A DISCUSSION OF MINERAL EXPLORATION AND DEVELOPMENT IN THE LARGE TIMBERLAND HOLDINGS OF NORTHERN MAINE

Presented Before The
Maine Forestry District Advisory Council
Bangor, Maine
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The purpose of this discussion is to present to the representatives of the principal timberland owners in the State a brief outline of the philosophy and methods of land acquisition and mineral exploration which are practiced by large mining companies on privately owned land tracts.

A. Mineral Potential In Maine:

(1) There is substantial evidence that valuable mineral deposits will be found and developed in the State of Maine. This judgement, held by many geologists, is based on results of preliminary exploration and geologic mapping carried out during the past ten years.

(2) The majority of mineral prospects found to date are located in the 10 million acre area of wild land townships of northern and central Maine which are owned principally by major pulp and timber companies.

(3) The mineral potential in the wild lands has, to date, not been proved and exploited because of:

inconsistent local field direction
the 1957 metal price recession
inadequate pre-exploration discussion with landowners

(4) With an upturn of metal prices; a greater interest in northeastern United States and Canada for mineral deposits; and more well-directed exploration work in the state; adequate exploration and exploitation of ore deposits is now practicable.

B. Value of Exploration to Landholders:

The landholders have a stake in this exploration and evaluation work, not only to promote the discovery of new mineral deposits, but also to increase the yield and sale value of their holdings. Several immediate advantages may be noted.

(1) Lease and option agreements include cash or some other consideration given for the privilege of doing exclusive exploration on private land. Copies of the reports and maps resulting from that exploration become the property of the landholder.

(2) The sale of large-acre tracts should definitely take into consideration the possibility of valuable mineral deposits on that land.

The existance of mineral evaluation reports alone will increase land value; this is analogous to an up-to-date timber cruise--you know what you are buying or selling.

(3) The sale or public grant of large holdings of land to state and federal agencies should be preceeded by an adequate mineral survey.

A case in point is the proposed Allagash Park Project. A private survey of the 500,000 acres involved will most assuredly increase the sale value.

(4) If a valuable deposit is found and developed, the landowner usually receives rental and royalty fees, whether of not the property is mined.

C. Land Optioning, Exploration Benefits and Land Lease Terms: The terms under which exploration, development and mining are carried on result from negotiation between landowner and mining company. Such terms, although varying in detail, follow a long standing pattern, which has proved to be satisfactory to both landowner and mining company.

Basic to any mineral land negotiation is the premise that land control must be established before commitment of an exploration program. Any major exploration program in an area as large and unmapped as northern Maine will require the expenditure of from one half million to several million dollars. For this reason, a mining company must have a firm agreement with the landowners before beginning any exploration program; thus giving the company a guarantee that a long-term exploration program and subsequent mining operations may be carried to a successful conclusion.

Step 1 - Exploration Option - A mining company is given, for some consideration, the exclusive right to carry on exploration, usually for one to five years, in all or part of the landowner's acreage; and to exercise a lease or purchase option if an ore body is found.

Step 2 - If, during that exploration period, a mineral deposit is found, the mining company may use its option to lease or buy acreage covering the ore deposit area, and begin development and mining operations.

There are three standard forms of land option agreement:-

1. Outright purchase which may include the mineral rights only on part of the mineral acreage.

2. Mining lease--covering a period of twenty years or more with:-
   a. rental payments, on a per acre basis.
   b. production royalty, on a percentage of the adjusted fair market value of all mineral products mined and processed for sale.
   c. minimum royalty, an annual payment until production begins, usually as a percentage of the proposed annual production value of an operating mine.
   d. automatic renewal guarantee by landowner if the property is in production during first term of lease.

3. Incorporation of joint company between mining company and landowner; this type of negotiation has many variations.

a. each party committing a percentage of required capital to a daughter company. Technical administration is usually provided by the mining company, this provision balanced by the contribution of acreage by the landowner. Profits and other advantages are shared by the principals in lieu of royalty.

D. <u>Exploration Techniques and Programs</u>:

(1) Preliminary considerations -

Interest in any area is generated by new or renewed mining activity, new prospects or accurate geologic information in a previously blank area, or a major change in land policy by the owners.

When interest is directed toward a specific locality, the first step taken is a compilation and evaluation of available geologic information in the area of choice. This limits the area to be optioned and explored.

At this time, negotiations for exploration and future development are initiated. When agreement is reached, an exploration program is set up and work begins.

(2) Exploration program--from 1-5 years duration -

Based on the premise that one moves from widespread broad low-cost/acre reconnaissance to detailed high-cost/acre surveying. The broad reconnaissance will eliminate all but geologically interesting smaller areas where costly methods may be used economically.

A three phase program is generally used in a large area with scanty information; with adequate information on a known target, one may go directly to a drilling program.

Phase I. Reconnaissance for possible targets:

A combination of airborne geophysical surveys and broad aerial geologic mapping which results in deliniation of major rock structures and the location of probable mineralized areas, giving basic geologic and economic control. This phase is of 1 to 2 years duration.

Phase II. Detailed survey of targets:

Usually initiated with detailed field mapping and geophysical-chemical surveys to ascertain mineralogic content of possible targets. This survey is followed by a diamond drill core recovery program to prove the value of best targets. The drilled cores are described, assayed and plotted on reports. The evaluation of drilling and geophysical results will decide if an ore body exists; in which case the third phase is initiated.

Phase III. Probing and elaboration of the ore body:
This phase consists of detailed grid diamond drilling, rock trenching, mass sampling, and shaft sinking which will determine size, shape, tonnage and ore grade of the deposit. This phase has the purpose of providing information necessary to plan the economics and engineering of a mining venture on the deposit. If this planning and study show a minable property present, development and mining is begun.

E. <u>Summary</u> <u>and</u> <u>Recommendations</u>:

(1) Three points of summary should be stressed:

a. Because of the major cash commitment and up to 5 years necessary to complete a major exploration program, a mining company must have a firm agreement on exploration and development guarantees <u>prior</u> to beginning exploration.

b. Exploration of large land holdings is of immediate value to the landowner, completely apart from any ore body which may be found and developed.

c. There are standard, recognized methods of land negotiation for exploration and mineral development which have evolved through many years of experience and the dictates of exploration techniques.

(2) Two recommendations are presented for your consideration:

a. The first is the preparation of a standard exploration and development land policy formula which may be presented to interested mining companies. This policy would cover large exploration programs on areas of one or more townships - 25,000 acres and up. Smaller areas of specific target interest must be considered individually.

The following outline is offered as a possible land option formula:

Work Requirement:

The mining company would agree to make a specified minimum expenditure on basic mineral exploration--possibly $25 per acre per year.

Fees for Exclusive Exploration Rights:

Large area exploration fee - over 45,000 acres - 5¢ / acre / year

Small area exploration fee - 0 - 45,000 acres - 10¢ / acre / year
(5,000 acre minimum)

Equivalent of $2,500 per township, up to 2 townships; this arrangement would include lease or purchase option, and would cover a 1-5 year exploration.

A.	Either in cash payment		$2,500 cash
B.	Or in other consideration as:		
	1. new set air photos of area		$ 500 value
	2. study and report of surficial sand and gravel and water resources		$1,000 value
	3. construction of new access roads, in conjunction with desires of landholder average 5 miles per year		$1,000 value
(possible)	4. shouldering part of land tax burden	up to	$1,000 value
	Total consideration		$2,500 value

Lease or Purchase After Exploration Period:

Lease or purchase arrangements, based on preliminary pre-exploration negotiation, generally follow the pattern presented below. It is offered as a guide in lease negotiations.

Actual rental, royalty or purchase payments are predicated first on the type, size and extent of mineral deposits found and developed, and second on market expectations for the mineral product. A minimum 20-year operating or depletion period may be expected.

In most cases all three principal forms of agreement are offered, giving an option to the landowner to choose the form most suited to his organization. The choice may be made after exploration period is completed, when a mineral deposit is found and adequate engineering and market studies are presented.

Outright Purchase:

The purchase price of mineral lands can be estimated at a figure approximating the "present immediate value" of the total future earnings from the property during its entire operating life. Since there is to date only a minimum of economic geologic knowledge available in northern Maine, the "present value" of mineral wealth is nil. Thus, even such preliminary work as a sand and gravel survey, water resources study and basic geologic mapping will necessarily augment "present value" of the land. And, to the extent that exploration is completed, to that extent will present value increase.

The "present value" for a mining operation may be calculated from formulas using known and reasonably predictable factors which will obtain if the property is operated. Such factors include:

annual production value - tonnage x grade % x metal price.

years of production to deplete ore.

costs of operation - mining, milling, administrative, transportation, etc.

hazards discount requirements - cave-in, loss of shaft, water flooding, etc.

original capital requirements for development and equipment.

interest requirements - speculative, investment capital, deferred operation capital.

Royalty Payment:

Royalty is calculated as a fixed or sliding percentage of (1) the fair market value (ie., smelter return value) of any valuable minerals produced and sold; (2) gross sales value less deductions for mining, transportation, treatment and marketing costs; (3) a unit, per ton cash figure on bulk products--coal, iron ore, manganese, etc.

In other words, royalty is some percentage of the profit resulting from a mining operation.

The percentage of royalty payment varies from property to property, but in total value, including normal appreciation, it will provide a mine life income close to that of the appreciated purchase price described above.

Joint Company:

Partnership in a joint "daughter" mining company to operate on the property offers a speculative opportunity whereby a landowner may invest his land and capital in a mining venture. It has the attraction of providing a direct hand in investment capital management, in addition to technical help to exploit the mineral potential on his land.

b. The second recommendation offered is: that a geologic exploration division be set up as a separate function within the company operations, employing a staff geologist who would work with a fixed budget on a permanent or 5-10 year program basis. In some cases, it may be advisable, instead, to retain a consulting geologist to work with management; set up a program, recommend a budget, and supervise exploration activity.

The primary objective of the staff geologist or consultant would be to make a resources and raw materials inventory of the company's land ownership. An accurate accounting of sand and gravel deposits, water resources, rock ballast and metal mineral showings should be made. All available geologic and soils engineering reports should be compiled and digested.

Ownership control, access road conditions, engineering studies and surface rock growth control studies would provide supplemental information of great importance to the woodlands and engineering departments.

With concise information concerning all known natural resources and a firm picture of ownership control, the geologist would then recommend a land policy and exploration program to properly investigate and evaluate the mineral potential and possible value of the company's holdings.

Soils studies, engineering, basic geologic maps, and access road control would be compiled and filed for reference. These land and geologic references could be then used in land sale negotiations, leasing and timber development work, as well as in mineral resource exploitation.