



Source: USGS Open-file Report 78-926.

E&M EXPLORATION ROUNDUP

PLACER AMEX FINDS URANIUM IN TERTIARY CALDERA

The allure of uranium is enticing explorationists to Humboldt County, Nev., previously better known for the mercury mined and milled at the largest producing plant in North America—the McDermitt operation of Placer Amex and Minerals Exploration Co. Now speculation is running high that the area straddling the Oregon-Nevada border, known as the McDermitt caldera complex, may host a uranium field containing low-grade, high-tonnage mineralization at shallow depths.

In the past year alone, 12 companies have acquired lands within the caldera, and an additional 15 to 20 companies and wildcaters are looking at other caldera complexes and geologically favorable sites. By the end of 1978, virtually the whole area had been staked, with the claims rush extending as far afield as Nevada, Utah, and California.

Placer Amex, US subsidiary of Canadian-based Placer Development Ltd., was the first to announce preliminary results of

drilling, on a site in Malheur County, Ore., 11 mi north of its mercury mine (E&MJ, January, p 31). Approximately 13 million tons of shallow mineralization has been delineated over a 1,200 x 300-m area on federal lands, with average grade estimated at 0.05-0.06% U_3O_8 . By December, Placer's exploration crew had completed 250 drill-holes, five diamond drillholes, and gamma-ray logging. According to a company spokesman, if further drilling confirms earlier findings, mining could possibly start early in 1981, with a processing plant at the site employing up to 100 workers.

The uranium potential of the area was brought to Placer Amex's attention by Locke Jacobs, whose company—Resource Associates of Alaska—has been involved with the oil fields on the North Slope. After contracting an aeroradiometric survey of the caldera a few years ago, Jacobs drilled on targeted anomalies, located promising mineralization, and engaged in a joint venture with Placer Amex, which now holds a 51% interest.

Meanwhile, much speculation surrounds the activity of Chevron Resources—the minerals arm of Standard Oil of California—which is drilling north of a uranium mine worked in the early 1950s at Moon-

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light, Nev. A Chevron spokesman, commenting on the reported 2-mi trend of intermittent mineralization on its properties, said: "We do not have a massive orebody, and it will be another year before economic feasibility of the trend is fully determined."

Chevron began exploring the southern portion of the caldera about three years ago, staking more than 1,000 claims, of which 20 to 30 are currently under evaluation. Two to four drilling rigs and 20 workers were reported on the job during the past three drilling seasons (April to November), and in March 1978 the company filed 109 mill site claims, some near the town of Orovada.

Although isolated, the hill-strewn, sagebrush country of the McDermitt basin has been covered by airborne surveys at least 20 times. The lack of water in the high-desert terrain may present a problem for exploration and mining.

GEOLOGY

Among the largest known caldera complexes in the world, the McDermitt caldera—spanning northern Humboldt County, Nev., and southern Malheur County, Ore.—measures 45 km in north-south diameter and 35 km east-west. The area contains five overlapping and nested calderas, or circular volcanic depressions, formed when the roof of a magma chamber collapsed after underlying magma was removed by large-scale pyroclastic eruptions. Subsequent resurgence of volcanic material in each caldera produced central domes of rhyolite, forming a doughnut-shaped structure.

According to a US Geological Survey report performed as part of the Mineral Resource Evaluation program, uranium mineralization at McDermitt occurs primarily within fracture zones in the rhyolitic ring domes and intrusions, which are of Tertiary age. The fracture zones along the western margin of the caldera contain the most economically significant uranium mineralization. A second type of uranium occurrence is associated with mercury deposits within tuffaceous sedimentary rock that forms the fill of the calderas. The USGS says anomalous uranium concentrations of up to several parts per million have been recorded from mercury deposits at Bretz, Opalite, and McDermitt.

Tuffaceous sediments in a caldera complex are an unusual setting for uranium occurrences. In fact, the only other known occurrence of this nature is in Russia, where low-grade uranium mineralization is present with molybdenum. (Rocks of the McDermitt caldera also contain large reserves of lithium in economic grades of 0.1-0.68%. However, lithium is not an immediate exploration target, since no metallurgical process is available to extract the element from its host clay mineral, hectorite. The US Bureau of Mines is currently working on the problem.)

DRILLING TARGETS VARY

The geological setting of Placer Amex's discovery, on the northwest part of the caldera complex, is described by the USGS as a lacustrine environment of water-laid tuffaceous sediments. On the other hand, Chevron, working north of the Moonlight mine on the western edge of the caldera, is drilling near-surface rhyolites. Chevron described the operation as "hard digging."

Other companies known to be drilling include Anaconda, which is working on near-surface rhyolites at the Moonlight mine, and Western Nuclear—a Phelps Dodge subsidiary—drilling on claims west of Placer's discovery.

Western Nuclear is active also near Lakeview, in Lake County, Ore.—site in the late 1950s of a 210-tpd solvent extraction mill producing 0.25% U₃O₈. The mill, operated by Lakeview Mining Co. under subsidy by the Atomic Energy Commission, was acquired by Kermac Nuclear Fuels Corp. in 1961. At that time, feed for the Lakeview mill came from the White King underground mine, 16 mi northwest of Lakeview, where secondary uranium mineralization in brecciated and altered tuffaceous beds was

mined from relatively shallow depths—70 ft, 160 ft, 250 ft, and 312 ft. The estimate of ore reserves at White King in 1957, when the AEC guaranteed a delivery price of \$8 per lb, was 500,000 tons. A similar tonnage was estimated for Lakeview Mining's other prospect—the Lucky Lass mine—which was unexplored at the time.

Among other companies that have staked claims in the Nevada-Oregon area are Exxon Minerals, St. Joe American, Conoco (near Placer's discovery), Energy Fuels Nuclear, and International Energy. The Cordex syndicate—a Canadian venture of McIntyre Mines, Rayrock Mines, Dome Exploration, and Lacana Mining—has reported low uranium values from rotary drilling on the Bretz property, immediately north of the state line.

By the end of 1978, virtually the whole area had been staked. In October, groupings of 717 claims went to Energy Reserves Group (now active in Colorado's Uravan belt) and 563 claims to Sierra del Rio Nuclear. Energy Reserves' claims are located midway between the King and Quinn rivers on the western side of the caldera, with Sierra del Rio nearby. ■

MORE DIAMONDS FOUND BY ASHTON

The Ashton joint venture has issued a fourth-quarter progress report on its diamond exploration program in the Kimberley district of Western Australia. In 1978, the venture spent A\$6.5 million on exploration and bulk sampling.

■ Two additional kimberlitic pipes have been confirmed in the southern part of the Kimberley region, bringing to 28 the total number identified by the venture. The pipes cover a total surface area of 610 hectares.

■ First-phase surface trenching has been completed on five pipes, and scout sampling was done on an additional 10 pipes. The report emphasizes that the results, taken from a limited number of surface samples, are not necessarily representative of the overall grade of the pipes.

■ Drilling to define the surface extent of the pipes, their structure, and the continuity of kimberlite with depth indicates that the pipes are shallow near the perimeter and

deeper toward the center. The deepest hole, drilled to more than 90 m, remained in kimberlitic material.

■ During the wet season, from mid-December to late March, bulk samples of 7,000 cu m from Pipe A and 6,000 cu m from Pipe B will be tested. ■

ONGOING PROJECTS

Canada: Westfield Minerals Ltd., investigating earlier discoveries of uranium-bearing sandstone fragments and boulders near the upper Humber River, 25 mi northeast of Deer Lake, Nfld., has located uranium mineralization in place in the underlying leached bedrock.

Initially, geochemical surveys located numerous radioactive boulders in the stream bed of Wigwam Creek, where the two best

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Sampling results of Ashton joint venture, August-December 1978

Pipe	Surface area (hectares)	No. of samples	Approx. volume treated (cu m)	Weight of industrial and gem diamonds recovered (carats)	No. of stones	Weight of largest stone >1 carat (carats)
A	46	27	2,730	197	966	4.9
B	84	39	4,170	237	2700	4.2
C	36	10	980	17	167	1.9
D	13	7	750	19	200	5.7
E	26	13	1,120	4	66	—
Scout x 10	290	35	3,210	3	108	—