6000 1969

Mining District File Summary Sheet

DISTRICT	Rosebud
DIST_NO	4010
COUNTY If different from written on document	Pershing
TITLE If not obvious	Near mine exploration targets, Rosebud Mine, Pershing County, Nevada, Spring 1998
AUTHOR	Rogowski, J; Allen K; Clayton R; Gray D; Muerhoff C
DATE OF DOC(S)	1998
MULTI_DIST Y / (N?) Additional Dist_Nos:	
QUAD_NAME	Sulphur 7½'
P_M_C_NAME (mine, claim & company names)	Rosebud Mine; Hecla Mining Co.; South Zone Rosebud Project
COMMODITY If not obvious	gold; silver
NOTES	Potential target report; geology; correspondence; handwritten notes; authority for expenditure; budget sheet 25p.

Keep docs at about 250 pages if no oversized maps attached
(for every 1 oversized page (>11x17) with text reduce
the amount of pages by ~25)

SS: DP 9/12/08
Initials Date

DB:
Initials Date

SCANNED:
Initials Date

Revised: 1/22/08

NEAR MINE EXPLORATION 98

60001969

4010

NEAR MINE EXPLORATION TARGETS
ROSEBUD MINE
PERSHING COUNTY, NEVADA
SPRING 1998

FOR
HECLA MINING COMPANY
BY
J. P. ROGOWSKI
12 JUNE 1998

CONTENTS

LIST OF ACCOMPANING MAPS AND SECTIONS

100 SCALE PLAN MAP

NE SECTIONS: 700 NE
1000 NE
1300 NE
1500 NE
1700 NE

NW SECTIONS: 1100 NW
1850 NW
2750 NW

INTRODUCTION

The Rosebud mine is located in Sec. 24, T.34 N., R.29 E., and Sec. 19, T. 34 N., R.30 E., Pershing County, Nevada. The purpose of this study is to identify near mine exploration targets that will increase the present ore reserve. The method of study was to review mine and surface geology, study existing drill logs, and build 100 scale geologic sections and a plan map. Primary focus was on the South Ridge fault and no attempt was made to place stratigraphy on sections.

In selecting exploration drill targets the following assumptions have been made concerning the geology of the area:

1) The Rosebud orebodies are clear examples of epithermal mineralization.

2) The South Ridge fault (SRF) is one of the major controls on ore deposition.

3) The South Ridge fault has 650 to 750 feet of post-mineral normal displacement in a N55 to 60W direction.

4) Regional tilting has occurred along a N10E axis dipping +/-35 degrees east.

ADD YOUR INTERPRETATION OF THE SOUTH RIDGE FAULT, SHARK FIN FAULT AND OFFICE FAULT. ALSO DISCUSS YOUR INTERPRETATION OF THE CAVE/ROSEBUD FAULT-SHEAR ZONE.

Two target areas have been selected on the above assumptions and two others are based on previous drill intercepts. The four target areas are outlined on the 100 scale topographic map of the mine area, and there are accompanying sections to facilitate geologic understanding. Targets 1A, 1B, 2 and 3 are numbered in order of priority.

EXPLORATION TARGETS

TARGET 1A (The footwall portion of the South ore zone)

The South Ridge fault appears to have a normal displacement in a N55 to N60W direction and dipping 20 to 28 degrees to the NW. This is based on three observations:

1) Drill hole trace element geochemistry indicates that the area directly above the East ore zone is essentially barren while geochemistry over the North ore zone extends upward from the orebody.

2) Last movement fault slickensides on the South Ridge fault at the surface and underground measure N+/-57 W with a plunge of -20 to -28 degrees to the NW.

3) If the North ore zone is moved in an up-slick direction 650 to 750 feet, it will lie directly over the East ore zone.

The above observations indicate that the South ore zone, which lies exclusively in the hanging wall of the South Ridge fault, will also have experienced similar movement to the North ore zone. If so, where is the footwall portion of the South ore zone? TARGET 1A is outlined on the 100 scale plan map and on Sections 700NE, 1000NE and 1100NW. Note that there are several drill holes within the 1A target area that did not encounter mineralization, but the ones that did were in the footwall of the South Ridge fault and this mineralization is highly siliceous, similar to the East orebody.

Target 1A is designed to explore the possible footwall zone of the South orebody. It is recommended that this target be drilled from an underground station. Holes should be below and near parallel to the South Ridge fault. The holes should be designed to cut the mineralization near perpendicular to the N70E grain of the mineralized fracturing displayed in the existing orebodies. Drill stations can be accessed from present underground stopes.

TARGET 1B (Possible additional ore zones NE of the present orebodies)

Suspected additional ore zones may lie along the South Ridge fault NE of the mine area. Reasons for believing this are based on the following:

1) Many epithermal mining districts have dominant mineralized structures or shear zones that have several ore shoots localized along their strike length. These ore shoots often develop along similar elevation lines and have abrupt bottoms along a base elevation.

2) Regional tilting has taken place in the Kamma Mountains. In the mine area this has rotated the stratigraphy and the South Ridge fault along a N10E axis with a 35-degree tilt to the east.

Using the above information, and postulating post-tilting mineralization indicate that the bottom of additional mineralized zones may lie along present elevations on the South Ridge fault. Following the contours would place new ore zones to the east of the East orebody. On the other hand, if postulating pre-tilting mineralization, the present ore zones must be tilted back 35 degrees to the west and the South Ridge fault re-contoured to find the base elevation of possible ore shoots. The South Ridge fault would then need to be rotated back to the present position. This will place the exploration targets to the NE of the present mine.

The East target has been discarded as a possibility because two drill holes in the area are unmineralized and unaltered (96–362 and 96–363). If the search continues eastward, the South Ridge fault will be cut off by the erosion surface.

The Northeast area is outlined on the 100 scale plan map as a large target with numerous proposed drill holes. This area is completely untested but two existing holes (RL-110C, at the SW edge of the target and RL-143C that did not reach the South Ridge fault) have strong clay alteration with trace amounts of gold and silver. Furthermore in RC-110C near the South Ridge fault, the alteration is similar to near mine alteration. An IP anomaly exists in this area that is probably seeing the pyrite intersected between 100 and 200 feet in hole 143. This pyrite could be indicative of ore at depth. Vertical RC drill holes are recommended for this target area. Holes should be started on the SW side of the target along mine section line 3000NE and progress northeastward on parallel mine section lines. Anticipated hole depth will be +/-1,000 feet. Additionally, it is recommended to test the South Ridge fault area in these holes with downhole IP and Resistivity (Newmont has a man able to do this). The hole spacing of 300 X 400 feet as shown on the 100 scale plan map is the maximum spacing recommended in order to avoid missing an ore zone similar to existing orebodies.

NOTE: A word of caution concerning the location of the South Ridge fault. The contours NE of the mine abruptly turn from NE to SE. This is based on data from one drill hole (RS-420). The South Ridge fault in this hole is placed at the contact between the tertiary and the basement Auld Lang Syne but in reality this may not be the case. The South Ridge fault may be some distance up the hole. If so, this would change the contour line locations but not significantly change the 1-B target location.

TARGET 2 (Feeder zones under the East orebody)

Drill holes 97-379C and RL-106C intersected fairly high grade mineralization that appears to be along structures that could, along with many others, be feeders to the East orebody. All of these intersections appear to be narrow and may be of limited extent along strike. Mine development has opened excellent access to the 379 structure where it is mapped in the east zone drift as a narrow mineralized fault. This structure can be tested with core holes from underground as suggested on the 100 scale plan map, and Section 1300NW. Section 1700 NW shows the location of the feeder structure encountered in hole RL-106C. This mineralization occurs 200 feet below the South Ridge fault in the Auld Lang Syne basement and appears to be significant. Unfortunately, underground access to this area at present is limited. As development progresses into the North ore zone, access will be better and this zone should be tested with holes down dip and along strike.

TARGET 3 (A deep mineralized intersection in hole 96-356)

A relog of the intersection encountered in hole 96-356 indicates that the mineralization may be confined to a narrow structure. Alteration around this intersection is not like that found in the mine near existing orebodies. Several other drill holes in the area had disappointing results, but were not blank holes in that trace amounts of Au and Ag occurred over a large area. The Section 1500NE through drill hole 356 indicates that a large fault drops the South Ridge fault approximately 100 feet to the NW. Strike on this structure is unknown but assumed to have a N-NE direction.

It is recommended that this area be tested and a suggestion is presented on the plan map and on Section 1500NE. A 1,000 foot hole drilled from present mine access in a N55E direction along Section 1500NE and parallel to the South Ridge fault will test the 356 intersection. This hole will also test the N–NE fault and should also encounter any possible mineral in the hanging wall of the South Ridge fault. More drill holes will be necessary if significant mineralization is found.

ADDITIONAL OBSERVATIONS AND RECOMMENDATIONS

Drill Logs: Both the RC and core drill logs need cover sheets that show a graphic summary of each hole. This summary should include in simple form: faults, major stratigraphic breaks, and accumulated assays. This will be of great assistance to future geologists. Alteration can also be shown in graph form.

Drilling of Exploration Holes on Sections: After completing several exploration holes, the geologists should be able to express what has been found in graphic form to further their understanding. Having holes drilled at random makes for confusion in interpretation.

Correlating Stratigraphy: Past and future drill holes may be impossible to correlate without an expensive relogging program that will take several months. This will be necessary if stratigraphic and fault drill hole data are to be entered into the mine database.

Mapping the Near Mine Surface: Numerous bedrock exposures can be found at old drill pads in the mine area and in the vent raise excavation. These have not been mapped or sampled, but doing this may facilitate the understanding of the ore zones and help in the correlation of the underground geology with the surface.

NEAR MINE EXPLORATION TARGETS
ROSEBUD MINE
PERSHING COUNTY, NEVADA
SPRING 1998

FOR
HECLA MINING COMPANY
BY
J. P. ROGOWSKI
12 JUNE 1998

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INTRODUCTION

The Rosebud mine is located in Sec. 24, T.34 N., R.29 E., and Sec. 19, T. 34 N., R.30 E., Pershing County, Nevada. The purpose of this study is to identify near mine exploration targets that will increase the present ore reserve. The method of study was to review mine and surface geology, study existing drill logs, and build 100 scale geologic sections and a plan map. Primary focus was on the South Ridge fault and no attempt was made to place stratigraphy on sections. Time spent on the project was 30 days over a period of two months.

In selecting exploration drill targets the following assumptions were made concerning the geology of the area:

1) The Rosebud orebodies are clear examples of epithermal mineralization.

2) The South Ridge fault (SRF) is one of the major controls on ore deposition.

3) The South Ridge fault has 650 to 750 feet of post-mineral normal displacement in a N55 to 60W direction.

4) Regional tilting has occurred along a N10E axis dipping +/-35 degrees east. This is the orientation of the mine stratigraphy.

Two target areas were selected on the above assumptions and two others based on previous drill intercepts using the above criteria to interpret their meaning. The four target areas are outlined on the 100 scale plan map of the mine area, and there are accompanying sections to facilitate geologic understanding. Targets 1A, 1B, 2 and 3 are numbered in order of priority.

EXPLORATION TARGETS

TARGET 1A (The footwall portion of the South ore zone)

The South Ridge fault appears to have a normal displacement in a N55 to N60W direction and has separated the North and East ore zones. This is based on three observations:

1) Drill hole trace element geochemistry indicates that the area directly above the East ore zone is essentially barren while geochemistry over the North ore zone extends upward from the orebody.

2) Last movement slickensides on the South Ridge fault at both the surface outcrops and underground measure N+/-57 W with a plunge to the NW.

3) If the North ore zone is moved in an up-slick direction 650 to 750 feet, it will lie directly over the East ore zone.

The above observations indicate that the South ore zone, which lies exclusively in the hanging wall of the South Ridge fault, will also have experienced movement similar to the North ore zone. If so, where is the footwall portion of the South ore zone? Target 1A is outlined on the 100 scale plan map and on Sections 700NE, 1000NE and 1100NW. It should be noted that there are several drill holes within the 1A target area that did not encounter mineralization. The holes that did were in the footwall of the South Ridge fault, and this mineralization is highly siliceous and similar to the East orebody.

Target 1A is designed to explore the possible footwall zone of the South orebody. It is recommended that this target be drilled from an underground station. Holes should be below and near parallel to the South Ridge fault. The holes should be designed to cut the mineralization near perpendicular to the N70E grain of the mineralized fracturing displayed in the existing orebodies. Drill stations can be accessed from present underground stopes.

TARGET 1B (Possible additional ore zones NE of the present orebodies)

Suspected additional ore zones may lie along the South Ridge fault NE of the mine area. Reasons for believing this are based on the following:

1) Many epithermal mining districts have dominant mineralized structures or shear zones that have several ore shoots localized along their strike length. These ore shoots often develop along similar elevation lines and have abrupt bottoms along a base elevation.

2) Regional tilting has taken place in the Kamma Mountains. In the mine area this has rotated the stratigraphy and the South Ridge fault along a N10E axis with a 35-degree tilt to the east.

3) Two holes in this target area are altered and have long intervals of trace gold and silver.

4) Several types of geophysical surveys indicate strong NE-SW trends in and around the mine area.

Using the above information, and postulating post-tilting mineralization, then the bottom of additional mineralized zones may lie along present elevations on the South Ridge fault. Following the contours would place new ore zones to the east of the East orebody. On the other hand, if postulating pre-tilting mineralization, the present ore zones must be tilted back 35 degrees to the west and the South Ridge fault re-contoured to find the base elevation of possible ore shoots. The South Ridge fault would then need to be rotated back to the present position. This will place the exploration targets to the NE of the present mine.

The East target is not as favorable as the NE because two drill holes in the area are unmineralized and unaltered (96-362 and 96-363). If the search continues further to the east of these drill holes, then the South Ridge fault will be cut off by the erosion surface.

The Northeast area is outlined on the 100 scale plan map as a large target with numerous proposed drill holes. This area is completely untested but two existing holes (RL-110C, at the SW edge of the target and RL-143C that did not reach the South Ridge fault) have strong clay alteration with trace amounts of gold and silver. Furthermore, in RC-110C near the South Ridge fault, the alteration is similar to near mine alteration. An IP anomaly exists in this area that is probably seeing the pyrite intersected between 200 and 400 feet in hole 143. This pyrite could be indicative of ore at depth. Vertical RC drill holes are recommended for this target area. Holes should be started on the SW side of the target along mine section line 2300NE and progress northeastward on parallel mine section lines. Anticipated depth to the area above and below the South Ridge fault will be 850 to 1150 feet. Additionally, it is recommended to test the South Ridge fault area in these holes with down hole IP and Resistivity (Newmont has a man able to do this). The hole spacing of 300 X 400 feet as shown on the 100 scale plan map is the maximum spacing recommended in order to avoid missing an ore zone similar to the existing orebodies. 200 X 200 and 200 X 600 have also been recommended by others working in the area.

NOTE: A word of caution concerning the location of the South Ridge fault. The contours on the fault surface NE of the mine abruptly turn from NE to SE. This is based on data from one drill hole (RS-420). The South Ridge fault in this hole is placed at the contact between the Tertiary and the basement Auld Lang Syne, but in reality, this may not be the case. The South Ridge fault may be some distance up the hole at 680 feet. If so, this would change the contour line locations but would not significantly change the 1B target location. Both possibilities were investigated with the tilting model.

TARGET 2 (Feeder zones under the East orebody)

Drill holes 97-379C and RL-106C and many others intersected fairly high grade mineralization that appears to be along structures that could be feeders to the East ore body. All of these intersections are narrow and may be of limited extent along strike. Mine development has opened excellent access to the 379 structure where it is mapped in the east zone drift as a narrow mineralized fault. This structure can be tested with core holes from underground as suggested on the 100 scale plan map and Section 1300NW. Section 1700NW shows the location of another possible feeder structure encountered in hole RL-106C. This significant mineralization occurs 200 feet below the South Ridge fault and is one of the few ore occurrences in the Auld Lang Syne basement. Underground access to this area at present is limited but can be drilled by extending some of the holes planned for the delineation of the North ore zone. This area, Target 2, should be tested with holes down dip and along the strike of these possible feeder structures.

TARGET 3 (A deep mineralized intersection in hole 96-356)

A relog of the intersection encountered in hole 96-356 indicates that the mineralization may be confined to a narrow structure. Alteration around this intersection is not like that found in the mine near existing orebodies. Several other drill holes in the area had disappointing results, but were not blank holes in that trace amounts of Au and Ag (0.0X) occurred over a large area. The Section 1500NE through drill hole 356 indicates that a large fault drops the South Ridge fault approximately 100 feet to the NW. Strike on this structure is unknown but assumed to have a NE direction.

It is recommended that this area be tested and a suggestion is presented on the plan map and on Section 1500NE. A 1,000 foot hole drilled from present mine access in a N55E direction along Section 1500NE and parallel to the South Ridge fault will test the 356 intersection. This hole will also test the NE fault and should also encounter any possible mineral in the hanging wall of the South Ridge fault. More drill holes will be necessary if significant mineralization is found. A drill hole to test below the South Ridge fault in this 356 area should also be considered.

ADDITIONAL OBSERVATIONS AND RECOMMENDATIONS

Drill Logs: Both the RC and core drill logs need cover sheets that show a graphic summary of each hole. This summary should include in simple form: faults, major stratigraphic breaks, and accumulated assays. This will be of great assistance to future geologists. Alteration can also be shown in color beside the graphic log.

Drilling of Exploration Holes on Sections: After completing several exploration holes, the geologists should be able to express what has been found in graphic form to further their understanding. Having holes drilled at random makes for confusion in interpretation.

Correlating Stratigraphy: Past and future drill holes may be impossible to correlate without a relogging program that will take several months. This may not be too expensive when compared to the cost of wildcat holes, and will be necessary if alteration, stratigraphy and fault drill hole data are to be entered into the mine database.

Mapping the Near Mine Surface: Numerous bedrock exposures can be found at old surface drill pads in the mine area and in the vent raise excavation. These have not been mapped or sampled, and doing this may facilitate the understanding of the ore zones and help in the correlation of the underground geology with the surface.

Cave Fault: During this study it has become apparent that the Cave fault encountered in both declines may be what gives the topographic expression and displacements that have led to the postulation of the Rosebud shear zone. Projecting the Cave fault from the declines to where it was encountered in near by drill holes place it about 1,000 feet above the South Ridge fault and near parallel to most of it. Where the South Ridge fault turns up, west of the

mine, it may be cut off by the Cave fault. The gouge zone associated with the Cave fault is also weakly mineralized.

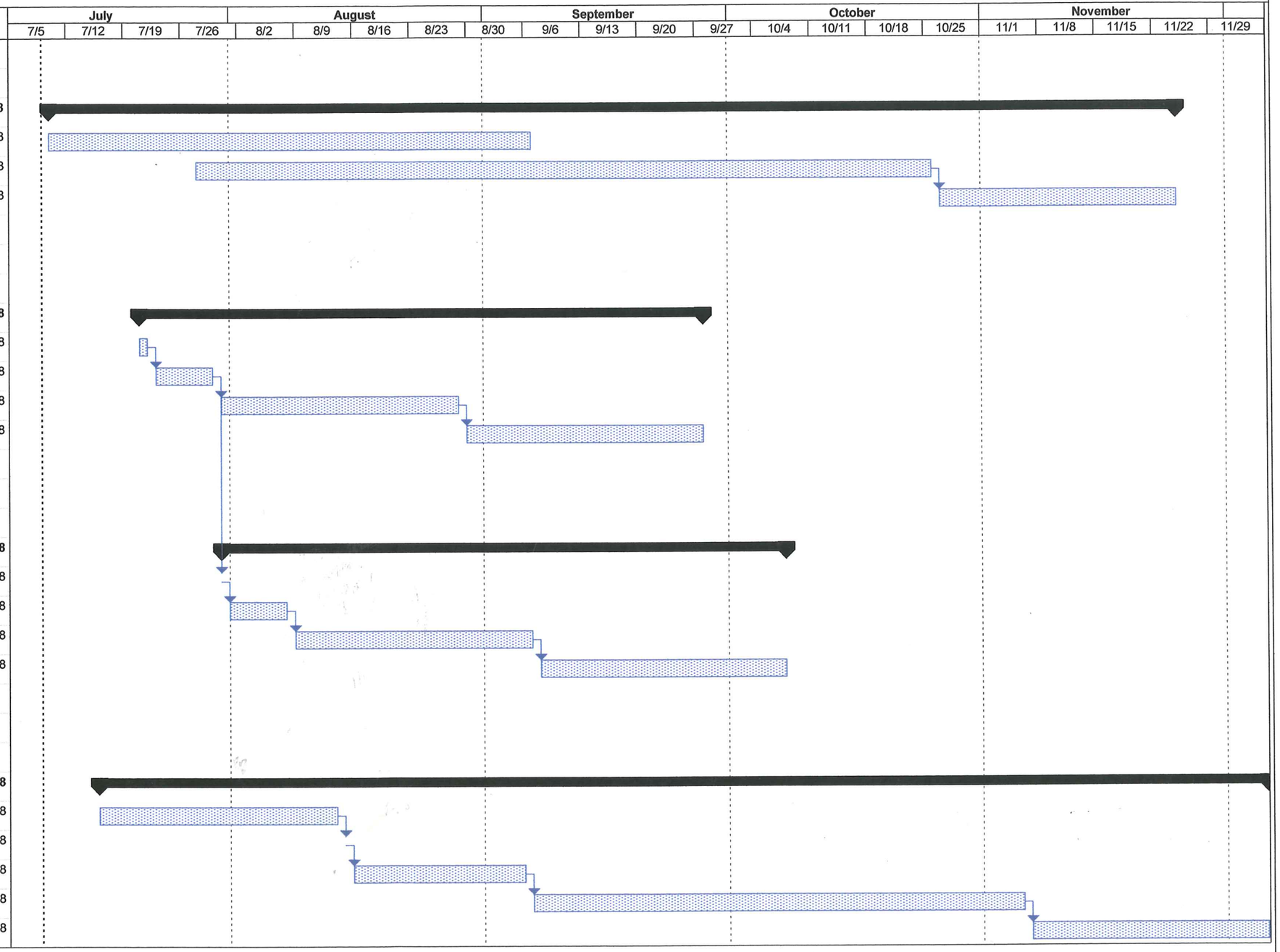
Rosebud Mine
1998 Underground Exploration Program

Target		Drift (feet)	Drill (feet)	Assay (feet)	Mob & DeMob	Quantity	Units	Unit Cost	Total Cost
1a	South Zone Offset	445				445	ft.	$300.00	$133,500
			3,000			3,000	ft.	$20.00	$60,000
				3,000		3,000	ft.	$2.00	$6,000
									$0
2a	Borehole Intercept		1,100			1,100	ft.	$20.00	$22,000
				1,100		1,100	ft.	$2.00	$2,200
									$0
3	356 Intercept		1,000			1,000	ft.	$20.00	$20,000
				1,000		1,000	ft.	$2.00	$2,000
									$0
1a,2a,&3					60	60	hrs.	$80.00	$4,800
									$0
2b	106 intercept in basement		3,200			3,200	ft.	$20.00	$64,000
				3,200		3,200	ft.	$2.00	$6,400
									$0
Total	Underground Program	445	8,300	8,300	60				320,900
Budget	1998 approved								$150,000
Variance	Scope Change Required								($170,900)

7/9/98

1998 Rosebud Underground Exploration

ID	Task Name	Duration	Start	Finish
1				
2				
3	**Target 2B 106 follow up**	**138d**	**7/9/98**	**11/24/98**
4	Drilling	60d	7/9/98	9/6/98
5	Logging & Assays	90d	7/27/98	10/25/98
6	Interpretation	30d	10/26/98	11/24/98
7				
8				
9				
10	**Target 2A borehole follow up**	**70d**	**7/20/98**	**9/27/98**
11	Drill Mobilization	2d	7/20/98	7/21/98
12	Drilling	8d	7/22/98	7/29/98
13	Logging & Assays	30d	7/30/98	8/28/98
14	Interpretation	30d	8/29/98	9/27/98
15				
16				
17				
18	**Target 3**	**69d**	**7/30/98**	**10/7/98**
19	Drill Move	1d	7/30/98	7/30/98
20	Drilling	8d	7/31/98	8/7/98
21	Logging & Assays	30d	8/8/98	9/6/98
22	Interpretation	30d	9/7/98	10/7/98
23				
24				
25				
26	**Target 1A**	**143d**	**7/15/98**	**12/5/98**
27	Drift to Drill Platform	30d	7/15/98	8/13/98
28	Drill Move	1d	8/14/98	8/14/98
29	Drilling	22d	8/15/98	9/5/98
30	Logging & Assays	60d	9/6/98	11/5/98
31	Interpretation	30d	11/6/98	12/5/98



Project:
Date: 7/9/98

Task
Progress
Milestone
Summary
Rolled Up Task
Rolled Up Milestone
Rolled Up Progress

ROSEBUD DEPOSIT
NEAR MINE EXPLORATION DRILL HOLES

TARGET	SECTION	HOLE#	BEARING	DIP	LENGTH	TOTAL	
1a	900	1A-1	S80E	14	1000'	1000	
		1A-2	S55E	28	1000'	1000	
		1A-3	SOUTH	42	1000'	1000	
2a	1300	2A-1	S55E	-15	300'	300	
		2A-2	S55E	-45	400'	400	
		2A-3	?	?	400'	400	
2b	1425	D-280-98	S55E	11	380-1080'	700	DOZER
	1475	2B-2	S55E	-14	900'	900	ALS
	1700	2B-3	S55E	13	250-950'	700	DOZER
		2B-4	S55E	-5	900'	900	ALS
3	1500	"3-1"	N55W	-26	1000'	1000	356 INT
TOTAL = 11 NTW CORE HOLES TOTALLING						**8300**	

THE ROSEBUD MINING CO., LLC
MEMORANDUM

TO: Ron Clayton

FROM: Kurt D. Allen

DATE: June 23, 1998

SUBJECT: Additional Work for Pete Rogowski.

Discussions regarding additional geological work needed near the mine area has occurred between Peter Mitchell, Randy Vance, Pete Rogowski, and myself. I believe that Pete Rogowski is the person to do the work the above discussions led to, which follows:

- Make a good geologic map of the surface above the mine. This would be accomplished by mapping surface outcrops and new road cut exposures at a scale of 1"=100'. In addition, projection of underground geologic units to the surface will be done and field proofed for accuracy. This mapping project should allow correlation between the underground mine geology and surface geology. This would also include some of my time on the surface with Pete.

- Make additional 1"=100' geologic cross-sections through the near mine area with some district wide cross-sections.

- Mesh the work near mine with Peter Mitchell's district work for geologic concurrence between mine area and district.

The above work will require approximately 30 days (10 days per month or 30 consecutive days) to complete. As discussed with Randy Vance and Peter Mitchell, costs of this work will come out of the mine budget not the exploration budget, and will therefore be supervised by me.

AUTHORITY FOR EXPENDITURE

A.F.E. NO.

DEPARTMENT NO.	DEPARTMENT	LOCATION	DATE
	ROSEBUD PROJECT	PERSHING CO., NV	3/14/94

PURPOSE ☐ PROGRAMMED EXPANSION, COST REDUCTION, AND OPTIONAL REPLACEMENTS AND ADDITIONS SUBJECT TO MINIMUM RETURN ON INVESTMENT ☐ NECESSARY REPLACEMENTS, AND "OTHER" EXPENDITURES NOT SUBJECT TO RETURN ON INVESTMENT

BUDGETED ☒ YES ☐ NO

RETURN ON INVESTMENT	REQUIRED	THIS PROPOSAL	CALCULATED BY	AMOUNT REQUESTED (TOTAL COST)
	%	%		$ 652,677

EXPENDITURE DESCRIPTION:

Funds are requested for a surface and underground drilling campaign to explore and define the Rosebud South Ore Zone. See attached document.

CHARGE	COST CENTER GRP.	COST CENTER NUMBER	ACCOUNT G/L	ACCOUNT DETAIL	ACCOUNT SUB-DETAIL	CAP. BUDG. CATG.	AUTHORITY	ADDITIONAL INFORMATION
☐ EXPENSE								
☐ CAPITAL								

ESTIMATE BY	A.F.E. MADE BY	CHECKED BY
CVM	CVM	RFW

APPROVED BY

APPROVED BY

APPROVED BY

APPROVED BY

VICE PRESIDENT

MATERIAL TRANSFERRED $ _____

CASH OUTLAY _____ $ 593,343

CONTINGENCIES 10 % 59,334

TOTAL COST 652,677

SALVAGE (PRES. VALUE) (_____)

CHARGEABLE TO OTHERS _____ % (_____) (_____)

NET COST $

CONTROLLER	DATE APPROVED

HECLA MINING COMPANY
ROSEBUD PROJECT

March 14, 1994

Memo to: Ron Clayton, Don Gray

From: Charlie Muerhoff

Subject: Rosebud Project
Surface and Underground Exploration\Definition Drilling Proposal

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Summary

Funds are requested for a surface and underground drilling campaign at the Rosebud Project, Pershing County, Nevada. This is a budgeted project with the objective to explore and define the South Ore Zone (also referred to as zones one through four) of the Rosebud deposit, with the ultimate objective of establishing an ore reserve estimation for this zone.

The drilling project must be completed by September 30, 1994 so that reserve determination can be completed by January 9, 1995 (please refer to D. Gray memo: Preliminary Project Schedule for Rosebud, dated February 22, 1994).

Part I of this program will consist of ten (10) HQ-size core holes drilled from the surface, with a total footage drilled of 4100 feet. This program is designed to define the southern-most portion of the South Ore Zone with a secondary purpose of identifying the ground conditions in the area where the decline will intersect the South Ridge Fault.

Part II of the program will consist of 98 NQ-size core holes drilled from underground stations, with a total footage drilled of 19,335 feet. This phase of the program, in conjunction with a 250-foot cross-cut driven off of the main decline, will define the remainder of the South Ore Zone.

Part III of the program will consist of 1565 feet of either surface or underground core drilling, used to fill-in drill any areas of uncertainty concerning geological\structural correlations and ore limits and continuity, that become evident during the above mentioned drilling phases.

The entire drilling program totals 25,000 feet. This program will allow Hecla Mining Company to advance the Rosebud project from Phases VI\VII (target confirmation\deposit definition) through Phase VIII (asset evaluation and feasibility).

Existing Situation

Drilling to date in the Rosebud South Ore Zone consists of 70 holes (combination of reverse-circulation and core) which were drilled by LAC between 1989 and 1992. While these drill holes identified the South Ore Zone target, the current drill spacing (50 feet up to 150 feet between holes) is inadequate to confidently define and project geologic boundaries, structural patterns, and ore occurrences and boundaries.

The high-grade "chimney" area of the deposit is currently defined only by a single drill fan, with the nearest drill fans located 100 feet in either direction. The current plan for the decline includes a cross-cut that will be driven through this drill fan to confirm continuity of grades and establish the lateral boundary of the "chimney".

Proposed Project

Funds are requested to drill ten (10) surface HQ-size core holes, totaling 4100 feet, and 98 NQ-size underground core holes, totaling 19,335 feet. It is also requested that 1565 feet of drilling, either from surface or underground, be budgeted should it be needed as fill-in drilling to answer any uncertainties that may arise concerning geologic\structural correlations and/or ore limits and continuity. Total footage proposed is 25,000 feet.

Data from the entire Rosebud South Ore Zone (geological, structural, grades) were compiled and plotted on 50-scale cross-sections and bench maps. This compilation and subsequent interpretation revealed deficiencies in the previous geologic interpretation and ore correlation. The proposed drilling program will define the deposit geometry and degree of grade continuity, as well as address and resolve the geologic and structural correlation problems.

All holes (surface and underground) will be drilled along systematic sections, spaced 50 feet apart through the deposit. The average hole lengths for the surface and underground drilling are 410 feet and 197 feet, respectively. The average horizontal distance between ore-zone intercepts is anticipated to be approximately 75 feet. The surface holes will be used to delineate the ore zones in the extreme south end of the deposit, where drilling from underground is not practical, and will also aid in determining ground conditions near the point where the decline is expected to intersect the South Ridge Fault. Rick Tschauder has reviewed and approved the preliminary drill proposal, with his suggestions incorporated into this final proposal.

Estimated total cost of the project is $562,043. Project costs are detailed below:

Salaries		
Project Geologist:	$ 31,200	
Rig Geologists:	46,800	
Drafting\Technician	7,500	
Surface Drilling (4100 ft. @ $20.00\ft.)	82,000	
Hourly Charges	3,000	
Consumables	2,000	
Water truck (40 days @ $100.00\day)	4,000	
Demobilization	2,450	(includes demob of drill; water truck, and dozer)
Underground Drilling (19,335 ft. @ $15.65\ft.)	302,593	
Fill-in Drilling (1565 ft. @ $20\ft.)	31,300	
Surveying	10,000	
Analytical (4300 samples @ $15.00\ea.)	64,500	
Roads, sites, reclamation	5,000	
Misc. Supplies	1,000	
Total	$593,343	

Assuming approval, the surface drilling will commence on April 4, 1994, with the underground drilling beginning in the second(?) week of May, 1994, dependent on advance rates and ground conditions in the decline. A formal drifting\drilling schedule is forthcoming.

Coates Drilling currently has a surface core drill rig, water truck, and D-6 dozer on site, and has agreed not to demob contingent upon approval of this proposal.

Factors Affecting the Project

There are two main factors that could have a negative affect on the project: ground conditions and analytical requirements.

In the event that very poor ground conditions are encountered while drifting through the ore-hosting LBT unit, it may be necessary to increase the distance between drill stations. To date, the decline has not intersected this unit and all data for the LBT is from drilling only. Upon reviewing LAC's core logs, there is no indication of increased difficulty in drilling nor lack of core recovery within the LBT unit. Poor ground conditions within the LBT unit should have no negative impact on the underground drilling, as the average hole length is slightly less than 200 feet.

The above quoted analytical costs are based on normal sample preparation and assays charges. Based on results from the initial analytical work, it may be deemed necessary to alter the analytical protocol to achieve the highest confidence level possible, thus increasing analytical costs.

An additional factor that may affect this proposal is that Fausett's contract calls for 25,000 feet of underground drilling at a cost of $15.65 per foot. The contract states this rate may be renegotiated if the amount of drilling actually done varies by ±15%. The underground drilling proposed in this document is only 77% of the 25,000 feet stated in the contract (83% if the fill-in drilling is added).

HECLA MINING COMPANY
ROSEBUD PROJECT

Charlie Muerhoff
March 15, 1994

Exploration\Definition Drilling Proposal
Budgeted Expenditures vs. AFE Estimates

Cost Area	Item		1994 Budget	Estimated AFE Costs	% of Cost Area Budgeted Funds
U\G Contractor Related	U\G Drilling		$507,000	$442,343	87.2
	includes:	Surface Drilling		$ 82,000	
		Hourly Charges		$ 3,000	
		Consumables		$ 2,000	
		Water Truck		$ 4,000	
		Demobilization		$ 2,450	
		Roads, Sites, & Reclamation		$ 5,000	
		Underground Drilling		$302,593	
		Fill-in Drilling		$ 31,300	
		Surveying		$ 10,000	
Geology	Project Geologist		$ 62,400	$ 31,200	50.0
	Rig Geologists		$ 46,800	$46,800	100.0
	Technician		$ 22,500	$ 7,500	33.3
	Analytical		$125,400	$ 64,500	51.4
	Field Supplies		$ 1,200	$ 1,000	83.3
	Totals		**$765,300**	**$593,343**	**79.9**
Adjustments	Technician			$ 7,500	
Contingency			$ 76,530	$ 60,084	
Total Budget vs. AFE			**$841,830**	**$660,927**	**78.5**

CGS Personnel Inc
A Division of SOS Staffing Services

TARGET NAME	RVC #	RVC Footage	CORE #	CORE Footage
1A NEW			3	@1000' = 3000
1B	15	@1000 = 15,000'		
2A BOREHOLE NEW			3	= 1100'
- Sect 1700			2	800' = 1600'
- Sect 1500			2	800' = 1600'
3 NRW			1	-1000' = 1,000'
	15	@1000 = 15,000'	11	= 8,300'

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NEAR MINE EXPLORATION

PETE R.

TARGET 1A 3 Holes = 3,000' 18-20 $/ft.

TARGET 2A 3 Holes = 1,100'
2B - 106, intercept.

MOB. DEMOB = $4800

MINE - OPERATE & OVERSEE UG EXPLORATION PROGRAM.

Stope 23 - Development ⇒ Get w/ Jim to Get Start Time & schedule of Completion.

TALK w/ TONY HESS w/RE to ⇒ footage Rates. to 1000'
⇒

TARGET 1B

GO → - Have Geologist Pick 3-4 holes that tests the concept.

1st MONDAY AFTERNOON ⇒ 1:00 PM

UG-EXPLORATION MEETINGS - ⇒ TUESDAYS @ 10:00 AM.

Call Silver State ⇒ Can they Do Sections any way we want?

Power in North.

Do Program:

S80°E +(14°)

SSE +28°

South . +42°

5th Aug

TARGET 1A - Sect 900 - 1000'

2 - Angled - 800 & 800'

TARGET 3 - Section 1500 ~~[illegible]~~ ON 1000' @ -26° N55W

TARGET 2 - Section 1700

1 Hole - 800 - 1000' AC5 - -5° S55E

1 Hole - 800 - 1000' TD. - +13° S55E

Section - 1475

+12° S55E

1 Hole - 800 - 1000'

1 Hole - 800 - 1000' -14° S55E

Section - 1300

@ corner of Back Hole Access.

1 - 300' Hole @ -15°

1 - 300' Hole @ -45°

(1)

Pete start June 29th

Stope Levels

Stope 21

Stope 22

Stope 23

Stope 24

Stope 25

Target 1A Target

Section 1000 North

700 North

Get Drill Station

Below the South Ridge Fault.

Target 1B Target

Plot North Drill station @ 100 scale. + Elevations.

Target 1A

- Plot of Stope Access @ 100 scale w/ Elev.
- 3 - 1,000' Holes

Target 1B 300 x 400' Grid - Recomends using IP Downhole Surveys For each Hole.

@ ave of 1000' = 15,000' RVC

15 - RVC - Holes - 3/section 2300NE, 2600NE, 2900NE & 3200 NE, 3500NE.

Target 2 - East Zone Feeder Sect 1300 & 1700

sect 1300 - (Bore Hole Target) - +3 Holes 1100' Hole 131 & 379

Sect 1700 & 1500 - From North Drill Station 2 800' Hole testing 106 intercept w/in Alma Lang Syncline & Dozer

Target 3 96-356 intercept - Section 1500

Drill From North Drill station

1 - 1,000' foot Hole

- Sections 700 NE
1000 NE
1300 NE
1500 NE
1700 NE

1100 NW
1850 NW
2750 NW

A) Digitize 1) SRF - BLUE
2) TARGET Outline - RED
3) NAME of TARGET on EACH

B) PLOT - WORKINGS / ACCESSES / DEVELOPMENT

C) 50' SEARCH EACH SIDE of SECTION (100')

D) DRILL Holes w/ 0.050 opt 0.050 - 0.099 - GREEN
0.100 + RED