Division of Geological & Geophysical Surveys

PUBLIC-DATA FILE 93-8

LAND SELECTION UNIT 8 (KANTISHNA RIVER, RUBY, AND MEDFRA QUADRANGLES): REFERENCES, LEAD ISOTOPE, GEOCHEMICAL AND MAJOR OXIDE DATA

by

K.H. Clautice, N.D. Bowman, J.G. Clough, W.G. Gilbert, J.T. Kline, T.E. Smith, and R.B. Blodgett

April 1993

Released by

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
Division of Geological & Geophysical Surveys
794 University Avenue, Suite 200
Fairbanks, Alaska 99709-3645

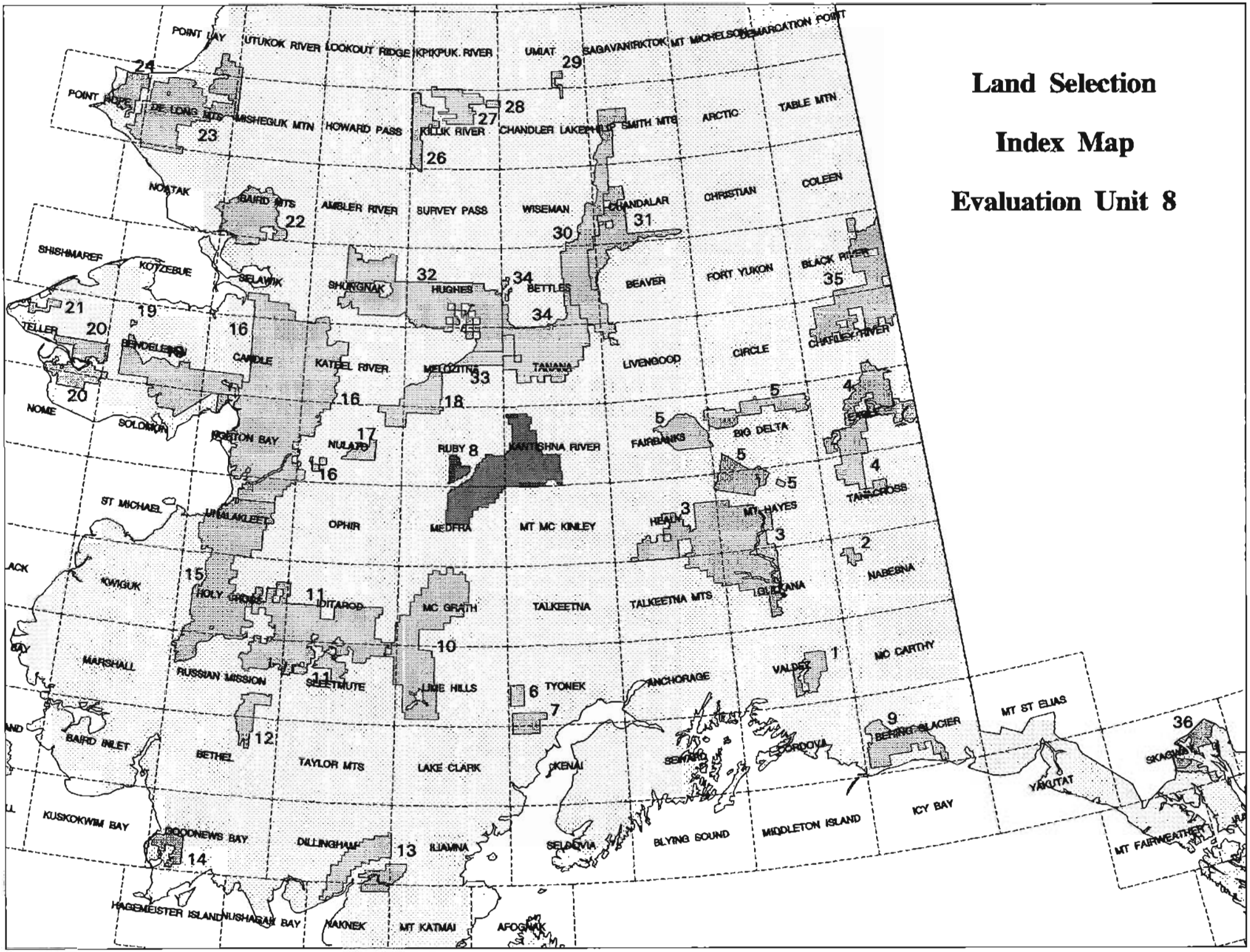
ERRATA

Public -Data File 93-8
Land Selection Unit 8 (Kantishna River, Ruby, and Medfra Quadrangles)

The following data were omitted from Table 3, page 41

	CR PPM	SR PPM	Y PPM	NB PPM
2320	60	412	15	44
2344	11	-10	43	28
2377	-10	546	29	44
2380	84	-10	24	34
2387	31	1530	18	25
2394	167	177	14	23
2753	-10	119	18	30
2760	36	279	52	22
2766	-10	441	41	35
2774	217	539	24	20
2789	251	1100	25	16
2795	-10	1310	15	28
2872	37	422	51	28
2878	25	1080	23	10
2880	23	289	53	35
2949	-10	76	42	46

CONTENTS


Land Selection
Index Map
Evaluation Unit 8
POINT LAY
UTUKOK RIVER
LOOKOUT RIDGE
KPIKPUK RIVER
UMIAT
SAGAVANIRKTOK
MT MICHELSON
DEMARCATION POINT
POINT HOPE
DE LONG MTS
MISHEGUK MTN
HOWARD PASS
KILLIK RIVER
CHANDLER LAKE
PHILIP SMITH MTS
ARCTIC
TABLE MTN
NOATAK
BAIRD MTS
AMBLER RIVER
SURVEY PASS
WISEMAN
CHANDALAR
CHRISTIAN
COLEEN
SHISHMAREF
KOTZEBUE
SELAWIK
SHUNGNAK
HUGHES
BETTLES
BEAVER
FORT YUKON
BLACK RIVER
TELLER
BENDELEBEN
CANDLE
KATEEL RIVER
MELOZITNA
TANANA
LIVENGOOD
CIRCLE
CHATHLEY RIVER
NOME
SOLOMON
NORTON BAY
NULATO
RUBY
KANTISHNA RIVER
FAIRBANKS
BIG DELTA
TANACROSS
ST MICHAEL
UNALAKLEET
OPHIR
MEDFRA
MT MC KINLEY
HEALY
MT HAYES
IGLUKANA
NABESNA
KWIGUK
HOLY CROSS
IDITAROD
MC GRATH
TALKEETNA
TALKEETNA MTS
MARSHALL
RUSSIAN MISSION
SLEETMUTE
LIME HILLS
TYONEK
ANCHORAGE
VALDEZ
MC CARTHY
BAIRD INLET
BETHEL
TAYLOR MTS
LAKE CLARK
KENAI
SEWARD
CORDOVA
BERING GLACIER
MT ST ELIAS
YAKUTAT
SKAGWAY
KUSKOKWIM BAY
GOODNEWS BAY
DILLINGHAM
ILIAMNA
SELDOVIA
BLYING SOUND
MIDDLETON ISLAND
ICY BAY
MT FAIRWEATHER
HAGEMEISTER ISLAND
NUSHAGAK BAY
NAKNEK
MT KATMAI
AFOGNAK

INTRODUCTION

The following data was compiled and used as part of a mineral evaluation of land remaining to be selected by the State of Alaska from its entitlement under the 1959 Alaska Statehood Act. Although much of the evaluation was based on a review of the literature, 10 days of helicopter-supported field work was conducted by the authors in August 1991.

Included herein is a bibliography of geological literature, geochemical analyses of rock and pan concentrate samples, a lead isotope analysis, and major oxide data with calculated normative minerals and gold discriminant values.

Normative minerals were calculated using the UAF/PETCAL program that is a modified version of a CIPW Normative calculation provided by the Nevada Geological Survey. The program is written in BASICA, and has been modified by L.E. Burns.

The discriminant scores presented in this report are a reflection of how similar the sampled rocks are to other systems which form gold deposits around the world. The score is based on the discriminant functions developed by Newberry and Burns (1989) and discussed in detail by Burns and others (1991). The discriminant functions statistically determine the extent to which the composition of an unaltered sampled plutonic rock resembles major-oxide compositions of unaltered plutonic rocks associated with gold deposits worldwide.

The discriminant score is a number between 0 and 100; a score of 100 indicates that the composition of the sample is indistinguishable from those of gold-associated plutons; a score of 0 indicates the opposite. The score is <u>not</u> directly proportional to the amount of gold present and does <u>not</u> indicate that there is gold at the sample site, but it is a good estimate of whether the sample belongs to a plutonic <u>system</u> that had the capability of depositing gold.

Some important limitations which must be considered in the interpretation of the scores are:
1) Only analyses from relatively unaltered rocks can be used.
2) Rocks from porphyry Cu-Mo deposits (because of alteration) and aplites will both typically have a low discriminant score, even though they may be from systems that are related to gold.
3) Discriminant scores are not given for alkalic (nepheline-normative) rocks, but these rocks may be related to gold.
4) A small percentage of plutonic rocks may appear to be related to gold systems when they are not.
5) Since gold deposits appear to be concentrated in the country rock just above a pluton or in the uppermost part of a pluton, and the areal extent of plutonic exposure generally increases with depth of a given pluton, a large, deeply eroded pluton would be less likely to host gold even if the pluton had a highly favorable score.

GEOLOGIC SUMMARY

Unit 8 encompasses about 2.6 million acres within the Kantishna River, Ruby, and Medfra quadrangles. The bedrock units of Unit 8 strike roughly northeast-southwest and represent diverse lithologies brought into juxtaposition by a system of northeast-trending strike slip faults and subsequent cross faults. From east to west the bedrock units include (1) a chert and black phyllite unit with some interbedded tuffaceous sediments of Ordovician to Silurian age, (2) limestone units of Ordovician through Devonian age of both reefal, shallow water and deep basin origin, and (3) to the northwest, a variety of Precambrian to lower Paleozoic metasedimentary and metaigneous rock including quartzite, quartz mica schist, calc-schist, and greenstone. Volcanic and plutonic rocks intruded these units along the northeast-trending fault system about 60 to 70 million years ago.

Major and trace element geochemical analyses of samples collected during the 1991 field season indicate there is a potential for gold deposits associated with plutonic rocks, which trend northeast-southwest across Unit 8. The region is very similar and on trend with recently recognized gold deposits outside Unit 8 in Southwestern Alaska.

Several lead-zinc-cadmium occurrences near Unit 8 and favorable stream sediment geochemistry within Unit 8 suggest that there is a potential for carbonate-hosted deposits of lead, zinc and cadmium within the unit. The proximity of the lead occurrences to plutonic rocks indicate that they might be hydrothermal vein occurrences or small skarns rather than a carbonate-hosted deposit. However, lead-isotope analyses done as part of the evaluation process suggest that the lead does not have an igneous source, but rather is similar isotopically to lead from carbonate-hosted deposits, which have a greater potential for significant tonnage.

Chert and black phyllite, which commonly host lead-zinc sedex deposits, underlie much of the eastern and central portions of Unit 8. There are no known occurrences of lead and zinc within the region, but because the area underlain by these rocks is so large and poorly explored and because rocks of similar age and lithology host significant deposits of lead and zinc in Canada, the area is considered to have a moderate to low favorability for lead zinc sedex deposits.

Extensive areas of hornfelsed rock and quartz-tourmaline veining, typically associated with tin greisen deposits, are abundant in the Bitzshtini and Haystack Mountain areas. Analyses of both intrusive rock and bedrock collected during this evaluation indicate a favorability for tin greisen deposits in this region of Evaluation Unit 8.

Radiometric surveys conducted as part of the National Uranium Research Evaluation (NURE) in the 1970s identified the region as having potential for uranium and rare earth deposits. Although no occurrences have been identified, trace element chemistry from rock samples collected during the land selection field work suggest a significant favorability for deposits of uranium and rare earths associated with the Sischu volcanics, which trend through the center of Evaluation Unit 8.

Data suggest a low potential for the discovery of gold veins associated with metamorphic rocks in the northern and western portions of Evaluation Unit 8. No significant gold placer production is known to have occurred within the area and the chance for the discovery of major new gold placers is considered to be low.

LAND SELECTION AREA 8: SELECT BIBLIOGRAPHY (KANTISHNA RIVER, RUBY, AND MEDFRA QUADRANGLES)

GEOLOGIC MAPS

Bundtzen, T.K., Kline, J.T., Smith, T.E., and Albanese, M.D., 1987, Geologic map of the McGrath A-2 quadrangle, Alaska: Alaska Division of Geological and Geophysical Surveys, 22 p., scale 1:63,360, 1 sheet.

Cass, John T., 1959, Reconnaissance geologic map of the Ruby Quadrangle, Alaska: U.S. Geological Survey Map I-289, scale 1:250,000, 1 sheet.

Chapman, R.M., and Patton, W.W., Jr., 1979, Two upper Paleozoic sedimentary rock units identified in southwestern part of the Ruby quadrangle, in Johnson, K.M., and Williams, J.R., eds., The United States Geological Survey in Alaska–Accomplishments during 1978: U.S. Geological Survey Circular 804-B, p. B59-61.

Chapman, R.M., and Yeend, Warren, 1981, Geologic reconnaissance of the east half of Kantishna River quadrangle and adjacent areas, in Albert, N.R.D., and Hudson, Travis, eds., The United States Geological Survey in Alaska--Accomplishments during 1979: U.S. Geological Survey Circular 823-B, p. B30-B32.

Chapman, R.M., Yeend, W.E., Brosge, W.P., and Reiser, Hillard N., 1975a, Preliminary geologic map of the Tanana and northeast part of the Kantishna River Quadrangles, Alaska: U.S. Geological Survey Open-file Report 75-337, scale 1:250,000, 1 sheet.

Chapman, R.M., Yeend, W.E., and Patton, W.W., Jr., 1975b, Preliminary reconnaissance geologic map of the western half of the Kantishna River Quadrangle, Alaska: U.S. Geological Survey Open-file Report 75-351, scale 1:250,000, 1 sheet.

Dutro, J.T., Jr., and Patton, W.W., Jr., 1981, Lower Paleozoic platform carbonate sequence in the Medfra quadrangle, west-central Alaska, in Albert, N.R.D., and Hudson, Travis, eds., The United States Geological Survey in Alaska--Accomplishments during 1979: U.S. Geological Survey Circular 823-B, p. B42-B44.

Moll, E.J., Silberman, M.L., and Patton, W.W., Jr., 1981, Chemistry, mineralogy, and K-Ar ages of igneous and metamorphic rocks of the Medfra Quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811C, 19 p., scale 1:250,000, 2 sheets.

Patton, W.W., Jr., Moll, E.J., Dutro, J.T., Jr., Silberman, M.L., and Chapman, R.M., 1980, Preliminary geologic map of the Medfra Quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811A, scale 1:250,000.

Silberman, M.L., Moll, E.J., Chapman, R.M., Patton, W.W., Jr., and Connor, C.L., 1979, Potassium-argon age of granitic and volcanic rocks from Ruby, Medfra, and adjacent quadrangles, west-central Alaska, in Johnson, K.M., and Williams, J.R., eds., The United States Geological Survey in Alaska--Accomplishments during 1978: U.S. Geological Survey Circular 804-B, p. B63-B66.

MINERALS

Berryhill, R.V., 1966, Summary report of minerals examination in the Cosna River region (Unpublished Report Form 6-803): U.S. Bureau of Mines, Available from U.S. Bureau of Mines, Fairbanks, AK.

Bundtzen, T.K., and Gilbert, W.G., 1983, Outline of geology and mineral resources of upper Kuskokwim region, Alaska: Alaska Geological Society, Proceedings of the 1982 symposium, v. 3, p. 101-117.

Burleigh, Roger, 1989, Tin and lead-silver mineralization in the Cosna River region: U.S. Bureau of Mines Open-file Report OFR 11-89, 19 p., 1 sheet.

Chapman, R.M., 1976, Geochemical anomalies in bedrock, west half of Kantishna River quadrangle, in Accomplishments during 1976: U.S. Geological Survey Circular 751-B, p. B35-B36.

Cobb, E.H., 1972a, Metallic mineral resource map of the Medfra Quadrangle, Alaska: U.S. Geological Survey MF 365, scale 1:250,000, 1 sheet.

--- 1972b, Metallic mineral resource map of the Ruby Quadrangle, Alaska: U.S. Geological Survey MF-405, scale 1:250,000, 1 sheet.

--- 1977, Placer deposits map of central Alaska: U.S. Geological Survey Open-file report 77-168B, 64 p., scale 1:1,000,000, 1 sheet.

--- 1978, Summary of references to mineral occurrences (other than mineral fuels and construction materials) in the Beaver, Bettles, and Medfra quadrangles, Alaska: U.S. Geological Survey Open-file Report 78-94, 55 p.

Cobb, E.H., and Chapman, R.M., 1981, Mineral occurrences (other than mineral fuels and construction materials) in the Kantishna River and Ruby Quadrangles, Alaska: U.S. Geological Survey Open-file Report 81-170, 94 p.

DGGS, 1982a, Mining claim location maps, Medfra Quadrangle, December 1982: Alaska Division of Geological and Geophysical Surveys, scale 1:250,000, 1 sheet.

--- 1982b, Mining claim location maps, Ruby quadrangle, December 1982: Alaska Division of Geological and Geophysical Surveys, scale 1:250,000, 2 sheets.

Eberlein, G.D., Chapman, R.M., Foster, H.L., and Gassaway, J.S., 1977, Map and table describing known metalliferous and selected nonmetalliferous mineral deposits in central Alaska: U.S. Geological Survey Open-file Report 77-168D, 132 p., scale 1:1,000,000.

Herreid, G., 1966, Geology and geochemistry of the Nixon Fork area, Medfra quadrangle, Alaska: Alaska Division of Geological and Geophysical Surveys Geologic Report no. 22, 34 p.

Jasper, M.W., 1960, Mespelt mine of Strandberg Mines, Inc., Territorial Department of Mines Document: Alaska Division of Geological and Geophysical Surveys PE-65-1,

Joesting, Henry R., 1943, Supplement to pamphlet No. 1--Strategic mineral occurrences in interior Alaska: Territory of Alaska, Dept. of Mines Pamphlet No. 2, March 1943, pp. 18-19.

King, H.D., Cooley, E.F., Gruzensky, A.L., and Spiesman, D.L., Jr., 1983, Distribution and abundance of gold and silver in nonmagnetic and moderately magnetic heavy-mineral

concentrate and minus 80-mesh stream sediment samples and silver in ash of aquatic-bryophyte samples, Medfra Quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811H, scale 1:250,000, 3 sheets.

Miller, T.P., Moll, E.J., and Patton, W.W., Jr., 1980, Uranium- and thorium-rich volcanic rocks of the Sischu Creek area, Medfra Quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-803, 9 p.

Patton, W.W., Jr., and Moll, E.J., 1983, Mineral resource assessment map of the Medfra Quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811G, scale 1:250,000, 3 sheets.

Reed, B.L., and Miller, R.L., 1971, Orientation geochemical soil survey at the Nixon Fork Mines, Medfra quadrangle, Alaska: U.S. Geological Survey Bulletin 1312-K, K1-K21 p.

Roehm, J.C., 1937, Nixon Fork district lode mining, Territorial Department of Mines Document: Alaska Division of Geological and Geophysical Surveys MR-65-1,

Schwab, C.E., Patton, W.W., Jr., and Moll, E.J., 1981, Mineral occurrence map of the Medfra quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811B, scale 1:250,000.

Silberman, M.L., O'Leary, R.M., Gray, L.B., and Patton, W.W., Jr., 1983, Trace metal anomalies associated with silicfication and argillic alteration in a rhyolite flow-dome in volcanic rocks of the Nowitna River area, Medfra quadrangle, Alaska, in Coonrad, W.L., and Elliot, R.L., eds., The United States Geological Survey in Alaska: Accomplishments during 1981: U.S. Geological Survey Circular 868, p. 32-34.

Thomas, Bruce, 1948, Nixon Fork mining district, Territorial Department of Mines Document: Alaska Division of Geological and Geophysical Surveys MR-65-2,

Throckmorton, M.L., and Patton, W.W., Jr., 1978, Contact metasomatic magnetite deposit, Medfra Quadrangle, Alaska: U.S. Geological Survey Open-file Report 78-26, 13 p.

White, M.G., and Stevens, J.J.M., 1953, Reconnaissance for radioactive deposits in the Ruby-Poorman and Nixon Fork districts, west-central Alaska: U.S. Geological Survey Circular 279, 19 p.

GEOCHEMISTRY

King, H.D., and Tripp, R.B., 1983, Multi-element maps showing the relative amounts of selected elements in four geochemical sampling media, Medfra quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811M, scale 1:250,000, 4 sheets.

King, H.D., Cooley, E.F., O'Leary, R.M., Tripp, R.B., McDanal, S.K., and Speisman, D.L., Jr., 1979, Spectrographic and atomic-absorption analyses of geochemical samples from the Medfra quadrangle, Alaska: U.S. Geological Survey Open-file Report 79-959, 43 p., scale 1:250,000, 1 sheet.

King, H.D., Risoli, D.A., Cooley, E.F., O'Leary, R.M., Speckman, W.A., Spiesman, D.L., and Galland, D.W., 1981, Final results and statistical summary of analysis of geochemical samples from the Medfra quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811F, 136 p., scale 1:250,000, 1 sheet.

King, H.D., Cooley, E.F., Gruzensky, A.L., and Spiesman, D.L., Jr., 1983a, Distribution and abundance of gold and silver in nonmagnetic and moderately magnetic heavy-mineral concentrate and minus 80-mesh stream sediment samples and silver in ash of aquatic-bryophyte samples, Medfra Quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811H, scale 1:250,000, 3 sheets.

King, H.D., Cooley, E.F., and Spiesman, D.L., Jr., 1983b, Distribution and abundance of arsenic and bismuth in nonmagnetic and moderately magnetic heavy-mineral-concentrate samples and arsenic in minus-80-mesh stream-sediment samples and ash of aquatic-bryophyte samples, Medfra quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811K, scale 1:250,000, 3 sheets.

King, H.D., O'Leary, R.M., Risoli, D.A., and Galland, D.W., 1983c, Distribution and abundance of antimony and mercury in minus-80-mesh stream-sediment and antimony in nonmagnetic and moderately magnetic heavy-mineral-concentrate samples, Medfra quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811L, scale 1:250,000, 2 sheets.

King, H.D., Risoli, D.A., and Tripp, R.B., 1983d, Distribution and abundance of molybdenum, tin and tungsten in nonmagnetic and moderately magnetic heavy-mineral-concentrate samples and tin in minus-80-mesh stream-sediment and ash of aguatic-bryophyte samples, Medfra quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811J, scale 1:250,000, 4 sheets.

King, H.D., Tripp, R.B., O'Leary, R.M., and Cooley, E.F., 1983e, Distribution and abundance of copper, lead, and zinc in nonmagnetic and moderately magnetic heavy-mineral-concentrate and minus-80-mesh stream-sediment, and ash of aquatic-bryophyte samples, Medfra quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811I, scale 1:250,000, 6 sheets.

Reed, B.L., and Miller, R.L., 1971, Orientation geochemical soil survey at the Nixon Fork Mines, Medfra quadrangle, Alaska: U.S. Geological Survey Bulletin 1312-K, K1-K21 p.

Wiltse, M.A., 1990, National Uranium Resource Evaluation (NURE) geochemical data for stream- and lake-sediment samples, Alaska--Medfra, Ruby, Kantishna River quadrangles: Alaska Division of Geological and Geophysical Surveys Public-data File 91-22u,ff,-

GEOPHYSICAL SURVEYS

Anderson, L.A., Reed, B.L., and Johnson, G.R., 1970, Geologic interpretation of a residual aeromagnetic map of the Nixon Fork district, Alaska: U.S. Geological Survey Professional Paper 700-D, D129-D133 p.

Barnes, D.F., 1977, Preliminary Bouguer gravity map of central Alaska: U.S. Geological Survey Open-file map 77-168-C, scale 1:1,000,000.

Decker, John, and Karl, Susan, 1977, Preliminary aeromagnetic profiles of central Alaska: U.S. Geological Survey Open-file Report 77-168F, scale 1:1,000,000, 1 sheet.

Department of Energy, 1980a, Airborne gamma-ray spectrometer and magnetometer survey, four corners detail area, portions of Kantishna River, Mt. McKinley, Medfra, and Ruby quadrangles, in Final Report, Volume II, prepared for the Dept. of Energy: Houston, Texas, Aero Service Division, Western Geophysical Company of America, GJBX 116-80, .

--- 1980b, Airborne gamma-ray spectrometer and magnetometer survey, Kantishna River quadrangle, Alaska, in Final Report, Volume II, prepared for the Dept. of Energy: Houston, Texas, Aero Service Division, Western Geophysical Company of America, GJBX 94-80, .

--- 1980c, Airborne gamma-ray spectrometer and magnetometer survey, Medfra quadrangle, Alaska, in Final Report, Volume II, prepared for the Dept. of Energy: Houston, Texas, Aero Service Division, Western Geophysical Company of America, GJBX 76-80, .

--- 1980d, Airborne gamma-ray spectrometer and magnetometer survey, Ruby quadrangle, Alaska, in Final Report, Volume II, prepared for the Dept. of Energy: Houston, Texas, Aero Service Division, Western Geophysical Company of America, GJBX 75-80, .

Patton, W.W., Jr., Cady, J.W., and Moll, E.J., 1982, Aeromagnetic interpretation of the Medfra Quadrangle, Alaska: U.S. Geological Survey Open-file Report 80-811E, 14 p., scale 1:250,000, 2 sheets.

USGS, 1976, Aeromagnetic survey, Ruby Quadrangle (western half), Alaska: U.S. Geological Survey Open-file Report 76-188, scale 1:250,000.

--- 1979, Aeromagnetic map of the Medfra 1 degree by 3 degree Quadrangle, Alaska: U.S. Geological Survey Open-file Report 79-380, scale 1:250,000, 1 sheet.

OTHER

Bundtzen, T.K., and Miller, M.L., 1992, Petrology and metallogeny of late Cretaceous-early Tertiary igneous rocks, Kuskokwim Mts., southwest Alaska, in Geological Society of America, southwestern Alaska Symposium, May 11-13, 1992, abstract.

Burns, L.E., Newberry, R.J., and Solie, D.N., 1991, Quartz normative plutonic rocks of Interior Alaska and their favorability for association with gold: Alaska Division of Geological and Geophysical Surveys Report of Investigations 91-3, 71 p., scale 1:250,000, 2 sheets

Clough, J.G., and Blodgett, R.B., 1992, A southwest Alaska Late Silurian - Early Devonian algal reef-rimmed carbonate ramp: Depositional cycles and regional significance, in Geological Society of America, southwestern Alaska Symposium May 11-13, 1992, abstract.

Dillon, J.T., Patton, W.W., Jr., Mukasa, S.B., Tilton, G.R., Blum, Joel, and Moll, E.J., 1985, New radiometric evidence for the age and thermal history of the metamorphic rocks of the Ruby and Nixon Fork terranes, west-central Alaska, in The United States Geological Survey in Alaska--Accomplishments during 1983: U.S. Geological Survey Circular 945, p. 13-18.

Gemuts, I., Puchner, C.C., and Steffel, C.I., 1983, Regional geology and tectonic history of Western Alaska: Alaska Geological Society, Proceedings of the 1982 symposium, v. 3, p. 67-85.

LeCompte, J.R., 1981, Maps showing interpretation of Landsat imagery of the Medfra quadrangle,Alaska: U.S. Geological Survey Open-file Report 80-811D, scale 1:250,000, 2 sheets.

Moll-Stalcup, E.J., 1990, Latest Cretaceous and Cenozoic magmatism in mainland Alaska: U.S. Geological Survey Open-file Report 90-84, 82 p.

Newberry, R.J., and Burns, L.E., 1989, The probabilistic estimation of gold resources in the Circle - Fairbanks - Kantishna area: Alaska Division of Geological and Geophysical Surveys Public-data File 89-9, 32 p., 1 sheet.

Patton, W.W., Jr., 1978a, Juxtaposed continental and oceanic-island arc terranes in the Medfra quadrangle, west-central Alaska, in Johnson, K.M., ed., The United States Geological Survey in Alaska--Accomplishments during 1977: U.S. Geological Survey Circular 772-B, p. B38-B39.

-- 1978b, Map and table describing areas of interest for oil and gas in central Alaska: U.S. Geological Survey Open-file Report 78-1-F, 2 p., scale 1:1,000,000, 2 sheets.

Patton, W.W., Jr., and Dutro, J.T., Jr., 1979, Age of the metamorphic complex in the northern Kuskokwim Mountains, west central Alaska, in Johnson, K.M., and Williams, J.R., eds., The U.S. Geological Survey in Alaska--Accomplishments during 1978: U.S. Geological Survey Circular 804-B, p. B61-B63.

Patton, W.W., Jr., Box, S.E., Moll-Stalcup, E.J., and Miller, T.P., 1989, Geology of west-central Alaska: U.S. Geological Survey Open-file Report 89-554, 50 p.

Shew, Nora, and Wilson, F.H., 1981, Map and tables showing radiometric ages of rocks in southwestern Alaska: U.S. Geological Survey Open-file Report 81-886, 25 p., scale 1:1,000,000.

Silberman, M.L., Moll, E.J., Patton, W.W., Jr., Chapman, R.M., and Connor, C.L., 1979, Precambrian age of metamorphic rocks from the Ruby province, Medfra and Ruby quadrangles--preliminary evidence from radiometric age data, in Johnson, K.M., and Williams, J.R., eds.,

The U.S. Geological Survey in Alaska--Accomplishments during 1978: U.S. Geological Survey Circular 804-B, p. B66-B67.

Streckeisen, A.L., and LeMaitre, R.W., 1979, A chemical approximation to the modal QAPF classification of the igneous rocks: Neues Jahrb. Mineral. Abh., v. 136, p. 169-206.

Wilson, F.H., and Turner, D.L., 1975, Radiometric age map of Alaska--southwestern Alaska: Alaska Division of Geological and Geophysical Surveys Open-file report AOF-84, 12 p.

LEAD ISOTOPE SAMPLE:

A lead isotope sample was collected from a gossan in silicified dolomitic breccia from the Reef Ridge Prospect in the Medfra Quadrangle. Geochemical analyses of this sample are listed in table 1.

Sample No.	Long(W)	Lat(N)	206Pb/204Pb	207Pb/204Pb	208Pb/204P
2370	154.367	63.385	18.456(07)	15.602(09)	37.981(09)

Errors are quoted at the 1 sigma standard error of the mean and occur in the last decimal place(s), e.g. 19.100(10) = 19.100 $\pm$ 0.010. All Pb isotopic results are corrected for isotopic fractionation relative to NBS SRM 981—corrections are 0.05%/mass unit. Lead concentrations are accurate to 5% as determined by replicate analyses of NIST SRM Pb standards (277, 1646, 1633a).

The sample was analyzed by Richard Hurst of Chempet Research Corporation, 330 N. Zachary Avenue, Suite 107, Moorpark, California 93021. Their analytical method: 1-3 mg of sample were extracted using 6.2 N HCL + 8N HNO3 (4:1 ratio). Lead was separated using anion exchange chromatography (HBr and HCl methods). Lead isotopic compositions were measured on a 30 cm radius, 90 degree sector TIMS. Isotopic fractionation ranged from 0.040 to 0.081% per atomic mass unit during the course of this study as measured relative to NBS SRM 981 lead (R. Hurst, written communication, 1992).

Table 1. GEOCHEMICAL ANALYSES OF ROCK AND PAN CONCENTRATE* SAMPLES

SAMPLE	LONG (W)	LAT (N)	QUAD	AU	IR	AG	ZN	MO	NI	CO	CD	AS	SB	FE	SE	TE	BA
				PPB	PPB	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM
				INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
2316	153.322	63.929	MED	<5	<100	<5	<200	62	<20	<10	<10	31	7.6	0.8	<10	<20	330
2317	153.322	63.929	MED	<5	<100	<5	<200	78	<20	<10	<10	40	7.7	0.9	<10	<20	210
2318	153.169	63.943	MED	<5	<100	<5	<200	<2	<20	<10	<10	32	7.2	7.9	<10	<20	340
2319	153.169	63.943	MED	<5	<100	<5	280	8	<20	<10	<10	68	11.0	8.6	<10	<20	530
2321	152.297	64.202	KR	6	<100	<5	<200	3	49	16	<10	14	9.2	4.5	<10	<20	1900
2322	152.297	64.202	KR	<5	<100	<5	<200	<2	<20	<10	<10	49	5.2	0.7	<10	<20	210
2324	152.300	64.206	KR	<5	<100	<5	<200	<2	40	23	<10	14	4.1	3.7	<10	<20	1300
2325	152.300	64.206	KR	<5	<100	<5	<200	<2	<20	<10	<10	37	2.8	0.7	<10	<20	<100
2326	152.300	64.206	KR	<5	<100	<5	300	<2	64	15	<10	22	11.0	4.6	<10	<20	3600
2327	152.305	64.210	KR	<5	<100	<5	<200	10	<20	29	<10	165	9.2	10.0	<10	<20	460
2328	152.310	64.212	KR	<5	<100	<5	<200	<2	<20	<10	<10	106	2.6	0.6	<10	<20	<100
2329	151.999	64.421	KR	<5	<100	<5	300	<2	<20	<10	<10	83	4.6	10.0	<10	<20	370
2330	151.999	64.421	KR	6	<100	<5	220	4	79	14	<10	2	8.7	3.2	<10	<20	1800
2331	151.998	64.416	KR	<5	<100	<5	430	<2	<20	<10	<10	13	14.0	10.0	<10	<20	100
2332	152.047	64.414	KR	7	<100	<5	<200	<2	<20	<10	<10	433	3.6	5.3	<10	<20	<100
2333	151.993	64.455	KR	<5	<100	<5	<200	<2	<20	<10	<10	270	3.9	3.0	<10	<20	<100
2334	152.010	64.454	KR	<5	<100	<5	<200	<2	51	<10	<10	153	7.5	4.4	<10	<20	490
2335	152.020	64.456	KR	<5	<100	<5	<200	<2	<20	<10	<10	842	26.6	10.0	<10	<20	530
2336	152.020	64.456	KR	19	<100	<5	<200	<2	<20	<10	<10	847	20.2	10.0	<10	<20	410
2337	152.028	64.459	KR	21	<100	11	250	<2	<20	<10	<10	793	34.3	10.0	<10	<20	1100
2338	152.294	64.472	KR	<5	<100	<5	320	<2	<20	48	<10	174	16.0	10.0	<10	<20	2100
2339	152.296	64.468	KR	<5	<100	<5	240	<2	81	39	<10	9	2.0	10.0	<10	<20	2000
2340	152.305	64.462	KR	<5	<100	<5	<200	<2	<20	31	<10	19	3.8	10.0	<10	<20	1300
2342	153.823	64.153	RUB	<5	<100	<5	<200	2	<20	<10	<10	<1	0.4	1.2	<10	<20	580
2343	153.824	64.148	RUB	<5	<100	7	<200	2	<20	<10	<10	1	2.0	1.0	<10	<20	930
2364	151.543	64.014	KR	8	<100	<5	<200	<2	<20	<10	<10	13	1.3	<0.5	<10	<20	100
2365	150.987	64.105	KR	<5	<100	<5	240	<2	120	28	<10	6	2.0	8.3	<10	<20	1700
2366	150.999	64.097	KR	<5	<100	<5	<200	<2	<20	<10	<10	5	0.4	1.0	<10	<20	<100
2367	152.733	64.213	KR	<5	<100	<5	<200	<2	<20	<10	<10	4	0.7	0.9	<10	<20	210
2368	152.949	64.155	KR	<5	<100	<5	<200	<2	280	64	<10	<1	1.0	10.0	<10	<20	1500
2369	152.944	64.152	KR	<5	<100	<5	<200	<2	<20	<10	<10	18	2.3	3.1	<10	<20	1100

* Sample numbers of the three pan concentrate samples in the data set are designated "PC."

SAMPLE	LONG (W)	LAT (N)	QUAD	AU	IR	AG	ZN	MO	NI	CO	CD	AS	SB	FE	SE	TE	BA
2370	154.367	63.385	MED	14	<100	<19	20000	4	7	<10	2000	8	0.8	<0.5	<10	<20	<220
2371	154.367	63.385	MED	<5	<100	<5	20000	18	<20	<10	600	87	3.9	10.0	<10	<20	<100
2372	154.095	63.471	MED	<5	<100	<5	2500	<2	<20	<10	25	3	0.4	1.2	<10	<20	<100
2373	154.577	63.519	MED	<5	<100	<5	340	<2	64	23	<10	301	3.9	3.3	14	<20	460
2374	154.500	63.523	MED	788	<100	<5	<200	2	<20	18	<10	50	5.3	2.2	<10	<20	220
2375	154.361	63.540	MED	52	<100	<5	<200	6	<20	13	<10	76	44.4	8.8	21	<20	910
2376	152.311	64.427	KR	<5	<100	<5	4300	7	<20	<10	16	3	1.3	3.6	<10	<20	2200
2378	152.309	64.423	KR	<5	<100	<5	600	5	<20	<10	<10	26	12.0	3.5	<10	<20	2300
2379	152.052	64.416	KR	<5	<100	<5	430	4	54	18	<10	263	11.0	5.7	<10	<20	1900
2381	151.562	64.316	KR	<5	<100	<5	<200	2	<20	<10	<10	10	1.6	1.1	<10	<20	890
2382	151.534	64.321	KR	<5	<100	<5	<200	<2	<20	<10	<10	3	0.8	0.8	<10	<20	580
2383	151.972	64.184	KR	<5	<100	<5	<200	<2	<20	<10	<10	1	0.5	3.1	<10	<20	190
2384	152.328	64.543	KR	<5	<100	<5	<200	<2	<20	<10	<10	5	3.8	1.0	<10	<20	9200
2385	152.387	64.542	KR	<5	<100	<5	<200	<2	<20	<10	<10	<1	<0.2	<0.5	<10	<20	250
2386	152.241	64.553	KR	6	<100	<5	280	<2	<20	84	<10	3	0.9	10.0	<10	<20	390
2388	152.098	64.652	KR	<5	<100	<5	<200	<2	<20	<10	<10	<1	<0.2	<0.5	<10	<20	<100
2389	152.103	64.654	KR	<5	<100	<5	<200	<2	<20	<10	<10	2	3.2	<0.5	<10	<20	140
2390	152.987	64.119	KR	<5	<100	<5	<200	<2	<20	<10	<10	9	4.6	2.1	<10	<20	390
2391	152.982	64.123	KR	<5	<100	<5	<200	<2	27	11	<10	7	0.6	2.4	<10	<20	190
2392	153.322	63.929	MED	<5	<100	<5	<200	73	<20	<10	<10	36	12.0	1.1	<10	<20	300
2393	153.169	63.943	MED	7	<100	<5	380	<2	<20	<10	<10	71	12.0	10.0	<10	<20	220
2395	151.993	64.455	KR	<5	<100	<5	<200	<2	<20	<10	<10	343	2.2	5.3	<10	<20	1500
2396	151.993	64.455	KR	<5	<100	<5	<200	<2	<20	<10	<10	144	2.1	2.4	<10	<20	400
2397	152.002	64.455	KR	28	<100	<5	<200	<2	<20	<10	<10	473	6.3	3.3	<10	<20	460
2398	152.002	64.455	KR	<5	<100	<5	<200	<2	41	<10	<10	443	5.6	2.9	<10	<20	<100
2399	152.002	64.455	KR	9	<100	<5	<200	<2	96	<10	<10	181	6.7	4.2	<10	<20	1400
2400	152.010	64.454	KR	<5	<100	<5	<200	<2	41	<10	<10	242	4.5	3.7	<10	<20	600
2401	152.013	64.450	KR	<5	<100	<5	<200	<2	<20	<10	<10	35	1.8	1.2	<10	<20	120
2402	152.011	64.443	KR	21	<100	<5	<200	3	<20	<10	<10	435	6.5	7.1	<10	<20	1100
2403	152.294	64.472	KR	8	<100	<5	<200	<2	<20	<10	<10	13	3.5	1.1	<10	<20	700
2404	152.297	64.480	KR	<5	<100	<5	<200	8	<20	<10	<10	52	34.7	2.1	15	<20	20000
2405	153.748	64.030	RUB	<5	<100	<5	<200	<2	<20	<10	<10	2	1.9	0.9	<10	<20	140
2406PC	152.059	64.438	KR	<5	<100	<5	380	3	99	25	<10	150	20.0	6.0	<10	<20	3100
2407	152.055	64.434	KR	<5	<100	<5	<200	20	<20	<10	<10	53	102.0	1.5	25	<20	5400

SAMPLE	LONG (W)	LAT (N)	QUAD	AU	IR	AG	ZN	MO	NI	CO	CD	AS	SB	FE	SE	TE	BA
2408	151.998	64.469	KR	<5	<100	<5	<200	<2	26	<10	<10	255	5.5	3.3	<10	<20	820
2409	152.007	64.469	KR	<5	<100	<5	<200	<2	37	<10	<10	218	3.9	2.7	<10	<20	780
2751	151.543	64.014	KR	<5	<100	<5	<200	<2	<20	<10	<10	17	1.9	0.6	<10	<20	<100
2752				22	<100	7	<200	73	<20	<10	<10	103	28.2	10.0	39	<20	4100
2754	152.298	64.183	KR	<5	<100	<5	<200	<2	<20	<10	<10	4	2.9	1.1	<10	<20	400
2755	152.289	64.188	KR	17	<100	<5	230	18	<20	25	<10	46	7.7	7.4	<10	<20	380
2756	152.287	64.185	KR	12	<100	<5	<200	41	50	<10	<10	91	7.2	3.1	<10	<20	970
2757	152.291	64.192	KR	13	<100	<5	<200	<2	<20	<10	<10	371	11.0	1.6	<10	<20	170
2758	152.294	64.198	KR	<5	<100	<5	<200	<2	25	<10	<10	47	10.0	2.1	<10	<20	1100
2759	152.313	64.068	KR	<5	<100	<5	<200	<2	<20	<10	<10	2	1.1	0.6	<10	<20	1500
2761	152.898	64.116	KR	<5	<100	<5	360	4	<20	17	<10	6	1.2	4.1	<10	<20	1100
2762	153.179	63.837	MED	9	<100	<5	<200	6	<20	<10	<10	234	18.0	7.0	<10	<20	410
2763	153.344	63.871	MED	<5	<100	<5	210	<2	<20	<10	<10	9	2.1	4.1	<10	<20	290
2764	153.290	63.915	MED	<5	<100	<5	260	<2	<20	<10	<10	5	1.4	10.0	<10	<20	340
2765	153.290	63.915	MED	<5	<100	<5	<200	<2	<20	<10	<10	4	3.9	1.0	<10	<20	210
2767	153.222	63.951	MED	6	<100	<5	<200	<2	<20	<10	<10	5	4.6	0.9	<10	<20	460
2768	153.187	63.954	MED	<5	<100	<5	<200	4	<20	<10	<10	6	5.4	0.9	<10	<20	<100
2769	153.183	63.957	MED	<5	<100	<5	<200	<2	<20	<10	<10	5	3.5	0.9	<10	<20	<100
2770	153.176	63.957	MED	<5	<100	<5	<200	6	<20	11	<10	9	10.0	3.4	<10	<20	430
2771	153.176	63.966	MED	<5	<100	<5	340	<2	<20	<10	<10	21	14.0	7.3	<10	<20	<100
2772	153.178	63.960	MED	<5	<100	<5	<200	<2	<20	<10	<10	8	4.0	1.6	<10	<20	<100
2773	153.041	63.962	MED	<5	<100	<5	<200	5	<20	<10	<10	38	8.6	1.3	<10	<20	<100
2775	154.069	63.664	MED	380	<100	<5	<200	<5	<20	35	<23	2980	236.0	10.0	<20	<200	<100
2777	154.073	63.661	MED	9	<100	<5	220	<2	<20	21	<10	14	1.9	10.0	<10	<20	<100
2778	154.065	63.661	MED	<5	<100	<5	<200	<2	<20	17	<10	2	0.5	9.3	<10	<20	<100
2779	154.065	63.661	MED	<5	<100	<5	200	<2	27	29	<10	3	0.2	10.0	<10	<20	<100
2780	154.339	63.626	MED	7	<100	<5	250	<2	<20	<10	<10	2	0.7	1.2	<10	<20	330
2781	154.577	63.519	MED	55	<100	7	<200	<2	<20	<10				2.4	<10	<20	<100
2782	154.503	63.511	MED	<5	<100	<5	<200	2	<20	<10	<10	3	2.0	1.4	<10	<20	370
2783	154.522	63.505	MED	<5	<100	<5	<200	<2	<20	<10	<10	7	1.8	0.7	<10	<20	440
2784	154.361	63.540	MED	78	<100	12	<200	45	38	<10	<10	131	92.6	10.0	<10	<20	590
2785	154.361	63.540	MED	7	<100	<5	<200	10	<20	28	<10	11	8.9	10.0	<10	<20	390
2786	152.328	64.154	KR	<5	<100	<5	<200	<2	65	27	<10	5	8.0	6.7	<10	<20	1800

SAMPLE	LONG (W)	LAT (N)	QUAD	AU	IR	AG	ZN	MO	NI	CO	CD	AS	SB	FE	SE	TE	BA
2787	152.332	64.161	KR	<5	<100	<5	<200	<2	27	14	<10	31	8 5	4.0	<10	<20	1300
2788	154.065	63.661	MED	<5	<100	<5	570	359	<20	<10	<10	2	0.7	0.6	<10	<20	<240
2790	154.364	63.614	MED	10	<100	<5	300	<2	99	32	<10	29	1.7	6.1	<10	<20	1500
2792	154.095	63.471	MED	<5	<100	<5	20000	32	110	29	63	276	36.6	10.0	15	<20	160
2794	153.011	63.877	MED	<5	<100	<5	<200	<2	<20	<10	<10	2	0.4	<0.5	<10	<20	<100
2796	152.655	64.422	KR	<5	<100	<5	<200	<2	<20	<10	<10	<1	1.1	<0.5	<10	<20	200
2797	152.663	64.387	KR	<5	<100	<5	<200	<2	<20	<10	<10	4	0.6	<0.5	<10	<20	380
2798	152.629	64.337	KR	<5	<100	<5	<200	<2	<20	<10	<10	2	0.8	2.1	<10	<20	180
2799	152.328	64.154	KR	<5	<100	<5	<200	4	39	18	<10	81	21.9	3.6	<10	<20	1200
2800	152.328	64.154	KR	100	<100	<5	<200	<2	<20	<10	<10	776	1.3	2.7	<10	<20	780
2801	153.179	63.837	MED	<5	<100	<5	350	<2	<20	<10	<10	26	1.6	9.5	<10	<20	220
2802	153.338	63.869	MED	<5	<100	<5	430	<2	<20	<10	<10	10	3.2	10.0	<10	<20	290
2803	153.290	63.915	MED	<5	<100	<5	280	<2	<20	<10	<10	15	4.2	10.0	<10	<20	320
2804	153.215	63.938	MED	<5	<100	<5	<200	<2	<20	<10	<10	15	11.0	10.0	<10	<20	420
2805	153.177	63.963	MED	<5	<100	<5	<200	<2	<20	<10	<10	11	6.4	1.4	<10	<20	240
2806	153.847	63.723	MED	<5	<100	<5	<200	<2	140	49	<10	14	3.1	6.8	<10	<20	150
2807	154.065	63.661	MED	7	<100	<5	<200	298	<20	32	<10	2	0.5	9.4	<10	<20	<100
2808	154.065	63.661	MED	16	<100	<5	2300	160	<20	<10	<10	2	1.2	3.8	<10	<20	<220
2809	154.065	63.661	MED	<5	<100	<5	<200	<2	<20	<10	<10	134	75.7	1.0	<10	<20	<100
2810	154.058	63.658	MED	3160	<100	<10	290	8	<66	<10	<24	4350	170.0	10.0	<23	<100	<250
2811	154.364	63.614	MED	14	<100	<5	360	<2	120	21	<10	42	2.7	6.0	<10	<20	1500
2812	154.577	63.519	MED	<5	<100	<5	450	<2	54	<10	<10	1870	26.2	10.0	<10	<20	340
2813	154.352	63.536	MED	57	<100	<5	<200	<2	<20	36	<10	87	7.8	8.5	<10	<20	1500
2814	152.035	64.418	KR	33	<100	<5	<200	<2	<20	<10	<10	60	4.7	0.8	<10	<20	860
2815	152.041	64.415	KR	<5	<100	<5	<200	<2	26	<10	<10	13	5.5	2.5	<10	<20	830
2816	151.534	64.321	KR	<5	<100	<5	<200	<2	<20	<10	<10	14	1.5	5.5	<10	<20	700
2817	152.316	64.559	KR	<5	<100	<5	<200	9	<20	<10	<10	20	4.3	3.2	31	<20	15700
2818	152.369	64.558	KR	<5	<100	<5	<200	<2	<20	<10	<10	1	0.5	0.8	<10	<20	230
2819	153.207	64.247	RUB	<5	<100	<5	<200	<2	<20	<10	<10	1	0.9	1.1	<10	<20	770
2820	153.378	64.212	RUB	<5	<100	<5	1600	13	150	<10	<10	86	20.0	5.0	12	<20	150
2821	152.964	64.139	KR	<5	<100	<5	<200	<2	<20	<10	<10	16	4.8	3.2	<10	<20	230
2871	153.597	63.718	MED	<5	<100	<5	390	<2	<20	<10	<10	2	1.2	6.3	<10	<20	780
2873	152.044	64.419	KR	<5	<100	<5	<200	31	<20	<10	<10	72	38.1	2.2	43	<20	1900

SAMPLE	LONG (W)	LAT (N)	QUAD	AU	IR	AG	ZN	MO	NI	CO	CD	AS	SB	FE	SE	TE	BA
2874	152.044	64.419	KR	<5	<100	6	<200	<2	<20	<10	<10	3	5.7	7.2	<10	<20	1600
2875	152.044	64.419	KR	<5	<100	<5	460	<2	<20	22	<10	11	31.6	3.7	<10	<20	780
2876	151.503	64.317	KR	5	<100	<5	<200	2	<20	<10	<10	3	2.0	0.6	<10	<20	3000
2877	152.326	64.281	KR	<5	<100	<5	<200	<2	<20	<10	<10	2	0.3	1.5	<10	<20	<100
2879	152.378	64.542	KR	<5	<100	<5	<200	<2	<20	<10	<10	5	2.0	1.3	<10	<20	270
2881	152.987	64.125	KR	<5	<100	7	<200	<2	<20	<10	<10	48	5.9	5.5	<10	<20	590
2882	153.169	63.943	MED	<5	<100	<5	<200	<2	<20	<10	<10	24	4.5	9.4	<10	<20	300
2883	153.176	63.938	MED	<5	<100	<5	240	<2	<20	<10	<10	60	13.0	10.0	<10	<20	250
2884	153.210	64.177	RUB	<5	<100	<5	240	<2	<20	15	<10	2	0.4	7.9	<10	<20	920
2885	153.297	64.008	RUB	7	<100	<5	<200	<2	62	19	<10	5	1.2	7.0	<10	<20	1300
2886PC	152.331	64.201	KR	<5	<100	<5	<200	<2	<20	<10	<10	13	4.2	1.9	<10	<20	960
2887	153.379	64.130	RUB	<5	<100	<5	<200	2	<20	<10	<10	<1	0.2	2.0	<10	<20	810
2908	152.111	64.652	KR	<5	<100	<5	220	<2	50	<10	<10	4	3.4	8.8	<10	<20	190
2909	153.207	64.247	RUB	<5	<100	<5	<200	<2	<20	<10	<10	<1	0.3	0.9	<10	<20	640
2910	153.378	64.212	RUB	<5	<100	<5	<200	<2	<20	<10	<10	<1	1.4	<0.5	<10	<20	130
2911	153.379	64.130	RUB	<5	<100	<5	<200	<2	<20	<10	<10	3	2.0	2.5	<10	<20	530
2946	152.015	64.467	KR	<5	<100	<5	<200	<2	<20	<10	<10	463	2.9	4.3	<10	<20	190
2947	152.296	64.468	KR	<5	<100	7	240	<2	<20	37	<10	18	3.8	10.0	<10	<20	2200
2948	152.305	64.462	KR	11	<100	<5	280	<2	<20	23	<10	22	3.5	10.0	<10	<20	1500
2950	153.823	64.118	RUB	<5	<100	<5	<200	<2	<20	<10	<10	2	0.4	8.6	<10	<20	300
2951PC	153.610	64.324	RUB	<5	<100	<5	230	4	94	87	<10	65	3.8	10.0	<10	<20	570
2952	154.042	64.317	RUB	<5	<100	<5	<200	<2	100	23	<10	2	2.1	5.9	<10	<20	530
2967	153.739	64.037	RUB	<5	<100	<5	<200	<2	<20	<10	<10	<1	0.5	1.2	<10	<20	<100
2968	153.737	64.044	RUB	<5	<100	<5	<200	<2	<20	<10	<10	1	0.5	1.0	<10	<20	1700
2969	153.732	64.048	RUB	<5	<100	<5	<200	<2	<20	<10	<10	3	0.7	2.8	<10	<20	1400
2970	153.732	64.055	RUB	<5	<100	<5	<200	<2	<20	<10	<10	2	0.3	1.4	<10	<20	760
2987	154.065	63.661	MED	<5	<100	<5	16000	32	<20	<10	<10	3	0.2	10.0	<10	<20	930

SAMPLE	CR	SN	W	CS	LA	CE	SM	EU	TB	YB	LU	SC	HF	TA	TH	U	NA
	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	%
	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
2316	<50	<200	<2	<1	6	<10	1.4	<2	<1	<5	<0.5	2.2	<2	<1	1.5	9.0	<0.05
2317	58	<200	<2	<1	6	<10	2.0	<2	<1	<5	<0.5	2.2	<2	<1	1.7	10.0	<0.05
2318	<50	<200	5	<1	73	170	9.3	3	<1	<5	<0.5	5.3	9	1	19.0	7.2	<0.05
2319	<50	<200	7	<1	70	190	9.2	<2	<1	<5	<0.5	4.7	9	3	19.0	7.2	0.05
2321	110	<200	3	17	46	97	6.8	<2	1	<5	<0.5	13.0	6	2	12.0	4.6	0.77
2322	<50	<200	<2	4	8	21	1.3	<2	<1	<5	<0.5	4.3	<2	<1	2.2	0.6	<0.05
2324	76	<200	<2	17	34	92	4.8	<2	<1	<5	<0.5	11.0	3	<1	11.0	1.8	0.21
2325	<50	<200	<2	1	10	19	1.6	<2	<1	<5	<0.5	1.4	4	<1	5.4	1.0	0.85
2326	190	<200	3	14	94	220	12.0	<2	2	5	1.2	27.0	6	3	31.0	5.4	1.00
2327	280	<200	<2	17	24	52	6.8	<2	2	<5	1.0	34.0	5	2	4.5	4.7	1.20
2328	<50	<200	<2	<1	<5	12	0.8	<2	<1	<5	<0.5	0.9	<2	<1	2.8	<0.5	<0.05
2329	<50	<200	2	4	19	35	2.3	<2	<1	<5	<0.5	7.7	<2	<1	5.0	1.4	0.63
2330	160	<200	2	17	75	220	9.2	<2	<1	<5	<0.5	19.0	4	1	26.0	5.6	0.87
2331	56	<200	<2	1	29	51	2.8	<2	<1	<5	<0.5	4.3	<2	<1	7.3	1.6	0.26
2332	89	<200	<2	9	16	22	3.3	<2	<1	<5	<0.5	7.2	5	<1	6.4	2.1	0.22
2333	76	<200	<2	2	19	46	2.9	<2	<1	<5	<0.5	7.0	3	1	5.8	1.0	0.22
2334	96	<200	4	17	39	85	5.3	<2	<1	<5	0.6	11.0	5	2	11.0	2.7	0.21
2335	<50	<200	4	18	39	77	5.8	<2	<1	<5	0.9	10.0	<2	2	10.0	2.9	0.18
2336	190	<200	4	17	54	100	8.0	<2	2	<5	0.8	18.0	7	2	13.0	4.6	0.23
2337	120	<200	8	17	52	120	7.4	<2	1	8	<0.5	16.0	<2	2	14.0	3.1	0.29
2338	<50	<200	3	2	35	57	6.1	<2	1	<5	0.6	14.0	6	<1	8.9	3.8	<0.05
2339	82	<200	<2	1	44	110	7.0	<2	1	<5	<0.5	31.0	4	<1	11.0	5.1	0.08
2340	120	<200	<2	1	50	130	7.1	<2	2	<5	<0.5	17.0	7	1	14.0	4.9	0.09
2342	<50	<200	<2	<1	<5	<10	0.4	<2	<1	<5	0.9	3.5	7	1	4.1	1.6	1.90
2343	<50	<200	<2	<1	<5	<10	0.8	<2	<1	6	1.5	4.8	10	2	8.9	2.7	3.80
2364	<50	<200	<2	3	<5	33	2.9	<2	<1	<5	<0.5	4.6	2	2	8.5	6.5	1.00
2365	180	<200	<2	16	61	150	9.5	<2	<1	<5	0.6	24.0	5	2	17.0	2.6	0.66
2366	<50	<200	<2	<1	<5	<10	0.7	<2	<1	<5	<0.5	1.4	<2	<1	<0.5	<0.5	<0.05
2367	<50	<200	<2	<1	7	18	1.0	<2	<1	<5	<0.5	3.4	<2	<1	0.7	1.9	<0.05
2368	630	<200	<2	<1	31	74	5.4	<2	1	<5	<0.5	26.0	3	2	3.1	1.2	2.20
2369	<50	<200	2	3	140	350	10.0	<2	2	10	<0.5	4.7	20	3	37.0	14.0	0.23

SAMPLE	CR	SN	W	CS	LA	CE	SM	EU	TB	YB	LU	SC	HF	TA	TH	U	NA
2370	<50	<520	<5	<3	<5	<33	0.7	<2	<1	<5	<0.5	<1.2	<2	<1	<1.1	<0.5	<0.05
2371	<50	<200	4	2	<5	<10	<0.2	<2	<1	<5	<0.5	<0.5	<2	<1	1.0	14.0	<0.05
2372	<50	<200	<2	<1	<5	<10	0.3	<2	<1	<5	<0.5	0.6	<2	<1	0.6	2.8	0.13
2373	83	<200	<2	16	23	39	2.8	<2	<1	<5	<0.5	6.3	<2	<1	13.0	6.6	2.80
2374	110	<200	2	5	14	30	3.8	<2	<1	<5	<0.5	13.0	3	<1	5.0	7.5	1.90
2375	120	<200	4	7	33	64	5.5	<2	1	<5	<0.5	17.0	5	1	11.0	3.5	0.24
2376	54	<200	<2	5	86	220	9.5	<2	1	6	<0.5	8.2	11	2	28.0	10.0	3.90
2378	<50	<200	2	1	40	110	7.5	<2	2	7	1.2	6.7	9	2	17.0	8.3	0.06
2379	150	<200	<2	19	46	130	6.4	2	<1	<5	0.6	16.0	4	2	13.0	6.3	0.61
2381	59	<200	<2	<1	5	14	1.1	<2	<1	<5	<0.5	2.9	<2	<1	1.7	0.6	<0.05
2382	66	<200	<2	<1	<5	14	0.5	<2	<1	<5	<0.5	2.1	<2	<1	0.7	<0.5	<0.05
2383	<50	<200	<2	<1	<5	<10	0.3	<2	<1	<5	<0.5	1.1	<2	<1	0.5	<0.5	0.07
2384	<50	<200	2	3	11	<10	2.1	<2	<1	<5	<0.5	6.8	<2	<1	2.9	0.5	<0.05
2385	<50	<200	<2	<1	<5	<10	<0.2	<2	<1	<5	<0.5	<0.5	<2	<1	<0.5	<0.5	<0.05
2386	<50	<200	<2	38	8	<10	4.1	<2	2	5	0.9	53.4	<2	<1	0.7	<0.5	1.90
2388	<50	<200	<2	<1	<5	<10	<0.2	<2	<1	<5	<0.5	<0.5	<2	<1	<0.5	0.9	<0.05
2389	<50	<200	<2	<1	<5	<10	0.3	<2	<1	<5	<0.5	0.8	<2	<1	<0.5	0.8	<0.05
2390	65	<200	<2	3	9	<10	2.2	<2	<1	<5	<0.5	8.8	<2	<1	3.2	1.8	0.45
2391	<50	<200	<2	3	11	26	2.0	<2	<1	<5	<0.5	8.1	<2	<1	3.1	1.4	0.38
2392	79	<200	<2	<1	<5	<10	1.4	<2	<1	<5	<0.5	2.5	<2	<1	1.1	11.0	<0.05
2393	55	<200	3	<1	57	110	7.6	<2	<1	<5	<0.5	7.4	8	1	17.0	6.9	<0.05
2395	190	<200	4	15	68	170	9.4	<2	<1	<5	0.9	22.0	10	4	17.0	5.2	0.30
2396	<50	<200	4	10	22	37	2.7	<2	<1	<5	<0.5	3.4	3	6	23.0	5.3	1.70
2397	61	<200	3	10	48	88	8.0	<2	<1	<5	<0.5	11.0	4	3	14.0	3.4	0.27
2398	<50	<200	<2	2	22	59	3.7	<2	<1	<5	0.7	8.7	4	1	6.7	1.9	0.26
2399	110	<200	6	13	32	81	5.7	<2	<1	<5	<0.5	14.0	4	2	13.0	2.8	0.22
2400	140	<200	4	16	50	140	8.1	<2	1	<5	<0.5	14.0	7	3	17.0	3.6	0.34
2401	<50	<200	<2	5	12	33	1.8	<2	<1	<5	<0.5	6.0	<2	<1	3.2	0.7	0.07
2402	110	<200	8	11	32	70	5.1	<2	<1	<5	<0.5	12.0	5	3	11.0	3.0	0.29
2403	<50	<200	<2	<1	<5	<10	0.9	<2	<1	<5	<0.5	2.9	<2	<1	1.1	1.9	<0.05
2404	130	<200	<2	<1	11	28	1.9	<2	2	<5	<0.5	3.6	2	<1	<0.5	38.0	<0.05
2405	<50	<200	<2	<1	11	26	1.6	<2	<1	<5	<0.5	0.9	<2	<1	0.6	<0.5	<0.05
2406PC	150	<200	6	10	49	100	8.5	<2	<1	<5	<0.5	16.0	5	2	9.3	4.9	0.43
2407	<50	<200	<2	3	9	23	1.1	<2	<1	<5	<0.5	5.0	<2	<1	3.0	3.9	<0.05

SAMPLE	CR	SN	W	CS	LA	CE	SM	EU	TB	YB	LU	SC	HF	TA	TH	U	NA
2408	95	<200	11	24	43	98	6.5	<2	1	<5	0.6	11.0	4	2	12.0	3.1	0.23
2409	120	<200	12	16	49	110	7.9	<2	<1	<5	<0.5	11.0	9	3	14.0	3.3	0.37
2751	<50	<200	3	5	15	26	8.5	<2	3	14	2.1	5.3	2	4	19.0	17.0	1.40
2752	230	<200	<2	4	39	89	4.9	2	1	<5	<0.5	15.0	<2	<1	6.0	12.0	<0.05
2754	<50	<200	12	34	47	110	5.6	<2	<1	<5	<0.5	2.5	4	6	34.0	5.9	2.60
2755	120	<200	2	35	37	83	6.4	<2	1	5	0.8	9.4	5	3	10.0	8.9	0.41
2756	<50	<200	3	6	35	74	4.9	<2	<1	<5	<0.5	8.2	3	2	11.0	17.0	0.77
2757	<50	<200	<2	3	12	28	2.2	<2	<1	<5	<0.5	3.0	3	<1	5.8	1.4	0.15
2758	<50	<200	<2	6	41	100	5.5	<2	<1	<5	<0.5	8.9	5	<1	17.0	3.0	0.27
2759	67	<200	<2	<1	8	27	1.3	<2	<1	<5	<0.5	3.3	<2	<1	2.1	0.9	0.06
2761	57	<200	2	10	70	160	8.1	<2	<1	<5	<0.5	10.0	12	1	28.0	10.0	3.60
2762	<50	<200	5	<1	54	120	5.8	<2	<1	<5	<0.5	3.4	8	2	16.0	5.9	<0.05
2763	<50	<200	4	<1	57	120	5.6	<2	<1	<5	<0.5	6.9	6	2	20.0	9.2	0.07
2764	<50	<200	3	<1	67	160	9.5	<2	<1	<5	<0.5	4.6	9	2	19.0	5.0	0.06
2765	<50	<200	<2	2	90	220	8.3	<2	<1	<5	<0.5	1.6	6	2	28.0	4.7	<0.05
2767	<50	<200	13	14	18	85	1.1	<2	<1	7	<0.5	0.9	10	6	73.2	23.0	0.72
2768	<50	<200	10	7	17	120	2.0	<2	1	6	0.9	<0.5	9	6	60.6	14.0	<0.05
2769	<50	<200	10	9	30	54	5.5	<2	2	6	0.9	0.7	9	6	68.1	11.0	0.09
2770	<50	<200	8	3	90	240	10.0	2	<1	<5	<0.5	4.9	12	3	27.0	7.3	0.11
2771	<50	<200	7	10	21	81	11.0	<2	7	25	3.3	1.5	8	6	69.3	51.5	0.08
2772	<50	<200	10	5	26	70	4.8	<2	2	7	1.2	1.2	9	6	76.9	21.0	<0.05
2773	<50	<200	14	28	77	230	8.6	<2	2	9	1.5	1.2	16	9	115.0	29.0	3.30
2775	<100	<200	7	<1	<5	<10	0.2	<2	<1	<5	<0.5	<0.5	<2	<1	<0.5	3.0	<0.05
2777	<50	<200	<2	<1	20	20	4.1	<2	<1	<5	<0.5	<0.5	<2	<1	<0.5	4.4	0.11
2778	<50	<200	<2	<1	7	<10	0.6	<2	<1	<5	<0.5	<0.5	<2	<1	<0.5	<0.5	0.29
2779	<50	<200	8	<1	<5	<10	<0.2	<2	<1	<5	<0.5	1.1	<2	<1	<0.5	<0.5	0.14
2780	<50	<200	<2	<1	16	49	5.5	4	<1	<5	<0.5	8.6	5	1	15.0	2.4	4.00
2781	85	<200	3	<1	10	<10	1.6	<2	<1	<5	<0.5	4.6	3	<1	10.0	4.6	0.40
2782	<50	<200	3	4	22	78	3.2	<2	<1	<5	<0.5	1.2	4	4	34.0	6.9	2.90
2783	<50	<200	<2	4	32	71	3.8	<2	<1	<5	<0.5	1.2	4	2	28.0	6.0	0.08
2784	150	<200	<2	7	40	110	5.0	<2	<1	<5	0.7	14.0	5	1	6.8	2.7	0.18
2785	92	<200	<2	5	27	71	4.5	<2	<1	<5	<0.5	21.0	3	1	5.7	4.4	0.94
2786	130	<200	<2	33	55	150	8.1	<2	<1	<5	0.7	22.0	3	1	18.0	3.0	1.00

SAMPLE	CR	SN	W	CS	LA	CE	SM	EU	TB	YB	LU	SC	HF	TA	TH	U	NA
2787	90	<200	<2	7	40	90	5.5	<2	1	<5	<0.5	10.0	3	<1	11.0	3.2	0.38
2788	<50	<200	17	5	20	41	<2.5	<2	<1	<5	<0.5	4.0	8	17	54.4	77.4	0.21
2790	220	<200	<2	6	40	80	6.0	2	1	<5	1.1	22.0	4	1	10.0	3.1	1.20
2792	97	<200	<2	<1	6	<10	0.9	<2	<1	<5	<0.5	3.2	3	<1	1.2	4.2	<0.05
2794	<50	<200	<2	<1	<5	<10	0.3	<2	<1	<5	<0.5	0.9	<2	<1	<0.5	1.3	<0.05
2796	<50	<200	<2	<1	<5	<10	<0.2	<2	<1	<5	<0.5	<0.5	<2	<1	<0.5	1.0	<0.05
2797	<50	<200	<2	<1	<5	<10	<0.2	<2	<1	<5	<0.5	0.8	<2	<1	<0.5	8.2	0.10
2798	59	<200	<2	3	13	30	3.1	<2	<1	<5	<0.5	7.2	<2	<1	3.2	1.6	0.59
2799	140	<200	<2	8	29	54	4.1	<2	<1	<5	0.6	11.0	2	1	7.4	3.5	0.16
2800	120	<200	<2	7	26	84	4.1	<2	<1	<5	0.6	7.1	7	<1	13.0	2.1	1.30
2801	<50	<200	4	1	47	110	6.9	2	<1	<5	<0.5	8.5	7	2	14.0	8.5	0.05
2802	<50	<200	<2	<1	59	100	13.0	3	2	9	1.5	15.0	10	1	12.0	9.5	0.06
2803	<50	<200	5	<1	73	180	12.0	2	2	6	0.8	8.0	9	2	19.0	6.7	0.07
2804	<50	<200	2	8	45	100	8.2	<2	2	<5	<0.5	3.6	8	1	16.0	6.5	0.09
2805	<50	<200	9	13	29	79	3.7	<2	2	7	1.1	1.2	10	6	55.8	19.0	0.80
2806	330	<200	<2	<1	7	<10	1.9	<2	<1	<5	0.7	23.0	2	<1	3.4	1.4	1.10
2807	<50	<200	170	<1	7	<10	0.6	<2	<1	<5	<0.5	0.6	2	<1	0.9	2.2	0.17
2808	<50	<200	310	2	32	65	2.4	<2	<1	<5	<0.5	4.2	10	12	59.7	69.9	0.51
2809	<50	<200	57	<1	<5	<10	0.8	<2	<1	<5	<0.5	0.7	<2	<1	<0.5	0.5	0.07
2810	<50	10	17	<1	<5	<44	0.4	<2	<1	14	1.1	<0.5	<4	<1	<1.7	<0.5	<0.05
2811	240	<200	<2	12	34	66	6.0	<2	<1	<5	<0.5	24.0	3	<1	11.0	3.8	1.60
2812	100	<200	3	<1	16	32	4.5	<2	<1	8	0.7	11.0	<2	<1	8.1	2.5	0.46
2813	180	<200	9	7	77	190	13.0	<2	<1	<5	<0.5	25.0	4	<1	23.0	11.0	2.70
2814	100	<200	<2	5	15	36	3.8	<2	<1	<5	<0.5	5.8	3	<1	4.5	1.7	0.08
2815	<50	<200	<2	7	28	65	3.3	<2	<1	<5	<0.5	4.8	3	<1	10.0	1.7	0.10
2816	<50	<200	<2	<1	<5	<10	0.8	<2	<1	<5	<0.5	3.2	<2	<1	1.0	<0.5	<0.05
2817	130	<200	3	9	96	250	12.0	<2	<1	<5	<0.5	21.0	9	2	37.0	13.0	0.17
2818	<50	<200	<2	1	8	17	1.1	<2	<1	<5	<0.5	1.1	2	<1	2.0	<0.5	<0.05
2819	<50	<200	<2	<1	20	39	2.5	<2	<1	<5	<0.5	3.3	2	1	6.5	1.9	4.10
2820	<50	<200	<2	<1	<5	<10	0.7	<2	<1	<5	<0.5	0.9	<2	<1	<0.5	3.0	<0.05
2821	<50	<200	<2	1	93	210	9.0	<2	1	7	1.0	6.2	11	2	32.0	9.4	0.06
2871	<50	<200	4	4	43	97	7.1	<2	<1	<5	<0.5	7.2	8	1	15.0	4.9	0.66
2873	76	<200	5	8	24	67	5.3	2	<1	<5	<0.5	8.8	<2	<1	6.5	18.0	0.08

SAMPLE	CR	SN	W	CS	LA	CE	SM	EU	TB	YB	LU	SC	HF	TA	TH	U	NA
2874	180	<200	<2	86	90	230	9.2	<2	2	<5	<0.5	23.0	<2	2	28.0	5.1	0.35
2875	410	<200	2	12	18	71	4.6	<2	<1	<5	<0.5	17.0	5	<1	8.0	1.2	0.88
2876	90	<200	<2	<1	6	<10	2.7	<2	<1	<5	<0.5	2.2	<2	<1	1.5	0.7	<0.05
2877	<50	<200	<2	<1	11	36	2.6	<2	<1	<5	<0.5	2.6	2	<1	3.7	0.5	0.89
2879	<50	<200	<2	<1	<5	<10	0.9	<2	<1	<5	<0.5	2.3	<2	<1	1.0	<0.5	1.40
2881	150	<200	<2	2	60	130	9.3	2	2	5	0.8	15.0	7	<1	15.0	6.3	0.06
2882	<50	<200	4	<1	70	180	9.0	<2	<1	<5	<0.5	4.3	11	2	19.0	4.7	0.07
2883	<50	<200	4	1	69	150	8.5	<2	<1	<5	<0.5	5.7	9	2	19.0	6.2	0.07
2884	150	<200	<2	3	78	180	9.3	<2	1	<5	1.4	27.0	6	1	34.0	2.5	1.10
2885	160	<200	<2	7	27	76	4.9	<2	1	<5	<0.5	20.0	6	<1	8.2	3.2	0.08
2886PC	<50	<200	28	12	120	250	10.0	<2	<1	<5	<0.5	6.3	5	2	29.0	3.7	1.30
2887	<50	<200	<2	2	15	40	2.4	<2	<1	<5	<0.5	7.7	3	1	4.4	2.2	3.30
2908	51	<200	7	2	8	<10	1.9	<2	<1	<5	<0.5	13.0	<2	<1	2.1	1.7	<0.05
2909	<50	<200	<2	1	10	22	2.0	<2	<1	<5	<0.5	2.6	<2	2	4.3	1.2	3.20
2910	<50	<200	<2	<1	6	11	0.8	<2	<1	<5	<0.5	0.7	<2	<1	2.0	<0.5	0.06
2911	<50	<200	<2	2	22	43	3.0	<2	<1	<5	<0.5	10.0	3	1	6.4	2.5	4.90
2946	130	<200	2	5	55	150	9.4	<2	<1	<5	0.5	12.0	6	3	16.0	4.0	0.46
2947	95	<200	5	2	54	120	10.0	<2	1	6	0.9	20.0	6	2	14.0	5.6	0.07
2948	<50	<200	6	2	50	88	7.2	<2	1	5	0.8	20.0	8	1	15.0	5.7	<0.05
2950	<50	<200	2	2	84	170	22.0	2	3	<5	0.6	0.9	<2	<1	4.9	1.9	<0.05
2951PC	90	<200	2	2	17	27	4.2	<2	<1	<5	<0.5	14.0	3	<1	4.4	2.2	0.69
2952	210	<200	<2	3	38	110	7.6	<2	1	<5	0.9	24.0	5	<1	11.0	2.7	2.10
2967	<50	<200	<2	<1	<5	<10	<0.2	<2	<1	<5	<0.5	<0.5	<2	<1	<0.5	<0.5	<0.05
2968	<50	<200	<2	3	30	49	5.6	<2	<1	<5	0.8	2.6	6	1	10.0	1.7	0.23
2969	<50	<200	<2	4	69	160	18.0	2	4	15	3.3	1.6	11	1	18.0	4.0	0.66
2970	<50	<200	<2	2	20	44	5.3	<2	3	12	2.6	2.8	9	1	13.0	2.3	2.20
2987	<50	<200	3	12	<5	<10	<2.3	<2	<1	<5	<0.5	3.8	7	10	53.0	88.4	0.28

SAMPLE	BR	RB	ZR	AG	CU	ZN	MO	NI	CO	CD	AS	SB	FE	MN	TE	BA	CR
	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	%	PPM	PPM	PPM	PPM
	INA	INA	INA	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP
2316	2	12	<500	<0.5	58	13	17	7	1	<2	20	<5	0.78	22	<25	358	27
2317	2	14	<500	<0.5	36	8	29	2	2	<2	17	<5	0.71	<5	<25	267	33
2318	<1	<10	<500	<0.5	10	162	<1	4	<1	<2	70	11	5.30	337	<25	327	10
2319	2	<10	<500	<0.5	10	147	<1	<1	<1	<2	45	20	6.11	2430	<25	527	10
2321	<1	160	<500	0.6	111	104	<1	36	19	<2	59	25	3.73	660	<25	1007	67
2322	1	23	<500	<0.5	29	18	<1	3	3	<2	67	9	0.65	137	<25	237	21
2324	<1	150	<500	0.8	114	93	<1	51	23	<2	69	15	3.18	128	<25	1160	53
2325	<1	16	<500	<0.5	10	12	<1	2	<1	<2	26	8	0.61	17	<25	68	13
2326	1	240	<500	1.1	14	88	<1	50	6	<2	114	26	3.23	225	<25	2000	108
2327	2	70	<500	2.6	92	116	<1	49	20	<2	205	46	6.60	1351	<25	215	137
2328	2	20	<500	<0.5	11	12	<1	6	2	<2	132	<5	0.55	38	<25	47	20
2329	11	28	<500	1.4	105	193	<1	18	6	<2	87	12	8.81	7260	<25	285	26
2330	<1	240	<500	0.8	58	21	<1	33	6	<2	40	24	1.95	215	<25	1188	90
2331	2	<10	<500	1.2	9	291	<1	24	8	<2	109	33	10.00	8898	<25	89	22
2332	6	31	<500	0.9	176	66	<1	9	8	<2	411	16	4.63	932	<25	108	39
2333	4	22	<500	1.7	18	31	<1	4	2	<2	303	16	2.71	22	<25	52	33
2334	3	170	<500	0.8	55	18	<1	24	<1	<2	169	17	3.76	78	<25	384	69
2335	14	110	<500	<0.5	152	39	<1	14	3	<2	831	23	9.51	65	<25	282	64
2336	13	140	1100	1.8	108	42	<1	19	6	<2	892	38	10.00	146	<25	346	81
2337	12	180	<500	1.1	94	57	<1	21	3	<2	778	35	6.59	137	<25	678	90
2338	4	<10	<500	0.6	30	259	<1	54	43	<2	208	30	10.00	5595	<25	1840	36
2339	<1	<10	<500	0.8	42	200	<1	46	30	<2	15	14	8.08	704	<25	1824	39
2340	<1	<10	<500	1	55	141	<1	33	17	<2	61	12	5.79	332	<25	1157	36
2342	<1	75	<500	<0.5	8	36	<1	1	<1	<2	<5	<5	0.93	210	<25	529	5
2343	<1	120	<500	0.5	8	47	<1	3	<1	<2	10	<5	0.82	64	<25	700	6
2364	<1	230	<500	<0.5	1	27	<1	<1	<1	<2	8	<5	0.33	33	<25	36	6
2365	<1	240	<500	1.4	25	142	<1	55	23	<2	135	42	6.30	825	<25	1310	103
2366	<1	<10	<500	<0.5	19	36	<1	3	<1	<2	6	<5	0.93	195	<25	35	20
2367	<1	22	<500	1.6	9	7	<1	10	2	<2	57	14	0.67	109	<25	191	20
2368	<1	<10	<500	1.8	86	542	<1	265	53	<2	136	35	7.31	799	<25	1397	291
2369	1	380	1200	0.6	5	26	<1	1	<1	<2	37	<5	1.67	58	<25	801	6

SAMPLE	BR	RB	ZR	AG	CU	ZN	MO	NI	CO	CD	AS	SB	FE	MN	TE	BA	CR
2370	<2	<43	<1700	0.5	5	20000	186	12	5	2000	140	132	2.01	65	<25	17	7
2371	3	<10	<500	<0.5	8	20000	119	60	14	441.9	167	117	10.00	231	<25	80	60
2372	<1	<10	<500	1.4	3	1537	<1	5	3	16.4	25	22	0.88	61	<25	35	5
2373	5	120	<500	0.7	176	176	<1	38	19	2.4	237	12	2.71	111	<25	379	53
2374	1	34	<500	2.1	585	55	<1	22	12	<2	56	13	1.86	157	<25	155	79
2375	6	160	<500	1.7	46	84	<1	41	10	<2	99	50	6.25	554	<25	399	115
2376	<1	220	<500	0.6	8	3648	<1	5	6	18.2	<5	25	2.68	598	<25	915	9
2378	2	<10	<500	0.6	5	622	<1	4	<1	2.3	58	15	2.31	97	<25	2000	10
2379	5	66	<500	1.5	60	352	<1	38	12	<2	285	21	4.04	2148	<25	343	88
2381	<1	18	<500	<0.5	13	96	<1	3	<1	<2	26	<5	1.06	7	<25	849	33
2382	<1	13	<500	<0.5	13	43	<1	6	<1	<2	<5	<5	0.75	24	<25	550	25
2383	<1	<10	<500	2.3	13	8	<1	12	7	<2	58	30	2.48	20000	<25	195	7
2384	<1	78	<500	0.7	40	35	<1	14	<1	<2	52	5	0.86	167	<25	2000	16
2385	<1	<10	<500	1.2	3	12	<1	<1	2	<2	<5	13	0.02	52	<25	192	<2
2386	<1	29	<500	0.6	163	142	<1	57	53	<2	21	19	9.64	1424	<25	326	10
2388	<1	<10	<500	1.5	3	6	<1	<1	5	<2	16	19	0.08	103	<25	55	<2
2389	<1	<10	<500	1.9	3	11	<1	4	<1	<2	18	12	0.13	163	<25	117	3
2390	<1	76	<500	2.1	11	54	<1	28	11	<2	114	26	1.87	210	<25	341	47
2391	<1	57	<500	1.3	25	33	<1	29	10	<2	47	29	1.85	303	<25	209	41
2392	2	<10	<500	<0.5	49	10	28	2	3	<2	36	9	0.95	30	<25	274	34
2393	2	<10	<500	<0.5	8	272	<1	8	5	<2	34	9	10.00	275	<25	186	21
2395	4	200	<500	<0.5	17	43	<1	24	<1	<2	368	6	3.28	435	<25	968	109
2396	2	240	<500	<0.5	33	9	<1	8	<1	<2	169	12	1.52	21	<25	387	2
2397	7	79	<500	0.9	87	21	<1	9	<1	<2	521	15	3.19	60	<25	395	65
2398	6	19	<500	0.8	71	25	<1	5	<1	<2	432	21	2.53	17	<25	91	46
2399	3	110	<500	1.5	81	108	39	82	6	<2	251	18	4.03	115	<25	1004	96
2400	4	160	<500	<0.5	49	29	4	9	4	<2	185	<5	3.58	75	<25	425	96
2401	<1	40	<500	0.7	14	11	<1	3	<1	<2	10	8	1.27	109	<25	95	24
2402	6	160	<500	<0.5	172	29	<1	10	5	<2	340	9	6.45	85	<25	858	67
2403	<1	10	<500	<0.5	26	15	<1	4	1	<2	32	8	0.92	26	<25	609	20
2404	4	11	<500	<0.5	41	20	<1	4	5	<2	70	38	1.96	<5	<25	2000	69
2405	<1	<10	<500	<0.5	8	13	<1	7	5	<2	<5	<5	0.76	58	<25	168	13
2406PC	4	170	<500	<0.5	37	249	2	57	19	2.3	127	<5	4.84	1702	<25	2000	86
2407	10	55	<500	1.6	40	48	7	10	2	<2	42	30	1.18	84	<25	2000	28

SAMPLE	BR	RB	ZR	AG	CU	ZN	MO	NI	CO	CD	AS	SB	FE	MN	TE	BA	CR
2408	3	160	<500	1.1	147	22	<1	14	<1	<2	213	9	2.60	167	<25	530	60
2409	3	180	710	1.1	39	27	<1	11	<1	<2	219	14	2.11	95	<25	531	71
2751	<1	420	<500	<0.5	4	35	<1	<1	3	<2	48	<5	0.50	74	<25	42	9
2752	4	73	<500	0.8	126	60	55	30	4	<2	84	24	10.00	37	<25	1032	137
2754	<1	390	<500	<0.5	6	25	<1	<1	2	<2	67	12	0.79	173	<25	277	6
2755	1	80	<500	<0.5	45	140	8	25	21	<2	37	6	6.03	3493	<25	315	56
2756	2	43	<500	<0.5	53	91	60	21	10	<2	60	<5	2.98	548	<25	776	46
2757	7	<10	<500	<0.5	37	17	3	2	2	<2	294	19	1.37	81	<25	131	12
2758	1	150	<500	0.5	18	34	<1	11	5	<2	79	18	1.76	160	<25	733	43
2759	<1	20	<500	<0.5	8	3	<1	2	2	<2	18	<5	0.52	34	<25	1421	26
2761	3	230	<500	<0.5	31	67	<1	19	11	<2	47	15	2.86	511	<25	885	37
2762	6	<10	<500	0.5	16	84	4	5	2	<2	215	20	4.83	80	<25	319	10
2763	<1	<10	<500	<0.5	7	122	<1	3	3	<2	39	21	2.30	45	<25	333	6
2764	<1	<10	<500	0.5	10	159	<1	8	6	<2	63	9	7.45	981	<25	258	11
2765	<1	22	<500	<0.5	4	15	<1	<1	<1	<2	35	14	0.50	29	<25	183	2
2767	<1	800	<500	<0.5	5	53	<1	<1	<1	<2	23	18	0.46	111	<25	319	<2
2768	<1	220	<500	<0.5	4	35	<1	<1	1	<2	47	16	0.56	45	<25	44	<2
2769	<1	520	<500	<0.5	3	41	<1	<1	3	<2	44	12	0.65	81	<25	95	2
2770	<1	140	<500	<0.5	15	71	42	7	7	<2	33	9	1.99	306	<25	342	8
2771	<1	440	<500	<0.5	17	306	12	6	2	<2	54	31	5.30	70	<25	52	10
2772	<1	120	<500	<0.5	7	93	<1	<1	2	<2	15	9	1.03	19	<25	62	5
2773	<1	990	1100	<0.5	13	82	<1	<1	4	<2	36	<5	0.92	58	<25	36	3
2775	24	<10	<500	4.9	6130	71	22	7	30	<2	2000	146	10.00	286	<25	43	59
2777	<1	<10	<500	1.1	394	135	4	6	21	<2	<5	<5	10.00	5585	<25	11	14
2778	<1	<10	<500	0.8	30	107	<1	16	18	<2	<5	<5	7.67	2589	<25	13	8
2779	<1	<10	<500	0.9	7	150	5	16	27	<2	<5	<5	10.00	2689	<25	25	27
2780	<1	<21	<500	0.5	4	48	<1	13	4	<2	33	<5	0.97	471	<25	293	39
2781	4	18	<500	3.1	26	32	<1	9	7	<2	149	27	2.24	108	<25	58	55
2782	<1	240	<500	1.3	3	20	<1	<1	<1	<2	32	<5	0.85	90	<25	282	6
2783	<1	120	<500	<0.5	7	13	<1	2	1	<2	16	14	0.39	135	<25	409	3
2784	11	78	<500	2.2	59	74	38	32	11	<2	135	86	10.00	312	<25	469	100
2785	2	71	<500	1.1	328	92	6	17	19	<2	64	20	8.43	248	<25	276	77
2786	<1	210	<500	0.7	52	120	<1	57	24	<2	68	24	5.07	1003	<25	1628	81

SAMPLE	BR	RB	ZR	AG	CU	ZN	MO	NI	CO	CD	AS	SB	FE	MN	TE	BA	CR
2787	2	120	<500	<0.5	67	93	<1	31	16	<2	73	28	3.46	539	<25	923	57
2788	<1	120	<500	<0.5	9	254	294	<1	4	<2	56	<5	0.40	88	<25	198	3
2790	<1	100	<500	1.5	33	117	24	87	25	<2	176	34	4.83	3550	<25	1228	146
2792	8	<10	<500	0.8	116	20000	47	114	35	38.4	288	113	10.00	309	<25	156	104
2794	<1	<10	<500	2.2	9	<2	<1	9	6	<2	40	17	0.31	108	<25	85	8
2796	<1	<10	<500	1	4	<2	<1	4	<1	<2	27	7	0.06	37	<25	180	3
2797	<1	<10	<500	0.9	2	<2	<1	15	3	<2	12	<5	0.16	279	<25	349	6
2798	<1	52	<500	1.1	18	15	2	24	7	<2	35	17	1.72	469	<25	142	35
2799	2	90	<500	0.9	61	37	2	32	19	<2	60	14	2.67	556	<25	549	41
2800	10	81	1000	<0.5	12	28	<1	18	7	<2	708	<5	2.18	605	<25	822	37
2801	<1	<10	600	1.5	9	179	<1	6	5	<2	81	7	6.89	192	<25	148	12
2802	<1	20	<500	<0.5	22	245	4	30	10	<2	<5	<5	10.00	334	<25	206	37
2803	<1	<10	<500	1.3	21	183	4	14	6	<2	36	14	9.20	367	<25	246	11
2804	<1	120	<500	1.3	9	79	5	12	1	<2	58	26	10.00	401	<25	305	13
2805	<1	710	<500	0.5	5	52	<1	2	<1	<2	<5	8	1.44	9	<25	244	4
2806	<1	<10	<500	2	81	39	<1	145	50	<2	56	13	6.49	639	<25	140	193
2807	<1	<10	<500	0.8	374	39	266	8	31	<2	13	13	8.38	2382	<25	8	15
2808	<1	65	<500	1.6	80	1370	158	26	10	<2	105	25	5.35	877	<25	66	22
2809	11	<10	<500	2.3	66	111	<1	14	8	<2	114	69	0.78	532	<25	10	5
2810	<28	<41	<500	5.1	940	101	<1	5	10	<2	2000	96	10.00	12	<25	46	25
2811	2	190	<500	1.4	46	202	<1	104	20	<2	100	21	4.40	574	<25	879	146
2812	26	<10	<500	5.2	141	197	1	58	9	<2	1853	34	10.00	3660	<25	413	129
2813	3	180	<500	3.4	150	94	12	53	36	<2	258	53	7.59	1316	<25	1344	85
2814	<1	89	<500	0.6	12	3	<1	5	<1	<2	72	<5	0.67	31	<25	677	70
2815	<1	70	<500	1.2	53	18	<1	19	10	<2	43	12	2.49	707	<25	791	27
2816	<1	<10	<500	0.9	35	4	<1	7	5	<2	<5	<5	4.77	196	<25	546	35
2817	<1	310	<500	1.2	43	31	7	7	<1	<2	<5	<5	2.57	22	<25	2000	58
2818	<1	65	<500	0.6	<1	<2	<1	2	<1	<2	27	<5	0.78	<5	<25	210	16
2819	<1	77	<500	0.7	2	<2	3	7	3	<2	67	<5	0.68	359	<25	575	8
2820	3	<10	<500	1	1	890	8	159	10	2.5	60	17	3.83	247	<25	173	6
2821	1	<10	<500	1.2	4	74	3	8	7	<2	132	23	2.35	590	<25	353	7
2871	<1	180	<500	<0.5	9	172	<1	4	4	<2	19	15	4.38	114	<25	574	10
2873	6	110	<500	2.5	69	47	30	26	<1	4.3	113	43	2.09	123	<25	1664	77

SAMPLE	BR	RB	ZR	AG	CU	ZN	MO	NI	CO	CD	AS	SB	FE	MN	TE	BA	CR
2874	<1	400	<500	<0.5	4	40	1	35	16	<2	24	6	6.46	340	<25	1534	106
2875	4	81	<500	1.1	40	92	<1	67	19	<2	32	29	3.12	831	<25	224	223
2876	<1	13	<500	1.4	10	<2	<1	4	<1	<2	32	9	0.59	49	<25	2000	58
2877	<1	<10	<500	0.7	7	<2	28	9	6	<2	<5	<5	1.07	953	<25	89	16
2879	<1	22	<500	<0.5	12	13	1	14	7	<2	11	10	0.88	245	<25	234	25
2881	1	50	<500	1.5	14	44	6	21	7	<2	105	18	4.36	463	<25	501	69
2882	<1	24	660	0.5	7	83	<1	1	<1	<2	11	<5	7.15	123	<25	305	7
2883	2	33	1100	0.8	8	160	<1	3	4	<2	33	<5	9.44	181	<25	253	9
2884	<1	130	<500	1.3	42	54	2	26	8	<2	51	14	5.36	725	<25	647	76
2885	<1	130	<500	2.1	32	72	8	77	19	<2	162	27	6.14	476	<25	1222	107
2886PC	<1	250	<500	<0.5	4	31	<1	6	6	<2	<5	<5	1.81	450	<25	660	25
2887	<1	160	<500	1.4	15	30	1	11	7	<2	76	19	1.63	611	<25	732	14
2908	<1	<10	<500	0.6	24	162	<1	78	8	<2	<5	<5	7.86	364	<25	216	32
2909	<1	120	<500	0.9	2	3	<1	3	<1	<2	59	16	0.68	158	<25	551	12
2910	<1	22	<500	0.8	4	<2	<1	5	<1	<2	17	10	0.27	<5	<25	120	4
2911	<1	69	<500	1.1	3	19	2	7	3	<2	58	15	1.61	545	<25	419	11
2946	6	<10	<500	2.7	101	40	<1	16	4	<2	515	17	4.41	184	<25	248	84
2947	1	50	<500	<0.5	32	118	<1	44	29	<2	<5	<5	10.00	1282	<25	1863	40
2948	<1	<10	<500	2.5	51	83	5	45	19	<2	87	19	10.00	478	<25	1143	42
2950	<1	76	<500	<0.5	1	<2	8	4	<1	<2	<5	<5	7.27	111	<25	207	20
2951PC	2	45	<500	0.8	105	54	<1	65	57	<2	33	<5	10.00	1526	<25	425	75
2952	<1	110	<500	1.5	4	47	13	77	25	<2	127	31	5.19	810	<25	400	119
2967	<1	<10	<500	0.6	31	<2	<1	15	7	<2	<5	<5	0.90	81	<25	20	18
2968	<1	170	<500	1.3	<1	<2	<1	7	3	<2	58	17	0.80	594	<25	1222	12
2969	<1	280	<500	0.9	<1	6	<1	11	4	<2	72	17	1.85	125	<25	981	13
2970	<1	190	780	0.9	<1	16	3	5	1	<2	91	25	1.27	75	<25	657	13
2987	<1	1030	<500	<0.5	1	7722	35	1	7	<2	<5	<5	6.83	1911	<25	883	8

SAMPLE	V	SN	W	LI	GA	LA	TA	TI	AL	MG	CA	NA	K	NB	SR	Y	ZR
	PPM	PPM	PPM	PPM	PPM	PPM	PPM	%	%	%	%	%	%	PPM	PPM	PPM	PPM
	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP	ICP
2316	225	<20	<20	7	<10	<5	<5	0.05	0.77	0.10	0.06	0.04	0.24	<5	66	7	15
2317	254	<20	<20	15	<10	<5	<5	0.03	0.66	0.03	<0.01	0.03	0.13	<5	60	9	7
2318	4	<20	<20	35	<10	23	<5	0.13	1.85	<0.01	0.01	0.09	0.11	18	126	12	215
2319	3	<20	<20	42	<10	24	<5	0.13	2.11	<0.01	<0.01	0.10	0.14	18	142	8	220
2321	141	<20	<20	61	<10	34	<5	0.41	4.91	2.64	1.29	0.93	0.92	26	137	18	63
2322	37	<20	<20	23	<10	<5	<5	0.07	1.06	0.30	0.05	0.05	0.33	<5	15	<5	7
2324	71	<20	<20	66	<10	23	<5	0.26	3.87	0.97	0.09	0.30	0.94	17	57	8	21
2325	5	<20	<20	6	<10	6	<5	0.07	1.31	0.08	0.05	0.76	0.24	<5	29	<5	7
2326	116	<20	<20	67	<10	56	<5	0.55	5.80	0.94	0.11	0.98	1.26	29	97	13	44
2327	284	50	<20	42	<10	11	<5	1.10	3.96	2.86	3.19	1.25	0.66	43	367	15	<5
2328	6	<20	<20	28	<10	7	<5	0.03	0.63	0.03	0.04	0.05	0.22	<5	29	<5	<5
2329	39	114	<20	29	<10	13	<5	0.10	2.65	2.18	8.16	0.73	0.51	19	56	7	26
2330	102	<20	<20	79	<10	24	<5	0.39	3.07	0.52	0.20	0.76	1.12	17	46	9	68
2331	29	220	<20	23	<10	23	<5	0.06	1.71	2.44	7.25	0.36	0.25	18	31	6	19
2332	44	91	<20	33	<10	13	<5	0.17	2.47	0.99	2.75	0.30	0.34	12	85	12	30
2333	48	<20	<20	18	<10	15	<5	0.19	1.67	0.38	0.11	0.23	0.12	15	38	<5	12
2334	118	<20	<20	72	<10	22	<5	0.34	3.03	0.36	0.03	0.30	0.73	25	42	6	47
2335	101	<20	<20	69	<10	11	<5	0.30	2.33	0.22	0.03	0.27	0.80	25	26	8	31
2336	155	36	<20	55	<10	22	<5	0.35	3.01	0.28	0.04	0.40	0.87	38	43	10	31
2337	152	21	<20	126	<10	17	<5	0.44	2.40	0.35	0.03	0.38	0.92	36	66	6	40
2338	93	<20	<20	13	<10	<5	<5	0.18	0.90	<0.01	0.02	0.21	0.34	16	227	<5	57
2339	163	<20	<20	16	<10	10	<5	0.44	1.65	<0.01	0.03	0.15	0.25	14	529	13	98
2340	121	<20	<20	35	<10	13	<5	0.65	2.02	<0.01	0.03	0.12	0.15	15	423	10	125
2342	3	<20	<20	6	<10	<5	<5	0.05	1.76	0.03	0.08	1.84	0.86	9	20	8	88
2343	5	<20	<20	9	<10	<5	<5	0.07	1.97	0.03	0.01	2.99	0.75	12	19	10	122
2364	<2	<20	<20	100	<10	<5	<5	<0.01	1.29	<0.01	0.04	0.82	0.68	6	9	32	15
2365	111	41	<20	147	<10	16	<5	0.46	5.45	1.29	0.09	0.87	1.08	33	79	8	60
2366	4	<20	<20	33	<10	<5	<5	<0.01	0.57	0.25	0.18	0.06	0.04	<5	14	<5	<5
2367	45	20	<20	4	<10	6	<5	0.07	0.80	0.40	10.00	0.07	0.45	44	566	6	10
2368	184	43	<20	39	<10	18	<5	0.80	5.23	4.61	5.68	2.36	0.44	53	211	12	60
2369	3	<20	<20	28	24	53	<5	0.24	3.42	0.08	0.10	0.55	1.53	41	16	16	446

SAMPLE	V	SN	W	LI	GA	LA	TA	TI	AL	MG	CA	NA	K	NB	SR	Y	ZR
2370	14	117	<20	3	<10	<5	<5	0.01	0.21	2.08	3.67	0.04	0.06	7	34	<5	<5
2371	33	155	<20	3	67	<5	<5	0.01	1.14	0.15	0.21	1.31	0.59	20	14	5	68
2372	28	25	<20	<2	36	<5	<5	<0.01	0.38	7.66	10.00	0.39	0.21	29	108	<5	14
2373	40	<20	<20	53	19	<5	<5	0.20	1.88	0.83	0.24	2.54	0.61	11	108	<5	87
2374	99	42	<20	40	21	<5	<5	0.40	1.58	0.63	0.28	1.99	0.42	13	76	<5	53
2375	200	<20	<20	110	32	5	<5	0.43	3.25	0.75	0.16	0.55	1.40	25	30	6	65
2376	35	<20	<20	26	<10	30	<5	0.37	1.97	0.43	1.17	3.09	0.95	25	237	17	68
2378	26	<20	<20	18	<10	13	<5	0.31	2.08	<0.01	0.04	0.11	0.08	29	67	18	152
2379	256	129	<20	24	<10	27	<5	0.38	2.71	2.52	8.46	0.66	0.69	39	266	15	73
2381	23	<20	<20	6	<10	<5	<5	0.05	1.03	0.09	0.05	0.05	0.36	<5	11	<5	11
2382	7	<20	<20	5	<10	<5	<5	0.02	0.53	0.03	<0.01	0.04	0.17	<5	6	<5	5
2383	31	<20	<20	2	<10	<5	<5	0.01	0.44	7.64	10.00	0.06	0.14	25	226	<5	<5
2384	43	<20	<20	23	<10	6	<5	0.08	1.79	0.32	0.13	0.06	0.73	<5	39	<5	15
2385	38	<20	<20	<2	<10	<5	<5	<0.01	0.07	0.07	9.23	0.03	0.03	43	248	6	<5
2386	957	<20	<20	15	<10	<5	<5	1.81	4.86	3.10	5.95	1.92	0.34	15	209	19	18
2388	41	<20	<20	<2	<10	<5	<5	0.01	0.06	0.22	8.03	0.04	0.02	47	238	7	<5
2389	44	<20	<20	4	<10	<5	<5	0.01	0.23	0.20	9.50	0.03	0.04	43	215	6	<5
2390	98	<20	<20	47	<10	12	<5	0.19	3.31	1.25	10.00	0.61	0.94	46	804	12	55
2391	76	<20	<20	50	<10	11	<5	0.14	2.50	2.13	10.00	0.48	0.87	37	954	9	41
2392	277	<20	<20	11	<10	<5	<5	0.03	0.77	0.07	0.29	0.03	0.15	<5	65	6	<5
2393	5	<20	<20	33	<10	13	<5	0.10	1.77	<0.01	0.03	0.11	0.05	16	138	7	152
2395	219	<20	<20	93	<10	32	<5	0.65	4.52	0.89	0.05	0.36	1.22	41	52	10	93
2396	3	<20	<20	26	<10	11	<5	0.02	2.61	0.08	0.03	1.51	0.78	34	64	<5	42
2397	120	<20	<20	50	<10	35	<5	0.39	3.48	0.42	0.08	0.30	0.75	33	41	7	33
2398	66	<20	<20	32	<10	17	<5	0.23	2.26	0.48	0.12	0.26	0.25	18	46	<5	14
2399	158	<20	<20	43	<10	23	<5	0.41	3.17	0.39	0.06	0.29	0.75	27	39	6	59
2400	184	<20	<20	69	<10	40	<5	0.57	3.83	0.60	0.09	0.44	0.87	39	65	7	53
2401	27	<20	<20	30	<10	13	<5	0.11	1.55	0.28	0.01	0.09	0.37	8	20	<5	10
2402	107	<20	<20	43	<10	16	<5	0.33	2.92	0.34	0.05	0.29	0.83	27	62	<5	29
2403	26	<20	<20	5	<10	<5	<5	0.05	0.77	0.03	<0.01	0.03	0.12	<5	22	<5	12
2404	171	<20	<20	11	<10	10	<5	0.03	1.37	0.03	0.06	0.05	0.11	<5	1122	37	12
2405	5	<20	<20	5	<10	9	<5	0.02	0.47	0.21	0.03	0.04	0.08	<5	14	<5	<5
2406PC	228	<20	<20	56	<10	41	<5	0.34	6.17	1.02	0.89	0.59	0.99	28	105	14	62
2407	297	<20	<20	14	<10	8	<5	0.07	1.72	0.68	<0.01	0.06	0.49	<5	29	<5	19

SAMPLE	V	SN	W	LI	GA	LA	TA	TI	AL	MG	CA	NA	K	NB	SR	Y	ZR
2408	114	<20	<20	59	<10	28	<5	0.33	3.08	0.37	0.04	0.23	1.14	22	73	8	47
2409	109	<20	<20	51	<10	41	<5	0.52	2.58	0.50	0.14	0.35	0.66	38	77	10	36
2751	2	<20	<20	119	<10	12	<5	0.02	2.03	<0.01	0.09	1.22	0.97	18	7	84	24
2752	561	<20	<20	9	<10	29	<5	0.15	3.99	0.37	0.03	0.09	0.59	6	170	12	43
2754	10	<20	<20	105	<10	32	<5	0.06	2.92	0.07	0.46	2.11	1.09	23	71	8	57
2755	96	<20	<20	48	<10	25	<5	0.44	3.28	3.27	4.71	0.48	0.53	39	181	27	36
2756	176	<20	<20	25	<10	29	<5	0.22	3.12	1.46	1.67	0.78	0.57	9	204	19	26
2757	8	<20	<20	37	<10	11	<5	0.05	1.51	0.26	0.10	0.13	0.25	<5	40	<5	<5
2758	38	<20	<20	21	<10	24	<5	0.20	3.06	0.31	0.03	0.26	0.54	11	29	5	23
2759	49	<20	<20	6	<10	8	<5	0.09	1.45	0.03	<0.01	0.08	0.37	<5	34	<5	25
2761	58	<20	<20	39	<10	31	<5	0.43	4.23	0.85	2.14	3.22	1.08	26	207	22	69
2762	14	<20	<20	40	<10	26	<5	0.16	2.64	<0.01	0.01	0.12	0.13	26	172	8	191
2763	9	<20	<20	39	18	22	<5	0.12	2.62	<0.01	<0.01	0.10	0.07	17	173	7	117
2764	3	<20	<20	25	<10	16	<5	0.12	1.72	0.01	<0.01	0.10	0.18	21	119	9	52
2765	2	<20	<20	22	<10	43	<5	0.06	2.40	<0.01	0.01	0.08	0.18	19	158	<5	65
2767	<2	<20	<20	124	<10	9	<5	0.04	2.54	0.02	0.03	0.57	0.74	39	12	25	147
2768	<2	<20	<20	61	<10	9	<5	0.03	3.40	0.05	0.01	0.16	0.44	50	21	26	132
2769	<2	<20	<20	52	<10	16	<5	0.03	2.72	0.02	<0.01	0.11	0.84	37	12	26	117
2770	11	<20	<20	51	<10	43	<5	0.19	2.30	0.04	0.04	0.11	0.59	28	107	13	266
2771	3	<20	<20	36	<10	10	<5	0.03	2.18	<0.01	<0.01	0.10	0.69	38	13	93	137
2772	<2	<20	<20	56	<10	13	<5	0.03	2.67	<0.01	0.01	0.12	0.37	42	18	26	135
2773	<2	<20	<20	172	<10	42	<5	0.06	1.99	<0.01	0.15	2.72	0.82	55	5	35	176
2775	5	28	<20	8	<10	<5	<5	<0.01	0.43	0.52	0.39	0.58	0.25	55	8	5	431
2777	30	22	<20	12	<10	15	<5	0.02	0.80	0.85	10.00	0.21	0.07	19	16	17	11
2778	18	30	<20	9	<10	<5	<5	<0.01	0.17	10.00	10.00	0.20	0.07	7	12	<5	<5
2779	7	51	<20	4	<10	<5	<5	0.01	0.49	10.00	0.14	0.49	0.21	17	5	<5	16
2780	42	<20	<20	28	<10	11	<5	0.25	5.25	1.53	3.61	3.02	0.26	17	741	11	27
2781	36	<20	<20	14	<10	6	<5	0.15	1.52	0.52	0.12	0.42	0.12	18	49	<5	93
2782	<2	<20	<20	8	<10	13	<5	0.03	4.36	0.02	0.03	2.30	0.86	37	34	10	111
2783	3	<20	<20	67	<10	23	<5	0.03	7.06	0.07	0.02	0.29	0.65	33	17	11	108
2784	161	<20	<20	88	<10	29	<5	0.36	5.66	1.07	0.12	0.37	0.69	35	57	12	70
2785	123	<20	<20	175	<10	8	<5	0.36	3.62	1.58	0.21	0.79	0.39	23	123	7	62
2786	122	<20	<20	145	<10	26	<5	0.53	4.33	0.79	0.29	0.99	1.29	29	125	8	25

SAMPLE	V	SN	W	LI	GA	LA	TA	TI	AL	MG	CA	NA	K	NB	SR	Y	ZR
2787	109	<20	<20	52	<10	31	<5	0.29	4.69	2.55	2.76	0.51	0.99	25	219	14	47
2788	14	<20	<20	6	<10	8	<5	<0.01	6.28	0.53	10.00	0.22	0.54	60	304	<5	46
2790	268	<20	<20	68	<10	30	<5	0.50	5.71	1.47	0.71	1.23	0.66	26	133	19	5
2792	401	117	<20	4	83	<5	<5	0.02	1.48	0.37	0.57	1.35	0.71	9	18	14	77
2794	46	<20	<20	3	<10	7	<5	0.02	0.32	0.15	10.00	0.05	0.09	39	337	<5	<5
2796	34	<20	<20	3	<10	<5	<5	<0.01	0.10	0.23	10.00	0.03	0.04	31	443	<5	<5
2797	27	<20	<20	5	<10	<5	<5	0.02	0.30	9.68	10.00	0.09	0.13	10	89	<5	<5
2798	59	<20	<20	29	<10	14	<5	0.14	2.15	1.44	10.00	0.58	0.60	27	1072	9	23
2799	95	<20	<20	44	<10	22	<5	0.28	3.21	0.89	0.79	0.23	0.62	17	110	10	44
2800	39	<20	<20	25	<10	21	<5	0.24	3.00	0.95	1.50	1.13	0.57	12	182	11	20
2801	17	<20	<20	37	<10	20	<5	0.14	2.30	<0.01	0.03	0.09	0.08	26	164	12	135
2802	21	<20	<20	21	<10	14	<5	0.35	2.85	<0.01	0.03	0.17	0.09	15	262	22	131
2803	6	<20	<20	28	<10	24	<5	0.14	2.30	<0.01	0.02	0.13	0.26	22	215	18	31
2804	<2	<20	<20	21	<10	8	<5	0.11	1.70	0.02	0.01	0.14	0.70	23	48	10	114
2805	<2	<20	<20	115	<10	24	<5	0.05	7.19	0.03	0.12	0.97	1.22	60	41	46	185
2806	138	<20	<20	13	<10	5	<5	0.21	4.63	4.80	6.35	1.27	0.21	18	518	7	34
2807	25	<20	128	6	<10	6	<5	0.01	0.25	9.09	10.00	0.16	0.12	13	14	<5	<5
2808	30	<20	74	20	<10	14	<5	<0.01	3.70	1.26	10.00	0.48	0.19	33	315	<5	33
2809	28	<20	78	<2	<10	7	<5	<0.01	0.23	7.38	10.00	0.06	0.04	28	58	<5	5
2810	16	27	<20	<2	<10	<5	<5	0.02	0.37	0.25	10.00	0.25	0.16	17	10	<5	11
2811	274	24	<20	82	34	<5	<5	0.40	3.09	1.50	0.71	1.56	1.11	18	156	5	63
2812	192	<20	27	17	<10	7	<5	0.32	2.05	0.96	0.34	0.57	0.05	17	110	9	34
2813	331	<20	<20	46	<10	84	<5	0.77	9.14	3.55	6.03	2.84	1.44	38	2000	30	40
2814	39	<20	<20	18	<10	12	<5	0.24	2.46	0.19	0.23	0.12	0.79	5	18	8	30
2815	28	<20	<20	38	<10	26	<5	0.10	2.35	0.88	0.13	0.14	0.64	8	29	7	25
2816	11	<20	<20	9	<10	<5	<5	0.03	0.66	0.04	0.02	0.05	0.21	<5	16	<5	10
2817	158	<20	<20	113	<10	73	<5	0.37	6.41	0.93	0.07	0.41	1.52	21	300	17	198
2818	9	<20	<20	10	<10	7	<5	0.03	1.67	0.12	0.02	0.06	0.53	<5	25	<5	13
2819	8	<20	36	8	<10	8	<5	0.05	3.17	0.20	0.47	2.83	1.10	13	106	6	17
2820	42	<20	<20	3	<10	<5	<5	<0.01	0.12	0.19	10.00	0.05	0.04	18	239	12	17
2821	8	<20	<20	41	<10	61	<5	0.27	4.77	0.04	0.25	0.21	0.44	28	30	20	253
2871	21	<20	<20	28	23	8	<5	0.25	4.02	0.07	0.07	0.75	0.81	21	68	10	79
2873	1157	<20	<20	25	<10	20	<5	0.21	3.29	0.63	0.11	0.15	1.07	<5	30	22	55

SAMPLE	V	SN	W	LI	GA	LA	TA	TI	AL	MG	CA	NA	K	NB	SR	Y	ZR
2874	133	<20	<20	110	<10	70	<5	0.53	9.61	1.63	0.14	0.87	1.96	30	25	19	126
2875	113	<20	<20	71	<10	15	<5	0.43	4.22	2.77	2.04	0.88	0.77	11	146	14	25
2876	67	<20	<20	7	<10	6	<5	0.04	0.71	0.06	0.09	0.06	0.19	<5	125	<5	<5
2877	25	<20	<20	10	<10	15	<5	0.03	1.23	0.15	10.00	0.75	0.11	11	827	12	11
2879	20	<20	<20	10	<10	<5	<5	0.05	1.76	0.27	0.22	1.14	0.21	<5	17	<5	7
2881	64	<20	<20	19	<10	51	<5	0.49	7.27	0.04	0.09	0.36	0.53	22	84	43	125
2882	<2	<20	<20	35	<10	35	<5	0.15	3.22	<0.01	0.02	0.14	0.26	21	156	11	211
2883	2	<20	<20	32	<10	32	<5	0.15	3.36	<0.01	0.02	0.16	0.30	23	145	10	206
2884	100	<20	<20	28	<10	37	<5	0.38	5.13	1.13	0.29	0.97	1.72	23	89	22	20
2885	135	<20	<20	70	<10	22	<5	0.45	7.22	1.58	0.38	0.51	1.88	23	143	18	134
2886PC	34	<20	<20	49	<10	98	<5	0.18	4.55	0.35	0.56	1.10	1.37	16	101	11	29
2887	43	<20	<20	21	<10	11	<5	0.13	5.20	0.60	0.95	2.64	1.85	16	327	11	28
2908	70	<20	<20	7	<10	6	<5	0.07	1.04	0.10	0.14	0.08	0.06	<5	8	10	18
2909	7	<20	<20	6	<10	7	<5	0.06	3.08	0.19	0.16	2.84	0.91	14	76	7	17
2910	<2	<20	<20	8	<10	5	<5	0.02	1.37	0.08	0.01	0.09	0.68	<5	32	<5	11
2911	41	25	<20	15	<10	10	<5	0.11	4.26	0.45	2.10	3.18	0.98	14	575	10	16
2946	143	<20	<20	20	<10	39	<5	0.55	3.31	0.84	0.24	0.54	0.51	49	112	10	34
2947	140	<20	<20	15	<10	25	<5	0.51	3.78	0.02	0.04	0.18	0.24	19	501	21	136
2948	147	<20	<20	23	<10	20	<5	0.61	3.65	<0.01	0.05	0.17	0.12	26	248	20	161
2950	25	<20	<20	10	<10	77	<5	0.03	1.60	0.06	<0.01	0.06	0.60	12	8	15	32
2951PC	135	<20	<20	16	<10	13	<5	0.40	3.78	2.45	4.36	0.76	0.93	14	110	15	36
2952	109	<20	<20	26	<10	26	<5	0.16	5.84	2.37	0.79	1.97	1.41	13	86	25	19
2967	<2	<20	<20	<2	<10	<5	<5	<0.01	0.08	0.01	<0.01	0.06	0.02	<5	3	<5	<5
2968	15	<20	<20	12	<10	27	<5	0.10	3.04	0.16	0.58	0.24	1.38	9	33	13	75
2969	7	<20	<20	9	<10	49	<5	0.06	3.68	0.08	<0.01	0.60	1.54	17	18	42	167
2970	10	<20	<20	6	<10	18	<5	0.08	5.72	0.13	0.04	2.18	1.20	22	23	46	141
2987	18	<20	<20	50	<10	<5	<5	<0.01	7.54	9.56	0.25	0.81	3.29	40	22	<5	71

SAMPLE	PB	BI	HG	B	TE	SN
	PPM	PPM	PPM	PPM	PPM	PPM
	AA	AA	CVAA	PE	AA	XRF
2316	15	<1				
2317	10	<1				
2318	25	<1				
2319	35	<1				
2321	8	<1	0.029		<0.2	<5
2322	7	<1	<0.01		<0.2	<5
2324	19	<1	0.012		<0.2	<5
2325	5	<1	<0.01		<0.2	<5
2326	9	<1	0.011	56	<0.2	<5
2327	11	<1	0.013	350	<0.2	20
2328	5	<1	<0.01	103	<0.2	<5
2329	13	4	0.019	293	<0.2	91
2330	13	<1				
2331	9	<1	0.030	317	<0.2	190
2332	11	<1	<0.01	513	<0.2	100
2333	8	12	0.016	16	0.3	12
2334	11	2	0.015	43	<0.2	10
2335	27	<1	0.040		<0.2	15
2336	16	4	0.054	33	<0.2	11
2337	17	<1	0.058	36	<0.2	12
2338	18	<1	1.618	5057	<0.2	<5
2339	18	<1	0.475	1158	<0.2	<5
2340	19	<1	0.892	1663	<0.2	<5
2342	5	<1	<0.01	1830	<0.2	<5
2343	18	<1	<0.01	2651	<0.2	<5
2364	13	2	0.012	39	<0.2	<5
2365	14	<1				
2366	15	6	<0.01	24	<0.2	<5
2367	6	2	0.095	21	<0.2	<5
2368	5	<1	0.027	15	<0.2	10
2369	21	<1	0.013	170	<0.2	<5

SAMPLE	PB	BI	HG	B	TE	SN
2370	485	<1	1.093	15	<0.2	15
2371	1149	<1	1.525	10	<0.2	18
2372	71	4	0.203	10	<0.2	<5
2373	11	<1	0.016	2450	<0.2	27
2374	11	16	<0.01	6400	<0.2	34
2375	43	<1	0.142	320	<0.2	7
2376	21	<1	0.013	16	<0.2	5
2378	15	<1	0.932		<0.2	<5
2379	24	1	0.042	23	<0.2	110
2381	7	<1	<0.01	24	<0.2	<5
2382	5	<1	<0.01	13	<0.2	<5
2383	5	<1	0.017	<10	<0.2	<5
2384	8	<1	<0.01	17	<0.2	<5
2385	5	<1	0.049	13	<0.2	<5
2386	10	<1	0.056	29	<0.2	10
2388	5	<1	0.025	36	<0.2	5
2389	6	<1	0.039	32	<0.2	<5
2390	11	<1				
2391	9	<1				
2392	8	<1				
2393	33	<1				
2395	5	<1				
2396	5	8	0.036	<10	<0.2	14
2397	5	5	0.024	47	<0.2	6
2398	4	3	0.033	<10	<0.2	7
2399	7	<1	<0.01	15	<0.2	10
2400	15	5	<0.01	<10	<0.2	16
2401	3	<1	<0.01	<10	<0.2	<5
2402	6	<1				
2403	4	<1	0.308		<0.2	<5
2404	8	<1	3.684		<0.2	<5
2405	6	<1	0.022		<0.2	<5
2406PC	13	3				<5
2407	60	<1				

SAMPLE	PB	BI	HG	B	TE	SN
2408	8	<1				
2409	6	<1				
2751	16	2				
2752	12	<1	0.506		<0.2	<5
2754	15	<1				
2755	10	<1	<0.01		<0.2	15
2756	7	<1	<0.01	56	<0.2	32
2757	29	<1	<0.01	5435	<0.2	27
2758	10	<1				
2759	4	<1	0.097	6770	<0.2	<5
2761	23	<1	<0.01	3777	<0.2	6
2762	21	<1	0.558	6843	<0.2	9
2763	17	<1	0.518	225	<0.2	7
2764	19	<1	1.119		<0.2	10
2765	12	<1	0.232	65	<0.2	26
2767	25	<1	0.041	27	<0.2	21
2768	19	<1	0.978	26	<0.2	20
2769	23	<1	0.147		<0.2	29
2770	19	<1	0.022		<0.2	9
2771	66	<1	0.233		<0.2	23
2772	41	<1	0.480		<0.2	19
2773	28	<1	<0.01	65	<0.2	26
2775	4	6	0.417	10	0.6	30
2777	6	<1	0.015	14	<0.2	18
2778	3	<1	<0.01	24	<0.2	13
2779	<2	<1	0.051	146	<0.2	29
2780	13	<1	0.030	27	<0.2	8
2781	49	27	0.075		2.4	46
2782	14	<1	<0.01	44	<0.2	<5
2783	15	<1	<0.01	3041	<0.2	7
2784	40	<1	0.189	3247	<0.2	<5
2785	40	<1	0.074		<0.2	8
2786	5	<1	<0.01	44	0.2	<5

SAMPLE	PB	BI	HG	B	TE	SN
2787	6	<1	<0.01	36	<0.2	7
2788	3	<1	<0.01	24	<0.2	<5
2790	5	<1	<0.01	21	<0.2	<5
2792	1611	<1	2.491	12	<0.2	24
2794	5	<1	0.045	17	<0.2	<5
2796	6	<1	0.015	75	<0.2	<5
2797	4	<1	0.113	147	0.3	<5
2798	9	<1	<0.01	98	<0.2	7
2799	8	<1	<0.01	77	0.3	<5
2800	6	<1	<0.01	94	<0.2	5
2801	23	<1	0.626	134	<0.2	10
2802	12	<1	1.079	96	<0.2	12
2803	28	<1	0.378	9036	<0.2	8
2804	32	<1	0.642	187	<0.2	18
2805	17	<1	<0.01	249	<0.2	22
2806	41	<1	0.032	368	<0.2	32
2807	5	<1	<0.01	81	<0.2	12
2808	5	<1	0.038	174	<0.2	<5
2809	358	<1	0.031	80	<0.2	<5
2810	90	2000	0.872	12	3.8	19
2811	16	<1	0.032	126	<0.2	<5
2812	154	<1				
2813	21	<1	0.024	34	<0.2	<5
2814	4	20	0.018	87	<0.2	<5
2815	6	<1	<0.01	110	<0.2	41
2816	5	<1	0.170	38	<0.2	<5
2817	32	<1	0.050	155	<0.2	<5
2818	3	<1	<0.01	12	<0.2	<5
2819	4	<1				<5
2820	5	<1	0.114	<10	<0.2	<5
2821	38	<1				
2871	10	<1	0.014	15	<0.2	<5
2873	30	<1	0.106	13	<0.2	<5

SAMPLE	PB	BI	HG	B	TE	SN
2874	3	<1	<0.01	39	<0.2	18
2875	41	<1	<0.01	88	<0.2	23
2876	5	<1	<0.01	82	<0.2	<5
2877	8	<1	0.068	21	<0.2	<5
2879	13	<1	<0.01	15	<0.2	<5
2881	12	<1				
2882	25	<1	0.724	17	<0.2	13
2883	24	<1				
2884	4	<1				
2885	14	<1				
2886PC	9	<1				105
2887	14	<1	<0.01	260	<0.2	<5
2908	7	<1				
2909	3	<1	<0.01	63	<0.2	<5
2910	4	<1				<5
2911	6	<1				<5
2946	10	<1				
2947	18	<1				
2948	13	<1				
2950	7	<1	<0.01	3301	<0.2	9
2951PC	16	<1				18
2952	<2	<1	<0.01	50	<0.2	7
2967	<2	<1	<0.01	41	<0.2	<5
2968	5	<1	<0.01	12	<0.2	<5
2969	3	<1	<0.01		<0.2	<5
2970	<2	<1	<0.01	86	<0.2	<5
2987	3	<1	0.012	13	<0.2	<5

DETECTION LIMIT AND ANALYTICAL METHOD

ELEMENT		LOWER DETECTION LIMIT		EXTRACTION	METHOD
Au	Gold	5	PPB		Inst. Neutron Activ.
Ir	Iridium	100	PPB		Inst. Neutron Activ.
Ag	Silver	5	PPM		Inst. Neutron Activ.
Zn	Zinc	200	PPM		Inst. Neutron Activ.
Mo	Molybdenum	2	PPM		Inst. Neutron Activ.
Ni	Nickel	20	PPM		Inst. Neutron Activ.
Co	Cobalt	10	PPM		Inst. Neutron Activ.
Cd	Cadmium	10	PPM		Inst. Neutron Activ.
As	Arsenic	1	PPM		Inst. Neutron Activ.
Sb	Antimony	0.2	PPM		Inst. Neutron Activ.
Fe	Iron	0.5	PCT		Inst. Neutron Activ.
Se	Selenium	10	PPM		Inst. Neutron Activ.
Te	Tellurium	20	PPM		Inst. Neutron Activ.
Ba	Barium	100	PPM		Inst. Neutron Activ.
Cr	Chromium	50	PPM		Inst. Neutron Activ.
Sn	Tin	200	PPM		Inst. Neutron Activ.
W	Tingsten	2	PPM		Inst. Neutron Activ.
Cs	Cesium	1	PPM		Inst. Neutron Activ.
La	Lanthanum	5	PPM		Inst. Neutron Activ.
Ce	Cerium	10	PPM		Inst. Neutron Activ.
Sm	Samarium	0.2	PPM		Inst. Neutron Activ.
Eu	Europium	2	PPM		Inst. Neutron Activ.
Tb	Terbium	1	PPM		Inst. Neutron Activ.
Yb	Ytterbium	5	PPM		Inst. Neutron Activ.
Lu	Lutetium	0.5	PPM		Inst. Neutron Activ.
Sc	ScandiumScandium	0.5	PPM		Inst. Neutron Activ.
Hf	Hafnium	2	PPM		Inst. Neutron Activ.
Ta	Tantalum	1	PPM		Inst. Neutron Activ.
Th	Thorium	0.5	PPM		Inst. Neutron Activ.
U	Uranium	0.5	PPM		Inst. Neutron Activ.
Na	Sodium	0.05	PCT		Inst. Neutron Activ.
Br	Bromine	1	PPM		Inst. Neutron Activ.
Rb	Rubidium	10	PPM		Inst. Neutron Activ.
Zr	Zirconium	500	PPM		Inst. Neutron Activ.
Ag	Silver	0.5	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Cu	Copper	1	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Zn	Zinc	2	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Mo	Molybdenum	1	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Ni	Nickel	1	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Co	Cobalt	1	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Cd	Cadmium	2	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
As	Arsenic	5	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Sb	Antimony	5	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Fe	Iron	0.01	PCT	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Mn	Manganese	5	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Te	Tellurium	25	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Ba	Barium	5	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Cr	Chromium	2	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
V	Vanadium	2	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Sn	Tin	20	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
W	Tungsten	20	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Li	Lithium	2	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Ga	Gallium	10	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
La	Lanthanum	5	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Ta	Tantalum	5	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Ti	Titanium	0.01	PCT	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Al	Aluminum	0.01	PCT	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Mg	Magnesium	0.01	PCT	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Ca	Calcium	0.01	PCT	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Na	Sodium	0.01	PCT	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
K	Potassium	0.01	PCT	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Nb	Niobium	5	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Sr	Strontium	1	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Y	Yttrium	5	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Zr	Zirconium	55	PPM	HF-HNO3-HClO4-HCl	Ind. Coupled Plasma
Pb	Leak	2	PPM	HNO3-HCl Hot Extr.	Atomic Absorption
Bi	Bismuth	1	PPM	HNO3-HCl Hot Extr.	Atomic Absorption
Hg	Mercury	0.01	PPM	HNO3-HCl-SnSO4	Cold Vapour AA
B	Boron	10	PPM	NaOH Fusion	DC Plasma Emission
Te	Tellurium	0.2	PPM	Multi Acid - MIBK	Atomic Absorption
Sn	Tin	5	PPM		X-Ray Fluorescence

Samples were analysed by Bondar-Clegg & Company Ltd., 130 Pemberton Ave., North Vancouver, B.C. V7P 2R5 (604)985-0681

Table 2. SAMPLE DESCRIPTIONS

STATION	SAMPLE*	QUAD**	BRIEF FIELD DESCRIPTION
91WG44 91KC291	2316	MED	Rusty layer in black chert, shale, argillite sequence
91WG44 91KC291	2317	MED	Rusty layer in black chert, shale, argillite sequence
	2318	MED	Limonite and clay-altered rhyolite breccia
	2319	MED	Composite chip sample of iron-oxide stained rhyolite breccia
	2320MO	KR	Pillow basalt, north of Sischu Mountain
	2321	KR	Sulfide-bearing hornfels
	2322	KR	Tourmaline-bearing quartz vein material
	2324	KR	Brown quartz veins to 1/2" cutting sulfide-rich hornfels
	2325	KR	Greisen(?) vein material with black metallics, limonite, tourmaline
	2326	KR	Brown mica, quartz, tourmaline(?) rock in rubble
	2327	KR	Chips of sulfide-bearing hornfels
	2328	KR	Rusty quartz vein
	2329	KR	Gossan in schistose limestone
	2330	KR	Rusty weathering, gray, schistose quartz-eye rhyolite(?)
	2331	KR	Tourmalinized gossan
	2332	KR	Rusty, somewhat pyritic quartzite
91WG48	2333	KR	Rusty, gossany quartz with tourmalinized stockwork veining
	2334	KR	Composite chip sample of quartz veins and rusty hornfels
	2335	KR	Gray hornfels with local breccia, gossan, iron-oxide veinlets and fractures
	2336	KR	Breccia zone with semi-massive gossan in hornfelsed gray siltstone and dense black shale
	2337	KR	Rusty gossan with few quartz veins and veinlets in hornfelsed siltstone
	2338	KR	Platy rhyolite and breccia with iron oxide cement, locally black massive goethite
	2339	KR	Composite chips of limonitic, brecciated rhyolite
	2340	KR	Composite chips of limonitic, brecciated rhyolite
	2341	KR	Biotite-bearing dike(?) cutting rhyolite
	2342	RUB	Felsite and some quartz vein material
	2343	RUB	Rusty fragments of rhyolite and quartz mica schist in frost boils
	2344MO	RUB	Schistose metaigneous, muscovite may be secondary, some iron oxide, not ideal M.O. sample
91WG18 91KC250	2364	KR	Coarse-grained, weathered grussy biotite granite with vertical quartz veining up to 5 cm thick
91WG19 91JK320	2365	KR	Gray quartz phyllite, metatuff
91WG20	2366	KR	Quartz vein in phyllite
91WG21	2367	KR	Iron-stained fillings in medium gray recrystallized limestone
91WG22	2368	KR	Felsite with calcite filled amygdules
91WG23	2369	KR	Rhyolite dikes cutting recrystallized limestone
91WG24	2370	MED	Gossan in silicified dolomitic breccia
91WG25	2371	MED	Silicified gossan in brecciated dolomite
91WG26	2372	MED	Gossan in brecciated dolomite with smithsonite(?) on fractures
91WG27	2373	MED	Tourmaline-quartz monzonite, locally with pyrrhotite and chalcopyrite
91WG28	2374	MED	Tourmaline vein with disseminated pyrrhotite and chalcopyrite
91WG29	2375	MED	Shale with lenticular, pyritic nodules to 5 cm long
91WG30 91KC271	2376	KR	Medium-grained biotite monzonite
91WG30	2377MO	KR	Medium-grained biotite quartz monzonite, marginal M.O., disseminated pyrite, VABM Titna
91WG31	2378	KR	Iron-stained rhyolite

91WG32		2379	KR	Metarhyolite tuff, locally with disseminated pyrite
91WG32		2380MO	KR	Rhyolite tuff
91WG33	91KC273	2381	KR	Iron-stained green radiolarian chert
91WG34		2382	KR	Iron-stained, fractured, locally brecciated white to gray chert
91WG35		2383	KR	Brecciated gray chert
91WG36	91KC279	2384	KR	Light green metatuff with scattered pyrite cubes
91WG37		2385	KR	Fractured limestone with iron-staining on fractures
91WG38	91KC282	2386	KR	Medium- to coarse-grained greenstone with magnetite
91WG40	91KC285	2387MO	KR	Fine-grained, equigranular monzonite
91WG41		2388	KR	Coarse, white, recrystallized marble near pluton contact
91WG41		2389	KR	Marble, 100 m away from pluton contact
91WG43		2390	KR	Limestone, <15 m from pluton contact
91WG43		2391	KR	Limestone, 75 m from pluton contact
91WG44	91KC291	2392	MED	Sooty, black argillite and cherty argillite
		2393	MED	Iron-stained rhyolite breccia with chalcedony, selective chips
91WG45		2394MO	RUB	Fine-grained, equigranular diorite/quartz diorite, VABM Baker
91WG46		2395	KR	Black biotite-tourmaline hornfels
91WG46		2396	KR	Iron-stained white rhyolite dike
91WG47		2397	KR	Brecciated, hornfelsed siltstone with quartz-tourmaline fracture filling up to 2 cm thick
91WG48		2398	KR	Banded quartz-tourmaline veins to .5 m thick
91WG49		2399	KR	Silicified, brecciated hornfelsed siltstone with quartz-tourmaline fracture filling
91WG50		2400	KR	Silicified, hornfelsed black siltstone, locally silicified brecciated zone up to 5 cm thick
91WG51		2401	KR	Quartz vein (5-10 cm thick) cutting hornfelsed siltstone
91WG52		2402	KR	Light gray, leached, hornfelsed siltstone
91WG53		2403	KR	Finely fractured, iron-stained aphanitic rhyolite
91WG54		2404	KR	Iron-stained, rhyolite breccia
91WG55		2405	RUB	Iron-stained metavolcanic
91KC296		2406P*	KR	Pan concentrate sample, Bitzshitini
		2407	KR	Rusty quartz veins in carbonaceous argillite
91KC297		2408	KR	Calc-silicate hornfels with tourmaline and limonite on fractures
91KC298		2409	KR	Schistose quartzite with limonite-filled vugs and quartz and tourmaline on fractures
91KC250	91WG18	2751	KR	Quartz vein (.5 m wide) in very weathered (altered?) biotite granite
91KC252		2752		Vuggy quartz vein in slate, off map area on south shore of Lake Minchumina
91KC253		2753MO	KR	Fine-grained equigranular biotite granite with tourmaline clots to 4 cm
91KC253		2754	KR	Fine-grained equigranular biotite granite with tourmaline clots to 4 cm
91KC254		2755	KR	Red-brown weathered, gray-green quartz-tourmaline vein
91KC254		2756	KR	Light green quartzite with tourmaline veinlets and limonite-filled vugs
91KC255		2757	KR	Quartz-tourmaline greisen
91KC256		2758	KR	Black quartzite
91KC257		2759	KR	Stretched pebble conglomerate of white quartz and red chert pebbles in a gray-green phyllitic matrix
91KC258		2760MO	KR	Medium-grained, equigranular biotite quartz monzonite
91KC258		2761	KR	Medium-grained, equigranular biotite monzonite
91KC259	91ND86	2762	MED	Limonite(goethite)-, clay-altered rhyolite breccia
91KC260		2763	MED	Finely layered chert with limonite- and clay-altered rhyolite
91KC261		2764	MED	Maroon-colored, clay-altered rhyolite with goethite layers
91KC261		2765	MED	Tan, fine-grained rhyolite with limonite banding
91KC262		2766MO	MED	Gray, aphanitic felsic volcanic, marginal M.O. sample, finely and sparsely disseminated pyrite
		2767	MED	Limonite-, clay-altered brecciated rhyolite

	2768	MED	Clay altered rhyolite with limonite veinlets
	2769	MED	Clay-altered rhyolite
	2770	MED	Limonite, clay-altered rhyolite
	2771	MED	Deeply limonite-stained aphanitic volcanic with rounded smokey quartz phenocrysts (3mm)
	2772	MED	Limonite-, clay-altered, gray intermediate(?) volcanic with rounded smokey quartz phenocrysts
91KC263	2773	MED	Rhyolite porphyry with sanidine phenocrysts to 2 cm, abundant limonite
91KC264	2774MO	MED	Medium-grained biotite hornblende qtz monzodiorite/qtz diorite
	2775	MED	Limonite pod (1 m diam.) in limestone near pluton contact
	2777	MED	Limonitic skarn in limestone near margin of pluton
	2778	MED	Pyroxene skarn at margin of magnetite near porphyritic granite
	2779	MED	Magnetite skarn, approximately 15 m across
	2780	MED	Light gray, fine-grained syenite(?) dike, 12 m wide
91KC267	2781	MED	Dark gray sandstone with quartz-tourmaline veins and limonite-filled vugs
91KC268	2782	MED	White, clay-altered felsite dike (25 m wide) with limonite banding and tourmaline clots to .5 cm, intrudes Cretaceous sandstone
	2783	MED	Tourmaline-bearing, pyritic, light tan rhyolite porphyry dike
	2784	MED	Rusty, hornfelsed argillite at margin of Von Frank pluton
	2785	MED	Rusty, hornfelsed argillite at margin of Von Frank pluton
91JK321	2786	KR	Hornfelsed, thinly bedded quartzite with secondary biotite
91JK322	2787	KR	Hornfelsed quartzite/shale
	2788	MED	Tourmaline, magnetite pyrrhotite skarn
91JK329	2789MO	MED	Biotite andesite
91JK330	2790	MED	Fractured andesite
91JK331	2792	MED	Sample from trench, iron-stained basalt(?) with sulfides
	2794	MED	Algal boundstone with iron gossan
	2795MO	KR	Qtz monzodiorite, Kantishna River Pluton
	2796	KR	Red-stained, recrystallized limestone
	2797	KR	Ferruginous limestone
	2798	KR	Red-stained, oxidized, silty, sandy limestone
91NBD2A	2799	KR	Dark gray phyllitic quartz-rich rock with sulfides
91NDB2B,C	2800	KR	Calc-silicate hornfels
91NDB6	2801	MED	Limonite-, hematite-altered rhyolite
91NDB7	2802	MED	Rhyolite, extremely limonitic
91NDB8	2803	MED	Brecciated rhyolite gossan
91NDB9	2804	MED	Limonite-altered rhyolite
91NDB10	2805	MED	Tan/pink rhyolite with black quartz
91NDB12	2806	MED	Gossan, endoskarn
91NDB13	2807	MED	Magnetite, pyrrhotite skarn
91NDB13	2808	MED	Magnetite
91NDB14	2809	MED	Limonitic, calcareous, medium- to fine-grained sand
91NDB16A	2810	MED	Limestone gossan
91NDB17A	2811	MED	Dark gray, aphanitic basalt, finely disseminated sulfides
91NDB16	2812	MED	Gossan, hornfelsed rock
91NDB17	2813	MED	Granodiorite with pyrite
91NDB21	2814	KR	Quartz-rich orthogneiss
91NDB22	2815	KR	Quartz-rich gossan
91KC275 91NB24	2816	KR	Limonitic brecciated chert and rhyolite(?) tuff
91NDB23	2817	KR	Felsite dike with sulfides
91NDB25	2818	KR	Limonite-stained, light to medium gray/white recrystallized limestone

91NDB28	2819	RUB	Light gray to white muscovite orthogneiss
91NDB29	2820	RUB	Granitic orthogneiss with epidote, chlorite, garnet
91ABD47	2821	KR	Rhyolitic dike rocks within limestone
	2871	MED	Limonite-stained rhyolite breccia
91KC270	2872MO	KR	Medium-grained biotite granite/qtz monzodiorite, Haystack Mountain
91KC272	2873	KR	Graphitic black slate/phyllite
91KC272	2874	KR	Cherty black slate
91KC272	2875	KR	Iron-stained siliceous sandstone with disseminated pyrite
91KC274	2876	KR	Brecciated Dark gray to red chert, orange translucent mineral in quartz veinlets
91KC277	2877	KR	Quartz-calcite veins and veinlets (1-5 cm wide) in sandstone
91KC278	2878MO	KR	Fine- to medium-grained equigranular biotite hornblende qtz monzodiorite
91KC280	2879	KR	Quartz vein (.3 m wide) within black slate
91KC287	2880MO	KR	Medium-grained biotite qtz monzonite(?), Sischu Mountain
91KC288	2881	KR	Limonitic rhyolite
91KC292	2882	MED	Brecciated rhyolite with chalcedony, trace cinnabar(?)
91KC292	2883	MED	Composite chips of brecciated, limonite-altered rhyolite
91KC293	2884	RUB	Felsite dike
	2885	RUB	Hematite-stained conglomerate
91KC295	2886P	KR	Pan concentrate sample, Haystack
91NDB30	2887	RUB	Granitic orthogneiss with sulfides, chlorite
	2908	KR	Gossan with sulfides in recrystallized limestone
	2909	RUB	Quartz muscovite metagranite
	2910	RUB	Granitic orthogneiss with garnet, epidote, and chlorite
	2911	RUB	Granitic orthogneiss with round quartz porphyroblasts, chlorite, epidote
	2946	KR	Quartz-tourmaline hornfelsed zone
91KC300	2947	KR	Composite chips of limonite-, clay-altered crystal-lithic tuff, abundant limonite and geothite
91KC301	2948	KR	Composite chips of limonite-, clay-altered brecciated rhyolite
91KC302	2949MO	KR	Gray, fine-grained dike(?) in rhyolite, occurs in 1 m diam. frostboil
91KC303	2950	RUB	Quartz and gray metallic mineral (hematite?) in veins throughout chlorite schist
	2951P	RUB	Pan concentrate sample, California Creek
	2952	RUB	Chlorite, quartz mica schist with quartz veinlets and limonite vugs
91WG56	2967	RUB	Quartz vein cutting chlorite schist
91WG57	2968	RUB	Light green chlorite schist (meta-tuff)
91WG58	2969	RUB	Light green quartz schist with blue-black metallic mineral in fine quartz veinlets
91WG59	2970	RUB	Rhyolite tuff with single metamorphic fabric
	2987	MED	Bright silvery green micaceous rock near magnetite skarn

*MO = Major oxide, P = Pan Concentrate, All other samples are rocks

**MED = Medfra, KR = Kantishna River, RUB = Ruby

Table 3. MAJOR OXIDE ANALYSES, NORMATIVE MINERALS, GOLD AND TIN DISCRIMINANT SCORES

MAJOR OXIDE ANALYSES (WT %)

SAMPLE	LONG (W)	LAT (N)	QUAD	SIO2	TIO2	AL2O3	FE2O3	FEO	MNO	MGO	CAO	NA2O	K2O	P2O5	BA	RB	ZR
2320	152.864	64.160	KR	47.9	3.400	13.7	2.331	10.50	0.20	6.24	7.63	2.39	1.50	0.35	486	43	238
2344	153.822	64.145	RUB	78.9	0.096	12.0	0.470	0.03	0.02	0.12	0.05	3.68	4.68	0.02	477	181	194
2377	152.311	64.427	KR	62.6	0.808	16.2	1.941	2.60	0.11	1.52	3.01	4.63	4.06	0.32	1750	144	383
2380	152.052	64.416	KR	68.6	0.789	16.8	1.135	3.10	0.06	1.26	0.11	0.16	5.06	0.07	1430	194	354
2387	152.085	64.648	KR	55.7	0.860	17.1	1.196	4.80	0.12	3.48	6.48	3.39	5.01	0.40	3310	168	261
2394	153.251	64.158	RUB	49.6	1.770	13.6	2.742	10.40	0.21	6.76	10.70	1.96	0.52	0.17	124	21	119
2753	152.321	64.171	KR	73.2	0.167	14.5	0.711	0.80	0.05	0.33	0.97	3.37	5.17	0.08	475	289	105
2760	152.898	64.118	KR	63.5	0.854	15.8	1.841	2.60	0.09	1.85	3.27	4.59	4.09	0.20	1080	162	466
2766	153.215	63.938	MED	65.7	0.341	17.0	1.375	3.10	0.09	0.43	2.23	3.85	3.97	0.17	1550	172	491
2774	153.847	63.723	MED	57.6	1.070	15.5	1.489	5.40	0.12	5.88	6.68	3.31	2.02	0.22	727	74	174
2789	154.364	63.614	MED	60.1	0.657	15.2	1.351	5.20	0.08	5.15	4.88	2.70	2.88	0.33	1670	115	186
2795	152.616	64.463	KR	64.6	0.481	17.5	0.790	1.80	0.07	1.41	3.79	4.17	3.57	0.16	2660	132	189
2872	152.321	64.171	KR	63.9	0.762	15.7	1.010	3.50	0.09	2.11	3.80	3.14	4.24	0.31	1450	219	255
2878	152.336	64.569	KR	60.0	0.542	17.5	1.150	3.50	0.11	2.72	6.25	3.36	3.30	0.19	2900	118	177
2880	152.864	64.160	KR	63.3	0.888	16.1	2.051	2.60	0.11	1.55	3.02	5.06	3.93	0.22	1450	164	526
2949	152.311	64.427	KR	58.3	0.938	16.0	9.020	0.03	0.60	0.66	0.98	2.01	5.31	0.39	2140	220	711

Table 3. (CONT.)

			NORMATIVE MINERALS												Discrim. Scores**	
SAMPLE	LOI	SUM*	QTZ	CO	OR	AB	AN	DIOP	HYP	OL	HEM	MT	ILM	RT	AP	Au	Sn
2320	2.77	100 2	1 001		9 22	21.034	23.115	11.389	23.17			3.514	6.717		0.843	100	
2344	0.47	100.6	39.331	0 837	27.635	31.115	0.117		0.299		0.47		0.106	0.044	0.046	0	0
2377	2.08	100.5	11.962		24.531	40.056	11.687	1.173	5.386			2.876	1.573		0.758	17	
2380	2 23	100	46.083	11.351	30.777	1.393	0.091		6.892			1.701	1.544		0.167	100	
2387	0 39	100 1			30 043	29.108	16.892	10.727	5.087	3.781		1.766	1.658		0.94	100	
2394	0.39	100 1	2.659		3.122	16.848	27.202	21.065	21.256			4.036	3.415		0.4	100	
2753	0 77	100.3	31.358	1.8	30.75	28.701	4.318		1.526			1.036	0.325		0.186	0	98
2760	0 77	100	12.164		24.492	39.356	10.569	3.668	4.944			2.704	1.636		0.469	32	
2766	1.54	100.5	21.658	2.77	23.877	33.156	10.13		5.33			2.022	0.657		0.401	100	0
2774	0.31	100.6	7.171		12.022	28.207	21.623	8.338	17.905			2.176	2.047		0 513	100	
2789	0.93	100.4	13 217		17.272	23.186	21.16	0.995	20.136			1.987	1.272		0.776	100	
2795	0 85	99.9	16.278	0.273	21.452	35.878	18.057		5.594			1.165	0.927		0.377	94	
2872	1	100.2	17.328		25.421	26.956	16.459	0.506	9.653			1.486	1.465		0.728	100	0
2878	0 54	100	10.359		19.773	28.827	23.242	5 676	8.946			1.691	1.04		0.446	100	
2880	0.62	100	10.82		23.498	43.32	9.724	3.218	4.187			3.008	1.71		0.515	20	
2949	4 85	99.4	25.791	6 47	33.295	18.046	2.458		1.744		9.571		1.429	0.245	0.958	0	0

* WRF W R.A. sums include all elements determined. For summation, elements are calculated as oxides

** Discriminant scores described in the text. Although this method was developed for plutonic rocks, extrusive and hypabyssal rocks are included here as a possible indication of gold potential of their parent magma. Rock descriptions are listed in table 2.

Table 4. GOLD DISCRIMINANT SCORES FROM MAJOR OXIDE ANALYSES PUBLISHED IN MOLL AND OTHERS, 1981

SAMPLE	LONG(W)	LAT(N)	AU DISC. SCORE
10	154° 04'	63° 40'	98
15	154° 23'	63° 36'	100
22	154° 18'	63° 32'	100
25	153° 51'	63° 43'	100
26	153° 51'	63° 43'	100
27	154° 37'	63° 32'	13
28	154° 17'	63° 39'	100

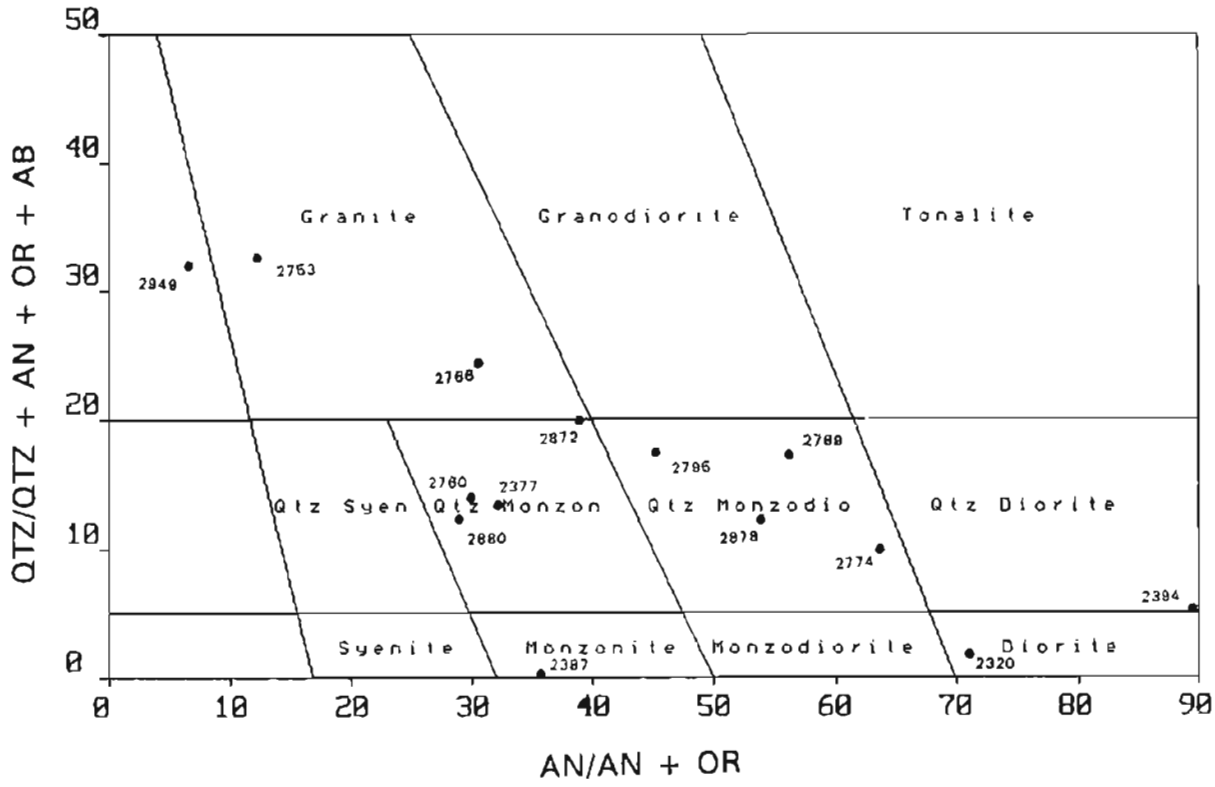


Figure 2. NORMATIVE MINERAL RATIOS (After Streckeisen and LeMaitre, 1979)