



Uranium dreams

New investors are predicting rising demand and soaring prices ahead for uranium. Michael Forrest reports on an Alaskan project that hopes to be at the forefront of this trend.

Uranium exploration and mining is exciting the investor market resulting in new companies, projects and mines. The predictions of global warming coupled with the ability of nuclear power stations to generate large amounts of energy with zero carbon emissions are driving new opportunities. The uranium market, however, used to be characterised in the early 1970s, 80s and 90s by low prices and no or little expenditure on exploration – that generated negative sentiment from investors.

During those decades, the mines that were sufficiently profitable continued to run, but most new projects were abandoned and some companies left the uranium sector altogether. One man who did not and remained faithful to the vision of nuclear energy on the power-generating agenda, was Robert Dotson, a prospector who acquired the claims to Bokan Mountain on Prince of Wales Island, Alaska, USA. This property hosts a granitic rock that contains uranium, zirconium and rare earth elements.

Bokan Mountain was first discovered by two men who disagreed with the views of experts in the 1950s who stated that the coastal mountains of the west coast of the USA (including Alaska) and Canada would be unlikely to contain much uranium. At the time, the US Atomic Energy Commission (AEC) believed the southwest of the country contained valuable uranium and spent millions of dollars encouraging exploration there. This programme was designed to reduce the dependency on Africa and Canada, from which 90% of the uranium for the US nuclear power industry was imported.

Seek and ye shall find

Using an airborne radiometer prospector, experienced pilot Don Ross and Kelly Adams, a longtime prospector, flew over southern Prince of Wales Island and discovered a large radiometric anomaly. Samples collected on site revealed high levels of radioactivity and, in great secrecy, the pair pegged their claim in May 1956. However, rumours of a large uranium find soon circulated and many prospectors tried to peg around the find. In the following year, the Climax Molybdenum Company purchased an interest and mined 18,000t of ore grading one per cent U_3O_8 . Later, Bay West Inc leased the property, now known as the Ross-Adams mine, and removed a reported 7,000t of ore. In 1963, the Standard Metals Corp purchased

Main image: Harmen Keyser with Bokan Mountain in the background. Above: Deep water access on Kendrick Bay



Deposit report

Year	Operator	US tons mined	Grade% U3O8	lbs U3O8
1957	Climax Molybdenum	15,000	1.05	315,000
1959-64	Standard Metals	15,000	1.00	300,000
1971	Newmont Exploration	55,600	0.62	687,000
Totals		85,600		1,302,000

Source: Warner and Barker 1989 USBM Open File report 33-89

the Bay West lease and, with local prospector Dotson, discovered a 2.5km northwest trending uraniferous vein and shear zone to the shore of the west arm of Kendrick Bay. The company mined 11,000t of ore from an open pit.

Newmont Exploration Ltd acquired the leases in 1968 and produced 55,000t of ore from underground workings before ceasing operations in 1971. Exploration expanded the reserves, with new finds of vein and shear-host uranium adjacent to the Ross-Adams deposit, possibly a fault-displaced extension to the Dotson shear found earlier. Known as the I and L deposits, they contained economic grades of uranium but were never mined.

In the 1970s, the AEC, now with adequate reserves of uranium ore, stopped buying uranium. Private industry triggered a minor boom mid-decade, but the bankruptcy of the nuclear-based Washington Public Power System, the Three-Mile Island accident and foreign competition put an end to the US domestic industry.

Dotson, however, had other ideas. His discoveries at Bokan Mountain, the area's history of successful and profitable mining, and the extensive infrastructure put in place by Newmont, including roads, accommodation blocks, and underground workings, led him to believe that the project was too valuable to be abandoned. Furthermore, the extensive production and exploration records, representing millions of dollars of expenditure, would be lost unless someone kept them safe. So a one-man care and maintenance programme was launched.

Over the next 30 years, Dotson archived the exploration and geological surveys, and with the use of simple machinery, kept the mine in good condition. He even maintained the leases from the US Forest Service (Bokan is part of the Tongrass National Forest) for roads and other infrastructure. Throughout the 1980s and 90s, despite Chernobyl and low uranium prices, Dotson remained undeterred.

Eventually, geologist Harmen Keyser, President of Larimar Minerals in Vancouver, Canada, alongside Jim McKenzie, President and CEO of Ucore Uranium Inc of Nova Scotia, Canada, formed a joint venture to restart the mine and confirm and expand the uranium resources. After negotiations with the Dotson family, Ucore acquired the rights to the property in February 2007. McKenzie reports that 'working with the Dotson family was a rewarding

experience and a testament to the diligence with which Bob Dotson carried out his maintenance of the project. The next immediate task is to confirm by exploration and drilling the resources reported by the US Bureau of Mines.'

Reserves and geology

There has been considerable research and interest in Bokan Mountain since its discovery. It is a Jurassic-aged peralkaline ring-dyke granitic intrusive complex that hosts a number of incompatible (with rock-making silicates) elements including uranium, cerium, zirconium and niobium. Mineralisation occurs in five styles – plunging broadly cylindrical pipes that are highly fractured and altered, steeply-dipping albite-quartz dyke systems, pegmatite veins at the granite margins, veins in altered syenite that were intruded late in the sequence, and replacement mineralisation in altered sandstones that are adjacent to or overlie the intrusion.

In 1989, two geologists from the US Bureau of Mines (now part of the United States Geographical Survey) produced a report on the deposit. They calculated that over the period that the mine had been worked, some 1.3 million pounds (Mlbs) of U_3O_8 contained in the ore had been recovered, at an average grade of 0.76% or 7,600g/t. This compares with the grade at the Rossing Mine in Namibia of 320g/t and at the Olympic Dam, Australia, of 600g/t. In localised pods, uranium values exceed three per cent.

The report also gave an indicated resource at Bokan Mountain of 11.8Mlb of U_3O_8 , 96.2Mlbs of niobium, 627.5Mlbs of zirconium and significant other rare earth element concentrations. These values are based on past work and exploration, mainly on the core drilling work undertaken by Newmont Exploration.

The next move of Ucore is to bring these resources into reserve category as defined by the Canadian instrument 43-101. Keyser is convinced that the property, when subjected to modern exploration, will reveal even better results. 'Bokan Mountain has impressive potential, with historical mining statistics, a large exploration data base and considerable infrastructure including deep-water access. Our joint venture will no doubt improve and confirm the resources. A multidisciplinary programme is underway for 2007 including drilling to bring past results up to 43-101 standards'.

Of particular interest is the I and L zone located at the edge of the Ross Adams deposit. Newmont's 1970 results indicate examples of 25m at 0.67% and 18m at 0.65% U_3O_8 in drill holes. The mineralisation is hosted in aegirine granite and is structurally controlled. Even in the Ross-Adams mine, values of 0.5% U_3O_8 were discarded to waste, and mineralisation is known to extend in a

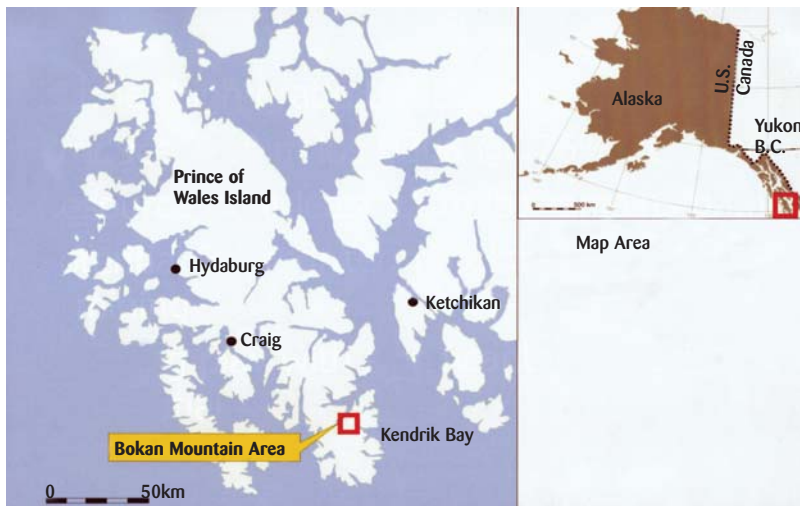
Bob Dotson



steeply dipping pipe beneath the old workings. Still subject to measurement, these relatively high-value waste dumps may prove a valuable resource.

Planned exploration includes a complete review of the data as well as radiometric and magnetic surveys over the entire property. Underground access, facilitated by mine workings carefully conserved by Dotson, also provides data on the mineralisation. Fracture pipes and vein/shear systems show wall rock alteration features consisting of pervasive albitisation, chloritisation, carbonate replacement of the mafic phases and both pervasive and local haematitisation. Much of the alteration is fracture-controlled, as are the mineralising pathways. Values of U_3O_8 greater than 0.5% are characterised by chlorite and those below 0.5%, haematite alteration.

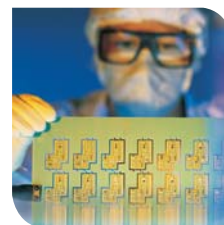
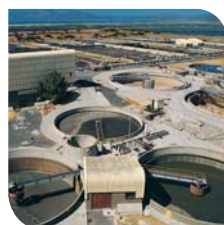
Both McKenzie and Keyser are clear about the uranium potential of the property and have an ambitious plan to bring it into production within three to five years. What has yet to be determined is the value of the other minerals associated with the deposits. The current uranium price of over US\$100/lb, or ten times the historical levels, is a high incentive for rapid production, but the mineral zircon is in great demand in ceramic manufacture as are the rare earths cerium and yttrium. The latter are important components in autocatalysts, permanent




magnets and in nickel metal hydride batteries. Bokan Mountain is the largest known rare earth deposit in North America – currently the USA import over 95% of its rare earth needs from China. ●

Further information

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