60000705

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 RS-478-99
AUTHOR	K. Allen; K. Meyer; G. Secrist; M. Niemi
DATE OF DOC(S)	1999
MULTI_DIST Y / N? Additional Dist_Nos:	
QUAD_NAME	Sulphur 7.5'
P_M_C_NAME (mine, claim & company names)	Rosebud Mine, Hecla Mining Co; Rosebud Project; Rosebud Mining Co. LLC
COMMODITY If not obvious	gold; silver
NOTES	drill logs; assay; geology; photographs; geochemistry; total depth 1600'; receipts handwritten notes 94p.

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 4/29/08
Initials Date
DB:
Initials Date
SCANNED:
Initials Date

Revised: 1/22/08

RS-478

6000 0705
4010

478

100 + 175

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

Hecla
MINING COMPANY

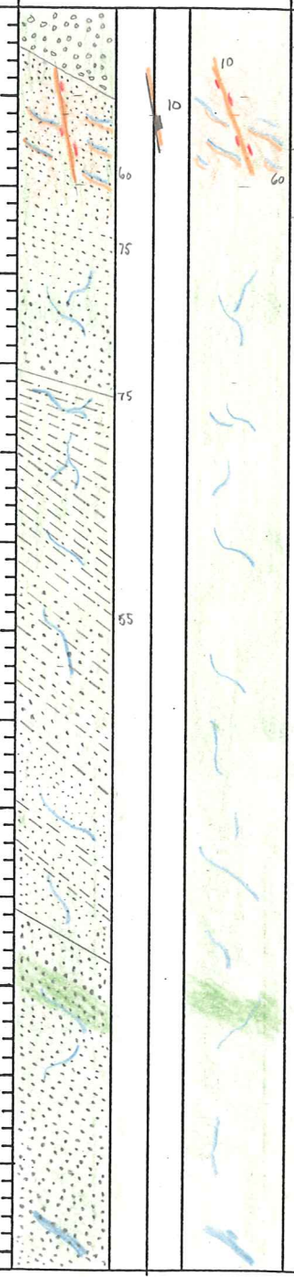
ROSEBUD PROJECT
DIAMOND DRILL LOG

HOLE NUMBER	RS-478-99	LOCATION		REMARKS	
PAGE	1 OF	NORTHING			
DATE	11/3/99	EASTING			
LOGGED BY	PTR	ELEVATION			
SCALE	1" = 10'	AZIMUTH			
TOTAL DEPTH		INCLINATION			

LITH	OX/RE	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
TCS	R	TCS Dark brown to Green Grey, slightly hard, weakly carbonaceous siltstones, Sandstones and Pebble conglomerates.	1610 1620 1630 1640 1650	Missing core 60 50	1600 - 1650 Calcite filled fractures parallel to bedding 1/16 - 1/8" ~ 1/ft, bedding at 40-60° coarses Sands and conglomerates have weak alignment of grains. 1607 Small breccia zone with calcite matrix, crackle to mosaic breccia. 60 60 60 50 1639 55° clay filled fractures ~1/8" thick	1600 - 1650 Weakly propylitic alteration, finer grained areas are weakly calcareous.

ANALYTICAL DATA						
FROM	TO	W	Au	Ag	Au2	A
1600	1606					
1606	1615					
1615	1625.5					
1625.5	1636					
1636	1646.5					
1646.5	1655					

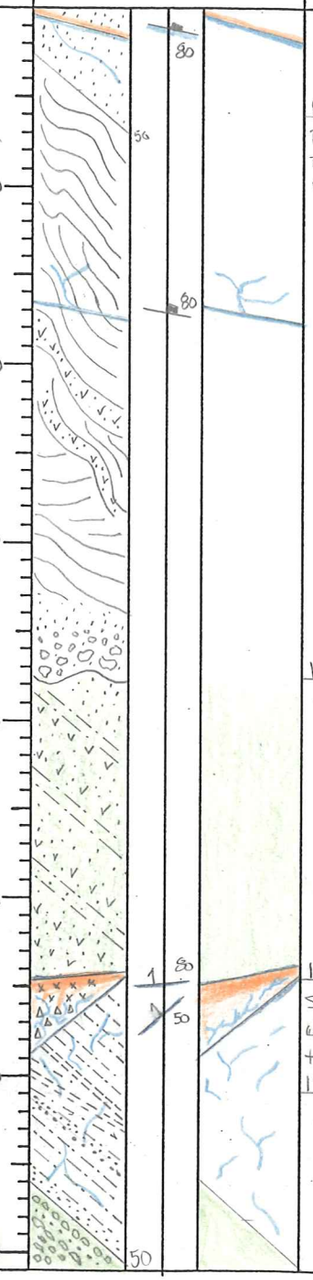
HOLE NUMBER RS-478-99 PAGE 2 OF

LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
TCS	R	TCS Continues	1660 1670 1680 1690 1700 1710 1720		1650-1720 Joints Parralell to bedding AT 58°. LESS CALCITE Fracture fille. 1656 White clay filled fracture. Some Pyrite. 1655-1660 White clay and calcite filled fractures. ~ 4/ft & 1/16-1/8" thick.	1650-1720 Weakly Propylitic, finer grained sediments are weakly calcareous 1655-1660 Matrix is weakly to moderately argillized.

ANALYTICAL DATA

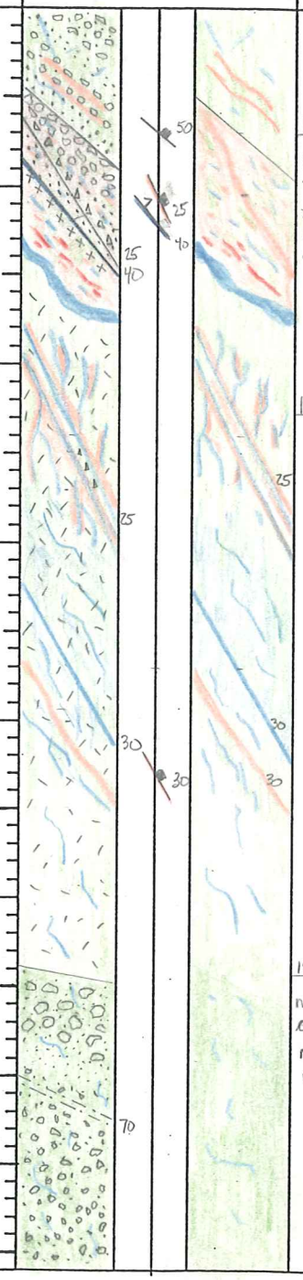
FROM	TO	W	Au	Ag	Au2
1646.5	1655				
1655	1660				
1660	1671.5				
1671.5	1682				
1682	1692.5				
1692.5	1703				
1703	1713.5				
1713.5					

HOLE NUMBER RS-478-99 PAGE 3 OF

LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		TCS 1723.9 – 1757.9 Dark Grey Brown mudstone, Some crossbeds of fine sandstone 1747 – 1757.9 Same as above w/ interbeds of dark Grey-Blue sandy Pebble conglomerate. Matrix supported Clasts are elongate and aligned and deformed Possible epiclastic tuff 1757.9 – 1774.1 Blue-Grey mudstones and fine to coarse sandstone. Deformed, elongate and aligned clasts. Has a "wavey" fabric – Possible epiclastic tuff. 1776.5 – 1788 Same as 1723.9. With some interbeds of a blue-grey mudstone 1788 Green-Grey Coarse sand to pebble conglomerate. Average to slightly soft. Six in. to 1 ft fining up sequences	1730 1740 1750 1760 1770 1780 1790		1723.9 – 1757.9 Bedding, 50-60°, Some cross-Beds at 20-30°, Minor Calcite Veins 1757.9 – 1774.1 Bedding at 50-60° 1774.1 – 1776.5 Small breccia zone – Upper Part is milled grading to Grackle in lower. 1776.5 –	1757.9 – 1774.1 Weakly Propylitized Minor calcite veins 1774.1 – 1776.1 Upper 1/2 is strongly argillized with some white clay Lower 1/2 has calcite matrix

ANALYTICAL DATA					
FROM	TO	W	Au	Ag	Au2
1713.5	1723.4				
1723.4	1729				
1729	1736				
1736	1743.5				
1743.5	1754				
1754	1757.9				
1757.9	1765.2				
1765.2	1774.1				
1774.1	1776.5				
1776.5	1785.5				
1785.5					

HOLE NUMBER RS-478-99 PAGE 4 OF

LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		TCS Continued 1802 – 1844.3 Greenish-Grey Slightly soft to average, aphanitic with 5-10% lithic fragments (Dk Grn). (Tuff?) 1844.3 – Mottled Dk Green to Grey Green, average to slightly soft interbedded sandstone and Conglomerate. Conglomerate is mostly matrix supported with sandstone to mudstone in matrix. Clasts are subrounded to angular	1800 1810 1820 1830 1840 1850 1860		1797.7 – 1806.5 Small fault? Numerous Parallel Joints and 2 brecciated zones. Upper is broken into ½-2" Pieces. Lower is a dark brown milled zone. 1806.5 – 1844.3 2-6 Calcite veins / ft. trending 20-40° 1844.3 – 1886 Minor calcite veins Occasional Partings on Mudstone seams and laminations in sandstone	1797.7 – 1806.5 Moderately argillized and weakly Propylitized. White Clay coated fractures and white clay filled Gashes Some calcite with W.C. Base of zone is a 4-6" calcite Vein at about 40° (uneven). minor aphanitic sulfides at bottom of zone in blebs and Veins w/ Calcite 1806.5 – 1844.3 Moderately Propylitized. Moderately calcareous 1817 – 1830 1844.3 – 1886 Moderatley Propylitized

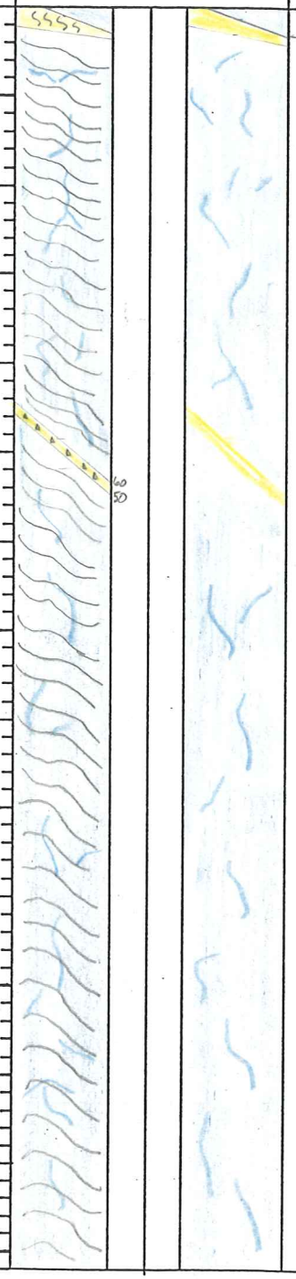
ANALYTICAL DATA

FROM	TO	W	Au	Ag	Au2
1785.5	1793.7				
1793.7	1797.7				
1797.7	1802				
1802	1806.5				
1806.5	1817				
1817	1827.5				
1827.5	1838				
1838	1844.3				
1844.3	1848				
1848	1858.5				

HOLE NUMBER RS-478-99 PAGE 5 OF

LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION	ANALYTICAL DATA FROM	TO	W	Au	Ag	Au2
TCS		TCS Continues	1870 1880		1870 - 1886 Conglomerate / Breccia UP to 3" clasts of ALS and fine-grained intrusive.	1860 - 1886. Moderately Propylitized Some olive green clay in Cong. matrix. Some calcite in matrix.	1868.5	1869.5				
							1869	1879.5				
							1879.5	1886				
ALS		1886 - 2396.5 ALS Dark Grey to Black. Average to slightly hard. Mudstone to siltstones w/ Some fine sandstones Minor Phyllies. Abundant synsenotic Qtz and Some syngenotic Pyrite	1890 1900 1910 1920 1930	85 60 40 40 70 70 60 50 80 80	1886 - 1927.7 Intensively sheared and Brecciated. Interbedded with fine-grained Intrusive. Shears are Graphite coated and run 40-70°.	1886 - 1930 ALS is weakly Calcareous. w/ Some calcite veins. Minor synsenotic Pyrite. Intrusive is weakly argillized.	1886	1893				
							1893	1900				
							1900	1910.5				
							1910.5	1920				
						1927.7 - 1928.5 5-10% Pyrite xtals 1-2mm.	1920	1927.7				

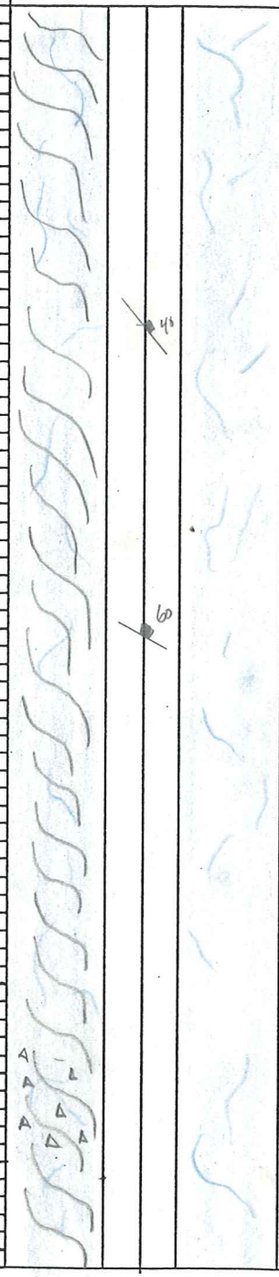
HOLE NUMBER RS-478-99 PAGE 6 OF

LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
					1931.1 - 2000 Less sheared and little brecciation. bedding is at 80-85° and shows deformation in the form of boudin-like structures.	1931.1 - 2000 Weakly calcareous and V. weakly silicified. <5% calcite veins Small silicified zone @ 1930' 1954.3 Small silicified Crackle breccia.

ANALYTICAL DATA

FROM	TO	W	Au	Ag	Au2
1927.7	1935				
1935	1945.5				
1945.5	1955				
1955	1966.5				
1966.5	1977				
1977	1987.5				
1987.5	1998				

HOLE NUMBER RS-478-99 PAGE 7 OF

LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		ALS Continues	2010 2020 2030 2040 2050 2060 2070		2000–2070 Bedding @ 40-60° with occasional x-beds. Crackle coated joints parralell to bedding. Boudin structures continue.	2000 – 2070 Weakly Calcareous and very weakly silicified, ±10% Calcite veins. Minor sporadic pyrite.

ANALYTICAL DATA

FROM	TO	W	Au	Ag	Au2
1998	2008				
2008	2018.5				
2018.5	2028				
2023	2038				
2038	2048.5				
2048.5	2059				
2059	2069				

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ESF Pbx.

LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		ALS Continues	2080, 2090, 2100, 2110, 2120, 2130, 2140	50, 60, 60	2070-2140 Continues.	2070-2140 Continues. 2093-2105 Intrusive - weakly to moderately argillized. Some Pyrite 2135-2142 Intrusive, trace clay weakly argillized.

ANALYTICAL DATA

FROM	TO	W	Au	Ag	Au2
2069	2079.5				
2079.5	2090				
2090	2099				
2099	2102.6				
2102.6	2109				
2109	2120				
2120	2130				
2130					

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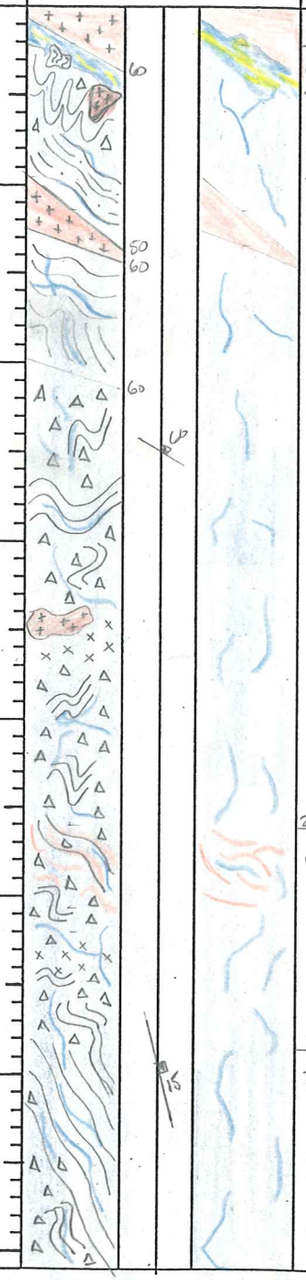
LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		ALS Continues	2150, 2160, 2170, 2180, 2190, 2200, 2210		2140 - 2210 Continues — Increasing Brecciation Mostly Rubble with some Milled sections (2176) Bedding dips 50-70° Some folding and deformation of bedding. 2186 - 2190.5 Continued rubble 2199 Bedding and joints at 15-30°	2140 - 2210 Continues — 2142 - 2146 Some ALS rubble with Intrusive clasts & white clay Also large mass of syngenetic qtz + calcite. 2186 - 2190.5 has some (5%) white clay on fracture surfaces.

ANALYTICAL DATA

FROM	TO	W	Au	Ag	Au2
2140	2146				
2146	2151				
2151	2153.5				
2159.5	2164				
2171	2171				
2179	2179				
2186	2186				
2190.5	2190.5				
2199	2199				
2208	2208				

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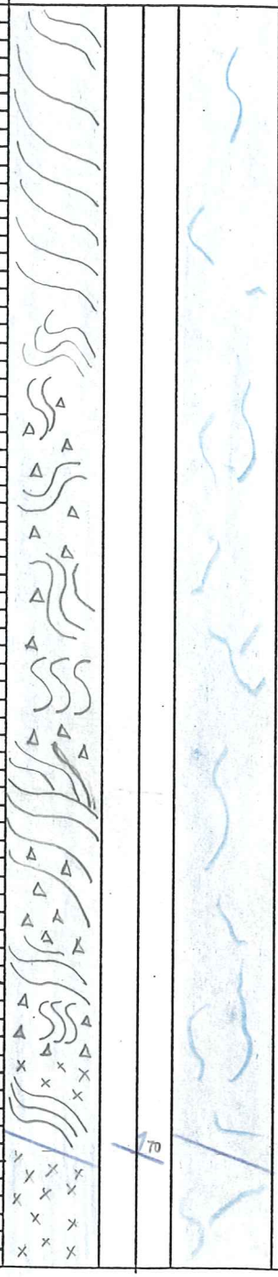
LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION
		ALS - continues	2210, 2220, 2230, 2240, 2250, 2260, 2270		2210 - 2280 Continues - Increasing Brecciation at 2270 on.	2210 - 2280 Continues -

ANALYTICAL DATA

FROM	TO	W	Au	Ag	Au2
2208	2218				
2218	2230				
2230	2239.5				
2239.5	2248.5				
2248.5	2258				
2258	2268.5				
2268.5	2274.5				
2274.5	2279.5				

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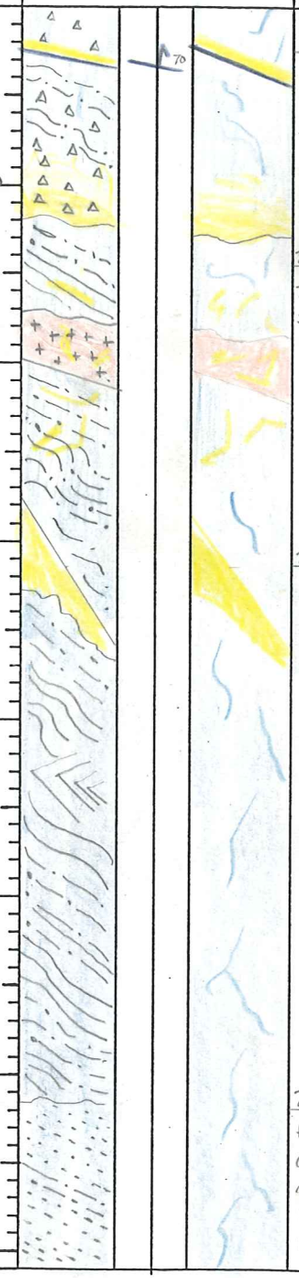
LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION	ANALYTICAL DATA FROM	TO	W	Au	Ag	Au2
		ALS · Continues SR4	2290 2300 2310 2320 2330 2340 2350		2274.5 - 2283 Zone of intense brecciation. Rock is milled with ALS. Powder matrix. Brecciation decreases in last 1' foot to mosaic with some silicification of matrix 2283 - 2291 Breccia zone w/ some siltstone. Crackle to mosaic clast supported at top and matrix supported in bottom 2' feet. 2311.5 - 2313.5 Syngenetic Qtz mass. 2342 - 2396.5 (TD) Fine-grained ss. Qtz clasts are flattened and stretched and aligned with bedding. Interbedded with siltstone. bedding 60-70°	2274.5 - 2283 No alteration - some silicification in last 1' foot. ± pyrite (syngenetic) 2283 - 2291 Bottom 2' is cemented with calcite and silica. Pyrite continues. 2295 - 2302.5 Veins of open fractures with Qtz crystal coatings. Minor white clay. Veins are 0-20° and cross-cut syngenetic Qtz. Also crosses intrusive from 2298 - 2301.	279.5 2291 2295 2302.5 2312.5 2323 2333.5 2344 2354.5	2291 2295 2302.5 2312.5 2323 2333.5 2344 2354.5				

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LITH.	OX/RED.	LITHOLOGY	FT	GRAPHIC LOG	STRUCTURE	ALTERATION AND MINERALIZATION	ANALYTICAL DATA FROM	TO	W	Au	Ag	Au2
		ALS Continues	2360, 2370, 2380, 2390, 2400		2371 – 2379.5 Broken core zone with 0-10° Calcite with white clay veins up to 1/4" wide.			2354.5				
							2354.5	2365				
							2365	2371.5				
							2371.5	2379				
							2379	2386				
							2386	2396.5				
		TD = 2396.5										

Hecla MINING COMPANY

ROSEBUD PROJECT
DRILL LOG

HOLE NUMBER RS-478
PAGE 1 OF 16
DATE
LOGGED BY KAA
TOTAL DEPTH 1600

LOCATION
NORTHING
EASTING
ELEVATION
AZIMUTH
INCLINATION

AREA Northwest Cranmer
DRILLING CO. EKLUND
RIG TYPE RA-10
HOLE SIZE
DOWN HOLE SURVEY BY Welcom.

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	SILICIFICATION 15%	SILICIFICATION +25%	SILICIFICATION MASS	SILICIFICATION QUARTZ %	ARGILLIC 5%	ARGILLIC 15%	ARGILLIC +25%	ARGILLIC TYPE	PROPYLITIC % CHLORITE	PROPYLITIC % CALCITE	POTASSIC % K-SPAR	POTASSIC % ALUNITE	OXIDATION 5%	OXIDATION 15%	OXIDATION +25%	VIENING %	VIENING TYPE	MINERALIZATION: SULFIDES 5%	SULFIDES 15%	SULFIDES +25%	PY %	CPY %	MAR %	AS-SLF %	SLENITE %	BARITE %	METALLURGY: OXIDE	SULF	DIAPBOX	MOLYBE	ANALYTICAL DATA: FROM	TO	W	Au	Ag
5		TC Fe-Mag	Tc - Fe-Mag Flow. slightly porphyritic flow w/ Hematite Replaced Hornblende microphenos. ± plag ± sanidine phenos.	M	SP																																				
10																																									
15																																									
20																																									
25																																									
30																																									
35		TC Fe-Mag ?	Fe-Mag Auto Bx ? or Badger Formation w/ Fe-Mag only clasts.	M	SP																																				
40																																									
45																																									
50																																									
55																																									
60																																									
65																																									
70																																									
75																																									
80																																									
85																																									
90																																									
95																																									
100																																									

Hecla MINING COMPANY

ROSEBUD PROJECT
DRILL LOG

HOLE NUMBER RS-478
PAGE 2 OF 6
DATE
LOGGED BY
TOTAL DEPTH

LOCATION
NORTHING
EASTING
ELEVATION
AZIMUTH
INCLINATION

AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	15%	+25%	MAGS	QUARTS	ARGILLIC 5%	15%	+25%	TYPE	PROPYLITIC %	CHLORITE	CALCITE	K-SPAR	POTASSIC %	KLUNTE	OXIDATION 5%	15%	+25%	VIENING %	TYPE	MINERALIZATION: SULFIDES 5%	15%	+25%	PY %	CPY %	MAR %	AS-SULF %	SULFATE %	BARITE %	METALLURGY: OXIDE	SULF	CARBON	MOISTURE	ANALYTICAL DATA: FROM	TO	W	Au	Ag
105		Fe mag.	SAA Flow																																								
110																																											
115																																											
120																																											
125																																											
130		Fe mag.	SAA Auto by																																								
135																																											
140																																											
145																																											
150																																											
155																																											
160																																											
165																																											
170																																											
175																																											
180																																											
185																																											
190																																											
195		Fe mag	SAA - Flow																																								
200																																											

Hecla MINING COMPANY

ROSEBUD PROJECT
DRILL LOG

HOLE NUMBER RS-478
PAGE 3 OF 16
DATE
LOGGED BY
TOTAL DEPTH

LOCATION
NORTHING
EASTING
ELEVATION
AZIMUTH
INCLINATION

AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION																	MINERALIZATION									METALLURGY				ANALYTICAL DATA				
						SILICIFICATION					ARGILLIC				PROPYLITIC %		POTASSIC %		OXIDATION			VIENING		SULFIDES			PY	CPY	MAR	K-SULF	SULBNTE	BARITE	OXIDE	SULF	CARBON	MOISURE	FROM	TO	W	Au	Ag
						5%	15%	+25%	MASSIVE	CLASTIC %	5%	15%	+25%	TYPE	CHLORITE	CALCITE	K-SPAR	ALUNITE	5%	15%	+25%	%	TYPE	5%	15%	+25%	%	%	%	%	%	%									
205		Ferrar	SAA - Flow																																						
210																																									
215																																									
220																																									
225																																									
230																																									
235																																									
240																																									
245																																									
250																																									
255																																									
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265																																									
270																																									
275																																									
280																																									
285																																									
290																																									
295																																									
300																																									

Hecla MINING COMPANY

ROSEBUD PROJECT
DRILL LOG

HOLE NUMBER RS-478
PAGE 4 OF 16
DATE
LOGGED BY
TOTAL DEPTH

LOCATION
NORTHING
EASTING
ELEVATION
AZIMUTH
INCLINATION

AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION																	MINERALIZATION									METALLURGY				ANALYTICAL DATA				
						SILICIFICATION					ARGILLIC				PROPYLITIC %		POTASSIC %		OXIDATION			VIENING	SULFIDES			PY	CPY	MAR	XC-SUL	SULFATE	BARITE	OXIDE	SULF	CARBON	MOISURE	FROM	TO	W	AU	AG
						5%	15%	+25%	MAGS	QUARTS	5%	15%	+25%	TYPE	CHLORITE	CALCITE	K-SPAR	ALUNITE	5%	15%	+25%	% TYPE	5%	15%	+25%	%	%	%	%	%	%									
305		Fe mag	SAA - Flow																																						
310																																									
315																																									
320																																									
325																																									
330																																									
335																																									
340																																									
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365																																									
370																																									
375																																									
380																																									
385																																									
390																																									
395																																									
400																																									

Hecla MINING COMPANY

ROSEBUD PROJECT
DRILL LOG

HOLE NUMBER RS-478
PAGE 5 OF 16
DATE
LOGGED BY
TOTAL DEPTH

LOCATION
NORTHING
EASTING
ELEVATION
AZIMUTH
INCLINATION

AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION																	MINERALIZATION									METALLURGY				ANALYTICAL DATA				
						SILICIFICATION					ARGILLIC				PROPYLITIC %		POTASSIC %		OXIDATION			VIENING	SULFIDES			PY	CPY	MAR	X-SUL	SULFATE	BARITE	OXIDE	SULF	CARBON	MOLYBDE	FROM	TO	W	Au	Ag
						5%	15%	+25%	MAGNETITE %	QUARTZ %	5%	15%	+25%	TYPE	CHLORITE	CALCITE	K-SPAR	ALUNITE	5%	15%	+25%	% TYPE	5%	15%	+25%	%	%	%	%	%	%										
405		Ferrugs	SAA - Flow																																						
410																																									
415																																									
420		Ferrugs	SAA - Auto Bx.																																						
425																																									
430																																									
435																																									
440																																									
445																																									
450																																									
455																																									
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465																																									
470																																									
475																																									
480																																									
485																																									
490																																									
495																																									
500																																									

Hecla MINING COMPANY

ROSEBUD PROJECT
DRILL LOG

HOLE NUMBER RS-478
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LOCATION
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AZIMUTH
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AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	SILICIFICATION 15%	SILICIFICATION +25%	SILICIFICATION MASSIVE	SILICIFICATION QUARTZ %	ARGILLIC 5%	ARGILLIC 15%	ARGILLIC +25%	ARGILLIC TYPE	PROPYLITIC % CHLORITE	PROPYLITIC % CALCITE	POTASSIC % K-SPAR	POTASSIC % ALUNITE	OXIDATION 5%	OXIDATION 15%	OXIDATION +25%	VEINING %	VEINING TYPE	MINERALIZATION: SULFIDES 5%	SULFIDES 15%	SULFIDES +25%	PY %	CPY %	MAR %	AS-SUL %	SILBENITE %	BARITE %	METALLURGY: OXIDE	SULF	DIPBOX	MOLUBE	ANALYTICAL DATA: FROM	TO	W	Au	Ag
505		Fe may	SAA Auto By																																						
510																																									
515																																									
520		Fe may	SAA - Flow																																						
525																																									
530																																									
535																																									
540																																									
545																																									
550																																									
555																																									
560																																									
565																																									
570																																									
575																																									
580																																									
585																																									
590																																									
595																																									
600		Fe may	SAA - Auto By																																						

Hecla MINING COMPANY

ROSEBUD PROJECT
DRILL LOG

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AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION																	MINERALIZATION									METALLURGY				ANALYTICAL DATA				
						SILICIFICATION					ARGILLIC				PROPYLITIC %		POTASSIC %		OXIDATION			VIENING	SULFIDES			PY	CPY	MAR	AS-SUL	STIBNITE	BARITE	OXIDE	SULF	CARBON	MOISURE	FROM	TO	W	Au	Ag
						5%	15%	+25%	MAGS %	QUARTZ %	5%	15%	+25%	TYPE	CHLORITE	CALCITE	K-SPAR	ALUNITE	5%	15%	+25%	% TYPE	5%	15%	+25%	%	%	%	%	%	%										
605		Fe Mag Tr	SAA - Auto Rx	M	SP																																				
610																																									
615																																									
620																																									
625																																									
630																																									
635																																									
640																																									
645																																									
650																																									
655																																									
660																																									
665																																									
670																																									
675																																									
680																																									
685																																									
690																																									
695		Fe Mag ?	interval has a spotted texture		spotted																																				
700																																									

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AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	SILICIFICATION 15%	SILICIFICATION +25%	SILICIFICATION MASSIVE	SILICIFICATION QUARTZ %	ARGILLIC 5%	ARGILLIC 15%	ARGILLIC +25%	ARGILLIC TYPE	PROPYLITIC % CHLORITE	PROPYLITIC % CHLORITE	POTASSIC % K-SPAR	POTASSIC % ALUNITE	OXIDATION 5%	OXIDATION 15%	OXIDATION +25%	VIENING %	VIENING TYPE	MINERALIZATION: SULFIDES 5%	SULFIDES 15%	SULFIDES +25%	PY %	CPY %	MAR %	AS-SULF %	STIBNITE %	BARITE %	METALLURGY: OXIDE	SULF	CARBON	MOISTURE	ANALYTICAL DATA: FROM	TO	W	AU	AG
705		RQL	Probably RQL - contains RARE Quartz phenos, minor plag ± SANADINE	MH	P																																				
710			unit contains HEMATITE Replaced Hornblende micro phenocrysts & is difficult to tell the difference between Fe-mag flow except the presence of RARE Qtz phenos																																						
715																																									
720																																									
725																																									
730																																									
735																																									
740																																									
745																																									
750																																									
755																																									
760																																									
765																																									
770																																									
775		TC ?	Fine-Grained, glassy appearing unit w/ Rounded Fine-grained laminated vesicle? sill, possibly spherolites.	M	Fg																																				
780		?		m																																					
785		TC ?	DARK GREEN to BLACK VOLCANIC glass	M	Fg																																				
790		?		m	Fg																																				
795		TC ?	Volcanic Epiclastic Breccia/conglomerate Propylitically altered	MS	clastic										X																										
800		?		ms	clastic										X																										

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AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	SILICIFICATION 15%	SILICIFICATION +25%	SILICIFICATION MASSIVE	SILICIFICATION QUARTZ %	ARGILLIC 5%	ARGILLIC 15%	ARGILLIC +25%	ARGILLIC TYPE	PROPYLITIC % CHLORITE	PROPYLITIC % CALCITE	POTASSIC % K-SPAR	POTASSIC % ALUNITE	OXIDATION 5%	OXIDATION 15%	OXIDATION +25%	VIENING %	VIENING TYPE	MINERALIZATION: SULFIDES 5%	SULFIDES 15%	SULFIDES +25%	PY %	CPY %	MAR %	X-SLF %	SULFATE %	BARITE %	METALLURGY: OXIDE	SULF	CARBON	MOISTURE	ANALYTICAL DATA: FROM	TO	W	AU	AG
805		Volc Bx-Epi YC?	SAA	MS-M	clastic																																				
810																																									
815																																									
820																																									
825																																									
830																																									
835																																									
840																																									
845																																									
850																																									
855																																									
860																																									
865																																									
870		TS?	Vesicular volcanic flow w/common glomerocrystic plagioclase phenos & vesicles filled w/a turquoise green clay	m	P																																				
875																																									
880																																									
885																																									
890																																									
895																																									
900																																									

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FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	15%	+25%	MASSIVE	QUARTZ	ARGILLIC 5%	15%	+25%	TYPE	PROPYLITIC % CHLORITE	CALCITE	K-SPAR	ALUNITE	POTASSIC % 5%	15%	+25%	OXIDATION %	VIENING TYPE	MINERALIZATION: SULFIDES 5%	15%	+25%	PY %	CPY %	MAR %	AS-SUL %	STIBNITE %	BARITE %	METALLURGY: OXIDE	SULF	CARBON	MOISTURE	ANALYTICAL DATA: FROM	TO	W	Au	As
905		TC ?	SAA	M-MH	P																																				
910																																									
915																																									
920																																									
925																																									
930																																									
935																																									
940		TC ?	Fine-grained, slightly porphyritic dike? contains ex. ex. Plagioclase phenocrysts	MH	≤P																																				
945																																									
950																																									
955																																									
960																																									
965		TC ?	SA 870-935	M-MH	P																																				
970																																									
975																																									
980																																									
985																																									
990																																									
995																																									
1000																																									

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FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	SILICIFICATION 15%	SILICIFICATION +25%	SILICIFICATION MAGS	SILICIFICATION QUARTZ	ARGILLIC 5%	ARGILLIC 15%	ARGILLIC +25%	ARGILLIC TYPE	PROPYLITIC % CHLORITE	PROPYLITIC % CALCITE	POTASSIC % K-SPAR	POTASSIC % KUNITE	OXIDATION 5%	OXIDATION 15%	OXIDATION +25%	VIENING %	VIENING TYPE	MINERALIZATION: SULFIDES 5%	SULFIDES 15%	SULFIDES +25%	PY %	CPY %	MAR %	AG-SULF %	SILVERITE %	BARITE %	METALLURGY: OXIDE	SULF	CARBON	MOISTURE	ANALYTICAL DATA: FROM	TO	W	Au	Ag
1005		Tc? RDL?	Fine-grained, slightly porphyritic; Contains rare phenos. of sanidine & plag	MH	SP-Fg																																				
1010																																									
1015																																									
1020																																									
1025																																									
1030																																									
1035																																									
1040																																									
1045																																									
1050																																									
1055																																									
1060																																									
1065																																									
1070																																									
1075																																									
1080																																									
1085																																									
1090																																									
1095																																									
1100																																									

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RIG TYPE
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DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	15%	+25%	WAXY	QUARTZ	ARGILLIC 5%	15%	+25%	TYPE	PROPYLITIC %	CHLORITE	CALCITE	POTASSIC %	K-SPAR	KAOLINITE	OXIDATION 5%	15%	+25%	VIENING %	TYPE	MINERALIZATION: SULFIDES 5%	15%	+25%	PY %	CPY %	MAR %	AS-SUL %	SILVERITE %	BARITE %	METALLURGY: OXIDE	SULF	CARBON	MOISTURE	ANALYTICAL DATA: FROM	TO	W	Au	Ag
1105		Tc?	SAA	MH	SP																																						
1110																																											
1115			this interval contains accessant plag glomeroporphyritic		P																																						
1120		Tc?	spotted textured flow w/ accessant glomeroporphyritic plag	M	P																																						
1125																																											
1130																																											
1135																																											
1140																																											
1145																																											
1150																																											
1155		RQL?	Fine-Grained porphyritic unit w/ common sanidine & glomeroporphyritic plag.	MH	P																																						
1160																																											
1165																																											
1170																																											
1175																																											
1180																																											
1185																																											
1190		Tc?	SA 1115-1150'	M	P																																						
1195																																											
1200																																											

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DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	15%	+25%	MAGNET	QUARTZ	ARGILLIC 5%	15%	+25%	TYPE	PROPYLITIC % CHLORITE	CALCITE	EX-SPAR	POTASSIC % ALUNITE	OXIDATION 5%	15%	+25%	VIENING %	TYPE	MINERALIZATION: SULFIDES 5%	15%	+25%	PY %	CPY %	MAR %	AS-SULF %	STIBNITE %	BARITE %	METALLURGY: OXIDE	SULF	OXIDOX	MOSURE	ANALYTICAL DATA: FROM	TO	W	Au	Ag
1205		RQL	SAME AS 1155-1185	MH	P																																				
1210																																									
1215																																									
1220																																									
1225																																									
1230																																									
1235																																									
1240																																									
1245																																									
1250																																									
1255																																									
1260																																									
1265																																									
1270																																									
1275																																									
1280																																									
1285																																									
1290																																									
1295																																									
1300																																									

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DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	15%	+25%	MASS %	QZ STS %	ARGILLIC 5%	15%	+25%	TYPE	PROPYLITIC % CHLORITE	CALCITE	K-SPAR	ALUNITE	POTASSIC % 5%	15%	+25%	OXIDATION %	VEINING TYPE	MINERALIZATION: SULFIDES 5%	15%	+25%	PY %	CPY %	MAR %	AC-SUL %	SULFATE %	BARITE %	METALLURGY: OXIDE	SULF	CAPROCK	MOISTURE	ANALYTICAL DATA: FROM	TO	W	Au	Ag
1305		RQL	SAA	MH	P																																				
1310																																									
1315																																									
1320																																									
1325			CAVE FAULT (minor clay gouge)																																						
1330		Dotted	Fine-grained, Aphanitic, propylitized ± silica. Rhyolitic flow.	MH	Fg	X					X				X									X																	
1335						X					X				X									X																	
1340						X					X				X									X																	
1345						X					X				X									X																	
1350						X					X				X									X																	
1355						X					X				X									X																	
1360						X					X				X									X																	
1365						X					X				X									X																	
1370						X					X	X			X								1-2 Py/cpy	X	X		X	Tr													
1375						X					X				X									X																	
1380						X					X				X									X																	
1385						X					X				X									X																	
1390						X					X				X									X																	
1395						X					X				X									X																	
1400						X					X				X									X																	

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AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	SILICIFICATION 15%	SILICIFICATION +25%	SILICIFICATION MATRIX %	SILICIFICATION CLASTS %	ARGILLIC 5%	ARGILLIC 15%	ARGILLIC +25%	ARGILLIC TYPE	PROPYLITIC % CHLORITE	PROPYLITIC % CALCITE	POTASSIC % K-SPAR	POTASSIC % ALUNITE	OXIDATION 5%	OXIDATION 15%	OXIDATION +25%	VIENING %	VIENING TYPE	MINERALIZATION: SULFIDES 5%	SULFIDES 15%	SULFIDES +25%	PY %	CPY %	MAR %	AS-SULF %	STIBNITE %	BARITE %	METALLURGY: OXIDE	SULF	DIPBOX	MOLYBE	ANALYTICAL DATA: FROM	TO	W	AU	AG
1405		Andr	SAA	Med	Fg	X					X				X									\	X		X	Tr													
1410						X					X				X									X			X														
1415						X					X					X								X			X														
1420						X					X				X									X			X														
1425						X					X				X										X		X	Tr													
1430						X					X				X									X			X														
1435						X					X				X									X			X														
1440						X					X				X									X			X														
1445						X					X				X									X			X														
1450						X					X				X									X			X														
1455		Tcs	Tcs - Epiclastic - volcaniclastic Looks like standard Tcs Epi & volc																																						
1460																																									
1465																																									
1470																																									
1475																																									
1480																																									
1485																																									
1490																																									
1495																																									
1500																																									

Hecla MINING COMPANY

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LOGGED BY
TOTAL DEPTH 1600' RUC Pre-collar

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AREA
DRILLING CO.
RIG TYPE
HOLE SIZE
DOWN HOLE SURVEY BY

FEET	GRAPHIC	ROCK TYPE	LITHOLOGY	HARDNESS	TEXTURE	ALTERATION: SILICIFICATION 5%	15%	+25%	MASSIV	QUARTZ	ARGILLIC 5%	15%	+25%	TYPE	PROPYLITIC % CHLORITE	CALCITE	POTASSIC % K-SPAR	KLINITE	OXIDATION 5%	15%	+25%	VIENING %	TYPE	MINERALIZATION: SULFIDES 5%	15%	+25%	PY %	CPY %	MAR %	AS-SLF %	STIBNITE %	BARITE %	METALLURGY: OXIDE	SULF	CARBON	MOISTURE	ANALYTICAL DATA: FROM	TO	W	AU	AG
1505		TCS	SAA																																						
1510																																									
1515			standard looking tcs sediments siltstones & sandstones w/ graphitic material - Brown in color																																						
1520																																									
1525																																									
1530																																									
1535																																									
1540																																									
1545																																									
1550																																									
1555																																									
1560																																									
1565																																									
1570																																									
1575			More Epiclastic Looking																																						
1580																																									
1585																																									
1590																																									
1595																																									
1600																																									

1.0 2.0 6.5 1.3
.25 .5

HECLA MINING COMPANY – ROSEBUD PROJECT
GEOTECHNICAL DRILL LOG

HOLE # RS-478-99 DATE: 11/3/99 LOGGED BY: PTL PAGE 1 OF

DRILL RUN FROM	DRILL RUN TO	SOLID CORE RECOVERY (%)	TOTAL CORE RECOVERY (%)	RQD	ROCK STRENGTH DOWNHOLE DEPTH	ROCK STRENGTH POINT LOAD INDEX (psi)	FRACTURE DATA FRACTURE DENSITY/FT.	FRACTURE DATA AVG. ANGLE TO C.A.	FRACTURE DATA ROUGHNESS	FRACTURE DATA INFILL	DENSITY DATA DOWNHOLE DEPTH	DENSITY DATA SAMPLE WEIGHT (g)	DENSITY DATA DISPLACEMENT (cc)	DENSITY DATA DENSITY (g/cc)
1600	1606	0	11	11										
1606	1608.5	85	2.1 85	80										
1608.5	1615	70	5.3 80	3.6 55										
1615	1625.5	90	10.1/10.5 96	4.2 45										
1625.5	1636	90	102	75										
1636	1646.5	95	98	75										
1646.5	1650.5	91	3.7 91	3.2 80										
1650.5	1660	95	2.3 102	6.2 65										
1660	1661.5	50	95	50										
1661.5	1671.5	95	100	94										
1671.5	1682	99	99	65										

HECLA MINING COMPANY – ROSEBUD PROJECT
GEOTECHNICAL DRILL LOG

HOLE # RS-478-99 DATE: 11/3 LOGGED BY: DTL PAGE 2 OF

DRILL RUN FROM	DRILL RUN TO	SOLID CORE RECOVERY (%)	TOTAL CORE RECOVERY (%)	RQD	ROCK STRENGTH DOWNHOLE DEPTH	ROCK STRENGTH POINT LOAD INDEX (psi)	FRACTURE DATA FRACTURE DENSITY/FT.	FRACTURE DATA AVG. ANGLE TO C.A.	FRACTURE DATA ROUGHNESS	FRACTURE DATA INFILL	DENSITY DATA DOWNHOLE DEPTH	DENSITY DATA SAMPLE WEIGHT (g)	DENSITY DATA DISPLACEMENT (cc)	DENSITY DATA DENSITY (g/cc)
1682	1692.5	99	99	60										
1692.5	1703	95	95	65										
1703	1713.5	100	100	95										
1713.5	1724	100	102	100										
1724	1729	75	94	20										
1729	1736	90	96 6.7	34										
1736	1743.5	90	101	67										
1743.5	1754	95	99	30										
1754	1764.5	90	98	45										
1764.5	1775	90	100	53										
1775	1785.5	3 100	7.8 100	0 37										

HECLA MINING COMPANY – ROSEBUD PROJECT
GEOTECHNICAL DRILL LOG

HOLE # RS-478-99 DATE: 11/4 LOGGED BY: PAGE 3 OF

DRILL RUN		SOLID CORE RECOVERY (%)	TOTAL CORE RECOVERY (%)	RQD	ROCK STRENGTH		FRACTURE DATA				DENSITY DATA			
FROM	TO				DOWNHOLE DEPTH	POINT LOAD INDEX (psi)	FRACTURE DENSITY/FT.	AVG. ANGLE TO C.A.	ROUGHNESS	INFILL	DOWNHOLE DEPTH	SAMPLE WEIGHT (g)	DISPLACEMENT (cc)	DENSITY (g/cc)
1785.5	1796	99	99	53										
1796	1806.5	75	100	15										
1806.5	1817	80	98	75										
1817	1827.5	95	99	77										
1827.5	1838	80	99	62										
1838	1848	97	97	52										
1848	1858.5	100	100	39										
1858.5	1869	100	100	10										
1869	1879.5	100	100	54										
1879.5	1890	100	100	35										
1890	1900	80	98	5										

HECLA MINING COMPANY – ROSEBUD PROJECT
GEOTECHNICAL DRILL LOG

HOLE # RS-478-99 DATE: 11/4/99 LOGGED BY: PAGE 4 OF

DRILL RUN		SOLID CORE RECOVERY (%)	TOTAL CORE RECOVERY (%)	RQD	ROCK STRENGTH		FRACTURE DATA				DENSITY DATA			
FROM	TO				DOWNHOLE DEPTH	POINT LOAD INDEX (psi)	FRACTURE DENSITY (FT.)	AVG. ANGLE TO C.A.	ROUGHNESS	INFILL	DOWNHOLE DEPTH	SAMPLE WEIGHT (g)	DISPLACEMENT (cc)	DENSITY (g/cc)
1900	1910.5	50	98	4										
1910.5	1914	0	100	0										
1914	1924.5	40	100	0										
1924.5	1935	90	102	10										
1935	1945.5	95	99	10										
1945.5	1956	70	70	0										
1956	1966.5	90	100	0										
1966.5	1977	85	100	Ø										
1977	1987.5	80	100	20										
1987.5	1998	90	100	10										
1998	2008	85	100	0										

HECLA MINING COMPANY – ROSEBUD PROJECT
GEOTECHNICAL DRILL LOG

HOLE # RS 478-99 DATE: 11/4/99 LOGGED BY: _____ PAGE 5 OF ____

DRILL RUN		SOLID CORE RECOVERY (%)	TOTAL CORE RECOVERY (%)	RQD	ROCK STRENGTH		FRACTURE DATA				DENSITY DATA			
FROM	TO				DOWNHOLE DEPTH	POINT LOAD INDEX (psi)	FRACTURE DENSITY/FT.	AVG. ANGLE TO C.A.	ROUGHNESS	INFILL	DOWNHOLE DEPTH	SAMPLE WEIGHT (g)	DISPLACEMENT (cc)	DENSITY (g/cc)
2008	2018.5	85	95	0										
2018.5	2024	75	100	Ø										
2024	2028	40	95	Ø										
2028	2038	75	100	25										
2038	2048.5	95	99	33										
			6.2	1.7										
2048.5	2059	75	100	0										
2059	2064	25	100	Ø										
2064	2069	75	110	0										
2069	2079.5	70	99	10										
2079.5	2084	90	95	0										
2084	2087	60	100	0										

HECLA MINING COMPANY – ROSEBUD PROJECT
GEOTECHNICAL DRILL LOG

HOLE # RS478-99 DATE: 11/4/99 LOGGED BY: PAGE 6 OF

DRILL RUN		SOLID CORE RECOVERY (%)	TOTAL CORE RECOVERY (%)	RQD	ROCK STRENGTH		FRACTURE DATA				DENSITY DATA			
FROM	TO				DOWNHOLE DEPTH	POINT LOAD INDEX (psi)	FRACTURE DENSITY/FT.	AVG. ANGLE TO C.A.	ROUGHNESS	INFILL	DOWNHOLE DEPTH	SAMPLE WEIGHT (g)	DISPLACEMENT (cc)	DENSITY (g/cc)
2087	2094	85	100	0										
2094	2098	20	100	0										
2098	2104.5	80	105	0										
2104.5	2109	40	100	10										
2109	2112.5	10	90	0										
2112.5	2116	80	80	Ø										
2116	2122.5	30	100	15										
2122.6	2130	90	100	10										
2130	2140	90	100	10										
2140	2147	80	100	20										
2147	2153.5	75	100	10										

HECLA MINING COMPANY – ROSEBUD PROJECT
GEOTECHNICAL DRILL LOG

HOLE # RS478-99 DATE: 11/17 LOGGED BY: PAGE 7 OF

DRILL RUN		SOLID CORE RECOVERY (%)	TOTAL CORE RECOVERY (%)	RQD	ROCK STRENGTH		FRACTURE DATA				DENSITY DATA			
FROM	TO				DOWNHOLE DEPTH	POINT LOAD INDEX (psi)	FRACTURE DENSITY/FT.	AVG. ANGLE TO C.A.	ROUGHNESS	INFILL	DOWNHOLE DEPTH	SAMPLE WEIGHT (g)	DISPLACEMENT (cc)	DENSITY (g/cc)
2153.5	2164	15	100	0										
2164	2170	70	100	Ø										
2170	2179	50	100	Ø										
2179	2184	50	96	Ø										
2184	2190.5	30	100	Ø										
2190.5	2194.5	60	100	Ø										
2194.5	2199	40	98	Ø										
2199	2201.5	75	100	Ø										
2201.5	2208	75	100	Ø										
2208	2211	40	99	Ø										
2211	2220	90	100	Ø										
		22	22	Ø										

HECLA MINING COMPANY – ROSEBUD PROJECT
GEOTECHNICAL DRILL LOG

HOLE # RS478-99 DATE: 11/17 LOGGED BY: PTR PAGE 8 OF

DRILL RUN FROM	DRILL RUN TO	SOLID CORE RECOVERY (%)	TOTAL CORE RECOVERY (%)	RQD	ROCK STRENGTH DOWNHOLE DEPTH	ROCK STRENGTH POINT LOAD INDEX (psi)	FRACTURE DATA FRACTURE DENSITY/FT.	FRACTURE DATA AVG. ANGLE TO C.A.	FRACTURE DATA ROUGHNESS	FRACTURE DATA INFILL	DENSITY DATA DOWNHOLE DEPTH	DENSITY DATA SAMPLE WEIGHT (g)	DENSITY DATA DISPLACEMENT (cc)	DENSITY DATA DENSITY (g/cc)
2220	2230	90	100	Ø										
2230	2239.5	80	100	Ø										
2239.5	2248.5	90	100	Ø										
2248.5	2256.5	90	110	Ø										
	2258	90	100	Ø										
	2268.5	90	100	Ø										
	2272	90	100	Ø										
	2281.5	90	100	Ø										
	2292	90	95	Ø										
	2302.5		100	30										
	2312.5	90	5.9 90	1.2 20										

HECLA MINING COMPANY – ROSEBUD PROJECT
GEOTECHNICAL DRILL LOG

HOLE # RS478-99 DATE: 11/17 LOGGED BY: PAGE 9 OF

DRILL RUN FROM	DRILL RUN TO	SOLID CORE RECOVERY (%)	TOTAL CORE RECOVERY (%)	RQD	ROCK STRENGTH DOWNHOLE DEPTH	ROCK STRENGTH POINT LOAD INDEX (psi)	FRACTURE DATA FRACTURE DENSITY /FT.	FRACTURE DATA AVG. ANGLE TO C.A.	FRACTURE DATA ROUGHNESS	FRACTURE DATA INFILL	DENSITY DATA DOWNHOLE DEPTH	DENSITY DATA SAMPLE WEIGHT (g)	DENSITY DATA DISPLACEMENT (cc)	DENSITY DATA DENSITY (g/cc)
2312.5	2313	100	100	100										
2313	2323	90	98	10										
2323	2333.5	100	100	0										
	2344	95	100	10										
	2354.5	95	100	20										
	2365	95	100	10										
	2375.5	60	100	10										
	2386	95	100	20										
TD	2396.5	90	100	30										

BARRINGER LABORATORIES, INC.

RENO, NEVADA, U.S.A., 5301 Longley Lane, Bldg. E, Reno, NV, 89511, TEL: 702-828-1158, FAX: 702-828-1263

BARRINGER LABORATORIOS de MEXICO, S.A.de C.V.
Carretera Panamericana, KM 10445
Durango, Durango, Mexico C.P. 34030
TEL/FAX (52)(18) 12-00-52

BARRINGER LABORATORIES del PERU S.A.
Avenida Domingo Orué 489
Surquillo, Lima 34, Peru
TEL (011-51-1) 222-2801
FAX (011-51-1) 442-7195

BARRINGER de COLOMBIA
Calle 80 Sur N. 47D-65, L-106
Sabaneta, Colombia
TEL (574) 301-0704

BARRINGER LABORATORIOS de MEXICO, S.A. de C.V.
Blvd. García Morales 829-A, Bodega #2
Colonia La Manga
Hermosillo, Sonora, Mexico C.P. 83210
TEL/FAX (011-52-6) 261-0415

BARRINGER LABORATORIES NICARAGUA
COMPLEJO OCAL
Km 7.5 Carretera Norte
Managua, Nicaragua
TEL (011-50-5) 883-0778

McCLELLAND/BARRINGER LABORATORIOS HONDURAS
Kilometro 5,
Boulevard Suyapa
Tegucigalpa, M.D.C., Honduras
TEL (011-50-4) 231-1841

Work Order # _____
Date Received _____
Purchase Order # _____
Project # _____
Date Shipped 10-16
Shipped Via _____
# of Cartons _____
# of Samples 320

Geochemical Laboratory Instruction Sheet

Copy of Results:	Results And Invoice To:
Fax to Kurt Allen	Kurt Allen
Rosebud Mining Co	Rosebud Mining Co.
Fax # (775) 623-6967	P.O. Box 2610
	Winnemucca NV 89446
	AUTHORITY:

No. of Samples	Sample Type	List of Sample Numbers	Elements Requested
320	cutting	RS-478-99	Au Ag Use Rosebud
		0, 5, 10, 15, etc...	Mine development Protocol
1	Pulp	Rosebud Production standard @ end of hole	Au/Ag - No ICP
		10-18-99	

COARSE REJECT (Free storage for 30 days)
- [x] Return/collect after analysis
- [ ] Return/collect after 30 days
- [ ] Discard after 30 days

IF NOT MARKED, REJECT DISCARDED AFTER 30 DAYS

PULP (Free storage for 6 months)
- [x] Return/collect after analysis
- [ ] Return/collect at 6 months
- [ ] Discard at 6 months

IF NOT MARKED, PULP IS DISCARDED AFTER 6 MONTHS

COARSE REJECTS/PULPS WILL BE DISCARDED UNLESS OTHERWISE REQUESTED

Au - GOLD METHOD
- [x] Fire Assay/A.A.
- [ ] Fire Assay/Gravimetric
- [ ] NaCN/A.A.

RESULTS REPORTED IN:
- [ ] ppb
- [ ] PPM
- [x] oz/T
- [ ] grams/T

TRACE ELEMENT METHOD
- [ ] Wet Chem./A.A.
- [ ] Wet Chem./ICP

RESULTS REPORTED IN:
- [ ] ppm
- [ ] Percent %
- [x] oz/T
- [ ] grams/T

ADDITIONAL INSTRUCTIONS:
Results go only to Kurt Allen

NOV96:PM5:RENO3:GEOCHEM

ROSEBUD MINING COMPANY
P.O. BOX 2610
58 MILES WEST OF
WINNEMUCCA, NV 89446

INSPECTORATE
INSPECTORATE AMERICA CORPORATION
840 Greg Street
Sparks, Nevada 89431
Tel:775-359-6311
Fax: 775-359-2944

20-Dec-99

Certificate of Analysis

Received: 2-Dec-99 15:37

Attn: Kurt Allen
Project: RS-478-99

PO #: Ref:99-46-34

Job: 993840R

Status: Final

Drill Core

Sample Id	Au FA/AA/AAS oz/ton	Au FA oz/ton	Ag AA oz/ton	Ag FA oz/ton
RS-478-99 1600-1615	0.001	NA	0.070	NA
RS-478-99 1615-1625.5	0.001	NA	0.007	NA
RS-478-99 1625.5-1636.5	0.001	NA	0.005	NA
RS-478-99 1636.5-1646	0.001	NA	0.002	NA
RS-478-99 1646-1655	0.000	NA	0.035	NA
RS-478-99 1655-1660	0.000	NA	0.003	NA
RS-478-99 1660-1671.5	0.000	NA	<0.001	NA
RS-478-99 1671.5-1682	0.000	NA	<0.001	NA
RS-478-99 1682-1692.5	0.000	NA	0.001	NA
RS-478-99 1692.5-1703	0.000	NA	<0.001	NA
RS-478-99 1703-1713.5	0.000	NA	<0.001	NA
RS-478-99 1713.5-1723.4	0.000	NA	0.002	NA
RS-478-99 1723.4-1729	0.000	NA	<0.001	NA
RS-478-99 1729-1736	0.000	NA	0.003	NA
RS-478-99 1736-1743.5	0.000	NA	0.002	NA
RS-478-99 1743.5-1754	0.000	NA	0.004	NA
RS-478-99 1754-1757.9	0.000	NA	<0.001	NA
RS-478-99 1757.9-1765.2	0.000	NA	0.030	NA
RS-478-99 1765.2-1774.4	0.000	NA	0.004	NA
RS-478-99 1774.4-1776.5	0.000	NA	0.026	NA

INSPECTORATE

INSPECTORATE AMERICA CORPORATION
840 Greg Street
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Page: 2
Copy: 1 of 2
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Sample Id	Au FA/AA/AAS oz/ton	Au FA oz/ton	Ag AA oz/ton	Ag FA oz/ton
RS-478-99 1776.5-1785.5	0.000	NA	0.004	NA
RS-478-99 1785.5-1793.7	0.000	NA	0.016	NA
RS-478-99 1793.7-1797.7	0.000	NA	0.006	NA
RS-478-99 1797.7-1802	0.000	NA	0.006	NA
RS-478-99 1802-1806.5	0.000	NA	0.015	NA
RS-478-99 1806.5-1817	0.000	NA	0.012	NA
RS-478-99 1817-1827.5	0.000	NA	0.008	NA
RS-478-99 1827.5-1838	0.000	NA	0.021	NA
RS-478-99 1838-1844.3	0.000	NA	0.022	NA
RS-478-99 1844.3-1848	0.000	NA	0.017	NA
RS-478-99 1848-1858.5	0.002	NA	0.016	NA
RS-478-99 1858.5-1869	0.000	NA	0.028	NA
RS-478-99 1869-1879.5	0.000	NA	0.011	NA
RS-478-99 1879.5-1886	0.000	NA	0.030	NA
RS-478-99 1886-1893	0.001	NA	0.070	NA
RS-478-99 1893-1900	0.000	NA	0.009	NA
RS-478-99 1900-1910.5	0.000	NA	0.019	NA
RS-478-99 1910.5-1920	0.000	NA	0.015	NA
RS-478-99 1920-1927.7	0.000	NA	<0.001	NA
RS-478-99 1927.7-1935	0.000	NA	0.011	NA

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Sample Id	Au FA/AA/AAS oz/ton	Au FA oz/ton	Ag AA oz/ton	Ag FA oz/ton
RS-478-99 1935-1945.5	0.000	NA	0.009	NA
RS-478-99 1945.5-1955	0.000	NA	<0.001	NA
RS-478-99 1955-1966.5	0.000	NA	0.007	NA
RS-478-99 1966.5-1977	0.000	NA	0.013	NA
RS-478-99 1977-1987.5	0.000	NA	0.009	NA
RS-478-99 1987.5-1998	0.000	NA	0.028	NA
RS-478-99 1998-2008	0.000	NA	0.005	NA
RS-478-99 2008-2018.5	0.000	NA	0.009	NA
RS-478-99 2018.5-2028	0.000	NA	0.009	NA
RS-478-99 2028-2038	0.000	NA	0.018	NA
RS-478-99 2038-2048.5	0.000	NA	0.012	NA
RS-478-99 2048.5-2059	0.000	NA	0.012	NA
RS-478-99 2059-2069	0.000	NA	0.018	NA
RS-478-99 2069-2079.5	0.000	NA	0.017	NA
RS-478-99 2079.5-2090	0.000	NA	0.011	NA
RS-478-99 2090-2099	0.000	NA	0.022	NA
RS-478-99 2099-2102.6	0.000	NA	0.003	NA
RS-478-99 2102.6-2109	0.000	NA	0.005	NA
RS-478-99 2109-2120	0.000	NA	0.015	NA
RS-478-99 2120-2130	0.000	NA	0.007	NA

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RS-478-99 2130-2140	0.000	NA	0.006	NA
RS-478-99 2140-2146	0.001	NA	0.008	NA
RS-478-99 2146-2151	0.000	NA	0.019	NA
RS-478-99 2151-2153.6	0.000	NA	0.001	NA
RS-478-99 2153.6-2164	0.000	NA	0.009	NA
RS-478-99 2164-2171	0.000	NA	0.012	NA
RS-478-99 2171-2179	0.000	NA	0.004	NA
RS-478-99 2179-2186	0.000	NA	0.001	NA
RS-478-99 2186-2190.6	0.000	NA	0.005	NA
RS-478-99 2190.6-2199	0.000	NA	0.011	NA
RS-478-99 2199-2208	0.000	NA	0.014	NA
RS-478-99 2208-2218	0.000	NA	0.012	NA
RS-478-99 2218-2230	0.000	NA	0.002	NA
RS-478-99 2230-2239.5	0.000	NA	0.014	NA
RS-478-99 2239.5-2248.5	0.000	NA	0.007	NA
RS-478-99 2248.5-2258	0.000	NA	0.003	NA
RS-478-99 2258-2268.5	0.000	NA	0.009	NA
RS-478-99 2268.5-2274.5	0.000	NA	0.024	NA
RS-478-99 2274.5-2279.5	0.001	NA	0.107	NA
RS-478-99 2279.5-2283	0.002	NA	0.050	NA

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Page: 5
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Certificate of Analysis

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Drill Core

Sample Id	Au FA/AA/AAS oz/ton	Au FA oz/ton	Ag AA oz/ton	Ag FA oz/ton
RS-478-99 2283-2291	0.002	NA	0.037	NA
RS-478-99 2291-2295	0.002	NA	0.038	NA
RS-478-99 2295-2302.5	0.003	NA	0.067	NA
RS-478-99 2302.5-2312.5	0.001	NA	0.056	NA
RS-478-99 2312.5-2323	0.000	NA	0.007	NA
RS-478-99 2323-2333.5	0.000	NA	0.017	NA
RS-478-99 2333.5-2344	0.001	NA	0.047	NA
RS-478-99 2344-2354.5	0.002	NA	0.048	NA
RS-478-99 2354.5-2365	0.000	NA	0.024	NA
RS-478-99 2365-2371.5	0.001	NA	0.049	NA
RS-478-99 2371.5-2379	0.003	NA	0.081	NA
RS-478-99 2379-2386	0.001	NA	0.025	NA
RS-478-99 2386-2396.5	0.000	NA	0.018	NA

Pulp

STD 75943	0.000	NA	1.360	NA

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Drill Core

Sample Id	Ag ICP ppm	Al ICP %	As ICP ppm	B ICP ppm	Ba ICP ppm	Bi ICP ppm	Ca ICP %	Cd ICP ppm	Co ICP ppm	Cr ICP ppm
RS-478-99 1600-1655	<0.1	0.97	4	41	70	2	1.14	0.9	18	33
RS-478-99 1655-1703	<0.1	1.02	4	37	259	3	1.17	0.9	14	25
RS-478-99 1703-1754	<0.1	1.34	5	44	190	3	0.99	0.9	14	27
RS-478-99 1754-1797.7	<0.1	1.56	4	52	323	9	1.25	1.4	22	66
RS-478-99 1797.7-1844.3	0.2	1.51	10	57	281	4	1.66	1.4	28	81
RS-478-99 1844.3-1886	0.3	1.29	15	48	292	7	0.78	1.8	20	43
RS-478-99 1886-1945.5	0.8	0.30	38	30	138	<1	2.23	7.0	9	26
RS-478-99 1945.5-1998	0.9	0.15	27	23	139	<1	3.78	7.7	5	12
RS-478-99 1998-2048.5	0.9	0.12	25	22	127	1	3.73	6.9	6	7
RS-478-99 2048.5-2099	1.0	0.16	41	28	126	<1	3.32	8.2	7	9
RS-478-99 2099-2146	0.6	0.60	21	38	182	4	3.27	4.1	14	36
RS-478-99 2146-2199	0.7	0.27	20	33	156	<1	3.32	6.1	9	16
RS-478-99 2199-2248.5	1.1	0.15	27	29	146	<1	4.37	5.9	7	7
RS-478-99 2248.5-2274.5	1.0	0.15	24	28	103	<1	4.00	1.6	7	9
RS-478-99 2274.5-2302.5	1.9	0.56	157	37	109	3	1.66	1.0	9	54
RS-478-99 2302.5-2354.5	1.3	0.69	142	45	57	2	2.21	0.9	11	22
RS-478-99 2354.5-2396.5	1.4	0.78	59	44	51	<1	1.92	0.8	12	15

INSPECTORATE

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Fax: 775-359-2944

20-Dec-99

ROSEBUD MINING COMPANY
P.O. BOX 2610
58 MILES WEST OF
WINNEMUCCA, NV 89446

Certificate of Analysis

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Attn: Kurt Allen
Project: RS-478-99

PO #: Ref:99-46-34

Job: 993840R

Status: Final

Drill Core

Sample Id	Cu ICP ppm	Fe ICP %	Hg HYG ppb	K ICP %	La ICP ppm	Mg ICP %	Mn ICP ppm	Mo ICP ppm	Na ICP %	Ni ICP ppm
RS-478-99 1600-1655	37	2.34	44	0.15	10	0.55	262	<1	0.38	66
RS-478-99 1655-1703	27	2.36	26	0.20	7	0.55	263	<1	0.37	33
RS-478-99 1703-1754	37	2.94	31	0.22	6	0.61	326	<1	0.36	51
RS-478-99 1754-1797.7	42	3.57	31	0.29	17	0.66	417	<1	0.52	106
RS-478-99 1797.7-1844.3	43	4.08	22	0.22	13	0.73	553	<1	0.40	134
RS-478-99 1844.3-1886	60	3.24	31	0.27	6	0.62	274	1	0.92	73
RS-478-99 1886-1945.5	46	1.98	57	0.20	<2	0.61	167	40	5.71	69
RS-478-99 1945.5-1998	42	1.38	52	0.17	2	0.46	137	36	6.37	64
RS-478-99 1998-2048.5	39	1.40	61	0.14	2	0.39	132	36	5.51	67
RS-478-99 2048.5-2099	48	1.69	65	0.16	2	0.35	159	46	7.02	70
RS-478-99 2099-2146	39	2.72	22	0.18	3	1.07	280	27	3.30	72
RS-478-99 2146-2199	43	2.09	35	0.19	2	0.65	216	38	4.87	71
RS-478-99 2199-2248.5	41	1.65	52	0.17	2	0.50	152	41	5.10	67
RS-478-99 2248.5-2274.5	38	1.75	39	0.14	2	0.53	161	38	1.35	57
RS-478-99 2274.5-2302.5	35	2.36	26	0.20	3	0.48	252	10	0.47	27
RS-478-99 2302.5-2354.5	36	2.97	26	0.15	3	0.90	333	<1	0.39	15
RS-478-99 2354.5-2396.5	35	2.76	26	0.16	2	0.65	312	1	0.35	14

INSPECTORATE

INSPECTORATE AMERICA CORPORATION
840 Greg Street
Sparks, Nevada 89431
Tel:775-359-6311
Fax: 775-359-2944

20-Dec-99

ROSEBUD MINING COMPANY
P.O. BOX 2610
58 MILES WEST OF
WINNEMUCCA, NV 89446

Certificate of Analysis

Received: 2-Dec-99 15:37

Attn: Kurt Allen
Project: RS-478-99

PO #: Ref:99-46-34

Job: 993840R

Status: Final

Drill Core

Sample Id	P ICP ppm	Pb ICP ppm	Sb ICP ppm	Se ICP ppm	Sr ICP ppm	Ti ICP %	Tl ICP ppm	V ICP ppm	W ICP ppm	Zn ICP ppm
RS-478-99 1600-1655	472	27	<2	<0.5	292	<0.01	<0.5	51	<1	58
RS-478-99 1655-1703	404	23	<2	<0.5	380	<0.01	<0.5	34	<1	57
RS-478-99 1703-1754	577	27	3	<0.5	392	<0.01	<0.5	39	<1	57
RS-478-99 1754-1797.7	1009	31	3	<0.5	498	<0.01	<0.5	47	<1	72
RS-478-99 1797.7-1844.3	803	29	2	<0.5	489	<0.01	<0.5	59	<1	61
RS-478-99 1844.3-1886	613	33	4	<0.5	308	<0.01	<0.5	52	<1	106
RS-478-99 1886-1945.5	638	29	4	<0.5	553	<0.01	<0.5	17	<1	506
RS-478-99 1945.5-1998	702	23	4	2.6	630	<0.01	<0.5	18	<1	553
RS-478-99 1998-2048.5	688	22	4	2.6	664	<0.01	<0.5	14	<1	482
RS-478-99 2048.5-2099	689	26	6	1.2	812	<0.01	<0.5	12	<1	619
RS-478-99 2099-2146	777	23	4	<0.5	694	0.01	<0.5	30	<1	294
RS-478-99 2146-2199	770	26	5	<0.5	712	<0.01	<0.5	15	<1	436
RS-478-99 2199-2248.5	683	24	6	<0.5	826	<0.01	<0.5	11	<1	441
RS-478-99 2248.5-2274.5	669	22	4	<0.5	664	<0.01	<0.5	5	<1	129
RS-478-99 2274.5-2302.5	475	24	4	<0.5	353	<0.01	<0.5	9	<1	56
RS-478-99 2302.5-2354.5	540	24	3	<0.5	463	<0.01	<0.5	10	<1	49
RS-478-99 2354.5-2396.5	525	23	4	<0.5	361	<0.01	<0.5	14	<1	47

INSPECTORATE

ROCKY MOUNTAIN GEOCHEMICAL

A MEMBER OF THE INSPECTORATE GROUP OF COMPANIES

840 GREG STREET • SPARKS, NEVADA 89431 • PHONE (775) 359-6311 • FAX (775) 359-2944

Certificate of Analysis

DATE: Sunday, November 07, 1999

JOB NO: 99-36-34

CLIENT: Hecla Mining Co. (Rosebud Mine)
P.O. Box 2610
Winnecmucca, NV 89446 US

INVOICE NO: 33100059

CLIENT ORDER NO: RS-478-99 (0 - 1600')

REPORT ON: 321 Cuttings

SUBMITTED BY: Kurt Allen

DATE RECIEVED: Saturday, October 16, 1999

ANALYSES: Gold, Silver

ANALYTICAL METHODS: AA, Fire/AA

REMARKS:

CC: RMG File

E-MAILED TO:

All values are reported in parts per million unless specified otherwise. A minus sign (–) is to be read "less than" and a plus sign (+) "greater than." Values in parenthesis are estimates. This analytical report is the confidential property of the above mentioned client and for the protection of this client and ourselves we reserve the right to forbid publication or reproduction of this report or any part thereof without written permission.

ND=None Detected 1 ppm=0.0001% Troy oz./ton=34.286 ppm 1 ppm=0.0292 Troy oz./ton

The results of this assay were based solely upon the content of the sample submitted. Any decision to invest should be made only after the potential investment value of the claim or deposit has been determined based on the results of assays of multiple samples of rocks or minerals collected by the prospective investor or by a qualified person selected by him.

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 0'-5'	0.001	-0.003
RS-478-99 5'-10'	0.001	-0.003
RS-478-99 10'-15'	0.001	0.003
RS-478-99 15'-20'	0.001	-0.003
RS-478-99 20'-25'	0.001	0.003
RS-478-99 25'-30'	-0.001	-0.003
RS-478-99 30'-35'	-0.001	0.003
RS-478-99 35'-40'	-0.001	-0.003
RS-478-99 40'-45'	-0.001	0.003
RS-478-99 45'-50'	0.001	0.003
RS-478-99 50'-55'	-0.001	-0.003
RS-478-99 55'-60'	-0.001	-0.003
RS-478-99 60'-65'	-0.001	-0.003
RS-478-99 65'-70'	-0.001	0.003
RS-478-99 70'-75'	-0.001	0.003
RS-478-99 75'-80'	-0.001	-0.003
RS-478-99 80'-85'	-0.001	-0.003
RS-478-99 85'-90'	-0.001	0.003
RS-478-99 90'-95'	0.001	-0.003
RS-478-99 95'-100'	-0.001	-0.003
RS-478-99 100'-105'	-0.001	-0.003
RS-478-99 105'-110'	-0.001	-0.003
RS-478-99 110'-115'	-0.001	-0.003
RS-478-99 115'-120'	-0.001	-0.003

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 120'-125'	-0.001	-0.003
RS-478-99 125'-130'	-0.001	-0.003
RS-478-99 130'-135'	-0.001	0.003
RS-478-99 135'-140'	-0.001	-0.003
RS-478-99 140'-145'	-0.001	0.003
RS-478-99 145'-150'	-0.001	0.003
RS-478-99 150'-155'	-0.001	-0.003
RS-478-99 155'-160'	-0.001	0.003
RS-478-99 160'-165'	-0.001	-0.003
RS-478-99 165'-170'	-0.001	0.003
RS-478-99 170'-175'	0.001	0.003
RS-478-99 175'-180'	-0.001	0.003
RS-478-99 180'-185'	-0.001	-0.003
RS-478-99 185'-190'	-0.001	0.003
RS-478-99 190'-195'	-0.001	-0.003
RS-478-99 195'-200'	-0.001	-0.003
RS-478-99 200'-205'	-0.001	-0.003
RS-478-99 205'-210'	-0.001	-0.003
RS-478-99 210'-215'	-0.001	0.003
RS-478-99 215'-220'	-0.001	-0.003
RS-478-99 220'-225'	-0.001	0.003
RS-478-99 225'-230'	-0.001	-0.003
RS-478-99 230'-235'	-0.001	0.003
RS-478-99 235'-240'	-0.001	0.006

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 240'-245'	-0.001	0.003
RS-478-99 245'-250'	-0.001	0.003
RS-478-99 250'-255'	-0.001	0.003
RS-478-99 255'-260'	-0.001	0.003
RS-478-99 260'-265'	-0.001	0.003
RS-478-99 265'-270'	-0.001	0.006
RS-478-99 270'-275'	-0.001	0.006
RS-478-99 275'-280'	-0.001	0.003
RS-478-99 280'-285'	-0.001	0.006
RS-478-99 285'-290'	-0.001	0.003
RS-478-99 290'-295'	-0.001	0.003
RS-478-99 295'-300'	-0.001	0.006
RS-478-99 300'-305'	-0.001	0.012
RS-478-99 305'-310'	0.001	0.015
RS-478-99 310'-315'	-0.001	0.006
RS-478-99 315'-320'	-0.001	0.009
RS-478-99 320'-325'	-0.001	0.003
RS-478-99 325'-330'	-0.001	0.009
RS-478-99 330'-335'	-0.001	0.006
RS-478-99 335'-340'	0.001	0.006
RS-478-99 340'-345'	-0.001	0.006
RS-478-99 345'-350'	-0.001	0.009
RS-478-99 350'-355'	-0.001	0.003
RS-478-99 355'-360'	-0.001	0.006

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 360'-365'	-0.001	0.003
RS-478-99 365'-370'	0.002	-0.003
RS-478-99 370'-375'	0.002	0.003
RS-478-99 375'-380'	-0.001	0.003
RS-478-99 380'-385'	-0.001	0.003
RS-478-99 385'-390'	-0.001	0.003
RS-478-99 390'-395'	0.002	0.003
RS-478-99 395'-400'	-0.001	0.003
RS-478-99 400'-405'	-0.001	0.003
RS-478-99 405'-410'	-0.001	0.006
RS-478-99 410'-415'	-0.001	0.003
RS-478-99 415'-420'	-0.001	0.003
RS-478-99 420'-425'	-0.001	0.003
RS-478-99 425'-430'	-0.001	0.009
RS-478-99 430'-435'	-0.001	-0.003
RS-478-99 435'-440'	-0.001	0.006
RS-478-99 440'-445'	-0.001	0.006
RS-478-99 445'-450'	-0.001	0.006
RS-478-99 450'-455'	-0.001	0.003
RS-478-99 455'-460'	-0.001	0.003
RS-478-99 460'-465'	-0.001	0.006
RS-478-99 465'-470'	-0.001	0.006
RS-478-99 470'-475'	-0.001	0.009
RS-478-99 475'-480'	-0.001	0.009

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 480'-485'	-0.001	0.006
RS-478-99 485'-490'	-0.001	0.009
RS-478-99 490'-495'	-0.001	0.009
RS-478-99 495'-500'	-0.001	0.009
RS-478-99 500'-505'	-0.001	0.006
RS-478-99 505'-510'	-0.001	0.006
RS-478-99 510'-515'	-0.001	0.006
RS-478-99 515'-520'	-0.001	0.006
RS-478-99 520'-525'	-0.001	0.006
RS-478-99 525'-530'	-0.001	0.012
RS-478-99 530'-535'	-0.001	0.003
RS-478-99 535'-540'	-0.001	0.015
RS-478-99 540'-545'	-0.001	-0.003
RS-478-99 545'-550'	-0.001	-0.003
RS-478-99 550'-555'	-0.001	-0.003
RS-478-99 555'-560'	-0.001	-0.003
RS-478-99 560'-565'	-0.001	-0.003
RS-478-99 565'-570'	-0.001	-0.003
RS-478-99 570'-575'	-0.001	-0.003
RS-478-99 575'-580'	-0.001	-0.003
RS-478-99 580'-585'	-0.001	0.012
RS-478-99 585'-590'	-0.001	0.003
RS-478-99 590'-595'	-0.001	-0.003
RS-478-99 595'-600'	-0.001	0.003

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 600'-605'	-0.001	0.009
RS-478-99 605'-610'	-0.001	0.003
RS-478-99 610'-615'	-0.001	-0.003
RS-478-99 615'-620'	-0.001	0.003
RS-478-99 620'-625'	-0.001	-0.003
RS-478-99 625'-630'	-0.001	0.006
RS-478-99 630'-635'	-0.001	-0.003
RS-478-99 635'-640'	-0.001	0.006
RS-478-99 640'-645'	-0.001	-0.003
RS-478-99 645'-650'	-0.001	0.003
RS-478-99 650'-655'	-0.001	0.006
RS-478-99 655'-660'	-0.001	0.009
RS-478-99 660'-665'	-0.001	0.006
RS-478-99 665'-670'	-0.001	-0.003
RS-478-99 670'-675'	-0.001	0.003
RS-478-99 675'-680'	-0.001	-0.003
RS-478-99 680'-685'	-0.001	0.003
RS-478-99 685'-690'	-0.001	0.012
RS-478-99 690'-695'	-0.001	0.003
RS-478-99 695'-700'	-0.001	0.006
RS-478-99 700'-705'	-0.001	0.003
RS-478-99 705'-710'	-0.001	0.003
RS-478-99 710'-715'	-0.001	-0.003
RS-478-99 715'-720'	-0.001	0.003

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 720'-725'	-0.001	-0.003
RS-478-99 725'-730'	-0.001	-0.003
RS-478-99 730'-735'	-0.001	-0.003
RS-478-99 735'-740'	-0.001	-0.003
RS-478-99 740'-745'	-0.001	-0.003
RS-478-99 745'-750'	-0.001	-0.003
RS-478-99 750'-755'	-0.001	0.003
RS-478-99 755'-760'	-0.001	-0.003
RS-478-99 760'-765'	-0.001	0.003
RS-478-99 765'-770'	-0.001	-0.003
RS-478-99 770'-775'	-0.001	0.006
RS-478-99 775'-780'	-0.001	0.009
RS-478-99 780'-785'	-0.001	0.003
RS-478-99 785'-790'	-0.001	0.006
RS-478-99 790'-795'	-0.001	-0.003
RS-478-99 795'-800'	-0.001	0.006
RS-478-99 800'-805'	-0.001	-0.003
RS-478-99 805'-810'	-0.001	-0.003
RS-478-99 810'-815'	-0.001	-0.003
RS-478-99 815'-820'	-0.001	0.003
RS-478-99 820'-825'	-0.001	-0.003
RS-478-99 825'-830'	-0.001	0.006
RS-478-99 830'-835'	-0.001	0.003
RS-478-99 835'-840'	-0.001	-0.003

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 840'-845'	-0.001	0.003
RS-478-99 845'-850'	-0.001	-0.003
RS-478-99 850'-855'	-0.001	-0.003
RS-478-99 855'-860'	-0.001	-0.003
RS-478-99 860'-865'	-0.001	-0.003
RS-478-99 865'-870'	-0.001	0.006
RS-478-99 870'-875'	-0.001	-0.003
RS-478-99 875'-880'	-0.001	-0.003
RS-478-99 880'-885'	-0.001	-0.003
RS-478-99 885'-890'	-0.001	0.003
RS-478-99 890'-895'	-0.001	-0.003
RS-478-99 895'-900'	-0.001	0.003
RS-478-99 900'-905'	-0.001	0.003
RS-478-99 905'-910'	-0.001	-0.003
RS-478-99 910'-915'	-0.001	0.003
RS-478-99 915'-920'	-0.001	0.003
RS-478-99 920'-925'	-0.001	-0.003
RS-478-99 925'-930'	-0.001	-0.003
RS-478-99 930'-935'	-0.001	0.003
RS-478-99 935'-940'	-0.001	-0.003
RS-478-99 940'-945'	-0.001	-0.003
RS-478-99 945'-950'	-0.001	-0.003
RS-478-99 950'-955'	-0.001	-0.003
RS-478-99 955'-960'	-0.001	-0.003

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 960'-965'	-0.001	0.003
RS-478-99 965'-970'	-0.001	-0.003
RS-478-99 970'-975'	-0.001	-0.003
RS-478-99 975'-980'	-0.001	0.006
RS-478-99 980'-985'	-0.001	0.003
RS-478-99 985'-990'	-0.001	-0.003
RS-478-99 990'-995'	-0.001	-0.003
RS-478-99 995'-1000'	-0.001	-0.003
RS-478-99 1000'-1005'	-0.001	0.006
RS-478-99 1005'-1010'	-0.001	-0.003
RS-478-99 1010'-1015'	-0.001	0.006
RS-478-99 1015'-1020'	-0.001	-0.003
RS-478-99 1020'-1025'	-0.001	0.003
RS-478-99 1025'-1030'	-0.001	-0.003
RS-478-99 1030'-1035'	-0.001	0.009
RS-478-99 1035'-1040'	-0.001	-0.003
RS-478-99 1040'-1045'	-0.001	-0.003
RS-478-99 1045'-1050'	-0.001	-0.003
RS-478-99 1050'-1055'	-0.001	0.003
RS-478-99 1055'-1060'	-0.001	0.003
RS-478-99 1060'-1065'	-0.001	0.003
RS-478-99 1065'-1070'	-0.001	0.006
RS-478-99 1070'-1075'	-0.001	0.009
RS-478-99 1075'-1080'	-0.001	0.012

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 1080'-1085'	0.001	0.038
RS-478-99 1085'-1090'	-0.001	0.020
RS-478-99 1090'-1095'	-0.001	-0.003
RS-478-99 1095'-1100'	-0.001	0.003
RS-478-99 1100'-1105'	-0.001	0.006
RS-478-99 1105'-1110'	0.001	0.006
RS-478-99 1110'-1115'	-0.001	0.003
RS-478-99 1115'-1120'	-0.001	-0.003
RS-478-99 1120'-1125'	-0.001	0.006
RS-478-99 1125'-1130'	-0.001	0.006
RS-478-99 1130'-1135'	-0.001	0.003
RS-478-99 1135'-1140'	-0.001	0.006
RS-478-99 1140'-1145'	-0.001	0.003
RS-478-99 1145'-1150'	-0.001	0.006
RS-478-99 1150'-1155'	0.001	-0.003
RS-478-99 1155'-1160'	0.002	0.006
RS-478-99 1160'-1165'	0.001	0.012
RS-478-99 1165'-1170'	-0.001	0.003
RS-478-99 1170'-1175'	-0.001	0.006
RS-478-99 1175'-1180'	-0.001	0.003
RS-478-99 1180'-1185'	-0.001	0.012
RS-478-99 1185'-1190'	-0.001	0.012
RS-478-99 1190'-1195'	-0.001	0.006
RS-478-99 1195'-1200'	-0.001	0.003

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 1200'-1205'	-0.001	0.003
RS-478-99 1205'-1210'	-0.001	-0.003
RS-478-99 1210'-1215'	-0.001	0.006
RS-478-99 1215'-1220'	-0.001	0.006
RS-478-99 1220'-1225'	-0.001	-0.003
RS-478-99 1225'-1230'	-0.001	0.006
RS-478-99 1230'-1235'	-0.001	0.003
RS-478-99 1235'-1240'	-0.001	0.006
RS-478-99 1240'-1245'	-0.001	0.003
RS-478-99 1245'-1250'	-0.001	0.006
RS-478-99 1250'-1255'	-0.001	-0.003
RS-478-99 1255'-1260'	-0.001	0.003
RS-478-99 1260'-1265'	-0.001	-0.003
RS-478-99 1265'-1270'	-0.001	-0.003
RS-478-99 1270'-1275'	-0.001	-0.003
RS-478-99 1275'-1280'	-0.001	-0.003
RS-478-99 1280'-1285'	-0.001	-0.003
RS-478-99 1285'-1290'	-0.001	-0.003
RS-478-99 1290'-1295'	-0.001	-0.003
RS-478-99 1295'-1300'	-0.001	-0.003
RS-478-99 1300'-1305'	-0.001	-0.003
RS-478-99 1305'-1310'	-0.001	-0.003
RS-478-99 1310'-1315'	-0.001	-0.003
RS-478-99 1315'-1320'	-0.001	0.003

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 1320'-1325'	0.002	-0.003
RS-478-99 1325'-1330'	0.001	0.020
RS-478-99 1330'-1335'	0.001	0.018
RS-478-99 1335'-1340'	0.001	0.015
RS-478-99 1340'-1345'	0.014	0.009
RS-478-99 1345'-1350'	0.003	0.012
RS-478-99 1350'-1355'	0.035	0.003
RS-478-99 1355'-1360'	0.003	0.006
RS-478-99 1360'-1365'	0.003	0.003
RS-478-99 1365'-1370'	0.001	0.003
RS-478-99 1370'-1375'	0.001	0.003
RS-478-99 1375'-1380'	0.001	-0.003
RS-478-99 1380'-1385'	0.001	-0.003
RS-478-99 1385'-1390'	0.003	0.003
RS-478-99 1390'-1395'	0.003	0.003
RS-478-99 1395'-1400'	-0.001	0.015
RS-478-99 1400'-1405'	0.016	-0.003
RS-478-99 1405'-1410'	0.004	0.006
RS-478-99 1410'-1415'	0.002	0.009
RS-478-99 1415'-1420'	-0.001	0.003
RS-478-99 1420'-1425'	0.001	0.003
RS-478-99 1425'-1430'	-0.001	0.003
RS-478-99 1430'-1435'	-0.001	0.003
RS-478-99 1435'-1440'	-0.001	0.006

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 1440'-1445'	-0.001	0.006
RS-478-99 1445'-1450'	-0.001	0.003
RS-478-99 1450'-1455'	-0.001	0.003
RS-478-99 1455'-1460'	-0.001	0.006
RS-478-99 1460'-1465'	0.001	0.003
RS-478-99 1465'-1470'	-0.001	0.003
RS-478-99 1470'-1475'	-0.001	0.003
RS-478-99 1475'-1480'	-0.001	0.003
RS-478-99 1480'-1485'	-0.001	-0.003
RS-478-99 1485'-1490'	-0.001	-0.003
RS-478-99 1490'-1495'	-0.001	0.003
RS-478-99 1495'-1500'	-0.001	0.003
RS-478-99 1500'-1505'	-0.001	0.003
RS-478-99 1505'-1510'	-0.001	0.003
RS-478-99 1510'-1515'	-0.001	0.003
RS-478-99 1515'-1520'	-0.001	0.006
RS-478-99 1520'-1525'	0.001	0.006
RS-478-99 1525'-1530'	-0.001	0.003
RS-478-99 1530'-1535'	0.002	-0.003
RS-478-99 1535'-1540'	-0.001	0.003
RS-478-99 1540'-1545'	0.001	0.003
RS-478-99 1545'-1550'	0.002	0.006
RS-478-99 1550'-1555'	-0.001	-0.003
RS-478-99 1555'-1560'	-0.001	-0.003

SAMPLE NO	oz/ton Gold	oz/ton Silver
RS-478-99 1560'-1565'	-0.001	-0.003
RS-478-99 1565'-1570'	-0.001	-0.003
RS-478-99 1570'-1575'	0.001	-0.003
RS-478-99 1575'-1580'	-0.001	-0.003
RS-478-99 1580'-1585'	-0.001	0.006
RS-478-99 1585'-1590'	-0.001	-0.003
RS-478-99 1590'-1595'	0.001	-0.003
RS-478-99 1595'-1600'	-0.001	-0.003
STD 75948	0.033	1.098

Monday, November 08, 1999

By Kristi Meyer

INSPECTORATE

INSPECTORATE AMERICA CORPORATION
840 Greg Street
Sparks, Nevada 89431
Tel:775-359-6311
Fax: 775-359-2944

20-Dec-99

ROSEBUD MINING COMPANY
P.O. BOX 2610
58 MILES WEST OF
WINNEMUCCA, NV 89446

Certificate of Analysis

Attn: Kurt Allen
Project: RS-478-99

Received: 2-Dec-99 15:37
PO #: Ref:99-46-34

Job: 993840R

Status: Final

Drill Core

Sample Id	Au FA/AA/AAS oz/ton	Au FA oz/ton	Ag AA oz/ton	Ag FA oz/ton
RS-478-99 1600-1615	0.001	NA	0.070	NA
RS-478-99 1615-1625.5	0.001	NA	0.007	NA
RS-478-99 1625.5-1636.5	0.001	NA	0.005	NA
RS-478-99 1636.5-1646	0.001	NA	0.002	NA
RS-478-99 1646-1655	0.000	NA	0.035	NA
RS-478-99 1655-1660	0.000	NA	0.003	NA
RS-478-99 1660-1671.5	0.000	NA	<0.001	NA
RS-478-99 1671.5-1682	0.000	NA	<0.001	NA
RS-478-99 1682-1692.5	0.000	NA	0.001	NA
RS-478-99 1692.5-1703	0.000	NA	<0.001	NA
RS-478-99 1703-1713.5	0.000	NA	<0.001	NA
RS-478-99 1713.5-1723.4	0.000	NA	0.002	NA
RS-478-99 1723.4-1729	0.000	NA	<0.001	NA
RS-478-99 1729-1736	0.000	NA	0.003	NA
RS-478-99 1736-1743.5	0.000	NA	0.002	NA
RS-478-99 1743.5-1754	0.000	NA	0.004	NA
RS-478-99 1754-1757.9	0.000	NA	<0.001	NA
RS-478-99 1757.9-1765.2	0.000	NA	0.030	NA
RS-478-99 1765.2-1774.4	0.000	NA	0.004	NA
RS-478-99 1774.4-1776.5	0.000	NA	0.026	NA

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RS-478-99 1776.5-1785.5	0.000	NA	0.004	NA
RS-478-99 1785.5-1793.7	0.000	NA	0.016	NA
RS-478-99 1793.7-1797.7	0.000	NA	0.006	NA
RS-478-99 1797.7-1802	0.000	NA	0.006	NA
RS-478-99 1802-1806.5	0.000	NA	0.015	NA
RS-478-99 1806.5-1817	0.000	NA	0.012	NA
RS-478-99 1817-1827.5	0.000	NA	0.008	NA
RS-478-99 1827.5-1838	0.000	NA	0.021	NA
RS-478-99 1838-1844.3	0.000	NA	0.022	NA
RS-478-99 1844.3-1848	0.000	NA	0.017	NA
RS-478-99 1848-1858.5	0.002	NA	0.016	NA
RS-478-99 1858.5-1869	0.000	NA	0.028	NA
RS-478-99 1869-1879.5	0.000	NA	0.011	NA
RS-478-99 1879.5-1886	0.000	NA	0.030	NA
RS-478-99 1886-1893	0.001	NA	0.070	NA
RS-478-99 1893-1900	0.000	NA	0.009	NA
RS-478-99 1900-1910.5	0.000	NA	0.019	NA
RS-478-99 1910.5-1920	0.000	NA	0.015	NA
RS-478-99 1920-1927.7	0.000	NA	<0.001	NA
RS-478-99 1927.7-1935	0.000	NA	0.011	NA

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Sample Id	Au FA/AA/AAS oz/ton	Au FA oz/ton	Ag AA oz/ton	Ag FA oz/ton
RS-478-99 1935-1945.5	0.000	NA	0.009	NA
RS-478-99 1945.5-1955	0.000	NA	<0.001	NA
RS-478-99 1955-1966.5	0.000	NA	0.007	NA
RS-478-99 1966.5-1977	0.000	NA	0.013	NA
RS-478-99 1977-1987.5	0.000	NA	0.009	NA
RS-478-99 1987.5-1998	0.000	NA	0.028	NA
RS-478-99 1998-2008	0.000	NA	0.005	NA
RS-478-99 2008-2018.5	0.000	NA	0.009	NA
RS-478-99 2018.5-2028	0.000	NA	0.009	NA
RS-478-99 2028-2038	0.000	NA	0.018	NA
RS-478-99 2038-2048.5	0.000	NA	0.012	NA
RS-478-99 2048.5-2059	0.000	NA	0.012	NA
RS-478-99 2059-2069	0.000	NA	0.018	NA
RS-478-99 2069-2079.5	0.000	NA	0.017	NA
RS-478-99 2079.5-2090	0.000	NA	0.011	NA
RS-478-99 2090-2099	0.000	NA	0.022	NA
RS-478-99 2099-2102.6	0.000	NA	0.003	NA
RS-478-99 2102.6-2109	0.000	NA	0.005	NA
RS-478-99 2109-2120	0.000	NA	0.015	NA
RS-478-99 2120-2130	0.000	NA	0.007	NA

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Sample Id	Au FA/AA/AAS oz/ton	Au FA oz/ton	Ag AA oz/ton	Ag FA oz/ton
RS-478-99 2130-2140	0.000	NA	0.006	NA
RS-478-99 2140-2146	0.001	NA	0.008	NA
RS-478-99 2146-2151	0.000	NA	0.019	NA
RS-478-99 2151-2153.6	0.000	NA	0.001	NA
RS-478-99 2153.6-2164	0.000	NA	0.009	NA
RS-478-99 2164-2171	0.000	NA	0.012	NA
RS-478-99 2171-2179	0.000	NA	0.004	NA
RS-478-99 2179-2186	0.000	NA	0.001	NA
RS-478-99 2186-2190.6	0.000	NA	0.005	NA
RS-478-99 2190.6-2199	0.000	NA	0.011	NA
RS-478-99 2199-2208	0.000	NA	0.014	NA
RS-478-99 2208-2218	0.000	NA	0.012	NA
RS-478-99 2218-2230	0.000	NA	0.002	NA
RS-478-99 2230-2239.5	0.000	NA	0.014	NA
RS-478-99 2239.5-2248.5	0.000	NA	0.007	NA
RS-478-99 2248.5-2258	0.000	NA	0.003	NA
RS-478-99 2258-2268.5	0.000	NA	0.009	NA
RS-478-99 2268.5-2274.5	0.000	NA	0.024	NA
RS-478-99 2274.5-2279.5	0.001	NA	0.107	NA
RS-478-99 2279.5-2283	0.002	NA	0.050	NA

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Sample Id	Au FA/AA/AAS oz/ton	Au FA oz/ton	Ag AA oz/ton	Ag FA oz/ton
RS-478-99 2283-2291	0.002	NA	0.037	NA
RS-478-99 2291-2295	0.002	NA	0.038	NA
RS-478-99 2295-2302.5	0.003	NA	0.067	NA
RS-478-99 2302.5-2312.5	0.001	NA	0.056	NA
RS-478-99 2312.5-2323	0.000	NA	0.007	NA
RS-478-99 2323-2333.5	0.000	NA	0.017	NA
RS-478-99 2333.5-2344	0.001	NA	0.047	NA
RS-478-99 2344-2354.5	0.002	NA	0.048	NA
RS-478-99 2354.5-2365	0.000	NA	0.024	NA
RS-478-99 2365-2371.5	0.001	NA	0.049	NA
RS-478-99 2371.5-2379	0.003	NA	0.081	NA
RS-478-99 2379-2386	0.001	NA	0.025	NA
RS-478-99 2386-2396.5	0.000	NA	0.018	NA

Pulp

STD 75943	0.000	NA	1.360	NA

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Sample Id	Ag ICP ppm	Al ICP %	As ICP ppm	B ICP ppm	Ba ICP ppm	Bi ICP ppm	Ca ICP %	Cd ICP ppm	Co ICP ppm	Cr ICP ppm
RS-478-99 1600-1655	<0.1	0.97	4	41	70	2	1.14	0.9	18	33
RS-478-99 1655-1703	<0.1	1.02	4	37	259	3	1.17	0.9	14	25
RS-478-99 1703-1754	<0.1	1.34	5	44	190	3	0.99	0.9	14	27
RS-478-99 1754-1797.7	<0.1	1.56	4	52	323	9	1.25	1.4	22	66
RS-478-99 1797.7-1844.3	0.2	1.51	10	57	281	4	1.66	1.4	28	81
RS-478-99 1844.3-1886	0.3	1.29	15	48	292	7	0.78	1.8	20	43
RS-478-99 1886-1945.5	0.8	0.30	38	30	138	<1	2.23	7.0	9	26
RS-478-99 1945.5-1998	0.9	0.15	27	23	139	<1	3.78	7.7	5	12
RS-478-99 1998-2048.5	0.9	0.12	25	22	127	1	3.73	6.9	6	7
RS-478-99 2048.5-2099	1.0	0.16	41	28	126	<1	3.32	8.2	7	9
RS-478-99 2099-2146	0.6	0.60	21	38	182	4	3.27	4.1	14	36
RS-478-99 2146-2199	0.7	0.27	20	33	156	<1	3.32	6.1	9	16
RS-478-99 2199-2248.5	1.1	0.15	27	29	146	<1	4.37	5.9	7	7
RS-478-99 2248.5-2274.5	1.0	0.15	24	28	103	<1	4.00	1.6	7	9
RS-478-99 2274.5-2302.5	1.9	0.56	157	37	109	3	1.66	1.0	9	54
RS-478-99 2302.5-2354.5	1.3	0.69	142	45	57	2	2.21	0.9	11	22
RS-478-99 2354.5-2396.5	1.4	0.78	59	44	51	<1	1.92	0.8	12	15

ROSEBUD MINING COMPANY
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Fax: 775-359-2944

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Drill Core

Sample Id	Cu ICP ppm	Fe ICP %	Hg HYG ppb	K ICP %	La ICP ppm	Mg ICP %	Mn ICP ppm	Mo ICP ppm	Na ICP %	Ni ICP ppm
RS-478-99 1600-1655	37	2.34	44	0.15	10	0.55	262	<1	0.38	66
RS-478-99 1655-1703	27	2.36	26	0.20	7	0.55	263	<1	0.37	33
RS-478-99 1703-1754	37	2.94	31	0.22	6	0.61	326	<1	0.36	51
RS-478-99 1754-1797.7	42	3.57	31	0.29	17	0.66	417	<1	0.52	106
RS-478-99 1797.7-1844.3	43	4.08	22	0.22	13	0.73	553	<1	0.40	134
RS-478-99 1844.3-1886	60	3.24	31	0.27	6	0.62	274	1	0.92	73
RS-478-99 1886-1945.5	46	1.98	57	0.20	<2	0.61	167	40	5.71	69
RS-478-99 1945.5-1998	42	1.38	52	0.17	2	0.46	137	36	6.37	64
RS-478-99 1998-2048.5	39	1.40	61	0.14	2	0.39	132	36	5.51	67
RS-478-99 2048.5-2099	48	1.69	65	0.16	2	0.35	159	46	7.02	70
RS-478-99 2099-2146	39	2.72	22	0.18	3	1.07	280	27	3.30	72
RS-478-99 2146-2199	43	2.09	35	0.19	2	0.65	216	38	4.87	71
RS-478-99 2199-2248.5	41	1.65	52	0.17	2	0.50	152	41	5.10	67
RS-478-99 2248.5-2274.5	38	1.75	39	0.14	2	0.53	161	38	1.35	57
RS-478-99 2274.5-2302.5	35	2.36	26	0.20	3	0.48	252	10	0.47	27
RS-478-99 2302.5-2354.5	36	2.97	26	0.15	3	0.90	333	<1	0.39	15
RS-478-99 2354.5-2396.5	35	2.76	26	0.16	2	0.65	312	1	0.35	14

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Sample Id	P ICP ppm	Pb ICP ppm	Sb ICP ppm	Se ICP ppm	Sr ICP ppm	Ti ICP %	Tl ICP ppm	V ICP ppm	W ICP ppm	Zn ICP ppm
RS-478-99 1600-1655	472	27	<2	<0.5	292	<0.01	<0.5	51	<1	58
RS-478-99 1655-1703	404	23	<2	<0.5	380	<0.01	<0.5	34	<1	57
RS-478-99 1703-1754	577	27	3	<0.5	392	<0.01	<0.5	39	<1	57
RS-478-99 1754-1797.7	1009	31	3	<0.5	498	<0.01	<0.5	47	<1	72
RS-478-99 1797.7-1844.3	803	29	2	<0.5	489	<0.01	<0.5	59	<1	61
RS-478-99 1844.3-1886	613	33	4	<0.5	308	<0.01	<0.5	52	<1	106
RS-478-99 1886-1945.5	638	29	4	<0.5	553	<0.01	<0.5	17	<1	506
RS-478-99 1945.5-1998	702	23	4	2.6	630	<0.01	<0.5	18	<1	553
RS-478-99 1998-2048.5	688	22	4	2.6	664	<0.01	<0.5	14	<1	482
RS-478-99 2048.5-2099	689	26	6	1.2	812	<0.01	<0.5	12	<1	619
RS-478-99 2099-2146	777	23	4	<0.5	694	0.01	<0.5	30	<1	294
RS-478-99 2146-2199	770	26	5	<0.5	712	<0.01	<0.5	15	<1	436
RS-478-99 2199-2248.5	683	24	6	<0.5	826	<0.01	<0.5	11	<1	441
RS-478-99 2248.5-2274.5	669	22	4	<0.5	664	<0.01	<0.5	5	<1	129
RS-478-99 2274.5-2302.5	475	24	4	<0.5	353	<0.01	<0.5	9	<1	56
RS-478-99 2302.5-2354.5	540	24	3	<0.5	463	<0.01	<0.5	10	<1	49
RS-478-99 2354.5-2396.5	525	23	4	<0.5	361	<0.01	<0.5	14	<1	47

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Job: 993840R

Status: Final

Abbreviations:

Parameters:

Au	: Gold
Ag	: Silver
Al	: Aluminum
As	: Arsenic
B	: Boron
Ba	: Barium
Bi	: Bismuth
Ca	: Calcium
Cd	: Cadmium
Co	: Cobalt
Cr	: Chromium
Cu	: Copper
Fe	: Iron
Hg	: Mercury
K	: Potassium
La	: Lanthanum
Mg	: Magnesium
Mn	: Manganese
Mo	: Molybdenum
Na	: Sodium
Ni	: Nickel
P	: Phosporus
Pb	: Lead

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Sb	: Antimony
Se	: Selenium
Sr	: Strontium
Ti	: Titanium
Tl	: Thallium
V	: Vanadium
W	: Tungsten
Zn	: Zinc

Methods:

FA/AA/AAS	: Fire Assay/Atomic Absorption Finish
FA	: Fire Assay/Gravimetric Finish
AA	: Atomic Absorption
ICP	: Inductively Coupled Plasma
HYG	: Hydride Generation

Units:

oz/ton	: ounces per ton
ppm	: Parts per million
%	: percent
ppb	: Parts per billion

Quality codes:

<	: Less than

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NA : Not Analyzed

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The results of this assay were based solely upon the content of the sample submitted. Any decision to invest should be made only after the potential investment value of the claim or deposit has been determined based on the results of assays of multiple samples of geologic materials collected by the prospective investor or by a qualified person selected by him and based on an evaluation of all engineering data which is available concerning any proposed project.

Job approved by:

Signed:

.....

Dave Francisco
Laboratory Manager

INSPECTORATE

ROCKY MOUNTAIN GEOCHEMICAL

A MEMBER OF THE INSPECTORATE GROUP OF COMPANIES
840 GREG STREET • SPARKS, NEVADA 89431 • PHONE (775) 359-6311 • FAX (775) 359-2944

Kurt Allen
Hecla (Rosebud Mine)
P.O. Box 2610
Winnecmucca, NV 89446 US

Invoice No: 33100287
Invoice Date: 12/27/99
JobNo: 99-46-34
Account No: 00007292

Client PO:

INVOICE

Terms: Net 30 days

Item Description	Qty	Unit Price	Amount
Prep Dcore 16-20lbs	93	$3.15	$292.95
Composite	93	$0.70	$65.10
Au FA/AA/AAS	94	$6.50	$611.00
30 element ICP	17	$7.65	$130.05

PLEASE REMIT TO:

Inspectorate America Corp.
P.O. Box 201901
Houston, TX 77216-1901

Sub Total:	**$1,099.10**
Discount:	**$0.00**
Discounted Total:	**$1,099.10**
Add'l Discount:	**$0.00**
Final Total:	**$1,099.10**

RS-478

Paid

RS-478-99

Depth From	To	Interval	Au	Ag	ICP	Composite Interval	Sample No.
1600	1606	6	X	X			1
1606	1615	9	X	X			2
1615	1625.5	10.5	X	X			3
1625.5	1646.5	21	X	X			4
1646.5	1655	8.5	X	X	X	55	5
1655	1660	5	X	X			6
1660	1671.5	11.5	X	X			7
1671.5	1682	10.5	X	X			8
1682	1692.5	10.5	X	X			9
1692.5	1703	10.5	X	X	X	48	10
1703	1713.5	10.5	X	X			11
1713.5	1723.4	9.9	X	X			12
1723.4	1729	5.6	X	X			13
1729	1736	7	X	X			14
1736	1743.5	7.5	X	X			15
1743.5	1754	10.5	X	X	X	51	16
1754	1757.9	3.9	X	X			17
1757.9	1765.2	7.3	X	X			18
1765.2	1774.4	9.2	X	X			19
1774.4	1776.5	2.1	X	X			20
1776.5	1785.5	9	X	X			21
1785.5	1785.5	0	X	X			22
1785.5	1793.7	8.2	X	X			23
1793.7	1797.7	4	X	X	X	43.7	24
1797.7	1802	4.3	X	X			25
1802	1806.5	4.5	X	X			26
1806.5	1817	10.5	X	X			27
1817	1827.5	10.5	X	X			28
1827.5	1838	10.5	X	X			29
1838	1844.3	6.3	X	X	X	46.6	30
1844.3	1848	3.7	X	X			31
1848	1858.5	10.5	X	X			32
1858.5	1869	10.5	X	X			33
1869	1879.5	10.5	X	X			34
1879.5	1886	6.5	X	X	X	41.7	35
1886	1893	7	X	X			36
1893	1900	7	X	X			37
1900	1910.5	10.5	X	X			38
1910.5	1920	9.5	X	X			39
1920	1927.7	7.7	X	X			40
1927.7	1935	7.3	X	X			41
1935	1945.5	10.5	X	X	X	59.5	42
1945.5	1955	9.5	X	X			43
1955	1966.5	11.5	X	X			44
1966.5	1977	10.5	X	X			45
1977	1987.5	10.5	X	X			46

RS-478-99

Depth From	To	Interval	Au	Ag	ICP	Composite Interval	Sample No.
1600	1606	6	X	X			1
1606	1615	9	X	X			2
1615	1625.5	10.5	X	X			3
1625.5	1646.5	21	X	X			4
1646.5	1655	8.5	X	X	X	55	5
1655	1660	5	X	X			6
1660	1671.5	11.5	X	X			7
1671.5	1682	10.5	X	X			8
1682	1692.5	10.5	X	X			9
1692.5	1703	10.5	X	X	X	48	10
1703	1713.5	10.5	X	X			11
1713.5	1723.4	9.9	X	X			12
1723.4	1729	5.6	X	X			13
1729	1736	7	X	X			14
1736	1743.5	7.5	X	X			15
1743.5	1754	10.5	X	X	X	51	16
1754	1757.9	3.9	X	X			17
1757.9	1765.2	7.3	X	X			18
1765.2	1774.4	9.2	X	X			19
1774.4	1776.5	2.1	X	X			20
1776.5	1785.5	9	X	X			21
1785.5	1785.5	0	X	X			22
1785.5	1793.7	8.2	X	X			23
1793.7	1797.7	4	X	X	X	43.7	24
1797.7	1802	4.3	X	X			25
1802	1806.5	4.5	X	X			26
1806.5	1817	10.5	X	X			27
1817	1827.5	10.5	X	X			28
1827.5	1838	10.5	X	X			29
1838	1844.3	6.3	X	X	X	46.6	30
1844.3	1848	3.7	X	X			31
1848	1858.5	10.5	X	X			32
1858.5	1869	10.5	X	X			33
1869	1879.5	10.5	X	X			34
1879.5	1886	6.5	X	X	X	41.7	35
1886	1893	7	X	X			36
1893	1900	7	X	X			37
1900	1910.5	10.5	X	X			38
1910.5	1920	9.5	X	X			39
1920	1927.7	7.7	X	X			40
1927.7	1935	7.3	X	X			41
1935	1945.5	10.5	X	X	X	59.5	42
1945.5	1955	9.5	X	X			43
1955	1966.5	11.5	X	X			44
1966.5	1977	10.5	X	X			45
1977	1987.5	10.5	X	X			46

WELLBORE NAVIGATION, INC.
WINNEMUCCA, NEVADA

GYROSCOPIC DIRECTIONAL SURVEY
BY MINIMUM CURVATURE

FOR

****
* **HECLA MINING COMPANY** *
****

JOB NUMBER: 29-0588-311

WELL NAME: RS-478 / VS 035.00

LOCATION: ROSEBUD MINE

SURVEY DATE: 10/13/99

SURVEY ENGINEER: VERN REID

GYRO REFERENCE BEARING: TRUE NORTH

TIE-ON COORDINATES AT: 0 M.D.
TAKEN FROM: COLLAR

VERTICAL SECTION CALCULATED IN A
PROPOSAL DIRECTION OF: 125.00
WATER CONTACT= 1198'

********** DEPTH MEASURED IN FEET ********

COMMENTS: ***** EKLUND *****
** GREG SECRIST **

PROJECTED F/1560' T/1600'.

*** THIS DIRECTIONAL SURVEY REPORT IS ****
** CORRECT TO THE BEST OF MY KNOWLEDGE ***
* AND IS SUPPORTED BY ACTUAL FIELD DATA! *

COMPANY REPRESENTATIVE

WELLBORE NAVIGATION, INC.
WINNEMUCCA, NEVADA

JOB NUMBER: 29-0588-311 WELL NAME: RS-478 / VS 035.00

INRUN SURVEY
BY MINIMUM CURVATURE

MEAS. DEPTH	VERT. DEPTH	VERT. SECT.	L/R PROP.	INCL HORZ	BEARING AZIMUTH	COORDINATES LATITUDE	COORDINATES DEPARTURE	D-LEG /100	D-LEG /CL	STATION DISP.	DISPLACEMENT DIRECTION
0.0	0.00	0.00	0.000	-55.93	150.68	0.00 N	0.00 E	0.00		0.00	AT 000.00
50.0	41.47	25.29	11.868	-56.14	149.60	24.23 S	13.91 E	1.28	0.64	27.93	AT 150.14
100.0	83.14	50.37	23.452	-56.77	149.98	48.10 S	27.81 E	1.33	0.66	55.56	AT 149.97
150.0	125.14	74.93	34.992	-57.49	150.36	71.64 S	41.31 E	1.50	0.75	82.70	AT 150.03
200.0	167.46	98.94	46.518	-58.15	150.94	94.85 S	54.36 E	1.46	0.73	109.33	AT 150.18
250.0	210.04	122.44	58.110	-58.63	151.57	117.83 S	66.97 E	1.17	0.58	135.53	AT 150.39
300.0	252.80	145.61	69.705	-58.95	151.60	140.62 S	79.29 E	0.64	0.32	161.43	AT 150.58
350.0	295.76	168.46	81.199	-59.50	151.80	163.14 S	91.42 E	1.12	0.56	187.01	AT 150.73
400.0	338.98	190.88	92.579	-60.13	152.03	185.32 S	103.26 E	1.28	0.64	212.15	AT 150.87
450.0	382.44	212.85	103.931	-60.59	152.63	207.22 S	114.74 E	1.09	0.55	236.87	AT 151.03
500.0	426.12	234.47	115.097	-61.16	151.99	228.77 S	126.05 E	1.30	0.65	261.20	AT 151.15
550.0	470.03	255.76	125.969	-61.72	152.12	249.88 S	137.25 E	1.13	0.56	285.10	AT 151.22
600.0	514.17	276.68	136.668	-62.22	152.05	270.65 S	148.25 E	1.00	0.50	308.59	AT 151.29
650.0	558.49	297.32	147.117	-62.66	151.65	291.05 S	159.17 E	0.95	0.48	331.72	AT 151.33
700.0	603.02	317.62	157.382	-63.22	152.01	311.10 S	169.90 E	1.17	0.58	354.47	AT 151.36
750.0	647.73	337.56	167.534	-63.61	151.95	330.85 S	180.42 E	0.78	0.39	376.84	AT 151.40
800.0	692.56	357.16	177.828	-63.81	153.46	350.53 S	190.57 E	1.40	0.70	398.98	AT 151.47
850.0	737.47	376.48	188.313	-64.04	153.53	370.20 S	200.38 E	0.46	0.23	420.95	AT 151.57
900.0	782.59	395.39	198.630	-64.91	153.69	389.50 S	209.96 E	1.75	0.87	442.48	AT 151.67
950.0	827.95	413.78	208.876	-65.30	154.58	408.43 S	219.14 E	1.08	0.54	463.51	AT 151.78
1000.0	873.40	431.87	219.210	-65.45	154.90	427.28 S	228.03 E	0.40	0.20	484.32	AT 151.91
1050.0	918.87	449.80	229.713	-65.42	155.80	446.17 S	236.70 E	0.75	0.38	505.07	AT 152.05
1100.0	964.32	467.70	240.411	-65.30	155.95	465.19 S	245.22 E	0.27	0.14	525.87	AT 152.20
1150.0	1009.85	485.35	251.146	-65.87	156.65	484.11 S	253.53 E	1.28	0.64	546.48	AT 152.36
1200.0	1055.52	502.66	261.849	-66.10	156.82	502.81 S	261.57 E	0.48	0.24	566.77	AT 152.52
1250.0	1101.26	519.78	272.572	-66.24	157.30	521.41 S	269.44 E	0.48	0.24	586.91	AT 152.67
1300.0	1147.04	536.82	283.221	-66.37	156.71	539.91 S	277.29 E	0.54	0.27	606.95	AT 152.82
1350.0	1192.96	553.74	293.492	-66.98	155.78	558.03 S	285.26 E	1.43	0.71	626.71	AT 152.92
1400.0	1239.00	570.54	303.400	-67.12	155.31	575.78 S	293.33 E	0.46	0.23	646.19	AT 153.00
1450.0	1285.12	587.24	313.074	-67.46	154.84	593.28 S	301.47 E	0.77	0.39	665.48	AT 153.06
1500.0	1331.52	603.41	322.347	-68.75	154.81	610.16 S	309.40 E	2.58	1.29	684.12	AT 153.11
1550.0	1378.22	618.98	331.098	-69.39	153.85	626.25 S	317.13 E	1.45	0.73	701.97	AT 153.14
1600.0	1425.03	634.39	339.500	-69.51	153.35	641.98 S	324.94 E	0.43	0.21	719.52	AT 153.15

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*************************************************************
*                         ********                          *
*      THE HORIZONTAL DISPLACEMENT AT THE DEPTH OF          *
*                         ********                          *
*  1600.0 FEET EQUALS   719.52   FEET AT   153.15           *
*                         ********                          *
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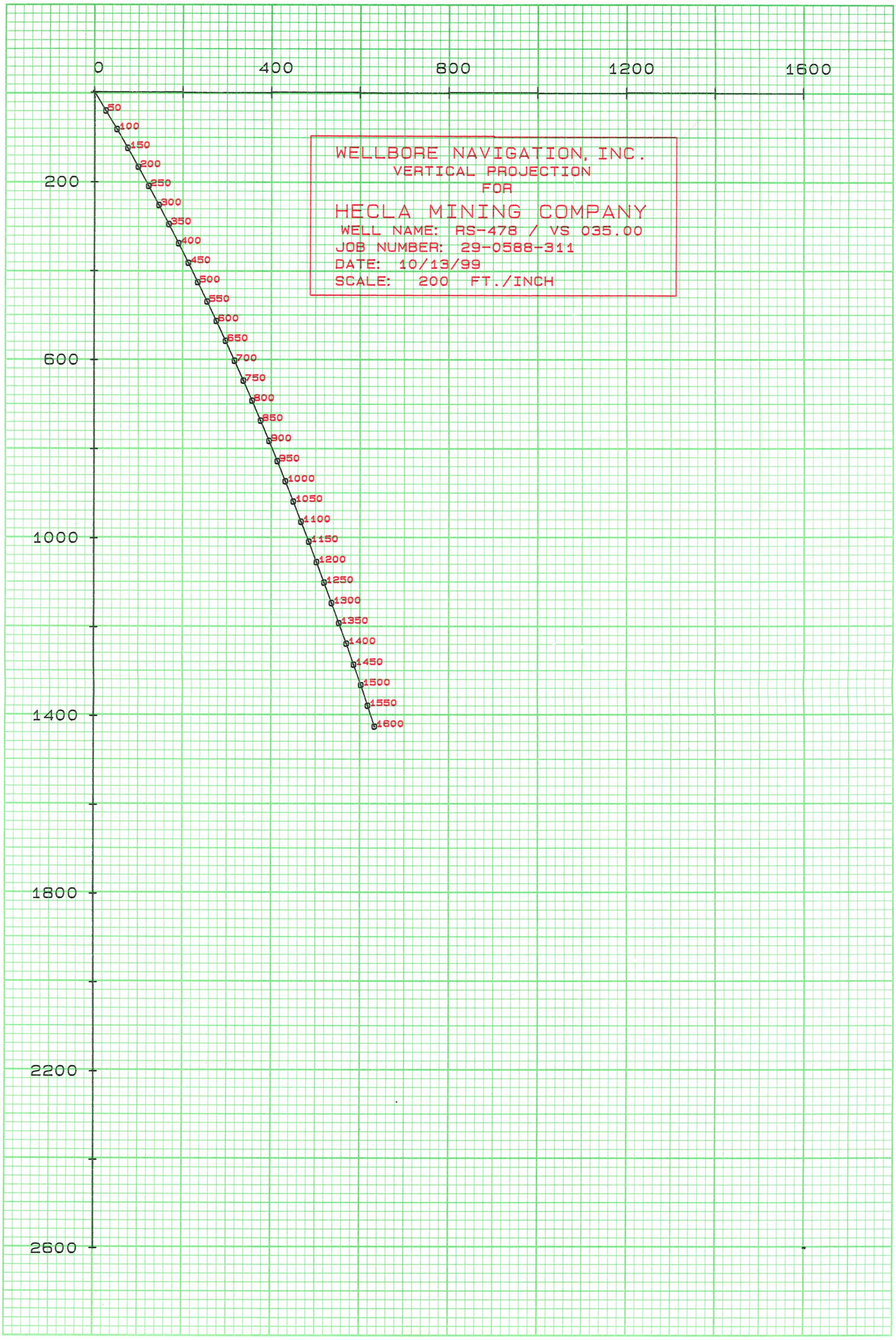
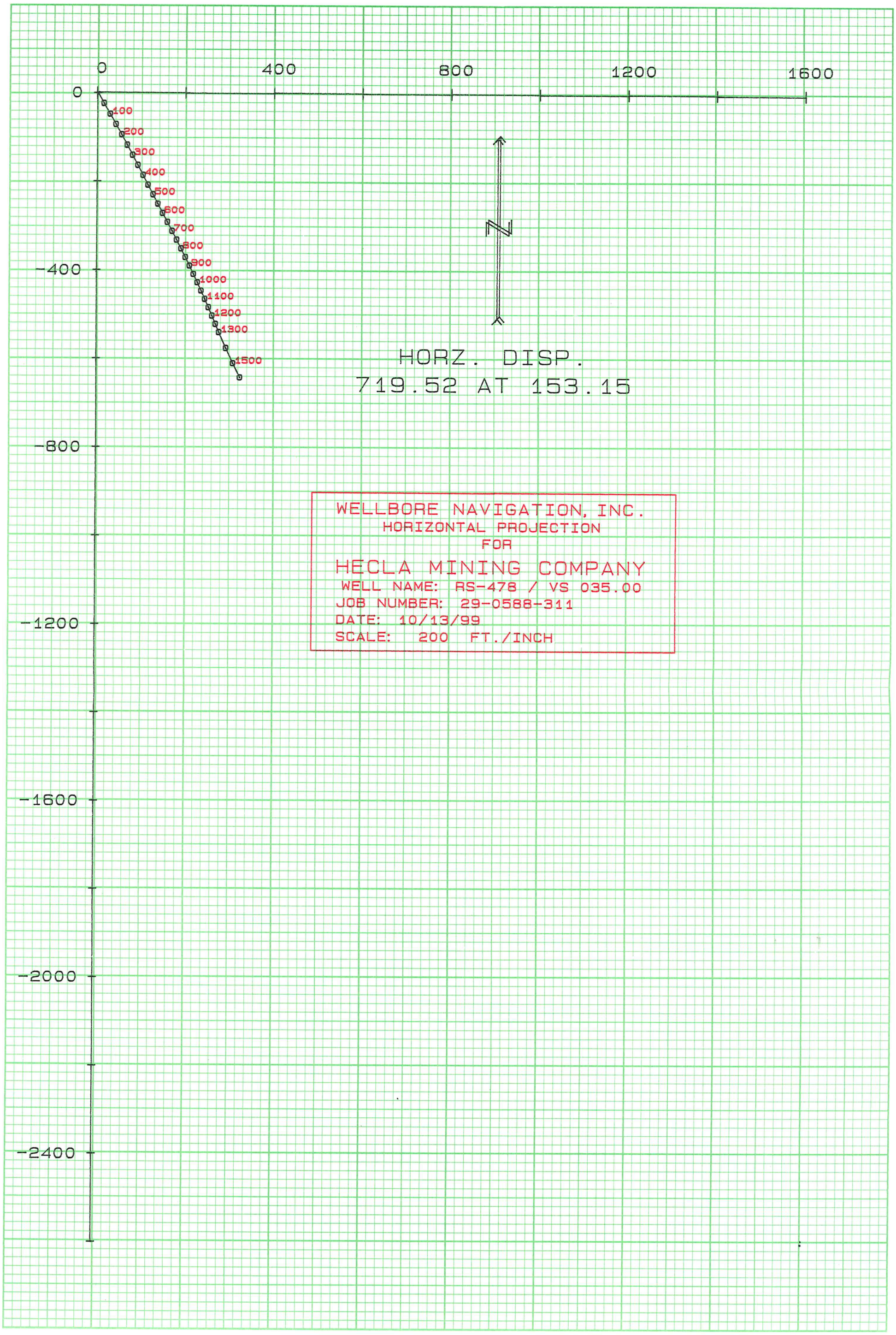
STARLIGHT PRINTING (801) 467-2841



STARLIGHT PRINTING (801) 467-2841



GREG

WELLBORE NAVIGATION, INC.
WINNEMUCCA, NEVADA

GYROSCOPIC DIRECTIONAL SURVEY
BY MINIMUM CURVATURE

FOR

****
* **HECLA MINING COMPANY** *
****

JOB NUMBER: 29-0588-311

WELL NAME: RS-478 / VS 035.00

LOCATION: ROSEBUD MINE

SURVEY DATE: 10/13/99

SURVEY ENGINEER: VERN REID

GYRO REFERENCE BEARING: TRUE NORTH

TIE-ON COORDINATES AT: 0 M.D.
TAKEN FROM: COLLAR

VERTICAL SECTION CALCULATED IN A
PROPOSAL DIRECTION OF: 125.00
WATER CONTACT= 1198'

WELNAV

********** DEPTH MEASURED IN FEET **********

COMMENTS: ***** EKLUND *****
** GREG SECRIST **

PROJECTED F/1560' T/1600'.

*** THIS DIRECTIONAL SURVEY REPORT IS ****
** CORRECT TO THE BEST OF MY KNOWLEDGE ***
* AND IS SUPPORTED BY ACTUAL FIELD DATA! *

****
COMPANY REPRESENTATIVE
****

WELLBORE NAVIGATION, INC.
WINNEMUCCA, NEVADA

JOB NUMBER: 29-0588-311 WELL NAME: RS-478 / VS 035.00

INRUN SURVEY
BY MINIMUM CURVATURE

MEAS. DEPTH	VERT. DEPTH	VERT. SECT.	L/R PROP.	INCL HORZ	BEARING AZIMUTH	COORDINATES LATITUDE	COORDINATES DEPARTURE	D-LEG /100	D-LEG /CL	STATION DISP.	DISPLACEMENT DIRECTION
0.0	0.00	0.00	0.000	-55.93	150.68	0.00 N	0.00 E	0.00		0.00	AT 000.00
50.0	41.47	25.29	11.868	-56.14	149.60	24.23 S	13.91 E	1.28	0.64	27.93	AT 150.14
100.0	83.14	50.37	23.452	-56.77	149.98	48.10 S	27.81 E	1.33	0.66	55.56	AT 149.97
150.0	125.14	74.93	34.992	-57.49	150.36	71.64 S	41.31 E	1.50	0.75	82.70	AT 150.03
200.0	167.46	98.94	46.518	-58.15	150.94	94.85 S	54.36 E	1.46	0.73	109.33	AT 150.18
250.0	210.04	122.44	58.110	-58.63	151.57	117.83 S	66.97 E	1.17	0.58	135.53	AT 150.39
300.0	252.80	145.61	69.705	-58.95	151.60	140.62 S	79.29 E	0.64	0.32	161.43	AT 150.58
350.0	295.76	168.46	81.199	-59.50	151.80	163.14 S	91.42 E	1.12	0.56	187.01	AT 150.73
400.0	338.98	190.88	92.579	-60.13	152.03	185.32 S	103.26 E	1.28	0.64	212.15	AT 150.87
450.0	382.44	212.85	103.931	-60.59	152.63	207.22 S	114.74 E	1.09	0.55	236.87	AT 151.03
500.0	426.12	234.47	115.097	-61.16	151.99	228.77 S	126.05 E	1.30	0.65	261.20	AT 151.15
550.0	470.03	255.76	125.969	-61.72	152.12	249.88 S	137.25 E	1.13	0.56	285.10	AT 151.22
600.0	514.17	276.68	136.668	-62.22	152.05	270.65 S	148.25 E	1.00	0.50	308.59	AT 151.29
650.0	558.49	297.32	147.117	-62.66	151.65	291.05 S	159.17 E	0.95	0.48	331.72	AT 151.33
700.0	603.02	317.62	157.382	-63.22	152.01	311.10 S	169.90 E	1.17	0.58	354.47	AT 151.36
750.0	647.73	337.56	167.534	-63.61	151.95	330.85 S	180.42 E	0.78	0.39	376.84	AT 151.40
800.0	692.56	357.16	177.828	-63.81	153.46	350.53 S	190.57 E	1.40	0.70	398.98	AT 151.47
850.0	737.47	376.48	188.313	-64.04	153.53	370.20 S	200.38 E	0.46	0.23	420.95	AT 151.57
900.0	782.59	395.39	198.630	-64.91	153.69	389.50 S	209.96 E	1.75	0.87	442.48	AT 151.67
950.0	827.95	413.78	208.876	-65.30	154.58	408.43 S	219.14 E	1.08	0.54	463.51	AT 151.78
1000.0	873.40	431.87	219.210	-65.45	154.90	427.28 S	228.03 E	0.40	0.20	484.32	AT 151.91
1050.0	918.87	449.80	229.713	-65.42	155.80	446.17 S	236.70 E	0.75	0.38	505.07	AT 152.05
1100.0	964.32	467.70	240.411	-65.30	155.95	465.19 S	245.22 E	0.27	0.14	525.87	AT 152.20
1150.0	1009.85	485.35	251.146	-65.87	156.65	484.11 S	253.53 E	1.28	0.64	546.48	AT 152.36
1200.0	1055.52	502.66	261.849	-66.10	156.82	502.81 S	261.57 E	0.48	0.24	566.77	AT 152.52
1250.0	1101.26	519.78	272.572	-66.24	157.30	521.41 S	269.44 E	0.48	0.24	586.91	AT 152.67
1300.0	1147.04	536.82	283.221	-66.37	156.71	539.91 S	277.29 E	0.54	0.27	606.95	AT 152.82
1350.0	1192.96	553.74	293.492	-66.98	155.78	558.03 S	285.26 E	1.43	0.71	626.71	AT 152.92
1400.0	1239.00	570.54	303.400	-67.12	155.31	575.78 S	293.33 E	0.46	0.23	646.19	AT 153.00
1450.0	1285.12	587.24	313.074	-67.46	154.84	593.28 S	301.47 E	0.77	0.39	665.48	AT 153.06
1500.0	1331.52	603.41	322.347	-68.75	154.81	610.16 S	309.40 E	2.58	1.29	684.12	AT 153.11
1550.0	1378.22	618.98	331.098	-69.39	153.85	626.25 S	317.13 E	1.45	0.73	701.97	AT 153.14
1600.0	1425.03	634.39	339.500	-69.51	153.35	641.98 S	324.94 E	0.43	0.21	719.52	AT 153.15

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*************************************************************
*                        ********                           *
*      THE HORIZONTAL DISPLACEMENT AT THE DEPTH OF          *
*                        ********                           *
*  1600.0 FEET EQUALS   719.52   FEET AT  153.15            *
*                        ********                           *
*************************************************************
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WELLBORE NAVIGATION, INC.
ELKO, NV.

GYROSCOPIC DIRECTIONAL SURVEY
BY MINIMUM CURVATURE

FOR

****
* HECCLA *
****

JOB NUMBER: 29-0588-311

WELL NAME: RS-478

LOCATION: ROSEBUD

SURVEY DATE: OCTOBER 10,1999

SURVEY ENGINEER: THORSEN

GYRO REFERENCE BEARING: TRUE NORTH

TIE-ON COORDINATES AT: 0 M.D.
TAKEN FROM: COLLAR
WATER CONTACT= 413

********** DEPTH MEASURED IN FEET *******
****

COMMENTS: DRILLER EKLUND
GRB 344

****
****
*** THIS DIRECTIONAL SURVEY REPORT IS ****
** CORRECT TO THE BEST OF MY KNOWLEDGE ***
* AND IS SUPPORTED BY ACTUAL FIELD DATA! *
**
**
** **********
** COMPANY REPRESENTATIVE **
****
****

WELLBORE NAVIGATION, INC.
ELKO, NV.

JOB NUMBER: 29-0588-311

WELL NAME: RS-478

INRUN SURVEY
BY MINIMUM CURVATURE

MEAS. DEPTH	VERT. DEPTH	VERT. SECT.	L/R CLOS.	INCL HORZ	BEARING AZIMUTH	COORDINATES LATITUDE	COORDINATES DEPARTURE	D-LEG /100	D-LEG /CL	STATION DISP.	DISPLACEMENT DIRECTION	TEMP. DEG F
0.0	0.00	0.00	0.000	-54.94	150.43	0.00 N	0.00 E	0.00		0.00	AT 000.00	
50.0	41.23	28.28	-0.671	-56.14	149.60	24.51 S	14.14 E	2.58	1.29	28.29	AT 150.02	077.59
100.0	82.90	55.90	-1.438	-56.77	149.98	48.38 S	28.04 E	1.33	0.66	55.92	AT 149.91	075.99
150.0	124.89	83.03	-2.012	-57.49	150.36	71.92 S	41.54 E	1.50	0.75	83.06	AT 149.99	074.98
200.0	167.21	109.66	-2.353	-58.15	150.94	95.13 S	54.59 E	1.46	0.73	109.68	AT 150.15	074.10
250.0	209.79	135.86	-2.411	-58.63	151.57	118.11 S	67.19 E	1.17	0.58	135.89	AT 150.36	073.56
300.0	252.56	161.77	-2.318	-58.95	151.60	140.90 S	79.52 E	0.64	0.32	161.79	AT 150.56	073.17
350.0	295.52	187.36	-2.176	-59.50	151.80	163.42 S	91.65 E	1.12	0.56	187.37	AT 150.71	072.59
400.0	338.74	212.49	-1.941	-60.13	152.03	185.60 S	103.49 E	1.28	0.64	212.50	AT 150.86	072.24
450.0	382.19	237.22	-1.532	-60.59	152.63	207.50 S	114.97 E	1.09	0.55	237.22	AT 151.01	063.95
500.0	425.87	261.55	-1.136	-61.16	151.99	229.05 S	126.28 E	1.30	0.65	261.55	AT 151.13	063.51
550.0	469.79	285.45	-0.855	-61.72	152.12	250.17 S	137.48 E	1.13	0.56	285.45	AT 151.21	063.68
600.0	513.92	308.95	-0.565	-62.22	152.05	270.93 S	148.48 E	1.00	0.50	308.95	AT 151.28	063.97
650.0	558.25	332.08	-0.375	-62.66	151.65	291.33 S	159.40 E	0.95	0.48	332.08	AT 151.32	064.46
700.0	602.78	354.83	-0.197	-63.22	152.01	311.38 S	170.13 E	1.17	0.58	354.83	AT 151.35	064.63
740.0	638.51	372.80	0.026	-63.36	152.17	327.26 S	178.55 E	0.39	0.16	372.80	AT 151.38	064.83

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*************************************************************
*                         ********                          *
*      THE HORIZONTAL DISPLACEMENT AT THE DEPTH OF          *
*                         ********                          *
*   740.0 FEET EQUALS    372.80    FEET AT   151.38         *
*                         ********                          *
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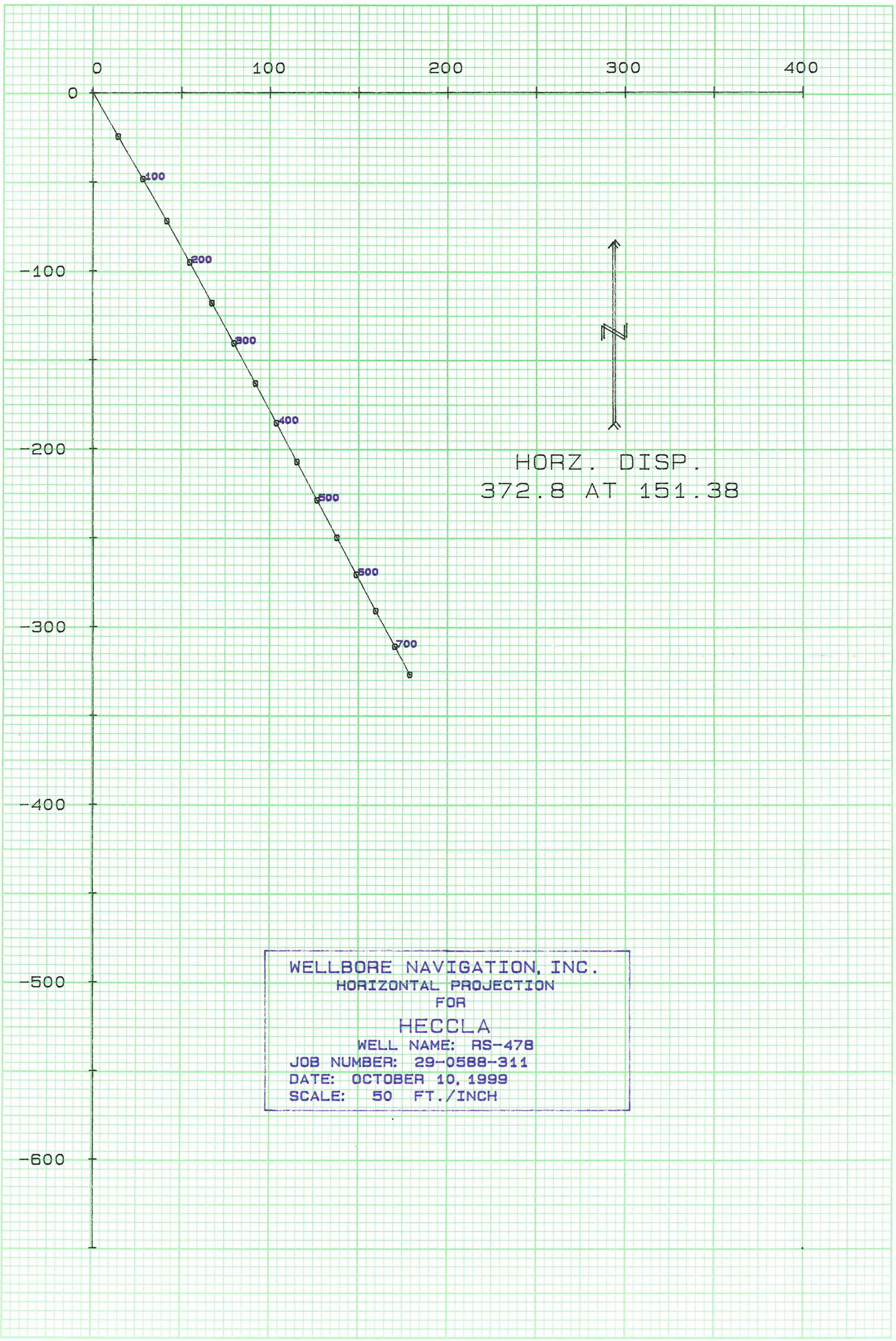
STARLIGHT PRINTING (801) 467-2841



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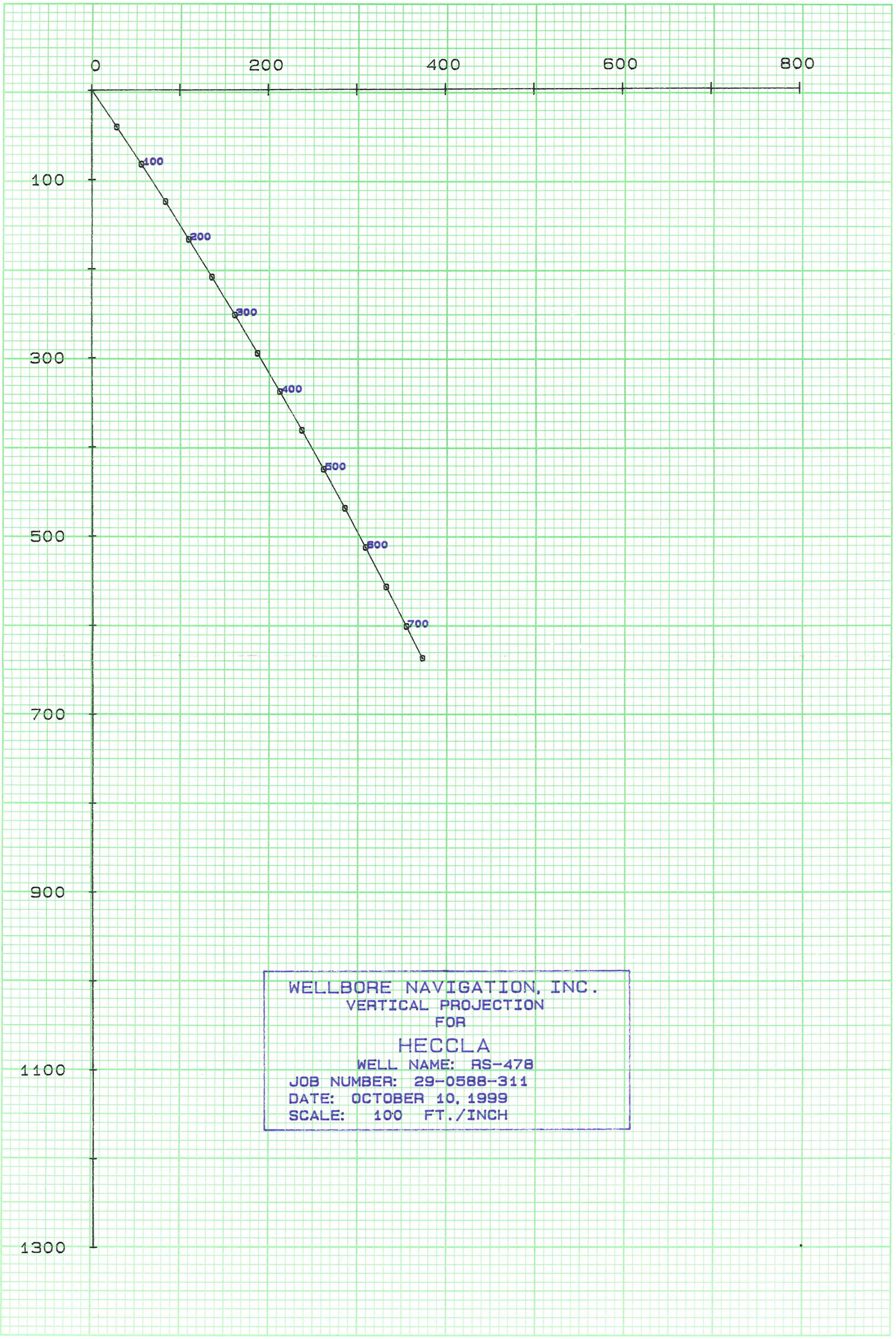

WELLBORE NAVIGATION, INC.
WINNEMUCCA, NEVADA

GYROSCOPIC DIRECTIONAL SURVEY
BY MINIMUM CURVATURE

FOR

****
* **HECLA MINING COMPANY** *
****

JOB NUMBER: 28-0588-311

WELL NAME: RS-478 / VS 035.00

LOCATION: ROSEBUD MINE

SURVEY DATE: 10/29/99

SURVEY ENGINEER: VERN REID

GYRO REFERENCE BEARING: TRUE NORTH

TIE-ON COORDINATES AT: 0 M.D.
TAKEN FROM: COLLAR

VERTICAL SECTION CALCULATED IN A
PROPOSAL DIRECTION OF: 125.00

****
****** DEPTH MEASURED IN FEET *******
****

COMMENTS: ** BOART LONGYEAR **
*** MARTIN NIEMI ***
BTTM HOLE TEMP=112.93~.

****
****
*** THIS DIRECTIONAL SURVEY REPORT IS ****
** CORRECT TO THE BEST OF MY KNOWLEDGE ***
* AND IS SUPPORTED BY ACTUAL FIELD DATA! *
**
**
** **********
** COMPANY REPRESENTATIVE **
****
****

WELLBORE NAVIGATION, INC.
WINNEMUCCA, NEVADA

JOB NUMBER: 28-0588-311 WELL NAME: RS-478 / VS 035.00

INRUN SURVEY
BY MINIMUM CURVATURE

MEAS. DEPTH	VERT. DEPTH	VERT. SECT.	L/R PROP.	INCL HORZ	BEARING AZIMUTH	COORDINATES LATITUDE	COORDINATES DEPARTURE	D-LEG /100	D-LEG /CL	STATION DISP.	DISPLACEMENT DIRECTION
0.0	0.00	0.00	0.000	-55.93	150.68	0.00 N	0.00 E	0.00		0.00	AT 000.00
50.0	41.47	25.29	11.868	-56.14	149.60	24.23 S	13.91 E	1.28	0.64	27.93	AT 150.14
100.0	83.14	50.37	23.452	-56.77	149.98	48.10 S	27.81 E	1.33	0.66	55.56	AT 149.97
150.0	125.14	74.93	34.992	-57.49	150.36	71.64 S	41.31 E	1.50	0.75	82.70	AT 150.03
200.0	167.46	98.94	46.518	-58.15	150.94	94.85 S	54.36 E	1.46	0.73	109.33	AT 150.18
250.0	210.04	122.44	58.110	-58.63	151.57	117.83 S	66.97 E	1.17	0.58	135.53	AT 150.39
300.0	252.80	145.61	69.705	-58.95	151.60	140.62 S	79.29 E	0.64	0.32	161.43	AT 150.58
350.0	295.76	168.46	81.199	-59.50	151.80	163.14 S	91.42 E	1.12	0.56	187.01	AT 150.73
400.0	338.98	190.88	92.579	-60.13	152.03	185.32 S	103.26 E	1.28	0.64	212.15	AT 150.87
450.0	382.44	212.85	103.931	-60.59	152.63	207.22 S	114.74 E	1.09	0.55	236.87	AT 151.03
500.0	426.12	234.47	115.097	-61.16	151.99	228.77 S	126.05 E	1.30	0.65	261.20	AT 151.15
550.0	470.03	255.76	125.969	-61.72	152.12	249.88 S	137.25 E	1.13	0.56	285.10	AT 151.22
600.0	514.17	276.68	136.668	-62.22	152.05	270.65 S	148.25 E	1.00	0.50	308.59	AT 151.29
650.0	558.49	297.32	147.117	-62.66	151.65	291.05 S	159.17 E	0.95	0.48	331.72	AT 151.33
700.0	603.02	317.62	157.382	-63.22	152.01	311.10 S	169.90 E	1.17	0.58	354.47	AT 151.36
750.0	647.73	337.56	167.534	-63.61	151.95	330.85 S	180.42 E	0.78	0.39	376.84	AT 151.40
800.0	692.56	357.16	177.828	-63.81	153.46	350.53 S	190.57 E	1.40	0.70	398.98	AT 151.47
850.0	737.47	376.48	188.313	-64.04	153.53	370.20 S	200.38 E	0.46	0.23	420.95	AT 151.57
900.0	782.59	395.39	198.630	-64.91	153.69	389.50 S	209.96 E	1.75	0.87	442.48	AT 151.67
950.0	827.95	413.78	208.876	-65.30	154.58	408.43 S	219.14 E	1.08	0.54	463.51	AT 151.78
1000.0	873.40	431.87	219.210	-65.45	154.90	427.28 S	228.03 E	0.40	0.20	484.32	AT 151.91
1050.0	918.87	449.80	229.713	-65.42	155.80	446.17 S	236.70 E	0.75	0.38	505.07	AT 152.05
1100.0	964.32	467.70	240.411	-65.30	155.95	465.19 S	245.22 E	0.27	0.14	525.87	AT 152.20
1150.0	1009.85	485.35	251.146	-65.87	156.65	484.11 S	253.53 E	1.28	0.64	546.48	AT 152.36
1200.0	1055.52	502.66	261.849	-66.10	156.82	502.81 S	261.57 E	0.48	0.24	566.77	AT 152.52
1250.0	1101.26	519.78	272.572	-66.24	157.30	521.41 S	269.44 E	0.48	0.24	586.91	AT 152.67
1300.0	1147.04	536.82	283.221	-66.37	156.71	539.91 S	277.29 E	0.54	0.27	606.95	AT 152.82
1350.0	1192.96	553.74	293.492	-66.98	155.78	558.03 S	285.26 E	1.43	0.71	626.71	AT 152.92
1400.0	1239.00	570.54	303.400	-67.12	155.31	575.78 S	293.33 E	0.46	0.23	646.19	AT 153.00
1450.0	1285.12	587.24	313.074	-67.46	154.84	593.28 S	301.47 E	0.77	0.39	665.48	AT 153.06
1500.0	1331.52	603.41	322.347	-68.75	154.81	610.16 S	309.40 E	2.58	1.29	684.12	AT 153.11
1550.0	1378.22	618.98	331.098	-69.39	153.85	626.25 S	317.13 E	1.45	0.73	701.97	AT 153.14
1600.0	1425.14	634.11	339.401	-70.24	153.68	641.73 S	324.76 E	1.70	0.85	719.23	AT 153.16
1650.0	1472.23	648.85	347.485	-70.47	153.81	656.81 S	332.19 E	0.47	0.23	736.03	AT 153.17
1700.0	1519.35	663.53	355.509	-70.43	153.51	671.80 S	339.62 E	0.22	0.11	752.77	AT 153.18
1750.0	1566.50	678.19	363.408	-70.65	153.10	686.68 S	347.10 E	0.52	0.26	769.42	AT 153.18
1800.0	1613.67	692.82	371.186	-70.66	152.92	701.44 S	354.62 E	0.12	0.06	785.99	AT 153.18

WELLBORE NAVIGATION, INC.
WINNEMUCCA, NEVADA

JOB NUMBER: 28-0588-311 WELL NAME: RS-478 / VS 035.00

INRUN SURVEY
BY MINIMUM CURVATURE

MEAS. DEPTH	VERT. DEPTH	VERT. SECT.	L/R PROP.	INCL HORZ	BEARING AZIMUTH	COORDINATES LATITUDE	COORDINATES DEPARTURE	D-LEG /100	D-LEG /CL	STATION DISP.	DISPLACEMENT DIRECTION
1850.0	1660.83	707.60	378.782	-70.50	151.47	716.14 S	362.37 E	1.02	0.51	802.61	AT 153.16
1900.0	1707.99	722.50	386.097	-70.73	150.83	730.68 S	370.38 E	0.63	0.31	819.19	AT 153.12
1950.0	1755.23	737.30	393.151	-70.99	150.14	744.95 S	378.46 E	0.69	0.34	835.57	AT 153.07
2000.0	1802.63	751.69	399.945	-71.89	150.41	758.77 S	386.35 E	1.81	0.90	851.46	AT 153.02
2050.0	1850.27	765.39	406.469	-72.78	150.52	771.97 S	393.83 E	1.78	0.89	866.62	AT 152.97
2100.0	1898.08	778.60	412.724	-73.21	150.13	784.67 S	401.07 E	0.89	0.44	881.23	AT 152.93
2150.0	1946.03	791.47	418.686	-73.83	149.57	796.94 S	408.19 E	1.28	0.64	895.39	AT 152.88
2200.0	1994.11	803.94	424.386	-74.34	149.56	808.76 S	415.13 E	1.02	0.51	909.08	AT 152.83
2250.0	2042.32	816.00	429.923	-74.89	149.79	820.21 S	421.83 E	1.11	0.55	922.33	AT 152.78
2300.0	2090.64	827.71	435.203	-75.33	148.73	831.25 S	428.40 E	1.03	0.52	935.15	AT 152.74
2350.0	2139.04	839.25	440.122	-75.61	147.43	841.90 S	435.03 E	0.86	0.43	947.65	AT 152.67
2396.0	2183.63	849.70	444.459	-75.92	147.67	851.45 S	441.10 E	0.69	0.32	958.92	AT 152.61

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*                         ********                          *
*      THE HORIZONTAL DISPLACEMENT AT THE DEPTH OF          *
*                         ********                          *
*  2396.0 FEET EQUALS   958.92   FEET AT   152.61           *
*                         ********                          *
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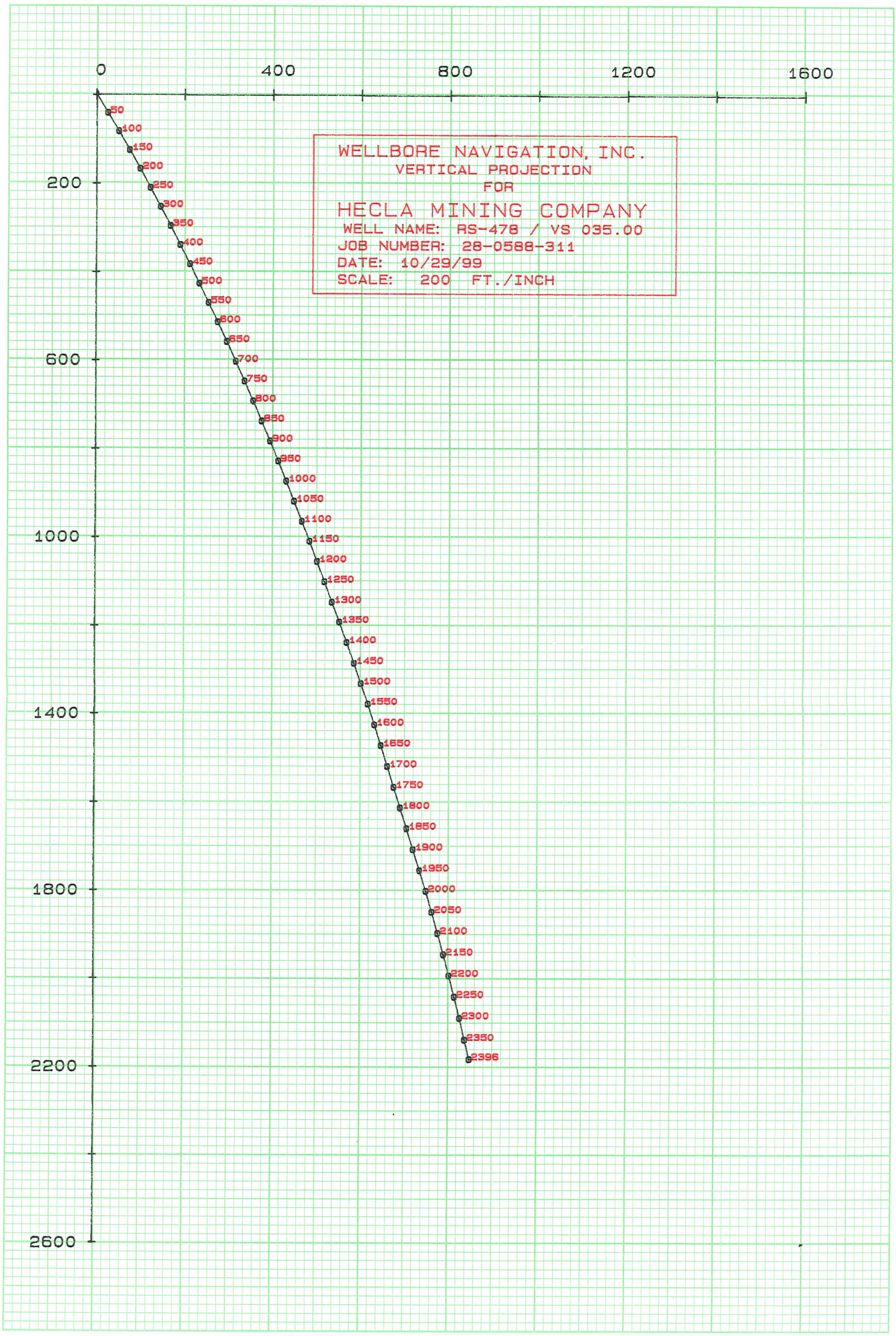

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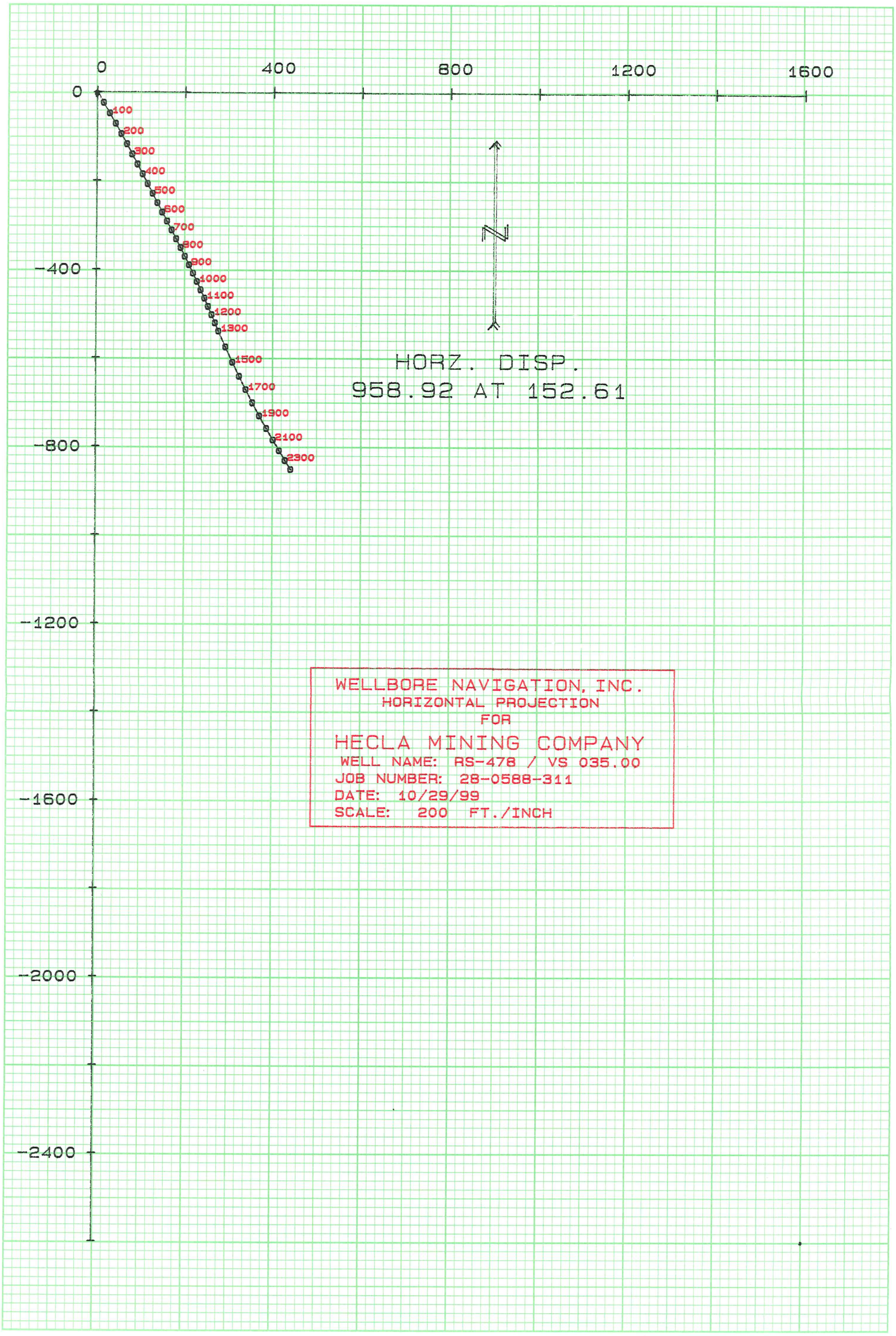

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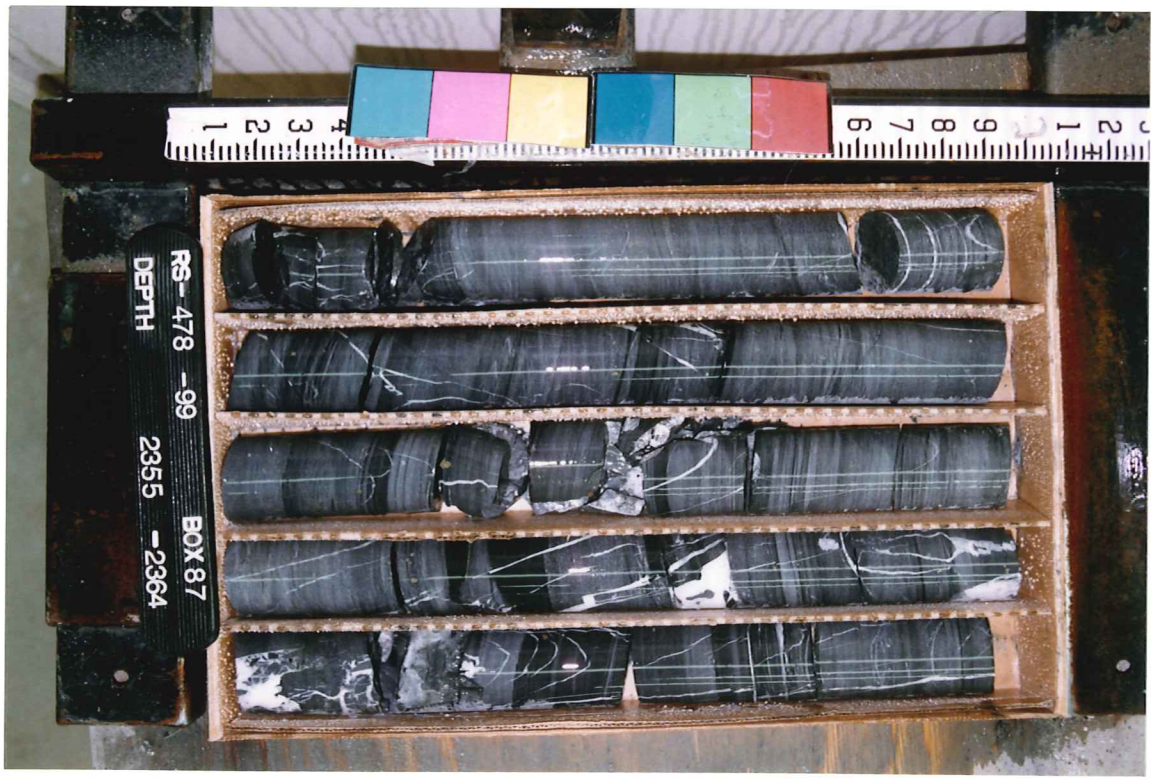
DEPTH 2317_5 -2327

RS- 478 -99 BOX 82
DEPTH 2309 -2317_5

RS- 478 -99 BOX 84
DEPTH 2327 -2336

2345.5
RS- 478 -99 BOX 86
DEPTH 2345 -2355

2344
RS- 478 -99 BOX 85
DEPTH 2336 -2345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DEPTH 2355 -2364

RS- 478 -99 BOX 89
DEPTH 2373_5-2382

RS- 478 -99 BOX 88
DEPTH 2364 -2373_5

RS- 478 -99 BOX 90
DEPTH 2382 -2391

NO. 79738 HQ DIV.
2396.5
RS- 478 -99
BOX 91
DEPTH
2391 -2396.5