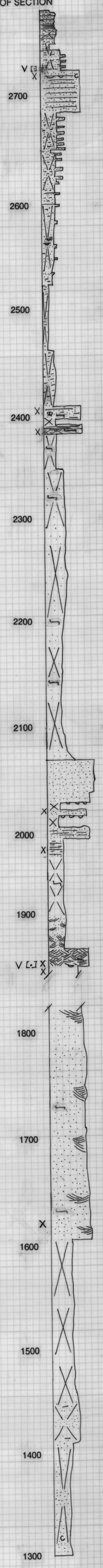
PUBLIC-DATA FILE 89-26B

PLATE 1 OF 1

"GILEAD CREEK SANDSTONE"
MEASURED SECTION 89RR20

Northeastern Alaska (Sagavanirtok A-2 Quadrangle)
(Base of section = R18E, T3S, Section 23; 69°10'23", 147°43'03"; top of section = 69°09'41", 147°48'05")

FEET ABOVE BASE OF SECTION



2785-2680' Dark-gray, and medium-gray, with dark-gray and orange-brown-weathering, subangular, moderately sorted, fine to coarse-grained sandstone and shale (ss/shl > 10/1).

2722' V [·] 89RR20-2722 Late Jurassic to Early Cretaceous, non-marine to paralic, TAI: 2. $R_o$max .26; range 1.03-1.55; number = 21.

2720' x 89RR20-2720 Shale typically < 1 cm thick; sandstone beds 1 to 20 cm thick; loadcasts abundant. Sandstone is non-channelized, massive or locally parallel-bedded, without visible convolute laminations, and is estimated to have low porosity and permeability. N35W,20SW; N63W,11 (loadcast) Sandstone clast estimates include: quartz 50%, chert 30%, metamorphic rock fragments 10%, limonitic-weathered clasts 2%, white mica 2%, with local carbonaceous material. Matrix and cement in this litharenite consists of ≤ 10% clays and iron oxide

2680-2430' Sandstone and shale float; sandstone increases upsection(?)

2575' Loadcasts abundant

2460-2520' Shale float abundant in saddle

2405' x 89RR20-2405 Two to 10cm bedding; concretions N72W,27SW: bedding

2385' x 89RR12 Trough cross stratified, fine to medium-grained sandstone with wavy fracture pattern; outcrops form small cliffs; calcareous zones locally (carbonate is preferentially concentrated with these trough cross stratified zones).

2070-2380' Predominantly covered interval. Fine to coarse-grained, locally orange-brown platey-weathering float, with calcareous zones locally

2030-2070' Cliff-forming, fine to coarse-grained sandstone

N60W, 10SW: bedding

2032' x 89RR20-2032 Five to 15cm bedding, fine to medium-grained, with minor coarse-grained sandstone with abundant rip-up clasts. Loadcasts and flutecasts common.

1985-2000' x 89RR20-2000 Plane-laminated (20-30cm thick) sandstone with minor shale

1890-1985' Covered interval with blocky rubble from cliff-forming unit. Minor carbonate-rich, brown-weathering, flaggy float.

1825-1890' Fine to coarse-grained sandstone (average grain size: medium grained). Abundant trough-crossbeds; 0.75-1.0m wave length. Open-space quartz crystals to 1cm long. Ten to 40cm thick bedding, locally with load casts.
N78W, 15; N80W, 18: axes of trough-crossbeds

1826' [.] V x 89RR20-1826 Indeterminate age, kerogen is oxidized, TAI: 3-. $R_o$max 1.25; range 1.08-1.48; number = 26

1825' x 89RR20-1825

==========/ OFFSET IN SECTION /==========

1825' Offset in section. Section restarts one mile due west (section 21, center) at 2900'. Basis for offset is: 1) Apparent low angle, north-south-trending, west-dipping fault between these ridge systems, 2) A less well defined low-angle detachment in shale-rich section which results in the eastern, resistant sandstone ridges being repeated 1 mile to the west. 3) Identical thickness of section below these localities and the underlying Jurassic and Cretaceous age Kingak Shale, 4) Mapped distribution of resistant, predominantly sandstone units and interbedded thick, recessive-weathering, predominantly shale units.

1605-1825' Medium-gray and gray with minor brown, fine to medium-grained sandstone, with four to 50 cm bedding (where discernable), load casts and groove casts common, and carbonate-bearing cross-bedding locally.

1705' Open-space quartz crystals, slickensides, and shearing

1725' Minor carbonate-rich zones

1605-1630' Medium to thick-bedded (>50cm) with minor carbonate-rich zones

1620' x 89RR20-1620 N13E,32NW:bedding; Base of cliff-forming rocks with fault and associated quartz veining, breccia, and slickensides.

1430' Thicker-bedded rocks from cliff (up section) to west.

1415' Break in slope. Blocky-weathering talus from cliff forming sandstone up section.

1350' Float is thin-bedded sandstone (3-7cm).

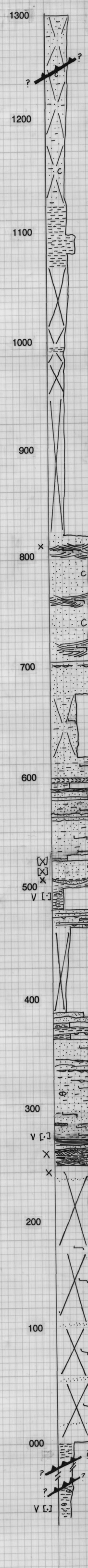
1320' Abundant wood fragments in float.

EXPLANATION

VERTICAL SCALE: 1 inch = 60 feet

[.] = Palynology sample* and summary of analytical report information.
V = Vitrinite reflectance sample+ and summary of analytical report information.
x = Thin section sample
[x] = Hand specimen
C = Carbonaceous material
= Sandstone
= Siltstone
= Shale
= Cross-bedding
= Covered interval
= Planar-bedded
= Carbonate-rich zones
= Partly covered
= Concretions
= Load casts

Section measured June, 1989 by R.R. Reifenstuhl (AKDGGS) and T.J. Ryherd (AKDOG) using Jacob Staff; dip was averaged for every 100 feet of section.
TAI Thermal Alteration Index (Bujak and others, 1976a; 1976b); samples from this measured section are: 3-, 3-, possibly 3-, and 2.
*Palynology analyses by Bujak and Davies Group, Calgary, Alberta, Canada.
+Vitrinite reflectance data from Reifenstuhl, 1990 (DGGS PDF 90-5a)



1250' Float is flaggy weathering sandstone in "soil" and 5mm shaley chips. Thrust fault(?) mapped in this saddle: west-dipping, north-south-trending, and surface expression "wraps" and dips to west similiar to the overall synclinal morphology of this stratigraphic package.

1130-1605' Covered interval. Float of medium-gray and medium-grayish brown-weathering fine to medium-grained (with minor coarse-grained) sandstone and lesser shale float. Carbonized wood fragments common in sandstone.

1100-1130' Shale-rich, fine talus.

1080-1100' Thick-bedded resistant unit; very large (1 to 2m) blocky rubble. Bedding locally 3 to 7cm thick.

985' Shale-rich, very fine rubble in resessive-weathering saddle.

920' Dark-gray and brown-weathering, blocky and slabby talus-covered and vegetation-covered slope of south side of "peak 3063'".

820-1080' Predominantly covered interval.

820' x 89RR20-820 Coarse-grained sandstone; carbonate-rich locally.

710-820' Dark-gray, very fine to coarse-grained sandstone (average grain size is in the fine to medium range). Climbing ripples abundant. Beds typically 3 to 4 cm thick and locally 15 to 20cm thick. Weathers dark-gray and orange-brownish dark-gray with ribbed pattern due to cross bedding. Many breakage surfaces reveal no indication of rippling, indicating that this important sedimentary structure may be easily obscured and overlooked in both outcrop and in float. Calcareous zones to 30cm are discontinuous and appear to be zones of secondary concentration and a function crossbedding structures. Sandstone clasts consist of: quartz > chert > wood chips > argillite >> plagioclase.

690' Load casts common.

675-700' Fine-to coarse-grained sandstone.

620-675' Discontinuous outcrop and blocky talus (0.5 X 0.1m); minor shale and minor calcareous, fine-to medium-grained sandstone.

600-620' Fine- to coarse-grained sandstone (to 0.6m thick) with minor calcareous-rich zones and thin shale, (sandstone to shale ratio: ≥30:1).

598-600' Very fine and fine-grained sandstone with climbing ripples, load casts, and abundant wood chips.

570' Carbonate-rich zone 10 to 30cm thick; pinches and swells and appears to be a zone of secondary enrichment within trough cross beds.

550' Massive sandstone 20 to 50cm thick with no finer sediment breaks.

530-532' Calcareous-rich sandstone 10cm thick with coalified wood fragments.

530-590' Fine-to medium-grained sandstone (to 40cm) with shale (1 to 4cm thick; sandstone to shale ratio: ≥30:1).

525' [x] 89RR20-525 Wood chips and mold of pelecypod(?)

510-525' [x] 89RR20-515 Fine- to medium-grained, with local coarse-grained sandstone, with 2 to 50cm thick bedding. Minor open-space quartz crystals to 1cm.

500-510' x 89RR20-505 Channelized(?) sandstone. Bed has an erosive base, varies from 10 to 25cm thick, is about 4m wide and from bottom to top sands are: massive, graded(?), wavy-laminated, and plane laminated to very fine-grained massive (top 1 to 2cm).

480-500' Shale: black, to brown and very-dark-gray weathering, and up to 7m thick. Sandstone channel(?) cuts down into top of shale section.
V [.] 89RR20-500: Indeterminate age, weathering or soil zone?, TAI: 3-. $R_o$max 1.30; range 1.09-1.56; number = 6.

470-480' Fine- to medium-grained, 10 to 30cm-thick bedded sandstone with abundant flute and bulbous loadcasts.

465-470' Massive, fine to medium-grained sandstone with local plane laminations; flute- and load casts common. N32W, 18SW = bedding, S72E, 17 = loadcast (bidirectional).

388-465' Covered.

375' Black shale.

363-366' Shale interval with load casts into top of section.

345' Five to 50cm thick, fine- and medium-grained sandstone with 1 to 5cm shale and lesser carbonate-rich sandstone.

330' Iron-staining; locally iron concretions and carbonate on breakage surfaces. N24W, 20SW = bedding.

298-388' Fine- to medium-grained sandstone and shale (50:1), one to 50cm thick sandstone with 1 to 5mm thick shale (locally to 1m), loadcasts, groove casts, and locally carbonate-rich sandstone and layer-parallel bedding.

297-298' Fine- to medium-grained, carbonate-rich, brownish-orange-weathering sandstone.

285' V [.] 89RR20-285 Black shale, 5cm thick. $R_o$max 1.34; range 1.07-1.61; number = 11.

277-285' Sandstone.

275-276' x 89RR20-276 Orange-brown-weathering, carbonate-bearing, fine to coarse-grained sandstone with 1 to 2cm beds and trough cross bedding.

251-275' x 89RR20-275 Fine to coarse-grained, dark-gray sandstone with minor coarse-grained sandstone, and minor shale (ss:shl = 50:1). Clasts are: quartz, chert, black argillaceous fragments, and iron-stained, weathered-out fragments. Carbonate on some weathered surfaces; load features common.

250-251' Orange-brown-weathering, carbonate-bearing, fine to coarse-grained sandstone with 1 to 2cm beds and local trough cross bedding.

0-250' Covered interval. Fine to medium-grained sandstone comprises 85 to 90 percent of the blocky-weathering talus. Carbonate on some weathered surfaces.
Base of section is at uppermost occurence of black shale (Kingak Shale?) rubble (2620' elevation, 500m due north of "peak 3063" in section 23; traverse southeast up rubble and cliff face).

V [.] 89RR19A (from black shale) Probably Jurassic, a paralic to marginally marine depositional environment is suggested by the single, poorly preserved specimen of *Pareodinia ceratophora*. TAI: 3+ $R_o$max 1.43; range 1.18-1.60; number = 4.

000' Thrust fault(s)?

BASE OF SECTION: KINGAK SHALE From 2620' elevation and down slope 500' to 2100' elevation: Black, and orange-brown-weathered shale chips (several mm in diameter) of the Jurassic to Neocomian age Kingak Shale. Open-space quartz crystals to 1.5cm long and slickensides are common, rocks are locally brecciated, and concretions to 15cm in diameter are abundant in float. Locally, iron-stained very-fine-grained sandstone float occurs. No megafossils found.