Appendix: Core analysis data record, list of measured sections, sampled areas and field notes, Copper River basin area, in Powell, Doug, and Amoco Oil Co., Geological report to the Ahtna Corporation, Copper River basin, Alaska, 1975

Amoco Oil Co.

GMC DATA REPORT 455B

This GMC data report from the Amoco Heritage collection has been made available through funding from the FY2018 USGS National Geological and Geophysical Data Preservation Program, Grant Number G18AP00054. This project report is presented in its original format and has not been reviewed for technical content or for conformity to the editorial standards of DGGS. It should not be used or cited as reviewed data.

2019
State of Alaska
Department of Natural Resources
Division of Geological & Geophysical Surveys
GEOLOGIC MATERIALS CENTER

5420X

Small Core

Lab. No. 4790
Date 12-9-74

Core Analysis Data Record

1 1974 Alaskan Field Party Field Copper River Basin State Alaska

Sample Number	Sample Position in Depths Section	Sample No. Description	Permeability-Millidarcys Horizontal	Permeability-Millidarcys Vertical	Effective Porosity	Saturation % Pore Oil	Saturation % Pore Water	Grain Density
A	40' above base	CR-30-L	<.05		3.2			2.56
B	48' above base	CR-31-L	131.		3.5			2.72
C	20' above base	CR-54-L	3.15		12.4			2.59
D	Grab	CR-55-L FR	1874.		12.0			2.52
E	Base of 100' sec.	CR-60-L	.85		11.3			2.72
F	Not indicated	CR-63-L	2.11		6.0			2.67
G	65' above base	CR-64-L	2.51		8.6			2.66
H	190-200 above base	CR-77-L	1.13		15.6			2.63
I	9580+	CR-91-L FR	11.9		3.5			2.66
J	0-150'	CR-92-L	<.05		1.3			2.67
K	1150'	CR-104-L	.18		5.6			2.60
L	Grab	CR-113-L	3.80		9.6			2.66
M	Grab	CR-128-L	3.49		15.5			2.69
N	Grab	CR-134-L	.32		3.2			2.67
O	0-100'	CR-172-L	55.8		9.9			2.66
P	400-410'	CR-195-L	38.5		19.4			2.66
Q	100'	CR-1025-L	<.05		4.9			2.50
R	2210'	CR-1047-L	<.05		4.5			2.57
S	2350'	CR-1049-L	.30		4.5			2.64
T	2675'	CR-1050-L	<.05		4.6			2.60
U	0'	CR-2010-L	1.55		6.8			2.54
V	0'	CR-2010-L	3.12		10.9			2.65
W	1000'	CR-2020-L	.39		11.4			2.67
X	9315	CR-2111-L(2)	.44		9.8			2.63
-	9330	CR-2111-L(1)	.18		7.4			2.63

cc: J. A. Momper
P. H. Garrison
W. W. Owens
C. D. Davis, Jr.

D. M. Buchanan

LIST OF MEASURED SECTIONS AND SAMPLED AREAS, COPPER RIVER BASIN AREA

Sections keyed by number to geologic map, field notes, and enclosures in wallet.

1. Syncline Mountain
1a Sheep Mountain - Inoceramus Creek } composite
1b Sheep Mountain - Gunsight Creek
2. Northeast Syncline Mountain; Section No. 2 of Grantz, 1953, USGS
3. Lower Gunsight Creek; Section No. 3 of Grantz, 1953, USGS
4. Limestone Gap (Bubb Creek); Section No. 4 of Grantz, 1953, USGS
5. White Hill; Section No. 5 of Grantz, 1953, USGS included in Amoco Section
6.ε a Upper Little Nelchina River; Section No. 6 of Grantz, 1953, USGS ε Amoco Section
7. Caribou Creek; Section No. 7 of Grantz, 1953, USGS
8. Mouse Creek
9. Chitna Creek
10. Limestone Gulch and 10a Billy Creek No. 1 ε No. 2 composited section
11. Mazuma Creek (~~grab sample only~~) plotted 11-17-75
12. Upper Bubb Creek (~~grab sample only~~) plotted 11-19-75
13. North Horn Mountain (grab sample only)
14. Crooked Creek (~~no section plotted~~) plotted 11-17-75
15. Meyer Creek
16. Lower Flat Creek
17. Lower Bubb Creek (~~no section plotted~~) plotted 11-17-75
18. North Little Nelchina River
19. Little Nelchina River (60 - Sh. 7) L.S. Rulla, 1960
20. Idaho Creek
21. South Tributary of Upper Tyone Creek
22. East Horse Pasture Pass
23. Headwaters, Little Oshetna River plotted 11-14-75
24. Little Oshetna River
25. East Conglomerate Creek
26. Cardioceras Creek (~~grab sample only~~) plotted 1-30-76
27. Red Fox Creek (no section plotted)
28. West White Sand Creek
29. East White Sand Creek
30. Yacko Creek
31. Tyone Creek (grab sample only)
32. Joe Creek East (grab sample only)
33. McClaren Glacier, East (grab sample only)
34. East Richardson Highway (grab sample only)
35. McCallum Creek plotted 11-17-75
36. Phelan Creek
37. West Fork Chistochina River
38. Coal Creek (~~grab sample only~~) plotted 11-17-75
39. Snider Peak
40. Chetaslina River
41. Cheshnina River
42. Limestone Creek
43.a&b North of Kotsina River
44. West Upper Sheep Creek
45. Lower Sheep Creek

46. Upper Sheep Creek
47. MacDougall Creek, USGS and Pan Am Sections
48. Trail Creek
49. Kuskulana Pass
50. Chokosna River
51. Northeast Alice Peak (grab sample only)
52. East Taral Lake } composite USGS sections
53. Chitina River }
54. Kuskulana Pass (~~grab sample only~~) Plotted 1-30-76
55. Bear Creek
56. Nizina River
57. Northeast Nikolai Mine (~~no section plotted~~) Plotted 11-14-75
58. Lubbe Creek
59. Regal Glacier
60. Contact Gulch
61. Copper Creek } Composite
62. MacColl Ridge }

SYNCLINE MOUNTAIN - SHEEP MOUNTAIN SECTION
SYNCLINE MOUNTAIN PORTION: SESE SEC. 12, NWNE, NWSWNE, SESENW, E/2 E/2 SW SEC. 13, E/2 E/2 Sec. 24, NENW, N/2 SENW Sec. 25, T21N, R10E, SM
ANCHORAGE QUADRANGLE (D-2), ALASKA

DATES: Saturday Afternoon, Sunday and Monday Afternoon, July 27-29, 1974

WEATHER: Saturday, 60°F, clear, sunny and very windy.
Sunday, 55°F, CAVU.
Monday, 40°F, zero visibility, operational at 12:30 P.M.

REMARKS: Composited section. Measured (estimated) and sampled down section from top of Syncline Mountain at VABM Fred-elevation 5471; down north tributary of Squaw Creek. Most of lower half of section obtained on the north flank of Sheep Mountain along Inoceramus Creek and basal part traversed on Gunsight Creek, a north flowing tributary of Squaw Creek on the northeast flank of Sheep Mountain.

BY: Dave Loney, Grant Street and Doug Powell (part time).

UPPER CRETACEOUS

MATANUSKA FORMATION

0-10' Sandstone, mainly fine-to medium-grained, dirty, silty, subrounded, (?) fair porosity.
CR-86L at 0' float at top of section.
CR-2010L at 0'

10-100' Shale, medium-grey, weathers lighter grey, platy to fissile, some rusty-colored silty stringers.
CR-2011P at 20'
CR-2012P at 100

100-450' Shale as above, mainly covered to 400' with shale talus close to being in place? Probable interbeds of sandstone. At 150' a sandstone bed, a few feet in thickness, medium-grained, medium-bedded, with some shale chips and grains, argillaceous, slightly more resistive than above, medium-sorted, sub-rounded, calcareous and tight.
CR-2013P composite 100-200'
CR-2014P composite 300-400'

450-550' Shale, medium-grained, fissile, weathers recessive. Good outcrop of massive sandstone and platy sandstone with shale partings 470-500'. Sandstone is fine-grained, dirty.
CR-2015P composite 450-550 of shale

550-650' Predominantly shales, medium-grey, fissile to platy with a few interbeds of siltstone, and interbeds of sandstone as above.
CR-2016P composite 550-650'

650-800' Shale, medium-grey, platy, as above.
CR-2017P composite 650-800'

800-900' Shale, as above. At 850': a thin-bedded siltstone, medium grey, weathers rusty, calcareous, slightly more resistive than above. From 850-880': interbeds of calcareous siltstones in grey shales. At 880: calcareous siltstone showing very good ripple marks with some scour-cut and fill, etc., tight.
CR-2018P composite 800-900'

Sunday - July 20, continuing down ridge in direction S15°E.

900-1000' Sandstone (900-920'), grey to brown, fine-grained, with black flecks, biotitic, subrounded, tight, shale partings, some interbeds of siltstone, brown, platy shale predominates from 920-990' at 990' top of a thick bed of sandstone in shales, medium-grey, very fine-grained, argillaceous, biotitic, very well indurated. A few shelly fragments were seen in scree.
CR-2019P composite 900-1000'

1000-1100' Sandstone, as 990-1000', predominates with siltstone and shale interbeds.
CR-2020L at 1000' 11.4% porosity and permeability of .39 md.
CR-2020P composite 1000-1100'

1100-1300' Sandstone, grey, very fine-grained, argillaceous, platy, with shale and siltstone interbeds. Mainly recessive.
CR-2021P composite 1200-1300' of shales and siltstones.

1300-1400' Shale, becomes predominant, grey to brown, weathers grey, platy, silty in part, recessive, interbeds of sandstone, very fine-grained, silty, very argillaceous, platy. All lithologies are non-calcareous.
CR-2022P composite 1300-1400'

1400-1500' Shale, as above, some of the sandstone interbeds have shale partings and chips. Shales are recessive. At 1485' shales are very calcareous in part.
CR-2023P composite 1400-1500'

1500-1600' Shales, grey, recessive with interbeds of siltstone and very fine-grained sandstones.
CR-2024P composite 1500-1600'

1600-1800' Shales, as above, becoming more resistant to cliff-forming in places, with some sandy lenses, and some interbeds at 1650' and 1680' of siltstone and very fine-grained sandstone, grey, weathers brown, argillaceous and platy. A few limestone concretions are present in upper 100'. A 10' sandstone at 1780' is very fine to medium-grained, massive, in part fines upward, (?) ripple marks, with some shale clasts and shale interbeds. Becomes recessive to covered at 1800'.
CR-2025P composite 1600-1700'
CR-2026P composite 1700-1800'

1800-1900' Shale, with some strong bed contortions (4" scale).
CR-2027P composite 1800-1900'

1900-2000' Shale, medium-grey, calcareous, platy to blocky with some siltstone interbeds, grey, calcareous, and some rusty, thick-bedded, well-indurated bands of shale.
CR-2028P composite 1900-2000'

2000-2300' Shale, medium-grey, platy, uniform texture, non-calcareous, recessive, much covered.
CR-2029P composite 2000-2100'
CR-2030P composite 2100-2200'
CR-2031P composite 2200-2300'

2300-2500' Shale, as above, with some calcareous interbeds of shale. Trace of poor pelecypod shells in limestone concretions (up to 2' across).
CR-2032P composite 2300-2400'
CR-2033P composite 2400-2500'

2500-2600' Shale, as above, no concretions with a 1' bed of sandstone at 2540', grey, weathers brown, fine-grained, hard, calcareous.
CR-2034P composite 2500-2600'

2600-2700' Shale, as above, with concretions. Sandstone at 2650-2660', greenish-grey, fine-grained, argillaceous, recessive, tight.
CR-2035P composite 2600-2700'

2700-2800' Shale, as above, attitude disturbed through questionable slumping. Some calcareous, massive interbeds and limestone concretions.
CR-2036P composite 2700-2800'

2800-2900' Shale, as above with trace of (?) fossil impressions and shelly material, calcareous.
CR-2037P composite 2800-2900'

2900-3000' Shale, as above, slightly calcareous in part, platy-to nodular-weathering in part.
CR-2038P composite 2900-3000'

3000-3100' Shale, as above, at 3020' some interbeds of siltstone to sandstone, grey, fine-grained, thin-bedded, well-indurated, calcareous in part, tight.
CR-2039P composite 3000-3100'

3100-3200' Shale, as above, with 4" to 2' diameter limestone concretions, some aragonite shell fragments. Recessive.
CR-2040P composite 3100-3200'

3200-3300' Shale, as above, trace of fossil material, some interbeds of calcareous shale.
CR-2041P composite 3200-3300'

3300-3400' Shale, medium-grey, platy, silty, calcareous in part, with lensing concretions to 10' diameter, massive, weathers blocky.
CR-2042P composite 3300-3400'

3400-3600' Shale, as above, some grey, slightly calcareous in part, siltstone beds. Recessive and mostly covered. At 3500' a thin coguina bed. Bedding attitude - strike N85°E, dip 13°N. Lower part mainly covered by shale talus, small shell fragments in scree.
CR-2043P composite 3400-3500'
CR-2044P composite 3500-3600'

3600-3700' Shale, as above, silty in part, large sandstone concretions.
CR-2045P composite 3600-3700'

3700-3900' Shale, as above, poor outcrop, with rusty weathering sandy concretions.
CR-2046P composite 3700-3800'
CR-2047P composite 3800-3900'

3900-4000' Covered.

Monday, July 29.

4000-4200' Shale, as above, with some limestone concretionary bands, very recessive, no fossils seen. Only few scattered shale outcrops in lower half of interval.
CR-2048P composite 4000-4100'
CR-2049P composite 4100-4200'

4200-4300' Shale, as above, with some thin clay (brown, silty, friable) bands. At 4255' a 2 1/2" diameter, 21" long, calcareous cylinder.
CR-2050P composite 4200-4300'

4300-4400' Shale, as above, beds greatly steepen up - locally to 60° to north.
CR-2051P composite 4300-4400'

4400-4900' Covered by trees and grass.

4900-5200' Shale, as above, very poor local outcrops.
CR-2052P at 4900'
CR-2053P(A) composite 4950-5000'
CR-2053P(B) composite 5000-5190'

5200-5275' Conglomerate at 5200' with pebbles up to 6", matrix is of siltstone and very fine-grained sandstone, calcareous, then some medium-bedded sandstone, S&P, calcareous with limestone concretions, micaceous shale chips, fair porosity, followed by shale, black to dark grey, non-calcareous then more interbeds of conglomerate and sandstone. Within a 75' interval there are 3 conglomerate beds 1'-9' thick with interbeds of sandstone and predominantly shale. Lowest conglomerate is an 8' unit at 5250'. Beds are dipping almost vertically and may be faulted.
CR-2054P composite 5200-5220'
CR-2055L at 5210'
CR-2056P composite 5220-5250'

5275-5500' Covered.

5500-5510' Shale, grey, recessive. Bedding attitude here N45°E, dipping variably from 30°-60° to west.
CR-2057P at 5500'

5510-5545' Covered.

5545-5550' Siltstone, medium-grey, calcareous thin-bedded, well indurated.

End Syncline Mountain part of section at Squaw Creek. Continued up north flank of Sheep Mountain along INOCERAMUS CREEK IN SENW, SE/4 SEC. 25, T21N, R10E, SM, AND SWSW SEC. 30, NW/4, NENESW AND NWSE SEC. 31, T21N, R11E, SM.

DATES: Tuesday and Thursday, July 30 and August 1, 1974
WEATHER: Tuesday, 40-45°F, Broken low clouds and clearing. Thursday, 60°F, scattered clouds.

REMARKS: Inoceramus Creek was measured upsection. Field notes have been rewritten as if down.

5550-5600' Shale, medium-grey, recessive, with limestone concretion zones (concretions contain aragomite fossil material). This zone fits on the end of the Syncline Mountain section.
CR-2099P composite 5550-5600'

5600-5950' Covered.

5950-6200' Shale, grey, non-calcareous, with limestone concretions, good cone-in-cone structures in concretions. Small scale faulting, slickensides, cylindrical fossils, and very irregular bedding at 6150', difficult to follow.
CR-2098P at 5950'
CR-2097P composite 5950-6150'
CR-2096P at 6150'
CR-2095P composite 6050-6100'
CR-2094P composite 6050-6100'
CR2093P composite 6000-6050'
CR-2092P composite 6000-6100'
CR-2091P composite 6100-6200'
CR-2090P at 6200'

6200-6450' Shale, grey non-calcareous, irregular bedding attitude, some section being lost. There are few outcrops and samples are very badly weathered. At 6450' all beds are becoming much more horizontal to even dipping slightly to the east. Footages here are in question due to inconsistent altitude.
CR-2089P composite 6200-6300'
CR-2088P composite 6250-6350'
CR-2087P composite 6350-6450'

6450-7050' Shale, grey, non-calcareous. There is a fault running down valley gorge. On one side (north side) the beds are shallow-dipping; on the other (south side) the beds are very steeply dipping.
CR-2086P composite 6450-6550'
CR-2085P composite 6550-6650'
CR-2084P composite 6650-6750'
CR-2083P composite 6750-6850'
CR-2082P composite 6850-6950'
CR-2081P composite 6950-7050'

7050-7650' Shale, grey, non-calcareous, recessive, poor outcrops, interval mainly covered, outcrops scattered, becoming fewer.
CR-2080P composite 7050-7150'
CR-2079P composite 7150-7250'
CR-2078P composite 7250-7350'
CR-2077P composite 7350-7450'
CR-2076P composite 7450-7550'
CR-2075P composite 7550-7650'

7650-8750' Shale, gray, non-calcareous, blocky, with calcareous concretions. Bedding dipping to near vertical; mainly recessive; a few shells.
CR-2074P composite 7650-7750'
CR-2073P composite 7750-7850'
CR-2072P composite 7850-7950'
CR-2071P composite 7950-8050'
CR-2070P composite 8050-8150'
CR-2069P composite 8150-8250'
CR-2068P composite 8250-8350'
CR-2067P composite 8350-8450'
CR-2066P composite 8450-8550'
CR-2065P composite 8550-8650'
CR-2064P composite 8650-8750'

8750-8850' Shale, as above, considerable calcite veining and concretions; bedding here dipping to almost vertical in places.
CR-2063P composite 8750-8850'

8850-8950' Shale, as above, some 1/2-inch cross-cutting calcite veining; some concretionary zones.
CR-2062P composite 8850-8950'

8950-9050' Predominantly shale, gray, non-calcareous, blocky, recessive with calcareous concretion bands and blocks; trace of fossils.
CR-2061P composite 8950-9050'

9050-9150' Shale, as above, but calcareous in part, blocky, recessive: some Inoceramus shells - very difficult to recover. Bedding attitude N20°E/60°NW.
CR-2060P composite 9050-9150'

9150-9205' Interval predominantly shale, medium-grey, non-calcareous, with a few limestone concretions; mainly recessive; poor outcrops.
CR-2059P composite 9150-9205'

9205-9250' Siltstone to very fine-grained sandstone, going to a medium-grained sandstone in part; grey-green, calcareous in part, massive, bedding indistinguishable.
CR-2058P composite 0-45

End, Inoceramus Creek section: Moving eastward over to Gunsight Creek where Kssb unit of Matanuska Formation (Cenomanian age, Grantz, 1965) overlies Talkeetna.

Continue Gunsight Creek Section - do not start new section on new paper.

GUNSIGHT CREEK SECTION
NWNE, NENE SEC. 3, T21N, R11E SM
ANCHORAGE (D-1) QUADRANGLE, ALASKA

BASAL MATANUSKA

DATES: Thursday and Friday, August 1-2, 1974
WEATHER: Thursday, 60°F, scattered clouds: Friday, 50°F, rain and low clouds early, operational about 11:00 A.M.

REMARKS: Measured up-section but rewritten as if down-section.

9250-9258' Shale, grey, calcareous in part, calcareous concretions with fossils.
CR-2113P composite, estimated at 9270-9285 +

9285-9335' Sandstone, flaggy, fossiliferous, porous, few wood fragments; porosity 9.8%, permeability 0.44 mds. upper part: porosity 7.4%, permeability 0.18 mds. lower part.
CR-2110F fossils collected from talus, 9285-9290
CR-2112L composite 9285-9365
CR-2111L1 sandstone for p&p 9315
CR-2111L2 sandstone for p&p 9330

9335-9365' Sandstone, slightly calcareous in part, fine-grained, grey, hard, thin-bedded to massive, worm trails.
CR-2109P 9363

9365-9367' Shale, splintery.
CR-2108P 9365

9367-9368' Sandstone, one bed, grey, very fine-grained, glauconitic, worm browsings; ammonites, Inoceramus, all in talus.

9368-9425' Covered.

9425-9475' Shale, recessive, poor sample, mainly covered.
CR-2107P composite 9425-9475 (poor sample)

August 2, 1974. Continuing up-section on Gunsight Creek (recorded below as if going down-section).

9475-9520' Shale, recessive, grey-brown, platy, interval partly covered, poor samples.
CR-2106P 9510
CR-2105P 9520

9520-9540' Sandstone, very fine-grained, greenish-grey, blocky weathering, concretionary zones, hard, laterally persistant.
CR-2104P 9530

9540-9550' Shale, grey, silty, recessive, the shale grades up into sand (soft, shaley).

9550' Unconformity.

REMARKS: Approximately 100 feet of massive Talkeetna Formation (Upper Jurassic) forms a cliff along Gunsight Creek. Attitude of the Talkeetna beds is N10°W, 25°E.

9550-9570' Sandstone, green, very fine-grained, to siltstone, hard, tite (volcanic), overlain by sandstone, medium-to coarse-grained, green, hard.
CR-2100P composite 9560-9570'

9570-9590' Sandstone, grey, conglomeratic, pebbly, composed of igneous material.
CR-2101P breccia-conglomerate 9580'
CR-91L conglomerate 9580 +

REMARKS: Additional samples were taken from the Talkeetna Formation on Inoceramus Creek, SWNWSE Sec. 31, T21N, R11E SM. Sampled down-section; contact not seen.

9590-9670' Pyroclastic rocks.
CR-88L composite 9550-9650'

9670-9700' Shaley siltstone to shale, varicolored greys, reds, purplish-green, brown.
CR-87P shaley siltstone 9680'

End section.

(5)

WHITE HILL SECTION
SESE SEC. 35, T24N, R11E, and E/2E/2SW/4 AND NENE SEC. 2
T 23N, R 11E, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

Date: Tuesday, August 6, 1974.
Weather: 50° F, scattered to broken clouds.

The Nelchina formation was sampled and measured (by brunton and estimates) downsection along a north tributary of the Little Nelchina River. The Naknek formation was traversed about 1/2 mile to the southwest along north tributary of the Little Nelchina River, which drains a small unnamed lake through the "Wall of China" topographic feature. This section is in the area of Grantz (1953) stratigraphic section No. 5.

By: Doug Powell, G. Streeton and D. Loney.

LOWER CRETACEOUS

Nelchina Formation

Top of the formation eroded and covered.

0-40'	Covered with slope wash. Probably shale and siltstone.
40-62'	Siltstone, grey, very shaly, carbonaceous, with scattered thin reddish-brown lignitic zones. Some calcareous concretions with belemnites and fossil fragments (Inoceramus prisms). At top of unit a very thin bed @ "3-4") of flaggy sandstone-siltstone overlies shaly siltstone. The concretions are reported as reworked with Callovian, Kimmeridgian and Portlandian faunas CR-124P taken at 40'
62-70'	Sandstone, brownish-grey, very fine to fine grained, thin bedded to massive, some flaggy, calcareous, carbonaceous, with poor-fair porosity. Unit divided in upper 3 1/2' massive bedded sandstone; a 6" member of very thin, wavy bedded (picture) siltstone to sandstone, overlying 4' very fine grained sandstone, calcareous, massive with uniform horizontal bedding. CR-125P composited 40'-70'

70-80' Covered to stream bed, appears to be sandstone and shaley, silty sandstone. Much fossil debris in streambed float, some belemnites, palecypods and one ammonite mold. Some large blocks of sandstone, grey-dark grey, very fine grained, calcareous, well sorted with fair porosity and permeability and with molds of 3-4" pelecypods in best condition of any seen in this type sandstone (pictures). There are abundant worm(?) burrows (horizontal) and single large well rounded pebble-cobble in the sandstone. The split block of sandstone shows profussion of pelecypod molds and casts, some wood fragments (pictures). CR-126F taken at 80', float in stream bed, in horizontal position with upper Nelchina sandstone, however of different lithology, so may be from higher or lower zones.

80-110' Sandstones, gray to light brownish-grey, fine grained, very calcareous, thin to thick bedded, lower part wavy (wave rippled?) weathers platy.

110-120' Shale, gray silty.
CR-127P composited 110'-120'

120-150' Limestone, light grey to white, fine grained, sandy, massive, platy-strongly wave rippled, composed of small particles of Inoceramus prisms. Strong petroleum odor on fresh breaks. Total of 20' of limestone was measured with basal contact concealed by slope wash and rubble so that total interval is probably about 30'. On west side of drainage found a single compressed ammonite in a slump block. Although the limestone is covered, the fossil is believed to be from below limestone unit. Strike and dip at top of limestone is N20°W26°SW.

Moved to the next stream cut to the west, which heads in small lake and drains southward through the "Wall of China" topographic feature. The base of this limestone is not exposed, however, the total thickness doesn't appear to exceed 20'. The lower Nelchina sandstone doesn't appear to be present.

UPPER JURASSIC

Naknek Formation

Contact is concealed in this drainage. Grantz (1953) on stratigraphic section No. 5 shows an erosional contact between the Nelchina limestone and fossiliferous siltstones and shales of the Upper Naknek formation.

150-200' Covered, probably sandy shales and siltstones and soft, friable, shelly sandstones as below.

200-250' Sandstone, grey, weathers brownish-grey, fine to medium-grained, friable, very shelly to coquinoid, argillaceous, poor to fair porosity.

250-300' Repetitive sequence of black, sandy mudstone, abundant fossils to coquinoidal, grading upward to coquinoidal sandstone at top. Tight to poor porosity. Abundant pelecypods, belemnites, rare ammonite, plant and fossil wood fragments. Sample below of parts of ammonite with original shell material. Could not break out one ammonite mold in an extremely hard sandstone.
CR-129F composite 250-275'

300-330' Sandstone, brownish-grey, fine to medium grained, soft, friable, with fair porosity. A few silty zones are scattered through unit. A silty zone with abundant carbnaceous and fossil wood material is located at 315'. Fossiliferous with plecypods
CR-130P composited 200-325'
CR-128L taken at 325'

330-400' Poorly exposed, probably sandstones, siltstones and mudstones as units above.

400-1400+ Predominantly shales with some siltstones, brownish-grey and grey fossiliferous. Scattered to many limy concretions between 650'-1,150'.

(6)

UPPER LITTLE NELCHINA RIVER SECTION
SENW, SWNE, NWNE SEC. 10, SWSE, NESW, NWSW
SEC. 3, NESE SEC. 4, T23N, R10E, SM
TALKEETNA MOUNTAINS (A-2) QUADRANGLE, ALASKA

DATE: Saturday, August 3, 1974; Monday, August 5, 1974

WEATHER: 50° F, scattered to overcast low clouds with intermittent rain.

Measured (estimated) and sampled downsection from cliff-forming limestone, down north sloping ridge and along north flowing tributary of the Little Nelchina River. Lower Nelchina (if present) and Upper Jurassic-Naknek sands are faulted out. See Section No. 6 of Grantz (1953) approximately 1/2 to 1 mile to the west.

BY: Doug Powell, Grant Streeton and Dave Loney.

LOWER CRETACEOUS

NELCHINA FORMATION

(Valanginian Age)

An east dip slope is developed on top of the Nelchina Limestone. Isolated shale knobs are locally developed on the slope. This 45-50' shale is calcareous, silty, weathers brownish-grey, soft and contains abundant belemnites. This unit overlies the limestone throughout the area.

Nelchina Limestones

0-150' Limestone, grey, light-grey to bluish-grey, weathers brownish-yellow in part, fine-grained, composed of finely pulverized inoceramus shells, sandy, massive cliff-former, thin beds indicated by iron stained laminae (1"-2" apart), some wave ripples. Oil odor on fresh breaks.
CR-92L at 75': 1.3% porosity and <.05 mds. permeability.
Normal fault - up to the north estimated 500'+ displacement.

UPPER JURASSIC

NAKNEK FORMATION

(Upper Oxfordian-Lower Kimmeridgian age)

150-230'	Covered.
230-250'	Siltstone to shale, grey to brownish-grey, hard with thin sandstone, yellow, very fine to coarse grained, clayey. CR-93P at 250'.
250-300'	Shale, dark grey, blocky. CR-94P at 300'.
300-500'	Shale, dark grey to black, few thin limy concretions, no fossils found. CR-95P composite 350-400' CR-96P composite 400-500'
500-600'	Shale, dark grey, silty to siltstones, shaly, few limy concretion zones, blue-grey, weathers brown with burrows (concretions most float). CR-97P composite 500-600'.
600-700'	Shale, dark grey to black. CR-98P composite 600-700'.
700-1,000'	Shale, as above, with thin calcareous concretions, some pelecypods, and belemnites. Thin bed (4-5') arkosic sandstone with a few pebbles at 750' and at 900'. CR-99P composite 700-800' CR-100P composite 800-900' CR-101P composite 900-1,000'.
1,000-1,100'	Shale, dark grey to black with thin 4"-8" concretionary units every 8-10'. CR-102P composite 1,000-1,100'.
1,100-1,200'	Shale, as above, some thin calcareous concretions. Pelecypod impression or concretions, traces of belemnite. A 4' sandstone at 1,150', grey-brown, fine-medium grained, arkosic, calcareous, thin bedded to massive. Top 10" cross-bedded showing flow direction to the southwest. CR-103P composite 1,100-1,200' CR-104L at 1,150': 5.6% porosity and .18 Mds permeability.

1,200-1,600' Shale, dark grey to black, calcareous, silty with thin limestone (lentils) and concretionary beds 1,300-1,400'. Gastropod at 1,325'.
CR-105P composite 1,200-1,300'
CR-106P composite 1,300-1,400'
CR-107P composite 1,400-1,500'
CR-108P composite 1,500-1,600'

Fault at 1,550 in stream bank with little apparent displacement.

1,600-1,700' Shale, dark grey to black, some sandy. Stopped at gorge and waterfall about 1,675'. Made quick stop on August 5, 1974, and sampled remainder of section.
CR-109P composite 1,600-1,700'

Ended section at 1,700' due to alluvium cover.

(8)

MOUSE CREEK SECTION
NESWSE, SESE SEC. 28, SWSWSW SEC. 27, NENWNW,
NENW, SWNWNE SEC. 34 AND S/2 NESW N/2 SE
Sec. 27, T. 22N, R 10E, SM (for Repeat Tuxedni Formation)
ANCHORAGE (D-2) QUADRANGLE, ALASKA

DATE: Wednesday, August 7, 1974
WEATHER: 50°F, heavy cloud cover, slight drizzle

Measured (estimated) and sampled downsection on Grantz (1953) stratigraphic Section No. 8 - a smooth hogback or ridge approximately 3 miles north of the mouth of Alfred Creek between Flume and Mouse Creek.

By: Dave Loney, Grant Streeton and Doug Powell

CRETACEOUS

UPPER CRETACEOUS

MATANUSKA FORMATION - Cenomanian (?)

0-125'	Sandstone, olive-grey, weathers brownish, fine grained, well sorted, subrounded to rounded, arkosic, slightly calcareous. Hard, massive, resistant, cliff-forming, occasional thin pebbly lenses, with well-rounded pebbles generally less than 1/2" diameter. Some coarse grained arkosic sandstone lenses and occasional ripple marks. No evidence for scour and fill. Minor carbonaceous debris. Some intra-formational conglomerate occurs, having intraclasts of medium to coarse grained sandstone, up to one inch thick, in an argillaceous tight sandstone matrix. CR-1025L at 100'
125-175'	Covered - talus is sandstone, as above. Contact is assumed at base of covered interval. Contact is probably erosional and angular unconformity.

JURASSIC

UPPER JURASSIC

NAKNEK FORMATION (?) - LOWER OXFORDIAN (?)

175-325' Shale, olive-grey, weathers grey and yellow in part, recessive, blockly rubble. Noncalcareous. Occasional black, rust, and yellow-weathering siltstone beds, generally soft and recessive.
CR-1026P composite 175'-300'

325-400' Interbedded shales and siltstones, with minor sandstone beds up to 8" thick, olive grey, weathers buff-brown, platey to flaggy, medium grained, arkosic, with quartz, feldspar, and mica, subangular - subrounded, well sorted. Hard resistant beds, very slightly calcareous. Rare interbedded coarse grained sandstone, brown weathering, poorly sorted, argillaceous and tight.
CR-1027P composite 300'-400'

400-530' Shaly siltstone, black, weathers yellow-brown, calcareous, with lesser grey to olive-grey shale. Some siltstone beds are up to 10" thick, and generally more resistant than shales.
CR-1028P composite 400-500'

530-610' Interbedded shaly siltstone and shale, as above, with rare sandstone beds up to 3' thick and ledge-forming. Sandstone is coarse to fine-grained, generally fining upwards, angular, poorly sorted, with some well rounded quartz and chert pebbles up to 1/2" in diameter. Sandstones are tight and unfossiliferous.
CR-1029P composite 500-600'

610-700' Interbedded shaly siltstone and shale, as above, but with interbedded olive-grey sandstone, weathers brown, medium to coarse grained, arkosic, poorly sorted, tight, with subrounded pebbles of quartz and chert, up to 2" in diameter, in a sandstone matrix. Sandstone is slightly calcareous. The interval consists of several 2' high benches or ledges which are capped by 6" thick sandstone beds.
CR-1030P composite 600-700'

700-810' Shale, black, weathers grey to olive-grey, blocky, recessive, as above, with interbedded olive-grey weathering calcareous siltstone. Unfossiliferous.
CR-1031P composite 700-800'
Strike N. 15° E.
Dip 45° NW.

810-870' Shale, as above, with 10% interbedded sandstone, medium to coarse grained, arkosic, poorly sorted, subangular, tight, and brown-buff weathering.
CR-1032P composite 800-900'

870-1,300' Interbedded shale and shaly siltstone, as above, with minor thin beds or arkosic sandstone, medium to coarse grained, poorly sorted, subangular. A few calcareous ironstone or claystone concretions occur at 1,060' - very common yellow-brown weathering concretions occur at 1,200-1,300'.
CR-1033P composite 900-1,000'
CR-1034P composite 1,000-1,100'
CR-1035P composite 1,100-1,200'
CR-1036P composite 1,200-1,300'

1,300-1,420' Shale, soft grey, weathers to a rust colored soil, partially covered. Some concretions, generally unfossiliferous.
CR-1037P composite 1,300-1,400'

1,420-1,600' Covered by vegetation, weathers to a rust colored soil.
CR-1038P composite from 1,400-1,500', mostly at 1,400-1,420', poor outcrop.
CR-1039P composite from 1,500-1,600', poor sample collected across covered interval.

PROBABLY AT NAKNEK - CHINITNA CONTACT

CHINITNA FORMATION - LOWER CALLOVIAN

1,600-1,900' Interbedded silty shale and sandstone, red-brown weathering, recessive, soft, blocky, only 20-30% outcrop. Sandstone is fine grained grey-green, weathers rusty, well sorted, argillaceous, calcareous and tight. Minor interbedded medium grained arkosic sandstone, subangular, poorly sorted, argillaceous, non-calcareous, and tight. Carbonaceous debris and belemnites are common, as are brown-weathering, calcareous, sandy concretions containing wood fragments and pelecypods.

CR-1040P composite 1,600-1,700'
CR-1041P composite 1,700-1,800'
CR-1042P composite 1,800-1,900'

Strike N 20° W.
Dip 20° SW.

1,900-2,200' Interbedded silty shale and calcareous, very fine-grained sandstone, recessive, soft, yellow-brown or rusty-brown. Some interbedded olive-grey calcareous siltstone, brown-weathering, platey to blocky. Calcareous concretions and thin beds of arkosic sandstone persist, as before. Pelecypods and belemnites are abundant.

At 2,100', numerous large, thin shelled pelecypods are present in thin beds of arkosic sandstone which is coarse grained, subrounded, poorly sorted and calcareous.
CR-1043P composite 1,900-2,000'
CR-1044P composite 2,000-2,100'
CR-1045P composite 2,100-2,200'

Contact is covered and slumped at 2,200'.

MIDDLE JURASSIC

TUXEDNI FORMATION - MIDDLE AND LOWER BAJOCIAN

2,200-2,500' Sandstone, olive-grey, weathers brownish grey, fine grained, well sorted, not calcareous. Bedding is up to 30" thick, massive, resistant, cliff-forming. Occasional 6" thick beds of siltstone are present as are lenses and beds of coarse grained, pebbly, arkosic sandstone which is poorly sorted, subangular, argillaceous and tight. Pebbles are rounded and up to 1 1/2 inches in diameter.

Lower portion of the interval consists of several small benches and cliffs. Most of the sandstone weather into a platey rubble.

CR-1046P 2,200-2,210'
CR-1047L 2,210'
CR-1048P composite 2,210-2,300'
CR-1049L 2,350'

2,500-2,675' Sandstone, olive-grey, weathers grey-brown, fine grained from 2,500-2,600' and medium grained below 2,600' well sorted, subrounded. Massive cliff-forming outcrop, hard, resistant, weathers to a flaggy to blocky talus. Occasional conglomerate lenses, up to 1/2" in diameter, in a sandstone matrix. Flat-lying pelecypod shells and shell fragments and belemnites are common. Some beds seem to show crossbedding and appear to fine upwards but these features were vague and indistinct.
CR-1050L 2,675'

2,675-2,900' Covered interval - talus is hard, blocky sandstone, with some blocky sandstone, with some softer sandstone, grey, weathers rusty, very arkosic, very uneven or concretionary in appearance, as talus consists of round layers of arkosic sandstone.

LOWER JURASSIC

TALKEETNA FORMATION - TOARCIAN

2,900-2,950' Cliff-forming interval, composed of angular pyroclasts or shards, up to 1-1/2" in diameter, of jasper, volcanic extrusives, and grey, silty or bentonitic material, in a tuffaceous, silty matrix.
CR-1051L 2,900'

Ended section in valley where the interval 2,900-2,950' was the lowermost outcrop.

Traversed back upsection to the ridge-top to investigate the contact between shales and sandstones which occurred at 2,200'. In doing so, the traverse probably crossed one or more faults, however, it is not possible to estimate movement along any fault zones. The interval which was investigated compares approximately to the sandstone unit examined previously at 2,200-2,900'.

REPEATED SECTION

MIDDLE JURASSIC

TUXEDNI FORMATION - MIDDLE AND LOWER BAJOCIAN

2,200-2,470' Sandstone, olive-grey, weathers brownish grey and rusty, rubbly, argillaceous, fine grained to medium grained, well sorted subrounded, noncalcareous, forms crest of ridge.
CR-1052P composite of argillaceous sandstones at 2,350-2,400'

2,470-2,480' Covered, recessive, soft, rust-weathering sandy shale or silt.
CR-1053P composite 2,450-2,500'

2,480-2,550' Sandstone, olive-grey, weathers mottled grey, silty, generally fine to medium grained, as before. Occasional pebbly, coarse grained, arkosic sandstone lenses. Large thick shelled pelecypods are very common in layers along bedding plane surfaces.

2,550-2,700' Silty clay and siltstone, yellow-weathering, soft, recessive, mostly covered. Contract with the lower interval - the Talkeetna Formation - was not seen.
CR-1054P 2,550'
CR-1055P 2,650' Missing

Record of samples taken:

1)	CR-1025	Lithology	general	at 100'
2)	CR-1026	Palynology	composite	175-300'
3)	CR-1027	Palynology	composite	300-400'
4)	CR-1028	Palynology	composite	400-500'
5)	CR-1029	Palynology	composite	500-600'
6)	CR-1030	Palynology	composite	600-700'
7)	CR-1031	Palynology	composite	700-800'
8)	CR-1032	Palynology	composite	800-900'
9)	CR-1033	Palynology	composite	900-1,000'
10)	CR-1034	Palynology	composite	1,000-1,100'
11)	CR-1035	Palynology	composite	1,100-1,200'
12)	CR-1036	Palynology	composite	1,200-1,300'
13)	CR-1037	Palynology	composite	1,300-1,400'
14)	CR-1038	Palynology	composite	1,400-1,500'
15)	CR-1039	Palynology	composite	1,500-1,600'
16)	CR-1040	Palynology	composite	1,600-1,700'
17)	CR-1041	Palynology	composite	1,700-1,800'
18)	CR-1042	Palynology	composite	1,800-1,900'
19)	CR-1043	Palynology	composite	1,900-2,000'
20)	CR-1044	Palynology	composite	2,000-2,100'
21)	CR-1045	Palynology	composite	2,100-2,200'
22)	CR-1046	Palynology	composite	2,200-2,210'
23)	CR-1047	Lithology	general	2,210'
24)	CR-1048	Palynology	composite	2,210-2,300'
25)	CR-1049	Lithology	general	2,350'
26)	CR-1050	Lithology	general	2,675'
27)	CR-1051	Lithology	general	2,900'
28)	CR-1052	Palynology	composite	2,350-2,450'
29)	CR-1053	Palynology	composite	2,450-2,500'
30)	CR-1054	Palynology		2,550'
31)	CR-1055	Palynology	(Missing)	2,650'

CHITNA CREEK SECTION
S/2 SWNW, NWNWSW SEC. 5, NESE, SENWSE,
N/2 SWSE, N/2 SESW, N/2 SWSW SEC. 6,
T21N R9E, SM AND SESE SEC. 1, SENE, NESE
SEC. 12 (grab samples CR-70-72) T21 R8E, SM
ANCHORAGE (D-3) QUADRANGLE, ALASKA

DATE: Friday and Saturday, July 26-27, 1974.

WEATHER: Friday - 50° F, cool, morning fog and cloudy.
Saturday - 60° F, clear, beautiful day.

Began Chitna Creek section in the afternoon. Worked down-section from a peak with elevation of 6,360'.

BY: Dave Loney and Grant Streeton.

JURASSIC

UPPER AND (?) MIDDLE JURASSIC

CHINITNA AND/OR UPPER TUXEDNI GROUP

Callovian and/or (?) Bathonian ages.

0-20'	Sandstone, very fine to fine grained, silty or argillaceous, grey-green in color, weathers grey-green, calcareous. Bedding is uneven, flaggy to blocky, and the interval is recessive and rubbly. No visible porosity. Lower contact is covered.
20-40'	Shale, grey, weathers light grey, soft, recessive, uneven, rubbly, in part blocky. CR-1007P 20-40' composite.
40-100'	Sandstone, very fine to fine grained, olive-grey in color, weathers grey-green, argillaceous, tight, in party pebbly. Pebbles are generally rounded and up to 1/2 inch in diameter. Bedding is generally platey to blocky. Lower portion of the interval is more shaly and recessive - lower contact is covered.
100-400'	Shale, grey, weathers light grey, soft, recessive, not calcareous, weathers blocky in rubble, with rare thin beds of sandstone, very fine to fine grained, grey-green, weathers rusty-brown. Constituents are quartz, feldspar, and mica. Sandstones possibly are arkosic. Grains are subangular, poorly sorted, and porosity is poor.

At 275' numerous tiny brown-weathering calcareous specks are present in the shale, as are prolific tiny, wavey, cylindrical tubes or burrows - possible evidence for bioturbation.
CR-1008P 100-200' composite
CR-1009P 200-300' composite
CR-1010P 300-400' composite.

400-404' Intrusive sill or volcanic bed, rust-weathering, hard, resistant, porphyritic, with feldspar crystals in an aphanitic matrix.
CR-1011L lithology 402'

404-550' Shale, as above, with interbedded siltstone or very fine grained sandstone, grey green in color, weathers rusty. Beds are up to 4" thick (= blocky). Very slightly calcareous interval, tight, soft, recessive, mostly covered. Ripple marks are common in the siltstone.
CR-1012P 404-500' composite
CR-1013P 500-600' composite

550-675' Shale, as above, but black, rust weathering, recessive and blocky, with interbedded siltstone, grey, weathers grey, very hard, not calcareous, blocky, with bedding up to 6" thick. Siltstone most common @ 600-675'. Shale has numerous spherical or cylindrical vugs which are filled with calcite and may have been fossils.

675-750' Shale, as above, but with interbedded platey thin siltstone, weathering green-yellow, very hard, slightly calcareous. Shales are very rubbly - the interval is mostly covered and recessive.

At 675-676', intrusive sill or volcanic bed, green weathering, hard, aphanitic, very slightly calcareous.
CR-1014P 600-750' composite
CR-1015 675' lithology

750-850' Covered interval, no visible outcrop, but talus consists of orange-weathering, hard, platey, to blocky intrusive or volcanic rock, aphanitic, pyroclastic?, very hard, and with calcareous blebs.
CR-1016L 750-850'

850-900' Covered.

900-1,000' Intrusive or volcanic rocks, massive, hard, resistant, cliff-forming, green in color, weathering rust and green, aphanitic, with interbedded black, soft, shales at the base.
CR-1017P approx. 1,000' shale in volcanics
CR-1018P approx. 1,000' shale below volcanics.

MIDDLE JURASSIC

TUXEDNI GROUP (LOWER PART) MIDDLE BAJOCIAN AGE

Contact is arbitrarily placed below intrusive and at top of sandstone.

1,000-1,020' Sandstone, very fine grained-to-coarse grained, grey-green in color, weathers grey-green and rusty, poorly sorted, subangular, in part calcareous, carbonaceous, argillaceous, or silty and tight. Bedding is platey to blocky and generally recessive and ledge-forming. Possible worm burrows. Very fossiliferous at top of unit, with articulated pelecypods and belemnites. Several extremely fossiliferous lenses or beds, up to 18" thick, containing belemnites, ammonites, and pelecypods, with wood fragments in an argillaceous, sandy matrix. Several pelecypods are articulated - suggestive of deposition in quiet water.
CR-1019F approx. 1,000-1,010' composite
CR-1020F 8 bags - various fossils, all common to 1,000-1,020' interval

1,020-1,040' Shale, grey, weathers grey-brown, soft, recessive, very slightly calcareous interval, soft, blocky rubble.
CR-1021P 1,020-1,040' composite.

1,040-approx. Covered section, very contorted, cut by numerous grey-green intrusive sills. Very difficult to estimate true thickness.

1,200-1,280' Interbedded shale, siltstone, and silty sandstone, generally grey-green in color, weathers grey, rusty brown, and black.

Bedding is generally 2"-6" thick and very uneven, concretionary-like in appearance. Unfossiliferous interval, beds seem to flow around rounded blebs or nodules - again concretionary-like.
CR-1022P 1,200-1,240' composite
Strike N 20° E
Dip 12° SE

At 1,240', basal half of the interval is dominated by soft, slightly calcareous, grey-black shale, with sandy colored calcareous concretions up to 2' in diameter, and containing carbonaceous material and ammonites.
CR-1023F 1,240-1,280'

1,280-1,286' Sandstone, fine grained to medium grained, generally thinly and unevenly bedded, argillaceous or silty, greenish grey, weathers greenish grey and rusty. Abundant fossil debris, including belemnites, large pelecypods, ribbed pelecypods. Lower part of interval is a very silty or argillaceous sandstone, red-weathering, oxidized. Sharp basal contact. 1,282-1,286 sandstone, very fine grained to coarse grained, poorly sorted, subangular pebbly lenses. Biomodal cross-bedding suggests southwesterly or westerly flow. Pebbly and shaly lags are common along scour and fill surfaces. Generally grey-green in color, rusty weathering, argillaceous, and tight. Basil portion is more argillaceous and recessive.

1,286-1,430' Siltstone very fine grained sandstone, grey-green in color, weathers rusty, soft, and recessive, friable, very well sorted, carbonaceous. Interbedded with siltstone are hard resistant beds of sandstone up to 15" thick, very fine grained, platey, slightly calcareous, and with pelecypods and belemnites. Thin coaly partings and stringers are common throughout the interval.
CR-1024P 1,280-1,430' composite

1,430 Possible Sandstone, black, weathers black, glossy or oily, resistant, fine to medium grained, poorly sorted, argillaceous, and tight. Common rounded clay concretions up to 2" in diameter. Scattered fossil debris. Cliff-forming interval, tight. Some red weathering. Interval appears to have been heated or scorched.

Record of samples collected:

1. CR-1007, Palynology, composite, 20-40'.
2. CR-1008, Palynology, composite, 100-200'.
3. CR-1009, Palynology, composite, 200-300'.
4. CR-1000, Palynology, composite, 300-400'.
5. CR-1011, Lithology, 402'.
6. CR-1012, Palynology, composite, 404-500'.
7. CR-1013, Palynology, composite, 500-600'.
8. CR-1014, Palynology, composite, 600-750'.
9. CR-1015, Lithology, 675'.
10. CR-1016, Lithology, 750-850'.
11. CR-1017, Palynology, approx. 1,000'(in volcs).
12. CR-1018, Palynology, approx. 1,000'(below volcs).
13. CR-1019, Fossil, composite, 1,000-1,010'.
14. CR-1020, Fossil, composite (8 bags), 1,000-1,020'.
15. CR-1021, Palynology, composite, 1,020-1,240'.
16. CR-1022, Palynology, composite, 1,240-1,280'.
17. CR-1023, Fossil, composite, 1,240-1,280'.
18. CR-1024, Palynology, composite, 1,280-1,430'.

(//)

MAZUMA CREEK SECTION
NESW SEC. 15, T23N, R9E, SM
TALKEETNA MOUNTAINS (A-2) QUADRANGLE, ALASKA

DATE: Friday, July 26, 1974

WEATHER: 50° F, cloudy

REMARKS: Measured (estimated) and sampled upsection. Mapped by Grantz, 1965, as Albian Age.

BY: Doug Powell.

LOWER CRETACEOUS

MATANUSKA FORMATION (basal beds - Albian Age)

0-100'	Shale, black, clayey, soft, some concretions and fossil fragments of Ammonites ?, Inoceramus and a bone fragment. Sample from top 10'. Consider for source rock. CR-73P composite 90-100'.
100-140'	Claystone, yellow, some dark grey claystone at top. Occasional siltstone bed. Abundant siltstone concretions on top of ridge. CR-74P composite 100-140'.

(12)

UPPER BUBB CREEK SECTION
NENE SEC. 28, T23N, R10E, SM
TALKEETNA MOUNTAINS (A-2) QUADRANGLE, ALASKA

DATE: Monday, August 5, 1974

WEATHER: 55° F, cloudy, raining intermittently.

REMARKS: In synclinal area near Limestone Gap. Lower part of Matanuska formation. Mapped by Grantz, 1965, as Albian Age, and overlying the Nelchina formation. Measured downsection.

BY: Doug Powell, Dave Loney and Grant Streeton.

LOWER CRETACEOUS

MATANUSKA FORMATION (Lower part - Albian Age)

0-25'	Clay shale, brownish-yellow, sandy, CR-119P composite 0-25'.
25-50'	Coal beds, black, soft, subbituminous, badly weathered, three seams 2 1/2 to 4' thick interbedded with clay shale.
50-75'	Clay shale, soft, some carbonaceous.
75-90'	Coal beds, as above, thin beds, few inches up to 3'. Much soft clay shale interbedded. CR-116P composite 75-90'
90-100'	Shale, grey, weathers brown, soft, badly weathered, with thin coal streaks about 1/4-1/2" thick, much fossil wood. CR-117P composite 90-100'.
100-150'	Clay shale, fault in this interval. CR-118P at 150'.

NORTH HORN MOUNTAIN AREA
SWNWSE SEC. 3 T. 22N, R. 11E, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Saturday, July 20, 1974.
WEATHER: 44°F, low clouds, light rain.

Grab samples near head of Shovel Creek.
BY: D. Powell, D. Loney and G. Streeton.

UPPER (?) AND MIDDLE JURASSIC

TUXEDNI FORMATION

CR-2009P(a,b) Grab sample. Shale, yellow, sandy and abundant coaly or carbonized material (up to 3 inches thick) over approximately a 15 foot interval, overlying a 15-20' sandstone, dark grey, weathers brownish grey, fine grain, argillaceous, with rounded limestone concretions up to 8 inches in diameter, well-sorted, friable, poor to fair porosity.

CR-2009L(c) Grab sample in sandstones described above. Sample lost.

(14)

CROOKED CREEK SECTION
SENW, SWNE SEC. 5, T. 22N, R. 12E, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Saturday, July 20, 1974.
WEATHER: 44°F, broken to overcast, low clouds, calm.

Measured and sampled downsection along north side of landslide scar.

BY: D. Loney, G. Streeton and D. Powell

UPPER (?) AND MIDDLE JURASSIC

TUXEDNI FORMATION

0-25'	Claystone, light brown, weathers yellow-brown, silty, argillaceous, some sandy beds, thin-bedded, and few calcareous concretions. CR-2001 P taken at 25'
25-60'	Interbedded clays and occasional sand lenses and coquinoid beds, some carbonaceous material, fossiliferous-plecypods, (buchias), belemnites and ammonites. CR-2002 F composite 45-60'
60-100'	Claystone, as above, more silty with occasional ironstone beds, very rich in belemnites. CR-2003 P composite 60-100
100-200'	Interbedded silty clays to clayey siltstone. Rich fauna. CR-2004 P taken at 200'

MEYER CREEK SECTION
SWNESW, NESWSW Sec. 20, T.23N, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Sunday, July 28, 1974
WEATHER: 60°F, scattered high clouds, light wind

Measured and sampled upsection on ridge, northside of Meyer Creek. Four-wheel or ATV road up drainage, over North Horn Mountains (via unnamed pass) into Willow Creek drainage.
BY: Doug Powell

UPPER JURASSIC

UPPER NAKNEK FORMATION

0 - 50'+ Conglomerate, grey to brown, massive, pebble to boulders. Large boulders abundant up to 6 feet across, well rounded, igneous (granitic) and volcanic material. Matrix of sandstone, brown, very fine to fine grained, poor to fair porosity and poor-tight permeability. Occasional pebble-cobble conglomerate and sand lenses.
CR-80P composited 0-50' +
CR-81L taken at 10' + of Matrix sandstone

50 - 65' Siltstone and sandstone, shaly, thin-bedded
CR-82P taken at 65'

65 - 150' Siltstone, shaly to sandstone, grey to brown, very fine grained, all thin-bedded 1/4-1 inch thick, fair porosity and permeability locally.
CR-83P taken at 150'

150 - 250' Siltstone and sandstone as above.
CR-84P taken at 250'
CR-85L composite 150-250 of sandstone

250 - 350' Section to top of hill consists of thin-bedded platy sandstone and siltstone as above.

LOWER FLAT CREEK SECTION
SENENW SEC. 18, T. 23N, R. 12E, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Sunday, July 21, 1974
WEATHER: 50° F, overcast with occasional light rain.

Measured and sampled down section.

BY: D. Powell, D. Loney and G. Streeton.

UPPER JURASSIC

NAKNEK FORMATION - Upper biotitic sandstone and siltstone beds with coquinoid beds (Grantz-Jnbsm)

0-25' Shale, grey, silty with limy concretions.
CR-56P composite 0-25'

25-50' Sandstone, grey, fine to medium grained, some loose pebble and rare pebble lenses or stringers, friable, fair porosity, traces carbonaceous material, abundant scour and fill with large clasts of shale in sandstone, some of units are coquina beds, highly fossiliferous throughout with pelecypods ?, belemnites, ammonites cast, mollusks? and trace of bone. Sandstone units become silty and sandy shale units to North and are not present in outcrop about 100 yards south.
CR-57P composite 25-50' in silty shale.

50-100' Shale as above with 10-15' sand lens at base. Sandstone, grey, weathers brown, very fine to fine grained, slightly calcareous with fair porosity and poor-fair permeability.
CR-58P composite 50-100
CR-59F composite 0-100
CR-60L taken 85-100'

Interpreted as shallow marine-intertidal deposits as evidenced by abundant marine life, scour and fill features and lenticular sand bodies with coquinous. Sandstones appear to be shoaling deposits, either banks or bars or both. Believe these deposits are the "farther" offshore finer clastic equivalents of the Upper Naknek-conglomerates noted at the North Little Nelchina River section.

(17)

LOWER BUBB CREEK SECTION
NESWSW SEC. 22, T. 23N, R. 11E, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Saturday, July 20, 1974
WEATHER: 44° F, broken to overcast, low clouds, calm.

Measured and sampled down section. Top of formation not exposed.

BY: D. Powell, G. Streeton and D. Loney.

UPPER JURASSIC

CHINITNA FORMATION

0-20'	Sandstone, grey to brown, fine to coarse grained, few pebbles, some hard siltstone, shaly, weathers to thin lamina appearance, some concretions and scour and fill features near base, grain size-fines upward. Abundant fossils-pelecypods (Inoceramus?) belemnites, carbonaceous material. CR-2005F composite 0-20' CR-2006P composite 0-20'
20-40'	Sandstone (predominantly) brown to grey, fine to coarse grained dominantly fine to medium, traces of pebbles, shaly, massive, low angle cross-bedding, and some lenticular units in the basal part. Some hard brown calcareous concretionary zones in massive unit. Some burrows in hard concretionary sandstone float. Unit is abundantly fossiliferous-pelecypods, belemnities and carbonaceous material in fossiliferous concretions-sandstone is friable, shaly and with poor to fair porosity and ? low permeability. CR-2007P composite 20-40' CR-2008F composite 20-40'
40-90'	Soft, soil covered slopes, probable increase in shale content.
	Light rain started at 11:45 A.M.

NORTH LITTLE NELCHINA RIVER SECTION
C N/2 SECTION 8, T. 23N, R. 12E, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Sunday, July 21, 1974
WEATHER: 50°F, overcast, occasional sprinkle of rain.

Measured and sampled upsection from stream bed. BY: D. Powell, G. Streeton and D. Loney.

UPPER JURASSIC

NAKNEK FORMATION

Shale and Siltstone Facies (Jns of Grantz)

0-10' Shale, dark grey to grey, silty in part, blockly, calcareous concretions common, fossiliferous-pelecypods and belemnities. Erosional surface at top with about 5 feet of relief.
CR-61P composite 0-10'

10-45' Interbedded silty sandstone, siltstone and shale, uniform thin beds 1 to 8 inches thick. Upper contact with overlying conglomerate is a slight wavy surface over much of exposed 600 feet horizontal distance. Conglomerate is interfacied (and/or channelled) with about 10' of the thin bedded unit on east side of section.
CR-62P composite 10'-45'

Upper Conglomerate Facies (Jnc of Grantz)

45-65' Conglomerate, pebble-cobble, massive, with medium to coarse grained sandstone matrix, occasion belemnite. Basal contact as above, upper contact with overlying sandstone gradational. Graded bedding-fining upward with few pebble and cobble and pebble streaks. Scattered pelecypods and belemnites in conglomerate and sandstone. Fossil tree trunk 6-8 inch diameter, poor porosity and permeability.
CR-63L taken at 50

65-95' Sandstone, grey, weathers brown, fine-medium grained, massive with some lensing appearance, friable, poor to fair porosity.
CR-64L taken at 75'

IDAHO CREEK SECTION
NWSE SEC. 3, NWNESE SEC. 4, T. 23N R12E, SM
TALKEETNA MOUNTAINS (A-1), ALASKA

Date: Thursday, July 18, 1974
Weather: 65° F, broken overcast.

Measured and sampled at two places along the Little Nelchina River @ .7 and 1.1 miles west of confluence with Idaho Creek. This section is about 1/3 and 3/4 miles east of Section 60-sh-7 measured May 19, 1960 by Bill Shaw and L. J. Rulla. Field notes composited and arranged as a downsection traverse.

By: Doug Powell, Grant Streeton and Dave Loney.

UPPER JURASSIC

Naknek Formation - Upper Conglomerate to Shale Facies

0-25'	Interbedded unit of very thin beds of siltstone and shale, grey to dark grey with thin coquina beds. Samples from papery shale and coquina beds (Pelecypods). CR-48P at 0' CR-47F at 0'
25-50'	Shale, dark grey, blocky to fissile, firm calcareous concretions, occasional large ammonite in concretion zone (see picture).
50-100'	Shale, dark grey as above, abundant fossils in concretions - belemnites, ammonites, and gastropods. CR-46P at 50' shale CR-45F at 50' concretions
100-125'	Shale, grey to dark grey, blocky to platy, soft to firm. CR-44P composite 100-125'
125-133'	Conglomerate (5') with 3' shale, as above, at base filling large "scour and fill" structure cut into underlying sandstone unit. Picture of worn burrow in shale.
133-145'	Sandstone, grey fine to coarse grained and slightly conglomeratic (pebble size), thin bedded, shaly sandstone thickness of 12'-15' is due to scour surface.

145-155'	Shale, grey-dark grey, blocky to platy, soft, non-calcareous, with grey calcareous concretions and few pyretic concretions. Sharp contact with underlying sandstone and conglomerate zone. CR-43P composite 145-155'
155-175'	Sandstone and conglomerate unit down to river edge. Upper 10' consists of interbedded sandstone and conglomerates. The conglomerates facies eastward to sandstone, grey, fine to coarse grained, badly weathered, soft and friable, fair porosity. This unit is equivalent to top of massive conglomerate at 165' in Little Nelchina River Section (60-Sh-7) and the upper part of the massive conglomerate shown in the picture of the lower part of this section. CR-42P composite 155-175'
	Lower part of this section was measured and sampled about .4 miles upstream (west) of above described section.
175-255'	Conglomerate, grey to brown to cobble and scattered boulders to 2' long. Many lenses of sandstone and conglomerate. Lithic clasts are of granitic and volcanic sources and some shale from underlying Naknek units. Matrix is fine to coarse grained sandstone, cross-bedded and in part shaly.
255-265'	Mostly sandstone with shaly lamina. CR-41P composite 255-265'
265-285'	Conglomerate, as above. Sample from a thin sandstone, medium grained, shaly, poor to fair porosity with low perm. CR-40P at 285'
285-335'	Conglomerate, as above. Sample mostly from sand lenses from 3-10' thick, fining upward from pebble-cobble at base. Cross-bedding show one direction - southerly flow dipping at steep angle about 30°. CR-39P composited 315-335'
235-385'	Conglomerate, as above. Sample from large grey-green shale clast. CR-38P at 375'
	Concealed below by river.

(21)

SOUTH TRIBUTARY OF UPPER TYONE CREEK
NWNWNE SEC. 29, T24N, R12E
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Wednesday, August 7, 1974

WEATHER: 50° F, cloudy

REMARKS: Traversed upsection through sandstone located on three benches. May be faulted.

BY: Doug Powell.

LOWER CRETACEOUS

NELCHINA FORMATION (Upper Sandstone - Neocomian Age)

0-125'	Sandstone, brown, very fine to fine grained, limy, poor to fair porosity, oil odor on fresh breaks. Located on three benches and may be faulted, as this is triple thickness as compared to White Hill area (30' sandstone). Base and top of unit covered. Interval to the limestone unknown. CR-139L composite 0-125'.

EAST HORSEPASTURE PASS AREA
N/2 SWSE, NESE Sec. 26, T. 24N R10E, SM
TALKEETNA MOUNTAINS (A-2) QUADRANGLE, ALASKA

DATE: Friday, July 19, 1972
WEATHER: 55° F, cloudy, front moving in bring frequent rain showers, temperature dropping to 40°F

Measured and sampled siltstone, shale and sandstone facies of the Naknek formation (Jns of Grantz) south of the Little Oshetna River section where same facies is conglomerates (Chisik member). Sampled downsection. BY: G. Streeton, D. Loney and D. Powell.

UPPER JURASSIC

Naknek Formation (Basal)

0 - 800' Dominantly siltstone and very fine grained sandstone, grey-green, soft, recessive, forms a fissile to flaggy talus slope, shaly, some pebbles lie loose on slope? from outcrop. Occasional small ripple marks in flaggy beds, unfossiliferous, in part calcareous.
CR-1000P composite 150-200'
CR-1001P composite 200-300'
CR-1002P composite 350-400"

HEADWATERS OF LITTLE OSHETNA RIVER
W/2 W/2 SE/4 SEC. 28, T24N, R9E, SM
TALKEETNA MOUNTAINS (A-2) QUADRANGLE, ALASKA

DATE: Friday, July 26, 1974.

WEATHER: 50° F, cloudy.

REMARKS: Sampled upsection. Mapped by Grantz, 1965.

BY: Doug Powell.

LOWER CRETACEOUS

MATANUSKA FORMATION (Basal beds - Albian Age)

0-150'	Shale, dark grey, with abundant conglomeratic material, some very large clasts. CR-75P composite 0-150'
	Moved along drainage and in same stratigraphic position. Faulting is not apparent.
0-150'	Shale to claystone, varicolored, dark grey, yellow-ochre, and red in same position as above (?) Tertiary. CR-76P composite 0-150'
150-190'	Covered.

TERTIARY (?)

190-200'	Sandstone (5') yellow, coarse grained, soft, friable, above yellow-ochre claystone, which changes laterally to sandstone, green-grey, fine to medium grained, massive with lenses of coal. CR-77L composite 190-200' sandstones. CR-78P composite 190-200' coal lenses.
200-225'	Lithology as above.
225-300'+	Conglomerate, pebble to cobble, some grey clays, weathered yellow.

LITTLE OSHETNA RIVER SECTION
W/2 NE Sec. 17, W/2 SE Sec. 8, T. 24N, R. 10E, SM
TALKEETNA MOUNTAINS (A-2) QUADRANGLE, ALASKA

DATE: Tuesday, July 16, 1974
WEATHER: 50-55°F, low clouds, overcast to broken, raining

Measured and sampled from top of hill (elev. 5808') down section.
BY: D. Powell, G. Streeton and D. Loney.

UPPER JURASSIC

NAKNEK FORMATION - CHISIK CONGLOMERATE

Top of conglomerate eroded. Approximately 800-1000' of additional conglomeratic section is present about two miles west in south-half of Section 13, T. 24N, R. 10E, SM.

0-150 Conglomerate, grey-dark grey to brownish-grey, cobble to boulder up to three (3') feet or more in size. Dominantly of granitic-dioritic and volcanic material. Matrix of siltstone to silty sandstone, very dirty (clay material), poorly indurated, and unstable.
CR-1P taken at 10' in coarse siltstone
CR-2P taken at 100' in silty sandstone

150-200' Siltstone and sandstone unit, interbedded, grey-brownish-grey, finely laminated in part. Very argillaceous and carbonaceous, flaggy.
CR-3P composite 150-200'

200-300' Conglomerate as above, with dirty, silty sandstone matrix. Faint bedding and local channel.
CR-4P taken at 300' in silty zone.

300-500' Conglomerate as above.
CR-5P taken at 500 in silty sandstone.

500-750' Conglomerate as above.
CR-6P composited 600-650 in siltstone-sandstone.
CR-7P take at 700' in sandy zone about 10" thick.

750-775' Siltstone, black, very argillaceous with fine pebbles. Contacts are irregular with local scour and fill, and discontinuous horizontal bedding.
CR-8P composited 750-775 in siltstone.

775-825' Covered contact but from distance the basal part of the conglomeratic member has more uniform bedding and appears to become more silty, sandy and shaly eastward. Base of conglomerated estimated at 825'.

UNCONFORMITY

CHINITNA FORMATION

825-840'	Contact covered, probably shale.
840-850'	Shale, grey, slightly sandy, soft, weathers yellows and blocky. CR-9P composite 840-850
850-900'	Shale-claystone, grey, soft, weathers yellow and blockly. CR-10P taken at 900'
900-1250'	Shale, as above, some calcareous, shaly concretions at 1150'. CR-11P taken at 950 CR-12P taken at 1100 CR-13P taken at 1150
1250-1300'	Shale as above, becoming hard and more concretionary. On gully to the east, the basal 15' of shale facies into interbedded siltstone-sandstone and shale. CR-14P composite 1250-1300 in shale. CR-15P taken at 1300 in top of sandy zone. Shifted to east side of gully from covered west side to sample channel conglomerate zone (Jcc unit of A. Grantz, USGS - 1965).
1300-1315'	Sandstone, very fine grained to siltstone, black in places, argillaceous, massive.
1315-1330'	Sandstone, becoming conglomeratic in sandy matrix. Cobbles up to 8 inches, no orientation, increasing toward base.
1330-1385'	Cobble conglomerate with sandy matrix, thin sandstone lenses at 1335-1337 and 1370-1372, dark grey, very fine grained, argillaceous, dirty becoming very coarse grained, no pebbles, in lower zone.
1385-1388'	Sandstone, very fine grained at top becoming pebble conglomerate with some chert fragments. Coarse grained at base rising upward with lower proportion of pebbles. CR-16P taken at 1385
1388-1393'	Sandstone.
1393-1400'	Conglomerate, cobbles with sandy matrix.

1400-1425' Conglomerate with series of cut and fill channels. CR-17F taken at 1420 in sandy matrix few fossil fragments of belemnites.

1425-1428' Cobble-conglomerate.

1428-1435' Sandstone, red, fine grained, calcareous, thin-bedded, flaggy.

1435-1465' Conglomerate, pebble-cobble, thins to about 10 feet on west side. Abundant pelecypods, belemnites and carbonaceous material in sandy zone at contact with overlying unit. CR-20F taken at 1435.

ANGULAR UNCONFORMITY

MIDDLE JURASSIC

TUXEDNI FORMATION

1465-1470' Siltstone, thin-bedded, calcareous to silty limestone, flaggy. CR-18P composite 1465-1470.

1470-1564' Mudstone, black, sandy. CR-19P composite 1470-1564

1564-1565' Coquina bed, very sandy, with abundant fossil wood up to 8 inches in diameter. CR-22F taken at 1564-1565.

1565-1640' Mudstone, black, sandy. CR-21P taken at 1565 CR-23P taken at 1640

1640-1815' Mudstone as above, increasing sandy content with a few pebbles. CR-24P taken at 1765

1815-1825' Sandstone, yellow, silty to , shaly, thin-bedded.

1825-1925' Mudstone, as above.

1925-1975' Sandstone, yellow-brown, fine to medium grained few pebbles, shaly, tight. CR-25L taken at 1925.

1975-2050' Sandstone, very shaly to sandy mudstone. CR-26P taken at 2050

2050-2075' Claystone, soft with coaly material and leaf imprints.
CR-34P composite 2050-2075

2075-2125' Sandstone, grey, weathers greenish-yellow, fine to medium grained, silty, with thin pebble conglomerate zone at top, thin-bedded to massive, weathers out in concentric pattern, finely cross-bedded and carbonaceous. Some red and yellow iron staining. Some silty claystone in upper 25'.
CR-35P composite 2075-2100

2125-2165' Sandstone, siltstone and shale as below.

2165-2225' Sandstone, siltstone and clay-shale, grey weathered yellow. Thin siltstone unit at top with thin cross-bedded units dipping to south. Very carbonaceous with scattered fossil wood as surface float. Several units of ochre to brown ironstone concretion conglomerate with much clay material. Base of unit has abundant fossil wood, in grey to brown, hard, 6 foot siltstone unit, calcareous. On side of Ridge which is badly covered was found coal float, black, soft sub-bituminous at about 2195' feet.
Could not dig to bedrock.
CR-36P composite 2165-2225
CR-33P taken at 2195

2225-2250' Covered, surface float of hard silty limestone? fossiliferous with abundant peleypods, belemnites, plus abundant carbonaceous material and fossil wood.
CR-37F taken at 2245

2250-2275' Sandstone, grey to black, fine to medium grained (basal 8 feet) with scattered pebbles and pebble lenses, silty, cross-bedded, bimodal dominantly easterly with some westerly flow directions. Some scour and fill units from 3 inches to 8 inches thick. Some fossil wood. At 8 feet up sandstone becomes coarse graine-pebbles, massive with some platy units. Poor to fair porosity, top is covered, Picture.
CR-32P composite 2267-2275
CR-31L taken at 2267
CR-30L taken at 2275

2275-2285' Sandstone, grey, weathers yellow, pebbly, massive bed, contact sharp.

2285-2315' Siltstone, yellowish-grey, weathers soft, very clayey, smooth slope.
CR-29P taken at 2285

ANGULAR UNCONFORMITY

LOWER JURASSIC

TALKEETNA FORMATION

2315-2335' Volcaniclastics, siltstone-sandstone, coarse grain, to conglomerates, pebbles to cobbles. No discreet bedding. Traces fossil wood and other fossils such as pelecypods, smooth, concentric and radial ribs, ? brachipods, and belemnites.
CR-28F taken at 2315
CR-27P taken at 2315

EAST CONGLOMERATE CREEK AREA
SE, SWNE, NWNWNE SEC. 14, T. 24N, R. 10E, SM
TALKEETNA MOUNTAINS (A-2) QUADRANGLE, ALASKA

DATE: Friday, July 19, 1974
WEATHER: 40° F, cloudy, occasional rain showers.

Described and sampled upsection by G. Streeton, D. Loney and D. Powell. Section estimated and very generalized.

UPPER JURASSIC

NAKNEK FORMATION (BASAL)

0-500'	Siltstone and sandstone, dark grey, weathers grey, very fine grained, thin bedded to massive, calcareous in part and some conglomeratic lenses consisting of up to well rounded boulders, generally of granite and monsonite, in a siltstone matrix. All unfossiliferous and hard. The conglomerates closely resemble those on the Little Oshetna River and not those on Yacko Creek, which were of smaller size and in a softer matrix. CR-1003P composite 0-100'
500-1300'+	Estimated 800'+ conglomerate, grey to dark grey to brownish-grey, cobble to boulder, matrix of silty sandstone, very dirty (clay) and similar to the Little Oshetna River section.

CARDIOCERAS CREEK SECTION
SESW SEC. 31, T24N, R10E, SM
TALKEETNA MOUNTAINS (A-2) QUADRANGLE, ALASKA

DATE: Wednesday, August 7, 1974

WEATHER: 50° F, cloudy, intermittent rain

REMARKS: Sampled upsection along Cardioceras Creek. Starting position unknown from base or top. Terminated traverse due to rain.

BY: Doug Powell.

UPPER (?) AND MIDDLE JURASSIC

TUXEDNI GROUP

CR-140P Grab	Sandstone (30' thick) brownish-red to yellowish-brown, fine to medium grained, soft, friable, with fossil fragments - pelecypods, belemnites and one gastropod (snail) in hard limy sandstone (probable float from overlying beds). Abundant fossil wood up to 6" diameter. Much carbonaceous material and carbonized wood. Some worm burrows - horizontal and ? vertical (in float).
CR-141P Grab	Siltstone, black, shaly, calcareous, fossiliferous. Unit about 150' above CR-140P.
CR-142F Grab	Ammonites and some pelecypods from shale and hard limy concretions in unit about 160-170' above CR-140P.

RED FOX CREEK SECTION
SWNE SEC. 11, T24N, R11E, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Tuesday, July 23, 1974

WEATHER: 55° F, cloudy, raining

REMARKS: On west tributary of Tyone Creek sampled upsection a small outcrop (25' thick) of Naknek Conglomerate and siltstone facies. See diagram.

BY: Doug Powell, Grant Streeton and Dave Loney.

UPPER JURASSIC

NAKNEK FORMATION

0-15'	Conglomerate, pebble to cobble, mostly under 5" and dominantly pebbles size with an occasional large boulder (3' across), shale clasts and streaks of iron stained sandstones with pebbles and cobbles. Conglomerate tongue has channel cut base, rises and thins to east. Slight fault on west side (5'+ down) and facies to siltstone and silty shale. CR-68P at 10' on west side conglomerate tongue.
15-20'	Shale, silty and sandy. CR-69P composite 10-20' shale overlying and within conglomerate unit.
20-25'	Conglomerate, as above, facies to siltstone and silty shale to west. To the northeast on the other branch of Tyone Creek about 500 yards upstream the lithology of the unit is shale, dark grey to black, silty and sandy. Occasional thin band (1/2") of coarse grained sandstone and one 8' pebble - cobble conglomerate channel deposit fines upward to coarse grained, pebbly sandstone.

WEST WHITE SAND CREEK SECTION
SENW SEC. 31, T25N, R12E, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Wednesday, August 7, 1974

WEATHER: 50° F, cloudy

REMARKS: On divide between White Sand and Yacko Creeks. Measured (brunton) and sampled up section.

BY: Doug Powell

UPPER JURASSIC

NAKNEK FORMATION

0-10'	Claystone, silty to siltstone, grey to brown, badly weathered, non-calcareous, trace of carbonaceous material. CR-135P at 5'
10-30'	Covered by vegetation.

LOWER CRETACEOUS

NELCHINA FORMATION (Neocomian Age)

30-60'	Limestone (calcarenite), light grey, sandy, petroliferous odor on fresh break.
60-110'	Shales, grey, silty. CR-136P at 60' CR-137P at 110'
	Outcrop of Nelchina about 200 yards to the west composed of very sandy limestone to sandstone, dipping strongly southward.
	CR-138L grab sample for general lithology.
	Flew around general area and saw several outcrop of Nelchina as mapped by Grantz, 1965. All material above and below the limestone appears to be silty claystone to siltstone.

EAST WHITE SAND CREEK SECTION
NWNE SEC. 32, T25N, R12E, SM
TALKEETNA MOUNTAINS (A-1) QUADRANGLE, ALASKA

DATE: Wednesday, August 7, 1974

WEATHER: 50° F, cloudy

REMARKS: Measured (estimated) and sampled upsection area appears synclinal.

BY: Doug Powell.

UPPER JURASSIC

NAKNEK FORMATION

0-20'	Shale, dark grey to black, very silty to sandy and shaly sandstone, fine-medium grained, some coarse grained to small pebbles, badly weathered, fossiliferous - only belemnites found. CR-133P at 7'.
20-40'	Covered by vegation and talus.

LOWER CRETACEOUS

NELCHINA FORMATION (Neocomian Age)

40-47'	Talus slope, contact is estimated at 40' though covered.
47-70'	Limestone (calcarenite), light grey, weathers brown, sucrosic, very fine to fine grained, sandy, massive, strong petroleum odor on fresh break. Weathered surface shows fair porosity and permeability, poor to very poor porosity on fresh surfaces. Strike of beds is N 25° W, dip 23° SW. CR-134L composite 47-70'
70-90'	Covered slope, may be faulted.
90-110'	Limestone, as above, much rubble. Dip direction uncertain, but appears same as above but steeper - suspect fault.
	Top eroded.

YACKO CREEK SECTION
NWNENE SEC. 26, N/2N/2NW, NWNWNE SEC. 25, SWSWSE SEC. 24,
AND GRAB SAMPLE IN NENWSE SEC. 14, T. 25N R11E, SM
TALKEETNA MOUNTAINS (A-1 AND B-1), ALASKA

Date: Thursday, July 18, 1974
Weather: 65° F, broken overcast

Measured and sampled part of the Lower Naknek-Chisik conglomerate and overlying shale-siltstone facies on the hill and stream bank on the west side of Yacko Creek. Traversed downsection. Outcrop is poorly exposed.

By: Doug Powell, Dave Loney and Grant Streeton.

UPPER JURASSIC

Naknek Formation - Conglomerate and Siltstone and Shale Facies

0-250' Siltstone and shale, grey to brown thin bedded. About 50' well exposed along ridge crest, badly weathered and poorly exposed below.
CR-51P at 0'

250-300' Conglomerate, dark grey, pebble and cobble, dominantly pebbles to 3 inches. The cobbles are smaller size than on the Little Nelchina River near Idaho Creek, fossiliferous - one 3 inch belemnite. The sampled matrix is dominantly shale, dark grey and soft. Base of unit poorly exposed.
CR-50P composite 250-300' with fossil in bag.

300-320' Sandstone, grey, very fine to fine grained, quartz, much shaly material in matrix, fair sorting, poor to fair porosity, poor permeability. Abundant pelecypods in shaly sandstone to coquina beds of very small clams (?) and one belemnite.
CR-52P composite 300-320
CR-53F composite 300-320
CR-54L composite 300-320

Moved about 1.6 miles downstream, to the north

MIDDLE JURASSIC

Tuxedni Formation (?)

0-25' Unit of thin-bedded siltstone, grey to brown, shale, grey and occasional sandstone, grey to brown, medium grained fining upward to clay shale. Beds are 1" to 8" thick.
CR-49P at 0' Grap sample.

TYONE CREEK
NWSWE SEC. 20, T6N, R10W, CRM
TALKEETNA MOUNTAINS (B-1) QUADRANGLE, ALASKA

DATE: Friday, July 19, 1974

WEATHER: 40° F, raining

REMARKS: On ridge adjacent to west side Tyone Creek.

BY: Doug Powell, Grant Streeton and Dave Loney.

TERTIARY

CR-55L Grab	Conglomerate, pebble to cobble, sandy matrix, fair porosity. Subsequent core analysis showed 12% porosity and permeability of 1874 millidarcies.

EAST JOE CREEK AREA
SWNE SEC. 4, T. 25N, R11E, SM
(on divide between Joe and Red Creeks)
TALKEETNA MOUNTAINS (B-1) QUADRANGLE, ALASKA

DATE: Friday, July 9, 1974
WEATHER: 40°F, cloudy, occasional rain showers.

Described and sampled by G. Streeton, D. Loney and D. Powell.

UPPER (?) AND MIDDLE JURASSIC

TUXEDNI FORMATION

CR-1004 P — Grab sample from a scrappy outcrop of shale, black, weathers rusty, recessive to blocky, sandy in part, noncalcareous. Irregular bedding some up to 4 inches thick and uneven.

CR-1005 P — Grab sample of shale, black as above.

CR-1005 F — Six inch sandstone bed on top, coarse-grained, poorly sorted, angular, argillaceous, carbonaceous and tight. Few pelecypods are present.

(33)

MC CLAREN GLACIER, EAST
SWSE SEC. 24, T18S, R6E, FM
MOUNT HAYES QUADRANGLE (B-6) ALASKA

DATE: Sunday, August 11, 1974

WEATHER: 45-50° F, low clouds, raining.

REMARKS: Grab sample of metamorphic rocks reported as Cretaceous age taken from the east side of McClaren Glacier.

BY: Doug Powell, Grant Streeton and Dave Loney.

CRETACEOUS

MC CLAREN METAMORPHIC BELT

CR-160P "GRAB" Phyllite, dark grey-black, hard.

(34)

RICHARDSON HIGHWAY - EAST
NWNW SEC. 21, T. 19S, R 11E, FM
MT. HAYES (B-4) QUADRANGLE, ALASKA

DATE: Friday, August 9, 1974
WEATHER: 50°F, cloudy

Bench composed of conglomerate on east side of Richardson Highway.

BY: D. Powell, G. Streeton and D. Loney

TERTIARY

Conglomerate, pebble-boulder with thin lenses of siltstone-shale.
CR-145P Grap Sample of matrix siltstone and shale

MC CALLUM CREEK AREA
ESW SEC. 26, T19S R11E, FM
MT. HAYES (A-4) QUADRANGLE, ALASKA

DATE: Friday, August 9, 1974
WEATHER: 50°F, cloudy

Grab samples of steeply dipping black shales and contorted limestones in McCallum Creek drainage.

BY: D. Powell, G. Streeton and D. Loney

PERMIAN

MANKOMEN FORMATION (MC CALLUM CREEK SEQUENCE)

0-150'±	Shale, black, hard, blocky, some limy to non-calcareous. Very steep dip. Overlying limestone. CR-146P grab sample about 20' near middle of shale
150-190'±	Limestone in sharp chevron fold. CR-147L grab sample of general lithology of the shale and limestone.

(36)

PHELAN CREEK SECTION
W/2SWNE, NWSE, NESWSE SEC. 36, T19S 11E, FM
MT. HAYES (A-4) QUADRANGLE, ALASKA

DATE: Friday, August 9, 1974
WEATHER: 40°F, cold and heavy rain.

Sampled and measured down section along a north tributary of Phelan Creek. Traverse started about 100' below top of ridge.

BY: D. Powell, G. Streeton and D. Loney.

TERTIARY

0-100'	Not sampled. Appears to be claystone and silty clayey sandstones and conglomerates as below.
100-150'	Claystone and silty clayey sandstone in conglomerate, grey-green to brown, pebble-cobble, much carbonaceous material and large pieces of carbonized (lignitic) bark(?) and trunk, some with soft woody character. CR-148P composite 100-150'
150-225'	Shale to claystone and siltstone, badly weathered
225-250'	Shale, grey, weathered, very soft, and siltstone overlying conglomerate. CR-149P composite 225-250'
250-300'	Conglomerate as above.
300-400'	Badly weathered and covered. Appears to be mostly pebble conglomerates with some shale and siltstone. A pebble conglomerate with pebbly sandstone, calcareous, overlies the unit below.
400-420'	Shale and shaly siltstone, carbonaceous. CR-150P composite 400-420'
420-450'	Alternating pebble conglomerates, siltstone and shales
450-460'	Shale, grey, silty, carbonaceous, raining hard. CR-151P at 450'
460-475'	Siltstone, shale and pebble-cobble conglomerate.

475-500'	Shale, as above, carbonaceous, plus lens of brown lignitic shale with lots of flexible wood fibers. CR-152P at 475. Photograph.
500-525'	Siltstone, shale and conglomerate.
525-550'	Shale, carbonaceous and lignitic. CR-153P composite 525-550'
550-575'	Lignitic shale and shale, carbonaceous. Terminated section - cold and soaking wet. CR-154P composite 550-575'

Whole sequence is cyclic with pebble or pebble-cobble conglomerates, siltstones, lignitic shales and shale.

WEST FORK CHISTOCHINA RIVER
C E/2 NW SEC. 11, SWNW, NESW SEC. 15, T20S, R14E, FM
MT. HAYES (A-3) QUADRANGLE, ALASKA

DATE: Saturday, August 10, 1974

WEATHER: 50° F, cloudy, fair day

Sampled downsection from spur on side of cliff. Many hundreds of feet of siltstone and shale (?) above. Climbed to spur as helicopter landing on top of spur was too hazardous due to weather, particularly winds.

BY: D. Powell, D. Loney, and G. Streeton.

TERTIARY

GAKONA FORMATION - Miocene (?) Age

0-10'	Siltstone, dark grey to black on top of conglomerate, badly weathered. CR-155P at 10' at top of conglomerate.
10-610'	Conglomerate, grey to brownish-grey, pebble to cobble, some lenses of siltstone-sandstone, and matrix of shaly siltstone and silty shale, dark grey to black. CR-156L 10-610' general lithology of conglomeratic unit as traversing down. CR-157P at 200' shaly siltstone-sandstone and thin sandstone lense in conglomerate. CR-158P 400-450' silty sandstone lens, platy with carbonaceous material, and matrix shaly siltstone and dark grey to black silty shale, some mixed with pebbles. 450-610 conglomerate as above, unsampled. Base covered with talus.

Conglomerates are much harder than overlying siltstones. This unit was sampled to determine if older than Tertiary. An unconformity was not apparent at top of the conglomeratic unit, so unit is probably same age as overlying units.

COAL CREEK SECTION
CNESESW SEC. 29, T20S, R16E, FM
MT. HAYES (A-2) QUADRANGLE, ALASKA

DATE: Saturday, August 10, 1974
WEATHER: 50°F, cloudy, fair day

Sampled section near mouth of Coal Creek. Much black shale above sampled interval.

BY: D. Powell, G. Streeton, and D. Loney

PERMIAN

MANKOMEN FORMATION

0-100'	Shale, black, blocky similar to McCallum Creek Sequence overlying limestone. CR-159P composite 0-100'
100-225'	Limestone, grey, coarsely crystalline (recrystallized?) dense. Fossil fragments, crinoids and ? bryozoan or tabulated coral. Some float with crinoids and horn coral.
	Float in creek bed showed many coal chunks and conglomerates of Tertiary (?) age. Literature has reports of Tertiary coal in this area.

SNIDER PEAK SECTION
SWSE SEC. 1, NWNE, NENE, SENE SEC. 12
T 3N R 4E, CRM
GULKANA (A-2) QUADRANGLE, ALASKA

Date: Thursday, August 15, 1974
Weather: 65° F clear

Measured (estimated) and sampled downsection along end of the ridge trending east and southeast from Snider Peak. Overlain by Wrangell lava. Basal contact is covered in stream bed of northwest tributary of the Dadina River, but partially in contact with igneous intrusive.

By: Doug Powell, Grant Streeton, and Dave Loney. Shell geological crew and helicopter on the outcrop.

LOWER CRETACEOUS

Kennicott Formation (Albian?)

0-30'	Shale, grey, very silty in part to siltstone, blocky, thin-bedded, non-calcareous, badly weather to brown color. CR-185P composite 0-30'
30-60'	Shale, as above, to top of concretion zone which is fossiliferous-small ammonities and single pelecypod fragments from a 6' limestone concretion, grey, weathers brown. Palynology sample includes a few pieces of the limy concretions. CR-186P at 60' CR-187F at 60' approximate zone from which Puzosia alaskana (ammonite) of probable late early Albian age (Grantz, et al, 1966) was found.
60-90'	Shale, grey, weathers brown, hard, silty, thin bedded with calcareous concretions. CR-188P composite 60-90'
90-200'	Shale, as above, hard, thin bedded, fissile to platy on weather surface, siliceous --looks like Mowry type shale. Strike and dip of beds is N24°W23°SW. CR-189P composite 100-200'
200-250'	Shale, as above with calcareous concretions. Traces of fossil wood. CR-190P composite 200-250'

250-300' Shale, dark grey, soft and siltstone with large calcareous concretion zones with silty sandstone at top. Occasional thin bed of grey, fine to medium grained sandstone, calcareous and tight. Fossils (ammonites) and fossil wood in the concretions.
CR-191P composite 250-300'
CR-192L composite 0-250' general lithology of the sandstones.

300-380' Shale, dark grey, soft silty with calcareous concretions and fossil wood on the surface. At 330' a 6-8 '+ (base covered) bed or lense of conglomerate, pebble to boulders composed predominantly of granitic material with some schist and gneissic material mixed with sandstone and limy concretions. Material is angular to subangular to blocky. Much conglomerate on slope so possibility of other lenses or only schree. Fossil wood noted in concretions. See remarks at end of section.
CR-193P composite 300-380'

380-400' Shale, as above.
CR-194P composite 380-400'

400-410' Sandstone, grey to brown, conglomeratic, pebble size, scour features with shale clasts. Unit broken into a basal 4' pebbly sandstone, overlain by 4' sandstone, pebbly sandstone with shale clasts and 2' sandstone. Fair porosity and permeability.
CR-195L composite 400-410'

410-425' Shale as above. In partial contact with intrusive, mostly covered slope wash and stream bed.
CR-196P composite 410-425'

REMARKS: "The granitic conglomerate at 330' is believed to be a wash from a biotite granodiorite pluton immediately adjacent to site of deposition (only 2 to about 10' away to the south -- see sketch below).

Biotite from this pluton yielded a potassium-argon age of 126 + 4 MY, suggesting intrusion during Neocomian (Early Cretaceous) time" (Grantz, et al, 1966). Possible that the age could be earlier, such as late Jurassic and similar to other intrusives in the region. See sketch below.

CHETASLINA RIVER SECTION
SE, SESW SEC. 7, N/2NW SEC. 18 T1N R5E, CRM
VALDEZ (D-2) QUADRANGLE, ALASKA

DATE: Tuesday, August 13, 1974
WEATHER: 60°F cloudy, breaking up to relatively clear and hot day.

Measured and sampled upsection (downstream) along river channel. Base and top of section concealed by alluvial and glacial deposits. Section very difficult to work because of the swollen glacial stream, which is too difficult to wade, steep canyon walls and few landing spots in canyon due to high water.

BY: Doug Powell, D. Loney and G. Streeton.

?UPPER JURASSIC

LOWER NAKNEK AND/OR CHINITNA FORMATIONS (?) EQUIVALENTS

0-50'	Conglomeratic sandstone, green, fine to medium grained with pebbles to cobbles throughout, hard and tight, trace of carbonaceous fragments and fossil wood. Matrix is shaly siltstone to sandstone. Beds are striking N70° W and dipping 24° SW (average of several strike and dips). CR-161P at 0'
50-75'	Siltstone to sandstone unit, green, weathers brown, contains some clay clasts (1/4"-1/2" size). Sample from carbonized wood and carbonaceous siltstone and sandstone. Zones may be badly weathered. There is abundant plant fragments, woody stems of branches imprints. CR-162P composite 50-75'
75-150'	Sandstone and siltstone, green, weathers brown, very fine to fine grained becoming conglomeratic with pebbles and cobbles in silty sandy matrix. Noncalcareous, hard and tight. CR-163L composite 0-150' CR-164P composite 100-150' from siltstone and conglomerate matrix.

150-200'	Sandstone, green, fine grained, some coarse grained, to pebble conglomeratic zone with occasional cobble, weathers brown (iron stain) tight to poor porosity, some shaly siltstone lenses through unit sample for Palynology. CR-165P composite 150-200'
200-300'	Mostly sandstone, grey to green, fine grained, some pebbles, non-calcareous, hard and tight, with occasional pieces of carbonaceous material (one large ?branch) some silty zones. CR-166P at 300'
300-500'	Sandstone, grey-green, fine grained and siltstone to sandstone zones with pebble and cobble conglomerates, non-calcareous, matrix material is silty-shale to shaly siltstone to sandstones. Slightly calcareous, hard with pebbles, poor porosity. CR-167P composite 450-500' in matrix
500-550'	Siltstone, grey, sandy, clayey and oxidized brownish-red silty zones. CR-168 at 520' from oxidized silt
550-600'	Siltstones, greenish grey, shaly, limy to silty limestone, some very shaly stringers weather in part to muddy soil. Many calcite veins in fractures, some carbonaceous material and slickensides. CR-169P composite 550-600' CR-170P at 590' large coaly zone probably carbonized tree trunk.
600-620'	Limestone, grey, silty, hard to limy silstone, many calcite veins and ?Inoceramus prisms. Possibly abundant crushed shells (Pelecypods). CR-171L at 620'

CHESHNINA RIVER SECTION
SESE SEC. 23, SW, SENW, NE Sec. 24, T1S R5E, CRM
NWNW, NENW SEC. 19 T1S R6E, CRM
VALDEZ (D-1) QUADRANGLE, ALASKA

DATE: Wednesday, August 14, 1974
WEATHER: Clear, 65°F rising rapidly to at least 90°F during midday.

Measured and sampled upsection (downstream) along the steep sided river canyon. Base and top covered by glacio-alluvial deposits. Section very difficult to work because of continued hot weather and resultant swollen glacial streams to swift to wade, few landing spots in canyon due to high waters and loss of helicopter lift due to high temperatures.

BY: Doug Powell, D. Loney and G. Streeton.

(?) UPPER JURASSIC

LOWER NAKNEK AND/OR CHINITNA FORMATIONS (?) EQUIVALENTS

0-100±	Sandstone, grey, fine to coarse grained with pebbles up to 1" (rare) scattered throughout, calcareous, micaceous, massive, cliff-former on the north side of the stream, weathers soft, poorly sorted, subangular to subrounded, poor porosity and permeability. Base of sandstone is not exposed. Near bottom of interval are a few cuts and fills with pebble sandstone fining upward and topped with scour zone and with shale clasts with horizontal lineation (few random). Few thin low-angle crossbeds dipping to the southwest. A few thin grey silty shale and carbonaceous siltstones lenses are scattered through the unit. CR-172L at 10' CR-173P at 15' from 1"-3" silty grey shale CR-174P at 12' from this brown shaly carbonaceous siltstone.
100-200'	Covered.
200-250'	Sandstone, grey-dark grey to brownish grey, fine to medium grained, occasionally coarse grained with some pebble conglomerate lenses scattered through unit, calcareous, micaceous, subangular to subrounded quartz grains, better sorted than lower sandstone, poor porosity and permeability. Palynology sample from silty zone and grey, silty shale as above, some carbonaceous with traces of coal (carbonized wood). CR-175P at 250'

250-325'	Massive sandstone as above, CR-176P at 295' silty shale and carbonaceous siltstone lens.
325-350'	Covered.
350-380'	Consists of 10' grey shale, dark grey to grey, silty, calcareous and interbedded with thin siltstones and sandstones (dip attitude N40W25°SW on siltstone bed), 8' shaly sandstone, 2' shale, grey, and 10' sandstone as above, grey to brown-grey f-mg, poor porosity. CR-177P composite 350-380' from shales, and siltstones.
380-415'+	Shale, dark grey to grey, silty, hard, limy weathers to soft, blocky looking shale but very hard on fresh breaks, interbedded with thin siltstone and sandstone layers. Fossiliferous - plant fragments (carbonaceous) and part of ? ammonite mold. CR-178F composite 380-415' CR-179P composite 380-415'
415-700'	Estimated interval skipped due to deep canyon and swollen river. Lithology is sandstone and shale as above.
700-800'	Sandstone, grey to brownish-grey, as above, with shaly zones and traces of coaly material. CR-180P at 700' two bags from shaly zone
800-1,000'	Skipped, mostly sandstones, as above some shaly zones and siltstones and shales.
1,000-1,050'	Shale, black, blocky, calcareous, scattered thin sandstone beds. CR-181P composite 1,000-1050'
1050-1,150'	Shale, as above, has vitreous lustre (slickensides?) in fault zone or near one as dip is reversed or overturned back to northeast. CR-182P composite 1,050-1,100'
1,150-1,200'	Shale, dark grey to black, as above. Sample is about 100-150' above CR-181P. Dip is to the northeast and may be overturned and equivalent to above samples CR-181-182P. CR-183P composite 1,150-1,200' CR-184P at ? 1,100', grab sample in black shale about 100 below last sample. Shales taken from across chevron fold zone (about 50 yards wide). Sample may be equivalent to CR-181-183P.

MAC DOUGALL CREEK SECTION
C W/2 NE SEC. 3, T4S, R9E, CRM
MC CARTHY QUADRANGLE (C-8), ALASKA

DATE: Thursday, August 29, 1974

WEATHER: 55° F, clear

REMARKS: Grab sample at previous measured sections by USGS, Grantz, 1966, Section E and by L. J. Rulla, Pan American, 1960.

BY: Doug Powell.

LOWER CRETACEOUS

NELCHINA FORMATION (Neocomian Age)

CR-313L Grab General lithology sample of the Nelchina Limestone. Identical to lithology of the Nelchina Area on west side of Copper River Basin.

CHOKOSNA RIVER SECTION
NWNW SEC. 4, T 4S R 10E, CRM (NELCHINA FORMATION)
NWSWSW SEC. 33, T 3S, R 10E, CRM (?KENNICOTT FORMATION) AND
SENE, NESE, SWSE SEC. 34, T. 3S R 10E, NWNWNE THROUGH CENTER
E/2W/2 SEC. 3, T 4S, R 10E, CRM (TERTIARY, UPPER(?)
AND LOWER (?) CRETACEOUS)
MC CARTHY (C-7) QUADRANGLE, ALASKA

Date: Saturday, August 24, 1974
Weather: 32° F, high clouds - front moving in, windy

Found Hunters camp at the objective Kuskulana Pass section, bypassed and traversed through portions of the Nelchina Formation about 1 mile east-northeast of the pass. The formation is faulted much like in the type Nelchina area.

By: Doug Powell, Dave Loney and Grant Streeton.

LOWER CRETACEOUS

Nelchina Formation

Grab sample — Limestone and sandstone identical to lithology in Nelchina type area. Petroleum odor on fresh breaks. The sandstone is olive-grey to light brown, fine grained with poor-fair porosity. Limestone is light grey to white, massive. Plugged into replotted Kuskulana Pass sections.
CR-1088L composite 100'+

Kennicott Formation (?)

Approximately 50' of interbedded sandstone and shale are exposed on a steep hillside to sheer cliff overlooking to north the Cirque Valley of south tributary of Slatka Creek. Unable to see the contact relationship with the underlying Triassic-McCarthy formation, however, the lithology is grey, microcrystalline limestone with some black chert in adjacent area.

Grab sample — Shale, dark grey to black, soft, silty weather brown.
CR-1103P @ 40' above Triassic

Grab sample — Sandstone, greenish grey, fine grained, glauconitic, non-calcareous, some pebble size interformation conglomerate along bedding plane. Some carbonaceous wood material.
CR-1104L composite 40-50' above Triassic.

Moved east about 2 miles to a north tributary of the Chokosna River to sample and measure (estimates) downsection Tertiary and Cretaceous rocks. Started section beneath basaltic lava flow. Slope below flow heavily covered with black lava talus.

TERTIARY - MIOCENE?

Fredericka Formation

0-10'	Coal, black and silty carbonaceous shale. CR-1089(b)P at 0'
10-15'	Siltstone, black, slightly calcareous, carbonaceous, firm, poorly exposed and weathered. CR-1089P composited 10'-15'
15-45'	Shale slope, probably silty shale as at top
45-100'	Conglomerate, grey to green, pebble-cobble, rounded to subrounded, with a matrix of grey to black siltstone near base, conglomerates weather to smooth slopes. Must be some shale interbeds or very shaly soft matrix. Unable to sample due to deep soil cover.
100-150'	Siltstone, grey, dense, very slightly calcareous, much of interval has purplish to reddish color. May be concretionary but very poor exposures. Appears to have conglomerate interbeds as above but with purplish color. CR-1090P at 100' siltstone. Color and lithology charge at 150' could not see contact but bedding relationships above and below indicates angular unconformity.

UPPER (?) AND LOWER (?) CRETACEOUS

?Chititu - Schulze and Kennicott (?) Formations

150-250'	Shale, dark grey, firm, silty to siltstones, non-calcareous, siliceous (?), weathers yellowish-brown. CR-1091 P at 150'

250-350' Shale, dark grey to black, hard and some shaly siltstone. At 350' fractures in beds are deep and all fragments are coated with soil, but fresh breaks appear unweathered.
CR-1092P at 250'
CR-1093P at 350'

350-750' Shale, dark grey to black, hard.
CR-1094P at 450'
CR-1095P at 550'
CR-1096P at 650'

750-1000' Shale as above, non-calcareous with a few calcareous concretions. Concretionary zones increasing at 850' with some elongated and discontinuous concretion beds with a few cannonball type. A thin (1') bed of sandstone, silty, calcareous, hard and tight occurs at 880', strike of bed is N28°W and dip is 3° NE. Numerous bedded concretions to calcareous siltstones zones begin at 950'.
CR-1097P at 750'
CR-1098P at 850'
CR-1099P at 950'

1000-1100' Shales, black, with calcareous concretions, as above.
CR-1100P at 1000'
CR-1101P at 1100'

Traversed down section along southwest trend of drainage where beds dip gently (@ 3°NE). Trend of drainage changed abruptly to the south and dip steepened to the south (strike N60°W, dip S30°W). Now traversed upsection to lithology, similar to our starting point, consisting of grey siliceous shale to siltstone which weathers yellowish-brown, thin bedded few inches to 1 foot with occasional large concretion. Looks like Schulze type beds.
CR-1102P sample should be about 100' above Cretaceous section starting point

NORTHEAST ALICE PEAK
NENWSE SEC. 23, T2S, R7E, CRM
VALDEZ QUADRANGLE (C-1), ALASKA

DATE: Thursday, August 29, 1974

WEATHER: 55° F, clear

REMARKS: Grab sample of the Kotsina Conglomerate in the Sheep Mountain Area of the Southwest Wrangell Mountains. On return trip to Anchorage at end of field season and insufficient time to evaluate this formation, which is reported 1,500-2,500' thick.

BY: Doug Powell.

UPPER JURASSIC (?)

KOTSINA CONGLOMERATE

CR-314L Grab Conglomerate, brownish-grey, pebble to cobble, highly indurated.

(?) LOWER JURASSIC AND UPPER TRIASSIC

MC CARTY FORMATION (Probably lower member)

CR-315P Grab About 20-30' below conglomerate. Siltstone to limestone, black, shaly, calcareous, weathers blocky.

BEAR CREEK SECTION
SWSW SEC. 14, SESESE SEC. 15, AND E/2 E/2 SEC. 22,
T 4S, R 12E, CRM
MC CARTHY (C-6) QUADRANGLE, ALASKA

Date: Sunday, August 25, 1974, 3:00 P.M.
Weather: 40° F, windy, raining and cold.

The Kennicott formation was sampled and measured (estimated) upsection at the designated type locality, the hillsides east of Fohlin Creek and north of Bear Creek (Jones and MacKevett, 1969). Specifically the section was traversed along a southwest to south trending ridge drained by north tributaries of Bear Creek. The basal contact with the Triassic-McCarthy Formation is an angular unconformity.

By: Doug Powell, and Grant Streeton.

LOWER CRETACEOUS

Kennicott Formation

0-5'	Shale, black, almost vitreous lustre, soft, weathers splintry, calcareous, very slightly silty. Erosional contact with grey, dense, hard limestone beds of the McCarthy formation. CR-241P composite 0-5'
0-100'	Shale as above with blocky highly fractured calcareous concretions (?) or limestones. Some appear to be pieces of McCarthy limestone enclosed within Kennicott shales in lower part of interval. CR-242P composite 0-100'
100-200'	Shale, as above, with grey, weathered brown, limestone concretions, highly fractured. Upper part about 30' of silty calcareous concretions or limy siltstone with occasional fossils - pelecypods. At top of unit is a 6-8' igneous sill (felsic) yellow-tan color. CR-243P composite 100-200'
200-250'	Shale, black, silty at base of overlying sandstone unit. CR-244P at 250'
250-400'	Sandstone, grey to greenish-gray, fine grained, well sorted, calcareous, poor porosity and permeability, fossiliferous-pelecypods. CR-245L at 400'

400-500' Shale, dark grey to greenish-grey, silty, non-calcareous, weathers blocky.
CR-246P at 500'

500-600' Shale, as above, weathers blocky and fissile.
CR-247P at 600'

600-675' Conglomerate (75'+ thick) dark-grey to brown, massive, pebbles to boulders, much from the McCarthy Formation, angular to subangular, with shaly-sandy dirty matrix, looks like a channel fill.

Jones and MacKevett (1969, USGS Bulletin 1274-K, p. K8) originally reported that the Kennicott formation at its type locality is locally overlain by the above massive conglomerate. Subsequently the conglomerate is questionably assigned to the Kennicott formation by MacKevett (1972).

Lower Cretaceous (?) and Upper Cretaceous.

Chititu Formation?

675-1050' Shale, dark grey, soft, weathers to fine, rounded fragments on the surface.
CR-248P at 1050'

1050-1250' Shales as above, poorly exposed, unable to obtain dip and strike.
CR-249P at 1250'

1250-1350' Shale as above.
CR-250P at 1350'

1350-1450' Shale as above, cold, hard wind and rain. Terminated section at 6:00 P.M.
CR-251P at 1450'

NIZINA RIVER SECTION
NORTH BANK OF RIVER, ALONG SOUTH LINE OF E/2 SEC. 10,
SEC. 11, AND W/2 W/2 SEC. 12, T6S, R14E, CRM
MC CARTHY (B-5) QUADRANGLE, ALASKA

DATE: Thursday, August 22,1974
WEATHER: 40°F, cool, overcast, probably snowing above 5,000'.

REMARKS: Helicopter down for repair of leaking fuel cell. Drove "carryall" to Nizina River and traversed approximately 1 - 1 1/2 miles downstream from Nizina Bridge, which leads to the May Creek airstrip, and mining camps on Dan and Chititu Creeks. About half of the bridge has been destroyed by floods. Began measuring upsection in the Chititu Formation at last exposure, where the black shales are covered by wooded slopes and eroded into by Quaternary gravels. Encountered grizzly bear at beginning of section.

By: Grant Streeton, Dave Loney and Doug Powell

UPPER CRETACEOUS

CHITITU FORMATION

0-100' Clay shale, grey, weathers grey-brown, soft, recessive, not calcareous, mostly covered along river-bank and cut into by Quaternary gravels.
CR-1056P taken at 0'
CR-1057P taken at 100'

100-450' Clay shale, as above, with brown-weathering, calcareous siltstone beds 4 inches thick and thin concretionary zones. Numerous rust weathering, calcite-filled veins cut across bedding and displace beds a few inches to a few feet. Concretionary zones contain calcareous concretions up to 1' thick, unfossiliferous, but containing rounded ironstone nodules up to 2" thick.
CR-1058P taken at 200'
CR-1059P taken at 300'
Beds strike N20°W and dips 25°NE, but are slumped and contorted.

450-650'	Shale, as above, with interbedded siltstone, grey, rust weathering, noncalcareous. CR-1060P taken at 500' CR-1061P taken at 600'
650-700'	Shale, as before, with large brown or rust-weathering lenses or blebs of olive-grey shale. Surfaces contain numerous crystals or laths of selenite or gypsum which are up to 1/2" long. Numerous ironstone nodules are also present. The rusty coloration and gypsum crystals are probably the result of leaching of gypsiferous shales. CR-1062P taken at 700'
700-1,200'	Shale, as before, with occasional beds, up to 6 inches thick, of brown-weathering calcareous siltstone, and numerous concretions up to 3' in diameter. CR-1063P taken at 800', lithology as before. CR-1064P taken at 950', lithology as before. CR-1065P taken at 1,000', lithology as before. CR-1066P taken at 1,100', lithology as before. CR-1067P taken at 1,200', lithology as before.
1,200-1,225'	Intrusive rock, light grey-green in color, weathers sandy, massive, hard, aphanitic, with calcareous blebs. Intrusive appears to be a felsic sill which is concordant with bedding. Contacts between the shale and the intrusive are sharp and show an oxidation zone into the shale for approximately 15" around the sill.
1,225-1,360'	Shale, as before, with large concretions and small dykes of intrusive rock which cut through bedding. Occasional sandstone dykes, 6 inches thick and near vertical in trend, are present - these are composed of quartz and black chert and are medium grained, poorly sorted, argillaceous, and tight. CR-1068P composite from 1,225-1,300'
1,360-1,375'	Intrusive sill, as described before.
1,375-1,425'	Shale, black, weathers rusty, but much harder and more resistant than before, possibly siliceous. Proximity of intrusive rocks may account for the hardness of the shales. Approximately 1,400' of section measured to the Nizina Bridge. CR-1069P composite 1,350-1,400'

1,425-1,485' Intrusive dyke, light grey-green, weathers sandy, aphanitic, hard, massive, resistant, as before. Dyke cuts through shales and locally uplifts them. Contacts between the intrusive and surrounding shales are very oxidized and rusty.

1,485-1,600' Shale, black, hard, weathers rusty, siliceous, with calcareous concretions up to 2" in diameter. CR-1070P taken at 1,500'
CR-1071P taken at 1,600'

1,600-1,625' Shale, black, weathers rusty, hard, siliceous, with yellow-brown siltstone beds up to 8" thick, and large rust-weathering calcareous concretions. Some siltstone beds and lenses contain small calcareous mudstone nodules up to 2 inches in diameter and with a greenish and brown coating. The siltstone is yellow-brownish, grey and shaly.

Section ended in the roadcut at 1,625'. Traversed around a small creek and worked back to the bank of the Nizina River. Sampled one further outcrop: CR-1072P composite sample, taken at estimated 1,700-1,750', consists of grey-black shale, as before.

End of section at 1,750'.

(57)

NORTHEAST NIKOLAI MINE SECTION
NWSW, SWSW SEC. 35, T4S, R15E, CRM
MC CARTHY QUADRANGLE (B-5), ALASKA

DATE: Friday, August 23, 1974

WEATHER: 20-25° F, cold and windy.

REMARKS: Measured (estimated) and sampled upsection from the strong angular unconformable contact of the Lower Cretaceous-Kennicott Formation and the Triassic-lower McCarthy Formation located on the east side of the divide between Nikolai Creek and west tributary of the Nizina River. Erosional cutting of up to 15' noted in the hard, siliceous, limy, siltstones to mudstones of the underlying McCarthy formation.

BY: Dave Loney, Grant Streeton and Doug Powell.

UPPER TRIASSIC

MC CARTHY FORMATION (LOWER PART)

Siltstone to mudstone, dark grey, hard, siliceous, limy. Erosional cutting of up to 15' noted in siltstones to mudstone.

Angular unconformity (about 40° angular discordance).

LOWER CRETACEOUS

KENNICOTT FORMATION (ALBIAN AGE)

0-15'	Sandstone and conglomeratic sandstone, dark grey, weathers orange-brown, interbedded fine-medium grained with coarse grained and pebbly sandstones over approximate 4' intervals with coarse pebbly bases, generally platy and blocky. Coarse grains consist of black chert with occasional pebble up to 1/2" diameter, subrounded to rounded, poorly sorted, poor porosity. Matrix of black argillaceous carbonaceous shale which weathers orange. Carbonaceous material and pelecypods in float. Beds strike N 40° W and dip 25° SW.

15-60' Sandstone, brownish grey, very fine grained, well sorted, argillaceous and platy, tight.

60-65' Sandstone, dark grey to brownish grey, coarse grained, conglomeratic (pebbly) as at base, dominantly with black chert grains, minor quartz and some lithic fragments, poorly sorted, subrounded. Matrix is an orange weathering siltstone.
CR-1080L composite 0-65'.

65-90' Shale and siltstone unit, very recessive, poorly exposed (soil cover). Probably purplish-greenish, silty, sandy, soft, badly weathered shale as sampled at 70' and greenish silts and shales found in float.
CR-1081P at 70'.

90-115' Shale, dirty grey, silty with rare interbeds of conglomeratic sandstone (6" thick) containing clasts of black chert, and grey-black shale up to 2" diameter, angular and poorly sorted in an orange weathering silty-sandy matrix.
CR-1082P composite 90-110'.

Formational contact sharp through poorly exposed from recessive shaly unit below to overlying siliceous unit.

Schulze Formation

115-145' Siltstone to shale, very diagnostic yellow-brown to orange brown weathered color, grey on fresh surfaces. Hard, siliceous, thin bedded up to 4", fissile to blocky rubble.
CR-1083P composite 115-145''

145-270' Siliceous shales and siltstones as above. Fossiliferous-Pelecypods at 230'.
CR-1084P composite 145-230'
CR-1085F at 230'
CR-1086P at 230'
CR-1087 composite 230-270'.

Upper part of formation eroded.

LUBBE CREEK SECTION
NW SEC. 29, NE, SE SEC. 30, NW, SW SEC. 32, T3S, R15E, CRM
NW, SW, SE OF SECS. 5 AND 6, NE SEC. 8, NW SEC. 9,
T4S, R15E, CRM
MC CARTHY (C-5) QUADRANGLE, ALASKA

DATE: Tuesday, August 20, Friday, August 23, and Sunday, August 25, 1974

WEATHER: Tuesday, 50° F, low clouds, windy and cool. Friday, 35° F, scattered clouds, clearing at takeoff. On outcrop temperature dropping to 19°-20° F, windy, snow cover about 4,000'. Sunday, 50° F, clear at takeoff changing rapidly to overcast, 32° F and snowing.

Measured (estimated) and sampled along Lubbe Creek and its tributaries, the high aretes north of Lubbe Creek and the lower ridge to the south. All formational names and ages assigned to this section are per MacKevett, 1969, 1970, 1971. The field notes were composited from three separate visits and are arranged to read as a downsection traverse. Samples cut for source rock analysis are marked with an *.

UPPER JURASSIC

Root Glacier Formation

(Oxfordian and Kimmeridgian Ages)
SW NW Sec. 29, SENE, NESE, SENWSE Sec. 30, SESWNW, NENWSW, E/2 SESW Sec. 32, T3S, R15E, NENW, SENW Sec. 5, T4S, R15E

Ice and snow covers the upper 500' of Root Glacier Formation in this area. This interval and description is after MacKevett, 1971, USGS Bulletin 1323. The top of the formation is unconformably overlain by Tertiary-Frederika Formation (Miocene age).

0-500' Shale, dark grey, slightly calcareous, hard, in part silty to siltstone, with a few thin interbeds (few inches thick) of sandstone, grey to dark grey, fine grained, and a few calcareous concretions.

Conglomerate Lentil

500-625'	Conglomerate pebble to cobble in sandstone matrix, well indurated, grades laterally and vertically into very coarse and coarse grained sandstone, locally contains wood fragments. Above description is after MacKevett, 1971, due to snowing and low clouds which prevented traversing the upper 125' of this unit.
625-700'	Conglomerate, grey to dark grey, weathers brown, rounded pebbles and cobbles of limestone-lime mudstone (siliceous), greenstone, granitic rocks, shale and some chert in a sand matrix, thicked bedded, graded bedding upward to sandstones, some lenses of pebbly sandstone and dark grey to black shale. Some cross-bedding with ? southerly dip. Basal 1-2' of unit composed of fewer pebbles and cobbles in shale or mud matrix which becomes increasingly sandy upward. CR-236P* taken at 650' in shale lens. CR-235L composite 625-700'.
700-800'	Shale, black, hard, calcareous, possibly siliceous. CR-234P composite 700-800'
800-900'	Shale, black to dark grey, slightly calcareous, hard. On west side of gully is an igneous dike and probable faulted block of the overlying conglomerate lentil. CR-233P composite 800-900'
900-1,000'	Shale, as above, few thin interbeds (1"-3") with sandstone, dark grey to black, calcareous, tight, all with small scour and fill structures. One thin sandstone, dark grey, with pebbles, black and green with some shale clasts, and occasional calcite vein through pebble. Single shale piece with fragment of pelecypod impression. Occasional light-colored igneous intrusive (vesicular) dike. CR-232P composite 900-1000'.
1,000-1,015'	Increase in siltstone to sandstone in upper 15', thinly bedded with silty shale to shale beds generally less than 2 inches thick. Sandstone is grey to dark grey, fine grained, calcareous, tight, some scour and fill structure on small scale with few shale clasts and possible worm burrows both horizontal and vertical (not conclusive). Some cross-bedding in a few 1/2" to 1" sand beds.
1,015-1,045'	Shale, black, hard, slightly calcareous scattered limy concretions.

1,045-1,100' Sandy unit consisting of thinly laminated sands with scour and fill bases, some shale clasts, grading into thin bedded shales, siltstones and sandstones (2"-3" thick). Sandstones are grey to brown, very fine to fine grained, calcareous, tight, weathers brown and flaggy on surface. All scour (very slight) bases appear to fine slightly upward, few calcite veins, some rare carbonaceous material and several thin 2"-3" beds of soft silty shale between hard black shale.
CR-231P composite 1,000-1,100'.

1,100-1,300' Shale, dark grey, hard, silty in part, calcareous massive slopes, weathers splintry to blocky. Scattered calcareous concretions (few inches to couple of feet across). Approximately 50' down is a 15' zone of thinly interbedded shale and siltstone to sandstone, dark grey, very fine to fine grained, hard, calcareous and carbonaceous. Looks laminated with quartz and black shaly material. Single vertical burrow about 1/4" wide and 5"+ long in 8" bed of laminated siltstone-sandstone and carbonaceous shale.
CR-230P composite 1,100-1,200'
CR-229P* composite 1,200-1,300'.

1,300-1,400' Shaly siltstone to silty shale, medium grey, well indurated, calcareous. Strike and dip of beds is N 55° E 25° NW.
CR-228P composite 1,300-1,400'.

Moved south about 9 miles to arete overlooking north tributary to Lubbe Creek where the lower part of the Root Glacier Formation was traversed and sampled on August 20, 1974.

1,400-1,600' About 200'+ interval skipped to new sampling location. Faulting and folding make estimating thickness very difficult. Lithology is same as above, to shale, dark grey to black, hard and calcareous.

1,600-1,700' Shale, dark grey to black, hard, calcareous and shale lenses interbedded with sandstone.
CR-237P at 1,600'.

1,700-1,725' Sandstone, grey, weathered brown, fine to medium grained, hard, calcareous.

1,725-1,825' Conglomerate, pebble to cobble with lenses of sandstone and shale.
CR-238L composited 1,700-1,825' general lithology of sandstones and conglomerates.
CR-239P* at 1,775' in shale lens.
CR-240P at 1,825' in shale lens.

Weather deteriorating-snowing lightly and clouds lowering had to move off ridge. Skipped an estimated 1,075' to top of August 23, 1974 traverse.

1,825-2,800' Shale, dark grey to black, hard calcareous, in part silty to siltstone.

2,800-2,900' Shale, black, hard, calcareous.
CR-227P at 2,900'.

2,900-3,400' Shale, black, hard, calcareous.
CR-226P* at 3,000'
CR-225P at 3,100'
CR-224P at 3,200'
CR-223P at 3,300'
CR-222P at 3,400'

3,400-3,700' Shale, as above
CR-221P composite 3,500-3,600'
CR-220P composite 3,600-3,700'.

3,700-3,800' Shale, black, hard, weathers splintry to blocky, some conchoidal fractures, few thin lenses of siltstone to sandstone, medium grey, very fine to fine grained, finely laminated with evidences of cut and fill structures and (?) worm burrows.
CR-219P composite 3,700-3,800'.

3,800-4,000' Shale, black, hard, badly jointed, massive, weathers splintry to blocky with some chonchoidal fractures.
CR-218P* composite 3,800-3,900'
CR-217P composite 3,900-4,000'

4,000-4,075' Siltstone, black, hard to silty shale, splintry to blocky.
CR-216P composite 4,000-4,075'.

4,075-4,190' Shale, black, hard, silty sample taken west side of drainage where underlying formation has been eroded. Faulting possibility also exists.
CR-213P(b) at 4,190'

MIDDLE AND ~~UPPER~~ JURASSIC

NIZINA MOUNTAIN FORMATION

(Bathonian and (?) Callovian ages)

Formation sampled in SENW Sec. 5, T4S, R15E, CRM. Strong erosional disconformity causing formation to vary in thickness from 0' to 1,350' maximum.

4,075-4,100'	Shale, black, weathered reddish-brown, splintry, blocky, few limy concretions. Strike: N 70° W, dip 30° N. CR-215P at 4,080'.
4,100-4,150'	Shale, as above, to siltstone, pyritic, some limy concretions. CR-214P* at 4,150'.
4,150-4,190'	Shale and siltstone, weathered reddish-brown, hard. CR-213P(a) at 4,190'.
4,190-4,200'	Covered by stream bed.
	Disconformity.

LOWER JURASSIC

LUBBE CREEK FORMATION

(Toarcian and probably Pliensbachian ages)

Formation sampled in SENW, NESW, W/2 SE Sec. 6, T4S, R15E, CRM. Sample CR-213 L(c) taken in SENW Sec. 5 of same township.

4,200-4,245'	Siliceous Limestone (spiculites) hard, to limy, siliceous-siltstone, grey, weathers brown, very dense, some cherty material, abundant calcareous veins and fractures, blocky to angular fragments from fraction of inch to several inches in size. Some concretions of same lithology. CR-213L(c) at 4,200'.

4,245-4,250' Siltstone, dark grey, calcareous, appears shaly, weathers out in splintery pieces, softer than overlying beds.
CR-204MF composite 4,200-4,250'
CR-205P* composite 4,245-4,250'.

4,250-4,325' Siliceous limestone as above, hard, some concretions, traces of fossil fragments (? pelecypods). Coquina bed, dark grey, weathers brown at 4,260'. A thin 6' siltstone, dark grey, hard at 4,294-4,300'.
CR-206 MF composite 4,250-4,300'
CR-207P at 4,300'
CR-208L at 4,260'.

Faulted zone with beds near vertical. Resampled lower 75' of Lubbe Creek formation in second fault block.

4,250-4,325' Siliceous siltstone to limestone, hard, some argillaceous.
CR-210MF composite 4,250-4,325'.

Conformable contact.

LOWER JURASSIC - ? UPPER TRIASSIC

MC CARTHY FORMATION - UPPER MEMBER
(Pliensbachian, Sinemuriar, Hettangian, and Rhaetian (?) ages)

The upper member is probably all Lower Jurassic age. This formation was sampled in NESW, NWSE, SESE, Sec. 5, SE Sec. 16, NENE Sec. 8, NWNW Sec. 9, T4S, R15E, CRM. The first three samples were taken along the same traverse as the above Lubbe Creek formation.

4,325' Shale, black, silty to siltstone, taken at base of first Lubbe Creek Formation fault block 25' below CR-207P. Dug down in vegetation covered ridge between good outcrop. Not 100% sure "in situ" sample.
CR-209P at 4,325'.

4,325-4,330' Shale, black, silty to siltstone, blocky and shaly sample taken at base of second Lubbe Creek Formation fault block on west side of Ridge.
CR-211P composite 4,325-4,330'.

4,330-4,425' Shale, black, hard, calcareous, silty, blocky. CR-212P composite 4,345-4,425' taken along the ridge crest.

Moved east about 1/2 mile and traversed along Lubbe Creek and resampled upper McCarthy formation. Section began at base of 50'+ cliff-forming unit of the Lubbe Creek Formation composed of siliceous limestone beds, dark grey to black, hard, few inches to 6-8' thick. Forms massive cliff.

4,325-4,350' Limestone, dark grey to black, siliceous, thin-bedded - up to 1' thick, interbedded with shale, dark grey to black, weathering fissile to blocky, slightly calcareous and silty in the upper part. Sample is from 3-5' shale at top of formation, which is much softer than hard, shaly siltstone in overlying formation.
CR-1073P* at 4,325'

Moved across Lubbe Creek and small normal fault to sample thin bedded limestones and shales.

4,350-4,360' Shale, black, limy interbedded with limestone, hard, siliceous. Sampled 6" shale beds, overlain by 1' beds of limestones, fossiliferous with abundant, ammonite impressions on upper surfaces and ? mollusk in float. Beds strike N 75° W and dip 45° NE.
CR-1074P composite 43,50-60'
CR-1075P composite 4,350-60'

4,360-4,425' Shale, black, calcareous interbedded with grey to black calcareous siltstone to limestone. Bedding is generally recessive, weathers flaggy to blocky; some beds are up to 1' thick. Interval generally weathers grey-black and brown. Shales are fairly soft and splintery to flaggy. Calcareous siltstones are very hard, siliceous, resistant, and blocky. Ammonite impressions occur on bedding plane surfaces. Rare rusty-weathering stringers, 1/2"-1" thick of yellow-brown clay or claystone, are probably zones of oxidation? Beds strike N 80° W and dip 40° N.
CR-1076P composite 4,325-4,425'
CR-1076P(b) at 4,375' in claystone.

4,425-4,545' Shales and siltstones to limestone, as above, but with some rounded clast, up to 1" thick, composed of black, siliceous siltstone in a dark grey-brown weathering calcareous siltstone (minor intraformational conglomerates). CR-1077P composite 4,425-4,525'

4,545-4,845' Siltstone, dark grey to black, weathers brownish-orange, calcareous to limestone, siliceous, blocky, bedding 2" to 15" thick, with minor interbedded black shale and occasional beds of light grey weathering siliceous lime mudstones, up to 1' thick. Numerous small folds with less than 6' amplitude. No fossils.
CR-1078P composite 4,525-4,625'
CR-1079P* composite 4,625-4,725'
CR-1080P composite 4,725-4,825''.

4,845-5,075' Siltstone, calcareous interbedded with lime mudstones, much as above, but much more resistant and massive, giving large dip slopes. Shale beds are very rare. Limestone is dark grey, weathers grey, massive, with numerous white calcite-filled veins and fractures. Siltstone is black, weathers black, hard, and siliceous. Beds are up to 2' thick and some appear to be concretions of lenses. Fossils are rare and scrappy.

Ended traverse at 5,075' in massive siltstones and limestones. The remainder of the upper member of the McCarthy formation is covered in this drainage. MacKevett, 1969, 1970b, and 1971 estimated a total thickness of about 2,000' (therefore 1,250' was not sampled). Although officially designated as Lower Jurassic - ? Upper Triassic most if not all of this unit is considered as Lower Jurassic.

REGAL GLACIER SECTION
SESW SEC. 28, NENW SEC. 33, T2S, R16E, CRM
MC CARTHY QUADRANGLE (C-5), ALASKA

DATE: Saturday, August 17, 1974

WEATHER: 55° F, low overcast

REMARKS: Measured (estimated) and sampled up-section along drainage.

BY: Doug Powell, Grant Streeton and Dave Loney.

TRIASSIC

NIKOLAI GREENSTONE

Greenstone, altered lavas and volcano-clastics with conglomerate at the top.

Angular unconformity.

LOWER CRETACEOUS

KENNICOTT FORMATION (Albian Age)

0-100'	Conglomerate, brown-yellow, pebble to cobble, tight, fossil (petrified) wood material. Matrix of siltstone to sandstone and thin sandstone lenses. CR-197P composite 0-50'
100-125'	Claystone, dark grey to black, hard, carbonaceous, lignitic to lignite layers. 1"-2" thick, pieces of fossil woody material. CR-198P at 125' of lignitic shales.
125-130'	Claystone, grey to black, carbonaceous, soft. CR-199P at 130'.
130-140'	Sandstone, yellow, fine-medium grained, massive, carbonaceous, tight, cross-bedded (dips north).
140-150'	Shale, dark grey to black, carbonaceous. CR-200P composite 100-150' CR-201L composite 0-150'.

150-160' Conglomerate, as above.

160-200' Shale, dark grey to black, carbonaceous.

Angular unconformity.

TERTIARY

FREDERIKA FORMATION (Miocene Age)

200-220' Lava, black, basaltic, 8-10' thick at base overlain by 4' shale, black, carbonaceous to lignitic and capped by 8' lava as above.

220-250' Shale, black, carbonaceous, lignitic, some coaly zones and thin siltstones.
CR-202P composite 200-250' (no lavas)
CR-203P at 250' of coal.

250-275' Sandstone and siltstone, brownish-grey, very fine to fine grained, massive, basal part shaly, with occasional tree trunks. Forms cliff.

CONTACT GULCH SECTION
CENTER E/2 SEC. 16, AND E/2 NE SEC. 21, T4S, R17E, CRM
MC CARTHY QUADRANGLE (B-4), ALASKA

DATE: Monday, August 19, 1974

WEATHER: 50° F, cloudy at start, cooling and raining before end of traverse.

REMARKS: Section started at base of 50' cliff of orange weather Tertiary volcanics - lava and sedimentary rocks of the Frederika formation. Measured (estimated) and sampled downsection.

BY: Dave Loney, Grant Streeton and Doug Powell.

TERTIARY

FREDERIKA FORMATION (Miocene Age)

0-50'	Clays and shales, grey and white, carbonaceous to lignitic in part almost coal. CR-2115P at 50'
50-100'	Mostly mud covered, probably Tuffaceous beds, silty, in part cross bedded at top of unit (about 10' unit). CR-2116L composite 50-100'
100-200'	Conglomeratic sandstone, coarse grained to fine pebbles in a soft clay matrix. Good coal bed at top and interbedded through the unit. Clays to soft and muddy to collect coaly material. CR-2117P composite 100-200'
	Disconformity.

UPPER AND LOWER CRETACEOUS

MOONSHINE CREEK FORMATION

	Predominantly green weathering color suggest start of Moonshine Creek formation. Much soil cover.
200-300'	Shale, soft grey, non-calcareous, containing rusty colored limestone concretions, some with fossil centers (unrecognizable). CR-2118P composite 200-300'.

300-400' Shale, as above, some concretions with ammonites.
CR-2119P composite 300-400'.

400-500' Shale, as above, concretions to 4' in diameter, fossiliferous with pelecypods, ammonites and well preserved petrified wood. Bedding is well defined by the concretionary zones.
CR-2120P composite 400-500'
CR-2121F composite 400-500'

500-800' Shales with concretions as above.
CR-2122P composite 500-600'
CR-2123P composite 600-700'
CR-2124P composite 700-800'

800-875' Shales, grey, soft, but becoming slightly more endurated, non-calcareous, mainly recessive, platy, silty in part. Concretions as above.

CR-2125P composite 800-875'

875-950' Covered, moved to other side of drainage.

950-1,300' Shale as above.
CR-2126P composite 950-1,000'
CR-2127P composite 1,000-1,100'
CR-2128P composite 1,100-1,200'
CR-2129P composite 1,200-1,300'

1,300-1,400' Poor outcrop, predominantly covered. Appears to be mostly shale as above.
CR-2130P composite 1,300-1,400'.

LOWER CRETACEOUS

KENNICOTT FORMATION (Albian Age)

1,400-1,405' Sandstone, grey, weathers reddish, possible scour base, a few pebble to 1/2" chert grains, mostly fine to medium grained, argillaceous, calcareous, grading at top to argillaceous siltstone. Contains a few calcareous iron stained concretions.

1,405-1,406' Shale, weathered red, non-calcareous fissile, more resistant than shales above.

1,406-1,475' Shale, grey, non-calcareous.
CR-2131P composite 1,400-1,475'
CR-2132F at 1,475', ammonites and gastropods in concretionary float. Probably from concretion beds above 1,400'?

1,475-1,483' Sandstone, dark greenish-grey, fine-grained, dirty, slightly calcareous, some beds have black chert pebbles.

1,483-1,500' Shales, grey non-calcareous.

1,500-1,600' Shales, as above, at 1,560-1,580'. A more resistive unit of interbedded shales, siltstones and sandstones occur. The silts to very fine grained sands are calcareous, tight, and with occasional calcareous concretions (up to 2' size)
CR-2133P composite 1,500-1,600'

1,600-1,700' Predominantly shales, platy, more resistive than those above 1,400', silty in part.
CR-2134P composite 1,600-1,700'

1,700-1,710' Covered.

Angular unconformity.

TRIASSIC

NIKOLAI GREENSTONE

1,710-1,800'+ Volcanics - basalt flows.

End of section due to sheer cliff and raining.

COPPER CREEK SECTION
SESENW, NWSE, SESE SEC. 20, NENENE SEC. 29, AND NWNW SEC. 28
T 6S, R 17E, CRM
MC CARTHY (B-4) QUADRANGLE, ALASKA

Date: Wednesday, August 28, 1974
Weather: 53° F, broken clouds, gusty

Measured and sampled downsection about 400' below hill top (Elev. 5305) along ridge crest trending northwest from Pyramid Peak. Only the lower 1950' of the Chititu formation (estimated 5000' thick) was sampled at this locality. Lithology consists of black shale above starting point. See the MacColl Ridge section for the Upper Chititu formation.

By: Doug Powell and Grant Streeton.

UPPER CRETACEOUS

Chititu Formation

(?Albian, Cenomanian to Campanian)

5050-5250'	Shale, black, slightly silty in part, blocky non-calcareous with calcareous concretions. Small igneous intrusive at 5090-5095'. CR-234P at 5050' CR-285P at 5150' CR-286P at 5250'
5250-5350'	Shale, as above, weathers concretionary to blocky (larger than above). CR-287P at 5350'
5350-5450'	Shale, black, blocky, non-calcareous, several pelecypod impressions in the shale and fragments in the concretions. CR-288P at 5450'
5450-5550'	Shale as above, abundant 3-3 1/2" inch concretions and occasional lens of limy siltstone to limestone, silty, very fossiliferous with pelecypods fragments, many shale clasts. Scour and fill relationship between shale and concretions with abundant nodules in fill. CR-289P at 5550'

5550-6050' Shales as above, occasional thin 4 inch igneous intrusive between 5650-5750. Concretions are common to scattered.
CR-290P at 5650'
CR-292P at 5850'
CR-293P at 5950'
CR-294P at 6050'

6050-6250' Shale as above. Surfaces are wet and dirty. Fresh breaks appear unweathered. Igneous intrusive about 50 feet thick at 6100' with bedded appearance and intersected by 5 foot igneous dike from the east. Plutons are brown (iron stain) color and quartz rich. Only few concretions.
CR-295P at 6150'
CR-296P at 6250'

6250-6850' Shale, black, splintry to fissile and very few concretions. Igneous intrusives of 50' thick at 6470-6520'.
CR-297P at 6450'
CR-298P at 6550'
CR-299P at 6650'
CR-300P at 6750'
CR-301P at 6850'

6850-6925' Shale, as above, few iron stained calcareous concretions 3 inches up to 3 feet. Samples very muddy but appear unweathered on fresh breaks. A 5' igneous dike at 6860-65'.
CR-302P at 6925'

6925-7000' Covered by heavy vegetation. Probable shale as above.

LOWER CRETACEOUS

Kennicott Formation
(Albian)

7000-7010' Siltstone, dark grey, argilleceous, limy, hard, thin bedded 1/4"-3" thick, flaggy.
CR-303P composite 7000-7010'

7010-7060' Sandstone, grey, weathers brown, very fine grained, hard and tight, thin bedded to massive weathers flaggy to conchoidal, non-calcareous traces of woody material.
CR-304L composite 7010-7060'

7060-7075' Siltstone, dark grey, very shaly, calcareous
CR-305P composite 7060-7075'

7075-7085' Sandstone, grey, weathered brown, fine to very fine grained

7085-7150' Shale, dark grey, silty, calcareous with some siltstone beds, blocky to fissile, calcareous some large rounded to flat limy concretions, grey, weathers brown (picture).
CR-306P composite 7085-7150'

ANGULAR UNCONFORMITY

From distance the discordance appears about 15° (picture taken toward northwest).

UPPER TRIASSIC AND LOWER JURASSIC (?)

McCarthy Formation - Lower Member

7150-7175' Limestone, black, pelletoidal, hard, matrix of mud and spar, with weak fetid odor.
CR-307L composite 7150-7175'

MAC COLL RIDGE SECTION
SWNW SEC. 7, T 8S, R 17E, CRM FOR MAC COLL RIDGE FORMATION AND CENTER N/2 SEC. 7, T 8S, R 17E, CRM AND ALONG DRAINAGE THROUGH C W/2 SEC. 6, T 7S, R 17E, CRM FOR THE CHITITU FORMATION
MC CARTHY (A-4) QUADRANGLE, ALASKA

Date: Tuesday, August 27, 1974, and Wednesday, August 28, 1974.

Weather: Tuesday, 45-50° F, rain
Wednesday, 60° F at 3:00 P.M., clear to scattered high clouds.

Measured and sampled downsection from top of MacColl Ridge, elevation about 5750'. Only the basal 600' of the MacColl Ridge formation (2,000' thick) and the upper 2,550' of the Chititu formation (5,000' thick) was sampled at this locality. See Copper Creek section for lowerpart of the Chititu.

By: Doug Powell, Grant Streeton, and Dave Loney. Field notes are composited from two visits. Thickness intervals are for composite section.

UPPER CRETACEOUS

MacColl Ridge Formation

(Campanian or Maestrichtian Age)

Top not exposed. Unsampled part estimated at 1350' thick (Mackevett, 1970; USGS Bull. 1333 and MacKevett, et al, 1972; USGS GQ 943, McCarthy B-4 Quadrangle).

0-1350'	Sandstone, medium or coarse-grained grades into granules to pebble conglomerates, fine grained sandstones and rarely siltstones. Colors are mostly light or medium grey and weathers to a light brown.
1350-1400'	Pebble conglomerates, brownish-grey fining upward. Some scour and fill structure at base. Palynology sample from a thin brownish-grey shale lens at the base of unit. CR-312P taken at 1400'

1400-1500' Interbedded sandstone, siltstone and shale unit. Upper 70' is poorly exposed. The lower 30' better exposed and appears to facies with conglomerates and sandstones to the east. Palynology sample is from 4" shale interbedded with sandstone, grey-green, very fine grained, tight, with abundant limy cannonball corrections which break into plates. Unit overlies a 5-6' shaly siltstone to silty shale unit.
CR-311P at 1470'

1500-1550' Sandstone, grey-green to grey, very fine grained, micaceous with 1/4" shale clasts, tight some limy cannonball concretions up to 8" diameter which weathers into plates, giving the area a broken up appearance. Some sandstone very calcareous, iron stained and with scattered wood impression. Upper part of unit appears to facies eastward into conglomerates.
CR-310L composite 1500-1525'
CR-309P at 1500' in large lens of shale, dark grey, silty non-calcareous, weather brown, blocky, splintry and interlensed with sandstone.
CR-308P at 1500' about 20' laterally, to the west of CR-309P in a shale lens about 2' thick and 30' long which lenses out to the west and is eroded to the east. The total unit is pebble conglomerate with sandy matrix and lenses of sandstone and shale with scour and fill bases fining upward. A (?) shingling shows west to east flow direction.

1500-1800' Estimated 300' to CR 252P taken August 27, 1974. The unit consists of pebble conglomerate, coarse grained sandstone and fine grained sandstone to siltstone with some shale lenses and fining upward.

1800-2000' Conglomerate, grey, weathers brown, massive appearing, soft, argillaceous, sandy matrix. Pebble-cobble with scattered boulder (small, less than 1') size composed of well-rounded to irregular discordal shaped granitic rocks, cherts (grey and black), greenstone, quartzite, some siliceous hard lime mudstone and traces of coal, all matrix supported. Many lenses of pebbles to cobbles and silty sandstone, green, weathers rusty (iron stained), and calcareous. Scour and fill units 6-9' thick.
CR-252P matrix at 1800'
CR-253P composite 1800-1900' from large shale clast and very shaly sandy matrix.

CR-254L composite 1800-2000' of matrix, sandstone and conglomerate.
CR-255P composite 1900-2000' of matrix.

Basal contact sharp but locally erosional cutting down 4-5' into underlying shale. The conglomerates matrix is very shaly.

Chititu Formation (Cenomanian to Campanian)

2000-2004' Claystone, weathers rusty, red and grey, soft, capped by 4" limy siltstone to limestone, then overlain by conglomerate.
CR-256(A)P at 2000-2004'.

2004-2100' Shale, black, soft, splintry-blocky, weathered on surface to grey-brown, papery to splintry.
CR-256(B)P at 2010'
CR 257P composite 2000-2100'

2100-2300' Shale, black, as above, some calcareous concretions, fossiliferous - abundant pelecypod fragments and Inoceramus prisms.
CR-258P at 2200'
CR-259P at 2300'

2300-2400' Shale as above, concretions with abundant Inoceramus prisms and more limy zones in shale.
CR-260P at 2400'

2400-2500' As above, concretions of smaller size (3"-8") with more brown (iron) color, very limy.
CR-261P at 2500'

2500-2700' Shale as above, with occasional worm-like burrow on surface of concretions.
CR-262P at 2600'
CR-263P at 2700'

2700-2800' Shale as above, lower 5' of reddish, crushed appearing, vitreous shale which is ? near fault zone or intrusive influence. In stream bed are large boulders of limestone coquinas composed of Inoceramus prisms (some 1/2"-3/4" thick).
CR-264P at 2800'

2800-2850' Interbedded shale, siltstone and sandstone, black, brown and reddish, thin-bedded with some sandstone and siltstone units up to 6' thick. Many scour and fill lenses with a few pebbles-cobbles in mud matrix composed of greenstone, limy concretions and ? volcanic material. Some good uniform bedding with rare horizontal worm-burrows and Inoceramus prisms.
CR-265P at 2850'

2850-2900' Shale, red, some grey with red coating, near possible fault, abundant concretions of potato to 4' across size.
CR-266P at 2900'

2900-3000' Red shale as above, some with vitreous or slickensided appearance. A 40-50' zone at mid-unit made up of 100's of limy grey concretions of all sizes, with occasional Inoceramus prisms.
CR-267P at 3000'

3000-3500' Shale, black, blocky with concretions, grey-black, weathers brown (Iron) color, limy
CR-268P at 3100'
CR-269P at 3200'
CR-270P at 3300'
CR-271P at 3400'
CR-272P at 3500'

3500-3600' Shale, black, blocky to splintry with calcareous concretions a few inches to several feet across.
CR-273P at 3600' faulting and/or folding dips beds down repeating same section, adjusted depths

3600-3700' Shale, as above, 6'-10' intrusive at 3690' -3700' sample, green-grey, slightly calcareous, and of siltstone to sandstone size, base and top show wavy contact
CR-274P at 3700'
CR-275L at 3690-3700'

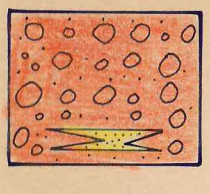
3700-3900' Shale, black, some concretions
CR-276P at 3800'
CR-277P at 3900'

3900-4400' Shale, as above, few thin concretionary beds, silty. Possible normal fault in 4200'-4300' interval.
CR-278P at 4000'
CR-279P at 4100'
CR-280P at 4200'
CR-281P at 4300'
CR-282P at 4400'

4400-4550' Shale, black and red as upsection at 2850-3000'. Normal fault at 4550 with dip reversal from south to north component. North dip continues 1/4-1/2 mile downstream to main branch of Young Creek.
CR-283P at 4500'

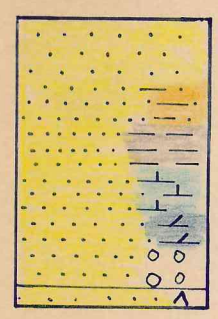
Terminated section at 4550 due to fault.
For lower portion of the Chititu formation, see the Copper Creek section, Sections 20 and 28, T. 6S, R 17 E, CRM. Approximately 500' unsampled between two sections.

EXPLANATION FOR MEASURED SECTIONS



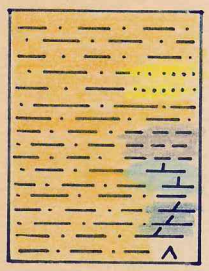
CONGLOMERATES

with sandstone lens



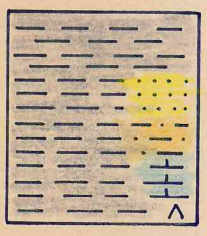
SANDSTONE

silty
shaley
calcareous
dolomitic
conglomeratic
siliceous



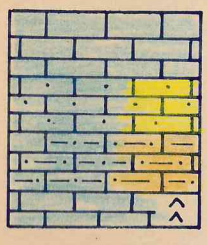
SILTSTONE

sandy
shaley
calcareous
dolomitic
siliceous



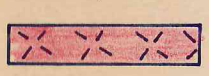
SHALE

sandy
silty
calcareous
siliceous



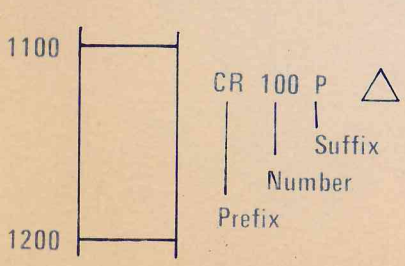
LIMESTONE

sandy
silty
siliceous



IGNEOUS ROCKS

SAMPLE NUMBERING SYSTEM



Prefix "CR" – Copper River Basin Area
Number "100" – Sample Number
Suffix – Sample type as follows:

- L – Lithology
- P – Palynology
- MF – Microfossil
- F – Megafossil
- SR – Source Rock

△ – indicates sample cut for source rock analysis.