## Uranium Outlook: 2007 - 2008



The New Gold

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# Uranium Outlook: 2007 - 2008



An update to StockInterview's book: *Investing in the Great Uranium Bull Market* 

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### Contents

Introduction	4
Chernobyl	6
Nuclear: Higher Safety Levels	7
Risk Factors	9
Chapter One: Uranium Overview: 2007-2008	12
Problems at Major Mining Companies	16
Rossing's Troubled Recent Past, Current Problems	16
Expansion at Olympic Dam?	17
Doing Business in Central Asia	18
Russia's Nuclear Aspirations	20
United States: Nuclear Waste Storage	22
An Overview: Australia's Uranium Mining Climate	23
Strong Market: More Consolidation Ahead	25
Chapter Two: Short-Term Uranium Price Outlook 2007 – 2008	28
Current Status	29
Outlook	32
Reference Case	35
Low Demand/High Supply Case	36
High Demand/Low Supply Case	37
Conclusion	37
Chapter Three: How to Choose Uranium Mining Stocks in 2007	39
10 "Golden Rules" for Choosing Uranium Stocks	40
Chapter Four: Who Will Be the World's Next Uranium Producers?	53
Current Publicly Traded Uranium Producers	54
The New Uranium Mining Companies	58
2007	59
2008	60
2009	61
2010 and Beyond	64
Conclusion	66

## Uranium Outlook: 2007 - 2008 The New Gold

### Contents

Chapter Five: In Situ Recovery (ISR): New Technology for U.S. Uranium Mining	67			
In Situ Recovery Made Easy	68			
Remote Ion Exchange: Satellite Plants Could Help Reduce Costs and Efficiently Mine the Smaller Deposits	75			
Conclusion	80			
Chapter Six: A Safe Haven Basket of Uranium Mining Stocks				
The Year of Consolidation	84			
Forsys Metals Corp	89			
Powertech Uranium Corp	96			
Strathmore Minerals Corp	102			
Uranerz Energy Corp	110			
Ur-Energy Inc.	117			
Mawson Resources	124			

#### Disclaimer

## Introduction



During the 1980s, U.S. uranium production collapsed while uranium exports rose. But, U.S. reactor needs also rose dramatically. Presently, neither U.S. uranium production nor exports satisfy U.S. reactor needs. In 2006, U.S. uranium production increased to its highest level since 1999. We anticipate this momentum to continue for the next two decades. Graph courtesy of David Miller.

Since the release of "*Investing in the Great Uranium Bull Market*," we have contemplated an update. This book has become widely read – even beyond our expectations. Its popularity grows every month. But, there were certain key parts of this book which begged an update.

In this publication we are providing some of the basic but very key updates for investors:

- The Uranium Overview for the Next Twelve Months
- How to Choose a Uranium Stock in 2007

- Near-Term Producers
- A Suggested Basket of Uranium Companies

One issue which we have sometimes addressed in our StockInterview articles is the impact of the environmental movement with regards to uranium mining. The foundation of the worldwide anti-nuclear movement is based upon two episodes: Three Mile Island and Chernobyl.

No one died at Three Mile Island. Only one nuclear reactor was shut down. The other nuclear reactor at Three Mile Island (TMI) continues to operate, generating baseload electricity for the past 28 years and without incident.

Litigation for damages, by those claiming physical harm as a result of the TMI episode, against the utility company which owned the Three Mile Island nuclear power plant was dismissed in court – without merit. There was no legal evidence of physical injury as a result of the Three Mile Island incident. While the scare sold movie tickets for "The China Syndrome," even that Jane Fonda and Michael Douglas theatrical melodrama has mainly been forgotten.

In eastern Pennsylvania, where the Three Mile 'accident' took place, there are presently seven nuclear reactors in four locations. These nuclear reactors continue to provide baseload electricity for the region. In the most recent figures provided by the U.S. Department of Energy (Energy Information Agency, EIA), nuclear power generates more than 30 percent of the electricity for the state of Pennsylvania.

On the 25th anniversary of Three Mile Island in 2004, Pennsylvania was deriving 36 percent of its electricity consumption from nuclear energy. Pennsylvania ranks second among U.S. states, behind Illinois, in nuclear-generated electricity consumption. Do you honestly believe nuclear energy failed in eastern Pennsylvania?

Twenty-seven years later, the nuclear reactors continue creating the energy to provide electrical power. By comparison, Pennsylvania residents and businesses pay less per kWh than those in California, according to the most recent EIA statistics. Pennsylvania residents paid 13.6 percent less per kWh than Californians on their electricity bills. Pennsylvania commercial and industrial electricity costs were more than 30 percent lower than in California. Pennsylvania produces more than twice the nuclear-generated electricity as California. Perhaps California should reconsider wind and solar power, and include more nuclear in its energy mix.

#### Chernobyl

While the Three Mile Island episode resulted in little damage, the Chernobyl reactor accident was very serious. In our book, and in numerous other publications, one will discover the Chernobyl episode was grossly blown out of proportion. While a small number of people died (less than 100), because of the nuclear accident, new evidence about the 'disaster' is showing positive environmental signs.

After the explosion in the early hours of April 26, 1986 at the Chernobyl nuclear power plant (which, by the way, was a Soviet-era military nuclear reactor), about 50 tons of radioactive dust and debris was scattered around the nearby Ukrainian countryside. An 18-mile circle around the center of the power plant was then designated the Chernobyl Exclusion Zone.

The residents were safely evacuated. The farm animals, pets and livestock were left behind. Many animals were severely burned by, or died because of, the immediate radiation from the accident. But since then, the area has become abundantly alive – for both flora and fauna. There are even pockets of this 'exclusion zone,' in which radiation levels have returned to normal, or near normal – and in less than 20 years! Media reporting of the area has been limited – possibly because it would upset the worldwide anti-nuclear movement. The various guesstimates of death, longer-term damage and emotional trauma as a result of Chernobyl, which were issued by numerous environmentalists after the accident, have long since been discredited by multiple governmental investigatory committees and panels.

As an encouraging example, we ran across a story of 'Uranium the Ukrainian Bull'. Instead of siring two-headed calves or mutated offspring with five or six legs, calves produced by 'Uranium' showed zero signs of birth defects. Fifteen years after Uranium was rescued and relocated to an experimental farm, he had been meticulously studied by geneticists. Three cows were also rescued: Alpha, Beta and Gamma. A senior researcher for Chernobyl's Ecological Center pointed out, "When our scientists found them, the animals suffered badly."

The animals were unapproachable for the first year after the nuclear accident. For a year after the accident, Uranium was unable to produce offspring. But over the following fifteen years, the bull reportedly had fathered 186 calves. Most of those calves were sired from Alpha, Beta and Gamma, also victimized by the Chernobyl accident.

After studying four generations of offspring, no mutated calves have been born in Chernobyl. For humans who continue to worry about nuclear radiation, mutation, and long-term damage, the first place to study would be Chernobyl. The global threat of radiation poisoning, once promised by environmentalists, never took place. It has been more than twenty years since the global media panicked over an actual accident at a nuclear power plant.

#### **Nuclear: Higher Safety Levels**

At Chernobyl, less than 100 people directly died as a result of this nuclear disaster; at Three Mile Island, no one died. By contrast, as many Chinese die every week, on average, in coal mining accidents than have died in the 50-year history of civilian nuclear energy. During the past decade, more have died as a result of accidents and leaks from natural gas production and consumption. More have died as a result of hydroelectricity use, mostly because of dam breaks and the resultant flooding of rural villages.

According to the World Bank, air pollution (as a result of coal burning) causes more than 300,000 premature deaths in China. While the environmentalists fret about the terrifying toxicity of nuclear energy use or uranium mining, millions are presently dying as a result of very real  $CO_2$  emissions.

Recently, the research director of the Norwegian Polar Institute announced concentrations of carbon dioxide had recently risen to 390 parts per million (ppm) – up from 388 ppm a year ago. "The levels are at a new high," he said. Before the Industrial Revolution of the 18th century, concentrations stood about 270 ppm. These concentrations have been rising faster, too. "When I was young, scientists were talking about 1 ppm rise," the research director said. "Since 2000, it has been a very rapid rate." Over the past two hundred years, CO<sub>2</sub> concentrations have jumped by 44 percent. Concentrations now stand at the highest levels of the past 650,000 years, according to scientists who study these levels.

For the time being – until solar and wind power can be technologically advanced, nuclear power may be the single solution to our growing energy burden and the control of air pollution. This is what Dr. James Lovelock had told us in previous interviews. Not only did he write the foreword to "*Investing in the Great Uranium Bull Market*," Dr. Lovelock was chosen as part of a three-man panel to judge other scientists' efforts to help solve the CO<sub>2</sub> problem in relation to global warming. Billionaire Richard Branson has offered scientists a \$25 million prize for solving the problem.

Once the issue of environmentalist misinformation is honestly and accurately addressed and remedied, we believe the nuclear renaissance will be fervently welcomed by the developed countries. In the interim, the nuclear renaissance will power ahead in China, India and Russia. Ironically, one of the countries where nuclear should flourish in coming years is the Ukraine, the country where the Chernobyl accident took place. Today, nearly 50 percent of the electricity generated in this country comes from its nuclear power plants.

For at least the next decade, however, the United States should remain the primary consumer of uranium oxide,  $U_3O_8$ , which is the processed uranium after mining. U.S. utilities should remain the primary buyers of uranium for at least the next ten years. Aggressive nuclear energy expansion in Japan and South Korea will also add to the nuclear renaissance and help keep the uranium mining sector healthy for a number of years. After the launch and widespread distribution of the Pebble Bed Modular Reactor (PBMR), more countries will have access to nuclear energy. The PBMR plays an essential role in the nuclear renaissance. Many developing countries have lower capacity electrical power grids, which make the larger nuclear reactors unsuitable. Since March 2005, the International Atomic Energy Agency has maintained a focus on new innovations with smaller reactors in order to provide the lesser equipped countries with the benefits of nuclear energy.



Non-OECD Installed Nuclear Generating Capacity, 2003-2030

Graph courtesy of the EIA, Energy Information Administration. Sources: 2003: Energy Information Administration (EIA), International Energy Annual 2003 (May-July 2005), web site <u>www.eia.doe.gov/iea/</u>. 2010-2030: EIA, System for the Analysis of Global Energy Markets (2006).

Uranium mining inventory will be in greater demand, helping to accelerate the nuclear renaissance. Nuclear energy will have additional applications in a number of energy- related industries. One significant application will likely include the desalination of water. Desalination from seawater will be in great demand in an era of growing global droughts, and nuclear energy will take on a greater role. There are evidences this can be viable, and projects are now underway to expand this application in more than twenty countries.

Far into the future, the hydrogen economy will most likely depend upon a greater use of nuclear energy. The cost of building hydrogen-powered cars, and powering them with hydrogen, will probably rely upon nuclear energy for hydrogen production. As the world changes, we believe the use of nuclear energy will grow. Consequently, uranium mining to help fuel the nuclear renaissance should become a growth sector for at least the next five years. After all, uranium mining companies represent the front end of the nuclear fuel cycle. Without the uranium oxide to fuel the reactors, there can be no increased reliance upon nuclear energy to generate baseload electricity.

*Editor's* Note: Stay up to date with StockInterview's updates on the uranium market. Join our free subscription list by <u>signing up for updates</u> on the StockInterview website.

*Tell your friends about "Investing in the Great Uranium Bull Market.*" It's now available at <u>http://bookstore.stockinterview.com</u>, offered by <u>Amazon.com</u>, and at U.S. bookstores through your local bookseller.

#### **Risk Factors**

Investing in stocks carries many risk factors. Speculating in natural resource stocks carries additional risk factors. When it comes to uranium mining stocks, there are several key risk factors which investors must additionally consider. We included these risk factors in the front of the book so that all investors are apprised of risks not normally found in resource/investor conferences, in company news releases or in speaking engagements where information is portrayed favorably during PowerPoint presentations. Please read each risk factor carefully.

**Underlying Commodity Price Risk**. Uranium mining stocks, whether they are currently producing or still in the hunt for an initial discovery, are dependent upon the underlying commodity. Nearly all uranium stocks had astounding rallies over the past year (2006), as the spot uranium price nearly doubled. Since hitting a bottom in December 2000, after a twenty-year price decline and drought, spot uranium has skyrocketed by more than 1100 percent. The spot and long-term uranium price continued climbing as we went to press. Will uranium continue to rally for 200 consecutive weeks without a single down month? That's difficult for even us to digest. Although we've been extremely bullish for the past three years, we have turned somewhat cautious about this commodity. If the uranium price takes a serious tumble, we anticipate the majority of pure uranium exploration stocks could vaporize. The new uranium miners and up-and-coming, near-term producers are also at risk at these levels. Most do not need \$100/pound uranium, but perception overpowers reality, but price risk could become a strong factor in 2007 or 2008.

**General Commodity Price Risk**. Because nearly all uranium mining stocks have been financed, and are currently being financed, by financial institutions specializing in natural resource stock investment, there is a related commodity risk. If precious metals, or related energy commodities, suffer a prolonged downturn, then such institutions may be reluctant to continue financing companies in this sector. The institutions may be forced to sell off some of their investments in uranium mining stocks to re-balance their portfolios. Some funds may also pressure stock prices by selling uranium mining stocks to cover investor redemptions.

**Financing Risk**. We anticipate all uranium companies will face equity dilution in bringing their projects into production. The larger projects are likely to force a smaller company to

partner with a much larger company; this may dilute some part or a major portion of their share in the project. Equity dilution is a fact of life when bringing mines into production, and must be considered as many projects move forward into operations. Project dilution is expected because of the expensive capital costs for mine and mill development. Capital costs to build an ion exchange for an ISR uranium processing plant (also known as Ion Exchange) starts at \$20 million; a remote ion exchange (also known as a satellite plant) will cost at least \$10 million. A conventional uranium mill should cost far more than \$100 million, depending upon the size (often expressed in terms of tons per day milled). Nearly all non-producing uranium companies are not financed fully through to the operations phase of their project. The majority have inadequate financing to provide for environmental permitting, cash bonding and reclamation on any single project, let alone an entire portfolio of uranium properties.

**Underlying Stock Exchange Risk**. Many of the early-stage uranium mining stocks find their primary trading home at the highly speculative TSX Venture Exchange or the less well-regulated Over the Counter Bulletin Board. Because these are considered more speculative trading platforms, publicly traded companies on these exchanges are at the mercy of the broader markets. Historically, a greater number of fraudulent companies have traded on the lesser exchanges.

**Political Risk.** Uranium mining is highly subject to local, state, national and international politics. There are numerous restrictions on uranium mining, which are rarely disseminated to investors in uranium mining stocks. In certain unstable countries, uranium mining may be subject to nationalization, the expulsion of foreign uranium mining companies, or the seizure of valuable mining assets. In numerous developing countries, there may be widespread political corruption which could interfere with a project's development. Investors should take care to evaluate the political risk in a country.

Environmental Hurdles. Uranium mining is the most regulated of mining activities. All uranium mining projects are subject to local, national or international environmental lobbying organizations efforts. Historically, politicians intervene in this area, adding an additional political risk. Uranium mining has been, and may continue to be, a touchy subject for many residents as to where it takes place. This is often referred to as 'not in my backyard.' Some regulatory bodies are more permissive than others when allowing uranium to be mined in their areas, regions or countries. But, there are areas of the world where uranium mining is presently banned or which allows limited uranium mining. One should carefully study the environmental downside of an area before proceeding with an investment in a company, which faces the environmental risk. Because of the uranium, politics has played a major regulatory role over the past half century. And politicians will continue as guardians for this material, directly or indirectly. One should also factor a minimum of four years for the entire environmental process before mining operations can commence. This timeframe would be under ideal circumstances, subject to many variables, and could take more than five years under a less favorable scenario. Understaffing at federal and state agencies could also become factors for 'surprise delays' in commencing a company's mining operations as promoted in PowerPoint presentations or in company news releases.

**Nuclear Accident Risk**. The previous uranium mining boom ended after Three Mile Island and Chernobyl. The uranium price slid from its previous high above \$40/pound (about \$111/pound in inflation-adjusted dollars) to a low of less than \$7/pound by the beginning of 2001. Uranium mining was nearly dormant post-Chernobyl through 2003. By then, there were probably less than 20 uranium mining companies (some purely exploration) worldwide. At this writing, there are perhaps more than 400 companies which claim to be – and some of which actually are – in the uranium mining sector. Another nuclear episode, on the level of Chernobyl, would pose a significant risk to the nuclear energy sectors and consequently for the uranium mining sector. This risk is enhanced because many of the world's reactors are aging. No new nuclear reactor has been built and begun operations in the United States for more than 30 years.

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## **Chapter One: Uranium Overview: 2007-2008**



World uranium mining production has failed to recover to the higher levels seen in the 1980s. Chart courtesy of TradeTech LLC, <u>www.tradetech.com</u>.

When trying to understand the mechanics of the nuclear fuel cycle – of which uranium mining is the first step, one has to adjust one's thinking and look into the future. This is how the entire industry is taught to think. It is a forward-looking business. From the time uranium is mined until the final product is utilized in a nuclear reactor, between two and three years have passed. Manufacturing nuclear fuel requires several steps: mining, milling, conversion to  $UF_c$ , enrichment and fuel fabrication –from pellets to fuel rod assemblies.

After the Cigar Lake mine flood in late 2006, utilities were not concerned about nuclear fuel for use from 2007 through 2009. They panicked because they were expecting uranium for use in 2010 and 2011. That would be when the actual fuel would be 'burned' in their reac-

tors. Fuel being enriched in 2007 would not reach a nuclear reactor until late 2008 or early 2009. Utilities in the United States and elsewhere are today powering their nuclear reactors with material mined in 2004.

As we review in this chapter the events taking place in 2007, we are discussing outcomes which may not take place until 2010. Companies hoping to bring uranium mining into production between 2008 and 2011 are the ones with whom utilities are presently discussing fuel strategies. The steps of the nuclear fuel manufacturing cycle require they ensure a reliable supply source by then.

This may help explain why the spot uranium price has been heading north since 2003 with greater acceleration in each year and, at the present time, by each month. Utilities are facing a tight nuclear fuel supply problem by 2010 and later. Certain events took place in 2006 which caused the uranium price to double:

• In July 2006, Russian President Vladimir Putin and U.S. President George W. Bush mutually decided to terminate the Megatons to Megawatts (HEU – LEU) agreement in 2013. There had been growing anxiety the Russians might discontinue SWU shipments before then. They could disrupt this supply source as early as 2008, but this is an uncertain forecast.



7.352

46,000

10,014

### **Megatons to Megawatts**

250.4

Program-to-date

- By September 2006, it became fairly well known that uranium production at the world's leading mines had dropped instead of climbed to meet the rising demand. This added further stress to an already tight pipeline of nuclear fuel supply.
- In late October 2006, Cameco Corp announced flooding problems at the Cigar Lake underground uranium mine. In April 2006, the company hinted there were water problems, but few took notice. We had reported on this, but the commentary was mainly ignored. We reviewed the risk factors surrounding the remediation of the Cigar Lake project and remain concerned about this supply source.

It was not until after Cigar Lake, when utilities became cognizant that a reliable vendor in Cameco Corp was unlikely to deliver uranium into the system by 2008. This event accelerated the soaring uranium price. The uranium price closed out 2006 with sufficient momentum to surpass US\$100/pound by spring 2007.

Before then, U.S. utilities were comfortable about their nuclear fuel supplies 'looking forward' to 2009 and beyond. We clearly remember a discussion with the vice president of nuclear engineering for Florida Power and Light at the Platts conference in Washington, D.C. in September 2006. He insisted utilities would have ample uranium supply coming from three areas: Cigar Lake, Kazakhstan and Olympic Dam. His utility had no interest in purchasing uranium at the U.S. Department of Energy auction held several weeks earlier because it was 'too expensive.'



#### World Net Electricity Consumption, 2003-2030

Graph courtesy of the EIA, Energy Information Administration. Sources: 2003: Energy Information Administration (EIA), International Energy Annual 2003 (May-July 2005), web site <u>www.eia.doe.gov/iea/</u>. Projections: EIA, System for the Analysis of Global Energy Markets (2006).

**Fuel Shares of World Electricity** 



#### Shares of OECD Installed Electricity Capacity by Fuel Type, 2003-2030

Graphs courtesy of the EIA, Energy Information Administration. Energy Information Administration (EIA) forecasts show nuclear will play a smaller percentage role in electricity-capacity generation by 2030. If the EIA is inaccurate and the demand for nuclear energy accelerates, then there will be inadequate uranium supplies to meet that demand. Sources: 2003: Derived from Energy Information Administration (EIA), International Energy Annual 2003 (May-July 2005), web site <u>www.eia.doe.gov/iea/</u>. 2010-2030: EIA, System for the Analysis of Global Energy Markets (2006).

This miscalculation is representative of numerous U.S. and global utilities ensconced in their offices reading spreadsheets instead of aggressively gathering data. Reliance upon second-hand and third-hand data has cost utilities and their rate-payers a bundle in increased fuel operating costs. The increase in the uranium price – of more than 400 percent since 2004, resulted in an operating cost increase of about 16 percent. It is not a major factor in the operation of a nuclear reactor, but much of this expense could have been avoided had utility fuel managers adjusted their forward thinking.

Another miscalculation was pointed out to us by Sprott Asset Management's Kevin Bambrough. Projections of core-build have been omitted from WNA reference cases. New reactors could add between two and three million pounds per 1000 MW reactor. If we include the 28 new reactors now being constructed, this adds about 60-plus million pounds to an already tight market supply. If another 200 nuclear reactors actually reach the operational phase by 2030, this could collectively require 400 to 600 million pounds of new supply over this time period.

In 2007 and beyond, utilities and uranium miners must address several uncertainties within the nuclear fuel cycle. Between 70 and 85 percent of the anticipated global uranium production from 2008 through 2012 is already under contract with utilities. Shortfalls from shocks to the system and uncertainties – such as Cigar Lake, Russia and more recently Energy Resources of Australia – have been followed by price spurts higher. Problems to be addressed are the reliability of new uranium producers and potential failures at their mines, legacy contracts delivering uranium to utilities at marginal profits while the uranium price races higher and the disincentive this engenders for the mining companies, and Russia's ambitions.



Early March 2007 flooding at the world's second largest uranium mining operation, which accounted for 11 percent of global mining production in 2006. Energy Resources of Australia declared a force majeure on the company's uranium sales contracts with utilities.

#### **Problems at Major Mining Companies**

Two countries – Canada and Australia – produce more than one-half of the world's newly mined uranium. In 2005, eight mining companies produced 78 percent of the world's newly mined uranium. In that same year ten uranium mines accounted for 73 percent of global production. In the past five months, mines in the two largest-producing countries were flooded. In early March, Energy Resources of Australia declared a force majeure on the sales contracts from the world's second largest uranium mining operation.

In 2006, uranium production by the world's top ten producers reportedly missed their mining estimates by a combined 10 million pounds. In a September 2006 interview with Patricia Mohr, Scotiabank vice president of economics, we were told uranium mining production probably fell by 20 percent in the first half of 2006.

This may be the tip of the iceberg for utilities with regards to future problems from previously reliable major mining operations. Let's review some of the key operations around the world, their prospects and many of the issues surrounding forecasts of reliable uranium supply.

#### **Rossing's Troubled Recent Past, Current Problems**

There are problems at the world's fifth largest uranium mine – Rossing (Namibia). The uranium mine was nearly closed down in 2003 because of declining uranium prices. By early 2004, the Namibian media announced the company had been diverting money set aside to decommission the mine to cover operating expenses. Then-managing director David Salisbury told a Namibian newspaper in January 2004, "It is true that we are using some of the money, but we have no intention of exhausting the fund." At the time, Rossing's uranium mill tailings represented the world's single largest uranium mining liability.

A soaring uranium price intervened to prevent any potential future embarrassment. Majority owner Rio Tinto approved \$112 million to extend Rossing's mine life through 2016. Rossing annually produces more than 7 million pounds  $U_3O_8$  – about 40 percent of what Cigar Lake was expected to annually produce. At some point, this production will have to be replaced by new uranium mines. But there may be problems before then.

Rossing has experienced declining ore grades at the company's open pit mining operations. Its more promising uranium ore is accompanied by betafite in the granite, running at ore content of about five percent. This refractory mineral can not be readily processed using Rossing's existing acid leach system. This may or may not present a production shortfall during 2007 or 2008, but it could in later years. Rossing is expected to increase production by 10 percent from 2005 levels, but this remains to be seen.

#### **Expansion at Olympic Dam?**

BHP Billiton's Olympic Dam hosts the world's largest known uranium deposit, about onethird of the world's known uranium resource. However in February, BHP was forced by some customers to sell them more uranium than it has been producing. Legacy contracts, inherited by the company's acquisition of WMC, bind BHP to sell uranium at less than \$20/pound so the company must arrange for uranium purchases at much higher prices to legally satisfy its contractual obligations. Production has also been down because of declining ore grades.

But BHP has other problems it must also overcome during its mammoth expansion at Olympic Dam. In early March, the South Australia government announced it was investigating the viability of building a desalination plant to help supply Adelaide's water needs. In reality, Olympic Dam's expansion will need this desalination plant or is unlikely expand mining production. One cost estimate provided to us was AUS\$700 million for the desalination and pipeline. To process the ore, Olympic Dam now draws about 30 million liters of fresh water each day from the Great Artesian Basin.

This is but one of many of the costs BHP will require during the expansion, presently estimated at nearly US\$4 billion. From what we understand, the company might not complete a feasibility study until 2009. If the project is given a green light, it could mean four years of digging to reach the first ores at depths of 350 meters. Nearly two cubic miles of rock will need to be shifted. We've reviewed estimates that the company will have to move 1 million tonnes of overburden per day! By converting the underground mine into an open pit operation, it will become the world's largest mine void – similar to a Martian crater. One analyst informed us Olympic Dam will need new power plants with a 400-Megawatt connection and a rail link. BHP will also have to move the airport and expand township of Roxby Downs to accomplish its mine expansion. While these plans would triple BHP's annual uranium production, it has not yet secured financing to expand Olympic Dam. It is uncertain if this behemoth project will ever come to pass. Some doubt BHP will be open pit mining Olympic Dam by 2014, at a time when we believe uranium may be in very short supply. Yet, global utilities are factoring newly mined uranium into their spreadsheets as a future, reliable source of nuclear fuel.

#### **Doing Business in Central Asia**

One of the underlying themes of Central Asian politics is: Who will take over when the dictator dies? Another is: When will this country come out of the dark ages?

In Uzbekistan, home of one of the Navoi uranium mine and the world's seventh largest uranium producing country, there is widespread corruption and human rights violations that rival any of the world's worst offenders. Uzbek President Islam Karimov has been accused by the U.S. State Department of political persecution and torture. Reports include that he has had his political enemies boiled in oil.

Generally, such political climates do not bode well for a stable mining atmosphere. Continuity in government often breaks down with a coup or sometime after a dictator's demise. U.S. utilities can not anticipate a reliable uranium supply from this country. It is also believed Japan has locked up uranium sales contracts from the Uzbeks. Whatever they don't acquire would likely go to Russia or China.

Kazakhstan has fared with better publicity than the other "Stans" despite the 'Borat' movie. Few believe the Kazakhs have cleaned up their act, aside from those presently doing business in this country. However, most industry experts have faith in the country's rich and abundant uranium resources.

As we have been advised through 2006, Kazakhstan remains the wild card for uranium mining production. In an earlier article we reported upon the important ingredient used to solution mine in Kazakhstan: sulphuric acid. For example, at Cameco's ISL project in this Central Asian country, uranium mining could annually consume about 2200 truckloads of sulphuric acid. That amounts to six truckloads of sulphuric acid, driven daily on what were once camel trails to extract the rich uranium grades found down to 1500 feet. And this is one of many hurdles the country's miners face.

At Cameco Corp's Inkai deposit in Kazakhstan, the company has worked full steam ahead, but has had difficulties annually producing more than four million pounds after four years of build-up. The grades are there, according to Glenn Catchpole (now chief executive of Uranerz Energy) who took the Inkai deposit from the beginning through to the first phase of production. Catchpole told us the historical data was always underestimated by the So-



Kazakhstan autocrat Nursultan Nazarbayev controls about 15 percent of the world's uranium. His country's savvy deals place the Kazakhs in a central role for nuclear energy's future. What happens if he is overthrown or dies?

viets. At the same time, he was told there would be more uranium in the deposit, which he reported was always confirmed. In a September 2006 presentation by Power Resources president Fletcher Newton (Power Resources is a Cameco subsidiary), he showed records of spectacular head grades at the Inkai In Situ Leach (ISL) project and praised KazAtomProm in every respect.

While the potential for superlative uranium mining in this country exists, how quickly can the government and its foreign joint venture partners construct the infrastructure and mobilize the labor force for such mining? In emails exchanged with those on the scene in this country, we have been advised to remain cautious and skeptical.

Kazakhstan has euphorically predicted a goal of producing 39 million pounds of uranium by 2010. There is little doubt the country has some of the largest uranium reserves on the planet – about 15 percent of known global reserves. But, analysts are questioning the optimistic time table. In September, Patricia Mohr called the timeline unrealistic. Merrill Lynch forecasts the country's production might climb to 26 million pounds by 2010. In analyst uranium pricing projections, most present the assumption that Kazakhstan will quadruple its current production by 2010. This remains to be seen. Most analysts believe the Kazakhs will sell their uranium production to Russia, the Ukraine, the Chinese or others, depriving U.S. utilities of an important uranium supply. Anecdotally, we were told from an extremely reliable source that the Kazakhs had been shipping 50 metric tons of uranium to China every month, having not included this production in any of the typical filings required by western countries. Again, this supply source could become a major stumbling block for utilities factoring in Kazakh uranium mining production into their spread sheets.

#### **Russia's Nuclear Aspirations**

The key driver behind Russia's energy focus shift to nuclear energy comes from the country's strategy to reduce its domestic dependency on natural gas. Indeed, Russia's natural gas arm, Gazprom, is emerging as a major player in Russia's nuclear renaissance. During 2006, Gazprom supplied over \$1 billion in financing to Rosatom's enterprises. Gazprom controls nearly 50 percent of Atomstroyexport (ASE), the company which constructs nuclear power plants outside of Russia. (ASE is presently building Iran's Bushehr nuclear plant.)

Basically, Russia would rather export its natural gas to Europe and capitalize upon the strong gas price than sell it domestically with subsidies. There is also concern of a future dwindling gas supply and the timing of bringing new gas fields online. Since 2003, nuclear has surfaced as an attractive energy solution. By enhancing control of the entire nuclear fuel cycle, Russia hopes to fortify its position as a dominant global energy supplier.



Russian President Vladimir Putin has led Russia to a potential nuclear renaissance, but will the country arrive at one by 2020?

In March, First Deputy Prime Minister Sergei Ivanov announced, "We must diversify our fuel and energy balance and develop efficient technologies to ensure energy security." Considered by many to become Vladimir Putin's heir apparent after 2008, Ivanov confirmed the country's goal, in a recent address to the country's nuclear power agency, of putting into service three nuclear reactors every year, starting in 2016. He also said he hoped Russia could increase this annual number to four before 2020.

Russia presently has ten nuclear power plants with a total installed capacity of 23.2 MWe. Nuclear energy generates about 16.5 percent of Russia's electricity. Russia hopes to nearly double nuclear capacity before 2030. The country's aggressive uranium mining program, outside of Russia, reinforces our belief Russia could help lead the nuclear renaissance further.

But, some questions remain unanswered. Since 1991, Russia has only commissioned 3 gigawatts of new nuclear capacity. Although Russian Prime Minister Mikhail Fradkov announced ten new 1,000 megawatt reactors would be completed by 2015, construction of nuclear plants since the early 1990s has been stalled by financing issues. Three production reactors and a few research reactors will require decommissioning over the next 25 years, but financing has not been included in the decommissioning budget. Our main questions are: Where will Russia get the money to build these reactors? And how stretched is the



First Deputy Prime Minister Sergei Ivanov

country's technical team in advancing a two-fold plan of building reactors domestically and outside of Russia?

While Russia hopes to consolidate its nuclear sector under fewer roofs, the complicated and interlocking relationships do not facilitate the creation of a single entity. As we pointed out, Gazprom owns nearly half of ASE. Another organization, TVEL, owns various uranium mining enterprises. State-owned TENEX exports uranium. Rosenergoatom controls all of Russia's nuclear power plants. Rosatom – the country's Federal Atomic Agency, acts as the regulatory body for the nuclear industry. Rosatom would likely emerge as the governing body over Russia's single-entity nuclear company.



Sergei Kirienko, Head of Rosatom

One needs look no further than the collapse of Russia's financial markets in August 1998. This destroyed Long Term Capital Management, which had invested in Russian treasury bonds. Russia's financial collapse nearly brought down the world's financial markets. Then-Fed Reserve Chief Greenspan responded with three monthly rate cuts to revive the financial markets. In turn, this engendered the 1999 tech and internet boom. And the subsequent bust in April 2000.

The current head of Rosatom is Sergei Kirienko. Between March and August 1998, as Russia's financial markets were rapidly collapsing, Kirienko was Russia's prime minister. It was Kirienko who appointed a former KGB colonel as the head of Russia's Federal Security Services – Vladimir Putin. The rest, as they say, is history. Should there be a consolidation of Russia's energy supply services – particularly the nuclear arm – Kirienko would mostly likely emerge as its chief. During his tenure at Rosatom, Kirienko has retired the old guard of academics and technicians, replacing them with business managers. Will Kirienko repeat his managerial failure, having once overseen Russia's financial markets, while tasked with managing the country's entire nuclear cycle, during Russia's nuclear revival?

Russia's publicity about building up its nuclear energy program sounds great on paper, but we remain unconvinced it will roll out as announced. One must wonder about Russia's ambitious nuclear plans and when the country will suffer a reality check about those plans. For the time being, the talk is long. And it helps keep the uranium price rising.



About 55,000 metric tons of nuclear waste could be buried in the Yucca Mountain repository. But it might not reach this portal until 2017 at the earliest.

#### **United States: Nuclear Waste Storage**

We won't pull any punches on this one. The head of the Nuclear Energy Institute (NEI) told one reporter a year ago that waste disposal was the 800-pound gorilla on the table. We have covered this subject on several occasions on StockInterview.com. It boils down to this: If spent fuel is not buried in the Yucca Mountain depository, the nuclear renaissance in the United States will never really move forward with much vigor.

This is the 'point of denial' for many nuclear renaissance enthusiasts. Sixty years of nuclear waste is being stored at more than 140 evaporating ponds or dry casket sites around the United States. About 55,000 metric tons of spent nuclear fuel and some 15,000 metric tons

of high-level military material have not been buried. First proposed in 1957 by the National Academy of Sciences that a geological repository host in perpetuity the waste remaining from the burning of nuclear fuel, it took another 25 years to identify a possible site. Yucca Mountain emerged as this solution in the 1980s. Billions of dollars have been spent studying this site and developing plans to bury spent reactor fuel.

The earliest such a site would become operational would be around 2017. Hopefully in 2008, Congress will accept a plan to proceed with Yucca Mountain. There remain numerous political sticky points, which make this an impractical starting date. We can't really argue this further as there are numerous variables preventing Yucca Mountain from becoming a reality. One potential breakthrough is the latest generation of reprocessing tests being generated at Idaho National Laboratories.

The Idaho National Labs breakthrough could become one solution to the nuclear waste issue. By reducing the amount of this waste through reprocessing and re-use, there would be less spent fuel to bury. But, this is not something we can expect in this decade. Please make a note of the nuclear waste disposal issue as one future stumbling block for the nuclear renaissance and the uranium price. It is not a short-term concern for uranium mining investors. By 2010 or 2012, it very well could be.

#### An Overview: Australia's Uranium Mining Climate

FNArena.com senior editor Greg Peel kindly supplied us with a brief overview on Australia and what to expect for developments in this important uranium-producing country.

Between September 2006 and March 2007 the price of uranium oxide leapt 96 percent from US\$46/lb to US\$90/lb. In the same period, the share price of Australia's largest listed pureplay uranium producer, Energy Resources Australia, leapt 123%. This was despite ERA being hampered by long term contracts that oblige the producer to sell at an average 2007 price of around only US\$21/lb. ERA's biggest local competitor, diversified giant BHP Billiton, is under similar, if not more onerous, limitations with sales from its Olympic Dam mine.

On the basis of enterprise value, ERA has slipped into third position globally since the merger of Canadians UrAsia Energy and SXR Uranium One. Cameco is a distant first. This does not include any valuation for ERA's Jabiluka deposit, which currently lays untouched due to indigenous ownership and environmental considerations. However, under current valuation ERA is just usurped by Australian "newcomer" Paladin Resources. Paladin has just begun production at its Langer Heinrich site in Namibia, and will soon commission its Kayelekera site in Malawi. Paladin is only now signing sales contracts – at spot prices. (It must be noted though securities analysts estimate the company forward sold circa 50 percent of base case Langer Heinrich production to 2012 (around 7.5mlb) at a floor price of around US\$30/lb, with escalator and ceiling terms incorporated).

Recently, Paladin made a bold and hostile scrip offer for Summit Resources in order to secure full control of Queensland's Vahalla/Skal deposit, which is half the size of Langer Heinrich. Paladin's share price has risen 142 percent over the above-mentioned period. The offer represented a 35 percent premium over the Summit share price, which itself had already risen 176 percent over the period. Yet Summit was not allowed to produce uranium until a state government policy reversal on March 23, and therein lies the crux of Australia's curious uranium policy.

The Australian federal government allowed uranium mining up until 1983, when a new Labor party government came to power. That government capped allowable mines at the existing three. When a Coalition government was returned in 1996, the restriction was lifted once more, however every Australian state remains governed by a state Labor party. Thus each state continues to ban the expansion of uranium mining, regardless of federal legislation, with the exception of South Australia which allows controlled expansion, and now Queensland, which has reversed its previously staunch refusal in anticipation of a similar move by the federal party. The Northern Territory – home to ERA – comes under federal control.

It is understood that the federal Labor party will reverse its mine policy in April 2007. Australia must also have a federal election by the end of 2007, and in March the Labor party was out-polling the increasingly threatened incumbent government by 61 percent to 39 percent. While a new Labor government would allow unlimited uranium mining as a matter of federal policy, it is conversely opposed to a local nuclear power industry. However, the federal Labor party cannot overrule state Labor governments. It was understood that Queensland might bow to federal pressure and allow uranium mining, and that has come to pass, but that Western Australia would stand fast. Together these two states boast 10 percent of Australia's known recoverable reserves of uranium. The Northern Territory boasts 18 percent and South Australia 72 percent (Olympic Dam is the world's largest uranium resource). Hence the Australian stock market has seen rampant speculation in recent months with regard to Queensland uranium miners/explorers in particular. And hence Paladin is prepared to pay a solid price for Summit.

While Paladin Resources might look like a newcomer, the company is really a manifestation of decades of the faith, patience and determination of its founder and CEO, John Borshoff. While Borshoff is keen to secure the Valhalla/Skal deposit, he is circumspect about the timing of a uranium ban reversal. He believes it will be 2010 before uranium could mined in both Queensland and Western Australia. While there are mines just waiting for a green light across the country, it still takes upward of five years to commence uranium production. Explorer/developers with at least estimated reserves are looking at longer still.

The Australian Bureau of Agriculture & Resource Economics forecasts an 11% increase in local production in 2007-08 to 11,500 tonnes. Most of this will stem from the commencement of production at SXR Uranium's Honeymoon mine in South Australia. ERA will also contribute via a new plant at its existing Ranger mine which will enable the processing of stockpiled lateritic ore. From now until 2011-12, Australian production is not expected to

CRITERIA	LANGER HEINRICH PROJECT*	KAYELEKERA PROJECT*	MANYINGEE PROJECT**	OOBAGOOM A PROJECT	VALHALLA DEPOSIT*	SKAL PROJECT	BIGRYLI DEPOSIT*
Paladin equity	100%	85%	100%	100%	50%	50%	41.7%
Location	Namibia, Southern Africa	Malawi, Southern Africa	West Pilbara, West Australia	West Kimberley, West Australia	Queensland, Australia	Queensland, Australia	Northern Territory, Australia
Deposit Type	Calcrete	Sandstone	Sandstone	Sandstone	Metasomatic	Metasomatic	Sandstone
Measured & Indicated Resources	37.1Mt of ore @ 0.06% U₃O <sub>8</sub> (22,500t U₃O <sub>8</sub> )	15Mt of ore @ 0.09% U₃O <sub>8</sub> (13,630t U₃O <sub>8</sub> )	7.9Mt of ore @ 0.1% U <sub>3</sub> O <sub>8</sub> (8,080t U <sub>3</sub> O <sub>8</sub> )		21.3Mt of ore @ 0.08% U <sub>3</sub> O <sub>8</sub> (16,900t U <sub>3</sub> O <sub>8</sub> )		1.05Mt of ore @ 0.2% U₃O <sub>8</sub> (2,450t U₃O <sub>8</sub> )
Mining Method	Conventional open pit	Conventional open pit	In-Situ Leach	In-Situ Leach	Open pit / Underground	Open pit / Underground	Open pit / Underground
Previous Owners	Gencor Limited (South African Mining Company) and Acclaim	Central Electricity Generating Board (UK utility)	Cogema (French utility)	Cogema (French utility)	Queensland Mines Ltd	Queensland Mines Ltd	AGIP Australia Pty Ltd
Project Status	Staged commissioning commenced. August 2006. Practical completion in December 2006. First production December 2006.	Bankable Feasibility Study finalised. Development Agreement executed. Project approved by Board February 2007.	Advanced development project. On hold. Feasibility Study in readiness.	Advanced exploration project. On hold. Resource definition drilling completed.	Advanced exploration project.     Resource definition drilling in progress.	<ul> <li>Advanced exploration project.</li> <li>Resource definition drilling in progress.</li> </ul>	Advanced exploration project. Resource definition drilling in progress.
Timeframe	<ul> <li>Production commenced in late 2006.</li> <li>17 year project life.</li> </ul>	<ul> <li>Production to commence in 2008.</li> <li>10 year project life.</li> </ul>	• 3 year staged feasibility study required.	• 2 year reserve / resource drilling required.	Development dependent on Government U Policy changes.	Development dependent on Government U Policy changes.	Prefeasibility Study if sufficient definition of resources.

#### PALADIN URANIUM PROJECT SUMMARY

Paladin's portfolio of uranium projects.

exceed 12,000 tonnes. Only small Northern Territory projects owned by Energy Metals and Compass Resources will add to existing mine production. BHP will triple the level of its Olympic Dam production, but this will not become effective until 2013. These figures assume no production from Queensland or Western Australia.

Australian explorers/developers sitting on significant reserves, but a long way from production, include Alliance Resources (South Australia), Deep Yellow (across Australia, and Namibia), Nova Energy (South and Western Australia), and OmegaCorp (Africa).

#### Strong Market: More Consolidation Ahead

The uranium space remains fragmented in light of the current uranium price and the extraordinary number of companies chasing so very few realistic uranium mining projects. Because this is a very strong market, we anticipate a number of very powerful business combinations and mergers as the uranium price continues to establish new record highs.

We believe the uranium price is likely to sustain at these and higher levels during 2007 and possibly well into 2008. Consequently, the currencies of the new uranium producers and the near-term producers will continue to increase in value. While likened to the Tech and Internet bubble, we believe any significant down turn in uranium pricing could be post-

poned until mid to late 2008. There will eventually be a crash in the uranium mining sector – but not just yet. And such an impact would mostly disintegrate the junior exploration sector, not the uranium producers.

In the beta version of this publication, we had forecast a high likelihood of a price decline between Labor Day and Memorial Day 2007. Because of the Ranger mine flooding and other major mine production problems, we believe a 'hiccup' at some point during 2007 would be a more accurate assessment. By this, we envision a slight price decline after nearly 200 consecutive weeks of a rising uranium price. It might only be observed as a bump in the road, short-lived (if it even materializes), and not a serious decline. (Please see Chapter 2, "Short-Term Uranium Price Outlook," in which TradeTech provides high, low and base reference cases for the spot uranium price.)

Nonetheless, the stronger currencies of the likes of SXR Uranium One, Paladin Resources and Energy Metals Corporation suggest more mergers and/or business combinations ahead. To date, the acquisitions completed have been for 'small change.' Energy Metals built its current company into a much stronger one by acquiring much smaller uranium exploration companies, such as Quincy Metals, Standard Uranium and High Plains Uranium. The mid March announcement of a merger between Bayswater and Kilgore is indicative of the tiny companies hoping to become stronger by merging different strengths. In this case, we are aware that Kilgore owned a valuable technical database to accompany its Montana and Wyoming uranium properties; Bayswater bought entry into the U.S. with this portfolio.

SXR Uranium One's biggest acquisition, for US Energy's uranium mill and uranium assets for about US\$150 million, was a real estate transaction for scrip, not a company takeover. SXR's reverse acquisition of UrAsia Energy was the exception, and one which caused many to incorrectly believe it could be Neal Froneman's last takeover for a while.

Some have suggested the consolidation activity, during early 2007, indicated the uranium market had peaked. This is a premature assumption. Because the uranium mining sector remains fragmented against a backdrop of steeply rising demand for uranium mining inventory, the stronger uranium companies – and those whose spokesmen firmly believe in higher uranium prices – will exploit whichever profitable opportunity to grow their assets. Companies, such as Paladin Resources, Denison Mines and SXR Uranium One, have a goal of becoming senior companies on the order of magnitude of Cameco Corp. Further acquisitions would bring them closer to achieving this goal.

While there may be bumps during the uranium price rise to record highs, the savviest analysts and industry experts foresee an overall price rally into at least the first half of 2008. During this timeframe we anticipate a frenzy of consolidations among the smaller uranium companies. Some will joint venture with major companies. It is not unrealistic to foresee a significant number of utilities and other major mining companies approaching the smaller, but well positioned, uranium 'near-term' producers.

This is a time for finding one's dance partners. Those who do not partner with a much stronger company may not survive a serious downturn. There are really less than thirty such companies worthy of notice. Hopefully, a sufficient number will merge before spring 2008 to further strengthen their long-term prospects. Companies which consolidate their assets and build up their net asset value will be the most durable. We believe some of our favorite companies, described in this publication, have a very strong operating future ahead for their projects. But, nearly all will require a stronger partner, or partner with each other, to survive the lean moments during the great uranium bull market.

One industry commentator told us, "The companies which have dominated the uranium sector for the past twenty-five years will not be the leaders over the next ten to twenty years." The new breed of uranium companies will merge and consolidate into a handful of dominant producers. We believe these will be the new leaders in the uranium space.

## **Chapter Two:** Short-Term Uranium Price Outlook 2007 – 2008



Spot uranium price chart courtesy of TradeTech LLC, <u>www.tradetech.com</u>.

This essay was kindly contributed to the Uranium Guide update by TradeTech. Our thanks go to Dr. Gene Clark, chief executive of TradeTech, and Treva Klingbiel, president of TradeTech and editor of Nuclear Market Review. The information which follows is one section of a much-larger overview of the uranium market, and over a longer time frame – through 2020.

In conversations we had with Dr. Clark, he pointed out that higher uranium prices will encourage numerous mining projects. But, he also warned this would lead to a supply glut by 2017. While discussing the global uranium mining production by the latter half of the next decade, he told us TradeTech had calculated the annual uranium production after 2015. The ballpark approached 300 million pounds  $U_{3}O_{8}$ . Of this, be believes about 230 million pounds would be realistic production.

It does appear we have entered a new era for uranium mining production. In the nearly 60 year history of uranium mining, no annual production has ever surpassed 200 million pounds.

#### **Current Status**

Several factors are predominant in the current uranium market. On the demand side is the voracious appetite of the speculator-investor segment for uranium. It is not just the quantity of uranium being sought by that segment, but also its willingness to pay above then-current prices in its procurement actions. Not only is that segment willing to pay increasing higher prices, it is necessary for its success.

With such steep recent price rises, and the expectation of further price rises, sellers have become unwilling, in general, to commit even to spot delivery time frames at fixed prices; a market-price-related pricing mechanism has become the norm for spot transactions.

The flooding at Cigar Lake in October 2006 called into question the reliability of even the most sound uranium producers. Uncertainty about Cameco's Cigar Lake project looms over the market.

The more recent event was the flooding at the Ranger operation in northern Australia. The Ranger Pit III (currently being mined) was flooded and the operations staff evacuated from the site, due to the 30 inches (75 cm) of rain that occurred over a 72-hour period.



Early March 2007 flooding at the world's second largest uranium mining operation, which accounted for 11 percent of global mining production in 2006. Energy Resources of Australia declared a force majeure on the company's uranium sales contracts with utilities.



10 drill holes are needed for concrete pouring and grouting to remediate the area of the rock fall and water inflow

Because of this and production losses from other previous heavy rainfalls, ERA declared a state of *force majeure* in its sales contracts. It reported that production for the first quarter of 2007 will be 20-30 percent lower than the corresponding quarter of 2006, meaning a loss of 600-900 thousand pounds  $U_3O_8$  for the quarter. ERA's further statement about production being impacted in the second half of 2007 obviously means the lost production will be much higher for the year. The comparison year of 2006 witnessed a low level of production for Ranger, relative to the previous recent years.

Although ERA has stated that the mining and milling operations have been 'restarted,' it is not clear what the phrase really means, in view of the pictures of flooding released by ERA to its customers. It seems reasonable to assume either ERA or its customers or both will have to be in the spot market, borrowing or buying to cover the resulting production shortfall, but ERA has yet to determine how much production will be lost for the year.

The year 2006 was undeniably the most extraordinary in the history of the uranium market. The spot price rose from \$36.50 per pound  $U_3O_8$  at the beginning of the year to \$72.00 at the end of the year. About three-fourths of this price rise occurred in the last half of the year, and about 44 percent of the price rise occurred in the two-month period after the October 23rd flooding at Cameco's Cigar Lake mine, then in the development stage.

With continuous upward price pressure, due to active supply at its historical low throughout most of the year and demand fueled by the private investor segment, a major issue in the market was price transparency. Although there is no open exchange for uranium (in contrast to most other commodities), a new market mechanism evolved with the secondary benefit of providing such transparency: the sealed-bid uranium auction. During the year, at least 13 such auctions were held and nearly all resulted in large spot market price increases.

The auctions of the three largest quantities were conducted by the U.S. Department of Energy (or USEC on behalf of USDOE). Two of these were early in the year, with the third in August. The August auction was for 700 tU of  $UF_6$  (over 1.8 million pounds  $U_3O_8$  equivalence), and resulted in a price rise of \$4.50.

By far most of the auctions were conducted by a start-up US uranium producer, Mestena Uranium, LLC, based in Corpus Christi, Texas. Nearly all its production from the Alta Mesa in-situ recovery production facility was sold using this auction mechanism, and its auctions were spaced out over the course of the year. Its last auction, held in mid-December, produced the largest period-to-period price rise in the history of the market – a whopping \$7.00 (10 percent).

It is clear these public auctions helped establish a level of market price transparency through the year. In fact, the auction results became the definitive word on the price level, especially in the period after the Cigar Lake flooding, which created rampant speculation about the impact of the event on the market.

#### Outlook

There are several key factors to consider about the short-term outlook for these market factors. First, spot demand is likely to continue at near-recent levels. From the utility demand side, levels of recent demand have not been high by historical standards, but have been significant.

On the uranium producer demand side, Cameco and ERA are in very tight production situations. Their customers will be in the market for loans or purchases to make up for shortfalls. Although Cameco has addressed its obligations for year 2007 deliveries, if the outcome of Cameco's schedule for Cigar Lake indicates the need to delay startup of this project for a an extended period (several years), many utilities with Cigar Lake specific contracts could find themselves back in the spot market to cover any resulting shortfall.

BHP Billiton's Olympic Dam operation, while back into more-or-less full operation, will need to allocate a significant portion of its production to the repayment of loans made to it over the past several years – loans needed to make up for the production shortfall from the fire at its solvent extraction facility and the aggressive sales program just prior to BHP Billiton's acquisition of WMC. In addition to this need, most of BHP Billiton's long-term customers with annual contract quantity flexibility are likely to be taking the maximum quantity allowable under their contracts, given that spot prices are now much higher than the estimated level of contract prices with BHP Billiton.

Given this price split, BHP Billiton is not likely to be as active in the spot market as in the past two years, but may need to either borrow more uranium or defer uranium loan repayments in order to be able to accommodate its customers. The expected impact of this is to possibly keep the active supply of spot uranium from increasing significantly above current levels.

During the years 2005 and 2006, the most significant factor in maintaining upward pressure on prices was the advent of investor (speculator) funds in the market. Several of these functioned during the year by raising funds directly from investors and then buying uranium in the spot market, speculating that the price would keep going up for an extended (multiyear) period. This buying accounted for over 36 percent of spot market activity for the year 2005, and this activity continued at a high level in the year 2006.

Another factor that could keep upward pressure on spot prices is the possible diminished availability of Russian HEU feed in the market. TENEX has already cut off deliveries to GNSS, but has taken over nominally equivalent deliveries, for GNSS customers that have come forward and identified themselves to TENEX. TENEX's action seems to reflect a growing concern in Russia about a lack of uranium feed for its own commitments, especially after 2008. Discussions between TENEX and the Western Russian HEU feed parties (Cameco, AREVA and NUKEM) about reducing their takes under the contract, were concluded in 2004, with the life-of contract quantities firmed up.

What would be the source of additional active supply in the spot market? This could be a problematic issue for the spot market, since the traditional holders of inventory for sale in the spot market seem to have little material available and diminished prospects for obtaining large quantities of uranium for spot sales. Most of the previously active spot sellers (traders) have been able to shift their focus into successfully obtaining significant longer term commitments to deliver uranium and, thus, will be pressed to meet those commitments on a first-priority basis.

On the other hand, one of the most basic tenets of economics is that increased prices result in increased supply. Given that current utility excess inventory levels are not significant (and, in fact, a number of utilities may be revising their 'prudent' inventory requirements to even higher levels, given current prices), utility inventory seems unlikely to be a major contributor to active supply in the near term.

Outside the utility sphere, two significant stockpile sources come to mind as possibilities. The first is USEC, which has been a major spot seller of  $UF_6$  in some recent periods. USEC undoubtedly has significant sources of  $UF_6$  equivalent, although some could take some time yet to become fungible. At the current spot price level, USEC's participation as a spot seller could accomplish two objectives for the company:

- 1. generation of cash flow, and
- 2. leverage for obtaining longer-term uranium enrichment commitments from customers.

However, USEC is caught in a 'tails assay squeeze' with regard to its Russian HEU contract with TENEX. This commercial agreement calls for USEC to purchase SWU and deliver back feed on the basis of 0.30 percent U-235 tails assay. Several years ago, before the run-up in uranium prices, USEC enrichment customers were specifying average tails assays above this level, meaning that USEC was being paid for less SWU than it was paying TENEX, but being delivered more feed UF<sub>6</sub> than it was required to deliver to TENEX.

However, with the advent of higher uranium prices, USEC's customers are on average specifying tails assays lower than 0.30 percent. Under this circumstance, USEC must deliver more natural UF<sub>6</sub> to TENEX than it receives from its customers, to whom it delivers the Russian LEU. This difference has to come either from USEC's inventory or from 'under-feeding' its Paducah enrichment plant – basically substituting electric power for uranium.

Given these factors, USEC's participation in the spot market is likely to be limited at best, lacking some resolution of its 'tails assay squeeze' with TENEX.

A second possible stockpile source is currently being accumulated by the investor/speculator group, which has been quietly active in the off-market segment, buying at prices often above then-published values. It is their announced intent to buy and hold uranium (perhaps for years), anticipating success in later selling at peaks in uranium market prices. A third stockpile source is the U.S. Department of Energy's (DOE) stockpile, estimated as approximately 22,000 tU. Under its current agreements with Russia, most of this stockpile is not to be released into the commercial market until after March 2009. However, given that the objective of this agreement is to encourage the Russian side to withhold an equal amount from the market and that Russia seems to be short of uranium for its own needs, a mutual re-assessment of this issue might make sense. And, with the current tax-averse U.S. Administration experiencing the largest budget deficits in history, it might be open to any way to raise revenues.

Given the political clout of Senator Domenici (Republican-New Mexico) and several other pro-uranium-industry politicians, it might be wise to expect concerted efforts to tie the release of this stockpile to programs aimed at supporting uranium production in the USA.

Finally, currently uncommitted uranium production capacity is a source of potential supply to the spot market. The U.S. Dollar rose in the past year against the Namibian currency (tied to the South African Rand) and was reasonably steady against the Australian and Canadian Dollars; thus, there is no doubt that prices rose last year significantly in producers' currencies. Further, there is the possibility of currency exchange rates (relative to the U.S. Dollar) to return at least part way to more historically average conditions, thus increasing the effective price to non-U.S. producers even without a further price rise in U.S. Dollar terms.

The producer candidates for spot market supply are few, and uncommitted production from most of these is only a moderate quantity. The Ukraine, for example, has sold up to 500 tU per year into the spot market, usually through traders and in the spring of each year. However, in the last few years, nearly all Ukrainian production has gone to Russia to supply the feed for Ukrainian nuclear power plant fuel.

As discussed earlier, a most visible supply to the spot market last year came from the sales via sealed bids to a new U.S. producer, Mestena Uranium. This producer is expected to continue such activity, but its production level is expected to be only five percent of world spot market volume.

Another possible source is production from Kazakhstan, sold through KazAtomProm. In the distant past, most of KazAtomProm's material was sold to NUKEM and ERA. (ERA's purchase contract ended in 1997.) However, KazAtomProm in the past few years has successfully marketed directly to other Western companies. On the other hand, production equivalent to the output of the Chiili production center is supplied directly to China's CNNC via rail shipment, and a good deal of KazAtomProm's other production is earmarked for shipment to Russia, to supply the partial needs of the Ukrainian and Russian nuclear power programs. Thus, any significant source of active spot supply from KazAtomProm would likely have to be from expanded production.

A potentially major source, given the current price run-up, could be Russian HEU feed. Although Russian domestic needs are acute, the most critical period for them is post-2008, so
the prospect of significant hard currency from near-term spot market participation could prove to be enticing, but short-lived.

Finally, Rio Tinto's Rossing operation in Namibia was until recently a source of considerable unsold production capacity, although at high production costs. The current spot price appears to be sufficient to interest Rio Tinto in spot sales, as several such offers are indicated to have been quietly made over the past several years. It is possible that there will now be a big internal demand (within Rio Tinto) for Rossing's production, to supplement what was lost from ERA's Ranger deposit, marketed through Rossing Uranium Ltd.

Since the outcomes (and timings of such outcomes) of the above issues are highly uncertain, there is no one scenario that could reasonably be attributed as a 'best case' scenario. Thus, in the next subsections, we attempt to bracket the range of reasonable assumptions (and thus, hopefully, outcomes) and to produce a 'middle case' for reference purposes.



# **Reference Case**

Under these assumptions, the quarterly average spot price continues its rise to a peak by the second quarter of 2008, at about \$140 per pound  $U_3O_8$ , with a decline to about \$105 per pound  $U_3O_8$  by the end of the period shown.

For this scenario, there are assumed to be no significant problems with any major uranium production center over the next two years, with Ranger coming back into full production

by the first of 2008 and Cigar Lake's schedule slipped by two years (startup in 2010). This case also assumes that the nominal quantities of the GNSS sales commitments are made successfully by TENEX, uranium purchases continue to be supplemented in 2007 by speculator buying, although at lower levels than 2006, giving total annual spot volume of 17 and 18 million pounds  $U_{3}O_{8}$  per year for 2007 and 2008, respectively, compared to 26 million pounds for 2006.

Although it is hard to project in which quarter an historically consistent spike in demand occurs, this case assumes fairly smooth demand evolution. Active supply, on the other hand, remains at historically low levels, until the third quarter of 2008, at which point the speculator group begins to sell off (on a net basis) some of its inventory. Active supply accordingly rises to over 2.5 million pounds  $U_3O_8$  in the third quarter of 2008 and to over 4.5 million pounds  $U_3O_8$  by the end of 2008.

# Low Demand/High Supply Case

In another plausible scenario, it is assumed that excess short-term production and supply from other sources comes to the spot market, in response to the recent price run-up, such that active spot supply rises fairly quickly back to the level of about 4-5 million pounds  $U_3O_8$  equivalent, and that spot demand remains at the lowest annual levels of recent years at 19 and 16 million pounds  $U_3O_8$  per year for the years 2007 and 2008, respectively.



# Spot Market Projection-Low Demand/High Supply

This scenario results in a long arc in the spot price, which peaks at around \$110 per pound U<sub>3</sub>O<sub>8</sub> quarterly average level in the third quarter of 2007, declining to a level of about \$62 per pound for the fourth quarter of 2008, primarily due to the actions of the speculators wanting to realize their asset appreciation.

# High Demand/Low Supply Case

In another plausible scenario, it is assumed that the strategic traders are very active buyers over the projection period, effectively buying up most of the active supply from other sources, thus simultaneously causing an increase of about 12 million pounds  $U_3O_8$  equivalent per year of spot demand.

Active supply is assumed, in this scenario, to remain low, hovering around 1.3 million pounds  $U_3O_8$  through the fourth quarter of 2008.



The price resulting from these supply/demand patterns increases from its current level, rising at a continual rate to about \$200 per pound  $U_3O_8$  by the end of the period shown: second quarter 2008.

# Conclusion

For all three cases shown, the projected spot market price remains at much higher levels than the general price level for the past ten years. Absent other factors, this seems to indicate a structural shift in market dynamics or other driving factors.

There does appear to be a shift in the fundamentals of the supply side of the market. It is not clear how the active supply will be able to return easily to historical levels. Excess inventory and production have traditionally been the sources of supply to the spot market. Given the recent price run-up, buyers are exercising upward flexibility in their long-term contracts

and utilities and other inventory holders seem to be reluctant to define significant portions of those inventories as 'excess.' Russia, a recent supplier of large quantities of its HEU feed to the Western market, has (and is attempting to) severely cut back on its exports to the West, needing all its sources of uranium for its domestic and 'Russian supplied' reactor commitments.

Nearly all the output of Uzbekistan is committed to NUKEM through 2013, but NUKEM has shifted much of its sales commitments into the near- and long-term markets, leaving it with limited amounts for spot sales. KazAtomProm's production in Kazakhstan is nearly all committed to long-term contracts with China, Russia, The Ukraine, and others.

Given these factors, a significant increase in active spot supply seems problematic. However, one should never underestimate the ability of producers and traders to generate supplies through innovative methods, if the spot price is sufficiently inducive. Thus, it is probably naive to assume that active spot supply will remain below 2 million pounds  $U_3O_8$  equivalent for an extended period.

On the demand side, utilities are (as mentioned above) recently opting for maximum quantities under their long-term contracts. In addition, many have decreased their transactional enrichment tails assays (or plan to do so), a factor with potential downside impact on spot demand, to some extent. All in all, these factors argue for a fundamental change in spot market balance.

# **Chapter Three:** How to Choose Uranium Mining Stocks in 2007



The uranium stock index, produced by TheInvestar.com, reflects price momentum among North American uranium stocks. The company produces separate charts for Canadian uranium companies and Australian uranium companies. Visit <u>www.theinvestar.com</u> to weekly monitor this price index.

Investing in junior uranium mining stocks can differ in some ways from typical natural resource investing. For example, the permitting process to develop a known uranium deposit can take several years and can require multiple environmental rulings and challenges. Another difference includes the multiple ways in which a uranium deposit can be mined, such as open pit, underground or in situ recovery (ISR). Even ISR mining can have variables, such as the chemistry of the extraction method. Two common methods utilize acid leaching or carbonated water. Because uranium is relatively new to most investors and presently a very hot sector, many first-time uranium investors jump into various stocks without understanding, let alone properly evaluating, a company's real prospects.

In 2007 and later, we must be ever more cautious about separating the hopefuls from the hopeless, when it comes to selecting a basket of uranium stocks. Our focus has been on uranium mining companies whose properties are most likely to reach the production phase. By comparison, many stock promoters and junior mining newsletters feature exploration

stocks. These generally have share-price momentum based upon newsletter advisory recommendations or drill exploration discoveries.

Our focus is in separating hype from reality. We try to feature those companies with realistic expectations and potentially economic projects. Below are the rules we've discovered through our interviews with industry experts and mining professionals. We call them rules because we use them when evaluating uranium companies.

We use these "golden rules" to prevent us from looking like fools. If you properly use the rules below, you can mostly avoid being fooled by a uranium company's stock promoters. We say this because many companies have no plans of ever putting their uranium property into production. As uranium mining and industry experts tell us, most of the 400 uranium mining companies are only mining the stock market (that means you – the investor), and have no real plans to mine for uranium.

# 10 "Golden Rules" for Choosing Uranium Stocks

# 1. Find out how much money the company has raised.

The dollar amount a uranium mining company has raised accurately demonstrates the level of confidence the market professionals have in the company or the sector. The amount of cash in a company's treasury can give you a rough yardstick as to the amount of confidence to place in this company. Those which have raised less than \$10 million during this significant uranium bull market might not have a compelling story to tell. Several companies have raised in excess of \$100 million for their projects. A good number of the better companies have landed between \$20 and \$50 million. Generally, a company raising less than \$10 million remains in the exploration category. Those raising \$30 million or more are often candidates whose uranium mining projects could begin production within the next five years. There are some exceptions, but these are the parameters we've observed on the financings. The downside to this yardstick is a fault of the frenzied uranium market. Many undeserving companies obtained financings, over the past six months, because the market became robust in the wake of the Cigar Lake uranium mine flooding.

## 2. Study the credentials of the company's management team.

Research analysts and corporate finance persons who recommend companies for financing are sold by the technical team's credentials. The more credible those personalities, the more money the funds and brokerage firms will throw at the company. Many of these personalities were in their 20s, 30s and 40s during the previous uranium boom. They are now in their late 40s, 50s and older. (Some names

are carried on the company's board of directors or advisors simply because of 'the name.') We've met and talked with many of the names in North America with sufficient technical expertise and capability of bringing into production an economically viable uranium mining operation. There are not many of these technical experts – probably less than 50 in all of North America with adequate experience. As a shortcut during your due diligence, review the geological and engineering roster a company presents on its website. Look for those who have previously established and/or operated a uranium mining operation. Whether they have done so through the in situ recovery method or conventional mining, it will be those who would have the highest probability of repeating that success during this current bull market.

# 3. Investigate the uranium property's pedigree, a property's past ownership and its institutional memory.

The best U.S. projects were worked by major oil companies or uranium divisions of those oil companies or other major conglomerates (Westinghouse and General Electric were both deeply involved in the uranium mining sector at one time.).

Uranium exploration and mining has been near-continuous for about 60 years in the United States. Because of radium exploration, of which uranium was the castaway mineral, one could argue uranium has been mined for more than 100 years in the United States. European uranium mining has an even longer history. Industry insiders know most of the major uranium 'hot spots.' There was a Cold War, remember? Uranium exploration in many parts of the world had gone forward for three decades before the recent 25-year uranium drought put many promising projects into mothballs.



**Uranium Exploration US** 

Greater than 500 million feet of drilling has been done in the United States.

In the United States, there are specific areas which have low-grade uranium deposits. These were sufficiently drilled during the previous uranium boom to delineate a uranium deposit. Several new companies have begun the final stages of development to bring those uranium deposits into production. It is not a complex task to discover how much drilling previously took place on a given property, and the amount of 'delineation drilling' on the project. Some deposits had reached the point of having had a mine shaft sunk (which would need to be rehabilitated after a 20year hiatus). Yes, some of these projects were fairly well advanced before the bottom fell out of the uranium market.

Major oil companies were key players in the previous uranium boom. Find out which major oil company or companies drilled the property of the new company in which you are considering for investment purposes. Find out how far advanced the property reached before it was abandoned. There were non-oil companies also included in the previous uranium bull market, such as Homestake Mining, Anaconda and Rio Algom. Several major mining companies are presently involved in the uranium mining process, including BHP Billiton and Rio Tinto, aside from Cameco Corp. They are among the world's largest producers.

The companies, which also obtained the drill databases of the previous major company's exploration activities, are probably in the best shape to move their projects forward. Lacking those valuable drill logs and other specialized highly technical information, a company may be forced to start at square one: drilling the property all over again. Having a complete database, a company is better poised to advance its project to production.

# Kerr McGee Nuclear Exploration & Geology Files





> 1000 Man-years of Geologic Work

In Summary. Because several countries have had many decades of uranium exploration, and because it can take between one and two decades from discovery to an economic mine, most companies are chasing butterflies with their exploration projects. Yes, it does provide them with a job and livelihood, but the project is being financed at your expense. Their chances are, at best, one in 100, and more likely one in 1,000, even after a discovery has been made.

Let's look at some numbers. An exploration company may be financed to drill about 50 to 100 holes to test for uranium mineralization. By comparison with advancedstage uranium deposits, several hundred (sometimes 1,000 or more) holes were drilled during exploration and many hundreds of holes to delineate a deposit. Few junior exploration companies can raise the amount of money required to prove up an 'elephant' discovery.

Many of the potentially bankable deposits have already been identified. During your investigation of a company's prospects, find out who previously owned the property. How much work was done on the property? When was that work done and which companies were involved in the exploration? It is important to know whether the drilling was exploratory or delineation drilling. If a uranium deposit was delineated and advanced to the point of being 'ready for production,' this could demonstrate the company has a real shot at actually putting a mine into production.



# 4. Find out if a company is moving its flagship project(s) forward.

On the surface, this rule sounds easy. However, nearly all companies say they are moving their projects forward. We've spoken with their project managers, geologists, engineers and exploration managers. Hardly a pessimist in the house. We recently found one way to separate those, in the United States, who are serious about becoming uranium miners from those who are only dreaming about it.

Does the company have a Technical Assignment Control (TAC) Number? The U.S. Nuclear Regulatory Commission (NRC) issues this number to uranium companies for pre-licensing activities. Then, NRC does site visits and accepts the company's submissions for review. We are aware of two near-term producers, which have a TAC number. Uranerz Energy (Amex: URZ) has NRC Technical Assessment Control # LU 0140. UR-Energy Corp (TSX: URE) has NRC Technical Assessment Control # LU 0142.

Does the company have an NRC Docket Number for the project? Uranerz Energy does not yet have an NRC Docket number. UR-Energy Corp has NRC Docket

UNITED ST NUCLEAR REGU	ATES OF AMERICA JLATORY COMMISSION
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	DOCKETED 05/16/00
	SERVED 05/16/00
COMMISSIONERS:	
Nils J. Diaz, Chairman Edward McGaffigan, Jr. Jeffrey S. Merrifield Gregory B. Jaczko Peter B. Lyons	
In the Matter of	}
HYDRO RESOURCES, INC. (P.O. Box 777 Crownpoint, NM 87313)	) Docket No. 40-8968-ML ) ) )
C	LI-06-14
MEMORAN	DUM AND ORDER
Intervenors Eastern Navajo Diné Against Uranium (together, "Intervenors") have petitioned for review Partial Initial Decision (Phase II Radiological Air Emi License). <sup>1</sup> The Presiding Officer found that radiolog proposed <i>in situ</i> leach mining facility in Church Rock Intervenors claim that the Presiding Officer errored	Mining and Southwest Research and Information Center of LBP-06-1, the Presiding Officer's January 6, 2006, ssion Challenges to In Situ Leach Uranium Mining ical air emissions from Hydro Resources, Inc.'s ("HRI's") k, New Mexico would not exceed the NRC dose limits. <sup>2</sup>
radiation from mining spoil left at the site by previo	us owners.
We granted review so that we could resolve the "ba as the Presiding Officer held, that radioactive reside	ckground radiation" issue definitively. $^3$ Today we decide, ue from previous mining activity amounts to "background
radiation" and does not count toward the 0.1 rem d	ose limit applicable to new <i>in situ</i> facility licenses. <sup>4</sup>

Documents filed with state and federal government agencies are evidence a company is moving its project forward.



Number 40-9068. The number was assigned for both the company's Lost Soldier and Lost Creek uranium projects in Wyoming. However, UR-Energy plans to split the two projects, because the projects will be permitted separately. So, the NRC Docket Number will be assigned for just the Lost Creek project. The Lost Soldier project does not currently have an assigned number, but one will be obtained in due course.

In Namibia, for example, one starts with an Exclusive Prospecting License (EPL). The next step is a Mineral Detention Resource License (MDRL). Finally, when a company has completed all of its set-up phases and has produced a bankable feasibility study, and has obtained all the governmental permissions, it is issued a Mine License (ML). Only then can a company begin mining uranium. In Namibia, Forsys Metals (TSX: FSY) has its MDRL and from what we understand some others do not.

Of course, the highest certificate one can obtain is a Mining License (ML) or Mining Permit. That gives a company the final approval required to commence mining. We expect one or more companies may attempt to buy another's mining permit to expedite the mining process. There are some properties, where a permit transfer could take place, but are uncertain as to the length of time this procedure could take.



Overview of an ISR wellfield operation. Courtesy of Uranium Resources, Inc.

Other ways to measure a company's early progress is by finding out whether they've begun the permitting process to get the preliminary mining approvals. These include the 'cultural' and archaeological studies, the bugs-and-bunnies study (impact on wildlife and flora), the radiation studies and baseline studies to determine the impact of uranium mining on the local water. These can take a number of years, depending upon the country in which mining is to take place. Find out if the company has a permitting office near the properties and when it was established. If this is an ISR project, ask when the company plans to perform its pump tests. Find out which studies have been completed and which are ongoing. Ask for a schedule of activities and when those tests will be done.

It's a lot easier to promote the 'real estate' than it is to advance a uranium project through each step in order to have a producing uranium mine. By taking the time to complete a thorough investigation, you should be able to get all your other questions answered along the way. You will want to find out about the "average grade" of the uranium deposit. If the project isn't being moved forward, as we've detailed in this rule, then the company knows its property doesn't have economic grades. And the company also believes it probably won't go into production.

## 5. Find out where the company's uranium ore will be milled.

There are two common ways of milling uranium – conventional milling methods and the ion exchange circuit. The latter is used during the in-situ recovery (ISR)



Schematic cross-section illustrating ore-zone geology and lixiviant migration from and injection well to a production well. Courtesy of Uranium Resources, Inc.



Properties near mills are most likely candidates for production. Above Uranium Resources' ISR Central Processing Facility at Kingsville Dome, Texas (left) and Denison's White Mesa Mill in Blandings, Utah (right). Photos courtesy of Uranium Resources and Denison Mines, respectively.

process (also known as In Situ Leaching [ISL] or solution mining). An ion exchange circuit costs a fraction of a conventional mill - \$10 million for a remote ion exchange (also known as a satellite plant) or more than \$20 million for a 'mother plant' or full-scale ion exchange processing plant. More permitting is required for a conventional mill, and it can take a longer period of time. The cost of building and permitting a conventional mill can cost north of \$100 million. Some are likely to cost more than \$200 million, depending upon the size of the milling operation. These are expressed in terms of tons per day.

Companies developing properties in close proximity to an operating conventional mill or an NRC-licensed ion exchange plant stand the best shot of economically mining uranium. Those who are distant from these milling facilities will either (a) be forced to build their own mill or circuit, or (b) become burdened with the cost of trucking their ore to another's mill site and paying the toll mill expenses. The greater the distance a uranium mine is located from the nearest milling facilities, the more it will cost to transport the material. The Remote Ion Exchange will be of great benefit to many ISR projects in the United States.

# **Wyoming Permitting Schedule 2006**



Ur-Energy and others are required to conduct numerous environmental studies as part of their 'application to mine.'

# 6. Find out if the mining area is environmentally friendly or not.

While composing this special report, we talked with Mark Pelizza of Uranium Resources Inc (OTC BB: URRE). This company, also known in the industry by its acronym – URI - first got its ISR uranium package in Church Rock and Crownpoint, New Mexico in 1986. They were awarded their NRC license in the mid 1990s. The property has not yet been mined. In 2005, the Navajo Nation banned uranium mining on the reservation. While none of URI's properties are on the reservation, the impact from local environmental groups has impeded the progress of bringing these properties into production.

In Slovakia, Tournigan Resources (TSX: TVC) hopes to move forward with their gold and uranium projects. However, there is outcry from the community by en-

vironmentalists. This may or may not impede the company's progress in bringing uranium into production.

In Sweden, companies are permitted to explore for uranium, but no one has been approved to actually mine uranium since the mid-1980s. Some companies are moving forward with their hunt and development of uranium resources in the hope the government may change its mind. This is slowly occurring.

Australia may change its "Three Mines" policy this year. Until now, Australia would only permit three uranium mines to operate. This, however, does not necessarily mean Australia will permit uranium mining in every state. Western Australia may not allow it; Queensland could very well approve uranium mining. When SXR Uranium One's Honeymoon ISL project comes online in early 2008, this would be Australia's fourth uranium mine. By then, we believe Australia's federal and some state governments might have already changed the uranium mining policy.

# 7. Political Risk



While Venezuela has no uranium mining, the country's president, Hugo Chavez, is a reminder of the political risks of all mining enterprises.

We call this the Hugo Chavez risk. Will a country nationalize its mineral resources? Bolivia appears to be heading in that direction. In our publication, "*Investing in the Great Uranium Bull Market*," we have warned there may be political risk in Kazakhstan. While this country may become the world's top uranium producer before 2020, there is great political risk in this country. From reports we have reviewed, there is widespread corruption in Kazakhstan and other reasons to avoid doing business in this country. Investors appear to be ignoring the political risk Kazakhstan carries. But, it is not just in that country where investors should be cautious. Similar sentiment can be found in some African, Asian and Latin American nations.

We feel strongly about U.S. mined uranium. It is quite possible that U.S.-mined uranium may carry a premium in the future. Some have told us it will, but this remains speculative. It is possible uranium mined in the 'safer' countries, such as Canada, Australia and the United States might someday carry a higher price tag in long-term contracts.

# 8. Find out about the depth of the company's property portfolio.

Those early-bird companies who got into the 'game' of acquiring uranium properties in late 2003 and early 2004 may have acquired some of the best of the previously worked properties. Companies such as Energy Metals (NYSE: EMU) and Strathmore Minerals (TSX: STM) landed superb properties in Wyoming, New Mexico and elsewhere. Both also accumulated large land positions. Many others later joined in the property acquisition parade.

There are advantages and disadvantages to a large property portfolio. Not only must a company pay fees to keep the acreage, but in some cases must also expend a certain amount to further develop or prove up the asset. One advantage is that numerous companies have lately arrived in the uranium bull market without properties of much merit. Many others still wish to join in the hunt or to develop a deposit. Companies with a large property portfolio are well-positioned to joint venture out some of their properties. Joint venturing the non-flagship properties can minimize drain on a company's treasury. Joint venturing the lesser, but often promising properties, can eliminate the exploration, and later the development risk. This practice also frees up the company to focus on developing the flagship projects.

Review the company's website to determine which properties are purely exploration, with maximum risks, and which are developmental properties with previous exploration accompanied with lesser risks. The companies with the most numerous properties and the most advanced are most likely to attract joint venture partners among the tardiest entries in this bull market.

## 9. Find out if a company has partnered with a major company or institution.

This may be premature for most uranium companies, but it is a story likely to emerge throughout the year and in 2008. Utilities may seek to partner with some uranium companies in order to guarantee a reliable uranium supply for their nuclear reactors. Itochu Corporation (a major Japanese conglomerate) has been working with Uranium Resources (OTC BB: URRE) over the past year to determine whether they can proceed with a joint venture in New Mexico. We've heard rumblings of other possible joint ventures but can not confirm whether they are true or remain rumors. For example, Strathmore Minerals recently announced it had signed an exclusivity

agreement to negotiate a joint venture with an un-named Global Fortune 500 company on the company's flagship Roca Honda project in New Mexico.

Smaller junior uranium companies have had ongoing joint ventures with majors to explore some promising ground. Several junior uranium exploration companies have partnered with Cameco Corp (NYSE: CCJ) or another major company to drill out potentially prospective uranium properties in the hopes of a discovery.

The more serious projects may very well attract the larger and more serious utilities. We believe these partnerships are mostly likely to occur with Asian utilities or Asian-headquartered major companies. After several such deals have materialized, perhaps U.S. utilities will awaken and return to the game. General Electric and Westinghouse were once heavily involved in uranium mining through subsidiaries. Oil companies were heavily involved in uranium mining in the 1970s and early 1980s. We anticipate some major investment funds may someday take stakes in selected uranium projects.

# 10. Find out if the company is likely to be a takeover candidate.

Many junior uranium mining companies follow the pattern of the junior natural resource sector:

- 1. Sufficiently advance the exploration project to attract the interest of a major mining company;
- 2. Then, hope to get a good price and sell out.

We anticipate a much stronger consolidation phase during the course of this uranium bull market. Some consolidations, or business combinations, took place in 2006. We believe there will be many more in this fragmented industry with projects of merit – those which actually can become producing uranium mines.

Those companies passing muster on the greatest number of the first nine rules are the ones most likely to be acquired in the future. SXR Uranium One Chief Executive Neal Froneman recently told us he would acquire more U.S. assets, but he only wanted advanced stage properties. He is looking for companies which have begun the permitting stage or whose properties can be quickly brought into production.

By the way, Froneman's advice on the exploration companies (of which there are hundreds) was this, "If I wait until later, I can get a good price for those companies." The point is this: There may likely be hiccups in the uranium bull market. If one studies the previous uranium bull markets, each one vaporized after the excitement about uranium mining became widespread. Only the strongest companies survived





those downturns in the market. There were only a handful of publicly traded companies still standing and which continued mining uranium at the bottom of the 25year uranium mining depression.

One final word when choosing a uranium stock. If you learn nothing more from this chapter, then please learn this. The uranium mining sector has advanced beyond the 'mantra' of pounds-in-the-ground, which was prevalent in 2005 and 2006. One uranium expert told us, "If I wanted to announce my company had 400 million pounds of uranium, I could stake several square miles in some parts of Wyoming, where there are granite formations." His point was this: He could throw up enormous numbers of pounds-in-the-ground, but the uranium project would be sub-economic.

Uranium is a common mineral on planet earth. Only when the uranium can be found in a highly concentrated area and readily extracted can the project become economic. Ideally, the company with the most uranium in the smallest area would have the most valuable quantity of uranium. Cameco Corp's McArthur River is about the size of a football field or so, but from this deposit, the company has been providing a significant share of the world's nuclear fuel.

We hope you don't just read these rules and turn the page to the next chapter. We strongly recommend you will take the time to complete your homework on various companies by using these rules. We've written about five or six versions of "how to choose a uranium stock." Each revision has probed more deeply into the entire uranium mining process. We believe these ten rules may help you safely review potential investment ideas in the uranium space. Studying these companies can become time consuming, but at least now you have some hard-won guidance to assist you. At the very worst, if you follow all of the above rules, you will have minimized a great deal of risk when investing in uranium mining companies.

# **Chapter Four:** Who Will Be the World's Next Uranium Producers?

You would be surprised how few uranium companies, of the more than 400 which claim to be uranium companies, are actually mining uranium. Globally, there are nine publicly traded companies mining uranium. There are five state-owned companies, which also account for significant uranium production. And there are two privately held companies which mine uranium.

Publicly traded companies include major producers, such as Cameco Corp, BHP Billiton, Rio Tinto and ERA (Australia). Minor producers include such newcomers as UrAsia Energy (TSX: UUU), Paladin Resources (TSX: PDN), SXR Uranium One (TSX: SXR) and Denison Mines (TSX: DML). Although Uranium Resources (OTC BB: URRE) has been around for three decades, the company remains a minor producer.

Privately held Mestena LLC mines about one million pounds per year in south Texas. Heathgate Resources, a subsidiary of U.S. defense contractor General Atomics, annually mines about 1.8 million pounds in Australia at its Beverly uranium operation. Both are In Situ uranium recovery operations.

Significant state-owned uranium producers include Areva (France), KazAtomProm (Kazakhstan), TVEL (Russia), Navoi Mining Metallurgical Kombinat (Uzbekistan) and Vostochny Uranium Ore Mining (Ukraine). We expect state-owned companies in other countries, such as China, India and the Czech Republic, to strongly grow their uranium mining production before 2013. (Note: As of November 2nd 2006, TVEL was replaced by "Uranium Mining Company (UGRK)" as Russia's mining company.)

Country	2002	2003	2004	2005
Canada	11 604	10 457	11 597	11 628
Australia	6854	7572	8982	9519
Kazakhstan	2800	3300	3719	4357
Russia (est)	2900	3150	3200	3431
Namibia	2333	2036	3038	3147
Niger	3075	3143	3282	3093
Uzbekistan	1860	1598	2016	2300
USA	919	779	846	1039
Ukraine (est)	800	800	800	800
China (est)	730	750	750	750
South Africa	824	758	755	674
Czech Repub.	465	452	412	408
India (est)	230	230	230	230
Romania (est)	90	90	90	90
Germany	212	150	150	77
Pakistan (est)	38	45	45	45
France	20	0	7	7
Brazil	270	310	300	0
Total world	36 063	35 613	40 219	41 595
	$(42529tU_{3}O_{8})$	$(41998tU_{3}O_{8})$	$(47430tU_{3}O_{8})$	$(49052\mathrm{t}\mathrm{U}_{2}\mathrm{O}_{2})$

#### **Production from mines (tonnes U)**

*The global production of uranium comes from less than twenty countries. Canada and Australia mine more than one-half of the world's uranium. Courtesy of the World Nuclear Association.* 

# **Current Publicly Traded Uranium Producers**



Uranium in Sasketchewan, Courtesy of Cameco.

**Cameco Corp** (NYSE: CCJ) is the world's largest uranium mining company, producing nearly 21 million pounds of uranium oxide in 2006. More than 62 percent of the company's production came from Cameco's McArthur River uranium mine and milled at its Key Lake mill. Another five million pounds were mined at the company's Rabbit Lake uranium mine – about 24 percent of Cameco's production. The company's U.S. operations contributed nearly 13 percent more of Cameco's total mining production with a record 2.7 million pounds at its Smith Ranch-Highland and Crow Butte ISR uranium mines. A test mine in Kazakhstan produced less than one million pounds at the company's Inkai in situ recovery uranium project. Global investors more closely watched developments at Cameco's Cigar Lake from late October forward, evaluating whether or not this uranium mine would reach the production phase. In late March, Cameco announced a start date of 2010, but included numerous risk factors and caveats suggesting the potential for future obstacles and delays. This creates future uncertainty with regards to a steady, reliable supply of uranium for the nuclear fuel cycle. The troubled Cigar Lake project could have further surprises before this becomes a producing uranium mine.



Energy Resources' uranium deposits at Ranger and Jabiluka in northern Australia. Courtesy of Energy Resources of Australia.

**Energy Resources of Australia** (ASX: ERA) is a member of the Rio Tinto group, one of the world's largest mining companies. ERA is Australia's largest, stand-alone publicly traded uranium producer, mining about 12 percent of the world's new uranium. In 2006, ERA mined about 10.4 million pounds of  $U_3O_8$  and sold 12.6 million pounds. ERA's current stockpiled reserves at the company's Ranger No. 3 pit stand at 27,692 tonnes of contained  $U_3O_8$ . The Ranger uranium mine may hold more than 43,200 tonnes of uranium resource. ERA's much larger Jabiluka uranium deposit could host more than 350 million pounds of uranium resource. However, Jabiluka can not proceed without consent of the "Traditional Owners," the aborigines which have strong anti-mining sentiment. In early March 2007, ERA declared a force majeure on its uranium sales contracts, further pressuring an already tight uranium market. Uncertainty surrounds the amount of production the company may offer for sale in 2007. In the first quarter of the past two years, ERA has lost high percentage production because of cyclones and subsequent flooding.



Geological map of the Langer Heinrich mine. Courtesy of Paladin Resources.

**Paladin Resources** (TSX: PDN) is the first publicly traded company to establish a new uranium mine in the current uranium bull market. A favorite among the Australian brokerage community, it has also become a darling for North American investors. Paladin should produce more than 800 thousand pounds of  $U_3O_8$  during 2007 from the company's Langer Heinrich uranium mine in Namibia (Africa). The company expects to annually produce more than 2.5 million pounds at its Namibian uranium mine. A bankable feasibility study was completed by the first quarter of this year on the company's Kayelekera uranium project in Malawi. This project could be commissioned in late 2008, and become a producing mine in 2009. This could annually produce more than 2.5 million pounds. When the Langer Heinrich is ramped up, this uranium mine could annually produce in excess of 3 million pounds.

**UrAsia Energy** (TSX: UUU) bought its way into the Akdala uranium mine in Kazakhstan, and in turn was proposed to be acquired by SXR Uranium One (TSX: SXR) on February 12th. Shareholders will vote on the takeover in April, and both companies hope to conclude the business combination in late May of this year. UrAsia is currently producing at an annual pace of 1.8 million pounds of  $U_3O_8$ , which has been pre-sold to one or more utilities. After these companies are merged into a new company named Uranium One, they hope to have five producing uranium mines by the first quarter 2008. SXR will contribute the massive Dominion uranium mine in South Africa and its Honeymoon In Situ Leach operation in Australia; UrAsia offers the presently producing Akdala mine and its soon-to-be-producing South Inkai and Kharassan uranium deposits. All three of UrAsia's deposits are in Kazakhstan. Kharassan is expected to annually produce slightly less than 2 million pounds; South Inkai about 1.3 million pounds.

Denison Mines (TSX: DML) recently combined with International Uranium Corporation to position itself in the United States. As with Paladin Resources, it has become a darling in selected circles, and a top pick by Sprott Securities (Toronto). It is being positioned as an intermediate North American uranium producer by several analysts. Denison is expected to produce about 1 million pounds of uranium in 2007. The company's White Mesa Mill in Blandings, Utah produced about 280 thousand pounds U<sub>3</sub>O<sub>8</sub> in 2006. It is reported that mill production could reach 400 thousand pounds in 2007. Ore is being stockpiled now for conventional milling at a later date. For the time being,



Arizona strip mines. Courtesy of Denison Mines.

Denison is milling 'alternate feed,' which is a polite way of saying it is recycling uranium waste-bearing materials – the tailings from other processing facilities. White Mesa also processes vanadium. Denison also has a 22.5 percent of the McLean Lake mill, for which the company's shares was almost 1.8 million pounds of  $U_3O_8$  this past year. The company's future uranium production could annually average between four million and six million before the end of this decade, through its U.S. and Canadian operations.

**Uranium Resources** (OTC BB: URRE) celebrates its thirtieth birthday this year, and has found itself at a crossroads. We are not absolutely certain how much uranium URI will produce in 2007. Previous guidance of 700 thousand pounds mined at the company's Vasquez In Situ Recovery (ISR) operation in Texas was cut to 400 thousand pounds in late 2006. For the first three quarters of 2006, the company reported 187 thousand pounds mined at Vasquez and Kingsville Dome uranium properties in south Texas. In an interview we conducted with Mark Pelizza, vice president of technical services for URI, it appears the company's hopes are pinned to the Rosita ISR project. The U.S. Environmental Protection Agency (EPA) recently ruled URI's Church Rock property in New Mexico was in Indian Country. In previous discussions with management, we expected the property would be in production by late 2007 or 2008. We believe the appeals process is unpredictable and could delay the project beyond those time frames. URI also has non-ISR uranium projects in New Mexico, West Largo and Roca Honda, which are suitable for conventional mining. (See Strathmore Minerals, ref: Roca Honda.)

We excluded two major uranium producers, BHP Billiton (NYSE: BHP) and Rio Tinto (London: RIO) because their uranium mining production only comprise a small portion of either company's overall mining portfolio. Both play significant roles in providing the world's utilities with uranium oxide; both are major uranium miners. BHP owns Olympic

Dam, which could become the world's largest uranium mine in the next decade, and presently supplies about eight percent of the world's mined  $U_3O_8$ . RIO owns a majority interest in the world's fifth largest uranium mine, Rossing (Namibia), and holds an interest in Australia's ERA. RIO also owns substantial uranium assets in the United States, including the Sweetwater Mill in Wyoming, which might start milling later this decade.

# The New Uranium Mining Companies

In 2005, eight mining companies produced 78 percent of the world's uranium. That's about to change. There may be as many as 20 publicly traded uranium mining companies who could become new uranium producers by 2010 to 2012. Many of these companies are reviving "brownfields" projects, or bringing abandoned projects out of mothballs. This type of project refers to one which has already been explored and upon which uranium mineralization has been discovered. No new discovery work is required as found in a "greenfields" project. Companies drilling these projects are confirming historical work. In many cases, conversions to National Instrument 43-101 technical specifications has resulted in a larger uranium resource than had been historically reported.

Uranium exploration can result in a project which takes between ten and twenty years to bring into production. Historically, this is how long it has taken from the discovery stage to production. Many companies which claim it won't take this length of time are either unfamiliar with the environmental permitting process or have not been correctly advised. To avoid the extremely speculative nature of the exploration cycle, we concentrated on the companies which would most realistically produce uranium in the near-term (five years or less). The main task for these companies is the confirmation of previous exploration work, verification of the historical resources of the property and progressing through the permitting process to bring the uranium deposit into production.

The length of time a uranium company will require to obtain a mining license may become the biggest surprise for many investors. Many have not realistically factored in the amount of time the procedure can take. In recent interviews with the technical specialists and environmental managers of several companies, we discovered the U.S. permitting process can take between four and six years. Many investors are not aware of the mandatory environmental studies a property must undergo and the amount of licensing time the U.S. Nuclear Regulatory Commission (NRC) will take before final approvals are given.

In a simple nutshell, environmental studies generally take about eighteen months to complete and send to the NRC for approvals. There is a three-month comment period, and it can take an additional eighteen month to twenty-four months before the NRC approves the license. Under ideal circumstances, this procedure can take 41 months.

Delays can occur for a number of reasons. Foremost is understaffing at the NRC, which can stall a project. If environmentalists are involved disputing the project, this can add time. Investors might be wise to expect a project to take a year longer than what the publicity for

the project suggests. In the United States, a company could spend \$4 to \$6 million, for every one million pounds of anticipated annual ISR production, in order to get the necessary mining permits. If there are interveners or other legal obstacles, the length of time and the cost to permit the mine could easily double. Permitting for a conventional mine and mill, including obtaining water rights, could cost up to \$30 million.

Our research found the following publicly traded uranium companies to be the most likely near-term uranium producers. By near term, again we mean over the next five years. Because the uranium exploration and development process is long, arduous and often tedious, we believe a five-year time horizon is appropriate for this sector.

The companies described in this report should be considered advanced stage exploration companies, as per the Section 7 definitions provided by the U.S. Securities and Exchange Commission (SEC). Some are further along than others. We have attempted to construct a timeline as to when we believe each company could actually be mining uranium.

Of course, there are likely to be disappointments along the way. And in the same light, we may also find some unexpected and positive surprises for some of these companies. We hope to update our subscribers of potential delays and pitfalls with the companies we cover.

# 2007

Aside from Paladin Resources, which commenced production at their Langer Heinrich uranium mine in Namibia in early January 2007, only one other new uranium miner would commence in 2007. Paladin had undergone the mine commissioning process in late 2006 and had begun stockpiling ore before the year ended. Therefore, the first new uranium miner of 2007 was SXR Uranium One.

**SXR Uranium One** (TSX: SXR) commenced uranium mining at the company's Dominion uranium project in March of this year. The company has already announced the forward sale of uranium production from this mine (and some to U.S. utilities). SXR has announced the sale of 4.7 million pounds of  $U_{3}O_{8}$  from the Dominion mine between 2008 and 2012. This represents about 28 percent of the mine's production during this time frame. In an interview we conducted with the SXR CEO, we were told his company would re-start the Honeymoon In Situ Leach uranium mine in Australia by early 2008. On February 12th, SXR Uranium One announced it would acquire UrAsia, a Canadian-based uranium miner, which also hold exploration and development projects in Kazakhstan (see UrAsia in the previous section). After multiple interviews and emails with chief executive Neal Froneman, we concluded his ambitions are to compete head-to-head against Cameco Corp within the next decade. After his UrAsia acquisition was announced, Froneman emailed us to let his know that his focus on the U.S. had not changed. As we went to press, his company announced it was buying the Shootaring uranium mill (Utah) and the uranium assets of



SXR Uranium One and UrAsia's combined assets and joint venture interests.

USEG during 2007. This will give him a basic foothold in the United States. In an email to us, Froneman wrote that he was awaiting the transfer of the mill license and had begun sending his technical team to the United States in preparation to move production forward. Froneman also wants a senior U.S. listing, presumably on the New York Stock Exchange. The new "Uranium One" will retain the ticker symbol 'SXR,' trading on the Toronto and Johannesburg stock exchanges. (Note: The symbol 'SXR' has not yet been designated on a U.S. stock exchange, so we presume it has been allocated for Mr. Froneman.) We do not believe Mr. Froneman's buying spree has yet ended.



Map of Energy Metals' properties. Courtesy of Energy Metals Corp.

# 2008

**Energy Metals Corp** (NYSE: EMU; TSX: EMC) plans to begin processing uranium at the company's fully licensed Hobson Uranium ISR processing facility in Karnes County, Texas in early 2008. In an interview with Dennis Stover, the company's chief operating officer, we were told uranium mining could start by late 2007, but start-up's are always subject to change. We have been told the company hopes to annually produce one million pounds of  $U_3O_8$  from its La Palangana uranium deposit. Because La Palangana would be in the ramp-up stage, the first year's production would be substantially less. The company targets about 700 thousand pounds for 2008, but this is subject to a firm start date. Energy Metals also hopes to ISR mine in Wyoming, but we are not certain which of its advanced stage properties, Moore Ranch, Peterson or Nine Mile, would be first in line for production.



First Uranium Corp's Buffelsfontein project. Courtesy of First Uranium Corp.

**First Uranium Corp** (TSX: FIU) recently debuted on the Toronto Stock Exchange, and whose parent company was one of the celebrated gold miners on the Johannesburg stock exchange during 2006. The company hopes to be milling gold and producing uranium at its Ezulwini project in South Africa sometime in 2008. The same target was proposed in the company's IPO prospectus for its Buffelsfontein project. The two mines are projected to have existing mine plans of 19 years and 14 years, respectively. The Ezulwini project involves the re-commissioning of a previously operating mine for which the mine shafts and much of the necessary infrastructure are already in place. By 2008, the company hopes to produce about 400 thousand pounds  $U_3O_8$  and about 1.5 million pounds in 2009. During that two-year period, First Uranium plans to also produce 114,000 and 380,000 ounces of gold, respectively.

# 2009

**UR-Energy** (TSX: URE) has an NRC Docket Number (40-9068) for the company's Lost Creek uranium project in Wyoming. The company is also seeking an NRC Docket Number for its Lost Soldier project, also in Wyoming. The latter should follow the former into production several months later. Final permitting for Lost Creek is expected by late 2008.



Production timeline for Lost Soldier, one of Ur-Energy's properties the company is seeking to bring to production.

Uranium production could begin by late 2008 or early 2009. As with other companies, during their first year of ramping up, production will range between 40 and 60 percent of annual mining expectations. The company might rely on processing their yellowcake at the ion exchange facility at Power Resources' Smith Ranch in Wyoming (a Cameco Corp subsidiary) or elsewhere. During a telephone interview, chief executive Bill Boberg confirmed the company planned to use Remote Ion Exchange to facilitate uranium processing (also known as a satellite facility).

**Forsys Metals** (TSX: FSY) has been working on its uranium project in Namibia (Africa) and is expected to announce the company's pre-feasibility study during April 2007. Should this study go according to plan, as we believe it will, the company would move forward with a final feasibility study. The company hopes to bring its Valencia uranium deposit into production by the middle of 2009. This would become Namibia's third uranium mine, after Rossing (one of the world's largest) and Paladin's Langer Heinrich. Forsys Metals announced a C\$ 47.5 million financing for the Valencia uranium project in early January. It would likely need additional financing to build out its entire open pit operation. The company has continued drilling its high grade extension and may announce additional properties in Namibia for exploration and development.

**UraMin** (TSX: UMN) reports on the company's website that it "is focusing on advancing its 100-percent owned Trekkopje uranium project in Namibia to the completed feasibility study stage." The company also reports on the website, "Should a feasibility study be sufficiently positive, trial mining and processing operations could be in place before the end

of 2007." UraMin plans to begin test mining and pre-production on this property for about two years. Reports suggest this could become a top open-pit mine because uranium mineralization is found at very shallow depth (less than 50 feet), but the uranium grades are very low. Despite unconvincing press reports about UraMin's production schedule, we believe UraMin would likely follow Forsys Metals in Namibia. The question holding back both companies from a definite production start date is water access. Both properties are in the African desert. UraMin may be required to build a desalination plan, which could be costly and add to their time horizon. Additional power generation may be required to achieve the company's ambitious production targets.

**Strathmore Minerals** (TSX: STM) has one of the largest and most diverse uranium property portfolios among the non-major uranium companies. The market mainly values the company's property portfolio for its New Mexico and Wyoming assets. It is unlikely the company can bring its Churchrock (New Mexico) project into production by 2010 or sooner. Strathmore's higher grade, and much larger, uranium property – Roca Honda – may not be ready until 2012. This will entail a full-scale underground mill and mining complex, for which significant international interest has been generated. Recently, the company announced the signing of an exclusivity agreement with a Global Fortune 500 company to develop the uranium mine and mill as part of a possible joint venture. Roca Honda is near Grants, New Mexico where uranium mining is more welcome, but the project would require a conventional milling operation. Roca Honda is currently undergoing a preliminary feasibility study. Strathmore acquired property in the area to build a mill site. We believe the company will commence production with one of the company's Gas Hill properties in Wyoming, sometime in 2009 or 2010. Other properties, such as the Sky uranium property in Wyoming, may also be permitted by then and ready for production.

**Uranium Energy Corp** (OTC BB: URME) is developing its advanced Goliad uranium project in south Texas. The company recently completed its cultural resource assessment survey and is moving forward on its baseline groundwater studies. These are preliminary steps in obtaining a permit from the Texas Commission on Environmental Quality to mine uranium. This will be an in situ recovery (ISR) uranium mine, which has historically been easier to permit in Texas than elsewhere in the United States. The Goliad deposit is a small historical deposit and has a bit more than five million pounds of ISR-amenable  $U_3O_8$ . URME's chief operating officer Harry Anthony is a pre-eminent ISR engineer with a proven track record in designing and building numerous in situ recovery plants. He also helped contribute his expertise on this subject in our publication, "*Investing in the Great Uranium Bull Market*."

# 2010 and Beyond

Looking three years or more into the future is difficult. There are many who hope to be mining uranium in both the United States and elsewhere, but which are the most likely candidates?

**Uranerz Energy Corp** (American Stock Exchange: URZ) has obtained NRC Technical Assessment Control # LU 0140, which is the first step in dealing with U.S. Nuclear Regulatory Commission. Uranerz hopes to move through the permitting process for the company's Hank and Nichols Ranch uranium properties in Wyoming's Powder River Basin. The initial ISR uranium deposit has more than 17 million pounds and possibly up to 22 million pounds  $U_3O_8$ . Uranerz Energy's Chief Executive Glenn Catchpole previously worked for Cameco as General Manager of the company's ISL operations in Kazakhstan; his team is proven in established in situ uranium recovery operations in the United States. Catchpole confirmed in a previous interview that his company would be mining uranium by 2010. Mr. Catchpole and his team have strong credibility in the uranium sector; this adds credence to his start date. In mid March, Uranerz hired a General Manager of production, which boosts our level of confidence in the company's mining plans.

**Powertech Uranium Corp** (TSX: PWE) recently received an exploration permit for its Dewey Burdock project in South Dakota. Nearly 4000 exploration holes were drilled in the property to depths of up to 800 feet. More than two million feet of drilling were completed on the Dewey Burdock. The projected mine production was 750 tons per day with a total production of 5 million pounds of  $U_3O_8$  using a cutoff of 6.0 feet of 0.10% grade. The Tennessee Valley Authority (TVA) completed an underground mining feasibility study in 1981 and designed an underground mine. Projected mine production was up to five million pounds of  $U_3O_8$ . The company estimates it can complete its permitting process on the Dewey Burdock and begin ISR mining by late 2010 or early 2011. Around the same time or before 2011, the company hopes to begin producing uranium at its Centennial project in Colorado. In an interview with the company's environmental manager, Richard Blubaugh, he told us it would be easier to permit the Centennial project because it was located in an 'agreement' state. This would expedite the permitting process. Planned ISR production over the mine life of both projects is expected to be between 750 thousand and one million pounds  $U_3O_8$  per year.

**Energy Fuels** (TSX: EFR) may produce uranium (and vanadium) before 2010 at the company's Whirlwind uranium property, which covers both Mesa County, Colorado and Grand County, Utah, in the Uravan mineral belt. The company recently received a drill permit and has contracted for 19,500 feet of drilling, a program which it hopes to complete in 2007. Then, it hopes to move forward with mine rehabilitation, a program which the company reported it would expect to take "less than six months." Chief Executive George Glasier worked at the previous incarnation of this company, and with the current Cameco Corp CEO, Gerry Grandey. The company has other projects. Given the timeline of permitting, we believe the years of 2010 or 2011 may offer a more realistic target.

**Compass Resources NL** (ASX: CMR) is an Australian mining company which plans to commence its copper-cobalt-nickel oxide resource in Australia's Northern Territories in 2007, and also plans to mine the associated lead-copper-cobalt-nickel sulphide deposit. CMR projects production of 1.3 million tons per year, which is expected to produce 10,000 tons per annum (pa) of copper cathode, 1,000 tons pa of cobalt and 700 tons pa of nickel as cobalt and nickel chemicals. CMR also holds a JORC-defined resource of 14.5 million pounds  $U_{3}O_{8}$  in the Rum Jungle mineral fields in the Northern Territories. This was the site of Australia's first uranium mines between the 1950s and 1970s. CMR hopes to complete the approval and permitting process by the end of 2007 and start construction of the uranium plant by mid 2008. Depending upon environmental approvals, construction and other matters, the company hopes to be producing uranium by late 2009 and in full production of 1 million pounds annually by 2010. The target dates may be impacted by Australia's political climate. This company is one of the more promising of near-term producers. The company trades on the Australian Stock Exchange and is now on the ASX 200.

**Tournigan Gold** (TSX: TVC) hopes to develop both a gold and uranium deposit in Slovakia. We interviewed the CEO about his development progress for both deposits. Depending upon the release and results of the deposit's pre-feasibility study, it appears the company's gold deposit at Kremnica could be mined by late 2009. The Jahodna uranium project may be in production by 2011. The Jahodna uranium deposit reportedly hosts more than 18 million pounds  $U_3O_8$  (inferred). This is a promising greenfields project, in an area with a long history of uranium mining. Because of the high grade at this deposit, production costs have been estimated below \$10/pound. TVC has four uranium exploration licenses with historical uranium resources in Slovakia.



Tournigan Gold's uranium projects, courtesy of Tournigan Gold.

**Mawson Resources** (TSX: MAW) hopes to receive approval from the Spanish legislature, by late 2007, to remove the State Mineral Reserve on the company's Don Benito uranium project in southwest Spain's La Haba uranium district. About 2.7 million pounds have previously been extracted from the Don Benito open pit uranium mine; some 6.7 million pounds  $U_3O_8$  reportedly remain to be mined. The area contains a 35-kilometer trend along strike from the mined area with about 40 uranium prospects. Mawson expects the applications, covering 17,837 hectares in La Haba, Corredor de la Guarda and Las Cruces-Manantial, to be approved for an initial period of three years.

# Conclusion

There may be other uranium mining companies to later include in this chapter. We will continue coverage of this sector, as we have for over the past three years, and provide such updates on the StockInterview website.

# **Chapter Five:** In Situ Recovery (ISR): New Technology for U.S. Uranium Mining



Major U.S. Uranium Reserves

Sources: Based on U.S. Department of Energy, Grand Junction Project Office (GJPO), National Uranium Resources Evaluation, Interim Report (June 1979) Figure 3.2; and GJPO data files.

There are numerous uranium districts in the United States. Those with ISR-amenable uranium deposits will be among the first to start mining. Courtesy of the EIA.

The new era of uranium mining in the United States will be led by the In Situ Recovery (ISR) method of mining. Known as solution mining or In Situ Leach (ISL) mining, we hoped to further clarify this method of uranium mining in this chapter. There are two basic solutions of in situ recovery mining. For purposes of precision, we refer to the ISR method when gaseous oxygen, gaseous carbon dioxide and/or sodium bicarbonate are added to the

native groundwater to extract the uranium from the sandstone deposit. The ISL method utilizes sulphuric acid to extract uranium from the deposit.

The ISL method is used in Australia and Kazakhstan to extract uranium. Because of U.S. environmental laws, only the ISR method is acceptable in the United States. The ISL method originated in Wyoming, initially with nitric acid and then evolved through a variety of chemical additives until miners and environmental regulators settled on the above-mentioned formula. The combination of native groundwater and the additive(s) is called lixiviant.

Although the ISR method does not include sulphuric acid in the lixiviant, the acid is used in the elution process to strip the uranium. Generally, this is referred to as a solvent in the literature and presentations. Extracting uranium from ore, whether by conventional or in situ methods, requires sulphuric acid at some point. In the ISR Central Processing Plant, a small amount of acid acts as a solvent to strip the uranium. The acid never returns to the native groundwater in order to satisfy the environmental regulators.

# In Situ Recovery Made Easy



UR-Energy chief executive Bill Boberg helps explain the ISR uranium mining method in simple and easy-to-understand terms.

We conducted an interview with Bill Boberg, chief executive of UR-Energy, to discuss the ISR method. This is a basic overview of the In Situ Recovery method and helps explain the nuances of ISR. For many readers this may seem a repetitive exercise, but we assure you there are excellent points made during this interview which bear reading.

## StockInterview:

How did the uranium actually get into the sandstones and become a roll front deposit?

## **Bill Boberg:**

Natural processes caused the uranium deposit to be in the aquifer in the first place. The uranium was deposited by the naturally flowing ground water when the natural oxygen in the ground water was exhausted due to natural chemical reactions with minerals and organic material contained in the sands of the aquifer itself. Uranium is still being carried by ground water flowing to the deposits. The flowing ground water is also naturally leaching parts of the deposit and re-depositing it a short distance away. This is really a very common natural process that's happening in many aquifers.



Courtesy of David Miller of Strathmore Minerals

#### **StockInterview:**

When you mine using the ISR method, do you destroy or contaminate an aquifer where you are mining?

## **Bill Boberg:**

There are probably thousands of uranium deposits throughout the world of varying quality in sandstones, which are also aquifers. Only a few hundred of these will contain sufficient uranium to eventually be mined. It's there, and if it is mined, most of the uranium that was in the aquifer will actually be removed from the aquifer instead of staying there. The in situ (ISR) mining process simply reverses the natural process that placed the uranium there in the first place. It's really a pretty simple process. The restoration process, after the mining is completed, actually returns the aquifer back to its pre-mining conditions. There is no way the aquifer is contaminated or destroyed (by ISR mining).

#### StockInterview:

Many environmentalists claim that by removing the uranium, you are changing the aquifer. Is the aquifer much different than before mining took place?

## **Bill Boberg:**

It's probably not a lot different. The formation of uranium deposits in the sandstones is a result of oxygenated ground waters that came from the surface, carrying uranium which is deposited when the oxygen is depleted or finally exhausted. The deposit is in place in the sandstone. As fresh oxygen is brought down to that point, it will re-dissolve and move the uranium further along.

#### StockInterview:

How do you know where in the deposit to inject the fresh oxygen?

#### **Bill Boberg:**

On one side of the deposit is what we call altered or oxidized sands. On the down dip side of the deposit are the reduced sands. There is no oxygen in those sands. Any fluid that carries uranium into the reduced sands is going to use up the oxygen and immediately deposit the uranium by natural processes. The mining process adds additional oxygen to the water in the deposit itself to cause the uranium to go into solution. Then, it can be pumped up to the surface. The area of reduced sand that is downstream from the deposit is still there. It is the contact between the altered or oxidized sand and the reduced sand that causes the uranium to be precipitated into the sand itself. As the natural ground water flow carries the uranium into the reduced sands, natural processes will cause the uranium to precipitate out of the ground water, if there is some that did not get pumped to the surface and recovered during the mining operation.

## StockInterview:

How do you control the water flow during the ISR mining process?

#### **Bill Boberg:**

The fluid flow is controlled by pumping the production well at a greater rate than the injection wells which are injecting the fluid. In other words, we create a flow to the production well because it is being pumped at a greater rate than the fluid being pumped into the surrounding injection wells. By doing this, we end up with a certain amount of 'bleed.' The majority of the ground water is returned to the aquifer on a regular basis. About one-half to one percent of the water used in the system is actually 'bled' out because we are pumping the production wells at a greater rate – between one-half to one percent greater rate than what we are injecting. That's how we control the flow from the injection wells into the production wells.
# **Solution Front Details**



Schematic of front showing altered/oxidized sand, geochemical interface, uranium deposition and unaltered/reduced sand.



Drawing of actual front exposed in Shirley Basin uranium mine showing altered/oxidized sand, uranium deposit and unaltered/reduced sand in a natural configuration

Courtesy of Ur-Energy Inc.

## StockInterview:

What is the solution you'll be using during the ISR process in Wyoming?

#### **Bill Boberg:**

This will be an alkaline solution – basically just the addition of carbonate and oxygen to normal ground water. The carbonate could be in the form of simple bicarbonate of soda or the gaseous carbon dioxide itself. The solution being used has been described as not much different than Perrier<sup>®</sup> water. The solution is not something out of the realm of normal ground water, and would cause no one any problem. The combination of the carbon dioxide or bicarbonate of soda and oxygen in the ground water is really quite a benign solution. But, it changes the chemical character sufficiently that it causes the uranium to go into solution. It's really just reversing the process that caused uranium to be deposited in the first place. Uranium is precipitated in a 'reduced form.' The alkaline solution just reverses the deposit-forming process by using the water already in the deposit. Adding oxygen to it enables the uranium to go into solution, and then be brought up to the surface. There the uranium is stripped out on the polycarbonate resin in the ion exchange column.

But, other areas in the world, such as Kazakhstan, rely upon sulphuric acid in the in situ recovery uranium mining method.

#### **Bill Boberg:**

Sulphuric acid will not be used as part of our in situ mining process. The sandstone deposits in Wyoming region are very suitable for alkaline-type in situ mining. The use of acid for in situ mining is considered suitable only under certain geologic conditions, particularly in areas of very poor water quality. Where we've got good water quality in the areas of Wyoming where we would be mining, alkaline is a far more suitable means of in situ mining. By using alkaline it is a lot easier to clean up and to restore the aquifer afterwards. Acids can react on many things besides uranium. They can dissolve pyrite, sulphides and other minerals in the sandstone. Acid can release a lot more undesirable things into the formation that can make it more difficult, in some cases, to recover the uranium, and make it more difficult to do a proper restoration job. The alkaline process is a lot cleaner process, and it's a lot easier to restore the aquifer.

#### StockInterview:

Tell us about constructing an ISR well field for mining the uranium.

#### **Bill Boberg:**

The wells are installed similar to most common water wells – with PVC piping. PVC casing would be cemented in place, and then piping similar to that used for irrigation would be used to transport the water to the injection wells. Similar piping would take the same water, coming out of the production well, when moving it to the ion exchange column. When you come right down to it, this is basically a water plant. You are dealing with piping and water and oxygen and bicarbonate of soda. There's not much of anything that is going to cause anybody a problem.

#### StockInterview:

There have been concerns about water use in certain parts of the United States. Will your company be consuming large amounts of water when mining at Lost Creek or Lost Soldier?

#### **Bill Boberg:**

Consumption will be really low because in situ mining is basically a closed process. We use the ground water that is in the uranium deposit itself. We pump it out. We bring it to the surface. We charge it with the oxygen and bicarbonate of soda. Then we recirculate it back through the formation. Ninety-nine percent or more of the water stays in the formation. We only have to take out and dispose of one-half to one percent of the water that we are producing.



Schematic of ISR wellfield beneath the surface. Courtesy of Uranerz Energy.

When you are ISR mining, how does your company ensure that radiation does not escape beyond the aquifer and contaminate the ground water people or livestock drink?

## **Bill Boberg:**

The key is a very extensive monitoring program through a system of monitoring wells. These surround the well fields. Shallow monitor wells watch over any overlying drinking water aquifers. The monitor wells are very close to the well field. The mining process is done by pumping at such a rate so it brings the flow toward the production wells themselves. This assures the ground water flow is not moving the mining solution away from the production wells. From a mining company's viewpoint, it would be a huge waste if we could not control the fluids. We would have a huge expense in not being able to have the fluids go where we want them to. As a result, we carefully set up the process to make sure the fluids are moving the way we need them to go. The monitor wells assist us in knowing that we have control of the water flow. The monitor wells also assist the state government and the Nuclear Regulatory Commission in assuring that we have our fluid flow under control.

What happens when the bells go off or the alarm sounds at the monitor wells?

#### **Bill Boberg:**

If any of the wells give a suggestion of the potential of mining solutions getting into the vicinity of the monitor wells, we would immediately stop the injection of solutions, and use 'overpumping' to draw the solutions back into the mine area. Monitor wells are there to ensure we can see what's happening in the area. They are there to enable us to ensure our operations are being done properly. If a solution does happen to get into the monitor well, that's not really such a bad thing. It's telling us we need to make some corrections and move forward. Monitor wells help us develop better controls in the natural system we are dealing with.

### StockInterview:

How do you restore the water back to its pre-mining quality?

### **Bill Boberg:**

The aquifer is usually restored using the reverse osmosis process. It is a super-filtering process. We can also use other techniques, like reduction or bio-remediation. But, reverse osmosis is probably the one that would be more commonly used. More than 99 percent of the water used in the mining process is recirculated. It's put back in the aquifer after it is restored at the surface. It's just the new volumes of newly restored water that are pumped back through the mined area to assure that it's returned to pre-mine conditions. Only the small volumes of water, which are left with more concentration, may be either evaporated or distilled to create a solid waste for disposal. Or, they would be disposed of in a licensed disposal well.

#### StockInterview:

Could you explain the deep disposal process?

#### **Bill Boberg:**

Deep disposal is an activity which is strictly licensed and monitored by the states. It's not for just when the mining activity is completed, but probably something to be used throughout the mining activity. What this amounts to is this: the waste water is injected into a very deep rock unit. The disposal well is too deep and with such poor water quality that it could never be used for drinking water. These wells are commonly 6,000 or more feet in depth. The containment qualities of the deep disposal rock unit have to be able to contain the disposed water without a potential for leakage into other rock units. This is a common and well-accepted method for fluid disposal. It is strictly licensed and monitored. We are currently evaluating both our project areas, through the use of old oil and gas drill logs, in the area for rock units which could be favorable for the installation of deep disposal wells. As I said before, the deep disposal well is for a small percentage of the whole volume of water that will be handled.

How can the environmentalists be assured that the water will be restored to its premining conditions?

#### **Bill Boberg:**

Wyoming and Nebraska have a similar law, which requires 100-percent bonding for reclamation. The bonds are a result of a calculation, depending on various qualities of the deposit and how the mining will be conducted, which determines what it would cost the state to compete restoration if the company went bankrupt, or was not able to do any more work in restoring the mine. It is a complete 100-percent bonding that is determined in advance. It's probably in the range of tens of millions of dollars, which would be required for the bonding.

## Remote Ion Exchange: Satellite Plants Could Help Reduce Costs and Efficiently Mine the Smaller Deposits



Individual Remote Ion Exchange (RIX) units have a small footprint and can be transported to a Central Processing Plant to complete the final steps of uranium processing. Because an individual RIX unit costs less than a 'mother plant,' one can solution mine multiple well fields in different locations without the necessity of building an expensive central processing facility near each wellfield. Photo courtesy of Uranium Resources.

If you study the news releases, several companies have discussed the setting up of one or more satellite plants in conjunction with their In Situ Recovery (ISR) uranium mining operations. In order to help readers better understand what exactly a 'satellite plant' is, we interviewed Mark Pelizza of Uranium Resources about how this relatively new operational technique is presently being used at the company's Texas operations. A larger uranium deposit, such as one at Cameco's Smith Ranch in Wyoming, requires a Central Processing Plant. The 'mother plant,' as it is called in the trade, can complete the entire processing cycle from uranium extraction through loading the resin, stripping the uranium from the resin with a solvent (elution), precipitating, drying and packaging.



## **CONVENTIONAL VS. RIX**

Remote Ion Exchange can mean shorter pipeline runs, with lower water pressures, less spills, and lower electrical costs when solution mining their well fields. Smaller, distant uranium deposits can be economically mined. Diagram courtesy of Uranium Resources.

With a satellite plant, also known as a Remote Ion Exchange (RIX), smaller and distant deposits can also be mined and then trucked to the mother plant. With an RIX operation, the front-end of the 'milling' cycle can be started independent of the much larger mother plant. It is the same ion exchange column found at central processing facility. The mobility factor makes RIX an attractive proposition for many of the new-breed uranium producers. Rather than piping the water and uranium across a longer distance to the mother plant for the entire processing cycle, the modular nature of RIX allows for multiple columns at each well field doing the ion exchange on the spot.

This is not a new idea, but one which has instead been re-designed by Uranium Resources and is also used elsewhere. In the early 1970s, Conoco and Pioneer Nuclear Corporation formed the Conquista project in south Texas. Uranium was open-pit mined at between ten and fifteen mines within a thirty-five mile radius and in two counties. Trucks hauled ore to the 1750-ton/day processing mill near Falls City in Karnes County.

"The trademark of south Texas is a lot of small million-pound-style deposits," Mark Pelizza told us. "I think we are heading in the right direction to exploit those small deposits." Trucking resin beads loaded with uranium is different from trucking ore which has been conventionally mined. Small, scattered uranium deposits aren't only found in Texas. There are numerous smaller ISR-amenable properties in Wyoming, New Mexico, Colorado and South Dakota.

"About half the uranium deposits in New Mexico can be mined with ISR," Pelizza said, "and the other half would require conventional mining." A number of companies we've interviewed have geographically diverse, but relatively nearby properties within their portfolio. Several companies with whom we discussed RIX have already made plans to incorporate this method into their mining operations.



Uranium Resources buys new bulk cement trailers, such as the one above, and modifies these for trucking the uranium-loaded resin. These specially designed transport systems are generally used for oil, chemicals, bulk cement, grains/flour and fly ash. Courtesy of Elemans Corporation.

The sole-use semi-trailer trucks hauling the yellowcake slurry are different from the typical dump trucks used in conventional mining. According to Pelizza, the truck carries a modi-fied bulk cement trailer with three compartments. The three compartments, or cells, each have a function. One cell holds the uranium-loaded resin, one cell is empty and the third has unloaded resin.

As per Department of Transportation (DOT) regulations, no liquids are permitted during the transportation process. Each container run between the wellfield and the mother plant can bring between 2,000 and 3,000 pounds of uranium-in-resin, depending upon how large the container is designed. The 'loaded' cell holds between 300 and 500 pounds of resin with six to eight pounds of uranium per cubic foot of resin. Age of the resin is important, too. New resin can hold up to ten pounds of uranium per cubic foot and can decline to five pounds of uranium per cubic foot after several years.

As we found with a conventional Ion Exchange process, the RIX system is run as a closed loop pressurized process to prevent the release of radon gas into the atmosphere. The uranium is oxidized, mobilized and pumped out of the sandstone formation into a loaded pipeline and ends up in an ion exchange column at the mining site. Inside the columns, uranium is extracted through an ion exchange process – a chloride ion on a resin bead exchanges for a uranium ion. After the fluid has been stripped of uranium, it is sent back to the wellfield as barren solution, minus the bleed.



Resin Transfer from Remote Ion Exchange. Photo courtesy of Uranium Resources.

When the ion exchange column is fully loaded, the column is taken offline. The loaded resin is transferred from the column to a bulk cement trailer, which is a pressurized vessel comprised of carbon steel with a rubberized internal lining. The resin trailer is connected to the ion exchange column transfer piping with hoses. After it has been drained of any free water, the uranium-loaded resin can be transported as a solid, known as 'wet yellowcake' to the mother plant. There, the yellowcake slurry is stripped from the resin, precipitated and vacuum-dried with a commercial-grade food dryer.



Resin that is delivered to the central plant can also contain formation sand. The resin is washed to remove deleterious elements. Photos courtesy of Uranium Resources.

Capital costs can be dramatically reduced with the satellite plants, or RIX units. "Well field installation can cost more than RIX," Pelizza noted. Often, installing a well field can start at approximately \$10 million and run multiples higher, depending upon the spacing of the wells and the depth at which uranium is mined. Still, compared to conventional mining, the entire ISR well field mining and solvent circuit method of uranium processing is relatively inexpensive.

We checked with a number of near-term producers – those with uranium projects in Wyoming – and discovered at least three companies planned to utilize one or more satellite plants, or RIX, in their operations. A company's reason for utilizing this method is to minimize capital and operating expenses while mining multiple smaller deposits within the same area. Water is treated at the RIX to extract the uranium instead of piping it across greater distances to a full-sized plant. Pelizza said, "The potential for pipeline failure and spillage from a high-flow trunk line is eliminated."

Strathmore Minerals' vice president of technical services John DeJoia said his company was moving forward with a new type of Remote Ion Exchange design, but would not provide details. UR-Energy chief executive Bill Boberg said his company would use an RIX for either Lost Soldier or Lost Creek in Wyoming, perhaps for both. Uranerz Energy chief executive Glenn Catchpole told us he planned to probably set up two RIX operations at the company's Wyoming properties and build a central processing facility.



Mark Pelizza, Vice President of Technical Services, Uranium Resources

"We are working on a standardized design of the remote ion exchange unit so it doesn't require any major licensing action," Pelizza said. "If you can speed up the licensing time, perhaps it would take one to two years rather than three to five years."

## Conclusion

rear	\$30 per pound	\$50 per pound	\$100 per pound
1993	292	952	1,511
994	294	953	1,501
995	290	947	1,493
996	285	939	1,480
997	281	931	1,466
998	276	923	1,452
999	274	908	1,432
000	271	904	1,430
001	268	899	1,422
002	266	896	1,418
003	265	890	1,414

As the uranium price remains high, more uranium falls into the reserve category, according to the Energy Information Administration table (shown above). Not all of the uranium can be mined using the ISR mining method. A very large quantity will be mined through conventional methods, such as open pit and underground mining.

For the next five years, the ISR mining method could dominate uranium mining in the United States. There will be conventional uranium mining, which has begun to emerge. Denison Mines (TSX: DML) has commenced stockpiling uranium and vanadium mined through conventional mining methods in the Colorado Plateau, at the company's Topaz, Pandora and Sunday uranium mines. The company also plans to conventionally mine in the Arizona Strip and expand mining operations in Colorado and Utah.



SXR Uranium One chief executive Neal Froneman explained to us that his company plans to move forward with the uranium assets acquired from U.S. Energy after the Shootaring Canyon uranium mill license has been transferred to SXR. His immediate focus appears to be conventional mining in Utah. He wrote to us. "We have dispatched our project and integration team to the US who are currently recruiting technical staff and preparing plans for the Shootaring mill and the associated Utah properties. We have also made application to have the mill license amended from reclamation to operational so we are serious about bringing this mill back into production."

Those are but two of numerous potential conventional uranium mining projects now in progress. We are aware that Strathmore Minerals plans open pit mining in the Gas Hills uranium district of Wyoming, but are uncertain as to the time frame. Strathmore has also announced it hopes to partner with a major international corporation to bring an underground uranium mine and mill complex to the Ambrosia Lake uranium district in Cibola County, New Mexico, at the company's Roca Honda project. Energy Fuels (TSX: EFR) also hopes to pursue conventional mining of uranium and vanadium in proximate distance to Denison Mines' operations in Colorado and Utah.

We asked Strathmore Minerals president David Miller to write a brief description of open pit uranium in Wyoming's Gas Hills District. He explained to us this is nearly the same procedure used about fifty years ago, and would still be used today.

Open pit mining would be conducted in the following manner. Overburden removal will be handled utilizing a contractor with scrapers as the primary method of excavation. Probe men walking behind scrapers with Geiger counters will monitor the newly uncovered ground surface and will identify any radiometric anomaly. Once the ore body has been encountered, self-loading scrapers will clean the ore body in preparation for mining. The ore body will then be ripped by a track-type dozer. The limits will be sampled, assayed, field-defined and then flagged with pin flags for mining. Then, the ore will be mined by a hydraulic backhoe into trucks. The ore will be sampled by the truckload and stored according to grade. Depending upon grade, the ore will be hauled to a uranium mill for concentration and production into yellowcake. Finally, the pit and overburden disposal areas will be re-contoured and restored in final reclamation by a contractor.

Capital costs of launching a conventional uranium mine and mill would start at north of US\$200 million in the United States. Such costs could easily be doubled, depending upon the size of the project and the daily production of the uranium mill.

Over the next three to five years, a number of ISR uranium projects are likely to commence. ISR uranium mining has been our primary focus during this leg of the uranium bull market in the United States. The smaller companies moving into production have become excellent consolidation candidates for the larger mining companies, depending upon the size of their portfolios and the progress they've made. The ISR space is fragmented and scattered



Conventional Open Pit Uranium Mine 500 workers required per 1 million lbs. of Uranium mined Courtesy of David Miller.

In Situ Uranium Recovery Facility 75 workers required per 1 million lbs. of Uranium mined Courtesy of David Miller.

in Wyoming, New Mexico and Texas. This may offer larger mining companies an entry, or expansion, into the uranium market.

We would not be surprised should major base metals and precious metals mining companies enter the uranium mining sector. The previous uranium bull market – mid 1970s – witnessed a number of major oil and mining companies participating. Many such examples are found when studying the lineage of previous U.S. uranium properties. But, this is not limited to the United States. For example, a number of African properties were previously explored, but abandoned during the 25-year uranium drought. Goldfields once explored the Valencia property now controlled by Forsys Metals. There are many such properties previously prepared for development before uranium mining became sub-economic in the late 1980s.

# **Chapter Six:** A Safe Haven Basket of Uranium Mining Stocks

After numerous requests by readers to feature a 'safe haven' basket of uranium mining stocks, we applied the very same rules and advice found in Chapter 3 (How to Choose a Uranium Stock in 2007) to create a group.

StockInterview is not a stock advisory service. We present this basket of stocks as a benchmark investors can use to measure the progress, or promoted claims, many other uranium mining companies have made over the course of the past two years. The corporate profiles we provide in this chapter are neither an offer to buy or sell the securities of these companies. Please see the disclaimer page at the end of this chapter, and please visit the StockInterview.com website for a more detailed disclaimer and full disclosure.

We have diligently followed the group of featured companies included in this chapter for at least twelve months, with the exception of Powertech Uranium. Several of these companies have experienced strong share price appreciation over the course of the past year, as the Great Uranium Bull Market intensifies.

Four of the six companies featured in this chapter meet the criteria of a near-term producer.

In Chapter Four, we discussed several uranium companies which are likely to become nearterm producers, or have already become uranium producers. It is always wise to include actual producers and imminent producers in one's portfolio if one believes in the sustained upward rise of the underlying uranium. Do you believe the uranium price will continue rising? That is the first question you must answer.

Uranium producers and imminent producers, whose progress we have followed over the past year, include Uranium One (TSX: SXR), Energy Metals (NYSE: EMU) and Paladin Resources (TSX: PDN). Those who invested in the shares of either or all of these companies over the past year or two have probably celebrated on many occasions. We do not believe the

strong price appreciation for these uranium miners has ended. Another company, which we have not closely followed, but which is also a uranium producer, and should be investigated is Denison Mines (TSX: DML).

## The Year of Consolidation

On February 12th, SXR Uranium One (TSX: SXR) announced it would buy UrAsia Energy (TSX: UUU) to create a senior level uranium producer with a potential market value of US\$5 billion. A few weeks later, SXR Uranium One announced a 'definitive purchase agreement' with U.S. Energy Corp (NASDAQ: USEG) and Crested Corp (OTC BB: CBAG) to buy the uranium assets and Shootaring Canyon Uranium Mill in a deal which could be worth more than \$150 million.

In late February, Paladin Resource announced an offer to buy Summit Resources (ASX: SMM) for nearly A\$1 billion (US\$791 million). Paladin Managing Director John Borshoff said of the takeover, "Summit has an attractive portfolio of Australian uranium deposits that will complement Paladin's extensive asset base." During early 2007, Paladin commenced production at the company's Langer Heinrich uranium mine in Namibia, and approved development of its Malawi uranium deposit in Africa.

More takeovers and consolidations are expected as the uranium price continues to soar. Because the currency of the new uranium producers continues to rise in tandem with the spot uranium price, the larger uranium companies are hustling to capitalize upon their new found paper wealth. They strongly believe in the uranium bull market, but more importantly, these new companies have advantages over their larger competitors, such as Cameco Corp (NYSE: CCJ), BHP Billiton (NYSE: BHP) and Rio Tinto (London: RIO).

The smaller, but growing companies, such as Uranium One, Paladin and Denison, hold the 'unencumbered bureaucracy' advantage. They are new, they are learning the corporate games, and they can make quick decisions to capitalize upon an opportunity, without long command chains and endless 'decision-making' conferences involving crowds of personalities competing for attention. The smaller company can move more quickly to acquire even smaller uranium companies and further increase its market capitalization.

The bigger advantage is profitability. Newer companies, such as Uranium One and Paladin, are also unencumbered by the legacy contracts the major miners suffer with utilities. The larger companies are still selling their newly mined uranium at 20 percent of the current price – for less than US\$20/pound. The profit margins of newer companies give them a very strong and competitive edge in acquiring the more promising companies.

We selected our 'safe haven' basket of uranium mining companies by applying the rules. These are the very same rules a consolidator in the uranium space would likely apply. He would be strongly interested in the quality of the uranium assets, available cash in the treasury, the expertise of the technical team and the progress a company has made, or is making, to bring its flagship property or properties into production. In other words, we attempted to determine what the chief executives of Uranium One or Paladin Resources, or others, would want to include in their growing companies.

This does not necessarily mean that each of these companies would want to be acquired or merged with a larger company. But because of the company's uranium assets and their technical team, they have become attractive candidates for acquisitions or business combinations. In an early 2007 article, we interviewed several of these junior uranium companies, who uniformly responded they were 'not for sale.' They wanted to advance their projects into production and reap the rewards their projects could offer.

Over the past year, we have written about the fragmented nature of the uranium universe. More than 400 uranium exploration companies and producers have been scrambling to cash in on the greatest bull market in yellowcake since the 1950s, possibly of all time. We identified two key areas with a high probability of consolidation in the sector: the western United States and Namibia. Other areas will emerge and we will report upon them on our website.

For the time being, these are extremely crowded and very competitive areas. Commonly, a space consolidates as the market reaches a top in the sector. The lesser well-branded companies vanish or are later consumed for any potential value remaining in their assets, as they are on the brink of closing their doors. Like their predecessors, their exploration projects will be moth-balled unless a predator finds some value, sometime down the road.

Most of the early entrants into the uranium sector accumulated potentially lucrative properties for a song. This was accomplished after the project was abandoned at the depth of the uranium bear market. Therefore, we remain extremely cautious about any uranium company lacking in advanced stage prospects. Technical teams are only so valuable to a company as long as the staff can cash their paychecks.

Each company, we identified and featured in this chapter, has its strengths and weaknesses. All six are among the most advanced-stage of the non-yet-producing uranium companies. Four of the companies are U.S.-based. One company is developing its project in Namibia, Africa; another in Spain. We are excited about their prospects and hope you study their merits.

The four development companies planning projects in the United States will utilize the in situ recovery (ISR) mining method. One also plans conventional mining. Please observe an illustration of a uranium rollfront found in Wyoming's Gas Hills uranium district (see next page).

Uranium in Tertiary sandstones occurs in what have been termed roll-front deposits. Uranium was first discovered in Tertiary sandstones in Wyoming by Dr. J. D. Love on October 15, 1951, at the Pumpkin Buttes, Campbell County. Following this discovery uranium was



In Wyoming, rollfronts are the most common form of uranium occurrence. These are typically mined through the ISR uranium mining method, also known as solution mining. Above photo shows a rollfront occurrence of uranium minerals (black) in host sandstone, Gas Hills, Wyoming. The sandstone contains reduced forms of minerals on the convex side of the roll-front, while the minerals exist in the oxidized state inside or on the concave side of the roll-front. Photo from C. L. VanAlstine, Office of the U. S. Atomic Energy Commission, Casper, Wyoming, donated to the Wyoming State Geological Survey. Courtesy of WSGS.

discovered in Tertiary sandstones in the Gas Hills, Red Desert, southern Powder River Basin, Shirley Basin, and other areas in the state. In Wyoming, roll-fronts are the most common type of occurrence.

In our previous book, Investing in the Great Uranium Bull Market, we described the ISR uranium mining method in detail. ISR mining in the United States utilizes a carbonated solution, much like soda water, to extract the uranium. In Kazakhstan and elsewhere, sulfuric acid is used to leach the uranium from the deposit. This is commonly referred to as ISL, or in situ leach mining. The ISR method in the United States resembles a water treatment plant. After you visit one, you will agree it is nothing more complex than that.

Four Companies featured in this section, such as UR-Energy, Uranerz, Powertech Uranium and Strathmore Minerals, plan to use the ISR uranium mining method for their initial uranium mining. (Forsys Metals, which is developing its project in Namibia, plans to mine uranium through the open-pit method.) ISR is a lower cost mining method, with less expensive capital costs than conventional mining – about 30 to 50 percent of the start-up cost for a conventional mine. Operating costs are lower because the ISR method requires a smaller labor force, uses fewer chemicals in the extraction and milling process, and leaves a smaller mining footprint than conventional mining.

Next update is approximately 45 days after the end of the first quarter 2007.

Calendar-Year Quarter	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	P2006
1st Quarter	1,734,427	1,149,050	1,151,587	1,196,225	1,018,683	709,177	620,952	400,000E	600,000E	709,600	921,999
2nd Quarter	1,460,058	1,321,079	1,143,942	1,132,566	983,330	748,298	643,432	600,000E	400,000E	630,053	894,268
3rd Quarter	1,691,796	1,631,384	1,203,042	1,204,984	981,948	628,720	579,723	400,000E	588,738	663,068	1,083,808
4th Quarter	1,434,425	1,541,052	1,206,003	1,076,897	973,585	553,060	500,000E	600,000E	600,000E	686,456	1,222,312
Calendar-Year Total	6,320,706	5,642,565	4,704,574	4,610,672	3,957,545	2,639,256	2,344,107E	2,000,000E	2,282,406	2,689,178	4,122,387

Total Production of Uranium Concentrate in the United States, 1996 - 4th Quarter 2006

es: Totals may not equal sum of components because of independent rounding. rcces: Energy Information Administration: Form EIA-851A and Form EIA-851Q. "[

Uranium Concentrate Production in the United States, 1996 - 4th Quarter 2006. Table courtesy of Energy Information Administration (EIA).

The U.S. Uranium mining sector is currently experiencing a revival, mainly through the ISR uranium mining method. Later in this decade, we expect conventional uranium mining will emerge as a powerful factor. U.S. utilities expect a 'security of supply.' In the previous uranium boom, utilities began participating as early as the 1960s in conjunction with uranium mining companies.

General Electric (NYSE: GE) merged with uranium miner Utah International in what was then the largest corporate merger in history. We anticipate utility companies will begin, at some point, taking stakes in uranium companies to ensure they have a reliable source of supply. In selecting a basket of uranium mining stocks, we kept that historical information in mind.

The graph below indicates how strongly utilities are in dire need of a reliable supply of uranium. Even with the record uranium mining using the ISR mining method, and the highest uranium mining production since 1999, U.S. uranium mining only supplies a bit more than 7 percent of nuclear fuel consumption by U.S. utilities. The remaining 93 percent comes from foreign-sourced uranium production and dwindling secondary supply. At some point, the global uranium renaissance could pose a serious supply threat to U.S. utilities.



**United States Uranium Production** 

America's gigantic appetite for nuclear fuel outstrips current U.S. uranium mining production.

For the future, we foresee waves of consolidations in the uranium mining sectors. This may not necessarily emerge as a single bull market. Conceivably, the Great Uranium Bull Market could evolve into multiple bull markets over the course of the next 25 years or longer. There will be rollercoasters along the way, perhaps starting as early as 2007 or in 2008.

We have been cautious and conservative while researching which of the many uranium companies may be suitable for the broadest number of investors. Nonetheless, any trading in natural resource stocks carries a high degree of speculative risk. Until a company can produce several quarters of operating profits on their flagship property or properties, caution is advised for the majority of investors.

The companies which follow are listed alphabetically to avoid any hint of preference. Please review our disclaimer page which follows the corporate profiles in this chapter.

## Forsys Metals Corp (TSX: FSY)

As	of March 19, 2007						
	Share Price	C\$7.45					
	High-Low (52 Week Range)	C\$1.01 – C\$8.90					
	Three-Month Average Volume	750,745					
	Market Capitalization	C\$475 Million					
	Market Float	C\$427.2 Million					
As	of March 19, 2007						
	Shares Outstanding	63,696,755					
	Shares Fully Diluted	71,095,000					
	Management Ownership	6.36 Million					
	Warrants Outstanding	3,602,265 @ C\$1.20, C\$0.45, 1.15, 1.50					
	Warrant Exercise Raise:	C\$5,315,669					
	Director & Advisor Stock Options	2,644,000					
	Expiration Dates Range:	April 2007 – September 2011					
	Strike Price Range:	C\$0.24 – C\$2.20					
	Cash	C\$55.5 Million					
	Monthly Burn Rate:	C\$350,000					
	Exploration Budget (2007)	C\$5 Million					
	Development Budget (2007)	C\$10 Million					
	Debt	None					
	Brokerage Firms Ratings:	Blackmont Capital, Canaccord Capital, Orion Securities, Paradigm					
	Employees/Consultants:	14					

## **Company Introduction**

The entirety of Forsys Metals assets, and potential assets, are in the Republic of Namibia. The West African nation (adjacent to and northwest of South Africa) is stably democratic with a 30-year uninterrupted history of uranium mining. The world's fifth largest producing uranium mine, Rossing and which supplies more than seven percent of worldwide uranium production, is also located in Namibia. Fitch Rating Services gave Namibia a BBB sovereign debt rating in December 2005.

Because the greatest risk in uranium mining is permitting, fast-tracking a project in Namibia is a major incentive. Paladin's Langer Heinrich became a commercial producer in a fraction of the time it is taking others. Paladin's market capitalization soared above C\$3 billion just as quickly. As more have observed the progress made by Forsys in following in Paladin's footsteps, shares in FSY have dramatically risen.



Valencia project is proximate to Rio Tinto's Rossing and Paladin Resources' Langer Heinrich mines

The main and east zones at the Valencia project.

Initially, Forsys Metals listed on the TSX-Venture Exchange in September 2004. The company acquired a 90-interest in the Valencia uranium deposit in July 2005 through privately held Namibian Metals Ltd. The company now holds a 100-percent interest in the Valencia project. By November 2005, Forsys raise C\$10.5 million to complete the acquisition of the private company and to advance confirmatory exploration work to a pre-feasibility study. In October 2006, Forsys Metals moved to Canada's senior Toronto Stock Exchange.

To acquire new uranium projects, Forsys signed a Letter of Intent to establish a strategic partnership with Namibia-based Ancash Investments Ltd, a Black Economic Empowerment (BEE) group. Recently proposed BEE initiatives would include project and equity participation in Namibian mining projects. In February, the Minister of Mines and Energy issued an initiative deterring the army of exploration companies hoping to pursue additional uranium projects in the country. On February 22nd, the TECO subsidiary of Forsys was granted Exclusive Prospecting License 1496. These actions have strengthened the company's position in Namibia.

## **Flagship Property**

The Forsys Valencia uranium project is located in central west Namibia, less than 100 miles from Namibia's capital Windhoek and about 100 miles from the country's only deep water port, Walvis Bay. The Valencia uranium deposit is about 25 miles from the Rossing and about 40 miles from the Langer Heinrich uranium mines. In 2005, Rossing produced more than 8 million pounds of  $U_3O_8$ . Annual production from Paladin's Langer Heinrich is expected at about 2.6 million pounds.

In 1968, uranium mineralization was discovered during a regional airborne radiometric survey conducted by the South African government. Four years later, Gold Fields of South Africa obtained a prospecting permit. The company's subsidiary explored and drilled the Valencia property defining a sizeable historic resource estimate. After approximately 25,000 meters of drilling, the company conducted inde-



Valencia project development is advanced stage

pendent studies in 1989, which led to discussions of proposed mining operations, preliminary pit design and financial calculations to proceed with Valencia.

By 1989, Gold Fields incorrectly concluded Namibia might participate in the continent's growing socialist movement and exited Namibia. Declining uranium prices also contributed to abandoning the project. The property was later sold at auction and then vended through various corporate channels into Forsys Metals.

Previous and current drilling projects have delineated two uranium deposits on the Valencia project. This property has been well drilled intermittently for more than twenty years.

Valencia's geology is promising. All of Namibia's known uranium mineralized occurrences found in granite are located in the Central Zone. The Valencia project is situated in the Central zone of the intra-continental branch of the Damara Orogenic Belt. The Damara Sequence rocks found at Valencia are generally referred to as alaskites, which host the uranium mineralization. These are reportedly massive stock-like bodies, dykes of varying thickness, and veins and veinlets. Exploration work has identified uranium mineralization over a north-south area of about 1,100 meters and an east-west area of about 500 meters. Mineralization has been identified by diamond drilling to a depth of 370 meters below surface.

Uraninite  $(UO_2)$  is the primary mineralization found in the billion-year old highly deformed meta-sedimentary rocks at the Valencia deposit. The most intense mineralization is mainly found in the finer grained alaskite. Previous laboratory leaching on drill core samples found 95 percent of the uranium was recoverable at a grind of 20 percent minus 200 mesh in the samples. Unlike Rossing's mineralization, no

betafite has been observed, which cause leaching complications. This means Valencia's uranium should be fairly clean by comparative Namibian standards, and is not contaminated by vanadium mineralization as has been reported by UraMin on the company's Trekkopje uranium project.



## **Company's Plan of Action**

In November 2005, the company reported a National Instrument 43-101 compliant resource of 21.6 million pounds (inferred), grading 0.22 kg/t. Since 2005, Forsys has conducted an infill and confirmation drilling program at Valencia with as many as three drill rigs on the property. About 15,000 meters of drilling was completed in 2006 to provide data for the pre-feasibility study.

In mid December, the company announced the discovery of a new high-grade uranium zone, about 1500 meters north of the Main Zone. Named after its discoverer, the 'Joly' zone, it is reportedly a dyke 1000 meters by 25 meters wide. Nineteen grab samples returned encouraging  $U_3O_8$  values, four with relatively high percentages of uranium-mineralized content. Twenty-five percent of the samples contained 0.10percent  $U_3O_8$  or more. These values reflect four times the uranium mineralization found in the Main Zone. Diamond drilling was reported to start, in late February, on the new zone.

In late March, Forsys announced a new resource calculation, using a cut-off of 0.08 kg/t  $U_3O_8$ . The company reported a measured resource of 15.1 million tonnes at 0.16 kg/t for 5.3 million pounds; an indicated resource of 104.2 million tonnes grading 0.13 kg/t  $U_3O_8$  for 29.8 million pounds. Using Measured and Indicated calculations,

		20	05		2006			2007				2008				2009				
	Q1	Q2	Q3	Q.4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Valencia Acquisition / Closing			(CD	N\$3. 8m)																
Core Drilling / Analysis					(0	CDN\$1	1.5m)	]												
RC Drilling / Metallurio	al						(	CDN\$ 1-2m)												
Prefeasibility / Revise Resource Calculation	ł						(a	pprox CDN\$ 3.8m)												
Bankable Feasibility (Proposed)								(app	orox C	DN\$5	-7m)	]								
Mine Construction (Proposed)																c	(ap DN\$1	prox 20m)	]	

## Valencia Development Cost and Schedule

Forsys Metals is on track for producing by mid 2009.

the resource jumped to 34.1 million pounds  $U_{3}O_{8}$ . The inferred resource is estimated at 14.9 million pounds. The entire resource of 49 million pounds is constrained to a depth of 380 meters below surface.

Forsys reported changes to the cut-off grade because of several favorable factors, including simple mineralogy, expected process recovery exceeding 90 percent, a lack of deleterious minerals (such as betafite), and acid consumptive lithologies. The higher price of uranium also helped the company model their higher projections for this resource.

During April 2007, Forsys hopes to issue a pre-feasibility study on the Valencia uranium project. From interviews with the company's exploration manager Rick Bonner and Forsys Metals president Wayne Isaacs, we are confident the company's board of directors will quickly move to commission a bankable feasibility study on the project. The final feasibility study should be completed in late 2007.

How much production will take place by the company's proposed start date of 2009, and how long does the company plan to mine the Valencia deposit? In response to our questionnaire, the company responded, "Historic numbers support a minimum ten-year mine life at roughly 2.5 million pounds per year production. More accurate and improved numbers will be determined in a bankable feasibility study."

Because the Valencia property is in the desert, our biggest concerns included power and water. These are necessary factors in uranium mining along with required infrastructure such as paved roads. The nearest regional power line is about twelve miles to the north. International airports are found at both Windhoek and Walvis Bay.

Exploration manager Rick Bonner told us in a telephone interview, "We have in writing a note from NamWater that they can supply us with water. We are also looking at other areas where we can make sure we have a sufficient supply of water for our business. We've talked to NamPower about power demands and building infrastructure for the mine.

Analysts have reviewed various company plans and believe the uranium mill for a 10,000-ton/day open pit operation can be constructed for between US\$120 and 150 million. Operating costs for mining and milling should cost about US\$25/pound. The most recent cash flow model provided by a brokerage firm suggested the company annually produce 1.5 million pounds per year at a cash cost of U\$27.50/pound for approximately ten years of mine life.

## **Technical Team**



Rick Bonner

Until late January, the mainstay of the company's technical team was exploration manager Rick Bonner. His most recent assignments, over a 25-year career, were for Rio Tinto as a mine geologist at the Diavik diamond mine in Canada's Northwestern Territories, and as an exploration for BHP Billiton for properties in Russia's Far East and Central Asia. In a telephone interview with Rick Bonner, published on StockInterview.com in November 2006, he told us the project was moving along as he expected with no surprises, "I drill a hole. I get what I expect. I send out the assays. I get what I expect."

During this time, the company relied upon Graeme Greenway of Snowden Mining Consultants (Johannesburg, South Africa) to calculate the resource. Formerly, Greenway was the chief geologist for nearby Rossing. One of his assignments at the time was to evaluate the Valencia uranium deposit. He has been advising Forsys on the recent pre-feasibility study and helped us define the cautions and advises for investing in African uranium in "*Investing in the Great Uranium Bull Market*."

Two new arrivals on the technical team, both based in Windhoek (Namibia), point strongly to the future plans Forsys Metals has for the Valencia project. Mining engineer Dag Kullman was hired, from Snowden Mining Consultants (Johannesberg), to complete the pre-feasibility and feasibility studies on the Valencia uranium project. Previously, he worked in the South African gold and platinum mining industries with four years at Anglo American Corporation and seven years with the Council for Scientific and Industrial Research's Division of Mining Technology. On the same day, Dr. Lima Maartens was announced as the company's environmental manager. She comes from DeBeers Marine Namibia, where she was a senior environmental scientist.

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# Powertech Uranium Corp (TSX: PWE)

As	of March 19, 2007	
	Share Price	C\$3.92
	High-Low (52 Week Range)	C\$1.20 – C\$4.50
	Three-Month Average Volume	355,368
	Market Capitalization	C\$173 Million
	Market Float	C\$123 Million
As	of March 19, 2007	
	Shares Outstanding	44,221,449
	Shares Fully Diluted	53,420,949
	Management Ownership	12,841,400
	Warrants Outstanding	5,074,500 @ C\$0.30 – C\$1.30
	Warrant Exercise Raise:	C\$5,969,850
	<b>Director &amp; Advisor Stock Options</b>	3.1 Million
	Expiration Dates Range:	May 2011 –February 2012
	Strike Price Range:	C\$1.00 – C\$3.00
	Cash	C \$12.2 million
	Monthly Burn Rate:	US\$350,000
	Exploration Budget (2007)	US2.25 Million
	Development Budget (2007)	US\$1.1 Million
	Debt	None
	Brokerage Firms Ratings:	Initial private placement was broadly distributed among several North American institutions, but no single institution holds more than 10%.
	Employees/Consultants:	18 plus outside consultants as needed

## **Company Introduction**

Powertech Uranium announced the acquisition of Denver Uranium Company LLC (DU) in August 2005, changing its business to uranium by acquiring DU. The acquisition included a number of lease and/or purchase agreements for surface and mineral rights in the Dewey Burdock uranium-mineralized property in South Dakota. In January 2006, a National Instrument 43-101 was filed on the Dewey Burdock property, showing resources of 7.6 million pounds  $U_{3}O_{8}$ . As per the report, the average grade thickness (GT) on the property is 1.28.

There are four main properties held by Powertech Uranium: Dewey Burdock, Centennial, Aladdin and Dewey Terrace. All four properties are in the high plains states in the U.S. Three are relatively proximate to each other in Wyoming and South Dakota, around the Black Hills. A fourth is located in Colorado, near the Wyoming border.



## **Project Summary**

Powertech Uranium quietly began acquiring pieces of the Dewey Burdock property in South Dakota in early 2005, completing the final piece of the 11,520 acres by early 2006. The company acquired the databases for Dewey Burdock shortly after signing the leases in 2005. Other data was later acquired and historical information continues to be acquired as it is identified and becomes available.

The Centennial property, located in northeastern Colorado, was bought through a competitive sale from Anadarko Petroleum Corp in October 2006. Powertech took possession of the historical data in December 2006.

The Aladdin property is located in northeastern Wyoming in Crooks County. It was identified as an exploration target in early 2006. Powertech obtained the historical data from Energy Metals Corp in early 2007. The data package included approximately 600 eletric logs from previous drilling and maps covering drill results of more than 1,800 drill holes. Options and leases for the Aladdin property were acquired during 2006 and in 2007. The company also staked claims at Dewey Terrace in mid 2006. Uranium mineralization found on the Dewey Terrace property may be a continuation of the mapped trends from the Dewey Burdock.

## **Property Descriptions**

The company's lead project should be Dewey Burdock. It's located in southwest South Dakota at the southwest flank of the Black Hills uplift. The project is part of the northern extension of the Edgemont uranium district, which was discovered in the 1950s. In the mid 1970s, the Tennessee Valley Authority (TVA) bought a major



Dewey Burdock Project - Edgemont District, South Dakota

interest in the property and made this their main exploration target. Nearly 4,000 exploration holes (more than 2 million feet of drilling) were drilled on the property into the early 1980s. Approximately 60 percent of the holes were delineation drilling along the uranium roll fronts.

The company appears optimistic about the Centennial project in northeastern Colorado, just south of the Wyoming border. Rocky Mountain Energy, a subsidiary of Union Pacific (see Jim Bonner bio under "Management and Technical Team" section), drilled more than 3,000 drill holes consisting of more than 1 million feet of drilling on the property. Judging from Bonner's track record, Centennial may be worth paying attention to.



## **Company's Plan of Action**

The company has budgeted US\$2.25 million for exploration in 2007, and US\$1.1 million to advance the company's core uranium assets through the permitting process. Exploration at Dewey Burdock is budgeted for US\$750,000; Centennial



## Dewey Burdock Project - Edgemont District, South Dakota

Senior Geological Consultant, Robert Smith at Dewey Burdock property

US\$500,000; Aladdin – US\$550,000; Dewey Terrace – US\$550,000. The balance will be divvied among other properties the company plans to explore.

In a response to our questionnaire, the company reported, "We believe the Dewey Burdock has additional exploration potential of up to 16 million pounds." This appears to be the company's first potential producer. "Dewey Burdock is being evaluated by outside environmental consulting firms," the company wrote. "Internally, we believe the applications will be completed and submitted by mid to late 2008." Clement believes production at Dewey Burdock can begin in the final quarter of 2009, or early 2010, using his estimate of the regulatory review.

He wrote of the property, "Because the grade of Dewey Burdock is fairly high, and it is estimated the permeability is of good quality, typical life of 10-15 pore volumes could be completed in approximately one year, assuming a wellfield of one million pounds.

With Centennial, Clement foresees the property possibly reaching production one to three quarters before Dewey Burdock. "Assuming permitting time will be fairly normal, about one year to 18 months after the submission of a completed application, the company is scheduling to be in operation by the last half of 2009," Clement wrote us. "This schedule has been independently reviewed by outside environmental consultants with significant experience and expertise in permitting projects in the U.S. uranium industry."

With regards to processing the mined uranium, Clement wrote, "Our intent is to build satellite facilities at the operating areas and transport loaded resin from ISR

operations to a central processing facility. A number of options are open to our company. The most likely outcome will be that Powertech will construct its own central processing facility."

Operating costs on the initial projects are estimated at approximately US\$20/pound, based on current drilling, chemical, electrical and assumed labor costs. Clement wrote, "The Capex budget is estimated at US\$12-15 million per project, including initial wellfield and plant capital."

## **Management and Technical Team**

Powertech Uranium Corp's management has previously permitted and constructed more than eight uranium mines and pilot operations. The company's technical team has cumulatively brought more than 12 in situ recovery (ISR) uranium operations into production and through completion to closure. Cumulatively, the technical team has more than 200 years of experience in the uranium industry.



Richard Clement, CEO

Chief executive Richard Clement started his career with Mobil Oil Corp (1967 - 1983), working in both the United States and Australia. A professional geologist, Clement was responsible for the operations management of Mobil Oil's U.S. uranium exploration programs. He later developed Mobil Oil's global strategy for mineral explorations and was vice president/exploration manager of Mobil Energy Minerals Australia. In 1983, Clement worked for Uranium Resources, specializing in the ISR method of uranium mining. He served as senior vice president/exploration of Uranium Resources, later becoming the president of the company's New Mexico subsidiary, Hydro Resources.

Chairman Wallace Mays began his career with Atlantic Richfield helping design, construct and operate one of the early ISR uranium mines. Mays has been involved with many uranium mining ventures, including Everest Minerals and Uranium Resources. He has designed and operated numerous ISR uranium mines across the southwestern United States. In 1996, he became a member of the Uranium Hall of Fame.

Vice president of exploration Jim Bonner is a professional geologist in Wyoming. Recently, he was senior scientist on the consulting engineering staff for Gordon Environmental. During the previous uranium boom, Bonner was exploration manager for Union Pacific (UP) Railroad where he managed a large number of uranium projects. While at UP, Bonner made a number of highly economic uranium discoveries, and also managed geotechnology for UP's Nine Mile uranium leach project. Bonner has overseen projects in all the U.S. target basins.

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# Strathmore Minerals Corp (TSX: STM)

As	of March 19, 2007	
	Share Price	C\$4.34
	High-Low (52 Week Range)	C\$1.49 – C\$5.40
	Three-Month Average Volume	525,400
	Market Capitalization	\$312,075,156
	Market Float	\$284,733,156
As	of March 19, 2007	
	Shares Outstanding	71,906,718
	Shares Fully Diluted	76,567,236
	Management Ownership	6.3 Million
	Warrants Outstanding	735,518
	Warrant Exercise Raise:	C\$ 2.2 M
	<b>Director &amp; Advisor Stock Options</b>	<4.0 Million
	Expiration Dates Range:	2007 through October 2011
	Strike Price Range:	C\$1.50 – C\$2.10
	Cash	C\$33,891,875
	Monthly Burn Rate:	C\$200,000
	Exploration Budget (2007)	Canadian Exploration: C\$6 – 8 Million U.S. Exploration: C\$1 Million
	Development Budget (2007)	U.S. Development: C\$10 Million Canadian Development: C\$1 Million
	Debt	None
	Institutional Holdings – Percentage:	At least 30% Sprott Asset Management (19.9%), Mavrix Funds, oth- ers
	Brokerage Firms Ratings:	Raymond James, Sprott Securities, National Bank Financial
	Employees/Consultants:	21 Employees and consultants

## **Company Introduction**

Strathmore Minerals was among the first entrants to the uranium bull market. As the rising uranium market stayed below the radar screen, the company was among the first to lease uranium from the state of Wyoming; the first to elect state of New Mexico uranium leases for auction. The company's core properties acquired in New Mexico had previously been held in continuous ownership by Kerr McGee Nuclear, then Rio Algom and finally BHP Billiton.

After acquiring the company's initial core properties, Strathmore was able to acquire some of the only continuously held properties and additional promising, but aban-



doned, U.S. uranium properties and their historic databases of previous exploration and drilling. Strathmore Minerals has accumulated a total uranium portfolio of 73.9 million resource pounds, technically compliant per National Instrument 43-101. Other properties in the company's portfolio, which have not yet been converted from an historical resource to the CIM standards of a NI 43-101 resource, could possibly show more than 150 million pounds.

Strathmore is one of the largest uranium property holders in two of its focused areas: New Mexico and Wyoming. The company is also one of the largest landholders in Canada's Athabasca Basin, where one finds some of the world's richest uranium grades. The company has additional uranium exploration properties in other Canadian provinces and in Peru.

In all the company has 27 property positions in three countries. Strathmore Minerals currently holds twelve properties in Wyoming, six properties in New Mexico, eight properties in Canada (six in Saskatchewan) and a Peruvian property. Of these, we will focus on Wyoming's Gas Hills properties and New Mexico's Roca Honda property.

## **Flagship Properties**

Strathmore Minerals plans to develop its most promising properties, first in Wyoming and secondly in New Mexico. Permitting activities are in progress in both states. The company has fully operating offices in Riverton, Wyoming and Santa Fe, New Mexico to attend to the permitting and development activities.

The most ambitious project is at Roca Honda, near Grants, New Mexico. The Grants Mineral Belt in New Mexico was the world's top producing uranium area in the last uranium bull market. The area yielded more than 300 million pounds of  $U_3O_8$ . Roca Honda's previous operator was Kerr McGee, then the world's largest uranium producer. Kerr McGee had fully permitted and begun development work on Roca Honda as its next development project to feed its 6,000 ton/day Ambrosia Lake Uranium Mill, the largest uranium mill in the world.

In April 2006, Strathmore announced the completion of a National Instrument 43-101 resource estimate on Roca Honda. The measured and indicated resource category showed more than 17.5 million pounds  $U_3O_8$ ; inferred pounds added another 15.8 million pounds. The property is currently proceeding through the permitting process. By September 2006, the company had begun investigating the feasibility of conventional mining and milling on the property.



ROCA HONDA, New Mexico 43-101 completed: Demonstrated Reserve: 17.5 million lbs.

A week later, the Cibola County commission and the city of Grants passed a resolution encouraging and supporting uranium mining in their area. In November 2006, the company announced it had purchased 620 acres of land in Ambrosia Lake, New Mexico, in an area where uranium had previously been milled nearby. Other sites are also being evaluated for potential mill sites, and the company plans to make a formal submission to the NRC after an Alternative Site Analysis.



GAS HILLS: Over 100 Million Pounds Produced

In Wyoming's Gas Hills District, Strathmore added 1,700 acres in three claimed properties. In November 2006 to its Wyoming portfolio: George-Ver, Bullrush and Loco-Lee. These were in addition to the company's Sky property (for which a NI 43-101 is being prepared), the Jeep property and the Frazier-LeMac property. All six are found in the Gas Hills. What makes the November acquisition special is that those three properties all have 'near surface' uranium mineralization.

Historically, these six uranium mineralized properties in the Gas Hills host more than 11.1 million pounds of  $U_3O_8$ . None have resource compliant documents filed. Therefore, some analysts have give zero, or minimal, value to these properties. Four of these properties had previously designed open pit plans. Some were fully permitted in the past.

Previous operators of the Gas Hills properties included Pathfinder and Federal American Partners. Pathfinder was a spin-off of General Electric. Federal American Partners' operating subsidiary was American Nuclear, which milled more than 20 million pounds  $U_3O_8$  during the last uranium cycle. Strathmore Minerals' vice president of technical services John DeJoia was previously the chief geologist and technical services manager for Federal American Partners. Strathmore's land manager Tom Powell managed those properties during the 1970s and 1980s.

## **Company's Plan of Action**

Strathmore Minerals wisely began monetizing its non-core assets at the end of January 2007. In a period of about two weeks to mid February, the company announced a joint venture with Yellowcake Mining (OTC BB: YCKM) to develop Strathmore's Baggs, Juniper Ridge properties in Wyoming; that Strathmore was spinning off its Canadian assets into a separate company; and had signed an exclusivity agreement with one of the world's largest diversified industrial and resource companies, a Fortune Global 500 company, to possibly joint venture the development of an underground mine and uranium mill at the company's Roca Honda project.

This demonstrates the company is extremely active about increasing shareholder value. It is anticipated that additional joint ventures of the company's properties in the United States and Canada could be pursued. Because of the company's large U.S. property portfolio, analysts have given zero value to the Canadian exploration properties. Spinning off those properties into a separate company could quickly provide a dollar market capitalization to the new company, on the order of a stock dividend. From what we understand the exclusivity agreement with the major industrial company, to joint venture the Roca Honda project, is being aggressively pursued.

The climate toward uranium mining in New Mexico has recently changed. Following the announcement of a uranium mining ban by the Navajo Nation on its reservation, many investors incorrectly assumed the entire state of New Mexico was anti-mining. Strathmore Minerals has made it evident this does not impact the company's Roca Honda Project, which is being advanced in Cibola County. The county commission announced in an interview that the county would welcome uranium mining 'with open arms.' The sentiment was repeated by the mayor of Grants, the city manager and the state senator for that district.



The company will likely first mine uranium in Wyoming in the Gas Hills district. Multiple property holdings surrounding the company's Wyoming office in Riverton are being prepared for permitting and mining. Wyoming has been recognized as one of the more uranium-friendly locations in the world. Cameco Corp's wholly owned U.S. subsidiary, Power Resources, recently mined a record 2.7 million pounds  $U_{3}O_{8}$  in 2006 through the ISR mining method at its Wyoming and Nebraska operations.

Through various company presentations, it appears one of the Gas Hills properties could become Strathmore's first uranium mines. Mining could commence during


2009, depending upon the permitting and development process and the style of mining used to extract uranium.

The Gas Hills Uranium District lies 45 miles east of Strathmore's Riverton, Wyoming office. Beginning in the late 1950s and extending to the mid 1980s, one hundred million pounds of uranium was mined in the district. This consisted of about one-half of Wyoming's historical production and second in U.S. uranium production to New Mexico's Grants Mineral Belt. At its peak, three uranium mills operated within this uranium district; two other mills were partially fed by additional production in the district. The Gas Hills remains an 'elephant' district among Wyoming's other, numerous uranium districts.

### **Technical Team**



David Miller, President

President and chief operating officer David Miller previously worked for Cogema (now Areva), the world's second largest uranium producer. In his last four years, he was chief geologist of the company's U.S. in situ (ISR) operations. Miller has more than 25 years experience in the exploration and acquisitions of uranium properties. He has consulted for the International Atomic Energy Agency (IAEA) in uranium exploration, deposits, mining and the ISR uranium mining method. Representative Miller is also an elected member of the Wyoming Legislature. Vice president of technical services John DeJoia has more than 30 years of technical expertise in underground, open pit and ISR uranium mining. In Wyoming, his mining experience includes among others, the Shirley Basin and Big Eagle uranium mines. DeJoia was development geologist for Pathfinder Exploration Corporation and chief geologist for Federal American Partners in the Gas Hills District of Wyoming. His diversified experience includes a broad range of the uranium mining and milling spectrum. Previously his management experience included work for Morrison-Knudsen at the Idaho National Engineering Laboratory and manager of the Washington Group projects at Los Alamos National Laboratories. DeJoia is a registered geologist in the state of Wyoming.

Vice president of environmental and regulatory affairs Juan Velasquez has more than thirty years experience in the uranium industry, including seven years with Phillips Uranium (ConocoPhillips) and fifteen years with United Nuclear Corporation as president of the minerals division and corporate manager of environmental affairs. He has consulted to the private and government sector in nuclear remediation. Velasquez has permitted several major uranium operations, including the Phillips Nose Rock mine/mill complex and a United Nuclear mill tailings disposal facility. He is a past chairman of the New Mexico Mining Association's Uranium Environmental Committee.

### **Analyst Comments**

Raymond James' uranium mining analyst Bart Jaworsky rated Strathmore Minerals Market Outperform in late January and raised his price target from C\$3.50 to C\$5.00/share. He raised his Net Asset Value calculation based upon the improved outlook for Strathmore Mineral's New Mexico projects.

National Bank Financial analyst Brian Christie rated the company a 'Sector Perform' with a price target of C\$3.70/share. Sprott Securities uranium analyst Justin Reid rated Strathmore Minerals a 'Speculative Buy' with a C\$4.70/share price target. In a report written for the firm's institutional clients, he wrote, "As permitting and development continue we anticipate that STM will continue to re-rate."

Contact	Inform	ation
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# Uranerz Energy Corp (AMEX: URZ)

As	As of March 16, 2007		
	Share Price	\$4.68	
	High-Low (52 Week Range)	\$1.33 – \$5.69	
	Three-Month Average Volume	500,675	
	Market Capitalization	\$182.75 Million	
	Market Float	\$145 Million	
As	of March 16, 2007		
	Shares Outstanding	39,052,087	
	Shares Fully Diluted	43,538,187	
	Management Ownership	8 Million	
	Warrants Outstanding	166,100	
	Warrant Exercise Raise:	\$.5 Million	
	<b>Director &amp; Advisor Stock Options</b>	4,320,000	
	Expiration Dates Range:	January 2011 to February 2012	
	Strike Price Range:	\$0.75 to \$3.69	
	Cash	\$16 Million	
	Monthly Burn Rate:	\$250,000	
	Exploration Budget (2007)	\$1.5 Million	
	Development Budget (2007)	\$1.0 Million	
	Debt	None	
	Brokerage Firms Ratings:	PEH Wertpapier AG, FPS Verm÷gensverwaltung GmbH, Vertex One Asset Management, Inc., Gebhard & Co. Asset Management AG, Gesbankinter S.G.I.I.C., S.A., Banif Gesti=n S.G.I.I.C., Passport Capital, L.L.C., Geode Capital Management, L.L.C., RBC Asset Man- agement, Inc., Credit Suisse Asset Management, LLC (US), Deutsche Asset Management Americas, UBS Securities LLC.	
	Employees/Consultants:	15 Employees and consultants	
Opi Ene	Options (Derivatives: Call and Put Options) Options trade on the American Stock Exchange for Uranerz Energy		

### **Company Introduction**

The bulk of the Uranerz Energy management and technical team, and the entirety of the this new company's advisory board come from the original Uranerz Exploration and Mining Ltd, the "Uranerz Group". The Uranerz Group was acquired by Cameco Corp, the world's largest primary uranium producer, in 1998.

The current Uranerz incarnation is moving forward its uranium-mineralized properties toward production in Wyoming. The company holds 14 separate uranium



June 2006 seillinf in Powder River Basin, Wyoming

properties in its Wyoming portfolio. According to a registered professional geologist, which evaluated 13 of the properties, and historic data, Uranerz Energy holds more than 18 million pounds of  $U_3O_8$  mineralization with potential for another 2.4 million pounds. In a recent news release, Uranerz announced that they continue to acquire and stake additional ground in the Powder River Basin where historic information indicates the presence of additional mineralized trends.

Historical estimates indicate the company's Wyoming portfolio may host significantly more pounds  $U_3O_8$ . However, none of these resource estimates can be validated, as is the practice of Canadian-listed public companies, under National Instrument 43-101. Uranerz Energy trades on the American Stock Exchange and on the Frankfurt Stock Exchange (Germany), and not the Canadian stock exchanges. Pursuant to U.S. Securities and Exchange Commission rules, none of these historical pounds can be stated as either reserves or resources.

Under the stewardship of Glenn Catchpole, Uranerz Energy has been quietly moving its production forward, generally unnoticed. Until August 9th, Uranerz Energy traded as an OTC Bulletin Board company and was mostly avoided, trading with volatility. Since listing on the American Stock Exchange as the only 'pure play' uranium mining company, its shares have performed well. On January 30th, Uranerz Energy made another milestone in being invited by the American Stock Exchange to launch trading of options (derivatives: puts and calls) on the company's underlying common stock. Of all the North American uranium companies, only Cameco Corporation and Uranerz Energy have options trading on their shares on U.S. exchanges.



Late February 2007 drilling on Nichols Ranch property in Wyoming

### **Flagship Properties**

Uranerz Energy has multiple projects in Wyoming's Powder River Basin. Based upon historical information, each project has drill-indicated uranium present. While continuing to acquire additional prospective ground in Wyoming, Uranerz decided, in May 2006, to begin preparing the environmental permit applications for two of its properties: the Hank and Nichols Ranch projects.

When some of the properties were acquired, historical exploration drill hole data were included. During the second half of 2007, Uranerz plans to submit its environmental permit applications to the state and federal agencies. After approval of the environmental permit applications, the company plans to proceed with commercial development of these properties.

On the state level, the Wyoming Department of Environmental Quality (DEQ) would issue a Permit to Mine. At the federal level, the U.S. Nuclear Regulatory Agency (NRC) would issue a Source Material License. Both the federal and state agencies would investigate all environmental aspects of the company's proposed insitu recovery ("ISR") uranium mine.

Uranerz Energy's prime environmental contractor is TRC Mariah Associates, based in Laramie (Wyoming). The contractor will perform several environmental baseline studies. George Hoffman of Hydro Engineering (Casper, Wyoming) will perform the required aquifer pump tests and prepare the hydrology section of the environmental permit applications. Ongoing or completed are environmental surveys for vegetation, soils, wildlife, cultural resources, radiation and water quality.

The company installed hydrologic test wells at the Hank and Nichols Ranch properties. Test wells were installed to perform aquifer pump tests. Core samples of the deposit were also taken while installing the test wells in connection with the radiation environmental studies. The pump tests are used to demonstrate that the aquifers are confined, and to test the permeability of the mineralized sandstone unit for both feasibility and permitting purposes.

The Wyoming DEQ has approved Uranerz Energy's plans for the hydrologic testing of the uranium-mineralized confined aquifers. The hydrologic test wells were installed in accordance with the plan. Uranerz Energy will also be collecting ground water samples in the near term at water wells in the region, and has reached an agreement with Cameco Corporation's wholly-owned US subsidiary, Power Resources Inc., to sample some of their monitor wells located on adjacent uranium properties.

In mid February, Uranerz announced a drilling program on the company's Powder River Basin uranium projects. The first task will be performing routine maintenance on three hydrogeologic wells on the Hank property to prepare for the aquifer pump test in spring 2007. Maintenance is to improve the efficiency and performance of the wells since the summer 2006 drilling.

As part of the drilling program, additional exploration drilling will take place on the Hank property. Later, drilling equipment will be moved to the Nichols ranch, where pre-development drilling will be performed to assist in finalizing the well field design. This is required for a 'permit to mine' application to Wyoming's DEQ.

Mine planning for both the Hank and Nichols Ranch properties is underway. Uranerz Energy's target date for submitting the environmental permit applications to the state and federal agencies is the second half of 2007.

### **Additional Data**

It should be noted, because of the company's experienced ISR technical team, that Uranerz Energy plans to specialize in ISR uranium recovery. Nearly all of the uranium mining in the United States and Central Asia is solution mined. More than 20 percent of the world's uranium is mined this way.

ISR mining, or solution mining, is a process using an oxidizing solution to dissolve uranium from underground ore bodies. The oxidizing agent, which contains an oxidant such as oxygen with sodium bicarbonate (commonly known as baking soda),



Uranerz Energy Board of Directors Meeting on one of the company's Wyoming properties

is injected through wells into the ore body in a confined aquifer to dissolve the uranium. The solution is then pumped via other wells to the surface for processing. This results in a cost-efficient and less environmental damaging mining process.

In discussions with Glenn Catchpole, we were told his company expects to commence mining by 2010 with annual production estimates of about 750 thousand pounds  $U_3O_8$ . According to the company with regards to the operating costs on the Hank and Nichols Ranch properties, "Our estimates are somewhere between \$20 and \$30/pound, not including capital costs." Glenn told us Uranerz hopes to build a full-scale Ion Exchange processing plant, which would cost between \$25 and \$30 million. He may start with a remote Ion Exchange (portable facility), which could cost between \$10 and \$15 million. As the company scales up, Catchpole believes he may need two remote IX facilities and one full-scale plant. This is premature and forward looking.

The company has exploration projects in Mongolia, Canada's Saskatchewan and in the Great Divide Basin of Wyoming that it has joint ventured with other companies. The decision was made to focus on bringing its advanced uranium projects into production as quickly as possible, and provide other publicly traded companies with the opportunity the exploration properties offer by joint venturing them. Uranerz could benefit should those companies make a discovery on those exploration properties, but has minimized shareholder risk by having the other companies carry the burden of exploration costs.

### **Management and Technical Team**

The Uranerz Energy technical team has had direct experience in licensing, designing, constructing and operating underground, open-pit and in-situ recovery uranium production facilities. Among them, they have built, operated or supervised at least seven in situ recovery (ISR) uranium operations.



Glenn Catchpole, CEO

Leading the Uranerz Energy management and technical team is chief executive Glenn Catchpole, formerly the general manager of Cameco Corp's Inkai solution mining operation in Kazakhstan. A civil engineer by education, Catchpole has been active in solution mining since 1976. He also worked in Wyoming's Department of Environmental Quality (DEQ) and helped write many of the water rules for the permitting process in the state. Catchpole has maintained close ties with DEQ, which is a hidden asset and could play an important role in the environmental permitting process. Between 1988 and 2002, Catchpole was involved first with Uranerz U.S.A., and after Cameco acquired the Uranerz Group, oversaw the development of the Inkai mine. He spent six years on the project, which included acquisition, feasibility, licensing, environmental permitting, design, construction and the first phase start-up.

Chief operating officer George Hartman has 37 years of ISR mining experience. His entry into the uranium mining business began with the in situ uranium recovery project at Bruni, Texas with the Westinghouse-led consortium, Wyoming Mineral Corporation. Hartman managed two uranium mines with ion exchange plants in Texas. Between 1982 and 1989, he was the general manager for the Uranerz U.S.A. in situ projects division of the Uranerz Group, managing the Ruth Mine, the North Butte property, and oversaw the Uranerz Group interests at the Crow Butte uranium mines. The latter is still producing, but is now owned by Cameco. Under his management, Uranerz served as the operator for the test solution mining of the Christensen Ranch uranium mine. This project is currently owned by Areva (Cogema), and may be restarted during the current uranium renaissance. Hartman has an M.S. degree from the Colorado School of Mines. Four process patents have been granted in his name.

Uranerz Energy director Dr. Gerhard Kirchner has 40 years of international mine development and management experience including twenty years with Uranerz Exploration and Mining Ltd. He holds degrees in mining engineering and economic geology, and a Doctorate in Mining Sciences. Dr. Kirchner spent nine years as general manager and eleven years as senior vice president of Uranerz Exploration and Mining (the Uranerz Group). His team was responsible for the Key Lake uranium discovery, and the engineering and development of projects such as the Midwest uranium deposit, Eagle Point North uranium deposit, Star Lake gold deposit and the Crow Butte uranium deposit.

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#### **Contact Information**

# Ur-Energy Inc. (TSX: URE)

As	As of March 19, 2007	
	Share Price	C\$4.28
	High-Low (52 Week Range)	C\$1.09 – C\$5.45
	Three-Month Average Volume	853,097
	Market Capitalization	C\$316.5 Million
	Market Float	C\$300 Million
As	As of March 19, 2007	
	Shares Outstanding	73,949,874
	Shares Fully Diluted	79,947,607
	Management Ownership	3.6 Million
	Warrants Outstanding	55,733 @ C\$1.25
	Warrant Exercise Raise:	C\$ 69,666
	<b>Director &amp; Advisor Stock Options</b>	4.7 Million
	Expiration Dates Range:	November 2010 – February 2012
	Strike Price Range:	C\$1.25 – C\$5.03
	Cash	C\$27,100,000
	Monthly Burn Rate:	C\$1.2 Million (2006 Average)
	Exploration Budget (2007)	US\$2 Million
	Development Budget (2007)	C\$14.7 Million
	Institutional Holdings – Percentage:	Between 50 and 60 Percent Blackrock London (formerly Merrill Lynch London), RAB Capital, Novadan Capital, K2 & Investments, Pinetree Resource Partners, Front Street Energy & Power, Sprott Securities, Raymond james
	Brokerage Firms Ratings:	Canaccord

### **Company Introduction**

Ur-Energy Inc. began trading on the TSX (Toronto) Exchange in late 2005. The company has 13 property groups in Canada and the United States. Its first properties were acquired in Canada in June 2004; in the United States in November 2005. Total Canadian mineral land holdings cover more than 295,000 acres; total U.S. land holdings are 80,443 acres. The most advanced uranium properties are the Lost Creek and Lost Soldier deposits in the state of Wyoming's Great Divide Basin. Ur-Energy acquired its flagship properties as part of the company's acquisition of New Frontiers Uranium in mid 2005. These properties had extensive exploration work done between the late 1960s through the 1970s. Included in this acquisition was the historic exploration data enabling Ur-Energy to properly evaluate and define the resources on the flagship projects.



Ur-Energy's Wyoming properties.

### **Flagship Properties**

Ur-Energy's flagship properties are 'twin' in situ recovery (ISR) uranium projects in Wyoming's Great Divide Basin, about 15 miles apart: Lost Creek and Lost Soldier. The state of Wyoming hosts more than 40 percent of known uranium resources in the United States. At this time, Wyoming is one of three states where ISR uranium mining takes place. Cameco Corp subsidiary Power Resources mines uranium by ISR in Wyoming's Powder River Basin. According to our research, Ur-Energy may highly likely become the next uranium producer in Wyoming, by early 2009.

Both properties are highly advanced – well beyond the exploration phase and nearly completed with the studies required to file an application for a mining permit. According to the company, "Ninety-five percent of environmental baseline studies have been completed on both the Lost Creek and Lost Soldier properties." At its current pace, Ur-Energy should complete its permitting process by late 2008.

In our questionnaire, the company reported, "We expect to start well field construction and initial well field operations at Lost Creek in late 2008 with actual production coming on in early 2009. We expect it to take most of the first year to ramp up to full production." At full production, Lost Creek is targeted for 1 million pounds. During the ramp up phase, production could range between 400 thousand and 750 thousand pounds  $U_3O_8$ .



The company stated, "We would expect to achieve full production in late 2009 at a target rate of one million pounds per year. Initial conceptual targets for production from both deposits are expected to total two million pounds  $U_3O_8$  on or before 2012."

### **Technical Filings**

According to National Instrument 43-101 (NI 43-101) technical document filings, the following resource calculations were submitted.

Lost Creek contains NI 43-101 compliant indicated resource of 8.5 million tons at 0.059% (9.8 million pounds  $U_3O_8$ ) and compliant inferred resource of 0.7 million tons at 0.076% (1.1 million pounds  $U_3O_8$ ). Lost Creek has an average grade thickness (GT) 1.11. This was calculated by multiplying the average grade of 0.058% at an average thickness of 19.5 feet.

Lost Soldier contains NI 43-101 compliant measure resource of 3.85 million tons at 0.065% (5 million pounds  $U_3O_8$ ), compliant indicated resource of 5.54 million tons at 0.065% (7.2 million pounds  $U_3O_8$  and compliant inferred resource of 1.6 million tons at 0.055% (1.8 million pounds). Lost Solider has an average grade thickness of 1.14. This was calculated by multiplying the average grade of 0.065% at an average thickness of 17.2 feet.

### **Background of Properties**

During July 2005, the company hired AATA International to complete a scoping study to define the multiple steps required to complete an Application for 'Permit to Mine.' The scoping study was completed in 2005. Baseline studies began in January 2006. Development work from mid 2005 forward was devoted first to permitting and then to drilling programs to confirm the historic data and develop confidence in the resource estimates. Drilling also provided Ur-Energy with NI 43-101 compliant resource numbers.

The Lost Creek property was drilling by TexasGulf and Conoco between 1976 and 1982, and again by Power Nuclear Corporation between 1986 and 1988. The historic Lost Creek database contains more than 2900 drill holes, totaling more than 1.5 million feet of drilling. In 2005, Ur-Energy drilled 12 holes for a total of 9,620 feet, including 472.3 feet of core in order to confirm the historic data. The Lost Creek resource was calculated by comparing 540 delineation holes with the 12 new holes. The company concluded it could be mined by the ISR uranium extraction method.

The Lost Soldier property was drilled by Kerr-McGee and various joint venture partners between 1967 and 1986. Cameco later drilled the property in 1993-94. More than 1.672 million feet were drilled over 3,758 holes. Ur-Energy drilled five holes for a total of 1,955 feet, including 197 feet of core, to confirm the historic data. Historic delineation data of more than 3,700 holes plus the five new holes was used to calculate the NI 43-101 resource. The drilling confirmed Lost Soldier could also be mined using the ISR method.

According to historical records, the resource could be larger. In 1978, Conoco-Texasgulf reported an historic resource of 12.8 million pounds of uranium resource, grading 0.044% at the Lost Creek project. In 1998, Cameco Corp reported an historic resource of 26.68 million pounds at the Lost Soldier project.

### **Company's Plan of Action**

Ur-Energy plans to spend U.S. \$6.5 million on preparing the Lost Creek and Lost Soldier properties for production. Expenditures include engineering feasibility studies, permitting, installation of monitor wells around Lost Creek Mine Unit #1 and hydrology tests.

Wellfield installation for Lost Creek Mine Unit #1 will probably cost between US\$5 and 10 million. To produce "one pound" of uranium, the company estimates allin production costs of US\$20 to \$25/pound. This includes overhead and funds escrowed for reclamation.



## Drilling 2005 - Lost Creek Project Potential to host<sup>(1)</sup>: 8.0-31.0 million Ibs U<sub>3</sub>O<sub>8</sub>

The company plans to fast-track into production by avoiding the construction of its own ISR plant. The company is in negotiations to have its initially mined uranium toll-milled at other uranium operations in the state of Wyoming by utilizing some of their current excess capacity. At this time, there are but two possibilities. Ur-Energy will truck an ion exchange column to either Areva's Christensen Ranch (currently under maintenance) or the operating Smith Ranch processing facility owned by Cameco.

The company has ongoing feasibility studies, which are now evaluating types and sizes of ion exchange (IX) processing plants. Initial concepts have included building a satellite IX plant at one site and a full IX processing plant at the other. The remote IX plants would cost between \$15 and 20 million. The company's dedicated ISR plant (also known as the 'mother plant') would cost between \$25 and \$30 million to construct. Pre-feasibility studies are underway and should be completed in the second half of 2007, at which time the company plans to file its application for a mining permit.

In response to our questions about the company's exploration plans for 2007, this was reported, "US\$2 million to be used for drilling at Eagles Nest, Radon Springs and other projects as well as acquisitions of new properties. An additional C\$2.5 million for Canadian exploration, mostly Screech Lake (Thelon Basin)." The company announced joint ventures in April 2006 with Triex Minerals (TSX: TXM) for the company's Hornby Bay Basin projects, Mountain Lake and Dismal Lake.



## Lost Creek Project: 3D View, Central Zone

Looking East – Uranium Deposits indicated in red

### Management & Technical Team



Bill Boberg, CEO

Ur-Energy chief executive and president William (Bill) Boberg has more than twenty years experience in uranium mining in the continental United States with a particular emphasis on Wyoming. His past geological work, including management positions, includes Hecla Mining, Anaconda, Conoco Minerals, Wold Nuclear, Kennecott, Western Mining Corporation and Canyon Resources. He discovered the Moore Ranch uranium deposit and several

smaller deposits in the state of Wyoming. Over the past 35 years, Bill has explored for gold, silver, copper, diamonds, oil& gas and other mineral resources in western North America, Asia, Africa and South America. Bill is registered as a Professional Geologist in Wyoming, and is a Certified Professional Geologist through the American Institute of Professional Geologists.

In late February, the company announced the appointment of a vice president of mining, Wayne Heili, who will be responsible for the development of the company's flagship Lost Creek and Lost Soldier uranium deposits. A metallurgical engineer,

Heili was Cogema's operations manager for ISR projects between 1998 and 2004. He has spent 19 years providing engineering, construction, operations and technical support in the uranium mining industry.

Ur-Energy reports the company's uranium team has combined experience of more than 400 years.

### **Analyst Comments**

On February 13th, Raymond James uranium analyst Bart Jaworski moved Ur-Energy to Strong Buy with a six- to twelve-month price target of C\$4.80/share. He wrote, "We believe that URE boasts one of the best uranium exploration teams in the industry. The company is headed by a conservative, well-respected and highly experienced management team."

On February 14th, Sprott Securities Justin Reid initiated coverage on URE with a buy recommendation and a target price of C\$5.10/share. Many consider Mr. Reid to be Canada's premier uranium analyst. Mr. Reid believes there may be upside to his valuation as the company moves closer to production.

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## Mawson Resources (TSX: MAW)

### **Speculative**

(First Requires Lifting of Spain's State Reserves)

As	As of March 19, 2007	
	Share Price	C\$2.50
	High-Low (52 Week Range)	C\$0.81 – C\$3.44
	Three-Month Average Volume	275,000
	Market Capitalization	C\$89.6 Million
	Market Float	C\$79.7 Million
As	As of March 19, 2007	
	Shares Outstanding	35,870,180
	Shares Fully Diluted	44,091,997
	Management Ownership	6,650,000
	Warrants Outstanding	5,908,567 @ C\$0.50 – C\$2.70
	Warrant Exercise Raise:	C\$10,896,000
	<b>Director &amp; Advisor Stock Options</b>	1.58 Million
	Expiration Dates Range:	February 2009 – December 2009 Advisor Options @ C\$1.15 – Dec 2009
	Strike Price Range:	C\$0.40– C\$1.30
	Cash	C\$17 million
	Monthly Burn Rate:	C\$100,000
	Exploration Budget (2007)	C\$3 Million
	Development Budget (2007)	C\$2 Million (provisional on Spanish approval)
	Institutional Holdings – Percentage:	None
	Brokerage Firms Ratings:	RAB Capital Plc, Sprott Asset Management, Max Capi- tal Markets, Rand Merchant Bank, Pinetree Capital
	Employees/Consultants:	12 plus outside consultants

### **Company Introduction**

Mawson Resources Ltd was incorporated and commenced operations in March 2004, and began trading on the TSX Venture exchange in late October 2004. The company launched its operations on the basis of the Vargbäcken gold project in northern Sweden's historic Skellefte mining district.

By summer 2005, the company had begun acquiring a uranium projects - at Flistjärn and Duobblon in Sweden. National Instrument 43-101 technical documents filed in July 2006 confirmed historical uranium resource estimates on the Kläppibäcken project (two million pounds  $U_3O_8$  indicated resource) and the Duobblon project (11.6 million pounds  $U_3O_8$  inferred resource), both in Sweden. By early 2007, the company's uranium portfolio had grown to also include projects in Finland and Spain.

Mawson has joint-ventured out the company's nickel-cobalt-copper sulphide project to Australian nickel miner, Independence Group, which trades on the Australian Stock Exchange. Mawson has also joint-ventured out to TSXv-listed First Fortune Investments its regional gold interests in the Skellefte mining district. Third parties are spending approximately C\$1 million per year on in-ground expenditures to earn interests in Mawson's non-core, non-uranium exploration properties. Mawson is also in joint-venture with Lundin Mining on two gold properties in Northern Sweden and a copper-cobalt project in central Sweden.



The Duobblon uranium project in northern Sweden has been drill defined with an inferred resource of 11.56 million pounds  $U_3O_8$  Courtesy of Mawson Resources.

### **Property Descriptions**

When we last wrote about Mawson Resources in "*Investing in the Great Uranium Bull Market*," the company's emphasis was Sweden. Three exploration targets remain promising in that country: Tåsjö, Duobblon and Kläppibäcken. Two have demonstrated resources as per CIM guidelines with NI 43-101 technical filings. Both suggest the possibility of mining at a future date, but require additional exploration. One very large exploration target, Tåsjö remains a noteworthy project, and which could someday become a company maker, depending upon the success of the exploration activity and the price of uranium.



CIM Indicated Resource at Klappibacken is 2 million pounds  $U_3O_8$  Mawson Resources regards this as a minimum resource because uranium mineralization is open laterally and at depth. Courtesy of Mawson Resources.

However, in our view, Sweden takes a backseat to Spain. The Don Benito uranium project was acquired in 2006 by staking in one of Spain's two principal uranium regions. The advanced stage property was mined from the 1960s to 1990. All resource drilling was completed in the mid 1980s. Through 1975, 1.7 million pounds  $U_3O_8$  were extracted at a grade of 0.12 percent  $U_3O_8$  from two open pit mining operations: El Lobo and El Pedigral. Between 1980 and 1990, one million pounds at a grade of 0.13 percent  $U_3O_8$  were extracted from the El Pedigral-Intermedia-Maria Lozano open pits.

Previous exploration was conducted Junta Energia Nuclear (JEN) from the 1960s through 1980, followed by state-owned Empresa Nacional del Uranio, S.A. (ENU-SA), between 1980 and 1990. Previous mining in the area ended in March 1990 because of declining uranium prices and an increasing strip ratio. ENUSA currently imports 1600 tonnes of uranium from a minority ownership share in Niger (Africa). Uranium is enriched for Spain's eight reactors, which generate about 25 percent of the country's electricity, through ENUSA's minority share in Eurodif in Marcoule, France.

The global historical resources total 9.4 million pounds of  $U_{3}O_{8}$  (3616 tU). Historic drilling in the area was extensive. More than 1,000 holes were drilled over a four-kilometer strike extent from the 1960s through 1985. Cumulatively, more than 18 miles of drilling was completed. The La Haba project area, for which Mawson Resources has applied and presently has no entitlement, totals more than 17,800 hectares.

Along strike from the delineated mining area, for 35 kilometers, are a number of identified uranium prospects. According to a 1996 PhD thesis submitted by Javier Almarza Lopez of the University of Seville, significant uranium resources remain within the La Haba State Reserve, including: 6.0 million pounds at 0.06 percent  $U_3O_8$  at a 200ppm lower cut off; 3.0 million pounds at 0.1 percent  $U_3O_8$  at a 600ppm lower cut off.

A 300-meter wide black shale unit hosts mineralization at La Haba. Uranium mineralization is reportedly found at surface and extends to a depth of 130 meters.

### **Company's Plan of Action**

The company has budgeted C\$2.7 million for uranium exploration in Sweden and Finland. Another C\$2 million is budgeted on the Don Benito project in southwestern Spain, contingent on permitting, of which C\$300,000 is marked for 2007.

Once the State Mineral Reserve has been lifted on the Don Benito property in Spain, Dr. Arturo Gutierrez (PhD Mining Engineering) will commence environmental permitting on the project. Mawson Resources chief executive Michael Hudson informed us, "Assuming successful permitting by late 2007, and a pre-feasibility and feasibility process of five years, the aim is for production to commence during 2011-2012." He cautioned, "Definitive economic studies have not been completed to date, therefore this timeline is speculative at best."

The Don Benito project could have additional projects. "Of most significance will be how much ore can be delineated adjacent to the 5+ million pound historic resource," Hudson told us. More than 40 projects have been identified along a 35-kilometer trend via drilling and/or sampling, along strike from the resource area. These areas require intense exploration to increase the resource base." The rate of expenditure depends on successful permitting before the pre-feasibility can commence. "We will work towards making the resource NI 43-101 compliant after permitting," Hudson said.

The Don Benito project is blessed with some infrastructure remaining from previous mining in the area. A mill existed on site and was functional until 1990. Mine



Prospects and airborne radiometrics of Mawson Resources' Don Benito uranium project in southwestern Spain.

buildings and pads reportedly remain on site. But, the infrastructure will need a significant overhaul before milling can restart. Capital expenditures may be lower than average because uranium is found near surface or at shallow depth.

Application for two "Permisos de Investigación" have been submitted to the Badajoz Mining Authorities of Extremadura. The company expects permissions to be granted in 2007, for an initial period of three years. The applications cover three historic project areas: La Haba, Corredor de la Guarda and Las Cruces-Manantial.

The key to the Don Benito is in the hands of the Spanish legislature. As with the company's Swedish uranium properties, the risk is not geologic, but political. On the bright side, Michael Hudson's forecasting of unfolding political scenarios demonstrates a strong grasp of local politics. He correctly guided us into forecasting a change in the Swedish Riksdag during summer 2006. In September, a new coalition government formed. Recent press also suggests the Swedish parliament is reviewing uranium mining in a more favorable light.

Hudson appears confident Spain will proceed to restore uranium mining. In the past, Spain would retain key resources with State Reserves, but the country's current policy is to lift such reserves. Mawson has been in discussions with the relevant

authorities to have the reserves lifted. If the forecast is accurate, the development could place Mawson Resources squarely in the spotlight for reviving uranium mining in Spain.

Competitor Berkeley Resources (ASX: BKY) is also pursuing advanced uranium exploration projects in Spain, north of properties held by Mawson Resources. The company has signed agreements with Areva (France's state-owned uranium and nuclear company) to further explore and develop those properties. Because both Mawson and Berkeley are planning on developing uranium projects in Spain, the lifting of Spanish State Reserves could attract future interest from other uranium exploration firms.

### Management & Technical Team



Michael Hudson, CEO

Michael Robert Hudson B.Sc.(Hons) GDipAppFin MAusIMM MSEG MAIG is President, CEO and director of the Company and has 17 years of experience in mineral exploration in Australia, Asia, South America and Europe. He graduated from the University of Melbourne in 1990 with a First Class B.Sc. (Hons) in Geology. Previously, he developed exploration stage to pre-feasibility project management experience in Pakistan, Australia and Peru for Pasminco Ltd, and by heading a team, funded by BHP Billiton, searching for mineralization in the arctic areas of northern Sweden. For the past three years he has headed Mawson and the three years prior to that he developed projects for the junior resource sector in Australia, Argentina, Peru and Mexico. His discoveries include the Portia gold deposit in the Olary district of South Australia.

David Henstridge B.Sc.(Hons) FAusIMM, MAIG, MGSAust is a Professional Geologist and a director of the Company. He has over 34 years of experience in mineral exploration overseas. He graduated from the University of Adelaide in 1971 with a B.Sc. in Geology and was been a key member of the exploration team responsible for the discovery of uranium in the Ngalia basin in the Northern Territory of Australia. He has over 20 years' experience in managing publicly traded companies. Mark Saxon B.Sc.(Hons) GDipAppFin MAusIMM MAIG is Vice-President Exploration and director of the Company. Mr. Saxon has 16 years of experience in exploration and resource geology. He graduated from the University of Melbourne in 1991 with a Bachelor of Science in geology, and is a member of the Australasian Institute of Mining and Metallurgy.

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### Disclaimer

It is important investors realize the highly speculative nature of investing in any mining venture. Commodity prices can quickly reverse. There is no guarantee we will be accurate in our assessment of a bull market in uranium continuing into the future. We have interviewed numerous experts, the majority of which believe we are in a sustainable uranium bull market. Others believe uranium pricing may drop below \$30/pound. If this materializes and uranium pricing remains below \$30/pound, a number of uranium companies will not economically extract their mineral deposit. Under these circumstances, the deposit would cease to be classified as reserves.

We are not registered investment advisors. As such, we can not, and do not, recommend the purchase or sale of securities. One should seek the counsel and advice of a registered investment adviser regarding the suitability of uranium mining stocks in one's portfolio. Because these companies fall under the highly speculative category of risk when investing, one should approach any such investment opportunities with caution and constraint. It is highly recommended an investor begin a course of careful due diligence of these companies before reaching any investment decision. Such investigation should include contact with the company to obtain a basic information package, obtaining any and all regulatory filings about the company's financial position and updates on their property positions, a review of the company's news releases and corporate developments, and independent opinions about the prospects of these companies from an individual or organization legally qualified to render such opinions or analysis.

Information contained in the company profiles in this chapter was supplied by the company and was published under those circumstances. While we believe their information to be reliable, we did not independently audit their financial statements. We did not visit the company properties described in the accompanying profiles. Photographs and maps supplied by each company were again accepted as accurate and reliable, but could not be independently verified as accurately representing those locations, actions or properties.

Further, there is always the possibility of human or mechanical error in the inputting of the financial and other information about the company. There may be typographical errors, incorrectly entered numbers and other material mistakes, which could affect any or all of the companies profiled in Chapter 4.

We highly recommend you obtain the correct information directly from the appropriate company or a company representative. We have provided the correct contact information for each company featured in Chapter 4. We insist you directly contact each company for further information about their financial condition and geological prospects.

Should economic conditions change, should commodity investments fall into disfavor, should the proposed nuclear energy renaissance fail to materialize, and any number of unforeseen variables come about, then all of the risk safeguards will fall by the wayside.

Finally, many of the companies featured in this chapter are Canadian-listed companies. Some may not have filed for trading in your state. One should check with one's registered financial advisor whether or not you may pursue an investment in such companies. There may also be penny stock regulations deterring your investment in such securities for those companies falling into that category. Please obtain all the necessary risk factors and advices before proceeding with an investment decision.

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