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Table 4.--Location and description of samples of oil shale from western Brooks Range, northern Alaska

[Location, description of outcrops and stratigraphic assignment by I. L. Tailleur. Sample description and petrographic data by H. A. Tourtelot based on very small hand specimens that may not be representative of the material for which analytical data are given in table 5]

Locality Number	Location	Description of outcrops and stratigraphic assignment	Sample description	Petrographic and mineralogic data
1	DeLong Mountains Quadrangle, 68°35'50" N., 164°26'10" W., Upper Ipewik River; rubble and bedrock bank on west side at the head of the downstream leg of the long loops.	The following section can be interpreted; (1) mudstone and wacke equivalent to the Fortress Mountain Formation of Early Cretaceous age lying with slight angular discordance on underlying units, not measured; (2) shale with rusty weathered limestone concretions and bitumen-filled fractures, surface considerably iron-stained, 6 ft; (3) shale, black, weathered papery and stained with yellow bloom, 6 ft; and (4) oil shale, 3 ft. The stratigraphic position of the organic rocks within the mid-Cretaceous to Triassic interval is uncertain. The unit is similar in general character to rocks that contain a Buchia of Late Jurassic age (D. L. Jones, written communication, 1964) farther upstream; it is quite different from other sequences that contain organic-rich shale. Sample 61ATr28A, oil shale unit.	61ATr28A.--Dark grayish-brown fissile shale with iron-oxide films along weathered bedding plants and slightly irregular fractures.	61ATr28A.--The organic matter is mostly black and opaque but is highly oriented and occurs as discrete flakes. The rock is unusual in consisting of about a third organic matter, a third clay (illite, a mixed-layer clay, and kaolinite) and a third quartz that occurs mostly in grains about half a mm in diameter with many grains as large as 2 mm in diameter. These very large quartz grains range from subhedral suggesting bipyramidal forms to embayed highly rounded but irregularly shaped grains suggesting the partly resorbed quartz phenocrysts of volcanic rocks. Some or most of the clay is in lenses less than a quarter mm thick and about 1 mm long; fine-grained quartz and muscovite occur in these lenses. Pyrite is associated with the organic matter.
4	DeLong Mountains Quadrangle, 68°15'20" N., 164°18'30" W. Low cuts on south and west banks of creek tributary to the Kukpuk River about one mile downstream from locality 5.	The organic-rich sequence dips south under chert and calcilutite assigned to the Shublik Formation of Triassic age, but the relation may be one of faulting. From south to north the organic-rich sequence consists of: (1) 5 to 18 ft thick zones of dark-weathering chert interbedded with brown organic shale and gray cherty shale in beds 0.1-0.4 ft thick separated by zones 2-3 ft thick of dark colored organic-rich shale and siltstone, the unit being about 50 ft thick, and (2) interbedded massive woody organic shale and fissile to chippy, stony, limonite-stained organic-rich shale in zones 1-35 ft thick, the unit, being 110 ft thick. Sample 63ATr260A, a composite sample of the richer-appearing woody zones in unit 2 above. Sample 63ATr260B, a composite sample of the interbedded stony zones.	63ATr260A.--Dark brownish-gray well-layered shale. 63ATr260B.--Dark brownish-gray shale that splits in irregular planes that cross bedding planes.	63ATr260A.--Organic matter is reddish-brown and fibrous in thin section. The rock consists of about 25 percent clay, almost entirely illite and some visible muscovite, 20 percent quartz, 5 percent calcite, and about 5 percent pyrite, the remaining 45 percent probably being organic matter. The pyrite is in irregular 10-20 micron aggregates that do not distort the orientation of the organic flakes or clay. The quartz averages 15-20 microns in diameter. 63ATr260B.--Organic matter is reddish brown but it is dispersed between other components of the rock and is not fibrous. The clay mineral fraction amounts to about 25 percent, and consists mostly of mixed-layer clay with some visible muscovite. Dolomite amounts to about 2 percent and occurs in poorly shaped rhombs about 20 microns in maximum dimension. Pyrite amounts to about 15 percent according to X-ray analysis and most of it occurs in aggregates about 5 microns in diameter.
5	DeLong Mountains Quadrangle, 68°14'40" N., 164°18'30" W. Along short east-flowing part, near middle, of tributary draining area within large north loop of Kukpuk River.	Beds of oil shale as much as 10 ft thick, exposed along north bank of stream, appear to lie on crumpled chert that is at least partly Shublik Formation. Sample 63ATr255b, from large block of float.	63ATr255b.--Dark grayish-brown shale that is highly layered but not fissile.	63ATr255b.--Organic matter is red and fibrous and probably amounts to 35 percent of the sample. The remaining 65 percent is made up of quartz, 20 percent, clay, 30 percent (illite and mixed-layer clay), pyrite, 10 percent, and plagioclase and other minerals, 5 percent. The pyrite is in the organic matter as aggregates about 20 microns in diameter. Most of the quartz is 20-25 microns in diameter.
7	DeLong Mountains Quadrangle, 68°13'10" N., 163°55'30" W. Chert bluffs along southeast side of upper Kukpuk River valley.	Rubble scars along the bluffs show black and dark-gray weathering granular to chippy organic-rich shale and chert. Chert and subordinate calcilutite of the Shublik Formation included in the surrounding terrane.	63ATr230.--Dark brownish-gray shale with thin coaly streaks and patches, and small elongate crystals of barite.	63ATr230.--The organic matter is black and opaque; no coaly streaks were included in the thin section. Barite amounts to about 10 percent of the rock and is present as euhedral elongate crystals randomly oriented approximately parallel to the bedding planes marked by the flakes of organic matter. The barite crystals do not distort the orientation of surrounding organic flakes and clay minerals. Pyrite is intergrown with some of the barite and is disseminated fairly evenly through the rock. There is no evidence that the barite is related to the oxidation of pyrite in the rock. Pyrite amounts to more than 10 percent of the rock. The clay mineral fraction, about 35 percent, is made up of illite.