60001861

Mining District File Summary Sheet

DISTRICT	Rosebud
DIST_NO	4010
COUNTY If different from written on document	Pershing
TITLE If not obvious	Rosebud Resource Estimate 1995 - Mine Development Associates Miscellaneous Correspondence
AUTHOR	Muerhoff, K; Ristorcelli, S; Sims R; Ernest D; Oppenheimer B; Johnson G; Clayton R; Allen K; Cameron D; Holmes B; Prenn N; Graeme R.
DATE OF DOC(S)	1995
MULTI_DIST Y / N? Additional Dist_Nos:	
QUAD_NAME	Sulphur 7½'
P_M_C_NAME (mine, claim & company names)	Rosebud Mine; Mine Development Associates; Hecla Mining Co; Rosebud Project; South Zone
COMMODITY If not obvious	gold; silver
NOTES	correspondence; handwritten notes; statistics; resource; assays 22p.

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

SS: DP 8/1/08
Initials Date

DB:
Initials Date

SCANNED:
Initials Date

Revised: 1/22/08

MINE DEVELOPMENT ASSOCIATES
MISC. CORRESPONDENCE

60001861 4010

Resource Model Meeting 6000 1861 4010

July 13, 1995

<u>Objective</u>: Provide a reserve number to Hecla management in order to complete the project feasibility study. The reserve figures used will be supported by Hecla corporate geology dept., The Winters Company, and project management.

Address: geology
ore controls
grade domain boundaries } verify & account for zone & blocks.
original modelling parameters - variography
grade populations / distribution

Model Checks / Sensitivity Studies
+ indicator variography
+ Comparison of DAT608's
- declustered data
- nearest neighbor estimate
+ blocks modelled with one composite
+ Winters 619 50% window (SR also ran 10% & 25% window)
- SR's 619 runs

In-attendance: S. Ristorelli (MDA)
R. Sims
D. Earnest } (TWC)
B. Oppenheimer
G. Johnson
R. Clayton
K. Allen
D. Cameron
C.M.
B. Holmes

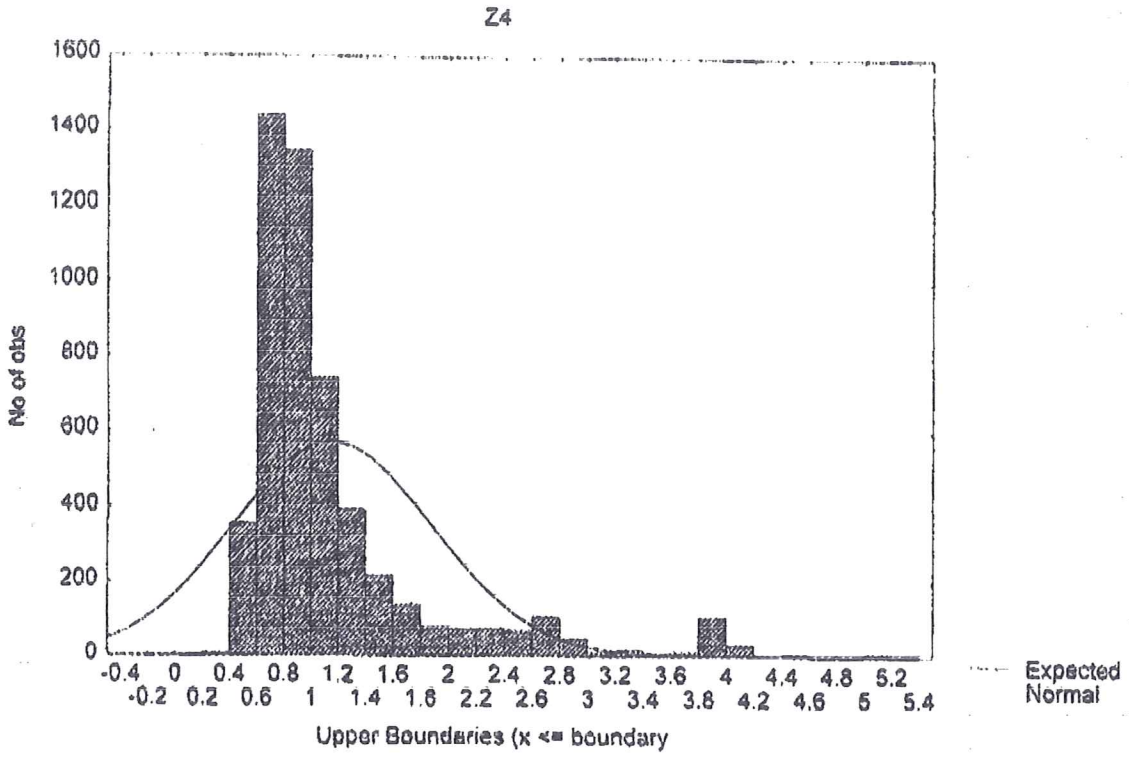
Recommendations

- Run indicator variograms individually on:
  - Chimney
  - leopard-skin tuff
- Run stats on R. Sims' zone 4 619 blocks (4%)
- Check & validate stratabound zone 4 with only one or two drill holes
- distance of 70' or less for zone 4 on new run.

Δ to Block Model

1. Re-orient model to N30°E
   - don't forget to rotate the downhole surveys
   - plot plan map w/ section lines & drift
   - show new & old coordinates
2. Re-run 608D (original) parameters
   - Δ domain 4 search back to 90'.
3. Plot a) 10' composites w/ drill hole traces & domain shapes.
   b) blocks w/ grade & domain designations
   (color code blocks to composites)

Check: distribution of high-grade blocks relative to high-grade composites
" " low-grade " " " low-grade "



Effects of cutting the block model grades to varying cutoffs

Cut to	Tons	% Above	Cut to	Ounces	%Diff
1.000	96565.2	41.3	1.000	96565	-72617
Cut to 2.000	25892.2	11.1	2.000	51784	-25607
Cut to 3.000	9589.1	4.1	3.000	28767	-8534

MINE DEVELOPMENT ASSOCIATES
MINE ENGINEERING SERVICES
SURPAC MINING SYSTEMS

DATE: August 29, 1995
TO: Charlie Muerhoff
FAX: 702-427-7781
FROM: Steven Ristorcelli

THIS TRANSMISSION CONSISTS OF __3__ PAGES INCLUDING THIS COVER PAGE.
IF ALL PAGES ARE NOT RECEIVED, PHONE (702) 856-5700.
FAX NUMBER: (702) 856-6053

Charlie,

Here is the latest run you requested. It is labeled *.W04 for the Winters run on zone 4. As you can see, it is still quite low in total ounces. This run effectively mimmicked the "N" version with the conservative indicator ranges. I suggest that most of the decrease in ounces came from the restriction of grade projections of the 2+ oz Au/ton to 20 ft from 45 ft. Please do not hesitate to call and discuss this. I will probably be working at home tommorrow (265-4248), and would not mind if you called there.

				08-29-95 11:37:11	
** AU4 STATISTICS FROM 3-D MODEL FILE ROSE15.DAT **					
	Statistical Analysis of MODEL			grades based on AU4	
	CUTOFF	SAMPLES	PERCENT	MEAN	OUNCES
	AU4	ABOVE	ABOVE	ABOVE	
	0.000	223561.6	100.0	0.931	208,136
	0.010	223561.6	100.0	0.931	208,136
	0.020	223561.6	100.0	0.931	208,136
	0.030	223561.6	100.0	0.931	208,136
	0.040	223561.6	100.0	0.931	208,136
	0.050	223561.6	100.0	0.931	208,136
	0.060	223561.6	100.0	0.931	208,136
	0.070	223561.6	100.0	0.931	208,136
	0.080	223561.6	100.0	0.931	208,136
	0.090	223561.6	100.0	0.931	208,136
	0.100	223561.6	100.0	0.931	208,136
	0.110	223561.6	100.0	0.931	208,136
	0.120	223561.6	100.0	0.931	208,136

	0.130	223561.6	100.0	0.931	208,136
	0.140	223561.6	100.0	0.931	208,136
	0.150	223561.6	100.0	0.931	208,136
	0.160	223561.6	100.0	0.931	208,136
	0.170	223561.6	100.0	0.931	208,136
	0.180	223561.6	100.0	0.931	208,136
	0.190	223561.6	100.0	0.931	208,136
	0.200	223561.6	100.0	0.931	208,136
	0.210	223561.6	100.0	0.931	208,136
	0.220	223561.6	100.0	0.931	208,136
	0.230	223561.6	100.0	0.931	208,136
	0.240	223487.0	100.0	0.931	208,066
	0.250	223412.4	99.9	0.931	207,997
	0.260	223263.2	99.9	0.932	208,081
	0.270	222899.2	99.7	0.933	207,965
	0.280	222824.5	99.7	0.933	207,895
	0.290	222824.5	99.7	0.933	207,895
	0.300	222824.5	99.7	0.933	207,895
	0.310	222824.5	99.7	0.933	207,895
	0.320	222824.5	99.7	0.933	207,895
	0.330	222675.3	99.6	0.934	207,979
	0.340	222453.8	99.5	0.934	207,772
	0.350	222319.5	99.4	0.934	207,646
	0.360	222095.7	99.3	0.935	207,659
	0.370	222021.1	99.3	0.935	207,590
	0.380	221946.5	99.3	0.935	207,520
	0.390	221871.9	99.2	0.936	207,672
	0.400	221801.0	99.2	0.936	207,606
	0.410	221454.1	99.1	0.937	207,502
	0.420	221379.5	99.0	0.937	207,433
	0.430	220974.5	98.8	0.938	207,274
	0.440	220785.7	98.8	0.938	207,097
	0.450	220524.6	98.6	0.939	207,073
	0.460	213157.9	95.3	0.955	203,566
	0.470	211560.7	94.6	0.959	202,887
	0.480	211145.2	94.4	0.960	202,699
	0.490	206846.7	92.5	0.970	200,641
	0.500	204283.5	91.4	0.976	199,381
	0.510	203809.0	91.2	0.977	199,121
	0.520	196624.3	88.0	0.994	195,445
	0.530	193804.4	86.7	1.001	193,998
	0.540	192769.7	86.2	1.003	193,348
	0.550	191652.2	85.7	1.006	192,802
	0.560	190873.3	85.4	1.008	192,400
	0.570	188401.1	84.3	1.013	190,850
	0.580	186278.7	83.3	1.018	189,632

	0.590	183531.2	82.1	1.025	188,119
	0.600	181000.8	81.0	1.031	186,612
	0.610	176802.3	79.1	1.041	184,051
	0.620	171666.1	76.8	1.054	180,936
	0.630	167547.4	74.9	1.064	178,270
	0.640	161187.0	72.1	1.081	174,243
	0.650	158441.7	70.9	1.089	172,543
	0.660	152846.0	68.4	1.105	168,895
	0.670	149909.0	67.1	1.113	166,849
	0.680	146624.3	65.6	1.123	164,659
	0.690	141893.2	63.5	1.138	161,474
	0.700	139007.7	62.2	1.147	159,442
	0.710	137044.2	61.3	1.153	158,012
	0.720	135376.1	60.6	1.159	156,901
	0.730	132361.6	59.2	1.169	154,731
	0.740	131150.8	58.7	1.173	153,840
	0.750	129300.7	57.8	1.179	152,446
	0.760	124965.7	55.9	1.194	149,209
	0.770	114791.8	51.3	1.232	141,423
	0.780	112549.3	50.3	1.241	139,674
	0.790	111247.5	49.8	1.246	138,614
	0.800	107843.5	48.2	1.260	135,883
	0.810	103624.2	46.4	1.279	132,535
	0.820	100317.9	44.9	1.294	129,811
	0.830	98631.2	44.1	1.302	128,418
	0.840	97087.7	43.4	1.310	127,185
	0.850	95210.0	42.6	1.319	125,582
	0.860	93138.4	41.7	1.329	123,781
	0.870	89546.4	40.1	1.348	120,709
	0.880	86789.9	38.8	1.363	118,295
	0.890	83338.2	37.3	1.383	115,257
	0.900	77914.0	34.9	1.417	110,404
	0.910	73966.9	33.1	1.444	106,808
	0.920	72328.0	32.4	1.456	105,310
	0.930	70504.0	31.5	1.470	103,641
	0.940	67770.6	30.3	1.491	101,046
	0.950	66215.2	29.6	1.504	99,588
	0.960	64066.8	28.7	1.523	97,574
	0.970	62120.4	27.8	1.540	95,665
	0.980	60503.9	27.1	1.555	94,084
	0.990	56723.9	25.4	1.593	90,361
	Max data	7.276			

FMT1 = (1X,10A1,3F10.2,2F10.3,F10.1)
FMT2 = (1X,10A1,3F10.2,F9.2,F11.3)

COM ASSAY ITEM ORDER WITHIN INPUT DATA
INP11 = FROM -TO- -AI- T-CU MOLY

I-O = 1 / LIST A LINE OF INFO FOR EACH DH INPUT
END

SAMPLE DRILLHOLE DATA FILE—DAT201.IA

SM-021	12250.00	12250.00	4294.10	90.000	-73.000	1720.0	Collar Data
SM-021	500.00	1000.00	500.00	92.000	-76.000		
SM-021	1000.00	1500.00	500.00	88.000	-79.000		Survey Data
SM-021	1500.00	1720.00	220.00	89.000	-75.000		
SM-021							
SM-021	0.00	20.00	20.00	0.00	0.000		
SM-021	20.00	40.00	20.00	0.00	0.000		
SM-021	40.00	60.00	20.00	0.00	0.000		Assay Data
SM-021	60.00	80.00	20.00	0.00	0.000		
SM-021	80.00	100.00	20.00	0.98	0.049		
SM-021	100.00	120.00	20.00	1.00	0.050		
SM-021	120.00	140.00	20.00	0.99	0.049		

Collar Data is: East North Elev Azimuth Dip DH Length

Survey Data is: From To Length Azimuth Dip

Assay Data is: From -To- -AI- T-CU Moly

Charlie,
Here is the MEDS format

Stew

MINE DEVELOPMENT ASSOCIATES

MINE ENGINEERING SERVICES
SURPAC MINING SYSTEMS

DATE: 11/15/95

TO: Charlie

FAX NUMBER: 702-427-7781

FROM: STEVE

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FAX NUMBER: (702) 856-6053

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SR

702-856-5700

230 South Rock
Suite 29
Reno, Nevada 89502
FAX: 702-856-6053

Rosebud Resources by Category and Area

	TOTALS											
	MEASURED			INDICATED			INFERRED			T MEAS+IND		
CUTOFF	T TONS	GRADE	OZ	T TONS	GRADE	OZ	T TONS	GRADE	OZ	T TONS	GRADE	OZ
0.00	11,810,193	0.062	732,151	1,926,510	0.072	139,570	814,141	0.063	51,665	13,736,703	0.063	871721
0.01	11,711,848	0.062	730,021	1,925,866	0.072	139,581	807,361	0.064	51,481	13,637,714	0.064	869602
0.02	7,356,729	0.090	665,009	1,572,784	0.087	136,980	507,139	0.090	45,548	8,929,513	0.090	801989
0.03	3,549,302	0.162	573,590	885,952	0.144	127,529	244,673	0.158	38,678	4,435,254	0.158	701119
0.04	2,163,268	0.244	528,276	614,352	0.197	120,926	149,126	0.234	34,855	2,777,620	0.234	649202
0.05	1,895,361	0.272	516,184	543,394	0.218	118,343	130,658	0.260	33,995	2,438,755	0.260	634527
0.06	1,766,984	0.288	509,359	513,277	0.228	117,040	121,808	0.275	33,461	2,280,261	0.275	626399
0.07	1,607,563	0.310	499,114	472,587	0.242	114,599	110,818	0.295	32,695	2,080,150	0.295	613713
0.08	1,417,159	0.342	484,784	442,505	0.254	112,524	97,692	0.321	31,378	1,859,665	0.321	597308
0.09	1,235,061	0.380	469,230	390,979	0.278	108,598	85,139	0.355	30,255	1,626,041	0.355	577828
0.10	1,068,725	0.425	453,678	351,966	0.299	105,186	73,673	0.393	28,981	1,420,691	0.393	558865
0.11	929,433	0.472	439,069	335,373	0.309	103,645	64,071	0.429	27,492	1,264,806	0.429	542714
0.12	813,241	0.524	425,918	286,584	0.344	98,598	56,061	0.477	26,736	1,099,826	0.477	524515
0.13	741,197	0.562	416,880	267,217	0.361	96,359	51,095	0.509	26,005	1,008,414	0.509	513239
0.14	681,110	0.600	408,917	247,785	0.379	93,914	46,953	0.541	25,416	928,895	0.541	502830
0.15	633,389	0.635	402,009	215,857	0.415	89,615	43,663	0.579	25,276	849,246	0.579	491624
0.16	613,494	0.650	398,932	202,223	0.433	87,622	42,291	0.596	25,226	815,717	0.596	486554
0.17	591,307	0.668	395,243	182,218	0.464	84,510	40,762	0.620	25,281	773,526	0.620	479753
0.18	576,615	0.681	392,604	172,667	0.481	82,968	39,749	0.635	25,229	749,283	0.635	475571
0.19	561,180	0.695	389,929	162,898	0.499	81,249	38,685	0.651	25,174	724,078	0.651	471178
0.20	549,310	0.706	387,624	156,007	0.513	79,961	37,867	0.663	25,104	705,318	0.663	467585
0.21	539,881	0.714	385,652	154,182	0.516	79,604	37,217	0.670	24,948	694,064	0.670	465255
0.22	524,934	0.728	382,343	152,744	0.519	79,310	36,187	0.681	24,651	677,678	0.681	461653
0.23	501,014	0.753	377,098	151,357	0.522	79,006	34,538	0.699	24,147	652,372	0.699	456104
0.24	486,128	0.768	373,540	151,357	0.522	79,006	33,511	0.710	23,790	637,485	0.710	452546
0.25	471,932	0.784	370,183	148,548	0.527	78,327	32,533	0.723	23,516	620,480	0.723	448511
0.26	452,883	0.807	365,374	145,731	0.533	77,616	31,220	0.740	23,103	598,614	0.740	442990
0.27	430,062	0.835	359,284	133,689	0.557	74,522	29,647	0.769	22,813	563,752	0.769	433806
0.28	410,939	0.862	354,055	125,291	0.576	72,222	28,328	0.795	22,520	536,230	0.795	426277
0.29	392,001	0.889	348,645	123,069	0.582	71,611	27,023	0.816	22,048	515,069	0.816	420257
0.30	381,152	0.906	345,453	121,239	0.586	71,088	26,275	0.829	21,785	502,391	0.829	416540
0.31	369,770	0.925	342,023	120,371	0.588	70,828	25,490	0.842	21,471	490,141	0.842	412851
0.32	354,096	0.952	337,094	108,540	0.620	67,249	24,410	0.874	21,334	462,635	0.874	404343
0.33	340,339	0.977	332,591	101,522	0.640	65,017	23,461	0.900	21,112	441,861	0.900	397608
0.34	324,397	1.009	327,160	96,062	0.659	63,269	22,362	0.929	20,765	420,459	0.929	390429

Rosebud Resources by Category and Area

0.35	311,792	1.036	322,877	94,099	0.665	62,608	21,494	0.950	20,413	405,891	0.950	385485
0.36	304,502	1.052	320,282	93,587	0.667	62,434	20,991	0.961	20,180	398,089	0.961	382716
0.37	296,492	1.070	317,282	93,575	0.667	62,427	20,439	0.973	19,896	390,067	0.973	379709
0.38	287,877	1.091	314,073	92,190	0.672	61,923	19,845	0.989	19,632	380,066	0.989	375996
0.39	280,717	1.109	311,389	91,706	0.673	61,738	19,351	1.002	19,388	372,423	1.002	373126
0.40	277,295	1.118	310,037	89,660	0.680	60,940	19,115	1.011	19,325	366,956	1.011	370977
0.41	275,399	1.123	309,273	87,712	0.686	60,149	18,985	1.017	19,315	363,111	1.017	369421
0.42	273,800	1.127	308,607	86,362	0.690	59,599	18,875	1.022	19,296	360,161	1.022	368205
0.43	271,961	1.132	307,786	74,918	0.731	54,779	18,748	1.045	19,596	346,879	1.045	362565
0.44	269,841	1.138	306,978	74,884	0.731	54,769	18,602	1.049	19,520	344,725	1.049	361747
0.45	268,320	1.141	306,242	74,884	0.731	54,769	18,497	1.052	19,456	343,204	1.052	361011
0.46	266,935	1.145	305,584	64,579	0.776	50,100	18,401	1.073	19,743	331,514	1.073	355684
0.47	265,335	1.149	304,861	63,196	0.783	49,472	18,291	1.079	19,728	328,531	1.079	354333
0.48	264,712	1.150	304,504	62,599	0.786	49,196	18,248	1.081	19,719	327,311	1.081	353700
0.49	263,719	1.153	304,049	59,656	0.801	47,773	18,180	1.088	19,779	323,375	1.088	351822
0.50	263,010	1.154	303,491	58,760	0.805	47,322	18,131	1.090	19,767	321,769	1.090	350813
0.51	261,896	1.158	303,175	58,760	0.805	47,322	18,054	1.093	19,734	320,655	1.093	350497
0.52	261,376	1.156	302,248	54,970	0.825	45,355	18,018	1.099	19,798	316,346	1.099	347602
0.53	259,066	1.164	301,647	54,119	0.830	44,911	17,859	1.107	19,762	313,185	1.107	346558
0.54	256,091	1.172	300,099	52,697	0.838	44,145	17,654	1.115	19,681	308,787	1.115	344244
0.55	254,678	1.174	299,029	52,232	0.840	43,888	17,556	1.117	19,616	306,909	1.117	342917
0.56	253,164	1.179	298,356	47,528	0.870	41,346	17,452	1.130	19,716	300,692	1.130	339702
0.57	252,307	1.181	297,891	47,318	0.871	41,230	17,393	1.132	19,686	299,626	1.132	339121
0.58	251,285	1.183	297,194	44,662	0.890	39,734	17,322	1.138	19,721	295,947	1.138	336928
0.59	250,356	1.184	296,512	44,662	0.890	39,734	17,258	1.140	19,670	295,018	1.140	336246
0.60	249,355	1.187	296,035	41,287	0.914	37,750	17,189	1.148	19,741	290,642	1.148	333785
0.61	248,700	1.187	295,119	40,417	0.921	37,239	17,144	1.150	19,708	289,117	1.150	332358
0.62	247,287	1.189	293,904	40,417	0.921	37,239	17,047	1.151	19,621	287,703	1.151	331143
0.63	244,502	1.193	291,812	40,417	0.921	37,239	16,855	1.155	19,466	284,918	1.155	329051
0.64	241,239	1.202	290,083	39,202	0.930	36,465	16,630	1.164	19,364	280,441	1.164	326548
0.65	238,920	1.206	288,076	36,155	0.955	34,538	16,470	1.173	19,316	275,076	1.173	322613
0.66	235,633	1.213	285,916	34,400	0.971	33,408	16,243	1.183	19,208	270,033	1.183	319324
0.67	232,435	1.226	284,879	32,698	0.988	32,293	16,023	1.196	19,168	265,132	1.196	317172
0.68	228,484	1.230	281,104	32,694	0.988	32,299	15,751	1.200	18,900	261,178	1.200	313402
0.69	223,149	1.247	278,203	32,694	0.988	32,299	15,383	1.214	18,669	255,843	1.214	310502
0.70	220,785	1.249	275,817	32,694	0.988	32,299	15,220	1.216	18,501	253,479	1.216	308116
0.71	216,953	1.263	274,119	32,694	0.988	32,299	14,956	1.227	18,357	249,647	1.227	306418
0.72	213,206	1.268	270,326	32,580	0.989	32,218	14,697	1.231	18,091	245,786	1.231	302544

Rosebud Resources by Category and Area

0.73	209,522	-.278	267,713	32,571	0.989	32,207	14,444	1.239	17,894	242,093	1.239	299921
0.74	59,231	-.104	65,376	32,393	0.990	32,077	4,083	1.064	4,343	91,624	1.064	97453
0.75	59,076	-.105	65,261	32,393	0.990	32,077	4,072	1.064	4,334	91,469	1.064	97338
0.76	58,221	-.110	64,608	30,200	1.007	30,411	4,013	1.075	4,313	88,421	1.075	95019
0.77	56,710	-.119	63,460	26,241	1.044	27,396	3,909	1.095	4,282	82,951	1.095	90856
0.78	55,906	-.123	62,810	26,123	1.045	27,306	3,854	1.099	4,234	82,028	1.099	90116
0.79	55,427	-.127	62,459	25,167	1.056	26,568	3,821	1.105	4,221	80,594	1.105	89027
0.80	50,317	-.160	58,360	25,167	1.056	26,568	3,469	1.125	3,903	75,484	1.125	84928
0.81	50,293	-.161	58,377	24,563	1.062	26,093	3,467	1.128	3,912	74,856	1.128	84470
0.82	49,211	-.168	57,479	21,068	1.105	23,279	3,392	1.149	3,898	70,279	1.149	80757
0.83	48,901	-.170	57,226	20,378	1.115	22,720	3,371	1.154	3,890	69,279	1.154	79946
0.84	48,337	-.174	56,747	20,378	1.115	22,720	3,332	1.156	3,854	68,715	1.156	79467
0.85	42,234	-.221	51,580	18,799	1.138	21,395	2,911	1.196	3,481	61,033	1.196	72975
0.86	40,622	-.236	50,192	18,170	1.148	20,860	2,800	1.209	3,384	58,791	1.209	71053
0.87	40,622	-.236	50,192	18,054	1.150	20,766	2,800	1.209	3,386	58,676	1.209	70959
0.88	37,264	-.268	47,254	18,054	1.150	20,766	2,569	1.230	3,159	55,318	1.230	68020
0.89	37,024	-.271	47,050	15,541	1.193	18,538	2,552	1.248	3,185	52,564	1.248	65589
0.90	37,024	-.271	47,050	12,427	1.268	15,762	2,552	1.270	3,242	49,451	1.270	62812
0.91	37,024	-.271	47,050	11,272	1.306	14,720	2,552	1.279	3,264	48,296	1.279	61771
0.92	36,791	-.273	46,822	11,075	1.313	14,542	2,536	1.282	3,251	47,866	1.282	61364
0.93	36,791	-.273	46,822	11,075	1.313	14,542	2,536	1.282	3,251	47,866	1.282	61364
0.94	36,295	-.277	46,362	11,075	1.313	14,542	2,502	1.286	3,217	47,370	1.286	60903
0.95	35,894	-.282	46,005	11,075	1.313	14,542	2,474	1.289	3,190	46,968	1.289	60547
0.96	35,664	-.284	45,777	11,075	1.313	14,542	2,458	1.291	3,173	46,738	1.291	60319
0.97	35,131	-.289	45,268	11,075	1.313	14,542	2,422	1.294	3,135	46,206	1.294	59810
0.98	32,875	-.310	43,056	11,075	1.313	14,542	2,266	1.311	2,970	43,949	1.311	57598
0.99	29,917	-.342	40,154	11,075	1.313	14,542	2,062	1.334	2,752	40,992	1.334	54695

MINE DEVELOPMENT ASSOCIATES

MINE ENGINEERING SERVICES
SURPAC MINING SYSTEMS

DATE: 7/24/95

TO: Charlie

FAX NUMBER: 702-427-7781

FROM: STEVE

THIS TRANSMISSION CONSISTS OF 3 PAGES INCLUDING THIS COVER PAGE.

IF ALL PAGES ARE NOT RECEIVED, PLEASE PHONE (702) 856-5700.
FAX NUMBER: (702) 856-6053

SHOULD BE SELF EXPLANATORY. IF NOT, PLEASE CALL

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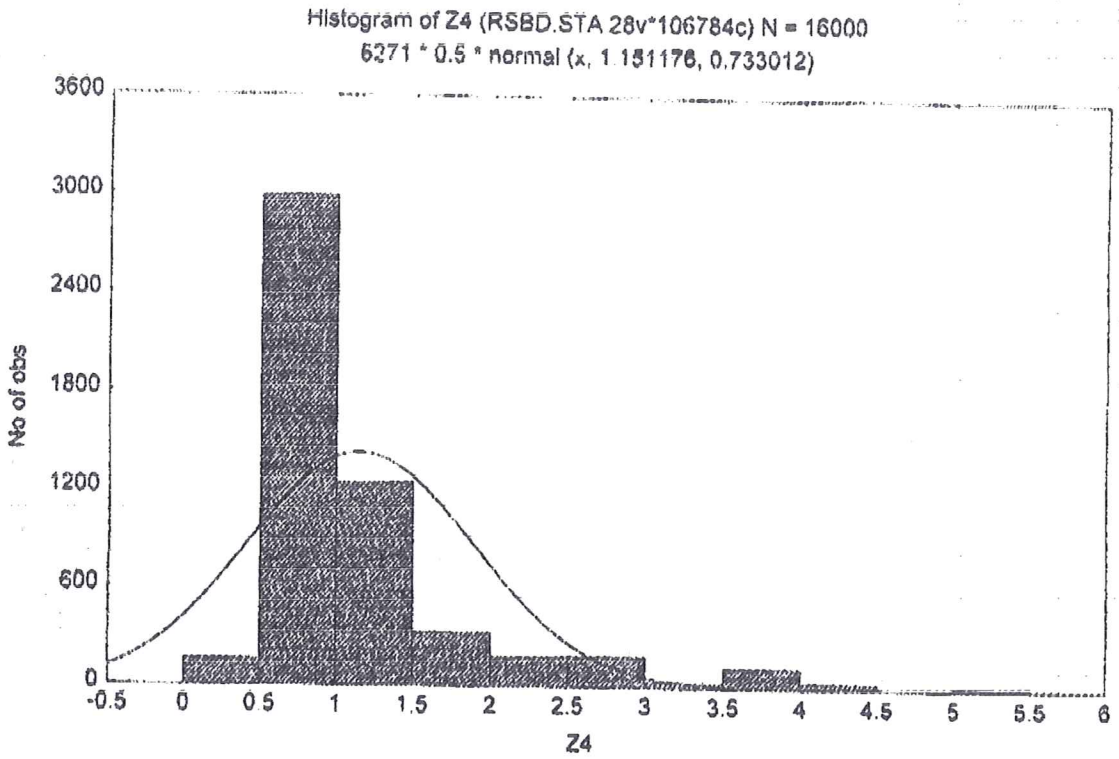
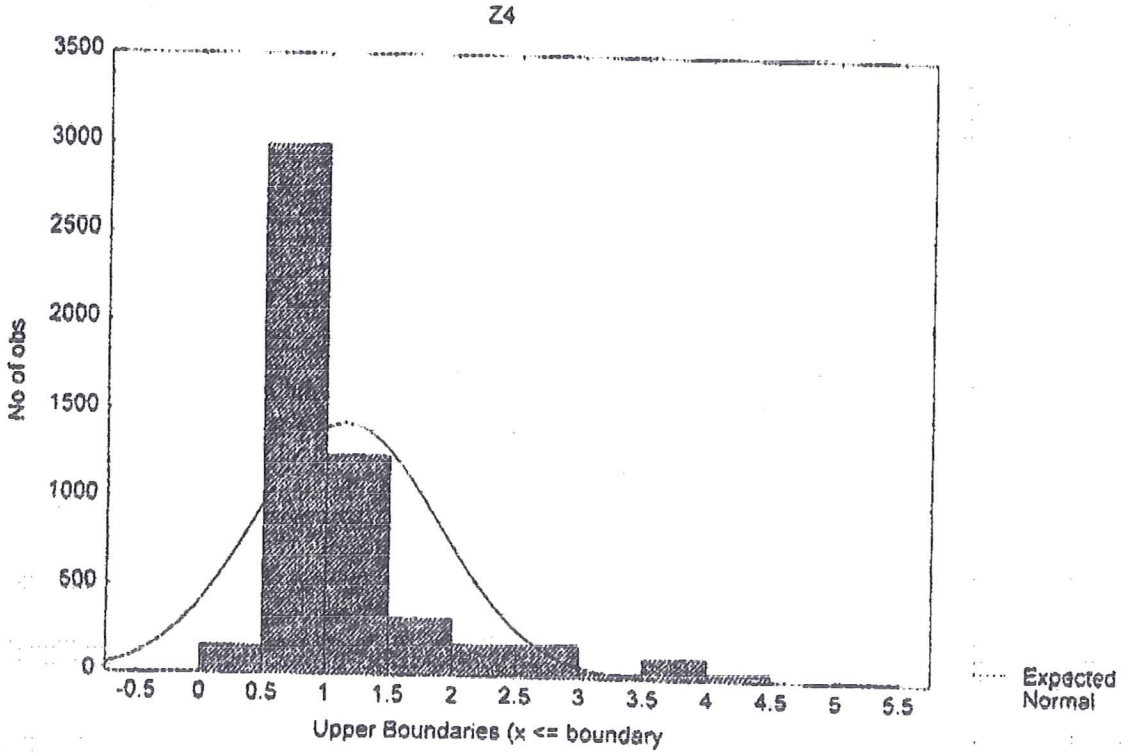
230 South Rock
Suite 29
Reno, Nevada 89502
FAX: 702-856-6053


Histogram of Z4 (RSBD.STA 28v*106784c) N = 16000
6271 * 0.5 * normal (x, 1.151176, 0.733012)
No of obs
3600
3000
2400
1800
1200
600
0
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
Z4


Z4
No of obs
3500
3000
2500
2000
1500
1000
500
0
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
Upper Boundaries (x <= boundary
Expected Normal

COMPUTER AND MODEL

- NEED A DATABASE, BE IT DBASE, ASQUII OR MEDS
- WE CAN TRANSFORM MEDS <-> SURPAC EASILY
- FROM TO AU AUM1 AU2 AUM2Y AUCN AG1 AG2 AS SB HG CU PB ZN LITH CLAY DENSITY REC. RQD.

BUT FOR MEDS

- FROM TO AU AU.CN AG AG.CN LITH CLAY

for plotting only

60

30/90

Hecla
MINING COMPANY

Steve Ristorcelli
Mine Development Associates
230 South Rock Blvd., Suite 29
Reno, NV 89502

June 13, 1994

Steve,

Enclosed is a summary data package for Hecla Mining Company's Rosebud Project, including

> *Reserve Audit of the Rosebud Deposit, Pershing County, Nevada*, by Mine Reserve Associates for Hecla Mining Company.
>
> *Discovery and Geology of Gold Mineralization at the Rosebud Project, Pershing County, Nevada*, by Walck, et. al. (LAC Minerals Ltd.)
>
> *Geostatistical Analysis of the Gold and Silver Ore Reserve Grades of the Rosebud Deposit, Pershing County, Nevada*, by Artesian Mineral Associates for LAC Minerals Ltd.

In the accompanying map tube, you will find a plan map, three cross-sections, and a long-section. Please keep in mind that these maps were prepared for a corporate presentation and are more than a little cartoon-ish, but they should give you a general idea of the deposit geometry. Please return these maps to me when we meet on Thursday.

While I can't prove it at this time, I feel confident that there is much more of a high-angle structural influence to the mineralization than previously thought by LAC and Equinox. The current underground delineation drilling will confirm or negate this theory.

I apologize for my tardiness in getting this information to you. I hope it reaches you in a timely manner. I look forward to seeing you again on Thursday, June 16.

Sincerely,

Charlie

Charles V. Muerhoff
Senior Mine Geologist

Rosebud Unit • P.O. Box 1861 • Lovelock, Nevada 89419 • 702/273-1715 • FAX 702/273-1716

Post-it™ Fax Note 7671	Date 2/14	# of pages ▶ 1
To Steve Ristorcelli	From Charlie Muerhoff	
Co./Dept. MDA	Co.	
Phone #	Phone #	
Fax # 702-856-6053	Fax #	

February 14, 1995

Steve,

Sorry it took me so long to get back to you. Here's the information you requested. I must not have been thinking too clearly when I spoke to you the other day - I underestimated the mining costs by about 100%.

Here are the costs/ton for two completely hypothetical shrink stopes:

	Stope 1	Stope 2
labor (mining)	$32.23	$26.59
labor (maintenance)	0.13	0.44
material	16.21	14.96
equipment allocation	2.78	0.96
material handling	0.85	1.04
Total	$52.20/ton	$43.99/ton

Stope 1 was approximately 150 feet long x 12 feet wide x 120 feet high (±18,000 tons grading 0.42 Au opt, 1.46 Ag opt), developed on a vein that dipped approximately 70°, but locally flattened to ±55°. Rail haulage to the shaft (approximately 2000 feet) averaged $0.27/ton. The higher cost per ton is attributed to poor hanging wall ground conditions when the vein layed over (i.e., more time and materials needed for ground support).

Stope 2 was approximately 200 feet long x 4 feet wide x 300 feet high (±20,000 tons grading 0.71 Au opt, 5.28 Ag opt), developed on a near-vertical vein. Draw point mucking (3.5 yd. LHD) and rubber-tire haulage (13 ton trucks) to the surface via decline averaged $2.68/ton(?).

Hope this is of some help to you. Keep in touch.

Charlie

HECLA MINING COMPANY
ROSEBUD PROJECT

7000 Pitt Road
P.O. Box 1861
Lovelock, NV 89419
(702) 427-7751 fax (702) 427-7781

FACSIMILE COVER SHEET

Date: July 27, 1995

To: Steve Ristorcelli
fax (702) 856-6053

From: Charlie Muerhoff

Number of pages (including this cover sheet): 1

Steve,

As per our telephone conversation today; here are the sections I would like you to generate using the restricted ranges which came out of the indicator variography:

350 N
750 N
800 N
850 N
900 N
950 N
1400 N
1500 N
1600 N

Call me if you have any questions. I really think we are seeing the light at the end of the tunnel (or maybe I'm just delusional).

Thanks.

Charlie

HECLA MINING COMPANY
ROSEBUD PROJECT

7000 Pitt Road
P.O. Box 1861
Lovelock, NV 89419
(702) 427-7751 fax (702) 427-7781

FACSIMILE COVER SHEET

Date: August 28, 1995

To: Steve Ristorcelli
Mine Development Associates, Inc.
fax (702) 856-6053

From: Charlie Muerhoff

Number of pages (including this cover sheet): 11

Steve,

Here's the final summary report from Don Earnest, et. al. concerning the Rosebud model.

Other items we should start thinking about:

- o Re-run model using a combination of original ranges and/or indicator ranges and/or TWC suggestions.
- o Incorporate new data into model (underground drilling in the South Zone is scheduled to commence the week of September 11th).
- o Silver model.
- o Re-generate model in Surpac(?) for ease of use by on-site personnel.

Give me a call sometime today at your convenience once you've had a chance to review Winters' comments.

Charlie

MINE DEVELOPMENT ASSOCIATES
MINE ENGINEERING SERVICES
SURPAC MINING SYSTEMS

June 23, 1994

Charles Muerhoff, Sr. Mine Geologist
Hecla Mining Company
P.O. Box 1861
Lovelock, Nevada 89419

Dear Charlie,

Mine Development Associates (MDA) is pleased to respond to Hecla Mining Company's request for assistance in auditing the geologic resource at your Rosebud Project located near Lovelock, Nevada. This proposal was prepared at your request and addresses those items pertinent to the audit. The following list outlines briefly the aspects of the resource audit that require attention:

1) Review of the database;
2) Review of sample integrity;
3) Review of the mineral model, including density and metallurgical characterization; and
4) Review of the grade estimation parameters and grade model.

At this time, an audit of minable reserves, mine planning, or economics is not required as this will be completed in the second quarter of next year. The work could take place at your Rosebud Project site, our Reno, Nevada office, or your Coeur D'Alene headquarters. The scope of the project presented here will result in MDA producing a document auditing and verifying the in-situ gold and silver resource at Rosebud and will be suitable for presentation to the U.S. Securities and Exchange Commission. We understand that the resource will be generated in-house with our peripheral involvement and that the document will be completed by January 1, 1995 or upon completion of your

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resource estimate. I believe that the report could be finalized very soon after the completion of the estimate by your staff. I propose that the MDA project team will include:

Steven Ristorcelli: Principal Geologist
Neil Prenn: Principal Engineer
Richard Graeme: Principal Engineer

Steve Ristorcelli will be responsible for this project but the participation of Neil Prenn and Richard Graeme will be beneficial for this effort and future efforts in reserves and mine planning. MDA will be available on call for the project period and will be present at the site for documentation of the procedures at certain milestones during the study. To complete the audit, we require the following from Hecla:

1) Access to all the files to review geology, assays, specific gravity testing, metallurgical testing, petrography and all data that may be pertinent to the delineation of the gold/silver resource;
2) Continual interaction with the process of resource delineation as it progresses; and
3) Access to all the run files, maps and data produced during this process.

It is very difficult to make this a turn-key estimate as ongoing development and resource estimation results in unexpected deviations from anticipated events. I would therefore like to bid this project in two separate phases: the audit and consultation on the resource estimate. The first estimate (Item I) will be for the preparation of the SEC document assuming no involvement by MDA beyond that. The second (Item II) is a rate schedule and preliminary recommendations for continuing to build the model and developing designs and mine planning. I feel we can offer help on an ongoing basis over and above what is required for the audit. Please refer to my report dated June 24, 1994 concerning my initial review and suggestions resulting from my visit last week.

Item I - Resource Audit

Review and Audit of 3-D Model of the deposit	
Labor (56 Hours)	$ 4,220
Meetings (16 Hours)	$ 1,120
Report	
Labor (24 Hours)	$ 1,680
Clerical and drafting (16 Hours)	$ 900
Contingency (10%)	$ 800
Total	$ 8,720

The purpose of this audit is to determine and convey the accuracy and level of confidence in the resource estimate and produce a document that can be used for external financing, if necessary. During this audit, MDA expects to have about five site visits reviewing the progress of the project, in areas of geology, sampling, assaying, mapping, metallurgy, database auditing, statistics, modelling, geostatistics, and estimation. Specifically this will include:

- Database audit;
- Drill hole location and survey spot checking;
- Examining geology in the field and drill core and related mapping and logging;
- Sampling and assaying procedures;
- Tonnage factors and metallurgical characterization;
- Drill hole and sample density;
- Geologic model review;
- Manual reserve review;
- Geostatistical analysis;
- Review computer model including appropriateness of methods;
- Review of the final estimation and tabulation; and
- Appropriateness of classification.

If any unanticipated concerts or doubts are found during this study, it may be necessary to get some independent assays or test the computer resource model. I am confident that this will not be necessary, I mention it only to make you aware of the possibility. If, in the unlikely event MDA is required to test the computer resource a separate bid will be prepared for that work.

The second phase of the project I am proposing would be to offer consultation and advice as you progress. As this cannot be predicted, I will present some preliminary suggestions and a rate schedule.

For this aspect of the project, we can offer you several services that may expedite and perfect the process over and above what you are presently doing in-house. First, we can perform a sampling integrity review which evaluates the potential for downhole contamination. This would add a significant amount of confidence to your resource estimate since there have been a few mentions of potential contamination in reports. If some contamination exists, it may help you decide how to handle that information. Second, we could help you run some of your statistics to define the mineral domains to be used in the estimate. Other duties which MDA could perform include help in defining the mineral model, help in mine design and scheduling, data manipulation and transfer (ie., between MEDS and SURPAC), and general support in either MEDS or SURPAC operations.

Item II - Consultation

Sample Integrity Study (16 Hours)	$ 1,280
Assay Integrity Study (16 Hours)	$ 1,280
Resource Geology	$ 70 per hour
Reserve Engineering	$ 85 per hour
Engineering	$ 75 per hour
Data Management	$ 55 per hour
Computer Use	$ 15 per hour
Plotting	$ ~20 per plot

MDA is very pleased to be associated with Hecla in this project. Further, my involvement with Hecla to date has left me assure that you are conducting this evaluation with high technical and professional standards. The result will be a sound and confident resource estimate and feasibility with all potential problems, if any, defined in advance. MDA endeavors to maintain high quality work and will do everything in its power to adhere to the schedule and maintain the quality and standard of work you too have already set.

Sincerely,

Steven Ristorcelli, RPG