GENERALIZED GEOLOGIC MAP OF THE IDITAROD QUADRANGLE, ALASKA, SHOWING POTASSIUM-ARGON, MAJOR-OXIDE, TRACE-ELEMENT, FOSSIL, PALEOCURRENT, AND ARCHAEOLOGICAL SAMPLE LOCALITIES

By

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INTRODUCTION

This geologic map and accompanying data tables are part of a series of reports on the geology, geochemistry, and mineral resources of the Iditarod quadrangle, Alaska. The map presented herein is generalized from a more complex as yet unpublished version. The study represents a cooperative effort between the U.S. Geological Survey (USGS) and the Alaska Division of Geological and Geophysical Surveys (ADGGS). Beginning in 1978, the ADGGS has conducted 1:63,360-scale geologic mapping and prospect evaluations within the Iditarod quadrangle. In 1984, the USGS began work on a more regional scale, and the two agencies merged their studies under the Alaska Mineral Resource Assessment Program (AMRAP). Field work for the joint project was performed primarily between 1984 and 1986, but site visits continued into 1989. The joint studies focused on geologic mapping and geochemical sampling needed to evaluate the mineral resource potential of the quadrangle. No geophysical data were collected during the course of the project. Several other studies, incidental to the geologic work, were accomplished with logistical support provided by the USGS/ADGGS cooperative project. These included a botanical study (Parker, 1985), an archaeologic survey (Betts, 1985), and a Master's thesis on lode mineralization near the town of Flat (Bull, 1988).

The Iditarod quadrangle encompasses 17,300 km^2 and is characterized by rounded upland areas and marshy lowlands. The Kuskokwim Mountains cover a broad swath across the mid and southeastern parts of the quadrangle; ridges are rounded and generally rise to 400-600 m from valley floors that average 150 m. The highest elevations (maximum of 1,235 m) are found in the Beaver Mountains, a rugged, glaciated, plutonic-cored mountain range that lies in the northeastern part of the study area. The west third of the quadrangle consists of wetlands and rolling hills of low relief (maximum of 300 m in elevation, but only 150 m average relief). Exposures are generally poor due to a thick cover of colluvium and vegetation. Access to the study area is primarily by air charter, and nearly all field work was helicopter supported. However, one 30-day season of foot traversing was aided by a seven-horse pack string.

The geologic map utilizes three previously published 1:63,360-scale geologic maps: Iditarod D-1 (Bundtzen and Laird, 1983a), D-2 plus part of D-3 (Bundtzen and Laird, 1982), and C-3 (Bundtzen and others, 1988). In areas covered by these maps we

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performed site checks only. As part of our joint work we have published Iditarod B-4 and part of B-5 (Bundtzen and others, 1992) at 1:63,360 scale. False color infrared aerial photographs (1:63,360 scale) were used extensively to interpret surficial units and to follow structural trends.

GEOLOGY

Rocks of the Iditarod quadrangle can be broadly subdivided into two groups: (1) displaced slices of pre-Cretaceous rocks, which occur in narrow fault-bounded belts, and (2) Cretaceous and younger overlapping assemblages of sedimentary, volcanic, and plutonic rocks, which extend over about 95 percent of the quadrangle. The overlap assemblages have experienced at least two periods of open to isoclinal folding: a well-expressed generally northeast-trending earlier event, and a poorly expressed more north-trending later one. The tectonic slivers of pre-Cretaceous rocks record earlier metamorphic and deformational events. Numerous high-angle faults parallel both structures. A major strike-slip fault, the Iditarod-Nixon Fork Fault, bisects the quadrangle in a northeast-southwest direction. The Dishna River Fault, named herein, lies in the north-central part of the quadrangle and defines the southeast side of a northeast-trending belt of pre-Cretaceous rocks. A suspected thrust fault may have repeated a section of Cretaceous flysch east of Bonanza Creek in the central part of the quadrangle.

PRE-CRETACEOUS ROCKS

Pre-Cretaceous rocks are divided into four fault-bounded map units exposed along the Dishna River Fault Zone. The two older units (Proterozoic to Paleozoic in age) represent metamorphosed continental rocks and the younger two units (Mississippian to Jurassic in age) are oceanic in origin.

The oldest unit (Xi) is the Idono Complex (Miller and others, 1991), a very poorly exposed fragment of metamorphosed continental crust. It consists of amphibolite grade granitic to dioritic orthogneiss, amphibolite, and metasedimentary rocks. Uranium-lead zircon and neodymium isotopic data indicate a protolith age of 2.06 Ga (Early Proterozoic) for granitic orthogneiss in the complex. Involvement of Archean crust in formation of at least some rocks of the Idono Complex is indicated by a T_{Sm-Nd} model age of 2.5 Ga. Major-oxide and trace-element chemistry (presented in tables 2 and 3, but discussed in detail in Miller and others, 1991) suggest the metagranitoids and amphibolites formed in a subduction-related volcanic-arc terrain, far removed from their present site. Potassium-argon ages range from about 120 Ma to about 1,230 Ma (table 1) and indicate Precambrian, Jurassic, and Early Cretaceous dynamo-thermal metamorphic events. It is unclear whether the maximum T/P conditions (amphibolite facies) occurred in Precambrian or Jurassic time (see Miller and others, 1991 for more detailed discussion). The origin of the Idono Complex appears to be closely tied to that of the Kilbuck terrane (Jones and others, 1987), which lies about 250 km to the southwest. Both assemblages represent Early Proterozoic crustal fragments that together constitute the oldest known rocks in Alaska (Box and others, 1990; Miller and others, 1991).

Continental crustal rocks are also represented by unit P₂Pg, an assemblage of greenschist facies meta-igneous and metasedimentary rocks that we tentatively correlate with the Ruby terrane of Jones and others (1987). Unit P₂Pg is characterized by mafic greenschist, lesser pelitic schist, phyllite, calcareous schist, quartzite, and minor granitic orthogneiss but lacks marble, which occurs in Ruby terrane assemblages elsewhere (Chapman and others, 1985). Protolith age assignment is made strictly on the basis of correlations outside of the study area, where fossil and radiometric data support an early and middle Paleozoic and possibly Proterozoic age (Patton and others, 1989b). Regional greenschist facies metamorphism of the Ruby terrane is thought to relate to collisional events in latest Jurassic and Early Cretaceous time (Patton and others 1989b). Unit P₂Pg represents the farthest southwest extent of the regionally extensive Ruby terrane, but the poor exposures in the Iditarod quadrangle contribute little new information to our understanding of this terrane.

An assemblage of oceanic crustal rocks and volcanic-arc rocks, metamorphosed to prehnite-pumpellyite facies (TₘMc), also crops out in the northeast-trending belt of pre-Cretaceous rocks. Radiolarian chert, basalt to basaltic andesite, lithic tuff, metasiltstone, and minor limestone compose the assemblage, but the stratigraphic succession is uncertain. These weakly metamorphosed rocks represent the farthest southwest extent of the Innoko terrane (of Jones and others, 1987) and are assigned a Mississippian to Triassic age primarily based on this correlation. Thin slices of unit TₘMc

crop out along high-angle faults at half a dozen localities far to the east of the main outcrop belt. These small occurrences are tectonic slivers but may represent basement rock beneath the Cretaceous flysch.

Mafic and ultramafic rocks of the Dishna River area (**Jdr**) compose the youngest of the pre-Cretaceous rocks. Mafic rocks, which are locally of greenschist facies, and serpentinized ultramafic rocks, occur as isolated fault-bounded blocks that are probably ophiolitic in origin (Miller, 1990). These mafic and ultramafic rocks are correlative with a large belt of lithologically similar mafic and ultramafic complexes (the Tozitna-Innoko belt of Patton and others, 1989a), which lies to the north. A Jurassic age is assigned to unit **Jdr** based on this correlation.

Poor exposures in the central Iditarod quadrangle make definition of contact and structural relations among the pre-Cretaceous rocks difficult to decipher. Where observed, all contacts are high-angle shear zones, but this likely reflects post-mid-Cretaceous deformation that has assembled the pre-Cretaceous units along a single northeast-trending structural belt. Correlative rocks to the north are thought to have been assembled by pre-mid-Cretaceous thrust faulting that placed the mafic and ultramafic rocks over the chert and volcanic rocks, which in turn were thrust over the metamorphic rocks (Patton and Box, 1989; Patton and others, 1989a; Patton and others, 1989b). In the Iditarod quadrangle, however, any original low-angle faults may have been obscured by subsequent high-angle faulting along the Dishna River Fault Zone. This zone trends into the Susulatna lineament (Patton, 1978) forming a linear belt that extends for at least 270 km from the central part of the Iditarod quadrangle into the Ruby quadrangle.

OVERLAP ASSEMBLAGES

The fault-bounded pre-Cretaceous rocks are depositionally overlain by Cretaceous sandstone, Upper Cretaceous to Tertiary subaerial volcanic rocks, plutons, and dikes, and Quaternary deposits. These overlap assemblages form by far the most widespread units of the Iditarod quadrangle. Sedimentary rocks, primarily represented by the Upper Cretaceous Kuskokwim Group (Cady and others, 1955), dominate the bedrock units. Late Cretaceous to early Tertiary plutonic rocks and associated volcanic rocks intrude and overlie this sequence. An extensive field of subaerial volcanic rocks, which are coeval with the volcano-plutonic complexes, covers a large part of the western Iditarod quadrangle. Other Late Cretaceous to early Tertiary intrusive rocks include peraluminous hypabyssal granite porphyry, altered intermediate to mafic dikes, and felsic plugs and plutons. Finally, surficial deposits of late Tertiary(?) to Quaternary age cover more than half of the quadrangle.

The oldest overlapping assemblage is represented by a very poorly known unnamed unit (**Ks**), which is exposed only as colluvial chips near the west edge of the Iditarod quadrangle. The unit consists of potassium-feldspar-bearing sandstone, tuffaceous sandstone, and lesser siltstone, and is tentatively assigned an Early Cretaceous age based on one Hauterivian to Barremian palynomorph collection. Age and compositional differences suggest that unit **Ks** is not part of the Kuskokwim Group, the nearest exposure of which lies 40 km to the southeast across an area largely underlain by subaerial volcanic rocks. Other potentially correlative sedimentary rocks crop out 5 km to the west in the Holy Cross quadrangle. These rocks reportedly represent the farthest southeast extension of the Yukon-Koyukuk basin-fill sequence, which is chiefly Albian and Cenomanian in age (Nilsen, 1989) and therefore younger than unit **Ks**. However, no specific information is available on exposures in the Holy Cross quadrangle and our Hauterivian to Barremian palynomorph age for unit **Ks** is tentative, therefore correlation of unit **Ks** with any other sedimentary rock units remains uncertain.

The Upper Cretaceous Kuskokwim Group, a regionally extensive basin-fill sequence that covers about 65,000 km^2 of southwest and west-central Alaska (Decker and others, in press; Box and Elder, 1992), underlies roughly 65 percent of the Iditarod quadrangle. The Kuskokwim Group consists primarily of marine turbidites deposited into a northeast-trending, elongate, fault-controlled basin; subordinate shallow-marine and fluvial strata were deposited along the margins of the basin (Bundtzen and Gilbert, 1983; Pacht and Wallace, 1984). In the Iditarod quadrangle the Kuskokwim Group also contains interbedded volcanic rocks, a fact first indicated by Bundtzen and Laird (1982) and confirmed by our studies.

For this report, the Kuskokwim Group is divided into five map units (**Kks**, **Kkq**, **Kkv**, **Kkt**, **Kka**), and assigned a Cenomanian to Campanian age. Basinal turbidites (**Kks**), which consist of interbedded sandstone, siltstone, shale, and minor conglomerate (Facies A to E of Mutti and Ricci Lucchi, 1978), constitute the major part of the Kuskokwim Group.

The sandstones are lithic rich and locally contain metamorphic rock, plutonic rock, sandstone, chert, limestone, and/or volcanic rock fragments; quartz clasts are ubiquitous, clasts of plagioclase are very common, but potassium-feldspar clasts are extremely rare. Nearly all of the sandstones contain abundant metamorphic lithic fragments, but some sandstones are notably rich in chert, limestone, or volcanic lithic fragments, suggesting variable source terranes (Miller and Bundtzen, 1992). Detrital modes can vary markedly both over short geographic distances and through stratigraphic sections, making regional patterns difficult to discern. However, it is clear that chert, limestone, metamorphic rocks, and volcanic rocks were emergent at the time of Kuskokwim deposition. The Ruby and Innoko terranes (Jones and others, 1987), which lie generally north of the basin, are likely sources for metamorphic and chert lithic fragments. The limestone lithic fragments were probably eroded from rocks of the Nixon Fork terrane (Jones and others, 1987), which lie generally to the east. The Innoko terrane might also have yielded volcanic lithic fragments, but syndepositional volcanic rocks may have been an important local source. The generally lithic-rich basinal rocks become progressively more quartz-rich approaching the shoreline. Rocks of the upper part (**Kkq**) of the Kuskokwim Group consist of relatively clean quartzose sandstone, cross-stratified sandstone, finely laminated shale, local leaf-rich beds, rare coal seams, and minor coquina composed of brackish-to-nonmarine bivalves. Field relations strongly suggest that unit **Kkq** represents a shoreline sequence that successively overlaps the basinal sequence in the form of an upward marine regression. Volcanic rocks of the Kuskokwim Group comprise units **Kkv**, **Kkt**, and **Kka**, which are primarily tuffs and flows no more than 50 m thick. We believe these interbedded volcanic rocks represent the initial phase of the subaerial volcanism that mostly postdates deposition of the Kuskokwim Group. Total thickness for the Kuskokwim Group in the study area is poorly constrained. In the upper George River area (deeper part of the basin), the Kuskokwim Group appears to be at least 5,000 m thick. However, overturned folds and thrust faults may have structurally repeated this part of the section. Nearer to the basinal margin, the Kuskokwim Group appears to be significantly thinner, about 2,400 m in the Ganes Creek area. Paleocurrent data (table 5), although sparse, generally indicate transport to the west and southwest for most of the study area, but to the south and southeast for the southeast quarter of the map area.

Volcano-plutonic complexes of Late Cretaceous and early Tertiary age intrude and overlie rocks of the Kuskokwim Group. The best exposed complex lies between the Beaver Mountains and Camelback Mountain in the north-central part of the map area; some of the volcanic rocks of this complex were dextrally offset about 90 km to the southwest across the Iditarod-Nixon Fork Fault (Miller and Bundtzen, 1988). Numerous smaller volcano-plutonic complexes are found at Swinging Dome, Chicken Mountain, Camelback Mountain, Granite Mountain, Mount Joaquin, Takotna Mountain, and at VABM Tatalina (T. 31 N., R. 36 W.). Volcanic rocks of these complexes are represented by map units **Kit** and **TKii**, which together constitute the Iditarod Volcanics (Miller and Bundtzen, 1988). These dominantly subaerial volcanic rocks form a 500- to 600-m-thick section that consists of basal tuffaceous rocks overlain by andesitic to basaltic flows. Monzonite to quartz monzonite composite plutons (**TKm**) of Late Cretaceous and early Tertiary age intrude both the Kuskokwim Group and the Iditarod Volcanics. Contact relations suggest that the plutons partially assimilated the comagmatic volcanic rocks; studies in the Chicken Mountain area (Bull, 1988) support a shallow epizonal environment for pluton crystallization. Hornfels aureoles as wide as 2 km surround most of the larger plutons and developed in both clastic sedimentary and overlying volcanic rocks. A roughly 10-km^2-zone of hornfels sedimentary rocks occurs in T. 27 N., R. 42 W.; although no plutonic rocks are exposed, we suspect that the hornfels cap is underlain by an unexposed stock of unit **TKm**. Potassium-argon ages for unit **TKm** (table 1) indicate a bimodal distribution centering around 71 Ma and 61 Ma. The Iditarod Volcanics yield K-Ar ages ranging from 77 Ma to 58 Ma (table 1). Results of major-oxide analysis of 77 volcanic and plutonic rock samples (table 2) indicate broad calc-alkaline trends with some alkalic affinities. The volcano-plutonic complexes of the Iditarod quadrangle form part of a 275-km-long belt that extends from the Medfra quadrangle southwest to the Sleetmute quadrangle and contains at least 17 volcano-plutonic complexes (Miller and others, 1989).

Subaerial volcanic rocks (**TKy**) of Late Cretaceous and early Tertiary age form an extensive (but poorly exposed) field in the Yetna River area, western Iditarod quadrangle. The field is composed primarily of andesite, dacite, rhyolite, and minor basalt flows, and subordinate welded to nonwelded rhyolitic to andesitic ash-flow tuffs. Other subaerial volcanic

fields of similar age and composition are exposed to the northeast in the Medfra quadrangle (Moll and others, 1981; Moll-Stalcup and Arth, 1989). Potassium-argon ages for unit **TKy** range from about 69 Ma to 54 Ma, making them generally slightly younger than the volcano-plutonic complexes. Results of 25 major-oxide analyses (table 2) indicate broad calc-alkaline trends with some alkalic affinities, similar to the volcano-plutonic complexes. We envision a genetic relation between the magma sources of the volcano-plutonic complexes and the volcanic rocks of the Yetna River field.

The remaining intrusive rocks of Late Cretaceous and early Tertiary age consist of altered intermediate to mafic dikes (**TKd**), alkali granite (**TKg**), and two hypabyssal-textured felsic igneous rock units (**TKgp**, **TKp**). Although volumetrically minor, altered intermediate to mafic dikes are ubiquitous throughout the Iditarod quadrangle. The dikes are porphyritic with biotite, clinopyroxene, plagioclase, and sometimes olivine phenocrysts, but original mineralogy is almost always masked by extensive alteration to chlorite, calcite, and silica invoking the field term "silica-carbonate dikes" to describe these rocks. Mineralogic and age similarities between dikes of unit **TKd** and the composite plutons of unit **TKm** make a genetic relation plausible. The dikes may also have been feeders for andesitic volcanism that resulted in the formation of the Iditarod Volcanics. Plutonic rocks of unit **TKg**, however, show no clear relation to other intrusive rocks. They consist of alkali amphibole-bearing alkali granite and biotite granite, both of which show granophyric texture. The age of unit **TKg** is somewhat uncertain (see unit **TKg** description): it may be around 63 Ma, like the younger of the bimodal ages found for unit **TKm**; or it may be Early Cretaceous, similar to one dated pluton west of the study area in the Holy Cross quadrangle (Marvin and Cole, 1978; Wilson and others, 1991). Hypabyssal granite porphyry dikes, sills, and plugs (**TKgp**) are volumetrically minor, but genetically distinct from the previously discussed igneous rocks. These rocks show peraluminous chemistry (table 2), are corundum normative, and locally contain garnet phenocrysts. Potassium-argon ages are bimodal, centering around 70 Ma and 65 Ma. The available evidence suggests that rocks of unit **TKgp** represent continental crust that perhaps was melted during periods of high heat flow associated with intrusion of the plutons of unit **TKm**. The pilotaxitic dacite-andesite plugs of unit **TKp** show similarities in mineralogy and mode of occurrence to the granite porphyry plugs, and lacking definitive data, we speculate that they may be genetically related.

The youngest bedrock exposures in the study area comprise two small map units of granitic and volcanic rocks. A porphyritic granodiorite plug (**Tp**), which yielded one K-Ar age of 53 Ma (table 2), crops out 14 km east of the old town of Iditarod (in T. 28 N., R. 46 W.). This age is somewhat young compared to other intrusive rocks nearby but is not unreasonable given that volcanic rocks of the Yetna River area (**TKy**) have yielded ages as young as 54 Ma. The youngest bedrock lithologies consist of subaerial basaltic andesite flows (**Tb**) about 10 Ma in age that crop out near the west border of the map area. These rocks occur as a few isolated outcrops among the volcanic rocks of the Yetna River area (**TKy**). They are distinguished from the latter, however, by their fresher-looking character and chemistry. Major-oxide analyses (table 2) indicate they are high in TiO_2 and low in K_2O. These volcanic rocks may be laterally equivalent to Miocene basalt mapped by Bundtzen and Laird (1991) in the Owhat River drainage, 95 km to the southeast in the Russian Mission quadrangle.

Surficial deposits of late Tertiary(?) and Quaternary age cover at least 50 percent of the map area. For the purpose of this simplified map, we have combined most surficial deposits into a single unit (**QTs**) with the exception of placer mine tailings (**Qp**), which identify important metallic mineral resource potential. Unit **QTs** consists largely of colluvial, alluvial, and eolian deposits, but locally includes bedrock-derived talus, silt and peat, terrace deposits, glacial deposits, and minor landslide deposits. The surficial deposits are commonly mantled by vegetation and generally frozen, except on south-facing, well drained slopes.

Although most of the map area was not glaciated during Pleistocene time, the Beaver Mountains and adjacent lowlands were subjected to four episodes of glacial and associated outwash deposition (Bundtzen, 1980; Kline and Bundtzen, 1986), and minor cirque glaciation occurred on Granite Mountain and near Fourth of July Creek. Ancestral stream drainages paralleling modern streams are represented by locally extensive terrace gravels. Terrace deposits of at least two separate ages have been identified along the Iditarod River, Crooked Creek, Takotna River, and George River. Although we have no absolute age control, a late Tertiary age is possible for the older deposits on the basis of a growing recognition of late Tertiary antiquity of similar terrace gravels throughout unglaciated interior and western Alaska (Karl and others, 1988; Hopkins and others, 1971; Péwé, 1975).

STRUCTURE

Numerous high-angle faults parallel the general northeast-trending structural grain that characterizes the map area. The most prominent of these is the Iditarod-Nixon Fork Fault, which diagonally bisects the quadrangle. A minimum of 88-94 km offset since at least earliest Tertiary time is indicated for this major right-lateral fault as evidenced by the separation of exposures of the Iditarod Volcanics (Miller and Bundtzen, 1988). Similarly, the granite porphyry dikes of the Ganes Creek area (east of the Beaver Mountains) are probably offset from a similar swarm of granite porphyry dikes and plugs in the Donlin Creek area (east of DeCourcy Mountain). Tectonic activity on the Iditarod-Nixon Fork Fault has continued into late Tertiary or Quaternary time as indicated by prominent escarpments along Bonanza Creek that cut fan-terrace deposits (Bundtzen and others, 1988). Although the Iditarod-Nixon Fork Fault is indicated as a single fault on the map, numerous strands split off and rejoin the fault along its length forming a 10-km-wide zone. Within this zone of faulting we mapped a possible thrust fault based on repetition of part of the Kuskokwim Group.

The Yankee-Ganes Creek Fault, a northeast-trending high-angle feature that lies about 8 km northwest of the Iditarod-Nixon Fork Fault, appears to be overlain by the Beaver Mountains volcano-plutonic complex and therefore may represent an older, inactive splay in the main fault zone. Fault-bounded slivers of unit **TrMc** crop out at half a dozen localities along the length of the Yankee-Ganes Creek Fault. We interpret these as tectonic slivers of basement rock brought up in classic positive flower structure (for example, Harding, 1985). The presence of these tectonic slivers indicates the Yankee-Ganes Creek Fault was active in Late Cretaceous time during deposition of the Kuskokwim Group, however, activity ceased by around 77 Ma, the time the Iditarod Volcanics were formed.

The Dishna River Fault is the third fault for which we have some control on timing of movement. This fault forms the present northwestern basin margin of the Kuskokwim Group in the map area. It defines a 6- to 10-km-wide northeast-trending zone of fault-bounded rocks that range from Proterozoic to Cretaceous in age. The pattern of anastomosing faults (see Reading, 1980) and the juxtaposition of a wide variety of rock types suggest the fault has a strike-slip character (may also have a dip-slip component), and has had significant movement. Further emphasizing the importance of this fault, it is on trend with the Susulatna lineament (Patton, 1978), and therefore is the southwest extension of a 270-km-long zone. Two constraints lead us to conclude the Dishna River Fault was active sometime between about 77 and 69 Ma. First, the fault zone contains slivers of the upper part of the Kuskokwim Group, therefore the fault was active after its deposition, or more recently than about 77 Ma. Second, the Dishna River Fault is overlain by volcanic rocks of the Yetna River area (**TKy**), indicating that movement must have ceased by the time the oldest rocks of the volcanic field were formed, or about 69 Ma. The Dishna River Fault may also have been active during deposition of the Kuskokwim Group (that is sometime between about 90 and 77 Ma), based on possible correlation with a comparable basin-margin fault that bounds the Kuskokwim Group in the Bethel quadrangle (south-southwest of the Iditarod quadrangle). There, documentation of a changing source terrane led Box (1992) to conclude that right-lateral strike-slip fault movement occurred on the northwest basin-margin fault (the Sawpit Fault) during deposition of the Kuskokwim Group.

Rocks of the map area are deformed by folds as well as faults. The pre-early Tertiary rocks have undergone at least two periods of folding, probably beginning in the latest Cretaceous and continuing into Tertiary time. The older period is marked by open to isoclinal, and locally, overturned folds that have amplitudes of 2-3 km and generally northeast-trending axes. Evidence for the later folding event is found only in the southeastern part of the map area where the northeast-trending synclines and anticlines were refolded into broad regional-scale folds that have wavelengths of approximately 25 km and north-northeast-trending fold axes.

Structural elements mapped in the Iditarod quadrangle can be explained within the framework of wrench fault tectonics. With the aid of clay models, Wilcox and others (1973) described the interrelated system of folds and faults that develop in a long active wrench fault system. Two primary patterns that mark such a system are the main wrench fault itself (here the Iditarod-Nixon Fork Fault) and en échelon folds with axial traces inclined to the fault trend (Wilcox and others, 1973). Right-lateral wrench faults produce right-handed folds, identical to the pattern found in the map area. Local zones of extension and contraction can form along major strike-slip fault systems as a result of curvature along the fault, braiding of faults within the zone, or side-stepping of faults (Reading, 1980).

Small thrust faults, like that observed within the fault zone in the central part of the study area, can develop in such a setting.

Strike-slip tectonics explains not only the structural setting of the Iditarod quadrangle, but much of its post-tectonic-assemblage geologic history as well (Miller and Bundtzen, 1992). The Kuskokwim Group was deposited in an elongate, probably strike-slip basin beginning in Late Cretaceous time. The basin likely continued to deepen while in-filling took place. As the subsidence rate declined, the basin filled, and marine turbidites yielded to shallow-marine, then non-marine sediments. By Late Cretaceous time compression in the wrench fault environment led to formation of en échelon folds followed by right-lateral strike-slip faulting; some deformation may have affected older parts of the basin while the younger part of the Kuskokwim Group was still being deposited. Because wrench fault systems seldom have strictly parallel movement, compressional and tensional stresses commonly operate alternately, depending upon whether the fault is convergent or divergent at the time (Wilcox and others, 1973). The volcanic and plutonic rocks were likely emplaced during intermittent periods of extension.

MINERAL RESOURCES

The Iditarod mining district, the third largest placer gold district in the State of Alaska, lies within the study area and has been a focus of keen interest since the turn of the century. However, prior to our AMRAP studies, little was known about the bedrock mineral resources present, which consist principally of gold, tungsten, silver, mercury, antimony, and tin. Our studies show that gold-polymetallic deposits of the study area occur in association with two types of Late Cretaceous to early Tertiary intrusive rocks: (1) composite plutons of the volcano-plutonic complexes (unit **TKm**), and (2) hypabyssal granite porphyry dikes and plugs (unit **TKgp**) (Bundtzen and Miller, 1992). Both units are potential host rocks for additional gold-polymetallic lode deposits.

DATA TABLES

Tables 1 through 6 present data primarily collected during the course of this study, but for completeness, all previously reported data are also included and so referenced. Table 1 contains K-Ar data from 99 analyses, four of which were replicate runs. All K-Ar data collected to date are reported herein; refer to comments column of table 1 for any accompanying remarks. Table 2 presents major-oxide chemical analyses and calculated CIPW normative minerals for 169 samples; one sample was run by two labs and both analyses are reported for comparison. Table 3 shows trace-element and rare-earth data for 30 selected samples from table 2. Tables 1, 2, and 3 are arranged by map number, and the sample localities are shown in black on the map sheet. Localities for data presented in tables 4, 5, and 6 are shown in red on the map sheet. Table 4 is a tabulation of fossil collections submitted for identification during the course of this study as well as those that yielded important information from previous studies. Table 5 presents paleocurrent data, about half of which were previously published. Finally, table 6 presents information obtained at two archaeologic sites.

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Table 1. Potassium-argon age determinations from the Iditarod quadrangle, Alaska

[Age determinations calculated using the following decay constants: $\lambda_\varepsilon + \lambda_{\varepsilon'} = .581 \times 10^{-10} yr^{-1}$, $\lambda_\beta = 4.962 \times 10^{-10} yr^{-1}$, $^{40}K/K_t = 1.167 \times 10^{-4}$ mol/mol. The error assigned to each age is 3% of the calculated age except where noted. Minimum ages are enclosed in parentheses. Data for some samples was previously published; references are noted. All locations are by township and range]

Map No.	Sample No.	Location (T,R)	Map unit	Rock type[1]	Mineral dated[2]	Lab[3]	K_2O (mean wt%)	$^{40}Ar_{rad}$ (10^{-11}mol/g)	$^{40}Ar_{rad}$ (mol%)	K-Ar age (Ma)	Ref.[4]	Comments
1	84AM87C	34N,43W	Jdr	gab	hb	1,C	.237	3.22	54.6	92.2±2.8	2	
7	84AM271A	33N,46W	TKy	rhy	wr	1,C,T	5.06	43.66	90.5	(59.0±1.8)	1	Secondary silica
8	84AAi601	33N,45W	TKy	and	wr	1,C,T	2.47	22.88	62.9	(63.3±1.9)	1	
9	84AM273A	33N,44W	TR Mc	mba	wr	1,C,T	2.86	46.47	76.6	(110±3)	1	
14	79BT436	33N,41W	TKm	mon	bi	2,T,S	8.75	90.31	73.1	70.3±2.1	3	
18	85AM108A	33N,39W	Kkt	tuf(a)	wr	1,C,T	2.21	23.07	90.1	(71.3±2.1)	1	
27	78BT461	33N,35W	TKm	md	bi	2,T,S	8.88	92.80	90.7	71.2±2.1	4	McGrath quad
29	85AAi689	32N,49W	TKy	tufw	sa	1,C,T	8.48	67.77	93.1	54.7±1.6	1	
29	85AAi689	32N,49W	TKy	tufw	sa	1,C,T	8.48	67.42	93.0	54.4±1.6	1	Replicate
30	85AM100A	32N,45W	TR Mc	mba	wr	1,C,T	4.14	46.55	95.8	76.5±2.3	1	
31	84AM279A	32N,45W	PZ Pg	mgd	bi	1,C,T	8.59	137.07	93.6	108±3	1	Reset
32	85AM91A	32N,44W	Jdr	gab	hb	1,C,T	.025	.863	23.2	228±25	2	Error >3%
32	85AM91A	32N,44W	Jdr	gab	hb	1,C,T	.025	.839	22.3	222±23	2	Replicate
39	78BT435	32N,37W	TKm	mon	bi	2,T,S	8.57	88.84	90.7	70.6±2.1	5	
40	85AM16A	31N,53W	TKy	tuf(d)	sa	1,C	10.16	99.76	91.8	67.0±2.0	1	Holy Cross quad
43	85AM93A	31N,47W	Xi	amp	bi	1,C	5.12	106.19	87.2	139±4	6	K_2O low
43	85AM93A	31N,47W	Xi	amp	hb	1,P	.800	18.94	43.7	157±5	6	
45	82BT392	31N,41W	Kit	and	pl	1,B	.600	6.68	35.3	75.7±2.3	9	
47	81BT523	31N,41W	TKil	bas	wr	3,K,M	5.11	26.08	66.1	(35.1±1.1)	3,1	
48	86BT94	31N,41W	Kit	vol	wr	1,P	3.24	34.24	89.7	72.0±2.2	1	
54	83AM113X	31N,40W	TKgp	grp(a)	wr	1,C	4.19	43.32	91.2	(70.4±2.1)	1	
57	81BT494	31N,39W	TKgp	grp	bi	3,K,M	8.46	81.54	30.0	65.7±3.9	3	
60	79BT261	31N,36W	TKm	mon	bi	2,T,S	6.47	58.08	68.0	(61.3±1.8)	5	
64	85AM2A	30N,48W	TKy	bas	pl	1,C	.448	1.66	31.6	25.5±.8	1	
71	84BT213	30N,47W	Xi	amp	hb	1,C	.801	27.34	92.1	223±7	6	
72	84AM121A	30N,47W	Xi	sch	bi	1,C,T	9.10	264.93	85.6	192±6	6	
72	84AM121C	30N,47W	Xi	hbt	hb	1,C,T	.508	100.92	97.5	1026±31	6	
72	84BT210	30N,47W	Xi	hbt	bi	1,C,T	8.68	443.02	96.1	324±10	6	
72	84BT210	30N,47W	Xi	hbt	hb	1,C,T	.932	233.27	99.3	1218±37	6	
72	84BT210	30N,47W	Xi	hbt	hb	1,C,T	.932	237.14	98.5	1233±37	6	Replicate
76	82BT399	30N,42W	TKm	md	bi	1,B	7.21	72.3	43.9	68.3±2.0	7	
82	86AMc39A	30N,41W	TKgp	grp	bi	1,P	6.17	57.40	72.8	63.5±1.9	1	
83	86BT93	30N,40W	TKm	mon	bi	1,P	8.22	83.93	86.8	69.5±2.1	1	
84	86BT89	30N,39W	TKgp	grp	wm	1,P	8.18	84.23	69.4	70.2±2.1	1	
85	86AM75A	30N,39W	TKgp	grp(a)	wr	1,P	3.52	33.33	77.0	64.6±1.9	1	
86	84AM244A	30N,38W	TKgp	grp(a)	wr	1,C,T	5.10	52.49	97.5	(70.1±2.1)	1	
89	84BT255	30N,37W	TKm	qm	bi	1,C,T	8.91	78.24	87.0	60.0±1.8	1	
90	84BT254B	30N,36W	TKgp	grp	wr	1,C,T	4.06	38.31	78.9	(64.3±1.9)	1	
91	84BT254A	30N,36W	Kit	and	wr	1,C,T	1.93	19.90	67.1	(70.3±2.1)	1	
92	85AAi627	29N,51W	Tb	ban	wr	1,C,T	.892	.891	5.19	6.9±.2	1	
93	85AM11A	29N,51W	TKg	gr	bi	1,C,T	1.84	38.51	87.5	140±4	1	K_2O very low
94	85AM18A	29N,50W	TKy	and	bi	1,C	6.63	66.87	87.9	68.7±2.1	1	
101	83BT349-1	29N,48W	Xi	sch	wm	1,B	10.11	202.6	76.9	134±4	8	
101	83BT349-1	29N,48W	Xi	sch	bi	1,B	9.45	186.7	82.3	132±4	8	
101	83BT349-2	29N,48W	Xi	amp	hb	1,B	.660	12.4	88.1	126±4	8	

Table 1. Potassium-argon age determinations from the Iditarod quadrangle, Alaska--Continued

Map No.	Sample No.	Location (T,R)	Map unit	Rock type[1]	Mineral dated[2]	Lab[3]	K_2O (mean wt%)	$^{40}Ar_{rad}$ (10^{-11}mol/g)	$^{40}Ar_{rad}$ (mol%)	K-Ar age (Ma)	Ref.[4]	Comments
102	84AM208A	29N,48W	Xi	sch	am	1,C	.680	12.49	57.0	123±4	6	
104	84AAi537B	29N,48W	Xi	sch	wm	1,C	10.49	219.68	82.5	140±4	6	
104	84AAi537B	29N,48W	Xi	sch	bi	1,P	9.20	186.66	93.4	136±4	6	
104	84AAi537C	29N,48W	Xi	sch	bi	1,C	8.98	225.22	92.8	166±5	6	
104	84AAi537C	29N,48W	Xi	sch	am	1,C	.882	24.13	80.0	181±13	6	Error >3%
105	84AAi538A	29N,48W	Xi	sch	wm	1,C,T	10.51	204.45	88.9	130±4	6	
105	84AAi538B	29N,48W	Xi	amp	bi	1,C,T	8.85	216.60	94.8	162±5	6	
105	84AAi538B	29N,48W	Xi	amp	hb	1,C,T	.766	21.91	88.6	189±6	6	
106	84AM181A	29N,48W	Xi	mgr	bi	1,C	9.09	202.02	92.8	148±4	6	
109	85AM35A	29N,47W	TRMc	vol(a)	wr	1,C,T	3.07	40.08	88.7	88.4±2.7	1	
113	84BT277	29N,43W	TKil	ban	wr	1,C,T	2.71	23.02	33.6	(58.1±1.9)	7,9	
118	82GL135	29N,42W	TKm	mon	bi	1,B	7.92	82.1	71.8	70.6±2.1	7	
119	82BT430	29N,40W	TKm	mon	bi	1,B	8.65	88.5	41.6	69.8±2.1	7	
120	86BT101	29N,41W	Kkt	and(a)	wr	1,P	3.01	30.59	88.5	69.4±2.1	1	
121	85AAi626A	28N,52W	TKy	tuf	sa	1,C,T	4.41	37.91	95.7	58.8±1.8	1	
122	85AAi625	28N,51W	Tb	ban	wr	1,C,T	.583	1.09	3.6	13.0±.5	1	
123	85AM9A	28N,51W	TKy	and	wr	1,C,T	1.45	12.60	27.0	59.5±1.8	1	
125	84AAi520	28N,48W	Xi	mgr	wm	1,C	9.78	205.56	91.1	140±4	6	
126	84AM172A	28N,48W	TRMc	tuf?	am	1,C,T	.947	44.84	96.0	302±9	1	
130	84BT242	28N,47W	TKm	mon	bi	1,C,T	9.23	95.72	84.1	70.7±2.1	10	
132	84BT240	28N,47W	TKgp	grp(a)	wr	1,C,T	4.15	42.60	86.0	(70.0±2.1)	10	
133	86BT20	28N,47W	TKm	mon(a)	hb	1,P	1.05	10.91	78.6	(70.8±2.1)	1	
133	86BT20	28N,47W	TKm	mon(a)	bi	1,P	7.64	79.55	89.4	70.9±2.1	1	
134	86BT19	28N,46W	Tp	gd	am	1,P	.501	3.86	38.6	52.8±1.6	1	
136	84AM292A	28N,46W	TKd	dk(a)	bi	1,C,T	5.90	61.66	87.8	71.2±2.1	1	
139	84BT276	28N,44W	TKm	mon	bi	1,C,T	8.17	87.83	90.0	73.2±2.2	7,1	
142	83BT76	28N,42W	TKgp	grp	wr	1,B	.180	1.77	37.1	(67.0±2.0)	7	
147	83BT360A	27N,47W	TKm	md	am	1,C,T	.313	3.15	37.6	68.7±2.1	10	
147	83BT360B	27N,47W	TKm	md	bi	1,C,T	7.86	81.80	20.2	70.9±2.1	10	
155	81BTFLAT	27N,47W	TKm	gab	bi	3,K,M	7.42	68.91	30.0	63.4±3.9	10	Error >3%
164	84AM261A	26N,49W	TKm	gd	am	1,C,T	.695	6.04	62.0	59.4±1.8	1	
164	84AM261A	26N,49W	TKm	gd	bi	1,C,T	5.64	50.31	84.3	60.9±1.8	1	
165	86BT392A	26N,46W	TKgp	grp(a)	wm	1,P	9.91	102.03	85.3	70.1±2.1	1	
166	86AM185A	26N,44W	TKgp	grp(a)	wm	1,C	10.09	104.94	82.7	70.8±2.1	1	
167	84AAi546	26N,43W	TKgp	grp(a)	wm	1,C,T	10.15	104.73	85.2	70.3±2.1	1	
170	84BT43	26N,41W	TKm	qm	bi	1,C,T	8.72	90.99	86.7	(71.1±2.1)	1	
173	84AAi552B	26N,40W	TKm	gd(a)	bi	1,C,T	4.63	42.39	13.0	62.6±1.9	1	K_2O very low
181	85AAi705	25N,50W	TKy	and	wr	1,C,T	2.62	22.73	93.7	59.2±1.8	1	
182	84BT288A	25N,47W	TKgp	grp(a)	bi	1,C	8.48	86.25	86.8	69.3±2.1	10	
182	84BT288A	25N,47W	TKgp	grp(a)	bi	1,C	8.48	85.94	86.7	69.1±2.1	1	Replicate
182	84BT288B	25N,47W	TKgp	grp(a)	wr	1,C,T	5.47	51.52	97.1	64.3±1.9	10	
183	84BT73	25N,44W	TKgp	grp	bi	1,C,T	2.77	28.50	79.2	(70.2±2.1)	1	K_2O very low
185	86BT174	25N,43W	TKgp	grp	bi	1,C	7.00	73.31	77.7	71.3±2.1	1	
187	87BT115	24N,54W	TKg	agr	am	1,C	.695	6.41	70.7	62.9±1.9	1	Holy Cross quad
191	85BT106	24N,50W	TKil	bas	pl	1,C,T	.579	5.32	79.7	62.7±1.9	9	
193	85AM67Z	24N,48W	Kit	vol(a)	wr	1,P	1.60	16.57	86.5	(70.6±2.1)	1	
194	84BT275	24N,47W	TKgp	grp(a)	bi	1,C,T	8.54	89.61	91.1	71.5±2.1	1	
195	85BT285	24N,45W	TKgp	grp	bi	1,P	6.58	67.82	58.4	70.2±2.1	1	
197	85AM125A	23N,53W	Kka	tuf(a)	bi	1,C,T	7.80	88.91	85.1	77.5±2.3	1	
198	85AM46A	23N,50W	TKil	ban(a)	wr	1,C,T	2.14	20.70	67.6	(66.1±2.0)	9	

Table 1. Potassium-argon age determinations from the Iditarod quadrangle, Alaska--Continued

Map No.	Sample No.	Location (T,R)	Map unit	Rock type[1]	Mineral dated[2]	Lab[3]	K_2O (mean wt%)	$^{40}Ar_{rad}$ (10^{-11}mol/g)	$^{40}Ar_{rad}$ (mol%)	K-Ar age (Ma)	Ref.[4]	Comments
199	84BT256	23N,50W	Kit	dk(a)	wr	1,C,T	1.31	14.76	15.3	76.7±2.3	9	
200	84BT260	23N,49W	TKgp	grp	bi	1,C,T	2.29	21.87	69.8	(65.1±2.0)	1	K_2O very low
203	86Mc158A	23N,48W	TKgp	grp	wm	1,P	9.29	96.65	82.6	70.9±2.1	1	
203	86Mc158A	23N,48W	TKgp	grp	bi	1,C	4.49	45.83	79.3	69.5±2.1	1	K_2O very low

[1] Abbreviations: (a), altered; agr, alkali granite; amp, amphibolite; and, andesite; bas, basalt; ban, basaltic andesite; (d), devitrified; dk, dike; gab, gabbro; gr, granite; grp, granite porphyry; gd, granodiorite; hbt, hornblendite; mba, metabasalt; mgr, metagranite; mgd, metagranodiorite; md, monzodiorite; mon, monzonite; qm, quartz monzonite; rhy, rhyolite; sch, schist; tuf, tuff; tufw, welded tuff; vol, volcanic.

[2] Abbreviations: am, amphibole; bi, biotite; hb, hornblende; pl, plagioclase; sa, sanidine; wm, white mica; wr, whole rock.

[3] Laboratory: 1, Alaska Cooperative Geochronology Laboratory (Alaska Division of Geological and Geophysical Surveys/University of Alaska, Fairbanks); 2, Geophysical Institute, University of Alaska, Fairbanks; 3, Department of Geological Sciences, San Diego State University, San Diego, California. Analysts: B, J.D. Blum, C, R.M. Cottrell; K, Daniel Krummenacher; M, Donna Martin; P, Eugene Pavia; S, B.J. Spell; T, D.L. Turner.

[4] References: 1 - this study; 2 - Miller, 1990; 3 - Bundtzen and Laird, 1982; 4 - Bundtzen and Laird, 1983b; 5 - Bundtzen and Laird, 1983a; 6 - Miller and others, 1991; 7 - Bundtzen and others, 1988a; 8 - Miller and Bundtzen, 1985; 9 - Miller and Bundtzen, 1908; 10 - Bundtzen and others, 1988b.

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska

[Major oxides determined by X-ray fluorescence. Most analyses performed by Alaska Division of Geological and Geophysical Surveys except 25 samples (indicated by an asterix after the sample number), which were analyzed by the U.S. Geological Survey. ND, not detected; --, not analyzed. Highest value in SiO_2 calibration curve is 75.70%. All locations are by township and range]

Map Unit	Tb	Tb	Tb	Tb	Tb	Tb	TKy
Map No.	62	92	92	95	122	122	7
Sample No.	85AM292A	85AA1627	85MLO6*	85BT71	85AA1625	85MLO5*	84AM271A
Location (T,R)	30N,50W	29N,51W	29N,51W	29N,50W	28N,51W	28N,51W	33N,46W
Rock Type[a]	ban	ban	ban	ban	ban	ban	rhy
References[b]	1	1	1	1	1	1	1
Major-oxide composition							
SiO_2	52.53	53.73	53.5	54.03	56.38	55.6	77.88
Al_2O_3	15.19	15.27	15.4	14.62	16.31	15.9	11.63
Fe_2O_3[c]	3.85a	3.65a	3.92a	3.1a	3.68a	3.88a	.56r
FeO	5.59a	4.71a	4.83a	5.44a	3.43a	3.41a	.46r
MgO	7.03	6.77	6.29	8.10	5.44	5.22	.06
CaO	8.20	8.20	8.19	7.30	7.80	7.83	.37
Na_2O	3.91	3.80	3.66	3.19	4.03	3.86	3.07
K_2O	.84	.87	.84	1.56	.65	.60	5.14
TiO_2	2.35	2.15	2.42	1.60	2.18	2.38	.16
P_2O_5	.41	.35	.35	.30	.29	.28	.03
MnO	.14	.12	.12	.13	.11	.10	.01
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	0	0	.19	.37	0	.19	0.63
Total	100.04	99.62	99.71	99.74	100.30	99.25	100.00
Fe_2O_3T	10.06	8.88	9.29	9.15	7.49	7.67	1.07
Normative mineral composition							
Quartz	1.69	4.13	5.53	3.24	9.08	9.93	39.74
Corundum	0	0	0	0	0	0	.42
Orthocase	4.96	5.16	4.99	9.28	3.83	3.58	30.57
Albite	33.07	32.28	31.12	27.16	34.00	32.97	26.14
Anorthite	21.41	22.12	23.22	21.10	24.42	24.52	1.65
Nepheline	0	0	0	0	0	0	0
Diopside	13.51	12.96	12.06	10.65	9.55	10.00	0
Hypersthene	14.73	13.13	11.94	20.30	9.08	8.49	.30
Olivine	0	0	0	0	0	0	0
Magnetite	5.58	5.31	5.71	4.52	5.07	4.46	.81
Hematite	0	0	0	0	.17	.84	0
Ilmenite	4.46	4.10	4.62	3.06	4.13	4.56	.31
Rutile	0	0	0	0	0	0	0
Apatite	.95	.81	.81	.70	.67	.66	.07
Total	100.00	100.00	100.00	100.01	100.00	100.01	100.01
Comments[d]							

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKy	TKy	TKy	TKy	TKy	TKy	TKy
Map No.	8	28	40	41	42	42	63
Sample No.	84AA1601	85AM280A	85ML07*	84AM148A	84AM119A	85ML02*	84AM142B
Location (T,R)	33N,45W	32N,52W	31N,53W	31N,48W	31N,48W	31N,48W	30N,49W
Rock Type[a]	and	bas	tuf(d)	rhy(a)	and	and	tufw(d)
References[b]	1	1	1	1	1	1	1
Major-oxide composition							
SiO_2	61.75	46.73	75.4	76.74	58.70	58.2	80.03
Al_2O_3	16.82	16.39	13.2	10.67	13.68	13.6	10.54
Fe_2O_3[c]	2.65a	2.52a	.49r	1.65a	2.53a	2.55a	.23r
FeO	3.32a	5.55a	.42r	1.19a	8.91a	8.86a	.19r
MgO	1.27	6.67	.29	ND	.81	.76	ND
CaO	4.56	16.70	.31	.09	4.30	4.39	.31
Na_2O	3.73	1.71	2.80	3.39	4.14	4.33	2.59
K_2O	2.43	.63	5.09	4.56	2.52	2.46	4.73
TiO_2	1.15	1.02	.17	.15	1.03	1.05	.06
P_2O_5	.40	.14	.04	.02	.42	.41	.02
MnO	.07	.20	.02	.02	.31	.26	.01
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	.90	1.39	1.57	.06	.46	1.75	.80
Total	99.05	99.65	99.80	98.54	97.81	98.62	99.51
Fe_2O_3T	6.34	8.69	.96	2.97	12.43	12.4	.44
Normative mineral composition							
Quartz	19.61	0	39.30	39.77	11.64	10.54	46.85
Corundum	.73	0	2.66	.04	0	0	.65
Orthocase	14.63	3.79	30.62	27.36	15.30	15.01	28.31
Albite	32.16	9.21	24.12	29.13	35.98	37.82	22.20
Anorthite	20.39	35.81	1.30	.32	11.61	10.74	1.43
Nepheline	0	2.99	0	0	0	0	0
Diopside	0	38.31	0	0	6.53	7.84	0
Hypersthene	5.40	0	.85	.62	12.16	11.20	0
Olivine	0	3.88	0	0	0	0	0
Magnetite	3.92	3.72	.74	2.43	3.77	3.82	0
Hematite	0	0	0	0	0	0	.45
Ilmenite	2.23	1.97	.33	.29	2.01	2.06	.02
Rutile	0	0	0	0	0	0	.05
Apatite	.94	.33	.09	.05	1.00	.98	.05
Total	100.01	100.01	100.01	100.01	100.00	100.01	100.01
Comments[d]				(ep,sh, si)			(si)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKy	TKy	TKy	TKy	TKy	TKy	TKy
Map No.	64	65	66	67	67	68	69
Sample No.	85ML01*	84AM105C	84AM108A	84AM111B	85ML04*	84AM115A	85ML03*
Location (T,R)	30N,48W	30N,48W	30N,48W	30N,48W	30N,48W	30N,48W	30N,48W
Rock Type[a]	bas	tuf(d)	rhy	dac	rhy(a)	and	tufl
References[b]	1	1	1	1	1	1	1
Major-oxide composition							
SiO_2	46.9	73.34	75.23	63.92	67.0	58.97	72.9
Al_2O_3[c]	17.4	11.85	12.19	15.84	15.0	13.67	12.2
Fe_2O_3	2.63a	.53r	1.66a	2.36a	1.87a	2.52a	.64r
FeO	6.04a	.44r	.32a	1.73a	1.45a	8.59a	.53r
MgO	8.61	ND	ND	.80	.24	.71	.11
CaO	10.4	1.53	.08	2.72	1.31	4.27	.75
Na_2O	2.44	.69	4.09	3.71	4.22	4.05	2.89
K_2O	.41	5.61	4.72	4.54	5.64	2.52	4.99
TiO_2	1.13	.08	.16	.86	.37	1.02	.10
P_2O_5	.12	.03	.05	.29	.08	.42	.02
MnO	.14	.01	.02	.08	.08	.26	.03
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	3.00	5.28	.57	1.87	2.25	.99	5.13
Total	99.22	99.39	99.09	98.72	99.51	97.99	100.29
Fe_2O_3T	9.34	1.02	2.02	4.28	3.48	12.07	1.23
Normative mineral composition							
Quartz	0	47.33	33.85	19.38	18.28	12.91	36.91
Corundum	0	2.05	.33	.59	0	0	.77
Orthocase	2.52	35.22	28.31	27.70	34.27	15.35	30.99
Albite	21.46	6.20	35.12	32.41	36.71	35.33	25.70
Anorthite	36.70	7.86	.07	11.98	5.48	12.04	3.77
Nepheline	0	0	0	0	0	0	0
Diopside	12.91	0	0	0	.55	6.09	0
Hypersthene	10.31	.28	0	2.06	1.01	11.52	.65
Olivine	9.62	0	0	0	0	0	0
Magnetite	3.96	.82	.66	3.45	2.79	3.77	.97
Hematite	0	0	1.23	.06	0	0	0
Ilmenite	2.23	.16	.31	1.69	.72	2.00	.20
Rutile	0	0	0	0	0	0	0
Apatite	.29	.07	.12	.69	.19	1.00	.05
Total	100.00	99.99	100.00	100.01	100.00	100.01	100.01
Comments[d]	h(LOI)	h(LOI)	(sh)	(hm)			h(LOI)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKy	TKy	TKy	TKy	TKy	TKy	TKy
Map No.	70	96	97	98	99	100	124
Sample No.	84AM123A	85AM281A	84AM173A	84AM175A	84AM122B	84AM180A	85ML08*
Location (T,R)	30N,47W	29N,49W	29N,49W	29N,49W	29N,48W	29N,48W	28N,50W
Rock Type[a]	tuf(a)(d)	dac	and	rhy(a)	and(a)	rhy(a)	dac(a)
References[b]	1	1	1	1	1	1	1
Major-oxide composition							
SiO_2	74.56	63.24	57.20	73.08	65.02	79.07	66.3
Al_2O_3	12.76	15.45	16.80	14.17	16.00	11.36	15.3
Fe_2O_3[c]	1.6a	2.07a	2.51a	1.73a	2.05a	.46r	1.99a
FeO	.36a	2.10a	3.65a	.13a	1.93a	.38r	1.47a
MgO	.40	2.67	2.84	.48	1.78	ND	1.34
CaO	.52	4.30	5.62	1.23	3.44	.06	2.90
Na_2O	2.47	3.47	3.66	4.20	3.63	.16	4.29
K_2O	5.13	2.64	2.14	3.77	2.09	7.00	3.29
TiO_2	.10	.57	1.01	.23	.55	.06	.49
P_2O_5	.02	.19	.43	.09	.16	.01	.26
MnO	.02	.06	.14	.04	.07	ND	.05
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	1.59	2.79	3.27	1.05	2.65	1.24	2.07
Total	99.53	99.55	99.27	100.20	99.37	99.80	99.75
Fe_2O_3T	2.00	4.40	6.57	1.88	4.19	.88	3.62
Normative mineral composition							
Quartz	39.73	20.65	12.10	31.39	26.73	51.90	21.63
Corundum	2.29	0	0	1.17	1.96	3.49	.03
Orthocase	30.95	16.12	13.17	22.47	12.77	41.97	19.90
Albite	21.34	30.34	32.26	35.84	31.76	1.37	37.16
Anorthite	2.50	19.41	24.05	5.56	16.57	.24	12.99
Nepheline	0	0	0	0	0	0	0
Diopside	0	1.07	1.67	0	0	0	0
Hypersthene	1.02	7.72	9.92	1.21	5.68	.23	3.76
Olivine	0	0	0	0	0	0	0
Magnetite	.96	3.10	3.79	0	3.07	.67	2.95
Hematite	.98	0	0	1.75	0	0	0
Ilmenite	.19	1.12	2.00	.37	1.08	.12	.95
Rutile	0	0	0	.04	0	0	0
Apatite	.05	.46	1.04	.21	.38	.02	.62
Total	100.01	99.99	100.00	100.01	100.00	100.01	99.99
Comments[d]		h(LOI) (cl)	h(LOI) (cl)	(cl,hm, wm)	h(LOI) (cc,cl)	(si,wm)	

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKy	TKy	TKy	TKil	TKil	TKil	TKil
Map No.	144	145	181	24	25	34	37
Sample No.	85ML09*	85ML10*	85AA1705	78BT388	78GL346	81BT510	79BT506.2
Location (T,R)	27N,51W	27N,50W	25N,50W	33N,36W	33N,36W	32N,41W	32N,41W
Rock Type[a]	tuf(d)	tuf(a)	and	ban(a)	bta(a)	vol(h)	tan(a)
References[b]	1	1	1	3,1	3,1	2,1	2,1
Major-oxide composition							
SiO_2	73.6	77.0	60.56	51.9	55.4	60.14	55.6
Al_2O_3	14.0	12.2	15.63	14.2	16.7	14.96	16.3
Fe_2O_3[c]	.58r	.31r	2.57a	1.13	1.24	1.15	1.28
FeO	.48r	.26r	3.69a	8.16	5.89	3.68	3.90
MgO	.14	.08	3.07	7.87	5.23	3.17	3.43
CaO	.51	.60	5.17	7.11	7.59	3.37	7.09
Na_2O	3.58	2.81	3.65	2.16	3.38	2.52	2.13
K_2O	5.35	5.07	2.70	2.32	2.98	4.66	7.48
TiO_2	.21	.10	1.07	.74	.93	.72	1.15
P_2O_5	.04	.03	.28	--	--	--	--
MnO	.01	<.01	.10	.24	.13	.12	.14
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	.31	.17	.09	.20
CO_2	--	--	--	--	--	--	--
(LOI)	1.07	1.07	.67	2.21	.37	2.36	1.82
Total	99.57	99.53	99.16	98.35	100.01	96.94	100.52
Fe_2O_3T	1.11	.59	6.67	--	--	--	--
Normative mineral composition							
Quartz	31.56	40.53	14.15	.29	0	14.51	0
Corundum	1.51	1.09	0	0	0	0	0
Orthocase	32.10	30.43	16.20	14.31	17.70	29.14	44.87
Albite	30.75	24.15	31.36	19.07	28.75	22.57	14.39
Anorthite	2.30	2.82	18.57	23.16	21.71	16.66	13.02
Nepheline	0	0	0	0	0	0	2.12
Diopside	0	0	4.52	11.15	13.17	.84	18.39
Hypersthene	.43	.27	8.71	28.86	14.75	13.07	0
Olivine	0	0	0	0	.33	0	3.11
Magnetite	.85	.45	3.78	1.71	1.81	1.77	1.88
Hematite	0	0	0	0	0	0	0
Ilmenite	.41	.19	2.06	1.47	1.78	1.45	2.22
Rutile	0	0	0	0	0	0	0
Apatite	.09	.07	.66	--	--	--	--
Total	100.00	100.00	100.01	100.02	99.99	100.01	100.00
Comments[d]						h(LOI)	h(K_2O)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKil	TKil	TKil	TKil	TKil	TKil	TKil
Map No.	38	44	46	50	52	53	75
Sample No.	79BT486b	82GL105	81BT524	79BT503.1	79BT514	79BT511	82BT396
Location (T,R)	32N,40W	31N,42W	31N,41W	31N,40W	31N,40W	31N,40W	30N,42W
Rock Type[a]	bta(a)	ban	tan(a)	tan(a)	tan(a)	ban	ban
References[b]	1	4,1	2,1	1	2,1	1	4,1
Major-oxide composition							
SiO_2	57.46	54.44	57.96	56.61	55.9	55.59	53.77
Al_2O_3	17.22	10.83	17.67	16.93	17.7	13.76	11.63
Fe_2O_3[c]	.75	2.90	2.27	1.10	.95	2.42	1.09
FeO	4.77	5.68	2.34	4.77	4.35	5.59	7.54
MgO	3.20	11.06	2.39	4.80	3.02	8.82	12.68
CaO	5.03	7.66	4.44	6.33	7.69	7.80	6.66
Na_2O	2.87	1.69	2.77	2.74	3.20	2.17	2.02
K_2O	5.22	3.07	4.39	4.58	3.17	1.69	2.73
TiO_2	1.07	.64	1.17	.99	1.04	.68	.73
P_2O_5	.63	.35	--	.52	--	.23	.28
MnO	.11	.16	.06	.12	.10	.16	.16
H_2O^+	--	--	--	--	--	--	--
H_2O-	.25	.44	.17	.20	.27	.60	.19
CO_2	--	--	--	--	--	--	--
(LOI)	1.63	1.46	2.15	.19	.22	.33	1.54
Total	100.21	100.38	97.78	99.88	97.61	99.84	101.02
Fe_2O_3T	--	9.21	--	--	--	--	9.47
Normative mineral composition							
Quartz	4.57	1.74	12.26	2.63	4.66	6.81	0
Corundum	0	0	.30	0	0	0	0
Orthocase	31.37	18.44	27.18	27.20	19.29	10.10	16.25
Albite	24.70	14.53	24.55	23.30	27.88	18.57	17.21
Anorthite	19.00	13.11	23.07	20.47	25.30	23.07	14.71
Nepheline	0	0	0	0	0	0	0
Diopside	1.80	18.58	0	6.23	11.46	11.68	13.45
Hypersthene	13.91	28.40	6.87	15.46	7.96	24.73	27.74
Olivine	0	0	0	0	0	0	7.01
Magnetite	1.11	3.15	3.45	1.60	1.42	3.20	1.59
Hematite	0	0	0	0	0	0	0
Ilmenite	2.07	1.24	2.33	1.89	2.03	1.31	1.40
Rutile	0	0	0	0	0	0	0
Apatite	1.48	.82	--	1.21	--	.54	.65
Total	100.01	100.01	100.01	99.99	100.00	100.01	100.01
Comments[d]			ma		(sh)		(wm)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKil	TKil	TKil	TKil	TKil	TKil?	TKil?
Map No.	77	78	110	113	114	114	115
Sample No.	82GL107	82BT410	85ML18*	84BT277	83BT89	85ML16*	85ML17*
Location (T,R)	30N,42W	30N,42W	29N,43W	29N,43W	29N,43W	29N,43W	29N,43W
Rock Type[a]	and	and	tan(a)	ban	ban	ban(a)	ban(a)
References[b]	4,1	4,1	1	4,1	4,1	1	1
Major-oxide composition							
SiO_2	59.66	57.07	56.0	54.95	54.12	53.9	52.6
Al_2O_3	14.11	13.59	17.3	11.31	11.78	12.4	10.2
Fe_2O_3[c]	1.47	3.25	2.75a	2.12a	2.2a	2.19a	2.29a
FeO	5.25	3.64	3.81a	5.43a	5.76a	5.71a	5.83a
MgO	6.16	8.17	1.78	11.28	8.98	8.16	14.1
CaO	4.92	6.41	5.00	6.68	8.52	7.65	6.28
Na_2O	2.63	2.25	3.83	1.79	2.04	1.81	1.37
K_2O	3.74	3.28	4.11	2.83	2.75	3.08	2.45
TiO_2	.77	.66	1.25	.62	.70	.69	.79
P_2O_5	.28	.28	.65	.33	.35	.40	.22
MnO	.14	.13	.09	.16	.16	.15	.89
H_2O^+	--	--	--	--	--	--	--
H_2O^-	.44	.53	--	--	.30	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	1.10	2.00	2.88	1.15	1.45	2.38	2.38
Total	100.67	101.26	99.45	98.65	99.11	98.52	99.40
Fe_2O_3T	7.30	7.30	6.98	8.15	8.60	8.54	8.77
Normative mineral composition							
Quartz	9.32	6.47	5.96	3.77	2.99	4.83	.55
Corundum	0	0	0	0	0	0	0
Orthocase	22.29	19.65	25.15	17.15	16.69	18.93	14.92
Albite	22.45	19.30	33.56	15.53	17.73	15.93	11.95
Anorthite	15.74	17.54	18.51	14.84	15.27	17.28	14.89
Nepheline	0	0	0	0	0	0	0
Diopside	5.66	10.27	2.27	13.51	20.70	15.66	12.55
Hypersthene	20.22	21.67	6.40	30.05	21.15	21.74	39.66
Olivine	0	0	0	0	0	0	0
Magnetite	2.15	3.18	4.13	3.15	3.28	3.30	3.42
Hematite	0	0	0	0	0	0	0
Ilmenite	1.48	1.27	2.46	1.21	1.37	1.36	1.55
Rutile	0	0	0	0	0	0	0
Apatite	.65	.66	1.56	.78	.83	.96	.53
Total	100.01	100.01	100.00	99.99	100.01	99.99	100.02
Comments[d]		ma (mi?)	h(LOI)	oa		h(LOI) oa	h(LOI) oa

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKil	TKil	TKil	TKil	TKil?	TKil	TKil
Map No.	116	117	129	131	151	152	153
Sample No.	85BT100	82GL136	84BT301	84BT241B	84BT306A	84BT307	84BT309
Location (T,R)	29N,42W	29N,42W	28N,47W	28N,47W	27N,47W	27N,47W	27N,47W
Rock Type[a]	ban	ban	bas(a)	vol(a)	and(h)	dac	and
References[b]	4,1	4,1	1	5,1	5,1	1	1
Major-oxide composition							
SiO_2	54.37	51.49	47.73	62.80	55.64	62.35	59.78
Al_2O_3	12.04	10.52	13.09	17.47	11.98	15.68	17.59
Fe_2O_3[c]	2.16a	1.80	3.02a	2.11a	2.08a	2.39a	2.9a
FeO	5.97a	7.32	11.51a	1.68a	5.07a	3.82a	2.57a
MgO	9.28	13.10	4.91	1.89	9.56	2.28	2.02
CaO	8.68	8.93	7.95	.87	6.40	3.59	5.06
Na_2O	1.85	1.63	4.42	3.28	2.05	3.01	3.25
K_2O	2.64	2.95	.20	6.49	2.38	3.25	2.95
TiO_2	.66	.69	1.52	.61	.58	.89	1.40
P_2O_5	.40	.34	.24	.33	.30	.31	.38
MnO	.17	.17	.22	.03	.16	.10	.11
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	.23	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	1.62	.60	3.50	1.92	1.44	.89	1.45
Total	99.84	99.77	98.31	99.48	97.64	98.56	99.46
Fe_2O_3T	8.80	9.93	15.81	3.98	7.71	6.64	5.76
Normative mineral composition							
Quartz	3.56	0	0	15.33	7.51	20.96	17.05
Corundum	0	0	0	4.36	0	1.46	.78
Orthocase	15.88	17.62	1.25	39.31	14.62	19.66	17.79
Albite	15.94	13.94	39.25	28.45	18.03	26.07	28.06
Anorthite	17.05	12.81	16.12	2.22	17.11	16.16	23.08
Nepheline	0	0	.11	0	0	0	0
Diopside	19.37	23.83	19.91	0	11.07	0	0
Hypersthene	22.79	12.31	0	5.23	26.66	9.67	5.36
Olivine	0	14.73	15.12	0	0	0	0
Magnetite	3.19	2.64	4.62	3.14	3.14	3.55	4.29
Hematite	0	0	0	0	0	0	0
Ilmenite	1.28	1.33	3.05	1.19	1.15	1.73	2.71
Rutile	0	0	0	0	0	0	0
Apatite	.94	.80	.59	.78	.72	.74	.90
Total	100.00	100.01	100.02	100.01	100.01	100.00	100.02
Comments[d]			h(LOI) h(FeO)	h(K_2O)			

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKil	TKil	TKil	TKil	TKil	Kit	Kit
Map No.	154	178	190	192	198	36	49
Sample No.	84BT311	84BT226	85BT103	85BT107	85ML21*	79BT501	81BT521
Location (T,R)	27N,47W	26N,40W	24N,50W	24N,50W	24N,50W	32N,41W	31N,41W
Rock Type[a]	and	dac	ban(a)	ban	ban(a)	tuf(a)	tan(a)
References[b]	5,1	1	1	1	1	2,1	2,1
Major-oxide composition							
SiO_2	59.07	62.46	48.40	54.77	53.4	47.4	56.97
Al_2O_3	17.88	11.97	10.42	12.15	15.8	11.9	16.74
Fe_2O_3[c]	2.86a	2.23a	2.18a	2.22a	2.43a	1.55	1.28
FeO	2.84a	4.50a	5.70a	4.58a	5.25a	7.78	3.32
MgO	2.23	7.44	13.14	11.30	5.21	12.5	2.48
CaO	5.65	5.39	6.78	5.74	7.63	9.62	5.12
Na_2O	3.28	1.17	1.52	2.01	2.83	1.29	2.67
K_2O	2.86	.76	.66	3.67	2.16	2.93	4.71
TiO_2	1.36	.73	.68	.72	.93	.84	1.07
P_2O_5	.41	.23	.25	.38	.26	--	--
MnO	.10	.16	.13	.12	.13	.20	.09
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	--	--	.45	.13
CO_2	--	--	--	--	--	--	--
(LOI)	1.11	2.53	9.72	1.43	3.25	1.50	2.83
Total	99.65	99.57	99.58	99.09	99.28	97.96	97.41
Fe_2O_3T	6.02	7.23	8.51	7.31	8.27	--	--
Normative mineral composition							
Quartz	14.62	29.13	3.06	1.18	5.23	0	8.89
Corundum	.10	0	0	0	0	0	0
Orthocase	17.15	4.63	4.34	22.21	13.29	18.03	29.47
Albite	28.16	10.20	14.31	17.41	24.93	9.63	23.92
Anorthite	25.73	25.93	21.88	13.61	25.02	18.78	20.94
Nepheline	0	0	0	0	0	.94	0
Diopside	0	.06	10.93	10.32	10.22	24.87	4.83
Hypersthene	6.45	24.75	39.88	29.67	15.18	0	7.83
Olivine	0	0	0	0	0	23.75	0
Magnetite	4.21	3.33	3.52	3.30	3.67	2.34	1.97
Hematite	0	0	0	0	0	0	0
Ilmenite	2.62	1.43	1.44	1.40	1.84	1.66	2.15
Rutile	0	0	0	0	0	0	0
Apatite	.96	.55	.64	.90	.63	--	--
Total	100.00	100.01	100.00	100.00	100.01	100.00	100.00
Comments[d]		h(LOI)	h(LOI) h(MgO)	(cl)	h(LOI) oa(cc)		h(LOI)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	Kit	Kit	Kit	Kit	Kit	Kit	Kit
Map No.	73	79	80	91	112	177	179
Sample No.	Camp 2	82BT415	82BT409	84BT254A	82BT439	84AM157A	84AM154A
Location (T,R)	30N,42W	30N,42W	30N,42W	30N,36W	29N,43W	26N,40W	26N,40W
Rock Type[a]	and	vol(a)	tuf(a)	and	tan	tuf	dac
References[b]	4,1	4,1	4,1	1	4,1	1	1
Major-oxide composition							
SiO_2	56.27	51.07	50.67	58.60	57.01	63.24	64.77
Al_2O_3	14.40	11.28	10.69	15.42	18.03	15.77	12.38
Fe_2O_3[c]	4.38	3.23	2.76	2.2a	3.94	2.22a	2.18a
FeO	2.39	4.16	3.71	4.72a	1.97	2.73a	3.77a
MgO	6.53	6.95	6.49	5.30	.80	3.16	4.88
CaO	6.76	4.21	5.71	4.33	5.02	4.70	2.67
Na_2O	2.50	.34	.23	3.60	3.57	2.48	1.74
K_2O	3.12	3.57	4.67	1.91	3.91	3.06	2.03
TiO_2	.76	.76	.64	.70	1.27	.72	.68
P_2O_5	.27	.27	.28	.16	.54	.25	.22
MnO	.06	.11	.13	.14	.09	.09	.12
H_2O^+	--	--	--	--	--	--	--
H_2O-	.91	.26	.21	--	.37	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	2.18	5.31	14.94	1.64	2.43	1.10	3.29
Total	100.53	101.52	101.13	98.72	98.95	99.52	98.73
Fe_2O_3T	--	7.85	6.88	7.45	6.13	5.25	6.37
Normative mineral composition							
Quartz	7.10	16.33	12.31	11.28	10.68	22.41	34.14
Corundum	0	0	0	0	.09	.44	3.14
Orthocase	18.96	24.57	32.12	11.63	24.06	18.37	12.57
Albite	21.76	3.35	2.27	31.38	31.45	21.32	15.43
Anorthite	19.39	21.79	16.70	20.88	22.26	22.03	12.37
Nepheline	0	0	0	0	0	0	0
Diopside	10.62	.39	11.33	.13	0	0	0
Hypersthene	16.67	27.34	19.50	19.67	3.46	10.18	17.16
Olivine	0	0	0	0	0	0	0
Magnetite	3.37	3.82	3.61	3.29	4.18	3.27	3.31
Hematite	0	0	0	0	0	0	0
Ilmenite	1.49	1.68	1.42	1.37	2.51	1.39	1.35
Rutile	0	0	0	0	0	0	0
Apatite	.64	.73	.76	.38	1.30	.59	.53
Total	100.00	100.00	100.02	100.01	99.99	100.00	100.00
Comments[d]	(cc,mi)	h(LOI) (cc,si)	h(LOI) (cc,si)	(cc,cl)	h(LOI) (cc,hm)	(cl)	h(LOI) (cc,cl, wm,sh)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	Kka	Kka	Kka	TR Mc	TR Mc	Tp	TKgp
Map No.	188	189	197	9	126	134	3
Sample No.	85BT129	85AM128A	85AM125A	84AM273A	84AM172A	86BT19	79BT6b
Location (T,R)	24N,53W	24N,52W	23N,53W	33N,44W	28N,48W	28N,46W	34N,37W
Rock Type[a]	tan	tan	tuf(a)	mba	tuf?	qd	grp
References[b]	1	1	1	1	1	1	3,1
Major-oxide composition							
SiO_2	59.15	60.70	57.37	50.12	51.12	64.83	72.1
Al_2O_3	19.05	17.96	15.56	16.63	16.22	14.72	14.0
Fe_2O_3[c]	2.22a	2.21a	2.06a	2.22a	2.19a	1.16	1.01
FeO	4.06a	2.64a	2.73a	6.75a	5.14a	2.44	.54
MgO	.57	1.61	2.26	4.92	4.26	3.58	.25
CaO	3.62	3.51	5.55	8.06	9.81	2.02	.08
Na_2O	4.94	8.87	4.14	3.19	4.07	4.90	2.65
K_2O	3.18	.28	2.85	3.14	1.61	2.79	2.70
TiO_2	.72	.71	.56	.72	.69	.42	.07
P_2O_5	.51	.43	.34	.42	.43	.17	--
MnO	.02	.09	.12	.16	.15	.06	.01
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	--	--	--	.39
CO_2	--	--	--	--	--	<.20	--
(LOI)	1.30	.95	5.77	2.81	3.90	2.08	1.86
Total	99.34	99.96	99.31	99.14	99.59	99.38	95.66
Fe_2O_3T	6.73	5.14	5.09	9.72	7.90	3.87	--
Normative mineral composition							
Quartz	9.23	0	9.65	0	0	15.59	49.01
Corundum	2.16	0	0	0	0	.39	7.04
Orthocase	19.17	1.67	18.01	19.26	9.94	16.98	17.08
Albite	42.63	75.80	37.45	26.36	34.68	42.70	24.00
Anorthite	14.92	8.45	16.52	22.61	22.19	9.18	.43
Nepheline	0	0	0	.90	.71	0	0
Diopside	0	5.11	8.51	13.17	20.99	0	0
Hypersthene	6.00	2.74	4.69	0	0	12.21	.73
Olivine	0	.63	0	11.92	5.77	0	0
Magnetite	3.28	3.24	3.19	3.34	3.32	1.73	1.57
Hematite	0	0	0	0	0	0	0
Ilmenite	1.40	1.36	1.14	1.42	1.37	.82	.14
Rutile	0	0	0	0	0	0	0
Apatite	1.21	1.01	.84	1.01	1.04	.41	--
Total	100.00	100.01	100.00	99.99	100.01	100.01	100.00
Comments[d]	(cl,ox)	h(Na_2O) (ox,wm)	h(LOI) (cc)	h(LOI) (cl,ep)	h(LOI) (cl)	BaO = .21	

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKgp	TKgp	TKgp	TKgp	TKgp	TKgp	TKgp
Map No.	20	20	55	55	56	81	86
Sample No.	79BT158	79BT159	81BT528	85ML15*	81BT495	82GL121	84AM244A
Location (T,R)	33N,38W	33N,38W	31N,40W	31N,40W	31N,39W	30N,41W	30N,38W
Rock Type[a]	grp	grp	grp	grp(a)	grp	grp	grp(a)
References[b]	1	3,1	2,1	1	2,1	4,1	1
Major-oxide composition							
SiO_2	74.41	70.8	71.21	69.8	72.90	72.14	74.31
Al_2O_3	14.66	14.5	15.17	15.9	14.04	14.71	15.10
Fe_2O_3[c]	1.57a	.50	.47	.59r	.31	.41	.51r
FeO	.04a	.63	.21	.49r	.54	.78	.43r
MgO	.19	.17	.18	.22	.07	.25	.06
CaO	.22	.88	1.89	2.20	.82	.72	.12
Na_2O	3.56	3.60	3.37	3.21	3.97	3.59	1.34
K_2O	3.77	3.98	4.05	4.34	4.58	4.35	5.00
TiO_2	.07	.09	.11	.10	.06	.12	.06
P_2O_5	.04	--	--	.06	--	.04	.04
MnO	ND	.01	.01	.02	.02	.01	.02
H_2O^+	--	--	--	--	--	--	--
H_2O^-	--	.17	.27	--	ND	.10	--
CO_2	--	--	--	--	--	--	--
(LOI)	1.37	1.12	1.91	3.00	.80	1.53	2.64
Total	99.90	96.45	98.85	99.93	98.11	98.75	99.63
Fe_2O_3T	1.62	--	--	1.13	--	1.28	.99
Normative mineral composition							
Quartz	39.21	33.85	32.89	30.46	30.95	33.36	48.47
Corundum	4.48	2.81	1.87	2.13	1.09	2.97	7.59
Orthocase	22.61	24.72	24.76	26.46	27.81	26.47	30.46
Albite	30.57	32.01	29.50	28.02	34.52	31.28	11.69
Anorthite	.84	4.59	9.70	10.86	4.18	3.41	.35
Nepheline	0	0	0	0	0	0	0
Diopside	0	0	0	0	0	0	0
Hypersthene	.48	1.09	.46	.86	.87	1.58	.47
Olivine	0	0	0	0	0	0	0
Magnetite	0	.76	.40	.88	.46	.61	.77
Hematite	1.59	0	.21	0	0	0	0
Ilmenite	.10	.18	.22	.20	.12	.24	.12
Rutile	.02	0	0	0	0	0	0
Apatite	.09	--	--	.14	--	.10	.10
Total	99.99	100.01	100.01	100.01	100.00	100.02	100.02
Comments[d]			(wm)	h(LOI) (wm)	(sh)		h(LOI) (ox)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKgp	TKgp	TKgp	TKgp	TKgp	TKgp	TKgp
Map No.	88	137	143	167	168	169	171
Sample No.	84MSL137	83GL88	84AM263A	84AA1546	84BT49	84BT41	84AM61A
Location (T,R)	30N,38W	28N,44W	28N,41W	26N,43W	26N,42W	26N,41W	26N,41W
Rock Type[a]	grp(a)	grp(a)	grp(a)	grp(a)	grp(a)	grp	grp
References[b]	1	4,1	1	1	1	1	1
Major-oxide composition							
SiO_2	73.95	75.97	74.11	74.87	75.67	76.96	72.16
Al_2O_3	16.75	9.37	15.86	14.89	15.60	14.28	14.84
Fe_2O_3[c]	.85r	2.21a	.33r	.61r	.56r	.64r	1.74a
FeO	.71r	3.23a	.28r	.51r	.47r	.54r	.41a
MgO	.26	2.19	.07	.07	.16	.13	.51
CaO	.10	.85	.05	.11	.11	.06	1.74
Na_2O	.22	1.53	2.06	3.07	1.44	2.66	3.37
K_2O	3.17	1.00	3.82	3.79	3.13	2.70	3.57
TiO_2	.13	.71	.02	.07	.01	.03	.24
P_2O_5	.06	.13	.03	.11	.02	.02	.08
MnO	.01	.07	.01	.04	.02	.01	.03
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	.42	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	3.70	3.25	2.81	1.57	2.40	1.51	1.75
Total	99.91	100.93	99.45	99.71	99.59	99.54	100.44
Fe_2O_3T	1.63	5.80	.64	1.17	1.08	1.24	2.20
Normative mineral composition							
Quartz	62.29	58.74	48.93	43.03	56.29	51.72	35.09
Corundum	13.43	4.66	8.61	5.85	9.97	7.06	2.49
Orthocase	19.47	6.08	23.36	22.82	19.03	16.28	21.38
Albite	1.94	13.31	18.04	26.47	12.54	22.96	28.89
Anorthite	.11	3.46	.05	0	.43	.17	8.22
Nepheline	0	0	0	0	0	0	0
Diopside	0	0	0	0	0	0	0
Hypersthene	1.09	8.76	.41	.57	.84	.76	1.29
Olivine	0	0	0	0	0	0	0
Magnetite	1.28	3.30	.50	.90	.84	.95	.75
Hematite	0	0	0	0	0	0	1.25
Ilmenite	.26	1.39	.04	.14	.02	.06	.46
Rutile	0	0	0	0	0	0	0
Apatite	.14	.31	.07	.66	.05	.05	.19
Total	100.01	100.01	100.01	100.44	100.01	100.01	100.01
Comments[d]	h(LOI) (wm)	h(LOI) (si)	h(LOI) (ox)	l(CaO) (hm)	h(LOI)	(wm)	(hm,wm)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKgp	TKgp	TKgp	TKgp	TKgp	TKgp	TKp
Map No.	182	184	194	196	201	202	87
Sample No.	84BT288	84BT76	84BT275	84BT78	84BT258	84AM240A	84AM243A
Location (T,R)	25N,47W	25N,44W	24N,47W	24N,44W	23N,49W	23N,49W	30N,38W
Rock Type[a]	grp(a)	gd?	grp(a)	grp	grp(a)	grp	dac
References[b]	1,5	1	1	1	1	1	1
Major-oxide composition							
SiO_2	74.93	60.25	71.79	67.13	74.18	74.06	61.52
Al_2O_3	14.35	14.51	14.96	15.53	14.69	14.37	17.61
Fe_2O_3[c]	.74r	2.23a	.55r	2.14a	1.69a	1.61a	2.41a
FeO	.62r	4.00a	.46r	1.88a	.28a	.60a	2.57a
MgO	.04	6.60	.10	1.38	.23	.08	1.82
CaO	.11	4.93	1.79	1.48	.36	.14	4.86
Na_2O	.61	2.14	.82	2.86	.15	2.51	2.96
K_2O	5.39	3.02	4.96	4.06	2.84	4.37	2.40
TiO_2	.06	.73	.06	.64	.19	.11	.91
P_2O_5	.03	.28	.06	.25	.09	.09	.24
MnO	ND	.14	.01	.05	.03	.03	.09
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	2.73	.21	3.93	1.88	3.57	1.84	2.02
Total	99.61	99.04	99.49	98.28	98.30	99.81	99.41
Fe_2O_3T	1.43	6.68	1.05	4.23	2.00	2.28	5.27
Normative mineral composition							
Quartz	51.97	15.07	46.14	30.91	65.01	43.45	22.62
Corundum	7.62	0	5.37	4.45	11.54	5.59	1.93
Orthocase	32.88	18.06	30.67	24.63	17.72	26.36	14.56
Albite	5.33	18.32	7.26	24.85	1.34	21.68	25.72
Anorthite	.36	21.32	8.88	5.86	1.27	.11	23.15
Nepheline	0	0	0	0	0	0	0
Diopside	0	1.26	0	0	0	0	0
Hypersthene	.54	20.65	.58	4.27	.61	.20	6.09
Olivine	0	0	0	0	0	0	0
Magnetite	1.11	3.27	.83	3.19	.47	1.76	3.59
Hematite	0	0	0	0	1.46	.43	0
Ilmenite	.12	1.40	.12	1.25	.38	.21	1.78
Rutile	0	0	0	0	0	0	0
Apatite	.07	.66	.15	.59	.22	.21	.57
Total	100.00	100.01	100.00	100.00	100.02	100.00	100.01
Comments[d]	h(LOI) (hm,wm)		h(LOI) (wm)		h(LOI) l(Na_2O) (wm)	(ox,wm)	(cc,hm)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKp	TKp	TKm	TKm	TKm	TKm	TKm
Map No.	141	141	4	14	15	16	17
Sample No.	83BT72	85ML20*	79BT6a	79BT436	79BT439	85ML13*	79BT457
Location (T,R)	28N,42W	28N,42W	34N,37W	33N,41W	33N,41W	33N,41W	33N,40W
Rock Type[a]	and	and(a)	gd?	mon	qm	qm	qm
References[b]	4,1	1	3,1	2,1	2,1	1	1
Major-oxide composition							
SiO_2	61.64	59.4	60.8	60.7	60.2	61.2	59.38
Al_2O_3	17.76	17.5	16.5	19.3	15.5	15.6	16.18
Fe_2O_3[c]	2.1a	2.15a	.31	.33	.77	2.16a	1.82
FeO	2.78a	3.17a	3.80	2.38	4.41	3.19a	4.23
MgO	1.37	2.11	2.22	1.80	3.37	3.40	3.91
CaO	5.57	5.67	4.90	4.84	3.18	4.11	3.79
Na_2O	4.05	3.29	3.23	3.71	2.75	2.86	2.73
K_2O	2.24	2.20	3.17	4.99	4.70	4.21	4.81
TiO_2	.60	.65	.54	.49	.68	.66	.95
P_2O_5	.30	.16	--	--	--	.37	.40
MnO	.05	.08	.09	.05	.12	.09	.11
H_2O^+	--	--	--	--	--	--	--
H_2O-	.93	--	.21	.17	.24	--	.45
CO_2	--	--	--	--	--	--	--
(LOI)	1.11	3.25	1.96	.09	1.40	1.50	1.59
Total	100.50	99.63	97.73	98.85	97.32	99.35	100.35
Fe_2O_3T	5.19	5.67	--	--	--	5.70	--
Normative mineral composition							
Quartz	15.94	16.31	14.68	6.11	11.91	14.66	10.22
Corundum	0	0	0	0	.11	0	.56
Orthocase	13.44	13.49	19.60	29.91	29.03	25.43	28.91
Albite	34.80	28.88	28.60	31.84	24.32	24.73	23.50
Anorthite	24.04	27.48	22.14	21.58	16.49	17.68	16.47
Nepheline	0	0	0	0	0	0	0
Diopside	1.67	.51	2.73	2.28	0	.56	0
Hypersthene	5.16	8.44	10.70	6.86	15.63	11.60	14.87
Olivine	0	0	0	0	0	0	0
Magnetite	3.09	3.24	.47	.49	1.17	3.20	2.68
Hematite	0	0	0	0	0	0	0
Ilmenite	1.16	1.28	1.07	.94	1.35	1.28	1.84
Rutile	0	0	0	0	0	0	0
Apatite	.71	.38	--	--	--	.88	.94
Total	100.01	100.01	99.99	100.01	100.01	100.02	100.01
Comments[d]		h(LOI) (hm)					

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKm	TKm	TKm	TKm	TKm	TKm	TKm
Map No.	21	22	23	26	35	39	50
Sample No.	78BT473	78BT393	78BT390	78GL343	85ML14*	78BT435	79BT503,2
Location (T,R)	33N,36W	33N,36W	33N,36W	33N,36W	32N,41W	32N,37W	31N,40W
Rock Type[a]	mon	mon	md(a)	mon	qm	mon	qm
References[b]	3,1	3,1	1	1	1	1	2,1
Major-oxide composition							
SiO_2	52.2	60.1	52.31	56.84	61.5	55.79	59.4
Al_2O_3	18.0	16.4	18.45	17.81	15.5	17.44	15.6
Fe_2O_3[c]	1.88	.74	.36	1.53	2.16a	1.47	.96
FeO	5.56	4.05	8.23	4.52	3.19a	6.09	3.60
MgO	3.35	2.12	5.12	3.37	3.42	3.89	3.23
CaO	6.49	3.63	7.83	5.35	3.81	6.36	3.65
Na_2O	4.23	4.19	3.24	3.28	2.85	3.55	3.07
K_2O	3.52	4.60	2.50	3.84	4.73	3.18	5.02
TiO_2	1.05	.69	1.23	.91	.66	1.01	.66
P_2O_5	--	--	.44	.36	.35	.41	--
MnO	.14	.09	.15	.10	.11	.14	.10
H_2O^+	--	--	--	--	--	--	--
H_2O-	.25	.22	.19	.34	--	.16	.35
CO_2	--	--	--	--	--	--	--
(LOI)	-.08	-.06	-.05	1.16	1.13	.27	1.30
Total	96.67	96.83	100.05	99.41	99.41	99.76	96.94
Fe_2O_3T	--	--	--	--	5.70	--	--
Normative mineral composition							
Quartz	0	5.95	0	5.47	13.57	2.25	8.77
Corundum	0	0	0	0	0	0	0
Orthocase	21.57	28.14	14.79	23.18	28.44	18.92	31.13
Albite	31.32	36.70	27.45	28.35	24.54	30.24	27.26
Anorthite	20.46	12.79	28.46	23.01	15.80	22.41	14.65
Nepheline	3.14	0	0	0	0	0	0
Diopside	10.64	4.86	6.27	1.38	.89	5.49	3.54
Hypersthene	0	9.11	9.09	13.74	11.48	15.67	11.87
Olivine	7.97	0	10.06	0	0	0	0
Magnetite	2.83	1.11	.52	2.27	3.19	2.15	1.46
Hematite	0	0	0	0	0	0	0
Ilmenite	2.07	1.36	2.34	1.77	1.28	1.93	1.32
Rutile	0	0	0	0	0	0	0
Apatite	--	--	1.02	.85	.83	.96	--
Total	100.00	100.02	100.00	100.02	100.02	100.02	100.00
Comments[d]							

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKm	TKm	TKm	TKm	TKm	TKm	TKm
Map No.	51	58	59	61	74	89	111
Sample No.	79BT508.2	79GL150	79BT281	79BT264	82BT397	84BT255	82BT437
Location (T,R)	31N,40W	31N,37W	31N,36W	31N,36W	30N,42W	30N,37W	29N,43W
Rock Type[a]	qm	qm	mon(a)	qm(a)	qm	qm	qm(a)
References[b]	2,1	3,1	3,1	1	4,1	1	4,1
Major-oxide composition							
SiO_2	60.8	64.9	55.8	67.94	63.53	67.14	57.13
Al_2O_3	14.8	14.9	15.4	14.61	14.42	15.07	15.16
Fe_2O_3[c]	.64	1.48	1.19	1.79a	1.27	2.15a	1.60
FeO	4.18	2.25	5.45	.77a	3.84	1.76a	3.99
MgO	3.29	1.20	2.72	.68	4.00	1.14	3.37
CaO	4.37	2.54	4.96	3.21	3.61	2.58	5.29
Na_2O	2.94	3.76	4.27	2.60	2.65	3.85	2.39
K_2O	5.03	4.34	2.27	3.59	3.72	4.26	3.64
TiO_2	.77	.51	.85	.29	.70	.65	.71
P_2O_5	--	--	--	.11	.21	.25	.31
MnO	.08	.08	.12	.05	.11	.08	.14
H_2O^+	--	--	--	--	--	--	--
H_2O^-	.25	.31	.32	--	.21	--	.17
CO_2	--	--	--	--	--	--	--
(LOI)	.95	.34	4.53	3.36	.67	.57	5.80
Total	98.10	96.61	97.88	99.00	98.94	99.50	99.70
Fe_2O_3T	--	--	--	2.65	5.54	4.11	6.03
Normative mineral composition							
Quartz	9.76	19.32	6.29	32.93	18.86	21.91	13.27
Corundum	0	0	0	.91	0	.03	0
Orthocase	30.67	26.73	14.42	22.18	22.42	25.44	22.95
Albite	25.67	33.15	38.84	23.00	22.87	32.93	21.58
Anorthite	12.73	11.42	17.36	15.90	16.79	11.29	21.22
Nepheline	0	0	0	0	0	0	0
Diopside	7.90	1.40	7.56	0	.06	0	3.76
Hypersthene	10.80	4.74	11.95	1.77	15.28	3.41	12.55
Olivine	0	0	0	0	0	0	0
Magnetite	.96	2.24	1.86	1.90	1.88	3.15	2.48
Hematite	0	0	0	.56	0	0	0
Ilmenite	1.51	1.01	1.74	.58	1.36	1.25	1.44
Rutile	0	0	0	0	0	0	0
Apatite	--	--	--	.27	.50	.59	.77
Total	100.00	100.01	100.02	100.00	100.02	100.00	100.02
Comments[d]		(hm)	h(LOI)	h(LOI)			h(LOI) (cc,cl, wm)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKm	TKm	TKm	TKm	TKm	TKm	TKm
Map No.	128	130	133	139	140	146	148
Sample No.	84BT304A	84BT242	86BT20	85ML19*	83BT48	84BT101	84BT98
Location (T,R)	28N,47W	28N,47W	28N,47W	28N,44W	28N,44W	27N,47W	27N,47W
Rock Type[a]	mon(a)	mon	mon(a)	mon	ton(a)	qm?	mon
References[b]	1	5,1	1	1	4,1	5,1	5,1
Major-oxide composition							
SiO_2	50.28	54.73	53.09	55.2	54.14	59.94	58.41
Al_2O_3	16.06	17.20	14.02	12.0	11.14	17.34	16.61
Fe_2O_3[c]	2.16a	2.35a	2.02	2.22a	2.18a	2.26a	2.31a
FeO	5.00a	3.09a	4.44	4.77a	7.13a	3.25a	2.89a
MgO	5.22	5.95	6.58	11.2	10.98	3.32	4.27
CaO	6.53	6.19	6.04	5.86	6.25	2.49	3.92
Na_2O	.28	3.46	3.31	1.75	1.19	3.02	3.55
K_2O	2.90	4.09	1.58	3.14	1.13	3.34	5.28
TiO_2	.66	.85	.71	.72	.68	.76	.81
P_2O_5	.12	.59	.42	.40	.29	.54	.52
MnO	.24	.09	.11	.13	.23	.05	.08
H_2O^+	--	--	--	--	--	--	--
H_2O^-	--	--	--	--	.68	--	--
CO_2	--	--	3.27	--	--	--	--
(LOI)	7.27	1.08	6.13	1.13	3.34	1.54	.51
Total	96.72	99.67	95.82	98.52	99.36	97.85	99.16
Fe_2O_3T	7.72	5.78	6.95	7.52	10.10	5.87	5.52
Normative mineral composition							
Quartz	14.58	0	6.01	4.63	11.26	20.24	3.80
Corundum	.98	0	0	0	0	5.73	0
Orthocase	19.16	24.52	10.11	19.05	7.00	20.49	31.63
Albite	2.65	29.70	30.34	15.20	10.56	26.53	30.45
Anorthite	35.34	19.60	20.29	16.03	22.78	9.17	13.98
Nepheline	0	0	0	0	0	0	0
Diopside	0	6.05	7.37	8.85	6.24	0	1.82
Hypersthene	22.09	11.12	20.19	30.58	36.79	11.63	12.16
Olivine	0	2.55	0	0	0	0	0
Magnetite	3.50	3.46	3.17	3.31	3.32	3.40	3.40
Hematite	0	0	0	0	0	0	0
Ilmenite	1.40	1.64	1.46	1.40	1.36	1.50	1.56
Rutile	0	0	0	0	0	0	0
Apatite	.31	1.39	1.05	.95	.70	1.30	1.22
Total	100.01	100.03	99.99	100.00	100.01	99.99	100.02
Comments[d]	h(LOI) TKm in TKil	(ep,mi, sh)	BaO = .23 h(LOI)	oa	h(LOI)		

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKm	TKm	TKm	TKm	TKm	TKm	TKm
Map No.	149	150	163	163	164	172	173
Sample No.	85BT117	84BT306	85ML11*	85AAi630A	84AM261A	84AM222A	84AAi552B
Location (T,R)	27N,47W	27N,47W	26N,50W	26N,50W	26N,49W	26N,40W	26N,40W
Rock Type[a]	gr	mon?(a)	gd?(a)	gd	gd	gd	gd(a)
References[b]	5,1	1	1	1	1	1	1
Major-oxide composition							
SiO_2	69.64	39.22	63.7	64.76	68.67	62.59	60.77
Al_2O_3	17.17	13.25	15.0	15.69	15.25	14.14	15.09
Fe_2O_3[c]	1.73a	2.51a	2.41a	2.31a	2.04a	2.34a	2.25a
FeO	.52a	10.30a	2.68a	2.24a	1.33a	3.90a	3.49a
MgO	.42	5.89	2.23	2.00	1.43	5.14	4.63
CaO	.62	11.41	2.78	2.68	3.11	4.67	3.45
Na_2O	3.81	.02	4.34	4.91	4.06	1.90	2.40
K_2O	4.17	1.49	2.69	2.70	2.94	3.22	2.81
TiO_2	.23	1.01	.91	.81	.54	.84	.75
P_2O_5	.17	.23	.49	.42	.16	.25	.23
MnO	.01	.21	.12	.11	.07	.12	.11
H_2O^+	--	--	--	--	--	--	--
H_2O^-	--	--	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	1.82	12.77	2.37	1.45	.32	.33	2.88
Total	100.31	98.31	99.72	100.08	99.92	99.44	98.86
Fe_2O_3T	2.31	13.96	5.39	4.80	3.52	6.67	6.13
Normative mineral composition							
Quartz	30.51	0	20.04	18.09	25.56	20.81	21.68
Corundum	5.76	0	1.10	.83	.12	0	2.48
Orthocase	25.02	10.29	16.33	16.18	17.44	19.20	17.30
Albite	32.73	.20	37.72	42.12	34.49	16.22	21.16
Anorthite	2.00	37.01	10.88	10.70	14.44	20.73	16.27
Nepheline	0	0	0	0	0	0	0
Diopside	0	22.72	0	0	0	.80	0
Hypersthene	1.06	18.71	7.40	6.14	3.58	16.63	15.68
Olivine	0	3.96	0	0	0	0	0
Magnetite	1.06	4.25	3.59	3.40	2.97	3.42	3.40
Hematite	1.02	0	0	0	0	0	0
Ilmenite	.44	2.24	1.78	1.56	1.03	1.61	1.48
Rutile	0	0	0	0	0	0	0
Apatite	.40	.62	1.17	.99	.37	.58	.56
Total	100.00	100.00	100.01	100.01	100.00	100.00	100.01
Comments[d]		h(LOI)	h(LOI) (cc,cl)	(cc,cl)		(cl)	h(LOI) (cl,sh)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKm	TKm	TKm	TKm	TKm	Tkd	TKd
Map No.	174	175	176	177	186	2	5
Sample No.	84AA1548A	84AA1511C	84AM161C	84BT227	84AM224B	79BT14	79BT36
Location (T,R)	26N,40W	26N,40W	26N,40W	26N,40W	25N,40W	34N,37W	34N,36W
Rock Type[a]	qd	qm	qm(a)	dac	qm	dk(a)	dk(a)
References[b]	1	1	1	1	1	3,1	3,1
Major-oxide composition							
SiO_2	60.99	72.63	65.02	63.29	72.67	49.1	48.4
Al_2O_3	14.08	15.13	15.57	15.77	14.91	11.0	11.0
Fe_2O_3[c]	2.33a	1.63a	2.14a	2.21a	1.68a	1.38	.82
FeO	3.97a	.03a	2.27a	2.49a	.04a	5.65	5.78
MgO	5.70	.32	2.61	2.99	.29	8.60	9.10
CaO	5.20	1.83	3.15	4.60	1.65	7.38	8.89
Na_2O	2.39	2.95	2.44	2.84	2.98	1.36	1.27
K_2O	2.97	4.43	3.46	3.07	3.95	1.67	.25
TiO_2	.83	.13	.64	.71	.18	.71	.62
P_2O_5	.25	.07	.20	.25	.07	--	--
MnO	.12	.02	.08	.08	.02	.16	.22
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	--	--	.35	.42
CO_2	--	--	--	--	--	--	--
(LOI)	.47	.45	2.22	1.01	1.02	10.6	10.7
Total	99.30	99.62	99.80	99.31	99.46	97.96	97.47
Fe_2O_3T	6.74	1.66	4.66	4.98	1.73	--	--
Normative mineral composition							
Quartz	16.20	34.61	27.50	20.99	37.03	7.09	8.84
Corundum	0	2.34	2.63	.01	2.95	0	0
Orthocase	17.76	26.40	20.95	18.45	23.71	11.34	1.71
Albite	20.46	25.17	21.16	24.45	25.61	13.23	12.44
Anorthite	19.14	8.69	14.68	21.55	7.85	21.81	27.30
Nepheline	0	0	0	0	0	0	0
Diopside	4.24	0	0	0	0	16.30	19.15
Hypersthene	16.60	.80	8.19	9.33	.73	26.38	27.82
Olivine	0	0	0	0	0	0	0
Magnetite	3.24	0	3.18	3.26	0	2.30	1.38
Hematite	0	1.64	0	0	1.71	0	0
Ilmenite	1.60	.10	1.25	1.37	.14	1.55	1.36
Rutile	0	.08	0	0	.11	0	0
Apatite	.59	.16	.48	.59	.17	--	--
Total	100.01	99.99	100.02	100.00	100.01	100.01	100.00
Comments[d]	(wm)	(sh,wm)	(cc,cl, wm)	(cl)	(cl,wm)	h(LOI)	h(LOI)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKd	Tkd	TKd	TKd	TKd	Tkd	TKd?
Map No.	6	19	127	135	136	138	156
Sample No.	79BT53	79BT117	84MSL155	84AM290A	84AM292A	83MSL45	84GL003
Location (T,R)	34N,36W	33N,38W	28N,47W	28N,46W	28N,46W	28N,44W	27N,46W
Rock Type[a]	dk(a)	dk(a)	dk	dk(a)	dk(a)	dk(a)	dk?(a)
References[b]	3,1	3,1	5,1	1	1	4,1	5,1
Major-oxide composition							
SiO_2	50.1	50.0	65.29	52.04	49.80	49.32	60.68
Al_2O_3	12.5	11.5	15.45	11.27	10.60	12.00	15.02
Fe_2O_3[c]	1.03	.41	1.9a	2.2a	2.14a	2.23a	2.21a
FeO	5.72	6.28	2.03a	4.74a	5.60a	5.42a	2.55a
MgO	6.89	7.96	2.75	7.12	12.74	7.86	2.61
CaO	8.05	5.93	3.14	7.27	5.46	6.58	4.41
Na_2O	1.66	1.40	3.72	ND	.84	2.18	4.41
K_2O	.87	1.11	3.50	1.87	.72	1.66	.98
TiO_2	.68	.61	.40	.70	.64	.73	.71
P_2O_5	--	--	.23	.40	.33	.22	.21
MnO	.16	.21	.07	.19	.13	.12	.08
H_2O^+	--	--	--	--	--	--	--
H_2O-	.55	.30	--	--	--	.47	--
CO_2	--	--	--	--	--	--	--
(LOI)	8.48	11.2	1.28	9.52	9.95	11.06	5.22
Total	96.69	96.91	99.76	97.32	98.45	99.85	99.09
Fe_2O_3T	--	--	4.16	7.47	8.36	8.25	5.04
Normative mineral composition							
Quartz	10.27	11.55	19.64	21.44	10.46	5.31	19.37
Corundum	0	0	.39	0	0	0	0
Orthocase	5.87	7.68	21.00	12.59	4.78	11.11	6.17
Albite	16.02	13.87	31.96	0	7.99	20.89	39.75
Anorthite	27.48	25.54	14.29	28.73	25.87	20.44	19.49
Nepheline	0	0	0	0	0	0	0
Diopside	14.65	7.22	0	7.51	1.71	11.96	1.88
Hypersthene	22.54	32.09	8.61	23.53	43.49	24.49	7.97
Olivine	0	0	0	0	0	0	0
Magnetite	1.70	.70	2.80	3.63	3.49	3.66	3.41
Hematite	0	0	0	0	0	0	0
Ilmenite	1.47	1.36	.77	1.51	1.37	1.57	1.44
Rutile	0	0	0	0	0	0	0
Apatite	--	--	.54	1.06	.86	.58	.52
Total	100.00	100.01	100.00	100.00	100.02	100.01	100.00
Comments[d]	h(LOI)	h(LOI)		h(LOI) (cc,cl, si)	h(LOI) (cc,cl)	h(LOI)	h(LOI)

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	TKd	TKd	TKd	TKd	TKd	TKd	TKg
Map No.	157	158	159	160	161	162	180
Sample No.	84AM125A	84GL004	84AM140A	84AM137A	84AM135A	84BT280	85AM132A
Location (T,R)	27N,46W	27N,46W	27N,46W	27N,46W	27N,46W	27N,45W	25N,52W
Rock Type[a]	dk(a)	dk(a)	dk(a)	dk(a)	dk(a)	dk(a)	agr
References[b]	1	5,1	5,1	5,1	5,1	5,1	1
Major-oxide composition							
SiO_2	45.71	50.35	54.24	50.17	54.01	53.10	69.69
Al_2O_3	16.29	15.73	15.03	14.40	14.87	13.05	14.53
Fe_2O_3[c]	3.2a	2.93a	2.21a	2.2a	2.31a	2.27a	2.01a
FeO	6.18a	4.39a	4.56a	4.73a	4.68a	5.57a	.87a
MgO	7.22	4.19	8.08	8.55	6.40	7.42	.57
CaO	8.90	7.49	5.01	6.17	5.62	8.44	.89
Na_2O	2.59	3.46	2.55	2.30	2.75	1.72	5.10
K_2O	.28	.56	.88	.36	.35	.38	4.75
TiO_2	1.70	1.43	.71	.70	.81	.77	.51
P_2O_5	.32	.28	.14	.13	.19	.26	.10
MnO	.17	.12	.16	.12	.14	.17	.09
H_2O^+	--	--	--	--	--	--	--
H_2O^-	--	--	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	6.29	8.18	5.88	9.40	6.37	6.23	.24
Total	98.85	99.11	99.45	99.23	98.50	99.38	99.35
Fe_2O_3T	10.07	7.81	7.28	7.46	7.51	8.46	2.98
Normative mineral composition							
Quartz	0	7.76	11.84	8.36	14.20	13.70	19.78
Corundum	0	0	1.19	0	.22	0	0
Orthocase	1.79	3.64	5.56	2.37	2.25	2.41	28.32
Albite	23.68	32.20	23.06	21.66	25.26	15.62	43.54
Anorthite	34.57	28.30	25.58	31.06	28.92	28.73	2.75
Nepheline	0	0	0	0	0	0	0
Diopside	8.72	8.46	0	1.65	0	11.59	.81
Hypersthene	21.92	11.28	27.57	29.53	23.39	22.20	1.06
Olivine	.03	0	0	0	0	0	0
Magnetite	5.01	4.67	3.42	3.55	3.64	3.53	1.64
Hematite	0	0	0	0	0	0	.90
Ilmenite	3.49	2.99	1.44	1.48	1.67	1.57	.98
Rutile	0	0	0	0	0	0	0
Apatite	.80	.71	.35	.34	.48	.65	.23
Total	100.01	100.01	100.01	100.00	100.03	100.00	100.01
Comments[d]	h(LOI) (cc,cl, hm)	h(LOI)	h(LOI) (cc,cl)	h(LOI) (cc,cl)	h(LOI) (cc,cl)	h(LOI)	

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	Jdr	Jdr	Jdr	Jdr	Jdr	Jdr	Jdr
Map No.	1	10	11	12	13	33	33
Sample No.	85AM87A	84AM276A	84AM280A	84AM285A	84AM284A	84AA1609B	84AA1609C
Location (T,R)	34N,43W	33N,44W	33N,44W	33N,43W	33N,43W	32N,44W	32N,44W
Rock Type[a]	gab	ser	gbn	har	har	cpx	weh
References[b]	6	1	6	6	6	6	6
Major-oxide composition							
SiO_2	42.10	31.87	49.17	41.48	39.97	52.20	40.24
Al_2O_3	19.34	.43	16.75	.66	.48	2.45	0.34
Fe_2O_3[c]	2.88a	1.52a	1.75a	1.51a	1.51a	1.6a	1.52a
FeO	9.91a	4.70a	6.15a	5.35a	5.64a	2.65a	9.54a
MgO	7.75	33.18	11.63	39.05	39.21	18.37	37.93
CaO	12.69	.18	11.93	.52	.54	20.97	1.79
Na_2O	1.89	ND	.98	ND	.07	.23	.06
K_2O	.18	.04	.03	ND	.01	.01	.01
TiO_2	1.38	.02	.25	.01	.01	.10	.02
P_2O_5	.12	.02	.02	.01	.01	.01	.02
MnO	.22	.10	.17	.13	.13	.13	.16
H_2O^+	--	--	--	--	--	--	--
H_2O-	--	--	--	--	--	--	--
CO_2	--	--	--	--	--	--	--
(LOI)	1.11	27.61	.80	10.92	11.62	1.51	7.55
Total	99.57	99.67	99.63	99.64	99.20	100.23	99.18
Fe_2O_3T	13.89	6.74	8.58	7.46	7.78	4.54	12.12
Normative mineral composition							
Quartz	0	0	0	0	0	0	0
Corundum	0	.15	0	0	0	0	0
Orthocase	1.08	.33	.18	0	.07	.06	.06
Albite	8.72	0	8.39	0	.68	1.97	.55
Anorthite	44.44	1.06	41.71	2.03	1.10	5.70	.69
Nepheline	4.05	0	0	0	0	0	0
Diopside	15.31	0	14.47	.63	1.48	78.18	7.02
Hypersthene	0	23.42	31.99	35.99	28.17	6.99	18.62
Olivine	19.19	71.87	.18	58.84	65.96	4.54	70.57
Magnetite	4.24	3.06	2.57	2.47	2.50	2.35	2.41
Hematite	0	0	0	0	0	0	0
Ilmenite	2.66	.05	.48	.02	.02	.19	.04
Rutile	0	0	0	0	0	0	0
Apatite	.28	.06	.05	.03	.03	.02	.05
Total	100.00	100.00	100.02	100.01	100.01	100.00	100.01
Comments[d]		h(LOI) %ms = 98.0		h(LOI) %ms = 78.2	h(LOI) %ms = 74.0	%ms = 6.2	h(LOI) %ms = 34.9

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	PzEq	Xi	Xi	Xi	Xi	Xi	Xi
Map No.	31	72	72	72	103	105	107
Sample No.	84AM279A	84AM121B	84AM121B*	84AM121F*	84AM206A	84AA1538B*	84AA1596*
Location (T,R)	32N,45W	30N,47W	30N,47W	30N,47W	29N,48W	29N,48W	29N,48W
Rock Type[a]	mgd	mgr	mgr	amp	aug	amp	sch
References[b]	1	1	7	7	1	7	7
Major-oxide composition							
SiO_2	67.95	75.79	74.4	48.6	65.24	51.4	73.1
Al_2O_3	16.59	14.00	14.0	12.5	16.02	10.3	14.3
Fe_2O_3[c]	1.81a	.33r	.16	1.68	2.07a	3.56	1.84
FeO	.68a	.28r	.24	9.56	1.98a	7.86	.46
MgO	1.02	.09	.25	10.70	1.77	10.50	.69
CaO	2.55	1.39	1.38	10.00	2.43	9.25	.65
Na_2O	4.60	3.58	3.63	2.09	4.11	1.78	2.93
K_2O	3.48	3.60	4.23	1.58	4.46	1.42	2.81
TiO_2	.31	.07	.05	.55	.57	1.18	.32
P_2O_5	.16	.03	<.05	.22	.27	.23	.12
MnO	.06	.01	<.02	.23	.05	.18	<.02
H_2O^+	--	--	.36	2.02	--	1.94	1.77
H_2O-	--	--	.09	.11	--	.08	.10
CO_2	--	--	<.01	<.01	--	.18	<.01
(LOI)	1.13	.43	--	--	.65	--	--
Total	100.34	99.60	98.79	99.84	99.62	99.86	99.09
Fe_2O_3T	2.57	.64	--	--	4.27	--	--
Normative mineral composition							
Quartz	21.52	38.42	34.34	0	16.87	1.49	44.45
Corundum	1.01	1.77	1.08	0	.67	0	5.70
Orthocase	20.73	21.45	25.40	9.56	26.63	8.60	17.08
Albite	39.23	30.55	31.21	18.10	35.14	15.44	25.50
Anorthite	11.70	6.76	6.63	20.53	10.40	16.32	2.51
Nepheline	0	0	0	0	0	0	0
Diopside	0	0	0	23.41	0	23.57	0
Hypersthene	2.56	.37	.90	4.06	5.54	27.77	1.77
Olivine	0	0	0	20.27	0	0	0
Magnetite	1.51	.49	.24	2.49	3.03	3.98	.70
Hematite	.78	0	0	0	0	0	1.39
Ilmenite	.59	.13	.10	1.07	1.09	2.30	.63
Rutile	0	0	0	0	0	0	0
Apatite	.37	.07	.12	.52	.63	.55	.29
Total	100.00	100.01	100.02	100.01	100.00	100.02	100.02
Comments[d]							

Table 2. Major-oxide chemical analyses (in weight percent) and CIPW normative minerals for selected samples from the Iditarod quadrangle, Alaska--Continued

Map Unit	Xi	Xi
Map No.	108	108
Sample No.	84AM267A	84AM267A*
Location (T,R)	29N,47W	29N,47W
Rock Type[a]	mto	mto
References[b]	1	7
Major-oxide composition		
SiO_2	70.28	67.4
Al_2O_3	17.23	18.4
Fe_2O_3[c]	.77r	.96
FeO	.65r	.23
MgO	.39	.44
CaO	2.50	3.06
Na_2O	5.67	6.21
K_2O	1.64	1.33
TiO_2	.15	.12
P_2O_5	.06	<.05
MnO	.02	<.02
H_2O^+	--	.77
H_2O-	--	.05
CO_2	--	<.01
(LOI)	1.05	--
Total	100.41	98.97
Fe_2O_3T	1.49	--
Normative mineral composition		
Quartz	25.27	19.47
Corundum	1.74	1.32
Orthocase	9.75	8.00
Albite	48.28	53.50
Anorthite	12.09	15.12
Nepheline	0	0
Diopside	0	0
Hypersthene	1.31	1.12
Olivine	0	0
Magnetite	1.13	.47
Hematite	0	.66
Ilmenite	.29	.23
Rutile	0	0
Apatite	.14	.12
Total	100.00	100.01
Comments[d]		

[a] Volcanic rocks named according to the total alkali-silica diagram (Le Bas and others, 1986). Plutonic rock names (IUGS classification) determined by modal analysis or petrographic examination. All other rock names determined by petrographic examination. Abbrevations: (a), altered; agr, alkali granite; amp, amphibolite; and, andesite; aug, augen gneiss; bas, basalt; ban, basaltic andesite; bta, basaltic trachyandesite; cpx, clinopyroxenite; (d), devitrified; dac, dacite; dk, dike; gab, gabbro; gbn, gabbronorite; gr, granite; grp, granite porphyry; gd, granodiorite; (h), hornfels; har, harzburgite; mba, metabasalt; mgr, metagranite; mgd, metagranodiorite; mto, metatonalite; md, monzodiorite; mon, monzonite; qm, quartz monzonite; rhy, rhyolite; sch, schist; ser, serpentinite; ton, tonalite; tan, trachyandesite; tuf, tuff; tufl, lithic tuff; tufw, welded tuff; vol, volcanic; weh, wehrlite.

[b] 1 - this study; 2 - Bundtzen and Laird (1982); 3 - Bundtzen and Laird (1983a); 4 - Bundtzen and others (1988); 5 - Bundtzen and others (1992); 6 - Miller (1990); 7 - Miller and others (1991).

[c] Where Fe was measured as Fe_2O_3 (Fe_2O_3T), Fe_2O_3 and FeO were calculated. Fe_2O_3 and FeO values followed by suffix "a" were adjusted using the method of Irvine and Barager (1971), wherein any Fe_2O_3 > (TiO_2 + 1.5) is recalculated as additional FeO. Fe_2O_3 and FeO values followed by suffix "r" were adjusted using a fixed ratio of Fe_2O_3/FeO = 1.2, an average value for andesites (Gill, 1981).

[d] Abbreviations: h(LOI)), high loss on ignition; h(FeO), high FeO value (for indicated oxide); l(CaO), low CaO value (for indicated oxide); %ms, percent modal serpentinite; ma, mafics altered; oa, olivine altered. Secondary minerals present are enclosed in parentheses and abbreviated as follows: cl, chlorite; ep, epidote; hm, hematite; mi, mica; ox, oxides; sh, schorl; si, silica; wm, white mica. Two samples (86BT19 and 86BT20) were analyzed for BaO; the value is shown in the comments column and is included in the oxide total.

Table 3. Trace element analyses of selected samples from the Iditarod quadrangle, Alaska

[ND, not detected; --, not analyzed; ppm, parts per million. All locations are by township and range]

Map unit	Tb	Tb	TKy	TKy	TKy	TKy	TKy
Map No.	92	122	40	42	64	67	69
Sample No.	85ML06	85ML05	85ML07	85ML02	85ML01	85ML04	85ML03
Location (T,R)	29N,51W	28N,51W	31N,53W	31N,48W	30N,48W	30N,48W	30N,48W
Rock type[a]	ban	ban	tuf(d)	and	bas	rhy(a)	tufl
Methods[b]	2	2	2	2	2	2	2
Trace elements (ppm)							
Sc	17.1	17.4	1.295	40.9	30.3	6.97	2.41
Cr	262	236	2.6	<7	262	3.4	<2
Co	37.1	24.7	.63	4.23	45.1	1.35	.36
Ni	125	54	<40	<90	<180	<80	<50
Cu	--	--	--	--	--	--	--
Zn	118	118	25.4	184	76.5	63.0	34.5
As	--	--	--	--	--	1.58	3.06
Rb	10	<10	82	54	13	160	210
Sr	670	600	51	380	280	97	20
Y	16	16	<10	80	18	43	40
Zr	130	110	130	920	90	600	150
Nb	23	17	20	26	<10	25	27
Mo	--	--	--	8.1	--	--	--
Sb	<.4	<.4	.85	--	--	.29	.54
Cs	.40	<.7	2.39	1.46	2.10	5.30	6.24
Ba	230	220	550	2400	150	2400	60
Hf	3.02	2.82	2.71	17.2	1.81	13.2	5.43
Ta	1.42	1.09	1.15	2.02	.40	1.94	2.30
Th	1.32	1.01	17.85	6.98	.78	15.5	29.1
U	.43	.39	2.60	2.78	<.5	5.67	9.45
Rare earth elements (REE, ppm)							
La	13.9	10.2	40.45	56.9	4.70	56.9	57.9
Ce	28.7	21.8	67.25	117	11.35	107	107
Pr	--	--	--	--	--	--	--
Nd	19.5	15.0	18.7	59.5	8.5	40.5	38.3
Sm	5.69	5.11	2.77	14.72	2.72	8.55	8.00
Eu	1.81	1.73	.390	5.29	.98	1.94	.113
Gd	5.8	5.4	--	14.5	2.9	7.2	7.5
Tb	.76	.71	.22	2.13	.53	1.05	1.012
Dy	--	--	--	--	--	--	--
Ho	--	--	--	--	--	--	--
Er	--	--	--	--	--	--	--
Tm	--	--	--	--	--	--	--
Yb	1.33	1.37	.73	8.2	2.11	3.98	4.27
Lu	.202	.186	.107	1.23	.31	.69	.603

Table 3. Trace element analyses of selected samples from the Iditarod quadrangle, Alaska--Continued

Map unit	TKy	TKy	TKy	TKil	TKil	TKil?	TKil
Map No.	124	144	145	110	114	115	198
Sample No.	85ML08	85ML09	85ML10	85ML18	85ML16	85ML17	85ML21
Location (T,R)	28N,50W	27N,50W	27N,50W	29N,43W	29N,43W	29N,43W	24N,50W
Rock type[a]	dac(a)	tuf(d)	tuf(a)	tan(a)	ban(a)	ban(a)	ban(a)
Methods[b]	2	2	2	2	2	2	2
Trace elements (ppm)							
Sc	6.7	2.99	1.12	12.12	31.2	24.0	24.2
Cr	21.3	<3	<2	11.4	723	1250	244
Co	7.6	.93	.46	12.2	36.2	53.8	28.80
Ni	<80	<60	<40	<100	<90	400	<140
Cu	--	--	--	--	--	--	--
Zn	43	60	16.9	86	101	92	96
As	--	--	--	13.3	2.9	3.9	7.1
Rb	94	180	180	130	94	84	50
Sr	430	34	64	380	480	370	430
Y	15	28	14	38	18	16	20
Zr	220	260	110	290	110	90	150
Nb	15	24	17	15	12	10	<10
Mo	--	--	--	--	--	--	--
Sb	.33	.77	.86	3.21	.39	.57	1.20
Cs	1.89	3.39	7.38	5.89	2.67	6.05	3.31
Ba	1600	610	630	2500	1650	1400	1550
Hf	4.85	6.99	3.31	7.45	2.50	2.06	3.60
Ta	1.24	2.16	1.80	1.08	.50	.35	.52
Th	15.7	27.8	21.5	14.3	5.23	2.89	5.70
U	4.7	8.0	4.96	6.67	1.91	1.44	2.66
Rare earth elements (REE, ppm)							
La	41.2	50.1	29.8	40.5	24.8	13.2	19.9
Ce	65	90.2	47.9	80	49.4	27.2	40.35
Pr	--	--	--	--	--	--	--
Nd	22.5	31.5	13.9	36.7	23.9	13.3	20.65
Sm	3.88	6.35	2.61	7.86	4.90	3.51	4.93
Eu	.958	.410	.345	1.55	1.18	.84	1.16
Gd	--	4.9	<5	7.5	4.1	3.5	5.0
Tb	.40	.711	.26	.82	.57	.47	.68
Dy	--	--	--	--	--	--	--
Ho	--	--	--	--	--	--	--
Er	--	--	--	--	--	--	--
Tm	--	--	--	--	--	--	--
Yb	1.40	2.57	1.43	2.99	1.80	1.61	2.05
Lu	.234	.353	.232	.495	.303	.270	.37

Table 3. Trace element analyses of selected samples from the Iditarod quadrangle, Alaska--Continued

Map unit	TKgp	TKp	TKm	TKm	TKm	TKm	Jdr
Map No.	55	141	16	35	139	163	11
Sample No.	85ML15	85ML20	85ML13	85ML14	85ML19	85ML11	84AM280A
Location (T,R)	31N,40W	28N,42W	33N,41W	32N,41W	28N,44W	26N,50W	33N,44W
Rock type[a]	grp(a)	and(a)	qm	qm	mon	gd?(a)	gbn
Methods[b]	2	2	2	2	2	2	1
Trace elements (ppm)							
Sc	.662	9.14	12.63	13.19	23.1	9.09	--
Cr	2.5	64.5	158	163	950	3.2	--
Co	.87	12.4	13.4	13.5	43.3	6.62	--
Ni	<40	40	<110	<110	320	<90	88
Cu	--	--	--	--	--	--	49
Zn	90	80	68	122	86	75.9	62
As	--	--	--	12.5	5.4	--	--
Rb	130	67	180	230	120	75	6
Sr	440	510	400	350	350	300	337
Y	<10	12	30	40	20	38	8
Zr	73	130	380	420	150	250	16
Nb	<10	<10	16	20	<10	17	<10
Mo	--	--	--	--	--	--	--
Sb	.28	.73	3.26	2.00	.73	.18	--
Cs	5.48	4.60	14.3	18.1	6.7	2.09	--
Ba	2850	1200	1400	1350	1100	1950	31
Hf	2.26	3.39	5.6	5.43	2.15	5.59	--
Ta	.505	.435	1.08	1.20	.37	1.00	--
Th	1.88	5.7	16.4	16.6	3.79	8.54	--
U	1.74	2.65	5.61	7.47	1.67	3.79	--
Rare earth elements (REE, ppm)							
La	7.08	19.4	32.2	33.9	14.1	33.9	4
Ce	12.7	36.0	59.1	60.65	28.9	68.9	2
Pr	--	--	--	--	--	--	--
Nd	4.9	17.1	22.2	24.55	14.5	32.4	--
Sm	1.35	3.37	4.75	5.31	3.55	6.94	--
Eu	.654	.952	1.02	1.03	.923	1.73	--
Gd	1.1	3.1	4.8	4.9	<6	6.9	--
Tb	.055	.333	--	.61	.43	.98	--
Dy	--	--	--	--	--	--	--
Ho	--	--	--	--	--	--	--
Er	--	--	--	--	--	--	--
Tm	--	--	.52	--	--	--	--
Yb	.19	.91	1.95	2.10	1.78	3.03	--
Lu	.040	.156	.28	.36	.27	.50	--

Table 3. Trace element analyses of selected samples from the Iditarod quadrangle, Alaska--Continued

Map unit	Jdr	Jdr	Jdr	Jdr	Xi	Xi	Xi
Map No.	12	13	33	33	72	72	105
Sample No.	84AM285A	84AM284A	84AAi609B	84AAi609C	84AM121B	84AM121F	84AAi538B
Location (T,R)	33N,43W	33N,43W	32N,44W	32N,44W	30N,47W	30N,47W	29N,48W
Rock type[a]	har	har	cpx	weh	mgr	amp	amp
Methods[b]	1	1	1	1	3	3	3
Trace elements (ppm)							
Sc	--	--	--	--	--	--	--
Cr	--	--	--	--	<20	466	808
Co	--	--	--	--	--	--	--
Ni	1942	2168	250	1377	10	68	198
Cu	4	4	.1	89	<10	<10	77
Zn	40	40	19	55	15	126	152
As	--	--	--	--	--	--	--
Rb	<10	<10	<10	<10	52	46	18
Sr	7	ND	22	8	486	302	189
Y	5	5	6	6	<5	19	17
Zr	11	10	11	12	80	77	76
Nb	<10	<10	<10	<10	<10	<10	10
Mo	--	--	--	--	--	--	--
Sb	--	--	--	--	--	--	--
Cs	--	--	--	--	--	--	--
Ba	ND	ND	24	19	2210	331	279
Hf	--	--	--	--	--	--	--
Ta	--	--	--	--	--	--	--
Th	--	--	--	--	--	--	--
U	--	--	--	--	--	--	--
Rare earth elements (REE, ppm)							
La	2	1	<5	<5	9.40	19.0	20.0
Ce	2	2	6	4	15.0	45.0	45.0
Pr	--	--	--	--	1.30	5.40	5.40
Nd	--	--	--	--	4.90	25.0	24.0
Sm	--	--	--	--	1.20	3.40	3.80
Eu	--	--	--	--	.90	1.30	1.10
Gd	--	--	--	--	.40	4.00	3.80
Tb	--	--	--	--	.02	.65	.58
Dy	--	--	--	--	.16	3.10	3.10
Ho	--	--	--	--	.02	.63	.57
Er	--	--	--	--	.08	1.70	1.50
Tm	--	--	--	--	<.03	.27	.18
Yb	--	--	--	--	.49	1.90	1.20
Lu	--	--	--	--	--	--	--

Table 3. Trace element analyses of selected samples from the Iditarod quadrangle, Alaska--Continued

Map unit	Xi	Xi
Map No.	107	108
Sample No.	84AA1596	84AM267A
Location (T,R)	29N,48W	29N,47W
Rock type[a]	sch	mto
Methods[b]	3	3
Trace elements (ppm)		
Sc	--	--
Cr	<20	<20
Co	--	--
Ni	14	<10
Cu	<10	<10
Zn	45	22
As	--	--
Rb	51	38
Sr	335	1150
Y	8	<5
Zr	126	156
Nb	<10	<10
Mo	--	--
Sb	--	--
Cs	--	--
Ba	1430	740
Hf	--	--
Ta	--	--
Th	--	--
U	--	--
Rare earth elements (REE, ppm)		
La	27.0	3.90
Ce	19.0	5.60
Pr	5.10	.60
Nd	20.0	2.10
Sm	1.40	.42
Eu	.74	.65
Gd	1.50	.30
Tb	.22	.05
Dy	1.10	.30
Ho	.18	.07
Er	.41	.28
Tm	.06	.04
Yb	.67	.52
Lu	--	--

[a] Abbreviations: (a), altered; amp, amphibolite; and, andesite; bas, basalt; ban, basaltic andesite; cpx, clinopyroxenite; (d), devitrified; dac, dacite; gbn, gabbronorite; grp, granite porphyry; gd, granodiorite; har, harzburgite; mgr, metagranite; mto, metatonalite; mon, monzonite; qm, quartz monzonite; rhy, rhyolite; sch, schist; tan, trachyandesite; tuf, tuff; tufl, lithic tuff; weh, wehrlite.

[b] Analytical methods and analysts:
1 - All elements by Kevex (analyst: R.G. McGimsey, U.S. Geological Survey); data previously cited in Miller (1990);
2 - Rb, Sr, Y, Zr, Nb, and Ba by X-ray fluorescence; all other elements by instrumental neutron activation; analyzed by the U.S. Geological Survey;
3 - Trace elements by X-ray fluorescence (analysts: F. Brown and Z. Brown, U.S. Geological Survey); REE by inductively coupled plasma mass spectrometry (analyst: A. Meier, U.S. Geological Survey); data previously cited in Miller and others (1991).

Table 4. Fossil identifications from the Iditarod quadrangle, Alaska

[All locations are by township and range]

Map No.	Field No.	Location (T,R)	Map Unit	Fossil Identification	Fossil Age	Identified By[1]	Reference[2]	Remarks
1	78BT420	34N,37W	Kks	Trace fossils: *Cosmorhapre, Paleodictyon, Helminthoida, Helminthopsis*, and *Dendrothichnium*	Probably Mesozoic	BE	3	Trace fossils occur in deep water distal turbidite facies
2	64-2	34N,36W	Kks	Bivalve: *Inoceramid* fragments	Probably Cretaceous	JM	1	Collected by D.W. Podson, ARCO
2	79BT59	34N,36W	Kks	Bivalve: *Inoceramid dunveganensis?*	If *I. dunveganensis*, then Turonian	TB	3	
	86AM293B	33N,42W	Kks	Bivalve: indeterminate clam	Indeterminate	JM	1	
4	79BT291	33N,39W	Kks	Dicotyledon leaf fragment	No older than Albian	CS	2	
5	83AM120A	33N,39W	Ꞧ Mc	Radiolarians, poorly preserved	Definitely Mesozoic, younger than Middle Triassic, possibly Jurassic	KR	1	
6	79BT238	33N,38W	Kks	Fern fragments: *Asplenium foersteri?* Dicot leaf fragments Conifer: rare needles of *Cephalotaropsis heterophylla?*	Conifer fragments are Cretaceous	CS	2	Abundant leaf and conifer fragments suggest proximity to shoreline
7	79BT118	33N,38W	Ꞧ Mc	Crinoid columnals Brachiopods Radiolarians	Rads are late Paleozoic; Crinoids columnals are pre-Mesozoic	TB,DJ	3	
7	83AM121A	33N,38W	Ꞧ Mc	Conodonts	No older than mid-Mississippian	AH,WT	1	Grainstone: includes late Late Devonian, middle Early Mississippian, and mid-Mississippian forms. Conodont color alteration index (CAI) = 4-1/2 to 5
8	79BT156	33N,37W	Kks	Bivalve: *Inoceramid* fragments	Probably Cretaceous	TB	3	
9	79BT96	33N,37W	Kks	Bivalve: *Inoceramid* fragments	Probably Cretaceous	TB	3	
10	79BT192	33N,36W	Kks	Bivalve: *Inoceramid* fragments	Probably Cretaceous	TB	3	
11	79GF15	33N,36W	Kks	Gastropods	Indeterminate	TB	3	
12	85AAi632	32N,46W	Kkq	Bivalve: *Corbicula* sp.	Indeterminate	JM	1	Probably brackish to fresh water, but could be shallow marine
13	85AM58A	32N,44W	Kkq	Bivalves: *Corbicula* sp. and *Unio* sp.	Indeterminate	JM	1	Presence of both *Unio* and *Corbicula* implies fresh water facies
14	85AM60B	32N,44W	Kkq	Bivalve: *Corbicula* sp.	Indeterminate	JM	1	Probably brackish to fresh water, but could be shallow marine
15	85AM62A	32N,44W	Kkq	Bivalve: *Corbicula* sp.	Indeterminate	JM	1	Probably brackish to fresh water, but could be shallow marine

Table 4. Fossil identifications from the Iditarod quadrangle, Alaska--Continued

Map No.	Field No.	Location (T,R)	Map Unit	Fossil Identification	Fossil Age	Identified By[1]	Reference[2]	Remarks
16	86AM38A	32N,44W	Kkq	Bivalve: *Corbicula* sp. Gastropod: indeterminate snail	Indeterminate	JM	1	Probably brackish to fresh water, but could be shallow marine
16	86AM38B	32N,44W	Kkq	Palynomorphs: indeterminate spores	Indeterminate	MC	1	
17	85GL45	31N,44W	Kkq	Bark impression	Indeterminate	RS	1	
18	86AM132A	31N,44W	Kkq	Palynomorphs: poorly preserved spore fragments	Indeterminate	MC	1	
19	85AM224B	31N,44W	Kkq	Bivalve: indeterminate clam	Indeterminate	JM	1	Coquina
20	83BT16	31N,44W	Kkq	Abundant wood chips, dicotyledon leaf fragments, and conifer needles of *Cephalotaxopsis heterophylla*	Cretaceous conifer needles	CS	4	Alligned wood chips suggest turbidite current modification
21	85AM17B	30N,51W	Ks	Palynomorphs: undifferentiated bisaccates, *Omatia alaskansis*, and rare *Oligosharidium* complex	Early Cretaceous (Hauterivian to Barremian)	MC	1	Marine environment
22	82BT402	30N,42W	Kks	Bivalve: fragment of *Inoceramus hobetsensis* Nagao and Matsumoto?	Late Cretaceous (probably Turonian)	JM	1,4	
23	85AM324A	29N,46W	Kkq	Bivalve: *Corbicula* sp.	Indeterminate	JM	1	Probably brackish to fresh water, but could be shallow marine
24	86AM336B	29N,45W	Kkq	Bivalve: *Corbicula* sp.? Gastropod	Indeterminate	JM	1	Probably brackish to fresh water, but could be shallow marine
25	83GL30A	29N,44W	Kks	Dicotyledon leaves	Early Cretacous (Albian) or younger	CS	4	
26	83BT47	29W,43W	Kks	Dicotyledon leaf debris and small fern similar to *Asplenium foersteri*	Probably Late Cretaceous	CS	4	
27	83BT46	29N,43W	Kks	Bivalve: *Inoceramid* fragments	Probably Cretaceous	JM	4	
28	9367[3]	29N,43W	Kks	Bivalve: *Inoceramus* sp. related to *I. labiatus* Schlothein	Probably Late Cretaceous	TS	5	
29	83BT87	29N,42W	Kks	Nearly complete dicotyledon leaves	Late Cretaceous	CS	4	Well preserved leaves suggest proximity to shoreline
30	84BT239	28N,47W	Kkq	Conifers: *Sequoia obovata* Knowlton? and *Metasequoia* cuneata? Dicotyledon leaf	Dicotyledon leaf probably Turonian to Paleocene	RS	1	Well preserved leaf and conifer fragment suggest proximity to shoreline
30	84BT239	28N,47W	Kkq	Palynomorphs: spore?, pollen?	Indeterminate	MC	1	

Table 4. Fossil identifications from the Iditarod quadrangle, Alaska--Continued

Map No.	Field No.	Location (T,R)	Map Unit	Fossil Identification	Fossil Age	Identified By[1]	Reference[2]	Remarks
31	83MSL51	28N,44W	Kks	Bivalve: *Inoceramid* sp. fragments	Probably Cretaceous	JM	4	
32	83MSL48	28N,44W	Kks	Large leaf fragment assigned to Laura family	Mid-Cretaceous to early Tertiary	CS	4	
33	83BT59	28N,43W	Kks	Bivalve: *Inoceramid* fragment	Jurassic or Cretaceous	JM	4	
34	83GL61	29N,43W	Kks	Bivalve: *Inoceramus hobetsensis* Nagao and Matsumoto	Late Cretaceous (Turonian)	JM	4	
35	83BT71	28N,43W	Kks	Bivalve: *Inoceramid* fragment	Cretaceous	JM	4	
36	85AM171C	27N,49W	Kkq	Bivalves: *Corbicula* sp. and *Unio* sp.	Indeterminate	JM	1	Presence of both *Unio* and *Corbicula* implies freshwater facies
37	84BT17	27N,45W	Kks	Bivalve: *Inoceramid* fragment	Probably Cretaceous	JM, WE	1	
38	84AAi591	27N,45W	Kks	Bivalve: *Inoceramid* fragments	Probably Cretaceous	JM, WE	1	
39	86AM351B	27N,43W	Kks	Palynomorphs: undifferentiated bisaccates, rare peridinoid, and very rare *Oligosphaeridium* complex and *Vitreisporites pallidus*	Cretaceous	MC	1	Marginal marine
40	84BT97	26N,47W	Kks	Bivalve: *Inoceramus hobetsensis*	Probably Turonian	TB	6	
41	86AGe63	26N,45W	Kks	*Inoceramus* sp. (may be *I. hobetsensis* Nagao Matsumoto)	Probably Cretaceous (Turonian)	JM	1	
42	86AM182A	26N,44W	Kks	Palynomorphs: *Sirmiodium Grossi?*	Possibly Late Jurassic to Early Cretaceous	MC	1	Based on a questionable specimen; the age is very tentative
43	86AM16B	26N,40W	Kks	Palynomorphs: *Isabelidinium cooksoniae?*	Possibly Late Cretaceous	MC	1	Poor preservation
44	52-1	26N,37W	Kks	Bivalve: *Inoceramus hobetsensis* Nagao and Matsumoto	Late Cretaceous (Turonian)	JM	1	Collected by D.W. Podson, ARCO
45	51-2	26N,37W	Kks	Bivalve: *Inoceramus hobetsensis* Nagao and Matsumoto	Late Cretaceous (Turonian)	JM	1	Collected by D.W. Podson, ARCO
46	50-3	26N,37W	Kks	Bivalve: *Inoceramid Kuskokwimensis* Elder	Probably Cretaceous	JM	1	Collected by D. W. Podson, ARCO
47	86AMc22A	25N,40W	Kks	Bivalve: *Inoceramus hobetsensis* Nagao and Matsumoto	Late Cretaceous (Turonian)	JM	1	
48	85AM50Y	24N,49W	Kit	Palynomorph: fungal spore fragment?	Indeterminate	MC	1	Probably reworked material
49	85AM259	24N,46W	Kks	Compressed wood impression	Indeterminate	RS	1	

Table 4. Fossil identifications from the Iditarod quadrangle, Alaska--Continued

Map No.	Field No.	Location (T,R)	Map Unit	Fossil Identification	Fossil Age	Identified By[1]	Reference[2]	Remarks
50	85GL58	23N,53W	Kkq	Gastropod: indeterminate snail Bivalve: *Atomodesma*? fragments	Permian if *Atomodesma* present	JM	1	May be reworked material
51	85BT124	23N,53W	Kkq	Palynomorphs: spore?, pollen?	Indeterminate	MC	1	Poorly preserved organics
52	85BT121	23N,53W	Kkq	Bivalves: indeterminate small clams	Indeterminate	JM	1	
53	85AM74B	23N,53W	Kkq	Conifer leafy shoot fragment Piece of rhizome system of *Equisetites* sp.	Cretaceous	RS	1	
54	86AM257A	23N,51W	Kkq	Indeterminate palynomorphs	Indeterminate	MC	1	Poorly preserved
55	45ACa84	23N,50W	Kks	Crustacean? trails	Indeterminate	JR	7	
56	14AS170	23N,47W	Kks	*Bivalves: Ostrea* sp., *Inoceramus* sp.	Cretaceous	TS	7	
57	14AS167	23N,47W	Kks	Dicotyledon leaf fragments	Cretaceous	TS	7	
58	14AS166	23N,47W	Kks	Bivalves: *Ostrea* sp., *Inoceramus reachensis* Etheridge	Cretaceous	TS RI	7	

[1] Abbrevations: RB - Robert Blodgett, USGS; TB - Thomas K. Bundtzen, ADGGS; WE - William Elder, USGS; BE - Bernd-Dietrich Erdtmann, Göttingen, Germany; AH - Anita Harris, USGS; DJ - David L. Jones, USGS; MC - Micropaleo Consultants, Inc.; JM - John W. Miller, USGS; KR - Katherine M. Reed, USGS; JR - J.B. Reedside, Jr., USGS; CS - C.J. Smiley, University of Idaho; RS - Robert A. Spicer, University of London, Goldsmith's College; TS - T.W. Stanton, USGS; WT - William Thompson, USGS.

[2] References: 1 - This study; 2 - Bundtzen and Laird (1980); 3 - Bundtzen and Laird (1983a); 4 - Bundtzen and others (1988); 5 - Mertie and Harrington (1924); 6 - Bundtzen and others (1992); 7 - Cady and others (1955).

[3] Field number not known, USGS fossil collection number given.

Table 5. Paleocurrent data from the Iditarod quadrangle, Alaska

[Actual station location marked by end of arrow tail. All locations by township and range]

Map No.	Station No.	Location (T, R)	Current indicator1	Azimuth (mean)2	Reference3
1	--	33N, 37W	SC,GC,FL, or XB	235°	1
2	--	33N, 36W	SC,GC,FL, or XB	264°	1
3	--	33N, 36W	SC,GC,FL, or XB	283°	1
3	--	33N, 36W	SC,GC,FL, or XB	225°	1
4	--	32N, 37W	SC,GC,FL, or XB	249°	1
5	83BT16	31N, 44W	SC,GC,FL, or XB	19°	2
6	83BT11	30N, 43W	SC,GC,FL, or XB	51°	2
7	83BT18	30N, 44W	SC,GC,FL, or XB	238°	2
8	83BT87	29N, 42W	SC,GC,FL, or XB	241°	2
9	83BT86	29N, 42W	SC,GC,FL, or XB	144°	2
10	86BT87	29N, 40W	FC	147°	3
11	86BT73	29N, 38W	IP	129°	3
12	83BT61	28N, 44W	SC,GC,FL, or XB	201°	2
13	86AMc27	28N, 38W	IP	182°	3
14	84BT17	27N, 45W	XB	24°	3,4
15	84BT18	27N, 45W	FC	182°	3,4
16	84MSL101	27N, 44W	XB,FC	West	3
17	86BT117	27N, 37W	XB	190°	3
18	86BT225	26N, 43W	FC	98°	3
19	84BT69	24N, 44W	IP	196°	3
20	84BT78	24N, 44W	PS	133°	3
20	84BT78	24N, 44W	LC,FC (poor)	166°	3
21	86BT169	24N, 42W	SM	106°/286°	3
22	86BT274	24N, 42W	FC,LC	181°	3
22	86BT274	24N, 42W	FC,LC	192°	3
22	86BT274	24N, 42W	FC,LC	172°	3
23	86AM219	24N, 38W	CR	238°	3
24	86AM201	24N, 38W	FC	324°	3

1 Abbreviations: SC, striation casts; GC, groove casts; FL, flow casts; XB, cross beds; FC, flute casts; IP, imbricate pebbles; PS, plant stem orientation; LC, load casts; SM, sole marks; CR, current ripples.

2 Azimuth corrected for bedding tilt; current measurements on a single bed are averaged; multiple beds at a single locality are listed (and plotted) separately.

3 Abbreviations: 1 - Bundtzen and Laird (1983a); 2 - Bundtzen and others (1988); 3 - this report; 4 - Bundtzen and others (1992).

Table 6. Description of archaeologic artifacts collected in the Iditarod quadrangle, Alaska, during course of this study

Map No.	Description of artifact(s)	Locality description
1	Probable scraping tool - 10 cm x 6 cm in maximum dimensions. Has two bifacially worked edges. Composed of light green chert or cherty argillite similar to lithologies found in the Innoko terrane (but exotic to host rocks of Kuskokwim Group).	Near geology station 86BT349. Artifact found at elevation 790 ft on north side of 833 ft knob in NE1/4 sec. 24, T. 33 N., R. 43 W.
2	Wedge-shaped biface tool and other shaped tools including bifaces, scrapers, burinated flakes, retouched flakes, and utilized flakes. Tools manufactured from sandstone hornfels that outcrops locally. Site interpreted as late Pleistocene or early Holocene kill-butchering site where stone tools were manufactured for immediate use (Betts, 1985).	Miller Ridge site. Just south of peak 2424 in sec. 13, T. 27 N., R. 42 W. Archaeological site (AHRS #) IDT 047. UAF Museum Accession #UA 84-148.