CYPRUS ANVIL MINING CORPORATION INTEROFFICE CORRESPONDENCE

CASE #6(9-1)

006983

To D. Hanson

From P. Clarke

Date September 3, 1980

Subject GRADE INTERPOLATION

Attached is a basic summary of M608V2 output run to date.

It compared a relatively small part of the Large Faro model, $1/D^2$ and $1/D^3$ interpolations, with 'actual' blocks. (Actual, for want of anything better, is considered to be 50' x 50' blocks of averaged blasthole assays lying within).

This was done for three 400' x 450' areas, vertically one above another, on benches 3690, 3670, and 3650. Interpreted geology was as indicated on the attached M606V2 maps and is predominantly rock type 10 (2E/2F).

One might have hoped for a more conclusive set of statistics, nevertheless $1/D^2$ seems to be in the right ballpark and preferable to $1/D^3$.

Further statistics could be done, $1/D$, $1/D^{1-5}$, etc., and for other benches. However, there is a limit in respect of the number of 20 foot benches mined in Zone 1 (begun in 1977). And Zone 2 is really a special case owing to the emaciated nature of the orebody. (Note: No diminishment of the Dynasty Exploration discovery is, in any way whatsoever, mean to be implied or to be interpreted here). Still the locational displacement of actual to predicted mineralized blocks, makes the application of this particular program of limited usefulness in that case.

I trust you may find the attached useful when considering your choice of a statistically optimum metal element spatial assignment technique for the Vangorda deposit computer simulation. (As Scientific American would have it writ). Otherwise known as SOMESAT (- and had to think hard!).

For you, me, and even A. Frederick Banfield Jr., 'grade interpolation' will do just fine.

Bucolically,

Peter

Peter Clarke
Engineering Geologist

PC/mm

CYPRUS ANVIL

ZONE 1

BLASTHOLE BLOCKS VS MODEL $1/D^2$

		BLASTHOLE BLOCKS		INTERPOLATION $1/D^2$		
ELEMENT	BENCH	AV. GRADE	VARIANCE	AV. GRADE	VARIANCE	CORRELATION COEFFICIENT
PB	3690	2·769	0·896	2·957	0·955	0·651
PB	3670	2·688	0·982	2·719	1·414	0·604
PB	3650	2·646	0·312	2·735	0·391	0·211
ZN	3690	4·402	1·749	4·599	0·844	0·496
ZN	3670	4·474	1·985	4·576	3·026	0·551
ZN	3650	4·472	1·003	4·901	1·118	0·552

ZONE 1

BLASTHOLE BLOCKS VS MODEL $1/D^3$

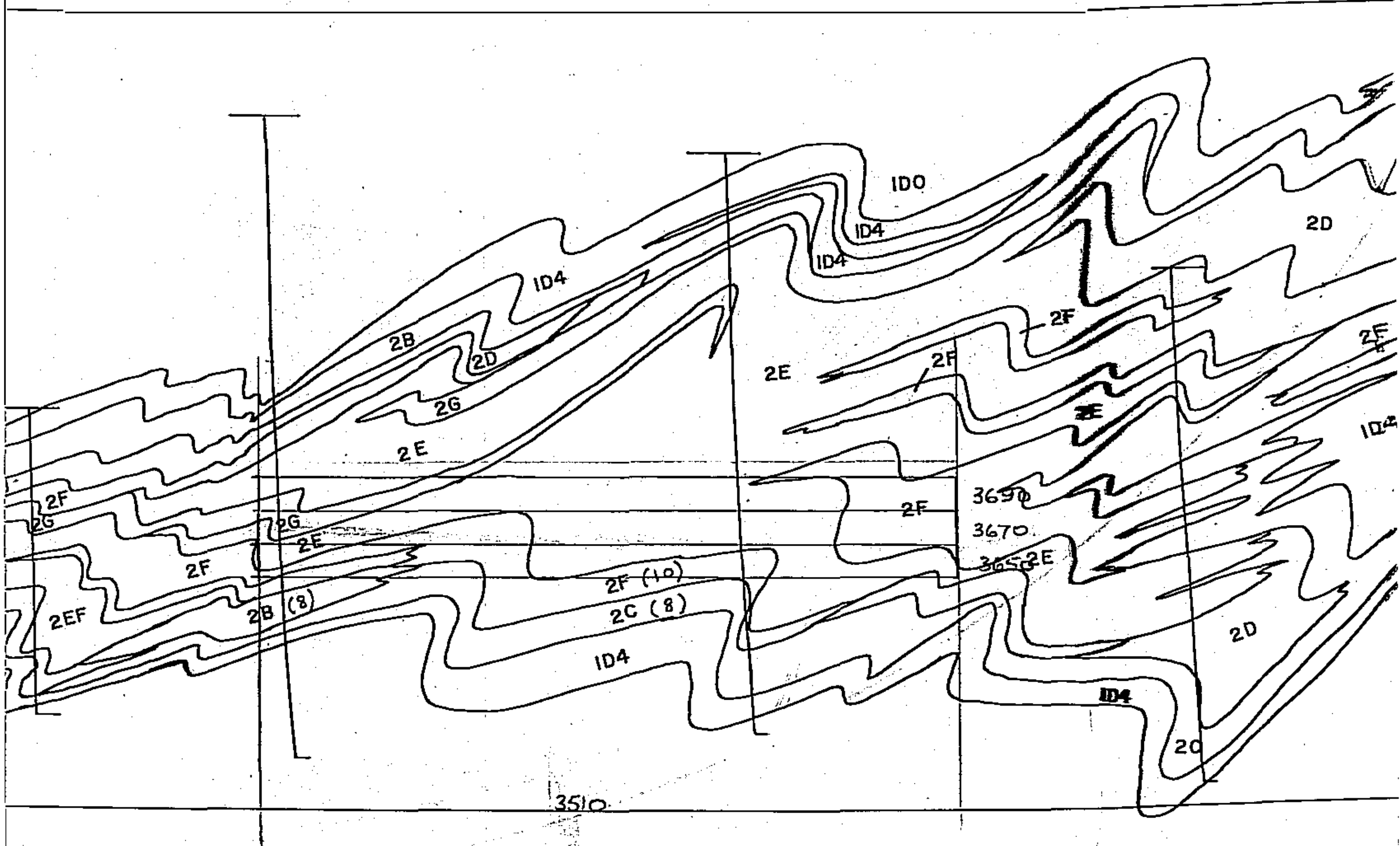
		BLASTHOLE BLOCKS		INTERPOLATION 1/D.3		
ELEMENT	BENCH	AV. GRADE	VARIANCE	AV. GRADE	VARIANCE	CORRELATION COEFFICIENT
PB	3690	2·769	0·896	2·905	1·087	0·638
PB	3670	2·688	0·982	2·659	1·837	0·580
PB	3650	2·646	0·312	2·701	0·532	0·265
ZN	3690	4·402	1·749	4·520	0·939	0·462
ZN	3670	4·474	1·985	4·517	3·953	0·538
ZN	3650	4·472	1·003	4·875	1·511	0·564

FARO 2·9/4·3

6801

Case #2 (86-2)

X - SECT. 115



1D0
1D4
1D4
1D4
2D
2B
2D
2G
2E
2F
2F
2E
2E
1D4
2F
2G
2F
2G
2E
2F
2EF
2B (8)
2F (10)
2C (8)
1D4
3690
3670
3650
2E
2D
1D4
2D
3510

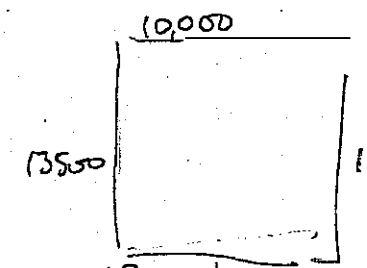
** LARGE FARO MODEL.L1 PB,ZN & ROCK TYPE 9450N-9850N & 13850E-14300E **

PB XXX.X
ZN XXX.X
+ROCK+ XXXX.

LEVEL 20 FROM 3690.0 TO 3710.0

	13950.	14050.	14150.	14250.	14350.	14450.	14550.	14650.	14750.
	38 39 40 41 42 43 44 45 46								
9850.+	+ + + + + + + + +	+ + + + + + + + +							
	36 25 20 19 21 28 34 35 44								
77	52 50 52 52 49 53 57 58 79								
9800.+	10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	33 25 20 20 20 21 30 34 38								
76	50 49 50 49 44 43 53 58 70								
9750.+	10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	31 26 22 19 15 15 21 28 28								
75	48 47 45 41 34 34 41 51 52								
9700.+	10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	37 28 25 23 15 15 19 21 26								
74	48 45 43 40 33 33 38 41 48								
9650.+	7+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	39 37 30 30 22 19 16 17 23								
73	50 48 44 44 38 36 35 37 43								
9600.+	7+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	43 39 35 31 28 21 18 20 26								
72	54 49 47 44 42 36 35 37 40								
9550.+	10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	45 43 43 42 34 29 25 26 31								
71	54 50 51 51 44 39 35 35 33								
9500.+	10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	47 42 51 52 43 31 31 32 32								
70	54 47 58 59 49 38 37 38 32								
9450.+	10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	38 39 40 41 42 43 44 45 46								
	13950.	14050.	14150.	14250.	14350.	14450.	14550.	14650.	14750.

450



3590
3610
3630
156
111
(135)
(134)

** LARGE FARO MODEL.L1 PB,ZN & ROCK TYPE 9450N-9850N & 13850E-14300E **

PB XXX.X
ZN XXX.X
+ROCK+ XXXX.

LEVEL 21 FROM 3670.0 TO 3690.0

	13950.	14050.	14150.	14250.	14350.	14450.	14550.	14650.	14750.
	38 39 40 41 42 43 44 45 46								
9850.+	+ + + + + + + + +	+	+	+	+	+	+	+	+
	46 24 13 11 11 20 27 41 54								
77	73 43 28 26 26 41 53 76 96								
9800.+	7+ 10+ 10+ 10+ 10+ 9+ 10+ 10+ 10+								
	39 24 14 13 12 12 24 36 47								
76	64 44 30 28 28 28 48 68 86								
9750.+	7+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	31 23 18 14 9 8 16 34 45								
75	52 42 35 30 23 23 35 65 85								
9700.+	10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	30 23 20 17 10 10 15 25 44								
74	49 42 38 33 25 24 33 51 83								
9650.+	7+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	27 29 23 23 19 17 12 14 28								
73	43 46 41 42 34 31 24 28 56								
9600.+	7+ 7+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	27 29 28 25 27 21 16 18 24								
72	42 44 44 42 42 35 29 32 45								
9550.+	7+ 7+ 7+ 9+ 10+ 10+ 10+ 10+ 10+								
	32 31 33 34 32 30 25 25 24								
71	46 45 47 49 49 43 35 38 40								
9500.+	10+ 10+ 9+ 9+ 10+ 10+ 10+ 10+ 10+								
	36 29 43 43 35 32 33 34 26								
70	48 42 53 54 49 41 39 41 39								
9450.+	10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+ 10+								
	38 39 40 41 42 43 44 45 46								
	13950.	14050.	14150.	14250.	14350.	14450.	14550.	14650.	14750.

** LARGE FARO MODEL.L1 PB,ZN & ROCK TYPE 9450N-9850N & 13850E-14300E **

PB XXX.X
ZN XXX.X
+ROCK+ XXXX.

LEVEL 22 FROM 3650.0 TO 3670.0

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          13950.    14050.    14150.    14250.    14350.    14450.    14550.    14650.    14750
          38   39   40   41   42   43   44   45   46
9850.+     +    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +    +
               21   22   22   21   26   29   34   38
     77        40   41   41   40   49   57   68   77
9800.+    5+   10+  10+  10+  10+  10+  10+  10+  10+
          20   21   21   22   21   20   28   35   38
     76   39   40   40   40   40   40   53   67   73
9750.+    7+    7+  10+  10+  10+  10+  10+  10+  10+
          21   21   23   21   15   15   24   36   43
     75   39   40   42   40   34   34   46   67   78
9700.+    7+    7+   7+  10+  10+  10+  10+  10+  10+
          22   23   25   24   17   17   27   35   43
     74   39   42   45   44   35   36   49   62   77
9650.+    7+  10+  10+  10+  10+  10+  10+  10+  10+
          22   25   28   29   25   27   31   32   37
     73   39   44   48   51   46   47   51   53   65
9600.+    7+    7+  10+  10+  10+  10+  10+  10+  10+
          23   25   28   28   30   29   31   32   34
     72   40   42   48   49   52   51   52   54   59
9550.+    7+    8+   8+  10+  10+  10+  10+  10+  10+
          26   23   27   31   32   31   31   32   32
     71   42   39   45   52   57   54   52   54   55
9500.+    7+    7+   8+   8+   9+  10+  10+  10+  10+
          27   19   29   32   32   32   33   34   32
     70   42   34   46   52   56   53   53   55   54
9450.+    8+    9+  10+  11+  10+  10+  10+  10+  10+
          38   39   40   41   42   43   44   45   46
          13950.    14050.    14150.    14250.    14350.    14450.    14550.    14650.    14750
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DATA FILE COMP.S1	*	NO.	SIZE	RECS	/REC
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DATA FILE COMP.S1	*	NO.	SIZE	RECS	/REC
MAX # BUFFERS = 0	*	9	500	33	15

LINE 3: 1 0 5 0 0 0

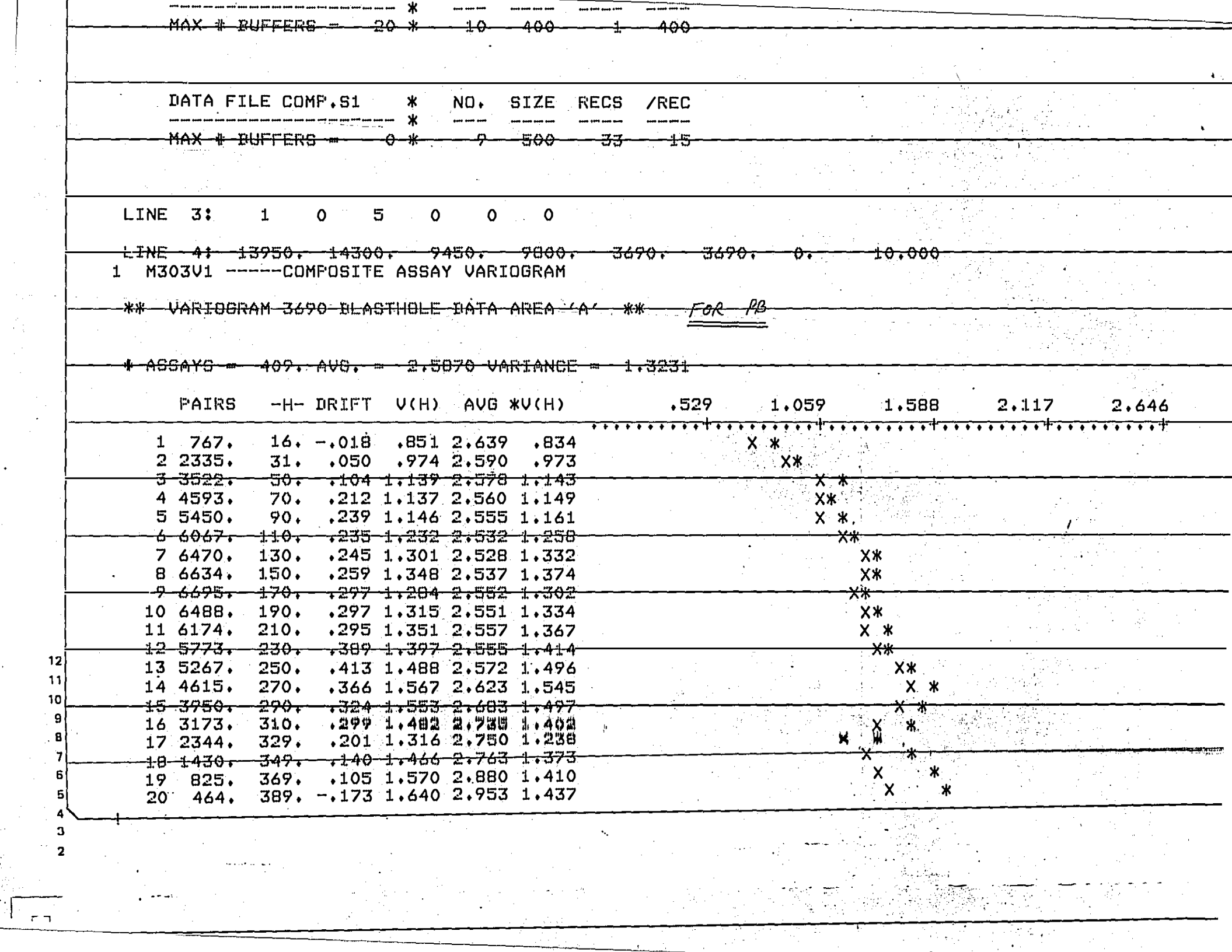
LINE 4: 13950. 14300. 9450. 9000. 3690. 3690. 0. 10.000

1 M303V1 -----COMPOSITE ASSAY VARIOGRAM

** VARIOGRAM 3690 BLASTHOLE DATA AREA 'A' ** For PB

ASSAYS = 409. AVG. = 2.5870 VARIANCE = 1.3231

	PAIRS	-H-	DRIFT	V(H)	AVG	*V(H)
1	767.	16.	-.018	.851	2.639	.834
2	2335.	31.	.050	.974	2.590	.973
3	3522.	50.	.104	1.139	2.578	1.143
4	4593.	70.	.212	1.137	2.560	1.149
5	5450.	90.	.239	1.146	2.555	1.161
6	6067.	110.	.235	1.232	2.532	1.250
7	6470.	130.	.245	1.301	2.528	1.332
8	6634.	150.	.259	1.348	2.537	1.374
9	6695.	170.	.297	1.284	2.552	1.302
10	6488.	190.	.297	1.315	2.551	1.334
11	6174.	210.	.295	1.351	2.557	1.367
12	5773.	230.	.389	1.397	2.555	1.414
13	5267.	250.	.413	1.488	2.572	1.496
14	4615.	270.	.366	1.567	2.623	1.545
15	3950.	290.	.324	1.553	2.603	1.497
16	3173.	310.	.299	1.402	2.735	1.402
17	2344.	329.	.201	1.316	2.750	1.256
18	1430.	349.	.140	1.466	2.763	1.373
19	825.	369.	.105	1.570	2.880	1.410
20	464.	389.	-.173	1.640	2.953	1.437



MAX # BUFFERS = 20 *	10	400	1	400	

DATA FILE COMP.61 *	NO.	SIZE	RECS	/REC
MAX # BUFFERS = 0 *	9	500	33	15

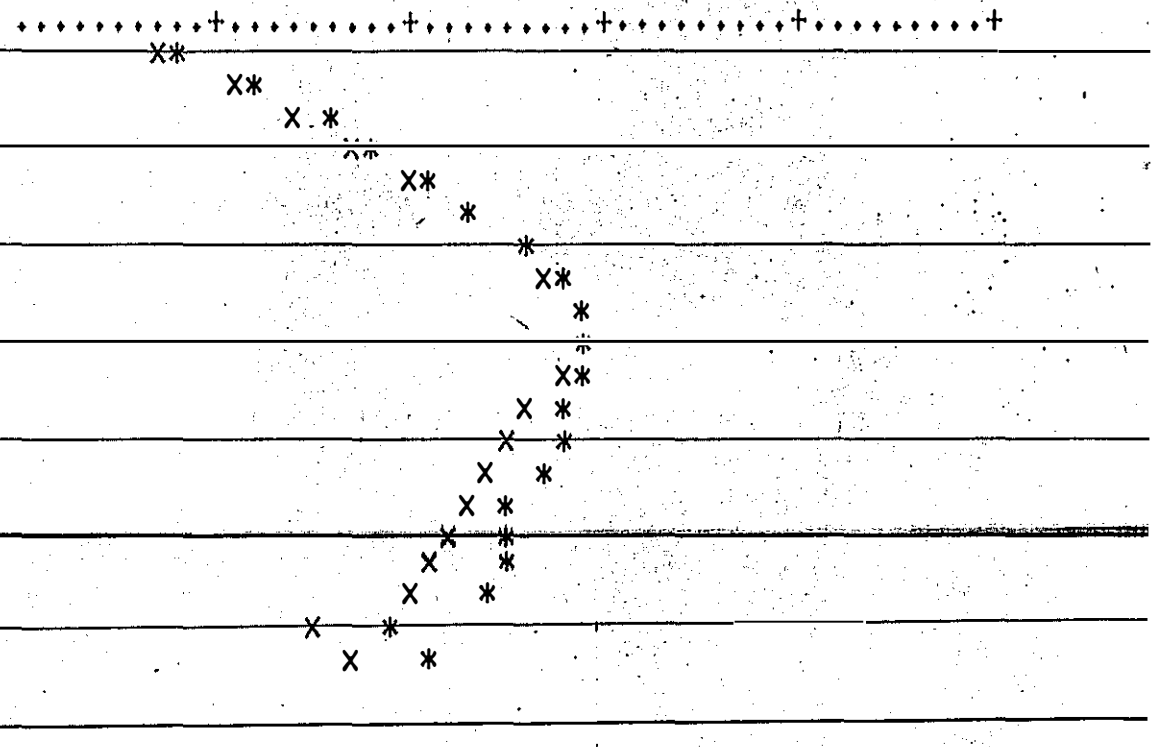
LINE 3: 1 0 0 0 0 0

LINE 4: 13950. 14300. 9450. 9800. 3670. 3670. 0. 10.000

** VARIOGRAM 3670 BLASTHOLE DATA AREA 'A' ** FOR PB

ASSAYS = 509. AVG. = 2.5086 VARIANCE = 1.1283

	PAIRS	-H-	DRIFT	V(H)	AVG	*V(H)
1	1210.	16.	-.031	.383	2.550	.377
2	3492.	31.	-.037	.561	2.507	.562
3	5599.	50.	-.028	.703	2.526	.699
4	7162.	70.	.007	.852	2.475	.844
5	8344.	90.	-.021	.927	2.454	.948
6	9311.	110.	-.060	1.048	2.426	1.084
7	9919.	130.	.082	1.179	2.412	1.226
8	10239.	150.	-.118	1.249	2.403	1.303
9	10290.	170.	-.155	1.311	2.407	1.366
10	10210.	190.	.172	1.323	2.442	1.359
11	9813.	210.	-.208	1.318	2.483	1.332
12	9302.	230.	-.212	1.266	2.528	1.256
13	8394.	250.	.206	1.243	2.571	1.213
14	7444.	270.	-.158	1.213	2.598	1.171
15	6306.	290.	-.115	1.146	2.647	1.086
16	4897.	310.	.088	1.121	2.688	1.047
17	3435.	329.	-.069	1.129	2.760	1.026
18	1969.	349.	-.107	1.064	2.799	.954
19	1044.	369.	.057	.864	2.852	.760
20	515.	389.	-.148	.945	2.881	.823



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      DATA FILE COMP.S1     *    NO.   SIZE   RECS   /REC
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LINE  4:  13950.  14300.   9450.  9800.   3650.   3650.   0.      10.000
1  M303V1 -----COMPOSITE ASSAY VARIOGRAM
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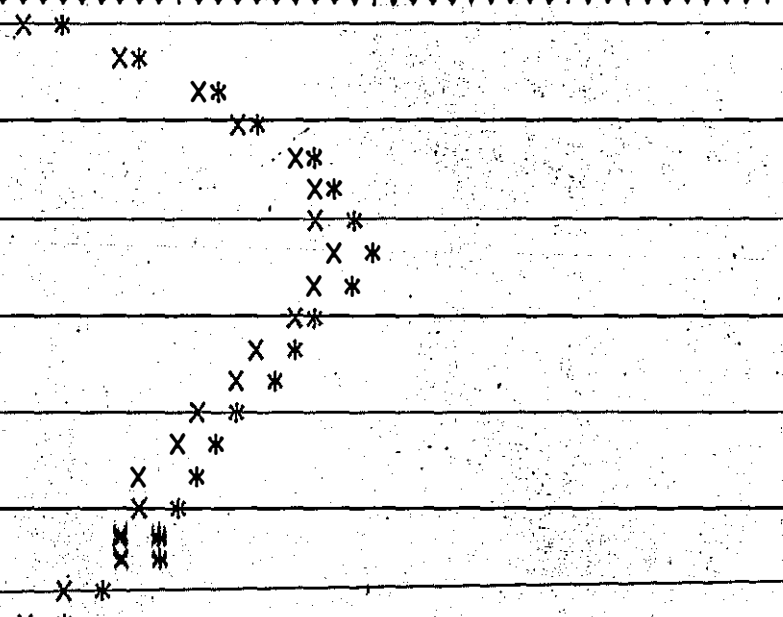
** VARIOGRAM 3650 BLASTHOLE DATA AREA 'A' ** FOR PB

ASSAYS = 509. AVG. = 2.5668 VARIANCE = .6159

	PAIRS	-H-	DRIFT	V(H)	AVG	*V(H)
1	1225.	16.	-.018	.335	2.556	.337
2	3521.	31.	-.018	.450	2.533	.456
3	5683.	50.	.005	.535	2.532	.543
4	7374.	70.	.039	.600	2.520	.611
5	8678.	90.	.038	.657	2.523	.669
6	9663.	110.	.038	.694	2.538	.702
7	10190.	130.	.004	.706	2.540	.713
8	10567.	150.	-.018	.732	2.552	.736
9	10626.	170.	-.017	.704	2.550	.709
10	10400.	190.	.017	.674	2.545	.680
11	9803.	210.	.039	.636	2.565	.637
12	9110.	230.	.091	.604	2.567	.604
13	8267.	250.	.126	.566	2.589	.561
14	7049.	270.	.163	.534	2.612	.525
15	5836.	290.	.205	.505	2.637	.492
16	4478.	309.	.226	.491	2.670	.472
17	3137.	329.	.196	.470	2.688	.449
18	1783.	349.	.199	.466	2.683	.446
19	965.	369.	.185	.397	2.668	.381
20	514.	389.	.152	.339	2.678	.325



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DATA FILE COMP.S1 *	NO.	SIZE	RECS	/REC
MAX # BUFFERS = 0 *	9	500	33	15

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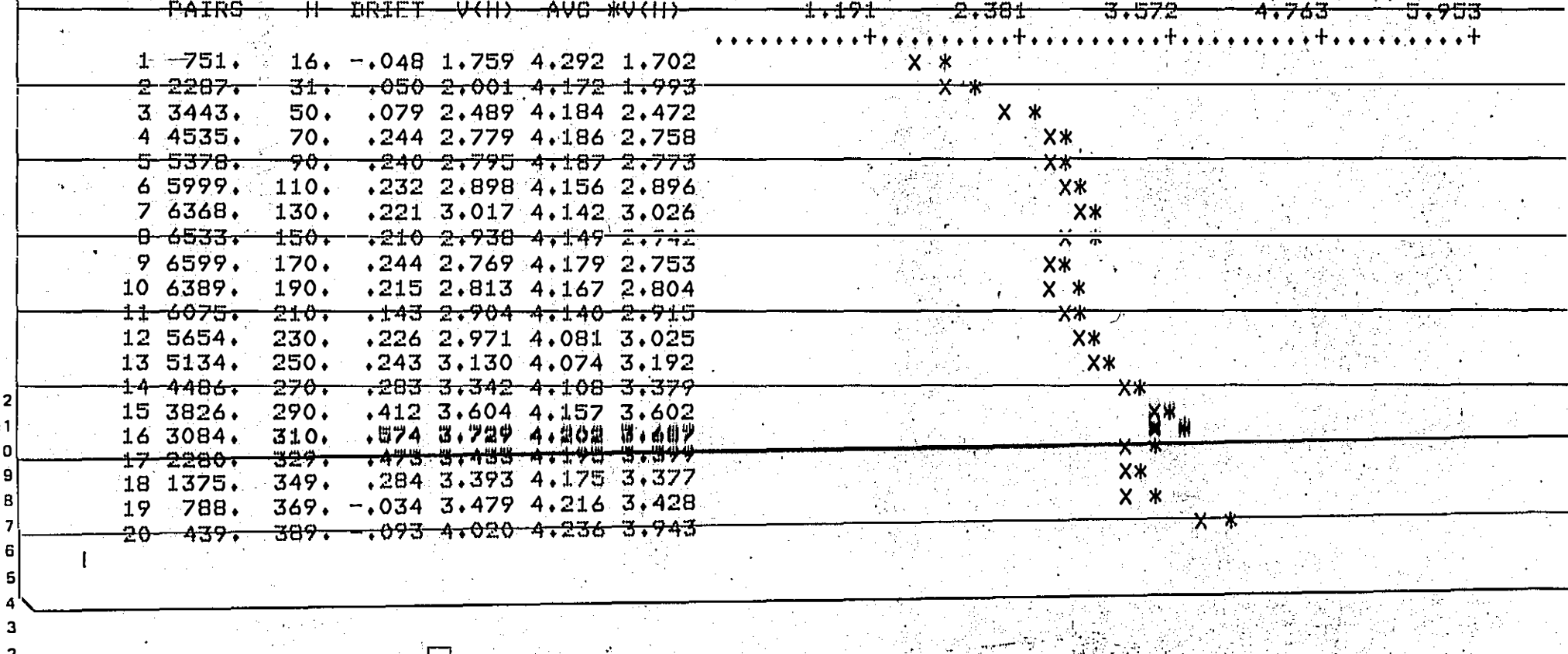
LINE 4: 13950. 14300. 9450. 9800. 3690. 3690. 0. 10.000

1 M303V1 -----COMPOSITE ASSAY VARIOGRAM

** VARIOGRAM 3690 BLASTHOLE DATA AREA 'A' ** FOR ZN

ASSAYS = 405. AVG. = 4.1543 VARIANCE = 2.9767

	PAIRS	H	DRIFT	V(H)	AVG	*V(H)
1	751.	16.	-.048	1.759	4.292	1.702
2	2287.	31.	.050	2.001	4.172	1.993
3	3443.	50.	.079	2.489	4.184	2.472
4	4535.	70.	.244	2.779	4.186	2.758
5	5378.	90.	.240	2.795	4.187	2.773
6	5999.	110.	.232	2.898	4.156	2.896
7	6368.	130.	.221	3.017	4.142	3.026
8	6533.	150.	.210	2.938	4.149	2.742
9	6599.	170.	.244	2.769	4.179	2.753
10	6389.	190.	.215	2.813	4.167	2.804
11	6075.	210.	.143	2.904	4.140	2.915
12	5654.	230.	.226	2.971	4.081	3.025
13	5134.	250.	.243	3.130	4.074	3.192
14	4486.	270.	.283	3.342	4.108	3.379
15	3826.	290.	.412	3.604	4.157	3.602
16	3084.	310.	.574	3.729	4.208	3.607
17	2280.	329.	.475	3.459	4.195	3.599
18	1375.	349.	.284	3.393	4.175	3.377
19	788.	369.	-.034	3.479	4.216	3.428
20	439.	389.	-.093	4.020	4.236	3.943



DATA FILE PGP.S1

MAX # BUFFERS = 20 1 400

DATA FILE COMP.S1	*	NO.	SIZE	RECS	/REC
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LINE 3: 1 0 0 0 0 0

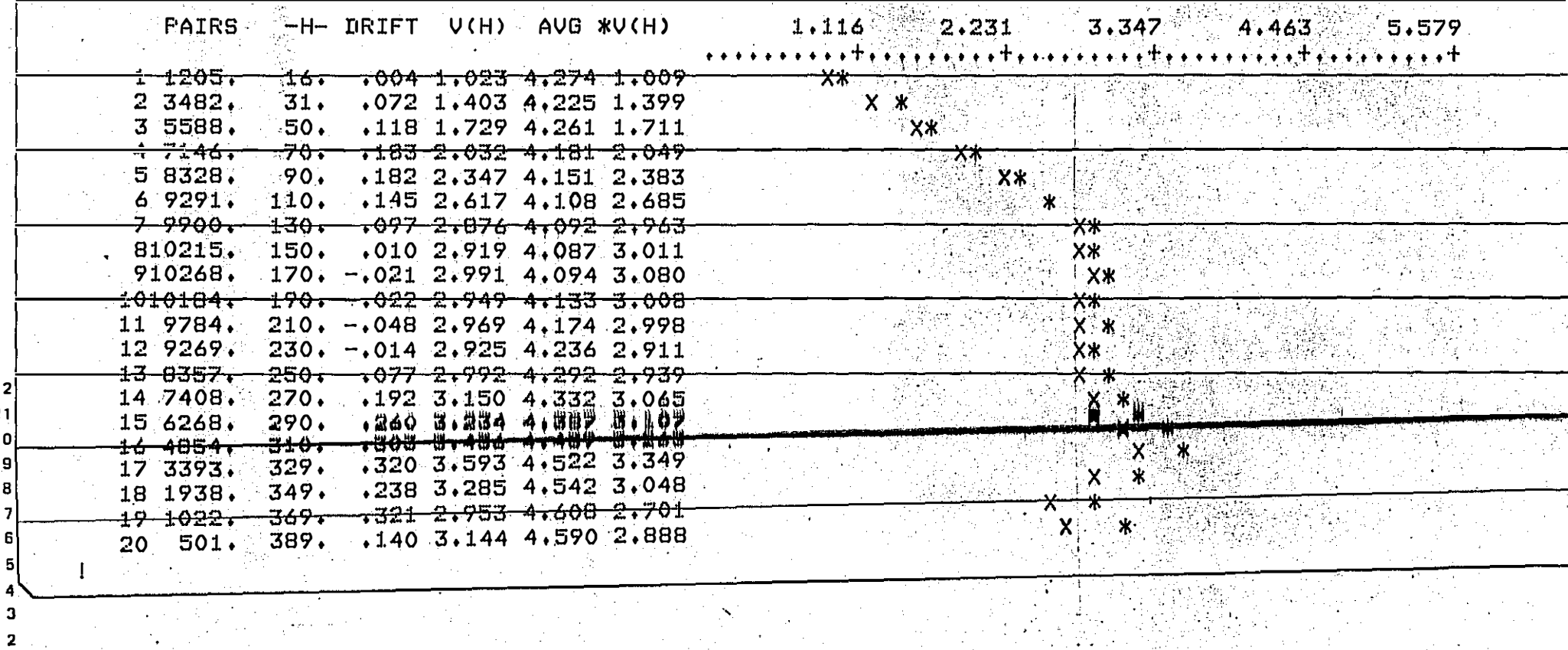
LINE 4: 13950. 14300. 9450. 9800. 3670. 3670. 0. 10.000

1 M303V1 -----COMPOSITE ASSAY VARIOGRAM

** VARIOGRAM 3670 BLASTHOLE DATA AREA 'A' ** FOR ZN

ASSAYS = 508. AVG. = 4.2150 VARIANCE = 2.7893

	PAIRS	-H-	DRIFT	V(H)	AVG	*V(H)
1	1205.	16.	.004	1.023	4.274	1.009
2	3482.	31.	.072	1.403	4.225	1.399
3	5588.	50.	.118	1.729	4.261	1.711
4	7146.	70.	.183	2.032	4.181	2.049
5	8328.	90.	.182	2.347	4.151	2.383
6	9291.	110.	.145	2.617	4.108	2.685
7	9900.	130.	.077	2.876	4.092	2.963
8	10215.	150.	.010	2.919	4.087	3.011
9	10268.	170.	-.021	2.991	4.094	3.080
10	10184.	190.	-.022	2.949	4.133	3.008
11	9784.	210.	-.048	2.969	4.174	2.998
12	9269.	230.	-.014	2.925	4.236	2.911
13	8357.	250.	.077	2.992	4.292	2.939
14	7408.	270.	.192	3.150	4.332	3.065
15	6268.	290.	.260	3.234	4.387	3.107
16	4854.	310.	.305	3.484	4.449	3.449
17	3393.	329.	.320	3.593	4.522	3.349
18	1938.	349.	.238	3.285	4.542	3.048
19	1022.	369.	.321	2.953	4.608	2.701
20	501.	389.	.140	3.144	4.590	2.888



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DATA FILE COMP.S1	*	NO.	SIZE	RECS	/REC
MAX # BUFFERS = 0	*	9	500	33	15

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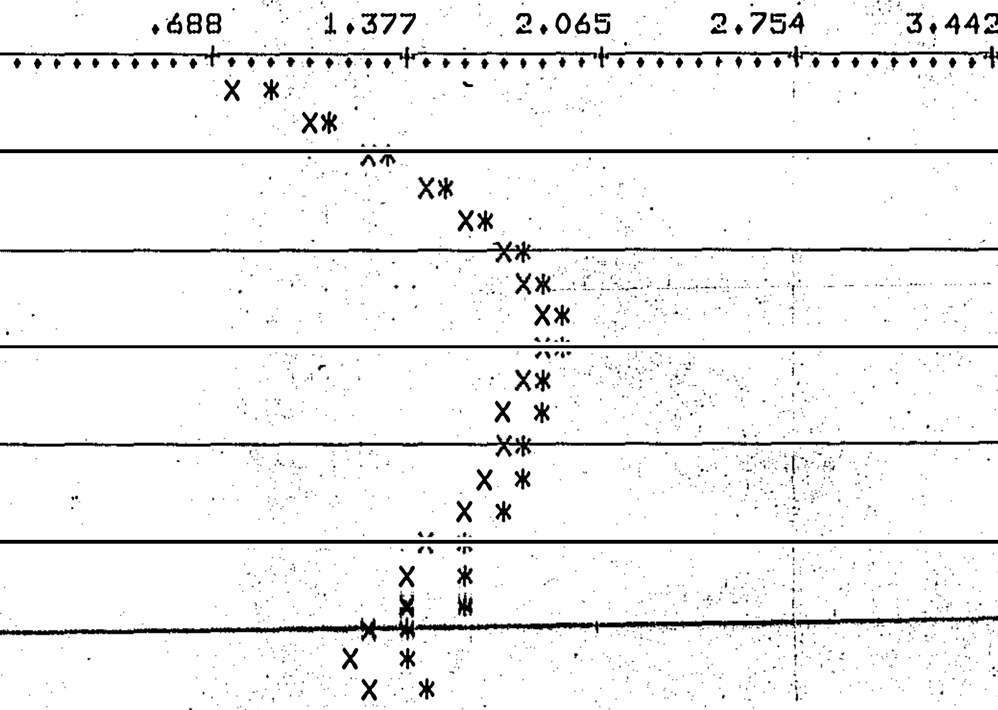
LINE 4: 13950. 14300. 9450. 9600. 3650. 3650. 0. 10.000

1 M303V1 -----COMPOSITE ASSAY VARIOGRAM

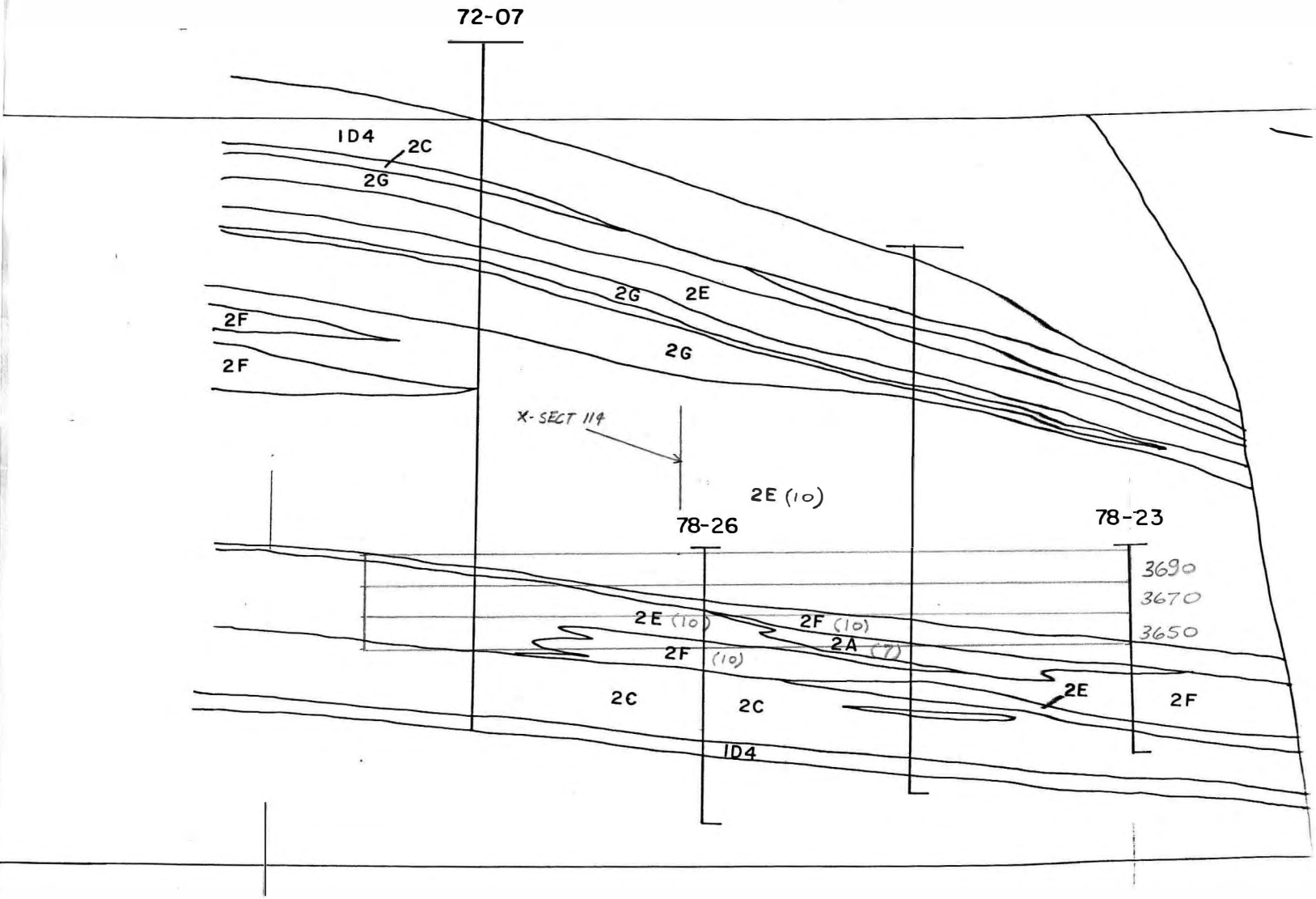
** VARIOGRAM 3650 BLASTHOLE DATA ** *AREA 'A' FOR ZN*

ASSAYS = 500. AVG. = 4.3779 VARIANCE = 1.7211

	PAIRS	-H-	DRIFT	V(H)	AVG	*V(H)
1	1220.	16.	.019	.881	4.340	.888
2	3514.	31.	.040	1.109	4.323	1.123
3	5683.	50.	.087	1.324	4.320	1.342
4	7347.	70.	.163	1.514	4.291	1.545
5	8649.	90.	.177	1.665	4.279	1.703
6	9637.	110.	.200	1.779	4.283	1.818
7	10161.	130.	.187	1.864	4.278	1.907
8	10536.	150.	.152	1.927	4.307	1.959
9	10594.	170.	.141	[illegible]	4.317	1.933
10	10364.	190.	.137	1.863	4.324	1.887
11	9767.	210.	.216	1.855	4.382	1.854
12	9071.	230.	.269	1.822	4.409	1.809
13	8224.	250.	.300	1.769	4.464	1.735
14	7012.	270.	.340	1.737	4.509	1.687
15	[illegible]	290.	[illegible]	[illegible]	[illegible]	[illegible]
16	4439.	309.	.339	1.584	4.588	1.511
17	3112.	329.	.321	1.567	4.636	1.480
18	1772.	349.	.234	1.411	4.672	[illegible]
19	958.	369.	.037	1.353	4.724	1.253
20	507.	389.	-.199	1.452	4.841	1.313



LONG SECT. 23 (STRIKE)



X - SECT. 114 (DIP)