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PHOENIX
ENGINEERING LTD.

RECEIVED
AUG 23 1994
Gold Commissioner's Office
VANCOUVER, B.C.

LOG NO: AUG 2 5 RD.
ACTION.
FILE NO:

Canmark International Resources Inc.

Sun Group of Claims
SOW #3050835
Similkameen, MD.

Statement of Work
for
1994 Exploration Programme

Reserve Estimate & Mine Feasibility
Review and Recommendations

by

Phoenix Engineering Ltd.

GEOLOGICAL BRANCH
ASSESSMENT REPORT

23,457

Wm. John Beck, AScT.
Principle

Wm. E. Hodge, P.Eng.
Principle

August 19th. 1994

475 Howe Street, Suite 710 • Vancouver, B.C. V6C 2B3 • phone (604) 684-1448

PHOENIX ENGINEERING LTD.

19 August, 1994

Province of British Columbia
Ministry of Economic Development,
Small Business and Trade
Government Agent
250, 450 Columbia Street
Kamloops, B.C.
V2C 6K4

Attention Mr. W. Poohachoff, Gold Commissioner

Dear Sir.

The following statement of work is submitted in accordance with the Mineral Tenure Act Sections 29 (1) and 1 (15) by Phoenix Engineering Ltd. on behalf of Canmark International Resources Inc. for the Sun Group of Claims (SOW #3050835) located in the Similkameen Mining District.

This Statement of Work includes the following:

1. Copy of Statement pages 1 & 2
2. Summary of 1994 Exploration Cost (Table 1)
3. Copies of all associated invoices
4. Phoenix Engineering Ltd. Reserve Estimate & Mine Feasibility Study

Should additional information be required please contact the writer at 684-1448 or Mr. Chris Lee, President Canmark International Resources Inc. at 685-5131, trusting this meets with your approval and acceptance.

Yours truly

Wm. John Beck, AScT
Phoenix Engineering Ltd.

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources
MINERAL RESOURCES DIVISION — TITLES BRANCH

EVENT NO. 3050835
OFFICE USE ONLY

SUB-RECORDER
RECEIVED
MAY 25 1994 ck
M.R. # 13 $ 470.00
VANCOUVER, B.C.
RECORDING STAMP

Mineral Tenure Act
Sections 25, 26 & 27

STATEMENT OF WORK — CASH PAYMENT

Indicate type of title MINERAL (Mineral or Placer)

Mining Division SIMILKAMEEN.

PLEASE PRINT CLEARLY

I, WILLIAM JOHN BECK (Name)
710-475 HOWE STREET (Address)
VANCOUVER B.C.
604-684-1448 (Telephone) V6C 2B3 (Postal Code)
Client Number 135346

Agent for CANMARK INTERNATIONAL RESOURCES INC AND GORDON WEBSTER (Name(s) of all recorded title holders)
308-698 SEYMOUR STREET (Address)
VANCOUVER, B.C.
685-5131 & 295-7638 (Telephone) V6B 3K6 (Postal Code)
Client Number 104156 & 128483

STATE THAT: (NOTE: If only paying cash in lieu of lease rental, turn to reverse and complete columns G to J and Q to T.)

Work has been done on the FARMER; SUN; LEE. CLAIMS Claim(s)

Tenure No.(s) 249993 ; 250125 ; 322492

Work was done from JANUARY 1st, 1994, to MAY 15th, 1994;

and was done in compliance with Section 50 of the Mineral Tenure Act and

Section 19(3) of the Regulation YES [✓] NO [ ] WORK PERMIT NO. KAM 94 1500257-159

TYPE OF WORK

PHYSICAL: Work such as trenches, open cuts, adits, pits, shafts, reclamation, and construction of roads and trails. Details as required under section 13 of the Regulations, including the map and cost statement, must be given on this statement.

PROSPECTING: Details as required under section 9 of the Regulations must be submitted in a technical report. Prospecting work can only be claimed once by the same owner of the ground, and only during the first three years of ownership.

GEOLOGICAL, GEOPHYSICAL, GEOCHEMICAL, DRILLING: Details must be submitted in a technical report conforming to sections 5 through 8 (as appropriate) of the Regulations.

PORTABLE ASSESSMENT CREDIT (PAC) WITHDRAWAL: A maximum of 30% of the approved value of geological, geophysical, geochemical and/or drilling work on this statement may be withdrawn from the owner's or operator's PAC account and added to the work value on this statement.

NOTE: Where required, the assessment report must be received within ninety days of the earliest due anniversary date on this statement.

TYPE OF WORK (Specify Physical (include details), Prospecting, Geological, etc.)	VALUE OF WORK Physical	*Prospecting	*Geological etc.	
DRILLED (9) DDHoles for a total of 194 metres core drilling on claims stated			60,000	
Report to follow.				
TOTALS	A +	B +	C 60,000	D 60,000
PAC WITHDRAWAL — Maximum 30% of Value in Box C Only			E →	E
from account(s) of			TOTAL	F 60,000

*Who was the operator (provided the financing)?
Name CANMARK INTERNATIONAL
Address 308-698 SEYMOUR St V6B 3K6
Phone 685-5131

Transfer amount in Box F to reverse side of form and complete as required.

M28-2024 MTL 112 Rev. 91/07

Page 1 of 2

Province of British Columbia
Ministry of Energy, Mines and Petroleum Resources
MINERAL RESOURCES DIVISION — TITLES BRANCH

EVENT NO. 3050835
OFFICE USE ONLY

SUB-RECORDER
RECEIVED
MAY 25 1994
M.R. # 13 $ 470
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RECORDING STAMP

Mineral Tenure Act
Sections 25, 26 & 27

STATEMENT OF WORK — CASH PAYMENT

Indicate type of title MINERAL (Mineral or Placer)

Mining Division SIMILKAMEEN

PLEASE PRINT CLEARLY

I, WILLIAM JOHN BECK (Name)
710-475 HOWE STREET (Address)
VANCOUVER B.C.
604-684-1448 (Telephone) V6C 2B3 (Postal Code)
Client Number 135346

Agent for CANMARK INTERNATIONAL RESOURCES INC AND GORDON WEBSTER (Name(s) of all recorded title holders)
308-698 SEYMOUR STREET (Address)
VANCOUVER, B.C.
685-5131 & 295-7638 (Telephone) V6B 3K6 (Postal Code)
Client Number 104156 & 128483

STATE THAT: (NOTE: If only paying cash in lieu of lease rental, turn to reverse and complete columns G to J and Q to T.)
Work has been done on the FALHOL ; SUN ; LEE. CLAIMS Claim(s)
Tenure No.(s) 249993 ; 250125 ; 322492
Work was done from JANUARY 1st, 19 94, to MAY 15th, 19 94;
and was done in compliance with Section 50 of the Mineral Tenure Act and
Section 19(3) of the Regulation YES ☑ NO ☐ WORK PERMIT NO. KAM 94 1500257-159

TYPE OF WORK

PHYSICAL: Work such as trenches, open cuts, adits, pits, shafts, reclamation, and construction of roads and trails. Details as required under section 13 of the Regulations, including the map and cost statement, must be given on this statement.

PROSPECTING: Details as required under section 9 of the Regulations must be submitted in a technical report. Prospecting work can only be claimed once by the same owner of the ground, and only during the first three years of ownership.

GEOLOGICAL, GEOPHYSICAL, GEOCHEMICAL, DRILLING: Details must be submitted in a technical report conforming to sections 5 through 8 (as appropriate) of the Regulations.

PORTABLE ASSESSMENT CREDIT (PAC) WITHDRAWAL: A maximum of 30% of the approved value of geological, geophysical, geochemical and/or drilling work on this statement may be withdrawn from the owner's or operator's PAC account and added to the work value on this statement.

NOTE: Where required, the assessment report must be received within ninety days of the earliest due anniversary date on this statement.

TYPE OF WORK (Specify Physical (include details), Prospecting, Geological, etc.)	Physical	*Prospecting	*Geological etc.	
DRILLED (9) DD Holes for a total of 194 metres core drilling on claims stated. Report to follow.			60,000	
TOTALS	A +	B +	C 60,000	D 60,000
PAC WITHDRAWAL — Maximum 30% of Value in Box C Only			E →	E
from account(s) of			TOTAL	F 60,000

*Who was the operator (provided the financing)? Name CANMARK INTERNATIONAL Address 308-698 SEYMOUR ST V6B 3K6 Phone 685-5131

Transfer amount in Box F to reverse side of form and complete as required.

M28-2024 MTL 112 Rev. 91/07

Canmark International Resources Inc.

1994 Exploration Costs

Claim	Sun DD #	Approx. Lat.	Dept.	Collar Elev.	Bottom Elev.	Drilling Depth (ft.)	Number of Samples	Drilling Cost	Assay Cost	Logging Core	Accom. Food	Transport	Total
	94- 11	7665.63	6196.2	1200.26	1144.48	183	33	$3,141.38	$1,456.18	$1,760.46	$600.93	$600.96	$7,559.91
	94- 12	7781.64	6092.75	1199.53	1168.14	103	12	$1,768.10	$529.52	$990.86	$338.23	$338.24	$3,964.95
	94- 13	7758.4	6154.53	1195.78	1149.15	153	21	$2,626.40	$926.66	$1,471.86	$502.41	$502.44	$6,029.77
	94- 14	7826.36	6179.36	1195.44	1148.81	153	12	$2,626.40	$529.52	$1,471.86	$502.41	$502.44	$5,632.63
	94- 15	7804.03	6360.37	1179.24	1094.51	278	15	$4,772.15	$661.90	$2,674.36	$912.88	$912.93	$9,934.22
	94- 16	7612.92	6967.53	1245.75	1176.26	228	0	$3,913.85	$0.00	$2,193.36	$748.70	$748.73	$7,604.64
	94- 17	7238.7	6205.53	1231.13	1181.45	163	4	$2,798.06	$176.51	$1,568.06	$535.25	$535.28	$5,613.16
	94- 18	7768.12	6686.63	1185.77	1164.13	71	0	$1,218.79	$0.00	$683.02	$233.15	$233.16	$2,368.11
	94- 19	8003.2	6819.13	1171.89	1138.97	108	0	$1,853.93	$0.00	$1,038.96	$354.65	$354.66	$3,602.20
						1440	97	$24,719.04	$4,280.30	$13,852.80	$4,728.60	$4,728.85	
											Sub Total		$52,309.59
											Contingency		$0.00
											Management Fee		$9,311.00
											Total Cost		$61,620.59

CANMARK INTERNATIONAL RESOURCES INC.

1994 DRILLING EXPENSES

ACME ANALYTICAL LABORATORIES	$ 1,765.80
ADAM DIAMOND DRILLING	24,719.05
PACIFIC SOIL ANALYSIS	2,514.50
PHOENIX ENGINEERING	79,560.49
WEBSTER, GORDON	7,258.91
TOTAL:	$115,818.75

Suite 308 – 698 Seymour Street, Vancouver, B.C. V6B 3K6 Tel: (604) 685-5131 Fax: (604) 685-6933
VSE Symbol: **CNM**

ACME ANALYTICAL LABORATORIES LTD.
852 E. Hastings St., Vancouver, B.C., CANADA V6A 1R6
Phone: (604) 253-3158 Fax: (604) 253-1716
Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94-1377**
Date: May 20 1994

QTY	ASSAY	PRICE	AMOUNT
1	30 ELEMENT ICP ANALYSIS @	5.70	5.70
1	GEOCHEM WHOLE ROCK ICP ANALYSIS @	12.35	12.35
1	SPECIAL GRAVITY @	8.20	8.20
1	ROCK SAMPLE PREPARATION @	3.85	3.85
			30.10
	SURCHARGE FOR UNDER 10 SAMPLES PER EACH ANALYSIS		18.00
	GST Taxable		48.10
	7.00 % GST		3.37
	TOTAL		**51.47**

COPIES 1

June 10/94

CHQ #0035

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852 E. Hastings St., Vancouver, B.C., CANADA V6A 1R6
Phone: (604) 253-3158 Fax: (604) 253-1716
Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94-0810R**
Date: May 12 1994

QTY	ASSAY	PRICE	AMOUNT
3	GEOCHEM WHOLE ROCK ICP ANALYSIS @	12.35	37.05
			37.05
	SURCHARGE FOR UNDER 10 SAMPLES PER BATCH		6.00
	GST Taxable		43.05
	7.00 % GST		3.01
	TOTAL		**46.06**

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PAID MAY 25/94

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Phone: (604) 253-3158 Fax: (604) 253-1716
Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94-0810R2**
Date: May 18 1994

QTY	ASSAY	PRICE	AMOUNT
3	30 ELEMENT ICP ANALYSIS @	5.70	17.10
3	SPECIFIC GRAVITY @	8.20	24.60
			41.70
	SURCHARGE FOR UNDER 10 SAMPLES PER EACH ANALYSIS		12.00
	GST Taxable		53.70
	7.00 % GST		3.76
	TOTAL		**57.46**

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MAY 25/94

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Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94F0509**
Date: May 9 1994

QTY	ASSAY	PRICE	AMOUNT
	SHIPPING CHARGE - SWIFT W/B #4573020		9.80
	GST Taxable		9.80
	7.00 % GST		0.69
	TOTAL		**10.49**

SENT SAMPLES TO PACIFIC SOIL

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852 E. Hastings St., Vancouver, B.C., CANADA V6A 1R6
Phone: (604) 253-3158 Fax: (604) 253-1716
Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94-0854R**
Date: Apr 29 1994

QTY	ASSAY	PRICE	AMOUNT
	SPECIAL HANDLING - 2 HOURS @ $23.20/HR.		46.40
	GST Taxable		46.40
	7.00 % GST		3.25
	TOTAL		**49.65**

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852 E. Hastings St., Vancouver, B.C., CANADA V6A 1R6
Phone: (604) 253-3158 Fax: (604) 253-1716
Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94-1006**
Date: Apr 26 1994

QTY	ASSAY	PRICE	AMOUNT
28	H2O ANALYSIS @	6.10	170.80
1	30 ELEMENT ICP ANALYSIS - SOLUTION @	12.35	12.35
27	CORE SAMPLE PREPARATION @	3.85	103.95
1	ROCK SAMPLE PREPARATION @	3.85	3.85
			290.95
	SURCHARGE FOR UNDER 10 SAMPLES ON ICP ANALYSIS		6.00
	GST Taxable		296.95
	7.00 % GST		20.79
	TOTAL		**317.74**

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Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94-1057**
Date: Apr 26 1994

QTY	ASSAY	PRICE	AMOUNT
6	H2O ANALYSIS @	6.10	36.60
6	CORE & ROCK SAMPLE PREPARATION @	3.85	23.10
			59.70
	SURCHARGE FOR UNDER 10 SAMPLES PER BATCH		6.00
	GST Taxable		65.70
	7.00 % GST		4.60
	TOTAL		**70.30**

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Phone: (604) 253-3158 Fax: (604) 253-1716
Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: 94S0414
Date: Apr 14 1994

QTY	ASSAY	PRICE	AMOUNT
	250 LARGE PLASTIC BAGS		60.00
	SHIPPING CHARGE - GREYHOUND W/B#2115680453		12.30
	7% G.S.T.		5.06
	7% P.S.T. ON SUPPLIES		4.20
	TOTAL		81.56

REQUESTED BY JOHN GRAVEL

COPIES 1

PAID APRIL 21/94 $81.56
CHQ #012

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INVOICE

ACME ANALYTICAL LABORATORIES LTD.

852 E. Hastings St., Vancouver, B.C., CANADA V6A 1R6
Phone: (604) 253-3158 Fax: (604) 253-1716
Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94F0408**
Date: Apr 8 1994

QTY	ASSAY	PRICE	AMOUNT
	SHIPPING CHARGE - SWIFT W/B #4573009/4573012		19.60
	GST Taxable		19.60
	7.00 % GST		1.37
	TOTAL		20.97

SENT PULP TO PACIFIC SOIL - RICHMOND. B.C.

COPIES 1

PAID APRIL 21/94 $20.97
CHQ # 012

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852 E. Hastings St., Vancouver, B.C., CANADA V6A 1R6
Phone: (604) 253-3158 Fax: (604) 253-1716
Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94-0854**
Date: Apr 6 1994

QTY	ASSAY	PRICE	AMOUNT
54	H2O ANALYSIS @	6.10	329.40
2	32 ELEMENT ICP ANALYSIS - SOLUTION @	12.35	24.70
54	CORE SAMPLE PREPARATION @	3.85	207.90
			562.00
	SPECIAL HANDLING FOR 2 HOURS @ $23.20/HR.		46.40
	GST Taxable		608.40
	7.00 % GST		42.59
	TOTAL		**650.99**

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PAID APRIL 8/94

CHQ # 003

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[COPY 1]

ACME ANALYTICAL LABORATORIES LTD.
852 E. Hastings St., Vancouver, B.C., CANADA V6A 1R6
Phone: (604) 253-3158 Fax: (604) 253-1716
Our GST # R100035377

CANMARK INTERNATIONAL RES. INC.
Unit #308 - 698 Seymour St.
Vancouver, BC
V6B 3K1

File: **94-0810**
Date: Mar 31 1994

QTY	ASSAY	PRICE	AMOUNT
18	H2O ANALYSIS @	15.00	270.00
3	30 ELEMENT ICP ANALYSIS - SOLUTION @	12.35	37.05
18	CORE SAMPLE PREPARATION @	3.85	69.30
			376.35
	SURCHARGE FOR UNDER 10 SAMPLES ON WATER ANALYSIS		6.00
	GST Taxable		382.35
	7.00 % GST		26.76
	TOTAL		**409.11**

INVOICE

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PAID
DATE April 4/94 C/Q # 0613
CNM ✓ # [redacted]

Please pay last amount shown. Return one copy of this invoice with payment.
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INVOICE NO-I

April, Ist 1994.

CANMARK INTERNATIONAL RESOURCES LTD.
Ste 308-698 Seymour Street
Vancouver, B.C. V6B 3K6
Christopher Lee -President
Ph. no-685-5I3I
Fax no-685-6933

IN ACCOUNT WITH-

ADAM DIAMOND DRILLING LTD.
P.O. Box I69I
Princeton, B.C. VOX IWO
Ph. no-295-3376

This invoice is up to end of March 3I which is exactly one thousand feet of BQ drilling done and Cat hours. A invoice will be billed at the end of drilling for the extra drilling and Cat hours at same contract rates and Cat rate and truck costs to move drill from one part of minning property doun highway to outher part of property.

IOOO feet BQ drilling x $I3.50 -	$I3,500.00
G.S.T.- no-RI22I77348 -	$,945.00
6I Cat hours x $40.00 per hour -	$ 2,440.00
G.S.T. no -RI22I77348 -	$,I70.80
Total invoice for Iooo feet and Cat hours is -	$I7,055.80
Subtract doun payment of -	$I0,000.00
Balance still owing for Iooo feet and Cat hours is-	$ 7,055.80

INVOICE-2

April I6, I994.

GLL

CANMARK INTERNATIONAL RESOURCES LTD.
Ste 308-698 Seymour Street
Vancouver, B.C. V6B 3K6
Christopher Lee -President
Ph. no-685-5I3I
Fax-685-6933

Paid
APR 26/94
CHQ # 0001

IN ACCOUNT WITH-

ADAM DIAMOND DRILLING LTD.
P.O. Box I69I
Princeton, B.C. VOX IWO
Ph. no-295-3376

This invoice is from April 2nd to April I5/94 end of project.

44I feet x $I3.50 -	$5,953.50
G.S.T. No-RI22I77348 -	$,4I6.75
22½ Cat hours x $40.00 per hour -	$,900.00
G.S.T. No-RI22I77348 -	$, 63.00
Total truck cost for moving drill from one part of minning property doun highway to other-	$,330.00
Total invoice to end of project -	$7,663.25

Thank You,

INVOICE

CONTRACT

THIS AGREEMENT made as of the 2nd day of March, 1994. A.D.

BETWEEN: CANMARK INTERNATIONAL RESOURCES LTD.
Ste 308 -698 Seymour Street
Vancouver, B.C. V6B 3K6
Christopher Lee- President
Ph. no-685-5131
Fax no-685-6933

(Hereinafter referred to as the "COMPANY") OF THE FIRST PART.

AND: ADAM DIAMOND DRILLING LTD.
P.O. Box 1691
Princeton, B.C. VOX 1W0
Ph.no-295-3376

(Hereinafter referred to as the "CONTRACTOR") OF THE SECOND PART.

WHEREAS: THE CONTRACTOR COVENANTS AND AGREES:

A. 1. That all holes be drilled with BQ wireline equipment.

2. That the Contractor shall use his best endeavour to complete all holes to the wishes of the Company, but should overburden or rock conditions prevent successful completion of such hole, the Contractor is not obliged to complete the same, but shall be paid for such incompleted hole at contract rates for the footage drilled in such hole.

3. Contractor will supply all necessary BQ drilling equipment and setting up, tearing doun, laying out hoseline, BQ core boxes and mobilization and demobilization of equipment, which is all included in contract footage rate of $13.50 per foot.

4. Contractor will supply his own transportation for his crew.

B. THE COMPANY COVENANTS AND AGREES:

1. That a minimum of one thousand feet of BQ wireline drilling to be drilled on Sunday Creek minning property.

2. The cost of BQ wireline drilling will be at a contract rate of $13.50 per foot.

3. Cat will be supplied by Contractor for building road, snow ploughing road, digging sumphole, preparing drillsites and moving drill and drilling equipment. The cost for this machine to the Company will be at a rate of $40.00 per hour when in use.

4. Goods and service tax is not included in these rates and will be charged to Company for contract drilling and cat hours.

5. A certified cheque for the amount of $10,000.00 doun before drilling commences, wich will be deducted off at the end of one thousand foot contract and the balance after the $10,000.00 is deducted off, will be paid in full to Contractor within one week after completion of the 1000 foot contract.

IN WITNESS WHEREOF these presents have been executed by the parties hereto this 2nd day of March, 1994.

CANMARK INTERNATIONAL RESOURCES LTD.	ADAM DIAMOND DRILLING LTD.
PER: [signature]	PER: George Adam
AUTHORIZED SIGNATORY	AUTHORIZED SIGNATORY
[signature]	Gordon Webster
WITNESS:	WITNESS:
C/S	C/S

PACIFIC SOIL ANALYSIS INC.

SOIL AND PLANT ANALYSES

To: Canmark

Date: May 24/94

Attention: John Beck

Re: Sample 94-1377

Invoice No.: 94-515

For the requested analyses as follows:

	x	
	x	
	x	
	x	
	x	
	x	
	x	
CEC	1 x 25	25.00
	x	
	x	
	x	
	x	
	x	
JUNE 15/94	x	
CHQ #0045	x	
	x	
	x	
	x	
	x	
	x	

Please include our invoice number on the face of your cheque.
Payment terms NET 30 DAYS.

G.S.T. Registration No.: 104 044 516

Total Lab Fees	25.00
G.S.T.	1.75
Net Invoice	$26.75

PSAI

#5 – 11720 Voyageur Way, Richmond, B.C. V6X 3G9 Phone: (604) 273-8226

PACIFIC SOIL ANALYSIS INC.

SOIL AND PLANT ANALYSES

To: CanMark

Date: April 27/94

Attention: J. Beck

Re:

Invoice No.: 94-376

For the requested analyses as follows:

	X	
	X	
	X	
CEC & cations	34 X 20	680.00
	X	
	X	
	X	
	X	
	X	
	X	
	X	
	X	
PAID MAY 18/94	X	
CHQ #0024	X	
	X	
	X	
	X	
	X	
	X	
	X	

Please include our invoice number on the face of your cheque.
Payment terms NET 30 DAYS.

G.S.T. Registration No.: 104 044 516

Total Lab Fees	680.00
G.S.T.	47.60
Net Invoice	$727.60

PSAI

#5 – 11720 Voyageur Way, Richmond, B.C. V6X 3G9 Phone: (604) 273-8226

PACIFIC SOIL ANALYSIS INC.

SOIL AND PLANT ANALYSES

To: Can Mark International

Date: April 18/94

Attention: J. Beck

Re: DDH 94 samples

Invoice No.: 94-357

For the requested analyses as follows:

	x	
	x	
	x	
	x	
CEC + exchangeable	x	
cations.	58 x 20	1160.00
	x	
	x	
	x	
	x	
	x	
	x	
P MAY 18/94	x	
	x	
CHQ #0024	x	
	x	
	x	
	x	
	x	
	x	

Please include our invoice number on the face of your cheque.
Payment terms NET 30 DAYS.

G.S.T. Registration No.: 104 044 516

Total Lab Fees	$1160.00
G.S.T.	81.20
Net Invoice	$1241.20

PSAL

#5 – 11720 Voyageur Way, Richmond, B.C. V6X 3G9 Phone: (604) 273-8226

PACIFIC SOIL ANALYSIS INC.

SOIL AND PLANT ANALYSES

To: Canmark

Date: Mar 30/94

Attention: John Beck

Re: CEC & Cations

Invoice No.: 94-256

For the requested analyses as follows:

	x	
	x	
Special Quote CEC & Cations	#20 x 18	$360.00
	x	
	x	
	x	
	x	
	x	
	x	
	x	
Paid APR 26/94	x	
CHQ # 0008	x	
	x	
	x	
	x	
	x	
	x	
	x	
	x	
	x	
	x	

Please include our invoice number on the face of your cheque.
Payment terms NET 30 DAYS.

G.S.T. Registration No.: 104 044 516

Total Lab Fees	$ 360.00
G.S.T.	25.20
Net Invoice	$ 385.20

PSAI

#5 – 11720 Voyageur Way, Richmond, B.C. V6X 3G9 Phone: (604) 273-8226

PACIFIC SOIL ANALYSIS INC.

SOIL AND PLANT ANALYSES

To: Canmark International Resources Inc. Date: March 22/94

698 Seymour St. Unit 308

Vancouver, B.C. V6B 3K6

Attention: Accounts Payable

Re: Zeolite testing for Christopher Lee Invoice No.: 94-170

For the requested analyses as follows:

CEC & Excl. Cations	5 x $25	$125.00
	x	
	x	
	x	
	x	
	x	
	x	
PAID Apr 26/94	x	
	x	
Chq #0008	x	
	x	
	x	
	x	
	x	
	x	
	x	
	x	
	x	
	x	
	x	

Please include our invoice number on the face of your cheque.
Payment terms NET 30 DAYS.

G.S.T. Registration No.: 104 044 516

Total Lab Fees 125.00

G.S.T. 8.75

Net Invoice $133.75

PSAI

#5 – 11720 Voyageur Way, Richmond, B.C. V6X 3G9 Phone: (604) 273-8226

Phoenix Engineering Ltd.

Canmark International Resources Inc.
Princeton Zeolite Project

Jun Billing for the Period May 15 - Jun 15

Work Description		Percent Compete	Budget Amount	Billable Billing	January Billing	February Billing	March Billing	April Billing	May Billing
Data Review		100%	$2,520	$2,520	$2,520	$0	$0		
Field Program									
	Baseline	100%	$1,820	$1,820	$1,456	$364	$0		
	Survey	100%	$2,730	$2,730	$2,730	$0	$0		
	Lab Test	100%	$2,432	$2,432	$243	$2,189	$0		
Engineering Design									
	Geological Xsect.	100%	$480	$480	$480	$0	$0		
	Geol. Model	100%	$1,680	$1,680	$1,680	$0	$0		
	Review Geol. Log	100%	$608	$608	$608	$0	$0		
	Logging Core	100%	$1,440	$1,440	$1,440	$0	$0		
	Mine Plan	100%	$6,620	$6,620	$1,324	$5,296	$0		
Permits									
	Dept. of Mines	100%	$1,840	$1,840	$920	$920	$0		
	Dept. of Highways	100%	$560	$560	$0	$560	$0		
	Dept. of Environment	100%	$560	$560	$0	$560	$0		
1994 Exploration									
	Program Management	100%	$9,311	$9,311	$0	$510	$7,870	$931	$0
	Survey (layout)(Logging)	100%	$13,900	$13,900	$0	$900	$10,915	$2,085	$0
	Data Interpretation	100%	$12,000	$12,000				$7,200	$4,800
	Report	80%	$4,500	$3,600				$0	$3,600
Application for Test Pit				$0				$0	$0
	Pit Design		$11,500	$0				$0	$0
	Documentation		$6,000	$0				$0	$0
			$80,501	$62,101	$13,401	$11,299	$18,785	$10,216	$8,400

Billable Disbursements May		units	unit cost	number	cost	
Equipment Rental						
	Survey Equipment					
					$0.00	
	Pick-up Truck Rental					
	Daily Rate	Day	$0.00	0	$0.00	
		km.	$0.18	0	$0.00	
Car Expense						
		km.	$0.30	600	$180.00	
Hotel Accom			$35.00	0	$0.00	
Food		per day	$50.00	0	$0.00	
Printing Reports		copies	$6.00	0	$0.00	
					$180.00	$180

GST #104183900	$601
Total May 15- Jun 15 Billing	**$9,181**

wjb

Phoenix Engineering Ltd.

Canmark International Resources Inc.
Princeton Zeolite Project

April Billing for the Period April 15 - May 15

Work Description		Percent Compete	Budget Amount	Billable Billing	January Billing	February Billing	March Billing	April Billing
Data Review		100%	$2,520	$2,520	$2,520	$0	$0	
Field Program								
	Baseline	100%	$1,820	$1,820	$1,456	$364	$0	
	Survey	100%	$2,730	$2,730	$2,730	$0	$0	
	Lab Test	100%	$2,432	$2,432	$243	$2,189	$0	
Engineering Design								
	Geological Xsect.	100%	$480	$480	$480	$0	$0	
	Geol. Model	100%	$1,680	$1,680	$1,680	$0	$0	
	Review Geol. Log	100%	$608	$608	$608	$0	$0	
	Logging Core	100%	$1,440	$1,440	$1,440	$0	$0	
	Mine Plan	100%	$6,620	$6,620	$1,324	$5,296	$0	
Permits								
	Dept. of Mines	100%	$1,840	$1,840	$920	$920	$0	
	Dept. of Highways	100%	$560	$560	$0	$560	$0	
	Dept. of Environment	100%	$560	$560	$0	$560	$0	
1994 Exploration								
	Program Management	100%	$9,311	$9,311	$0	$510	$7,870	$931
	Survey (layout)(Logging)	100%	$13,900	$13,900	$0	$900	$10,915	$2,085
	Data Interpretation	60%	$12,000	$7,200				$7,200
	Report		$4,500	$0				$0
Application for Test Pit				$0				$0
	Pit Design		$11,500	$0				$0
	Documentation		$6,000	$0				$0
			$80,501	$53,701	$13,401	$11,299	$18,785	$10,216

Billable Disbursements February		units	unit cost	number	cost	
Equipment Rental						
	Survey Equipment					
					$0.00	
	Pick-up Truck Rental					
	Daily Rate	Day	$0.00	0	$0.00	
		km.	$0.18	0	$0.00	
Car Expense						
		km.	$0.30	0	$0.00	
Hotel Accom			$35.00	0	$0.00	
Food		per day	$50.00	0	$0.00	
Printing Reports		copies	$6.00	0	$0.00	
					$0.00	$0

GST #104183900 $715

Total April 15 to May 15 Billing **$10,931**

Paid June 3/94

wjb

PHOENIX ENGINEERING LTD.

Canmark International Resources Inc.
Princeton Zeolite Project

March 1st. to April 15th. Billing

Work Description		Percent Complete	Budget Amount	Billable Billing	January Billing	February Billing	March Billing
Data Review		100%	$2,520	$2,520	$2,520	$0	$0
Field Program							
	Baseline	100%	$1,820	$1,820	$1,456	$364	$0
	Survey	100%	$2,730	$2,730	$2,730	$0	$0
	Lab Test	100%	$2,432	$2,432	$243	$2,189	$0
Engineering Design							
	Geological Xsect.	100%	$480	$480	$480	$0	$0
	Geol. Model	100%	$1,680	$1,680	$1,680	$0	$0
	Review Geol. Log	100%	$608	$608	$608	$0	$0
	Logging Core	100%	$1,440	$1,440	$1,440	$0	$0
	Mine Plan	100%	$6,620	$6,620	$1,324	$5,296	$0
Permits							
	Dept. of Mines	100%	$1,840	$1,840	$920	$920	$0
	Dept. of Highways	100%	$560	$560	$0	$560	$0
	Dept. of Environment	100%	$560	$560	$0	$560	$0
1994 Exploration							
	Program Management	90%	$9,311	$8,380	$0	$510	$7,870
	Survey (layout)(Logging)	85%	$13,900	$11,815	$0	$900	$10,915
	Data Interpretation	0%	$12,000				
	Report	0%	$4,500				
Application for Test Pit							
	Pit Design	0%	$11,500				
	Documentation	0%	$6,000				
			$80,501	$43,485	$13,401	$11,299	$18,785

Billable Disbursements March 1st. to April 15th	units	unit cost	number	cost	
Equipment Rental					
Survey Equipment					
April 8 1994 Norman Wade				$285.00	
Pick-up Truck Rental					
Daily Rate	Day	$58.97	39	$2,300.00	
	km.	$0.18	4500	$810.00	
Car Expense					
FourTrips to Princeton	km.	$0.30	2400	$720.00	
Hotel Accom	man day	$49.53	45	$2,228.85	
Food	man day	$50.00	50	$2,500.00	
Printing Reports	copies		6	$575.17	
				$9,419.02	$9,419

PAID APR 13/94
CHQ #006

GST #104183900	$1,974
Total March 1 to April 15	$30,178

wjb

475 Howe Street, Suite 710 • Vancouver, B.C. V6C 2B3 • phone (604) 684-1448

Phoenix Engineering Ltd.

Canmark International Resources Inc.
Princeton Zeolite Project

February Billing

Work Description		Percent Compete	Budget Amount	Billable Billing	January Billing	February Billing
Data Review		100%	$2,520	$2,520	$2,520	$ -
Field Program						
	Baseline	100%	$1,820	$1,820	$1,456	$ 364.00
	Survey	100%	$2,730	$2,730	$2,730	$ -
	Lab Test	100%	$2,432	$2,432	$243	$ 2,188.80
Engineering Design						
	Geological Xsect.	100%	$480	$480	$480	$ -
	Geol. Model	100%	$1,680	$1,680	$1,680	$ -
	Review Geol. Log	100%	$608	$608	$608	$ -
	Logging Core	100%	$1,440	$1,440	$1,440	$ -
	Mine Plan	100%	$6,620	$6,620	$1,324	$ 5,296.00
Permits						
	Dept. of Mines	100%	$1,840	$1,840	$920	$ 920.00
	Dept. of Highways	100%	$560	$560	$0	$ 560.00
	Dept. of Environment	100%	$560	$560	$0	$ 560.00
1994 Exploration						
	Program Management	10%	$5,096	$510	$0	$ 509.60
	Survey (layout)(Logging)	15%	$6,000	$900	$0	$ 900.00
			$34,386	$24,700	$13,401	$ 11,298.40

Billable Disbursements February		units	unit cost	number	cost	
Equipment Rental						
	Survey Equipment				$228.00	
Car Expense		km.				
	One Trip to Princeton		0.3	600	$180.00	
Hotel Accom			35	2	$70.00	
Food						
	Two people 3 days	per day	50	6	$300.00	
					$778.00	$ 778.00
			GST #104183900			$ 845.35
			Total February			$ 12,921.75

PAID MAR 30/94

CHQ # 0610

wjb

Phoenix Engineering Ltd.

Canmark International Resources Inc.
Princeton Zeolite Project

January Billing

Work Description		Percent Compete	Billable Amount	January Billing	
Data Review		100.00%	$2,520.00	$2,520.00	
Field Program					
	Baseline	80.00%	$1,820.00	$1,456.00	
	Survey	100.00%	$2,730.00	$2,730.00	
	Lab Test	10.00%	$2,432.00	$243.20	
Engineering Design					
	Geological Xsect.	100.00%	$480.00	$480.00	
	Geol. Model	100.00%	$1,680.00	$1,680.00	
	Review Geol. Log	100.00%	$608.00	$608.00	
	Logging Core	100.00%	$1,440.00	$1,440.00	
	Mine Plan	20.00%	$6,620.00	$1,324.00	
Permits					
	Dept. of Mines	50.00%	$1,840.00	$920.00	
	Dept. of Highways	0	$560.00	$0.00	
	Dept. of Environment	0	$560.00	$0.00	
			$23,290.00	$13,401.20	**$13,401.20**

Billable Disbursements		units	unit cost	number	cost	
Equipment Rental						
	Survey Equipment				$684.00	
Car Expense		km.	0.3	680	$204.00	
	Two Trips to Princeton		0.3	600	$180.00	
Hotel Accom			35	3	$105.00	
			35	3	$105.00	
Food						
	Two people 3 days	per day	50	6	$300.00	
	Three people 2 days		50	6	$300.00	
					$1,878.00	**$1,878.00**

PAID FEB 21/94
CHQ #0574

GST #104183900	$1,069.54
Total January	$16,348.74

PHOENIX ENGINEERING LTD.

GORDON W[illegible]

Prospecting and Consulting

Box 1420, Princeton, B.C. VOX IWO Ph: 295-7638

INVOICE

TO CANMARK INTERNATIONAL RESOURCES LTD
308 - 698 SEYMOUR ST
VANCOUVER, B.C. V6B 3K6

DATE MAY 15, 1994

CUSTOMER ORDER

INVOICE #94-004

WORK DONE ON CANMARKS SUN CLAIM	
GROUP FROM MAY 1, 1994 TO MAY 15, 1994	
RATES:	
FIELD MANAGER $150.00 P/d.	
HELPER 125.00 P/d	
4X4 RENTAL ALLFOUND 90.00 Pd.	
1 DAY SEEDING DRILL SITES AND	
DISTURBED AREAS DUE TO DRILL PROGRAM.	
SEED	$ 80.25
RENTAL OF SEEDER	40.00
FIELD MANAGER	150.00
HELPER	125.00
4X4 RENTAL	90.00
EXPENSES FOR TRIP TO CANMARK MEETING	
BUS FARE	64.84
TAXI FARES	20.00
½ DAY GETTING ROCK SAMPLES FIELD MANAGER	75.00
HELPER	62.50
4X4 RENTAL	90.00
	797.59
TOTAL	797.59

PAID MAY 24/94
CHQ #0028

[signature]

GORDON WEBSTER

Prospecting and Consulting

Box 1420, Princeton, B.C. VOX IWO Ph: 295-7638

INVOICE

DATE APRIL 16, 1994

CUSTOMER ORDER

Invoice #94-003

TO CANMARK INTERNATIONAL RESOURCES INC.
308-968 SEYMOUR ST.
VANCOUVER, B.C. V6B 3K6

OVERSEEING CANMARK'S DRILL PROGRAM ON SUN-CLAIMS PROJECT AND STAKING NEW CLAIMS FOR CANMARK FROM APRIL 2 - APRIL 16 1994			
RATES: WAGES $125.00 PER DAY			
4X4 RENTAL (ALL FOUND) $25.00 PER DAY			
HELPER $125.00 PER DAY			
TOTAL DAYS 14.			
WAGES	$125.00	X14	1750.00
4X4	$25.00	X14	350.00
"STAKING CLAIMS" HELPER	125.00	X2	250.00
RECORDING FEES			60.00
CLAIM TAGS			16.92
FLAGGING TAPE			14.99
MEALS			49.46
TOTAL			2,491.37

PAID APR 29/94 APR 29/94
CHQ # 0010

GW

TOTAL 2,491.37

GORDON WEBSTER

Prospecting and Consulting

Box 1420, Princeton, B.C. VOX IWO Ph: 295-7638

INVOICE

TO CANMARK INTERNATIONAL RESOURCES INC. 308-698 SEYMOUR ST., VANCOUVER, B.C. V6B 3K6

DATE APRIL 4, 1994

CUSTOMER ORDER

Invoice #94-002

OVERSEEING CANMARK'S DRIL PROGRAM ON SUN MINERAL CLAIM GROUP FROM MARCH 9, 1994 TO MARCH 31, 1994.		
RATES: WAGES $125.00 PER DAY		
4X4 RENTAL (ALL FOUND) $25.00 P/D		
TOTAL DAYS 23.		
WAGES $125.00 X 23 =	2,875	00
4X4 RENTAL $25.00 X 23 =	575	00
TOTAL	3,450	00

PAID APR 7/94

CHQ #001

GORDON WEBSTER

Gordon Webster

TOTAL	3,450	00

GORDON WEBSTER

Prospecting and Consulting

Box 1420, Princeton, B.C. VOX IWO Ph: 295-7638

INVOICE

TO CANMARK INTERNATIONAL RES
VANCOUVER, B.C.

DATE JAN. 26, 1994
CUSTOMER ORDER
Invoice #94-001

RATE: $125.00 PER DAY 4X4 RENTAL 25.00 PER DAY

JAN. 1, 1994 ½ DAY WORK ON SUN CLAIMS	62	50
4X4 RENTAL	25	00
JAN 10 ½ DAY IN TOWN WITH ENGINEER	62	50
JAN 12 1 DAY WORK ON SUN CLAIMS	125	00
4X4 RENTAL	25	00
JAN. 14, 1994 RECORDING ASSESMENT WORK ON FARMER CLAIMS	220	00
	520	00

PAID FEB 1/94
CHQ #0566

TOTAL MONEY OWING — TOTAL 520 00

FROM:SCOTTS PHARM. TO: 604 584 47 5 JAN 2 . 1994

PHOENIX ENGINEERING LTD.

Canmark International Resources Inc.

Sun Group of Claims

1994 Exploration Programme

Reserve Estimate & Mine Feasibility
Review and Recommendations

by

Phoenix Engineering Ltd.

Wm. John Beck, AScT.
Principle

Wm. E. Hodge, P.Eng.
Principle

July 17 th. 1994

475 Howe Street, Suite 710 • Vancouver, B.C. V6C 2B3 • phone (604) 684-1448

Table of Content

List of Figures

List of Tables

Appendix

CANMARK'S PROPERTY

EXECUTIVE SUMMARY

This preliminary feasibility study examines the costs associated with the development and mining of the largest Clinoptilolite zone presently defined in the Sun Claim. This zone lies in the west-central part of the site. The reserve of Clinoptilolite ore is estimated at approximately 3.5 million tonnes measured, 4.4 million tonnes indicated, and 38.6 million tonnes inferred. The reserve occurs in zones which are 10 to 15 metres thick. The average Clinoptilolite grade is approximately CEC 116, and core assay grades typically cluster in the 95 to 135 CEC range. While a small amount of ore occurs in the second mining bench, the typical overburden and *top waste* thicknesses are in the order of 10-40 metres.

The feasibility of exploiting these reserves is based on the *trial mine* approach. The degree of planning and estimating detail is believed to be consistent with the level of geological information available and the preliminary nature of this cost analysis. The trial mine pit limits were selected on a basis of a 1.79:1 Waste-to-Ore ratio for the Clinoptilolite zones which provide the largest reserve in the area. This resulted in a pit limit with dimensions of approximately 0.3 km (east-west) and 0.4 km (north-south).

The mine design centres on a multi-bench pit layout, with 5 metre high and 30 metre wide benches extending across the full length of the pit, in a north-south direction. A conventional mobile fleet would be employed including trucks, drills, loaders, dozers, etc. Mining would commence on the west side and advances across the pit in an easterly direction, adhering to the *least-cost* principle, by mining outcrop material first. Up to ten benches would be required to mine the currently measured reserves from the Sun Claims. Overburden disposal would encroach on some external area at start-up, but most waste would be returned to the pit for final disposal, it would thus prove to be a perpetual reclamation programme.

Capital costs to prepare the site allow for: providing access, on site power, mine equipment, pre-stripping and mine development. These are estimated at 2.93 million Canadian dollars to be capitalized over the 10 year mine life; this is equivalent to a cost of $2.12, per tonne ore mined. Total mine operation costs (fixed) are estimated at $35.86 per tonne ore mined, which includes allowances for excavation, transportation of ore to

Hope rail head by road, administration, depreciation and reclamation. No allowance has been made for depletion of reserves. Overburden stripping cost (variable cost) has been estimated at $3.24 per tonne excavated.

The foregoing unit costs derived from the trial mine study show that the break-even Clinoptilolite selling price is $55.00 per tonne for a 75 percent probability of success for an ore reserve with a waste-to-ore striping ratio of 1.9:1 or less. Inspection of the ore reserves reveals that the reserves within the Sun Claim model area are sufficient to sustain a viable mining operation.

A *minimum ore reserve* approach (4 million tonnes of Clinoptilolite are required to sustain a 10 year mine life) indicates a corresponding stripping ratio of 1.77:1 and a required selling price of $55.00 per tonne for Clinoptilolite, in order to provide a minimum 25% profit incentive on revenue to offset the risk of failure. Furthermore, mining of this deposit will facilitate the principle of *least-cost* mining, first allowing development from the outcrop, then systematically progressing into the more deeply covered material.

Both of the above scenarios are viewed as being sufficiently economically attractive to justify mining of these reserves at the current Clinoptilolite selling prices used in the earlier study by Phoenix Engineering Ltd.

2 Canmark Claim Description

2.1 Staked Claims

The Canmark International Resources Inc. (Canmark) property is located in the Similkameen Mining Division of British Columbia and is comprised of eight SUN claims, four FARMER claims and eleven LEE claims, for a total of twenty-three two-post units.

These claims are listed as follows:

Claim Name	Tenure Number	Expiry Date
Sun	250124	May 27 1996
Sun # 1	250125	May 27 1996
Sun # 2	250126	May 27 1996
Sun # 3	250127	May 27 1996
Sun # 6	305974	Nov. 5 1996
Sun # 7	305975	Nov. 5 1996
Sun # 8	306309	Nov. 6 1996
Sun # 9	306310	Nov. 6 1996
Farmer I	249993	Jan. 31 1997
Farmer II	249994	Jan. 31 1997
Farmer III	320716	Sept. 7 1996
Farmer IV	320717	Sept. 7 1996
Lee	320364	Aug. 21 1996
Lee # 1	320365	Aug. 21 1996
Lee # 2	322491	Nov. 12 1996
Lee # 3	322492	Nov. 12 1996
Lee # 4	322493	Nov. 12 1996
Lee # 5	324272	Apr. 4 1997
Lee # 6	324272	Apr. 4 1997
Lee # 7	324430	Apr. 7 1997
Lee # 8	324431	Apr. 7 1997
Lee # 9	324432	Apr. 8 1997
Lee #10	324433	Apr. 8 1997

The Sun # 2 and Sun # 3 claims are partially over-staked onto the Farmer claims. The total group is known as the SUN GROUP shown on **Figure 1,** and have been formally grouped in accordance with the Mines Act on May 26 ,1994, giving a total area under claim by Canmark of 492 Ha. (1216 acres).

Canmark International Resources Inc.
Sunday Creek Group
Claim Boundary Location Plan

Figure 1

The last six claims listed above were staked by Canmark as a result of positive showings of mineral deposits during the 1994 exploration programme.

2.2 Mineral Deposit

The claims are staked over a deposit of Clinoptilolite. Clinoptilolite is a mineral belonging to the zeolite family of mineral and synthetic compounds. Clinoptilolite is extensively studied from theoretical and technical standpoints because of their potential and actual uses as *molecular sieves*, catalysts, and water softeners. Dehydrated zeolite can absorb other liquids such as ammonia, alcohol and hydrogen sulfide. This mineral is of value primarily because of its ability to extract contaminants from other materials in an efficient, environmentally friendly, and cost effective manner. Depending on the planned end-use it is not normally necessary to process or refine ore of grades in excess of 100 CEC since it can perform its beneficial function while diluted within the natural matrix of aluminum silicate rock in which it resides.

2.3 Location and Access

The property is on the Hope Princeton Highway (British Columbia Provincial Highway 3), about 30 kilometers south of Princeton, and about 3 kilometers (by road) north of Sunday Summit. The town of Princeton is about a three-hour drive from Vancouver City. The claims actually straddle the highway, and needless to say, this extremely favorable access is a definite asset. The larger section of the property lies east of the highway, and various gravel roads give access to the different parts of the interior of the property.

2.4 Topography and Climate

The property generally lies between 1,265 metres and 1,175 metres above sea level. The topography consists of an area of open, terraced hills with localized incised creeks. Where logged, the hills are gently sloping park-like openings, and where still in virgin timber, lodgepole and jackpine-covered forest. Brush is encountered mainly around water courses.

The local climate is generally one of warm dry summers and cold winters with moderate snowfall. Water is normally available for exploration purposes. Snow may hinder surface work from late December through March or April.

The main areas of current exploration interest are the Sun # 1, Sun # 2, Farmer # 1 and Lee #3 claims, which have all been recently logged for insect control purposes, with no known reclamation or reforestation of the Sun #1 and Sun #2 claims. Requests have been made to the Ministry of Forestry to defer any reclamation of the area until the completion of the proposed Canmark bulk sample pit.

2.5 Physical Surveys

The Canmark property is bounded by Universal Transverse Mercator (UTM) coordinates:

{(5,546,000 N. ; 676,000 E.) to (5,459,000 N. ; 677,000 E.)}

Latitude	49 degrees 15 minutes
Longitude	120 degrees 35 minutes

The site is on the boundary of National Topographic System's map sheets 92H/2 and 92H/7.

Phoenix Engineering Ltd., (Phoenix) carried out a physical survey of the Sun # 1 claim, establishing a control co-ordinate system for Latitude, Departure and Elevation datum fixed to the UTM coordinate system; this facilitates the use of survey data by all government agencies to locate drill sites and proposed test pits on departmental map sheets.

The survey traverse datum point was at geodetic control marker 83C053 located:

- along Highway 3
- 32.5 km. -- South of junction with Highway 5
- 450m. -- South of the South fork of Sunday Creek
- 36.8m. -- South of the most Easterly point of pull-out
- 24.5m.-- East of centerline of Highway 3
- 1m.-- above highway elevation.

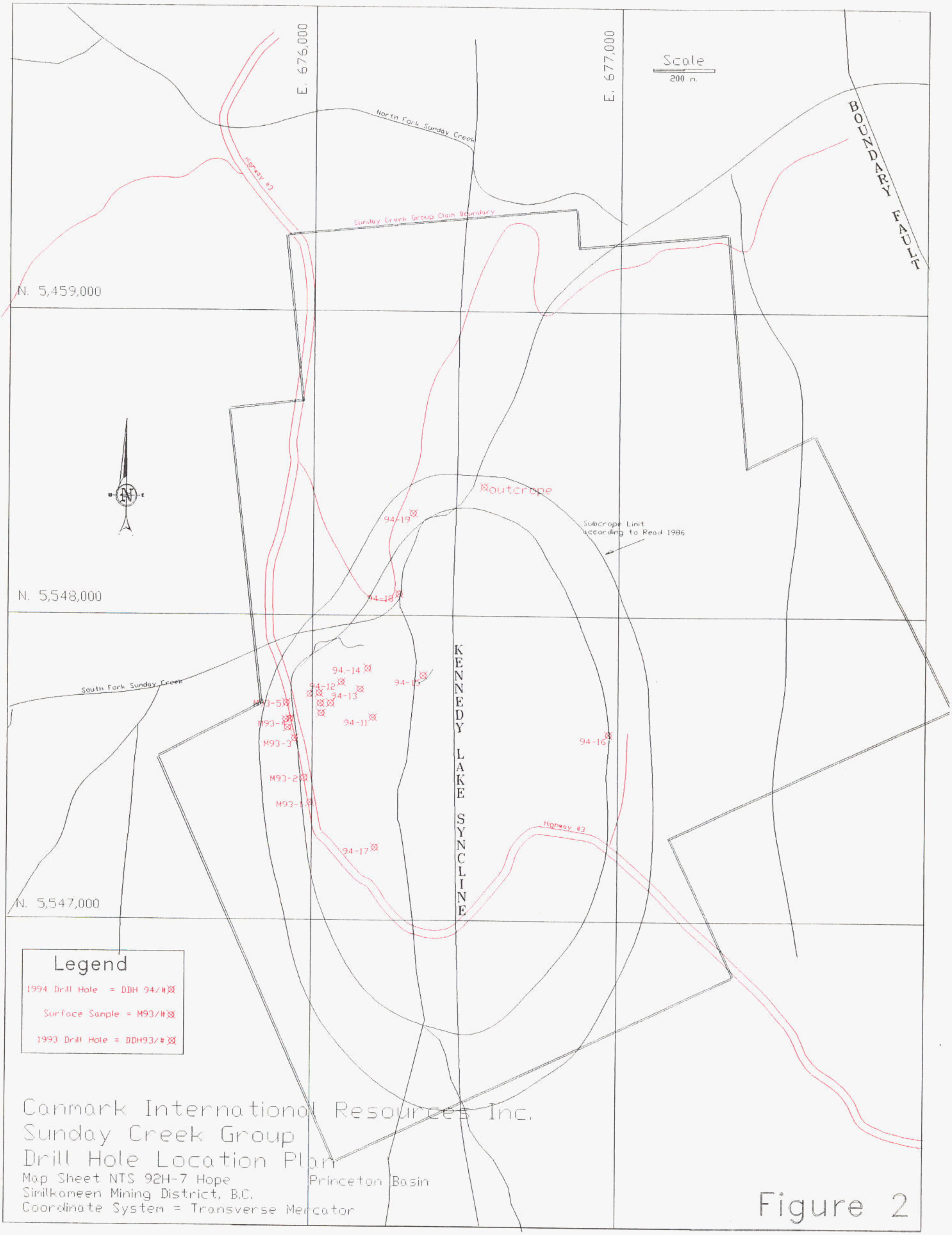
The elevation of 83C053 is 1,235.63 metres above sea level and all drill hole and site topography have been fixed to this datum.

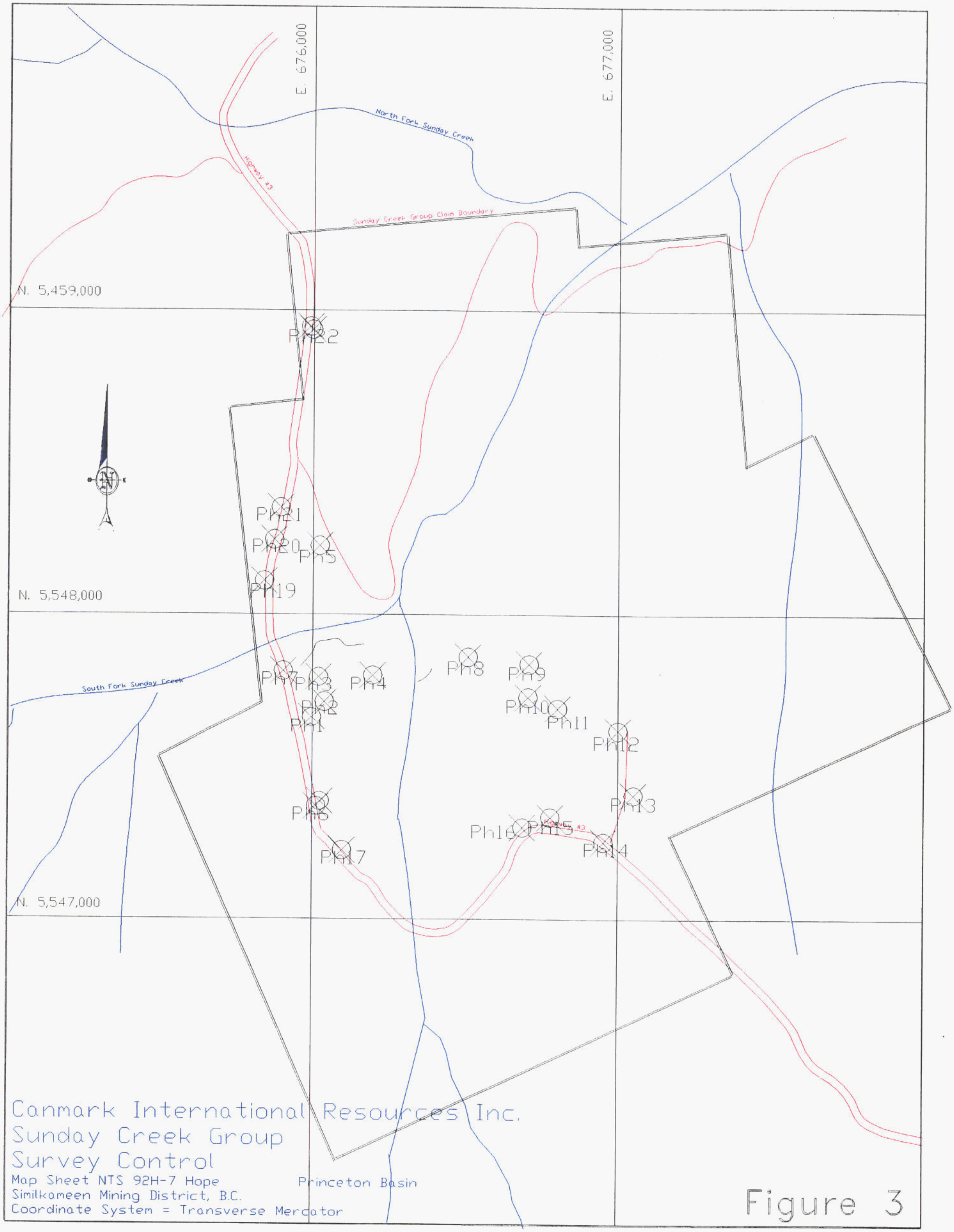
The survey by Phoenix included determination of the following salient features which are shown on **Figure 2:**

Existing drill hole collars
1993 Outcrop sample points
Claim Posts (where accessible)
Logged treeline limits
Changes in topographic relief
Highway 3 centerline
The south fork of Sunday Creek
Logging roads
1994 Exploration diamond drill holes

The survey was to determine limits imposed on the expanse of potential mining areas dictated by natural barriers or man-made boundaries, for example, creeks and Highway 3, and to facilitate the development of a geological model for the purpose of estimating Clinoptilolite ore reserve for the Sun Group of claims.

To facilitate survey control for the exploration programme, Phoenix carried a survey traverse along Highway 3 to the Farmer claims, west to the abandoned saw mill site and back to the Highway 3 control station. Control survey data, and control sheets are attached in **Appendix "D"** and plotted on **Figure 3** for reference purposes.


E. 676,000
E. 677,000
Scale
200 m.
North Fork Sunday Creek
Highway #3
BOUNDARY FAULT
Sunday Creek Group Claim Boundary
N. 5,459,000
outcrope
Subcrope Limit according to Read 1986
94-19
N. 5,548,000
94-18
94-14
94-15
94-12
94-13
94-11
South Fork Sunday Creek
M93-5
M93-3
M93-2
94-16
KENNEDY LAKE SYNCLINE
Highway #3
94-17
N. 5,547,000
Legend
1994 Drill Hole = DDH 94/#
Surface Sample = M93/#
1993 Drill Hole = DDH93/#
Canmark International Resources Inc.
Sunday Creek Group
Drill Hole Location Plan
Map Sheet NTS 92H-7 Hope
Princeton Basin
Similkameen Mining District, B.C.
Coordinate System = Transverse Mercator
Figure 2


E. 676,000
E. 677,000
North Fork Sunday Creek
Highway #3
Sunday Creek Group Claim Boundary
N. 5,459,000
N. 5,548,000
N. 5,547,000
South Fork Sunday Creek
Ph22
Ph21
Ph20
Ph5
Ph19
Ph7
Ph3
Ph4
Ph8
Ph9
Ph2
Ph1
Ph10
Ph11
Ph12
Ph13
Ph6
Ph16
Ph15
Ph14
Ph17
Canmark International Resources Inc.
Sunday Creek Group
Survey Control
Map Sheet NTS 92H-7 Hope
Princeton Basin
Similkameen Mining District, B.C.
Coordinate System = Transverse Mercator
Figure 3

3 Ore Reserves

Phoenix recommended additional exploration drilling to permit the further delineation of ore reserves on the Sun Claims, in January, 1994, and Canmark approved the proposed drilling program and provided budget funds to proceed. Application was made by Phoenix to the Department of Mines on January 26, 1994, with final approval to proceed being granted on March 11, 1994; drilling commenced on March 14, 1994, and was terminated on April 22, 1994.

The drilling contractor was Adam's Drilling of Princeton, B.C. employing the use of a Longyear double tube core barrel and a wire line BQ diamond drill system. A total of nine holes were drilled for a total footage of 1,436 feet. Of the nine holes drilled five were located in the main target area and the remaining four were drilled on the periphery of the known deposit. The five holes drilled in the main target area all intercepted ore; of the four holes drilled on the periphery, two holes (94-18 and 94-19) located on the Farmer claim had to be abandoned due to bad ground conditions which inhibited drilling operations. Drill holes (94-16 and 94-17) designed to obtain data on geologic structure, because the ore in that area was expected to be below surface mineable limits.

Drill core was recovered from all of the 1994 holes. The core was logged, measured to determine RQD values, photographed, split and sampled for assay; for a description of the core and results of laboratory testing, refer to Appendix "A" of this report. The remaining split core was boxed and shipped for short-term storage to Adam's Drilling in Princeton. At this time Canmark should arrange for long-term storage facilities in the area, as this core is a valuable asset.

Outcrop Samples

During the 1993 and 1994 drilling programme, samples were also collected from natural outcrops. The purpose for these samples was to identify areas for potential bulk sample pits; however, after evaluation of the CEC values it was concluded that the outcrop material was not typical of the Sun Claim ore body. Although the analysis in some cases has given normally acceptable total CEC ratings, after evaluation of the exchangeable cation it was found that the outcrop material was sodium poor; this is most likely a result of oxidization of the Clinoptilolite ore by the atmosphere, consequently, it is strongly recommended that Canmark uses only bulk samples excavated from test pits within the main sequence, or obtained by a large diameter core drilling programme designed for optimum sample recovery to permit lab testing by prospective clients.

3.1 Material Characteristics

To assist in the future development and mine design, samples were selected from the recovered drill core and analyzed for specific rock properties; parameters tested are as follows:

Rock Engineering Parameters

Sample	Unit Weight Wet $Kg./m^3$	Unit Weight Dry $Kg./m^3$	% Water (cw)	Sg.	Void Ratio (calc.)	Shear Plane	Unconfined Compression Peak
Waste (overburden)	1965	1683	16.8	NA	NA	70 deg.	19237 kPa
Ore Sample	2009	1793	12.1	2.32	0.2939	70 deg.	34682 kPa
Waste (footwall)	2355	2159	9.1	NA	NA	70 deg.	16308 kPa

3.2 Chemical Analysis

Methodology

CEC values are measured to determine the extend of a potential zeolite ore body, however, they do not give a definitive answer to what kind of zeolite material exists; basically, CEC values are an indicator for determining grade. The true test for defining material type and class is by: 1) X-ray Fluorescent Analysis (X-ray) scanning range 2 degrees to 37 degrees; 2) whole rock analysis by Inductive Coupled Plasma (ICP). The disadvantage of these types of analyses is that they do not give a quantifiable value to facilitate modeling, and because of their cost it would not be economic to run these tests on all material being evaluated; consequently, the use of CEC testing is the method of choice by the zeolite industry for ore body delineation.

From observations of the diamond drill core, a significant change in CEC values can be observed at the visible interface of tuff and zeolite materials. The change in total CEC value is abrupt and allows the evaluator to apply a threshold unit value of 100 CEC to identify the cut-off between ore and waste during the zeolite modeling process. However, for the purpose of marketing and assigning value to the commodity, it is necessary to determine type of zeolite material that is present within the Sun Claim target area.

The rationale for sample selection for detailed analysis is as follows:

The total ore body has been analyzed on the basis of CEC resulting in a total population of sixty samples; these samples were used to calculate the mean and standard deviation of CEC within the 1994 analysis area.

Samples from the population were selected on the following basis: one sample representing the mean CEC value and two samples representing one standard deviation above and below the mean CEC value for analysis by X-ray. Three random samples were also selected from within the defined ore body for analysis by ICP; the samples were taken at random and consisted of one from each of the upper and lower interface of ore and waste and one sample from within the central zone of the ore body.

The results from the analysis are as follows:

Insitu Material

Assay Method	CEC	SiO_2 %	Al_2O %	Fe_2O_3 %	MgO %	CaO %	NA_2O %	K_2O %	TiO_2 %	P_2O_5 %	MnO %	Ba %
X-ray	131	66.8	12.2	2.1	0.6	1.99	3.41	2.19	0.22	0.04	0.05	0.19
X-ray	118	66.6	12.3	2.44	0.69	2.11	3.37	2.34	0.26	0.05	0.06	0.15
X-ray	109	66.2	12.4	2.68	0.86	2.15	3.37	2.29	0.27	0.05	0.05	0.18
ICP	123	67.1	11.8	2.44	0.58	1.99	2.52	2.34	0.21	0.02	0.03	0.23
ICP	127	66.1	11.9	2.56	0.52	2.03	3.09	2.33	0.21	0.04	0.05	0.19
ICP	91	65.9	12.5	3.2	1.18	2.1	2.72	1.97	0.24	0.04	0.04	0.16

Outcrop Material

Method	CEC	SiO_2	Al_2O	Fe_2O_3	MgO	CaO	NA_2O	K_2O	TiO_2	P_2O_5	MnO	Ba
ICP	94.6	68.5	12.3	1.96	0.71	2.35	1.26	2.71	0.17	0.01	0.02	0.28

Note: Cation Exchange Capacity (CEC) = meq/100g.

The outcrop sample analyzed was compared to the plus and minus one standard deviation chemical analysis. The outcrop material falls within the deviation limits with the exception of Sodium (NaO_2) which demonstrates a deficiency when comparison is made between outcrop and low grade insitu material the low grade insitu material also demonstrates a reduced Sodium value but follows the same trend of the plus and minus one standard deviation samples.

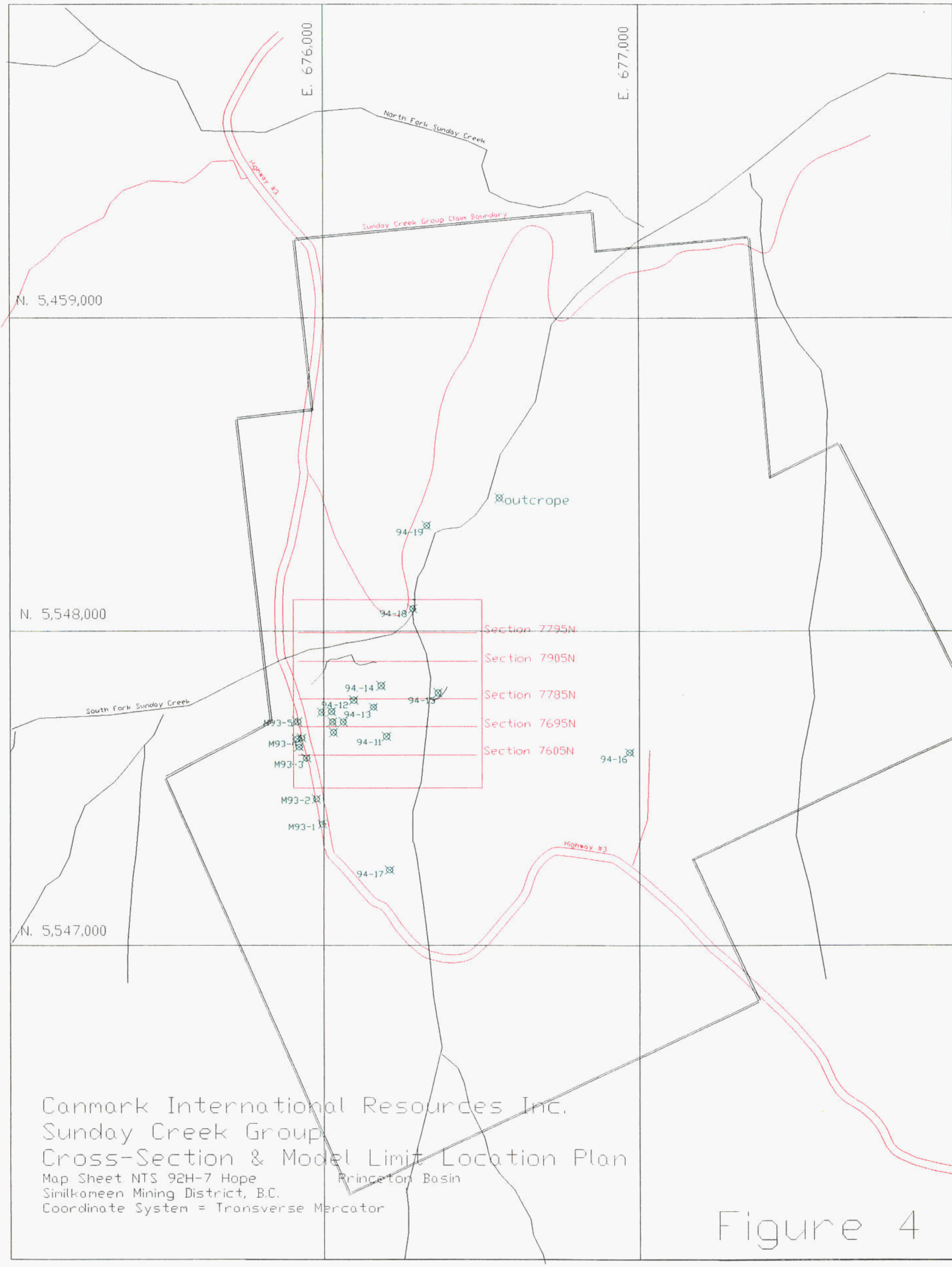
4 Creation of Mine Model

Upon completion of the review of the 1994 drilling data, the creation of a computer generated geological model of the ore body was initiated. The modeling program was developed by Phoenix and modified to suit the particular nature of the Princeton Clinoptilolite deposit. The modeling algorithm used is *the inverse distance squared modeling variogram technique*. Such a computer model is the only feasible method of handling the large data base which is accumulated through the investigation stages, and by being continually updated as new information becomes available, this model will form the basis for mine planning and production in future. At the present stage it should be noted that the geologic model is intended to reflect the geologic and topographic facts available as of June, 1994.

This mine model works in the following way: It divides the part of the property as shown in **Figure 4,** which is selected as having mining potential, into three dimensional blocks. The dimensions of these blocks are chosen to simulate the size of the blocks which will be used in the proposed method of mining. Optimization of the block size will be a priority of the 10,000 tonne test pit currently being planned for the Fall of 1994. This results in about 8,000 separate blocks being considered in subsequent analyses for the selected area. The next step is to incorporate all laboratory analyses results from both the 1993 and 1994 exploration programme into the model. Each assessment of ore grade is located within the array of blocks and its influence on adjacent blocks is quantified. The result of this predicted ore grade is then plotted at planned mining bench elevations thus forming *Isopleth* values of CEC as shown in **Figures 5 through 14.** By the development of isopleth bench plans it is possible to determine the mineable limits (x,y) on the bases of ore grade; for the purpose of this study Phoenix have selected a CEC value of 100 for the minimum ore grade (Cut-off Grade) to define the ore grade block model.

For the sake of clarity some of the refinements of the programme have been ignored in the preceding description; some aspects of the program are described below in more detail.

The topographic, ore zone structure, and block ore grades are all developed from raw data mathematically manipulated, using geostatistics in recognition that the samples within the ore deposit should be spatially correlated with each other, and that nearby samples will probably not be independent. The technique is based on the concept of regionalized variables, i.e. variables which are associated in volume (grade) and position in space.



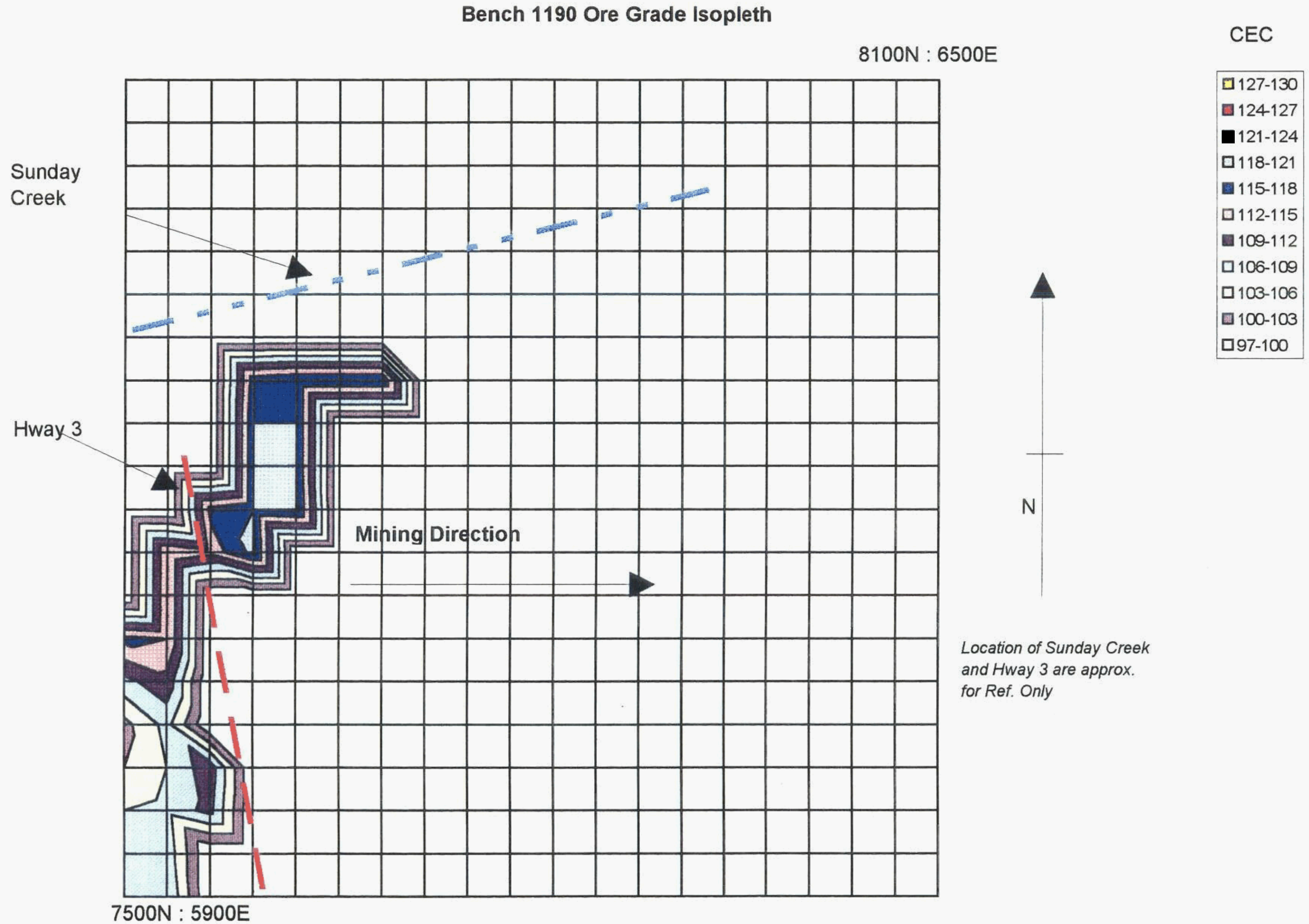
Canmark International Resources Inc.
Sunday Creek Group
Cross-Section & Model Limit Location Plan
Map Sheet NTS 92H-7 Hope Princeton Basin
Similkameen Mining District, B.C.
Coordinate System = Transverse Mercator

Figure 4

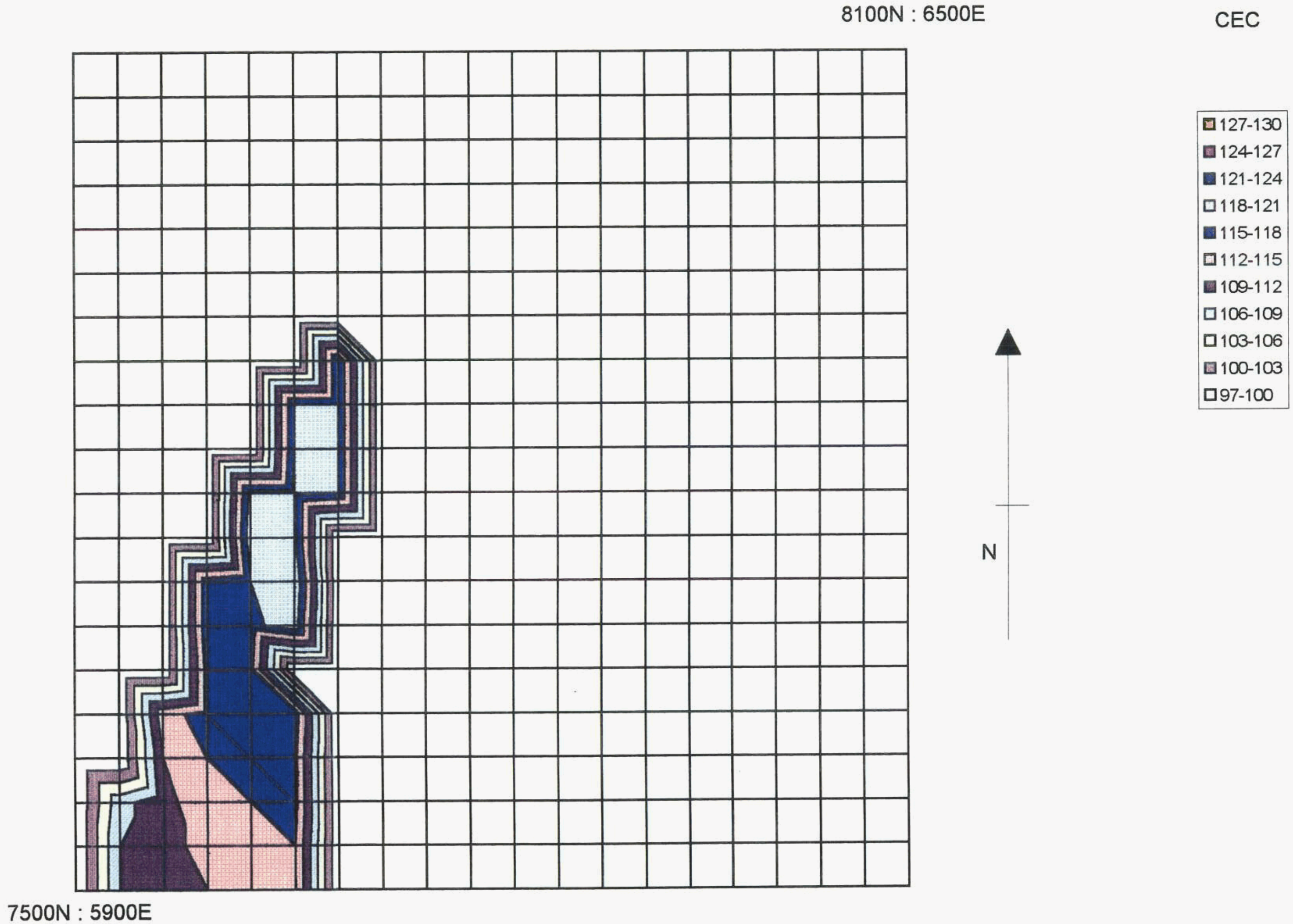
The construction of the ore bodies physical limits starts with modeling the upper and lower boundaries of the ore according to the assay results from the 1993 and 1994 drilling programme. A series of data points are generated which represent the deposit thickness, elevation and location, with respect to the UTM coordinate system. This information is input to the program to calculate trended bottom and top elevations of the deposit. The same process is repeated for the topographic surface whereby all elevation information developed by Phoenix during the physical survey of the area was incorporated into the model; this gave the uppermost limits of the deposit thereby providing a cut-off boundary for outwashed (eroded by stream flow) areas of the deposit. The resultant surfaces were used to define the ore grade block model. The modeling process of creating a mathematical array representation of an ore body involves three steps. Initially, known data points combined with interpretive geological input are utilized to build arrays for the geological structure. The arrays are then manipulated to create grids for ore grade associated with ore quality (CEC). The purpose of griding the ore grades is to identify the limits of the current ore body at variable cut-off grades.

Typical results of the analyses to date are shown in **Figures 5 to 14.** The model shown here was developed on the basis of a 30 by 30 by 10 metre mining block, and the values presented in the figures would be representative of a mining block of that size allowing for the dilution of ore grade by cross contamination of waste to ore.

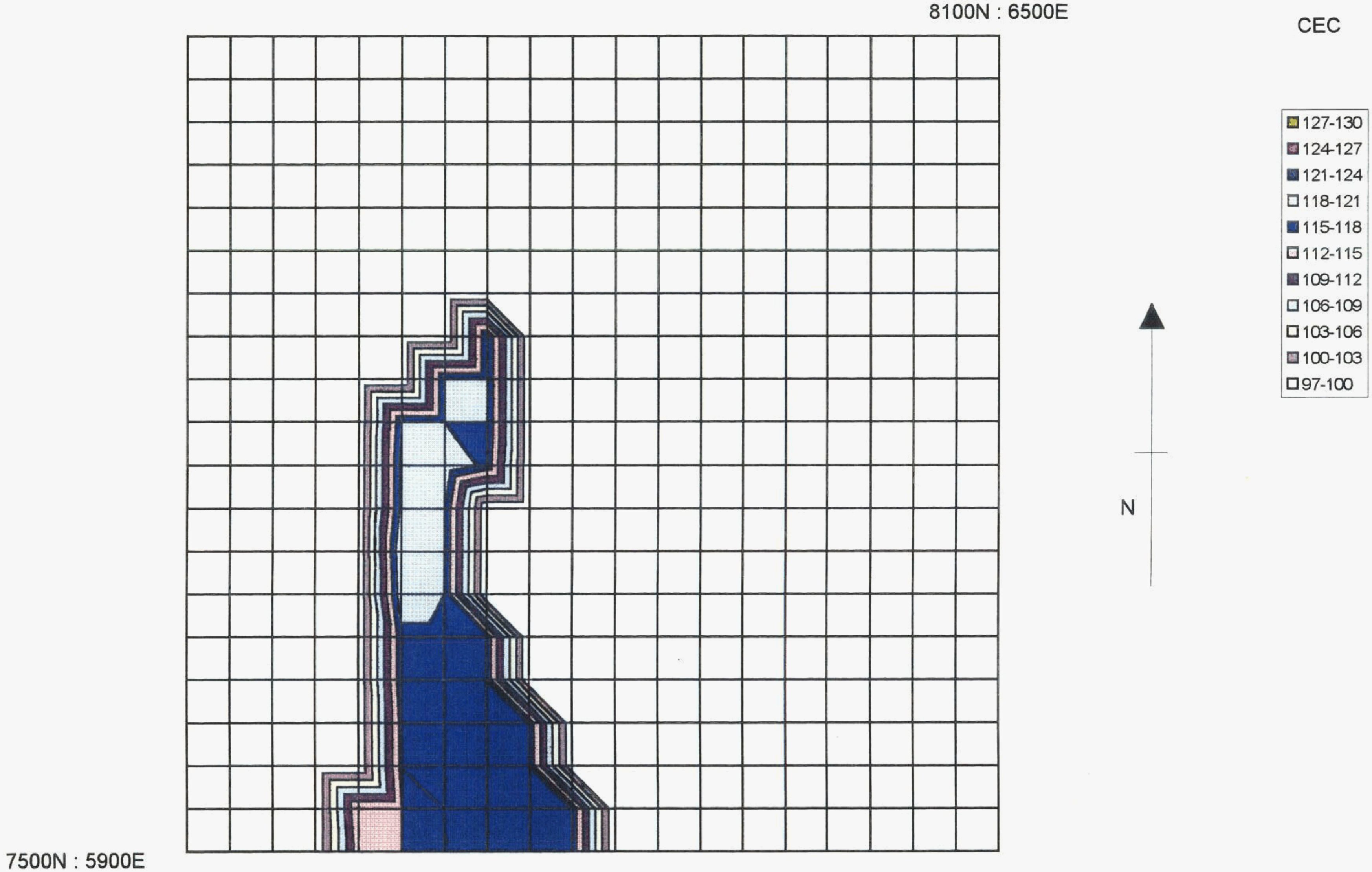
The computer process presented here allows monitoring of the model's ability to reflect the actual property, by plotting isopach data for topography, top and bottom of ore in cross-section as shown in **Figure 15** it permits checking the validity of the model against the root data (drill logs and survey). It should be noted that most of the drill holes shown are off section; for information of the location of drill holes with respect to the section please refer to **Figure 4** of this report.

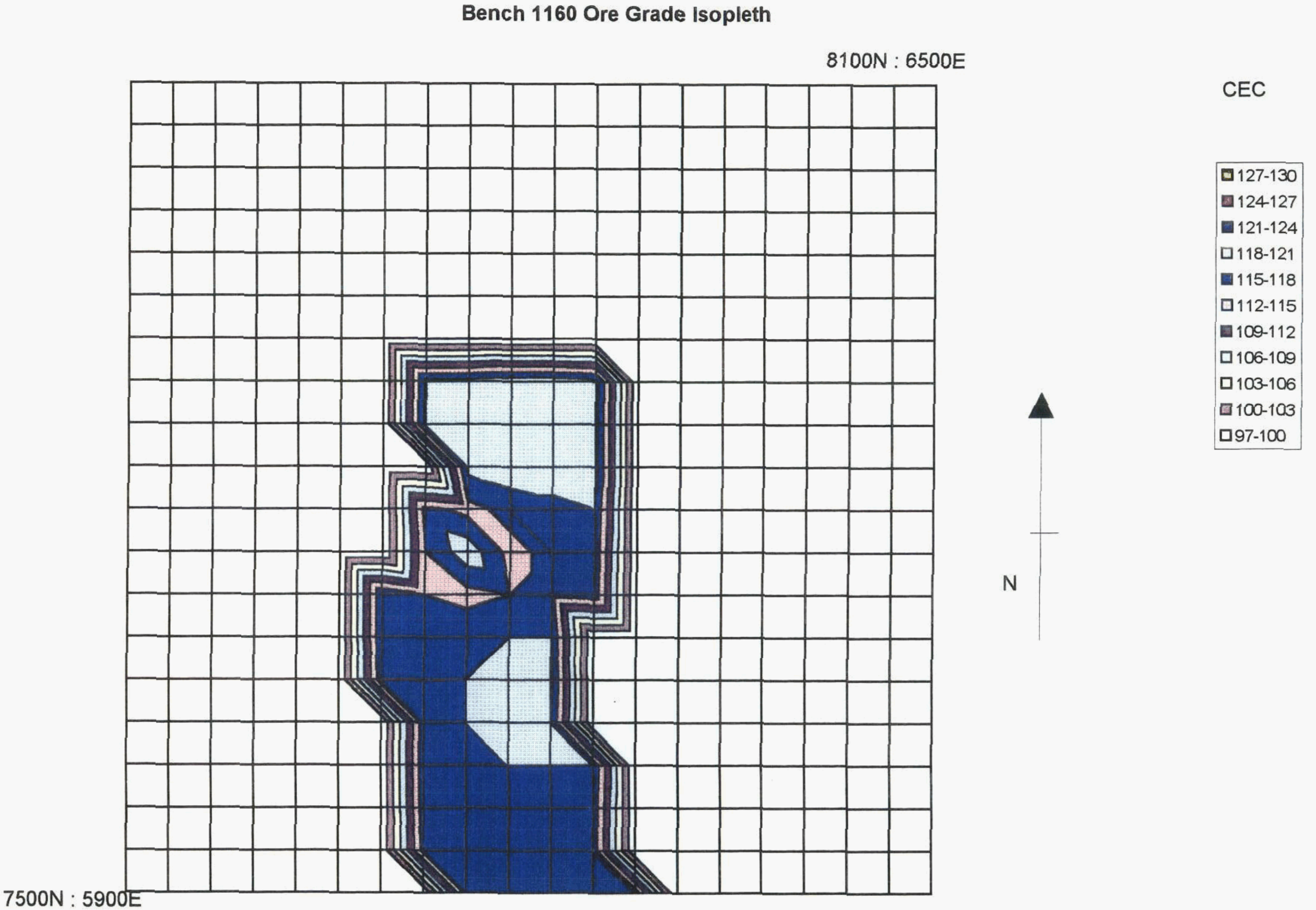

Bench 1190 Ore Grade Isopleth
8100N : 6500E
Sunday Creek
Hway 3
Mining Direction
N
7500N : 5900E
CEC
127-130
124-127
121-124
118-121
115-118
112-115
109-112
106-109
103-106
100-103
97-100
Location of Sunday Creek and Hway 3 are approx. for Ref. Only

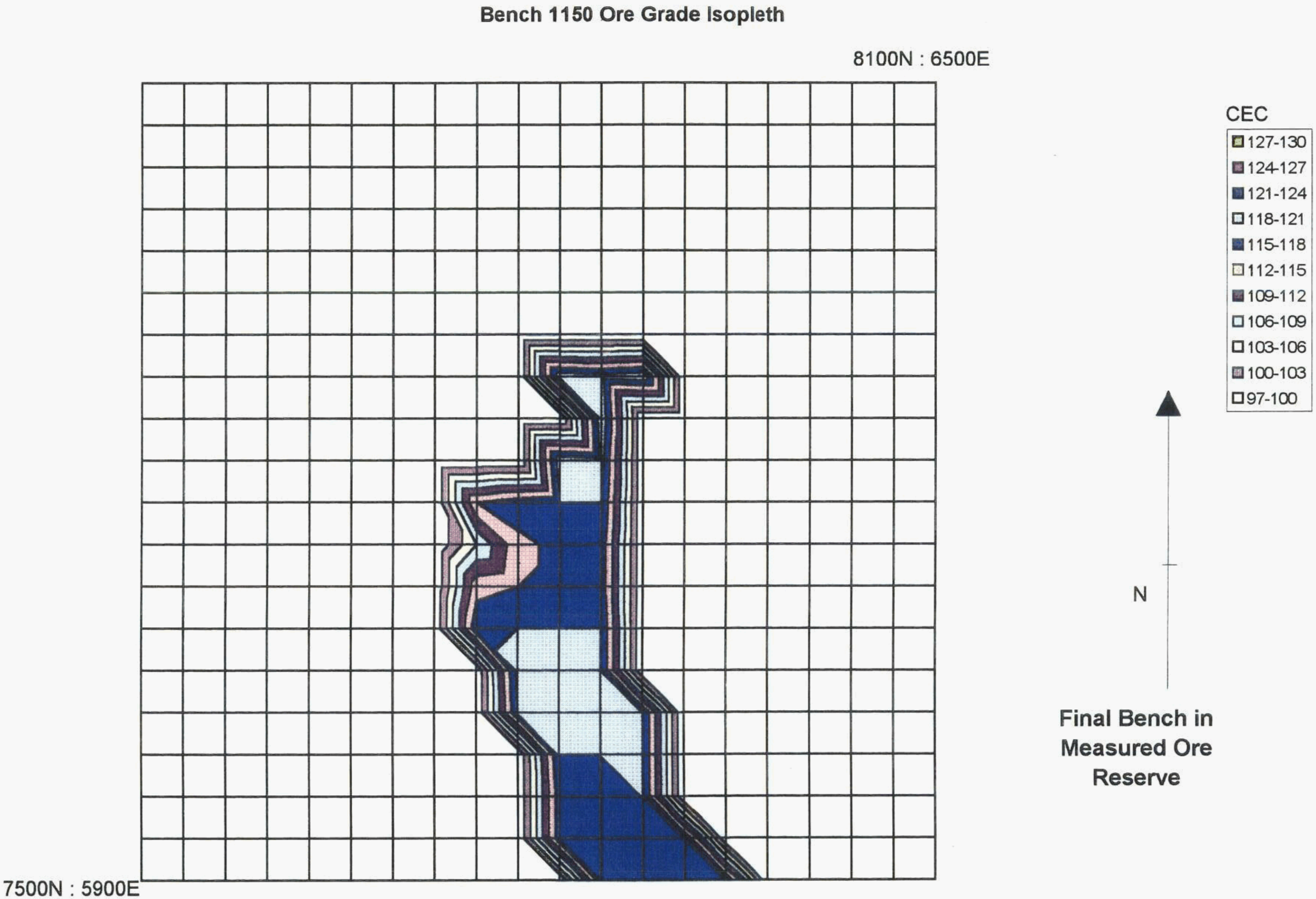
Bench 1180 Ore Grade Isopleth



Bench 1170 Ore Grade Isopleth

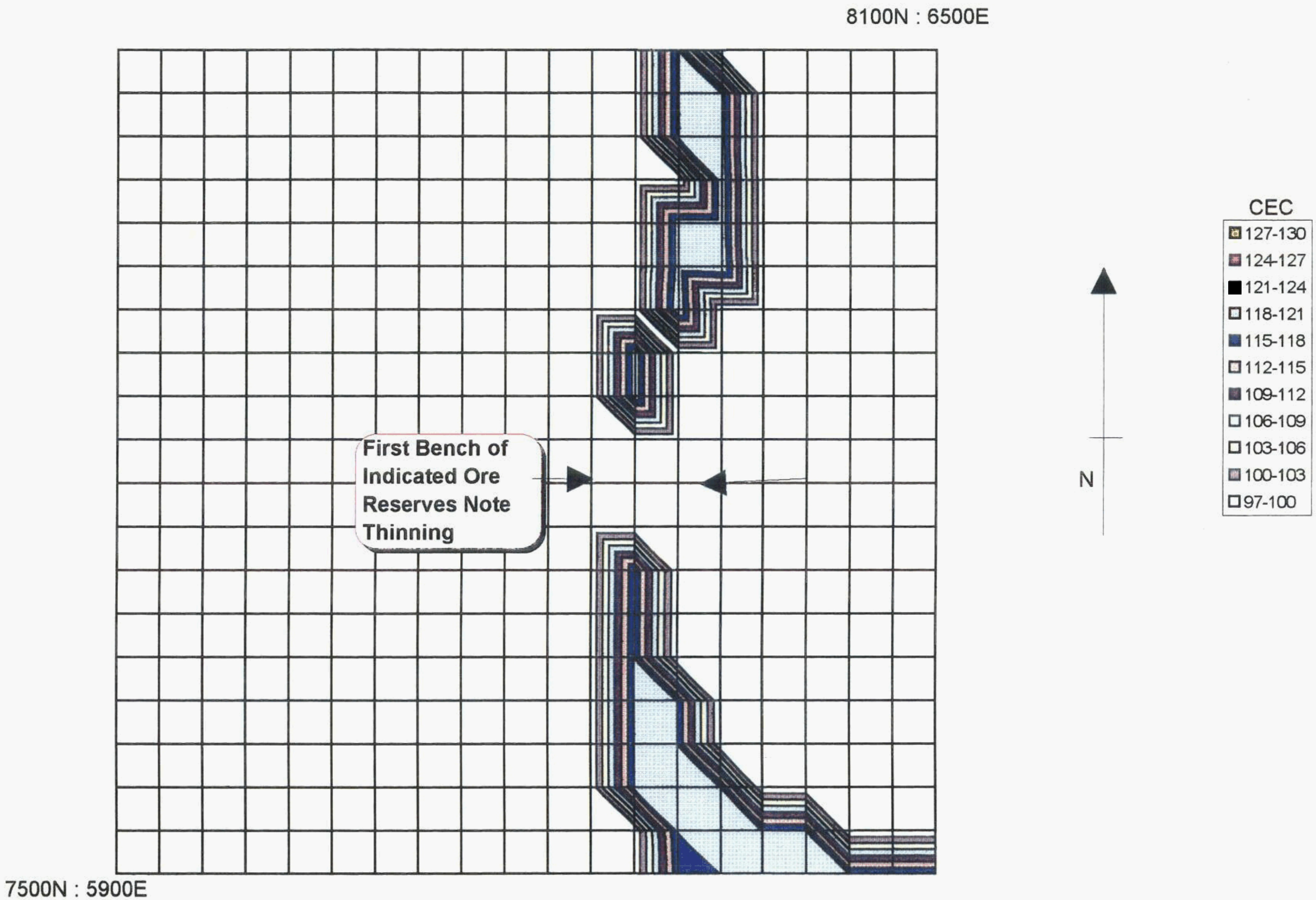



Bench 1160 Ore Grade Isopleth
8100N : 6500E
7500N : 5900E
CEC
127-130
124-127
121-124
118-121
115-118
112-115
109-112
106-109
103-106
100-103
97-100
N

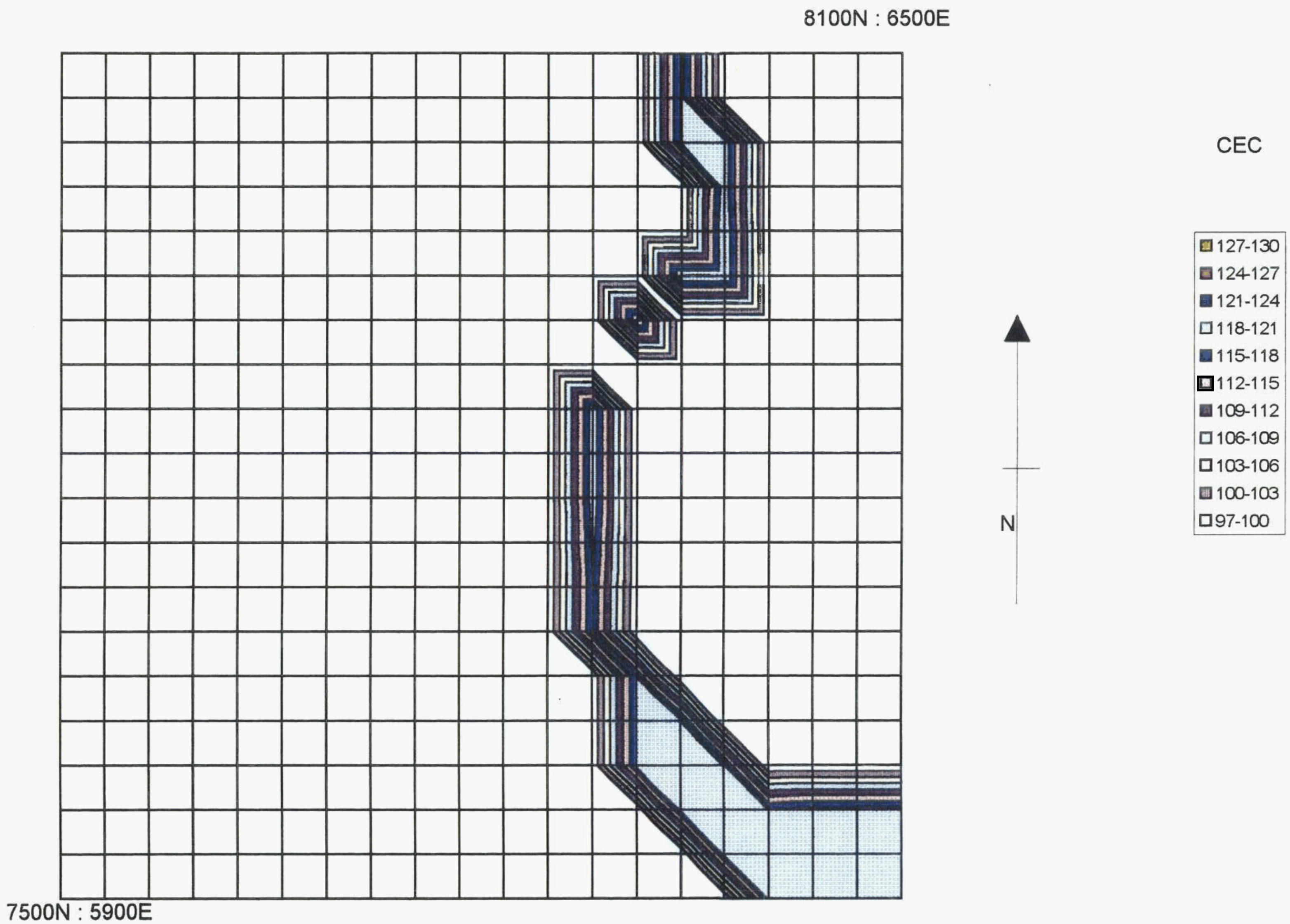


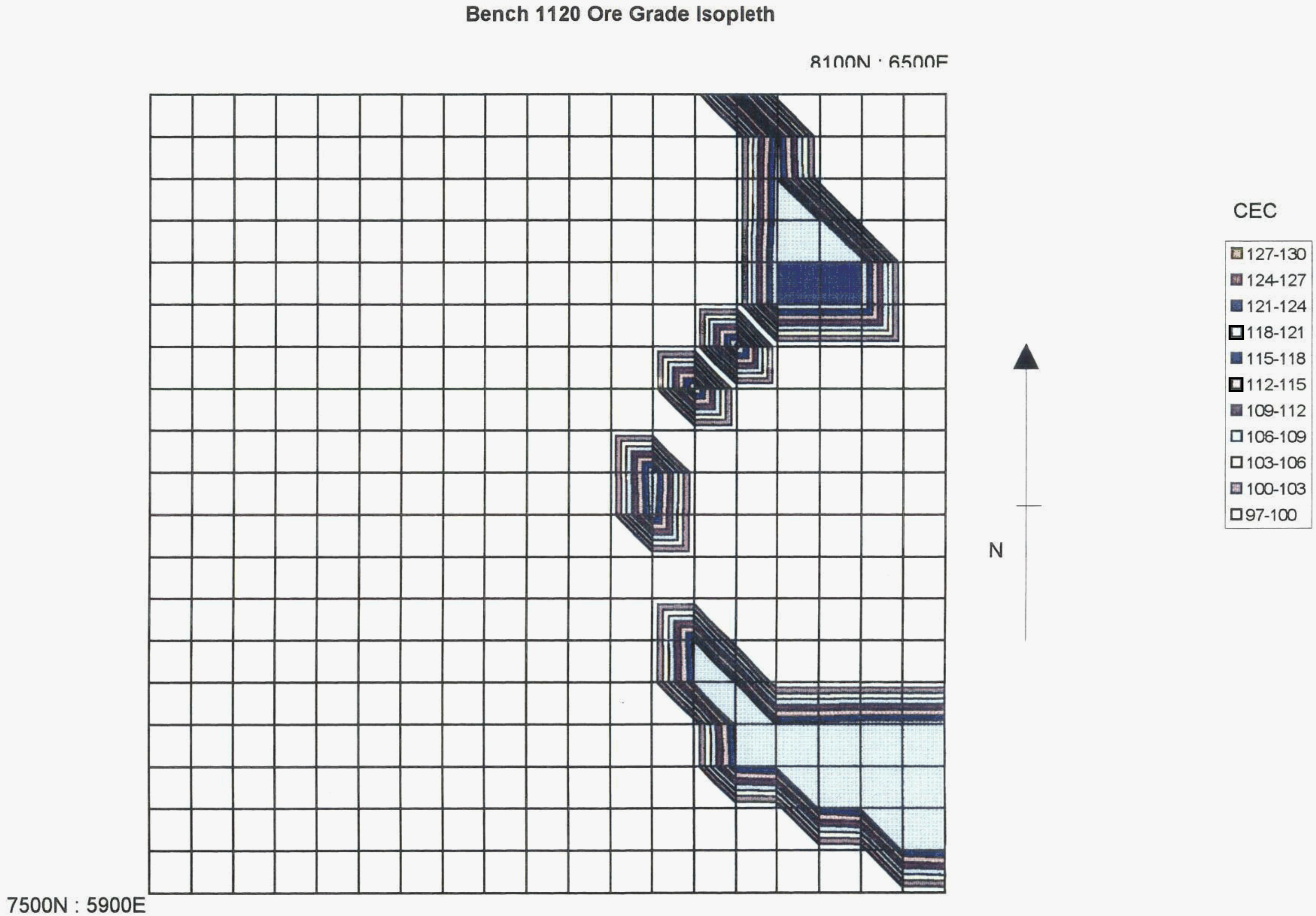
Final Bench in Measured Ore Reserve

Bench 1140 Ore Grade Isopleth

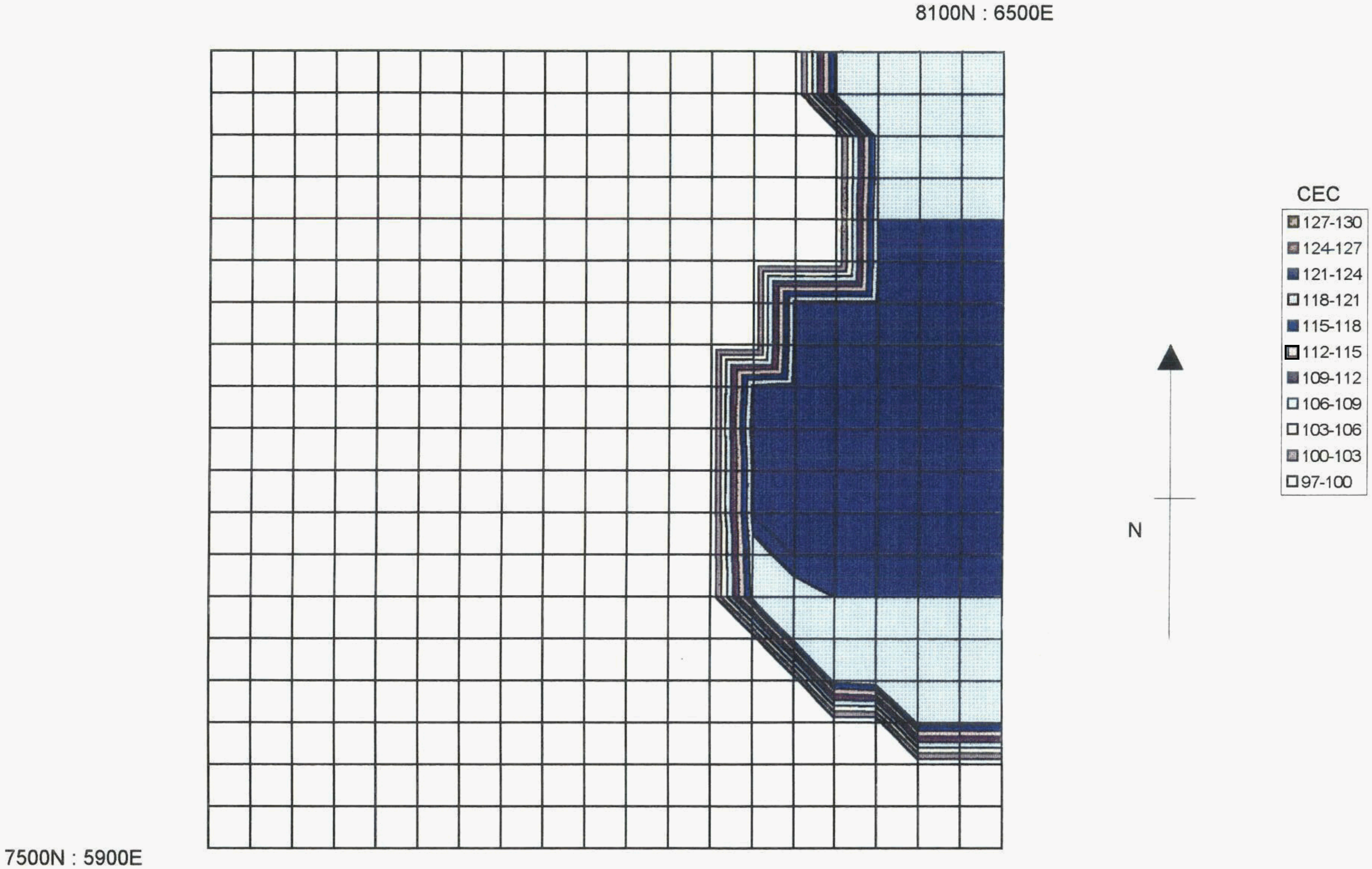


Bench 1130 Ore Grade Isopleth

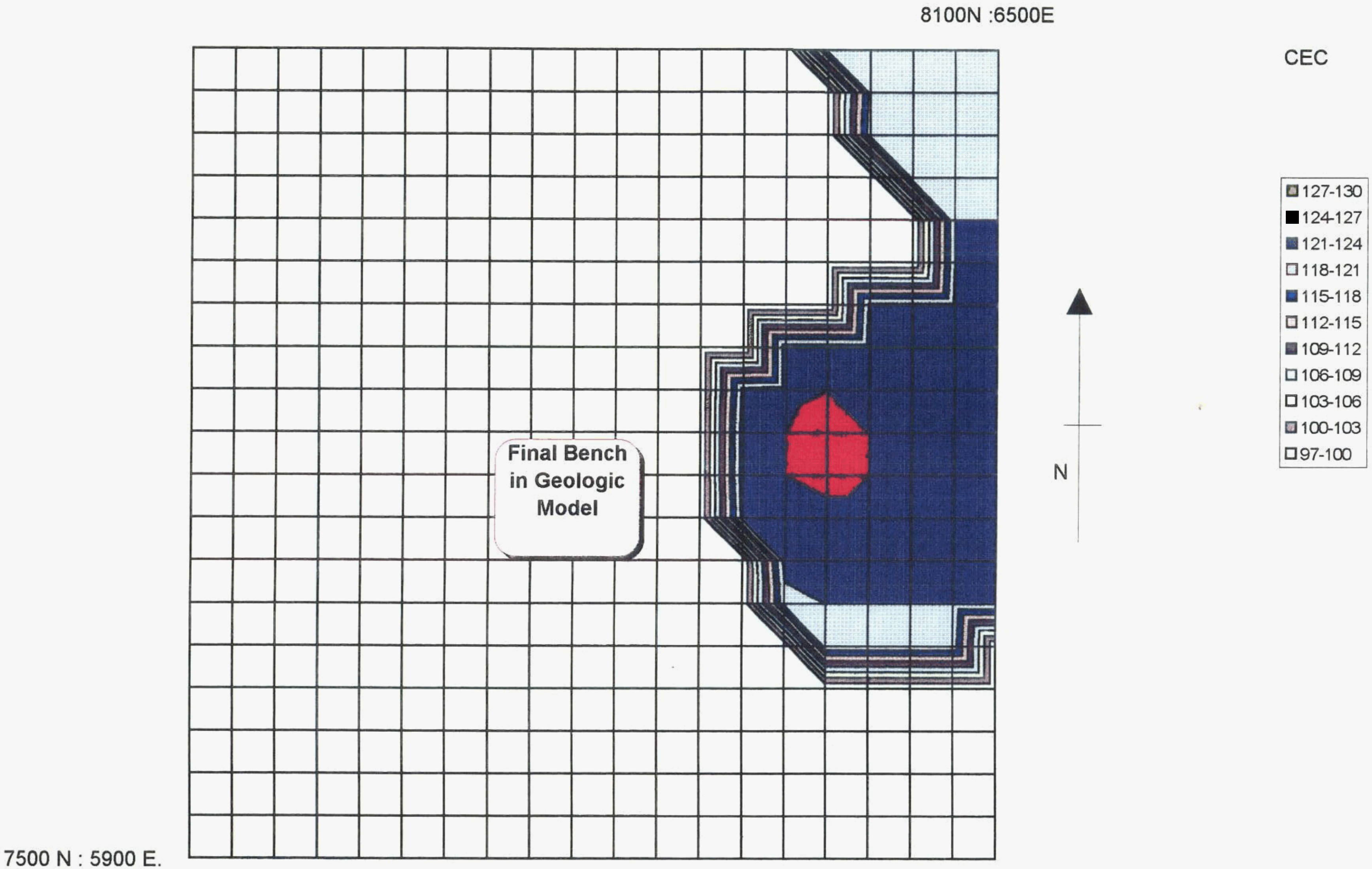



Bench 1120 Ore Grade Isopleth
8100N : 6500E
7500N : 5900E
N
CEC
127-130
124-127
121-124
118-121
115-118
112-115
109-112
106-109
103-106
100-103
97-100

Bench 1110 Ore Grade Isopleth



Bench 1100 Ore Grade Isopleth



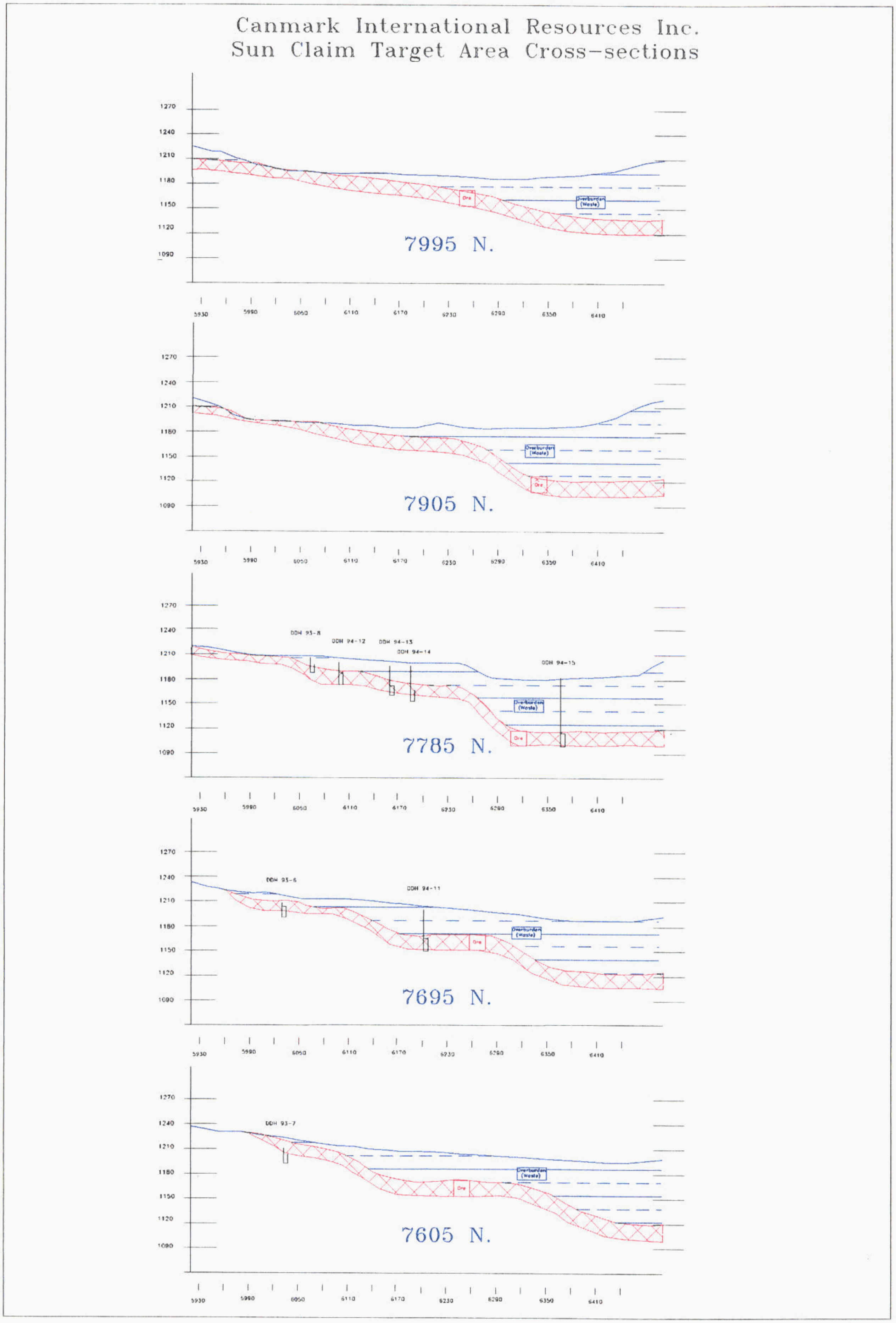

Canmark International Resources Inc.
Sun Claim Target Area Cross-sections
7995 N.
7905 N.
7785 N.
7695 N.
7605 N.
Ore
Overburden (Waste)
DDH 93-8
DDH 94-12
DDH 94-13
DDH 94-14
DDH 94-15
DDH 93-6
DDH 94-11
DDH 93-7

Figure 15

4.1 Measured Ore Reserves

Measured ore, is ore for which tonnage or volume has been computed from dimensions revealed in outcrops, trenches, workings, and drill holes, and for which the grade is known from results of detailed sampling. It is also necessary that the sites of ore sampling and physical measurement be closely spaced, and furthermore, the geologic character of the host rock must be well defined.

Measured ore reserve estimates were made for the Canmark property using a technique referred to as the *inverse distance squared modeling variogram,*[1] which was documented earlier. In this mathematical modeling technique it is necessary to select two parameters, vis-à-vis the *Cut-off grade*, and the *Geological Index*; both are a matter of judgment. Cut-off grade, is normally defined as the minimum grade that can be mined at a profit; however, from physical inspection of the recovered core and correlation with CEC analysis values, the appropriate Cut-off value between ore and waste is quite evident in this particular case. This is mainly because of the increase in the sodium exchangeable cation allowing the establishment of a minimum grade for modeling at 100 CEC. The Geological Index can vary between 1 and 3, and is a measure of the confidence one has in the available geological data. As a result of the field programme assay data demonstrating uniformity in ore grade between holes, an index value of 2 has been used for this evaluation resulting in an average model grade of 116 CEC. This is less than the arithmetic mean of all of the total ore grade samples analyzed, 119 CEC, which indicates the conservative nature of the assumption.

Measured Insitu Ore Reserve

Geological Factor	Average Grade	Tonnes Ore
1.00	116.78	3.5 million
2.00	116.60	3.5 million
3.00	116.33	3.5 million

4.2 Indicated Ore Reserves

Indicated ore, is ore for which tonnage and grade are computed partly from specific measurement, and partly from projection for a reasonable distance on the basis of geological evidence.

[1] *Mine Investment Analysis, Society of Mining Engineers, DW Gentry & TJ O'Neil*

The method of calculation used in determination of Indicated ore reserves for the Sun Claim was as follows:

After review of the cross-sections and bench plan ore grade isopleths developed from the geological model, evidence of seam thinning and thickening below elevation 1150 m.(Figures 13 and 14) was observed; this phenomenon is normally associated with the presence of a fault structure. This is the only indication of faulting in the area that Phoenix encountered via the drilling programme. The surface topography also provides some evidence of faulting by the presence of the deeply incised creek bed traversing the area south to north. As a result of insufficient evidence to confirm or disprove the presence of faulting of the formation, Phoenix has elected to take the conservative approach in defining the reserves within the modeling area below elevation 1150 m to that of indicated rather than measured.

Indicated Insitu Ore Reserve

Geological Factor	Average Grade	Tonnes Ore
1.00	118.07	4.4 million
2.00	119.46	4.4 million
3.00	120.50	4.4 million

4.3 Inferred Ore Reserves

Inferred ore, is ore for which qualitative estimates are based largely on a knowledge of the broad geologic character of the deposit and for which there are few, if any, samples or measurements.

Inferred reserves are based on the assumption of continuity for which there is geologic evidence. From recovered core, and from an understanding of the depositional environment of the area, it can be assumed that the ore body is a bedded formation and demonstrates uniformity with the exception of the areas that have been subjected to erosion by surface weathering and possible post-depositional faulting.

Estimates of Inferred ore reserves were made from information provided in Read's report where he outlined the assumed geological boundary for the Sunday Creek Tephra (refer to Phoenix report 1). The common ground within the geologic boundary and within the claim boundaries was measured by planimeter; the resulting area of 173.6 Ha. was multiplied by the model average seam thickness of 15 m., then the resulting volume was multiplied by the unit weight of 1.79, thus giving an Inferred reserve of 38.6 million tonnes.

4.4 Recoverable Reserves

Estimates of recoverable reserves at various bench levels shown in **Figure 16** are quantified on the basis of the deposits mineability either by surface or by underground mining methods. Of the insitu reserve mineable by surface means, it is estimated that a 10% mining loss will occur. This mining loss will be as a result of physical limiting factors such as environmental buffer zones for the protection of watercourses and the allowance for Highway 3 right-of-way, these considerations have been included in the current proforma mine plan.

The remaining indicated reserves are below normal surface mineable limits and require recovery by underground mining methods. The methods selected to facilitate estimates of recoverable ore was that by *room and pillar* with an estimated 30% ore loss allowance for roof control pillars resulting in the following overall recoverable measured and indicated tonnes ore as follows:

Recoverable Ore

Method of Mining	Insitu (Tonnes)	% Recovery	Recoverable (Tonnes)
Surface	3.5 million	90%	3.2 million
Underground	4.4 million	70%	3.1 million
Total	**7.9 million**	**79%**	**6.3 million**

Sun Claim Ore Reserves

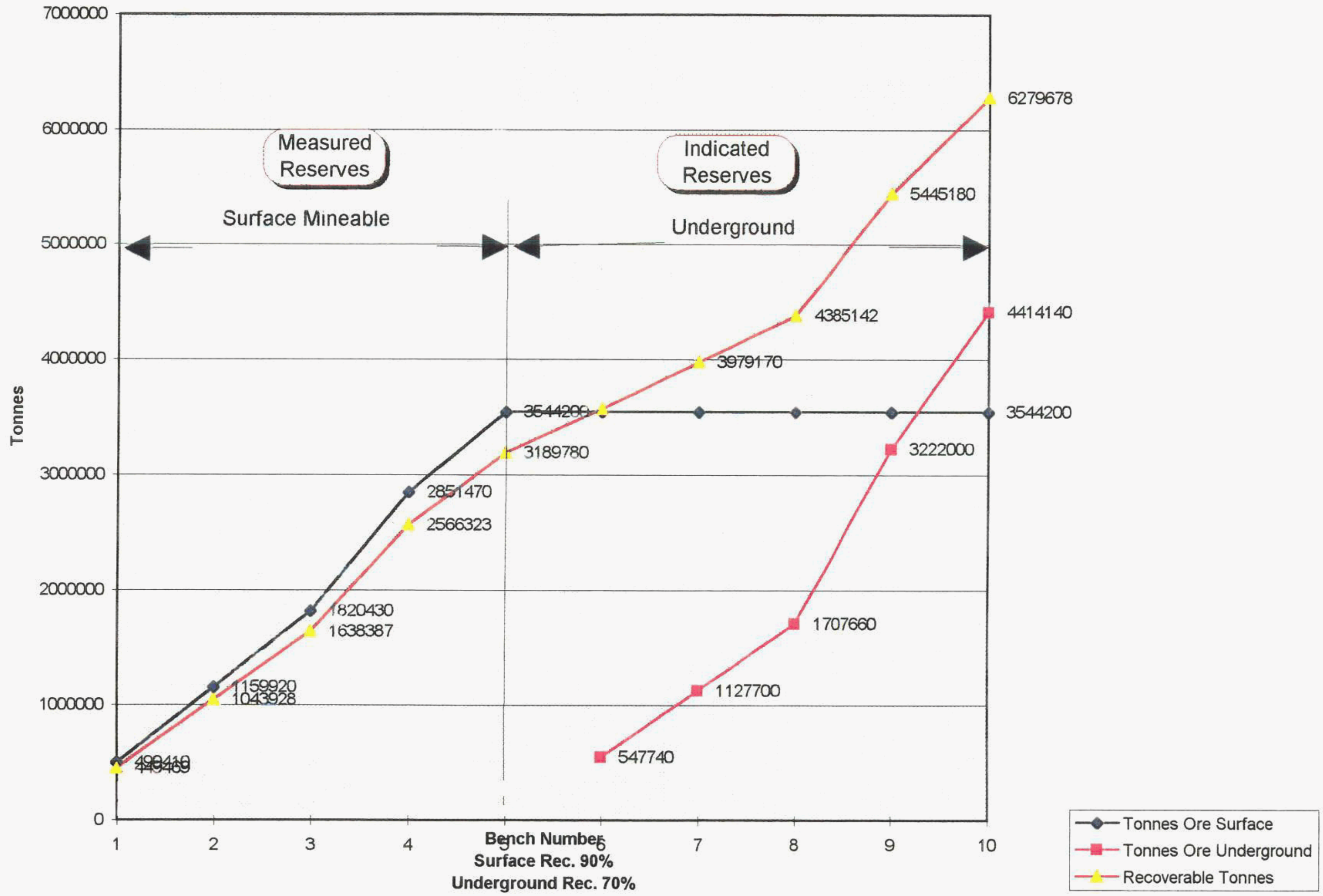


Figure 16

5 Clinoptilolite Recovery by Surface Mining

5.1 Methodology of Analysis

The decision to mine a mineral deposit by surface or underground means is primarily dependent on two major conditions. The first provision is that the ore body lies near the surface, and the geologic structure of the overburden is such that will permit extraction by surface means. The second major factor is economic considerations such as the cost of excavating, hauling and dumping rock which are evaluated before a property is considered for production. Since surface mining is usually of lower unit cost than underground, it is possible to surface mine lower grade ore. Production of surface mines, however, often involves the treatment of larger ore tonnage to permit the benefits which come from *economy of scale.*

When a surface mine is deepened to develop production faces, the volume of overburden (waste material) removed may become excessive relative to ore volume removed from the pit's production face. Surface mining ceases to be economic when the waste to ore ratios fall beyond the break-even value (operational economics). At this point, the mine is either closed, or production is switched to the more costly (on a unit of ore basis) underground mining, where the removal of only limited amounts of waste material can be tolerated in the recovery of ore.

5.2 Surface Mining Costs

Overview of Costs

Economic evaluation of various mining plans is necessary to compare alternative methods of mine development, and also to provide a comparison of competing alternative mineral deposits. The key to preliminary analysis is the *stripping ratio*, since for a given situation, it is this factor which usually dictates the initial decision to mine or not to mine by surface methods.

Capital cost considerations can hardly be over-emphasized when contemplating the development of a new mine. Such capital costs as equipment costs vary widely; they are a function of the amount of steel and the fabrication in the design and construction of the equipment.

Cost involved for other surface facilities (e.g. storage, office space, buildings, etc.) are also subject to great regional variances, for instance, site location. In this regard the Sun Claims location and accessibility have only positive effects on the projects economic viability, with its close proximity to Highway 3 and the community of Princeton.

Labour and material costs need to be estimated for: drilling, explosives, overburden removal, reclamation, pit cleaning, ore loading, haulage, road building, fuel, oil, grease, maintenance, supervision, depreciation, etc. In addition, costs must be considered for: transporting, erecting, dismantling, and moving the primary stripping and other equipment.

5.3 Probability of Success

The selling value of any resource is an uncertainty factor unless secured by long-term contracts. It is a complex function of the demand and the variability of other industry factors and their prices. The correlation between the selling price and the mining and preparation cost on one hand, and the attractiveness of the investment in stripping on the other, is strong. Evaluation of these factors require analysis of *stripping ratio* combined with the effects of economy of scale.

5.4 Cost Analysis of Stripping Ratio

The first step in the analysis is the calculation of a stripping ratio at which recovery by surface mining is cost equivalent to recovery by underground methods. Once a surface vs. underground ratio is established, the amount of surface mineable reserves can be established. Resources recovered at or below this stripping ratio are mined more economically by surface means rather than by an underground approach.

The stripping ratio is the proportion of overburden (waste material) to ore recovered. Though there are several ways in which this proportion can be defined, the most common in the industry is in terms of the tonnes of overburden removed per tonne of ore.

This ratio can also relate the revenue base with the costs of mining the ore and stripping the waste. In technical literature, the calculations are sometimes based on average overburden depths, though in reality, the break-even stripping ratio is a point value beyond which the ore body cannot be economically mined. As the overburden depth increases, progressively more money is spent in exposing the ore body until a limit is reached when the value of the recovered material (ore) equals the cost involved to mine, to prepare, and to sell the material.

The removal of overburden, or waste, is generally regarded as the most significant component of surface mining costs, as far as overburden handling is concerned. Variations in stripping ratio affect the scale of the equipment and the efficiency of its operation, thus resulting in a variable cost. On the other hand, the procedures for handling, preparing and marketing ore, and costs associated with these three steps are, in comparison, fixed.

Distinction is often made between several different ratio calculations, such as actual or overall stripping ratio, and the stripping ratio developed on the basis of underground mining costs vs. surface mining costs, excluding stripping costs. The considerations of various ratios also depend on the scale of the operation, the capabilities of equipment, and the general economic structure of the company.

5.5 Mine Design

Surface or Underground

The underground vs. surface-stripping ratio (RSu) for the Sun Claim Reserves has been calculated as follows:

$$RSu = \frac{\text{Underground mining cost - Surface mining and reclamation cost per tonne ore}}{\text{Surface stripping cost per tonne overburden}}$$

$$RSu = \frac{\$10.65 - ((\$5.41) + (\$0.09)}{\$2.88} = 1.79:1$$

Clinoptilolite should therefore only be mined by surface means in that portion of the deposit where the ratio does not exceed 1.79:1 overburden per equivalent unit of ore. In the current Canmark deposit the average ore zone thickness is in the order of 15 m. This method of determination indicates that the deposit could be exploited by surface mining providing the overburden cover was less than 27 m.

Total design of the mine requires that an ultimate break-even stripping ratio be calculated. This ratio is that which establishes the ultimate limits of mining, and should not be confused with the overall stripping ratio.

The break-even ratio is the ratio at which the total cost of marketing one tonne of ore is equal to the value of that tonne of ore; the overall ratio must be less than the break-even ratio or no profit would be realized.

The break-even ratio (RBE) is calculated as:

$$RBE = \frac{\text{Recoverable value per unit of ore} - \text{Production cost per unit of ore}}{\text{Stripping cost per unit waste}}$$

Working in common units of tonnes of ore and tonnes of waste, the family of analyses curves for three economies of scale, 250, 500, 1000 tonnes ore per day have been calculated and the results are shown in **Figures 17, 18 and 19** respectively. These are based on various costs and revenue values which has been derived by incorporating data from the estimates for capital and operating cost, as outlined in **Tables 1-1, 1-2 and 1-3.**

In reality, RBE (or any stripping ratio) is most commonly a linear polynomial function in several variables; the variables depend on location, method of mining, risk and desired rate of return.

Economic Ratio
1000 tonne/day Operation

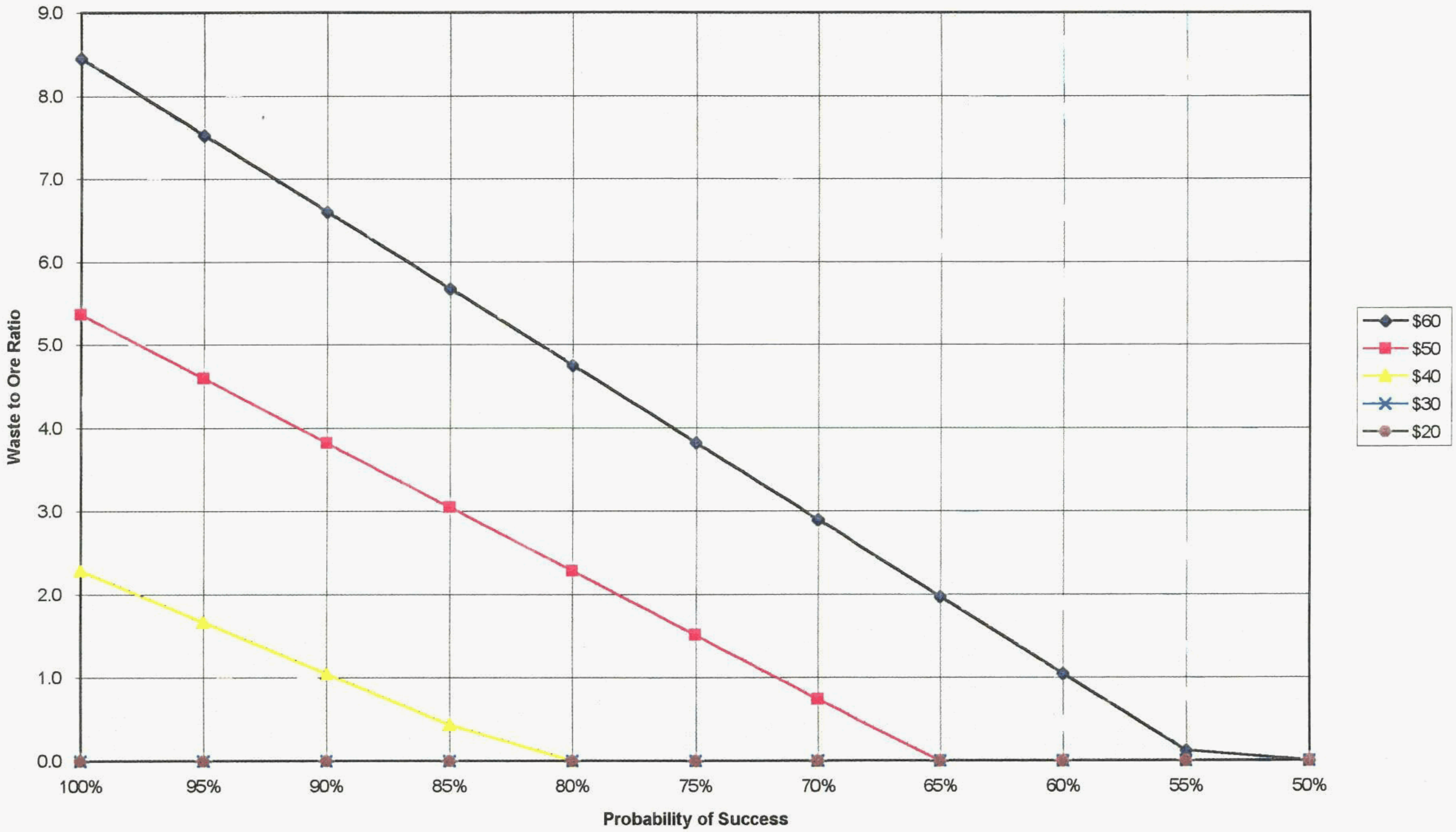


Figure 18

Economic Ratio
500 tonne/day Operation

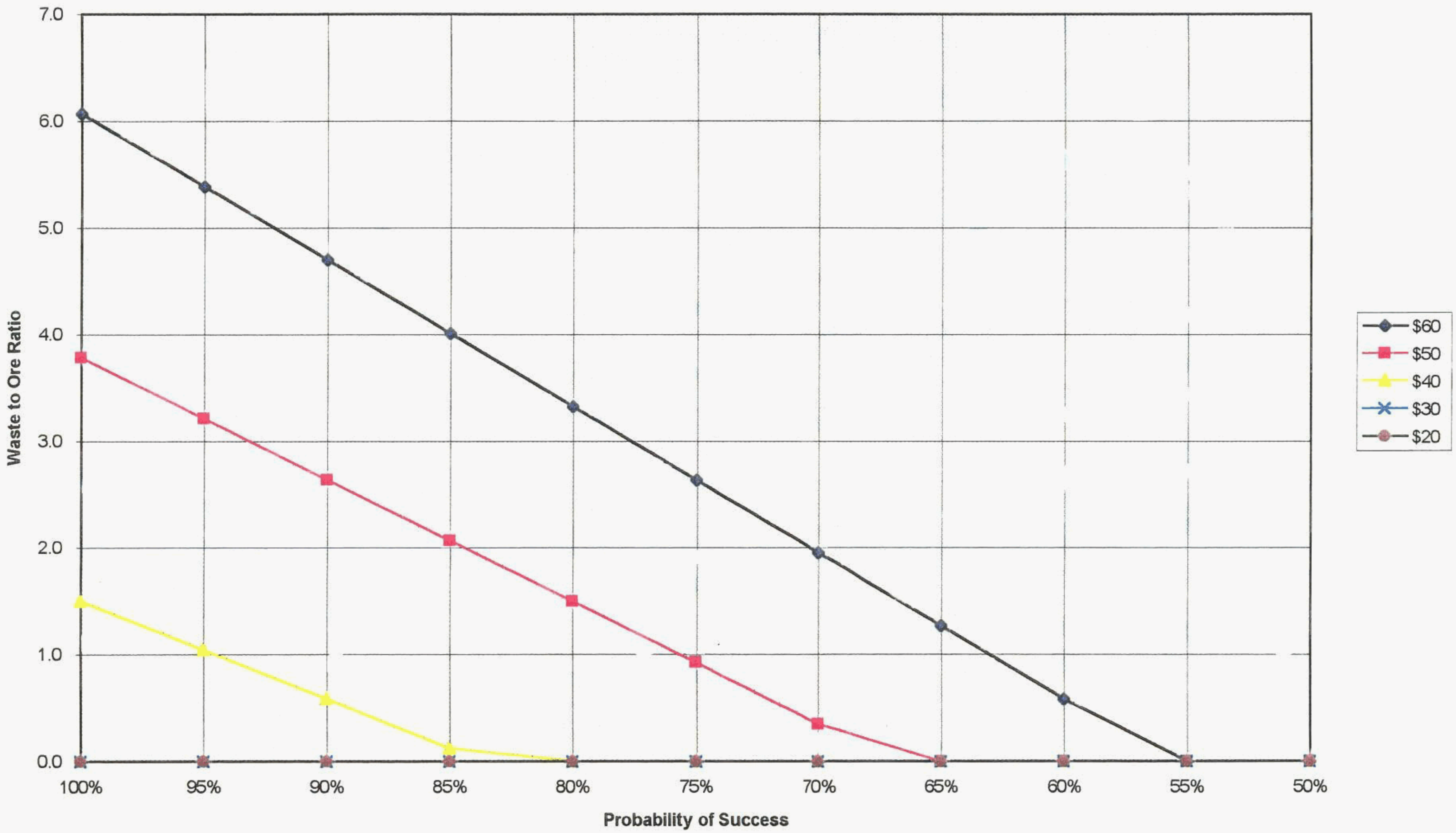


Figure 19

250 tonnes per Day

Risk Factor	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
OPERATING EXPENSE											
Probability of Success	100%	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%

FIXED PRODUCTION COSTS		
Ore Mining/Transport	22.99	/tonne
Process	1.96	
Administration	3.77	
Depreciation	5.84	
Reclamation	0.02	
TOTAL	34.58	
WASTE STRIPPING COSTS		
Overburden Stripping	2.18	
Waste Haul	1.07	
TOTAL	3.25	

STRIPPING RATIO FOR VALUE OF TONNE ORE

Value/Tonne Ore	60.0											
Value	60.0	57.0	54.0	51.0	48.0	45.0	42.0	39.0	36.0	33.0	30.0	Value
Net	25.4	22.4	19.4	16.4	13.4	10.4	7.4	4.4	1.4	-1.6	-4.6	Net
	7.8	6.9	6.0	5.1	4.1	3.2	2.3	1.4	0.4	0.0	0.0	Ratio
Value/Tonne Ore	50.0											
Value	50.0	47.5	45.0	42.5	40.0	37.5	35.0	32.5	30.0	27.5	25.0	Value
Net	15.4	12.9	10.4	7.9	5.4	2.9	0.4	-2.1	-4.6	-7.1	-9.6	Net
	4.7	4.0	3.2	2.4	1.7	0.9	0.1	0.0	0.0	0.0	0.0	Ratio
Value/Tonne Ore	40.0											
Value	40.0	38.0	36.0	34.0	32.0	30.0	28.0	26.0	24.0	22.0	20.0	Value
Net	5.4	3.4	1.4	-0.6	-2.6	-4.6	-6.6	-8.6	-10.6	-12.6	-14.6	Net
	1.7	1.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ratio
Value/Tonne Ore	30.0											
Value	30.0	28.5	27.0	25.5	24.0	22.5	21.0	19.5	18.0	16.5	15.0	Value
Net	-4.6	-6.1	-7.6	-9.1	-10.6	-12.1	-13.6	-15.1	-16.6	-18.1	-19.6	Net
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ratio
Value/Tonne Ore	20.0											
Value	20.0	19.0	18.0	17.0	16.0	15.0	14.0	13.0	12.0	11.0	10.0	Value
Net	-14.6	-15.6	-16.6	-17.6	-18.6	-19.6	-20.6	-21.6	-22.6	-23.6	-24.6	Net
$20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ratio

500 Tonnes Per Day

Risk Factor	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
OPERATING EXPENSE											
Probability of Success	100%	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%

FIXED PRODUCTION COSTS		
Ore Mining/Transport	22.99	/tonne
Process	1.96	
Administration	3.20	
Depreciation	3.87	
Reclamation	0.02	
TOTAL	32.04	
WASTE STRIPPING COSTS		
Overburden Stripping	2.18	
Waste Haul	0.80	
TOTAL	2.98	

STRIPPING RATIO FOR VALUE OF TONNE ORE

Value/Tonne Ore	60.0											
Value	60.0	57.0	54.0	51.0	48.0	45.0	42.0	39.0	36.0	33.0	30.0	Value
Net	28.0	25.0	22.0	19.0	16.0	13.0	10.0	7.0	4.0	1.0	-2.0	Net
	9.4	8.4	7.4	6.4	5.4	4.3	3.3	2.3	1.3	0.3	0.0	Ratio
Value/Tonne Ore	50.0											
Value	50.0	47.5	45.0	42.5	40.0	37.5	35.0	32.5	30.0	27.5	25.0	Value
Net	18.0	15.5	13.0	10.5	8.0	5.5	3.0	0.5	-2.0	-4.5	-7.0	Net
	6.0	5.2	4.3	3.5	2.7	1.8	1.0	0.2	0.0	0.0	0.0	Ratio
Value/Tonne Ore	40.0											
Value	40.0	38.0	36.0	34.0	32.0	30.0	28.0	26.0	24.0	22.0	20.0	Value
Net	8.0	6.0	4.0	2.0	0.0	-2.0	-4.0	-6.0	-8.0	-10.0	-12.0	Net
	2.7	2.0	1.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ratio
Value/Tonne Ore	30.0											
Value	30.0	28.5	27.0	25.5	24.0	22.5	21.0	19.5	18.0	16.5	15.0	Value
Net	-2.0	-3.5	-5.0	-6.5	-8.0	-9.5	-11.0	-12.5	-14.0	-15.5	-17.0	Net
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ratio
Value/Tonne Ore	20.0											
Value	20.0	19.0	18.0	17.0	16.0	15.0	14.0	13.0	12.0	11.0	10.0	Value
Net	-12.0	-13.0	-14.0	-15.0	-16.0	-17.0	-18.0	-19.0	-20.0	-21.0	-22.0	Net
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ratio

1000 Tonnes Per Day

Risk Factor	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
OPERATING EXPENSE											
Probability of Success	100%	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%

FIXED PRODUCTION COSTS		
Ore Mining/Transport	22.56	/tonne
Process	1.96	
Administration	2.85	
Depreciation	3.32	
Reclamation	0.02	
TOTAL	30.71	
WASTE STRIPPING COSTS		
Overburden Stripping	2.18	
	0.70	
TOTAL	2.88	

STRIPPING RATIO FOR VALUE OF TONNE ORE

Value/Tonne Ore	60.0											
Value	60.0	57.0	54.0	51.0	48.0	45.0	42.0	39.0	36.0	33.0	30.0	Value
Net	29.3	26.3	23.3	20.3	17.3	14.3	11.3	8.3	5.3	2.3	-0.7	Net
	10.2	9.1	8.1	7.0	6.0	5.0	3.9	2.9	1.8	0.8	0.0	Ratio
Value/Tonne Ore	50.0											
Value	50.0	47.5	45.0	42.5	40.0	37.5	35.0	32.5	30.0	27.5	25.0	Value
Net	19.3	16.8	14.3	11.8	9.3	6.8	4.3	1.8	-0.7	-3.2	-5.7	Net
	6.7	5.8	5.0	4.1	3.2	2.4	1.5	0.6	0.0	0.0	0.0	Ratio
Value/Tonne Ore	40.0											
Value	40.0	38.0	36.0	34.0	32.0	30.0	28.0	26.0	24.0	22.0	20.0	Value
Net	9.3	7.3	5.3	3.3	1.3	-0.7	-2.7	-4.7	-6.7	-8.7	-10.7	Net
	3.2	2.5	1.8	1.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	Ratio
Value/Tonne Ore	30.0											
Value	30.0	28.5	27.0	25.5	24.0	22.5	21.0	19.5	18.0	16.5	15.0	Value
Net	-0.7	-2.2	-3.7	-5.2	-6.7	-8.2	-9.7	-11.2	-12.7	-14.2	-15.7	Net
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ratio
Value/Tonne Ore	20.0											
Value	20.0	19.0	18.0	17.0	16.0	15.0	14.0	13.0	12.0	11.0	10.0	Value
Net	-10.7	-11.7	-12.7	-13.7	-14.7	-15.7	-16.7	-17.7	-18.7	-19.7	-20.7	Net
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	Ratio

6 Cost Estimates

6.1 Operating Costs

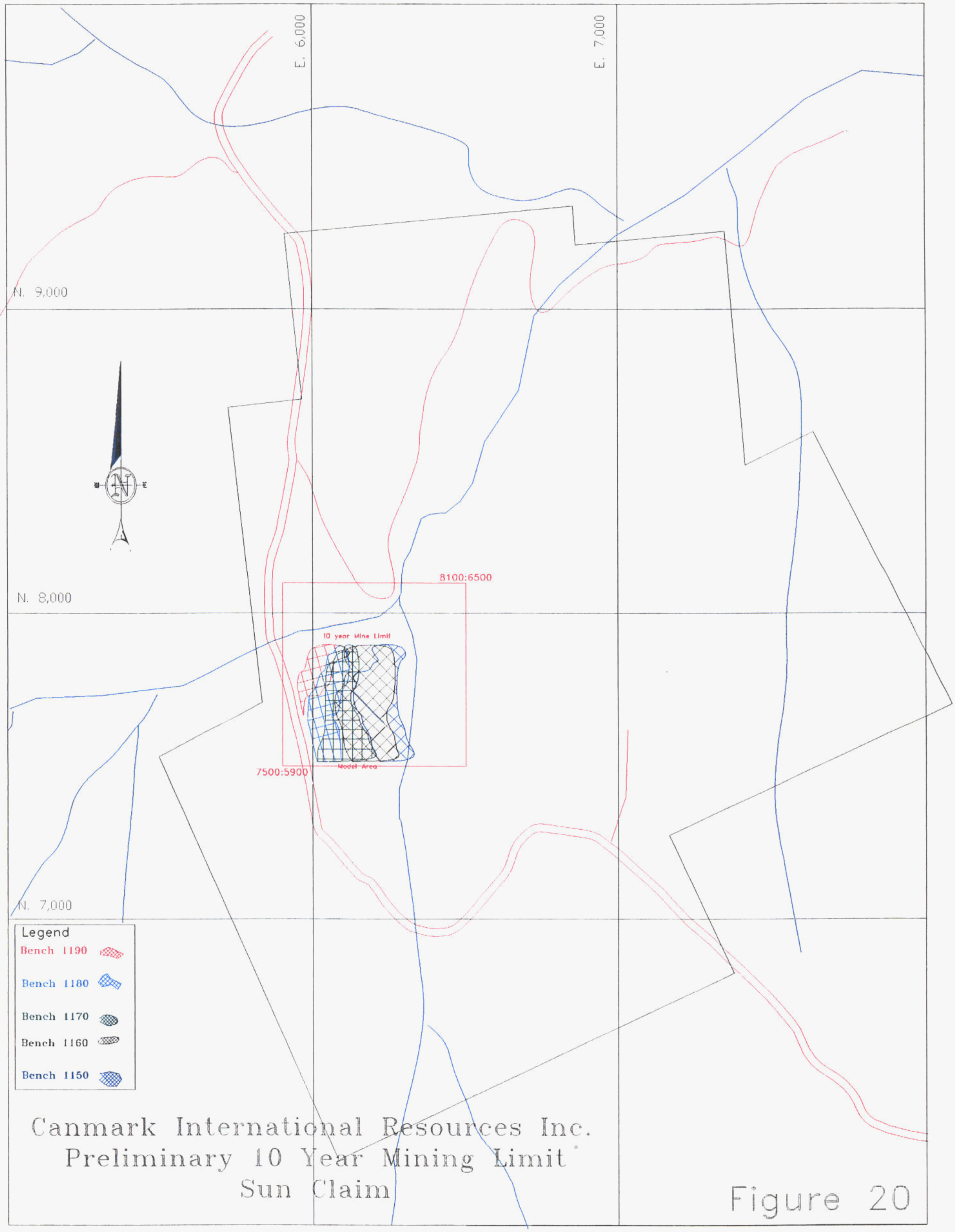
Operating costs detailed in **Table 2** show operating cost for loading and hauling, drilling and blasting, dozer costs and miscellaneous cost (admin. and engineering). The model considers the effects of available hours, utilization and job efficiency for all of the major functions of mining operations; these values are based on experience gained from similar operations in Canada and the United States.

The number of required equipment units was estimated for a given production volume as shown in **Table 2.** Production volumes were derived from the development of a preliminary mine plan, mining in a *panel least cost sequence.* The mine plan allows the development of production values in the form of tonnes waste and ore.

Production estimates (Appendix B) are summarized in **Tables 2** in the form of tonnes ore and waste per period. The proforma mine plan was made on the basis of a ten year mine life mining within the boundaries as shown in **Figure 20.** with mine development starting on bench 1190 and terminating in year ten on bench 1150. Production rates are modified on the basis of available shifts starting with one shift 5 days per week operating 150 days in the first year building up to three shifts, 5 days per week, 300 days per year operation by the third year of operation.
The operating cost model was also used to develop proforma costs for waste to ore ratio estimates for production rates of 250, 500 and 1,000 tonnes ore per year.

6.2 Equipment Procurement Schedule

Equipment and manpower requirements shown in **Table 2** were developed in conjunction with the mine plan production schedule (Appendix B). Allowance for a one time capital equipment acquisition at time zero. Infrastructure requirements were estimated by approximation from drawing off-takes for power line, road construction, site preparation and portable mine dry facilities; this data has been incorporated into the cash flow schedule as an Annual Worth Value based on a 10 year economic life and 10% cost of capital shown in **Table 2.**


E. 6,000
E. 7,000
N. 9,000
N. 8,000
N. 7,000
8100:6500
10 year Mine Limit
Model Area
7500:5900
Legend
Bench 1190
Bench 1180
Bench 1170
Bench 1160
Bench 1150
Canmark International Resources Inc.
Preliminary 10 Year Mining Limit
Sun Claim
Figure 20

6.3 Break-Even Ratio Estimate

The break-even estimate as detailed in **Tables 1-1, 1-2 and 1-3** incorporate all of the data developed in the cost estimating models previously discussed, with the exception of the categories of Probability of Success and Value per Tonne Ore.

The probability of success factor is used in the form of a revenue discount. A low probability of success factor would be used if a mine were to be located in a country which is politically unstable, or the company has limited access to funds, or the mine is remote from markets. Risk is also associated with the magnitude of the project. This would be based on the planned production rate and projected capital requirements; the lower the planned production rate the lower the associated risk.

The value per tonne ore normally would be the result of a market survey, or derived from an existing contract for the delivery of ore over the life of mine, however, data of this nature is not available at this time and a suite of values have been used ranging from $20 to $60, in ten dollar increments.

Economies of scale are an important consideration when excavating material. Phoenix is currently considering a maximum production rate of 1,000 tonnes of Clinoptilolite ore per day; the break-even ratios have also been calculated for lower production rates of 500 and 250 tonnes per day. The comparison of economies of scale for a revenue value of 50 dollars per tonne, is as follows:

Revenue value 50 dollars per tonne

Production Rate	Probability of Success	Break-Even Ratio	Life of Mine
1,000 Tonnes / day	75%	2.4	10 years
500 Tonnes / day	80%	2.7	20 years
250 Tonnes / day	85%	2.4	40 years

The preceding sensitivity analysis suggests the benefits of a phased development for the mine production, where mining can be commenced in areas of least cost, thus minimizing expenditures with no loss of revenue, and later as markets develop, adding additional equipment to meet the opportunities of an improving market.

Net cash flow estimates for market values of $40, $60 and $100 per tonne of ore as shown in Table 2 were calculated for the ten year surface mine production, resulting in before tax and depletion allowance, return on investment (IRR) of 18, 71 and 140 percent respectively.

Budget										
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Production Estimate Summary										
Tonnes Waste	20,205	40,409	124,586	212,718	266,805	299,955	329,110	333,611	336,162	332,168
Tonnes Ore	71,985	143,970	244,172	340,419	286,331	253,182	224,027	219,525	216,975	220,969
Total Tonnes	92,189	184,379	368,758	553,137	553,137	553,137	553,137	553,137	553,137	553,137
Average Tonnes. Ore/Cal.d	197	394	669	933	784	694	614	601	594	605
Waste to Ore Ratio	0.28	0.28	0.51	0.62	0.93	1.18	1.47	1.52	1.55	1.50
Operating Costs										
Loading										
Production Rate	109	109	109	109	109	109	109	109	109	109
Hours	1092	2184	4368	6552	6552	6552	6552	6552	6552	6552
Hourly Cost	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00	$75.00
Cost	**$81,900**	**$163,800**	**$327,600**	**$491,400**	**$491,400**	**$491,400**	**$491,400**	**$491,400**	**$491,400**	**$491,400**
Cost/tonne Ore	$1.14	$1.14	$1.34	$1.44	$1.72	$1.94	$2.19	$2.24	$2.26	$2.22
Drilling & Blasting										
Unit Cost	$1.45	$1.45	$1.45	$1.45	$1.45	$1.45	$1.45	$1.45	$1.45	$1.45
Cost	**$74,679**	**$149,357**	**$298,715**	**$448,072**	**$448,072**	**$448,072**	**$448,072**	**$448,072**	**$448,072**	**$448,072**
Cost/tonne Ore	$1.04	$1.04	$1.22	$1.32	$1.56	$1.77	$2.00	$2.04	$2.07	$2.03
Dozer										
Percent Rehandle	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Cost/BCM	$1.15	$1.15	$1.15	$1.15	$1.15	$1.15	$1.15	$1.15	$1.15	$1.15
Cost	**$17,768**	**$35,537**	**$71,073**	**$106,610**	**$106,610**	**$106,610**	**$106,610**	**$106,610**	**$106,610**	**$106,610**
Cost/tonne Ore	$0.25	$0.25	$0.29	$0.31	$0.37	$0.42	$0.48	$0.49	$0.49	$0.48
Inpit Crushing										
Cost/BCM	$3.51	$3.51	$3.51	$3.51	$3.51	$3.51	$3.51	$3.51	$3.51	$3.51
Cost	**$141,155**	**$282,310**	**$478,795**	**$667,526**	**$561,466**	**$496,464**	**$439,292**	**$430,466**	**$425,464**	**$433,296**
Cost/tonne Ore	$1.96	$1.96	$1.96	$1.96	$1.96	$1.96	$1.96	$1.96	$1.96	$1.96
Hauling										
Ore										
BCM/Hr.	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63	1.63
Hours Required	24,672	49,344	83,686	116,674	98,136	86,775	76,782	75,239	74,365	75,734
Number of Units	22.59	22.59	19.16	17.81	14.98	13.24	11.72	11.48	11.35	11.56
Cost/hr.	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00	$60.00
Cost	**$1,480,308**	**$2,960,616**	**$5,021,181**	**$7,000,429**	**$5,888,161**	**$5,206,478**	**$4,606,913**	**$4,514,351**	**$4,461,897**	**$4,544,030**
Cost/tonne Ore	$20.56	$20.56	$20.56	$20.56	$20.56	$20.56	$20.56	$20.56	$20.56	$20.56

Budget										
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Waste										
BCM/Hr.	41.32	41.32	41.32	41.32	41.32	41.32	41.32	41.32	41.32	41.32
Hours Required	273	546	1,684	2,876	3,607	4,055	4,450	4,511	4,545	4,491
Number of Units	0.89	0.89	0.76	0.70	0.59	0.52	0.46	0.45	0.45	0.46
Cost/hr.	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00	$45.00
Cost	**$12,293**	**$24,585**	**$75,800**	**$129,420**	**$162,328**	**$182,497**	**$200,235**	**$202,974**	**$204,526**	**$202,096**
Cost/tonne Ore	$0.17	$0.17	$0.31	$0.38	$0.57	$0.72	$0.89	$0.92	$0.94	$0.91
Reclamation										
Area (Ha.)	7.69	0.87	1.64	1.91	1.44	1.21	0.96	1.13	2.74	2.90
Cost/Ha.	$8,500.00	$8,500.00	$8,500.00	$8,500.00	$8,500.00	$8,500.00	$8,500.00	$8,500.00	$8,500.00	$8,500.00
Total Reclamation	**$65,395.13**	**$7,364.74**	**$13,928.95**	**$16,268.64**	**$12,216.31**	**$10,312.76**	**$8,149.34**	**$9,586.43**	**$23,315.77**	**$24,654.69**
Cost /tonne Ore	**$0.91**	**$0.05**	**$0.06**	**$0.05**	**$0.04**	**$0.04**	**$0.04**	**$0.04**	**$0.11**	**$0.11**
Total Op. Cost	**$1,873,498**	**$3,623,570**	**$6,287,092**	**$8,859,726**	**$7,670,253**	**$6,941,833**	**$6,300,672**	**$6,203,459**	**$6,161,284**	**$6,250,159**
Cost/tonne Ore	**$26.03**	**$25.17**	**$25.75**	**$26.03**	**$26.79**	**$27.42**	**$28.12**	**$28.26**	**$28.40**	**$28.29**
Cost of Capital										
AW	$840,358	$840,358	$840,358	$840,358	$840,358	$840,358	$840,358	$840,358	$840,358	$840,358
Cost/tonne Ore	**$11.67**	**$5.84**	**$3.44**	**$2.47**	**$2.93**	**$3.32**	**$3.75**	**$3.83**	**$3.87**	**$3.80**
Total Cost	**$2,713,856**	**$4,463,928**	**$7,127,450**	**$9,700,084**	**$8,510,611**	**$7,782,191**	**$7,141,030**	**$7,043,817**	**$7,001,642**	**$7,090,517**
Cost/tonne Ore	**$37.70**	**$31.01**	**$29.19**	**$28.49**	**$29.72**	**$30.74**	**$31.88**	**$32.09**	**$32.27**	**$32.09**
Administration	$271,386	$446,393	$712,745	$970,008	$851,061	$778,219	$714,103	$704,382	$700,164	$709,052
Cost/tonne Ore	**$3.77**	**$3.10**	**$2.92**	**$2.85**	**$2.97**	**$3.07**	**$3.19**	**$3.21**	**$3.23**	**$3.21**
Total Cost plus Admin.	$2,985,241	$4,910,321	$7,840,195	$10,670,092	$9,361,672	$8,560,410	$7,855,133	$7,748,199	$7,701,806	$7,799,569
Overall Cost/tonne Ore	**$41.47**	**$34.11**	**$32.11**	**$31.34**	**$32.70**	**$33.81**	**$35.06**	**$35.30**	**$35.50**	**$35.30**
Net Revenue										
$40/tonne	($105,845)	$848,473	$1,926,671	$2,946,675	$2,091,586	$1,566,884	$1,105,928	$1,032,815	$977,177	$1,039,176
$60/tonne	$1,333,854	$3,727,869	$6,810,104	$9,755,059	$7,818,215	$6,630,530	$5,586,458	$5,423,322	$5,316,669	$5,458,549
$100/tonne	$4,213,250	$9,486,663	$16,576,970	$23,371,827	$19,271,473	$16,757,824	$14,547,519	$14,204,336	$13,995,653	$14,297,294
IRR		IRR								
$40/tonne	($21,492.80)	**18%**								
$60/tonne	($4,776.81)	**71%**								
$100/tonne	($7,990.61)	**140%**								

Budget										
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
CapitalCost										
	Number Req.									
Site Development	1									
Repair Shops & Facilities	1									
Equipment										
Tucks	1	1	1	1	1	1	1	1	1	1
Loaders	1	1	1	1	1	1	1	1	1	1
Dozer	1	1	1	1	1	1	1	1	1	1
Crushing Plant	1	1	1	1	1	1	1	1	1	1
Drill	1	1	1	1	1	1	1	1	1	1
Powder truck	1	1	1	1	1	1	1	1	1	1
Total Capital	$5,680,000									
			Unit Cost							
Site Development			$500,000							
Repair Shops & Facilities			$2,500,000							
Equipment										
Tucks	Waste Haul		$220,000							
Loaders	3 yd		$255,000							
Dozer	120 hp		$230,000							
Crushing Plant			$1,250,000							
Drill	3.5 to 6.75"dia	Rotary	$690,000							
Powder truck			$35,000							
Annual worth	$840,358									
Interest Rate	10.00%									
n =	10									
Salvage Value	0									
Note only one truck purchase for waste haul										
Manpower Requirment										
Tucks	24	24	20	19	16	14	13	12	12	13
Loaders	1	1	2	3	3	3	3	3	3	3
Dozer	1	1	2	3	3	3	3	3	3	3
Crushing Plant	3	3	6	9	9	9	9	9	9	9
Drill	1	1	2	3	3	3	3	3	3	3
Powder truck	2	2	4	6	6	6	6	6	6	6
Supervision										
Shiftboss	1	1	2	3	3	3	3	3	3	3
Total Onsite manpower	33	33	38	46	43	41	40	39	39	40

7 Markets

Clinoptilolites are a relatively new mineral commodity, with little commercial interest shown before the 1960s except for building stone and pozzolan uses. No formal commodity markets exist and sales for lower value products are confined mostly to the countries with Clinoptilolite resources. Higher value products may be sold internationally, but their total value worldwide is still small. Synthetic Clinoptilolites have established major growing markets through silicate chemical manufacturers, mostly in North America, Western Europe, and Japan.

Because of their very wide range of applications, natural Clinoptilolites sell into diverse markets. Japan has a particularly wide range of Clinoptilolite markets for agricultural, industrial, and consumer uses. North American sales are principally for agricultural and pet litter applications. Markets in Western Europe, the former Eastern Bloc countries, and Cuba are primarily for agricultural products but with a growing industrial market sector.

Steady growth is anticipated for the rest of the 1990s for agricultural, industrial, and consumer applications. The strongest areas of market growth in North America are expected to be in sewage treatment, deodorants, pet litter, soil treatment, and nuclear waste treatment and containment.

7.1 Competitive Values and Costs

The cost of Clinoptilolite products depends mostly on the type and degree of processing that must be done to satisfy specific market specifications. Mining costs are generally fairly low, typically US $3 to $7/ ton, unless very selective mining is done.

Most natural Clinoptilolites are sold into low value industrial or agricultural markets, commonly selling for US. $30 to US. $70/ ton for granular products down to 40 mesh, and US. $50 to US. $120/ton for ground materials, in a range of -40 to -35 mesh. Consumer products such as pet litter, fish-tank media or deodorant materials commonly sell for $.50 to $4.50/kg at the retail level.

Products for very special industrial applications such as radwaste filter media or catalysts in petroleum refining, may show values ranging up to thousands of dollars per ton, although their market demand may be very limited.

7.2 Future Trends

Overall, Clinoptilolites present a healthily, growing industry with continued expansion into new applications and steady demand in industrial markets where they have achieved acceptance. Most of this activity and growth, however, has been in the synthetic Clinoptilolite field. Natural Clinoptilolites have only a small portion of the markets, commonly those with lower costs or very specific uses, and growth in North America has generally languished. Because the technology has been firmly established, an excellent range of high quality natural Clinoptilolite deposits have been identified and characterized, and there is a record of successful sales for products with consistent specifications achieved, growth of the natural Clinoptilolite field appears likely to continue through the 1990s on a slow and steady basis.

Natural Clinoptilolite have established a strong domestic market pattern for several uses: catalysis and petroleum refining, nuclear waste treatment, and odor control. These marketing areas can be expected to continue and expand. Natural Clinoptilolite uses are particularly tied to 1) pollution control and 2) energy cost and efficiency issues; greater emphasis on these areas through the decade would markedly increase the probable adaptation of Clinoptilolite technology. Higher energy costs and greater environmental demands will spur Clinoptilolite production and sales significantly.

Japan, the former Soviet Union, and a few other countries have evolved strong natural Clinoptilolite industries based on the availability, low cost, suitability (agricultural and industrial), and consumer applications of these minerals. Through the decade natural Clinoptilolites should emerge as a better-defined mineral commodity, and North America will become a leading producer.

7.3 Competition

The synthetic Clinoptilolites are materials with few if any problems. They are readily made from abundant raw materials, and present no toxic or environmental problems. Natural Clinoptilolites must penetrate markets where other materials are already used and accepted, and they are also faced with a stigma of having formerly been presented as a panacea for too many material supply problems in the 1970s. Suppliers of competing materials have capitalized on this past over-selling of Clinoptilolite.

Several natural Clinoptilolites are fibrous minerals, and their use or presence even in trace amounts may suppress the use or consideration of Clinoptilolite for some new applications. Erionite has been classified as a hazardous material, which precludes its use for some applications, particularly in consumer products. Mordenite is also a fibrous mineral but apparently has no record of carcinogenic problems. Natural Clinoptilolites commonly contain some crystalline silica, which may require stringent hazardous materials labeling for finished products.

The natural Clinoptilolites lack any designation of industrial standards on a national or international basis. This lack of standardization inhibits their sale and use, particularly in industrial and consumer markets. Creation of standards through ASTM or trade associations would alleviate this problem.

7.4 Marketing Plan

Based on the preceding information it is quite evident that a detailed marketing plan should be developed in conjunction with the development of a technical plan since both are as significant as a handshake, two fields working in concert . Over the next year it will be necessary for Canmark International Resources Inc. to work with government agencies in concert with its technical and marketing consultants to promote the merits of the Sun Claim Clinoptilolite deposits in the local and international market place. A marketing process normally takes considerable time, as natural resource development typically can take up to three years just to get in place the permit to mine.

Marketing	**Canmark International Resources Inc.**	**Engineering**
	Discovery of Ore Reserve	
Market Potential *Literature Search*		Extent of Ore Body *Field Program*
	Target Markets	
Local *Sewage Treatment* *Acid Rock Drainage*		Application Research *Literature Search* *Bench Scale Testing*
	Market Bata Testing	
Determining Other Like Markets		Pilot Testing
	Contract Negotiations	
Price Negotiations		Mine Design *Production Estimates* *Cost Estimates*
	Contract Long-term	
Joint Venture with Customer		Permitting

Phoenix Engineering Ltd.
Statement of Qualification

Phoenix Engineering Ltd. is a wholly owned Canadian company, with over a decade of experience in the following areas:

Geotechnical Engineering for:

MINE DESIGN
GEOTECHNICAL INVESTIGATIONS
SOLID & LIQUID WASTE MANAGEMENT
SOIL & GROUNDWATER REMEDIATION

Phoenix Engineering Ltd. provides engineering and technical support services to industry and municipalities for the design, economical evaluation and project management of geotechnical investigations for mine & civil facilities such as roads, bridges, marine facilities and containment structures for the treatment of environmentally sensitive wastes.

COMPANY SERVICES

FOUNDATION DESIGN
PROJECT MANAGEMENT
MINE TAILINGS DISPOSAL PLANNING
MINE DESIGN & FEASIBILITY ANALYSIS
COST ESTIMATING & ECONOMIC EVALUATION
MATERIAL HANDLING FACILITY DESIGN
SOIL & GROUNDWATER INVESTIGATIONS
SOLID WASTE MANAGEMENT
EDUCATION

CLIENT BASE INCLUDES:

DEFENSE CONSTRUCTION CANADA
PUBLIC WORKS CANADA
COLLEGES AND UNIVERSITIES
SYNCRUDE CANADA LTD.
ALSANDS ENERGY LTD.
GULF CANADA RESOURCES INC.
MINISTRY OF TRANSPORTATION & HIGHWAYS
B.C. HYDRO & POWER AUTHORITY

Phoenix Engineering Ltd., have no financial interests either directly or indirectly, nor do we expect to have or receive any interests in Canmark International Resources Inc. The preceding report was prepared for the use of Canmark for either a Prospectus or a Statement of Material Facts and data for this report was prepared from: Government maps; private reports; drilling and field data obtained under supervision by Phoenix Engineering Ltd. between the period January 1, and April 22, 1994.

PHOENIX ENGINEERING LTD.
475 HOWE STREET, SUITE 710
VANCOUVER, B.C.

KEY PERSONNEL
Responsible for this report

William John Beck, AScT., Mining Specialist

William E. Hodge, P.Eng., Technical Review

Résumés

WILLIAM JOHN BECK, ASCT.

EDUCATION

1992 to-date **British Columbia Institute of Technology**
School of Engineering Technology

Advanced National Diploma Programme
Technology Management

Minors in: Waste Management
& GIS (TerraSoft)

1991-1992 Diploma Mining Technology
2 year National Diploma

1989-1991 **The University of Calgary, Calgary, Alberta**

Management Development Certificate

1979 **Colorado State University, Denver, Colorado**

Geotechnical Engineering Programme
Design of Tailing Impoundment Structures

1967-1969 **Canadian Institute of Science & Technology, Toronto, Ontario**

Engineer in Training Programme

Additional Courses

1992 **University of Waterloo, Waterloo, Ontario**
Physical Hydrogeology

1990-1991 **University of Calgary, Calgary, Alberta**
Engineering Geology (Rock Mechanics)
Engineering Economics

1979 **Kepner-Tregoe Inc., Princeton, New Jersey**

Kepner Tregoe, Decision Analysis Course

AFFILIATIONS

Member, Applied Science Technologists and Technicians of British Columbia
Member, American Institute of Mining Engineers
Member, Canadian Institute of Mining and Metallurgy

MINING CERTIFICATES

British Columbia Shift Boss Certificate
British Columbia Underground Mine Rescue
British Columbia Surface Mine Rescue
British Columbia Blasters Certificate

CAREER SUMMARY

Principle responsibilities within the Resource Industries have included Mine General Manager, Engineering Manager, Project Engineer and Consultant.

The twenty-five year career has included engineering and project management for civil, environmental and geological projects for the design and evaluation of capital and replacement capital facilities for mining operations in Canada and the United States of America.

Throughout my career, I have demonstrated successively the ability to coordinate and execute the logistical and technical aspects in the following areas:

Management:

Profit and Loss Control
Labour Relations & Union Negotiations
Government and Public Environmental Liaison
Project Management
Total Quality Management Practitioner
Experienced in Management of Technological Change

Solid & Liquid Waste Disposal System Design:

Due Diligence Review for Environmental Liabilities
Site Investigation and Selection
Ground and Surface Water Monitoring
Material & Water Balance Modeling
Fly & Bottom Ash Disposal Systems
Sludge & Sand Disposal Systems
Abandonment Planning
Contaminated Site Remediation

Economics:

Capital and Operating Cost Estimates
Project Economics
Risk Assessment
Replacement Capital Evaluations
Due Diligence Review

Mine Planning:

Metalliferous
Quarry Operations
Oilsand Mining
Coal (Surface and Underground Room and Pillar)

Material Handling Facilities:

Truck & Shovel, Dragline
Bucketwheel, Conveyor & Stacker Systems
Hydraulic Transport
Cyclone and Thickener Classification

Computer Literacy:

IT Management Systems; Lotus 123; Microsoft QBasic, Excel 5, Works and Word; Harvard Graphics and Project Manager; Symantec Time Line; C++; TerraSoft and AutoCad

CAREER HISTORY

SELF EMPLOYED
11/88- 11/93

Providing consulting services to industry in areas of Project Management, Materials Handling, Environmental Treatment & Containment Facilities; Cost Estimating & Economic Evaluations for Capital Facilities.

ASSOCIATE COMPANIES

PHOENIX ENGINEERING LTD., 710 - 475 HOWE STREET, VANCOUVER, B. C.

Projects to date:

Canmark International Resources Inc.

Review of 1993 drilling program, development of geological model for zeolite deposits in the Princeton area, design of the 1994 drilling program, development of preliminary mine plans for bulk sample pit and overall project management.

British Columbia Institute of Technology

Research in acid rock drainage for the development of the Mining Departments environmental lab programme, the research on acid rock drainage was to identify low cost low maintenance solutions using sphagnum moss and the clay materials buffering affects on acid mine drainage.

Environmental Remediation Project Management & Marketing

Working in association with other environmental and geotechnical engineering companies, providing consulting and technical services to industry and municipalities Involved in project management for remediation of hydrocarbon and PCBs contaminated soils in tank farms and transformer sites, incorporating conventional and bioremediation technologies. Groundwater investigations for hydrocarbon contamination requiring piezometer installation and groundwater modeling.

Lelydrop III Bauxite Mining Operation, Suriname, South America

Review of proposed mine plan: This project included review of opening bucketwheel boxcut sequence and the application of scrapers as overburden stripping equipment prior to bucketwheel and dragline operations.

The OSLO Project, Esso Resources Ltd., Calgary, Alberta
Senior Mining and Environmental Consultant

Project Engineer: Design and economic evaluation of mining and extraction tailing disposal systems for oilsand leases under review for development in Northern Alberta.

Designed, fostered and piloted the concept of sludge injection within the tailing sand matrix. This process reduced the extraction sludge volume by seventy percent of conventional methods. The tailing disposal environmental impact was the most critical facet of oilsand mine development, requiring innovative approach to the waste management and stake-holder issues associated with a project of this magnitude.

Off-Lease Mining Study

Mining and economic feasibility study for the development of oilsand reserves from non-contiguous ore bodies, utilizing truck shovel and conveyor mining systems. Life of mine capital and operating costs were developed on a class five basis, to permit calculation of mining break-even ratios. This study formed the basis for defining non-recoverable reserves to permit the optimum location of tailing ponds and plant sites.

Preliminary Tailing and Plant Site Selection Study

Identify, select and rank possible sites on the basis of construction feasibility, capital and operating costs. Each site was evaluated on its operational logistics with the existing planned mining operations. Capital and operating costs were developed on a class five basis for a five year construction, twenty-five year operating and site specific reclamation periods.

MARSTON & MARSTON INC. MINING CONSULTANTS, St. Louis MO.
06/85 - 11/88 - Director of Technical Services

Project Manager for Due Diligence Reviews

Critique of environmental liabilities, reserves, mine operations, engineering and management practices of coal mining operations in Southern Kentucky and Missouri.

Project Manager and Senior Consultant to Coal Ridge Fuels Inc.
Hazard, Kentucky

Development of a detailed mine plan for the Red Oak and Roark Mine sites. This required the scheduling of a blend of compliance run of mine coal, by mountain top mining methods and the development of detailed cost model.

Project Manager of the Quintette Coal Project.

Responsible for development of the 1986 Mine Plan, Mid-Term five year plan, Long-Term twenty-five year plan. This included production schedules, equipment requirements and the development of new production areas. For two years I was responsible for the on-site monitoring of the compliance by operations to the mine plan .
The Quintette reserves are structurally altered by massive regional thrust faulting, resulting in overlaying of the coal sequence making ROM coal quality blending an integral part of mine scheduling. Mine production was in the order of 5 million tonnes per year metallurgical coal, incorporating the use of four (4) P&H 2800, two (2) P&H 2300 and ten (10) Demag hydraulic excavators loading fifty (50) 180 tonne rear dump haul trucks.

Senior Consultant to Hodgson, Russ, Andrews & Goodyear
Attorneys at Law

Provided technical review of the Swanton Corporation coal mining property which included development costs and mining potential of four coal deposits in South-East Kentucky. Appeared as an expert witness for the defendant in the Federal Tax Case, I.R.S. versus Swanton Corp. New York.

NEW BRUNSWICK COAL LTD., Minto, New Brunswick
08/82 - 08/85 - Manager of Mines

Responsible for mine operations, maintenance, engineering, environmental liaison and mine development for five operating mines in the Minto Chipman area.
The mine employed seven draglines, ranging in size from a Marion 8200 (65 yd) to a BE 9W (15 yd) machines, for the production of 35 million cu. yd's. waste silt-sandstone formation for the liberation of 600,000 tons coal. Work force consisted of 237 UMWA hourly operating personnel and 40 CUPE supervisory staff.

ALSANDS ENERGY LTD., Calgary, Alberta
01/80 - 06/82 - Staff Mining Engineer

Project Engineer: Design of overburden stripping and tailing (solid and liquid wastes) disposal systems for the annual containment of 78 million cubic metres of sand and sludge. This required site selection, material and water balance, evaluation of geotechnical characteristics of foundation strata and dyke structure, construction methods and equipment selection.

The project was canceled in June 1982 prior to appropriation, as a result of declining world oil prices and high inflation forecasts.

SYNCRUDE CANADA LTD., Fort McMurray, Alberta
06/77 - 01/80 - Mine Operations Planning Supervisor

Syncrude Canada Ltd., is the largest mine in North America with an annual combined waste and ore production of approximately 200 million cubic metres.

I was initially hired as Project Manager for the construction of the tailing facility foundation and internal drain systems, which required stripping of muskeg and evaluation and classification of geotechnical characteristics of foundation strata. Designed modifications to the dyke geometry to meet foundation conditions encountered in site preparation. This tailing facility at Syncrude Canada Ltd. is the world's largest man-made water containment structure.

At completion of this project, I assisted in the transition period between construction phase and full scale production of the mine and tailing facilities. Responsibilities during this transition period included supervising and giving technical support to the Mine and Tailing Engineering & Operations Staff in areas of production planning and trouble shooting.

MONTREAL ENGINEERING LIMITED, Calgary, Alberta
08/74 - 06/77 - Design Engineer

Sundance Power Plant. Ash disposal system technical and economic evaluation of pneumatic vs. hydraulic disposal of 1.2 million tons per year of fly and bottom ash.

Ardley Coal Mine. Project included design and economic evaluation of planned mine production of 12.96 million tonnes (coal) per year with an average strip ratio of 6:1 estimated mine economic life 25 years.

Wabamum Power Plant. Whitewood Mine Production Report - Evaluated and recommended possible solutions to loss in production of 2.7 million tons of recoverable coal, due to highwall and spoil pile slides.

GRANBY MINING LTD., Granisle and Phoenix Copper Ltd.
04/67 - 08/74 - Surface Engineer and Mine Surveyor

Projects included: mine planning, tailings disposal, supervision of construction and construction scheduling. Pipeline and pumping design for 14,000 tonnes/day mill tailing disposal system. Waste dump and pit wall stability monitoring, piezometer installation, blasting techniques for final well, i.e. pre-shearing and cushion blasting. Control surveys for pit operations and exploration.

WILLIAM E. HODGE, P.ENG.

EDUCATION

National University of Ireland
University College Cork

1961 **Bachelor of Engineering (Civil), First Class Honours.**

Awarded the Peel Memorial Prize for participation in sports and for the part played in the public life of college.

1963 **Master of Engineering Science**
Soil Mechanics and Soil Physics

ENGINEERING EXPERIENCE

CONSULTING

1978 to date:
Geotechnical Engineer , Phoenix Engineering Ltd., Vancouver, Canada

The following are some selected projects:

Earthquake design, assessments and remediation recommendations for variety of proposed and existing structures, including: Arthur Laing Bridge for Vancouver International Airport Authority; Little Mountain Reservoir for GVRD; Kaon Factory for Triumf; Murrin Substation for B.C. Hydro; Haldi Island Bridge and French Creek Bridge for MoTH. These projects required guidance on the appropriate earthquake levels to adopt, performing liquefaction determinations, SHAKE, FLUSH, and Newmark type analyses, and providing foundation designs, and soil-structure interaction input data and variables, to the structural designers.

Lions Gate Bridge ship impact protection structure around the existing South Pier. This work involved building a sheet piled cofferdam on rock. The rock surface clearing and foundation grade approval were done underwater prior to tremie placement. Rock dowels were placed to provide lateral support. The pier stability was monitored during construction. Responsible to the Ministry of Transportation & Highways for all aspects of the geotechnical design and construction supervision.

The North Main Pier of the Annacis Island cable-stayed bridge. This pier footing is underlain by thick deltaic sand and marine silt deposits. The foundation design involved detailed assessment of several pier support options including driving 910 mm pipe piles to 90 m and accelerated consolidation of the deep silts by dewatering. The soil-structure interaction under earthquake loading was evaluated and ground motion values were provided to the Structural designers. Performed this geotechnical work for CBA-Buckland Taylor.

Underwater sand fill placement. Researched and developed a method of constructing sand fills underwater with the purpose of producing denser, steeper sided and more erosion resistant submerged berms or islands. Performed this work for Phoenix Engineering Ltd.

Bridges on the Coquihalla Highway. Provided detailed foundation design for bridges over Ladner Creek and Boston Bar Creek on the Coquihalla Highway for the Ministry of Transportation & Highways.

ALRT guideway foundation design. The Surrey Extension section of Vancouver's Rapid Transit system crosses very unusual and troublesome stratigraphy. Performed the static and dynamic analyses of the piling systems for the towers in this area.

The Alaska Gas Pipeline. The pipeline stability under seismic loading was in question at the point where it crosses the loose sediments of Kluane Lake in the Yukon. Acted in the capacity of Advisor to the Government of Canada at public hearings held in Whitehorse.

The Guayape Valley Project in Honduras. Conducted site evaluations, conceptual designs and preliminary costing of dams and appurtenant structures at five sites in Honduras. Performed this work in the field for Crippen Consultants.

Gulf's Mobile Arctic Caisson, the Molikpaq. This work involved site investigation in the Beaufort Sea; seismic evaluation of the MacKenzie Delta; stability analyses of the composite structure for pulsating monotonic and cyclic loading; non-linear stress deformation studies using numerical models and centrifuge testing; and soil-structure interaction considerations. Initially, worked together with John Bruce to develop this concept. Later, coordinated and directed the detailed geotechnical design which was done by Golder Associate's engineering staff.

Cyprus Anvil Cross-Valley dam. This water retaining earth dam with an upstream blanket was built on discontinuous permafrost in the south abutment and in the valley alluvium. Provided the detailed earthworks design and construction procedures.

Syncrude's tailings dam. The foundation strata which underlie part of the dam's 21 km alignment contain pre-sheared highly plastic clay shales. Reviewed the design following failure of a section of the early embankment construction. Also designed the seepage control system which is now used.

Alsand's tailings dam proposal. Meltwater channels and discontinuous permafrost underlie the proposed alignment. Reviewed the proposed design with respect to liquefaction potential of the sand fill, seepage control measures and foundation stability.

Offshore Arctic Drilling Platforms. Directed in situ testing of existing sand fill and spray ice artificial islands in the Canadian and US offshore Arctic to evaluate static stability and liquefaction potential. Also, carried out design studies for utilization of several novel construction techniques for constructing building platforms.

1976 to 1978 Head Soils and Foundations Engineer
Tippetts Abbett McCarthy Stratton
Tarbela Dam, Indus River, Pakistan

Tarbela Dam was at that time the largest man-made structure in the world. During this period it came close to catastrophic failure on several different occasions because of both geotechnical and hydraulic structural problems. As geotechnical Divisional Head resident on site, was responsible for directing the operations of the following supervisory Sections: Design and Construction Review; Instrumentation; Soils Testing; Geology; and Micro-seismicity. Also supervised hydraulic model testing and monitoring of hydraulic control structures.

1974 - 1976 Founding Partner
Associated Geotechnical Consultants Ltd.
Vancouver, Canada

Provided geotechnical reports on projects which included foundation designs for a broad range of industrial, commercial and public structures; stability evaluation of developments on steep slopes; and design of small storage and tailings dams.

1970 - 1974 Senior Engineer
Golder Associates Ltd.

An SNC-Golder expatriate team made an assessment of the hydroelectric potential of the Acheloos River in Greece. Provided the geotechnical input to the final engineering design for Agios Georgios Dam and Spolaita Dam which are two large earthfill structures. Also involved in the preliminary design of several other proposed earthdams.

Project Engineer
Golder Associates Ltd.

Prepared reports on projects which included the design of Nanaimo water storage dam; seepage control design for Matsqui dyking system; stability evaluation of 335 m overburden cut; several reports for structural footings, retaining structures and tailings dams.

1966 - 1970 Site Soils Engineer
CBA Engineering Ltd.
Keenleyside (Arrow) Dam
Columbia River, Canada

The majority of the earthfill at Arrow Dam was placed through flowing river water. As Site Soils Engineer was responsible for the quality control of the fill placement. Conducted several large scale field trials to establish construction procedures. Also was responsible for installation and construction monitoring of instrumentation. Arthur Casagrande was a special consultant.

Soils Engineer
CBA Engineering Ltd.
Vancouver, Canada

The Burrard Inlet Crossing study involved the detailed engineering design of both a sub-aqueous tunnel and various suspension bridge concepts for the Third Crossing of Burrard Inlet. Provided the foundation design for both alternative structures and the soil-structure interaction analysis for the tunnel. Arthur Casagrande was a special consultant.

1963 - 1966 Junior Soils Engineer
George Wimpey, Central Laboratory
London, England

Wimpey was at that time the largest Civil Engineering contractor in the world and the Central Laboratory provided technical support for its own operations as well as site investigation services for consulting firms. Involved in some forty varied projects which included motorway design and construction; river diversion scheme through peat; evaluation of lightweight and degradable earthfills; power station foundations on marine clays; and pile loading and plate bearing tests.

Academic

Presented the Earth Dams course, comprising thirty eight lectures, to final year Engineering students at the University of British Columbia.

Lectures on the following Engineering topics have also been presented at the University of British Columbia, and elsewhere:

- Types of Dams and their Appurtenant Structures
- Annacis Cable-Stayed Bridge, North Main Pier Design
- Earthworks Construction Methods & Equipment
- Tailings Dam Design Considerations
- Instrumentation of Earthdams
- Bridges on the Coquihalla Highway
- Tarbela Dam, Case History
- Molikpaq Sand Core Densification
- Ship Impact Protection for South Pier of Lions Gate Bridge

PUBLICATIONS & PATENTS

D.R. McCreath, W.E. Hodge and A.G. Harrington (1982)
"Geotechnical Design Considerations for the Gulf Oil Mobile Arctic Caisson, Beaufort Sea"
Second Canadian Geotechnical Marine Conference, Halifax

W.E. Hodge and H.M.R. Fenton (1984)
Canadian Design Patent 53128

P.R. Taylor, A.M.van Selst, W.E. Hodge and R.G. Sexsmith (1985)
"Annacis Cable-Stayed Bridge, Design for Earthquake"
Canadian Journal of Civil Engineering

W.E. Hodge and H.M.R. Fenton (1987)
United States Patent Des. 289,677

W.E. Hodge (1987)
"Method and Apparatus for Constructing an Underwater Fill" United States Patent No. 4,664,557

W.E. Hodge (1987)
"Underwater Sand Fill Placement"
Geotechnical News

H.R Stewart and W.E. Hodge (1988)
"Molikpaq Core Densification with Explosives at Amauligak F-24"
Proceedings of the 20th Offshore Technology Conference, Houston

W.E. Hodge (1988)
"Method and Apparatus for Constructing an Underwater Fill"
Canadian Patent 1245468

W.E. Hodge (1988)
"Construction Method for Improving Underwater Sand Fills"
American Society of Civil Engineers, Geotechnical Division
Specialty Conference on Hydraulic Fill Structures, Fort Collins

W.E. Hodge (1989)
"Method for Densification of Particulate Masses"
South Africa Patent No. 88/8485

R.G. Campanella, R. Hitchman, and W.E. Hodge (1990)
"New Equipment for Densification of Granular Soils at Depth"
Canadian Geotechnical Journal, Volume 27, Number 2

Appendix A

1994
Drill Hole Logs

Borehole Log
Canmark International Resources Inc.
Sun Claims 1994 Exploration Programme
Zeolite

Borehole Number:	94-11	**Project Name:**	Canmark International Resources Inc.
Site Location :	Sun Claims	**Co-ords. (x,y):**	
Elevation [m] :		**Date:**	
Date Started :		**Date Started:**	March 16, 1994
Total Depth:	178'	**Date Finished:**	March 19, 1994
O.B. Thickness	15'		
Depth rock drilled	163'		
Supervised by:		**Checked by:**	John Beck
Type of Boring:		**Logged by:**	John Gravel
		Remarks:	

Depth [feet].	Casing	Description
0		
15	yes	
		Light olive green. Friable sandstone fine grained ∠ 33 deg. core to bedding. Carbon rich layers.
18		
		Dark green less friable sandstone.
20.5		
		Polylithic conglomerate rounded pebbles up to 5 cm in diameter. Occasional small cobble up to 7 cm. Bright green mineral in matrix likely zeolite. Volcanic cobbles and pebbles, mainly rhyolite to andesite composition.
30		
		Dark olive green, friable sandstone poor core recovery <50%. Few rounded pebbles.
33.5		
		Polylithic conglomerate rounded pebbles and cobbles. Occasional sandstone layer ∠ 22 deg. bedding to core. Angular pebbles are rhyolite to andesite composition. Matrix is medium gray green color minor zeolite in matrix.
43		
		Dark leaf green fine to coarse grained sandstone. moderate amount of bright green mineral in matrix (Zeolite).
48		
		Medium green sandstone conglomerate. Fining upwards sequences, rhyolitic volcaniclastic.
52		
53.5		Red brown sandstone, no evidence of zeolite.
		Coarse to fine cobble conglomerate, reddish brown matrix, very little zeolite.
61.5		
		Fine to medium pebble conglomerate; moderate zeolite in matrix.
64		

Dark green coarse sandstone to fine pebble conglomerate.

69

Medium green fine to coarse grained sandstone.

73

Fine pebble conglomerate, dark green stained volcanic fragments in matrix.

89

Dark green coarse sandstone moderately friable, clay alteration, 30 deg. ∠ between main cleavage and core.

94

Fine pebble conglomerate, bright green mineral in matrix and as altered fragments.

97

Dark green moderately friable sandstone, clay alteration of matrix material.

101

Medium green pebble conglomerate friable matrix, clay alteration.

103.5

Medium green soft sandstone, clay alteration.

109.5

Medium green, very fine sandstone possible clay altered

113

Medium green siltstone, oolitic in appearance; (not altered?)

114

Poorly sorted sandstone with 1 cm lithic fragments; numerous altered ash fragments, occasional carbon-rich fragment.
Entered main sequence of water lain volcanic ash sediment. Numerous altered volcanic ash fragments.
Few carbon rich fragments. Fragments are mostly < 1 cm in size.
Sequence begins as a coarse sandstone medium green in color with translucent waxy
altered volcanic fragments.

118

First appearance of volcanic pebble. Red-brown, likely rhyolite. Still matrix supported fine pebble conglomerate.

136.5

First appearance of volcanic cobble - rhyolite

147

thumb-size chunk of dark coal. Altered volcanic ash fragments are getting larger (>1 cm) & more angular. 27 deg. ∠ between orientation of conglomerate fragments and drill core. Cobbles becoming more frequent and increasing in size, reddish brown rhyolite cobbles and black charcoal fragments.

148

Hit top of basal conglomerate at 173'. 5-15 cm cobbles of porphyritic rhyolite to andesite, medium green zeolite at matrix hit bottom of basal conglomerate at 178'.

173

Hit lower sandstone and mudstone unit reddish brown colour.

178

183 End hole at 183'.

Water recovery:
To = 3.10 m
T15 = 2.91 m

T45 = 2.85 m

Borehole Log
Canmark International Resources Inc.
Sun Claims 1994 Exploration Programme
Zeolite

Borehole Number:	94-12	**Project Name:**	Canmark International Resources Inc.
Site Location :	Sun Claims	**Co-ords. (x,y):**	
Elevation [m] :		**Date:**	
Date Started :		**Date Started:**	March 20, 1994
Total Depth:	103'	**Date Finished:**	March 21, 1994
O.B. Thickness	36'		
Depth Rock Drilled	67'		
Supervised by:		**Checked by:**	John Beck
Type of Boring:		**Logged by:**	John Gravel
		Remarks:	

Depth [feet].	Casing	Description
0	yes	
		Overburden clay rich till, casing driven to 15'
36		
		Medium green volcaniclastic coarse sandstone, near top of main zeolite sequence. Volcanic ash fragments are all < 1 cm in diameter and rounded, some clay alteration lowering strength of rock. Volcanic fragments becoming larger than 1 cm and angular in shape, altered rim on some fragments, few rounded fragments of rhyolite.
54		3 cm rhyolite pebble. Main volcaniclastic ash sequence medium blue green conglomerate with angular to rounded fragments of welded volcanic ash; rhyolite, andesite and charcoal in a fine matrix of altered ash. Cobbles of andesitic basalt, at 77'. Welded ash fragments up to 5 cm. Larger fragments of dark coal.
83		
		Intersected small boulder of feldspar porphyry andesitic-basalt, marks top of basal conglomerate.
93		
		Basal conglomerate, cobbles of rhyolite, andesite and basalt
98		
		Lower sandstone sequence green brown color.
103		
103		End of hole.

Borehole Log

Canmark International Resources Inc.
Sun Claims 1994 Exploration Programme
Zeolite

Borehole Number:	94-13	**Project Name:**	Canmark International Resources Inc.
Site Location :	Sun Claims	**Co-ords. (x,y):**	
Elevation [m] :		**Date:**	
Date Started :		**Date Started:**	March 14, 1994
Total Depth:	153'	**Date Finished:**	March 15, 1994
O.B. Thickness	17'		
Depth Rock Drilled	136'		
Supervised by:		**Checked by:**	John Beck
Type of Boring:		**Logged by:**	John Gravel
		Remarks:	

Depth [feet].		**Description**
0	Yes	
17	Yes	
18		Basal till and rubble crop. Light gray green arkose fine grained minor rounded pebbles up to 0.5 cm. 6" conglomerate layer at 20' rhyolite - basalt pebbles rounded.
22		
		Fine grained very friable layer medium green siltstone.
23		
		volcanic clastic dark green sandstone minor amount of interstitial bright green mineral (zeolite?)
28		
		Medium green volcaniclastic sandstone; moderate amount of interstitial brown green mineral. Thin (3") conglomerate layer hornblende porphyry and matrix rounded pebbles up to 1 cm. Thin fine green volcaniclastic sandstone. Medium green volcanic sandstone. Thin fine green volcanic sandstone ∠25 deg. bedding to core angle.
38		
		Dark green siltstone volcanic; friable dark green sandstone volcanic friable. Dark green volcanic friable greywacke parting planes at 25 deg. to core.
43		
		Buff arkose altered regions increase in amount of brown green intastitial mineral, regions of alteration display change in splitting characteristics (effect of cementation?)
48		
48.5		Dark green friable sandstone; Medium green moderate friable sandstone.
52.5		
		Medium green rounded pebble conglomerate 0.25 - 1 cm diameter; good zeolite in matrix.
53		
		Medium green moderate friable sandstone, dark lithic fragments 1-2 mm rounded grains abundant color grains <5.
58		

Rounded quartz grains, abundant amber color grains (<5%). Medium to light green sandstone <5% coarse material at top, percent of coarse fragments increases down hole to 15% at base of sequence. Fragments mainly volcanic and light green mineral of 3-4 hardness, also a hard (>5) clear mineral having good cleavage on one plane (topaz?)

73

Light green fine pebble conglomerate pebbles rounded and 1 cm in diameter increasing in % down hole to approximately 30-35% at 95'. Med green fine conglomerate volcanic fragments, light green altered mineral fragments, occasional charcoal fragment.

95

Medium green moderate conglomerate red brown volcanic fragments (rounded pebbles up to 5 cm), rounded to angular shaped light green mineral fragments (altered ash?) Fragments display an altered rim of light - dark green alteration by zeolitizing solution - should give good ammonia response.

113

Medium green conglomerate slightly fewer coarse fragments thin overlying unit fewer light green altered fragments. Fine pebble coral conglomerate, contorted organic rich layer at base of sequence.

123

Coarse pebble to fine cobble conglomerate polylithic, rhyolitic to andesitic pebbles medium green matrix probably min. amount of zeolite. Basal conglomerate a cataclysmic volcaniclastic sequence.

132

Rhythmic fining upward sequences, fine pebble conglomerate. Altered base grading upwards to fine sandstone possibly siltstone.
Hole ended at 153'.

153

Borehole Log

Canmark International Resources Inc.
Sun Claims 1994 Exploration Programme
Zeolite

Borehole Number:	94-14	**Project Name:**	Canmark International Resources Inc.
Site Location :	Sun Claims	**Co-ords. (x,y):**	
Elevation [m] :		**Date:**	
Date Started :		**Date Started:**	March 22, 1994
Total Depth:	153'	**Date Finished:**	March 24, 1994
O.B. Thickness	30.5'		
Depth Rock Drilled	122.5		
Supervised by:		**Checked by:**	John Beck
Type of Boring:		**Logged by:**	John Gravel
		Remarks:	

Depth [feet].	Casing	Description
0	yes	
30	yes	
		Red gray to red green coarse grained sandstone.
32		
		Polylithic conglomerate, cobbles to 7 cm in diameter consisting of red porphyritic rhyolite and grayish porphyritic andesite. Lens of red green coarse grained sandstone. Possible fault gouge 2 ft of core missing min. amount of zeolite in matrix.
47		
		Dark leaf green medium to coarse grained sandstone likely zeolite in matrix occasional thin (2-3 cm) pebbly layers. Thin conglomerate layer.
58		
		Slight color change and dark leaf green to medium blue green, possible change in zeolite content? occasional thin coarse sand to fine gravel layer. Med. green sandstone v. friable, high clay content. 6' section to be for rock test for 67-67.5.
73		
		Volcaniclastic coarse sandstone to fine pebble conglomerate. Friable abundant clay.
79		
		Similar to above unit but less friable, less clay alternation, medium green fine sandstone to coarse sandstone; few fragments of (< 1 cm) of rhyolite and (1 - 3 mm) fragment of altered ash fragments.
88		
		Top of Main Sequence, very fine granular altered ash, oolitic in places.
90		
		Fine volcanic pebble conglomerate most volcanic ash fragments are less than 1 cm rounded to sub angular, few longer angular fragments, rare rhyolite pebble.
103		
		Colour intensifying between 103 and 108 from medium green to medium
108		bluish green. Fine medium pebble conglomerate.

Fine ash layer 45 deg. $\angle$ between layer and core.

113

120 5 cm rounded rhyolite pebble.

First rhyolite cobble 6.4 cm in diameter.

130

Medium to coarse pebble conglomerate, large ash fragments.

143

First large cobble (10 cm diameter).

147

Top of basal conglomerate, matrix supported.

148

Tan colored fine grained sandstone, lower sandstone unit.

153

End of hole at 153'.

4:15 water at 7.08 m.

4:45 water at 0.42 m, collar was pulled after first test.

Borehole Log

Canmark International Resources Inc.
Sun Claims 1994 Exploration Programme
Zeolite

Borehole Number:	94-15	**Project Name:**	Canmark International Resources Inc.
Site Location :	Sun Claims	**Co-ords. (x,y):**	
Elevation [m] :		**Date:**	
Date Started :		**Date Started:**	March 25, 1994
Total Depth:	278'	**Date Finished:**	March 29, 1994
O.B. Thickness	6'		
Depth Rock Drilled	272'		
Supervised by:		**Checked by:**	John Beck
Type of Boring:		**Logged by:**	John Gravel
		Remarks:	

Depth [feet].	Casing	Description
0	Yes	
6	yes	Light olive green fine to medium grade sandstone, high clay content poor core recovery at places oxygenated, Fe^{3+} to Fe^{2+}.
14		Gray-green fine to medium grade sandstone, oxygen reduced variety of above unit, 1/2" contact zone.
18		Light grayish green fine to medium grained sandstone very friable, high clay content.
23		Medium grayish green with dark green mottles medium grained sandstone, very friable, high clay content.
28.5		Buff medium grade sandstone with minor dark green mottles.
33		Medium gray green medium grained sandstone with bright green mineral in matrix. 4 ft of core lost due to core tube not locked in drill tube. Coarse grained sandstone layer of Rhyolite and a bright green hornblende porphyritic altered rock slightly darker gray green medium grained sandstone. Thin coarse sandstone layer.
43		Fining upwards sequences grading from conglomerate at the base to overlying coarse sandstone dark gray green color, some zeolite in matrix.
55		
56		Badly broken, possibly faulted Medium to coarse sandstone dark gray blue green, rhyolitic fragment and bright blue gray altered volcanic fragments.
66		Dark leaf green, very fine sandstone some mottling.
67		

Buff to medium green medium sandstone to fine pebble conglomerate, fragments of rhyolite and altered light green hornblende porphyry. Fining upwards sequences.

78

Medium gray green coarse sandstone zeolite matrix. Coarse sandstone.

87

Medium gray green cobble conglomerate moderate amount of zeolite in matrix.

89.5

Coarse pebble conglomerate poor recovery with clay in matrix possible fault.

93

93.5 Fault gouge

Coarse sandstone to fine pebble conglomerate, moderate amount of zeolite in matrix.

97

97.5 Fault gouge.

Medium to coarse volcanic sandstone medium gray green gray.

98

Fine to coarse grained sandstone, dark green color. Fault gouge.

103

105 Dark green conglomerate

Medium blue green gray sandstone to conglomerate. Moderate amount of zeolite in matrix. Some clay in matrix.

113

Drilled through a hornblende porphyry boulder.

115

Medium brown fine to medium grain sandstone.

118

Medium pebble to fine cobble conglomerate with sandstone layers. Moderate gray green color rhyolite fragments. Moderate amount of zeolite in matrix.

125

Medium to coarse grained sandstone - medium green gray colour -, moderate amount of zeolite in matrix.

132

Dark green gray fine to coarse sandstone. Moderate zeolite in matrix.

133

Fine to coarse sandstone dark gray to dark green gray color -, minute amount of zeolite.

137

Fine to medium pebble conglomerate medium green gray rhyolite pebbles. Zeolite in matrix. Grades downwards into a rounded cobble conglomerate; grades downwards to a medium to coarse cobble conglomerate; minor zeolite in matrix.

146.5

Medium gray green coarse sandstone to fine pebble conglomerate.

149

	Fine to course sandstone dark gray green some zeolite in matrix.
152	Coarse pebble to fine cobble conglomerate.
153	Coarse to medium grained sandstone dark gray green. Some zeolite.
156	
156.5	Thin conglomerate layer. Medium grained sandstone buff colour. Little or no zeolite. Conglomerate of rhyolite and andesite cobblers in a buff sandstone matrix.
163	
168	Buff coloured sandstone.
178	Cobble conglomerate.
184	Buff sandstone. Thin conglomerate layer. Buff sandstone.
187	Carbon rich layer (2") 22 deg. ∠ to core.
198	Top of main sequence. Very fine grained. Top of main sequence ashy siltstone, few fragments of welded ash, clay altered, very minor grains of andesite and rhyolite.
208	Character is beginning to change, more sand in matrix, must be approaching base of main sequence. Large andesite cobble.
273	Brown sandstone grades downwards to blue green coarse sandstone with rhyolite, andesite, and altered ash, no basal conglomerate. End of hole at 278.
278	

Water Test:
t = 0 D = 9.53 m
t = 10 D = 9.40 m
t = 20 D = 9.22 m
t = 30 D = 8.76 m

Borehole Log
Canmark International Resources Inc.
Sun Claims 1994 Exploration Programme
Zeolite

Borehole Number:	94-16	**Project Name:**	Canmark International Resources Inc.
Site Location :	Sun Claims	**Co-ords. (x,y):**	
Elevation [m] :		**Date:**	
Date Started :		**Date Started:**	March 30, 1994
Total Depth:	228'	**Date Finished:**	April 05, 1994
O.B. Thickness	13'		
Depth Rock Drilled			
Supervised by:		**Checked by:**	John Beck
Type of Boring:		**Logged by:**	John Gravel
		Remarks:	

Depth [feet].	Casing	Description
0	Yes	
9	Yes	
		Over burden. Clay rich boulder till.
13		
		Coarse sandstone to fine pebble conglomerate, altered and weathered, difficult to drill. Light olive brown colour clay rich bright green mineral in voids and along fracture surfaces.
21.5		
		Coarse pebble to cobble conglomerate, incompetent matrix, highly clay altered 50% core recovery. Blue-gray-green colour.
28		
		Sandstone grading downwards to a cobble conglomerate, blue- gray-green color 50% core recovery.
33		
		Incompetent sandstone with thin conglomerate layers medium blue-gray-green colour. Abundant clay in matrix. Moderately poor recovery (50% - 65%). Continuing incompetent sandstone with thin conglomerate layers, occasional mod. more competent sandstone layers. Very poor recovery between 43' - 48' (20%). Matrix completely washed away, only pebbles recovered. Moderately poor recovery between 48' - 52' (70% - 80% recovery).
52		
		Rock is becoming slightly more competent, dark gray green colour.
53		

Conglomerate, med pebble to cobble, rounded, andesite to rhyolite composition, matrix of clay rich sandstone completely washed away . ≈ 50% recovery from 53' to 58'. ≈ 25% recovery from 59' to 63'. ≈ 90% recovery from 63' - 68'. ≈ 40% recovery from 68' to 73'. Sandstone matrix where preserved is a dark leaf green with abundant clay.

73

Similar to above rock but more competent fewer fragments and ≈ 90% recovery, dark green gray color. Color changing to dark gray green ; dark gray green rounded pebble to cobble conglomerate ≈ 85 to 90% recovery.

83

Conglomerate is less competent ≈ 15 to 20% recovery consistent mainly of loose rounded pebbles.

91

Medium gray green sandstone, high clay content, more competent than overlying unit. Andesite boulder.

93

Sandstone grades downwards to a fine pebble to coarse cobble conglomerate with sandstone layers. Medium to dark blue green color, clay rich matrix. Moderate recovery (80-90%) pebbles and cobbles are rounded and consist mainly of andesite and rhyolite. No bedding angle apparent in sandstone unit.

116

Medium gray-green coarse grained sandstone with thin fine pebble conglomerate layers considerable clay in matrix. Medium gray green coarse grained sandstone with thin conglomerate layer fine pebble green colour comes from altered volcanic fragment (possibly a basalt) altered to a light blue green, hornblende pebbles in fragments, matrix becomes med gray towards base. Abundant clay in matrix.

128

Coarse pebble to cobble conglomerate, pebbles and cobbles composed mainly of andesite to rhyolite. Minor amount of basalt. Matrix is a medium to coarse sandstone , medium gray green color. Abundant blue-green altered fragments of hornblende - needle volcanic (basalt). Matrix completely washed away in places likely due to swelling of benitonite in matrix causing a very friable matrix.

151

Coarse grained sandstone dark green colour moderate amount of clay in matrix, volcaniclastic, rhyolite, andesite, basalt, (altered to blue-green) colour.

159

Thin conglomerate layer. Bright green precipitate along fractures.

161

Coarse grained sandstone, occasional thin layer of conglomerate. Gray to dark green gray, moderate to abundant amounts of clay. Med to coarse grained sandstone mainly gray-green-colour, volcaniclastic with fragments of red rhyolite, medium gray andesite, and altered green-blue hornblende needle basalt.

178

	Core is light gray-green, very high clay content.
181	
181	Sandstone. Thin conglomerate layer. Sandstone.
196	
	Conglomerate, rounded pebbles to cobbles of rhyolite and andesite and lightly altered hornblende needle volcanic (possibly basalt). Matrix completely washed away in places due to swelling of benitonite clay.
206	
	Medium to coarse sandstone, light gray green colour. Abundant epidote in matrix as clots, abundant clay red-brown mottles at 210' to 218', probably due to pyrite which has since weathered out.
218	
	Conglomerate, matrix same as above sandstone, rounded cobbles of rhyolite and andesite. Conglomerate down to 228.
228	
228	End of Hole.

Borehole Log
Canmark International Resources Inc.
Sun Claims 1994 Exploration Programme
Zeolite

Borehole Number:	94-17	**Project Name:**	Canmark International Resources Inc.
Site Location :	Sun Claims	**Co-ords. (x,y):**	
Elevation [m] :		**Date:**	
Date Started :		**Date Started:**	
Total Depth:	164'	**Date Finished:**	
O.B. Thickness	39'		
Depth Rock Drilled	125'		
Supervised by:		**Checked by:**	John Beck
Type of Boring:		**Logged by:**	John Gravel
		Remarks:	

Depth [feet).	Casing	Description
0	Yes	
38	Yes	
39		Over-burden Incompetent clay altered fine conglomerate grading down to a more competent conglomerate, medium to dark olive green matrix, rhyolite and andesite pebbles, bright green altered lithic fragments.
40		Medium leaf green conglomerate, moderate competent sandstone, clay altered.
43		Medium pebble conglomerate buff color matrix with bright green altered fragments of andesite with minor rhyolite.
58		Fine to medium grained sandstone medium gray-brown core to bedding angle ∠ 15 deg. minor bright green altered mineral fragments.
68		Thin conglomerate, rhyolite and andesite fragments, minor alteration of matrix, lower section is broken and altered.
73		Medium grained buff colored sandstone. Coarse pebble conglomerate, dark gray green matrix, minor clay alteration andesite and rhyolite fragments.
78		

Med grained gray-green sandstone, thin carbonaceous rich layer.

83

Cobble conglomerate, dark brown-green matrix, andesite to rhyolite cobbles.

91

92 Thin gray-brown sandstone

Thin sandstone layer, medium buff colour.

97

Thin clay rich sandstone unit, light buff colour.

98

Sandstone grading downward to conglomerate. Dark green matrix with bright green fragments (could be altered basalt?)

105

Medium gray-green moderately altered sandstone with occasional andesite and rhyolite pebbles.

106

Andesite boulder, altered K-Feldspar and chlorite.

108

Conglomerate, medium gray green matrix, rhyolite-andesite pebbles to cobbles. Conglomerate.

113

Highly altered sandstone, very friable, high clay content, dark olive green.

118

More competent sandstone, bright green mineral in matrix, minor zeolite < 1 %.

119

120 Thin conglomerate unit.

Medium to coarse sandstone, medium green colour, moderate amount of bright green mineral in matrix (zeolite?) Coarser sections have greater abundance.

128

Fine to medium sandstone, medium green mottling, light gray green colour, minor amount bright green mineral in matrix. Very friable layer at 133'. Altered fault, gouge?

133

Conglomerate with occasional sandstone layer generally buff gray colour; rounded pebbles of andesite and rhyolite. Carbonaceous layer at 144', soft, matrix colour changes to a medium green to bright green at base of conglomerate sequence (increasing alteration).

148

Medium green fine to coarse grained sandstone, rare zeolitized fragments of welded ash. Abundant bentonite in matrix. (Clay swelled up with water added) might be distal wedge of main zeolite sequence.

158

Conglomerate, bright green alternation in matrix, andesite to rhyolite rounded pebbles.

163

Borehole Log
Canmark International Resources Inc.
Sun Claims 1994 Exploration Programme
Zeolite

Borehole Number:	94-18	**Project Name:**	Canmark International Resources Inc.
Site Location :	Sun Claims	**Co-ords. (x,y):**	
Elevation [m] :		**Date:**	
Date Started :		**Date Started:**	
Total Depth:	71'	**Date Finished:**	
O.B. Thickness	64'		
Depth Rock Drilled	7'		
Supervised by:		**Checked by:**	John Beck
Type of Boring:		**Logged by:**	John Gravel
		Remarks:	

Depth [feet].	**Casing**	**Description**
0	Yes	
40	Yes	
64		Recovery started at ≈ 64' Highly clay altered sandstone medium buff color with bands of medium green. Conglomerate, matrix completely washed away only pebbles of andesite and rhyolite remain . Recovery ≈ 20%. End of hole.
71		

Borehole Log
Canmark International Resources Inc.
Sun Claims 1994 Exploration Programme
Zeolite

Borehole Number:	94-19	**Project Name:**	Canmark International Resources Inc.
Site Location :	Sun Claims	**Co-ords. (x,y):**	
Elevation [m] :		**Date:**	
Date Started :		**Date Started:**	April 14, 1994
Total Depth:	108'	**Date Finished:**	April 15, 1994
O.B. Thickness	108'		
Depth Rock Drilled	0		
Supervised by:		**Checked by:**	John Beck
Type of Boring:		**Logged by:**	John Gravel
		Remarks:	

Depth [feet].	Casing	Description
0	yes	
15	yes	
		Large (2m) boulder of hornblende - feldspar porphyry from 13' - 18'. Recovered mainly pebbles and small cobbles consisting of rhyolite and andesite. Some matrix recovered mainly clay and sand, remaining matrix was washed away during drilling. No pebbles or cobbles of zeolitized rock.
18		

Canmark International Resource Inc.

	Depth	Lat.	7,665.63		Caton Exchange							
	Interval	Dept.	6,196.20									
Sample #	Top	Bottom	Mid Ord.	Elevation	CEC	Ca	Mg	Na	K	Unknown	% moisture	RDQ
	Hole #	94-11	Collar Elev	1,200.26								
89328	18.5	23	6.32	1,193.93	23.20	15.80	5.00	1.03	1.48	-0.11	2.90%	0.39
89329	23	28	7.77	1,192.48	18.30	13.00	4.25	0.93	1.43	-1.31	2.30%	0.57
89330	28	33	9.30	1,190.96	18.00	11.50	4.00	1.45	1.23	-0.18	2.50%	0.00
89331	33	38	10.82	1,189.44	21.00	14.30	3.00	2.00	1.23	0.47	2.40%	0.48
89332	38	43	12.34	1,187.91	25.00	16.80	3.25	2.75	1.55	0.65	2.90%	0.62
89333	43	48	13.87	1,186.39	33.90	22.80	3.25	4.25	1.70	1.90	4.40%	0.71
89334	48	53	15.39	1,184.86	19.50	14.30	2.25	4.00	1.38	-2.43	2.60%	0.55
89335	53	58	16.92	1,183.34	20.70	13.30	2.50	4.50	1.33	-0.93	2.00%	0.77
89336	58	63	18.44	1,181.82	23.20	13.30	3.00	5.50	1.45	-0.05	2.20%	0.15
89337	63	68	19.96	1,180.29	36.60	19.80	2.75	9.25	2.25	2.55	3.80%	0.75
89338	68	73	21.49	1,178.77	26.80	13.50	2.25	6.00	1.85	3.20	2.30%	0.62
89339	73	78	23.01	1,177.24	21.40	12.30	2.00	5.50	2.30	-0.70	1.80%	0.61
89340	78	83	24.54	1,175.72	23.20	13.30	1.75	5.50	2.75	-0.10	2.10%	0.82
89341	83	88	26.06	1,174.20	24.10	12.50	1.75	6.50	3.00	0.35	1.90%	0.99
89342	88	93	27.58	1,172.67	48.20	25.00	2.50	13.50	2.75	4.45	4.60%	0.80
89343	93	98	29.11	1,171.15	25.00	13.00	1.50	8.50	3.00	-1.00	1.80%	0.68
89344	98	103	30.63	1,169.62	65.00	30.00	2.25	22.50	4.25	6.00	6.20%	0.83
89345	103	108	32.16	1,168.10	77.90	35.50	2.75	25.00	5.00	9.65	6.60%	0.70
89346	108	113	33.68	1,166.58	85.70	33.30	2.50	30.00	7.25	12.65	5.30%	0.69
89347	113	118	35.20	1,165.05	108.00	33.50	2.25	42.50	11.50	18.25	4.20%	0.81
89348	118	123	36.73	1,163.53	115.10	33.50	2.25	47.50	14.00	17.85	4.10%	1.03
89349	123	128	38.25	1,162.00	121.80	31.30	2.00	55.00	16.80	16.70	3.60%	0.97
89350	128	133	39.78	1,160.48	126.60	32.30	2.00	55.00	15.80	21.50	3.90%	0.91
89351	133	138	41.30	1,158.96	127.50	33.00	2.00	55.00	15.30	22.20	3.90%	1.00
89352	138	143	42.82	1,157.43	125.00	32.80	2.00	55.00	15.30	19.90	3.70%	0.98
89353	143	148	44.35	1,155.91	125.00	34.30	2.50	55.00	14.80	18.40	3.80%	0.99
89354	148	153	45.87	1,154.38	125.00	32.50	2.25	55.00	15.00	20.25	3.90%	0.97
89355	153	158	47.40	1,152.86	128.60	31.30	2.00	55.00	14.80	25.50	4.00%	0.88
89356	158	163	48.92	1,151.34	114.30	30.50	2.50	50.00	13.00	18.30	3.60%	0.97
89357	163	168	50.44	1,149.81	105.40	30.30	2.50	45.00	11.00	16.60	3.90%	1.03
89358	168	173	51.97	1,148.29	92.00	27.80	2.50	37.50	8.50	15.70	3.80%	0.88
89359	173	178	53.49	1,146.76	44.60	17.00	2.25	17.50	3.50	4.35	2.40%	0.79
89360	178	183	55.02	1,145.24	31.20	12.30	2.00	11.30	1.98	3.62	2.00%	0.93
Total Footage		178		Waste to Ore Ratio		2.10	:1					

Canmark International Resource Inc.

	Depth	Lat.	7,781.64		Caton Exchange							
	Interval	Dept.	6,092.75									
Sample #	Top	Bottom	Mid Ord.	Elevation	CEC	Ca	Mg	Na	K	Unknown	% moisture	RDQ
	Hole #	94-12	Collar Elev	1,199.56								
89361	38	43	12.34	1,187.22	100.90	39.50	4.25	30.00	12.00	15.15	4.60%	0.74
89362	43	48	13.87	1,185.69	117.00	39.50	3.50	42.50	16.30	15.20	4.30%	0.85
89363	48	53	15.39	1,184.17	120.50	33.30	2.50	45.00	17.00	22.70	4.30%	0.97
89364	53	58	16.92	1,182.65	123.20	36.80	2.50	47.50	18.30	18.10	4.60%	1.02
89365	58	63	18.44	1,181.12	125.90	34.80	2.25	52.50	18.80	17.55	4.30%	0.97
89366	63	68	19.96	1,179.60	122.30	33.30	2.00	52.50	18.00	16.50	4.70%	1.00
89367	68	73	21.49	1,178.07	125.00	31.50	2.00	55.00	18.50	18.00	5.00%	0.88
89368	73	78	23.01	1,176.55	117.90	28.00	2.00	50.00	16.50	21.40	4.50%	1.00
89369	78	83	24.54	1,175.03	133.00	28.90	2.25	55.00	16.90	29.95	4.60%	0.93
89370	83	88	26.06	1,173.50	125.90	29.80	2.25	57.50	16.00	20.35		0.83
89371	88	93	27.58	1,171.98	92.90	24.00	2.00	42.50	12.30	12.10	3.10%	0.53
89372	93	98	29.11	1,170.45	46.40	18.00	2.50	20.00	5.50	0.40	2.50%	0.34
												0.88
												0.00
Total Footage		103		Waste to Ore Ratio		0.81	:1					

Canmark International Resource Inc.

	Depth	Lat.	7,758.40		Caton Exchange							
	Interval	Dept.	6,154.53									
Sample #	Top	Bottom	Mid Ord.	Elevation	CEC	Ca	Mg	Na	K	Unknown	% moisture	RDQ
	Hole #	94-13	Collar Elev	1,195.78								
89301	18	23	6.25	1,189.53								0.00
89302	23	28	7.77	1,188.00								0.00
89303	28	33	9.30	1,186.48								0.00
89304	33	38	10.82	1,184.96	16.10	13.00	2.25	3.25	3.50	-5.90	1.40%	0.83
89305	38	43	12.34	1,183.43	42.00	30.00	3.75	6.75	2.75	-1.25	3.90%	1.03
89306	43	48	13.87	1,181.91	32.10	22.50	2.50	7.00	2.75	-2.65	2.10%	0.83
89307	48	53	15.39	1,180.38	68.70	45.80	4.00	12.50	4.25	2.15	6.10%	0.72
89308	53	58	16.92	1,178.86	74.10	47.80	4.50	15.00	3.50	3.30	7.40%	0.68
89309	58	63	18.44	1,177.34	82.10	43.00	3.50	20.00	7.25	8.35	5.00%	0.92
89310	63	68	19.96	1,175.81	90.20	43.00	3.00	27.50	7.50	9.20	4.30%	0.98
89311	68	73	21.49	1,174.29	95.50	42.30	2.75	37.50	12.30	0.65	4.00%	0.93
89312	73	78	23.01	1,172.76	123.20	41.30	2.75	47.50	16.30	15.35	3.40%	0.97
89313	78	83	24.54	1,171.24	126.80	37.50	2.50	52.50	17.50	16.80	3.70%	0.94
89314	83	88	26.06	1,169.72	126.80	36.80	2.50	52.50	18.30	16.70	3.50%	1.03
89315	88	93	27.58	1,168.19	126.80	37.50	2.50	55.00	18.00	13.80	3.60%	0.80
89316	93	98	29.11	1,166.67	118.70	32.80	2.25	50.00	17.50	16.15	3.10%	1.01
89317	98	103	30.63	1,165.14	124.10	33.30	2.25	55.00	18.30	15.25	3.40%	0.98
89318	103	108	32.16	1,163.62	124.10	33.30	2.50	55.00	17.80	15.50	3.50%	1.00
89319	108	113	33.68	1,162.10	117.00	29.00	2.00	45.00	15.80	25.20	3.50%	0.98
89320	113	118	35.20	1,160.57	108.90	29.30	2.00	50.00	15.50	12.10	3.30%	0.80
89321	118	123	36.73	1,159.05	91.10	30.00	2.75	37.50	11.30	9.55	3.40%	0.62
												0.78
Total Footage		153		Waste to Ore Ratio		1.41	:1					

Canmark International Resource Inc.

	Depth	Lat.	7,826.36		Caton Exchange							
	Interval	Dept.	6,179.36									
Sample #	Top	Bottom	Mid Ord.	Elevation	CEC	Ca	Mg	Na	K	Unknown	% moisture	RDQ
	Hole #	94-14	Collar Elev	1,195.44								
89385	88	93	27.58	1,167.85	105.40	35.50	2.25	37.50	12.00	18.15		0.83
89386	93	98	29.11	1,166.33	108.00	37.80	2.25	37.50	12.30	18.15		0.98
89387	98	103	30.63	1,164.80	116.10	38.00	2.25	42.50	14.50	18.85		1.00
89388	103	108	32.16	1,163.28	125.90	36.50	2.00	50.00	17.00	20.40		0.98
89389	108	113	33.68	1,161.76	125.90	33.50	2.00	52.50	18.80	19.10		0.84
89390	113	118	35.20	1,160.23	126.80	32.50	2.00	52.50	17.80	22.00		0.95
89391	118	123	36.73	1,158.71	125.90	30.80	1.75	52.50	17.30	23.55		1.00
89392	123	128	38.25	1,157.18	128.60	32.00	2.25	55.00	18.00	21.35		0.83
89393	128	133	39.78	1,155.66	125.90	31.30	2.00	57.50	17.00	18.10		0.99
89394	133	138	41.30	1,154.14	125.90	30.50	2.00	52.50	16.30	24.60		0.85
89395	138	143	42.82	1,152.61	111.60	27.50	1.75	47.50	14.80	20.05		0.97
89396	143	148	44.35	1,151.09	72.30	20.80	2.50	30.00	8.00	11.00		0.63
												0.78
Total Footage		153		Waste to Ore Ratio		1.81	:1					

Canmark International Resource Inc.

	Depth	Lat.	7,804.03		Caton Exchange							
	Interval	Dept.	6,360.37									
Sample #	Top	Bottom	Mid Ord.	Elevation	CEC	Ca	Mg	Na	K	Unknown	% moisture	RDQ
	Hole #	94-15	Collar Elev	1,179.24								
89432	198	203	61.11	1,118.12	78.60	37.50	2.75	30.00	4.75	3.60		0.43
89433	203	208	62.64	1,116.60	87.50	37.30	2.50	35.00	6.75	5.95		0.64
89434	208	213	64.16	1,115.08	102.70	36.50	2.25	42.50	10.00	11.45		1.01
89435	213	218	65.68	1,113.55	116.10	37.30	2.00	50.00	13.30	13.50		1.00
89436	218	223	67.21	1,112.03	120.00	37.50	2.00	52.50	13.30	14.70		0.98
89437	223	228	68.73	1,110.50	121.40	36.00	2.25	52.50	13.00	17.65		0.94
89438	228	233	70.26	1,108.98	132.10	36.50	2.25	57.50	13.80	22.05		0.88
89439	233	238	71.78	1,107.46	134.80	33.00	2.00	62.50	15.50	21.80		1.03
89440	238	243	73.30	1,105.93	133.00	34.50	1.75	62.50	14.80	19.45		0.96
89441	243	248	74.83	1,104.41	135.70	35.00	2.00	62.50	15.00	21.20		0.99
89442	248	253	76.35	1,102.88	133.90	33.00	2.00	62.50	14.30	22.10		1.01
89443	253	258	77.88	1,101.36	133.00	34.30	2.00	62.50	13.80	20.40		0.98
89444	258	263	79.40	1,099.84	131.20	32.30	2.00	60.00	13.00	23.90		0.98
89445	263	268	80.92	1,098.31	121.40	33.30	2.00	55.00	11.50	19.60		0.94
89446	268	273	82.45	1,096.79	89.30	32.30	2.50	40.00	7.50	7.00		0.97
Total Footage		278		Waste to Ore Ratio		3.83	:1					

	Depth	Lat.	7,238.72		Caton Exchange							
	Interval	Dept.	6,205.53									
Sample #	Top	Bottom	Mid Ord.	Elevation	CEC	Ca	Mg	Na	K	Unknown	% moisture	RDQ
	Hole #	94-17	Collar Elev	1,231.13								
89451	148	150.5	45.49	1,185.64	16.5	10.5	1.5	5.75	2	-3.25		
89452	150.5	153	46.25	1,184.88	15.9	12	1.75	5.25	2.75	-5.85		
89453	153	155.5	47.02	1,184.11	19.5	9.75	1.25	5.75	3	-0.25		
89454	155.5	158	47.78	1,183.35	24.1	11.8	1.25	8.25	2.75	0.05		
Total Footage		164										

Appendix B

1994
10 Year Production Plan

Unit	Prod R	Eff	Fill f	Hr/d	Days/y	unit w	Bulk F
Loader	109	0.75	0.75	8	150	1.79	30%

Total Tonnage 92189

PERIOD: 1 Ore Day 197

	-			Marginal	STRIP		RESERVES				STRIP	
CUT	Total T	Waste T	Ore T	Tonnes	RATIO	%CUT	Total T	Waste T	Ore T	Tonnes	RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6020	92189	20205	71985	0	0.28	27.42%	336223	73688	262535	0	0.28	92189
6050	0	0	0	0	0.00	0.00%	464163	167452	296712	0	0.56	92189
6080	0	0	0	0	0.00	0.00%	545875	214987	330888	0	0.65	92189
6110	0	0	0	0	0.00	0.00%	768128	395297	372831	0	1.06	92189
6140	0	0	0	0	0.00	0.00%	943560	561408	382152	0	1.47	92189
6170	0	0	0	0	0.00	0.00%	978187	594481	383706	0	1.55	92189
6200	0	0	0	0	0.00	0.00%	969550	581184	388366	0	1.50	92189
6230	0	0	0	0	0.00	0.00%	955529	570270	385259	0	1.48	92189
6260	0	0	0	0	0.00	0.00%	1455443	886760	568683	0	1.56	92189
TOTAL	92189	20205	71985	0	0.28		7416658	4045526	3371133	0	1.20	

Unit	Prod R	Eff	Fill f	Hr /d	Days / y	unit w	Bulk F
Loader	109	0.75	0.75	8	300	1.79	30%

			Total Tonnage	184379									
PERIOD:	2		Ore Day	394									
				Marginal	STRIP							STRIP	
CUT	Total T	Waste T	Ore T	Tonnes	RATIO	%CUT	Total T	Waste T	Ore T	Tonnes		RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0		0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0		0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0		0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0		0.00	0
6020	184379	40409	143970	0	0.28	75.55%	244034	53483	190551	0		0.28	184379
6050	0	0	0	0	0.00	0.00%	464163	167452	296712	0		0.56	184379
6080	0	0	0	0	0.00	0.00%	545875	214987	330888	0		0.65	184379
6110	0	0	0	0	0.00	0.00%	768128	395297	372831	0		1.06	184379
6140	0	0	0	0	0.00	0.00%	943560	561408	382152	0		1.47	184379
6170	0	0	0	0	0.00	0.00%	978187	594481	383706	0		1.55	184379
6200	0	0	0	0	0.00	0.00%	969550	581184	388366	0		1.50	184379
6230	0	0	0	0	0.00	0.00%	955529	570270	385259	0		1.48	184379
6260	0	0	0	0	0.00	0.00%	1455443	886760	568683	0		1.56	184379
TOTAL	184379	40409	143970	0	0.28	TOTAL	7324469	4025321	3299148	0		1.22	

Unit	Prod R	Eff	Fill f	Hr/d	Days / y	unit w	Bulk F
Loader	109	0.75	0.75	16	300	1.79	30%

Total Tonnage 368758

PERIOD: 3 Ore Day 669

				Marginal	STRIP						STRIP	
CUT	Total T	Waste T	Ore T	Tonnes	RATIO	%CUT	Total T	Waste T	Ore T	Tonnes	RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6020	59655	13074	46581	0	0.28	100.00%	59655	13074	46581	0	0.28	59655
6050	309103	111512	197591	0	0.56	66.59%	464163	167452	296712	0	0.56	368758
6080	0	0	0	0	0.00	0.00%	545875	214987	330888	0	0.65	368758
6110	0	0	0	0	0.00	0.00%	768128	395297	372831	0	1.06	368758
6140	0	0	0	0	0.00	0.00%	943560	561408	382152	0	1.47	368758
6170	0	0	0	0	0.00	0.00%	978187	594481	383706	0	1.55	368758
6200	0	0	0	0	0.00	0.00%	969550	581184	388366	0	1.50	368758
6230	0	0	0	0	0.00	0.00%	955529	570270	385259	0	1.48	368758
6260	0	0	0	0	0.00	0.00%	1455443	886760	568683	0	1.56	368758
TOTAL	368758	124586	244172	0	0.51	TOTAL	7140090	3984912	3155178	0	1.26	

Unit	Prod R	Eff	Fill f	Hr/d	Days/y	unit w	Bulk F
Loader	109	0.75	0.75	24	300	1.79	30%

Total Tonnage 553137

PERIOD: 4 Ore Day 933

				Marginal	STRIP						STRIP	
CUT	Total T	Waste T	Ore T	Tonnes	RATIO	%CUT	Total T	Waste T	Ore T	Tonnes	RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6020	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6050	155060	55940	99121	0	0.56	100.00%	155060	55940	99121	0	0.56	155060
6080	398076	156778	241298	0	0.65	72.92%	545875	214987	330888	0	0.65	553137
6110	0	0	0	0	0.00	0.00%	768128	395297	372831	0	1.06	553137
6140	0	0	0	0	0.00	0.00%	943560	561408	382152	0	1.47	553137
6170	0	0	0	0	0.00	0.00%	978187	594481	383706	0	1.55	553137
6200	0	0	0	0	0.00	0.00%	969550	581184	388366	0	1.50	553137
6230	0	0	0	0	0.00	0.00%	955529	570270	385259	0	1.48	553137
6260	0	0	0	0	0.00	0.00%	1455443	886760	568683	0	1.56	553137
TOTAL	553137	212718	340419	0	0.62	TOTAL	6771332	3860326	2911006	0	1.33	

Unit	Prod R	Eff	Fill f	Hr/d	Days / y	unit w	Bulk F
Loader	109	0.75	0.75	24	300	1.79	30%

Total Tonnage 553137

PERIOD: 5 Ore Day 784

CUT	Total T	Waste T	Ore T	Marginal Tonnes	STRIP RATIO	%CUT	Total T	Waste T	Ore T	Tonnes	STRIP RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6020	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6050	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6080	147798	58209	89589	0	0.65	100.00%	147798	58209	89589	0	0.65	147798
6110	405339	208597	196742	0	1.06	52.77%	768128	395297	372831	0	1.06	553137
6140	0	0	0	0	0.00	0.00%	943560	561408	382152	0	1.47	553137
6170	0	0	0	0	0.00	0.00%	978187	594481	383706	0	1.55	553137
6200	0	0	0	0	0.00	0.00%	969550	581184	388366	0	1.50	553137
6230	0	0	0	0	0.00	0.00%	955529	570270	385259	0	1.48	553137
6260	0	0	0	0	0.00	0.00%	1455443	886760	568683	0	1.56	553137
TOTAL	553137	266805	286331	0	0.93	TOTAL	6218195	3647608	2570587	0	1.42	

Unit	Prod R	Eff	Fill f	Hr /d	Days / y	unit w	Bulk F
Loader	109	0.75	0.75	24	300	1.79	30%

			Total Tonnage	553137								
PERIOD:	6		Ore Day	694								
				Marginal	STRIP						STRIP	
CUT	Total T	Waste T	Ore T	Tonnes	RATIO	%CUT	Total T	Waste T	Ore T	Tonnes	RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6020	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6050	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6080	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6110	362789	186700	176089	0	1.06	100.00%	362789	186700	176089	0	1.06	362789
6140	190348	113255	77093	0	1.47	20.17%	943560	561408	382152	0	1.47	553137
6170	0	0	0	0	0.00	0.00%	978187	594481	383706	0	1.55	553137
6200	0	0	0	0	0.00	0.00%	969550	581184	388366	0	1.50	553137
6230	0	0	0	0	0.00	0.00%	955529	570270	385259	0	1.48	553137
6260	0	0	0	0	0.00	0.00%	1455443	886760	568683	0	1.56	553137
TOTAL	553137	299955	253182	0	1.18	TOTAL	5665058	3380803	2284256	0	1.48	

Unit	Prod R	Eff	Fill F	Hr/d	Days/y	unit w	Bulk F
Loader	109	0.75	0.75	24	300	1.79	30%

Total Tonnage 553137

PERIOD: 7 Ore Day 614

					Marginal STRIP						STRIP	
CUT	Total T	Waste T	Ore T	Tonnes	RATIO	%CUT	Total T	Waste T	Ore T	Tonnes	RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6020	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6050	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6080	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6110	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6140	553137	329110	224027	0	1.47	73.44%	753212	448153	305059	0	1.47	553137
6170	0	0	0	0	0.00	0.00%	978187	594481	383706	0	1.55	553137
6200	0	0	0	0	0.00	0.00%	969550	581184	388366	0	1.50	553137
6230	0	0	0	0	0.00	0.00%	955529	570270	385259	0	1.48	553137
6260	0	0	0	0	0.00	0.00%	1455443	886760	568683	0	1.56	553137
TOTAL	553137	329110	224027	0	1.47	TOTAL	5111921	3080848	2031073	0	1.52	

Unit	Prod R	Eff	Fill f	Hr/d	Days / y	unit w	Bulk F
Loader	109	0.75	0.75	24	300	1.79	30%

Total Tonnage 553137

PERIOD: 8 Ore Day 601

				Marginal	STRIP						STRIP	
CUT	Total T	Waste T	Ore T	Tonnes	RATIO	%CUT	Total T	Waste T	Ore T	Tonnes	RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6020	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6050	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6080	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6110	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6140	200076	119043	81033	0	1.47	100.00%	200076	119043	81033	0	1.47	200076
6170	353061	214569	138493	0	1.55	36.09%	978187	594481	383706	0	1.55	553137
6200	0	0	0	0	0.00	0.00%	969550	581184	388366	0	1.50	553137
6230	0	0	0	0	0.00	0.00%	955529	570270	385259	0	1.48	553137
6260	0	0	0	0	0.00	0.00%	1455443	886760	568683	0	1.56	553137
TOTAL	553137	333611	219525	0	1.52	TOTAL	4558784	2751738	1807047	0	1.52	

Unit	Prod R	Eff	Fill f	Hr/d	Days / y	unit w.	Bulk F
Loader	109	0.75	0.75	24	300	1.79	30%

		Total Tonnage	553137
PERIOD:	9	Ore Day	594

				Marginal	STRIP						STRIP	
CUT	Total T	Waste T	Ore T	Tonnes	RATIO	%CUT	Total T	Waste T	Ore T	Tonnes	RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6020	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6050	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6080	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6110	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6140	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6170	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6200	553137	336162	216975	0	1.55	88.48%	625126	379913	245213	0	1.55	553137
6230	0	0	0	0	0.00	0.00%	969550	581184	388366	0	1.50	553137
6260	0	0	0	0	0.00	0.00%	955529	570270	385259	0	1.48	553137
TOTAL	553137	336162	216975	0	1.55	TOTAL	2550205	1531366	1018838	0	1.50	

Unit	Prod R.	Eff.	Fill f.	Hr/d	Days / y	unit w.	Bulk F.
Loader	109	0.75	0.75	24	300	1.79	30%

Total Tonnage 553137

PERIOD: 10 Ore Day 605

				Marginal	STRIP						STRIP	
CUT	Total T	Waste T	Ore T	Tonnes	RATIO	%CUT	Total T	Waste T	Ore T	Tonnes	RATIO	CUM
5900	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5930	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5960	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
5990	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6020	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6050	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6080	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6110	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6140	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6170	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6200	0	0	0	0	0.00	100.00%	0	0	0	0	0.00	0
6230	71989	43750	28239	0	1.55	100.00%	71989	43750	28239	0	1.55	71989
6260	481148	288418	192730	0	1.50	49.63%	969550	581184	388366	0	1.50	553137
TOTAL	553137	332168	220969	0	1.50	TOTAL	1041539	624935	416605	0	1.50	

Appendix C

1994 Lab Programme

Methods of Calculation

Methods of Analyses

EXCHANGEABLE CATIONS AND TOTAL EXCHANGE CAPACITY BY THE AMMONIUM ACETATE METHOD (pH 7. 0)

I. REAGENTS

A. 1. 1 N $NH_4 0Ac$:

Dissolve 77.08 gm of $NH_4 0Ac$ per litre of distilled water. Adjust the pH to 7.0 with $NH_4 0H$ or HOAc.

Each batch of $NH_4 0Ac$ should be checked for sodium contamination. If necessary this reagent can be prepared as follows:

Dilute 114 ml of glacial acetic acid (99.5%) with distilled water to a volume of approximately 1 little. Then add 138 ml of concentrated $NH_4 0H$, and add water to obtain a volume of about 1980 mil. Adjust the pH to 7.0 with $NH_4 0H$ or HOAc and dilute the solution to a volume of 2 litres with distilled water.

2. Isopropanol

3. 1 N KC1:

Dissolve 74.6 gm of KC1 per litre of distilled water.

B. For Semi-Micro Kjeldahl Analysis:

1. Boric Acid Indicator Solution:

a. Indicator:

Dissolve 0.5 gm Bromocresol Green and 0.1 gm Methyl Red in 100 ml Ethanol (95%). Adjust the solution to a bluish-purple mid-colour at pH 4.5 with dilute NaOH or HCl. This indicator is pink at pH 4.2 or lower and bluish-green as the pH rises to 4.9 and above.

b. Boric Acid Solution:
Dissolve, by heating, 40 gm of Boric Acid in 1000 ml of distilled water.

c. Add, by pipette, 5 ml of Indicator to the 1000 ml of boric Acid Solution. This solution should turn blue with the addition of a small amount of stilled water or can be adjusted by the addition of dilute NaOH or HCl.

2. 10 N NaOH:
Dissolve 400 gm of NaOH in 1000 ml of distilled water. This should be carried out with the flask in a cold water bath in the sink. Add $\approx$ 50 gms NaOH at a time with constant stirring, so that the pellets do not fuse into the glassware.

3. Standardized HC1:
0.02 or 0.05 N

II. PROCEDURE

A. For Exchangeable cations:

1. a. For samples low in organic matter:
Weigh out 10.000 gm of soil into a 100 ml centrifuge tube.

b. For samples high in organic matter:
Weigh out 5.00 or 2.000 gm.

2. Add 40 ml of 1 N NH_4OAc. Stopper the tube and shake for 5 minutes. Shake to rinse down soil adhering to sides of tube and let stand overnight.

3. Shake tube again for 15 minutes. Prepare Buchner funnels with Whatman No. 42 filter paper and place above 500 ml filtering flasks.

(N.B.:) for samples high in organic matter, it may not be possible to obtain a clear filtrate with the Whatman No. 42 paper alone. Mix 3 gm of Celite Analytical Filter Aid (check for contamination) in 150 ml of distilled water and pour portions of this suspension equally into the 112 filter papers.)

4. Transfer contents of the tube to the funnel with suction applied. Rinse the tube and the stopper with 1 N NH_4OAc from a wash bottle.

5. Wash the soil with four 30 mil portions of 1 N NH_4OAc. Let each portion drain completely before adding the next but do not allow the soil to become try and cracked.

6. Transfer the leachate to a 250 ml volumetric flask. Rinse the filtering flask and make up to volume with 1 N NH_4OAc. Mix well and save a portion of the extract (in 60 ml plastic bottles) for analysis of Na, Ca, Mg and K by A.A. If extracts are to be stored, add 1 ml of toluene to each bottle or refrigerate.

B. For total exchange capacity (C.E.C.):

7. Replace the funnels containing the ammonium-saturated soil onto the filtering flasks. Wash with three 40 ml portions of Isopropanol, again letting each portion drain completely before adding the next. * Discard the washing and rinse out the flask well with tap water and finally with distilled water.

** Try to turn the suction off on the last washing before the soil dries out.*

8. Replace the funnels onto the flasks and leach the soil with four 50 ml portions of 1 N KC1, again letting each portion drain completely before adding the next. Transfer the leachate to a 250 ml volumetric flask. Rinse the filtering flask, and make up to volume with distilled water. Mix well and save a portion of the extract (in 60 ml plastic bottles) for analysis of NH_4^+ by Semi-micro Kjeldahl.

C. C.E.C. Determination:

METHOD 1

9. Pipette a 10 to 25 ml aliquot into a Semi-micro Kjeldhal flask. (Usually 20).

10. Connect the flask to the distillation unit.

11. Place a 150 ml graduated beaker containing 10 ml of Boric Acid-Indicator Solution under the condenser outlet.

12. Cautiously add 10 ml of 10 N NaOH.

13. Distill to a total of 40 ml.

14. Titrate the distillate with standardized HC1.

METHOD 2

1. Dilute samples 10 times and run for NH_4^+ -N as in Total Nitrogen Determination - Colourimetric by Auto Analyzer. Obtain instructions on the use of the Auto Analyzer. Samples are used directly without digestion.

Ref. Pacific Soils, Vancouver, BC

WHOLE ROCK PROCEDURES

An aliquot of samples was fused with lithium metaborate in a graphite crucible and dissolved in 5 % HNO3. The solution was analyzed by ICP, model Jarrell-Ash Atom Comp. Series 800. Calibration is done using Geological Survey standards SY-3 & SO-4. Quality is provided by SY-3 and SO-4, one blank and one repeat.

SPECIFIC GRAVITY

40g into 100 ml volumetric flask, weigh flask and sample, fill to the mark with water and record weights:

A = weight of sample + flask
B = weight of samples + flask + water
V (change in volume) = (100+A) - B

S.G. = 40g/V

ICP ANALYSIS

0.5g is digested with 3 ml 3-1-2- HCL: HNO3: H2O at 95 deg. C for one hour, diluted to 10ml with water, analyze by ICP.
The leached is partial for Mn,Fe,Sr,Ca,P,La,Cr,Mg,Ba,Ti,B,W,Na,K, & Al.

SAMPLE PREPARATION

Crushed sample to -1/16" with jaw crusher, split 200g with riffle, pulverized in a ring & puck pulverizer to -100 mesh.

REFERENCE

ACME ANALYTICAL LABORATORIES LTD.
852 E. Hastings St. Vancouver, B.C. Canada V6A 1R6

Appendix D

1994
Sun Claim Survey Control

›ate APRIL 5th. 1994				EDM Survey					Dept	Lat			
Control Stations					Control	83c053	nverted to NAD 87		679,025	5,457,367			
Bk. Site	Station	F.Site	Hor.. Ang.	Vert. Ang.	Slope Dst.	Hrz. Dst.	Vert. Dst.	Az.	Dept.	Lat.	Elev.	Hi	Hf
	83c053							214.92	6,025.13	7,387.30	1,235.63		
	83c053	PH 6	0.00	84.34	20.21	20.11	1.99	214.92	6,013.61	7,370.81	1,237.77	1.64	1.49
83c053	PH6	PH7	311.22	93.20	458.45	457.73	(25.59)	706.14	5,903.94	7,815.21	1,212.39	1.26	1.49
PH6	Ph7	Ph3	293.66	94.27	117.75	117.42	(8.77)	1,179.79	6,019.65	7,795.24	1,203.53	1.40	1.49
PH6	Ph7	Ph4	286.57	93.54	294.55	293.99	(18.17)	1,172.71	6,197.59	7,801.31	1,194.07	1.34	1.49
PH7	PH4	PH8	166.48	86.58	318.34	317.77	19.01	1,519.19	6,509.73	7,860.89	1,212.79	1.20	1.49
AZ PH7 TO PH8			279.55					1,165.69	6,509.73	7,860.89	1,212.79		
PH7	PH8	PH9	190.91	83.55	201.33	200.06	22.61	1,536.60	6,708.46	7,837.89	1,235.17	1.25	1.49
PH8	PH9	PH10	265.08	86.70	109.17	108.99	6.28	1,981.68	6,705.27	7,728.95	1,241.38	1.42	1.49
PH9	PH10	PH11	108.55	86.73	103.25	103.08	5.89	2,270.22	6,802.00	7,693.31	1,247.15	1.36	1.49
PH10	PH11	PH12	180.21	89.93	211.36	211.36	0.27	2,630.43	7,000.06	7,619.53	1,247.14	1.21	1.49
PH11	PH12	PH13	236.10	87.13	217.77	217.50	10.90	3,046.53	7,050.72	7,408.02	1,257.46	0.91	1.49
PH12	PH13	PH14	225.76	88.31	182.01	181.93	5.36	3,452.29	6,953.53	7,254.22	1,262.30	0.97	1.49
PH13	PH14	PH15	262.45	89.83	192.51	192.51	0.57	3,894.74	6,778.68	7,334.77	1,262.89	1.51	1.49
PH14	PH15	PH16	135.24	91.26	96.82	96.80	(2.12)	4,209.97	6,687.74	7,301.62	1,260.77	1.49	1.49
PH15	PH16	PH17	192.76	91.37	593.51	593.34	(14.23)	4,582.73	6,099.17	7,226.54	1,246.19	1.13	1.49
PH16	PH17	PH18	238.73	92.80	73.60	73.51	(3.59)	5,001.46	6,053.36	7,284.03	1,242.49	1.38	1.49
PH17	PH18	PH6	193.88	92.84	94.37	94.26	(4.68)	5,375.34	6,014.03	7,369.69	1,237.51	1.19	1.49
Closure					3,285.00				0.42	(1.12)	(0.26)		
AZ CHECK			239.57					5,794.91					
								706.14	5,903.94	7,815.21	1,212.39		
PH6	PH7	PH19	181.73	88.65	301.54	301.45	7.11	1,067.86	5,840.56	8,109.92	1,219.33	1.32	1.49
PH7	PH19	PH20	205.32	89.00	142.11	142.09	2.48	1,453.19	5,872.97	8,248.26	1,221.72	1.39	1.49
PH19	PH20	PH21	177.94	90.41	107.20	107.20	(0.77)	1,811.13	5,893.65	8,353.45	1,220.73	1.28	1.49
PH20	PH21	PH22	178.18	91.40	601.72	601.54	(14.67)	2,169.30	5,990.90	8,947.08	1,205.97	1.40	1.49
PH21	PH22	MON 83C054	316.96	90.08	12.65	12.64	(0.02)	2,666.27	5,997.92	8,936.56	1,205.659	1.19	1.49
CONTROL													
								3,452.29	6,953.53	7,254.22	1,262.30		
PH13	PH14	BM	70.66	90.55	53.84	53.84	(0.52)	3,702.95	7,006.00	7,242.15	1,261.54	1.51	1.75
DRILL HOLES													
								1,172.71	6,197.59	7,801.31	1,194.07		

ate APRIL 5th. 1994

Control Stations

				EDM Survey					Dept.	Lat.			
					Control	83c053	nverted to NAD 87		578 085	5 457 267			
Bk. Site	Station	F.Site	Hor.. Ang.	Vert. Ang.	Slope Dst.	Hrz. Dst.	Vert. Dst.	Az.	Dept.	Lat.	Elev.	Hi	Hf
PH7	PH4	DDH 94-15	176.33	95.11	163.45	162.80	(14.55)	1,529.04	6,360.37	7,804.03	1,179.24	1.20	1.49
								2,630.43	7,000.06	7,619.53	1,247.14		
PH11	PH12	DDH 94-16	328.07	91.39	33.20	33.19	(0.81)	3,138.50	6,967.53	7,612.92	1,245.75	0.91	1.49
								4,582.73	6,099.17	7,226.54	1,246.19		
PH16	PH17	DDH 94-17	0.74	97.95	108.10	107.06	(14.95)	4,763.47	6,205.53	7,238.72	1,231.13	1.38	1.49
								1,179.79	6,019.65	7,795.24	1,203.53		
PH7	PH3	PH1	277.31			140.97	13.03	1,637.10	5,978.19	7,660.50	1,216.24	1.08	1.40
			22.03			65.45	-9	1,839.13	6,019.50	7,711.27	1,207.09	1.25	1.40

ate APRIL 5th. 1994 EDM Survey

Control Stations

									Dept.	Lat.			
					Control	83c053	nverted to NAD 97		676.025	5,457.367			
Bk. Site	Station	F.Site	Hor.. Ang.	Vert. Ang.	Slope Dst.	Hrz. Dst.	Vert. Dst.	Az.	Dept.	Lat.	Elev.	Hi	Hf

Canmark Sun Claim

Date Jan 1st. 1994 EDM Survey

Control Stations

							Coverted to NAD 97		675.976	5,457.660	1,216.24		
Bk. Site	Station	F.Site	Hor.. Ang.	Vert. Ang.	Slope Dst.	Hrz. Dst.	Vert. Dst.	Az.	Dept.	Lat.	Elev.	Hi	Hf
	PH1							39.13	5,978.22	7,660.46	1,216.24		
	PH 1	PH 2	0.00	97.83	66.07	65.45	-9.00	39.13	6,019.52	7,711.24	1,206.99	1.25	1.50
PH1	PH2	PH3	140.95	92.11	84.04	83.98	-3.10	360.08	6,019.65	7,795.22	1,203.66	1.27	1.50
PH2	Ph3	Ph4	267.95	92.91	178.26	178.03	-9.04	808.04	6,197.57	7,801.32	1,194.20	1.08	1.50
Ph3	Ph4	Ph1	329.27	85.11	261.63	260.68	22.32	1,317.30	5,978.21	7,660.50	1,216.24	1.22	1.50
								360.08	6,019.65	7,795.22	1,203.66		
Ph2	PH3	PH1	17.02	84.72	141.57	140.97	13.03	557.10	5,978.20	7,660.48	1,216.26	1.08	1.50
Drill Holes								360.08	6,019.65	7,795.22	1,203.66	1.08	1.50
PH2	PH3	93-7	5.44	86.40	120.25	120.01	7.54	545.53	6,008.09	7,675.77	1,210.78	1.08	1.50
		93-8	347.42	88.46	88.86	88.83	2.39	887.50	6,038.86	7,708.50	1,205.63	1.08	1.50
		93-6	9.41	86.73	88.39	88.25	5.05	549.50	6,005.09	7,708.18	1,208.29	1.08	1.50
		93-10	40.39	85.59	74.91	74.69	5.76	580.48	5,971.16	7,738.41	1,208.99	1.08	1.50
		93-9	18.27	87.68	0.00	0.00	0.00	558.35	6,019.65	7,795.22	1,203.24	1.08	1.50
		93-3	35.86	81.11	208.54	206.04	32.24	575.94	5,898.71	7,628.41	1,235.48	1.08	1.50
		93-2	42.03	80.98	191.79	189.42	30.08	582.11	5,892.63	7,654.70	1,233.31	1.08	1.50
								39.13	6,019.52	7,711.24	1,206.99	1.27	1.50
PH1	PH2	93-7	338.59	84.19	37.65	37.46	3.81	557.72	6,008.12	7,675.56	1,210.57	1.27	1.50
		93-8	239.38	93.54	19.57	19.54	-1.21	458.51	6,038.85	7,708.34	1,205.55	1.27	1.50
		93-6	38.71	84.38	14.96	14.89	1.47	257.84	6,004.97	7,708.10	1,208.22	1.27	1.50
		93-10	80.13	87.73	55.58	55.54	2.20	299.26	5,971.08	7,738.38	1,208.96	1.27	1.50
		93-9	110.13	92.23	34.88	34.85	-1.36	329.26	6,001.71	7,741.19	1,205.40	1.27	1.50
PH1	PH2	Claim Post	65.18	84.09	77.76	77.35	8.01	284.31	5,944.58	7,730.35	1,214.77	1.27	1.50
		Tree Line	297.50	87.10	58.50	58.43	2.96	516.63	6,042.70	7,657.60	1,209.72	1.27	1.50
			278.90	88.75	74.44	74.42	1.62	498.03	6,069.29	7,655.90	1,208.38	1.27	1.50
			260.55	91.17	130.61	130.58	-2.66	479.68	6,132.97	7,646.58	1,204.10	1.27	1.50
			257.55	91.10	154.73	154.70	-2.97	476.68	6,157.75	7,641.77	1,203.79	1.27	1.50
			248.33	91.75	173.73	173.65	-5.31	467.46	6,185.17	7,659.13	1,201.45	1.27	1.50

ate APRIL 5th. 1994

Control Stations

EDM Survey — Control 93x053 nverted to NAD 87 — Dept. 676,025 — Lat. 5,457,367

Bk. Site	Station	F.Site	Hor.. Ang.	Vert. Ang.	Slope Dst.	Hrz. Dst.	Vert. Dst.	Az.	Dept.	Lat.	Elev.	Hi	Hf
			238.80	92.93	198.52	198.26	-10.16	457.93	6,215.88	7,683.88	1,196.60	1.27	1.50
			233.50	93.63	218.47	218.03	-13.84	452.63	6,237.32	7,701.23	1,192.91	1.27	1.50
			228.07	94.05	227.22	226.65	-16.05	447.20	6,245.91	7,722.31	1,190.71	1.27	1.50
			226.26	94.40	228.16	227.49	-17.50	445.39	6,246.28	7,729.52	1,189.25	1.27	1.50
		Ridge						219.13	6,019.52	7,711.24	1,206.76	1.27	1.50
			206.75	93.60	204.27	203.87	-12.83	425.88	6,205.59	7,794.55	1,193.93	1.27	1.50
			200.25	93.60	210.32	209.90	-13.21	419.38	6,200.16	7,818.15	1,193.55	1.27	1.50
			193.75	93.67	213.94	213.50	-13.68	412.88	6,189.77	7,840.08	1,193.07	1.27	1.50
			186.75	93.49	227.78	227.35	-13.87	405.88	6,182.74	7,869.51	1,192.89	1.27	1.50
			185.05	93.25	203.58	203.25	-11.54	404.18	6,161.17	7,857.00	1,195.21	1.27	1.50
			182.25	93.30	175.44	175.15	-10.10	401.38	6,135.31	7,842.66	1,196.66	1.27	1.50
			179.05	93.50	141.40	141.14	-8.63	398.18	6,106.77	7,822.18	1,198.12	1.27	1.50
			168.05	93.30	116.45	116.25	-6.70	387.18	6,072.63	7,814.65	1,200.05	1.27	1.50
			154.00	92.57	98.63	98.53	-4.42	373.13	6,041.91	7,807.19	1,202.34	1.27	1.50
			140.75	91.53	83.21	83.18	-2.23	359.88	6,019.35	7,794.41	1,204.53	1.27	1.50
			123.25	91.02	94.27	94.26	-1.68	342.38	5,990.99	7,801.07	1,205.08	1.27	1.50
			109.30	89.83	99.68	99.68	0.29	328.43	5,967.34	7,796.16	1,207.05	1.27	1.50
			104.25	89.15	114.64	114.63	1.70	323.38	5,951.15	7,803.24	1,208.46	1.27	1.50
		Tree Line											
			96.28	89.10	125.90	125.88	1.98	315.41	5,931.15	7,800.88	1,207.66	1.27	2.57
			91.31	89.27	107.31	107.30	1.37	310.44	5,937.86	7,780.84	1,207.05	1.27	2.57
			78.97	85.78	80.64	80.42	5.93	298.10	5,948.58	7,749.11	1,211.62	1.27	2.57
			57.97	83.00	61.87	61.41	7.54	277.10	5,958.59	7,718.82	1,213.23	1.27	2.57
			24.30	80.74	55.26	54.54	8.89	243.43	5,970.75	7,686.84	1,214.58	1.27	2.57
			2.75	80.95	67.52	66.67	10.62	221.88	5,975.01	7,661.59	1,216.31	1.27	2.57
	Road	creek cl	99.46	88.19	188.93	188.84	5.98	318.59	5,894.62	7,852.86	1,211.67	1.27	2.57
			87.74	86.88	139.53	139.32	7.59	306.87	5,908.07	7,794.84	1,213.27	1.27	2.57
PH2	Ph3							360.08	6,019.65	7,795.22	1,203.66	1.08	2.57
		Road	88.58	84.30	113.00	112.44	11.22	628.67	5,907.24	7,792.60	1,213.39	1.08	2.57
			83.93	81.30	111.06	109.79	16.80	624.02	5,910.46	7,783.78	1,218.97	1.08	2.57
			71.97	83.50	111.24	110.53	12.59	612.05	5,914.50	7,761.16	1,214.76	1.08	2.57
		Corner Post	49.22	82.75	100.09	99.29	12.63	589.30	5,944.37	7,730.48	1,214.80	1.08	2.57
		road	52.50	83.01	121.94	121.03	14.85	592.58	5,923.52	7,721.68	1,217.02	1.08	2.57
			45.01	83.02	130.64	129.67	15.88	585.09	5,927.81	7,703.67	1,218.05	1.08	2.57
	Lower	Ridge	111.30	90.10	85.92	85.92	-0.15	651.38	5,939.64	7,826.55	1,202.02	1.08	2.57
			119.00	91.37	81.77	81.75	-1.95	659.08	5,948.21	7,834.96	1,200.22	1.08	2.57
			131.00	94.37	79.03	78.80	-6.02	671.08	5,960.25	7,847.00	1,196.14	1.08	2.57
			144.75	96.36	81.35	80.85	-9.01	684.83	5,973.08	7,861.31	1,193.16	1.08	2.57

ate APRIL 5th. 1994 EDM Survey

Control Stations

Control 83c053 nverted to NAD 87 Dept. 678,025 Lat. 5,457,887

Bk. Site	Station	F.Site	Hor.. Ang.	Vert. Ang.	Slope Dst.	Hrz. Dst.	Vert. Dst.	Az.	Dept.	Lat.	Elev.	Hi	Hf
			158.60	97.36	94.23	93.45	-12.07	698.68	5,985.67	7,882.28	1,190.10	1.08	2.57
			164.00	97.26	111.19	110.30	-14.05	704.08	5,989.40	7,901.29	1,188.11	1.08	2.57
			171.70	97.50	117.66	116.66	-15.36	711.78	6,002.97	7,910.68	1,186.81	1.08	2.57
			181.95	97.51	116.45	115.45	-15.22	722.03	6,023.74	7,910.60	1,186.95	1.08	2.57
			200.30	98.10	139.27	137.88	-19.62	740.38	6,067.67	7,924.47	1,182.54	1.08	2.57
			209.70	98.53	122.40	121.05	-18.16	749.78	6,079.77	7,900.28	1,184.00	1.08	2.57
			218.44	98.33	123.75	122.44	-17.93	758.52	6,095.91	7,891.02	1,184.23	1.08	2.57
			223.45	98.31	138.58	137.12	-20.03	763.53	6,114.09	7,894.63	1,182.14	1.08	2.57
			227.51	98.00	157.89	156.35	-21.97	767.59	6,135.09	7,900.66	1,180.19	1.08	2.57
			231.15	97.60	168.31	166.83	-22.26	771.23	6,149.72	7,899.68	1,179.91	1.08	2.57
PH3	PH4							808.04	6,197.57	7,801.32	1,194.20	1.22	2.57
		Tree line	238.11	93.00	86.90	86.78	-4.55	1,226.15	6,245.92	7,729.26	1,188.30	1.22	2.57
			228.27	95.15	80.93	80.60	-7.26	1,216.31	6,253.25	7,743.04	1,185.59	1.22	2.57
			209.22	98.55	83.47	82.54	-12.41	1,197.26	6,270.95	7,763.52	1,180.44	1.22	2.57
			199.50	100.98	78.80	77.36	-15.01	1,187.54	6,271.33	7,778.02	1,177.84	1.22	2.57
		Dyke	184.12	100.87	97.31	95.57	-18.35	1,172.15	6,293.07	7,797.73	1,174.51	1.22	2.57
		Dyke	188.03	100.21	105.74	104.06	-18.75	1,176.07	6,301.05	7,790.32	1,174.10	1.22	2.57
		Road Cut	192.75	97.39	131.02	129.93	-16.85	1,180.79	6,325.21	7,777.01	1,176.00	1.22	2.57
			188.87	96.28	144.62	143.75	-15.81	1,176.90	6,340.28	7,784.05	1,177.04	1.22	2.57
			184.10	95.15	158.03	157.39	-14.19	1,172.14	6,354.85	7,795.46	1,178.67	1.22	2.57
		Out crop	179.48	94.33	168.49	168.01	-12.72	1,167.52	6,365.42	7,808.60	1,180.13	1.22	2.57
			175.19	93.61	176.93	176.58	-11.12	1,163.23	6,372.92	7,822.15	1,181.73	1.22	2.57
		Out crop	181.37	94.52	165.98	165.46	-13.07	1,169.40	6,363.03	7,803.05	1,179.78	1.22	2.57
		Ridge	169.90	100.65	85.44	83.97	-15.79	1,157.94	6,279.69	7,818.87	1,177.06	1.22	2.57
			124.00	96.90	117.59	116.74	-14.13	1,112.04	6,259.50	7,900.28	1,178.72	1.22	2.57
			114.75	97.42	104.75	103.87	-13.52	1,102.79	6,237.80	7,897.09	1,179.33	1.22	2.57
			105.75	97.68	85.13	84.37	-11.38	1,093.79	6,217.68	7,883.26	1,181.47	1.22	2.57
			94.30	95.10	77.03	76.73	-6.85	1,082.34	6,200.70	7,877.98	1,186.00	1.22	2.57
		Drill Holes	341.19	83.55	336.30	334.17	37.78	1,329.23	5,885.12	7,682.82	1,230.63	1.22	2.57
			336.31	83.36	340.77	338.49	39.38	1,324.34	5,892.46	7,654.75	1,232.23	1.22	2.57
PH3	PH1							377.10	5,978.22	7,660.46	1,216.24	0.00	
		PH5	345.42	91.42	566.45	566.28	-14.03	722.52	6,003.08	8,226.20	1,201.02	1.41	2.60
		Temp 1	247.75	81.17	38.41	37.95	5.90	624.85	5,940.42	7,657.06	1,220.98	1.41	2.57
PH1	PH5							722.52	6,003.08	8,226.20	1,201.02		

				EDM Survey	Control	83c053	nverted to NAD 87		Dept. 676,025	Lat. 5,457,387			
ate APRIL 5th. 1994													
Control Stations													
Bk. Site	Station	F.Site	Hor.. Ang.	Vert. Ang.	Slope Dst.	Hrz. Dst.	Vert. Dst.	Az.	Dept.	Lat.	Elev.	Hi	Hf
		bl 44 #1#2+30	6.60	98.10	12.61	12.48	-1.78	909.12	6,001.10	8,213.87	1,198.08	1.41	2.57
		Corner Post	228.72	97.60	101.37	100.48	-13.41	1,131.23	6,081.42	8,289.11	1,186.42	1.41	2.60
PH1	TEMP1							624.85	5,940.42	7,657.06	1,220.98		
		Road cl	86.88	93.35	32.01	31.95	-1.87	891.73	5,945.01	7,625.44	1,219.37	1.56	1.30
			86.65	87.27	66.45	66.37	3.16	891.50	5,950.23	7,591.42	1,224.40	1.56	1.30
			83.76	86.67	179.08	178.78	10.41	888.61	5,975.74	7,481.80	1,231.65	1.56	1.30
			83.42	86.67	214.09	213.73	12.44	888.27	5,983.88	7,447.80	1,233.67	1.56	1.30
			83.17	86.67	252.44	252.01	14.68	888.02	5,992.75	7,410.54	1,235.91	1.56	1.30
			82.78	86.69	290.66	290.18	16.76	887.62	6,002.61	7,373.62	1,238.00	1.56	1.30
			81.76	86.76	337.50	336.96	19.10	886.61	6,018.48	7,329.26	1,240.34	1.56	1.30
		TEMP2	82.46	86.72	344.92	344.35	19.75	887.31	6,016.04	7,321.11	1,240.99	1.56	1.30
TEMP1	TEMP2							887.31	6,016.04	7,321.11	1,240.99		
		Road Cl	358.94	93.32	361.00	360.39	-20.92	1,426.26	5,930.43	7,671.19	1,220.21	1.44	1.30
			358.96	93.33	424.51	423.79	-24.62	1,426.28	5,915.51	7,732.81	1,216.51	1.44	1.30
			358.97	93.26	481.66	480.88	-27.40	1,426.29	5,902.04	7,788.28	1,213.73	1.44	1.30
			358.98	92.95	566.00	565.25	-29.10	1,426.29	5,882.11	7,870.27	1,212.03	1.44	1.30
			359.00	92.66	615.31	614.65	-28.51	1,426.31	5,870.58	7,918.30	1,212.62	1.44	1.30
			359.06	92.27	637.47	636.97	-25.24	1,426.37	5,865.99	7,940.16	1,215.88	1.44	1.30
			359.37	91.98	722.40	721.97	-24.97	1,426.69	5,849.78	8,023.68	1,216.16	1.44	1.30
			0.20	91.78	768.39	768.02	-23.88	1,067.51	5,849.95	8,070.96	1,217.25	1.44	1.30
		Corner Post	131.11	89.95	69.25	69.25	0.06	1,198.42	6,076.95	7,288.15	1,239.89	1.44	2.60
			130.51	89.86	67.18	67.18	0.17	1,197.82	6,075.46	7,289.76	1,240.00	1.44	2.60
								722.52	6,003.08	8,226.20	1,201.02		
PH1	PH5	DDH94-18	298.84	95.48	303.45	302.07	-28.97	1,201.36	6,261.03	8,069.02	1,171.85	1.30	1.49
		DDH94-19	247.65	97.59	324.36	321.52	-42.86	1,150.16	6,305.52	8,335.30	1,157.97	1.30	1.49
								557.10	6,019.65	7,795.22	1,203.66		
Ph1	ph3	DDH94-11	293.00	90.60	205.35	205.34	-2.15	850.10	6,176.72	7,662.96	1,200.26	1.30	2.55
		DDH94-12	269.77	92.91	56.11	56.04	-2.84	826.87	6,073.27	7,778.96	1,199.56	1.30	2.55
		DDH94-13	271.79	93.11	122.16	121.98	-6.63	828.89	6,135.05	7,755.72	1,195.78	1.30	2.55
		DDH94-14	241.43	92.79	143.26	143.09	-6.97	798.53	6,159.88	7,823.68	1,195.44	1.30	2.55

ate APRIL 5th. 1994 EDM Survey

Control Stations Control 93C053 nverted to NAD 87 Dept. 676,025 Lat. 5,457,987

Bk. Site	Station	F.Site	Hor.. Ang.	Vert. Ang.	Slope Dst.	Hrz. Dst.	Vert. Dst.	Az.	Dept.	Lat.	Elev.	Hi	Hf
MON	PH6							214.92	6,013.61	7,370.81	1,237.77		
		M93-1	270.04	91.02	25.90	25.89	-0.46	664.96	5,992.39	7,385.65	1,237.17	1.26	1.40
		M93-2	301.76	93.08	102.98	102.83	-5.54	696.68	5,972.91	7,465.25	1,232.09	1.26	1.40
		M93-3	307.28	93.21	235.69	235.32	-13.20	702.20	5,941.69	7,594.87	1,224.43	1.26	1.40
		M93-4	308.27	93.29	303.16	302.66	-17.42	703.19	5,926.07	7,660.53	1,220.21	1.26	1.40
		M93-5	308.73	93.33	355.61	355.01	-20.68	703.65	5,913.66	7,711.46	1,216.95	1.26	1.40