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NORTH BAY, ONTARIO



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**PETROGRAPHIC REPORT
ON THE
EMERALD LAKE PROPERTY
SHEPPARD AND McCARTHY TOWNSHIPS, ONTARIO**

2.14809

Report No. 1208NB

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PETROGRAPHIC REPORT: JOB 15800

October, 1992.

By: Eva S. Schandl Ph.D.

SUMMARY

The suite of fourteen rocks studied is made up of various types of sediments and mafic intrusive rocks. The sediments are quartzose sandstones, fine-grained siltstones and wackes, whereas the mafic intrusives include gabbros (one leucocratic) and diabase.

All of the rocks have been altered to various degrees. Alteration of the sediments include silicification, albitization, sericite/biotite and chlorite alteration, epidotization and minor carbonatization. In the gabbros, the alteration is predominantly saussuritization of plagioclase, uralitization of amphibole and chlorite alteration of both in one sample (# 5078).

The earliest alteration is represented by silicification and early carbonate alteration in the sediments. This was followed by chlorite alteration in the more mafic sediments. Pervasive sericite alteration (# 5011) appears to post-date chloritization. Calcium metasomatism, represented by epidote veins, postdated sericite and chlorite (# 3700) although some minor replacement of epidote by chlorite was observed in some samples. Albitization probably postdated epidote, as epidote was not found to replace chessboard albites. Late (minor), second episode of carbonate alteration is suggested by the inclusion of some epidote grains in carbonate (# 5115). In addition, late quartz veins cross-cut all alteration types.

Albitization:

Based on petrographic observations of fourteen selected samples from northeast of Lake Wanapitei, it is suggested that most of the sediments have been albitized to various degrees. Albitization is evident on the thin section scale from the partial replacement of quartz by chessboard albite, although this is not evident on the hand specimen scale.

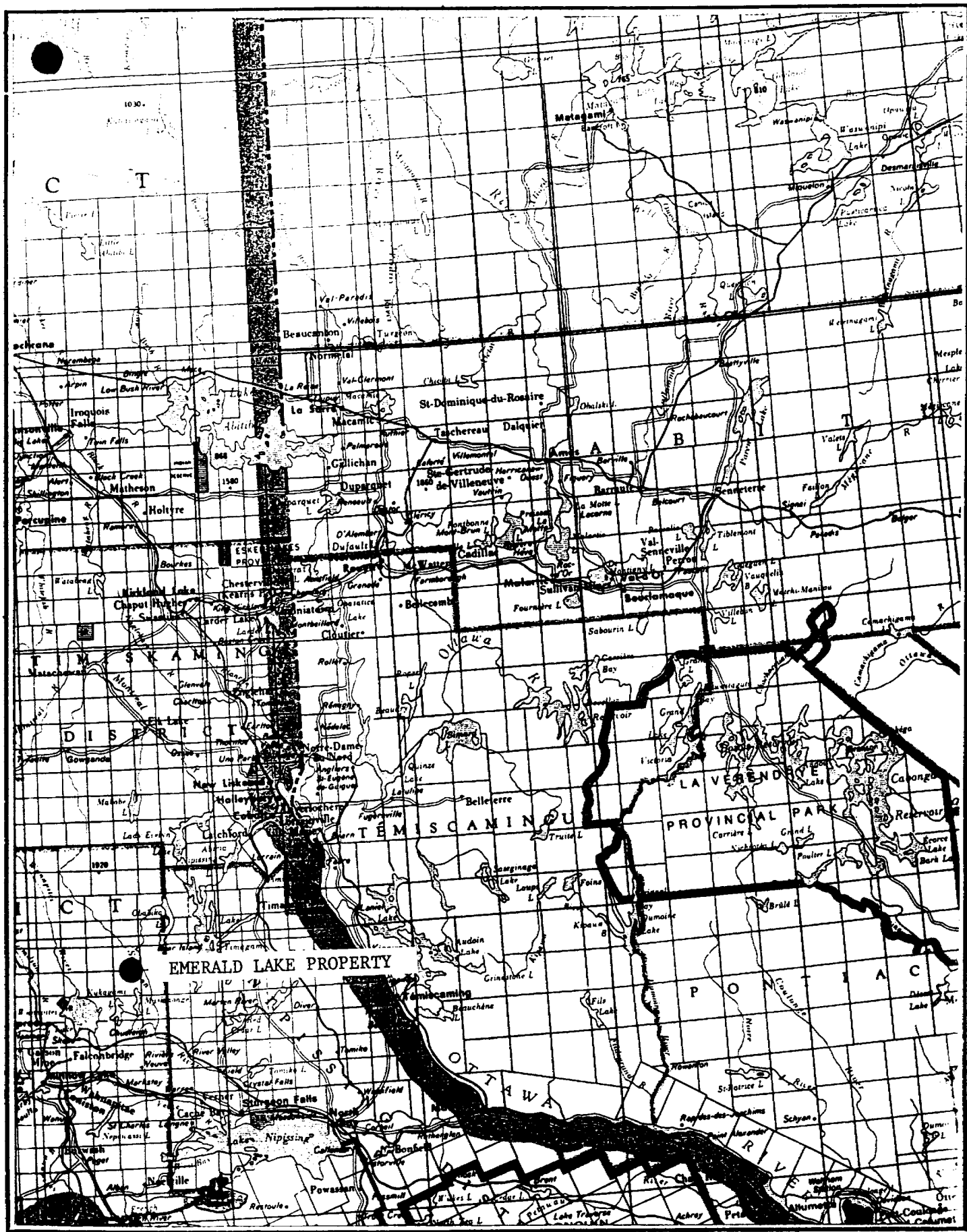
There are similarities and differences between rocks in the present study and those from albitized rocks in the Lake Wanapitei area. The most significant differences are in the degree of albitization, carbonate alteration, sulfidation and pervasive chlorite alteration:

- (1) Although Na_2O content of the albitized sediments is relatively low, ranging between

3 - 6.5 wt. %, some of the features identified, such as hematitization and silicification are consistent with those of other albitized rocks in the area. Hematite occurs as replacement of pyrite in four of the samples studied (5020, 5115, 5116 and 5117) and silicification is apparent in several others.

- (2) Hematite in the albitized rocks was found as replacement after pyrite and not as disseminated inclusions in quartz and albite.
- (3) Pervasively albitized rocks are typically pink or tan colored, whereas the rocks in this study are light to medium grey in color, reflecting the low degree of albitization and the lack of 'hematite' dust in quartz and albite.
- (4) Although some carbonate alteration post-dated albitization, the volume of carbonate present is much less than in pervasively albitized rocks in the Sudbury-Wanapitei Lake area.

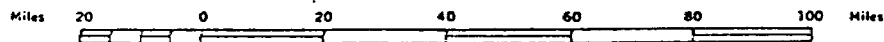
Finally, although some of the above features are lacking in the suite of sediments studied and albitization is weaker than in mineralized areas, the partial albitization and hematitization of the rocks suggests that the samples came from a location that is probably not too far removed (in distance) from more extensively altered (and possibly mineralized) rocks in the area.



LOCATION MAP

Figure 1

1 inch equals approximately 32 miles



JOB # 15800

Specimen Number: 3700

Name: Diabase

Hand Specimen Description: Very fine-grained, equigranular, dark grey rock with epidote veins.

Petrographic Description:

Very fine-grained, extensively altered diabase (or basalt?). One relict amphibole phenocryst has medium-green pleochroism, whereas fine-grained second generation amphibole is only faintly pleochroic. Aggregates of biotite, calcite and tremolite suggests the replacement of phenocrysts in the rock. Biotite, chlorite alteration is pervasive in the matrix and epidote veinlets cross-cut biotite and chlorite.

Mineral:	Vol.%	Description
Quartz	(?)	Not possible to determine due to extensive alteration and to the small grains in the rock. One quartz-carbonate vein cross-cuts the rock.
Chlorite	35	Chlorite is part of the matrix and appear to be intergrown with fine-grained biotite. Also occurs in a relatively wide vein with biotite, which is cut diagonally by a small epidote vein.
Biotite	30	Very fine-grained biotite is part of the matrix, but it also occurs in veins. Cross-cutting relationship between biotite, chlorite and epidote veins suggests that epidote post-dated chlorite and biotite.
Epidote	20	Very fine-grained epidote is dispersed throughout the rock, but it also occurs in small veinlets, cross-cutting other alteration.
Amphibole	5	Some medium-green relict amphibole grains are preserved (0.6 mm), but most amphibole occurs as fine-grained, acicular, secondary actinolite. They are replacing primary amphibole.
Carbonate	1	Carbonate occurs in calcite vein and as partial replacement of phenocrysts.
Zircon	tr	Corroded, brown zircon in matrix



3700: Small epidote vein (N-S) cuts biotite-chlorite altered rock. Field: 2.23. Ppl.

JOB # 15800

Specimen Number: 5011

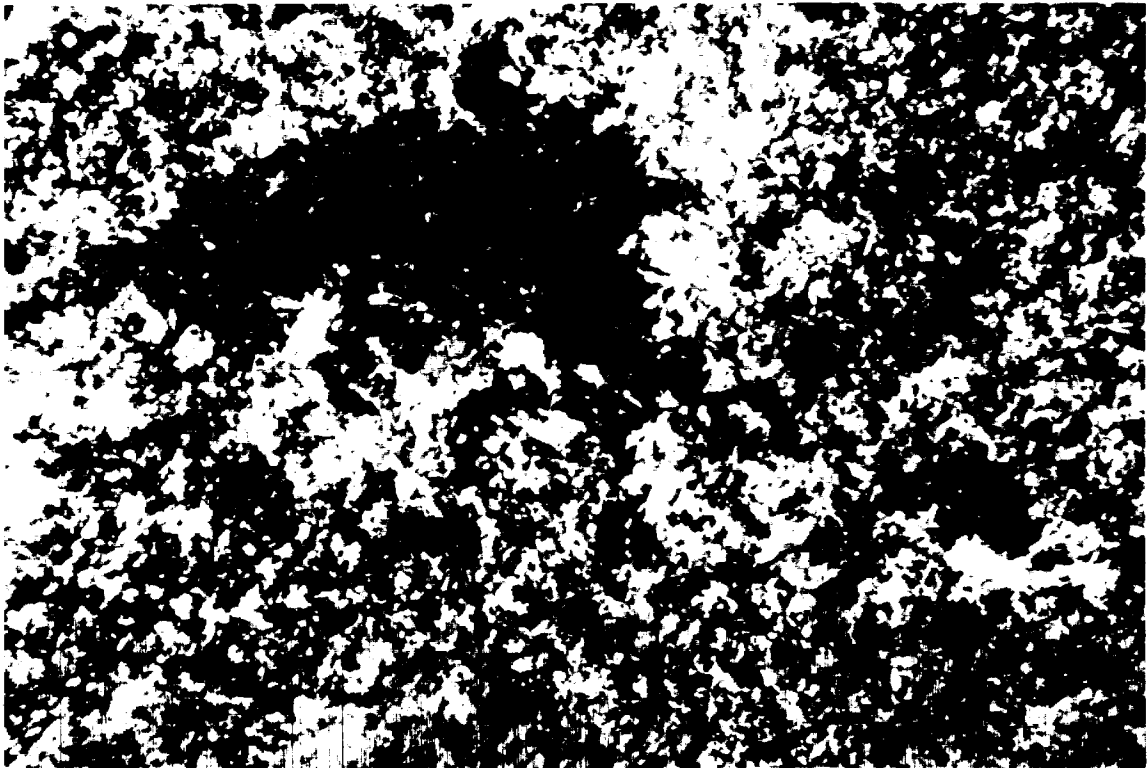
Name: Diabase (?)

Hand Specimen Description: Fine-grained, massive, dark grey rock.

Petrographic Description:

Extensively sericitized rock with patches (up to 5 mm) of chlorite alteration after phenocrysts or clasts. Quartz clasts in the altered rock suggests a possible sediment protolith. Small quartz veins suggests silicification prior to sericite and chlorite alteration. magnetite is dispersed through the rock, some occur as rim on quartz. Fine-grained rutile is abundant.

Mineral:	Vol.%	Description
Sericite	60	Sericite alteration is pervasive and sericite occurs interstitially, as well as very small veinlets. It post-dates chlorite alteration, forming at the expense of chlorite in the pods.
Chlorite	25	Chlorite occurs in aggregates as replacement of phenocrysts or clasts and it is also part of the matrix.
Quartz	15	Quartz occurs as detrital, subrounded grains or in veins cross-cutting the rock. Small quartz veins suggest that the rock has been silicified.
Rutile	2	Fine-grained rutile is dispersed throughout the rock, some occur in very small stringers, others are interstitial to silicates.
Magnetite	1	Fine-grained, euhedral magnetite occur as rim on quartz or is interstitial to quartz.



5011: Chlorite (dk. blue aggregate) after clast or phenocryst; chlorite is replaced by sericite. Field: 6 mm. Crossed polars.

JOB # 15800

Specimen Number: 5020

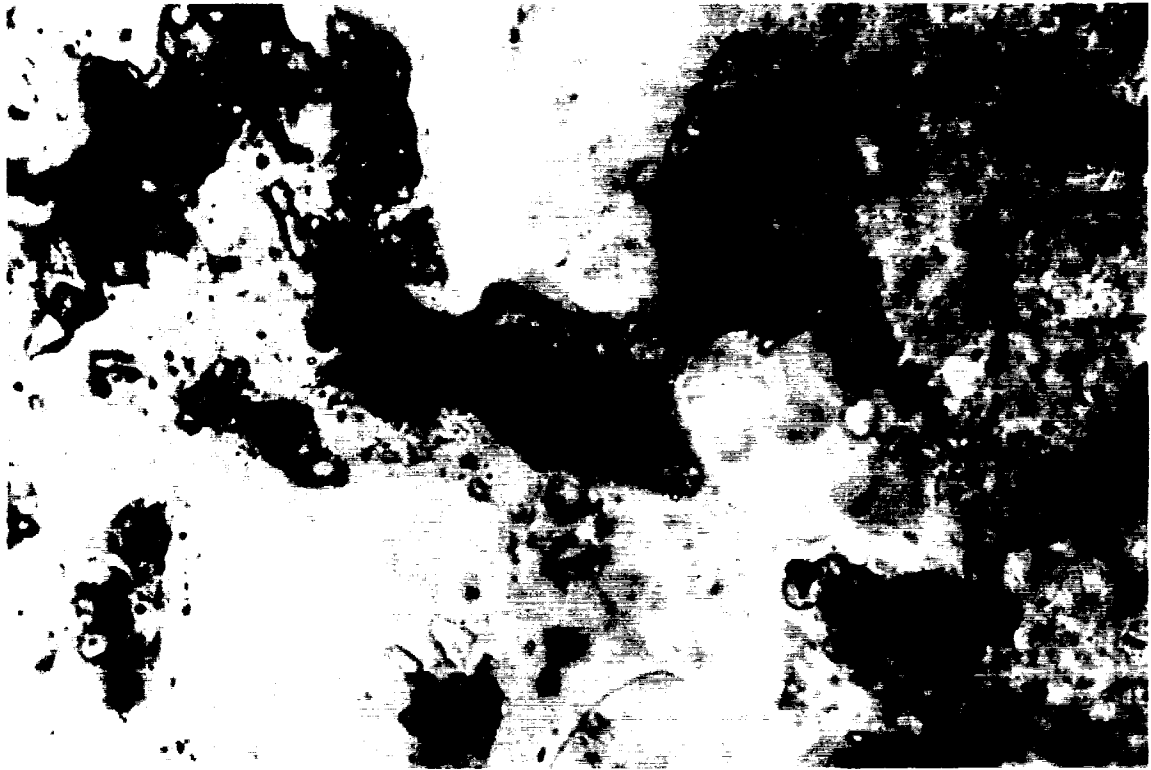
Name: Sandstone

Hand Specimen Description: Fine-grained, light grey quartzose sandstone.

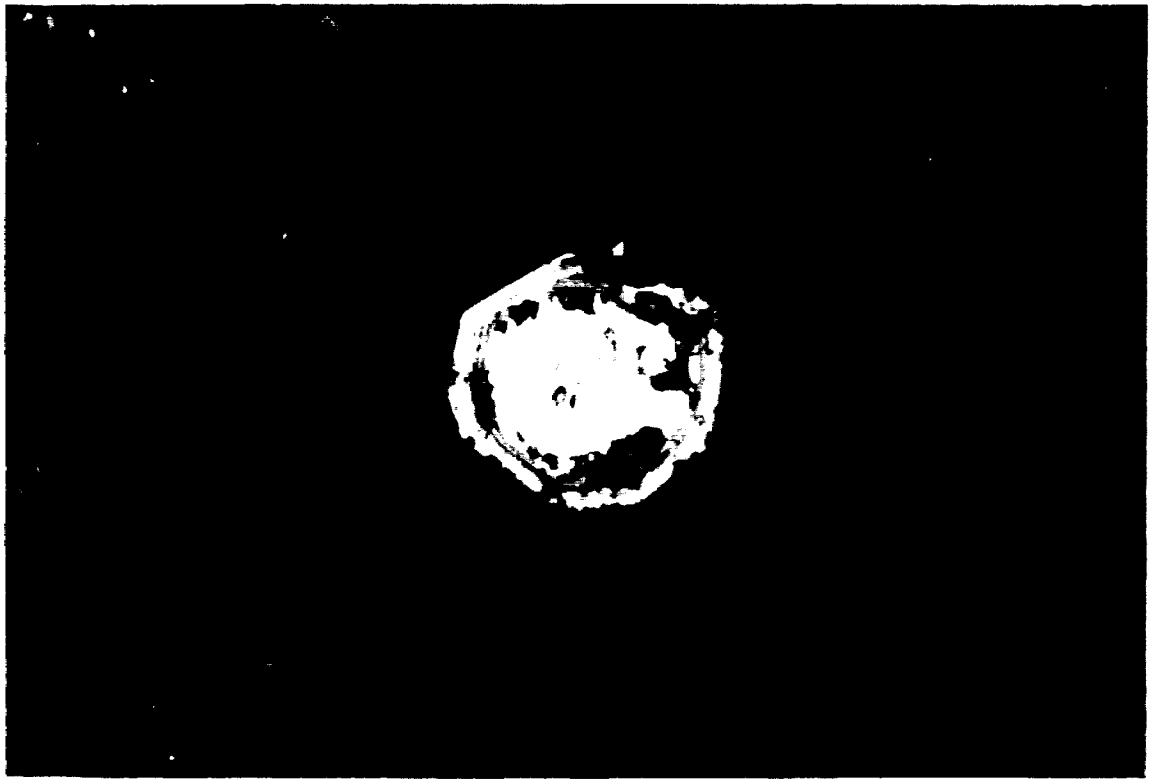
Petrographic Description:

Fine-grained equigranular sandstone with relatively well rounded quartz grains. Some quartz grains are partly albitized. Fine-grained, granular epidote aggregates are interstitial to quartz and albite. Some pyrrhotite are rimmed by pyrite and several pyrite grains have overgrowth of fine-grained hematite.

Mineral:	Vol.%	Description
Quartz	60	Subrounded grains are equigranular and range in size from 0.2 to 0.5 mm.
Albite	20	Anhedral detrital grains form interlocking texture with quartz. Some quartz grains are partly replaced by albite.
Epidote	18	Occurs as brownish cement (probably intergrown with some hydroxide) and is interstitial to quartz and albite. It generally forms fine-grained clusters between quartz grains.
Pyrite	1	Subhedral grains are occasionally overgrown by hematite. A few pyrite grains rim pyrrhotite.
Rutile	1	Fine-grained rutile is dispersed throughout the rock.
Pyrrhotite	tr	Rimmed by pyrite.
Hematite	tr	Occurs as rim on pyrite grains.
Chlorite	tr	Interstitial to quartz grains.
Zircon	tr	Detrital pink zircon



5020: Epidote aggregates (green) replace quartz. Field: 1 mm. Ppl.



5020: Hematite rim (grey-blue) on pyrite (tan). Field: 0.7 mm. Reflected light.

JOB # 15800

Specimen Number: 5021

Name: Sandstone

Hand Specimen Description: Fine-grained, medium-grey sandstone

Petrographic Description:

Fine-grained, inequigranular, quartzose sandstone. The quartz grains are subrounded. Matrix supported rock and matrix consists of fine-grained quartz and albite. Although most of the feldspars are relict (perthitic texture) albitization is evident from the partial replacement of quartz by chessboard albite. Minor biotite occurs in clusters and replaces quartz and albite.

Mineral:	Vol.%	Description
Quartz	80	Occurs as subrounded grains ranging in size from 0.5 to 5 mm. They are generally intergrown with albite aggregates.
Albite	18	Occurs as detrital twinned or perthitic grains (0.5 to 6 mm) and as newly formed chessboard albite. Replacement of quartz by chessboard albite is most common in the matrix.
Biotite	2	Biotite occurs in aggregates, partly replacing the matrix and partly replacing detrital albite. They vary in size up to 1 mm.
Epidote	2	Occur as fine-grained granular aggregates between quartz or albite grain boundaries.
Sericite	tr	Mostly as replacement of detrital albite
Magnetite-		
Ilmenite	tr	Dispersed throughout the rock.

PETROGRAPHIC REPORT - JOB # 15800

Specimen Number: 5035

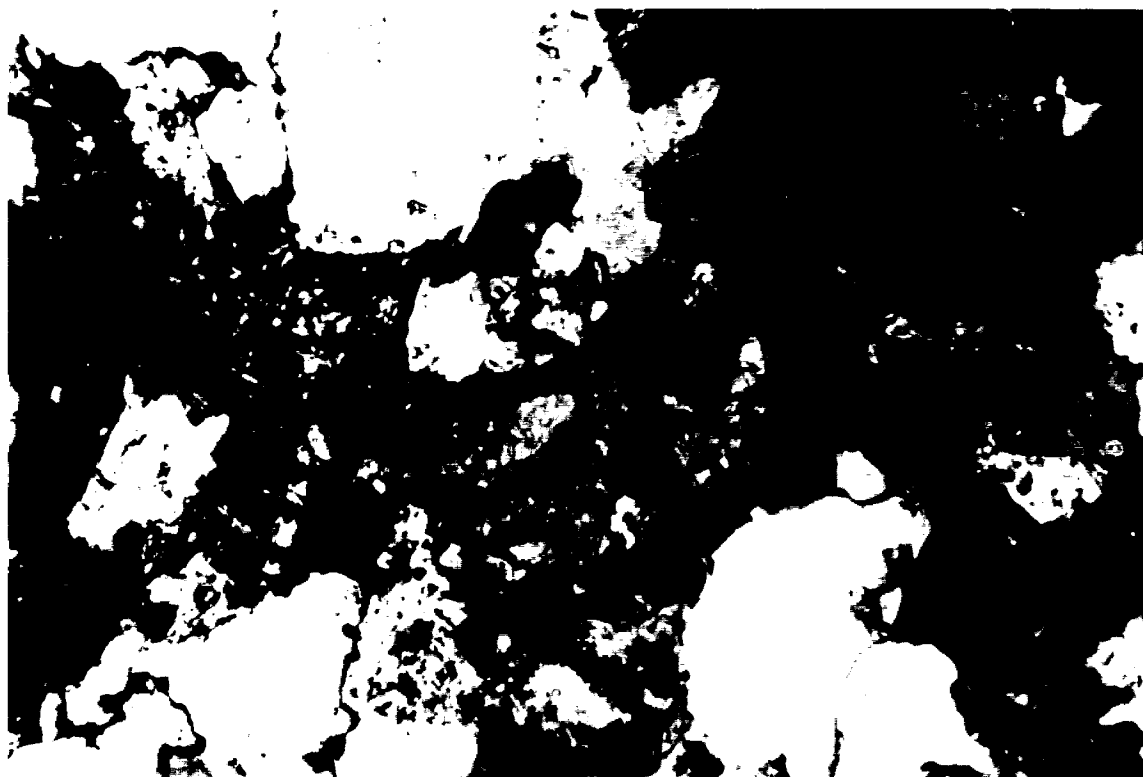
Name: Siliceous sandstone

Hand Specimen Description: Vitreous, equigranular, medium-grained, light grey rock.

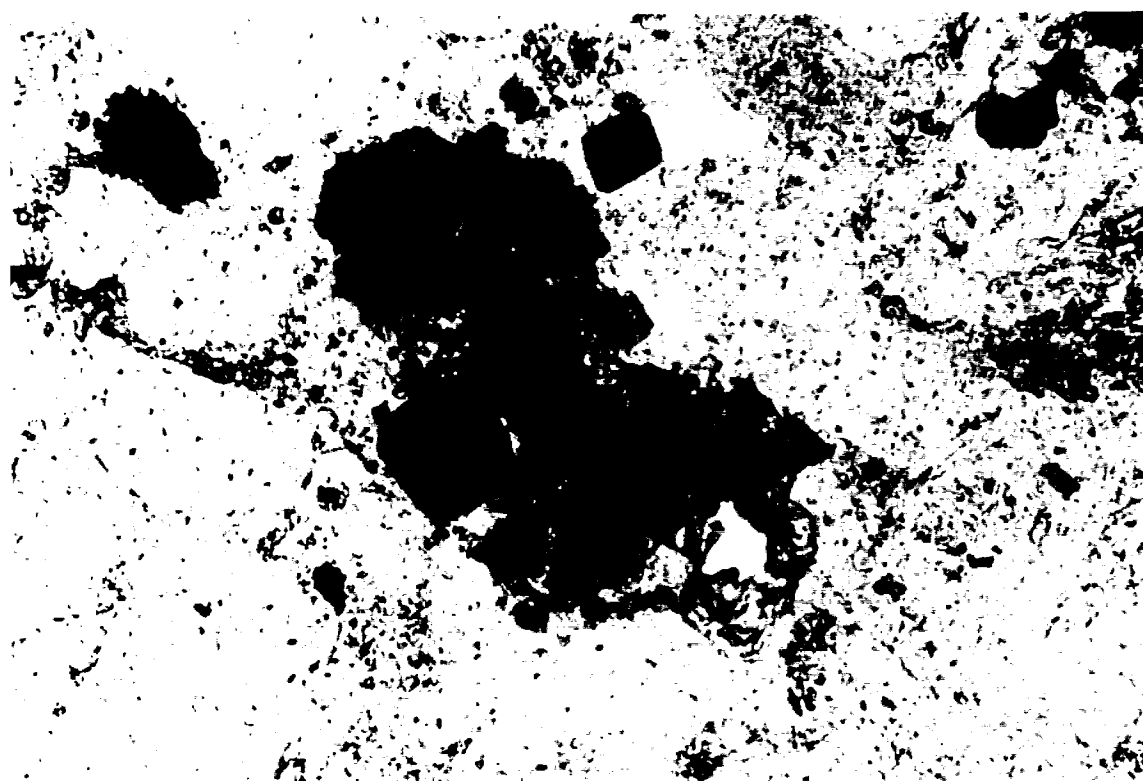
Petrographic Description:

Clast-supported rock consists predominantly of quartz and subordinate feldspars. Other minor phases include epidote, chlorite, biotite, rutile, tourmaline, detrital zircon, monazite or allanite.

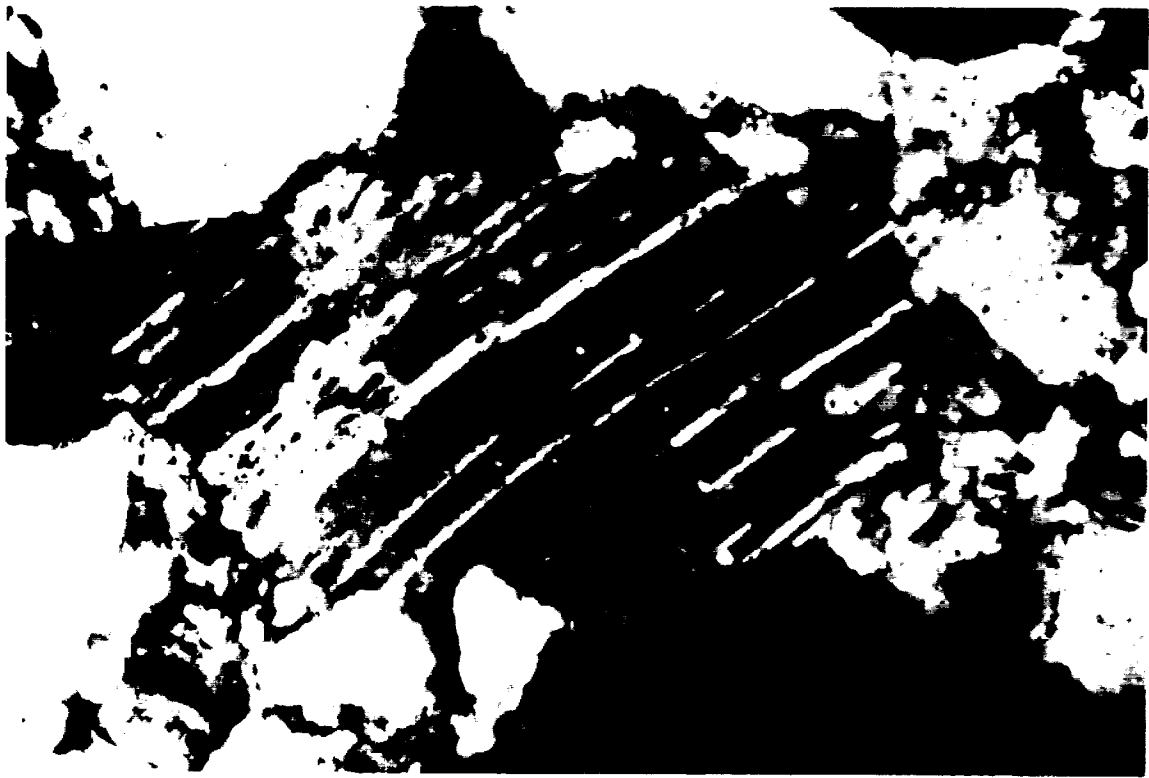
Mineral:	Vol%	Description
Quartz	70	Subrounded to well rounded quartz grains range in size from 0.5 - 1.0 mm (not including the matrix). Minor replacement of quartz by albite is apparent in some grains, where newly formed chessboard albite includes fine-grained quartz. Some of the fine quartz grains form cement between clasts and albitization is most evident from the partial replacement of the quartz cement by twinned albite.
Feldspar	25	Detrital albite and andesine occur between quartz clasts. The grains are subhedral to anhedral, ranging in size from 0.2 - 1.0 mm. Some are extensively strained with undulose extinction and/or have displaced twin lamellae. Late, metasomatic albite grains are less well defined, the grain boundaries are uneven and embayed.
Epidote	3	Very fine-grained epidote is interstitial to some quartz grains and appear to act as a cementing agent. Some are relatively dark (allanite?) - perhaps containing some rare earth elements.
Chlorite	2	Chlorite partly replaces epidote.
Rutile	tr	Fine-grained, dk. brown aggregates.
Tourmaline	tr	Very few, small dispersed grains.
Biotite	tr	Minor, interstitial between grain boundaries.
Zircon	tr	Brownish, corroded detrital grains.
Monazite(?)	tr	Fine-grained (30 microns) interstitial, pale yellow pleochroism and high birefringence.



5035: Epidote aggregate interstitial to quartz. Field: 2.3 mm.
Crossed polars.



5035: Allanite (?) aggregate interstitial to quartz. Field: 2.3 mm. Ppp.



5035: Slightly deformed detrital albite. Field: 2.3 mm. Crossed polars.

JOB # 15800

Specimen Number: 5036

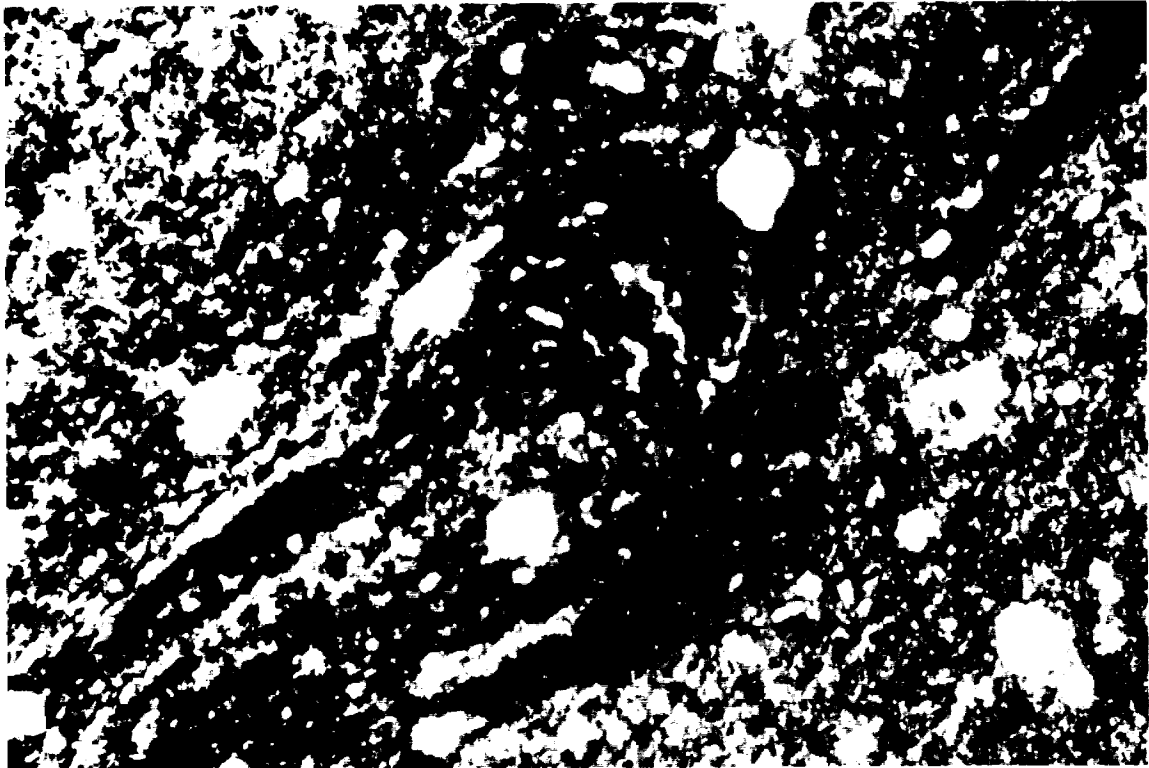
Name: Siltstone

Hand Specimen Description: Very fine-grained, dark grey siltstone with small quartz clasts.

Petrographic Description:

Fine-grained siltstone is partly matrix supported. Quartz clasts range from 0.5 to 3.0 mm in size. Fine-grained matrix consists of quartz, albite and chlorite with minor sericite. Some of the clasts are weakly albitized and a quartz-albite vein cross-cuts the rock. Fine-grained rutile is dispersed throughout. Some rutile aggregates are rimmed by biotite.

Mineral:	Vol.%	Description
Quartz	40	Subrounded and anhedral quartz occurs as clasts (up to 3 mm) in a very fine-grained matrix. Quartz grains in the matrix are <0.1 mm in size and are interlocking with ragged grain boundaries. Quartz also occurs in a quartz-albite veinlet (0.6 mm width) that cross-cuts the rock.
Albite	10 (?)	Difficult to identify in the matrix due to the small grain size. But albite in the quartz vein suggests albitization of the rock.
Chlorite	30	Very fine-grained chlorite is dispersed in the matrix and is intergrown with minor sericite.
Graphite	10	Occurs as contorted veins
Pyrite	3	Large anhedral pyrite is intergrown with chalcopyrite. Minor, very fine-grained pyrite in matrix.
Chalcopyrite	1	Occurs only as intergrowth with large pyrite.
Rutile	5	Fine-grained rutile is dispersed through the rock. It generally occurs in stringers associated with graphite.
Sericite	tr	Fine grains are intergrown with chlorite.
Biotite	tr	Some biotite forms a rim on pyrite and rutile



5036: Sediment with contorted graphite veinlets (dark): Field: 6 mm. Ppl.

JOB # 15800

Specimen Number: 5066

Name: Sandstone

Hand Specimen Description: Medium-grained, light grey sandstone

Petrographic Description:

Inequigranular, medium-grained sandstone, with sub to well rounded quartz clasts and albite. Albite grains are detrital and the rock does not appear to be albitized. Matrix supported and the matrix is made up of fine-grained quartz and detrital feldspar. Some of the matrix is partly replaced by amphibole. Two types of detrital zircon in the rock suggests a mixed provenance. Unaltered magnetite is the only opaque mineral.

Mineral:	Vol.%	Description
Quartz	70	Sub to well rounded grains, some of which form granoblastic texture with detrital albite. They range in size from 0.5 to 6 mm. Fine-grained quartz also makes up part of the matrix.
Albite	23	Twinned albite occurs as clasts and fine-grained aggregates, forming part of the matrix. The grains are sub to anhedral.
K-feldspar (?)	2	Untwinned grains (up to 2 mm), partly sericitized suggests the possible presence of K-feldsapr. Cannot be positively identified by optics alone.
Amphibole	5	Medium-grained, anhedral, medium-light green amphibole partly replaces the quartz-albite matrix.
Biotite	tr	Interstitial to quartz grains, occurs in matrix.
Magnetite	tr	Sub to anhedral magnetite grains are dispersed throughout the rock.

JOB # 15800

Specimen Number: 5068

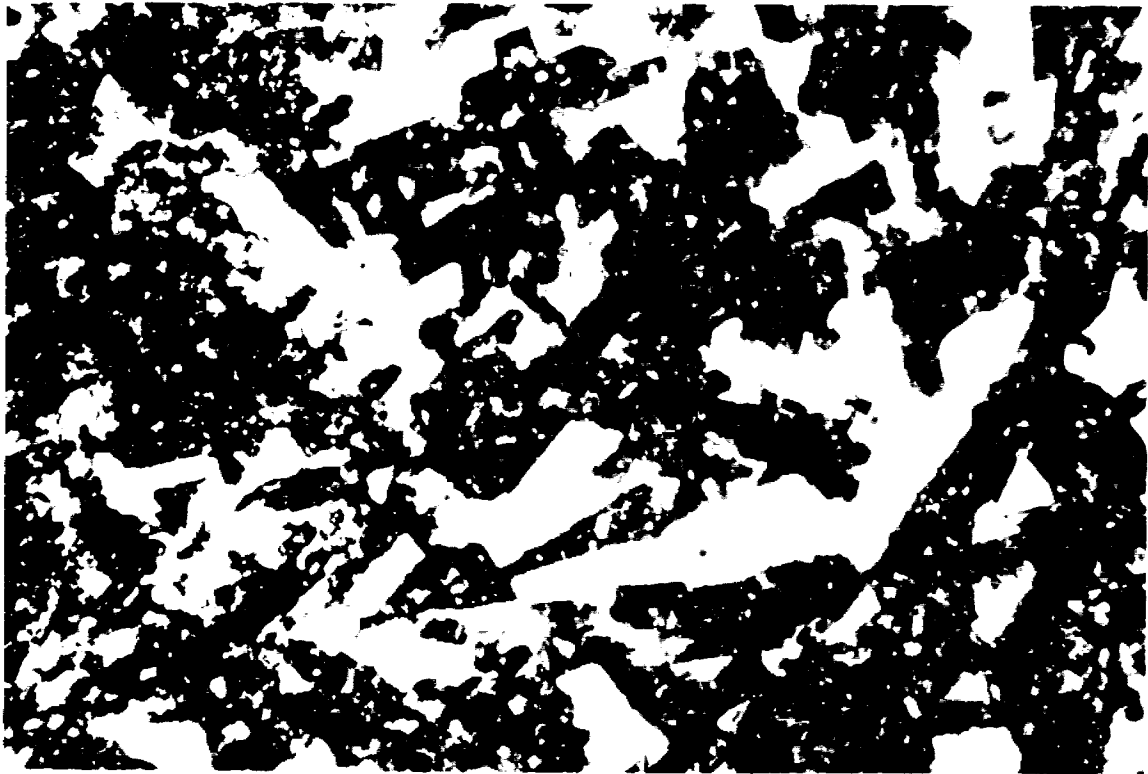
Name: Gabbro

Hand Specimen Description: Medium-grained, dark-grey gabbro with abundant biotite.

Petrographic Description:

Leucocratic gabbro consisting of up to 50 graphic quartz. Graphic plates are up to 1 cm in size and poikilitically enclose extensively altered plagioclase laths. Plagioclase is pervasively epidotized, somewhat sericitized and chloritized. Relict biotite grains are interstitial and range in size from 2 to 5 mm. Relict green amphibole is up to 5 mm and is partly uralitized.

Mineral:	Vol.%	Description
Quartz	50	Mostly occurs as graphic plates, made up of individual fragments having the same extinction. The plates are up to 1 cm in size and some have slightly undulose extinction. They poikilitically enclose altered plagioclase.
Plagioclase	20-originally	They occur mostly as lath-shaped inclusions in graphic quartz, ranging in size from 1 5 mm. Plagioclase grains are extensively altered. The most significant alteration is epidote, somewhat lesser importance is sericite / muscovite, chlorite and biotite. The grains are too altered for optical estimation of the composition.
Biotite	10	Biotite are generally anhedral and are interstitial to quartz and amphibole. The grains are up to 5 mm in size and some have inclusions of monazite or allanite with pleochroic haloes. Some biotite grains are secondary and replace plagioclase.
Amphibole	20	Dark green sub to euhedral amphibole ranges in size from 3 to 6 mm. Some of the grain boundaries are partly uralitized and the occasional grains contain monazite or allanite with dark pleochroic haloes.
Epidote		Occurs only as fine-grained granular aggregates, partly replacing plagioclase.
Sericite-chlorite		As alteration of plagioclase.
Monazite-allanite (?)		Primary; included in amphibole and biotite.



5068: Graphic quartz (white) with epidotized plagioclase laths. Field: 6 mm.
Crossed polars.



5068: Monazite or allanite with dark pleochroic haloes in biotite (brown). Field:
2.3 mm. Ppl.

JOB # 15800

Specimen Number: 5070-A

Name: Sediment

Hand Specimen Description: Siliceous, bleached, fine-grained quartzite, slightly yellowish. Contains numerous small quartz veinlets and rusty carbonate aggregates.

Petrographic Description:

Inequigranular, siliceous sandstone is matrix supported. The matrix consists mostly of sericite and fine-grained, granular quartz. Silicification is evident from the presence of quartz veins. Minor albitization is apparent mostly in the matrix, where quartz is partly replaced by chessboard albite. In parts of the rock granoblastic texture dominates, whereas in other parts grain boundaries of quartz are embayed, ragged and uneven.

Mineral:	Vol.%	Description
Quartz	70	Quartz grains range in size from 0.5 to 5 mm and have undulose extinction. Some are subrounded. Grain boundaries vary from even to embayed, ragged. Some occur as clasts, some occur in veins (overprinted by sericite alteration) and some as part of the matrix. One wide quartz vein cross-cuts the rock. The matrix quartz is <0.5 mm in size and may be partly replaced by minor fine-grained chessboard albite (similar to those shown on the microphotograph from # 5116).
Albite	1	Rare detrital albite forms granoblastic texture with quartz. Albite clasts are generally <2 mm in size. Minor chessboard albite occurs in the matrix as replacement after quartz (albitization).
Sericite	27	Sericite is interstitial to quartz and forms part of the matrix. It appears to overprint earlier silicification in the rock.
Carbonate	2	Occurs in aggregates and appear to post-date sericitic alteration. Relatively dark color of some grains suggest that they may be iron-rich carbonates (ankerite or Fe-dolomite).
Magnetite-		
Ilmenite	tr	Minor, small grains dispersed through the rock.

JOB # 15800 Identical to 5070-A, but with somewhat less carbonate

Specimen Number: 5070-B

Name: Sediment

Hand Specimen Description: Siliceous, bleached, fine-grained quartzite, slightly yellowish. Contains numerous small quartz veins and rusty carbonate aggregates.

Petrographic Description:

Inequigranular, siliceous sandstone is matrix supported. The matrix consists mostly of sericite and fine-grained, granular quartz. Silicification is evident from the presence of quartz veins. Minor albitization is apparent mostly in the matrix, where quartz is partly replaced by chessboard albite. In parts of the rock granoblastic texture dominates, whereas in other parts grain boundaries of quartz are embayed, ragged and uneven.

Mineral:	Vol.%	Description
Quartz	70	Quartz grains range in size from 0.5 to 5 mm and have undulose extinction. Some are subrounded. Grain boundaries vary from even to embayed, ragged. Some occur as clasts, some occur in veins (overprinted by sericite alteration) and some as part of the matrix. One wide quartz vein cross-cuts the rock. The matrix quartz is <0.5 mm in size and may be partly replaced by minor fine-grained chessboard albite (similar to those shown on the microphotograph from # 5116).
Albite	1	Rare detrital albite forms granoblastic texture with quartz. Albite clasts are generally <2 mm in size. Minor chessboard albite occurs in the matrix as replacement after quartz (albitization).
Sericite	27	Sericite is interstitial to quartz and forms part of the matrix. It appears to overprint earlier silicification in the rock.
Carbonate	1	Occurs in aggregates and appear to post-date sericitic alteration. Relatively dark color of some grains suggest that they may be iron-rich carbonates (ankerite or Fe-dolomite).
Magnetite-		
Ilmenite	tr	Minor, small grains dispersed through the rock.



5070-B: Extensively sericitized quartzose sandstone. Field: 6 mm. Crossed polars.

JOB # 15800

Specimen Number: 5078

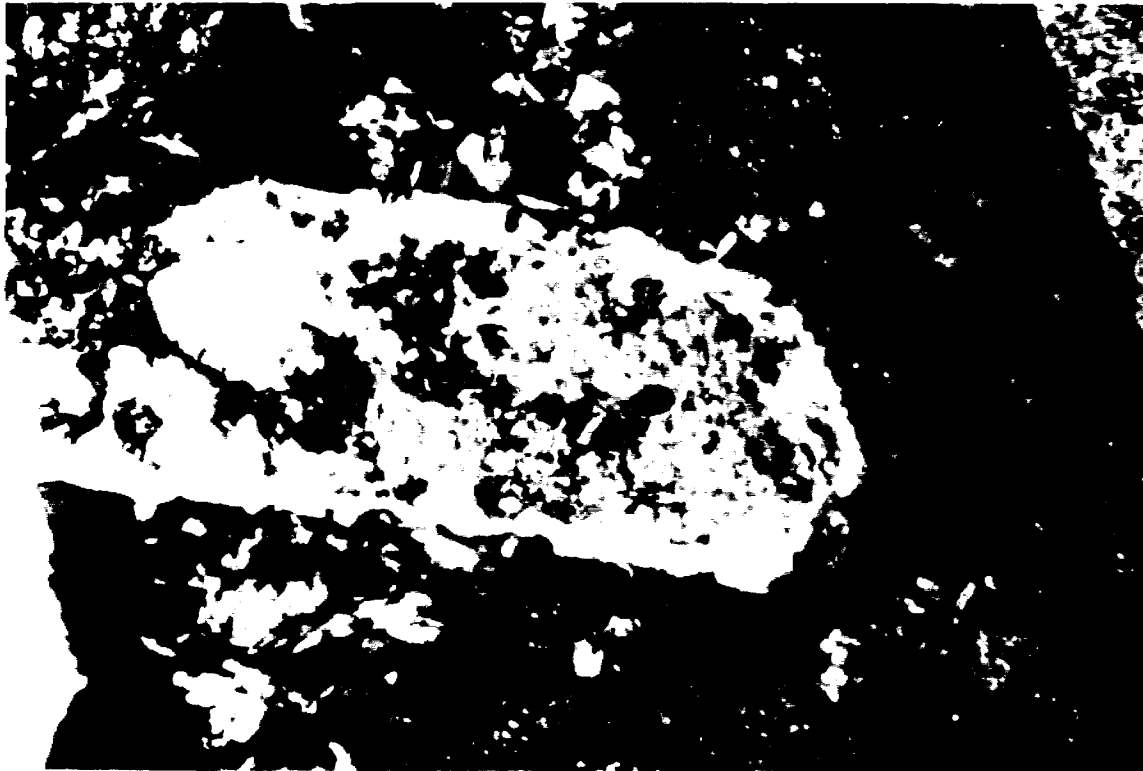
Name: Gabbro

Hand Specimen Description: Coarse-grained (up to 1 cm grain size) gabbro with bone to pink colored plagioclase. Medium grey.

Petrographic Description:

Coarse-grained gabbro is extensively altered; plagioclase is saussuritized and chloritized and amphibole is extensively chloritized. Oxidation (iron staining) is extensive and appears to be the result of weathering. Most of the magnetite-ilmenite have been at least partly oxidized.

Mineral:	Vol.%	Description
Plagioclase	50	Plagioclase grains are up to 1 cm in size. Most are saussuritized (sericite, epidote, minor carbonate) and partly replaced by green chlorite aggregates. Because of the alteration, optical identification of plagioclase composition is not possible.
Quartz	15	Quartz grains are interstitial to plagioclase. They are anhedral and some are partly replaced by chlorite.
Amphibole	10	Most amphibole have been partly or completely replaced by chlorite. It is not possible to estimate the % amphibole in the original rock.
Chlorite	30	Dark blue-green-yellow, highly pleochroic (green) chlorite occurs as replacement after amphibole, plagioclase and quartz. Chlorite grains occur in clusters or bundles and individual grains are relatively coarse-grained (0.5 mm).
Magnetite- Ilmenite	5	Most of the coarse-grained (up to 5 mm) magnetite-ilmenite grains are extensively oxidized. This oxidation, which also gives red color to some chlorite, is probably only the result of surface weathering.
carbonate	tr	Small carbonate grains are minor alteration products of saussuritized plagioclase.



5078: Plagioclase (tan) in gabbro, partly replaced by chlorite (green). Field: 6 mm.
Crossed polars.

JOB # 15800

Specimen Number: 5081

Name: Gabbro

Hand Specimen Description: Coarse-grained, dark grey gabbro with large amphibole crystals.

Petrographic Description:

The rock consists predominantly of amphibole and plagioclase. Most of the amphibole has been uralitized (partly replaced by actinolite), whereas plagioclase is saussuritized. Some amphibole contains small inclusions of monazite or allanite with dark pleochroic haloes. The replacement of calcic amphibole by actinolite is accompanied by the crystallization of titanite. Some titanite also occur on magnetite-ilmenite grains.

Mineral:	Vol.%	Description
Amphibole	58	Large, relict calcic amphibole are up to 8 mm and they are partly replaced by blue-green actinolite. Replacement occurs mostly along grain boundaries, but also along cleavage planes. Some amphiboles have allanite or monazite inclusions, suggesting the crystallization of these REE accessory minerals prior to uralitization. Most amphiboles are associated with secondary titanite, which evidently crystallized during the replacement of the calcic amphibole by actinolite.
Plagioclase	30	Most grains are saussuritized and/or epidotized and their size ranges from 2 to 6 mm.
Quartz	2	Anhedral and occurs interstitially between plagioclase and amphibole.
Titanite	3	Some large (up to 4 mm), subhedral grains are fragmented and appear to be primary. Others are anhedral, they occur as intergrowths with actinolite, as overgrowth on magnetite-ilmenite, or granular aggregates on the rim of relict, calcic amphibole.
Magnetite- Ilmenite	5	Large (up to 5 mm) anhedral magnetite-ilmenite occurs as part of the primary assemblage. Some are rimmed by secondary titanite.
Sericite, epidote	tr	Fine-grained, alters plagioclase

JOB # 15800

Specimen Number: 5115

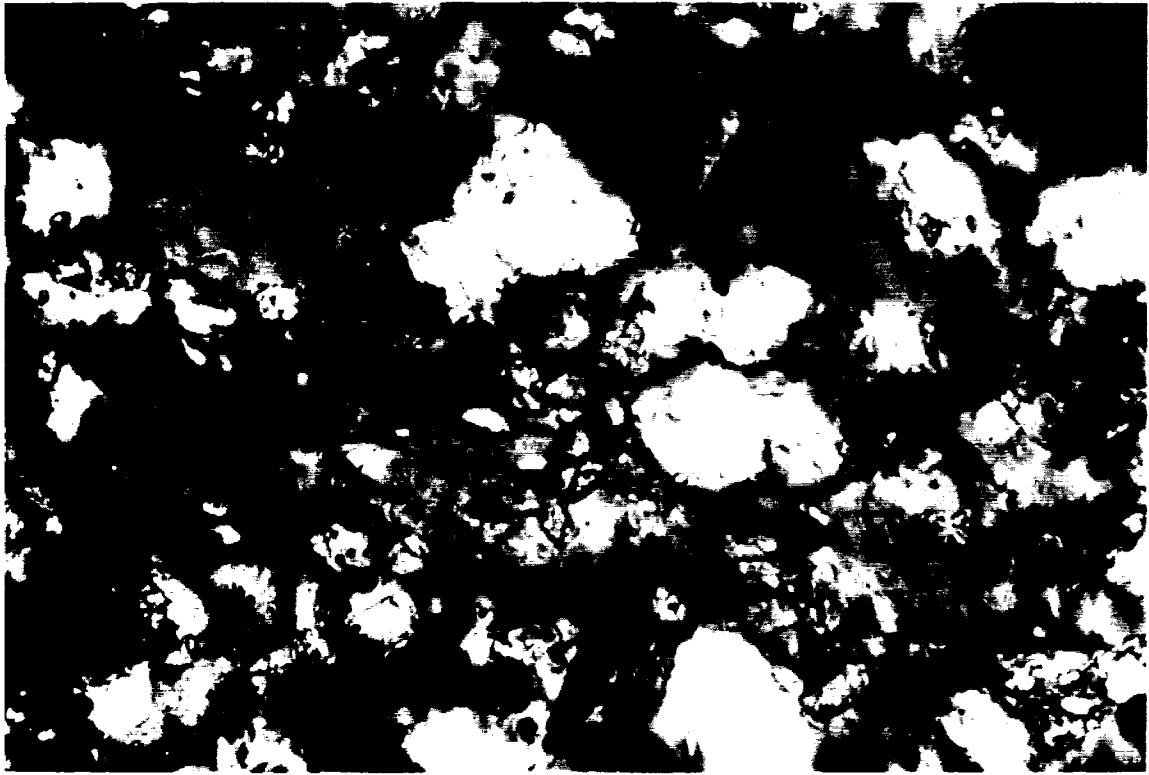
Name: Sediment

Hand Specimen Description: Sandstone with wide quartz vein. Chilled margin or inclusion of fine-grained siltstone on one side of vein.

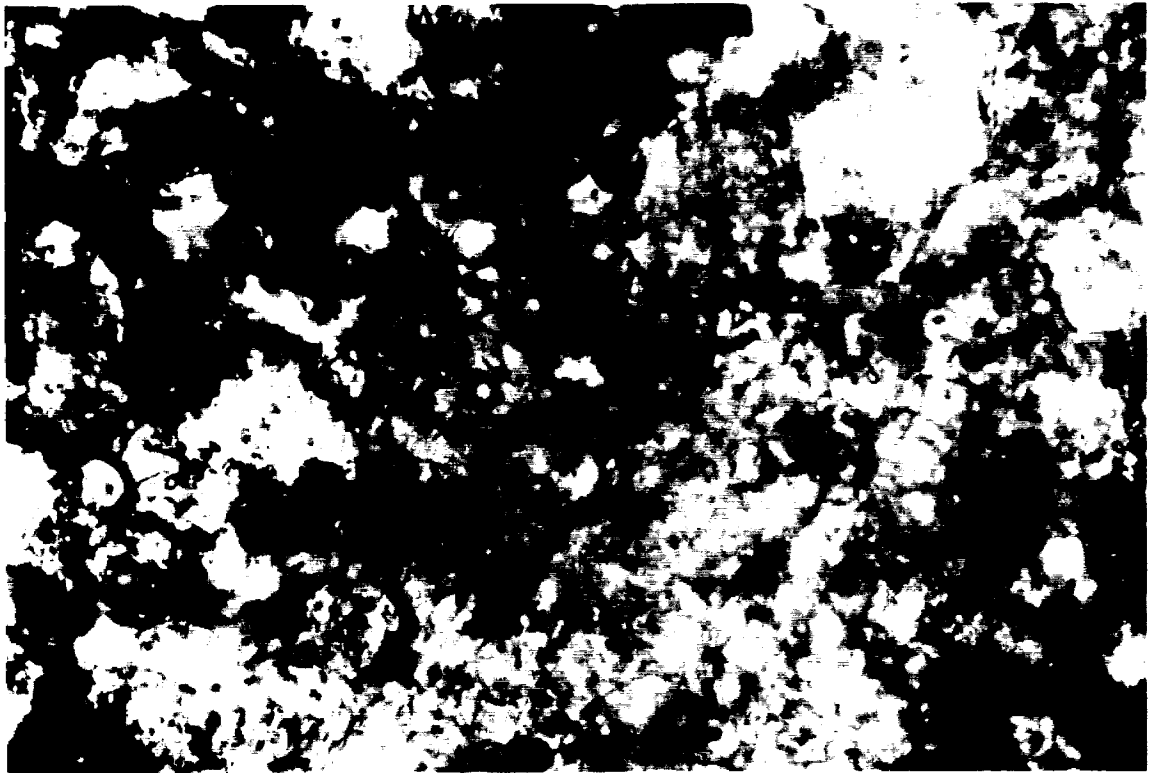
Petrographic Description:

Very fine-grained, matrix supported sediment, consisting predominantly of quartz, albite and epidote. It also contains inclusions of fine-grained, sericitized rock fragments. The rock is extensively epidotized, somewhat sericitized and altered by carbonate. Minor albitization. Some pyrite grains are partly replaced by hematite.

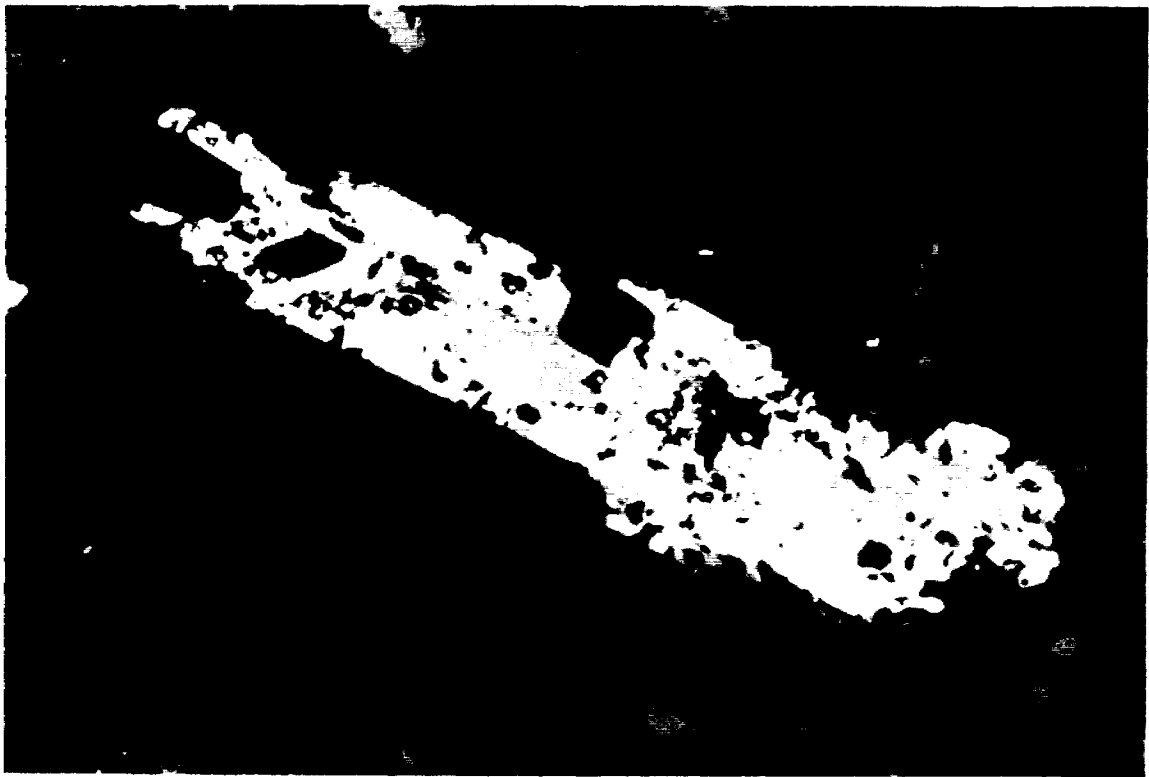
Mineral:	Vol.%	Description
Quartz	70	Equigranular, subrounded to angular, some grains have uneven, embayed grain boundaries, suggesting disequilibrium, whereas others have granoblastic texture. The granoblastic texture is believed to be a relict texture prior to epidotization, silicification and carbonate alteration. The matrix is made up of very fine-grained, mortar-like intergrowth of quartz and epidote.
Epidote	15	Epidote occurs in very fine-grained veinlets and is interstitial to quartz and albite. The presence of veins suggests that calcium has been introduced to the rock from an outside source.
Albite	10	Some albite are small, detrital grains. Minor chessboard albite forms at the expense of quartz, indicating albitization.
Carbonate	5	Carbonate occurs as veins, selvage on fine-grained rock fragments and as small aggregates. They represent a late alteration and overprint fine-grained epidote.
Sericite	<2	Interstitial to quartz and albite and it represents an earlier alteration than epidote or carbonate.
Rutile	1	Fine-grained rutile is dispersed throughout the rock
Pyrite	1	Pyrite is partly altered to hematite, or it is overgrown by hematite rim.
Hematite	tr	Occurs as alteration product of pyrite or as rim on pyrite.



5115: Granular epidote (pinkish-tan) interstitial to quartz (white-grey). Field: 1 mm. Crossed polars.



5115: Granular epidote (high relief) included in carbonate vein (tan color). Field: 1 mm. Crossed polars.



5115: Pyrite (tan) is replaced by hematite (grey). Field: 0.7 mm. Reflected light.

JOB # 15800

Specimen Number: 5116

Name: Sandstone

Hand Specimen Description: Siliceous, medium to fine-grained, light grey sandstone with minor pyrite.

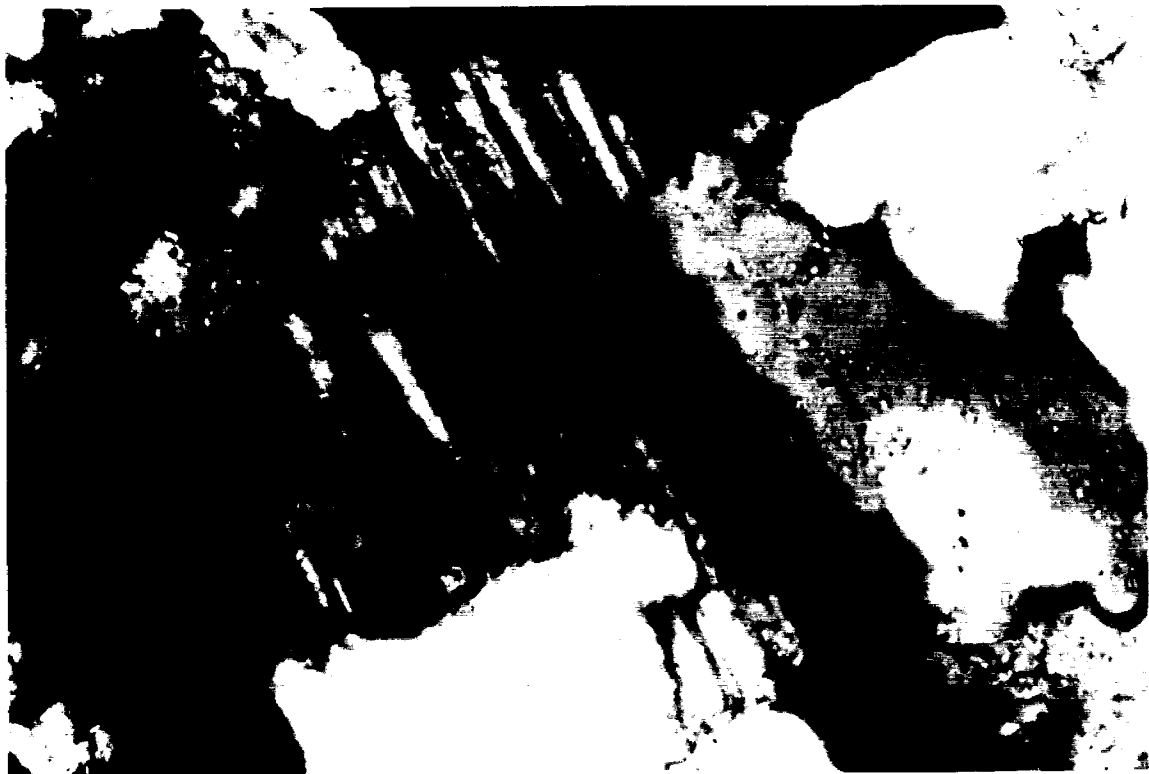
Petrographic Description:

Medium-grained, inequigranular quartzose sandstone, partly matrix supported. Partial recrystallization of the rock gave rise to embayed, ragged, uneven grain boundaries at the expense of relict granoblastic texture. Albitization is evident from partial replacement of quartz by chessboard albite. Epidote, carbonate, minor sericite and biotite are alteration minerals. Pyrite is overgrown by hematite rims and are partly replaced by hematite.

Mineral:	Vol.%	Description
Quartz	70	Quartz occurs as veins, clasts and as matrix. They generally are inequigranular, ranging in size from 0.5 to several mm. Grain boundaries are mostly embayed, uneven and individual grains have undulose extinction. Relict granoblastic texture suggests at least partial recrystallization of the rock. Quartz veins indicate silicification. Some grains are interlocking with detrital albite and some are partly replaced by chessboard albite.
Albite	15	Albite occurs as anhedral, relict grains and as chessboard albite, partly replacing quartz. They range in size from <0.5 to 2 mm and relict grains have undulose extinction.
Epidote	5	Fine-grained epidote aggregates are interstitial to quartz and albite. They occur in aggregates and include some sericite.
Carbonate	tr	Small aggregates are interstitial to quartz.
Sericite	2	Interstitial to quartz and albite and represents an early alteration episode.
Chlorite	tr	Minor, pleochroic green chlorite occurs as replacement after epidote.
Pyrite	2	Spectacular hematitization of pyrite (as replacement and rim on pyrite).



5116: Quartz replaced by albite. Field: 1 mm. Crossed polars.



5116: Quartz replaced by albite. Field: 1 mm. Crossed polars.

JOB # 15800

Specimen Number: 5117

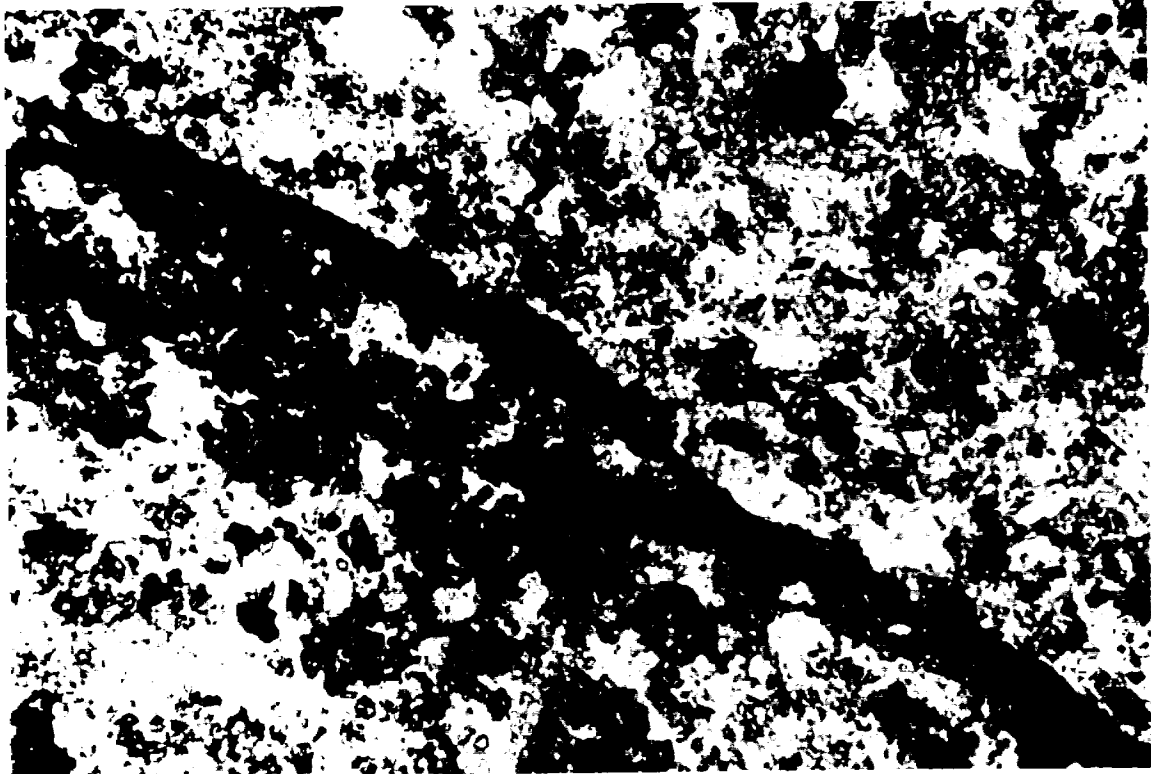
Name: Sediment

Hand Specimen Description: Fine-grained, massive, medium grey rock.

Petrographic Description:

Very fine-grained rock with granoblastic texture. It consists predominantly of quartz, albite and epidote. Minor albitization is apparent from partial replacement of quartz by chessboard albite. Epidote veinlets cross-cut the rock and overprints earlier sericitic alteration. Epidote appears to post-date carbonate and epidote is partly replaced by minor chlorite.

Mineral:	Vol. %	Description
Quartz	50	Very fine-grained (0.5 mm) with uneven, embayed grain boundaries. The grains are anhedral, they have undulose extinction, suggesting strain.
Albite	10	Difficult to estimate its concentration, as most are untwinned relict albite. Minor albitization is evident from partial replacement of quartz by chessboard albite although this is not easy to recognize due to the small grain size.
Epidote	35	Fine-grained epidote occurs in veins and as fine-grained, globular, interstitial aggregates, as well as pods. Carbonate and sericite are both replaced by epidote, suggesting that calcium metasomatism post-dated both minerals.
Sericite	5	Fine-grained sericite is interstitial to quartz and albite. It is partly replaced by epidote.
Carbonate	tr	Occurs as small aggregates.
Chlorite	tr	Minor chlorite partly replaces epidote and is interstitial between quartz and albite.
Rutile	tr	Fine-grained rutile is dispersed throughout the rock.
Pyrite	1	Pyrite is rimmed by hematite.



5117: Epidote (dark) vein cross-cuts rock. Field: 2.3 mm. Ppl.

Report of Work Conducted After Recording Claim

Transaction Number
W 9276 00055

Mining Act



900

Personal information collected on this form is obtained under the authority of the Mining Act. This collection should be directed to the Provincial Manager, Mining Lands, Ministry of Northern Development and Mines, Sudbury, Ontario, P3E 6A5, telephone (705) 670-7264.

- Instructions:**
- Please type or print and submit in duplicate.
 - Refer to the Mining Act and Regulations for requirements of filing assessment work or consult the Mining Recorder.
 - A separate copy of this form must be completed for each Work Group.
 - Technical reports and maps must accompany this form in duplicate.
 - A sketch, showing the claims the work is assigned to, must accompany this form.

Recorded Holder(s) Teck Corporation		Client No. 200408
Address Suite 7000, 1 First Canadian Place, Toronto, Ontario M5X 1G9		Telephone No. 416-862-7102
Mining Division Sudbury	Township/Area Sheppard & McCarthy Twps	M or G Plan No. G5104 & G4082
Dates Work Performed From September 1, 1992	To: October 16, 1992	

Work Performed (Check One Work Group Only)

Work Group	Type
Geotechnical Survey	
Physical Work, Including Drilling	
Rehabilitation	
Other Authorized Work	Microscopic Studies - Thin Sections
Assays	
Assignment from Reserve	

RECEIVED

NOV 24 1992

MINING LANDS BRANCH

Total Assessment Work Claimed on the Attached Statement of Costs \$ 1200.00

Note: The Minister may reject for assessment work credit all or part of the assessment work submitted if the recorded holder cannot verify expenditures claimed in the statement of costs within 30 days of a request for verification.

Persons and Survey Company Who Performed the Work (Give Name and Address of Author of Report)

Name	Address
Dr. Eva Schandl	Dept. of Geology, University of Toronto, 100 Queens Park Toronto, Ontario M5S 2S6

(attach a schedule if necessary)

Certification of Beneficial Interest * See Note No. 1 on reverse side

I certify that at the time the work was performed, the claims covered in this work report were recorded in the current holder's name or held under a beneficial interest by the current recorded holder.	Date Nov 13, 92	Recorded Holder or Agent (Signature) <i>Alex Christy</i>
--	---------------------------	---

Certification of Work Report

I certify that I have a personal knowledge of the facts set forth in this Work report, having performed the work or witnessed same during and/or after its completion and annexed report is true.

Name and Address of Person Certifying A. Christopher, 19 Legault Street, North Bay, Ontario P1B 8Z4		
Telephone No. 705-474-5500	Date Nov 13, 92	Certified By (Signature) <i>Alex Christy</i>

For Office Use Only

Total value Cr. Recorded 1200	Date Recorded November 19/92	Mining Recorder <i>A. Christy</i>	Received Stamp 9
	Deemed Approval Date February 18/93	Date Approved	
	Date Notice for Amendments Sent		



Ministry of
Northern Development
and Mines
Ministère du
Développement du Nord
et des mines

**Statement of Costs
for Assessment Credit**

**État des coûts aux fins
du crédit d'évaluation**

Mining Act/Loi sur les mines

Transaction No./N° de transaction

15800

2 14809

Personal information collected on this form is obtained under the authority of the Mining Act. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule sont recueillis en vertu de la Loi sur les mines et serviront à tenir à jour un registre des concessions minières. Adresser toute question sur la collecte de ces renseignements au chef provincial des terrains miniers, ministère du Développement du Nord et des Mines, 159, rue Cedar, 4^e étage, Sudbury (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour Main-d'oeuvre		
	Field Supervision Supervision sur le terrain		
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert- conseil	Type		
	Thin Sections	1200.00	
			1200.00
Supplies Used Fournitures utilisées	Type		
Equipment Rental Location de matériel	Type		
RECEIVED			
NOV 24 1992			
MINING LANDS BRANCH			
Total Direct Costs Total des coûts directs			1200.00

2. Indirect Costs/Coûts indirects

** Note: When claiming Rehabilitation work indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total global
Transportation Transport	Type		
Food and Lodging Nourriture et hébergement			
Mobilization and Demobilization Mobilisation et démobilisation			
Sub Total of Indirect Costs Total partiel des coûts indirects			
Amount Allowable (not greater than 20% of Direct Costs) Montant admissible (n'excédant pas 20 % des coûts directs)			
Total Value of Assessment Credit (Total of Direct and Allowable Indirect costs)		Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)	1200.00

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note : Le titulaire enregistré sera tenu de vérifier les dépenses demandées dans le présent état des coûts dans les 30 jours suivant une demande à cet effet. Si la vérification n'est pas effectuée, le ministre peut rejeter tout ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.
2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit	Total Assessment Claimed
x 0.50 =	

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement sont remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluation.
2. Les travaux déposés trois, quatre ou cinq ans après leur achèvement sont remboursés à 50 % de la valeur totale du crédit d'évaluation susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation	Évaluation totale demandée
x 0,50 =	

Certification Verifying Statement of Costs

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that Senior Project Geologist I am authorized
(Recorded Holder Agent, Position in Company)

to make this certification

Attestation de l'état des coûts

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que ces dépenses ont été engagées pour effectuer les travaux d'évaluation sur les terrains indiqués dans la formule de rapport de travail ci-joint.

Et qu'à titre de _____ je suis autorisé
(titulaire enregistré, représentant, poste occupé dans la compagnie)

à faire cette attestation.

Signature	Date
	Nov 10, 92



Ontario

Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Mining Lands Branch
Geoscience Approvals Section
933 Ramsey Lake Road
6th Floor
Sudbury, Ontario
P3E 6B5

Telephone: (705) 670-5853
Fax: (705) 670-5863

January 6, 1993

Our File: 2.14809
Transaction #W9270.00055

Mining Recorder
Ministry of Northern Development
and Mines
159 Cedar Street
2nd Floor
Sudbury, Ontario
P3E 6A5

Dear Sir/Madam:

Subject: APPROVAL OF ASSESSMENT WORK CREDITS ON MINING CLAIMS
S.1146870 ET AL. IN McCARTHY TOWNSHIP

The assessment work credits for the Petrographic studies filed under Section 18 of the Mining Act Regulations have been approved.

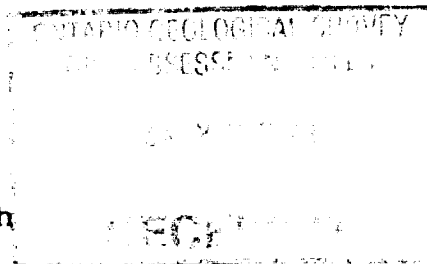
The approval date is January 5, 1993.

Please indicate this approval on your records.

If you have any questions regarding this correspondence, please contact Ted Anderson of the Mining Lands Branch at (705) 670-5856.

Yours sincerely,

Ron C. Gashinski
Senior Manager, Mining Lands Branch
Mines and Minerals Division



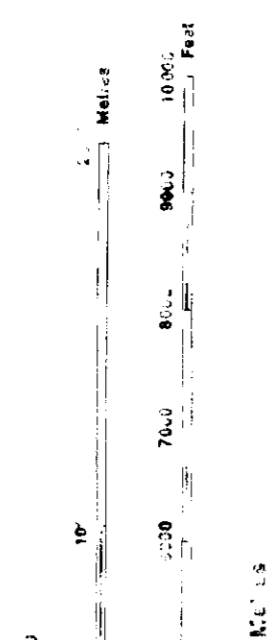
TAA
TAA/jl
Enclosures:

cc: Resident Geologist
Sudbury, Ontario

✓ Assessment Files Library
Toronto, Ontario

INDEX TO LAND DISPOSITION

PLAN
G-4082
TOWNSHIP
MCCARTHY



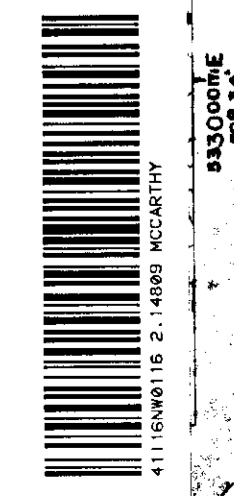
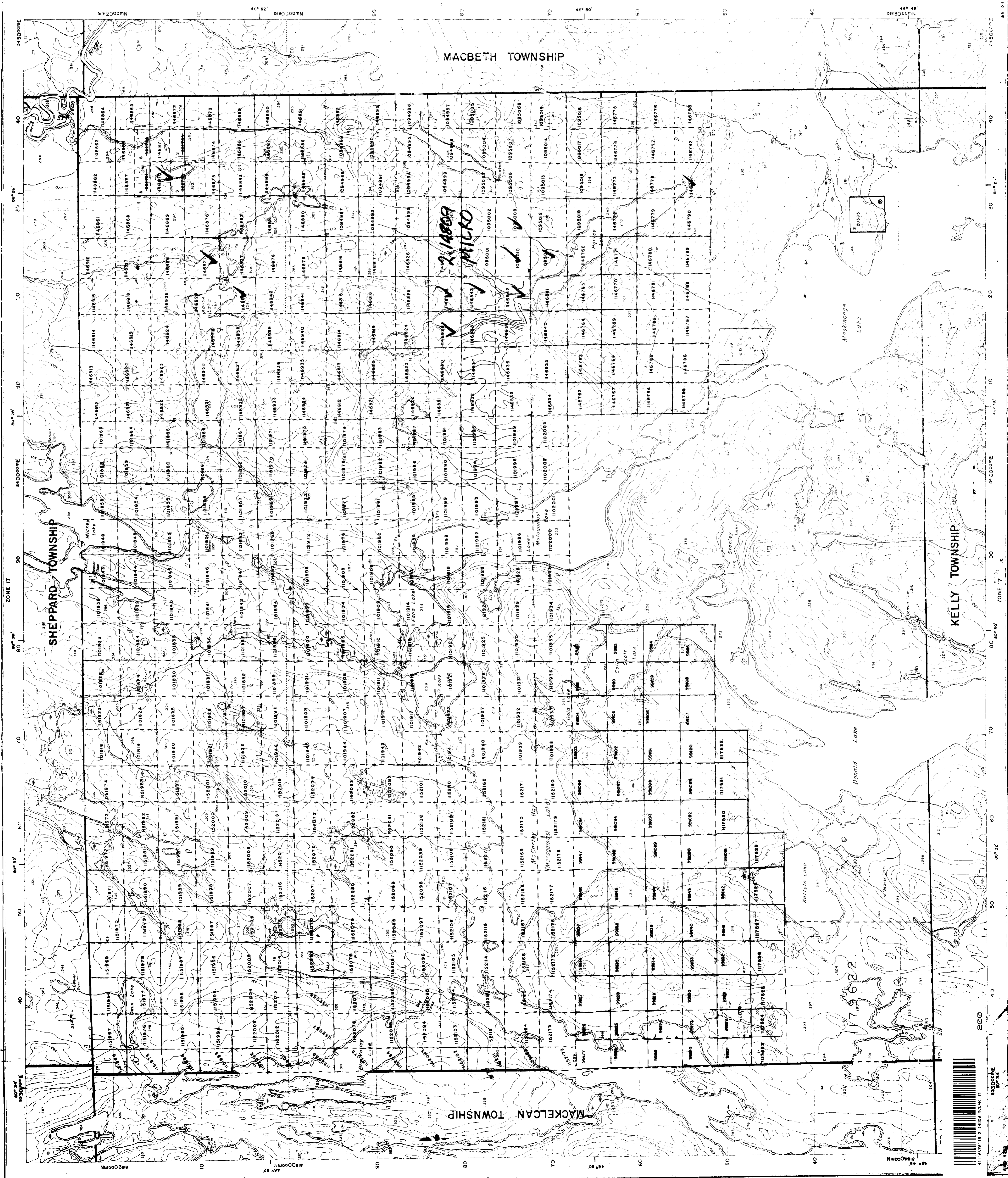
AREAS WITH JURISDICTION FROM DISPOSITION
MRO - Mining Rights Only
SRO - Surface Rights Only
M - Mining and Surface Rights

SUMMARY

Description	Date	Disposition	File
Blank			
...

DATE OF ISSUE
MAY 2 1982
SUDBURY
MINING RECORDERS OFFICE

THE INFORMATION THAT HAS BEEN COMPILED FROM VARIOUS SOURCES AND ACCURACY IS NOT GUARANTEED. CLAIMS SHOULD CONSIDER THE RECORDS OF THE MINING RECORDERS OFFICE OF THE MINISTRY OF NORTHERN DEVELOPMENT AND MINES FOR A COMPLETE LIST OF CLAIMS ON THE STATUS OF THE LANDS SHOWN HEREON



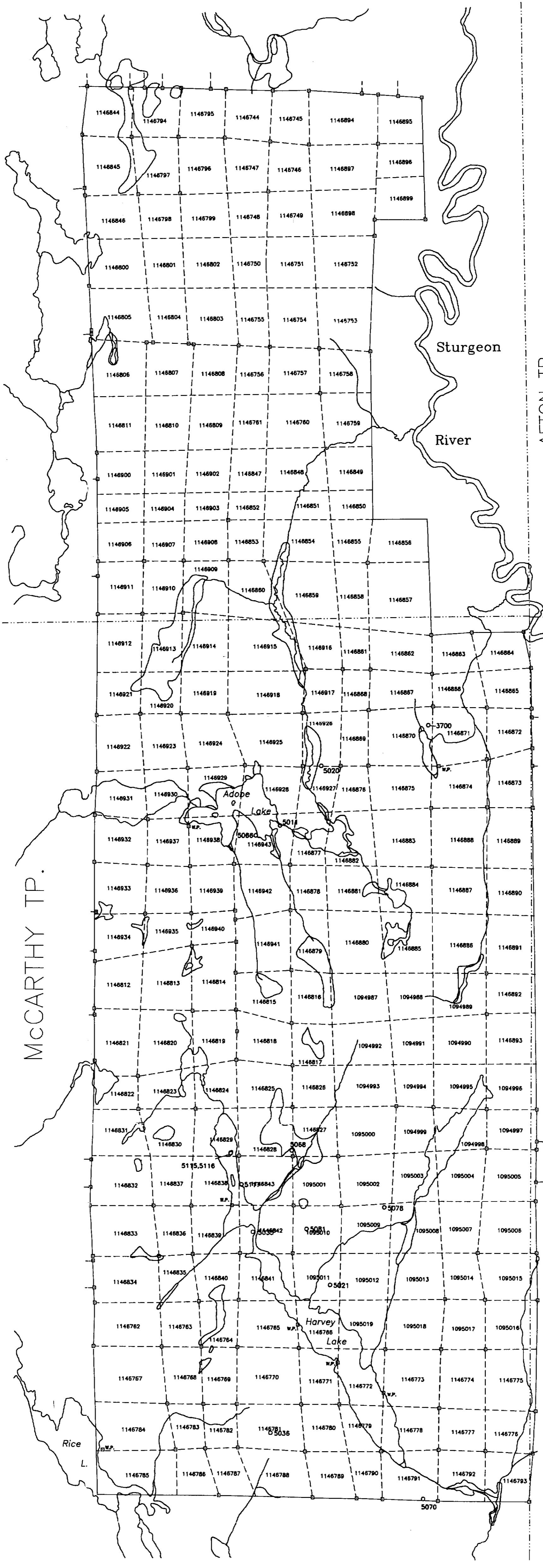
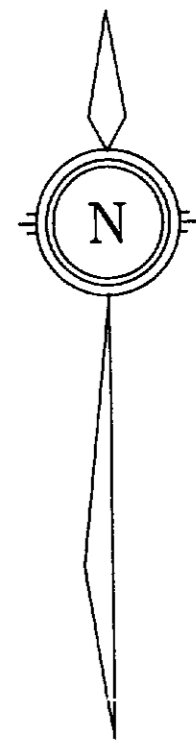
411000118 2-4800 MCCARTHY

SHEPPARD TP.

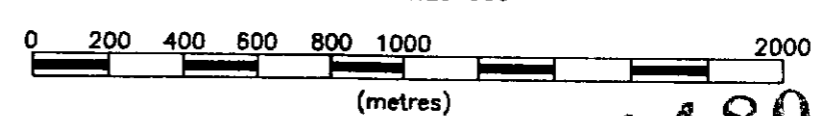
AFTON TP.

MCCARTHY TP.

MACBETH TP.



Scale 1:20 000



2.14809

TECK EXPLORATION LTD.

SAMPLE LOCATIONS

EMERALD LAKE PROPERTY

SHEPPARD - MCCARTHY TOWNSHIPS

PROVINCE OF ONTARIO

N.T.S:	JOB NO:	DATE:	DWG:
041116	15800	OCT. 92	6857

