DISTRICT	Rosehud
DIST_NO	4010
COUNTY	Pershing
If different from written on document	<u> </u>
TITLE	Rose bud Respecte
If not obvious	Nose of Resperse
AUTHOR	Tschauder R. Russel D. Stahlbuch F; Noyes R
	Noyes R
	1050
DATE OF DOC(S)	1993
MULTI_DIST Y / N?	
Additional Dist_Nos:	
QUAD_NAME	Sulphur 12
P_M_C_NAME	Roschad Mine: Roseland Project: South Zone;
(mine, claim & company names)	Heela Mining Co. Lac Menerals (USA) lan
	Equiaor
004402174	
COMMODITY If not obvious	gold, silver
NOTES	Reserves; assays i corres prondence;
	harder, Hen potes
	360
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Keep docs at about 250 pages if (for every 1 oversized page (>11 the amount of pages by ~25)	no oversized maps attached SS: DP g / / OS Initials Date DB:
and amount of pages by -20)	Initials Date SCANNED:
Revised: 1/22/08	Initials Date

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Rosebud Project - Preliminary Resource Estimate

CAUTIO	N!!!!!-SF	PECIAL	RUN F	OR RIC	KT. (RU	SSELL RE	SERVE)
Hole #	Pod#	Thick	Ar		Grade	Tons	Ounces
COLITILO	DE 70NE						
SOUTH OF RL27	KE ZONE *	1	40	12,569	0.169	38,674	6,536
RL41C	*	1	17	9,613		,	2,150
RL66	*	i 1	13	9,342			
RL129C	*	1	31	7,010	0.243	1000	
RL209C	*	1	16	9,404	0.154		
RL247	*	1	40	9,230	0.142	28,400	4,033
RL3	*	2	25	12,500	0.224	24,038	5,385
RL35	*	2	15	8,340	0.117	9,623	1,126
RL40C	*	2	23	2,737		•	
RL41C	*	2	17	4,800			
DI 550				46-6-			
RL55C	*	2	29	10,732			7,781
RL57	*	2	30	10,671	0.778	(*)	
RL60	•••	2	22	5,822	0.164	9,853	1,616
RL75C	*	2	19	29,827	0.229	43,593	9,983
RL104C	*	2	107	19,630	0.610	161 570	100.012
NL104C		2	107	19,630	0.619	161,570	100,012
RL123C	*	2	35	9,330	0.422	25,119	10,600
RL125C	*	2	41	10,463	0.334	32,999	11,022
RL130C	*	2	39	10,708		P4000	12,946
RL159C	*	2	169	4,905			(5)
RL171	*	2	70	3,116			•
RL192C	*	2	45	5,709			
RL193C	*	2	172	8,873			
RL195C RL208C	*	2	63 70 F	7,032		•	
RL209C	*	2	70.5 43	8,009		-2.1. U 100 PA	
HLZU9C		2	43	11,020	0.130	36,451	4,739
5 1.000							
RL289	*	2	119	4,917			(3)
RL41C	*	3	35	11,404			
RL171	*	3	60	1,802			
RL192C		3	20	4,419	0.325	6,798	2,210
RL82C	*	5	42	11,749			
RL88C	*	5	64	12,573	0.179	61,898	11,080

Rosebud Project – Preliminary Resource Estimate

CAUTION!!!!!-SPECIAL RUN FOR RICK T. (RUSSELL RESERVE)

					N I. (nus		
Hole #	Pod#	Thick	Ar	ea	Grade	Tons	Ounces
RL82C	*	6	18.8	9,965	0.315	14,411	4,539
RL89C	*	6	42	8,068	0.396	26,066	10,322
RL93C	*	6	91	16,730	0.225	117,110	26,350
						, , , , , , , ,	,
RL102	*	6	28.5	9,010	0.180	19,753	3,555
			_0.0	0,0.0	355	,	0,000
RL145	*	6	26	15,881	0.264	31,762	8,385
RL159C	*	6	31	7,116		16,969	2,019
RL168	*	6	45	9,282		32,130	67,955
RL169	*	6	25	17,138		32,958	4,515
RL170	*	6	55	13,508		57,149	6,915
NL170		O	55	13,306	0.121	57,149	0,913
RL186	*	6	105	15,642	0.100	100 000	02 100
	*	6		11 100		126,339	23,120
RL187		6	55	7,405	0.598	31,329	18,735
DI 4040	*	0	440	45.000	0.400	100 700	00.045
RL191C	*	6	110	15,686		132,728	26,015
RL194C	*	6	30	10,536		24,314	2,626
RL198C		6	80	7,597		46,751	33,848
RL201C	*	6	48	14,856	0.415	54,853	22,764
RL261	*	6	60	10,198	0.179	47,068	8,425
RL289C	*	6	51	3,001	0.162	11,773	1,907
RL94C	*	7	17	15,587	0.205	20,383	4,179
RL131C	*	7	15	17,104	0.564	19,735	11,131
RL206C	*	7	20	17,528	0.127	26,966	3,425
				,			,

SUMMARY FOR ORIGINAL "RUSSELL" RESERV	E		
	GRADE	TONS	OZ AU
UNIT 1	0.169	117,277	19,833
UNIT 2	0.485	775,279	376,197
(CHIMNEY)	0.746	226,171	168,651
UNIT 3	0.266	45,818	12,167
UNIT 4	ERR	0	0
UNIT 5	0.282	99,856	28,161
UNIT 6	0.330	823,461	271,996
UNIT 7	0.279	67,085	18,734
UNIT 8	ERR	0	0
TOTALS	0.377	1,928,776	727,088
MINING RESERVE WITH 15% DILUTION	0.328	2,218,093	727,088

0,0 gale

SUMMARY FOR ORIGINAL "RUSSELL" RESERVE							
	GRADE	TONS	OZ AU				
UNIT 1	0.169	117,277	19,833				
UNIT 2	0.485	775,279	376,197				
(CHIMNEY)	0.746	226,171	168,651				
UNIT 3	0.266	45,818	12,167				
UNIT 4	ERR	0	0				
UNIT 5	0.282	99,856	28,161				
UNIT 6	0.330	823,461	271,996				
UNIT 7	0.279	67,085	18,734				
UNIT 8	ERR	0	0				
TOTALS	0.377	1,928,776	727,088				
MINING RESERVE WITH 15% DILUTION	0.328	2,218,093	727,088				

SUMMARY FOR 2,500 SQUARE FT MAXIMUM (50' BY 50')								
,	GRADE	TONS	OZ AU					
UNIT 1	0.173	30,192	5,214					
UNIT 2	0.494	221,827	109,595					
(CHIMNEY)	0.761	88,462	67,318					
UNIT 3	0.376	18,894	7,108					
UNIT 4	ERR	0	0					
UNIT 5	0.286	20,385	5,838					
UNIT 6	0.375	173,327	64,945					
UNIT 7	0.279	10,000	2,786					
UNIT 8	ERR	0	0					
TOTALS	0.412	474,625	195,486					
MINING RESERVE WITH 15% DILUTION	0.358	545,818	195,486					

SUMMARY FOR 10,000 SQUARE FT MAXIMUM	100' BY 100	')	
,	GRADE	TONS	OZ AU
UNIT 1	0.169	109,372	18,497
UNIT 2	0.484	652,091	315,903
(CHIMNEY)	0.746	226,171	168,651
UNIT 3	0.274	42,038	11,521
UNIT 4	ERR	0	0
UNIT 5	0.286	81,538	23,351
UNIT 6	0.368	622,258	229,107
UNIT 7	0.279	40,000	11,142
UNIT 8	ERR	0	0
TOTALS	0.394	1,547,299	609,521
MINING RESERVE WITH 15% DILUTION	0.343	1,779,393	609,521

SUMMARY FOR 5,625 SQUARE FT MAXIMUM (75' BY 75')								
	GRADE	TONS	OZ AU					
UNIT 1	0.173	67,933	11,731					
UNIT 2	0.496	463,571	230,135					
(CHIMNEY)	0.758	183,198	138,785					
UNIT 3	0.314	30,260	9,507					
UNIT 4	ERR	0	0					
UNIT 5	0.286	45,865	13,135					
UNIT 6	0.380	379,691	144,459					
UNIT 7	0.279	22,500	6,268					
UNIT 8	ERR	0	0					
TOTALS	0.411	1,009,820	415,234					
MINING RESERVE WITH 15% DILUTION	0.358	1,161,293	415,234					

Hole #	Pod#	Thick	Ar	ea	Grade	Tons	Ounces
SOUTH OI	RE ZONE						
/RL27	*	1	40	12569	0.169	38674	6536
RL41C	*	1	17	9613	0.171	12571	2150
RL66	*	1	13	9342	0.136	9342	
of RL129C	*	1	31	7010	0.243		
RL209C	*	1	16	9404	0.154		
RL247	*	1	40	9230			
RL3	*	2	25	12500			
O-RL5	*	2	98	3805			
0 × RL22	*	2	30	3754		8663	
0~RL25	*	2	25	20602			
RL35	*	2	15	8340			
RL40C	*	2	23	2737	0.094	4842	
RL41C	*	2	17	4800		6277	
0 FRL52C	*	2	29	5816	0.151	12974	1959
RL55C	*	2	29	10732	0.325	23941	7781
RL57	*	2	30	10671	0.778		
RL60	*	2	22	5822			
OVRL71C	*	2	37	13918			
RL75C	*	2	19	29827			
@RL89C	*	2	34	4442			
RL104C	*	2	107	19630			
PRL108C	*	2	35	4420			
RL123C	*	2	35	9330			
RL125C	*	2	41	10463	0.334	32999	
RL130C	*	2	39	10708			
RL159C	*	2	169	4905			
RL171	*	2	70	3116			
RL192C	*	2	45	5709			
RL193C	*	2	172	8873			
RL195C	*	2	63	7032			
RL208C	*	2	70.5	8009			
RL209C	*	2	43	11020			4739
	*	2	20	3652			
@ RL220	*	2	30	11789			
0 × RL247	*	2	35	6725			
RL289	*	2	119	4917			
RL41C	*	3	35	11404			
RL171	*	3	60	1802			
RL192C	*	3	20	4419			
© > /RL257	*	4	20	12573			
RL272	*	4	26	11749			
AL RL82C	*	5	42	11749			
RL88C	*	5	64	12573			
RL82C	*	6	18.8	9965			
RL89C	*	6	42	8068			
RL93C	*	6	91	16730			
							8555

RL94C	w	6	30	23778	0.097	54872	5323	
RL102	*	6	28.5	9010	0.037	19753	3555	
RL106C	*	6	11	20869	0.104	17658	1836	
€ CRL109C	*	6	19	7560	0.104	11049	1624	
RL145	*	6	26	15881	0.147	31762	8385	
RL159C	*			7116				
RL168	*	6	31		0.119	16969	2019	
RL169	*	6	45 05	9282	2.115	32130	67955	
RL170	*	6	25	17138	0.137 0.121	32958	4515 6915	
o ∠RL185	*	6	55	13508		57149		
	*	6	20	13141	0.103	20217	2082	
RL186	*	6	105	15642	0.183	126339	23120	
RL187		6	55	7405	0.598	31329	18735	
0 VRL188	*	6	25	21930	0.1	42173	4217	
RL191C	*	6	110	15686	0.196	132728	26015	
RL194C	*	6	30	10536	0.108	24314	2626	
RL198C	*	6	80	7597	0.724	46751	33848	
RL201C	*	6	48	14856	0.415	54853	22764	
PL206C	*	6	17	16460	0.092	21525	1980	
0 ~ RL213	*	6	25	20520	0.159	39462	6274 \circ	1.0
@ RL217	*	6	40	20719	0.098	63751	6248 \circ	K-0)
RL261	*	6	60	10198	0.179	47068	8425	N
0 √RL273	*	6	75	10778	0.154	62181	9576 0 ≒	(- 0)
RL289C	*	6	51	3001	0.162	11773	1907	
RL94C	*	7	17	15587	0.205	20383	4179	
RL131C	*	7	15	17104	0.564	19735	11131	
RL206C	*	7	20	17528	0.127	26966	3425	
DV RL217	*	7	35	21681	0.16	58372	9340	
∠0 RL214	*	8	25	8910	0.207	17135	3547	
SUMMAR	Υ							
UNIT 1					0.169	117277	19833	
UNIT 2					0.425	979279	416248	
(CHIMI	NEY)				0.746	226171	168651	
UNÌT 3	•				0.266	45818	12167	
UNIT 4					0.178	42841	7644	
UNIT 5					0.282	99856	28161	
UNIT 6					0.269	1156349	311157	
UNIT 7					0.224	125456	28073	
UNIT 8					0.207	17135	3547	
				*	0.320	2,584,012	826830	
				112	. Wischa	uder		

Rick Ischauder

Rick Ischauder

Aug

1993

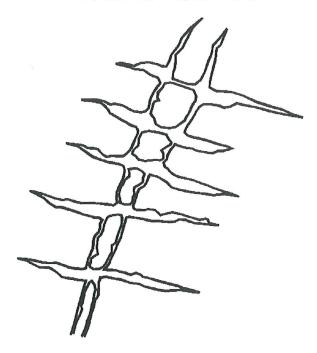
Rosebud Project – Preliminary Resource Estimate

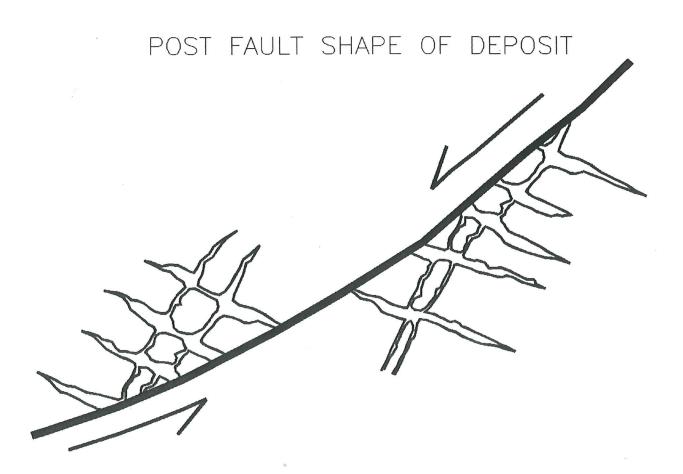
Hole #	Pod#	Thick	Are	a	Grade	Tons	Ounces
SOUTH OF RL27 RL41C RL66 RL129C RL209C RL247 RL3	* * * * * * * * *	1 1 1 1 1 2	40 17 13 31 16 40 25	12569 9613 9342 7010 9404 9230 12500	0.171 0.136 0.243 0.154 0.142	12571 9342 16716 11574 2 28400	2150 1271 4062 1782 4033
RL35 RL40C RL41C	*	2 2 2	15 23 17	8340 2737 4800	0.094	4842	455
RL55C RL57 RL60	* *	2 2 2	29 30 22	10732 10671 5822	0.778	3 24625	19159
RL75C	*	2	19	29827	0.229	9 43593	9983
RL104C	*	2	107	19630	0.619	161570	100012
RL123C RL125C RL130C RL159C RL171 RL192C RL193C RL195C RL208C RL209C	* * * * * * * * * * * * * * * * * * *	2 2 2 2 2 2 2 2 2 2 2	35 41 39 169 70 45 172 63 70.5 43	9330 10463 10708 4905 3116 5709 8873 7032 8009 11020	0.334 0.403 0.803 0.203 0.203 0.699 0.159	32999 3 32124 7 63765 3 16778 6 19762 5 117397 5 34078	11022 12946 51458 3406 5138 7 81591 5282 3 5690
RL289 RL41C RL171 RL192C	* * *	2 3 3 3	119 35 60 20	4917 11404 1802 4419	0.17 0.56	1 30703 6 8317	5250 7 4707
RL82C RL88C RL82C RL89C RL93C	* * * * *	5 5 6 6 6	42 64 18.8 42 91	11749 12573 9965 8068 16730	3 0.17 5 0.31 3 0.39	9 61898 5 1441 6 26066	3 11080 1 4539 6 10322

RL102	*	6	28.5	9010		0.18	19753	3555
RL145 RL159C RL168 RL169 RL170	* * * *	6 6 6 6	26 31 45 25 55	15881 7116 9282 17138 13508	;	0.264 0.119 2.115 0.137 0.121	31762 16969 32130 32958 57149	8385 2019 67955 4515 6915
RL186 RL187	*	6 6	105 55	15642 7405		0.183 0.598	126339 31329	23120 18735
RL191C RL194C RL198C RL201C	* * *	6 6 6	110 30 80 48	15686 10536 7597 14856		0.196 0.108 0.724 0.415	132728 24314 46751 54853	26015 2626 33848 22764
RL261	*	6	60	10198		0.179	47068	8425
RL289C RL94C RL131C RL206C	* * * *	6 7 7 7	51 17 15 20	3001 15587 17104 17528		0.162 0.205 0.564 0.127	11773 20383 19735 26966	1907 4179 11131 3425
SUMMAR	Y							
UNIT 1 UNIT 2 (CHIMI) UNIT 3 UNIT 4 UNIT 5 UNIT 6 UNIT 7 UNIT 8	NEY)		ซ์			0.169 0.485 0.746 0.266 ERR 0.282 0.330 0.279 ERR	117,277 775,279 226,171 45,818 0 99,856 823,461 67,085 0	19,833 376,197 168,651 12,167 0 28,161 271,996 18,734 0
mining res	serve wi	th 15% dilutio	n			0.377 0.328	1,928,776 2,218,093	727,088 727,088

Dare Russel"
Dare Russel"
1993
esemate in 1993

SHAPE OF TYPICAL CARLIN OR BATTLE MOUNTAIN TREND DEPOSIT







Technical Services

Fax: (208) 769-4122

Date: $11/22/93$
To: RICK ISCHAUDER
W/ Hecla MINING Company
From: FRED STAHLBUSH
Hecla Mining Company
Transmitting: Pages (Including Cover)
Operator:
Rick,
Call me for Explanation!!
Later

SUMMARY FOR ORIGINAL "TSCHAUDER" RESERVE						
	GRADE	TONS	OZ AU			
UNIT 1	0.169	117,277	19,833			
UNIT 2	0.425	979,279	416,248			
(CHIMNEY)	0.746	226,171	168,651			
UNIT 3	0.266	45,818	12,167			
UNIT 4	0.178	42,841	7,644			
UNIT 5	0.282	99,856	28,161			
UNIT 6	0.269	1,156,349	311,157			
UNIT 7	0.224	125,456	28,073			
UNIT 8	0.207	17,135	3,547			
		-				
TOTALS	0.320	2,584,012	826,830			

SUMMARY FOR 2,500 SQUARE FT MAXIMUM (50' BY 50')						
•	GRADE	TONS	OZ AU			
UNIT 1	0.173	30,192	5,214			
UNIT 2	0.420	293,558	123,332			
(CHIMNEY)	0.761	88,462	67,318			
UNIT 3	0.376	18,894	7,108			
UNIT 4	0.179	8,846	1,586			
UNIT 5	0.286	20,385	5,838			
UNIT 6	0.318	223,712	71,179			
UNIT 7	0.231	16,731	3,863			
UNIT 8	0.207	4,808	995			
TOTALS	0.355	617,125	219,114			

SUMMARY FOR 10,000 SQUARE FT MAXIMUM (100' BY 100')							
	GRADE	TONS	OZ AU				
UNIT 1	0.169	109,372	18,497				
UNIT 2	0.427	820,423	350,066				
(CHIMNEY)	0.746	226,171	168,651				
UNIT 3	0.274	42,038	11,521				
UNIT 4	0.179	35,385	6,343				
UNIT 5	0.286	81,538	23,351				
UNIT 6	0.309	820,230	253,518				
UNIT 7	0.231	66,923	15,450				
UNIT 8	0.207	17,135	3,547				
TOTALS	0.342	1,993,045	682,293				

SUMMARY FOR 5,625 SQUARE FT MAXIMUM (75' BY 75')						
	GRADE	TONS	OZ AU			
UNIT 1	0.173	67,933	11,731			
UNIT 2	0.428	597,554	255,987			
(CHIMNEY)	0.758	183,198	138,785			
UNIT 3	0.314	30,260	9,507			
UNIT 4	0.179	19,904	3,568			
UNIT 5	0.286	45,865	13,135			
UNIT 6	0.321	493,057	158,485			
UNIT 7	0.231	37,644	8,691			
UNIT 8	0.207	10,817	2,239			
			•			
TOTALS	0.356	1,303,034	463,342			



Technical Services

Fax: (208) 769-4122

Date:	11/22/93	
To:	Rick Tschauder	
	WHECLA	
From:	FRED STAHLBU	LSH
	Hecla Mining Company	ny
Transı	mitting: <u>3</u> (Including Cover)	_ Pages
Opera		
FA	BACK-UP FOR	IN FORMATION
(SCIGINAL DATA	BASE
		Later
		Fred

Rosebud Project – Preliminary Resource Estimate CAUTION!!!!! – SPECIAL RUN FOR RICK TSCHAUDER

			KUN	FOR RIC	CKISCHA		
Hole #	Pod#	Thick	Α	rea	Grade	Tons	Ounces
SOUTH OF	RE ZONE						
RL27	*	1	40	12,569	0.169	38,674	6,536
RL41C	*	1	17	9,613		200 Section # 00000 00 1000	2,150
RL66	*	1	13	9,342			
RL129C	*	1	31	7,010		•	(0)
RL209C	*	1	16	9,404			
RL247	*	1	40	9,230		54 72 Press 50 199	
RL3	*	2	25	12,500			
RL5	*	2	98	3,805			150
RL22	*	2	30	3,754			
RL25	*	2	25	20,602		1000 \$ 100 100 100	
RL35	*	2	15	8,340			
RL40C	*	2	23	2,737			
RL41C	*	2	17	4,800		, -	
RL52C	*	2	29	5,816			· ·
RL55C	*	2	29	10,732			7,781
RL57	*	2	30	10,671		•	
RL60	*	2	22	5,822			
RL71C	*	2	37	13,918			
RL75C	*	2	19	29,827			-
RL89C	*	2	34	4,442			
RL104C	*	2	107	19,630		- VIII-	100 to 100 to 100 to 100 to 100
RL108C	*	2	35	4,420			
RL123C	*	2	35	9,330		•	V#1
RL125C	*	2	41	10,463		200.00	20 000 000 000 000
RL130C	*	2	39	10,708			
RL159C	*	2	169	4,905			
RL171	*	2	70	3,116		•	
RL192C	*	2	45	5,709		0 000-0 000 -0 -0-00	10-01 Ft 10 10-00-00
RL193C	*	2	172	8,873			
RL195C	*	2	63	7,032			
RL208C	*	2	70.5	8,009		100 100 100 100	
RL209C	*	2	43	11,020			4,739
RL210C	*	2	20	3,652			
RL220	*	2	30	11,789			
RL247	*	2	35	6,725			
RL289	*	2	119	4,917			
RL41C	*	3	35	11,404			150
RL171	*	3	60	1,802			
RL192C	*	3	20	4,419			
RL257	*	4	20	12,573		S.*	
RL272	*	4	26	11,749		10 10 100	
RL82C	*	5	42	11,749			
RL88C	*	5	64				
ILOUG		3	04	12,573	0.179	61,898	11,080

Rosebud Project – Preliminary Resource Estimate CAUTION!!!!!-SPECIAL RUN FOR RICK TSCHAUDER

Hole #	Pod #	Thick	1	∖rea	Grade	Tons	Ounces
DI 000	*		40.0	0.005	0.045		
RL82C	*	6	18.8	9,965	0.315	14,411	4,539
RL89C	*	6	42	8,068	0.396	26,066	
RL93C	*	6	91	16,730	0.225	117,110	
RL94C	*	6	30	23,778	0.097	54,872	
RL102	*	6	28.5	9,010	0.180	19,753	15
RL106C	*	6	11	20,869	0.104	17,658	
RL109C	*	6	19	7,560	0.147	11,049	
RL145	*	6	26	15,881	0.264	31,762	
RL159C	*	6	31	7,116	0.119	16,969	•
RL168	*	6	45	9,282	2.115	32,130	
RL169	*	6	25	17,138	0.137	32,958	
RL170	*	6	55	13,508	0.121	57,149	
RL185	, * *	6	20	13,141	0.103	20,217	
RL186		6	105	15,642	0.183	126,339	
RL187	*	6	55	7,405	0.598	31,329	
RL188	*	6	25	21,930	0.100	42,173	
RL191C	*	6	110	15,686	0.196	132,728	
RL194C	*	6	30	10,536	0.108	24,314	
RL198C	*	6	80	7,597	0.724	46,751	33,848
RL201C	*	6	48	14,856	0.415	54,853	
RL206C	*	6	17	16,460	0.092	21,525	•
RL213	*	6	25	20,520	0.159	39,462	6,274
RL217	*	6	40	20,719	0.098	63,751	6,248
RL261	*	6	60	10,198	0.179	47,068	8,425
RL273	*	6	75	10,778	0.154	62,181	9,576
RL289C	*	6	51	3,001	0.162	11,773	1,907
RL94C	*	7	17	15,587	0.205	20,383	4,179
RL131C	*	7	15	17,104	0.564	19,735	11,131
RL206C	*	7	20	17,528	0.127	26,966	3,425
RL217	*	7	35	21,681	0.160	58,372	15
RL214	*	8	25	8,910	0.207	17,135	

SUMMARY FOR ORIGINAL "TSCHAUDER" RESERVE						
	GRADE	TONS	OZ AU			
UNIT 1	0.169	117,277	19,833			
UNIT 2	0.425	979,279	416,248			
(CHIMNEY)	0.746	226,171	168,651			
UNIT 3	0.266	45,818	12,167			
UNIT 4	0.178	42,841	7,644			
UNIT 5	0.282	99,856	28,161			
UNIT 6	0.269	1,156,349	311,157			
UNIT 7	0.224	125,456	28,073			
UNIT 8	0.207	17,135	3,547			
TOTALS	0.320	2,584,012	826,830			

HECLA MINING COMPANY

November 29, 1993

MEMORANDUM TO:

Ralph Noyes

FROM:

Rick Tschauder fich

SUBJECT:

Rosebud Reserves - Additional Information

This memo expands on the discussion of the difference between the Hecla and the Equinox reserve estimates, and reveals some new points which we did not make in the memo of November 16.

Bob Weicker, Equinox's Chief Mine Geologist built a set of northwest facing sections on which he calculated his reserve estimate. The mineralized zones appear very continuous in this long section, as they do in plan. In examining the two reserves, it is evident that they are not directly comparable. Weicker picked different intercepts that Hecla did, in that Hecla included more internal dilution than the Equinox reserve. Hecla also did not include some narrow intercepts on the fringes of the deposits. Therefore, we could not do a polygon by polygon comparison. Included is a sketch of a polygon by polygon comparison from zone 6 that demonstrates how difficult it is to compare the reserves. The three Hecla polygons compare to two Equinox polygons. In section, two holes plot in the same place, while in plan, they are separated by enough distance to construct two separate polygons.

Weicker was more conservative with his polygons as discussed below. There are a number of reasons why his estimate is overly conservative. The two most important are because of the projection plane he used (which affects polygon size), and because of instructions from his Chief Operating Officer. Other techniques which we consider overly conservative include his assay cutting techniques and not considering external dilution.

Differences due to different polygon sizes.

The practice of using variograms to establish area of influence parameters and to determine drill spacing is at least 15 years old. So long as the variogram range is about 2/3 the drill hole spacing, drilling is tight enough to calculate a drill-indicated resource estimate. Unfortunately, variogram analysis is usually after the fact. The variogram analyses we performed with Larry Allen of Mine Reserves Associates¹ supports the decision to use larger polygons in that the

¹ Mine Reserves Associates provides consulting services to the mineral industry in the areas of geostatistical analysis, ore reserve estimation, and mine planning. The company has worked on several gold deposits in Nevada including Alligator Ridge, Candelaria, Getchell, Gold Bar, Gold Pick, Gold Ridge, Ivanhoe, Mt. Hamilton, Rawhide, Relief Canyon, and Round Mountain. They have a world-wide client list, and are well-respected in the industry. Larry Allen is a Principal Mining Engineer of the firm, and has over ten years experience with geostatistical ore reserve estimation. He has worked on several Hecla projects, including the blanket ore at Republic, Yellowpine, Green's Creek, and evaluation of Mount Hamilton.

search radius for grade in zones 2 and 6 exceeded 200 feet for all indicators while the drill hole spacing is about 100 feet. We used a technique called indicator kriging which breaks up the deposit into a series of grade or thickness populations, then handles each population separately, finally assigning a weighted grade or thickness to each block based on the grade of the indicators and on the influence each indicator has on the block, thus the range for every indicator must be considered. If the high grade indicator had a lower range, we would have had to reduce the maximum size for the high grade polygons. The larger polygons (up to 31,400 ft²) are justified statistically for a drill-indicated reserve estimate. Ten polygons exceeded (15,000 ft²; only one exceeded (20,000 ft²). That one polygon was large (29,827 ft²) but low grade (0.229 opt). Weicker took a conservative 100 by 100 (equivalent) maximum polygon size, as directed by management and dictated by his cross section spacing and drill hole projection problems.

The attached graph and the table below shows what happens if we reduce polygon size in the Hecla reserve. If the size of the Hecla polygons are cut to Weicker's maximum polygon size, then the difference in tons shrinks to 111,000 and the ounces to 61,000. However, as evident from the table and graph, the extra ounces are carried in just a few polygons, most of which are of marginal grade (but still ore). Note that at the larger polygon sizes, as the maximum size of the polygons decreases, the average reserve grade remained steady, while tons and ounces decreased only slightly. At a maximum size of 12,500 ft² the reserve grade and the reserve tons decrease markedly while the reserve ounces decrease at a much slower rate. What this demonstrates is that the high grade (and therefore higher margin) intercepts are contained within the smaller polygons that are not affected by cutting the maximum polygon size. There is a 117,200 contained ounces difference is due to the difference in maximum polygon sizes used (727,500 - 610,300), but 2/3 of these ounces are in lower grade polygons.

Poly. Size	Tons Grade		Ounces
10,000	1,779,000	0.343	610,300
12,500	1,974,000	0.332	655,400
15,000	2,108,000	0.328	691,400
20,000	2,202,000	0.329	724,300
25,000	2,210,000	0.328	724,900
30,000	2,218,000	0.328	727,500

Differences due to Dilution.

The Hecla resource estimate added five feet above and below the ore zone at reported grade for mining dilution in the vertical dimension. The Equinox estimate did not. I did not calculate a weighted grade for this material, but the deposit is surrounded in the vertical dimension by low grade material. If we assume that this low grade material is half the cutoff grade used for the reserve estimate (i.e., 0.05 opt), then we would add 20,400 ounces to the Hecla estimate that would not appear in the Equinox estimate.

In addition, we added a 15% lateral and internal dilution at no grade. The grade assumption introduces some conservatism to the resource estimate, as lateral dilution will be about the same grade as vertical dilution.

Differences due to Assay cutting.

Lac assayed the higher grade intervals at least twice and as many as nine times. The grade that both Hecla and Equinox used for the reserve estimate is the average of these assays or, in some cases, a "referee" assay (i.e., the average would not include an outlier). I felt that I could use these numbers without further cutting of assay values, as it appears obvious that there are parts of the deposit, particularly in the chimney, that will exceed 1 opt. Equinox cut all assays to 2 opt. This had the effect of discounting the high grade assays twice. In comparing the Equinox polygon grade estimate to the average of the assays that make up the composite ore interval, I noted that the block grade was, approximately 0.10 opt lower than the average of the assays in the composite.

If the high grade polygons in the Hecla estimate are reduced by 0.1 opt, then 86,800 ounces are cut from the reserve.

At the direction of the chief operating officer, Weicker only extended grade out from the hole 25 feet. Past 25 feet, he diluted the grade by averaging it with the nearest low grade hole, so that if an intercept averaged 0.45 opt gold and the nearest hole 100 feet away had an intercept that averaged 0.05 opt gold, the polygon centered 37.5 feet from the ore hole and 62.5 feet from the waste hole was given a grade of 0.25 opt gold. Weicker believes this is the single most important difference between the two reserve estimates, as the tonnage would match closely if Equinox had diluted the reserve as we did.

SUMMARY

If we were to just subtract the ounces indicated above, the Hecla reserve would be depleted by substantially more than the difference of 549,00 tons and 279,500 ounces. Because the difference in methodology is so great, there is no way to compare the numbers and say that x% of the difference is due to this factor, y% to a second factor and z% to a third.

Recently, I talked with Steve Ristorcelli of Mine Development Associates in Reno². Steve completed a study of the Rosebud for a competitor during the summer. While he could not discuss the final numbers, he did confirm that projecting to plan view is the proper methodology to use in this type of deposit, and that both the earlier estimates by Lac and the estimate by Equinox are too conservative. In fact, he was very unkind to the Lac estimate, stating that it was done by an exploration geologist with no sense for what is minable and what was not and was best relegated to the paper shredder. We talked specifically about handling the high grade "chimney" ores and he agrees that that part of the deposit is real, is high grade, and needs to

² Mine Development Associates is another firm very similar to Mine Reserves Associates. Their client list includes Barrick Goldstrike, Cambior, Minnova, Noranda, Pegasus Lac, FMC Gold Western Mining, and several other major companies. They are familiar with Nevada deposits based on their work at Barrick Goldstrike, Round Mountain, Getchell, El Indio/Tambo, etc.

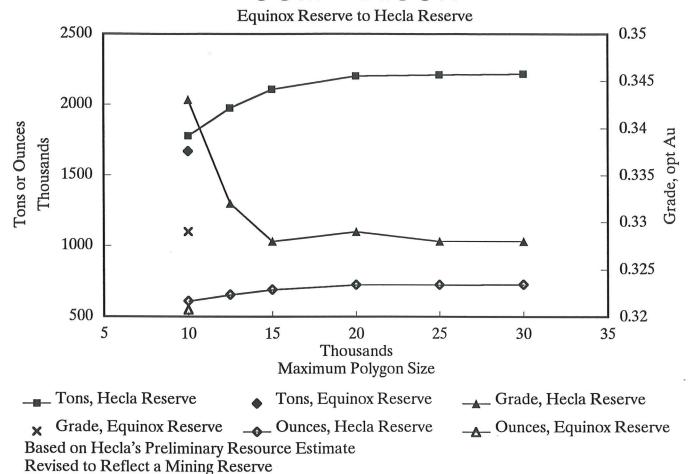
be considered as a high grade deposit rather than as spurious high grade assays in a substantially lower grade resource.

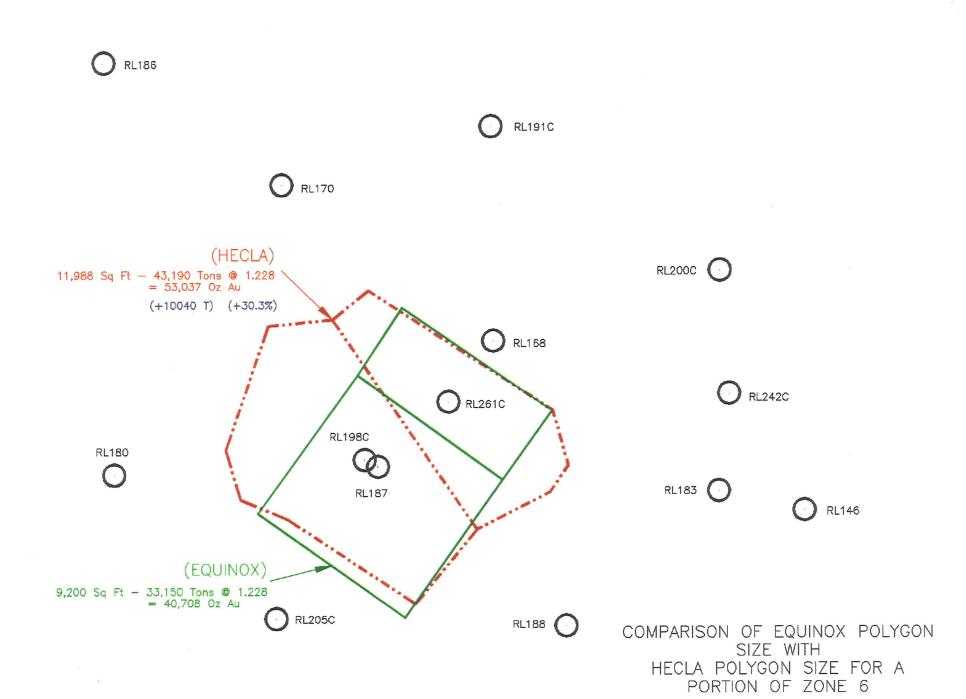
Larry Allen (see above), who is doing a reserve audit on the Rosebud for us, has also assured me that the Equinox reserve estimate is conservative, and that the techniques Hecla used to estimate reserves are acceptable and defendable. He also believes the high grade part of the deposit is real.

In addition to our in-house expertise, two well-respected ore reserve estimating firms with world-wide client lists agree that the methodology Hecla used is more appropriate than the methodology Lac or Equinox used. Our experience with the blanket ores at Republic have given us a good feeling for what dilution will be. The consensus between Hecla and two ore reserve estimators who have done an ore reserve on the Rosebud is that the high grade ores are real and should not be treated as statistical "nuggets".

Assay cutting may be an issue, but it is not good engineering. When Francois Pitard worked with us on Grouse Creek, one of the very strong points he made is that you don't cut assays. Cutting assays skews your population statistics. The entire field of indicator kriging evolved to analyze high grade populations in order to properly evaluate high grade intercepts. It all comes down to understanding the geology and geometry of the deposit and modelling it correctly. The indications we have gotten from the outside experts is that we have modelled the deposit correctly.

COMPARISON





Upside Potential at the Rosebud Property

The potential to find additional reserves on the Rosebud property is excellent. Potential falls into three categories: discovery of more ore within the present resource area, discovery of extensions to the known resource (either contiguous with it or offset by faulting), and discovery of satellite ore zones.

Discovery of more ore within the present resource area will have the largest impact on project economics. The best chance to find ore within the present resource is to discover more "chimney" zones. Chimney zones have thicknesses exceeding 100 feet at grades between 0.60 and 0.80 opt Au. If they are the size of the zone 2 chimney, these will contain 150,000 ounces or more. There is probably a chimney in the north part of the deposit in the vicinity of holes RL 104C (107' - 0.619) and RL 93C (91' - 0.225), another in the east part of the deposit in the vicinity of hole RL 198C (80' - 0.724), and possibly a third just east of the present resource area.

The potential to find extensions of known ore bodies is very good. Drilling has not delineated the boundaries of the mineralized beds in several areas in the north and east parts of the deposit. The deposit appears to be bound by post-mineral faulting along the long axis of the system. Drilling is concentrated in the hangingwall of a major structure called the South Ridge fault. The geometry of the deposit strongly suggests that the fault displaced the upper part of the mineralized system from the lower part, leaving an undiscovered part of the deposit in the hills to the southwest. The attached diagram illustrates how closely Rosebud would resemble a typical large Battle Mountain trend or Carlin trend deposit if this interpretation is correct.

There are 15 other drill targets on the Rosebud land package. While Lac finished some drilling away from the Rosebud deposit, none of those holes penetrated the stratigraphy containing the ore reserve.

Rosebud Project - Preliminary Resource Estimate

	CAUTION Hole #	-SP Pod#	ECIAL Thick		FOR RIC	KT. (RUS Grade	SSELL RE	SERVE) Ounces
	COLITH OR	E ZONE						
	SOUTH OR RL27	E ZONE *	1	40	10 560	0.169	20 674	C F0C
	RL41C	*	1	17	12,569 9,613	0.109	38,674 12,571	1000 Factor 100 to 100
	RL66	*	1	13	9,342	0.171	9,342	2,150 1,271
	RL129C	*	1	31	7,010	0.130	16,716	•
	RL209C	*	i	16	9,404	0.154	11,574	
	RL247	*	i	40	9,230	0.142		N. 181 N. 180 Laure
	RL3	*	2	25	12,500	0.224	24,038	00,000,000
					, ~ ~	· · · · · ·	_ 1,000	0,000
	RL35	*	2	15	8,340	0.117	9,623	1,126
	RL40C	*	2	23	2,737	0.094	4,842	
	RL41C	*	2	17	4,800	0.511	6,277	3,208
	RL55C	*	2	29	10,732	0.325	23,941	7,781
	RL57	*	2	30	10,671	0.778		150
X	RL60	*	2	22	5,822	0.164	9,853	•
	RL75C	*	2	19	29,827	0.229	43,593	9,983
							.0,000	3,000
	RL104C	*	2	107	19,630	0.619	161,570	100,012
	RL123C	*	2	35	9,330	0.422	25,119	10,600
	RL125C	*	2	41	10,463	0.334	32,999	
	RL130C	*	2	39	10,708	0.403	32,124	12,946
	RL159C	*	2	169	4,905	0.807	63,765	51,458
	RL171	*	2	70	3,116	0.203	16,778	1.5
	RL192C	*	2	45	5,709	0.260	19,762	
	RL193C	*	2	172	8,873	0.695	117,397	
	RL195C	*	2	63	7,032	0.155	34,078	1.5
	RL208C	*	2	70.5	8,009	0.131	43,433	•
	RL209C	*	2	43	11,020	0.130	36,451	4,739
	RL289	*	2	119	4,917	0.791	45,009	35,602
	RL41C	*	3	35	11,404	0.171	30,703	
	RL171	*	3	60	1,802	0.566	8,317	85
	RL192C	*	3	20	4,419	0.325	6,798	
	RL82C	*	5	42	11,749	0.450	37,958	17,081
	RL88C	*	5	64	12,573	0.179		-

Rosebud Project – Preliminary Resource Estimate CAUTION!!!!! – SPECIAL RUN FOR RICK T. (RUSSELL RESERVE)

Hole #	Pod #	Thick		rea	Grade	SSELL RE Tons	SERVE) Ounces
RL82C RL89C RL93C	* * *	6 6 6	18.8 42 91	9,965 8,068 16,730	0.315 0.396 0.225	14,411 26,066 117,110	4,539 10,322 26,350
RL102	*	6	28.5	9,010	0.180	19,753	3,555
RL145 RL159C RL168 RL169 RL170	* * * * *	6 6 6 6	26 31 45 25 55	15,881 7,116 9,282 17,138 13,508	0.264 0.119 2.115 0.137 0.121	31,762 16,969 32,130 32,958 57,149	8,385 2,019 67,955 4,515 6,915
RL186 RL187	*	6 6	105 55	15,642 7,405	0.183 0.598	126,339 31,329	23,120 18,735
RL191C RL194C RL198C RL201C	* * *	6 6 6	110 30 80 48	15,686 10,536 7,597 14,856	0.196 0.108 0.724 0.415	24,314	26,015 2,626 33,848 22,764
RL261	*	6	60	10,198	0.179	47,068	8,425
RL289C RL94C RL131C RL206C	* * *	6 7 7 7	51 17 15 20	3,001 15,587 17,104 17,528	0.162 0.205 0.564 0.127	20,383 19,735	1,907 4,179 11,131 3,425

SUMMARY FOR ORIGINAL "RUSSELL" RESERVE						
GRADE TONS OZA						
UNIT 1	0.169	117,277	19,833			
UNIT 2	0.485	775,279	376,197			
(CHIMNEY)	0.746	226,171	168,651			
UNIT 3	0.266	45,818	12,167			
UNIT 4	ERR	0	0			
UNIT 5	0.282	99,856	28,161			
UNIT 6	0.330	823,461	271,996			
UNIT 7	0.279	67,085	18,734			
UNIT 8	ERR	0	0			
			50000			
TOTALS	0.377	1,928,776	727,088			
MINING RESERVE WITH 15% DILUTION	0.328	2,218,093	727,088			

SUMMARY FOR ORIGINAL "RUSSELL" RESERVE				
	GRADE	TONS	OZ AU	
UNIT 1	0.169	117,277	19,833	
UNIT 2	0.485	775,279	376,197	
(CHIMNEY)	0.746	226,171	168,651	
UNIT 3	0.266	45,818	12,167	
UNIT 4	ERR	0	0	
UNIT 5	0.282	99,856	28,161	
UNIT 6	0.330	823,461	271,996	
UNIT 7	0.279	67,085	18,734	
UNIT 8	ERR	0	0	
TOTALS	0.377	1,928,776	727,088	
MINING RESERVE WITH 15% DILUTION	0.328	2,218,093	727,088	

SUMMARY FOR 2,500 SQUARE FT MAXIMUM (50' BY 50')						
GRADE TONS						
UNIT 1	0.173	30,192	5,214			
UNIT 2	0.494	221,827	109,595			
(CHIMNEY)	0.761	88,462	67,318			
UNIT 3	0.376	18,894	7,108			
UNIT 4	ERR	0	0			
UNIT 5	0.286	20,385	5,838			
UNIT 6	0.375	173,327	64,945			
UNIT 7	0.279	10,000	2,786			
UNIT 8	ERR	0	0			
TOTALS	0.412	474,625	195,486			
MINING RESERVE WITH 15% DILUTION	0.358	545,818	195,486			

SUMMARY FOR 10,000 SQUARE FT MAXIMUM (100' BY 100')					
	GRADE	TONS	OZ AU		
UNIT 1	0.169	109,372	18,497		
UNIT 2	0.484	652,091	315,903		
(CHIMNEY)	0.746	226,171	168,651		
UNIT 3	0.274	42,038	11,521		
UNIT 4	ERR	0	0		
UNIT 5	0.286	81,538	23,351		
UNIT 6	0.368	622,258	229,107		
UNIT 7	0.279	40,000	11,142		
UNIT 8	ERR	0	0		
TOTALS	0.394	1,547,299	609,521		
MINING RESERVE WITH 15% DILUTION	0.343	1,779,393	609,521		

SUMMARY FOR 5,625 SQUARE FT MAXIMUM (75' BY 75')				
	GRADE	TONS	OZ AU	
UNIT 1	0.173	67,933	11,731	
UNIT 2	0.496	463,571	230,135	
(CHIMNEY)	0.758	183,198	138,785	
UNIT 3	0.314	30,260	9,507	
UNIT 4	ERR	0	0	
UNIT 5	0.286	45,865	13,135	
UNIT 6	0.380	379,691	144,459	
UNIT 7	0.279	22,500	6,268	
UNIT 8	ERR	0	0	
TOTALS	0.411	1,009,820	415,234	
MINING RESERVE WITH 15% DILUTION	0.358	1,161,293	415,234	



Technical Services

Fax: (208) 769-4122

Date: $11/22/93$
To: RICK ISCHAUDER
W/ Hecla MINING Company
From: FRIO STAHLBUSH
Hecla Mining Company
Transmitting: Pages (Including Cover)
Operator:
Rick,
Call me for Explanation!!
Later

SUMMARY FOR ORIGINAL "TSCHAUDER" RESERVE						
GRADE TONS OZ						
UNIT 1	0.169	117,277	19,833			
UNIT 2	0.425	979,279	416,248			
(CHIMNEY)	0.746	226,171	168,651			
UNIT 3	0.266	45,818	12,167			
UNIT 4	0.178	42,841	7,644			
UNIT 5	0.282	99,856	28,161			
UNIT 6	0.269	1,156,349	311,157			
UNIT 7	0.224	125,456	28,073			
UNIT 8	0.207	17,135	3,547			
		,				
TOTALS	0.320	2,584,012	826,830			

SUMMARY FOR 2,500 SQUARE FT MAXIMUM (50' BY 50')						
GRADE TONS OZ AU						
UNIT 1	0.173	30,192	5,214			
UNIT 2	0.420	293,558	123,332			
(CHIMNEY)	0.761	88,462	67,318			
UNIT 3	0.376	18,894	7,108			
UNIT 4	0.179	8,846	1,586			
UNIT 5	0.286	20,385	5,838			
UNIT 6	0.318	223,712	71,179			
UNIT 7	0.231	16,731	3,863			
UNIT 8	0.207	4,808	995			
	20 12	,				
TOTALS	0.355	617,125	219,114			

SUMMARY FOR 10,000 SQUARE FT MAXIMUM (100' BY 100')				
	GRADE	TONS	OZ AU	
UNIT 1	0.169	109,372	18,497	
UNIT 2	0.427	820,423	350,066	
(CHIMNEY)	0.746	226,171	168,651	
UNIT 3	0.274	42,038	11,521	
UNIT 4	0.179	35,385	6,343	
UNIT 5	0.286	81,538	23,351	
UNIT 6	0.309	820,230	253,518	
UNIT 7	0.231	66,923	15,450	
UNIT 8	0.207	17,135	3,547	
			5 Francisco	
TOTALS	0.342	1,993,045	682,293	

SUMMARY FOR 5,625 SQUARE FT MAXIMUM (75' BY 75')					
	GRADE	TONS	OZ AU		
UNIT 1	0.173	67,933	11,731		
UNIT 2	0.428	597,554	255,987		
(CHIMNEY)	0.758	183,198	138,785		
UNIT 3	0.314	30,260	9,507		
UNIT 4	0.179	19,904	3,568		
UNIT 5	0.286	45,865	13,135		
UNIT 6	0.321	493,057	158,485		
UNIT 7	0.231	37,644	8,691		
UNIT 8	0.207	10,817	2,239		
		,	_,		
TOTALS	0.356	1,303,034	463,342		



Technical Services

Fax: (208) 769-4122

Date: $\frac{11/22/93}{}$
To: Rick Tschauder
WHECLA
From: FRED STAHLBUSH
Hecla Mining Company
Transmitting: 3 Pages (Including Cover)
Operator:
BACK-UP FOR IN FORMATION) FAXED EARLIER
ORIGINAL DATA BASE
Later
Fred

Rosebud Project – Preliminary Resource Estimate CAUTION!!!!!-SPECIAL RUN FOR RICK TSCHAUDER

					N 190HA		
Hole #	Pod#	Thick	Ar	rea	Grade	Tons	Ounces
SOUTH O	RE ZONE						
RL27	*	1	40	12,569	0.169	38,674	6,536
RL41C	*	1	17	9,613	0.171	12,571	2,150
RL66	*	1	13	9,342	0.136		
RL129C	*	1	31	7,010	0.243		
RL209C	*	1	16	9,404		11,574	
RL247	*	1	40	9,230			•
RL3	*	2	25	12,500			•
RL5	*	2	98	3,805	0.206		CO . DESCRIPTION AND ADDRESS OF THE PARTY AND
RL22	*	2	30	3,754		8,663	
RL25	*	2	25	20,602		39,619	
RL35	*	2	15	8,340		9,623	•
RL40C	*	2	23	2,737		4,842	10 · 00 attractor
RL41C	*	2	17	4,800		6,277	
RL52C	*	2	29	5,816		12,974	
RL55C	*	2	29	10,732		23,941	7,781
RL57	*	2	30	10,671	0.778	24,625	
RL60	*	2	22	5,822		9,853	
RL71C	*	2	37	13,918		39,613	
RL75C	*	2	19	29,827		43,593	•
RL89C	*	2	34	4,442		11,618	
RL104C	*	2	107	19,630		161,570	
RL108C	*	2	35	4,420		11,900	
RL123C	*	2	35	9,330		25,119	•
RL125C	*	2	41	10,463		32,999	5 100 • 100 ACC 000
RL130C	*	2	39	10,708		32,124	
RL159C	*	2	169	4,905		63,765	
RL171	*	2	70	3,116		16,778	
RL192C	*	2	45	5,709		19,762	
RL193C	*	2	172	8,873		117,397	
RL195C	*	2	63	7,032		34,078	
RL208C	*	2	70.5	8,009		43,433	
RL209C	*	2	43	11,020		36,451	4,739
RL210C	*	2	20	3,652		5,618	
RL220	*	2	30	11,789		27,205	
RL247	*	2	35	6,725		18,106	NO CONTRACTOR OF THE PARTY OF T
RL289	*	2	119	4,917		45,009	15
RL41C	*	3	35	11,404		30,703	
RL171	*	3	60	1,802			100 M. J. 100 M. J. 100
RL192C	*	3	20	4,419		8,317	3
RL257	*	4				6,798	•
RL272	*	4	20	12,573		19,343	
RL82C	*		26 42	11,749		23,498	A 40-300 PM 400 PM
	*	5	42	11,749		37,958	
RL88C		5	64	12,573	0.179	61,898	11,080

Rosebud Project - Preliminary Resource Estimate

CAUTION!!!!!-SPECIAL RUN FOR RICK TSCHAUDER

UAU IIO			HON	I ON MIC	NISCHA		_
Hole #	Pod#	Thick	P	rea	Grade	Tons	Ounces
RL82C	*	6	100	0.065	0.015	4.4.4.4	4.500
	*	6	18.8	9,965		14,411	4,539
RL89C	*	6	42	8,068			· .
RL93C	*	6	91	16,730			
RL94C	*	6	30	23,778		•	
RL102		6	28.5	9,010		19,753	
RL106C	*	6	11	20,869			•
RL109C	*	6	19	7,560			15.0
RL145	*	6	26	15,881	0.264	,	
RL159C	*	6	31	7,116		16,969	
RL168	*	6	45	9,282		32,130	
RL169	*	6	25	17,138		32,958	4,515
RL170	*	6	55	13,508	0.121	57,149	6,915
RL185	*	6	20	13,141	0.103	20,217	2,082
RL186	*	6	105	15,642	0.183	126,339	23,120
RL187	*	6	55	7,405	0.598	31,329	18,735
RL188	*	6	25	21,930	0.100	42,173	4,217
RL191C	*	6	110	15,686	0.196	132,728	26,015
RL194C	*	6	30	10,536			
RL198C	*	6	80	7,597	0.724	46,751	33,848
RL201C	*	6	48	14,856	0.415		
RL206C	*	6	17	16,460	0.092		
RL213	*	6	25	20,520			
RL217	*	6	40	20,719	0.098		6,248
RL261	*	6	60	10,198	0.179	•	
RL273	*	6	75	10,778			9,576
RL289C	*	6	51	3,001	0.162		
RL94C	*	7	17	15,587			· · · · · · · · · · · · · · · · · · ·
RL131C	*	7	15	17,104			•
RL206C	*	7	20	17,528		200	A-C NO -01 -11 -11
RL217	*	7	35	21,681	0.160		
RL214	*	8	25	8,910		17,135	•
1 1 1		5	20	0,510	0.201	17,100	3,347

SUMMARY FOR ORIGINAL "TSCHAUDER" RESERVE						
	GRADE	TONS	OZ AU			
UNIT 1	0.169	117,277	19,833			
UNIT 2	0.425	979,279	416,248			
(CHIMNEY)	0.746	226,171	168,651			
UNIT 3	0.266	45,818	12,167			
UNIT 4	0.178	42,841	7,644			
UNIT 5	0.282	99,856	28,161			
UNIT 6	0.269	1,156,349	311,157			
UNIT 7	0.224	125,456	28,073			
UNIT 8	0.207	17,135	3,547			
		, and the second				
TOTALS	0.320	2,584,012	826,830			

Charlie FYI

HECLA MINING COMPANY

November 29, 1993

MEMORANDUM TO:

Ralph Noyes

FROM:

Rick Tschauder full

SUBJECT:

Rosebud Reserves - Additional Information

This memo expands on the discussion of the difference between the Hecla and the Equinox reserve estimates, and reveals some new points which we did not make in the memo of November 16.

Bob Weicker, Equinox's Chief Mine Geologist built a set of northwest facing sections on which he calculated his reserve estimate. The mineralized zones appear very continuous in this long section, as they do in plan. In examining the two reserves, it is evident that they are not directly comparable. Weicker picked different intercepts that Hecla did, in that Hecla included more internal dilution than the Equinox reserve. Hecla also did not include some narrow intercepts on the fringes of the deposits. Therefore, we could not do a polygon by polygon comparison. Included is a sketch of a polygon by polygon comparison from zone 6 that demonstrates how difficult it is to compare the reserves. The three Hecla polygons compare to two Equinox polygons. In section, two holes plot in the same place, while in plan, they are separated by enough distance to construct two separate polygons.

Weicker was more conservative with his polygons as discussed below. There are a number of reasons why his estimate is overly conservative. The two most important are because of the projection plane he used (which affects polygon size), and because of instructions from his Chief Operating Officer. Other techniques which we consider overly conservative include his assay cutting techniques and not considering external dilution.

Differences due to different polygon sizes.

The practice of using variograms to establish area of influence parameters and to determine drill spacing is at least 15 years old. So long as the variogram range is about 2/3 the drill hole spacing, drilling is tight enough to calculate a drill-indicated resource estimate. Unfortunately, variogram analysis is usually after the fact. The variogram analyses we performed with Larry Allen of Mine Reserves Associates¹ supports the decision to use larger polygons in that the

¹ Mine Reserves Associates provides consulting services to the mineral industry in the areas of geostatistical analysis, ore reserve estimation, and mine planning. The company has worked on several gold deposits in Nevada including Alligator Ridge, Candelaria, Getchell, Gold Bar, Gold Pick, Gold Ridge, Ivanhoe, Mt. Hamilton, Rawhide, Relief Canyon, and Round Mountain. They have a world-wide client list, and are well-respected in the industry. Larry Allen is a Principal Mining Engineer of the firm, and has over ten years experience with geostatistical ore reserve estimation. He has worked on several Hecla projects, including the blanket ore at Republic, Yellowpine, Green's Creek, and evaluation of Mount Hamilton.

search radius for grade in zones 2 and 6 exceeded 200 feet for all indicators while the drill hole spacing is about 100 feet. We used a technique called indicator kriging which breaks up the deposit into a series of grade or thickness populations, then handles each population separately, finally assigning a weighted grade or thickness to each block based on the grade of the indicators and on the influence each indicator has on the block, thus the range for every indicator must be considered. If the high grade indicator had a lower range, we would have had to reduce the maximum size for the high grade polygons. The larger polygons (up to 31,400 ft²) are justified statistically for a drill-indicated reserve estimate. Ten polygons exceeded (15,000 ft²; only one exceeded (20,000 ft²). That one polygon was large (29,827 ft²) but low grade (0.229 opt). Weicker took a conservative 100 by 100 (equivalent) maximum polygon size, as directed by management and dictated by his cross section spacing and drill hole projection problems.

The attached graph and the table below shows what happens if we reduce polygon size in the Hecla reserve. If the size of the Hecla polygons are cut to Weicker's maximum polygon size, then the difference in tons shrinks to 111,000 and the ounces to 61,000. However, as evident from the table and graph, the extra ounces are carried in just a few polygons, most of which are of marginal grade (but still ore). Note that at the larger polygon sizes, as the maximum size of the polygons decreases, the average reserve grade remained steady, while tons and ounces decreased only slightly. At a maximum size of 12,500 ft² the reserve grade and the reserve tons decrease markedly while the reserve ounces decrease at a much slower rate. What this demonstrates is that the high grade (and therefore higher margin) intercepts are contained within the smaller polygons that are not affected by cutting the maximum polygon size. There is a 117,200 contained ounces difference is due to the difference in maximum polygon sizes used (727,500 - 610,300), but 2/3 of these ounces are in lower grade polygons.

Poly. Size	Tons	Grade	Ounces
10,000	1,779,000	0.343	610,300
12,500	1,974,000	0.332	655,400
15,000	2,108,000	0.328	691,400
20,000	2,202,000	0.329	724,300
25,000	2,210,000	0.328	724,900
30,000	2,218,000	0.328	727,500

Differences due to Dilution.

The Hecla resource estimate added five feet above and below the ore zone at reported grade for mining dilution in the vertical dimension. The Equinox estimate did not. I did not calculate a weighted grade for this material, but the deposit is surrounded in the vertical dimension by low grade material. If we assume that this low grade material is half the cutoff grade used for the reserve estimate (i.e., 0.05 opt), then we would add 20,400 ounces to the Hecla estimate that would not appear in the Equinox estimate.

In addition, we added a 15% lateral and internal dilution at no grade. The grade assumption introduces some conservatism to the resource estimate, as lateral dilution will be about the same grade as vertical dilution.

Differences due to Assay cutting.

Lac assayed the higher grade intervals at least twice and as many as nine times. The grade that both Hecla and Equinox used for the reserve estimate is the average of these assays or, in some cases, a "referee" assay (i.e., the average would not include an outlier). I felt that I could use these numbers without further cutting of assay values, as it appears obvious that there are parts of the deposit, particularly in the chimney, that will exceed 1 opt. Equinox cut all assays to 2 opt. This had the effect of discounting the high grade assays twice. In comparing the Equinox polygon grade estimate to the average of the assays that make up the composite ore interval, I noted that the block grade was, approximately 0.10 opt lower than the average of the assays in the composite.

If the high grade polygons in the Hecla estimate are reduced by 0.1 opt, then 86,800 ounces are cut from the reserve.

At the direction of the chief operating officer, Weicker only extended grade out from the hole 25 feet. Past 25 feet, he diluted the grade by averaging it with the nearest low grade hole, so that if an intercept averaged 0.45 opt gold and the nearest hole 100 feet away had an intercept that averaged 0.05 opt gold, the polygon centered 37.5 feet from the ore hole and 62.5 feet from the waste hole was given a grade of 0.25 opt gold. Weicker believes this is the single most important difference between the two reserve estimates, as the tonnage would match closely if Equinox had diluted the reserve as we did.

SUMMARY

If we were to just subtract the ounces indicated above, the Hecla reserve would be depleted by substantially more than the difference of 549,00 tons and 279,500 ounces. Because the difference in methodology is so great, there is no way to compare the numbers and say that x% of the difference is due to this factor, y% to a second factor and z% to a third.

Recently, I talked with Steve Ristorcelli of Mine Development Associates in Reno². Steve completed a study of the Rosebud for a competitor during the summer. While he could not discuss the final numbers, he did confirm that projecting to plan view is the proper methodology to use in this type of deposit, and that both the earlier estimates by Lac and the estimate by Equinox are too conservative. In fact, he was very unkind to the Lac estimate, stating that it was done by an exploration geologist with no sense for what is minable and what was not and was best relegated to the paper shredder. We talked specifically about handling the high grade "chimney" ores and he agrees that that part of the deposit is real, is high grade, and needs to

² Mine Development Associates is another firm very similar to Mine Reserves Associates. Their client list includes Barrick Goldstrike, Cambior, Minnova, Noranda, Pegasus Lac, FMC Gold Western Mining, and several other major companies. They are familiar with Nevada deposits based on their work at Barrick Goldstrike, Round Mountain, Getchell, El Indio/Tambo, etc.

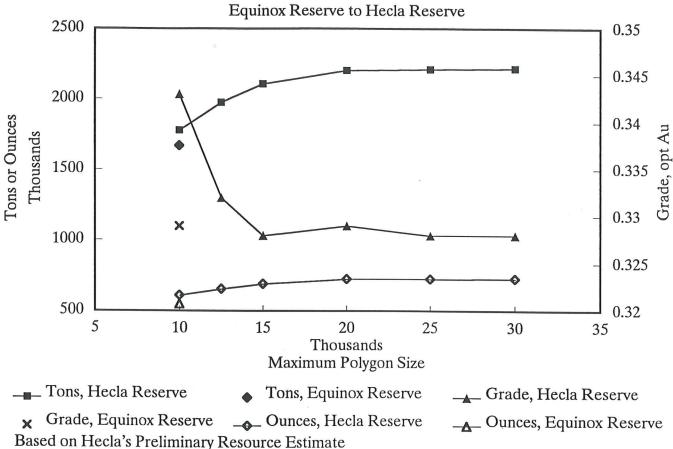
be considered as a high grade deposit rather than as spurious high grade assays in a substantially lower grade resource.

Larry Allen (see above), who is doing a reserve audit on the Rosebud for us, has also assured me that the Equinox reserve estimate is conservative, and that the techniques Hecla used to estimate reserves are acceptable and defendable. He also believes the high grade part of the deposit is real.

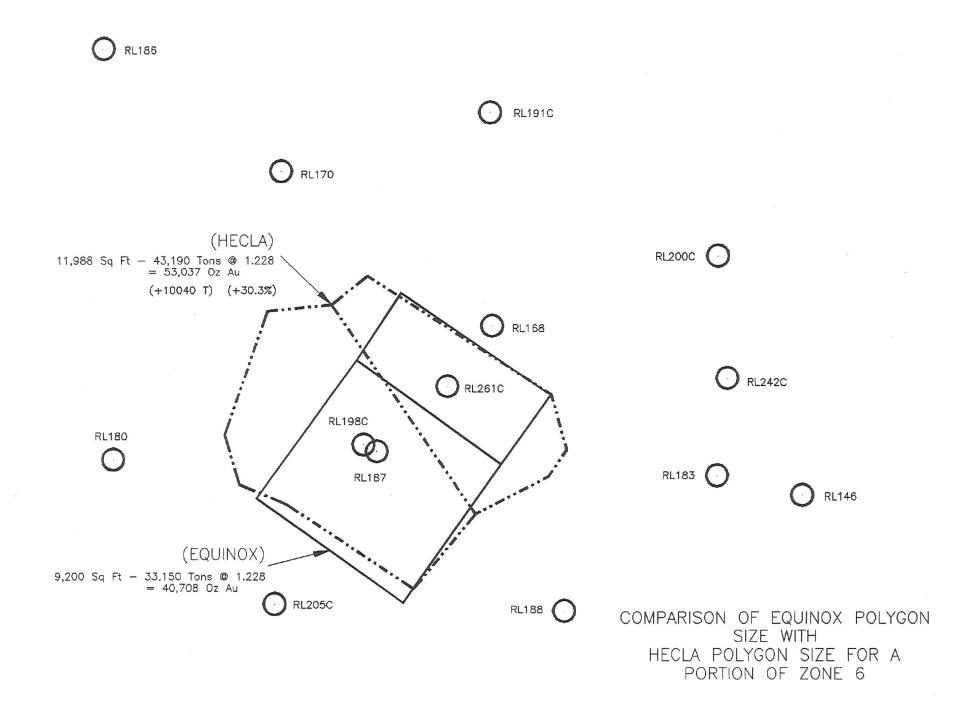
In addition to our in-house expertise, two well-respected ore reserve estimating firms with world-wide client lists agree that the methodology Hecla used is more appropriate than the methodology Lac or Equinox used. Our experience with the blanket ores at Republic have given us a good feeling for what dilution will be. The consensus between Hecla and two ore reserve estimators who have done an ore reserve on the Rosebud is that the high grade ores are real and should not be treated as statistical "nuggets".

Assay cutting may be an issue, but it is not good engineering. When Francois Pitard worked with us on Grouse Creek, one of the very strong points he made is that you don't cut assays. Cutting assays skews your population statistics. The entire field of indicator kriging evolved to analyze high grade populations in order to properly evaluate high grade intercepts. It all comes down to understanding the geology and geometry of the deposit and modelling it correctly. The indications we have gotten from the outside experts is that we have modelled the deposit correctly.

COMPARISON



Based on Hecla's Preliminary Resource Estimate Revised to Reflect a Mining Reserve



SUMMARY FOR ORIGINAL 'TSCHAUDER' RESE	RVE		
	GRADE	TONS	OZ AU
TUNIT 1	0.169	117,277	19,833
UNIT 2	0.425	979,279	416,248
(CHIMNEY)	0.746	226,171	168,651
UNIT 3	0.266	45,818	12,167
UNIT 4	0.178	42,841	7,644
UNIT 5	0.282	99,856	28,161
UNIT 6	0.269	1,156,349	311,157
UNIT 7	0.224	125,456	28,073
UNIT 8	0.207	17,135	3,547
TOTALS	0.320	2,584,012	826,830

SUMMARY FOR 2,500 SQUARE FT MAXIMUM (50' BY 50')						
	GRADE	TONS	OZ AU			
UNIT 1	0.173	30,192	5,214			
UNIT 2	0.420	293,558	123,332			
(CHIMNEY)	0,761	88,462	67,318			
UNIT 3	0.376	18,894	7,108			
UNIT 4	0.179	8,846	1,586			
UNIT 5	0.286	20,385	5,838			
UNIT 6	0.318	223,712	71,179			
UNIT 7	0.231	16,731	3,863			
UNIT 8	0.207	4,808	995			
TOTALS	0.355	617,125	219,114			

100			
SUMMARY FOR 10,000 SQUARE FT MAXIMUM (100' BY 100')	
	GRADE	TONS	OZ AU
UNIT 1	0.169	109,372	18,497
UNIT 2	0.427	820,423	350,066
(CHIMNEY)	0.746	226,171	168,651
UNIT 3	0.274	42,038	11,521
UNIT 4	0.179	35,385	6,343
UNIT 5	0.286	81,538	23,351
UNIT 6	0.309	820,230	253,518
UNIT 7	0.231	66,923	15,450
UNIT 8	0.207	17,135	3,547
TOTALS	0.342	1,993,045	682,293

SUMMARY FOR 5,625 SQUARE FT MAXIMUM (7	5' BY 75')		
*	GRADE	TONS	OZ AU
TUNIT 1	0.173	67,933	11,731
UNIT 2	0.428	597,554	255,987
(CHIMNEY)	0.758	183,198	138,785
UNIT 3	0.314	30,260	9,507
UNIT 4	0.179	19,904	3,568
UNIT 5	0.286	45,865	13,135
UNIT 6	0.321	493,057	158,485
UNIT 7	0.231	37,644	8,691
UNIT 8	0.207	10,817	2,239
,			
TOTALS	0.356	1,303,034	463,342

sebua Project -	Preliminary Resource Estimate	
PALITIONIUM	CDEALL -	

Ulala #	OMITT	I-SEEC	IAL RUN	FOR RIC	CK TSCHA	LIDED		
Hole #	Po	d# T	hick 🔎 🔎	Area	Grade	Tone		
FLOOR					GIGGE	Tons	Ounces	
RL82C	*	/ 6 ∖	18.8	/9,965	0.245			
RL89C	*	6		45 8,068	0.315	14,411	4,539)
RL93C	*	6	91	, 0,000	0.396			
RL94C	W	6	30	16,730	0.225	117,110	26,350	
RL102	*	6		23,778	0.097	54,872	5,323	
RL106C	*	6	28.5	9,010	0.180	19,753	3,555	
RL109C	*	6	11	20,869	0.104	17,658	1,836	
RL145	*		19	7,560	0.147	11,049	1,624	
RL159C	*	6	26	15,881	0.264	31,762	8,385	
RL168	*	6	13.0 31	7,116	0.119	16,969	2,019	
RL169	*	6	45 39	9,282	(2.115)		24910 67,955	too high
RL170	*	6	13.0 25	17,138	0.137	32,958		35' 1.3
RL185	*	6	55	13,508	0.121	57,149	4,515	120
RL186	*	6	20	13,141	0.103	20,217	6,915	
		6	105	15,642	0.183		2,082	
RL187	*	6	55	7,405	0.598	126,339	23,120	
RL188 /	*	6	25	21,930		31,329	18,735	
RL191C	*	6	110	15,686	0.100	42,173	4,217	
RL194C	*	6	30	10,536	0.196	-,0	26,015	
RL198C	*	6	80	7,597	0.108	24,314	2,626	
RL201C	*	6	48		0.724	46,751	33,848	
RL206C	*	6	17	14,856	0.415	54,853	22,764	
RL213	*	6	25	16,460	0.092	21,525	1,980	
RL217 V	*	6		20,520	0.159	39,462	6,274	
RL261	*	6	40	20,719	0.098	63,751	6,248	
RL273	*		60	10,198	0.179	47,068	8,425	
RL289C	*	6	75	10,778	0.154	62,181	9,576	
RL94C	Ŕ	, 6	51	3,001	0.162	11,773	1,907	
RL131C	*	7	17	15,587	0.205	20,383	4,179	
	*	7	15	17,104	0.564	19,735	11,131	
RL206C		7	20	17,528	0.127	26,966	3,425	1114
RL217√	*	7	35	21,681	0.160	58,372		. 2
RL214 V	*	8	25	8,910	0.207	17,135	9,340	1/2/44/999
SIMMADO			-	2,0.0	0.207	17,133	3,547	77 17.25
	EODA	DIGININ						' /

SUMMARY FOR ODICINAL ITERATION			
SUMMARY FOR ORIGINAL "TSCHAUDER" RESE	RVE		
UNIT 1	GRADE	TONS	OZ AU
UNIT 2	0.169	117,277	19,833
(CHIMNEY)	0.425	979,279	416,248
UNIT 3	0.746	226,171	168,651
UNIT 4	0.266	45,818	12,167
UNIT 5	0.178	42,841	7,644
UNIT 6	0.282	99,856	28,161
UNIT 7	0.269	1,156,349	311,157
UNIT 8	0.224	125,456	28,073
gradical commer q	0.207	17,135	3,547
TOTALS	0.320	2,584.012	826 830

826,830 826,830 2.115 2584012 32126 2554882 2000 738875.1 6.291 1.311 1.30(1)

35' 131/

Jsebud Project - Preliminary Resource Estimate

CAUTIO	N!!!!!!-S	PECIAL	RUN F	OR RIC	K TSCHA	UDER		
/ Hole #	Pod#	Thick				Tons	Ounces	
SOUTH OF	RE ZONE	Bil	0					
RL27	*	1	40	12,569	0.169	38,674	6,536	
RL41C	*	1	17	9,613	0.171	12,571	2,150	
RL66 ✓	*	1	13	9,342	0.136	9,342		
VAL129C	*	1	(31)	7,010	10.243			
RL209C	*	1	16	9,404	0.154	11,574		
VAL247	*	. 1	40	9,230	♦0.1421			
RL3 V	*	2	25 V	AND RESIDENCE OF THE PROPERTY	0.224	99		
RL5	*	2	98	3,805	0.206	28,684		
RL22	*	2	30	3,754	0.251	8,663	2,174	
1/RL25 1		2	25 /	20,602	0.105		4,160	
RL35	*	2	15	8,340	0.117	9,623		
RL40C	*	2 2	23	2,737	0.094	4,842		
RL41C	*		17	4,800	0.511	6,277	·5.	
RL52C √	*	2	29	5,816	0.151		1,959	
RL55C	*	2	29	10,732	0.325	23,941	7,781	
RL57	*	2	30	10,671	0.778	24,625	19,159	
RL60 V		2	22	5,822	0.164			r
RL71C	*	2 24		13,918	.156 0.152			,222-)
RL75C V		2	19	29,827	0.229	43,593	11 10 10 10	405240
RL89C	*	2	34	4,442	0.119	11,618		1
RL108C	*	2	35	19,630	0.619	√∫ 161,570 ⊶37: 11,900		
RL123C	*	2	35	9,330	0.121	25,119		
RL1250		2	41 42		V 0.334.			
RL130C	*	,2	39	10,708	0.403	32,124	The second secon	
RL159C	*	2	169	4,905	0.807			
RL171	*	2	70	3,116	0.203	, 16,778		
RL192C	*	2	45v	5,709	0.260			
RL193C	*	2	172	8,873	0.695	117,397	(5)	
RL195C	*	2	63	7,032	0.035	34,078	5,282	
RL208C	*	2	70.5	8,009	0.133	43,433		
/RL209C	*	2	43 V	11,020	0.130	_	4,739	
RL210C √	*	2	20	3,652	0.127	5,618		
RL220	*	2	30	11,789	0.497	27,205		
VRL247 1	*	2	35	6,725	↑0.153 _/			
RL289	*	2	119	4,917	0.791	45,009		
RL41C	*	3	35	11,404	0.171	30,703		
RL171	*	3 /	60	1,802	0.566	8,317		029
RL192C √	*	_(3) \	20	4,419	0.325			190417
RL257	*	4	20	12,573	0.323	19,343		97977
RL272	*	4	26	11,749	0.131	23,498		
RL82C V	*	5	42	11,749	0.450	37,958		
RL88C	*	5	64	12,573	0.430	61,898		
TILOOU /		5	U ⁻⁴	12,010	0.173	01,030	11,000	

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sebud Project - Preliminary Resource Estimate

CAUTION!!!!!—SPECIAL RUN FOR RICK TSCHAUDER

Hole #	Pod#	Th	ick Ar	ea	Grade	Tons	Ounces
RL82C	*	6	18.8	9,965	0.315	14,411	4,539
RL89C	*	6	42	8,068			10,322
RL93C	*	6	91	16,730	0.225	117,110	26,350
RL94C	增	6	30	23,778	0.097	54,872	5,323
RL102	*	6	28.5	9,010	0.180	19,753	3,555
RL106C	*	6	11	20,869	0.104	17,658	1,836
RL109C	*	6	19	7,560	0.147	11,049	1,624
RL145	*	6	26	15,881	0.264	31,762	8,385
RL159C	*	6	13.0 31	7,116	0.119	16,969	2,019
RL168	*	6	45 35	9,282	2.115	32,130	2490 67,955
RL169	*	6	13.0 25	17,138	0.137	32,958	4,515
RL170	*	6	55	13,508	0.121	57,149	6,915
RL185	*	6	20	13,141	0.103	20,217	2,082
RL186	*	6	105	15,642	0.183	126,339	23,120
RL187	*	6	55	7,405	0.598	31,329	18,735
RL188 🗸	*	6	25	21,930	0.100	42,173	4,217
RL191C	*	6	110	15,686	0.196	J 132,728	26,015
RL194C	*	6	30	10,536	0.108	24,314	2,626
RL198C	*	6	80	7,597	0.724	46,751	33,848
RL201C	*	6	(48)	14,856	0.415	54,853	22,764
RL206C	*	6	17	16,460	0.092	21,525	1,980
RL213	*	6	25	20,520	0.159	39,462	6,274
RL217 √	*	6	40	20,719	0.098	63,751	6,248
RL261	*	6	60	10,198	0.179	47,068	8,425
RL273	*	6	75	10,778	0.154	62,181	9,576
RL289C	st.	6	51	3,001	0.162	11,773	1,907
RL94C	R	7	17	15,587	0.205	20,383	4,179
RL131C	*	7	15	17,104	0.564	19,735	11,131
RL206C	*	7	20	17,528	0.127	26,966	3,425
RL217√	*	7	35	21,681	0.160	58,372	9,340
RL214 √	*	8	25	8,910	0.207	17,135	3,547

OLIMANY FOR ORIGINAL ITOOLIALISED DEGENIE								
SUMMARY FOR ORIGINAL "TSCHAUDER" RESERVE								
	GRADE	TONS	OZ AU					
UNIT 1	0.169	117,277	19,833					
UNIT 2	0.425	979,279	416,248					
(CHIMNEY)	0.746	226,171	168,651					
UNIT 3	0.266	45,818	12,167					
UNIT 4	0.178	42,841	7,644					
UNIT 5	0.282	99,856	28,161					
UNIT 6 EAST	0.269	1,156,349	311,157					
UNIT 7 north	0.224	125,456	28,073					
UNIT 8	0.207	17,135	3,547					
TOTALS	0.320	2,584,012	826,830					

.320 2581012 626.836 2.115 32136 67,954.9 6.297 2551,882 758,875.1 03060 2576,877 12 18 201 4 4 8 8 9 7

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sebud Project - Preliminar	v Resource Estimate
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1	CAUTIO	N!!!!!!-SF	PECIAL	RUN FO	OR RIC	K TSCHA	UDER		
1	Hole #	Pod#	Thick	Are		Grade	Tons	Ounces	
7									
	SOUTH OF								
	RL27	*	1	40	12,569	0.169		20.000.000.000	
	RL41C	*	1	17	9,613		12,571	0.000	
	RL66 √	*	1	13	9,342		101 (51)		
	RL129C ~	*	1	31	7,010		A1	• • • • • • • • • • • • • • • • • • • •	
	RL209C	*	1	16	9,404				
	RL247	*	1	40	9,230			-	
	RL3 V	*	2	25	12,500				
	RL5	sk	2	98	3,805				
	RL22	. *	2	30	3,754			7.	
	RL25 V	*	2	25	20,602		2		
	RL35 V	*	2	15	8,340			-	
	RL40C	*	2	23	2,737				
	RL41C	*	2	17	4,800		6,277		
	RL52C V	*	2	29	5,816				
	RL55C	*	2	29	10,732				
	RL57	*	2	30	10,671	0.778			
	RL60 ✓	*	2	22	5,822			•	
	RL71C	±	2	37	13,918				2225
	RL75C ✓	*	2	19	29,827		D. CO.D. • CO.D. CO.D. D. CO.	9,983	1-240
_	RL89C	*	2	34	4,442				405240
	RL104C ✓	*	2	107	19,630		161,570		
	RL108C	*	2	35	4,420		11,900		
	RL123C	*	2	35	9,330		•	10,600	
	TIE TEOC	*	2	41	10,463				
	RL130C	*	, 2	39	10,708				
	RL159C	*	2	169	4,905				
	RL171	*	2	70	3,116			3,406	
	RL192C	*	2	45	5,709				
	RL193C	*	2	172	8,873				
	RL195C	*	2	63	7,032		34,078		
	RL208C	*	2	70.5	8,009	0.131	43,433		
	RL209C	* , , ,	2	43	11,020	0.130	36,451	4,739	
	RL210C √	*	2	20	3,652				
	RL220	*	2	30	11,789		50		
	RL247 V	*	2 .	35	6,725				
	RL289	*	2 3	119	4,917	0.791	45,009	35,602	
	RL41C	*	3	35	11,404	0.171	30,703		G
	RL171	*	3	60	1,802				579P2977
	RL192C	*	3	20	4,419				61 14
	RL257	*	4	20	12,573	0.151	19,343		0 ./
	RL272	*	4	26	11,749		23,498		
	RL82C V	*	5	42	11,749			ė.	
	RL88C √	#	5	64	12,573	0.179	61,898	11,080	
			*						