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# ALASKA'S COAL DATA BASE: EXPLAKATION GUIDE TO ACCOMPANY MAP OF ALASKA'S COAL RESOURCES

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Coal-bearing exposure within the Suntrana and Lignite Creek Formations, Mystic Mountain, Wood River Coal Basin, Nenana coal field, Alaska.

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# ALASKA COAL DATA BASE:

# EXPLANATION GUIDE TO ACCOMPANY 'MAP OF ALASKA'S COAL RESOURCES'

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## INTRODUCTION

Coal is found in all physiographic regions of Alaska (fig. 1). Geologic formations containing coal deposits are thought to underlie about 10 percent of Alaska's land area. Alaska's coal resources are estimated to exceed 5.5 trillion short tons and may constitute the most important asset in Alaska's energy future. The total energy (Btu) equivalent of the coal in Alaska surmounts by many magnitudes that present in all the oil that ultimately will flow from the state. Coal is known to occur in over half of the 153 quarter-million scale quadrangles of Alaska (fig. 2). The major Alaskan geosynclines, geanticlines, and post-early Cretaceous faults have greatly influenced and affected the distribution and tectonic setting for Alaska's coal basins (fig. 3).

The accompanying map of Alaska's coal resources presents an overview of the occurrence and characteristics of coal in Alaska. In addition to the distribution of coal-bearing formations, the map shows the location of all active and numerous inactive (abandoned) mine sites and gives the names for the coal basins, fields and occurrences. The former mine sites shown are keyed to a list (table 1) that gives the mine name, location, and geologic

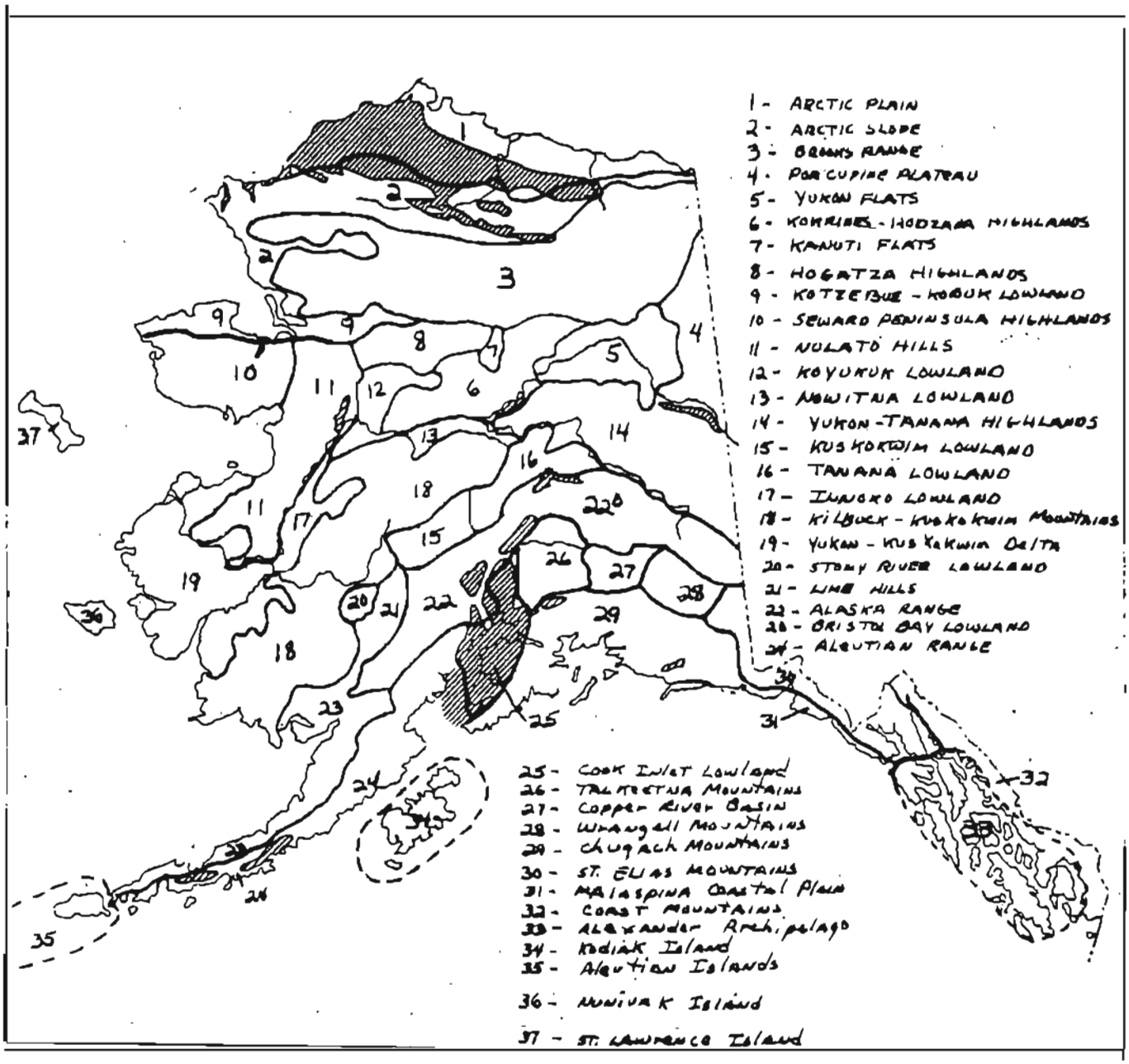



Figure 1. Physiographic regions of Alaska (after Wahrhaftig, 1965) in relation to major coal fields.

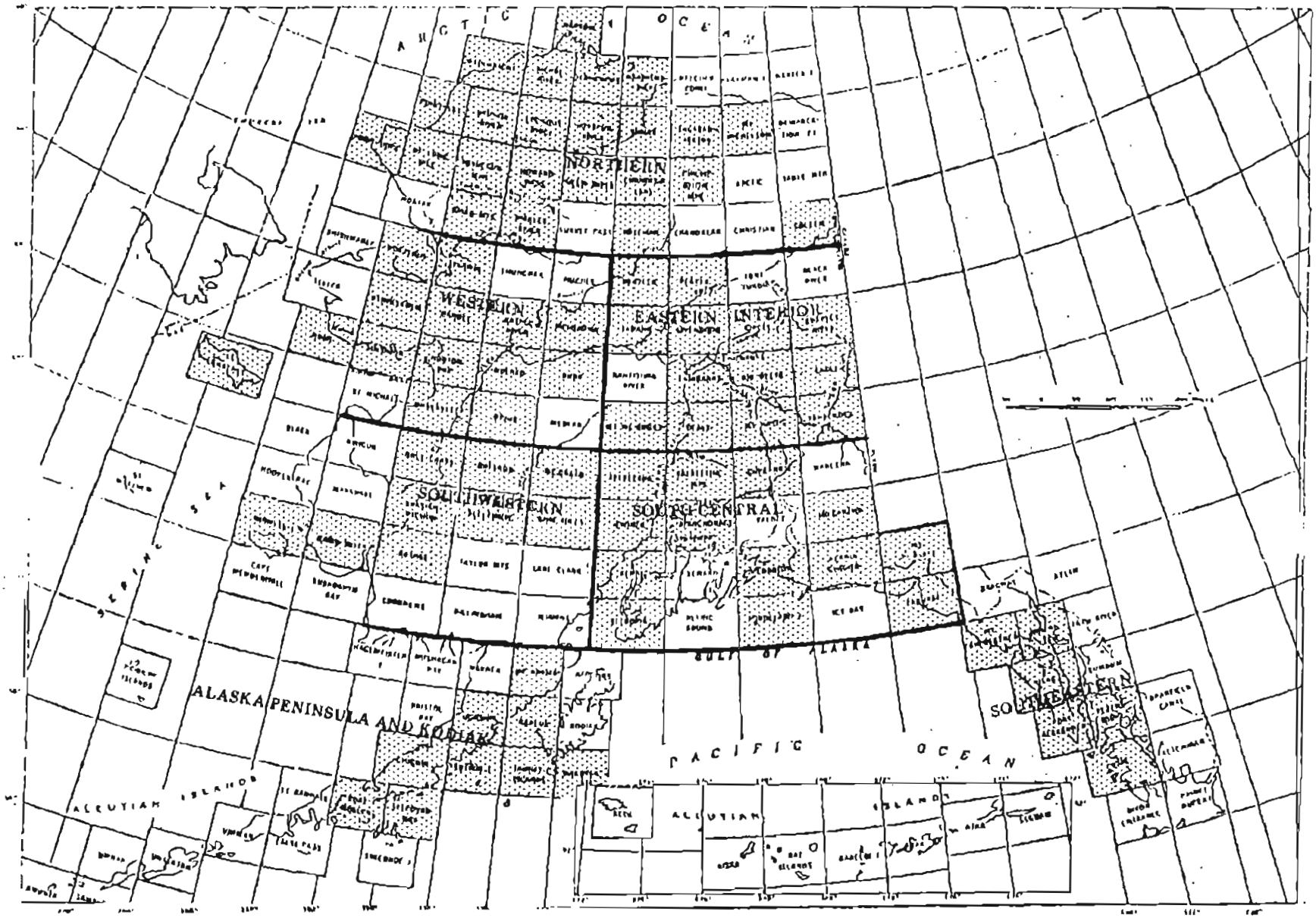



Figure 2. Coal resource regions and 1:250,000 quadrangles in Alaska with known coal occurrences.

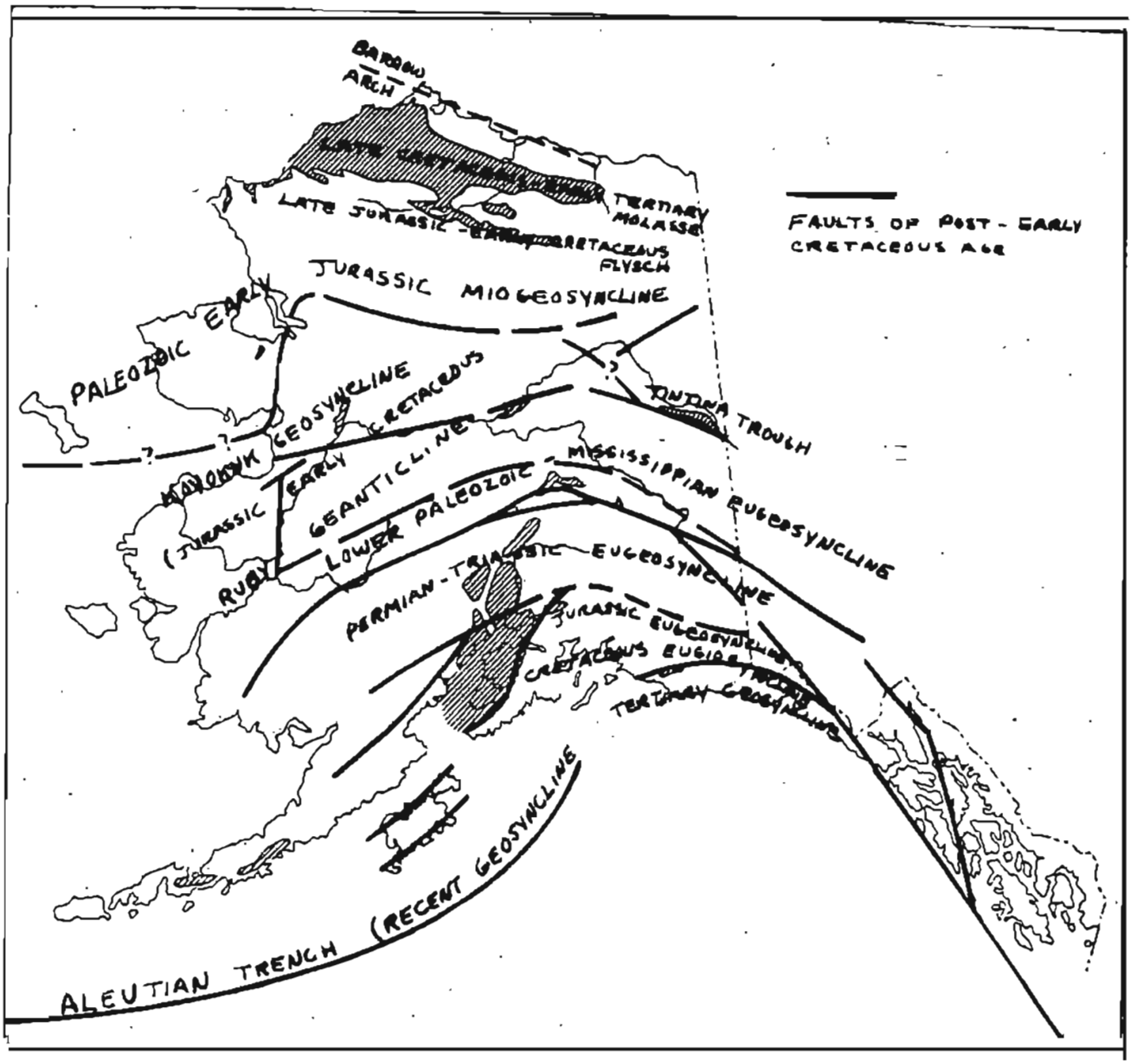



Figure 3. Locations of Alaskan tectonic elements (after Packer, Brogan, and Stone, 1975) in relation to major coal fields.

Table 1. Inactive coal mines end prospects in Alaska.

| Mine Number | Mine name | Type* | Location: Latitude | Location: Longitude | Coal resource region | Quadrangle | Coal field | Coal rank | Geologic unit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Kugrua River 1 | P | N 70°44'19" | W 159°15'52" | Northern | Wainwright | Northern | Subbituminous | Corwin Fm. |
| 2 | Kugrua River 2 | P | N 70°40'37" | W 159°10'12" | Northern | Wainwright | Northern | Subbituminous | Corwin Fm. |
| 3 | Point Collie | P | N 70°36'37" | W 160°06'20" | Northern | Wainwright | Northern | Subbituminous | Corwin Fm. |
| 4 | Kuk River 1 | S/U | N 70°33'07" | W 159°48'58" | Northern | Wainwright | Northern | Subbituminous | Corwin Fm. |
| 5 | Kuk River 2 | S/U | N 70°26'36" | W 159°48'30" | Northern | Wainwright | Northern | Subbituminous | cot-win Fm. |
| 6 | Kuk River 3 | S/U | N 70°25'13" | W 159°51'25" | Northern | Wainwright | Northern | Subbituminous | Corwin Fm. |
| 7 | Peard Bay | P | N 70°47'17" | W 158°58'00" | Northern | Meade River | Northern | Subbituminous | Corwin Fm. |
| 8 | Hesde River Prospect | P | N 70°38'00" | W 157°07'00" | Northern | Meade River | Northern | Subbituminous | Corwin Fm. |
| 9 | Meade River 1 | P | N 70°37'40" | W 157°18'50" | Northern | Meade River | Northern | Subbituminous | Corwin Fm. |
| 10 | Meade River 3 | P | N 70°37'38" | W 157°22'50" | Northern | Meade River | Northern | Subbituminous | Corwin Fm. |
| 11 | Meade River Mine 2 | S | N 70°30'00" | W 157°08'00" | Northern | Meade River | Northern | Subbituminous | Corvin Fm. |
| 12 | Meade River Mine 1 | S/U | N 70°27'47" | W 157°22'55" | Northern | Hesde River | Northern | Subbituminous | Corwin Fm. |
| 13 | Meade River 2 | P | N 70°18'52" | W 157°04'50" | Northern | Meade River | Northern | Subbituminous | Corwin Fm. |
| 14 | Tepsako River | S | N 69°45'10" | W 162°25'46" | Northern | Point Lay | Northern | Bituminous | Corwin Fm. |
| 15 | Epizetka Anticline | S | N 69°36'00" | W 162°56'40" | Northern | Point Lay | Northern | Bituminous | Corwin Fm. |
| 16 | Eskimo Mine | S | N 69°19'28" | W 162°33'33" | Northern | Point Lay | Northern | Bituminous | Corwin Fm. |
| 17 | Kukpowruk River | S | N 69.09'50" | W 162°42'40" | Northern | Point Lay | Northern | Bituminous | Corwin Fm. |
| 18 | Cnpr Beaufort | S | N 69°01' 19" | W 163°50'09" | Northern | Point Lay | Northern | Bituminous | Corwin Fm. |
| 19 | Kigalik River | P | N 69°20'00" | W 156°04'00" | Northern | Lookout Ridge | Northern | Bituminous | Corwin Fm. |
| 20 | Awuna River 1 | P | N 69°05'50" | W 156°33'10" | Northern | Lookout Ridge | Northern | Bituminous | Corwin Fm. |
| 21 | Ikpikpuk River | P | N 69°35'10" | W 154°55'40" | Northern | Ikpikpuk River | Northern | Subbituminous | Corwin Fm. |
| 22 | Colville River | P | N 69°03'50" | W 155°03'00" | Northern | Ikpikpuk River | Northern | Subbituminous | Corvin Fm. |
| 23 | Awuna River 2 | P | N 69-01'40" | W 155°47'00" | Northern | Ikpikpuk River | Northern | Subbituminous | Corwin Fm. |
| 24 | Killik River | S | N 69°00'45" | W 153°52'00" | Northern | Ikpikpuk River | Northern | Subbituminous | Corwin Fm. |
| 25 | Corwin Mine | S/U | N 69°52'13" | W 165°08'20" | Northern | Point Hope | Northern | Bituminous | Corwin Fm. |
| 1b | Niak Creek | P | N 68°49'06" | W 166°11'20" | Northern | Point Hope | Northern | Bituminous | Corwin Fm. |
| 21 | Cape Lewis | P | N 68°42'07" | W 166°11'25" | Norchsrn | Point Hope | Northern | Bituminous | Corwin Fm. |
| 28 | Cape Dyer | P | N 68°39'00" | W 166°13'30" | Northern | Point Hope | Lisburne | Bituminous | Kapaloak Fm. |
| 29 | Kukpuk River | S | N 68°24'30" | W 165°54'26" | Northern | Point Hope | Lisburne | Bituminous | Kapaloak Fm. |
| 10 | Cape Thompson | S | N 68°08'40" | W 165°58'00" | Northern | Point Hope | Lisburne | Bituminous | Kapaloak Fm. |
| 31 | Cape Sabine | S | N 68°54'26" | W 164°36'52" | Northern | De Long Mtns. | Northern | Bituminous | Corvin Fm. |
| 32 | Thetis Mine | S | N 68°53'20" | W 164°50'45" | Northern | De Long Mtns. | Northern | Bituminous | Corwin Fm. |
| 33 | Corvin Bluff | S | N 68°53'00" | W 164°58'35" | Northern | De Long Mtns. | Northern | Bituminous | Corwin Fm. |
| 34 | Tramway Bar | S | N 67°06'45" | U 150°27'39" | Northern | Wiseman | Coal occ. | Bituminous | Bergman Gp. |
| 35 | Hunter Creek | P | N 66°01'55" | W 162°15'60" | Western | Kotzebue | Coal occ. | Lignite | Coal-bearing fm. |
| 36 | Coal Creek | P | N 66°19'25" | W 149°51'15" | Eastern Interior | Beaver | Coal occ. | Lignite | Coal-bearing fm. |
| 37 | Chicago Cr. Coal Mine | S/U | N 65°54'10" | W 162°25'24" | Western | Bendeleben | Chicago Creek | Lignite | Coal-bearing fm. |
| 38 | Wallin Coal Mine | S/U | N 65.50'55" | W 162°25'47" | Western | Bendeleben | Chicago Crest | Lignite | Coal-bearing fm. |
| 39 | superior Coal nine | S/U | N 65°50'18" | W 162.26'04" | Western | Bendeleben | Chicago Creek | Lignite | Coal-bearing fm. |
| 40 | Wilson Creek | P | N 65°21'30" | W 161°23'10" | Western | Candle | Coal occ. | Lignite | Coal-bearing fm. |
| 41 | (The) Palisades | P | N 65°06'40" | W 153°11'58" | Western | Melozitna | Coal ace. | Lignite | Coal-bearing fm. |
| 42 | Rampart | S | N 65°29'34" | W 150.10'58" | Eastern Interior | Tanana | Rampart | Lignite | Coal-bearing fm. |
| 43 | Minook Creek | P | N 65°29'09" | W 150°06'00" | Eastern Interior | Tanana | Rampart | Lignite | Coal-bearing fm. |
| 44 | Drew Mine | U | N 65°40'13" | W 149°49'35" | Eastern Interior | Livengood | Rampart | Lignite | Coal-bearing fm. |
| 45 | Coal Creek | S | N 65°20'18" | W 143°06'02" | Eastern Interior | Charley River | Eagle-Circle | Subbituminous | Coal-bearing fm. |
| 46 | Nation River Mine | S/U | N 65°12'30" | W 141°40'30" | Eastern Interior | Chsrley River | Coal occ. | Bituminous | Nation River Pm. |
| 47 | Washington Creek | S/U | N 65°09'30" | W 142°18'30" | Eastern Interior | Cherley River | Eagle-Circle | Subbituminous | Coal-bearing fm. |
| 48 | Sinuk River | P | N 64.44'00" | W 165.55'20" | western | Nome | Coal occ. | Bituminous | Coal-bearing fm. |
| 49 | Koyuk River | P | N 64°56'65" | W 161°09'55" | Western | Norton Bsy | Coal occ. | Lignite | Kaltag-Nulato Fms. |
| 50 | Koyukuk Island | P | N 64°54'17" | W 157°38'07" | Western | Nuleto | Nulato | Bituminous | Kaltag Fm. |
| 51 | Pickart Mine | S/U | N 64°51'40" | W 157°55'00" | Western | Nulato | Nulato | Bituminous | Kaltag Fm. |
| 52 | Nulato Mine | S | N 64°54'02" | W 158°04'01" | Western | Nulato | Nulato | Bituminous | Kaltag Pm. |
| 53 | Bush Mine | S | N 64°41'10" | W 158°13'00" | Western | Nulato | Nulato | Bituminous | Kaltag Fm. |
| 54 | Nahoclatilten Mine | S | N 66°60'00" | W 156°31'00" | Western | Nulato | Nulato | Bituminous | Kaltag Pm. |
| 55 | Blatchford Mine | S/U | N 64°37'13" | W 158°18'00" | Western | Nulato | Nulato | Bituminous | Kaltag Fm. |
| 56 | Adolph Muller Pros. | P | N 64°12'55" | W 158°40'40" | Western | Nulato | Nulato | Bituminous | Kaltag Fm. |
| 57 | Poorman Creek | U | N 64°01'37" | W 155.45'50" | Western | Ruby | Coal occ. | Subbituminous | Coal-bearing fm. |
| 58 | Lyon Mine | S | N 64°13'56" | W 149°15'55" | Eastern Interior | Fairbanks | Nenana | Subbituminous | Coal-Bearing cp. |
| 59 | California Creek | P | N 64°07'56" | W 148°44'08" | Eastern Interior | Fairbanks | Nenana | Subbituminous | Coal-Bearing cp. |
| 60 | Tatlanika Creek | P | N 64°07'16" | W 148°14'50" | Eastern Interior | Fairbanks | Nenana | Subbituminous | Coal-Bearing Gp. |
| 61 | California Cr. South | P | N 64°01'12" | W 148°41'50" | Eastern Interior | Fairbanks | Nenana | Subbituminous | Coal-Bearing Gp. |
| 62 | Charley R.-Copper Cr. | P | N 64°50'37" | W 143°18'15" | Eastern Interior | Eagle | Eagle-Circle | Subbituminous | Coal-bearing fm. |
| 63 | Mission Creek | P | N 64°48'02" | W 141°12'28" | Eastern Interior | Eagle | Eagle-Circle | Subbituminous | Coal-bearing fm. |
| 64 | American Creek | P | N 64°45'41" | W 141°14'44" | Eastern Interior | Eagle | Eagle-Circle | Subbituminous | Coal-bearing fm. |
| 65 | Wolf Creek | P | N 64°45'13" | W 141°21'02" | Eastern Interior | Eagle | Eagle-Circle | Subbituminous | Coal-bearing fm. |
| 66 | Chicken | U | N 64°04'45" | W 141°56'30" | Eastern Interior | Eagle | Eagle-Circle | Subbituminous | Coal-bearing fm. |
| 67 | Naskak Camp Prospect | P | N 63°39'00" | W 171°29'00" | Western | st .Lawrence Ie. | Coal occ. | Lignite | Coal-bearing fm. |
| 68 | Williams Mine | U | N 63°50'08" | W 159°13'12" | Western | Unalakleet | Nulato | Bituminous | Kaltag Fm. |
| 69 | Unalakleet | S | N 63°45'00" | W 160°45'00" | Western | Unalakleet | Coal occ. | Subbituminous | Coal-bearing fm. |
| 70 | Coal Mine No. 1 | U | N 63°33'45" | W 159°31'00" | Western | Unalakleet | Nulato | Bituminous | Kaltag Fm. |
| 71 | Blackburn | U | N 63°22'42" | U 159°34'06" | Western | Unalakleet | Nulato | Bituminous | Kaltag Fm. |
| 72 | Halls Rapids | S | N 63°04'55" | W 159°47'00" | Western | Unalakleet | Nulato | Bituminous | Kaltag Pm. |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 73 | Mystic Creek | U | N 63°58'05" | W 147°53'13" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 74 | Moose Seam | S | N 63°56'15" | W 148°44'52" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 75 | Caribou Sea. | S | N 63°56'07" | W 148°43'50" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 76 | Arctic Coal co. Mine | S | N 63°55'01" | W 148°51'58" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 77 | Mile 363 Mine | S | N 63°54'32" | W 149°01'18" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 78 | Cold Run Pass No. 2 | S | N 63°54'32" | W 148°42'31" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 79 | Cold Run Pass No. 1 | S | N 63°54'08" | W 148°42'00" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 80 | Burns Mine (Mile 362) | S | N 63°53'32" | W 149°00'24" | eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 81 | Healy Creek Adits | U | N 63°52'59" | W 148°35'44" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 82 | Upper Healy cr. Mine | S | N 63°52'46" | W 148°37'50" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 83 | Roth-Taylor Mine | S | N 63°52'26" | W 148°48'26" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 84 | Cripple Creek Mine | S | N 63°52' 18" | W 148°42'47" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Flearing cp. |
| 85 | Cripple Creek West | S | N 63°51'57" | W 148°43'50" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 86 | French Creek | S | N 63°51'53" | W 148°45'39" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 87 | Healy Creek Tipple | P | N 63°51'37" | W 148°52'10" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 88 | Suntrana | U/S | N 63°51'32" | W 148°52'37" | Eastern Interior | Healy | Nenana | --- | --- |
| 89 | Peterson Mine and New mine | I | N 63°51'00" | W 148°57'55" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 90 | Diamond Coal Mine | S | N 63°49'40" | W 149°03'17" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 91 | Moody Creek | I | N 63°49'06" | W 148°48'13" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 92 | Mile 353 Prospect | I | N 63°48'00" | W 148°57'53" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 93 | Sanctuary River | P | N 63°47'16" | W 149°30'15" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 94 | Savage River | P | N 63°46'07" | W 149°18'58" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 95 | Sushana | I | N 63°45'13" | W 149°33'39" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 96 | Teklanika River | I | N 63°45'49" | W 149°32'35" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 97 | Hines Creek | I | N 63°42'15" | W 149°05'40" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 98 | Yanert Mine | S | N 63°38'43" | W 148°50'24" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing cp. |
| 99 | Sable Mountain | I | N 63°34'00" | W 149°46'05" | Eastern Interior | Healy | Coal occ. | Bituminous | Cantwell pm. |
| 100 | Polychrome Mine | U | N 63°32'19" | W 149°49'35" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 101 | Dunkle Mine | U | N 63°16'13" | W 149°31'40" | Eastern Interior | Healy | Nenana | Subbituminous | Coal-Bearing Gp. |
| 102 | Coal cr. mine Complex | S/U | N 63°15'11" | W 149°12'15" | Eastern Interior | Healy | Broad Pass | Subbituminous | Coal-Bearing Gp. |
| 103 | Broad Pass Mine Com. | S | N 63°14'15" | W 149°15'20" | Eastern Interior | Healy | Broad Pass | Lignite | Coal-bearing fm. |
| 104 | Jarvis Cr. Coal Mine | S | N 63°39'27" | W 145°48'58" | Eastern Interior | Mt. Hayes | Jarvis Creek | Lignite | Coal-bearing fm. |
| 105 | Little Cold Creek | I | N 63°39'46" | W 145°41'51" | Eastern Interior | mt. Hayes | Jarvis Creek | Subbituminous | Coal-Bearing Cp. |
| 106 | Coal Creek | S/U | N 63°11'01" | W 146.56'46" | Eastern Interior | mt. Hayes | Coal occ. | Bituminous | Coal-Bearing Cp. |
| 107 | Slate Creek | I | N 63°10'05" | W 144°50'25" | Eastern Interior | Mt. Hayes | Coal ~Cf. | Lignite | Coal-bearing fm. |
| 108 | Chisna | P | N 63°08'49" | W 144°45'22" | Eastern Interior | mt. Hayes | Coal ~CC. | Lignite | Coal-bearing fm. |
| 109 | Innoko River | I | N 62°49' 10" | W 159°22'44" | Southwestern | Holy Cross | Coal ~CC. | Bituminous | Coal-bearing fm. |
| 110 | Iditarod Mine | S/U | N 62°29'00" | W 158°00'52" | Southwestern | Iditarod | Coal occ. | Anthracite | Coal-bearing fm. |
| 111 | Big River | c | N62°15'00" | W 155.15'00" | Southwestern | McGrath | Coal ~CC. | Subbituminous | Coal-bearing fm. |
| 112 | Bluff Creek | I | N 62°40'40" | W 150°31'55" | South-central | Talkeetna | Yentna | Lignite | Tyonek Fm. |
| 113 | Short Creek Mine | U | N 62°29'47" | W 151°02'29" | South-central | Talkeetna | Yentna | Lignite | Tyonek Fm. |
| 114 | Cache Creek Mine | U | N 62°28'25" | W 151°01'29" | South-central | Talkeetna | Yentna | Lignite | Tyonek Fm. |
| 115 | Beluga River Prospect | P | N 61°14'30" | W 151°14'45" | South-central | Tyonek | Beluga | Subbituminous | Tyonek Fm. |
| 116 | Boulder Creek | I | N 61.56'25" | W 14.3°04'00" | South-central | Anchorage | Matanuska | Semianthracite | Chickaloon Fm. |
| 117 | Anthracite Ridge | I | N 61°50'25" | W 148°06'15" | South-central | Anchorage | Matanuska | Anthracite | Chickaloon Fm. |
| 118 | Castle Mtn. Mine | S | N 61°48'57" | W 148°32'50" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 119 | Young Creek | I | N 61°46'29" | W 148°41'45" | south-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 120 | Kings River | I | N 61°47'15" | W 148°37'40" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 121 | Chickaloon | S/U | N 61°47'50" | W 148°27'45" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 122 | Red Mountain | P | N 61°48'12" | W 148°41'30" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 123 | Hacky Mine | S/U | N 61°46'45" | W 148°25'40" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 124 | Knob Creek Complex | S | N 61°44'30" | W 148°52'48" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 125 | Carpenter Creek | P | N 61°44'30" | W 148°36'35" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 126 | South Even Jones Mine | S/U | N 61°44'27" | W 148°56'10" | south-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 127 | North Even Jones Mine | S/U | N 61°44'23" | W 148°59'46" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 128 | Eska Complex | S/U | N 61°44'15" | W 148°54'40" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 129 | Wishbone Hill | U | N 61°43'20" | W 149°02'25" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| | Rawson | U | N 61°43'52" | W 149°01'50" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| | Matanuska Center | S/U | N 61°43'40" | W 149°22'00" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 130 | Granite Coal mine | U | N 61.44'07" | W 148°47'47" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 131 | Even Jones Mine | S/U | N 61°43'52" | W 148°56'05" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 132 | Buffalo Mine | U | N 61°43'18" | W 149.03'22" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 133 | Baxter mine | U/S | N 61.42'45" | W 149°04'19" | south-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 134 | Sutton Coal Washery | P | N 61°42'48" | W 148°54'00" | South-central | Anchorage | Matanuska | --- | — |
| 135 | Premier Mine | U/S | N 61°42'08" | W 149°05'31" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 136 | Barrett and others | P | N 61°41'15" | W 149°16'20" | South-central | Anchorage | Matanuska | Subbituminous | Coal-bearing fm. |
| 137 | Doherty Mine | U | N 61°40'53" | W 149°01'50" | South-central | Anchorage | Matanuska | Bituminous | Chickaloon Fm. |
| 138 | Bartholf | I | N 61°39'23" | W 149°27'35" | South-central | Anchorage | Matanuska | Subbituminous | Coal-bearing fm. |
| 139 | Houston Tipple and Washery | P | N 61°38'30" | W 149°53'48" | South-central | Anchorage | Little Susitna | ... | --- |
| 140 | Houston East | S | N 61°38'23" | W 149°51'00" | South-central | Anchorage | Little Susitna | Subbituminous | Coal-bearing fm. |
| 141 | Houston West | U | N 61°38'11" | W 149°54'14" | South-central | Anchorage | Little Susitna | Subbituminous | Coal-bearing fm. |
| 142 | Eagle River mine | U | N 61°18'53" | W 149°52'48" | South-central | Anchorage | Coal occ. | Subbituminous | Coal-bearing fm. |
| 143 | Lignite Creek | I | N 61°52'28" | W 141°00'20" | south-central | McCarthy | Coal occ. | Lignite | Frederika fm. |
| 144 | Fourth of July Creek | P | N 61°30'48" | W 143°08'50" | South-central | McCarthy | Coal ~CC. | Lignite | Frederika fm. |
| 145 | Nelson Island | P | N 60°36'03" | W 165°13'39" | Southwestern | Nunivak Island | Coal ~CC. | Bituminous | Coal-bearing fm. |
| 146 | Falls crest | P | N 60°12'03" | W 151°26'00" | south-central | Kenai | Kenai | Subbituminous | Kenai Group |
| 147 | Deep Creek (Ninilchik) | I | N 60°07'15" | W 151°41'32" | South-central | Kenai | Kenai | Subbituminous | Kenai Group |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 148 | Fourth Berg Lake | P | N 60°28'10" | W 143°48'00" | South-central | Bering Glacier | Bering River | Anthracite | Kushtaka Fm. |
| 149 | Hartline Mine | U | N 60°26'42" | W 143°55'23" | South-central | Bering Glacier | Bering River | Anthracite | Kushtaka Fm. |
| 150 | Carbon Mountain | P | N 60°25'40" | W 143°53'50" | South-central | Bering Glacier | Bering River | Anthracite | Kushtaka Fm. |
| 151 | Second Berg Lake | P | N 60°26'50" | W 143°50'00" | South-central | Bering Glacier | Bering River | Anthracite | Kushtaka Fm. |
| 152 | Canyon Creek | U | N 60°25'52" | W 143°55'30" | South-central | Bering Glacier | Bering River | Anthracite | Kushtaka Fm. |
| 153 | Clear Creek 1 | P | N 60°25'25" | W 143°59'00" | South-central | Bering Glacier | Bering River | Bituminous | Kushtaka Fm. |
| 154 | Trout Creek Mine | U | N 60.25' 14" | W 144°08'49" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 155 | Wardall Ridge | P | N 60.25 00" | W 143°58'00" | South-central | Bering Glacier | Bering River | Bituminous | Kushtaka Fm. |
| 156 | Clear Creek 2 | P | N 60°28'00" | W 144°00'00" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 157 | Queen Creek | P | N 60°23'26" | W 144.09' 16" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 158 | Carbon Creek Airstrip | P | N 60°23'20" | W 144°10'23" | South-central | Cordova | Bering River | --- | --- |
| 159 | Leeper Tunnel Site | U | N 60°23'15" | W 144°11'05" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 160 | Kentucky Mine | U | N 60°23'02" | W 144°08'45" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 161 | Tokum Creek | U | N 60°28'00" | W 144°16'51" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 162 | Carbon Creek Complex | U | N 60.22'55" | W 144°12'00" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 163 | Nevada Creek Tunnel | U | N 60°22'50" | W 144°12'41" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 164 | Shepherd Creek | U | N 60°21'49" | W 144°14'19" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 165 | Christopher's Tunnel | U | N 60°19'57" | W 144°16'43" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 166 | McDonald Mine. | U | N 60°19'10" | W 144.16'09" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 167 | Bering Lake Tunnel | U | N 60°19'05" | W 144°17'19" | South-central | Cordova | Bering River | Bituminous | Kushtaka Fm. |
| 168 | Dukkoth River | P | N 60°19'30" | W 142°27'00" | South-central | Bering Glacier | Coal occ. | Bituminous | Kulthieth Fm. |
| 169 | Fall, Creek | P | N 59°16'31" | W 151°06'59" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 170 | Eastland Canyon | U | N 59°45'29" | W 151°09'28" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 171 | Cottonwood Creek | P | N 59°44'25" | W 151°11'30" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 172 | Troublesome Creek | P | N 59°44'40" | W 151°50'45" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 173 | McNeil Canyon | U | N 59°46'45" | W 151°09'45" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 174 | Fritz Creek | S | N 59°43'35" | W 151°21'10" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 175 | Aurora | U | N 59°42'25" | W 151°05'25" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 176 | Diamond Creek | P | N 59 10 40" | W 151°42'11" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 177 | Bradley Seam | U | N 59°43'35" | W 151°15'60" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 178 | Bluff Point | U | N 59°40'01" | W 151°40'09" | South-central | Seldovia | Kenai | Subbituminous | Kenai group |
| 179 | Vent Homer | U | N 59°38'40" | W 151°35'15" | South-central | Seldovia | Kenai | Subbituminous | Kenai Group |
| 180 | Port Graham | U | N 59°23'45" | W 151°53'45" | South-central | Seldovia | Coal occ. | Subbituminous | Kenai Group |
| 181 | Dalton Mine | S/U | N 59°55'40" | W 130 47'30" | South-central | Yakutat | Coal occ. | Lignite | Coal-bearing fm. |
| 182 | Coal Creek | P | N 59°44'57" | W 137°47'50" | Southeastern | Mt. Fairweather | Coal occ. | Subbituminous | Coal-bearing fm. |
| 183 | Tlituya Bay | P | N 58°37'50" | W 137°31'45" | Southeastern | Mt. Fairweather | Coal occ. | Subbituminous | Coal-bearing fm. |
| 184 | Casement Glacier | P | N 58°56'05" | W 135.58'57" | Southeastern | Juneau | Coal occ. | Subbituminous | Coal-bearing fm. |
| 185 | Diamond Island | P | N 57°32'57" | W 134°25'25" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 186 | Unnamed Mine 3 | P | N 57°31'55" | W 134°26'47" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 187 | Lighter Creek | P | N 59°31'22" | W 134°27'00" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 188 | Unnamed Mine 2 | P | N 57°31'01" | W 134°27'18" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 189 | Lighter Creek 2 | U | N 57°31'15" | W 134°28'45" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 190 | Brightman and Degroff | P | N 57°30'50" | W 134°28'40" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 191 | Davis Creek | P | N 57°30'25" | W 134°26'47" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 192 | Sullivan Island | P | N 57.30'05" | W 134°33'25" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 193 | Unnamed Mine 1 | P | N 57°30'04" | W 134°30'18" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 194 | Harkrader Mine | S/U | N 57°29'55" | W 134°26'45" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 195 | Sapphagen Mine | S/U | N 57°28'40" | W 134°30'15" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm |
| 196 | Firestone Mine | S/U | N 57°28'30" | W 134.32'32" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 197 | Datewell Mine | U | N 57°03'45" | W 134°33'40" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 198 | Point Gardiner | U | N 57°01'50" | W 134°36'30" | Southeastern | Sitka | Coal occ. | Bituminous | Coal-bearing fm. |
| 199 | Ayakulik River Pros. | P | N 57°11'50" | W 154°31'30" | AK Penin. and Kodiak | Karluk | Coal occ. | Lignite | Coal-bearing fm. |
| 200 | Hook Bay Mine | U | N 56°33'00" | W 158°15'06" | AK Penin. and Kodiak | Chignik | Chignik | Bituminous | Chignik Fm |
| 201 | Thompson Valley 2 | U | N 56°28'46" | W 158°26'29" | AK Penin. and Kodiak | Chignik | Chignik | Bituminous | Chignik Fm. |
| 202 | Thompson Valley 1 | U | N 56°28'26" | W 158°27'19" | AK Penin. and Kodiak | Chignik | Chignik | Bituminous | Chignik Fm. |
| 203 | Thompson Valley 3 | U | N 56°28'05" | W 158°26'23" | AK Penin. and Kodiak | Chignik | Chignik | Bituminous | Chignik Fm. |
| 204 | Whalers Creek Mine | U | N 56°18'04" | W 158°38'44" | AK Penin. and Kodiak | Chignik | Chignik | Bituminous | Chignik Fm. |
| 205 | Chignik River | S/U | N 56°23'40" | W 158°48'40" | AK Penin. and Kodiak | Chignik | Chignik | Bituminous | Chignik Fm. |
| 206 | Sitkinak Island West | S | N 56°30'00" | W 154°15'00" | AK Penin. and Kodiak | Trinity Islands | Coal occ. | Subbituminous | Coal-bearing fm. |
| 207 | Sitkinak Island East | P | N 56°33 05" | W 153°53'30" | AK Penin. and Kodiak | Kaguyak | Coal occ. | Subbituminous | Coal-bearing fm. |
| 208 | Herendeen Bay | S/U | N 55 46'00" | W 160 40'00" | AK Penin. and Kodiak | Port Moller | Herendeen Bay | Bituminous | Chignik Fm. |
| 209 | Johnson Tunnel | U | N 55°46'22" | W 160°38'04" | AK Penin. and Kodiak | Port Moller | Herendeen Bay | Bituminous | Chignik Fm. |
| 210 | Unga Island | S/U | N 55°20'54" | W 160°40'00" | AK Penin. and Kodiak | Port Moller | Herendeen Bay | Lignite | Coal-bearing fm. |

*P = prospect; S = surface mine activity; U = underground mine activity; S/U and U/S = both surface and underground mine activity; and P = facility.

coal-bearing unit. In addition, a synopsis of each major field or basin provides further information on the geography of the field, its area, general geologic structure, character of coal beds, and probable future mining methods (later section). Resource figures cited include measured, identified, and hypothetical tonnages; these figures neglect the minor tonnages removed by previous mining.

The annual tonnages and the value of coal produced in Alaska over nearly the past century are listed in table 2. Coal is known to have been mined in Alaska by the Russians at Port Graham on the Kenai Peninsula beginning in 1855 (table 3). Small-scale mining has been recorded at many sites throughout the state since then (fig. 4). However, mining did not begin on a significant scale until around 1917 after construction of the Alaska Railroad had begun; for the first time, over a quarter-million tons of coal were produced. Annual coal production in Alaska peaked in 1966 at over 927,000 tons. During the era beginning with World War I and extending up to the present time, coal has been mined mainly in the Nenana and Matanuska coal fields. The discovery of less expensive gas and oil resources in the Swanson River field of Cook Inlet initiated the decline of the coal market in the Anchorage area in 1968. However, an expected increased demand for inexpensive, strippable, low-sulfur coal for mine-mouth power plants across the state and for export to Pacific-rim nations has revitalized interest in Alaska's vast coal resources, and will be the key factor in opening up some of the more remote coal basins for future mining.

Table 2. Alaska's historic coal production and value (modified from Sanders, 1981).

| Year | Production (short tons) | Value (dollars) |
|---|---|---|
| Pre-1891 | 6,076 | 37,205 |
| 1891 | 1,083 | 6,291 |
| 1892 | 871 | 5,093 |
| 1893 | 923 | 5,372 |
| 1894 | 488 | 2,765 |
| 1895 | 1,687 | 9,290 |
| 1896 | 712 | 4,142 |
| 1897 | 2,673 | 31,373 |
| 1898 | 2,652 | 27,201 |
| 1899 | 2,264 | 22,836 |
| 1900 | 2,855 | 35,275 |
| 1901 | 2,740 | 29,843 |
| 1902 | 3,052 | 22,508 |
| 1903 | 2,717 | 21,302 |
| 1904 | 1,824 | 8,195 |
| 1905 | 4,334 | 15,070 |
| 1906 | 6,061 | 19,924 |
| 1907 | 10,689 | 55,770 |
| 1908 | 4,066 | 22,665 |
| 1909 | 3,430 | 16,350 |
| 1910 | 2,250 | 13,200 |
| 1911 | 1,850 | 11,690 |
| 1912 | 1,205 | 7,130 |
| 1913 | 2,312 | 13,290 |
| 1914 | 1,190 | 6,540 |
| 1915 | 1,629 | 6,653 |
| 1916 | 12,676 | 57,412 |
| 1917 | 54,275 | 268,438 |
| 1918 | 75,316 | 413,870 |
| 1919 | 60,894 | 345,617 |
| 1920 | 61,111 | 355,668 |
| 1921 | 76,817 | 496,394 |
| 1922 | 79,275 | 430,639 |
| 1923 | 119,826 | 755,469 |
| 1924 | 99,663 | 559,980 |
| 1925 | 82,868 | 404,617 |
| 1926 | 87,300 | 459,000 |
| 1927 | 104,300 | 548,000 |
| 1928 | 126,100 | 662,000 |
| 1929 | 100,600 | 528,000 |
| 1930 | 120,100 | 631,000 |
| 1931 | 105,900 | 556,000 |
| 1932 | 102,700 | 513,000 |
| 1933 | 96,200 | 481,000 |
| 1934 | 107,500 | 451,500 |
| 1935 | 119,425 | 501,600 |

| | | |
|---|---|---|
| 1936 | 136,600 | 573,700 |
| 1937 | 131,600 | 552,700 |
| 1938 | 159,230 | 620,900 |
| 1939 | 146,250 | 585,000 |
| 1940 | 173,970 | 695,000 |
| 1941 | 238,960 | 944,588 |
| 1942 | 260,893 | 1,623,264 |
| 1943 | 289,232 | 1,842,708 |
| 1944 | 348,375 | 2,239,684 |
| 1945 | 297,644 | 1,868,592 |
| 1946 | 366,809 | 2,354,952 |
| 1947 | 361,220 | 2,554,747 |
| 1948 | 407,906 | 2,789,275 |
| 1949 | 433,533 | 3,309,303 |
| 1950 | 412,455 | 3,033,445 |
| 1951 | 494,333 | 3,766,987 |
| 1952 | 686,218 | 5,779,423 |
| 1953 | 861,471 | 8,451,542 |
| 1954 | 666,618 | 6,442,414 |
| 1955 | 639,696 | 5,759,000 |
| 1956 | 726,801 | 6,373,976 |
| 1957 | 842,000 | 7,296,000 |
| 1958 | 759,000 | 6,931,000 |
| 1959 | 660,000 | 5,869,000 |
| 1960 | 722,471 | 6,318,358 |
| 1961 | 736,931 | 5,867,764 |
| 1962 | 871,379 | 6,408,659 |
| 1963 | 853,398 | 5,910,007 |
| 1964 | 744,942 | 5,007,506 |
| 1965 | 893,182 | 6,095,216 |
| 1966 | 927,145 | 6,953,073 |
| 1967 | 924,549 | 7,295,834 |
| 1968 | 750,435 | 4,502,097 |
| 1969 | 667,179 | 4,365,930 |
| 1970 | 549,473 | 4,058,929 |
| 1971 | 698,000 | 5,710,000 |
| 1972 | 668,000 | 6,680,000* |
| 1973 | 694,000 | 8,350,000 |
| 1974 | 700,000 | 10,500,000 |
| 1975 | 766,000 | 12,250,000 |
| 1976 | 706,000 | 12,000,000 |
| 1977 | 685,000 | 12,400,000 |
| 1978 | 730,000 | 13,900,000 |
| 1979 | 750,000 | 15,000,000 |
| 1980 | 750,000 | 16,000,000 |
| 1981 | 800,000 | 17,600,000 |
| 1982 | 830,000 | 18,000,000 |
| 1983 | 803,000 | 18,000,000 |
| 1984 | 849,161 | 23,775,000 |
| Total | 31,435,538 | 345,081,770 |

*1972-1984 evaluations are estimates. Note also that dollar values have not been adjusted for inflation.

Table 3. Chronology of events in Alaska coal mining history,

1786 Captain Nathaniel Portlock, an English trader, finds coal at Coal Cove (presently Port Graham) on the Kenai Peninsula.

1798 Aleksandr Baranov of the Shelikhov-Golikov Company experiments with Coal Bay coal in smelting iron.

1826-27 First reports to outside of coal in Alaska by A. Collie, who accompanied Captain Beechey on an expedition to the Arctic Ocean.

1850 Peter Doroshin, a mining engineer, explores the coals at Coal Cove for the Russian Trading Company.

1851 Coal on Unga Island is also explored by Doroshin of the Russian Trading Company.

1855 First coal mine in Alaska is opened by the Russian-American Company at Coal Cove near Port Graham on the Kenai Peninsula.

1856 A shipment of 88 tons of Coal Bay coal is made to California.

1862 First coal mined in southeast Alaska at Sepphagen Mine, Kootznahoo Bay, Admiralty Island.

1867 Coal mine at Port Graham is closed when the United States assumes possession of Alaska.

1869 U.S.S. Saginaw uses coal from Kootznahoo Inlet of southeast Alaska as fuel.

1873 Federal Coal Land Act ratified by the U.S. Congress.

1879 Whaling ships and U.S. Revenue cutters start using coal from the Corwin Bluff mines and Cape Beaufort area along the Arctic coast.

1880's Three coal mines operate in the Herendeen Bay-Chignik coal fields---at Herendeen Bay, on the Chignik River, and on Unga Island.

1881 Captain C.L. Hooper takes on 20 tons of coal along Corwin Bluff for his ship, the Corwin.

1885 Coal discovered along banks of the Chignik River on the Alaska Peninsula.

1888 Alaska Coal Company begins coal mining operations near Port Craham at Kachemak Bay (Wharf Mine) and opens a mine tunnel at Fritz Creek on the Kenai Peninsula.

1888-89 Bituminous coal from the Thetis Mine near Cape Lisburne is supplied to the cutter, Thetis.

1889 Coal is mined at the Wainwright and Kuk River area.

1891 U.S. Navy mines 200 tons of coal in McNeil Canyon west of Coal Point (Homer Spit) for testing in San Francisco.

1893 Alaska Mining and Development Company opens a coal mine on Anchorage Bay near Chignik Lagoon. The Alaska Packers Association open the Chignik River Mine to produce coal for their cannery and steamer. The mine operates for over 12 years.

1894 Early prospectors and traders learn of coal deposits in the Matanuska Valley from the Indians. The North Pacific Mining and Transportation Company opens a coal mine north of Homer.

1894-97 The North Pacific Mining and Transportation Company mines 650 tons of coal from an area 14 miles northwest of Homer.

1895 Preliminary investigations of the coals along the Pacific seaboard of Alaska take place. The Admiralty Island Coal and Fuel Company opens the Datewell Mine about 1.5 miles from Murder Cove in southeast Alaska. Small-scale mining for local use begins on Unga Island and continues intermittently for the next 20 years.

1896 Coal is discovered in the area of the Bering River coal field. W.H. Dall's report on the coals and lignites of Alasks is published.

1897 Mining begins along the Yukon River. The Drew Mine is opened at a site 25 miles above Rampart on the left bank of the Yukon River opposite the mouth of Hess Creek. The Alaska Commercial Company opens a coal mine on the Nation River about 1.5 miles from the Yukon River and extracts about 2,000 tons of coal.

1898 Yukon sternwheelers use coal as a fuel to transport gold seekers to the gold fields. The Pickart Mine is opened on the right bank of the Yukon about 10 miles above Nultao. The discovery of gold at Nome increases interest in the Cape Lisburne region coal fields.

1898-99 Geologist W.C. Mendenhall accompanies Army exploration parties into the Matanuska Valley.

1898-1902 Coal occurrences between Ruby and Blackburn along the Yukon River are mined for steamboat fuel.

1899 Cook Inlet Coal Fields Company opens a second mine near Homer.

1900 Coal laws of the U.S. are extended to the Territory of Alaska. One to 2 thousand tons of coal are mined along the Yukon River by the more than 100 steamers carrying gold prospectors to the Klondike. The Williams Mine, located 90 miles below Nulato on the Yukon River, opens. Coal deposits on the Seward Peninsula are discovered by gold prospectors.

1900-01 Over 1,000 tons of coal extracted from the Thetis Mine and other small-scale mines along the Cape Lisburne seacliffs are shipped to Nome.

1902 The Williams Mine produces 1,700 tons of coal. The St. Michael Tipple serves as a coal-onloading site for steamers plying the Yukon River. Steamers begin to convert coal and wood burners to petroleum engines. A railroad is built to the end of Homer Spit.

1902-08 Some 100,000 tons of coal are mined at Chicago Creek to provide coal locally for placer-mining operations on the Seward Peninsula.

1904 Coal Claims Act is ratified allowing coal claim locations without prior surveys. Coal claims in the Bering River field are filled under the act. Coal bunkers are constructed at Coal Harbor on Unga Island.

1906 Johnson Tunnel(s) driven hundreds of feet at slope mine in the Herendeen Bay field. President Theodore Roosevelt closes Alaska public land to entry under coal laws due to the Ballinger-Pinchot feud.

1906-12 U.S. Bureau of Mines conducts extensive studies on the Bering River coals for the Navy.

1907 Several thousand tons of coal are mined from the McDonald Property on Bering Lake.

1908 Alaska Peninsula Mining and Trading Company opens the Hook Bay Mine. Captain Theielen opens the "Haralan Mine" adjacent to the Kobuk River bank, a mile below the Kallarichuk River. Named for Alexander Haralan who renewed mining at this site in 1929. The mine is now located in Kobuk Valley National Park. The Chicago Creek Coal Mine on the Seward Peninsula is the largest producer in Alaska.

1910 Alaska Coal and Petroleum Company drives a 1,000 ft tunnel at the Davis Mine of the Cunningham Claims, Bering River coal field.

1911 Cordova "Coal Party" held in which imported coal is shoveled into the harbor by angry residents in protest of federal coal policies. Pinchot is burned in effigy. The Chignik River Mine closes after almost two decades of operation providing coal for the Alaska Packers Association Cannery on the south side of Chignik Lagoon. The Dunkle Mine on Costello Creek opens.

1912 U.S. Navy begins coal investigations in the Bering River field. Coal is discovered on Eek River of the Lower Kuskokwim region by placer miners. Capps delineates the coal basins of the Nenana region in near their present configuration.

1912-14 U.S. Navy tests Matanuska and Bering River coal for naval use.

1913 Capps describes coal occurrences in the Fairview Mountain region of the northwest Susitna Lowland. Over 1,000 tons of coal are extracted by the U.S. Bureau of Mines in the Chickaloon area. About 100 tons of coal per day (seasonal) are produced at Bluff Point near Homer for use by the fish canneries of Cook Inlet; over 10,000 tons of coal were produced here during the early 1900's.

1914 The Alaska Coal Leasing Act is passed by the U.S. Congress. About 600 tons of Chickaloon coal are used in a steaming test aboard the U.S.S. Maryland. President Woodrow Wilson and the U.S. Congress pass the Alaska Railroad Act authorizing the construction of the Alaska Railroad to pass through the Matanuska, Little Susitna, Broad Pass, and Nenana coal fields. Some 25 coal mines are in operation in the Matanuska Valley.

1914-16 Iditarod Mine operates producing coal from two shallow shafts and transporting it on a tramway between Flat and Iditarod.

1916 U.S. Department of the Interior issues regulations implementing the Coal Leasing Law of 1914. The Alaska Railroad is built to the Matanuska coal field. Mining begins in the Moose Creek district on lower Matanuska Valley. The Cache Creek Dredging Company operates the Short Creek Mine on a small tributary of the Yentna River beginning in 1916 to supply power for its dredge.

1916-17 Naval colliers anchor near the present city of Anchorage to take on coal.

1916-18 The Doherty Mine of the Matanuska field produces some 50,000 tons of coal.

1917 The Eska Mine is opened and a railroad spur is constructed. The Alaska Railroad is extended to Chickaloon. The Cache Creek Mining Company extracts 100 tons of coal at its mine in the northern Susitna Lowland for use in a gold dredge.

1918 Coal from the Coal Creek Mine near Unalakleet is mined for use at St. Michael and Nome.

1919 The Alaska Railroad reaches the Nenana coal field and purchases the Eska Mine of the Matanuska Valley. Two coal mines are operated by the U.S. government at Eska and Chickaloon. Thirty-five men work at the Chickaloon Mine and over 4,000 tons of coal are mined incidental to development.

1920 Sixty percent of the coal consumed in Alaska is imported. The underground operations at the Evan Jones Mine of the Matanuska field begin. The U.S. Navy constructs a coal-mining town at Chickaloon.

1920-21 The U.S. Navy drives two exploratory tunnels at a site 8 miles above the mouth of the Kings River of the Matanuska Valley.

1920-22 The Naval Alaskan Coal Commission performs exploratory work on coal beds at Chickaloon. Over 30,000 tons of coal are produced at the Peterson Mine by the Healy River Coal Corporation on the west bank of the Nenana River opposite the mouth of Healy Creek.

1921 A rail spur is completed to the Evan Jones Mine from the Eska branch of the Alaska Railroad.

1921-22 The Sutton Coal Washery is constructed by the U.S. Navy Alaskan Coal Commission and Alaska Engineering Commission. Only about 5,000 tons of coal are washed before it is closed and dismantled. The Navy prospects for coal on Coal Creek (south side of Matanuska River) and completed eight diamond-drill holes on the bench east of the creek.

1922 Alaska Railroad is completed between Seward and Nenana after the construction of the Riley Creek Bridge at McKinley Park. A 4.4 mile railroad spur up Healy creek is completed and the Suntrana Mine is established. The Chickaloon coal mine and townsite are prepared for abandonment.

1923-24 The Mount McKinley Bituminous Coal Company operates the Yanert Mine.

1924 The U.S. Navy begins converting its coal-burning ships to oil.

1925 The Premier Mine is opened by the Alaska Matanuska Coal Company. Ross S. Hecky opens the Hecky (or Coal Creek) Mine on the west side of Coal Creek opposite the mouth of the Chickaloon River, Matanuska Valley.

1928 The Suntrana Mine produces nearly half of the total coal mined in Alaska. The Harkrader Mine is opened in Kootznahoo Inlet and extracts coal intermittently until 1932.

1931 Detailed topographic and geologic survey is made of the Matanuska Valley by R.W. Richards and L.O. Newsome.

1932 The Wishbone Hill Coal Company produces a small quantity of coal from the Rawson Mine. Eight diamond-drill holes are completed south of Anthracite Ridge in the upper Matanuska Valley; over 8,000 feet are core-drilled but significant resources on the tract were not proven even though the deepest hole extended to 1,820 feet.

1937 A coal mine explosion at the Evan Jones Mine kills 14 men and curtails production.

1940 Eleven percent of the coal consumed in Alaska is imported from outside. The Suntrana Mine is the largest coal mine in the Alaskan Territory. Coal is used to power the dredges and large placer-mining operations near Fairbanks. Coal for local use is extracted from a mine located about 0.25 mile west of Chicken Creek.

1940-54 Over 60,000 tons of subbituminous coal are produced from the Dunkle Mine on Costello Creek west of Broad Pass,

1942 The Alaska Railroad reopens the Eska Mine. Coal is needed for the new army posts and military airfields. Drilling begins on the Buffalo property of the Wishbone Hill district, Matanuska coal field.

1943 Traditional underground coal mining in Alaska gives way to surface-mining methods with the opening of two strip mines in the Nenana coal field, one of which is the Diamond Coal Company mine, A military coal commission is sent to Alaska and headquartered at Fort Richardson to investigate the coal resources of the Territory and to stimulate additional production in favorable areas. G.O. Gates of the U.S. Geological Survey completes a geological map of the Wishbone Hill area of the Matanuska Valley.

1943-44 Over 10,500 tons of coal are exported from Alaska.

1944 Emile Usibelli and T.E. Sanford open a strip mine on Healy Creek east of the Suntrana Mine under a U.S. Army license; the mine is a forerunner of the Usibelli Coal Company of today.

1945 The Eska Coal Mine of the Matanuska field is closed.

1946 The Alaska Railroad begins conversion of its coal-burning engines to diesel fuel and the military posts convert to natural gas.

1949-52 Over 65,000 tons of coal are mined at Houston and washed in a Forester jig.

1950 Alaska's annual coal imports decline to less than 1 percent of the annual consumption of the state.

1953 Maximum underground production in the Matanuska field reaches over 285,000 tons.

1955 The Gold Run Pass Mine on upper Lignite Creek is opened.

1958 Several hundred tons of coal are produced at a small operation in the Jarvis Creek field.

1958-59 Jewel Ridge Coal Company of Tazewell, Virginia reopens old underground workings on Carbon and Trout Creeks in the Bering River coal field.

1958-60 Two strip pits are excavated at the Castle Mountain Mine in the Matanuska Valley removing less than 30,000 tons of coal.

1959 Underground coal mining at Evan Jones ceases.

1959-64 Small strip mines operate on the slopes above Homer on the Kenai Peninsula.

1960 Surface mines account for over 90 percent of Alaska's total coal output. Emile Usibelli purchases the Suntrana Mine. Paul Omlin acquires the Premier Coal Mine in the Matanuska Valley.

1962 The Suntrana Mine is closed because of serious fires.

1966-67 Alaska's coal production peaks at about 925,000 tons per year.

1967 Cook Inlet natural gas from the Swanson River field begins to supplant Matanuska coal.

1968 Fort Richardson and Elmendorf Air Force Base convert coal-fired steam-power plants to natural gas. The Matanuska field coal mining shuts down except for small mines filling local needs.

1969 Private industry begins extensive exploration for coal in the Beluga and Yentna coal fields. A mine-mouth power plant is built at Healy that supplies electricity to the Golden Valley Electric Association of Fairbanks.

1971 A flood closes the mining operation at the Premier Coal Mine. The Usibelli Coal Mine becomes the only significant operating coal mine in the state of Alaska.

1972 The Usibelli Coal Company mining pit on Lignite Creek is opened.

1973 The OPEC oil embargo and severe winter result in oil and gas shortages. The Alaska Department of Natural Resources receives requests for coal prospecting permits under Cook Inlet near producing oil wells because of interest for in-situ or solution mining.

1975 First University of Alaska Mineral Industry Research Laboratory conference focusing on Alaska's coal is co-sponsored by the Federal Energy Administration.

1977 President Carter's energy policy includes conversion of utilities and industry to coal prompting renewed interest in Alaska coal fields. The Federal Surface Mining Control and Reclamation Act is passed. The Alaska Regional Energy Resources Planning Project report estimates Alaska's coal resources between 1.7 and 4.9 trillion short tons.

1980 Second University of Alaska Mineral Industry Research Laboratory conference focusing on Alaska's coal is co-sponsored by the State Divisions of Minerals and Energy Management and Energy and Power Development, and the Mining and Mineral Resources Research Institute. Doyon Native Corporation and Canadian Superior investigate the coal deposits at Little Tonzona River.

1981 Usibelli Coal Mine signs a contract with a Korean consortium to provide 880,000 short tons of Alaska coal annually for export to the Far-East country. Diamond Alaska Coal Company initiates a drilling program to determine the coal reserves of the Bass-Hunt-Wilson coal leases in the Susitna Lowland.

1981-84 The Northwest Alaska coal investigation, including drilling, coring, and geophysical exploration at several sites is conducted by the State Division of Geological and Geophysical Surveys.

1982 Alaska's Coal Marketing Conference, coordinated by the Resource Development Council for Alaska, Inc., is held in Anchorage. The Premier Coal Mine reports its coal production at 1,000 tons.

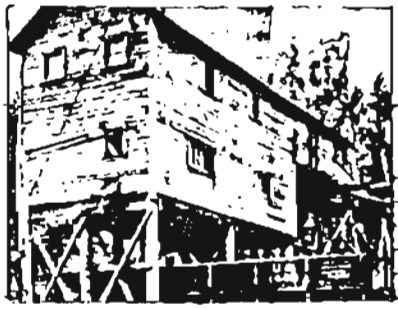
1983 Delta Coal Company receives a mine permit from the U.S. Bureau of Land Management. The Alaska Department of Natural Resources assumes primacy for the regulation of surface mining and reclamation in Alaska from the U.S. Department of Interior Office of Surface Mining. An international conference on coal, minerals, and petroleum, sponsored by the Resource Development Council for Alaska, Inc. in cooperation with the Office of Mineral Development, Alaska Department of Commerce and Economic Development, is held in Anchorage.

1983-84 Alaska's first deep-water coal port is developed at Seward.

(A)

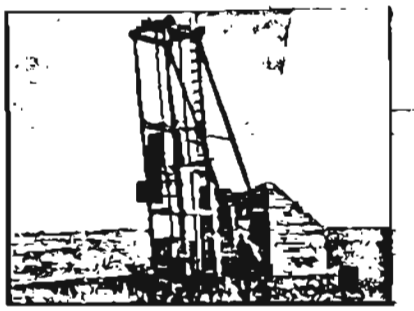
(B)

(C)



(D)

(E)



(F)

A.... Natives mining and sacking coal on Kuk River, Northern Alaska coal field (U.S.G.S. Bulletin 218, 1903).

B.... Barge loading coal at the Williams Mine, Yukon River (U.S.G.S. Bulletin 218, 1903).

C.... Coal mine village at Chickaloon, Matanuska coal field (Univ. of Alaska Archives).

D.... Coal cleaning plant at the Eska Mine, Matanuska coal field (Univ. of Alaska Archives).

E.... Sunbrana Coal Mine on Healy Creek, Nenana coal field (Univ. of Alaska Archives).

F.... Meade River Mine near the village of Atkasuk, northwest Alaska (courtesy J. Callahan).

Figure 4. Selected Alaska coal historical photos.

# MAJOR COAL FIELDS OF ALASKA

## Northern Alaska Fields

The northern Alaska coal fields form by far the largest coal resource province of the nation in terms of area and resource base. The deposits, which underlie up to 30,000 square miles, can be divided into a largely bituminous subprovince to the south near the north flank of the Brooks Range and a wide belt of predominantly subbituminous coals farther north. These coals occur mainly within the Corwin Formation of the Cretaceous Nanushuk Group (fig. 5); this group attains its greatest thickness, approximately 11,000 ft, in the southwestern portion of the province near Cape Lisbume (fig. 6). Coal beds 15- to 40-ft thick are characteristic of the group. The geologic structure is generally flat-lying to gently dipping. Possible future development may occur through either surface or underground mining.

## Lisburne (Point Hope) Field

Mississippian coals of the Lisburne field are the oldest in Alaska. The coal-bearing unit occurs within the Kapaloak Formation of the Lisburne Group, and extends north-south for about 40 mi from Cape Dyer to Cape Thompson. The field occupies an area of about 200 sq mi, and coal seams are less than 6 ft thick. The geologic structure is fairly complex with many coal beds deformed and broken by faulting. Probable future development would be by surface mining.

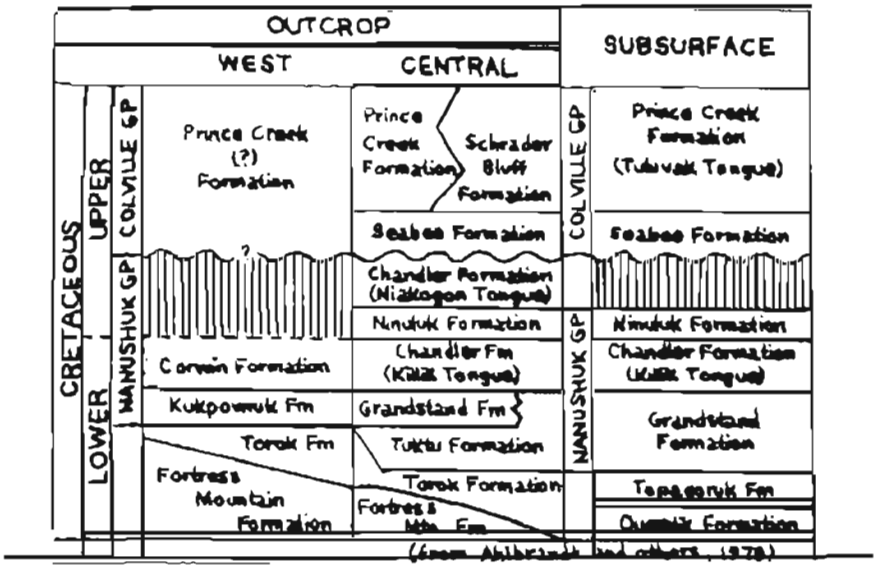



Figure 5. Stratigraphic nomenclature of the Colville and Nanushuk Groups, Alaska (after Ahlbrandt and others, 1979).

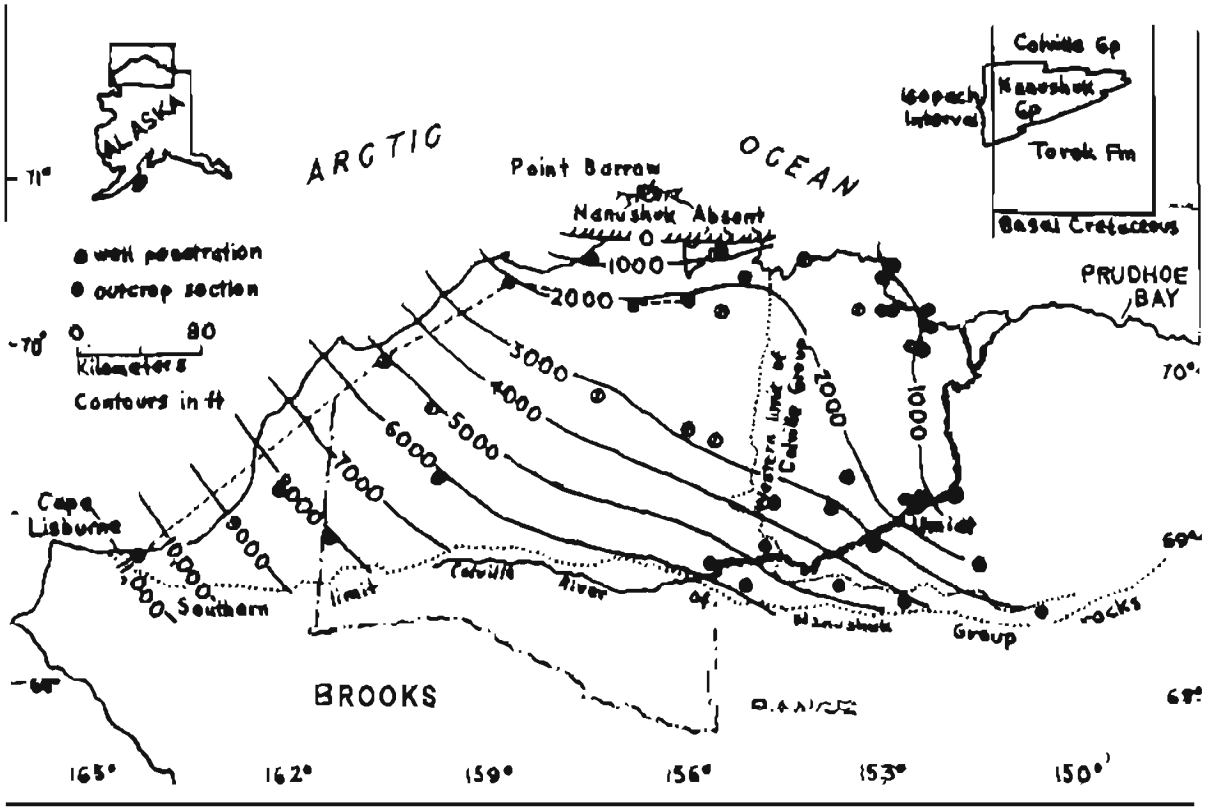



Figure 6. Nanushuk Group isopach map (courtesy J. Callahan).

## Chicago Creek (Kugruk River) Field

The Chicago Creek field lies on the Seward Peninsula and occupies an area of less than 40 sq mi. The lignite coals are of Tertiary age and one bed is about 80-ft thick. The seams dip from 45 to 70 degrees and may occur within a **graben.** Considering the low rank of the coal, probable future development would be by surface mining.

## Nulato Field

The Nulato field occurs in an area along the lower Yukon of western Alaska, and may underlie up to 150 sq mi. Outcrops are common on the north and west bank of the river from Ruby to Anvik. The deposits are found in the Late **Cretaceous** Kaltag Formation. The coal beds are of bituminous to subbituminous rank and are less than 4-ft thick. The geologic structure in the region is locally complex with folding and faulting. Probable future development would be by underground mining.

## Rampart Field

Scattered outcrops of the Rampart field occur over an estimated area of about 100 sq mi in the interior of Alaska. The Tertiary coal-bearing unit is exposed along the middle reaches of the Yukon River and near its confluence with the Tanana River in the vicinity of Rampart. The coal beds are of subbituminous to bituminous rank, typically less than 5 ft thick, and steeply dipping. Further exploration will be required in this region to determine future mining potential.

## Eagle-Circle Field

Tertiary subbituminous to bituminous coals of the Eagle-Circle field occur along an 80 mi stretch of the upper Yukon River in eastern interior Alaska. Scattered outcrops within the field are found over an area of nearly 800 sq mi. Although most of the beds are thin, one seam of 22 ft is known. Broad open folds characterize the geologic structure of the coal-bearing unit. Possible future development may occur through either surface or underground mining.

## Nenana Field

The Nenana field forms the third largest coal resource base in Alaska. The outcrops of the Tertiary Coal-bearing Group are spread over an area encompassing nearly 1,000 sq mi. The deposits trend east-west along the north-central flank of the Alaska Range for about 140 mi. The important coal-bearing sub-fields include western Nenana, Healy Creek, Lignite Creek (now producing), Rex Creek, Tatlanika Creek, Mystic Creek, Wood River, and Jarvis Creek (fig. 7).

Essentially all of Alaska's coal production today comes from the Nenana field near Healy. The approximately 3,000-ft thick coal-bearing sedimentary sequence rests directly on Precambrian and Paleozoic schists. The Suntrana Formation contains the bulk of the coal resources of the field (fig. 8). The Usibelli Mine at Poker Flats in the lower Lignite Creek basin presently is mining the 3, 4, and 6 seams, which average about 20-ft thick each. Coal seams in the Nenana field may attain thicknesses up to 60 ft. Moderately-

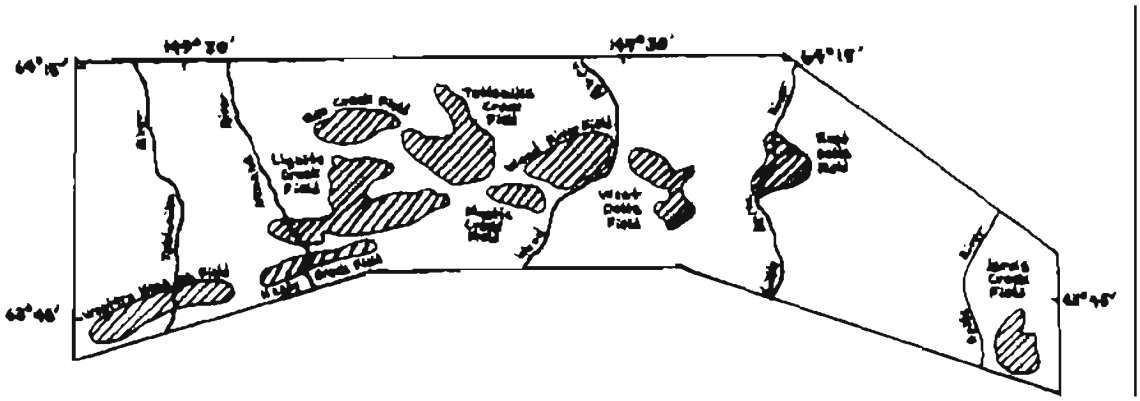


Figure 7. Major coal-bearing subfields of the Nenana region.

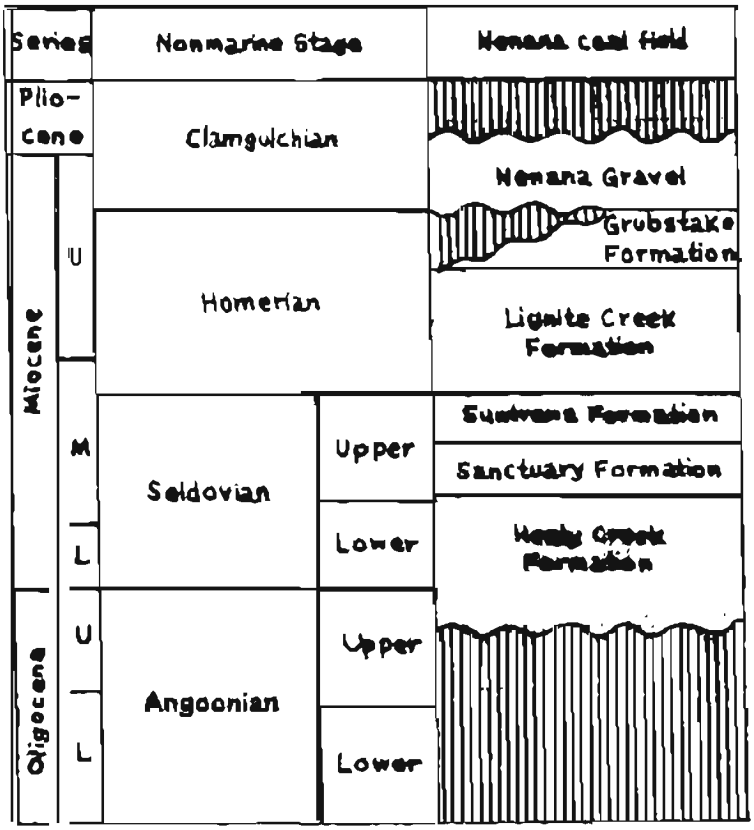



Figure 8. Stratigraphic nomenclature of the coal-bearing group of the Nenana coal field (after Wolfe and Tanai, 1980).

dipping fault blocks and gentle folds are the predominant geologic structure. Most future development will be by surface mining, but underground mining may be possible on certain tracts.

Jarvis Creek Field

The Jarvis Creek field occurs east of the Delta River at the easternmost extent of the Nenana trend and encompasses an area less than 40 sq mi. The Tertiary sedimentary sequence here probably correlates with the lower part of the Coal-Bearing Group of the Nenana field proper, at least in part the Healy Creek Formation. The coal beds are less than 10 ft thick and are of subbituminous rank. They dip gently around the rim of this relatively isolated structural basin. Future development will be by surface mining.

Farewell (Little Tonzona) Field

The Farewell coal field occurs near the southeastern margin of the Minchumina Basin in southwestern Alaska and contains outcrops scattered over an area of about 200 sq mi from Little Tonzona River to the Middle Fork of the Kuskokwim River. The Tertiary coal-bearing sequence at Little Tonzona River includes one seam over 100 ft thick. Seams at Deepbank Creek range from 5 to 20 ft thick. The coal is predominantly of subbituminous rank, and occurs in low-angle faults blocks and minor folds. Probable future development will be by surface mining.

## Broad Pass Field

The Broad Pass field occurs in south-central Alaska and is considered to be a northeastern extension of the Cook Inlet basin. The field includes the deposits in the vicinity of Broad Pass Station and on Costello Creek. The Tertiary coal-bearing sequence at Broad Pass occupies a narrow graben less than 40 sq mi in area; the coals are lignites and range from 5 to 10 ft thick. The Costello Creek basin coals occur in an area less than 10 sq mi and are of subbituminous rank. Possible future development will be by surface mining.

## Beluga and Yentna Fields

The Beluga and Yentna coal fields occur within the Susitna Lowland of south-central Alaska, and contain the largest reserves of coal recoverable by surface mining in southern Alaska. Coal-bearing outcrops of the Tertiary Kenai Group (fig. 9) are scattered over a broad area incorporating nearly 6,000 sq mi. Most of the major minable seams (over 20 ft thick) of the Kenai Group are restricted to the Tyonek Formation, while thinner subbituminous and lignite coal beds occur in the Beluga and Sterling Formations. The coal-bearing strata are relatively flat-lying, but broad gentle folds and minor faults are found locally. Seams over 50-ft thick may have less than 150 ft of overburden. The Capps sub-field is a localized coal deposit of the Beluga field occupying an area less than 10 sq mi. Two major beds, the Capps and Waterfall seams of 55- and 25-ft maximum thickness (respectively) occur within this deposit.

| SYSTEM | SERIES | GROUP | FORMATION | COALS |
|---|---|---|---|---|
| CENOZOIC | QUAT | | Alluvium and glacial deposits | |
| | TERTIARY | KENAI GROUP | Sterling Formation | Thin lignite beds |
| | | | Beluga Formation | Thin subbituminous coal beds |
| | | | Tyonek Formation | Massive subbituminous coal beds |
| | | | Hemlock Conglomerate | |
| | | | West Foreland Formation | |
| | | Rests unconformably on older Tertiary, Cretaceous and Jurassic rocks | | |

Figure 9. Stratigraphic nomenclature, Kenai Group (after Calderwood and Fackler, 1972).

Matanuska Field

The Tertiary Chickaloon Formation of the Matanuska Field contains at least 30 separate coal beds in the upper half of the 3,000-ft thick unit. Coal-bearing outcrops are scattered over an area of about 700 sq mi in south-central Alaska, and are found within three main districts---Wishbone Hill, Chickaloon, and Anthracite Ridge. The seams in the Wishbone Hill area occur in the Jonesville, Premier, Eska, and Burning Bed coal groups (fig. 10). Some coal of the Chickaloon area are of coking quality. Coals along the south flank of Anthracite Ridge have been upgraded to semianthracite and anthracite because of contact metamorphism by igneous intrusions and regional deformation. The coal beds of the region range in thickness from 2 to 40 ft. Although future development will most likely be by surface mining, underground mining on certain tracts may also be feasible.

Kenai Field

Tertiary coal-bearing rocks of the Kenai Group underlie much of the Kenai Peninsula and extend offshore beneath Cook Inlet. The landward portion of the field alone occupies an area over 2,000 sq mi. The coals are mainly of subbituminous rank and range from 2.5 to 20 ft thick. The coal-bearing strata are predominantly flat-lying to gently dipping. Future development may be by surface or underground mining.

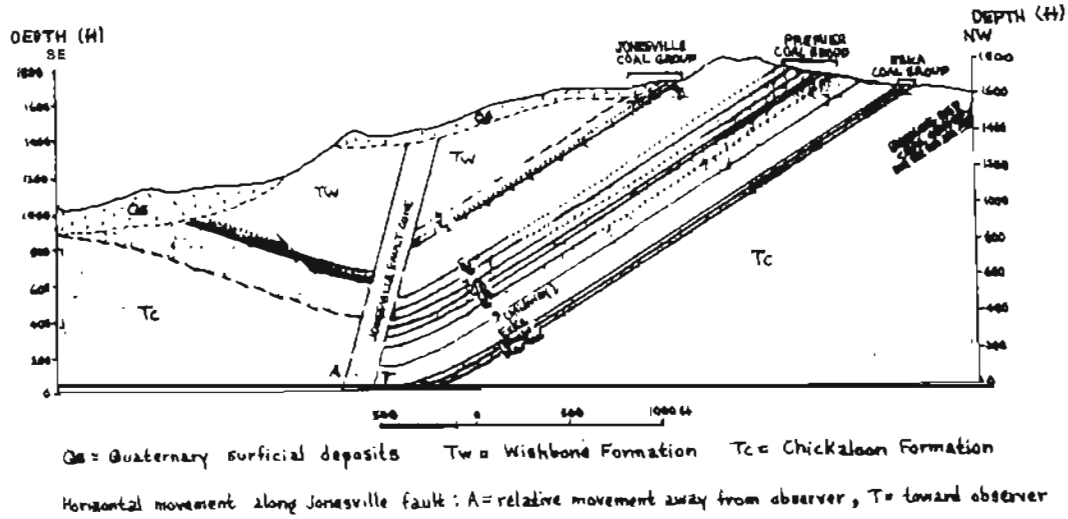



Figure 10. Geologic structure section through Evan Jones Mine, Wishbone Hill district, Matanuska coal field (after Barnes and Payne, 1956).

## Bering River Field

The distribution of the coal deposits of the Bering River field of south-central Alaska is delineated by the outcrop extent of the Kushtaka Formation. The area of the field is nearly 300 sq mi. In general, the coals increase in rank from the western part of the field to the eastern part; most are high-grade bituminous and anthracite. The structure of the Tertiary coal-bearing formation is complex with the coals occurring in pod- or lense-shaped thickenings from 6 to 30 ft. Future development may be by surface or underground mining.

## Chignik and Herendeen Bay Fields

The Chignik and Herendeen Bay fields occur on the Alaska Peninsula. Late Cretaceous bituminous and subbituminous coals of the Chignik field occupy an area over 150 sq mi. Coals of the Coal Valley Member of the Chignik Formation are typically less than 7 ft thick. Late Cretaceous and Tertiary bituminous coals of the Herendeen Bay field occupy an area over 1,100 sq mi. At Mine Harbor on Herendeen Bay, up to 17 coal beds crop out but most are less than 2-ft thick. The strata in both fields are moderately folded and faulted. Lignitic coal deposits on the northern margin of Unga Island occur within an area less than 40 sq mi. Future development in the Chignik and Herendeen Bay fields could be by underground or surface mining.

## STRATIGRAPHY

Alaska coals are chiefly of Cretaceous and Tertiary age. Coals of the Lisburne or Point Hope field are Carboniferous (Mississippian), and the bituminous coal bed in the Nation River Formation is of probable Pennsylvanian age, Figure (on coal map) places the major coal-bearing formations of Alaska on a geologic age continuum diagram. Correlations of the many Cretaceous and Tertiary units are very crude, and the exact stratigraphic relationships of many of the near age-equivalent units are presently unknown. Additional geologic mapping, subsurface data, paleobotanical and palynological investigations, and age dating (as of volcanic ash partings or tonsteins within coal seams, for example) will be required in order to more definitively correlate the coal-bearing formations in the different regions of Alaska. Two generalized Tertiary stratigraphic sections---(a) for the coal-bearing group of the Nenana coal field, and (b) for the Chickaloon Formation of the Matanuska Valley---are also shown on the coal map.

## DEPOSITIONAL ENVIRONMENTS

Predictive paleoenvironmental models have proved to be useful as coal exploration tools (for example, in determining the location and spacing of drill holes), in understanding the depositional regime in which a coal seam formed, and coal seam and overburden characteristics in a given basin. Coals formed in continental depositional systems tend to be more discontinuous laterally, but locally they can be very thick (to a 100 ft or more). Ash contents (mainly silica and kaolinite) may also be higher in these coals but

overall are quite variable. Marine-influenced coals are usually more continuous laterally and have higher contents of chemically precipitated minerals (carbonates and sulfides), Coals formed in fluvial-associated paleoenvironments are usually higher in Cu, Cr, Ti, K, Si, Fe, pyritic and sulfate sulfur, and sometimes Ca (Bailey, 1981). Cyclicity is commonly better developed in marine-influenced environments and denotes transgressions and regressions. Table 4 below summarizes the general depositional regime of the major coal-bearing formations in Alaska. Two examples of general models are also depicted--- (1) the deltaic sedimentation model (fig. 1.1) developed by Callahan and Martin (1981) to illustrate the marine-influenced depositional environments and facies of the Corwin and Kukpowruk Formations, which compose the Nanushuk Group on the Arctic Coastal Plain and in the foothills of the western North Slope, and (2) an idealized continental depositional model for the Tyonek Formation of the Kenai Group (fig. 12).

## COAL PETROLOGY

The organic components of coal occur as macerals, which are essentially analogous to minerals in rocks. The respective maceral composition of a coal gives only part of the overall picture because of the complex mineral-matter content and chemical composition. Both structurally intact cell walls and relatively unstructured fine granular materials (for example, mineral matter, fragmented charcoal, and fungal remains) are sometimes observed. Although the maceral compositions usually reflect changes in the primary vegetation cover, thermal effects may remove less resistant macerals such as exinoids from the assemblage. The plant materials are subjected to different conditions before

Table 4. Depositional regime of Alaska's major coal-bearing formations.

| Formation | Area | Coal resource region | Age | Lithology | Depositional regime |
|---|---|---|---|---|---|
| Bergman Group (upper member) | Kobuk Field | Northern | Late Cretaceous | Sandstone, conglomerate, subbituminous to bituminous coal | Continental |
| Bergman Group (upper member) | Tramway Bar--- middle fork of Koyukuk River | Northern | Late Cretaceous | Sandstone, conglomerate, and bituminous coal | Continental |
| Kapaloak Formation of Lisburne Group | Lisburne field | Northern | Mississippian | Mudstone, sandstone, limestone, minor conglomerate and coal | Transitional--- marine and nonmarine |
| Nanushuk Group | Northern field | Northern | Cretaceous | Sandstone, claystone, silty claystone, siltstone, carbonaceous shale and coal beds | Prograding deltaic depositional system in swampy coastal lowland |
| Coal-bearing | Chicago Creek-Kugruk River field | Western | Late Cretaceous-Early Tertiary | Poor- to well-consolidated gravel, sand, carbonaceous debris, and lignitic coal beds | Continental |
| Kaltag Formation | Nulato and Kateel Rivers area; Koyukuk basin; Yukon River---Blackburn to Nulato | Western | Late Cretaceous | Siltstone, dark gray and olive gray shale, lesser sandstone, and bituminous and subbituminous coal beds | Continental |
| Coal-bearing | Palisades--Yukon River | Western | Miocene | Grayish white granule conglomerate and sandstone, reddish-brown claystone, and lignitic coal | Continental |

| | | | | | |
|---|---|---|---|---|---|
| Kaltag and Nulato Formations | Koyuk, Unalakleet | Western | Late Cretaceous-Tertiary | Graywacke, mudstone, sandstone, conglomerate, and coal | Terrigenous---shallow marine |
| Coal-bearing | St. Lawrence Island | Western | Oligocene | Poorly consolidated sandstone, grit, conglomerate, carbonaceous mudstone, ashy tuff, volcanic breccia, and pods of lignitic coal to 2 ft | Continental |
| Coal-bearing | Selawik Basin and southeastern Baird Mountains | Western; Northern | Late Cretaceous | Conglomerate, sandstone, mudstone, and bituminous coal | Continental |
| Coal-bearing | Costello Creek | Eastern Interior | Tertiary | Sandstone, siltstone, mudstone, conglomerate, and subbituminous coal | Continental |
| Coal-bearing | Eagle Field | Eastern Interior | Late Cretaceous-Tertiary | Sandstone, mudstone, shale, conglomerate, and subbituminous-lignitic coal | Continental |
| Coal-bearing | Rampart | Eastern Interior | Early Tertiary | Claystone, sandstone, conglomerate, and subbituminous to lignite coal | Continental |
| Coal-bearing | Tanacross (upper Tanana basin) | Eastern Interior | Cretaceous | Conglomerate, sandstone, shale, siltstone, tuff, tuffaceous sandstone and shale, lignite, and chert | Continental |

| | | | | | |
|---|---|---|---|---|---|
| Coal-bearing group: Healy Creek, Suntrana, and Lignite Creek Formations | Nenana coal field | Eastern Interior | Tertiary | Sandstone, conglomerate, claystone, and subbituminous coal | Continental |
| Healy Creek Formation | Jarvis Creek field | Eastern Interior | Tertiary | Sandstone, claystone, siltstone and coal | Continental |
| Nation River | Nation River | Eastern Interior | Paleozoic Pennsylvanian(?) | Sandstone, conglomerate, shale, and bituminous coal | Continental |
| Coal-bearing | Farewell field---Little Tonzona, Deepbank Creek, Windy Fork of Kuskokwim River | Southwestern | Tertiary | Sandstone, siltstone, coal, burn, and bentonite | Continental |
| Coal-bearing | Yukon-Kuskokwim delta region---Nunivak-Nelson Islands | Southwestern | Upper Cretaceous | Graywacke, siltstone, pebble conglomerate, and coal | Littoral marine |
| Kuskokwim Group | Eek River | Southwestern | Cretaceous | Black carbonaceous shale, graywacke, conglomerate, siltstone, and coal | Shallow marine, nonmarine |
| Chickaloon | Matanuska Valley | Southcentral | Paleocene-Eocene | Claystones, siltstone, sandstones, conglomerate, and coal | Fluvial braided-meandering (lower part) and fluvial meandering-paludal (upper part) |

| | | | | | |
|---|---|---|---|---|---|
| Coal-bearing | Broad Pass | South-central | Late Tertiary | Lignite, conglomerate, sandstone, claystone, and carbonaceous claystone | Continental |
| Frederika | McCarthy area, Copper River basin | South-central | Miocene | Conglomerate, sandstone, siltstone, shale, impure limestone and lignite | Continental |
| Kenai Group: Beluga, Tyonek, and Sterling Formations | Susitna Lowland-Kenai field | South-central | Tertiary | Sandstone, conglomerate, claystone, siltstone, and subbituminous, lignite, and bituminous coal beds | Continental |
| Kulthieth | Malaspina district: Robinson Mountains, Yakataga district | South-central | Paleocene(?)-Eocene | Sandstone, siltstone, and numerous thin beds of high-rank coal | Transitional---continental and marine |
| Kushtaka | Bering River field | South-central | Tertiary | Graywacke, feldspathic sandstone, siltstone, shale, and bituminous-anthracite coal beds | Continental |
| Coal-bearing | Kootznahoo Inlet, Admiralty Island | South-eastern | Tertiary | Coarse sandstone, conglomerate, shale, and bituminous coal beds | Continental |
| Chignik | Chignik and Herendeen Bay fields | Alaska Peninsula and Kodiak | Late Cretaceous | Sandstone, pebble-cobble conglomerate, siltstone, shale, and bituminous coal beds | Cyclic nearshore marine and nonmarine |
| Coal-bearing | South and east of Herendeen Bay | Alaska Peninsula and Kodiak | Tertiary | Sandstone, conglomerate, claystone, and subbituminous coal | Transitional---marine and nonmarine |

| | | | | | | |
|---|---|---|---|---|---|---|
| Coal-bearing | Unga Island | Alaska Peninsula and Kodiak | Tertiary | Sandstone, conglomerate, claystone, and lignite | | Transitional---marine and nonmarine |
| Coal-bearing | Sitkinak Island Tugidak Island | Alaska Peninsula and Kodiak | Tertiary | Sandstone, shale, conglomerate, and subbituminous coal | | Continental |

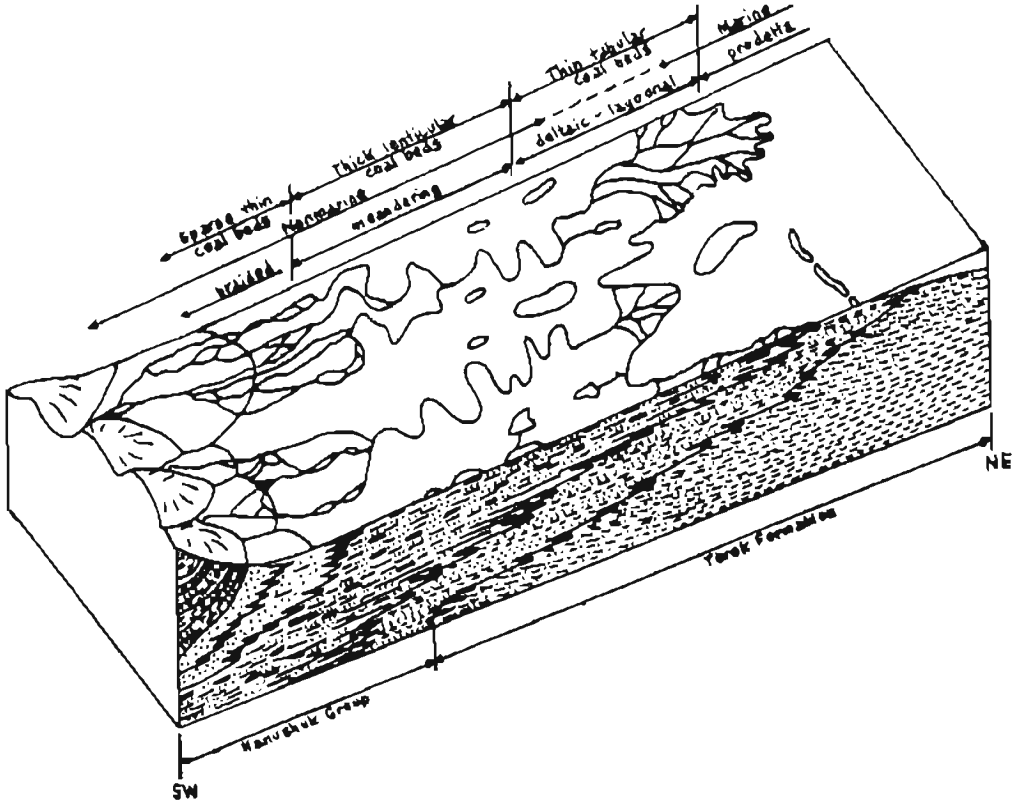



Figure 11. Block diagram illustrating the principal depositional environments that influenced the distribution of coal-bearing facies during the deposition of the Nanushuk Group (after Callahan and Martin, 1981).

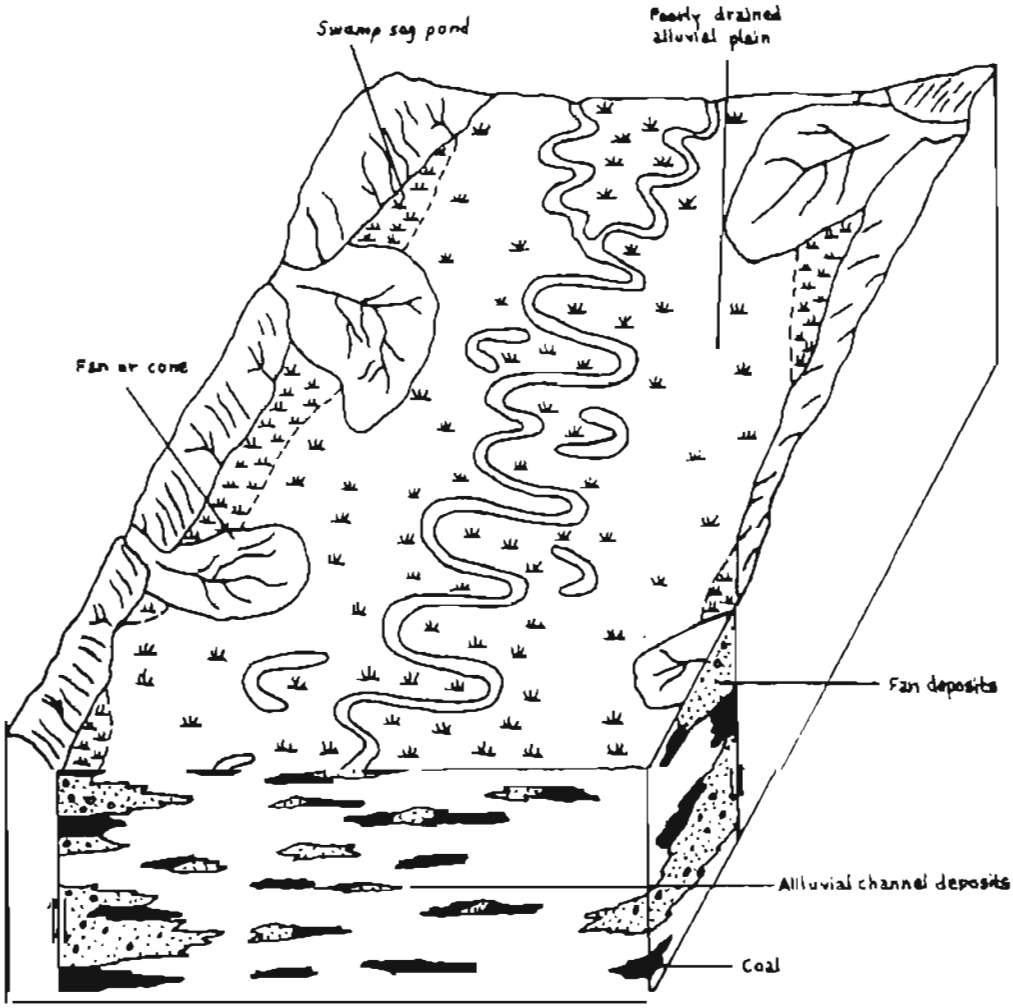



Figure 12. Idealized depositional model for the Tyonek Formation, Kenai Group, Cook Inlet (after Hite, 1976).

their burial beneath a sediment cover. The changes that occur in the eventual maceral compositions ultimately determine the quality of a coal and its heating value.

There are three major macernl groups--- the vitrinite or huminite group, the liptinite or exinite group, and the inertinite group. Alaska coals are usually dominated by a large percentage of vitrinoid or huminoid components and less secondary amounts of exinoids and inertinoids. The vitrinites or huminites are derived from the wood, bark, and other vascular tissues of plants, and are intermediate in reflectance between the inertinites and liptinites. The inertinites are derived from the same general components but they have been strongly altered and degraded in the peat stage of coal formation, for example, fossil charcoal; they have the highest reflectances of all macerals. The liptinites are derived mainly from the waxy and resinous parts of plants such as spores, cuticles, and wound resins, and have the lowest reflectances of all macerals. Table 5 summarizes the petrologic composition of several notable Alaskan coal seams, and the representative photomicrographs of figure 13 show the general morphology and character of various macerals and associated mineral matter.

## COAL QUALITY

Alaska's coal resources range in rank from lignite to anthracite, but the majority are bituminous and subbituminous (see fig. 14). Martin and Callahan (1978) give a ratio of 60 percent bituminous to 40 percent subbituminous. Probably half of the subbituminous coal in Alaska is near the lower end of the subbituminous range (McGee and Emmel, 1979). Anthracite

Table 5A.
Petrology of selected representative Alaskan subbituminous and lignite raw coals (adapted from Rao and Wolff, 1981)

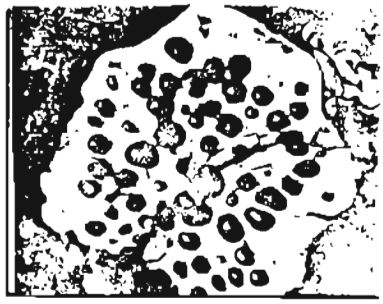
| Field / Seam | Ulminite | Gelinite | Corpohuminite | Humodetrinite | Fluorescent Huminite | Total Huminite | Suberinite | Cutinite | Alginite | Sporinite | Resinite | Total Liptinite | Semifusinite | Fusinite | Sclerotinite | Macrinite | Inertodetrinite | Total Inertinite | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Nenana, Poker Flat / No. 4 Seam | 54.8 | 2.83 | 2.0 | 1.1 | 0 | 84.0 | 0.2 | 0.3 | 61 | 3.3 | 0.4 | 4.2 | 0.8 | 1.3 | 0 | 0 | 0.8 | 11.8 | 100.0 |
| (2) Jarvis Creek/ Otter Creek | 81.7 | 1.3 | 0.6 | 2.5 | 0 | 84.1 | 0.1 | 0.1 | 0 | 3.5 | 0.8 | 4.3 | 0 | 0 | 0.2 | 0 | 1.4 | 1.6 | 100.0 |
| (3) Farewell / Little Tonsina | 38.4 | 34.0 | 0.4 | 3.0 | 15.4 | 89.2 | 0.0 | 0.8 | 0 | 5.8 | 1.4 | 8.8 | 0.3 | 0.4 | 0.2 | 0 | 1.1 | 2.0 | 100.0 |
| (4) Broad Pass/ Coal Creek | 28.1 | 35.8 | 0.3 | 8.5 | 17.0 | 90.7 | 0 | 0.5 | 0 | 4.6 | 0.0 | 5.0 | 0 | 0 | 0.5 | 0 | 1.8 | 3.4 | 100.0 |
| (5) Beluga / Waterfall | 65.7 | 18.3 | 2.5 | 3.4 | 0 | 89.9 | 0.4 | 0.3 | 0 | 3.5 | 0.4 | 4.6 | 0 | 0.5 | 0.7 | 0.1 | 4.2 | 5.5 | 100.0 |
| (6) Northern Alaska/ Wainwright | 75.2 | 3.3 | 8.8 | 0.3 | 0 | 88.8 | 0 | 0.1 | 0.7 | 2.2 | 0.8 | 3.8 | 3.5 | 2.4 | 0.2 | 1.2 | 2.3 | 9.6 | 100.0 |
| (7) Northern Alaska/ Meade River | 80.3 | 4.0 | 18.0 | 0.7 | 0 | 92.0 | 0 | 0.4 | 0.4 | 1.5 | 1.7 | 4.0 | 2.4 | 0.8 | 0 | 0 | 0 | 3.4 | 100.0 |

Table 5B.
Petrology of selected representative Alaskan bituminous raw coals (adapted from Rao and Wolff, 1981).

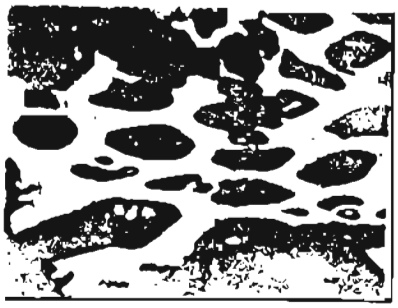
| Field / Seam | Vitrinite | Pseudo-vitrinite | Fluorescent Vitrinite | Total Vitrinite | Cutinite | Alginite | Sporinite | Resinite | Total Liptinite | Semifusinite | Fusinite | Sclerotinite | Macrinite | Inerto-detrinite | Total Inertinite | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (8) Matanuska, Castle Mountain Mine / Lower | 80.2 | 14.3 | 0.4 | 84.8 | 0 | 0 | 0.5 | 0.6 | 1.1 | 3.4 | 2.8 | 0 | 0.5 | 2.5 | 4.0 | 100.0 |
| (9) Matanuska / Premier Mine | 79.5 | 13.2 | 0 | 82.7 | 1.1 | 0 | 1.2 | 0.7 | 3.0 | 3.3 | 0 | 0 | 0 | 4.0 | 4.3 | 100.0 |

A. Ulminite with desiccation cracks (400 X).

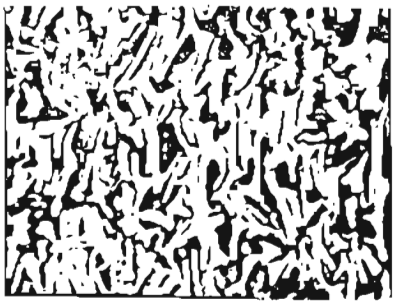
B. Pseudophlebaphinites (250 X).



C. Sclerotinite (315 X).



D. Fusinite (400 X).



E. Fusinite with bogen structure (400 X).

F. Sporinites in ulminite (625 X).

G. Phlebaphinite cell fillings and suberinite cell walls (400 X).

H. Striated, massive secondary pyrite (400 X).

I. Framboidal pyrite (625 X).

Figure 13. Alaska coal photomicrographs.

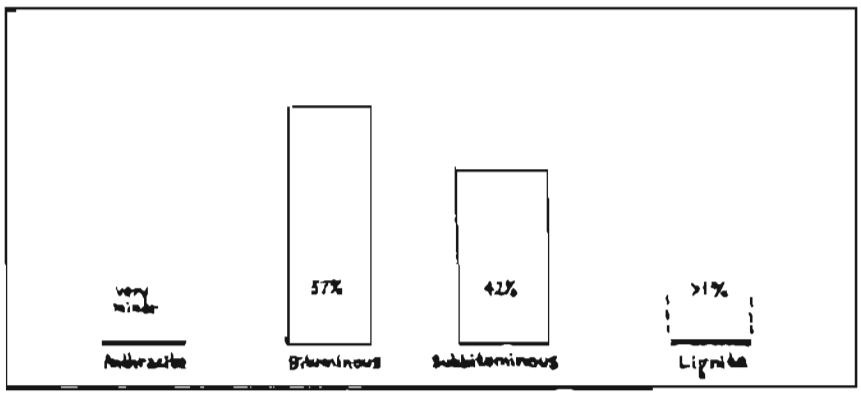



Figure 14. Percentage of Alaska's coal resources by rank (from McGee and Emmel, 1979).

Table 6. Representative analyses of Alaskan coals on an as-received basis (compiled from various sources).

| Coal area | Moisture | Volatile matter | Fixed carbon | Ash | Sulfur | Heating value | Rank* |
|---|---|---|---|---|---|---|---|
| Arctic Slope | | | | | | | |
| Foothills | 2-10 | 31-36 | 53-58 | 4-15 | 0.1-0.3 | 10,000-13,500 | hvCb |
| Coastal Plain | 8-20 | 30-36 | 38-50 | 3-20 | 0.2-0.8 | 7,700-10,700 | subB |
| Nulato | 1-10 | 25-40 | 47-65 | 3-22 | 0.2-0.6 | 9,100-9,750 | hvCb |
| Eagle-Circle | 2-15 | 20-45 | 40-55 | 2-22 | 0.2-0.6 | 10,900-11,500 | mvb |
| Nenana | 10-31 | 21-43 | 24-45 | 3-30 | 0.2-1.2 | 6,200-9,800 | subC |
| Jarvis Creek | 20-25 | 35-45 | 25-35 | 5-15 | 0.3-1.5 | 7,800-9,500 | subC |
| Broad Pass | 20-35 | 27-35 | 20-28 | 10-20 | 0.2-0.4 | 5,500-7,100 | lig |
| Susitna Lowland | 10-30 | 28-40 | 25-45 | 3-30 | 0.1-0.7 | 6,200-9,500 | subC |
| Kenai | 20-27 | 30-38 | 25-35 | 3-25 | 0.2-0.4 | 6,500-8,500 | subC |
| Matanuska Valley | | | | | | | |
| Wishbone Hill | 3-9 | 32-45 | 38-51 | 4-22 | 0.2-1.0 | 10,400-13,200 | hvBb |
| Chickaloon | 1-5 | 14-24 | 60-72 | 5-20 | 0.4-0.7 | 11,960-14,400 | lvb |
| Anthracite Ridge | 3-9 | 7-11 | 65-81 | 7-20 | 0.2-0.7 | 10,720-14,000 | sa |
| Bering River | 1-8 | 13-17 | 65-91 | 2-18 | 0.1-1.0 | 11,000-15,000 | lvb |
| Chignik-Herendeen Bay | 7-9 | 32-35 | 45-51 | 7-12 | 0.2-0.4 | 11,300-11,800 | hvBb |

*sa = semianthracite, lvb = low-volatile bituminous, mvb = medium volatile bituminous, hvBb = high-volatile B bituminous, hvCb = high-volatile C bituminous, subB = subbituminous B, subC = subbituminous C, lig = lignite.

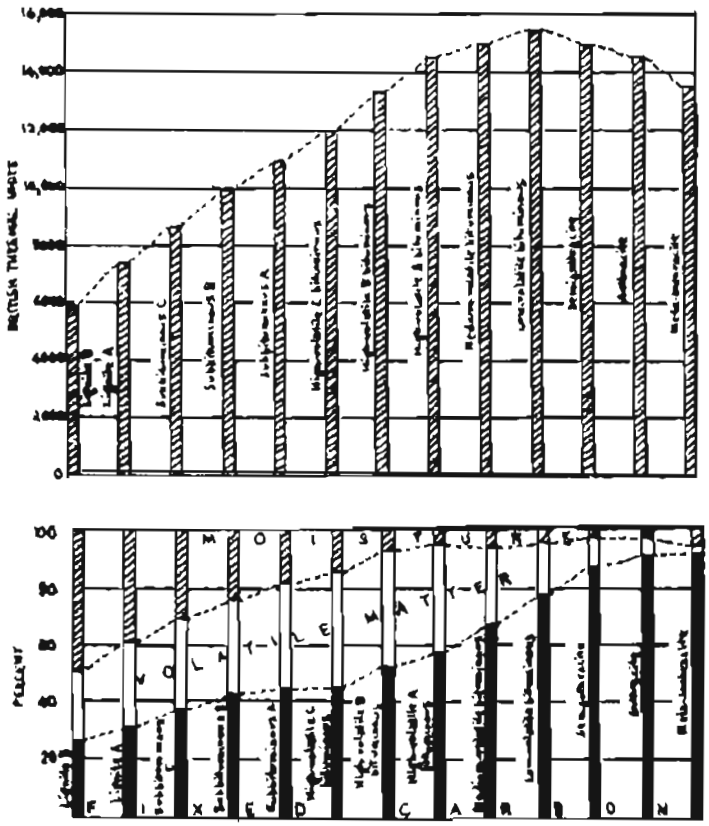


Figure 15. Comparison of the heating value of coals of different ranks to proximate analyses (modified from Trumbull, 1960).

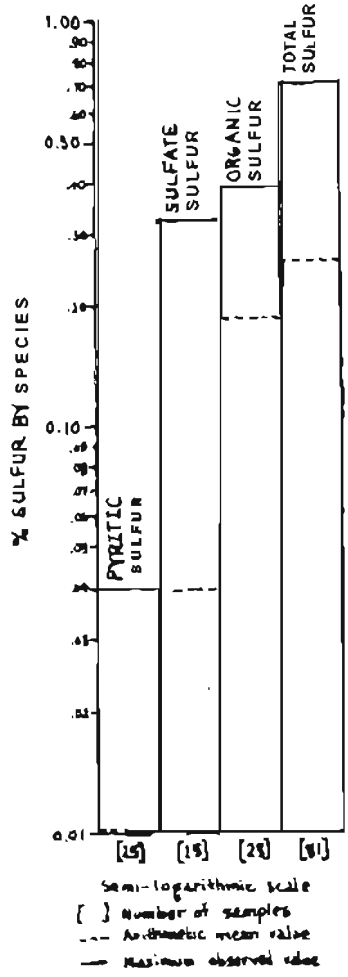



Figure 16. Histogram showing the maximum and mean values for the percent total sulfur and sulfur species of Susitna Lowland coal samples (as received basis).

occurs in the Bering River and Matanuska fields. The quality of Alaskan coals in general compares very favorably with other western U.S. coals (table 6 and compare with figure 15). One of the chief advantages of Alaskan coals is their extremely low sulfur contents. Organic sulfur is commonly the most abundant form of sulfur in Alaskan coals (fig. 16). Since most acid-mine drainage results from pyritic sulfur (particularly framboidal pyrite), both the low sulfur content and organic variety should preclude significant AMD problems at Alaska coal mine sites. The lower mean annual temperatures and local relative aridity act to reduce the oxidation effects on Alaskan coals. Because of the very low emissions of $SO_x$ and $NO_x$ gases during combustion, Alaskan coals are environmentally among the safest in the world.

## COAL RESOURCES

Alaska probably contains half of the coal resources of the United States and possibly 15 percent of the total world coal resources (table 7). Hypothetical coal resource estimates range upward to over 5.5 trillion short tons. Only the Soviet Union, the People's Republic of China, and the contiguous United States contain as much coal as Alaska (table 8). Alaska may hold 10 percent of the technically and economically recoverable coal reserves of the world.

Due to the current relative poor definition of Alaska's coal resources, measured coal reserve figures are low compared to projected total coal resources. Measured coal reserves and the demonstrated coal reserve base are over 6.0 billion short tons (table 9), indicated and inferred reserves are over 15 billion short tons (table 10), and identified resources are about 170

Table 7. Alaska coal resources compared to the U.S. and the world (modified from McConkey and others, 1977).

| | Total coal resources (trillion short tons) | Percent in Alaska | Percent probable |
|---|---|---|---|
| Alaska | 2.0 - 5.5 | - - - | - - - |
| United States | 4.5 - 9.0 | 44-61 | 50 |
| World | 20.0 - 25.0 | 10-22 | 15 |

Table 8. World coal resources (percent total resource basis). Data evaluated and altered from various sources (including Wilson, 1980). Reflects magnitude percentage of total only.

| Country | Geological resources | Technically and economically recoverable reserves |
|---|---|---|
| 1. Soviet Union | 40.0 | 16.5 |
| 2. People's Republic of China | 16.0 | 15.0 |
| 3. Contiguous United States | 15.0 | 15.0 |
| 4. Alaska | 15.0 | 10.0 |
| Total United States | 30.0 | 25.0 |
| 5. Australia | 4.5 | 5.0 |
| 6. Canada | 2.5 | 0.5 |
| 7. Federal Republic of Germany | 2.0 | 5.0 |
| 8. United Kingdom | 1.5 | 6.5 |
| 9. Poland | 1.0 | 8.0 |
| 10. India | 0.5 | 2.0 |
| 11. Republic of South Africa | 0.5 | 6.5 |
| 12. Other countries | 1.5 | 10.0 |
| World total | 100.0% | 100.0% |

Table 9. Demonstrated coal reserve base of major coal-resource states of United States (billion short tons; U.S. Department of Energy, 1982).

| | | | | | |
|---|---|---|---|---|---|
| 1. | Montana | 120 | 8. | Colorado | 17 |
| 2. | Illinois | 79 | 9. | Texas | 13 |
| 3. | Wyoming | 70 | 10. | Indiana | 10 |
| 4. | West Virginia | 39 | 11. | N. Dakota | 10 |
| 5. | Kentucky | 33 | 12. | Utah | 6 |
| 6. | Pennsylvania | 30 | 13. | ALASKA | 6 |
| 7. | Ohio | 19 | 14. | Missouri | 6 |

Table 10. Identification of coal resource areas.

Table 10. IDENTIFICATION OF COAL RESOURCE AREAS,

TOTAL RESOURCES
( billion short tons)

| | IDENTIFIED | | UNDISCOVERED | |
|---|---|---|---|---|
| | Measured | Indicated and inferred | Hypothetical (in known districts) | Speculative (in undiscovered districts) |
| ECONOMIC | 6.0 RESERVES | 15.0 | 5,500.0 total<br>4,000.0 onshore | |
| SUBECONOMIC | 0.25 | 160 | | |

R E S O U R C E S

Identified resources

UNDISCOVERED RESOURCES

Increasing degree of economic feasibility

Increasing degree of geologic assurance

(modified from McGee and Emmel, 1979)

billion short tons (table 10). According to the U.S. Geological Survey (Averitt, 1973), Alaska ranks fifth among the states in terms of the total estimated remaining coal resources to 6,000 ft depth (table 11). The Alaska Regional Energy Resources Planning Project report (McConkey and others, 1977) estimated Alaska's coal resources between 1.7 and 4.9 trillion short tons. McGee and Emmel (1979) estimated Alaska's total coal resources (excluding the large offshore accumulations) at over 1.8 trillion short tons.' Figures 17-19 compare this level of resources (i.e., McGee and Emmel, 1979) with those of the contiguous U.S. and the world, the resources of the three largest coal provinces of the state, and coal resources by area. Table 12 summarizes the coal resources of the major fields of Alaska. Perhaps 75 percent of Alaska's coal underlies the 23 million acre National Petroleum Reserve on the North Slope. The North Slope province (including offshore extensions) could very well be the largest single coal deposit on earth.

New discoveries of coal in Alaska are being made annually as exploration activity steps up. Coal may underlie large areas of the Yukon Flats Cenozoic basin (Barker, 1981), deposits along the Nenana trend have been extended up to 200 mi southwestward, and significant deposits are also believed to underlie tracts in the Copper River basin. Since the surficial expression of existent coal deposits in many areas of Alaska known to contain large quantities of coal is poor to absent, entire new fields may be discovered in the future.

## COAL PRODUCTION

Early coal production (pre-World War II) in Alaska was dominated by underground mining. An era of combined underground and surface mining

Table 11. Total estimated remaining coal resources to 6,000 ft of major coal-resource states of U.S. (billion short tons; Averitt, 1973).

| | | | | | |
|---|---|---|---|---|---|
| 1. | Wyoming | 546 | 6. | Illinois | 239 |
| 2. | N. Dakota | 531 | 7. | Kentucky | 117 |
| 3. | Montana | 379 | a. | N. Mexico | 109 |
| 4. | Colorado | 372 | 9. | W. Virginia | 101 |
| 5. | ALASKA | 265 | 10. | Pennsylvania | 87 |

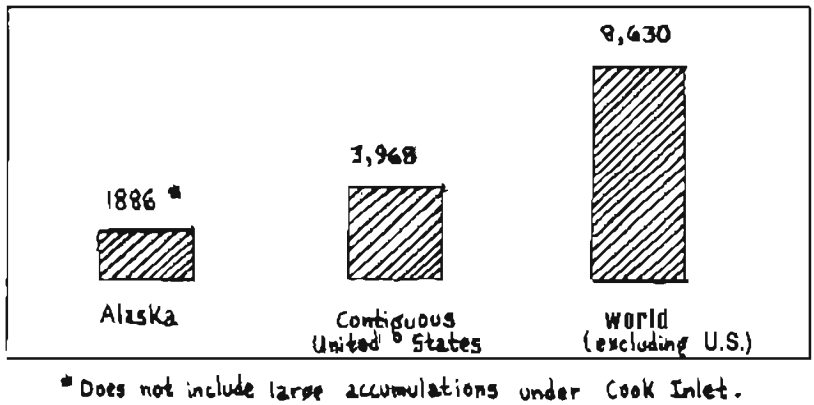



Figure 17. Comparison of the coal resources of Alaska, the contiguous United States and the world (billions of short tons; modified from McGee and Emmel, 1979).

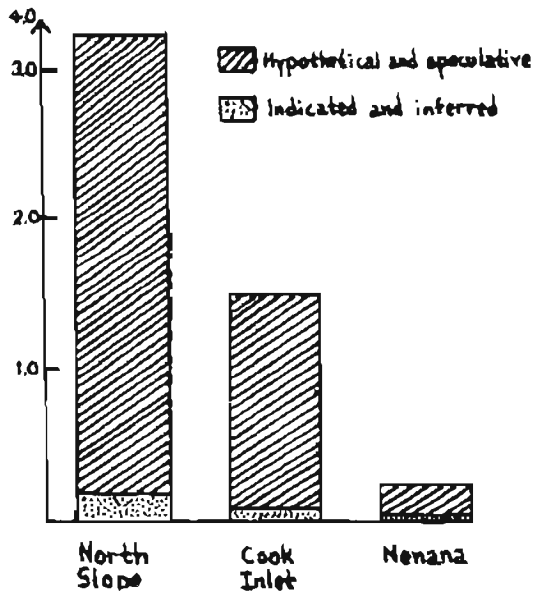



Figure 18. Comparison of coal resources for three major coal provinces of Alaska (trillions of short tons; after McGee and O'Connor, 1975; Tailleur and Brosgé, 1976).

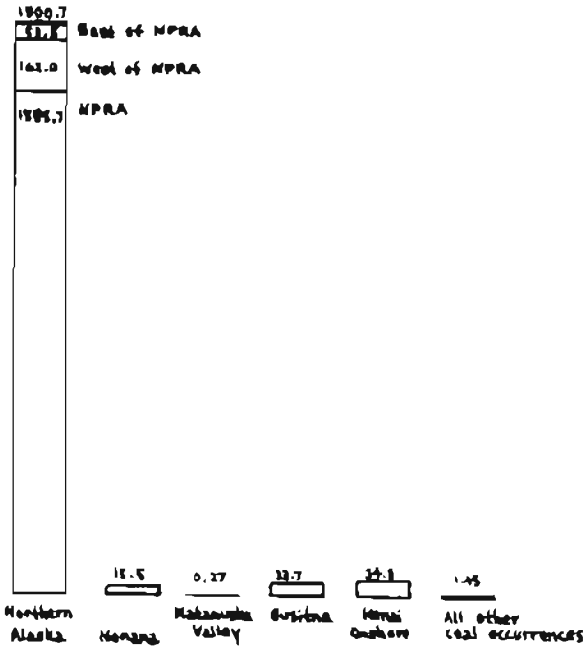



Figure 19. Coal resources by area in Alaska (billions of tons; after McGee and Emmel, 1979).

Table 12. Summary of the coal resources of Alaska (in millions of short tons; modified from McGee and Emmel, 1979).

| Region | Measured | Identified resources | Hypothetical resources |
|---|---|---|---|
| Northern Alaska coal province | 250 | 150,000 | to 4,000,000 |
| Cook Inlet-Susitna Lowland coal province | >2,500 | 11,000 | >1,600,000 |
| a. Beluga and Yentna fields | 2,500 | 10,000 | to 30,000 |
| b. Kenai field (including offshore deposits) | 0.5 | 320 | to 150,000[1]<br>to 1,500,000[2] |
| c. Matanuska field | 50 | 120 | to 500 |
| d. Broad Pass field | 10 | 50 | to 500 |
| Nenana trend coal province' | 3,500 | 7,000 | to 17,000 |
| Jarvis Creek field | 1 | 75 | to 175 |
| Other interior coal occurrences | --- | --- | to 5,000 |
| Bering River field | 60 | 100 | to 3,500 |
| Chignik Bay-Herendeen Bay fields | 20 | 200 | to 3,000 |
| ALASKA (total) | >6,300 | >168,000 | >5,600,000 |

[1] Includes offshore deposits to 2,000 ft depth.
[2] Includes offshore deposits to 10,000 ft depth.
[3] Includes Farewell-Little Tonzona field.

followed from around 1943 till the early 1960s. Recent production has been entirely by surface mining (fig. 20). More coal was produced in the mid-sixties (from more mines) than at present reflecting its use by Elmendorf and Fort Richardson military bases near Anchorage. The Usibelli Coal Mine (fig. 21) currently produces about 800,000 short tons of coal per year at the Poker Flats pit of the Lignite Creek field, Nenana basin. The annual tonnages and the value of coal produced in Alaska for nearly the past century are listed in table 2.

ECONOMICS

In addition to the vast resource base and wide distribution, the extremely low sulfur contents and near proximity to coastal access in certain areas are important selling points for Alaska coal. In fact, coal-bearing areas in Alaska near tidewater may have the greatest potential of any undeveloped coal 'property' in the United States. Exploration, technology, and economics will ultimately determine the marketability of Alaska's coal resources. Large-scale exploration programs have been conducted in most of Alaska's coal fields for the past decade by private industry and state and federal governments. Alaska's complicated land status (for example, see figs. 22 and 23) may slow or limit future coal development in certain areas.

Technologically, the mining of coals in areas of the state underlain by permafrost (fig. 24) may present the most formidable future challenge. From an economics standpoint, Pacific-rim countries are potential markets for large-scale coal exports. Alaska is closer to these markets than other possible coal-exporting countries---as Canada, Australia, or South America---

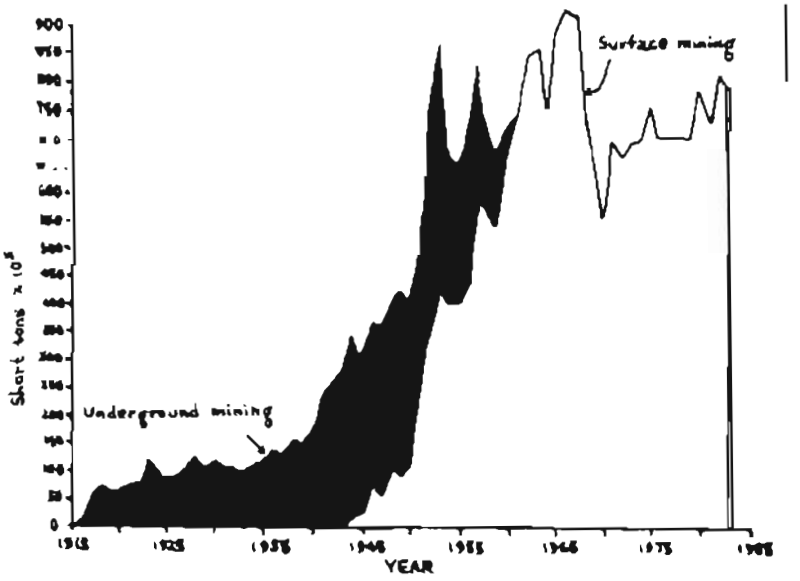



Figure 20. Coal production in Alaska, 1915-83 (modified from Eakins and others, 1983).

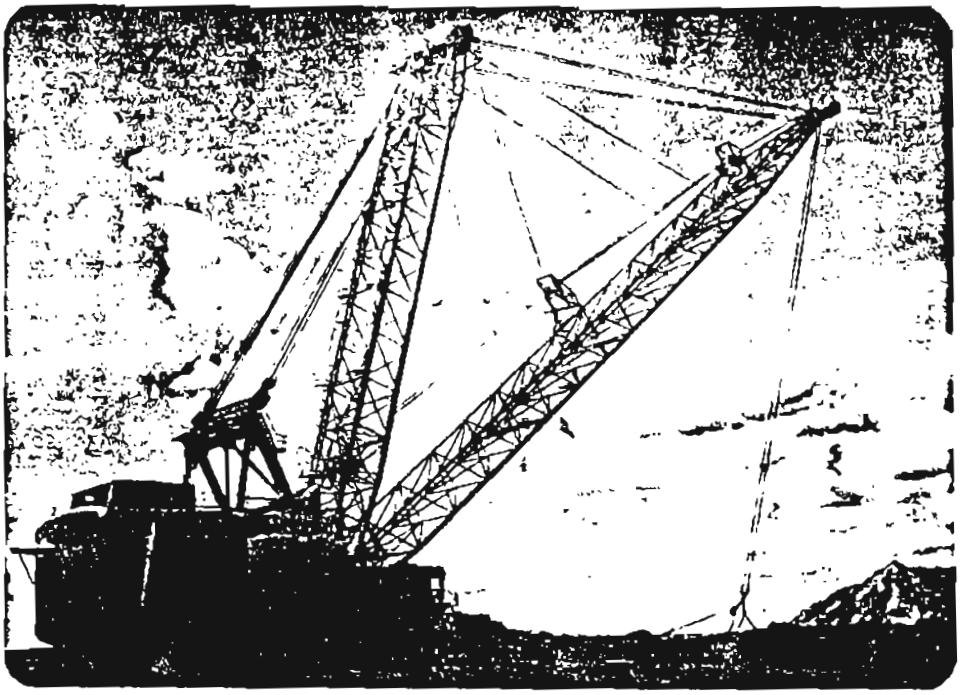


Figure 21. 'Ace-in-the-Hole' dragline of the Usibelli Coal Mine, Healy, Alaska.

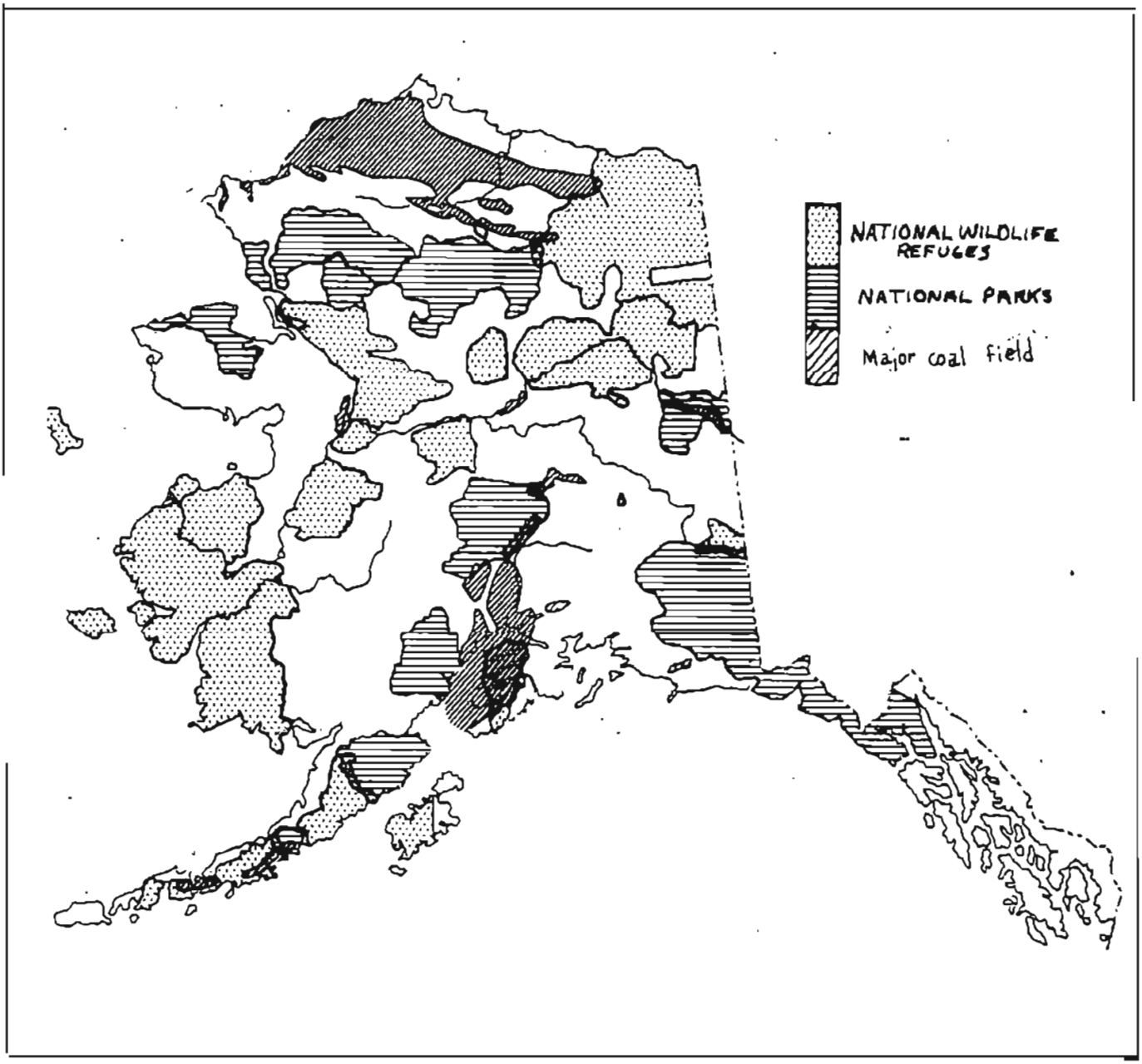



Figure 22. Location of national parks and wildlife refuges in relation to major coal fields in Alaska.

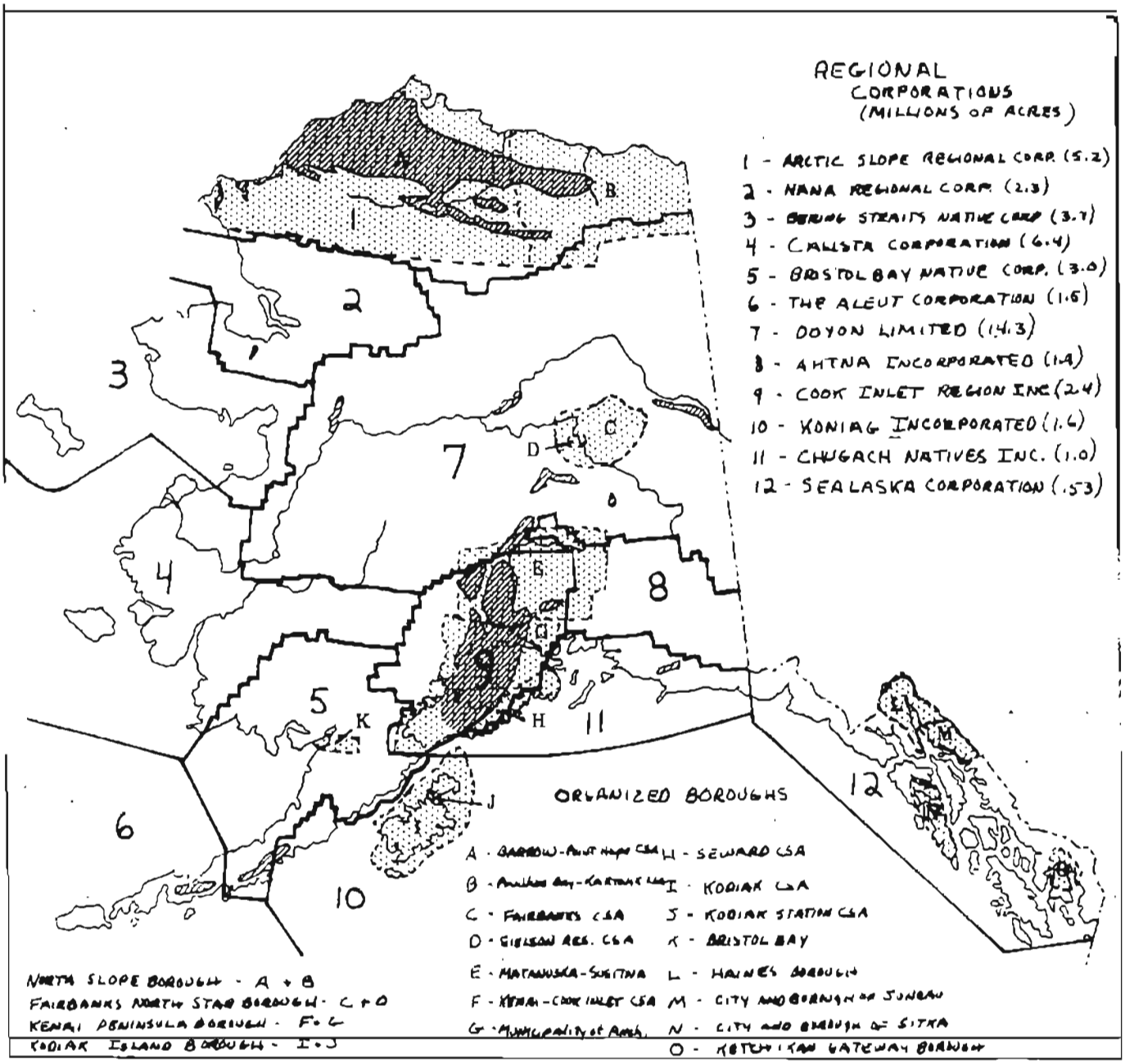



Figure 23. Regional corporations and organized boroughs of Alaska in relation to major coal fields.

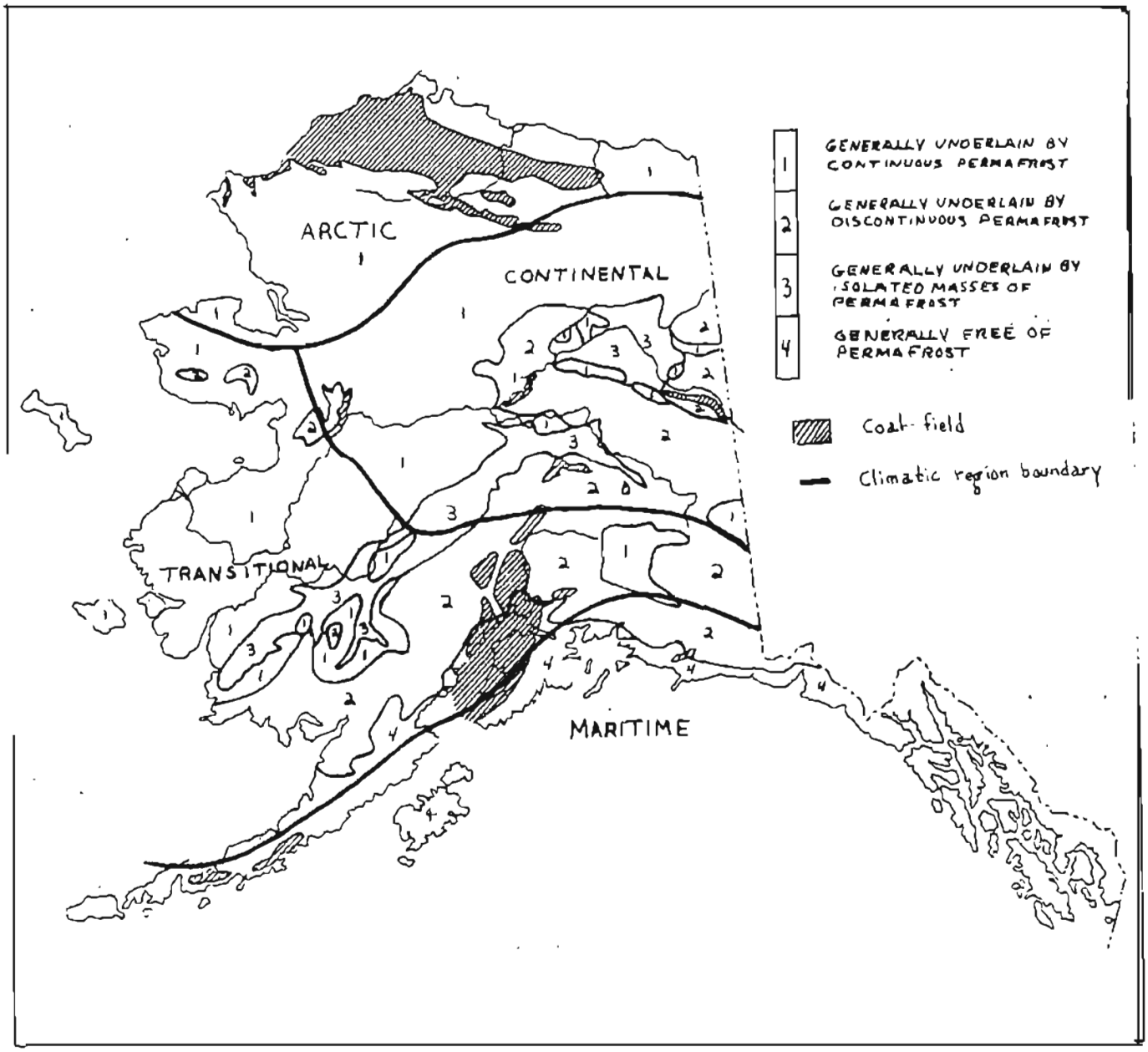



Figure 24. General climatic regions and permafrost distribution (after Ferrians, 1965) in Alaska compared to major coal field locations.

giving the state a competitive edge (see fig. 25). Far-Easterners typically view Alaska as a veritable 'treasure house' of energy and mineral resources.

Test shipments of Alaska coal to Japanese and Korean utilities have been made in hopes of establishing long-term contracts. Production at the Usibelli Coal Mine in the interior is slated to double by 1985 to meet the terms of the first Asian contract for Alaska coal. Shipments from the mine near Healy will travel via the Alaska Railroad to Seward on the Gulf of Alaska and thence by cargo ships to Korea. Harbor facilities and dredging operations are presently being completed at Alaska's first coal port. After the dredging is completed, the port at Seward will be able to handle 65,000-ton cargo vessels. In addition to exports, Alaskan coals can be substituted for expensive and uncertain supplies of fuel oil in many Alaskan towns and villages, Mine-mouth power plants and the generation of synthetic fuels (as methanol) are other viable options.

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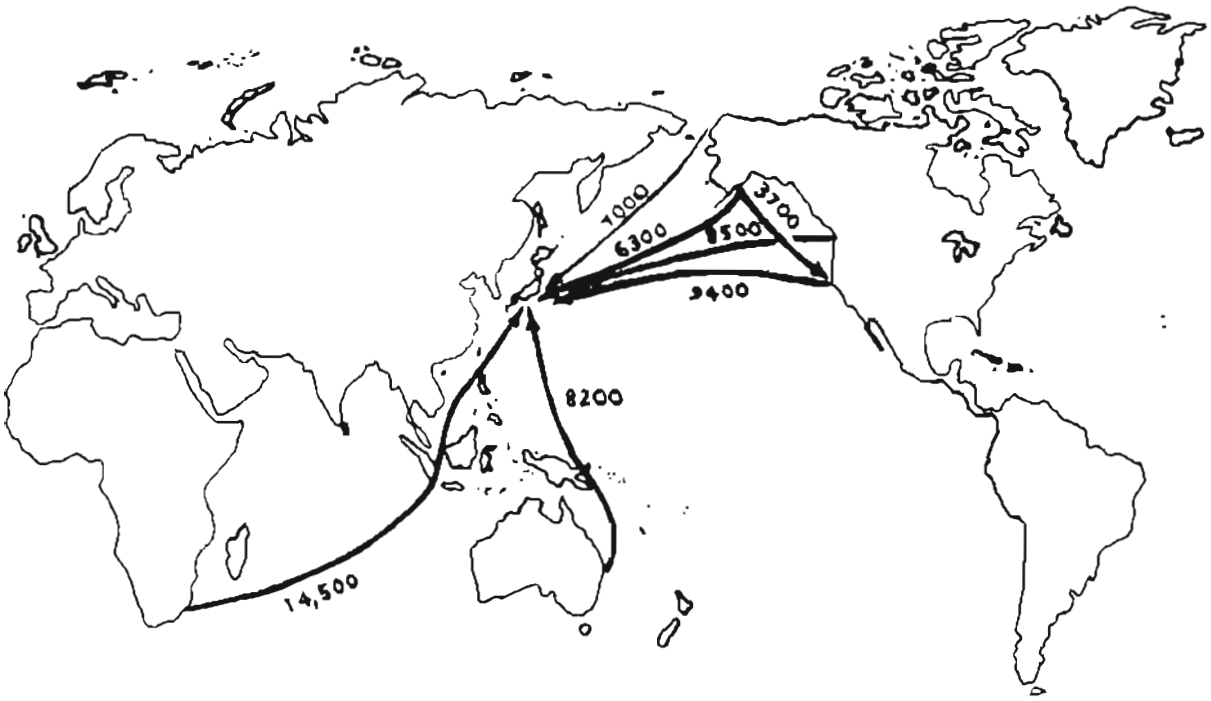


Figure 25. Round-trip ocean freight distances from potential coal-shipping points to Pacific markets (in nautical miles; modified from Swift and others, 1981).

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