

## The successful application of modern exploration techniques to previously explored areas in the Athabasca Basin, Canada

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Several project areas within the Athabasca Basin of northern Saskatchewan, Canada, which were explored in the 1970s and 1980s have had recent discoveries due to the application of modern exploration techniques and the evolution in the understanding of unconformity uranium deposit models. The Otis, Barney and Opie showings of the Maurice Bay area and the Patterson Lake deposits on the west side of the basin, and the Roughrider, Midwest A and Phoenix deposits on the east side of the basin are all recent discoveries in areas that were explored in the past.

New showings in the Maurice Bay area on the northwest shore of Lake Athabasca were discovered mainly by the application of the Millennium basement-hosted unconformity model in conjunction with a refined ground gravity survey which easily delineated areas of less dense hydrothermal alteration within Proterozoic lithologies. Previous exploration methods relied heavily on surface prospecting of glaciated terrain and tracing uraniferous boulders back to their source, or EM surveys which delineated graphitic conductors.

The Patterson Lake South (PLS) deposits were found by a combination of the age-old technique of following a train of uraniferous boulders to its source along an EM conductor and by a refined radon sampling system which led to the quick discovery of a series of mineralized pods under Patterson Lake (the zone may be continuous but this has yet to be proven). The new radon surveys have a quick turnaround time (1 day), are easy to collect and are reproducible. This survey appears to work better in lakes when samples are collected from under the ice in winter. Previous exploration in this area was concentrated to the north within the Athabasca Basin.

The Midwest A deposit was found along the NNE extension of the Midwest trend within a grid of previous drill holes completed in the early 1980s. A mixture of lithogeochemistry and a ground resistivity survey provided the target for the drill program. This deposit was found at the intersection of the N030E Midwest structure and a cross-cutting N070E structure and is located at the unconformity.

The Roughrider deposit was also found along the NNE extension of the Midwest structure using lithogeochemistry from historic drill holes, and is also located at the intersection with a cross-cutting N070E structure. The illitic alteration halo in the overlying sandstone in the historic drill hole was similar to that found above the Millennium deposit.

The Phoenix deposit was discovered on the southeast side of the Athabasca Basin on a project previously worked since the 1970s. Several sub-economic zones were discovered on the project by previous explorers, but the use of a detailed resistivity survey along a prospective trend based on the McArthur River deposit model (footwall of a quartzite ridge) provided three well-defined drill targets that led to the discovery.

**Primary author:** Mr WHEATLEY, Kenneth (Forum Uranium Corp.)

**Presenter:** Mr WHEATLEY, Kenneth (Forum Uranium Corp.)

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