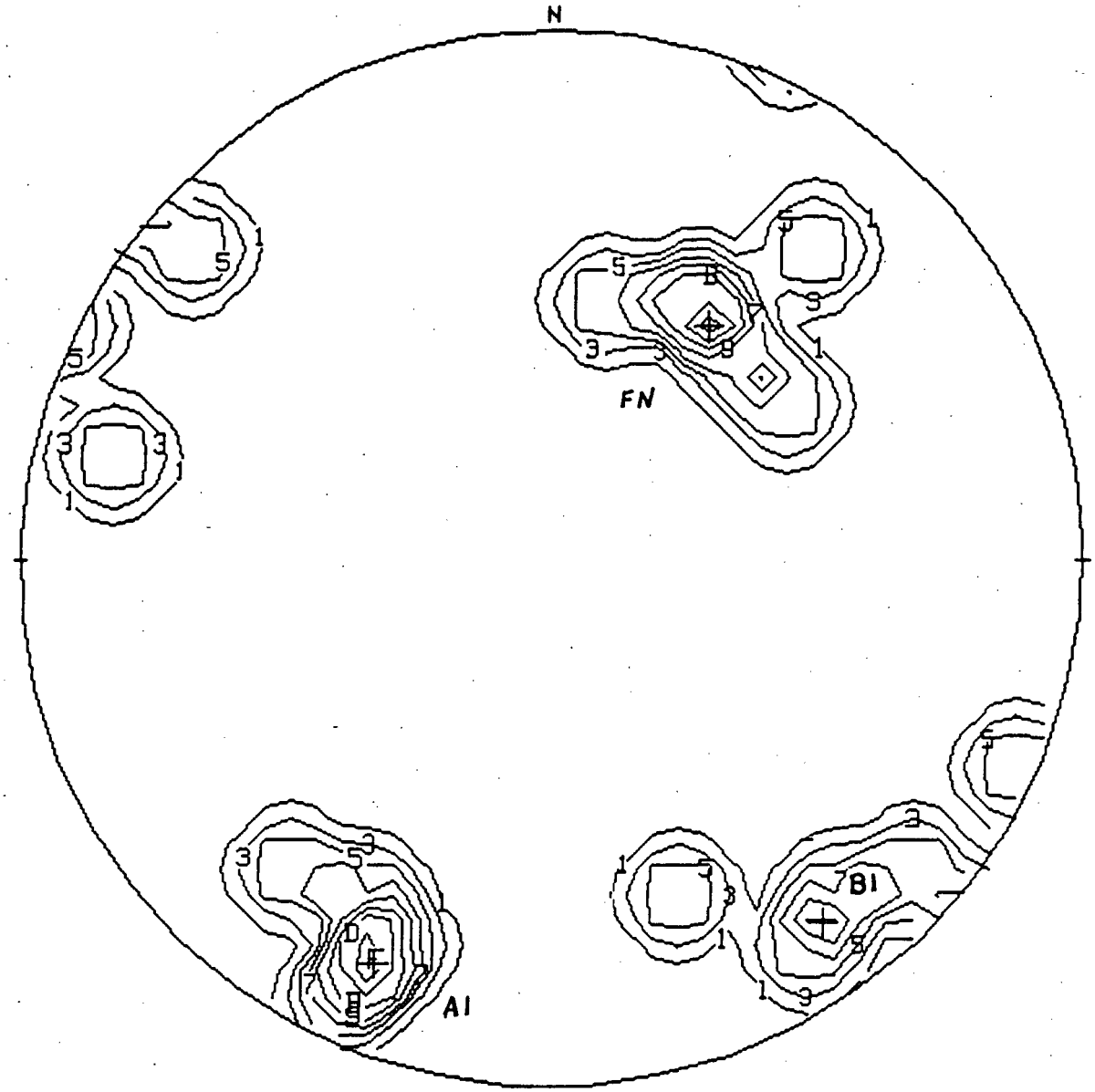
APPENDIX A

LOWER HEMISPHERE EQUAL AREA PROJECTIONS OF DISCONTINUITIES

OBSERVATIONS: 18
POPULATION: 18

CONTOUR PLOT



LABEL	DIP DIRECTION	DIP	CONCENTRATION (%)
FN	213	44	17
AI	023	72	17
BI	323	75	11

BRUHM MINING CORP.

GILT EDGE MINE

PITEAU ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

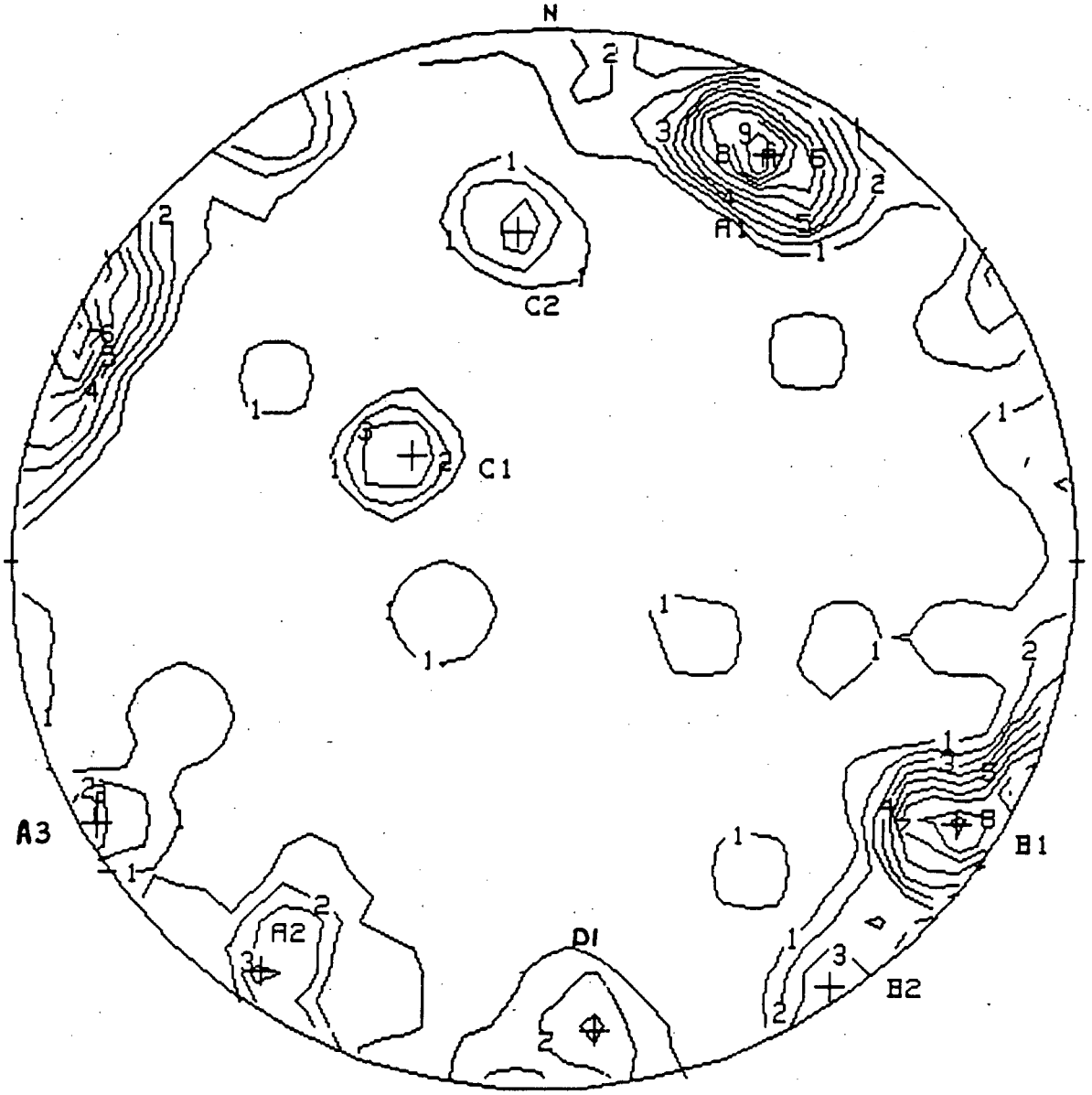
GEODAT: LOWER HEMISPHERE EQUAL AREA PROJECTION

ALL JOINTS IN PRECAMBRIAN ROCK

By:	Date:
DH	DEC/88
Page:	Job#:
A-1	

OBSERVATIONS: 90
POPULATION: 159

CONTOUR PLOT



LABEL	DIP DIRECTION	DIP	CONCENTRATION (%)
A1	208	75	11
A2	034	83	4
D1	354	78	3
A3	059	87	3
B1	303	81	9
B2	326	87	4
C1	128	26	4
C2	174	52	4

BROHM MINING CORP.

GILT EDGE MINE

PITEAU ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

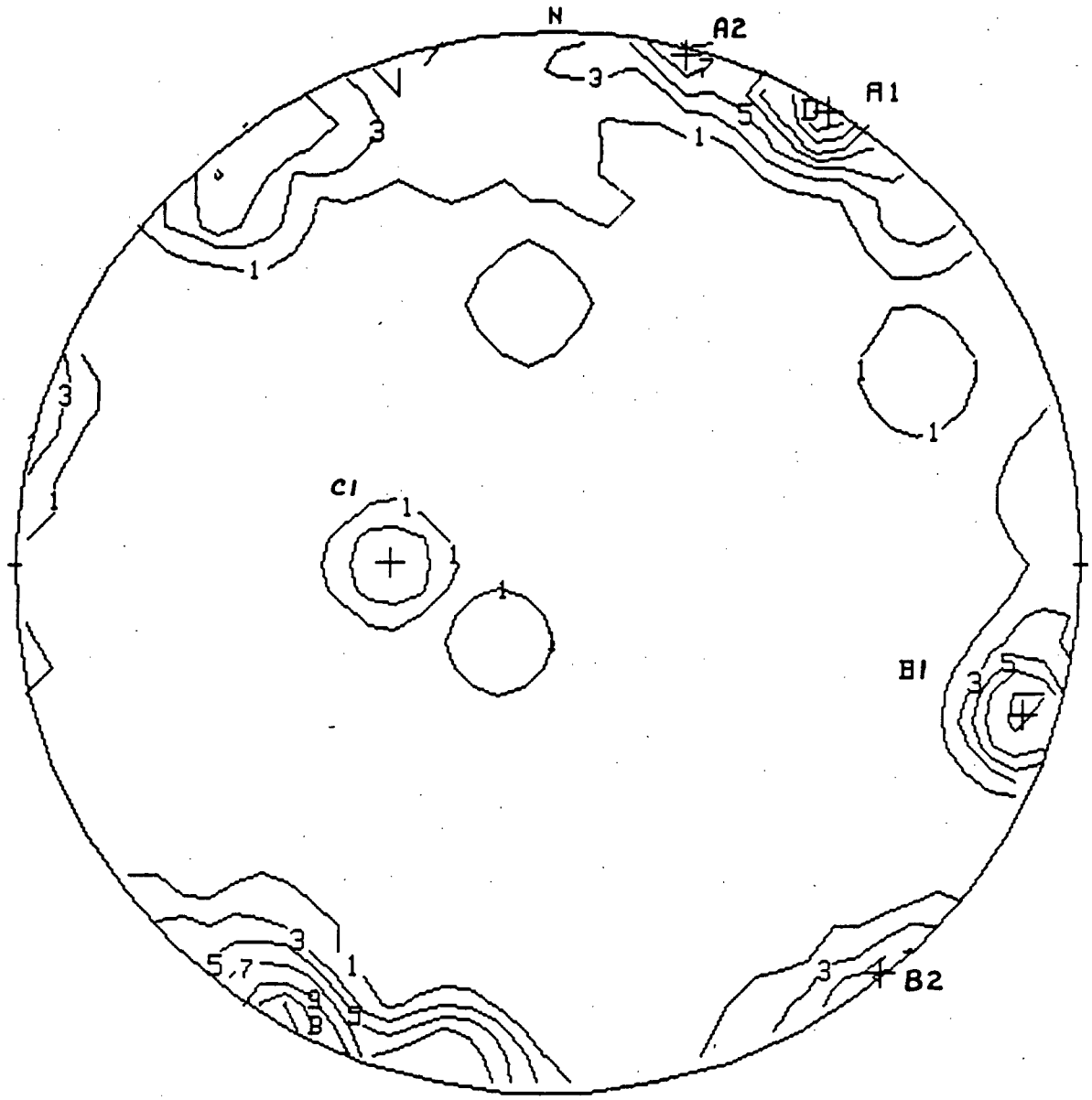
GEODAT: LOWER HEMISPHERE EQUAL AREA PROJECTION

ALL JOINTS IN TRACHYTE PORPHYRY

By:	Date:
DH	DEC/88
Page:	Job#:
A-2	

OBSERVATIONS: 68
POPULATION: 100

CONTOUR PLOT



LABEL	DIP DIRECTION	DIP	CONCENTRATION (%)
A1	211	89	14
A2	194	88	9
B1	288	83	10
B2	321	89	8
C1	091	25	4

BROHM MINING CORP.

GILT EDGE MINE

PITEAU ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

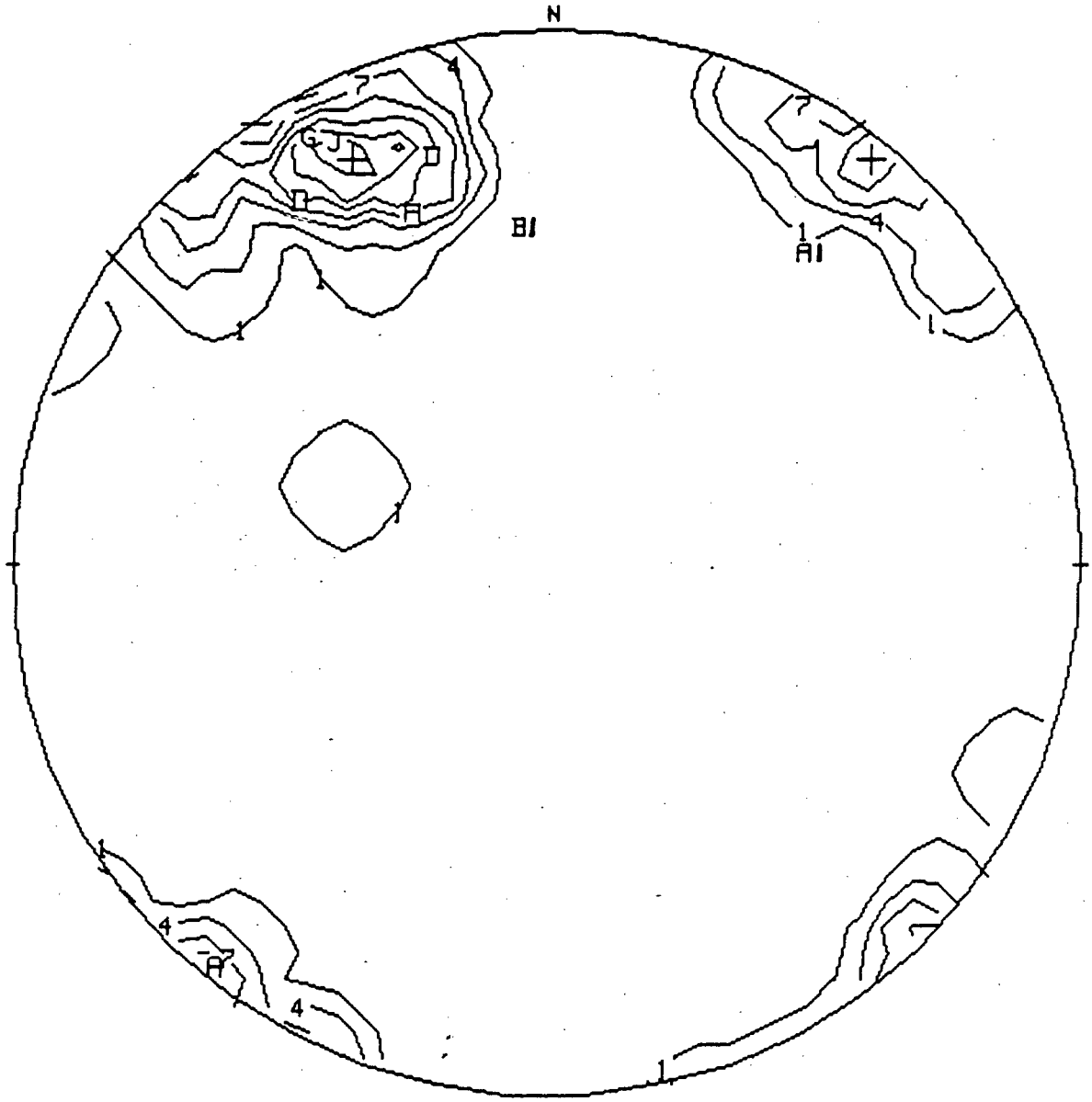
GEODAT: LOWER HEMISPHERE EQUAL AREA PROJECTION

ALL JOINTS IN QUARTZ TRACHYTE PORPHYRY

By:	Date:
DH	DEC/88
Page:	Job#:
A-3	

OBSERVATIONS: 22
POPULATION: 29

CONTOUR PLOT



LABEL	DIP DIRECTION	DIP	CONCENTRATION (%)
A1	218	85	12
B1	153	74	21

BRUHM MINING CORP.

GILT EDGE MINE

PITEAU ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

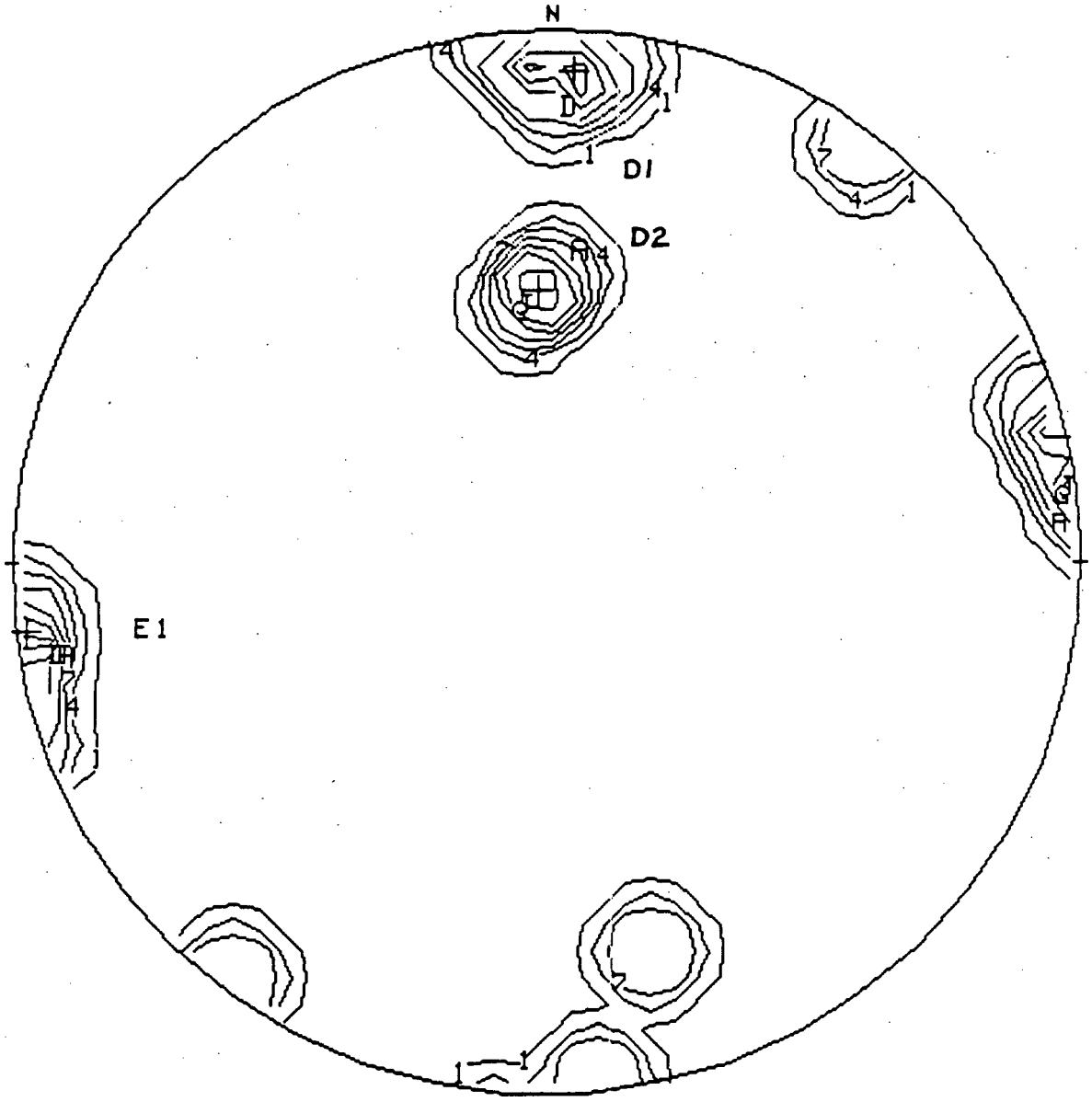
GEODAT: LOWER HEMISPHERE EQUAL AREA PROJECTION

ALL JOINTS IN TRACHYTE BRECCIA

By:	Date:
DH	DEC/88
Page:	Job#:
A-4	

OBSERVATIONS: 10
POPULATION: 10

CONTOUR PLOT



LABEL	DIP DIRECTION	DIP	CONCENTRATION (%)
D1	182	81	20
D2	177	42	20
E1	083	88	20

BROHM MINING CORP.

GILT EDGE MINE

PITEAU ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

GEODAT: LOWER HEMISPHERE EQUAL AREA PROJECTION

ALL JOINTS IN Thtp

By: DH

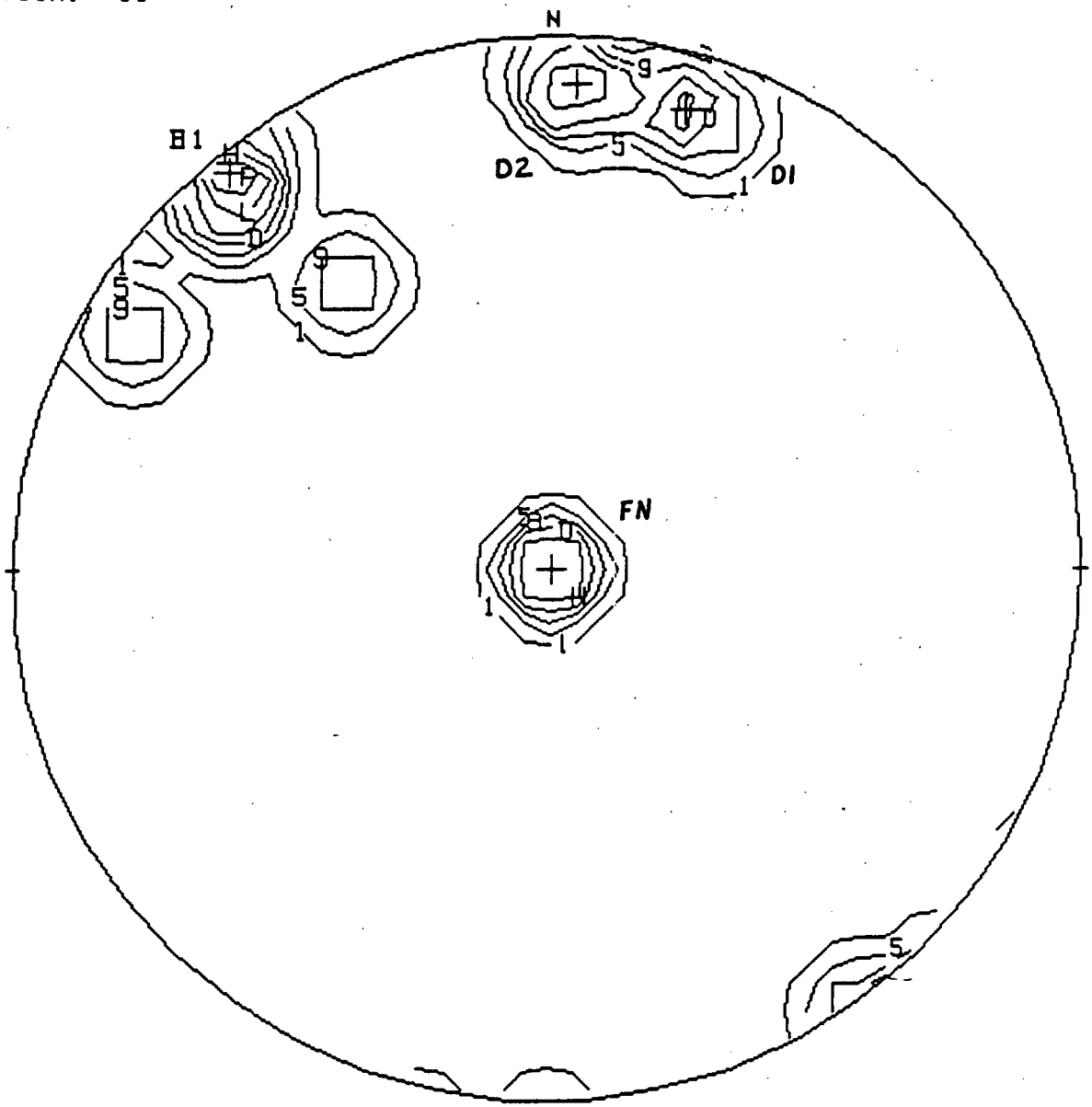
Date: DEC/88

Page: A-5

Job#:

OBSERVATIONS: 10
POPULATION: 11

CONTOUR PLOT



LABEL	DIP DIRECTION	DIP	CONCENTRATION (%)
B1	141	86	27
D1	196	78	18
D2	183	80	18
FN	256	00	18

BROHM MINING CORP.

GILT EDGE MINE

PITEAU ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

GEODAT: LOWER HEMISPHERE EQUAL AREA PROJECTION

ALL JOINTS IN DEADWOOD FORMATION

By:	Date:
DH	DEC/88
Page:	Job#:
A-6	

APPENDIX B

RELATIONSHIP BETWEEN HARDNESS AND UNCONFINED COMPRESSIVE STRENGTH

QUALITATIVE & QUANTITATIVE EXPRESSIONS FOR CONSISTENCY OF COHESIVE SOIL AND ROCK*

HARDNESS	CONSISTENCY	FIELD IDENTIFICATION	APPROXIMATE RANGE OF UNCONFINED COMPRESSIVE STRENGTH	
			MPa	p.s.i.
S1	very soft soil	Easily penetrated several inches by fist; shows distinct heel marks.	<0.025	<3.5
S2	soft soil	Easily penetrated several inches by thumb; faint heel marks.	0.025 - 0.05	3.5 - 7
S3	firm soil	Can be penetrated by thumb with moderate effort; difficult to cut with hand spade.	0.05 - 0.10 [1]	7 - 14
S4	stiff soil	Readily indented by thumb but penetrated only with great effort; cannot be cut with hand spade.	0.1 - 0.2	14 - 28
S5	very stiff soil	Readily indented by thumbnail; requires pneumatic spade for excavation.	0.20 - 0.4	28 - 56
S6	hard soil	Indented with difficulty by thumbnail.	>0.4	>56
R0	extremely soft rock	Indented by thumbnail.	0.2 - 0.7	28 - 100
R1	very soft rock	Crumbles under firm blows with point of geological pick; can be peeled by a pocket knife.	0.7 - 7.0	100 - 1,000
R2	soft rock	Can be peeled by a pocket knife with difficulty; shallow indentations made by firm blow of geological pick.	7.0 - 28	1,000 - 4,000
R3	average rock	Cannot be scraped or peeled with a pocket knife; specimen can be fractured with single firm blow of hammer end of geological pick.	28 - 56	4,000 - 8,000
R4	hard rock	Specimen requires more than one blow with hammer end of geological pick to fracture it.	56 - 112	8,000 - 16,000
R5	very hard rock	Specimen requires many blows of hammer end of geological pick to fracture it.	112 - 224	16,000 - 32,000
R6	extremely hard rock	Specimen can only be chipped with geological pick.	>224	>32,000

* *Modified Rock Hardness Classification*

S1 to S6 Modified after Terzaghi, K. and Peck, R.B., 1967. "Soil Mechanics in Engineering Practice, 2nd Edition, John Wiley and Sons Inc., New York. p.30.

R1 to R5 Modified after Piteau, D.R., 1970. "Geological Factors Significant to the Stability of Slopes Cut in Rock" in Planning Open Pit Mines, Van Rensburg Ed. Aug. 29-Sept. 4, 1970. Balkema. p.51 and 68.

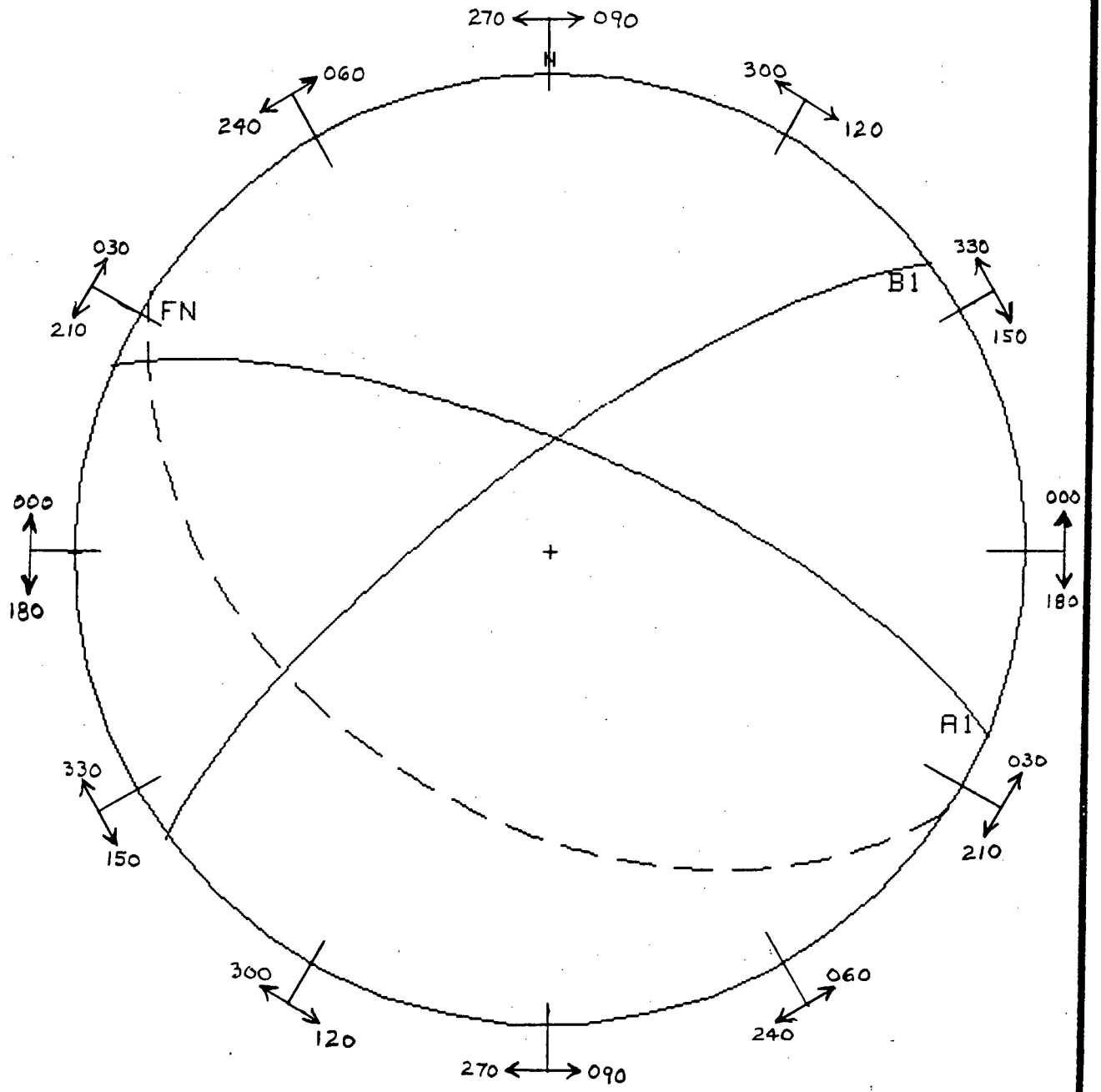
APPENDIX C

LOWER HEMISPHERE EQUAL AREA PROJECTIONS OF PLANES FOR KINEMATIC ASSESSMENT OF POSSIBLE MODES OF FAILURE

JOB NUMBER 88-098

GEOPLN - LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES

PROJECT: BROHM MINING - GILT EDGE PROJECT
DATE: 19/12/88
STRUCTURAL DOMAIN: PC



KEY

030° PIT SLOPE ORINTATION & DIP DIRECTION

PEAK ORIENTATION OF FAULT SET

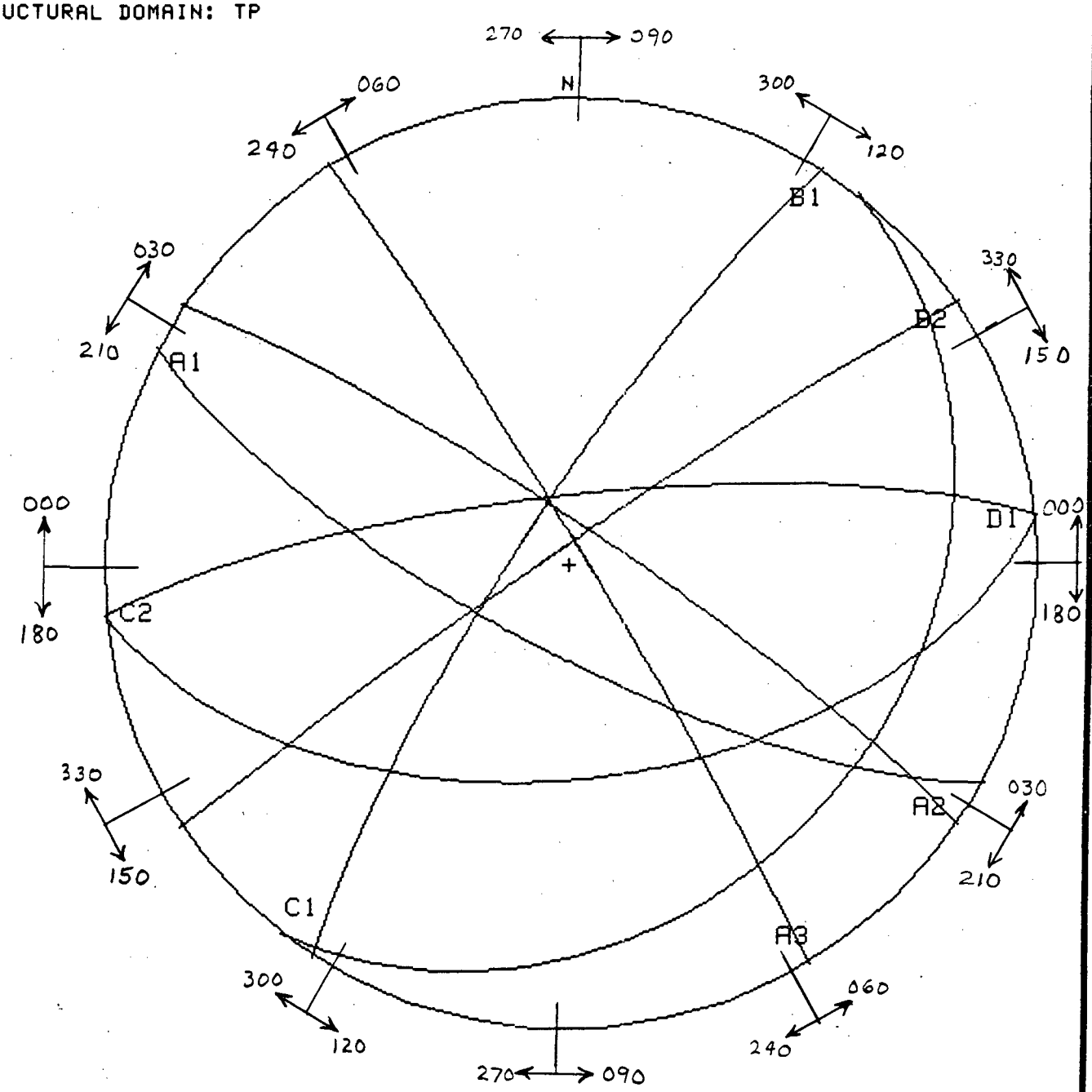
PEAK ORIENTATION OF JOINT SET

BROHM MINING CORP. GILT EDGE MINE	PITEAU ASSOCIATES GEOTECHNICAL CONSULTANTS VANCOUVER CALGARY	
LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES REPRESENTING PEAK ORIENTATIONS OF DISCONTINUITY SETS IN DESIGN SECTORS PC-000 TO PC-330	BY: DH APPROVED:	DATE: DEC/88 DWG: C-1

JOB NUMBER 88-096

GEOPLN - LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES

PROJECT: BROHM MINING - GILT EDGE PROJECT
DATE: 19/12/88
STRUCTURAL DOMAIN: TP



KEY

030° PIT SLOPE ORINTATION & DIP DIRECTION

PEAK ORIENTATION OF FAULT SET

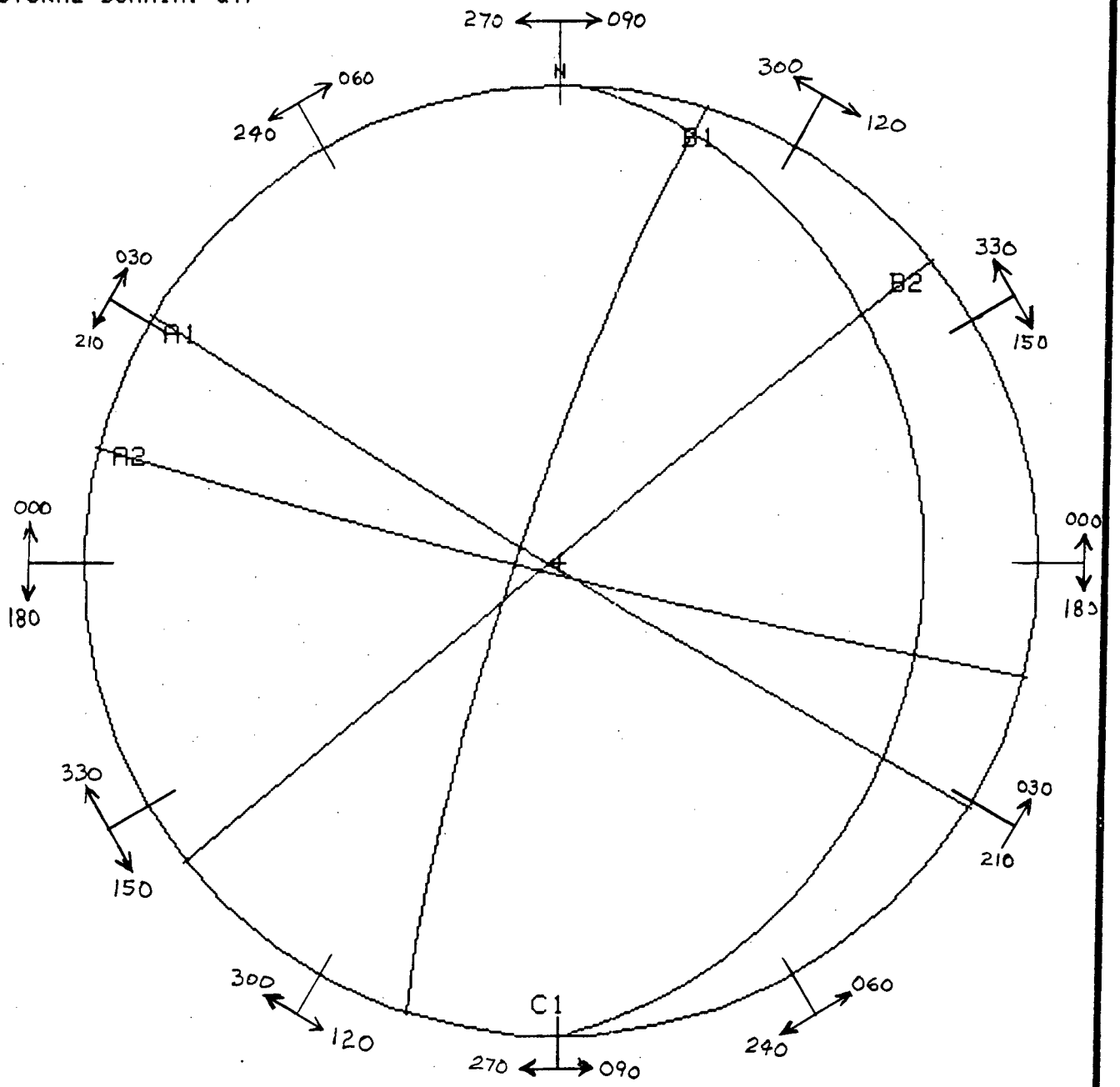
PEAK ORIENTATION OF JOINT SET

BROHM MINING CORP. GILT EDGE MINE	PITEAU ASSOCIATES GEOTECHNICAL CONSULTANTS VANCOUVER CALGARY	
LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES REPRESENTING PEAK ORIENTATIONS OF DISCONTINUITY SETS IN DESIGN SECTORS TP-000 TO TP-330	BY: DH APPROVED:	DATE: DEC/88 DWG: C-2

JOB NUMBER 88-098

GEOPLN - LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES

PROJECT: BROHM MINING - GILT EDGE PROJECT
DATE: 19/12/88
STRUCTURAL DOMAIN: QTP



KEY

030° PIT SLOPE ORINTATION & DIP DIRECTION

PEAK ORIENTATION OF FAULT SET

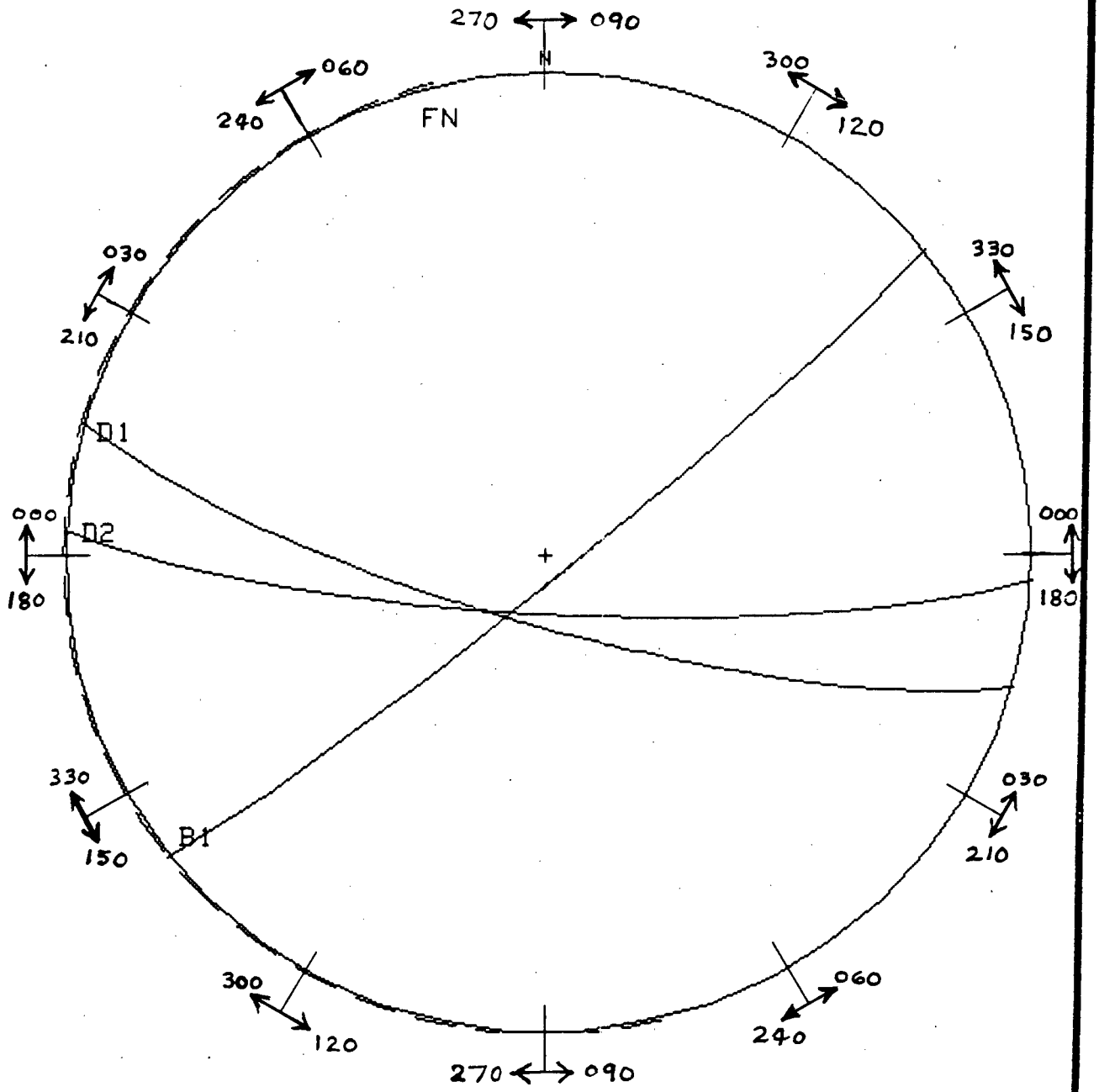
PEAK ORIENTATION OF JOINT SET

BROHM MINING CORP. GILT EDGE MINE	PITEAU ASSOCIATES GEOTECHNICAL CONSULTANTS VANCOUVER CALGARY	
LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES REPRESENTING PEAK ORIENTATIONS OF DISCONTINUITY SETS IN DESIGN SECTORS QTP-000 TO QTP-330	BY: DH APPROVED:	DATE: DEC/88 DWG: C-3

JOB NUMBER 88-098

GEOPLN - LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES

PROJECT: BROHM MINING - GILT EDGE PROJECT
DATE: 19/12/88
STRUCTURAL DOMAIN: DW



KEY

030° PIT SLOPE ORINTATION & DIP DIRECTION

PEAK ORIENTATION OF FAULT SET

PEAK ORIENTATION OF JOINT SET

BROHM MINING CORP.
GILT EDGE MINE

PITEAU ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

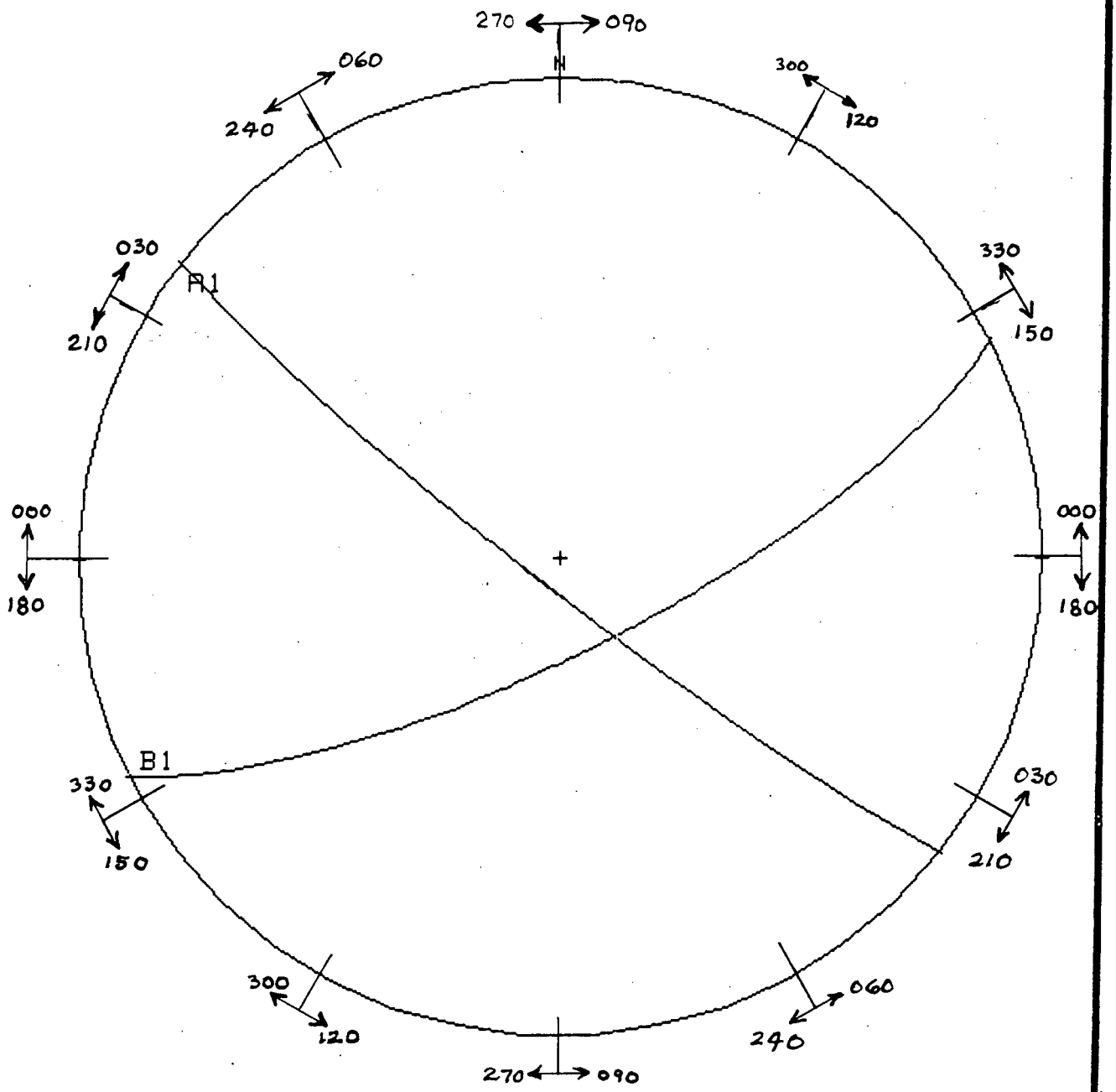
LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES REPRESENTING PEAK ORIENTATIONS OF DISCONTINUITY SETS IN DESIGN SECTORS DW-000 TO DW-330

BY:	DATE:
DH	DEC/88
APPROVED:	DWG: C-4

JOB NUMBER 88-098

GEOPLN - LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES

PROJECT: BROHM MINING - GILT EDGE PROJECT
DATE: 19/12/88
STRUCTURAL DOMAIN: TB



KEY

030° PIT SLOPE ORINTATION & DIP DIRECTION

PEAK ORIENTATION OF FAULT SET

PEAK ORIENTATION OF JOINT SET

BROHM MINING CORP.
GILT EDGE MINE

PITEAU ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

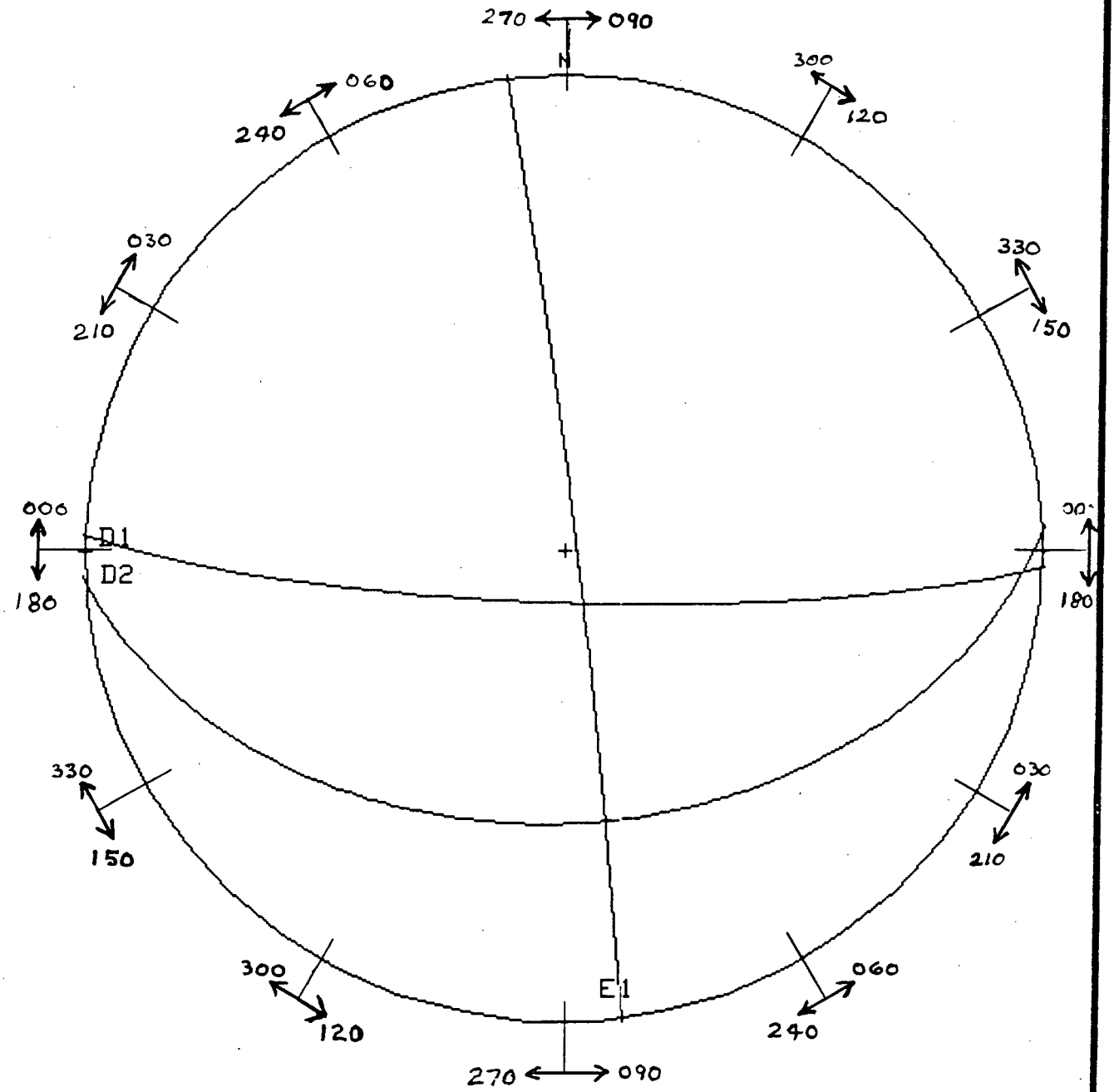
LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES REPRESENTING PEAK ORIENTATIONS OF DISCONTINUITY SETS IN DESIGN SECTORS TB-000 TO TB-330

BY:	DATE:
DH	DEC./88
APPROVED:	DWG: C-5

JOB NUMBER 88-098

GEOPLN - LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES

PROJECT: BROHM MINING - GILT EDGE PROJECT
DATE: 19/12/88
STRUCTURAL DOMAIN: HTP



KEY

030° PIT SLOPE ORINTATION & DIP DIRECTION

PEAK ORIENTATION OF FAULT SET

PEAK ORIENTATION OF JOINT SET

BROHM MINING CORP.
GILT EDGE MINE

PITEAU ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

LOWER HEMISPHERE EQUAL AREA PROJECTION OF PLANES REPRESENTING PEAK ORIENTATIONS OF DISCONTINUITY SETS IN DESIGN SECTORS HTP-000 TO HTP-330

BY:	DATE:
DH	DEC/88
APPROVED:	DWG: C-6