



Mechanical unit description

- Tss** SAGAVANIRKTOK FORMATION, SAGWON MEMBER: Thickness poorly constrained in map area, but measured at 220 m in the Bush Federal well and estimated to exceed 900 m elsewhere (see unit description and well location map). Mostly poorly consolidated, thick-bedded nonmarine pebble to cobble conglomerate and sandstone. Weakly deformed by gentle, long-wavelength folds and infrequent, small-scale, brittle faults in map area.
- TKpc** PRINCE CREEK FORMATION: Thickness poorly constrained in outcrop, but measured at 385 m in the Susie well and thins to northeast (see unit description and well location map). Weakly indurated to friable nonmarine sandstone, siltstone, pebble to cobble conglomerate, and coal. Weakly deformed by gentle, long-wavelength folds and infrequent, small-scale, brittle faults in map area.
- Ksbu** SHRADER BLUFF FORMATION (UPPER): More than 830 m in outcrop to 1,147 m thick in the Susie well, but thins to northeast (see unit description and well location map). Coarsens and thickens upward in stacked parasequences from common shale and mudstone near the base to well indurated, medium- to thick-bedded, tuffaceous marine sandstone and thin-bedded argillaceous siltstone, mudstone, and shale. Moderate to low mechanical competency, and slightly more competent than underlying Ksbm. Typically deformed by longer-wavelength folds and local brittle faults at surface. Locally intensely deformed by short-wavelength, high-frequency folds and faults in outcrop, particularly near fold axes.
- Ksbm** SHRADER BLUFF FORMATION (MIDDLE): Approximately 65 and 292 m thick in outcrop and Echooka well, respectively (see unit description and well location map). Coarsens and thickens upward in stacked parasequences from mostly marine mudstone and siltstone to more common thin- to medium-bedded sandstone. Moderate to low mechanical competency and slightly less competent than overlying Ksbu. Typically deformed by longer-wavelength folds and local brittle faults at surface. Locally intensely deformed by short-wavelength, high-frequency folds and faults in outcrop, particularly near fold axes.
- Kc** CANNING FORMATION: Approximately 1,166 and 1,300 m thick in the Echooka well and outcrop, respectively (see unit description and well location map). The lower part of the formation consists of mostly organic-rich clay shale and fissile to chippy siltstone with interbedded, thin, very-fine, sandstone, the latter of which may form thick beds toward the middle part of the unit. The upper part of the formation contains repetitive centimeter-scale beds of very-fine-grained sandstone and siltstone. Mechanically weak and hosts local detachment horizons. Commonly intensely deformed by short-wavelength, high-frequency folds and faults in outcrop, particularly well expressed in outcrop near fold axes.
- Ks** SEABEE FORMATION: Approximately 315 m in the Echooka well (see unit description and well location map). Organized into discrete packages dominated by either sandstone or mudstone several meters to tens of meters thick. Moderate to low mechanical competency. Poorly expressed in outcrop, but where observed, sandstone intervals deformed by infrequent fault cut-offs and associated small-scale folds. Mudstone intervals likely host local detachment surfaces and locally are deformed by short-wavelength, high-frequency folds and faults in outcrop. Forms fault cut-offs at scales resolved by seismic data.
- Kt** TOROK FORMATION: Thickness poorly constrained in outcrop, but interpreted to be 1,200 m thick in the Lupine well (see unit description and well location map). Organized into discrete packages dominated by either sandstone or mudstone. More sand-prone to south (toward hinterland), where beds in sandstone intervals often decimeters thick and amalgamated. Mudstone facies composed of moderately-hard siltstone and silty shale. Mechanically competent, thick sandstone packages typically deformed by long-wavelength, low-frequency structures. Mudstone facies sometimes deformed by gentle disharmonic folds. Forms fault cut-offs at scales resolved by seismic data.
- Khs/Kps/Kk/LCU** HUE SHALE, PEBBLE SHALE, KEMIK SANDSTONE, AND LOWER CRETACEOUS UNCONFORMITY (UNDIVIDED): Not exposed at surface in map area. Inferred in subsurface from well cuttings, well logs, and distinctive acoustic contrast. Mechanically competent as a seismic interval. Commonly forms medium-wavelength, low-amplitude imbricates at seismic resolution scales. Competency contrast with underlying Kingak Shale may promote local detachment between the two units.
- KJk** KINGAK SHALE: Not exposed at surface in map area, but inferred in subsurface from well cuttings and petrophysical character. Internally thickened by distributed shortening. Mechanically incompetent and forms the principal detachment interval for Brookian deformation in the map area. Stratigraphically and structurally thins to north.
- Rpu** ECHOOKA FORMATION, SADLEROCHIT GROUP, AND SHUBLIK FORMATION (UNDIVIDED): Not exposed in map area, but inferred in subsurface based on its stratigraphic position and acoustic contrast with respect to the Kingak Shale. More competent than overlying Kingak Shale, but serves as a detachment interval for underlying, competent Lisburne Group strata.
- PMI** LISBURNE GROUP (MAY INCLUDE KAYAK SHALE): Not exposed at surface in map area, but inferred in subsurface based on a change in seismic expression and stratigraphic position with respect to Kingak and inferred interval. Competent stratigraphic interval that forms large anticlinoria southeast of the map area. Detaches above Kayak Shale at its base.
- MI/pMu** LOWER MISSISSIPPIAN/PRE-MISSISSIPPIAN STRATA, UNDIVIDED (MAY INCLUDE KAYAK SHALE): Not exposed at surface in map area, but inferred in subsurface based on a change in seismic expression and stratigraphic position with respect to the interval. Mechanically competent. Detached from the overlying Lisburne Group by the Kayak Shale.

Symbol legend

- Stratigraphic contact constrained by seismic interpretation and/or well control. Dashed where poorly constrained or inferred.
- Fault contact constrained by seismic interpretation and/or well control. Dashed where poorly constrained or inferred. Arrows reflect relative hanging-wall/footwall motion within plane of section.
- Diagrammatic bedding form lines.
- Apparent dip magnitude projected into plane of section.
- Diagrammatic small-scale folding or distributed shortening. Solid where observed, dashed where inferred.
- Symmetrical anticline.
- Symmetrical syncline.
- Asymmetrical anticline with steeper forelimb.
- Asymmetrical syncline with steeper backlimb.
- Exploration well.

Schematic Cross-Section for Geologic Map of the South-central Sagavanirktok Quadrangle, North Slope, Alaska
by
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