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GEOLOGICAL REPORT ON THE WESTMIN LEASE No. 802015 MOUNT PALSSON AREA

LIARD MINING DIVISION 93 P - 4 55°08'30" North; 121°53'00" West

> Prepared For: Knox Western Capital Inc. 780; 521 - 3rd. Avenue S.W. Calgary, Alberta T2P - 3T3

By: W.A. MacLeod, P.Geol. Kamand Resource Services Limited Calgary, Alberta

#### SUMMARY

Knox Western Capital Inc. of Calgary, Alberta has sublet one five-year lease from Westmin Resources Limited of Calgary for the purpose of establishing proven reserves of chemical grade limestone and initiating an ongoing quarry operation.

The property is underlain by Triassic and Mississippian aged carbonates. Folded micritic and detrital limestones of the Rundle Formation host "probable" reserves of 2.1 million tonnes of chemical grade limerock suitable for the Grande Prairie and Peace River kraft mill markets.

An undetermined reserve of lower grade silicic and dolomitic limestone adjacent to the chemical grade material is markettable into the agricultural sector.

Diamond drilling followed by limited quarry development, bulk sampling, and test marketting is proposed for the property. The recommended program budget will total \$ 160,000.00 with a sales revenue return from the test marketted lime of \$ 60.000.00.

#### INTRODUCTION

This report on the Westmin Lease No. 802015 located in the Sukunka River Valley in the Liard Mining Division , British Columbia has been prepared at the request of Mr. K. Nielsen, President of Knox Western Capital Inc. of Calgary, Alberta.

The geological mapping and outcrop sampling program described herein was planned and supervised by the author with the field work phase of the contract completed during June, 1988.

This report describes the work performed and the results obtained and further recommends continued exploration by diamond drilling, bulk sampling (trial production), and the test marketting of recoverable chemical grade limestone present on the property.

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#### PROPERTY

The Mount Palsson limestone property consists of a single five-year Lease (Number 802015) granted to Westmin Resources Limited of Calgary, Alberta for the sole purpose of quarrying limestone.

The lease is located some seventy kilometres south southwest of Chetwynd, British Columbia in the Sukunka River Valley within the Liard Mining Division in N.T.S. grid 93 P/4 at 55°08' 30" N.; 121°53' 00" W.(Figure No. 1).

The property is accessable from Chetwynd via Provincial Highway No. 29 and the all weather Sukunka Forestry Access Road.

Persuant to the new Provincial Mineral Tenture Act proclaimed on August 15, 1988, the subject lands are now administered by the Ministry of Energy, Mines, and Petroleum Resources. The lessee has the exclusive right to apply for a mining lease for the original term of the limestone lease in order to aquire mineral title to the land. This has not been done to date.

#### LEASE AGREEMENTS

Westmin's lease, referred to as Lot No. 3470, totals 20.77 hectares in area and was granted for a five year period from February 1, 1985 by the Provincial Ministry of Forests and Land. Payments attendant to the lease include an annual rental of \$634.00 and a Provincial royalty of \$0.35 per tonne of produced limestone.

Knox Western Capital Inc. of Calgary, Alberta entered into a sublet agreement with Westmin Resources Limited In December, 1987 for the purpose of defining recoverable limestone reserves and undertaking an ongoing quarry operation. Under the terms of the renewable agreement, Knox will maintain all statutory terms with the Province and will, in addition, pay Westmin a royalty of \$1.00 per tonne or 5% of the fair market value of all substances produced from the lands.

#### GEOLOGY

Published geological maps show the Westmin Lease to be located on the eastern limb of a thrust block syncline in the Rocky Mountain Front Range and underlain by thrusted and folded Triassic and Mississippian aged marine sediments (Figure 2).

Northwest striking Mississippian Rundle Group limestones underlie at least the eastern two-thirds of the lease and host the potential chemical grade limestone guarry reserves (Figure 3).



Geological mapping and sampling carried out during 1988 has shown the Rundle carbonate to consist of two gradiationally distinct folded limestone lithofacies.

Chemical grade brown to grey-brown carbonates are continuously transitional from a very "clean" white speckled micrite through very fine grained detrital wackestone to a slightly dolomitic and silty courser grained wackestone.

Impure limestones gradiationally overlie the chemical grade material and consist of brown-grey to grey fine through course grained detrital (with lessor crinoidal) silty and dolomitic wackestones and minor dolomitic micrite.

White crystalline calcite veins and stringers are present in both limestone units, but are more prevalent in the finer grained chemical grade material.

Dolomite crystals in both units are typically very fine grained and appear to represent diagenetic overgrowth whereas the silica component, while equally fine grained, could either be primary or diagenetic and may therefore be indicative of depositional environment.

All limestones are relatively "tight" with only minor fracture porosity being present. Pyrobitumen is commonly observed on many of the fracture surfaces.

In the absence of a clearly defined marker horizon, structural defnition is tentative at best and is only supported by opposed sedimentary layering attitudes and rock type distribution as best defined by assay data. Resolution of the detailed structure must await future drill core analyses.

#### LIMESTONE SAMPLING

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Surface sampling was carried out on the property during June, 1988 by the author and Mr. R.D. Gilchrist.

Thirty-seven representative chip samples were collected on a nominal fifty metre line spacing perdedicular to strike over most of the quarriable limestone in order to verify and augment previous sampling carried out by Westmin Resources Ltd. in 1983.

The sample locations are presented in Figure No.3 with the earlier Westmin samples referred to as the "A" Series and the 1988 work shown as Series "B".

Individual sample volumetrics are assumed to be constant and representative for the purpose of defining average limestone grades.



The samples were microscopically examined and subsequently forwarded to Loring Labs Ltd. of Calgary for assay. The assay results are discussed in the following section and the certificates included as "Appendix A" to this report.

### LIMESTONE RESERVES and PRODUCTION

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Two zones of chemical grade limestone have been defined on the property.

The "South Zone", by far the larger of the two, is located along a northwest trending anticlinal axis in the southern portion of the lease. Assuming a guarry floor elevation of 765 metres and a stable guarry wall configuration attainable at sixty degrees, planimeter measurements indicate that some 1.7 million tonnes recoverable chemical grade reserves are present without incurring any dilution from the overlying assay-defined low grade limestone.

Sampling results inclusive of both the 1983 Westmin assays and the current survey over the "South Zone" are tabled below (Table I):

#### TABLE I

SAMPLE No	ASSAY No	% CaO	% MgO	% SiO2	% Fe2O3	% A1203
A-1		53.43	0.68			
A-2		53.94	0.53			
A-3		53.09	1.21			
A-4		54.86	0.45			
A-5		54.77	0.46			
A-6		54.54	0.58			
A-7		54.50	0.56			
A-8		54.42	0.90			
A-9		54.89	0.63			
A-10		54.54	0.65			
A-11	200+00	54.70	0.37	0.35	0.01	0.26
A-12	200+10	55.00	0.43	0.15	trace	0.24
A-13	200+17	54.88	0.52	0.07	trace	0.24
A-14	200+50	54.76	0.50	0.21	trace	0.24
A-15	300+00	55.00	0.48	0.11	trace	0.28
A-16	300+30	54.27	0.59	0.81	0.03	0.31
B-1	33776	55.82	1.07	0.04		
B-2	33777	54.32	0.89	0.04		
B-3	33752	54.92	0.44	0.16		
B-4	33753	54.52	0.63	0.42		
B-5	33754	54.82	0.42	0.28		
B-36	33763	53.21	1.18	1.20	1	1

Continued

TABLE I (Continued)

SAMPLE No	ASSAY No	% CaO	% MgO	% SiO2	% Fe2O3	& A1203
B-37	33764	53.91	1.31	0.72		
B-6	33501	53.31	0.56	0.76		
B-7	33502	· 54.12	0.58	0.50		
B-8	33503	54.82	0.74	0.12		
B-9	33504	53.71	0.79	0.68		
B-10	33505	54.32	0.60	0.56		
B-11	33506	53.81	0.48	0.16		
B-12	33507	54.52	0.73	0.38		
B-13	33755	54.82	0.45	0.30		
B-14	33756	53.41	0.96	0.58		
B-15	33757	54.52	0.88	0.20		
B-16	33758	54.54	0.77	0.26		
B-17	33759	54.12	0.79	0.74		
B-18	33509	54.29	0.58	0.28		
B-19	33510	54.62	0.54	0.12	1	
B-20	33513	54.62	0.58	0.20	1	

The "South Zone" assays average 54.36% CaO (97.02% CaCO3), 0.67% MgO, 0.37% SiO2, 0.01% Fe2O3, and 0.26% Al2O3.

The "North Zone" is also situated along a northwest trending anticlinal axis and is located near the Sukunka Forestry Road in the northern portion of the lease. It is limited to some 440,000 tonnes recoverable reserves with a guarry floor elevation of 756 metres and similar development geometry to that proposed for the southern zone.

Sampling results inclusive of the Westmin assays are tabled below (Table II):

#### TABLE II

SAMPLE No	ASSAY No	% CaO	% MgO	% SiO2	% Fe2O3	% A1203	
A-17	200+210	54.92	0.44	0.16	trace	0.31	
A-18	300+160	55.04	0.44	0.21	trace	0.26	
A-19	300+220	54.92	0.41	0.24	trace	0.24	
B-21	33512	54.52	0.58	0.28			
B-22	33765	55.12	0.84	0.10			
B-23	33766	54.02	0.93	0.18			
B-24	33767	54.52	0.89	0.31			
B-25	33768	54.22	0.90	0.22			
B-26	33769	52.51	0.96	1.93			
B-27	33770	54.42	0.87	1.20		1	

Analysis of the "North Zone" sample data indicates average assay values of: 54.42 % CaO (97.13% CaCO3), 0.73% MgO, 0.48% SiO2, trace Fe2O3, and 0.27% Al2O3.

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Reserves on both deposits are presently classified as "Probable" with a diamond drilling and bulk sampling program required to define proven tonnages.

Grade variance is apparent across strike on both zones and appears to be related to either locallized diagenesis or the enfolding of the gradiationally overlying impure carbonates. In either case, the dolomitic and silicic material has been included within the calculated recoverable reserves to allow for lower grade sections which may be present elsewhere in the deposits.

Sampling of the lower grade silicic and dolomitic carbonates adjacent to the "North" and "South" zones is summarized below (TABLE III):

#### TABLE III

	•				•	•
SAMPLE No	ASSAY No	% CaO	% MgO	% SiO2	% Fe2O3	% A1203
A-20		54.85	0.49			
A-21	200+80	52.78	1.66	1.17	0.03	0.28
A-22	200+110	54.15	0.63	1.21	trace	0.24
A-23	200+150	54.01	0.53	1.69	0.01	0.31
A-24	300+90	53.14	1.05	2.22	0.03	0.26
A-25	300+123	54.19	0.62	1.20	0.01	0.24
B-28	33508	53.21	1.62	0.73		
B-29	33760	53.21	1.36	2.29		
B-30 -	33761	53.31	1.35	1.16		
B-31	33762	54.02	0.47	1.71		
B-32	33511	51.00	1.56	2.76		
B-33	33778	53.28	0.63	0.88		
B-34	33751	54.25	0.41	0.14		
B-35	33514	53.11	0.76	2.10		1

The low grade material averages 53.47% CaO (95.4% CaCO3), 0.94% MgO, 1.38% SiO2, 0.02% Fe2O3, 0.27% Al2O3.

The Westmin property has not been developed to date but the good access and relative proximity to the Grande Prairie and Peace River bleached chemical kraft mills clearly enhances the potential economic viability if those markets can be established.

Relatively thin overburden cover coupled with steep outcrop slopes, most noteably on the "South Zone", will facilitate ultimate guarry development.

Limestone grades at the Westmin property compare favourably with material produced from the Peace River Lime Ltd. quarry located 2.5 kilometres northwest of the Westmin deposits (Figure No.2). Peace River lime quarry-run samples obtained by the author in 1987 (Assay No.'s: 17013 to 17015 incl.) averaged 54.64% CaO, 0.51% MgO, 0.39% Al2O3, 0.08% Fe2O3, and 0.81% SiO2. Peace River Lime Ltd. was supplying the Grande Prairie market until early 1988 when it lost the contract because of failure to adequately supply for the Proctor and Gamble mill. The Peace River Lime operation has subsequently passed into receivership.

#### CONCLUSIONS

Knox Western Capital Inc. of Calgary has sublet a single five year lease in the Sukunka River valley located in northeastern British Columbia from Westmin Resources Limited for the purpose of defining chemical grade limestone reserves and initiating an ongoing limestone quarry operation.

Persuant to the terms of the sublet agreement with Westmin, Knox is to maintain all Provincial statutory terms on the lease and will pay a production royalty to Westmin Resources on any limestone produced from the Westmin lands.

The subject property is underlain by northwest striking folded and thrusted marine sediments of Triassic and Mississippian age. Rundle Group limestones outcropping on the property host significant potential industrial chemical grade limestone reserves.

Representative chip sampling completed during 1988 in conjunction with an earlier sampling program carried out by Westmin successfully defined two quarriable zones of chemical grade limestone reserves.

The largest zone at, some 1.7 million tonnes of "probable" reserves, is located in the southern portion of the Westmin Lease while the second deposit is limited to 440,000 tonnes in the norteastern corner of the property. Average assay grades at both exceed designated limerock specifications for the bleached kraft mill markets located in Grande Prairie and Peace River.

Silicic and dolomitic limestones adjacent to the two high grade deposits will meet agricultural specifications and could therefore be recovered for Peace River aglime market.

The Peace River Lime Ltd. quarry, located near the Westmin property is presently in receivership thereby allowing increased access to both the chemical and aglime markets.

#### RECOMMENDATIONS

The results of the work have been encouraging to date, but proven quarriable reserves remain to be defined on the Westmin Lease. Two northeast trending fences of diamond drill holes are proposed for the western end of the "South" zone in order to define sufficient initial "proven" reserves from which to base limited site development, a bulk sampling program, trial marketting, and initial limestone guarrying.

The timing of the drill program must satisfy the requirements of the sublet agreement between Knox and Westmin and should be consistant with aggressive sales of the chemical and agricultural limestone product into the Grande Prairie and Peace River markets.

Concurrent trial production (bulk sampling) and test marketting would be contingent upon a successful drill program.

The proposed budget for the drilling and bulk sampling program is presented below (TABLE IV):

#### TABLE IV

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<u>Commodity/Service</u> Contract Diamond Drilling - 200 métres @ \$80.00/ metre - Inclusive of mob/demob, accommodation-meals.	<u>Amount</u> \$ 16,000.00
Contract Bulldozing	10,000.00
Contract Blasting and Crushing	39,000.00
Contract Trucking	42,000.00
Assay and Lab Services	7,500.00
Equipment Rentals - Inclusive of vehicles, survey equipment, and production equipment.	5,000.00
Project Supervision	12,000.00
Report preparation and Reproduction	1,500.00
Sub Total: plus: 10% Contingency: Operating Total: plus: 10% G&A:	\$133,000.00 <u>\$ 13,000.00</u> \$146,000.00 <u>\$ 14,000.00</u>
TOTAL OPERATING AFE: - Sales revenue on 2000 tonnes limerock @ \$ 30.00/tonne.	\$160,000.00 (\$ 60,000.00)
NET PROJECT COST:	\$100,000.00

#### CERTIFICATE and SIGNATURE

- I, William A. MacLeod do hereby certify that:
- I am a practicing consultant geologist and President of Kamand Resource Services Limited, 780; 521 - 3rd. Avenue S.W., Calgary, Alberta; T2P-3T3.
- 2. I have graduated from the University of Manitoba; B.Sc. 1970.
- 3. I am a member of The Association of Professional Engineers, Geologists, and Geophysicists of Alberta.
- 4. The field program described herein was personally carried out by myself and Mr. R.D. Gilchrist of Calgary, Alberta during June, 1988.

Dated at Calgary, this <u>8th</u> day of February, 1989.

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William A. MacLeod, P.Geol. Consultant Geologist.

## APPENDIX "A"

### ASSAY CERTIFICATES

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File No.	31412
Date	July 11, 1988
Samples	Rock

Sandy MacLeod ATTN:

Ser ASSAY or LORING LABORATORIES LTD.

CORRECTED"

Page # 1

SAMPLE No.	% CaO	% Mg0	% SiO2
"Rock Samples"			
"Assay Analysis"			
33501	53.31	.56	.76
33502	54.12	.58	.50
33503	54.82	.74	.12
33504	53.71	.79	.68
33505	54.32	.60	.56
33506	53.81	. 48	.16
33507	54.52	.73	. 38
33508	53.21	1.62	.73
33509	54.29	.58	. 28
33510	54.62	.54	.12
33511	51.00	1.56	2.76
33512	54.52	.58	.28
33513	54.62	.58	.20
33514	53.11	.76	2.10
33751	54.25	.41	.14
33752	54.92	. 44	.16
33753	54.52	.63	.42
33754	54.82	.42	.28
33755	54.82 I Here	.45 by Certify that the above results are those be by ME UPON THE HEREIN DESCRIBED SAMPLES	.30

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

1 Assayer

To: <u>KNOX WESTERN CAPITAL</u> , 521 - 3rd Avenue S.W., jary, Alberta T2P 3T3
ATIN: Sandy MacLeod



File No	31412
Date	July 11, 1988
Samples	Rock

LORING LABORATORIES LTD.

RRECTED"		rage # 2	
SAMPLE No.	CaO	% MgO	% Si02
33756	53.41	. 96	. 58
33757	54.52	.88	. 20
33758	54.54	.77	. 26
33759	54.12	.79	.74
33760	53.21	1.36	2.29
33761	53.31	1.35	1.16
33762	54.02	. 47	1.71
33763	53.21	1.18	1.20
33764	53.91	1.31	.72
33765	55.12	. 84	.10
33766	54.02	. 93	.18
33767	54.52	.89	. 30
33768	54.22	. 90	. 22
33769	52.51	. 96	1.93
33770	54.42	.87	1.20
33776	55.82	1.07/	. 04
33777	54.32	. 89	. 04
33778	53.28	.63	. 83
	I Thereby	Mertify that the above results	ARE THOSE
	ASSAYS MADE E	BY ME UPON THE HEREIN DESCRIBED SAM	IPLES

Pulps Retained one month ss specific arrangements e in advance.

Soil Der Assaver

To: WESTMIN RESOURCES LIMITED, 1800, 255 - 5th Avenue S.W., Calgary, Alberta T2P 3G6

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ATTN: Fred Riddell



File No. 25160 Date August 25, 1983 Samples Rock Chip

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xxificate 1x ASSAY

# LORING LABORATORIES LTD.

		· · _		
SAMPLE No.	<b>%</b> Ca0	% MgO	% Si02	% L.O.I.
"Limestone Samples"		١		
200 + 00	54.70	. 37	. 35	43.88
200 + 10	55.00	.43	.15	43.67
200 + 17	54.88	.52	.07	43.94
200 + 50	54.76	.50	.21	43.86
200 + 80	52.78	1.66	1.17	43.46
200 + 100	53.63	1.33	.81	43.55
200 + 110	54.15	.63	1.21	43.21
200 + 150	54.01	.53	1.69	43.03
200 + 210	54.92	.44	.16	43.84
300 + 00	55.00	. 48	.11	43.86
300 + 30	54.27	.59	.81	43.62
300 + 90	53.14	1.05	2.22	43.09
300 + 123	54.19	.62	1.20	43.46
300 + 160	55.04	. 44	.21	43.90
300 + 220	54.92	. 41	.24	43.89
	• ·			1

I Merchy Certify that the above results are those assays made by he upon the herein described samples ....

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

To: ...WESTMIN RESOURCES LIMITED, ...1800, 255 - 5th Avenue S.W., Calgary, Alberta T2P 3G6



File No. 25160 Date August 25, 1983 Samples Rock Chip

ATTN: Fred Riddell

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St ASSAY %

# LORING LABORATORIES LTD.

Page # 2				
SAMPLE No.	% Fe2O3	% A1203	% Insoluble + SiO2	
"Limestone Samples"				
200 + 00	.01	.26	. 50	
200 + 10	Trace	.24	.22	
200 + 17	Trace	. 24	.16	
200 + 50	Trace	.24	. 33	
200 + 80	.03	.28	1.39	
200 + 100	.01	.24	.94	
200 + 110	Trace	.24	1.35	
200 + 150	.01	. 31	1.86	
200 + 210	Trace	. 31	.24	
300 + 00	Trace	.28	.20	
300 + 30	.03	. 31	.99	
300 + 90	.03	.26	2.38	
300 + 123	.01	.24	1.32	
300 + 160	Trace	.26	. 32	
300 + 220	Trace	.24	. 34	
	•			
	1 Herely assays made by	Certify that the above re the upon the herein describe	SULTS ARE THOSE	

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

To: KNOX WESTERN CAPITAL Calgary,Alberta T2R OH5 Attn: Karsten Neilson cc: Sandy Macleod



File No. .. 29829 Date May 27, 1987 Samples Limestone

# LORING LABORATORIES LTD.

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Page # 1

SAMPLE No.	% Ca0	% MgO	% A1 <sub>2</sub> 0 <sub>3</sub>	% Fe <sub>2</sub> 0 <sub>3</sub>	% SiOz
"Assay Analysis"					
					,
13	54.91	. 47	.38	.07	.63
14	54.41	.47	.42	.09	1.01
15	54.60	.60	.38	.09	.79
	I Herel	vy Certify	THAT THE ABO	VE RESULTS ARE	THOSE

Rejects Retained one month.

Pulps Retained one month unless specific arrangements made in advance.

Assayer



	A No vertical exaggeration (looking N.W.)
	Scale 1:2000 0 160
	LEGEND
	MISSISSIPPIAN Rundle Group DOLOMITIC LIMESTONE:brown-grey to grey variably silty wackestone.
	LIMESTONE: brown to grey-brown micrite and wackestone- slightly dolomitic and silty in part.
rease	B35 Grab sample location Bedding
Westmin	Anticlinal axis Gradiational contact
	KNOX WESTERN CAPITAL INC.
	General Geology Westmin Lease
	PROJECT: Mount Palsson Limestone SCALE: NTS 93 P 4 FIGURE: AUTIOR: W.A.MacLeod; P.Geol. DATE: November, 1988
	by; RESOURCE SERVICES LIMITED Calgary, Alberta