GEOLOGIC MAP OF THE CHANDALAR B-6 QUADRANGLE, SOUTHEASTERN BROOKS RANGE, ALASKA

Final compilation, editing, and development of this map occurred after John Dillon's death on July 26, 1987. I have made every effort to maintain consistency with John's work and to continue his high geologic standards and accept responsibility for any omissions or misinterpretations Rocky Reifenstuh

Fairbanks, Alaska, February 1989

J.T. Dillon and R.R. Reifenstuhl

Sea level NO VERTICAL EXAGGERATION

QUATERNARY DEPOSITS

(modified from Hamilton, 1978b)

ALLUVIAL DEPOSITS

Qat ALLUVIAL-TERRACE DEPOSITS—Poorly sorted, moderately stratified mixtures of sand and gravel.

Qaf ALLUVIAL-FAN AND FAN-DELTA DEPOSITS, UNDIFFERENTIATED—Fan-shaped deposits of

COLLUVIAL DEPOSITS

Qcl LANDSLIDE AND FLOW-SLIDE DEPOSITS, UNDIFFERENTIATED—Unsorted and nonstratified to

LACUSTRINE DEPOSITS

QI LACUSTRINE DEPOSITS, UNDIFFERENTIATED—Well-sorted, stratified silt and clay that contain

scattered dropstones; grade into sand near shorelines and fine gravel near stream mouths

NEOGLACIAL DEPOSITS

GLACIAL DEPOSITS

Itkillik Glaciation

angular rubble in and near cirques on Poss Mountain (northeast quadrangle)

and 11,000 ¹⁴C yr B.P. (Hamilton and Porter, 1975)

and striated boulders

absent, and exposed stones show slight to moderate weathering

radiocarbon ages of 13,000 and 30,000 yr B.P. for these deposits

formed during local readvances during Itkillik Phase I

RIFT OF NEOGLACIAL AGE, UNDIFFERENTIATED—Unsorted, nonstratified, coarse to fine

ITKILLIK DRIFT, UNDIFFERENTIATED-Poorly to very poorly sorted, nonstratified to weakly

stratified till that ranges in composition from muddy, sandy gravel to clayey, stony silt, with local

stratified ice-contact deposits that consist of moderately to poorly sorted sand, sandy gravel, and silty,

sandy gravel. Consists of thick (>3 m) drift deposits that cannot be assigned to a specific Itkillik

DRIFT OF ITKILLIK PHASE III—Till and stratified ice-contact deposits, as described in the Itkillik drift,

undifferentiated unit (Qd). Forms sharp-crested end moraines, very irregular ground moraine, ice-

stagnation deposits, and glacio-lacustrine deposits along the Middle Fork Koyukuk River valley.

Loess cover is generally absent, and exposed stones are slightly weathered. Formed during

stillstands or readvances of glaciers. Based on radiocarbon dating these deposits are between 13,000

DRIFT OF ITKILLIK PHASE II-Till and stratified ice-contact deposits; ice-contact deposits more

abundant than till in most valleys. Forms sharply defined drift lobes. Loess cover is generally thin to

OUTWASH OF ITKILLIK PHASE II-Moderately well-sorted, stratified, sandy gravel that contains

subrounded cobbles and small boulders near moraine fronts and rounded pebbles downvalley. Forms

generally continuous terraces 10 to 20 m above modern flood plains in front of Itkillik Phase II

moraines. Usually covered by <0.3 m of loess. Hamilton, Stuckenrath, and Stuiver (1980) reported

ranges from silty, sandy gravel to clayey, stony silt with local stratified ice-contact deposits that

consist of moderately to poorly sorted sand, sandy gravel, and silty, sandy gravel; contains faceted

DRIFT OF RECESSIONAL MORAINES OF ITKILLIK PHASE I-Small, subdued inner moraines

METAMORPHOSED GRAYWACKE AND SILTSTONE—Fine- to medium-grained metagraywacke

with minor interbeds of brown metasiltstone and dark-gray, graphitic phyllite. Relic clastic texture and

bedding are well preserved. Sole marks on several samples may be relic tool marks. Metagraywacke

is composed of angular to subangular detrital grains of quartz (40 percent), rock fragments

(35-percent), albite (10 percent), and tourmaline (trace) in a microcrystalline matrix (15 percent) of

quartz, sericite, and chlorite. Potassium feldspar may have been originally present and subsequently

converted to albite. Rock fragments consist primarily of chert but include clasts of graphitic

metasedimentary and chloritic metavolcanic rocks. Metamorphic minerals include quartz + albite +

sericite \pm chlorite \pm biotite \pm white mica. Semipenetrative cleavage is defined primarily by oriented

sericite, chlorite, pyrite, and rare biotite. Metamorphic textures are similar to textural zone 2 of

metagraywackes (Blake, Irwin, and Coleman, 1967). These textures and structures appear to be the

result of a single metamorphic event, although locally, refolded folds and folded cleavages provide

evidence for at least two deformational events. Unit does not crop out in the Chandalar B-6

IYLLITE—Dark-gray graphitic phyllite with subordinate metasiltstone and metagraywacke

metamorphosed graywacke and siltstone unit (MzPzg). This unit is well-exposed in the Chandalar A-6

(Dillon, Reifenstuhl, and Harris, in press) and Wiseman A-1 (Dillon, Reifenstuhl, and others, 1989)

erbeds. Similar in sedimentary and metamorphic mineralogy, texture, and structure to

Quadrangle, but we infer its presence at depth, as shown in cross section A-A'

Qd2 DRIFT OF ITKILLIK PHASE I—Very poorly to poorly sorted, nonstratified to weakly stratified drift that

MESOZOIC-PALEOZOIC ROCKS

MONOMETAMORPHIC MESOZOIC-PALEOZOIC ROCKS—Although the graywacke unit (MzPzg) described

below does not crop out in the Chandalar B-6 Quadrangle, we infer its presence beneath Quaternary deposits

(southeast quadrangle; cross-section A-A'). This unit is well exposed in the adjacent Chandalar A-6 (Dillon,

Reifenstuhl, and Harris, in press) and Wiseman A-1 Quadrangles (Dillon, Reifenstuhl, and others, 1989). Unit descriptions are modified from the Wiseman A-1 Quadrangle map (Dillon, Reifenstuhl, and others, 1989).

and mixed talus rubble unit (Qc), and solifluction deposits (Qcs)

poorly sorted and stratified, coarse to fine, angular rubble in matrix of finer rock debris. Form lobes

lacustrine and deltaic sediments of well-sorted, stratified silt, sand, and fine gravel

gravel, sand, silt, and clay

terraces of uncertain or composite origin

phyllite, shale, and slate bedrock

MESOZOIC

PALEOZOIC

Form stream terraces

ALLUVIAL DEPOSITS, UNDIFFERENTIATED—Poorly sorted, moderately stratified mixtures of

poorly sorted, nonstratified, angular rock debris in alpine fans and poorly to moderately sorted,

stratified mixtures of subangular gravel and sand in larger stream valleys. Distal deposits grade into

PROFESSIONAL REPORT 103 Dillon and Reifenstuhl (1995)

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and felsic volcanic rocks. The Beaucoup Formation (Dutro and others, 1979) grades laterally and downward into the Whiteface Mountain volcanic rocks (Dillon, Brosgé, and Dutro, 1986) and to the southwest, into the Skajit Limestone (Henning, 1982). It is laterally equivalent to the Ambler volcanic rocks (Dillon, Brosgé, and Dutro,

CHLORITIC SILT\$TONE (Middle to Upper Devonian?)—Limonitic, partly calcareous, banded quartz siltstone and dull gray phyllite with chlorite along foliation planes. Locally contains chloritic quartzite, sandstone, conglomerate, and limestone and marble interlayers. Correlates with the graywacke and limestone of the wacke unit of the Whiteface Mountain wacke unit (Dw); (Dillon, Brosgé, and Dutro,

BLACK SLATE AND PHYLLITE (Devonian? or older)—Black, partly pink-weathering, partly alcareous, silty phyllite and slate with lenses of brown, finely crystalline dolomite and a few beds of black, very fine grained quartzite. In the Nolan Creek area (Wiseman B-1 Quadrangle), lower part includes banded black and gray metasiltstone and may include lower Paleozoic rocks. Probably laterally equivalent to the black phyllite of the Whiteface Mountain wacke unit (Dw); (Dillon, Brosgé,

DEVONIAN CONTACT METAMORPHITIC ROCKS

Devonian igneous tocks. Includes minor noncalcareous rock

LOWER PALEOZOIC ROCKS

LOWER PALEOZOIC ROCKS The rocks described below occur only in the extreme northeast corner of the Chandalar B-6 Quadrangle. They are common in the adjacent Chandalar C-5 (Dillon, Reifenstuhl, and Harris, in

MARBLE (Ordoviclan to Cambrian)—Medium-gray and brown, thin-bedded, unfossiliferous marble. Includes marble interlayers in the calcareous chlorite quartz schist and quartzite unit (OEcq)

quartz albite schist Commonly calcareous and locally graphitic with interlayers of calcschist. Grades into calcareous chlorite quartz schist and quartzite unit (OGcq) and into chlorite calcareous schist unit (O€cc) in the Chandalar C-5 Quadrangle (Dillon, Reifenstuhl, and Harris, in press)

green-weathering muscovite-chlorite quartz schist; locally calcareous. Contains chlorite quartzite

LOWER PALEOZOIC(?) TO PROTEROZOIC(?) POLYMETAMORPHOSED SCHIST AND PARAGNEISS UPPER GREENSCHIST TO LOWER AMPHIBOLITE FACIES

INTERBANDED QUARTZITE AND GRAPHITIC SCHIST (lower Paleozoic to Proterozoic)-Predominantly white, medium-grained quartzite bands <5 cm thick with numerous interbands, lenses, or knots of dark-dray, graphitic albite-chlorite-muscovite-quartz schist. Bands probably represent metamorphically differentiated relicts of interbedded quartzose and pelitic sediments. Minor and trace mineral phases include clinozoisite, pyrite, tourmaline, chloritoid, rutile, sphene, calcite, and allanite. To the south and southwest, unit is extensive and includes rusty-weathering, coarsely crystalline mica schist and paragneliss with minor lenses and bands of black, graphitic schist in muscovite quartzite; quartzo-feldspathic schist; marble and calcareous schist; and mafic greenschist. Locally includes gray, blocky-weathering, foliated, coarse- to very coarse grained, biotite-quartz-feldspar orthogneiss or paragneiss interlayers and may include garnet-epidote-chlorite-muscovite-biotite granite orthogneiss with thin aplitic veins. Locally contains potassium feldspar megacrysts. Yields Proterozoic

INTERBANDED GRAPHITIC SCHIST AND QUARTZITE (lower Paleozoic to Proterozoic)—Light gray to white, medium-grained and fine-grained graphite-bearing quartzite. Quartzite bands are <5 cm thick with numerous dark-gray, graphitic albite-chlorite-muscovite-quartz schist interbands and lenses or knots. Bands probably represent metamorphically differentiated relicts of interbedded quartzose and pelitic sediments. Accessory minerals are clinozoisite, pyrite, tourmaline, chloritoid, rutile, sphene, calcite, and allanite. Lithologically, unit is similar to interbanded quartzite and graphitic schist

unit (Pqs), but contains <25 percent quartzite. Quartz veins are especially noticeable because the graphite-rich rocks are darker. Locally includes graphitic schist ARBLE (lower Paleozoic to Proterozoic)—Gray marble, schistose marble, and interlayers of

ALCAREOUS SCHIST (lower Paleozoic to Proterozoic)—Brown-weathering calcareous schist with bundant thick and thin layers of marble and some layers of noncalcareous schist like the greenschist

DISCUSSION

METAMORPHISM

The Paleozoic(?) to Proterozoic(?) rock units Ps, Pqs, Pm, and Pcs compose the southern Brooks Range "schist belt." Two or more metamorphic episodes have produced a distinct tectonic fabric within the country rock schist. Gneissic lithologic bands transposed from bedding are evidence for the oldest metamorphic event (M.). A strong penetrative schistosity (S₁) locally cuts across and deforms the bands into rods, but in most places the schistosity is parallel to the banding. Therefore, the banding may have formed penecontemporaneously with schistosity (S₁) during metamorphism (M₂). The schistosity and banding are disrupted and partially transposed by subsequent Late Jurassic or earliest Cretaceous semipenetrative cleavage (S2) that is defined by middle greenschist-facies minerals. Where semipenetrative cleavage cuts schistosity and banding at high angles, bands of quartzite and graphitic schist are deformed into black and white lenses and rods that yield a distinctive

The lack of knotty structures in the Devonian rock units and the intrusion of the Late Devonian Wild River pluton (Dillon, Pessel, and others, 1980) into the interbanded graphitic schist and quartzite unit (Esq) in the Wiseman B-3 Quadrangle are evidence of pre-Late Devonian metamorphism of the banded schist. Greenschist and gabbro layers in the banded schist correlate with Proterozoic(?) mafic rocks interlayered with country rock in the Brooks Range "Hub Mountain" area (Mt. Angayukaqsraq, northeastern Baird Mountains Quadrangle) and the Ambler mining district (Turner and others, 1979). Karl and others (1989) report 750 Ma, U-Pb zircon dates from three samples from the Mt. Angayukaqasraq intrusive complex. This date places Late Proterozoic upper age limit on amphibolite metamorphism of the host rock.

Wiseman Thrust Fault: The Wiseman thrust fault is named for its surface expression near the town of Wiseman in the Wiseman B-1 Quadrangle. In the northern quarter of the Chandalar B-6 Quadrangle, the fault can be traced from Minnie Creek to Wolf Pup Creek. It juxtaposes Proterozoic(?) or Paleozoic(?) interbanded quartzite and graphitic schist (Pqs) over Devonian metasediments of the Beaucoup Formation (Dbcs, Dbs). This major fault, which is well documented in the Wiseman A-4 Quadrangle (Dillon, Tilton, and others, 1987), indicates north-directed Brookian compression and thrusting and subsequent uplift of the schist belt rocks. Uplift on the Wiseman thrust fault and on related faults is recorded by (1) K-Ar cooling ages that cluster between 100 and 120 Ma (Turner and others, 1979), (2) metamorphic detritus in Albian clastic rocks of the Yukon-Koyukuk basin (Patton and Miller, 1973; Dillon, Tilton, and others, 1987; Dillon, Reifenstuhl, and others, 1989), and (3) vertical stratigraphic variation in clast composition in the Albian age conglomerates along the southern flank of the Brooks Range, which records the progressive erosional unroofing of the range (Dillon and Smiley, 1984; Dillon, Tilton, and others, 1987; Dillon, Reifenstuhl, and others, 1989). Gottschalk (1987) refers to the Wiseman thrust fault as the Minnie Creek thrust and also postulates north-directed Brookian thrusting along this fault.

Angayucham Thrust System: The Angayucham thrust system is the inferred extension of a mapped thrust ault system in the adjacent Chandalar A-6 Quadrangle where it emplaces the metagr structurally above the phyllite unit (MzPzp). Evidence for the northern extension of the thrust fault system into the Chandalar B-6 Quadrangle includes an abrupt transition from monometamorphic (unit MzPzp) to polymetamorphic (unit Pqs) rocks and an abrupt, 300-gamma, east-southeast-trending step downward from high, varied magnetic values on the north to low values-with a gentle, systematic gradient-on the south (Cady, 1978). The Angayucham thrust system displaced Carboniferous, Permian, and Triassic rocks in its upper plate and is apparently related to Late Jurassic to Early Cretaceous metamorphic events (Dillon, Reifenstuhl,

We identified some megascopic folds, but the larger, north-vergent recumbent folds shown on the cross sections are schematic. The existence and geometry of the larger folds are indicated by (1) folds of this size and symmetry have been mapped in the Wiseman A-5, A-6, B-3, B-5, and B-6 Quadrangles; (2) the repetition of lithologic units is best explained by folding, even where hinge areas were not located; and (3) semipenetrative cleavage (S₃) is axial planar to the mapped mesoscopic and megascopic folds (measurements of this axialplanar cleavage provide reference surface control of the geometry of the unmapped folds); and (4) the intersection of the younger semipenetrative axial-planar cleavage (S₃) with the older, layer-parallel penetrative cleavage (S₂) indicates the orientation of major fold axes.

ECONOMIC GEOLOGY

The Chandalar B-6 Quadrangle includes part of the Koyukuk gold district, the most productive gold district in the Brooks Range. The Chandalar gold district lies just 50 km to the east. Between 1900 and 1970, placer miners in the Koyukuk and Chandalar gold districts reportedly produced more than 330,000 oz of gold. Most of the known placer deposits lie in a belt that cuts east across the northern Chandalar B-6 Quadrangle from the historic towns of Nolan and Wiseman to the gold camps of Gold Creek and Linda Creek. In the Nolan and Hammond Creek areas (Wiseman B-1 Quadrangle), more than 122,000 oz of placer gold production has been reported. In the southwest Chandalar B-6 Quadrangle, Myrtle Creek produced 9,800 oz of gold from 1900 to 1909. Three varieties of gold-bearing stream gravels present throughout the Koyukuk district are active stream gravels (Qa), elevated bench gravels (Qat), and deep buried gravels. Fragments of auriferous vein material in placer concentrates, that are mineralogically similar to veins found upstream imply a genetic link between lodegold deposits and placer deposits. Placer grades vary according to bedrock type; the highest grade placer deposits are located immediately downstream of lode occurrences. Lode-gold prospects are predominantly associated with quartz-arsenopyrite-gold veins that crop out discontinously throughout the district. Three hypotheses for the origin the lodes have been proposed: (1) the lodes were derived from the metamorphism of skarn and high-temperature metasomatic deposits akin to copper porphyries (Dillon, 1989); the skarn and metasomatic deposits were originally formed by intrusion of Devonian granitic plutons; (2) the lodes were derived from metamorphism of spatially associated Devonian volcanogenic massive-sulfide deposits; and (3) the lodes were derived from the metamorphism of Precambrian basement rocks located beneath the veins (R.J. Newberry, oral commun., 1989).

the veins were derived from a Frecambrian source reservoir. We propose that the lode deposits were formed in upper greenschist-lower amphibolite facies rocks during Late Jurassic to Early Cretaceous metamorphism of

nearly 300 km east across the southern Brooks Range schist belt from the Ambler mining district to the central Wiseman Quadrangle at the west edge of the Dalton Highway corridor. Mixed felsic-mafic plutonic complexes and Devonian granites intrude the older banded and knotty schist and may represent the exhumed roots of bimodal and felsic intrusive complexes related to the Ambler volcanics. However, this relationship between the felsic-mafic plutonic complexes and the Ambler volcanics is uncertain because the area of this study (Chandalar B-6 Quadrangle) is beyond the easternmost exposures of the Ambler volcanics. The distribution of the Ambler volcanics east of the Dalton Highway is largely unknown.

Zircons from the Ambler volcanic rocks and from granitic plutons in the Wiseman and Chandalar Quadrangles yield Devonian ages (Dillon, Pessel, and others, 1980; Newberry and others, 1986). Overlapping distribution, age, and chemistry of the volcanic and plutonic rocks provide evidence that these rocks are cogenetic. East of the Dalton Highway (and north of the Chandalar B-6 Quadrangle), felsic volcanic rocks are interlayered in the Devonian Skajit Limestone, Beaucoup Formation, and Whiteface Mountain volcanic rocks near the large Devonian plutons. We infer from these spatial and temporal relationships that the granitic plutons are also consanguineous with the Whiteface Mountain volcanics.

Two rock sequences within the quadrangle have potential for shale-hosted Pb-Zn and barite deposits: (1) highly metamorphosed shales in the Brooks Range schist belt yield several clusters of Cu, Pb, Zn, Ba, and Ag anomalies from stream-sediment and pan-concentrate samples, but statistically set anomaly thresholds are lower in the schist belt than in the Doonerak or Hunt Fork Shale rocks (Cathral, Dillon, and others, 1987); and (2) the Beaucoup Formation consists of Devonian and lower Paleozoic rocks lithologically suited for shale, carbonate, and shale-carbonate interface Pb-Zn deposits. The Beaucoup Formation contains a high geochemical background for Pb, Zn, Cu, Ag, and Ba, and numerous geochemical anomalies (of these elements) in a belt that trends southwest from Snowden Mountain (Chandalar D-6 Quadrangle) through the

SAND AND GRAVEL

Sand and gravel deposits in the Middle Fork Koyukuk River valley have been mined to construct and maintain the Trans-Alaska Pipeline System in the Brooks Range, the Dalton Highway, and the local road system. Highest quality sand and gravel deposits are in the modern flood plain units (Qa, Qag), terrace unit

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METAMORPHOSED DEVONIAN SEDIMENTARY AND **VOLCANIC ROCKS**

the Hunt Fork Shale grades into the underlying Middle and Upper Devonian Beaucoup Formation in

MIDDLE TO UPPER GREENSCHIST FACIES HUNT FORK SHALE, SEMISCHIST AND SCHIST (Upper Devonian?)—Black quartz shale, semischist, and schist; locally very dark gray, graphitic schist and chlorite-white mica-albite quartz schist with accessory graphite, apatite, ilmenite, and tourmaline. Relict graded bedding and sedimentary quartz grains and plagioclase porphyroclasts visible locally. Regionally, this unit correlates with the Hunt Fork Shale, which crops out discontinously throughout the central and northern Wiseman 1° x 3° Quadrangle (Dillon, Brosgé, and Dutro, 1986). The Upper Devonian Hunt Fork Shale consists of black slate and phyllite, minor fossiliferous limestone, lithic wacke (locally in the upper part of the unit), and a basal quartz-chert clast conglomerate and sandstone. Regionally,

some places and unconformably overlies upper Middle Devonian and older rock units in other places GRAVEL, UNDIFFERENTIATED—Gravel and sandy gravel. Forms glacial and nonglacial alluvial METAVOLCANIC ROCKS (Devonian?)—Light-green and medium-green, fine- to medium-grained, schistose chlorite, epidote and albite volcanic rocks. These basic volcanic rocks, which occur in lenses and layers in polymetamorphic rocks (Dcc; Dcss), probably represent flows and are mapped in the field as greenschists

COLLUVIUM, UNDIFFERENTIATED-Mixed talus rubble and solifluction deposits (see units Qcl, CHLORITIC SANDSTONE AND CONGLOMERATE (Middle to Upper Devonian)-Gray-green, Qcs). Forms aprons >1-2 m thick on slopes beyond limits of Itkillik II glaciation. Most common on chloritic quartz schist, calcareous quartz schist, and quartzite with interlayers of carbonate clast conglomerate. Laterally equivalent to black slate and phyllite unit (Dbs). Locally contains thin, discontinuous lenses and layers of mafic metavolcanic rocks (greenschist) in the Wiseman B-1 Quadrangle. The green to light-green, fine- to medium-grained, schistose, chlorite-epidote- and albitebearing greenschist probably represents flows and tuffs below detachment scars, slide tracks, and steep rock walls. Locally include undifferentiated colluvium

CHLORITIC AND CARBONATE ROCKS (Middle to Upper Devonian)—Interbedded green and gray phyllite, chloritic, calcareous metasandstone, and finely crystalline orange dolomite; local chloritic, Qcs SOLIFLUCTION DEPOSITS—Very poorly sorted, nonstratified to weakly stratified sheets and aprons calcareous schist carbonate clast conglomerate, and quartzite clast conglomerate. Commonly of stony, sandy silt and organic-rich silt (typically 1 m thick). Active lobes subject to seasonal weathers with a green or orange cast. Locally contains thin, discontinuous lenses and layers of mafic metavolcanic rocks (greenschist) in the adjacent Wiseman B-1 Quadrangle. The green to light-green, fine- to medium-grained, schistose, chlorite-epidote- and albite-bearing greenschist probably ROCK GLACIER DEPOSITS, ACTIVE AND INACTIVE-Very poorly sorted, nonstratified, coarse represents flows and tuffs angular rock debris, commonly with matrix of silt and fine rubble. Active deposits contain interstitial

BEAUCOUP FORMATION

BEAUCOUP FORMATION (Middle to Upper Devonian)—Carbonaceous, siliceous, and calcareous sedimentary

TACTITE (Devonian)—Green and brown garnet-pyroxene skarn, calc-silicate hornfels, and skarnoid formed by thermal metamorphism and metasomatism of calcareous rocks during intrusion of

LOWER GREENSCHIST AND PREHNITE-PUMPELLYITE FACIES

press)and C-6 (Dillon and Reifenstuhl, in press) Quadrangles.

FELDSPAR QUARTZ SCHIST (Ordovician to Cambrian)—Olive-green-weathering muscovite-chlorite

CALCAREOUS CHLORITE QUARTZ SCHIST AND QUARTZITE (Ordovician to Cambrian?)—Pale-

GREENSCHIST (lower Paleozoic to Proterozoic)-Light-green to medium-green, fine- to mediumgrained, actinolite epidote-chlorite-albite greenschist. Lithologically identical to the Devonian(?) greenschist unit (Ds), but differentiated by its structural position and lithologic association with other

rocks of Proterozoic(?) or early Paleozoic(?) age Pb-Pb ages (Dillon Pessel, and others, 1980). Superposition of three intersecting schistosities yields typical lenticular or "knotty" structure described by Dillon, Pessel, and others (1981; 1987) and Dillon and Smiley (1984). Includes quartzite unit (Psq) mapped in the Wiseman B-1 Quadrangle (Dillon and

alcareous schist. Unit is closely associated with and gradational with the calcareous schist unit (Pcs)

Pb²⁰⁷/Pb²⁰⁶ isotopic data (R.J. Newberry, University of Alaska Fairbanks, unpub. data, 1989) indicate that

BASE METALS

The Ambler volcanics, which are known to contain volcanogenic massive-sulfide deposits, can be traced

northwest corner of the Chandalar B-6 Quadrangle and into the Wiseman B-1 Quadrangle.

(Qat), and glacial outwash unit (Qdo₄). Lower grade deposits are in alluvial fans (Qaf).