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TONNAGE AND GRADE ESTIMATE,  
GRUM DEPOSIT, FARO AREA,  
YUKON TERRITORY

G. M. Hogg, P. Eng.  
G. M. Hogg & Associates Ltd.  
Toronto, Ontario  
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CERTIFICATE OF QUALIFICATION

I, Glen M. Hogg, of the City of Toronto, in the Province of Ontario, Canada, do hereby certify that:

1. I am a Consulting Geologist with an office situated at 28 Thompson Avenue, Toronto, Ontario.
2. I am a graduate of Queen's University, Kingston, Ontario, having received the degree of Master of Science in Geological Science from the Faculty of Applied Science in 1952. I have since that time practised professionally in the field of mineral exploration and development.
3. I have an extensive knowledge of the Grum deposit and the general district through continued association with the Faro area of the Yukon Territory since 1969 and have been closely associated with the exploration and development of the Grum deposit since its discovery in 1973.
4. I have no interest, direct or indirect, in the property on which this report is written, nor do I expect to receive any. I have no interest, direct or indirect, in Canadian Natural Resources Limited, as successor to AEX Minerals Corporation, nor do I expect to receive any.

DATED this            day of            , 1976.

G. M. Hogg, P. Eng.

### SUMMARY

Evaluation work completed on the Grum deposit to date includes approximately 9,200 ft. (2,800 metres) of underground decline and crosscutting, and over 350 drill holes from surface and underground. The deposit has been reasonably thoroughly explored over a strike distance of 2,200 ft. (671 metres) and extends at least another 800 ft. (244 metres) northwesterly as indicated by surface drilling.

On the basis of this work a tonnage and grade estimate for the deposit has been prepared. The reserves are drill-indicated but are well supported by underground exposure and closely spaced drill data. For the most part a cut-off grade of 9% Pb-Zn combined and a minimum width of 9.84 ft. (3.0 metres) have been applied and a well-defined configuration for the various sulphide zones making up the deposit has been used in estimating ore block outlines.

The best explored portion of the deposit extends from Section 61W to Section 85W and is estimated to contain 26,948,168 Metric Tons (29,704,965 short tons) grading 4.34% lead, 6.76% zinc and 65.45 gms/metric ton silver (1.91 oz./short ton silver). Of this total, 21,630,590 Metric Tons (23,843,399 short tons) are considered Proven Tonnage; 3,023,195 Metric Tons (3,332,468 short tons) are considered as Probable Tonnage; and 2,294,383 Metric Tons (2,529,098 short tons) are considered as Possible Tonnage. In addition, a Possible Tonnage of 8,000,000 Metric Tons (8,818,400 short tons) grading 3.87% lead, 6.47% zinc, and 60.59 gms/metric ton silver (1.77 oz./short ton silver) are estimated as occurring in the area from Section 85W to Section 93W.

SUMMARY (cont'd)

The total estimated tonnage in the Proven, Probable and Possible categories is 34,948,168 Metric Tons grading 4.23% lead, 6.69% zinc and 64.31 gms/metric ton silver. This equates to 38,523,366 short tons grading 4.23% lead, 6.69% zinc and 1.88 oz./short ton silver.

The most efficient and most profitable manner of mining the deposit appears to be a combination of open pit and underground methods.

G. M. Hogg, P.Eng.

### GENERAL STATEMENT

The Grum lead-zinc-silver deposit is located in the Faro area of the Yukon Territory approximately 120 miles northeast of Whitehorse. Since its discovery in 1973 the deposit has been under intensive evaluation by Canadian Natural Resources Limited, and Kerr Addison Mines Ltd. Canadian Natural Resources Limited holds a 40% interest in the project, and Kerr Addison Mines Ltd. a 60% interest.

At the request of Canadian Natural Resources Limited, the writer has prepared a tonnage and grade estimate of the deposit as so far outlined. This report deals specifically with this estimate and includes only such details and data which are relevant to its development. For more complete information on other aspects of the deposit the reader is referred to "A Report on the Grum Deposit With a Review of Its Economic Potential" prepared by the writer on April 6, 1976.

On site evaluation work to date has included the completion of approximately 150 surface drill holes and 215 underground drill holes for a total drilled footage of over 200,000 feet. Underground access for drilling and sampling has involved approximately 9,200 feet (2,800 meters) of decline and crosscutting work on 14 ft. x 14 ft. headings. The decline work extends from Section 62W to Section 84W, a distance of 2,200 feet (670 meters) along strike of the deposit, and reaches a maximum depth below surface of 650 feet (1,100 meter elevation) in the vicinity of Section 84W. Over 11,000 samples, almost exclusively from drill core have been taken and analysed during the program. This area so evaluated can be seen in the Drill Plan (Drawing 1 of this report).

From the foregoing it will be evident that any tonnage and grade estimate developed will be essentially drill-indicated. However, the estimate is substantially supported by underground exposure, and in the statistical sense by a very large amount of assay data.

## DESCRIPTION OF DEPOSIT

### General Character:

The Grum deposit is a highly complex, fold-controlled sulphide zone extending over a length of at least 3,000 feet (914 meters) in a northwesterly direction. The zone plunges at approximately  $10^{\circ}$  to the northwest and has been traced continuously and in considerable detail from suboutcrop in the vicinity of Section 62W to a depth of over 800 feet from surface in the Section 84W area. Surface drilling up to the 92W Section has confirmed its presence in that area.

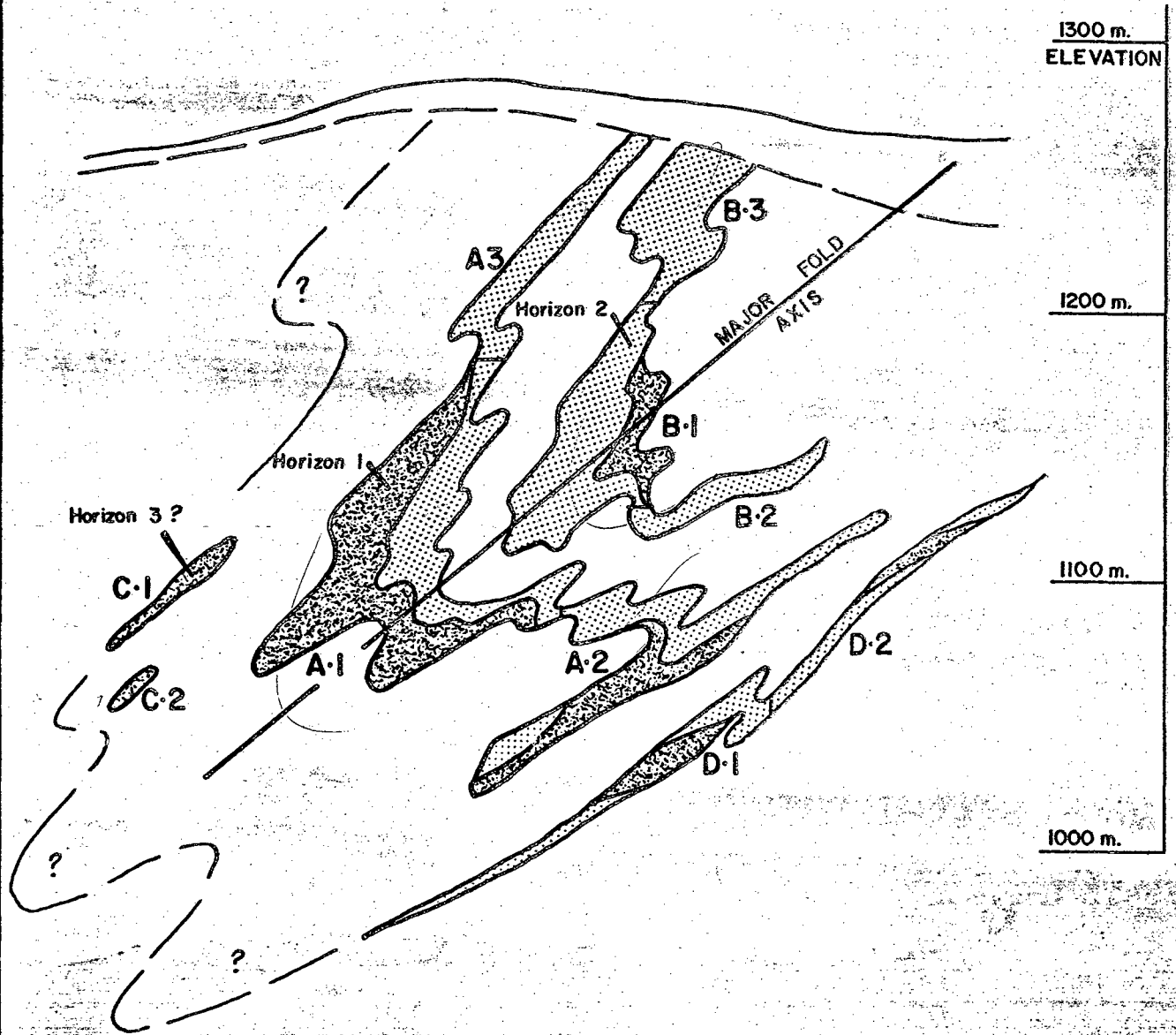
In cross-section the sulphide zone assumes the configuration of an overturned recumbent fold, the axis of which dips from  $25^{\circ}$  to  $35^{\circ}$  to the southwest. The area in which significant mineralization occurs is approximately 1,000 feet wide and 650 feet in vertical extent. The mineralized locus may be grossly described as the interface or contact area between graphitic and sericitic phyllites.



In detail the sulphide zone resolves itself into two rather distinct mineralized horizons which are essentially parallel each other along the major fold limbs and around the fold nose. (See Figure 1). These mineralized horizons contain from 5% to 75%+ sulphides consisting of pyrite and more or less sphalerite and galena. A third mineralized horizon may also exist, but is not well known save in proximity to the major mineralized horizons. Massive and near massive sulphide segregations within the disseminated zones show good continuity from section to section, and of course comprise the higher grade material of the deposit. This is also schematically indicated in Figure 1.

Faulting is present but does not appear to have caused any major disruptions in the continuity of the mineralized zones. In this regard

SW

NE



-  MASSIVE SULPHIDES 75% + Sulphides, Pb Zn 5-30% range
-  5-75% SULPHIDES, Pb Zn 1-10% range

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CANADIAN NATURAL RESOURCES

**SCHMATIC SECTION**  
ILLUSTRATING BLOCKS  
SELECTED FOR TONNAGE  
& GRADE DEVELOPMENT

FIGURE 1

SCALE: 1: 250 (approx)

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DESCRIPTION OF DEPOSIT (cont'd)

zones of "gouge" or micro-breccia occur in the vicinity of the mineralized horizons, and are particularly well developed on the outer or southwest side of the A-1/A-2/A-3 horizon. This is probably more of a cleavage-alteration effect than a derivative of true faulting, and does serve as a marker horizon to some degree.

In the development of reserves for the Grum deposit the mineralized zones can be recognized and followed from section to section on the basis shown in Figure 1. In essence the A-1 and B-1 zones occupy the fold nose area of the two main mineralized horizons, the A-2 and B-2 zones the lower limb areas, and the A-3 and B-3 zones the upper limb areas. In this context the C-1 and C-2 zones occupy the upper fold nose area, and the D-1/D-2 zones the lower limb area of a potential third mineralized horizon.

As the more detailed sections show (Drawings 2 to 13 inclusive) the mineralized zones and higher grade areas within them pinch and swell in a rather unpredictable manner. As a general observation it may be noted that the best grades and tonnages developed lie in the area between Section 70W and Section 30W. However, this effect may be mainly a function of the data available particularly in the northern portion of the deposit area. Sparse surface drilling to the north does indicate good grades and widths to exist well beyond the decline limits.

Reserve Blocks:

The following is a brief outline of the major characteristics of the various reserve blocks. They will be found useful in providing some explanation for the procedures and assumptions made by the writer in the development of the deposit tonnage and grade.

DESCRIPTION OF DEPOSIT (cont'd)

1. Block A-1: The nose area of the most westerly mineralized horizon. Generally massive to near massive sulphide mineralization with grades often in excess of 15% Pb Zn combined. Lead to zinc ratio in the 1:2 range. It is remarkably continuous and regular, and selective mining of higher grade material could probably be successfully done.
2. Block A-2: The lower limb area of the most westerly mineralized horizon. Similar in character to the A-1 Block, but of lower grade and of greater structural complexity. Lead to zinc ratio in the 1:2 range. In the north deposit area the lower portion of the A-2 Block assumes a tabular configuration which probably extends well beyond the 84W Section, and will likely prove an excellent mining area.
3. Block A-3: The upper limb of the most westerly mineralized horizon. In general it is pyritic and not of massive character. It is of lower grade than the A-1 and A-2 Blocks and tends to be much thinner. Lead to zinc ratio in the 1:2 range.
4. Block B-1: The nose area of the more easterly mineralized horizon. It is generally pyritic and of lower grade, except for the east core area where the mineralization becomes more massive and of excellent grade. (The B-1A and B-4 Blocks are in this area.) The Block obviously contains bands of better grade material intercalated in the pyritic zone, but selective mining would not likely be possible. This Block is not well developed in the Section 62W-68W area, but is otherwise of excellent continuity. The lead to zinc ratio is in the 1:2 range.

DESCRIPTION OF DEPOSIT (cont'd)

5. Block B-2: The lower limb portion of the easterly mineralized zone. It is of better grade than the B-1 Block in general, but often indistinguishable from it. It appears to show very good tabular development in the Section 62W - 68W area. On some Sections it can be confused with the A-2 or D-1/D-2 Blocks. Lead to zinc ratio in the 1:2 range.
6. Block B-3: The upper limb of the easterly mineralized zone. Subsidiary folding produces considerable thickness and good tonnage in places, but the grade is generally rather low. Lead to zinc ratio in the 1:2 range.
7. Blocks C-1/C-2: A persistent zone occurring to the southwest of the A-1 Block. It is largely massive in character and of good grade. The C-2 Block is a smaller zone, possibly connected to the C-1, and it is present only in the Section 72W to 76W area. Drill information is not extensive, and tonnages may be greater than estimated. Lead to zinc ratio is a characteristic 1:1 and silver content is high.
8. Blocks D-1/D-2: The lower limb of a possible third mineralized zone. Information is generally quite limited on this Block complex, and tonnages and grades could be considerably in excess of that estimated. It can be confused with the A-2 and B-2 Blocks. Lead to zinc ratios are variable, but in cases lie in the 1:1 range. This suggests a relationship to the C-1/C-2 Blocks.

## DEVELOPMENT OF RESERVES, PARAMETERS

### General:

The following section of this report describes the methods and parameters used in the development of tonnage and grade estimates for the Grum deposit.

In regard to the Grum deposit, it will be noted that the evaluation work has been carried on under the metric system. Thus, except where otherwise noted, the tonnage figures are given in Metric Tons and grade of silver in Grams per Metric Ton.

### Block Outlines:

The basis for identification of the various Blocks has been previously described.

The outlines of the Blocks on the twelve Sections are preferentially based on underground exposure and underground drilling data. Surface hole locations are used where necessary, but because of possible location inaccuracies due to greater length of holes it is considered subordinate to underground information.

Interpretive configuration is used in cases, but usually with confirmation from adjoining sections. It is considered conservatively applied.

### Tonnage Estimation:

Tonnage estimates are prepared by definition of the irregular block areas by planimeter on each of the 12 Sections. The area is then considered to extend one half the distance to the next Section, in this case 100 feet to the northwest and to the southeast.

DEVELOPMENT OF RESERVES, PARAMETERS (cont'd)

A tonnage factor of 8 cubic feet to the short ton is used throughout. The tonnage is then converted to Metric Tons.

Assay Treatment:

Average assays from all drill holes were used with a general cutoff grade of 9% combined Pb Zn, and a thickness limit of 3.0 meters or 9.84 feet. However, in many cases average values somewhat lower than the cutoff grade and thickness somewhat below the 3.0 meter limit were accepted (a) to provide continuity or (b) to provide a broader average base for Block grade calculation.

In application of assay data to Blocks, a weighted average of all drill hole assays available within any given Block was calculated and this average grade assigned to the total estimated tonnage.

*by area? or intersection length?*  
*MISSING CODE?*

Classification:

As noted, all reserves so calculated are drill indicated, but are supported by underground information and a considerable number of drill intersections. A division into Proven, Probable and Possible categories is applied however, on the following basis:

Proven - Supported by a large number of drill intersections or underground exposure. Projection is sometimes used, but only in virtually assured situations.

Probable - Based on a lesser number of drill intersections and projection from adjoining Sections.

Possible - Based largely on projection from adjoining Sections.

TONNAGE AND GRADE ESTIMATES

I Tonnage and Grade by Section (See Appendix I)

<u>Section</u>	<u>From</u>	<u>To</u>	<u>Metric Tons</u>	<u>% Pb</u>	<u>% Zn</u>	<u>Ag gms/metric ton</u>
62W	61W	63W	589,835	4.46	7.68	66.33
64W	63W	65W	902,470	5.10	7.67	78.02
66W	65W	67W	1,594,598	5.07	6.82	71.78
68W	67W	69W	1,710,977	5.05	7.31	70.55
70W	69W	71W	2,455,017	4.70	7.83	70.32
72W	71W	73W	2,842,499	4.18	6.39	64.07
74W	73W	75W	3,177,939	4.35	6.61	65.28
76W	75W	77W	2,971,848	4.22	6.53	66.00
78W	77W	79W	2,828,929	4.21	6.95	64.56
80W	79W	81W	3,110,965	4.15	6.27	62.12
82W	81W	83W	2,666,422	3.88	6.26	59.21
84W	83W	85W	2,096,669	3.87	6.47	60.59
<b>TOTAL*</b>	61W	85W	26,948,168 metric tons	4.34	6.76	65.45 gms/m. ton
-- or --						
<b>TOTAL</b>	61W	85W	29,704,965 short tons	4.34	6.76	1.91 oz./ton Ag

\* - This total may be broken down into categories as follows:-

<u>Category</u>	<u>Metric Tons</u>	<u>% Pb</u>	<u>% Zn</u>	<u>Ag (gms/metric ton)</u>
Proven	21,630,590	4.47	7.09	68.36
Probable	3,023,195	3.90	5.67	57.12
Possible	2,294,383	3.69	5.09	49.01

TONNAGE AND GRADE ESTIMATES (cont'd)

II Tonnage and Grade by Block (See Appendix II)

<u>Block*</u>	<u>From</u>	<u>To</u>	<u>Metric Tons</u>	<u>% Pb</u>	<u>% Zn</u>	<u>Ag gms/metric ton</u>
A-1	61W	85W	5,644,763	5.04	8.73	80.20
A-2	61W	85W	5,957,797	4.28	6.62	66.63
A-3	65W	85W	1,798,164	3.33	5.89	49.44
B-1/B-2 (B-1A, B-4)	61W	85W	7,477,807	4.25	6.83	63.35
B-3	69W	85W	3,062,066	3.30	5.34	47.97
C-1	67W	85W	1,322,880	6.32	5.46	86.55
C-2	71W	85W	164,587	5.09	3.86	66.64
D-1/D-2/D-3	65W	83W	1,520,104	3.96	4.92	53.40

\* - Categories for the various blocks are as follows:-

- A-1 - Considered as all in Proven Category.
- A-2 - All Proven Category except in 62W to 66W Section area where Probable to Possible Categories exist.
- A-3 - Proven except on 68W Section where estimate is Probable Category.
- B-1/B-2 - Proven except on 62W Section where estimate is Probable Category and 72W Section where small tonnage of Probable Category exists.
- B-3 - Probable and Possible Categories only. Area from 77W to 85W Sections is projection only and therefore in Possible Category.
- C-1/C-2 - Proven Category except on Section 78W.
- D-1/D-2/D-3 - All Possible and Probable Categories. Tonnage and Grade estimates are difficult because of limited data.

TONNAGE AND GRADE ESTIMATES (cont'd)

III Tonnage and Grade, Northwest Extension\*

<u>Section</u>	<u>From</u>	<u>To</u>	<u>Metric Tons</u>	<u>% Pb</u>	<u>% Zn</u>	<u>Ag gms/metric ton</u>
86W	85W	87W	2,000,000	3.87	6.47	60.59
88W	87W	89W	2,000,000	3.87	6.47	60.59
90W	89W	91W	2,000,000	3.87	6.47	60.59
92W	91W	93W	2,000,000	3.87	6.47	60.59
<b>TOTAL</b>	85W	93W	8,000,000 metric tons	3.87	6.47	60.59
- or -						
<b>TOTAL</b>	85W	93W	8,818,400 short tons	3.87	6.47	1.77 oz./ton Ag

\* Note 1 - Surface drilling northwest of Section 84W shows that the mineralized zones in similar configuration to that described extend at least to the 92W Section. The tonnage in this area is in addition to that included in Part I.

Note 2 - The approximate tonnage and actual grades as estimated on Section 84W are projected northwesterly on an additional four sections to Section 92W. These reserves are in the Possible Category and are shown to illustrate the potential of the area northwest of the decline limits.

### MINING OPERATIONS

The study of mining procedures and methods to be applied to the Grum deposit to attain maximum recovery and profitability is beyond the scope of this report. However, there are certain features of a general nature that arise in the course of development of reserves which bear on such considerations and warrant mention. They are as follows:-

1. The southeastern portion of the Grum deposit is relatively shallow and can be best mined by open pit methods. The extent of an open pit operation will be limited by the stripping ratio, of course, and at a ratio in the 5:1 range it appears possible to extend the pit limit northward to about the 1100 metre elevation on the 72W Section (see approximate Pit Limits as shown on the Ore Reserve Sections, Drawings 2 to 13 inclusive). A somewhat lower stripping ratio can be attained if the Pit Limit is moved further southeast with a corresponding increase if the Pit Limit is moved further northwest.
2. Including all reserves estimated (up to the 92W Section), approximately 25 million metric tons of good grade ore remain to the north of Section 72W which can probably be best extracted by underground methods.
3. The distribution of higher and lower grade material in the open pit context appears to provide for good flexibility in mining and also for the maintenance of

MINING OPERATIONS (cont'd)

relatively high grade production. However, lower grade pyritic material, not necessarily included in this reserve estimate, will probably not be visually separable from better grade material for the most part. Thus grade control from the pit may present problems if output in excess of the 10% Pb-Zn range is required.

4. In this reserve estimate linear continuity of the better grade zones is clearly established. For instance, the A-1 zone extends a minimum 2400 ft. as a regular, well defined unit comprising 6.2 million short tons grading 13.77% Pb-Zn combined on an undiluted basis. Sizeable sections of this zone are of even higher grade. It would appear that early underground mining in this area would exert a very desirable effect on production grades during the pay-back period.
  
5. To show the herein developed reserves in time context it is assumed that mining of the Grum deposit is done on a 5,000 short ton per day rate at 2,500 tons per day from open pit (300 days per year), and 2,500 tons per day from underground (at 360 days per year with the additional open pit tonnage for 60 days being made up from underground). With pit limit set at the 72W Section, the open pit reserves will total 12,875,620 short tons which will sustain the operation for 17 years. The underground reserve up to the 92W Section totals 25,636,158 short tons, which will sustain this phase of operations for 20 years.

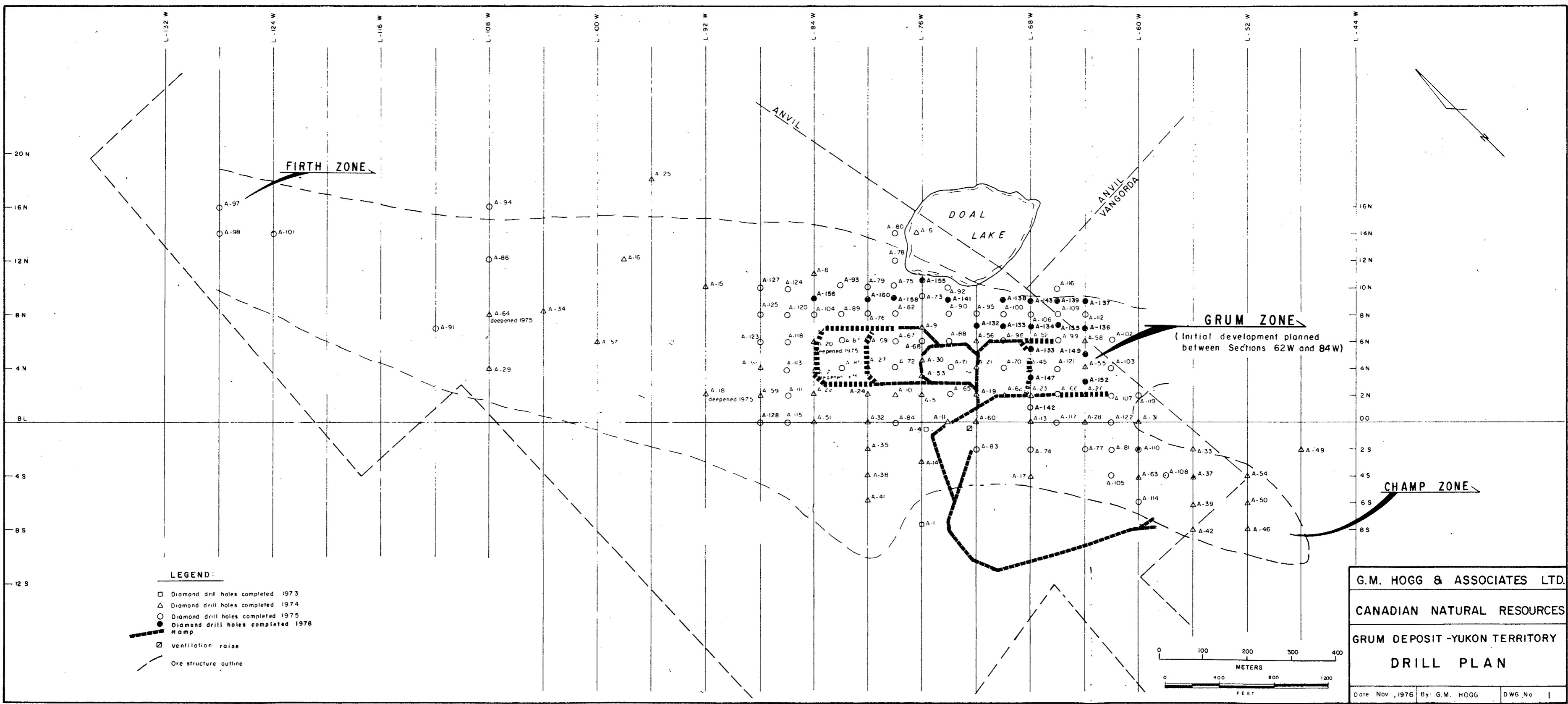
### CONCLUSIONS

1. The Grum deposit reserves between the 61W Section and the 85W Section are estimated at 26,948,168 metric tons (29,704,965 short tons) grading 4.34% Pb, 6.76% Zn, 65.45 gms. Ag/metric ton, (1.91 oz. Ag/short ton). These reserves are drill-indicated, but are supported by considerable underground work and over 300 drill holes.
2. On the basis of surface drilling the Grum deposit is projected northwest to the 93W Section to develop an additional 8,000,000 metric tons (8,818,400 short tons) grading 3.87% Pb, 6.47% Zn, 60.59 gms. Ag/metric ton (1.77 oz. Ag/short ton). This is of the Possible Ore category.
3. The deposit may be resolved into approximately eight essentially separate zones of excellent continuity between the 61W Section and the 85W Section, a distance of 2,400 ft.
4. Some views are given as to the adaptability of the deposit to both open pit and underground mining operations. It appears that a combination of these methods would produce the most efficient, flexible and profitable condition.

Respectfully submitted,

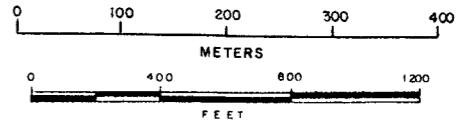
G. M. Hogg, P.Eng.

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**LEGEND:**

- Diamond drill holes completed 1973
- △ Diamond drill holes completed 1974
- Diamond drill holes completed 1975
- Diamond drill holes completed 1976
- ▬ Ramp
- ▣ Ventilation raise
- - - Ore structure outline



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CANADIAN NATURAL RESOURCES	
GRUM DEPOSIT -YUKON TERRITORY	
DRILL PLAN	
Date Nov., 1976	By G.M. HOGG DWG No.

Appendix I

GRUM DEPOSIT  
TONNAGE AND GRADE ESTIMATE BY SECTION

Section	From	To	Block No.	Metric Tons	Category	% Pb	% Zn	Ag gms/metric ton
62W	61W	63W	A-1	357,917	Proven	5.35	9.95	80.09
			A-2	91,350	Possible	3.74	4.42	60.64
			B-2	140,568	Probable	2.66	4.01	35.00
<b>TOTAL</b>	<b>61W</b>	<b>63W</b>		<b>589,835</b>		<b>4.46</b>	<b>7.68</b>	<b>66.33</b>
64W	63W	65W	A-1	485,097	Proven	5.21	9.47	86.36
			A-2	107,887	Probable	3.36	3.34	52.76
			B-2	309,486	Proven	5.53	6.37	73.74
<b>TOTAL</b>	<b>63W</b>	<b>65W</b>		<b>902,470</b>		<b>5.10</b>	<b>7.67</b>	<b>78.02</b>
66W	65W	67W	A-1	520,140	Proven	5.30	8.72	79.06
			A-2	227,587	Probable	4.14	5.37	63.53
			A-3	133,793	Proven	2.92	4.15	40.58
			B-1	113,399	"	9.82	8.97	123.95
			B-2	496,910	"	5.01	5.99	66.62
			D-2	102,769	Probable	3.85	5.56	61.28
<b>TOTAL</b>	<b>65W</b>	<b>67W</b>		<b>1,594,598</b>		<b>5.07</b>	<b>6.82</b>	<b>71.78</b>

Cont'd

## Appendix I (cont'd)

Section	From	To	Block No.	Metric Tons	Category	% Pb	% Zn	Ag gms/metric ton
68W	67W	69W	A-1	379,572	Proven	5.68	10.85	89.31
			A-2	143,324	"	4.18	6.27	59.32
			A-3	271,292	Probable	5.01	9.06	65.16
			B-1	239,149	Proven	6.07	6.66	82.59
			B-2	231,524	"	4.48	5.74	54.44
			C-1	206,717	"	5.72	4.80	79.30
			D-1	53,156	"	4.34	4.08	47.82
			D-2	186,243	"	3.38	4.83	50.17
<b>TOTAL</b>	<b>67W</b>	<b>69W</b>		<b>1,710,977</b>		<b>5.05</b>	<b>7.31</b>	<b>70.55</b>
70W	69W	71W	A-1	365,791	Proven	4.72	8.60	77.95
			A-2	227,193	"	5.98	11.63	91.79
			A-3	278,773	"	2.25	4.95	34.93
			B-1/B-2	856,007	"	5.34	10.23	80.45
			B-3	203,568	Probable	3.23	3.47	47.31
			C-1	177,974	Proven	5.93	5.35	82.98
			D-1	124,031	"	4.40	4.40	58.28
			D-2	221,680	"	4.51	4.98	58.78
<b>TOTAL</b>	<b>69W</b>	<b>71W</b>		<b>2,455,017</b>		<b>4.70</b>	<b>7.83</b>	<b>70.32</b>
72W	71W	73W	A-1	546,915	Proven	4.85	8.09	74.61
			A-2	552,428	"	4.05	6.39	65.68
			A-3	74,419	"	3.29	5.54	46.62
			B-1/B-2	817,814	"	3.66	6.73	57.31
			B-3	72,056	Probable	4.83	8.01	72.78
			B-3	380,000	Possible	3.60	5.00	54.00
			B-4	42,131	Probable	4.49	9.92	66.92
			C-1	261,055	Proven	5.55	4.88	79.32
			C-2	41,344	"	4.66	4.33	58.00
			D-1	34,650	Possible	3.45	4.55	52.11
			D-2	19,687	"	4.10	7.80	60.34
<b>TOTAL</b>	<b>71W</b>	<b>73W</b>		<b>2,842,499</b>		<b>4.18</b>	<b>6.39</b>	<b>64.07</b>

Cont'd

## Appendix I (cont'd)

Section	From	To	Block No.	Metric Tons	Category	% Pb	% Zn	Ag gms/metric ton
74W	73W	75W	A-1	417,373	Proven	5.74	9.05	87.88
			A-2	858,764	"	4.40	6.65	68.37
			A-3	75,600	"	3.84	7.52	66.92
			B-1	525,653	"	3.38	6.37	53.80
			B-2	304,367	"	4.38	6.65	69.25
			B-3	558,728	Probable	3.95	6.63	60.89
			B-4	32,287	"	3.08	5.24	48.90
			C-1	140,174	Proven	5.40	4.66	68.09
			C-2	75,600	"	6.35	4.55	79.44
			D-1	39,375	Possible	3.81	3.47	44.57
			D-2	150,018	"	3.75	3.75	31.60
			TOTAL	73W	75W		3,177,939	
76W	75W	77W	A-1	554,790	Proven	5.84	9.53	107.58
			A-2	553,609	"	3.61	5.76	56.04
			A-3	188,999	"	3.29	5.67	48.13
			B-1	654,015	"	3.79	6.08	56.28
			B-2	136,631	"	4.76	7.32	62.12
			B-3	647,714	Probable	2.95	5.34	45.48
			C-1	166,162	Probable	8.29	6.92	105.77
			C-2	47,643	Proven	3.48	2.36	53.83
			D-2	22,285	Possible	4.55	6.56	64.44
TOTAL	75W	77W		2,971,848		4.22	6.53	66.00

Cont'd

## Appendix I (cont'd)

Section	From	To	Block No.	Metric Tons	Category	% Pb	% Zn	Ag gms/metric ton
78W	77W	79W	A-1	678,427	Proven	4.88	9.55	76.07
			A-2	676,852	"	4.90	7.71	77.97
			A-3	168,130	"	3.13	5.19	45.84
			B-1	682,364	"	2.90	5.21	46.19
			B-2	85,050	"	4.83	5.99	77.93
			B-3	300,000	Possible	3.00	5.00	40.00
			B-1A	31,500	Proven	3.98	7.42	64.01
			C-1	144,000	Possible	7.60	6.30	102.00
			D-2	62,606	Probable	3.91	5.98	59.03
<b>TOTAL</b>	<b>77W</b>	<b>79W</b>		<b>3,110,965</b>		<b>4.21</b>	<b>6.95</b>	<b>64.56</b>
80W	79W	81W	A-1	597,315	Proven	4.43	6.77	64.48
			A-2	841,833	"	4.13	6.16	62.11
			A-3	159,861	"	3.28	5.41	59.02
			B-1	546,522	"	4.05	7.07	65.97
			B-2	171,280	"	4.33	7.10	70.62
			B-3	300,000	Possible	3.00	5.00	40.00
			C-1	122,456	Proven	6.98	5.74	99.01
			D-2	158,680	Probable	3.21	5.23	50.09
			D-3	213,018	Possible	4.90	6.11	60.00
<b>TOTAL</b>	<b>79W</b>	<b>81W</b>		<b>3,110,965</b>		<b>4.15</b>	<b>6.27</b>	<b>62.12</b>

Cont'd

## Appendix I (cont'd)

Section	From	To	Block No.	Metric Tons	Category	% Pb	% Zn	Ag gms/metric ton
82W	81W	83W	A-1	406,741	Proven	4.18	6.93	70.39
			A-2	1,123,755	"	4.30	6.61	63.61
			A-3	156,712	"	3.66	5.41	54.77
			A-3 Ext.	76,386	Probable	2.16	4.56	36.77
			B-1/B-2	450,054	Proven	3.69	7.08	61.01
			B-3	300,000	Possible	3.00	5.00	40.00
			C-1	20,868	Proven	4.91	4.24	73.23
			D-2/D-3	131,906	Probable	3.10	3.59	40.84
<b>TOTAL</b>	<b>81W</b>	<b>83W</b>		<b>2,666,422</b>		<b>3.88</b>	<b>6.26</b>	<b>59.21</b>
84W	83W	85W	A-1	334,685	Proven	4.29	7.45	67.86
			A-2	159,468	"	4.57	7.87	93.13
			A-2 Ext.	393,747	"	3.84	6.04	62.18
			A-3	214,199	"	3.08	5.65	46.20
			B-1/B-2	611,096	"	3.91	6.92	58.80
			B-3	300,000	Possible	3.00	5.00	40.00
			C-1	83,474	Probable	5.78	5.95	85.88
			D-2/D-3	No Estimate				
<b>TOTAL</b>	<b>83W</b>	<b>85W</b>		<b>2,096,669</b>		<b>3.87</b>	<b>6.47</b>	<b>60.59</b>

Appendix II

GRUM DEPOSIT  
 TONNAGE AND GRADE LISTING BY BLOCKS  
FROM SECTION 61W TO SECTION 85W

Block	Section	From	To	Metric Tons	Category	% Pb	% Zn	Ag (gms/ metric ton)
A-1	62W	61W	63W	357,917	Proven	5.35	9.95	80.09
	64W	63W	65W	485,097	"	5.21	9.47	86.36
	66W	65W	67W	520,140	"	5.30	8.72	79.06
	68W	67W	69W	379,572	"	5.68	10.85	89.31
	70W	69W	71W	365,791	"	4.72	8.60	77.95
	72W	71W	73W	546,915	"	4.85	8.09	74.61
	74W	73W	75W	417,373	"	5.74	9.05	87.88
	76W	75W	77W	554,790	"	5.84	9.53	107.58
	78W	77W	79W	678,427	"	4.88	9.55	76.07
	80W	79W	81W	597,315	"	4.43	6.77	64.48
	82W	81W	83W	406,741	"	4.18	6.93	70.39
	84W	83W	85W	334,685	"	4.29	7.45	67.86
A-1 Blocks	TOTAL	61W	85W	5,644,763		5.04	8.73	80.20
A-2	62W	61W	63W	91,350	Possible	3.74	4.42	60.64
	64W	63W	65W	107,887	Probable	3.36	3.34	52.76
	66W	65W	67W	227,587	"	4.14	5.37	63.53
	68W	67W	69W	143,342	Proven	4.18	6.27	59.32
	70W	69W	71W	227,193	"	5.98	11.63	91.79
	72W	71W	73W	552,428	"	4.05	6.39	65.68
	74W	73W	75W	858,764	"	4.40	6.65	68.37
	76W	75W	77W	553,609	"	3.61	5.76	56.04
	78W	77W	79W	676,852	"	4.90	7.71	77.97
	80W	79W	81W	841,833	"	4.13	6.16	62.11
	82W	81W	83W	1,123,755	"	4.30	6.61	63.61
	84W	83W	85W	159,468	Proven	4.57	7.87	93.13
A-3 Extension	84W	83W	85W	393,747	"	3.84	6.04	62.18
A-2 Blocks	TOTAL	61W	85W	5,957,797		4.28	6.62	66.63

## Appendix II (cont'd)

Block	Section	From	To	Metric Tons	Category	% Pb	% Zn	Ag (gms/ metric ton)
A-3	66W	65W	67W	133,793	Proven	2.92	4.15	40.58
	68W	67W	69W	271,292	Probable	5.01	9.06	65.16
	70W	69W	71W	278,773	Proven	2.25	4.95	34.93
	72W	71W	73W	74,419	"	3.29	5.54	46.62
	74W	73W	75W	75,600	"	3.84	7.52	66.92
	76W	75W	77W	188,999	"	3.29	5.67	48.13
	78W	77W	79W	168,130	"	3.13	5.19	45.84
	80W	79W	81W	159,861	"	3.28	5.41	59.02
	82W	81W	83W	156,712	"	3.66	5.41	54.77
A-3 Extension		81W	83W	76,368	Probable	2.16	4.56	36.77
A-3	84W	83W	85W	214,199	Proven	3.08	5.65	46.20
A-3 Blocks	TOTAL	65W	85W	1,798,164		3.33	5.89	49.44
B-2	62W	61W	63W	140,568	Probable	2.66	4.01	35.00
B-2	64W	63W	65W	309,486	Proven	5.53	6.37	73.74
B-1	66W	65W	67W	113,399	"	9.82	8.97	123.95
B-2				416,910	"	5.01	5.99	66.62
B-1	68W	67W	69W	239,149	"	6.07	6.66	82.59
B-2				231,254	"	4.48	5.74	54.44
B-1/B-2	70W	69W	71W	856,007	"	5.34	10.23	80.45
B-1/B-2	72W	71W	73W	817,814	"	3.66	6.73	57.31
B-4				42,131	Probable	4.49	9.92	66.92
B-1	74W	73W	75W	525,653	Proven	3.38	6.37	53.80
B-2				304,367	"	4.38	6.65	69.25
B-4				32,287	"	3.08	5.24	48.90
B-1	76W	75W	77W	654,015	"	3.79	6.08	56.28
B-2				136,631	"	4.76	7.32	62.12
B-1	78W	77W	79W	682,364	"	2.90	5.21	46.19
B-2				85,050	"	4.83	5.99	77.93
B-1A				31,500	"	3.98	7.42	64.01
B-1	80W	79W	81W	546,522	"	4.05	7.07	65.97
B-2				171,280	"	4.33	7.10	70.62
B-1/B-2	82W	81W	83W	450,054	"	3.69	7.08	61.01
B-1/B-2	84W	83W	85W	611,096	"	3.91	6.92	58.80
B-1/B-2 Blocks	TOTAL	61W	85W	7,477,807		4.25	6.83	63.35

## Appendix II (cont'd)

Block	Section	From	To	Metric Tons	Category	% Pb	% Zn	Ag (gms/ metric ton)
B-3	70W	69W	71W	203,568	Probable	3.23	3.47	47.31
	72W	71W	73W	72,056	"	4.83	8.01	72.78
		71W	73W	380,000	Possible	3.60	5.00	54.00
	74W	73W	75W	558,728	Probable	3.95	6.63	60.89
	76W	75W	77W	647,714	"	2.95	5.34	45.48
	78W	77W	85W	1,200,000	Possible	3.00	5.00	40.00
B-3 Blocks	TOTAL	69W	85W	3,062,066		3.30	5.34	47.97
C-1	68W	67W	69W	206,717	Proven	5.72	4.80	79.30
	70W	69W	71W	177,974	"	5.93	5.35	82.98
	72W	71W	73W	261,055	"	5.55	4.88	79.32
	74W	73W	75W	140,174	"	5.40	4.66	68.09
	76W	75W	77W	166,162	Probable	8.29	6.92	105.77
	78W	77W	79W	144,000	Possible	7.60	6.30	102.00
	80W	79W	81W	122,456	Proven	6.98	5.74	99.01
	82W	81W	83W	20,868	"	4.91	4.24	73.23
	84W	83W	85W	83,474	Probable	5.78	5.95	85.88
C-1 Blocks	TOTAL	67W	85W	1,322,880		6.32	5.46	86.55
C-2	72W	71W	73W	41,344	Proven	4.66	4.33	58.00
	74W	73W	75W	75,600	"	6.35	4.55	79.44
	76W	75W	77W	47,643	"	3.48	2.36	53.83
C-2 Blocks	TOTAL	71W	77W	164,587		5.09	3.86	66.64

## Appendix II (cont'd)

Block	Section	From	To	Metric Tons	Category	% Pb	% Zn	Ag (gms/ metric ton)
D-2	66W	65W	67W	102,769	Probable	3.85	5.56	61.28
D-1	68W	67W	69W	53,156	Proven	4.34	4.08	47.82
D-2				186,243	"	3.38	4.83	50.17
D-1	70W	69W	71W	124,031	"	4.40	4.40	58.28
D-2				221,680	"	4.51	4.98	58.78
D-1	72W	71W	73W	34,650	Possible	3.45	4.55	52.11
D-2				19,687	"	4.10	7.80	60.34
D-1	74W	73W	75W	39,375	"	3.81	3.47	44.57
D-2				150,018	"	3.75	3.75	31.60
D-2	76W	75W	77W	22,285	"	4.55	6.56	64.44
D-2	78W	77W	79W	62,606	"	3.91	5.98	59.03
D-2	80W	79W	81W	158,680	"	3.21	5.23	50.09
D-3				213,018	"	4.90	6.11	60.00
D-2/D-3	82W	81W	83W	131,906	Probable	3.10	3.59	40.84
D Blocks	TOTAL	65W	83W	1,520,104		3.96	4.92	53.40

Appendix IIIMETRIC CONVERSION

Original exploration work on the Grum deposit was carried on under the English System of measurement. Notably the surface location grid which was established at that time is still in use in some respects. Thus, references to drill sections such as 70+00W (70W) are in terms of feet in relation to the original northwesterly trending base line.

With the definition of an economically important deposit and the commencement of underground evaluation the conversion to the Metric System was instituted. Hence, all subsequent reference to location, elevation, tonnage and grade in the operating sense is on the metric basis. At present this creates an awkward but unavoidable situation. It will be overcome in due course by total conversion. *? Done a long time ago!*

For ease of reference a few basic conversion factors are given herein:-

1 Meter	=	3.2808 feet
1 Foot	=	0.3048 meter
1 Square Meter	=	10.7636 square feet
1 Square Foot	=	0.0929 square meter
1 Metric Ton	=	1.1023 short tons
1 Short Ton	=	0.9072 metric tons
1 Ounce (Troy)	=	31.1035 grams
1 Gram	=	0.0322 ounce (troy)

$$\text{Ounces (troy)/short ton} = \frac{\text{grams/metric ton}}{34.285}$$

$$\text{Grum 1300 metre elevation (a.s.l.)} = \text{Grum 4216 foot elevation (a.s.l.)}$$

Appendix IVCOMMENTS REGARDING LONGITUDINAL SECTION 2N

To illustrate the continuity and size of the ore sections making up the Grum deposit, a longitudinal section along 2N paralleling the strike of the deposit has been prepared. It is found in the map pocket of this report.

It will be appreciated that the fold-controlled ore zones do undulate in the lateral sense along strike and this causes apparent abrupt changes in dip or thickness in any regular longitudinal plane. The value of this section as prepared then is simply to indicate the remarkable continuity of the defineable ore blocks along strike of the deposit.