ZEOLITE A MULTI-PURPOSE MINERAL

By Ellsworth Dickson

The area near Princeton, southwest British Columbia, Canada is well known for its deposits of copper, gold, coal – even platinum. However, it is the industrial mineral zeolite that has caught the attention of **Zeo-Tech Enviro Corp.** [ZEO-TSXV] and 50/50 joint venture partner **C_2C Zeolite Corporation** [CZC-TSXV]. The partners have formed an operating company, **United Zeolite Products Ltd.**, to construct and operate a specialty elite processing plant.

What is zeolite? Zeolite is a generic term for a group of hydrous aluminosilicates minerals – in this case, clinoptilolite, heulandite and stilbite. These minerals were derived from lakebed sediments deposited during intense volcanic activity that took place millions of years ago. Hot water rising from subsurface thermal activity and extreme pressures transformed the volcanic ash materials into a rock with a honeycomb-like structure containing thousands of tiny chambers. Due to the regular structure, or lattice, of pores and chambers, this group of minerals has some unique characteristics that make them useful in a number of applications, including an ability to absorb liquids and odours on a molecular level.

Under an agreement with Halliburton Energy Services Inc., zeolite is currently shipped by truck to Lethbridge, Alberta for processing before delivery to Halliburton's distribution facility in Red Deer where a specialty zeolite cementing system is formulated. This specialty zeolite cementing system combines light-weight and strength to provide enhanced cementing performance.

At the Princeton mine site, blasting is used to extract the high-grade zeolite ore. It is then crushed to a coarse 3/8-inch material before being trucked to the Alberta plant. Once at the Alberta plant, the material goes through crushers, is rotary kiln dried, micronized and shipped in bulk trucks. It took 2 1/2 years of research working with Halliburton to bring this product to market.

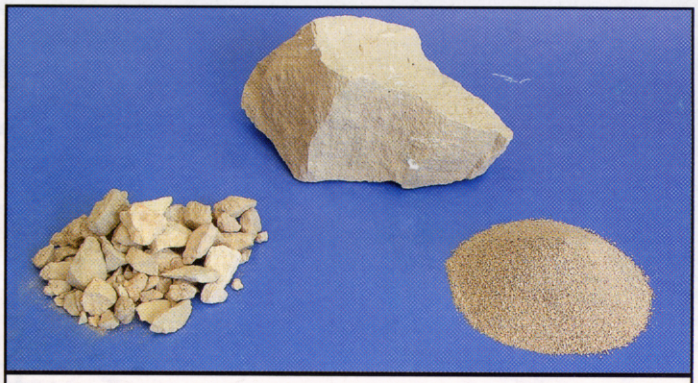
Drilling holes in the zeolite deposit in preparation for blasting to obtain a bulk sample. *Photo courtesy Zeo-Tech Enviro Corp.*

Ray Paquette, president of Zeo-Tech, says the trucking operation is temporary until United Zeolite completes construction of its own processing plant near Princeton. Capital costs for the plant are estimated to be $1.2 to $1.5 million. The plant site selection and engineering design are now being finalized. When completed, the final value-added zeolite products will result in increased revenues and less trucking costs.

Another potentially important source of sales will be selling crushed zeolite from the mine to vineyard operators in the Okanagan wine region of south-central British Columbia. The region has a dry, desert-like climate with sandy soil. While this is great for growing grapes, water used for irrigation tends to seep away rather quickly. This is where the zeolite comes in. Trenches are dug where the grape vines are to be planted. A nine-inch layer of crushed zeolite is then spread along the bottom of the trenches followed by the soil and the grape vines. During irrigation, the zeolite absorbs the water enabling the plants to have a source of water as the zeolite gradually releases its stored moisture into the roots of the vines. This particular use of zeolite is being developed with Agriculture Canada Summerland at Okanagan vineyards.

As zeolites are non-toxic minerals that absorb odours, another potential market is in farming where the mineral can be used to absorb ammonia and other gases that can cause respiratory problems in penned animals. There are several other industries that use zeolite including:

- Industrial absorbent and adsorbent applications
- Silica fume alternative in construction materials
- Toxic waste encapsulation
- Removal of heavy metals from soils
- Treatment of Radioactive waste
- Anti-caking agent for animal feed
- Animal husbandry (odour/moisture)



A typical sample of zeolite from the Princeton deposit of United Zeolite Products. At left is zeolite crushed to 3/8-inch that will be tested with Agriculture Canada at Okanagan vineyards. The finely ground (-40 +80) micronized zeolite at right is a product used as an industrial absorbent. *Photo by Ellsworth Dickson*

- Effluent treatment (biomass waste sludge)
- Water and air filtration
- Composting and potting soil amendment

Other products targeted for future sales will include supplying zeolite for use in Shot Crete, a specialty concrete used for rock support in underground mines.

Under its 30-year mining lease from the provincial government, United Zeolite can mine 25,000 tonnes per year that can be increased to 250,000 tonnes per year. In an assessment report by John Jenks, P.Geo., the zeolite resource has been calculated as follows. Utilizing a combination of polygonal and sectional calculations, the total resource stands at 564,528 tonnes made up of 350,218 tonnes in the measured/drill-indicated category and 214,310 tonnes in the indicated category. An additional 297,000 tonnes of inferred resource extends along the mineral trend to the south. Since the zeolite deposit is roughly coincidental with the slope of the local topography, an open pit mining operation is fairly straightforward with a low stripping ratio.

In 1998 C_2C Zeolite built the first zeolite plant near Ashcroft, BC that packaged various zeolite products for the industrial, horticultural and commercial markets. The current zeolite project near Princeton was developed by $1.25 million spent on research in conjunction with the Institute of Research in Construction, an arm of the National Research Council of Canada. The work was designed to develop new cementaceous products. These objectives were accomplished and the zeolite technologies were subsequently patented that represent the core technology.

This work was followed by two years of work at the University of British Columbia supported by the BC Science Council preparing various zeolite products for commercial production.

Luverne Hogg, president of C_2C Zeolite Corporation says United Zeolite will create a distribution channel and large commercial user base in the specialty building materials market. He adds that the company's objective is to expand the processing capabilities and seek new international markets to grow the sales and revenue side of the business. He says that pending approval from the City of Princeton, construction of the modular processing plant should start around the end of June with operations expected to be underway by September of this year.