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GEOLOGY REPORT ON THE SWEET GRASS AREA, SOUTHERN ALBERTA METALLIC MINERAL EXPLORATION PERMIT AREA W4M-R9-T1, W4M-R9-T2, W4M-R10-T1

NOVEMBER, 1990

NTS: 72 E/3

PROJECT: 1748

Permit Nos. 6890100010 and 6890100011

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November, 1991

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SUMMARY

Geological evidence from field mapping and oil well drilling data in southern Alberta and Saskatchewan suggest that Tertiary-age intrusions have pierced the Phanerozoic sedimentary rocks of the Western Canadian Sedimentary Basin. Epithermal gold mineralization may be hosted in the sedimentary strata above these intrusions. Stream sediment, rock, and soil samples collected from selected target areas indicate the presence of zones of anomalous gold values in the near-surface sedimentary rocks in southern Alberta.

Recent work done in the permit area includes: ground magnetic surveys, prospecting, soil, rock and stream sediment sampling, and petrographic studies. The results of this work indicate that hydrothermal activity with associated gold mineralization may have occurred within the Bear Creek permit area.

The most favourable host rocks for epithermal gold mineralization are thinly bedded, silty carbonate rocks, such as those found in the area around the Carlin deposit in Central Nevada. Within the Sweet Grass area, there are several formations containing thinly bedded calcareous-rich or carbonate beds in the top 1000 m of the stratigraphy.

Additional pan concentrate sampling is recommended in the area of the anomalous gold zones that have been defined by soil sampling. Microscopic study of the samples should be completed in order to understand the nature of the gold and to determine its proximity to source. At least three 300 m reverse circulation drill holes are recommended to test the stratigraphy below the target areas.

1.0 INTRODUCTION

There has been little exploration for precious and base metals in the central plains of southern Alberta and Saskatchewan. Historically, this area has been the target of oil, gas and coal exploration. However, in the United States, and particularly in Montana, mining companies have been exploring for gold and other minerals for many years. One of the reasons for the difference in exploration philosophy across the border is the abundance of exposed Tertiary intrusions in Montana (Sweet Grass Hill, Little Rocky Mountains, Bearpaw Mountains). These intrusions often form prominent laccolithic bodies piercing the thick sedimentary cover where northeast trending basement fractures intersect northwest trending structures. Gold, silver, copper, lead, fluorspar and magnetite are often associated with many of these intrusions. Most, if not all past explorations, has centred on these intrusions. As a result, most of the area between these prominent intrusions has largely been ignored, as has southern Alberta and Saskatchewan, in the search for metallic deposits.

Geological evidence from field mapping and oil well drilling in southern Alberta and Saskatchewan suggest that intrusions intrude the sedimentary rocks of this portion of the Western Canadian Sedimentary Basin. Locally, uplifts of up to 1000 m have been documented, however, since the intrusions have not been exposed by erosion, no obvious expression of the intrusions exist. Thus the gold potential of these intrusions and the surrounding sediments, has never been examined.

Epithermal gold deposits can develop in structurally anomalous zones within the sediments above or near Tertiary intrusions. During intrusion, the sediments are fractured and domed upward as they give way to a rising magma pool. As the magma rises, a hydrothermal cell is generated as a result of the heat of the intrusion. In the meantime, near-surface sediments are continually being peneplaned and no obvious surficial expression of intrusion is evident. As the hydrothermal cell matures and expands in size, replacement of limy and feldspathic sediments with silica, sulphides, calc-silicates, fluorite, etc. occurs. Replacement may vary from very subtle, minor recrystallization of carbonate and the addition of gold and sometimes sulphides, to intense silicification and sulphidization. This replacement is especially evident near faults and fractures in the sediments. As the hydrothermal cell cools, with the crystallization of the intrusion, some altered zones near fractures coalesce to produce a large zone of alteration and gold enrichment. This altered and gold enriched target zone can occur within sedimentary rocks or within the intrusive body.

Examples of such replacement and alteration processes, in sedimentary rocks, occur at the Carlin (Bakker and Einandi, 1986), Vantage, New (Ilchik, 1990), Anne Creek and Black Hill (J.D.) deposits. These epithermal deposits exhibit similar characteristics. Gold generally occurs as submicroscopic disseminations in organic-rich, thinly-laminated silty carbonate rocks. The Carlin deposit contains approximately 10 million tons, grading 10 g/t Au.

Near the project area, most of the known gold mineralization is related to exposed Late Cretaceous to Early Tertiary intrusives, such as those forming the Sweet Grass Hills, Bearpaw Mountains, the Little Rocky Mountains and Judith Mountains (O'Neill and Lopez, 1985). Evidence gathered in these areas confirmed the presence of gold, in placers and in lodes, and the presence of hydrothermally altered sedimentary rocks. The Zortman/Landusky deposit, which occurs within an intrusive body in the Little Rocky Mountains, contains over 50 million tons grading 0.81 g/t Au (Hasting, 1986). Other similar but smaller deposits, the Gilt Edye and Geis deposits, are located in the Judith Mountains in Montana. Both deposits are hosted by epithermally altered zones in Ordovician carbonates; adjacent Tertiary intrusives appear to be related to structurally controlled epithermal systems (Hasting, 1986).

Smaller gold occurrences of this type are also found in the Sweet Grass Hills and Bearpaw Mountains. These occurrences, however, have limited or no recorded production.

Geochemically, high concentrations of Ag, Sb, Hg and As are associated with these deposits. Weak enrichment in Cu, Pb, Zn, W and F are reported in some deposits but may be absent in others.

Heavy mineral samples collected by Noranda Exploration personnel in 1990 from streams in southern Alberta, contain highly anomalous concentrations of gold. A follow-up program of soil and rock sampling, prospecting and magnetic surveying was carried out, in the fall of 1990, on two grids within the metallic mineral exploration permit area. Geochemical results confirm the presence of a definite anomalous gold zone in the gridded area.

This report is based on the work completed on the 1990 follow-up program.

2.0 LOCATION AND ACCESS

The metallic mineral exploration permit area is located about 120 km southeast of Lethbridge, and 60 km east of Coutts, Alberta, near the Canada-United States border. It can be reached by Highways 4 and 50 (Figure 1).

3.0 CLAIM STATUS

Noranda Exploration Company, Limited (no personal liability) obtained a metallic mineral exploration permit, that covers 2,492 Ha, in September, 1990 from the Alberta Energy and Mines. The permit covers two blocks: Surprise Creek and Bear Creek. The following is a township and range description of the permit area:

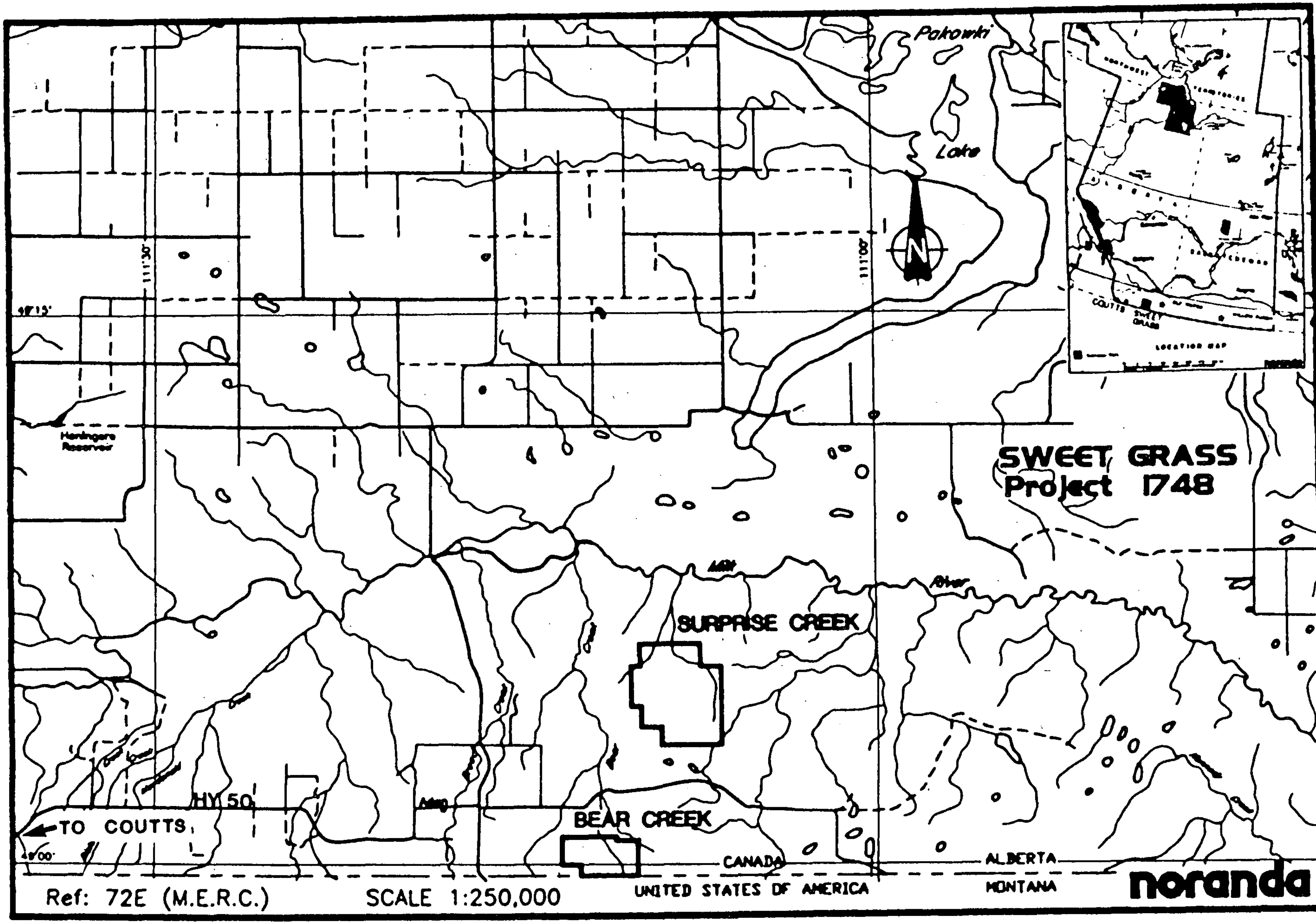


Figure 1. Location of the Metallic Mineral Exploration Area: Bear Creek Grid and Surprise Creek Grid.

Bear Creek

W4M-R9-T1 SEC 5; SEC6L1-3, L4E, L5E, L6-11, L12E&NW, L13-16; SEC7S, L9S, L10S, L11S, L12S; SEC8L1-5, L6W, L11SW, L12S; SEC26L5, L6W, L11W, L12, L13, L14W; SEC27L5-8, N; SEC28L7-10, L13N, L14N, L15, L16; SEC32L9, 10E, L15E, L16; SEC 33; SEC 34; SEC35L3W, L4, L5, L6W, L11W, L12, L13, L14W;

Surprise Creek

W4M-R9-T2 SEC2L3W, L4, L5, L6W, L11W, L12; SEC3S, NW, L9, L10, L15; SEC4; SEC5L1, L2E, L7E, L8, L9, L10E; SEC9L1-4; SEC10L2-4; W4M-R10-T1 SEC1L9N, L10N, L15, L16; SEC12SE, L9S, L10S.

4.0 1990/91 EXPLORATION WORK

In the spring of 1990, a Noranda Exploration crew collected stream sediment samples from streams draining several prospective target areas. Heavy mineral fractions from these samples were analyzed for gold, silver, and several other elements. Several of these samples contain highly anomalous concentrations of gold. In the fall, a metallic exploration permit, was obtained, to acquire the mineral rights to the areas with anomalous gold values.

In the fall of 1990, a program of geological mapping, prospecting, soil and rock sampling, petrographic studies and approximately 125 km of magnetic survey was carried out on the permit area. Soil and rock samples were analyzed for 32 elements by ICP method (see Appendix 4).

The list of personnel who performed the work is included in Appendix 2.

The expenditures incurred, on the permit, are listed in Appendix 3.

5.0 REGIONAL FEATURES

5.1 Regional Geology

The areas with potential for hosting epithermal gold mineralization in southern Alberta are located in two partially overlapping sedimentary basins: the Western Canada Sedimentary basin and the Williston Basin. The basins consist of a mixture of marine and continental sediments underlain by Precambrian basement metamorphic rocks. Rocks within the basins were deformed by the Cordilleran Orogeny and the emplacement of local Tertiary intrusives.

The stratigraphy of the project area has been described by Caldwell (1987), as follows:

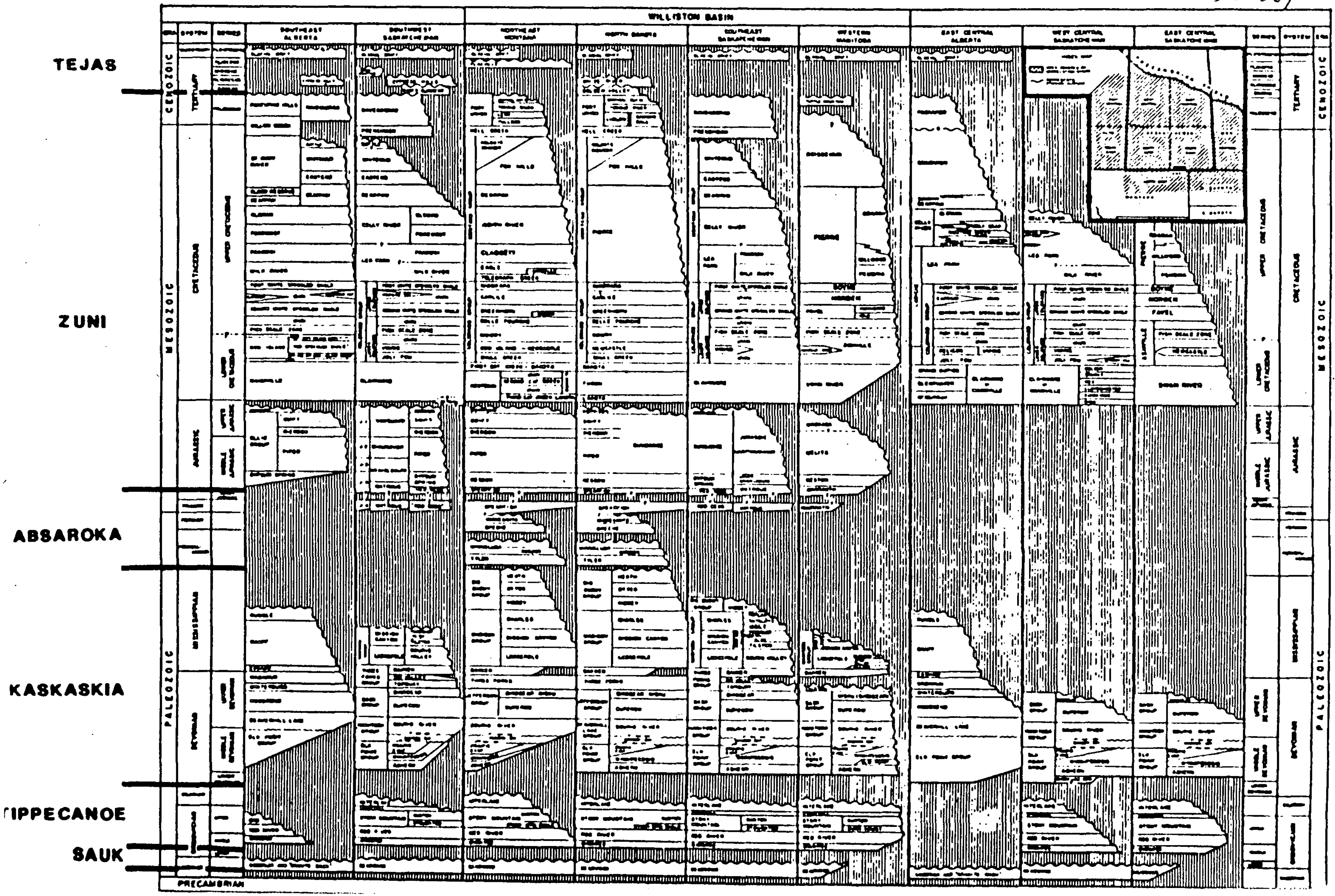
> "Phanerozoic sedimentary rocks in Saskatchewan are readily divisible into the Sauk, Tippecanoe, Kaskaskia, Abrosoka, Zuni, and Tejas unconformity bound sequences. The stratigraphic spans of these areas agree so closely with positive fluctuations in the second order of global changes in sea level that deposition of these sequences may be claimed to be controlled eustatically... The Sauk sequence preserves the distal edge of the earliest Phanerozoic transgressive-regressive cycle and predates the Williston Basin. The Tippecanoe sequence records marginal thinning and facies changes in the oldest rocks of that basin. Older Kaskaskia rocks carry prime evidence of persistent evaporitic pans within the Williston Basin; youngest Kaskaskia rocks of a second transgressive-regressive marine cycle show a prominent shoaling phase. Absaroka rocks ... betray restriction of the seas in the continental interior, the restriction to be correlated with unusually low stands of global sea level. The Zuni and Tejas sequences in Saskatchewan record expanding marine conditions, followed by the spread of continental conditions, which marked the evolution of the Western Canadian foreland basin in sectors well removed from the Flanking orogen."

These unconformity bound sequences are in turn sub-divided into six sedimentary groups. These groups and their relationship to the time sequences are present in Table 1.

The Precambrian and Phanerozoic rocks in the sedimentary basins have been affected by the Sweet Grass Arch, which is a broad Paleogene flexure that separates the Western Canada Basin and the Williston Basin (Figure 2). The flexure consists of three different components including the Bow Island Arch, Kevin Sunburst Dome, and the South Arch (Figure 3). These features are represented by tight northwest-trending, northwest-plunging or northeast-trending, northeast-plunging faulted folds, broad arches and local domes.

The Sweet Grass Arch was established in the Precambrian and has maintained the same relative position and influenced the deposition and erosion of sediments since Beltian time (Alpha, 1955). The Laramide orogeny, culminating in Eocene time, caused rejuvenation of the arch to produce the present form. Alpha (1955) and Meyboom (1960) suggested that Laramide disturbances included the elevation of blocks constituting the ranges of central and southern Montana and the intrusion of igneous rocks on the east side of the Sweet Grass Arch. These late Cretaceous to Early Tertiary intrusions range from ultramafic to granitic in composition (O'Neill and Lopez, 1985). Three major intrusive centers have been identified in the vicinity of project area and these include the Sweet Grass Hills, Bearpaw Mountains and the Little Rocky Mountains, all of which are located on the northeast flank of the Sweet Grass Arch, in the United States. These intrusives are confined to a 250 km wide trend known as the Great Falls Tectonic Zone (Figure 4). This zone consists of a series of a northeast-trending fractures that extends from south-central Idaho to Port Nelson on Hudson Bay. This zone is bound in the west by the Sweet Grass Hills, in Alberta, and in the east by the Little Rocky Mountains, in Montana. Numerous other exposed and buried intrusive bodies have been documented away from these intrusive centers.

Table 1. Stratigraphic correlation chart for Saskatchewan and adjoining areas, modified from the chart published by the Saskatchewan Department of Mineral Resources, Petroleum and Natural Gas Branch, in 1963. (From: Caldwell, 1986)



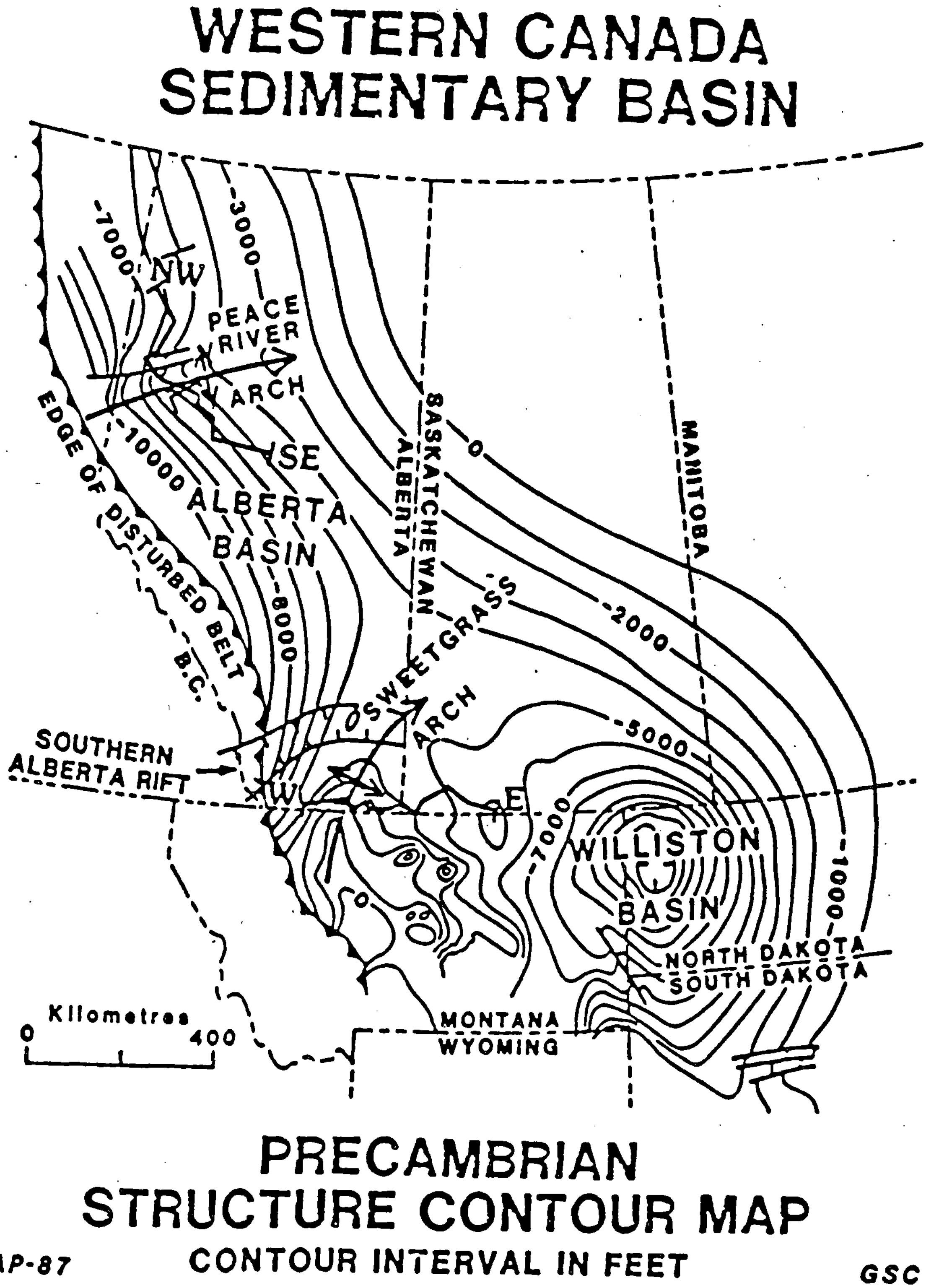


Figure 2. *Precambrian structure contour map, Western Canada Sedimentary Basin. (After Burwash* et al., *1964 and RMAG Research Committee, 1967-1969, 1972).*

From Podruski, 1988

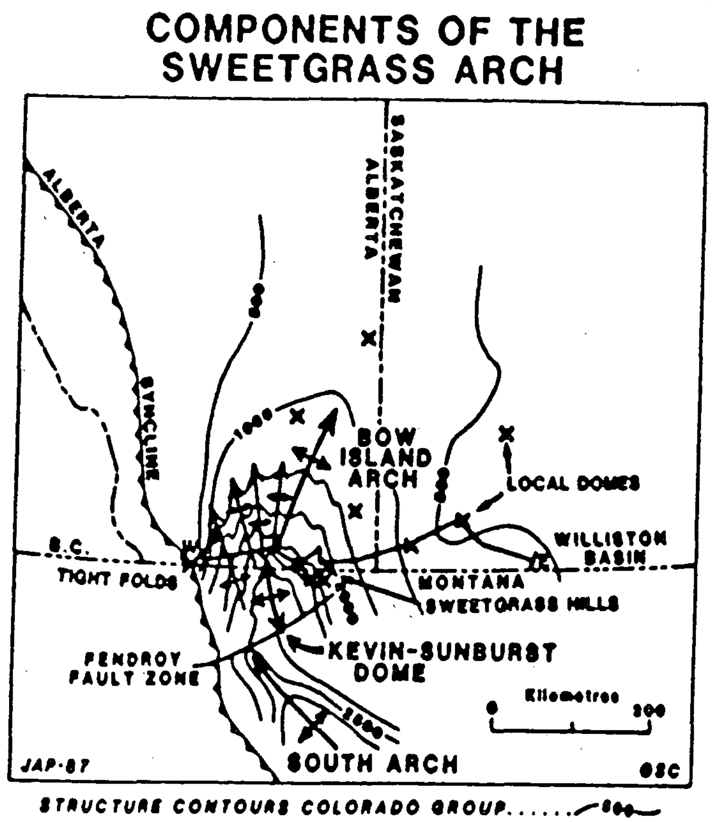


Figure 3. Components of the Sweetgrass Arch. West-east line of section shown. (After Dobbin and Erdmann, 1955, McLean, 1971; and Tovell, 1958).

(From: Podruski, 1988)

Great Falls Tectonic Zone

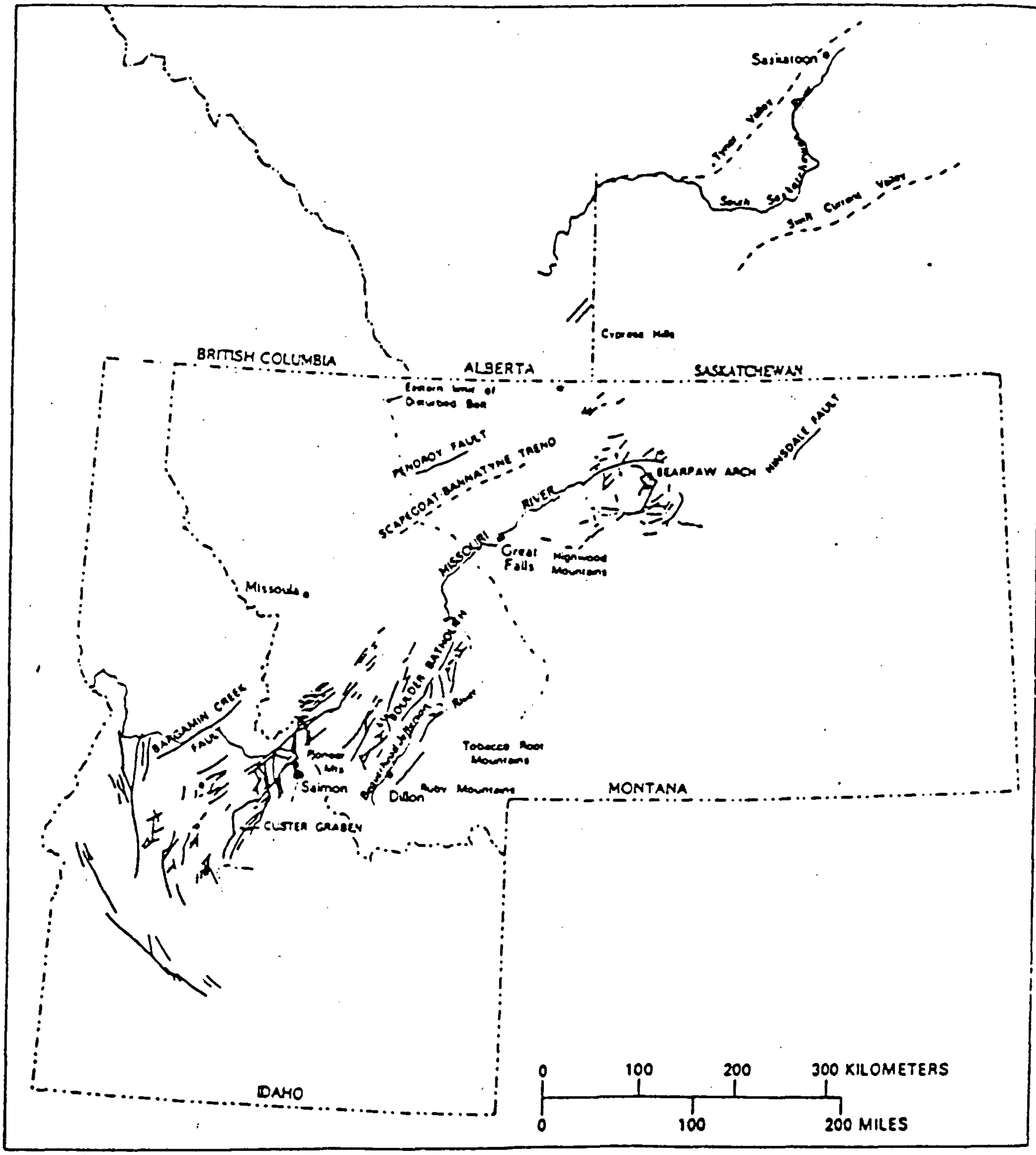


Figure 4—Map showing northeast-trending high-angle faults, shear zones, and linear topographic features in Idaho, Montana, and southern Saskatchewan (Williams and Dyer, 1930; Alpha, 1956; Cohee, 1961; Stone, 1968; Mudge, 1972; Whitaker and Pearson, 1972; Rember and Bennett, 1979; McIntyre et al, 1982; Ruppel et al, 1983).

From O'Neill and Lopez, 1985

Numerous faults of various ages and complex history have crosscut the area.

5.2 Regional Geophysics

Regional airborne magnetic and ground gravity surveys have defined numerous anomalous zones (Figure 5), which generally are parallel to the Great Falls Tectonic Zone. These anomalies may reflect anisotropies (such as faults, intrusive bodies at depth, salt collapse features, etc.) in the rocks underlying the area.

6.0 LOCAL GEOLOGY

6.1 Local Stratigraphy

The general stratigraphic succession of the top 1000 m in the area comes from well logs of three gas wells (two from the Surprise Creek and one from the Bear Creek, Figures 6 and 7). The lithotypes in both grids are very similar. Except for the Colorado and the Milk River formations, the thickness of all the other formations in the two grids are similar. The Bear Creek has a thicker Colorado but a thinner Milk River formation, than the Surprise Creek. All the units in the Bear Creek area are about 150 m higher in elevation than the corresponding units in the Surprise Creek area. The Surprise Creek grid is located about 10 km northeast of the Bear Creek grid. This suggests that the rocks in the Bear Creek area have been uplifted by about 150 m with respect to the rocks in the Surprise Creek area. The uplift may have been caused by intrusions and/or associated differential movement in faulted blocks. Figure 8 shows that an anticlinal axis, which is part of the Sweet Grass Hill Arch, passes through the vicinity of Bear Creek, while a synclinal axis passes through the Surprise Creek area.

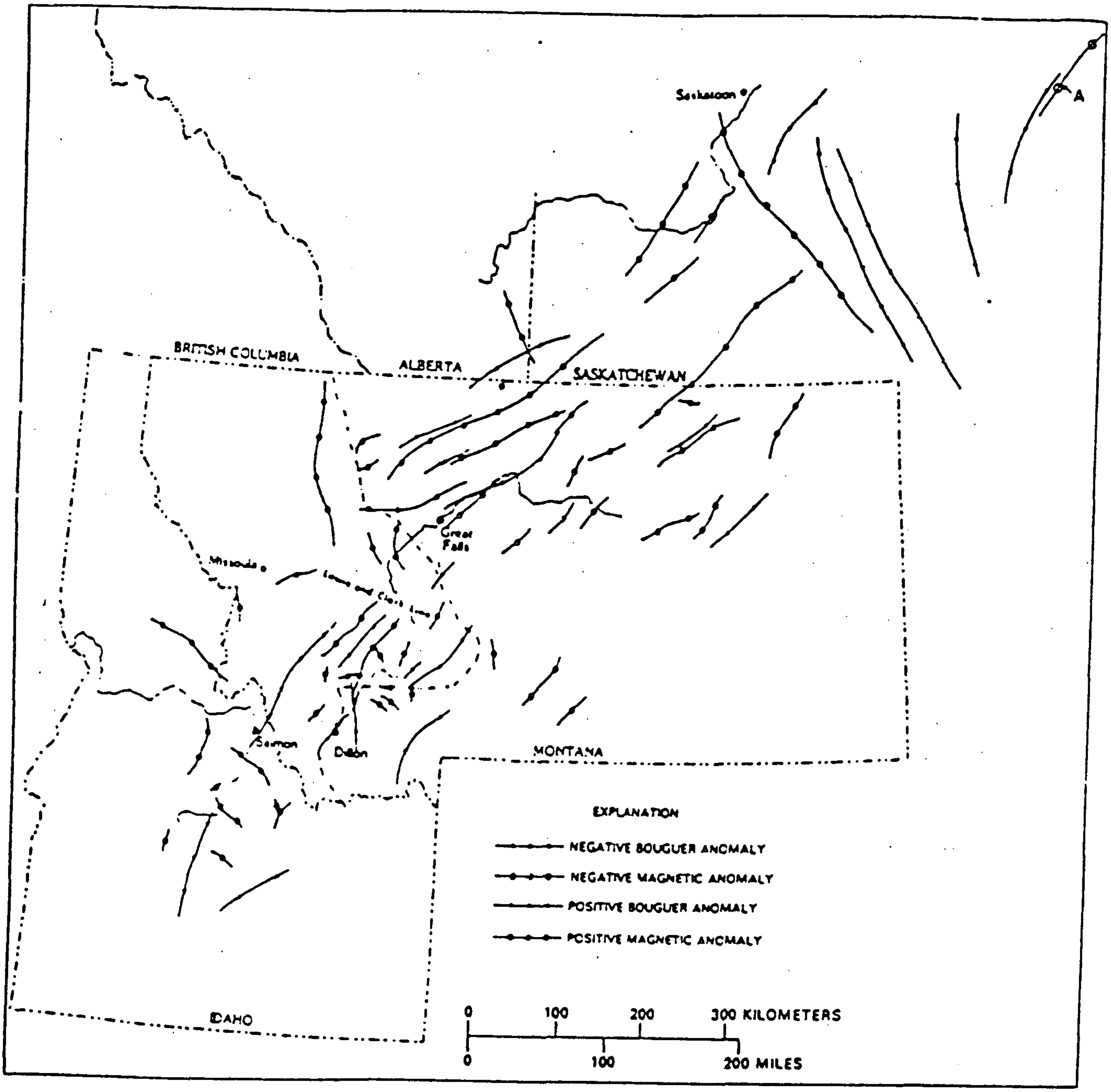


Figure 5—Map showing distribution of linear magnetic and gravity anomalies in parts of Idaho, Montana, and southern Saskatchewan (Smith, 1970; Kleinkopf and Mudge, 1972; Burwash and Culbert, 1976; Coles et al, 1976; Zeitz et al, 1978; Zeitz, 1982).

After O'Neill and Lopez, 1985

BEAR CREEK
WELL: CMG ADEN 1A-6-1-9

AGE	Elev (Top) A.S.L. (m)	Thickness (m)	FORMATION	DESCRIPTION
UPPER CRETACEOUS	Surface 1196.9		St. Mary River	Shale, sandstone, bentonite, coal seams
			Blood Reserved	Shale, sandstone, bentonite, coal seams
		152.4	Bear Paw	Shales, bentonite, iron-nodules shale, coal seams
			Oldman	Shale, bentonite, iron-nodules shale, sandy shale, coal seams
			Foremost	Shale, coal seams, sandstone
	1044.5	46.0	Lea Park/Pakowki	Interbedded shale, siltstone, bentonite
	998.5	82.0	Milk River	Sandstone
	916.5	68.6	Colorado/First White Speckle	Calcareous Shale
	847.9	208.8	Medicine	Sandstone
	639.1	64.6	Second White Speckle Shale	Calcareous Shale
	574.5	17.7	Fish Scale	Sandstone
LOWER CRETACEOUS	556.8	146.3	Bow Island	Sandstone, Shale
	410.5	143.2	Manville	Sandstone, calcareous/limestone members
JURASSIC	267.3	21.4	SBRS	
	240.7	41.1	Rierdon Swift	Carbonate
	191.1		Madison STTH	Carbonate

Figure 6. Stratigraphy of the Bear Creek Grid from Gas Well CMG 1A-6-1-9

SURPRISE CREEK

Well: CMC LAIT 7-4-29		2.5km Apart	Well: CMC ADEN 11-3-2-9	
Elev (Top) A.S.L. (m)	Thick-ness (m)	FORMATION	Elev (Top) A.S.L. (m)	Thick-ness (m)
Surface 1002.5	152.4	St. Mary River	Surface 996.2	152.4
		Blood Reserved		
		Bear Paw		
		Oldman		
		Foremost		
871.7	46 (?)	Lea Park/Pakowki	857.2	46 (?)
825.7	119.5	Milk River	811.2	104.7
706.2	23.4	Colorado	706.5	32.9
682.8	207.6	Medicine	673.6	207.6
475.2	75.3	Second White Speckle Shale	465.7	74.9
399.9	42.7	Fish Scale	390.8	44.5
357.2	129.5	Bow Island	346.3	139.9
227.7	119.5	Manville	206.4	88.7
108.2	14.3	SBRS	117.7	33.0
93.9	43.9	Rierdon	84.7	45.4
50.0	7.0	STTH		
43.0		Madison	39.3	

Figure 7. Stratigraphy of the Surprise Creek Grid from gas wells CMG LAIT 7-4-29 and CMG ADEN 11-3-2-9.

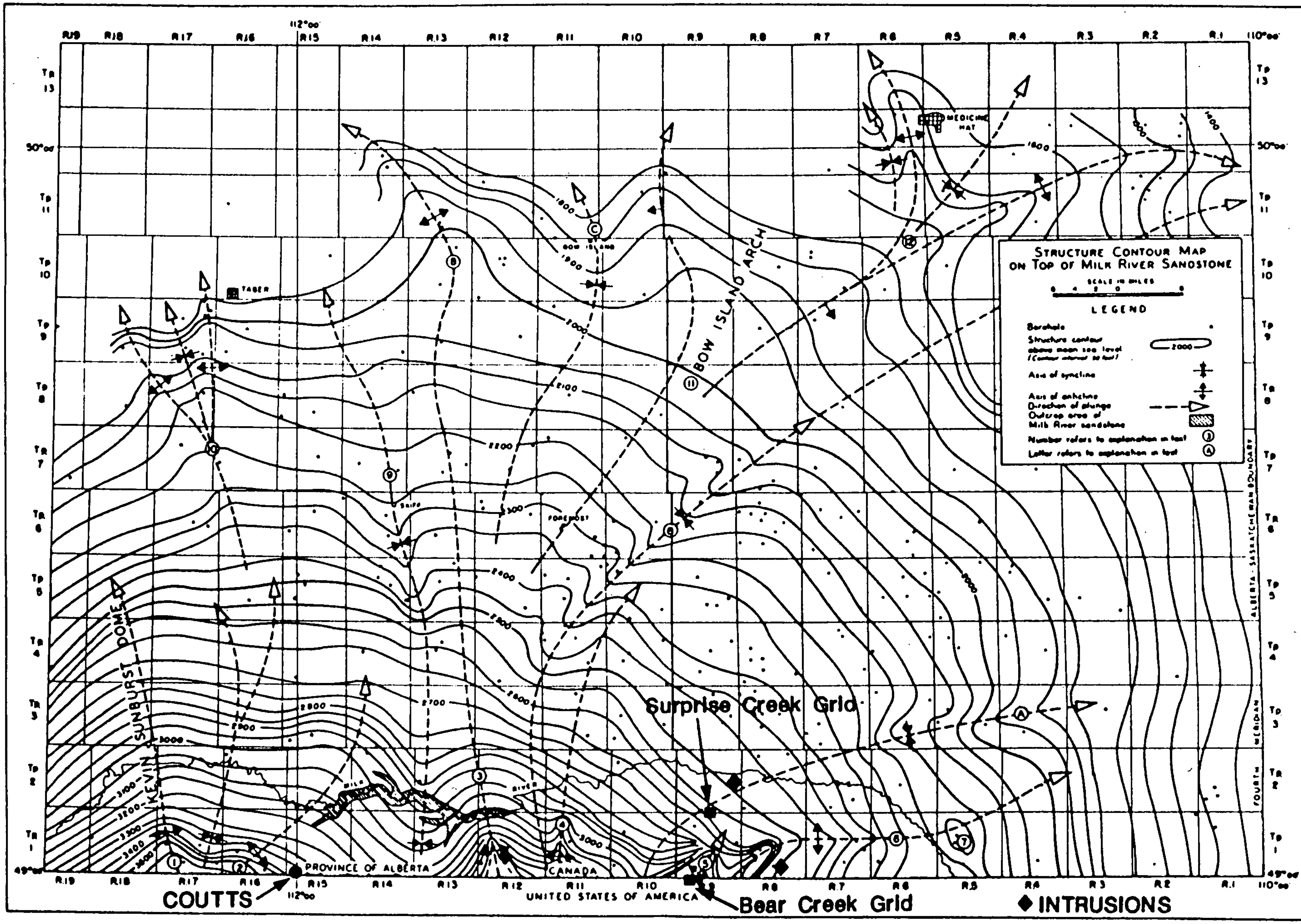


Figure 8. Structure Contour Map on Top of the Milk River Sandstone
(After Meyboom, 1960)

6.2 Local Intrusives

Mafic intrusions with abundant inclusions of granite, limestone, mafic clasts, volcanic fragments, sulphides and shales occur eleven (11) km east of Bear Creek and four (4) km northeast of Surprise Creek. A five-meter wide, north-northeast striking lamprophyre dyke occurs on the east side of the Bear Creek grid. Also, a diorite sill outcrops approximately 12 km northwest of the Bear Creek grid.

The Eastern Butte of the Sweet Grass Hills intrusions is located 10-12 km south and southwest of Bear Creek.

6.3 Site Geology

Surficial materials covering bedrock (both rocks and in situ soil derived from weathering of the rocks), in the area, consists of 1-5 cm organic material and a few centimeters to 2 m of glacial till. On the Bear Creek grid, streams cut up to 50-75 m below the gently sloping, peneplaned surface. In a few locations, outcrops showing 20-30 m of the local stratigraphy are exposed on the steep slopes of these creeks. In other locations, only the more resistant sedimentary rocks can be observed. On the Surprise Creek grid, creeks have cut up to 75-100 m below the level of the plain. Bedrock exposures of 50-100 m can be observed on the steep canyons of some of these creeks.

The rock types observed in both grids are similar. They consist mostly of successive horizontal beds of calcareous mudstone, calcareous siltstone, coquina/oyster beds, coal seams, siltstone (with or without ironstone), bentonite and sandstone. These beds range from a couple of centimeters to about 5 m thick. The most intriguing rock seen in the area is the brecciated calcareous mudstone which usually occurs in small outcrops.

Most of the rock types, except the brecciated carbonate mudstone, are very friable. The brecciated carbonate mudstone rocks are hard and more resistant to weathering and thus are easily recognized. The mudstones contain angular breccias (crackle breccias) cemented together by mainly fine-grained calcite and with minor silica. Fractures, 1-10 mm wide and 5-50 mm long, lined with calcite/ silica, are abundant in the brecciated rocks. Most breccias show little evidence of displacement, however, at a few locations in the Bear Creek grid (Map 1), strong slickensides have been observed in some brecciated mudstone outcrops. This gradation of breccias from highly brecciated rocks with slickensides to crackle breccia, is thought to represent evidence of hydrothermal or hydraulic brecciation (Montri and Paterson, 1990). Outcrops of brecciated carbonate mudstone are observed at many locations in the Bear Creek grid (circled sample numbers on Map 1). Only five such outcrops are observed in the Surprise Creek Grid (Map 2).

The networks of fractures of various orientations (A_2 010/64, 210/90, 285/77, 308/56) that occur at several places in the Bear Creek grid are intriguing in that they may indicate hydrothermal alteration. These features have rusty brown alteration selvages ranging up to 2 cm wide and these selvages are more resistant to weathering than the surrounding rocks. Some of the fractures offset one another by a couple of centimeters.

7.0 GEOPHYSICAL SURVEYS

7.1 Vertical Gradient Magnetic Surveys

The purpose of this survey was to test for 'blind' intrusive bodies near surface. Proton magnetometers were used in the surveys with readings taken at 25 m intervals on lines spaced 200 m apart.

7.1.1 Bear Creek (South) Grid

45.975 km of magnetic survey was carried out on this grid. There is a very gradual and subtle increase in values from the west to the east of the grid (Maps 4 and 5). Such a gradual change may reflect the gentle tilting of the rock units toward the west as the result of broad folding (Sweet Grass arch?). A five-meter wide, north-northeast striking lamprophyre dyke, which is exposed at several locations on the east side of the grid, has a distinctly higher magnetic response than the surrounding rocks.

7.1.2 Surprise Creek (North) Grid

77.75 km of magnetic survey was carried out on this grid. The magnetic response is flat over the entire grid (Maps 6 and 7).

Hydrothermally altered zones would not be detected by these magnetic surveys due to the lack of magnetite in these sedimentary rocks.

8.0 GEOCHEMICAL STUDY

A total of 1,037 soil and 29 rock samples were analyzed for gold and 30 other elements. Soil samples from the B-horizon were collected on the break of slopes along steep creeks using augers. Samples were collected at 50 m intervals. Occasionally, till samples were collected for comparison purposes. Rock samples were collected from almost every rock outcrop found. The locations of all these samples have been plotted on 1:5000 scale base maps made from aerial photographs. Four hundred fifty eight soil, 112 rock and 4 stream samples were collected from the Bear Creek grid (Map 1). Four hundred thirty seven soil and 56 rock samples were collected from the Surprise Creek Grid (Maps 2 and 3). The heavy mineral fractions from stream samples were analyzed for Au, Ag, Cu, Pb and Zn. All assay certificates are included in Appendix 4.

Contoured results for Au, As, Hg, Cu, Pb, Zn, Ni, Co, Mn, B, Ba and Sr were plotted individually on 1:20,000 scale maps (Figures 9-20 and Figures 23-34) using a UTM grid, (north top of page). These elements were chosen because of their known association with epithermal gold deposits. Silver, Sb, W and Mo which are commonly present in many epithermal gold deposits; are not plotted due to low and/or near background values in all samples. To facilitate easy recognition of anomalous trends colour maps were plotted with colours corresponding to values that are (a) two standard deviations above average, (b) one standard deviation above average, (c) average, and (d) two subdivisions below average. Samples that contain elements with values greater than two standard deviations above the average values are considered anomalous.

In addition, colour contour maps of cumulative standard deviation of (Ag+As+Sb+Hg) and (As+Ag+Sb+Hg+Cu+Pb+Zn+Ni+Co) were also plotted (Figures 21-22 and Figures 35-36). Coordinate values for these maps are calculated by adding the standard deviations of the selected geochemical values for each site. These cumulative values are then contoured.

The soil samples from the two grids consistently contain 3-5 times more Cu, Pb, Zn, Ni, Co and B than rock samples. The rock samples, on the other hand, generally contain more Mn, Ba and Co than soil samples. The contents of As, Th, Sr, Sb, Bi, and W are similar in both rock and soil samples.

The main rock types, collected from the area, are calcareous siltstone/sandstone, carbonate mudstone and brecciated carbonate mudstone (micritic limestone?). The brecciated carbonate mudstone contains more than twice as much Mn and Ba as calcareous siltstone/sandstone and carbonate mudstone. The contents of all other elements are similar in all rock types. This manganese enrichment may represent hydrothermal alteration preceding gold mineralization, as in Pahasapa deposit, Black

Hills (Montri and Paterson, 1990). Manganese halos may also occur in breccia zones in some modern hot spring gold deposits. Unusual barium-enrichment may signal the presence of adularia, a common hydrothermal alteration product.

8.1 The Bear Creek Grid

The average gold content of the 570 soil and rock samples from this area analyzed is 3.62 ppb. The highest value is 65 ppb Au. The standard deviation is 5.45 ppb Au and the value at two standard deviations above average is 14.62 ppb Au. Twenty-three (4%) of 570 samples contain anomalous amounts of gold (i.e., 15 or more ppb Au). All the rock samples contain 10 ppb or less gold. Gold does not appear to be enriched in a particular rock type.

Figure 9 and Map 1 show that there are several northeast (N60°E) striking zones with anomalous gold values. The largest zone is about 800 m long. A sandstone outcrop with network of fractures and alteration salvages occurs near the eastern part of this zone. At the same location, several soil samples (Sample #SL30-SL36) collected from outcrops with distinct bedding show symmetrical elevation of gold content from 3 ppb to 20 ppb. A brecciated carbonate mudstone sample (sample #SLR-9) collected from the same location contains 9 ppb Au. As a follow up, a pan concentrate sample (#310) collected from a creek cutting across the zone yielded 5.7 ppm Au and 0.4 ppm Ag.

Each of the eleven other element geochemical plots (Figures 10-20) contain several anomalous zones. However, none of these anomalous zones appear to correlate spatially with Au anomalies. There may be some weak correlations, but none well-defined. The anomalous areas defined by the cumulative standard deviation plots (Figures 21 and 22) also do not appear to correlate spatially with Au anomalies.

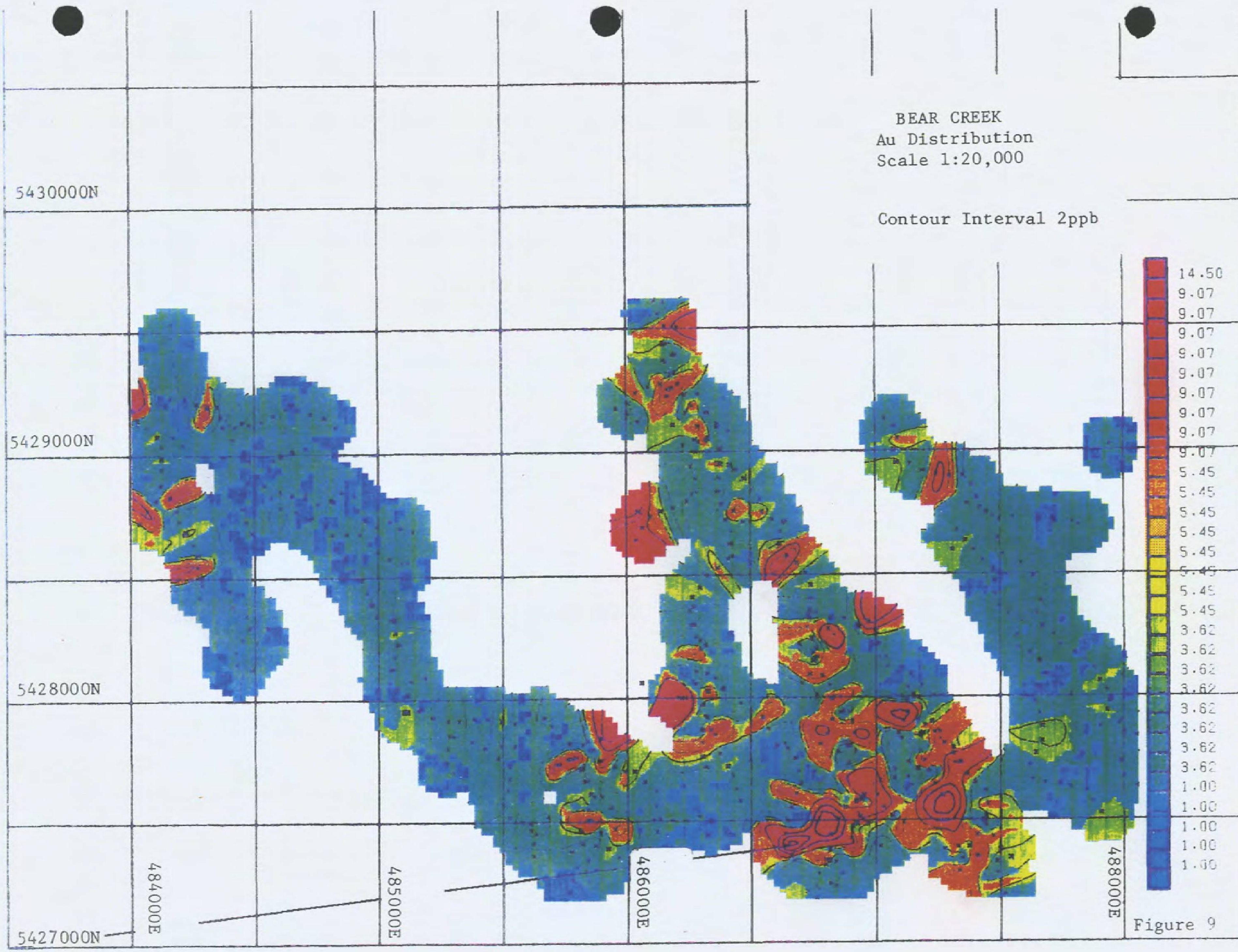
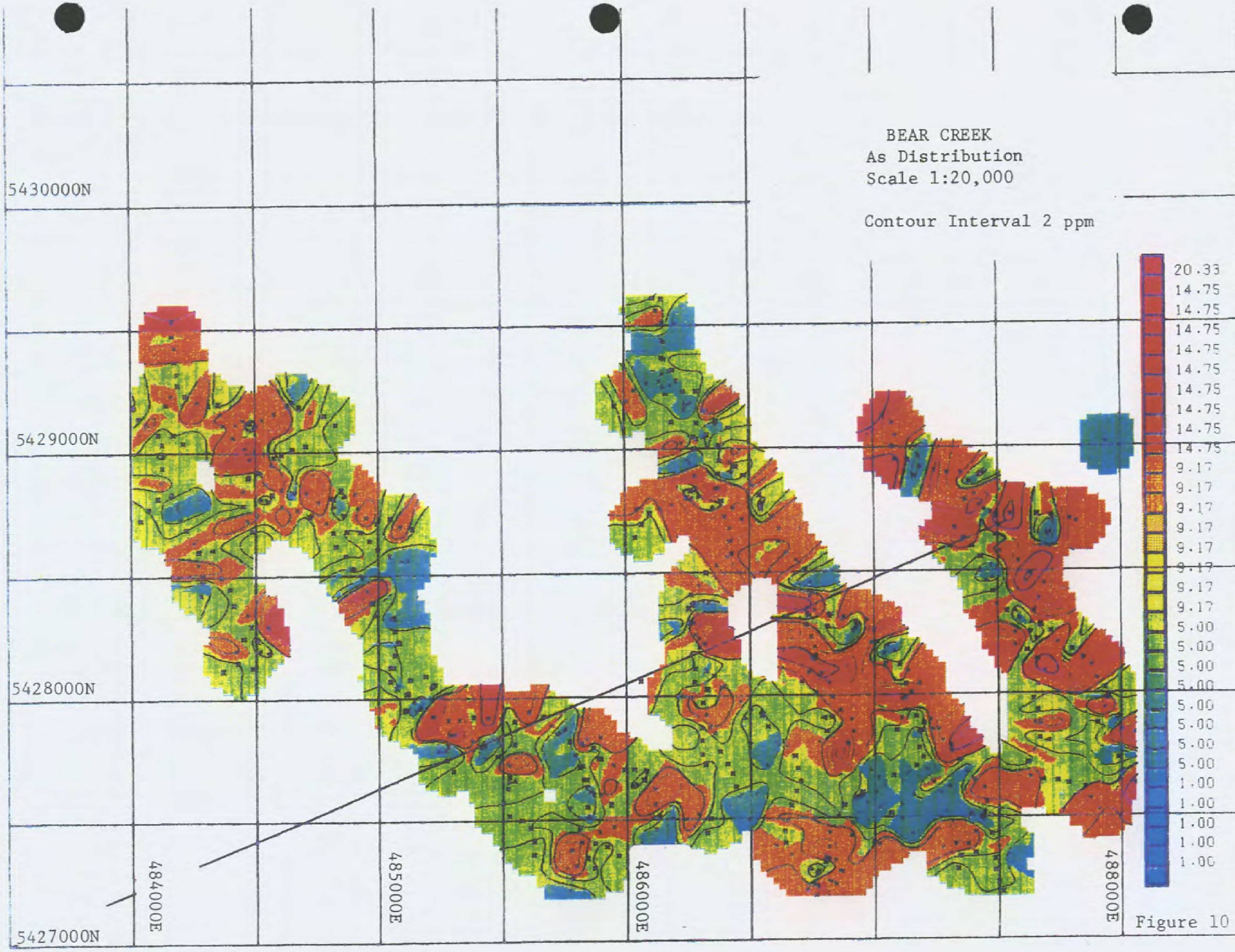

BEAR CREEK
Au Distribution
Scale 1:20,000
Contour Interval 2ppb
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
14.50
9.07
5.45
3.62
1.00

Figure 9


BEAR CREEK
As Distribution
Scale 1:20,000
Contour Interval 2 ppm
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
20.33
14.75
14.75
14.75
14.75
14.75
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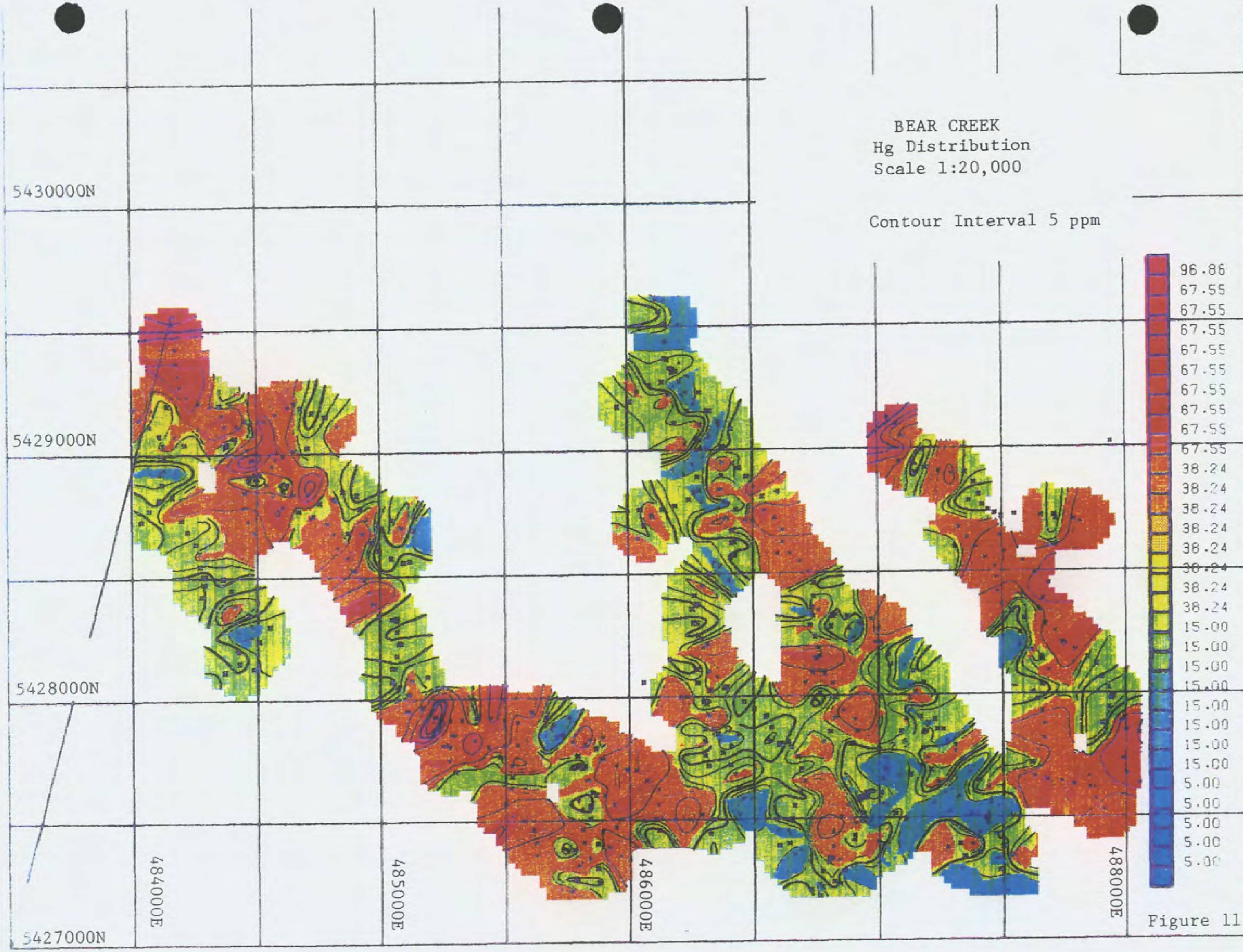
1.00
1.00
Figure 10


BEAR CREEK
Hg Distribution
Scale 1:20,000
Contour Interval 5 ppm
96.86
67.55
67.55
67.55
67.55
67.55
67.55
67.55
67.55
67.55
38.24
38.24
38.24
38.24
38.24
38.24
38.24
38.24
15.00
15.00
15.00
15.00
15.00
15.00
15.00
15.00
5.00
5.00
5.00
5.00
5.00
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
Figure 11

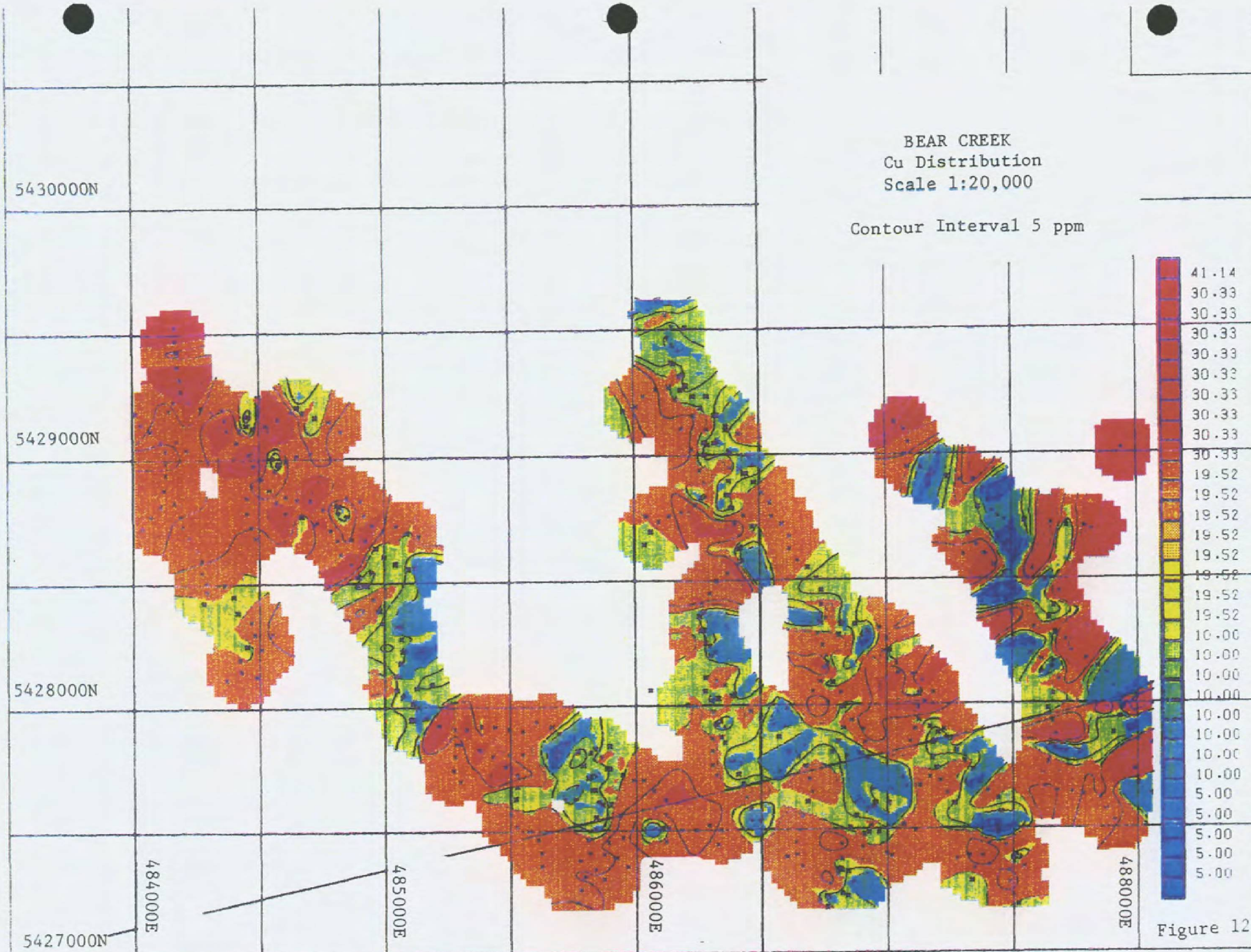
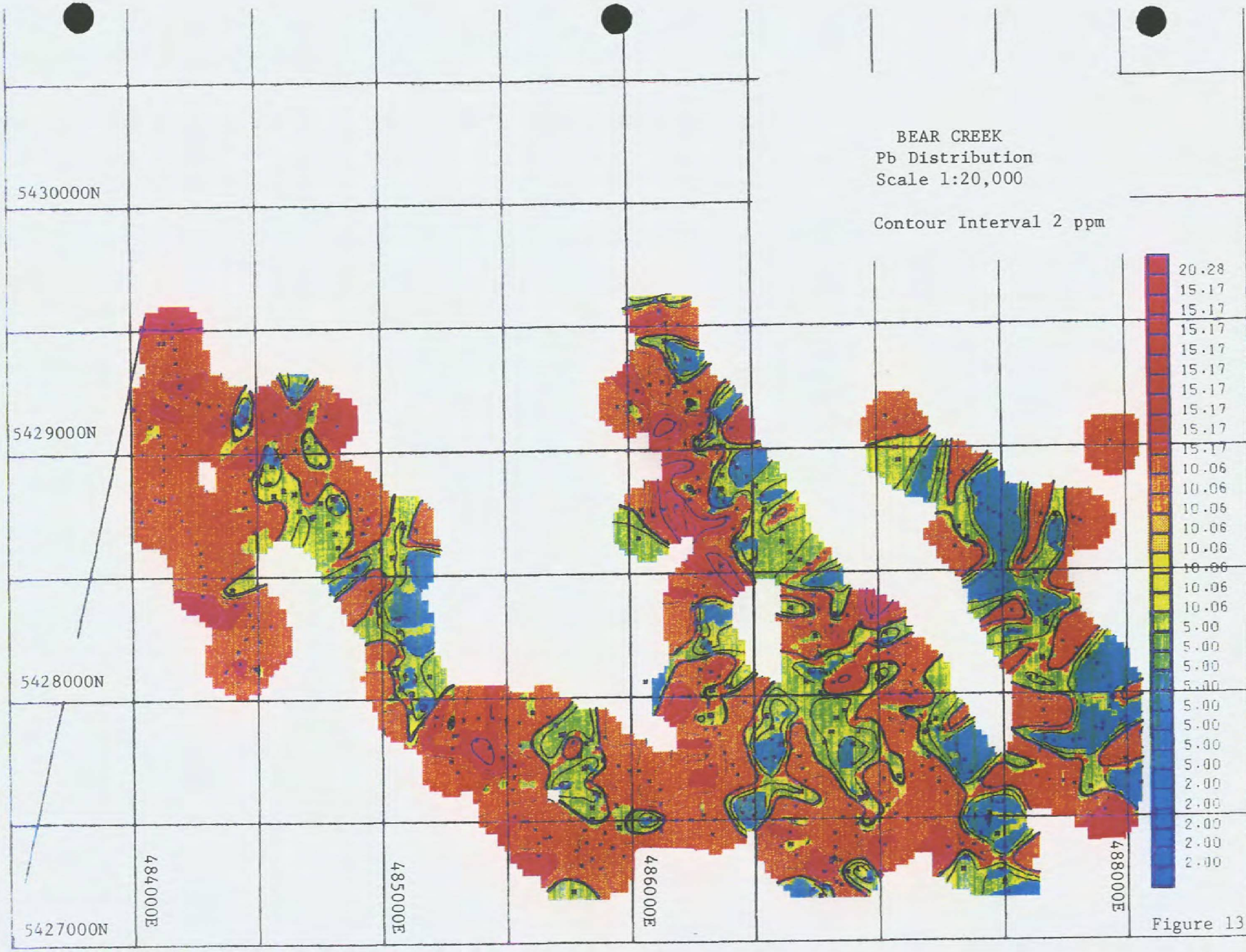

BEAR CREEK
Cu Distribution
Scale 1:20,000
Contour Interval 5 ppm
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
41.14
30.33
30.33
30.33
30.33
30.33
30.33
30.33
30.33
30.33
19.52
19.52
19.52
19.52
19.52
19.52
19.52
19.52
10.00
10.00
10.00
10.00
10.00
10.00
10.00
10.00
5.00
5.00
5.00
5.00
5.00

Figure 12


BEAR CREEK
Pb Distribution
Scale 1:20,000
Contour Interval 2 ppm
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
20.28
15.17
15.17
15.17
15.17
15.17
15.17
15.17
15.17
15.17
10.06
10.06
10.06
10.06
10.06
10.06
10.06
10.06
5.00
5.00
5.00
5.00
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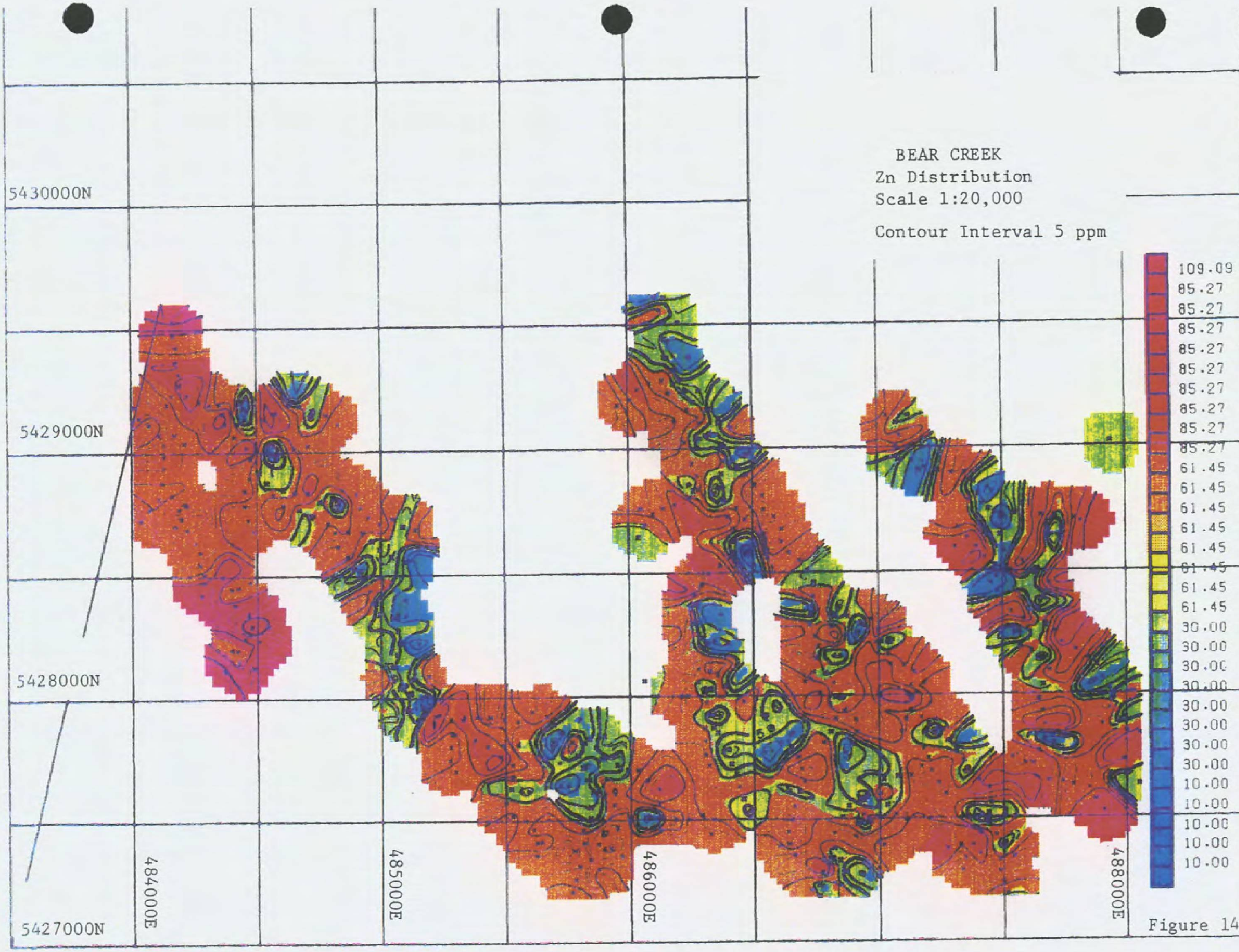
5.00
5.00
5.00
2.00
2.00
2.00
2.00
2.00

Figure 13



BEAR CREEK
Zn Distribution
Scale 1:20,000
Contour Interval 5 ppm
109.09
85.27
85.27
85.27
85.27
85.27
85.27
85.27
85.27
85.27
85.27
61.45
61.45
61.45
61.45
61.45
61.45
61.45
61.45
61.45
30.00
30.00
30.00
30.00
30.00
30.00
30.00
30.00
10.00
10.00
10.00
10.00
10.00
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E

Figure 14

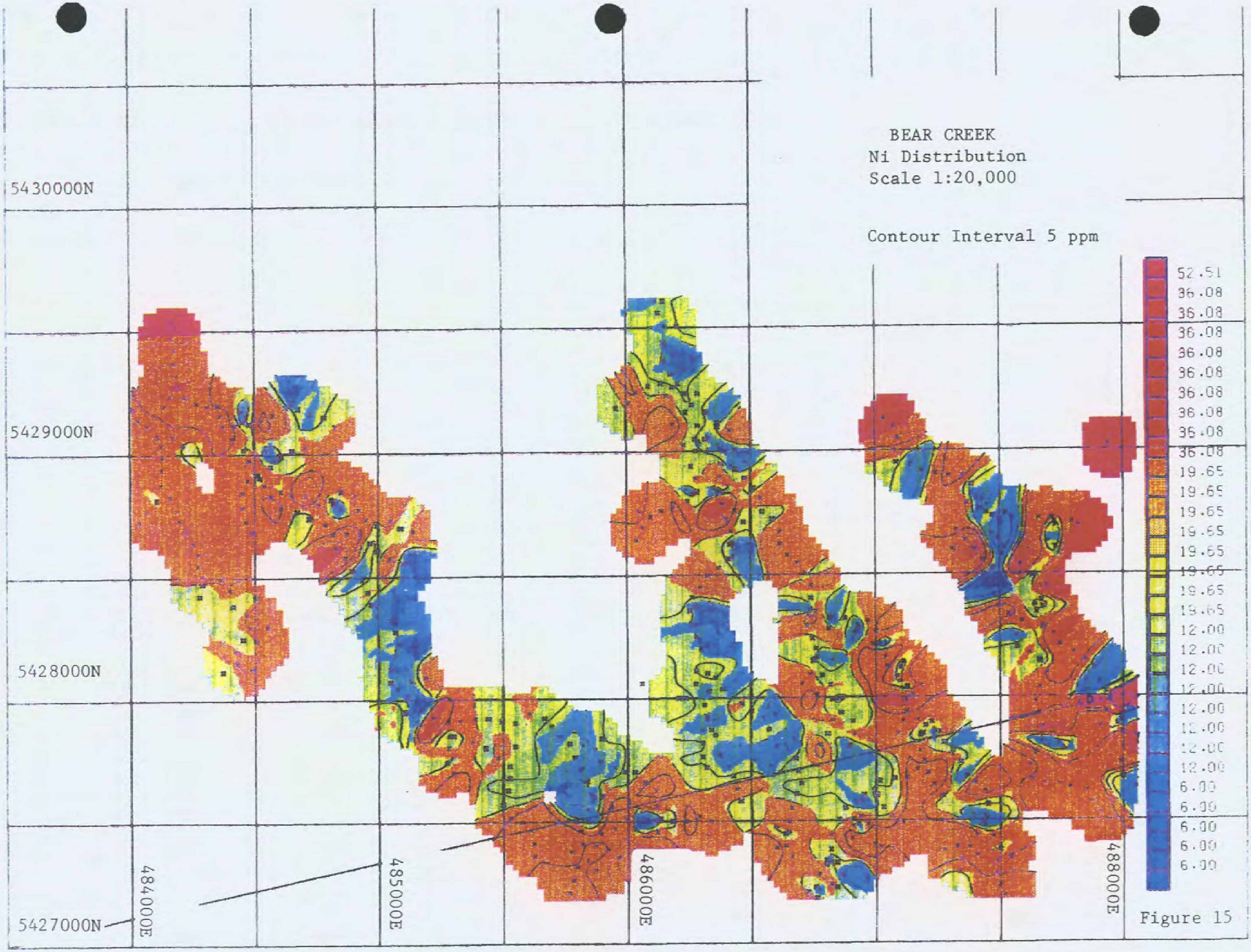

BEAR CREEK
Ni Distribution
Scale 1:20,000
Contour Interval 5 ppm
52.51
36.08
36.08
36.08
36.08
36.08
36.08
36.08
36.08
36.08
19.65
19.65
19.65
19.65
19.65
19.65
19.65
19.65
12.00
12.00
12.00
12.00
12.00
12.00
12.00
12.00
6.00
6.00
6.00
6.00
6.00
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E

Figure 15

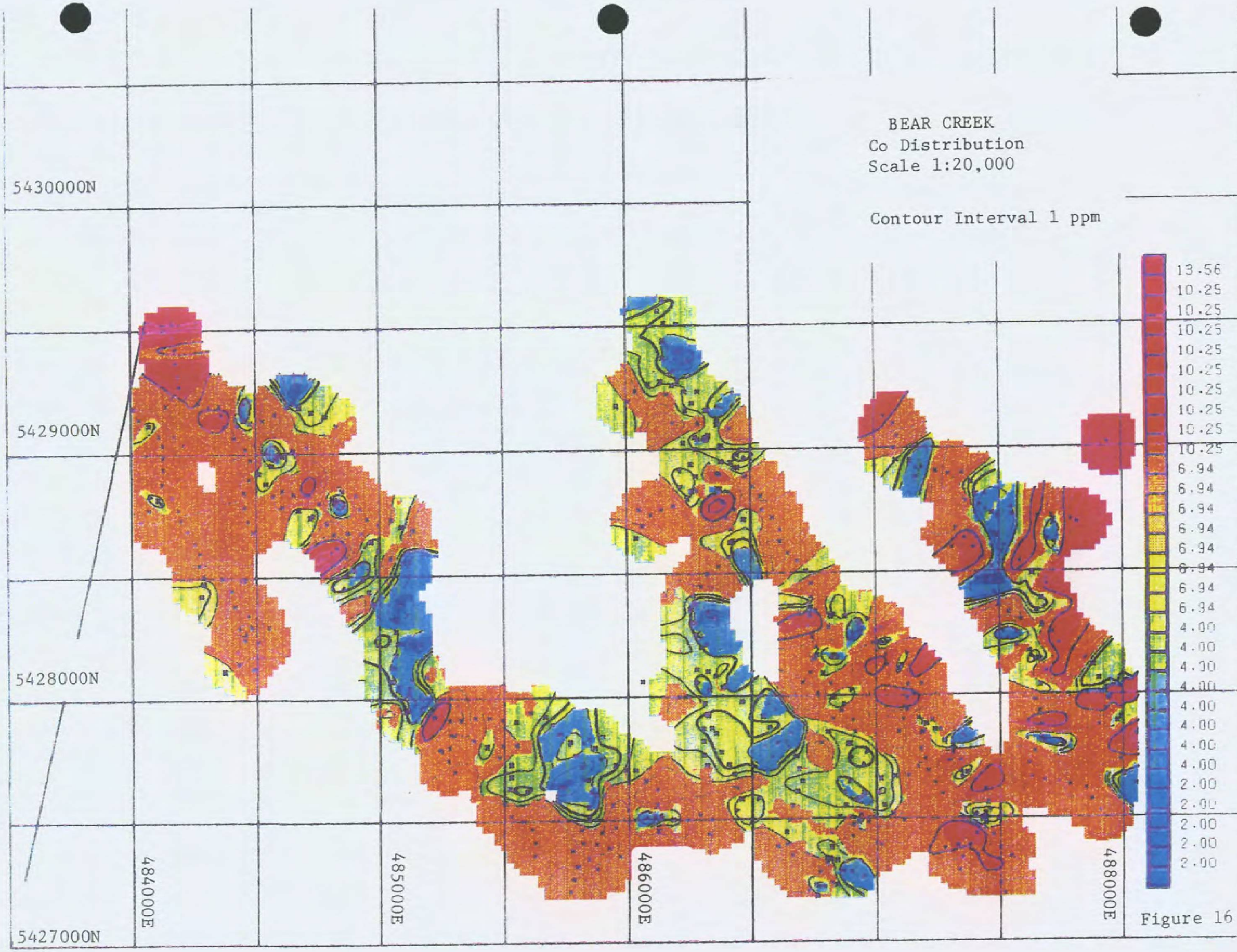

BEAR CREEK
Co Distribution
Scale 1:20,000
Contour Interval 1 ppm
13.56
10.25
10.25
10.25
10.25
10.25
10.25
10.25
10.25
10.25
6.94
6.94
6.94
6.94
6.94
6.94
6.94
6.94
4.00
4.00
4.00
4.00
4.00
4.00
4.00
4.00
2.00
2.00
2.00
2.00
2.00
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E

Figure 16

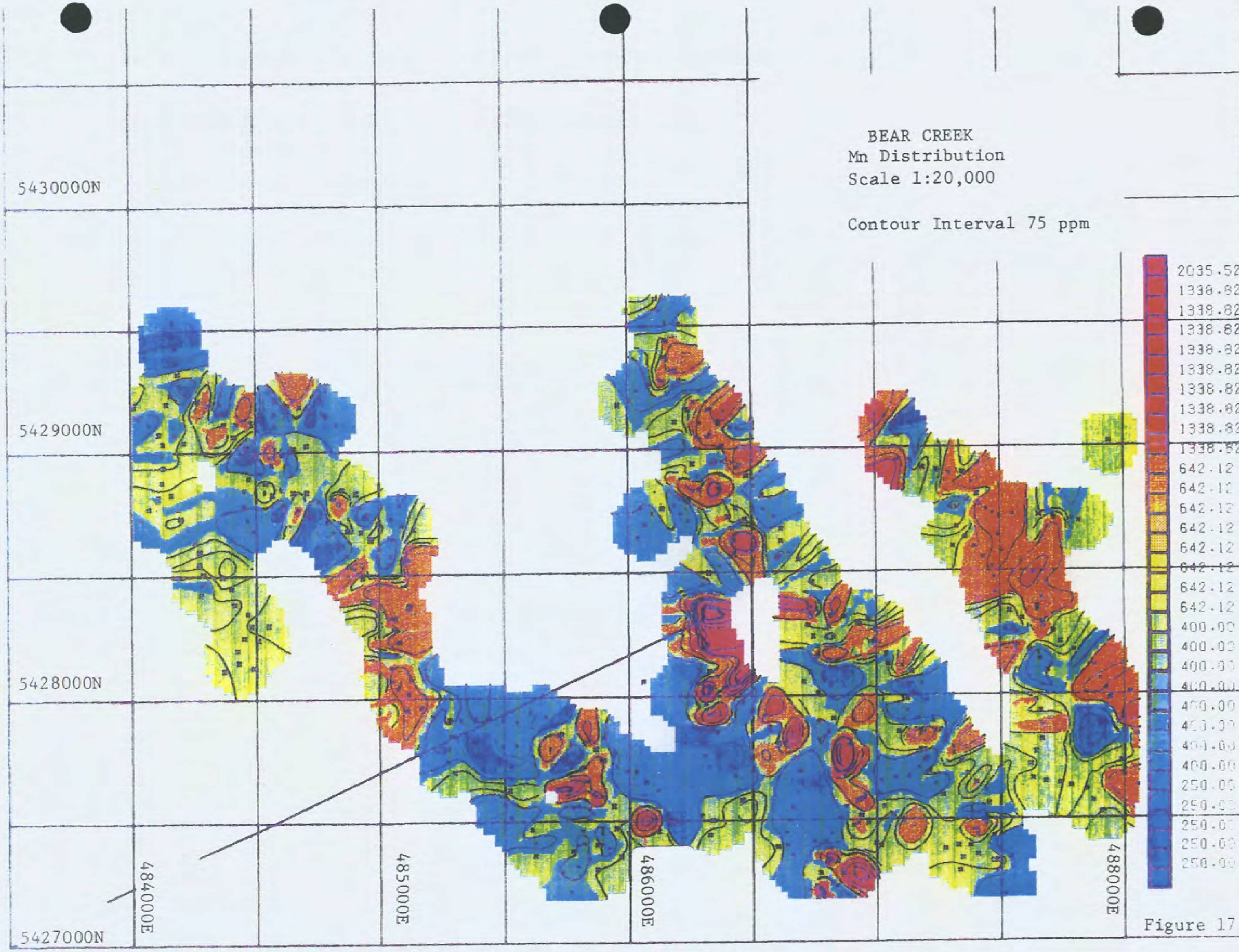

BEAR CREEK
Mn Distribution
Scale 1:20,000
Contour Interval 75 ppm
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
2035.52
1338.82
642.12
400.00
250.00

Figure 17

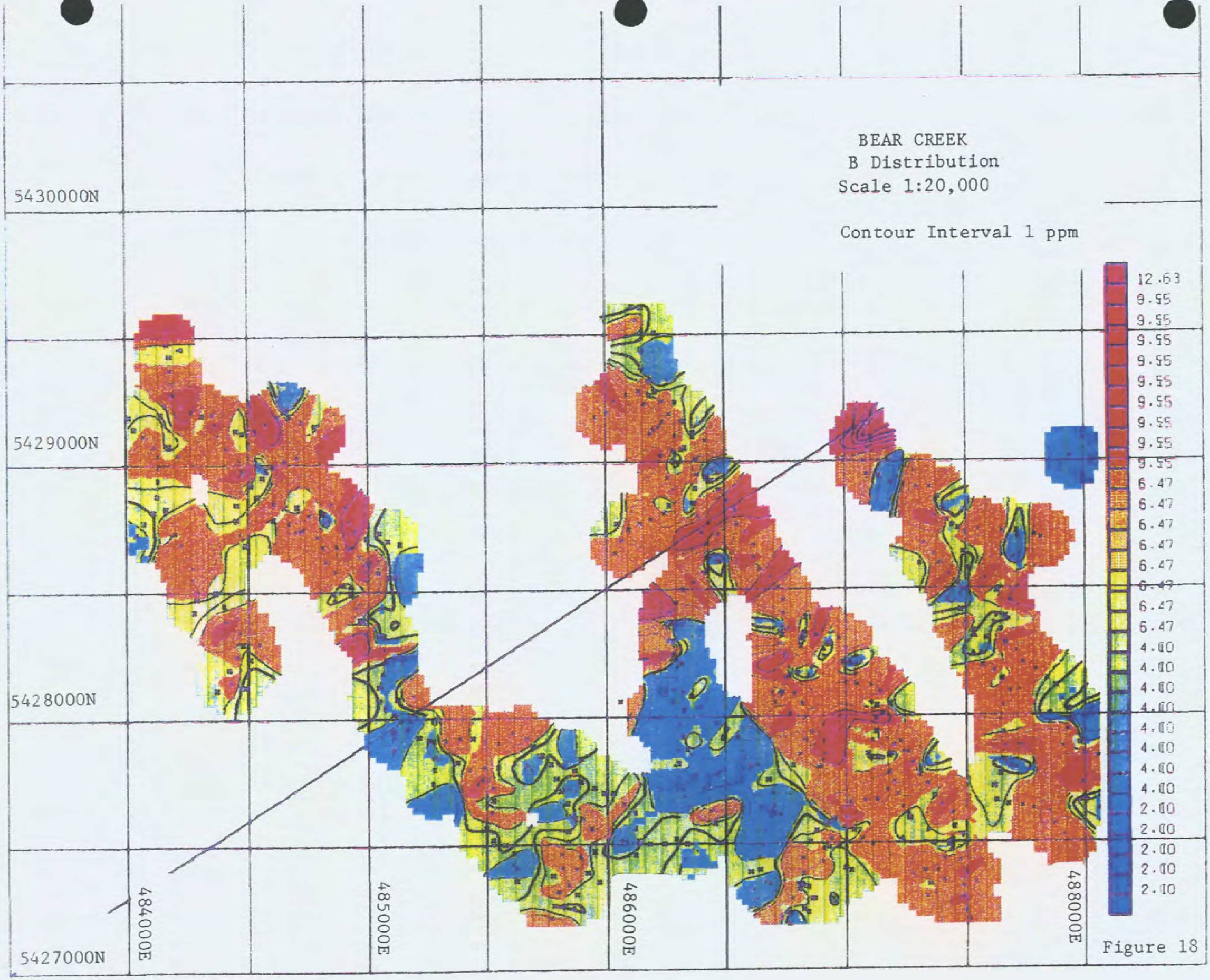
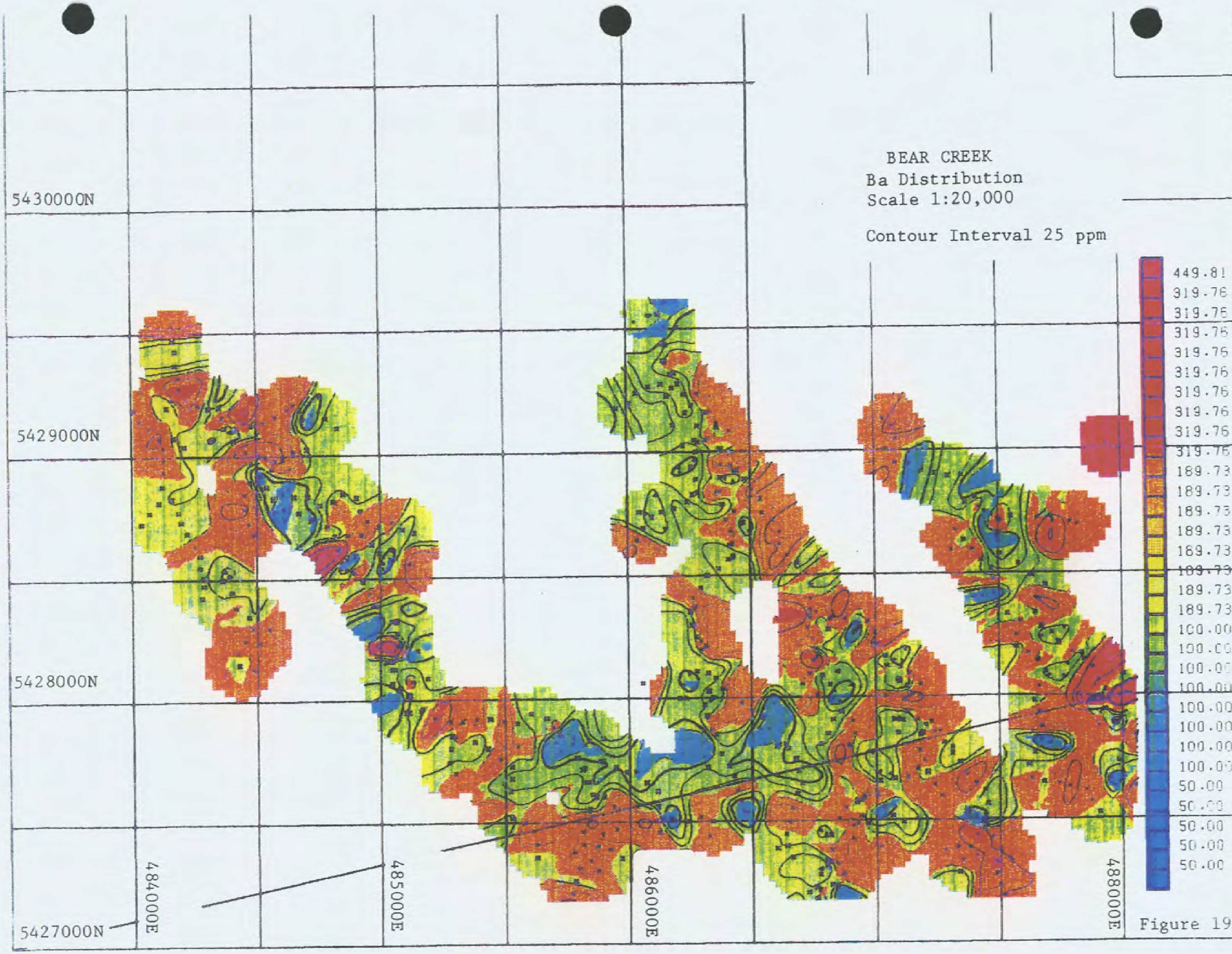
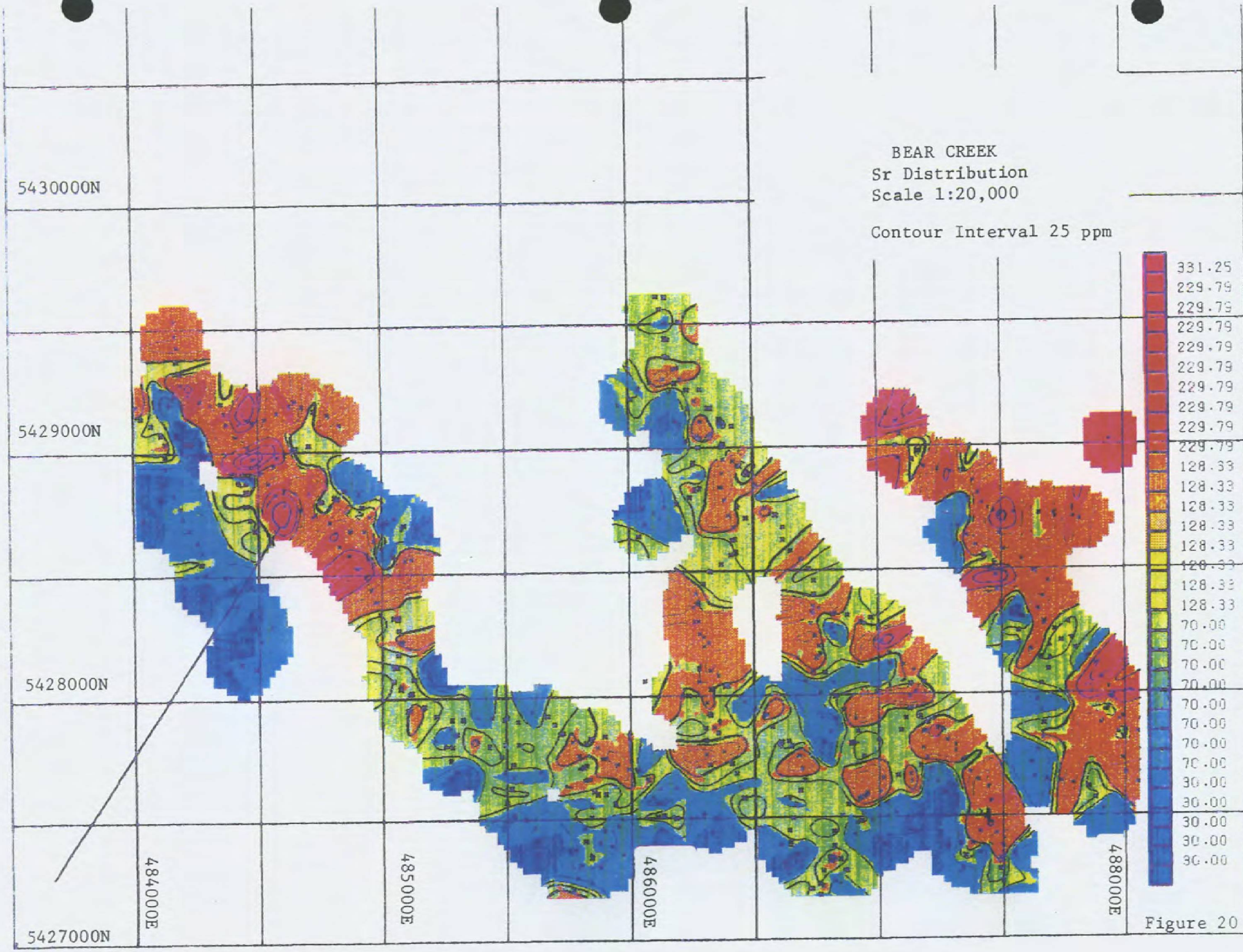

BEAR CREEK
B Distribution
Scale 1:20,000
Contour Interval 1 ppm
12.63
9.55
9.55
9.55
9.55
9.55
9.55
9.55
9.55
9.55
6.47
6.47
6.47
6.47
6.47
6.47
6.47
6.47
4.00
4.00
4.00
4.00
4.00
4.00
4.00
4.00
2.00
2.00
2.00
2.00
2.00
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E

Figure 18


BEAR CREEK
Ba Distribution
Scale 1:20,000
Contour Interval 25 ppm
449.81
319.76
319.76
319.76
319.76
319.76
319.76
319.76
319.76
319.76
189.73
189.73
189.73
189.73
189.73
189.73
189.73
189.73
100.00
100.00
100.00
100.00
100.00
100.00
100.00
100.00
50.00
50.00
50.00
50.00
50.00
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
Figure 19


BEAR CREEK
Sr Distribution
Scale 1:20,000
Contour Interval 25 ppm
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
331.25
229.79
229.79
229.79
229.79
229.79
229.79
229.79
229.79
229.79
128.33
128.33
128.33
128.33
128.33
128.33
128.33
128.33
70.00
70.00
70.00
70.00
70.00
70.00
70.00
70.00
30.00
30.00
30.00
30.00
30.00
30.00
Figure 20

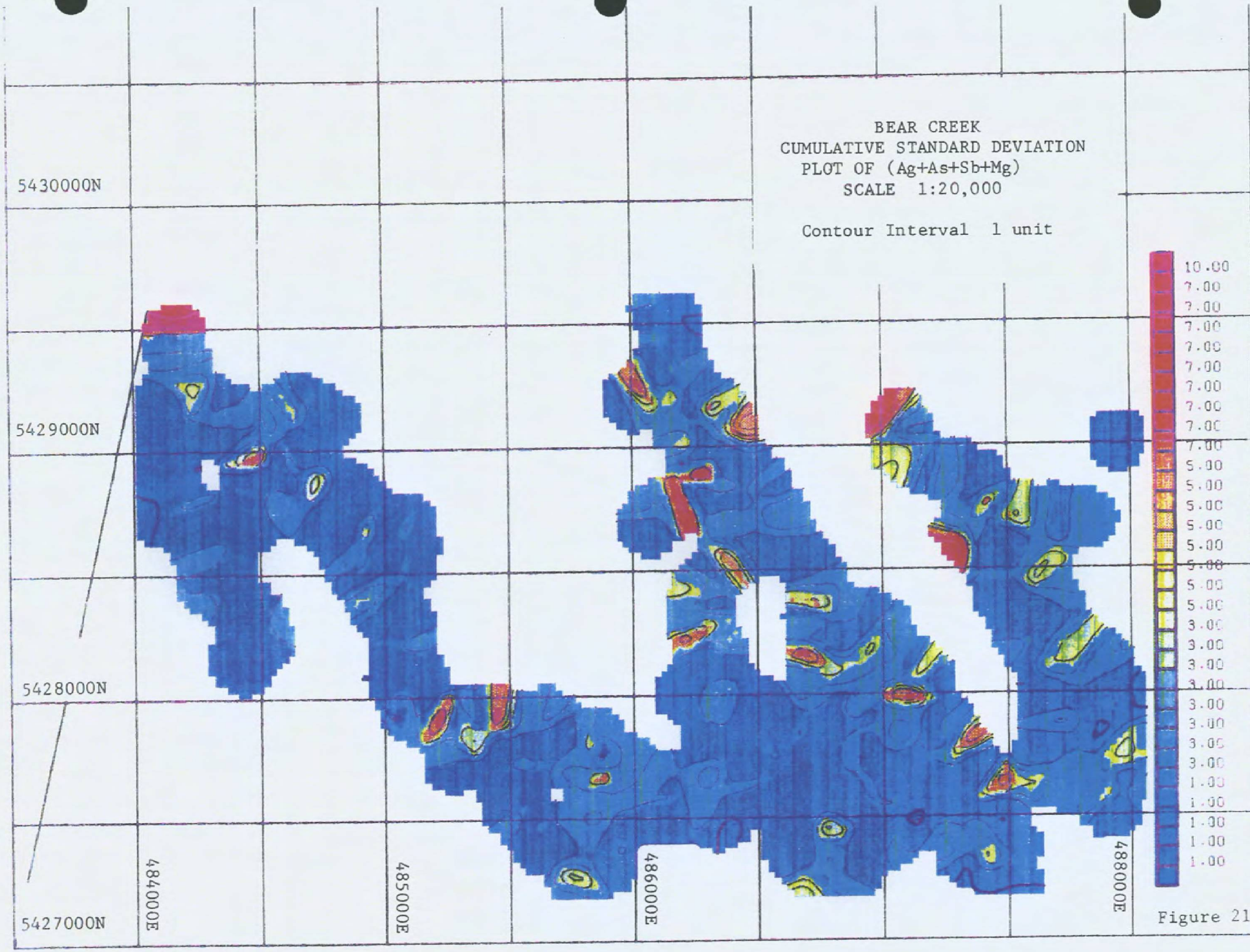
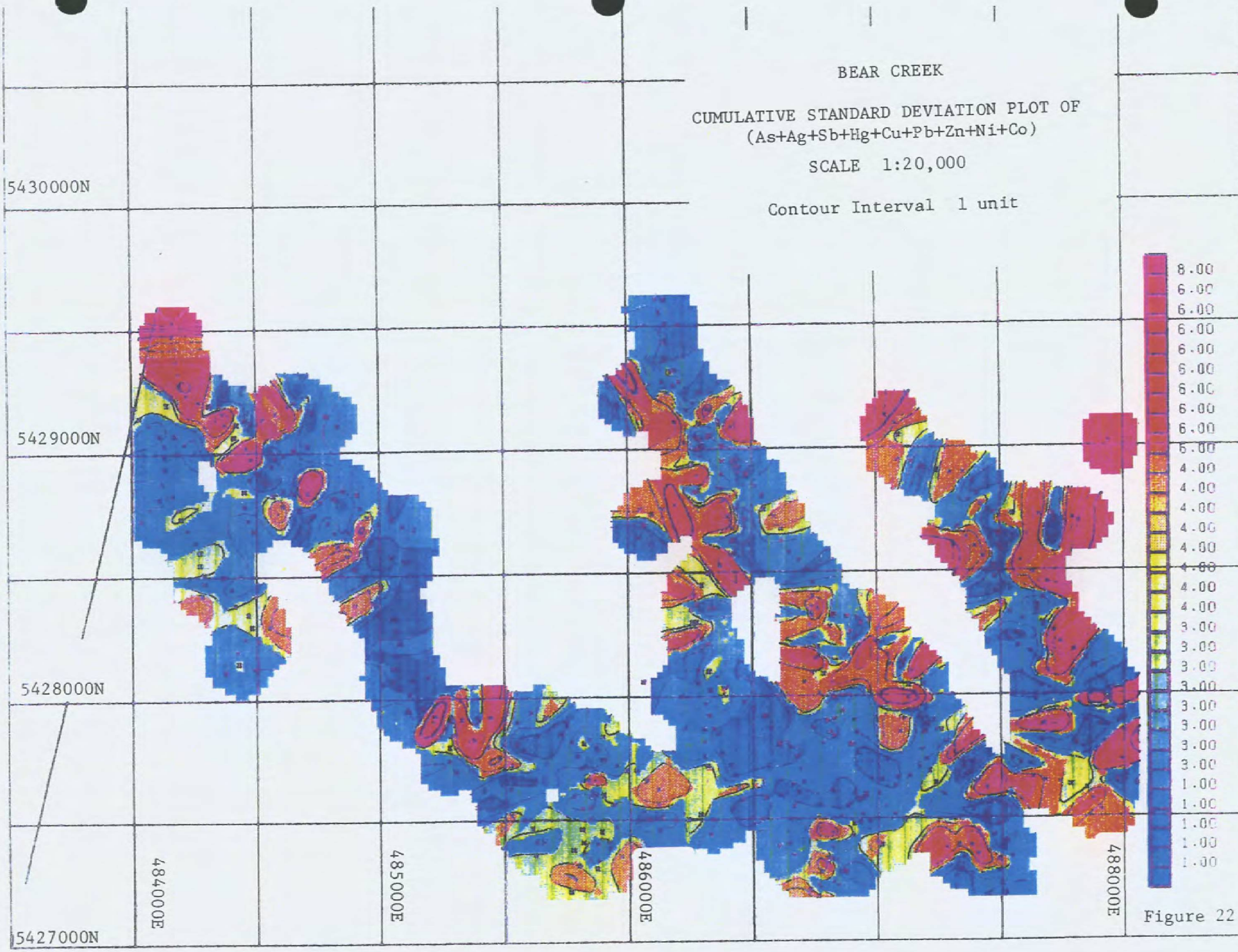

BEAR CREEK
CUMULATIVE STANDARD DEVIATION
PLOT OF (Ag+As+Sb+Mg)
SCALE 1:20,000
Contour Interval 1 unit
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
10.00
7.00
5.00
3.00
1.00

Figure 21

34


BEAR CREEK
CUMULATIVE STANDARD DEVIATION PLOT OF
(As+Ag+Sb+Hg+Cu+Pb+Zn+Ni+Co)
SCALE 1:20,000
Contour Interval 1 unit
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
488000E
8.00
6.00
4.00
3.00
1.00
Figure 22

8.2 The Surprise Creek Grid

The average gold content of the 493 soil and rock samples from this area is 2.23 ppb. The highest value is 17 ppb Au. The standard deviation is 1.73 ppb Au and the value at two standard deviations above the average is 5.69 ppb Au. Eighteen (3.7%) of the samples contain 6 ppb or more gold. Four rock samples contain between 6 and 10 ppb Au.

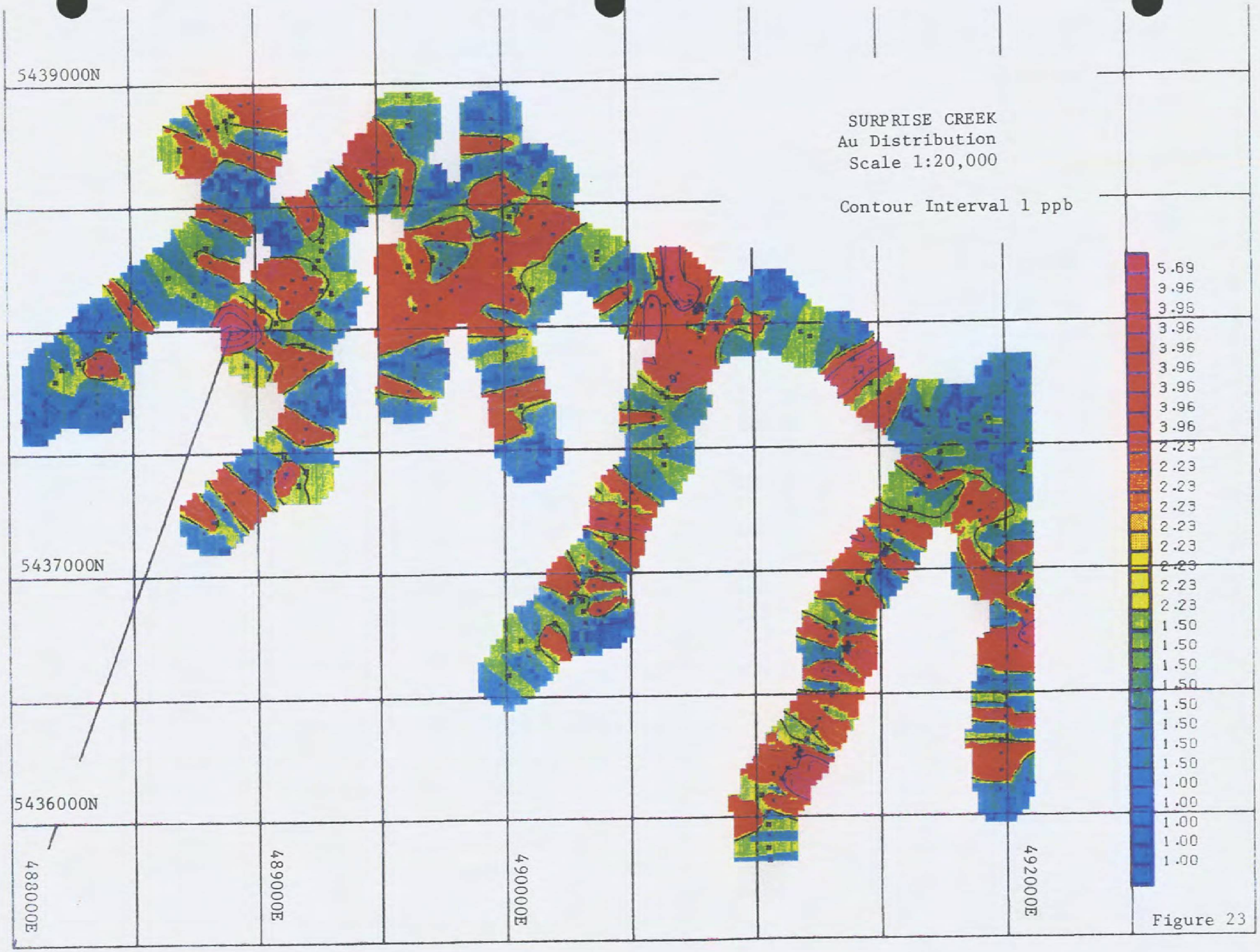
Figure 23 shows there are a couple of small gold anomalous zones (at least two adjacent samples containing gold values greater than 5.69 ppb Au). These anomalous zones do not have any trend. However, if values at one standard deviation (3.96 ppb Au) above the average are included, then there are a couple of Au anomalous zones that strike N60°E.

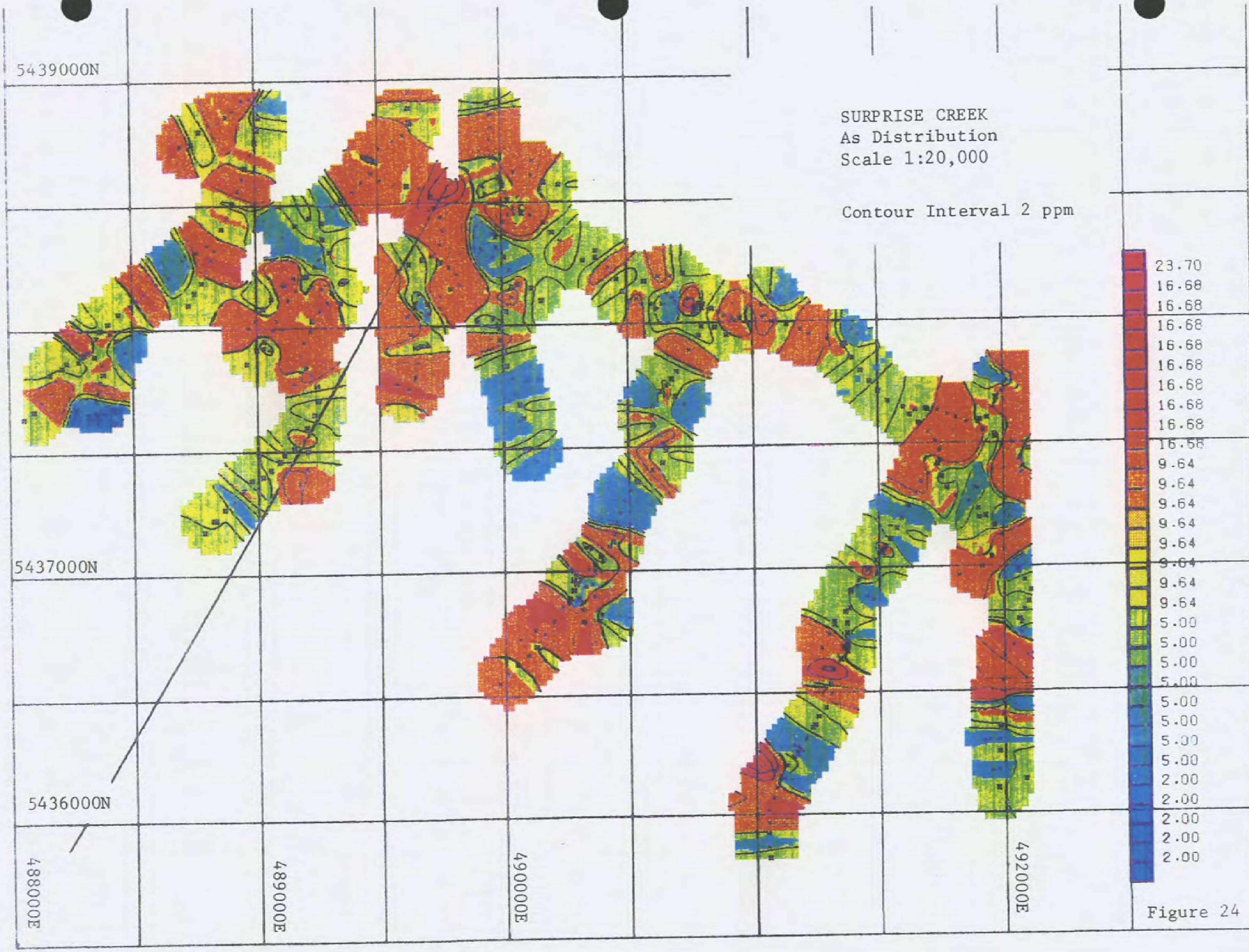
Each of the eleven other elemental geochemical plots (Figures 23-34) contain several anomalous zones. As in the Bear Creek, none of these anomalous zones appear to correlate spatially with the Au anomalies. The anomalous areas defined by the cumulative standard deviation plots (Figures 35 and 36) do not correlate spatially with Au anomalies either.

The lack of strong spatial correlations between anomalies of gold and other elements is not unusual. In many sediment-hosted epithermal gold deposits (including Carlin and Vantage deposits, Nev) gold correlates, only broadly with other elements.

9.0 PETROGRAPHIC STUDY

Twenty-six representative rock samples from the Bear Creek were sent for petrographic analyses. The petrographic report prepared by the Vancouver Petrographic Ltd. is presented in Appendix 5 of this report.

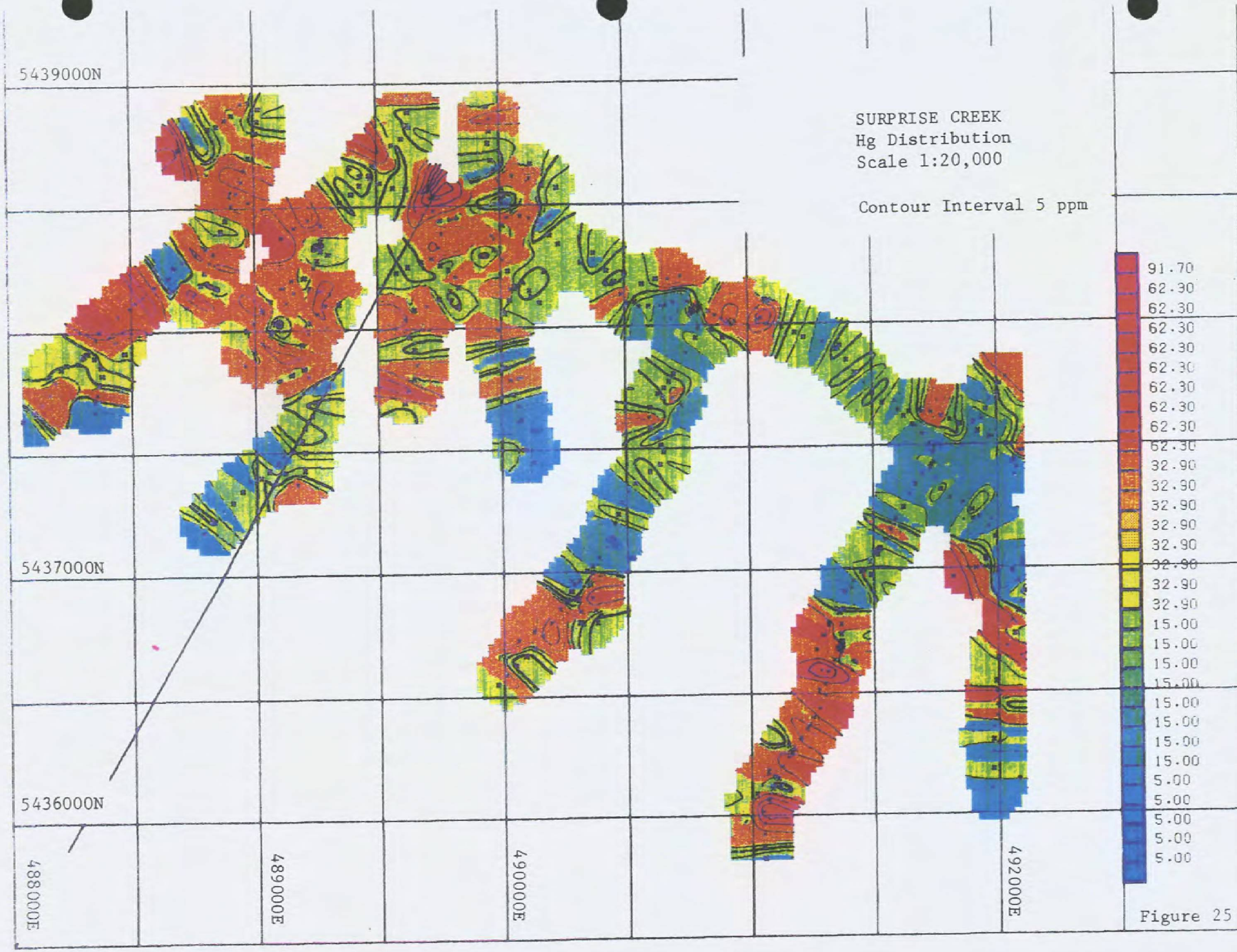

SURPRISE CREEK
Au Distribution
Scale 1:20,000
Contour Interval 1 ppb
5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
5.69
3.96
3.96
3.96
3.96
3.96
3.96
3.96
3.96
2.23
2.23
2.23
2.23
2.23
2.23
2.23
2.23
2.23
1.50
1.50
1.50
1.50
1.50
1.50
1.50
1.50
1.00
1.00
1.00
1.00
1.00
Figure 23



5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
SURPRISE CREEK
As Distribution
Scale 1:20,000
Contour Interval 2 ppm
23.70
16.68
9.64
5.00
2.00

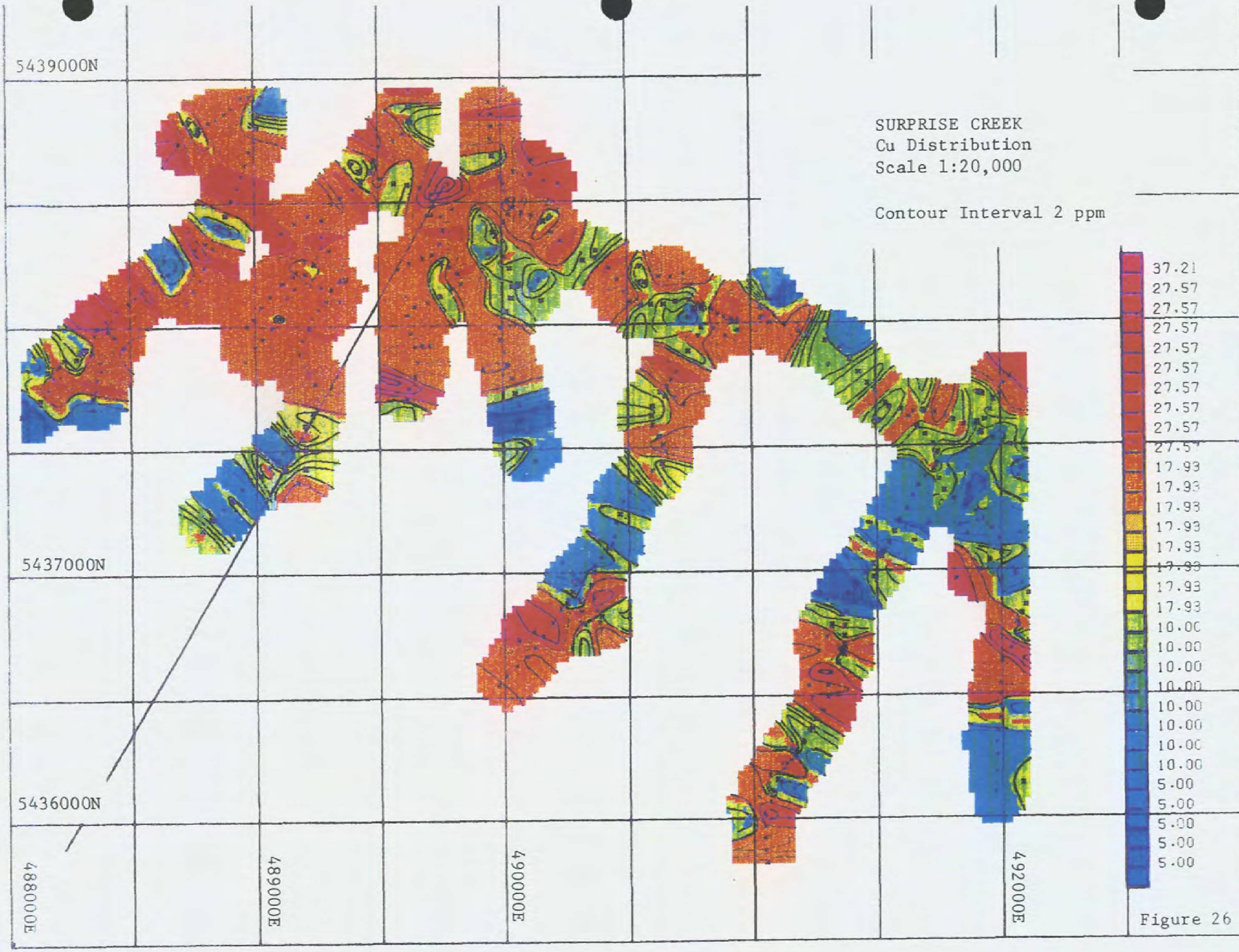
Figure 24

38



SURPRISE CREEK
Hg Distribution
Scale 1:20,000
Contour Interval 5 ppm
5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
91.70
62.30
32.90
15.00
5.00

Figure 25



5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
SURPRISE CREEK
Cu Distribution
Scale 1:20,000
Contour Interval 2 ppm
37.21
27.57
17.93
10.00
5.00

Figure 26

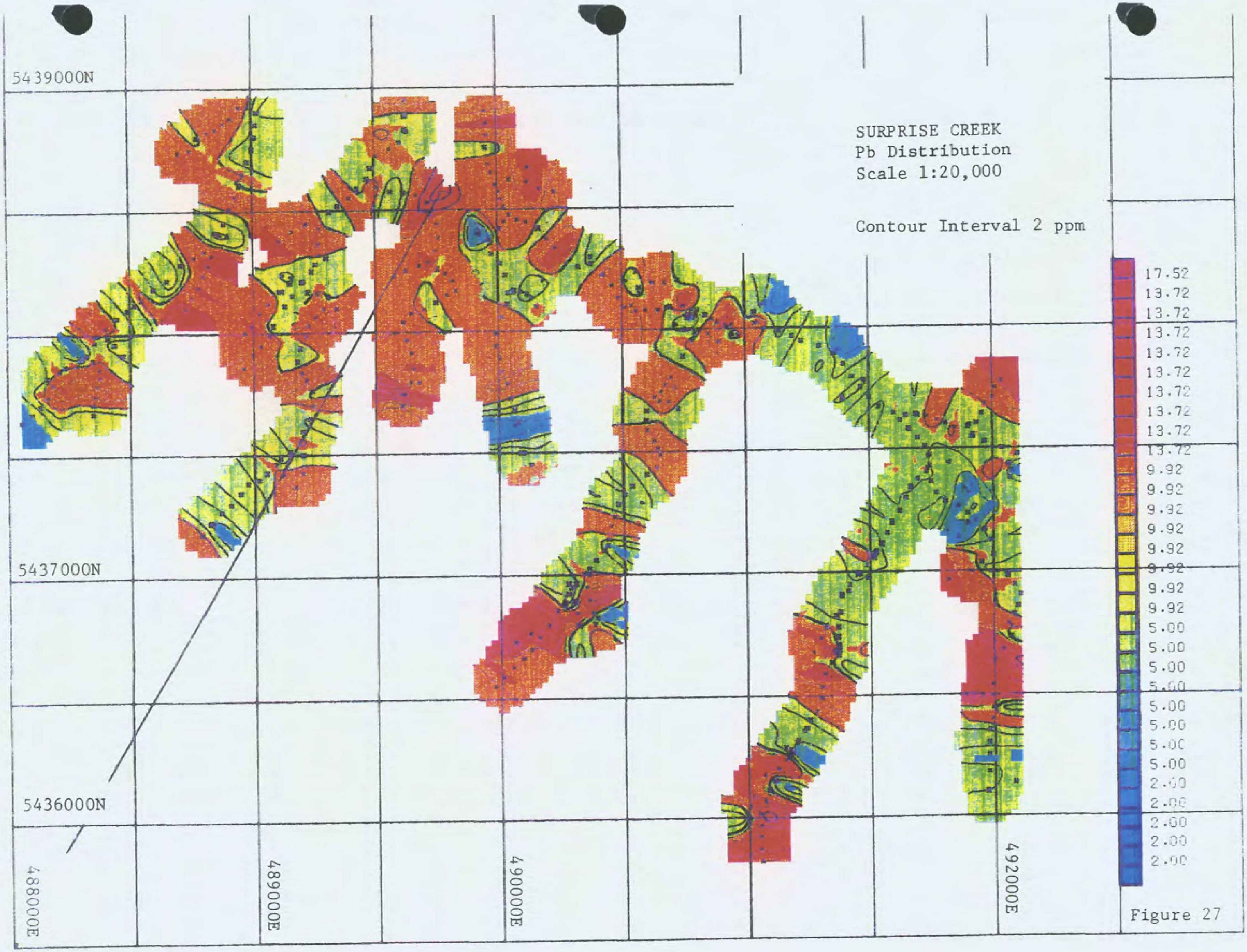

SURPRISE CREEK
Pb Distribution
Scale 1:20,000
Contour Interval 2 ppm
5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
17.52
13.72
9.92
5.00
2.00

Figure 27

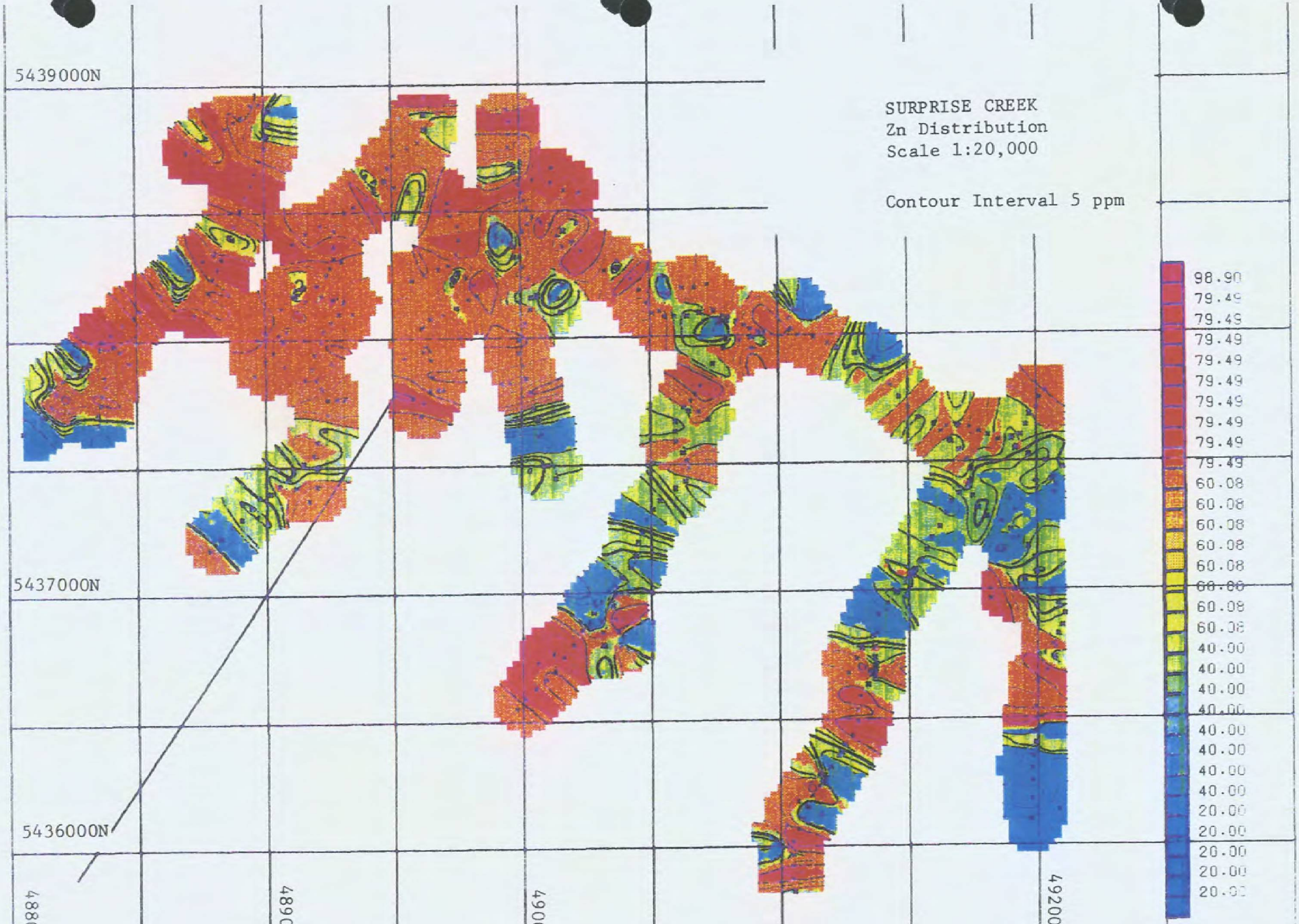

SURPRISE CREEK
Zn Distribution
Scale 1:20,000
Contour Interval 5 ppm
5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
98.90
79.49
60.08
40.00
20.00

Figure 28

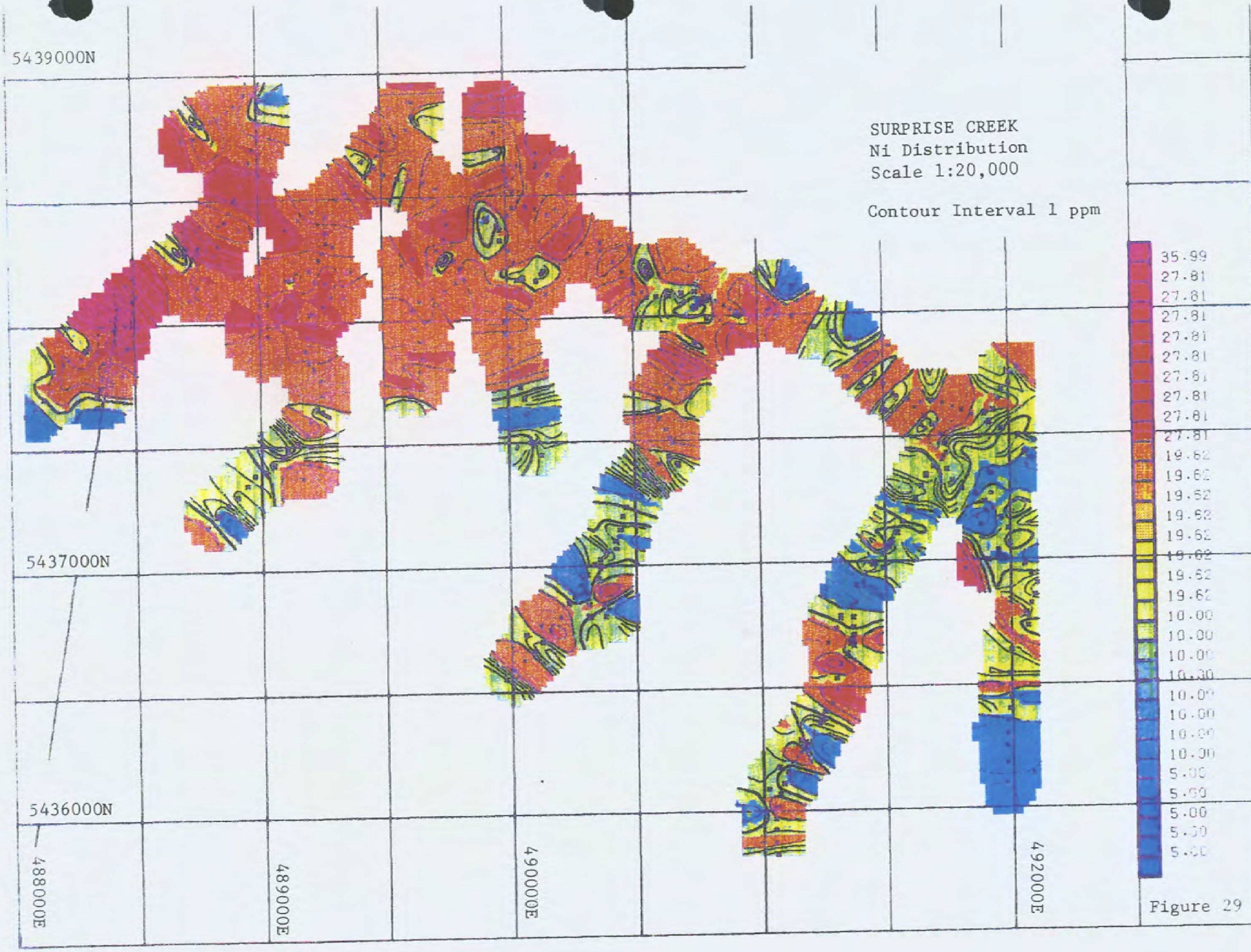
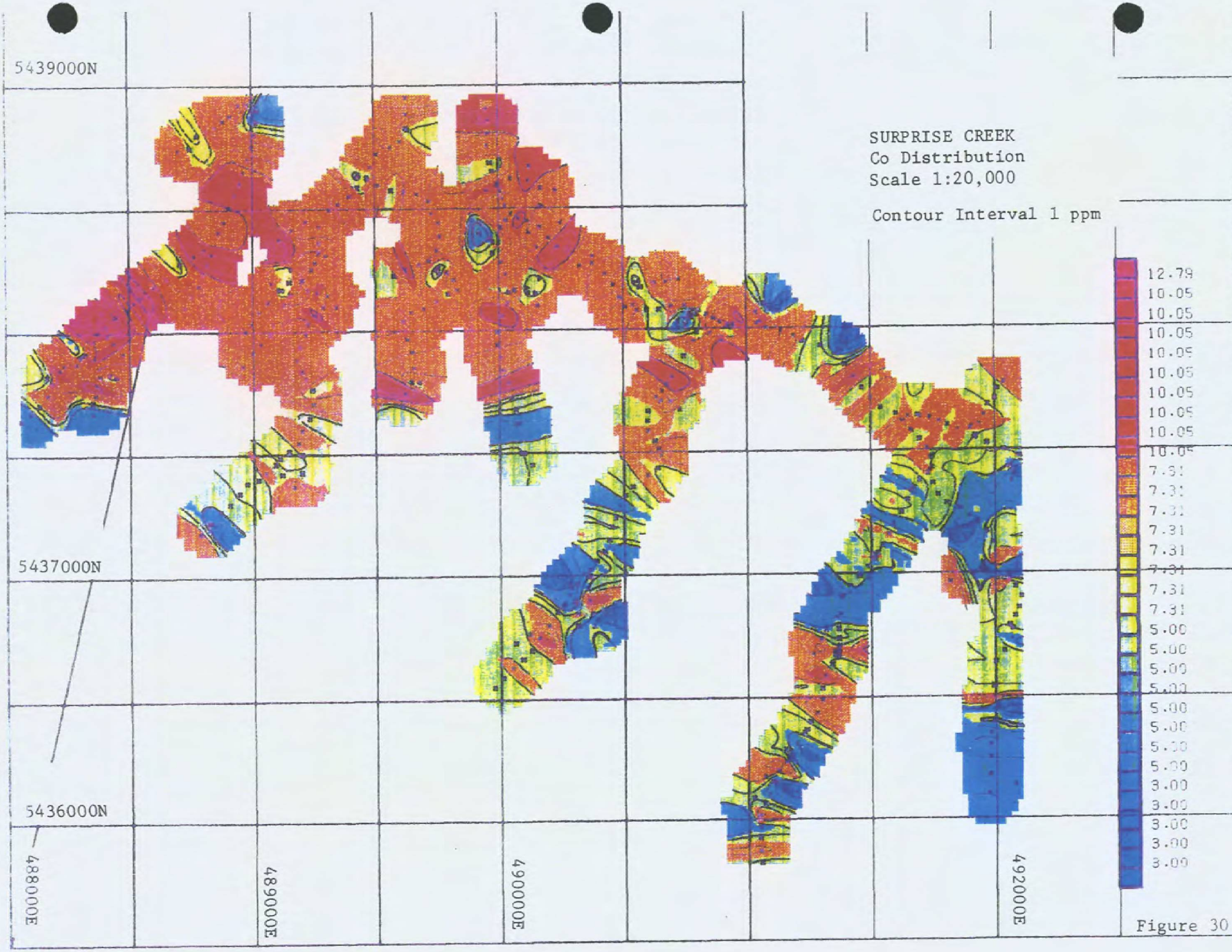
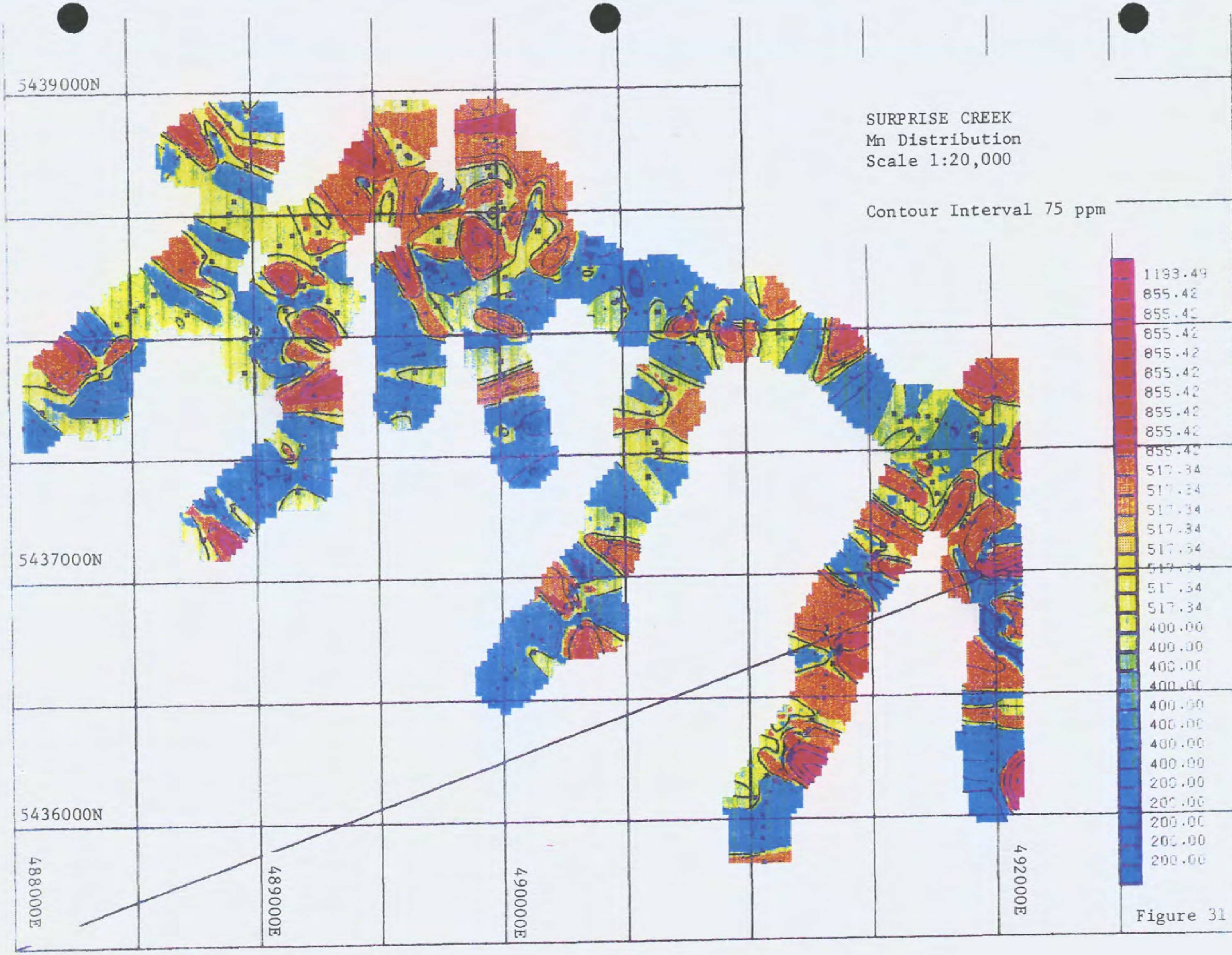

SURPRISE CREEK
Ni Distribution
Scale 1:20,000
Contour Interval 1 ppm
5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
35.99
27.81
19.62
10.00
5.00

Figure 29



SURPRISE CREEK
Co Distribution
Scale 1:20,000
Contour Interval 1 ppm
5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
12.79
10.05
10.05
10.05
10.05
10.05
10.05
10.05
10.05
10.05
7.31
7.31
7.31
7.31
7.31
7.31
7.31
7.31
5.00
5.00
5.00
5.00
5.00
5.00
5.00
5.00
3.00
3.00
3.00
3.00
3.00

Figure 30


5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
SURPRISE CREEK
Mn Distribution
Scale 1:20,000
Contour Interval 75 ppm
1193.49
855.42
517.34
400.00
200.00
Figure 31

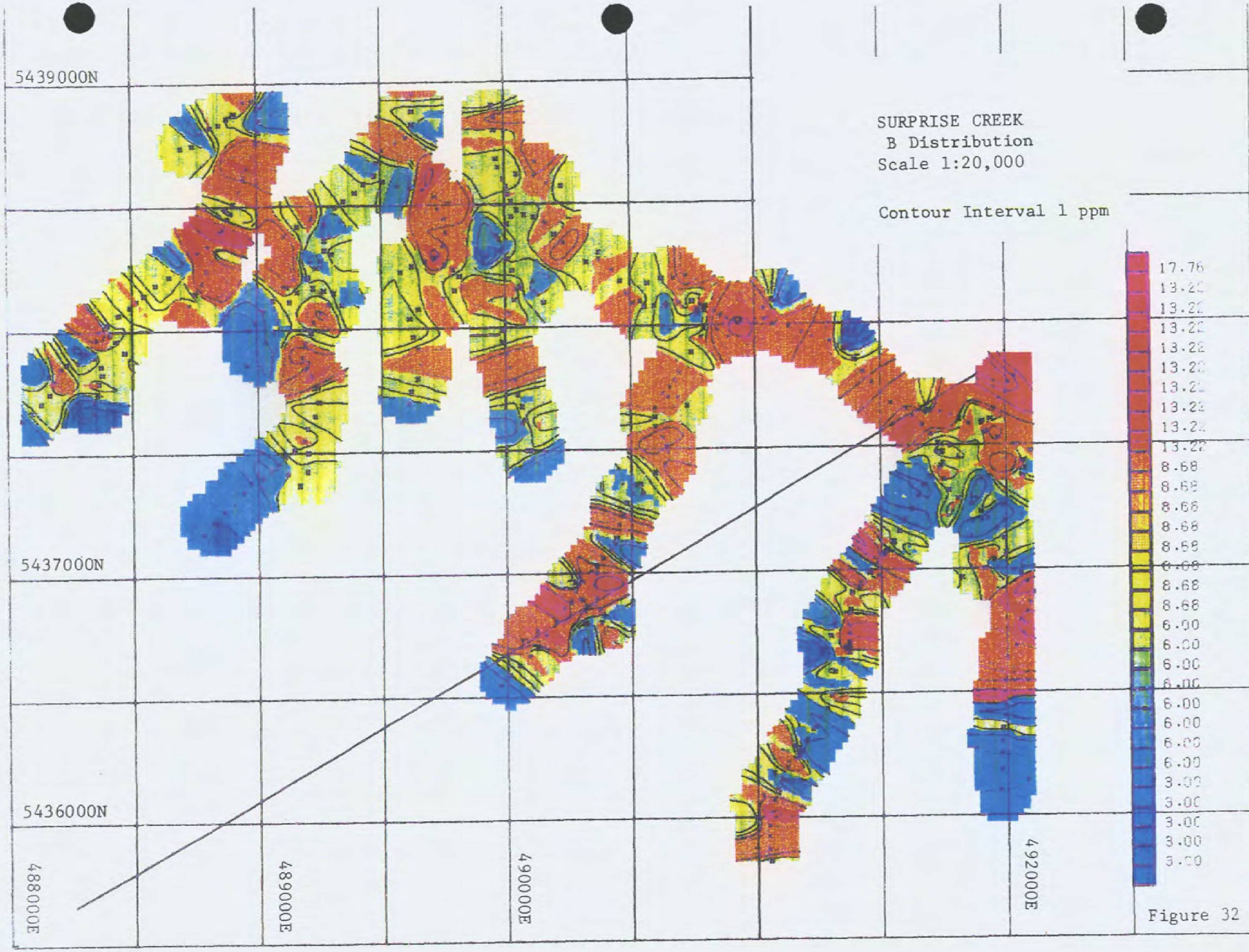
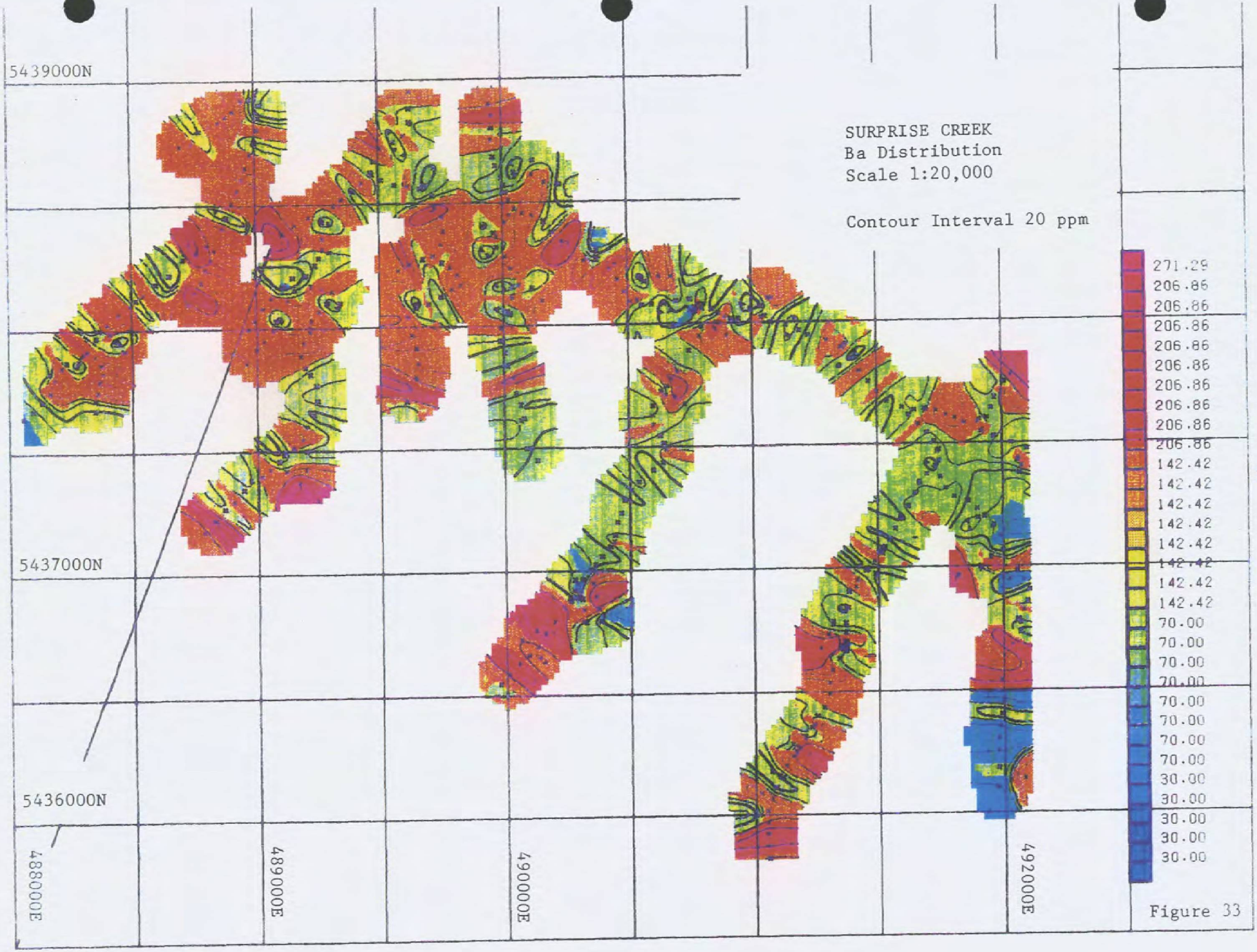

SURPRISE CREEK
B Distribution
Scale 1:20,000
Contour Interval 1 ppm
5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
17.76
8.68
6.00
3.00

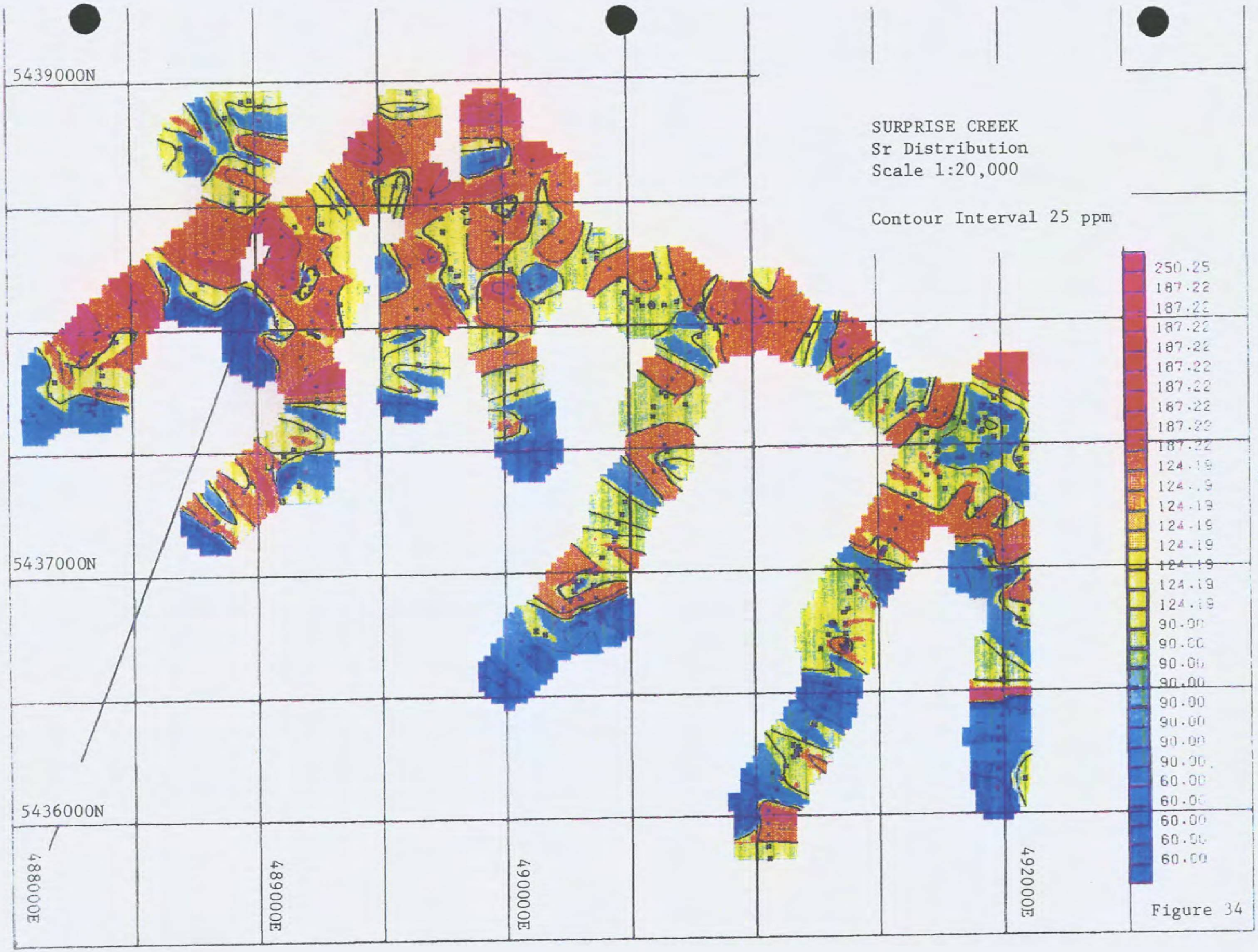
Figure 32



5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
SURPRISE CREEK
Ba Distribution
Scale 1:20,000
Contour Interval 20 ppm
271.29
206.86
206.86
206.86
206.86
206.86
206.86
206.86
206.86
206.86
142.42
142.42
142.42
142.42
142.42
142.42
142.42
142.42
70.00
70.00
70.00
70.00
70.00
70.00
70.00
70.00
30.00
30.00
30.00
30.00
30.00

Figure 33

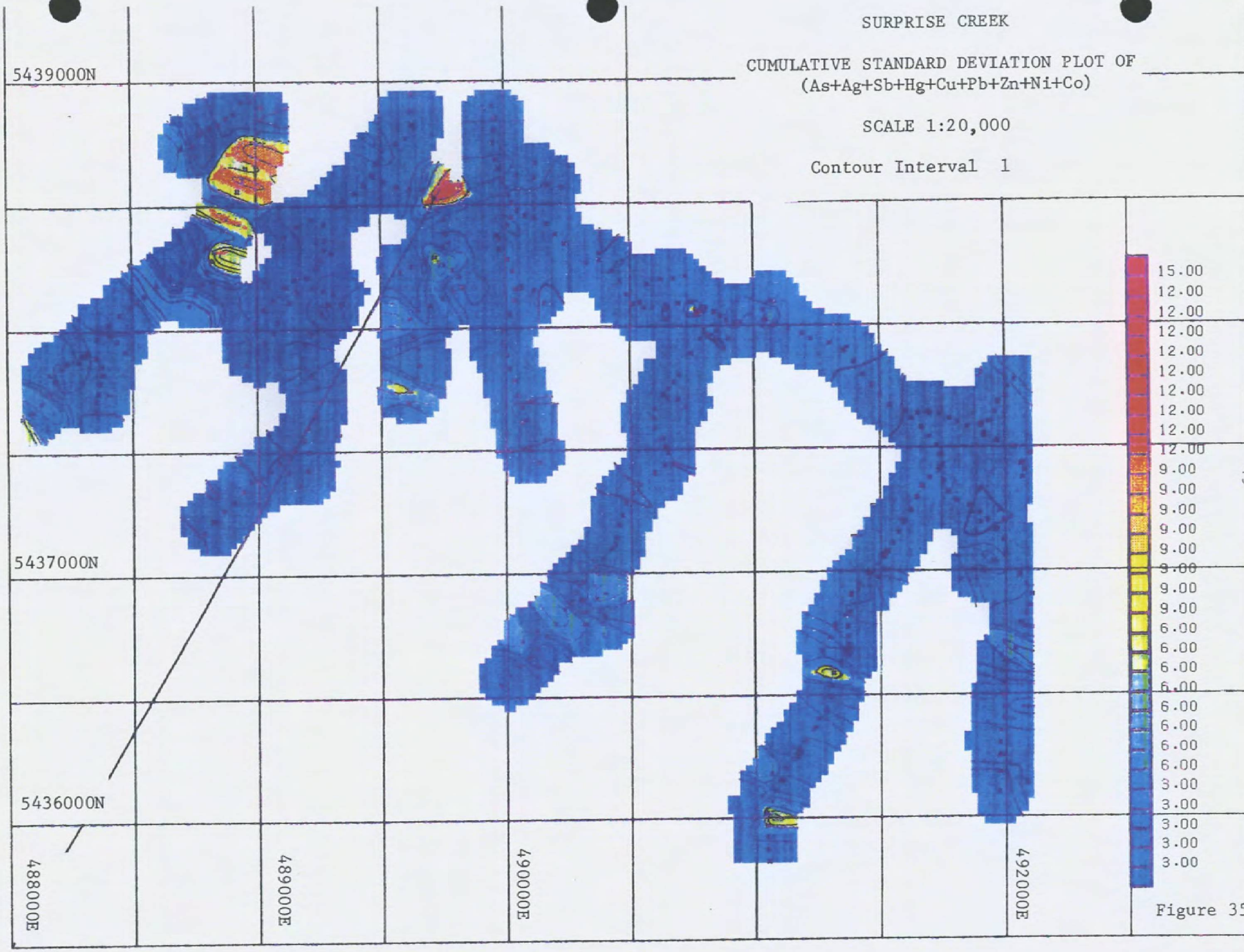
47



SURPRISE CREEK
Sr Distribution
Scale 1:20,000

Contour Interval 25 ppm

Figure 34


SURPRISE CREEK
CUMULATIVE STANDARD DEVIATION PLOT OF
(As+Ag+Sb+Hg+Cu+Pb+Zn+Ni+Co)
SCALE 1:20,000
Contour Interval 1
5439000N
5437000N
5436000N
488000E
489000E
490000E
492000E
15.00
12.00
12.00
12.00
12.00
12.00
12.00
12.00
12.00
12.00
9.00
9.00
9.00
9.00
9.00
9.00
9.00
9.00
6.00
6.00
6.00
6.00
6.00
6.00
6.00
6.00
3.00
3.00
3.00
3.00
3.00
Figure 35

Fourteen samples of brecciated carbonate mudstone, eleven samples of siltstone/sandstone, and one mafic rock sample were analyzed. The laboratory identified the brecciated carbonate mudstone as micritic limestone, siltstone/sandstone as calcareous siltstone/sandstone and the mafic rock as lamprophyre. Except for the mafic rock, all the samples are of the carbonate-rich sedimentary sequence.

(a) <u>Brecciated Carbonate Mudstone (micritic limestone)</u>

These samples contain only trace amounts of detrital grains (consist of angular fragments of quartz, plagioclase, ankerite, calcite, chert and latite) and fossil shells. All samples are moderately to strongly brecciated and fractures are healed by two or three ages of calcite, quartz, kaolinite and hematite veinlets. The majority of the veinlets are made up of calcite. Veinlet material comprises between 1 to 33% of the rock volume. The width of these veinlets varies from 0.01 to 0.6 mm. These samples also contain gash fractures filled with calcite and minor amounts of quartz, kaolinite and hematite.

It is not expected that the voluminous amounts of veinlet material could have all come from dissolution and reprecipitation of the trace amounts of detrital grains in the host rocks. Therefore, these veinlets appear to be of a hydrothermal origin. Hydrothermal decalcification of carbonate or calcareous rocks at lower levels would lead to precipitation of calcite in fractures at higher levels (e.g., Vantage and Carlin deposits). Hydrothermal hematite veinlets are common in many sediment-hosted epithermal gold deposits including the Carlin and Vantage deposits. Hematite veinlets may have developed from oxidation of pyrite veinlets. The amounts of silica in hydrothermal fluids varies from system to system. In silica-rich hydrothermal systems, jasperoid would be abundant. Low silica hydrothermal systems would produce jasperoid-poor deposits like Carlin and Vantage. The Kaolinite observed in the brecciated calcareous mudstone may be altered adularia. Adularia is a low temperature, barium-enriched K-feldspar variety that commonly occurs in hydrothermal systems. Brecciated calcareous mudstone with veinlets contain twice as much barium as calcareous siltstone/sandstone and calcareous mudstone without veinlets may further indicate that brecciation and veining in the brecciated calcareous mudstone may be of hydrothermal origin.

(b) Calcareous Siltstone/Sandstone

This rock type contains large quantities of angular detrital fragments made up of mainly quartz, with less abundant plagioclase, carbonate (ankerite and calcite), chert, latite, K-feldspar, minor opaques and shell fragments. Their groundmass is made up of calcite/aragonite, hematite, minor kaolinite, fossils, opaque, chlorite, K-feldspar and biotite.

(c) Lamprophyre Dyke

The lamprophyre contains phenocrysts of phlogopite/biotite and lesser amounts of clinopyroxene in a groundmass of alkali-feldspar, biotite and clinopyroxene. It also contains 0.7% magnetite.

10.0 DISCUSSION

Only a few samples from the Surprise Creek grid contain anomalous concentrations of gold. Very little hydrothermal activity (e.g., brecciation and veining of host rocks) appears to have occurred in this grid area. Thus, the area appears to have little potential for epithermal gold mineralization.

In the Bear Creek grid area, many of the soil samples which contain anomalous gold are confined to fairly well defined linear trends perpendicular to the drainage patterns (Figure 9). Many of the soil samples within these trends were collected from subcrop near outcrops with strong bedding features; this strongly suggests that gold in the soil samples may reflect the gold mineralization in the rocks. Furthermore, the presence of linear anomalous zones in near-horizontal stratigraphic formations, implies that sub-vertical structures must have existed to deliver gold-bearing fluids to the anomalous zones. The presence of crackle breccias and slickensides in some brecciated rocks seem to confirm that tectonic and possibly hydrothermal activities (Montri and Paterson, 1990) did occur in the area. The abundant fractures networks, with alteration selvages, may be the result of such tectonic and hydrothermal activities.

The hardened, fine-grained, brittle, calcareous mudstone unit probably acted as an impermeable seal which led to increased hydrothermal fluid pressure beneath it. Sudden rupturing and release of pressure caused by tectonism or hydrofracturing would then result in the emplacement of calcite, and possibly adularia, into the resulting fractures and breccias (Panteleyer, 1986). The presence of slickensides in some of the brecciated calcareous mudstone suggest that shearing or faulting may have occurred prior to hydrofracturing. The fine-grained nature of the veinlets that cemented the breccias is probably due to rapid equilibration of hydrothermal fluids, after the volatiles escaped (McInness, et. al., 1990). Repeated brecciation, caused by multiple pulses of shearing and/or hydraulic fracturing, may have occurred to produce the two to three ages of veinlets observed.

Hydrothermal fluids probably derived most of the essential elements for the veinlets from the rocks they infiltrated. Since calcite veinlets are the most common, de-calcification probably was the prevalent process occurring in the calcareous units in the area. Calcite veinlets, observed at surface, may have formed as the result of hydrothermal fluid induced movement of carbonate away from the lower levels and precipitated in the microfractures at higher levels. The presence of only minor amounts of quartz, hematite (after pyrite?) and kaolinite veinlets may be due to the fluids lack of capacity to dissolve (low temperature?) thesematerials from the surrounding rocks, the small quantities of these materials in the country rocks and/or that quartz and pyrite already precipitated, at depth, in a hotter part of the system.

Calcite, quartz, hematite and kaolinite veinlets are found in many carbonate-rich sediment-hosted epithermal gold deposits including Carlin, Vantage, and Jerrit Canyon in Nevada, Mercur in Utah, and Annie Creek in the Black Hills. At the Vantage deposit, calcite veinlets occur up to 150 m away from the site of decalcification and/or the orebody. Pyrite is a common gangue mineral in the Jerrit Canyon deposit (Bivak, 1986).

One of the most important controlling factors in all sediment-host epithermal gold deposits is the presence of a fracture system to channel gold-bearing fluids into favourable stratigraphic horizons. A fracture system of this type probably exists on the Bear Creek grid as evidenced by the presence of a fracture network with alteration selvages and slickensides in some of the brecciated rocks. The elevation difference in Cretaceous formations between the Surprise Creek and the Bear Creek grids indicates that some tectonic event had occurred after the Cretaceous in the Bear Creek area. Most likely, tertiary intrusions on the south flank of the Sweet Grass Arch caused uplift which resulted in a well developed fracture system. The lamprophyre dyke in the Bear Creek may have been introduced into one of these pre-existing fractures. Heat from the intrusions would have generated hydrothermal cells in the overlying fractured rocks. If most of these fractures have branched and terminated below the surface (preferably in favourable stratigraphic horizons) as they did in the Carlin, Vantage, Jerrit Canyon and Annie Creek deposits, then, conceivably most of the ascending hydrothermal fluids would be trapped and may have deposited gold in the fracture-induced, de-calcified permeable zones. The few brecciated mudstone outcrops with or without slickensides and the network of fractures in the sandstone on the surface of the Bear Creek may represent a few of the splay fractures that have reached the surface. Figure 36 illustrates a model that portrays the possible fracture and hydrothermal systems that might have existed in the Bear Creek.

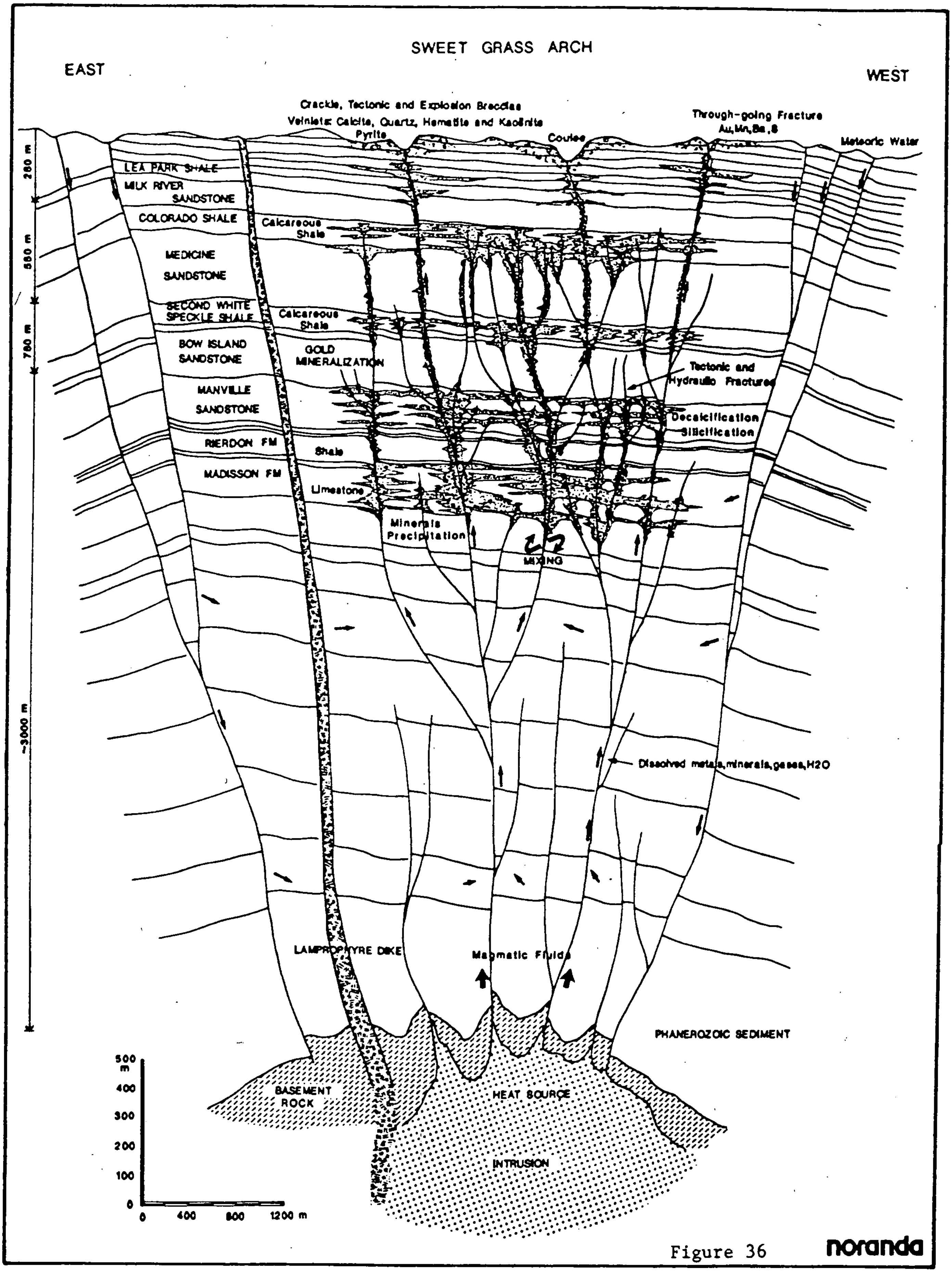


Figure 36 noranda

At Bear Creek, the lack of veinlets in the calcareous siltstone and sandstone units indicate that they were sufficiently permeable to accommodate hydrothermal fluid flow; this may imply that these rock types may not form favourable stratigraphic horizons to host an epithermal gold deposit. On the other hand, the fine-grained, less permeable, more dense and brittle calcareous mudstones (in which all breccias and veinlets occur) and calcareous shale units, may form the favourable stratigraphic horizons. This is because permeability induced by tectonic or hydraulic fracturing in these units could be further enhanced by de-calcification by acid solutions or brecciation by hydrothermal fluids. The resultant permeability would be confined and centred around the fractures. Hence, gold-bearing hydrothermal fluids would be confined to these induced permeable zones.

Thus, at Bear Creek, the favourable formations within the top 1000 m (Figure 6) which may host gold mineralization are, calcareous siltstone beds in the first 250 m, the Colorado/First White Speckle (calcareous) Shale Formation, Second White Speckle (calcareous) Shale Formation and the Manville Formation. Sediment-hosted epithermal gold deposits, however, may develop at depths up to three kilometers below the surface (e.g., Carlin deposit). The Colorado Formation is about 70 m thick and is located 280 m below the surface. It is a carbonate-rich (coccolith-rich) sediment. The Second White Speckle Shale Formation is about 65 m thick and is located 550 m below the surface. Its composition is similar to the Colorado Formation (Lecki, 1989). The Manville Sandstone Formation contains four 5-8 m thick calcareous members (from Well log CMG Adar 1A-6-9, Benertgee, 1985). This Formation is about 140 m thick and is located 780 m below the surface.

The carbonate-dominated formations (Reirdon and Madisson Formations) of the upper Jurassic (Figure 6) are other formations that may host gold deposits. These formations are about 950 m below the surface at the Bear Creek.

11.0 CONCLUSIONS AND RECOMMENDATION

Geological evidence from field mapping and oil well drilling in southern Alberta and southern Saskatchewan suggests that late Cretaceous to Early Tertiary intrusions have intruded the Phanerozoic sedimentary rocks in this part of the Western Canadian Sedimentary Basin. If there is gold mineralization associated with these intrusions in the U.S. side, similar gold mineralization processes are likely to have occurred in the Canadian portion of the basin.

Stream samples and subsequent rock and soil samples collected from selected areas confirmed there are some definite zones of anomalous gold content in the sedimentary rocks, near the surface, in southern Alberta. The Bear Creek grid hosts soil samples which contain anomalous concentrations of gold which are confined to fairly well defined linear trends perpendicular to the drainage patterns. Since many of the soil samples within these trends were collected from subcrops adjacent to outcrops with strong bedding features, this suggests that gold in the soil samples may reflect nearby gold mineralization in the rocks. The presence of linear anomalous zones in near-horizontal stratigraphic formations implies that subvertical structures must have existed to deliver gold-bearing fluids to the anomalous zones. A fracture system is thought to exist in the Bear Creek as evident from the presence of fracture networks with alteration selvages. The presence of crackle breccias and slickensides in some brecciated rocks seem to confirm that tectonic and possibly hydrothermal activities did occur in the area.

The voluminous amounts of veinlet material in the brecciated rock are thought to be derived from hydrothermal fluids. Brecciated calcareous mudstone with abundant veinlets, contain twice as much barium as calcareous siltstone/sandstone and calcareous mudstone without veinlets, further indicate that veining in the brecciated calcareous mudstone to be of hydrothermal origin.

Several other elements that are commonly found in epithermal system are also present in the Bear Creek grid. However, the distribution of these elements correlates spatially with the distribution of gold.

At Bear Creek, the favourable formations within the top 1000 m which may host gold mineralization are thought to be: calcareous siltstone units in the top 250 m, the Colorado, Second White Speckle, the Manville, Rierden and Madisson. These formations contain calcareous or carbonate members which are more susceptible to tectonic and hydraulic fracturing, and de-calcification by hydrothermal fluids.

The geochemical anomalies and the structural features, present on the surface, of the Bear Creek grid, may represent the surface expression of a much larger system at depth. More pan concentrate samples should be taken from all anomalous gold zones defined by soil sampling. These pan samples should be examined microscopically to determine the character of the gold to determine how far it has travelled from the source. If the source of gold appears to be proximal, greater credence could be given to the thesis that the gold present in the grid area is hydrothermal. At least three 300 m drill holes are recommended to test the more favourable horizons at depth if the source area is proximal.

Respectfully submitted,

NORANDA EXPLORATION COMPANY, LIMITED
(no personal liability)

[redacted]

Sebastian Lau
Project Geologist
Athabasca District

Don Dudek
Project Geologist
Athabasca District

SL/aa

REFERENCES

Allis, R.G. (1990). Geophysical anomalies over epithermal systems, Jour. Geochem Expl. 36 p. 339-374

Alpha, A.G. (1955): Tectonic History of North-Central Montana; Billings Geol. Soc. Ann. Field Conf. p. 129-41.

Appleton, J.D., Claros J. and Rodriguez, W. (1989). Lithogeochemical and mineralogical indicators of Archean precious-metal and polymetallic vein mineralization. Jour Geochem Expl. 32 p. 359-368.

Bakken, B.M. and Einandi, M.T. (1986). Spatial and temporal relations between wallrock alteration and gold mineralization, Main Pit, Carlin Gold Mine, Nevada, U.S.A., in Macdonald A.J., ed., Proceedings of Gold' 86, an International Symposium on the Geology of Gold: Toronto, 1986, p. 388-403.

Berger, B.R. and Healey, R.W. (1988). Advances in the understanding of epithermal gold-silver deposits, with special reference to the Western United States. Economic Geology Monograph 6: The geology of gold deposits: The perspective in 1988, p. 405-423.

Berger, B.R. and Bonham, H.F. (1990). Epithermal gold-silver deposits in the Western United States: time-space products of evolving plutonic, volcanic and tectonic environments, Jour. Geochem Expl. 36 p. 103-142.

Berger, B.R. and Eimon, P.I. (1982). Conceptual models of epithermal precious metal deposits.

Bonham, H.F. Jr. (1986). Bulk mineable gold deposits of the Western United States.

Dudek, D.P. (1990). Potential for gold in sedimentary rocks associated with Tertiary intrusives in Southern Alberta, Saskatchewan and Northern Montana. In-house company report, 19p.

Ilchik, R.P. (1990). Geology and geochemistry of the Vantage gold deposits, Alligator Ridge - Bald Mountain Mining District, Nevada, Econ. Geology V 85 p. 50-75.

Irvine, R.J. and Smith, M.J. (1990). Geophysical exploration for epithermal gold deposits. Jour. Geochem Expl. 36 p. 375-412.

Leckie, D.A. (1989). Upper Zuni Sequence: Upper Cretaceous to Lower Tertiary, in Ricketts BD (ed.), Western Canada Sedimentary Basin, A Case History: Canadian Society of Petroleum Geologists, p. 269-284.

Lessard, J.F. et al (1990). Geology of the Anne Creek sediment and porphyry-hosted gold deposit, in Paterson C.J. and Lisenbee A.C., eds., Metallogeny of gold in the Black Hills, South Dakota, p. 151-156.

Mason, R. (1985). Some aspects of epithermal gold mineralization in the Western U.S.A. in Gold Exploration 85; Short Course Note, May 8-10, Appendix 1, Dept. of Geol Science, Queen's University, 9p.

McIness B., et. al. (1990). The Laforma Deposit, an atypical epithermal gold system at Freegold Mountain, Yukon Territory, Canada, Jour. Geochem Expl. 36 p. 72-102.

Meyboom, P. (1960). Geology and Groundwater Resources of the Milk River Sandstone in Southern Alberta. Research Council of Alberta, Memoir 2.

Montri, W., et. al., (1990). Carbonate-hosted Au-Ag-Pb deposit, Northern Black Hills, in Paterson C.J. and Lisenbee, A.L. (eds.), Metallogeny of Gold in the Black Hills, South Dakota, p. 157-163.

O'Neill, J.M. and Lopez, D.A., (1985). Character and Regional Significance of Great Falls Tectonic Zone, East-Central Idaho and West-Central Montana. AAPG Bull V69(3) p. 437-447.

Panteleyev, A. (1986), Ore Deposits #10. A Canadian Cordilleran model for epithermal gold-silver deposits. Geoscience Canada Volume 13 (2), pp. 101-111.

Paterson, C.J., et. al., (1990). Gold deposits in the Black Hills, South Dakota, in Paterson D.J. and Lisenbee A.L. (eds.), Metallogeny of gold in the Black Hills, South Dakota, p. 10-19.

Paterson, C.J., et. al., (1990). A view through an epithermal-mesothermal precious metal system in the Northern Black Hills, South Dakota: A magmatic origin for the ore-forming fluids, in Paterson, D.J. and Lisenbee, A.L. (eds), Metallogeny of gold in the Black Hills, South Dakota, p. 53-59.

Pearcy, E. and Petersen, U. (1990). Mineralogy, geochemistry and alteration of the Cherry Hill, California hot-spring gold deposit. Jour. Geochem. Expl. 36, p 143-169.

Podruski, J.A., (1988). Contrasting character of the Peace River and Sweet Grass Arches, Western Canada. Sedimentary Basin Geological Survey of Canada Contribution #40487.

Wood, D.G., Porter R.G. and White N.C. (1990). Geological features of some Paleozoic epithermal gold occurrences in northeastern Queensland, Australia. Jour. Geochem. Expl. 36, p 413-443.

APPENDIX 1A

STATEMENT OF QUALIFICATIONS
DON DUDEK

STATEMENT OF QUALIFICATIONS

I, Don P. Dudek of [redacted] Winnipeg, Manitoba, do hereby certify that:

1) I graduated from the University of Saskatchewan with a degree of B.Sc. Honours Geology in 1982.
2) I have practised the profession of geology continuously since 1982 and have worked for various consulting and mineral exploration companies.
3) I am familiar with the property and have spent time in the area off and on since 1989.
4) I monitored the exploration, described in this report, both in the office and by field visits.
5) I am a project geologist for Noranda Exploration Company, Limited (no personal liability).
6) I am a member in good standing of the Association of the Professional Engineers, Geologists and Geophysicists of Alberta.

Don P. Dudek
Project Geologist
Athabasca District

Dated at Winnipeg
this 13 day of March, 1992.

APPENDIX 1B

STATEMENT OF QUALIFICATIONS

SEBASTIAN LAU

STATEMENT OF QUALIFICATIONS

I, Sebastian M. H. Lau, of the City of Winnipeg, in the Province of Manitoba, do hereby certify that:

1) I am a geologist residing at [redacted] Winnipeg, R3B 2P6.

2) I am a graduate of the University of Manitoba, Winnipeg, Manitoba, with an M.Sc Degree (1988) in Geology.

3) I have been actively employed as a geologist since graduation in 1988 in the following capacities:

   1988-present: Exploration Geologist
   Noranda Exploration Company, Limited
   (no personal liability)

4) I have no direct or indirect interest in the property which is the subject of this report.

Dated in Winnipeg
this 1 day of May, 1992.

[redacted]

Sebastian Lau
Geologist
Churchill District

SL/aa

APPENDIX 2

PERSONNEL WHO PERFORMED THE WORK

PERSONNEL

The following is a list of people who worked on the Sweet Grass project. They can be contacted at Noranda Exploration Company, Limited (no personal liability), 4-2130 Notre Dame Avenue, Winnipeg, Manitoba, R3H 0K1.

Names	Position	Dates Worked	Days
G. Maxwell	Sr. Proj. Geologist	Oct. 4-6, 1990	3
D. Dudek	Project Geologist	Oct. 3, 10, Nov. 25, 28, June 28, 29, 1991	15
S. Lau	Project Geologist	Oct. 1-31, Nov. 15-Dec. 7, 1990 June 1-3, June 28-29, 1991	51
K. Yazdani	Project Geologist	Oct. 1-31, 1990	31
R. Sharpe	Geophysicist	Oct. 27-29, 1990	3
D. Hancock	Geophysical Tech.	Oct. 22-30, 1990	9
M. Liskowich	Contract Geologist	Oct. 12-31, 1990	20

APPENDIX 3

STATEMENT OF EXPENDITURES

STATEMENT OF EXPENDITURES

1748 - Sweet Grass (May - Dec. 1990)

Geology/Prospecting	$19,100.78
Geophysics	2,825.54
Consulting Fee	3,000.00
Supplies and lodging	6,617.11
Transportation	3,954.54
Assays	11,572.05
Equipment rental	160.00
Fed/Prov. Government	450.00
Miscellaneous	2,040.49
Total	**$49,720.51**

Certified Correct:

[redacted]

Sebastian Lau and Don Dudek
Project Geologists
Athabasca District

Sworn before me at Winnipeg, Manitoba, this 1st day of May, 1992

Lynn Boittiaux
Commissioner of Oaths for Manitoba
Commission expires November 7, 1992.

APPENDIX 4

CERTIFICATES OF ANALYSES

ACME ANALYTICAL LABORATORIES LTD. 852 E. HASTINGS ST. VANCOUVER B.C. V6A 1R6 PHONE(604)253-3158 FAX(604)253-1716

GEOCHEMICAL ANALYSIS CERTIFICATE

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 File # 90-5593 Page 1

#4 - 2130 Norte Dame Ave, Winnipeg MB R3H 0K1

NOV - 6 1990

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
K 1	1	25	17	86	.2	25	9	522	2.23	10	5	ND	3	34	.3	2	2	35	.59	.054	18	23	.50	177	.01	8	1.75	.01	.24	1	4
K 2	1	29	11	87	.2	31	10	581	2.63	13	5	ND	4	111	.2	3	2	34	2.82	.068	19	22	.99	195	.01	7	1.92	.01	.18	1	1
K 3	1	24	8	74	.1	26	8	540	2.04	9	5	ND	4	82	.3	3	2	32	4.09	.052	18	20	.75	205	.01	7	1.55	.01	.15	2	1
K 4	1	26	11	73	.2	28	9	426	2.16	9	5	ND	5	169	.2	2	2	32	4.40	.050	19	22	.87	293	.01	7	1.62	.01	.15	1	1
K 5	1	23	10	78	.1	24	9	574	2.07	9	5	ND	4	144	.3	3	2	28	5.06	.059	19	18	1.07	202	.01	8	1.48	.01	.15	1	1
K 6	1	25	12	86	.2	30	10	539	2.61	9	5	ND	4	45	.2	2	2	37	.64	.053	21	24	.63	187	.01	6	2.12	.01	.22	1	1
K 7	1	27	12	96	.2	26	9	609	2.68	14	5	ND	4	35	.2	3	2	37	.60	.064	20	24	.60	201	.01	6	2.06	.01	.23	1	2
K 8	1	20	9	79	.1	20	8	436	2.04	6	5	ND	2	34	.2	2	2	33	.35	.052	19	21	.41	175	.01	5	1.78	.01	.17	2	1
K 9	1	28	14	89	.1	31	10	628	2.67	10	5	ND	3	39	.2	2	2	38	.47	.056	22	26	.58	172	.01	6	2.14	.01	.20	2	4
K 10	1	42	13	106	.3	39	12	752	3.32	12	5	ND	4	120	.2	2	2	49	1.40	.073	21	32	.95	237	.01	11	2.77	.02	.22	1	5
K 11	1	26	14	77	.1	25	9	537	2.17	6	5	ND	4	54	.4	2	2	30	3.60	.059	20	19	.86	226	.01	6	1.48	.01	.11	1	2
K 12	1	16	12	67	.1	20	8	653	2.49	9	5	ND	3	45	.2	2	2	34	2.30	.058	17	18	.48	174	.01	7	1.35	.01	.17	1	1
K 13	1	17	7	58	.1	20	6	349	1.54	8	5	ND	2	107	.2	2	2	23	6.51	.051	16	16	.84	206	.01	8	1.16	.01	.09	1	1
K 14	1	27	10	84	.1	30	11	412	2.68	22	5	ND	3	127	.2	2	2	35	3.06	.055	18	24	1.00	155	.01	8	1.70	.01	.14	1	1
K 15	1	14	14	63	.1	17	8	233	2.58	36	5	ND	3	62	.2	2	2	38	1.79	.044	15	19	.59	219	.01	9	1.65	.01	.24	1	1
K 16	1	24	11	71	.2	21	7	399	1.91	5	5	ND	4	184	.4	2	2	28	7.82	.046	19	17	.97	245	.01	8	1.44	.01	.11	1	1
K 17	1	8	10	60	.1	18	7	921	2.10	16	5	ND	2	56	.2	2	2	31	3.45	.057	14	16	.48	135	.01	7	1.21	.01	.18	1	2
K 18	1	23	12	92	.1	26	9	465	2.46	4	5	ND	3	32	.2	2	2	35	.46	.054	21	23	.48	192	.01	4	1.89	.01	.17	1	1
K 19	1	23	12	84	.1	25	8	441	2.33	9	5	ND	3	27	.2	2	2	33	.43	.054	23	23	.47	179	.01	5	1.72	.01	.15	1	2
K 20	1	36	10	88	.2	30	9	420	2.79	10	5	ND	4	151	.3	2	2	39	4.40	.063	18	25	1.03	192	.01	8	2.02	.01	.17	1	2
K 21	1	35	11	94	.2	34	11	685	2.92	8	5	ND	4	108	.3	2	2	41	2.06	.061	19	27	.95	187	.01	10	2.14	.05	.20	1	1
K 22	1	32	11	89	.1	37	12	671	2.60	9	5	ND	4	165	.2	2	2	32	2.39	.061	16	23	1.19	213	.01	8	1.70	.10	.13	1	2
K 23	1	27	8	87	.2	35	12	635	2.32	16	5	ND	5	196	.2	2	2	28	1.90	.066	15	20	1.18	177	.01	8	1.40	.16	.12	1	4
K 24	1	19	10	67	.1	20	8	407	2.57	20	5	ND	3	48	.2	2	2	29	.59	.049	17	19	.45	201	.01	7	1.47	.03	.16	1	1
K 25	1	28	13	89	.1	29	10	584	2.58	9	5	ND	4	33	.3	7	2	36	.60	.061	24	24	.53	208	.01	5	1.84	.01	.17	1	4
K 26	1	19	10	66	.1	24	9	336	2.30	14	5	ND	3	60	.2	2	2	38	.80	.051	16	22	.60	132	.01	10	1.49	.01	.18	2	2
K 27	1	37	11	91	.2	39	13	648	3.01	12	5	ND	4	159	.2	2	2	35	2.17	.061	17	27	1.34	145	.01	10	1.69	.02	.15	1	1
K 28	1	40	12	94	.2	43	14	640	2.90	11	5	ND	5	172	.2	2	2	37	3.03	.057	19	26	1.48	180	.01	11	1.76	.03	.16	1	1
K 29	1	34	10	88	.2	31	10	495	2.95	12	5	ND	6	148	.2	2	2	34	2.53	.071	18	24	1.66	313	.01	14	1.70	.19	.18	1	1
K 30	1	42	11	97	.2	37	12	571	3.02	9	5	ND	5	101	.2	2	2	39	2.25	.069	18	28	1.29	168	.01	9	1.92	.01	.18	1	1
K 31	1	41	11	93	.3	36	11	578	2.94	13	5	ND	5	72	.3	2	2	39	3.00	.071	19	27	1.16	174	.01	8	1.96	.01	.18	1	2
K 32	1	37	12	87	.3	32	10	446	2.62	7	5	ND	5	120	.2	3	2	35	3.25	.065	19	26	1.17	197	.01	8	1.76	.01	.16	1	1
K 33	1	13	5	71	.1	25	9	234	2.86	13	5	ND	5	34	.2	2	2	44	.44	.069	17	28	.53	135	.01	6	1.51	.01	.13	1	1
K 34	1	14	7	70	.1	23	9	204	2.51	14	5	ND	4	85	.2	2	2	42	.98	.065	16	28	.70	130	.01	8	1.45	.02	.16	1	1
K 35	1	15	4	65	.1	21	8	166	2.28	6	5	ND	4	193	.2	2	2	41	3.45	.062	15	24	.64	218	.01	9	1.36	.01	.12	1	1
K 36	1	35	11	93	.2	34	11	354	3.07	16	5	ND	6	120	.2	2	2	40	2.00	.074	19	27	1.14	190	.01	10	1.93	.02	.18	1	2
STANDARD C/AU-S	18	60	36	131	7.1	72	31	1053	3.97	43	21	7	40	52	19.7	15	18	58	.46	.097	40	61	.90	177	.07	32	1.90	.06	.14	11	51

ICP - .500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN FE SR CA P LA CR MG BA TI B W AND LIMITED FOR NA K AND AL. AU DETECTION LIMIT BY ICP IS 3 PPM.
- SAMPLE TYPE: P1 TO P7 SOIL P8 TO P9 ROCK AU* ANALYSIS BY ACID LEACH/AA FROM 10 GM SAMPLE.

DATE RECEIVED: OCT 29 1990 **DATE REPORT MAILED:** Nov 1/90. **SIGNED BY** [redacted] D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	AU* ppb
K 37	1	48	13	96	.3	34	10	475	3.09	5	5	ND	5	185	.2	2	2	38	2.77	.070	18	27	1.15	170	.01	10	1.78	.01	.19	1	1
K 38	1	43	15	95	.2	52	15	711	2.94	16	5	ND	5	224	.3	2	2	37	2.98	.061	20	27	.93	257	.01	9	1.76	.01	.16	1	3
K 40	1	41	13	92	.3	35	11	453	2.89	8	5	ND	4	126	.4	2	2	37	3.80	.068	19	25	1.35	196	.01	7	1.85	.01	.16	1	1
K 41	1	22	9	72	.2	30	9	313	2.26	11	5	ND	3	187	.2	2	2	30	2.27	.076	19	22	.75	163	.01	5	1.44	.01	.12	1	1
K 42	1	29	13	82	.2	34	12	357	2.58	16	5	ND	5	276	.3	2	2	31	1.81	.060	18	22	.80	201	.01	7	1.63	.01	.11	1	2
K 43	1	42	15	102	.2	42	14	431	3.16	14	5	ND	4	199	.4	2	2	41	2.40	.060	19	27	.87	219	.01	8	2.05	.01	.20	1	2
K 44	1	33	13	79	.1	30	10	520	2.52	12	5	ND	4	108	.2	2	2	35	2.33	.064	17	23	1.08	159	.01	9	1.72	.08	.17	1	1
K 45	1	24	11	79	.2	25	9	827	2.37	11	5	ND	5	275	.3	3	2	27	2.79	.065	19	17	1.28	185	.01	9	1.51	.02	.19	1	9
K 46	1	12	6	63	.3	25	9	371	2.34	17	5	ND	3	227	.2	2	2	22	1.37	.060	13	16	.41	137	.01	7	1.18	.04	.14	1	12
K 47	1	6	9	27	.4	10	4	260	.93	5	7	ND	3	70	.2	2	2	11	1.99	.029	10	6	.57	73	.01	3	.56	.03	.08	1	3
K 48	1	22	8	42	.1	16	6	1826	3.99	30	5	ND	3	332	.3	2	2	13	2.44	.037	13	7	.34	261	.01	9	.73	.01	.07	1	5
K 49	1	26	9	67	.2	24	8	579	2.33	11	5	ND	3	127	.4	2	2	27	3.13	.054	17	17	.89	187	.01	9	1.44	.06	.13	1	3
K 50	1	28	10	80	.2	28	9	407	2.19	11	5	ND	3	124	.5	2	2	29	3.50	.056	19	19	.97	217	.01	9	1.54	.10	.13	1	6
K 51	1	44	15	82	.4	43	11	1393	3.98	22	5	ND	4	335	1.0	2	2	30	7.32	.058	23	17	.67	195	.01	12	1.33	.02	.11	1	2
M 1	1	30	11	72	.2	25	8	461	1.96	6	5	ND	4	142	.5	2	2	29	5.91	.052	20	18	1.07	237	.01	6	1.47	.01	.13	1	15
M 2	1	29	14	73	.2	24	8	354	1.98	6	5	ND	4	121	.4	2	2	29	4.42	.051	19	18	1.02	256	.01	6	1.42	.01	.14	1	1
M 3	1	23	10	64	.1	20	6	315	1.58	13	5	ND	2	87	.4	2	2	23	5.37	.061	17	16	.91	208	.01	7	1.18	.01	.14	1	3
M 4	1	24	10	71	.1	22	8	460	1.92	5	5	ND	5	113	.5	2	2	28	4.96	.052	18	17	1.08	292	.01	8	1.41	.10	.13	1	4
M 5	1	24	15	78	.1	25	8	373	2.20	9	5	ND	4	28	.5	2	2	35	.57	.044	20	22	.54	175	.01	5	1.81	.01	.22	1	1
M 6	1	23	12	79	.1	19	8	511	1.96	6	5	ND	2	24	.3	2	2	32	.35	.048	19	20	.35	165	.02	7	1.66	.01	.27	1	1
M 7	1	29	13	72	.2	24	8	424	2.02	7	5	ND	5	137	.4	2	2	29	5.63	.050	20	19	1.18	237	.01	7	1.42	.01	.12	1	2
M 8	1	28	12	75	.2	23	8	362	2.10	9	5	ND	4	100	.4	2	2	29	5.40	.056	19	19	1.05	214	.01	7	1.52	.01	.16	1	4
M 9	1	22	14	78	.1	25	8	463	2.26	6	5	ND	4	31	.2	2	2	35	.41	.045	21	22	.49	193	.01	6	1.95	.01	.22	1	1
M 10	1	23	12	80	.1	20	8	499	2.03	10	5	ND	2	26	.3	2	2	33	.46	.054	20	20	.38	177	.01	6	1.70	.01	.23	1	1
M 11	1	22	11	81	.1	19	6	398	1.83	6	5	ND	1	30	.4	2	2	29	.38	.058	19	19	.35	181	.01	5	1.59	.01	.19	1	1
M 12	1	23	14	80	.1	25	8	420	2.25	8	5	ND	2	25	.4	2	2	34	.42	.053	22	22	.45	185	.01	4	1.86	.01	.18	1	13
M 13	1	20	14	71	.1	20	8	390	2.00	9	5	ND	2	22	.3	2	2	31	.43	.052	20	20	.39	177	.01	4	1.70	.01	.18	1	5
M 14	1	23	13	81	.1	24	8	432	2.15	7	5	ND	3	30	.2	2	2	34	.42	.050	19	23	.44	171	.01	5	1.78	.01	.24	1	11
M 15	1	25	12	70	.2	23	7	371	1.88	2	5	ND	2	81	.5	2	2	28	4.19	.056	18	18	.87	180	.01	9	1.51	.01	.16	1	1
M 16	1	26	14	83	.1	23	9	513	2.18	6	5	ND	3	28	.3	2	2	36	.39	.051	20	24	.42	176	.01	6	1.89	.01	.31	1	1
M 17	1	28	12	77	.2	23	8	364	2.08	8	5	ND	2	53	.3	2	2	32	2.66	.064	18	21	.71	174	.01	9	1.74	.01	.25	1	5
M 18	1	28	14	72	.1	22	7	399	2.00	11	5	ND	1	64	.5	2	2	32	4.53	.060	18	19	.70	231	.01	9	1.82	.01	.19	1	2
M 19	1	25	13	74	.3	23	8	532	1.99	7	5	ND	3	62	.4	2	2	31	2.80	.057	17	19	.66	174	.01	9	1.60	.01	.23	1	3
M 20	1	24	13	73	.3	23	8	538	1.99	12	5	ND	1	88	.5	2	2	27	4.01	.066	16	18	.70	188	.01	8	1.38	.01	.19	1	14
M 21	1	25	15	79	.2	22	8	517	2.09	12	5	ND	2	34	.4	2	2	33	.68	.060	18	21	.49	173	.01	9	1.67	.01	.29	1	1
M 22	1	20	10	95	.1	19	5	290	1.75	3	5	ND	1	29	.4	2	2	28	.46	.063	17	18	.34	187	.01	5	1.47	.01	.17	1	2
STANDARD C/AU-S	18	58	38	130	7.2	72	31	1053	3.97	42	21	7	40	52	19.8	15	18	58	.46	.096	40	60	.90	175	.07	32	1.90	.06	.14	12	47

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
M 23	1	19	18	95	.3	18	6	453	1.71	6	5	ND	2	26	.4	2	2	28	.35	.059	17	20	.34	189	.01	6	1.55	.01	.16	1	2
M 24	1	20	13	97	.2	20	8	641	2.19	10	5	ND	3	48	.2	2	2	30	.61	.078	17	22	.52	144	.01	6	1.59	.02	.24	1	1
M 25	1	18	7	79	.2	20	8	501	1.99	8	5	ND	4	24	.3	2	2	30	.37	.039	19	20	.38	171	.01	6	1.63	.01	.27	1	1
M 26	1	19	16	94	.2	18	8	413	1.68	8	5	ND	3	56	.4	2	2	25	.96	.059	16	17	.50	191	.01	10	1.30	.07	.21	1	1
M 27	1	22	14	95	.2	20	9	507	2.01	10	5	ND	4	28	.2	2	2	31	.53	.054	18	21	.45	168	.01	9	1.58	.01	.23	1	3
M 28	1	22	13	113	.2	21	7	555	1.98	8	5	ND	2	29	.7	2	2	30	.36	.069	19	19	.38	218	.01	6	1.67	.01	.24	1	2
M 29	1	27	12	99	.2	23	10	561	2.38	16	5	ND	3	43	.3	2	2	36	.62	.060	21	22	.47	198	.01	8	1.93	.01	.32	1	1
M 30	1	18	15	91	.2	16	8	484	1.94	9	5	ND	3	27	.2	2	2	30	.40	.056	18	19	.34	204	.02	7	1.66	.01	.25	1	2
M 31	1	21	14	90	.2	20	9	504	1.85	7	5	ND	3	31	.2	2	2	29	.44	.053	17	20	.36	207	.02	5	1.62	.01	.19	1	1
M 32	1	20	13	83	.2	21	9	456	2.06	11	5	ND	3	24	.2	2	2	32	.46	.051	19	21	.41	193	.01	6	1.76	.01	.24	1	1
M 33	1	20	18	85	.2	20	8	477	1.92	7	5	ND	3	40	.2	2	2	30	.38	.058	18	20	.40	165	.01	8	1.61	.01	.31	1	1
M 34	1	22	11	103	.1	18	6	442	1.71	7	5	ND	2	28	.4	2	2	26	.37	.066	17	18	.31	198	.01	6	1.44	.01	.24	1	1
M 35	1	23	10	99	.1	20	7	491	2.00	9	5	ND	2	30	.4	2	2	31	.40	.059	19	22	.37	217	.01	4	1.69	.01	.21	1	3
M 36	2	41	28	163	.3	60	16	371	2.97	21	5	ND	8	145	1.4	2	2	36	.79	.041	30	23	.60	275	.02	12	1.51	.01	.12	1	2
M 37	1	31	10	79	.1	29	11	179	2.05	8	5	ND	3	144	.7	2	2	29	4.14	.054	18	24	1.04	146	.01	6	1.51	.10	.10	1	1
M 38	1	21	14	73	.1	30	9	262	1.49	15	5	ND	2	168	.5	2	2	19	6.21	.068	21	16	1.14	129	.01	6	1.13	.01	.08	1	1
M 39	1	33	12	94	.3	29	12	220	2.08	9	5	ND	3	110	.5	2	2	28	3.23	.056	18	23	.99	143	.01	8	1.42	.01	.10	1	2
M 40	1	34	14	85	.1	35	11	502	2.34	8	5	ND	3	113	.4	2	2	30	2.03	.057	18	24	.83	215	.01	7	1.50	.02	.12	1	1
M 41	2	55	24	99	.3	38	14	214	2.44	9	5	ND	7	321	1.0	2	2	66	1.43	.030	22	29	.57	444	.05	14	1.33	.03	.09	1	2
M 42	1	24	12	80	.2	24	8	446	2.10	10	5	ND	2	33	.2	2	2	33	.91	.054	19	23	.69	174	.01	6	1.74	.01	.22	1	1
M 43	1	23	18	78	.1	28	9	405	2.21	9	5	ND	3	32	.2	2	2	35	.45	.049	20	23	.53	175	.01	6	2.03	.01	.30	1	1
M 44	1	41	14	94	.3	30	10	230	2.13	7	5	ND	4	242	.9	2	2	49	3.17	.036	21	24	.69	311	.02	14	1.38	.02	.10	1	1
M 45	1	24	15	94	.2	29	10	654	2.63	17	5	ND	5	244	.2	2	2	24	4.41	.057	18	20	1.41	220	.01	11	1.58	.01	.18	1	1
M 46	1	22	12	71	.2	27	10	671	1.92	8	5	ND	3	154	.2	2	2	25	5.37	.066	15	23	1.06	119	.01	5	1.14	.01	.10	1	12
M 47	1	20	12	63	.1	20	7	341	1.44	6	5	ND	4	110	.2	2	2	17	6.16	.057	14	17	2.13	120	.02	9	.94	.01	.14	1	1
M 48	1	42	18	104	.2	35	14	173	2.13	12	5	ND	6	274	.4	2	2	52	1.46	.039	24	24	.52	342	.02	10	1.32	.01	.12	1	2
M 49	1	33	17	90	.2	26	10	686	2.08	9	5	ND	6	194	.7	2	2	24	3.02	.072	20	20	1.13	132	.01	9	1.28	.01	.15	1	2
M 50	1	26	6	77	.2	29	9	299	1.96	11	5	ND	4	261	.2	2	2	22	4.06	.043	16	18	.50	82	.01	7	1.17	.01	.11	1	2
M 51	1	21	10	55	.1	19	7	450	1.55	5	5	ND	3	134	.8	2	2	22	4.11	.058	15	21	1.23	106	.01	5	.98	.01	.08	1	1
M 52	1	45	19	92	.2	29	9	221	2.19	13	5	ND	6	183	.4	2	2	35	2.87	.050	23	22	.90	232	.02	10	1.40	.01	.15	1	1
M 53	1	32	15	90	.2	22	8	318	2.17	13	5	ND	6	142	.7	2	2	30	3.49	.057	22	23	1.31	214	.02	12	1.46	.01	.18	1	3
M 54	1	34	22	82	.2	22	8	172	1.97	14	5	ND	6	294	.5	3	2	29	6.83	.043	23	21	.92	214	.02	12	1.39	.02	.15	1	1
M 55	1	24	20	76	.2	16	7	537	1.92	7	5	ND	5	152	.4	3	2	24	7.44	.060	19	19	1.98	132	.02	7	1.24	.01	.17	1	1
M 56	1	14	8	46	.2	10	5	168	1.12	10	5	ND	2	103	.4	2	2	15	9.23	.051	14	15	1.86	91	.01	7	.86	.01	.10	1	2
M 57	1	24	16	69	.1	15	6	379	1.85	7	5	ND	2	199	.4	2	2	22	9.52	.052	18	18	1.30	161	.01	6	1.37	.01	.19	1	1
M 58	1	27	16	74	.2	20	7	341	2.08	9	5	ND	3	128	.5	2	2	27	6.17	.053	18	21	1.26	174	.01	10	1.52	.01	.17	1	1
STANDARD C/AU-S	18	57	37	131	6.8	73	31	1052	3.95	39	17	8	38	52	18.4	15	18	56	.46	.094	38	60	.89	182	.07	31	1.89	.06	.13	12	48

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
M 59	1	29	9	75	.2	27	9	602	2.10	11	5	ND	5	227	.6	2	2	29	5.11	.057	17	19	1.02	186	.01	7	1.32	.02	.12	1	1
M 60	1	42	15	90	.1	18	9	248	2.70	19	5	ND	8	214	.4	2	2	33	2.67	.045	20	18	.58	324	.01	7	1.33	.01	.13	1	1
M 61	2	39	18	76	.2	28	9	243	2.63	20	5	ND	8	780	.6	2	2	39	2.73	.040	17	17	.60	160	.02	12	.94	.02	.14	1	1
M 62	1	23	6	56	.2	19	6	302	1.15	8	5	ND	6	200	.4	2	2	16	6.70	.051	12	11	1.43	70	.01	5	.85	.01	.10	1	1
M 63	1	19	7	51	.2	20	6	543	1.17	12	5	ND	5	226	.4	2	2	15	10.24	.059	14	10	1.37	121	.01	5	.84	.02	.09	1	1
M 64	1	25	6	58	.1	22	7	310	1.50	11	5	ND	4	128	.3	2	2	24	5.63	.047	16	15	1.02	171	.01	5	1.09	.01	.08	1	1
M 65	1	28	14	54	.2	17	6	208	1.47	6	5	ND	6	193	.6	2	2	30	4.90	.043	20	15	.97	244	.02	10	1.22	.01	.12	1	1
M 66	1	30	13	72	.1	18	7	413	1.73	8	5	ND	5	99	.5	2	2	27	4.66	.059	21	15	1.19	230	.01	9	1.67	.01	.20	1	2
M 67	1	24	8	73	.2	20	8	412	1.77	6	5	ND	3	102	.4	2	2	27	5.86	.049	19	16	.94	170	.01	8	1.49	.01	.18	1	1
M 68	1	24	11	75	.1	21	8	458	1.76	7	5	ND	5	38	.5	2	2	26	.67	.048	19	17	.42	192	.01	7	1.42	.01	.17	1	1
M 69	1	29	11	77	.2	21	8	391	1.90	10	5	ND	7	128	.5	2	2	25	4.62	.053	19	16	1.15	228	.01	5	1.21	.01	.10	1	1
M 70	1	27	10	66	.2	24	8	396	1.84	7	5	ND	6	128	.4	2	2	27	5.44	.046	18	17	.90	274	.01	6	1.32	.01	.13	1	1
M 71	1	25	11	68	.2	20	7	305	1.84	13	5	ND	5	92	.5	2	2	27	4.11	.048	18	17	.91	215	.01	7	1.39	.01	.13	1	1
M 72	1	24	10	64	.2	22	8	367	1.79	5	5	ND	5	104	.5	2	2	26	5.93	.047	18	16	.86	245	.01	5	1.29	.01	.12	1	1
M 73	1	27	9	53	.2	19	9	376	1.29	13	5	ND	5	261	.4	2	2	19	5.54	.049	13	12	1.22	86	.01	10	.90	.01	.09	1	2
M 74	1	29	6	68	.1	27	9	464	1.93	3	5	ND	5	175	.4	2	2	25	4.29	.060	16	19	1.22	104	.01	6	1.15	.01	.09	1	1
M 75	1	42	14	88	.1	36	11	435	1.94	15	5	ND	7	241	.7	2	2	27	4.95	.051	19	16	1.15	126	.01	6	1.33	.01	.10	1	1
M 76	1	24	8	59	.2	21	7	338	1.69	11	5	ND	3	72	.5	2	2	28	5.43	.049	17	17	.70	178	.01	8	1.49	.01	.18	1	1
M 77	1	29	8	66	.1	23	8	359	1.66	14	5	ND	3	115	.5	2	2	27	7.12	.051	18	18	.85	164	.01	7	1.45	.01	.14	1	2
M 78	1	30	11	80	.2	21	7	453	2.00	8	5	ND	4	51	.5	2	2	30	2.63	.053	21	17	.81	175	.01	9	1.72	.01	.23	1	1
M 79	1	26	12	78	.1	20	8	506	2.05	10	5	ND	4	47	.5	2	2	30	3.30	.057	21	18	.95	163	.01	10	1.72	.01	.27	1	1
M 80	1	27	12	81	.1	20	7	360	1.96	9	5	ND	4	82	.5	2	2	32	2.94	.055	21	17	.67	189	.02	11	1.68	.01	.25	1	1
M 81	1	33	17	63	.2	21	7	213	1.60	15	5	ND	6	157	.6	2	2	31	5.35	.051	23	15	.94	234	.02	14	1.41	.01	.14	1	1
M 82	1	24	11	86	.1	19	8	516	1.93	8	5	ND	5	25	.4	2	2	29	.43	.049	20	17	.38	181	.02	5	1.53	.01	.20	1	1
M 83	1	23	10	64	.2	22	7	374	1.78	6	5	ND	5	58	.4	2	2	26	3.87	.052	18	17	.90	210	.01	5	1.29	.01	.10	1	1
M 84	1	19	6	46	.2	16	6	381	1.37	15	5	ND	4	90	.3	2	2	16	11.08	.056	16	9	1.48	114	.01	5	.86	.01	.11	1	1
M 85	1	21	13	73	.1	21	9	569	1.99	7	5	ND	4	21	.2	2	2	28	.35	.046	23	18	.40	167	.01	4	1.48	.01	.14	1	2
SL 223	1	24	11	73	.1	22	9	466	2.01	5	5	ND	5	26	.2	2	2	32	.40	.041	21	21	.41	198	.01	4	1.67	.01	.15	1	1
SL 224	1	23	12	70	.1	25	9	441	2.19	7	5	ND	5	28	.2	2	2	33	.43	.039	22	22	.45	189	.01	4	1.71	.01	.14	1	1
SL 225	1	28	10	68	.3	23	8	401	1.87	11	5	ND	7	67	.4	2	2	27	3.55	.047	20	17	.95	202	.01	6	1.42	.01	.14	1	1
SL 226	1	28	11	75	.1	29	8	270	2.33	13	5	ND	6	37	.4	2	2	35	1.12	.040	20	23	.58	171	.01	6	1.76	.01	.20	1	1
SL 227	1	25	12	65	.1	16	6	158	1.81	3	5	ND	8	115	.5	2	2	21	4.77	.041	23	15	1.17	89	.01	5	1.72	.01	.17	1	1
SL 228	1	26	11	70	.2	17	6	216	1.85	6	5	ND	7	102	.5	2	2	24	4.50	.046	23	16	1.27	68	.01	6	1.77	.01	.19	1	2
SL 229	1	26	15	80	.1	24	9	373	2.31	13	5	ND	6	24	.2	2	2	31	.51	.041	23	20	.55	138	.01	4	1.89	.01	.16	1	1
SL 230	1	23	12	76	.1	27	10	506	2.27	4	5	ND	7	26	.3	2	2	35	.44	.039	22	23	.49	210	.01	6	1.94	.01	.19	1	1
SL 231	1	32	14	88	.1	26	9	282	2.45	14	5	ND	7	41	.3	2	2	32	.70	.037	25	20	.55	146	.01	4	2.05	.01	.17	1	1
STANDARD C/AU-S	18	60	36	130	7.0	72	31	1053	3.97	42	19	8	40	53	19.9	14	22	59	.46	.096	41	61	.90	183	.08	33	1.90	.06	.13	11	48

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	AU* ppb
SL 232	1	26	15	82	.2	25	8	254	2.13	7	5	ND	7	133	.7	2	2	27	3.14	.041	26	17	1.06	115	.01	7	2.18	.01	.24	1	3
SL 233	1	21	12	68	.2	18	6	291	1.74	9	5	ND	6	28	.4	3	2	24	1.68	.048	24	15	1.16	90	.01	6	1.62	.01	.19	1	4
SL 234	1	23	12	60	.2	17	7	347	1.62	9	5	ND	6	194	.5	3	2	19	5.88	.040	22	12	1.61	131	.01	5	1.58	.01	.19	1	6
SL 235	1	19	10	40	.2	11	4	279	1.10	10	5	ND	5	137	.3	3	2	17	5.89	.047	17	8	1.42	123	.02	5	.84	.01	.10	1	1
SL 236	1	22	14	69	.2	15	5	198	1.74	8	5	ND	7	190	.6	2	2	23	3.97	.042	24	14	1.00	120	.01	6	1.76	.01	.16	1	17
SL 237	1	22	11	62	.2	12	5	412	1.84	4	5	ND	6	155	.5	2	2	21	7.33	.044	21	13	1.68	79	.02	7	1.42	.01	.17	1	1
SL 238	1	19	13	59	.2	16	6	270	1.48	14	5	ND	6	127	.6	3	2	18	4.53	.045	21	11	1.50	186	.01	5	1.50	.01	.17	1	16
SL 239	1	14	9	43	.2	11	4	233	1.16	17	5	ND	4	93	.3	3	2	14	7.69	.049	16	9	1.95	73	.02	5	.86	.01	.12	1	1
SL 240	1	20	16	75	.1	18	6	317	1.73	6	5	ND	7	138	.4	2	2	22	3.52	.046	23	16	1.38	55	.01	6	1.61	.01	.15	1	2
SL 241	1	15	10	54	.2	12	4	182	1.35	4	5	ND	5	156	.4	3	2	19	7.37	.044	20	12	1.49	133	.01	6	1.43	.01	.16	1	14
SL 242	1	11	7	35	.3	10	3	349	.74	5	5	ND	4	77	.2	3	2	13	8.02	.047	16	9	1.77	144	.01	6	.69	.01	.09	1	2
SL 243	1	22	16	72	.4	17	6	482	1.69	7	5	ND	7	146	.6	4	2	24	6.08	.051	21	13	1.72	76	.01	6	1.45	.01	.18	1	1
SL 244	1	10	7	35	.1	8	4	311	.96	2	5	ND	4	72	.2	3	2	12	6.66	.042	16	8	1.85	116	.01	4	.68	.01	.08	1	6
SL 245	1	20	13	76	.1	22	8	383	1.99	12	5	ND	4	67	.5	3	2	30	2.23	.045	21	18	.84	189	.01	8	1.69	.01	.19	1	2
SL 246	1	26	10	67	.2	27	8	415	1.97	8	5	ND	5	110	.4	2	2	31	5.61	.049	19	20	.87	228	.01	7	1.56	.01	.11	1	1
SL 247	1	11	10	41	.1	11	4	258	.90	6	5	ND	4	61	.2	3	2	14	7.66	.045	15	11	2.22	149	.01	5	.74	.01	.11	1	3
SL 248	1	9	8	41	.3	10	5	466	.93	4	5	ND	3	115	.2	3	2	13	7.76	.053	21	8	1.70	322	.01	6	.69	.01	.08	1	16
SL 249	1	30	12	86	.1	26	8	300	2.07	10	5	ND	3	64	.6	2	2	32	2.98	.047	19	21	.64	204	.01	8	1.67	.01	.18	1	1
SL 250	1	25	10	76	.1	30	10	454	2.37	10	5	ND	5	34	.3	2	2	36	.73	.040	22	24	.53	213	.01	5	1.78	.01	.14	1	7
SL 251	1	22	13	70	.3	27	8	380	2.00	9	5	ND	5	60	.5	2	2	30	3.26	.048	20	21	.85	192	.01	8	1.51	.01	.13	1	4
SL 252	1	24	10	70	.3	24	7	336	1.99	13	5	ND	5	89	.6	2	2	31	5.71	.053	19	20	.92	210	.01	7	1.57	.01	.14	1	1
SL 253	1	22	13	78	.1	29	9	414	2.42	13	5	ND	4	28	.4	2	2	38	.40	.041	23	25	.50	197	.01	6	2.15	.01	.20	1	2
SL 254	1	22	11	76	.2	25	8	480	2.21	8	5	ND	5	31	.5	2	2	32	.66	.044	23	21	.66	189	.01	8	1.73	.01	.19	1	1
SL 255	1	25	12	67	.2	23	7	279	1.90	7	5	ND	4	60	.5	2	2	28	3.26	.045	18	19	.67	196	.01	6	1.45	.01	.13	1	4
SL 256	1	28	13	78	.2	36	10	476	2.32	9	5	ND	5	35	.4	2	2	33	.75	.051	23	24	.59	183	.01	6	1.68	.01	.14	1	3
SL 257	1	22	12	70	.1	23	8	360	1.88	8	5	ND	4	92	.5	2	2	27	3.75	.051	18	17	.89	223	.01	7	1.31	.01	.13	1	2
SL 258	1	27	12	83	.2	28	10	467	2.44	8	5	ND	4	33	.4	2	2	37	.55	.048	23	25	.52	194	.01	5	1.92	.01	.18	1	3
SL 259	1	28	12	72	.2	25	8	309	2.12	15	5	ND	4	65	.6	2	2	32	3.55	.048	19	23	.74	213	.01	8	1.67	.01	.14	1	1
SL 260	1	20	10	71	.1	20	7	382	1.88	8	5	ND	3	27	.2	5	2	30	.30	.039	22	21	.40	177	.02	4	1.59	.01	.17	1	1
SL 261	1	26	9	69	.3	23	8	384	1.87	4	5	ND	5	135	.6	2	2	28	6.17	.051	19	18	1.03	253	.01	8	1.48	.01	.15	1	1
SL 262	1	5	6	30	.3	7	3	325	.69	2	5	ND	3	128	.2	2	2	10	10.30	.043	13	8	2.03	73	.01	5	.50	.01	.07	1	1
SL 263	1	8	8	37	.2	12	4	209	.87	10	5	ND	2	70	.2	2	2	14	8.99	.042	15	9	1.45	207	.01	5	.79	.01	.09	1	1
SL 264	1	24	12	78	.3	17	6	266	1.95	8	5	ND	8	88	.5	3	2	24	3.63	.055	24	15	1.50	152	.01	8	1.77	.01	.17	1	3
SL 265	1	24	10	73	.1	20	7	326	1.86	13	5	ND	5	42	.4	2	2	25	3.18	.055	21	17	1.10	152	.01	7	1.33	.01	.13	1	1
SL 266	1	20	11	68	.2	17	6	293	1.48	9	5	ND	4	89	.4	3	2	19	8.20	.053	20	13	1.22	187	.02	7	1.08	.01	.10	1	1
SL 267	1	21	11	70	.3	18	7	336	1.79	7	5	ND	6	106	.6	3	2	25	5.31	.050	19	15	1.05	219	.01	7	1.27	.01	.11	1	4
STANDARD C/AU-S	19	58	37	130	7.1	72	31	1054	3.98	41	21	7	40	52	19.8	15	20	59	.46	.095	40	60	.90	177	.08	33	1.90	.06	.14	11	46

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL 268	1	26	17	63	.2	16	7	375	2.64	33	5	ND	5	68	.9	3	2	21	4.90	.050	21	18	1.59	177	.03	6	1.02	.02	.13	1	1
SL 269	1	19	14	69	.1	20	7	394	1.94	8	5	ND	2	57	.6	2	2	24	4.91	.049	17	18	.86	222	.01	9	1.37	.01	.13	1	1
SL 270	1	35	15	100	.1	26	10	347	2.26	14	5	ND	7	102	.7	3	2	29	4.15	.070	22	19	1.42	187	.01	8	1.45	.01	.17	1	3
SL 271	1	21	9	72	.1	22	8	433	2.05	9	5	ND	4	85	.2	2	2	24	4.61	.054	20	21	1.21	243	.01	3	1.19	.01	.12	1	2
SL 272	1	23	16	63	.1	15	8	259	2.19	22	5	ND	5	111	.4	3	2	22	5.90	.048	22	17	1.55	219	.02	3	1.19	.01	.12	1	2
SL 273	2	32	21	89	.2	23	8	210	2.39	12	5	ND	6	133	.8	3	2	32	3.45	.047	23	20	1.01	146	.02	5	1.27	.01	.14	1	2
SL 274	1	26	21	86	.1	16	6	199	2.09	3	5	ND	7	105	.5	2	2	23	4.34	.052	22	18	1.31	182	.01	7	1.59	.01	.17	1	2
SL 275	1	22	12	73	.2	24	8	397	1.98	5	5	ND	3	78	.2	2	2	24	4.49	.052	18	19	1.04	210	.01	8	1.25	.01	.13	1	2
SL 276	1	20	10	61	.1	18	7	341	1.79	9	5	ND	2	103	.5	2	2	21	6.66	.050	16	18	1.09	193	.01	5	1.12	.01	.11	1	1
SL 277	1	37	20	98	.1	21	8	248	2.18	8	5	ND	6	107	.3	2	2	30	3.99	.055	23	19	1.18	248	.01	11	1.64	.01	.19	1	1
SL 278	1	29	16	76	.1	17	6	244	2.31	15	5	ND	5	87	.7	2	2	25	5.04	.070	23	20	1.29	151	.01	7	1.51	.01	.19	1	1
SL 279	1	17	10	61	.1	15	6	395	1.63	7	5	ND	3	42	.7	2	2	20	4.20	.058	19	17	1.47	142	.01	5	1.15	.01	.15	1	2
SL 280	1	23	17	76	.2	19	7	252	2.12	10	5	ND	6	104	.2	2	2	23	3.87	.047	22	18	1.11	128	.01	9	1.45	.01	.19	1	1
SL 281	1	22	11	62	.1	18	7	256	1.91	8	5	ND	3	94	.2	2	2	24	6.16	.046	17	19	.96	210	.01	5	1.29	.01	.13	1	3
SL 282	1	25	16	75	.1	25	8	358	2.26	7	5	ND	3	27	.2	2	2	29	.90	.042	22	22	.62	155	.01	4	1.63	.01	.21	1	1
SL 283	1	24	13	65	.2	27	8	339	2.16	6	5	ND	2	56	.2	2	2	29	4.02	.053	16	22	.73	208	.01	6	1.59	.01	.19	1	3
SL 284	1	24	14	74	.1	27	9	429	2.17	9	5	ND	4	43	.3	2	2	29	1.68	.051	19	21	.67	211	.01	4	1.45	.01	.15	1	1
SL 285	1	21	11	66	.1	25	8	332	2.10	5	5	ND	3	25	.2	2	2	30	.44	.034	19	20	.42	203	.01	2	1.62	.01	.11	1	3
SL 286	1	21	17	73	.2	25	9	424	2.17	6	5	ND	3	24	.2	2	2	31	.47	.040	20	22	.42	181	.01	5	1.71	.01	.17	1	1
SL 287	1	21	11	67	.1	16	7	353	1.98	14	5	ND	4	25	.8	2	2	20	2.91	.061	20	17	1.52	126	.02	4	1.05	.01	.12	1	2
SL 288	1	22	17	65	.1	21	7	392	1.67	2	5	ND	6	81	.2	3	2	21	4.89	.053	22	18	1.70	177	.01	5	1.38	.01	.15	1	1
SL 289	1	21	12	65	.1	18	7	354	1.85	6	5	ND	2	73	.2	2	2	24	4.21	.050	18	20	1.06	170	.01	5	1.32	.01	.14	1	1
SL 290	1	20	14	78	.1	26	9	475	2.29	9	5	ND	3	25	.2	2	2	33	.44	.048	22	23	.47	193	.01	2	1.84	.01	.21	1	1
SL 291	2	53	18	113	.2	44	15	288	2.89	21	5	ND	5	103	.6	2	2	42	3.01	.042	20	27	1.10	354	.02	5	1.50	.01	.12	1	3
SL 292	1	12	6	35	.1	10	4	889	2.15	6	5	ND	1	134	.3	2	2	13	16.75	.050	10	12	1.29	129	.01	3	.57	.01	.09	1	1
SL 293	1	21	15	70	.2	24	9	489	1.49	11	5	ND	5	101	.4	2	2	17	5.58	.055	17	15	1.67	87	.01	4	.92	.01	.14	1	3
SL 294	1	16	13	64	.2	14	5	673	2.37	9	5	ND	4	99	.2	3	2	17	7.42	.062	16	16	1.99	103	.01	6	.88	.01	.14	1	1
SL 295	1	12	9	49	.1	13	5	703	1.70	9	5	ND	4	107	.2	3	2	15	8.28	.061	14	14	2.17	49	.01	5	.74	.01	.13	1	1
SL 296	1	16	5	51	.2	10	4	702	1.74	8	5	ND	1	103	.2	2	2	13	18.53	.052	10	13	.82	191	.01	6	.73	.01	.12	1	1
SL 297	1	15	10	66	.1	21	7	323	1.61	6	5	ND	2	17	.4	2	2	23	.47	.041	15	17	.42	131	.01	7	1.18	.01	.14	1	2
SL 298	1	20	14	65	.1	14	6	601	2.68	8	5	ND	4	83	.2	2	3	20	6.26	.059	17	18	1.70	127	.01	6	1.02	.01	.19	1	1
SL 299	1	24	12	74	.1	16	6	616	2.12	6	5	ND	6	106	.3	2	2	24	6.80	.056	18	18	1.90	126	.02	6	1.05	.01	.18	1	2
SL 300	1	10	11	43	.2	10	4	298	1.26	6	5	ND	3	69	.2	2	2	15	6.23	.051	15	15	1.65	101	.01	4	.73	.01	.11	1	2
SL 301	1	20	14	74	.1	16	7	937	2.23	5	5	ND	5	132	.2	3	2	18	6.33	.055	15	16	2.05	880	.01	6	1.02	.01	.16	1	2
SL 302	1	16	9	58	.1	15	6	503	1.66	9	5	ND	4	108	.2	2	2	19	6.15	.058	14	16	1.88	161	.02	13	.86	.53	.15	1	4
SL 303	1	10	6	44	.2	11	4	363	1.13	2	5	ND	3	78	.2	2	2	13	6.54	.058	11	14	2.14	141	.02	5	.59	.03	.09	1	1
STANDARD C/AU-S	18	57	39	131	7.1	73	31	1054	3.97	42	20	8	38	52	18.5	15	20	57	.46	.096	39	61	.90	183	.07	32	1.90	.06	.13	11	53

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL 304	1	14	8	48	.2	11	4	430	1.41	8	7	ND	6	87	.2	2	2	16	8.30	.061	16	10	2.47	75	.02	13	.81	.35	.15	1	2
SL 305	1	28	14	82	.3	18	9	384	1.72	11	5	ND	8	146	.3	2	2	23	6.05	.059	22	14	1.77	149	.01	7	1.39	.02	.20	1	1
SL 306	1	25	13	76	.2	20	7	938	2.26	19	5	ND	7	192	.4	2	2	21	5.91	.059	20	14	1.63	259	.01	9	1.36	.01	.16	1	2
SL 307	2	15	14	47	.1	13	5	398	1.39	2	5	ND	1	255	.2	2	2	13	5.22	.044	7	9	.63	93	.01	6	.89	.03	.09	4	1
SL 308	1	23	6	56	.2	19	6	766	2.00	3	5	ND	5	248	.4	2	2	24	7.42	.055	18	16	1.09	126	.01	7	1.17	.01	.09	1	1
SL 309	1	36	11	78	.3	30	9	295	1.84	9	5	ND	6	286	.4	2	2	31	5.24	.064	13	20	.74	75	.02	8	1.24	.01	.11	1	1
SL 310	1	29	9	75	.1	40	14	224	1.47	8	5	ND	5	223	.4	2	2	25	2.71	.043	16	21	.77	551	.01	7	1.24	.01	.07	1	1
SL 311	1	26	10	70	.2	23	8	285	1.71	8	5	ND	6	303	.3	2	2	22	3.75	.052	17	16	1.19	113	.01	9	1.32	.19	.13	1	1
SL 312	1	22	8	68	.2	27	8	492	1.80	8	5	ND	4	176	.4	2	2	26	6.65	.051	16	19	.78	200	.01	7	1.31	.01	.13	1	1
SL 313	1	37	13	75	.3	29	8	428	2.36	7	5	ND	7	161	.5	2	2	28	3.37	.060	19	17	1.29	284	.02	12	1.24	.01	.13	1	2
SL 314	1	15	10	52	.2	12	5	471	1.34	8	5	ND	6	147	.4	2	2	15	7.01	.059	17	9	2.34	149	.01	7	.86	.01	.11	1	1
SL 315	1	18	9	60	.2	16	6	340	1.43	7	5	ND	6	64	.5	2	2	21	4.20	.054	19	13	1.70	148	.02	12	1.01	.02	.15	1	1
SL 316	1	18	8	57	.2	26	8	289	1.32	5	5	ND	5	66	.2	2	2	31	3.14	.057	16	16	1.39	92	.03	7	.82	.01	.09	1	2
SL 317	1	17	8	49	.3	13	4	481	1.37	4	5	ND	5	247	.4	2	2	17	11.76	.050	16	10	1.51	214	.01	7	.95	.01	.14	1	1
SL 318	1	28	10	72	.2	25	9	406	1.92	10	5	ND	5	142	.3	2	2	28	4.15	.052	18	19	.84	196	.01	8	1.40	.01	.14	1	1
SL 319	1	19	7	56	.2	18	6	251	1.35	4	5	ND	5	183	.4	2	2	18	4.96	.041	16	13	1.08	108	.01	6	1.18	.33	.09	1	1
SL 320	1	18	8	61	.3	18	6	722	1.87	10	5	ND	6	175	.4	2	2	21	5.50	.058	18	14	1.47	131	.01	9	1.17	.01	.13	1	1
SL 321	1	36	11	84	.2	26	8	222	1.83	11	5	ND	6	1183	.6	2	2	20	5.59	.043	18	15	.84	77	.01	6	1.24	.01	.11	1	3
SL 322	1	31	10	74	.2	28	8	530	1.86	5	5	ND	5	269	.6	2	2	26	4.82	.054	19	19	1.17	114	.01	9	1.40	.02	.12	1	1
STANDARD C/AU-S	18	58	36	129	6.8	73	31	1053	3.98	38	17	7	39	52	19.8	14	20	58	.46	.094	40	60	.90	181	.08	32	1.90	.06	.14	11	46

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
KR 8	1	9	2	35	.1	12	3	884	1.46	5	5	ND	2	161	.3	2	2	19	21.64	.034	6	21	.62	83	.01	3	.67	.01	.06	1	2
KR 9	1	7	3	34	.2	14	5	1021	1.21	2	5	ND	2	147	.2	2	2	16	21.99	.034	7	12	.76	65	.01	6	.72	.07	.08	1	4
KR 10	1	4	2	19	.2	5	2	902	1.95	37	5	ND	1	594	.4	2	2	10	33.11	.440	5	5	.66	396	.01	8	.59	.04	.10	1	1
KR 11	1	1	3	32	.1	8	4	740	1.24	7	5	ND	2	189	.2	2	2	23	13.78	.033	8	12	.60	56	.01	5	.61	.02	.14	1	2
KR 12	1	4	3	28	.2	9	3	811	1.25	12	5	ND	1	181	.2	2	2	13	25.06	.041	6	11	.61	112	.01	4	.60	.03	.08	1	1
KR 13	1	7	5	39	.2	15	4	1424	1.57	34	5	ND	2	209	.3	2	2	16	24.49	.089	13	10	.52	180	.02	6	.78	.02	.11	1	2
KR 14	1	10	3	35	.1	12	4	1048	1.38	17	5	ND	1	197	.2	2	2	15	23.53	.036	12	12	.66	278	.01	4	.70	.01	.08	1	2
KR 15	1	15	2	36	.2	13	4	1251	1.71	10	5	ND	2	242	.3	2	2	20	26.16	.141	12	13	.51	168	.01	6	.90	.02	.11	1	2
KR 16	1	7	3	33	.1	13	5	860	1.23	5	5	ND	2	146	.3	2	2	15	23.78	.031	7	13	.64	87	.01	4	.69	.01	.09	1	2
KR 17	1	6	3	35	.2	9	4	1056	2.60	20	5	ND	2	345	.4	2	2	21	23.41	.067	7	11	.52	489	.02	5	.73	.03	.11	1	1
KR 18	1	7	3	28	.2	9	4	1163	2.45	13	5	ND	2	341	.4	2	2	20	22.73	.102	7	13	.48	416	.01	4	.74	.03	.11	1	4
KR 19	1	4	2	40	.1	13	5	1121	1.83	7	5	ND	2	203	.2	2	2	28	17.80	.125	14	16	.36	157	.01	6	.92	.03	.13	1	1
KR 20	1	77	15	64	.1	213	29	660	3.65	7	5	ND	4	396	.4	2	2	99	4.46	.265	26	828	3.66	1584	.28	2	2.33	.07	2.08	1	1
KR 21	1	72	11	57	.1	186	29	1086	3.50	3	5	ND	4	423	.6	2	2	94	10.10	.269	25	742	3.07	1597	.25	2	2.03	.07	2.03	1	2
KR 22	1	8	2	46	.2	13	5	1507	2.15	15	5	ND	3	198	.4	2	2	26	19.43	.070	17	16	.42	187	.01	5	.81	.02	.13	1	1
KR 23	1	17	2	71	.1	38	13	271	3.14	2	5	ND	5	70	.2	2	2	77	.76	.055	13	68	.77	265	.09	4	1.58	.06	.37	1	2
KR 24	1	11	5	72	.1	25	11	340	3.12	16	5	ND	5	86	.2	2	2	59	.77	.055	16	36	.62	148	.02	8	1.43	.02	.18	1	4
KR 25	1	4	2	33	.1	10	4	1389	2.38	9	5	ND	2	186	.3	2	2	25	21.43	.083	8	13	.41	162	.02	3	.71	.02	.12	1	2
KR 26	1	3	5	35	.1	13	6	593	1.49	2	5	ND	3	160	.2	2	2	21	18.41	.031	7	21	.51	87	.01	5	.66	.03	.14	1	1
KR 27	1	6	2	31	.2	12	4	893	1.25	8	6	ND	2	160	.2	2	2	14	24.26	.031	6	9	.65	95	.01	4	.62	.02	.08	1	2
KR 28	1	9	3	32	.1	9	3	862	1.37	24	5	ND	2	192	.3	2	2	14	25.77	.036	6	10	.62	294	.01	4	.62	.02	.08	1	1
KR 29	1	11	5	34	.1	11	4	1052	1.51	31	5	ND	2	232	.3	2	2	14	24.22	.037	9	10	.64	121	.01	7	.68	.04	.09	1	2
KR 30	1	10	3	28	.1	10	3	985	1.15	2	6	ND	2	128	.2	2	2	17	22.10	.044	6	12	.45	425	.02	2	.53	.02	.06	1	1
KR 31	1	79	14	58	.1	219	28	564	3.50	2	5	ND	5	351	.4	2	2	94	2.23	.290	25	815	4.22	1702	.37	2	2.44	.09	2.16	1	1
KR 32	1	4	4	25	.2	9	4	518	2.38	12	5	ND	3	233	.4	2	2	28	19.29	.166	8	11	.51	124	.01	3	.58	.03	.13	1	1
KR 33	1	4	4	32	.1	13	5	1172	1.54	4	5	ND	3	224	.2	2	2	19	14.39	.046	9	11	.53	71	.01	6	.57	.02	.12	1	3
KR 34	1	4	3	20	.1	6	2	652	1.26	2	5	ND	3	146	.2	2	2	9	20.77	.034	6	7	.50	99	.02	2	.45	.03	.07	1	1
KR 35	2	31	12	53	.2	37	9	81	1.58	10	5	ND	5	571	.6	3	2	57	3.20	.012	12	28	.44	326	.05	37	1.04	.04	.07	1	1
STANDARD C/AU-R	19	60	37	131	7.1	73	31	1053	3.97	41	19	7	40	53	18.8	14	18	60	.46	.095	41	60	.89	189	.08	32	1.90	.07	.14	11	510

ACME AN[illegible]TICAL LABORATORIES LTD. 852 E. HASTINGS ST. [illegible]COUVER B.C. V6A 1R6 PHONE(604)253-3158 [illegible]3-1[illegible]

GEOCHEMICAL [illegible]ALYSIS CERTIFICATE

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 File # 90-5429 Page 1

#4 - 2130 Norte Dame Ave, Winnipeg MB R3H 0K1

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL 1	1	22	12	79	.1	26	9	366	2.25	4	5	ND	1	31	.2	2	2	33	.55	.051	19	23	.45	241	.01	7	1.64	.01	.15	1	4
SL 2	1	16	2	50	.1	18	7	268	1.54	11	5	ND	2	205	.2	2	2	17	3.35	.030	13	11	.63	221	.01	11	.95	.07	.09	1	4
SL 3	1	28	6	67	.1	24	8	406	1.95	5	5	ND	1	148	.4	2	2	23	2.86	.036	16	16	.62	235	.01	8	1.28	.01	.11	1	6
SL 4	1	27	11	73	.3	34	11	651	2.05	7	5	ND	5	145	.5	3	2	27	5.04	.049	18	19	.99	337	.01	8	1.33	.01	.13	1	3
SL 5	1	26	4	76	.2	26	10	393	2.15	8	5	ND	4	112	.2	2	2	28	4.22	.051	18	19	1.02	305	.01	10	1.33	.01	.13	1	1
SL 6	1	25	6	75	.1	21	8	337	2.11	6	5	ND	4	108	.3	2	2	28	4.13	.053	19	20	1.07	287	.01	9	1.40	.01	.14	1	7
SL 7	1	18	4	60	.1	20	7	296	1.76	6	5	ND	2	56	.2	2	2	23	4.52	.050	16	17	.78	237	.01	8	1.20	.01	.12	1	1
SL 8	1	5	2	62	.1	12	6	570	2.30	5	5	ND	8	398	.2	2	2	16	5.77	.050	20	6	.92	186	.02	6	1.05	.26	.15	1	1
SL 9	1	2	4	32	.1	11	5	192	.95	2	5	ND	1	71	.2	2	2	10	1.77	.034	10	6	1.05	43	.01	4	.50	.04	.06	1	1
SL 10	1	3	3	49	.1	8	5	464	1.68	2	5	ND	6	218	.2	2	2	13	5.12	.056	17	6	.99	84	.02	7	.74	.48	.12	1	1
SL 11	1	4	3	45	.1	8	5	331	2.05	2	5	ND	2	143	.2	2	2	15	1.85	.051	14	7	.97	195	.02	7	.71	.32	.12	1	4
SL 12	1	2	2	52	.2	6	5	646	1.88	6	5	ND	7	154	.2	2	2	15	6.28	.056	19	7	.85	118	.02	6	.89	.52	.16	1	3
SL 13	1	3	2	33	.1	7	5	1048	1.66	3	5	ND	4	180	.2	2	2	11	6.75	.046	12	5	.78	136	.01	6	.56	.38	.09	1	5
SL 14	1	1	2	27	.1	6	4	1769	1.10	2	5	ND	3	159	.2	2	2	9	12.05	.035	10	5	.64	65	.01	2	.53	.04	.09	1	2
SL 15	1	1	4	31	.2	9	6	292	1.16	5	5	ND	1	109	.2	2	2	11	1.97	.040	10	6	1.10	63	.01	6	.53	.23	.08	1	5
SL 16	1	5	3	39	.1	9	6	244	1.42	2	5	ND	1	131	.2	2	2	13	1.58	.044	12	7	.94	58	.01	6	.74	.49	.12	1	1
SL 17	1	3	9	45	.1	8	6	268	1.67	4	5	ND	3	147	.2	2	2	15	1.67	.049	16	7	.90	99	.02	6	.86	.71	.15	1	3
SL 18	1	4	2	57	.1	17	10	376	2.12	5	5	ND	1	122	.2	2	2	24	1.92	.053	14	12	.87	100	.02	12	.88	.60	.13	1	1
SL 19	1	2	5	36	.1	10	5	172	1.22	6	5	ND	1	87	.2	2	2	12	1.64	.033	11	9	.89	125	.01	7	.62	.01	.08	1	4
SL 20	1	27	4	91	.2	33	15	688	2.53	13	5	ND	3	228	.7	3	2	29	3.04	.063	16	19	.99	441	.01	7	1.22	.02	.10	1	7
SL 21	1	32	14	91	.2	28	10	484	2.30	13	5	ND	5	159	.7	2	2	26	4.78	.063	22	17	1.19	224	.01	9	1.44	.02	.15	1	5
SL 22	1	24	12	85	.2	27	10	462	2.36	8	5	ND	1	36	.2	4	3	33	.72	.055	20	22	.50	229	.01	8	1.67	.01	.16	1	10
SL 23	1	23	4	72	.1	26	9	491	2.05	7	5	ND	4	120	.4	2	2	26	7.21	.049	17	18	1.02	257	.01	6	1.33	.01	.11	1	1
SL 24	1	15	8	71	.1	19	8	424	1.87	5	5	ND	1	29	.2	2	2	28	.27	.044	19	17	.38	157	.02	7	1.32	.01	.19	1	9
SL 25	1	24	11	82	.1	31	11	464	2.38	10	5	ND	1	35	.2	2	2	32	.88	.054	21	23	.61	223	.01	7	1.61	.01	.14	1	14
SL 26	1	24	17	87	.2	30	10	464	2.40	11	5	ND	1	29	.2	3	2	33	.67	.058	21	22	.49	228	.01	7	1.65	.01	.14	1	3
SL 27	1	27	12	75	.3	25	10	416	2.20	14	5	ND	3	53	.2	3	2	29	2.76	.053	20	20	.80	209	.01	8	1.42	.01	.10	1	1
SL 28	1	10	3	61	.1	14	7	452	1.73	10	5	ND	1	270	.2	2	2	20	2.61	.071	12	15	1.06	156	.01	6	.92	.50	.09	1	6
SL 29	1	19	12	93	.3	30	11	353	2.10	12	5	ND	1	152	.2	5	2	25	1.03	.058	13	18	.74	111	.01	8	1.25	.05	.11	1	2
SL 30	1	26	10	92	.2	31	11	668	2.47	10	5	ND	2	197	.2	2	2	24	2.53	.071	16	16	1.32	295	.01	11	1.31	.12	.13	1	3
SL 31	1	4	3	50	.2	9	5	395	1.78	4	5	ND	3	132	.2	2	2	23	3.70	.057	14	13	.92	289	.02	6	.92	.02	.14	1	7
SL 32	1	6	3	60	.1	15	9	436	2.19	8	5	ND	1	112	.2	2	5	25	3.20	.056	15	15	.80	156	.01	7	1.08	.03	.10	1	20
SL 33	1	32	6	81	.3	31	12	624	2.33	19	5	ND	2	198	.6	2	3	24	2.34	.053	17	15	.72	141	.01	10	1.26	.02	.11	1	12
SL 34	1	15	5	61	.1	15	6	140	1.54	9	5	ND	1	147	.2	2	2	21	1.44	.024	15	12	.39	189	.02	11	1.07	.02	.11	1	11
SL 35	1	22	13	65	.2	24	9	339	2.02	12	5	ND	1	115	.5	3	2	25	4.90	.050	16	16	.71	194	.01	7	1.39	.01	.12	1	10
SL 36	1	22	6	70	.1	20	8	349	2.20	12	5	ND	1	91	.2	2	2	23	3.73	.060	17	16	1.00	228	.01	7	1.28	.01	.12	1	4
STANDARD C/AU-S	19	58	44	134	7.2	73	32	1054	3.98	43	21	7	37	52	20.5	15	23	57	.46	.098	39	60	.90	183	.07	35	1.89	.06	.14	13	53

ICP - .500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN FE SR CA P LA CR MG BA TI B W AND LIMITED FOR NA K AND AL. AU DETECTION LIMIT BY ICP IS 3 PPM.
- SAMPLE TYPE: P1 TO P7 SOIL P8 TO P9 ROCK AU* ANALYSIS BY ACID LEACH/AA FROM 10 GM SAMPLE.

DATE RECEIVED: OCT 22 1990 DATE REPORT MAILED: Oct 24/90. SIGNED BY [redacted] D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

$1 2400.00

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 FILE # 90-5429

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL 37	1	15	11	69	.1	21	7	328	1.88	5	5	ND	4	87	.4	2	2	26	3.68	.054	19	16	.93	200	.01	9	1.36	.01	.15	1	1
SL 38	1	10	8	46	.1	17	6	366	1.40	6	5	ND	5	67	.2	2	2	18	2.00	.058	14	14	.80	139	.01	10	.83	.11	.12	1	7
SL 39	1	13	8	72	.1	28	10	278	1.78	6	5	ND	4	124	.2	2	2	24	.88	.048	12	20	.79	214	.01	8	1.00	.36	.09	1	12
SL 40	1	9	7	44	.2	17	8	1348	1.50	6	5	ND	3	225	.2	2	2	18	11.50	.044	10	13	.61	197	.01	5	.78	.01	.07	1	1
SL 41	1	15	10	66	.1	25	9	436	2.07	6	5	ND	4	135	.4	2	2	28	3.38	.052	15	18	.83	255	.01	8	1.29	.07	.10	1	1
SL 42	1	19	10	60	.2	21	7	208	1.68	6	5	ND	4	186	.4	3	2	23	5.59	.056	17	14	1.05	211	.01	8	1.18	.02	.11	1	12
SL 43	1	23	13	81	.2	32	9	461	2.60	2	5	ND	5	31	.3	2	2	36	.57	.047	21	26	.57	177	.01	7	1.87	.01	.20	1	1
SL 44	1	22	15	79	.2	32	9	279	2.60	10	5	ND	6	32	.3	2	2	38	.51	.035	22	25	.52	217	.01	7	1.86	.01	.16	1	7
SL 45	1	14	13	71	.1	19	8	423	2.07	2	5	ND	4	26	.2	2	2	32	.37	.049	19	21	.38	206	.01	5	1.62	.01	.18	1	34
SL 46	1	22	11	76	.1	26	8	310	2.09	6	5	ND	4	79	.2	2	2	27	1.74	.051	20	19	.71	187	.01	9	1.54	.01	.15	1	2
SL 47	1	26	11	78	.2	28	9	358	2.05	2	5	ND	5	173	.3	2	2	26	3.23	.057	18	18	1.01	224	.01	8	1.24	.01	.16	1	1
SL 48	1	8	9	53	.2	14	6	365	1.83	7	5	ND	4	85	.2	2	2	21	2.46	.058	19	12	.71	138	.01	8	1.09	.01	.18	1	1
SL 49	1	7	11	47	.1	12	5	372	1.38	3	5	ND	3	163	.3	2	2	17	7.00	.044	17	11	.69	149	.01	9	1.07	.01	.16	1	11
SL 50	1	20	16	80	.2	20	7	233	2.00	2	5	ND	7	171	.4	2	2	30	4.34	.046	21	16	1.14	317	.01	14	1.74	.01	.21	1	11
SL 51	1	6	9	47	.1	14	5	580	1.28	3	5	ND	3	45	.2	3	2	16	4.85	.060	16	12	1.16	61	.01	4	.84	.01	.06	1	15
SL 52	1	25	13	71	.1	22	7	361	2.03	6	5	ND	4	55	.5	2	2	30	4.98	.057	18	19	1.06	158	.01	8	1.59	.01	.20	1	2
SL 53	1	24	14	81	.1	28	9	686	2.59	2	5	ND	4	24	.3	2	2	34	.60	.051	22	23	.55	145	.01	7	1.69	.01	.15	1	9
SL 54	1	13	12	60	.1	17	6	450	1.70	8	5	ND	4	232	.5	3	2	21	9.70	.043	17	12	.96	282	.01	11	1.19	.01	.19	1	23
SL 55	1	16	16	78	.2	17	8	377	1.89	4	5	ND	7	164	.3	2	2	22	5.18	.053	20	14	1.36	96	.01	7	1.31	.01	.19	1	16
SL 56	1	4	6	48	.1	15	5	456	1.35	8	5	ND	3	111	.3	2	2	17	5.48	.049	14	12	1.04	74	.01	5	.89	.01	.08	1	7
SL 57	1	22	12	72	.1	26	8	452	2.15	4	5	ND	4	57	.4	2	3	31	2.81	.056	18	21	.71	196	.01	10	1.72	.01	.21	1	18
SL 58	1	16	10	64	.1	26	8	451	1.93	5	5	ND	3	47	.4	2	2	28	2.20	.050	18	19	.79	135	.01	6	1.63	.01	.12	1	4
SL 59	1	23	16	81	.2	29	9	398	2.41	6	5	ND	7	27	.2	2	2	33	.53	.031	25	22	.53	190	.01	5	1.78	.01	.13	1	2
SL 60	1	20	15	81	.1	24	9	482	2.37	15	5	ND	4	27	.3	2	2	34	.49	.050	21	23	.45	215	.01	6	1.87	.01	.21	1	1
SL 61	1	22	14	75	.1	30	10	478	2.61	11	5	ND	6	35	.5	2	2	34	.87	.035	21	23	.57	190	.01	7	1.75	.01	.19	1	3
SL 62	1	21	14	75	.1	28	9	444	2.28	11	5	ND	6	39	.4	2	2	33	1.06	.045	20	22	.59	236	.01	7	1.75	.01	.17	1	11
SL 63	1	14	13	58	.1	16	6	394	1.52	9	5	ND	5	83	.4	2	2	20	6.09	.044	17	12	1.23	197	.01	6	1.08	.01	.10	1	4
SL 64	1	18	14	61	.1	18	6	318	1.58	7	5	ND	4	84	.4	2	2	20	7.59	.047	19	13	1.07	198	.01	6	1.27	.01	.12	1	37
SL 65	1	30	14	80	.2	20	7	336	1.90	11	5	ND	7	120	.6	4	2	23	6.42	.055	21	15	1.33	163	.01	8	1.37	.01	.16	1	37
SL 66	1	20	12	61	.1	17	5	227	1.75	13	5	ND	3	81	.4	2	2	23	6.58	.047	18	16	.94	208	.01	7	1.30	.01	.12	1	2
SL 67	1	20	14	65	.1	20	7	382	1.84	10	5	ND	5	105	.4	2	2	25	6.23	.049	19	16	1.01	226	.01	6	1.30	.01	.11	1	3
SL 68	1	9	9	50	.2	11	4	728	1.81	12	5	ND	3	60	.4	2	2	19	11.48	.055	14	11	.96	201	.01	7	1.07	.01	.13	1	2
SL 69	1	12	12	62	.1	16	6	291	1.59	12	5	ND	6	61	.5	3	2	19	5.73	.057	19	11	1.77	71	.01	6	1.18	.01	.13	1	1
SL 70	1	19	13	63	.2	28	8	363	2.02	14	5	ND	5	24	.4	2	2	28	.71	.048	19	18	.43	190	.01	6	1.43	.01	.14	1	4
SL 71	1	27	18	97	.3	23	9	357	2.15	4	5	ND	8	149	.8	3	2	25	7.06	.050	23	14	1.28	91	.01	7	1.35	.01	.12	1	4
SL 72	1	27	19	83	.2	21	7	260	2.10	13	5	ND	10	54	.6	3	2	26	3.16	.052	25	15	1.25	136	.01	8	1.56	.01	.15	1	12
STANDARD C/AU-S	18	57	39	130	7.0	73	31	1053	3.97	42	20	7	40	52	18.8	15	18	59	.46	.096	40	60	.90	187	.08	33	1.90	.06	.14	12	46

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL 73	1	27	18	87	.3	21	8	458	2.01	7	5	ND	5	114	.4	2	3	23	4.56	.048	22	14	1.34	135	.01	7	1.72	.01	.16	1	1
SL 74	1	14	13	53	.2	13	5	382	1.44	6	5	ND	4	75	.2	2	2	15	7.60	.057	17	10	2.12	101	.01	6	.91	.01	.09	1	1
SL 75	1	23	11	76	.4	23	11	442	2.13	12	5	ND	1	23	.2	2	2	27	.45	.041	23	18	.51	158	.01	4	1.67	.01	.13	1	1
SL 76	1	22	2	69	.4	21	8	367	1.79	12	5	ND	5	110	.4	3	2	22	5.54	.047	18	16	1.30	178	.01	7	1.36	.01	.11	1	4
SL 77	1	17	2	55	.3	20	7	247	1.28	6	5	ND	3	90	.6	2	2	15	4.41	.060	14	13	1.50	163	.01	5	.81	.01	.06	1	29
SL 78	1	26	14	72	.3	25	9	343	1.96	11	5	ND	2	117	.2	2	2	25	4.03	.057	17	20	1.12	136	.01	7	1.31	.01	.11	1	21
SL 79	1	24	11	71	.4	24	10	511	1.94	7	9	ND	4	114	.8	2	2	25	5.50	.057	17	17	1.21	172	.01	6	1.29	.01	.11	1	1
SL 80	1	38	22	144	.6	55	16	493	2.87	26	6	ND	4	256	.9	2	2	29	4.35	.045	29	17	1.18	292	.01	13	1.63	.01	.11	1	1
SL 81	3	37	17	70	.3	27	10	165	2.78	21	5	ND	2	272	1.0	2	2	52	4.01	.053	21	21	.69	291	.03	14	.94	.07	.10	1	5
SL 82	1	16	12	63	.4	16	7	195	1.34	8	6	ND	3	107	.3	2	2	17	4.00	.073	15	13	1.30	110	.01	5	.93	.01	.07	2	1
SL 83	1	34	11	90	.4	30	12	444	2.47	12	5	ND	1	136	.2	3	2	30	2.49	.053	18	24	.87	212	.01	10	1.62	.01	.13	1	1
SL 84	1	25	9	68	.2	26	9	363	1.90	10	5	ND	2	101	.8	2	2	27	5.52	.052	15	19	.94	230	.01	5	1.43	.01	.12	1	1
SL 85	1	20	11	62	.2	14	6	788	1.74	7	5	ND	3	149	.2	2	2	18	9.58	.059	15	14	1.33	129	.01	8	1.04	.01	.11	1	1
SL 86	1	32	7	88	.3	26	10	413	2.16	12	5	ND	3	60	.2	2	2	27	2.75	.056	19	19	1.13	192	.01	9	1.37	.01	.12	1	1
SL 87	1	22	15	71	.4	36	11	372	1.55	4	5	ND	2	83	.2	2	2	21	3.08	.067	16	18	1.47	125	.01	7	.99	.02	.08	1	3
SL 88	1	30	12	86	.4	29	11	538	2.16	15	5	ND	5	140	.6	2	2	26	3.98	.058	19	17	1.28	216	.01	8	1.30	.01	.12	1	1
SL 89	1	26	9	89	.2	29	11	656	2.57	16	10	ND	4	125	.6	2	2	26	4.49	.060	19	17	1.22	237	.01	8	1.29	.01	.11	1	5
SL 90	1	24	23	73	.1	23	7	392	1.98	11	5	ND	3	91	.2	2	3	25	4.74	.056	18	16	1.14	227	.01	8	1.33	.01	.11	1	31
SL 91	1	5	13	32	.1	8	4	504	1.10	7	5	ND	2	152	.2	2	2	10	6.44	.039	11	7	1.01	30	.01	2	.50	2.85	.06	1	1
SL 92	1	19	14	63	.3	19	7	353	1.71	12	5	ND	2	88	.2	2	2	23	3.38	.056	15	16	1.02	243	.01	14	1.08	.01	.12	1	2
SL 93	1	21	12	65	.4	16	7	525	1.67	9	7	ND	6	114	.2	2	2	16	5.77	.062	16	11	1.92	166	.01	8	1.05	.01	.14	1	1
SL 94	1	26	16	81	.4	25	9	417	2.06	14	8	ND	4	138	.2	2	2	27	3.98	.058	18	16	1.13	217	.01	11	1.32	.02	.14	1	1
SL 95	1	23	18	86	.2	26	10	426	2.28	7	5	ND	1	28	.5	2	2	33	.50	.053	19	22	.47	175	.01	7	1.69	.01	.15	1	24
SL 96	1	23	16	74	.4	18	7	304	1.93	11	5	ND	4	104	.3	2	2	26	3.58	.056	18	16	1.16	206	.01	8	1.24	.01	.13	1	2
SL 97	1	7	5	51	.1	18	8	968	1.86	4	5	ND	2	248	.2	2	2	19	5.94	.052	13	13	1.07	476	.01	7	.88	.01	.04	1	1
SL 98	1	26	16	75	.3	20	10	419	1.96	13	7	ND	5	132	.2	2	2	25	4.97	.053	18	16	1.16	239	.01	8	1.29	.01	.11	1	7
SL 99	1	22	8	65	.2	19	10	581	2.01	11	5	ND	1	169	.4	2	2	24	2.64	.052	16	16	1.12	226	.01	12	1.10	.02	.07	1	3
SL 100	1	23	15	78	.2	18	8	295	1.77	13	5	ND	5	125	.2	2	2	22	5.16	.054	19	14	1.21	169	.01	8	1.28	.01	.13	1	1
SL 101	4	55	17	84	.2	22	10	139	3.05	23	7	ND	5	182	.2	2	2	60	3.36	.056	20	19	.64	633	.02	11	1.30	.01	.11	1	1
SL 102	1	18	9	58	.4	14	7	296	1.86	37	8	ND	5	115	.2	2	2	17	6.30	.060	17	10	1.86	128	.02	10	.87	.01	.11	1	7
SL 103	1	21	3	63	.4	25	9	450	1.78	11	5	ND	5	142	.2	2	2	25	6.99	.050	17	16	1.23	230	.01	6	1.23	.01	.09	1	9
SL 104	1	25	10	74	.4	24	9	401	2.17	9	5	ND	1	41	.2	2	2	31	1.63	.049	21	20	.80	185	.01	9	1.70	.01	.14	1	1
SL 105	1	27	8	86	.3	27	10	444	2.34	9	5	ND	1	34	.2	2	2	34	.87	.049	21	22	.61	206	.01	10	1.82	.01	.19	1	1
SL 106	1	15	3	54	.2	14	6	224	1.65	26	5	ND	4	97	.2	2	2	17	5.85	.052	18	11	1.78	116	.02	10	.97	.01	.10	1	8
SL 107	1	24	25	70	.3	20	8	238	1.74	16	5	ND	3	42	.4	2	2	23	2.79	.052	20	13	1.35	131	.01	7	1.31	.01	.12	1	1
SL 108	1	17	6	58	.1	12	6	373	1.51	11	5	ND	5	112	.2	2	2	17	7.01	.058	18	11	1.99	92	.02	9	1.04	.01	.12	1	12
STANDARD C/AU-S	19	62	40	134	7.3	73	32	1059	3.98	41	22	7	36	56	19.6	19	18	58	.46	.095	39	60	.91	183	.08	36	1.90	.06	.14	13	49

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL 109	1	26	8	67	.1	19	7	386	1.81	14	5	ND	4	133	.5	2	2	20	8.85	.053	20	14	1.47	145	.01	8	1.45	.01	.16	1	1
SL 110	1	19	6	76	.1	22	8	427	2.09	5	5	ND	1	21	.2	2	2	30	.48	.046	21	20	.46	172	.01	7	1.66	.01	.16	1	9
SL 111	1	9	8	49	.1	14	5	276	1.34	8	5	ND	3	47	.2	2	2	18	5.21	.048	16	12	1.51	145	.01	8	1.04	.01	.12	1	11
SL 112	1	19	8	70	.1	27	9	390	2.14	10	5	ND	1	23	.4	2	2	31	.70	.035	22	21	.63	180	.01	6	1.71	.01	.20	1	9
SL 113	1	25	11	74	.1	18	8	1012	1.82	10	5	ND	5	206	.2	2	2	20	10.85	.076	17	12	1.54	220	.01	14	1.35	.02	.17	1	6
SL 114	1	26	7	77	.2	21	7	355	2.01	12	5	ND	4	87	.7	2	2	29	5.61	.056	20	17	1.16	200	.01	13	1.68	.01	.16	1	13
SL 115	1	10	6	42	.2	10	4	229	1.00	7	5	ND	4	60	.3	2	2	15	10.61	.058	16	10	1.78	92	.01	8	1.00	.01	.11	1	4
SL 116	1	11	2	54	.2	21	8	536	1.74	2	5	ND	2	122	.2	3	2	20	4.07	.060	13	15	1.39	159	.01	9	.80	.24	.07	1	4
SL 117	1	12	11	51	.1	19	6	347	1.37	8	5	ND	1	75	.2	2	2	19	2.76	.048	14	12	.90	204	.01	8	.78	.01	.08	1	3
SL 118	1	19	9	65	.2	25	8	607	1.87	11	5	ND	4	142	.2	2	2	22	7.11	.063	12	15	.98	103	.01	13	1.02	.02	.12	1	6
SL 119	1	21	7	66	.2	21	8	343	1.80	10	5	ND	4	127	.3	2	2	24	7.99	.053	17	17	1.03	286	.01	8	1.29	.01	.10	1	18
SL 120	1	23	8	75	.2	25	8	411	1.97	9	5	ND	4	121	.2	2	2	25	4.12	.057	18	17	1.13	232	.01	10	1.19	.01	.12	1	5
SL 121	1	22	7	73	.3	25	8	425	1.99	13	5	ND	6	122	.2	2	2	26	6.86	.056	18	18	1.26	309	.01	9	1.28	.02	.11	1	2
SL 122	1	24	11	78	.4	19	7	302	2.04	10	5	ND	6	111	.2	2	2	25	5.43	.059	19	18	1.12	247	.01	10	1.18	.01	.11	1	2
SL 123	1	23	7	74	.3	17	7	280	1.90	5	5	ND	5	158	.2	2	2	25	4.94	.055	18	17	1.15	218	.01	7	1.19	.01	.12	1	6
SL 124	1	22	4	78	.1	24	9	424	2.11	6	5	ND	1	32	.2	2	2	29	.79	.062	20	20	.58	191	.01	12	1.51	.01	.14	1	3
SL 125	1	24	10	76	.1	18	7	311	1.99	12	5	ND	5	179	.2	2	2	26	5.51	.056	18	18	1.22	314	.01	13	1.31	.02	.12	2	1
SL 126	1	18	2	66	.1	21	8	411	1.94	7	5	ND	1	73	.2	2	2	26	4.12	.060	17	20	1.11	155	.01	7	1.21	.01	.08	1	5
SL 127	1	21	2	64	.2	20	7	519	1.97	2	5	ND	2	134	.2	2	2	24	3.89	.053	15	19	1.12	121	.01	7	1.04	.01	.09	1	3
SL 128	1	24	9	71	.1	21	6	287	1.93	9	5	ND	4	135	.2	2	2	25	6.76	.046	18	19	1.03	262	.01	8	1.30	.01	.11	1	6
SL 129	1	10	8	53	.1	27	13	513	1.53	5	5	ND	3	180	.2	2	2	20	6.04	.052	14	14	1.18	143	.01	5	.85	.01	.07	1	1
SL 130	1	25	12	73	.2	17	6	410	1.76	14	5	ND	7	182	.2	2	2	21	11.66	.062	17	13	1.55	191	.01	9	1.37	.01	.14	1	2
SL 131	1	12	2	50	.1	58	22	385	1.40	7	5	ND	3	145	.2	2	2	17	5.11	.052	14	13	1.41	107	.01	7	.80	.01	.06	1	1
SL 132	1	22	14	69	.1	20	7	436	1.87	13	5	ND	4	103	.7	2	2	23	6.69	.058	19	15	1.38	197	.01	12	1.24	.01	.13	1	8
SL 133	1	19	7	62	.2	15	6	491	2.00	14	5	ND	5	90	.2	2	2	19	8.65	.057	19	12	1.76	143	.02	7	1.05	.01	.14	1	3
SL 134	1	31	24	88	.2	30	9	677	2.09	13	5	ND	7	183	.2	2	2	23	8.19	.057	19	15	1.52	195	.01	16	1.43	.01	.17	1	3
SL 135	1	30	16	79	.2	21	7	260	1.96	13	5	ND	5	140	.3	3	2	32	4.26	.040	22	16	.97	219	.02	10	1.29	.01	.13	2	3
SL 136	1	22	14	66	.2	17	6	222	1.70	13	5	ND	4	85	.2	2	2	21	4.21	.051	19	13	1.40	160	.01	8	1.30	.01	.14	1	4
SL 137	1	40	20	78	.3	17	8	192	2.13	15	5	ND	6	70	.3	4	2	29	2.87	.055	27	16	1.09	145	.02	7	1.34	.01	.11	1	2
SL 138	1	27	24	86	.3	20	8	310	2.01	12	5	ND	7	77	.2	4	2	25	3.79	.059	22	15	1.37	173	.01	10	1.58	.01	.16	1	6
SL 139	1	26	17	88	.1	20	7	453	2.10	8	5	ND	5	85	.4	2	2	25	3.68	.056	22	16	1.27	182	.01	9	1.71	.01	.20	1	1
SL 140	1	27	12	75	.2	21	7	310	1.91	10	5	ND	4	79	.2	3	5	26	3.28	.051	19	16	1.00	189	.01	9	1.36	.01	.17	1	4
SL 141	1	31	16	96	.2	19	7	256	2.12	9	5	ND	7	204	.4	4	2	29	3.39	.047	24	16	1.21	207	.01	15	1.65	.04	.16	1	4
SL 142	1	18	14	69	.3	18	7	327	1.69	8	5	ND	7	203	.2	3	2	22	7.36	.046	22	14	1.38	137	.01	8	1.58	.01	.18	2	2
SL 143	1	22	14	75	.2	11	6	323	1.47	3	5	ND	6	135	.2	3	2	19	6.26	.073	19	12	1.83	129	.01	9	1.33	.01	.19	1	1
SL 144	1	25	13	75	.3	16	7	425	1.78	11	5	ND	8	133	.4	6	2	22	4.86	.060	21	14	1.66	124	.01	12	1.43	.01	.18	1	3
STANDARD C/AU-S	19	57	40	133	7.2	73	32	1056	3.97	41	19	7	36	56	20.1	16	19	57	.44	.099	39	61	.90	182	.07	38	1.89	.06	.13	13	53

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL 145	1	18	7	69	.1	15	7	690	2.00	7	6	ND	5	176	.2	2	2	20	7.13	.046	19	12	1.43	125	.01	4	1.29	.01	.13	1	9
SL 146	1	27	23	79	.2	18	5	440	1.56	4	5	ND	7	237	.3	2	2	20	7.79	.055	19	11	1.82	152	.01	3	1.33	.01	.15	1	2
SL 147	1	18	11	66	.1	15	5	239	1.55	9	5	ND	4	123	.2	2	2	19	5.99	.049	19	13	1.62	132	.01	2	1.31	.01	.16	1	1
SL 148	1	17	12	61	.2	13	5	242	1.57	6	9	ND	5	154	.2	2	2	17	4.93	.046	21	12	1.45	88	.01	2	1.46	.01	.18	1	1
SL 149	1	21	18	73	.2	17	7	366	1.74	12	6	ND	3	88	.2	2	6	21	4.60	.055	19	13	1.23	136	.01	3	1.36	.01	.16	2	20
SL 150	1	18	13	70	.2	16	7	909	2.56	9	9	ND	5	150	.5	2	2	20	7.98	.053	19	12	1.56	130	.01	5	1.28	.01	.16	1	1
SL 151	1	24	12	81	.3	19	8	333	1.95	14	5	ND	5	91	.2	3	3	24	3.67	.058	21	16	1.46	149	.01	4	1.49	.01	.19	1	2
SL 152	1	19	16	63	.1	15	7	279	1.57	6	5	ND	3	140	.2	2	2	21	6.14	.048	20	13	1.43	137	.01	3	1.32	.01	.12	1	20
SL 153	1	21	15	63	.1	20	6	280	1.71	10	9	ND	1	62	.2	2	2	25	4.53	.049	17	18	.92	223	.01	2	1.39	.01	.15	1	1
SL 154	1	18	10	62	.1	14	5	314	1.49	5	5	ND	1	63	.2	2	2	21	4.74	.053	18	13	1.12	195	.01	6	1.30	.01	.16	1	3
SL 155	1	10	11	58	.1	10	5	849	1.41	5	5	ND	5	163	.2	2	2	18	9.08	.049	18	11	1.98	126	.01	3	1.11	.01	.11	1	12
SL 156	1	16	6	54	.1	14	6	272	1.43	6	5	ND	4	84	.6	2	2	16	6.38	.048	16	10	1.99	77	.02	2	1.11	.01	.13	1	1
SL 157	1	4	2	30	.1	7	3	197	.75	2	5	ND	2	112	.2	2	2	11	8.27	.044	15	9	1.56	87	.01	2	.53	.01	.06	1	1
SL 158	1	14	9	43	.2	8	4	839	1.37	11	10	ND	3	86	.2	2	4	13	13.67	.044	12	9	1.41	149	.01	4	.88	.01	.12	3	1
SL 159	1	20	13	69	.1	17	6	254	1.78	8	5	ND	3	162	.2	2	5	22	3.70	.046	21	14	1.24	131	.01	5	1.61	.01	.16	1	1
SL 160	1	24	10	73	.2	17	7	349	1.83	9	5	ND	5	176	.2	2	2	23	4.44	.044	22	14	1.13	104	.01	3	1.63	.01	.16	1	1
SL 161	1	25	13	71	.1	14	5	192	1.83	9	6	ND	5	96	.2	2	2	25	3.76	.043	22	13	1.10	124	.01	2	1.39	.01	.13	1	1
SL 162	1	14	6	54	.2	14	6	366	1.47	6	11	ND	3	82	.6	2	3	18	5.50	.045	18	12	1.19	168	.01	2	1.20	.01	.16	2	11
SL 163	1	22	13	70	.1	24	7	345	2.06	9	5	ND	1	68	.5	2	2	29	2.71	.046	17	19	.66	239	.01	3	1.49	.01	.17	1	1
SL 164	1	23	9	64	.1	22	7	370	1.90	11	5	ND	3	95	.2	2	2	27	4.69	.049	16	18	.76	241	.01	2	1.32	.01	.13	1	1
SL 165	1	20	18	62	.1	18	6	354	1.64	8	7	ND	4	97	.2	2	2	21	5.85	.043	19	14	1.00	173	.01	4	1.31	.01	.14	1	18
SL 166	1	23	6	62	.2	23	7	290	1.76	9	5	ND	2	83	.2	2	2	25	5.32	.050	16	18	.74	191	.01	6	1.19	.01	.11	1	65
SL 167	1	24	12	74	.1	30	9	468	2.21	10	5	ND	1	30	.2	2	2	30	.63	.054	19	19	.46	169	.01	4	1.37	.01	.15	1	5
SL 168	1	20	15	78	.2	21	7	329	2.12	10	10	ND	2	19	.2	2	2	27	.41	.044	24	19	.45	138	.01	2	1.62	.01	.17	1	1
SL 169	1	23	10	69	.1	14	5	398	1.51	4	5	ND	5	123	.2	2	2	19	6.07	.049	19	12	1.92	109	.01	4	1.21	.01	.16	1	10
SL 170	1	22	12	66	.3	16	7	482	1.76	8	5	ND	5	131	.4	2	2	21	7.53	.047	19	13	1.24	143	.01	3	1.45	.01	.19	1	1
SL 171	1	18	8	56	.1	14	5	806	1.48	12	7	ND	2	140	.2	2	2	18	9.45	.079	18	11	1.26	125	.01	2	1.15	.01	.16	1	5
SL 172	1	23	12	64	.1	11	5	199	1.62	5	5	ND	3	72	.2	2	2	21	3.58	.044	20	13	1.50	103	.01	2	1.34	.01	.19	1	1
SL 173	1	21	17	66	.2	17	6	216	1.72	6	10	ND	3	113	.2	2	5	21	2.88	.044	20	16	1.02	58	.01	5	1.58	.01	.20	1	8
SL 174	1	24	13	67	.1	14	6	305	1.75	6	5	ND	6	214	.8	2	2	20	5.32	.042	21	14	1.31	83	.01	2	1.54	.01	.18	1	5
SL 175	1	21	16	68	.4	16	7	266	1.91	9	7	ND	5	122	.2	2	2	22	2.82	.037	23	14	1.07	162	.01	2	2.05	.01	.19	1	1
SL 176	1	20	11	56	.2	13	4	227	1.43	12	5	ND	5	153	.2	2	2	18	6.09	.042	17	11	1.63	210	.02	5	1.02	.01	.13	1	14
SL 177	1	17	10	51	.1	13	4	299	1.38	8	6	ND	3	100	.4	2	2	17	4.76	.045	19	12	1.16	166	.01	3	1.52	.01	.19	1	7
SL 178	1	8	12	34	.1	7	4	154	1.18	8	6	ND	7	184	.3	2	2	11	4.51	.028	19	6	1.10	147	.02	2	1.25	.01	.16	2	2
SL 179	1	11	11	41	.2	11	4	168	1.17	7	5	ND	5	103	.2	2	2	15	3.14	.037	20	11	.99	109	.02	2	1.23	.01	.17	1	4
SL 180	1	18	10	57	.2	15	6	285	1.46	6	5	ND	3	98	.2	2	2	18	3.71	.042	19	13	1.18	163	.01	2	1.49	.01	.21	1	1
STANDARD C/AU-S	19	62	42	133	7.5	73	32	1057	3.97	43	24	7	37	52	19.4	15	16	59	.45	.094	40	61	.90	183	.08	34	1.89	.06	.14	13	51

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL 181	1	28	12	76	.2	29	9	331	2.28	8	5	ND	1	56	.3	3	2	33	3.15	.051	18	22	.67	207	.01	10	1.69	.01	.17	1	1
SL 182	1	9	3	49	.1	15	5	548	1.42	2	5	ND	4	111	.2	2	2	18	11.63	.053	13	14	1.13	96	.01	5	.73	.01	.05	1	2
SL 183	1	20	19	61	.2	14	5	261	1.52	3	5	ND	2	56	.3	2	2	19	2.74	.045	20	13	1.11	156	.01	7	1.46	.01	.22	1	1
SL 184	1	14	14	61	.2	19	6	330	1.48	2	5	ND	2	113	.2	2	5	22	3.04	.063	15	17	1.37	103	.01	7	.96	.01	.08	1	11
SL 185	1	20	18	71	.3	18	8	842	2.45	7	5	ND	6	152	.2	2	4	19	8.07	.065	18	12	1.79	172	.01	8	1.12	.03	.18	1	9
SL 186	1	17	11	65	.3	20	7	389	1.72	3	12	ND	1	46	.2	3	5	23	2.99	.057	16	16	1.01	160	.01	7	1.11	.01	.14	1	3
SL 187	1	21	18	67	.3	25	8	351	1.77	6	5	ND	4	111	.2	5	2	24	7.94	.046	16	17	.86	200	.01	8	1.26	.01	.11	1	2
SL 188	1	24	19	79	.4	21	7	533	1.95	8	7	ND	5	106	.2	4	3	22	4.87	.061	18	15	1.35	150	.01	9	1.19	.01	.17	1	1
SL 189	1	18	7	56	.3	13	5	786	2.05	2	5	ND	5	139	.8	2	3	16	14.50	.056	14	10	1.29	137	.01	8	.91	.01	.14	1	7
SL 190	1	28	11	69	.1	18	6	494	2.25	4	5	ND	2	76	.8	2	6	25	5.71	.058	16	17	1.06	127	.01	8	1.19	.01	.10	1	2
SL 191	1	27	21	83	.2	30	10	482	2.41	7	5	ND	1	27	.2	3	2	32	.66	.048	23	21	.51	183	.01	8	1.74	.01	.14	1	5
SL 192	1	18	11	58	.1	14	6	372	1.63	5	5	ND	2	98	.2	2	2	21	9.08	.056	15	14	1.18	126	.01	8	1.14	.01	.11	1	1
SL 193	1	16	12	53	.1	19	6	303	1.40	6	5	ND	2	120	.3	2	3	19	6.68	.043	14	13	.78	245	.01	6	.94	.01	.10	1	3
SL 194	1	12	10	52	.3	14	6	374	1.47	5	5	ND	4	151	.2	3	2	18	4.72	.061	15	13	1.69	144	.01	6	.71	.01	.05	1	15
SL 195	1	21	13	71	.1	25	8	357	1.93	6	5	ND	1	45	.2	4	2	27	2.97	.062	18	17	.76	188	.01	9	1.45	.01	.14	1	9
SL 196	1	26	17	82	.3	15	6	586	1.80	3	5	ND	7	158	.8	2	4	21	8.97	.064	19	13	2.19	125	.01	11	1.26	.01	.18	1	2
SL 197	1	20	14	68	.2	15	6	795	2.13	2	5	ND	7	199	.4	2	3	17	10.73	.056	17	11	1.72	149	.01	8	1.12	.01	.15	1	9
SL 198	1	27	11	65	.2	15	5	365	1.35	3	5	ND	5	125	.5	2	2	17	10.77	.055	15	11	1.97	128	.01	9	1.10	.01	.12	1	2
SL 199	1	30	22	92	.4	27	9	303	2.24	10	5	ND	2	64	.5	5	2	33	1.27	.055	21	20	.73	189	.01	10	1.75	.01	.19	1	7
SL 200	1	29	9	80	.3	22	7	380	2.17	10	5	ND	4	82	.6	3	2	27	3.45	.057	21	16	1.02	186	.01	8	1.50	.01	.15	1	1
SL 201	1	18	14	63	.1	16	6	416	1.45	5	5	ND	5	66	.2	2	2	20	6.13	.055	18	13	1.76	121	.01	7	1.30	.01	.14	1	3
SL 202	1	13	10	58	.1	16	6	270	1.40	3	5	ND	1	84	.2	2	2	20	2.84	.059	16	16	1.15	101	.01	6	.81	.01	.07	1	12
SL 203	1	11	15	52	.2	16	7	302	1.19	5	8	ND	2	129	.3	2	2	16	3.67	.054	15	13	1.47	121	.01	7	.74	.01	.06	1	4
SL 204	1	12	10	50	.2	17	6	448	1.49	2	5	ND	3	115	.2	3	2	19	4.73	.056	14	14	1.50	102	.01	5	.78	.01	.06	1	5
SL 205	1	9	13	43	.1	10	4	325	1.23	9	5	ND	5	48	.2	2	2	12	6.72	.050	17	8	1.88	63	.02	6	.63	.01	.07	1	9
SL 206	1	19	14	50	.1	16	5	406	1.63	2	5	ND	1	130	.2	2	2	18	7.80	.048	14	13	1.11	137	.01	4	.93	.01	.07	1	11
SL 207	1	23	19	75	.2	16	6	338	1.86	10	5	ND	4	113	.2	2	2	22	4.82	.063	17	15	1.49	137	.01	8	1.11	.01	.18	1	1
SL 208	1	9	8	37	.2	15	5	276	.88	7	5	ND	5	107	.2	2	2	12	8.07	.063	14	11	2.28	46	.01	5	.52	.05	.07	1	1
SL 209	1	18	9	51	.2	16	6	495	1.63	7	5	ND	4	168	.2	2	2	18	11.83	.052	14	12	1.23	136	.01	9	.91	.01	.13	1	3
SL 210	1	27	15	71	.3	20	6	316	1.86	11	5	ND	2	63	.2	3	2	25	3.47	.058	20	18	1.06	150	.01	10	1.29	.01	.14	1	3
SL 211	1	11	8	54	.2	18	7	384	1.54	5	5	ND	2	116	.2	2	2	20	5.04	.049	16	17	1.02	114	.01	5	.91	.01	.05	1	4
SL 212	1	23	24	68	.1	17	6	481	1.44	2	5	ND	5	117	.4	2	2	17	9.93	.062	17	11	2.16	118	.01	7	1.09	.01	.12	1	1
SL 213	1	23	14	62	.3	20	6	273	1.75	22	5	ND	3	55	.4	6	2	22	5.34	.054	19	13	1.14	144	.01	10	1.24	.01	.14	1	3
SL 214	1	25	18	82	.1	18	8	613	1.90	9	5	ND	5	100	.2	2	2	23	4.42	.057	20	13	1.54	159	.01	9	1.43	.01	.17	1	2
SL 215	1	31	19	92	.1	22	7	263	2.16	11	5	ND	5	105	.2	2	2	26	3.63	.055	24	16	1.23	174	.01	8	1.70	.01	.18	1	3
SL 216	1	30	26	88	.5	27	9	271	2.05	14	5	ND	6	74	.2	6	5	31	2.82	.051	25	16	.99	189	.02	8	1.38	.01	.14	1	1
STANDARD C/AU-S	19	60	44	133	7.3	73	32	1057	3.97	42	22	7	36	52	20.4	15	19	58	.44	.099	40	60	.90	181	.08	37	1.90	.06	.14	11	48

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL 217	1	21	20	67	.3	20	8	523	1.71	10	5	ND	3	38	.2	2	2	22	3.78	.061	17	14	1.20	136	.01	9	1.31	.01	.20	1	5
SL 218	1	23	20	74	.2	20	8	257	1.81	7	5	ND	5	66	.5	2	3	27	3.70	.050	21	14	1.35	127	.02	9	1.40	.01	.17	1	8
SL 219	1	20	10	73	.4	28	9	392	2.10	11	5	ND	2	22	.2	2	2	28	.42	.039	21	18	.44	159	.01	5	1.53	.01	.17	1	18
SL 220	1	17	9	61	.2	25	8	316	1.60	8	5	ND	1	33	.2	2	2	23	1.27	.044	16	15	.51	156	.01	7	1.10	.01	.08	1	10
SL 221	1	16	6	60	.2	20	6	312	1.55	7	5	ND	4	103	.2	2	2	20	4.73	.045	15	14	.94	252	.01	7	.99	.01	.09	1	14
SL 222	1	17	2	61	.2	18	6	271	1.55	10	5	ND	4	117	.2	2	5	21	5.25	.046	15	15	.87	224	.01	9	1.08	.01	.09	1	2
STANDARD C	19	61	37	132	6.9	72	32	1055	3.97	45	18	7	36	53	18.9	18	18	57	.46	.099	38	60	.90	182	.07	32	1.89	.06	.13	12	-

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SLR 1	1	6	9	24	.3	3	2	827	1.45	2	5	ND	2	142	.2	2	2	9	21.30	.040	8	7	.60	90	.01	4	.45	.02	.08	1	1
SLR 2	1	4	7	28	.1	3	3	970	1.08	6	5	ND	4	148	.2	2	2	9	15.55	.035	10	7	.57	71	.01	2	.57	.04	.09	2	4
SLR 3	1	5	2	20	.4	6	2	904	1.62	30	5	ND	2	148	.2	2	2	9	24.08	.082	5	8	.37	159	.02	3	.30	.02	.06	2	3
SLR 4	1	10	10	35	.3	10	6	1340	3.32	4	5	ND	1	147	.5	2	2	26	21.71	.047	7	12	.62	140	.01	4	.71	.03	.07	2	1
SLR 5	1	3	2	15	.3	2	2	1747	2.57	5	5	ND	1	185	.2	2	4	5	32.24	.072	3	3	.33	226	.01	3	.25	.01	.05	1	2
SLR 6	1	4	9	12	.4	1	2	1622	2.49	4	5	ND	1	186	.3	2	2	3	35.75	.066	3	2	.34	193	.01	2	.19	.01	.05	2	7
SLR 7	1	5	3	13	.4	2	3	1627	2.50	2	5	ND	1	181	.5	2	2	4	34.71	.074	3	2	.34	216	.01	2	.23	.01	.05	1	2
SLR 8	1	4	5	14	.1	1	2	1234	2.56	3	5	ND	1	171	.2	2	2	4	34.16	.065	3	2	.35	235	.01	2	.23	.02	.06	2	2
SLR 9	1	2	2	16	.1	4	2	1730	2.51	5	5	ND	1	168	.2	2	2	4	33.88	.061	3	2	.40	241	.01	2	.28	.02	.07	1	1
SLR 10	1	8	2	20	.2	2	3	1361	2.55	4	5	ND	1	170	.7	2	2	6	29.42	.076	5	4	.63	259	.01	3	.35	.02	.08	1	4
SLR 11	1	6	2	15	.3	4	3	1280	2.08	15	5	ND	1	639	.2	2	2	7	32.76	.283	4	5	.28	197	.01	7	.43	.07	.06	1	9
SLR 12	1	4	3	21	.1	4	2	2668	1.43	9	5	ND	1	116	.6	2	2	6	33.74	.049	4	3	.56	239	.01	4	.30	.02	.07	1	1
SLR 13	1	2	5	15	.2	3	3	4145	.94	17	5	ND	1	193	.3	2	2	5	37.19	.044	4	2	.38	239	.01	2	.25	.02	.05	1	4
SLR 14	1	3	7	28	.3	5	4	1422	2.06	10	5	ND	2	136	.2	2	4	9	20.44	.036	11	5	1.05	105	.02	4	.43	.01	.08	1	2
SLR 15	1	3	3	14	.1	5	1	4542	1.01	20	5	ND	1	162	.2	2	2	5	36.21	.033	5	3	.48	226	.01	2	.25	.02	.06	1	1
SLR 16	1	10	3	25	.3	7	3	1230	3.02	7	5	ND	1	626	1.3	2	2	13	28.39	.057	11	6	.56	359	.01	2	.50	.04	.08	1	1
SLR 17	1	3	5	20	.1	5	1	823	1.11	3	5	ND	2	127	.2	2	5	11	17.75	.030	8	12	.41	78	.01	6	.62	.09	.08	1	1
SLR 18	1	8	5	27	.3	6	4	1380	1.92	10	5	ND	2	137	.2	2	2	9	27.55	.059	7	5	.87	230	.01	4	.46	.02	.11	1	1
SLR 19	1	4	2	16	.3	2	4	2033	4.04	7	5	ND	1	216	1.2	2	2	7	31.03	.100	4	4	.50	332	.01	3	.33	.03	.07	1	1
SLR 20	1	4	6	12	.2	5	3	3927	1.04	43	5	ND	1	175	.5	2	2	5	31.88	.031	4	3	.39	215	.01	2	.24	.03	.05	3	1
SLR 21	1	6	7	32	.1	40	22	861	1.30	5	5	ND	1	117	.2	2	2	14	19.17	.040	7	12	.45	143	.01	5	.61	.02	.06	1	5
SLR 22	1	4	4	17	.2	3	2	1443	.93	7	5	ND	1	100	.2	2	2	6	24.89	.044	8	4	.92	132	.01	2	.40	.01	.07	1	10
SLR 23	1	5	4	22	.1	12	6	4576	1.38	22	5	ND	1	147	.2	2	2	8	32.37	.043	7	5	.49	353	.01	6	.40	.02	.07	2	1
SLR 24	1	7	3	21	.3	6	4	1710	1.94	9	6	ND	1	115	.2	2	2	8	31.56	.064	5	4	.62	229	.01	3	.37	.01	.07	2	2
SLR 25	1	3	5	18	.2	4	4	1495	2.32	13	5	ND	1	146	.2	2	2	9	31.07	.068	5	5	.61	282	.01	2	.34	.02	.06	1	3
SLR 26	1	5	2	17	.1	5	3	4605	1.61	20	5	ND	1	164	.2	2	2	6	33.78	.046	4	3	.50	294	.01	2	.31	.02	.06	1	2
SLR 27	1	5	2	21	.2	3	4	4927	1.32	11	5	ND	1	109	.2	2	2	7	31.59	.055	5	5	.67	202	.01	2	.38	.02	.09	1	1
SLR 28	1	4	5	25	.2	7	2	1052	2.20	10	5	ND	2	127	.2	2	2	10	22.69	.041	8	6	1.27	158	.01	5	.48	.01	.09	2	1
SLR 29	1	6	6	29	.3	6	4	1272	3.92	9	5	ND	2	116	.4	2	3	11	20.63	.039	9	6	1.33	172	.01	5	.55	.01	.09	2	1
SLR 30	1	4	6	23	.1	4	2	4384	1.30	7	5	ND	1	121	.2	2	2	8	33.55	.040	5	4	.66	231	.01	2	.35	.02	.08	1	1
SLR 31	1	7	4	20	.1	3	2	3460	1.10	2	5	ND	1	114	.2	2	2	7	34.40	.045	4	3	.55	235	.01	2	.30	.02	.08	1	1
SLR 32	1	4	3	15	.3	4	1	4588	1.05	20	5	ND	1	183	.2	2	3	5	34.67	.037	5	3	.47	247	.01	3	.25	.02	.05	1	3
SLR 33	1	4	2	20	.1	4	2	3686	1.21	9	5	ND	1	136	.2	2	2	7	33.08	.042	4	3	.60	261	.01	2	.32	.02	.08	1	1
SLR 34	1	5	2	18	.1	3	3	4721	1.36	10	5	ND	1	160	.2	2	2	6	34.12	.038	4	3	.54	268	.01	2	.28	.02	.07	2	1
SLR 35	1	9	8	34	.3	7	4	2063	2.21	21	5	ND	3	173	.2	2	2	12	26.83	.045	8	6	.70	241	.01	4	.76	.01	.13	1	1
SLR 36	1	5	4	17	.1	3	2	2998	1.41	7	5	ND	1	142	.2	2	2	6	32.25	.037	5	3	.44	260	.01	2	.29	.02	.07	2	2
STANDARD C/AU-R	19	61	40	132	7.2	73	32	1057	3.99	42	21	7	36	52	18.9	15	23	57	.45	.099	39	61	.90	188	.07	35	1.90	.06	.13	13	540

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SLR 37	1	3	3	28	.2	8	3	1637	1.10	7	5	ND	4	142	.2	2	2	10	19.76	.039	11	10	1.76	66	.01	4	.43	.01	.08	1	5
SLR 38	1	6	2	25	.3	6	2	975	1.19	5	5	ND	3	95	.6	2	2	9	21.50	.046	8	6	1.26	115	.02	2	.50	.01	.11	1	1
SLR 39	1	6	14	23	.3	7	2	2338	1.34	9	5	ND	3	84	.6	2	2	8	30.40	.035	6	4	.81	126	.01	3	.40	.01	.09	3	2
SLR 40	1	1	3	15	.4	5	2	5332	1.58	13	5	ND	2	135	1.0	2	2	6	33.90	.035	4	3	.36	227	.01	2	.30	.02	.06	1	4
SLR 41	1	5	7	27	.4	3	4	2833	1.46	11	5	ND	4	100	.4	2	2	12	25.01	.080	7	7	.96	246	.01	6	.48	.01	.10	2	1
SLR 42	1	4	2	19	.3	3	6	1397	2.41	12	5	ND	2	123	.2	2	2	9	29.54	.060	5	4	.73	190	.01	7	.36	.01	.06	1	1
SLR 43	1	8	2	18	.4	6	4	1722	3.33	7	5	ND	2	183	1.3	2	2	10	32.92	.074	4	5	.41	275	.01	6	.32	.02	.06	1	1
SLR 44	1	9	2	28	.3	10	4	2010	2.87	6	5	ND	2	117	.4	2	2	14	29.60	.055	5	8	.49	227	.01	4	.52	.01	.07	1	1
SLR 45	1	5	2	19	.4	5	3	1403	1.94	19	5	ND	2	124	.2	2	2	7	31.31	.069	5	3	.75	220	.01	4	.32	.01	.06	1	2
STANDARD C	18	59	44	131	6.7	72	32	1053	3.95	44	20	7	36	53	19.0	16	18	55	.46	.094	37	59	.89	180	.07	34	1.88	.06	.14	13	-

ACME A[illegible]TICAL LABORATORIES LTD. 852 E. HASTINGS ST. [illegible]COUVER B.C. V6A 1R6 PHONE(604)253-3158 FA[illegible] [illegible])253-1716

NOV 14 [illegible]90

GEOCHEMICAL [illegible]NALYSIS CERTIFICATE

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 File # 90-5701 Page 1

#4 - 2130 Norte Dame Ave, Winnipeg MB R3H 0K1

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
K52	1	28	18	83	.1	19	6	349	2.12	12	5	ND	6	62	.5	3	2	34	2.96	.062	22	18	1.11	201	.02	11	1.28	.01	.14	1	2
K53	1	31	16	85	.2	22	7	329	2.10	17	5	ND	5	98	.6	2	2	32	2.41	.067	21	19	.86	251	.01	13	1.47	.03	.18	1	1
K54	1	31	17	86	.1	22	8	279	2.23	17	5	ND	7	71	.5	3	2	33	2.30	.054	23	19	1.09	220	.02	13	1.49	.01	.16	1	2
K55	1	32	15	95	.1	29	11	291	1.96	15	5	ND	6	94	.6	2	2	40	1.55	.043	22	24	.66	326	.02	14	1.37	.01	.13	1	3
K56	1	20	13	74	.1	16	6	454	2.05	8	5	ND	5	56	.5	2	2	23	3.92	.064	20	14	1.38	177	.01	8	1.32	.01	.17	1	2
K57	1	19	13	70	.1	18	6	354	1.85	14	5	ND	4	51	.5	3	2	25	2.78	.062	18	15	1.13	181	.01	9	1.31	.01	.19	1	1
K58	1	21	13	83	.1	24	8	392	1.96	9	5	ND	4	70	.6	2	2	30	1.65	.058	19	18	.82	233	.01	8	1.51	.01	.19	1	1
K59	1	24	14	81	.1	21	6	239	1.93	10	5	ND	6	54	.6	2	2	29	3.17	.050	20	18	.86	214	.01	6	1.61	.01	.15	1	2
K60	1	18	11	66	.1	15	6	321	1.60	10	5	ND	4	21	.3	2	2	25	.61	.047	18	16	.49	140	.01	4	1.34	.01	.22	1	1
K61	1	28	16	74	.2	20	7	267	1.72	17	5	ND	7	153	.5	3	2	28	2.99	.049	19	16	1.35	223	.02	23	1.20	.16	.14	1	1
K62	1	7	8	32	.1	7	3	767	1.30	7	6	ND	4	109	.2	2	2	12	8.03	.056	12	7	1.93	52	.01	19	.50	.24	.08	1	3
K63	1	14	10	48	.2	10	4	601	1.46	9	5	ND	6	90	.4	3	2	15	7.69	.062	15	9	2.12	83	.02	9	.79	.01	.12	2	2
K64	1	7	7	33	.1	7	3	217	.60	7	5	ND	4	61	.2	2	2	11	7.44	.063	14	7	2.17	40	.01	8	.48	.01	.09	2	3
K65	1	10	7	38	.1	10	4	322	.92	4	7	ND	3	177	.2	2	2	13	7.73	.053	10	8	1.65	60	.01	19	.62	1.25	.09	2	1
K66	1	31	18	91	.2	22	8	278	2.10	17	5	ND	7	98	.4	2	2	32	2.07	.048	22	19	.94	211	.01	10	1.61	.02	.20	1	2
K67	1	25	13	69	.2	17	6	300	2.03	13	5	ND	6	47	.4	3	2	25	4.58	.056	19	16	1.76	140	.01	8	1.32	.01	.13	1	1
K68	1	3	7	32	.2	11	4	463	1.65	4	5	ND	4	75	.2	2	2	16	1.84	.039	12	10	.83	71	.01	10	.59	.41	.08	2	1
K69	1	10	11	37	.2	12	4	81	1.66	26	5	ND	6	126	.2	2	2	15	1.19	.045	13	14	.50	58	.01	13	.65	.30	.08	2	1
K70	1	5	8	35	.2	10	4	296	1.26	5	5	ND	4	137	.2	2	2	16	1.68	.042	14	10	.80	82	.01	7	.66	.21	.09	2	3
K71	1	25	13	68	.2	21	8	418	1.59	15	5	ND	6	118	.5	3	2	23	4.20	.055	17	12	1.63	169	.02	18	1.00	.03	.13	1	1
K72	1	17	10	54	.2	13	5	558	1.79	2	6	ND	5	112	.4	3	2	17	5.70	.058	16	10	1.73	181	.01	18	.94	.02	.13	1	4
K73	2	41	25	116	.2	35	12	281	2.64	19	5	ND	9	172	.7	3	2	37	2.47	.049	25	16	.68	335	.02	13	1.53	.01	.15	1	1
K74	1	29	14	81	.2	21	7	346	1.86	10	5	ND	4	56	.8	2	2	29	2.09	.064	18	17	1.00	220	.01	12	1.50	.14	.18	1	5
K75	1	25	13	71	.2	15	6	616	2.05	10	7	ND	7	70	.4	3	2	24	5.05	.055	19	13	1.65	130	.01	10	1.39	.05	.15	1	1
M86	1	7	6	29	.1	6	3	243	.98	6	8	ND	5	41	.2	3	2	10	6.56	.056	15	7	2.22	58	.02	4	.43	.01	.06	2	1
M87	1	8	7	39	.1	8	4	387	1.16	4	5	ND	5	54	.2	3	2	14	6.24	.048	13	9	1.80	71	.01	5	.64	.06	.10	2	3
M88	1	7	5	34	.1	8	3	301	.98	6	7	ND	5	63	.2	2	2	12	6.67	.046	14	8	1.95	60	.02	4	.56	.01	.09	2	3
M89	1	7	7	32	.2	8	3	261	.86	3	7	ND	5	58	.2	2	2	12	5.92	.042	14	8	1.90	49	.02	4	.51	.01	.10	2	2
M90	1	8	8	32	.1	8	3	383	1.31	8	5	ND	4	81	.2	2	2	10	4.46	.044	11	6	1.69	54	.02	7	.44	.81	.08	1	1
M91	1	18	12	55	.1	17	6	592	1.90	10	6	ND	5	61	.4	3	2	17	5.03	.042	16	10	1.89	131	.01	5	1.00	.02	.13	1	4
M92	1	6	7	29	.1	7	2	475	1.09	3	5	ND	4	45	.2	2	2	11	4.81	.043	11	8	1.76	59	.02	4	.46	.03	.09	2	1
M93	2	32	18	89	.1	23	8	230	1.90	18	6	ND	7	304	.7	2	2	32	5.29	.047	17	14	.94	56	.02	20	1.21	.03	.13	1	2
M94	1	25	14	73	.2	17	7	566	1.71	10	5	ND	7	105	.4	2	2	24	5.15	.054	19	14	1.64	228	.02	9	1.15	.01	.16	1	1
M96	1	21	14	68	.1	18	6	668	2.28	10	8	ND	7	102	.4	3	2	21	5.63	.053	18	17	1.56	148	.02	12	1.10	.01	.14	1	3
M97	2	54	21	88	.1	21	7	147	2.60	21	5	ND	8	76	.3	3	2	53	.91	.044	19	29	.68	263	.03	11	1.60	.03	.12	1	4
M98	1	11	7	42	.1	10	4	501	1.17	4	5	ND	5	78	.3	3	2	13	7.59	.058	13	8	2.15	67	.01	15	.62	.07	.10	1	6
STANDARD C/AU-S	18	60	40	130	7.1	72	31	1053	3.97	40	21	7	40	56	19.7	15	19	58	.46	.095	39	60	.90	183	.07	34	1.89	.06	.13	11	48

ICP - .500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER.
THIS LEACH IS PARTIAL FOR MN FE SR CA P LA CR MG BA TI B W AND LIMITED FOR NA K AND AL. AU DETECTION LIMIT BY ICP IS 3 PPM.
- SAMPLE TYPE: P1-13 SOIL P14 SILT P15-16 ROCK AU* ANALYSIS BY ACID LEACH/AA FROM 10 GM SAMPLE.

DATE RECEIVED: NOV 2 1990 **DATE REPORT MAILED:** *Nov 8/90.* **SIGNED BY** [redacted] .TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

NOV 14 199

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
M99	1	5	6	20	.1	6	3	77	3.15	103	5	ND	3	162	.2	2	2	10	2.16	.038	11	6	.20	42	.01	14	.43	.26	.10	2	1
M100	1	25	12	73	.1	26	9	432	2.12	8	5	ND	5	131	.3	2	2	25	2.28	.054	17	17	.96	158	.01	10	1.34	.12	.13	1	3
M101	1	16	8	59	.1	19	7	233	1.70	6	5	ND	3	94	.2	2	2	25	1.11	.036	13	15	.51	113	.01	8	.97	.05	.12	1	2
M102	1	18	7	58	.1	19	7	388	1.86	9	5	ND	4	192	.2	2	2	26	3.94	.035	11	15	.53	70	.01	10	1.05	.05	.11	1	1
M103	1	34	12	88	.1	31	11	404	2.54	10	5	ND	5	182	.4	2	2	29	1.40	.049	17	21	.82	102	.01	11	1.45	.68	.13	1	1
M104	1	17	9	58	.1	21	8	738	2.78	11	5	ND	3	121	.2	2	2	28	.83	.037	12	13	.39	214	.01	16	.84	.04	.09	1	1
M105	1	41	24	86	.1	20	9	166	3.23	25	5	ND	9	279	.2	2	2	33	1.01	.032	16	18	.43	85	.01	11	1.25	.65	.15	1	5
M106	1	26	11	82	.1	32	11	428	2.29	7	5	ND	5	182	.3	2	2	30	2.52	.048	15	22	.81	103	.01	15	1.46	.29	.12	1	2
M107	1	26	10	74	.1	26	9	680	2.58	10	5	ND	5	262	.4	2	2	25	7.36	.064	15	17	.90	160	.01	12	1.35	.07	.12	1	3
M108	1	23	9	74	.2	28	9	288	1.78	11	5	ND	5	328	.3	2	2	31	4.12	.038	12	20	.65	68	.01	12	1.24	.02	.10	1	1
M109	1	12	10	50	.1	16	7	409	1.48	8	5	ND	4	92	.2	2	2	19	2.72	.048	15	11	.96	155	.01	10	.82	.07	.10	2	1
M110	1	34	14	80	.1	34	12	243	2.29	14	5	ND	5	268	.3	2	2	56	1.14	.040	14	23	.89	139	.03	17	1.06	.94	.08	1	2
M111	1	21	10	68	.1	24	9	459	1.85	10	5	ND	5	126	.3	2	2	25	3.61	.055	15	17	1.36	115	.01	10	1.22	.27	.11	1	1
M112	1	19	7	66	.1	24	9	425	2.02	9	5	ND	4	179	.3	2	2	26	3.66	.049	13	17	.88	76	.01	11	1.28	.58	.14	1	1
M113	1	25	10	73	.2	25	9	419	2.12	11	5	ND	5	160	.3	2	2	27	2.95	.050	15	18	1.04	77	.01	11	1.38	1.15	.14	1	2
M114	1	13	6	54	.1	16	7	373	1.64	11	5	ND	4	101	.2	2	2	23	1.39	.041	15	15	.60	119	.01	9	.94	.17	.11	1	2
M115	1	10	7	46	.1	16	6	386	1.45	10	5	ND	4	77	.2	2	2	19	2.54	.050	15	11	.97	148	.01	9	.76	.06	.09	2	1
M116	1	14	10	70	.1	19	8	580	2.40	9	5	ND	4	107	.3	2	2	30	1.77	.044	19	19	.57	135	.01	10	1.16	.06	.12	1	2
M117	1	10	5	50	.1	16	7	486	1.80	8	5	ND	4	141	.2	2	2	24	3.23	.035	18	14	.36	67	.01	8	.83	.02	.11	2	6
M118	1	17	7	64	.1	30	11	254	1.84	5	5	ND	4	86	.2	2	2	28	.90	.040	16	18	.54	187	.01	9	1.13	.16	.13	1	8
M119	1	10	5	52	.1	13	6	208	1.61	5	5	ND	3	67	.2	2	2	27	.81	.037	16	16	.38	106	.01	11	.92	.07	.12	1	2
M120	1	22	10	69	.1	26	9	397	2.12	8	5	ND	4	107	.2	2	2	28	2.15	.048	17	19	.83	154	.01	10	1.27	.05	.14	1	2
M121	1	13	7	53	.1	17	7	358	1.61	6	5	ND	3	125	.2	2	2	23	1.94	.041	15	15	.59	81	.01	9	.93	.29	.12	1	5
M122	1	30	13	90	.1	29	10	504	2.48	13	5	ND	4	112	.4	2	2	31	2.31	.057	19	20	.86	171	.01	9	1.59	.02	.18	1	2
M123	1	16	9	58	.1	20	8	543	1.66	7	5	ND	4	89	.2	2	2	21	2.26	.063	13	13	1.03	134	.01	6	.90	.32	.10	1	1
M124	1	26	11	77	.1	28	10	496	2.18	12	5	ND	6	122	.4	2	2	27	2.60	.058	18	19	1.05	161	.01	9	1.36	.09	.13	1	2
M125	1	6	8	47	.1	12	5	643	1.36	8	5	ND	4	146	.2	2	2	15	3.30	.044	12	12	.82	93	.01	4	.83	.73	.08	1	1
M126	1	23	10	71	.1	25	9	448	2.08	11	5	ND	5	161	.4	2	2	26	3.69	.050	15	17	.93	152	.01	10	1.28	.41	.11	1	1
M127	1	23	10	69	.1	24	9	549	2.09	11	5	ND	4	212	.2	2	2	26	3.22	.059	12	16	.85	80	.01	9	1.35	.53	.11	1	3
M128	1	34	10	71	.1	29	9	1048	3.35	12	5	ND	4	213	.5	2	2	31	4.02	.049	17	19	.81	223	.01	9	1.31	.02	.09	1	4
M129	1	19	9	71	.2	21	8	1026	3.10	9	5	ND	5	331	.2	2	2	23	2.14	.101	15	15	1.10	126	.01	6	1.16	.69	.12	1	5
M130	1	8	8	53	.1	15	6	281	1.62	12	5	ND	5	165	.2	2	2	18	1.53	.047	12	11	.90	91	.01	4	.89	.66	.09	1	2
M131	1	23	11	72	.1	25	9	545	2.12	11	5	ND	5	120	.2	2	2	26	1.80	.065	13	18	.97	129	.01	7	1.31	.65	.12	1	2
M132	1	11	6	49	.1	19	7	410	1.42	11	5	ND	4	98	.2	2	2	17	2.40	.056	12	14	1.01	123	.01	5	.77	.38	.08	1	1
M133	1	14	8	53	.2	20	8	628	1.48	9	5	ND	4	95	.2	2	2	18	2.75	.061	12	12	1.06	153	.01	5	.81	.39	.09	1	3
M134	1	28	12	79	.2	27	9	783	2.67	13	5	ND	5	239	.3	2	2	28	3.43	.047	14	18	.78	86	.01	17	1.39	.59	.13	1	1
STANDARD C/AU-S	18	59	37	131	6.9	70	32	1056	3.98	42	21	7	40	53	18.8	14	20	57	.46	.092	38	58	.90	183	.07	34	1.91	.06	.14	11	47

Noranda Exploration Co. Ltd. ([illegible]) PROJECT 1748 FILE # 90-5701

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
M135	1	55	34	94	.2	26	9	154	4.18	38	5	ND	10	257	.3	3	2	41	.99	.050	18	21	.37	120	.02	10	1.28	.18	.15	2	1
M136	1	23	15	77	.1	24	9	694	2.20	20	5	ND	6	156	.2	2	2	26	1.97	.052	17	13	.89	243	.02	12	1.17	.03	.12	1	1
M137	1	24	11	78	.1	28	10	470	2.24	12	5	ND	5	110	.2	2	2	30	2.29	.056	18	20	1.02	183	.01	11	1.44	.06	.15	1	2
M138	1	29	12	83	.1	30	10	510	2.37	14	5	ND	6	108	.4	2	2	30	2.58	.056	18	20	1.06	176	.01	9	1.49	.03	.15	1	3
M139	1	26	10	79	.1	28	10	556	2.31	11	5	ND	5	97	.2	2	2	29	2.33	.055	17	19	.96	155	.01	10	1.37	.08	.15	1	1
M140	1	28	18	76	.2	25	9	114	1.62	10	5	ND	14	460	.3	4	2	27	.59	.023	22	12	.45	213	.02	23	1.09	.83	.07	1	2
M141	1	23	10	71	.2	24	9	455	1.94	7	5	ND	5	125	.2	2	2	25	2.89	.054	14	16	1.09	107	.01	8	1.22	.57	.15	1	3
M142	1	24	11	78	.1	31	11	1281	2.49	6	5	ND	5	159	.3	2	2	24	2.89	.054	13	18	1.13	220	.01	8	1.18	.19	.11	1	2
M143	1	23	11	64	.2	21	7	321	1.60	11	5	ND	3	75	.3	2	2	23	5.18	.058	15	17	.88	180	.01	7	1.22	.01	.18	1	3
M144	1	12	9	47	.1	14	5	218	1.06	9	5	ND	5	102	.2	4	2	15	6.65	.060	14	9	2.37	116	.01	8	.77	.06	.11	2	1
M145	1	24	12	73	.1	22	8	348	2.06	16	5	ND	6	122	.3	3	2	25	2.69	.053	17	16	1.16	183	.01	9	1.23	.04	.14	1	1
M146	1	29	11	84	.1	28	9	333	2.38	12	5	ND	5	119	.2	2	2	31	1.37	.052	17	22	.74	177	.01	7	1.58	.05	.14	1	4
M147	1	25	11	78	.2	27	9	420	2.13	14	5	ND	5	108	.2	2	2	28	2.26	.054	18	19	1.07	180	.01	10	1.38	.03	.15	1	5
M148	1	17	12	64	.1	21	7	390	1.75	9	5	ND	5	67	.3	2	2	23	2.77	.052	16	15	1.00	194	.01	6	1.16	.01	.14	1	4
M149	1	15	9	59	.1	22	9	468	1.89	14	5	ND	5	208	.2	3	2	25	4.73	.062	12	15	1.75	83	.02	9	.94	.44	.09	1	3
M150	1	26	10	75	.3	26	9	611	2.13	5	5	ND	5	139	.3	2	2	24	4.33	.055	15	17	1.64	147	.01	9	1.22	.02	.15	1	4
M151	1	20	10	68	.1	23	8	351	1.95	5	5	ND	4	161	.2	2	2	25	3.82	.046	14	17	.73	93	.01	7	1.33	.33	.16	1	2
M152	1	25	11	71	.1	26	10	397	2.28	16	5	ND	4	144	.2	3	2	29	2.61	.043	18	20	.58	206	.01	7	1.49	.02	.16	1	4
M153	1	26	13	70	.1	25	8	364	2.14	11	5	ND	4	86	.2	3	2	31	2.42	.045	17	19	.70	181	.01	6	1.51	.01	.17	1	3
M154	1	21	12	70	.1	26	9	214	1.94	7	5	ND	4	114	.2	2	2	30	.95	.047	18	21	.57	176	.01	9	1.37	.15	.14	1	1
M155	1	25	14	78	.1	29	10	477	2.23	14	5	ND	5	104	.4	2	2	31	2.13	.050	18	21	.88	195	.01	10	1.51	.12	.16	1	1
M156	1	19	11	65	.1	20	7	369	1.98	10	5	ND	4	80	.2	2	2	30	2.73	.045	17	18	.86	153	.01	8	1.35	.01	.15	1	1
M157	2	64	21	115	.1	31	15	209	3.03	24	5	ND	8	131	.3	3	2	47	1.00	.043	21	28	.57	381	.01	8	1.55	.02	.14	1	3
M158	1	11	11	60	.1	18	6	410	1.74	8	5	ND	4	29	.2	3	2	24	.53	.050	18	16	.38	121	.01	5	1.33	.01	.15	1	1
M159	1	24	10	74	.1	24	8	410	1.89	14	5	ND	6	104	.4	2	2	22	3.63	.058	16	15	1.31	112	.01	9	1.24	.04	.14	1	4
M160	1	25	13	78	.1	26	9	384	2.11	13	5	ND	5	109	.3	2	2	27	2.29	.051	18	18	.96	172	.01	9	1.35	.01	.15	1	3
M161	1	24	11	76	.1	25	8	431	2.05	11	5	ND	4	82	.3	2	2	26	1.91	.061	17	18	.78	178	.01	8	1.27	.01	.17	1	2
M162	1	24	11	74	.1	28	9	586	2.26	9	5	ND	5	127	.2	2	2	29	4.30	.056	16	19	.91	206	.01	8	1.42	.02	.15	1	2
M163	1	26	11	72	.1	25	8	365	1.92	13	5	ND	3	77	.3	2	2	28	2.48	.053	17	19	.92	159	.01	8	1.37	.01	.18	1	2
M164	1	26	13	98	.1	25	8	451	2.00	10	5	ND	3	46	.3	3	2	28	.82	.075	16	19	.52	166	.01	9	1.39	.01	.24	1	3
M165	1	15	8	47	.1	16	5	1020	1.35	6	5	ND	2	139	.3	2	2	16	16.05	.049	10	11	.66	101	.01	4	.77	.01	.10	1	1
M166	1	20	12	80	.1	22	7	430	1.89	6	5	ND	3	31	.2	2	2	27	.63	.054	18	18	.46	154	.01	7	1.36	.01	.24	1	4
M167	1	41	13	81	.1	34	10	398	2.43	17	5	ND	5	104	.4	2	2	39	2.26	.049	18	25	.87	177	.01	7	1.43	.01	.13	1	2
M168	1	5	5	38	.1	8	3	389	1.18	4	5	ND	4	106	.2	2	2	14	2.92	.046	11	9	.88	71	.01	4	.74	.67	.07	2	3
M169	1	11	8	44	.1	15	5	385	1.28	6	5	ND	3	66	.2	2	2	16	2.96	.060	11	9	1.06	97	.01	4	.66	.33	.07	2	3
M170	1	18	8	58	.1	21	8	482	1.72	9	5	ND	4	90	.2	2	2	22	2.55	.061	15	14	.95	185	.01	6	1.02	.02	.10	1	1
STANDARD C/AU-S	18	57	39	130	6.9	73	31	1054	3.97	41	20	7	39	56	19.9	15	21	58	.46	.095	39	59	.90	183	.07	32	1.90	.06	.13	11	53

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SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
M171	1	20	8	65	.6	26	8	590	2.02	9	5	ND	7	187	.4	4	2	25	3.70	.062	14	14	.92	97	.01	12	1.20	.27	.12	1	1
M172	1	25	6	76	.5	28	10	441	2.05	10	5	ND	6	80	.5	4	2	29	1.56	.054	17	16	.83	157	.01	11	1.38	.02	.15	1	4
M173	1	26	11	83	.5	27	10	321	2.21	9	5	ND	6	122	.3	3	2	29	2.18	.055	18	18	1.06	142	.01	14	1.38	.03	.12	1	1
M174	1	30	9	84	.5	32	11	375	2.26	13	5	ND	7	137	.2	4	2	30	2.40	.052	20	18	.97	188	.01	9	1.40	.02	.12	1	1
M175	1	28	14	80	.5	31	11	459	2.22	12	5	ND	6	107	.4	3	2	30	1.93	.053	18	18	.87	186	.01	10	1.43	.01	.15	1	1
M176	1	29	10	79	.2	32	10	409	2.22	7	5	ND	4	118	.4	2	2	30	2.28	.051	17	19	.92	172	.01	8	1.50	.01	.15	1	1
M177	1	17	8	65	.5	26	9	449	1.69	10	5	ND	6	145	.5	4	2	22	2.77	.057	13	14	1.05	92	.01	6	1.05	.35	.10	1	4
M178	1	7	5	46	.2	20	9	302	1.34	8	5	ND	5	173	.2	3	2	16	1.34	.049	14	10	.88	179	.01	22	.94	.19	.08	1	1
M179	1	24	15	84	.4	29	11	486	2.06	12	5	ND	6	173	.3	4	2	27	1.50	.058	14	18	1.22	143	.01	7	1.41	.88	.14	1	1
M180	1	33	16	92	.4	33	12	280	2.72	23	5	ND	7	217	.6	2	2	33	1.47	.054	19	19	.57	219	.01	12	1.39	.06	.16	1	4
M181	1	25	10	71	.4	27	9	542	2.25	10	5	ND	7	137	.7	2	2	30	5.38	.054	15	18	.96	167	.01	12	1.48	.26	.13	1	1
M182	1	19	14	77	.2	28	9	482	2.02	9	5	ND	3	120	.5	2	2	29	1.68	.054	18	18	.89	164	.01	13	1.57	.07	.20	1	1
M183	1	23	13	71	.1	25	9	259	2.06	9	5	ND	2	124	.5	3	2	27	2.72	.045	19	18	.63	246	.01	7	1.49	.01	.15	1	2
M184	1	22	15	81	.4	25	9	481	2.20	9	5	ND	4	32	.3	3	2	32	.63	.051	19	20	.50	184	.01	9	1.65	.01	.19	1	1
M185	1	24	12	73	.3	29	10	486	2.06	13	5	ND	5	142	.5	2	2	26	2.76	.053	17	16	.94	199	.01	12	1.25	.08	.11	1	2
M186	1	37	13	98	.2	44	12	567	2.13	11	5	ND	4	190	.8	2	2	37	1.66	.105	19	18	.81	376	.01	15	1.35	.03	.11	1	2
M187	1	6	6	34	.1	11	6	583	1.21	3	5	ND	4	142	.4	2	2	15	6.04	.042	12	8	.84	109	.01	4	.74	.14	.06	1	1
M188	1	5	5	49	.1	21	9	347	1.33	3	5	ND	2	77	.2	2	2	16	1.90	.049	12	11	1.20	73	.01	7	.72	.04	.07	1	2
M189	1	23	8	74	.5	31	10	422	2.04	10	5	ND	6	150	.7	2	2	27	2.68	.051	17	17	1.01	135	.01	6	1.32	.02	.12	1	1
M190	1	34	12	90	.3	42	20	437	2.78	19	5	ND	5	199	.3	2	2	30	.97	.052	24	22	.53	168	.01	8	1.59	.04	.16	1	1
M191	1	22	5	70	.1	28	9	424	1.89	7	5	ND	4	285	.6	2	2	24	4.34	.049	12	16	1.01	62	.01	9	1.18	.35	.10	1	2
M192	1	24	8	76	.2	28	9	429	2.17	10	5	ND	5	125	.5	2	2	28	2.97	.054	17	18	1.05	168	.01	8	1.42	.02	.14	1	3
M193	1	30	9	78	.2	49	15	435	2.23	9	5	ND	4	129	.7	2	2	26	2.76	.054	17	18	1.06	167	.01	8	1.38	.01	.13	1	1
M194	1	32	15	87	.1	35	13	380	2.54	9	5	ND	4	137	.6	2	2	30	2.00	.055	18	20	.79	176	.01	7	1.57	.02	.14	1	1
M195	1	43	10	95	.1	33	14	171	2.47	7	5	ND	4	393	.5	2	2	36	1.50	.041	16	19	.59	107	.01	14	1.42	.34	.10	1	1
M196	1	24	6	76	.1	25	9	407	2.10	11	5	ND	3	127	.6	2	2	27	2.08	.053	16	15	.89	180	.01	9	1.37	.02	.15	1	2
M197	1	23	8	70	.2	44	11	734	2.42	5	5	ND	4	109	.6	2	2	25	1.82	.056	13	17	1.04	80	.01	8	1.10	.58	.09	1	1
M198	1	19	8	61	.1	29	9	304	1.52	4	5	ND	2	130	.6	2	2	22	2.13	.049	14	15	.91	151	.01	7	1.10	.03	.10	1	1
M199	1	22	10	66	.1	25	10	357	1.92	10	5	ND	4	183	.6	2	2	26	2.69	.045	14	14	.79	113	.01	11	1.17	.05	.11	1	1
M200	1	15	6	55	.1	25	9	528	1.55	4	5	ND	2	75	.4	2	2	20	1.97	.051	13	13	.89	168	.01	6	.90	.06	.09	1	1
M201	1	18	8	62	.1	24	10	486	1.88	7	5	ND	4	143	.9	2	2	25	3.96	.052	12	16	.73	90	.01	6	1.10	.30	.09	1	1
M202	1	14	13	56	.3	24	9	530	1.71	7	5	ND	4	121	.5	2	2	22	5.07	.049	11	14	.71	110	.01	6	.94	.51	.08	1	2
M203	1	15	8	49	.1	24	9	747	1.38	7	5	ND	3	121	.7	2	2	16	2.84	.050	12	10	.94	112	.01	7	.73	.37	.07	1	1
M204	1	3	3	24	.6	7	4	354	1.13	9	5	2	4	84	.7	3	2	13	2.70	.031	10	6	.43	67	.01	3	.53	.04	.05	1	1
M205	1	1	5	21	.1	8	4	286	1.07	9	5	ND	1	76	.4	2	2	13	1.15	.026	6	8	.61	79	.01	7	.40	.08	.04	1	1
M206	1	13	6	39	.1	14	7	442	1.28	10	10	ND	1	56	.6	4	2	14	1.06	.033	7	11	.54	85	.01	8	.68	.02	.08	1	1
STANDARD C/AU-S	19	57	35	131	7.0	72	32	1053	3.97	42	18	7	39	56	20.0	19	20	56	.46	.095	39	56	.90	181	.07	33	1.89	.06	.14	11	53

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SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
M207	1	27	12	69	.1	25	9	391	2.04	12	5	ND	5	110	.3	2	2	27	1.93	.055	17	19	.92	164	.01	7	1.25	.01	.13	1	1
M208	1	8	6	41	.1	11	5	485	1.62	7	5	ND	4	74	.2	2	2	20	4.41	.048	13	11	.81	93	.01	5	.74	.08	.11	1	1
M209	1	28	14	81	.2	26	9	462	2.04	12	5	ND	4	123	.3	2	2	29	1.73	.059	17	18	.73	193	.01	10	1.35	.16	.16	1	2
M210	1	23	12	70	.3	28	11	739	2.71	8	5	ND	6	137	.2	2	2	30	1.00	.062	18	20	.63	190	.01	11	1.40	.19	.17	1	2
M211	1	22	11	77	.2	29	11	517	2.14	8	5	ND	4	107	.2	2	2	31	2.23	.063	16	21	.87	157	.01	6	1.31	.02	.15	1	3
M212	1	28	10	76	.2	27	9	458	2.20	11	5	ND	5	132	.4	2	2	29	3.13	.059	18	20	1.02	206	.01	8	1.36	.11	.14	1	6
M213	1	22	11	63	.1	20	7	364	1.87	8	5	ND	5	99	.2	2	2	25	2.68	.053	16	16	.89	146	.01	7	1.14	.15	.14	1	2
M214	1	27	12	80	.1	28	12	205	2.00	10	5	ND	5	111	.2	2	2	28	.64	.051	20	20	.57	202	.01	9	1.29	.02	.15	1	1
M215	1	31	13	78	.2	26	9	404	2.25	12	5	ND	6	159	.4	2	2	29	2.84	.056	18	19	.99	196	.01	8	1.41	.01	.16	1	1
M216	1	9	10	56	.1	14	5	297	1.51	2	5	ND	4	40	.2	2	2	26	1.62	.050	15	16	.81	108	.01	3	.91	.01	.09	1	1
M217	1	5	6	34	.1	9	4	452	1.39	2	5	ND	3	90	.2	2	2	17	6.29	.049	14	10	.71	95	.01	2	.78	.01	.09	1	1
SL323	1	19	13	56	.2	15	6	798	1.75	9	5	ND	6	121	.4	2	2	18	8.34	.050	18	11	1.94	164	.02	7	1.10	.01	.13	1	1
SL324	1	27	18	81	.2	21	9	355	1.93	4	5	ND	9	120	.5	2	2	26	4.18	.055	24	16	1.46	308	.01	13	1.89	.03	.20	1	2
SL325	1	27	15	83	.1	19	7	318	2.01	5	5	ND	9	130	.4	2	2	29	4.82	.041	23	17	1.23	409	.01	11	2.13	.04	.18	1	1
SL326	2	23	18	54	.3	17	4	288	1.71	16	5	ND	11	156	.3	3	2	31	4.50	.044	21	11	1.77	221	.02	11	.74	.13	.09	1	2
SL327	1	56	24	112	.4	31	10	297	2.61	18	5	ND	11	323	.8	2	3	34	3.96	.056	22	17	1.20	146	.02	19	1.48	.01	.17	1	1
SL328	1	9	7	38	.1	9	4	374	1.22	10	5	ND	5	42	.3	2	2	14	6.76	.053	15	9	2.44	73	.02	7	.71	.01	.10	1	3
SL329	1	29	16	83	.2	18	6	269	1.90	19	5	ND	8	88	.5	2	3	22	4.64	.054	21	15	1.85	176	.02	12	1.34	.02	.20	1	4
SL330	1	10	9	36	.1	11	4	276	1.09	10	5	ND	5	55	.2	2	2	14	5.36	.048	15	10	1.88	68	.02	6	.61	.01	.10	2	1
SL331	1	15	9	39	.1	12	5	244	.98	6	5	ND	6	73	.3	2	2	12	5.60	.049	16	10	1.94	92	.02	6	.73	.01	.08	2	2
SL332	1	25	15	69	.2	19	8	785	1.86	7	5	ND	7	107	.5	2	2	21	5.16	.049	21	14	1.82	182	.01	10	1.36	.03	.17	1	5
SL333	1	20	14	66	.1	18	8	412	2.60	36	5	ND	8	64	.3	2	2	18	4.23	.048	20	11	1.86	87	.02	6	1.17	.01	.16	1	3
SL334	1	23	14	74	.1	17	6	492	1.85	10	5	ND	6	48	.5	2	2	25	2.71	.083	21	16	1.02	167	.01	9	1.55	.01	.23	1	2
SL335	1	51	19	112	.1	41	11	183	2.74	9	5	ND	8	87	.7	2	2	40	.96	.045	24	29	.79	213	.01	12	1.93	.01	.14	1	3
SL336	1	9	5	36	.1	10	4	509	1.25	2	5	ND	4	118	.2	2	2	14	6.38	.048	11	8	2.09	107	.01	5	.58	.16	.06	1	5
SL337	1	17	8	59	.1	18	6	441	1.74	2	5	ND	6	102	.6	2	2	17	6.36	.049	15	14	1.96	133	.01	9	.94	.02	.11	1	2
SL338	1	30	11	79	.1	29	9	830	2.25	8	5	ND	5	79	.3	2	2	28	2.90	.064	18	20	1.21	168	.01	8	1.36	.01	.12	1	3
SL339	1	11	7	35	.1	10	4	414	1.44	4	5	ND	5	44	.3	2	2	12	6.13	.050	14	7	2.25	68	.01	5	.59	.01	.07	1	2
SL340	1	9	8	48	.1	15	6	327	1.25	8	5	ND	5	58	.2	2	2	16	4.14	.065	14	13	1.75	60	.02	7	.64	.01	.09	2	1
SL341	1	16	8	57	.1	17	6	372	1.66	7	5	ND	5	54	.2	2	2	22	3.27	.063	16	17	1.40	104	.01	5	.92	.01	.10	1	3
SL342	1	34	11	82	.2	28	9	536	2.42	9	5	ND	6	31	.3	2	2	33	1.27	.069	18	25	.95	143	.01	6	1.40	.01	.11	1	2
SL343	1	36	13	92	.2	29	9	540	2.63	11	5	ND	5	58	.4	2	2	35	1.38	.058	19	25	.94	159	.01	9	1.61	.01	.15	1	3
SL344	1	21	10	59	.1	17	6	593	2.02	9	5	ND	6	38	.4	2	2	20	4.74	.056	17	15	1.80	143	.01	5	1.06	.01	.14	1	1
SL345	1	49	18	100	.2	37	11	567	3.01	39	5	ND	7	119	.5	2	2	40	2.18	.054	20	25	.94	210	.01	8	1.51	.03	.13	1	6
SL346	1	12	7	49	.1	16	6	429	1.52	6	5	ND	5	58	.2	2	2	19	4.42	.063	16	13	1.63	76	.01	5	.75	.01	.08	1	1
SL347	1	13	9	49	.1	12	4	378	.99	5	5	ND	5	181	.4	2	2	13	9.46	.054	11	9	2.26	45	.02	12	.69	.02	.10	2	1
STANDARD C/AU-S	18	57	39	132	7.0	72	31	1055	3.98	42	20	7	40	52	19.7	14	21	58	.46	.096	39	60	.90	183	.07	32	1.90	.06	.13	11	47

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Noranda Exploration Co. Ltd. ([illegible]) PROJECT 1748 FILE # 90-5701

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL348	1	36	18	102	.2	30	14	317	2.28	25	5	ND	6	252	.9	2	2	30	6.39	.054	16	14	.95	57	.02	14	1.25	.02	.15	1	4
SL349	1	20	10	61	.1	15	6	646	1.61	9	5	ND	6	102	.5	2	2	18	7.02	.063	16	11	2.05	164	.02	16	.99	.01	.14	1	2
SL350	1	6	5	33	.1	7	3	224	.68	5	5	ND	5	62	.2	2	2	10	7.16	.059	13	6	2.33	53	.02	9	.49	.01	.08	1	2
SL351	1	10	6	40	.1	9	4	382	1.21	5	5	ND	5	75	.2	2	2	13	8.10	.067	15	8	2.44	55	.02	12	.66	.01	.10	1	1
SL352	1	21	11	72	.1	35	13	426	1.44	6	5	ND	4	100	.4	2	2	23	2.73	.061	15	16	1.07	73	.02	12	.97	.01	.07	1	1
SL353	4	33	25	93	.2	36	23	403	4.72	63	5	ND	8	509	1.0	2	2	62	3.98	.053	18	14	.41	57	.04	22	1.02	.10	.16	1	3
SL354	1	18	9	56	.3	13	5	496	1.64	10	5	ND	6	272	.5	2	2	16	9.04	.049	11	10	1.35	37	.02	17	.87	.01	.12	1	2
SL355	3	28	23	84	.1	21	8	276	2.74	22	5	ND	8	276	.6	2	2	47	2.01	.058	19	17	.75	223	.04	21	1.08	.02	.16	1	1
SL356	1	25	14	74	.1	20	7	435	2.01	9	5	ND	8	82	.5	2	2	24	3.54	.051	18	15	1.54	154	.02	7	1.23	.01	.15	1	1
SL357	3	33	18	101	.2	28	10	359	2.50	20	5	ND	9	160	.6	2	2	44	3.02	.060	22	19	1.24	490	.02	9	1.37	.01	.14	1	1
SL358	1	36	11	86	.2	24	9	722	3.26	10	5	ND	7	93	.7	2	2	31	2.73	.055	19	22	1.20	178	.01	10	1.39	.01	.13	1	5
SL359	2	40	26	129	.1	32	13	225	3.24	28	5	ND	10	127	.4	2	2	45	1.39	.052	22	19	.74	563	.02	4	1.46	.03	.12	1	5
SL360	1	10	10	51	.1	13	5	251	1.14	10	5	ND	5	61	.2	2	2	15	3.65	.050	14	11	1.15	190	.01	2	.66	.01	.07	1	1
SL361	1	22	13	75	.1	21	7	392	1.85	8	5	ND	7	92	.4	2	2	25	3.45	.052	18	16	1.30	233	.01	4	1.35	.01	.14	1	1
SL362	1	11	8	49	.1	11	5	634	1.26	6	5	ND	6	86	.4	2	2	15	7.55	.064	15	9	2.22	91	.02	17	.73	.03	.11	1	1
SL363	1	19	10	63	.1	16	7	630	1.71	7	5	ND	6	132	.5	2	2	19	7.18	.061	15	12	1.87	133	.02	18	.96	.04	.13	1	1
SL364	1	12	7	44	.1	9	4	607	1.35	8	5	ND	5	98	.3	2	2	13	9.51	.060	14	10	2.21	74	.02	9	.72	.01	.12	1	1
SL365	1	21	13	70	.1	15	6	327	1.74	7	5	ND	8	67	.4	2	2	21	5.02	.050	20	14	2.06	95	.03	5	1.20	.01	.16	1	1
SL366	1	27	15	77	.2	21	8	618	1.88	14	5	ND	7	124	.5	2	2	25	5.35	.059	19	17	1.63	162	.02	8	1.39	.01	.16	1	5
SL367	1	19	10	63	.1	21	8	387	1.69	13	5	ND	4	119	.5	2	2	24	7.16	.047	16	15	.97	239	.01	2	1.17	.01	.10	1	1
SL368	1	2	8	36	.1	7	4	376	1.54	6	5	ND	4	94	.2	2	2	16	1.42	.037	11	9	.84	110	.01	11	.66	.10	.09	1	2
SL369	1	3	7	40	.1	13	6	311	1.38	7	5	ND	4	104	.2	2	2	15	1.90	.048	14	10	1.06	166	.01	15	.65	.16	.09	1	2
SL370	1	13	10	60	.1	18	7	482	1.73	13	5	ND	5	129	.3	2	2	20	3.71	.058	13	14	1.31	67	.01	4	.96	.38	.13	1	2
SL371	1	6	8	39	.1	10	5	365	1.41	10	5	ND	4	70	.2	2	2	17	2.58	.043	13	9	.81	88	.01	6	.74	.02	.10	1	3
SL372	1	1	6	36	.1	7	4	265	1.24	3	5	ND	4	75	.2	2	2	15	1.34	.040	12	9	.97	101	.01	3	.62	.01	.08	1	3
SL373	1	6	8	38	.1	10	5	475	1.30	10	5	ND	4	76	.2	2	2	15	1.62	.040	12	9	.82	107	.01	9	.60	.01	.08	1	2
SL374	1	9	10	43	.1	15	6	179	1.20	23	5	ND	4	67	.2	2	2	15	1.51	.038	13	9	.74	150	.01	10	.70	.01	.09	1	1
SL375	1	9	9	44	.1	14	6	410	1.49	8	5	ND	4	67	.2	2	2	17	2.31	.042	13	10	.95	139	.01	8	.76	.01	.09	1	1
SL376	1	7	9	46	.1	12	6	661	1.91	10	5	ND	4	167	.3	2	2	21	8.32	.046	11	10	.68	106	.01	3	.84	.35	.12	1	2
SL377	1	11	13	70	.1	26	13	503	2.16	17	5	ND	6	161	.3	2	2	27	3.27	.061	16	14	.72	106	.02	4	1.20	1.04	.19	1	3
SL378	1	5	9	48	.1	13	6	558	1.90	4	5	ND	4	126	.3	2	2	20	1.31	.038	12	11	.75	69	.01	5	.79	.48	.09	1	1
SL379	1	11	11	54	.1	24	10	232	1.51	18	5	ND	4	134	.3	2	2	23	.84	.035	13	15	.51	143	.01	7	.85	.17	.08	1	1
SL380	1	13	9	60	.1	18	8	508	1.73	11	5	ND	5	88	.2	2	2	21	2.61	.061	15	13	1.39	122	.01	9	.97	.09	.12	1	1
SL381	1	6	10	50	.1	13	6	467	1.74	8	5	ND	5	92	.3	2	2	20	2.65	.050	13	12	.99	116	.01	6	.86	.03	.12	1	1
SL382	1	9	10	48	.1	15	7	505	1.56	14	5	ND	5	88	.2	2	2	20	2.15	.051	14	11	1.03	169	.01	8	.77	.03	.11	1	3
SL383	1	4	7	37	.1	9	5	421	1.60	3	5	ND	4	96	.2	2	2	16	2.01	.038	11	9	.67	86	.01	8	.65	.02	.09	1	2
STANDARD C/AU-S	18	58	37	131	6.7	72	32	1053	3.97	43	18	7	39	53	19.6	14	20	57	.46	.094	38	59	.90	182	.07	33	1.90	.06	.14	13	54

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL384	1	9	8	46	.1	15	6	526	1.29	9	5	ND	4	127	.2	2	2	15	2.82	.045	12	9	.95	85	.01	16	.65	.02	.10	1	8
SL385	1	7	9	37	.1	12	5	186	.96	19	5	ND	3	55	.2	2	2	11	1.69	.036	13	7	.82	147	.01	11	.58	.02	.08	1	5
SL386	1	27	11	76	.2	27	12	278	1.41	11	5	ND	6	82	.5	2	2	18	3.33	.069	17	11	1.67	242	.01	13	.91	.04	.10	1	1
SL387	1	24	12	75	.1	20	9	427	1.53	11	5	ND	6	113	.5	2	2	22	4.85	.058	17	12	2.05	325	.02	18	1.04	.03	.14	1	4
SL388	1	16	9	49	.1	14	5	462	1.33	13	5	ND	5	88	.2	2	2	15	6.37	.057	14	9	1.89	111	.01	14	.77	.03	.11	1	4
SL389	1	20	8	56	.1	12	5	1268	3.56	5	5	ND	6	111	.3	2	2	19	8.30	.064	16	11	1.52	160	.01	16	.93	.01	.15	1	4
SL390	1	11	11	53	.1	21	8	315	1.86	6	5	ND	3	137	.2	2	2	20	1.15	.045	13	13	.85	82	.01	11	.95	.82	.11	1	1
SL391	1	20	12	71	.1	30	12	644	1.78	8	5	ND	4	174	.2	2	2	24	2.54	.056	13	17	1.08	102	.01	11	1.11	.29	.12	1	4
SL392	1	7	6	46	.1	11	5	819	1.48	2	5	ND	4	120	.2	2	2	19	12.58	.049	11	10	.62	57	.01	5	.82	.62	.15	1	1
SL393	1	8	8	51	.1	21	9	392	2.03	7	5	ND	4	156	.2	2	2	21	1.00	.046	13	13	.73	88	.01	6	.86	1.00	.11	1	2
SL394	1	9	9	50	.1	17	8	295	1.65	14	5	ND	4	103	.2	2	2	22	1.57	.043	13	11	.80	94	.01	7	.85	.49	.14	1	1
SL395	1	8	13	50	.1	13	6	397	2.03	11	5	ND	4	129	.2	2	2	25	2.78	.044	12	11	.83	76	.01	7	.82	.77	.14	1	2
SL396	1	11	8	57	.1	18	8	253	1.79	6	5	ND	3	63	.2	2	2	25	.54	.051	16	17	.48	75	.01	8	1.14	.79	.15	1	7
SL397	1	24	11	70	.1	28	10	745	2.18	6	5	ND	4	157	.2	2	2	21	4.82	.061	13	15	1.29	81	.01	8	1.09	.92	.12	1	1
SL398	1	10	8	50	.1	18	6	397	1.27	5	5	ND	4	117	.2	2	2	17	4.49	.048	13	12	1.40	106	.01	9	.86	.03	.09	1	3
SL399	1	12	6	50	.1	18	7	426	1.40	9	5	ND	4	102	.2	2	2	15	4.41	.055	13	13	1.54	116	.01	6	.82	.16	.10	1	1
SL400	1	9	10	51	.1	15	7	492	2.43	10	5	ND	3	126	.2	2	2	26	1.92	.047	14	13	.87	140	.01	9	.94	.06	.13	1	2
SL401	1	6	3	39	.1	10	5	1410	3.60	2	5	ND	2	162	.2	2	2	27	8.77	.047	16	15	.39	114	.01	4	.72	.89	.09	1	3
SL402	1	15	9	59	.1	18	7	387	1.68	7	5	ND	5	92	.2	2	2	21	2.43	.063	16	15	1.34	111	.01	10	.99	.03	.14	1	4
SL403	1	6	3	35	.1	8	3	770	1.17	7	5	ND	3	187	.2	2	2	13	12.05	.035	17	9	.29	79	.01	3	.52	1.15	.06	1	3
SL404	1	7	10	49	.1	18	7	622	2.51	2	5	ND	3	110	.2	2	2	26	5.55	.047	12	11	.72	65	.01	5	.83	1.25	.14	1	2
SL405	1	6	8	50	.1	13	6	381	2.37	11	5	ND	3	131	.2	2	2	28	1.36	.046	13	13	.83	53	.01	8	.84	.76	.13	1	1
SL406	1	13	9	57	.1	19	8	631	2.03	14	5	ND	4	193	.2	2	2	23	4.41	.054	12	14	1.13	93	.01	7	1.01	.62	.15	1	4
SL407	1	17	11	57	.1	13	5	320	1.18	8	5	ND	6	78	.3	3	2	16	6.27	.063	17	10	2.03	103	.02	10	.94	.02	.12	1	2
SL408	1	20	13	62	.1	14	5	318	1.38	10	5	ND	6	78	.3	2	2	17	5.39	.057	16	11	1.78	106	.02	9	.95	.01	.12	1	4
SL409	1	16	7	55	.1	11	4	213	1.12	5	5	ND	5	50	.3	3	2	14	5.86	.059	16	9	2.13	86	.02	9	.76	.01	.10	1	1
SL410	1	40	14	93	.1	33	10	635	2.77	11	5	ND	5	74	.5	2	2	36	4.20	.054	21	26	1.05	281	.01	7	1.64	.01	.10	1	1
SL411	1	7	10	47	.1	17	8	219	1.56	5	5	ND	3	42	.2	2	2	21	.83	.035	11	11	.70	61	.01	6	.75	.57	.11	1	5
SL412	1	7	10	45	.1	14	6	422	2.10	8	5	ND	3	164	.2	2	2	21	1.86	.046	10	11	.96	53	.01	20	.76	.64	.10	1	2
SL413	1	13	8	57	.1	19	7	339	1.41	7	5	ND	4	145	.2	3	2	18	3.28	.061	12	13	1.57	134	.01	16	.95	.44	.11	1	1
SL414	1	14	8	57	.1	19	7	598	1.71	9	5	ND	4	125	.2	2	2	18	3.40	.062	15	12	1.54	137	.01	10	.95	.01	.12	1	1
SL415	1	16	10	56	.1	14	6	804	1.73	8	5	ND	5	121	.3	3	2	18	7.33	.064	16	10	1.90	147	.02	17	.92	.04	.15	1	4
SL416	1	19	11	62	.1	18	7	1001	2.14	6	5	ND	5	115	.4	2	2	19	5.91	.065	15	11	1.81	133	.02	22	.94	.12	.12	1	7
SL417	1	26	11	63	.1	20	6	180	1.32	8	5	ND	6	89	.4	2	2	20	3.39	.075	21	14	1.60	124	.01	13	1.09	.01	.12	1	1
STANDARD C/AU-S	18	58	39	130	6.9	72	31	1056	3.98	42	20	7	39	55	19.6	15	20	58	.46	.096	39	60	.90	183	.07	32	1.91	.06	.14	13	53

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL418	1	20	13	72	.1	23	9	545	1.95	9	5	ND	5	105	.2	2	2	24	2.28	.061	16	16	1.34	132	.01	9	1.20	.03	.15	1	2
SL419	1	11	9	43	.1	14	6	412	1.41	13	5	ND	4	78	.2	2	2	17	2.70	.048	12	9	.90	97	.01	9	.67	.29	.11	1	1
SL420	1	11	12	55	.1	14	6	452	1.90	13	5	ND	4	99	.2	2	2	24	2.13	.048	15	13	.83	135	.01	13	.98	.01	.13	1	1
SL421	1	11	10	38	.1	9	4	277	.99	16	8	ND	4	77	.2	2	2	11	6.42	.052	12	7	1.92	71	.02	9	.58	.01	.07	1	1
SL422	1	9	8	43	.1	15	6	400	1.42	5	5	ND	3	70	.2	2	2	19	2.18	.041	16	10	.73	120	.01	10	.70	.06	.10	1	1
SL423	1	8	9	47	.1	15	6	314	1.72	8	5	ND	3	104	.2	2	2	21	1.69	.038	13	11	.76	124	.01	10	.87	.04	.11	1	1
SL424	1	8	8	45	.1	17	7	349	1.64	14	5	ND	3	87	.2	2	2	20	1.97	.050	14	13	.82	129	.01	6	.76	.26	.10	1	1
SL425	1	16	10	62	.1	19	7	482	1.87	10	5	ND	5	115	.2	2	2	24	4.11	.056	16	14	1.08	166	.01	13	1.08	.11	.13	1	1
SL426	1	19	11	64	.1	20	8	305	1.88	15	5	ND	3	96	.2	2	2	24	1.66	.044	18	16	.68	161	.01	10	1.11	.08	.13	1	1
SL427	1	8	7	43	.1	16	7	367	1.38	7	5	ND	3	61	.2	2	2	19	2.07	.050	16	12	.74	152	.01	8	.64	.06	.09	1	1
SL428	1	11	7	53	.1	21	8	278	1.67	9	5	ND	3	84	.2	2	2	23	1.54	.043	18	16	.43	146	.01	7	.90	.16	.10	1	1
SL429	1	14	8	57	.1	19	8	398	1.95	7	5	ND	5	117	.2	2	2	27	1.89	.045	19	17	.74	127	.01	8	1.06	.05	.13	1	2
SL430	1	15	9	59	.1	20	8	427	1.70	11	5	ND	3	53	.2	2	2	23	1.41	.054	15	15	.92	141	.01	9	.98	.05	.13	1	1
SL431	1	11	10	58	.1	17	7	577	2.00	8	5	ND	4	98	.3	2	2	22	2.78	.065	15	15	1.34	113	.01	15	.98	.02	.12	1	1
SL432	1	22	12	64	.1	17	6	439	1.65	15	5	ND	5	107	.5	2	2	23	5.52	.056	17	13	1.55	175	.02	18	1.09	.02	.13	1	1
SL433	1	21	11	68	.1	15	6	1373	2.65	4	5	ND	6	145	.6	2	2	19	8.28	.068	15	13	1.83	102	.01	30	1.14	.02	.16	1	1
SL434	1	33	16	79	.2	22	8	599	2.07	13	5	ND	6	203	.7	2	2	27	7.69	.067	17	15	1.31	321	.02	14	1.28	.03	.14	1	1
SL435	1	16	9	57	.1	21	7	337	1.63	10	5	ND	3	105	.2	2	2	21	2.73	.046	15	14	.92	161	.01	7	.98	.10	.09	1	1
SL436	1	20	11	67	.1	22	8	456	1.91	12	5	ND	5	152	.4	2	2	25	4.34	.053	19	16	1.11	175	.01	16	1.18	.03	.12	1	1
SL437	1	25	11	67	.1	22	8	429	1.83	11	5	ND	5	184	.4	2	2	22	4.19	.053	17	14	1.11	171	.01	13	1.14	.06	.11	1	1
SL438	1	22	10	70	.1	23	9	517	2.08	9	5	ND	4	153	.5	2	2	26	4.09	.055	18	17	1.00	173	.01	10	1.37	.04	.14	1	1
SL439	1	9	7	44	.1	14	6	325	1.58	8	5	ND	3	59	.2	2	2	21	2.08	.042	14	11	.68	91	.01	6	.81	.05	.11	1	2
SL440	1	23	9	71	.1	24	8	393	1.72	10	5	ND	5	127	.4	2	2	21	3.69	.056	16	16	1.40	130	.01	9	1.21	.03	.12	1	1
SL441	1	15	10	56	.1	19	7	485	1.70	9	5	ND	4	75	.4	2	2	21	2.40	.047	15	13	.89	123	.01	10	.89	.06	.11	1	1
SL442	1	21	8	66	.1	28	9	436	1.70	9	5	ND	4	132	.4	2	2	24	2.47	.051	12	18	.99	97	.01	15	1.06	.28	.09	1	1
SL443	1	20	10	60	.1	22	8	539	2.47	6	5	ND	4	195	.3	2	2	27	3.92	.045	15	14	.85	154	.01	17	1.06	.03	.12	1	1
SL444	1	13	8	50	.1	16	7	459	1.43	13	5	ND	4	73	.3	2	2	18	2.74	.050	14	11	1.03	150	.01	9	.71	.05	.09	1	1
SL445	1	15	8	58	.1	19	7	477	1.78	10	5	ND	4	124	.4	2	2	21	4.01	.051	14	13	1.00	112	.01	9	.99	.28	.11	1	1
SL446	1	15	9	64	.1	22	8	369	1.90	13	5	ND	4	103	.2	2	2	23	2.34	.047	16	15	.64	121	.01	7	1.15	.05	.12	1	1
SL447	1	11	5	42	.1	15	6	383	1.26	10	5	ND	4	60	.2	2	2	16	2.38	.045	13	10	.92	132	.01	7	.62	.04	.09	1	2
SL448	1	14	11	65	.1	20	8	490	1.46	10	5	ND	4	149	.3	2	2	18	4.87	.061	13	14	1.26	87	.01	6	.94	.50	.09	1	2
SL449	1	6	5	34	.1	12	5	323	1.11	13	5	ND	3	58	.2	2	2	14	2.15	.046	13	9	.83	137	.01	7	.50	.04	.07	1	1
SL450	1	13	9	49	.1	16	6	539	1.42	12	5	ND	4	133	.3	2	2	18	5.69	.054	13	11	1.12	86	.01	10	.76	.40	.08	1	1
SL451	1	6	8	41	.1	12	5	373	1.46	6	5	ND	3	106	.2	2	2	18	2.34	.046	13	11	.97	95	.01	10	.78	.24	.09	1	1
SL452	1	14	11	62	.1	20	8	473	1.88	15	5	ND	4	120	.2	2	2	23	2.14	.052	13	16	1.17	85	.01	7	1.08	.52	.13	1	1
SL453	1	10	10	56	.1	16	7	458	1.98	15	5	ND	4	84	.3	2	2	23	2.40	.049	14	14	1.08	120	.01	8	1.01	.03	.11	1	1
STANDARD C/AU-S	18	57	39	131	6.9	73	32	1053	3.97	40	21	7	39	55	19.8	19	19	58	.46	.095	39	59	.89	183	.07	34	1.90	.06	.14	13	50

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL454	1	7	12	55	.1	15	7	395	1.82	3	5	ND	4	98	.2	2	2	24	2.50	.054	15	14	1.16	94	.01	12	1.02	.06	.12	1	6
SL455	1	15	11	58	.2	17	7	425	1.76	2	5	ND	4	105	.2	2	2	23	3.27	.053	16	15	1.17	117	.01	10	1.11	.02	.13	1	3
SL456	1	6	10	41	.1	11	5	440	1.56	4	5	ND	4	107	.2	2	2	19	4.34	.042	13	11	.84	93	.01	11	.77	.18	.09	2	1
SL457	1	8	9	45	.1	12	6	356	1.58	2	5	ND	3	84	.2	2	2	21	3.44	.046	15	11	.69	88	.01	6	.78	.06	.11	2	4
SL458	1	11	7	43	.1	15	6	371	1.38	6	5	ND	4	77	.2	2	2	18	2.92	.056	16	11	.93	141	.01	6	.70	.03	.09	2	1
SL459	1	19	9	59	.1	21	8	500	2.01	11	5	ND	4	183	.2	2	2	24	5.01	.042	15	15	.69	70	.01	8	1.07	.23	.12	1	1
SL460	1	12	11	53	.1	15	6	333	1.57	9	5	ND	3	88	.2	2	2	21	2.74	.049	14	12	.97	113	.01	11	.94	.08	.11	1	2
SL461	1	22	10	70	.1	26	9	411	2.05	7	5	ND	5	102	.2	2	2	26	2.08	.053	17	20	.83	164	.01	9	1.28	.04	.14	1	1
SL462	1	25	11	71	.1	26	9	420	2.02	11	5	ND	4	162	.4	2	2	25	2.77	.054	14	16	1.04	77	.01	10	1.19	.96	.12	1	2
SL463	1	17	10	54	.1	19	7	426	1.68	11	5	ND	4	139	.2	2	2	22	5.03	.048	15	15	.91	120	.01	12	1.00	.04	.11	1	2
SL464	1	20	12	66	.1	24	8	401	1.94	6	5	ND	4	125	.3	2	2	26	2.91	.050	16	20	.85	152	.01	9	1.28	.02	.14	1	1
SL465	1	12	9	50	.2	17	7	590	1.40	11	7	ND	4	113	.2	2	2	15	5.28	.064	14	10	1.70	109	.01	7	.80	.08	.07	2	3
SL466	1	15	9	55	.1	20	7	428	1.71	3	5	ND	4	104	.2	2	2	23	3.01	.051	14	18	1.05	108	.01	10	1.03	.09	.10	1	1
SL467	1	17	11	60	.2	23	8	372	1.82	4	5	ND	4	102	.2	2	2	24	2.66	.051	15	18	.82	150	.01	9	1.15	.06	.12	1	2
SL468	1	20	11	63	.2	22	8	366	1.78	11	5	ND	5	164	.3	2	2	24	3.47	.052	14	15	.98	93	.01	10	1.09	.20	.11	1	2
SL469	1	14	11	55	.1	19	8	415	1.65	12	5	ND	4	88	.3	2	2	21	2.70	.051	16	13	.92	136	.01	9	.88	.05	.12	2	2
SL470	1	23	13	76	.1	26	10	462	2.02	6	5	ND	5	128	.4	2	2	24	3.07	.055	17	16	1.14	281	.01	10	1.19	.02	.11	1	2
SL471	1	19	8	55	.2	18	7	610	1.66	2	5	ND	4	116	.3	2	2	19	4.89	.061	14	14	1.56	113	.01	8	.90	.02	.08	1	1
SL472	1	27	12	77	.1	33	11	555	2.54	6	5	ND	5	151	.4	2	2	27	3.14	.059	17	18	1.00	288	.01	9	1.35	.08	.11	1	7
SL473	1	30	12	85	.1	38	11	492	2.42	7	5	ND	5	128	.5	2	2	29	2.18	.049	17	21	.85	138	.01	10	1.47	.04	.13	1	4
SL474	1	16	9	56	.1	19	7	271	1.61	14	5	ND	3	82	.2	2	2	21	1.23	.031	12	14	.57	126	.01	7	.94	.04	.10	1	4
SL475	1	22	11	65	.1	25	9	400	1.98	7	5	ND	4	115	.3	2	2	25	2.66	.048	15	18	.83	171	.01	9	1.24	.04	.11	1	4
SL476	1	9	8	42	.1	15	6	402	1.35	6	5	ND	4	79	.2	2	2	16	2.96	.041	14	9	.77	129	.01	7	.62	.02	.10	2	1
SL477	1	20	13	62	.1	22	8	429	1.68	9	5	ND	5	113	.3	2	2	19	3.48	.061	15	16	1.41	233	.01	12	.99	.07	.10	1	7
SL478	1	26	12	78	.1	32	11	496	2.32	8	5	ND	4	129	.3	2	2	28	2.62	.048	17	18	.77	158	.01	11	1.38	.04	.13	1	1
SL479	1	15	10	56	.1	20	8	421	1.69	10	5	ND	4	88	.2	2	2	21	2.69	.047	16	13	.89	139	.01	9	.89	.06	.11	1	2
SL480	1	12	16	73	.1	18	8	400	2.42	15	5	ND	8	151	.2	2	2	21	1.15	.080	20	12	.90	105	.03	6	1.27	1.04	.19	1	10
SL481	1	16	9	55	.1	19	8	379	1.70	3	5	ND	4	100	.2	2	2	22	2.72	.052	15	14	.84	144	.01	9	1.02	.09	.11	1	6
SL482	1	10	11	51	.1	14	6	471	1.73	5	5	ND	7	118	.2	2	2	17	1.89	.049	15	9	.79	72	.02	4	.96	1.34	.14	1	2
SL483	1	17	10	59	.1	19	7	365	1.75	6	5	ND	4	88	.3	2	2	22	2.20	.046	15	14	.80	135	.01	8	1.05	.02	.11	1	11
SL484	1	12	14	68	.1	17	8	380	2.12	12	5	ND	7	116	.2	2	2	20	1.52	.054	16	11	.77	88	.03	7	1.10	.98	.15	1	3
SL485	1	20	10	62	.1	23	8	410	1.82	9	5	ND	4	110	.2	2	2	24	2.21	.045	14	17	.70	147	.01	10	1.12	.10	.11	1	1
SL486	1	26	11	73	.1	26	9	399	2.10	12	5	ND	4	101	.3	2	2	26	2.06	.050	17	18	.89	183	.01	9	1.38	.08	.12	1	1
SL487	1	11	8	37	.1	10	5	129	1.26	8	5	ND	5	153	.2	2	2	11	1.43	.048	14	8	.56	81	.01	7	.61	.35	.09	2	1
SL488	1	26	13	77	.1	27	9	403	2.13	11	5	ND	4	122	.4	2	2	25	2.41	.051	17	18	.89	190	.01	8	1.32	.02	.14	1	2
SL489	1	21	13	69	.1	24	9	369	1.95	10	5	ND	5	115	.4	2	2	23	2.12	.048	17	16	.90	198	.01	9	1.18	.03	.13	1	11
STANDARD C/AU-S	18	57	39	132	7.0	73	32	1054	3.98	39	21	7	39	53	19.3	15	18	57	.46	.094	38	59	.90	182	.07	34	1.90	.06	.13	13	54

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SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL490	1	24	9	69	.1	27	9	396	1.81	5	5	ND	4	148	.3	2	2	26	2.46	.053	13	17	1.20	73	.02	12	1.16	1.29	.10	1	3
SL491	1	27	12	78	.1	30	10	508	2.44	8	5	ND	4	96	.5	2	2	31	1.67	.053	16	22	.89	145	.01	9	1.38	.04	.13	1	3
SL492	1	21	10	62	.1	22	8	393	1.87	6	5	ND	4	123	.2	2	2	24	2.78	.051	14	15	.88	144	.01	8	1.15	.20	.11	1	1
SL493	1	29	13	85	.2	27	10	353	2.37	13	5	ND	5	149	.3	2	2	28	1.97	.054	17	17	.76	216	.01	9	1.33	.04	.13	1	1
SL494	1	12	7	51	.1	26	9	467	1.78	7	5	ND	3	126	.2	2	2	24	1.25	.039	13	15	.56	122	.01	9	.86	.35	.11	2	2
SL495	1	16	9	65	.2	22	8	385	1.82	8	5	ND	5	104	.3	2	2	23	2.25	.052	15	15	.98	157	.01	8	1.09	.16	.12	1	1
SL496	1	14	8	62	.1	21	8	180	1.75	6	5	ND	3	89	.2	2	2	23	.69	.037	11	16	.51	66	.01	8	1.08	.63	.13	1	2
SL497	1	30	15	95	.1	35	13	739	2.90	10	5	ND	6	148	.2	2	2	33	1.17	.061	17	22	.80	296	.01	11	1.67	.08	.16	1	1
SL498	1	20	10	62	.1	24	8	416	1.76	6	5	ND	4	126	.2	2	2	24	2.97	.048	13	15	.83	120	.01	8	1.11	.05	.11	1	5
SL499	1	17	9	59	.1	20	8	458	1.83	10	5	ND	4	114	.2	2	2	22	1.99	.048	13	13	.73	114	.01	10	1.00	.22	.11	1	4
SL500	1	26	12	75	.1	27	9	308	1.99	15	5	ND	5	103	.3	2	2	27	1.32	.046	18	18	.76	178	.01	7	1.22	.06	.13	1	3
SL501	1	26	12	89	.1	35	12	768	2.45	7	5	ND	5	248	.3	2	2	27	1.73	.063	14	22	1.10	188	.01	8	1.54	.56	.16	1	3
SL502	1	18	10	65	.1	22	9	690	2.05	11	5	ND	5	107	.2	2	2	22	1.79	.056	14	15	.88	132	.01	8	1.19	.15	.13	1	1
SL503	1	21	10	64	.1	23	8	437	1.84	8	5	ND	4	97	.3	2	2	24	2.37	.051	16	16	.84	185	.01	8	1.20	.01	.14	1	2
SL504	1	19	10	67	.1	22	8	485	2.14	12	5	ND	5	146	.2	2	2	27	1.79	.048	13	18	.68	124	.01	9	1.35	.11	.14	1	4
SL505	1	26	11	83	.3	29	10	542	2.35	3	5	ND	6	214	.3	2	2	26	1.90	.064	15	19	1.04	123	.01	7	1.44	.79	.13	1	3
SL506	1	31	13	89	.2	32	11	762	2.59	9	5	ND	6	237	.2	2	2	28	2.55	.065	14	21	1.22	89	.01	8	1.56	.79	.15	1	3
SL507	1	22	11	81	.2	23	9	404	2.12	12	5	ND	6	124	.2	2	2	26	1.37	.056	15	18	1.12	80	.01	7	1.54	1.02	.17	1	1
SL508	1	29	14	88	.1	31	11	642	2.62	14	5	ND	5	145	.2	2	2	31	1.88	.059	16	20	.82	159	.01	10	1.64	.05	.15	1	1
SL509	1	28	14	79	.2	26	9	394	2.17	9	5	ND	5	115	.3	2	2	28	2.08	.052	17	19	.95	171	.01	9	1.44	.02	.16	1	2
SL510	1	30	10	87	.2	28	10	670	2.60	8	5	ND	6	159	.3	2	2	26	1.43	.066	13	18	1.08	78	.01	7	1.43	1.60	.14	1	1
SL511	1	31	14	90	.2	31	11	774	2.85	12	5	ND	6	220	.2	2	2	32	2.58	.066	15	21	.92	106	.01	11	1.64	.55	.16	1	1
SL512	1	16	10	58	.1	19	7	396	1.70	10	5	ND	5	88	.2	2	2	21	2.63	.052	16	13	.98	145	.01	8	.95	.03	.10	1	1
SL513	1	17	11	58	.2	19	7	435	1.69	9	5	ND	5	67	.2	2	2	22	1.98	.056	14	14	.98	128	.01	7	1.06	.05	.13	1	1
SL514	1	21	9	73	.2	25	9	713	2.24	16	5	ND	5	122	.2	2	2	27	1.85	.060	14	17	.99	159	.01	9	1.39	.34	.14	1	3
SL515	1	20	11	66	.2	22	8	480	2.01	12	5	ND	5	140	.2	2	2	26	3.41	.055	13	16	.90	116	.01	8	1.36	.10	.13	1	1
SL516	1	36	16	109	.2	45	16	1686	3.91	13	5	ND	6	388	.3	2	2	38	1.68	.099	18	24	.84	323	.01	12	1.91	.13	.16	1	1
SL517	1	23	11	75	.3	28	10	580	2.21	5	5	ND	7	185	.2	2	2	23	1.44	.060	15	18	1.07	154	.01	6	1.35	.87	.13	1	1
SL518	1	19	11	62	.2	22	8	432	1.78	11	5	ND	4	82	.3	2	2	23	1.94	.051	15	15	.84	158	.01	7	1.13	.04	.11	1	2
SL519	1	22	12	71	.2	24	9	503	2.10	15	5	ND	5	173	.3	2	2	26	3.39	.054	14	17	.90	148	.01	8	1.39	.06	.13	1	1
SL520	1	21	12	69	.1	23	8	424	1.96	6	5	ND	4	108	.4	2	2	25	2.13	.051	15	16	.86	161	.01	7	1.29	.05	.13	1	5
SL521	1	7	9	51	.1	13	6	813	1.87	2	5	ND	4	158	.2	2	2	16	12.34	.048	10	9	.66	91	.01	2	.83	1.01	.10	2	3
SL522	1	19	9	70	.2	26	10	488	2.02	6	5	ND	5	117	.4	2	2	26	2.53	.055	17	17	.93	178	.01	8	1.26	.05	.12	1	5
SL523	1	14	9	63	.1	20	8	398	1.84	4	5	ND	5	106	.2	2	2	21	1.96	.054	16	14	.94	188	.01	6	1.17	.03	.12	1	2
SL524	1	18	9	56	.2	17	7	438	1.64	9	5	ND	5	382	.2	2	2	19	5.65	.046	12	12	.87	56	.01	11	1.10	.28	.11	1	5
SL525	1	16	10	56	.1	19	8	391	1.62	10	5	ND	4	79	.2	2	2	20	2.38	.050	15	13	.97	143	.01	8	.89	.05	.11	1	1
STANDARD C/AU-S	17	57	37	131	6.7	71	32	1054	3.97	38	21	7	38	53	18.9	18	18	56	.46	.093	37	57	.90	181	.07	34	1.90	.06	.14	13	53

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL526	1	15	7	53	.1	20	8	406	1.59	11	5	ND	4	80	.2	2	2	20	2.23	.047	15	13	.88	153	.01	6	.87	.03	.10	1	3
SL527	1	9	6	38	.1	14	6	273	1.18	6	5	ND	3	65	.2	2	2	16	1.69	.036	13	9	.70	117	.01	5	.60	.04	.07	2	2
SL528	1	16	10	57	.1	23	8	342	1.52	5	5	ND	4	105	.3	2	2	19	3.25	.050	14	14	1.18	193	.01	7	1.00	.07	.09	1	1
SL529	1	17	10	63	.1	33	10	252	1.95	11	5	ND	4	196	.2	2	2	27	1.51	.039	16	18	.61	174	.01	8	1.19	.16	.13	1	5
SL530	1	17	11	68	.1	24	11	720	2.56	9	5	ND	5	172	.2	2	2	26	1.47	.070	14	15	.92	105	.01	9	1.23	1.06	.13	1	1
SL531	1	25	11	79	.1	27	9	378	2.26	7	5	ND	5	123	.4	2	2	27	2.57	.053	17	19	.83	165	.01	7	1.39	.01	.14	1	3
SL532	1	19	10	71	.1	24	9	409	2.03	14	5	ND	5	103	.4	2	2	22	2.86	.066	16	16	1.31	114	.01	7	1.21	.09	.10	1	1
SL533	1	23	12	71	.2	25	9	418	1.97	5	5	ND	5	166	.3	2	2	26	3.11	.052	14	16	.88	84	.01	11	1.32	.56	.13	1	2
SL534	1	18	11	61	.1	21	8	450	1.98	6	5	ND	4	120	.2	2	2	27	1.86	.045	14	17	.57	89	.01	11	1.18	.28	.13	1	1
SL535	1	26	13	81	.1	30	13	840	2.75	2	5	ND	5	116	.2	2	2	26	1.93	.058	17	19	.82	242	.01	10	1.35	.15	.13	1	1
SL536	1	12	10	58	.1	17	7	379	1.93	2	5	ND	4	98	.2	2	2	25	2.20	.045	17	16	.77	123	.01	6	1.08	.03	.10	1	4
SL537	1	6	7	46	.1	13	6	294	1.48	7	5	ND	3	83	.2	2	2	21	1.73	.040	15	12	.57	94	.01	6	.78	.14	.11	2	2
SL538	1	3	4	31	.1	10	4	150	.89	6	5	ND	3	41	.2	2	2	13	1.23	.037	16	8	.47	103	.01	9	.42	.13	.06	2	1
SL539	1	16	10	59	.1	20	7	312	1.85	6	5	ND	4	47	.2	2	2	25	1.29	.048	18	16	.73	122	.01	6	1.12	.01	.11	1	1
SL540	1	8	7	39	.1	10	5	366	1.48	7	5	ND	3	61	.2	2	2	19	2.95	.052	14	11	.95	90	.01	8	.82	.05	.09	2	1
SL541	1	5	10	46	.1	14	6	197	1.22	3	5	ND	4	24	.2	2	2	18	.99	.052	19	13	.41	90	.01	3	1.04	.01	.10	2	1
SL542	1	12	11	61	.1	22	7	274	1.58	11	5	ND	4	25	.2	2	2	24	.52	.048	22	16	.36	148	.01	6	1.27	.01	.10	1	5
SL543	1	18	11	74	.1	21	8	471	2.01	9	5	ND	4	24	.5	2	2	30	.42	.045	21	20	.40	183	.01	3	1.66	.01	.13	1	1
SL544	1	12	8	44	.1	14	6	244	1.60	6	5	ND	2	161	.3	2	2	18	8.27	.058	17	13	.57	214	.01	4	1.10	.01	.11	1	4
SL545	1	6	8	38	.1	12	5	169	.91	8	5	ND	5	71	.2	2	2	13	2.55	.066	18	10	1.34	93	.01	4	.81	.01	.07	2	1
SL546	1	12	10	51	.1	15	6	463	1.44	3	5	ND	4	134	.3	2	2	20	3.79	.043	16	12	.71	157	.01	5	1.14	.01	.11	1	3
SL547	1	5	6	42	.1	13	6	333	1.43	10	5	ND	4	132	.2	2	2	17	2.60	.050	14	11	.98	130	.01	3	.78	.01	.10	2	4
SL548	1	10	8	52	.1	15	6	375	1.54	7	5	ND	3	107	.2	2	2	21	3.30	.053	15	13	.98	106	.01	4	.95	.01	.09	1	1
SL549	1	14	8	49	.1	14	6	276	1.58	7	5	ND	4	234	.2	2	2	22	3.48	.048	15	13	1.14	151	.01	6	.94	.23	.07	2	1
SL550	1	20	9	62	.1	19	8	331	1.78	9	5	ND	4	113	.2	2	2	26	2.37	.053	17	16	.98	167	.01	5	1.12	.01	.09	1	1
SL551	1	7	11	48	.1	14	7	399	1.49	8	5	ND	3	136	.2	2	2	21	2.73	.041	14	13	.57	104	.01	4	.88	.01	.09	2	1
SL552	1	5	5	46	.1	13	7	337	1.45	5	5	ND	3	113	.2	2	2	21	1.75	.038	15	13	.55	87	.01	7	.79	.01	.09	2	2
SL553	1	10	8	58	.1	16	6	555	2.05	7	5	ND	4	109	.2	2	2	26	2.21	.051	16	16	.88	150	.01	8	.94	.01	.09	1	1
SL554	1	20	11	65	.1	21	8	410	1.82	12	5	ND	5	142	.3	2	2	25	3.54	.051	17	16	1.07	177	.01	9	1.19	.04	.10	1	3
SL555	1	11	9	51	.1	16	7	279	1.37	6	5	ND	3	90	.2	2	2	21	1.75	.039	15	14	.58	101	.01	7	.89	.01	.12	2	1
SL556	1	17	11	67	.1	20	7	326	1.77	10	5	ND	4	74	.3	2	2	26	2.04	.057	17	17	1.02	167	.01	7	1.24	.02	.15	1	2
SL557	1	21	12	69	.1	24	9	457	1.90	10	5	ND	5	96	.4	2	2	27	3.81	.055	18	17	1.04	294	.01	7	1.35	.01	.13	1	2
SL558	1	25	12	80	.1	25	8	402	2.18	12	5	ND	5	94	.3	2	2	28	1.98	.066	18	18	1.07	146	.01	8	1.34	.05	.15	1	1
SL559	1	12	9	54	.1	18	7	883	1.95	13	5	ND	5	152	.2	2	2	19	1.80	.059	14	12	1.05	205	.01	7	1.05	.10	.11	1	3
SL560	1	34	12	88	.1	30	10	652	2.75	15	5	ND	5	160	.3	2	2	30	1.80	.091	16	25	.91	82	.01	8	1.79	1.68	.15	1	1
SL561	1	18	9	62	.1	24	10	680	1.72	8	5	ND	4	84	.3	2	2	22	1.89	.067	15	14	1.15	191	.01	8	1.06	.06	.12	1	1
STANDARD C/AU-S	18	57	39	130	6.9	72	31	1054	3.97	42	20	7	40	56	19.7	15	19	58	.46	.096	39	60	.90	183	.07	32	1.90	.06	.14	11	53

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SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL562	1	21	9	66	.1	22	8	425	1.86	4	5	ND	4	108	.4	2	2	24	2.28	.051	16	15	.88	146	.01	6	1.13	.03	.10	1	1
SL563	1	23	10	73	.1	23	8	509	1.98	5	5	ND	4	98	.2	2	2	23	1.62	.057	12	16	.97	91	.01	5	1.18	.85	.11	1	2
SL564	1	27	13	68	.1	23	8	520	1.70	9	5	ND	4	148	.4	2	2	20	2.63	.054	15	13	.82	159	.01	10	1.01	.01	.11	1	4
SL565	1	23	10	70	.1	26	8	414	1.92	6	5	ND	3	109	.4	2	2	25	2.21	.052	16	17	.87	147	.01	7	1.27	.01	.11	1	1
SL566	1	30	14	81	.2	32	13	469	2.48	2	5	ND	5	481	.2	2	2	29	1.38	.046	18	20	.56	326	.01	11	1.43	.02	.12	1	1
SL567	1	30	13	83	.1	28	10	546	2.18	7	5	ND	5	146	.2	2	2	25	1.08	.057	14	19	.95	167	.01	6	1.31	.64	.12	1	2
SL568	1	28	10	75	.1	27	9	431	2.10	3	5	ND	4	123	.4	2	2	28	2.35	.050	17	18	.84	148	.01	7	1.32	.02	.11	1	2
SL569	1	26	9	73	.1	25	8	340	1.90	10	5	ND	4	101	.4	2	2	26	1.86	.052	17	17	.88	139	.01	8	1.24	.01	.13	1	1
SL570	1	25	9	76	.1	25	8	414	1.98	4	5	ND	4	180	.2	2	2	23	1.75	.053	12	16	.90	116	.01	5	1.21	.64	.11	1	2
SL571	1	17	9	66	.2	24	8	628	1.92	5	5	ND	5	117	.2	2	2	22	2.16	.062	14	15	1.11	125	.01	6	1.05	.02	.10	1	2
SL572	1	18	8	60	.1	22	8	382	1.66	11	5	ND	4	82	.2	2	2	21	2.50	.057	15	14	1.16	118	.01	7	.97	.07	.10	1	2
SL573	1	21	9	64	.1	23	8	435	1.65	5	5	ND	4	85	.2	2	2	20	1.43	.045	10	14	.94	48	.01	5	1.01	.72	.10	1	3
SL574	1	23	9	69	.1	22	8	317	1.81	10	5	ND	5	106	.3	2	2	24	2.33	.051	16	15	1.09	129	.01	7	1.13	.01	.13	1	4
SL575	1	26	9	80	.1	32	10	510	2.22	11	5	ND	5	144	.4	2	2	26	2.52	.054	17	18	.93	166	.01	8	1.32	.03	.10	1	3
SL576	1	15	10	46	.1	13	5	220	1.47	30	5	ND	4	205	.4	2	2	13	7.02	.053	12	7	1.92	40	.02	8	.69	.02	.08	1	1
SL577	1	17	8	66	.1	35	9	361	1.63	11	5	ND	3	113	.2	2	2	22	2.15	.049	13	18	1.04	99	.01	6	1.06	.04	.06	1	2
SL578	1	24	11	67	.1	23	8	342	1.87	13	5	ND	2	85	.3	2	2	27	3.28	.049	18	18	.76	186	.01	6	1.48	.05	.12	1	1
SL579	1	22	10	67	.1	23	9	201	1.89	6	5	ND	4	177	.2	2	2	26	2.13	.041	19	18	.61	177	.01	5	1.35	.02	.11	1	4
SL580	1	20	12	74	.1	22	8	425	1.94	9	5	ND	4	25	.3	2	2	27	.70	.054	18	18	.49	149	.01	4	1.36	.01	.19	1	1
SL581	1	21	12	71	.1	23	8	425	1.84	9	5	ND	3	59	.3	2	2	25	3.09	.055	17	16	.75	163	.01	4	1.28	.01	.14	1	2
SL582	1	23	13	76	.2	28	9	461	2.15	14	5	ND	4	27	.3	2	2	30	.45	.039	20	20	.45	151	.01	3	1.54	.01	.15	1	17
SL583	1	23	14	76	.1	28	9	441	2.11	14	5	ND	4	29	.2	2	2	29	.52	.044	21	19	.49	147	.01	4	1.51	.01	.15	1	4
SL584	1	25	12	77	.1	26	8	369	2.01	7	5	ND	4	46	.4	2	2	28	1.14	.052	18	19	.67	158	.01	5	1.56	.01	.17	1	2
SL585	1	25	12	73	.2	24	8	328	1.91	8	5	ND	4	127	.5	2	2	26	2.89	.051	17	17	.88	154	.01	6	1.41	.01	.16	1	1
SL586	1	25	9	71	.2	27	9	486	2.21	6	5	ND	5	163	.2	2	2	25	2.66	.050	16	18	.91	92	.01	10	1.24	.11	.12	1	5
SL587	1	20	7	59	.2	22	7	1243	3.75	16	5	ND	4	335	.4	2	2	21	8.62	.070	13	14	.70	100	.01	12	1.08	.08	.09	1	4
SL588	1	18	9	59	.1	22	8	385	1.65	9	5	ND	4	105	.2	2	2	22	2.54	.051	15	14	.89	155	.01	8	1.01	.08	.10	1	4
SL589	1	28	11	85	.1	36	11	386	2.49	18	5	ND	5	171	.4	2	2	27	1.49	.052	21	19	.60	152	.01	8	1.31	.08	.13	1	2
SL590	1	19	9	66	.2	23	8	415	1.83	5	5	ND	5	130	.4	2	2	24	3.06	.051	17	16	.92	155	.01	6	1.17	.04	.11	1	2
SL591	1	22	11	67	.2	27	8	445	1.72	8	5	ND	5	99	.5	2	2	24	3.21	.057	15	17	1.47	123	.01	6	1.05	.04	.09	1	1
SL592	1	28	13	74	.1	27	9	491	2.09	21	5	ND	6	221	.3	2	2	28	3.26	.049	14	16	.75	76	.01	9	1.22	.25	.11	1	1
SL593	1	27	14	71	.2	30	11	1141	1.86	16	5	ND	6	190	.7	2	2	22	2.05	.056	15	12	.85	183	.01	11	.95	.04	.10	1	2
SL594	1	22	10	66	.2	24	8	606	2.04	9	5	ND	5	136	.4	2	2	24	3.62	.053	16	16	.92	176	.01	9	1.09	.13	.11	1	1
SL595	1	29	11	80	.1	29	9	401	2.19	12	5	ND	5	117	.4	2	2	28	1.89	.053	17	19	.90	144	.01	7	1.37	.01	.16	1	1
SL596	1	20	9	63	.2	28	9	645	1.87	12	5	ND	4	156	.4	2	2	23	5.19	.051	14	16	.87	177	.01	10	1.13	.17	.09	1	2
SL597	1	23	9	69	.2	26	8	379	1.90	12	5	ND	5	166	.5	2	2	27	2.41	.047	16	18	.85	152	.01	11	1.27	.03	.11	1	3
STANDARD C/AU-S	18	58	38	131	7.1	73	31	1054	3.98	42	22	7	40	52	19.6	14	20	58	.46	.095	39	60	.90	175	.07	32	1.90	.06	.14	13	52

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
SL598	1	23	11	70	.1	24	8	382	1.90	9	5	ND	4	135	.3	2	2	25	2.76	.054	14	17	1.04	146	.01	8	1.21	.10	.12	1	4
SL599	1	29	14	73	.3	26	9	1001	3.05	11	5	ND	5	207	.6	2	2	26	4.08	.054	14	14	.84	97	.02	15	1.09	.44	.10	1	1
SL600	1	19	9	64	.3	21	7	1185	2.64	9	8	ND	3	213	.3	2	2	23	7.30	.063	13	16	.97	121	.01	8	1.08	.02	.13	1	1
SL601	1	27	11	67	.2	24	9	508	1.79	5	5	ND	4	121	.3	2	2	21	3.13	.053	15	15	1.10	134	.01	7	1.11	.03	.09	1	1
SL602	1	13	7	50	.1	17	6	322	1.21	6	5	ND	3	69	.3	2	2	16	4.12	.053	13	12	1.70	83	.01	6	.84	.02	.08	1	1
SL603	1	17	9	61	.1	21	8	374	1.71	6	5	ND	4	100	.2	2	2	23	2.44	.048	15	15	.86	143	.01	8	1.08	.01	.11	1	4

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
10877	1	13	10	66	.1	15	6	421	1.63	9	5	ND	2	84	.3	2	2	21	3.23	.055	14	12	.90	179	.01	13	1.01	.17	.14	1	2
10879	1	12	8	54	.1	15	6	479	1.50	5	5	ND	3	134	.2	2	2	19	2.69	.049	12	12	.84	133	.01	16	.80	.71	.09	1	2

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
R SLR75	1	4	4	18	.2	4	2	331	1.18	2	5	ND	2	130	.2	2	2	11	19.73	.042	6	6	.49	114	.01	2	.40	.02	.09	1	10
R SLR76	1	9	7	34	.3	9	4	2256	3.46	2	5	ND	5	128	.8	2	2	18	19.67	.043	9	7	1.08	194	.01	5	.62	.17	.13	1	7
R SLR77	1	6	3	27	.2	6	3	1413	1.92	3	5	ND	4	129	.6	2	2	11	27.00	.077	7	6	.91	350	.02	4	.54	.03	.12	1	6
R SLR78	1	10	3	23	.3	4	2	2071	1.97	2	9	ND	4	140	.6	2	2	10	34.15	.056	5	5	.47	263	.01	3	.45	.02	.09	1	1
R SLR79	1	14	7	42	.2	11	5	969	1.87	8	5	ND	5	118	.6	2	2	15	23.32	.049	9	9	1.23	240	.02	4	.77	.02	.17	1	4
R SLR80	1	11	7	46	.2	15	6	1152	2.68	9	5	ND	5	134	.6	2	2	20	16.83	.047	13	13	.94	121	.01	6	.66	.03	.09	1	5
R SLR81	1	8	4	31	.1	5	3	816	1.27	2	6	ND	4	137	.4	2	2	9	22.26	.047	8	5	1.23	97	.02	8	.50	.02	.10	1	2
R SLR82	1	28	9	73	.1	21	8	2142	8.47	2	5	ND	6	112	1.1	2	2	36	2.45	.047	19	21	1.16	120	.01	20	1.35	.02	.15	1	3
R SLR83	1	10	5	35	.3	5	2	2428	2.26	8	5	ND	3	186	.5	2	2	11	26.56	.104	7	5	.62	364	.01	7	.60	.02	.13	1	6
R SLR84	1	6	6	32	.3	6	3	951	1.55	5	5	ND	5	122	.5	2	2	11	20.94	.049	10	6	1.34	107	.01	8	.55	.02	.12	1	3
R SLR85	1	11	8	33	.2	9	3	1022	2.89	8	5	ND	4	120	.5	2	2	12	19.97	.039	9	7	1.28	136	.03	3	.58	.02	.14	1	2
R SLR86	1	3	5	29	.2	5	2	877	1.72	8	5	ND	3	122	.3	2	2	18	21.39	.047	8	7	.38	154	.01	5	.59	.02	.14	1	3
R SLR87	1	3	6	32	.2	4	3	911	2.10	3	5	ND	4	130	.5	2	2	19	22.00	.062	8	7	.43	156	.02	6	.58	.03	.14	1	3
R SLR88	1	6	7	32	.1	6	3	572	1.95	3	5	ND	3	125	.4	2	2	19	21.68	.042	8	7	.46	113	.01	6	.68	.08	.15	1	2
R SLR89	1	32	15	93	.2	32	12	248	1.96	14	5	ND	8	79	.8	2	2	26	1.81	.060	24	17	.84	112	.02	18	1.69	.04	.19	1	2
R SLR90	3	27	13	52	.1	18	4	40	1.33	4	5	ND	6	186	.3	2	2	29	1.51	.016	16	13	.41	204	.02	31	.94	.06	.08	1	3
R SLR91	1	16	11	37	.2	7	3	105	.68	2	5	ND	5	162	.4	2	2	20	2.71	.016	13	9	.48	150	.02	28	.80	.05	.06	2	1
R SLR92	1	25	15	66	.1	19	6	153	2.13	16	5	ND	6	179	.4	2	2	31	2.41	.072	16	17	.77	202	.02	45	1.60	.08	.17	1	1
R SLR93	1	6	7	35	.1	9	4	806	1.20	9	5	ND	4	143	.3	2	2	9	17.93	.041	10	6	1.32	73	.02	7	.52	.02	.10	1	2
R SLR94	1	3	4	32	.1	5	3	587	2.15	4	5	ND	3	128	.3	2	2	20	19.07	.042	7	8	.46	93	.01	4	.59	.04	.11	1	1
R SLR95	1	2	4	27	.2	5	3	503	2.18	5	5	ND	3	142	.5	2	2	17	27.05	.059	6	5	.48	158	.02	5	.50	.03	.12	1	1
R SLR96	1	3	5	34	.1	8	3	721	2.00	7	5	ND	3	133	.3	2	2	20	21.41	.046	9	7	.41	110	.01	4	.65	.05	.13	1	4
R SLR97	1	4	8	33	.2	5	3	459	1.91	3	5	ND	3	158	.3	2	2	17	28.49	.081	7	6	.47	181	.02	4	.64	.07	.15	1	2
R SLR98	1	6	7	31	.1	9	4	507	1.63	6	5	ND	2	108	.2	2	2	22	20.23	.041	7	7	.45	134	.01	4	.53	.02	.11	1	2
R SLR99	1	4	4	22	.2	8	3	1530	5.60	10	5	ND	2	129	.9	2	2	29	20.10	.075	6	6	.52	169	.01	2	.43	.03	.08	1	1
R SLR100	1	4	7	32	.1	5	3	535	2.41	15	5	ND	3	147	.3	2	2	20	24.06	.059	7	6	.43	145	.02	3	.62	.05	.13	1	5
R SLR101	1	3	3	28	.1	8	3	467	1.74	4	5	ND	3	107	.3	2	2	21	18.77	.036	7	8	.46	76	.01	4	.53	.08	.10	1	2
R SLR102	1	6	6	29	.1	6	3	510	1.29	9	5	ND	3	98	.2	2	2	15	18.34	.029	7	7	.39	68	.01	5	.56	.02	.11	1	2
R SLR103	1	5	2	21	.1	7	2	523	1.19	6	5	ND	1	133	.2	2	2	14	18.38	.029	8	9	.20	73	.01	4	.35	.03	.05	1	2
R SLR104	1	5	7	39	.1	8	4	793	2.87	9	5	ND	4	130	.6	2	2	22	25.35	.052	9	6	.49	109	.03	5	.80	.05	.18	1	1
R SLR105	1	8	6	24	.3	4	2	2628	1.98	14	5	ND	3	120	.5	2	2	8	31.97	.070	6	4	.58	217	.01	4	.47	.02	.10	1	1
R SLR106	1	7	7	28	.2	6	2	1883	1.62	3	5	ND	3	107	.4	2	2	9	26.77	.055	7	5	.94	174	.01	4	.52	.02	.10	1	1
R SLR107	1	11	5	27	.2	7	3	1583	1.71	8	5	ND	3	117	.5	2	2	9	26.53	.057	7	5	.75	168	.01	4	.54	.02	.10	1	1
R SLR108	1	11	7	35	.2	9	4	1621	1.92	10	5	ND	5	127	.5	2	2	13	15.68	.051	15	8	1.67	103	.02	10	.63	.04	.13	1	1
R SLR109	1	6	6	22	.2	5	2	2316	1.87	7	6	ND	3	128	.4	2	2	7	31.47	.047	5	4	.57	196	.01	4	.42	.02	.10	1	1
R SLR110	1	4	2	20	.2	4	2	1071	2.05	5	5	ND	2	126	.3	2	2	9	28.63	.062	5	5	.56	161	.01	3	.41	.02	.08	1	2
STANDARD C/AU-R	18	58	39	131	6.7	71	32	1052	3.96	35	20	7	38	53	19.1	15	18	56	.46	.093	37	57	.89	181	.08	34	1.89	.06	.14	11	460

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
R SLR111	1	6	2	16	.2	4	2	935	2.20	5	5	ND	3	142	.4	2	2	11	33.16	.050	4	5	.52	160	.01	2	.36	.02	.06	1	4
R SLR112	1	5	2	28	.1	6	3	353	1.92	5	5	ND	3	118	.3	2	2	21	20.08	.042	7	8	.49	112	.01	3	.46	.03	.09	1	3
R SLR113	1	9	2	30	.1	9	3	1231	1.78	4	5	ND	2	159	.2	2	2	16	16.95	.043	12	9	.26	136	.01	4	.67	.04	.11	1	1
R SLR114	1	2	2	27	.2	7	3	444	2.02	2	5	ND	3	138	.3	2	2	20	20.58	.040	6	8	.61	127	.01	4	.45	.03	.10	1	3
R SLR115	1	9	3	20	.2	5	2	1472	4.30	9	5	ND	3	117	.7	2	2	10	26.86	.055	6	6	.37	278	.01	2	.38	.01	.05	1	1
R MR1	1	8	2	15	.3	7	2	1262	3.39	14	6	ND	3	649	.5	2	2	9	30.09	.071	6	4	.41	421	.01	6	.36	.03	.06	1	3
R MR2	1	9	2	20	.2	4	1	1037	1.77	4	5	ND	4	147	.4	2	2	6	33.81	.058	4	4	.43	235	.01	2	.38	.02	.09	1	1
R MR3	1	8	2	16	.2	6	2	1215	3.07	9	5	ND	2	507	.5	2	2	10	27.60	.061	6	5	.45	314	.01	3	.38	.03	.07	1	1
R MR4	1	6	3	17	.2	3	1	1107	1.82	2	5	ND	2	176	.5	2	2	6	34.32	.059	3	2	.39	223	.01	2	.31	.02	.07	1	1
R MR5	1	8	2	29	.2	6	3	1632	1.90	3	5	ND	3	124	.5	2	2	14	23.43	.047	7	6	1.10	225	.02	3	.52	.02	.14	1	3
R MR6	1	5	6	31	.1	10	3	837	2.32	7	5	ND	5	49	.2	2	2	13	5.96	.048	15	10	1.69	47	.02	6	.58	.05	.10	1	3
R MR7	1	11	5	41	.2	9	3	1188	2.52	5	5	ND	5	157	.6	2	2	14	17.63	.050	13	9	1.48	113	.02	7	.67	.02	.15	1	4
R MR8	1	7	5	33	.2	14	7	750	2.39	7	5	ND	3	142	.4	2	2	23	27.85	.094	10	7	.46	139	.03	3	.69	.03	.16	1	3
R MR9	1	7	5	26	.1	8	4	1658	6.85	20	5	ND	2	144	.2	2	2	25	1.05	.064	7	9	.26	119	.01	28	.55	.20	.10	1	2
R MR10	1	2	2	25	.2	4	2	663	2.13	3	5	ND	3	152	.4	2	2	12	28.98	.084	6	4	.44	163	.02	2	.53	.07	.12	1	1
R MR11	1	6	3	12	.2	4	2	932	2.09	13	5	ND	3	398	.5	2	2	5	34.75	.074	3	3	.43	261	.01	2	.27	.04	.05	1	1
R MR12	1	6	3	26	.2	6	3	858	1.71	2	5	ND	3	161	.2	2	2	13	22.19	.047	6	6	.49	105	.01	2	.54	.03	.08	1	1
R MR13	1	6	3	29	.1	8	4	1181	3.10	28	5	ND	3	297	.3	2	2	17	22.05	.132	7	7	.63	251	.02	4	.69	.11	.09	1	1
R MR14	1	9	2	17	.3	10	4	2075	5.24	8	5	ND	3	287	.8	2	2	22	24.02	.069	6	7	.49	269	.01	2	.36	.05	.05	1	3
R BB1	1	64	9	23	.1	32	10	265	1.65	2	5	ND	2	233	.2	2	2	38	3.11	.071	10	53	.62	168	.09	2	3.13	.49	.24	1	1
R BB2	1	84	22	37	.1	54	12	398	2.02	2	5	ND	24	426	.2	2	2	39	1.31	.254	108	183	1.13	385	.18	5	.66	.11	.59	1	3
R BB3	1	50	23	31	.1	52	10	327	1.66	2	5	ND	13	413	.2	2	2	36	1.94	.226	26	175	1.14	327	.17	2	.62	.10	.56	1	2
R BB4	1	54	20	33	.1	38	8	400	1.90	2	5	ND	3	277	.2	2	2	30	1.96	.155	26	107	.83	240	.09	2	.49	.08	.34	1	1
R BB5	2	30	24	46	.1	13	4	471	2.06	2	5	ND	3	132	.2	2	2	19	1.37	.084	35	14	.48	93	.04	7	.26	.07	.12	1	2
R KR36	1	14	4	29	.2	8	3	1617	1.75	9	5	ND	4	133	.3	2	2	11	23.78	.072	13	15	1.01	198	.02	5	.61	.02	.15	1	1
R KR37	1	5	6	21	.2	6	2	701	.90	6	5	ND	4	149	.2	2	2	7	17.51	.035	12	5	1.13	89	.01	6	.41	.06	.06	1	3
R KR38	1	5	5	19	.1	6	2	664	.86	2	5	ND	3	137	.2	2	2	7	19.75	.037	10	8	1.18	76	.01	7	.39	.17	.07	1	2
R KR39	1	10	5	34	.2	10	3	1183	3.31	20	5	ND	5	93	.5	2	2	14	14.70	.048	12	9	1.60	116	.02	3	.59	.01	.11	1	1
R KR40	2	8	2	13	.1	6	1	204	.63	2	5	ND	7	9	.2	2	2	4	.87	.013	15	7	.52	28	.01	4	.25	.02	.11	1	1
STANDARD C/AU-R	18	58	39	131	7.0	72	31	1054	3.97	40	18	7	40	56	19.8	15	21	58	.46	.096	39	59	.90	183	.07	31	1.90	.06	.13	13	530

ACME ANALYTICAL LABORATORIES LTD.
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PHONE(604)253-3158 FAX(604)253-1716

DATE RECEIVED: DEC 12 1990

DATE REPORT MAILED: Dec 19/90

GEOCHEMICAL ANALYSIS CERTIFICATE

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 FILE # 90-5429R Page 1

#4 - 2130 Norte Dame Ave, Winnipeg MB R3H 0K1

DEC 27 1990

SAMPLE#	HG ppb
SL 1	40
SL 2	20
SL 3	30
SL 4	10
SL 5	20
SL 6	10
SL 7	10
SL 8	5
SL 9	5
SL 10	5
SL 11	5
SL 12	5
SL 13	5
SL 14	10
SL 15	5
SL 16	5
SL 17	10
SL 18	5
SL 19	5
SL 20	10
SL 21	60
SL 22	20
SL 23	30
SL 24	10
SL 25	30
SL 26	50
SL 27	40
SL 28	10
SL 29	40
SL 30	30
SL 31	10
SL 32	20
SL 33	60
SL 34	10
SL 35	20
SL 36	20
STANDARD C	1300

- SAMPLE TYPE: SOIL PULP HG ANALYSIS BY FLAMELESS AA.

SIGNED BY. [redacted] D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

SAMPLE#	Hg ppb
SL 37	20
SL 38	10
SL 39	20
SL 40	30
SL 41	20
SL 42	50
SL 43	30
SL 44	40
SL 45	5
SL 46	10
SL 47	20
SL 48	5
SL 49	5
SL 50	30
SL 51	5
SL 52	30
SL 53	10
SL 54	30
SL 55	20
SL 56	10
SL 57	20
SL 58	10
SL 59	60
SL 60	10
SL 61	50
SL 62	20
SL 63	40
SL 64	50
SL 65	60
SL 66	40
SL 67	60
SL 68	10
SL 69	20
SL 70	40
SL 71	30
SL 72	40
STANDARD C	1400

SAMPLE#	Hg ppb
SL 73	30
SL 74	10
SL 75	20
SL 76	30
SL 77	10
SL 78	40
SL 79	30
SL 80	40
SL 81	60
SL 82	10
SL 83	30
SL 84	20
SL 85	10
SL 86	30
SL 87	20
SL 88	40
SL 89	60
SL 90	50
SL 91	10
SL 92	30
SL 93	20
SL 94	60
SL 95	20
SL 96	30
SL 97	10
SL 98	40
SL 99	30
SL 100	50
SL 101	90
SL 102	70
SL 103	40
SL 104	50
SL 105	20
SL 106	50
SL 107	40
SL 108	30
STANDARD C	1600

SAMPLE#	Hg ppb
SL 109	70
SL 110	40
SL 111	30
SL 112	40
SL 113	60
SL 114	50
SL 115	20
SL 116	20
SL 117	50
SL 118	50
SL 119	40
SL 120	40
SL 121	60
SL 122	50
SL 123	80
SL 124	20
SL 125	80
SL 126	20
SL 127	30
SL 128	50
SL 129	30
SL 130	60
SL 131	10
SL 132	30
SL 133	40
SL 134	60
SL 135	30
SL 136	20
SL 137	30
SL 138	10
SL 139	20
SL 140	40
SL 141	30
SL 142	20
SL 143	30
SL 144	20
STANDARD C	1400

SAMPLE#	Hg ppb
SL 145	50
SL 146	40
SL 147	20
SL 148	30
SL 149	40
SL 150	40
SL 151	30
SL 152	50
SL 153	20
SL 154	30
SL 155	30
SL 156	20
SL 157	20
SL 158	30
SL 159	40
SL 160	20
SL 161	50
SL 162	20
SL 163	30
SL 164	30
SL 165	10
SL 166	20
SL 167	20
SL 168	10
SL 169	40
SL 170	20
SL 171	50
SL 172	20
SL 173	40
SL 174	20
SL 175	30
SL 176	50
SL 177	10
SL 178	20
SL 179	30
SL 180	40
STANDARD C	1300

SAMPLE#	Hg ppb
SL 181	30
SL 182	5
SL 183	20
SL 184	10
SL 185	40
SL 186	10
SL 187	30
SL 188	20
SL 189	10
SL 190	20
SL 191	30
SL 192	10
SL 193	20
SL 194	10
SL 195	40
SL 196	30
SL 197	20
SL 198	20
SL 199	40
SL 200	30
SL 201	30
SL 202	10
SL 203	20
SL 204	10
SL 205	20
SL 206	10
SL 207	30
SL 208	10
SL 209	30
SL 210	40
SL 211	10
SL 212	10
SL 213	20
SL 214	10
SL 215	20
SL 216	20
STANDARD C	1500

SAMPLE#	Hg ppb
SL 217	20
SL 218	70
SL 219	30
SL 220	30
SL 221	40
SL 222	30

ACME ANALYTICAL LABORATORIES LTD.
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DATE RECEIVED: DEC 12 1990
DATE REPORT MAILED: Dec.17/90

GEOCHEMICAL ANALYSIS CERTIFICATE

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 FILE # 90-5593R2 Page 1
#4 - 2130 Norte Dame Ave, Winnipeg MB R3H 0K1

SAMPLE#	Hg ppb
K 1	40
K 2	60
K 3	50
K 4	70
K 5	60
K 6	70
K 7	60
K 8	30
K 9	50
K 10	60
K 11	50
K 12	20
K 13	20
K 14	50
K 15	30
K 16	40
K 17	10
K 18	30
K 19	20
K 20	50
K 21	60
K 22	50
K 23	50
K 24	40
K 25	30
K 26	20
K 27	50
K 28	100
K 29	50
K 30	60
K 31	80
K 32	70
K 33	30
K 34	20
K 35	20
K 36	90
STANDARD C	1600

- SAMPLE TYPE: Soil Pulp HG ANALYSIS BY FLAMELESS AA.

SIGNED BY. [redacted] D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

SAMPLE#	HG ppb
K 37	90
K 38	70
K 40	40
K 41	30
K 42	50
K 43	60
K 44	30
K 45	60
K 46	40
K 47	20
K 48	50
K 49	120
K 50	40
K 51	140
M 1	60
M 2	50
M 3	30
M 4	30
M 5	40
M 6	30
M 7	40
M 8	30
M 9	10
M 10	20
M 11	20
M 12	30
M 13	20
M 14	30
M 15	80
M 16	20
M 17	30
M 18	30
M 19	40
M 20	30
M 21	20
M 22	20
STANDARD C	1700

SAMPLE#	HG ppb
M 23	20
M 24	30
M 25	20
M 26	40
M 27	30
M 28	10
M 29	20
M 30	10
M 31	20
M 32	30
M 33	30
M 34	20
M 35	20
M 36	410
M 37	70
M 38	60
M 39	80
M 40	70
M 41	110
M 42	40
M 43	30
M 44	100
M 45	70
M 46	50
M 47	30
M 48	80
M 49	60
M 50	70
M 51	30
M 52	100
M 53	50
M 54	70
M 55	30
M 56	20
M 57	30
M 58	40
STANDARD C	1400

SAMPLE#	HG ppb
M 59	30
M 60	60
M 61	150
M 62	30
M 63	40
M 64	60
M 65	80
M 66	40
M 67	30
M 68	30
M 69	60
M 70	50
M 71	40
M 72	50
M 73	30
M 74	50
M 75	120
M 76	30
M 77	40
M 78	30
M 79	20
M 80	30
M 81	50
M 82	20
M 83	30
M 84	50
M 85	10
SL 223	20
SL 224	30
SL 225	50
SL 226	60
SL 227	50
SL 228	40
SL 229	50
SL 230	20
SL 231	40
STANDARD C	1400

SAMPLE#	Hg ppb
SL 232	70
SL 233	50
SL 234	70
SL 235	50
SL 236	60
SL 237	30
SL 238	40
SL 239	70
SL 240	60
SL 241	30
SL 242	20
SL 243	60
SL 244	20
SL 245	50
SL 246	70
SL 247	20
SL 248	30
SL 249	60
SL 250	40
SL 251	50
SL 252	50
SL 253	30
SL 254	20
SL 255	70
SL 256	60
SL 257	50
SL 258	30
SL 259	60
SL 260	20
SL 261	50
SL 262	10
SL 263	10
SL 264	30
SL 265	60
SL 266	40
SL 267	60
STANDARD C	1500

SAMPLE#	Hg ppb
SL 268	90
SL 269	30
SL 270	60
SL 271	50
SL 272	60
SL 273	100
SL 274	50
SL 275	60
SL 276	40
SL 277	30
SL 278	60
SL 279	20
SL 280	50
SL 281	40
SL 282	80
SL 283	50
SL 284	70
SL 285	40
SL 286	50
SL 287	60
SL 288	50
SL 289	70
SL 290	30
SL 291	200
SL 292	50
SL 293	50
SL 294	40
SL 295	30
SL 296	40
SL 297	30
SL 298	20
SL 299	30
SL 300	20
SL 301	20
SL 302	30
SL 303	20
STANDARD C	1500

SAMPLE#	HG ppb
SL 304	20
SL 305	80
SL 306	70
SL 307	40
SL 308	50
SL 309	70
SL 310	40
SL 311	50
SL 312	30
SL 313	100
SL 314	30
SL 315	20
SL 316	20
SL 317	30
SL 318	40
SL 319	40
SL 320	30
SL 321	80
SL 322	70
STANDARD C	1400

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GEOCHEMICAL ANALYSIS CERTIFICATE

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 FILE # 90-5701R Page 1

#4 - 2130 Norte Dame Ave, Winnipeg MB R3H 0K1

SAMPLE#	Hg ppb
K52	50
K53	40
K54	50
K55	60
K56	30
K57	20
K58	20
K59	40
K60	30
K61	50
K62	20
K63	20
K64	10
K65	20
K66	40
K67	30
K68	10
K69	20
K70	10
K71	40
K72	30
K73	80
K74	30
K75	20
M86	10
M87	20
M88	10
M89	20
M90	10
M91	40
M92	20
M93	80
M94	30
M96	30
M97	80
M98	20
STANDARD C	1400

- SAMPLE TYPE: SOIL PULP HG ANALYSIS BY FLAMELESS AA.

SIGNED BY. [redacted] D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

SAMPLE#	Hg ppb
M99	20
M100	40
M101	20
M102	30
M103	60
M104	30
M105	90
M106	40
M107	40
M108	50
M109	30
M110	200
M111	40
M112	30
M113	20
M114	20
M115	10
M116	30
M117	20
M118	30
M119	10
M120	30
M121	20
M122	40
M123	20
M124	40
M125	10
M126	30
M127	20
M128	90
M129	30
M130	10
M131	30
M132	20
M133	20
M134	60
STANDARD C	1500

SAMPLE#	Hg ppb
M135	220
M136	60
M137	30
M138	50
M139	50
M140	60
M141	20
M142	20
M143	30
M144	20
M145	30
M146	40
M147	30
M148	20
M149	30
M150	50
M151	30
M152	60
M153	30
M154	20
M155	40
M156	30
M157	100
M158	20
M159	30
M160	40
M161	30
M162	40
M163	30
M164	30
M165	10
M166	20
M167	130
M168	20
M169	20
M170	30
STANDARD C	1600

SAMPLE#	Hg ppb
M171	40
M172	30
M173	50
M174	60
M175	40
M176	50
M177	30
M178	30
M179	40
M180	60
M181	30
M182	20
M183	70
M184	30
M185	30
M186	60
M187	10
M188	10
M189	40
M190	100
M191	50
M192	60
M193	50
M194	80
M195	70
M196	50
M197	40
M198	30
M199	40
M200	20
M201	20
M202	30
M203	20
M204	10
M205	20
M206	50
STANDARD C	1300

SAMPLE#	HG ppb
M207	40
M208	20
M209	40
M210	30
M211	20
M212	30
M213	20
M214	20
M215	50
M216	5
M217	10
SL323	10
SL324	30
SL325	40
SL326	70
SL327	140
SL328	30
SL329	100
SL330	10
SL331	30
SL332	50
SL333	40
SL334	30
SL335	90
SL336	10
SL337	20
SL338	60
SL339	50
SL340	60
SL341	30
SL342	80
SL343	60
SL344	50
SL345	150
SL346	30
SL347	20
STANDARD C	1700

SAMPLE#	HG ppb
SL348	130
SL349	30
SL350	20
SL351	20
SL352	30
SL353	360
SL354	30
SL355	90
SL356	40
SL357	60
SL358	50
SL359	140
SL360	20
SL361	60
SL362	20
SL363	50
SL364	20
SL365	60
SL366	70
SL367	60
SL368	10
SL369	10
SL370	30
SL371	20
SL372	10
SL373	20
SL374	40
SL375	20
SL376	10
SL377	30
SL378	10
SL379	40
SL380	30
SL381	20
SL382	30
SL383	20
STANDARD C	1600

SAMPLE#	Hg ppb
SL384	20
SL385	10
SL386	20
SL387	10
SL388	10
SL389	30
SL390	10
SL391	40
SL392	10
SL393	20
SL394	10
SL395	10
SL396	5
SL397	30
SL398	10
SL399	20
SL400	10
SL401	5
SL402	30
SL403	10
SL404	10
SL405	20
SL406	10
SL407	30
SL408	40
SL409	30
SL410	100
SL411	5
SL412	10
SL413	30
SL414	10
SL415	20
SL416	30
SL417	70
STANDARD C	1500

SAMPLE#	Hg ppb
SL418	40
SL419	20
SL420	10
SL421	10
SL422	10
SL423	5
SL424	5
SL425	20
SL426	30
SL427	5
SL428	10
SL429	10
SL430	20
SL431	10
SL432	30
SL433	20
SL434	60
SL435	20
SL436	40
SL437	50
SL438	40
SL439	20
SL440	20
SL441	10
SL442	20
SL443	20
SL444	5
SL445	10
SL446	5
SL447	5
SL448	5
SL449	10
SL450	5
SL451	10
SL452	5
SL453	5
STANDARD C	1600

SAMPLE#	Hg ppb
SL490	40
SL491	40
SL492	20
SL493	30
SL494	10
SL495	30
SL496	20
SL497	30
SL498	30
SL499	10
SL500	50
SL501	40
SL502	30
SL503	10
SL504	20
SL505	30
SL506	50
SL507	40
SL508	60
SL509	20
SL510	20
SL511	30
SL512	10
SL513	20
SL514	30
SL515	30
SL516	70
SL517	30
SL518	40
SL519	30
SL520	40
SL521	20
SL522	40
SL523	30
SL524	50
SL525	30
STANDARD C	1600

SAMPLE#	Hg ppb
SL454	10
SL455	30
SL456	10
SL457	10
SL458	20
SL459	30
SL460	20
SL461	20
SL462	30
SL463	10
SL464	30
SL465	40
SL466	20
SL467	20
SL468	30
SL469	20
SL470	40
SL471	10
SL472	30
SL473	20
SL474	10
SL475	20
SL476	10
SL477	20
SL478	20
SL479	10
SL480	10
SL481	5
SL482	10
SL483	20
SL484	10
SL485	30
SL486	20
SL487	30
SL488	30
SL489	40
STANDARD C	1500

SAMPLE#	Hg ppb
SL526	10
SL527	20
SL528	30
SL529	30
SL530	30
SL531	40
SL532	30
SL533	10
SL534	20
SL535	60
SL536	20
SL537	10
SL538	5
SL539	20
SL540	5
SL541	10
SL542	20
SL543	10
SL544	30
SL545	10
SL546	20
SL547	20
SL548	10
SL549	30
SL550	20
SL551	10
SL552	10
SL553	20
SL554	30
SL555	20
SL556	20
SL557	40
SL558	30
SL559	20
SL560	30
SL561	20
STANDARD C	1400

SAMPLE#	Hg ppb
SL562	40
SL563	50
SL564	60
SL565	40
SL566	70
SL567	20
SL568	30
SL569	30
SL570	20
SL571	40
SL572	30
SL573	30
SL574	40
SL575	40
SL576	30
SL577	20
SL578	30
SL579	60
SL580	30
SL581	40
SL582	30
SL583	40
SL584	60
SL585	30
SL586	40
SL587	40
SL588	30
SL589	70
SL590	50
SL591	30
SL592	40
SL593	60
SL594	30
SL595	40
SL596	30
SL597	60
STANDARD C	1400

SAMPLE#	Hg ppb
SL598	20
SL599	60
SL600	10
SL601	30
SL602	20
SL603	30
STANDARD C	1500

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
M226	1	16	11	63	.1	19	7	363	1.81	4	5	ND	4	22	.3	2	2	28	.46	.058	20	18	.50	150	.01	15	1.43	.01	.22	1	1
M227	1	17	8	70	.1	19	7	444	1.71	2	5	ND	3	30	.3	2	2	23	.73	.060	18	15	.48	175	.01	14	1.41	.01	.27	1	1
M228	1	17	10	71	.1	18	7	475	1.73	2	5	ND	4	36	.2	2	2	23	.79	.051	17	15	.55	183	.02	16	1.45	.12	.23	1	1
M229	1	17	12	79	.1	19	7	532	1.81	10	5	ND	3	22	.2	2	2	24	.45	.064	19	16	.45	196	.01	16	1.39	.01	.28	1	1
M230	1	16	9	74	.1	18	7	495	1.75	3	5	ND	3	24	.3	2	2	24	.35	.054	18	16	.44	168	.01	14	1.46	.02	.25	1	5
M231	1	15	11	68	.2	18	7	430	1.71	8	5	ND	4	32	.3	2	2	24	.77	.049	14	16	.57	155	.01	15	1.40	.27	.26	1	2
M232	1	17	12	73	.1	18	7	449	1.82	10	5	ND	3	22	.2	2	2	26	.36	.056	18	17	.40	160	.01	14	1.46	.01	.29	1	1
M233	1	15	9	72	.1	18	7	456	1.76	7	5	ND	4	21	.2	2	2	25	.40	.058	18	16	.40	164	.01	14	1.35	.01	.26	1	1
M234	1	16	10	66	.2	17	7	421	1.68	3	5	ND	3	20	.2	2	2	25	.41	.058	18	16	.40	135	.01	16	1.29	.01	.30	1	1
M235	1	13	10	72	.2	16	7	490	1.64	5	5	ND	3	21	.2	2	2	22	.36	.056	17	15	.37	154	.01	12	1.22	.01	.24	1	2
M236	1	15	9	50	.1	16	6	300	1.36	3	5	ND	2	48	.2	2	2	20	4.08	.070	14	13	.70	165	.01	15	1.03	.01	.19	1	3
M237	1	14	12	68	.1	18	7	476	1.72	5	5	ND	3	28	.3	2	2	23	.77	.068	17	15	.50	156	.01	14	1.24	.01	.23	1	1
M238	1	16	11	57	.1	18	7	334	1.57	5	5	ND	4	85	.2	2	2	23	3.78	.057	17	14	1.00	220	.01	15	1.26	.02	.19	1	19
M239	1	13	11	58	.2	15	6	401	1.47	2	5	ND	2	32	.3	2	2	20	1.03	.068	16	14	.56	144	.01	18	1.05	.09	.21	1	2
M240	1	15	13	59	.2	17	7	385	1.61	4	5	ND	3	62	.4	2	2	22	3.31	.061	15	14	1.05	198	.01	17	1.16	.21	.18	1	2
M241	1	7	7	35	.1	9	4	283	.89	5	5	ND	3	92	.2	2	2	12	4.09	.050	12	7	1.25	145	.01	9	.55	.20	.09	1	1
M242	1	12	12	51	.3	13	5	302	1.35	5	5	ND	3	50	.2	3	2	19	2.77	.059	17	11	1.06	213	.01	17	.97	.01	.16	1	4
PSS1	1	18	11	58	.1	19	7	514	1.60	6	5	ND	4	69	.2	2	2	22	3.18	.059	17	13	1.11	128	.01	16	1.06	.02	.14	1	1
PSS2	1	21	9	68	.2	26	9	514	2.08	6	5	ND	4	118	.4	2	2	26	3.03	.063	15	18	.99	163	.01	18	1.21	.09	.14	1	1
PSS3	1	16	14	59	.1	20	8	633	1.63	9	5	ND	3	73	.5	2	2	21	2.27	.061	15	14	.97	151	.01	17	1.01	.05	.13	1	2
PSS4	1	13	11	56	.2	16	7	393	1.42	5	5	ND	4	75	.2	2	2	19	3.24	.070	17	13	.97	164	.01	14	.80	.02	.12	1	2
STANDARD C/AU-S	19	57	38	132	7.1	73	32	1054	3.98	38	21	7	38	53	18.9	14	19	56	.46	.098	38	59	.89	181	.07	38	1.89	.06	.14	13	51

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
72F12S1	1	15	12	59	.1	13	6	142	1.16	3	5	ND	3	41	.2	2	2	14	1.88	.040	12	17	.77	128	.01	5	.81	.02	.11	1	7
72F12S2	1	14	12	55	.1	14	7	286	1.39	5	5	ND	4	45	.2	2	2	17	2.14	.045	15	15	.93	136	.01	6	.89	.03	.12	1	3
72F12S3	1	15	7	67	.1	14	7	758	2.04	9	5	ND	1	133	.2	2	2	19	3.94	.075	13	15	.81	173	.01	10	1.05	.02	.16	1	3
72HS1	1	13	3	58	.2	14	7	384	1.42	3	5	ND	2	39	.2	2	2	21	2.58	.052	16	17	1.05	153	.01	9	.95	.01	.14	1	1
72HS2	1	21	17	72	.2	22	10	444	2.03	7	5	ND	4	37	.2	2	2	25	2.85	.058	17	19	1.42	213	.01	9	1.01	.02	.16	1	4
72HS3	1	20	13	89	.1	19	7	337	1.88	4	5	ND	3	28	.2	2	2	30	.74	.063	18	23	.57	204	.02	12	1.53	.02	.27	1	2
72HS4	1	13	10	64	.1	16	7	369	1.57	6	5	ND	3	27	.2	2	2	25	1.39	.062	18	18	.67	159	.02	5	1.04	.01	.19	1	1
72HS5	1	21	14	70	.1	17	8	459	1.92	5	5	ND	2	15	.2	2	2	22	.54	.065	22	18	.55	162	.02	4	1.38	.01	.24	1	3
72HS6	1	20	17	86	.1	15	7	380	1.91	4	5	ND	2	17	.2	2	2	24	.58	.066	22	21	.52	157	.02	8	1.38	.01	.25	1	1
72HS7	1	19	19	53	.1	18	6	324	1.93	3	5	ND	4	13	.2	2	2	25	.38	.046	21	20	.52	148	.02	5	1.33	.01	.17	5	4
72HS8	1	19	14	56	.1	16	6	378	1.69	2	5	ND	1	37	.2	4	2	21	3.40	.057	15	19	1.38	160	.01	10	1.05	.01	.18	1	2
72HS9	1	9	10	35	.2	8	4	203	.97	2	5	ND	1	62	.2	2	2	12	7.67	.036	9	13	2.00	70	.01	4	.62	.01	.08	1	2
72HS10	1	20	10	79	.2	18	8	520	1.90	2	5	ND	3	23	.2	3	2	29	.83	.057	20	22	.88	158	.01	16	1.48	.02	.27	1	31
72HS11	1	21	19	90	.1	21	7	360	2.15	6	5	ND	3	19	.2	2	2	38	.57	.062	21	25	.53	161	.02	9	1.69	.01	.22	1	1
72HS12	1	19	12	91	.1	19	5	279	1.88	2	5	ND	3	18	.2	2	2	33	.41	.059	22	22	.44	139	.01	7	1.43	.01	.23	1	2
72HS13	1	22	10	87	.1	22	6	257	2.08	4	5	ND	3	19	.2	2	2	36	.45	.061	23	24	.48	139	.02	8	1.60	.01	.27	1	3
72HS14	1	15	7	65	.1	11	4	219	1.30	3	5	ND	2	12	.2	2	2	19	.34	.046	16	14	.33	122	.01	5	1.01	.01	.13	1	3
72HS15	1	13	9	48	.1	12	5	294	1.20	4	5	ND	2	17	.2	2	2	16	1.18	.044	14	14	.72	111	.01	9	.76	.01	.14	1	3
72HS16	1	17	10	64	.2	14	5	222	1.51	2	5	ND	2	21	.2	2	2	21	1.12	.064	17	18	.74	128	.01	10	1.00	.01	.15	2	1
72HS17	1	16	10	66	.1	14	5	225	1.71	5	5	ND	3	14	.2	2	2	23	.46	.073	21	18	.43	145	.02	6	1.19	.01	.20	1	2
72HS18	1	21	5	76	.1	17	7	240	1.80	3	5	ND	1	17	.2	2	2	25	.77	.077	19	20	.47	360	.01	7	1.21	.01	.14	1	1
72HS19	1	20	17	87	.2	19	8	510	1.87	4	5	ND	3	16	.2	2	2	26	.53	.065	23	19	.49	201	.01	9	1.29	.01	.20	1	3
72HS20	1	4	6	27	.1	7	4	92	.55	3	5	ND	4	32	.2	2	2	9	8.08	.068	17	6	4.12	50	.01	5	.47	.01	.05	1	1
72HS21	1	9	7	38	.1	13	6	437	1.48	4	5	ND	1	69	.2	2	2	19	15.14	.068	16	21	.54	288	.01	9	1.01	.01	.15	1	1
72HS22	2	15	18	76	.1	16	8	669	1.98	4	5	ND	2	18	.2	2	2	29	.77	.069	21	22	.46	259	.02	4	1.48	.01	.17	2	5
72HS23	1	19	14	57	.2	18	8	715	1.91	2	5	ND	4	76	.2	4	2	21	4.02	.043	18	20	1.51	152	.01	13	1.17	.01	.15	1	2
72HS24	1	20	15	74	.2	21	8	432	1.92	5	5	ND	3	25	.2	2	2	26	1.27	.056	21	24	1.01	142	.02	10	1.37	.01	.22	1	3
72HS25	1	9	12	45	.3	15	7	247	1.42	6	5	ND	3	44	.2	2	2	16	3.11	.056	16	15	1.48	117	.02	13	.63	.06	.08	1	1
M218	1	14	13	59	.1	19	7	359	1.69	4	5	ND	2	22	.2	2	2	25	.54	.053	17	17	.47	157	.01	5	1.23	.01	.21	3	1
M219	1	13	14	74	.1	13	6	473	1.49	2	5	ND	2	20	.2	2	2	21	.29	.051	17	13	.32	155	.01	7	1.22	.01	.25	1	1
M220	1	17	10	70	.1	21	8	408	1.88	5	5	ND	2	31	.2	3	2	24	.76	.063	18	18	.69	186	.02	6	1.59	.01	.26	1	8
M221	1	15	13	75	.2	18	8	524	1.78	4	5	ND	4	20	.2	2	2	26	.29	.055	20	19	.36	155	.01	4	1.42	.01	.28	1	1
M222	1	16	13	74	.1	19	7	435	1.87	4	5	ND	3	27	.2	2	2	27	.49	.052	18	19	.50	172	.01	6	1.67	.01	.30	1	31
M223	1	16	12	66	.1	21	8	481	1.92	4	5	ND	2	26	.2	2	2	27	1.02	.069	19	19	.70	161	.01	8	1.35	.01	.26	1	1
M224	1	16	14	79	.1	18	7	519	1.72	3	5	ND	3	23	.2	2	2	25	.38	.056	18	17	.40	174	.01	8	1.40	.01	.28	1	5
M225	1	17	13	80	.2	19	8	472	1.87	6	5	ND	2	25	.2	2	2	28	.67	.054	19	20	.52	189	.01	9	1.51	.01	.21	1	4
STANDARD C/AU-S	18	60	39	132	7.4	73	31	1055	3.98	41	19	8	36	52	18.9	15	23	56	.45	.094	37	59	.89	180	.07	31	1.90	.06	.13	11	51

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 FILE # 90-5985

SAMPLE#	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Au* ppb
EWR1	3	5	10	11	.1	6	1	67	.34	4	5	ND	2	152	.5	2	2	7	1.47	.003	23	10	.36	295	.06	12	2.31	.28	.04	3	3
EWR2	5	29	9	1	.1	7	6	929	1.11	11	5	ND	3	731	.4	2	2	42	8.49	.014	20	14	.81	1068	.12	792	5.13	1.04	.11	1	1
EWR3	4	12	2	1	.1	10	3	66	1.98	14	5	ND	1	55	.2	2	2	28	.26	.015	4	21	.34	123	.02	9	1.61	.09	.05	2	1
EWR4	1	7	5	1	.1	8	3	95	.52	7	5	ND	1	119	.2	2	2	3	.65	.020	8	6	.27	162	.03	8	1.65	.16	.03	1	2
EWR5	2	16	2	10	.1	15	6	108	1.35	13	5	ND	1	30	.2	2	2	13	.22	.004	6	14	.35	109	.02	5	1.54	.09	.07	1	1
EWR6	1	4	8	1	.1	2	2	60	.89	4	5	ND	7	172	.4	3	2	15	.64	.016	22	12	.09	1111	.09	24	1.08	.09	.05	1	2
EWR7	2	12	2	1	.2	5	3	660	1.61	18	5	ND	6	238	.7	2	2	26	1.46	.017	19	21	.67	1380	.10	285	1.89	.17	.07	1	1
4STP1	1	74	14	73	.4	162	24	682	4.94	4	5	ND	2	283	.7	2	2	91	3.47	.318	25	277	3.90	765	.22	5	2.00	.13	1.13	1	2
4STP2	1	42	19	96	.3	49	12	758	3.03	16	5	ND	3	240	.5	4	2	38	3.61	.086	16	56	1.53	132	.02	21	2.06	.42	.31	1	3
4STP3	2	88	18	68	.2	167	28	899	4.81	4	5	ND	1	373	1.0	2	2	75	13.09	.383	23	320	2.07	37	.16	6	1.51	.09	1.04	1	1
4STP4	3	116	25	87	.3	212	32	891	5.60	2	5	ND	2	406	.8	3	3	116	5.23	.290	32	383	3.31	1357	.11	5	2.27	.16	1.46	2	2
4STP5	1	37	13	80	.2	51	12	713	3.58	15	5	ND	2	230	.2	3	2	42	6.30	.123	14	75	1.42	327	.03	20	1.98	.13	.35	1	1
4STP6	1	18	11	65	.3	16	6	1169	3.77	5	5	ND	3	245	.3	5	2	20	7.77	.069	14	22	2.20	76	.01	26	1.41	.09	.21	1	1
4STP7	2	101	20	83	.4	360	35	701	5.45	4	5	ND	2	341	.5	2	2	117	1.77	.400	31	495	5.99	1213	.21	5	2.90	.35	.96	1	3
4STP8	3	45	13	57	.3	165	20	1162	4.14	8	5	ND	2	257	.2	3	2	65	6.58	.196	19	250	2.31	677	.12	7	2.19	.42	.59	1	5
4STP9	1	7	7	27	.2	5	3	1975	1.91	4	5	ND	1	125	.2	2	2	6	27.86	.037	5	12	.94	135	.01	8	.58	.01	.13	1	1
4STP10	1	103	15	94	.3	177	31	597	5.69	4	5	ND	1	319	.5	3	3	106	2.54	.366	26	312	4.46	1246	.19	3	2.50	.08	1.38	2	1
4STP11	1	10	4	34	.2	9	4	1238	2.11	10	5	ND	1	131	.2	2	2	12	22.96	.061	5	15	1.02	129	.01	6	.62	.01	.10	1	1
4STP12	2	47	10	38	.5	105	15	2234	3.80	2	5	ND	1	651	.7	3	2	56	25.24	.209	14	174	1.75	539	.12	5	1.09	.05	.70	1	2
4STP13	1	9	5	28	.3	8	4	1924	4.03	2	5	ND	1	121	.2	3	2	14	25.56	.073	5	16	.85	169	.01	12	.60	.02	.10	1	4
STANDARD C/AU-R	18	63	38	133	7.3	72	31	1058	3.98	39	18	7	36	52	18.7	15	19	56	.46	.094	36	59	.90	180	.07	35	1.91	.06	.13	11	550

ACME AN ICAL LABORATORIES LTD. 852 E. HASTINGS ST. OUVER B.C. V6A 1R6 PHONE(604)253-3158 FAX( )253-1716

WHOLE ROCK ICP ANALYSIS

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 File # 90-6195 Page 1

#4 - 2130 Norte Dame Ave, Winnipeg MB R3H 0K1 Submitted by: KAMRAN YAZDANI

SAMPLE#	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	TiO2 %	P2O5 %	MnO %	Cr2O3 %	Ba ppm	Cu ppm	Zn ppm	Ni ppm	Co ppm	Sr ppm	La ppm	Zr ppm	Ce ppm	Y ppm	Nb ppm	Ta ppm	LOI %	SUM %
F.S. 3	61.52	19.69	5.71	4.49	3.86	.51	3.24	.60	.16	.06	.010	715	5	38	30	43	89	14	85	152	29	27	20	.2	100.24
F.S. 4	72.76	15.95	3.73	1.44	.47	1.06	3.07	.49	.08	.02	.007	719	28	87	5	29	102	16	73	95	21	42	20	.9	100.16
F.S. 5	71.22	16.02	5.00	1.25	.69	1.07	2.57	.50	.08	.03	.007	633	28	34	43	32	139	17	44	142	26	20	20	1.6	100.21

.200 GRAM SAMPLES ARE FUSED WITH 1.2 GRAM OF LIBO2 AND ARE DISSOLVED IN 100 MLS 5% HNO3.
- SAMPLE TYPE: ROCK

DATE RECEIVED: DEC 3 1990 DATE REPORT MAILED: Dec 5/90 SIGNED BY. [redacted] .D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

852 E. HASTINGS ST. VANCOUVER B.C. V6A 1R6
PHONE 253-3158 DATA LINE 251-1011

DATE REPORT MAILED: Dec. 6/90.

ASSAY CERTIFICATE

Noranda Exploration Co. Ltd. (MB) PROJECT 1748 FILE # 90-5593R

SAMPLE#	Pt** oz/t
KR 20	.001
KR 21	.001
KR 31	.001

PT** BY FIRE ASSAY FROM 1 A.T.
[redacted] TYPE: ROCK PULP

SIGNED BY.. [redacted] D.TOYE, C.LEONG, J.WANG; CERTIFIED B.C. ASSAYERS

NORANDA VANCOUVER LABORATORY

PROPERTY/LOCATION: WINNIPEG

CODE :9011-048

Project No. :1748
Material :40 PANS
Remarks :

Sheet: 1 of 1
Geol.: S. LAU

Date rec'd: NOV 19
Date compl: DEC 03

Values in PPM, except where noted.

T.T. No.	SAMPLE No.	mass (g)	PPB Au	Cu	Zn	Pb	Ag
1	EW 1	19.2	5	6	56	26	0.2
2	2	12.3	5	2	18	2	0.2
3	3	7.9	5	2	6	2	0.2
4	4	9.7	5	2	6	2	0.2
5	5	7.9	5	2	4	2	0.2
6	6	5.7	5	2	2	2	0.2
7	7	8.4	5	2	6	2	0.2
8	8	6.9	5	2	6	2	0.2
9	9	7.3	5	4	48	2	0.2
10	10	6.7	5	2	6	2	0.2
11	11	7.2	5	2	4	2	0.2
12	12	8.6	10	2	8	2	0.2
13	13	8.3	5	4	8	42	0.2
14	14	6.2	5	2	6	2	0.2
15	15	6.6	5	2	4	2	0.2
16	16	8.6	5	2	8	2	0.2
17	17	6.6	5	2	10	2	0.2
18	18	7.0	5	4	8	2	0.2
19	19	7.6	5	2	10	2	0.2
20	20	5.5	5	2	8	2	0.2
21	21	8.0	5	2	10	2	0.2
22	22	6.3	5	2	6	2	0.2
23	EW 23	8.7	550	4	10	2	0.2
24	72 F 31	17.2	5	4	18	2	0.2
25	32	8.8	5	2	10	2	0.2
26	33	7.9	5	6	14	2	0.2
27	34	41.3	480	4	20	2	0.2
28	35	26.0	200	4	28	2	0.2
29	72 F 36	15.9	5	4	18	2	0.2
30	72 F 121	7.8	470	4	10	180	0.2
31	122	5.0	5	4	6	2	0.2
32	72 F 123	5.9	5	2	8	2	0.2
33	72 H 1	8.4	5	4	10	2	0.2
34	2	4.4	5	4	8	2	0.2
35	3	6.3	1550	2	8	2	0.2
36	72 H 4	6.8	70	4	10	2	0.2
37	PS 1	8.5	470	4	14	2	0.2
38	2	11.7	260	4	16	2	0.2
39	3	7.0	5	4	10	2	0.2
40	PS 4	11.2	410	20	16	46	0.2

SAMPLE#	Pt** oz/t
F.S. 1	.001
F.S. 2	.001

OCT 24 1991

NORANDA VANCOUVER LABORATORY
Geochemical Analysis

PROPERTY/
LOCATION: ATHABASCA

CODE: 9110-020

Project No.: 1700 Sheet: 1 of 1 Date received: OCT 15
Material: 3 PAN-CON Geol.: S.L. Date completed: OCT 18
Remarks: Pan-con: entire sample used for Au determination.
*Cu, Zn, Pb, Ag values obtained from Aqua Regia sol'n.

T.T. No.	SAMPLE No.	weight (g)	PPB Au	PPM Cu	PPM Zn	PPM Pb	PPM Ag
1	309	16.9	5	4	20	2	0.2
2	310	27.7	5700	4	32	4	0.4
3	311	16.9	1900	4	78	2	0.2

1 cc: Winn

APPENDIX 5

PETROGRAPHIC REPORT

JAN - 3 199:

Vancouver Petrographics Ltd.

JAMES VINNELL, Manager
JOHN G. PAYNE, Ph.D. Geologist
CRAIG LEITCH, Ph.D. Geologist
JEFF HARRIS, Ph.D. Geologist
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Report for: Sebastian Lau,
Noranda Exploration Company, Ltd.,
4 - 2130 Notre Dame Avenue,
WINNIPEG, Manitoba, R3H 0K1

Job 136
December 1990

Samples: SLR: 1, 5, 6, 13,14,15,16,17,18,19, 24, 25, 26, 29, 31, 32, 57, 61, 62, 67, 68, 69
KR: 1, 100
MR: 2, 4

Summary:

Samples are mainly of a carbonate-rich sedimentary sequence ranging from micritic limestone to calcareous siltstone.

In the siltstone, angular detrital fragments are mainly of quartz, with less abundant ones of plagioclase, carbonate (ankerite, calcite), chert, latite, and minor ones of opaque. Biotite and muscovite form generally slender flakes. Most of these samples do not contain veins. One sample contains abundant brachiopod shells, and a few contain minor fragments of similar shells. Fragments of fresh, untwinned feldspars could not be distinguished from those of quartz.

Micritic limestone commonly contain trace to minor amounts of detrital grains similar to those in the calcareous siltstone. Most samples are cut by two or three ages of veins and veinlets. Early seams are of hematite and calcite-hematite, commonly with broad halos containing irregular to dendritic patches of hematite. A few samples contain gash fractures filled with calcite and less kaolinite and hematite. Many samples are brecciated moderately to strongly, and healed by veins of calcite with minor patches of quartz and of kaolinite, and local patches of hematite. In some samples the gash fractures and breccia matrix may be of the same age.

Different carbonate minerals were distinguished mainly on refractive index, and in some samples ankerite is identified because it is oxidized to hematite/limonite on grain borders.

Some of the cryptocrystalline oxide identified as hematite in dendritic aggregates in halos about veinlets may be one of several secondary manganese minerals.

One sample is of a lamprophyre dike containing phenocrysts of phlogopite/biotite and lesser clinopyroxene in a groundmass dominated by alkali feldspar, with less biotite and clinopyroxene, and minor magnetite.

(continued)

1.0 Sedimentary Rocks

1.1 Micritic Limestone

sample	detrital grains (%)	veins (%)	other
MR-2	trace	5	
MR-4	trace	30	
SLR-5	0.1	33	
SLR-6	trace	18	
SLR-13	0.2	16	
SLR-15	0.2	14	
SLR-19	0.7	10	
SLR-25	0.6	1	(0.1% fossil shells)
SLR-26	0.3	8	
SLR-32	1.7	16	(0.3% fossil shells)
SLR-62	minor	19	

1.2 Silty Micritic Limestone

sample	detrital grains (%)	veins (%)	other
SLR-31	4	5	(2-3% fossil shells)
SLR-61	7	5	(0.1% fossil shells)
SLR-67	5	10	

1.3 Calcareous Siltstone

sample	detrital grains %	brachiopod fragments %	other
KR-1	33		coarse
SLR-1	43		coarse
SLR-14	33	minor	
SLR-16	7	42	
SLR-17	43		very coarse
SLR-18	15	minor	fine
SLR-24	20	minor	fine
SLR-29	30		
SLR-57	16	5	calcite vein
SLR-68	33		
SLR-69	30		

2.0 Lamprophyre

KR-100

[redacted]

John G. Payne
(604)-986-2928

Sample KR-1   Coarse Calcareous Siltstone; Calcite Vein

Angular, detrital fragments of quartz, plagioclase, chert, ankerite, latite, K-feldspar, and opaque, minor flakes of biotite and muscovite, and minor patches of chlorite are set in a groundmass dominated by calcite/aragonite with disseminated patches and diffuse tabular zones of hematite. Angular fragments average 0.1-0.15 mm in size. A vein averaging 0.15-0.2 mm wide is of calcite.

detrital grains		opaque	0.2%
quartz	15-17%	biotite	0.1
chert	5- 7	muscovite	minor
plagioclase	4- 5	chlorite-(opaque)	minor
ankerite	3- 4	tourmaline	trace
latite	2- 3		
K-feldspar	0.5		
groundmass			
calcite/aragonite	60-65		
hematite	3- 4		

Quartz forms equant to elongate angular fragments of single grains; the latter are up to 0.3 mm long.

Chert ranges from cryptocrystalline to extremely fine grained aggregates, showing a variety of textures ranging from submosaic to feathery and subradiating. A few contain moderately abundant dusty opaque inclusions.

Most plagioclase grains are fresh. Many are unzoned and some show faint to prominent concentric growth zones. Some contain moderately abundant, dusty opaque inclusions. This suggests two or more sources of plagioclase.

Latite fragments up to 0.17 mm in size contain minor plagioclase phenocrysts up to 0.05 mm in size in an extremely fine grained groundmass of plagioclase and minor to moderately abundant sericite.

In hematite-rich parts of the sample, ankerite fragments are rimmed by limonite/hematite.

K-feldspar forms angular grains averaging 0.1-0.2 mm in size; some show weak microcline twinning.

Biotite and muscovite form slender to stubby flakes averaging 0.1-0.15 mm in size. Biotite is pleochroic from straw to medium brown or reddish brown.

A few rounded fragments up to 0.1 mm across and one elongate fragment 0.15 mm long are of light to medium yellowish green, cryptocrystalline chlorite(?). One fragment 0.12 mm across of cryptocrystalline chlorite(?) contains abundant dusty opaque.

Opaque (hematite) forms equant grains averaging 0.05-0.1 mm in size. One tabular grain, possibly of graphite, is 0.087 mm across.

Tourmaline forms an anhedral grain 0.1 mm across with a medium olive green color.

The groundmass is dominated by subradiating aggregates of calcite/aragonite up to 0.2 mm long and patches of very fine grained, equant calcite grains. Subradiating aggregates are stained pale to light yellow-orange by limonite. Hematite is concentrated moderately to strongly in diffuse to sharply defined, interstitial patches up to 0.4 mm in size. These are concentrated moderately in a few diffuse tabular zones up to 2 mm wide.

On the edge of the section is a vein up to 0.2 mm wide of extremely fine grained calcite.

Sample KR-100 Lamprophyre; Interstitial Patches of Calcite-(Sericite) and K-feldspar-Calcite

Abundant coarse, mainly euhedral phenocrysts of phlogopite with thin rims of biotite, and smaller ones of clinopyroxene are set in a groundmass of alkali feldspar, biotite, clinopyroxene, and magnetite. Interstitial patches are of two types, one dominated by calcite with minor sericite, and the other dominated by K-feldspar and mainly less calcite.

phenocrysts	
phlogopite/biotite	17-20%
clinopyroxene	4- 5
groundmass	
alkali feldspar	35-40
biotite	17-20
clinopyroxene	8-10
magnetite	0.7

interstitial patches	
A) calcite	2- 3%
sericite	0.3
opaque	minor
B) K-feldspar	4- 5
calcite	2- 3

Phlogopite forms euhedral to subhedral phenocrysts averaging 1-4 mm in size. Pleochroism is from very pale to pale brown. They have thin rims of biotite, whose pleochroism is from light to medium brown. Some phenocrysts have concentrations of opaque along cleavage planes. One is embayed strongly by the groundmass. A few contain minor to moderately abundant replacement patches of calcite.

Clinopyroxene forms euhedral to subhedral phenocrysts averaging 0.3-1 mm in size, and one 2.5 mm across. Some larger grains are replaced slightly to moderately by lenses of calcite. One grain contains a broad core in which two twins are intimately intergrown in irregular, very fine grained patches.

In the groundmass, alkali feldspar forms interstitial grains averaging 0.1-0.3 mm in size. The stain on the offcut block and the lack of well developed albite twins suggests that much of this is K-feldspar.

Biotite forms subhedral flakes averaging 0.05-0.15 mm long. Coarser grains have phlogopite cores and are similar texturally to the phenocrysts.

Clinopyroxene forms equant to prismatic, anhedral to euhedral grains averaging 0.05-0.1 mm in size.

Magnetite forms disseminated, euhedral cubic grains averaging 0.02-0.03 mm in size.

Interstitial patches averaging 1.5-3 mm in size are of two main types. The first is dominated by fine to medium grained carbonate. Some contain minor to moderately abundant interstitial patches and seams of extremely fine grained sericite stained light yellow by limonite. Two contain a patch of opaque (hematite) 0.2 mm across. A few of these have subhedral outlines, suggesting they may have formed by replacement of mafic (olivine?) phenocrysts.

The second type contains prismatic grains of alkali feldspar averaging 0.5-1 mm long with interstitial patches of calcite. One elongate patch is 9 mm long. In some patches, alkali feldspar grains are subparallel to slightly radiating. A few patches of this type are dominated by calcite with minor to moderately abundant euhedral grains of K-feldspar averaging 0.1-0.2 mm in size along and near its borders.

Sample MR-2 Micritic Limestone; Gash Fractures of Calcite-Limonite; Veinlets of Calcite-(Kaolinite-Hematite)

The rock is a relatively pure, micritic limestone, containing minor gash fractures with calcite cores and limonite borders. It was brecciated slightly and cut by veinlets of calcite-(kaolinite) and a few stringers of calcite-hematite.

calcite		
micritic	94-95%	
coarser grained	minor	
hematite	0.4	(including halos on veins)
quartz	trace	
gash fractures		
calcite-limonite	0.4	
veinlets		
calcite	4- 5	
kaolinite	0.2	
hematite	minor	

Calcite forms a pale brown, cryptocrystalline aggregate of grains less than 0.003 mm in size. Scattered through the rock are minor, coarser grained lenses of calcite up to 0.6 mm long and a few, angular, detrital(?) grains up to 0.02 mm across.

Quartz forms a few detrital grains averaging 0.02-0.03 mm in size.

Hematite forms disseminated grains averaging 0.005-0.02 mm in size, and irregular patches from 0.05-0.3 mm in size in which dusty red-brown hematite is concentrated moderately to strongly.

A few early, subparallel gash fractures have cores up to 0.05 mm wide of extremely fine grained calcite bordered by rims up to 0.15 mm wide of extremely fine grained orange-brown limonite. These are cut by later calcite veins.

The rock was brecciated slightly and contains replacement or fracture-filling patches up to 1 mm across of calcite and veinlets up to 1.5 mm wide of calcite-(kaolinite). Grain size of calcite is extremely fine along borders of veinlets and increases into their cores, reaching 0.2-0.3 mm in size in the cores of the largest ones. A few veinlets contain lenses in their cores up to 0.1 mm wide of kaolinite flakes averaging 0.01 mm in grain size. One veinlet of calcite is interrupted by a lens 1.2 mm long of cryptocrystalline to extremely fine grained plagioclase(?) with minor disseminated calcite grains. Some calcite veinlets are bordered by a thin, discontinuous rim containing dusty hematite intergrown with calcite of the host rock in irregular to dendritic textures.

A few wispy seams up to 0.1 mm wide are of calcite-hematite. Some of these have halos containing poorly developed, dendritic patches of hematite.

Sample MR-4 Brecciated Micritic Limestone; Early Veinlets of Hematite-Calcite; Veins and Veinlets of Calcite-(Kaolinite-Aragonite)

The sample is a micritic limestone which is very similar to Sample MR-2. Early veinlets are of hematite-(calcite), and some have prominent limonitic halos. The rock was brecciated and healed by veins and veinlets dominated by calcite, with a few interstitial patches of kaolinite, and vuggy cores containing aragonite/calcite.

calcite	65-70%
quartz	trace
hematite/limonite	0.5 (including halos)
early lenses	
calcite-limonite	0.3
early veinlets	
hematite	0.3
calcite	0.5
veins	
calcite	25-30
kaolinite	1- 2
aragonite/calcite	1

Quartz forms disseminated, angular grains averaging 0.015-0.03 mm in size, and a few up to 0.07 mm long.

Calcite forms a dense aggregate of cryptocrystalline grains with a light brown color and uniform texture.

A few lenses up to 0.35 mm long and irregular patches up to 0.6 mm long are of slightly coarser grained calcite rimmed by a zone containing moderately abundant irregular to dendritic aggregates of limonite.

Hematite forms disseminated grains averaging 0.005-0.015 mm in size and a few dense patches up to 0.25 mm across.

A few wispy veinlets of hematite and hematite-calcite are up to 0.05 mm wide. Narrower veinlets are of hematite, and wider ones have borders of hematite and a broad core of calcite, much of which was leached from the rock or removed from the section during sample preparation. Some have halos from 0.3-1 mm wide containing minor to moderately abundant irregular to dendritic patches of orange-brown limonite.

The main veins are dominated by fine to medium and locally coarse grained calcite. In the core of the largest vein is a vuggy zone lined with subhedral to euhedral, prismatic aragonite grains averaging 0.03-0.05 mm long or a dense aggregate of extremely fine grained calcite/aragonite.

Some of the veins contain interstitial patches up to 0.5 mm across of kaolinite flakes averaging 0.01 mm in grain size.

Sample SLR-1   Siltstone, Aragonite/Calcite-(Hematite) Groundmass

Fragments are dominated by plagioclase and quartz, with less abundant ones of chert and ankerite, and minor ones of K-feldspar, muscovite and biotite. They are set in a groundmass of aragonite/calcite with patches of hematite. Fragments are mainly angular and equant to slightly elongate; they are of relatively uniform size between 0.08-0.2 mm. A few elongate fragments are from 0.3-0.5 mm long and less than 0.1 mm wide.

fragments			
plagioclase	15-17%	K-feldspar	0.2%
quartz	15-17	biotite	0.2
chert	7- 8	chlorite(?)	0.2
ankerite	4- 5	muscovite	0.1
andesite	0.5	opaque	trace
dacite/latite	0.5		
groundmass			
aragonite/calcite	50-55		
hematite	3- 4		

Plagioclase fragments are mainly fresh and appear to be of oligoclase composition. A few fragments of more-calcic plagioclase are altered slightly to sericite.

Quartz fragments are mainly of single grains, and a few are of very fine grained aggregates.

Cherty fragments are of interlocking grains of silica ranging from 0.003-0.015 mm in grain size. Finer grained fragments commonly contain more abundant dusty opaque inclusions. Some of the cryptocrystalline fragments might be of latite dominated by plagioclase.

Ankerite fragments are altered slightly to limonite along their margins.

Andesite fragments contain minor plagioclase crystals up to 0.05 mm in size in a cryptocrystalline to extremely fine grained groundmass.

Several fragments of altered intermediate volcanic rocks(?) consist of extremely fine grained plagioclase and/or quartz intergrown with moderately abundant sericite.

Biotite forms a few slender flakes averaging 0.1-0.3 mm long, with a few bent and broken ones up to 0.5 mm long. Pleochroism is from straw to medium red-brown or brown. Some biotite flakes have lenses of calcite between cleavage planes. Chlorite forms one pale to light green flake 0.15 mm long, probably secondary after biotite.

A few equant, subrounded fragments are of cryptocrystalline, medium yellowish green chlorite(?). Some of these patches are stained light to medium orangish brown by limonite.

K-feldspar forms a few grains, some of which also contain minor plagioclase.

Muscovite forms a few flakes up to 0.2 mm long.

Opaque forms a few grains up to 0.07 mm in size.

The groundmass is dominated by calcite/aragonite grains ranging from less than 0.01 mm in size up to 0.3 mm long. Fairly common Many patches show a subradiating to radiating texture. Many of these are stained pale to light yellow by limonite. Hematite forms dense patches up to 0.5 mm across and is concentrated moderately to strongly in patches up to 0.3 mm in size in which it is intergrown with calcite.

Sample SLR-5 **Breccia: Micritic Limestone Fragments in a Vuggy Matrix of Calcite**

Fragments of micritic limestone are set in a vuggy matrix of calcite. The micritic limestone contains scattered quartz grains and muscovite flakes in a medium brown, cryptocrystalline groundmass.

The matrix consists of calcite which ranges in grain size from extremely fine on borders of the fragments to medium in the centers of patches. Some patches have vuggy cores surrounded by euhedrally terminated crystals. Hematite is concentrated locally in veinlets and patches in the matrix.

limestone	
quartz grains	0.1%
muscovite flakes	trace
groundmass	65-70
matrix	
calcite	30-35
opaque/hematite	0.2
kaolinite	minor

Quartz forms equant to elongate fragments averaging 0.01-0.02 mm in size, with a few up to 0.05 mm across.

Muscovite forms a few slender flakes up to 0.05 mm long.

The groundmass of the limestone is cryptocrystalline and medium brown in color. It contains moderately abundant equant to lath-like patches averaging 0.01-0.03 mm in size of slightly coarser grain size. Hematite forms disseminated concentrations of diffuse patches containing moderately abundant, dusty, red-brown hematite, some of which also contain opaque spots up to 0.02 mm across.

The fragments are recrystallized to a slightly coarser grain size along a few planar zones which resemble veins. Associated with many of these are patches in which hematite is concentrated moderately.

Adjacent to the fragments the breccia matrix generally is extremely fine grained. This grades rapidly into fine to medium grained cores of matrix patches. Some of these are vuggy. Hematite is concentrated in a few patches and veinlike zones in the matrix. Most of these are cryptocrystalline.

Cutting a few fragments are veinlike zones containing minor to moderately abundant hematite as cryptocrystalline aggregates and as equant grains averaging 0.02-0.03 mm in size. One patch of hematite is 0.3 mm across.

A few lenses in the matrix up to 0.5 mm long are of interlocking kaolinite flakes averaging 0.01-0.015 mm in grain size.

Sample SLR-6(7) Brecciated Micritic Limestone; Hematite Seams; Breccia Matrix of Calcite-(Hematite-Kaolinite) Veins and Veinlets

Trace amounts of detrital quartz grains are set in a groundmass of micritic calcite. Early seams of hematite commonly have hematitic halos. The rock was brecciated and fragments were healed by veinlets and veins of calcite-(kaolinite-hematite).

detrital grains	
quartz	trace
muscovite	trace
groundmass	
calcite	80-82
hematite	1
early seams	
hematite	0.5
breccia matrix: veins, veinlets	
calcite	15-17
hematite	1
kaolinite	0.5

Angular detrital quartz grains average 0.01-0.02 mm in size, with a few from 0.05-0.08 mm across.

Muscovite forms a few flakes up to 0.03 mm long.

The groundmass is of micritic calcite stained medium orange brown by limonite. Opaque to deep red-brown hematite forms disseminated spots and angular grains averaging 0.01-0.02 mm in size. One lens 1.2 mm long contains abundant equant grains of hematite averaging 0.01 mm in size, probably after original pyrite crystals.

A few early seams averaging 0.01 mm wide are of red-brown hematite; these commonly have weak to moderately well developed alteration halos containing scattered irregular to dendritic patches of red-brown hematite. Near a few of these are single grains and clusters of subrounded grains of opaque (hematite) averaging 0.02-0.03 mm in diameter.

The breccia matrix is dominated by calcite. Many of the narrower veins and patches, and borders of larger ones are extremely fine grained. Cores of larger patches are very fine to fine grained.

Kaolinite occurs in lensy patches in cores of larger veins; these are mainly from 0.05-0.15 mm wide and consist of grains averaging 0.005-0.01 mm in size. Many narrower veins and veinlets contain patchy cores dominated by hematite and/or kaolinite.

One veinlet 0.1-0.2 mm wide of calcite contains abundant anhedral patches of deep red-brown to opaque hematite averaging 0.02-0.07 mm in size, and a few over 0.1 mm across. This veinlet is surrounded by a thin halo stained reddish orange by limonite.

Sample SLR-13 — Brecciate Micritic Limestone; Calcite-(Kaolinite) Matrix

The sample is a micritic limestone containing minor detrital quartz grains. It is brecciated and healed by veins of calcite with minor interstitial patches of kaolinite-(hematite).

limestone	
quartz	0.2%
muscovite	trace
tourmaline(?)	trace
calcite	80-83
hematite	0.5
matrix	
calcite	15-17
kaolinite	0.2
hematite	0.1

Quartz forms angular grains averaging 0.02-0.04 mm in size, with a few grains from 0.07-0.1 mm across.

Muscovite forms a few flakes up to 0.1 mm long.

A grain 0.03 mm across is of an unknown mineral (possibly tourmaline). Part of the grain is pleochroic from nearly colorless to light olive green, and the rest is colorless.

Calcite forms feathery aggregates averaging 0.003-0.007 mm in grain size, with a few grains up to 0.02 mm in size. Scattered irregular patches, mainly from 0.1-0.3 mm in size consist of cryptocrystalline calcite.

Hematite forms disseminated grains averaging 0.003-0.01 mm in size, scattered grains from 0.01-0.02 mm in size, and a few patches up to 0.5 mm in size of dense to extremely fine grained aggregates.

The breccia matrix consists of patches averaging 2-3 mm across and veinlets averaging 0.2-0.6 mm wide. It is dominated by extremely fine to fine grained aggregates of calcite.

Hematite forms scattered concentrations in wispy patches and seams.

Kaolinite occurs in cores of some patches and vein-like zones as aggregates of flakes averaging 0.01-0.02 mm in size. Dusty brown hematite commonly occurs with kaolinite.

Sample SLR-14 Siltstone: Calcite/Aragonite-(Hematite) Groundmass

The rock contains fragments of quartz and ankerite, less abundant ones of latite, chert, micritic limestone, and plagioclase, and minor ones of biotite, muscovite, and K-feldspar in a groundmass dominated by calcite with scattered patches of aragonite and of hematite. Fragments are angular and average 0.07-0.15 mm in size. Ankerite fragments and hematite patches in the groundmass each are concentrated moderately in some layers. In the hand sample, a black fragment 1 cm long on a bedding plane fracture is of wood.

fragments		K-feldspar	0.2%
quartz	12-15%	chlorite	0.1
ankerite	8-10	opaque/hematite	0.1
latite	2- 3	volcanic glass	minor
micritic limestone	2- 3	fossils	minor
chert	2- 3	apatite	trace
plagioclase	2- 3	tourmaline	trace
biotite	0.3	wood (hand sample only)	
muscovite	0.2		
groundmass			
calcite/aragonite	60-65		
hematite	3- 4		
kaolinite	0.3		

Quartz forms angular fragments of single grains.

Ankerite forms subangular fragments, most of which are altered moderately along their margins to limonite.

Latite forms extremely fine grained aggregates of plagioclase and sericite.

Micritic limestone forms subrounded fragments composed of cryptocrystalline aggregates of calcite.

Chert forms cryptocrystalline to extremely fine grained aggregates.

Plagioclase forms fresh, angular to subangular grains.

Biotite and muscovite each forms ragged to subhedral flakes averaging 0.1-0.2 mm long, and locally up to 0.4 mm long. Biotite is pleochroic from pale to medium brown. Some muscovite flakes contain abundant Ti-oxide inclusions, suggesting that they were formed by replacement of biotite.

K-feldspar forms a few angular grains showing poorly developed microcline twins.

Rounded to subrounded fragments are of cryptocrystalline, medium green chlorite(?).

A few fragments up to 0.4 mm long are of pale to medium brown, isotropic volcanic glass(?).

Opaque/hematite forms a few subangular to angular fragments up to 0.4 mm long.

One slender curved brachiopod(?) shell is 0.6 mm long. A few other, very elongate carbonate grains may be fossil fragments.

Apatite forms a slender, euhedral prismatic grain 0.2 mm long.

Tourmaline forms an equant grain 0.06 mm across. It is medium green in color. A few tourmaline grains up to 0.02 mm in size show pleochroism from pale to medium green.

The groundmass is dominated by extremely fine to very fine grained calcite. Scattered patches consist of subradiating aggregates of aragonite. Some of these are stained light to medium orange by limonite. Opaque (hematite) is concentrated moderately in a few layers parallel to bedding as anhedral patches averaging 0.1-0.4 mm in size. Kaolinite forms scattered patches up to 0.3 mm in size of slightly interlocking flakes averaging 0.02-0.05 mm in size.

Sample SLR-15 Brecciated Micritic Limestone; Calcite Matrix

The rock contains scattered concentrations of detrital quartz grains in a groundmass of cryptocrystalline carbonate. It was brecciated, and healed by a matrix of calcite.

detrital grains	
quartz	0.2%
calcite	minor
muscovite	trace
opaque	trace
groundmass	
carbonate	85-87
hematite	0.3
breccia matrix	
calcite	12-15
hematite	0.1
kaolinite	minor

Detrital quartz grains averaging 0.05-0.1 mm in size are concentrated in a few patches up to 2 mm across. These patches also contain a few equant calcite grains averaging 0.1 mm across, a few wispy muscovite flakes up to 0.1 mm long, and a few equant grains of opaque up to 0.05 mm in size.

The groundmass is dominated by cryptocrystalline to extremely fine grained, feathery calcite grains up to 0.01 mm in size. Hematite forms scattered, commonly wispy patches, which are concentrated somewhat outwards from calcite veinlets. Many hematite patches have a dendritic texture. Opaque also forms disseminated grains averaging 0.01 mm in size.

Patches up to a few mm across and veinlets averaging 0.1-0.3 mm wide are dominated by very fine to locally fine grained calcite. Hematite forms wispy, interstitial patches in some veinlets, and a few dense patches up to 0.1 mm across.
One patch 0.4 mm across is of equant kaolinite flakes averaging 0.01 mm in grain size.

A few contorted stringers less than 0.02 mm wide are of hematite.

Sample SLR-16 **Fossiliferous (Brachiopods) Calcareous Siltstone**

The sample contains abundant shells and fragments of shells of brachiopods in a variable groundmass of very fine grained calcareous siltstone to hematitic micritic limestone. Most shells are oriented parallel to bedding.

fossil fragments	
brachiopods	40-45%
detrital grains	
quartz	5- 7
plagioclase	1
ankerite	0.5
ellipsoid	(one fragment)
muscovite	trace
elongate fragment	(one)
groundmass	
calcite	43-48
hematite/limonite	2- 3

Brachiopod shells are up to 1 cm in size. Many are delicately laminated and consist of well oriented cryptocrystalline calcite, which shows wavy extinction patterns which reflect original internal structures in the shells. A few large shells are cut by veinlets up to 0.2 mm wide of very fine grained calcite. A few large shells contain moderately abundant concentrations of anhedral opaque grains from 0.01-0.1 mm in size.

An ellipsoidal structure 1.3 mm long by 0.95 mm wide has a rim 0.05-0.07 mm wide of opaque surrounding a core of isotropic, light orange material containing abundant disseminated extremely fine grained to dusty opaque and a few elongate grains up to 0.3 mm long of calcite. Its origin is unknown.

One elongate fragment 0.35 mm long is colorless with very low birefringence and a diffuse banded structure parallel to its length. It is partly bordered by opaque and contains a few lensy inclusions of opaque parallel to its length. Its origin is unknown.

Quartz with lesser plagioclase, ankerite, and chert form equant, angular, detrital fragments averaging 0.03-0.07 mm in size.
Muscovite forms slender flakes up to 0.35 mm long.

The groundmass is patchy, with siltstone zones containing moderately abundant detrital grains, and micritic limestone zones containing very few. Calcite/aragonite forms cryptocrystalline to extremely fine, in part feathery aggregates. Hematite forms diffuse patches up to 0.2 mm in size; many of these are oriented along bedding planes. Finer grained, wispy hematite lenses are more abundant in the micritic limestone than in the siltstone. Dusty hematite/limonite gives much of the groundmass a pale to medium orange color.

Sample SLR-17 Friable Calcareous Siltstone/Fine Greywacke

The sample contains equant, angular to subangular grains of quartz, feldspars, chert, volcanic rocks, and ankerite, and scattered flakes of biotite and muscovite moderately loosely cemented by a groundmass of calcite. Fragment size averages 0.1-0.2 mm, with a few up to 0.4 mm long.

detrital grains		biotite	0.3%
quartz	15-17%	muscovite	0.1
chert	15-17	Ti-oxide	minor
plagioclase	5- 7	elongate siliceous(?) fragment	(one)
K-feldspar	1- 2		
latite/andesite	2- 3		
ankerite	1- 2		
hematite	0.2		
groundmass			
calcite	50-55		
hematite	1		

Quartz fragments are of single grains.

Chert aggregates range from cryptocrystalline to 0.02 mm in grain size. Finer grained fragments commonly contain dusty opaque or limonite, giving them a dark grey or light orange color. A few of the coarsest grained fragments have a mosaic texture. A few cherty fragments contain a few pyrite grains up to 0.015 mm in size.

Most plagioclase grains are fresh and a few are altered slightly to sericite. Some contain abundant dusty opaque inclusions. One contains a myrmekitic intergrowth of quartz.

Latite forms fragments dominated by extremely fine grained plagioclase and sericite.

Andesite forms fragments containing minor laths of plagioclase up to 0.07 mm in length in a cryptocrystalline to extremely fine grained groundmass.

Ankerite fragments commonly have rhombic cleavage outlines. Alteration is slight along fragment borders to limonite.

A slender siliceous(?) fragment 0.8 mm long is banded delicately and diffusely parallel to its length. It is pale yellow with very low birefringence and length-fast character. It is broken perpendicular to its length into a few segments. (This is similar to the "elongate fragment" in Sample SLR-16).

Biotite forms slender, commonly crumpled flakes up to 0.5 mm long and a few stubby books; the latter consist of thin flakes intergrown with lenses of calcite parallel to cleavage. Pleochroism is from straw to medium, slightly reddish brown. In a few stubby books biotite is replaced by pseudomorphic chlorite. Muscovite forms a few subhedral to ragged flakes up to 0.3 mm long.

Hematite forms one patch 0.55 mm in size with a banded structure perpendicular to its length. It contains scattered concentrations of relic(?) grains averaging 0.005 mm in size of pyrrhotite/pyrite. A much smaller similar patch consists entirely of hematite.

K-feldspar forms grains which generally lack twins. A few contain minor exsolution spots of plagioclase.

Ti-oxide forms scattered grains up to 0.07 mm in size.

The groundmass ranges from cryptocrystalline to very fine grained calcite. Scattered patches averaging 0.12-0.2 mm across of aragonite have a subradiating texture. Hematite forms irregular, disseminated patches averaging 0.05-0.2 mm in size and is concentrated moderately in other patches as dusty to extremely fine grained aggregates intergrown with calcite.

Sample SLR-18   Fine Calcareous Siltstone; Seams of Hematite and Carbonaceous Opaque

Angular, detrital fragments of quartz and plagioclase averaging 0.05-0.1 mm in size, much less abundant ones of chert and ankerite, and slender flakes of biotite and muscovite are set in a groundmass of calcite with moderately abundant lenses of hematite and of carbonaceous opaque, mainly parallel to bedding. Some layers contain much more abundant detrital fragments than others.

detrital grains		limonite	minor
quartz	8-10%	fossil shells	minor
plagioclase	3- 4	Ti-oxide	trace
ankerite/calcite	1	garnet	trace
chert	1		
biotite	0.2		
muscovite	0.1		
K-feldspar	0.1		
carbonaceous opaque	0.1		
groundmass		veinlets, seams	
calcite	80-83	hematite	1- 2%
hematite	1	carbonaceous opaque	0.3
marcasite	0.2		
pyrite	0.1		

Quartz, plagioclase, chert, ankerite/calcite, and K-feldspar form equant to slightly elongate, generally angular grains. A few elongate grains of quartz and chert are over 0.3 mm long. Plagioclase ranges from fresh to altered slightly to sericite and dusty opaque. Chert ranges from extremely fine grained to cryptocrystalline.

Biotite and muscovite each form slender flakes averaging 0.1-0.2 mm long. Biotite is pleochroic from straw to medium reddish brown. One flake is altered to pale to light/medium green chlorite.

A few fragments are of slender fossil shells up to 1 mm long and 0.02 mm wide.

One fragment 0.3 mm across is of light orange, isotropic limonite. Carbonaceous opaque forms a few equant patches up to 0.2 mm in size. Ti-oxide forms grains averaging 0.04-0.07 mm in size. Garnet forms an anhedral, equant grain 0.08 mm across. Zircon forms an anhedral grain up to 0.1 mm across.

The groundmass is dominated by cryptocrystalline to extremely fine grained calcite.

Marcasite forms disseminated clusters averaging 0.05-0.1 mm in size of grains averaging 0.005-0.01 mm in size.

Several fragments averaging 0.03-0.05 mm in size and a few lenses up to 0.35 mm long are dominated by cubes of pyrite 0.0015-0.0025 mm across in a sparse groundmass of non-reflective material of unknown composition. One lens 0.35 mm long is dominated by subrounded to subhedral pyrite grains averaging 0.005-0.01 mm in size. Hematite forms a few patches up to 0.4 mm in size of skeletal aggregates intergrown with minor calcite.

Wispy seams parallel to bedding and a few veinlets from 0.02-0.05 mm wide are of red-brown, cryptocrystalline, isotropic hematite. One major, discontinuous veinlet 0.1-0.15 mm wide of deep red-brown hematite is perpendicular to bedding. Other lenses averaging 0.3-0.5 mm long and parallel to bedding are of carbonaceous opaque. One such lens is 1 mm long and 0.1 mm wide.

Sample SLR-19 — Micritic Limestone; Veins of Calcite-(Kaolinite-Hematite)

A few detrital quartz grains and irregular patches of calcite-hematite, possibly of organic origin, are set in a groundmass of micritic limestone. The rock is brecciated slightly and healed by veins dominated by calcite. Lenses of hematite or kaolinite occur in cores of some larger veins.

detrital grains	
quartz	0.7%
biotite	trace
muscovite	trace
groundmass	
micritic calcite	85-87
calcite-hematite patches	4- 5
opaque	0.2
veins	
calcite	8-10
kaolinite	0.7
hematite	0.4
aragonite(?)	trace

Quartz forms equant to elongate grains averaging 0.05-0.08 mm in size. Bordering many coarser grains, calcite is slightly coarser grained and clearer than in the main groundmass.

Biotite forms a few slender flakes up to 0.2 mm in length. These commonly are rimmed by clear overgrowths of calcite with comb textures. Muscovite forms a stubby flake 0.05 mm long.

The groundmass is dominated by light brown, cryptocrystalline calcite. Equant patches up to 0.8 mm across and wispy, elongate patches consist of extremely fine grained calcite intergrown with reddish orange to brown hematite/limonite. Some of the patches have a delicate tabular texture, suggesting that they are of organic origin.

Opaque (hematite?) forms a few lenses up to 0.6 mm long and patches up to 0.3 mm across.

Veins are dominated by extremely fine to very fine grained, anhedral calcite, with the coarser grained aggregates (0.15-0.2 mm) being concentrated in the cores of veins. In the cores of many larger veins are lenses up to 0.2 mm wide of kaolinite flakes averaging 0.01-0.02 mm in size. In the core of a few veins are irregular lenses up to 0.2 mm wide of cryptocrystalline, red-brown hematite. One vein has a vuggy patch in its core into which grew numerous delicate, prismatic aragonite(?) crystals averaging 0.02-0.04 mm long. Bordering one vein is a discontinuous zone 0.05-0.08 mm wide of opaque (hematite?).

Sample SLR-24 **Fine Calcareous Siltstone**

Angular detrital fragments of quartz, less calcite, and much less plagioclase and opaque, and minor flakes of muscovite and biotite are set in a groundmass dominated by calcite with wispy lenses and patches of hematite. Angular fragments average 0.02-0.07 mm in size, with a few over 0.1 mm long.

detrital fragments	
quartz	15-17%
calcite	3- 4
plagioclase	1
muscovite	0.2
opaque	0.2
biotite	0.1
fossil shells(?)	minor
limonite	trace
tourmaline	trace
groundmass	
calcite/aragonite	75-78
hematite	3- 4
chlorite(?)	0.2
kaolinite	minor

Quartz and much less plagioclase form equant to elongate, angular fragments averaging 0.0-2-0.07 mm in size, with a few up to 0.15 mm long. Plagioclase is fresh.

Calcite forms grains averaging 0.03-0.05 mm in size, with a few up to 0.1 mm long. A few elongate lenses up to 0.7 mm long and less than 0.03 mm wide may be fragments of thin brachiopod shells.

Muscovite and biotite form slender flakes averaging 0.05-0.15 mm long, and locally up to 0.3 mm long. Biotite is pleochroic from straw to medium brown or medium reddish brown. A few elongate biotite flakes are rimmed by calcite/ aragonite aggregates with comb textures oriented perpendicular to the biotite flakes.

Opaque forms equant grains averaging 0.03-0.07 mm in size, with a few up to 0.2 mm long.

Limonite forms a few equant grains averaging 0.02-0.03 mm in size.

Tourmaline forms a few equant grains up to 0.02 mm in size. Pleochroism is from pale to medium slightly bluish green.

The groundmass is dominated by cryptocrystalline to extremely fine grained, in part feathery calcite/aragonite. Much of it is stained pale to light yellow by limonite. In one corner of the section, it is stained medium orange-brown by more abundant limonite.

One recrystallized(?) or replacement patch 0.5 mm across is dominated by equant calcite grains averaging 0.05 mm in size.

Several patches (or fragments) averaging 0.05-0.08 mm in size are of aggregates of brownish green, cryptocrystalline to extremely fine grained chlorite(?) flakes.

Hematite forms moderately abundant wispy lenses up to 0.7 mm long, and irregular patches averaging 0.05-0.1 mm across.

Kaolinite forms a few patches up to 0.1 mm in size of grains averaging 0.005-0.01 mm in size.

One vuggy, gash fracture up to 0.15 mm wide and 1.5 mm long contains a thin rim of cryptocrystalline carbonate.

Sample SLR-25 Micritic Limestone; Veinlet of Calcite-Hematite with Hematite-Limonite Halo

Minor detrital grains of quartz, chert, fossil shells, plagioclase, muscovite, biotite, and calcite are set in a groundmass of micritic calcite. A veinlet of calcite-(hematite) has a broad halo of hematite/limonite. Limonite bands formed by surface weathering are offset locally along late(?) calcite stringers.

detrital grains		
quartz	0.3%	
chert	0.1	
fossil fragments	0.1	
plagioclase	minor	
muscovite	trace	
biotite	trace	
calcite	trace	
groundmass		
calcite	90-92	
hematite/limonite	2- 3	(including limonite formed by weathering)
veinlet (with hematite-limonite halo)		
calcite	1	
hematite	0.5	
late veinlets		
calcite	minor	

Detrital grains are concentrated moderately in a few patches up to a few mm across, which grade into a micritic limestone containing much fewer detrital grains.

Angular detrital grains of quartz and chert average 0.02-0.05 mm in size, with a few up to 0.08 mm across. Plagioclase forms subhedral rectangular grains averaging 0.02-0.05 mm in size, and one 0.15 mm long. A few, very slender brachiopod(?) shells of calcite are up to 2 mm long.

Muscovite and biotite form stubby to slender flakes averaging 0.04-0.07 mm long. Biotite is pleochroic from pale straw to light brown.

Calcite forms equant detrital grains averaging 0.02-0.04 mm across.

The groundmass is dominated by cryptocrystalline calcite which is stained light brown by limonite. Bordering detrital grains, the groundmass commonly is recrystallized in zones from 0.005-0.015 mm wide to slightly coarser grained aggregates free of Fe-oxide stain. Bordering mica flakes these aggregates generally are oriented perpendicular to the mica flakes. Deep red-brown to opaque hematite forms irregular patches averaging 0.01-0.1 mm in size. Patches up to 0.5 mm across and seams up to a few mm long consist of extremely fine to very fine grained calcite and abundant red-brown hematite/limonite.

A veinlet 0.03-0.05 mm wide is dominated by extremely fine grained calcite with minor concentrations of hematite along its margins. It is bordered by a halo up to 2 mm in size containing minor to moderately abundant irregular to detrital patches of limonite.

Limonite is concentrated in the groundmass in concentrically banded zones formed during surface weathering. Locally, these are offset up to 1 mm along a few late calcite stringers averaging 0.005-0.008 mm wide.

Sample SLR-26 Brecciated Micritic Limestone; Early Seams of Hematite and Calcite-(Hematite); Veins and Veinlets of Calcite-(Hematite-Kaolinite)

Minor detrital grains of quartz, chert, calcite, muscovite, and plagioclase are set in a groundmass of micritic calcite with a few slightly coarser grained patches of calcite. Veinlets of hematite and calcite-(hematite) have broad halos of hematite/limonite. Veins and veinlets are of calcite with minor kaolinite and hematite.

detrital grains		early seams	
quartz	0.2%	hematite	0.3%
chert	minor	calcite	0.1
calcite	minor	veins, veinlets	
muscovite	trace	calcite	7- 8
plagioclase	trace	kaolinite	0.1
groundmass		hematite	minor
calcite			
micritic	90-92		
coarser patches	1- 2		
hematite/limonite	1 (including halos on early seams)		

Angular to subrounded detrital grains of quartz and chert average 0.03-0.07 mm in size, with a few up to 0.15 mm across. Chert ranges from cryptocrystalline to extremely fine grained, and generally is free of dusty opaque inclusions. Calcite forms equant, commonly angular grains averaging 0.03-0.07 mm across. Muscovite forms slender flakes averaging 0.03-0.07 mm long. Plagioclase forms anhedral grains averaging 0.03-0.07 mm in size.

The groundmass is dominated by cryptocrystalline calcite which is stained light brown by limonite. Bordering detrital grains, the groundmass is recrystallized in zones from 0.005-0.015 mm wide to slightly coarser grained aggregates free of Fe-oxide stain. Bordering mica flakes these aggregates generally are oriented perpendicular to the mica flakes. Deep red-brown to opaque hematite forms irregular patches averaging 0.02-0.15 mm in size.

Recrystallized(?) patches up to 1.2 mm long consist of extremely fine to very fine grained calcite. One very elongate patch resembles a fossil shell fragment in some of the other sections. Some others have an internal, broadly zoned, concentric structure indicated by variation in grain size of calcite.

One unusual patch 0.5 mm long contains thin, curved lenses of orange limonite bordered by recrystallized calcite oriented perpendicular to borders of the limonite patches. The textures suggests an organic origin, but the limonite composition is unusual.

A few seams and irregular veinlets averaging 0.01-0.03 mm wide are dominated by hematite or by extremely fine grained calcite with minor concentrations of hematite along margins. They commonly are bordered by halos up to 1.5 mm wide containing minor to moderately abundant irregular to detrital patches of hematite/limonite.

The main veins and veinlets are dominated by extremely fine to locally fine grained calcite, with grain size largest in cores of larger veins. In the cores of a few veins, kaolinite forms patches up to 0.15 mm in size of grains averaging 0.01 mm in size. Hematite forms scattered patches in the cores of some veinlets.

Sample SLR-29 Calcareous Siltstone; Patchy Hematite-Free Zones in Groundmass

Angular, detrital fragments dominated by ankerite and quartz, with much less chert, latite/andesite, and plagioclase, and minor flakes of biotite/chlorite and muscovite are set in a groundmass of calcite-(hematite). Angular fragments average 0.03-0.06 mm in size. In a few lenses and equant patches up to 1 cm in the groundmass, hematite was removed and in part reprecipitated outwards from the borders of the patches.

detrital grains	
ankerite	12-15%
quartz	10-12
chert	2- 3
latite/andesite	1- 2
plagioclase	1
biotite/chlorite	0.5
muscovite	0.1
opaque/hematite	0.1
groundmass	
calcite	65-70
hematite	3- 4
kaolinite	minor

Quartz, ankerite, chert, and plagioclase form equant to slightly elongate angular grains averaging 0.03-0.06 mm in size, with a few up to 0.12 mm across. Chert fragments are cryptocrystalline to extremely fine grained. Plagioclase is fresh. Ankerite is altered along fragment borders to red-brown hematite.

Latite and andesite form fragments averaging 0.05-0.07 mm in size. These are dominated by extremely fine grained plagioclase and sericite in a variety of textures.

Biotite forms slender to stubby flakes averaging 0.07-0.15 mm long. Alteration is moderate to strong to light to medium olive green chlorite. Chlorite also forms patches up to 0.15 mm across of cryptocrystalline to very fine grained flakes of light to medium olive green color. Muscovite forms slender flakes up to 0.1 mm long.

Opaque forms a few angular grains up to 0.1 mm in size. Red-brown hematite forms a few fragments (?) up to 0.25 mm across.

In the groundmass, calcite forms cryptocrystalline to extremely fine grained aggregates. Hematite forms disseminated red-brown spots and patches, which are concentrated slightly in wispy seams parallel to bedding(?). A few patches up to 1 cm across and lenses bordering fractures (in the hand sample) contain much less hematite; in these, hematite appears to have been leached. Hematite is more abundant than normal in diffuse zones bordering these patches, suggesting that hematite was removed from the cores of the patches and reprecipitated outwards from the margins. Opaque hematite forms a few irregular patches averaging 0.07-0.15 mm in size. One patch 1.7 mm across contains abundant opaque hematite grains up to 0.4 mm in size intergrown with groundmass calcite; this hematite may be secondary after pyrite. Kaolinite forms a few patches up to 0.1 mm across of aggregates of flakes averaging 0.015-0.025 mm in size.

Sample SLR-31 **Slightly Fossiliferous Micritic Limestone; Veinlets of Calcite**

The rock is a micritic limestone containing moderately abundant fragments of brachiopod shells and detrital quartz grains, and much fewer ones of calcite, chert, and volcanic rocks. Veinlets are dominated by calcite. A few seams are dominated by hematite/pyrite.

detrital grains		groundmass	
quartz	2- 3%	calcite	87-90
fossil fragments	2- 3	hematite/limonite	0.5
calcite	0.3	pyrite	minor
chert	0.2	veinlets, veins	
latite/andesite	0.1	calcite	4- 5%
plagioclase	minor	kaolinite	0.2
limonite	minor	seams	
muscovite	trace	hematite	0.1
phlogopite	trace		
opaque	trace		
zircon	trace		

At one side of the sample is a patch containing several fragments up to 1 mm long and 0.15 mm wide of brachiopod(?) shells. Elsewhere are scattered similar and somewhat larger fragments of brachiopod shells, ranging up to 2.5 mm long. Many show delicate, wavy internal textures.

Quartz and chert both form angular, detrital grains averaging 0.04-0.08 mm in size. A few quartz grains are up to 0.2 mm long.

Calcite forms equant, angular grains averaging 0.03-0.07 mm in size, with a few up to 0.1 mm across.

Latite forms a few fragments up to 0.1 mm in size. These are dominated by extremely fine grained plagioclase and sericite. Andesite forms a few fragments up to 0.05 mm in size. These contain minor coarser grained plagioclase in a finer grained groundmass dominated by plagioclase.

One rectangular patch 0.2 mm across is of extremely fine grained to cryptocrystalline, feathery, orange limonite.

Plagioclase forms a few equant grains up to 0.08 mm in size.

Muscovite forms stubby flakes averaging 0.05-0.07 mm long.

One fragment 0.15 mm across is of an aggregate of extremely fine grained, pale brown flakes of phlogopite(?).

Opaque forms a few equant grains up to 0.05 mm across.

Zircon forms a subrounded, prismatic grain 0.07 mm long.

The groundmass is dominated by cryptocrystalline calcite. A few lenses up to 1 mm long consist of coarser grained calcite with moderately abundant orange-brown limonite. Hematite forms irregular, disseminated patches. A few wavy seams up to 0.15 mm wide contain abundant spots of hematite (in part after pyrite) and minor patches up to 0.2 mm long of kaolinite. Pyrite forms a few clusters up to 0.7 mm in size of euhedral grains averaging 0.01 mm across intergrown with groundmass calcite.

In a veinlike zone up to 1.2 mm wide calcite is recrystallized in irregular patches to coarser grained aggregates averaging 0.03-0.1 mm in grain size. In cores of some of these patches are aggregates of kaolinite flakes averaging 0.01 mm in grain size.

Veins and veinlets averaging 0.1-0.5 mm wide and locally up to 2 mm wide are dominated by very fine to fine grained calcite.

One veinlet 0.05 mm wide is of kaolinite flakes averaging 0.01-0.02 mm in size.

Sample SLR-32 **Brecciated Micritic Limestone; Veinlets of Hematite-(Calcite); Veins and Veinlets of Calcite-(Kaolinite)**

The sample is a brecciated micritic limestone containing minor detrital grains of quartz and calcite and fragments of brachiopod(?) shells. Early veinlets are of hematite-(calcite). Limestone fragments are healed by veins and veinlets of calcite-(kaolinite).

detrital grains		plagioclase	minor
quartz	1%	opaque	minor
calcite	0.3	muscovite	trace
fossil fragments	0.3	zircon	trace
chert	0.1		
groundmass			
calcite	80-83		
hematite	2- 3		
veins, veinlets			
calcite	15-17		
kaolinite	0.3		
hematite	minor		

Quartz forms angular detrital grains averaging 0.03-0.07 mm in size, with a few up to 0.12 mm long.

Calcite forms angular, detrital (?) grains averaging 0.04-0.07 mm in size.

A few fragments up to 1 mm long are of brachiopod(?) shells. In one shell 0.06 mm wide kaolinite forms patches up to 0.4 mm long which occupy the entire width of the shell.

Chert forms a few patches up to 0.15 mm in size of cryptocrystalline to extremely fine grained aggregates.

Opaque (hematite?) forms a few equant grains averaging 0.05-0.08 mm in size. Plagioclase forms a few grains up to 0.07 mm in size; some are altered partly to sericite/muscovite. Muscovite forms a few flakes up to 0.07 mm long. Zircon forms one prismatic grain with subrounded outlines 0.07 mm long.

The groundmass is dominated by cryptocrystalline calcite. A few patches up to 0.4 mm in size have a thin rim of slightly coarser grained calcite surrounding a core of red-brown hematite. Hematite forms disseminated grains and aggregates averaging 0.01-0.03 mm in size, and a few patches up to 0.2 mm across. Hematite (after pyrite?) forms a few clusters of spheroidal grains 0.015-0.02 mm wide.

One lens 1.1 mm long contains abundant spots of hematite averaging 0.01-0.02 mm in size. At one end these are intergrown with groundmass calcite, and at the other end with a patch up to 0.4 mm long of kaolinite averaging 0.01 mm in grain size.

A few early veinlets up to 0.05 mm wide are of hematite, in part with cores of calcite. A few have halos up to 0.6 mm wide containing minor to moderately abundant dendritic to irregular patches of red-brown hematite.

Veins up to 3 mm wide are of calcite. Grain size increases from extremely fine on borders of veins to fine to medium in cores of veins. One large vein has a core of cryptocrystalline carbonate, in part separated from outer zones of coarser grained calcite by a thin seam of red-brown hematite. In cores of a few veins, colorless to pale yellow kaolinite forms minor patches up to 0.3 mm long of flakes averaging 0.01-0.02 mm in size.

Sample SLR-57 Slightly Fossiliferous Calcareous Siltstone; Calcite Vein

Angular fragments of quartz, calcite, and brachiopod shells, and minor angular to subrounded fragments of chert, latite, and plagioclase, and flakes of biotite and muscovite are set in a groundmass dominated by micritic calcite. Fragments average 0.05-0.1 mm in size, with a few up to 0.2 mm across. The groundmass contains wispy lenses of hematite and patches and lenses of kaolinite-hematite-(calcite). The hand sample is cut by a vein of calcite up to 3 mm wide.

detrital grains	
quartz	5- 7%
calcite	3- 4
brachiopod shells	3- 4
limonitic fossils(?)	1- 2
latite	0.7
chert	0.5
plagioclase	0.3
biotite/chlorite	0.1
opaque	minor
muscovite	minor
zircon	trace
groundmass	
calcite	82-85
hematite	2- 3
kaolinite	0.7

vein	
calcite	(hand sample only; 8-10 of hand sample)

Quartz forms fragments of single grains, and a few aggregates of moderately interlocking grains averaging 0.05-0.07 mm in size. One large grain is cut by a veinlet of calcite. Numerous fragments of quartz and chert have thin rims of extremely fine grained calcite, which is relatively clear compared to surrounding groundmass calcite.

Calcite forms mainly fragments of single grains. A few fragments 0.15 mm across are aggregates of very fine, equant grains.

Fragments of brachiopod shells are up to several few mm long and generally very slender. A few shells are complete. Most are replaced by calcite, but a few contain patches up to 0.4 mm long of equant kaolinite flakes averaging 0.005 mm in size. Some lenses up to 0.6 mm long of hematite and patches of similar kaolinite may also be replacements of fossil shells. One shell contains abundant opaque grains averaging 0.01 mm in size near its inner margin.

Numerous fragments averaging from 0.5-1.5 mm long by 0.07-0.2 mm wide are of banded limonite; they are cut perpendicular to their length by a few veinlets of calcite averaging 0.15-0.2 mm wide. One also contains a patch of cryptocrystalline kaolinite up to 0.6 mm long. Textures suggest that they are of organic origin.

One curved patch 1.4 mm long by 0.15 mm wide contains abundant grains of hematite (after pyrite) averaging 0.01 mm in size intergrown with micritic calcite stained orange by limonite. It may be a replacement of a fossil shell.

Chert fragments range from cryptocrystalline containing abundant dusty opaque to colorless, extremely fine grained and free of opaque inclusions.

Latite fragments are of extremely fine grained aggregates of plagioclase and sericite. A few also contain slightly coarser laths of plagioclase.

Sample SLR-61 (5) **Silty Micritic Limestone; Gash Fractures of Calcite-(Kaolinite-Hematite); Veins of Calcite-(Kaolinite)**

The rock is a micritic limestone containing minor detrital grains mainly of quartz and calcite averaging 0.02-0.03 mm in size. Gash fractures are of calcite with minor kaolinite and hematite. Veins up to a few mm across are of fine to medium grained calcite.

detrital grains		
quartz	4- 5%	
calcite	1- 2	
chert	0.5	
opaque/hematite	0.2	
biotite	minor	
muscovite	minor	
zircon	trace	
brachiopod	0.1	(one bivalve shell)
groundmass		
calcite	85-87	
hematite	2- 3	(including halos on veins)
early seams		
hematite/limonite	0.1	

gash fractures	
calcite	0.3%
kaolinite	minor
veins	
calcite	4- 5
kaolinite	0.2
quartz	minor

Quartz forms angular grains averaging 0.02-0.04 mm in size, with a few elongate grains up to 0.12 mm long.

Calcite forms equant grains averaging 0.03-0.04 mm in size.

Chert forms angular grains averaging 0.03-0.05 mm in size.

Hematite/opaque forms equant grains averaging 0.02-0.05 mm in size, and a few elongate grains up to 0.12 mm long.

Biotite forms a few flakes averaging 0.1-0.15 mm long. Pleochroism is from straw to medium brown to greenish brown.

Muscovite forms slender flakes averaging 0.04-0.06 mm long and a few up to 0.13 mm long. A few have rims of extremely fine grained calcite in comb textures extending out from the sides of the biotite flake.

Zircon forms an anhedral grain 0.02 mm across.

One bivalve brachiopod fossil shell is 3 mm long; valves (of calcite) are 0.07 mm thick.

The groundmass is patchy and grades in irregular patches from cryptocrystalline to extremely fine grained. Hematite is concentrated in wispy lenses and patches up to 0.4 mm long.

A few early veinlets up to 0.01 mm wide of hematite/limonite have halos up to 0.3 mm wide containing moderately abundant limonite.

A few gash fractures up to 0.05 mm wide are dominated by extremely fine to very fine grained calcite with scattered patches of kaolinite.

Veinlets averaging 0.05-0.15 mm wide and a few veins up to 2 mm wide are dominated by calcite. Grain size generally increases with the width of the vein. Some veins contain interstitial patches up to 0.6 mm in size of kaolinite flakes averaging 0.01-0.015 mm in size. One vein contains a few grains of quartz averaging 0.05 mm in size along its margin. Bordering the largest vein are a few clusters of irregular patches of hematite averaging 0.03-0.1 mm in size. As well, the groundmass bordering the vein is stained medium orange by limonite.

Sample SLR-62 — Brecciated Micritic Limestone; Early Veinlets of Hematite-(Calcite); Veins of Calcite-(Quartz)

The rock is dominated by micritic calcite ranging from cryptocrystalline to extremely fine grained. Minor detrital grains are of quartz. Early veinlets are dominated by hematite and have hematite-rich halos. Breccia fragments are healed by veins of calcite with minor quartz.

detrital grains		
quartz	minor	
groundmass		
calcite	78-82	
hematite	0.7	(including halos of veins)
early veinlets		
hematite	0.2	
calcite	minor	
veins		
calcite	17-20	
quartz	0.3	

Quartz forms scattered detrital grains averaging 0.01-0.02 mm in size in a few coarser grained patches of groundmass, and one grain 0.17 mm across.

The groundmass is variable. Much of it is dominated by cryptocrystalline calcite. At one end, a patch up to several mm across is dominated by extremely fine grained, feathery calcite grains averaging 0.003-0.005 mm in size. This zone contains a patch 2 mm across of cryptocrystalline calcite. A few other patches up to 1.,5 mm across of extremely fine grained calcite occur in the zone of cryptocrystalline calcite.

Hematite forms disseminated red-brown grains averaging 0.005-0.01 mm in size. Scattered patches and lenses of groundmass calcite are stained light to medium yellow by limonite.

A few early, in part warped veinlets averaging 0.01-0.02 mm wide of hematite or hematite-calcite are rimmed by halos up to 0.1 mm wide containing abundant reddish brown hematite/limonite.

Veins up to 1 mm wide are dominated by very fine to medium grained calcite; wider veins generally are coarser grained than narrower veins. A few veins contain a few subhedral to euhedral quartz grains averaging 0.4-0.7 mm across, and one contains an anhedral grain of quartz 0.5 mm across. A wispy, discontinuous veinlet up to 0.05 mm wide contains a quartz vein up to 0.7 mm long and patches of very fine grained calcite.

Sample SLR-67 (4) **Brecciated Silty Micritic Limestone; Early Veinlets of Hematite; Veinlets and Veins of Calcite-(Quartz-Kaolinite)**

Detrital grains dominated by quartz and less calcite are set in a groundmass of micritic limestone. Early veinlets are of hematite with hematitic halos. Abundant veins and veinlets are dominated by calcite with patches of each of quartz and kaolinite.

detrital grains	
quartz	3- 4%
calcite	1
hematite	0.2
muscovite	trace
biotite	trace
plagioclase	trace
groundmass	
calcite	82-85
hematite	1
early seams	
hematite	0.2
veins, veinlets	
calcite	8-10
quartz	0.7
kaolinite	0.7

Angular grains of quartz, calcite, and minor plagioclase average 0.02-0.04 mm in size. Biotite flakes are up to 0.1 mm long. Pleochroism is from straw to medium brown. Muscovite flakes average 0.04-0.08 mm long. Opaque (hematite?) forms a few elongate grains up to 0.1 mm long.

The groundmass is dominated by light brown, cryptocrystalline calcite. Opaque (hematite) forms disseminated grains averaging 0.01-0.03 mm in size and a few lenses up to 0.35 mm long. A few patches from 0.1-0.3 mm in size are of slightly coarser grained calcite and minor to abundant medium red-brown hematite/limonite.

A few early seams averaging 0.01-0.02 mm wide are of hematite. They have halos containing minor to moderately abundant irregular to dendritic patches of hematite.

Veins and veinlets ranging from 0.05-1 mm in width are dominated by very fine to fine grained calcite. Some contain patches of extremely fine grained kaolinite in their cores. Quartz forms scattered anhedral grains averaging 0.2-0.6 mm in size. Bordering some veins are irregular patches of red-brown hematite.

<u>Sample SLR-68</u> **Calcareous Siltstone**

Angular, detrital fragments of quartz, lesser calcite, plagioclase, and chert, and minor flakes of biotite and muscovite are set in a groundmass of extremely fine grained calcite with subradiating patches of calcite/aragonite. Angular grains average 0.04-0.08 mm in size.

detrital grains	
quartz	17-20%
carbonate	5- 7
plagioclase	3- 4
chert	3- 4
opaque	0.3
biotite	0.2
muscovite	0.2
zircon	minor
chlorite(?)	trace
tourmaline	trace
groundmass	
calcite	65-70

Quartz forms equant to elongate angular grains averaging 0.04-0.08 mm in size, and a few elongate grains up to 0.2 mm long. Plagioclase forms equant grains averaging 0.03-0.07 mm in size.

Chert forms equant fragments averaging 0.05-0.1 mm in size. Many contain moderately abundant to abundant dusty opaque grains which give chert a medium to dark grey color.

Biotite and muscovite form slender flakes averaging 0.1-0.25 mm long. A few biotite flakes are up to 0.35 mm long. Biotite is pleochroic from straw to medium red-brown. A few biotite flakes are replaced by pseudomorphic chlorite and minor lenses of Ti-oxide.

Carbonate forms equant grains averaging 0.04-0.07 mm in size. It includes ankerite and dolomite. Some ankerite grains have thin rims of hematite/limonite.

A few equant patches up to 0.06 mm across are of medium green, cryptocrystalline chlorite(?).

Opaque forms equant grains averaging 0.03-0.05 mm in size, and a few anhedral grains up to 0.15 mm long.

Zircon forms anhedral, equant grains averaging 0.02-0.05 mm across.

Tourmaline forms an equant grain 0.06 mm across; pleochroism is from pale to medium olive green.

The groundmass is dominated by cryptocrystalline to extremely fine grained calcite, with moderately abundant patches of subradiating calcite/aragonite. Several of the latter are stained light to medium yellow by limonite.

Sample SLR-69   Calcareous Siltstone

Angular, equant to elongate detrital grains of quartz and lesser plagioclase and ankerite, and flakes of biotite and muscovite are set in a groundmass of carbonate. Angular fragments average 0.04-0.07 mm in size, with a few between 0.1-0.2 mm long.

detrital grains	
quartz	17-20%
ankerite	4- 5
chert	2- 3
plagioclase	2- 3
biotite	0.7
opaque	0.5
latite	0.3
muscovite	0.3
chlorite(?)	minor
zircon	trace
tourmaline	trace
groundmass	
calcite	65-70
hematite	1
kaolinite	1

Quartz and plagioclase fragments are of single grains, and range from equant to very elongate. Plagioclase is fresh.

Ankerite fragments are equant to elongate and generally angular in outline. A few elongate ankerite fragments are up to 0.15 mm long.

A few elongate chert fragments are up to 0.2 mm long. Chert is composed of interlocking, extremely fine to cryptocrystalline grains. Finer grained varieties contain moderately abundant to very abundant dusty opaque inclusions, and a few contain several extremely fine, equant opaque grains.

Biotite and less muscovite form flakes averaging 0.1-0.25 mm long. Biotite is pleochroic from straw to medium brown or medium reddish brown. A few biotite flakes are replaced completely by pseudomorphic chlorite.

Opaque forms disseminated grains averaging 0.02-0.05 mm in size, and a few up to 0.2 mm across.

Latite forms a few equant fragments averaging 0.05-0.1 mm in size. It consists of extremely fine grained plagioclase and sericite.

A few equant patches averaging 0.05-0.06 mm in size are of bright green cryptocrystalline chlorite(?).

Zircon forms a few elongate, anhedral grains up to 0.06 mm long.

Tourmaline forms an equant grain 0.03 mm across; it is medium olive green in color with no pleochroism.

The groundmass is dominated by cryptocrystalline calcite. Scattered patches up to 0.15 mm in size are of extremely fine grained, subradiating calcite/aragonite. Subradiating patches commonly are stained pale to light yellow-orange by limonite.

Hematite forms diffuse patches averaging 0.05-0.1 mm in size, and a few lenses up to 0.2 mm long. A few patches up to 0.5 mm in size contain abundant hematite.

Kaolinite forms interstitial patches averaging 0.1 mm in size of equant flakes averaging 0.005-0.01 mm in size.

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Job 136
December 1990

Samples: SLR: 1, 5, 6, 13,14,15,16,17,18,19, 24, 25, 26, 29, 31, 32, 57, 61, 62, 67, 68, 69
KR: 1, 100
MR: 2, 4

Summary:

Samples are mainly of a carbonate-rich sedimentary sequence ranging from micritic limestone to calcareous siltstone.

In the siltstone, angular detrital fragments are mainly of quartz, with less abundant ones of plagioclase, carbonate (ankerite, calcite), chert, latite, and minor ones of opaque. Biotite and muscovite form generally slender flakes. Most of these samples do not contain veins. One sample contains abundant brachiopod shells, and a few contain minor fragments of similar shells. Fragments of fresh, untwinned feldspars could not be distinguished from those of quartz.

Micritic limestone commonly contain trace to minor amounts of detrital grains similar to those in the calcareous siltstone. Most samples are cut by two or three ages of veins and veinlets. Early seams are of hematite and calcite-hematite, commonly with broad halos containing irregular to dendritic patches of hematite. A few samples contain gash fractures filled with calcite and less kaolinite and hematite. Many samples are brecciated moderately to strongly, and healed by veins of calcite with minor patches of quartz and of kaolinite, and local patches of hematite. In some samples the gash fractures and breccia matrix may be of the same age.

Different carbonate minerals were distinguished mainly on refractive index, and in some samples ankerite is identified because it is oxidized to hematite/limonite on grain borders.

Some of the cryptocrystalline oxide identified as hematite in dendritic aggregates in halos about veinlets may be one of several secondary manganese minerals.

One sample is of a lamprophyre dike containing phenocrysts of phlogopite/biotite and lesser clinopyroxene in a groundmass dominated by alkali feldspar, with less biotite and clinopyroxene, and minor magnetite.

(continued)

1.0 Sedimentary Rocks

1.1 Micritic Limestone

sample	detrital grains (%)	veins (%)	other
MR-2	trace	5	
MR-4	trace	30	
SLR-5	0.1	33	
SLR-6	trace	18	
SLR-13	0.2	16	
SLR-15	0.2	14	
SLR-19	0.7	10	
SLR-25	0.6	1	(0.1% fossil shells)
SLR-26	0.3	8	
SLR-32	1.7	16	(0.3% fossil shells)
SLR-62	minor	19	

1.2 Silty Micritic Limestone

SLR-31	4	5	(2-3% fossil shells)
SLR-61	7	5	(0.1% fossil shells)
SLR-67	5	10	

1.3 Calcareous Siltstone

sample	detrital grains %	brachiopod fragments %	other
KR-1	33		coarse
SLR-1	43		coarse
SLR-14	33	minor	
SLR-16	7	42	
SLR-17	43		very coarse
SLR-18	15	minor	fine
SLR-24	20	minor	fine
SLR-29	30		
SLR-57	16	5	calcite vein
SLR-68	33		
SLR-69	30		

2.0 Lamprophyre

KR-100

[redacted]

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Sample KR-1 Coarse Calcareous Siltstone; Calcite Vein

Angular, detrital fragments of quartz, plagioclase, chert, ankerite, latite, K-feldspar, and opaque, minor flakes of biotite and muscovite, and minor patches of chlorite are set in a groundmass dominated by calcite/aragonite with disseminated patches and diffuse tabular zones of hematite. Angular fragments average 0.1-0.15 mm in size. A vein averaging 0.15-0.2 mm wide is of calcite.

detrital grains			
quartz	15-17%	opaque	0.2%
chert	5- 7	biotite	0.1
plagioclase	4- 5	muscovite	minor
ankerite	3- 4	chlorite-(opaque)	minor
latite	2- 3	tourmaline	trace
K-feldspar	0.5		
groundmass			
calcite/aragonite	60-65		
hematite	3- 4		

Quartz forms equant to elongate angular fragments of single grains; the latter are up to 0.3 mm long.

Chert ranges from cryptocrystalline to extremely fine grained aggregates, showing a variety of textures ranging from submosaic to feathery and subradiating. A few contain moderately abundant dusty opaque inclusions.

Most plagioclase grains are fresh. Many are unzoned and some show faint to prominent concentric growth zones. Some contain moderately abundant, dusty opaque inclusions. This suggests two or more sources of plagioclase.

Latite fragments up to 0.17 mm in size contain minor plagioclase phenocrysts up to 0.05 mm in size in an extremely fine grained groundmass of plagioclase and minor to moderately abundant sericite.

In hematite-rich parts of the sample, ankerite fragments are rimmed by limonite/hematite.

K-feldspar forms angular grains averaging 0.1-0.2 mm in size; some show weak microcline twinning.

Biotite and muscovite form slender to stubby flakes averaging 0.1-0.15 mm in size. Biotite is pleochroic from straw to medium brown or reddish brown.

A few rounded fragments up to 0.1 mm across and one elongate fragment 0.15 mm long are of light to medium yellowish green, cryptocrystalline chlorite(?). One fragment 0.12 mm across of cryptocrystalline chlorite(?) contains abundant dusty opaque.

Opaque (hematite) forms equant grains averaging 0.05-0.1 mm in size. One tabular grain, possibly of graphite, is 0.087 mm across.

Tourmaline forms an anhedral grain 0.1 mm across with a medium olive green color.

The groundmass is dominated by subradiating aggregates of calcite/aragonite up to 0.2 mm long and patches of very fine grained, equant calcite grains. Subradiating aggregates are stained pale to light yellow-orange by limonite. Hematite is concentrated moderately to strongly in diffuse to sharply defined, interstitial patches up to 0.4 mm in size. These are concentrated moderately in a few diffuse tabular zones up to 2 mm wide.

On the edge of the section is a vein up to 0.2 mm wide of extremely fine grained calcite.

Sample KR-100 Lamprophyre; Interstitial Patches of Calcite-(Sericite) and K-feldspar-Calcite

Abundant coarse, mainly euhedral phenocrysts of phlogopite with thin rims of biotite, and smaller ones of clinopyroxene are set in a groundmass of alkali feldspar, biotite, clinopyroxene, and magnetite. Interstitial patches are of two types, one dominated by calcite with minor sericite, and the other dominated by K-feldspar and mainly less calcite.

phenocrysts		interstitial patches		
phlogopite/biotite	17-20%	A)	calcite	2- 3%
clinopyroxene	4- 5		sericite	0.3
groundmass			opaque	minor
alkali feldspar	35-40	B)	K-feldspar	4- 5
biotite	17-20		calcite	2- 3
clinopyroxene	8-10			
magnetite	0.7			

Phlogopite forms euhedral to subhedral phenocrysts averaging 1-4 mm in size. Pleochroism is from very pale to pale brown. They have thin rims of biotite, whose pleochroism is from light to medium brown. Some phenocrysts have concentrations of opaque along cleavage planes. One is embayed strongly by the groundmass. A few contain minor to moderately abundant replacement patches of calcite.

Clinopyroxene forms euhedral to subhedral phenocrysts averaging 0.3-1 mm in size, and one 2.5 mm across. Some larger grains are replaced slightly to moderately by lenses of calcite. One grain contains a broad core in which two twins are intimately intergrown in irregular, very fine grained patches.

In the groundmass, alkali feldspar forms interstitial grains averaging 0.1-0.3 mm in size. The stain on the offcut block and the lack of well developed albite twins suggests that much of this is K-feldspar.

Biotite forms subhedral flakes averaging 0.05-0.15 mm long. Coarser grains have phlogopite cores and are similar texturally to the phenocrysts.

Clinopyroxene forms equant to prismatic, anhedral to euhedral grains averaging 0.05-0.1 mm in size.

Magnetite forms disseminated, euhedral cubic grains averaging 0.02-0.03 mm in size.

Interstitial patches averaging 1.5-3 mm in size are of two main types. The first is dominated by fine to medium grained carbonate. Some contain minor to moderately abundant interstitial patches and seams of extremely fine grained sericite stained light yellow by limonite. Two contain a patch of opaque (hematite) 0.2 mm across. A few of these have subhedral outlines, suggesting they may have formed by replacement of mafic (olivine?) phenocrysts.

The second type contains prismatic grains of alkali feldspar averaging 0.5-1 mm long with interstitial patches of calcite. One elongate patch is 9 mm long. In some patches, alkali feldspar grains are subparallel to slightly radiating. A few patches of this type are dominated by calcite with minor to moderately abundant euhedral grains of K-feldspar averaging 0.1-0.2 mm in size along and near its borders.

Sample MR-2 — Micritic Limestone; Gash Fractures of Calcite-Limonite; Veinlets of Calcite-(Kaolinite-Hematite)

The rock is a relatively pure, micritic limestone, containing minor gash fractures with calcite cores and limonite borders. It was brecciated slightly and cut by veinlets of calcite-(kaolinite) and a few stringers of calcite-hematite.

calcite		
micritic	94-95%	
coarser grained	minor	
hematite	0.4	(including halos on veins)
quartz	trace	
gash fractures		
calcite-limonite	0.4	
veinlets		
calcite	4- 5	
kaolinite	0.2	
hematite	minor	

Calcite forms a pale brown, cryptocrystalline aggregate of grains less than 0.003 mm in size. Scattered through the rock are minor, coarser grained lenses of calcite up to 0.6 mm long and a few, angular, detrital(?) grains up to 0.02 mm across.

Quartz forms a few detrital grains averaging 0.02-0.03 mm in size.

Hematite forms disseminated grains averaging 0.005-0.02 mm in size, and irregular patches from 0.05-0.3 mm in size in which dusty red-brown hematite is concentrated moderately to strongly.

A few early, subparallel gash fractures have cores up to 0.05 mm wide of extremely fine grained calcite bordered by rims up to 0.15 mm wide of extremely fine grained orange-brown limonite. These are cut by later calcite veins.

The rock was brecciated slightly and contains replacement or fracture-filling patches up to 1 mm across of calcite and veinlets up to 1.5 mm wide of calcite-(kaolinite). Grain size of calcite is extremely fine along borders of veinlets and increases into their cores, reaching 0.2-0.3 mm in size in the cores of the largest ones. A few veinlets contain lenses in their cores up to 0.1 mm wide of kaolinite flakes averaging 0.01 mm in grain size. One veinlet of calcite is interrupted by a lens 1.2 mm long of cryptocrystalline to extremely fine grained plagioclase(?) with minor disseminated calcite grains. Some calcite veinlets are bordered by a thin, discontinuous rim containing dusty hematite intergrown with calcite of the host rock in irregular to dendritic textures.

A few wispy seams up to 0.1 mm wide are of calcite-hematite. Some of these have halos containing poorly developed, dendritic patches of hematite.

Sample MR-4 — Brecciated Micritic Limestone; Early Veinlets of Hematite-Calcite; Veins and Veinlets of Calcite-(Kaolinite-Aragonite)

The sample is a micritic limestone which is very similar to Sample MR-2. Early veinlets are of hematite-(calcite), and some have prominent limonitic halos. The rock was brecciated and healed by veins and veinlets dominated by calcite, with a few interstitial patches of kaolinite, and vuggy cores containing aragonite/calcite.

calcite	65-70%	
quartz	trace	
hematite/limonite	0.5	(including halos)
early lenses		
calcite-limonite	0.3	
early veinlets		
hematite	0.3	
calcite	0.5	
veins		
calcite	25-30	
kaolinite	1- 2	
aragonite/calcite	1	

Quartz forms disseminated, angular grains averaging 0.015-0.03 mm in size, and a few up to 0.07 mm long.

Calcite forms a dense aggregate of cryptocrystalline grains with a light brown color and uniform texture.

A few lenses up to 0.35 mm long and irregular patches up to 0.6 mm long are of slightly coarser grained calcite rimmed by a zone containing moderately abundant irregular to dendritic aggregates of limonite.

Hematite forms disseminated grains averaging 0.005-0.015 mm in size and a few dense patches up to 0.25 mm across.

A few wispy veinlets of hematite and hematite-calcite are up to 0.05 mm wide. Narrower veinlets are of hematite, and wider ones have borders of hematite and a broad core of calcite, much of which was leached from the rock or removed from the section during sample preparation. Some have halos from 0.3-1 mm wide containing minor to moderately abundant irregular to dendritic patches of orange-brown limonite.

The main veins are dominated by fine to medium and locally coarse grained calcite. In the core of the largest vein is a vuggy zone lined with subhedral to euhedral, prismatic aragonite grains averaging 0.03-0.05 mm long or a dense aggregate of extremely fine grained calcite/aragonite.

Some of the veins contain interstitial patches up to 0.5 mm across of kaolinite flakes averaging 0.01 mm in grain size.

Sample SLR-1 Siltstone, Aragonite/Calcite-(Hematite) Groundmass

Fragments are dominated by plagioclase and quartz, with less abundant ones of chert and ankerite, and minor ones of K-feldspar, muscovite and biotite. They are set in a groundmass of aragonite/calcite with patches of hematite. Fragments are mainly angular and equant to slightly elongate; they are of relatively uniform size between 0.08-0.2 mm. A few elongate fragments are from 0.3-0.5 mm long and less than 0.1 mm wide.

fragments		K-feldspar	0.2%
plagioclase	15-17%	biotite	0.2
quartz	15-17	chlorite(?)	0.2
chert	7- 8	muscovite	0.1
ankerite	4- 5	opaque	trace
andesite	0.5		
dacite/latite	0.5		
groundmass			
aragonite/calcite	50-55		
hematite	3- 4		

Plagioclase fragments are mainly fresh and appear to be of oligoclase composition. A few fragments of more-calcic plagioclase are altered slightly to sericite.

Quartz fragments are mainly of single grains, and a few are of very fine grained aggregates.

Cherty fragments are of interlocking grains of silica ranging from 0.003-0.015 mm in grain size. Finer grained fragments commonly contain more abundant dusty opaque inclusions. Some of the cryptocrystalline fragments might be of latite dominated by plagioclase.

Ankerite fragments are altered slightly to limonite along their margins.

Andesite fragments contain minor plagioclase crystals up to 0.05 mm in size in a cryptocrystalline to extremely fine grained groundmass.

Several fragments of altered intermediate volcanic rocks(?) consist of extremely fine grained plagioclase and/or quartz intergrown with moderately abundant sericite.

Biotite forms a few slender flakes averaging 0.1-0.3 mm long, with a few bent and broken ones up to 0.5 mm long. Pleochroism is from straw to medium red-brown or brown. Some biotite flakes have lenses of calcite between cleavage planes. Chlorite forms one pale to light green flake 0.15 mm long, probably secondary after biotite.

A few equant, subrounded fragments are of cryptocrystalline, medium yellowish green chlorite(?). Some of these patches are stained light to medium orangish brown by limonite.

K-feldspar forms a few grains, some of which also contain minor plagioclase.

Muscovite forms a few flakes up to 0.2 mm long.

Opaque forms a few grains up to 0.07 mm in size.

The groundmass is dominated by calcite/aragonite grains ranging from less than 0.01 mm in size up to 0.3 mm long. Fairly common Many patches show a subradiating to radiating texture. Many of these are stained pale to light yellow by limonite. Hematite forms dense patches up to 0.5 mm across and is concentrated moderately to strongly in patches up to 0.3 mm in size in which it is intergrown with calcite.

Sample SLR-6(7) **Brecciated Micritic Limestone; Hematite Seams; Breccia Matrix of Calcite-(Hematite-Kaolinite) Veins and Veinlets**

Trace amounts of detrital quartz grains are set in a groundmass of micritic calcite. Early seams of hematite commonly have hematitic halos. The rock was brecciated and fragments were healed by veinlets and veins of calcite-(kaolinite-hematite).

detrital grains	
quartz	trace
muscovite	trace
groundmass	
calcite	80-82
hematite	1
early seams	
hematite	0.5
breccia matrix: veins, veinlets	
calcite	15-17
hematite	1
kaolinite	0.5

Angular detrital quartz grains average 0.01-0.02 mm in size, with a few from 0.05-0.08 mm across.

Muscovite forms a few flakes up to 0.03 mm long.

The groundmass is of micritic calcite stained medium orange brown by limonite. Opaque to deep red-brown hematite forms disseminated spots and angular grains averaging 0.01-0.02 mm in size. One lens 1.2 mm long contains abundant equant grains of hematite averaging 0.01 mm in size, probably after original pyrite crystals.

A few early seams averaging 0.01 mm wide are of red-brown hematite; these commonly have weak to moderately well developed alteration halos containing scattered irregular to dendritic patches of red-brown hematite. Near a few of these are single grains and clusters of subrounded grains of opaque (hematite) averaging 0.02-0.03 mm in diameter.

The breccia matrix is dominated by calcite. Many of the narrower veins and patches, and borders of larger ones are extremely fine grained. Cores of larger patches are very fine to fine grained.

Kaolinite occurs in lensy patches in cores of larger veins; these are mainly from 0.05-0.15 mm wide and consist of grains averaging 0.005-0.01 mm in size. Many narrower veins and veinlets contain patchy cores dominated by hematite and/or kaolinite.

One veinlet 0.1-0.2 mm wide of calcite contains abundant anhedral patches of deep red-brown to opaque hematite averaging 0.02-0.07 mm in size, and a few over 0.1 mm across. This veinlet is surrounded by a thin halo stained reddish orange by limonite.

Sample SLR-13   **Brecciate Micritic Limestone; Calcite-(Kaolinite) Matrix**

The sample is a micritic limestone containing minor detrital quartz grains. It is brecciated and healed by veins of calcite with minor interstitial patches of kaolinite-(hematite).

limestone	
quartz	0.2%
muscovite	trace
tourmaline(?)	trace
calcite	80-83
hematite	0.5
matrix	
calcite	15-17
kaolinite	0.2
hematite	0.1

Quartz forms angular grains averaging 0.02-0.04 mm in size, with a few grains from 0.07-0.1 mm across.

Muscovite forms a few flakes up to 0.1 mm long.

A grain 0.03 mm across is of an unknown mineral (possibly tourmaline). Part of the grain is pleochroic from nearly colorless to light olive green, and the rest is colorless.

Calcite forms feathery aggregates averaging 0.003-0.007 mm in grain size, with a few grains up to 0.02 mm in size. Scattered irregular patches, mainly from 0.1-0.3 mm in size consist of cryptocrystalline calcite.

Hematite forms disseminated grains averaging 0.003-0.01 mm in size, scattered grains from 0.01-0.02 mm in size, and a few patches up to 0.5 mm in size of dense to extremely fine grained aggregates.

The breccia matrix consists of patches averaging 2-3 mm across and veinlets averaging 0.2-0.6 mm wide. It is dominated by extremely fine to fine grained aggregates of calcite.

Hematite forms scattered concentrations in wispy patches and seams.

Kaolinite occurs in cores of some patches and vein-like zones as aggregates of flakes averaging 0.01-0.02 mm in size. Dusty brown hematite commonly occurs with kaolinite.

Sample SLR-14 Siltstone: Calcite/Aragonite-(Hematite) Groundmass

The rock contains fragments of quartz and ankerite, less abundant ones of latite, chert, micritic limestone, and plagioclase, and minor ones of biotite, muscovite, and K-feldspar in a groundmass dominated by calcite with scattered patches of aragonite and of hematite. Fragments are angular and average 0.07-0.15 mm in size. Ankerite fragments and hematite patches in the groundmass each are concentrated moderately in some layers. In the hand sample, a black fragment 1 cm long on a bedding plane fracture is of wood.

fragments		K-feldspar	0.2%
quartz	12-15%	chlorite	0.1
ankerite	8-10	opaque/hematite	0.1
latite	2- 3	volcanic glass	minor
micritic limestone	2- 3	fossils	minor
chert	2- 3	apatite	trace
plagioclase	2- 3	tourmaline	trace
biotite	0.3	wood (hand sample only)	
muscovite	0.2		
groundmass			
calcite/aragonite	60-65		
hematite	3- 4		
kaolinite	0.3		

Quartz forms angular fragments of single grains.

Ankerite forms subangular fragments, most of which are altered moderately along their margins to limonite.

Latite forms extremely fine grained aggregates of plagioclase and sericite.

Micritic limestone forms subrounded fragments composed of cryptocrystalline aggregates of calcite.

Chert forms cryptocrystalline to extremely fine grained aggregates.

Plagioclase forms fresh, angular to subangular grains.

Biotite and muscovite each forms ragged to subhedral flakes averaging 0.1-0.2 mm long, and locally up to 0.4 mm long. Biotite is pleochroic from pale to medium brown. Some muscovite flakes contain abundant Ti-oxide inclusions, suggesting that they were formed by replacement of biotite.

K-feldspar forms a few angular grains showing poorly developed microcline twins.

Rounded to subrounded fragments are of cryptocrystalline, medium green chlorite(?).

A few fragments up to 0.4 mm long are of pale to medium brown, isotropic volcanic glass(?).

Opaque/hematite forms a few subangular to angular fragments up to 0.4 mm long.

One slender curved brachiopod(?) shell is 0.6 mm long. A few other, very elongate carbonate grains may be fossil fragments.

Apatite forms a slender, euhedral prismatic grain 0.2 mm long.

Tourmaline forms an equant grain 0.06 mm across. It is medium green in color. A few tourmaline grains up to 0.02 mm in size show pleochroism from pale to medium green.

The groundmass is dominated by extremely fine to very fine grained calcite. Scattered patches consist of subradiating aggregates of aragonite. Some of these are stained light to medium orange by limonite. Opaque (hematite) is concentrated moderately in a few layers parallel to bedding as anhedral patches averaging 0.1-0.4 mm in size. Kaolinite forms scattered patches up to 0.3 mm in size of slightly interlocking flakes averaging 0.02-0.05 mm in size.

Sample SLR-15 Brecciated Micritic Limestone; Calcite Matrix

The rock contains scattered concentrations of detrital quartz grains in a groundmass of cryptocrystalline carbonate. It was brecciated, and healed by a matrix of calcite.

detrital grains	
quartz	0.2%
calcite	minor
muscovite	trace
opaque	trace
groundmass	
carbonate	85-87
hematite	0.3
breccia matrix	
calcite	12-15
hematite	0.1
kaolinite	minor

Detrital quartz grains averaging 0.05-0.1 mm in size are concentrated in a few patches up to 2 mm across. These patches also contain a few equant calcite grains averaging 0.1 mm across, a few wispy muscovite flakes up to 0.1 mm long, and a few equant grains of opaque up to 0.05 mm in size.

The groundmass is dominated by cryptocrystalline to extremely fine grained, feathery calcite grains up to 0.01 mm in size. Hematite forms scattered, commonly wispy patches, which are concentrated somewhat outwards from calcite veinlets. Many hematite patches have a dendritic texture. Opaque also forms disseminated grains averaging 0.01 mm in size.

Patches up to a few mm across and veinlets averaging 0.1-0.3 mm wide are dominated by very fine to locally fine grained calcite. Hematite forms wispy, interstitial patches in some veinlets, and a few dense patches up to 0.1 mm across.

One patch 0.4 mm across is of equant kaolinite flakes averaging 0.01 mm in grain size.

A few contorted stringers less than 0.02 mm wide are of hematite.

Sample SLR-16 Fossiliferous (Brachiopods) Calcareous Siltstone

The sample contains abundant shells and fragments of shells of brachiopods in a variable groundmass of very fine grained calcareous siltstone to hematitic micritic limestone. Most shells are oriented parallel to bedding.

fossil fragments	
brachiopods	40-45%
detrital grains	
quartz	5- 7
plagioclase	1
ankerite	0.5
ellipsoid	(one fragment)
muscovite	trace
elongate fragment	(one)
groundmass	
calcite	43-48
hematite/limonite	2- 3

Brachiopod shells are up to 1 cm in size. Many are delicately laminated and consist of well oriented cryptocrystalline calcite, which shows wavy extinction patterns which reflect original internal structures in the shells. A few large shells are cut by veinlets up to 0.2 mm wide of very fine grained calcite. A few large shells contain moderately abundant concentrations of anhedral opaque grains from 0.01-0.1 mm in size.

An ellipsoidal structure 1.3 mm long by 0.95 mm wide has a rim 0.05-0.07 mm wide of opaque surrounding a core of isotropic, light orange material containing abundant disseminated extremely fine grained to dusty opaque and a few elongate grains up to 0.3 mm long of calcite. Its origin is unknown.

One elongate fragment 0.35 mm long is colorless with very low birefringence and a diffuse banded structure parallel to its length. It is partly bordered by opaque and contains a few lensy inclusions of opaque parallel to its length. Its origin is unknown.

Quartz with lesser plagioclase, ankerite, and chert form equant, angular, detrital fragments averaging 0.03-0.07 mm in size.
Muscovite forms slender flakes up to 0.35 mm long.

The groundmass is patchy, with siltstone zones containing moderately abundant detrital grains, and micritic limestone zones containing very few. Calcite/aragonite forms cryptocrystalline to extremely fine, in part feathery aggregates. Hematite forms diffuse patches up to 0.2 mm in size; many of these are oriented along bedding planes. Finer grained, wispy hematite lenses are more abundant in the micritic limestone than in the siltstone. Dusty hematite/limonite gives much of the groundmass a pale to medium orange color.

Sample SLR-17   Friable Calcareous Siltstone/Fine Greywacke

The sample contains equant, angular to subangular grains of quartz, feldspars, chert, volcanic rocks, and ankerite, and scattered flakes of biotite and muscovite moderately loosely cemented by a groundmass of calcite. Fragment size averages 0.1-0.2 mm, with a few up to 0.4 mm long.

detrital grains			
quartz	15-17%	biotite	0.3%
chert	15-17	muscovite	0.1
plagioclase	5- 7	Ti-oxide	minor
K-feldspar	1- 2	elongate siliceous(?)	
latite/andesite	2- 3	fragment	(one)
ankerite	1- 2		
hematite	0.2		
groundmass			
calcite	50-55		
hematite	1		

Quartz fragments are of single grains.

Chert aggregates range from cryptocrystalline to 0.02 mm in grain size. Finer grained fragments commonly contain dusty opaque or limonite, giving them a dark grey or light orange color. A few of the coarsest grained fragments have a mosaic texture. A few cherty fragments contain a few pyrite grains up to 0.015 mm in size.

Most plagioclase grains are fresh and a few are altered slightly to sericite. Some contain abundant dusty opaque inclusions. One contains a myrmekitic intergrowth of quartz.

Latite forms fragments dominated by extremely fine grained plagioclase and sericite.

Andesite forms fragments containing minor laths of plagioclase up to 0.07 mm in length in a cryptocrystalline to extremely fine grained groundmass.

Ankerite fragments commonly have rhombic cleavage outlines. Alteration is slight along fragment borders to limonite.

A slender siliceous(?) fragment 0.8 mm long is banded delicately and diffusely parallel to its length. It is pale yellow with very low birefringence and length-fast character. It is broken perpendicular to its length into a few segments. (This is similar to the "elongate fragment" in Sample SLR-16).

Biotite forms slender, commonly crumpled flakes up to 0.5 mm long and a few stubby books; the latter consist of thin flakes intergrown with lenses of calcite parallel to cleavage. Pleochroism is from straw to medium, slightly reddish brown. In a few stubby books biotite is replaced by pseudomorphic chlorite. Muscovite forms a few subhedral to ragged flakes up to 0.3 mm long.

Hematite forms one patch 0.55 mm in size with a banded structure perpendicular to its length. It contains scattered concentrations of relic(?) grains averaging 0.005 mm in size of pyrrhotite/pyrite. A much smaller similar patch consists entirely of hematite.

K-feldspar forms grains which generally lack twins. A few contain minor exsolution spots of plagioclase.

Ti-oxide forms scattered grains up to 0.07 mm in size.

The groundmass ranges from cryptocrystalline to very fine grained calcite. Scattered patches averaging 0.12-0.2 mm across of aragonite have a subradiating texture. Hematite forms irregular, disseminated patches averaging 0.05-0.2 mm in size and is concentrated moderately in other patches as dusty to extremely fine grained aggregates intergrown with calcite.

Sample SLR-18 Fine Calcareous Siltstone; Seams of Hematite and Carbonaceous Opaque

Angular, detrital fragments of quartz and plagioclase averaging 0.05-0.1 mm in size, much less abundant ones of chert and ankerite, and slender flakes of biotite and muscovite are set in a groundmass of calcite with moderately abundant lenses of hematite and of carbonaceous opaque, mainly parallel to bedding. Some layers contain much more abundant detrital fragments than others.

detrital grains		limonite	minor
quartz	8-10%	fossil shells	minor
plagioclase	3- 4	Ti-oxide	trace
ankerite/calcite	1	garnet	trace
chert	1		
biotite	0.2		
muscovite	0.1		
K-feldspar	0.1		
carbonaceous opaque	0.1		
groundmass		veinlets, seams	
calcite	80-83	hematite	1- 2%
hematite	1	carbonaceous opaque	0.3
marcasite	0.2		
pyrite	0.1		

Quartz, plagioclase, chert, ankerite/calcite, and K-feldspar form equant to slightly elongate, generally angular grains. A few elongate grains of quartz and chert are over 0.3 mm long. Plagioclase ranges from fresh to altered slightly to sericite and dusty opaque. Chert ranges from extremely fine grained to cryptocrystalline.

Biotite and muscovite each form slender flakes averaging 0.1-0.2 mm long. Biotite is pleochroic from straw to medium reddish brown. One flake is altered to pale to light/medium green chlorite.

A few fragments are of slender fossil shells up to 1 mm long and 0.02 mm wide.

One fragment 0.3 mm across is of light orange, isotropic limonite. Carbonaceous opaque forms a few equant patches up to 0.2 mm in size. Ti-oxide forms grains averaging 0.04-0.07 mm in size. Garnet forms an anhedral, equant grain 0.08 mm across. Zircon forms an anhedral grain up to 0.1 mm across.

The groundmass is dominated by cryptocrystalline to extremely fine grained calcite.

Marcasite forms disseminated clusters averaging 0.05-0.1 mm in size of grains averaging 0.005-0.01 mm in size.

Several fragments averaging 0.03-0.05 mm in size and a few lenses up to 0.35 mm long are dominated by cubes of pyrite 0.0015-0.0025 mm across in a sparse groundmass of non-reflective material of unknown composition. One lens 0.35 mm long is dominated by subrounded to subhedral pyrite grains averaging 0.005-0.01 mm in size. Hematite forms a few patches up to 0.4 mm in size of skeletal aggregates intergrown with minor calcite.

Wispy seams parallel to bedding and a few veinlets from 0.02-0.05 mm wide are of red-brown, cryptocrystalline, isotropic hematite. One major, discontinuous veinlet 0.1-0.15 mm wide of deep red-brown hematite is perpendicular to bedding. Other lenses averaging 0.3-0.5 mm long and parallel to bedding are of carbonaceous opaque. One such lens is 1 mm long and 0.1 mm wide.

Sample SLR-19 Micritic Limestone; Veins of Calcite-(Kaolinite-Hematite)

A few detrital quartz grains and irregular patches of calcite-hematite, possibly of organic origin, are set in a groundmass of micritic limestone. The rock is brecciated slightly and healed by veins dominated by calcite. Lenses of hematite or kaolinite occur in cores of some larger veins.

detrital grains	
quartz	0.7%
biotite	trace
muscovite	trace
groundmass	
micritic calcite	85-87
calcite-hematite patches	4- 5
opaque	0.2
veins	
calcite	8-10
kaolinite	0.7
hematite	0.4
aragonite(?)	trace

Quartz forms equant to elongate grains averaging 0.05-0.08 mm in size. Bordering many coarser grains, calcite is slightly coarser grained and clearer than in the main groundmass.

Biotite forms a few slender flakes up to 0.2 mm in length. These commonly are rimmed by clear overgrowths of calcite with comb textures. Muscovite forms a stubby flake 0.05 mm long.

The groundmass is dominated by light brown, cryptocrystalline calcite. Equant patches up to 0.8 mm across and wispy, elongate patches consist of extremely fine grained calcite intergrown with reddish orange to brown hematite/limonite. Some of the patches have a delicate tabular texture, suggesting that they are of organic origin.

Opaque (hematite?) forms a few lenses up to 0.6 mm long and patches up to 0.3 mm across.

Veins are dominated by extremely fine to very fine grained, anhedral calcite, with the coarser grained aggregates (0.15-0.2 mm) being concentrated in the cores of veins. In the cores of many larger veins are lenses up to 0.2 mm wide of kaolinite flakes averaging 0.01-0.02 mm in size. In the core of a few veins are irregular lenses up to 0.2 mm wide of cryptocrystalline, red-brown hematite. One vein has a vuggy patch in its core into which grew numerous delicate, prismatic aragonite(?) crystals averaging 0.02-0.04 mm long. Bordering one vein is a discontinuous zone 0.05-0.08 mm wide of opaque (hematite?).

Sample SLR-24   Fine Calcareous Siltstone

Angular detrital fragments of quartz, less calcite, and much less plagioclase and opaque, and minor flakes of muscovite and biotite are set in a groundmass dominated by calcite with wispy lenses and patches of hematite. Angular fragments average 0.02-0.07 mm in size, with a few over 0.1 mm long.

detrital fragments	
quartz	15-17%
calcite	3- 4
plagioclase	1
muscovite	0.2
opaque	0.2
biotite	0.1
fossil shells(?)	minor
limonite	trace
tourmaline	trace
groundmass	
calcite/aragonite	75-78
hematite	3- 4
chlorite(?)	0.2
kaolinite	minor

Quartz and much less plagioclase form equant to elongate, angular fragments averaging 0.0-2-0.07 mm in size, with a few up to 0.15 mm long. Plagioclase is fresh.

Calcite forms grains averaging 0.03-0.05 mm in size, with a few up to 0.1 mm long. A few elongate lenses up to 0.7 mm long and less than 0.03 mm wide may be fragments of thin brachiopod shells.

Muscovite and biotite form slender flakes averaging 0.05-0.15 mm long, and locally up to 0.3 mm long. Biotite is pleochroic from straw to medium brown or medium reddish brown. A few elongate biotite flakes are rimmed by calcite/ aragonite aggregates with comb textures oriented perpendicular to the biotite flakes.

Opaque forms equant grains averaging 0.03-0.07 mm in size, with a few up to 0.2 mm long.

Limonite forms a few equant grains averaging 0.02-0.03 mm in size.

Tourmaline forms a few equant grains up to 0.02 mm in size. Pleochroism is from pale to medium slightly bluish green.

The groundmass is dominated by cryptocrystalline to extremely fine grained, in part feathery calcite/aragonite. Much of it is stained pale to light yellow by limonite. In one corner of the section, it is stained medium orange-brown by more abundant limonite.

One recrystallized(?) or replacement patch 0.5 mm across is dominated by equant calcite grains averaging 0.05 mm in size.

Several patches (or fragments) averaging 0.05-0.08 mm in size are of aggregates of brownish green, cryptocrystalline to extremely fine grained chlorite(?) flakes.

Hematite forms moderately abundant wispy lenses up to 0.7 mm long, and irregular patches averaging 0.05-0.1 mm across.

Kaolinite forms a few patches up to 0.1 mm in size of grains averaging 0.005-0.01 mm in size.

One vuggy, gash fracture up to 0.15 mm wide and 1.5 mm long contains a thin rim of cryptocrystalline carbonate.

Sample SLR-25 **Micritic Limestone; Veinlet of Calcite-Hematite with Hematite-Limonite Halo**

Minor detrital grains of quartz, chert, fossil shells, plagioclase, muscovite, biotite, and calcite are set in a groundmass of micritic calcite. A veinlet of calcite-(hematite) has a broad halo of hematite/limonite. Limonite bands formed by surface weathering are offset locally along late(?) calcite stringers.

detrital grains		
quartz	0.3%	
chert	0.1	
fossil fragments	0.1	
plagioclase	minor	
muscovite	trace	
biotite	trace	
calcite	trace	
groundmass		
calcite	90-92	
hematite/limonite	2- 3	(including limonite formed by weathering)
veinlet (with hematite-limonite halo)		
calcite	1	
hematite	0.5	
late veinlets		
calcite	minor	

Detrital grains are concentrated moderately in a few patches up to a few mm across, which grade into a micritic limestone containing much fewer detrital grains.

Angular detrital grains of quartz and chert average 0.02-0.05 mm in size, with a few up to 0.08 mm across. Plagioclase forms subhedral rectangular grains averaging 0.02-0.05 mm in size, and one 0.15 mm long. A few, very slender brachiopod(?) shells of calcite are up to 2 mm long.

Muscovite and biotite form stubby to slender flakes averaging 0.04-0.07 mm long. Biotite is pleochroic from pale straw to light brown.

Calcite forms equant detrital grains averaging 0.02-0.04 mm across.

The groundmass is dominated by cryptocrystalline calcite which is stained light brown by limonite. Bordering detrital grains, the groundmass commonly is recrystallized in zones from 0.005-0.015 mm wide to slightly coarser grained aggregates free of Fe-oxide stain. Bordering mica flakes these aggregates generally are oriented perpendicular to the mica flakes. Deep red-brown to opaque hematite forms irregular patches averaging 0.01-0.1 mm in size. Patches up to 0.5 mm across and seams up to a few mm long consist of extremely fine to very fine grained calcite and abundant red-brown hematite/limonite.

A veinlet 0.03-0.05 mm wide is dominated by extremely fine grained calcite with minor concentrations of hematite along its margins. It is bordered by a halo up to 2 mm in size containing minor to moderately abundant irregular to detrital patches of limonite.

Limonite is concentrated in the groundmass in concentrically banded zones formed during surface weathering. Locally, these are offset up to 1 mm along a few late calcite stringers averaging 0.005-0.008 mm wide.

Sample SLR-26

Brecciated Micritic Limestone; Early Seams of Hematite and Calcite-(Hematite); Veins and Veinlets of Calcite-(Hematite-Kaolinite)

Minor detrital grains of quartz, chert, calcite, muscovite, and plagioclase are set in a groundmass of micritic calcite with a few slightly coarser grained patches of calcite. Veinlets of hematite and calcite-(hematite) have broad halos of hematite/limonite. Veins and veinlets are of calcite with minor kaolinite and hematite.

detrital grains		early seams	
quartz	0.2%	hematite	0.3%
chert	minor	calcite	0.1
calcite	minor	veins, veinlets	
muscovite	trace	calcite	7- 8
plagioclase	trace	kaolinite	0.1
groundmass		hematite	minor
calcite			
micritic	90-92		
coarser patches	1- 2		
hematite/limonite	1 (including halos on early seams)		

Angular to subrounded detrital grains of quartz and chert average 0.03-0.07 mm in size, with a few up to 0.15 mm across. Chert ranges from cryptocrystalline to extremely fine grained, and generally is free of dusty opaque inclusions. Calcite forms equant, commonly angular grains averaging 0.03-0.07 mm across. Muscovite forms slender flakes averaging 0.03-0.07 mm long. Plagioclase forms anhedral grains averaging 0.03-0.07 mm in size.

The groundmass is dominated by cryptocrystalline calcite which is stained light brown by limonite. Bordering detrital grains, the groundmass is recrystallized in zones from 0.005-0.015 mm wide to slightly coarser grained aggregates free of Fe-oxide stain. Bordering mica flakes these aggregates generally are oriented perpendicular to the mica flakes. Deep red-brown to opaque hematite forms irregular patches averaging 0.02-0.15 mm in size.

Recrystallized(?) patches up to 1.2 mm long consist of extremely fine to very fine grained calcite. One very elongate patch resembles a fossil shell fragment in some of the other sections. Some others have an internal, broadly zoned, concentric structure indicated by variation in grain size of calcite.

One unusual patch 0.5 mm long contains thin, curved lenses of orange limonite bordered by recrystallized calcite oriented perpendicular to borders of the limonite patches. The textures suggests an organic origin, but the limonite composition is unusual.

A few seams and irregular veinlets averaging 0.01-0.03 mm wide are dominated by hematite or by extremely fine grained calcite with minor concentrations of hematite along margins. They commonly are bordered by halos up to 1.5 mm wide containing minor to moderately abundant irregular to detrital patches of hematite/limonite.

The main veins and veinlets are dominated by extremely fine to locally fine grained calcite, with grain size largest in cores of larger veins. In the cores of a few veins, kaolinite forms patches up to 0.15 mm in size of grains averaging 0.01 mm in size. Hematite forms scattered patches in the cores of some veinlets.

Sample SLR-29 — Calcareous Siltstone; Patchy Hematite-Free Zones in Groundmass

Angular, detrital fragments dominated by ankerite and quartz, with much less chert, latite/andesite, and plagioclase, and minor flakes of biotite/chlorite and muscovite are set in a groundmass of calcite-(hematite). Angular fragments average 0.03-0.06 mm in size. In a few lenses and equant patches up to 1 cm in the groundmass, hematite was removed and in part reprecipitated outwards from the borders of the patches.

detrital grains	
ankerite	12-15%
quartz	10-12
chert	2- 3
latite/andesite	1- 2
plagioclase	1
biotite/chlorite	0.5
muscovite	0.1
opaque/hematite	0.1
groundmass	
calcite	65-70
hematite	3- 4
kaolinite	minor

Quartz, ankerite, chert, and plagioclase form equant to slightly elongate angular grains averaging 0.03-0.06 mm in size, with a few up to 0.12 mm across. Chert fragments are cryptocrystalline to extremely fine grained. Plagioclase is fresh. Ankerite is altered along fragment borders to red-brown hematite.

Latite and andesite form fragments averaging 0.05-0.07 mm in size. These are dominated by extremely fine grained plagioclase and sericite in a variety of textures.

Biotite forms slender to stubby flakes averaging 0.07-0.15 mm long. Alteration is moderate to strong to light to medium olive green chlorite. Chlorite also forms patches up to 0.15 mm across of cryptocrystalline to very fine grained flakes of light to medium olive green color. Muscovite forms slender flakes up to 0.1 mm long.

Opaque forms a few angular grains up to 0.1 mm in size. Red-brown hematite forms a few fragments (?) up to 0.25 mm across.

In the groundmass, calcite forms cryptocrystalline to extremely fine grained aggregates. Hematite forms disseminated red-brown spots and patches, which are concentrated slightly in wispy seams parallel to bedding(?). A few patches up to 1 cm across and lenses bordering fractures (in the hand sample) contain much less hematite; in these, hematite appears to have been leached. Hematite is more abundant than normal in diffuse zones bordering these patches, suggesting that hematite was removed from the cores of the patches and reprecipitated outwards from the margins. Opaque hematite forms a few irregular patches averaging 0.07-0.15 mm in size. One patch 1.7 mm across contains abundant opaque hematite grains up to 0.4 mm in size intergrown with groundmass calcite; this hematite may be secondary after pyrite. Kaolinite forms a few patches up to 0.1 mm across of aggregates of flakes averaging 0.015-0.025 mm in size.

Sample SLR-32 — Brecciated Micritic Limestone; Veinlets of Hematite-(Calcite); Veins and Veinlets of Calcite-(Kaolinite)

The sample is a brecciated micritic limestone containing minor detrital grains of quartz and calcite and fragments of brachiopod(?) shells. Early veinlets are of hematite-(calcite). Limestone fragments are healed by veins and veinlets of calcite-(kaolinite).

detrital grains		plagioclase	minor
quartz	1%	opaque	minor
calcite	0.3	muscovite	trace
fossil fragments	0.3	zircon	trace
chert	0.1		
groundmass			
calcite	80-83		
hematite	2- 3		
veins, veinlets			
calcite	15-17		
kaolinite	0.3		
hematite	minor		

Quartz forms angular detrital grains averaging 0.03-0.07 mm in size, with a few up to 0.12 mm long.

Calcite forms angular, detrital (?) grains averaging 0.04-0.07 mm in size.

A few fragments up to 1 mm long are of brachiopod(?) shells. In one shell 0.06 mm wide kaolinite forms patches up to 0.4 mm long which occupy the entire width of the shell.

Chert forms a few patches up to 0.15 mm in size of cryptocrystalline to extremely fine grained aggregates.

Opaque (hematite?) forms a few equant grains averaging 0.05-0.08 mm in size. Plagioclase forms a few grains up to 0.07 mm in size; some are altered partly to sericite/muscovite. Muscovite forms a few flakes up to 0.07 mm long. Zircon forms one prismatic grain with subrounded outlines 0.07 mm long.

The groundmass is dominated by cryptocrystalline calcite. A few patches up to 0.4 mm in size have a thin rim of slightly coarser grained calcite surrounding a core of red-brown hematite. Hematite forms disseminated grains and aggregates averaging 0.01-0.03 mm in size, and a few patches up to 0.2 mm across. Hematite (after pyrite?) forms a few clusters of spheroidal grains 0.015-0.02 mm wide.

One lens 1.1 mm long contains abundant spots of hematite averaging 0.01-0.02 mm in size. At one end these are intergrown with groundmass calcite, and at the other end with a patch up to 0.4 mm long of kaolinite averaging 0.01 mm in grain size.

A few early veinlets up to 0.05 mm wide are of hematite, in part with cores of calcite. A few have halos up to 0.6 mm wide containing minor to moderately abundant dendritic to irregular patches of red-brown hematite.

Veins up to 3 mm wide are of calcite. Grain size increases from extremely fine on borders of veins to fine to medium in cores of veins. One large vein has a core of cryptocrystalline carbonate, in part separated from outer zones of coarser grained calcite by a thin seam of red-brown hematite. In cores of a few veins, colorless to pale yellow kaolinite forms minor patches up to 0.3 mm long of flakes averaging 0.01-0.02 mm in size.

Sample SLR-57 Slightly Fossiliferous Calcareous Siltstone; Calcite Vein

Angular fragments of quartz, calcite, and brachiopod shells, and minor angular to subrounded fragments of chert, latite, and plagioclase, and flakes of biotite and muscovite are set in a groundmass dominated by micritic calcite. Fragments average 0.05-0.1 mm in size, with a few up to 0.2 mm across. The groundmass contains wispy lenses of hematite and patches and lenses of kaolinite-hematite-(calcite). The hand sample is cut by a vein of calcite up to 3 mm wide.

detrital grains	
quartz	5- 7%
calcite	3- 4
brachiopod shells	3- 4
limonitic fossils(?)	1- 2
latite	0.7
chert	0.5
plagioclase	0.3
biotite/chlorite	0.1
opaque	minor
muscovite	minor
zircon	trace
groundmass	
calcite	82-85
hematite	2- 3
kaolinite	0.7

vein	
calcite	(hand sample only; 8-10 of hand sample)

Quartz forms fragments of single grains, and a few aggregates of moderately interlocking grains averaging 0.05-0.07 mm in size. One large grain is cut by a veinlet of calcite. Numerous fragments of quartz and chert have thin rims of extremely fine grained calcite, which is relatively clear compared to surrounding groundmass calcite.

Calcite forms mainly fragments of single grains. A few fragments 0.15 mm across are aggregates of very fine, equant grains.

Fragments of brachiopod shells are up to several few mm long and generally very slender. A few shells are complete. Most are replaced by calcite, but a few contain patches up to 0.4 mm long of equant kaolinite flakes averaging 0.005 mm in size. Some lenses up to 0.6 mm long of hematite and patches of similar kaolinite may also be replacements of fossil shells. One shell contains abundant opaque grains averaging 0.01 mm in size near its inner margin.

Numerous fragments averaging from 0.5-1.5 mm long by 0.07-0.2 mm wide are of banded limonite; they are cut perpendicular to their length by a few veinlets of calcite averaging 0.15-0.2 mm wide. One also contains a patch of cryptocrystalline kaolinite up to 0.6 mm long. Textures suggest that they are of organic origin.

One curved patch 1.4 mm long by 0.15 mm wide contains abundant grains of hematite (after pyrite) averaging 0.01 mm in size intergrown with micritic calcite stained orange by limonite. It may be a replacement of a fossil shell.

Chert fragments range from cryptocrystalline containing abundant dusty opaque to colorless, extremely fine grained and free of opaque inclusions.

Latite fragments are of extremely fine grained aggregates of plagioclase and sericite. A few also contain slightly coarser laths of plagioclase.

Sample SLR-61 (5) Silty Micritic Limestone; Gash Fractures of Calcite-(Kaolinite-Hematite); Veins of Calcite-(Kaolinite)

The rock is a micritic limestone containing minor detrital grains mainly of quartz and calcite averaging 0.02-0.03 mm in size. Gash fractures are of calcite with minor kaolinite and hematite. Veins up to a few mm across are of fine to medium grained calcite.

detrital grains			gash fractures	
quartz	4- 5%		calcite	0.3%
calcite	1- 2		kaolinite	minor
chert	0.5		veins	
opaque/hematite	0.2		calcite	4- 5
biotite	minor		kaolinite	0.2
muscovite	minor		quartz	minor
zircon	trace			
brachiopod	0.1	(one bivalve shell)		
groundmass				
calcite	85-87			
hematite	2- 3	(including halos on veins)		
early seams				
hematite/limonite	0.1			

Quartz forms angular grains averaging 0.02-0.04 mm in size, with a few elongate grains up to 0.12 mm long.

Calcite forms equant grains averaging 0.03-0.04 mm in size.

Chert forms angular grains averaging 0.03-0.05 mm in size.

Hematite/opaque forms equant grains averaging 0.02-0.05 mm in size, and a few elongate grains up to 0.12 mm long.

Biotite forms a few flakes averaging 0.1-0.15 mm long. Pleochroism is from straw to medium brown to greenish brown.

Muscovite forms slender flakes averaging 0.04-0.06 mm long and a few up to 0.13 mm long. A few have rims of extremely fine grained calcite in comb textures extending out from the sides of the biotite flake.

Zircon forms an anhedral grain 0.02 mm across.

One bivalve brachiopod fossil shell is 3 mm long; valves (of calcite) are 0.07 mm thick.

The groundmass is patchy and grades in irregular patches from cryptocrystalline to extremely fine grained. Hematite is concentrated in wispy lenses and patches up to 0.4 mm long.

A few early veinlets up to 0.01 mm wide of hematite/limonite have halos up to 0.3 mm wide containing moderately abundant limonite.

A few gash fractures up to 0.05 mm wide are dominated by extremely fine to very fine grained calcite with scattered patches of kaolinite.

Veinlets averaging 0.05-0.15 mm wide and a few veins up to 2 mm wide are dominated by calcite. Grain size generally increases with the width of the vein. Some veins contain interstitial patches up to 0.6 mm in size of kaolinite flakes averaging 0.01-0.015 mm in size. One vein contains a few grains of quartz averaging 0.05 mm in size along its margin. Bordering the largest vein are a few clusters of irregular patches of hematite averaging 0.03-0.1 mm in size. As well, the groundmass bordering the vein is stained medium orange by limonite.

Sample SLR-62 — **Brecciated Micritic Limestone; Early Veinlets of Hematite-(Calcite); Veins of Calcite-(Quartz)**

The rock is dominated by micritic calcite ranging from cryptocrystalline to extremely fine grained. Minor detrital grains are of quartz. Early veinlets are dominated by hematite and have hematite-rich halos. Breccia fragments are healed by veins of calcite with minor quartz.

detrital grains		
quartz	minor	
groundmass		
calcite	78-82	
hematite	0.7	(including halos of veins)
early veinlets		
hematite	0.2	
calcite	minor	
veins		
calcite	17-20	
quartz	0.3	

Quartz forms scattered detrital grains averaging 0.01-0.02 mm in size in a few coarser grained patches of groundmass, and one grain 0.17 mm across.

The groundmass is variable. Much of it is dominated by cryptocrystalline calcite. At one end, a patch up to several mm across is dominated by extremely fine grained, feathery calcite grains averaging 0.003-0.005 mm in size. This zone contains a patch 2 mm across of cryptocrystalline calcite. A few other patches up to 1.,5 mm across of extremely fine grained calcite occur in the zone of cryptocrystalline calcite.

Hematite forms disseminated red-brown grains averaging 0.005-0.01 mm in size. Scattered patches and lenses of groundmass calcite are stained light to medium yellow by limonite.

A few early, in part warped veinlets averaging 0.01-0.02 mm wide of hematite or hematite-calcite are rimmed by halos up to 0.1 mm wide containing abundant reddish brown hematite/limonite.

Veins up to 1 mm wide are dominated by very fine to medium grained calcite; wider veins generally are coarser grained than narrower veins. A few veins contain a few subhedral to euhedral quartz grains averaging 0.4-0.7 mm across, and one contains an anhedral grain of quartz 0.5 mm across. A wispy, discontinuous veinlet up to 0.05 mm wide contains a quartz vein up to 0.7 mm long and patches of very fine grained calcite.

Sample SLR-67 (4) Brecciated Silty Micritic Limestone; Early Veinlets of Hematite; Veinlets and Veins of Calcite-(Quartz-Kaolinite)

Detrital grains dominated by quartz and less calcite are set in a groundmass of micritic limestone. Early veinlets are of hematite with hematitic halos. Abundant veins and veinlets are dominated by calcite with patches of each of quartz and kaolinite.

detrital grains	
quartz	3- 4%
calcite	1
hematite	0.2
muscovite	trace
biotite	trace
plagioclase	trace
groundmass	
calcite	82-85
hematite	1
early seams	
hematite	0.2
veins, veinlets	
calcite	8-10
quartz	0.7
kaolinite	0.7

Angular grains of quartz, calcite, and minor plagioclase average 0.02-0.04 mm in size. Biotite flakes are up to 0.1 mm long. Pleochroism is from straw to medium brown. Muscovite flakes average 0.04-0.08 mm long. Opaque (hematite?) forms a few elongate grains up to 0.1 mm long.

The groundmass is dominated by light brown, cryptocrystalline calcite. Opaque (hematite) forms disseminated grains averaging 0.01-0.03 mm in size and a few lenses up to 0.35 mm long. A few patches from 0.1-0.3 mm in size are of slightly coarser grained calcite and minor to abundant medium red-brown hematite/limonite.

A few early seams averaging 0.01-0.02 mm wide are of hematite. They have halos containing minor to moderately abundant irregular to dendritic patches of hematite.

Veins and veinlets ranging from 0.05-1 mm in width are dominated by very fine to fine grained calcite. Some contain patches of extremely fine grained kaolinite in their cores. Quartz forms scattered anhedral grains averaging 0.2-0.6 mm in size. Bordering some veins are irregular patches of red-brown hematite.

Sample SLR-69   Calcareous Siltstone

Angular, equant to elongate detrital grains of quartz and lesser plagioclase and ankerite, and flakes of biotite and muscovite are set in a groundmass of carbonate. Angular fragments average 0.04-0.07 mm in size, with a few between 0.1-0.2 mm long.

detrital grains	
quartz	17-20%
ankerite	4- 5
chert	2- 3
plagioclase	2- 3
biotite	0.7
opaque	0.5
latite	0.3
muscovite	0.3
chlorite(?)	minor
zircon	trace
tourmaline	trace
groundmass	
calcite	65-70
hematite	1
kaolinite	1

Quartz and plagioclase fragments are of single grains, and range from equant to very elongate. Plagioclase is fresh.

Ankerite fragments are equant to elongate and generally angular in outline. A few elongate ankerite fragments are up to 0.15 mm long.

A few elongate chert fragments are up to 0.2 mm long. Chert is composed of interlocking, extremely fine to cryptocrystalline grains. Finer grained varieties contain moderately abundant to very abundant dusty opaque inclusions, and a few contain several extremely fine, equant opaque grains.

Biotite and less muscovite form flakes averaging 0.1-0.25 mm long. Biotite is pleochroic from straw to medium brown or medium reddish brown. A few biotite flakes are replaced completely by pseudomorphic chlorite.

Opaque forms disseminated grains averaging 0.02-0.05 mm in size, and a few up to 0.2 mm across.

Latite forms a few equant fragments averaging 0.05-0.1 mm in size. It consists of extremely fine grained plagioclase and sericite.

A few equant patches averaging 0.05-0.06 mm in size are of bright green cryptocrystalline chlorite(?).

Zircon forms a few elongate, anhedral grains up to 0.06 mm long.

Tourmaline forms an equant grain 0.03 mm across; it is medium olive green in color with no pleochroism.

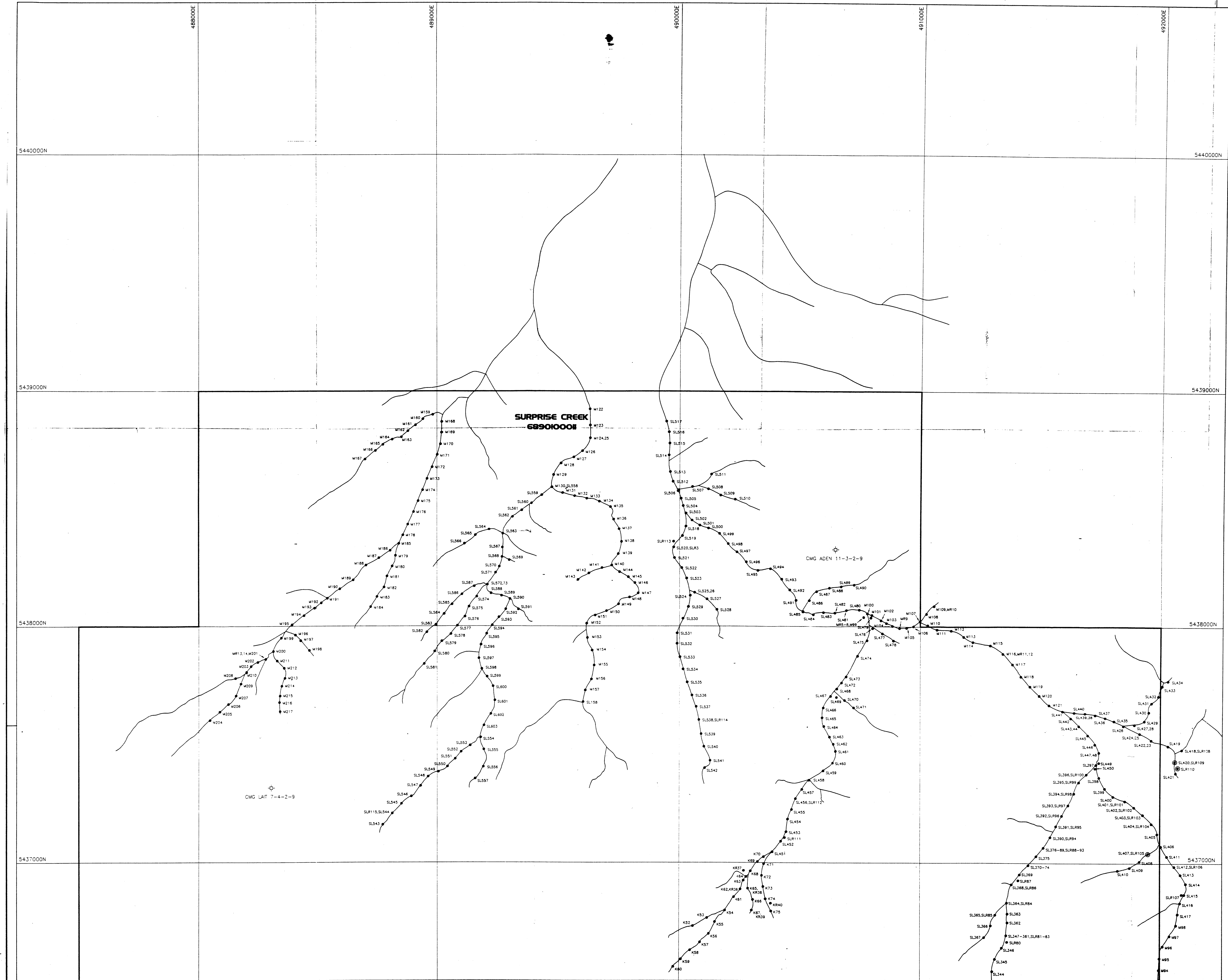
The groundmass is dominated by cryptocrystalline calcite. Scattered patches up to 0.15 mm in size are of extremely fine grained, subradiating calcite/aragonite. Subradiating patches commonly are stained pale to light yellow-orange by limonite.

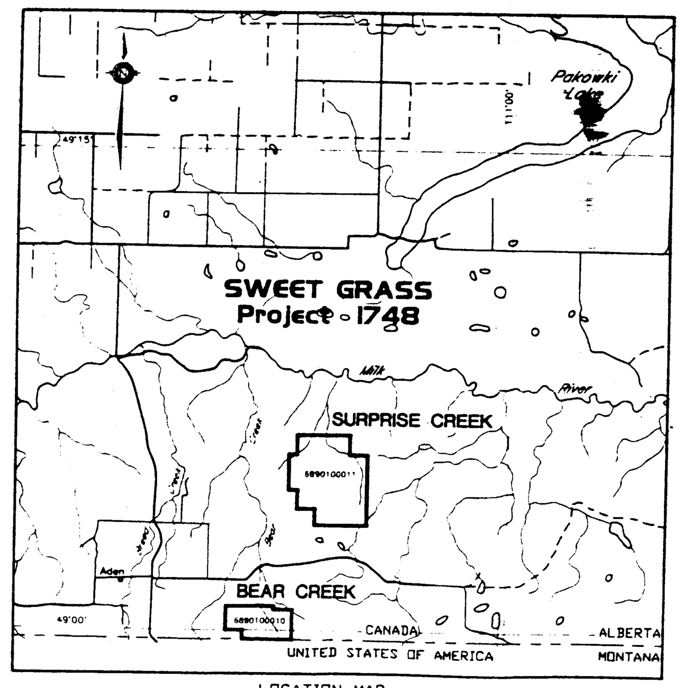
Hematite forms diffuse patches averaging 0.05-0.1 mm in size, and a few lenses up to 0.2 mm long. A few patches up to 0.5 mm in size contain abundant hematite.

Kaolinite forms interstitial patches averaging 0.1 mm in size of equant flakes averaging 0.005-0.01 mm in size.


SWEET GRASS
Project 1748
SURPRISE CREEK
BEAR CREEK
CANADA
UNITED STATES OF AMERICA
ALBERTA
MONTANA
LOCATION MAP
1:250,000
BEAR CREEK
6890100010
COUTTS (64 km)
WATER
5430000N
5429000N
5428000N
5427000N
484000E
485000E
486000E
487000E
488000E
ALBERTA
MONTANA
CANADA
UNITED STATES OF AMERICA
CMG ADEN 1A-6-1-9
SAMPLE LOCATION
GOLD VALUE (PPB)
SAMPLE NUMBER
K10 M10 SL10 — SOIL SAMPLE
KR10 MR10 SLR10 — ROCK SAMPLE
SP1 — PAN SAMPLE
11128 — HEAVY MINERAL SAMPLE
BRECCIATED CARBONATE MUDSTONE OUTCROPS
ZONE WITH ANOMALOUS GOLD VALUES
GAS WELL
0 100 200 400 meters
Scale 1:5,000
ID 1991 0001
Map 1
REVISED
ROCK, SOIL & PAN SAMPLES
LOCATION MAP
BEAR CREEK
PROJECT SWEET GRASS
PROJ. No. 1748
N.T.S. 72E/3
DWG. No. 1748-03-001
Surveyed by: S.LAU
Drawn by: ACAD/E.LANDRY
Date: JANUARY 1991
Scale: 1:5,000
noranda
NORANDA EXPLORATION CO. LTD. – WINNIPEG, MANITOBA

1





LOCATION MAP
1:250,000

SAMPLE LOCATION
K10
SAMPLE NUMBER

K10 / M10 / SL10 — SOIL SAMPLE

KR10 / MR10 / SLR10 — ROCK SAMPLE

BRECCIATED CARBONATE MUDSTONE OUTCROPS

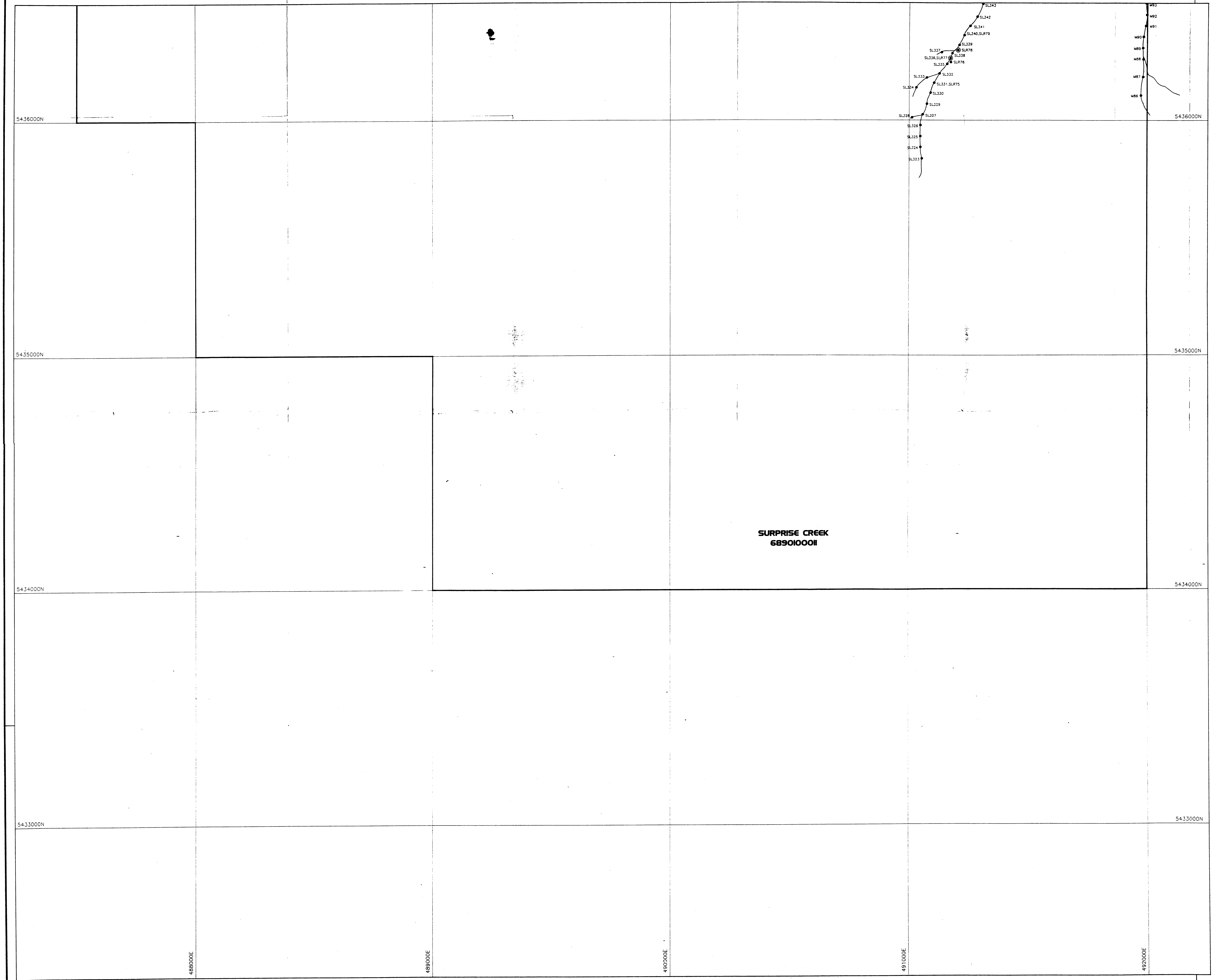
GAS WELL

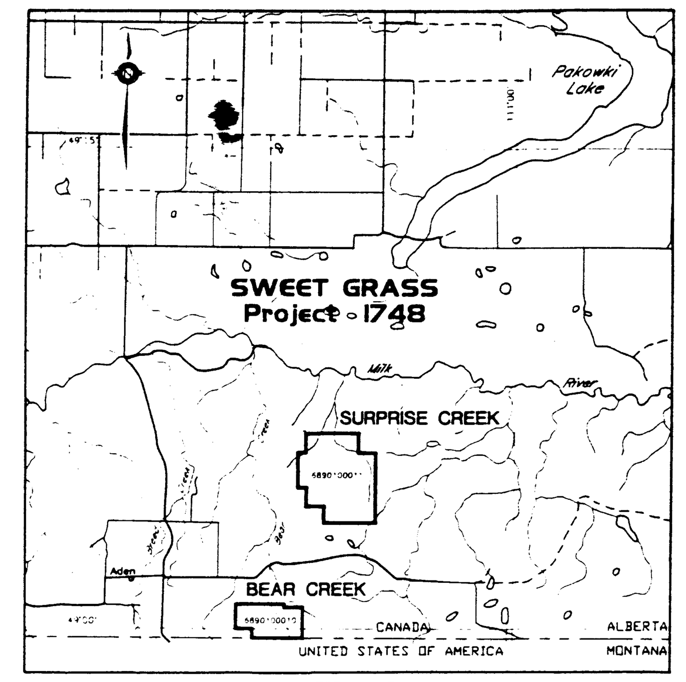
0 100 200 400 meters
Scale 1:5,000

ID 19910001

Map 2

REVISED	ROCK, SOIL SAMPLES LOCATION MAP (NORTH SHEET) SURPRISE CREEK
	PROJECT SWEET GRASS
PROJ. No. 1748	Surveyed by: S.LAU Date: JANUARY 1991
N.T.S. 72E/3	Drawn by: ACAD/E.LANDRY Scale: 1:5,000
DWG. No. 1748-03-002	noranda NORANDA EXPLORATION CO. LTD. – WINNIPEG, MANITOBA





LOCATION MAP
1:250,000

SAMPLE LOCATION — K10 — SAMPLE NUMBER

K10
M10
SL10 — SOIL SAMPLE

KR10
MR10
SLR10 — ROCK SAMPLE

◉ BRECCIATED CARBONATE MUDSTONE OUTCROPS

0 100 200 400 meters
Scale 1:5,000

ID 1991000 1

Map 3

REVISED	ROCK, SOIL SAMPLES LOCATION MAP (SOUTH SHEET) SURPRISE CREEK	
	PROJECT SWEET GRASS	
PROJ. No. 1748	Surveyed by: S.LAU	Date: JANUARY 1991
N.T.S. 72E/3	Drawn by: ACAD/E.LANDRY	Scale: 1:5,000
DWG. No. 1748-03-003	noranda NORANDA EXPLORATION CO. LTD. - WINNIPEG, MANITOBA	

Instrument : mp3
Field : TOTAL
Datum : 58000.0 nT
Contour interval :
Profile Scale : 100 nT / Cm (logarithmic)
Conductor Axis :

ID 1991 0001

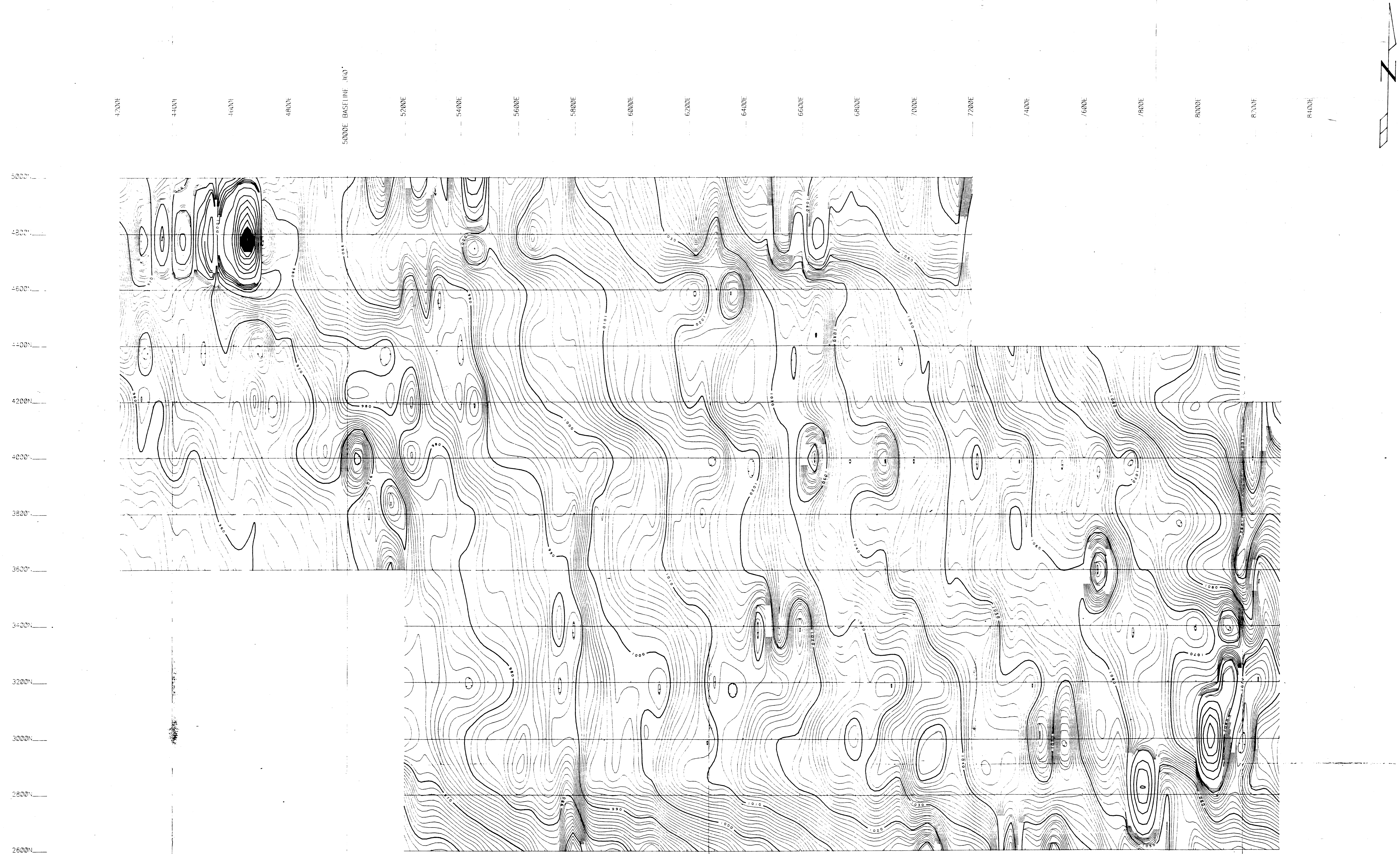
Map 4

BEAR CREEK GRID

MAGNETOMETER SURVEY

PROJECT: SWEETGRASS PROJECT # : 1748.
BASELINE AZIMUTH : 360 Deg.

SCALE = 1 : 5000 DATE : 10/24/90
SURVEY BY : DH,KY NTS : 72E-3
FILE: M1748SOU
NORANDA EXPLORATION



ID 19910001

Map 5

Instrument	: MP3
Field	: TOTAL
Datum	: 58000.0 nT
Contour Interval	:
Conductor Axis	:

100m 50m 0m 100m 200m

BEAR CREEK GRID

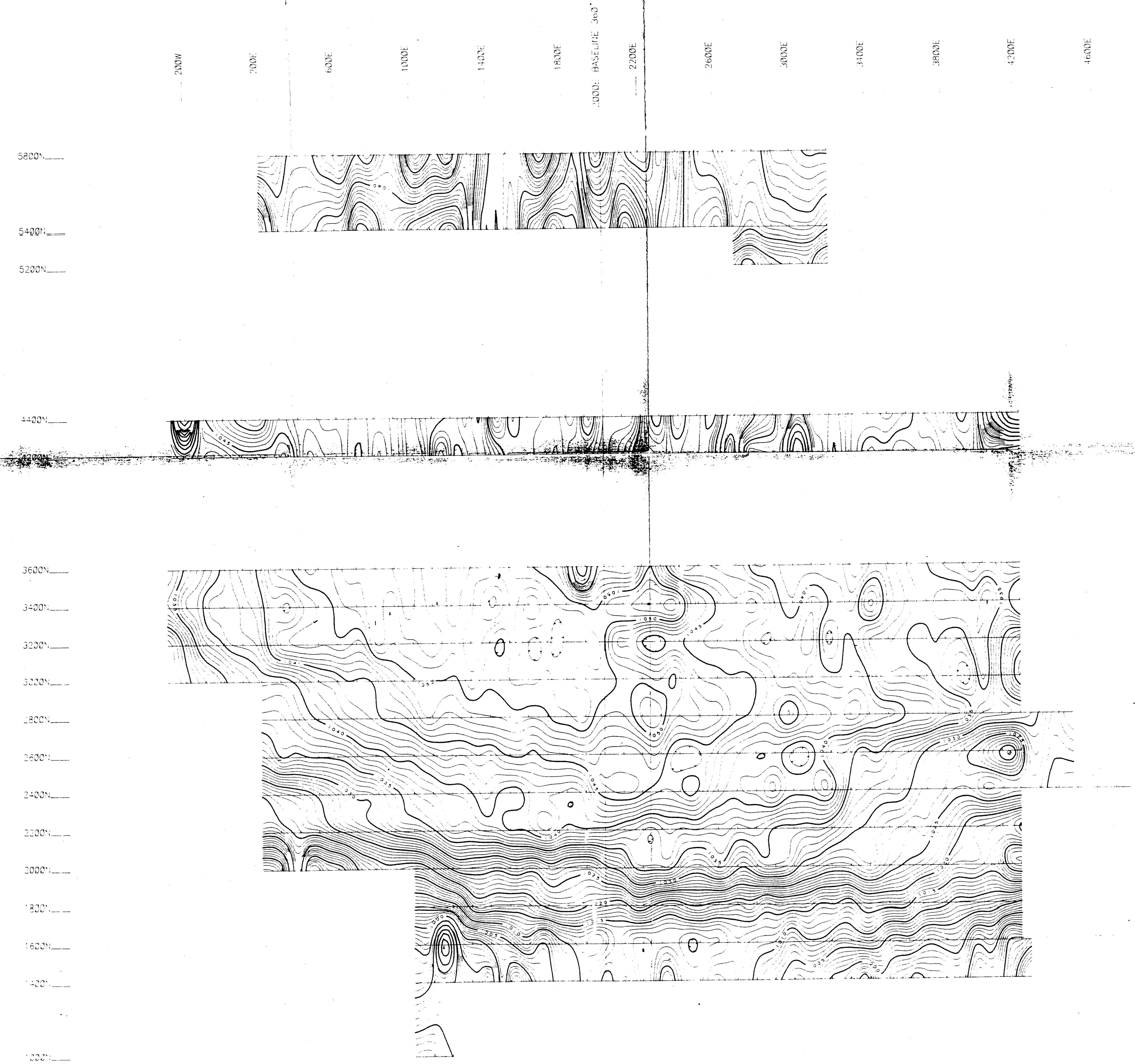
MAGNETOMETER SURVEY

PROJECT: SWEETGRASS PROJECT # : 1748.
BASELINE AZIMUTH : 360 Deg.

SCALE = 1 : 5000 DATE : 10/24/90
SURVEY BY : DH,KY NTS : 72-E/3
FILE: M1748S

NORANDA EXPLORATION


N
200W
200E
600E
1000E
1400E
1800E
2000E BASELINE 360°
2200E
2600E
3000E
3400E
3800E
4200E
4600E
5800N
5400N
5200N
4400N
4200N
3600N
3400N
3200N
3000N
2800N
2600N
2400N
2200N
2000N
1800N
1600N
1400N
1000N
ID 1999 0001
Map 6
Instrument : mp3
Field : TOTAL
Datum : 58000.0 nT
Contour Interval :
Profile Scale : 50 nT / Cm (logarithmic)
Conductor Axis :
200m 100m 0m 200m 400m
SURPRISE CREEK GRID
MAGNETOMETER SURVEY
PROJECT: SWEETGRASS PROJECT # : 1748.
BASELINE AZIMUTH : 360 Deg.
SCALE = 1 :10000
DATE : 10/27/90
SURVEY BY : DH, KY
NTS : 72E-3
FILE: M1748N
NORANDA EXPLORATION



ID 1991000l

Map 7

Instrument : mp3
Field : TOTAL
Datum : 58000.0 nT

Contour Interval :

Conductor Axis :

200m 100m 0m 200m 400m

SURPRISE CREEK GRID

MAGNETOMETER SURVEY

PROJECT: SWEETGRASS PROJECT # : 1748.
BASELINE AZIMUTH : 360 Deg.

SCALE = 1 :10000 DATE : 10/27/90
SURVEY BY : DH, KY NTS : 72E-3
FILE: M1748N

NORANDA EXPLORATION

(7)