-trending zones over a 15 km² area. On the one tract, a soil anomaly approximately 250 × 200 m in size, averaging over 20 ppb, with a core averaging 100 ppb Au, was established by syndicate work in 1997. At the heart of this anomaly, a trench containing gold averaging 0.5 g/t over a 44 m continuous length that is not necessarily across strike. Adjacent to the trench a small pit of mid-1800 vintage exposes vein quartz from which a grab sample assayed 12.5 g/t gold.

The southeastern United States remains an underexplored major gold region and further new exploration activity is expected.

**WESTERN UNITED STATES**

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First a correction to my last column, in the comment about the Troy mine (Montana). I incorrectly labeled the precious metal grade as Au, it should have been Ag. I know there are at least two people reading this column, since that is the number of comments I received. In this new world of more than gold in our exploration and development focus I have to reprogram myself not to add gold after every grade number.

**ARIZONA**

It is beyond the scope to this column to summarize all of American Bonanza’s activities at Copperstone (La Paz County). Therefore, the reader is referred to the July 6, 2006, news release for a good summary of the history of developments on the property since discovery. In that document there is a statement that Copperstone is “within the regional Walker Lane mineral belt.” This gives me pause, but then maybe the Colorado Plateau uranium deposits are along the Carlin Trend.

**CALIFORNIA**

Canyon Resources has been very active in and around the Briggs mine (Inyo County). A recently completed drilling program at the mine resulted in a new resource estimate of 23.5 Mt with an average grade of 0.023 opt Au (0.01 opt Au cutoff). Additionally, six reverse circulation holes totaling 2,030 ft were completed at the Cecil R deposit. All holes encountered greater than 0.01 opt Au, with the best intercept of 95 ft of 0.023 opt Au. Previous drilling at Cecil R defined a resource of 4.1 Mt of 0.029 opt Au along a near-surface “detachment” fault. Canyon also acquired the nearby Suitcase and Mineral Hill Au deposits that were drilled in a previous era. You remember, back in the old days—the 1980s.

**SUTTER GOLD MINING** is in the midst of a surface and underground drilling program at the Sutter gold project (Amador County). The first five underground holes encountered several Au-bearing veins that are outside of the established resource. Most of the new intercepts are a few feet of +0.10 to 0.50 opt Au with several 3- to 12-ft intervals of multiple-ounce Au grades to a maximum of 12 ft of 5.9 opt Au.

**COLORADO**

U.S. Energy hired MGA Communications Inc. to help with a community relations program for the possible development of the Luck Jack (read Mt. Emmons) Mo deposit (Gunnison County). They could hire many ex-Amax personnel that could tell them the difficulty in that course of action.

**IDAHO**

The Trio Gold-Journey Resources venture at the Empire mine (Custer County) completed 10 core and reverse circulation holes to confirm a historic resource estimate of about 33 Mt of 0.44% Cu, 0.20% Zn, 0.01 opt Au, and 0.19 opt Ag. Drill hole intercepts seem to confirm grades in the historic resource over lengths from 6 to 80 ft. Mineralization in these new holes is contained in endoskarn in the Mackay granite porphyry stock.

**MONTANA**

Just as it looked as if Apollo Gold’s Montana Tunnels (Jefferson County) mine was closing, a white knight (not the company) appeared on the horizon. Elkhorn Tunnels and affiliate companies formed a joint venture to take over...
the property. The plan is to put $13M into additional stripping and to produce the remaining 33.241 Mt of 0.016 opt Au, 0.212 opt Ag, 0.185% Pb, and 0.596% Zn. Additionally, other agreements include an option of Apollo Gold’s Diamond Hill mine (Broadwater County) and the opportunity to process ore from the Elkhorn property (Jefferson County). Diamond Hill is an underground mine about 28 miles southeast of Helena and was operated by Apollo Gold. The Elkhorn is about 20 miles south of Montana Tunnels and is a resource developed primarily by Gold Fields several years ago.

**NEVADA**

Do you guys remember how much laughter there was when Barrick Gold paid $62M for the Goldstrike property (Eureka County) 20 years ago? What were they thinking? Recently Barrick produced the 30 millionth ounce of Au from the property, with still more to mine. Who is laughing now?

Queenstake Resources continues to explore Starvation Canyon (Elko County) and reports one exceptional drill hole containing 170 ft of 0.46 opt Au. The significance may be that the hole is between the two defined zones of mineralization and “could represent a newly identified northwest trending Au-bearing structure.” As part of Queenstake Resources’ ongoing underground drilling program at the Smith mine (Elko County), two separate holes along the Mahala Dike trend encountered 40 ft of 1.82 opt Au and 30 ft of 0.91 opt Au. Other holes contain 15 to 40 ft intercepts with grades at, or near, 0.5 opt Au. This new area of mineralization is within 180 ft of existing drifts.

Metalllic Ventures completed a 10-hole, 2,830 ft in-fill reverse circulation drilling program at Gemfield (Esmeralda County) that was designed to further define high-grade Au mineralization within the deposit. Two of the more successful holes contain 80 ft of 0.918 opt Au and 128 ft of 0.114 opt Au. Both of these intercepts start at less than 100 ft below the surface. The other holes are well mineralized, mostly in the 0.0X opt Au range over intervals 80 ft, or more. More drilling is planned, of course.

Nevada Pacific Gold released initial results from drilling at the Cornerstone property (Eureka County). Gold mineralization starts at the surface and extends to 150 ft with intercepts generally in the 0.01 to 0.03 opt Au range. And at the BMX property in Lander County, initial drill results produced a 65 ft interval of 0.301 opt Au and 1.83 opt Ag, starting 110 ft down the hole. Pan-Nevada Gold released results from the final five holes at Jessup (Churchill County), which encountered previous unknown “vein structures.” Most of the intercepts are 5 ft thick with grades of 0.10 to 0.25 opt Au. At their Pan property (White Pine County) four holes apparently discovered a new Au zone about one mile northwest of the nearest Au resource. Intercepts are up to 55 ft thick, starting at the surface, with average grades from 0.01 to 0.039 opt Au.

Coral Gold continues to drill at the Robertson property (Lander County) with a focus on the 39A zone. The better intercepts are between 400 and 900 ft below the surface with average grades up to 0.08 opt Au. Intervals are up to 130 ft thick. Incorporating the more than 1,100 drill hole, Coral Gold estimates that the measured/indicated global resource contains 22.9 Mt with an average grade of 0.031 opt Au, plus an inferred resource of 9.4 Mt of 0.046 opt Au.

The Hecla Mining-Great Basin Gold venture at Ivanhoe (Elko County) revealed very interesting results from underground development drilling. Many of the holes intersected multiple veins each up to a few feet wide with multiple-ounce per ton Au and Ag grades. The volume of data from the drilling program is too abundant to summarize here. The Great Basin Gold website contains detailed information for those interested.

Gryphon Gold completed a feasibility study and received mining permits for an open pit heap leach operation at Borealis (Mineral County). Mining will be based on a reserve of about 15 Mt with an average grade of about 0.03 opt Au and 0.5 opt Ag. A minimum six year mine life is planned with annual production of about 58,000 oz of Au and 546,000 oz of Ag, once financing is arranged.

Golden Odyssey Mining completed nine shallow holes totaling 4,500 ft at Morningstar (Esmeralda County) which encountered “anomalous Au” and associated pathfinder elements, the best of which is 40 ft of about 0.006 opt Au and a separate 5 ft interval of 0.040 opt Au. Dave Shaddrick is now faced with getting his checkbook out in the hopes that this isn’t “suck-you-in” mineralization.

It has been about 20 years since anyone seriously considered tungsten as a commodity of interest in the U.S. Galway Resources believes that the time is right to pursue an opportunity in the metal. They are drilling the Indian Springs tungsten property in Elko County, where Utah International defined a “reserve” of 21.9 Mt of 0.179% WO3 several years ago. Galway’s drilling is designed to confirm historical data and collect metallurgical samples. Initial results appear to verify the geometry of the mineralized zones and grades compare favorably with historic drilling.

Klondex Mines continues drilling at Fire Creek in Lander County. The best intercepts in the new report are 20 ft of 1.64 opt Au and a second hole with 7.5 ft of 1.87 opt Au. Other holes contained lesser grades, but many have intervals of 0.1+ opt Au. The information is so extensive that a summary is difficult here; those interested in the details are referred to Klondex Mines’ website. A recent estimate places the inferred resource at about 1.8 Mt with an average grade of 0.576 opt Au, clearing the magic 1-million-ounce hurdle.

Boxxer Gold completed 13 holes totaling 2,100 ft at the Boss property (Clark County) to test mineralization along the Yellowhorse zone. Gold mineralization is in altered granite-syenite porphyry in a northwest-trending, steeply dipping zone that averages 78 ft wide and has at least 550 ft of strike. Drilling traced mineralization to at least 200 ft deep. The average grade of all drill hole intercepts is 0.023 opt Au, with associated Fe and copper oxides.

Newmont Mining announced new proven and probable reserves for several areas in northern Nevada. Underground operations along the Carlin trend contain 7.7 Mt of 0.49 opt Au, while open pits reserves along the trend contain 238.3 Mt of 0.043 opt Au. The Twin Creek mine contains 61.2 Mt of 0.074 opt Au and the Lone Tree mine contains 4.0 Mt at 0.08 opt Au.

Columbus Gold completed a 15-hole drilling program at the Gold Mile...
property (Mineral County) to test Au mineralization in skarn zones hosted by Triassic Luning and Jurassic Dunlop formations at a Cretaceous quartz monzonite contact. Several holes encountered Au mineralization with the best intercepts 45 ft of 0.07 opt Au and 20 ft of 0.40 opt Au. Since mineralization is open in most directions, except up, more drilling is planned.

AuEx Ventures completed 10 core holes totaling 3,700 ft to confirm “relatively” high-grade Ag intercepts encountered in historic drilling at the Trinity Silver property (Pershing County). Four of the holes encountered 5 to 10 ft of greater than 10 opt Ag, with a high value of about 26 opt Ag.

Assays from five more holes of a planned 33-hole program at New York Canyon (Mineral County) were announced by Abendene Mines. Mineralized intervals are generally over 100 ft of 0.1X to 0.6X% Cu. Copper oxides, with minor sulfides, occur in skarn associated with felsic dikes and sills.

Western Uranium completed a six-hole reverse circulation confirmatory drilling program at Kings Valley (Humboldt County). Previous drilling by Chevron and Anaconda defined resources of several million tons with an average grade of about 0.10% U₃O₈ in several areas. The recently completed drilling “confirms that the uranium mineralization at Kings Valley is of similar grade, thickness, and character as that originally defined.”

Texas

Energy Metals is currently drilling at the La Palangana (Duval County) in-situ recovery uranium project. Drilling is designed to define, delineate, and expand the 5.7 Mlb U₃O₈ resource.

Utah

Ken Krahulec, Utah Geological Survey, informs me that uranium exploration is extremely active in Utah (and throughout the Western U.S.) with six state permits issued and nine under review. Much of the work is being conducted on the Colorado Plateau.

International Uranium Corp. announced the reopening of the White Mesa uranium mill in San Juan County. This mill served as a central processing facility in the past and could stimulate development of new uranium deposits in the area. International Uranium is also reopening the Pandora uranium mine in the Lisbon Valley (San Juan County).

Universal Uranium completed 12 holes totaling 30,780 ft (that is the correct footage) at its Lisbon Valley property (San Juan County), four of which contain “significant” uranium. These holes intersected 5 to 30 ft of 0.04 to 0.06% U₃O₈ at 2,400 to 2,500 ft down the hole. Mineralization is in the Moss Back Member of the Chinle Formation and in the Morrison Formation along the down-dip extension of the Lisbon antline.

Trigon Exploration acquired a volcanic-hosted uranium property in the Marysville district (Sevier and Piute counties) that has a historic resource of 750,000 t of 0.75% U₃O₈.

Mesa Uranium released results from three drill holes at its Lisbon Valley property (San Juan County). Anomalous uranium mineralization is in the Moss Back Member of the Chinle Formation. Intervals are 3 to 4.4 ft thick containing 0.013 to 0.014 U₃O₈, at depths reported to by about 375 ft and averages about 70 ft thick. Mineralization seems to be at least to the southeast.

Palladon Ventures made a 200-ton test shipment from the Comstock Fe mine (Iron County) to the Levin-Richmond Terminal in California. They are overcoming numerous obstacles in the effort to return the property to production. To conform to the numerous reporting regulations, where they operate in the U.S., where there stock is listed in Canada, and where they vacation if Fiji, the resource estimate had to be restated and now is about 33 Mt of 47.2% Fe in the Comstock-Mt. Lion deposit. Historical data indicates there is a substantial more Fe mineralization on the property that may be amenable to future mining.

Astral Mining is drilling the Jumbo property (Iron County) to explore for high-grade Au along the vein zone. One hole encountered about 20 ft of 0.21 opt Au and 0.84 opt Ag in the hanging-wall size of the main Jumbo vein. Two other holes encountered anomalous Au, also in the hanging-wall zone.

Constellation Copper is continuing to explore the Flying Diamond copper deposit near its Lisbon Valley copper operation. Ten additional core holes have been completed intersecting up to 70 ft of oxide copper mineralization with average grades between 0.1X to 1.5X% Cu. Mineralization is commonly in two horizontal sandstone layers in the upper Dakota and lower Burro Canyon formations. These results “confirm the good overall continuity of grade and thickness of the Flying Diamond deposit.” The deposit is at least 4,000 ft long, 900 ft long, and averages about 70 ft thick.

Mineralization seems to be open at least to the southeast.

Recursos del Caribe, S.A.

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The SME '07 Annual Meeting in Denver, Feb. 26-28 will feature the following SME-SEG co-sponsored geology technical sessions: (1) Where Next for Cu-Ag: Undeveloped Copper Deposits of the World, (2) Gold and Silver Exploration 2006: Shine On! (3) Advancing Exploration through Innovative Technology, and (4) Geology of Uranium Deposits, which is part of a 5-session Uranium Symposium sponsored jointly by the Mining and Exploration Division and the Mineral Processing Division of SME. This Symposium will be a state-of-the-art snapshot of the re-emerging uranium industry from exploration through production, with special emphasis on In-Situ Leaching.

On the final day of the meeting, there will be an extended discussion on the relationship between the Society for Mining, Metallurgy and Exploration and the Society of Economic Geologists entitled “Where Have the Exploration Geologists Gone? Putting the ‘Exploration’ Back in SME.” The two Societies have a long history of co-planning and co-chairing geology sessions at SME’s Annual Meeting, and we have more than 400 mutual members. This session is open to everyone.
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The following deposit types will be discussed:
• U deposits (Australian and Canadian examples)
• Cu (the African Copperbelt)
• Zn-Pb (Australia, Canada and China)
• Au (Carlin and Sukhoi Log)
• Ni-Mo-PGE (carbonaceous shales from China and Canada)

Speakers include: Kurt Kyser (Queens University), Ron Matthews (Cameco), Paul Polito (Anglo American Exploration-Australia), Murray Hitzman (Colorado School of Mines), David Rickard (University of Cardiff), Poul Emsbo (USGS), Ray Coveney (UMKC), David Selley, Ross Large, Stuart Bull, Rob Scott, Peter McColdrick (CODES).

The meeting will commence with a general paper describing ore-forming processes in sedimentary basins (Kyser), and conclude with an overview and synthesis (Hitzman). All presentations will be by invited speakers, and ample time will be set aside for discussion. 

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MEMBERSHIP

appointed as a director of Spider Resources.

RICHARD A. CLEATH
House, 2 the High Street, Stockbridge, manufacturer. Nick’s address is Clarendon Exploration, Ltd., a company he co-founded managing director of Sirius Exploration, Ltd., a company he co-founded managing director of Sirius

PAUL G. ANDERSON
appointed vice president of exploration for MDN Northern Mining.

JAMES FRANKLIN
appointed vice president of exploration for Timberline Resources.

NEIL GOW (SEG 1993) has been named vice president of exploration for Aurogin Gold.

C. JAY HODGSON (SEG 1993) was appointed to the advisory board for Canadian Shield Resources, Inc. He is also chairman of Murgor Resources, Inc., and consults for various mining companies.

A. JAMES MACDONALD (SEG 1988 F) was appointed to the advisory board of Mirasol Gold, a company specializing in underexplored areas of Latin America, with interests in other areas as well.

PETER MEGAW (SEG 1982 F) has been named to the advisory board of Garibaldi.

GEORGE A. SCHROER (SEG 1998) has been appointed vice president of exploration for Uruguay Minerals Exploration.

MICHAEL R. SCHWABE (SEG 1985 F) recently retired from Uruguay Minerals Exploration.

WILLIAM E. STONE (SEG 2005) has been appointed vice president of exploration by Goldbrook Ventures.

CAREER-RELATED CHANGES

Paul G. Anderson (SEG 1990) was appointed exploration manager for Riverstone Resources.

Nick J.P. Badham (SEG 1981 F) has been named managing director of Sirius Exploration, Ltd., a company he co-founded. Sirius has advanced exploration projects in Macedonia. He is also vice-chairman of Helipeds Ltd., a grinding ball manufacturer. Nick’s address is Clarendon House, 2 the High Street, Stockbridge, SO20 6EY, UK; e-mail, nickb@dmac.co.uk.

Richard A. Cleath (SEG 1987) has resigned his position as vice president of exploration with Absolute Resources.

Paul E. Dircksen (SEG 2001) has been appointed vice president of exploration for Timberline Resources.

Dominique Fournier (SEG 1998) has been appointed vice president of exploration for MDN Northern Mining.

James Franklin (SEG 1985 F) has been appointed as a director of Spider Resources.

EDWIN W. ROEDDER (SEG 1959 LF) 1919–2006

Edwin W. Roedder, Penrose Medalist and the father of modern fluid inclusion study, died on August 1, 2006, in Gloucester, Massachusetts, at the age of 87. He was born July 30, 1919, received an A.B. from Lehigh University in 1941, worked as a research engineer for Bethlehem Steel Corporation from 1941 to 1946, and at the Carnegie Geophysical Laboratory from 1947 to 1948. He received a Ph.D. in geology from Columbia University in 1950, after which he taught mineralogy at the University of Utah from 1950 to 1955. He then spent the bulk of his prodigious career with the U.S. Geological Survey until 1987, when he became an Associate of the Earth and Planetary Sciences Department at Harvard University.

Roedder is best known for advancing the subject of fluid inclusions from a qualitative curiosity (ignored by many, untrusted by most) and revolutionizing it to become one of the most dynamic and fruitful lines of quantitative investigation in ore deposits, petroleum geology, mineralogy, and all facets of petrology. Ed Roedder’s name is synonymous with the subject, and he is considered by many to be the father of modern fluid inclusion research. As a capstone to his prolific yet still unfinished career, he wrote the encyclopedic Reviews in Mineralogy volume 12 on Fluid Inclusions in 1984. His other work deserves mention: on silicate melt immiscibility, particularly of lunar samples, and on nuclear waste isolation (he demonstrated that fluid inclusions in halite migrate up thermal gradients, effectively killing the idea of isolating reactor waste in massive but not-so-dry salt). Ed’s work was always carefully thought out, meticulously executed, rigorously interpreted, and clearly reported. He was well known for his openness, support of young researchers, and editorial prowess, and his unselfishness in sharing samples, data, and credit for research. Ed acted as a bridge for scientists from many corners of the world, near and far.

In addition to the Penrose Medal from the SEG, Roedder received the Roebling Medal of the Mineralogical Society of America, the Werner Medal from the German Mineralogical Association, and the Exceptional Scientific Achievement Medal from NASA, among others; he was elected as a member of the U.S. National Academy of Science. In 2002, his colleagues established the Roedder medal, which recognizes outstanding lifetime contributions to the study of fluid inclusions.

Contributions to his memory may be made to PACROFI (Pan American Current Research on Fluid Inclusions), c/o Prof. Robert Bodnar, Dept. Geological Sciences, Virginia Technical Institute and State University, Blacksburg, VA 24060, USA, to Planned Parenthood, or to a charity of choice.

A Fluid Inclusion Speaks Its Mind

Just to learn my secrets.
Do you like me?
Caught you there
Why do you look
With your soul bare.
At this tiny thing
You want to know my past.
That I am?
Was I homogeneous?
I see your eyes
Was I heterogeneous?
And you want to sing to me
These are the questions
To discover my soul
I can see in your eyes.
Don’t tell me
Can you hear me?
That you want to know me
And when you do
I am trying to say something.
I will tell it to you all.
I know that you can love me.

Joyanta Guha, Chicoutimi, 6 March 1982; reproduced at the beginning of Ch. 1, in Roedder, E., 1984, Fluid Inclusions: Reviews in Mineralogy, v. 12, 644 p. With permission of the author.

DEATHS

Geoff Bradshaw (SEG 2004), 32, died of injuries sustained when his head was hit by a helicopter rotor during a toe-in take-off while he was collecting samples on Wernecke Mountain, BC. Geoff was a mineral assessment geologist with the Yukon Geological Survey, and was well known in the exploration community in both British Columbia and Yukon.

Geoff grew up in British Columbia and graduated with a bachelor’s degree from the University of British Columbia. He received a master’s degree in 2003, focusing on massive sulfide deposits in the Finlayson Lake district. He joined the Yukon Geological Survey in 2003. A hardworking professional, he was also known as a drummer who “jammed” with fellow geologists.

Geoff is survived by his family in Sechelt, BC, and his girlfriend in Whitehorse. A scholarship is being established in Geoff’s name through the Yukon Foundation (tel. 1-867-393-2454).

MEMBERSHIP
Hugh Exton McKinstry (SEG 1928) will be inducted into the American Mining Hall of Fame on December 9. The Mining Foundation of the Southwest will hold the event in Tucson, Arizona.

McKinstry graduated from Haverford College, Pennsylvania, in 1917, and under the influence of Waldemar Lindgren, he earned a master’s degree at the Massachusetts Institute of Technology. After working for Cerro de Pasco in the Andes for three years, he became a part-time instructor at Harvard University, under L.C. Graton, earning his doctoral degree in 1926. For the next period of his life, McKinstry traveled around the world and carried out many evaluations of mining properties, joining Case, Pomeroy and Co. in New York in 1937. He became an independent consultant on ore deposits and deposit styles, and then taught at the University of Wisconsin until the outbreak of World War II.

During the war, he worked for the government (1942–1945), returning to Harvard to teach following his service. The textbook he wrote on Mining Geology became a standard for mining exploration and operations. McKinstry served as SEG President in 1954 and was a fellow of the American Academy of Arts and Sciences.

Nicolas J. Beukes (SEG 1985) was recently honored, on the occasion of his 60th birthday, by the dedication to him of a special issue of the South African Journal of Geology (SAJG). A prefatory note indicates that the 16 papers in volume 109, no. 1–2, “follow Nic’s approach and his broad research interests. These contributions are original and data-driven, and centre around the environmental significance and evolution of Precambrian sedimentary successions . . .” Nic is on the faculty of the University of Johannesburg and is the SEG Regional Vice President Lecturer for 2006.

Calendar of Events

Society of Economic Geologists

2006


★ Dec. 4–8. NWMA Annual Meeting — “Sustaining the Boom.” Reno, Nevada. This meeting will be held at the John Ascuaga’s Nugget Hotel, SEG Session. Mineral Deposits, Geology & Exploration; Wednesday, December 6, 8:00 – 11:15 am. SEG session chair is Tommy Thompson. For meeting information, see <http://www.nwma.org/>. See p. 4. Dec. 6–8. GeoCon 2006. Quezon City, Philippines. The Geological Society of the Philippines in collaboration with the Society of Economic Geologists will present two special lectures on mineral ore deposits and exploration during Geocon06. Lectures will be given by SEG 2006 International Exchange Lecturer, Doug Kirwin and SEG Fellow, Larry Meinsert. Please see website for details. <www.geoloc.phil/intro2.htm>.

2007

★ February 17–24. Joint Modular Course in Hydrothermal Ore Deposits. University of Ottawa and Laurentian University. To be held in Ottawa, Ontario, Canada. The course will feature four 2-day modules by Jeffrey Hedehusnitz, Daniel Kontak, Marc Hannington, and Larry Meinsert. Open to professionals in industry and graduate students. Contact: icr@uottawa.ca. See p. 28.


OTHER EVENTS

2006

★ Oct. 17–20. XIII Congreso Peruano de Geología. Lima, Peru. “Mobilizing Geosciences for the Development of the Country.” Website: <www.congreso2006.com>. For more information, please contact Dr. Lukas Züchter, Manager, Lowell Program in Economic Geology. E-mail: lzuechter@email.arizona.edu. Dec. 5–14. Short Course on Porphyry, IOCG, and Alkaline Cu and Au Deposits. Arizona, USA. For more information, please contact Dr. Lukas Züchter, Manager, Lowell Program in Economic Geology. E-mail: lzuechter@email.arizona.edu.

2007

★ Apr. 29–May 2. CIM Conference and Exhibition “Energy and Mines.” Montreal, Canada. Website: <www.cim.org/montreal2007/>. May 9–23. Field Course in Iberian Geology and Related Ore Deposits. Destination Lisbon, Portugal. WSU Faculty-Led Program. Application deadline: February 1, 2007. For information, contact: Dr. Peter Larson, Geology. E-mail: plarson@wsu.edu; Tel: +1.509.335.3065; Fax: +1.509.335.7816 or Ashley Krause, Education Abroad. E-mail: ashleykrause@wsu.edu; Tel: +1.509.335.3158; Fax: +1.509.335.2373.

★ May 20–23. The 43rd Forum on the Geology of Industrial Minerals. Boulder, Colorado, USA. This meeting will be held at the Millennium Harvest House Hotel hosted by the Colorado Geological Survey. For more information on technical sessions, poster sessions, and field trips, please see <http://in forum2007.crmea.org>. See p. 31.


★ Sept. 1–15. Modular Course in Structure, Tectonics, and Mineral Exploration (Field-Based). Sudbury, Ontario, Canada. Based). Sudbury, Ontario, Canada. Information: Bruno lafrance, Mineral Exploration Research Centre, Department of Earth Sciences, Laurentian University, Willet Green Miller Centre, 933 Ramsey Lake Road, Sudbury, ON, Canada, P3E 6B5. Tel: +1.705.675.1151 x2364; Fax: +1.705.675.4898; e-mail: blafrance@laurentian.ca; Website: <http://earth sciences.laurentian.ca>.

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