REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:7902080227 DOC.DATE: 79/02/02 NOTARIZED: NO DOCKET #
FACIL:50-400 Shearon Harris Nuclear Power Plant, Unit 1, Carolina 05000400
50-401 Shearon Harris Nuclear Power Plant, Unit 2, Carolina 05000401
50-402 Shearon Harris Nuclear Power Plant, Unit 3, Carolina 05000402
AUTH.NAME AUTHOR AFFILIATION
MCDUFFIE,M.A. Carolina Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation

SUBJECT: Forwards rept on micaceous gneiss layer & schistose zone requested by NRC during 781208 insp of main dam coretrench. Concludes micaceous gneiss layer & schistase zone cannot be capable of faults.W/photo & 4 oversize drawings.

DISTRIBUTION CODE: B001B COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 12
TITLE: PSAR/FSAR AMDTS AND RELATED CORRESPONDENCE.

NOTES: SEND ORIGINAL PHOTO & DRWGS TO GEOSCIENCES BR.

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
ACTION:	05 PM MINER	1	1	AD VASSALLO	1	0
	BC LWR #3	1	0	LA LWR #3	1	0
INTERNAL:	01 REG FILE	1	1	02 NRC PDR	1	1
	06 I & E	2	2	08 OPERA LIC BR	1	1
	09 GEOSCIEN BR	1	1	10 QAB	1	1
	11 MECH ENG BR	1	1	12 STRUC ENG BR	1	1
	13 MATL ENG BR	2	2	15 REAC SYS BR	1	1
	16 ANALYSIS BR	1	1	17 CORE PERF BR	1	1
	18 AUX SYS BR	1	1	19 CONTAIN SYS	1	1
	20 I & C SYS BR	1	1	21 POWER SYS BR	1	1
	22 AD SITE TECH	4	4	26 ACCDNT ANLYS	1	1
	27 EFFL TRT SYS	1	1	28 RAD ASMT BR	1	1
	29 KIRKWOOD	1	1	AD FOR ENG	1	0
	AD PLANT SYS	1	0	AD REAC SAFETY	1	0
	AD SITE ANLYSIS	1	0	DIRECTOR NRR	1	0
	MPA	1	0	OELD	1	0
EXTERNAL:	03 LPDR	1	1	04 NSIC	1	1
	30 ACRS	16	16			

May CCP

Ltr
MOORE
EPB #2 BC
5 BAJWA
EPB #2 LA

Oversized drawings & photos not reed files. Sent to Geosciences Br.

FEB 8 1979

TOTAL NUMBER OF COPIES REQUIRED: LTTR 55 ENCL 45

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

MEMORANDUM FOR: TERA Corp.

FROM: US NRC/TIDC/Distribution Services Branch

SUBJECT: Special Document Handling Requirements

☐ 1. Please use the following special distribution list for the attached document.

☑ 2. The attached document requires the following special considerations:

- ☐ Do not send oversize enclosure to the NRC PDR.
- ☑ Only one oversize enclosure was received - please return for Regulatory File storage.
- ☐ Proprietary information - send affidavit only to the NRC PDR
- ☐ Other: (specify)

REGULATORY DOCKET FILE COPY.

Mike Collins

TIDC/DSB Authorized Signature

cc: DSB Files

February 2, 1979

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, D. C. 20555

SHEARON HARRIS NUCLEAR POWER PLANT, UNIT NOS. 1, 2, 3, AND 4
DOCKET NOS. 50-400, 50-401, 50-402, AND 50-403
GEOLOGICAL FEATURES IN THE MAIN DAM CORE TRENCH

Dear Mr. Denton:

Attached is a report on a micaceous gneiss layer and a schistose zone that was requested from Carolina Power & Light Company by Mr. Tom Cardone, NRC Staff Geologist, during his inspection of the main dam core trench on December 8, 1978.

As indicated in the report, the evidence demonstrates that the micaceous gneiss layer and schistose zone in question originated about the same time as the nearby schistose zones at the main dam conduit wall. We have previously documented that the latest deformation-mineralization processes for these zones occurred over 225 million years ago. Therefore, CP&L concludes that this particular micaceous gneiss layer and schistose zone cannot be capable faults as defined in Appendix A to 10CFR100.

Yours very truly,

M. A. McDuffie

M. A. McDuffie
Senior Vice President
Engineering & Construction

JJS/mf
Attachment

cc: Mr. J. C. Bryant

Boo1 5E 1/1
send original photo & drwgs to Geosciences BR

A

SHEARON HARRIS NUCLEAR POWER PLANT UNITS NOS. 1, 2, 3 AND 4
GEOLOGIC REPORT ON GNEISS LAYER 63 AND SCHISTOSE ZONE 82
AT MAIN DAM

The following is a report on a micaeous gneiss layer (designated 63) and a schistose zone (designated 82), requested from CP&L by Mr. Tom Cardone, NRC Staff Geologist, during his inspection of the Main Dam core trench on December 8, 1978.

To determine the nature of these two features, the northwest side of the core trench, from Sta. 3+60 to 2+90, and the northwest wall of the trench, from Sta 3+15 to 2+90, were mapped at a scale of 1 inch = 5 feet. The area where Schistose Zone 82 passes under the conduit below Sta 3+60 had been mapped earlier at 1 inch = 10 feet. The following is a description of the two features as documented by the geologic plan of the southeast side of the trench (Figure 2), the geologic plan of the northwest side of the trench (Figure 2B, the geologic section (Figure 2C), where Zone 82 passes into the wall, the key (Figure 3) and photo 1.

Micaeous Gneiss Layer 63

Excavation of the softer rock has created a depression along the gneiss layer from above core-trench Sta 2+90 to Sta 3+32 where the micaeous gneiss grades into the country rock (See Figure 2B and Photo 1). Additional areas of the gneiss beyond Sta 2+90 will be exposed as the upper part of the trench is cleaned. The gneiss is 3 to 12 inches wide, strikes almost parallel to the trench, and dips toward the northwest wall of the trench. At both contacts the micaeous gneiss grades into the surrounding, harder, fine-grained, hornblende-mica gneiss. Foliation in the micaeous gneiss layer is concordant across the lithologic contact with the hornblende-mica gneiss; the contacts are sinuous rather than planar. The concordant foliation and sinuous contacts show that the contacts are not faults. However, even if we assume that faulting occurred, the movement must have taken place along a plane or group of planes roughly parallel to the plane of foliation of the hornblende-mica gneiss country rock and is very ancient, as shown by the following:

1. Four northeast-trending fractures (76 & 77 cross the micaeous gneiss layer between Stations 3+00 and 3+05 without offset.

2. The segment of Fracture Zone 17, striking N80°W, crosses the micaeous gneiss layer without offset. The relative age of Fracture Zone 17 is known from its relationship to Fault Group D, in that the fault group is part of the N40°W-segment of the Fracture 17 conjugate pair. (See Figure 2 and Item 17 in key, Figure 3.) Fault Group D is post-dated by a large biotite pod (41), a product of late Paleozoic hydrothermal activity, as outlined in an earlier report. Therefore, the micaeous gneiss layer at 66 is older than the fracture zone, which is, older than the biotite pod.

<u>Schistose Zone 82</u>

The schistose zone is exposed in the core trench, in a second depression extending from beyond the diversion conduit-core trench intersection to where the zone passes into the trench wall at Station 3+10 (See Figures 2B, 2C and Photo 1). The zone is composed of a blackish-green mica schist, a gradational lithology between the fine-grained hornblende-mica gneiss along the south contact and the strongly foliated, quartz-feldspathic gneiss with thin schistose layers along the north contact. Large quartz pods (60) are common within the mica schist. They have been folded and contain little or no feldspar, indicating that the pods represent a different and older generation of quartz than that associated with feldspar and biotite in the northeast trending veins and gashes (81).

The following lines of evidence indicate that the mica-schist schistose zone resulted from deformation, rather than faulting, which occurred during Late Paleozoic regional tectonic events:

1. There is no mesoscopic evidence for brittle failure in the gneissic rock. Both the hornblende-mica gneiss and the quartz-feldspathic gneiss show strong foliation from regional metamorphism. There are no distortions of schistosity in the schistose zone that are related to brittle deformation along either contact.

2. The mica schist schistose zone represents a gradational lithology between the surrounding fine-grained hornblende-mica gneiss and the quartz-feldspathic gneiss.

3. The schistose zone is folded with the surrounding country rock.

4. The contacts of the schistose zone are sinuous, not planar.

However, despite this evidence, if we assume that faulting occurred, it was very ancient, based on the following:

1. Fractures (78. & 80) and a gash filled with quartz and feldspar (81) cross the south contact of the zone, without offset.

2. While veins, pods, or lithologic units do not completely cross the schistose zone, neither are they truncated at the contacts.

The above evidence demonstrates that Micaeous Gneiss Layer 63 and Schistose Zone 82 originated about the same time as the nearby schistose zones at the conduit wall, for which we documented that the latest deformation-mineralization processes occurred over 225 million years ago. Please see previous reports to the NRC, "Geological Feature at the West Wall of Main Dam Diversion Conduit", dated October 17, 1978, and January 19, 1979. Thus, we conclude that Micaeous Gneiss Layer 63 and Schistose Zone 82 cannot be capable faults as that term is defined in Appendix A to 10 CFR 100.

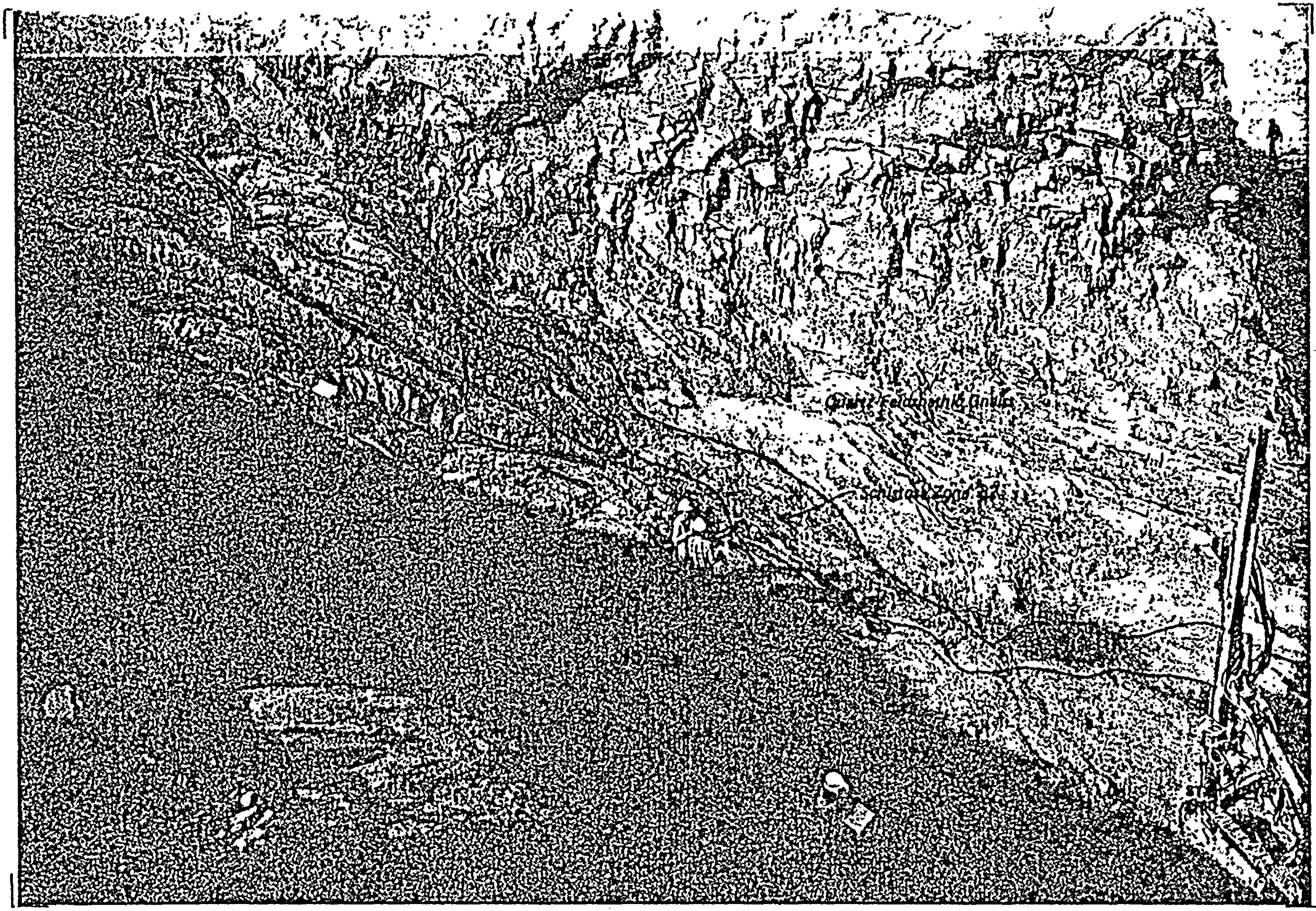

PHOTO 1

Core trench, Stations 2+90 to 3+80. Northwest View.

No. SHNPP Main Dam 1/79–1 11/10/78

FIGURE 3

KEY TO PLAN GEOLOGIC MAP
CORE TRENCH
STATION = 2+90 TO 3+90
DOWNSTREAM SIDE OF CENTERLINE
SCALE: 1 INCH = 5 FEET
(REVISED 12/20/78)

A. Fault A — Oriented N34E 75SE. Terminates within core trench.
Fault A_2 — Oriented N34E 81SE.
Fault A_3 — Oriented N40E 82SE. Terminates within core trench.
B. Fault Group B — En echelon set of four fractures with an average strike of N80E.
C. Fault C — Average orientation of N20E and a steep dip to the SE.
D. Fault Group D — Four closely-spaced fractures with an average orientation of N40W.

1. Fault A terminates.
2. Aplite dikelite.
3. 1.0 inch of right-lateral strike separation of aplite dikelet.
4. 3.0 inches of right-lateral strike separation of aplite dikelet.
5. 3.8 inches of right-lateral strike separation of aplite dikelet.
6. 1.0 inch of right-lateral strike separation of aplite dikelet.
7. 6.0 inches of right-lateral separation of aplite dikelet along Fault A .
8. 3.0 inches of right-lateral strike separation of epidote vein along Fault A .
9. Epidote vein 1 to 3 inches wide. Reaches maximum width between Stations 3+20 and 3+30.
10. Epidote vein 0.5 to 2.0 inches wide. Near Station 3+21, epidote vein intersects a NW-trending fracture which is filled with a dark green-gray mineral with a thickness of 1 to 5 mm.
11. Quartz-feldspar vein.
12. No offset of the mineral-filled NW-trending fracture.
13. Aplite dikelet.
14. Aplite dikelet terminates.
15. Massive biotite vein, 2 to 3 inches wide. Exposed along two parallel NE-trending fractures.
16. Pods of granitic pegmatite very similar in texture and mineralogy to the granitic gneiss.
17. Zone of highly-fractured rock, 2 to 8 inches wide. This zone is formed by the intersection of a conjugate pair of fractures. The average orientation of the conjugate pair is N40W 70NE and N75W 55SW. Slickensides on some of the N40W planes were observed to have the same orientation as those of Fault Group D. A quartz-feldspar vein on the upstream side of the core trench was observed to cross the fracture zone with no offset.
18. Quartz-feldspar vein. The vein crosses the aplite dikelet with no offset. Crystal growth is perpendicular to the vein wall.
19. Fracture is completely healed and can be traced no further.
20. Small granitic pegmatite lens.
21. Epidote vein, 3 to 5 inches wide.
22. Epidote vein bifurcates into two fractures with no epidote along either fracture.
23. Epidote vein thins into fracture with little or no mineralization.
24. 9.0 inches of right-lateral strike separation of the epidote vein along Fault C .
25. Epidote vein, 1 to 2 inches wide, which thins to a fracture with a thin mineralized layer.
26. 4.0 inches of right-lateral separation of the epidote vein along Fault C . Some right-lateral drag observed along the trace of the fault plane.
27. Fault C cannot be traced beyond this point.
28. Southeast end of a quartz-feldspar vein.
29. Closely-spaced set of joints.
30. Closely-spaced set of joints with average strike and dip of N40E and 40SE respectively.
31. Fault A terminates.
32. Closely-spaced set of joints trending about N30W and dipping steeply to the NE.
33. Fault C bifurcates and becomes a single fracture where it offsets epidote vein (No. 25).
34. Granitic pegmatite lens is offset by less than one inch by a NW-trending fracture that terminates locally.
35. Small granitic pegmatite pods.
36. 2.2 feet of right-lateral strike separation of granitic pegmatite pod along Fault Group D.
37. Fault A_2, which displaces small epidote and quartz-feldspar veins. Orientation and sense of strike separation is the same as Fault A .
38. 1.0 inch of right-lateral strike separation of a quartz-feldspar vein along Fault A_2.
39. 2.5 inches of right-lateral strike separation of an epidote vein along Fault A_2.
40. 4.0 inches of right-lateral strike separation of a quartz-feldspar vein along Fault A_2.
41. Large biotite pod, with some quartz along its edge, which has been deposited across Fault Group D and is not offset.
42. Fault Group D terminates at the biotite pod.
43. Massive biotite vein.
44. NE-trending fracture with similar orientation to Faults A and A_2.
45. NE-trending fracture with similar orientation to Faults A and A_2.
46. Epidote veinlet with less than 1.0 inch of right-lateral strike separation along Fault C .
47. Fault A_2 terminates.
48. Aplite dikelet.
49. Intersection of Fault A_3 and a fracture with similar orientation to Fault C .
50. 4.0 inches of right-lateral strike separation of an epidote vein (No. 9) along Fault A_3.
51. Fault A_3 cannot be traced beyond this point.
52. Fault A_3 terminates.
53. NE-trending fractures, with a similar orientation to that of Fault A_3, crossing epidote vein (No. 9) with no offset.
54. NE-trending fractures, with a similar orientation to that of Fault A_3, crossing epidote vein (No. 9) with no offset.
55. Aplite dike.
56. Quartz-K-feldspar-biotite vein (pegmatitic) which projects across a fracture of Fault A-type orientation with no offset.
57. Fracture filled with a 1 to 4-inch thickness of quartz, opaques, aplitic material, and epidote.
58. Fault C terminates.

FIGURE 3 (Continued)

59. Quartz-feldspar vein associated with massive biotite. In some places biotite is weathered, leaving voids in the quartz. Feldspar crystals are perpendicular to vein walls.
60. Quartz is folded in the blackish-green mica schist.
61. Quartz-feldspar vein which definitely crosses fracture zone (No. 17) with no offset.
62. Small quartz-feldspar pod.
63. Micaceous gneiss layer, 2 to 8 inches wide. Foliation is concordant across the micaceous gneiss into the more massive hornblende-mica gneiss along both contacts.
64. Micaceous gneiss layer, 3 to 12 inches wide, within the hornblende-mica gneiss. The layer represents a minor compositional change within the gneiss. Foliation is concordant across the layer into the more massive hornblende-mica gneiss along each contact.
65. Thin micaceous gneiss layer 1 to 3 inches wide. This layer appears to be an extension of No. 63.
66. The N80W orientation of the fracture zone (No. 17) definitely crosses the quartz-feldspar vein and the surrounding country rock. The exposure of the vein is irregular, but the vein definitely is not offset by the fracture zone. No slickensides were observed on a joint face in the quartz vein.
67. Quartz-feldspar-biotite vein with feldspar crystals perpendicular to vein walls. Biotite and feldspar around the quartz is altered.
68. Small quartz-feldspar-biotite pod.
69. Quartz-feldspar filled gash.
70. Quartz-feldspar pod.
71. Quartz-feldspar-biotite pod. Possibly tension gashes, filled with pegmatitic quartz, feldspar, and biotite.
72. Quartz pods associated with a small amount of fine-grained dark-green biotite.
73. (Same as 72).
74. Quartz pod in quartz-feldspar gneiss with blackish-green mica schist folded around the quartz.
75. Quartz pod folded within the quartz-feldspar gneiss.
76. NE-trending fractures cross the thin micaceous gneiss layer with no offset.
77. NE-trending fracture crosses thin micaceous gneiss layer with no offset.
78. NE-trending fracture crosses into blackish-green mica schist with no offset.
79. Micaceous gneiss layer grades into more massive hornblende-mica gneiss.
80. NW-trending fracture crosses the south contact of the blackish-green mica schist with no offset, and is terminated by the large biotite pod (No. 41).
81. Quartz-feldspar-biotite vein crosses the south contact of the blackish-green mica schist.
82. Layer of blackish-green mica schist which grades into a fine-grained hornblende-mica gneiss along the south contact and into a medium-grained quartz-feldspathic gneiss with thin mica-schist layers along the north contact. Within the blackish-green mica schist large pods of folded quartz are exposed. Foliation is concordant across the mica schist-gneiss contacts, indicating that the mica schist has been folded with both gneissic units. Mineralogically, the blackish-green mica schist is similar to the thin mica schist layers that define the well-developed folds in the quartz-feldspathic gneiss.
83. L_1 — Lineation-fold axis of broad warps.
84. Closely-spaced NE-trending joints.
85. Quartz pod.
86. Joint, N81W 52NE, with iron stains.
87. Joint, N85 W 72NE, open and continuous. This joint crosses the mica schist with no offset.