

**ERIN VENTURES INC.**

**ANNUAL INFORMATION FORM**

**March 29, 2000**

# ERIN VENTURES INC. ANNUAL INFORMATION FORM

## **Item 1: Incorporation**

### (1) Incorporation or Organization of the Issuer

Erin Ventures Inc. (the "Issuer") was incorporated by Articles of Incorporation under the Business Corporations Act of the Province of Alberta on July 19, 1993.

### (2) Subsidiaries

The Issuer holds a 65% interest in Shadow Capital Corp. ("Shadow"), a company incorporated in British Columbia on May 29, 1995 and subsequently continued under the Business Corporations Act of the Province of Alberta on July 28, 1997; a 100% interest in 766072 Alberta Inc. and a 50% interest in Ras Borati, Ltd. ("Ras") a company incorporated in the Federal Republic of Yugoslavia.

## **Item 2: General Development of the Business**

The Issuer completed its initial public offering on October 27, 1994 as a junior capital pool corporation on The Alberta Stock Exchange. On March 20, 1996 the Issuer completed its Major Transaction pursuant to which the Issuer acquired all the issued capital of Shadow (formerly known as 497281 B.C. Ltd.). Pursuant to an Option and Joint Venture Agreement dated February 14, 1996, Shadow was the optionor of the Cop Property, 4 mineral claims located in the Atlin Mining Division of British Columbia. Pursuant to a Non-Offering Prospectus dated October 29, 1998 Shadow was issued a receipt on November 3, 1998 from each of the Alberta and Ontario Securities Commissions. Subsequently, the Issuer established December 24, 1998 as the record date for distributing 3,400,000 common shares of Shadow, 3,400,000 Series A Warrants and 3,400,000 Series B Warrants to the shareholders of the Issuer as a dividend in specie on the basis of one common share, one Series A Warrant and one Series B Warrant for each 5 common shares of the Issuer held as of the record date. Securities of Shadow were distributed to shareholders of the Issuer resident in Alberta, Ontario and other jurisdictions where the Issuer was permitted to do so without further approval as of February 12, 1999.

Pursuant to a Joint Venture Agreement dated January 22, 1997 among Electroprivreda Srbije and the Issuer, the Issuer holds a 50% interest in the Piskanja Borate Property located in Yugoslavia through its 50% ownership of Ras Borati Ltd. Pursuant to the terms of the Joint Venture Agreement, the Issuer is obligated to fund a maximum of \$2,670,000 to complete a pre-feasibility drilling program. Thereafter all exploration and development expenses are to be funded equally by the joint venturers.

Pursuant to an agreement dated February 28, 2000 the Corporation acquired 766072 Alberta Inc., the holder of an option to acquire a 100% working interest in the Stope Baby Claims, a 32 claim block located in the Quesnell Mining Division of British Columbia.

## **Item 3: Narrative Description of the Business**

The Issuer is a natural resource company engaged in the acquisition, exploration and development of natural resource properties. The Issuer owns or has an interest in the

following described properties and intends to seek and acquire additional properties worthy of exploration and development.

1. Piskanja Borate Property, Baljevac, Republic of Serbia, Yugoslavia

Pursuant to a Joint Venture Agreement dated January 22, 1997 for reference, among Electroprivreda Sjerbe and the Issuer, the Issuer holds a 50% interest in the Piskanja Borate Property through its 50% ownership of the joint venture company, Ras Borati Ltd. Pursuant to the terms of the Joint Venture Agreement, the Issuer is obligated to fund a maximum of \$2,670,000 to complete a pre-feasibility drilling program. Thereafter all exploration and development expenses are to be funded equally by the joint venturers. According to the agreement, all exploration work up to and including the completion of a feasibility study is to be completed by October 31, 1999. However, due to the current civil unrest in Yugoslavia's southern region of Kosovo, and resulting international sanctions against Yugoslavia, all work programs on the Piskanja Borate Property were suspended in the first quarter of 1998, pursuant to a force majeure clause in the agreement. The continuation of the work program is expected when the situation in Yugoslavia normalizes. Application has been made to the Chief Court of Yugoslavia to extend the incorporation of Ras Borati for two years. In addition, Electroprivreda Sjerbe is anticipated to ratify this extension duration

James Wallis, M.Sc. (Eng.), P.Eng. of Williams Lake, British Columbia, has prepared an engineering report dated February 14, 1997 entitled *Preliminary Evaluation Report on the Piskanja Borate Deposit*, Baljevac, Republic of Serbia, Yugoslavia. Copies of the report are on file at the registered office of the Issuer located at Suite 907 Empire Building, 10080 Jasper Avenue, Edmonton, Alberta. An excerpt of that report reads as follows:

**Preliminary Evaluation Report on the Piskanja Borate Deposit**

***Location***

The Baljevac borate deposits are located in the Republic of Serbia, Yugoslavia near the mining town of Baljevac. Best access is from the city of Belgrade by good paved road to Baljevac, a 3.5 hour drive to cover a distance of some 250 kilometers. Belgrade is serviced by daily international flights. The town of Baljevac is equipped with railway loading facilities which provides connector service to most of Europe, including inexpensive barge access to major coastal seaports via the Danube River.

***Property***

Electroprivreda (the national power company of Yugoslavia) has the exclusive rights to all mineral exploration and development in the Baljevac area (with the exception of bauxite). This extensive concession was granted to protect their thermal coal mining interests in the district and to ensure that the local mining infrastructure developed by the socialistic government is fully supported.

Known borate mineral resources are contained in two separate properties known as the "Pobrdski Potok", on the north side and the "Piskanja" deposit on the south side of the Jarandol basin. Additional resources may well exist in the approximate 3 kilometers of untested area separating these two deposits and at 'Raspopovici' some 20 kilometers to the south. Exploration prior to the Issuer's involvement, consisting of detailed drilling and underground bulk sampling, has been concentrated on the Pobrdski Potok property which has probable resources of 140,000 metric tonnes of 37 percent B<sub>2</sub>O<sub>3</sub> in an upper and lower zone with an average thickness of 1.0 meter. The larger of the two properties,

the Piskanja, which has been subjected to the least exploration, has a probable resource of some 7 million tonnes of similar grade with an average thickness of 4.5 meters for the upper layer and 3.5 meters for the lower layer.

The Piskanja deposit, because of its larger resource potential and the thicker borate beds, will be the primary target of the next planned phase of drilling and development.

### ***Local Geology***

Both the Pobrđjski Potok and Piskanja borate properties are located within the Jarandol basin. The subsidence which formed the Jarandol Basin appears to have been initiated by an east-west fault system, with subsequent north-south faulting during the second phase of volcanic extrusion resulting in their separation. The lithological composition of the basin sequence is characterized by the following rock types: unconsolidated Quaternary and alluvial sediments, Tertiary claystones, tuffaceous claystones, marlstones with organic material and pyrite, siltstones with organic material and pyrite, pelitic and silty tuffs, highly calcareous tuffites, dolomitic and marly limestones, volcanic-sedimentary breccias of varying composition and borate layers.

The volcanic-sedimentary breccias apparently are a constant lithological constituent in the sedimentary sequence between the borate beds. Fragments vary in size from 20 cm to less than 2 cm and are primarily of dacite-andesite composition with a fine sandstone matrix that is highly pyritized.

The distribution of the boron minerals in the borate layers is variable, depending both on depth and perhaps their horizontal location in the basin. Although the full suite of boron minerals have been recognized, the primary minerals consist of colemanite and ulexite.

### ***Drilling by Electroprivreda***

Between 1984 and 1991, Electroprivreda drilled a total of 20 vertical HQ size diamond drill holes in the Piskanja boron deposit that varied in depth from 250 meters to 500 meters and averaged 300 meters. The initial holes were drilled on a 800 X 800 meter grid with second phase drilling on a 400 X 200 meter grid and third phase drilling reduced to a 300 X 200 meters. The majority of the drill holes (14 of the 20 holes completed) intersected at least 2 zones of boron rich mineralization which occur for the most part within volcanic-sediment beds. This series of beds is composed of quaternary and alluvial sediments, marls (tuffogenic and alluvial), alverolite, dolomitic and marly limestones, carbonates and volcanic breccias. The upper boron layer varies from 2.8 to 14.0 meters in thickness and averages 4.6 meters while the second zone varies from 1.5 to 7.5 meters and averages 3.3 meters thick. Drilling results indicate that the deposit remains open to the south.

The drill holes were logged and the collars of the holes surveyed and collar elevations established.

Serbian drilling technology has not kept pace with that of the western world primarily because of laws which demanded that most industrial equipment be manufactured within communist bloc countries. As a result, drilling equipment is cumbersome and is several years behind in technological improvements which greatly affects its efficiency by western standards. These factors coupled with the 'laid back' work ethics of the general labour force is reflected in the time that is required to complete a normal drilling project. HQ size diamond drill holes drilled to an average depth of 300 meters on the Piskanja borate deposit required drilling times that varied from 90 to 120 days per hole. The 20 holes drilled on this project by Electroprivreda required 7 years to complete.

### ***Recent Exploration by Ras Borati Ltd.***

Ras Borati Ltd. contracted a large truck mounted Schram reverse circulation drill from Midnight Sun Drilling Ltd. of Whitehorse, Yukon, Canada and completed the first 10 holes of a planned 50 to 60 hole drilling program. The drilling was conducted between October, 1997 and December, 1997. Assays from hole #B-9 which were published by the Issuer on February 5, 1998 are attached hereto as Schedule A. Duplicate sample splits and pulps were sent to Lakefield Research in Lakefield, Ontario for check analysis and confirmed the absence of bias. The Issuer intends to publish assay results of the balance of the completed drilling upon receipt of the results.

### ***Mineralogy***

Although the full suite of borate minerals have been identified in the initial drill holes, the deposit appears to be mineralogically similar to the Turkish deposits with the primary minerals consisting of the calcium borate mineral Colemanite and the sodium-calcium borate mineral Ulexite; both of which are the primary source of most boron products that are produced world-wide. The distribution of mineral types varies both vertically and laterally within the deposit.

Assays of the boron intersections by Electroprivreda and the Geological and Mining Institute suggest that the average arithmetic grade of all borate sections intersected in the Piskanja deposit is 39.39% B<sub>2</sub>O<sub>3</sub>.

### ***Mineral Resources***

The Geological and Mining Institute in Belgrade has taken a cursory look at mineral resources for the Piskanja Deposit based on existing drill results and have calculated that borate resources in all categories are approximately 7 million tonnes with an average grade of 39 percent B<sub>2</sub>O<sub>3</sub>. A quick approximation of the resource tonnage, based on a drilled plan area of 350,000<sup>2</sup> meters (700 m X 500 m) and 2 beds with a total thickness of 8 meters with 1 meter<sup>3</sup> weighing 2.5 tonnes, calculates to be approximately 6.9 million tonnes. Further detailed drilling is a necessity before refinements to the resource and grade are warranted.

### ***Geotechnical Studies***

Preliminary rock mechanic studies that were undertaken by Electroprivreda on core samples collected during drilling of the smaller Pobrđjski Potok deposit indicates that the borate beds and the overlying strata have sufficient strength to support room and pillar type underground workings.

Although similar tests have not been conducted on the Piskanja deposit; visually the core is similar and is expected to exhibit comparable or better shear strengths due to slightly more dense overlying sediments. A multitude of samples for geotechnical testing must be collected during the next phase of drilling to ensure that sufficient data is available to permit design of underground openings and mining systems.

### ***Hydro-metallurgical Studies***

The Institute for Nuclear and Metallurgical Studies, located in Belgrade, conducted a series of preliminary beneficiation and hydro-metallurgical studies on bulk borate samples from the Pobrđjski Potok deposit which were designed to investigate the feasibility of producing marketable products from these borates. These studies indicate that the borate ore can be readily upgraded to a saleable product and/or can be chemically reacted with sulphuric acid to produce another saleable product-boric acid.

As an added benefit, the tailings from this process are suitable for use in the production of a marketable grade of boron enriched fertilizers. Conventional weak sulphuric acid leaching of the concentrate followed by evaporation and recrystallization of the pregnant solution permitted the manufacture of a technical grade boric acid (99.96% H<sub>3</sub>BO<sub>3</sub>).

### ***Markets and Marketing Considerations***

Borate minerals and refined borate products are used extensively in the manufacture of vitreous products, such as fiberglass insulation, textile fiberglass, borosilicate glass, ceramic glazes and porcelain enamels. In North America these applications account for approximately 60 percent of borate consumption. Other substantial uses of borates include detergents, fire retardants, metallurgy, agriculture, insecticides and wood preservatives. The latest figures that are available show that in 1998, glass products accounted for approximately 71% of United States usage, followed by soaps and detergents with 5%, agriculture with 4%, fire retardants with 4%, and other uses with 16%. Demand for borates tends to follow world economic patterns because of a large consumption in building and construction applications.

The United States continues to be the world's largest producer and consumer of boron compounds. An excerpt from the United States Geological Survey Mineral Commodity Summaries, February 2000 on Boron is attached hereto as Schedule B. This report can be found on the world wide web at <http://minerals.er.usgs.gov/minerals/pubs/commodity/boron/120300.pdf>.

U.S. Borax, the world's largest producer, operates a large open pit kernite and tincal mine at Boron, California which produces boric acid, borax and enhanced borate products. More than 80 percent of the US production results from mineral deposits mined only for their boron content, with extraction from lake brines for sodium carbonate, sodium sulfate, potassium sulfate and potassium chloride accounting for the remaining borate production.

In 1954, Borax Consolidated formed Turk Boraks to explore for and mine borax in Turkey. Extensive exploration resulted in the discovery of a major borate deposit at Kirka in Anatoli in 1960 which was subsequently developed by Turk Boraks in conjunction with Turkish interests; shortly after a successful start-up, the operation was nationalized by the Turkish government. Turkey continues to be the world's second largest producer and exporter of both raw and refined borate products.

The vulnerability of the world borate supply to local labour disruptions was emphasized in 1995 when a strike by the Turkish metal and mining workers between September and November affected the delivery of all borate products for many months. This strike served to remind customers that the world borate supply is controlled by just two major producers.

1995 imports of borates to the United States totaled 145,500 short tons, approximately the same amount as in 1994. Imports of boric acid totals 20,000 short tons, borax 15,400 short tons, colemanite 44,000 short tons and ulexite 66,000 short tons. Nearly all of the imported colemanite came from Turkey with approximately 57% of the boric acid imports originating in Italy from Turkish feed-stock and the remainder imported from Chile and South America. Imports of boric acid and ulexite from South American producers are generally destined for agricultural use because of their low grades.

Fifty percent of domestic production in the United States is exported and competes with borate concentrates and refined products from Turkish, South American and European sources.

The principal refined borates sold on the market today are as follows:

CHEMICAL NAME	FORMULA	% B <sub>2</sub> O <sub>3</sub>	USES
Borax pentahydrate	Na <sub>2</sub> O.2B <sub>2</sub> O <sub>3</sub> .5H <sub>2</sub> O	47.8	Fertilizer, ceramics, flux, fibreglass, metallurgy, perborate detergents
Borax decahydrate	Na <sub>2</sub> O.2B <sub>2</sub> O <sub>3</sub> .10H <sub>2</sub> O	36.5	Flux, nuclear, adhesives, detergents
Boric acid	H <sub>3</sub> BO <sub>3</sub>	56.3	Fire retardant, flux, glass, insecticide, nuclear
Anhydrous borax	Na <sub>2</sub> O.2B <sub>2</sub> O <sub>3</sub>	69.2	Ceramics, frit, glass
Anhydrous boric acid	B <sub>2</sub> O <sub>3</sub>	100.0	Frit, ceramics

Borate minerals are comparatively rare with large deposits only known to occur in a few places in the world, with the best known located in California and Turkey. Boron touches the lives of everyone and can be found in almost everything including fertilizer, cookware, medicines and space age metals. For these reasons borates are extremely valuable industrial minerals that command prices from US\$300 per ton for raw material to US\$95 per kg for boric nitric powder a specialty chemical. The product in common demand, and hence most readily marketed, is boric acid which has a value of approximately US\$500 to \$600 per ton.

### ***Foreign Investment***

As with all types of international business operations, currency fluctuations, exchange controls, restriction on foreign investment, changes to tax regimes or political action could impair the value of the Issuer's investment, and may adversely affect the Issuer's financial position and the results of its operations. Yugoslavia is a democratic country, although recent conflicts in the southern Kosovo region of Yugoslavia have generated demands for a cease-fire and negotiated settlement of the warring partners supported by threats of military action on the part of NATO. The Issuer believes that the resolution of this conflict would be in the best interests of the Issuer whereas the continued unrest would in all likelihood hamper the Issuer's progress.

**The United States has imposed trade sanctions on all U.S. persons and U.S. companies prohibiting them from conducting any investment and/or trade with the Federal Republic of Yugoslavia. A number of other countries have supported the U.S. directive and applied similar sanctions to their nationals.** This action has and continues to make the financing and development of the Issuer's Piskanja Borate Deposit difficult and uncertain. See "Risk Factors" on page 19.

## 2. Cop Property, Atlin Mining Division, British Columbia

Shadow was organized to enter an option and joint venture agreement (the "Option and Joint Venture Agreement") dated February 14, 1996 as amended by amending agreements dated December 2, 1997, July 15, 1998, September 15, 1998 and November 27, 1998 between Shadow and Malcolm Bell and Paul Sorbara ("Bell and Sorbara"), to conduct mineral exploration activities pursuant to the Option and Joint Venture Agreement on certain mineral claims held by Bell and Sorbara located in the Atlin Mining Division of British Columbia (defined in detail below as the "Cop Property") and to engage in the acquisition and exploration of other mining properties. Shadow is owned as to 65% by the Issuer, the promoter of Shadow. Shadow initially acquired the mineral rights under the Option and Joint Venture Agreement for the benefit of the Issuer. Shadow is obligated to pay an aggregate of \$60,000 of rental payments of which \$40,000 has been paid, issue an aggregate of 200,000 common shares of Shadow at a deemed price of \$0.25 per common share, of which 100,000 common shares have been issued and incur an aggregate of \$614,000 of expenditures on the Cop Property prior to December 1, 2000. Shadow is dealing at arms' length with Bell and Sorbara.

Other than its right to earn an interest in the Cop Property under the Option and Joint Venture Agreement, Shadow has no interests in any mineral properties and to date its activities have been concentrated solely on acquiring its rights under the Option and Joint Venture Agreement and fulfilling its obligations thereunder.

### Option and Joint Venture Agreement

Under the Option and Joint Venture Agreement Bell and Sorbara also granted Shadow the option (the "Option") to cause a joint venture agreement having as its material terms those terms set out in Schedule B to the Option and Joint Venture Agreement. This Option may be exercised at any time on or before December 24, 1998 (subsequently extended to December 1, 2000), (as defined in the Option and Joint Venture Agreement), but only if, prior to the exercise date, Shadow has expended at least \$1,000,000 (subsequently reduced to \$614,000) for "Project Work" as defined below, issued an aggregate of 200,000 common shares of Shadow, at a deemed issuance price of \$0.25 per common share, to Bell and Sorbara and paid an aggregate of \$60,000 to Bell and Sorbara. The Option expires at 11:59 p.m. on December 1, 2001. In consideration of expending a total of \$614,000 in exploration, land holding costs, and development work as more specifically set out in the Option and Joint Venture Agreement (the "Project Work") over four (4) years pursuant to the Option and Joint Venture Agreement, Shadow is entitled to earn an undivided sixty percent (60%) interest under the Option and Joint Venture Agreement in the Cop Property.

In the event that Shadow exercises its option to cause the Joint Venture Agreement to become effective the term of the Option and Joint Venture Agreement shall terminate immediately thereon and the relationship between the parties with respect to the Cop Property shall be governed by the terms of the Joint Venture Agreement.

The additional required expenditures of \$450,000 is to be expended in the following minimum annual amounts and any excess expenditures in any year may be credited towards future expenditure requirements:

Project Year	Minimum Property Expenditure	Deadline	Status
1999	\$200,000	12/01/99 <sup>(1)</sup>	Not Completed <sup>(1)</sup>
2000	\$250,000	12/01/00	Pending



In addition to expenditures required for Project Work, upon execution of the Option and Joint Venture Agreement Shadow was required to pay Bell and Sorbara \$10,000 during the term of the Option and Joint Venture Agreement. Shadow is required to pay the following amounts and issue certain amounts of common shares of Shadow in order to extend the term of the Option and Joint Venture Agreement on an annual basis (collectively the "Rentals"):

Project Year	Amount	Number of Common Shares	Rental Period	Rental Due Date	Status
1996	\$20,000	Nil	02/14/96 to 12/24/96	12/24/96	Paid
1997	\$5,000	Nil	12/24/96 to 12/31/97	12/31/97	Paid
1998	\$5,000	Nil	12/31/97 to 12/31/98	02/28/98	Paid
1998	Nil	50,000	12/31/97 to 12/31/98	09/15/98	Paid
1998	\$10,000	50,000	12/31/97 to 12/31/98	12/01/98	Paid
1999	\$10,000	50,000	12/31/98 to 12/31/99	12/01/99	Not Completed <sup>(1)</sup>
2000	\$10,000	50,000	12/31/99 to 12/31/00	12/01/00	Outstanding

Shadow is required to make the expenditures indicated above for the Project Work and the rentals on or before 11:59 p.m. on December 1 of each of the Project Years or the Option and Joint Venture Agreement will terminate. In the event of an unexcused failure by Shadow to comply with any of the covenants, terms and conditions of the Option and Joint Venture Agreement Bell and Sorbara shall be entitled to give Shadow written notice of its defaults specifying the details of same. Generally, if such default is not remedied within 30 days after receipt of the said notice then the Option and Joint Venture Agreement may be cancelled at the option of Bell and Sorbara by written notice to Shadow.

Shadow may cancel and terminate the Option and Joint Venture Agreement by delivering to Bell and Sorbara written notice stating Shadow's desire not to extend the term of the Option and Joint Venture Agreement for an additional Project Year or by failure to satisfy the Project Work obligations required. Otherwise, upon the payment of the Rentals and expenditures for Project Work, the term of the Option and Joint Venture Agreement automatically extends to cover each Project Year subsequent to 1996.

The Cop Property consists of 4 claims comprised of 72 units in the Atlin Mining Division of British Columbia, more particularly described as follows:

Claim Name	Units	Record Number	Record Date	Expiry Date
Cop 1	16	203650	April 21, 1991	April 21, 2001 <sup>(1)</sup>
Cop 2	16	203651	April 20, 1991	April 20, 2001 <sup>(1)</sup>
Cop 3	20	203652	April 21, 1991	April 21, 2001 <sup>(1)</sup>
Cop 4	20	203653	April 21, 1991	April 21, 2001 <sup>(1)</sup>

collectively referred to as the "Cop Property").

**(1) The Option and Joint Venture Agreement is currently in default due to the non-payment of Rentals to the Optionors and completion of required Project Work.**

The Option and Joint Venture Agreement further provides that Shadow shall procure, and at all times, during the term of the Option and Joint Venture Agreement, maintain in full force and effect such insurance as required by law.

Pursuant to the Option and Joint Venture Agreement, Shadow has indemnified and saved harmless Bell and Sorbara and its successors and assigns of and from any and all liability in any way arising out of Shadow's occupation and use of the Cop Property or its operations thereon or therein, excluding any liability arising out of any claims, actions or damages resulting from Bell and Sorbara's own negligence or default.

Shadow has satisfied the 1998 commitment required pursuant to the Option & Joint Venture Agreement dated February 14, 1996 as amended. During August of 1999 Shadow attempted to complete the reclamation of the Cop Claims. This work was filed as assessment to maintain the Cop Claims for a further 12 months from their expiry date until April 2001. **The Option and Joint Venture Agreement is currently in default.** Shadow is currently negotiating an extension to its obligation pursuant to the Option and Joint Venture Agreement. Shadow is evaluating its continued participation pursuant to the Option and Joint Venture Agreement.

### Kuran Report

The Cop Property is the subject of a geological and mineralization report (the "Kuran Report") prepared by Virginia Kuran, B.Sc., P. Geo. ("Kuran") of Kuran Exploration Ltd., Consulting Geologists, Maple Ridge, British Columbia, dated March 25, 1998. The following is an excerpt of the Kuran Report.

Kuran's evaluation is based on her visit to the site in June 1991 and her review of existing reports and data on the Cop Property. A more recent property visit by Kuran was not deemed necessary as the work conducted since 1991 did not discover any new surface showings or produce drill core which needed to be examined in the field. The purpose of the evaluation was to assess the geology, the results of past work done on the property and its future development potential and to provide recommendations and cost estimates for appropriate additional exploration work.

### SUMMARY

The Cop 1-4 mineral claims, totalling 72 contiguous units, are located 45 kilometres northwest of Telegraph Creek, British Columbia, Canada. The claims lay within the Intermontaine Belt of Upper Triassic intermediate volcanics, tuffs and sediments which have been intruded by granodiorite and monzonitic stocks of Lower Jurassic to Triassic age.

The general area in which the Cop 1-4 claims are situated was extensively explored for large scale copper deposits from the mid-1950's to the early 1970's by numerous companies. At that time, exploration efforts were concentrated on searching for copper due to prevailing metal prices. Work completed in the 1980's and more recently in the 1990's focused both on the copper potential and the potential for the claims to host copper-gold porphyry mineralization and/or epigenetic base and precious metal mineralization.

Porphyry style, fracture controlled, copper mineralization hosted by diorite and andesite has been outlined on the property. Results from two separate trenches on the Dick Creek showing returned 0.41% Cu across 179 metres and 0.33% Cu across 70 metres. Gold values in these trenches range between 0.003 and .01 oz/ton. Diamond drilling on the Copper Creek showing returned 143 feet of 0.485% Cu with low gold values, including 4.5 feet of 0.13 oz/ton Au and 2.6% Cu. Geochemical, geophysical and geological surveying has outlined significant coincident copper-gold soil anomalies with coincident induced

polarization anomalies 350 meters northwest of the Dick Creek showing and at the East Dick Creek target located 800 metres to the southeast of the Dick Creek showing. Neither of these targets have been tested by drilling or trenching.

Lead-zinc mineralization has been recognized on the property at the Tin Can showing on the Cop 4 claim. A coincident 600 metre long by 100 metre wide anomaly of greater than 1000 ppm lead and 1000 ppm zinc cuts across topography on the south end of the Copper Creek copper anomaly. The Tin Can Pb-Zn showing is located directly above the east end of this anomaly. This anomaly has never been tested by trenching or drilling.

In 1991, a helicopterborne geophysical survey was carried out over the entire area of the Cop 1-4 claims. This survey outlined 12 groups of electromagnetic conductors. Soil geochemical sampling carried out in 1996 to follow up one of these groups of airborne electromagnetic anomalies located in the northeast corner of the Cop 1 claim outlined a new area of anomalous gold, copper and zinc geochemical values referred to as the North Dick Creek target. The other 11 groups of conductors remain unexplored.

### ***Summary Of Recent Exploration Work***

In the spring of 1996 Shadow flew a LandSat Colour Image Survey of Shadow's Cop Property which indicated oxide and clay alteration. The survey outlined alteration in areas where past exploration had already indicated anomalous gold, silver, copper, lead and zinc geochemistry, anomalous geophysical anomalies and the Dick Creek copper showing.

The 1996 Exploration Program on the Cop Property consisted of two ground V.L.F.-E.M. surveys. The first V.L.F.-E.M. survey covered the Dick Creek and East Dick Creek areas. This survey outlined a sequence of conductors that appear to be continuous between the two zones. Some of the conductors are also coincident with previously located gold and copper anomalies. The conductors outlined a zone over 1,000 metres long which is open at both ends.

The second V.L.F.-E.M. and soil survey was conducted in an area previously referred to as Helicopter Borne V.L.F. anomaly XVI. The anomaly lies a little north of and between the Dick Creek and East Dick Creek areas. This area is referred to as North Dick Creek.

The results of the 1996 geochemical survey on the North Dick Creek area outlined a copper anomaly at least 350 metres long and 200 metres wide. This copper anomaly is coincident with a gold anomaly of greater than 50 ppb of 100 metres by 100 metres in size with one value of 430 ppb gold. The southeastern portion of the copper and gold anomalies are also coincident with zinc values of greater than 1000 ppm.

Due to technical complications Shadow was unable to complete the diamond drilling expected to be included in the 1996 exploration program.

A \$160,000 Phase I exploration program consisting of soil geochemical sampling, geophysical surveying and drilling is warranted and recommended in order to evaluate the potential of the Cop Property to host either porphyry Cu-Au mineralization and/or epigenetic base and precious metal mineralization. Contingent upon favourable results from the Phase I program, a second phase of exploration will be required. This program would mostly involve further drilling of the previously outlined zones. The cost of this phase would depend largely upon the drill footage required, which cannot be accurately determined until after the Phase I results are analysed. However, Kuran states that a preliminary estimate of \$150,000 is reasonable for a program of this type.

3. The Stope Baby VMS Project – British Columbia, Canada  
121° 26' 30"W 52° 17' 30"N

### **Location**

The Stope Baby VMS Project is located some 3 miles south east of the village of Horsefly, B.C. and approximately 15 kms south of Mount Polley Mine's open pit, copper-gold mine. The historic Horsefly mining district first gained prominence with the discovery of rich placer gold deposits in the area during the early 1850's, and again in the early 1960's with the discovery of the Mount Polley deposit and the QR gold deposit, some 15 kilometers north of Mount Polley. A 1999 discovery of a high grade boulder train, thought to represent a yet undiscovered VMS source, near Eureka Peak to the east has been recently optioned to Hudson Bay Mining.

Excellent access from Horsefly is provided by a good all-weather road which crosses the property diagonally.

### **Regional Geology**

The property is located on the eastern side of a volcanic belt of rocks (Nicola Group) mapped as the Quesnel Trough. This belt is bounded on the east by the Eureka thrust, and on the west by major regional dextral faults. In the Quesnel Lake area, rocks of the Nicola Group form a broad, northwest trending syncline. The basal strata is represented by middle-to-late Triassic black phyllite which grades locally into siltstone, sandstone and greywacke. Overlying this package are Upper Triassic alkali olivine basalt flows and breccias. Monolithic latite breccias are common near volcanic centers.

Locally, the Triassic and Jurassic volcanic rocks are intruded by Lower Jurassic syn-volcanic syenite to dioritic stocks and plugs. Many of these alkalic stocks host, or are spatially related to, copper-gold mineralization with associated strong K-feldspar and propylitic alteration zones; ie the Mount Polley deposit with reserves of 53 million tons averaging 0.44% copper and 0.017 opt gold per tone.

### **Target Synopsis**

The Quesnel trough has long been recognized as having the potential to host volcanic massive sulphide deposits (VMS deposits). Exploration for these types of targets has been unsuccessful to date primarily because of lack of rock exposure and the problems this creates for accurate bedrock mapping. The late December 1999 discovery of a massive sphalerite showing, with copper, lead, silver and gold values, in Triassic volcanics on the Stope Baby property is the first significant polymetallic, epithermal discovery in the Quesnel trough. Subsequent review of available aeromagnetic data suggests that the Meese Lake syenite intrusive forms much of the bedrock geology just to the south of this new showing.

### **Proposed Exploration Plan**

As a result, the Corporation's exploration during the 2000 season will concentrate on evaluating the potential of this new discovery and outlining the boundaries of the syenite unit. Line cutting to establish a grid over the property is expected to be initiated in April, with follow-up magnetic, resistivity and IP surveys completed by late June. This proposed work program is designed to provide the geophysical data required to refine understanding of the bedrock stratigraphy and define potential targets in preparation for early diamond drilling.

#### ITEM 4: SELECTED CONSOLIDATED FINANCIAL DATA

The following tables summarize financial data for the Issuer, including its subsidiary<sup>(1)</sup>, Shadow Capital Corp., for the last five completed financial years and the last eight quarters ending with June 30, 1999, the most recently completed financial year:

<b>For the Years ending June 30,</b>	<b>1999</b>	<b>1998</b>	<b>1997</b>	<b>1996</b>	<b>1995</b>
Net revenue (Interest Income)	842	1,921	23,018	12,389	-
Income or loss before discontinued operations and extraordinary items	(380,178)	(524,272)	(302,148)	(31,503)	(15,140)
Income or loss before discontinued operations and extraordinary items, per share	(0.02)	(0.04)	(0.03)	(0.007)	(0.003)
Income or loss before discontinued operations and extraordinary items, per share fully diluted	(0.02)	(0.03)	(0.02)	(0.002)	(0.003)
Net income or loss	(401,085)	(604,298)	(378,887)	(146,503)	(15,140)
Net income or loss, per share	(0.022)	(0.04)	(0.03)	(0.03)	(0.003)
Net income or loss, per share fully diluted		(0.03)	(0.02)	(0.01)	(0.003)
Total assets	4,770,156	4,015,259	2,291,134	990,084	236,669
Total long term debt	-	308,716	-	750,000	-
Cash dividends	-	-	-	-	-

(1) 766072 Alberta Inc. was acquired subsequent to the yearend. Its financial information has not been included and is not as of the date of this report.

<b>For the Four Quarters for Fiscal 1999</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Total</b>
Net revenue (Interest Income)	318	140	107	277	842
Income or loss before discontinued operations and extraordinary items	(43,700)	(98,293)	(109,567)	(128,618)	(380,178)
Income or loss before discontinued operations and extraordinary items, per share	(0.003)	(0.006)	(0.006)	(0.007)	(0.021)
Income or loss before discontinued operations and extraordinary items, per share fully diluted	(0.002)	(0.005)	(0.005)	(0.006)	(0.018)
Net income or loss	(81,414)	(99,344)	(103,942)	(116,385)	(401,085)
Net income or loss, per share	(0.005)	(0.006)	(0.006)	(0.006)	(0.022)
Net income or loss, per share fully diluted	(0.004)	(0.005)	(0.005)	(0.005)	(0.019)

<b>For the Four Quarters for Fiscal 1998</b>	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>	<b>Total</b>
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Net revenue (Interest Income)	1,646	14	16	245	1,921
Income or loss before discontinued operations and extraordinary items	(121,276)	(138,734)	(182,685)	(81,577)	(524,272)
Income or loss before discontinued operations and extraordinary items, per share	(0.01)	(0.01)	(0.02)	(0.006)	(0.04)
Income or loss before discontinued operations and extraordinary items, per share fully diluted	(0.007)	(0.008)	(0.01)	(0.005)	(0.03)
Net income or loss	(121,276)	(138,734)	(182,685)	(81,577)	(604,298)
Net income or loss, per share	(0.01)	(0.01)	(0.02)	(0.006)	(0.04)
Net income or loss, per share fully diluted	(0.007)	(0.008)	(0.01)	(0.005)	(0.03)

Since its incorporation, the Issuer has declared no dividends and has no formal policy with respect to the declaration of dividends. There are no restrictions which could prevent the Issuer from paying dividends.

Note: In fiscal year 1999 the Issuer issued a dividend in specie comprised of one share of Shadow, one Series A Warrant of Shadow and one Series B Warrant of Shadow for each 5 shares of the Issuer held as of the close of business on December 24, 1998 . The Issuer has not declared or paid any other dividends.

## **Item 5: Management's Discussion and Analysis of Operating Results**

### **(1) Issuer**

The following discussion of the results of operations of the Issuer for the fiscal years ended June 30, 1999 and 1998 should be read in conjunction with the financial statements of the Issuer and notes thereto. There have been no major changes in the accounting policies during the two-year period.

### **Results of Operations**

In that the Issuer does not have a producing mineral property, it has no sources of revenue other than interest income. The interest amounts earned fluctuate with changing amounts on deposit and with changing interest rates. These amounts are, in any event, not material, and are merely used to offset administrative operating expenses. The decrease in such income to June 30, 1999 from the previous period reflects the decrease in amounts held on deposit during the latest period.

The Issuer's administration and exploration expenses decreased approximately 27% for the year ended June 30, 1999 compared to the year ended June 30, 1998. This is simply a reflection of the decrease in mineral exploration activity conducted by the Issuer over the past year which also necessitated decreased expenditures on professional fees, salaries, consulting fees and investor relations.

The Issuer's loss for the year ended June 30, 1999 was \$401,085 or \$0.02 per share, compared with a loss for the previous year of \$604,298, or \$0.04 per share, representing approximately a 34% decrease. Due to the Issuer's focus on exploration rather than on mining operations, an annual profit or loss is not currently a meaningful measure of the Issuer's performance or value.

The Issuer has not been subject to income or capital taxes during either of the two most recent fiscal years.

Cumulative net deferred exploration costs as at June 30, 1999 totaled \$4,736,462, compared with \$3,864,435 as at the previous year-end. Deferred mineral property costs are an accumulation of exploration and development costs on active properties. The Issuer's policy is to write-off such costs on a property-by-property basis, as the claims or agreements lapse. Costs for properties held but on which little or no current work is being performed are not written down, since the possibility exists of re-activation by either the Issuer or a joint venture partner.

Accounts payable at the end of the current fiscal year were substantially higher than at the previous year-end, \$1,458,462 versus \$713,761 in 1998.

### **Outlook for the Fiscal Year Ending June 30, 2000**

The Issuer will continue to operate with annual losses until sufficient revenues may be generated from one or more mineral properties of the Issuer which may be taken to the production stage. At the present time, management believes that the Piskanja Borate Property offers the best potential for development into a profitable producing mining operation. Management also believes that if the feasibility study proves positive and the Issuer can raise the necessary capital for more development, production could be initiated during the fiscal year ended June 30, 2001. For this reason, management will focus its attention on completion of a feasibility study on the Piskanja Borate Property in 2000 and raising additional capital to reduce its working capital deficit.

From July 1999 to February 2000 the Issuer completed two private placements resulting in gross proceeds of \$876,666 in additional working capital which was utilized for general corporate purposes.

**Investors are cautioned that, even with a positive feasibility study, the uncertainties in commodity markets and political developments, may delay or prevent the Issuer from developing the Piskanja Borate Property or any other mineral deposit discovered by the Issuer.**

### **Liquidity and Capital Reserves**

In management's view, given the nature of the Issuer's operations, which consists of the exploration and evaluation of mining properties, the most relevant financial information relates primarily to current liquidity, solvency and planned property expenditures. The Issuer's financial success will be dependent upon the economic viability of the Piskanja Borate Property and the extent to which it can discover new mineral deposits. Such development may take several years to complete and the amount of resulting income, if any, is difficult to determine. The sales value of any mineralization discovered by the Issuer is largely dependent upon factors beyond the Issuer's control, including the market value of the minerals to be produced. The Issuer does not expect to receive significant revenue from any of its properties in the next year.

The Issuer's historical capital needs have been met by equity subscriptions (1999 - \$605,140; 1998 - \$513,126; 1997 - \$1,585,050). The Issuer will require additional financing to fund future exploration and development work. However, the Issuer presently does not have sufficient working capital to fund its exploration work programs and to meet its anticipated administrative and overhead expenses for the current fiscal year.

In light of the current volatile financing markets, there is no assurance that funding by equity subscriptions will be possible at the times required or desired by the Issuer.

As at June 30, 1999, the Issuer's working capital deficit was approximately \$1,773,377 versus a working capital deficit of \$796,096 in 1998.

## **(2) Shadow Capital Corp.**

The following discussion of the results of operations of Shadow for the fiscal years ended June 30, 1999, 1998, 1997 and 1996 should be read in conjunction with the financial statements of Shadow and notes thereto. There have been no major changes in the accounting policies during the four-year period.

### **General**

Shadow is an exploration-stage company, and as such it has yet to receive income from its mineral exploration operations. In that Shadow does not have a producing mineral property, it has no sources of revenue other than interest income. The interest amounts earned fluctuate with changing amounts on deposit and with changing interest rates. These amounts are, in any event, not material, and are merely used to offset administrative operating expenses.

To date Shadow has raised funds through the issuance of its securities. Shadow's expenses relate to work done on the Cop Property and limited corporate and administration expenses.

Currently, Tim Daniels, the President of the Corporation, is the only director accruing a salary of \$2,500 a month. Otherwise, expenses directly related to the administration of Shadow on a day to day basis are incurred.

### **Year Ended June 30, 1999 Compared to Year Ended June 30, 1998**

During the year ended June 30, 1999, Shadow incurred a loss of \$35,202 or \$0.003 per share, as compared to a loss of \$6,645 or \$0.0007 per share for the one year period ended June 30, 1998. Administration and corporate expenses amounted to \$34,945, as compared to \$6,868 in the same period in 1998. No exploration expenses were incurred during 1999 as compared to exploration and property development in 1998 of \$12,565.

### **Liquidity and Capital Resources**

As at June 30, 1999 Shadow had 10,000,000 Common Shares issued and outstanding and 3,400,000 Series A Warrants and 3,400,000 Series B Warrants issued and outstanding. Three Series A Warrants and \$0.25 are required to acquire one common shares of Shadow prior to August 15, 1999. Three Series B Warrants and \$0.50 are required to acquire one common shares of Shadow prior to April 31, 2000.

As at June 30, 1999, Shadow had a working capital deficit of (\$27,997). Shadow intends to utilize the proceeds, if any from the exercise of Series A Warrants to fund the reclamation and first phase of the recommended exploration on the Cop Property in late 1999. In the event that Shadow does not receive sufficient funds from the exercise of Series A Warrants, then Shadow may not be able to carry out the proposed exploration program.



### **Year Ended June 30, 1998 Compared to Year Ended June 30, 1997**

During the year ended June 30, 1998, Shadow incurred a loss of \$6,645 or \$0.0007 per share with a loss of \$3,528 in the comparative period in 1997. Administration and corporate expenses amounted to \$6,868 with \$3,853 for the comparative period in 1997. Property development in 1998 aggregated \$12,565 as compared to \$137,345 in the year ended 1997.

#### **Liquidity and Capital Resources**

As at June 30, 1998 Shadow had 10,000,000 Common Shares issued and outstanding.

As at June 30, 1998, Shadow had working capital of \$502.

### **Year Ended June 30, 1997 Compared to Period Ended June 30, 1996**

During the year ended June 30, 1997, Shadow incurred a loss of \$3,528. Administration and corporate expenses amounted to \$3,853. Property development in 1997 aggregated \$137,345 as compared to \$75,803 in the period ended June 30, 1996. Per share figures are not presented as they are meaningless. In addition, comparative figures for the period ended June 30, 1996 are excluded, as no expenses had been incurred in such period.

#### **Liquidity and Capital Resources**

As at June 30, 1997 Shadow had one Common Share issued and outstanding.

As at June 30, 1997, Shadow's working capital was \$6,697.

### **Period from commencement of operations in February 1996 to June 30, 1996**

During the period ended June 30, 1996, Shadow did not have any expenses. Administrative services were provided by its parent, the Issuer. Property development in 1996 totalled \$75,803.

#### **Liquidity and Capital Resources**

As at June 30, 1996, Shadow had one Common Share issued and outstanding.

As at June 30, 1999, Shadow's working capital deficit was \$17,568 arising primarily from administrative expenditures.

Shadow intends to utilize the proceeds, if any from the exercise of its outstanding Series B Warrants to satisfy corporate indebtedness and fund the first Phase of the exploration program recommended by the Kuran Report on the Cop Property in mid 2000. Finally, in the event that no funding is readily available the Corporation may seek to diversify from the resource field. No such agreements have been formulated. Alternatively Shadow will seek funding from either the Issuer, pursuant to private placements at prevailing market prices and/or seeking; a joint venture partner.

#### Outlook

To date, exploration, corporate and administration expenses have been below management's projections. Continuing attention to control of expenses should allow Shadow to complete its exploration programs within the stated cost projections.

Shadow's short to medium term success is dependent upon raising sufficient capital to commence the exploration programs recommended by the Kuran Report. **Due to Shadow's inability to raise sufficient capital from the exercise of its Series A Warrants, it has had to defer the commencement of the exploration program recommended by the Kuran Report. In light of Shadow's inability to attract additional capital to date, management of Shadow is evaluating its continued participation in the exploration of the Cop Claims.**

#### **Events Subsequent to June 30, 1999**

1. On August 15, 1999, the Series A Warrants of Shadow Capital Corp. expired. 153,275 Series A Warrants were exercised and Shadow Capital Corp. issued 51,091 shares at \$0.25 per share for aggregate consideration of \$12,772.75.
2. On August 18, 1999, Shadow Capital Corp. consolidated its capital on a 3.5 old shares for 1 new share basis and changed its name to Soundcache.com Inc.
3. Pursuant to Directors' Resolution dated December 21, 1999 the Board of Directors extended the expiry date of the Shadow Capital Corp. Series B Warrants to April 30, 2000.
4. On February 14, 2000, the Issuer completed a Private Placement of 1,658,001 units at a price of \$0.12 per unit. Each unit was comprised of one common shares and one-half warrant. Each full warrant allowed the purchase of an additional common share at a price of \$0.50 until February 14, 2002. The Issuer paid a cash commission of \$17,390.
5. On February 14, 2000, the Issuer completed a Private Placement of 100,000 units at a price of \$0.15 per unit. Each unit was comprised of one common share and one warrant to purchase an additional common share at a price of \$0.25 until February 14, 2001 and thereafter until February 14, 2002 at a price of \$0.50.
6. On February 14, 2000, the Issuer completed a Private Placement of 270,000 units at a price of \$0.15 per unit. Each unit was comprised of one common share and one warrant to purchase an additional common share at a price of \$0.25 until February 14, 2001.
7. On February 22, 2000, the Issuer completed a Private Placement of 1,015,550 units at a price of \$0.128 per unit. Each unit was comprised of one common share and one-half warrant. Each full warrant allowed the purchase of an additional common share at a price of \$0.50 until February 22, 2002. The Issuer paid a cash commission of \$9,999.
8. On February 22, 2000, the Issuer completed a Private Placement of 384,450 units at a price of \$0.128 per unit. Each unit was comprised of

one common share and one warrant to purchase an additional common share at a price of \$0.50 until February 22, 2002.

9. On February 28, 2000, the Issuer acquired all the issued and outstanding securities of 766072 Alberta Inc. by reimbursing \$20,000 paid by 776072 Alberta Inc. under a Property Option Agreement to acquire an option to earn a 100% interest in a 32 Unit claim block property located in the Quesnell Mining Division, Province of British Columbia.

**Item 6: Market for Securities**

The Issuer's common shares trade on The Canadian Venture Exchange located in Calgary, Alberta, Canada.

**Item 7: Directors and Officers**

<b>Name, Office Held and Municipality of Residence</b>	<b>Director Since</b>	<b>Principal Occupation For the Previous Five Years</b>
<b>TIM DANIELS<sup>(1)</sup></b> Director and President Victoria, British Columbia	March 20, 1996	Since 1996, President of Issuer; and, prior thereto, between 1991 and 1996, President of T.D. Daniels & Associates Ltd.
<b>BARBARA MORROW<sup>(1)</sup></b> Director New York, New York, U.S.A.	March 7, 1998	President of Barronett Global Investors Inc., a registered investment advisor; and, President of Barronett Financial Services, Inc., a provider of consulting and financial services.
<b>WILL THOMPSON<sup>(1)</sup></b> Director Qualicum Beach, British Columbia	March 20, 1996	Since June 1997, Assistant Exploration Manager with Sutton Resources Ltd.; prior thereto, for two years insurance salesman; and, prior thereto self-employed mineral explorationist.
<b>Dr. DRAGOLJUB JUJIC</b> Director Belgrade, Yugoslavia	January 30, 1997	Since 1993, independent mining engineering consultant primarily consulting on mining technology.
<b>JIM WALLIS</b> Director Williams Lake, British Columbia	October 22, 1999	Mining Consultant.

<sup>(1)</sup> Member of the Issuer's audit committee.

The directors of the Issuer are elected and hold office until the next annual general meeting of shareholders of the Issuer, unless any director resigns, is removed or becomes disqualified earlier.

The directors and senior officers of the Issuer as a group beneficially own, directly or indirectly, or exercise control or direction over, 3.6% of the voting securities of the Issuer as of June 30, 1999.

The Issuer has no executive committee.

**Item 8: Additional Information**

- (1) Additional information, including directors' and officers' remuneration and indebtedness, principal holders of the Issuer's securities, options to purchase securities and interests of insiders in material transactions, where applicable, are contained in the Issuer's Information Circular dated May 14, 1999 for its Annual Shareholders' Meeting held on June 18, 1999. Additional financial information is provided in the Issuer's comparative financial statements for its fiscal year ended June 30, 1999. A copy of the financial statements may be obtained from the Issuer at Suite 907 Empire Building, 10080 Jasper Avenue, Edmonton, Alberta, T5J 1V9. The Issuer may require payment of a reasonable charge for such copy if the request is made by a person who is not a security holder of the Issuer.

Additional information, including directors' and officers' remuneration and indebtedness, principal holders of Shadow's securities, options to purchase securities and interests of insiders in material transactions, where applicable, are contained in Shadow's Non-Offering Prospectus dated October 29, 1998. Additional financial information respecting Shadow is provided in Shadow's comparative financial statements for its fiscal year ended June 30, 1999. A copy of the financial statements may be obtained from the Issuer at Suite 907 Empire Building, 10080 Jasper Avenue, Edmonton, Alberta, T5J 1V9. The Issuer may require payment of a reasonable charge for such copy if the request is made by a person who is not a security holder of the Issuer or Shadow.

(2) **Risk Factors**

Foreign Government Risks

The Issuer's major property is located in Yugoslavia where mineral exploration and mining activities may be affected in varying degrees by political stability and government regulations relating to the mining industry. Any changes in regulations or shifts in political conditions are beyond the control of the Issuer and may adversely affect its business. Yugoslavia is, to a degree, a developing country, which may make it more difficult for the Issuer to obtain any required exploration, development and production financing for projects located there. Existing and possible future environmental legislation, regulations and actions could cause additional expense, capital expenditures, restrictions and delays in the activities of the Issuer, the extent of which cannot be predicted. Before production can commence on any properties, the Issuer must obtain regulatory and environmental approvals and there is no assurance that such approval will be obtained, and on a timely basis. The cost of compliance with changes in governmental regulations has the potential to reduce the profitability of operations.

Future operations of the Issuer, including development activities and commencement of production on its properties, will require permits from various Yugoslavian federal, state and local governmental authorities and such operations will be governed by laws and regulations governing prospecting, development, mining, production, exports, taxes, labour standards, occupational health, waste disposal, toxic substances, land use, environmental protection, mine safety and other matters. Companies engaged in the development and operation of mines and related facilities generally experience increased cost, and delays in production and other schedules as a result of the need to comply with applicable laws, regulations and permits.

The Issuer's exploration activities and its potential mining and any future operations are subject to various laws governing the land use, the protection of the environment, prospecting, development, productions, exports, taxes, labour standards, occupational health, waste disposal, toxic substances, mine safety and other matters. Such operations and exploration activities are also subject to substantial regulation under

these laws by governmental agencies and may require that the Issuer obtain permits from various governmental agencies. The Issuer believes it is currently in substantial compliance with all material laws and regulations which currently apply to its activities. There can be no assurance, however, that all permits which the Issuer may require for construction of future mining facilities and conduct of mining operations will be obtainable on reasonable terms or that such laws and regulations would not have an adverse effect on any mining project which the Issuer might undertake.

Failure to comply with applicable laws, regulations and permitting requirements may result in enforcement actions thereunder including orders issued by regulatory or judicial authorities causing operations to cease or be curtailed, and may include corrective measures requiring capital expenditures, installation of additional equipment, or remedial actions. Parties engaged in mining operations may be required to compensate those suffering loss or damage by reason of the mining activities and may have civil or criminal fines or penalties imposed for violations of applicable laws or regulations.

Amendments to current laws, regulations and permits governing operations and activities of mining companies, where more stringent implementation thereof, could have a material adverse impact on the Issuer and cause increases in capital expenditures or production costs or reduction in levels of productions at producing properties or require abandonment or delays in development of new mining properties.

#### Title Risks

The Issuer is satisfied that evidence of title to each of its mining properties is adequate and acceptable by prevailing industry standards with respect to the current stage of exploration on that property. Nevertheless, there is no guarantee that title to the mining properties held by the subsidiaries of the Issuer will no be challenged or impugned by third parties or that the applicable governmental authorities will not revoke, or significantly alter the conditions of the mineral properties. There is no certainty that the current rights represented by the mineral properties or any additional rights applied for, will be granted or renewed on terms satisfactory to the Issuer.

#### Currency Fluctuations and Inflationary Risks

The Issuer's operations in Yugoslavia make it subject to foreign currency fluctuations and inflationary pressures which may adversely effect the Issuer's financial position and results. With respect to Yugoslavian currency, the Issuer transfers funds to its subsidiaries on a "as needed" basis to avoid significant exposure to currency fluctuations. There can be no assurance that steps taken by management to address foreign currency fluctuations will eliminate all adverse effects and, accordingly, the Issuer may suffer losses due to adverse foreign currency fluctuations. **Yugoslavia has experienced extreme inflationary rates recently. Although the situation appears to have stabilized, the Issuer bears the risks of incurring losses occasioned as a result of rampant inflation in Yugoslavia.**

#### Exploration and Mining Risks

Mineral exploration and development involves a high degree of risk and few properties which are explored are ultimately developed into producing mines. The long-term profitability of the Issuer's operations will be in part directly related to the cost and success of its exploration programs, which may be affected by a number of factors. Substantial expenditures are required to establish ore reserves through drilling, to develop metallurgical processes to extract the metals from the ore and, in the case of new properties, to develop the mining and processing facilities at any site chosen for mining. Although substantial benefits may be derived from the discovery of a major

mineralized deposit, no assurance can be given that minerals will be discovered in sufficient quantities to justify commercial operations or that the funds required for development can be obtained on a timely basis.

If the Issuer proceeds to production on a particular property, commercial viability will be affected by factors that are beyond the Issuer's control, including the particular attributes of the deposit, the fluctuation in mineral prices, the costs of mining, processing and refining facilities, the availability of economic sources of energy, government regulations including regulations relating to prices, royalties, restrictions on production, quotas on exportation of minerals, as well as the protection of the environment and agricultural lands. It is impossible to assess with certainty the impact of these factors.

### Competition Risks

The Issuer competes with major mining companies and other smaller natural resource companies in the acquisition, exploration, financing and development of new properties and projects. Many of these companies are more experienced, larger and better capitalized than the Issuer. The Issuer's competitive position will depend upon its ability to successfully explore, acquire and develop new and existing mineral resource properties or projects. The Issuer is also in competition with other companies insofar as they produce the same product in a market where pricing and quality advantages can be claimed by all of the market participants. Factors which allow producers to remain competitive in the market over the long term are the quality and the size of the ore body, cost of production, and proximity to market. In all of these factors, the Issuer is competitive to greater or lesser degrees but because of the limited number of companies and variables involved, an individual group of producers can be pointed to as being in direct competition.

### Financing Risks

The Issuer has limited financial resources and there is no assurance that additional funding would be available to the Issuer for further exploration or development of its properties or to fulfil its obligations under any applicable agreements. Although the Issuer has been successful in the past in obtaining financing through the sale of equity securities, there can be no assurance that the Issuer will be able to obtain adequate financing in the future or that the terms of such financing will be favourable. Failure to obtain such additional financing could result in delay or indefinite postponement of further exploration and development of the Issuer's properties with the possible loss of properties.

### Uninsurable Risks

In the course of exploration, development and production of mineral properties, several risks, and in particular, unusual geological or unexpected operating conditions including rockbursts, cave-ins, fires and flooding, may occur. The Issuer may also incur liability as a result of pollution and other casualties. It is not always possible to fully insure against such risks and the Issuer may decide not to take out insurance against such risks as a result of high premiums or other reasons. Paying compensation for obligations resulting from such liability may entail significant costs for the Issuer.

### Permits and Licences Risks

The operations of the Issuer may require licenses and permits from various governmental authorities. There can be no assurance that the Issuer will be able to obtain all necessary licenses and permits that may be required to carry out exploration, development and mining operations at its projects.

### Mineral Prices Risks

Factors beyond the control of the Issuer may affect the marketability of any minerals discovered. Mineral prices have fluctuated wildly, particularly in recent years. The effect of these factors cannot accurately be predicted.

### Environmental Regulations Risks

The Issuer's operations may be subject to environmental regulations promulgated by government agencies from time to time. Environment legislation provides for restrictions and prohibitions on spills, releases or emissions of various substances produced in association with certain mining industry operations, such as seepage from tailings disposal areas, which would result in environmental pollution. A breach of such legislation may result in the imposition of fines and penalties. In addition, certain types of operations require the submission and approval of environmental impact assessments. Environmental legislation is evolving in a manner which means stricter standards, and enforcements, fines and penalties for non-compliance are more stringent. Environmental assessments of proposed projects carry a heightened degree of responsibility for companies and directors, officers and employees. The cost of compliance with changes in governmental regulations has the potential to reduce the profitability of operations. The Issuer intends to fully comply with all environmental regulations in Yugoslavia and in the areas in which it is active as well as with the sometimes higher standards set by North American environmental regulations.

### Conflicts of Interest

Certain of the directors and officers of the Issuer are also directors and/or officers and/or shareholders of other natural resource companies. Such associations may give rise to conflicts of interest. If a conflict of interest arises at a meeting of the Board of Directors, any director in a conflict will disclose his or her interest and abstain from voting on such matter. In determining whether or not the Issuer will participate in any project or opportunity, the directors will primarily consider the degree of risk to which the Issuer may be exposed and its financial position at the time.

### Directors and Assets Outside Canada

Certain of the directors are resident outside of Canada, and it may not be possible to effect service of process upon such directors and since all or a substantial portion of the assets of such directors are located outside of Canada, there may be difficulties in enforcing against such directors the judgements obtained in Canadian courts. Similarly, substantially all of the Issuer's non-monetary assets are located outside of Canada and there may be difficulties in enforcing against the Issuer judgements obtained in Canadian courts.

### (3) Glossary

Certain terms used in this Annual Information Form are defined below:

**“alteration”** means any change in the mineralogic composition of a rock brought about by physical or chemical means.

**“andesite”** means a dark-colored, fine-grained extrusive rock.

**“anomaly (geophysical)”** means a deviation from uniformity or regularity in geophysical quantities.

**“anomaly (geochemical)”** means a deviation from uniformity or regularity in geochemical quantities.

**“biotite”** means a widely distributed and important rock-forming mineral of the mica group.

**“borate”** means a generic term for boron compounds that contain oxygen.

**“borax”** means natural or refined sodium tetraborate decahydrate. This term is also used for pentahydrate (five molecules of water) and anhydrous (without water) forms of the refined mineral.

**“boric acid”** means a compound formed from the reaction of borates with acid and was formerly called boracic acid. Its formula is  $H_3BO_3$ .

**“boric oxide”** means anhydrous boric acid,  $B_2O_3$ . The boron content of materials is usually measured by their percentage of  $B_2O_3$ .

**“boron”** means a non-metallic element, fifth in the atomic table. In nature, boron always occurs in combination with oxygen and other elements, notably sodium and/or calcium.

**“claystones”** means fine, compact equigranular rock composed of clay particles.

**“colemanite”** means the principal calcium borate mineral, used mainly for making boric acid.

**“contiguous”** means touching or joining at the edge or boundary; adjacent.

**“deposit”** means a mineralized body which has been physically delineated by sufficient drilling, trenching, and/or underground work, and found to contain a sufficient average grade of metal or metals to warrant further exploration and/or development expenditures; such a deposit does not qualify as a commercially mineable ore body or as containing ore reserves, until final legal, technical and economic factors have been resolved.

**“diorite”** means a group of plutonic rocks intermediate in composition between acidic and basic rocks.

**“epigenetic”** is said of a mineral deposit of origin later than that of the enclosing rocks.

**“fracture”** means any break in a rock, includes, cracks, joints and faults.

**“geochemical survey”** means the sampling of rocks, stream sediments, and soils in order to locate abnormal concentrations of metallic elements or minerals. The samples are usually assayed by various methods to determine the quantities of elements or minerals in each sample.

**“geophysical survey”** means the exploration of an area in which physical properties relating to geology are used. Geophysical methods include seismic, magnetic, gravity and induced polarization techniques.



**“granodiorite”** means a group of coarse-grained plutonic rocks intermediate in composition between quartz diorite and quartz monzonite, containing quartz, plagioclase and potassium feldspar, with biotite, hornblende.

**“hornblende”** refers to the commonest minerals of the amphibole group. It has a variable composition, and may contain potassium and appreciable fluorine.

**“induced polarization survey”** means a method of ground geophysical surveying employing current to determine indications of mineralization through electrical conductivity.

**“intermontaine belt”** refers to the north-south trending tectonic belt bordered by the Coast Crystalline belt to the west and the Omineca belt to the east in the province of British Columbia.

**“kernite”** means a sodium borate mineral with four molecules of water, used for the manufacture of boric acid.

**“marls”** means fine compact water impervious clays.

**“mineralization”** means a natural aggregate of one or more metalliferous minerals.

**“monzonite”** means a group of plutonic rocks intermediate in composition between syenite and diorite.

**“plagioclase”** means a group of triclinic feldspars of general formula. Plagioclase minerals are among the commonest rock-forming minerals.

**“reverse circulation drilling”** means a drilling method used in geological appraisals whereby the drilling fluid passes inside the drill stem to a down-the-hole precision bed and returns to the surface outside the drill stem carrying chips of rock.

**“sediment”** means a solid fragmental material that originates from weathering of rocks.

**“siltstone”** means an indurated silt having the texture and composition of shale but lacking its fine lamination.

**“syenite”** means a group of plutonic rocks containing alkali feldspar (usually orthoclase, microcline, or perthite), a small amount of plagioclase (less than in monzonite), one or more mafic minerals.

**“tincal”** means the historic name of decahydrate borax, the principal sodium borate mineral.

**“tuff”** means a compacted pyroclastic deposit of volcanic ash and dust which may or may not contain up to 50% sediments such as sand or clay.

**“ulexite”** means a sodium-calcium borate mineral, often called “cottonball” in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries because of the silky, felted appearance of its crystals.

**“VLF- EM survey”** means a very low frequency electromagnetic geophysical survey.

### (3) Metric Equivalentents and Abbreviations

For ease of reference, the following conversion factors are provided:

1 acre	= 0.4047 hectares
1 foot	= 0.3048 metres
1 gram per tonne	= 0.0291 ounces per ton
1 ton	= 0.9072 tonnes (2000 pounds)
1 mile	= 1.6093 kilometres
1 troy ounce	= 31.1035 grams
1 square mile	= 2.59 square kilometers (259 hectares)
1 tonne	= metric tonne (2204.6 pounds)
short ton	= ton

The following abbreviations of measurements are used herein:

g	= grams	mg	= milligrams
g/t	= grams per tonne	mg/m <sup>3</sup>	= milligrams per cubic metre
km	= kilometers	t	= tones
m	= metre	oz.	= Troy ounces
m <sup>2</sup>	= square metre	oz./t	= Troy ounces per tonne
ha	= hectares	ppb	= parts per billion
m <sup>3</sup>	= cubic metre	ppm	= parts per million

The following abbreviations are used herein:

B <sub>s</sub> O <sub>2</sub>	= boric oxide	Au	= gold
SiO <sub>2</sub>	= silica	Zn	= zinc
MgO	= magnesium oxide	Cu	= copper
CaO	= calcium oxide		
Na <sub>2</sub> O	= sodium oxide		
K <sub>2</sub> O	= potassium oxide		

**Assay results from hole #B-9 as published by Issuer on February 5, 1998**

Four main borite beds were intersected for a total of 23 metres of compact (high grade) borite. The top bed returned a 10 metre intersection of 35.36%  $B_3$  (boron) including 3.5 metres of 43.18%  $B_2O_3$ ; the next bed returned a 2.5 metre intersection with an average grade of 30.94%  $B_2O_3$ ; the third bed included a 3 metre intersection with an average grade of 22.25%  $B_2O_3$ ; and the last bed included a 3 metre intersection with an average grade of 24.92%  $B_2O_3$ .

As well, these results confirm that the upper two borite beds, discovered during earlier wide spaced drilling, have continuity.

In accordance with the policies of The Alberta Stock Exchange, the following technical information is provided.

Results are stated as a percentage concentration.

All measurements are metric.

Chemical analysis was conducted by Geozavod-nemetali (Geological Institute of Yugoslavia).

Analytical Methodology : standard chemical analysis.

Duplicate sample splits and pulps have been sent to Lakefield Research in Lakefield, Ontario for check analysis.

Samples were collected between 06/11/97 and 11/11/97.  
Analysis was conducted between 26/01/98 and 28/01/98.

Results presented are from drill hole B-9/97.

All results are expressed as per cent.

Location: Piskanja Project, Baljevac, Yugoslavia.

Sample type: Reverse circulation - centre line sampling system.

Azimuth/dip: vertical hole, 90 degree dip.  
sample interval is 0.5 metres.

Lithology is typical of sedimentary basins, primarily shales, marls and limestone with two primary gently undulating borate beds, mineralization is primarily dense, compact colemanite with some ulexite.

sample widths: 0.5 metres.

Weighted average grades:

10 m of 35.36%  $B_2O_3$ , includes 3.5 m of 43.18%  $B_2O_3$  ; 2.5 m of 30.94%  $B_2O_3$ ; 3 m of 22.25%  $B_2O_3$ ; 3 m of 24.92%  $B_2O_3$

See attached table for detailed chemical analysis.

<<

GEOZAVOD-NEMETALI  
(Geological Institute of Yugoslavia)

Redni broj	B-9	Od - do m	ANALIZA				
			%	%	%	%	%
			SiO(2)	MgO	CaO	Na(2)O	K(2)O
			B(2)O(3)				
1. 0.13	B-9	76.0--76.5	34.80	10.31	9.67	2.80	2.06
2. 0.12	B-9	77.5--78.0	32.00	10.74	14.92	1.45	2.00
3. 0.23	B-9	105.0--105.5	3.90	4.0	50.75	0.48	0.23
4. 0.22	B-9	105.5--106.0	4.21	10.38	40.00	0.34	0.37
5. 0.21	B-9	106.0--106.5	10.36	7.84	37.00	0.71	1.37
6. 0.18	B-9	106.5--107.0	3.68	8.11	44.80	0.11	0.38
7. 0.27	B-9	107.0--107.5	7.56	6.08	41.50	0.38	0.65
8. 14.00	B-9	121.5--122.0	31.90	10.09	11.76	1.73	2.95
9. 0.14	B-9	122.0--122.5	29.64	11.00	12.57	1.83	3.22
10. 0.88	B-9	122.5--123.0	25.80	11.10	16.50	1.72	2.62
11. 25.70	B-9	123.0--123.5	8.30	6.04	32.30	0.57	0.93
12. 51.00	B-9	123.5--124.0	2.60	1.16	26.80	0.50	0.32

13.	B-9	124.0--124.5	6.05	7.00	23.60	0.56	0.68
37.20							
14.	B-9	124.5--125.0	7.86	10.70	22.80	0.23	0.97
26.60							
15.	B-9	125.0--125.5	3.66	2.74	28.70	0.11	0.63
49.80							
16.	B-9	125.5--126.0	4.00	1.50	25.80	0.13	0.77
44.20							
17.	B-9	126.0--126.5	2.47	1.37	27.50	0.10	0.53
50.33							
18.	B-9	126.5--127.0	10.20	5.13	26.80	0.36	1.24
28.65							
19.	B-9	127.0--127.5	15.30	6.16	24.00	0.55	1.55
26.00							
20.	B-9	127.5--128.0	15.30	4.93	22.00	0.58	1.40
35.47							
21.	B-9	128.0--128.5	6.10	3.10	22.90	0.26	0.37
40.31							
22.	B-9	128.5--129.0	9.38	4.70	22.00	0.70	0.98
32.00							
23.	B-9	129.0--129.5	13.30	4.72	16.20	4.00	1.26
30.60							
24.	B-9	129.5--130.0	14.70	4.64	16.20	3.48	1.30
29.00							

25.	B-9	130.0--130.5	14.40	6.00	16.50	3.92	1.24
32.70							
26.	B-9	130.5--131.0	13.20	4.50	15.20	5.14	1.00
35.85							
27.	B-9	131.0--131.5	8.50	2.65	16.60	5.57	0.60
36.83							
28.	B-9	131.5--132.0	17.60	6.20	13.30	4.62	1.14
25.52							
29.	B-9	132.0--132.5	8.23	2.45	16.10	5.75	1.07
34.50							
30.	B-9	132.5--133.0	7.70	2.43	16.20	5.70	0.88
35.00							
31.	B-9	133.0--133.5	10.90	18.30	12.90	1.63	1.15
13.50							
32.	B-9	133.5--134.0	20.80	22.90	7.66	1.26	0.54
7.06							
33.	B-9	134.0--134.5	14.30	17.90	14.00	1.13	0.36
12.18							
34.	B-9	134.5--135.0	6.04	21.40	16.80	0.46	0.28
4.80							
35.	B-9	135.0--135.5	12.00	20.20	16.20	0.64	0.47
5.66							
36.	B-9	135.5--136.0	20.60	17.90	14.50	1.02	0.87
1.95							
37.	B-9	136.0--136.5	26.40	12.70	6.45	2.23	2.20
6.28							
38.	B-9	136.5--137.0	27.50	13.00	8.84	2.61	1.90
12.54							
39.	B-9	141.5--142.0	20.75	11.80	18.10	2.11	3.54
6.40							

40.	B-9	142.0--142.5	9.62	2.95	23.58	0.40	0.91
38.71							
-----							
41.	B-9	142.5--143.0	29.50	7.65	15.27	1.61	2.92
14.13							
-----							
44.	B-9	144.0--144.5	12.73	5.65	19.16	1.70	1.67
26.51							
-----							
45.	B-9	152.0--152.5	42.30	6.55	9.20	2.68	2.80
2.12							
-----							
46.	B-9	152.5--153.0	43.20	6.15	7.66	4.22	2.70
4.90							
-----							
47.	B-9	153.0--153.5	44.00	5.63	8.84	3.00	2.65
5.30							
-----							
48.	B-9	153.5--154.0	44.80	5.50	8.58	3.45	3.32
5.35							
-----							
49.	B-9	154.0--154.5	39.60	5.45	10.24	3.08	3.45
6.73							
-----							
50.	B-9	181.0--182.0	31.00	11.04	12.08	1.75	3.45
6.48							
-----							
51.	B-9	182.0--183.0	8.64	8.32	23.30	0.60	1.24
27.80							
-----							
52.	B-9	183.0--184.0	4.27	4.04	25.74	0.20	0.40
38.80							
-----							
53.	B-9	183.5--184.0	33.65	12.52	12.16	1.68	4.32
0.48							
-----							
54.	B-9	184.0--184.5	9.80	7.45	22.50	1.25	1.75
28.77							
-----							
55.	B-9	184.5--185.0	17.70	15.26	21.00	1.44	2.53
2.66							
-----							
56.	B-9	185.0--185.5	7.85	3.97	24.23	0.72	0.86
35.00							
-----							
57.	B-9	185.5--186.0	37.46	11.23	10.03	1.75	4.67
0.90							

58.	B-9	186.0--186.5	46.50	7.73	4.73	2.00	5.18
0.80							
59.	B-9	186.5--187.0	41.87	9.35	4.95	1.96	5.10
0.60							
60.	B-9	187.0--187.5	32.65	12.18	10.70	2.26	2.92
1.00							
61.	B-9	221.5--220.0	51.08	5.35	4.55	1.98	3.41
2.60							
62.	B-9	220.0--222.5	49.04	4.70	7.00	2.90	3.38
2.53							
63.	B-9	222.5--223.0	50.75	5.03	4.73	2.00	3.58
0.68							
64.	B-9	223.0--223.5	49.50	5.48	3.68	2.48	3.66
0.75							
65.	B-9	254.0--254.5	40.20	11.50	5.10	2.05	3.07
2.10							
66.	B-9	254.5--255.0	26.00	9.60	13.50	1.50	2.27
14.00							
67.	B-9	255.0--255.5	9.00	7.31	24.00	0.65	0.57
35.00							
68.	B-9	255.5--256.0	6.90	8.56	21.60	0.55	0.40
27.00							
69.	B-9	256.0--256.5	5.30	9.65	22.00	0.26	0.54
31.00							
70.	B-9	256.5--257.0	3.00	10.65	22.80	0.10	0.17
31.40							
71.	B-9	257.0--255.5	5.75	14.50	21.50	0.21	0.58
21.10							
72.	B-9	257.5--258.0	27.50	16.60	18.00	0.71	0.47
0.93							



73. B-9 258.0--258.5 29.80 11.78 5.50 1.26 2.34  
0.83

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74. B-9 258.5--259.0 40.06 8.87 2.40 1.67 4.40  
0.90

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THE ALBERTA STOCK EXCHANGE HAS NEITHER APPROVED NOR DISAPPROVED THE  
INFORMATION CONTAINED HEREIN

**Schedule B to Annual Information Form**  
of Erin Ventures Inc. dated March 29, 2000

**BORON**

(Data in thousand metric tons of boric oxide (B<sub>2</sub>O<sub>3</sub>), unless otherwise noted)

**Domestic Production and Use:** The estimated value of boric oxide contained in minerals and compounds produced in 1999 was \$500 million. Domestic production of boron minerals, primarily as sodium borates, by four companies was centered in southern California. The largest producer operated an open pit tincal and kernite mine and associated compound plants. A second firm, using Searles Lake brines as raw material, accounted for the majority of the remaining output. A third company continued to process small amounts of calcium and calcium sodium borates. A fourth company used an in-situ process. Principal consuming firms were in the North Central and Eastern States. The reported distribution pattern for boron compounds consumed in the United States in 1998 was as follows: Glass products, 71%; soaps and detergents, 5%; agriculture, 4%; fire retardants, 4%; and other, 16%.

<b><u>Salient Statistics—United States:</u></b>	<b><u>1995</u></b>	<b><u>1996</u></b>	<b><u>1997</u></b>	<b><u>1998</u></b>
	<b><u>1999<sup>e</sup></u></b>			
Production <sup>1</sup>	728	581	604	587
	657			
Imports for consumption, gross weight				
Borax	9	11	54	14
22				
Boric acid	16	25	26	23
29				
Colemanite	45	44	44	47
47				
Ulexite	153	136	157	170
170				
Exports, gross weight:				
Boric acid	75	42	92	106
100				
Refined sodium borates	588	381	473	453
450				
Consumption: Apparent	312	234	483	412
529				
Reported	NA	367	403	NA
NA				
Price, dollars per ton, granulated pentahydrate borax in bulk, carload, works <sup>2</sup>				
341	324	375	340	340
Stocks, yearend <sup>3</sup>	NA	NA	NA	NA
NA				
Employment, number	900	900	900	900
900				
Net import reliance <sup>4</sup> as a percent of apparent consumption	E	E	E	E
E				

**Recycling:** Insignificant

**Import Sources (1994-97):** Boric acid: Chile, 35%; Turkey, 30%; Bolivia, 14%; Italy, 13%; and other, 8%.

<b>Tariff:</b>	<b>Item</b>	<b>Number</b>	<b>Normal Trade Relations (NTR) 12/31/99</b>	
	Borates:			
	Refined borax:			
	Anhydrous	2840.11.0000	0.3% ad val.	
	Other	2840.19.0000	0.1% ad val.	
	Other	2840.20.0000	3.7% ad val.	25%
	ad val.			
	Perborates:			
	Sodium	2840.30.0010	3.7% ad val.	.
	Other	2840.30.0050	3.7% ad val.	
	Boric acids	2810.00.0000	1.5% ad val.	
	Natural borates:			
	Sodium	2528.10.0000	Free	
	Other:			
	Calcium	2528.90.0010	Free	
	Other	2528.90.0050	Free	

**Depletion Allowance:** Borax 14% (Domestic and foreign).

**Government Stockpile:** None.

## **BORON**

**Events, Trends and Issues:** The United States was the world's largest producer of boron compounds during 1999 and exported about one-half of domestic production. Exported materials competed with borax, boric acid, colemanite, and ulexite primarily from Turkey, the largest producer of boron ore in the world.

Importation of borates from northern Chile continued. Ulexite is mined in Chile for the production of boric acid, synthetic colemanite, and refined ulexite for use in ceramics, insulating and reinforcing fiberglass, and agriculture. Other South American countries that exported boron ore and compounds to the United States are Bolivia and Peru.

The in-situ borate project produced synthetic calcium borate product that was being tested for usage in the glass industry.

The boron, sodium bicarbonate, and sodium sulfate production from underground brines in California continued and the company plans a sale of the assets to be finalized in early 2000.

The only domestic underground operation continued production during the year.

### **World Production, Reserves, and Reserve Base:**<sup>5</sup>

<b>base</b> <sup>6</sup>	<b>Production---all forms</b>		<b>Reserves</b> <sup>6</sup>	<b>Reserve</b>
	<b><u>1998</u></b>	<b><u>1999</u></b> <sup>e</sup>		

United States	1,170	1,270	40,000	80,000
Argentina	270	270	2,000	9,000
Bolivia	12	12	4,000	19,000
Chile	160	160	8,000	41,000
China	140	140	27,000	36,000
Iran	1	1	1,000	1,000
Kazakhstan	30	30	14,000	15,000
Peru	40	40	4,000	22,000
Russia	1,000	13	40,000	100,000
Turkey	<u>1,550</u>	<u>1,250</u>	<u>30,000</u>	<u>150,000</u>
World total (rounded)	4,370	4,470	170,000	470,000

**World Resources:** Large domestic reserves of boron materials occur in California, chiefly in sediments and their contained brines. Extensive resources also occur in Turkey. Small deposits are being mined in South America. World resources are adequate, at current levels of consumption, for the foreseeable future.

**Substitutes:** Substitution for boron materials is possible in applications such as soaps, detergents, enamel, and insulation. In soaps, sodium and potassium salts of fatty acids are the usual cleaning and emulsion agents. Borates in detergents can be replaced by chlorine bleach or enzymes. Some enamels use other glass producing substances such as phosphates. Insulation substitutes include foams and mineral wools.

\*Estimated. E Net exporter. NA Not available.

<sup>1</sup>Minerals and compounds sold or used by producers; Includes both actual mine production and marketable products.

<sup>2</sup>Chemical Market Reporter.

<sup>3</sup>Stocks data are not available and are assumed to be zero for net import reliance and apparent consumption calculations.

<sup>4</sup>Defined as imports – exports + adjustments for Government and Industry stock changes.

<sup>5</sup>Gross weight of ore in thousand metric tons.

<sup>6</sup>See Appendix C for definitions.

## APPENDIX A

### **Abbreviations and Units of Measure**

1 carat (metric) (diamond)	= 200 milligrams
1 flask (f)	= 76 pounds, avoirdupois
1 karat (gold)	= one twenty-fourth part
1 kilogram (kg)	= 2.2016 pounds, avoirdupois
1 long ton (lt)	= 2,240 pounds, avoirdupois
1 long ton unit (ltu)	= 1% of 1 long ton or 22.4 pounds avoirdupois
long calcined ton (let)	= excludes water of hydration
long dry ton (ldt)	= excludes excess free moisture
Mcf	= 1,000 cubic feet
1 metric ton (t)	= 2,204.6 pounds, avoirdupois or 1,000 kilograms
1 metric ton (t)	= 1.1023 short ton
1 pound (lb)	= 453.6 grams
1 short ton (st)	= 2,000 pounds, avoirdupois
1 short ton unit (stu)	= 1% of 1 short ton or 20 pounds, avoirdupois
1 short dry ton (sdt)	= 2,000 pounds, avoirdupois, excluding moisture content
1 troy ounce (tr oz)	= 1.09714 avoirdupois ounces
1 troy pound	= 12 troy ounces

## APPENDIX B

### **Terms Used for Materials in the National Defense Stockpile**

**Uncommitted inventory**, as used by the Department of Defense, refers simply to material currently in the stockpile, whether stockpile-grade or nonstockpile-grade. In the tables for this report, only the stockpile-grade material is listed; nonstockpile-grade material, if any, is cited in the text.

**Committed inventory** refers to both stockpile-grade materials and nonstockpile-grade materials that have been sold or traded from the stockpile, either in the current fiscal year or in prior years, but not yet removed from stockpile facilities.

**Authorized for disposal** refers to quantities that are in excess of the stockpile goal for a material, and for which Congress has authorized disposal over the long term at rates designed to maximize revenue but avoid undue disruption of the usual markets and loss to the United States.

**Disposal plan FY 1999** refers the Defense Logistics Agency's Annual Materials Plan for the fiscal year. Fiscal year 1999 is the period 10/1/98 through 9/30/99.

**Disposals FY 1998** refers to material sold or traded from the stockpile in fiscal year 1999; it may or may not have been removed by the buyers.

## **APPENDIX C**

### **A Resource/Reserve Classification for Minerals<sup>1</sup>**

#### **INTRODUCTION**

Through the years, geologists, mining engineers, and others operating in the minerals field have used various terms to describe and classify mineral resources, which as defined herein include energy materials. Some of these terms have gained wide use and acceptance, although they are not always used with precisely the same meaning.

The U.S. Geological Survey collects information about the quantity and quality of all mineral resources. In 1976, the Survey and the U.S. Bureau of Mines developed a common classification and nomenclature, which was published as U.S. Geological Survey Bulletin 1450-A—“*Principles of the Minerals Resource Classification System of the U.S. Bureau of Mines and U.S. Geological Survey.*” Experience with this resource classification system showed that some changes were necessary in order to make it more workable in practice and more useful in long-term planning. Therefore, representatives of the U.S. Geological Survey and the U.S. Bureau of Mines collaborated to revise Bulletin 1450-A. Their work was published in 1980 as U.S. Geological Survey Circular 831—“*Principals of a Resource/Reserve Classification for Minerals.*”

Long-term public and commercial planning must be based on the probability of discovering new deposits, on developing economic extraction processes for currently unworkable deposits, and on knowing which resources are immediately available. Thus, resources must be continuously reassessed in the light of new geologic knowledge, of progress in science and technology, and of shifts in economic and political conditions. To best serve these planning needs, known resources should be classified from two standpoints: (1) purely geologic or physical/chemical characteristics—such as grade, quality tonnage, thickness, and depth—of the material in place, and (2) profitability analyses based on costs of extracting and marketing the material in a given economy at a given time. The former constitutes important objective scientific information of the resource and a relatively unchanging foundation upon which the latter more valuable economic delineation can be based.

The classification of mineral and energy resources is necessarily arbitrary, because definitional criteria do not always coincide with natural boundaries. The system can be used to report the status of mineral and energy-fuel resources for the Nation or for specific areas.

#### **RESOURCE/RESERVE DEFINITIONS**

A dictionary definition of resource, “something in reserve or ready if needed,” has been adapted for mineral and energy resources to comprise all materials, including those only surmised to exist, that have present in anticipated future value.

**Resource.**—A concentration of naturally occurring solid, liquid, or gaseous material in or on the Earth’s crust in such form and amount that economic extraction of commodity from the concentration is currently or potentially feasible.

**Original Resource.**—The amount of a resource before production.

**Identified Resources.**—Resources whose location, grade quality, and quantity are known or estimated from specific geologic evidence. Identified resources include economic, marginally economic, and sub-economic components. To reflect varying degrees of geologic certainty, these economic divisions can be subdivided into measured, indicated, and inferred.

**Demonstrated.**—A term for the sum of measured plus indicated.

**Measured.**—Quantity is computed from dimensions revealed in outcrop, trenches, workings, or drill holes; grade and(or) quality are computed from the results of detailed sampling. The sites for inspection, sampling, and measurements are spaced so closely and the geologic character is so well defined that size, shape, depth, and mineral content of the resource are well established.

**Indicated.**—Quantity and grade and(or) quality are computed from information similar to that used for measured resources, but the sites for inspection, sampling, measurement are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for measured resources, is high enough to assume continuity between points of observation.

**Inferred.**—Estimates are based on an assumed continuity beyond measured and(or) indicated resources, for which there is geologic evidence. Inferred resources may or may not be supported by samples or measurements.

**Reserve Base.**—That part of an identified resource that meets specified minimum physical and chemical criteria related to current mining and production practices, including those for grade, quality, thickness, and depth. The reserve base is the in-place demonstrated (measured plus indicated) resource from which reserves are estimated. It may encompass those parts of the resources that have a reasonable potential for becoming economically available within planning horizons beyond those that assume proven technology and current economics. The reserve base includes those resources that are currently economic (reserves), marginally economic (marginal reserves), and some of those that are currently subeconomic (subeconomic resources). The term “geologic reserve” has been applied by others generally to the reserve-base category, but it also may include the inferred-reserve-base category/ it is not a part of this classification system.

**Inferred Reserve Base.**—The in-place part of an identified resource from which inferred reserves are estimated. Quantitative estimates are based largely on knowledge of the geologic character of a deposit and for which there may be no samples or measurements. The estimates are based on an assumed continuity beyond the reserve base, for which there is geologic evidence.

**Reserves.**—That part of the reserve base which could be economically extracted or produced at the time of determination. The term reserves need not signify that extraction facilities are in place and operative. Reserves include only recoverable materials; thus, terms such as “extractable reserves” and “recoverable reserves” are redundant and are not a part of this classification system.

**Marginal Reserves.**—That part of the reserve base which, at the time of determination, borders on being economically producible. Its essential characteristic is economic uncertainty. Included are resources that would be producible, given postulated changes in economic or technological factors.

**Economic.**—This term implies that profitable extraction or production under defined investment assumptions has been established, analytically demonstrated, or assumed with reasonable certainty.

**Subeconomic Resources.**—The part of identified resources that does not meet the economic criteria of reserves and marginal reserves.

**Undiscovered Resources.**—Resources, the existence of which are only postulated, comprising deposits that are separate from identified resources. Undiscovered resources may be postulated in deposits of such grade and physical location as to render them economic, marginally economic, or subeconomic. To reflect varying degrees of geologic certainty, undiscovered resources may be divided into two parts.

**Hypothetical Resources**—Undiscovered resources that are similar to known mineral bodies and that may be reasonably expected to exist in the same producing district or region under analogous geologic conditions. If exploration confirms their existence and reveals enough information about their quality, grade, and quantity, they will be reclassified as identified resources.

**Speculative Resources.**—Undiscovered resources that may occur either in known types of deposits in favorable geologic settings where mineral discoveries have not been made, or in types of deposits as yet unrecognized for their economic potential. If exploration confirms their existence and reveals enough information about their quantity, grade, and quality, they will be reclassified as identified resources.

**Restricted Resources/Reserves.**—That part of any resource/reserve category that is restricted from extraction by laws or regulations. For example, restricted reserves meet all the requirements of reserves except that they are restricted from extraction by laws or regulations.

**Other Occurrences.**—Materials that are too low grade or for other reasons are not considered potentially economic. In the same sense as the defined resource, may be recognized and their magnitude estimated, but they are not classified as resources. The boundary is obviously uncertain, but limits may be specified in terms of grade, quality, thickness, depth, percent extractable, or other economic-feasibility variables.

**Cumulative Production.**—The amount of past cumulative production is not, by definition, a part of the resource. Nevertheless, a knowledge of what has been produced is important to an understanding of current resources, in terms of both the amount of past production and the amount of residual or remaining in-place resource. Residual material left in the ground during current or future extraction should be recorded in the resource category appropriate to its economic-recovery potential.