



Fracture Network, Fault Zone, and Geologic Data Collected from the Turkey Creek Watershed, Colorado Rocky Mountain Front Range

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**U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY**

Introduction

The data reported herein was tabulated from field notes into a spreadsheet. The data was collected during autumn of 1999 as part of a U.S. Geological Survey, Geologic Division, Postdoctoral Fellowship to J.S. Caine. The data was used to characterize fracture networks and fault zones and their impact on the hydrogeology of crystalline, Precambrian rocks of the Colorado Rocky Mountain Front Range just west of Denver, Colorado (Figure 1). As part of the characterization effort the data were used to numerically simulate fracture network hydraulic properties such as fracture porosity and permeability. Data from the Harrington, Nobel, and Green localities formed the basis for a Master's thesis by Stephanie Tomusiak working with Shemin Ge at the University of Colorado, Boulder. Additionally, numerous field assistant volunteers helped collect and record the data and their names appear throughout the body of the data. The reader is referred to existing and future publications for a full explanation and interpretation of this characterization and modeling study (Caine, 2000; Char, 2000; Tomusiak and others, 2000; Caine, 2001a and 2001b).

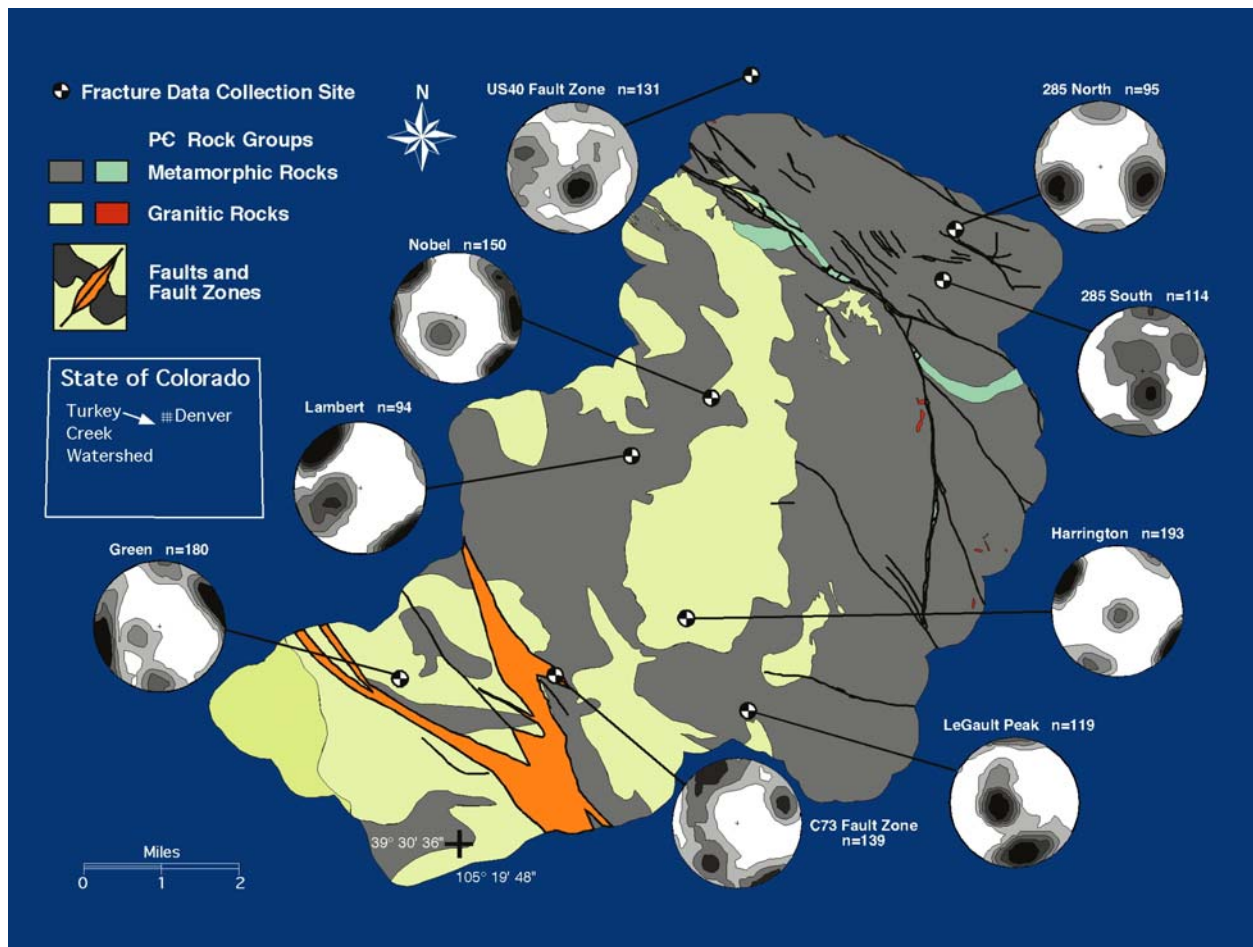


Figure 1: Simplified geologic map of the Turkey Creek Watershed showing fracture network data-collection localities. Individual rock types have been grouped together in hydrologically significant units and structures. The US40 Fault Zone locality is outside of the watershed and is not shown in its correct position. Poles to all data collected at each locality are shown in equal area projections (n is the number of fracture orientation measurements collected at each locality). Modified from Sheridan and others, 1972; Bryant and others, 1973; Scott, 1972; and Bryant, 1974; Char, 2000.

Collection of Fracture Network Data in the Field

Overview

Fracture network data was collected in the Turkey Creek Watershed (TCW) to better characterize fracture network and fault-related hydraulic parameters and answer a few primary questions about this complex aquifer system: (1) How do fracture networks vary in individual lithologies? (2) How do fracture networks vary from one lithology to another? And (3) How do the variations in common and measurable fracture network parameters translate into numerically simulated hydraulic parameters such as fracture porosity and permeability?

In practice, several approaches have been used to better characterize fracture network hydraulic parameters. These have included aquifer hydraulic tests and numerical modeling with discrete fracture network modeling schemes (Anna and Wallman, 1997; Jones and others, 1999); fracture network data collection from pavements and tunnels (Sweetkind and others, 1997); analysis of mineralized and altered fracture networks as indicators of the systematics of paleoflow in an aquifer (Taylor and others, 1999); borehole televiewer logging and flow metering (Paillet and Pedler, 1996); lineament analyses (Bryant and others, 1975); and environmental tracer analyses (Abelin and others, 1991). Many studies, however, only address one of two major components of the needed information for comprehensive groundwater resource evaluation in fractured rock at the watershed-scale (notable exceptions come from work at Mirror Lake, New Hampshire, Barton, 1996; Hsieh and Shapiro, 1996; Tiedeman and others, 1998). These components include either field-based characterization of the geometric properties of fracture networks (typically from the borehole to outcrop to aerial photographic scales) or aquifer hydraulic testing to directly measure hydraulic parameters (typically at the scale of individual to multiple boreholes). The following describes the field data collection techniques used in the TCW study where aspects of both of these components are investigated.

Outcrop Selection and Fracture Data Collection Along Scan Lines

Color aerial photographs (at a scale of about 1:12,000) were used to select representative exposures of the dominant lithologic groups. Field inspection identified nine suitable localities. Natural outcrops with length scales of at least thirty meters and exposures of at least two near orthogonal faces were sought. By taking measurements on two near-orthogonal faces, fractures that were subparallel to one face were captured on the second face in an attempt to eliminate scanline orientation bias. Typically at least three and up to nine scan lines were analyzed at each of nine localities. Scan line sampling was used to collect the raw fracture network data (Priest, 1993). A graduated tape, or “scan line” was stretched across the outcrop face and where practical, scan lines were set up at near right angles to major fracture sets to further avoid scan line-fracture set orientation bias. For each fracture that intersected the tape position (from which spacing and density are derived), orientation, trace length, termination, an estimate of aperture, degree and type of mineralization, shape, roughness, and any indicators of timing relationships (e.g. crosscutting and offset of other fracture sets) were recorded. These parameters form the basic fracture data from which Discrete Fracture Network models were constructed (to be reported elsewhere). Because the foliated rocks were folded and faulted any indication of structural position of each locality was also determined. Rock type, ‘unit’ contacts, compositional layering, foliations and a variety of lineations were also recorded at each locality.

Data Format and Contact Information for Additional Copies

The raw field data was entered into a spreadsheet computer program and formatted with all pertinent information regarding outcrop location, fracture scan line orientation and number, location geology, time, date, data measurer and recorder (listed below), assorted comments, samples and photographs taken. Measured data for each fracture encountered on a scan line was tabulated into individual data columns in the spreadsheet to facilitate a variety of calculations and transferability into other computer codes. In order to collect field data rapidly numerous abbreviations were used in the field notes. These are listed below.

For additional information contact Jonathan Caine, U.S. Geological Survey, P.O. Box 25046, MS 973, Denver, CO, 80225-0046 or jscaine@usgs.gov.

Abbreviations Used in the Data

Ap, aperture; avg, average; bot, bottom; btwn, between; contin, continuous; cov, covered; cp, curvilinear; dir, direction; est, estimated; FCG, Fully Cuts Grid; fe, iron; fe conc, iron concentration; fol, foliation; frac, fracture; hor, horizontal; intersec, intersection; irreg, irregular; jnt zn, joint zone; lies bnds, Liesegang bands; min, mineralization; num, number; peg, pegmatite; pl, planar; r, rough; sl, slightly; SL, scan line; sm, smooth; stnd, stained; stpd, stepped; surf, surface; tl, trace length; trnk, truncates; undef, undeformed; undul, undulating; um, unmineralized; vert, vertical; vr, very rough; w, with; zn, zone; ||, parallel; $\perp$, perpendicular.

Field Volunteers Cited in the Data

AM: Ari Menitove, BG: Ben Glass, DG: David Gartner, JB: Jessica Beck, JC: Jonathan Caine, JL: Jared Lewis, MH: Margaret Hiza, SC: Sonya Cadel, ST: Stephanie Tomusiak.

Measurement Localities

Location and elevation data is taken from U.S.G.S. topographic maps. UTM coordinates are in continental U.S. Zone 13. Latitude and longitude format is: degrees minutes seconds. Scan lines were collected from multiple elevations at each locality thus one representative value is reported for each locality.

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Acknowledgments

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TURKEY CREEK WATERSHED FRACTURED BEDROCK AQUIFER CHARACTERIZATION: RAW FRACTURE AND GEOLOGIC DATA

285 SOUTH OUTCROPS

LOCATION: 4385015 North, 481295 East (39 36 59.64 North Latitude, 105 13 04.47 West Longitude)
 ELEVATION: 6800 Feet

SCAN LINE NUMBER: **SL 1 285 S**
 PHYSICAL LOCATION: US 285, Mid Turkey Creek Canyon, under power lines on south side of highway.
 SCAN LINE ORIENT: 00/347
 FACE ORIENT: 347/36 e
 MEASUREMENT DIR: s to n (horizontal)
 LITHOLOGY: Xm / f-spar, qtz, bio foliated and ptgymatically folded gneiss
 FIELD BOOK / PAGE: 1 / p. 96
 DATE and TIME OUT: 9.24.99 8:30am to 5pm
 MEASUREMENT: JSC
 RECORDER: JL ST SC
 COMMENTS / NOTES: fractures < 3 cm censored
 PHOTO(S): R8N F15

num	postion (m)	orient			termination			notes
		strike	dip	dir	TL (m)	top	bot	
1	0	90	86	s	3.7	trnk	tip	pl, r, <1mm
2	0.48	99	88	s	3.24	tip to step	tip	pl, r, <1mm
3	0.89	103	87	s	2.19	tip	tip to step	sl cp, r, <1mm
4	0.98	252	23	n	0.6	tip	tip	sl cp, r, <1mm
5	1.22	253	33	n	1	tip	tip	sl cp, r, <1mm
6	1.44	262	35	n	1.97	trnk	cov	sl cp, r, <1mm
7	1.52	102	81	s	2	trnk	cov	sl cp, r, <1mm
8	1.57	262	34	n	0.9	trnk	cov	sl cp, r, <1mm
9	1.8	254	37	n	2	trnk	cov	sl cp, r, <1mm
10	1.79	93	32	s	0.66	tip	tip	cp, v r, fol
11	1.99	109	87	s	1.17	cov	cov	sl cp, r, <1mm
		166	62	w	1.77	tip	tip	sl cp, r, <1mm, SL
12	2.13	267	34	n	1.14	trnk	trnk	sl cp, r, <1mm
13	2.27	49	69	s	0.41	cov	cov	
14	2.54	261	32	n	0.93	cov	cov	sl cp, r, <1mm
		89	47	s				fol
15	2.64	260	30	n	0.7	tip	cov	cp, r
16	2.91	279	90		1.24	tip	tip	sl cp, r, <1mm
17	3.13	265	40	n	1.28	cov	cov	
		107	23	s				fol
18	3.27	257	46	n	0.5	tip	cov	
19	3.32	60	52	s	0.4	tip	tip	sl cp
20	3.59	105	90		3.38	tip	tip	sl cp
21	3.85	96	87	s	2.1	trnk	tip	sl cp, stpd
BREAK IN SL								sl skip to 5m, peg dike @ 5.2 to 5.4m cut by fracs
22	5.62	51	55	s	0.5	cov	cov	sl cp
23	5.55	142	17	w	1.05	tip	tip	sl cp
24	6	49	55	s	1.42	tip	tip	sl cp
25	6.02	262	52	n	0.5	tip	tip	sl cp, r
26	6.29	61	50	s	0.4	tip	tip	sl cp
27	6.4	263	32	n	0.89	trnk	tip	sl cp, r
28	6.37	264	30	n	2.1	tip	tip	sl cp, r
29	7.2	247	30	n	1.7	tip	trnk	sl cp
30	7.79	105	30	s	6.8	trnk	trnk	jnt zone
		117	43	s				fol
31	8.5	255	26	n	2	tip	tip?	cp, r
32	9.26	54	8	s	4	trnk	tip	cp, stpd
33	9.58	117	82	s	0.48	trnk	trnk	sl cp
34	10.23	267	90		3.84	tip to stp	tip	cp, stpd
35	10.67	65	44	s	1.24	trnk	trnk	sl cp, vr
36	10.57	82	21	s	1.04	tip	trnk	pl, r
37	11.09	84	21	s	3.56	trnk	trnk	sl cp, r
38	11.33	111	32	s	0.94	trnk	tip	sl cp
39	11.57	98	86	s	2.44	tip	tip	sl cp, stpd
40	12.25	113	12	s	4.5	tip	tip	cp, vr
41	12.99	89	83	s	2.15	tip	tip	pl, r
42	13.42	81	86	s	2.78	tip	tip	sl cp, r
43	13.79	120	14	s	1.22	trnk	trnk	sl cp, r

44	14.2	256	44 n	2 cov	tip	none	sl cp, r
45	14.68	91	73 s	3.5 trnk	tip	none	cp, vr
46	14.9	112	24 s	0.55 tip	tip	none	sl cp, stpd
47	15.08	92	80 s	1.95 trnk	cov	none	sl cp
		80	32 s				fol, many dm scale folds

Note; small cliff to south
sl face || fracs w spacing
~2-3 m and ~TL's 4-5 m.

END

SCAN LINE NUMBER: SL 2 285 S
 PHYSICAL LOCATION: US 285, Mid Turkey Creek Canyon, under power lines on south side of highway.
 SCAN LINE ORIENT: vertical SL
 FACE ORIENT: 347/36 e
 MEASUREMENT DIR: bottom to top (77 TO 257)
 LITHOLOGY: Xm / f-spar, qtz, bio foliated and ptgymatically folded gneiss
 FIELD BOOK / PAGE: 1 / p. 100
 DATE and TIME OUT: 9.24.99 8:30am to 5pm
 MEASURURE: JSC
 RECORDER: ST
 COMMENTS / NOTES:
 PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	N	S		
1	0.1	150	62	w	3.65	tip	tip	none	pl, r, east stepping
2	0.4	192	62	w	2.3	cov	tip	none	pl, r
3	0.6	200	68	w	2.1	tip	trnk	none	cp
4	1.16	74	67	s	0.65	trnk	trnk	none	cp, r
5	1.16	157	70	w	4.22	tip	tip	none	cp, vr
6	1.8	43	26	s	0.93	tip	tip	none	pl, r
7	2.34	158	63	w	1.65	tip	tip	none	pl
8	2.4	200	70	w	1.76	trnk	trnk	none	cp, r
9	2.64	154	78	w	1.3	trnk	trnk	none	cp, r
10	3.08	58	54	s	0.7	tip	trnk	none	cp
11	3.28	65	35	s	47	tip	trnk	none	cp, vr, stpd
12	3.84	155	72	w	2.78	trnk	tip stpd	none	sl cp, r
13	4.08	7	82	e	0.55	trnk	trnk	none	cp, r
14	4.2	159	70	w	2.31	tip stpd	trnk	none	sl cp, r
15	4.7	223	14	w	0.65	tip stpd	tip stpd	none	sl cp to pl
16	4.88	152	66	w	0.68	trnk	trnk	none	sl cp
17	5.19	206	8	w	0.73	tip	tip	none	pl
18	5.63	255	22	n	1.7	trnk	tip	none	cp,r
19	6.1	105	30	s	6.8	trnk	trnk	none	jnt zone,cp, r, fol
20	6.3	196	10	w	0.77	trnk	trnk	none	sl cp, r
21	6.78	116	34	s	2	tip	tip	none	sl cp, r
22	6.9	264	18	n	0.67	tip	tip	none	sl cp, r
23	7	253	28	n	0.93	trnk	trnk	none	cp
24	7.25	129	43	w	3.8	trnk	trnk	none	cp, vr
		133	25	w					comp fol at end of sl

END

SCAN LINE NUMBER: SL 3 285 S
 PHYSICAL LOCATION: US 285, Mid Turkey Creek Canyon, under power lines on south side of highway.
 SCAN LINE ORIENT: subhorizontal
 FACE ORIENT: 110/84 S
 MEASUREMENT DIR: bottom to top
 LITHOLOGY: Xm / f-spar, qtz, bio foliated and ptgymatically folded gneiss
 FIELD BOOK / PAGE: 1 / p. 103
 DATE and TIME OUT: 9.24.99
 MEASURURE: JSC
 RECORDER: ST
 COMMENTS / NOTES: ⊥ to fractures trending 290/45 on face 290/90. ~ 200m w of SL 1 & 2. Sketch in field book.
 PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	2.17	20	43	e	5	cov	cov	none	pl, r

2	2.6	32	43 e	2.57 cov	tip	none	pl, r
3	2.98	32	32 e	2.4 cov	trnk	none	pl, r
4	3.78	10	34 e	2.4 cov	cov	none	pl, r

OTHER NOTES AND DATA

Spacing between SL and next EW face 6.2m

5	345	30 e				none	frac 1.4m to 6
	144	38 s					fol
6	377	33 e	~20	tip	tip	none	frac w step at ~ 10m
	181	30 w					fol
7	336	31 e	6.6	tip	trnk	none	
8	162	35 w				none	fol
	347	22 e	~7 to 8				frac

END

SCAN LINE NUMBER: none (randomly collected data)
LOCATION: Fold Block on south side of 285
SCAN LINE ORIENT:
FACE ORIENT:
MEASUREMENT DIR: random
LITHOLOGY: Xm / f-spar, qtz, bio foliated and ptygmatically folded gneiss
FIELD BOOK / PAGE: book 1, p. 33
DATE and TIME OUT: 9.2.99
MEASURURE: JSC
RECORDER: JL
COMMENTS / NOTES: Data collected at stations
PHOTO(S): R1N F1 to 24

num	postion (m)	orient		TL (m)	termination		min	notes
		strike	dip dir		top	bot		
			37 83					station 1
			155 65					
			256 71					
			240 32					station 2
			247 68					
			318 66					
			310 52					
			46 74					
			65 13					
			16 33					
			173 42					station 3
			140 79					
			64 47					
			186 37					
			322 54					
			231 40					
			144 59					
			133 66					station 4
			322 74					
			258 32					
			128 39					
			289 67					
			178 90					
			215 33					station 5
			147 61					
			5 29					
			135 80					station 6
			233 64					
			10 76					station 7
			155 61					
			288 84					
			153 63					

282 58
287 86

END

285 NORTH OUTCROPS

LOCATION: 4385672 North, 481700 East (39 37 20.98 North Latitude, 105 12 47.55 West Longitude)
ELEVATION: 7075 Feet

SCAN LINE NUMBER: **SL 1 285 N**
PHYSICAL LOCATION: US 285, Mid Turkey Creek Canyon, north side of highway near top of ridge.
SCAN LINE ORIENT: 006/85e
FACE ORIENT: ~00/006
MEASUREMENT DIR: s to n
LITHOLOGY: Xm / bio, qtz, f-spar well foliated gneiss
FIELD BOOK / PAGE: 1 / p. 57, sketch
DATE and TIME OUT: 9.16.99 8am to 6pm
MEASUREMENT: JSC
RECORDER: ST
COMMENTS / NOTES:
PHOTO(S): R6N F19-20

num	postion (m)	orient		termination				min	notes
		strike	dip dir	TL (m)	top	bot			
1	0	86	86 s	>6	cov	cov		none	pl, sm
2	2.9	84	76 s	4?	tip	tip		none	pl, r, <1mm
3	3.66	92	78 s	~6	tip	tip		none	pl, r, <1mm, fe stain
4	6.79	88	90	1.74	tip	tip		none	pl, sm, <1mm
5	7.7	84	80 s	>2	cov	cov		none	pl, sm, <1mm
6	10	84	90	~1.2	cov	trnk		none	pl, sm, <1mm
7	11.4	85	82 s	2.5	cov	cov		none	pl, sm, <1mm
8	7.14 (18.18)	92	80						sm walled frac forming gully.
		170	6 w						compositional layering on biotite

Randomly collected orientation data for fractures > 1 m for consistency of orientations at length scales of 10's of meters

177	56 w	
179	65 w	
193	16 w	fol
93	82 s	pl, sm
265	49 n	
118	73 s	pl, sm
168	54 w	r
175	53 w	
247	22 n	
180	61 w	
113	77 s	
110	81 s	pl
150	60 w	pl, r
120	8 sw	fol
123	76 sw	pl, sm
127	72 sw	pl, r
175	56 w	pl, sm
159	60 w	pl, sm
81	68 s	pl, r
179	56 w	
295	12 n	fol
157	62 w	pl, sm
307	8 n	fol
179	28 w	pl, sm
242	53 n	cp, r

END

SCAN LINE NUMBER: **SL 2 285 N**
PHYSICAL LOCATION: US 285, Mid Turkey Creek Canyon, north side of highway near top of ridge.
SCAN LINE ORIENT: ~00/086, around corner from SL 1 285 N
FACE ORIENT: 086/86s
MEASUREMENT DIR: w to e

LITHOLOGY: Xm / qtz, f-spar, bio foliated gneiss
 FIELD BOOK / PAGE: 1 / p. 60
 DATE and TIME OUT: 9.16.99 8am to 6pm
 MEASUREMENT: JSC
 RECORDER: JL ST
 COMMENTS / NOTES: stepped scan line
 PHOTO(S): R6N F21

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0	179	66	w	3.1	cov	cov	none	pl, r, <1mm, 'units' are massive, main fractures are subparallel to foliation (133/16w), off w side of photo
2	0.62	4	64	e	0.9	trnk	trnk	none	pl, r, stpd, <1mm
3	0.98	162	58	w	3.7	cov	cov	none	pl, sm, <1mm
4	2.74	166	664	w	4.2	cov	cov	none	pl, r, >2mm
vertical step in SL down 2m									
5	3.09	175	64	w	2.93	tip	tip	none	pl, r, <1mm, stpd with L lat shear sense or mixed mode
6	3.48	162	70	w	3.1	cov	tip	none	pl, r, <1mm
7	4	155	53	w	2.4	tip	cov	none	r, stpd
vertical step in SL down 0.53m									
8	5.9 ~23		74	e	0.7	tip	trnk	none	cp, <1mm, on photo
vertical step in SL down 1.79m									
9	5.9	176	62	w	~3	tip	tip	none	vertical intersection
10	5.9h, 2.9v	170	56	w	1.7	tip	cov	none	stpd
11	5.9h, 2.62v	342	74	e	1.4	tip	tip	none	pl, <1mm
vertical step in SL down 3m??? Ask ST???									
12	6.24	175	56	w	3.54	trnk	cov	none	cp, r
13	6.96	170	56	w	2.4	trnk	cov	none	pl, r, <1mm
14	7.33	164	58	w	2.8	tip	tip	none	stpd, <1mm
15	7.71	169	57	w	~5	tip	tip	none	pl, horsetail, approx TL, 0.345m right angle distance from 13
16	8.18	165	62	w	~5	trnk	cov	none	pl, r, stpd, <1mm
17	8.53	158	56	w	4	trnk	trnk	none	poorly defined
18	9	163	58	w	6	trnk	cov	none	
19	off line	168	30	w	1.7	cov	trnk	none	cp, TL is segment length
20	off line	145	30	w		cov	trnk		cp

END

SCANLINE NUMBER: SL 1 285 N2
 PHYSICAL LOCATION: US 285, Mid Turkey Creek Canyon, north side of highway near top of ridge.
 SCAN LINE ORIENT: 00/106
 FACE ORIENT: 106/90
 MEASUREMENT DIR: horizontal
 LITHOLOGY: Xm / K-spar, qtz, bio gneiss — massive less biotite-rich unit
 FIELD BOOK / PAGE: 1 / p. 105
 DATE and TIME OUT: 9.27.99 12pm to 7pm
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES:
 PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0	202	50	w	4.77	trnk	tio	none	pl, r
		36	50	e				none	fol, folding at decimeter scale
2	1.07	210	59	w	4.75	trnk	tip	none	pl, stpd, cut small peg dike
3	1.4	59	42	s	~8	tip	tip	none	cp, fol @ strong comp break
4	3	211	51	w	1.2	tip	tip	none	pl, r
5	3.6	324	75	e	1.4	tip	tip	none	sl cp, r
6	4.27	206	52	w	~6	tip	tip	none	
7	7.2	203	72	w	2.7	?	tip	none	pl, r, stpd
8	9.32	194	70	w	2.8	tip	tip	none	pl, r, stpd, cuts through peg dike
9	9.76	207	77	w	>6	cov	cov	none	pl, r
10	10.3	157	35	w	5.5	trnk	trnk	none	cp, fol (?)
11	10.3	331	54	e	1.60	(v)trnk	cov	none	pl, r
					5.45	(h)cov	cov	none	
12	11.54	329	54	e	1.7	(v) trnk	cov	none	pl, r
					2.57	(h)cov	cov	none	
13	12.8	218	73	w	3.84	trnk	trnk	none	pl, r
14	13.84	198	80	w	3.8	trnk	cov (trnk?)	none	sl cp, r

15 14.7 205 34 w >6 cov cov none cp, r, || fol
16 17 end of sl

END

SCANLINE NUMBER: SL 2 285 N2
PHYSICAL LOCATION: US 285, Mid Turkey Creek Canyon, north side of highway near top of ridge.
SCAN LINE ORIENT:
FACE ORIENT:
MEASUREMENT DIR: 243 to 063 (sw to ne)
LITHOLOGY: Xm / K-spar, qtz, bio gneiss — massive less biotite-rich unit
FIELD BOOK / PAGE: 1 / p. 106
DATE and TIME OUT: 9.27.99 12pm to 7pm
MEASUREMENT: JSC
RECORDER: JL
COMMENTS / NOTES: Stepped SL for m scale modeling. Fracture density appears related to biotite content here?
PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	346	36	e	0.7	trnk	cov	none	pl
2	0.20	342	88	e	0.74	trnk	trnk	none	pl
3	0.20	348	89	e	0.72	trnk	tip	none	pl
4	0.43	152	78	w	0.9	trnk	trnk	none	pl, r
5	0.54	150	88	w	0.33	tip	tip	none	sl cp, r
6	0.64	328	86	e	0.44	trnk	tip	none	pl
7	0.82	333	89	e	1.35	tip	cov	none	pl, r
8	1.08	334	86	e	0.63	trnk	tip	none	sl cp, r

END

Bottom and top of OC bounded by fol || jnts
upper jnt = 180/03 TL ~ 4m, lower jnt = 168/12 TL ~ 4m.

SCANLINE NUMBER: SL 3 285 N2
PHYSICAL LOCATION: US 285, Mid Turkey Creek Canyon, north side of highway near top of ridge.
SCAN LINE ORIENT:
FACE ORIENT: ~160/25w
MEASUREMENT DIR: 25 to 240 (ne to sw)
LITHOLOGY: Xm / K-spar, qtz, bio gneiss — massive less biotite-rich unit
FIELD BOOK / PAGE: 1 / p. 107
DATE and TIME OUT: 9.27.99 12pm to 7pm
MEASUREMENT: JSC
RECORDER: JL
COMMENTS / NOTES: On cp fol || surface for m scale modeling.
PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
1	0.00								blank
2	1.00	222	76	w	0.86	tip	tip	none	cp: wavelength ~ 20cm, amplitude ~ 1cm.
3	1.22	331	55	e	0.55	cov	cov	none	cp
4	1.74	330	48	e	3.8	cov	cov	none	pl
5	2.06	332	52	e	3.5	tip	tip	none	pl
6	3.20	210	84	w	1.23	cov	cov	none	cp, stpd (dm scale)

END

SCANLINE NUMBER: SL 4 285 N2
PHYSICAL LOCATION: US 285, Mid Turkey Creek Canyon, north side of highway near top of ridge.
SCAN LINE ORIENT: horizontal?
FACE ORIENT: 010/90
MEASUREMENT DIR: s to n
LITHOLOGY: Xm / K-spar, qtz, bio gneiss — massive less biotite-rich unit
FIELD BOOK / PAGE: 1 / 108
DATE and TIME OUT: 9.27.99 12pm to 7pm
MEASUREMENT: JSC
RECORDER: JL
COMMENTS / NOTES: Thought: Fractures most often not greater than 10m in length???
PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	102	80	s	>8	cov	cov	none	face of previous scanlines
2	1.48	92	21	s	1.36	trnk	tip	none	cp, r, <1mm, fol
3	2.50	94	84	s	>6	cov	cov	fe	pl, r, stpd

4	3.33	97	86 s	1.36	trnk	tip	fe	pl, r, stpd
5	3.64	90	84 s	>6	cov	cov	none	pl, r, foled at dm scale
6	5.10	88	89 s	1	trnk	trnk	none	pl, r
7	6.20	89	86 s	>6	cov	cov	none	pl, r

END

SCANLINE NUMBER: SL 5 285 N2
 PHYSICAL LOCATION: Outcrops on N side of 285, W of SL 1 285 N
 SCAN LINE ORIENT: Horizontal SL beginning where SL 4 285 N2 ended (~ perpendicular to SL 4).
 FACE ORIENT: ~100/90
 MEASUREMENT DIR: w to e
 LITHOLOGY: Xm / K-spar, qtz, bio gneiss — massive less biotite-rich unit
 FIELD BOOK / PAGE: 1 / 109
 DATE and TIME OUT: 9.27.99 12pm to 7pm
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES:
 PHOTO(S): R8NF17: Looking NW at OC 285 N (north side of 285) near Mount Falcon. Note similar jnt spacing to that seen at 285 S outcrops.

num	postion (m)	orient		termination			min	notes
		strike	dip dir	TL (m)	top	bot		
1	0.00	199	58 w	6.28	cov	tip	none	sl cp, r
2	1.31	202	55 w	7.14	cov	tip	none	sl cp, r
3	2.23	192	50 w	0.82	tip	tip	none	pl, r
4	2.68	342	54 e	5.20	tip	tip	none	pl, r
5	4.49	205	60 w	6.70	cov	cov	none	pl, r
6	4.94	185	53 w	2.70	tip	cov	none	pl, vr. Note: dm scale asymmetric folding. major foliation At 5m SL dropped down 1m.
		304	16 e					
7	5.70	183	56 w	2.20	cov	tip	none	pl, r, stpd
8	6.39	183	52 w	1.73	stpd tip	tip	none	pl, r, cuts folds
9	6.67	192	56 w	4.00	cov	cov	fe	pl, r
10	6.58	327	58 e	1.68	tip	trnk	none	sl cp, r, <1mm
11	7.61	334	62 e	1.40	trnk	tip	none	
12	7.97	333	64 e	1.50	trnk	cov	none	pl
13	8.39	338	62 e	0.93	trnk	tip	fe	pl, r
14	9.10	198	58 w	~2	cov	cov	none	pl, r

END

12 and 13 possibly not in place?

Random orientations of planar fractures on outcrop seen in R8NF17 (on map as 285N3).

088	83 s	
085	80 s	
332	53 e	
338	60 e	08/310 non-cylindrical fold axis
124	48 w	fol
208	75 w	
340	58 e	
268	30 n	
089	84 s	
187	52 w	
146	37 w	fol
254	68 n	
097	73 s	
328	68 e	
183	57 w	
187	52 w	
097	80 s	
335	67 e	
091	74 s	
209	73 w	
095	70 s	many frags fe stained
202	78 w	
202	73 w	R8NF18: Looking w @ frags in F17
331	60 e	R8NF19: Looking n @ same OC
330	55 e	R8NF20: Looking ne @ same OC

SCANLINE NUMBER: SL 6 285 N2
 PHYSICAL LOCATION: Outcrops on N side of 285, W of SL 1 285 N
 SCAN LINE ORIENT: Horizontal SL

FACE ORIENT: 106/36s (~fol ||)
 MEASUREMENT DIR: w to e
 LITHOLOGY: Xm / K-spar, qtz, bio gneiss — massive less biotite-rich unit
 FIELD BOOK / PAGE: 1 / 112
 DATE and TIME OUT: 9.27.99 12pm to 7pm
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES: See outcrop sketch in field book
 PHOTO(S): R8NF21: stepping crack (9) on SL

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	w	e		
1	0.00	209	70	n	0.78	tip	tip	none	pl, r
2	0.66	208	66	n	0.63	tip	tip	none	pl, r
3	1.05	329	56	e	1.20	cov	trnk	none	pl, r, stpd
4	1.54	344	75	e	2.07	tip	trnk	none	pl, r
5	1.56	217	70	n	1.90	trnk	trnk	none	pl, r
6	1.61	348	70	e	1.90	tip	trnk	none	pl, r
7	1.96	180	90		10.00	tip	cov	none	pl, r
8	2.22	202	62	w	0.50	tip	tip	none	pl, r
9	2.59	202	62	w	0.96	tip	tip	none	pl, r, TI = 3.26 if hydraulically connected orientation suspect?
10	2.78	219	82	n	0.88	tip	tip	none	pl, r
11	2.63	350	37	e	0.97	tip	tip	none	pl, r
12	3.44	191	58	n	2.82	tip	tip	none	pl, r
13	3.84	084	77	s	6.45	tip	tip	none	pl, r
14	not on sl	076	90		2.36	tip	tip	none	pl, r
15	4.35	078	90		2.38	trnk	tip	none	pl, r
16	5.69	186	57	w	4.08	tip	tip	none	pl, r
17	6.77	171	45	w	5.50	cov	cov	none	pl, r, fol ?

END

SCANLINE NUMBER: **SL 7 285 N2**
 PHYSICAL LOCATION: Outcrops on N side of 285, W of SL 1 285 N
 SCAN LINE ORIENT: Slightly inclined from horizontal
 FACE ORIENT: 115/48s rake = 34 down from nw
 MEASUREMENT DIR: e to w
 LITHOLOGY: Xm / K-spar, qtz, bio gneiss — massive less biotite-rich unit
 FIELD BOOK / PAGE: 1 / 113
 DATE and TIME OUT: 9.27.99 12pm to 7pm
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES: For data on n-s fracture set
 PHOTO(S): R8NF21

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	337	70	e	1.08	tip	tip	none	pl, r
2	1.01	333	50	e	1.27	tip	tip	none	pl, r
3	1.21	336	61	e	1.14	tip	tip	none	pl, r, in pegmatite dike
4	1.37	331	54	e	1.22	tip	tip	none	pl, r, stpd
5	2.68	337	54	e	1.02	tip	tip	none	pl, r
6	2.80	334	63	e	3.2	tip	trnk	none	pl, r
7	3.16	340	56	e	1.24	trnk	trnk	none	pl, r, trnk into fol

END

LEGAULT PEAK OUTCROPS

LOCATION: 4375765 North, 477253 East (39 31 59.25 North Latitude, 105 15 52.84 West Longitude)
 ELEVATION: 9000 Feet

SCAN LINE NUMBER: **SL L 1**
 PHYSICAL LOCATION: Legault Peak
 SCAN LINE ORIENT: 00/150
 FACE ORIENT: 330/90
 MEASUREMENT DIR: nw to se
 LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss
 FIELD BOOK / PAGE: 1 / 115
 DATE and TIME OUT: 9.29.99 8am to 8:30pm

MEASURE: JSC
 RECORDER: JL
 COMMENTS / NOTES: Rx are locally ptgmatally folded at decimeter scale.
 PHOTO(S): R9F1,2: Looking north at OC. Fractures are poorly organized, short and curvilinear and appear to be primarily controlled by fol.
 Rx appear to have higher bio content than east block which shows more planar fractures than west block.

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	210	75	w	2.00	tip	tip	none	cp, fol
2	1.00	004	30	e	1.52	tip	trnk	none	sl cp, r
3	0.86	217	81	w	2.40	trnk into fo	cov	none	cp, r, stpd
4	2.00	285	34	n	1.32	trnk	tip	none	sl cp, r, stpd
5	2.71	209	72	w	0.38	trnk	trnk	none	cp
6	2.91	246	40	w	0.34	trnk	trnk	none	cp
7	3.22	217	44	w	0.41	trnk	trnk	none	cp, irreg
8	3.56	218	40	w	0.98	tip	tip	none	irreg, r, fol
9	3.87	166	64	w	1.77	tip	tip	none	irreg
10	4.38	236	32	w	2.94	trnk	cov	none	irreg, fol but fol changes rapidly here
11	5.87	230	84	w	0.39	trnk	tip	none	sl cp, r
12	6.06	226	78	w	>10	cov	cov	none	v cp, fol , 222/50w and 225/31w = other orients

END

SCAN LINE NUMBER: **SL L 2**
 PHYSICAL LOCATION: Legault Peak: Central west block
 SCAN LINE ORIENT: 00/150
 FACE ORIENT: 330/90
 MEASUREMENT DIR: nw to se
 LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss
 FIELD BOOK / PAGE: 1 / 116
 DATE and TIME OUT: 9.29.99 8am to 8:30pm
 MEASURE: JSC
 RECORDER: JL
 COMMENTS / NOTES: SL starts 2m sw and 1m se of SL L 1 and ~1.5 m up. End of OC and SL is a fol || off-width crack > 10 m long (275/70n) possibly a good recharge pathway?
 PHOTO(S): R9F3: Looking north at OC. Shows irregular nature of fractures and impact of micaceous vs non-micaceous lithologies.
 R9F4: Looking north at off-width crack at end of OC.
 SAMPLES: LE1: orient = 030/90, LE2: orient = 000/90 for lithology and microstructural analysis.

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.21	259	32	n	1.58	trnk	tip	none	sl cp, r
2	1.47	279	54	n	1.02	trnk	trnk	none	irreg, fol
3	2.30	013	52	e	2.20	trnk	cov	none	v v cp
		036	64	e					
		045	88	e					
		197	72	w					
4	3.12	280	63	n	1.73	trnk	trnk	none	irreg
5	3.94	024	62	e	1.45	trnk	trnk	none	sl cp, r
6	4.09	204	70	w	1.76	trnk	trnk	none	sl cp, r, fol

END

SCAN LINE NUMBER: **SL L 3**
 PHYSICAL LOCATION: Legault Peak: SE corner of west block
 SCAN LINE ORIENT: 40/010: n-s line to capture e-w fracture set
 FACE ORIENT: 010/90
 MEASUREMENT DIR: s to n
 LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss
 FIELD BOOK / PAGE: 1 / 118
 DATE and TIME OUT: 9.29.99 8am to 8:30pm
 MEASURE: JSC
 RECORDER: JL
 COMMENTS / NOTES: SL is horizontal from #'s 1 to 4 : 9 to 14 and plunges 40 degrees for 5 to 8. Fracs cut ptgmat folds.
 PHOTO(S): R9F5: Looking west at se corner of OC at strong foliation.
 R9F6: Looking n at se corner crack orient 198/70w which is fol || and cp. Avg. of ~ 15 fracs/m with larger open fracs at ~ 4/m

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	263	71	n	3.00	cov	cov	none	sl cp, r

2	0.80 ~273	86 n	~4	cov	tip	none	sl cp, r
		172 68 w					fol
		320 20					trend / plunge of pygmatic fold axis
3	2.18	276 82 n	2.30	tip	tip	none	sl cp, r
4	3.56	270 84 n	0.86	tip	tip	none	cp, semi sm
5 ~7.6		281 90	~2	tip	tip	none	sl cp, r
6	11.24	268 84 n	1.80	tip	tip	none	sl, cp, semi sm
7	10.10 ~288	86 n	>2				v weathered
8	11.78	280 83 n	>2				sl cp, r
9	13.14	286 82 n	1.10	trnk	trnk	none	sl cp, r
10	16.20	275 73 n	1.90	cov	tip	none	sl cp, r
11	17.35	274 76 n	0.76	trnk	cov	none	sl cp, r
12	18.90	272 84 n	1.48	tip	trnk	none	sl cp, r
13 ~19.2		284 86 n	2.50	cov	cov	none	v weathered
14	21.30	282 88 n	>2?	cov	trnk		v weathered

END

SCAN LINE NUMBER: **SL L 4**

PHYSICAL LOCATION: Legault Peak: SE corner of west block

SCAN LINE ORIENT: vertical line

FACE ORIENT: 010/90

MEASUREMENT DIR: top to bot

LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss

FIELD BOOK / PAGE: 1 / 119

DATE and TIME OUT: 9.29.99 8am to 8:30pm

MEASUREMENT: JSC

RECORDER: JL

COMMENTS / NOTES: Avg. spacing of fol || fracs ~ 4/m. They tend to tip out into steps and are quite short (1.5 to 2 m).
Fabric tends to 'come' and 'go', maybe forming compartments spaced on order of a few 10's of m's. Compartments ~ 10m wide?

PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	352	28	e	1.48	tip	tip	none	sl cp, r
		194	66	w					fol
2	0.51	342	22	e	>4	cov	cov	none	sl cp, r
3	2.10	346	26	e	2.60	cov	trnk	none	sl cp, r
from 2 to 5 moved horizontally ~5 m to the south									
4	3.20	336	20	e	1.90	cov	tip	none	sl cp, r
from 3 to 4 moved horizontally ~1.3 m to the south									
5	4.50	335	22	e	1.94	trnk	tip	none	sl cp, r
		203	60	w					fol

END

SCAN LINE NUMBER: **SL L 5**

PHYSICAL LOCATION: Legault Peak: SE corner of west block

SCAN LINE ORIENT: Spot check in separate block: Vertical line

FACE ORIENT:

MEASUREMENT DIR: top to bot

LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss

FIELD BOOK / PAGE: 1 / 120

DATE and TIME OUT: 9.29.99 8am to 8:30pm

MEASUREMENT: JSC

RECORDER: JL

COMMENTS / NOTES: Fracture cp wavelengths on order of ~ 1 to 2 dm and amplitude ~ 1 to 2 cm. This was a difficult outcrop that should not be modeled at scales of more than a few meters.

PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	352	23	e	~3	cov	cov	none	sl cp
2	1.30	338	24	e	2.85	cov	trnk	none	cp
3	1.75	334	23	e	2.00	tip	cov	none	cp
4	2.35	358	38	e	1.30	trnk	trnk	none	cp
5	2.81	359	31	e	2.02	trnk	tip	none	cp
Fracs appear to occur in pairs ~ 0.5 m apart									
6	3.39	356	18	e	2.35	cov	cov	none	cp
7	4.29	334	18	e	3.20	tip	cov	none	cp

END

Set of SE dipping fracs missed in SL (this set is sparse)

8 na		054	39 se	1.30 trnk	trnk	none	pl, sm
9 na		053	38 se	1.21 trnk	tip	none	pl, sm
10	6.14	070	40 se	2.60 trnk	trnk	none	pl, sm
11	6.74	074	46 se	2.04 tip	trnk	none	pl, sm
12	6.94	052	45 se	3.10 trnk	trnk	none	pl, sm
13	7.94	~054	42 se	2.50 trnk	trnk	none	pl, sm, stpd

END

SCAN LINE NUMBER: **SL L 6**
 PHYSICAL LOCATION: Legault Peak: WNW side of east block
 SCAN LINE ORIENT: 25/330
 FACE ORIENT: 330/90
 MEASUREMENT DIR: n to s?
 LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss
 FIELD BOOK / PAGE: 1 / 122
 DATE and TIME OUT: 9.29.99 8am to 8:30pm
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES: Fracs < ~ 0.5 m censored out
 PHOTO(S): R9F7: Looking east at SL L 6

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	236	72	n	1.80	tip	tip	none	sl cp, r, stpd
2	0.00	209	16	w	0.73	trnk	trnk	none	cp, r
3	0.55	271	80	n	1.40	tip	tip	none	sl cr, r
4	1.05	130	15	w	1.08	trnk	tip	none	sl cp, r
5	1.72	074	44	s	1.70	trnk	trnk	none	sl cp, r
6	2.27	268	72	n	1.24	tip	tip	none	sl cp, r
7	2.56	267	76	n	2.73	tip	tip	none	sl cp, r
8	2.78	263	70	n	1.16	trnk	tip	none	sl cp, r
9	2.87	044	34	e	0.60	trnk	tip to stp	none	pl
10	2.96	056	40	e	2.88	tip	tip	none	pl, semi sm
11	3.45	197	10	w	~3	trnk	cov	none	cp
12	3.84	270	66	n	1.72	trnk	trnk	none	sl cp, r, stpd
13	3.98	266	66	n	0.84	trnk	trnk	none	pl, r, stpd, connected to 12 by step
14	4.68	252	68	n	1.73	tip	tip	none	pl, semi sm
		347	90						fol
		347	20						trend and plunge of mineral lineation
15	4.50	284	15	n	2.15	cov	trnk	none	cp
16	5.14	346	41	e	3.10	trnk	trnk	fe	sl cp, semi sm
17	5.33	251	66	n	1.22	tip	tip	none	pl, semi sm, stpd

END

WNW end of east block fracs randomly measured below SL L 6.

265	73	n	1.96	tip	tip	none	sl cp, multiple subparallel fracs a mini joint zone?
243	65	n	2.24	tip	tip	none	cp
330	62	n					fol

END

SCAN LINE NUMBER: **SL L 7**
 PHYSICAL LOCATION: Legault Peak: Mid-SW face of east block
 SCAN LINE ORIENT: 00/160?
 FACE ORIENT: 160/62w
 MEASUREMENT DIR: n to s?
 LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss
 FIELD BOOK / PAGE: 1 / 122
 DATE and TIME OUT: 9.29.99 8am to 8:30pm
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES:
 PHOTO(S): R9F8 to 10: Looking east at SL L 7 OC
 SAMPLES: LE 3a and b: orient = 072/36s

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	072	36	s	1.67	tip	trnk	none	pl, r to semi sm
2	0.25	240	70	n	1.44	trnk	trnk	none	sl cp, r, stpd
3	0.96	237	65	n	1.30	trnk	tip	none	sl cp, r, jnt zone, trnk into e-w striking shallow n dipping frac jnt zone has 8 fracs upto ~ 0.3m long
4	1.10	060	40	s	0.97	trnk	tip	fe	pl, semi sm, stpd
5	1.52	061	40	s	1.60	trnk	tip	none	pl, semi sm, stpd
6	1.60	244	69	n	1.90	tip	tip (crosses	none	sl cp
7	2.67	243	70	n	4.18	tip	tip	none	stpd jnt zone, ~0.06m wide w 4 fracs of varying TL's
8	3.74	269	70	n	7.90	trnk	cov	none	pl (top), cp (bot), quite weathered
9	4.04	274	69	n	0.86	tip	tip	none	pl, stpd
10	4.75	272	77	n	3.00	tip	cov	none	sl cp, stpd, <1mm

END

SCAN LINE NUMBER: **SL L 8**

PHYSICAL LOCATION: Legault Peak: Mid-SW face of east block ~30m s of SL L 7 along a line trending 350 horizontal.

SCAN LINE ORIENT:

FACE ORIENT:

MEASUREMENT DIR:

LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss

FIELD BOOK / PAGE: 1 / 125

DATE and TIME OUT: 9.29.99 8am to 8:30pm

MEASURURE: JSC

RECORDER: JL

COMMENTS / NOTES:

PHOTO(S):

SAMPLES: LE 4: orient = 352 for microstuctural analysis

num	postion (m) from last	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	>2	251	60	n	~2			none	pl, r, stpd
2	0.15	249	56	n	~1			none	pl, r, stpd
3	0.63	244	58	n				none	pl, r, stpd
4	0.92	267	62	n				none	pl, r, stpd
5	0.40	266	58	n				none	pl, r, stpd
6	0.26	265	60	n				none	pl, r, stpd
7	0.19	255	62	n				none	pl, r, stpd
8	0.16	256	66	n				none	joint zone 1.4m until covered

END

SCAN LINE NUMBER: **SL L 9**

PHYSICAL LOCATION: Legault Peak: At se end of sw side of east block.

SCAN LINE ORIENT:

FACE ORIENT: 325/90

MEASUREMENT DIR: 325 to 145

LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss

FIELD BOOK / PAGE: 1 / 125

DATE and TIME OUT: 9.29.99 8am to 8:30pm

MEASURURE: JSC

RECORDER: JL

COMMENTS / NOTES: Unit much more massive than prevois OC's

PHOTO(S):

SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.00	190	46	w	~3	trnk	tip	none	cp, irreg
		001	18	e	6.40	cov	tip	none	?
2	0.69	215	70	w	2.30	trnk	tip	none	cp, irreg
3	4.16	280	32	n	1.34	trnk	tip to splay	none	irreg
4	6.11	255	70	n	0.70	trnk	trnk	none	sl cp, r
5	6.25	256	69	n	1.84	trnk	tip to splay	none	sl cp, r
6	6.67	070	70	s	~18	tip	cov	none	sl cp, r, weakly polished and striated slip surf lin = 46 df nw
7	6.84	249	76	n	3.64	trnk	trnk	none	sl cp, r, possible distributed def down to the se

8	7.27	245	78 n	~3.3	tip to splay	tip to splay	none	pl, stpd
9	7.44	248	82 n	2.00	trnk	cov	none	pl to sl cp, stpd
10	7.52	236	78 n	2.04	tip	trnk	none	sl cp, stpd
11	8.52	250	76 n	2.10	tip to step	tip to step	none	sl cp
12	8.64	241	86 n	0.90	tip	tip	none	sl cp, r
13	9.99	250	62 n	3.86	trnk	tip to step	none	sl cp, r
14	12.12	250	64 n	7.50	cov	cov	none	pl, stpd
15	14.29	260	60 n	1.27	trnk	trnk	none	cp, irreg
16	15.85	253	68 n	8.10	trnk	cov	none	sl cp, r
subhorizontal fractures								
	~15m on SL (0.65	356	25 e	5.30	trnk (s)	tip (n)	none	sl cp, r
	3.90 above line	314	24 e	1.60	trnk (s)	tip (n)	none	sl cp, r
	4.75 above	328	20 e				none	sl cp, r
	5.30 above	312	18 e	1.37	trnk (s)	trnk (n)	none	sl cp, r

END

SCAN LINE NUMBER: **SL L 10**
 PHYSICAL LOCATION: Legault Peak: At se end of sw side of east block 8m along SL L9.
 SCAN LINE ORIENT: Vertical
 FACE ORIENT: 325/90
 MEASUREMENT DIR: bottom to top
 LITHOLOGY: Xm / Interlayered foliated qtz, bio, gneiss
 FIELD BOOK / PAGE: 1 / 127
 DATE and TIME OUT: 9.29.99 8am to 8:30pm
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES: See sketch in book of SL's 9 and 10 outcrop within compartment of fractures. Outside this area fractures are less dense.
 PHOTO(S):
 SAMPLES: LE5: Flt zone sample, orient = 220/60 (top down to nw)

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
1	0.83	000	21	e	6.10	tip	tip	none	sl cp, r
2	1.26	347	24	e	1.80	tip to splay	trnk	none	sl cp, r
3	1.44	002	18	e	1.50	tip	trnk	none	sl cp, r
4	1.15	331	25	e	1.88	trnk	tip	none	sl cp, r
5	1.87	005	25	e	1.55	tip	tip	none	sl cp, r
6	2.16	354	22	e	2.62	tip	tip	none	sl cp, r
7	2.34	350	16	e	0.80	tip	tip to step	none	sl cp, r
8	2.38	346	16	e	1.83	tip	trnk	none	sl cp, r
9	2.80	342	18	e	6.79	tip	tip	none	sl cp, r
10	2.92	343	17	e	1.10	tip	tip	none	sl cp, r
11	3.20	357	26	e	3.20	trnk	tip	none	sl cp, r
12	3.50	358	10	e	~5	trnk	cov	none	sl cp, r
13	3.68	347	26	e	2.80	trnk	trnk	none	sl cp, r
14	4.71	343	19	e	~5	trnk	cov	none	sl cp, r

END

Data from around corner from SL L10 at a face oriented 220/56. Fractures subparallel to foliation (300/72). Clusters of fractures up to 2m wide with short TL's, spacing ~ 20 to 30 cm

129	89	sw	~1
120	88	sw	~1
130	86	sw	~1
132	87	sw	~1

END

LAMBERT OUTCROPS

LOCATION: 4381241 North, 474727 East (39 34 56.63 North Latitude, 105 17 39.41 West Longitude)
 ELEVATION: 7670 Feet

SCAN LINE NUMBER: **SL LAMBERT 1**
 PHYSICAL LOCATION: Lambert Outcrops; N. Turkey Creek Rd, E. of Marshdale; NW sect. of road-cut
 SCAN LINE ORIENT: 10/150
 FACE ORIENT: 000/00?
 MEASUREMENT DIR: NE to SW
 LITHOLOGY: FLO-QTZ-BIOT-GNEISS (Xm?) locally migmatitic, local intrusions of sills/dikes of Ysp
 FIELD BOOK / PAGE: 2 / 8

DATE and TIME OUT: 10.20.99 9:00am to 7:30pm
 MEASURER: JSC
 RECORDER: ST
 COMMENTS / NOTES: See sketch in book 2 p. 10; ? May not be representative of migmatites
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	ne	sw		
1	0.00	(avg) 043	77	se	est 4.0	cov	cov	none	sl cp, r; tends to twist/chng dir. NW bound of joint zone
2	0.16	039	78	se	1.74	cov	termination	none	sl cp, r
3	0.28	037	79	se	5.66	cov	cov	none	cp, r; SE bound of joint zone above; fol 304/66 NE
4	0.75	337	40	ne	0.72	tip	tip	none	cp, r; fol sub- , expresses pygmatic folding
5	1.29	042	76	se	4.95	tip	tip	none	sl cp, r; segmented sim. to that in silver plume--stepping, NE termination tips into parallel step
6	1.57	044	75	se	1.58	trnk	tip	none	sl cp, r; trunks into 7)
7	1.60	039	80	se	4.84	trnk 'J'	tip	none	sl cp, r
8	2.76	048	81	se	1.30	tip	tip	none	sl cp, r; schmutzy, stpd at tips, hydrologically unimportant?
9	3.00	022	77	se	0.66	tip	trnk	none	sl cp, r
10	3.03	043	80	se	4.98	tip	tip	none	sl cp, r; NE tips into step
11	3.53	046	86	se	2.11	trnk	tip	none	sl cp, r; smooth/good orientation
12	3.64	044	78	se	est 6.0	tip	cov	none	sl cp, r; weath
13	3.95	048	84	se	1.35	tip splay	trnk	none	---trunks into 12)
14	3.95	352	34	e	0.67	trnk	trnk	none	cp, r, <1mm; fol
15	4.29	054	76	se	0.86	tip	trnk	none	sl cp, r
16	4.31	050	88	se	1.34	tip	tip	none	sl cp, r
17	4.39	046	86	se	0.95	trnk 'J'	trnk	none	sl cp, r
18	4.41	049	86	se	1.74	trnk 'J'	tip	none	sl cp, r
19	4.46	053	88	se	3.43	tip	tip	none	sl cp, r
20	5.43	051	86	se	4.44	tip	trnk	none	sl cp, r; sm edge shows twist, 'J', grain scale r
21	5.51	054	86	se	est 2.0	tip	tip	none	sl cp, r
22	5.59	ave 032	82	se	avg 0.4	tip	cov	none	sl cp, r; a step fracture, see diagram book 2, pg. 10
23	5.83	053	84	se	est 2.0	sp	cov	none	sl cp, r
24	5.89	-050	82	se	est 1.5	cov	cov	none	sl cp, r; twists quite a bit
25	6.12	040	84	se	3.50	cov	tip	none	sl cp, r; part cov termination
26	6.23	040	80	se	est 3.6	cov	tip	none	sl cp, r
27	6.23	343	26	e	1.70	trnk	cov	none	sl cp, r; fol
28	6.73	046	82	se	2.15	tip	trnk	none	sl cp, r
29	6.80	050	78	se	3.80	tip stpd	trnk	none	sl cp; sl sm
30	6.89	046	80	se	2.75	tip	tip	none	sl cp, r

PAUSED AT 7.0m

SCAN LINE NUMBER: **SL LAMBERT 1, cont'd**
 PHYSICAL LOCATION: Lambert outcrops, N. Turkey Creek Rd, E. of Marshdale
 SCAN LINE ORIENT: 10/150
 FACE ORIENT:
 MEASUREMENT DIR: TOP to BOT
 LITHOLOGY: FLO-QTZ-BIOT-GNEISS, locally migmatitic, local int of sills/dikes of Ysp
 FIELD BOOK / PAGE: 2 / 12
 DATE and TIME OUT: 10.21.99 8:00am to 6:15pm
 MEASURER: JSC (recorder from pos 34-43)
 RECORDER: ST (measurer from pos 34-43)
 COMMENTS / NOTES:
 PHOTO(S): R10F4: Taken at 5.59m on SL Lambert 1, looking down on twisting, indicative of rough seen on frac surf
 R10F5: Same position as above, looking at frac face
 R10F6: Picture looking W at Mt. Evans
 R10F7: Looking down at stepping (en-echelon) vert fracs (not matrix metered)
 R10F8: Same as F7, but matrix metered
 R10F9: Looking down at pothole with a NE-SW joint zone, appears evap>>>infil, hardly lost anything in one day
 SAMPLE(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
31	7.77	045	77	se	3.38	tip	tip	none	sl cp, r
32	7.82	045	78	se	4.00	tip	cov	none	sl cp, r; part of small joint zone--W bound
33	8.00	038	80	se	3.50	cov	tip	none	sl cp, r
34	8.65	045	74	se	6.50	tip	tip	none	sl cp, r; (start ST meas, JSC record)
35	8.74	042	84	se	4.00	tip	trnk	none	sl cp, r; weath, "quite twisted", so far <1mm

36	9.76	047	80 se	~ 1.35	trnk	tip	none	sl cp, r
37	10.75	058	88 se	0.40	tip	tip	none	sl cp, r
38	10.22	058	80 se	1.50	tip	tip	none	sl cp, r
	10.22	292	60 n	~ 4.60	cov	cov	fol frac	cp, r; weath
39	10.38	060	90	1.16	tip	tip	none	sl cp, r
40	10.51	062	89 se	1.13	tip	J tip	none	sl cp, r
41	10.96	058	86 se	5.60	cov	tip	none	sl cp, r
42	11.31	057	90	~ 0.6	tip	tip	tiny tiny one	sl cp, r
43	11.37	058	90	0.54	tip	stpd tip	none	sl cp, r; twisters (end ST meas, JSC record)
44	11.46	062	87 se	1.06	trnk	tip	none	sl cp, r
45	11.94	053	87 se	1.65	tip	tip	none	sl cp, r
46	12.07	055	86 se	2.42	tip	tip	none	sl cp, r
47	12.90	174	88 w	4.25	tip	tip	none	sl cp, r; weath
48	13.54	048	76 se	0.97	tip	trnk	none	sl cp, r
49	13.65	048	76 se	1.08	tip	trnk	none	sl cp, r
50	14.17	045	74 se	1.04	tip	tip	none	sl cp, r
51	14.19	039	78 se	2.54	tip	tip	none	sl cp, r

END

SCAN LINE NUMBER: **SL LAMBERT 2**
 PHYSICAL LOCATION: Lambert Outcrops; N. Turkey Creek Rd, E. of Marshdale; NW sect. of road-cut, vert SL E of SL1
 SCAN LINE ORIENT: 200/10
 FACE ORIENT: 200/70W
 MEASUREMENT DIR: N to S
 LITHOLOGY: FLO-QTZ-BIOT-GNEISS (Xm?) locally migmatitic, local intrusions of sills/dikes of Ysp
 FIELD BOOK / PAGE: 2 / 15
 DATE and TIME OUT: 10.21.99 8:00am to 6:15pm
 MEASURER: JSC
 RECORDER: ST
 COMMENTS / NOTES: see notes bk 2 pgs 18-20
 PHOTO(S): R10F10: Looking E at fol fracd face: ? See notes bk 2 pg 18
 R10F11: Looking SSE at another fol || frac face--illustrates frac surf rough, stpd nature, interconnectivity
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
1	0.00	331	78	ne	0.28	tip	tip	none	sl cp, r; <1mm
2	0.30	322	78	ne	1.21	trnk	splay tip	none	sl cp, r
3	0.30	201	24	nw	1.5-2				sl cp; fol frac, spacing ~4cm, commonly lichen covered
4	0.90	326	64	ne	2.14	tip	tip	none	sl cp, r
5	1.21	332	68	ne	0.62	tip	tip	none	sl cp, r
6	2.28	339	76	ne	1.46	splay tip	tip	none	sl cp, r
7	2.57	307	50	ne	1.53	trnk	trnk	none	sl cp, r
8	2.64	326	56	ne	1.68	tip	trnk	none	sl cp, r
9	3.09	281	80	n	0.94	trnk	trnk	none	cp, r
10	3.09	350	12	e	1.4*	trnk	trnk	none	cp, r; *highly weath (gen.) zone, fol frac
11	3.18	311	54	ne	~ 0.9	tip	trnk	none	sl cp, r
12	3.42	323	60	ne	est 5.0	trnk	tip	none	sl cp, r; cuts clearly through QTZ BLOB
13	3.51	330	82	ne	~ 3.9	trnk	tip	none	sl cp, r, stpd
14	3.62	344	82	ne	est 2.0	cov	cov	none	sl cp, r
15	3.96	343	85	ne	~ 3.8	cov	cov	none	sl cp, r
16	4.30	337	86	ne	6.67	tip	tip	none	sl cp, r
17	5.14	248	71	n	2.48	tip	cov	none	sl cp; highly weath
18	6.60	348	22	ne	~ 2.6	trnk	trnk	none	sl cp, r; fol frac
19	7.42	306	86	n	~ 3.5	cov	tip	none	sl cp, r
20	4.64	242	67	nw	2.72	tip	cov	none	sl cp, r; *out of order in position
21	7.59	267	90		1.45	tip	tip	none	sl cp, r
22	7.63	277	86	n	1.34	trnk*	trnk	none	sl cp, r; *into fol frac
23	8.00	327	80	ne	1.35	tip	trnk	none	sl cp, r
24	8.21	331	47	ne	1.84	trnk*	tip	none	sl cp, r; *into fol frac
25	8.40	329	45	ne	0.65	trnk	trnk	none	chausy scwagg fol folded, fol orient 016/10 E
26	8.45	342	52	ne	~ 4.25	cov	cov	none	sl cp, r
27	8.60	320	38	n	~ 4.0	trnk	cov	none	sl cp, r
28	8.69	326	40	ne	1.53	trnk	trnk	none	sl cp, r
29	8.94	336	82	ne	1.53	tip	cov	none	sl cp
30	9.06	338	80	ne	0.94	tip	tip	none	sl cp, r
31	9.46	335	86	ne	3.14	tip	tip	none	sl cp, r

END OF OUTCROP

END

SCAN LINE NUMBER: **SL LAMBERT 3**
 PHYSICAL LOCATION: Lambert Outcrops; N. Turkey Creek Rd, E. of Marshdale; NW sect. of road-cut, vert SL E of SL1
 SCAN LINE ORIENT: 60/232
 FACE ORIENT: 052/82 NE
 MEASUREMENT DIR: N to S
 LITHOLOGY: FLO-QTZ-BIOT-GNEISS (Xm?) locally migmatitic, local intrusions of sills/dikes of Ysp
 FIELD BOOK / PAGE: 2 / 20
 DATE and TIME OUT: 10.21.99 8:00 am to 6:15 pm
 MEASURER: JSC
 RECORDER: ST
 COMMENTS / NOTES: Face is typical of stepping, slightly cv joints, FP=foliation parallel; see diagram book 2, page 22
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
1	0.000	358	47	e	1.20	cov	splay tip	none	sl cp, r, FP; interminationed to fol scale of SL Lambert 2 - dm scale
2	0.095	353	36	e	0.27	tip	tip	none	sl cp, FP
3	0.205	346	36	e	0.87	tip splay	tip	none	sl cp, FP
4	0.300	354	38	e	0.58	tip stpd	tip stpd	none	sl cp, r
5	0.470	321	33	e	0.69	tip splay	tip splay	none	sl cp, r; shear sense indicator, left lateral
6	0.575	348	30	e	0.36	tip	tip	none	sl cp, r
7	0.630	346	26	e	0.15	tip	tip	none	sl cp, r
8	0.755	355	24	e	1.04	* curve	tip stpd	none	sl cp, r; *1.04 tip, 0.31 to curve
9	1.080	346	36	e	1.83	tip	tip	none	sl cp, r
10	1.340	351	36	e	0.67	trnk	tip	none	sl cp, r
11	1.560	347	32	e	0.34	tip	tip	none	sl cp, r

END

NOBEL OUTCROPS

LOCATION: 4382436 North, 476454 East (39 35 35.58 North Latitude, 105 16 27.17 West Longitude)
 ELEVATION: 7640 Feet

SCAN LINE NUMBER: **SL BN 1**
 PHYSICAL LOCATION: Betty Nobel Outcrops: Inclined pavement at northwest end of outcrop in middle of nw end of Ysp outcrop
 SCAN LINE ORIENT: 12/230
 FACE ORIENT: 000/12 inclined pavement
 MEASUREMENT DIR: sw to ne
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1 / 134
 DATE and TIME OUT: 9.30.99 10am to 8pm
 MEASURURE: JSC
 RECORDER: JL
 COMMENTS / NOTES: See sketch in book 1 p. 148. Renumbered from book to exclude off-scanline data points from numbered list; many fractures composed of smaller subsidiary fractures; ~1 cm amplitude, 7-10 cm wavelengths
 PHOTO(S): R9F22: Stepped terminationination typical of Ysp fractures along this scanline.
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	e	w		
1	0.00	120	85	S	1.71	trnk	trnk		pl, r, stepped
2	0.83	119	82	S	1.46	tip	trnk		pl, r, tips to splay
3	0.89	116	80	S	1.47	trnk	tip	fe-stained	pl, r
4	2.19	057	84	E	2.1	tip	trnk		pl, r, near T-junction with #4, possibly older than #4
					3.13	trnk	tip	fe-stained	pl, r, stepped;
					5.12	tip			vertical measurement
5	2.22	180	76	W	1.54	tip	tip	fe-stained	
6	2.51	132	76	W	1.5	tip	tip		
7	2.63	130	87	W	0.77	tip	tip		sl cp, stepped; #7 off splay of #6
8	2.7	183	87	W	2	tip	tip	fe-stained	pl, r, stepped; bottom t ips to splay
9	3.22	185	88	W	4.47	tip	tip	fe-stained	
10	3.78	125	90		4.86	trnk	tip		sl cp, r, stepped
11	4.82	137	90		1.62	tip	trnk		sl cp, r, trnks into T-junction; older than #11
		227	66	W	3.4	tip	tip		
12	5.56	179	86	W	2.89	tip	tip		
13	5.7	146	84	W	4.62	trnk	splay		sl cp, bottom J-splay

14	7.86	150	88 W	4.92 step	cov	
	8.35					contact to Xm
15	12.3	139	88 W	4.2 tip	tip	cp, r, bot tips in Xm; fracture goes through both Ysp and Xm

END OF SCANLINE

SCAN LINE NUMBER: SL BN 2
 PHYSICAL LOCATION: In middle of nw end of Ysp outcrop
 SCAN LINE ORIENT: 00/310
 FACE ORIENT: pavement
 MEASUREMENT DIR: ne to sw
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1, 136
 DATE and TIME OUT: 9/30/99
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES: to capture ne/sw trending fractures; 0.0 at covered section of outcrop
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	n		
1	2.75	228	83	W	3.74	tip	tip		sl cp, r, bottom tips to step
2	4.08	229	74	W	4.1	tip	tip		sl cp, r, top tips to step
3	4.15	220	78	W	1.5	tip	trnk		trnk into #2
4	5.50	185	88	W	4.47	tip	tip	fe-stained	pl, r, same as #10 on SL BN 1
5	5.66	225	75	W	3.3	splay	splay		cp, both splays into steps
6	5.92	227	80	W	4.3	tip	tip		sl cp
7	7.78	226	75	W	2.5	tip	trnk		sl cp, r, tips into step
8	8.04	179	80	W	1.9	tip	tip		sl cp, r
	12.5								outcrop covered

END OF SCANLINE

SCAN LINE NUMBER: SL BN 3
 PHYSICAL LOCATION: ~15 m west of SL BN 1 and SL BN 2
 SCAN LINE ORIENT: horizontal trending 270
 FACE ORIENT: pavement
 MEASUREMENT DIR: w to e
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1, 136
 DATE and TIME OUT: 9/30/99
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES: in qtz-rich sections, fractures are much more prominent in all sets
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
1	0.24	172	80	W	1.1	cov	tip		pl, r
2	0.73	171	82	W	4.8	cov	cov		sl cp, r
3	1.57	116	88	W	2.38	tip	tip		sl cp, r, bottom tips to step
4	2.25	177	80	W	1.58	tip	trnk		sl cp, r, top tips into splay
5	2.34	119	83	W	1.61	cov	tip		sl cp, stepping
6	3.63	175	87	W	1.68	tip	tip	fe-stained	sl cp, stepping; top tips into splay
7	4.25	036	84	E	2.78	tip	tip	fe-stained	sl cp, top tips into splay
8	4.31	179	84	W	2.77	cov	tip		sl cp, stepping; bottom tips to step
9	4.68	181	80	W	2.6	cov	cov		sl cp, stepping
10	4.83	182	76	W	2.44	cov	tip		sl cp, stepping
11	5.27	179	77	W	2.1	cov	tip	fe-stained	sl cp, stepping
12	4.41	179	82	W	1.41	tip	cov		sl cp, stepping; tips into step
13	5.0	295	86	N	2.7	tip	tip		pl, bottom tips to step
14	6.54	181	89	W	2.26	tip	tip	fe-stained	sl cp
15	6.72	183	78	W	2.48	tip	tip	fe-stained	sl cp, bottom tips to splay
16	7.08	325	90		2.35	tip	tip		sl cp
17	7.23	181	78	W	2.87	tip	tip	fe-stained	pl, stepping
18	7.28	180	81	W	1.72	tip	tip	fe-stained	pl
19	8.08	185	79	W	4.67	tip	tip		sl cp
20	8.12	184	81	W	2.7	trnk	trnk	fe-stained	sl cp, r, stepping; top trnks into #19

21	8.44	179	77 W	2.84 tip	tip	sl cp,r
22	8.46	183	76 W	2.79 tip	tip	sl cp, r, bottom tips to step
23	8.87	179	84 W	3.5 cov	cov	sl cp, r, bottom terminations in step?
24	9.67	178	73 W	8.9 cov	tip	sl cp, r, stepping

END OF SCANLINE

SCAN LINE NUMBER: SL BN 4
 PHYSICAL LOCATION: Along a major joint set
 SCAN LINE ORIENT: 00/043
 FACE ORIENT: vertical
 MEASUREMENT DIR: sw to ne
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1, 139
 DATE and TIME OUT: 10/12/99
 MEASUREMENT: JSC
 RECORDER: ST, MH
 COMMENTS / NOTES:
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
1	0.00	149	74	SW	1.04	tip	tip		sl cp,r
2	1.33	134	80	SW	1.37	trnk	tip		divides into a Y at top; Y caused by a step
3	1.92	150	76	SW	2.64	cov	tip		sl cp,r, tracelength measured vertically; horizontal aspect cov
4	4.6	120	67	SW	3.18	cov	trnk		cp, r, tracelength measured vertically; horizontal aspect cov
	4.6	152	57	SW	0.9	trnk	tip		tracelength measured vertically; horizontal aspect covered; trnks into a step; average tracelength ~0.5 m; 5 fractures between 4a and 4b; may be surface feature; same average orientation as #5
5	5.46	323	62	NE	1.94	cov	trnk		sl cp,r, tracelength measured to trnk; projected onto scanline
6	8.38	151	80	SW	3.0	cov	tip		sl cp, jnt zn? Weathered, >1mm; measured vertically
7	8.55	173	82	W	1.1	tip	tip		r, steps; at least 4 other fractures in zone; top tips to dike
					1.23	tip			measured horizontally; tips to step
8	8.9	164	80	W	2.34	tip	tip	fe-stained	sl cp, r, <1mm
9	10.43	155	80	W	1.57	tip	tip		sl cp, <1mm; top tips to step
10	11.84	310	44	N	1.83	tip	tip		cp, r, <1mm; weathered
11	14.0	125	60	SW	0.77	tip	tip		sl cp, r, <1mm

END OF SCANLINE

SCAN LINE NUMBER: SL BN 5
 PHYSICAL LOCATION: Same block as SLBN04
 SCAN LINE ORIENT: ~30/138
 FACE ORIENT: inclined; 007/32 E
 MEASUREMENT DIR: se to nw
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1, 142
 DATE and TIME OUT: 10/13/99
 MEASUREMENT: JSC
 RECORDER: ST
 COMMENTS / NOTES: starting at jnt zn of SL BN 4 (~8 - 8.5m); 1st fracture is face of SL BN 4 (not recorded)
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	sw	ne		
1	1.29	045	86	SE	2.04	tip	tip		sl cp, r, <1mm; both tips to splays
2	2.59	047	90		2.62	tip	tip		sl cp, r, <1mm
3	3.23	017	84	E	0.8	tip	tip		sl cp, r, <1mm
4	3.39	005	88	E	0.94	tip	tip		cp, r, #3 and 4 are more cp than #1 and 2
5	3.58	116	66	S	4.3	tip	tip	fe-stained	sl cp, r, <1mm
6	3.8	044	86	E	5.53	tip	tip		sl cp, r, <1mm; top tips into splay
7	4.23	043	84	SE	5.46	trnk	tip		sl cp, r, weathered, part covered, <1mm
8	4.53	043	88	SE	1.42	tip	tip		sl cp, r, both tips into splays
9	4.62	044	90		9.73	tip	tip		sl cp, r, part covered; top tips into splay
10	5.38	227	90		6.65	cov	tip		sl cp, r
11	5.59	235	84	NW	2.53	tip	tip		sl cp, r, bottom tips into splay

12	5.71	048	90	1.21 tip	tip		sl cp, r
13	5.89	233	86 NW	3.12 tip	trnk		sl cp, r
14	6.49	228	86 NW	4.35 tip	tip		sl cp, r, <1mm; part covered; tip measured mid-way under cov
15	7.23	227	90	5.0 tip	tip		sl cp, r, <1mm; start of jint zn; bottom designated a cov tip
16	7.47	224	85 NW	8.5 tip	trnk	fe-stained	sl cp, r, <1mm; part covered at 5m; min 5m max 8.5 m
17	7.54	226	88 NW	1.68 tip	tip		sl cp, r, <1mm; top tips into splay
18	9.94						

END OF SCANLINE

SCAN LINE NUMBER: **SL BN 6**
 PHYSICAL LOCATION: Same block as SLBN04 and SLBN05; se corner of n block
 SCAN LINE ORIENT: 65/202
 FACE ORIENT: 102/65w
 MEASUREMENT DIR: w to e
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1, 144
 DATE and TIME OUT: 10/13/99
 MEASUREMENT: JSC
 RECORDER: ST
 COMMENTS / NOTES: to capture semi-horizontal fracture set; weathering phenomena?; fractures are probably not more than 3m?
 PHOTO(S): R10F2; picture of vertical scanline; this photo is sw corner of north block
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	w	e		
1	0.61	303	27	NE	1.41	tip	tip		sl cp, r, about grain-scale; several mm; (<1mm)
2	1.23	308	42	NE	1.28	tip	trnk	fe-stained	sl cp, r, about grain-scale; several mm; (<1mm)
3	1.36	308	41	NE	2.74	tip	cov	fe-stained	sl cp, r, about grain-scale; several mm; (<1mm); cov at end OC
4	2.47	305	44	NE	1.89	tip	cov	too weathered?	sl cp, r, about grain-scale; several mm; (<1mm); cov at end OC
5	3.06	295	32	N	1.24	trnk	cov	too weathered?	sl cp, r, about grain-scale; several mm; (<1mm); cov at end OC
6	3.24	343	32	N	0.82	tip	cov		sl cp, r, about grain-scale; several mm; (<1mm); cov at end OC
7	3.64	346	24	E	1.9	trnk	cov		sl cp, r, about grain-scale; several mm; (<1mm); cov at end OC

END OF SCANLINE

SCAN LINE NUMBER: **SL BN 7**
 PHYSICAL LOCATION: On ne corner of detached block of north block
 SCAN LINE ORIENT: vertical
 FACE ORIENT: 330/90
 MEASUREMENT DIR: nw to se
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1, 146
 DATE and TIME OUT: 10/13/99
 MEASUREMENT: JSC
 RECORDER: ST
 COMMENTS / NOTES: very weak foliation (sub-parallel to fractures that might control fracture orientation; might be exfoliation due to short tracelength, sub-parallel to foliation, and trnkates on joints
 PHOTO(S):

1	0.33	303	27	NE	1.18 tip	cov		sl cp,r , <1mm
2	1.91	296	32	N	2.73 tip	tip		sl cp,r , <1mm
3	1.91	348	28	E	1.72 trnk	tip		sl cp,r , <1mm, trnk against #2
4	2.64	312	36	NE	2.0 cov	cov		cp, <1mm; weathered
5	3.12	288	22	NE	2.33 tip	trnk		sl cp,r , <1mm
6	3.86	297	32	NE	2.97 tip	trnk		sl cp,r , <1mm
7	4.44	274	32	N	>5 tip	trnk		cp, trnks vert crack at 2.68m; orient 043/90; cuts through peg
8	5.27	327	37	N	2.4 tip	trnk		sl cp,r , <1mm; trnks against same crack as in #7
9	6.0	318	18	N	2.27 trnk	trnk		sl cp,r , <1mm; top trnk at crack orient 046/88SE
10	7.6							top of outcrop

END OF SCANLINE

SCAN LINE NUMBER: **SL BN 8**
 PHYSICAL LOCATION: Betty Nobel north outcrop (North Turkey Creek Road)
 SCAN LINE ORIENT: subhorizontal; 10/140, 320/140; body height
 FACE ORIENT: 140/72 SW

MEASUREMENT DIR: nw to se
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1, 148
 DATE and TIME OUT: 10/14/99
 MEASUREMENT: JSC
 RECORDER: ST
 COMMENTS / NOTES: ~3mm sized grains; at ~8.45m, weathered channel in face (no crack at scanline level, but visible crack above) ~30 cm wide; small apparently unconnected fracture
 PHOTO(S): R10F3-at 10.48 - branching nature of these fractures, looking ne; at ~8.45m, weathered channel in face (no crack at scanline level, but visible crack above) ~30 cm wide; small apparently unconnected fracture
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	sw	ne		
1	0.00	261	81	N	0.8	tip	tip		sl cp, r, <1mm
2	0.69	031	76	E	2.54	trnk	tip		cp, r, <1mm; wavelength of cp plane ~20 cm; A ~1cm
3	0.9	059	70	SE	0.89	tip	trnk		cp, r, <1mm
4	2.58	000	32	E	5.6	tip	tip		cp, r, >1mm, at times <1mm also; cm-sized grain
5	3.78	232	60	NW	4	tip	tip		cp, r, cp wavelength ~5 dm; A~2 dm
6	4.32	258	20	N	1.74	tip	tip		sl cp, <1mm
7	4.74	012	66	E	0.34	trnk	trnk		sl cp, r
8	9.88	010	74	E	1.58	tip	cov	veg	sl cp, weathered
step scanline up 1 m at 10 m									
9	10.62	039	84	SE	2.55	trnk	tip		same scanline orientation
10	10.79	180	84	W	0.63	trnk	tip		sl cp, r, beginning of joint zone
11	10.91	202	82	NW	2.38	tip	tip		sl cp, r, <1mm
12	10.96	002	59	E	0.88	trnk	trnk		sl cp, r, <1mm
13	10.98	228	85	W	1.29	tip	tip		sl cp, stepping
14	11.08	233	88	NW	0.93	tip	tip		sl cp, r, <1mm
15	11.28	024	60	SE	1.88	tip	trnk		sl cp, r, <1mm
16	11.37	227	89	NW	0.74	tip	tip		sl cp, r, <1mm
17	11.44	192	80	N	6.0	splay	cov		sl cp, r, splay was actually documented as a branch
18	11.7	050	87	SE	2.32	tip	cov		sl cp, r, <1mm
19	12	357	68	E	0.97	trnk	tip		sl cp, r, <1mm
20	12.48	044	86	SE	3.73	tip	cov		sl cp, <1mm
21	12.77	048	88	SE	0.74	tip	tip		sl cp, r, <1mm
22	12.78	041	86	SE	0.65	trnk	tip		sl cp, r, <1mm; trnk into #21
23	12.96	043	88	SE	2.52	tip	tip		sl cp, r, <1mm
24	13.03	046	87	SE	1.04	trnk	cov		sl cp, r, <1mm
25	13.08	043	89	SE	4.0	tip	cov		sl cp, r, <1mm
26	13.13	048	84	SE	0.86	tip	cov		sl cp, r, <1mm
27	13.2	225	88	NW	0.42	tip	cov		sl cp, r, <1mm; end of jnt zn
28	14.42								

END OF SCANLINE

SCAN LINE NUMBER: SL BN 9
 PHYSICAL LOCATION:
 SCAN LINE ORIENT: 00/050; 230/50 horizontal
 FACE ORIENT: uneven, near vertical face
 MEASUREMENT DIR:
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1, 153
 DATE and TIME OUT: 10/14/99
 MEASUREMENT: JSC
 RECORDER: ST
 COMMENTS / NOTES: NW end is edge of crack
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	nw	se		
1	2.23	354	36	E	4.0	cov	cov		cp, r, <1mm; wavelength ~10's cm, amplitude ~ few cm
2	3.28	197	50	W	1.24	tip	tip		sl cp, r, <1mm
3	4.15	326	81	NE	0.79	tip	trnk		sl cp, r, <1mm; trnk branches
4	4.24	124	70	SW	2.17	tip	tip		sl cp, r, <1mm
5	6.49	077	78	S	1.27	trnk	tip		sl cp, r, <1mm
6	6.42	221	32	NW	1.22	trnk	tip		sl cp, r, stepping
7	5.29	000	66	E	6.0	cov	cov		sl cp, r, weathered, >1mm
8	6.70	308	34	NE	4.0	trnk	cov		cp, r, bottom surface of dike

9	6.95	148	84 W	6.0 cov	trnk	fe-stained	sl cp, r, <1mm
10	7.25	141	82 W	6.0 cov	trnk		sl cp, r, <1mm; trnks into dike in #8
11	8.64	168	72 W	0.9 trnk	tip		sl cp, r, <1mm
12	8.74	170	72 W	1.22 trnk	trnk		sl cp, r, <1mm; bottom trnks into dike
13	8.91	130	80 W	5.0 trnk	tip		sl cp, r, <1mm; tips at step
14	10.12	136	78 W	1.81 tip	tip		sl cp, r, <1mm; bottom tip splays out to east
15	10.62	147	76 W	0.62 tip	tip		sl cp, r, <1mm
16	10.97	140	79 SW	2.77 tip	cov		sl cp, r, <1mm
17	11.01	144	83 SW	0.94 trnk	tip		sl cp, r, <1mm
18	11.03	152	80 SW	0.63 tip	tip		sl cp, r, <1mm
19	11.17	154	82 SW	2.72 tip	tip		sl cp, r, <1mm
20	11.31	150	81 SW	1.58 tip	tip		sl cp, r, <1mm
21	14.83	153	86 SW	1.24 tip	cov		sl cp, r, <1mm
22	16.76	153	82 SW	2.34 tip	tip	fe-stained	sl cp, r, <1mm; west margin of jnt zn; intersect w another frac which is heavily fe-stained

END OF SCANLINE

SCAN LINE NUMBER: **SL BN 10**
 PHYSICAL LOCATION:
 SCAN LINE ORIENT: vertical scanline; 70/220
 FACE ORIENT: 130/70 SW (roughly)
 MEASUREMENT DIR: bottom to top
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1, 156
 DATE and TIME OUT: 10/14/99
 MEASUREMENT: JSC
 RECORDER: ST
 COMMENTS / NOTES: to capture sub-horizontal fracture set
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient		termination			min	notes
		strike	dip dir	TL (m)	nw	se		
1	0.84	334	36 NE	0.75	tip	tip		cp, r, <1mm
2	2.14	307	24 NE	1.2	tip	tip		cp, r, <1mm
3	9.4	324	16 NE	3.1	tip	tip		sl cp, r, <1mm
4	12.21	128	07 SW	7	trnk	cov		cp, r, <1mm; top trnks at dike
5	13.17	332	34 NE	1.66	tip	tip		sl cp, r, <1mm
6	17.1	313	28 NE	1.8	tip	tip		cp, r, <1mm
7	17.88	304	02 NE	1.9	tip	tip		sl cp, r, <1mm
8	21.0	284	08 NE	4.23	tip	tip		sl cp, <1mm
9	21.27	285	11 NE	4.5	tip	tip		sl cp, <1mm; just barely on scanline
10	25.0							top of outcrop

END OF SCANLINE

HARRINGTON OUTCROPS

LOCATION: 4377998 North, 475793 East (39 33 11.54 North Latitude, 105 16 54.32 West Longitude)
 ELEVATION: 8240 Feet

SCAN LINE NUMBER: **SL H 1**
 PHYSICAL LOCATION: Berrian Mt. On first band of cliffs(e-w trend), on side of bands
 SCAN LINE ORIENT: 00/309
 FACE ORIENT: ~309/80N
 MEASUREMENT DIR: e to w
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 65
 DATE and TIME OUT:
 MEASUREMENT: JSC
 RECORDER: ST
 COMMENTS / NOTES:
 PHOTO(S): R8NF4

num	postion (m)	orient		termination			min	notes
		strike	dip dir	TL (m)	nw	se		
1	0.00	034	90	>10	cov	cov		edge of outcrop; jnt zn
2	0.25	024	87 E	1.7	tip	tip		pl, smooth, mode 1 (?)
3	1.88	042	86 E	1.77	tip	cov		pl, r
4	2.25	034	89 E	1.4	tip	tip		pl, r, steps into other fracs off sl; <1mm, mode 1:1.72m is

								outcrop face height
5	4.58	032	87 E	1.72 v	trnk	cov		pl, r
				8.4 h	tip			
6	4.67	028	87 E	1.35 v		cov		pl, r
				0.9 h	tip			
7	6.15	030	86 E	1.6 v	trnk	cov		pl, r, stepping
				1.9 h				
n/a	trnk frac from 7	308	90	n/a	n/a	n/a		off scanline
8	6.36	034	84 E	0.9	tip	tip		pl, <1mm, stepping zone
9	6.98	026	80 E	1.4 v	tip	tip		pl, r
				9.0 h				
10	7.12	031	83 E	1.55 v		cov		pl, r
				1.5 h	tip			
11	8.43	022	82 E	1.5	cov	tip		pl, r
12	9.04	025	82 E	2	cov	cov		pl, jnt zn
13	9.29	019	85 E	1.6	cov	cov	Fe stain	pl, jnt zn
14	9.35	025	79 E	1	cov	trnk by #13		pl, jnt zn
15	9.4	029	80 E	2.2	cov	cov		pl, jnt zn
16	11.36	042	44 E	n/a	n/a	n/a		cp, coarse-grained, pegmatite dike
n/a	2m below #16	284	10 N	10.3	tip (east) @tip (west)			off scanline; often horizontal: >3mm aperture
17	14.2	192	72 W	0.96	tip	tip		cp, r
18	15.52	039	83 E	2 v	tip	trnk		pl, r, jnt zn
				14.4 h				
19	15.9	035	87 E	~3 v	trnk (top o	cov		pl, r, jnt zn; no evidence of displacement
				14.4 h				
20	15.97	034	85 E	~3 v	trnk	cov		pl, r, jnt zn; no evidence of displacement
				14.4 h				
21	16.36	036	80 E	1.8	tip	tip		cp, r
								dropped scanline down; vertical face with vertical fracture
22	16.6	038	85 E	1.56	tip	cov		cp, >1mm aperture
23	16.83	040	86 E	2.25	tip	tip		cp
24	17.24	207	90	1.8	tip	tip		cp, cuts across exfoliation noted after #16
25	17.31	021	90	3.25	tip	tip		cp, r, >1 mm ap; cuts across exfol noted after #16; bot tip shows several strands of parallel fractures at mm scale
26	17.76	315	12 S	1.2	tip (east)	tip (west)		cp, r, <1 mm aperture
27	18.22	023	82 E	1.2	tip	tip		cp, r, <1 mm aperture
28	18.34	022	82 E	1.49	tip	tip		cp, r, <1 mm aperture
29	18.48	018	90	3.5 v	tip	cov		pl, r
				6.9 h		tip		
30	18.59	030	84 E	1.2	cov	tip		cp
31	18.95	021	84 E	2.3	tip	tip		cp, r, cuts exfoliation noted after #16
32	19.39	036	81 E	2.7	tip	tip		cp, r, cuts exfoliation noted after #16
33	20.05	010	85 E	5 v	tip	cov	Fe stain	anastomosing; west edge of jnt zn
				10.8 h				
34	20.05	315	90	1.8	tip	cov	Fe stain	
35	20.05	062	24 E	1	cov (north)	tip (south)		possible vein - lots of biotite
36	20.1	020	84 E	0.81	tip	tip	weak Fe stain	cp, <1 mm aperture
37	20.16	020	86 E	3.5	tip	cov	weak Fe stain	cp, <1 mm aperture
38	20.22	022	86 E	2	tip	splay		cp, <1 mm aperture; splays into #37 on top
39	20.49	313	80 N	1.9	tip	tip		cp, <1 mm aperture
	20.49	038	90	0.9	tip	tip		cp, <1 mm aperture
40	20.68	033	80 E	1.57	tip	tip		pl, r walled
41	20.98	220	80 W	1.5	cov	trnk		cp, >1 mm aperture
	20.98	048	70 S	2.7	tip	cov		pl, vr, intersec of 2 sets at 20.98; weathered, many splayed cracks going into and out of; > 1 mm
42	21.16	039	82 E	2.1	tip	cov		cp, >1 mm aperture; splays into #41; highly weathered
43	21.28	038	78 E	2.65	trnk (#41)	trnk (#42)		cp, highly weathered
44	21.43	038	73 E	2	cov	trnk (#43)		cp, <1 mm aperture; splayed at bottom
	24.4 n/a		n/a	n/a	n/a	n/a		end of outcrop

END

SCAN LINE NUMBER: SL H 2
 PHYSICAL LOCATION: Berrian Mt. On first band of cliffs(e-w trend), on side of bands
 SCAN LINE ORIENT: vertical line perpendicular to SLH01 to capture exfoliation
 FACE ORIENT: ~309/80N
 MEASUREMENT DIR: bottom to top - note position 1
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 73

DATE and TIME OUT:
 MEASURURE: JSC
 RECORDER: JL
 COMMENTS / NOTES:
 PHOTO(S):

num	postion (m)	orient			termination			notes
		strike	dip	dir	TL (m)	top	bot (southmin	
2	0.9	210	10	N	5.1	cov	trnk	cp, bottom of scanline; now going up
3	1.5	225	5	N	3.8	trnk	trnk	highly curved surface
4	2.15	232	13	N	7	cov	step	carb salt precip
1	3.60	246	15	N	4.4	trnk	trnk	highly cp, trnk by open space; top of scanline

END

SCAN LINE NUMBER: SL H 3
 PHYSICAL LOCATION: Berrian Mt. On first band of cliffs(e-w trend), on side of bands
 SCAN LINE ORIENT: horizontal SL starting at N-end of #4 on SLH02
 FACE ORIENT: ~309/80N
 MEASUREMENT DIR: 040 to 220
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 74
 DATE and TIME OUT:
 MEASURURE: JSC
 RECORDER: JL
 COMMENTS / NOTES: SLH03 same outcrop as SLH01, on W end from N to S
 PHOTO(S): R8NF7, R8NF8, R8NF9 panorama N to S of SLH3

num	postion (m)	orient			termination			notes
		strike	dip	dir	TL (m)	top	bot min	
1	1.9	124	76	S	2.84	cov (open)	cov	pl, r
2	3.45	121	79	S	2.32	trnk	cov	pp, r, trnk on #4 SLH2
3	5.95	116	77	S	0.84	tip	tip	cp, r
4	7.35	120	77	S	3.2	cov	cov	pl, r
5	7.85	118	75	S	2.0	cov	trnk	pl, r
6	8.35	115	84	S	2.0	v cov	cov	pl, r
					5.55	h		
7	11.23	120	87	S	3.3	v cov (open)	cov	pl, r
					4.5	h		
	19	120	87	S				possible joint at end of outcrop

END

SCAN LINE NUMBER: SL H 4
 PHYSICAL LOCATION: Berrian Mt. On first band of cliffs(e-w trend), on side of bands
 SCAN LINE ORIENT: vertical scanline at 14.5 m along SLH03
 FACE ORIENT: ~309/80N
 MEASUREMENT DIR: bottom to top at 3.9 m
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 75
 DATE and TIME OUT:
 MEASURURE: JSC
 RECORDER: JL
 COMMENTS / NOTES: all exfoliation?
 PHOTO(S): R8NF10 Looking W of Xm inclusion in Ysp with near vertical E-W trending fracture set cutting through both

num	postion (m)	orient			termination			notes
		strike	dip	dir	TL (m)	top	bot min	
1	0.3	027	22	W	5.0	tip	cov	highly cp
2	0.85	310	48	N	2.55	cov	cov	cp
3	1.4	294	25	N	2.2	splay (into	tip	cp
4	1.88	235	12	N	9.3	cov	trnk	highly cp
5	1.68	174	16	E	9.3	cov	trnk	highly cp, below #4

END

SCAN LINE NUMBER: SL H 5
 PHYSICAL LOCATION: Berrian Mt. On first band of cliffs(e-w trend), on side of bands
 SCAN LINE ORIENT: inclined SL following trend of joint along 040
 FACE ORIENT: avg angle of OC face 20°

MEASUREMENT DIR: NE to SW, begin at N end of outcrop
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 77
 DATE and TIME OUT: 9/21/99
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES: strike and dip of big 'scanline' fracture 042/90
 PHOTO(S):

num	postion (m)	orient			TL (m)	termination			notes
		strike	dip	dir		top	(west)bot	(east) min	
1	0.00	135	85	S	3.0	trnk	(splay?)trnk		<1 mm
2	0.82	268	74	N	0.6	cov	trnk		cp, <1 mm
3	1.50	124	83	S	0.9	trnk	cov	Fe stained	cp, <1 mm; trnkates on SL-fracture
4	1.48	326	85	N	1.1	tip	cov		cp,
5	2.60	146	80	S	4.5	trnk	cov		cp, <1 mm
6	2.99	304	84	N	1.54	trnk	cov		cp, r, <1 mm
7	3.50	290	80	N	1.8	cov	tip		cp, <1 mm
8	3.85	305	85	N	2.4	trnk	cov		cp, <1 mm
9	4.00	149	80	S	2.5	trnk	cov		cp, r, trnk into #8
10	4.10	139	77	S	2.6	cov	cov		cp,
11	4.84	266	74	N	1.3	trnk	trnk		cp,
12	4.98	135	82	S	2.2	trnk	cov		cp,
13	5.60	296	74	N	5.45	cov	cov		cp, stepping
14	5.93	300	68	N	3.3	cov	cov		cp,
15	6.20	297	86	N	2.2	tip	trnk		cp,
16	6.86	294	86	N	1.8	cov	trnk		cp,
17	8.91	289	78	N	2	trnk	cov		cp, smooth,
18	9.41	298	66	N	1.5	cov	cov		frac is offset rt. Lat. Along 031/90 by 3mm; E/W frac's first
19	10.30	272	74	N	1.6	cov	tip		

END

SCAN LINE NUMBER: **SL H 6**
 PHYSICAL LOCATION: Barrien Mt - M. Harrington's Property
 SCAN LINE ORIENT: near vertical
 FACE ORIENT: 034/near vertical
 MEASUREMENT DIR: top to bottom
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 79
 DATE and TIME OUT: 9/22/99
 MEASUREMENT: JSC
 RECORDER: JL, ST
 COMMENTS / NOTES: along joint zone
 PHOTO(S): R8NF12 characteristics of SLH06

num	postion (m)	orient			TL (m)	termination			type
		strike	dip	dir		top	bot	min	
1	0.00	277	73	N	1.1	tip	tip		cp
2	0.26	295	71	N	0.7	tip	tip		pl, multi-stepping splays; <1mm aperture
3	1.08	289	75	N	2.4	tip	cov		pl, <1mm aperture
4	1.4	309	85	N	0.6	tip	tip		cp, this fracture is poor
5	1.76	294	74	N	2.1	tip	cov		pl, r, <1mm aperture
6	2.38	289	78	N	2.9	tip	cov		pl
7	2.88	324	84	N	0.9	tip	trnk		pl, r, <1mm aperture
8	3.62	278	80	N	2	tip	cov		pl, r, splay off it
9	4.22	292	70	N	3.4 v	cov	cov		pl, little steps; <1mm aperture
					2.6 h				
10	4.47	297	72	N	1.94	tip	tip		pl, little steps; <1mm aperture
11	4.12	157	17	W	2.3	tip (south)	tip (north)		subhoriz, exfoliation; <1mm aperture
12	4.78	295	73	N	1.85	tip	cov		pl, r, L. stpd; <1mm aperture; possibly offset in vert. sense?
13	5.11	288	71	N	4.1 v	cov	tip (rt. Step)		
					2.8 h		tip		
14	5.4	275	75	N	2.85	tip	tip		pl, r, stepped; <1mm aperture
15	6.1	296	73	N	5.8 v	cov	cov		pl, <1mm
					2.0 h				
16	6.51	291	83	N	1.32	tip	cov		pl, stepping; <1mm
17	6.87	286	76	N	3.1	tip	tip		cp, r, stepping; <1mm
18	7	291	75	N	3.4	tip	tip		sl cp, r,
19	7.8	294	80	N	1.46	tip	cov		pl, <1mm

20	8.16	306	84	N	1.4	tip	tip	cp, r, <1mm
21	8.93	125	59	S	1.1	tip	tip	pl, <1mm
22	9.25	294	76	N	1.27	trnk	cov	sl cp, r, <1mm
23	10.31	314	86	N	1.6	tip	cov	irreg. And stepping
24	10.67	285	77	N	1.9	tip	cov	pl to sl cp, r, <1mm
	12.40							end of outcrop

END

SCAN LINE NUMBER: SL H 7
 PHYSICAL LOCATION: Barrien Mt - M. Harrington's Property
 SCAN LINE ORIENT: near vertical
 FACE ORIENT: 034/near vertical
 MEASUREMENT DIR: bottom to top
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 81
 DATE and TIME OUT: 9/22/99
 MEASUREMENT: JSC
 RECORDER: JL, ST
 COMMENTS / NOTES: same face as SLH06; probable exfoliation features
 PHOTO(S): R8NF11 looking W at SLH07

num	postion (m)	orient		dip	dir	TL (m)	termination		notes
		strike					top	bot (southmin)	
1	0.75	161	10	W		4.4	cov	tip	cp, >1mm
2	2.9	190	12	W		3	tip	termination	cp, splays into upward diagonal
3	4.1	140	16	W		4.5	tip	termination	cp, termination into splay

END

SCAN LINE NUMBER: SL H 8
 PHYSICAL LOCATION: Barrien Mt - M. Harrington's Property
 SCAN LINE ORIENT: near vertical
 FACE ORIENT: 034/near vertical
 MEASUREMENT DIR: bottom to top
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 82
 DATE and TIME OUT: 9/22/99
 MEASUREMENT: JSC
 RECORDER: JL, ST
 COMMENTS / NOTES: same face as SLH06; probable exfoliation features; at 7.2m from 0.0 of SLH06
 PHOTO(S): R8NF13 looking W at SLH08

num	postion (m)	orient		dip	dir	TL (m)	termination		notes
		strike					top	bot (southmin)	
1	0.40	108	06	S		3.0	tip	tip	cp
2	1.75	147	08	S		4	trnk	tip	cp, non-exfolial
3	3	250	06	N		2.1	tip	tip	cp, strike averaged and eyeballed
4	4.3	250	06	N		2.4	trnk	trnk	cp

END

SCAN LINE NUMBER: SL H 9
 PHYSICAL LOCATION: Barrien Mt - M. Harrington's Property
 SCAN LINE ORIENT: trending 135° and inclined 15° to E
 FACE ORIENT: S-sloping face
 MEASUREMENT DIR: W to E
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 84
 DATE and TIME OUT: 9/22/99
 MEASUREMENT: JSC
 RECORDER: JL, ST
 COMMENTS / NOTES: measured by ST, recorded by JL; TL est as measured along slope of outcrop (~20° down to south); fractures cut cm-scale fsp grains
 PHOTO(S):

num	postion (m)	orient		dip	dir	TL (m)	termination		type
		strike					top	bot (southmin)	
1	0.00	038	083	E		10.3	tip	tip	pl, r
2	0.28	046	86	E		12	tip	cov	pl, r, TL extended past cov to tip

3	1.9	036	87 E	4 cov	cov	cp, r, stepping
4	2.44	032	85 E	2.5 cov	tip	cp, r
5	2.52	049	89 E	2.43 cov	tip	cp, r, converges with #4
6	2.65	044	79 E	2.4 cov	tip	sl cp, r
7	2.85	047	90	6.9 tip	trnk	sl cp, stepping
8	3.28	048	90	9 cov	cov	cp, r, stepping
9	3.7	047	89 E	2.1 cov	tip	cp, r
10	4.02	039	90	1.8 cov	tip	sl cp, r
11	4.2	035	74 E	2.8 tip	cov	cp, r, surface weathered
12	4.6	044	84 E	2.6 tip	trnk	pl, r, stepping; trnk by perpendicular fracture
13	4.88	040	79 E	3.2 cov	trnk	pl, r, stepped
14	5.28	040	86 E	3.3 cov	cov	cp, r
15	5.53	035	79 E	4.1 cov	cov	cp, stepped
16	5.62	046	89 E	0.6 cov	trnk	pl, stepped; trnk against #15
17	5.76	195	78 W	2.5 h cov	trnk	pl, r, weathered
				0.6 v	cov	
18	7.07	037	90	2.6 h cov	tip	pl, r, stepped
				0.8 v		
19	7.42	037	87 E	3.5 h tip	cov	cp, stepped; part of fracture zone
				0.4 v		
20	7.52	038	90	1 trnk	tip	cp, stepping; trnk by #21; in frac zone
21	7.55	036	89 E	2 tip	tip	cp, r, in fracture zone
22	11.85	036	70 E	1.9 tip	tip	cp, stepping
23	17.65	185	83 W	3 tip	tip	cp, stepping

Fe-stained

END

SCAN LINE NUMBER: **SL H 10**
 PHYSICAL LOCATION: Barrien Mt - Harrington's - southern-most block at mid-section
 SCAN LINE ORIENT: vertical sl
 FACE ORIENT: 027/87E (parallel to joint zone)
 MEASUREMENT DIR: bottom to top
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: Book 1 p 89
 DATE and TIME OUT: 9/23/99
 MEASUREMENT: JSC
 RECORDER: JL
 COMMENTS / NOTES: SLH10 mainly to record horizontal fractures on face
 PHOTO(S): R8NF14 looking W at SLH10

num	postion (m)	orient			termination		notes
		strike	dip	dir	TL (m)	top (north bot (southmin	
1	0.00	284	013	N	1.1 trnk	trnk	sl cp, <1mm
2	0.3	033	016	SE	1.9 cov	cov	cp, r
3	0.85	204	04	W	2.2 cov	cov	cp
4	1.8	217	017	W	3.5 cov	cov-trnk	highly cp, trnk by long fract at 298/76N
		006	010	E			, SL face
5	2.1	310	020	N	1.7 cov	tip	sl cp, <1mm; little steps
6	2.43	250	06	N	2.6 tip	tip	cp
7	4.25	250	018	N	6 cov	tip	sl cp, exfolial; strike est. On parallel fracture
8	6.1	322	010	N	5.5 tip	cov	pl
9	7.1	316	012	N	3.6 tip	tip	sl cp
10	8.5	226	020	N	2.4 tip	tip	sl cp
11	9.4	287	08	N	4.6 tip	tip	sl cp
12	10.03	006	07	E	3.9 tip	cov	cp
13	11.2	268	04	N	4.8 tip	cov	sl cp

Fe-stained

END

SCAN LINE NUMBER: **SL H 11**
 PHYSICAL LOCATION: "main ridge" @ Harrington residence, approx. 270m east of "south block"
 SCAN LINE ORIENT: 00/310
 FACE ORIENT: 310/90
 MEASUREMENT DIR: w to e
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 1 / 46
 DATE and TIME OUT:
 MEASUREMENT: JSC
 RECORDER: JL, ST
 COMMENTS / NOTES:

PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0	28	84	E	7.1	tip	tip	Fe-stained	sl cp, stpd up to 1cm
2	0.32	24	80	E	3	tip	cov	Fe-stained	sl cp, stpd up to 1cm
3	0.74	29	88	E	8.8	tip	cov	Fe-stained	sl cp, stpd up to 1cm
4	1.2	34	86	E	1.1	tip	tip		pl, r, <1mm
5	2.05	35	82	E	4	tip	tip		sl cp
6	2.3	34	82	E	28.5	tip	tip	Fe-stained	sl cp, tl approx. 50, r, incomplete exposure
7	3.01	28	87	E	4.3	tip	tip	Fe-stained	sl cp
8	3.14	26	84	E	2.2	termination	tip		sl cp, r, termination. Against 7
9	4.3	29	88	E	2.7	tip	tip	Fe-stained	sl cp, r
10	4.6	216	84	W	11.5 (vert 7.0 (hor)	tip	cov	Fe-stained	sl cp, r, forms E-crack, highly weathered
11	8.5	215	85	W	2	tip	cov	Fe-stained	cp, r
12	9	335	28	N	4.5	trunc	tip		cp
13	9.44	205	82	W	1.7	tip	cov	Fe-stained	sl cp
14	10	27	84	W	10.9	cov	cov		sl cp, highly weathered joint zone
15	10.2	208	76	W	2.5	tip	trunc	Fe-stained	sl cp, stpd, r, trunc. Against 14
16	10.4	212	78	W	1.65	tip	tip	Fe-stained	sl cp
17	11.25	31	84	E	4.3	tip	cov	Fe-stained	sl cp
18	11.5	35	77	E	2.4	trunc	cov	Fe-stained	sl cp, trunc. Against 17
19	11.7	30	80	E	1.35	tip	cov	Fe-stained	sl cp, r
20	13.85	34	88	E	9.3	tip	tip		sl cp, stpd, weathered, 5 II joints in 1m area, all <2m in length
21	13.95	32	87	E	1.8	tip	trunc		sl cp, stpd, r, trunc. Against 20
22	15.13	28	86	E	1.58	tip	cov		sl cp, r, cm-scale tip w/ many cracks
23	15.19	24	80	E	0.8	trunc	tip		sl cp, r
24	15.32	23	81	E	1.34	tip	tip		sl cp, r
25	16.1	30	80	E	6.2	tip	cov		sl cp, within 10cm space, 8 visible surrounding cracks
26	16.96	27	84	E	5	tip	cov		sl cp, r
27	17.9	29	89	E	1.43	tip	tip		sl cp, weathered
28	18.72	22	80	E	10.2	tip	tip		sl cp
29	20.54	324	58	N	1.4	tip	cov		sl cp, part of little deformation zone
30	20.97	334	61	N	2.5	tip	cov		sl cp, 15 II frags. In joint zone between 19 & 20
31	21.1	317	65	N	3.16	tip	tip		sl cp, part of deformation zone
32	21.1	187	18	W	10.8	tip	tip		sl cp, r, exfolial type
33	21.26	327	59	N	3.6	trunc	cov		curved
34	22.53	314	66	N	1.3	cov	cov		sl cp, r
35	22.89	6	80	E	2.2	tip	tip		sl cp, r
36	22.98	6	82	E	1.8	tip	tip		sl cp, r
37	23.37	16	80	E	11.3	tip	tip		sl cp, weathered
38	26.09	9	86	E	2.14	tip	tip		sl cp, r
39	26.16	211	83	W	2.1	tip	cov		sl cp, r
40	26.23	208	87	W	1.93	tip	trunc		sl cp, r
41	27.37	205	87	W	10.6	tip	cov		sl cp, r

END

SCAN LINE NUMBER: SL H 12
 PHYSICAL LOCATION: "main ridge" @ Harrington residence, approx. 270m east of "south block"
 SCAN LINE ORIENT: 90/310
 FACE ORIENT: 310/90
 MEASUREMENT DIR: vert bot to top
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE:
 DATE and TIME OUT:
 MEASURURE: JSC
 RECORDER: JL, ST
 COMMENTS / NOTES:
 PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	1.05	187	18	W	10.8	tip	tip		cp, r
2	2	190	10	W	4.2	tip	tip		cp, r
3	2.85	230	4	W	6.4	tip	tip		cp
4	3.84	230			5.3	tip	tip		cp, subparallel to pos. 2.85, slightly steeper dip
5	9.8	222	6	N	6.2	tip	tip		cp
6	7.6	262	14	N	4.6	tip	tip		cp

END

RON GREEN OUTCROPS

LOCATION: 4376562 North, 469916 East (39 32 24.28 North Latitude, 105 21 00.34 West Longitude)
 ELEVATION: 8940 Feet

SCAN LINE NUMBER: SL RG 1
 PHYSICAL LOCATION: Cliffs at Ron Green's property, mid-east block
 SCAN LINE ORIENT: ~15/078
 FACE ORIENT: ~340/15
 MEASUREMENT DIR: nw to se
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 2,30
 DATE and TIME OUT: 10/23/99
 MEASUREMENT: JSC
 RECORDER: JSC
 COMMENTS / NOTES: normal to fabric
 PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
1	0.00	019	74	SE	4.35	tip	tip	none	sl cp to step twisted, <1mm
2	2.02	027	82	SE	1.33	trnk	tip	none	sl cp to step twisted, mm
3	2.04	025	74	SE	4.25	tip	tip	none	sl cp to step twisted, mm
4	3.08	008	80	SE	2.85	tip	tip	none	sl cp to step twisted, weathered
5	3.23	141	75	SW	<0.50	cov	trnk	none	sl cp to step twisted, mm;en echelon; bottom trnks into #8
6	3.34	138	69	SW	<0.50	cov	trnk	none	sl cp to step twisted, mm; bottom trnks into #8
7	3.41	125	73	SW	0.48	tip	trnk	none	sl cp to step twisted, mm; bottom trnks into #8
8	3.67	019	80	SE	1.16	trnk	trnk	none	sl cp to step twisted, mm
9	3.83	332	74	NE	4.00	cov	tip	none	sl cp to step twisted, mm
10	3.72	357	80	E	2.52	tip	tip	none	sl cp to step twisted, mm
11	4.23	350	74	SE	4.00	cov	tip	none	sl cp to step twisted, mm
12	4.57	002	80	E	2.15	tip	tip	none	sl cp to step twisted, mm
13	5.02	357	82	E	4.70	tip	tip	none	sl cp to step twisted, mm
14	5.54	126	70	SW	1.22	tip	tip	none	pl step twisted
15	6.10	272	90		0.91	tip	tip	none	pl step twisted
16	6.95	086	78	S	0.79	tip	tip	none	sl cp to step twisted, break along mineral grains (fabric)?
17	7.25	347	70	NE	0.54	trnk	trnk	none	sl cp to step twisted, break along mineral grains (fabric)?
18	7.33	358	76	NE	1.43	trnk	tip	none	sl cp to step twisted, break along mineral grains (fabric)?
19	7.30	336	75	NE	1.40	tip	trnk	none	sl cp to step twisted, break along mineral grains (fabric)?
20	8.42	158	70	SW	1.70	tip	tip	none	sl cp to step twisted, break along mineral grains (fabric)?
21	8.78	356	80	NE	3.64	tip	trnk	none	sl cp to step twisted, break along mineral grains (fabric)?
22	11.48	350	82	NE	4.50	tip	cov	none	pl step twisted, effective tl; 1.6 real
23	12.33	360	75	NE	2.80	cov	cov	none	pl step twisted
24	14.16	348	72	NE	3.10	cov	cov	none	pl step twisted

END

SCAN LINE NUMBER: SL RG 2
 PHYSICAL LOCATION: Mid-east block
 SCAN LINE ORIENT: ~15/035
 FACE ORIENT:
 MEASUREMENT DIR: s to n
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 2, 33
 DATE and TIME OUT: 10/24/99
 MEASUREMENT: JSC
 RECORDER: JSC
 COMMENTS / NOTES:
 PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	w	e		
1	0.00	157	87	SW	1.35	tip	tip	none	pl step twisted
2	0.66	060	90		1.87	tip	tip	none	pl step twisted
3	1.27	262	82	N	1.81	tip	trnk	none	pl step twisted
4	1.75	141	67	SW	1.45	tip	trnk	fe-stained	pl step twisted
5	2.62	120	72	SW	3.45	tip	trnk	fe-stained	pl step twisted

6	2.83	134	67 SW	2.9 trnk	trnk	fe-stained	pl step twisted, effective tl
7	3.16	141	70 SW	1.7 trnk	trnk	fe-stained	pl step twisted, effective tl
8	3.21	140	80 SW	1.4 trnk	trnk	fe-stained	pl step twisted
9	3.64	026	70 SE	3.1 tip	tip	fe-stained	pl step twisted
10	3.70	136	68 SW	2.55 tip	trnk	fe-stained	pl step twisted
11	3.95	120	77 SW	1.75 tip	tip	fe-stained	pl step twisted
12	4.08	126	78 SW	1.04 trnk	tip	fe-stained	pl step twisted
13	5.24	358	82 E	4.84 trnk	tip	fe-stained	pl step twisted
14	5.84	003	80 E	1.72 tip	trnk	fe-stained	pl step twisted
15	6.03	005	80 E	1.92 tip	tip	fe-stained	pl step twisted
16	7.00	248	72 N	1.80 cov	tip	fe-, mn-stained	pl step twisted
17	7.04	316	80 NE	1.12 tip	tip	fe-stained	pl step twisted
18	8.60	270	80 N	5.64 tip	tip	veg	>1mm
19	9.03	002	82 E	3.83 trnk	tip	none	pl step twisted
20	11.29	309	83 NE	1.24 cov	tip	none	pl step twisted

END

SCAN LINE NUMBER: SL RG 3
 PHYSICAL LOCATION: Western-most outcrops on highest hill
 SCAN LINE ORIENT: 10/260
 FACE ORIENT: horizontal (projected)
 MEASUREMENT DIR: n to s
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 2, 42
 DATE and TIME OUT: 11/1/99
 MEASUREMENT: JSC
 RECORDER: JSC
 COMMENTS / NOTES: scatter of sets due to discontinuity and twisting of sets
 PHOTO(S):

num	postion (m)	orient		termination			min	notes
		strike	dip dir	TL (m)	n	s		
1	0.00	296	36 N	1.1	tip	tip	none	sl cp, r, <1mm
2	2.40	343	82 NE	2.48	tip	tip	none	sl cp, r, begin jnt zn
3	2.51	336	84 N	5.45	cov	tip	none	sl cp, r
4	2.56	339	83 N	>10	tip	cov	fe-stained	sl cp, r, top tips to splay; jnt zn
5	3.35	342	86 NE	5.73	tip	tip	none	sl cp, r
6	4.12	096	78 S	8.00	tip	tip	local qtz	sl cp, r, w to e; locally open
7	5.28	313	78 N	1.76	tip	tip		sl cp, r
8	6.07	312	69 NE	1.13	trnk	tip		sl cp, r, tips to step
9	6.89	348	90	6.56	cov	tip	fe-stained	sl cp, r
10	7.08	346	88 E	2.55	tip	tip		sl cp, r, bottom tips to step
11	7.20	162	86 SW	1.26	tip	tip		sl cp, r
12	9.60	348	90	10.26	cov	tip		sl cp, r, top ~12m to tip; bottom tips to step
13	9.60	036	83 NW	2.49	tip	trnk		sl cp, r, trnk into #12
14	9.82	320	71 NE	1.03	trnk	tip		sl cp, r
15	10.98	345	90	9.00	tip	tip	weathered	sl cp, r
16	11.06	339	86 E	2.48	trnk	tip		sl cp, r
17	11.28	352	90	4.81	tip	tip		sl cp, r, tip at top?
18	11.68	352	30 E	4.00	trnk	tip		cp, r
19	11.79	234	16 NW	2.66	tip	cov	weathered	cp, r
20	15.72	355	90	12.2	cov	tip		sl cp, effective length
21	15.72	322	88 NE	2.81	tip	tip		sl cp, r
22	15.68	092	86 S	17.23	tip	tip	local qtz	sl cp, r, locally filled; w to e; opened, sticking up
23	18.10	272	69 N	2.24	tip	tip		cp, r
24	17.46	358	38 E	4.0	cov	cov	fe-stained	cp, r
25	17.80	029	34 SE	4.0	cov	cov		sl cp, r
26	19.15	348	90	6.0	cov	tip		sl cp, r
27	20.18	158	86 W	4.86	cov	tip		sl cp, r, <1mm
28	22.71	327	84 NE	9.45	tip	tip	fe-stained	sl cp, r, top tips to splay; effective length
29	23.30	350	88 E	6.3	tip	cov		sl cp, r, top tips to step; 9.4 = effective length; hard 'j' link
30	25.83	157	84 SW	8.4	tip	tip		sl cp, r
31	26.94	134	83 SW	3.86	trnk	tip		sl cp, r, trnks into #30; tips into step

END

SCAN LINE NUMBER: SL RG 4
 PHYSICAL LOCATION: East of SLRG03
 SCAN LINE ORIENT: 00/020

FACE ORIENT: variable from horizontal to vertical
 MEASUREMENT DIR:
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 2, 45
 DATE and TIME OUT: 11/1/99
 MEASUREMENT: JSC
 RECORDER: DG
 COMMENTS / NOTES:
 PHOTO(S):

num	postion (m)	orient		dip	dir	termination		min	notes
		strike	TL (m)			n	s		
1	2.0	324	85	NE	3.16	tip	tip		sl cp, r
2	2.0	045	77	SE	3.5	tip	tip		sl cp, r
3	2.74	038	85	SE	2.24	tip	trnk		sl cp, r
4	2.75	092	48	S	2.02	tip	tip		sl cp, r, east to west
5	2.83	096	66	S	1.44	tip	tip		sl cp, r
6	3.71	338	88	E	2.75	tip	tip		sl cp, r, both tips to step
7	4.71	085	62	S	3.14	tip	tip		sl cp, r, east to west; bottom tips to splay
8	4.88	092	73	S	0.98	tip	tip		sl cp, r, both tips to step; interstep space = 4 cm
9	4.97	098	76	S	0.82	tip	tip		sl cp, r, both tips to step; interstep space = 4 cm
10	5.21	100	80	S	1.78	tip	tip		sl cp, r, east to west; top tips to step
11	5.28	273	64	N	0.73	tip	tip		sl cp, r
12	5.65	090	80	S	2.31	tip	tip		sl cp, r, bottom tips to step
13	6.23	293	40	N	3.07	tip	tip		cp, r, top tips to step
scanline goes almost vertical									
14	6.31	271	78	N	2.13	tip	trnk		sl cp, r, east to west
15	7.12	278	65	N	3.64	tip	trnk		sl cp, r, east to west; trnks in 'T'; older than NNW set
vertical measure									
16	7.28	282	60	N	1.21	tip	tip		sl cp, r
vertical measure									
17	7.89	245	72	NW	4.67	tip	tip		sl cp, r
vertical measure									
18	7.33	327	24	NE	2.44	tip	tip		sl cp, r
vertical measure									
19	8.0	000	10	E	1.43	tip	trnk		sl cp, r, trnks into #20
vertical measure									
20	8.0	015	70	E	2.02	tip	tip		sl cp, r
vertical measure									
scanline goes horizontal									
21	8.64	299	22	N	1.27	tip	tip		sl cp, r
22	9.92	341	88	NE	0.82	trnk	tip		sl cp, r
23	10.28	121	80	SW	5.44	tip	tip		sl cp, r, bottom tips into splay
24	10.45	144	82	SW	4.66	tip	tip		sl cp, r, top tips into step
25	10.5	101	80	S	5.74	trnk	tip		sl cp, r, top trnks into #24 at angle; older?
26	12.48	097	76	S	>30	cov	cov		sl cp, r

END

SCAN LINE NUMBER: SL RG 5
 PHYSICAL LOCATION: East of SLRG03
 SCAN LINE ORIENT: 70 / 200
 FACE ORIENT: 098/70 S
 MEASUREMENT DIR:
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 2,47
 DATE and TIME OUT: 11/1/99
 MEASUREMENT: JSC
 RECORDER: DG
 COMMENTS / NOTES: sub-vertical line
 PHOTO(S): roll 10, frames 17 & 18; north-looking photo of SLRG05

num	postion (m)	orient		dip	dir	termination		min	notes
		strike	TL (m)			n	s		
1	0.0	331	24	NE	16.3	tip	tip		cp, r, top tip poor; effective trace length
2	0.16	337	34	NE	2.63	tip	tip	fe-stained	sl cp, r
3	0.4	314	34	NE	2.73	tip	tip		sl cp, r
4	0.55	350	27	E	0.74	tip	tip		sl cp, r, east to west; bottom tips to step
5	0.55	322	85	NE	3.44	trnk	tip		sl cp, r, east to west; bottom tips to splay
6	0.68	340	36	NE	2.95	trnk	tip		sl cp, r, east to west

7	0.73	337	35 NE	9.67 tip	tip	sl cp, r
8	0.63	205	12 W	3.71 tip	tip	sl cp, r, >1mm
9	0.94	355	28 E	2.67 trnk	tip	sl cp, r, east to west
10	0.96	332	38 E	2.76 tip	tip	sl cp, r
11	1.22	347	34 E	3.61 tip	tip	sl cp, r
12	2.14	323	90	0.8 tip	tip	sl cp, r
13	3.85	341	58 E	2.52 tip	tip	sl cp, r
14	6.00	283	47 N	3.03 tip	tip	sl cp, r, almost horizontal

END

SCAN LINE NUMBER: SL RG 6
 PHYSICAL LOCATION: Bottom of north block, south side
 SCAN LINE ORIENT: 35/112
 FACE ORIENT: 112/66 S
 MEASUREMENT DIR: nw to se
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 2, 50
 DATE and TIME OUT: 11/8/99
 MEASUREMENT: JSC
 RECORDER: DG
 COMMENTS / NOTES:
 PHOTO(S):

num	postion (m)	orient			termination		min	notes
		strike	dip	dir	TL (m)	top		
1	0.0	147	78 W	>6	cov	cov	partial qtz filled	sl cp,r , <1mm
2	1.33	359	73 E		1.92 tip	tip		sl cp,r , <1mm
3	1.42	336	62 E		2.18 tip	tip		sl cp,r , tip to splay
4	3.55	041	81 SE		1.41 tip	tip	fe-stained	sl cp,r , tip to splay
5	3.58	027	84 SE		0.51 tip	tip	fe-stained	sl cp,r , tip to splay
6	4.06	035	76 SE		0.47 tip	tip	fe-stained	sl cp,r , stepped
7	4.33	344	78 E		2.16 tip	cov		sl cp,r , effect tracelength = >6m
8	4.36	000	79 E		0.42 tip	tip		sl cp,r
9	4.44	346	81 E		0.43 trnk	tip		sl cp,r
10	4.76	355	44 E		1.24 trnk	tip		sl cp,r
11	5.54	066	88 E		0.96 tip	trnk	fe-stained	sl cp,r
SL orientation changes to 15/112								
12	5.86	358	76 E		2.81 tip	cov	fe-stained	sl cp,r , tips to step
13	5.94	351	83 E		2.82 trnk	tip	fe-stained	sl cp,r
14	6.08	060	82 SE		0.92 tip	trnk	fe-stained	sl cp,r , tips to #13
15	6.36	340	81 E		2.42 tip	trnk	fe-stained	sl cp,r , <1mm
16	7.16	325	18 NE		1.56 tip	trnk	fe-stained	sl cp,r , se to nw
17	8.10	150	77 W		3.68 tip	cov		cp, r, qtz vein; open; max kinap <1cm
18	8.97	307	24 NE		3.32 tip	tip	fe-stained	sl cp,r , nw to se; <1mm
19	11.34	310	42 NE		3.56 tip	tip		sl cp,r , open at tip of qtz vein
20	12.77	141	76 W		3.66 tip	tip	fe-stained	sl cp,r , <1mm
21	15.27	220	60 NW		1.08 tip	tip		sl cp,r
22	16.12	345	75 E		3.02 tip	cov	fe-stained	sl cp,r , <1mm
23	17.59	178	70 W		2.1 trnk	cov	fe-stained	sl cp,r , <1mm
sl orientation changes to 00/090								
24	18.08	065	56 SE		1.89 trnk	cov	fe-stained	sl cp,r , <1mm
25	18.17	020	78 SE		2.38 tip	tip	fe-stained	sl cp,r , <1mm
26	18.30	002	69 E		1.14 trnk	cov	fe-stained	sl cp,r , <1mm; very rough
27	18.48	011	79 SE		1.97 tip	cov	fe-stained	sl cp,r , <1mm
28	18.91	026	75 SE		1.39 trnk	cov	fe-stained	sl cp,r , <1mm
29	19.06	023	77 SE		1.75 tip	trnk	fe-stained	sl cp,r , <1mm; stepped
30	19.08	216	81 W		0.51 trnk	trnk	fe-stained	sl cp,r , <1mm

END

SCAN LINE NUMBER: SL RG 7
 PHYSICAL LOCATION: Middle of north end of south block on north side
 SCAN LINE ORIENT: ~10/120
 FACE ORIENT: ~300/85 S
 MEASUREMENT DIR:
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 2,58
 DATE and TIME OUT: 11/8/99
 MEASUREMENT: JSC

RECORDER: DG
 COMMENTS / NOTES: At top of south block, looking over to east block, subhorizontal fracture spacing ~2 - 3 m decreasing vertically downward (maybe?)
 ; tracelengths ~ 20 m
 PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	top	bot		
1	0.0	269	72	N	7	tip	tip		sl cp, r, >1mm
2	2.11	151	73	W	0.56	tip	tip		sl cp, r, >1mm
3	2.23	148	71	W	0.66	tip	tip		sl cp, r, >1mm
4	3.59	230	19	NW	4.2	cov	trnk		sl cp, r, stepped
5	3.79	035	90		3.02	trnk	cov		sl cp, r, >1mm
6	3.94	188	64	W	0.83	tip	trnk	fe-stained	sl cp, r, <1mm trnk to #5
7	4.19	170	67	W	1.131	tip	trnk	fe-stained	sl cp, r, <1mm
8	4.91	157	75	W	1.43	tip	tip	fe-stained	sl cp, r, effective hydro tracelength ~4m
9	8.7	151	86	W	5.0	tip	tip	fe-stained	sl cp, r, <1mm
10	9.7	336	56	NE	3.1	trnk	trnk	fe-stained	sl cp, r, <1mm; bottom trnk to #9
11	9.86	139	76	SW	1.98	tip	tip	fe-stained	sl cp, r, <1mm
12	10.15	156	78	SW	1.49	tip	trnk	fe-stained	sl cp, r, <1mm; joint zone
13	10.21	162	76	SW	1.54	tip	tip	fe-stained	sl cp, r, <1mm; joint zone; 9 fracs between 12 & 13 all fe-stnd; tracelength range 0.3 to 0.5m
14	10.45	151	73	SW	1.16	tip	tip	fe-stained	sl cp, r, <1mm
15	10.55	246	81	N	1.31	tip	tip	fe-stained	sl cp, r, <1mm
16	10.76	149	74	SE	2.82	tip	trnk	fe-stained	sl cp, r, <1mm; between 16 & 18 - 8 fracs, avg space ~2cm, average length ~0.8 m
17	10.89	148	78	SW	3.77	tip	cov	fe-stained	sl cp, r, <1mm
18	10.97	166	75	SW	0.63	trnk	trnk	fe-stained	sl cp, r, <1mm
19	13.65	160	82	SW	2.51	tip	cov	fe-stained	sl cp, r, <1mm
20	14.17	167	83	SW	2.49	tip	cov	fe-stained	sl cp, r, <1mm
	15.97	end of scanline							no fractures between #20 and end of scanline

END

SCAN LINE NUMBER: SL RG 8
 PHYSICAL LOCATION: Top of south block at west end
 SCAN LINE ORIENT: 10/180
 FACE ORIENT: subhorizontal
 MEASUREMENT DIR: n to s
 LITHOLOGY: Ysp
 FIELD BOOK / PAGE: 2, 56
 DATE and TIME OUT: 11/8/99
 MEASURURE: JSC
 RECORDER: DG
 COMMENTS / NOTES: to capture e-w set
 PHOTO(S):

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	e	w		
1	0.0	283	64	N	5.9	tip	tip	fe-stained	sl cp, r, <1mm; note splay to 7.6
2	0.38	271	63	N	4.09	tip	tip	fe-stained	sl cp, r, <1mm
3	3.59	271	57	N	4.19	tip	tip	fe-stained	sl cp, r, <1mm: 271/45N @ splay/step @ 15.5 = eff hydro tl
4	5.90	092	70	S	4.02	tip	tip	fe-stained	sl cp, r, <1mm
5	8.36	272	80	N	1.6	tip	tip	fe-stained	sl cp, r, stepping at mm-scale; effective tracelength = 17.6
6	10.38	274	82	N	1.52	tip	tip	fe-stained	sl cp, r, <1mm: south margin of joint zone
7	10.42	033	70	SE	5.74	trnk	tip	fe-stained	sl cp, r, n to s; cuts through e - w set
8	10.46	275	78	N	0.9	tip	tip	fe-stained	sl cp, r, <1mm
9	10.53	280	68	N	0.38	tip	trnk	fe-stained	sl cp, r, <1mm
10	10.56	286	77	N	1	cov	trnk	fe-stained	sl cp, r, <1mm
11	10.61	273	76	N	0.9	cov	cov	fe-stained	sl cp, r, <1mm: effective hydro tracelength >25; partially cov
12	10.85	273	74	N	1.83	tip	cov	fe-stained	sl cp, r, <1mm: north margin of jnt zn; from #11 to #12 along SL there are ~10 cracks with ~1.5 to 2cm spacing and tl's ~1m and average orientation sub-parallel to #9 -#12
13	12.36	279	80	N	>10	tip	tip	fe-stained	sl cp, r, <1mm
14	14.14	095	80	S	13.3	tip	tip	fe-stained	sl cp, r, <1mm
15	17.20	261	64	N	>6	cov	tip	fe-stained	sl cp, r, <1mm

END

US 40 FAULT ZONE OUTCROPS

LOCATION: 4395390 North, 476514 East (39 42 35.76 North Latitude, 105 16 26.34 West Longitude)
ELEVATION: 7480 Feet

SCAN LINE NUMBER: SL US40 Grid 1, SL1, Horizontal Axis
PHYSICAL LOCATION: US 40, E of Genesee exit on I-70
SCAN LINE ORIENT: 00/081
FACE ORIENT: 081/52 S
MEASUREMENT DIR: W to E
LITHOLOGY: Variably altered, F-SPAR, QTZ, BIO GNEISS (AL, PY), QTZ veins are cutting PL and are brit. def.
FIELD BOOK / PAGE: 2 / 58
DATE and TIME OUT: 11.11.99 8:30 am to 6:00 pm
MEASURER: JSC
RECORDER: JB
COMMENTS / NOTES: grid located between survey points 3 and 4, hor SL
PHOTO(S): R10F25: looking N at grid (Nikon)
R24F1-F9: med. Format stereo photos (RMS 120)
R10F26: looking N, between CP6 and CP7, at Fe ridge seams that cut sub-hor attrition breccia
R11F1-F3, F5: same as R10F26--see notes on bk 2 pg 70 describing orients
R11F4: detail of seam and attrition breccia --see notes on bk 2 pg 70 describing orients

SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	t	b		
1	0.003	012	60	e	0.134	trnk	tip	fe stain extn?	sl cp, r, um=micrometer,
2	0.018	326	72	ne	0.12	trnk	trnk	fe	sl cp, r, um
3	0.018	334	64	ne	0.174	trnk	trnk	fe	sl cp, r, um
4	0.028	003	76	e	~0.98*	trnk	sp	fe conc	sl cp, r, <1mm, shear? (no slip surf) *FCG
5	0.082	031	67	se	0.57*	sp	sp	fe	sl cp, r, <1mm, shear? *FCG, cp WL=20-30cm, A= 0.5-1cm, avg spac sm frac (10-20cm)=5-10mm censored, no min fills
6	0.064	190	26	w	0.26	trnk	tip	sl fe stain	pl, um
7	0.100	002	64	se	0.21	trnk	trnk	fe	sl cp, r, um
8	0.131	016	80	e	0.74	trnk	trnk	none	sl cp, r, um
9	0.175	012	76	e	2.30	~ tip	cov	FeMnO stain	W bound sm shear zn, locally dialated, very difficult to see shear sense indicators
10	0.219	004	84	e	2.30	~tip	cov	FeMnO stain	E bound sm sheal zn
11	0.233	223	66	w	0.39	trnk	trnk *	sl fe	pl, sl r, um, *trnk by shear zn
12	0.246	020	77	e	1.32	trnk	cov	fe conc	cp, um
13	0.293	012	78	e	1.21	trnk	trnk	sl fe	sl cp, r, um
14	0.303	023	78	e	0.42	trnk	tip	fe	sl cp, r, um
15	0.324	024	83	e	0.26	trnk	trnk	fe conc	sl cp, r,
16	0.373	128	56	w	0.36	trnk	trnk	fe conc	sl cp, r
17	0.407	156	90	w	0.27	trnk	trnk		pl, no discernable fol
18	0.419	159	85	w	0.43	trnk	trnk	fe conc	sl cp
19	0.473	029	85	e	0.62	trnk	sp	fe conc	sl cp
20	0.473	247	21	nw	1.07	trnk	trnk	not lies band	sl cp, um -- btwn #19 and #21, 8 lies bnds w length=10-20cm, width ave=5mm
21	0.543	033	76	e	0.44	trnk	trnk	fe conc	sl cp
22	0.641	338	60	ne	0.31	trnk	trnk	minor fe	sl cp
23	0.643	167	68	w	0.29	trnk	trnk	fe conc	sl cp, r, um, note: lies bands nearly vert
24	0.710	178	85	w	0.37	trnk	trnk	fe conc	sl cp, r, um
25	0.795	333	70	e	0.20	tip	sp	sl fe	sl cp, r
26	0.826	021	83	e	0.31	trnk	trnk	sl fe	sl cp, r
27	0.839	345	69	e	0.27	trnk	trnk	sl fe	sl cp, r
28	0.890	354	62	e	0.18	tip	trnk	no lies	sl cp, r
29	0.926	025	60	e	0.39	trnk	tip	no lies	sl cp, r
30	0.943	011	60	e	0.28	tip	trnk	no lies	sl cp, r
31	0.958	032	44	e	0.27	trnk	trnk	no lies	sl cp, r
32	0.992	162	80	w	0.27	trnk	trnk	fe conc	sl cp, r

END

Assorted other data:

235	28 nw	sharp upper contact of low angle attrition breccia zone (angular and sub-rounded clasts
359	24	trend and plunge of mullion on contact
155	62 w	fe-rich seam that cuts attrition breccia
162	6	very weak lineation on seam

270 24 n

comp fol of ortho(?), qtz, bio gneiss on west side of seam

239 17 n

comp fol of ortho(?), qtz, bio gneiss on east side of seam

END

SCAN LINE NUMBER: US 40 Grid 1, SL 2, Vertical Axis
 PHYSICAL LOCATION: US 40, E of Genesee exit on I-70
 SCAN LINE ORIENT: 52/170 (90 DF east)
 FACE ORIENT: 081/52 S
 MEASUREMENT DIR: Bot to Top
 LITHOLOGY: Variably altered, F-SPAR, QTZ, BIO GNEISS (AL, PY), QTZ veins are cutting PL and are brit. def.
 FIELD BOOK / PAGE: 2 / 71
 DATE and TIME OUT: 11.11.99 8:30am to 6:00pm
 MEASURER: JSC
 RECORDER: JB
 COMMENTS / NOTES: grid located between survey points 3 and 4, hor SL
 PHOTO(S): R11F6-F7: grid 2 photo (Nikon)
 R24F10-F16: grid 2, photos taken W to E
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	w	e		
1	0.029	239	33	n	0.38	sp	tip	part fe	sl cp, sl r, um
2	0.084	274	41	n	0.23	trnk	trnk	part fe	sl cp, sl r, um
3	0.231	252	40	n	0.72	tip	trnk	part fe	sl cp, sl r, um
4	0.270	245	23	n	1.22	trnk	trnk	part fe & lies	sl cp, sl r, um, few hor lies bnnds--may indicate vert flow (influence of norm load?)
5	0.345	244	29	n	1.09	trnk	trnk	part fe	sl cp, sl r, um; hor fracs not contin across shear zn suggesting shear zn cuts frac
6	0.468	254	29	n	0.19	trnk	trnk	part fe	sl cp, sl r, um
7	0.503	252	28	n	0.35	trnk	trnk	part fe	sl cp, sl r, um
8	0.526	268	29	n	1.22	trnk	trnk	fair amt fe	sl cp, sl r, um
9	0.565	272	24	n	1.54	trnk	trnk	fair amt fe	sl cp, sl r, um
10	0.611	265	32	n	1.83	trnk	trnk	fair amt fe	sl cp, sl r, um
11	0.687	130	22	sw	0.96	trnk	trnk	fair amt fe	sl cp, sl r, um
12	0.730	245	29	n	1.05	trnk	trnk	fair amt fe	sl cp, sl r, um
13	0.839	129	23	sw	1.09	trnk	trnk	fair amt fe	sl cp, sl r, um
14	1.110	226	30	n	0.38	trnk	trnk	fair amt fe	sl cp, sl r, um

END

SCAN LINE NUMBER: SL US 40 Grid 2, SL 1
 PHYSICAL LOCATION: US 40, E of Genesee exit on I-10, W of grid 1, 5.786m W of center point 6--> 12 / 083
 SCAN LINE ORIENT: 00/070
 FACE ORIENT: 070/53 S
 MEASUREMENT DIR: W to E
 LITHOLOGY: Variably altered, F-SPAR, QTZ, BIO GNEISS (AL, PY), QTZ veins are cutting PL and are brit. def.
 FIELD BOOK / PAGE: 2 / 73
 DATE and TIME OUT: 11.12.99 9:00 am to 7:00 pm
 MEASURER: JSC
 RECORDER: alone
 COMMENTS / NOTES: face on a rough frac, see face diagram book 2, pg 73, cencoring fracs <0.1m and not cnctd, rel. unaltered and unfrac, pod/fracs cen not lies bndd, 246/28 N comp fol
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	w	e		
1	0.010	340	86	ne	0.19	trnk	sp to trnk	none	pl, r, um=micrometer
2	0.092	114	56	sw	0.364	trnk	trnk	fe	sl cp, r, um, not lies
3	0.132	298	90		0.34	trnk to sp	trnk	fe	sl cp, r, um, not lies
4	0.238	138	27	s	0.71	trnk	tip to sp	fe	sl cp, r, um, not lies
5	0.350	196	56	w	0.49	trnk	tip to sp	fe	sl cp, r, um, not lies
6	0.375	317	88	ne	1.78	tip	cov	fe seam	sp, r, Fe seam, AP ~1mm
7	0.404	338	81	ne	0.302	trnk	tip	no fe lies	sl cp, r um
8	0.432	111	87	sw	0.220	trnk	trnk	no fe lies	sl cp, r, um
9	0.446	123	45	sw	0.26	trnk	tip	no fe lies	sl cp, r, um
10	0.512	003	80	e	0.310	trnk	trnk	no fe lies	sl cp, r, um
11	0.512	149	50	s	0.47	sp to trnk	trnk	no fe lies	sl cp, r, um

12	0.576	137	36 sw	1.52 trnk	trnk		sl cp, r, um, sp of Fe seam, appears that jnt was first and seam followed (see diagram bk 2, pg 75)
13	0.614	312	88 ne	0.534 trnk	trnk	fe	sl cp, r, um
14	0.677	321	45 ne	0.348 trnk	sp to tip	fe	sl cp, r, um
15	0.680	184	60 w	0.110 trnk	trnk	fe	sl cp, r, um
16	0.822	115	30 s	0.710 trnk	trnk	fe	sl cp, r, um
16	0.822	158	51 s	0.505 trnk	trnk	fe	sl cp, r, um
17	0.849	161	44 s	0.310 trnk	trnk	fe	sl cp, r, um
18	0.890	331	74 ne	0.338 trnk	trnk	fe	sl cp, r, um
19	0.919	142	70 s	0.610 trnk	trnk	fe	sl cp, r, um
20	0.972	319	88 ne	0.185 tip	trnk	fe	sl cp, r, um
21	0.995	128	62 s	0.240 trnk	trnk	fe	sl cp, r, um

END

SCAN LINE NUMBER: **SL US 40 Grid 2, SL 2**
 PHYSICAL LOCATION: US 40, E of Genesee exit on I-10, W of grid 1, 5.786m W of center point 6--> 12 / 083
 SCAN LINE ORIENT: 53/160
 FACE ORIENT: 070/53 S
 MEASUREMENT DIR: BOT to TOP
 LITHOLOGY: Variably altered, F-SPAR, QTZ, BIO GNEISS (AL, PY), QTZ veins are cutting PL and are brit. def.
 FIELD BOOK / PAGE: 2 / 76
 DATE and TIME OUT: 11.12.99 9:00am to 7:00pm
 MEASURER: JSC
 RECORDER: alone
 COMMENTS / NOTES: bot to top, for sub-hor cracks
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	w	e		
1	0.042	252	13	n	1.550	cov	trnk	none	cp, r, <1mm, frac zn
2	0.081	294	72	n	0.270	trnk	trnk	fe	sl cp, r, um=micrometer
3	0.124	166	47	sw	0.530	tip	tip	fe	sl cp, r, um
4	0.190	332	20	ne	0.580	trnk	tip	fe	sl cp, r, um
5	0.282	267	17	n	2.230	trnk	trnk	fe	sl cp, r, um
6	0.314	196	56	w	0.490	trnk	tip to splay		(don't include splay?); #5 from hor SL
7	0.347	256	14	n	1.267	trnk	trnk	fe	cp, r, um
8	0.365	224	23	n	0.445	trnk	trnk	fe	cp, r, um
9	0.407	242	26	n	0.194	trnk	trnk	fe	cp, r, um
10	0.515	159	34	sw	0.324	trnk	sp to tip	fe	cp, r, um
11	0.548	112	40	s	0.970	trnk	trnk	fe	cp, r, um
12	0.579	300	17	ne	0.310	tip	tip	fe	cp, r, um
13	0.680	269	37	n	0.714	tip	trnk	fe	sl cp, r, um
14	0.698	265	31	n	0.285	tip	tip	fe	sl cp, r, um
15	0.789	280	41	n	0.410	cov	tip	fe	sl cp, r, um
16	0.830	245	40	n	0.620	trnk	trnk	fe	cp, r, um
17	0.898	227	22	n	0.320	tip	tip	fe	sl cp, r, um
18	0.914	233	25	n	0.160	tip	trnk	fe	sl cp, r, um
19	0.998	190	27	w	0.140	tip	trnk	fe	sl cp, r, um

END

SCAN LINE NUMBER: **SL US 40 Grid 3, SL 1**
 PHYSICAL LOCATION: US 40, E of Genesee exit on I-70
 SCAN LINE ORIENT: 00/159
 FACE ORIENT: 159/61 S
 MEASUREMENT DIR: N to S
 LITHOLOGY: Variably altered, F-SPAR, QTZ, BIO GNEISS (AL, PY), QTZ veins are cutting PL and are brit. def.
 FIELD BOOK / PAGE: 2 / 78
 DATE and TIME OUT: 11.13.99 12:00pm to 6:00pm
 MEASURER: JSC
 RECORDER: alone
 COMMENTS / NOTES: horiz SL, west end of outcrop, QTZ-rich shear zones
 PHOTO(S): R11: finished various photos around RT 40
 R12: slides of brittle structures that impact hydro
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	t	b		

1	0.000	104	80 s	0.29 trnk	trnk	fe, no lies	sl cp, r, um=micrometer
2	0.000	034	70 s	0.65 trnk	trnk	fe, no lies	sl cp, r, um
3	0.095	081	85 s	0.37 tip	trnk	fe, no lies	sl cp, r, um
4	0.110	141	86 s	0.43 trnk	trnk	fe, no lies	sl cp, r, um, cut or obliterated in shear zn, suggesting it was pre-shear
5	0.154	111	84 s	0.37 trnk	trnk	fe, no lies	sl cp, r, um
6	0.205	084	78 s	0.78 trnk	tip	fe, min. lies	sl sp, r, um, Fe seam w/ minor lies, cuts shear zn of #4
7	0.257	280	86 n	0.41 trnk	trnk	fe, no lies	sl cp, r, um
8	0.346	061	79 s	0.84 trnk	tip	fe, no lies	sl cp, r, um, cuts shear zn
9	0.440	276	85 n	0.67 trnk	trnk	fe, no lies	sl cp, r, um
10	0.510	251	41 n	0.31 trnk	trnk	fe, no lies	sl cp, r, um
11	0.510	007	44 e	1.13 trnk	tip	fe, no lies	sl cp, r, um
12	0.594	068	64 s	2.10 tip	cov	fe, no lies	sl cp, r, um
13	0.599	095	78 s	0.235 sp to tip	trnk*	fe, no lies	sl cp, r, um, *trnk into prev
14	0.673	085	80 s	0.124 trnk	trnk	fe, no lies	sl cp, r, um
15	0.767	058	70 s	0.210 tip	trnk	fe, no lies	sl cp, r, um
16	0.817	068	80 s	1.44 tip	tip	fe seam lies	sl cp, r, um, Fe seam with lies, see diagram bk 2, pg 79
17	0.849	290	50 n	0.27 trnk	trnk	fe, no lies	sl cp, r, um
18	0.898	085	80 s	>2.0 cov	cov	fe seam lies	sp, Fe seam with lies, made of many Fe stained stringers ~2mm
19	0.904	310	70 n	0.14 trnk	trnk*	fe, no lies	sl cp, r, um, *trnk into prev
20	0.947	094	84 s	0.12 trnk	trnk	fe, no lies	sl cp, r, um
21	0.982	038	43 s	2.74 trnk	trnk	fe, no lies	sl cp, r, um
22	1.005	092	88 s	0.42 trnk	tip	fe, no lies	sl cp, r, um

END

SCAN LINE NUMBER: SL US 40 Grid 3, SL 2
 PHYSICAL LOCATION: US 40, E of Genesee exit on I-70
 SCAN LINE ORIENT: 61/249
 FACE ORIENT: 159/61 S
 MEASUREMENT DIR: BOT to TOP
 LITHOLOGY: Variably altered, F-SPAR, QTZ, BIO GNEISS (AL, PY), QTZ veins are cutting PL and are brit. def.
 FIELD BOOK / PAGE: 2 / 80
 DATE and TIME OUT: 11.13.99 12:00pm to 6:00pm
 MEASURER: JSC
 RECORDER: alone
 COMMENTS / NOTES: Meas bot to top, vert SL, dupe=mea on hor SL
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
1	0.000	330	46	ne	0.92	tip	trnk	Fe, no lies	sl cp, r, um=micrometer
2	0.098	002	52	e	0.186	trnk	trnk	Fe, no lies	sl cp, r, um
3	0.120	280	76	n	0.24	trnk	trnk	Fe, no lies	sl cp, r, um
4	0.216	028	74	s	0.47	tip	tip	Fe, no lies	sl cp, r, um
5	0.230	355	38	e	0.31	tip	tip	Fe, no lies	sl cp, r, um
6	0.260	350	50	e	1.28	trnk	trnk	Fe, no lies	sl cp, r, um
7	0.357	291	50	n	0.34	trnk	tip	Fe, no lies	sl cp, r, um
8	0.402	026	42	s	0.74	tip	trnk	Fe, no lies	sl cp, r, um
9	0.486	340	16	ne	0.54	trnk	trnk	Fe, no lies	sl cp, r, um
10	0.580	007	44	e	1.13	trnk	tip	Fe, no lies	sl cp, r, um, dupe 11
11	0.660	294	12	n	0.43	trnk	trnk	Fe, no lies	sl cp, r, um
12	0.705	018	40	se	0.73	trnk	trnk	Fe, no lies	sl cp, r, um
13	0.741	030	66	se	~1.4	trnk	tip	Fe, no lies	sl cp, r, um
14	0.785	254	36	n	0.46	trnk	trnk	Fe, no lies	sl cp, r, um
15	0.864	038	43	s	2.74	trnk	trnk	Fe, no lies	sl cp, r, um, dupe 21
16	0.885	009	32	e	0.34	trnk	trnk	Fe, no lies	sl cp, r, um
17	0.905	291	36	n	0.29	trnk	tip	Fe, no lies	sl cp, r, um
18	0.908	175	12	w	0.11	trnk	trnk	Fe, no lies	sl cp, r, um
19	0.910	168	31	w	0.19	trnk	trnk	Fe, no lies	sl cp, r, um
20	0.957	284	36	n	0.12	trnk	trnk	Fe, no lies	sl cp, r, um
21	0.991	349	32	e	0.105	tip	tip	Fe, no lies	sl cp, r, um
22	0.997	034	44	se	0.16	trnk	trnk	Fe, no lies	sl cp, r, um

END

COLORADO ROUTE 73 FAULT ZONE OUTCROPS

LOCATION: 4376701 North, 473028 East (39 32 29.16 North Latitude, 105 18 49.97 West Longitude)

ELEVATION: 8000 Feet

SCAN LINE NUMBER: **SL RT73 1**

PHYSICAL LOCATION: RT 73, Conifer FZ, Just N of Shadow Mtn Rd. and 73. Diane Wolf's property

SCAN LINE ORIENT: 00 / 170

FACE ORIENT: 170/60 W

MEASUREMENT DIR: N to S

LITHOLOGY: Ysp, hemitite

FIELD BOOK / PAGE: 2 / 82

DATE and TIME OUT: 11.15.99 9:00am to 5:00pm

MEASURER: JSC

RECORDER: alone

COMMENTS / NOTES: faulting in Ysp, similar style to US40, "short" Fe-oxide coated fracs, lies band swarms, predominantly DDZ, little clay rich gouge, few, if any, slip surfs, a conduit!, internal deformation zns w/ localized slip-->tend to be undulatory, difficult to determinationine sence of slip, road cut bladed?
SL 1 ~2m N of central core zn, in damage zn

PHOTO(S):

SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	t	b		
1	0.000	070	71	s	1.58	trnk	trnk	fe, slight lies	sl cp, r, stpd, fe seam, um=micrometer
2	0.032	300	64	ne	0.56	trnk	trnk	fe, no lies	sl cp, r, um
3	0.051	080	58	s	0.25	trnk	trnk	fe, no lies	sl cp, r, um
4	0.056	307	50	ne	0.41	trnk	trnk	fe, no lies	sl cp, r, um
5	0.089	291	82	n	0.11	trnk	trnk	fe, no lies	sl cp, r, um
6	0.123	298	73	n	0.18	trnk	trnk	fe, no lies	sl cp, r, um
7	0.149	258	78	n	0.13	trnk	trnk	fe, no lies	sl cp, r, um
8	0.176	304	53	n	0.28	trnk	trnk	fe, no lies	sl cp, r, um, fracs appear to cut grains
9	0.183	273	85	n	0.29	trnk	trnk	fe, no lies	sl cp, r, um, stpd
10	0.198	323	61	ne	0.24	trnk	trnk	fe, no lies	sl cp, r, um, stpd
11	0.253	330	62	ne	0.27	trnk	trnk	fe, no lies	sl cp, r, um, stpd
12	0.362	001	51	e	1.38	sp to trnk	trnk	fe, no lies	sl cp, r, um, stpd
13	0.413	085	65	s	0.54	tip	trnk	fe, no lies	sl cp, r, um, stpd
14	0.416	122	56	sw	0.31	trnk	trnk	fe, no lies	sl cp, r, um, stpd
15	0.430	027	55	se	0.22	trnk	trnk	fe, no lies	sl cp, r, um, stpd
16	0.520	068	63	se	0.15	trnk	trnk	fe, no lies	sl cp, r, um, stpd
17	0.528	258	55	n	0.17	tip	trnk	fe, no lies	sl cp, r, um, stpd
18	0.550	046	86	se	0.13	trnk	trnk	fe, no lies	sl cp, r, um, stpd
19	0.566	134	45	sw	0.38	trnk	cov (trnk)	fe, no lies	sl cp, r, um, stpd
20	0.725	027	22	se	0.20	trnk	trnk	fe, no lies	sl cp, r, um, stpd
21	0.722	303	36	ne	0.25	trnk	trnk	fe, no lies	sl cp, r, um
22	0.743	316	57	ne	1.16	trnk	trnk	fe, no lies	sl cp, r, um

STOPPED AT 5:00pm, due to light

SCAN LINE NUMBER: **SL RT73 1 cont'd**

PHYSICAL LOCATION: RT 73, Conifer FZ, Just N of Shadow Mtn Rd. and 73. Diane Wolf's property

SCAN LINE ORIENT: 00 / 170

FACE ORIENT: 170/60 W

MEASUREMENT DIR: N to S

LITHOLOGY: Ysp, hemitite

FIELD BOOK / PAGE: 2 / 85

DATE and TIME OUT: 11.16.99 8:00am to 6:00pm

MEASURER: JSC

RECORDER: JB

COMMENTS / NOTES: faulting in Ysp, similar style to US40, "short" Fe-oxide coated fracs, lies band swarms, predominantly DDZ, little clay rich gouge, few, if any, slip surfs, a conduit!, internal deformation zns w/ localized slip-->tend to be undulatory, difficult to determinationine sence of slip, road cut bladed?
SL 1 ~2m N of central core zn, in damage zn

R13F1-6 were taken at a stop on US285, mile 245: see SL US285 for details, R13F7-F13 taken at RT73 Flt zn

PHOTO(S): R13(slides) F1-F2: (US285) Detail of pegmatite/gneiss cut (see detailed notes and diagram book 2, page 85)

R13F3: (US285) Detail of fe coated jnt surf in gneiss (see detailed notes book 2, page 86)

R13F4-6: (US285) far field views looking west

R13F7: Far view of main shear zn looking ENE

R13F8: SL detail for grid 1

SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	t	b		

23	0.768	079	56 s	0.495 trnk	trnk	fe, no lies	sl cp, r, um=micrometers
24	0.818	241	56 n	0.342 tip	trnk	fe, no lies	sl cp, r, um
25	0.926	064	57 se	0.547 trnk	trnk	fe, no lies	sl cp, r, um
26	0.969	308	46 n	0.136 trnk	trnk	fe, no lies	sl cp, r, um
27	1.051	305	44 n	0.147 trnk	trnk	fe, no lies	sl cp, r, um
28	1.177	312	76 n	0.505 trnk	trnk	fe, no lies	sl cp, r, um
29	1.214	314	77 n	0.130 trnk	trnk	fe, no lies	sl cp, r, um
30	1.367	320	39 ne	0.562 trnk	trnk	fe, no lies	sl cp, r, um
31	1.420	114	46 s	0.110 trnk	trnk	fe, no lies	sl cp, r, um
32	1.657	294	46 n	1.780 trnk	trnk	fe, no lies	sl cp, r, um, stpd, N margin of minor shear zn
33	1.645	082	80 s	0.230 trnk	trnk	fe, no lies	sl cp, r, um
34	1.655	076	66 s	1.110 trnk	sp to trnk	fe, no lies	sl cp, r, um
35	1.692	271	78 n	0.124 trnk	trnk	fe, no lies	sl cp, r, um
36	1.755	281	76 n	0.210 trnk	trnk	fe, no lies	sl cp, r, um, see diagram in book 2, pg 88, (?orient 219/34 nw), weak slip surf 00/219 lin **see 'note'
37	1.790	283	75 n	0.177 trnk	trnk	fe, no lies	sl cp, r, um
38	1.839	281	73 n	0.440 trnk	trnk	fe, no lies	sl cp, r, um
39	1.946	272	58 n	3.900 trnk to sp	cov	fe, no lies	sl cp, r, um, stpd, S margin of minor shear zn

END

SCAN LINE NUMBER: SL RT73 2
 PHYSICAL LOCATION: RT 73, Conifer FZ, Just N of Shadow Mtn Rd. and 73. Diane Wolf's property
 SCAN LINE ORIENT: 60/260
 FACE ORIENT: 170/60 W
 MEASUREMENT DIR: Bot to top
 LITHOLOGY: Ysp, hemitite
 FIELD BOOK / PAGE: 2 / 89
 DATE and TIME OUT: 11.16.99 8:00am to 6:00pm
 MEASURER: JSC
 RECORDER: JB
 COMMENTS / NOTES:
 PHOTO(S): R13F9: Frac intersect relation in FZ
 R13F10: detail of core DZ contact of N. bound
 R13F11: same as F10, but lower down
 R13F12: minor attrition breccia on N core DZ contact
 R13F13: lies band zone, look NE ~70m N of N bound of core DZ contact
 SAMPLES: A73FZ: 10cm from N. core DZ contact
 B73FZ: Hem/Limonite thin seam (<1cm)
 C73FZ: 310/86 NE 20cm below DZ core contact, in core
 D73FZ: 110/60 S 15cm above DZ core contact
 E73FZ: 214/30 NW ~3.4m from N. core DZ contact
 F73DZ: ~130/30 S ~3.4m from core DZ; ~0.5m above sample E (bounded by Fe stain)

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	n	s		
1	0.000	296	33	n	0.82	trnk	trnk	Fe, so MnO	sl cp, r, mainly sub-hor fracs, so=some
2	0.060	321	82	ne	~0.47	trnk	trnk	Fe, so MnO	sl cp, r,
3	0.150	340	30	ne	1.81	trnk	trnk	Fe, so MnO	sl cp, r
4	0.186	005	48	e	0.74	trnk	trnk	Fe, so MnO	sl cp,
5	0.320	359	56	e	1.35	sp to trnk	trnk	Fe, so MnO	sl cp, r, dup that crosses hor SL at 0.37
6	0.356	350	63	e	0.34	trnk	trnk	Fe, so MnO	sl cp, r
7	0.450	294	46	n	1.78	trnk	trnk	Fe	sl cp, r, dup? that crosses at 1.657 hor SL
8	0.555	333	43	ne	0.37	trnk	trnk	Fe, so MnO	sl cp, r
9	0.667	355	47	e	2.25	trnk	trnk	Fe, so MnO	sl cp, r
10	0.667	244	46	n	0.18	trnk	trnk	Fe, so MnO	sl cp, r
11	0.812	001	48	e	2.54	tip	trnk	Fe, so MnO	sl cp, r, minor shear zn, see diagram bk 2 pg 90
12	0.975	348	46	e	1.70	trnk	trnk	Fe, so MnO	sl cp, r, part filled QTZ vein
13	1.095	353	42	e	0.63	trnk	trnk	Fe, so MnO	sl cp, r
14	1.235	000	52	e	2.20	trnk	trnk	Fe, so MnO	sl cp, r

END

SCAN LINE NUMBER: SL RT73 3
 PHYSICAL LOCATION: RT 73, Conifer FZ, Just N of Shadow Mtn Rd. and 73. Diane Wolf's property
 SCAN LINE ORIENT: 00/118
 FACE ORIENT: 118/~50 SW
 MEASUREMENT DIR: W to E
 LITHOLOGY: HBLD (chloritized?), BIO, FSPAR, QTZ, GNEISS intruded by massive pegmatite dikes
 FIELD BOOK / PAGE: 2 / 93

DATE and TIME OUT: 11.16.99 8:00am to 6:00pm
 MEASURER: JSC
 RECORDER: JB
 COMMENTS / NOTES: roughness at m scale
 PHOTO(S):
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	t	b		
1	0.00	040	70	se	1.50	trnk	cov	none	cp, vr
2	0.18	035	60	se	2.20	trnk	cov	none	cp, vr, WL of r=20cm, amp=2-3cm
3	0.47	158	62	sw	0.44	trnk	trnk	fe coat	sl cp, r
4	0.95	149	67	sw	0.78	trnk	cov	fe coat	sl cp, r
5	1.21	157	68	sw	0.44	trnk	cov	fe coat	sl cp, r
6	1.31	155	68	sw	1.46	trnk	trnk	fe coat	sl cp, r
7	1.50	320	80	ne	0.88	trnk	cov	fe coat	sl cp, r
8	1.39	169	66	sw	1.80	cov	cov	fe coat	sl cp, r
9	1.67	165	71	sw	1.80	trnk	cov	fe coat	sl cp, r
10	1.88	159	56	sw	0.68	tip	trnk	fe coat	sl cp, r
11	1.96	305	62	ne	0.49	trnk	trnk	fe	sl cp, r
12	2.15	298	63	ne	0.57	trnk	trnk	fe	sl cp, r
13	2.39	160	72	sw	0.67	trnk	trnk	fe	sl cp, r
14	2.41	162	66	sw	1.14	trnk	cov	fe	sl cp, r
15	2.96	148	63	sw	1.40	trnk	cov	fe	sl cp, r
16	3.34	157	65	sw	~2.40	trnk	cov	fe	sl cp, r
17	3.46	159	75	sw	0.86	tip	cov	fe	sl cp, r
18	3.99	152	84	sw	0.81	trnk	trnk	fe	sl cp, r
19	4.40	152	73	sw	0.85	trnk	trnk	fe	sl cp, r
20	4.08	047	76	se	1.20	trnk	trnk	fe	sl cp, r
21	4.17	252	79	n	0.67	trnk	tip	fe	sl cp, r
22	4.41	246	80	n	0.49	trnk	cov	fe	sl cp, r
23	4.59	259	90		1.13	trnk	trnk	fe	sl cp, r
24	5.09	146	58	sw	1.50	trnk	trnk	fe	sl cp, r
25	5.69	157	57	sw	1.10	trnk	cov	fe	sl cp, r
26	5.40	180	49	w	0.74	trnk	trnk	fe	sl cp, r
27	5.77	172	80	w	0.73	trnk	trnk	fe	sl cp, r
28	5.65	076	70	se	0.61	tip	cov	fe	sl cp, r
29	6.25	149	80	sw	0.77	trnk	trnk	fe	sl cp, r
30	6.13	048	40	se	1.40	trnk	cov	fe	sl cp, r
31	6.37	152	74	sw	0.73	tip	trnk	fe	sl cp, r
32	6.42	050	62	se	0.57	trnk	tip	fe	sl cp, r
33	6.56	049	60	se	2.79	trnk	cov	fe	sl cp, r

END

SCAN LINE NUMBER: SL RT73 4
 PHYSICAL LOCATION: RT 73, Conifer FZ, Just N of Shadow Mtn Rd. and 73. Diane Wolf's property
 SCAN LINE ORIENT: 00/140
 FACE ORIENT: 140/75 SW
 MEASUREMENT DIR: NW to SE
 LITHOLOGY: HBLD (chloritized?), BIO, FSPAR, QTZ, GNEISS intruded by massive pegmatite dikes
 FIELD BOOK / PAGE: 2 / 99
 DATE and TIME OUT: 11.17.99
 MEASURER: JSC
 RECORDER: alone
 COMMENTS / NOTES: SL 4 on 3rd tier, ~50m NW of main flt
 PHOTO(S): R13F20: photo of SL4
 SAMPLES:

num	postion (m)	orient			termination			min	notes
		strike	dip	dir	TL (m)	t	b		
1	0.365	050	90		0.78	tip	tip	fe, no lies	sl cp, r, stpd, um=micrometer
2	0.37	106	65	s	2.10	trnk	cov	fe, no lies	sl cp, r, stpd, um,
3	0.45	066	86	se	0.73	tip	cov	fe, no lies	sl cp, r, stpd, um
4	0.40	090	90		0.54	trnk	trnk	fe, no lies	sl cp, r, stpd, um
	1.90	~140	10	sw	22.00	cov	cov	fe, no lies	sl cp, r, stpd, um, *offline hor, see bk 2 pg 100
	0.80	143	6	sw	2.45	tip to sp	tip	fe, no lies	sl cp, r, stpd, um, *offline hor, see bk 2 pg 100
	0.00	142	13	sw	0.83	tip	trnk	fe, no lies	sl cp, r, stpd, um, *offline hor, see bk 2 pg 100
5	0.92	013	78	e	0.32	trnk	cov	fe, no lies	sl cp, r, stpd, um
6	0.96	010	80	e	0.43	tip	trnk	fe, no lies	sl cp, r, stpd, um

7	1.05	305	66 ne	1.20 trnk	cov	fe, no lies	sl cp, r, stpd, um
8	1.16	238	86 nw	0.32 trnk	trnk	fe, no lies	sl cp, r, stpd, um
9	1.23	085	80 s	0.38 trnk	trnk	fe coat, lies	sl cp, r, stpd, um
10	1.21	093	94 s	1.65 trnk	trnk	fe coat, lies	sl cp, r, stpd, um
11	1.27	020	73 se	0.29 trnk	tip	fe, no lies	sl cp, r, stpd, um
12	1.36	080	68 s	0.72 tip	tip	fe, no lies	sl cp, r, stpd, um
13	1.30	090	60 s	0.21 trnk	trnk	fe, no lies	sl cp, r, stpd, um
14	1.39	092	57 s	0.44 trnk	trnk	fe, no lies	sl cp, r, stpd, um
15	1.51	025	56 s	0.57 trnk	trnk	fe, no lies	sl cp, r, stpd, um
16	1.52	230	82 nw	0.68 trnk	trnk	fe, no lies	sl cp, r, stpd, um
17	1.66	349	74 e	1.52 trnk	trnk	fe, no lies	sl cp, r, stpd, um
18	1.61	087	70 s	0.40 tip	trnk	fe, no lies	sl cp, r, stpd, um
19	1.68	233	74 nw	0.46 trnk	trnk	fe, no lies	sl cp, r, stpd, um
20	1.55	314	82 n	0.30 cov	cov	fe, no lies	sl cp, r, stpd, um
21	1.72	305	62 n	1.05 trnk	trnk	fe, no lies	sl cp, r, stpd, um
22	1.94	306	73 n	1.13 trnk	trnk	fe, no lies	sl cp, r, stpd, um
23	1.86	044	77 se	0.81 tip	cov	fe seam	sl cp, r, stpd, um, Fe seam
24	2.10	027	72 s	1.85 trnk	tip	fe, no lies	sl cp, r, stpd, um
25	2.20	305	77 n	0.41 trnk	trnk	fe, no lies	sl cp, r, stpd, um
26	2.15	240	88 nw	0.62 tip	trnk	fe, no lies	sl cp, r, stpd, um
27	2.32	030	54 s	1.68 trnk	tip	fe, no lies	sl cp, r, stpd, um
28	2.29	295	83 n	~0.51 trnk	trnk	fe, no lies	sl cp, r, stpd, um
29	2.44	245	88 n	1.17 trnk	tip	fe, no lies	sl cp, r, stpd, um
30	2.44	111	82 s	2.40 trnk	cov	fe, no lies	sl cp, r, stpd, um
31	2.49	116	77 s	0.38 trnk	trnk	fe, no lies	sl cp, r, stpd, um
32	2.66	120	72 s	0.40 trnk	cov	fe, no lies	sl cp, r, stpd, um
33	2.80	054	80 s	0.76 trnk	tip	fe, no lies	sl cp, r, stpd, um
34	2.89	029	78 s	3.60 trnk	cov	fe, no lies	sl cp, r, stpd, um
35	2.83	060	86 s	1.04 trnk	trnk	fe, no lies	sl cp, r, stpd, um
36	3.06	044	70 s	1.65 trnk	trnk	fe, no lies	sl cp, r, stpd, um
37	3.13	065	72 s	1.70 trnk	trnk	fe, no lies	sl cp, r, stpd, um
38	3.67	308	60 n	0.96 trnk	trnk	fe, no lies	sl cp, r, stpd, um
39	3.26	240	72 n	0.42 trnk	trnk	fe, no lies	sl cp, r, stpd, um
40	3.39	018	56 e	0.81 trnk	trnk	fe, no lies	sl cp, r, stpd, um
41	3.55	063	88 s	1.68 trnk	trnk	fe, no lies	sl cp, r, stpd, um
42	3.69	233	86 n	0.35 tip	tip	fe, no lies	sl cp, r, stpd, um
43	3.73	037	58 s	3.20 tip	trnk	fe, no lies	sl cp, r, stpd, um
44	3.88	250	86 n	0.90 tip	tip	fe, no lies	sl cp, r, stpd, um
45	4.01	036	53 s	1.41 trnk	tip	fe, no lies	sl cp, r, stpd, um
46	4.08	054	76 s	0.19 tip	trnk	fe, no lies	sl cp, r, stpd, um
47	4.10	230	76 n	0.43 tip	trnk	fe, no lies	sl cp, r, stpd, um
48	4.17	352	70 e	1.13 trnk	trnk	fe, no lies	sl cp, r, stpd, um
49	4.15	301	36 n	1.31 trnk	tip	fe, no lies	sl cp, r, stpd, um
50	4.41	057	71 s	0.47 trnk	trnk	fe, no lies	sl cp, r, stpd, um

END