6000 0588

Mining District File Summary Sheet

DISTRICT	Rosebud
DIST_NO	4010
COUNTY If different from written on document	Pershing
TITLE If not obvious	Rosebud Mine - East Zone Resources
AUTHOR	K. Allen; D. Cameron; F.F. Pitard C. Moore; S. Ristorcelli
DATE OF DOC(S)	1998
MULTI_DIST Y / N? Additional Dist_Nos:	
QUAD_NAME	Sulphur 7.5'
P_M_C_NAME (mine, claim & company names)	Rosebud Mine; Rosebud Mining Company LLC; Hecla Mining Co.; East Zone
COMMODITY If not obvious	gold; silver
NOTES	Resources; correspondence; handwritten notes; assays; geology; stratigraphic column; statistics; drill direction data 133 p.

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

SS: DD 3/20/08
Initials Date
DB:
Initials Date
SCANNED:
Initials Date

Revised: 1/22/08

East Zone Resources

6000 0588
4010

60000588
CINDY

Fax

To: K. Allen

From: D. Cameron

- Your comments?

P.S. - I Fixed the GRAPHS.

Kurt: I received the email with graphs. The x-axis values are transposed: i.e., most values are less than or equal to 2 samples/block, not 8. I assume all blocks with 1 sample are inferred, right? Since there are so many you had better check to see if the model is filled; if not, expand the inferred search to fill model.

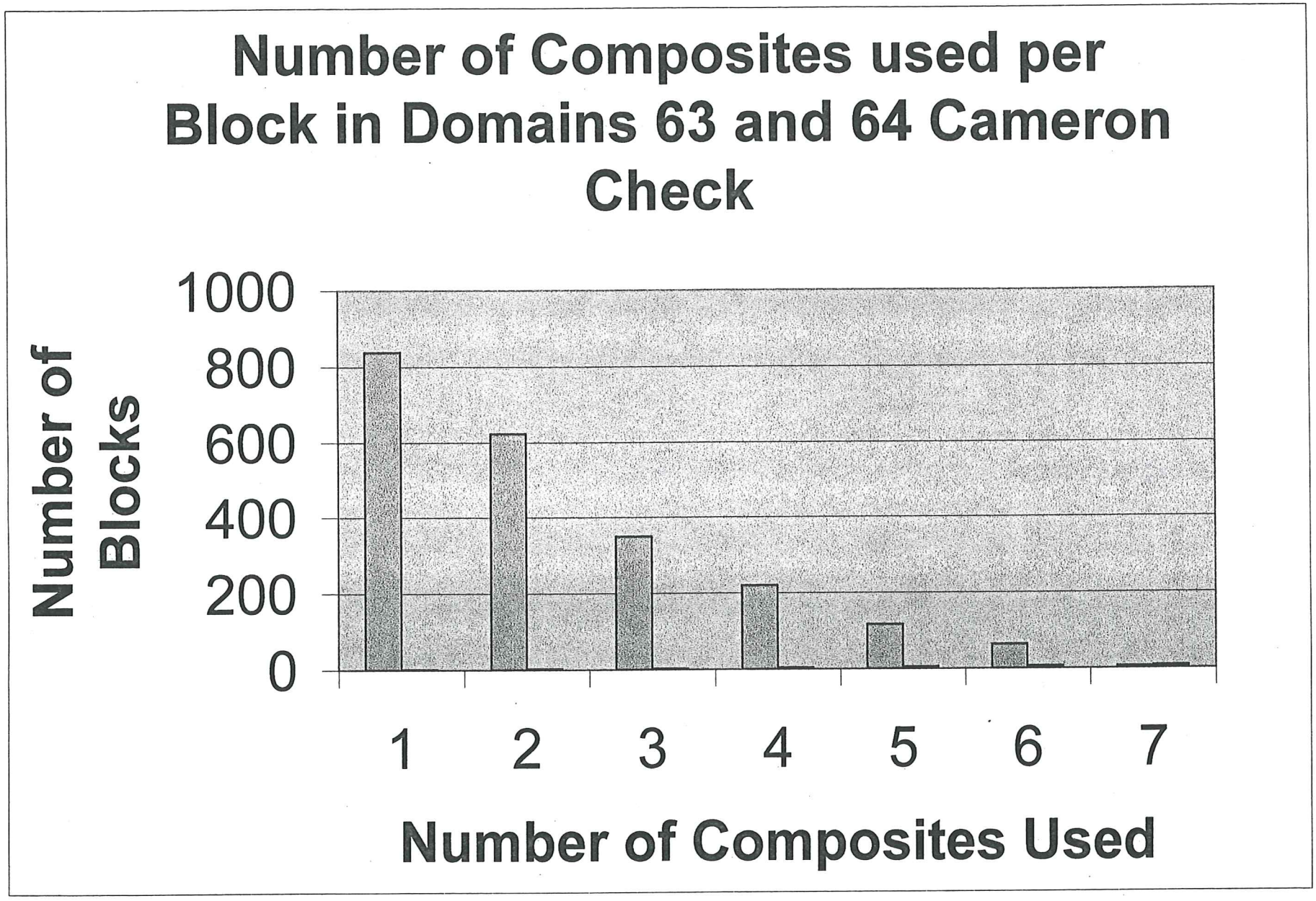
1) I recommend making plots with domains, color-coded blocks by classification, and composites (symbols only) to see what your classification and search have done. Put the number of samples in blocks.

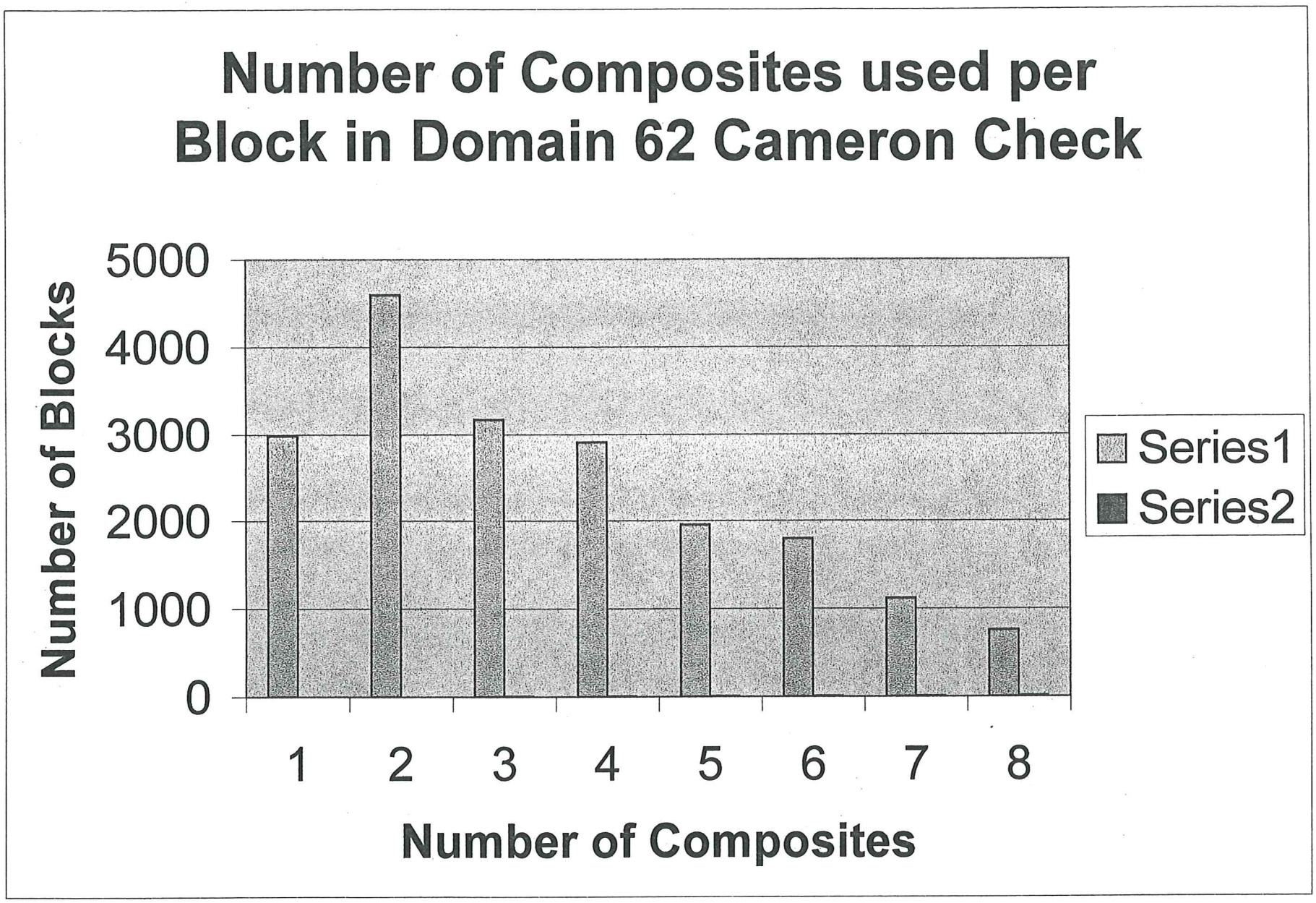
2) I recommend making a set of check plots of domain boundaries, blocks color-coded on grade, and composites along drill-holes with values and color-coding equal to blocks, and the classification code of block + the block grade written in the blocks.

When we have time

When you are satisfied, you should make a complete set of plans and sections with the scheme (2) above.

Regards,
Don


Number of Composites used per Block in Domains 63 and 64 Cameron Check
Number of Blocks
1000
800
600
400
200
0
1
2
3
4
5
6
7
Number of Composites Used


Number of Composites used per Block in Domain 62 Cameron Check
Number of Blocks
5000
4000
3000
2000
1000
0
1
2
3
4
5
6
7
8
Number of Composites
Series1
Series2

The Rosebud Mining Company LLC
P.O. Box 2610
Winnemucca, NV 89446
Phone (702) 623-6912
Fax (702) 623-6967
Hecla Mining Co. - Manager of Mining

Mr. Francis F. Pitard
FRANCIS PITARD SAMPLING CONSULTANTS
14710 Tejon Street
Broomfield, Colorado 80020

October 13, 1998

Dear Francis,

Enclosed are the data pertaining to the heterogeneity study of the East Zone of the Rosebud Deposit. The samples have been collected, prepared, and analyzed as per your recommendations, dated November 1, 1995. I am faxing you the data now, in hopes that you will have a chance to look at it prior to the upcoming short courses in Golden. I will be attending all three of your courses and would like to take you to dinner sometime during that week and discuss the results (given you have a chance to look at the data).

East zone mineralization is hosted within and in the footwall of the South Ridge fault in Dozer formation rhyolite flow dome and Bud Marker Bed "type" of rhyolitic porphyry dike. Mineralization is associated with moderate to intense silicification + marcasite +/- pyrite +/- white clay.

It is interesting to note that the higher-grade gold is somewhat systematically contained in the larger size fractions:

+1/2 inch	0.719 opt Au
-1/2 inch to +1/4 inch	0.721 opt Au
-1/4 inch to +10 mesh	0.603 opt Au
-10 mesh to +24 mesh	0.532 opt Au
-24 mesh to +65 mesh	0.532 opt Au
-65 mesh	0.358 opt Au

The gold being enriched in the larger size fractions is not surprising due to the fact that in the East zone, gold is associated with stockwork or massive silica. Silica would tend to be more difficult to break down and thus the larger fragments would be more silica enriched. Since the larger fragments would contain more silica, they would also contain more gold (East zone mineralization).

Following is the data from the East Zone Heterogeneity test:

nacritic clays are present with mineralization in varying amounts with barite and stibnite surrounding mineralization.

- The sample was taken by splitting the core in half, sending one half of the core to American Assay Laboratory in Sparks NV for gold and silver analysis, and retaining the other half for the Heterogeneity test. Based on ore grade assay results from the first half, the remaining ore grade core was weighed and composited into a 55-gallon barrel. This composite was then shipped to American Assay Lab. The composite weighed 238.41 kg (525.6 pounds) with an estimated average grade of 0.652 opt Au and 0.93 opt Silver.

- The entire composite was dried for 24 hours at 105 degrees Celsius, then jaw crushed to minus ¾ inch.

- The entire composite was then screened through ½ inch, ¼ inch, 10 mesh, 24 mesh, and 65 mesh screens. The size fractions were then weighed, with results as follows:

+1/2 inch	25.00 kg.
-1/2 inch +1/4 inch	93.50 kg.
-1/4 inch +10 mesh	69.50 kg.
-10 mesh +24 mesh	18.00 kg.
-24 mesh +65 mesh	16.50 kg.
-65 mesh	13.00 kg.

- The entire –1/2 inch +1/4 inch fraction was spread out over a clean cement floor in a layer one fragment deep. Alex Davidson and Kurt Allen collected 100 samples from this material, with each sample made up of 30 fragments selected one by one at random. These samples were numbered and weighed. The pulp envelopes were weighed individually prior to collecting the sample so as to determine the true weight of the sample.

- The 100 samples were then pulverized in an enclosed ring pulverizer to about 95% passing 100 mesh. Each sample was analyzed for gold and silver by fire assaying the entire sample and completing gravimetric finish.

- Three size fractions (+1/2 inch, -1/2 inch +¼ inch, -1/4 inch +10 mesh) were then individually crushed to –10 mesh.

- From each of the six size fractions (+1/2 inch, -1/2 inch +¼ inch, -1/4 inch +10 mesh, -10 mesh +24 mesh, -24 mesh +65 mesh, and –65 mesh), 8,000 gram subsamples were split out using a rotary splitter and pulverized in their entirety in an Essa 3-kg capacity enclosed ring and puck mill to approximately 95% passing 100 mesh.

- Each 8,000 gram subsample was split into eight 1,000 gram subsamples using a rotary splitter, with each subsample being weighed.

- Metallic screen assays over a 100-mesh screen were performed on each of the 1,000-gram subsamples. The entire +100 mesh fraction was fire assayed and four 30 gram subsamples from the –100 mesh fraction were split out and fire assayed. All analyses were completed using a gravimetric finish.

Best Regards,

Kurt D. Allen

Kurt D. Allen

Rosebud Mining Company - Rosebud Deposit
1998 East Zone Heterogeneity Study

100 Samples Comprised of 30 Fragments Picked at Random
Size Fraction: -1/2" +1/4"

Sample ID	Weight (g)	Au (opt)	Ag (opt)	Sample ID	Weight (g)	Au (opt)	Ag (opt)
1	41.77	0.171	0.35	51	38.35	0.256	0.18
2	39.15	not successful		52	42.77	0.485	1.47
3	44.59	0.883	0.92	53	42.34	0.389	0.09
4	41.34	0.766	1.06	54	33.91	0.238	0.00
5	38.90	1.663	3.06	55	39.77	0.246	0.08
6	35.81	0.084	0.05	56	45.95	0.505	0.45
7	40.88	0.167	0.62	57	38.13	0.321	0.62
8	44.69	0.129	1.33	58	41.15	1.399	1.94
9	33.34	0.649	0.61	59	43.32	0.300	2.58
10	41.29	0.482	0.33	60	29.32	0.318	0.31
11	46.00	2.013	3.13	61	43.36	0.311	0.29
12	41.96	0.925	0.90	62	39.44	0.028	0.39
13	36.44	1.600	1.46	63	44.25	0.207	0.17
14	37.58	0.396	1.62	64	42.61	0.212	0.77
15	34.51	0.859	1.22	65	42.29	0.761	1.64
16	41.50	0.542	0.22	66	37.45	0.320	0.11
17	47.51	0.223	0.08	67	38.40	0.563	0.50
18	38.60	0.383	0.43	68	49.48	0.112	0.09
19	43.97	0.672	0.61	69	39.61	0.261	0.47
20	35.34	0.525	0.26	70	46.12	0.040	0.00
21	42.28	0.165	0.00	71	45.85	0.056	0.13
22	39.75	0.573	0.60	72	29.45	0.174	0.00
23	43.44	0.256	0.26	73	49.31	0.823	0.68
24	38.61	0.965	1.03	74	36.80	0.071	0.00
25	43.09	4.676	9.93	75	41.40	0.639	0.59
26	42.52	1.360	1.58	76	36.83	0.678	0.75
27	46.93	1.966	4.01	77	37.66	0.482	0.76
28	39.21	0.542	0.40	78	34.68	1.197	1.14
29	34.90	0.429	0.58	79	32.58	1.350	1.27
30	40.81	1.657	1.53	80	33.76	0.335	0.06
31	41.03	0.416	0.31	81	40.53	0.258	0.15
32	39.40	0.320	0.45	82	43.28	0.847	0.47
33	39.73	6.054	6.14	83	33.32	0.149	0.00
34	39.66	0.350	0.52	84	34.78	0.219	0.43
35	41.98	0.398	0.28	85	33.35	0.851	1.04
36	43.40	0.553	0.66	86	29.84	0.998	1.50
37	39.89	0.772	0.41	87	39.44	0.458	2.13
38	43.30	0.776	0.70	88	43.15	0.588	0.81
39	34.41	1.141	0.95	89	41.39	0.065	1.35
40	48.15	0.456	2.50	90	43.41	0.612	0.29
41	47.20	0.623	0.58	91	38.95	0.333	0.09
42	38.64	0.265	0.44	92	37.87	1.729	3.08
43	43.52	1.151	1.25	93	36.60	0.496	0.84
44	43.91	0.208	0.62	94	35.95	0.871	1.09
45	35.35	0.658	0.80	95	29.69	0.174	0.12
46	41.26	0.292	0.54	96	36.91	0.589	0.50
47	36.99	0.550	0.34	97	42.87	0.391	2.73
48	43.32	0.270	1.30	98	27.84	0.258	0.13
49	44.12	2.143	1.87	99	34.07	0.665	0.66
50	38.51	0.322	0.25	100	44.10	0.370	1.12
				Average	39.84	0.680 (weighted)	0.98

HECLA MINING COMPANY - ROSEBUD MINE
EAST ZONE HETEROGENEITY STUDY - METALLIC SCREEN ASSAYS
Analytical Performed by American Assay Laboratories, Inc. - Sparks, Nevada

13-Oct-98

Fraction	Split #	Total Wt (g)	+100m wt (g)	-100m wt (g)	+100m wt wt %	-100m wt wt %	+100m Au (opt)	-100m Au (opt)	-100m Au (opt)	-100m Au (opt)	-100m Au (opt)	Average -100m Au (opt)	Weighted Au Average (opt)	+100m Ag (opt)	-100m Ag (opt)	-100m Ag (opt)	-100m Ag (opt)	-100m Ag (opt)	Average -100m Ag (opt)	Weighted Ag Average (opt)
+1/2"	1	1,096.0	98.0	998.0	8.94%	91.06%	4.192	0.380	0.349	0.363	0.404	0.374	0.715	13.34	0.75	0.39	0.61	0.43	0.55	1.69
	2	1,097.0	106.0	991.0	9.66%	90.34%	4.347	0.346	0.354	0.385	0.361	0.362	0.747	12.70	0.60	0.82	0.53	0.23	0.55	1.72
	3	1,074.0	123.0	951.0	11.45%	88.55%	3.910	0.256	0.360	0.256	0.328	0.300	0.713	12.21	0.66	0.15	0.60	0.12	0.38	1.74
	4	1,074.0	110.0	964.0	10.24%	89.76%	4.055	0.323	0.314	0.336	0.337	0.328	0.709	10.53	0.73	0.73	0.57	0.59	0.66	1.67
	5	991.0	123.0	868.0	12.41%	87.59%	3.846	0.184	0.270	0.268	0.323	0.261	0.706	11.87	0.31	0.13	0.00	0.00	0.11	1.57
	6	1,017.0	111.0	906.0	10.91%	89.09%	4.148	0.315	0.288	0.314	0.372	0.322	0.740	13.08	0.67	0.27	0.23	0.59	0.44	1.82
	7	878.0	100.0	778.0	11.39%	88.61%	3.804	0.364	0.291	0.274	0.316	0.311	0.709	12.37	0.57	0.22	0.32	0.66	0.44	1.80
	8	836.0	97.0	739.0	11.60%	88.40%	3.802	0.279	0.356	0.265	0.285	0.296	0.703	10.90	0.58	0.14	0.35	0.45	0.38	1.60
-1/2" +1/4"	1	759.0	108.0	651.0	14.23%	85.77%	2.546	0.363	0.298	0.387	0.366	0.354	0.665	8.32	0.83	0.46	0.53	0.58	0.60	1.70
	2	952.0	115.0	837.0	12.08%	87.92%	3.228	0.388	0.337	0.392	0.439	0.389	0.732	11.12	0.78	0.64	0.48	0.67	0.64	1.91
	3	1,092.0	172.0	920.0	15.75%	84.25%	2.707	0.319	0.370	0.271	0.378	0.335	0.708	9.62	0.82	0.59	0.59	0.68	0.67	2.08
	4	1,039.0	159.0	880.0	15.30%	84.70%	2.665	0.352	0.341	0.332	0.298	0.331	0.688	9.07	0.68	0.51	0.57	0.72	0.62	1.91
	5	1,107.0	160.0	947.0	14.45%	85.55%	3.155	0.308	0.298	0.319	0.317	0.311	0.722	10.30	0.69	0.69	0.47	0.47	0.58	1.98
	6	1,148.0	164.0	984.0	14.29%	85.71%	3.340	0.372	0.373	0.312	0.344	0.350	0.777	1.90	0.70	0.57	0.81	0.55	0.66	0.84
	7	1,115.0	150.0	965.0	13.45%	86.55%	2.891	0.324	0.327	0.296	0.447	0.349	0.691	9.80	0.88	0.60	0.28	0.75	0.63	1.86
	8	1,124.0	181.0	943.0	16.10%	83.90%	3.003	0.344	0.303	0.262	0.437	0.337	0.766	9.29	0.93	0.25	0.42	0.79	0.60	2.00
-1/4" +10m	1	947.0	88.0	859.0	9.29%	90.71%	4.060	0.296	0.233	0.272	0.252	0.263	0.616	8.19	0.59	0.64	0.21	0.67	0.53	1.24
	2	1,001.0	100.0	901.0	9.99%	90.01%	3.486	0.244	0.253	0.240	0.286	0.256	0.578	12.04	0.61	0.35	0.00	0.42	0.35	1.51
	3	983.0	81.0	902.0	8.24%	91.76%	4.496	0.282	0.293	0.288	0.261	0.281	0.628	12.35	0.51	0.72	0.48	0.71	0.61	1.57
	4	921.0	74.0	847.0	8.03%	91.97%	4.896	0.225	0.239	0.297	0.305	0.267	0.638	12.99	0.54	0.86	0.11	0.06	0.39	1.40
	5	990.0	90.0	900.0	9.09%	90.91%	3.997	0.245	0.247	0.274	0.315	0.270	0.609	12.79	0.55	0.14	0.19	0.44	0.33	1.46
	6	931.0	52.0	879.0	5.59%	94.41%	4.319	0.327	0.301	0.339	0.298	0.316	0.540	7.84	0.56	0.69	0.54	0.71	0.63	1.03
	7	970.0	92.0	878.0	9.48%	90.52%	3.766	0.340	0.239	0.276	0.307	0.291	0.620	12.16	0.66	0.39	0.47	0.58	0.53	1.63
	8	1,021.0	94.0	927.0	9.21%	90.79%	3.586	0.276	0.312	0.261	0.308	0.289	0.593	11.34	0.68	0.41	0.43	0.53	0.51	1.51
-10m +24m	1	909.0	56.0	853.0	6.16%	93.84%	4.542	0.322	0.279	0.218	0.233	0.263	0.527	11.34	0.57	0.34	0.49	0.74	0.54	1.20
	2	1,093.0	60.0	1,033.0	5.49%	94.51%	4.697	0.262	0.227	0.196	0.293	0.245	0.489	10.17	0.75	0.29	0.31	0.65	0.50	1.03
	3	1,138.0	77.0	1,061.0	6.77%	93.23%	4.561	0.237	0.295	0.185	0.276	0.248	0.540	12.63	0.77	0.26	0.53	0.53	0.52	1.34
	4	1,190.0	94.0	1,096.0	7.90%	92.10%	3.478	0.265	0.156	0.219	0.287	0.232	0.488	14.79	0.70	0.24	0.00	0.57	0.38	1.52
	5	1,205.0	77.0	1,128.0	6.39%	93.61%	4.569	0.271	0.260	0.244	0.318	0.273	0.548	12.25	0.69	0.65	0.48	0.60	0.61	1.35
	6	1,208.0	100.0	1,108.0	8.28%	91.72%	4.104	0.224	0.242	0.170	0.274	0.228	0.548	12.04	0.53	0.00	0.63	0.47	0.41	1.37
	7	1,188.0	86.0	1,102.0	7.24%	92.76%	4.443	0.247	0.219	0.213	0.318	0.249	0.553	13.82	0.42	0.25	0.41	0.60	0.42	1.39
	8	1,201.0	84.0	1,117.0	6.99%	93.01%	4.622	0.242	0.251	0.213	0.292	0.250	0.555	14.62	0.72	0.38	0.44	0.64	0.55	1.53
-24m +65m	1	988.0	100.0	888.0	10.12%	89.88%	4.094	0.197	0.198	0.129	0.182	0.177	0.573	15.74	0.66	0.09	0.74	0.76	0.56	2.10
	2	997.0	105.0	892.0	10.53%	89.47%	3.667	0.181	0.171	0.187	0.174	0.178	0.546	14.75	0.73	0.74	0.57	0.27	0.58	2.07
	3	1,031.0	128.0	903.0	12.42%	87.58%	3.241	0.183	0.174	0.204	0.173	0.184	0.563	14.22	0.68	0.80	0.56	0.76	0.70	2.38
	4	1,024.0	125.0	899.0	12.21%	87.79%	2.778	0.203	0.178	0.205	0.175	0.190	0.506	12.30	0.68	0.73	0.94	0.64	0.75	2.16
	5	963.0	98.0	865.0	10.18%	89.82%	3.875	0.182	0.185	0.204	0.225	0.199	0.573	14.68	0.82	0.46	0.64	0.83	0.69	2.11
	6	993.0	118.0	875.0	11.88%	88.12%	3.043	0.181	0.181	0.199	0.223	0.196	0.534	13.49	0.79	0.69	0.46	0.78	0.68	2.20
	7	1,023.0	127.0	896.0	12.41%	87.59%	2.909	0.202	0.174	0.179	0.002	0.139	0.483	11.31	0.56	0.73	0.74	0.61	0.66	1.98
	8	973.0	104.0	869.0	10.69%	89.31%	2.678	0.247	0.186	0.186	0.245	0.216	0.479	14.96	0.55	0.68	0.22	0.75	0.55	2.09
-65m	1	963.0	38.0	925.0	3.95%	96.05%	4.564	0.231	0.308	0.243	0.213	0.249	0.419	6.17	0.90	1.07	1.02	1.10	1.02	1.23
	2	1,094.0	49.0	1,045.0	4.48%	95.52%	2.736	0.268	0.247	0.259	0.106	0.220	0.333	6.49	1.09	0.96	0.91	1.09	1.01	1.26
	3	1,159.0	47.0	1,112.0	4.06%	95.94%	3.369	0.187	0.289	0.258	0.056	0.198	0.326	6.34	1.03	1.01	0.90	0.81	0.94	1.16
	4	1,081.0	45.0	1,036.0	4.16%	95.84%	3.447	0.268	0.219	0.200	0.224	0.228	0.362	6.15	0.98	0.58	0.84	0.97	0.84	1.06
	5	1,164.0	56.0	1,108.0	4.81%	95.19%	2.939	0.262	0.244	0.198	0.214	0.230	0.360	5.27	0.95	0.73	1.01	1.06	0.94	1.15
	6	1,014.0	43.0	971.0	4.24%	95.76%	3.608	0.258	0.250	0.225	0.210	0.236	0.379	4.52	1.04	0.52	1.12	0.97	0.91	1.07
	7	964.0	44.0	920.0	4.56%	95.44%	3.229	0.260	0.268	0.193	0.223	0.236	0.373	5.34	1.04	0.76	0.69	1.13	0.91	1.11
	8	871.0	45.0	826.0	5.17%	94.83%	2.638	0.187	0.213	0.174	0.194	0.192	0.318	4.84	0.92	0.64	0.78	0.96	0.83	1.03

East Zone - 7 Foot To 14 Foot Block Combinations								
Lower 7 Foot	Mid-Level 14 Foot	Upper 7 Foot	Lower 7 Foot	Mid-Level 14 Foot	Upper 7 Foot	Lower 7 Foot	Mid-Level 14 Foot	Upper 7 Foot
4269.5	4273	4276.5	4535.5	4539	4542.5	4801.5	4805	4808.5
4283.5	4287	4290.5	4549.5	4553	4556.5	4815.5	4819	4822.5
4297.5	4301	4304.5	4563.5	4567	4570.5	4829.5	4833	4836.5
4311.5	4315	4318.5	4577.5	4581	4584.5	4843.5	4847	4850.5
4325.5	4329	4332.5	4591.5	4595	4598.5	4857.5	4861	4864.5
4339.5	4343	4346.5	4605.5	4609	4612.5	4871.5	4875	4878.5
4353.5	4357	4360.5	4619.5	4623	4626.5	4885.5	4889	4892.5
4367.5	4371	4374.5	4633.5	4637	4640.5	4899.5	4903	4906.5
4381.5	4385	4388.5	4647.5	4651	4654.5	4913.5	4917	4920.5
4395.5	4399	4402.5	4661.5	4665	4668.5	4927.5	4931	4934.5
4409.5	4413	4416.5	4675.5	4679	4682.5	4941.5	4945	4948.5
4423.5	4427	4430.5	4689.5	4693	4696.5	4955.5	4959	4962.5
4437.5	4441	4444.5	4703.5	4707	4710.5	4969.5	4973	4976.5
4451.5	4455	4458.5	4717.5	4721	4724.5	4983.5	4987	4990.5
4465.5	4469	4472.5	4731.5	4735	4738.5	4997.5	5001	5004.5
4479.5	4483	4486.5	4745.5	4749	4752.5	5011.5	5015	5018.5
4493.5	4497	4500.5	4759.5	4763	4766.5	5025.5	5029	5032.5
4507.5	4511	4514.5	4773.5	4777	4780.5	5039.5	5043	5046.5
4521.5	4525	4528.5	4787.5	4791	4794.5			

East Zone - 7 Foot To 14 Foot Block Combinations								
Lower 7 Foot	Mid-Level 14 Foot	Upper 7 Foot	Lower 7 Foot	Mid-Level 14 Foot	Upper 7 Foot	Lower 7 Foot	Mid-Level 14 Foot	Upper 7 Foot
4269.5	4273	4276.5	4535.5	4539	4542.5	4801.5	4805	4808.5
4283.5	4287	4290.5	4549.5	4553	4556.5	4815.5	4819	4822.5
4297.5	4301	4304.5	4563.5	4567	4570.5	4829.5	4833	4836.5
4311.5	4315	4318.5	4577.5	4581	4584.5	4843.5	4847	4850.5
4325.5	4329	4332.5	4591.5	4595	4598.5	4857.5	4861	4864.5
4339.5	4343	4346.5	4605.5	4609	4612.5	4871.5	4875	4878.5
4353.5	4357	4360.5	4619.5	4623	4626.5	4885.5	4889	4892.5
4367.5	4371	4374.5	4633.5	4637	4640.5	4899.5	4903	4906.5
4381.5	4385	4388.5	4647.5	4651	4654.5	4913.5	4917	4920.5
4395.5	4399	4402.5	4661.5	4665	4668.5	4927.5	4931	4934.5
4409.5	4413	4416.5	4675.5	4679	4682.5	4941.5	4945	4948.5
4423.5	4427	4430.5	4689.5	4693	4696.5	4955.5	4959	4962.5
4437.5	4441	4444.5	4703.5	4707	4710.5	4969.5	4973	4976.5
4451.5	4455	4458.5	4717.5	4721	4724.5	4983.5	4987	4990.5
4465.5	4469	4472.5	4731.5	4735	4738.5	4997.5	5001	5004.5
4479.5	4483	4486.5	4745.5	4749	4752.5	5011.5	5015	5018.5
4493.5	4497	4500.5	4759.5	4763	4766.5	5025.5	5029	5032.5
4507.5	4511	4514.5	4773.5	4777	4780.5	5039.5	5043	5046.5
4521.5	4525	4528.5	4787.5	4791	4794.5			

North & East Cross-Sections

1. FG Tc or Tc undifferenciated
2. Tc LLT
3. Tc FG
4. Tc Vitrophyre
5. Tc FG Pink Porphyry — Tc
6. uBud — Bud
7. Porphyritic Auto Breccia
8. m Bud
9. BMB
10. L Bud — BUD
11. LBT massive AT — LBT
12. LBT Vitrophyre
13. LBT FG slightly planar laminated AT
14. LBT spotted/mottled/LST ... Tuff
15. LBT ms-cs volc mono? Breccia
16. LBT massive - Vitrophyre
17. LBT massive AT — LBT
18. Tos — Tos
19. South Ridge Fault Splay
20. South Ridge Fault Main
21. TD Prop (Green)
22. TD Brown (Hem) - Bel SRF
23. Porphyry (BMB) - Below SRF
24. Fault in 1
25. Bud/Tos in Footwall SRF
26. TD Auto Bx
27. TD FG vesicular
28. Stockworked TD
29. Vitrophyre Below SRF
30. R-E als
31. Tcs
32. FLT
33. FLT
34. Qal
35. CG Bud
36. Clay zone

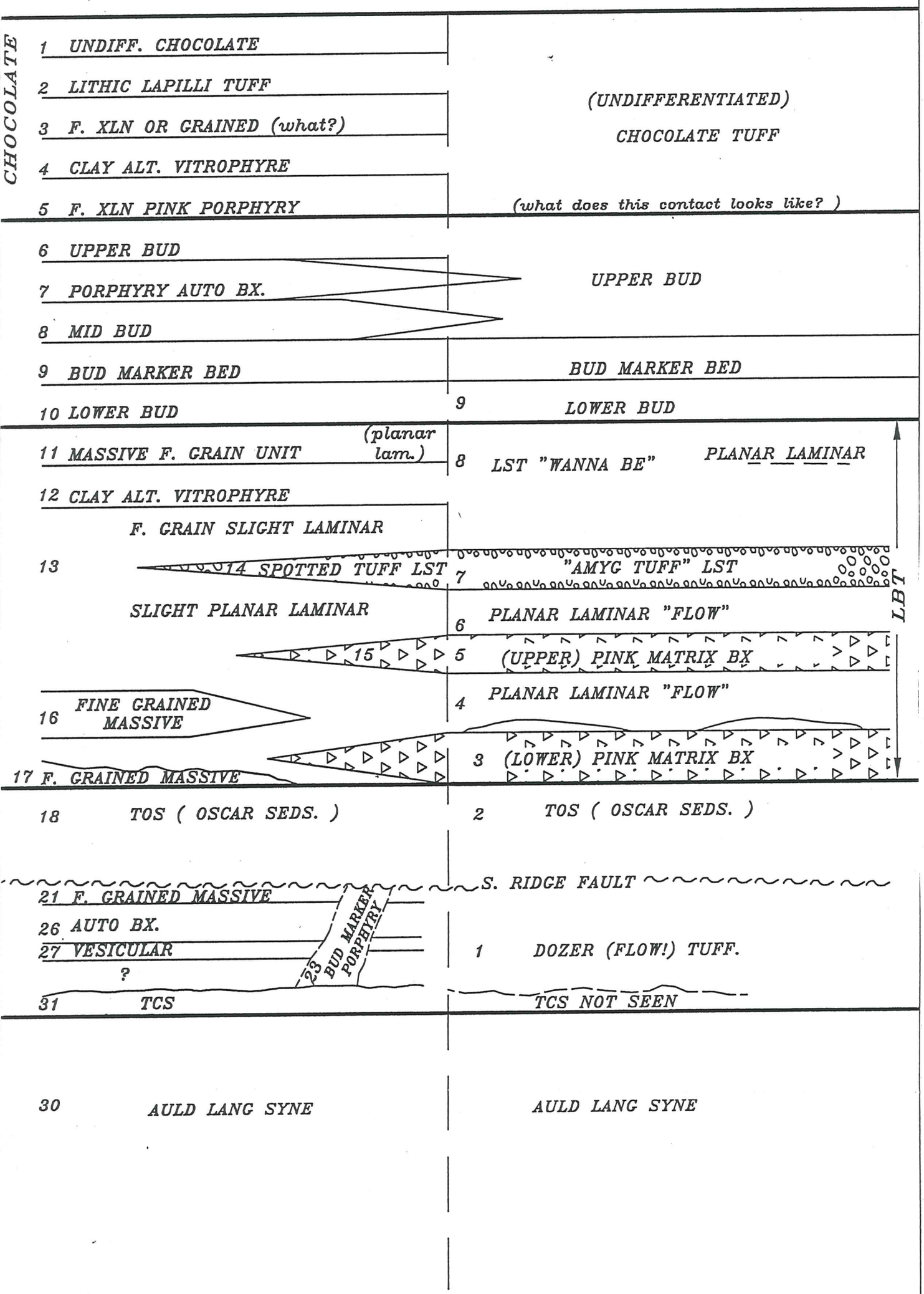
40 - Bore Hole Flt
41 - Bore Hole Flt
50 - Gen - Faults

Point 1

	4250	5250
	-2250	-750

Zset points
4250 5250
-2000 -500

ROSEBUD MINE STRATIGRAPHY



Note: LBT is NOT Lower Bud Tuff

Hecla Mining Company - Rosebud Mine Optimum Level Height - 5 Foot Base Case (> 0.010 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	26,690	0.089	26,690	2,375.4	102.30%	97.78%	100.03%
2	13,493	0.088	26,986	2,374.8	101.15%	98.87%	100.00%
3	9,028	0.087	27,084	2,356.3	100.00%	99.23%	99.23%
4	6,807	0.087	27,228	2,368.8	100.00%	99.75%	99.75%
5	5,459	0.087	27,295	2,374.7	100.00%	100.00%	100.00%
6	4,612	0.085	27,672	2,352.1	97.70%	101.38%	99.05%
7	3,974	0.085	27,818	2,364.5	97.70%	101.92%	99.57%
8	3,522	0.084	28,176	2,366.8	96.55%	103.23%	99.67%
9	3,147	0.083	28,323	2,350.8	95.40%	103.77%	99.00%
10	2,842	0.083	28,420	2,358.9	95.40%	104.12%	99.33%
11	2,606	0.082	28,666	2,350.6	94.25%	105.02%	98.99%
12	2,407	0.082	28,884	2,368.5	94.25%	105.82%	99.74%
13	2,236	0.081	29,068	2,354.5	93.10%	106.50%	99.15%
14	2,074	0.081	29,036	2,351.9	93.10%	106.38%	99.04%

Hecla Mining Company - Rosebud Mine Optimum Level Height - 7 Foot Base Case (> 0.010 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	26,690	0.089	26,690	2,375.4	104.71%	95.95%	100.46%
2	13,493	0.088	26,986	2,374.8	103.53%	97.01%	100.43%
3	9,028	0.087	27,084	2,356.3	102.35%	97.36%	99.65%
4	6,807	0.087	27,228	2,368.8	102.35%	97.88%	100.18%
5	5,459	0.087	27,295	2,374.7	102.35%	98.12%	100.43%
6	4,612	0.085	27,672	2,352.1	100.00%	99.48%	99.48%
7	3,974	0.085	27,818	2,364.5	100.00%	100.00%	100.00%
8	3,522	0.084	28,176	2,366.8	98.82%	101.29%	100.10%
9	3,147	0.083	28,323	2,350.8	97.65%	101.82%	99.42%
10	2,842	0.083	28,420	2,358.9	97.65%	102.16%	99.76%
11	2,606	0.082	28,666	2,350.6	96.47%	103.05%	99.41%
12	2,407	0.082	28,884	2,368.5	96.47%	103.83%	100.17%
13	2,236	0.081	29,068	2,354.5	95.29%	104.49%	99.58%
14	2,074	0.081	29,036	2,351.9	95.29%	104.38%	99.47%

Hecla Mining Company - Rosebud Mine Optimum Level Height - 5 Foot Base Case (> 0.050 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	7,875	0.249	7,875	1,960.9	104.62%	95.92%	100.35%
2	4,029	0.243	8,058	1,958.1	102.10%	98.15%	100.21%
3	2,700	0.241	8,100	1,952.1	101.26%	98.66%	99.90%
4	2,077	0.235	8,308	1,952.4	98.74%	101.19%	99.92%
5	1,642	0.238	8,210	1,954.0	100.00%	100.00%	100.00%
6	1,428	0.227	8,568	1,944.9	95.38%	104.36%	99.54%
7	1,234	0.225	8,638	1,943.6	94.54%	105.21%	99.47%
8	1,075	0.224	8,600	1,926.4	94.12%	104.75%	98.59%
9	975	0.220	8,775	1,930.5	92.44%	106.88%	98.80%
10	890	0.218	8,900	1,940.2	91.60%	108.40%	99.29%
11	798	0.218	8,778	1,913.6	91.60%	106.92%	97.93%
12	753	0.213	9,036	1,924.7	89.50%	110.06%	98.50%
13	701	0.210	9,113	1,913.7	88.24%	111.00%	97.94%
14	648	0.210	9,072	1,905.1	88.24%	110.50%	97.50%

Hecla Mining Company - Rosebud Mine Optimum Level Height - 7 Foot Base Case (> 0.050 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	7,875	0.249	7,875	1,960.9	110.67%	91.17%	100.89%
2	4,029	0.243	8,058	1,958.1	108.00%	93.29%	100.75%
3	2,700	0.241	8,100	1,952.1	107.11%	93.77%	100.44%
4	2,077	0.235	8,308	1,952.4	104.44%	96.18%	100.45%
5	1,642	0.238	8,210	1,954.0	105.78%	95.05%	100.54%
6	1,428	0.227	8,568	1,944.9	100.89%	99.19%	100.07%
7	1,234	0.225	8,638	1,943.6	100.00%	100.00%	100.00%
8	1,075	0.224	8,600	1,926.4	99.56%	99.56%	99.12%
9	975	0.220	8,775	1,930.5	97.78%	101.59%	99.33%
10	890	0.218	8,900	1,940.2	96.89%	103.03%	99.83%
11	798	0.218	8,778	1,913.6	96.89%	101.62%	98.46%
12	753	0.213	9,036	1,924.7	94.67%	104.61%	99.03%
13	701	0.210	9,113	1,913.7	93.33%	105.50%	98.47%
14	648	0.210	9,072	1,905.1	93.33%	105.02%	98.02%

Hecla Mining Company - Rosebud Mine

Optimum Level Height - 5 Foot Base Case (> 0.140 Au opt)

Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	3,254	0.483	3,254	1,571.7	104.32%	97.28%	101.48%
2	1,639	0.476	3,278	1,560.3	102.81%	98.00%	100.75%
3	1,124	0.463	3,372	1,561.2	100.00%	100.81%	100.81%
4	842	0.458	3,368	1,542.5	98.92%	100.69%	99.60%
5	669	0.463	3,345	1,548.7	100.00%	100.00%	100.00%
6	580	0.441	3,480	1,534.7	95.25%	104.04%	99.09%
7	499	0.436	3,493	1,522.9	94.17%	104.42%	98.33%
8	448	0.425	3,584	1,523.2	91.79%	107.14%	98.35%
9	390	0.427	3,510	1,498.8	92.22%	104.93%	96.77%
10	346	0.433	3,460	1,498.2	93.52%	103.44%	96.74%
11	320	0.423	3,520	1,489.0	91.36%	105.23%	96.14%
12	301	0.411	3,612	1,484.5	88.77%	107.98%	95.85%
13	278	0.406	3,614	1,467.3	87.69%	108.04%	94.74%
14	259	0.404	3,626	1,464.9	87.26%	108.40%	94.59%

Hecla Mining Company - Rosebud Mine

Optimum Level Height - 7 Foot Base Case (> 0.140 Au opt)

Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	3,254	0.483	3,254	1,571.7	110.78%	93.16%	103.20%
2	1,639	0.476	3,278	1,560.3	109.17%	93.84%	102.45%
3	1,124	0.463	3,372	1,561.2	106.19%	96.54%	102.51%
4	842	0.458	3,368	1,542.5	105.05%	96.42%	101.29%
5	669	0.463	3,345	1,548.7	106.19%	95.76%	101.69%
6	580	0.441	3,480	1,534.7	101.15%	99.63%	100.77%
7	499	0.436	3,493	1,522.9	100.00%	100.00%	100.00%
8	448	0.425	3,584	1,523.2	97.48%	102.61%	100.02%
9	390	0.427	3,510	1,498.8	97.94%	100.49%	98.41%
10	346	0.433	3,460	1,498.2	99.31%	99.06%	98.37%
11	320	0.423	3,520	1,489.0	97.02%	100.77%	97.77%
12	301	0.411	3,612	1,484.5	94.27%	103.41%	97.48%
13	278	0.406	3,614	1,467.3	93.12%	103.46%	96.34%
14	259	0.404	3,626	1,464.9	92.66%	103.81%	96.19%

Cindy Moore

From: Ristorcelli, Steve [stever@mda.com]
Sent: Monday, September 14, 1998 7:29 AM
To: 'Cindy Moore'
Subject: RE: Rosebud Resources

Cindy,
Busy! I sure hope you are enjoying your spare time; there would not have been that much here (which is better than the alternative and we are gratefull).
For your interest, Mojon numbers just came out. There were 56 models based on rock, area, and modeling parameters. Macro hell! But it looks like a very good model and estimate. Now we are looking at the check assays to see if the data is OK!?!?!?!

Re: Rosebud. Use the following format:
Column 1:Bench height (self-explanatory)
Column 2:Number of samples (self-explanatory)
Column 3:Mean grade (self-explanatory)
Column 4:Relative tons (# smpls * bench height)
Column 5:Relative ounces (C4*C3)
Column 6:% of mean % of mean grade (5ft=base case)
Column 7:% of tons (5ft=base case)
Column 7:% of ounces (5ft=base case)

Make 5 ft the smallest interval and use that as the base case for 100% and make the others a % of that.
Call if you have anymore questions.
Steve
-----Original Message-----
From: Cindy Moore [mailto:cmoore@hecla-mining.com]
Sent: Monday, September 14, 1998 6:49 AM
To: 'stever@mda.com'
Subject: Rosebud Resources

Steve:

Hi, how are things? Could you do me a favor please? I guess you talked

with Kurt on Wednesday and told him to do downhole composites to evaluate
the most optimum level height. I did this same thing for Vueltas before I
left. Could you please send me through e-mail the spreadsheet, or an example on the fax at 623-6967? I just need an example of how the spreadsheet was put together. Thanks a lot.

Cindy

Cindy Moore
Hecla Mining Company
Rosebud Mine

```
Variable       : 1 ft. Au (>0.010)
Transformation: x

Number of samples: 26690
Minimum          :   0.010
Maximum          :   8.250

Mean                     :   0.089
Variance                 :   0.073
Standard deviation       :   0.269
Coefficient of variation:   3.041

Skewness:  12.929
Kurtosis: 263.953

Median  :   0.026
Trimean :   0.032
Biweight:   0.029
MAD     :   0.016
Alpha   :  -0.009
Sichel-t:    1.13
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable      : 2 ft. Au (>0.010)
Transformation: x

Number of samples: 13493
Minimum          :   0.010
Maximum          :   7.479

Mean                     :   0.088
Variance                 :   0.067
Standard deviation       :   0.258
Coefficient of variation:   2.947

Skewness:  12.142
Kurtosis: 231.654

Median  :   0.026
Trimean :   0.032
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.009
Sichel-t:    1.13

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---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 3 ft. Au (>0.010)
Transformation: x

Number of samples: 9028
Minimum          :   0.010
Maximum          :   7.479

Mean                     :   0.087
Variance                 :   0.064
Standard deviation       :   0.253
Coefficient of variation:   2.905

Skewness:  12.381
Kurtosis: 244.828

Median  :   0.026
Trimean :   0.033
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.009
Sichel-t:    1.13

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---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 4 ft. Au (>0.010)
Transformation: x

Number of samples: 6807
Minimum          :   0.010
Maximum          :   5.784

Mean                     :   0.087
Variance                 :   0.058
Standard deviation       :   0.240
Coefficient of variation:   2.769

Skewness:  10.791
Kurtosis: 181.521

Median  :   0.026
Trimean :   0.033
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:    1.12

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Variable : 5 ft. Au (>0.010)
Transformation: x

Number of samples: 5459
Minimum : 0.010
Maximum : 7.479

Mean : 0.087
Variance : 0.061
Standard deviation : 0.248
Coefficient of variation: 2.864

Skewness: 12.381
Kurtosis: 251.229

Median : 0.026
Trimean : 0.033
Biweight: 0.030
MAD : 0.017
Alpha : -0.010
Sichel-t: 1.12

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---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 6 ft. Au (>0.010)
Transformation: x

Number of samples: 4612
Minimum          :   0.010
Maximum          :   4.258

Mean                     :   0.085
Variance                 :   0.050
Standard deviation       :   0.223
Coefficient of variation:   2.616

Skewness:   9.003
Kurtosis: 118.739

Median  :   0.027
Trimean :   0.033
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:    1.12

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```
Variable       : 7 ft. Au (>0.010)
Transformation: x

Number of samples: 3974
Minimum          :   0.010
Maximum          :   5.352

Mean                     :   0.085
Variance                 :   0.050
Standard deviation       :   0.224
Coefficient of variation:   2.648

Skewness:  10.286
Kurtosis: 164.373

Median  :   0.027
Trimean :   0.033
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:    1.12
```

```
Variable      : 8 ft. Au (>0.010)
Transformation: x

Number of samples: 3522
Minimum          :   0.010
Maximum          :   3.206

Mean                     :   0.084
Variance                 :   0.042
Standard deviation       :   0.204
Coefficient of variation:   2.441

Skewness:   7.715
Kurtosis:  86.048

Median  :   0.026
Trimean :   0.033
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:    1.11
```

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---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 9 ft. Au (>0.010)
Transformation: x

Number of samples: 3147
Minimum          :   0.010
Maximum          :   3.157

Mean                     :   0.083
Variance                 :   0.041
Standard deviation       :   0.202
Coefficient of variation:   2.431

Skewness:   7.516
Kurtosis:  80.904

Median  :   0.026
Trimean :   0.033
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:    1.11

---------------------------------------------------------------------
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---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable      : 10 ft. Au (>0.010)
Transformation: x

Number of samples: 2842
Minimum          :   0.010
Maximum          :   3.821

Mean                     :   0.083
Variance                 :   0.043
Standard deviation       :   0.207
Coefficient of variation:   2.493

Skewness:   8.619
Kurtosis: 113.683

Median  :   0.026
Trimean :   0.033
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:    1.11

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---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 11 ft. Au (>0.010)
Transformation: x

Number of samples: 2606
Minimum          :   0.010
Maximum          :   3.409

Mean                     :   0.082
Variance                 :   0.039
Standard deviation       :   0.197
Coefficient of variation:   2.399

Skewness:   7.623
Kurtosis:  86.004

Median  :   0.027
Trimean :   0.034
Biweight:   0.031
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:    1.11

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```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 12 ft. Au (>0.010)
Transformation: x

Number of samples: 2407
Minimum          :   0.010
Maximum          :   2.775

Mean                     :   0.082
Variance                 :   0.036
Standard deviation       :   0.190
Coefficient of variation:   2.323

Skewness:   6.771
Kurtosis:  63.872

Median  :   0.027
Trimean :   0.033
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:     1.1

---------------------------------------------------------------------
```

```
Variable       : 13 ft. Au (>0.010)
Transformation: x

Number of samples: 2236
Minimum          :   0.010
Maximum          :   2.888

Mean                     :   0.081
Variance                 :   0.036
Standard deviation       :   0.190
Coefficient of variation:   2.350

Skewness:   7.322
Kurtosis:  76.210

Median  :   0.027
Trimean :   0.033
Biweight:   0.031
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:     1.1
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 14 ft. Au (>0.010)
Transformation: x

Number of samples: 2074
Minimum          :   0.010
Maximum          :   2.704

Mean                     :   0.081
Variance                 :   0.035
Standard deviation       :   0.187
Coefficient of variation:   2.318

Skewness:   7.235
Kurtosis:  74.515

Median  :   0.027
Trimean :   0.033
Biweight:   0.030
MAD     :   0.017
Alpha   :  -0.010
Sichel-t:     1.1

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 1 ft. Au (> 0.050)
Transformation: x

Number of samples: 7875
Minimum          :   0.050
Maximum          :   8.250

Mean                     :   0.249
Variance                 :   0.209
Standard deviation       :   0.457
Coefficient of variation:   1.834

Skewness:   7.873
Kurtosis:  95.982

Median  :   0.117
Trimean :   0.135
Biweight:   0.128
MAD     :   0.061
Alpha   :  -0.048
Sichel-t:    1.42

---------------------------------------------------------------------
```

```
Variable      : 2 ft. Au (> 0.050)
Transformation: x

Number of samples: 4029
Minimum          :   0.050
Maximum          :   7.479

Mean                     :   0.243
Variance                 :   0.188
Standard deviation       :   0.434
Coefficient of variation:   1.784

Skewness:   7.444
Kurtosis:  85.639

Median  :   0.115
Trimean :   0.133
Biweight:   0.126
MAD     :   0.060
Alpha   :  -0.048
Sichel-t:     1.4
```

Variable : 3 ft. Au (> 0.050)
Transformation: x

Number of samples: 2700
Minimum : 0.050
Maximum : 7.479

Mean : 0.241
Variance : 0.181
Standard deviation : 0.425
Coefficient of variation: 1.761

Skewness: 7.653
Kurtosis: 91.618

Median : 0.116
Trimean : 0.135
Biweight: 0.128
MAD : 0.062
Alpha : -0.048
Sichel-t: 1.39

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 4 ft. Au (> 0.050)
Transformation: x

Number of samples: 2077
Minimum          :   0.050
Maximum          :   5.784

Mean                     :   0.235
Variance                 :   0.157
Standard deviation       :   0.396
Coefficient of variation:   1.686

Skewness:   6.703
Kurtosis:  69.292

Median  :   0.112
Trimean :   0.131
Biweight:   0.124
MAD     :   0.059
Alpha   :  -0.048
Sichel-t:    1.37

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 5 ft. Au (> 0.050)
Transformation: x

Number of samples: 1642
Minimum          :   0.050
Maximum          :   7.479

Mean                     :   0.238
Variance                 :   0.171
Standard deviation       :   0.414
Coefficient of variation:   1.741

Skewness:   7.706
Kurtosis:  95.360

Median  :   0.114
Trimean :   0.134
Biweight:   0.127
MAD     :   0.061
Alpha   :  -0.049
Sichel-t:    1.38

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS            14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 6 ft. Au (> 0.050)
Transformation: x

Number of samples: 1428
Minimum          :   0.050
Maximum          :   4.258

Mean                     :   0.227
Variance                 :   0.131
Standard deviation       :   0.362
Coefficient of variation:   1.595

Skewness:   5.563
Kurtosis:  45.431

Median  :   0.108
Trimean :   0.127
Biweight:   0.122
MAD     :   0.058
Alpha   :  -0.048
Sichel-t:    1.34

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 7 ft. Au (> 0.050)
Transformation: x

Number of samples: 1234
Minimum          :   0.050
Maximum          :   5.352

Mean                     :   0.225
Variance                 :   0.133
Standard deviation       :   0.365
Coefficient of variation:   1.624

Skewness:   6.484
Kurtosis:  64.529

Median  :   0.110
Trimean :   0.129
Biweight:   0.125
MAD     :   0.062
Alpha   :  -0.047
Sichel-t:    1.34

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 8 ft. Au (> 0.050)
Transformation: x

Number of samples: 1075
Minimum          :   0.050
Maximum          :   3.206

Mean                     :   0.224
Variance                 :   0.108
Standard deviation       :   0.328
Coefficient of variation:   1.463

Skewness:   4.730
Kurtosis:  32.915

Median  :   0.114
Trimean :   0.133
Biweight:   0.129
MAD     :   0.064
Alpha   :  -0.046
Sichel-t:    1.32

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS            14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 9 ft. Au (> 0.050)
Transformation: x

Number of samples: 975
Minimum          :   0.050
Maximum          :   3.157

Mean                     :   0.220
Variance                 :   0.104
Standard deviation       :   0.323
Coefficient of variation:   1.469

Skewness:   4.601
Kurtosis:  31.012

Median  :   0.111
Trimean :   0.127
Biweight:   0.122
MAD     :   0.059
Alpha   :  -0.047
Sichel-t:    1.31

---------------------------------------------------------------------
```

```
Variable       : 10 ft. Au (> 0.050)
Transformation: x

Number of samples: 890
Minimum          :   0.050
Maximum          :   3.821

Mean                     :   0.218
Variance                 :   0.110
Standard deviation       :   0.332
Coefficient of variation:   1.524

Skewness:   5.408
Kurtosis:  45.131

Median  :   0.110
Trimean :   0.125
Biweight:   0.119
MAD     :   0.057
Alpha   :  -0.046
Sichel-t:    1.31
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 11 ft. Au (> 0.050)
Transformation: x

Number of samples: 798
Minimum          :   0.050
Maximum          :   3.409

Mean                     :   0.218
Variance                 :   0.100
Standard deviation       :   0.316
Coefficient of variation:   1.447

Skewness:   4.683
Kurtosis:  33.267

Median  :   0.112
Trimean :   0.130
Biweight:   0.125
MAD     :   0.061
Alpha   :  -0.047
Sichel-t:    1.31

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 12 ft. Au (> 0.050)
Transformation: x

Number of samples: 753
Minimum          :   0.050
Maximum          :   2.775

Mean                     :   0.213
Variance                 :   0.090
Standard deviation       :   0.299
Coefficient of variation:   1.408

Skewness:   4.117
Kurtosis:  24.425

Median  :   0.111
Trimean :   0.127
Biweight:   0.122
MAD     :   0.060
Alpha   :  -0.046
Sichel-t:    1.29

---------------------------------------------------------------------
```

```
-----------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
-----------------------------------------------------------------------

Variable       : 13 ft. Au (> 0.050)
Transformation: x

Number of samples: 701
Minimum          :   0.050
Maximum          :   2.888

Mean                     :   0.210
Variance                 :   0.090
Standard deviation       :   0.301
Coefficient of variation:   1.432

Skewness:   4.527
Kurtosis:  29.697

Median  :   0.108
Trimean :   0.125
Biweight:   0.121
MAD     :   0.058
Alpha   :  -0.046
Sichel-t:    1.29

-----------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 14 ft. Au (> 0.050)
Transformation: x

Number of samples: 648
Minimum          :   0.050
Maximum          :   2.704

Mean                     :   0.210
Variance                 :   0.088
Standard deviation       :   0.296
Coefficient of variation:   1.409

Skewness:   4.485
Kurtosis:  29.157

Median  :   0.111
Trimean :   0.128
Biweight:   0.123
MAD     :   0.061
Alpha   :  -0.045
Sichel-t:    1.29

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable      : 1 ft. Au ( >0.140)
Transformation: x

Number of samples: 3254
Minimum          :   0.140
Maximum          :   8.250

Mean                     :   0.483
Variance                 :   0.412
Standard deviation       :   0.642
Coefficient of variation:   1.328

Skewness:   5.775
Kurtosis:  50.621

Median  :   0.280
Trimean :   0.316
Biweight:   0.307
MAD     :   0.128
Alpha   :  -0.128
Sichel-t:    1.99

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------------

Variable       : 2 ft. Au ( >0.140)
Transformation: x

Number of samples: 1639
Minimum          :   0.140
Maximum          :   7.479

Mean                     :   0.476
Variance                 :   0.371
Standard deviation       :   0.609
Coefficient of variation:   1.280

Skewness:   5.446
Kurtosis:  45.036

Median  :   0.284
Trimean :   0.316
Biweight:   0.306
MAD     :   0.128
Alpha   :  -0.128
Sichel-t:    1.94

---------------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 3 ft. Au ( >0.140)
Transformation: x

Number of samples: 1124
Minimum          :   0.140
Maximum          :   7.479

Mean                     :   0.463
Variance                 :   0.348
Standard deviation       :   0.590
Coefficient of variation:   1.275

Skewness:   5.702
Kurtosis:  49.603

Median  :   0.278
Trimean :   0.311
Biweight:   0.301
MAD     :   0.124
Alpha   :  -0.129
Sichel-t:    1.89

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 4 ft. Au ( >0.140)
Transformation: x

Number of samples: 842
Minimum          :   0.140
Maximum          :   5.784

Mean                     :   0.458
Variance                 :   0.302
Standard deviation       :   0.550
Coefficient of variation:   1.200

Skewness:   4.931
Kurtosis:  37.014

Median  :   0.280
Trimean :   0.310
Biweight:   0.300
MAD     :   0.124
Alpha   :  -0.125
Sichel-t:    1.84

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 5 ft. Au ( >0.140)
Transformation: x

Number of samples: 669
Minimum          :   0.140
Maximum          :   7.479

Mean                     :   0.463
Variance                 :   0.334
Standard deviation       :   0.578
Coefficient of variation:   1.250

Skewness:   5.742
Kurtosis:  51.590

Median  :   0.287
Trimean :   0.317
Biweight:   0.307
MAD     :   0.130
Alpha   :  -0.122
Sichel-t:    1.88

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------------

Variable       : 6 ft. Au ( >0.140)
Transformation: x

Number of samples: 580
Minimum          :   0.140
Maximum          :   4.258

Mean                     :   0.441
Variance                 :   0.245
Standard deviation       :   0.495
Coefficient of variation:   1.123

Skewness:   4.027
Kurtosis:  23.918

Median  :   0.272
Trimean :   0.303
Biweight:   0.295
MAD     :   0.121
Alpha   :  -0.132
Sichel-t:    1.76

---------------------------------------------------------------------------
```

```
---------------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------------

Variable       : 7 ft. Au ( >0.140)
Transformation: x

Number of samples: 499
Minimum          :   0.140
Maximum          :   5.352

Mean                     :   0.436
Variance                 :   0.254
Standard deviation       :   0.504
Coefficient of variation:   1.154

Skewness:   4.813
Kurtosis:  34.895

Median  :   0.274
Trimean :   0.299
Biweight:   0.288
MAD     :   0.107
Alpha   :  -0.130
Sichel-t:    1.76

---------------------------------------------------------------------------
```

```
---------------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------------

Variable       : 8 ft. Au ( >0.140)
Transformation: x

Number of samples: 448
Minimum          :   0.140
Maximum          :   3.206

Mean                     :   0.425
Variance                 :   0.189
Standard deviation       :   0.435
Coefficient of variation:   1.023

Skewness:   3.463
Kurtosis:  17.968

Median  :   0.274
Trimean :   0.298
Biweight:   0.286
MAD     :   0.108
Alpha   :  -0.132
Sichel-t:    1.68

---------------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 9 ft. Au ( >0.140)
Transformation: x

Number of samples: 390
Minimum          :   0.140
Maximum          :   3.157

Mean                     :   0.427
Variance                 :   0.188
Standard deviation       :   0.434
Coefficient of variation:   1.016

Skewness:   3.255
Kurtosis:  16.140

Median  :   0.273
Trimean :   0.299
Biweight:   0.286
MAD     :   0.115
Alpha   :  -0.127
Sichel-t:    1.68

---------------------------------------------------------------------
```

Variable : 10 ft. Au (>0.140)
Transformation: x

Number of samples: 346
Minimum : 0.140
Maximum : 3.821

Mean : 0.433
Variance : 0.206
Standard deviation : 0.454
Coefficient of variation: 1.049

Skewness: 3.937
Kurtosis: 24.145

Median : 0.267
Trimean : 0.295
Biweight: 0.287
MAD : 0.106
Alpha : -0.140
Sichel-t: 1.71

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 11 ft. Au ( >0.140)
Transformation: x

Number of samples: 320
Minimum          :   0.141
Maximum          :   3.409

Mean                     :   0.423
Variance                 :   0.179
Standard deviation       :   0.423
Coefficient of variation:   1.001

Skewness:   3.375
Kurtosis:  17.932

Median  :   0.274
Trimean :   0.300
Biweight:   0.289
MAD     :   0.109
Alpha   :  -0.127
Sichel-t:    1.67

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              14-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 12 ft. Au ( >0.140)
Transformation: x

Number of samples: 301
Minimum          :   0.140
Maximum          :   2.775

Mean                     :   0.411
Variance                 :   0.157
Standard deviation       :   0.397
Coefficient of variation:   0.964

Skewness:   2.858
Kurtosis:  12.492

Median  :   0.260
Trimean :   0.289
Biweight:   0.278
MAD     :   0.108
Alpha   :  -0.133
Sichel-t:    1.63

---------------------------------------------------------------------
```

Variable : 13 ft. Au (>0.140)
Transformation: x

Number of samples: 278
Minimum : 0.140
Maximum : 2.888

Mean : 0.406
Variance : 0.163
Standard deviation : 0.404
Coefficient of variation: 0.993

Skewness: 3.196
Kurtosis: 15.324

Median : 0.262
Trimean : 0.287
Biweight: 0.279
MAD : 0.107
Alpha : -0.124
Sichel-t: 1.63

INTERNATIONAL

Variable : 14 ft. Au (>0.140)
Transformation: x

Number of samples: 259
Minimum : 0.140
Maximum : 2.704

Mean : 0.404
Variance : 0.155
Standard deviation : 0.394
Coefficient of variation: 0.976

Skewness: 3.209
Kurtosis: 15.308

Median : 0.265
Trimean : 0.293
Biweight: 0.279
MAD : 0.100
Alpha : -0.130
Sichel-t: 1.62

SURPAC DRILL HOLE COLLAR SUMMARY Date : 22-Sep-98

HOLE ID	NORTHING	EASTING	ELEVATION	DEPTH	DIP	AZIMUTH
94_307C	2204154.00	482211.90	5374.00	610.00	-89.00	233.50
94_308C	2203943.98	482511.88	5286.02	800.00	-90.00	35.50
94_309C	2203854.95	482625.48	5298.95	800.00	-89.50	69.50
94_310C	2203779.65	482730.86	5315.10	700.00	-90.00	76.50
94_313C	2204250.30	482240.50	5389.00	1048.00	-89.00	274.50
94_314C	2204012.36	482577.59	5295.07	800.00	-89.50	314.50
94_315C	2203869.31	482763.78	5313.65	751.00	-88.50	349.50
94_316C	2203727.72	482980.13	5341.90	703.00	-90.00	128.50
94_318C	2204307.90	482245.10	5397.20	1100.00	-89.50	258.50
94_319C	2204169.20	482460.70	5314.33	900.00	-89.50	87.50
94_320C	2204040.11	482635.21	5298.96	800.00	-89.50	343.50
94_321C	2203953.61	482752.83	5311.80	752.00	-89.50	82.50
94_323C	2204304.00	482356.30	5369.80	1000.00	-90.00	108.50
94_324C	2203959.04	482830.56	5318.13	787.00	-89.00	322.00
94_325C	2203889.22	482925.91	5329.17	752.00	-90.00	34.50
94_327C	2204283.00	482458.00	5345.00	1000.00	-90.00	91.00
94_328C	2204164.31	482629.60	5287.69	850.00	-90.00	276.50
94_329C	2204067.66	482758.36	5302.23	800.00	-88.00	37.00
94_330C	2203831.88	483084.58	5345.77	702.00	-89.50	303.00
94_331C	2204045.45	482892.74	5318.44	800.00	-88.50	198.50
94_332C	2203942.88	483032.82	5334.12	698.00	-89.00	116.00
94_333C	2204168.53	482781.67	5308.01	798.00	-90.00	8.50
94_334C	2204460.60	482472.00	5351.40	1110.00	-88.50	317.50
94_335C	2204340.80	482631.10	5316.88	1050.00	-90.00	60.50
94_336C	2204109.88	482961.91	5321.39	800.00	-89.00	45.00
94_337C	2204016.90	483098.35	5335.77	750.00	-89.50	242.00
94_338C	2203952.39	483207.20	5349.36	701.00	-89.00	294.50
94_339C	2204438.70	482592.30	5330.47	950.00	-90.00	116.00
94_340C	2204017.88	483184.33	5345.75	751.50	-87.50	105.50
95_342C	2203370.10	482289.76	5333.81	470.00	-88.99	70.00
95_345C	2203797.40	483305.63	5362.94	712.80	-88.99	125.00
95_346C	2203727.97	483393.74	5382.00	1055.00	-88.99	342.50
95_347C	2203732.90	483457.56	5380.46	598.00	-88.99	228.00
95_348C	2203826.06	483676.55	5389.78	770.00	-58.99	221.99
95_350C	2203515.88	483584.05	5408.26	1168.00	-88.99	342.50
95_352C	2204071.36	483906.58	5395.17	922.00	-59.99	217.99
95_353C	2203750.27	483783.59	5408.39	922.00	-88.00	225.99
95_355A	2204241.22	483731.00	5366.10	850.00	-70.00	213.00
95_355C	2204243.40	483722.76	5365.64	710.00	-70.00	213.00
96_368	2203849.00	482311.50	5260.90	920.00	-44.47	138.29
97_379C	2203748.00	482699.00	5317.00	804.00	-89.44	104.13
DHET_258_98	2203864.48	482793.68	4636.65	250.00	31.50	302.50
DHET_260_98	2203904.48	482838.86	4638.97	200.00	44.50	304.70
DHET_261_98	2203953.13	482844.67	4625.00	220.00	2.00	306.20
DHET_262A_98	2203946.53	482839.70	4625.51	200.00	9.50	316.70
D_154_97	2203944.86	482838.84	4624.89	230.00	-1.00	320.00
D_157_98	2203939.97	482844.24	4631.09	120.00	65.00	295.00
D_158_98	2203940.14	482845.01	4631.10	140.00	65.00	92.00
D_161_98	2203944.77	482842.36	4631.42	120.00	42.00	303.70
D_162_98	2203944.87	482844.13	4630.98	120.00	86.50	129.20
D_163_98	2203943.36	482846.14	4630.22	150.00	68.00	137.70
D_167_98	2203928.89	482832.94	4635.29	83.00	46.50	302.70
D_168_98	2203925.74	482839.54	4633.23	90.00	77.00	303.70

D_169_98	2203925.57	482840.63	4633.00	140.00	65.00	121.20
D_171_98	2203904.46	482826.54	4639.02	94.00	59.50	293.70
D_178_98	2203880.56	482817.63	4642.95	100.00	79.00	301.70
D_184_98	2203863.21	482795.76	4646.70	81.00	45.50	302.20
D_185_98	2203858.95	482802.56	4646.24	80.00	86.00	297.70
D_186_98	2203856.74	482762.01	4637.72	199.00	-40.50	307.70
D_191_98	2203853.98	482766.49	4648.36	75.00	85.00	125.70
D_192_98	2203851.11	482770.74	4648.39	140.00	54.50	126.70
D_197A_98	2203769.63	483094.57	4707.95	130.00	62.00	329.20
D_197_98	2203770.86	483092.73	4708.07	130.00	62.50	321.70
D_198_98	2203767.43	483093.78	4707.91	140.00	81.00	359.70
D_199_98	2203768.96	483091.41	4707.80	160.00	85.00	334.70
D_202_98	2203771.66	483091.39	4707.40	130.00	54.00	305.20
D_203_98	2203769.39	483094.08	4707.30	130.00	70.50	304.70
D_204_98	2203767.96	483095.91	4707.34	130.00	84.00	298.70
D_205_98	2203770.82	483093.33	4708.15	150.00	79.00	130.70
D_209_98	2203756.98	483082.03	4705.26	150.00	47.50	302.70
D_210_98	2203754.43	483085.38	4706.08	140.00	68.50	303.70
D_211_98	2203752.64	483086.54	4705.94	130.00	79.00	305.70
D_212_98	2203756.44	483082.89	4706.15	150.00	83.00	148.30
D_215_98	2203738.65	483064.47	4704.36	160.00	43.50	304.20
D_216_98	2203736.12	483068.04	4703.87	140.00	61.50	306.20
D_217_98	2203734.39	483070.32	4705.60	140.00	75.50	306.70
D_218_98	2203732.68	483071.53	4705.20	140.00	88.00	4.30
D_219_98	2203734.73	483069.34	4705.45	180.00	71.00	126.70
D_223_98	2203718.59	483050.94	4703.35	145.00	49.50	304.70
D_224_98	2203715.95	483054.60	4703.81	135.00	72.50	305.70
D_227_98	2203701.97	483033.78	4701.78	180.00	37.00	303.70
D_230_98	2203673.98	483026.70	4702.26	140.00	49.50	126.20
KM2	2203868.00	483400.30	5370.30	605.00	-90.00	.00
KM3	2204028.00	482194.60	5335.00	974.50	-88.00	276.00
KM5	2204907.00	483078.50	5363.30	400.00	-90.00	.00
RL10	2204004.00	482025.30	5323.90	832.00	-58.00	144.00
RL100C	2204656.00	481915.70	5269.00	1168.50	-60.00	125.00
RL101C	2204719.00	481996.50	5273.00	1123.50	-59.00	126.00
RL106C	2204662.00	482091.70	5300.90	1237.00	-60.00	129.00
RL107C	2204326.00	481702.10	5257.20	1030.00	-55.00	128.00
RL109C	2204609.00	481989.00	5296.70	1247.00	-60.00	129.00
RL131C	2203960.00	482601.90	5298.70	1078.00	-90.00	.00
RL141	2204301.00	483189.40	5324.90	1155.00	-60.00	125.00
RL142	2203896.00	483417.50	5369.90	845.00	-60.00	125.00
RL143	2205647.00	483234.90	5376.10	1005.00	-60.00	129.00
RL145	2204001.00	482623.30	5301.40	700.00	-60.00	125.00
RL146	2203782.00	483195.70	5360.20	665.00	-60.00	125.00
RL147	2204260.00	483792.50	5373.40	605.00	-60.00	125.00
RL149	2203430.00	482619.70	5351.50	545.00	-60.00	140.00
RL163	2203723.00	482599.20	5312.40	600.00	-60.00	125.00
RL165C	2204299.00	481924.00	5318.80	1032.00	-75.00	125.00
RL168	2203876.00	483023.70	5337.10	720.00	-88.70	54.50
RL169	2203872.00	482692.90	5308.20	780.00	-89.50	208.50
RL170	2203963.00	482905.10	5322.40	853.00	-89.40	158.90
RL178	2203873.00	482339.00	5265.00	850.00	-89.00	42.20
RL179	2203857.00	482545.00	5294.00	1020.00	-89.30	36.80
RL17C	2204370.00	481803.50	5275.40	1065.00	-61.00	144.00
RL180	2203802.00	482814.00	5322.00	685.00	-89.00	98.30
RL181	2204114.00	483193.00	5339.00	935.00	-88.60	162.90
RL182	2203720.00	482602.00	5312.00	785.00	-88.10	96.30
RL183	2203793.00	483148.00	5355.00	600.00	-88.30	97.90
RL184	2204278.00	483311.00	5333.00	900.00	-90.00	.00
RL185	2204225.00	482707.00	5295.00	1000.00	-90.00	.00

RL186	2204030.00	482806.00	5312.00	845.00	-88.70	14.60
RL187	2203807.00	482961.00	5336.00	750.00	-89.00	113.20
RL188	2203718.00	483065.00	5351.00	685.00	-90.00	.00
RL189	2203591.00	483087.00	5366.00	675.00	-90.00	.00
RL190	2203613.00	482892.00	5345.00	635.00	-90.00	.00
RL191C	2203994.00	483022.00	5332.00	903.00	-89.30	342.00
RL198C	2203811.00	482953.00	5334.00	745.50	-88.20	339.00
RL199C	2204214.00	482392.00	5338.00	1277.00	-66.90	300.00
RL200C	2203915.00	483148.00	5345.00	873.00	-90.00	.00
RL201C	2203987.00	482701.00	5307.00	881.00	-88.20	311.00
RL204C	2204108.00	482880.00	5316.00	878.00	-90.00	.00
RL205C	2203722.00	482904.00	5337.00	722.50	-90.00	.00
RL206C	2204105.00	482705.00	5299.00	878.50	-90.00	.00
RL207C	2204022.00	482457.00	5279.00	1023.00	-90.00	.00
RL211	2203535.00	482993.00	5364.00	680.00	-90.00	.00
RL212	2203737.00	482715.00	5318.00	1065.00	-90.00	.00
RL213	2203966.00	483597.00	5376.00	865.00	-90.00	.00
RL214	2203670.00	483494.00	5389.00	1000.00	-90.00	.00
RL215	2203605.00	483228.00	5374.00	825.00	-90.00	.00
RL216	2203587.00	482389.00	5308.00	600.00	-90.00	.00
RL217	2203780.00	483731.00	5401.00	825.00	-90.00	.00
RL218	2203946.00	483415.00	5366.00	940.00	-90.00	.00
RL219	2203939.00	483809.00	5394.00	1000.00	-90.00	.00
RL220	2203557.00	483655.00	5412.00	865.00	-90.00	.00
RL221	2204090.00	482551.00	5281.00	935.00	-90.00	.00
RL222	2204288.00	482972.00	5311.00	1000.00	-90.00	.00
RL242C	2203846.00	483154.00	5347.00	698.00	-90.00	.00
RL243C	2204081.00	483085.00	5333.00	803.00	-90.00	.00
RL245	2203668.00	483897.00	5431.00	900.00	-90.00	.00
RL248	2203415.00	483679.00	5423.00	525.00	-90.00	.00
RL249	2203807.00	483867.00	5410.00	785.00	-90.00	.00
RL253	2203600.00	483615.00	5402.00	560.00	-60.00	125.00
RL255	2203700.00	483590.00	5401.00	500.00	-60.70	126.00
RL256	2203367.00	482354.00	5339.00	600.00	-89.60	96.90
RL258	2203851.00	483597.00	5384.70	900.00	-89.70	48.10
RL259	2203857.00	483402.00	5370.90	920.00	-90.00	.00
RL261C	2204079.00	483220.00	5344.80	1210.00	-61.50	224.00
RL264C	2204207.00	483348.00	5338.40	1003.00	-61.00	221.00
RL266	2203651.00	483404.00	5384.80	700.00	-70.80	42.00
RL269	2203399.00	482659.00	5359.90	550.00	-89.40	179.70
RL270C	2203631.00	483551.00	5394.60	933.00	-88.50	17.00
RL272	2203403.00	482651.00	5358.90	640.00	-60.00	220.00
RL273	2203793.00	483327.00	5365.10	700.00	-61.60	126.30
RL275	2203395.00	482660.00	5359.30	400.00	-67.00	179.30
RL277	2203477.60	483373.00	5400.90	500.00	-60.00	35.00
RL278	2203604.40	483194.90	5372.80	605.00	-60.00	35.00
RL279	2203748.60	483598.80	5392.80	805.00	-70.00	35.00
RL283	2203422.80	482479.90	5341.40	425.00	-60.00	215.00
RL285	2203942.80	483270.10	5358.60	725.00	-90.00	.00
RL286C	2203385.10	483525.10	5419.60	1077.00	-59.00	35.00
RL288C	2203721.80	483344.70	5374.00	1012.00	-60.00	35.00
RL61	2203725.00	482596.00	5311.50	945.00	-63.00	305.00
RL68	2203361.00	482583.50	5363.50	715.00	-60.00	305.00
RL69A	2203962.00	482600.80	5298.60	1179.00	-62.00	305.00
RL70C	2204177.00	481707.40	5255.90	1012.00	-68.50	125.00
RL89C	2204136.00	482664.20	5298.30	1152.00	-60.00	306.00
RL94C	2204457.00	482195.20	5376.00	1199.00	-60.00	125.00
RL95C	2204598.00	482727.30	5330.70	1270.00	-60.00	125.00
RL97C	2204524.00	481967.70	5304.50	1252.00	-63.00	125.00
RL99C	2204431.00	481909.90	5302.30	1242.00	-58.50	125.00

RS_409C	2203890.99	483063.81	5340.35	700.00	-89.60	55.41
RS_410C	2203853.76	483120.44	5346.01	1140.00	-89.35	337.33
RS_411C	2203891.80	483107.26	5342.43	676.70	-89.23	339.28
RS_412C	2203923.80	482974.02	5331.28	750.00	-89.68	42.21
RS_413C	2203924.23	483102.88	5339.12	670.00	-89.07	52.52
RS_414C	2204002.86	482861.55	5317.76	850.00	-89.57	352.16
RS_415C	2204076.28	482798.85	5309.41	982.00	-90.00	.00
RS_416C	2204020.79	482965.55	5325.35	750.00	-89.52	322.39
RS_417C	2203977.03	483073.14	5335.63	725.40	-89.52	324.10
RS_418C	2204021.71	483006.57	5329.03	1071.10	-88.61	273.00
RS_419C	2204025.24	483054.89	5332.34	750.00	-89.62	332.85
RS_427C	2204123.07	482645.84	5298.21	900.00	-90.00	.00
RS_428C	2203973.13	482989.33	5329.09	750.00	-90.00	.00
RS_429C	2204016.87	482929.69	5323.22	800.00	-90.00	.00
RS_430C	2204084.69	482894.85	5318.66	800.00	-90.00	.00
RS_431C	2204012.96	482894.01	5320.36	800.00	-90.00	.00
RS_432C	2203965.81	482956.63	5327.55	770.00	-90.00	.00
RS_433C	2204142.25	482662.52	5297.78	850.00	-90.00	.00
RS_434C	2204129.63	482557.11	5290.10	900.00	-90.00	.00
RS_435C	2204234.98	482661.95	5291.78	880.00	-90.00	.00
RS_436C	2204177.67	482568.93	5294.87	900.00	-90.00	.00
RS_437C	2204210.42	482610.22	5296.18	900.00	-90.00	.00
RS_438C	2204083.42	482836.13	5312.92	850.00	-90.00	.00
RS_439C	2204128.65	482815.28	5311.22	800.00	-90.00	.00
RS_440C	2204179.32	482740.85	5305.92	850.00	-90.00	.00
RS_441C	2204143.19	482705.54	5304.49	850.00	-90.00	.00
RS_442C	2204086.72	482613.28	5297.56	900.00	-90.00	.00

```
# Macro Name    : kurt_plot_sections.cmd
#
# Version       : surpac2000 V3.1-G
#
# Creation Date : Thu May 14 14:32:42 1998
#
# Description   :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=plots:
#
# PLOTTING MENU
#
@menu("00034")
@FUNCTION MAP CREATE,error=abort,mismatch=display
#
# CREATE A NEW MAP FORM
#
@FORM frm00330,action=apply,pause=2.000000,error=abort,mismatch=display\
  |map_name=SEC@(1)
#
# DEFINE A MAP FORM
#
@FORM frm00230,action=apply,pause=2.000000,error=abort,mismatch=display\
  |entity_name(1)=DH TRACE\
  |entity_name(2)=DH TRACE NO TOP\
  |entity_name(3)=DH TRACE NO BOT\
  |entity_name(4)=DH TRACE NO TOPBOT\
  |entity_name(5)=DH LABEL\
  |entity_name(6)=DH LABEL AT EOH\
  |entity_name(7)=DH DEPTH/PN5\
  |entity_name(8)=DH ASSAY1 RHS/PN1\
  |entity_name(9)=DH ASSAY1 RHS/PN5\
  |entity_name(10)=DH ASSAY1 RHS/PN3\
  |entity_name(11)=DH ASSAY1 RHS/PN2\
  |entity_name(12)=DH ASSAY1 RHS/PN6\
  |entity_name(13)=LINE/PN24\
  |location(1)=dhsects:sec\
  |location(2)=dhsects:sec\
  |location(3)=dhsects:sec\
  |location(4)=dhsects:sec\
  |location(5)=dhsects:sec\
  |location(6)=dhsects:sec\
  |location(7)=dhsects:sec\
  |location(8)=dhsects:sec\
  |location(9)=dhsects:sec\
  |location(10)=dhsects:sec\
  |location(11)=dhsects:sec\
  |location(12)=dhsects:sec\
  |location(13)=topo_sect:ne_xtp\
  |id_range(1)=@(1)\
  |id_range(2)=@(1)\
  |id_range(3)=@(1)\
  |id_range(4)=@(1)\
```

```
  |id_range(5)=@(1)\
  |id_range(6)=@(1)\
  |id_range(7)=@(1)\
  |id_range(8)=@(1)\
  |id_range(9)=@(1)\
  |id_range(10)=@(1)\
  |id_range(11)=@(1)\
  |id_range(12)=@(1)\
  |id_range(13)=@(1)\
  |string_range(1)=1\
  |string_range(2)=2\
  |string_range(3)=3\
  |string_range(4)=4\
  |string_range(5)=5\
  |string_range(6)=5\
  |string_range(7)=1,4\
  |string_range(8)=11\
  |string_range(9)=12\
  |string_range(10)=13\
  |string_range(11)=14\
  |string_range(12)=15\
  |string_range(13)=\
  |segment_range(1)=\
  |segment_range(2)=\
  |segment_range(3)=\
  |segment_range(4)=\
  |segment_range(5)=\
  |segment_range(6)=\
  |segment_range(7)=\
  |segment_range(8)=\
  |segment_range(9)=\
  |segment_range(10)=\
  |segment_range(11)=\
  |segment_range(12)=\
  |segment_range(13)=
@FUNCTION PROCESS MAP,error=abort,mismatch=display
#
# PROCESS EXISTING MAP DEFINITIONS FORM
#
@FORM frm00332,action=apply,pause=2.000000,error=abort,mismatch=display\
  |map_name(1)=SEC@(1)\
  |map_name(2)=PETE_PLAN
#
# PLOT PRESENTATION PARAMETERS FORM
#
@FORM frm00226,action=apply,pause=2.000000,error=abort,mismatch=display\
  |xscale=20\
  |yscale=20\
  |sheet=E\
  |border=BORD\
  |drawsp=ES12\
  |orient=NF\
  |grid=OBA0\
  |title=NMA0\
  |quad=NE\
  |unit=I\
  |over=N\
  |txtrot=Y
#
# TITLE BLOCK FORM
```

```
#
@FORM frm00232,action=apply,pause=2.000000,error=abort,mismatch=display\
  |line1=           East Zone\
  |line2=       Section @(1) North\
  |line3=         Au opt Values\
  |line4= mjb\
  |line5=\
  |line6=\
  |line7=\
  |line8=\
  |line9=\
  |line10=
#
# REFERENCE CORNER FORM
#
@FORM frm00229,action=apply,pause=2.000000,error=abort,mismatch=display\
  |yref=4300\
  |xref=-1600
#
# GRID FORM
#
@FORM frm00219,action=apply,pause=2.000000,error=abort,mismatch=display\
  |ygli=100\
  |yline=F\
  |xgli=100\
  |xline=F
#
# PLOT PRESENTATION PARAMETERS FORM
#
@FORM frm00226,action=apply,pause=2.000000,error=abort,mismatch=display\
  |xscale=20\
  |yscale=20\
  |sheet=E\
  |border=BORD\
  |drawsp=EP12\
  |orient=RX\
  |grid=YXA0\
  |title=N\
  |quad=NE\
  |unit=I\
  |over=N\
  |txtrot=Y
#
# REFERENCE CORNER FORM
#
@FORM frm00229,action=apply,pause=2.000000,error=abort,mismatch=display\
  |yref=@(2)\
  |xref=@(3)
#
# ORIENTATION ANGLE FORM
#
@FORM frm00216,action=apply,pause=2.000000,error=abort,mismatch=display\
  |angle=325
#
# GRID FORM
#
@FORM frm00219,action=apply,pause=2.000000,error=abort,mismatch=display\
  |ygli=100\
  |yline=F\
  |xgli=100\
```

```
  |xline=F
@FUNCTION PLOT DRIVER,error=abort,mismatch=display
#
# PLOTTING FORM
#
@FORM frm00265,action=apply,pause=2.000000,error=abort,mismatch=display
#
# PLOTTER DRIVERS FORM
#
@FORM frm00217,action=apply,pause=2.000000,error=abort,mismatch=display\
  |device=2\
  |plot_now=N\
  |printer=\\Gateway\HP650C\
  |media=vellum\
  |quality=\
  |sort=\
  |rotation=\
  |save=N\
  |colour(1)=black\
  |colour(2)=red\
  |colour(3)=green\
  |colour(4)=yellow\
  |colour(5)=blue\
  |colour(6)=magenta\
  |colour(7)=cyan\
  |colour(8)=black\
  |colour(9)=light grey\
  |colour(10)=orange\
  |colour(11)=gray\
  |colour(12)=light yellow\
  |colour(13)=light green\
  |colour(14)=periwinkle\
  |colour(15)=black\
  |colour(16)=blue\
  |colour(17)=forest green\
  |colour(18)=orange\
  |colour(19)=red\
  |colour(20)=plum\
  |colour(21)=light red\
  |colour(22)=brick red\
  |colour(23)=brown\
  |colour(24)=black\
  |colour(25)=blue\
  |colour(26)=green\
  |colour(27)=orange\
  |colour(28)=red\
  |colour(29)=plum\
  |colour(30)=pink\
  |colour(31)=light blue\
  |width(1)=0.25\
  |width(2)=0.25\
  |width(3)=0.25\
  |width(4)=0.25\
  |width(5)=0.25\
  |width(6)=0.25\
  |width(7)=0.25\
  |width(8)=0.35\
  |width(9)=0.25\
  |width(10)=0.25\
  |width(11)=0.25\
```

```
  |width(12)=0.25\
  |width(13)=0.25\
  |width(14)=0.25\
  |width(15)=0.18\
  |width(16)=0.18\
  |width(17)=0.18\
  |width(18)=0.18\
  |width(19)=0.18\
  |width(20)=0.18\
  |width(21)=0.25\
  |width(22)=0.25\
  |width(23)=0.25\
  |width(24)=0.35\
  |width(25)=0.35\
  |width(26)=0.35\
  |width(27)=0.35\
  |width(28)=0.35\
  |width(29)=0.35\
  |width(30)=0.35\
  |width(31)=0.35\
  |velocity(1)=\
  |velocity(2)=\
  |velocity(3)=\
  |velocity(4)=\
  |velocity(5)=\
  |velocity(6)=\
  |velocity(7)=\
  |velocity(8)=\
  |velocity(9)=\
  |velocity(10)=\
  |velocity(11)=\
  |velocity(12)=\
  |velocity(13)=\
  |velocity(14)=\
  |velocity(15)=\
  |velocity(16)=\
  |velocity(17)=\
  |velocity(18)=\
  |velocity(19)=\
  |velocity(20)=\
  |velocity(21)=\
  |velocity(22)=\
  |velocity(23)=\
  |velocity(24)=\
  |velocity(25)=\
  |velocity(26)=\
  |velocity(27)=\
  |velocity(28)=\
  |velocity(29)=\
  |velocity(30)=\
  |velocity(31)=
@FUNCTION MAP DELETE,error=abort,mismatch=display
#
# DELETE EXISTING MAP DEFINITIONS FORM
#
@FORM frm00327,action=apply,pause=2.000000,error=abort,mismatch=display\
  |map_name(1)=SEC@(1)
#
# CONFIRM DELETION OF MAPS/ENTITIES FORM
#
```

```
@FORM frm00221,action=apply,pause=2.000000,error=abort,mismatch=display
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=macros:
```

43AUG10.CR5 09/15/98 08:12:44

Point	Northing	Easting	Elevation	Description
1	2,203,857.1010	482,801.4030	4,646.58	A43-3BS
2	2,203,834.1910	482,697.1440	4,661.08	A43-2BS
5	2,203,864.4818	482,793.6830	4,636.65	258
6	2,203,904.4798	482,826.5748	4,638.97	260
7	2,203,945.4511	482,838.8595	4,625.54	262
8	2,203,946.5337	482,839.7022	4,625.51	262A

```
# Macro Name     : plot_plan_geology.cmd
#
# Version        : surpac2000 V3.1-H
#
# Creation Date  : Wed Aug 19 16:51:37 1998
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=f:\east_zone_1998_reserves\plots
#
# PLOTTING MENU
#
@menu("00034")
@FUNCTION MAP CREATE,error=abort,mismatch=display
#
# CREATE A NEW MAP FORM
#
@FORM frm00330,action=apply,pause=2.000000,error=abort,mismatch=display\
  |map_name=GEPL@(1)
#
# DEFINE A MAP FORM
#
@FORM frm00230,action=apply,pause=2.000000,error=abort,mismatch=display\
  |entity_name(1)=DH TRACE\
  |entity_name(2)=DH TRACE NO TOP\
  |entity_name(3)=DH TRACE NO BOT\
  |entity_name(4)=DH TRACE NO TOPBOT\
  |entity_name(5)=DH LABEL\
  |entity_name(6)=PLAN_AU_SLICE/PN28\
  |entity_name(7)=PLAN_AU_SLICE/PN32\
  |entity_name(8)=PLAN_AU_SLICE/PN33\
  |entity_name(9)=PLAN_AU_SLICE/PN26\
  |entity_name(10)=PLAN_AU_SLICE/PN30\
  |entity_name(11)=PLAN_AU_SLICE/PN29\
  |entity_name(12)=PLAN_AU_SLICE/PN27\
  |entity_name(13)=PLAN_AU_SLICE/PN34\
  |entity_name(14)=PLAN_AU_SLICE/PN35\
  |entity_name(15)=PLAN_AU_SLICE/PN25\
  |entity_name(16)=PLAN_AU_SLICE/PN36\
  |entity_name(17)=PLAN_AU_SLICE/PN24\
  |entity_name(18)=PLAN_AU_SLICE/PN37\
  |entity_name(19)=PLAN_AU_SLICE/PN25\
  |entity_name(20)=SECTION LINE/PN9\
  |entity_name(21)=DH ASSAY1 RHS/PN1\
  |entity_name(22)=DH ASSAY1 RHS/PN5\
  |entity_name(23)=DH ASSAY1 RHS/PN3\
  |entity_name(24)=DH ASSAY1 RHS/PN10\
  |entity_name(25)=DH ASSAY1 RHS/PN2\
  |entity_name(26)=DH ASSAY1 RHS/PN6\
  |entity_name(27)=PLAN_AU_LABEL/PN2\
  |entity_name(28)=PLAN_AU_LABEL/PN6\
  |entity_name(29)=PLAN_AU_LABEL/PN14\
  |entity_name(30)=PLAN_AU_LABEL/PN3\
```

```
|entity_name(31)=PLAN_AU_LABEL/PN38\
|entity_name(32)=PLAN_AU_LABEL/PN20\
|entity_name(33)=PLAN_AU_LABEL/PN10\
|entity_name(34)=PLAN_AU_LABEL/PN23\
|entity_name(35)=PLAN_AU_LABEL/PN7\
|entity_name(36)=PLAN_AU_LABEL/PN5\
|entity_name(37)=PLAN_AU_LABEL/PN4\
|entity_name(38)=PLAN_AU_LABEL/PN1\
|entity_name(39)=PLAN_AU_LABEL/PN11\
|entity_name(40)=PLAN_GE_LABEL/PN5\
|location(1)=98eastplan:plan\
|location(2)=98eastplan:plan\
|location(3)=98eastplan:plan\
|location(4)=98eastplan:plan\
|location(5)=98eastplan:plan\
|location(6)=98eastplange:xezgeo\
|location(7)=98eastplange:xezgeo\
|location(8)=98eastplange:xezgeo\
|location(9)=98eastplange:xezgeo\
|location(10)=98eastplange:xezgeo\
|location(11)=98eastplange:xezgeo\
|location(12)=98eastplange:xezgeo\
|location(13)=98eastplange:xezgeo\
|location(14)=98eastplange:xezgeo\
|location(15)=98eastplange:xezgeo\
|location(16)=98eastplange:xezgeo\
|location(17)=98eastplange:xezgeo\
|location(18)=98eastplange:xezgeo\
|location(19)=98eastplan:\faults\fault\
|location(20)=dhsects:axis\
|location(21)=98eastplan:plan\
|location(22)=98eastplan:plan\
|location(23)=98eastplan:plan\
|location(24)=98eastplan:plan\
|location(25)=98eastplan:plan\
|location(26)=98eastplan:plan\
|location(27)=98eastplange:xezgeo\
|location(28)=98eastplange:xezgeo\
|location(29)=98eastplange:xezgeo\
|location(30)=98eastplange:xezgeo\
|location(31)=98eastplange:xezgeo\
|location(32)=98eastplange:xezgeo\
|location(33)=98eastplange:xezgeo\
|location(34)=98eastplange:xezgeo\
|location(35)=98eastplange:xezgeo\
|location(36)=98eastplange:xezgeo\
|location(37)=98eastplange:xezgeo\
|location(38)=98eastplange:xezgeo\
|location(39)=98eastplange:xezgeo\
|location(40)=98eastplan:\faults\fault\
|id_range(1)=@(1)\
|id_range(2)=@(1)\
|id_range(3)=@(1)\
|id_range(4)=@(1)\
|id_range(5)=@(1)\
|id_range(6)=@(1)\
|id_range(7)=@(1)\
|id_range(8)=@(1)\
|id_range(9)=@(1)\
|id_range(10)=@(1)\
```

```
|id_range(11)=@(1)\
|id_range(12)=@(1)\
|id_range(13)=@(1)\
|id_range(14)=@(1)\
|id_range(15)=@(1)\
|id_range(16)=@(1)\
|id_range(17)=@(1)\
|id_range(18)=@(1)\
|id_range(19)=@(1)\
|id_range(20)=111\
|id_range(21)=@(1)\
|id_range(22)=@(1)\
|id_range(23)=@(1)\
|id_range(24)=@(1)\
|id_range(25)=@(1)\
|id_range(26)=@(1)\
|id_range(27)=@(1)\
|id_range(28)=@(1)\
|id_range(29)=@(1)\
|id_range(30)=@(1)\
|id_range(31)=@(1)\
|id_range(32)=@(1)\
|id_range(33)=@(1)\
|id_range(34)=@(1)\
|id_range(35)=@(1)\
|id_range(36)=@(1)\
|id_range(37)=@(1)\
|id_range(38)=@(1)\
|id_range(39)=@(1)\
|id_range(40)=@(1)\
|string_range(1)=1\
|string_range(2)=2\
|string_range(3)=3\
|string_range(4)=4\
|string_range(5)=5\
|string_range(6)=1\
|string_range(7)=2\
|string_range(8)=3\
|string_range(9)=4;6;8;10\
|string_range(10)=5\
|string_range(11)=7\
|string_range(12)=9;23\
|string_range(13)=11\
|string_range(14)=13\
|string_range(15)=19;20\
|string_range(16)=21\
|string_range(17)=30\
|string_range(18)=31\
|string_range(19)=24;40;41;50\
|string_range(20)=25;50;75;100;200\
|string_range(21)=11\
|string_range(22)=12\
|string_range(23)=13\
|string_range(24)=14\
|string_range(25)=15\
|string_range(26)=16\
|string_range(27)=1\
|string_range(28)=2\
|string_range(29)=3\
|string_range(30)=4;6;8;10\
```

```
  |string_range(31)=5\
  |string_range(32)=7\
  |string_range(33)=9;23\
  |string_range(34)=11\
  |string_range(35)=13\
  |string_range(36)=19;20\
  |string_range(37)=21\
  |string_range(38)=30\
  |string_range(39)=31\
  |string_range(40)=24;40;41;50\
  |segment_range(1)=\
  |segment_range(2)=\
  |segment_range(3)=\
  |segment_range(4)=\
  |segment_range(5)=\
  |segment_range(6)=\
  |segment_range(7)=\
  |segment_range(8)=\
  |segment_range(9)=\
  |segment_range(10)=\
  |segment_range(11)=\
  |segment_range(12)=\
  |segment_range(13)=\
  |segment_range(14)=\
  |segment_range(15)=\
  |segment_range(16)=\
  |segment_range(17)=\
  |segment_range(18)=\
  |segment_range(19)=\
  |segment_range(20)=\
  |segment_range(21)=\
  |segment_range(22)=\
  |segment_range(23)=\
  |segment_range(24)=\
  |segment_range(25)=\
  |segment_range(26)=\
  |segment_range(27)=\
  |segment_range(28)=\
  |segment_range(29)=\
  |segment_range(30)=\
  |segment_range(31)=\
  |segment_range(32)=\
  |segment_range(33)=\
  |segment_range(34)=\
  |segment_range(35)=\
  |segment_range(36)=\
  |segment_range(37)=\
  |segment_range(38)=\
  |segment_range(39)=\
  |segment_range(40)=
@FUNCTION PROCESS MAP,error=abort,mismatch=display
#
# PROCESS EXISTING MAP DEFINITIONS FORM
#
@FORM frm00332,action=apply,pause=2.000000,error=abort,mismatch=display\
  |map_name(1)=GEPL@(1)
#
# PLOT PRESENTATION PARAMETERS FORM
#
@FORM frm00226,action=apply,pause=2.000000,error=abort,mismatch=display\
```

```
  |xscale=20\
  |yscale=20\
  |sheet=E1\
  |border=BORD\
  |drawsp=DRAW\
  |orient=RX\
  |grid=YXA0\
  |title=LRG1\
  |quad=NE\
  |unit=I\
  |over=N\
  |txtrot=Y
#
# TITLE BLOCK FORM
#
@FORM frm00232,action=apply,pause=2.000000,error=abort,mismatch=display\
  |line1=1998 East Zone\
  |line2=Reserve Model\
  |line3=@(1) Plan Section\
  |line4=Geology Outlines\
  |line5=\
  |line6=\
  |line7=mjb\
  |line8=\
  |line9=\
  |line10=
#
# REFERENCE CORNER FORM
#
@FORM frm00229,action=apply,pause=2.000000,error=abort,mismatch=display\
  |yref=2203975\
  |xref=482200
#
# ORIENTATION ANGLE FORM
#
@FORM frm00216,action=apply,pause=2.000000,error=abort,mismatch=display\
  |angle=325
#
# GRID FORM
#
@FORM frm00219,action=apply,pause=2.000000,error=abort,mismatch=display\
  |ygli=100\
  |yline=F\
  |xgli=100\
  |xline=F
@FUNCTION PLOT DRIVER,error=abort,mismatch=display
#
# PLOTTING FORM
#
@FORM frm00265,action=apply,pause=2.000000,error=abort,mismatch=display
#
# PLOTTER DRIVERS FORM
#
@FORM frm00217,action=apply,pause=2.000000,error=abort,mismatch=display\
  |device=2\
  |plot_now=Y\
  |sys_command=windows\
  |printer=\\Gateway\HP650C\
  |media=vellum\
  |quality=\
```

```
|sort=\
|rotation=\
|save=N\
|colour(1)=black\
|colour(2)=red\
|colour(3)=green\
|colour(4)=yellow\
|colour(5)=blue\
|colour(6)=magenta\
|colour(7)=cyan\
|colour(8)=black\
|colour(9)=light grey\
|colour(10)=orange\
|colour(11)=gray\
|colour(12)=light yellow\
|colour(13)=light green\
|colour(14)=periwinkle\
|colour(15)=black\
|colour(16)=blue\
|colour(17)=forest green\
|colour(18)=orange\
|colour(19)=red\
|colour(20)=plum\
|colour(21)=light red\
|colour(22)=brick red\
|colour(23)=brown\
|colour(24)=black\
|colour(25)=blue\
|colour(26)=green\
|colour(27)=orange\
|colour(28)=red\
|colour(29)=magenta\
|colour(30)=pink\
|colour(31)=light blue\
|colour(32)=magenta\
|colour(33)=periwinkle\
|colour(34)=brown\
|colour(35)=cyan\
|colour(36)=yellow\
|colour(37)=gray\
|colour(38)=pink\
|width(1)=0.25\
|width(2)=0.25\
|width(3)=0.25\
|width(4)=0.25\
|width(5)=0.25\
|width(6)=0.25\
|width(7)=0.25\
|width(8)=0.35\
|width(9)=0.25\
|width(10)=0.25\
|width(11)=0.25\
|width(12)=0.25\
|width(13)=0.25\
|width(14)=0.25\
|width(15)=0.18\
|width(16)=0.18\
|width(17)=0.18\
|width(18)=0.18\
|width(19)=0.18\
```

```
  |width(20)=0.18\
  |width(21)=0.25\
  |width(22)=0.25\
  |width(23)=0.25\
  |width(24)=1\
  |width(25)=1\
  |width(26)=1\
  |width(27)=1\
  |width(28)=1\
  |width(29)=1\
  |width(30)=1\
  |width(31)=0.35\
  |width(32)=1\
  |width(33)=1\
  |width(34)=1\
  |width(35)=1\
  |width(36)=1\
  |width(37)=1\
  |width(38)=0.25\
  |velocity(1)=\
  |velocity(2)=\
  |velocity(3)=\
  |velocity(4)=\
  |velocity(5)=\
  |velocity(6)=\
  |velocity(7)=\
  |velocity(8)=\
  |velocity(9)=\
  |velocity(10)=\
  |velocity(11)=\
  |velocity(12)=\
  |velocity(13)=\
  |velocity(14)=\
  |velocity(15)=\
  |velocity(16)=\
  |velocity(17)=\
  |velocity(18)=\
  |velocity(19)=\
  |velocity(20)=\
  |velocity(21)=\
  |velocity(22)=\
  |velocity(23)=\
  |velocity(24)=\
  |velocity(25)=\
  |velocity(26)=\
  |velocity(27)=\
  |velocity(28)=\
  |velocity(29)=\
  |velocity(30)=\
  |velocity(31)=\
  |velocity(32)=\
  |velocity(33)=\
  |velocity(34)=\
  |velocity(35)=\
  |velocity(36)=\
  |velocity(37)=\
  |velocity(38)=
@FUNCTION MAP DELETE,error=abort,mismatch=display
#
# DELETE EXISTING MAP DEFINITIONS FORM
```

```
#
@FORM frm00327,action=apply,pause=2.000000,error=abort,mismatch=display\
  |map_name(1)=GEPL@(1)\
  |map_name(2)=
#
# CONFIRM DELETION OF MAPS/ENTITIES FORM
#
@FORM frm00221,action=apply,pause=2.000000,error=abort,mismatch=display
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=2.000000,error=abort,mismatch=display\
  |directory=f:\east_zone_1998_reserves\macros
```

Hecla Mining Company - Rosebud Mine Level Height Study - 5 Foot Base Case (> 0.010 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
5	4,005	0.061	20,025	1,221.5	100.00%	100.00%	100.00%
6	3,446	0.059	20,676	1,219.9	96.72%	103.25%	99.87%
7	2,969	0.059	20,783	1,226.2	96.72%	103.79%	100.38%
8	2,666	0.058	21,328	1,237.0	95.08%	106.51%	101.27%
9	2,405	0.057	21,645	1,233.8	93.44%	108.09%	101.00%
10	2,212	0.056	22,120	1,238.7	91.80%	110.46%	101.41%
11	2,033	0.056	22,363	1,252.3	91.80%	111.68%	102.52%
12	1,884	0.056	22,608	1,266.0	91.80%	112.90%	103.64%
13	1,767	0.055	22,971	1,263.4	90.16%	114.71%	103.43%
14	1,618	0.056	22,652	1,268.5	91.80%	113.12%	103.85%
15	1,527	0.055	22,905	1,259.8	90.16%	114.38%	103.13%
16	1,445	0.055	23,120	1,271.6	90.16%	115.46%	104.10%
17	1,377	0.055	23,409	1,287.5	90.16%	116.90%	105.40%
18	1,316	0.054	23,688	1,279.2	88.52%	118.29%	104.72%

Hecla Mining Company - Rosebud Mine Level Height Study - 7 Foot Base Case (> 0.010 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
5	4,005	0.061	20,025	1,221.5	103.39%	96.35%	99.62%
6	3,446	0.059	20,676	1,219.9	100.00%	99.49%	99.49%
7	2,969	0.059	20,783	1,226.2	100.00%	100.00%	100.00%
8	2,666	0.058	21,328	1,237.0	98.31%	102.62%	100.88%
9	2,405	0.057	21,645	1,233.8	96.61%	104.15%	100.62%
10	2,212	0.056	22,120	1,238.7	94.92%	106.43%	101.02%
11	2,033	0.056	22,363	1,252.3	94.92%	107.60%	102.13%
12	1,884	0.056	22,608	1,266.0	94.92%	108.78%	103.25%
13	1,767	0.055	22,971	1,263.4	93.22%	110.53%	103.03%
14	1,618	0.056	22,652	1,268.5	94.92%	108.99%	103.45%
15	1,527	0.055	22,905	1,259.8	93.22%	110.21%	102.74%
16	1,445	0.055	23,120	1,271.6	93.22%	111.24%	103.70%
17	1,377	0.055	23,409	1,287.5	93.22%	112.64%	105.00%
18	1,316	0.054	23,688	1,279.2	91.53%	113.98%	104.32%

Hecla Mining Company - Rosebud Mine Level Height Study - 5 Foot Base Case (> 0.050 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
5	1,002	0.179	5,010	896.8	100.00%	100.00%	100.00%
6	846	0.176	5,076	893.4	98.32%	101.32%	99.62%
7	729	0.175	5,103	893.0	97.77%	101.86%	99.58%
8	642	0.172	5,136	883.4	96.09%	102.51%	98.51%
9	575	0.172	5,175	890.1	96.09%	103.29%	99.25%
10	515	0.172	5,150	885.8	96.09%	102.79%	98.77%
11	487	0.166	5,357	889.3	92.74%	106.93%	99.16%
12	456	0.165	5,472	902.9	92.18%	109.22%	100.68%
13	420	0.163	5,460	890.0	91.06%	108.98%	99.24%
14	396	0.162	5,544	898.1	90.50%	110.66%	100.15%
15	378	0.159	5,670	901.5	88.83%	113.17%	100.53%
16	359	0.156	5,744	896.1	87.15%	114.65%	99.92%
17	338	0.159	5,746	913.6	88.83%	114.69%	101.88%
18	326	0.154	5,868	903.7	86.03%	117.13%	100.77%

Hecla Mining Company - Rosebud Mine Level Height Study - 7 Foot Base Case (> 0.050 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
5	1,002	0.179	5,010	896.8	102.29%	98.18%	100.42%
6	846	0.176	5,076	893.4	100.57%	99.47%	100.04%
7	729	0.175	5,103	893.0	100.00%	100.00%	100.00%
8	642	0.172	5,136	883.4	98.29%	100.65%	98.92%
9	575	0.172	5,175	890.1	98.29%	101.41%	99.67%
10	515	0.172	5,150	885.8	98.29%	100.92%	99.19%
11	487	0.166	5,357	889.3	94.86%	104.98%	99.58%
12	456	0.165	5,472	902.9	94.29%	107.23%	101.10%
13	420	0.163	5,460	890.0	93.14%	107.00%	99.66%
14	396	0.162	5,544	898.1	92.57%	108.64%	100.57%
15	378	0.159	5,670	901.5	90.86%	111.11%	100.95%
16	359	0.156	5,744	896.1	89.14%	112.56%	100.34%
17	338	0.159	5,746	913.6	90.86%	112.60%	102.31%
18	326	0.154	5,868	903.7	88.00%	114.99%	101.19%

Hecla Mining Company - Rosebud Mine Level Height Study - 5 Foot Base Case (> 0.140 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
5	340	0.372	1,700	632.4	100.00%	100.00%	100.00%
6	278	0.372	1,668	620.5	100.00%	98.12%	98.12%
7	244	0.362	1,708	618.3	97.31%	100.47%	97.77%
8	207	0.363	1,656	601.1	97.58%	97.41%	95.06%
9	194	0.351	1,746	612.8	94.35%	102.71%	96.91%
10	175	0.344	1,750	602.0	92.47%	102.94%	95.19%
11	162	0.339	1,782	604.1	91.13%	104.82%	95.52%
12	153	0.330	1,836	605.9	88.71%	108.00%	95.81%
13	139	0.328	1,807	592.7	88.17%	106.29%	93.72%
14	124	0.337	1,736	585.0	90.59%	102.12%	92.51%
15	119	0.328	1,785	585.5	88.17%	105.00%	92.58%
16	115	0.315	1,840	579.6	84.68%	108.24%	91.65%
17	110	0.318	1,870	594.7	85.48%	110.00%	94.03%
18	104	0.311	1,872	582.2	83.60%	110.12%	92.06%

Hecla Mining Company - Rosebud Mine Level Height Study - 7 Foot Base Case (> 0.140 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
5	340	0.372	1,700	632.4	102.76%	99.53%	102.28%
6	278	0.372	1,668	620.5	102.76%	97.66%	100.36%
7	244	0.362	1,708	618.3	100.00%	100.00%	100.00%
8	207	0.363	1,656	601.1	100.28%	96.96%	97.22%
9	194	0.351	1,746	612.8	96.96%	102.22%	99.12%
10	175	0.344	1,750	602.0	95.03%	102.46%	97.36%
11	162	0.339	1,782	604.1	93.65%	104.33%	97.70%
12	153	0.330	1,836	605.9	91.16%	107.49%	97.99%
13	139	0.328	1,807	592.7	90.61%	105.80%	95.86%
14	124	0.337	1,736	585.0	93.09%	101.64%	94.62%
15	119	0.328	1,785	585.5	90.61%	104.51%	94.69%
16	115	0.315	1,840	579.6	87.02%	107.73%	93.74%
17	110	0.318	1,870	594.7	87.85%	109.48%	96.18%
18	104	0.311	1,872	582.2	85.91%	109.60%	94.16%

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 5 ft Au (> 0.010)
Transformation: x

Number of samples: 4005
Minimum          :   0.010
Maximum          :   3.271

Mean                     :   0.061
Variance                 :   0.022
Standard deviation       :   0.150
Coefficient of variation:   2.476

Skewness:  10.350
Kurtosis: 160.346

Median  :   0.023
Trimean :   0.028
Biweight:   0.026
MAD     :   0.013
Alpha   :  -0.009
Sichel-t:    1.07

---------------------------------------------------------------------
```

```
Variable      : 6 ft Au (> 0.010)
Transformation: x

Number of samples: 3446
Minimum          :   0.010
Maximum          :   3.234

Mean                     :   0.059
Variance                 :   0.021
Standard deviation       :   0.144
Coefficient of variation:   2.442

Skewness:  10.295
Kurtosis: 159.878

Median  :   0.023
Trimean :   0.027
Biweight:   0.026
MAD     :   0.013
Alpha   :  -0.009
Sichel-t:    1.07
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 7 ft Au (> 0.010)
Transformation: x

Number of samples: 2969
Minimum          :   0.010
Maximum          :   2.721

Mean                     :   0.059
Variance                 :   0.019
Standard deviation       :   0.138
Coefficient of variation:   2.345

Skewness:   9.537
Kurtosis: 136.206

Median  :   0.024
Trimean :   0.028
Biweight:   0.026
MAD     :   0.013
Alpha   :  -0.009
Sichel-t:    1.07

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 8 ft Au (> 0.010)
Transformation: x

Number of samples: 2666
Minimum          :   0.010
Maximum          :   2.481

Mean                     :   0.058
Variance                 :   0.018
Standard deviation       :   0.133
Coefficient of variation:   2.318

Skewness:   9.494
Kurtosis: 132.251

Median  :   0.024
Trimean :   0.028
Biweight:   0.025
MAD     :   0.012
Alpha   :  -0.009
Sichel-t:    1.07

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 9 ft Au (> 0.010)
Transformation: x

Number of samples: 2405
Minimum          :   0.010
Maximum          :   2.302

Mean                     :   0.057
Variance                 :   0.017
Standard deviation       :   0.131
Coefficient of variation:   2.276

Skewness:   9.218
Kurtosis: 125.152

Median  :   0.024
Trimean :   0.028
Biweight:   0.026
MAD     :   0.013
Alpha   :  -0.009
Sichel-t:    1.07

---------------------------------------------------------------------
```

```
Variable      : 10 ft Au (> 0.010)
Transformation: x

Number of samples: 2212
Minimum          :   0.010
Maximum          :   2.269

Mean                     :   0.056
Variance                 :   0.016
Standard deviation       :   0.125
Coefficient of variation:   2.209

Skewness:   8.560
Kurtosis: 108.301

Median  :   0.023
Trimean :   0.027
Biweight:   0.025
MAD     :   0.012
Alpha   :  -0.009
Sichel-t:    1.07
```

Variable : 11 ft Au (> 0.010)
Transformation: x

Number of samples: 2033
Minimum : 0.010
Maximum : 1.968

Mean : 0.056
Variance : 0.015
Standard deviation : 0.121
Coefficient of variation: 2.164

Skewness: 8.492
Kurtosis: 105.825

Median : 0.023
Trimean : 0.027
Biweight: 0.025
MAD : 0.012
Alpha : -0.009
Sichel-t: 1.07

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 12 ft Au (> 0.010)
Transformation: x

Number of samples: 1884
Minimum          :   0.010
Maximum          :   2.029

Mean                     :   0.056
Variance                 :   0.014
Standard deviation       :   0.117
Coefficient of variation:   2.095

Skewness:   7.893
Kurtosis:  93.704

Median  :   0.023
Trimean :   0.027
Biweight:   0.025
MAD     :   0.012
Alpha   :  -0.009
Sichel-t:    1.06

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 13 ft Au (> 0.010)
Transformation: x

Number of samples: 1767
Minimum          :   0.010
Maximum          :   1.918

Mean                     :   0.055
Variance                 :   0.013
Standard deviation       :   0.114
Coefficient of variation:   2.071

Skewness:   7.757
Kurtosis:  89.238

Median  :   0.023
Trimean :   0.027
Biweight:   0.025
MAD     :   0.012
Alpha   :  -0.009
Sichel-t:    1.06

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 14 ft Au (> 0.010)
Transformation: x

Number of samples: 1618
Minimum          :   0.010
Maximum          :   1.837

Mean                     :   0.056
Variance                 :   0.013
Standard deviation       :   0.113
Coefficient of variation:   2.029

Skewness:   7.548
Kurtosis:  85.051

Median  :   0.024
Trimean :   0.028
Biweight:   0.026
MAD     :   0.013
Alpha   :  -0.009
Sichel-t:    1.06

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 15 ft Au (> 0.010)
Transformation: x

Number of samples: 1527
Minimum          :   0.010
Maximum          :   1.747

Mean                     :   0.055
Variance                 :   0.012
Standard deviation       :   0.111
Coefficient of variation:   2.001

Skewness:   7.274
Kurtosis:  77.837

Median  :   0.023
Trimean :   0.027
Biweight:   0.026
MAD     :   0.013
Alpha   :  -0.009
Sichel-t:    1.06

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 16 ft Au (> 0.010)
Transformation: x

Number of samples: 1445
Minimum          :   0.010
Maximum          :   1.659

Mean                     :   0.055
Variance                 :   0.012
Standard deviation       :   0.108
Coefficient of variation:   1.970

Skewness:   7.263
Kurtosis:  77.496

Median  :   0.023
Trimean :   0.027
Biweight:   0.026
MAD     :   0.013
Alpha   :  -0.009
Sichel-t:    1.06

---------------------------------------------------------------------
```

```
Variable       : 17 ft Au (> 0.010)
Transformation: x

Number of samples: 1377
Minimum          :   0.010
Maximum          :   1.600

Mean                     :   0.055
Variance                 :   0.011
Standard deviation       :   0.107
Coefficient of variation:   1.938

Skewness:   6.921
Kurtosis:  70.820

Median  :   0.024
Trimean :   0.028
Biweight:   0.026
MAD     :   0.013
Alpha   :  -0.009
Sichel-t:    1.06
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 18 ft Au (> 0.010)
Transformation: x

Number of samples: 1316
Minimum          :   0.010
Maximum          :   1.393

Mean                     :   0.054
Variance                 :   0.011
Standard deviation       :   0.105
Coefficient of variation:    1.937

Skewness:   7.055
Kurtosis:  71.001

Median  :   0.024
Trimean :   0.028
Biweight:   0.026
MAD     :   0.013
Alpha   :  -0.009
Sichel-t:    1.06

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 5 ft Au (> 0.050)
Transformation: x

Number of samples: 1002
Minimum          :   0.050
Maximum          :   3.271

Mean                     :   0.179
Variance                 :   0.071
Standard deviation       :   0.266
Coefficient of variation:   1.493

Skewness:   5.969
Kurtosis:  52.490

Median  :   0.097
Trimean :   0.108
Biweight:   0.105
MAD     :   0.045
Alpha   :  -0.046
Sichel-t:    1.24

---------------------------------------------------------------------
```

```
Variable       : 6 ft Au (> 0.050)
Transformation: x

Number of samples: 846
Minimum          :   0.050
Maximum          :   3.234

Mean                     :   0.176
Variance                 :   0.066
Standard deviation       :   0.257
Coefficient of variation:   1.467

Skewness:   5.915
Kurtosis:  51.939

Median  :   0.096
Trimean :   0.108
Biweight:   0.104
MAD     :   0.043
Alpha   :  -0.046
Sichel-t:    1.23
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 7 ft Au (> 0.050)
Transformation: x

Number of samples: 729
Minimum          :   0.050
Maximum          :   2.721

Mean                     :   0.175
Variance                 :   0.060
Standard deviation       :   0.245
Coefficient of variation:   1.402

Skewness:   5.505
Kurtosis:  44.831

Median  :   0.099
Trimean :   0.110
Biweight:   0.106
MAD     :   0.046
Alpha   :  -0.046
Sichel-t:    1.23

---------------------------------------------------------------------
```

```
Variable      : 8 ft Au (> 0.050)
Transformation: x

Number of samples: 642
Minimum          :   0.050
Maximum          :   2.481

Mean                     :   0.172
Variance                 :   0.056
Standard deviation       :   0.237
Coefficient of variation:   1.379

Skewness:   5.460
Kurtosis:  42.880

Median  :   0.100
Trimean :   0.110
Biweight:   0.106
MAD     :   0.045
Alpha   :  -0.044
Sichel-t:    1.22
```

```
Variable      : 9 ft Au (> 0.050)
Transformation: x

Number of samples: 575
Minimum          :   0.050
Maximum          :   2.302

Mean                     :   0.172
Variance                 :   0.054
Standard deviation       :   0.232
Coefficient of variation:   1.348

Skewness:   5.304
Kurtosis:  40.704

Median  :   0.101
Trimean :   0.111
Biweight:   0.108
MAD     :   0.047
Alpha   :  -0.045
Sichel-t:    1.22
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 10 ft Au (> 0.050)
Transformation: x

Number of samples: 515
Minimum          :   0.050
Maximum          :   2.269

Mean                     :   0.172
Variance                 :   0.049
Standard deviation       :   0.221
Coefficient of variation:   1.288

Skewness:   4.873
Kurtosis:  34.882

Median  :   0.104
Trimean :   0.114
Biweight:   0.110
MAD     :   0.045
Alpha   :  -0.044
Sichel-t:    1.22

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 11 ft Au (> 0.050)
Transformation: x

Number of samples: 487
Minimum          :   0.050
Maximum          :   1.968

Mean                     :   0.166
Variance                 :   0.045
Standard deviation       :   0.213
Coefficient of variation:   1.277

Skewness:   4.925
Kurtosis:  35.091

Median  :   0.099
Trimean :   0.110
Biweight:   0.106
MAD     :   0.045
Alpha   :  -0.044
Sichel-t:    1.21

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------------

Variable       : 12 ft Au (> 0.050)
Transformation: x

Number of samples: 456
Minimum          :   0.050
Maximum          :   2.029

Mean                     :   0.165
Variance                 :   0.041
Standard deviation       :   0.202
Coefficient of variation:   1.226

Skewness:   4.617
Kurtosis:  32.096

Median  :   0.099
Trimean :   0.109
Biweight:   0.106
MAD     :   0.045
Alpha   :  -0.044
Sichel-t:     1.2

---------------------------------------------------------------------------
```

```
Variable       : 13 ft Au (> 0.050)
Transformation: x

Number of samples: 420
Minimum          :   0.050
Maximum          :   1.918

Mean                     :   0.163
Variance                 :   0.039
Standard deviation       :   0.197
Coefficient of variation:   1.205

Skewness:   4.510
Kurtosis:  30.114

Median  :   0.100
Trimean :   0.112
Biweight:   0.109
MAD     :   0.045
Alpha   :  -0.046
Sichel-t:     1.2
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 14 ft Au (> 0.050)
Transformation: x

Number of samples: 396
Minimum          :   0.050
Maximum          :   1.837

Mean                     :   0.162
Variance                 :   0.037
Standard deviation       :   0.193
Coefficient of variation:   1.189

Skewness:   4.460
Kurtosis:  29.702

Median  :   0.102
Trimean :   0.112
Biweight:   0.107
MAD     :   0.044
Alpha   :  -0.042
Sichel-t:     1.2

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 15 ft Au (> 0.050)
Transformation: x

Number of samples: 378
Minimum          :   0.050
Maximum          :   1.747

Mean                     :   0.159
Variance                 :   0.035
Standard deviation       :   0.188
Coefficient of variation:   1.181

Skewness:   4.280
Kurtosis:  27.117

Median  :   0.097
Trimean :   0.109
Biweight:   0.105
MAD     :   0.042
Alpha   :  -0.045
Sichel-t:    1.19

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 16 ft Au (> 0.050)
Transformation: x

Number of samples: 359
Minimum          :   0.050
Maximum          :   1.659

Mean                     :   0.156
Variance                 :   0.033
Standard deviation       :   0.181
Coefficient of variation:   1.164

Skewness:   4.325
Kurtosis:  27.387

Median  :   0.095
Trimean :   0.105
Biweight:   0.103
MAD     :   0.042
Alpha   :  -0.048
Sichel-t:    1.19

---------------------------------------------------------------------
```

Variable : 17 ft Au (> 0.050)
Transformation: x

Number of samples: 338
Minimum : 0.050
Maximum : 1.600

Mean : 0.159
Variance : 0.032
Standard deviation : 0.179
Coefficient of variation: 1.128

Skewness: 4.108
Kurtosis: 25.113

Median : 0.100
Trimean : 0.109
Biweight: 0.106
MAD : 0.043
Alpha : -0.047
Sichel-t: 1.19

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS            18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 18 ft Au (> 0.050)
Transformation: x

Number of samples: 326
Minimum          :   0.050
Maximum          :   1.393

Mean                     :   0.154
Variance                 :   0.031
Standard deviation       :   0.176
Coefficient of variation:   1.143

Skewness:   4.196
Kurtosis:  24.809

Median  :   0.097
Trimean :   0.105
Biweight:   0.103
MAD     :   0.042
Alpha   :  -0.048
Sichel-t:    1.18

---------------------------------------------------------------------
```

```
Variable      : 5 ft Au (> 0.140)
Transformation: x

Number of samples: 340
Minimum          :   0.140
Maximum          :   3.271

Mean                     :   0.372
Variance                 :   0.152
Standard deviation       :   0.389
Coefficient of variation:   1.047

Skewness:   4.070
Kurtosis:  24.341

Median  :   0.239
Trimean :   0.261
Biweight:   0.253
MAD     :   0.089
Alpha   :  -0.132
Sichel-t:    1.56
```

```
Variable       : 6 ft Au (> 0.140)
Transformation: x

Number of samples: 278
Minimum          :   0.140
Maximum          :   3.234

Mean                     :   0.372
Variance                 :   0.143
Standard deviation       :   0.378
Coefficient of variation:   1.018

Skewness:   4.016
Kurtosis:  23.855

Median  :   0.248
Trimean :   0.267
Biweight:   0.259
MAD     :   0.089
Alpha   :  -0.131
Sichel-t:    1.56
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 7 ft Au (> 0.140)
Transformation: x

Number of samples: 244
Minimum          :   0.140
Maximum          :   2.721

Mean                     :   0.362
Variance                 :   0.125
Standard deviation       :   0.353
Coefficient of variation:   0.976

Skewness:   3.771
Kurtosis:  21.051

Median  :   0.234
Trimean :   0.261
Biweight:   0.255
MAD     :   0.089
Alpha   :  -0.135
Sichel-t:    1.53

---------------------------------------------------------------------
```

```
Variable      : 8 ft Au (> 0.140)
Transformation: x

Number of samples: 207
Minimum          :   0.140
Maximum          :   2.481

Mean                     :   0.363
Variance                 :   0.120
Standard deviation       :   0.346
Coefficient of variation:   0.953

Skewness:   3.695
Kurtosis:  19.397

Median  :   0.253
Trimean :   0.269
Biweight:   0.264
MAD     :   0.090
Alpha   :  -0.121
Sichel-t:    1.53
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 9 ft Au (> 0.140)
Transformation: x

Number of samples: 194
Minimum          :   0.140
Maximum          :   2.302

Mean                     :   0.351
Variance                 :   0.110
Standard deviation       :   0.331
Coefficient of variation:   0.943

Skewness:   3.665
Kurtosis:  19.214

Median  :   0.239
Trimean :   0.259
Biweight:   0.253
MAD     :   0.083
Alpha   :  -0.129
Sichel-t:     1.5

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 10 ft Au (> 0.140)
Transformation: x

Number of samples: 175
Minimum          :   0.140
Maximum          :   2.269

Mean                     :   0.344
Variance                 :   0.098
Standard deviation       :   0.314
Coefficient of variation:   0.912

Skewness:   3.295
Kurtosis:  16.391

Median  :   0.230
Trimean :   0.249
Biweight:   0.241
MAD     :   0.076
Alpha   :  -0.131
Sichel-t:    1.48

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 11 ft Au (> 0.140)
Transformation: x

Number of samples: 162
Minimum          :   0.140
Maximum          :   1.968

Mean                     :   0.339
Variance                 :   0.090
Standard deviation       :   0.300
Coefficient of variation:   0.883

Skewness:   3.420
Kurtosis:  16.685

Median  :   0.233
Trimean :   0.256
Biweight:   0.254
MAD     :   0.088
Alpha   :  -0.125
Sichel-t:    1.47

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 12 ft Au (> 0.140)
Transformation: x

Number of samples: 153
Minimum          :   0.140
Maximum          :   2.029

Mean                     :   0.330
Variance                 :   0.079
Standard deviation       :   0.281
Coefficient of variation:   0.851

Skewness:   3.196
Kurtosis:  15.723

Median  :   0.225
Trimean :   0.249
Biweight:   0.244
MAD     :   0.080
Alpha   :  -0.133
Sichel-t:    1.45

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 13 ft Au (> 0.140)
Transformation: x

Number of samples: 139
Minimum          :   0.141
Maximum          :   1.918

Mean                     :   0.328
Variance                 :   0.076
Standard deviation       :   0.275
Coefficient of variation:   0.837

Skewness:   3.073
Kurtosis:  14.352

Median  :   0.221
Trimean :   0.241
Biweight:   0.234
MAD     :   0.067
Alpha   :  -0.137
Sichel-t:    1.44

---------------------------------------------------------------------
```

```
-----------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
-----------------------------------------------------------------------

Variable       : 14 ft Au (> 0.140)
Transformation: x

Number of samples: 124
Minimum          :   0.140
Maximum          :   1.837

Mean                     :   0.337
Variance                 :   0.073
Standard deviation       :   0.270
Coefficient of variation:   0.801

Skewness:   3.051
Kurtosis:  14.079

Median  :   0.249
Trimean :   0.261
Biweight:   0.257
MAD     :   0.082
Alpha   :  -0.120
Sichel-t:    1.45

-----------------------------------------------------------------------
```

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---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 15 ft Au (> 0.140)
Transformation: x

Number of samples: 119
Minimum          :   0.140
Maximum          :   1.747

Mean                     :   0.328
Variance                 :   0.069
Standard deviation       :   0.263
Coefficient of variation:   0.800

Skewness:   2.845
Kurtosis:  12.515

Median  :   0.231
Trimean :   0.245
Biweight:   0.239
MAD     :   0.070
Alpha   :  -0.131
Sichel-t:    1.44

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 16 ft Au (> 0.140)
Transformation: x

Number of samples: 115
Minimum          :   0.142
Maximum          :   1.659

Mean                     :   0.315
Variance                 :   0.064
Standard deviation       :   0.252
Coefficient of variation:   0.801

Skewness:   2.916
Kurtosis:  12.733

Median  :   0.229
Trimean :   0.240
Biweight:   0.234
MAD     :   0.070
Alpha   :  -0.129
Sichel-t:    1.41

---------------------------------------------------------------------
```

```
---------------------------------------------------------------------
SURPAC SOFTWARE          SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
---------------------------------------------------------------------

Variable       : 17 ft Au (> 0.140)
Transformation: x

Number of samples: 110
Minimum          :   0.140
Maximum          :   1.600

Mean                     :   0.318
Variance                 :   0.060
Standard deviation       :   0.244
Coefficient of variation:   0.768

Skewness:   2.815
Kurtosis:  12.143

Median  :   0.243
Trimean :   0.247
Biweight:   0.242
MAD     :   0.074
Alpha   :  -0.114
Sichel-t:    1.42

---------------------------------------------------------------------
```

```
-----------------------------------------------------------------------
SURPAC SOFTWARE            SURPAC2000 STATISTICS              18-Sep-98
INTERNATIONAL
-----------------------------------------------------------------------

Variable       : 18 ft Au (> 0.140)
Transformation: x

Number of samples: 104
Minimum          :   0.140
Maximum          :   1.393

Mean                     :   0.311
Variance                 :   0.060
Standard deviation       :   0.244
Coefficient of variation:   0.784

Skewness:   2.812
Kurtosis:  11.116

Median  :   0.235
Trimean :   0.243
Biweight:   0.238
MAD     :   0.080
Alpha   :  -0.114
Sichel-t:    1.41

-----------------------------------------------------------------------
```

Cindy Moore

From: Ristorcelli, Steve [stever@mda.com]
Sent: Monday, September 14, 1998 11:25 AM
To: 'Cindy Moore'
Subject: RE: Spreadsheet

-----Original Message-----
From: Cindy Moore [mailto:cmoore@hecla-mining.com]
Sent: Monday, September 14, 1998 9:15 AM
To: 'stever@mda.com'
Subject: Spreadsheet
Cindy,
Preliminary comments inserted into text and attached below.

Steve:

Attached is the spreadsheet for the optimum composite height. [Thankyou] I've completed it for the gold only and I've also done the spreadsheet for a couple different scenarios. 5 foot base case [Hint: don't use "optimum", someone may grab on that, I think it is base case] and 7 foot base case (1/2 the current), as well as different cut-off values. I wasn't seeing much (if any) difference at low-end cut-offs so I did it for the current domain boundaries, up to 0.140 opt. [The key here is to see how it impacts grade, tons, and metal at the economic cutoff so try one at that cutoff.]

If the economic cutoff is 0.14 then the impact is relatively big because you will have to mine 8% more tons in the 14 ft scenario to get the same amount of ounces in the 7 ft scenario. I think you should do a cost analysis on mining at 7ft vs 14 ft to see if the costs exceed this 8%.

However.....the following comments should be considered:
1)Do a comparison at an economic cutoff.
2)This is an insitue tonnage and grade and metal loss and would be a minimum and does not consider the ore loss from mining access due to loss of ore from bigger "bench" heights.
3)Surpac compositing parameters: What did you use for the minimum % acceptable; as this is to approximate a minimum mining height, it should be set to something like 80to 90% or more. What percentage of the samples had no assays and why didn't they [did you dilute or not?]. And finally, what threshold did you use on the dip from horizontal?
4)Your data resolution in the sample length, which I believe is probably about 5 ft. So don't bother with anything less because there will be by definition little change because you are just "decompositing".

Please call me about item 3 as I need to know what the deposit orientation and low-angle drill hole dips are. The low angle holes are giving us bad results if we used the standard 50% and 5 degree parameters.

Thanks.

Steve

Cindy Moore

To: Ristorcelli, Steve
Subject: RE: Spreadsheet

Steve:

The reason for doing this study is not to determine 'optimum' mining height. That height is pre-determined by the equipment on site. We will be mining a 14 foot height. The reason for compositing 1 foot to 14 foot is because I was told you asked for it, in order to determine the best height for zone estimations. I know the resolution is 5 foot, because it is the sample interval. The economic cut-off is 0.14, that is why I ran results using 0.01, 0.05 and 0.14 (the domain boundaries). The reason I used a 7 foot base case is because I feel this is the best height for estimation, rather than 10 foot. This will help immensely in the design and planning on our end.

To answer your questions about the Surpac options. I used the 50%, 5 degree defaults. We do have low angle holes which may be causing a problem. Do you think I should redo this spreadsheet? If so, what do you think I should use for the low angle threshold?

Thanks,

Cindy

Sample on Geology not mine 5 ft see the line no decomposing

70%

300°
130

Hecla Mining Company - Rosebud Mine Optimum Level Height - 5 Foot Base Case (> 0.010 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	26,690	0.089	26,690	2,375.4	102.30%	97.78%	100.03%
2	13,493	0.088	26,986	2,374.8	101.15%	98.87%	100.00%
3	9,028	0.087	27,084	2,356.3	100.00%	99.23%	99.23%
4	6,807	0.087	27,228	2,368.8	100.00%	99.75%	99.75%
5	5,459	0.087	27,295	2,374.7	100.00%	100.00%	100.00%
6	4,612	0.085	27,672	2,352.1	97.70%	101.38%	99.05%
7	3,974	0.085	27,818	2,364.5	97.70%	101.92%	99.57%
8	3,522	0.084	28,176	2,366.8	96.55%	103.23%	99.67%
9	3,147	0.083	28,323	2,350.8	95.40%	103.77%	99.00%
10	2,842	0.083	28,420	2,358.9	95.40%	104.12%	99.33%
11	2,606	0.082	28,666	2,350.6	94.25%	105.02%	98.99%
12	2,407	0.082	28,884	2,368.5	94.25%	105.82%	99.74%
13	2,236	0.081	29,068	2,354.5	93.10%	106.50%	99.15%
14	2,074	0.081	29,036	2,351.9	93.10%	106.38%	99.04%

Hecla Mining Company - Rosebud Mine Optimum Level Height - 7 Foot Base Case (> 0.010 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	26,690	0.089	26,690	2,375.4	104.71%	95.95%	100.46%
2	13,493	0.088	26,986	2,374.8	103.53%	97.01%	100.43%
3	9,028	0.087	27,084	2,356.3	102.35%	97.36%	99.65%
4	6,807	0.087	27,228	2,368.8	102.35%	97.88%	100.18%
5	5,459	0.087	27,295	2,374.7	102.35%	98.12%	100.43%
6	4,612	0.085	27,672	2,352.1	100.00%	99.48%	99.48%
7	3,974	0.085	27,818	2,364.5	100.00%	100.00%	100.00%
8	3,522	0.084	28,176	2,366.8	98.82%	101.29%	100.10%
9	3,147	0.083	28,323	2,350.8	97.65%	101.82%	99.42%
10	2,842	0.083	28,420	2,358.9	97.65%	102.16%	99.76%
11	2,606	0.082	28,666	2,350.6	96.47%	103.05%	99.41%
12	2,407	0.082	28,884	2,368.5	96.47%	103.83%	100.17%
13	2,236	0.081	29,068	2,354.5	95.29%	104.49%	99.58%
14	2,074	0.081	29,036	2,351.9	95.29%	104.38%	99.47%

Hecla Mining Company - Rosebud Mine Optimum Level Height - 5 Foot Base Case (> 0.050 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	7,875	0.249	7,875	1,960.9	104.62%	95.92%	100.35%
2	4,029	0.243	8,058	1,958.1	102.10%	98.15%	100.21%
3	2,700	0.241	8,100	1,952.1	101.26%	98.66%	99.90%
4	2,077	0.235	8,308	1,952.4	98.74%	101.19%	99.92%
5	1,642	0.238	8,210	1,954.0	100.00%	100.00%	100.00%
6	1,428	0.227	8,568	1,944.9	95.38%	104.36%	99.54%
7	1,234	0.225	8,638	1,943.6	94.54%	105.21%	99.47%
8	1,075	0.224	8,600	1,926.4	94.12%	104.75%	98.59%
9	975	0.220	8,775	1,930.5	92.44%	106.88%	98.80%
10	890	0.218	8,900	1,940.2	91.60%	108.40%	99.29%
11	798	0.218	8,778	1,913.6	91.60%	106.92%	97.93%
12	753	0.213	9,036	1,924.7	89.50%	110.06%	98.50%
13	701	0.210	9,113	1,913.7	88.24%	111.00%	97.94%
14	648	0.210	9,072	1,905.1	88.24%	110.50%	97.50%

Hecla Mining Company - Rosebud Mine Optimum Level Height - 7 Foot Base Case (> 0.050 Au opt)							
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	7,875	0.249	7,875	1,960.9	110.67%	91.17%	100.89%
2	4,029	0.243	8,058	1,958.1	108.00%	93.29%	100.75%
3	2,700	0.241	8,100	1,952.1	107.11%	93.77%	100.44%
4	2,077	0.235	8,308	1,952.4	104.44%	96.18%	100.45%
5	1,642	0.238	8,210	1,954.0	105.78%	95.05%	100.54%
6	1,428	0.227	8,568	1,944.9	100.89%	99.19%	100.07%
7	1,234	0.225	8,638	1,943.6	100.00%	100.00%	100.00%
8	1,075	0.224	8,600	1,926.4	99.56%	99.56%	99.12%
9	975	0.220	8,775	1,930.5	97.78%	101.59%	99.33%
10	890	0.218	8,900	1,940.2	96.89%	103.03%	99.83%
11	798	0.218	8,778	1,913.6	96.89%	101.62%	98.46%
12	753	0.213	9,036	1,924.7	94.67%	104.61%	99.03%
13	701	0.210	9,113	1,913.7	93.33%	105.50%	98.47%
14	648	0.210	9,072	1,905.1	93.33%	105.02%	98.02%

Hecla Mining Company - Rosebud Mine

Optimum Level Height - 5 Foot Base Case (> 0.140 Au opt)

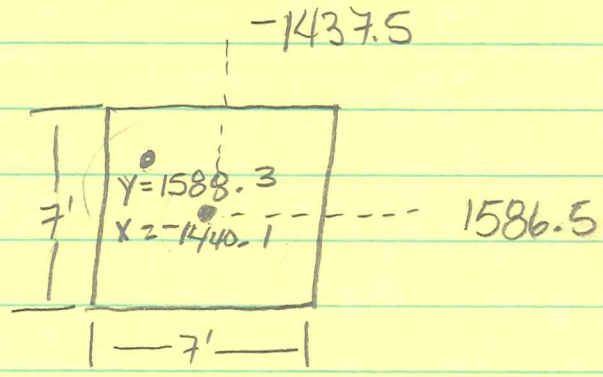
Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	3,254	0.483	3,254	1,571.7	104.32%	97.28%	101.48%
2	1,639	0.476	3,278	1,560.3	102.81%	98.00%	100.75%
3	1,124	0.463	3,372	1,561.2	100.00%	100.81%	100.81%
4	842	0.458	3,368	1,542.5	98.92%	100.69%	99.60%
5	669	0.463	3,345	1,548.7	100.00%	100.00%	100.00%
6	580	0.441	3,480	1,534.7	95.25%	104.04%	99.09%
7	499	0.436	3,493	1,522.9	94.17%	104.42%	98.33%
8	448	0.425	3,584	1,523.2	91.79%	107.14%	98.35%
9	390	0.427	3,510	1,498.8	92.22%	104.93%	96.77%
10	346	0.433	3,460	1,498.2	93.52%	103.44%	96.74%
11	320	0.423	3,520	1,489.0	91.36%	105.23%	96.14%
12	301	0.411	3,612	1,484.5	88.77%	107.98%	95.85%
13	278	0.406	3,614	1,467.3	87.69%	108.04%	94.74%
14	259	0.404	3,626	1,464.9	87.26%	108.40%	94.59%

Hecla Mining Company - Rosebud Mine

Optimum Level Height - 7 Foot Base Case (> 0.140 Au opt)

Height (ft.)	Number Samples	Mean Grade (Au opt)	Relative Tons	Relative Ounces	% of Mean Grade	% of Tons	% of Ounces
1	3,254	0.483	3,254	1,571.7	110.78%	93.16%	103.20%
2	1,639	0.476	3,278	1,560.3	109.17%	93.84%	102.45%
3	1,124	0.463	3,372	1,561.2	106.19%	96.54%	102.51%
4	842	0.458	3,368	1,542.5	105.05%	96.42%	101.29%
5	669	0.463	3,345	1,548.7	106.19%	95.76%	101.69%
6	580	0.441	3,480	1,534.7	101.15%	99.63%	100.77%
7	499	0.436	3,493	1,522.9	100.00%	100.00%	100.00%
8	448	0.425	3,584	1,523.2	97.48%	102.61%	100.02%
9	390	0.427	3,510	1,498.8	97.94%	100.49%	98.41%
10	346	0.433	3,460	1,498.2	99.31%	99.06%	98.37%
11	320	0.423	3,520	1,489.0	97.02%	100.77%	97.77%
12	301	0.411	3,612	1,484.5	94.27%	103.41%	97.48%
13	278	0.406	3,614	1,467.3	93.12%	103.46%	96.34%
14	259	0.404	3,626	1,464.9	92.66%	103.81%	96.19%

Option 2: Full Block Centroid has Fractional Coordinates



String Maths

- $D_y = y = 1588.3$

$D_x = x = -1440.1$

$D_y / 7 = 226.9$

$D_x / 7 = -205.7$

$D_y = 226$

$D_x = -205$

$D_y * 7 = 1582$

$D_x * 7 = -1435$

$D_y + 3.5 = 1585.5$

$D_x - 3.5 = -1438.5$

because of sign convention

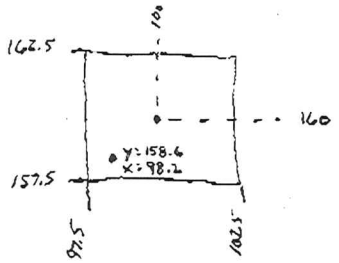
Partial block centroids to center of Full blocks

1. If the full block centroid has whole number coordinates:

   1) add ½ block size
   2) divide by block size
   3) truncate decimals (DZ D Ø).
   4) multiply by block size

in string maths

- D_y^3 = 'y' = 158.6
  D_x^4 = 'x' = 98.2
  1) $D_y^3 + 2.5$ = 160.5
     $D_x^4 + 2.5$ = 100.7
  2) $D_y^3 / 5$ = 32.1
     $D_x^4 / 5$ = 20.14
  3) D_y^3 = 32
     D_x^4 = 20
  4) $D_y^3 * 5$ = 160
     $D_x^4 * 5$ = 100
- y = 'D_y^3'
  x = 'D_x^4'
- D_y^3 = ___
  D_x^4 = ___



2. If the full block centroid has fractional coordinates :

1) divide by block size
2) truncate decimals
3) multiply by block size
4) add 1/2 block size

in string maths

- $D_y = y = 258.7$

  $D_x = x = 101.6$

1) $D_y / 5 = 51.74$

   $D_x / 5 = 20.32$

2) $D_y = 51$

   $D_x = 20$

3) $D_y * 5 = 255$

   $D_x * 5 = 100$

4) $D_y + 2.5 = 257.5$

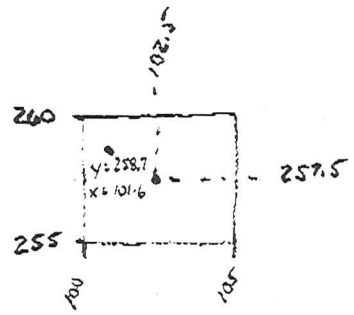
   $D_x + 2.5 = 102.5$

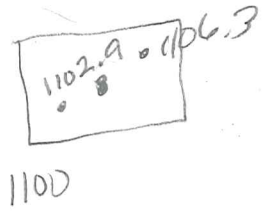
- $y = D_y$

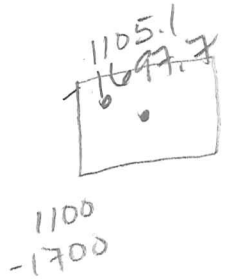
  $x = D_x$

- $D_y = \_\_$

  $D_x = \_\_$







EZ 1998	CLIP 1996
4304	4304
4311	4316
4318	4316
4325	4328
4332	4328
4339	4340
4346	4340
4353	4352
4360	4364
4367	4364
4374	4376
4381	4376
4388	4388
4395	4400
4402	4400
4409	4412
4416	4412
4423	4424
4430	4424
4437	4436
4444	4448
4451	4448
4458	4460
4465	4460
4472	4472
4479	4484
4486	4484
4493	4496
4500	4496
4507	4508
4514	4508
4521	4520
4528	4532
4535	4532
4542	4544
4549	4544
4556	4556
4563	4568
4570	4568
4577	4580
4584	4580
4591	4592
4598	4592
4605	4604
4612	4616
4619	4616
4626	4628
4633	4628

EZ 1998	CLIP 1996
4640	4640
4647	4652
4654	4652
4661	4664
4668	4664
4675	4676
4682	4676
4689	4688
4696	4700
4703	4700
4710	4712
4717	4712
4724	4724
4731	4736
4738	4736
4745	4748
4752	4748
4759	4760
4766	4760
4773	4772
4780	4784
4787	4784
4794	4796
4801	4796
4808	4808
4815	4820
4822	4820
4829	4832
4836	4832
4843	4844
4850	4844
4857	4856
4864	4868
4871	4868
4878	4880
4885	4880
4892	4892
4899	4904
4906	4904
4913	4916
4920	4916
4927	4928
4934	4928
4941	4940
4948	4952
4955	4952
4962	4964
4969	4976

New, combined files → EASTxxxx.STR

```
# Macro Name     : extract_geo_sect.cmd
#
# Version        : surpac2000 V3.1-E Beta
#
# Creation Date  : Wed Jul 09 08:20:02 1997
#
# Description    :
#
# ----------------------------------------------------------------------
#
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=0.000000,error=abort,mismatch=display\
  |directory=database:
@FUNCTION DHL DATABASE DEFINITION,error=abort,mismatch=display
#
# SELECT DATABASE FORM
#
@FORM frm10010,action=apply,pause=0.000000,error=abort,mismatch=display\
  |dbname=rosebud
#
# GEOLOGICAL DATABASE - PROCESSING DATA MENU
#
@menu("00004")
@FUNCTION EXTRACT PLANS FOR PLOT,error=abort,mismatch=display
#
# EXTRACT PLANS FOR PLOTTING FORM
#
@FORM frm12012,action=apply,pause=0.000000,error=abort,mismatch=display\
  |loc=dhsects:plan\
  |secrange=5000\
  |nor1=0\
  |nor2=9999999999\
  |eas1=0\
  |eas2=9999999999\
  |dis1=5000\
  |dis2=5000\
  |depths=20\
  |pldepths=0\
  |sample_table(1)=\
  |geology_table(1)=
#
# DEFINE QUERY CONSTRAINTS FORM
#
@FORM frm00012,action=apply,pause=0.000000,error=abort,mismatch=display\
  |field(1)=\
  |operator(1)==\
  |value(1)=
@FUNCTION EXTRACT SECTIONS FOR PLOT,error=abort,mismatch=display
#
# EXTRACT SECTIONS FOR PLOTTING FORM
#
@FORM frm12008,action=apply,pause=0.000000,error=abort,mismatch=display\
  |loc=dhsects:sec\
  |secrange=1200,1900,25\
  |nor1=2203727.4\
  |eas1=480464.4\
  |nor2=2202007\
```

```
  |eas2=482921.9\
  |elemin=-9999\
  |elemax=9999\
  |dis1=12.5\
  |dis2=12.5\
  |rworld=N\
  |depths=5\
  |pldepths=100\
  |sample_table(1)=assay\
  |geology_table(1)=\
  |diptable=
#
# DEFINE SAMPLE FIELDS FOR PLOTTING FORM
#
@FORM frm12009,action=apply,pause=0.000000,error=abort,mismatch=display\
  |element=Y\
  |combass=N\
  |field(1)=au_avg2\
  |field(2)=ag_avg\
  |range(1)=0;.01;.05;.25;1;4.5;99999\
  |range(2)=0;.4;3;6;18;55;9999\
  |bulk(1)=0\
  |bulk(2)=0\
  |ndec(1)=3\
  |ndec(2)=3\
  |graph(1)=none\
  |graph(2)=none\
  |barpos(1)=right\
  |barpos(2)=right\
  |barsize(1)=1\
  |barsize(2)=1\
  |barmax(1)=50\
  |barmax(2)=50
#
# DEFINE QUERY CONSTRAINTS FORM
#
@FORM frm00012,action=apply,pause=0.000000,error=abort,mismatch=display\
  |field(1)=\
  |operator(1)==\
  |value(1)=
@FUNCTION EXIT DATABASE,error=abort,mismatch=display
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=0.000000,error=abort,mismatch=display\
  |directory=macros:
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=0.000000,error=abort,mismatch=display\
  |directory=dhsects:
#
# STRING TOOLS MENU
#
@menu("00039")
@FUNCTION STR MATHS,error=abort,mismatch=display
#
# STRING MATHS FORM
```

```
#
@FORM frm00700,action=apply,pause=0.000000,error=abort,mismatch=display\
  |file_loc=sec\
  |file_id=0,1900,25\
  |result_loc=sec\
  |str_range(1)=1,99999999\
  |str_range(2)=\
  |constraint(1)=\
  |constraint(2)=\
  |field(1)=x\
  |field(2)=\
  |expr(1)=x-2900\
  |expr(2)=
#
# STRING MATHS CONFIRM OVERWRITE FORM
#
@FORM frm00701,action=apply,pause=0.000000,error=abort,mismatch=display
@menu("previous")
@FUNCTION CHANGE DIRECTORY,error=abort,mismatch=display
#
# CHANGE WORKING DIRECTORY FORM
#
@FORM frm00035,action=apply,pause=0.000000,error=abort,mismatch=display\
  |directory=macros:
```