ＭＪＣＣ－４８

D(m)	TCu	SCu	Fe
~1	0.026	0.003	1.30
2	0.033	0.003	3.00
3	0.016	0.002	4.43
4	0.016	0.004	0.94
5	0.012	0.002	0.80
6	0.034	0.003	3.64
7	0.041	0.004	7.40
8	0.050	0.004	6.80
9	0.029	0.003	6.95
10	0.015	0.001	6.40
11	0.005	0.001	2.02
12	0.015	0.002	2.00
13	0.021	0.002	2.76
14	0.019	0.002	3.36
15	0.019	0.002	2.35
16	0.010	0.001	1.02
17	0.010	0.001	4.16
18	0.008	0.002	0.82
19	0.011	0.002	5.06
20	0.011	0.001	2.90
21	0.022	0.002	4.28
22	0.006	0.001	0.94
23	0.042	0.016	4.80
24	0.030	0.010	4.16
25	0.009	0.002	6.50
26	0.003	0.001	6.80
27	0.004	0.002	7.00
28	0.016	0.008	4.62
29	0.007	0.003	4.86
30	0.003	0.001	3.60
31	0.003	0.001	6.10
32	0.002	0.001	5.70
33	0.008	0.002	4.70
34	0.012	0.002	5.18
35	0.014	0.005	3.64
36	0.006	0.001	4.78
37	0.013	0.003	3.96
38	0.006	0.002	4.00
39	0.005	0.000	3.54
40	0.003	0.001	4.22
41	0.002	0.000	3.84
42	0.007	0.001	4.18
43	0.013	0.002	3.48
44	0.005	0.001	2.56
45	0.007	0.002	2.17
46	0.006	0.001	1.08
47	0.008	0.002	3.00
48	0.002	0.001	2.98
49	0.004	0.001	3.56
50	0.002	0.001	3.52
51	0.004	0.001	3.50
52	0.016	0.006	4.00
53	0.034	0.016	3.48
54	0.013	0.004	4.16
55	0.011	0.003	3.64
56	0.004	0.001	2.78
57	0.022	0.006	3.60
58	0.027	0.010	3.72
59	0.037	0.012	4.40
60	0.076	0.026	5.60
61	0.096	0.037	3.88
62	0.062	0.014	4.18
63	0.021	0.003	6.10
64	0.074	0.026	4.04
65	0.070	0.038	1.98
66	0.070	0.019	4.40
67	0.031	0.007	4.28
68	0.017	0.003	5.02
69	0.030	0.007	5.20
70	0.048	0.013	5.26
71	0.017	0.004	4.54
72	0.083	0.019	5.24
73	0.029	0.004	3.58
74	0.062	0.024	4.48
75	0.066	0.006	4.67
76	0.100	0.047	3.70
77	0.110	0.057	2.96
78	0.120	0.026	9.80
79	0.120	0.021	6.00
80	0.077	0.018	4.70
81	0.040	0.008	5.21
82	0.096	0.039	6.70
83	0.070	0.026	5.06
84	0.026	0.005	4.14
85	0.069	0.018	4.36
86	0.083	0.036	4.46
87	0.077	0.042	4.61
88	0.063	0.016	4.10
89	0.099	0.002	5.18
90	0.210	0.001	4.10
91	0.074	0.000	4.48
92	0.940	0.007	7.20
93	0.120	0.000	3.23
94	0.110	0.000	6.40
95	0.130	0.000	7.20
96	0.062	0.000	7.40
97	0.068	0.000	2.14
98	0.058	0.000	7.20
99	0.150	0.000	4.66
100	0.230	0.000	5.80
101	0.096	0.000	2.88
102	0.230	0.001	14.20
103	0.081	0.000	11.80
104	0.230	0.002	8.40
105	0.370	0.002	17.30
106	0.260	0.002	13.80
107	0.130	0.000	6.80
108	0.510	0.003	18.00
109	0.310	0.002	16.40
110	0.470	0.002	13.40
111	0.160	0.000	6.00
112	0.840	0.000	4.90
113	0.049	0.000	2.44
114	0.120	0.000	2.76
115	0.100	0.000	1.76
116	0.049	0.000	1.82
117	0.280	0.001	4.16
118	0.190	0.001	3.56
119	0.830	0.004	15.60
120	0.840	0.004	16.40
121	1.690	0.010	13.20
122	0.110	0.001	16.00
123	0.033	0.000	13.50
124	0.014	0.000	13.60
125	0.110	0.000	2.88
126	0.080	0.000	3.04
127	0.350	0.002	14.60
128	1.050	0.017	31.40
129	0.550	0.007	22.60
130	0.790	0.011	29.80
131	0.970	0.007	35.00
132	0.550	0.009	37.60
133	0.440	0.008	20.40
134	1.210	0.013	33.80
135	0.580	0.004	22.80
136	0.280	0.003	18.00
137	0.440	0.005	20.50
138	0.380	0.003	18.40
139	0.610	0.002	20.00
140	0.560	0.003	15.20
141	0.510	0.004	25.80
142	0.690	0.005	30.00
143	0.710	0.005	31.20
144	0.530	0.004	26.40
145	0.510	0.003	20.20
146	0.760	0.006	20.20
147	0.470	0.003	14.60
148	0.240	0.002	10.40
149	0.350	0.003	10.20
150	0.300	0.002	16.60
151	0.290	0.002	20.40
152	0.430	0.003	23.00
153	0.330	0.002	21.60
154	0.160	0.001	20.40
155	0.120	0.001	5.80
156	0.440	0.002	15.00
157	0.150	0.000	7.80
158	0.180	0.001	14.60
159	0.440	0.002	15.00
160	0.200	0.001	16.00
161	0.100	0.000	8.40
162	0.240	0.001	9.80
163	0.060	0.000	7.80
164	0.050	0.001	3.16
165	0.020	0.000	2.58

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D(m)	TCu	SCu	Fe
~1	0.370	0.069	17.10
2	0.210	0.038	17.20
3	0.160	0.019	25.00
4	0.210	0.046	23.00
5	0.300	0.073	21.00
6	0.170	0.034	17.30
7	0.210	0.049	18.10
8	0.180	0.037	22.00
9	0.310	0.083	20.00
10	0.310	0.088	21.00
11	0.770	0.430	30.00
12	2.020	1.570	26.00
13	2.270	1.900	28.00
14	0.890	0.490	24.00
15	1.150	0.078	20.00
16	0.450	0.180	24.00
17	0.520	0.190	24.00
18	0.530	0.300	28.00
19	0.770	0.480	30.00
20	0.760	0.400	22.00
21	0.610	0.390	22.00
22	0.730	0.490	21.00
23	0.750	0.470	18.50
24	0.420	0.160	21.00
25	0.450	0.270	24.00
26	0.360	0.170	45.00
27	0.710	0.230	22.00
28	0.890	0.420	28.00
29	0.730	0.320	18.60
30	0.810	0.420	29.00
31	0.580	0.250	31.00
32	0.270	0.069	31.00
33	0.370	0.110	24.00
34	0.490	0.200	31.00
35	0.480	0.180	23.00
36	0.360	0.110	21.00
37	0.430	0.140	19.90
38	0.510	0.170	29.00
39	0.340	0.120	13.40
40	0.380	0.130	27.00
41	0.520	0.220	26.00
42	0.460	0.180	22.00
43	0.560	0.250	25.00
44	0.490	0.200	31.00
45	0.590	0.250	27.00
46	0.330	0.088	23.00
47	0.200	0.043	15.40
48	0.170	0.063	24.00
49	0.250	0.096	25.00
50	0.410	0.190	28.00
51	0.650	0.440	23.00
52	0.390	0.240	34.00
53	0.800	0.500	34.00
54	0.520	0.320	19.30
55	0.360	0.140	14.90
56	0.340	0.100	21.00
57	0.210	0.064	21.00
58	0.190	0.039	29.00
59	0.550	0.340	17.60
60	1.390	1.200	29.00
61	1.170	1.070	26.00
62	0.091	0.020	22.00
63	0.078	0.012	19.10
64	0.100	0.012	36.00
65	0.520	0.330	41.00
66	0.260	0.100	14.90
67	0.260	0.099	14.40
68	0.092	0.032	12.40
69	0.041	0.011	13.50
70	0.035	0.006	13.50
71	0.030	0.005	14.10
72	0.042	0.007	13.30
73	0.022	0.003	13.60
74	0.010	0.001	14.50
75	0.032	0.003	14.70
76	0.075	0.012	15.20
77	0.017	0.002	15.70
78	0.012	0.001	14.20
79	0.011	0.001	13.60
80	0.007	0.001	15.40
81	0.006	0.001	15.00
82	0.010	0.002	13.50
83	0.042	0.015	12.90
84	0.030	0.004	13.90
85	0.048	0.009	12.40
86	0.037	0.005	11.70
87	0.023	0.003	14.00
88	0.016	0.002	15.00
89	0.100	0.014	15.80
90	0.022	0.002	18.10

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D(m)	TCu	SCu	Fe
~1	0.230	0.068	28.00
2	0.570	0.160	19.80
3	0.400	0.110	14.10
4	0.460	0.100	17.00
5	0.350	0.100	17.20
6	0.300	0.130	20.00
7	0.430	0.160	16.10
8	0.220	0.050	19.60
9	0.430	0.230	27.00
10	2.100	1.660	22.00
11	0.250	0.086	17.50
12	0.440	0.210	21.00
13	0.450	0.230	21.00
14	0.420	0.120	22.00
15	0.630	0.360	21.00
16	0.790	0.650	27.00
17	0.450	0.210	27.00
18	0.810	0.460	27.00
19	0.740	0.400	22.00
20	0.650	0.340	17.70
21	0.360	0.160	17.40
22	0.340	0.170	16.00
23	0.280	0.140	17.20
24	0.390	0.160	15.80
25	0.350	0.150	16.20
26	0.440	0.130	13.60
27	0.490	0.170	15.50
28	0.320	0.180	13.60
29	0.420	0.180	14.90
30	0.610	0.230	25.00
31	0.640	0.430	24.00
32	0.310	0.180	18.80
33	0.440	0.220	21.00
34	0.095	0.020	17.40
35	0.230	0.100	15.60
36	0.260	0.110	25.00
37	0.140	0.032	16.20
38	0.220	0.042	26.00
39	0.710	0.042	21.00
40	1.090	0.800	21.00
41	0.350	0.180	44.00
42	0.440	0.290	27.00
43	0.510	0.390	29.00
44	0.520	0.300	21.00
45	0.480	0.300	22.00
46	2.030	1.490	39.00
47	0.150	0.050	15.80
48	0.100	0.020	19.00
49	0.300	0.037	42.00
50	0.120	0.026	31.00
51	0.093	0.025	25.00
52	0.100	0.026	16.60
53	0.080	0.015	25.00
54	0.034	0.010	33.00
55	0.088	0.017	22.00
56	0.190	0.025	38.00
57	0.086	0.021	21.00
58	0.110	0.026	22.00
59	0.110	0.033	23.00
60	0.096	0.026	29.00
61	0.081	0.021	25.00
62	0.110	0.022	30.00
63	0.093	0.030	13.60
64	0.130	0.044	18.10
65	0.270	0.120	19.40
66	0.130	0.048	24.00
67	0.140	0.052	21.00
68	0.140	0.048	26.00
69	0.071	0.027	20.00
70	0.520	0.370	28.00
71	1.580	1.520	32.00
72	1.040	0.900	23.00
73	0.890	0.680	28.00
74	0.400	0.230	18.70
75	1.040	0.950	25.00
76	0.170	0.071	24.00
77	0.110	0.047	18.80
78	0.086	0.038	24.00
79	0.078	0.029	33.00
80	0.250	0.068	26.00

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D(m)	TCu	SCu	Fe
~1	0.035	0.008	4.60
2	0.065	0.007	5.20
3	0.042	0.004	5.20
4	0.022	0.002	3.20
5	0.016	0.002	2.20
6	0.016	0.002	3.60
7	0.018	0.005	3.01
8	0.025	0.006	2.06
9	0.028	0.008	0.70
10	0.037	0.011	0.86
11	0.028	0.003	8.12
12	0.015	0.002	7.64
13	0.012	0.001	6.58
14	0.058	0.016	2.96
15	0.025	0.005	4.82
16	0.007	0.001	7.04
17	0.011	0.001	6.92
18	0.014	0.002	5.80
19	0.009	0.001	5.82
20	0.008	0.001	8.28
21	0.007	0.001	8.16
22	0.031	0.007	5.60
23	0.017	0.003	3.98
24	0.006	0.000	2.28
25	0.015	0.004	2.86
26	0.027	0.002	1.98
27	0.028	0.004	2.46
28	0.018	0.001	1.92
29	0.011	0.001	1.50
30	0.014	0.002	2.10
31	0.006	0.000	2.78
32	0.002	0.000	2.32
33	0.004	0.000	2.76
34	0.015	0.001	5.84
35	0.005	0.000	3.52
36	0.002	0.000	1.00
37	0.002	0.000	2.20
38	0.001	0.000	1.72
39	0.002	0.000	1.96
40	0.005	0.001	4.12
41	0.075	0.007	7.92
42	0.044	0.006	4.44
43	0.056	0.009	9.34
44	0.520	0.200	13.00
45	1.190	0.890	48.00
46	0.420	0.160	42.00
47	0.130	0.017	24.00
48	0.210	0.028	24.00
49	0.080	0.013	19.10
50	0.020	0.003	19.20
51	0.071	0.008	13.60
52	0.210	0.027	19.00
53	0.250	0.042	16.60
54	0.130	0.017	14.40
55	0.160	0.021	17.80
56	0.180	0.027	17.00
57	0.160	0.017	16.40
58	0.160	0.020	24.00
59	0.210	0.025	20.00
60	0.180	0.025	16.00
61	0.200	0.036	17.60
62	0.210	0.031	21.00
63	0.190	0.034	15.20
64	0.220	0.045	16.40
65	0.370	0.082	29.00
66	0.180	0.035	35.00
67	0.230	0.039	12.00
68	0.160	0.028	9.20
69	0.110	0.020	9.00
70	0.140	0.028	10.00
71	0.084	0.016	9.00
72	0.059	0.015	8.00
73	0.120	0.019	9.30
74	0.180	0.026	9.40
75	0.090	0.014	7.80
76	0.092	0.016	8.40
77	0.130	0.042	12.20
78	0.069	0.016	13.60
79	0.082	0.019	9.00
80	0.059	0.014	9.20
81	0.071	0.013	9.00
82	0.035	0.004	9.80
83	0.120	0.038	16.60
84	0.120	0.031	8.20
85	0.069	0.022	7.70
86	0.200	0.047	20.00
87	0.110	0.018	16.20
88	0.230	0.036	21.00
89	0.170	0.049	16.00
90	0.110	0.047	14.80
91	0.034	0.009	11.10
92	0.057	0.013	14.00
93	0.066	0.009	13.20
94	0.091	0.012	12.80
95	0.082	0.014	12.40
96	0.190	0.035	14.40
97	0.440	0.120	15.20
98	0.160	0.057	12.60
99	0.190	0.049	13.80
100	0.053	0.019	11.40
101	0.040	0.013	11.00
102	0.026	0.010	9.00
103	0.048	0.023	9.30
104	0.052	0.024	10.40
105	0.020	0.002	9.60
106	0.007	0.001	10.80
107	0.010	0.000	11.60
108	0.013	0.001	10.60
109	0.024	0.001	12.10
110	0.019	0.001	18.00
111	0.012	0.000	13.10
112	0.270	0.022	16.00
113	0.560	0.047	17.10
114	0.420	0.024	14.90
115	0.150	0.004	15.30
116	0.052	0.001	12.40
117	0.610	0.040	18.50
118	0.680	0.027	20.20
119	0.220	0.022	13.50
120	0.120	0.010	10.40
121	0.180	0.015	11.20
122	0.450	0.030	31.00
123	0.026	0.000	35.00
124	0.040	0.001	32.00
125	0.013	0.000	40.00
126	0.130	0.011	41.00
127	0.120	0.013	33.00
128	0.059	0.003	28.00
129	0.072	0.008	36.00
130	0.017	0.001	12.60
131	0.010	0.002	11.20
132	0.012	0.001	9.55
133	0.024	0.001	10.40
134	0.024	0.001	11.50
135	0.043	0.003	10.40
136	0.069	0.003	12.00
137	0.022	0.003	11.80
138	0.120	0.006	12.80
139	0.047	0.003	11.80
140	0.018	0.001	12.00
141	0.008	0.001	11.70
142	0.026	0.005	12.30
143	0.053	0.005	13.50
144	0.037	0.004	12.00
145	0.031	0.002	11.90
146	0.023	0.003	11.70
147	0.020	0.002	12.50
148	0.024	0.001	12.20
149	0.030	0.006	13.40
150	0.014	0.002	14.20

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D(m)	TCu	SCu	Fe
～1	0.270	0.044	17.50
2	0.260	0.053	13.80
3	0.360	0.059	15.50
4	0.380	0.100	31.00
5	0.270	0.079	24.00
6	0.400	0.097	26.00
7	0.540	0.110	26.00
8	0.510	0.140	24.00
9	0.360	0.100	26.00
10	0.490	0.190	24.00
11	0.450	0.190	24.00
12	0.410	0.160	23.00
13	0.480	0.170	33.00
14	0.350	0.140	23.00
15	0.160	0.032	32.00
16	0.120	0.032	25.00
17	0.400	0.120	22.00
18	0.560	0.170	26.00
19	0.200	0.060	30.00
20	0.560	0.170	20.00
21	0.460	0.200	24.00
22	0.800	0.600	17.90
23	1.080	0.790	42.00
24	1.320	1.090	26.00
25	0.290	0.150	31.00
26	0.085	0.024	27.00
27	0.150	0.032	23.00
28	0.250	0.067	23.00
29	0.680	0.540	21.00
30	0.230	0.130	33.00
31	0.700	0.390	30.00
32	1.810	1.700	16.20
33	1.200	1.020	18.70
34	1.250	1.030	15.70
35	0.590	0.360	16.20
36	0.430	0.130	17.70
37	0.350	0.091	16.60
38	0.220	0.040	26.00
39	0.260	0.040	21.00
40	0.230	0.035	16.60
41	0.220	0.032	17.30
42	0.220	0.032	16.60
43	0.340	0.050	15.90
44	0.220	0.028	16.50
45	0.230	0.026	17.50
46	0.190	0.018	20.00
47	0.200	0.033	15.30
48	0.200	0.056	15.00
49	0.320	0.100	28.00
50	0.500	0.160	20.00
51	0.380	0.095	16.60
52	0.310	0.110	22.00
53	0.320	0.140	22.00
54	0.380	0.130	18.20
55	0.370	0.110	25.00
56	0.490	0.220	24.00
57	0.410	0.210	22.00
58	0.610	0.200	23.00
59	0.430	0.110	21.00
60	0.530	0.140	19.40
61	0.440	0.100	19.50
62	0.540	0.110	21.00
63	0.420	0.100	21.00
64	0.160	0.025	25.00
65	0.028	0.003	21.00
66	0.012	0.002	15.60
67	0.032	0.003	14.80
68	0.026	0.002	16.30
69	0.010	0.003	19.70
70	0.018	0.002	17.30
71	0.016	0.001	16.00
72	0.016	0.001	14.20
73	0.016	0.001	16.60
74	0.018	0.001	14.40
75	0.018	0.002	13.50
76	0.024	0.003	14.20
77	0.027	0.003	15.90
78	0.029	0.002	15.00
79	0.033	0.002	14.20
80	0.031	0.003	14.50
81	0.025	0.005	13.80
82	0.020	0.002	15.50
83	0.039	0.008	15.20
84	0.025	0.002	15.20
85	0.020	0.001	17.90
86	0.016	0.001	21.00
87	0.016	0.003	12.90
88	0.012	0.002	12.60
89	0.017	0.002	15.00
90	0.028	0.004	13.60
91	0.028	0.004	14.50
92	0.023	0.003	14.20
93	0.023	0.005	14.60
94	0.050	0.007	15.00
95	0.012	0.002	12.90
96	0.012	0.002	12.60
97	0.016	0.002	18.90
98	0.011	0.002	11.10
99	0.016	0.003	11.80
100	0.006	0.001	12.40
101	0.006	0.001	12.80
102	0.009	0.002	16.40
103	0.007	0.002	12.30
104	0.008	0.002	20.00
105	0.024	0.002	11.60
106	0.012	0.002	16.40
107	0.028	0.005	15.30
108	0.021	0.004	13.80
109	0.010	0.002	12.80
110	0.018	0.003	19.80
111	0.008	0.002	19.30
112	0.010	0.002	13.10
113	0.061	0.011	20.00
114	0.088	0.014	22.00
115	0.033	0.005	23.00
116	0.044	0.008	16.70
117	0.021	0.005	12.80
118	0.009	0.002	16.30
119	0.008	0.001	16.80
120	0.029	0.004	15.00
121	0.027	0.003	18.10
122	0.048	0.004	16.00
123	0.040	0.003	19.60
124	0.039	0.004	19.50
125	0.013	0.002	17.00
126	0.020	0.002	16.00
127	0.006	0.001	16.20
128	0.004	0.001	16.20
129	0.007	0.002	15.40
130	0.007	0.002	18.40
131	0.033	0.004	21.00
132	0.007	0.002	19.40
133	0.009	0.002	23.00
134	0.006	0.002	26.00
135	0.018	0.003	25.00
136	0.018	0.002	30.00
137	0.026	0.004	15.70
138	0.050	0.006	13.60
139	0.220	0.033	15.10
140	3.330	0.090	35.00
141	1.090	0.054	23.00
142	0.720	0.044	37.00
143	0.970	0.040	38.00
144	1.500	0.065	25.00
145	2.180	0.072	33.00
146	3.910	0.070	26.00
147	0.610	0.039	20.00
148	1.410	0.064	23.00
149	0.840	0.061	19.50
150	0.390	0.042	16.50
151	0.800	0.063	26.00
152	0.390	0.044	19.90
153	0.120	0.016	17.00
154	0.076	0.008	18.90
155	0.086	0.006	20.00
156	0.110	0.014	22.00
157	0.240	0.022	21.00
158	0.110	0.001	17.00
159	0.250	0.001	18.20
160	0.130	0.001	17.20
161	0.260	0.010	21.00
162	0.220	0.016	19.40
163	0.190	0.017	21.00
164	0.099	0.011	20.00
165	0.077	0.011	18.80
166	0.150	0.033	18.50
167	0.140	0.041	18.10
168	0.110	0.030	13.60
169	0.096	0.030	14.80
170	0.082	0.018	18.20
171	0.120	0.023	15.40
172	0.140	0.027	24.00
173	0.073	0.021	23.00
174	0.310	0.043	19.30
175	0.340	0.046	25.00
176	0.170	0.032	22.00
177	0.120	0.020	26.00
178	0.130	0.019	24.00
179	0.220	0.046	24.00
180	0.310	0.036	17.30

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D(m)	TCu	SCu	Fe
181	0.480	0.029	17.40
182	0.270	0.012	16.20
183	0.300	0.015	16.00
184	0.440	0.033	16.80
185	0.220	0.023	23.00
186	0.150	0.012	17.90
187	0.380	0.020	19.50
188	0.140	0.011	20.00
189	0.120	0.015	16.40
190	2.190	0.060	19.40
191	0.900	0.021	25.00
192	0.660	0.025	22.00
193	1.440	0.035	21.00
194	0.770	0.038	21.00
195	0.880	0.120	23.00
196	0.970	0.640	18.60
197	0.600	0.250	16.80
198	0.820	0.320	19.50
199	0.460	0.093	22.00
200	0.320	0.050	17.20
201	0.390	0.098	14.20
202	0.150	0.052	15.90
203	0.130	0.007	16.70
204	0.038	0.002	22.00
205	0.051	0.003	19.60
206	0.055	0.003	17.30
207	0.071	0.004	18.30
208	0.035	0.003	19.30
209	0.040	0.002	22.00
210	0.006	0.001	23.00

MJCC-53

D(m)	TCu	SCu	Fe
1	0.000	0.000	0.00
2	0.000	0.000	0.00
3	0.010	0.001	7.80
4	0.008	0.001	3.01
5	0.028	0.002	4.32
6	0.015	0.001	4.16
7	0.006	0.001	3.72
8	0.007	0.001	4.60
9	0.037	0.003	4.00
10	0.093	0.010	4.40
11	0.074	0.005	5.24
12	0.034	0.003	5.60
13	0.120	0.010	9.80
14	0.320	0.036	16.40
15	0.280	0.079	17.60
16	0.240	0.067	16.40
17	0.770	0.450	20.00
18	1.210	0.890	19.60
19	7.300	6.420	17.40
20	3.330	2.870	20.00
21	1.430	1.100	19.60
22	0.530	0.170	16.90
23	0.360	0.074	15.20
24	0.310	0.060	13.60
25	0.240	0.049	15.60
26	0.370	0.070	18.00
27	2.550	2.080	21.80
28	0.590	0.280	24.80
29	0.460	0.150	16.80
30	0.300	0.066	13.60
31	0.380	0.100	17.20
32	0.420	0.110	18.00
33	0.370	0.110	14.60
34	0.180	0.049	13.00
35	0.150	0.034	13.80
36	0.230	0.034	15.80
37	0.072	0.008	15.00
38	0.026	0.002	12.80
39	0.063	0.007	13.80
40	0.059	0.009	9.00
41	0.054	0.005	11.40
42	0.015	0.001	10.80
43	0.034	0.003	10.20
44	0.051	0.006	9.60
45	0.038	0.005	11.60
46	0.023	0.003	8.00
47	0.026	0.007	8.20
48	0.013	0.001	7.00
49	0.014	0.002	8.60
50	0.020	0.002	8.40
51	0.033	0.003	7.40
52	0.020	0.003	10.50
53	0.036	0.004	20.20
54	0.036	0.003	24.00
55	0.029	0.002	11.80
56	0.024	0.003	12.20
57	0.035	0.004	11.00
58	0.056	0.007	10.20
59	0.062	0.009	11.00
60	0.058	0.008	17.40
61	0.100	0.018	17.40
62	0.100	0.015	11.00
63	0.097	0.015	12.00
64	0.160	0.033	11.00
65	0.260	0.044	10.20
66	0.092	0.017	9.80
67	0.180	0.028	10.60
68	0.150	0.022	11.20
69	0.220	0.029	13.00
70	0.130	0.018	11.90
71	0.150	0.017	11.60
72	0.140	0.023	10.40
73	0.095	0.014	10.40
74	0.078	0.013	9.80
75	0.100	0.022	10.20
76	0.170	0.033	12.90
77	0.150	0.027	11.00
78	0.170	0.040	11.20
79	0.270	0.045	11.80
80	0.089	0.015	9.80
81	0.180	0.030	12.60
82	0.064	0.007	9.40
83	0.130	0.013	10.20
84	0.190	0.024	14.80
85	0.093	0.033	15.40
86	0.280	0.033	19.20
87	0.081	0.001	14.80
88	0.083	0.001	14.40
89	0.150	0.021	15.80
90	0.058	0.014	14.60
91	0.360	0.130	16.20
92	0.076	0.023	14.00
93	0.190	0.075	17.20
94	0.300	0.120	16.00
95	0.700	0.440	17.40
96	0.560	0.360	16.20
97	0.120	0.050	15.20
98	0.052	0.023	14.80
99	0.036	0.014	14.80
100	0.030	0.007	13.80
101	0.150	0.044	17.00
102	0.081	0.008	13.40
103	0.150	0.019	15.80
104	0.092	0.014	13.80
105	0.100	0.018	15.80
106	0.130	0.038	12.80
107	0.027	0.008	13.00
108	0.057	0.011	14.80
109	0.300	0.004	13.00
110	0.260	0.005	12.40
111	0.007	0.001	12.20
112	0.063	0.005	11.40
113	0.014	0.005	11.60
114	0.020	0.007	13.00
115	0.035	0.009	12.40
116	0.140	0.003	14.00
117	0.094	0.017	15.20
118	0.110	0.037	16.10
119	0.140	0.006	17.20
120	0.027	0.002	14.80
121	0.019	0.001	14.40
122	0.013	0.002	14.00
123	0.016	0.001	13.20
124	0.008	0.001	13.80
125	0.056	0.002	14.20
126	0.100	0.001	15.40
127	0.180	0.002	18.20
128	0.180	0.003	19.20
129	0.140	0.002	20.20
130	0.140	0.002	16.40
131	0.100	0.001	16.20
132	0.072	0.001	15.60
133	0.053	0.001	14.20
134	0.045	0.000	14.40
135	0.079	0.001	14.80
136	0.050	0.001	14.10
137	0.028	0.000	14.00
138	0.120	0.001	16.20
139	0.048	0.002	15.60
140	0.080	0.001	15.00
141	0.082	0.001	14.40
142	0.077	0.004	15.10
143	0.059	0.011	12.60
144	0.110	0.002	13.60
145	0.140	0.038	16.60
146	0.073	0.023	12.20
147	0.023	0.006	9.20
148	0.010	0.002	9.20
149	0.063	0.020	12.40
150	0.150	0.044	16.80
151	0.081	0.019	15.20
152	0.074	0.017	12.60
153	0.005	0.001	12.20
154	0.045	0.012	12.10
155	0.087	0.021	13.60
156	0.076	0.021	13.60
157	0.021	0.001	11.00

RESULTS OF MICROSCOPICAL OBSERVATION(1)

ROCK SAMPLE				Phenocryst				Grandmass				Texture	Alt. Mineral							Description
No.	Drilling site	Depth(m)	Rock name	Pl	Hb	Op	Qz	Pl	Hb	Op	G		Qz	Pl	Se	Ch	Ep	Sh	Ca	
1	MJCC- 1	28.10	Hb Porphyrite	◎/	◎/					△		Holocry.- porphy.			△	△	△	△	△	with Apatite
2	MJCC- 2	58.20	Sp-Cc-Qz Vein					○				Pilotaxitic								Brecciate Andesite
3	MJCC- 3	88.00	Sp Ore					○				Intersertal			△					Hm-rich Andesite
4	MJCC- 4	186.40	Brecciate Andesite	◎/		△Mt		△/		◎Mt		Amyg-Hyalopilitic			△	△				amygdal cavity bearing
5	MJCC- 5	64.70	Banded Sp Ore			○Sp										△				
6	MJCC- 6	120.70	Mt bearing Hb-Andesite	○/	△/	○Mt	△	◎/	△			Holocry.- porphy.			△	△		·		Qz-Ch vein
7	MJCC- 7	138.70	Cp-Py-Sp-Mt Ore	○				○/				Intersertal	○					△		Brecciate Andesite
8	MJCC- 8	186.50	Mt Andesite	◎/	○/	△Mt		○/		◎Mt		Intersertal	◎		△	○				
9	MJCC-10	37.70	Sp-Mtt Ore			○Sp				△Hm		Colloform	△			○				
10	〃	69.00	Mt-Hm-Cp-Py Ore							△Mt		Pilo-Inter.								Brecciate Andesite
11	MJCC-14	90.05	Sp Ore	◎						△Hm		Inter- Hyalo.								Silic.aphyric Ad.
12	MJCC-15	145.00	Silicified Hb Andesite	○/	○/	△Mt				△Mt			◎		○	○	△	·	△	
13	MJCC-19	53.85	Sp-Mtt Ore	○						△Mt		Intersertal								
14	MJCC-21	137.10	Py-Cv-Qz-Ch Vein	○				○		△Mt		Inter- Amyg.								Intermediate Ad.
15	〃	268.60	Cp-Py Ore(Mt.Hm)					○Mt		○			○			○				
16	MJCC-24	94.80	Py-Cp-Cv-Cc-Sp Ore					○Sp					○			△				
17	〃	280.10	Hb Andesite	◎/	○/					○		Holocry.- porphy.				◎	·	△	△	Qz.Ca Vein
18	〃	280.10	Mt bearing Andesite	○/		·		○								◎				Qz.Ca Vein
19	MJCC-25	35.40	Mt Andesite	△				○		△Sp										
20	〃	211.50	Sp-Mt-Py-Qz assemblage	○/				○/		○Mt		Intersertal	△		△	△				Brecciate Andesite
21	MJCC-26	155.50	Cp-Py, Sp Veinlet	△				◎		○Mt			△			·				Mt-rich Andesite
22	MJCC-27	121.70	Sp-Mt-Ge-Qz-Ch Ore	△			△			○Mtt					△	△				Brecciate Andesite
23	〃	234.60	Cp-Py Vein in Sp-Mt Ore					△				Intersertal								
24	MJCC-28	117.40	Mt Andesite	△/				△/		◎Mt		Intersertal								Amygdal cavity bearing
25	MJCC-29	37.75	Sp-Gt-To-Qz in Andesite	△				△		○Mt		Intersertal								
26	〃	54.30	Py vein in Sp-Ore	○				○				Holocry.- porphy.								Sp rich Andesite
27	〃	113.00	Cp-Cv-Py Vein	△				△												Silic.Sp-rich Andesite
28	〃	151.00	Cp-Py.Sp vein in Mt Andesite	○				○		○Mt		Intersertal	△			△				Cp-Py.Sp vein
29	MJCC-30	84.00	Sp-Mtt Ore					○Sp		○Mt			○						△	Qz. Ca vein
30	〃	94.60	Sp-Qz Ore in Mtt Andesite	○				○		△Py		Intersertal								Mtt-rich Andesite
31	〃	226.30	Py-Cp-Mt in Mt Andesite					◎		○Mt		Intersertal				△		·		Amygdal cavity bearing
32	MJCC-35	132.20	Sp-Mt-Py-Qz Ore in Andesite	○				◎		○Mt		Intersertal								
33	MJCC-40	6.20	Meta-Andesite	○				○		○Mt		Intersertal		○Ab		◎				
34	MJCC-41	245.50	Mt Andesite with Py-Cp	○				○				Intersertal		○Ab		○				
35	MJCC-42	74.40	Andesitic Tuff	○				○			△	Pyroclastic			·	◎				
36	MJCC-43	47.55	Hm-Mt Ore in Brecciate Ad.	△				◎		○Mt. Hm		Intersertal								
37	〃	52.00	Meta Andesite with Mt ball	○				◎			△					○		·		mudball abundant
38	MJCC-44	164.40	Py-Mt-Hm Vein in Meta Andesite	○		△Mt		△		△Mt, Hm			○							silicified
39	MJCC-45	10.30	Hm-Qz Ore in Mt Andesite	○				◎		◎Mt										
40	〃	25.90	Sp Ore in Meta Andesite	○				◎				Intersertal					△			
41	MJCC-47	32.70	Brecciate Meta Andesite					○				Intersertal				○				
42	〃	122.80	Brecciate Meta Andesite	○		△Mt		○		△Mt										
43	MJCC-53	156.00	Meta Andesite	◎				◎		△Mt		Amyg. - Inter.			△	○				

Total 43 Samples

[Abandance]
◎:abandant
○:common
△:minor
・:rare

[Alteration]
/:partlly altered
*:completely altered

[Mineral names]
Ab:Albite
At:Atacamite
Ca:Calcite
Cc:Chalcosite
Ch:Chlorite
Cp:Chalcopyrite
Cv:Covellite
Ep:Epidote
G :Glass
Hb:Holnblend
Hm:Hematite
Mt:Magnetite
Mtt:Martite
Ms:Muscovite
Op:Opaqe minerals
Pl:Plagioclase
Py:Pyrite
Qz:Quartz
Se:Sericite
Sh:Sphene
Sp:Specularite
To:Tourmaline

[Other]
B :Brecciate
Ad:Andesite

RESULTS OF MICROSCOPICAL OBSERVATION(2)

ROCK SAMPLE				ORE MINERAL										GANGUE						DESCRIPTION
No.	Drilling site	Depth(m)	Rock name	Cp	Py	Cc	Cv	At	Sp	Mt	Mtt	Gt	Hm	Qz	Ca	Ch	Se	Ac	To	
1	MJCC- 1	91.55	Cp-Py-Mt Ore	◎	◎		·			△			△	○	△	△				Mt→Hm Brecciate Andesite
2	〃	196.80	Sp-Cc-Qz Vein	○	·					△			△	○	○	△			△	Mt→Hm Brecciate Andesite
3	MJCC- 2	58.20	Sp-Cc-Qz Vein						△	△			△	○	◎	△			·	Mt→Hm Brecciate Andesite
4	MJCC- 3	88.00	Sp Ore						○	·	·		○	◎		·		△		Mt→Mtt
5	MJCC- 4	2.60	Sp Ore						◎	△	△		△	△		△				Mt→Mtt Brecciate Andesite
6	MJCC- 5	64.70	Banded Sp Ore					△	○	·	·		○			△				Mt→Mtt
7	MJCC- 7	20.50	Sp-Martite Ore	·				△	◎		△			△		○	△			
8	〃	60.90	Stratiform Sp Ore						○					◎		○			○	
9	〃	138.70	Cp-Py-Sp-Mt Ore	○	○				○	○			○	○		○				Mt→Hm Brecciate Andesite
10	MJCC- 8	186.50	Mt Andesite							◎				○		◎	△			
11	MJCC-10	37.70	Sp-Martite Ore	·					○		○			△		○				
12	〃	69.00	Mt-Hm-Cp-Py Ore	△	○					◎			○	◎		△				silicified Brecciate Andesite
13	MJCC-14	90.05	Sp Ore							◎		△		○		·				silicified Aphynic Andesite
14	MCCC-19	53.85	Sp-Martite Ore					·	○		△	·		△		○				
15	MJCC-21	137.10	Py-Cv-Qz-Ch Vein	·	○		△						△	○		○				
16	〃	268.60	Cp-Py Ore(Mt.Hm)	◎	◎	·				○			△	○		○				
17	MJCC-24	94.80	Py-Cp-Cv-Cc-Sp Ore	△	○	△	△	·	○					○		△				
18	MJCC-25	35.40	Mt Andesite					○	○					○		△		△		
19	〃	211.50	Sp-Mt-Py-Qz assemblage		△				△	·				○	·	△				Brecciate Andesite
20	MJCC-26	155.50	Cp-Py, Sp Veinlet	○	△				△					△		△				Brecciate Andesite
21	MJCC-27	121.70	Sp-Mt-Gt-Qz-Ch Ore						○	·		○	△	△		△				Mtt bearing, Mt→Hm
22	〃	234.60	Cp-Py Vein in Sp-Mt Ore	△	△				◎	○				◎						
23	MJCC-28	71.30	Mt Ore					·		◎		△		·		·				
24	〃	117.40	Amygdaloidal-Mt Andesite	△	△				△	△				○		△				Amygdal cavity bearing
25	MJCC-29	37.75	Sp-Gt-To-Qz in Andesite					△	△			△		◎					·	
26	〃	54.30	Py vein in Sp-Ore		○		△		◎					△		·				
27	〃	113.00	Cp-Cv-Py Vein	△	△		△							·	·					Qz & Calcite network vein
28	〃	136.10	Cp-Py-Sp Ore	◎	○				○					◎		·	△			
29	〃	151.00	Cp-Py vein in Andesite	○	○				△					○	·	·				Cp-Py.Sp vein
30	MJCC-30	84.00	Sp-Mtt Ore					·	○		○			○	△					
31	〃	94.60	Sp-Qz-Mtt Ore in Andesite		△		·		○		◎			△						Mtt rich
32	〃	226.30	Py-Cp-Mt in Andesite	·	△					△				○	△					Amygdal cavity bearing
33	MJCC-35	132.20	Py-Mt-Sp-Qz Ore in Andesite		○				◎	○				◎				△		
34	MJCC-40	79.20	Py-Hm-Cv-Mt Ore in Tuff		◎		◎			△			◎	△					·	
35	MJCC-41	153.70	Py-Sp-Mt Ore		○				○	△				○						
36	〃	245.50	Mt Andesite with Py-Cp	○	·				·	○			△	△		△				in Sandstone
37	MJCC-42	43.20	Mt-Sp-Qz Ore in Tuff						○	○	△			○						
38	MJCC-43	47.55	Hm-Mt Ore in Brecciate Andesite							○	△	△	○	△						
39	〃	52.00	Meta Andesite with Mt ball						·	·	○			△						Mt ball abundant
40	MJCC-44	164.40	Py-Mt-Hm Vein in Meta Andesite	△	○					○			○	△						silicified
41	〃	25.90	Sp Ore in Meta Andesite						◎					△						
42	MJCC-47	32.70	Brecciate Meta Andesite					△	◎		·									

Total 42 Samples

[abundance]
◎:abundant
○:common
△:minor
·:rare

[Mineral Name]
Ac:Actinolite
At:Atacamite
Ca:Calcite
Cc:Chalcosite
Ch:Chlorite
Cp:Chalcopyrite
Cv:Covellite
Gt:Geothite
Hm:Hematite
Mt:Magnetite
Mtt:Martite
Py:Pyrite
Qz:Quartz
Se:Sericite
Sp:specularite
To:tourmarine

APPENDIX E Specific Gravity of the Cerro Negro Ores

Sample	Specific Gravity
SC-1	3.39
SW-2	2.78
OX-1	3.18
MC-1	3.12
MW-2	2.82

APPENDIX F Bond's Work Index of the Cerro Negro Ores

Sample	Work Index (kWh/st)
SC-1	13.62
SW-2	17.65
OX-1	14.45
MC-1	13.90
MW-2	16.90

APPENDIX G Head Assay of the Cerro Negro Ores

Sample	SC-1	SW-2	OX-1	MC-1	MW-2
Cu	1.19	0.66	0.78	0.93	1.10
Citric Sol. Cu	0.045	0.013	0.43	0.16	0.54
Sulfuric Sol. Cu	0.083	0.022	0.50	0.20	0.62
Fe	29.0	13.7	27.2	23.6	14.6
Al_2O_3	9.16	13.1	11.2	12.1	11.7
S	3.36	1.03	0.14	1.32	0.94
Na_2O	0.26	1.55	0.27	0.27	0.73
K_2O	4.43	2.76	5.58	5.70	3.12
MgO	2.22	2.16	1.66	1.97	1.67
CaO	0.39	3.20	0.17	0.39	2.85
SiO_2	32.7	49.6	37.4	39.6	48.5
Zn	0.003	0.006	0.005	0.004	0.007
Pb	<0.002	<0.002	<0.002	<0.002	<0.002
Mo	<0.004	0.006	<0.004	<0.004	0.005
Mn	0.042	0.061	0.057	0.063	0.11
Co	0.050	0.009	0.053	0.041	0.049
Ni	0.005	0.003	0.006	0.003	0.006
Cd	<0.005	<0.005	<0.005	<0.005	<0.005
As	<0.005	0.005	<0.005	<0.005	0.011
Sb	<0.005	<0.005	<0.005	<0.005	<0.005
Bi	<0.005	<0.005	<0.005	<0.005	<0.005
Se	<0.005	<0.005	<0.005	<0.005	<0.005
Te	<0.005	<0.005	<0.005	<0.005	<0.005
F	<0.02	0.03	<0.02	<0.02	<0.02
Cl	0.017	0.018	0.031	0.045	0.019
Hg (ppm)	<0.1	0.1	<0.1	<0.1	<0.1
Au (g/t)	0.2	0.2	0.1	0.2	0.2
Ag (g/t)	2	<1	<1	<1	<1
Total (%)	82.841	87.897	84.539	86.036	85.417

APPENDIX H-1 Microscopical Observation of the Cerro Negro Ores(1)
(Mineralogical Composition of the Cerro Negro Ores)

Sample	SC-1	SW-2	OX-1	MC-1	MW-2
Chalcopyrite	2.89	1.59	0.03	1.28	0.37
Chaococite	0.13	0.06	0.39	0.23	0.23
Covellite	0.08	0.01	0.05	0.19	0.36
Metallic Copper	0	0.04	0	0.01	0
Malachite	0	0	0.66	0	0.52
Chrysocolla	0	0	0.11	0.34	0.18
Atacamite	0	0	0	0.10	0.20
Brochantite	0	0	0	0	0.12
Pyrite	3.92	0.83	0.06	1.31	1.22
Gangue/Others	92.98	97.47	98.70	96.54	96.80
Total	100.00	100.00	100.00	100.00	100.00

APPENDIX H-2 Microscopical Observation of the Cerro Negro Ores(2)
(Formula of Minerals in the Cerro Negro Ores)

Mineral	Formula
Chalcopyrite	$CuFeS_2$
Chaococite	Cu_2S
Covellite	CuS
Metallic Copper	Cu
Malachite	$CuCO_3 \cdot Cu(OH)_2$
Chrysocolla	$CuSiO_3 \cdot 2H_2O$
Atacamite	$Cu_2Cl(OH)_3$
Brochantite	$Cu_4(SO_4)(OH)_6$
Pyrite	FeS_2

APPENDIX I Qualitative Results of X-ray Diffraction of the Cerro Negro Ores

	Sample				
Mineral	SC-1	SW-2	OX-1	MC-1	MW-2
α-quartz	**	**	**	**	**
Actinolite	**		**		**
Microcline	**	**	**	**	**
Berthierine	**	**		**	**
Calcite	*	**			*
Hematite			**	**	
Pyrite	*	*			
Chalcopyrite		*			*
Forsterite				*	

Note;** indicates major constituent. * indicates minor constituent.

APPENDIX J-1 Results of Leaching -SX-EW Tests(1)
(Results of Column Leaching Tests with OX-1)

Column No.	1	2	3	4	4'	5
Operation Days	15	15	24	22	60	24
H2SO4 Consumption						
(kg/t-ore)	41.66	38.20	29.67	30.34	34.7	30.79
(kg/kg extr.Cu)	7.13	6.52	5.18	5.10	5.74	5.34
Cu Extraction(%)	76.07	76.14	74.93	75.50	77.4	75.69
Composite 1 of						
Pregnant Leach Sol.						
Assay of Cu(%)	7.70	5.85	7.40	6.75		6.90
Fe(%)	4.15	3.55	2.44	2.16		2.37
Al(%)	NA	NA	1.35	NA		1.35

APPENDIX J-2 Results of Leaching-SX-EW Tests(2)
(Results of Column Leaching Tests with MC-1)

Column No.	6	7	8	9	10
Operation Days	91	91	91	91	91
H2SO4 Consumption					
(kg/t-ore)	51.9	54.3	43.2	54.1	54.1
(kg/kg extr. Cu)	10.8	11.6	9.7	12.2	11.5
Cu Extraction(%)	51.8	50.4	47.7	47.3	50.7
Composite 1 of Pregnant Leach Sol.					
Assay of Cu(%)	3.61	2.90	2.54	2.90	1.64
Fe(%)	5.67	5.88	4.00	5.28	2.60

APPENDIX J-3 Results of Leaching-SX-EW Tests(3)
(Results of Column Leaching Tests with MW-2)

Column No.	13	14	15
Operation Days	91	88	91
H2SO4 Consumption			
(kg/t-ore)	137.2	124.2	138.4
(kg/kg extr. Cu)	15.4	14.0	15.7
Cu Extraction(%)	81.1	80.8	80.1
Composite 1 of Pregnant Leach Sol.			
Assay of Cu(%)	4.64	5.46	4.30
Fe(%)	8.15	8.06	7.98

APPENDIX J-4 Results of Leaching-SX-EW Tests(4)

Results of the Solvent Extraction Tests with OX-1

Origin Pregnant Leach Solution (at 23℃)

◎Organic Phase: LIX 984 at 20%(v/v) in ESCAID 103

Organic:Aqueous Phase Ratio O:A	Cu Concentration(g/l)	
	Aqueous	Organic
Recycled extractant		
1:2	3.94	8.37
1:1	1.86	7.53
2:1	0.65	5.66
4:1	0.32	4.39

APPENDIX J-5 Results of Leaching-SX-EW TEsts(5)

Results of the Stripping Extraction Tests with OX-1

Origin Loaded Organic (at 23℃)

◎Organic Phase: LIX 984 at 20%(v/v) in ESCAID 103

◎Aqueous Phase:Stripping solution 30g/l Cu, 170g/l H_2SO_4

Aqueous:Organic Phase Ratio A:O	Cu Concentration(g/l)	
	Organic	Aqueous
4:1	2.27	33.2
2:1	2.44	34.4
1:1	2.75	37.6
1:2	3.55	42.8
1:3	4.72	44.8
1:4	5.38	46.4

APPENDIX J-6 Results of Leaching-SX-EW Tests(6)

Results of the Electrowinning Tests with OX-1 Origin Electrolyte

Sample	OX-1
Operation Conditions	
Electrolyte Volume	
◎within the cell	3.2 l
◎reservoir for recirculation	2.25 l
Recirculation flow	～0.9 ml/s
Estimated residence time	～1 h
Temperature	38℃
Cathodic current density	2.34 A/dm^2
Anodic current density	2.5 A/dm^2
Time	8 h 49 min
Total electric energy provided	75.42 A
Results Obtained	
Copper deposited	
◎theoretical	89.9 g
◎experimental	88.8 g
Electrical yield	98.8 %

APPENDIX J-7 Results of Leaching-SX-EW Tests(7)

(Assay results of electrolyte and cathode)

Sample	OX-1	MC-1	MW-2
Assay of electrolyte			
Cu (g/l)	46.5	(44.0)	44.0
Fe (mg/l)	345	(495)	495
Al (mg/l)	40	(40)	40
H_2SO_4 (g/l)	155.2	(159.9)	159.9
Assay of spent solutions			
Cu (g/l)	30.3	(30.0)	30.0
Fe (mg/l)	365	(505)	505
Al (mg/l)	45	(40)	40
H_2SO_4 (g/l)	173.4	(180.6)	180.6
Assay of produced cathode			
Se (ppm)	<0.1	<0.1	<0.1
Te (ppm)	<0.1	<0.1	<0.1
Bi (ppm)	<0.1	<0.1	<0.1
Sb (ppm)	<0.1	<0.1	NA
As (ppm)	<0.1	<0.1	<0.1
Pb (ppm)	14	4	7
Sn (ppm)	<0.2	<0.2	<0.2
Ni (ppm)	<1	<1	1
Fe (ppm)	<1	2	4
Ag (ppm)	<0.2	<0.2	<0.2
S (ppm)	13	13	<5

APPENDIX K-1

Results of Flotation Tests(1)

Results of the Rougher Flotation Tests with SC-1

◎Frother :DF-250, 30 g/t
◎Flotation time :10 min
◎Conditioning time : 2 min

Test No.	Grinding -200mesh (Wt%)	pH	Reagents & dosages (g/t)	Concentrate Weight (%)	Concentrate Grade (%Cu)	Cu Recovery (%)
4	50	9.5	AC-350:30	8.20	14.20	92.83
5	60	9.5	AC-350:30	7.96	14.30	93.93
6	70	9.5	AC-350:30	7.11	16.40	95.44
16	60	9.8	AC-3477:15 +SF-113:15	9.48	12.10	95.55
17	60	9.8	SF-203:30	8.42	13.60	94.06
18	60	9.6	SF-323:30	8.63	13.50	95.51
25	60	9.8	SF-323:20	7.95	14.50	95.21
26	60	9.1	SF-323:30	9.22	12.50	95.63
49	50	9.1	AC-3477:15 +SF-113:15	9.81	11.82	93.45
50	60	9.1	AC-3477:15 +SF-113:15	9.74	12.25	95.22

APPENDIX K-2 Results of Flotation Tests(2)

Results of the Rougher Flotation Tests with SW-2

◎Frother :DF-250, 30 g/t

◎Flotation time :10 min

◎Conditioning time : 2 min

Test No.	Grinding -200mesh (Wt%)	pH	Reagents & dosages (g/t)	Concentrate Weight (%)	Concentrate Grade (%Cu)	Cu Recovery (%)
1	50	9.5	AC-350:30	5.40	9.90	81.31
2	60	9.5	AC-350:30	5.45	10.40	85.70
3	70	9.5	AC-350:30	6.48	8.79	88.65
13	60	9.5	AC-3477:15 +SF-113:15	5.54	10.50	88.50
14	60	9.5	SF-203:30	4.57	11.80	82.48
15	60	9.5	SF-323:30	5.54	10.70	89.96
27	60	9.6	SF-323:20	5.28	10.70	89.23
28	60	9.0	SF-323:30	5.37	10.80	90.95
33	50	9.6	SF-323:30	5.13	10.90	85.49
34	70	9.6	SF-323:30	6.17	9.78	92.13

APPENDIX K-3

Results of Flotation Tests(3)

Results of the Rougher Flotation Tests with MC-1

◎Frother :DF-250, 30 g/t
◎Flotation time :10 min
◎Conditioning time : 2 min

Test No.	Grinding -200mesh (Wt%)	pH	Reagents & dosages (g/t)	Concentrate Weight (%)	Concentrate Grade (%Cu)	Cu Recovery (%)
7	50	9.5	AC-350:30	3.61	17.90	69.08
8	60	9.5	AC-350:30	3.75	17.20	71.29
9	70	9.5	AC-350:30	4.06	16.90	74.12
19	60	9.6	AC-3477:15 +SF-113:15 +NaSH:250	5.23	13.60	76.53
20	60	9.6	SF-203:30 +NaSH:250	5.21	14.00	76.99
21	60	9.5	SF-323:30 +NaSH:250	5.13	13.70	77.11
29	60	9.5	SF-323:40 +NaSH:250	5.86	12.30	78.46
30	60	9.5	SF-323:40 +NaSH:250	5.49	12.40	77.41
35	60	9.6	AC-350:45 +NaSH:250	5.09	14.10	80.76
36	60	9.6	AC-3477:20 +SF-113:25 +NaSH:250	5.05	13.90	78.69
52	60	9.1	SF-323:35 +NaSH:300	5.42	14.00	78.48

APPENDIX K-4

Results of Flotation Tests(4)

Results of the Rougher Flotation Tests with MW-2

◎Frother :DF-250, 30 g/t
◎Flotation time :10 min
◎Conditioning time : 2 min

Test No.	Grinding -200mesh (Wt%)	pH	Reagents & dosages (g/t)	Concentrate Weight (%)	Concentrate Grade (%Cu)	Cu Recovery (%)
10	50	9.5	AC-350:30	2.99	10.30	26.71
11	60	9.5	AC-350:30	4.29	8.45	31.60
12	70	9.5	AC-350:30	5.70	6.90	34.56
22	60	9.5	AC-3477:15 +SF-113:15 +NaSH:250	6.39	10.40	58.19
23	60	9.5	SF-203:30 +NaSH:250	6.09	10.40	56.95
24	60	9.6	SF-323:30 +NaSH:250	5.92	10.90	55.03
31	60	9.6	SF-323:40 +NaSH:250	5.70	9.96	52.72
32	60	9.6	SF-323:40 +NaSH:300	6.98	8.78	56.86
37	60	9.6	AC-350:45 +NaSH:250	5.89	11.50	62.08
38	60	9.6	AC-3477:20 +SF-113:25 +NaSH:250	5.69	11.30	58.69
48	60	9.1	AC-3477:15 +SF-113:15 +NaSH:500	5.69	11.70	56.19
51	60	9.1	SF-323:35 +NaSH:300	6.73	9.89	56.56

APPENDIX K-5 Results of Flotation Tests(5)

Results of the Kinetics Flotation Tests with SC-1

◎pH :9.1
◎Collector :SF-323, 30 g/t
◎Frother :DF-250, 30 g/t
◎Grinding :60% -200 mesh
◎Conditioning time : 2 min

Test No.	Product	Time (min)		Concentrate Weight(%)		Concentrate Grade(%Cu)		Cu Recovery (%)	
		Par	Cum	Par	Cum	Par	Cum	Par	Cum
42	Conc.1	1	1	5.73	5.73	6.00	16.00	75.84	75.84
	Conc.2	2	3	1.99	7.71	0.50	14.58	17.27	93.11
	Conc.3	3	6	0.65	8.36	4.27	13.79	2.28	95.39
	Conc.4	6	12	0.66	9.02	1.58	12.90	0.86	96.25
	Conc.5	8	20	0.47	9.49	0.98	12.30	0.38	96.63
	Tail	20		90.51		0.045		3.37	

APPENDIX K-6

Results of Flotation Tests(6)

Results of the Kinetics Flotation Tests with SW-2

◎pH :9.6
◎Collector :SF-323, 30 g/t
◎Frother :DF-250, 30 g/t
◎Grinding :60%(Test 39) & 70%(Test 40) -200 mesh
◎Conditioning time : 2 min

Test No.	Product	Time (min)		Concentrate Weight(%)		Concentrate Grade(%Cu)		Cu Recovery (%)	
		Par	Cum	Par	Cum	Par	Cum	Par	Cum
39	Conc. 1	1	1	3.35	3.35	14.60	14.60	74.27	74.27
	Conc. 2	2	3	1.65	4.99	4.24	11.18	10.62	84.89
	Conc. 3	3	6	0.94	5.93	1.99	9.73	3.23	87.72
	Conc. 4	6	12	0.87	6.80	1.43	8.66	1.91	89.63
	Conc. 5	8	20	0.73	7.53	0.73	7.89	0.81	90.44
	Tail	20		92.46		0.068		9.56	
40	Conc. 1	1	1	3.20	3.20	13.80	13.80	66.39	66.39
	Conc. 2	2	3	2.12	5.33	5.66	10.55	18.06	84.45
	Conc. 3	3	6	1.26	6.59	1.95	8.91	3.69	88.14
	Conc. 4	6	12	1.13	7.71	1.01	7.75	1.72	89.86
	Conc. 5	8	20	1.61	9.32	0.42	6.49	1.01	90.87
	Tail	20		90.68		0.067		9.13	

APPENDIX K-7 Results of Flotation Tests(7)

Results of the Kinetics Flotation Tests with MC-1

◎pH :9.1
◎Collector(Test No.55):AC-350, 30 g/t+15 g/t(at 5 min)
(Test No.56):SF-323, 30 g/t+10 g/t(at 6 min)
◎NaSH (Test No.55):100 g/t+100 g/t(at 5 min)
(Test No.56):200 g/t+100 g/t(at 6 min)
◎Frother :DF-250, 40 g/t
◎Grinding :60% -200 mesh
◎Conditioning time : 2 min

Test No.	Product	Time (min)		Concentrate				Cu Recovery (%)	
				Weight(%)		Grade(%Cu)			
		Par	Cum	Par	Cum	Par	Cum	Par	Cum
55	Conc.1	1	1	3.72	3.72	16.30	16.30	64.22	64.22
	Conc.2	2	3	1.03	4.75	9.99	14.94	10.85	75.07
	Conc.3	3	6	0.66	5.41	3.67	13.55	2.57	77.64
	Conc.4	6	12	0.77	6.18	2.27	12.16	1.84	79.48
	Conc.5	8	20	0.73	6.91	2.31	11.11	1.80	81.28
	Tail	20		93.09		0.19		18.72	
56	Conc.1	1	1	2.19	2.19	23.80	23.80	56.63	56.63
	Conc.2	2	3	1.12	3.31	13.70	20.39	16.60	73.23
	Conc.3	3	6	1.13	4.44	1.75	15.63	2.16	75.39
	Conc.4	6	12	1.03	5.47	2.90	13.24	3.23	78.62
	Conc.5	8	20	0.89	6.36	2.12	11.68	2.06	80.68
	Tail	20		93.64		0.19		19.32	

APPENDIX K-8

Results of Flotation Tests(8)

Results of the Kinetics Flotation Tests with MW-2

◎pH :9.1

◎Collector(Test No.53):AC-350, 30 g/t+15 g/t(at 5 min)

(Test No.54):SF-323, 30 g/t+10 g/t(at 5 min)

◎NaSH (Test No.53):100 g/t+100 g/t(at 5 min)

(Test No.54):200 g/t+100 g/t(at 5 min)

◎Frother :DF-250, 40 g/t

◎Grinding :60% -200 mesh

◎Conditioning time : 2 min

Test No.	Product	Time (min)		Concentrate Weight(%)		Grade(%Cu)		Cu Recovery (%)	
		Par	Cum	Par	Cum	Par	Cum	Par	Cum
53	Conc. 1	1	1	2.34	2.34	19.10	19.10	39.58	39.58
	Conc. 2	2	3	1.24	3.58	9.75	15.87	10.68	50.26
	Conc. 3	3	6	1.41	4.99	3.33	12.32	4.16	54.42
	Conc. 4	6	12	1.62	6.61	4.35	10.37	6.22	60.64
	Conc. 5	8	20	1.86	8.47	1.28	8.37	2.10	62.74
	Tail	20		91.53		0.46		37.26	
54	Conc. 1	1	1	2.14	2.14	12.60	12.60	23.94	23.94
	Conc. 2	2	3	1.87	4.01	5.77	9.41	9.60	33.54
	Conc. 3	3	6	2.84	6.85	6.58	8.24	16.57	50.11
	Conc. 4	6	12	2.16	9.01	3.64	7.14	6.98	57.09
	Conc. 5	8	20	2.09	11.10	1.86	6.14	3.45	60.54
	Tail	20		88.90		0.50		39.46	

APPENDIX K-9

Results of Flotation Tests(9)

Results of the Cleaner Flotation Tests with SC-1

◎pH :9.0(Rougher) & 11.0(Cleaner)
◎Collector :SF-323, 30 g/t
◎Frother :DF-250, 30 g/t
◎Grinding :60% -200 mesh
◎Regrinding :95% -325 mesh(Test No.47)
Without regrinding(Test No.46)
◎Rougher Flotation time: 12 min
◎Conditioning time : 2 min

Test No.	Product	Concentrate		Cu Recovery (%)
		Weight (%)	Grade (%Cu)	
46	Feed	100.00	1.22	100.00
	Clean. Conc. 1'	2.25	22.90	42.34
	Clean. Conc. 3'(Cumul)	4.86	19.20	76.58
	Clean. Conc. 6'(Cumul)	6.78	16.43	91.44
	Clean. Conc. 10'(Cumul)	7.59	15.12	94.13
	Clean. Tail.	1.78	1.42	2.08
	Rough. Tail.	90.63	0.051	3.79
47	Feed	100.00	1.27	100.00
	Clean. Conc. 1'	1.20	33.20	31.36
	Clean. Conc. 3'(Cumul)	2.55	33.52	67.64
	Clean. Conc. 6'(Cumul)	3.66	31.46	90.89
	Clean. Conc. 10'(Cumul)	4.09	29.11	93.96
	Clean. Tail.	5.51	0.55	2.40
	Rough. Tail.	90.40	0.051	3.64

APPENDIX K-10 Results of Flotation Tests(10)

Results of the Cleaner Flotation Tests with SW-2

◎pH :9.0(Rougher) & 11.0(Cleaner)
◎Collector :SF-323, 30 g/t
◎Frother :DF-250, 30 g/t
◎Grinding :60% -200 mesh
◎Regrinding :95% -325 mesh(Test No.44)
Without regrinding(Test No.43)
◎Rougher Flotation time: 12 min
◎Conditioning time : 2 min

Test No.	Product	Concentrate		Cu Recovery (%)
		Weight (%)	Grade (%Cu)	
43	Feed	100.00	0.65	100.00
	Clean. Conc. 1'	0.65	25.20	25.14
	Clean. Conc. 3'(Cumul)	1.78	22.28	61.01
	Clean. Conc. 6'(Cumul)	2.62	19.27	77.65
	Clean. Conc. 10'(Cumul)	3.19	17.50	85.80
	Clean. Tail.	2.30	1.50	5.47
	Rough. Tail.	94.51	0.060	8.73
44	Feed	100.00	0.64	100.00
	Clean. Conc. 1'	0.77	32.50	38.94
	Clean. Conc. 3'(Cumul)	1.54	31.45	75.36
	Clean. Conc. 6'(Cumul)	1.89	29.08	85.17
	Clean. Conc. 10'(Cumul)	2.05	27.55	87.67
	Clean. Tail.	3.22	0.70	3.50
	Rough. Tail.	94.73	0.060	8.83

APPENDIX K-11

Results of Flotation Tests(11)

Results of the Cleaner Flotation Tests with MC-1

◎pH :9.1(Rougher) & 11.0(Cleaner)
◎Collector(Rougher):AC-350, 30 g/t+15 g/t(at 5 min)
(Scavenger):AC-350, 5 g/t+5 g/t(at 8 min)
◎NaSH (Rougher):200 g/t+100 g/t(at 5 min)
(Scavenger):50 g/t+50 g/t(at 8 min)
◎Frother (Rougher):DF-250, 40 g/t+10 g/t(at 5 min)
(Scavenger):DF-250, 10 g/t
◎Grinding :60% -200 mesh
◎Regrinding :95% -325 mesh(Test No.57)
Without regrinding(Test No.58)
◎Flotation time :12 min(Rougher)+12 min(Scavenger)
◎Conditioning time :2 min

Test No.	Product	Concentrate		Cu Recovery (%)
		Weight (%)	Grade (%Cu)	
57	Feed	100.00	0.94	100.00
	Clean. Conc. 1'	0.76	32.40	25.55
	Clean. Conc. 3'(Cumul)	1.69	30.50	54.90
	Clean. Conc. 6'(Cumul)	2.46	27.26	71.46
	Clean. Conc. 10'(Cumul)	3.01	23.71	75.99
	Clean. Tail.	3.49	0.87	3.16
	Rough. Scav. Conc.	1.66	1.29	2.29
	Rough. Scav. Tail.	91.84	0.19	18.56
58	Feed	100.00	0.94	100.00
	Clean. Conc. 1'	0.41	19.30	8.33
	Clean. Conc. 3'(Cumul)	3.03	17.14	54.95
	Clean. Conc. 6'(Cumul)	4.25	16.69	75.26
	Clean. Conc. 10'(Cumul)	4.53	16.07	77.23
	Clean. Tail.	1.97	0.96	2.00
	Rough. Scav. Conc.	1.66	1.29	2.28
	Rough. Scav. Tail.	91.84	0.19	18.49

APPENDIX K-12

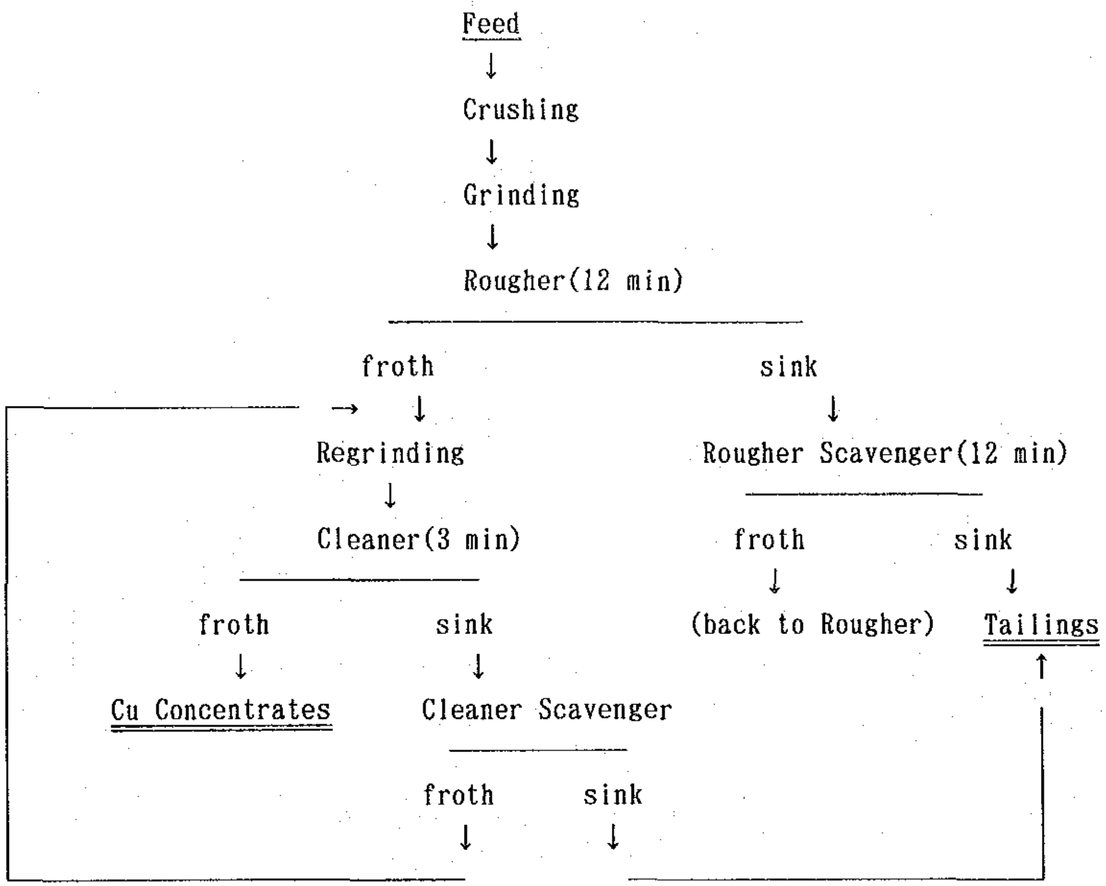
Results of Flotation Tests(12)

Results of the Cleaner Flotation Tests with MW-2

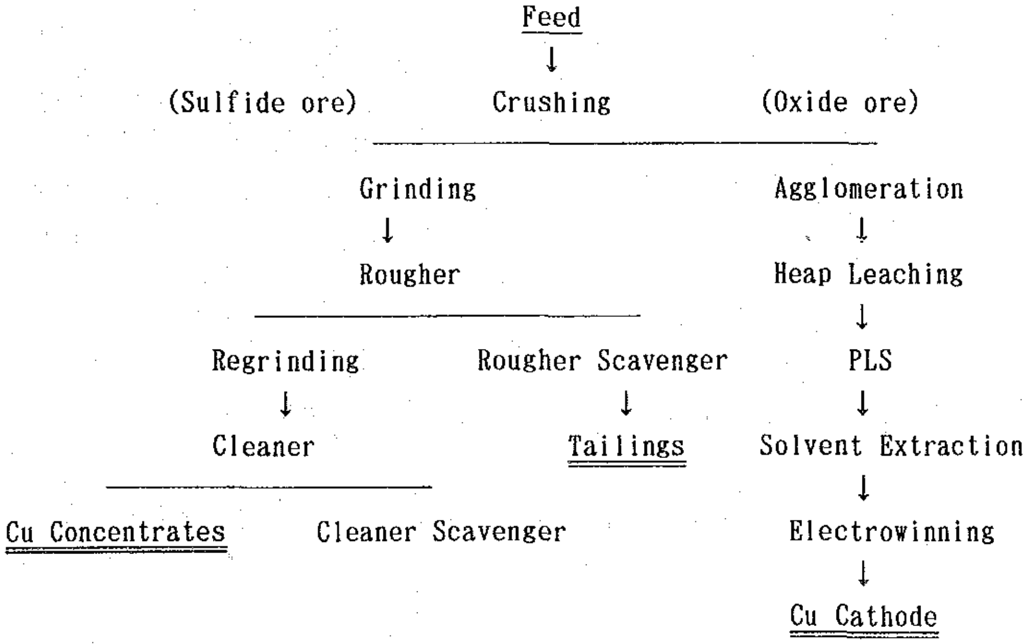
◎pH :9.1(Rougher) & 11.0(Cleaner)
◎Collector(Rougher):AC-350, 30 g/t+15 g/t(at 5 min)
(Scavenger):AC-350, 5 g/t+5 g/t(at 8 min)
◎NaSH (Rougher):200 g/t+100 g/t(at 5 min)
(Scavenger):50 g/t+50 g/t(at 8 min)
◎Frother (Rougher):DF-250, 40 g/t+10 g/t(at 5 min)
(Scavenger):DF-250, 10 g/t
◎Grinding :60% -200 mesh
◎Regrinding :95% -325 mesh(Test No.60)
Without regrinding(Test No.59)
◎Flotation time :12 min(Rougher)+12 min(Scavenger)
◎Conditioning time :2 min

Test No.	Product	Concentrate		Cu Recovery (%)
		Weight (%)	Grade (%Cu)	
60	Feed	100.00	1.14	100.00
	Clean. Conc. 1'	0.73	32.20	20.78
	Clean. Conc. 3'(Cumul)	1.78	27.90	43.76
	Clean. Conc. 6'(Cumul)	2.35	24.63	50.99
	Clean. Conc. 10'(Cumul)	2.66	22.67	53.12
	Clean. Tail.	4.43	1.28	4.99
	Rough. Scav. Conc.	4.40	1.56	6.05
	Rough. Scav. Tail.	88.51	0.46	35.84
59	Feed	100.00	1.13	100.00
	Clean. Conc. 1'	1.10	20.20	19.63
	Clean. Conc. 3'(Cumul)	2.70	19.08	46.00
	Clean. Conc. 6'(Cumul)	3.51	17.33	53.62
	Clean. Conc. 10'(Cumul)	3.80	16.44	55.12
	Clean. Tail.	3.28	1.00	2.90
	Rough. Scav. Conc.	4.40	1.56	6.07
	Rough. Scav. Tail.	88.52	0.46	35.91

APPENDIX L Recommended Flowsheet of Flotation



APPENDIX M Recommended Flowsheet of Ore Treatment



APPENDIX N-1 Summary of the Metallurgical Results Obtained in Japan(1)

Summary of the Metallurgical Results Obtained at
Niihama Laboratories in Japan
-Comparison with the results of CIMM-

Laboratory	Japan	CIMM
Bond's Work Index		
SC-1(kWh/st)	12.6	13.62
SW-2(kWh/st)	14.8	17.65
Cu Recovery by Flotation		
SC-1(%)	92.04	90.89
SW-2(%)	88.44	85.17
Cu Grade of Concentrates		
SC-1(Cu%)	32.08	31.46
SW-2(Cu%)	30.96	29.08
Unit Area of Conc. Thickener		
SC-1(m^2/tpd)	0.163	0.117
SW-2(m^2/tpd)	0.22	0.202
Unit Area of Tail. Thickener		
SC-1(m^2/tpd)	0.38	0.106
SW-2(m^2/tpd)	0.92	1.084
Unit Area of Conc. Filter		
SC-1(m^2/tpd)	0.024	0.028
SW-2(m^2/tpd)	0.037	0.047
Specific Gravity		
SC-1	3.40	3.39
SW-2	2.80	2.78

APPENDIX N-2 Summary of the Metallurgical Results Obtained in Japan(2)

Head Assays of the Cerro Negro Sulfide Ores

-Comparison with the results of CIMM-

Sample	SC-1		SW-2	
Laboratory	Japan	CIMM	Japan	CIMM
Component (%)				
Cu	1.17	1.19	0.68	0.66
＊Citric Sol.Cu	0.02	0.045	0.007	0.013
＊Sulfur.Sol.Cu	0.06	0.083	0.02	0.022
Fe	32.0	29.0	13.8	13.7
Al_2O_3	8.39	9.16	11.7	13.1
S	3.05	3.36	1.12	1.03
Na_2O	0.12	0.26	1.37	1.55
K_2O	4.83	4.43	3.57	2.76
MgO	2.27	2.16	2.35	2.16
CaO	0.36	0.39	3.15	3.20
SiO_2	32.9	32.7	49.8	49.6
Zn	0.005	0.003	0.003	0.006
Pb	0.005	<0.002	0.007	<0.002
Mo	<0.02	<0.004	<0.02	0.006
Mn	NA	0.042	NA	0.061
Co	0.05	0.050	<0.02	0.009
Ni	<0.02	0.005	<0.02	0.003
Cd	NA	<0.005	NA	<0.005
As	0.04	<0.005	0.06	0.005
Sb	<0.02	<0.005	<0.02	<0.005
Bi	<0.02	<0.005	<0.02	<0.005
Se	<0.02	<0.005	<0.02	<0.005
Te	<0.02	<0.005	<0.02	<0.005
F	0.03	<0.02	0.04	0.03
Cl	0.05	0.017	0.09	0.018
＊Hg (ppm)	<0.1	NA	<0.1	NA
＊Au (g/t)	0.2	0.2	0.2	0.2
＊Ag (g/t)	1	2	2	<1
Total(Excl.＊)	85.270	82.841	87.740	87.897

APPENDIX N-3 Summary of the Metallurgical Results Obtained in Japan(3)
Analytical Results of Cu Concentrates
-Comparison with the results of CIMM-

Sample	SC-1		SW-2	
Laboratory	Japan	CIMM	Japan	CIMM
Component (%)				
Cu	32.33	33.7	29.68	28.4
Fe	30.21	27.30	29.45	27.10
S	33.99	33.31	31.15	30.46
Pb	0.007	0.004	0.009	0.004
Zn	0.004	0.022	0.015	0.021
As	<0.01	<0.005	0.08	0.063
Sb	<0.01	<0.005	0.02	<0.005
Bi	<0.01	<0.005	<0.01	<0.005
Se	<0.01	<0.005	<0.01	<0.005
Te	<0.01	<0.005	<0.01	<0.005
Ni	0.019	0.007	0.009	0.003
Co	0.14	0.087	0.05	0.047
Mo	<0.01	0.005	0.14	0.12
F	0.02	NA	0.01	
Cl	<0.01	<0.05	0.01	<0.05
Hg (ppm)	0.5	<0.2	0.9	<0.2
SiO_2	1.56	2.30	4.09	7.10
Al_2O_3	0.39	0.81	1.22	0.42
MgO	0.15	0.33	0.41	0.56
CaO	0.10	0.07	0.47	0.48
K_2O	0.15	0.29	0.24	0.51
Na_2O	<0.01	0.01	0.06	0.15
Au (g/t)	4.8	4.0	6.4	4.7
Ag (g/t)	11	6	46	40
Total	99.070	94.545	97.113	95.328

APPENDIX O List of Main Equipment and Reagents used at CIMM

Ball mill : 17×22.5cm
Ball load : 10kg of 1" balls
Rotation speed : 60 rpm

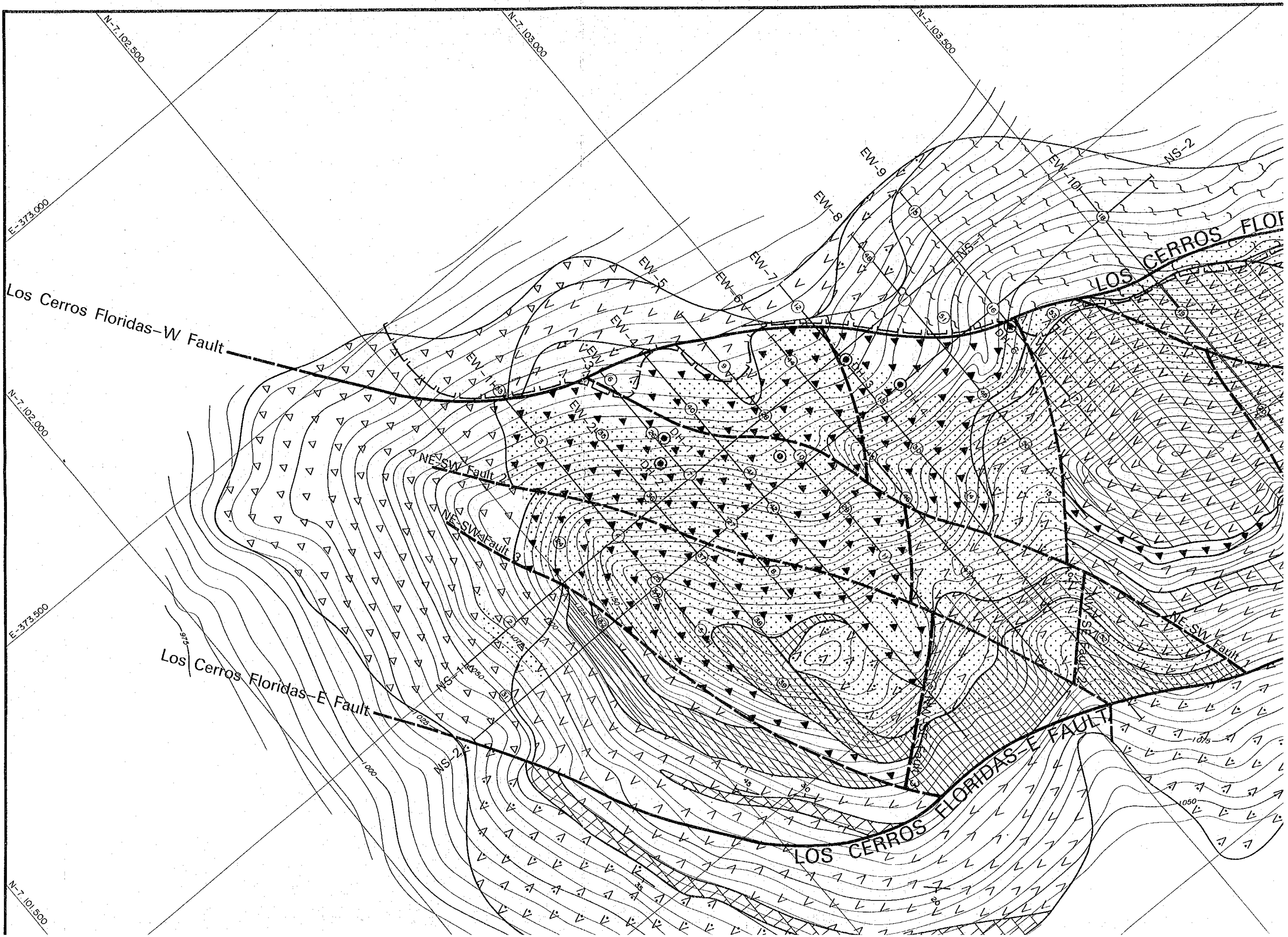
Rougher flotation
Flotation machine : Agitair LA-500
Cell Volume : 2700cm^3
Rotor speed : 1000 rpm

Cleaner flotation
Flotation machine : Agitair LA-500
Cell Volume : 1350cm^3
Rotor speed : 900 rpm

Flotation Reagents
AC-350 : Potassium amylic xanthate : Cytec Industries
AC-3477 : Sodium diisobutyl dithiophosphate : Cytec Industries
SF-113 : Sodium isopropylic xanthate : Shell Flot Chile
SF-203 : Dialkyl-xanthoformiate : Shell Flot Chile
SF-323 : Isopropyl-ethyl-thionocarbamate : Shell Flot Chile
NaSH : Sodium sulfhydrate : OXIQUIM
DF-250 : Propylene glycol methylic ester : DOW Chemicals

Leaching Column
Nominal diameter : 150mm & 80mm
Total height : 2000mm
Bed height : ~1900

SX Reagents
LIX 984 : isovolumetric mixture of LIX 860(5-dodecyl salicyl aldoxime) and LIX 84(2-hydroxi-5-nonyl acetophenone oxime) : *Henkel/MID-Mining Chemical Specialties*
SOLMIN : diluent : Empresa Nacional de Mineria - Chile
ESCAID 103 : diluent : EXXON Chemical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N-7.101.500
Los Cerros Floridas-W Fault
Los Cerros Floridas-E Fault
LOS CERROS FLOR
LOS CERROS FLORIDAS-E FAULT
NE-SW Fault 1
NE-SW Fault 2
NE-SW Fault 3
NW-SE Fault
EW-1
EW-2
EW-3
EW-4
EW-5
EW-6
EW-7
EW-8
EW-9
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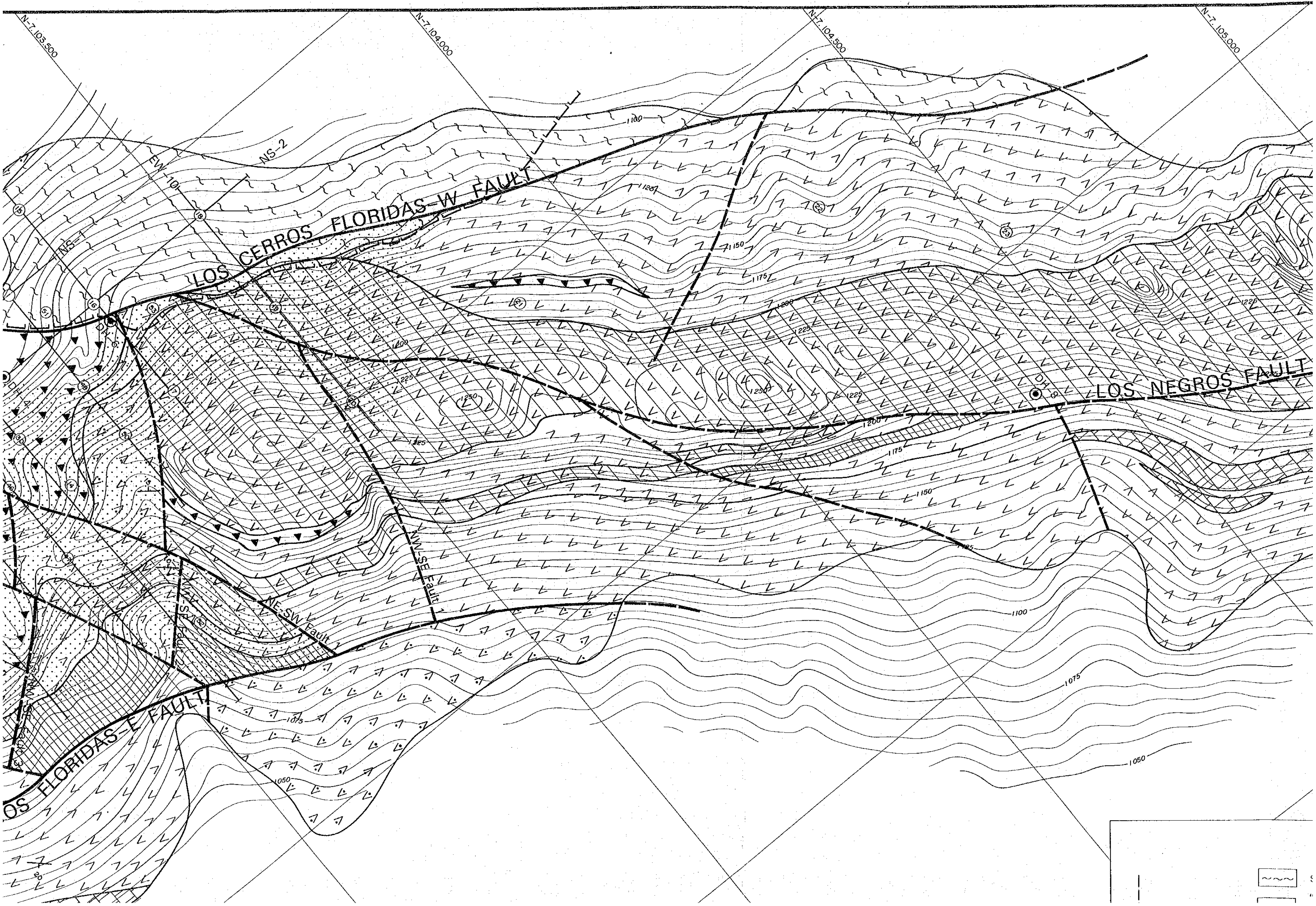
1075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N-7.105.000
NS-2
NS-1
EW-10
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LOS NEGROS FAULT
OS FLORIDAS-E FAULT
NW-SE Fault
NE-SW Fault
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DH-4
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1175
1200
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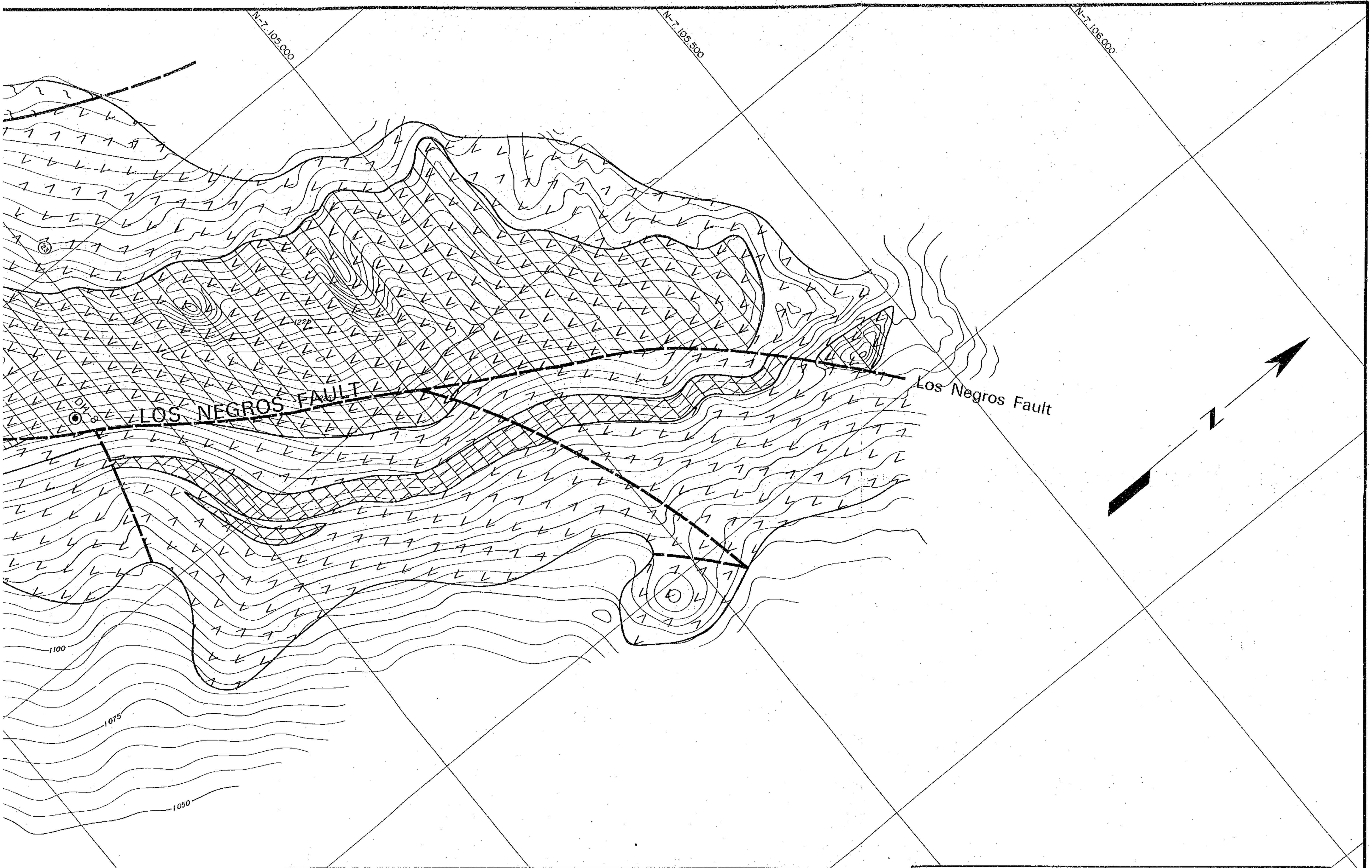
1250
1075
1050

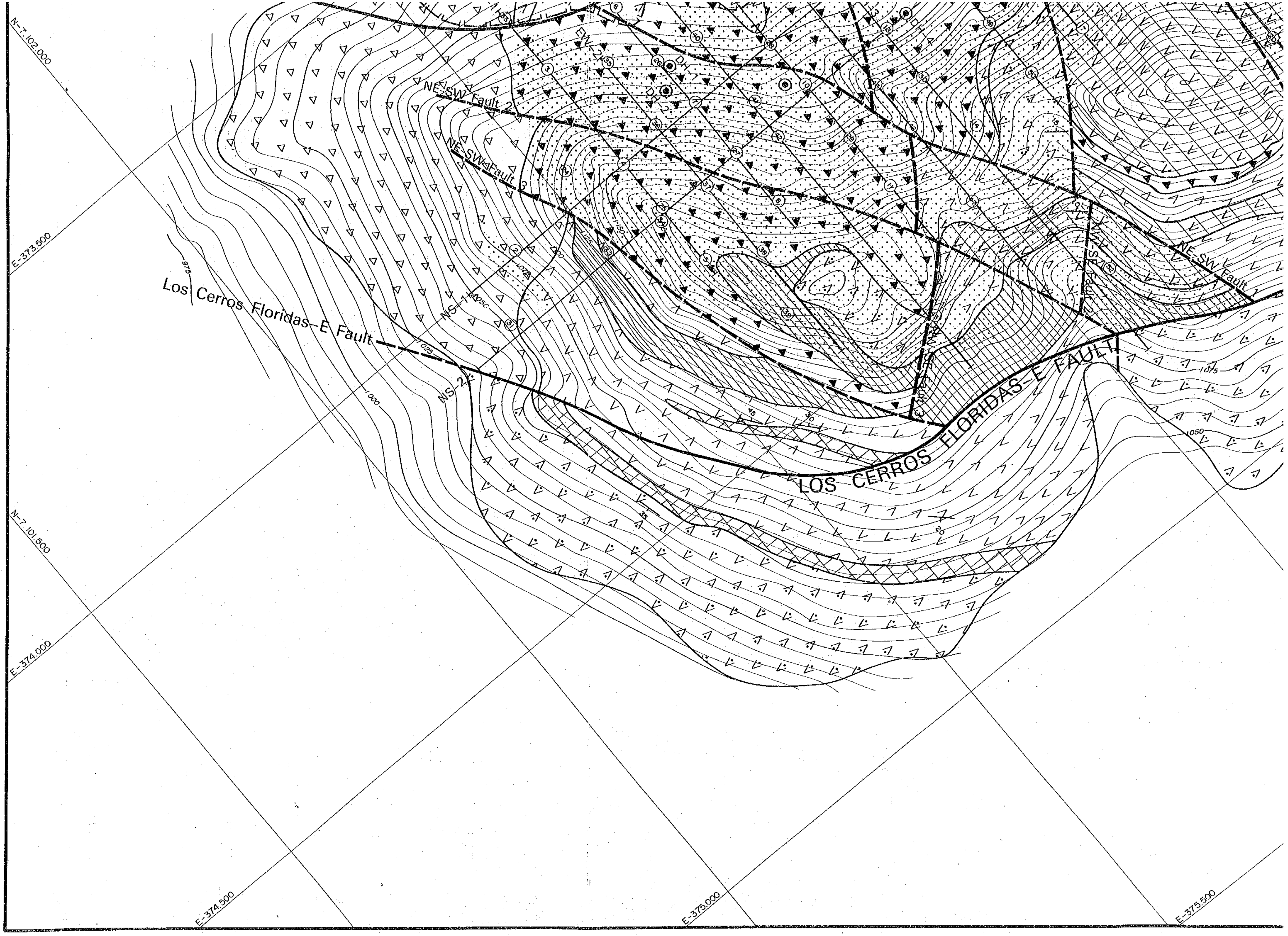


LEGEND

~~	Silicified rock and Cataclasite
	"Hydrothermal Breccia
	Hydrothermal alteration Zone

PLATE I

MINERAL EXPLORATION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NE-SW Fault 1
EW-2
DH-1
DH-2
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Los Cerros Floridas-E Fault
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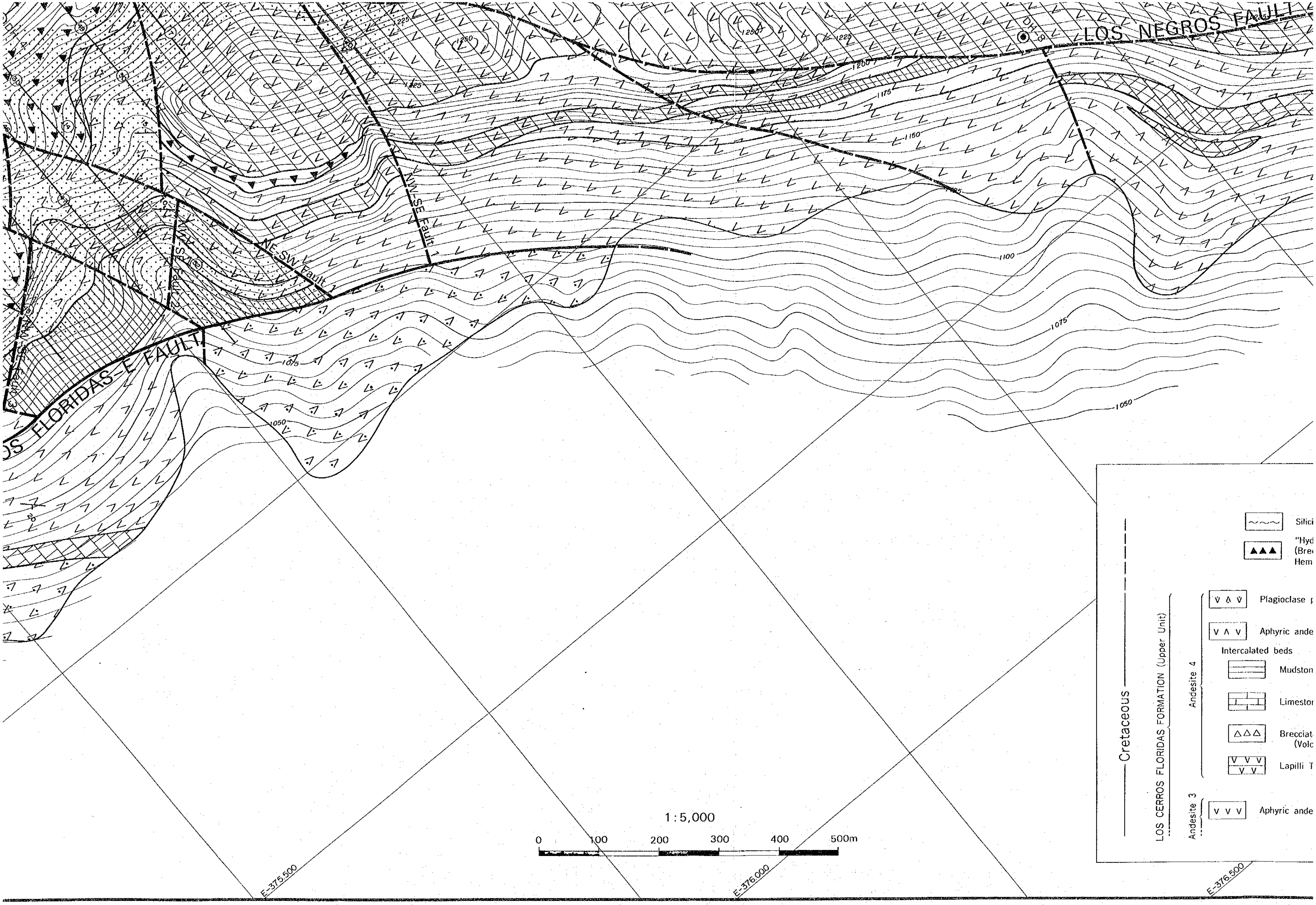
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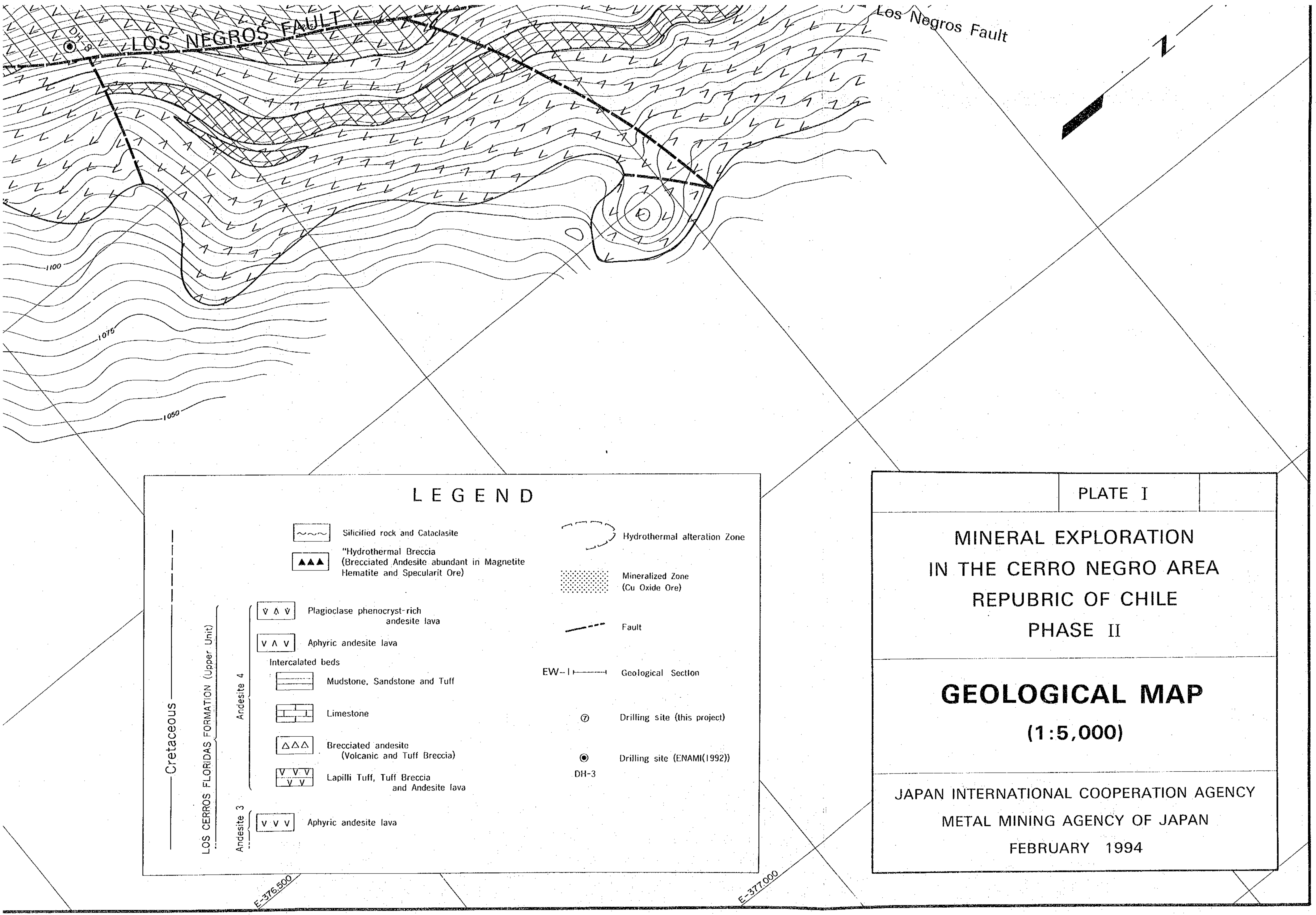
1200
1175
1150
1125
1100
1075
1050
NE-SW Fault
NW-SE Fault
NW-SE Fault
OS FLORIDAS-E FAULT
E-375.500
E-376.000
E-376.500
1:5,000
0
100
200
300
400
500m
Cretaceous
LOS CERROS FLORIDAS FORMATION (Upper Unit)
Andesite 4
Andesite 3
Silici
"Hyd
(Bre
Hem
Plagioclase p
Aphyric ande
Intercalated beds
Mudston
Limestor
Brecciat
(Volc
Lapilli T
Aphyric ande



LEGEND

~~~ Silicified rock and Cataclasite

▲▲▲ "Hydrothermal Breccia (Brecciated Andesite abundant in Magnetite Hematite and Specularit Ore)

Cretaceous
- LOS CERROS FLORIDAS FORMATION (Upper Unit)
  - Andesite 4
    - V ∧ V Plagioclase phenocryst-rich andesite lava
    - V ∧ V Aphyric andesite lava
    - Intercalated beds
      - Mudstone, Sandstone and Tuff
      - Limestone
      - △△△ Brecciated andesite (Volcanic and Tuff Breccia)
      - V V V Lapilli Tuff, Tuff Breccia and Andesite lava
  - Andesite 3
    - V V V Aphyric andesite lava

Hydrothermal alteration Zone

Mineralized Zone (Cu Oxide Ore)

Fault

EW-I Geological Section

⑦ Drilling site (this project)

◉ DH-3 Drilling site (ENAMI(1992))

PLATE I

MINERAL EXPLORATION
IN THE CERRO NEGRO AREA
REPUBRIC OF CHILE
PHASE II

GEOLOGICAL MAP
(1:5,000)

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1994
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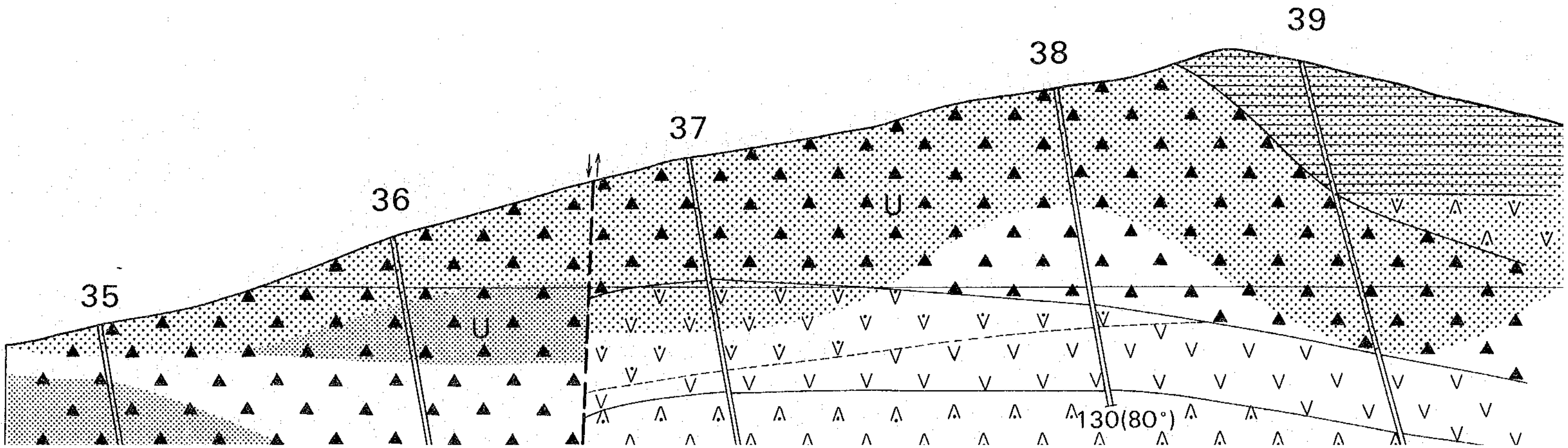
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38
37
36
35
U
U
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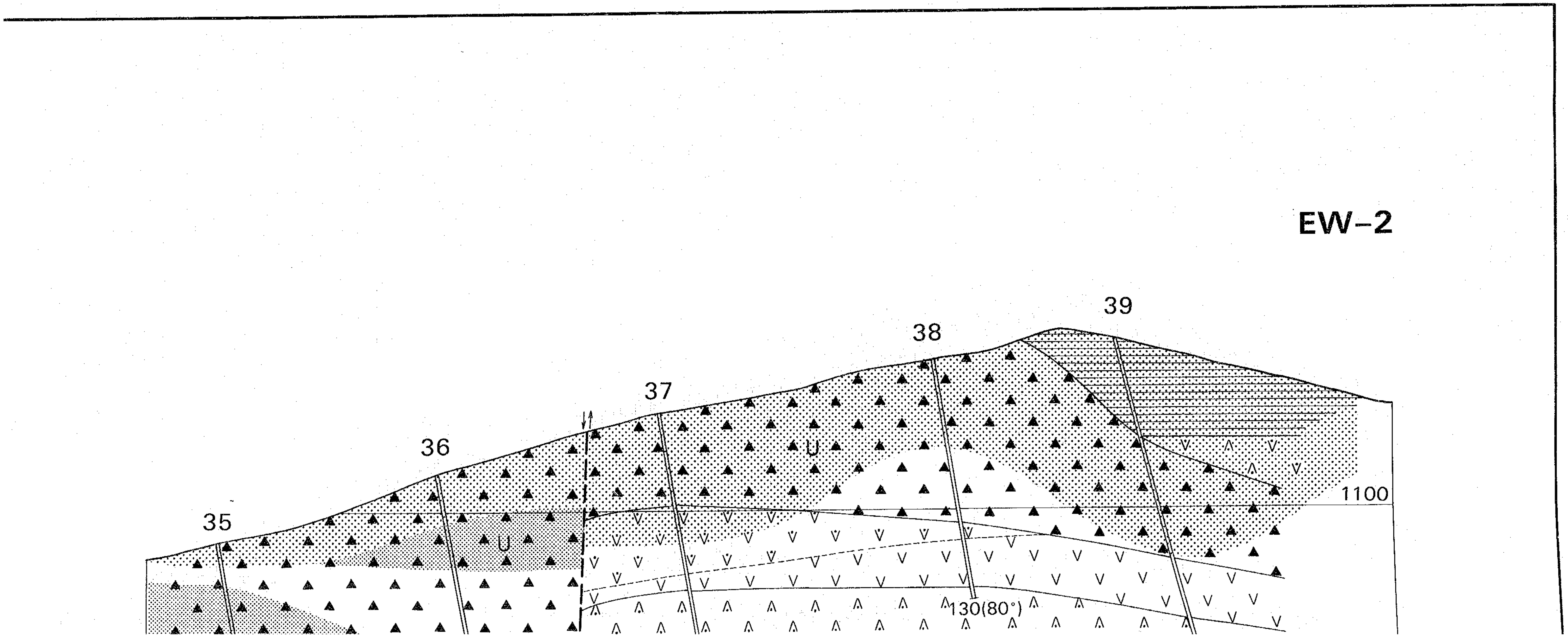
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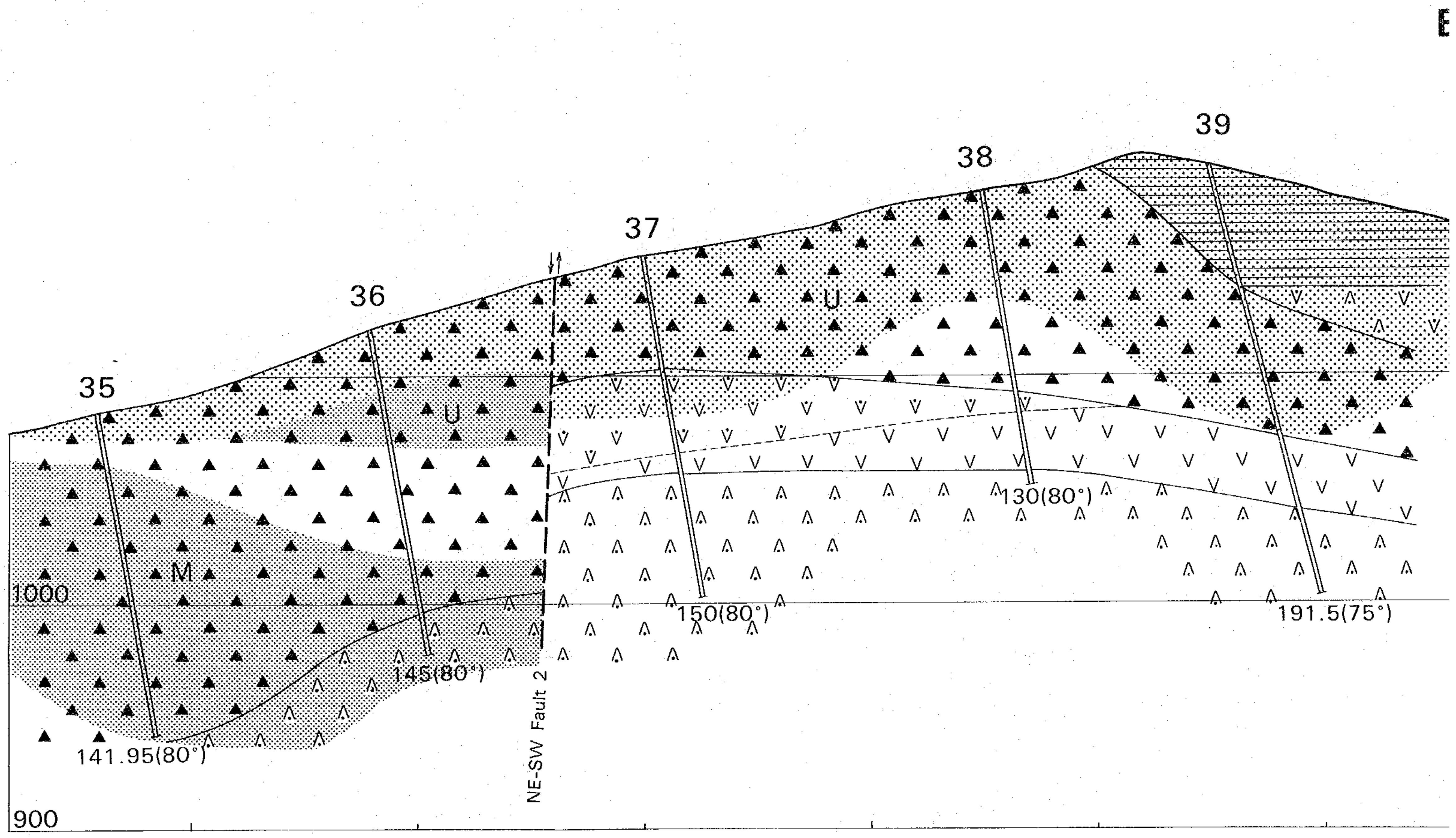
38
37
36
35
U
U
1100
130(80°)


E
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38
37
36
35
U
U
M
1000
900
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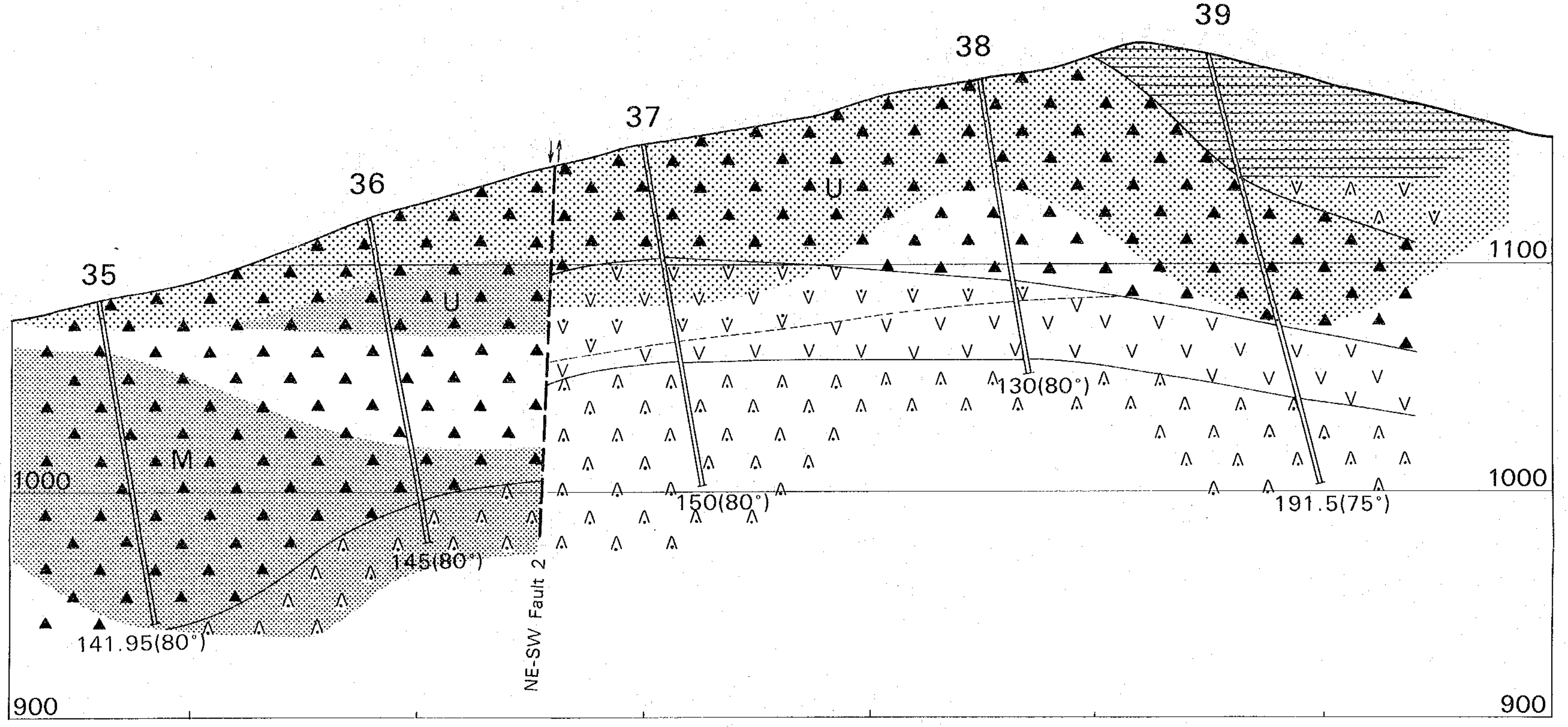
150(80°)
130(80°)
191.5(75°)
NE-SW Fault 2

FW-1

EW–2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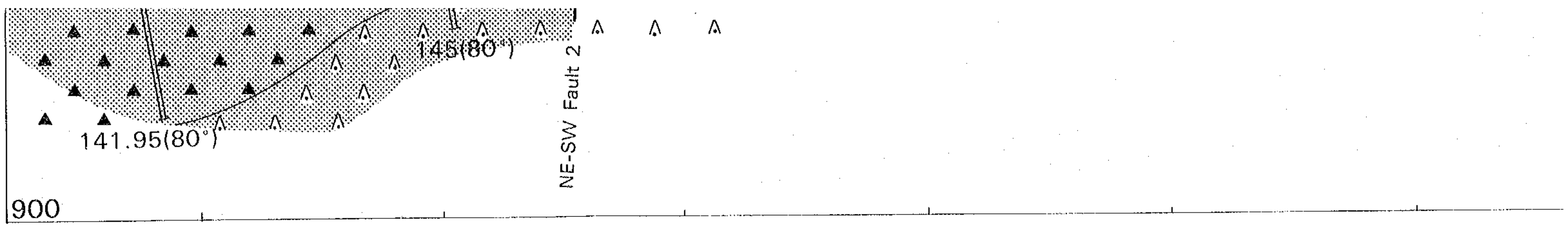
37
36
35
U
U
M
1100
1000
1000
900
900
130(80°)
150(80°)
191.5(75°)
145(80°)
141.95(80°)
NE-SW Fault 2

FW–1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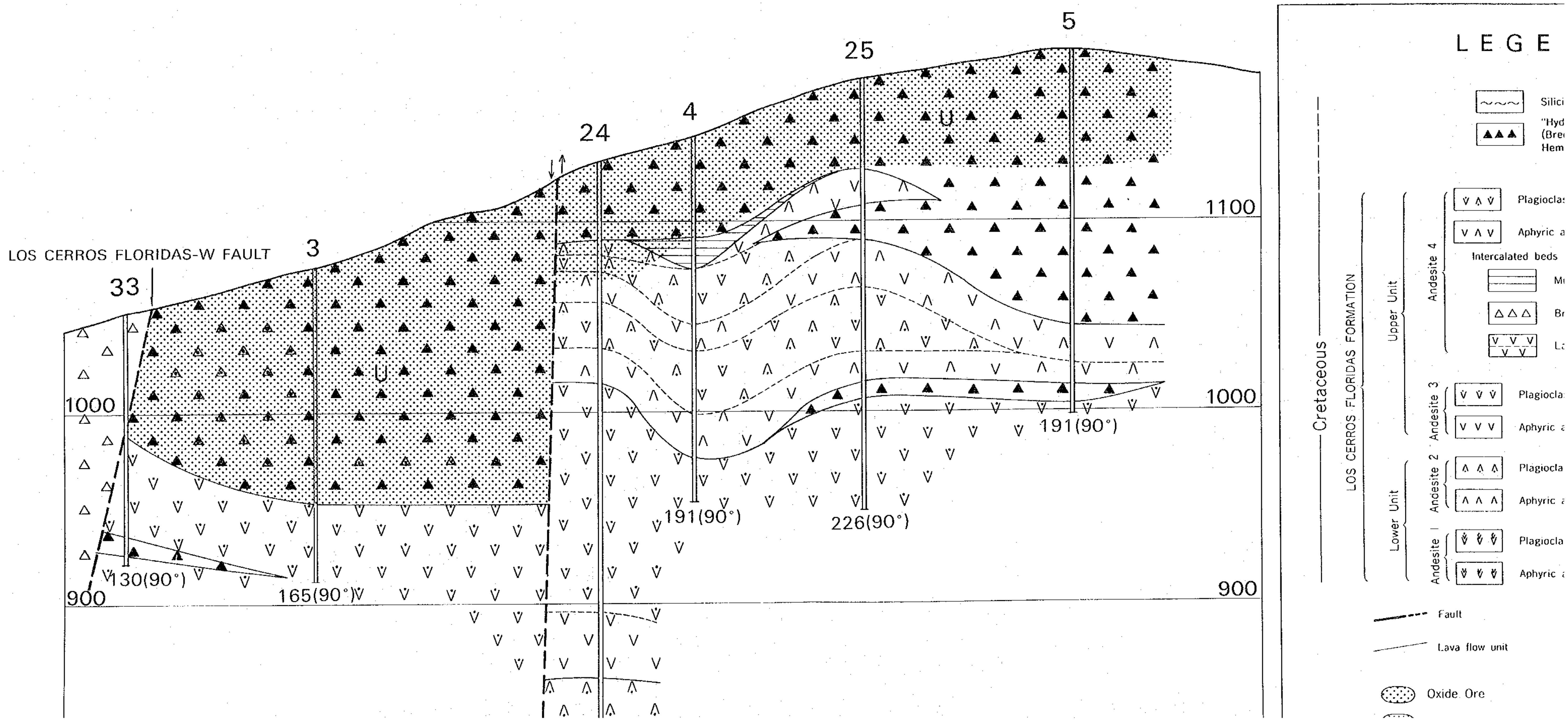
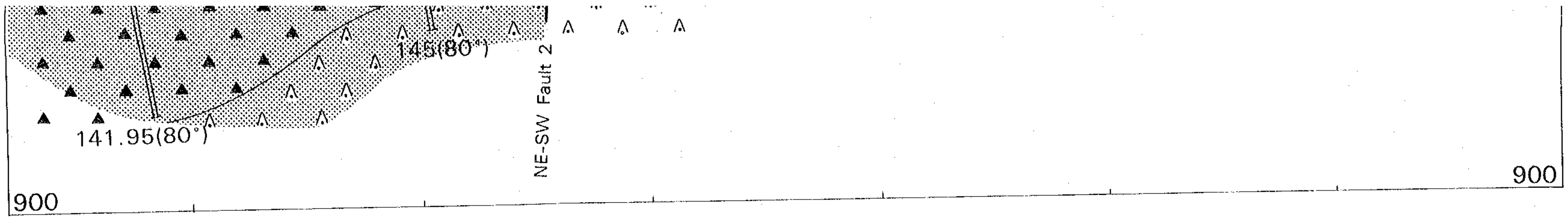
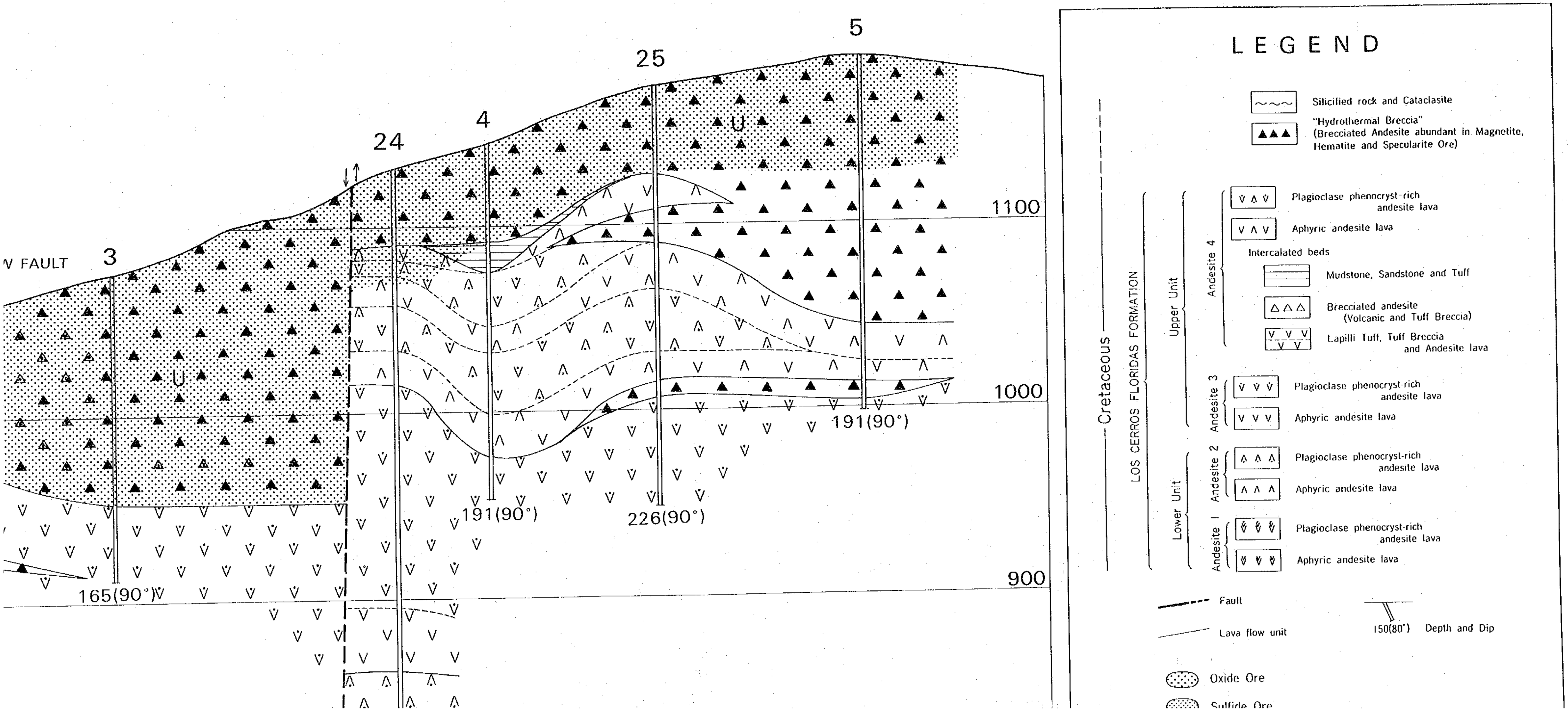
141.95(80°)
NE-SW Fault 2
900

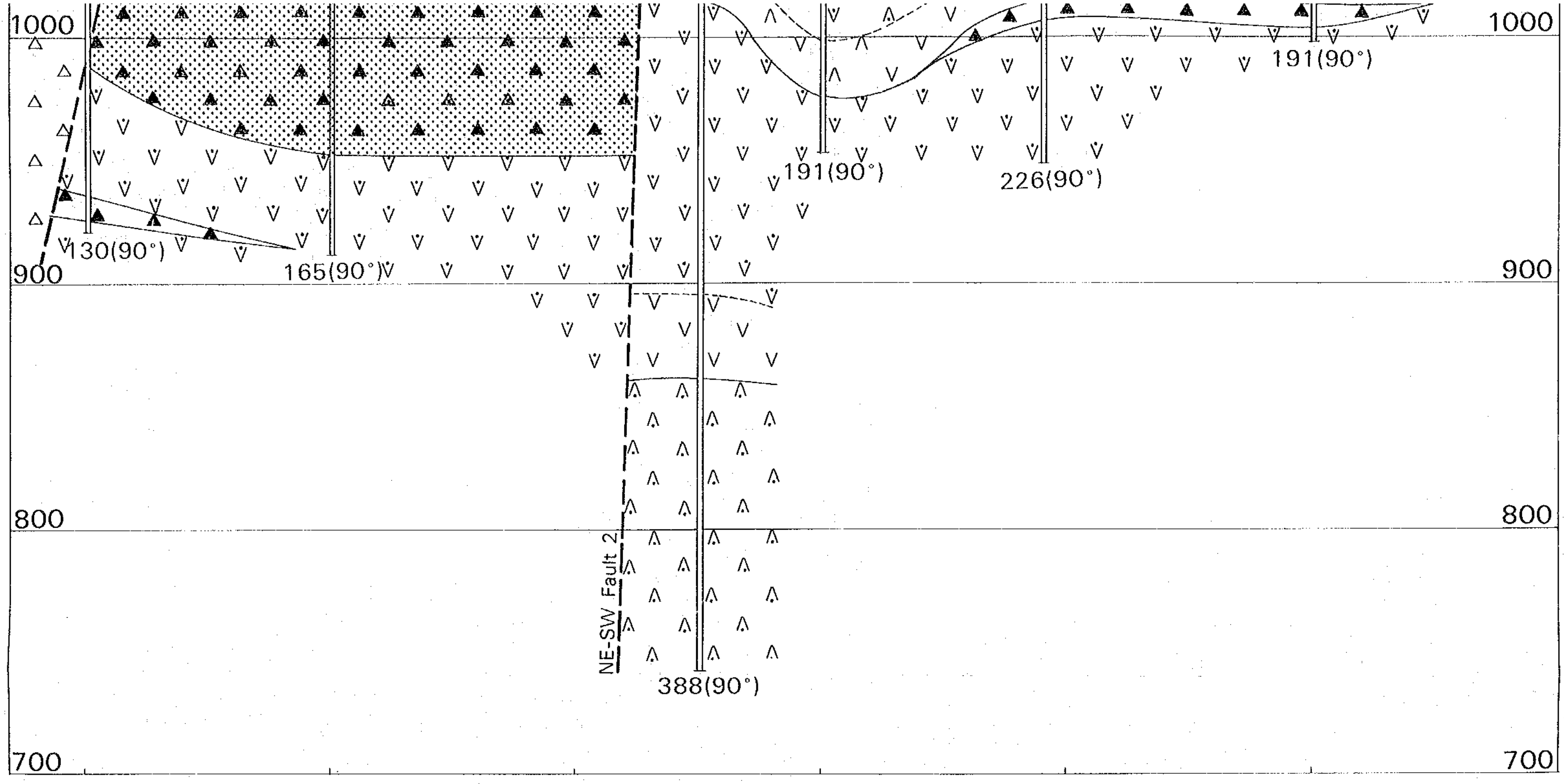
EW-1

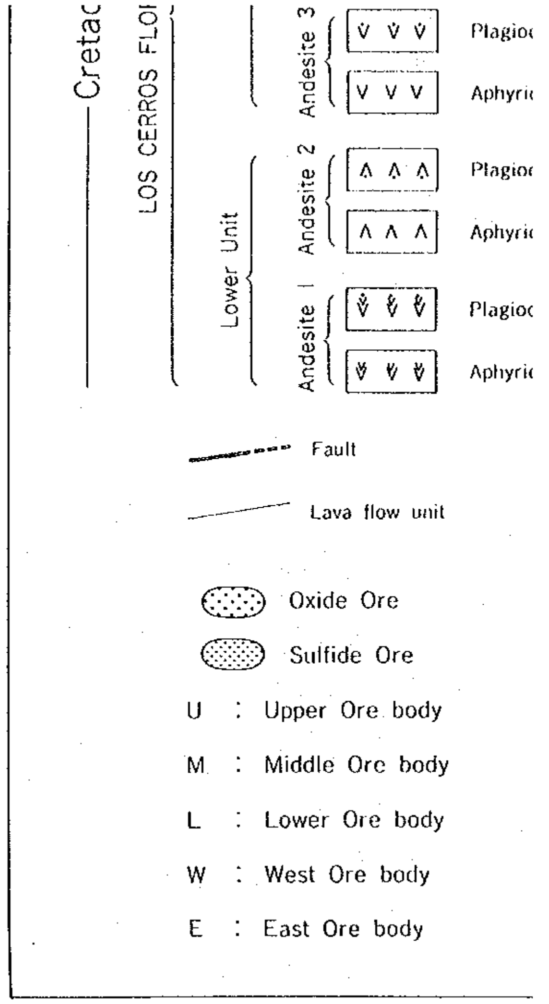

5
25
4
24
3
33
LOS CERROS FLORIDAS-W FAULT
U
U
1100
1000
900
1000
900
130(90°)
165(90°)
191(90°)
226(90°)
191(90°)
L E G E
Silici
"Hyd
(Brec
Hem
Plagioclas
Aphyric a
Intercalated beds
Mu
Br
La
Plagiocla
Aphyric a
Plagiocla
Aphyric a
Plagiocla
Aphyric a
Andesite 4
Andesite 3
Andesite 2
Andesite 1
Upper Unit
Lower Unit
LOS CERROS FLORIDAS FORMATION
Cretaceous
Fault
Lava flow unit
Oxide Ore


145(80°)
141.95(80°)
NE-SW Fault 2
900
900

EW-1


5
25
4
24
3
V FAULT
U
U
1100
1000
900
191(90°)
226(90°)
191(90°)
165(90°)
LEGEND
Silicified rock and Cataclasite
"Hydrothermal Breccia" (Brecciated Andesite abundant in Magnetite, Hematite and Specularite Ore)
Cretaceous
LOS CERROS FLORIDAS FORMATION
Upper Unit
Andesite 4
Plagioclase phenocryst-rich andesite lava
Aphyric andesite lava
Intercalated beds
Mudstone, Sandstone and Tuff
Brecciated andesite (Volcanic and Tuff Breccia)
Lapilli Tuff, Tuff Breccia and Andesite lava
Andesite 3
Plagioclase phenocryst-rich andesite lava
Aphyric andesite lava
Lower Unit
Andesite 2
Plagioclase phenocryst-rich andesite lava
Aphyric andesite lava
Andesite 1
Plagioclase phenocryst-rich andesite lava
Aphyric andesite lava
Fault
Lava flow unit
150(80°) Depth and Dip
Oxide Ore
Sulfide Ore





PL

MINERAL EXP
IN THE CERRO
REPUBRIC
PHASE

GEOLOGICAL

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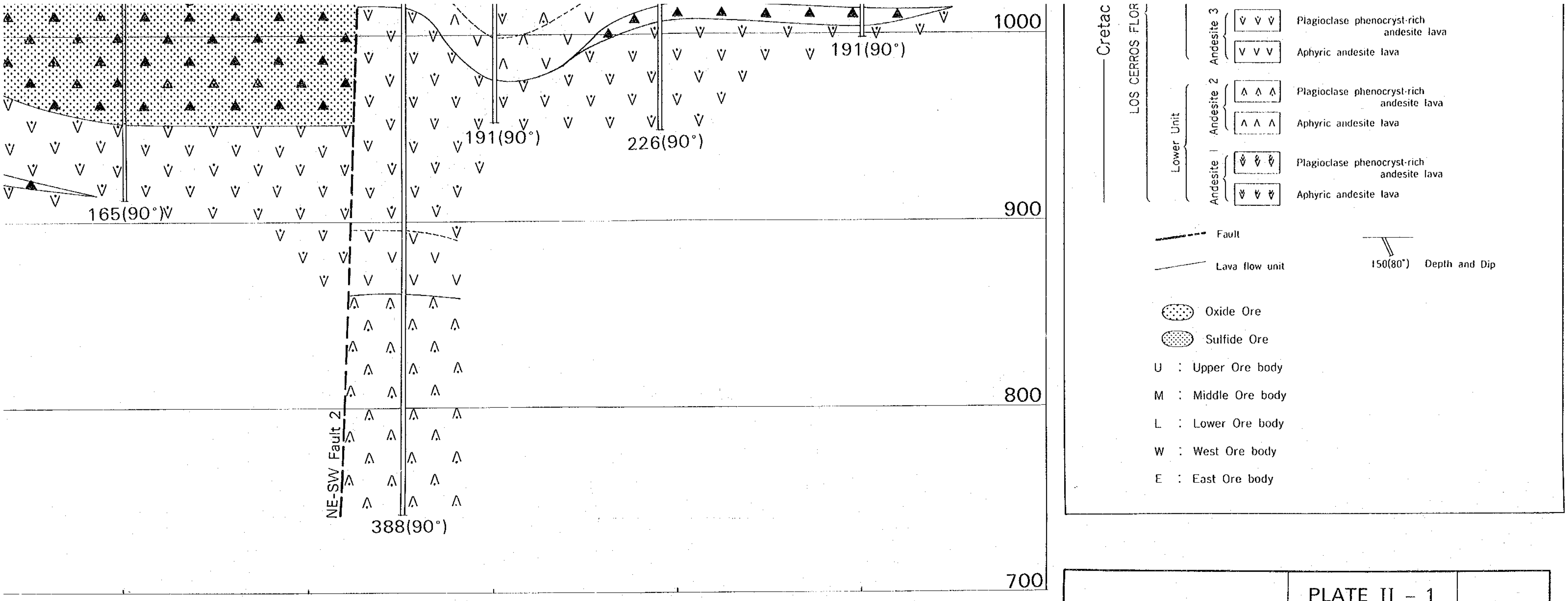

PLATE II - 1

MINERAL EXPLORATION
IN THE CERRO NEGRO AREA
REPUBRIC OF CHILE
PHASE II

GEOLOGICAL SECTION

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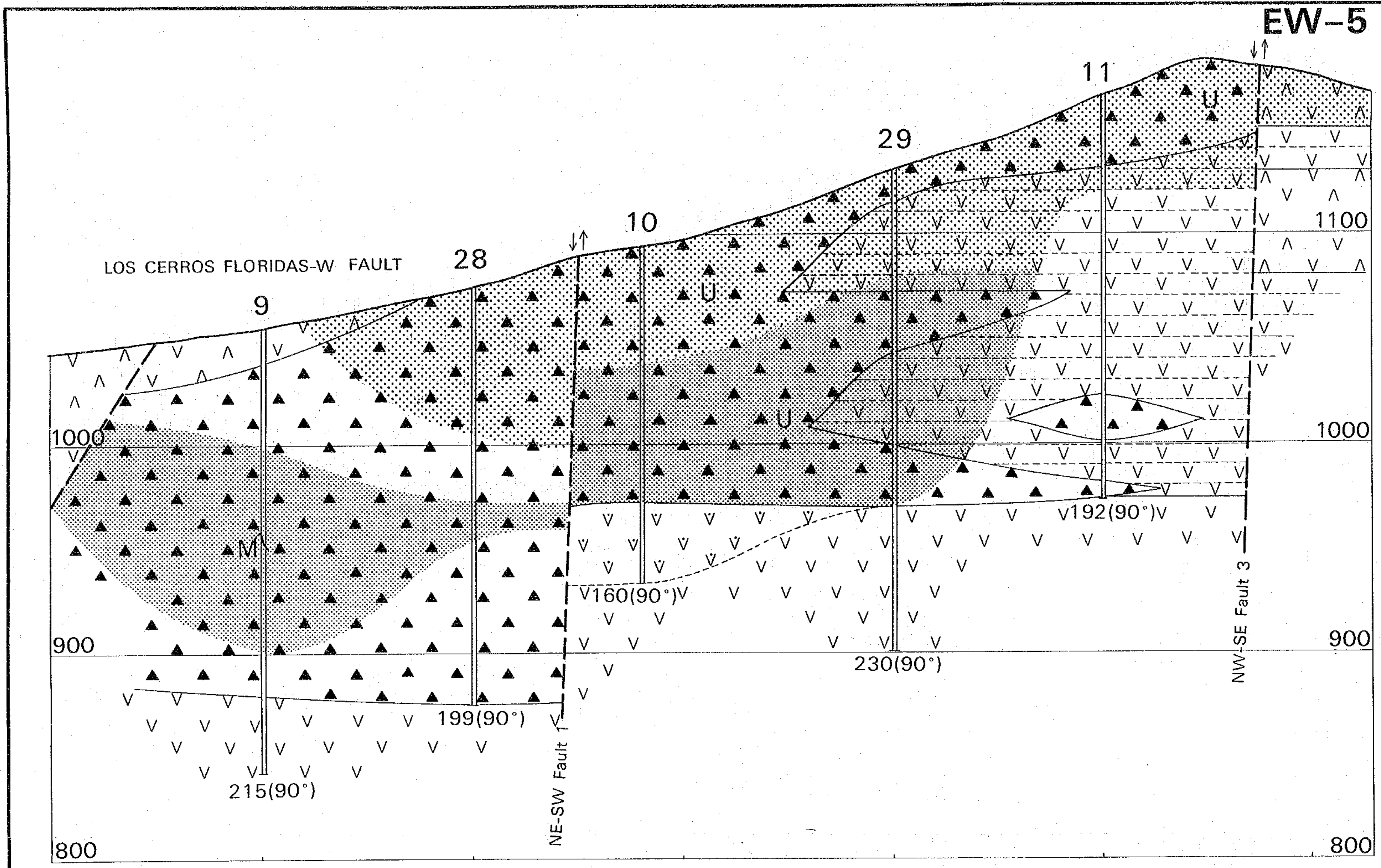
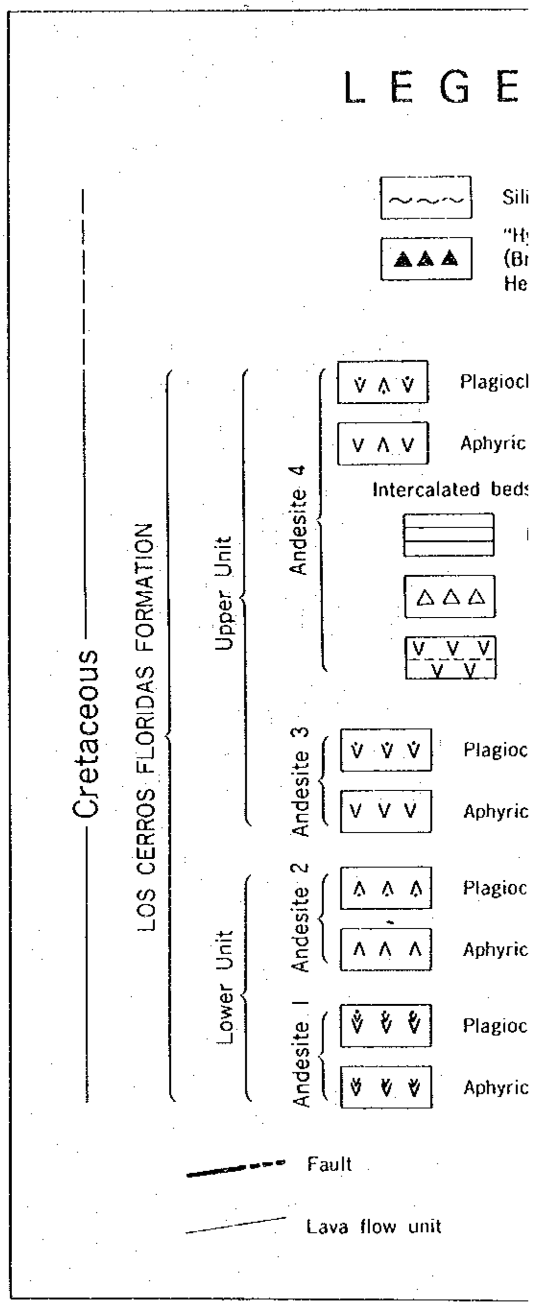
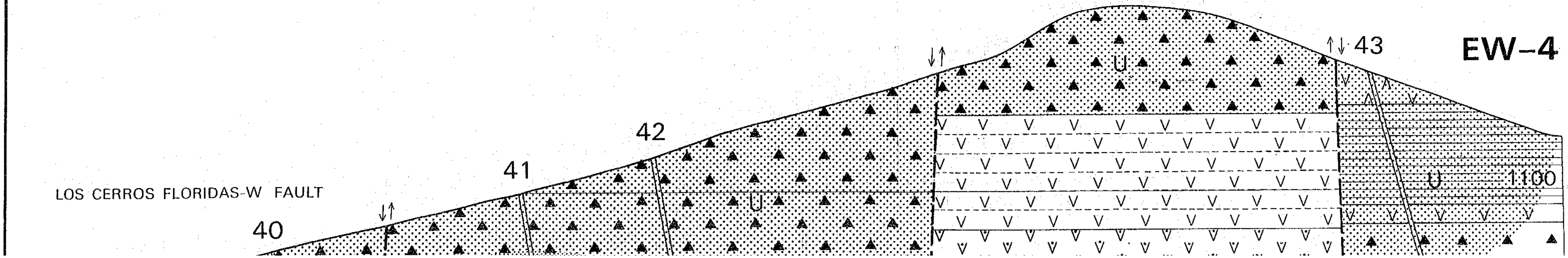
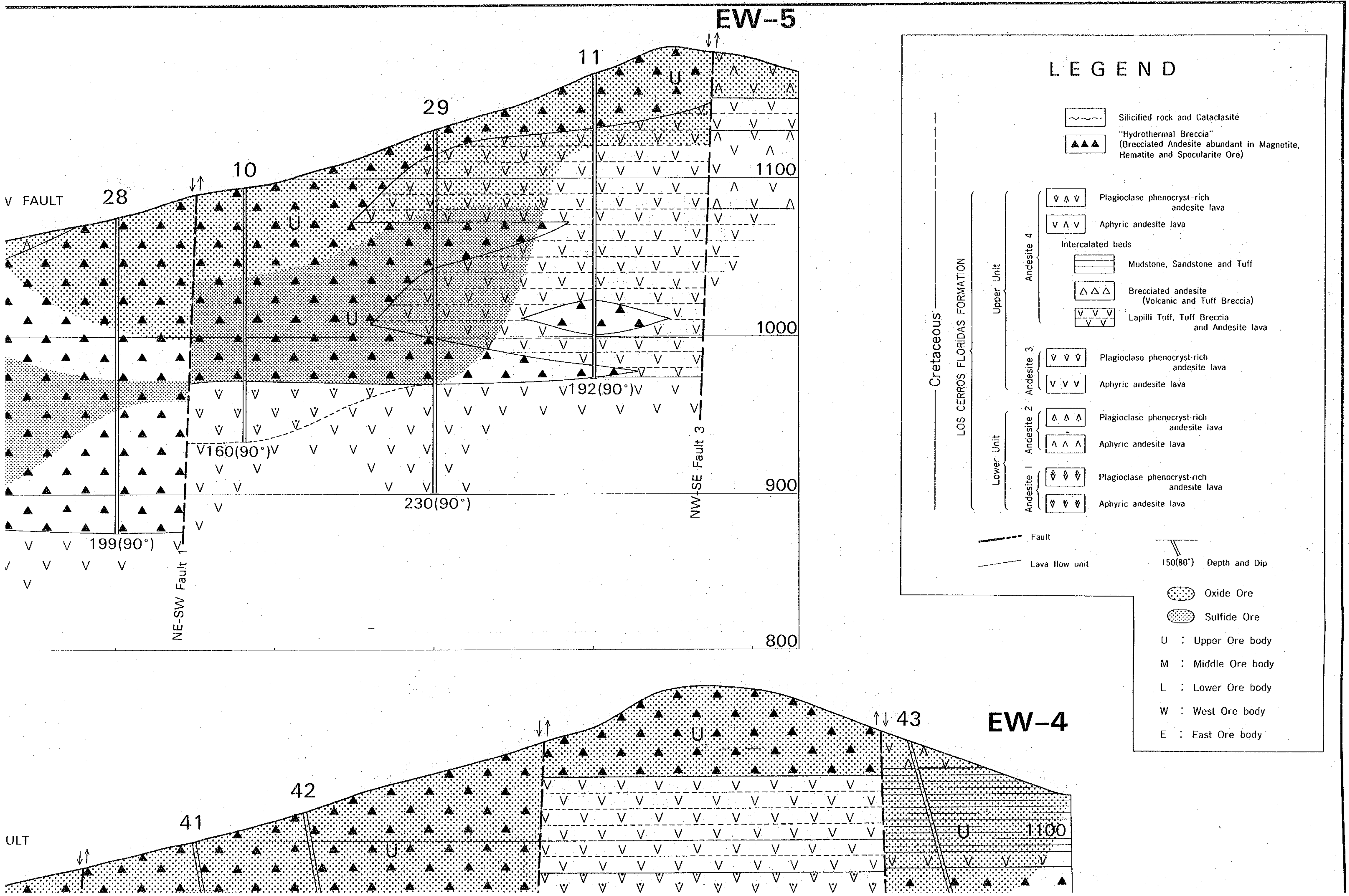
JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1994


EW-5
LOS CERROS FLORIDAS-W FAULT
9
28
10
29
11
U
U
U
M
1100
1000
1000
900
900
800
800
215(90°)
199(90°)
160(90°)
230(90°)
192(90°)
NE-SW Fault 1
NW-SE Fault 3


LEGE
Sili
"Hy
(Br
He
Cretaceous
LOS CERROS FLORIDAS FORMATION
Upper Unit
Lower Unit
Andesite 4
Andesite 3
Andesite 2
Andesite I
Plagiocl
Aphyric
Intercalated beds
Plagioc
Aphyric
Plagioc
Aphyric
Plagioc
Aphyric
Fault
Lava flow unit


EW-4
LOS CERROS FLORIDAS-W FAULT
40
41
42
43
U
U
U
1100


EW-5
11
29
10
28
V FAULT
U
1100
1000
900
800
V192(90°)V
V160(90°)V
230(90°)
199(90°)
NE-SW Fault 1
NW-SE Fault 3
EW-4
43
42
41
ULT
1100
LEGEND
Silicified rock and Cataclasite
"Hydrothermal Breccia" (Brecciated Andesite abundant in Magnetite, Hematite and Specularite Ore)
Cretaceous
LOS CERROS FLORIDAS FORMATION
Upper Unit
Lower Unit
Andesite 4
Plagioclase phenocryst-rich andesite lava
Aphyric andesite lava
Intercalated beds
Mudstone, Sandstone and Tuff
Brecciated andesite (Volcanic and Tuff Breccia)
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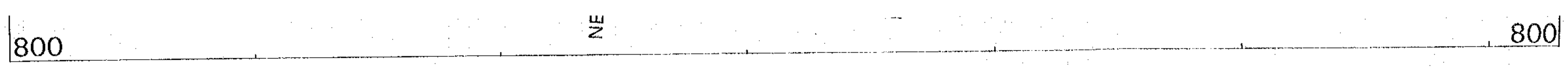
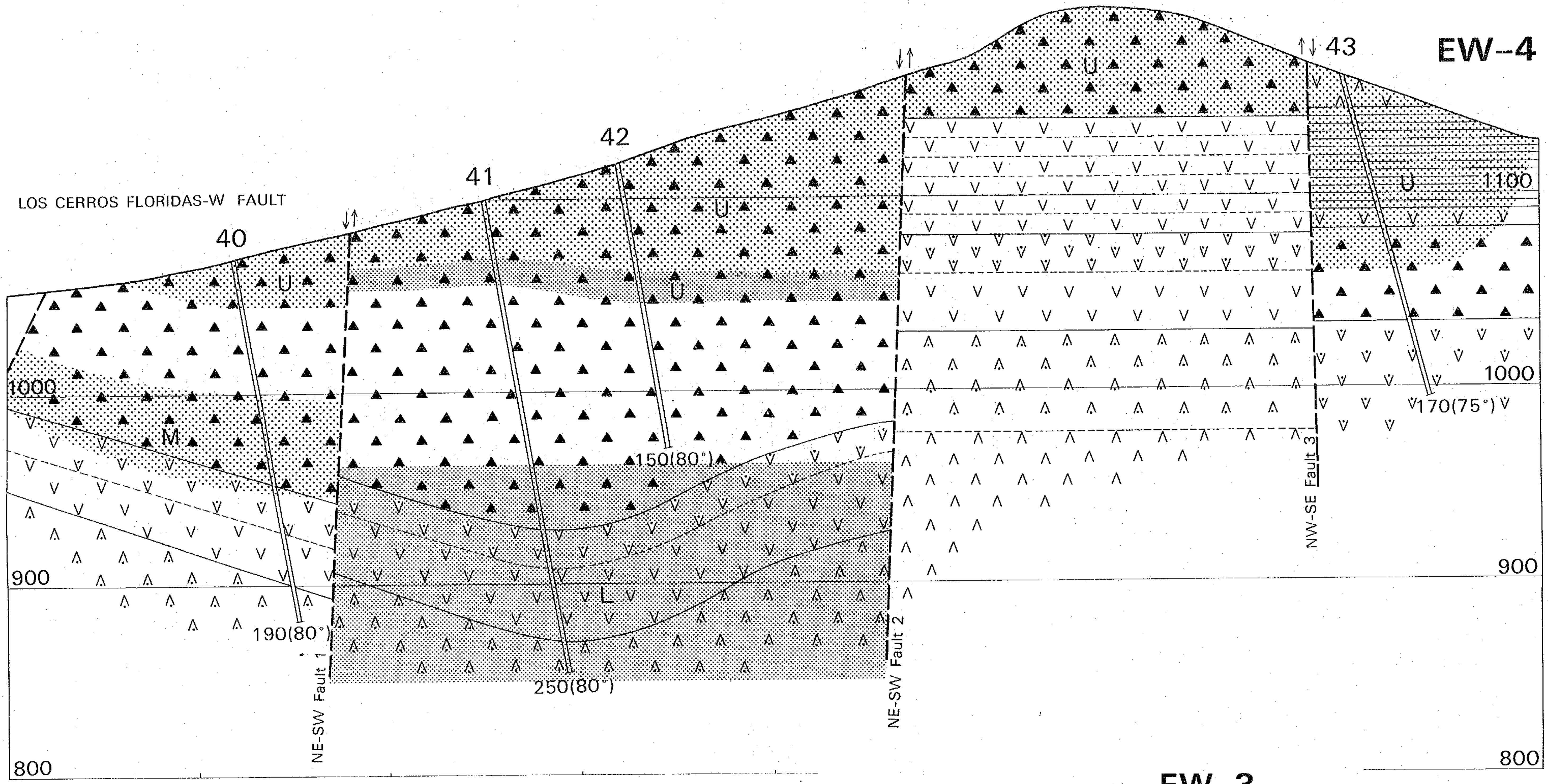
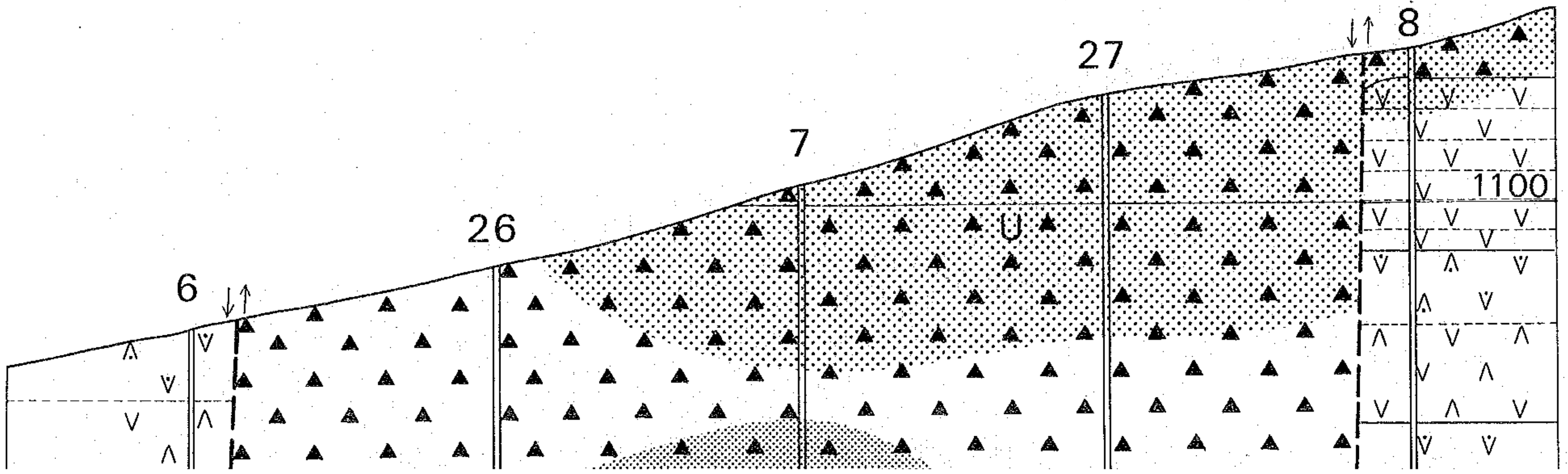
Plagioclase phenocryst-rich andesite lava
Aphyric andesite lava
Andesite 2
Plagioclase phenocryst-rich andesite lava
Aphyric andesite lava
Andesite 1
Plagioclase phenocryst-rich andesite lava
Aphyric andesite lava
Fault
Lava flow unit
150(80°) Depth and Dip
Oxide Ore
Sulfide Ore
U : Upper Ore body
M : Middle Ore body
L : Lower Ore body
W : West Ore body
E : East Ore body


800
NE
800

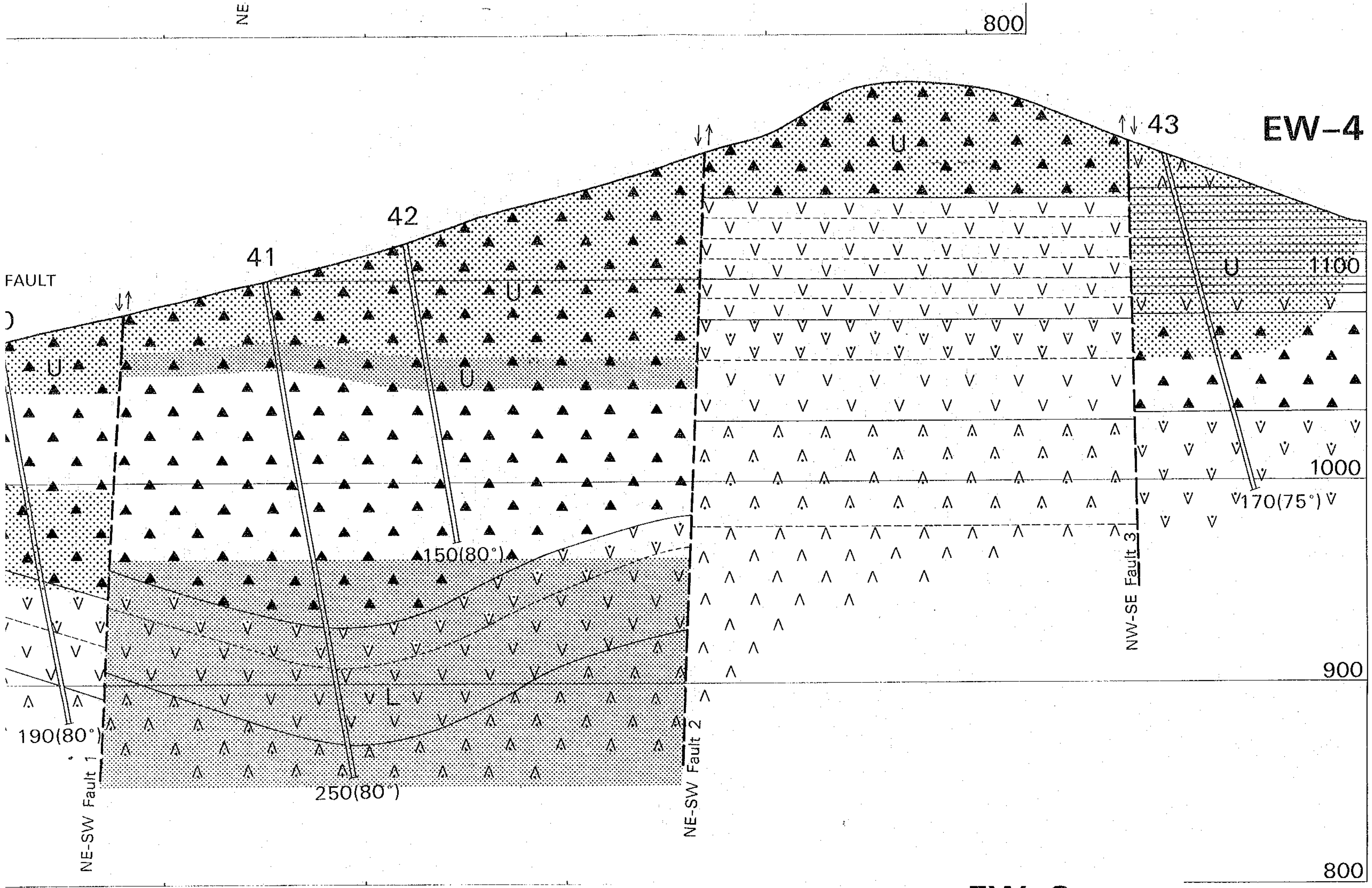
EW-4

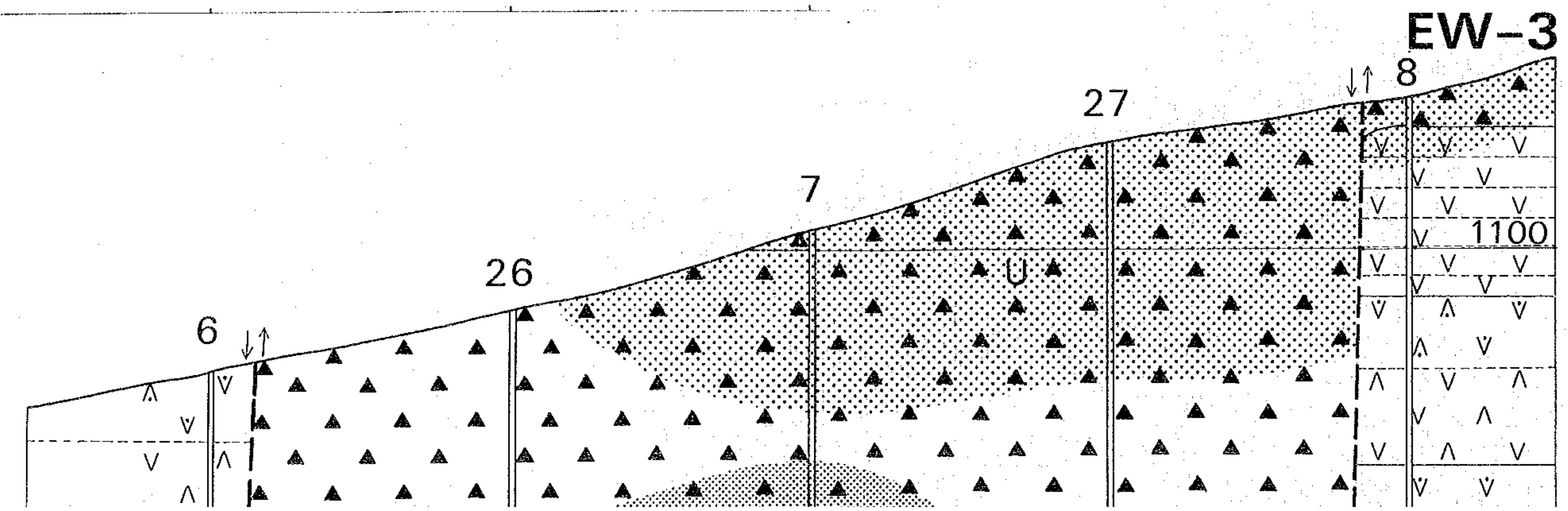

LOS CERROS FLORIDAS-W FAULT
40
41
42
43
U
U
U
U
U
M
L
1100
1000
1000
900
900
800
800
190(80°)
250(80°)
150(80°)
170(75°)
NE-SW Fault 1
NE-SW Fault 2
NW-SE Fault 3

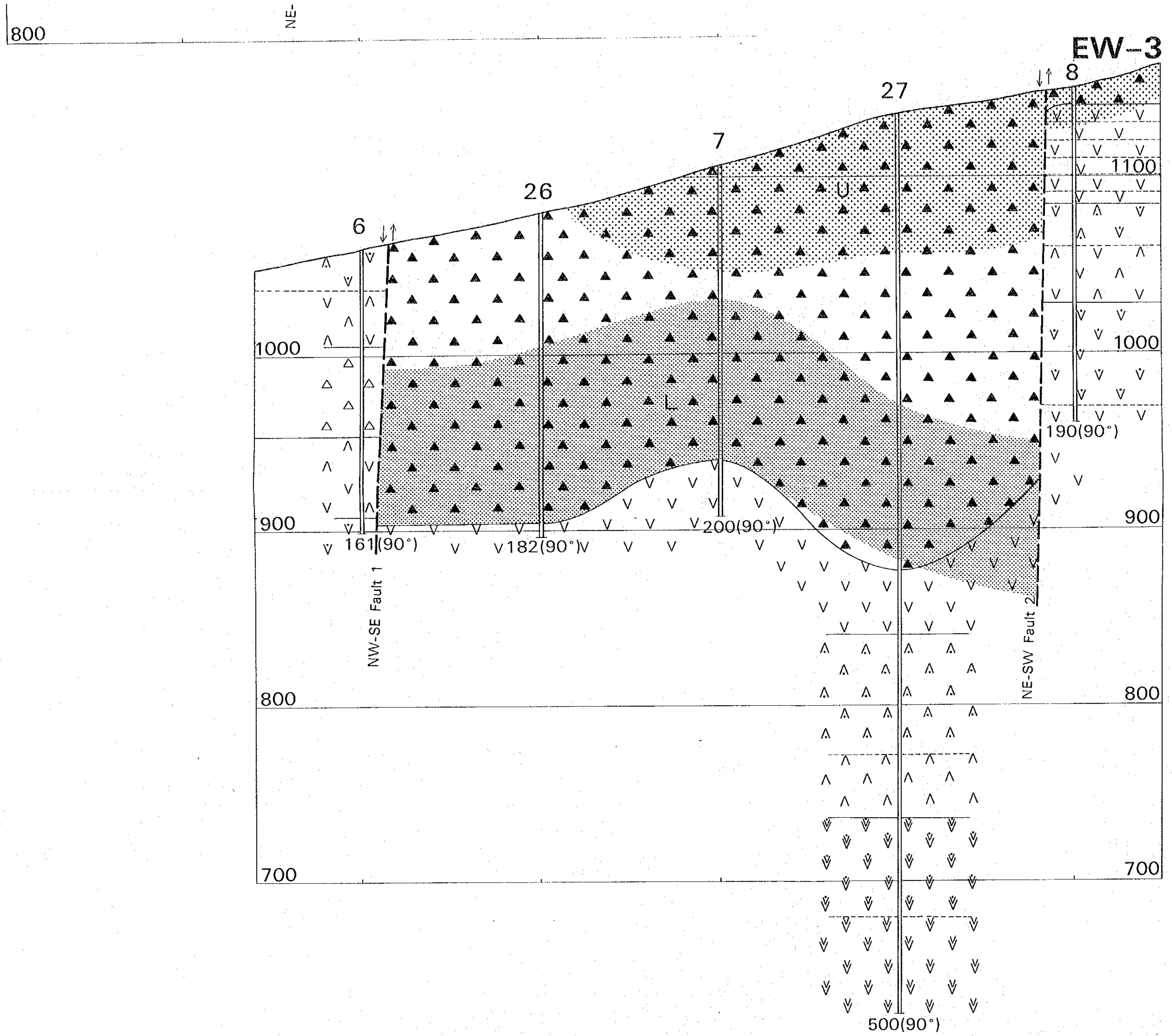
EW-3


6
26
7
27
8
U
1100

U : Upper Ore body
M : Middle Ore body
L : Lower Ore body
W : West Ore body
E : East Ore body







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FEBRUARY

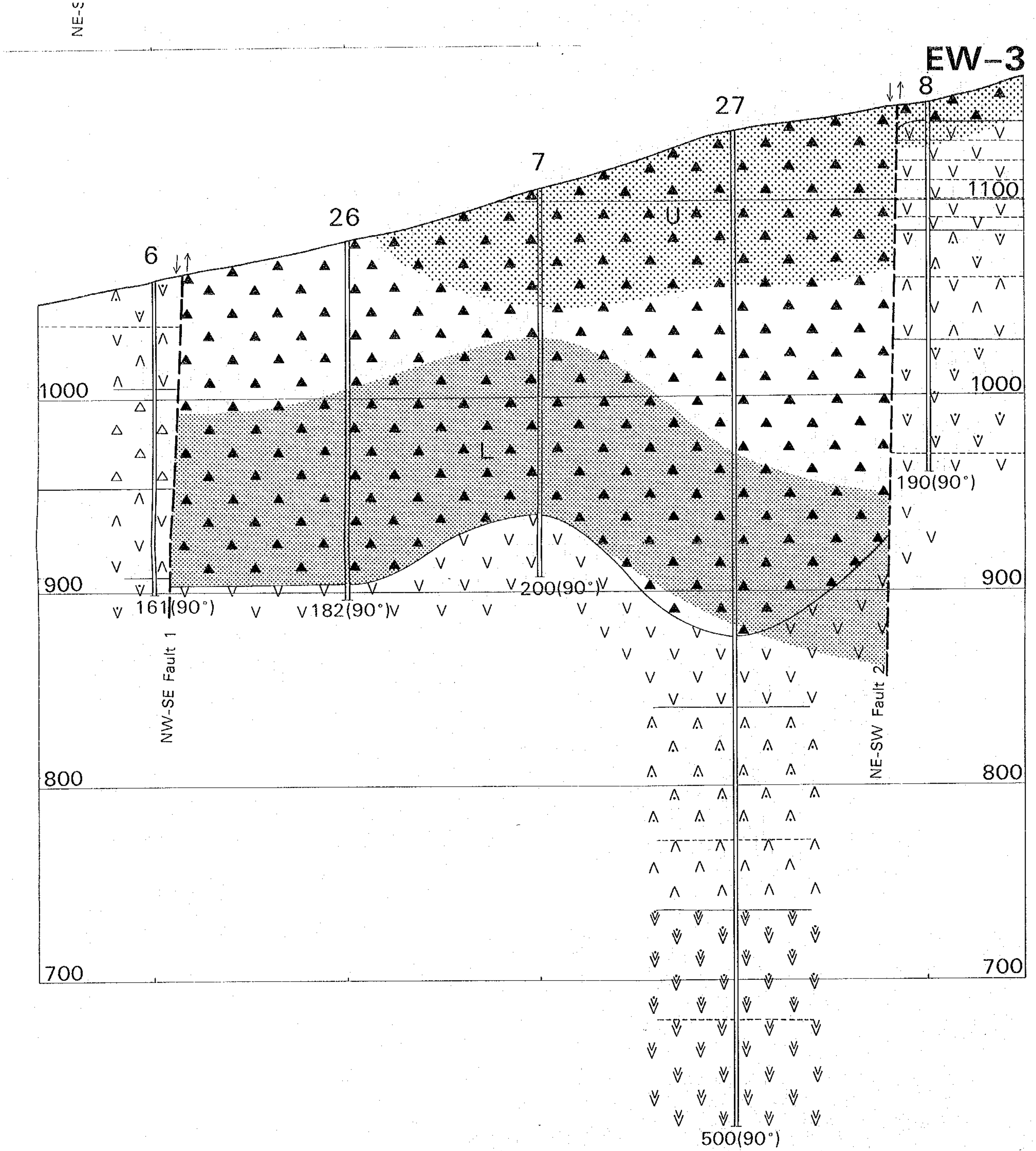

PLATE II - 2

MINERAL EXPLORATION
IN THE CERRO NEGRO AREA
REPUBRIC OF CHILE
PHASE II

GEOLOGICAL SECTION

(1:2,000)

JAPAN INTERNATIONAL COOPERATION AGENCY
METAL MINING AGENCY OF JAPAN
FEBRUARY 1994