60001562

Mining District File Summary Sheet

DISTRICT	Rosebud
DIST_NO	4010
COUNTY If different from written on document	Pershing
TITLE If not obvious	Rosebud Drill Hole File - Hole No. D-114-95
AUTHOR	C. Muerhoff; S. Kay
DATE OF DOC(S)	1995
MULTI_DIST Y / (N?) Additional Dist_Nos:	
QUAD_NAME	Sulphur 7.5'
P_M_C_NAME (mine, claim & company names)	Rosebud Mine; Rosebud Project; Hecla Mining Co. South Zone
COMMODITY If not obvious	gold silver
NOTES	Drill log; geology; assay; total depth 301' handwritten notes 10 p.

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: DD 5/29/08
Initials Date
DB: mch
Initials Date
SCANNED: NV Blue
Initials Date

Revised: 1/22/08

D-114-95 SOUTH ZONE / 825 N

60001562 4010

60001562

Hecla MINING COMPANY

- ☐ quartz, chalcedony, silicification
- ☐ faults, fractures, joints
- ☐ FeO_X
- ☐ sulfide
- ☐ calcite, carbonate
- ☐ argillization, white clays
- ☐ propylitization
- ☐ potassic alteration
- ☐ chlorite, chloritic clays

ROSEBUD PROJECT
DIAMOND DRILL LOG

HOLE NUMBER	D-114-95	LOCATION	South Zone / 825 N	REMARKS	
PAGE 1 OF 5		NORTHING	2,203,861.892	Drilled from decline @ station 15½	
DATE	11/6/95	EASTING	481,708.679	NW Drilling - Hagby On-Rem 1000	
LOGGED BY	C. Muerhoff	ELEVATION	4654.627	NDBGM Core (2.2" diameter)	
SCALE	1" = 10'	AZIMUTH	collar: 125.5° (S54.5°E)	150': 123.5° (S56.5°E)	301': 124° (S56°E)
TOTAL DEPTH	301'	INCLINATION	collar: +5.0°	150': +5.0°	301': +5.0°

%REC	RQD	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		0'-301' LBT 0'-38.0' vfg convoluted-laminated ash flow / breccia. Fg, pink-colored (K-altered) groundmass/ash flow with discontinuous bands of strongly propylitized to moderately argillized vfg ash. Occassional (<1/ft.) large angular blocks of very finely-laminated, vfg ash tuff (banding is also convoluted). Flow banding @ 35°-40° to c.a., steepening to ±20° to c.a. by 25' downhole. ~20'-30' flow contains no breccia clasts	10 20 30		0'-38.0' Fracture / joint sets @ ±50° to c.a. (~1/ft.) & @ ±60° to c.a. (~1/5ft.). Although close in orientation, fairly confident these are two distinct sets. Both with minor white "powdery" clay/rock flour on surfaces.	0'-38.0' flow is cut by stockwork of pyrite > calcite veinlets & stringers. Preferentially @ ∡s between 40° & 70° to c.a.; minor set @ ±0° to c.a.; also randomly oriented. (Avg ~ 5-10/ft.). ± white clay where veinlets are locally vugy. Fg pyrite preferentially disseminated along coarser ash beds.
	80-90% of clast population	38.0'-106.0'(±) Matrix-supported heterolithic breccia w/ small (≤½"), well-rounded, tan to bleached vfg ash frags > small (≤½") rounded, intensely argillized fg-med gr ashy frags > small (≤¼") v. angular, dark brown, aphanitic frags > large (≤ core diameter), propylitized planar- to mildly convoluted-laminated ash flow tuff. All floating in a light grey to locally light pink (weak K-alt) fragmental groundmass.	40 50		38.0' conformable contact @ 20° to c.a. 38.0'-106.0' Fracture/joint set @ ±50° to c.a. continues w/ v. minor white clayey rock flour + disseminated pyrite on rough, irregular surfaces. (~1/3ft.)	38.0'-47.4' Stockwork as described above continues w/ increased vuginess. Calcite content decreasing with depth ↓ @47.4 Stockwork intensity / density increases dramatically to >10/ft. Grey chalcedony veinlets w/ pyrite ± marcasite

ANALYTICAL DATA						
FROM	TO	W	Au	Ag	Au2	~~Ag2~~ AuGrav
0'	5'	5'	0.070	3.71		
5'	10'	5'	0.133	0.28		0.120
10'	15'	5'	0.491	0.76		0.576
15'	20'	5'	0.198	0.40		0.267
20'	25'	5'	0.076	0.21		
25'	30'	5'	0.268	0.88		0.380
30'	35'	5'	0.140	0.41		0.140
35'	38'	3'	0.115	0.24		0.111
38'	43'	5'	0.294	0.39		0.325
43'	47.4'	4.4'	0.195	0.78	0.152	0.120
47.4'	52'	4.6'	0.097	0.33		

(con't)

HOLE NUMBER D-114-95 PAGE 2 OF 5

%REC	RQD	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		~60', breccia is nearly monolithic, with sub rounded k-altered to argillized fg ash frags >> tan, sub-rounded nearly aphanitic frags. Laminated ash flow clasts are very rare. (both clast groups occassionally sub-angular.) ↓ silicification of breccia groundmass waning.	60 70		past 60', begin to pick up minor drusy qtz ± mare blades ↔ ± pyrite ± minor white clay on the fracture/joint surfaces @ ±50° to c.a. → to 106'	(con't) ± white clays. Carbonates noticeably absent. Groundmass of breccia is moderately to locally pervasively silica-flooded. Local, short (≤6") intervals of hydrothermal brecciation with fragments of ash tuff breccia either floating in or supported by grey vugy chalcedony. Mineralization preferentially @ 40° & 60° to c.a., but also randomly oriented. Where veins & hydro-breccia are vugy; filled with xtalline marcasite + pyrite ± drusy qtz. @64' downhole, begin to pick up minor late calcite in vugs.
		@81.1' - 85.6' breccia groundmass pervasively silica flooded.	80		81.1'-85.6' fracture/stockwork zone @ 40° & 0°-20° to c.a. Extremely vugy w/ drusy qtz + mare blades + pyrite + white clay. No apparent offset across zone.	81.1'-106' see lith & structure comments.
		85.6'-90.4' Very few, thin pyrite + grey chalcedony stringers @ 30° & 50° to c.a., but breccia groundmass strongly silica-flooded.			85.6'-106' see lith comments.	
		90.4'-106' Strong vein/stockwork/breccia zone. Ash tuff breccia has been hydrothermally re-brecciated by grey chalcedony → very vugy w/ drusy quartz + marcasite xtals ↔ pyrite + pyrite xtals ± white clay ± late barite xtals. Veining is preferentially @ 20°-30° to c.a. Mineralization is cut by later fractures @ ±30° to c.a. w/ white clay & rock flour on surfaces (~2/ft → decreasing downhole).	90 100			
		— gradational, conformable contact —	110		106'-177.6' v. competent unit with fracture/joint sets @ 50° & 30°; very widely spaced (~1/5 ft.). Set @ 50° clearly cuts set @ 30°. Both with light grey to white rock flour/clay gouge. Both sets appear to cut mineralization.	106'-125'(±) Stockwork described above continues, but rapidly waning in intensity. Veining is vugy (s.a.a.) to ~110' downhole, then just thin stringers of pyrite ± chalcedony ± chalcopyrite. Generally 60°-70° to c.a. Groundmass is weakly silicified.
		106'-177.6' Heterolithic, nearly clast-supported breccia w/ v. angular, light green, devitrified glassy-textured flow fragments + light tan to bleached sub-angular to angular vfg "massive" ash fragments + dark brown, (con't)	120			

FROM	TO	W	Au	Ag	Au2	~~Ag2~~ Au Grav
52'	57'	5'	0.010	0.13		
57'	62'	5'	0.018	0.10		
62'	67'	5'	0.016	0.13		
67'	72'	5'	0.008	0.11		
72'	77'	5'	0.009	0.05		
77'	81.1'	4.1'	0.004	0.05		
81.1'	85.6'	4.5'	0.111	0.29		
85.6'	90.4'	4.8'	0.025	0.13		
90.4'	96'	5.6'	2.970	5.84		2.920
96'	101'	5'	0.540	0.84		0.470
101'	106'	5'	0.571	3.05		0.440
106'	110'	4'	0.808	0.86		0.803
110'	115'	5'	0.207	15.00	0.179	0.200
115'	120'	5'	0.038	0.26		

HOLE NUMBER D-114-95 PAGE 3 OF 5

%REC	RQD	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		(con't) angular, nearly aphanitic fragments + K-altered to propylitized to argillized planar laminated ash flow fragments. Dark brownish-red to pinkish-brown fg to fragmental groundmass w/ "glassy" appearance.	130			125'-177.6' Stockwork is very weak. Only ~1-2/thin stringers/ft. However, composition changes to calcite + pyrite ± chlorite. Generally @ ±70° to c.a. Breccia groundmass is locally carbonate flooded to completely replaced by calcite
		~140', light green devitrified angular "glassy" flow fragments dominate breccia (~75% of clasts). Grading into matrix-supported. ↓	140			
			150			
		~160', breccia is nearly monolithic; light green devitrified glassy flow / flow breccia fragments.	160		~165' fault/shear zone light green pyritic clay + rock fragments. 165' 30° to c.a. 166' 50° to c.a. Internal shears are at ±15° to c.a. fractures/shears @ 30° continue to 167.5.	-past structure @ 165', carbonate flooding ceases, only minor (<1/ft) thin pyrite ± calcite stringers @ 50°-70° to c.a.
		~170', breccia begins to incorporate large (≤ core diameter finely-laminated fg ash flow fragments w/ alternating bands of argillization & propylitization.	170			
		177.6'-186.1' fault breccia? brecciated contact? clast-supported breccia with large strongly bleached argillized sub-rounded ash frags + >core diameter frags of strongly propylitized, weakly banded ash tuff in tan fg (locally clayey) matrix; local zones of intense silicification → replacement of matrix.	180		177.6'-178.4' fault/fracture zone. 3 strong fractures @ 60° to c.a. → 40° to c.a. @ 178.4' All have ~1/4" grey-green clay & rock flour gouge w/ competent bxa horse blocks inbetween. ↖ unit above	177.6'-186.1' unit has been re-brecciated by grey chalcedony + pyrite ± fg Ag-salts.
			190			

ANALYTICAL DATA						
FROM	TO	W	Au	Ag	Au2	~~Ag2~~ AuGrav
120'	125'	5'	0.106	0.28		
125'	130'	5'	0.142	0.20		0.110
130'	135'	5'	0.031	0.19		
135'	140'	5'	0.069	1.86		
140'	145'	5'	0.387	2.01		0.320
145'	150'	5'	0.012	0.15		
150'	155'	5'	0.008	0.09		
155'	160'	5'	0.015	0.08		
160'	165'	5'	0.003	0.05		
165'	167.5'	2.5'	0.003	0.09		
167.5'	172.5'	5'	0.017	0.11		
172.5'	177.6'	5.1'	0.392	0.76		0.400
177.6'	182'	4.4'	0.396	1.23		0.388
182'	186.1'	4.1'	2.890	29.00		3.110
186.1'	188'	1.9	0.546	2.17		0.480

HOLE NUMBER D-114-95 PAGE 4 OF 5

%REC	RQD	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		186.1' - 210.6' "wavy-laminated ash tuff". Flow-banded fg ash, generally light grey to light pink (K-alt) in color with convoluted, discontinuous layers of strongly argillized med-grained ash. Flow banding @ 60°-65° to c.a. -203.8'-204.9' laminated ash tuff is strongly brecciated by black, pyritic chalcedony + matrix-supported in a few places with rotation of clasts. -past 204.9', increase in frequency of med-gr argillized ash beds. Grades into 210.6'-217.3' "Leopard-skin tuff". Alternating, very discontinuous bands of light green, clay altered ash & fg pinkish K-altered ash. Flow banding @ ±70° to c.a. Grades into 217.3'-243.8' Weaker version of leopard-skin tuff. Texturally, looks about the same, but alteration is much less intense. Flow foliation is variable from 50° to 70° to c.a. Generally light green mottled color w/ moderately argillized to chloritized elongated ash (pumice?) fragments. Weakly brecciated & healed by chloritized fg groundmass. Becoming more fg with depth. 243.8'-260.3' Gradational into clast-supported breccia with rounded fragments of unit above, light green devitrified glassy flow, & very planar banded, propylitized fg ash. Dark grey to dark green chloritic, pyritic groundmass. Matrix-supported over a few short intervals in deep green chloritic clay.	200 210 220 230 240 250 260		186.1'-188' first 2 ft of laminated ash are strongly fractured @ 60° to c.a. which cut fault @ ±0° to c.a. (~6/interval). White clay + pyrite + marcasite ± chlorite on surfaces. 188'-210.6' Occassional (<1/5ft) fractures @ ±30° to c.a. w/ chlorite + white clay ± pyrite on undulating surfaces. Strongly fractured along bedding planes. Same mineralization as 210.6'-217.3' fractured along flow planes only w/ light green wavy clay on surfaces. 217.3'-243.8' fracture set @ 50° to c.a. (not along flow planes) w/ minor white clay / white rock flour on planar surfaces (~1/ft.) 243.8'-260.3' Very occassional fractures/joints @ 80° & 40° to c.a. (<1/2ft.) w/ minor light grey-green clays on planar surfaces. Locally vugy w/ drusy qtz + marc + pyrite (~2-3/ft.)	186.1'-210.6' Early set of bedding plane stringers w/ chlorite + pyrite ± white clays (propylitization bleeds outward into wall rock) cut by black chalcedony + white chalcedony (not banded; looks like two different phases) + pyrite ± marc ± chlorite ± white clay. Very dense stockwork >25/ft. Predominantly @ 40°-50° to c.a., but also quite randomly oriented. 210.6'-217.3' LST is cut by grey chalcedony + pyrite + chlorite ± white clay ± grey vfg sulfide/sulfosalt? Slightly vugy locally w/ drusy qtz ± marc blades. Stockwork is randomly oriented. ~5/ft. 217.3'-243.8' Minor, random stringers of grey chalcedony ± pyrite ± chlorite. (<1/ft.) ~237'-238' extremely vugy w/ drusy qtz + large marc blades (the drusy qtz actually coates the marc in a few places). Not really a structure, just a zone of pervasive silicification. 243.8'-260.3' breccia is cut by grey chalcedony + chlorite + pyrite ± marc stringers @ 80° & 30° to c.a. (do not cross into areas of extreme chloritization of groundmass)

ANALYTICAL DATA

FROM	TO	W	Au	Ag	Au2	AuGrav
188'	193'	5'	0.434	2.26		0.340
193'	198'	5'	0.620	0.94		0.714
198'	203.8'	5.8'	1.930	1.51		2.020
203.8'	205.9	2.1'	0.473	1.06		0.480
205.9'	210.6'	4.7'	0.540	0.44		0.510
210.6'	217.3'	6.7'	0.096	0.47		
217.3'	223'	5.7'	0.007	0.07		
223'	228'	5'	0.006	0.05		
228'	233'	5'	0.004	0.04		
233'	238'	5'	0.012	0.12	0.014	
238	243.8'	5.8'	0.010	0.06		
243.8'	249'	5.2'	0.006	0.04		
249'	255'	6'	0.004	0.07		
255'	260.3'	5.3'	0.009	0.08		

HOLE NUMBER D-114-95 PAGE 5 OF 5

%REC	RQD	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		260.3' - 286.8' Dark green, propylitized → chloritized vfg ash flow. No distinct laminations, but flow foliation @ 45°-50° to c.a. Occassional argillized, stretched pumice → med-grain ash fragments, but rare. Weakly brecciated by deep green chloritic clays. Flow is essentially non-variable over entire interval.	270 280		260.3'-286.8' Ash flow is fractured @ 50° & 70°(±) to c.a. ~2/ft. Chlorite in drusy qtz (i.e., qtz is dark green) + grey chalcedony + pyrite ± mare ± white clay ± yellow "duck's butter" clay on rough surfaces.	260.3'-286.8' pyrite + chlorite + white clay along foliation planes, cut by stringers of grey chalcedony + pyrite + mare. Local silica-flooding of ash flow; vugy with drusy qtz + pyrite ↔ mare blades + white clay ± minor yellow "duck's butter" clay. Stockwork oriented @ ±60° to c.a. generally, but also random ∡'s to c.a.
		286.8'-301' vfg ash flow grades into ash flow with argillized pumice fiamme / med-grained ashy fragments in chloritized fg ash. Like preceding unit, no distinct laminations, but clear foliation @ ±55° to c.a. First few feet (after fault) are strongly brecciated & cemented by grey chalcedony.	290 300		286.8'-291' Strong fractured zone w/ white clay + grey chalcedony + mare blades packed into open fractures @ ±40° to c.a. Strongly brecciated & healed by grey chalcedony to ~291'. Don't think there's much offset; grading into pumice ash tuff prior to first fracture. 291'-301' fractures @ ±50° to c.a. (~1/ft.) w/ white clay ± grey chalcedony ± mare on fractures.	-past 291' ash flow is moderately silica-flooded; locally intense w/ drusy qtz + white clay + mare blades where vugy.
				T.D. 301'		

ANALYTICAL DATA						
FROM	TO	W	Au	Ag	Au2	AuGrav
260.3'	266'	5.7'	0.015	0.08		
266'	271'	5'	0.014	0.09		
271'	276'	5'	0.008	0.07		
276'	281'	5'	0.006	0.12		
281'	286.8'	5.8'	0.007	0.12		
286.8'	291'	4.2'	0.007	0.15		
291'	296'	5'	0.002	0.07		
296'	301'	5'	0.004	0.08		

AMERICAN ASSAY LABORATORIES

ANALYSIS REPORT SP036449

American Assay Laboratories

P.O. BOX 11530
RENO, NV,,USA
Ph.1-702-356-0606, Fax.1-702-356-1413

HECLA MINING CO.

COPIES TO : CHARLIE MUERHOFF
:
:
:

CLIENT REFERENCE No: D-114-95 RECEIVED : 14 NOV 1995

No. SAMPLES : 62 REPORTED : 22 NOV 1995

MAIN SAMPLE TYPE : DRILL CORE

ANALYSIS	ANALYTICAL METHOD	QUALITY PARAMETER	UNIT	DETECTION
Au(OZ)	FA60	15%	OPT	0.001
Au(RZ)	FA60	15%	OPT	0.001
AuGRAV	GRAV	15%	OPT	0.001
Ag(OZ)	D210	10%	OPT	0.02

SIGNATORY : Sue King M.S.

AMERICAN ASSAY LABORATORIES

ANALYSIS REPORT SP036449

American Assay Laboratories

CLIENT : HECLA MINING CO.
PROJECT : ROSEBUD
REFERENCE : D-114-95

REPORTED : 22 NOV 1995

SAMPLES	Au(OZ) FA60 OPT	Au(RZ) FA60 OPT	AuGRAV GRAV OPT	Ag(OZ) D210 OPT
D-114-95 00-05	0.070			3.71
D-114-95 05-10	0.133		0.120	0.28
D-114-95 10-15	0.491		0.576	0.76
D-114-95 15-20	0.198		0.267	0.40
D-114-95 20-25	0.076			0.21
D-114-95 25-30	0.268		0.380	0.88
D-114-95 30-35	0.140		0.140	0.41
D-114-95 35-38	0.115		0.111	0.24
D-114-95 38-43	0.294		0.325	0.39
D-114-95 43-47.4	0.195	0.152	0.120	0.78
D-114-95 47.4-52	0.097			0.33
D-114-95 52-57	0.010			0.13
D-114-95 57-62	0.018			0.10
D-114-95 62-67	0.016			0.13
D-114-95 67-72	0.008			0.11
D-114-95 72-77	0.009			0.05
D-114-95 77-81.1	0.004			0.05
D-114-95 81.1-85.6	0.111			0.29
D-114-95 85.6-90.4	0.025			0.13
D-114-95 90.4-96	2.970		2.920	5.84
D-114-95 96-101	0.540		0.470	0.84
D-114-95 101-106	0.571		0.440	3.05
D-114-95 106-110	0.808		0.803	0.86
D-114-95 110-115	0.207	0.179	0.200	15.00
D-114-95 115-120	0.038			0.26

AMERICAN ASSAY LABORATORIES

ANALYSIS REPORT SP036449

American Assay Laboratories

CLIENT : HECLA MINING CO.
PROJECT : ROSEBUD
REFERENCE : D-114-95

REPORTED : 22 NOV 1995

SAMPLES	Au(OZ) FA60 OPT	Au(RZ) FA60 OPT	AuGRAV GRAV OPT	Ag(OZ) D210 OPT
D-114-95 120-125	0.106			0.28
D-114-95 125-130	0.142		0.110	0.20
D-114-95 130-135	0.031			0.19
D-114-95 135-140	0.069			1.86
D-114-95 140-145	0.387		0.320	2.01
D-114-95 145-150	0.012			0.15
D-114-95 150-155	0.008			0.09
D-114-95 155-160	0.015			0.08
D-114-95 160-165	0.003			0.05
D-114-95 165-167.5	0.003			0.09
D-114-95 167.5-172.5	0.017			0.11
D-114-95 172.5-177.6	0.392		0.400	0.76
D-114-95 177.6-182	0.396		0.388	1.23
D-114-95 182-186.1	2.890		3.110	29.00
D-114-95 186.1-188	0.546		0.480	2.17
D-114-95 188-193	0.434		0.340	2.26
D-114-95 193-198	0.620		0.714	0.94
D-114-95 198-203.8	1.930		2.020	1.51
D-114-95 203.8-205.9	0.473		0.400	1.06
D-114-95 205.9-210.6	0.540		0.510	0.44
D-114-95 210.6-217.3	0.096			0.47
D-114-95 217.3-223	0.007			0.07
D-114-95 223-228	0.006			0.05
D-114-95 228-233	0.004			0.04
D-114-95 233-238	0.012	0.014		0.12

AMERICAN ASSAY LABORATORIES

ANALYSIS REPORT SP036449

American Assay Laboratories

CLIENT : HECLA MINING CO.
PROJECT : ROSEBUD
REFERENCE : D-114-95

REPORTED : 22 NOV 1995

SAMPLES	Au(OZ) FA60 OPT	Au(RZ) FA60 OPT	AuGRAV GRAV OPT	Ag(OZ) D210 OPT
D-114-95 238-243.8	0.010			0.06
D-114-95 243.8-249	0.006			0.04
D-114-95 249-255	0.004			0.07
D-114-95 255-260.3	0.009			0.08
D-114-95 260.3-266	0.015			0.08
D-114-95 266-271	0.014			0.09
D-114-95 271-276	0.008			0.07
D-114-95 276-281	0.006			0.12
D-114-95 281-286.8	0.007			0.12
D-114-95 286.8-291	0.007			0.15
D-114-95 291-296	0.002			0.07
D-114-95 296-301	0.004			0.08

HECLA MINING COMPANY - ROSEBUD PROJECT
1995 SOUTH ZONE FILL-IN DRILLING PROGRAM

Date: 11/6/95

HOLE ID: D-114-95

By: C. Muerhoff

Sample ID	Description	Mass (g)	H2O Level (cc)		Displacement (cc)	Sp. Grav. (g/cc)
			Beginning	Ending		
94.6' - 94.8	pink-matrix supported heterolithic bxa stockworked / vugy w/ drusy qtz + py + minor white clay	348.6	1200	1365	165	2.11
108.7' - 109.0'	s.a.a.	427.4	1365	1540	175	2.44
175.5' - 175.8'	pink-matrix supported monolithic bxa w/ propylitized, weakly banded devitrified frags.	448.8	1540	1720	180	2.49
190.0' - 190.4'	vfg, planar banded ash flow	625.4	1720	1970	250	2.50
212.8' - 213.1'	LST	244.2	825	925	100	2.44
230.3' - 230.6'	weak LST	372.0	925	1080	155	2.40
273.8' - 274.2'	silicified, vugy, chloritized ash flow	621.8	1080	1315	235	2.65
295.5' - 295.7'	pumice-rich ash flow; silicified, vugy	323.6	1080	1220	140	2.31