# Spanish River Carbonatite Complex

# Biotite-Calcite Bulk Sample

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### Spanish River Carbonatite Complex - Claim S359400 Bulk Sample

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#### SUMMARY

To date all material distributed from the Burn's quarry has been soft weathered sovite. Seismic surveys conducted by International Minerals and Chemical Corp. in 1975 suggested this layer was approximately 15 metres before hitting bedrock. Though extraction of residuum remains the primary focus the development of a rock face for the purpose of mineralogical, geochemistry, metallurgical and agronomical testing is necessary for future market development.

Individual rock specimens have been used to describe the mineralogy of the deposit to prospective agricultural clients. Unlike residuum where hematite staining is prevalent and much of the biotite has been converted to vermiculite the rock specimens are very visual, snow white calcite intermixed with black biotite flakes. All rock specimens for display purposes have been hand selected and this desired sovite-biotite has never been found in sufficient quantity to supply a potential horticultural market. The 2005 bulk sample represents the first time that an area has been exposed that may have sufficient volume and consistency to commence a test market. The marketing study would require enough material to supply small lots to selected retail outlets and run long term test trials both on turf, vegetable and omamental gardens. AMP believed that a 200 tonne bulk sample was sufficient to achieve these goals.

The bulk sample area was stripped and approximately 80 tonnes was drilled and blasted. Material stockpiled was predominantly disseminated black biotite in a white sugary calcite matrix. This initial stockpile meets color and spreading consistency required for the home market. Whole rock analysis results are better in respect to nutrient content then residuum shipped to date.

To determine effectiveness of this material a number of test plots have been established with crushed material being delivered later this fall for application. Fall test plots will be on turf and home gardens Baseline studies of each plot will evaluate soil genesis, soil type, organic matter and nutrient content. The test plots will be conducted on a variety of soils ranging from acidic sand to base saturated clay. Spanish River Carbonatite rock will be applied at 250, 500 and 1000 kg/hectare rates. Ongoing tissue analysis of plant growth will be collected to evaluate test plots against control plots. Currently, Laurentian University and the Guelph Soccer club have been selected as turf test plot candidates.

Laurentian representing an acid soil systems and Guelph calcareous, base saturated soils. Horticultural and vegetable garden plots will be established at AMP's research farm. The baseline studies have been conducted at all locations.

Ongoing research in the fields of biogeochemistry, geomicrobiology and organic farming are demonstrating the agronomical benefits and uses of biotite mica (potassium), calcite and apatite over water soluble fertilizers.

The desired situation was to locate larger homogenous deposits of calcite, biotite and apatite. This situation would be ideal for extracting sought after minerals in situ, requiring no further secondary concentration. The 2005 bulk sample located concentrations of calcite and biotite but heterogeneity of mineralization would not allow separation during the quarrying process. At this time there is no evidence of residual apatite on the contrary phosphorous content in weathered sovite has decreased. Preliminary bulk samples of calcite rich mineralization and historical exploration has located areas where extraction of homogenous calcite and biotite maybe possible. Further exploration and definition of these potential zones is recommended.

The 2005 bulk sample was successful in locating typical sovite mineralization that constitutes the parent material of our current quarried product. Color and mineral consistency makes this an ideal face to extract material for retail market tests. Field trials and test marketing will be undertaken this fall to evaluate agronomical effectiveness and consumer appeal. Continued petrography analysis should be done to evaluate all mineral facies encountered. Whole rock, geochemistry samples should be taken per 20 tonne lots to ensure an overall grade of test product. Biotite concentration of quarried material utilizing Magnetic separation should be conducted immediately. Potassium grade of biotite coupled with apatite inclusions represent a very important agromineral product. Currently, AMP through soil geological audits, farm trials and individual farming practices has determined that there are two main bulk markets. Farms that require calcium, potassium, magnesium and phosphorous (tomatoes, potatoes) and livestock operation where calcium, magnesium, phosphorous is required absent of potassium. This is because livestock operations create excess amounts of potassium. The natural division between biotite rich sovite and sovite would ensure that the two concentrates would have available markets.

#### INTRODUCTION

Agricultural Mineral Prospectors Inc. ("AMP") is a private company of mineral industry professionals that explores for, tests, develops and produces organic approved agromineral fertilizer and soil amendment products. After farming and gardening organically for many years the AMP founders began in 1990 prospecting for the minerals approved for organic use by the various North American and European certifying agencies. These essential minerals approved and required by organic farmers are high calcium limestone, hard or soft rock phosphate (apatite), various potassium rich minerals (langbeinite, glauconite, orthoclase feldspar or biotite) and an ever-increasing number of trace elements.

We were aware of the inevitability of ever more stringent control of the toxic metals and pathogens contained in fertilizers and soil amendment products. Many of the available rock phosphate and compost products wouldn't pass waste management guidelines employed in other industries. Radioactive minerals and cadmium content alone may exceed current standards. Such stringent agricultural environmental legislation is already in force in various jurisdictions and will certainly be

the future requirement for Ontario agriculture. Anticipating the demand for extremely clean and safe products we incorporated these standards into our exploration search parameters.

Further to our exploration search parameters we targeted the most reactive minerals as superior for organic operations. The more reactive a mineral is the quicker it will break down, weather or decompose giving up its nutrients to the soil system and thus making them plant available. We were aware that minerals with identical chemical composition could vary widely in their reactivity as well as other characteristics. In particular limestone and dolomite, the universally recommended agricultural liming materials can have wide variations in reactivity. Agronomists focus on fine grind and potential neutralizing capacity and pay no attention to the inherent reactivity properties of each mineral deposit. Dolomites can vary from being slightly reactive to almost totally inert. They are recommended because they contain both magnesium and calcium, but often provide neither when required. All Ontario liming materials are sourced from sedimentary or metamorphic limestone. High calcium limestone can be quite reactive, however, more than 70% of aglime is dolomite and substantially less reactive. On many impacted soils, with depleted calcium carbonate levels neither high calcium limestone nor dolomite is sufficiently reactive to buffer acid generating fertilizer, heavy acid rainfall and preventing metal toxicity.

It was in this context that AMP commenced an evaluation of unique reactive mineral deposits called Carbonatite Complexes. Carbonatite is generally accepted to be intrusive and extrusive carbonate rocks associated with alkaline igneous activity. Author E. Wm. Heinrich in <u>"Geology of Carbonatites"</u> for descriptive purposes defines carbonatite "as a carbonate-rich rock of apparent magmatic derivation or descent." Carbonatites are rare, only representing .03% of all igneous rocks. No other igneous rocks have provoked such fascination. It is the incredible variation they exhibit in mineralogy, texture and grain size, disproportionate concentration of hydrolysable bases (Ca, Na, Mg, K, etc.), volatiles (CO2, H2O, etc.) and lithophile elements, (lithophile elements are those with a strong affinity for oxygen, having a greater free energy of oxidation) which characterizes this rock type. Carbonatite rocks, following a systems approach, are of significant interest because of their high reactivity, positive benefits to soil formation and direct benefit to the biosphere. Mineral constituents of alkalic rocks are not usually found in developed soils, they are the first primary minerals to be transformed into key secondary clay minerals giving up essential minerals in the process.

The calcium carbonate found in Cabonatite Complexes, we believed, was more reactive than virtually all sedimentary and metamorphic limestone deposits. Fortuitously they also may contain sufficient reactive primary biotite and apatite for potassium and phosphorous requirements. We researched Canadian Carbonatite deposits and in 1993 acquired the Spanish River Carbonatite Complex deposit.

#### **PROPERTY DESCRIPTION AND HISTORY**

#### PREVIOUS WORK

In 1955 Johns-Mansville Company performed a ground magnetometer survey over what is now referred to as the Spanish River Carbonatite Complex. The purpose for this survey was to find vermiculite. The Ontario Department of Mines in 1962 reinterpreted this data, which outlined an oval shaped magnetic high, which they believed to be a carbonatite.

In 1968 Union Carbide Exploration made a rough surface geological map and drilled a 1746-foot drill hole in search of niobium, copper and rare earths. Outcrop of the Carbonatite is scarce and the main oval shape and size of the deposit was primarily the result of magnetometer work and the one drill hole.

Jenmac Company Ltd. in 1960 completed a trenching program. This work was the basis of the 1962 ODM work and geological mapping by Union Carbide. It was also the point of reference for the Junior Mine Services Ltd. (JMS) 1996 trenching program ultimately leading to the Burns Mine.

In 1975 International Minerals and Chemical Corp. completed a seismic survey over the complex in an effort to determine overburden thicknesses. This was followed up with four reverse-circulation drill holes in an attempt to locate residual apatite. This work has been reinterpreted and included in JMS's 1996 trenching and stripping work. Of particular significance is the depth of what is referred to in the seismic data as the dense layer. Trenching has revealed that this dense layer represents a residuum capping the bedrock. This work has been used to establish ore reserves for the residuum covering the 1962 bulldozer trenches and 1996 follow-up trenching program. At the present time the residuum, whether carbonatite or biotite-pyroxenite represents the mined product.

Ron Sage from Ministry of Northern Mines and Development completed a geological report on the complex in 1987. Dr Sage has subsequently visited the site on several occasions to review work conducted by AMP.

From 1955 through to 1975 no niobium, uranium and residual apatite mineralization was located. Ironically, this feature of the Spanish River Carbonatite coupled with unusually high sovite content makes it ideal for organic agricultural use.

The original Spanish River property consisted of six mining leases and 5 unpatented claims in Venturi and Tofflemire Townships. All claims originally were 100% owned by Junior Mine Services Ltd. ("JMS"). In 1999 Agricultural Mineral Prospectors Inc. (AMP) was incorporated and optioned the property from JMS. The new company was formed to run all activities associated with the Spanish River Property and is controlled and run by the principles of JMS. Chris Caron and John M. Slack hold the unpatented claims in trust. Subsequent staking has added an additional 6 claims, which are held by either John M. Slack or Chris Caron in trust on behalf of AMP. The list of leases and mining claims that comprise the Spanish River Property are listed in table: 1.

The property was optioned because of the likelihood of locating sufficient reserves of the minerals calcite, apatite, biotite and vermiculite for the purpose of selling to organic farmers, market and backyard gardeners. From 1994 through to 1996, JMS conducted several site visits collecting samples, preliminary geological mapping and assaying. The purpose of the sampling was to determine consistency of material and potential toxic elements. This was critical to ensure Spanish River Carbonatite would be approved under the organic guidelines. The samples collected were crushed, screened and used in garden test plots and fed as mineral supplement to small flocks of layer hens. Coinciding with these activities JMS began extensive market studies and research into organic agricultural practices and accepted soil mineral amendments.

In 1996 JMS conducted a trenching and bulk sample program to delineate potential zones of afore mentioned minerals, either alone our combined. The program was successful in locating three areas that could be used as a source of nutrients and soil amendments for organic agriculture. As a result a 100 tonne bulk sample was taken and shipped to our farms in Southern Ontario. This material was used in test gardens on the farm, turf applications, layer hen mineral supplement and finally field trials in the Chatham-Kent area.

Following these initial trials we began a comprehensive research and investigation of soil mineral deficiencies, organic and conventional farming practices, weathering characteristics of Spanish River Carbonatite including soil geochemistry and biogeochemistry. From January 1998 until to May 2000 this was the total focus and only business activity carried out by AMP, employing three people full time. In the spring of 2000 AMP commenced an advanced exploration program comprising of stripping, trenching, sampling and a second 1000 metric tonne bulk sample. That same year AMP obtained a quarry permit covering the original six patented claims. To date approximately 15,000 tonnes has been quarried and distributed in Ontario, Quebec, Vermont, New York, Michigan, Pennsylvania and Virginia.

#### CURRENT EXPLORATION PROGRAMS

In 1996 the original a small test pit on claim 3002843 located an area of massive sovite hosted in fenitized quartz monzonite. The sovite located in this area was of high purity and lacked biotite, apatite and magnetite mineralization. Trenching and prospecting activities in this area started in the fall of 2002.

In 2003 a total of 9 trenches and one test pit have been excavated to define what was referred to as Zone 4. This work was able to cut and delineate numerous sovite veins and seams none of them of any economic significance. The area exposed is predominantly fenitized host quartz monzonite with an abundance of fracture fillings comprised of sovite and pyroxene. The sovite veins, though of high purity are narrow and discontinuous in this vicinity.

2004 explored a series of altered fenite, sovite float boulders, geological mapping and preliminary scintillometer investigations.

#### LOCATION AND ACCESS

The Spanish River Carbonatite Complex straddles the common boundary of Venturi and Tofflemire Townships just south of a sharp bend in the Spanish River known as the "Elbow". The property is cut by numerous, very well maintained, logging roads.

Access to the property is via the Fox Lake Lodge road, which turns off highway 144 at Cartier. From Cartier it is 25 km to the property. At present AMP and Fox Lake Lodge maintains the main road. All river and creek crossing have had culverts and bridges put in place to handle heavy logging trucks. Road infrastructure is excellent and required very little upgrade.

Cartier is the closest town, a village with approximately 500 inhabitants. Within the town limits is a rail spur owned by C.P.R. Sudbury is approximately 50 kilometres south of Cartier on highway 144. Total driving time from Sudbury to the property is  $1\frac{1}{2}$  hours.

Accommodation was at the Fox Lake Lodge, located 1000 metres south of the property.

#### MINING CLAIMS & LEASES

The Spanish River Carbonatite Complex property consisted of 14 mining claims and 6 leased located in Tofflemire and Venturi townships, district of Sudbury. The mining claims are 100% owned by Agricultural Mineral Prospectors Inc. and held in trust by Chris Caron (C38620) and John Slack.

#### Table: 1 - Claims and Leases Comprising Spanish River Property



Figure : 1

Mining Claims	Township	Ownership	Recorded Holder
1237466	Tofflemire	AMP Inc.	Chris Caron
1237463	Tofflemire	AMP Inc.	Chris Caron
1198345	Tofflemire	AMP Inc.	John Slack
1198344	Tofflemire	AMP Inc.	John Slack
1246239	Tofflemire	AMP Inc.	AMP Inc.
1237467	Venturi	AMP Inc.	Chris Caron
1237464	Venturi	AMP Inc.	Chris Caron
1237462	Venturi	AMP Inc.	Chris Caron
1237465	Venturi	AMP Inc.	Chris Caron
1214616	Venturi	AMP Inc.	John Slack
1214615	Venturi	AMP Inc.	John Slack
1198340	Venturi	AMP Inc.	John Slack
1198154	Venturi	AMP Inc.	John Slack
1136165	Venturi	AMP Inc.	John Slack
Mining Leases	Township	Ownership	Recorded Holder
359399	Venturi	AMP Inc.	AMP Inc.
359400	Venturi	AMP Inc.	AMP Inc.
377231	Venturi	AMP Inc.	AMP Inc.
378212	Venturi	AMP Inc.	AMP Inc.
378894	Tofflemire	AMP Inc.	AMP Inc.
378893	Tofflemire	AMP Inc.	AMP Inc.

#### GENERAL GEOLOGY OF SPANISH RIVER COMPLEX

The Spanish River Carbonatite emplacement occurred between  $1790 \pm 90$  Ma to  $1883 \pm 95$  Ma the same time as the Sudbury norite. This suggests that the to alkalic magmatic events are related and the Sudbury eruptive may account for the alkaline glasses of the Onaping Formation.



These wishing to stake mining daims should consult with the Provincial Mining Recorders' Office of the Ministry of Northern Development and Mines for additional information on the status of the lands shown hereon. This map is not intended for navgational, survey, or land title determination purposes as the information shown on this map is completed from various sources. Completeness and accuracy are not guaranteed. Additional information may also be obtained through the Iccal Land Titles or Registry Office, or the Ministry of Natural Resources.

General Information and Limitations Contact Information: Provincial Mining Recorders' Office

Home Page: www.mirdm.gov.on.ca/MNDM/MINES/LANDS/mlimnpge.htm

Dorbit Information: Toll Free Map Datum: NAD 83 Provincial Mining Recorders' Office Tel: 1 (885) 415-9845 ext 57/bit(jettion: UTM (6 degree)) Nitel Green Miller Centre 933 Ramsey Lake Road Fax: 1 (877) 670-1444 Topographic Data Source: Land Information Ontario Subury ON P3C 605 Milling Land Terure Source: Provincial Mining Recordent' Office

This map may not show unregistered lend tenure and interests in land including certain patients, leases, easements, light of ways, flooding rights, licences, or other forms of disposition of rights on interest from the Crown. Also certain land tenure and land uses that restrict or prohibit free entry to stake mining dail Illustrated

The information shown is derived from digital data available in the Provincial Mining Recorders' Office at the time of downloading from the Ministry of Northern pment and Mines web site.

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The Spanish River Carbonatite Complex is enveloped in a halo of fenitized granitic rocks. Carbonatite rocks with a high silicate mineral content occur along the periphery of the body. Lower silicate carbonatite occurs toward the core. The contact between fenitized wall rock and carbonatite appears to be over a maximum thickness of 300 metres. This observation is based on the trenching program and the Union Carbide drill hole. This area is referred to as the "Transition Zone" and is a banded and brecciated assemblage of layered biotite sovite, fenite and mafic rocks. The transition zone appears to be a result of contact metamorphism and metasomatism. Discreet lenses bands and veins of high purity sovite have been located in this zone. The sovites in this area appear to have higher quantities of magnetite, vermiculite and apatite. The second classification of the complex is referred to as the "Outer Core". This classification is used for the purpose of describing the trenching program and is adopted from a drill hole completed in 1968, by Union Carbide. The outer core is very similar to the transition zone with exception of a marked increase in sovite (calcite). The third and last classification of the complex is the "Inner Core", comprised almost entirely of sovite.

The main characteristic that distinguishes the Spanish River Carbonatite from other carbonatite complexes in northern Ontario is the very high content of sovite verses mafic rock components.

#### **REGIONAL STRUCTURAL GEOLOGY**

The Spanish River Complex Carbonatite Complex lies within the Abitibi Subprovince of the Superior Province of the Canadian Shield. The complex occurs along a north-south striking fault zone along the west side of the Sudbury Basin. According to the 1987 O.G.S. Study 30 this fault system maybe a graben structure branching off the Ottawa-Bonnechere graben, a system hosting carbonatite-alkalic rock complexes in the Nipissing area.

Airphotos of the region also suggest the complex occurs at the point of intersection of a number of regional linearnents.

#### SPANISH RIVER COMPLEX STRUCTURE

Shearing and brecciation of the enveloping quartz monzonite is common. Fractures are commonly filled with mafic pyroxenes, amphiboles and calcite. There is evidence in the trenching and the Union Carbide drill hole that blocks of fenite have peeled of the walls and are incorporated into the complex. Banding of fenites and sovite is common.

Post faulting has not been encountered at this time. The heterogeneous mixture and lack of outcrop makes it very difficult at this time to suggest that post faulting has occurred.

#### FENITIZED QUARTZ MONZONITE

The host rock enclosing the Spanish River Complex is massive, medium grained pink quartz monzonite. In contact with the complex the quartz monzonite has been fenitized. The granitic rock becomes mottled pink and green-blue in colour. Sodic amphibole and pyroxene have replaced the quartz in the quartz monzonite.

The fenitized quartz monzonite is brecciated and intruded by dark green mafic veins. Carbonate is commonly associated with the veins and fracture fills. The closer to the intrusive the greater the number of mafic and calcite filled fractures and veins.

#### SPANISH RIVER CARBONATITE COMPLEX – TRANSITION ZONE

The transition zone is predominantly fenite, but exhibits less brecciation and more banding. There is a marked increase of sovite veins, lenses and bands. The purity of the sovite in this zone varies from 45% CaCO<sub>3</sub> to nearly pure. The variations and types of accessory mineral found in the sovite are as follows:

- Vermiculite -0 to 15%
- Biotite -0 to 15%
- Magnetite 0 to 5%
- Pyrrhotite -0 to 5%
- Apatite -0 to 5%

Numerous lenses and veins of clean calcite (sovite) have been located through the trenching program, which occur in what previously would have been described as the transition zone. It is from one of these lenses that the 1996 bulk sample was taken.

#### SPANISH RIVER CARBONATITE COMPLEX - OUTER CORE

The actual contact between the transition zone and outer core is not well defined and is based on the degree of sovite verses fenite present and overburden thickness. Where there is a sharp increase in overburden is the logical location for the contact between the complex and altered host rock. The approximate thickness of the outer core based on the above observations would be 200 metres. The outer core appears only to outcrop along the road where Vein No.3 is located. A vertical rotary percussion hole ( $\Gamma P$ -2) drilled, in 1975, in this vicinity encountered 15 feet of overburden. This is also in the vicinity of test pits, which exposed decomposed sovite very similar to TP-2.

In the O.G.S. Study, "Spanish River Carbonatite Complex" the outer core is described as the Outer Phase. The outer phase based on this report is comprised of syenite, pyroxenite, ijolite and biotite sovite.

For the purpose of this report the description of the composition for the outer core is from the Union Carbide drill hole.

"The Outer Core of the carbonatite-filled diatreme, composed of biotite amphibole sovite with some phyrrhotite and minor chalcopyrite and gramphite. There is no appreciable magnetite between 1066'4" and 1339'. Between 1339' and 1495' coarse magnetite is present in both sovite and the gramphite. For the purpose of logging this core, 3 rock types are recognized, gramphite, sovite inclusions, which may be either sovite with a high proportion of inclusions, or gramphite, which has been carbonated. In either case, the dark minerals constitute up to 50% of the rock. The proportions of sovite, inclusions and gramphite in this section are: 22%, 32% and 46% respectively."

All previous trenching, geological mapping, bulk sampling has been located in the outer core. Outcrop exposure was poor. Trenching has located sovite mineralization in four separate areas. Prospecting and geological mapping has located sovite bedrock in two localities.

The 1996 trenching program was carried out almost entirely over this zone covering 800 metres of strike length along the western contact of the complex. The approximate thickness of the transition zone – outer core is approximately 300 metres.

The trenching program located several areas of economic interest. For the purpose of describing these areas they will be described as follows:

- Zone No. 1 area where the 100 tonne bulk sample was taken and the best continuous high grade CaCO<sub>3</sub> has been located to date.
- Zone No. 2 area that had been stripped for a potential bulk sample in 1996, contained a blend
  of calcite, apatite, biotite, vermiculite with minor silicocarbonatite and pyroxenitic rocks. In 2000
  a 1000 tonne bulk sample was taken. In 2001 the area is the Burns Mine current quarry location.
- Zone No. 3 area that was originally sampled in 1993 and contained mineral composition similar to Zone No.2. The main difference is a marked increase in biotite and vermiculite content. This are contains large reserves of residuum.
- Zone No. 4 area of fracture filled sovite and pyroxenite veins within well fenitized quartz monzonite. Large sovite reserves anticipated under fine stratified sand along borders of this zone.
- Road Zone area of high purity calcite banded with magnetite, pyroxene rich sovite.
- Residual Vermiculite this area measures 82m x 32m and is comprised of at least 50% fine vermiculite.

#### SPANISH RIVER COMPLEX – INNER CORE

The inner core of the Spanish River Complex is entirely covered by a thick layer, +100 feet, of overburden. Descriptions provided from various sources all relate back Union Carbide diamond drill hole. All descriptions use calcite content to describe and classify the inner core. Concentrations of calcite (sovite) increase closer to the centre of the complex.

For the purpose of this report Union Carbide's description (refer to Appendix 8) was used to describe the inner core. Union Carbide describes the inner core being comprised almost entirely of



Carbonatite Complex - Inner Core Clean Sovite - white massive, fine grain to decomposed granular texture, in excess of 50% CaO. Minor iron oxide and magnetite, .5% to 5% P2O5, minor to abundant vermiculite and biotite.

Carbonatite Complex - Outer Core Biotite Sovite - white to grey with black banding, moderate to abundant biotite & vermiculite, 5% iron oxide, 2% to 5% P2O5. Often interbanded with biotite pyroxene.

Alteration Zone - Transition Zone Fenite - altered quartz monzonite, fine to coarse grain unit. Carbonatite veins present, 2% to 5% K2O.

Diamond Drill Hole

**Reverse Circulation Drill Hole** 

Claim Number

**Claim Boundary** 

Township Boundary

Venturi Tp. - Tofflemire Tp.

# Property Geology Map

Agricultural Mineral Prospectors Inc.

100 200 400 600 800 metres 

biotite/magnetite sovite, with minor sections of gramphite. Accessory minerals found were pyrrhotite, chalcopyrite and apatite.

#### LITHOLOGIC UNITS FOR THE SPANISH RIVER CARBONATITE

#### **CENOZOIC**

#### PLEISTOCENE AND RECENT

River deposits, stream and swamp deposits, Glacial Deposits - sand and gravel

Unconformity

#### PROTEROZOIC

SPANISH RIVER CARBONATITE COMPLEX

Inner Core

Outer Core

Fracture fillings

#### ARCHEAN

Fenitized and brecciated quartz monzonite

Quartz monzonite

(Adapted from Table: 1 pg 10, OGS Study 30, Spanish River Carbonatite Complex, Ron Sage, 1987)

#### LEASE 359400 ROCK BULK SAMPLE PROGRAM

Between the dates February 25<sup>th</sup> and March 5<sup>th</sup> 2005 Agricultural Mineral Prospectors shipped residuum from the Burn's quarry to Dowling for spring sales. At this time the excavator was used to strip residuum to bedrock on the existing pit floor. The area cleared measured 20 metres by 22 metres and was excavated to a depth of 1 to 2 metres.



The bedrock exposed was comprised of biotite sovite, silicocarbonatite and biotite seams. Sulfide mineralization is found as disseminated blebs particularly where silicocarbonatite was present. It is to early to tell if this area represents a boulder field commonly encountered in excavating residuum or actual bedrock. The size of the area, results from the historical seismic survey and continuity of rock exposure suggests that this is actual a bedrock.

After evaluating stripped area a location was picked to drill and blast. A gas plugger accomplished all



#### Purpose of Rock Face Bulk Sample

The primary objective of the bulk sample program was to evaluate biotite-sovite bedrock exposure. To date all material distributed from the current quarry has been soft weathered sovite. Seismic surveys conducted by International Minerals and Chemical Corp. in 1975 suggested the residual layer was approximately 15 metres before bedrock.

AMP has had requests for specialty products such as crushed calcite-biotite for retail markets, biotite mica (potassium), apatite (phosphorous) and livestock mineral supplement for bulk markets. To respond to these potential markets and ensure organic certification is maintained detailed geochemistry, mineralogy, metallurgical and finally field testing of total rock and individual mineral drilling. Due to friability, alternating dense and granular calcite bands, biotite seams drilling proved difficult with stuck rods being a common occurrence. Due to difficult drilling, residual contamination of blasted rock an air plugger and blow pipe was employed for the remainder of the bulk sample program.

Biotite-calcite rock was loaded and stored at the loading dock located at the quarry. The stockpile material will be sent for crushing in Dowling, Ontatio. Once material has been crushed to minus 3/8 inches the sample will be divided. One half of the sample will be used in field test plots the remainder will be subject to high intensity magnetic separation to concentrate biotite and other mafic minerals, producing two concentrates biotite and calcite-apatite.





constituents is required.

#### Agricultural and Horticultural Application of Sovite-Biotite Rock



Unlike currently quarried material, which has the appearance of sand the rock specimens are very visual, snow white calcite intermixed with black biotite flakes. AMP has been approached by organic lawn and home garden product distributors inquiring about our ability to supply them with this very visual material. All rock specimens have been hand selected and the nature of rock fragments found in the soft residuum represented discontinuous boulder fields. Representation of display specimens has never been found in sufficient quantity to produce a consistent blend for this

potential market. The 2005 bulk sample represents the first time that an area has been exposed that may have sufficient volume and consistency to commence a test market. The marketing study would require enough material to supply small lots to selected retail outlets and run long term test trials both on turf and ornamental gardens. A 200 tonne bulk sample was sufficient to achieve these goals.

#### **Agricultural Applications of Biotite**

Soil is described as the outer thin layer of loose material, which supports life on earth. It is the interaction between the earth's atmosphere, hydrosphere, (which means water), lithosphere (which means rocks) and biosphere, (all living things), that produces soil. This complex interaction results in the formation of a group of secondary minerals of fundamental importance known as clay. It is their permanent structure, colloidal size, large surface area and unique physical properties that play a major role in the biochemical cycling of plant nutrients and soil formation.

*Clay* has numerous definitions, agronomists use the term to describe particle –size in the mechanical analysis of soil. This has resulted in grouping all clay minerals together into one constant progression where there is no discernable difference from one clay mineral species to the next. Geologists classify clays into two main groups:

- Low-activity clays these clays are characteristic of silica and alkali, (base element), depleted environments, (i.e. acid soils). The clays usually founds in such environments are kaolinite and aluminum, iron and manganese oxides. Low activity clays have low cation exchange capacities (CEC) and small surface areas. Soils predominated by these clays are referred to as old. These soils are highly oxidized, generally infertile and usually have symptoms of metal toxicity. Soils predominated by these clay mineral types are well drained soils, where total hydrolysis results in a complete loss of silica and cations.
- 2. High-activity clays these clays are charged and have more hydrated clay layers. High activity clays have large surface areas and corresponding high CEC, containing an abundance of Ca<sup>++</sup>, Mg<sup>++</sup> and Fe<sup>++</sup> ions. Soils predominated by these clays are referred to as early mature to mature, (young soils have not formed clay minerals and are almost entirely comprised of primary minerals). These soils generally are very fertile. Examples of clays minerals belonging to this group are vermiculite, illite and montmorillonite. Soils

predominated by these clay mineral types are where hydrolysis is less pervasive resulting in only partial losses of silica and alkalies.

The intensity of clay weathering and soil aging is a function of climate, soil parent material and human influences, Soils impacted by acid rain, chemical fertilizers and tillage has resulted in clay destruction and accelerated soil aging. This results in loss of silica, alkali elements, exchange capacity, soil surface area, soil aggregation, plant nutrient uptake and increases soil compaction and metal toxicities.

The division of clays into high and low energy aids the geologist in determining the type of clays, soil genesis and the age of soils. For the agronomist and environmentalist this information is critical in determining the impact of human activity on soil health and determining the best course of action in restoring soil vitality.

#### The Properties of Clay

"Any clay, even a monomineral clay is a population of different particles. Each particle is itself a population of microdomains. When the environment changes, each micro-domain and each particle starts changing. Each of them shift towards a new thermodynamic equilibrium according to its own speed: population dynamics are going on. Population dynamics apply to clay mineralogy today" (Millot, 1989).

Clays being tiny nanocrystalline particles and essential components of the earth's surface are layertype aluminosilicates, referred to as phyllosilicates. They arrange themselves into a structure of platelets similar to a deck of playing cards referred to as a colloid. This results in these compact nanocrystalline structures having very large surface areas. Illites having a specific surface area of 97.0 m<sup>2</sup>/gram and kaolinite 16.0 m<sup>2</sup>/gram. The best way to describe this incredible phenomenon is to tear the pages out of a book and place the torn pages side by side. The rather small book would cover a very large area and the number of pages would determine how large the area would ultimately be.

Clay minerals have the property of absorbing certain anions and cations and retaining them in an exchangeable state, (Grim, 1968). Agronomists have focused on the cation exchange properties but very little work has been done on clay weathering resulting aluminum toxicity, nitrogen fixation and anion exchange. In general the most common exchange cations and in the sequence of relative attractive forces are Al<sup>3+</sup>, Ca<sup>2+</sup>, Mg<sup>2+</sup>, NH<sub>4</sub><sup>+</sup> ~ K<sup>+</sup> > Na<sup>+</sup>, (Juma 2002). Common anions in clay materials are SO<sub>4</sub><sup>-</sup>, Cl<sup>2-</sup> PO<sub>4</sub><sup>3-</sup>, NO<sub>3</sub><sup>-</sup>.



The importance of ion exchange and the exchange reaction are of fundamental importance in soils. Plant growth and soil structure are dependant on this process. Drever (1994) and Shwortzman (1993) suggested the most critical factor affecting microbial enhancement of soil mineral weathering and in turn nutrient uptake by plants is soil stabilization. While soil aggregation decreased physical weathering rates

the increased soil surface area and water retention significantly enhanced chemical weathering.

#### Clay Weathering - Biotite to Vermiculite

"The transformation of biotite to vermiculite with the release of the interlayer K is perhaps the most important biologically mediated geochemical reactions occurring in the rhizosphere" (Banfield, Proc. Natl. Acad. Sci. USA 96, (1999).

All clays are classified as secondary or sedimentary in origin. There is only one group of primary rock forming minerals that are classified as clay; they are micas. The most important agromineral mica is biotite. Biotite is a charged potassium, (~ 12% K<sub>2</sub>O), phyllosilicate that carries its unique structure through various transformations to become the most reactive clay colloid in our soils, (~ CEC 180 meq/100g). As the potassium is released the exchange capacity is increased and is characteristic of the clay mineral illite. With complete removal of K interlayer planes vermiculite and montmorillonite clay minerals are produced, (Hinsinger, P., Elsass, F. Jaillard, B. & Robert, M. (1993) *J. Soil Sci.* 44, 525). Vermiculites are classified as high activity clays. This means that this group of clays has a wide range of mineralogy resulting in a wide range of compositions where the interlayer spaces are charged and hydrated to various extents resulting in a wide diversity in behavior, (Pedro 1997).

"Plant nutritionists, primarily working with model rhizospheres, have documented the dramatic and astonishingly rapid biomobilization of essential nutrients from phyllosilicates (Hinsinger et al. 1992, Leyval and Berthelin 1991)." Barker, Welch, Banfield (2000).



The transformation of biotite to vermiculite within the soil system is rapid. Experiments conducted by Mortland (1956), Spyridakis et al. (1667) and Weed et al. (1969) documented biotite functioned as well as soluble salt (KCl) as a source of K. Possibly more significant then the bioavailability of potassium the formation of vermiculite contributes an essential clay mineral to the soil system.

The Spanish River Carbonatite Complex is an exceptional source of biotite. Though not widely recognized in agriculture today, ongoing research will demonstrate that biotite is a far more effective potassium

source then soluble potassium fertilizer both in supplying soils with potassium and creating highactivity clays.

#### Agricultural Applications of Apatite

Rock phosphate applications to agricultural soils are increasing in response to the growth in organic food production. This demand will increase beyond the organic sector as ornamental chemical fertilizer use is restricted, environmental legislation affecting agriculture becomes more stringent and continued research is able to demonstrate the agronomical benefits over soluble fertilizers.

The phosphate ion is extremely reactive combining with at least 30 elements and under every conceivable geological setting resulting in approximately 300 phosphate minerals. Minute changes in

impurities, pH, and crystal defects, to list of few, result in significant changes in solubility-reactivity behavior. For this reason wide discrepancies exist for solubility rates for many phosphate minerals and sources. Different phosphate phase's maybe stabilized or destabilized by the presence of various cations and anions, which do not have to be incorporated into the crystal lattice.

Microorganisms play a very important role in the distribution of phosphorous on the earth's surface. Microorganisms are closely involved in the cycling of phosphorous and current biogeochemistry and geomicrobiology research is providing greater in sight into influences on phosphorous dissolution and mineralization within the soil system. The impact of this work undoubtedly will change current thinking on solubility characteristics of phosphate minerals, particularly in the soil system where phosphorous is supplied to plants by microbial mediated interactions. A 21-year study comparing conventional, biodynamic and organic agroecosytems recognized that the solubility fraction of phosphorous and potassium was lower and calcium and magnesium was higher in organic soils verses conventional. However, phosphatase activities were higher in organic soils then in conventional. Phosphorous movement through the microbial biomass was faster with more phosphorous being bound (Mader, 2002). Organically bound P accounts for approximately 30 to 50% of phosphorous in soil. The maintenance of soil organic matter ensures high levels of organically bound phosphorous.

1. All soils have undergone at least one sedimentary cycle, resulting in most of the iron and transition metals occurring in a higher oxidation state. It is for this reason that plants will likely utilize only 10% of applied acidulated phosphate fertilizer in a growing season. The PO<sub>4</sub> radical will rapidly combine with almost any soil element to form stable secondary soil phosphate minerals, particularly iron, aluminum, calcium and manganese. This process is far more exaggerated in acid soils where aluminum, iron and manganese hydroxides are prevalent. The mineral apatite does not react in this manner. Apatite mineral weathering by microorganisms is primarily accomplished by their acid production. Banfield (1999) was able to detect pH values of 3 to 4 in proximity of cells attached to mineral grains within a local microenvironment. The bulk soil solution was pH 7. A lowering of pH between 3-4 will result in 10 to 1000-time increase in the mineral dissolution rate.

Phosphate minerals are a favored host for radioactive ions and heavy metals, particularly cadmium. The phosphate fertilizer refining process removes radioactive ions but cadmium is incorporated into the fertilizer. Recent research is showing plant and animal cadmium uptake exceeding tolerable level intake guidelines established by the World Health Organization. Cadmium containing phosphate fertilizers were confirmed to have increased the Cd status both in soil and plants. In response New Zealand, Australia, Austria, Sweden and Finland have established guidelines and worked with the fertilizer industry to reduce Cd soil contamination. Austria, Sweden and Finland have enacted legislation to ban high cadmium fertilizers. This new legislation will increase the demand for low cadmium igneous rock phosphates.

Rock phosphate applications to agricultural soils in North America, for the most part, have gone unregulated. This has possibly resulted in U, Th and Cd soil contamination. To address this problem the North American organic agriculture industry has adopted Canadian waste management guidelines. Recognized as one of the most stringent these regulations are based on the philosophy that in order to insure the long-term fertility of the soil, the levels of selected contaminants should not be increased over background soil levels. Under these regulations there are no threshold levels set for radioactive elements.

The New Zealand and Australian experience suggests that utilizing waste management guidelines could be ineffective in reducing Cd soil and plant levels. The plant availability of heavy metals is very

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dependant on soil conditions, farming practices and climate. Generally, metal uptake is high in acid soils; guidelines in New Zealand and Australia recommend maintaining soil fertility to reduce weed pressure and using lime to prevent soil acidification. Calcium within the soil system also stimulates microbial activity, provided there is adequate carbon and nitrogen. Increased microbial activity will result in increased phosphate mineral dissolution and higher levels within the soils biomass.

Current opinion amongst soil scientists is in the industrialized world soil phosphorous levels are sufficient and phosphorous use is declining as a result. Nutrient management legislation in effect across North America is curtailing phosphorous use. The utilization of existing soil phosphate minerals can be accomplished by microbial enhancement through adequate levels of organic matter, reactive calcium and catalytic minerals. Not only is the apatite in the Spanish River Carbonatite Complex approaching 5% but also contains a variety of minerals, which will stimulate soil microbialmineralogical interactions enhancing dissolution of existing secondary soil phosphate minerals.

#### Bulk Sample Bedrock Geology

An excavator was used to strip residuum to bedrock on the existing pit floor. The area cleared measured 20 metres by 22 metres and was excavated to a depth of 1 to 2 metres. The bulk sample location was selected because it appears to be the first location where continuous bedrock is exposed. An air compressor and blow pipe was used to clean the surface. The size of the area, results from the historical seismic survey and continuity of rock exposure suggests that this is actual bedrock.

Geological mapping of cleaned surface outlined an area predominantly biotite sovite with minor biotite seams and silicocarbonatite nodules. Sulfide mineralization is found as disseminated blebs particularly where silicocarbonatite is present. Large nodules of massive sovite appear to have been the earliest deposited magma later fractured and case hardened by subsequent volcanic activity. The soviet nodules are predominately surrounded by softer granular seams of sugary calcite and to a lesser degree massive biotite intermixed with clinopyroxene. The

It was the hope that sovite, biotite and apatite mineral types could be separated in situ. This would result in supplying markets with unique mineral products without the need of further processing. Due to the heterogeneity of the exposed rock face this was impossible at this location. Though there is no indication of residual apatite deposits previous exploration has identified potential areas of biotite mineralization. Ongoing exploration should focus on testing zones where potential biotite mineralization exists.

#### **Geochemical and Whole Rock Analysis**

Five samples were collected from blasted material and stockpile. Four samples where selected on mineral content and the fifth was a representation of the approximate 40 tonnes of material and stockpiled. Two accredited laboratories were used Geo Labs located in Sudbury and Chemex laboratories of Mississauga.

The four samples sent to Geo Labs were crushed using a small jaw crusher, riffled to split the sample and pulverized to 90 microns. Whole rock analysis was performed using X-ray fluorescence. Geochemistry was performed by total digestion ICP multi element analysis. At the time of this report these analysis were in progress.

The composite sample sent to Chemex was dried at a maximum temperature of 60° C, fine crushed to 70% <2 mm, split and pulverized to <75 um. Analysis included whole rock by X-ray fluorescence, Fluorine by fusion/electrochem, Iodine and Bromine by NAA, complete rare earth and 50 element geochemistry by aqua regia ICP-MS.

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Sample descriptions and results are as follows:

#### FX39211-005

Sample 005 represented a cross section of numerous biotite facies outlined in the test sample area. This sample indicative of biotite zones is very significant. Not only are the K<sub>2</sub>O grades appreciable (6.95%) but surprisingly the content of  $P_2O_5$ , (2.72%). Biogeochemistry research conducted by Jullian Banfield and Susan Whelch, (*Impact on Mineral Dissolution: Application of the Lichen Model to Understanding Mineral Weathering in the Rhizosphere*), on apatite dissolution and biotite transformation suggests that plant availability is equal to potassium chloride and soluble phosphate fertilizer. In petrography analysis it appears that apatite crystals are presence within biotite sheets. This would imply apatite is cryptocrystalline and very reactive. Samples of biotite should be submitted for X-ray diffraction and microprobe analysis.

#### FX39211-006

Sample 006 represents siliceous nodules of silicocarbonatite. These nodules resemble volcanic bombs that have been ejected during eruptive periods. The predominant mineralogy is potassium feldspar with minor calcite and sulfides occurring as disseminated blebs. Petrography of feldspars show numerous inclusions of calcite, which will result in high instability. This again is a very positive attribute for agricultural applications.

#### FX39211-007 & FX39211-008

Samples 007 and 008 represented the largest mineral constituent of the bulk sample biotite rich calcite. This material is very visual, very easy to crush to specific size tolerance that will allow free flowing material that can be utilized by any make of home fertilizer spreader. Whole rock analysis of this material very closely mimics the content of weathered sovite.

#### SRC0501

SRC0501 is a composite sample of bulk sample. The purpose of this sample was to get an overall grade of material that will be supplied for field testing and to ensure potential contaminants fall within waste management guidelines. The grade of material shows a high content of calcite, biotite, apatite and feldspar with no concentrations of potential toxic metals. Fluorine levels suggest that apatite is fluorapatite. Further analysis of apatite is recommended.

#### **Petrography Analysis**

Chris Fratton MSCGeo, P.Geo of Calgary, Alberta prepared thin sections and interpretation. All of the photos were shot at 40x magnification. The thin sections are approximately 45mm x 26mm. The horizontal axis (HA) on all of the other (40x) images is approximately 2.6mm. Generally, coarse crystalline nature of the rocks precludes clear photos where numerous finer grain minerals are in the field of view. Overall they still make for interesting images.

The general observations are:

- 1) The biotites (brown in Plane Polarized Light [PPL]) typically do not contain any radioactive accessory minerals.
- 2) Biotites often appear to have been deformed during or just after their crystallization.
- 3) Green minerals in PPL are probably Na-Ca clinopyroxene.

- 4) Staining and acid immersion indicates that the carbonate component is a Fe-calcite (but not Ankerite or Siderite).
- 5) The calcite is clear in PPL and creamy white in crossed polarized light (XPL), often exhibiting both rhombohedral cleavage and well-defined twinning.
- 6) There is no evidence of dolomite.
- 7) The apatite (nice solid grey in XPL) appears to be a fluorapatite, although this is best determined by electron microprobe. Determining compositions of apatite's from colour and other optical characteristics is not reliable.
- 8) There is allot lot of Sr in historical analyses. The Sr maybe substituting for Ca in both the Calcite and the Apatite (as could be Ba).
- 9) There are not a lot of accessory minerals that would normally be associated with high numbers for Ba, Ce, La, Nb, Sr, and Zr. Further work is necessary to determine trace mineral associations.
- 10) Feldspars typically occur in minor amounts as an anhedral groundmass mineral, but in thin section SRC3, they occur as coarse crystals with numerous inclusions, including calcite. These grains are probably not particularly stable, and should break down rapidly.

These thin sections are just from one representative hand specimen. The complexity of carbonatites will in compass a vast range of igneous textures, crystal sizes, and stages of weathering (similar to the crater facies of a Kimberlite Diatreme). Thin sections and observations should be taken in that context.

Geochemistry suggests the apatite is fluorapatite. Further petrographic analysis is recommended to evaluate all styles of mineralization. Biotite whole rock analysis and thin sections suggest apatite inclusions; electron microscopy, x-ray diffraction and microprobe analysis is recommended to determine trace element mineralogy.

# SRC01 Scan



View01 PPL HA2.6mm



View01 XPL HA2.6mm



View03 PPL HA2.6mm





# SRC02 Scan



View01 PPL HA2.6mm

Nà-Ca Canopyroxena Na-Ca Chropyroxena

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View02 PPL HA2.6mm

View01 XPL HA2.6mm



View02 XPL HA2.6mm



## SRC03 Scan



View01 PPL HA2.6mm

View01 XPL HA2.6mm





#### **CONCLUSIONS & RECOMMENDATIONS**

Bedrock exposure is predominantly sovite and biotite. This exposure has the brightness and biotite content to ensure a consistent product for the retail market. The bulk sample location was unable to locate concentrated zones of calcite, apatite or biotite. Further exploration is recommended to investigate areas where earlier activities have located potential concentrations of calcite and biotite.

Geochemical and whole rock analysis suggests a natural division between biotite rich sovite and sovite. Gravity separation experiments should be conducted to produce a biotite concentrate. Research and current market studies suggest that biotite; particularly apatite rich biotite has very good market potential both in retail and bulk markets.

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Appendix 1

Letter of Authorization

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.....

I John Slack;

- 1. Conducted exploration activities on lease S359400 Venturi Township, District of Sudbury.
- 2. The work was performed between June 2nd 2005 and June 5th 2005.
- 3. I concur with all information contained in this report and is an accurate description of work performed.
- 4. I am a mining technologist and have been practicing my profession since 1984
- 5. I reside in the town of Erin, County of Wellington, Ontario.

Date:

Signature: \_\_\_\_\_

Appendix 2

Certificates of Analysis

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### **CERTIFICATE OF ANALYSIS**



Geoscience Laboratories (Geo Labs) 933 Ramsey Lake Road, Bldg A4 Sudbury, ON P3E 6B5 Phone: (705) 670-5637 Toll Free : 1-866-436-5227 Fax: (705) 670-3047

Issued To :	Mr. P Slack	
	Agricultural Mineral Prospectors P.O. Box 866	F
	Erin, ON N0B 1T0 Canada	Ge
Phone :	519-833-9827	S
Fax :	519-833-7515	
E-Mail :	rocks@rockpowder.com	
Client No. :	391	

Certificate Date :	07/28/2005
Certificate No. :	16883
Project Number:	n/a
Geo Labs Job No. :	05-0112
Submission Date :	06/03/2005
Delivery Via :	E-MAIL
QC Requested :	NO

Method Code reported with this certificate : XWF-101

Method Code	Description	Qty	Status
IM-100	ICP_MS Total Digestion	4	IN PROG
XWF-101	WD-XRF : Majors	4	COMPLETE

Legend:

N.D.= Not detected

N.M. = Not measured

Please refer to Geo Labs Job No. 05-0112 if you have any questions.

CERTIFIED	BY				
E	d Debicki, Laboratory	Ed DebicKi Manager	Date :	July 27/05	

Except by special permission, reproduction of these results must include any qualifing remarks made by this Ministry with reference to any sample. Results are for samples as received.



### GEOSCIENCE LABORATORIES CERTIFICATE OF ANALYSIS



"

 CLIENT :
 Slack

 Geo Labs JOB # :
 05-0112

 DATE :
 07/28/2005

 METHOD CODE :
 XWF-101

Client ID Units Detection Limit	SiO2 wt% 0.01	TiO2 wt% 0.01	AI2O3 wt% 0.01	Fe2O3 wt% 0.01	MnO wt% 0.01	MgO wt% 0.01	CaO wt% 0.01	Na2O wt% 0.01	K2O wt% 0.01	P2O5 wt% 0.01	LOI wt% 0.05	TOTAL wt% n/a
FX3921 <b>1-005</b>	36.67	2.12	11.86	16.34	0.19	6.13	9.81	2.04	6.95	2.72	5.06	99.90
FX39211-006	43.98	0.76	13.03	6.55	0.12	1.81	13.81	5.09	4.24	0.89	9.61	99.88
FX39211-007	13.14	0.92	3.0 <b>1</b>	8.66	0.17	2.74	39.44	1.04	1.98	3.23	24.86	99.20
FX39211-008	16.08	1.06	4.82	7.79	0.19	2.85	36.22	1.06	2.70	2.29	24.88	99.92



### ALS Chemex **EXCELLENCE IN ANALYTICAL CHEMISTRY**

ALS Canada Ltd.

To: AGRICULTURAL MINERAL PROSPECTORS INC. P.O. BOX 866 ERIN ON NOB 1TO

Page: 1 Finalized Date: 16-AUG-2005 Account: AGRMIP

212 Brooksbank Avenu	le	
North Vancouver BC V	7J 2C1	
Phone: 604 984 0221	Fax: 604 984 0218	www.alschemex.com

CERTIFICATE TO05061050		SAMPLE PREPARATION
	ALS CODE	DESCRIPTION
Project: AMP02-05	WEI-21	Received Sample Weight
	DRY-22	Drying - Maximum Temp 60C
This report is for 1 Soil cample submitted to our lab in Terente, ON, Canada an	PUL-31	Pulverize split to 85% <75 um
	SPL-21	Split sample - riffle splitter
	CRU-31	Fine crushing - 70% <2mm
John slack	LOG-22	Sample login - Rcd w/o BarCode
		ANALYTICAL PROCEDURES
	41.0.0005	

		L3
ALS CODE	DESCRIPTION	INSTRUMENT
ME-XRF06	Whole Rock Package - XRF	XRF
OA-GRA06	LOI for ME-XRF06	WST-SIM
F-ELE81	Fluorine - Fusion/ Electrochem	
I-NAA07	lodine by NAA	
Br-NAA05	Bromine by NAA - Halogen Pkg	
ME-MS82	Complete rare earth package	ICP-MS
ME-MS41	50 element aqua regia ICP-MS	
	· •	

To: AGRICULTURAL MINERAL PROSPECTORS INC. ATTN: JOHN SLACK P.O. BOX 866 ERIN ON NOB 1T0

This is the Final Report and supersedes any preliminary report with this certificate number. Results apply to samples as submitted. All pages of this report have been checked and approved for release.

Signature: Rest Com



ALS Canada Ltd.

EXCELLENCE IN ANALYTICAL CHEMISTRY

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Page: 2 - A Total # Pages: 2 (A - F) Finalized Date: 16-AUG-2005 Account: AGRMIP

Project: AMP02-05

### CERTIFICATE OF ANALYSIS TO05061050

Sample Description	Method Analyte Units LOR	WEI-21 Recvd Wt. kg 0.02	ME-MS82 Ce ppm 0.5	ME-MS82 Dy ppm 0.1	ME-MS82 Er ppm 0.1	ME-MS82 Eu ppm 0.1	ME-MS82 Gd ppm 0.1	ME-MS82 Ho ppm 0.1	ME-MS82 La ppm 0.5	ME-MS82 Lu ppm 0.1	ME-MS82 Nd ppm 0.5	ME-MS82 Pr ppm 0.1	ME-MS82 Sm ppm 0.1	ME-MS82 Tb ppm 0.1	ME-MS82 Th ppm 1	ME-MS82 Tm ppm 0.1
SRC0501		0.61	293	8.0	3.4	4.8	16.1	1.3	147.0	0.3	118.5	33.0	18.8	1.9	7	0.4
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Page: 2 - B Total # Pages: 2 (A - F) Finalized Date: 16-AUG-2005 Account: AGRMIP

#### Project: AMP02-05

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									(	CERTIFI	CATE	TO050	61050			
Sample Description	Method Analyte Units LOR	ME-MS82 U ppm 0.5	ME-MS82 Y ppm 0.5	ME-MS82 Yb ppm 0.1	ME-MS41 Ag ppm 0.01	ME-MS41 Al % 0.01	ME-MS41 As ppm 2	ME-MS41 B ppm 10	ME-MS41 Ba ppm 10	ME-MS41 Be ppm 0.05	ME-MS41 Bi ppm 0.01	ME-MS41 Ca % 0.01	ME-MS41 Cd ppm 0.01	ME-MS41 Ce ppm 0.02	ME-MS41 Co ppm 0.1	ME-MS41 Cr ppm 1
SRC0501		2.0	33.7	2.1	0.07	2.10	5	<10	410	0.79	0.02	19.50	0.17	307.00	17.2	3
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#### Project: AMP02-05

									CERTIFICATE OF ANALYSIS						TO05061050		
Sample Description	Method Analyte Units LOR	ME-MS41 Cs ppm 0.05	ME-MS41 Cu ppm 0.2	ME-MS41 Fe % 0.01	ME-MS41 Ga ppm 0.05	ME-MS41 Ge ppm 0.05	ME-MS41 Hf ppm 0.02	ME-MS41 Hg ppm 0.01	ME-MS41 In ppm 0.005	ME-MS41 K % 0.01	ME-MS41 La ppm 0.2	ME-MS41 Li ppm 0.1	ME-MS41 Mg % 0.01	ME-MS41 Mn ppm 5	ME-MS41 Mo ppm 0.05	ME-MS41 Na % 0.01	
SRC0501		0.83	23.7	3.82	9.31	0.23	0.24	0.01	0.010	0.78	141.5	5.0	1.32	1030	0.21	0.51	
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Comments: Interference: Ca>10% on ICP-MS As,ICP-AES results shown.



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Page: 2 - D Total # Pages: 2 (A - F) Finalized Date: 16-AUG-2005 Account: AGRMIP

Project: AMP02-05

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									CERTIFICATE OF ANALYSIS					TO05061050				
Sample Description	Method Analyte Units LOR	ME-MS41 Nb ppm 0.05	ME-MS41 Ni ppm 0.2	ME-MS41 P ppm 10	ME-MS41 Pb ppm 0.2	ME-MS41 Rb ppm 0.1	ME-MS41 Re ppm 0.001	ME-MS41 S % 0.01	ME-MS41 Sb ppm 0.05	ME-MS41 Sc ppm 0.1	ME-MS41 Se ppm 0.2	ME-MS41 Sn ppm 0.2	ME-MS41 Sr ppm 0.2	ME-MS41 Ta ppm 0.01	ME-MS41 Te ppm 0.01	ME-MS41 Th ppm 0.2		
SRC0501		9.39	2.9	>10000	4.7	53.3	0.001	<0.01	0.11	1.1	1.3	0.2	3020.0	0.09	0.03	6.2		
															r			



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Project: AMP02-05

ample Description		ME-MS41 Ti % 0.005			ME-MS41 V ppm 1	ME-MS41 W ppm 0.05	ME-MS41 Y ppm 0.05		(	61050						
	Method Analyte Units LOR		ME-MS41 Ti ppm 0.02	ME-MS41 U ppm 0.05				ME-MS41 Zn ppm 2	ME-MS41 Zr ppm 0.5	ME-XRF06 SiO2 % 0.01	ME-XRF06 Al2O3 % 0.01	ME-XRF06 Fe2O3 % 0.01	ME-XRF06 CaO % 0.01	ME-XRF06 MgO % 0.01	ME-XRF06 Na2O % 0.01	ME-XRF0 K2O % 0.01
SRC0501		0.267	0.10	1.06	54	0.09	32.10	66	10.2	25.73	6.04	8.71	25.92	3.07	2.50	1.05
															,	



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CERTIFICATE OF ANALYSIS TO05061050

Page: 2 - F Total # Pages: 2 (A - F) Finalized Date: 16-AUG-2005 Account: AGRMIP

Project: AMP02-05

Sample Description	Method Analyte Units LOR	ME-XRF06 Cr2O3 % 0.01	ME-XRF06 TiO2 % 0.01	ME-XRF06 MnO % 0.01	ME-XRF06 P2O5 % 0.01	ME-XRF06 SrO % 0.01	ME-XRF06 BaO % 0.01	ME-XRF06 LOI % 0.01	ME-XRF06 Total % 0.01	F-ELE81 F ppm 20	I-NAA07 I ppm 2	Br-NAA05 Br ppm 2			
SRC0501		<0.01	0.93	0.23	2.81	0.30	0.06	21.30	98.65	1690	<2	<2			
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