

NATIONAL INSTRUMENT

43-101

STANDARDS OF DISCLOSURE FOR MINERAL PROJECTS

PART 1

APPLICATION, DEFINITIONS AND INTERPRETATION

1.1 Application - This Instrument applies to all oral statements and written disclosure of scientific or technical information, including disclosure of a mineral resource or mineral reserve, made by or on behalf of an issuer in respect of a mineral project of the issuer.

1.2 Definitions - In this Instrument

"adjacent property" means a property

- (a) in which the issuer does not have an interest;
- (b) that has a boundary reasonably proximate to the closest boundary of the property being reported on; and
- (c) that has geological characteristics similar to those of the property being reported on;

"data verification" means the process of confirming that data has been generated with proper procedures, has been accurately transcribed from the original source and is suitable to be used;

"development property" means a property that is being prepared for mineral production and for which economic viability has been demonstrated by a feasibility study;

"disclosure" means any oral statement or written disclosure made by or on behalf of an issuer and intended to be, or reasonably likely to be, made available to the public in a Canadian jurisdiction, whether or not filed under securities legislation, but does not include written disclosure that is made available to the public only by reason of having been filed with a government or agency of government pursuant to a requirement of law other than securities legislation;

"disclosure document" means an annual information form, prospectus, material change report or annual financial statement filed with a regulator pursuant to a requirement of securities legislation;

"exploration information" means geological, geophysical, geochemical, sampling, drilling, analytical testing, assaying, mineralogical, metallurgical and other similar information concerning a particular property that is derived from activities undertaken to locate, investigate, define or delineate a mineral

prospect or mineral deposit;

"feasibility study" means a comprehensive study of a deposit in which all geological, engineering, operating, economic and other relevant factors are considered in sufficient detail that it could reasonably serve as the basis for a final decision by a financial institution to finance the development of the deposit for mineral production;

"IMM system" means the classification system and definitions for mineral resources and mineral reserves approved from time to time by The Institution of Mining and Metallurgy in the United Kingdom;

"JORC Code" means the Australasian Code for Reporting of Mineral Resources and Ore Reserves prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Mineral Council of Australia as amended or supplemented;

"mineral project" means any exploration, development or production activity in respect of natural, solid, inorganic or fossilized organic, material including base and precious metals, coal and industrial minerals;

"preliminary assessment" means a preliminary assessment permitted to be disclosed pursuant to subsection 2.3(3);

"preliminary feasibility study" and "pre-feasibility study" each mean a comprehensive study of the viability of a mineral project that has advanced to a stage where the mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, has been established, and which, if an effective method of mineral processing has been determined, includes a financial analysis based on reasonable assumptions of technical, engineering, operating, economic factors and the evaluation of other relevant factors which are sufficient for a qualified person, acting reasonably, to determine if all or part of the mineral resource may be classified as a mineral reserve;

"producing issuer" means an issuer the annual audited financial statements of which disclose

- (a) gross revenues, derived from mining operations, of at least \$30 million for the issuer's most recently completed financial year; and
- (b) gross revenues, derived from mining operations, of at least \$90 million in the aggregate for the issuer's three most recently completed financial years;

"professional association" means a self-regulatory organization of engineers,

geoscientists or both engineers and geoscientists that

- (a) has been given authority or recognition by statute;
- (b) admits members primarily on the basis of their academic qualifications and experience;
- (c) requires compliance with the professional standards of competence and ethics established by the organization; and
- (d) has disciplinary powers, including the power to suspend or expel a member;

and until February 1, 2002 includes an association of geoscientists in Ontario and until February 1, 2003 includes an association of geoscientists in a Canadian jurisdiction other than Ontario that does not have a statutorily recognized self-regulatory association;

"qualified person" means an individual who

- (a) is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development or operation or mineral project assessment, or any combination of these;
- (b) has experience relevant to the subject matter of the mineral project and the technical report; and
- (c) is a member in good standing of a professional association;

"quantity" means either tonnage or volume, depending on which term is the standard in the mining industry for the type of mineral;

"technical report" means a report prepared, filed and certified in accordance with this Instrument and Form 43-101F1 Technical Report;

"USGS Circular 831" means the circular published by the United States Bureau of Mines/United States Geological Survey entitled "Principles of a Resource/Reserve Classification for Minerals", as amended or supplemented; and

"written disclosure" includes any writing, picture, map or other printed representation whether produced, stored or disseminated on paper or electronically.

1.3 Mineral Resource - In this Instrument, the terms "mineral resource", "inferred mineral resource", "indicated mineral resource" and "measured mineral resource" have the meanings ascribed to those terms by the

Canadian Institute of Mining, Metallurgy and Petroleum, as the CIM Standards on Mineral Resources and Reserves Definitions and Guidelines adopted by CIM Council on August 20, 2000, as those definitions may be amended from time to time by the Canadian Institute of Mining, Metallurgy and Petroleum.

1.4 Mineral Reserve - In this Instrument, the terms "mineral reserve", "probable mineral reserve" and "proven mineral reserve" have the meanings ascribed to those terms by the Canadian Institute of Mining, Metallurgy and Petroleum, as the CIM Standards on Mineral Resources and Reserves Definitions and Guidelines adopted by CIM Council on August 20, 2000, as those definitions may be amended from time to time by the Canadian Institute of Mining, Metallurgy and Petroleum.

1.5 Interpretation

- (1) In this Instrument, a person or company is considered to be an affiliated entity of another person or company if
 - (a) one is a subsidiary of the other,
 - (b) both are subsidiaries of the same person or company, or
 - (c) each is controlled by the same person or company.
- (2) In this Instrument, a person or company is considered to be controlled by a second person or company if
 - (a) in the case of a company,
 - (i) voting securities of the company carrying 50 percent or more of the votes for the election of directors are held, otherwise than by way of security only, by or for the benefit of the second person or company; and
 - (ii) the votes carried by such securities entitle the second person or company to elect a majority of the directors of the company;
 - (b) in the case of a partnership, other than a limited partnership, the second person or company holds an interest of 50 percent or more in the partnership; or
 - (c) in the case of a limited partnership, the general partner is the second person or company.
- (3) In this Instrument, a person or company is considered to be a

subsidiary entity of a second person or company, if

- (a) the person or company is controlled by
 - (i) the second person or company, or
 - (ii) the second person or company and one or more other persons or companies, each of which is controlled by the second person or company, or
 - (iii) one or more other persons or companies, each of which is controlled by the second person or company; or
- (b) the person or company is a subsidiary entity of a person or company that is itself a subsidiary entity of the second person or company.

(4) In this Instrument, a qualified person involved in the preparation of a technical report is not considered to be independent of the issuer in respect of the technical report, if

- (a) the qualified person, or any affiliated entity of the qualified person, is, or by reason of an agreement, arrangement or understanding expects to become, an insider, associate, affiliated entity or employee of
 - (i) the issuer,
 - (ii) an insider of the issuer, or
 - (iii) an affiliated entity of the issuer;
- (b) the qualified person, or any affiliated entity of the qualified person, is, or by reason of an agreement, arrangement or understanding expects to become, a partner of any person or company referred to in paragraph (a);
- (c) the qualified person, or any affiliated entity of the qualified person, owns, or by reason of an agreement, arrangement or understanding expects to receive, any securities of the issuer or of an affiliated entity of the issuer or an ownership or royalty interest in the property that is the subject of the technical report;
- (d) the qualified person, or any affiliated entity of the qualified person, has received the majority of his or her income in the three years preceding the date of the technical report from one or more of the issuer and insiders and affiliated entities of the

issuer; or

- (e) the qualified person, or any affiliated entity of the qualified person,
 - (i) is, or by reason of an agreement, arrangement or understanding expects to become, an insider, affiliate or partner of the person or company which has an ownership or royalty interest in a property which has a boundary within two kilometres of the closest boundary of the property being reported on; or
 - (ii) has, or by reason of an agreement, arrangement or understanding expects to obtain, an ownership or royalty interest in a property which has a boundary within two kilometres of the closest boundary of the property being reported on.

PART 2

REQUIREMENTS APPLICABLE TO ALL DISCLOSUREPART

- 2.1 Requirements Applicable to All Disclosure** - An issuer shall ensure that all disclosure of a scientific or technical nature, including disclosure of a mineral resource or mineral reserve, concerning mineral projects on a property material to the issuer is based upon a technical report or other information prepared by or under the supervision of a qualified person.
- 2.2 All Disclosure of Mineral Resources or Mineral Reserves** - An issuer shall ensure that any disclosure of a mineral resource or mineral reserve, including disclosure in a technical report filed by an issuer
- (a) utilizes only the applicable mineral resource and mineral reserve categories set out in sections 1.3 and 1.4;
 - (b) reports each category of mineral resources and mineral reserves separately, and if both mineral resources and mineral reserves are disclosed, states the extent, if any, to which mineral reserves are included in total mineral resources; and
 - (c) does not add inferred mineral resources to the other categories of mineral resources.
- 2.3 Prohibited Disclosure**

- (1) An issuer shall not make any disclosure of
 - (a) quantity or grade of a deposit which has not been categorized as an inferred mineral resource, an indicated mineral resource, a measured mineral resource, a probable mineral reserve or a proven mineral reserve, or
 - (b) results of an economic evaluation which uses inferred mineral resources.
- (2) Despite paragraph (1)(a), an issuer may disclose in writing the potential quantity and grade, expressed as ranges, of a possible mineral deposit that is to be the target of further exploration, provided that the disclosure includes
 - (a) a proximate statement that the potential quantity and grade is conceptual in nature, that there has been insufficient exploration to define a mineral resource on the property and that it is uncertain if further exploration will result in discovery of a mineral resource on the property, and
 - (b) the basis on which the disclosed potential quantity and grade has been determined.
- (3) Despite paragraph (1)(b), an issuer may disclose a preliminary assessment that includes an economic evaluation which uses inferred mineral resources, provided
 - (a) the preliminary assessment is a material change in the affairs of the issuer or a material fact;
 - (b) the disclosure includes
 - (i) a proximate statement that the preliminary assessment is preliminary in nature, that it includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary assessment will be realized, and
 - (ii) the basis for the preliminary assessment and any qualifications and assumptions made by the qualified person; and
 - (c) in Ontario, if the issuer is a reporting issuer in Ontario, the issuer shall deliver to the regulator in Ontario the disclosure it proposes

to make together with the preliminary assessment and the technical report required pursuant to section 4.2 at least five business days prior to making the disclosure and the regulator in Ontario shall not have advised the issuer that it objects to the disclosure.

- (4) An issuer shall not use the terms preliminary feasibility study, pre-feasibility study or feasibility study when referring to a study unless the study satisfies the criteria set out in the definitions of the applicable terms in section 1.2.

2.4 Disclosure of Historical Estimates - Despite section 2.2 an issuer may disclose an estimate of mineral resources or mineral reserves made before this Instrument came into force if

- (a) the estimate is an estimate of mineral resources or mineral reserves prepared by or on behalf of a person or company other than the issuer, or
- (b) the estimate accompanies disclosure of an estimate of mineral resources and mineral reserves made in accordance with section 2.2

and provided that the disclosure:

- (i) identifies the source of the historical estimate;
- (ii) confirms that the historical estimate is relevant;
- (iii) comments on the reliability of the historical estimate;
- (iv) states whether the historical estimate uses categories other than the ones stipulated in sections 1.3 and 1.4 and, if so, includes an explanation of the differences; and
- (v) includes any more recent estimates or data available to the issuer.

PART 3

ADDITIONAL REQUIREMENTS FOR WRITTEN DISCLOSURE

3.1 Written Disclosure to Include Name of Qualified Person - An issuer shall ensure that all written disclosure of a scientific or technical nature, other than a news release, concerning a mineral project on a property material to the issuer identifies and discloses the relationship to the issuer of the qualified

person who prepared or supervised the preparation of the technical report or other information that forms the basis for the written disclosure.

3.2 Written Disclosure to Include Data Verification - An issuer shall ensure that all written disclosure of a scientific or technical nature concerning mineral projects on a property material to the issuer:

- (a) states whether a qualified person has verified the data disclosed, including sampling, analytical and test data underlying the information or opinions contained in the written disclosure;
- (b) describes the nature of, and any limitations on, the verification of data disclosed; and
- (c) explains any failure to verify the data disclosed.

3.3 Requirements Applicable to Written Disclosure of Exploration Information

- (1) An issuer shall ensure that all written disclosure containing scientific or technical exploration information concerning a property material to the issuer includes:
 - (a) to the extent not previously disclosed in writing and filed by the issuer, the results, or a summary of the material results, of surveys and investigations regarding the property;
 - (b) a summary of the interpretation of the exploration information to the extent that such interpretation has not been previously disclosed in writing and filed by the issuer; and
 - (c) a description of the quality assurance program and quality control measures applied during the execution of the work being reported on.
- (2) An issuer shall ensure that all written disclosure containing sample or analytical or testing results on a property material to the issuer includes
 - (a) to the extent not previously disclosed in writing and filed by the issuer, a summary description of the geology, mineral occurrences and nature of mineralization found;
 - (b) to the extent not previously disclosed in writing and filed by the issuer, a summary description of rock types, geological controls and widths of mineralized zones, and the identification of any significantly higher grade intervals within a lower grade

- intersection;
- (c) the location, number, type, nature and spacing or density of the samples collected and the location and dimensions of the area sampled;
- (d) identification of any drilling, sampling, recovery or other factors that could materially affect the accuracy or reliability of the data referred to in this subsection;
- (e) a summary description of the type of analytical or testing procedures utilized, sample size, the name and location of each analytical or testing laboratory used, the certification of each laboratory, if known to the issuer, and any relationship of the laboratory to the issuer; and
- (f) a listing of the lengths of individual samples or sample composites with analytical values, widths and, to the extent known to the issuer, the true widths of the mineralized zone.

3.4 Requirements Applicable to Written Disclosure of Mineral Resources and Mineral Reserves - An issuer shall ensure that all written disclosure of mineral resources or mineral reserves on a property material to the issuer includes:

- (a) the effective date of each estimate of mineral resources and mineral reserves;
- (b) details of quantity and grade or quality of each category of mineral resources and mineral reserves;
- (c) details of the key assumptions, parameters and methods used to estimate the mineral resources and mineral reserves;
- (d) a general discussion of the extent to which the estimate of mineral resources and mineral reserves may be materially affected by any known environmental, permitting, legal, title, taxation, socio-political, marketing, or other relevant issues; and
- (e) a statement that mineral resources which are not mineral reserves do not have demonstrated economic viability.

3.5 Exception for Written Disclosure Already Filed - The requirements of sections 3.3 and 3.4 are satisfied by reference, in written disclosure, to a previously filed disclosure document that complies with those requirements.

PART 4

OBLIGATION TO FILE A TECHNICAL REPORT

4.1 Obligation to File a Technical Report Upon Becoming a Reporting Issuer

- (1) Upon first becoming a reporting issuer in a Canadian jurisdiction an issuer shall file with the regulator in that Canadian jurisdiction a current technical report for each property material to the issuer.
- (2) An issuer may satisfy the requirement of subsection (1) by filing a technical report or a report prepared and filed in accordance with National Policy Statement No. 2-A before February 1, 2001 that it has previously filed in another Canadian jurisdiction in which it is a reporting issuer, amended or supplemented, if necessary, to reflect material changes in the information contained in the technical report since the date of filing in the other Canadian jurisdiction.

4.2 Obligation to File a Technical Report in Connection with Certain Written Disclosure Concerning Mineral Projects on Material Properties

- (1) An issuer shall file a current technical report to support information in the following documents filed or made available to the public in a Canadian jurisdiction describing mineral projects on a property material to the issuer:
 1. A preliminary prospectus, other than a preliminary short form prospectus filed in accordance with National Instrument 44-101.
 2. A preliminary short form prospectus filed in accordance with National Instrument 44-101 that includes material information concerning mining projects on material properties not contained in
 - (a) a disclosure document filed before February 1, 2001;
 - (b) a previously filed technical report; or
 - (c) a report prepared in accordance with National Policy Statement No. 2-A and filed with a regulator before February 1, 2001.
 3. An information or proxy circular concerning a direct or indirect acquisition of a mineral property, including an acquisition of control of a person or company with an interest in the property,

that upon completion of the acquisition would be material to the issuer if the consideration includes securities of the issuer or the person or company which continues to hold an interest in the property upon completion of the acquisition.

4. An offering memorandum.
5. A rights offering circular.
6. An annual information form or annual report that includes material information concerning mining projects on material properties not contained in
 - (a) a disclosure document filed before February 1, 2001;
 - (b) a previously filed technical report; or
 - (c) a report prepared in accordance with National Policy Statement No. 2-A and filed with a regulator before February 1, 2001.
7. A valuation required to be prepared and filed under securities legislation.
8. A directors' circular that discloses for the first time a preliminary assessment or mineral resources or mineral reserves on a property material to the issuer that constitutes a material change in respect of the affairs of the issuer, or discloses any change in a preliminary assessment or in mineral resources or mineral reserves, from the most recently filed technical report of the issuer, that constitutes a material change in respect of the affairs of the issuer.
9. A take-over bid circular that discloses a preliminary assessment or mineral resources or mineral reserves on a property material to the offeror if securities of the offeror are being offered in exchange on the take-over bid.
10. Any written disclosure, made other than in a document referred to in paragraphs 1 to 9 above, which is either
 - (i) first time disclosure of a preliminary assessment or mineral resources or mineral reserves on a property material to the issuer that constitutes a material change in respect of the affairs of the issuer; or
 - (ii) disclosure of any change in a preliminary assessment or in

mineral resources and mineral reserves from the most recently filed technical report, that constitutes a material change in respect of the affairs of the issuer.

- (2) If there has been a material change to the information in the technical report filed under paragraph 1 or 2 of subsection (1) before the filing of the final version of a prospectus or short form prospectus, the issuer shall file an updated technical report or an addendum to the technical report with the final version of the prospectus or short form prospectus.
- (3) Subject to subsections (4), (5), and (6), the technical report required to be filed under subsection (1) shall be filed not later than the time of the filing of the document listed in subsection (1) that it supports.
- (4) Despite subsection (3), a technical report concerning mineral reserves and mineral resources that supports disclosure described in paragraph 10 of subsection (1) shall
 - (a) be filed not later than 30 days after the disclosure; and
 - (b) if filed subsequent to the disclosure, be accompanied by a contemporaneous disclosure that reconciles any material differences between the technical report filed and the previous disclosure in connection with which the technical report was prepared.
- (5) Despite subsection (3), if a property referred to in a document described in paragraph 6 of subsection (1) first becomes material to the issuer less than 30 days before the filing deadline for the document, the issuer shall file the technical report required by subsection (1) within 30 days of the date that the property first became material to the issuer.
- (6) Despite subsection (3), a technical report that supports a directors' circular shall be filed not less than 3 business days prior to the expiry of the take-over bid.

4.3 Required Form of Technical Report. A technical report that is required to be filed under this Part shall be in accordance with Form 43-101F1.

PART 5

AUTHOR OF TECHNICAL REPORT

5.1 Prepared by a Qualified Person. Prepared by a Qualified Person - A

technical report shall be prepared by or under the supervision of one or more qualified persons.

5.2 Execution of Technical Report. A technical report shall be dated, signed and, if the qualified person has a seal, sealed, by the qualified person who prepared it or supervised its preparation, or if such an individual is an employee, officer, director or associate of a person or company the principal business of which is the provision of engineering or geoscientific services, by that person or company.

5.3 Independent Technical Report

(1) Subject to subsection (2), a technical report required under any of the following provisions of this Instrument shall be prepared by a qualified person that is, at the date of the technical report, independent of the issuer:

1. **First-time Reporting Issuer** - Subsection 4.1(1)
2. **Long Form Prospectus and Valuation** - Paragraphs 4.2(1) and 7
3. **Other** - Paragraphs 4.2(1)2, 3, 4, 5, 6, 8, 9 and 10 if the document discloses a preliminary assessment, or mineral resources or mineral reserves on a property material to the issuer for the first time, or discloses a 100 percent or greater change, from the most recently filed technical report prepared by a qualified person who is independent of the issuer, in mineral resources or mineral reserves on a property material to the issuer
4. **Reporting Issuer in an Additional Canadian Jurisdiction** - Subsection 4.1(2)

(2) A technical report required to be filed by a producing issuer under paragraphs 3 and 4 of subsection (1) is not required to be prepared by an independent qualified person.

(3) A technical report required to be filed by an issuer that is or has contracted to become a joint venture participant, concerning a property which is or will be the subject of the joint venture's activities, is not required to be prepared by an independent qualified person if the qualified person preparing the report is an employee of, or retained by, another participant in the joint venture that is a producing issuer.

PART 6

PREPARATION OF TECHNICAL REPORT

- 6.1 Nature of the Technical Report.1 Nature of the Technical Report** - A technical report shall be prepared on the basis of all available factual data that is relevant to the disclosure which it supports.
- 6.2 Personal Inspection.2 Personal Inspection** - At least one qualified person preparing or supervising the preparation of the technical report shall inspect the property that is the subject of the technical report.
- 6.3 Maintenance of Records.3 Maintenance of Records** - The issuer shall keep copies of assay and other analytical certificates, drill logs and other information referenced in the technical report or used as a basis for the technical report for 7 years.

PART 7

USE OF FOREIGN CODE

7.1 Use of Foreign Code

- (1) An issuer that is incorporated or organized in a foreign jurisdiction may make disclosure and file a technical report that utilizes the mineral resource and mineral reserve categories of the JORC Code, USGS Circular 831 or the IMM system provided that a reconciliation to the mineral resource and mineral reserve categories set out in sections 1.3 and 1.4 is filed with the technical report and certified by a qualified person. The reconciliation shall address the confidence levels required for the categorization of mineral resources and mineral reserves.
- (2) An issuer that is incorporated or organized under the laws of Canada or a province or territory of Canada may make disclosure and file a technical report that utilizes the mineral resource and mineral reserve categories of the JORC Code, USGS Circular 831 or the IMM system for properties located in a foreign jurisdiction, provided that a reconciliation to the mineral resource and mineral reserve categories set out in sections 1.3 and 1.4, which reconciliation addresses the confidence levels required for the categorization of mineral resources and mineral reserves, is certified by a qualified person and is filed with the technical report.

PART 8

CERTIFICATES AND CONSENTS OF QUALIFIED PERSONS FOR TECHNICAL REPORTS

8.1 Certificates of Qualified Persons

- (1) An issuer shall, when filing a technical report, also file a certificate of each of the individuals who are qualified persons and who have been primarily responsible for the technical report, or a portion of the technical report, dated, signed and, if the signatory has a seal, sealed, by the signatory.
- (2) The certificate of each qualified person shall state
 - (a) the name, address and occupation of the qualified person;
 - (b) the qualified person's qualifications, including relevant experience, the name of all professional associations to which the qualified person belongs, and that the qualified person is a "qualified person" for purposes of this Instrument;
 - (c) the date and duration of the qualified person's most recent visits to each applicable site;
 - (d) the section or sections of the technical report for which the qualified person is responsible;
 - (e) that the qualified person is not aware of any material fact or material change with respect to the subject matter of the technical report which is not reflected in the technical report, the omission to disclose which makes the technical report misleading;
 - (f) if the qualified person is independent of the issuer applying the tests set out in section 1.5;
 - (g) what prior involvement, if any, the qualified person has had with the property that is the subject of the technical report; and
 - (h) that the qualified person has read this Instrument and Form 43-101F1, and the technical report has been prepared in compliance with this Instrument and Form 43-101F1.

8.2 Addressed to Issuer - All technical reports shall be addressed to the issuer.

8.3 Consents of Qualified Persons - All technical reports and addenda to

technical reports that are required by this Instrument to be filed shall

- (a) be accompanied by the written consent of the qualified person, addressed to the securities regulatory authorities, consenting to the filing of the technical report and to the written disclosure of the technical report and of extracts from or a summary of the technical report in the written disclosure being filed; and
- (b) be accompanied by a certificate confirming that the qualified person has read the written disclosure being filed and does not have any reason to believe that there are any misrepresentations in the information derived from the technical report or that the written disclosure contains any misrepresentation of the information contained in the technical report.

PART 9 EXEMPTION

9.1 Exemption

- (1) The regulator or the securities regulatory authority may, on application, grant an exemption from this Instrument, in whole or in part, subject to such conditions or restrictions as may be imposed in the exemption in response to an application.
- (2) Despite subsection (1), in Ontario, only the regulator may grant such an exemption.
- (3) Despite subsection (1), in Alberta, only the regulator may grant such an exemption.

PART 10 EFFECTIVE DATE

10.1 Effective Date - This Instrument shall come into force on February 1, 2001.

FORM 43-101F1

TECHNICAL REPORT

INSTRUCTIONS

- (1) *The objective of the technical report is to provide scientific and technical information concerning mineral exploration, development and production activities on a mineral property that is material to an issuer. This Form sets out specific requirements for the preparation and contents of a technical report. Item 25 of this Form includes additional requirements for technical reports on development and production properties.*
- (2) *Terms used and not defined in this Form that are defined or interpreted in National Instrument 43-101 Standards of Disclosure for Mineral Projects (the "Instrument") shall bear that definition or interpretation. In particular, the terms "mineral resource" and "mineral reserve" and the categories of each are defined in the Instrument. In addition, a general definition instrument has been adopted as National Instrument 14-101 Definitions which contains definitions of certain terms used in more than one national instrument. Readers of this Form shall review both these national instruments for defined terms.*
- (3) *The author preparing the technical report shall use the headings of the Items in this Form. If unique or infrequently used technical terms are required, clear and concise explanations shall be included.*
- (4) *No disclosure need be given in respect of inapplicable items and, unless otherwise required by this Form, negative answers to items may be omitted. Disclosure included under one heading is not required to be repeated under another heading.*
- (5) *The technical report is not required to include the information required in Items 6 through 11 of this Form to the extent that the required information has been previously filed in a report for the property being reported on, the previous report is referred to in the technical report and there has not been any change in the information.*

CONTENTS OF THE TECHNICAL REPORT

- Item 1: Title Page** - Include a title page setting out the title of the technical report, the general location of the mineral project, the name(s) and the professional designation(s) of the authors and the effective date of the technical report.
- Item 2: Table of Contents** - Provide a table of contents listing the contents of the technical report, including figures and tables.
- Item 3: Summary** - Provide a summary which briefly describes the property, its location, ownership, geology and mineralization, the exploration concept, the status of exploration, development and operations and the author's conclusions and recommendations.
- Item 4: Introduction and Terms of Reference** - Include a description of
- (a) the terms of reference;
 - (b) the purpose for which the technical report was prepared;
 - (c) the sources of information and data contained in the technical report or used in its preparation, with citations if applicable; and
 - (d) the extent of field involvement of the qualified person.
- Item 5: Disclaimer** - If the author of all or a portion of the technical report has relied on a report, opinion or statement of legal or other experts who are not qualified persons for information concerning legal, environmental, political or other issues and factors relevant to the technical report, the author may include a disclaimer of responsibility in which the author identifies the report, opinion or statement relied upon, the maker of that report, opinion or statement, the extent of reliance and the portions of the technical report to which the disclaimer applies.
- Item 6: Property Description and Location** - To the extent applicable, with respect to each property reported on, describe
- (a) the area of the property in hectares or other appropriate units;
 - (b) the location, reported by section, township, range mining division or district, municipality, province, state, country and National Topographic System designation or Universal Transverse Mercator (UTM) system, as applicable, or by latitude and longitude;
 - (c) the claim numbers or equivalent, whether they are patented or unpatented, or the applicable characterization in the jurisdiction in which they are situated, and whether the claims are

contiguous;

- (d) the nature and extent of the issuer's title to, or interest in, the property including surface rights, the obligations that must be met to retain the property, and the expiration date of claims, licences or other property tenure rights;
- (e) whether or not the property has been legally surveyed;
- (f) the location of all known mineralized zones, mineral resources, mineral reserves and mine workings, existing tailing ponds, waste deposits and important natural features and improvements, relative to the outside property boundaries by showing the same on a map;
- (g) to the extent known, the terms of any royalties, back-in rights, payments or other agreements and encumbrances to which the property is subject;
- (h) to the extent known, all environmental liabilities to which the property is subject; and
- (i) to the extent known, the permits that must be acquired to conduct the work proposed for the property, and if the permits have been obtained.

Item 7: Accessibility, Climate, Local Resources, Infrastructure and Physiography - With respect to each property reported on, describe

- (a) topography, elevation and vegetation;
- (b) the means of access to the property;
- (c) the proximity of the property to a population centre, and the nature of transport;
- (d) to the extent relevant to the mineral project, the climate and the length of the operating season; and
- (e) to the extent relevant, the sufficiency of surface rights for mining operations, the availability and sources of power, water, mining personnel, potential tailings storage areas, potential waste disposal areas, heap leach pad areas and potential processing plant sites.

Item 8: History - To the extent known, with respect to each property reported on, describe

- (a) the prior ownership of the property and ownership changes;
- (b) the type, amount, quantity and results of exploration and/or development work undertaken by the owners and any previous owners;
- (c) historical mineral resource and mineral reserve estimates, including the reliability of the historical estimates and whether the estimates are in accordance with the categories set out in sections 1.3 and 1.4 of the Instrument; and
- (d) any production from the property.

INSTRUCTION

If a reporting system other than the one stipulated by the Instrument has been used, the author shall include an explanation of the differences and reliability.

- Item 9: Geological Setting** - Include a description of the regional, local and property geology.
- Item 10: Deposit Types** - Describe the mineral deposit type(s) being investigated or being explored for and the geological model or concepts being applied in the investigation and on the basis of which the exploration program is planned.
- Item 11: Mineralization** - Describe the mineralized zones encountered on the property, the surrounding rock types and relevant geological controls, detailing length, width, depth and continuity, together with a description of the type, character and distribution of the mineralization.
- Item 12: Exploration** - Describe the nature and extent of all relevant exploration work conducted by, or on behalf of, the issuer on each property being reported on, including
- (a) results of surveys and investigations, and the procedures and parameters relating to the surveys and investigations;
 - (b) an interpretation of the exploration information;
 - (c) a statement as to whether the surveys and investigations have been carried out by the issuer or by a contractor and, if the latter, identifying the contractor; and

- (d) a discussion of the reliability or uncertainty of the data obtained in the program.

Item 13: Drilling - Describe the type and extent of drilling including the procedures followed and a summary and interpretation of all results. The relationship between the sample length and the true thickness of the mineralization must be stated, if known, and if the orientation of the mineralization is unknown, state this.

Item 14: Sampling Method and Approach - Include

- (a) a description of sampling methods and details of location, number, type, nature and spacing or density of samples collected, and the size of the area covered;
- (b) identification of any drilling, sampling or recovery factors that could materially impact the accuracy and reliability of the results;
- (c) a discussion of the sample quality and of whether the samples are representative and of any factors that may have resulted in sample biases;
- (d) a description of rock types, geological controls, widths of mineralized zones and other parameters used to establish the sampling interval and identification of any significantly higher grade intervals within a lower grade intersection;and
- (e) a list of individual samples or sample composites with values and estimated true widths.

Item 15: Sample Preparation, Analyses and Security - Describe sample preparation methods and quality control measures employed prior to dispatch of samples to an analytical or testing laboratory, the method or process of sample splitting and reduction, and the security measures taken to ensure the validity and integrity of samples taken, including

- (a) if any aspect of the sample preparation was conducted by an employee, officer, director or associate of the issuer;
- (b) details regarding sample preparation, assaying and analytical procedures used, including the sub-sample size, the name and location of the analytical or testing laboratories and whether the laboratories are certified by any standards association and the particulars of any certification;
- (c) a summary of the nature and extent of all quality control

measures employed and check assay and other check analytical and testing procedures utilized, including the results and corrective actions taken; and

- (d) a statement of the author's opinion on the adequacy of sampling, sample preparation, security and analytical procedures.

Item 16: Data Verification - Include a discussion of

- (a) quality control measures and data verification procedures applied;
- (b) whether the author has verified the data referred to or relied upon, referring to sampling and analytical data;
- (c) the nature of and any limitations on such verification; and
- (d) the reasons for any failure to verify the data.

Item 17: Adjacent Properties - A technical report may include information concerning an adjacent property if

- (a) such information was publicly disclosed by the owner or operator of the adjacent property;
- (b) the source of the information and any relationship of the author of the information on the adjacent property to the issuer is identified;
- (c) the technical report states that its author has been unable to verify the information and, in bold face type, that the information is not necessarily indicative of the mineralization on the property that is the subject of the technical report;
- (d) the technical report clearly distinguishes between mineralization on the adjacent property and mineralization on the property being reported on; and
- (e) if any historical estimates of mineral resources and mineral reserves are included in the technical report, they are disclosed in accordance with section 2.4 of the Instrument.

Item 18: Mineral Processing and Metallurgical Testing - Where mineral processing and/or metallurgical testing analyses have been carried out, include the results of testing and details of sample selection representativity and testing and analytical procedures.

Item 19: Mineral Resource and Mineral Reserve Estimates - Each technical report on mineral resources and mineral reserves shall

- (a) use only the applicable mineral resource and mineral reserve categories set out in sections 1.3 and 1.4 of the Instrument;
- (b) report each category of mineral resources and mineral reserves separately and if both mineral resources and mineral reserves are disclosed, state the extent, if any, to which mineral reserves are included in total mineral resources;
- (c) not add inferred mineral resources to the other categories of mineral resources;
- (d) disclose the name, qualifications and relationship, if any, to the issuer of the qualified person who estimated mineral resources and mineral reserves;
- (e) include appropriate details of quantity and grade or quality for each category of mineral resources and mineral reserves;
- (f) include details of the key assumptions, parameters and methods used to estimate the mineral resources and mineral reserves;
- (g) include a general discussion on the extent to which the estimate of mineral resources and mineral reserves may be materially affected by any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant issues;
- (h) identify the extent to which the estimates of mineral resources and mineral reserves may be materially affected by mining, metallurgical, infrastructure and other relevant factors;
- (i) use only indicated mineral resources, measured mineral resources, probable mineral reserves and proven mineral reserves when referring to mineral resources or mineral reserves in an economic evaluation that is used in a preliminary feasibility study or a feasibility study of a mineral project;
- (j) state the grade or quality, quantity and category of the mineral resources and mineral reserves if the quantity of contained metal is reported; and
- (k) when the grade for a polymetallic mineral resource or mineral reserve is reported as metal equivalent, report the individual grade of each metal, and consider and report the recoveries,

refinery costs and all other relevant conversion factors in addition to metal prices and the date and sources of such prices.

INSTRUCTIONS

- (1) The methods and procedures to be used in estimating mineral resources and mineral reserves are the responsibility of the authors preparing the estimate.*
- (2) A statement of quantity and grade or quality is an estimate and shall be rounded to reflect the fact that it is an approximation.*
- (3) An issuer that is incorporated or organized in a foreign jurisdiction may file a technical report that utilizes the mineral resource and mineral reserve categories of the JORC Code, USGS Circular 831 or IMM system provided that a reconciliation to the mineral resource and mineral reserve categories referred to in sections 1.3 and 1.4 of the Instrument is filed with the technical report and certified by the author. The reconciliation shall also address the confidence levels required for the categorizations of mineral resources and mineral reserves.*

Item 20: Other Relevant Data and Information - Include any additional information or explanation necessary to make the technical report understandable and not misleading.

Item 21: Interpretation and Conclusions - Include the results and reasonable interpretations of all field surveys, analytical and testing data and other relevant information. Discuss the adequacy of data density and the data reliability as well as any areas of uncertainty. A technical report concerning exploration information shall include the conclusions of the author. The author must discuss whether the completed project met its original objectives.

Item 22: Recommendations - If successive phases of work are recommended, each phase must culminate in a decision point. The recommendations shall not apply to more than two phases of work. The recommendations shall state whether advancing to a subsequent phase is contingent on positive results in the previous phase. Provide particulars of the recommended programs and a breakdown of costs for each phase. A technical report that contains recommendations for expenditures on exploration or development work on a property shall include a statement by a qualified person that, in the qualified person's opinion, the character of the property is of sufficient merit to justify the program recommended.

Item 23: References - Include a detailed list of all references cited in the

technical report.

Item 24: Date - Include the effective date of the technical report on both the title page and the page of the technical report that is signed. The date of signing must also be included on the signature page.

Item 25: Additional Requirements for Technical Reports on Development Properties and Production Properties - Technical reports on development properties and production properties shall also include

- (a) Mining Operations - information and assumptions concerning the mining method, metallurgical processes and production forecast;
- (b) Recoverability - information concerning results of all test and operating results relating to the recoverability of the valuable component or commodity and amenability of the mineralization to the proposed processing methods;
- (c) Markets - information concerning the markets for the issuer's production and the nature and material terms of any agency relationships;
- (d) Contracts - a discussion of whether the terms of mining, concentrating, smelting, refining, transportation, handling, sales and hedging and forward sales contracts or arrangements, rates or charges are within market parameters;
- (e) Environmental Considerations - a discussion of bond posting, remediation and reclamation;
- (f) Taxes - a description of the nature and rates of taxes, royalties and other government levies or interests applicable to the mineral project or to production, and to revenues or income from the mineral project;
- (g) Capital and Operating Cost Estimates - capital and operating cost estimates, with the major components being set out in tabular form;
- (h) Economic Analysis - an economic analysis with cash flow forecasts on an annual basis using proven mineral reserves and probable mineral reserves only, and sensitivity analyses with variants in metal prices, grade, capital and operating costs;
- (i) Payback - a discussion of the payback period of capital with imputed or actual interest;

- (j) Mine Life - a discussion of the expected mine life and exploration potential.

Item 26: Illustrations -

- (a) Technical reports shall be illustrated by legible maps, plans and sections. All technical reports shall be accompanied by a location or index map and more detailed maps showing all important features described in the text. In addition, technical reports shall include a compilation map outlining the general geology of the property and areas of historical exploration. The location of all known mineralization, anomalies, deposits, pit limits, plant sites, tailings storage areas, waste disposal areas and all other significant features shall be shown relative to property boundaries. Maps, drawings and diagrams that have been created by the author, in whole or in part, and that are based on the work that the author has done or supervised, shall be signed and dated by the author. Where information from other sources, either government or private, is used in preparing these maps or diagrams, the source of the information shall be named.
 - (b) If adjacent or nearby properties have an important bearing on the potential of the property under consideration, their location and any mineralized structures common to two or more such properties shall be shown on the maps.
 - (c) If the potential merit of a property is predicated on geophysical or geochemical results, maps showing the results of surveys and their interpretations shall be included in the technical report.
 - (d) Maps shall include a scale in bar form and an arrow indicating North. Information taken from government maps or from drawings of other engineers or geoscientists shall be acknowledged on the map.
-