NEW IMPERIAL MINES LTD.

THE N.I.M. COORDINATE SYSTEM

A New Reference Coordinate System

For the Whitehorse Copper Belt

-Preliminary Report-

by

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Definitions of Terms Used

Angular measure: A point relative to another point, on the circumference of a circle may be defined by a single angle plus the circle radius. Extended to a sphere, two angles plus the radius are required to define the point relative to two perpendicular planes which bisect the sphere.

Geodetic (geodesic) Coordinates: These coordinates use angular measure to define a point on the surface of the earth. The two planes of reference are the equatorial plane (0^{o} latitude) and the plane passing through both poles and Greenwich, England (0^{o} longitude). The radius measure is generally ignored.

Plane Coordinates: These coordinates define any point on a horizontal planar surface relative to a predetermined perpendicular grid system.

Introduction:

Over the many years of exploration and development work on the Whitehorse Copper Belt, a large number of rather small grid systems have been used as the need has arisen. The only system uniform over the entire area is the Territorial Plane Coordinate System, as related to the Whitehorse Reference Traverse. Unfortunately, these coordinates have never been taken beyond this line.

In order to correct this situation, and to tie all points in the copper belt region to a single referencing system, for both mapping and filing purposes, F.M. Smith has suggested incorporation of the National Topographic System (N.T.S.) of coordinates. This is a grid system, based on geodetic coordinates (longitude and latitude) which covers all of Canada. Since this system will not conveniently provide the accuracy required, a second north-south p l a n e grid system, derived from the Territorial Plane coordinate system, is also being used. The ultimate accuracy here will be to the nearest hundredth of a foot.

N.T.S. Geodetic Coordinates:

The Little Chief ore body is approximately located by the designation 105-D-11-i-II. This is a rectangular area approximately 5700 ft. by 5600 ft.

The basic division here is given by the first number, 105, which defines an area bounded by lines of longitude and latitude. Its dimensions are, in an east-west direction, 8^{o} of longitude, and, in a north-south direction, 4^{o} of latitude. In the Whitehorse area, these dimensions are approximately 271.0 miles and 275.5 miles respectively. (See Map 1)

This area is in turn divided into 16 smaller areas of equal angular dimensions, designated by capital letters from A to P. The N.T.S. 1:250,000 Whitehorse sheet, 105-D (see Map 2), extending from 60°-00'-00" N. to 61°-00'-00" N. latitude and from 134°-00'-00" W. to 136°-00'-00" W. longitude, covers the entire copper belt.

All subsequent divisions are similar to the previous one. That is, each area is divided into 16 smaller areas of equal angular dimensions. With the third division, N.T.S. sheets 105-D-10, 11 and 14 are required to cover the New Imperial property (see Map 3). These are at a scale of 1:50,000, or approximately 1.25 inces = 1 mile. The small letter designations, from a to p on each sheet will provide the basic divisions within the copper belt. An exploration area, such as the Best Chance 68 linecutting grid, may be readily located in the area 105-D-11-o. The final division, into Roman Numeral areas, would be used to pin point smaller areas, such as the original example of the Little Chief ore body. (See Map 4)

N.I.M. P l a n e Coordinates:

The Whitehorse Reference Traverse was surveyed using the Territorial Plane Coordinate System, with the origin on the equator at 135°-00'-00" W. longitude. This system gives locations to the nearest hundredth of a foot, but, in the Whitehorse area, the northings are extremely large numbers, and most of the eastings are negative. For this reason, a new origin, to the south and west of all points on the property, was chosen. The conversion from Territorial Plane coordinates to N.I.M. coordinates for the Whitehorse Reference Traverse is shown in Table 1.

Oct./69

WHITEHORSE REFERENCE TRAVERSE

(Revised)

COORDINATE TABLE

STATION	NORTHING	EASTING
BL0	99,807.89	50,694.79
BL2	96,962.82	49,858.50
BL10	83,912.33	48,599.54
BL18	69,484.14	50,011.91
BL21	65,801.84	52,176.13
BL25	61,563.22	57,111.20
BL27	58,702.70	59,038.85
BL35	47,916.85	70,859.82
BL42	35,118.23	75,993.67
BL45	31,398.91	78,509.20
BL57	26,934.41	101,682.99

B.L.35 is at approximately 60°-37'-52.7" N. LAT.
135°-02'-58.8" W. LONG.

Transformation from Terretorial Plane coordinates to revised N.I.M. co-ordinate system.

Northing = Lat. - 22,011,000.00

Easting = Dep. + 80,000.00

Table 1

Whitehorse Reference Traverse

Coordinate Table

Station	Territorial Plane Coordinates		N.I.M. Coordinates	
	Latitude	Departure	Northing	Easting
B.L.0	+22,110,807.89	-29,305.21	99,807.89	50,694.79
B.L.2	107,962.82	-30,141.50	96,962.82	49,858.50
B.L.10	094,912.33	-31,400.46	83,912.33	48,599.54
B.L.18	080,484.14	-29,988.09	69,484.14	50,011.91
B.L.21	076,801.84	-27,823.87	65,801.84	52,176.13
B.L.25	072,563.22	-22,888.80	61,563.22	57,111.20
B.L.27	069,702.70	-20,961.15	58,702.70	59,038.85
B.L.35	058,916.85	- 9,140.18	47,916.85	70,859.82
B.L.42	046,118.23	- 4,006.33	35,118.23	75,993.67
B.L.45	042,398.91	- 1,490.80	31,398.91	78,509.20
B.L.57	037,934.41	+21,682.99	26,934.41	101,682.99

UTM

N E

6724196 508912

Find UTM from Lat long!

Conversion Factors: Northing = Latitude -22,011,000.00

Easting = Departure +80,000.00

Conversion From Geodetic to Plane Coordinates:

As the geodetic areas become smaller, their shape approaches that of a rectangle. In an area as small as the copper belt, all lines of longitude may be considered parallel, and thus all geodetic areas of a specific angular size may be called equidimensional. The problem, then, is to correlate two parallel grid systems.

a) Longitude: A value of 2980 ft. for one degree of longitude was obtained by scaling off the N.T.S. 1:50,000 sheet along the line of 60°-45'-00" N. latitude.

b) Latitude: The distance between lines of latitude is relatively constant, with only a small variation from the equator to the poles. The average of these values, 6060 ft. for one minute of latitude, provides a sufficiently accurate figure for use here.

c) Ground Control: Station B.L.-35, on the Whitehorse Reference Traverse, was located as accurately as possible on N.T.S. sheet 105-D-11, using triangulation with natural landmarks from the Lockwood Survey topographic sheets. The resulting geodetic coordinates are:

60°-37'-52.7"N.; 135°-02'-58.8"W.

The N.I.M. coordinates are:

47,916'.85 N.; 70,859'.82 E.

From these values, the conversion from geodetic to plane coordinates can be accomplished for any point in the copper belt area. The accuracy for the conversion is probably not better than 20 to 50 ft., but this is sufficient for all purposes intended.

Use of the N.I.M. Coordinate System:

a) Geodetic Coordinates:

The small letter squares, approximately 22,500 foot squares, will provide the basis for an overall filing system of maps at 1 inch = 1000 feet and data for the entire copper belt. There will be six of these map sheets with Herculean overlays of topography, geology, ground magnetics, aeromagnetics, claims and exploration grid plans on the photos of the area. The Roman Numeral rectangles will be used on top of this for more precise location and filing. The file system will be based on these six areas, with the smaller divisions used as necessary. All information on the property will be stored in this manner. These six areas are 105-D-10-f (Cowley Park 69), 10-e (Cowley Park 68 to Gem 69), 11-h (Gem 69 to Pass Lake), 11-i (Valerie to the Best Chance ore body), 11-o (Best Chance 68) and 14-b (War Eagle). The first two reference figures, 105 and D, may be left off here since they are common to the whole property.

b) P l a n e Coordinates:

These coordinates would not relate to the filing or classifications of specific areas, but all survey monuments, diamond drill holes and other surface plans would be tied in to them. At present, all surface surveying for the underground work is being tied to this grid system.

Conclusions:

Work is underway to reduce all pertinent maps on the property to a scale of 1 inch = 400 feet. All information at this scale will then be joined together in the six basic sheets and sent for final reduction to 1 inch = 1000 feet.

Simultaneously, the present filing system is being revised, and the coordinates of all surveying monuments are being revised.

Although the original work on this project has produced a few difficult problems, and much work has yet to be done, work is progressing smoothly, and the project should be completed before summer 1970.