

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

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MAPS AND TABLE DESCRIBING AREAS OF INTEREST  
FOR OIL AND GAS IN CENTRAL ALASKA

By

William W. Patton, Jr.

TO ACCOMPANY  
GEOLOGICAL SURVEY OPEN-FILE REPORT 78-1-F

This report is preliminary and has  
not been edited or reviewed for  
conformity with Geological Survey  
standards and nomenclature

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Table 1.--Areas of interest for oil and gas in central Alaska (to accompany open-file report 78-1F)

Area	Petroleum Interest	Geologic Setting	Aeromagnetics	Gravity	Comments
1	Based on speculation that basement may be overlain by substantial thickness of little deformed Tertiary and possibly Upper Cretaceous sediments representing an on-land extension of the Norton Sound basin or the St. Matthew basin	Bedrock completely covered by alluvial deposits of Yukon River delta. Situated on west flank of Koyukuk basin and presumably underlain at depth by basement rocks similar to eastern Seward Peninsula, i.e., Paleozoic and Precambrian metamorphic rocks and upper Paleozoic and Mesozoic volcanic and plutonic rocks. May be transected by southwest extension of Kaltag fault	Covered by 10-km-spaced E-W profiles and tie-lines. Profiles characterized by broad low-gradient anomalies which suggest that basement is at considerable depth. Area delimited on south and southeast by steep-gradient high-amplitude anomalies interpreted as a belt of near-surface Lower Cretaceous and Jurassic(?) volcanic rocks	Scattered gravity stations show a broad regional gradient sloping to north from more than +10 mgal at south edge to less than -10 mgal at coast	
2	Based on speculation that Cretaceous sedimentary rocks with favorable reservoir characteristics may occur at drillable depths. The possibility that parts of the area may be underlain by embayments of marine Tertiary deposits of the Bering Sea shelf is also considered	Covered by alluvial deposits of Yukon-Kuskokwim delta and by patches of flat-lying upper Cenozoic volcanic rocks. Underlain by moderately deformed Cretaceous sedimentary rocks and perhaps locally by Tertiary deposits. Cretaceous section believed to be more than 5000 m thick. Where exposed to northeast along Yukon valley and to southwest on Nelson Island, Cretaceous section composed of shallow-water fossiliferous marine sandstone and shale and nonmarine sandstone, conglomerate, shale and coal. Aeromagnetic data suggest that area is bordered on northwest and southeast by basement highs of upper Paleozoic to Lower Cretaceous volcanic and metamorphic rocks	Covered by 10-km-spaced E-W profiles and tie-lines except along southeast margin. Also crossed in northwest-southeast direction by 14 3-km-spaced profiles. Profiles are flat to gently sloping except over Cenozoic volcanics where they show a characteristically rugged pattern of closely spaced steep-gradient anomalies. Data suggest that pre-mid-Cretaceous basement lies at considerable depths	Stations widely distributed throughout area. Show less than 20 mgal of relief. Suggest that poorly consolidated Cenozoic deposits, if present, are relatively thin and that the Cretaceous sediments are denser and in better isostatic adjustment	Stratigraphic test hole drilled to a depth of 4500 m in 1961. Reportedly drilled entirely in Cretaceous except possibly near top where section may be as young as Tertiary
3	Based on speculation that little-deformed Upper Cretaceous and Tertiary strata with favorable reservoir characteristics may be present, at least locally, in substantial thicknesses. Pre-Upper Cretaceous strata may also have petroleum potential but where exposed in adjoining northern Kuskokwim Mountains are complexly folded and faulted	A broad lowland largely covered by alluvial deposits and glacial drift. Bedrock exposures confined to small area of Paleozoic carbonate rocks and a granitic intrusive body at Lone Mountain. Projection of bedrock trends in bordering highlands suggest lowland is underlain by 1500-3000 m of lower Paleozoic carbonate rocks and perhaps locally by as much as 3000 m of Permian, Triassic, and Cretaceous terrigenous strata. A nonmarine Tertiary sequence as much as 2500 m thick is exposed near south edge of lowlands and may be preserved in small basins beneath the lowlands	Two 1.6-km-spaced pairs of profiles traversing lowland in northwest-southeast direction. Profiles are generally smooth and free of large amplitude anomalies except locally where they cross Lone Mountain intrusive. Profiles suggest that rocks underlying lowland at shallow depth are generally free of large volcanic and plutonic bodies	Data chiefly along North, East, and South Forks of Kuskokwim River and along Big River. Show large 30-40 mgal low extending northeast across central and northern part of lowland	

Area	Petroleum Interest	Geologic Setting	Aeromagnetics	Gravity	Comments
4	Based on speculation that the lowland may be underlain by one or more deep sedimentary basins containing little deformed Tertiary and/or Upper Cretaceous sediments. Stimulated in part by presence of several gravity lows	Lowland mantled by alluvium, windblown sand, and glacial drift. Basement beneath lowland probably composed of Birch Creek Schist and Totolanka Schist of Precambrian and Paleozoic age and an unnamed assemblage of argillite, chert, quartzite, and conglomerate of probable Paleozoic age. Cretaceous and Tertiary nonmarine deposits of conglomerate, sandstone, shale, and coal exposed along southern edge of area	Two 6-km-spaced pairs of profiles traversing lowland in a northwest-southeast direction and a single profile traversing lowland in a northeast-southwest direction. Profiles generally free of steep-gradient high-amplitude anomalies indicating absence of large volcanic and plutonic bodies at shallow depth	Stations located chiefly along Kantishna River and around Lake Minchumina; a few stations scattered elsewhere across lowland. Gravity data show several -30 to -50 mgal lows possibly indicating substantial thicknesses of Tertiary and/or Upper Cretaceous sediments above the Paleozoic-Precambrian basement	
5	Similar to 4; stimulated in part by presence of a gravity low in northern part of lowland	Similar to 4. Lowland mantled by alluvium, windblown sand, and glacial drift. Basement appears to be composed largely of Precambrian and Paleozoic rocks including Birch Creek Schist, Totolanka Schist, and chert, argillite, quartzite, and conglomerate of the Mikota Group. Poorly consolidated Tertiary nonmarine deposits of conglomerate, sandstone, claystone, and coal with an aggregate thickness of as much as 2000 m exposed along north part of Alaska Range	Ir Fairbanks quadrangle covered by contour map based on 1.2-km-spaced N-S lines and in Kantishna River quadrangle by a 1.6-km-spaced pair of profiles traversing lowlands in a northwest-southeast direction. Magnetic field characterized by broad gently to moderately sloping anomalies indicating probable absence of major plutonic and volcanic bodies at shallow depths	Stations located chiefly along Tanana and Kantishna Rivers. A few scattered stations in lowland north and south of Tanana River. Show prominent -50 mgal low trending northeast across Tanana valley and Minto Flats	A test hole drilled in 1962 to a depth of about 1000 m reportedly penetrated poorly consolidated deposits believed to be Quaternary in upper part and Tertiary in lower part. Bottomed in crystalline basement rocks
6	Based chiefly on gravity and magnetic data which suggest that area may be underlain by thick section of Tertiary and possibly Upper Cretaceous sediments	Situated in south-central part of Yukon Flats. Largely covered by alluvium and loess deposits. Bordered on south by bedrock uplands composed chiefly of upper Paleozoic-Lower Mesozoic mafic volcanic rocks with lesser amounts of lower Paleozoic and Precambrian sedimentary rocks. These rocks probably compose the basement beneath much of the Yukon Flats. Small patches of Cretaceous and Tertiary non-marine coal-bearing rocks and upper Tertiary or Quaternary volcanic rocks crop out around the margins of the Flats	Area covered by 14 N-S variably spaced lines. Profiles are generally smooth over large part of area but locally are characterized by low-amplitude steep-sloped anomalies which may be interpreted either as structural highs of upper Paleozoic-lower Mesozoic volcanic rocks or as Cenozoic volcanic rocks interlayered with sediments	Stations chiefly along Yukon and Hodzana Rivers; a few stations scattered across Flats south of Yukon River. Show area to be underlain by broad -30 to -50 mgal low	
7	Based on occurrence of bitumen and oil shale in Cambrian, Devonian, Mississippian, Permian, and lower Mesozoic rocks and the speculation that Paleozoic reservoir rocks may be found at drillable depths and in favorable structural settings	Northeast-trending Mesozoic Kandik basin bordered on southeast by Paleozoic and Precambrian strata of the Nation Arch and on the northwest by Paleozoic strata of the Porcupine Plateau. Aggregate thicknesses for exposed stratigraphic sequences are: Precambrian, 3000+ m; Paleozoic, 4000 m; and Mesozoic (Triassic to Lower Cretaceous), 4000 m. Entire sequence is deformed, especially the Mesozoic strata, which locally display slaty cleavage	Covered by 16-km-spaced N-S lines and, north of lat. 66°, by 10-km-spaced E-W lines. Profiles characterized by broad gently sloping anomalies suggesting that large plutonic and volcanic bodies are absent over most of the area. Local steep-gradient high-amplitude anomalies in Black River drainage probably reflect isolated patches of Cenozoic volcanic rocks	Stations located chiefly along Porcupine, Black, and Yukon Rivers; a few scattered stations in interstream areas. Gravity field over most of the area has less than 20 mgal of relief and an absence of steep-gradient anomalies	Three test wells drilled in 1976-1977 to depths of approximately 3400 m, 2800 m, and 4200 m. Results not available