



# Haoma Mining NL

A.B.N 12 008 676 177

**Registered Office & Head Office:**

Tonic House, 386 Flinders Lane, Melbourne, Vic., 3000, GPO Box 2282U, Melbourne, Vic., 3001.

Telephone (03) 9629 6888, Facsimile (03) 9629 1250

Email: [haoma@roymorgan.com](mailto:haoma@roymorgan.com) Website: [www.haoma.com.au](http://www.haoma.com.au)

May 22, 2019

## **Haoma Shareholder Recent Activities Update:**

### **Haoma measured 244.8g/t gold in Bamboo Creek Tailings**

Haoma's Directors are pleased to advise shareholders that an improved **Elazac Gravimetric Assay Process** has been developed.

The **Elazac Gravimetric Assay Process** was used to assay samples of Bamboo Creek Tailings and measured **244.8 g/t gold based on physical recovered gold from a sample of Bamboo Creek Tailings**. (Previous gold grade from physical gold recovered: 161.01g/t – [See Haoma Shareholder Report May 8, 2019](#)).

(<https://arc-haoma.s3.amazonaws.com/uploads/2019/05/Haoma-Mining-NL-Activities-Update-May-8-2019.pdf>)

Haoma has about a 1 million tonnes of Bamboo Creek Tailings plus additional tonnes of underground ore in dumps near the Bamboo Creek Plant which can be readily processed.

The Elazac Gravimetric Assay Process will now be used to measure the gold grades in Haoma's many other Pilbara tenements.

### **Production at Bamboo Creek**

On May 8, 2019 Haoma's advised shareholders that recommissioning of the Bamboo Creek Plant had been completed and a total of 225 dry tonnes of Nuggety Gully Scree had been processed (at 30-40 t/hr) recovering 0.52 g/t gold.

The initial run showed some commissioning issues and highlighted the need for minor Plant modifications. Over the last 4 days 509.2 tonnes of Nuggety Gully Scree were processed through the Bamboo Creek Plant at 25 dry tonnes per hour.

With further Plant modifications the expected Plant production rate will be 30-40 dry tonnes per hour and operate on 2 shifts per day.

### **Rare Earths (See description in attached Appendix A)**

Test-work is continuing at The University of Melbourne School of Engineering on extracting Rare Earths from Haoma's Bamboo Creek Tailings.

### **Exercise of Haoma Mining NL share options issued to Aldinga Way Pty Ltd**

Shareholders were advised on May 8, 2019 that Haoma had received notification from Aldinga Way Pty Ltd that it wished to immediately exercise the conversion of 2,367,000 share options to Haoma Mining shares. The exercise of the options and issue of shares has now been completed.

Following the completion of the share issue, Aldinga Way Pty Ltd holds a 5.91% shareholding in Haoma Mining NL which constitutes a substantial holding.

Yours sincerely,

**Gary C Morgan, Chairman**

## **Appendix A: Rare Earths**

Rare Earths are a series of chemical elements found in the Earth's crust that are vital to many modern technologies.

There are 17 elements that are considered to be Rare Earth elements: 15 elements in the lanthanide series and two additional elements that share similar chemical properties. They are listed below in order of atomic number:

### **Scandium or Sc (21)**

Scandium, a silvery-white metal, is a non-lanthanide rare earth. It is used in many popular consumer products, such as televisions and fluorescent or energy-saving lamps. In industry, the primary use of scandium is to strengthen metal compounds. The only concentrated sources of scandium currently known are in rare minerals such as thortveitite, euxenite, and gadolinite from Scandinavia and Madagascar.

### **Yttrium or Y (39)**

Yttrium is a non-lanthanide rare earth element used in many vital applications, such as superconductors, powerful pulsed lasers, cancer treatment drugs, rheumatoid arthritis medicines, and surgical supplies. A silvery metal, it is also used in many popular consumer products, such as color televisions and camera lenses.

### **Lanthanum or La (57)**

This silver-white metal is one of the most reactive rare earth elements. It is used to make special optical glasses, including infrared absorbing glass, camera and telescope lenses, and can also be used to make steel more malleable. Other applications for lanthanum include wastewater treatment and petroleum refining.

### **Cerium or Ce (58)**

Named for the Roman goddess of agriculture, Ceres, cerium is a silvery-white metal that easily oxidizes in the air. It is the most abundant of the rare earth elements and has many uses. For instance, cerium oxide is used as a catalyst in catalytic converters in automotive exhaust systems to reduce emissions, and is highly desirable for precision glass polishing. Cerium can also be used in iron, magnesium and aluminum alloys, magnets, certain types of electrodes, and carbon-arc lighting.

### **Praseodymium or Pr (59)**

This soft, silvery metal was first used to create a yellow-orange stain for ceramics. Although still used to color certain types of glasses and gemstones, praseodymium is primarily used in rare earth magnets. It can also be found in applications as diverse as creating high-strength metals found in aircraft engines and in flint for starting fires.

### **Neodymium or Nd (60)**

Another soft, silvery metal, neodymium is used with praseodymium to create some of the strongest permanent magnets available. Such magnets are found in most modern vehicles and aircraft, as well as popular consumer electronics such as headphones, microphones and computer discs. Neodymium is also used to make high-powered, infrared lasers for industrial and defense applications.

### **Promethium or Pm (61)**

Although the search for the element with atomic number 61 began in 1902, it was not until 1947 that scientists conclusively produced and characterized promethium, which is named for a character in Greek mythology. It is the only naturally radioactive rare earth element, and virtually all promethium in the earth's crust has long ago decayed into other elements. Today, it is largely artificially created, and used in watches, pacemakers, and in scientific research.

### **Samarium or Sm (62)**

This silvery metal can be used in several vital ways. First, it is part of very powerful magnets used in many transportation, defense, and commercial technologies. Second, in conjunction with other compounds for intravenous radiation treatment it can kill cancer cells and is used to treat lung, prostate, breast and some forms of bone cancer. Because it is a stable neutron absorber, samarium is used to control rods of nuclear reactors, contributing to their safe use.

### **Europium or Eu (63)**

Named for the continent of Europe, europium is a hard metal used to create visible light in compact fluorescent bulbs and in color displays. Europium phosphors help bring bright red to color displays and helped to drive the popularity of early generations of color television sets. Fittingly, it is used to make the special phosphors marks on Euro notes that prevent counterfeiting.

### **Gadolinium or Gd (64)**

Gadolinium has particular properties that make it especially suited for important functions, such as shielding in nuclear reactors and neutron radiography. It can target tumors in neuron therapy and can enhance magnetic resonance imaging (MRI), assisting in both the treatment and diagnosis of cancer. X-rays and bone density tests can also use gadolinium, making this rare earth element a major contributor to modern health care solutions.

### **Terbium or Tb (65)**

This silvery rare earth metal is so soft it can be cut with a knife. Terbium is often used in compact fluorescent lighting, color displays, and as an additive to permanent rare earth magnets to allow them to function better under higher temperatures. It can be found in fuel cells designed to operate at elevated temperatures, in some electronic devices and in naval sonar systems. Discovered in 1843, terbium in its alloy form has the highest magnetostriction of any such substance, meaning it changes its shape due to magnetization more than any other alloy. This property makes terbium a vital component of Terfenol-D, which has many important uses in defense and commercial technologies.

### **Dysprosium or Dy (66)**

Another soft, silver metal, dysprosium has one of the highest magnetic strengths of the elements, matched only by holmium. Dysprosium is often added to permanent rare earth magnets to help them operate more efficiently at higher temperatures. Lasers and commercial lighting can use dysprosium, which may also be used to create hard computer disks and other electronics that require certain magnetic properties. Dysprosium may also be used in nuclear reactors and modern, energy-efficient vehicles.

### **Holmium or Ho (67)**

Holmium was discovered in 1878 and named for the city of Stockholm. Along with dysprosium, holmium has incredible magnetic properties. In fact, some of the strongest artificially created magnetic fields are the result of magnetic flux concentrators made with holmium alloys. In addition to providing coloring to cubic zirconia and glass, holmium can be used in nuclear control rods and microwave equipment.

### **Erbium or Er (68)**

Another rare earth with nuclear applications, erbium can be found in neutron-absorbing control rods. It is a key component of high-performance fiber optic communications systems, and can also be used to give glass and other materials a pink color, which has both aesthetic and industrial purposes. Erbium can also help create lasers, including some used for medical purposes.

**Thulium or Tm (69)**

A silvery-gray metal, thulium is one of the least abundant rare earths. Its isotopes are widely used as the radiation device in portable X-rays, making thulium a highly useful material. Thulium is also a component of highly efficient lasers with various uses in defense, medicine and meteorology.

**Ytterbium or Yb (70)**

This element, named for a village in Sweden associated with its discovery, has several important uses in health care, including in certain cancer treatments. Ytterbium can also enhance stainless steel and be used to monitor the effects of earthquakes and explosions on the ground.

**Lutetium or Lu (71)**

The last of the rare earth elements (in order of their atomic number) has several interesting uses. For instance, lutetium isotopes can help reveal the age of ancient items, like meteorites. It also has applications related to petroleum refining and positron emission tomography. Experimentally, lutetium isotopes have been used to target certain types of tumors.