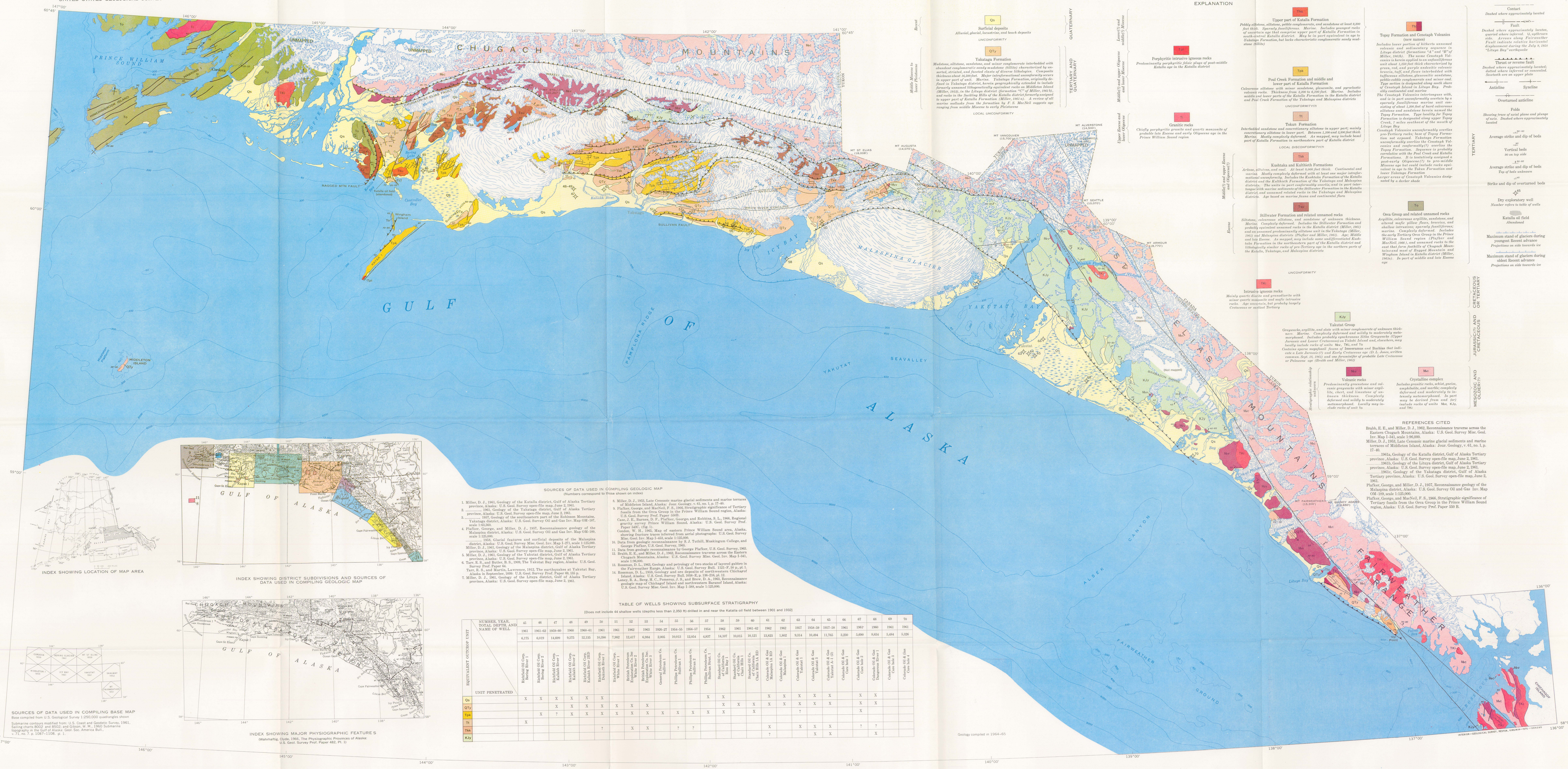

Geology compiled in 1964–65

EXPLANATION

Qs — Surficial deposits
Alluvial, glacial, lacustrine, and beach deposits

UNCONFORMITY

QTy — Yakataga Formation
Mudstone, siltstone, sandstone, and minor conglomerate interbedded with abundant conglomeratic sandy mudstone (tillite) characterized by unsorted, striated, and faceted clasts of diverse lithologies. Composite thickness about 10,500 feet. Major intraformational unconformity occurs in upper part of unit. Marine. Yakataga Formation, originally defined in Yakataga district, herein geographically extended to include formerly unnamed lithogenetically equivalent rocks on Middleton Island (Miller, 1953) in the Lituya district (Plafker and Miller, 1961) and rocks in the Suckling Hills of the Bering district (Miller, 1951) and in upper part of Kenai Formation in the Kenai district (Miller, 1951). A review of all marine mudstone from the formation by K. S. MacNeil suggests age ranging from middle Miocene to early Pleistocene

LOCAL UNCONFORMITY

Middle Miocene to lower Pleistocene — Middle(?) and upper Oligocene and lower Miocene — Lower(?) and middle(?) Miocene — Upper Eocene and lower Oligocene — Middle(?) and upper Eocene and Oligocene(?) — Eocene

QUATERNARY — TERTIARY AND QUATERNARY — TERTIARY

Tmv — Porphyritic intrusive igneous rocks
Predominantly porphyritic felsic plugs of post-middle Katalla age in the Katalla district

Tpb — Foul Creek Formation and middle and lower part of Katalla Formation
Calcareous siltstone with minor sandstone, glauconite, and pyroclastic volcanic rocks. Thickness from 1,200 to 6,100 feet. Marine. Includes middle and lower parts of the Katalla Formation in the Katalla district and Foul Creek Formation of the Yakataga and Malaspina districts

UNCONFORMITY(?)

Tt — Tokun Formation
Interbedded sandstone and conceritionary siltstone in upper part; mainly conceritionary siltstone in lower part. Between 1,100 and 3,300 feet thick. Marine. Mostly completely deformed. As mapped, may include basal part of Katalla Formation in northeastern part of Katalla district

LOCAL DISCONFORMITY(?)

Tkb — Kushtaka and Kulthieth Formations
Arkose, siltstone, and coal. At least 9,000 feet thick. Continental and marine. Mostly completely deformed with at least one major intraformational unconformity. Includes the Kushtaka Formation of the Katalla district and the Kulthieth Formation of the Yakataga and Malaspina districts. The units in part conformably overlie, and in part interfinger with marine sediments of the Stillwater Formation in the Katalla district, and unnamed related rocks in the Yakataga and Malaspina districts. Age based on marine fauna and continental flora

Tsw — Stillwater Formation and related unnamed rocks
Siltstone, calcareous siltstone, and sandstone of unknown thickness; mainly marine. Completely deformed. Includes the Stillwater Formation and probably equivalent unnamed rocks in the Katalla district (Miller, 1951) and unnamed related rocks in the Yakataga (Miller, 1953) and Malaspina districts (Plafker and Miller, 1961). Age, Middle and late Eocene. As mapped, may include some undifferentiated Kushtaka Formation in the northeastern part of the Katalla district and lithologically similar rocks of pre-Tertiary age in the northern parts of the Katalla, Yakataga, and Malaspina districts

UNCONFORMITY

Tki — Intrusive igneous rocks
Mainly quartz diorite and granodiorite with minor quartz monzonite and mafic intrusive rocks. Age uncertain, but probably largely Cretaceous or earliest Tertiary.

KJy — Yakutat Group
Graywacke, argillite, and slate with minor conglomerate of unknown thickness. Marine. Completely deformed and mildly to moderately metamorphosed. Includes the Yakataga Formation (Upper Jurassic and Lower Cretaceous) on Yakutat Island and, elsewhere, may locally include rocks of units Mzv, Tki, and To

Contains spores suggesting fauna of Inoceramus and Buchias that indicate a Late Jurassic(?) and Early Cretaceous age (D. L. Jones, written commun. Sept. 19, 1962) and one foraminifer of probable Late Cretaceous or Paleocene age (Brabb and Miller, 1962)

Stratigraphic relationship uncertain

Mzv — Volcanic rocks
Predominantly greenstone and volcanic graywacke with minor argillite, chert, and limestone of unknown thickness. Completely deformed and mildly to moderately metamorphosed. Locally may include rocks of unit To

Mzc — Crystalline complex
Includes granitic rocks, schist, gneiss, amphibolite, and marble; completely deformed and moderately to intensely metamorphosed. In part may be derived from and/or include rocks of units Mzv, KJy, and Tki

Tkc — Upper part of Katalla Formation
Pebbly siltstone, siltstone, pebble conglomerate, and sandstone at least 8,200 feet thick. Sparsely fossiliferous. Marine. Includes youngest rocks of uncertain age that comprise upper part of Katalla Formation in southeastern Katalla district. May be in part equivalent in age to Yakataga Formation, but lacks characteristic conglomeratic sandy mudstone (tillite)

Tc — Topsy Formation and Cenotaph Volcanics (new names)
Includes lower portion of hitherto unnamed volcanic and sedimentary sequence in Lituya district (formations "A" and "B" of Miller, 1953). The name Cenotaph Volcanics is herein applied to an extensive volcanic sequence of dominantly pyroclastic rocks, mainly green, red, and purple andesitic volcanic breccia, tuff, and flows interbedded with diffuseous siltstone, glauconitic sandstone, pebble-cobble conglomerate and minor coal. Type section is designated along south shore of Cenotaph Island in Lituya Bay. Probably equivalent in part to the Cenotaph Volcanics intertongues with, and is in part unconformably overlain by a sparsely fossiliferous marine unit consisting of about 1,200 feet of hard calcareous siltstone and sandstone herein named the Topsy Formation. Type locality for Topsy Formation is designated along upper Topsy Creek, 2 miles southeast of the mouth of Lituya Bay

Cenotaph Volcanics unconformably overlies pre-Tertiary rocks; base of Topsy Formation not exposed. Yakataga Formation unconformably overlies the Cenotaph Volcanics and conformably(?) overlies the Topsy Formation. Sequence is probably correlative with the Foul Creek and Kushtaka Formations. It is tentatively assigned a post-early Eocene age but a pre-middle Miocene age, but could include rocks equivalent in age to the Tokun Formation and lower Yakataga Formation

Larger areas of Cenotaph Volcanics designated by a darker shade

To — Orca Group and related unnamed rocks
Argillite, calcareous argillite, sandstone, and altered mafic pillow lava and breccia; mostly shallow intrusive; sparsely fossiliferous; marine; completely deformed. Includes the early Tertiary Orca Group in the Prince William Sound region (Plafker and MacNeil, 1966), and unnamed rocks to the east that form foothills of Chugach Mountains and west of Bragg Mountain and Wingham Island in Katalla district (Miller, 1951). In part of middle and late Eocene age

TERTIARY — CRETACEOUS OR TERTIARY — JURASSIC(?) AND CRETACEOUS — MESOZOIC AND OLDER(?)

Contact
Dashed where approximately located

Fault
Dashed where approximately located; queried where inferred. U, upthrown side; D, downthrown side. Arrows indicate relative horizontal displacement during the July 9, 1964 "Lituya Bay" earthquake

Thrust or reverse fault
Dashed where approximately located; dotted where inferred or concealed. Sawteeth are on upper plate

Anticline — Syncline

Overturned anticline

Folds
Showing trace of axial plane and plunge of axis. Dashed where approximately located

Average strike and dip of beds

Vertical beds
30 or less top side

Average strike and dip of beds
Top of beds unknown

Strike and dip of overturned beds

Dry exploratory well
Number refers to table of wells

Katalla oil field
Abandoned

Maximum stand of glaciers during youngest Recent advance
Projections on side towards ice

Maximum stand of glaciers during oldest Recent advance
Projections on side towards ice

REFERENCES CITED

Brabb, E. E., and Miller, D. J., 1962, Reconnaissance traverse across the Eastern Chugach Mountains, Alaska: U.S. Geol. Survey Misc. Geol. Inv. Map I-341, scale 1:96,000.

Miller, D. J., 1953, Late Cenozoic marine glacial sediments and marine terraces of Middleton Island, Alaska: Jour. Geology, v. 61, no. 1, p. 17–40.

———1951a, Geology of the Katalla district, Gulf of Alaska Tertiary province, Alaska: U.S. Geol. Survey open-file map, June 2, 1951.

———1951b, Geology of the Lituya district, Gulf of Alaska Tertiary province, Alaska: U.S. Geol. Survey open-file map, June 2, 1951.

———1951c, Geology of the Yakataga district, Gulf of Alaska Tertiary province, Alaska: U.S. Geol. Survey open-file map, June 2, 1951.

Plafker, George, and Miller, D. J., 1957, Reconnaissance geology of the Malaspina district, Alaska: U.S. Geol. Survey Oil and Gas Inv. Map OM-189, scale 1:125,000.

Plafker, George, and MacNeil, F. S., 1966, Stratigraphic significance of Tertiary fossils from the Orca Group in the Prince William Sound region, Alaska: U.S. Geol. Survey Prof. Paper 550 B.

INDEX SHOWING LOCATION OF MAP AREA

INDEX SHOWING DISTRICT SUBDIVISIONS AND SOURCES OF DATA USED IN COMPILING GEOLOGIC MAP

INDEX SHOWING MAJOR PHYSIOGRAPHIC FEATURES
(Wahrhaftig, Clyde, 1966, The Physiographic Provinces of Alaska: U.S. Geol. Survey Prof. Paper 482, Pl. 1)

SOURCES OF DATA USED IN COMPILING GEOLOGIC MAP
(Numbers correspond to those shown on index)

1. Miller, D. J., 1951, Geology of the Katalla district, Gulf of Alaska Tertiary province, Alaska: U.S. Geol. Survey open-file map, June 2, 1951.
2. ———1951, Geology of the Yakataga district, Gulf of Alaska Tertiary province, Alaska: U.S. Geol. Survey open-file map, June 2, 1951.
3. ———1957, Geology of the southeastern part of the Gulf of Alaska Tertiary province, Alaska: U.S. Geol. Survey Oil and Gas Inv. Map OM-187, scale 1:62,500.
4. Plafker, George, and Miller, D. J., 1957, Reconnaissance geology of the Malaspina district, Alaska: U.S. Geol. Survey Oil and Gas Inv. Map OM-189, scale 1:125,000.
5. ———1958, Glacial features and surficial deposits of the Malaspina district, Alaska: U.S. Geol. Survey Misc. Geol. Inv. Map I-271, scale 1:125,000.
6. ———1961, Geology of the Malaspina district, Gulf of Alaska Tertiary province, Alaska: U.S. Geol. Survey open-file map, June 2, 1961.
5. Miller, D. J., 1961, Geology of the Yakutat district, Gulf of Alaska Tertiary province, Alaska: U.S. Geol. Survey open-file map, June 2, 1961.
6. Tarr, R. S., and Butler, R. S., 1909, The Yakutat Bay region, Alaska: U.S. Geol. Survey Prof. Paper 64, pl. 1.
7. Tarr, R. S., and Martin, Lawrence, 1912, The earthquakes at Yakutat Bay, Alaska, in September, 1899: U.S. Geol. Survey Prof. Paper 69, 135 p.
7. Miller, D. J., 1961, Geology of the Lituya district, Gulf of Alaska Tertiary province, Alaska: U.S. Geol. Survey open-file map, June 2, 1961.
8. Miller, D. J., 1953, Late Cenozoic marine glacial sediments and marine terraces of Middleton Island, Alaska: Jour. Geology, v. 61, no. 1, p. 17–40.
9. Plafker, George, and MacNeil, F. S., 1966, Stratigraphic significance of Tertiary fossils from the Orca Group in the Prince William Sound region, Alaska: U.S. Geol. Survey Prof. Paper 550B.
Case, J. E., Barnes, D. F., Plafker, George and Robbins, S. L., 1966, Regional gravity survey Prince William Sound, Alaska: U.S. Geol. Survey Prof. Paper 549C, (fig. 1).
Coastal Topo. Map of eastern Prince William Sound area, Alaska, showing fracture traces inferred from aerial photographs: U.S. Geol. Survey Misc. Geol. Inv. Map I-433, scale 1:125,000.
10. Data from geologic reconnaissance by S. J. Tuthill, Muskingum College, and George Plafker, U.S. Geol. Survey, 1965.
11. Data from geologic reconnaissance by George Plafker, U.S. Geol. Survey, 1963.
12. Brabb, E. E., and Miller, D. J., 1962, Reconnaissance traverse across the Eastern Chugach Mountains, Alaska: U.S. Geol. Survey Misc. Geol. Inv. Map I-341, scale 1:96,000.
13. Rossman, D. L., 1963, Geology and petrology of two stocks of layered gabbro in the Fairweather Range, Alaska: U.S. Geol. Survey Bull. 1121-F, 50 p., pl. 1.
14. Rossman, D. L., 1959, Geology and ore deposits of northwestern Chichagof Island, Alaska: U.S. Geol. Survey Bull. 1059-E, p. 136–216, pl. 12.
Loney, R. A., Berg, H. C., Pomeroy, J. S., and Brew, D. A., 1963, Reconnaissance geologic map of Chichagof Island and northwestern Baranof Island, Alaska: U.S. Geol. Survey Misc. Geol. Inv. Map I-388, scale 1:125,000.

TABLE OF WELLS SHOWING SUBSURFACE STRATIGRAPHY
(Does not include 44 shallow wells (depths less than 2,350 ft) drilled in and near the Katalla oil field between 1901 and 1932)

NUMBER, YEAR, TOTAL DEPTH, AND NAME OF WELL	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
	1961	1961–62	1959–60	1960	1960–61	1961	1961	1962	1963	1926–27	1954–55	1956–57	1954	1962	1961	1961–62	1962	1962	1957	1958–59	1957–58	1961	1962	1960	1961	1961
	6,175	6,019	14,699	9,575	12,135	10,590	7,962	12,417	6,984	2,005	10,013	12,654	4,837	14,107	10,015	10,121	13,023	1,802	9,314	10,494	11,765	3,230	5,090	8,634	5,484	5,326
EQUIVALENT OUTCROP UNIT / UNIT PENETRATED	Richfield Oil Corp. Boring Hover 1	Richfield Oil Corp. Boring Hover 2	Richfield Oil Corp. Kalinik River 1	Richfield Oil Corp. Kalinik River 2	Richfield Oil Corp. Kalinik River 2ED	Richfield Oil Corp. Dickerh Hover 1	British Petroleum Exploration Co. Ltd. Hover 1	British Petroleum Exploration Co. Ltd. White River 3	General Petroleum Co. Hover 1	Phillips Petroleum Co. Sullivan 1	Phillips Petroleum Co. Sullivan 2	Phillips Petroleum Co. Sullivan Hover 1	Sun Company Hover Creek 1	Standard Oil Co. of California Chalk Hills 1A	Standard Oil Co. of California Chalk Hills 1A RD	Colorado Oil & Gas Manatuska 1	Colorado Oil & Gas Manatuska 1 Gas	Colorado Oil & Gas Yakataga 1	Colorado Oil & Gas Yakataga 3	Colorado Oil & Gas Yakataga 4 ST1	Colorado Oil & Gas Yakataga 5	Colorado Oil & Gas Cape Imlay 2	Colorado Oil & Gas Dangerous River 1	Colorado Oil & Gas Cape Suckling 1	Colorado Oil & Gas Cape Suckling 2
Qs		X	X	X	X	X							X	X			X	X	X	X	X		X	X		
QTy			X	X	X	X	X	X	X					X	X	X	X	X	X	X	X		X	X		
Tpb		X	?	X	X	X	X	X	X	X	X	X	X	X		X			?				X			
Tt	X																									
Tkb						?		X	X		?	?					X		X	X	X		?	?		
KJy																	?			X	X			X		

SOURCES OF DATA USED IN COMPILING BASE MAP
Base compiled from U.S. Geological Survey 1:250,000 quadrangles shown
Submarine contours modified from: U.S. Coast and Geodetic Survey, 1961, Sailing charts 8002 and 8502; and Gibson, W. M., 1960 Submarine topography in the Gulf of Alaska: Geol. Soc. America Bull., v. 71, no. 7, p. 1087–1108, pl. 1.

GEOLOGIC MAP OF THE GULF OF ALASKA TERTIARY PROVINCE, ALASKA

By
George Plafker

SCALE 1:500 000

10 0 10 20 30 40 50 MILES
10 0 10 20 30 40 50 KILOMETERS

SUBMARINE DEPTH CONTOURS IN FEET
DATUM IS MEAN LOWER LOW WATER

1967

This map was reproduced by electronic color scanning of an earlier printing (1967).

For sale by U.S. Geological Survey, Fairbanks, Alaska 99701; Denver, Colo. 80225; or Reston, Va. 22092, price $1.00