

**ASSOCIATION PROFESSIONNELLE DES
GÉOLOGUES ET GÉOPHYSICIENS DU QUÉBEC**

Quebec, November 6, 1998

Mr. Daniel B. Iggers, Secretary
Ontario Securities Commission
20 Queen Street West
Suite 800, Box 55
Toronto, Ontario M5H 3S8

Mr. Iggers:

The Association of Professional Geologists and Geophysicists of Québec (APGGQ) commends the Canadian Securities Regulatory Authorities for facing the demanding challenge of setting new standards for mineral exploration. Achieving this objective requires to review and modify many "generally accepted practices". This task has been continued in National Instrument 43-101 and the Companion Policy 43-101 CP, and we are pleased to send our comments and suggestions concerning these documents.

As a professional organization of geoscientists that has been seeking professional registration for 25 years, the APGGQ welcomes the emphasis the Interim Report, "Setting New Standards" puts on the role of the qualified professionals, the engineers and geoscientists referred to as "qualified persons" and the support given to the registration of geoscientists. However, this role is a daunting challenge, as many readers of these documents will consider the qualified persons as being almost solely responsible and accountable for achieving the improvements sought.

In addition, our review of the latter two documents indicates a number of ambiguities, shortcomings or contradictions in some of the definitions and guidelines proposed. We consider this situation is likely to affect the aptitude of the "qualified persons" to deliver the improvement in quality and efficiency that are required. A detailed critical review of the items of particular concern to us is presented in the Annex to this letter. The key aspects of these concerns will be described in the following paragraphs. They involve the focus on the qualified person to achieve / maintain quality, the objectives and requirements of the feasibility study and the resource/reserve definitions.

Quality Assurance

Quality control must not be the sole responsibility of the qualified person for several reasons. First, all quality experts stipulate that involvement of company management is the first requirement of a successful quality assurance policy. Exploration quality cannot be insured only by the qualified person, particularly when he is not directly involved in the actual exploration activity. In many cases, he (she) may not be in a position to verify a significant part of the information after the fact, when auditing the results. Under these conditions, verifications may become more expensive and less complete than what would be required.

Objectives and Requirements of the Feasibility Study

The definition proposed is adequate so far as it goes, but it does not address the main cause of the problems observed in too many mining projects: cost overruns, late schedule affecting cash flow, project not performing to specifications regarding forecast grades, tonnages, mill recoveries, etc. These are quality problems related to imprecise objectives and requirements. The goal of the feasibility study is to ensure the mining project is planned adequately to:

- complete the mine development according to specifications, within budget and on schedule;
- achieve the planned production on schedule, according to specifications (quantities and grades/quality of ore and concentrates) and realize the cash flow forecasts.

We consider it is essential to make explicit reference to these specific objectives and requirements, which are typical of any industrial project.

Resource Reserve Definitions

These definitions embody many ambiguities, shortcomings and even contradictions. They contain significant discrepancies with the Australian system from which they derive, and that has become the basis of a de facto international standard for the U.K and the U.S.A. The main ones are:

- inconsistent structure and imprecise wording of the various definitions;
- modifying and blurring the difference in the Australian system between the "preliminary / intermediate" delineation level of indicated/probable and the "adequate for mine planning feasibility" level of measured/probable;
- inconsistent place in the definitions to the level of continuity achieved in the various categories;
- at place, confusion and contradiction in wording between the prefeasibility and feasibility studies;

We strongly recommend that the only way to upgrade from resource estimate to reserve is by way of a full blown feasibility study. This way there will be no ambiguity for the public and the financing world. When we will be talking reserves this will mean that all aspects of the profitability of the project have been taken into account and that we are not talking of a more or less defined accumulation of metal within a more or less secured fiscal/legal/political/economical environment, as it is the case for a resource.

We consider that our recommendations could help achieve a needed contribution to more appropriate inventory work by the "qualified person" and could help informing truthfully, completely and clearly the potential investor regarding the merits of a potential investment.

Sincerely yours,

Jacquelin Gauthier, Geologist, P. Eng.
APGGQ

**ASSOCIATION PROFESSIONNELLE
DES GÉOLOGUES ET GÉOPHYSICIENS DU QUÉBEC**

Annex 1

**COMMENTS ON NATIONAL INSTRUMENT 43-101
Standards of Disclosure for Mineral Exploration and Development
and Mining Properties**

Part. 1 APPLICATION AND DEFINITIONS

1.1 Application

This requirement should raise the profile of the qualified persons relative to P.R. people. It may or may not be more expensive in the long run, but it will undoubtedly contribute to more appropriate information being transmitted to the investing public. The additional work required may well contribute to a higher quality of exploration work and better results.

1.2 Definitions

Mining project

The use of “mining project” to describe “*any mineral exploration, development or production activities*” is not likely to help inform the investor truthfully and adequately on the merits of a proposed investment. This term should be restricted to development and production activities, as most exploration projects will not become mines.

Feasibility study

We see no problem with this definition as it stands, except for the fact it sets no specific requirements or objectives beyond the “*development of the deposit to production*”. Industry history shows beyond doubt that such requirements and objectives are needed as bases for both the company involved and the qualified persons to carry out their work and for the consultants of the regulatory and financial partners to evaluate its appropriateness. A feasibility study should be viewed as a due diligence exercise that must be carried out with sufficient care and thoroughness to allow:

- completing the mine development activities according to specifications, within budget and on schedule;

- achieving the planned production on schedule, according to specifications (quantities and grade/quality of ore and concentrates) and achieving the cash flow that was forecast.

As a feasibility study should evaluate all parameters/aspects that could affect the profitability of the project, at least one should add “legal, fiscal” after “engineering”.

Preliminary feasibility study

This is a misleading and dangerous definition: it narrows too much the scope of application of this term, and it is too permissive within this scope. A reserve should not be established nor announced to the investing public based upon “. . . *a study based upon reasonable assumptions of technical and economic factors, . . .*” [bold added]

Actually, preliminary feasibility studies are carried out at several successive stages of a mining project, not necessarily when all the conditions described in the proposed definition have been met. This proposed definition is too limiting: what will we call similar studies that are carried out at earlier project stages, to summarize project results and plan/budget the next work phase. Some use the term “scoping study” at very early project stages. In fact, the announcement of a resource following a discovery and its delineation to the indicated stage, should be based on a preliminary or ‘scoping study’ carried out by a qualified person to establish the potential economic interest of the mineralized zone.

Professional association

As registration of geoscientists has not yet been established by law in all jurisdictions in Canada, the following should be added after paragraphs (a) and (b):

“In the interim, only the members of provincial/territorial Associations of Geoscientists that are seeking professional registration and that are members of the Canadian Council of Professional Geoscientists, will be considered as eligible as Qualified persons in that jurisdiction.”

Out of the four remaining provinces where geoscientists are not registered, it is expected that registration will be a “fait accompli” fairly shortly in New Brunswick and Nova Scotia. The Canadian Securities Administrators should maintain close scrutiny and contacts in Ontario and Quebec.

Qualified person

Article (b) should be deleted as it infringes upon the provincial laws that regulate professional practice and only define personal practice. Until the professional associations do establish the legal support and the required regulations to control the practice of engineering and geosciences by corporate practice, this article would offer too many opportunities to defeat the purpose and effectiveness of article (a) regarding professional practice by individuals, as it may lead to “rubber stamping,” that is having work that should be carried out by a qualified professional done by a less qualified person.

The minimum period of experience for a qualified person should be seven years, as required now in Quebec. It is difficult to justify tougher standards if, in Quebec, the minimum experience is lowered from 7 years to 5.

Resource

We should refer to “a mineral resource,” as the word resource is a generic one with many associations. The words “*currently or*” should be removed from the definition. If extraction it is “currently feasible” it should be a reserve, not a resource. Feasibility is an attribute that is applied to a deposit/project following a feasibility study as defined above.

Generally speaking, the resource/reserve definitions in this text, which are based on the CIM proposal, diverge significantly from the Australian system and the similar U.K, U.S. systems. This is not appropriate, given the internationalization of the mining industry. The recommended changes bring them closer to the developing international consensus.

Inferred resource

This definition contains conflicting elements and should be revised. How can one obtain, ". . . on the basis of limited sampling . . . a reasonable understanding of the continuity and distribution of metal values to outline a deposit of potential economic interest" [underline added].

The following is proposed:

An inferred mineral resource is estimated based on apparent geological continuity in two or three dimensions of mineral occurrences of interest, supported by samples which are too very few and too widely spaced to allow actual delimitation of a mineral-bearing zone and appraisal of its continuity in three dimensions.

Indicated and measured resource

The structure of these two closely related definitions should be similar, which is definitely not the case in the proposal. Both definitions should refer to the type and amount of continuity which has been established on the basis of the available information, to establish more specific criteria to attribute material to one category or the other.

Indicated resource

This definition is confusing in several aspects! Traditionally, the indicated category has consisted of estimates made on deposits which have been delineated by a rather wide and more or less regular sampling grid, so that the extent, shape and continuity are established in a preliminary fashion, providing estimates that carry a fairly large margin of error and do not allow detailed mine planning and estimates. This is because, at the "indicated level", only the geological/structural continuity can be established, as the wide sampling grid not allowing detailed investigation of the local grade continuity. In consequence, only a preliminary

feasibility study can be carried out on this material. Alone and by itself, indicated resource cannot be converted into a probable reserve: it must be supported by a measured resource category which meets the conditions for a proven reserve.

Proposed definition

"indicated resource" "the estimated quantity and grade of that part of a deposit for which the continuity of grade, the extent and the shape have been established using a fairly wide sampling grid, allowing only an estimate of grade and tonnage carrying a significant margin of error on the global estimate.

Measured resource

There should be reference to continuity in this definition, as in the **"indicated resource"** definition. The narrower sampling grids and additional information, such as mining sampling and bulk sampling that define a measured resource allow establishment of the local continuity of grades, thus making feasible the detailed mine planning and ore recovery/dilution allowances that will be required to establish mining feasibility.

Proposed definition:

measured resource is the portion of a deposit whose mass (tonnes), form, limits and grade/ quality are known by surveys, sampling and drilling that are detailed

compared to the dimensions of the deposit, and appropriate to verify and measure continuity in 3D. This allows a global estimate with a low margin of error, and value/quality estimates with limited margins of error on blocks of a restricted size compared to the dimensions of the deposit

Reserve

This definition is contradictory with the definition of the feasibility study earlier in this text and the concept of reserve as ". . . *the part of the deposit which can be extracted or produced legally and profitably* . . ." (SEC). If the investing public is to have any confidence in the term "reserve" it must be based on a **feasibility study**, not on "at least a preliminary feasibility study". We should not have two categories of reserves to confuse the investors, the reserves of mining operations that have shown feasibility and profitability (and, of course, are vulnerable to metal markets and prices) and the may-be reserves, based upon assumptions, albeit "reasonable" ones! Possession of all the required permits is another essential condition.

Once a resource/reserve inventory system has been adopted, the promoter does not need to have as easy an access to the term "reserve" as before, given the availability of the resource category. Maintaining such a situation would be a major handicap on the truthful and accurate information of the investor.

Proposed revision:

An **Reserve** consists of the portion of a measured and indicated mineral resource which can be extracted or produced legally and profitably, at conditions established in a production feasibility study for a new mine, and based upon possession of the required permits.

Possible reserve

This category should be removed for several reasons:

- 1) "Possible reserve" does not enjoy the required level of knowledge to be a reserve as it is equivalent to the inferred resource category - it cannot support either a feasibility or a prefeasibility study.
- 2) In a resource/reserve system, the inferred, indicated and measured resources make up additional categories that fulfil very adequately the original purpose of the possible category.
- 3) The definition contains conflicting elements. The proposition : ". . . *that part of measured, indicated or inferred resource be determined from limited sample data and for which geology, grade continuity and operating parameters are principally based on reasonable extrapolations, assumptions, and interpretation.* " ?? This wording indicates a confusion of the resource and reserve concepts. The reserve category should be based on technical and economic feasibility, availability of permits and actual production or commitment to production and the level of geological characterization of an inferred resource does not allow to determine these factors. *Interpolations, assumptions and interpretation* are characteristic of the geological domain, of the resource category, not of the engineering aspects that are required for a reserve.

Probable reserve

This formulation is too ambiguous and unnecessarily creates confusion between the meaning of the probable and proven categories. What is a ". . . *significant capital expenditure* . . ." for the operator, for the investor? The intended meaning refers probably to significant deposit appraisal expenditures required for underground sampling and testing: why not to say it explicitly, at least in the interpretation (43-101 CP), to help informing the investor adequately.

Proposed revision:

, **Probable reserve** is the estimated mass (tonnes) and grade/quality of the "indicated mineral resource" which could be extracted according to a production plan. As a consequence of the fairly high margin of error of this resource category, technical feasibility, mine planning and cost and income estimates can be established only in a preliminary or conceptual way. In principle, this category cannot yet meet the requirements of the production feasibility study by itself and must be associated with a proven reserve. Part of a measured resource might be included in this category, depending on mining requirements.

Proven reserve

The term ". . . *the highest degree of confidence in the estimate*" is very qualitative and does not correspond to the mining reality. In the mining industry, **there is no such thing as a true value, . . . there is no such thing as the highest degree of confidence**. We are working from figures produced by geological, engineering and economic estimation processes - this information is always incomplete and/or mutable. Market demand and prices also may change at any time.

The basic support of a proven reserve is the thoroughness of the geological appraisal it is based on. How can engineering and economic feasibility be more accurate and precise than the geology supporting them.

Proposed revision:

, **Proven reserve** is the estimated mass (tonnes) and grade/quality of the measured mineral resource that can be extracted or produced "legally and profitably," according to the mining plan selected. As a consequence of the low margin of error typical of this mineral resource category, the technical feasibility, mining planning and the cost and revenue estimates meet the technical and economic requirements of the production feasibility for the mining and processing methods adopted, and justify the production decision and the major investments required for mine development.

Senior resource issuer

We would recommend that the amount of the gross revenue be \$25 million per year rather than \$50 million.

Part 2 - DISCLOSURE

2.1 Requirements applicable to all disclosures

Several modifications appear required to avoid needless confusion regarding the content of this section. They are in normal type, the original text being in italic.

Article (a) should read;

be based upon information prepared by or under the “immediate” supervision of a qualified person.

- (b) *if a resource or reserve is disclosed*
 - (i) *utilise only the applicable resource and reserve categories set out in section 1.2 of this Instrument; “whenever a resource or reserve category contains zones that have been delimited based on more than one sampling grid, sub-categories may be used ;”*
 - (ii) *state that only reserves have demonstrated economic viability “based upon economic conditions at the time of the feasibility study”*
 - (iii) *disclose each category of resources and reserves separately*
Comment: reserve should **never** be included in total resources: a noun should not be used to identify both the whole and a part thereof; this is needlessly confusing for the operators as well as the investors. The basic all inclusive resource concept of the USGS and United Nations pertains to both undelimited and delimited resources in addition to reserves.
 - (iv) complete agreement

2.3 Nature of Data Verification

The formulations of this and the two following sections are ambiguous. Disclosure may be in a communique, but often a formal report may be required. The requirements as presented appear at time slanted to the less format type of disclosure. This may not be the optimal base for the more elaborate reports, particularly the feasibility reports. Moreover, experience has shown repeatedly that such minimum requirements rapidly become maximum requirements.

In agreement, save for the need to explicitly mention geological, geochemical and geophysical data. It is not enough to ask questions about the verification, the results of the verifications must also be reported upon.

- (a) *state whether the qualified person has independently verified the “geological, geophysical and geochemical” data, including sampling and assaying data, “and the interpretations” underlying the information or opinions contained in the written disclosure;*
- (b) *describe the nature of and any limitations of such verifications and “present the results and implications of these verifications”*
- (c) no change

2.4 Written disclosure of Exploration Information

Sub-section (1) seems to give short shrift to geological information and interpretation. Defining and understanding the geological framework is an essential part of establishing the basis of the geological projections to be applied to the sampling points and drill hole grids.

Quality control must not be the sole responsibility of the qualified person for several

reasons. First, all experts agree that quality control must start at the head of the company concerned. Moreover, the qualified person may not be in a position to verify a significant part of the information after the fact, or it might have become too expensive or too lengthy to carry out required such verifications at the time of writing a disclosure or a qualification report.

Proposed revisions (“in normal type”)

- (1) (a) *results of “all” surveys and investigations regarding that property*
- (b) presentation of the interpretation of *exploration information*, “with a critical review of the geological model used; and”
- (c) *a statement as to whether the surveys and investigations have been carried out by the issuer or by a contractor*, “and a description of the quality control measures used during the execution of the work.”

Section 2.4 must include a third sub-section dealing with the results on the ongoing deposit appraisal work (the so-called “advanced exploration” work), such as mineral processing tests, environmental characterization, engineering tests and design including the geotechnical aspects, bulk sampling, pilot plant testing of mineral processing and metallurgical characteristics, any economic study, marketing, etc. These activities are essential components of the eventual feasibility study.

- (1) No particular problem, in the light of our comments on section 2.3
- (2) (a, b, c) agreement with wording
- (d) agreement with wording
- (e) “. . . .of each assay and or analytical laboratory used “and the status of each regarding certification ”
- (f) “for exploration information”, a summary “listing ” ~~description~~ *the true width of individual samples or sample composites*, “stating explicitly the extend to which this information is” *known*

2.5 Written Disclosure of Resources and Reserves

In agreement, save for the need to specify more explicitly the geometric parameters of the drilling sampling information and other information regarding grade/quality. Quality may apply not only to the contents in substances of interest, but to chemical impurities, or to physical characteristics of industrial minerals for instance; quality may also apply to mineral processing characteristics, which too often are not determined systematically enough.

- (a) *include details of quantity and grade/“quality” of each category of resource and reserve “including mineral processing and metallurgical characteristics”*
- (b) *include details of the key assumptions, parameters and methods used to estimate the resource and reserve, including “the grid cell dimensions characteristic of each resource reserve category, the various sample types used and their location”, and*
- (c) “present and” *discuss “in a fashion appropriate for each category” the extent to which . . .*

Part 3 OBLIGATION TO FILE A REPORT

3.1 Obligation to file a report

This obligation is essential to providing information to the investors and justifies the additional costs that may be involved.

3.2) 3) What will happen if the information in the report is different from the information of the press release?

Part 5 NATURE OF REPORT

5.1 Engineering “or Geoscientific” Document”

Reports required by this Instrument shall be engineering or “geo”scientific documents

5.2 Judgment of Author

We understand that the objective of this paragraph is to have the qualified person justify the next work phase recommended on the basis of the information acquired so far, not to guarantee a mine!

7.1)7) Property geology should be described in detail particularly in relation to the geology of similar mineralization in the area.

**COMPANION POLICY 43-101 CP
TO NATIONAL INSTRUMENT 43-101
STANDARDS OF DISCLOSURE FOR MINERAL EXPLORATION
AND DEVELOPMENT AND MINING PROPERTIES**

PART 1 PURPOSE AND DEFINITIONS

1.4 Interpretation

Professional association

Erroneous formulation. Professional associations have regulatory status established by the provincial or territorial jurisdictions. The Engineering Associations in all provinces and territories are regrouped on the Canadian Council of Professional Engineers. Existing geoscientist organization are regrouped in the Canadian Council of Professional Geoscientists (CCPG) which also includes the geoscientist organizations in Ontario, Québec, New Brunswick and Nova Scotia, which are working towards registration. Mining industry recognition only is of concern to the latter, as the others have legal mandates and powers. (See comments on 1.02, NI 43-101)

Resource

The comments made above on NI 43-101 apply as well to the interpretations presented here. The interpretations on the inferred, indicated and measured categories are similar to the definitions themselves and do not contribute to better understanding. One

Reserve

The interpretation introduces a complex perspective on reserve. The formulation of one statement in particular can be misleading: *The category assigned to a reserve depends not only on the resource category, but also on the level of confidence in all associated costs, mining conditions.* The first source of uncertainty in reserve estimation lies with geological/sampling/mineral processing/geotechnical knowledge; in other words, no engineering design and cost estimation, no economic study can be better than the data it is based upon. The main difference in confidence lies with the difference in the geological knowledge and definition of continuity between the indicated (global only, moderate margin of error) and the measured resource category (global continuity with low margin of error; local continuity known with margin of error appropriate for mining method planned).

Probable reserve - The formulation of the comments here applies to the conditions in a producing mine or one under development, not to an exploration project, as no exploration project can have a probable reserve; this is not formulated clearly enough.

Proven reserve - This explanation could be reformulated as: “any mineralized sector included in proven reserve must be profitable by itself as established by the feasibility study (engineering design and cost studies) carried out before attribution to a category; profitability must not depend on adjoining probable reserve.”

1.5 Non-Metallic Mineral Deposits

Industrial minerals - The present formulation of this is not acceptable and contradictory. The definition of resource is based upon potential economic interest and this is appropriate for industrial minerals. Several mineral commodities have been brought to production because an entrepreneur took upon himself to develop a market. As for other commodities, the key point to classify a deposit as a (delimited) resource, there should be a scoping or pre-feasibility study to establish the potential economic interest, based not only on geology but also on marketing perspectives. To classify an industrial mineral as a reserve, it should meet the same requirements as a metallic deposit: feasibility study with positive recommendation, possession of permits, commitment to production.

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