

Element of Success: Company, remote town bank on little known metal

RENO GAZETTE-JOURNAL

3/30/2002 05:06 pm

McDERMITT — An obscure metal that melts in the hand and holds far-reaching economic promise awaits extraction from an abandoned mercury mine site near the Nevada-Oregon border.


The metal is gallium, an element used mainly in cell phone circuitry but whose value in high-tech and medical applications is still emerging.

While its name lacks the allure of gold, the main metal of Nevada mining, it conjures visions of bonanza for its pursuers, who are considering opening what would be the world's only gallium mine.

"It could put Nevada in the forefront of something other than just gold," said Robert Carrington, a Reno geologist.

Carrington also is chief executive officer of Gold Canyon Resources, a tiny exploration company that is studying rock samples taken at the site of the old Cordero mercury mine.



 Robert Carrington, right, of Gold Canyon Resources, holds a rock he says contains the element gallium at the site of a former mercury mine outside McDermitt. On the left is Sam Nunnemaker, a Carson City geologist. - Marilyn Newton/RGJ

"It's promising. It's one of those elements that has special properties not easily matched by other elements," said Nathan Tewalt, a Washington state geologist who took the first samples of the rust-colored rock.

Canada-based Gold Canyon, with a subsidiary incorporated in Nevada, has a lease agreement on the 1,800-acre property, and a Reno lab is doing metallurgy tests.

If all goes well, Gold Canyon could give the go-ahead for production by early 2003 with initial digging two to three years later, Carrington said.

"There are extremely high levels of gallium there," he said. "Once we figure out how much we can get out and at what cost, that will guide our future."

A town's hopes rise

The Nevada Division of Mines has confirmed that Gold Canyon has made initial inquiries into the permitting process.

Additionally, word has spread in nearby McDermitt, this tiny outpost on U.S. Highway 95 at the Oregon line where a gallium mine could employ up to 75 people and rejuvenate the local economy. The area lost dozens of jobs as well as mine-related tax revenues after the mercury mines shut down a decade ago.

“We know what it’s like with no mine around here,” said Todd Murrah, assistant general manager of the Say When Bar Café and Casino. “We have to watch for the cars going by.”

For four years, Humboldt County has watched its mining-dependent economy sag with the gold market.

Observers, citing the county’s net loss of 1,100 mining jobs, including nearly 200 when the Getchell gold mine closed two months ago, see a gallium mine as nothing but positive.

“Eighty percent of our mineral revenues are from gold,” said Russ Fields of the Nevada Mining Association. “Anything to diversify would be an important thing.”

The case for Nevada

The gallium mine would be Gold Canyon’s first revenue-generating venture, and with a green light from his board of directors, Carrington would begin raising capital to cover start-up costs.

He admits it’s a gamble. But he points out factors that could propel Gold Canyon onto Nevada’s — and the world’s — mining stage:

- o There is no U.S. production and no existing mine on Earth dedicated solely to gallium. It comes only as a byproduct of aluminum and zinc processing.
- o Gallium is widely found in trace amounts, up to 30 parts per million, but is rarer in higher concentrations, notably 400 parts per million, found at an elevation of 4,779 feet near McDermitt.
- o Most of the world’s gallium comes from Russia, Japan and Europe, according to the U.S. Geological Survey, although two U.S. companies refine gallium from scrap and other sources at plants in Utah and Oklahoma.
- o The needs for gallium are expanding. Besides its minute presence in cell phones, gallium compounds are being developed in the medical care, aerospace and energy-saving LED lighting industries.

Gallium arsenide solar cells make up new solar panels put on the Hubble telescope by space shuttle astronauts a month ago.

- o U.S. gallium imports rose to \$18.4 million in 2000, according to the geological survey, a 76 percent increase over the previous year.

The bottom line

Carrington’s biggest gamble comes in price. There is no commodities market for gallium, classified as an exotic metal, as there is for precious metals like gold and silver.

“So what’s the price of gallium?” Carrington said. “Whatever you can get for it. Every sale is negotiated. It’s nearly impossible to figure out what the going rate is. It’s a very fluid number.”

To that end, the price in the past year has been as high as \$70 per ounce, but with the tech industry collapse it has fallen to \$32 for an ounce of 99.99 percent pure gallium, according to industry sources. The price reportedly can double for chip-grade gallium, rated at 99.9999 percent or higher.

That easily tops silver’s rate of about \$4.60 an ounce but is far short of gold’s \$300 range.

Still, Carrington, whose company would pay royalties on mine proceeds to Tewalt and other property owners, is cautiously confident.

“We have found extremely high levels of gallium,” he said. “We’re still a ways away from a production decision. But this would be the only gallium mine in the world, and by 2008, the world demand will be triple the 120 metric tons of last year.”

He envisions a 15- to 20-year life for the mine. Production costs per ounce will be paramount when Gold Canyon considers what it would take to extract the gallium, process it and send it off for further refining, as is typically done with gold mined in Nevada.

Skepticism abounds

Carrington said the company is considering two extraction methods similar to gold mining techniques: heap leaching and, more likely, milling.

At least one mine, in Utah, tried gallium mining in the 1980s but failed, said Debbie Kramer of the U.S. Geological Survey in Washington, D.C.

“The problem is, you have to devise a whole new processing scheme,” she said. “No one in recent years has gotten a process to work commercially. It will be a challenge. That’s not to say they can’t do it.”

There’s deeper skepticism at Recapture Metals Inc., a privately owned gallium recycling facility in Blanding, Utah, near the Colorado border.

“We’ve read about Gold Canyon,” said Duane Lyman, general manager. “Our impression is they don’t know what they’re doing.

“A number of years ago, a company went to Australia to make a killing with an extraction process designed for 40 to 50 tons a year. The entire world consumption was 35 tons. They had to shut down.

“There’s not the demand yet. Yeah, you might be in a position five years from now,” Lyman said. “But how do you get by in the meantime?”

A ‘cool’ metal

In pure form, gallium, first discovered in France in 1875, has a silvery, aluminum-like appearance.

“It’s cool, a very pretty metal,” Lyman said.

Hold solid gallium in your hand and the skin temperature melts it into a mercury-like consistency. But unlike mercury, experts say, gallium is not toxic and won’t absorb into the body.

“It certainly is a different kind of metal,” Kramer said.

Once a laboratory curiosity, gallium melts at about 86 degrees Fahrenheit and boils at 4,357 degrees Fahrenheit, the broadest range of any known metal, according to Carrington.

For years, it has been held up as a potentially mammoth market yet to prove itself, Kramer said.

“Gallium is a metal of the future and always will be,” she said. “They’re always promising huge growth

rates for gallium, but it's always competing with something else, especially in high tech."

To wit: She said the gallium market spiked in early 2001 when tech markets and other industries worried there was not enough supply.

"I was having people call me, big consumers, asking if I knew where they could get some," Kramer said.

Then came last year's economic collapse, and the price fell back with reduced demand.

"It got insane, but now it's dropped," Lyman said. "No one's out there buying a lot of it yet."

So far, so good

That hasn't stopped Carrington from pursuing tests on samples from the Cordero site.

Early results are positive, said Dan Kappes, president of Kappes, Cassidy & Associates in Reno, where lab studies began this month.

"It's promising, but it's early," Kappes said of the metallurgical analyses that will take six months to complete.

Carrington estimates that gallium demand will grow 20 percent to 50 percent in the next five to seven years. That will be driven, he said, by the growing field of light-emitting diodes — or LEDs, which use less than one-quarter the energy of an incandescent bulb — and studies into medical care applications, including the treatment of neurological disorders and detection of certain cancers.

The road ahead

Kramer said U.S. gallium imports are mostly in the form of gallium arsenide wafers for high-tech use.

"We wouldn't have wireless today without gallium," Carrington said.

The first round of metallurgical tests is costing Gold Canyon Resources about \$50,000, Carrington said. He estimates it will take about \$95 million for construction, vehicles, water and other necessities to get production up and running.

Carrington said the heavily regulated mining industry typically requires up to 200 permits for such issues as air quality, pollution control and land reclamation.

"I'm quite confident, with the studies we're doing, we'll show we can extract gallium on an economic basis," he said. "We just don't have the scientific documentation yet that proves we can."

"You limp along, looking for big projects. This is a very small company that's got a hold of a very big project."