STRUCTURAL and STRATIGRAPHIC SETTING of STRATIFORM Pb-Zn-Ba and BARITE MINERALISATION NORTHEASTERN BRITISH COLUMBIA

Omineca Mining District

Cirque Claims
NTS: 94F/06,11
Latitude: 57o31'N
Longitude: 124o50'W

Fluke Claims
NTS: 94F/07
Latitude: 57o24'N
Longitude: 124o54'W

by

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for

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submitted

February 6, 1990

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INTRODUCTION

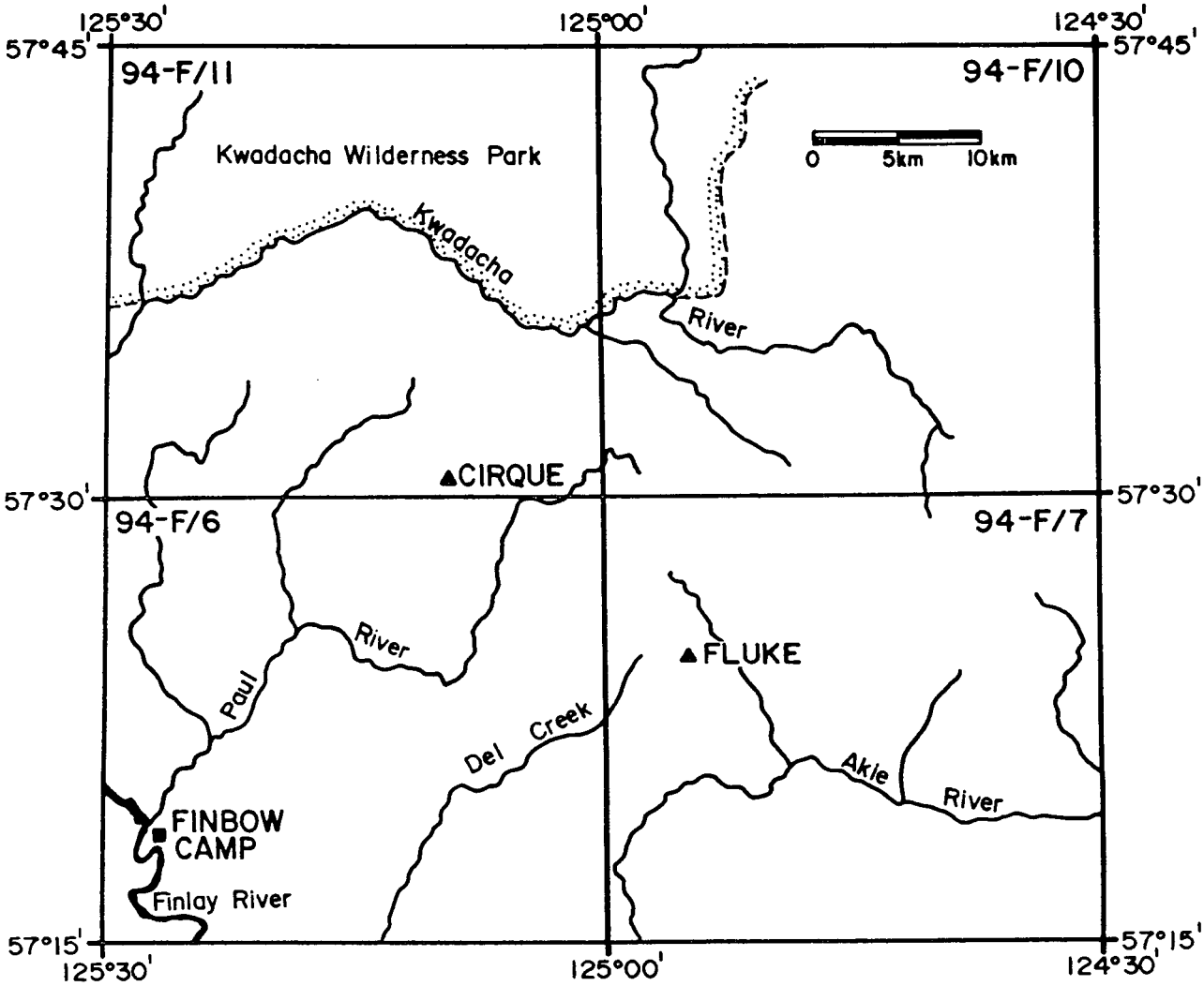
The Cirque and Fluke Claims occur within the Akie District of northeastern British Columbia (Fig. 1). The Cirque Ba-Zn-Pb-Ag deposit contains estimated reserves of 32.2 million tonnes with average grades of 10.0% Pb+Zn and 47.7 grams/tonne Ag (Pigage, 1987) and is located near the headwaters of the Paul River. The Fluke Claims cover a laminated pyrite showing associated with minor Pb-Zn mineralisation at the head waters of the Fluke Creek and baritic Pb-Zn mineralisation at the head of Pook Creek.

The Cirque and Fluke mineralisation is hosted in black siliciclastics of the Devonian to Mississippian Earn Group (Gordey et al., 1982; Gordey et al., 1987), which is associated with stratiform barite and barite-sulphide throughout the Kechika Trough and Selwyn Basin (Fig. 2). The Akie District forms part of a 180km northwest trending belt, which includes the Gataga District (Fig. 3), of complexly folded, thrust and penetratively cleaved Earn Group strata.

Much of the Earn Group stratigraphy in the Kechika Trough is based largely on lithostratigraphic correlation as macrofossils are generally absent. Recently conodonts have become increasingly important as a means of biostratigraphic correlation both within Kechika Trough and Selwyn Basin (Dawson and Orchard, 1982; Orchard, 1986; Irwin and Orchard, 1989; Insley, 1990). The conodonts are mainly associated with nodular and lenticular limestone which occurs within the Earn Group black clastics and mineralisation. The limestones usually contain abundant conodont faunas which often allow correlation to be refined down to conodont zone level i.e. less than 1 million years.

During August, 1989, field work was carried out on the Cirque and Fluke Claims to assess the stratigraphic and structural setting of the mineralisation. Limestone samples for conodont analysis were shipped to the Geological Survey of Canada in Vancouver for identification by Dr. M Orchard. Samples were collected mainly from mineralised sections in the Earn Group to enable biostratigraphic correlation of the mineralisation between Cirque and Fluke. Limestone in the Silurian siltstone unit of the Road River Group was also sampled to assess the nature of the sub-Earn Group unconformity.

Conodont samples from Cirque and Fluke may provide a useful tool



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CIRQUE & FLUKE CLAIMS LOCATION MAP

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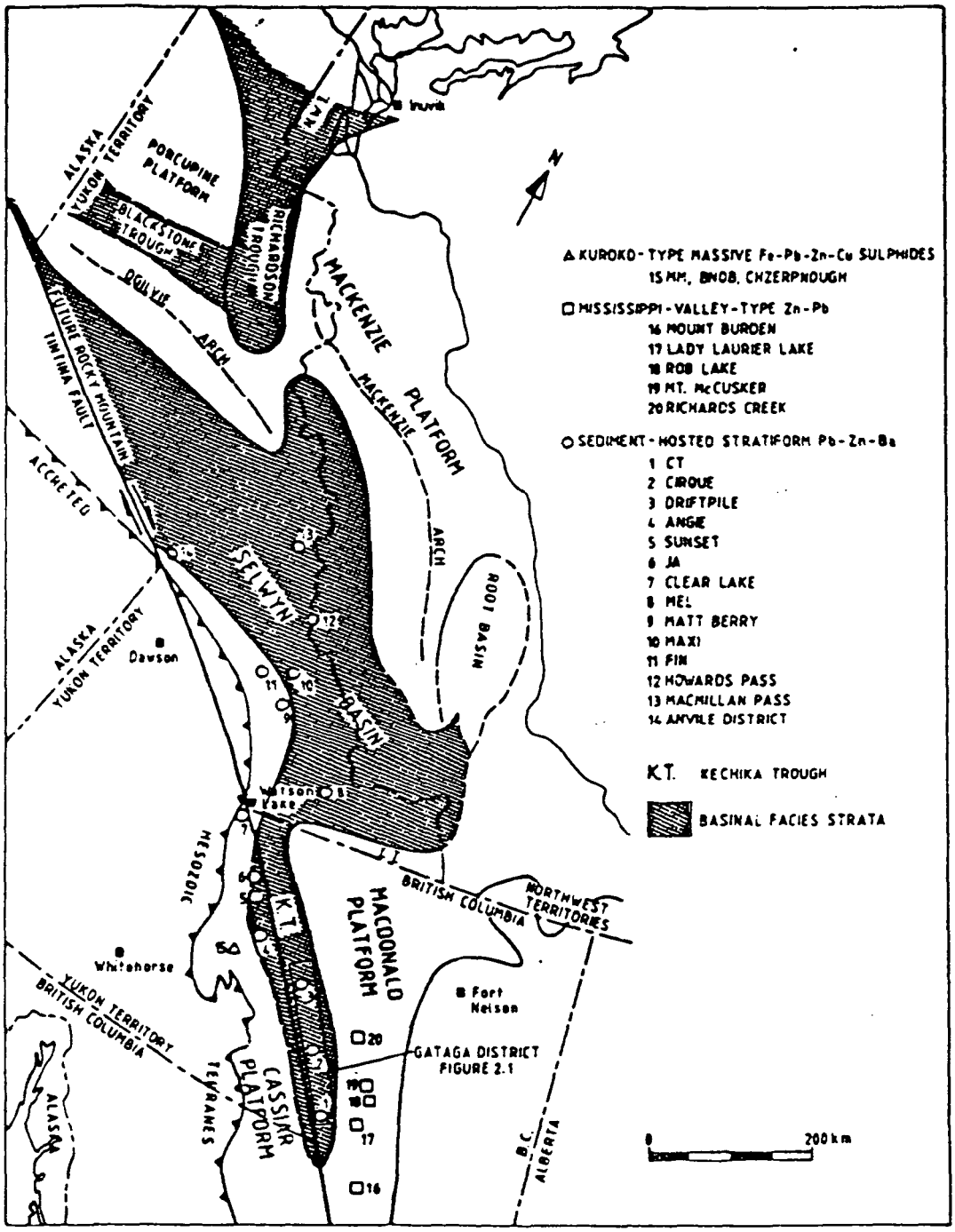
Drawing No. AK-AK-90-001	Figure No. 1



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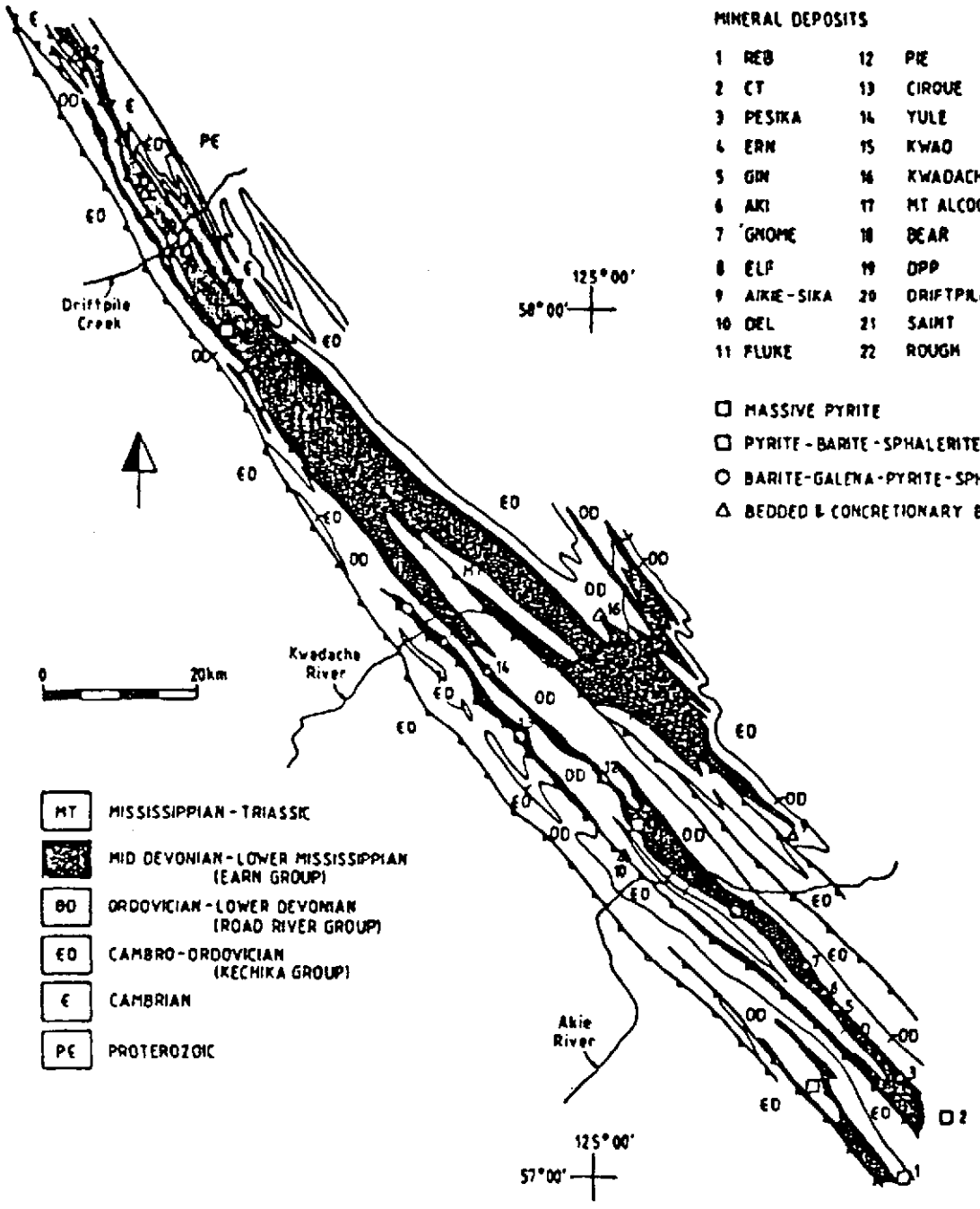
TECTONIC UNITS
KECHIKA TROUGH & SELWYN BASIN

Date: 90/06/20	Drawn by: H.D.S.
Drawing No. AK-AK-90-002	Figure No. 2



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EARN GROUP DISTRIBUTION MAP STRATA AND MINERALIZATION GATAGA-AKIE RIVER DISTRICT

Date: 90/06/21	Drawn by: H.D.S.
Drawing No. AK-AK-90-003	Figure No. 3

with which to identify key stratigraphic horizons associated with stratiform mineralisation and targets for future exploration. They may also enable more accurate correlation with similar mineralisation in the Gataga area and MacMillan Pass and Howards Pass areas of the Selwyn Basin. In addition conodonts can be used for estimating the conditions of deformation which have important implications for remobilisation of the ore components.

REGIONAL STRATIGRAPHY

Within the Akie District strata range in age from Cambrian to Triassic (Cecile and Norford, 1979; Fritz, 1979; Gabrielse, 1981; Jefferson et al., 1983; MacIntyre, 1983; Pigage, 1988). The Cambro-Ordovician through Silurian strata include shelf to off-shelf fine grained clastics, carbonate, chert and mafic volcanics deposited within a northwest trending basin referred to as the Kechika Trough (Fig. 2). During this time the eastern basin-platform transition was situated at least 25km from Cirque and 15km from Fluke (Cecile and Norford, 1979). Devonian to Mississippian strata is associated with dominantly fine grained black siliciclastics deposited within sediment starved extensional basins and host widespread stratiform barite and barite sulphide deposits (Carne and Cathro, 1982; MacIntyre, 1983; Gordey et al., 1987). These sediments are associated with abrupt facies and thickness changes associated with 7-10km wide shale basins separated by relatively narrow northwest trending shallow water carbonate reefs. Devonian-Mississippian shale is overlain by chert, dolomitic siltstone and limestone containing Early Triassic shelly fauna (Gabrielse, 1977).

REGIONAL STRUCTURE

The Akie District of the Kechika Trough forms part of the Late Jurassic to Cretaceous Columbian-Laramide northeast verging fold and thrust belt of the western Rocky Mountains. This compressional deformation is associated with sub-greenschist facies conditions and development of northeast verging folds, imbricate thrusts and penetrative cleavage. The geometries of the fold and thrust belt have been influenced by the Mid-Late Devonian half-graben extensional architectures and by the geometries of the syn-rift sediment packages of the Earn Group. Consequently the thrust belt is characterised by thrust bound packages each with a distinctive

stratigraphy and sedimentology that can be related to individual extensional half-grabens. Structures related to the contraction of half-grabens in the Gataga area have been summarised by McClay et al., (1989) as:

(i) Reactivation of extensional graben bounding faults.
(ii) Rotation and reutilisation of previous extensional faults by thrust faults.
(iii) Pop-up structures and 'triangle' zones related to the pinning of thrust faults by the buttressing effect of extensional faults and adjacent competent half-graben sediment infill.
(iii) Out-of-half-graben thrust faults, imbrication and intense folding of synrift sediments as a result of space problems in the half-graben as it is shortened.
(iv) Foreland propagating thrust faults that locally cut down stratigraphic section in the direction of propagation e.g. when a relatively flat trajectory thrust cuts through strata previously tilted on Mid-Late Devonian extensional faults.

Recognition of these structures in the Cirque and Fluke areas may assist in the understanding of the Mid-Late Devonian extensional basin geometries and the influence of extensional faults on sedimentation and mineralisation.

SUMMARY OF EARN GROUP STRATIGRAPHY

In the Akie District the Earn Group is informally divided into the Akie, Gunsteel and Warneford formations (Jefferson et al,. 1983). The base of the Earn Group is diachronous and locally interdigitated with Paul River shale and fossiliferous limestone from the Kwadacha reef indicating an Early to Mid Devonian age. Additionally the ammonite *Ponticeras* has been found below the Cirque mineralisation suggesting that mineralisation is at least Frasnian in age. The top of the Earn Group is generally considered as between Early-Late Mississippian. The stratigraphy of the Earn Group in the Cirque and Fluke areas is summerised in figure 4.

Gunsteel Formation

The Gunsteel Formation forms the lower part of the Earn Group and hosts the Cirque stratiform mineralisation. It contains all carbonaceous, siliceous, fine grained rocks which fall into two distinct lithofacies referred to as ribbon banded porcellanite (DG_C)

LEGEND FOR STRATIGRAPHIC SECTIONS

EARN GROUP

Conundrum Siltstone (DCS)

Poorly bedded, soft, variably calcareous, spckled siltstone.

Warneford Formation (DMW)

Sandstone, conglomerate and minor shale (DMWR (Cirque) and DMWQ (Fluke)).

Intraformational shale chip breccia (DMWB).

Akie Formation (DA)

Finely laminated, soft shale with phyllitic sheen (DAP)

Gunsteel Formation (DG)

Black porcellanite with minor siliceous shale (DGC (Cirque) and DGCH (Fluke)).

Massive to thin bedded, non-calcareous, black siliceous shale containing abundant nodules - 'pregnant' shale (DGPR)..

Stratiform mineralisation:sphalerite and laminated pyrite (Fluke). Barite-sphalerite-galena-pyrite mineralisation (Cirque).

ROAD RIVER GROUP

'Silurian' siltstone unit (Sss)

Grey and buff weathering crinkle laminated limestone
Buff-brown weathering dolomitic siltstone and mottled bioturbated mudstones and silty mudstone.

'Silurian' Limestone unit (SRL)

Grey, rhythmic bedded, flaggy limestone with thin shale partings.

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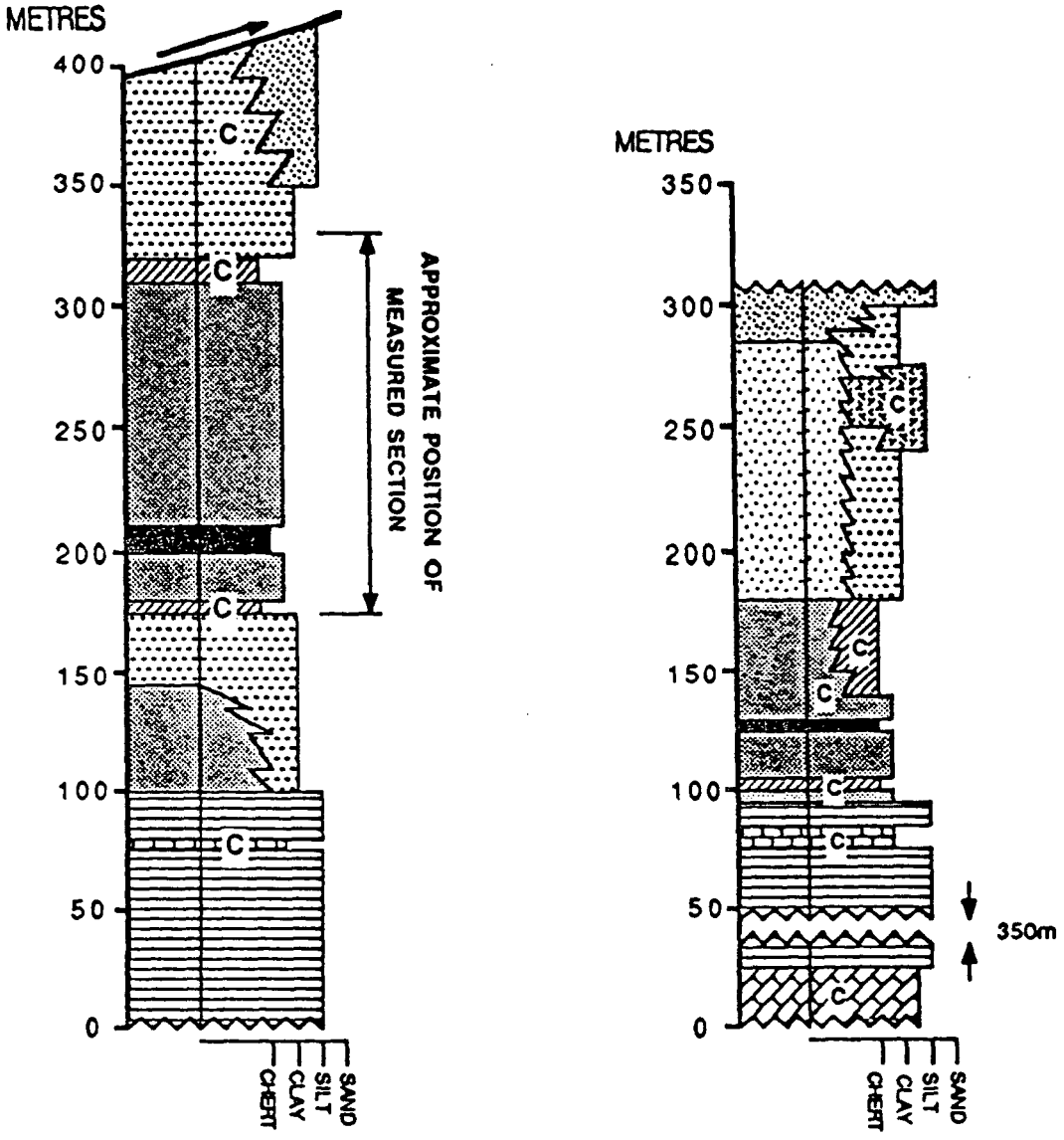
STRATIGRAPHIC SECTIONS LEGEND
for (Figure 4)

Date: 90/06/21	Drawn by: H.D.S.
Drawing No. AK-AK-90-005	Figure No. 4a

GOSSAN THRUST SHEET, CIRQUE

FLUKE CLAIMS
(COMPOSITE SECTION)



C- Relative stratigraphic position of conodont samples

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STRATIGRAPHIC SECTIONS SHOWING
CONODONT SAMPLE LOCATIONS
CIRQUE & FLUKE CLAIMS

Date: 90/06/21	Drawn by: H.D.S.
Drawing No. AK-AK-90-004	Figure No. 4

(DG_C) and pregnant shale (DG_{PR}). The Gunsteel formation generally thins to the northeast and southwest of the Cirque mineralisation and thickness varies from 0-200m. The formation is correlated with the Lower Earn Group in MacMillan Pass (Gordey et al., 1982).

Akie Formation

This formation contains all non-siliceous, soft, shales of the Earn Group. It contains four main lithofacies consisting of phyllitic shale (DA_P), silty shale (DA_{SS}), siltstone (DA_S) and pin-stripe shale (DA_{PS}). The Akie formation is distinctly rusty and recessive weathering and is correlated to the Upper Earn Group in MacMillan Pass (Gordey et al., 1982).

Warneford Formation

The Warneford formation contains all the coarse grained Earn Group rocks including sandstone and conglomerate. It is divided into two main lithofacies consisting of interbedded shale with quartzose siltstone and fine grained sandstone (DM_{WR}) and lenticular bodies of chert pebble conglomerate and coarse grained sandstone (DMW_{BX}). The formation generally overlies the Gunsteel formation and is often interbedded with Akie shales. The Warneford formation has variable thickness from 0-150m. The Warneford formation is correlated with similar rocks in the Gataga area and in MacMillan Pass (Gordey et al., 1982).

CIRQUE CLAIM GROUP

N.T.S. 94-F-06, 11

Latitude: 57°31' N

Longitude: 124°50' W

Summary of field work during 8.8.89 to 22.8.89

Earn Group Stratigraphy

The stratigraphy of the Lower Earn Group within the Gossan thrust panel at Cirque is summarised in figure 4a. Upper Devonian stratiform mineralisation occurs in the 'pregnant' shale lithofacies (DG_{PR}) of the Gunsteel Formation. Distinct silver-grey weathering porcellanite (DG_C), occurs at the top and bottom of the 'pregnant' shale lithofacies (Fig. 4a).
The basal contact of the Earn Group with the Silurian siltstone unit is sharp and appears conformable. The Earn Group has been informally divided into three formations:

Gunsteel Formation: The Gunsteel Formation contains two distinct lithofacies referred to as ribbon banded porcellanite and 'pregnant' shale:

The ribbon-banded porcellanite consists 1-8cm beds of microcrystalline carbonaceous chert with minor silt laminae and radiolarian separated by thin carbonaceous partings. The porcellanite units are 1-20m thick and occur at the top and/or base of the Gunsteel Formation and are typically silver-blue weathering. The porcellanite contains blebby barite units up to 3m thick, stratigraphically above and below the Cirque deposits. Barite mineralisation in porcellanite below the Cirque deposits also contains the Frasnian age ammonite *Ponticeras*.

The 'pregnant' shale facies consists of non-calcareous, medium to thick bedded, black, siliceous shale which locally contains disseminated small concretions of pyrite, calcite, chert or barite. The siliceous shale is easily distinguished from the porcellanite by its pale brown to cream weathering. The facies hosts the Cirque stratiform barite-sulphide mineralisation. It also contains thin

laminae of fine grained pyrite. The bulk of the limestone samples collected for conodont analysis were from this lithofacies (Fig. 4a and Table 1).

Akie Formation: This formation consists of grey weathering, non-siliceous, soft, parallel laminated, shale. It is generally variable in thickness which is generally inversely proportional to the Gunsteel Formation. The dominant lithofacies is a rusty brown weathering, homogeneous, poorly bedded, phyllitic shale (DA_p). This shale occasionally contains planar silt laminations which weather to give the rock a distinctive pin-stripe surface (DA_{PS}). Phyllitic shale is also interbedded with siltstone (D_{AS}).

Warneford Formation: Towards the east the Gunsteel and Akie Formations become interbedded with variably calcareous, soft siltstones of the Warneford Formation. The Warneford Formation consists of rusty brown weathering, medium to thick bedded, soft silty shale which contains beds of cross-laminated, quartzose, siltstone and sandstone (DM_{WR}). One concretionary limestone horizon was found and sampled from this formation (LC 14, conodont sample C8, Fig. 5 and Table 1).

Structure

The Cirque Pb-Zn-Ba mineralisation occurs within the Gossan thrust sheet which lies in the footwall to the 'A' thrust duplex containing horses of Ordovician and Silurian siltstone units (Fig. 5). Footwall and hangingwall detachments of the duplex must have propagated as bedding parallel flats within relatively incompetent Ordovician shale and chert and upper part of the Silurian siltstone unit respectively. Individual link thrusts within the duplex are associated with thrust ramps which cut up stratigraphy in the more competent Silurian dolomitic siltstone. The exclusion of relatively incompetent Lower Earn Group strata from the duplex also indicates that structural continuity may not always be present between the Road River and Lower Earn Groups.

In contrast the footwall Earn Group in the Gossan thrust panel is tightly folded, imbricated and contains a penetrative slaty cleavage. Folds are generally northeast verging and fold geometries and scale are closely controlled by lithology, competence and effective bed thickness:

(i) Shale units - contain tight, generally chevron-style folds with strong axial planar cleavage.

(ii) Chert units - bed thickness is generally 2-8cm and folds have chevron to kink-style geometries. Cleavage is usually poorly developed and consists of a close spaced fracture which fans around fold hinges.

(iii) Interbedded chert-shale or sandstone-shale units - typically have chevron style folds formed by flexural slip. Cleavage shows well developed refraction between adjacent competent and incompetent beds. Cleavage has a mean orientation axial planar to the folds.

The three dominant phases of deformation described by Jefferson et al., (1983), McClay (1983) and Pigage (1987), were identified at Cirque. In addition, occasional moderately steep plunges of bedding/slaty cleavage intersection lineations L1 (of Jefferson et al., 1983), may indicate an earlier phase of folding prior to the accepted phase 1 deformation.

Phase 1 (?): These structures represent pre-phase 1 structures of Jefferson et al., (1983). No phase 1 fold hinges were recognised in outcrop although their location can be inferred from abrupt changes in So/S2 intersection lineations. F2 fold axes and L2 intersection lineations are either flat or shallow plunging over most of the Cirque Claims suggesting that phase 1 structures are on the scale of a few metres and only locally developed in the Lower Earn Group strata.

Phase 2: These structures correlate with the phase 1 structures of Jefferson et al., (1983). This phase is responsible for the northwest trending structural grain of the area associated with the development of tight northeast verging folds and thrust faults and a penetrative pressure solution cleavage (S2). Fold axes and L2 (bedding-S2 cleavage) intersection lineations generally have horizontal or shallow plunges.

Within the Cirque Claims a marked contrast in structural style occurs between the duplex of Road River Group and the underlying folded and imbricated sequence of Lower Earn and Road River Groups as described above.

Phase 3: This phase is associated with the local development of small scale crenulation folds and cleavage (S3). The crenulation cleavage is associated with open-tight, relatively upright folds found to the east of the Cirque Claims. This phase is equivalent to phase 2 of Jefferson et al., (1983).

Phase 4: This phase of essentially brittle deformation (phase 3 of Jefferson et al., 1983) is associated with the development of vertical to steeply dipping extensional and minor strike-slip faults which cross-cut and off-set all previous structures. The most dominant faults generally trend north-south and northwest-southeast with displacements up to 50m. Fault planes usually contain fault gouge and quartz-calcite veining.

Mineralisation

The Cirque deposit consists of barite-sphalerite-galena-pyrite hosted within the 'pregnant' shale facies of the Gunsteel Formation. It is associated with lateral and vertical mineral and chemical zonation. The distal equivalent 'pregnant' shale is generally associated with siliceous shale or chert containing abundant small barite concretions which form blebby to discontinuous laminated barite bands and beds. On the Cirque Claims baritic 'pregnant' shale is associated with nodular limestone (Fig. 4a) which was sampled for conodont analysis.
Jefferson et al., (1983) and Pigage (1987) have divided the mineralisation into three main facies:
(i) Baritic facies - fine-medium grained, white-grey barite containing <40% sulphides. The barite contains diffuse or discontinuous laminations 1-5mm thick. Recrystallised coarsely crystalline barite also occurs within the more massive barite. The barite contains occasional small amounts of fine grained pyrite and interstitial remobilised fine grained sphalerite and galena often infilling fractures.

(ii) Pyrite facies - contains 40-100% pyrite with lesser sphalerite and galena associated with minor barite, quartz and limestone.

(iii) Laminated pyrite facies - consists of 0.1-20cm thick beds of fine grained framboidal and colloform pyrite within siliceous argillite.

Conodont samples

A total of 18 samples of limestone were collected from the Cirque area (Fig. 5 and Table 1), for conodont analysis. Samples were primarily collected from the Gossan thrust sheet which contains the Cirque mineralisation and laterally extensive concretionary barren barite. Samples generally consist of boudinaged, coarsely crystalline, black limestone often containing relict parallel lamination (Fig. 6).

The majority of the limestone appears to be restricted to the 'pregnant' shale facies particularly in more baritic sections. In total 12 samples were collected this lithofacies. The 'pregnant' shale contains at least two concretionary barite units which may represent more distal equivalents of the Cirque deposits exposed at localities LC12/13 and LC18/19 (Fig. 5). The barite is locally thin bedded and strongly sheared and/or occurs as densely spaced small concretions within siliceous shale. Smaller pieces of fragmented and sheared limestone are also occasionally found in the laminated barite which forms the extensive kill zone in the Cirque valley.

Other samples have been collected from the $DG_{TH/PR}$ unit in the hangingwall of the 'pregnant' shale facies and one sample from the DM_{WRT} unit of the Warneford Formation. Three samples of limestone were also taken from the 'Silurian' siltstone unit (Table 1).

On the southeastern ridge of the Cirque (locality LC12/13, Fig. 5), two baritic units occur within the pregnant shale facies below the Road River duplex (Fig. 7). The barite units contain small barite concretions which are often coalesced to form discontinuous laminations. The barite appears to correlate with the Cirque mineralisation proper on the northern side of the cirque. A measured section was made of the exposure of pregnant shale on the ridge (Fig. 8) and limestone samples collected from the baritic units.

The lower unit (Fig. 8) consists of 1.9m of baritic shale. The proportion of barite varies between 15-30% and increases towards the centre of the unit containing 0.8m of diffusely laminated barite within siliceous mudstone. Ribbon bedded chert with siliceous mudstone partings occurs above and below the unit. No limestone concretions occur within the barite although a concretion horizon was sampled 0.6m above the barite (conodont sample C6). The footwall to the barite is predominantly ribbon banded chert with

Figure 6. Boudinaged limestone lens containing relict lamination.

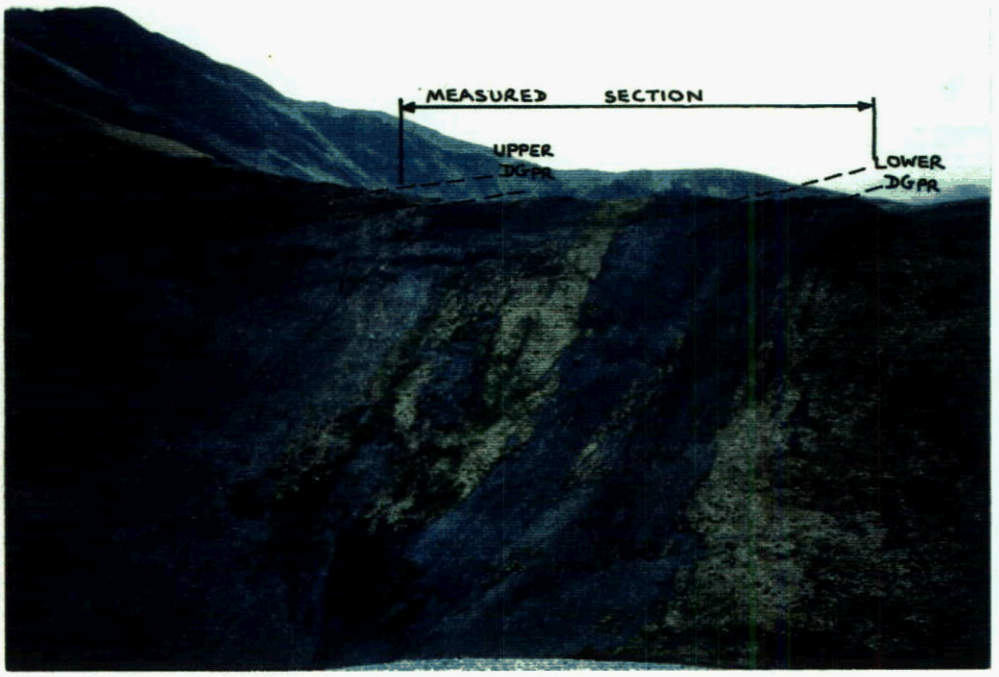
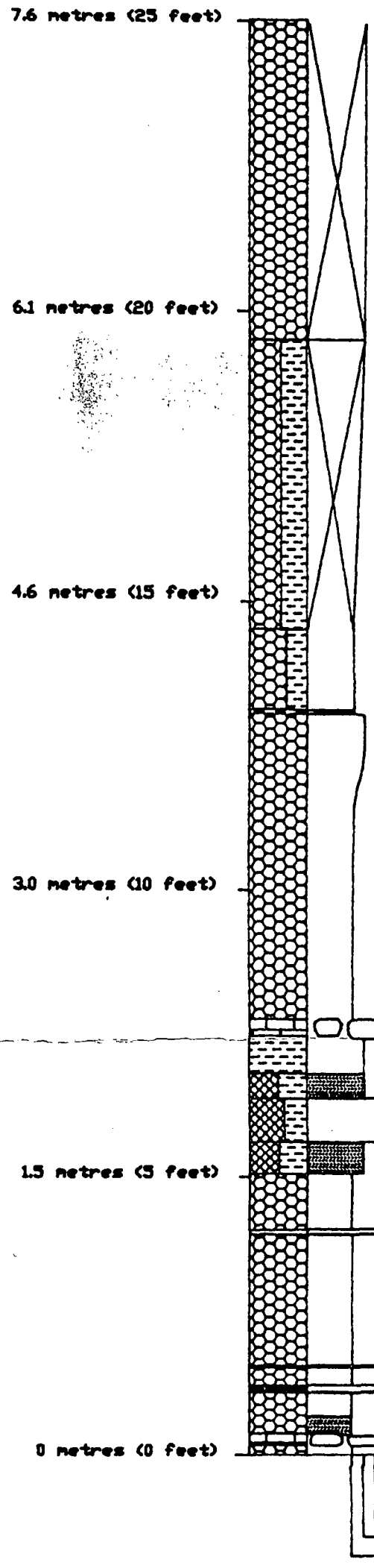


Figure 7. Photograph looking west towards ridge at northeast side of Cirque valley showing position of measured section and 'pregnant' shale units.



sub-crop silver-grey weathering thin bedded mudstone, siliceous and cherty mudstone and chert

alternating thin bedded chert and slightly siliceous mudstone - carbonaceous

2.5 cm chert band

bedding 120 / 30 SV

3 - 12 mm ribbon bedded chert with siliceous shale partings and occasional beds up to 15 mm

bedding 120 / 32 SV

LC 13 conodont sample C6

boudinaged blocks containing relict parallel lamination

bedding 125 / 26 SV

fine diffusely laminated barite with siliceous mudstone (probably highly sheared)

siliceous/cherty mudstone with disseminated small barite concretions throughout

limonitic band - probably weathered out pyrite

3 - 12 mm ribbon bedded chert with minor shale partings

10 mm barite band

25 mm diffusely laminated barite band

LC 13 conodont sample C7

shale / mudstone

chert

limestone

barite

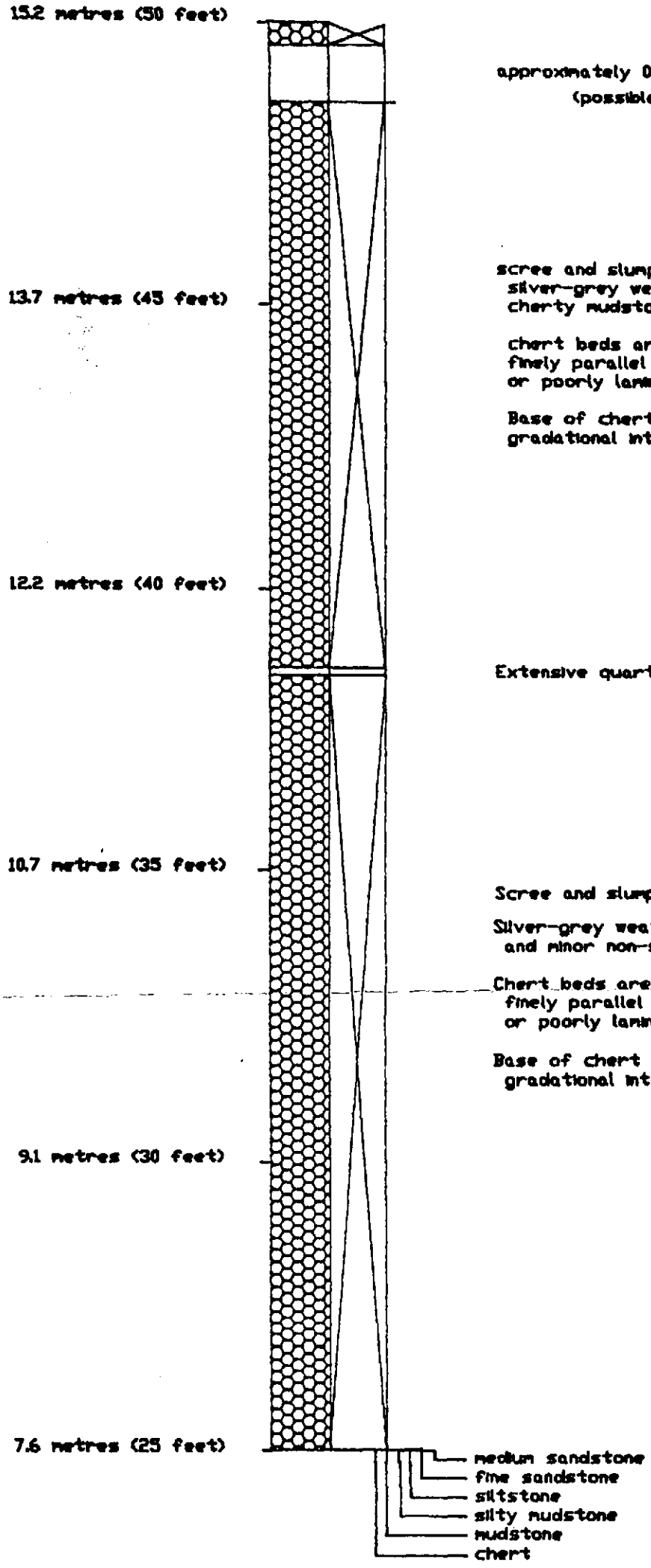
silty shale / mudstone

concretions

Curragh Resources Inc.

DETAILED LITHOLOGIES MEASURED FOR SECTION NORTHEAST SIDE OF CIRQUE VALLEY

Date: 90/06/22	Drawn by: H.D.S.
Drawing No. AK-CQ-90-001	Figure No. 8a



approxmately 0.3 metres of porous pyrobitumen
(possible fault zone ?)

scree and slumped outcrop / subcrop
silver-grey weathering chert, siliceous
cherty mudstone and minor non-siliceous mudstone

chert beds are generally 3 - 8 cm thick and usually finely parallel laminated. Mudstone is non-laminated or poorly laminated

Base of chert beds are sharp while top of chert is gradational into mudstone

bedding 188 / 21 S

Extensive quartz veining - possible fault ?

Scree and slumped outcrop / subcrop

Silver-grey weathering chert, siliceous / cherty mudstone and minor non-siliceous mudstone.

Chert beds are generally 3 - 8 cm thick and usually finely parallel laminated. Mudstone is non-laminated or poorly laminated.

Base of chert beds are sharp while top of chert is gradational into mudstone.

shale / mudstone

chert

limestone

barite

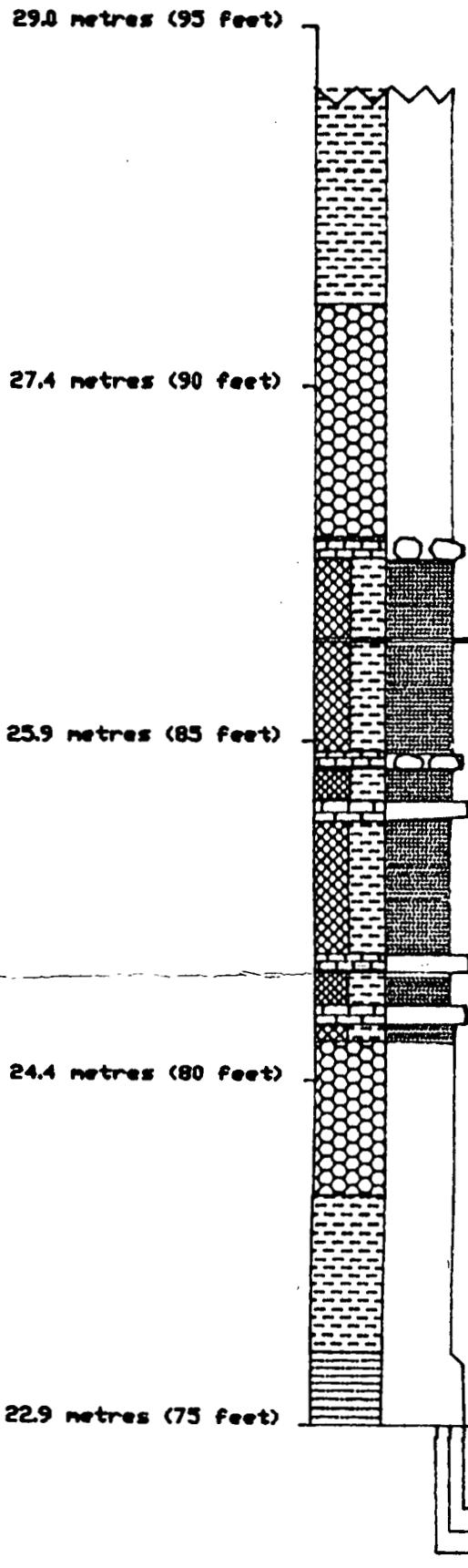
silty shale / mudstone

concretions

Curragh Resources Inc.

DETAILED LITHOLOGIES MEASURED FOR SECTION NORTHEAST SIDE OF CIRQUE VALLEY

Date: 90/06/22	Drawn by: H.D.S.
Drawing No. AK-CQ-90-002	Figure No. 8b



Section passes upwards into parallel silt laminated mudstone (i.e. 'pin-striped argillite')

bedding 130 / 35 SW
slaty cleavage 152 / 88 SW
L1 clvg/bedding 160 / 30

Orange-red weathering limonitic argillite - possible thin pyritic laminae

Upward decrease in siliceous character

bedding 120 / 35 SW

Rusty weathering cherty argillite - thin bedded and ribbon banded

LC 12 conodont sample C1

Bedding parallel calcite - barite fault plane

LC 12 conodont sample C2

LC 12 conodont sample C3

bedding 133 / 20 SW

LC 12 conodont sample C4

LC 12 conodont sample C5

shale / mudstone

chert

limestone

barite

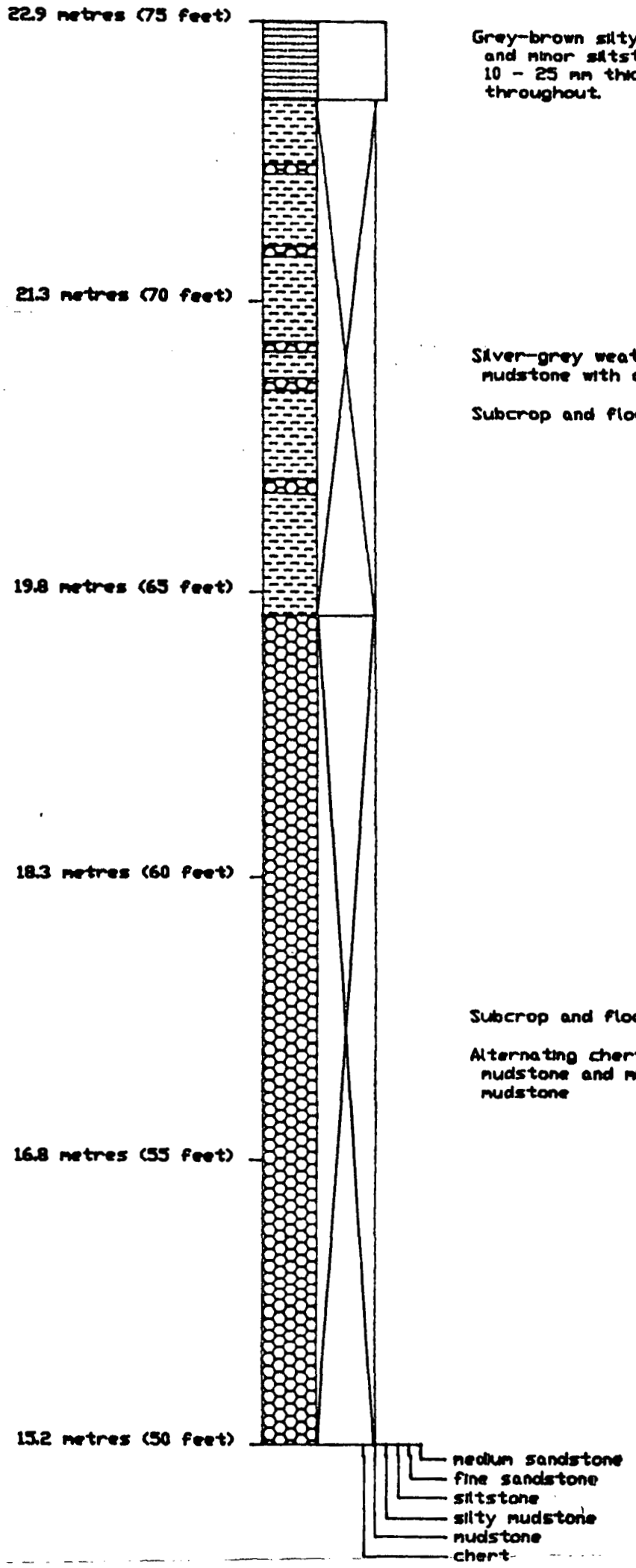
silty shale / mudstone

concretions

Curragh Resources Inc.

DETAILED LITHOLOGIES
MEASURED FOR SECTION
NORTHEAST SIDE OF CIRQUE VALLEY

Date: 90/06/22	Drawn by: H.D.S.
Drawing No. AK-CQ-90-003	Figure No. 8c



Grey-brown silty mudstone and minor siltstone. Contains occasional 10 - 25 mm thick chert bands. Parallel laminated throughout.

bedding 120 / 35 SW

Silver-grey weathering carbonaceous mudstone with only minor thin chert beds.

Subcrop and float

Subcrop and float

Alternating chert, siliceous / cherty mudstone and minor non-siliceous mudstone

shale / mudstone

chert

limestone

barite

silty shale / mudstone

concretions

Curragh Resources Inc.

DETAILED LITHOLOGIES MEASURED FOR SECTION NORTHEAST SIDE OF CIRQUE VALLEY

Date: 90/06/22	Drawn by: H.D.S.
Drawing No. AK-CQ-90-004	Figure No. 8d

minor thin mudstone partings and may contain fine pyrite laminae causing the limonitic weathering. The footwall also contains two barite beds 10mm and 25mm thick approximately 3.25m below the main barite mineralisation. A concretionary limestone horizon 1m below these barite beds was sampled (conodont sample C7).

The upper 'pregnant' shale unit (Locality 12) occurs approximately 47.8m above the lower baritic unit (Fig. 8) and the two units are separated by silver-grey weathering, thin bedded chert, siliceous/cherty mudstone and minor mudstone mainly as thin partings between cherty beds. This siliceous unit is correlated with the ribbon bedded chert facies of the Gunsteel Formation. The intervening outcrop is generally scattered and lithological logging based largely on subcrop and float (Fig. 8). The barite tends to occur as closely spaced concretions (less than 4mm in size) and generally represent less than 25% of the rock. The hangingwall ribbon bedded chert is rusty weathering adjacent to the baritic unit (probably due to pyrite) and passes upwards into parallel silt-laminated 'pin-stripe' argillite. The footwall and hangingwall sections tend to become more siliceous closer to the barite mineralisation.

The upper barite unit contains 5 concretionary limestone horizons (Fig. 8). The limestone concretions contain a relict lamination and appear to have originally formed as beds up to 15cm thick which subsequently became boudinaged during burial and compaction. Conodont samples were collected 0.2m and 1.0m above the base of the baritic mineralisation (conodont samples C5 and C4 respectively), approximately half-way through the mineralisation (conodont samples C3 and C2) and at the top of the mineralisation (conodont sample C1).

FLUKE CLAIM GROUP

N.T.S. 94-F-07

Latitude: 57°24' N

Longitude: 124°54' W

Summary of field work during 22.8.89 to 30.8.89

Detailed structural transects were made across the Fluke Claims to assess the structural analysis carried out by Pigage (1982). In addition limestones were sampled from the Earn Group and Silurian siltstone unit of the Road River Group and are shown in table 2.

Earn Group stratigraphy

The Earn Group stratigraphy of the Fluke Claims is similar to that established at Cirque (Fig. 4). Stratiform mineralisation occurs within the 'pregnant' shale lithofacies (DG_{PR}) with distinct silver-grey weathering porcellanite (DG_C) containing limestone concretions above and below. No measured sections through Devonian stratigraphy were made at Fluke due to structural complexity and lack of continuous accessible exposure. The basal contact of the Earn Group with the Silurian siltstone unit is usually sharp and appears conformable. In the Fluke Claims as a whole the Silurian siltstone is overlain by limestone of the Kwadacha reef to the east, Paul River intraformational shale breccia also containing porcellanite and limestone; and Gunsteel 'pregnant' shale (DG_{PR}) or porcellanite (DG_{CH}) to the west.

The Earn Group has been informally divided into three formations as in the Cirque area:

Gunsteel Formation: This formation contains two distinct lithofacies consisting of thin bedded, black, siliceous shale referred to as the 'pregnant' shale (DG_{PR}) and ribbon-bedded, black porcellanite. The porcellanite occurs as 1-3m thick discontinuous units (DG_{CM}) generally at the top and bottom parts of the 'pregnant' shale (Fig. 4b) and often contain large limestone concretions (Fig. 9). Three limestone horizons were sampled from porcellanite units near to the base of the 'pregnant' shale' (LF 154, LF 155 and LF 156, Figs. 4b and 10). To the east and northeast the 'pregnant' shale is

Figure 9. Limestone concretion within porcellanite unit above Pook Creek.

Figure 11. Photograph looking west of baritic pregnant shale on South Fluke Ridge.

interbedded with shale chip breccia of the Paul River Formation. West of Pook Creek ribbon-bedded porcellanite (DG_{CH}) overlies the 'pregnant' shale (Fig. 4b). The unit contains several concretionary limestone horizons which were sampled at two localities (LF 182 and LF 189, Figs. 4b and 10).

The 'pregnant' shale lithofacies is associated with two sulphide showings located on the upper part of Fluke Creek and on the cliff section of Pook Creek (Pigage, 1982). The Fluke Creek showing contains a 1 metre section of laminated pyrite in black shale with visible galena and sphalerite. The Pook Creek showing consists of two 1-5cm thick beds of sheared, fine grained, barite with minor disseminated, remobilised galena. The mineralisation occurs within siliceous black shale containing abundant small barite concretions over an approximate stratigraphic thickness of 2m.

Laminated barite was also found within 'pregnant' shale at the southern end of the Fluke Claims approximately 20m above the basal contact with the Silurian siltstone unit (Figs. 10 and 11). The barite is diffusely laminated and occurs within thin bedded siliceous shale containing densely spaced small barite concretions with a stratigraphic thickness of approximately 5m. This baritic shale appears to be almost continuous along the length of the overturned limb of the major syncline which dominates the Fluke Claims (Fig. 10). In contrast to the Cirque Claims, no concretionary limestone was found in the 'pregnant' shale at Fluke.

Akie Formation: The Akie Formation generally consists of non-siliceous, soft shale. The 'phyllitic' shale (DA_P) is generally poorly bedded, non-laminated and has a characteristic phyllitic sheen. This lithofacies is often interbedded with rusty weathering, silt laminated shale and silty shale (DA_{RS}). No limestone was found within the Akie Formation.

Warneford Formation: The 'pregnant' shale is conformably overlain by grey to black, poorly bedded, intraformation shale chip breccia (DM_{WB}). The breccia weathers to a distinct, mottled, blue-grey colour. This unit is also associated with large lenses of medium-coarse grained sandstone (DM_{WQ}) and chert pebble conglomerate and grit (DM_{WC}) to to the south of Fluke Creek.

Conundrum Siltstone: This unit generally overlies the Kwadacha

limestone and Akie shale. The lithofacies typically consists of poorly bedded, soft, speckled siltstone which locally contains medium bedded fine-coarse grained sandstone. One concretionary limestone horizon was found within this unit at the east end of the South Fluke Ridge (Fig. 10).

Conodont samples

A total of 27 samples were collected from the Fluke Claims for conodont analysis (Table 2). They include 17 surface samples from the Earn Group and Silurian units of the Road River Group (located in figure 10), and 10 drill-core samples from diamond drill-holes 80-F-01 and 80-F-03. Samples from the Earn Group were mainly collected from large limestone concretions (up to 1.5m thick) found within porcellanite units (DG_{CM}) at the base of the 'pregnant' shale and in the porcellanite unit (DG_{CH}) overlying pregnant shale. Limestone was also sampled from the medium bedded siltstone and sandstone of the Conundrum siltstone (DC_S). Road River Group samples were taken from the Silurian limestone unit and a 5m thick, grey weathering, crinkle laminated, limestone approximately 25m from the top of the Silurian siltstone unit. The relative stratigraphic position of conodont samples from the Fluke Claims are summerised in figure 4b.

Structure

Four phases of deformation were identified on the Fluke Claims:

Phase 1: These structures represent pre-phase 1 structures of Pigage (1982) and are most easily recognised within the Kechika Group strata. Individual fold hinges are usually poorly preserved but can be inferred from abrupt changes in So/S2 intersection lineations across northeast trending hinges. The flat limbs of these structures are associated with shallow plunging F2 fold axes and L2 intersection lineations while the steeper limbs contain F2 fold axes and L2 intersection lineations with plunges up to 65°. These pre-phase 1 structures are clearly cross-cut by the S2 slaty cleavage. The fold structures have step-like geometry with long flat limbs and relatively narrow steep limbs and fold axes which crudely trend northeast. The structures tend to be locally developed with fold amplitudes up to 10m. They appear to be less well developed in the Lower Earn Group although this probably reflects the poorly

laminated and bedded nature of the strata.

Phase 2: These structures correlate with the phase 1 structures of Pigage (1982) and are responsible for the northwest trending structural grain of the area. Deformation is associated with tight northeast verging folds and thrust faults and development of a penetrative pressure solution cleavage (S2). Fold axes and L2 (bedding-S2 cleavage) intersection lineations generally have horizontal or shallow plunges although areas associated with the steeper limbs of phase 1 folds contain steep plunging F2 fold axes and L2 lineations. Parasitic folds developed in the porcellanite unit on the overturned limb of the major syncline in structural panel B are associated with a transecting close spaced, fracture cleavage (Fig. 12) due to the competent nature of the lithology.

Within the Fluke Claims the Road River Group behaves as a single competent layer which controls the dominant wavelength and amplitude of the folding. The overlying relatively incompetent Lower Earn Group accommodates this folding through the development of mesoscale folds and out-of-syncline imbricates. These imbricates may be linked at depth and allow the Lower Earn Group sequence to be decoupled from the Road River Group.

Phase 3: This phase is associated with locally developed mesoscale, open-tight, upright folds which are approximately coaxial with phase 2 structures. The folds are associated with an axial planar crenulation cleavage (S3) best developed on the overturned limbs of phase 2 folds where the S2 cleavage has shallower dips. The orientation of the bedding and S2 foliation is therefore important for the development of F3 crenulation folds and cleavage. This phase is equivalent to phase 2 of Pigage (1982).

Phase 4: This phase of deformation (phase 3 of Pigage, 1982) is associated with the development of vertical to steeply dipping extensional faults which cross-cut and off-set all previous structures. The most dominant faults generally trend north-south and east-west with displacements up to 50m. Fault planes usually contain fault gouge and are associated with quartz-calcite veining.

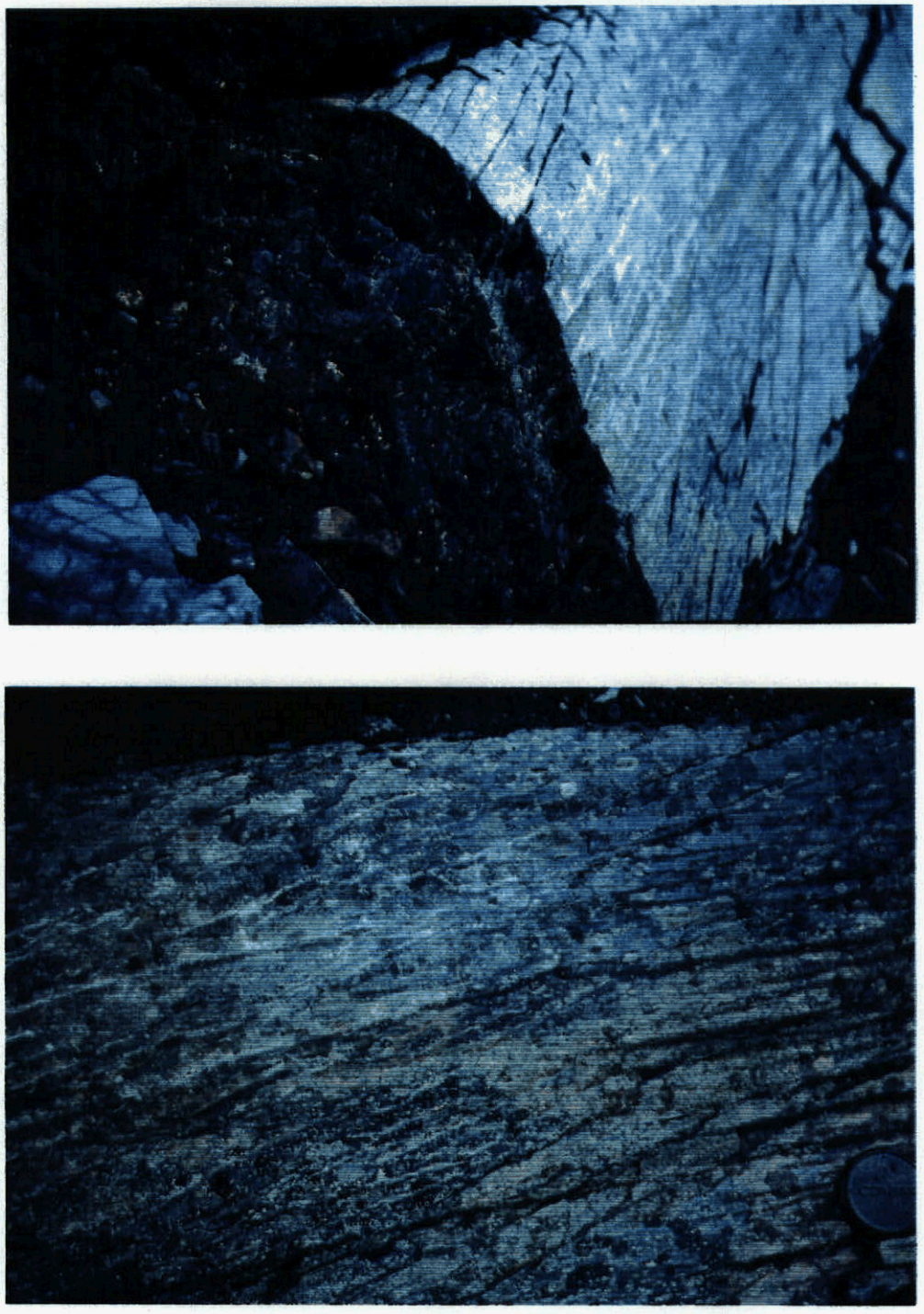


Figure 12. Transecting cleavage within folded porcellanite on the overturned limb of a major syncline.

Table 1.
CIRQUE PROPERTY (57°31' N 124°50'W)
CONODONT SAMPLE LIST - SURFACE SAMPLES

CONODONT NO	FIELD LOCALITY	UTM COORDINATES		SAMPLE DESCRIPTION	STRATIGRAPHIC UNIT
		NORTH	EAST		
C1 (Top)	LC12	6,375,867	371,528	Limestone lens within baritic siliceous shale	Gunsteel - porcellanite
C2	LC12	6,375,867	371,528	Limestone lens within baritic siliceous shale	Gunsteel - porcellanite
C3	LC12	6,375,867	471,528	Limestone lens within baritic siliceous shale	Gunsteel - porcellanite
C4	LC12	6,375,867	471,528	Limestone lens within baritic siliceous shale	Gunsteel - porcellanite
C5 (Bottom)	LC12	6,375,867	471,528	Limestone lens within baritic siliceous shale	Gunsteel - porcellanite
C6 (Top)	LC13	6,375,939	371,486	Limestone lens within baritic siliceous shale	Gunsteel - porcellanite
C7 (Bottom)	LC13	6,375,939	371,486	Limestone lens within baritic siliceous shale	Gunsteel - porcellanite
C8	LC14	6,375,890	371,728	Small limestone concretion in silty argillite and siltstone	Warneford
C9	LC15	6,375,840	371,016	Limestone in float associated with porcellanite	Gunsteel - porcellanite
C10	LC16	6,375,920	370,844	Calcareous siltstone from dolomitic siltstone unit	Silurian Siltstone
C11 (Top)	LC17	6,376,988	370,120	Limestone concretion from baritic siliceous shale	Gunsteel - pregnant shale
C12	LC17	6,376,988	370,120	Limestone concretion from baritic siliceous shale	Gunsteel - pregnant shale
C13 (Bottom)	LC17	6,376,988	370,120	Limestone concretion from baritic siliceous shale	Gunsteel - pregnant shale
C14	LC18	6,377,041	370,107	Limestone concretion from baritic siliceous shale	Gunsteel - pregnant shale
C15	LC19	6,376,454	370,143	Limestone bed in dolomitic siltstone/mudstone	Silurian Siltstone
C16	LC20	6,376,283	370,194	Limestone bed in dolomitic siltstone/mudstone	Silurian Siltstone
C17	LC22	6,375,665	370,404	Limestone bed near top of dolomitic siltstone	Silurian Siltstone
C22	LC10	6,375,609	371,292	Limestone concretion from porcellanite	Gunsteel - porcellanite

Table 1.
CIRQUE PROPERTY (57°31' N 124°50' W)
CONODONT SAMPLE LIST - DRILL CORE SAMPLES

CONODONT NO	DRILL HOLE	DEPTH	SAMPLE DESCRIPTION	STRATIGRAPHIC UNIT
C30	EG79C-24	461.6 m	Nodular limestone	Gunsteel - porcellanite (footwall)
C31	EG79C-14	329.5 m	Nodular limestone	Gunsteel - porcellanite (footwall)
C32	EG79C-14	333.4 m	Nodular limestone	Gunsteel - porcellanite (footwall)
C33	EG80C-13	214.4 m	Nodular limestone	Ordovician shale
C34	EG80C-13	215.0 m	Nodular limestone	Ordovician shale

Table 2.
FLUKE PROPERTY (57°24' N 124°54' W)
CONODONT SAMPLE LIST - SURFACE SAMPLES

CONODONT NO	FIELD LOCALITY	UTM COORDINATES		SAMPLE DESCRIPTION	STRATIGRAPHIC UNIT
		NORTH	EAST		
F1	LF29				
F2	LF33	6,363,732	385,200	Limestone concretion from top of dolomitic siltstone unit	Silurian Siltstone
F3	LF33	6,363,717	385,222	Limestone concretion from top of dolomitic siltstone unit	Silurian Siltstone
F4	LF69				
F5	LF69				
F6	LF75				
F7	LF79	6,363,058	385,574	Limestone from middle of Silurian limestone unit	Silurian Limestone
F8	LF81	6,362,763	386,130	Crinkle laminated grey/tan limestone near top of dolomitic siltstone unit	Silurian Siltstone
F9	LF107	6,362,662	386,905	Small limestone concretions in Pregnant Shale	Gunsteel - pregnant shale
F10	LF111	6,362,743	387,305	Limestone concretion in medium bedded siltstone/sandstone sequence	Conundrum Siltstone - DCS
F11	LF154	6,363,884	385,534	1 metre limestone concretion in thin bedded porcellanite	Porcellanite - DMWP
F12	LF155	6,363,910	385,531	1 metre limestone concretion in thin bedded porcellanite	Porcellanite - DMWP

Table 2.
FLUKE PROPERTY (57°24' N 124°54' W)
CONODONT SAMPLE LIST - SURFACE SAMPLES

F13	LF156	6,363,899	385,555	Large limestone concretion in thin bedded porcellanite	Porcellanite - DMWP
F14	LF176	6,365,534	385,222	Bioclastic limestone	Kwadacha Reef - DKR
F15	LF178	6,365,458	385,167	Calcareous siltstone below Kwadacha limestone	Possibly Silurian Siltstone
F16	LF182			Large limestone concretions in porcellanite unit	Porcellanite - DGC
F17	LF189			Large limestone concretions in porcellanite unit	Porcellanite - DGC

Table 2.
FLUKE PROPERTY (57°24' N 124°54' W)
CONODONT SAMPLE LIST - DRILL CORE SAMPLES

CONODONT NO	DRILL HOLE	DEPTH	SAMPLE DESCRIPTION	STRATIGRAPHIC UNIT
F18	EG80F-01	23.0 m	Calcareous siltstone in siliceous shale	Gunsteel - pregnant shale
F19	EG80F-01	46.8 m	Calcareous siltstone in siliceous shale	Gunsteel - pregnant shale
F20	EG80F-01	72.0 m	Calcareous siltstone in siliceous shale	Gunsteel - pregnant shale
F21	EG80F-01	168.7 m	Dark grey, soft shale with intraformational breccias	Warneford - intraformational breccia DMWBX
F22	EG80F-01	184.6 m	Massive porcellanite interbedded with pyritic siltstone	Porcellanite - DMWP
F23	EG80F-01	273.1 m	Dark grey shale with pyritic siltstone to sandstone interbeds	Warneford - DMWB
F24	EG80F-01	382.9 m	Siliceous shale with 1 - 2 cm framboidal pyrite interbeds	Gunsteel - pregnant shale
F25	EG80F-03	195.8 m	Nodular limestone 83 cm below barite mineralisation	Gunsteel - pregnant shale
F26	EG80F-02	342.8 m	Limestone concretions in dark grey shale chip breccia	Warneford -DMWBX
F27	EG80F-03	160.2 m	Nodular limestone in barite-pyrite mineralisation	Gunsteel - pregnant shale

SUMMARY AND CONCLUSIONS

Structure

(i) Structural mapping at Fluke has led to the recognition of an earlier pre-fold and thrust phase of folding associated with monoclinal folding along northeast trending fold axes. The structural relationships between the phase 1 and phase 2 deformation are schematically shown in figure 13. A similar phase of folding may be present at Cirque but is poorly developed in the Lower Earn Group. This phase of folding is correlated with the phase 1 compressional deformation described at Driftpile Creek (McClay and Insley, 1986; McClay et al., 1988). In severe cases where the F1 folds are 10-20m amplitude superposition of F2 folds results in a modified Type-2 interference fold pattern.

(ii) A contrast in the structural style exists at Cirque between the Road River Group duplex of the 'A' thrust and the footwall sequence containing tightly folded and imbricated Road River Group and Lower Earn Group strata associated with the Cirque and South Cirque deposit(s). This relationship also occurs in the Gataga area and is interpreted as representing the contrast in between the footwall block and adjacent sediment in-fill across a significant extensional fault (McClay et al,. 1989). A schematic model developed for the contraction of the Driftpile sub-basin in the Gataga area provides a good analogy to the Cirque sub-basin (Fig. 14). The model predicts that much of the Earn Group, although strongly deformed, should be preserved below the duplex. The structure at Fluke is comparable to the folded and imbricated sequence in the footwall to the 'A' thrust duplex at Cirque.

(iii) At Fluke the structural style is dominated by folds and thrusts. The western margin of the claims is associated with an overturned panel of Earn Group strata stratigraphically overlying 'Silurian' siltstone with apparent conformity. Strata west of this contact is dominated by Kechika and Road River Groups and may represent a separate tectonostratigraphic panel. Earn Group strata is preserved in this panel west of Pie and becomes more significant towards the northwest where it contains the Cirque deposit. An unusually thick unit of Ospika mafic volcanics along the western margin of the Fluke Claims may indicate the presence of an Ordovician age extensional fault or faults. These relationships may suggest that the Cirque and Fluke mineralisation may have been deposited in two separate sub-basins.

(iv) Mineralisation in the Fluke Claims consists of concretionary barite on South Fluke Ridge, thin bedded laminated barite to the west of Pook Creek and laminated pyrite in Fluke Creek. The mineralisation is hosted by the 'pregnant' shale lithofacies in panel B (Fig. 10) where the structure is dominated by a major northeast verging syncline. Diamond drilling carried out to test the 'pregnant' shale around the fold structure did not intersect any significant mineralisation.

Stratigraphy

(i) The host rocks of the Cirque and Fluke stratiform Ba-Fe-Zn-Pb-Ag mineralisation are siliceous black shales of the 'pregnant' shale lithofacies. Areas containing mineralisation are generally associated with anomalous thickened units of siliceous shale and porcellanite.

(ii) The mineralisation at Cirque appears to be stratigraphically higher than that at Fluke (Fig. 4) and conodont samples have been collected with the possibility of correlation between the two areas.

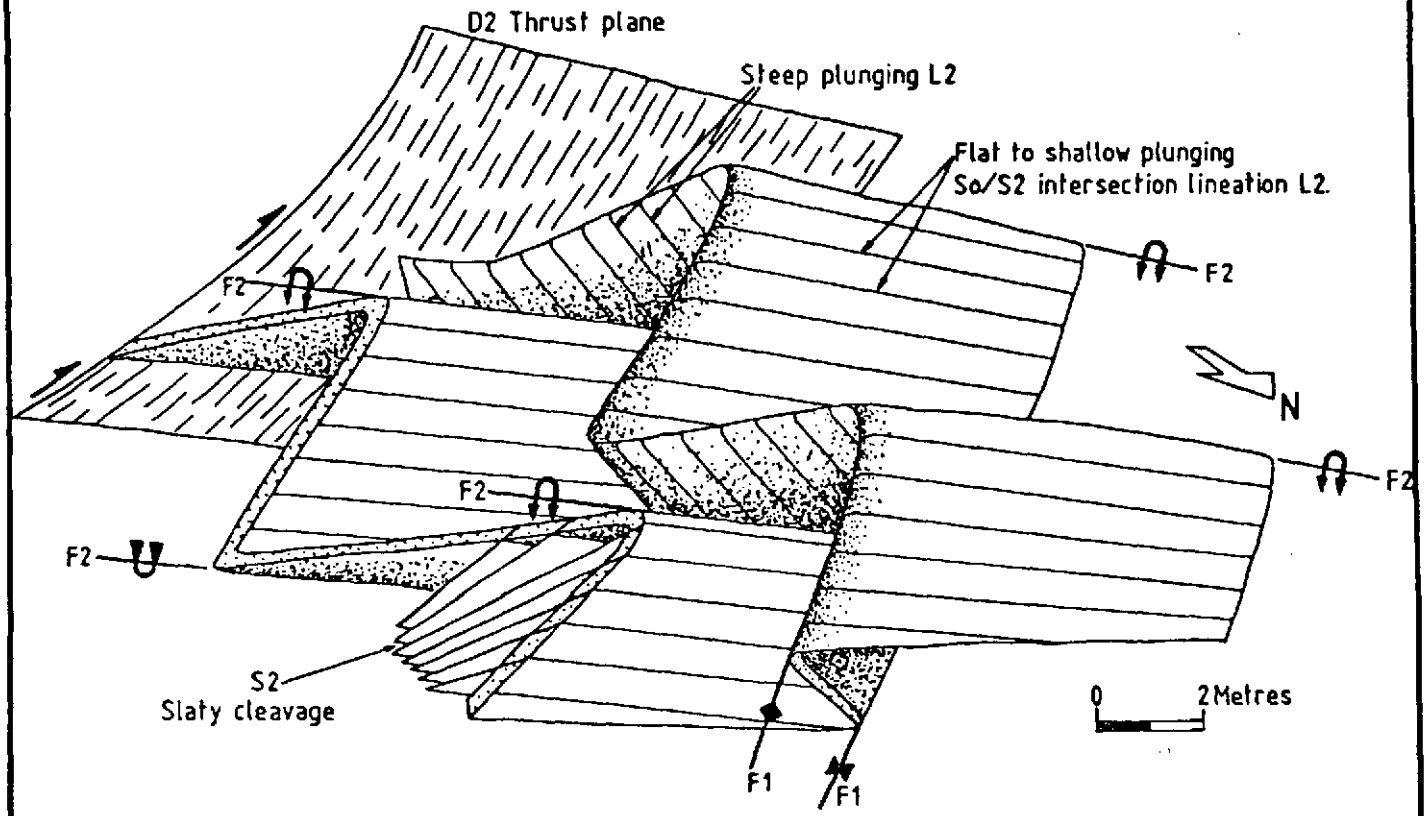
(iii) Conodont samples have been collected from the 'pregnant' shale and porcellanite lithofacies of the Gunsteel Formation, Warneford Formation at Cirque and Conundrum shale at Fluke and may provide biostratigraphic correlation between the lithofacies.

(iv) Limestone from the Silurian siltstone at Cirque and Fluke has been sampled to assess the significance of the sub-Earn Group unconformity.

(v) Conodont biostratigraphy has allowed three principal periods of barite deposition (Fig. 15), to be identified in the Selwyn Basin (Dawson and Orchard, 1982):

(i) late Middle Devonian
(ii) early Upper Devonian
(iii) upper Early Mississippian

Irwin and Orchard (1989) have also shown that late Devonian stratiform Pb-Zn±Ag mineralisation in the Selwyn Basin and Kechika Trough generally preceded from north to south (Fig. 15). This is of interest as the Cirque deposit is presently considered to be at least Frasnian in age compared to the middle Famennian age for Driftpile



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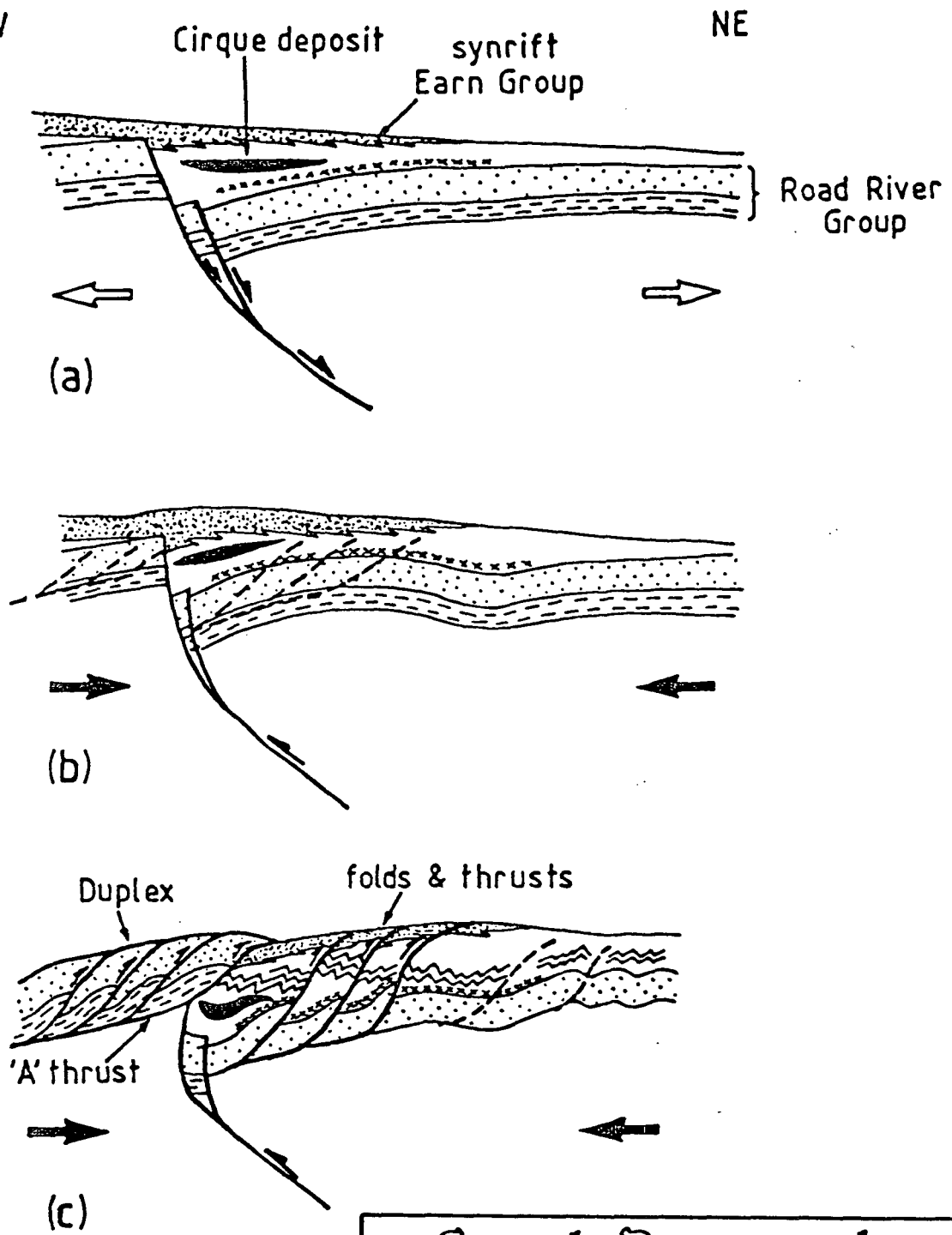
RELATIONSHIP BETWEEN
F1 & F2 FOLDS AT FLUKE

Date: 90/06/21	Drawn by: H.D.S.
Drawing No. AK-FL-90-001	Figure No. 13



Schematic model for the contraction of the Cirque sub-basin based on the interpretation for Driftpile Creek after McClay et al., (1989). (a), Possible pre-contration geometry of Cirque sub-basin - an extensional half-graben with hangingwall roll-over anticline. (b), Initial contraction with reactivation of extensional faults and bulk shortening of the synrift Earn Group. (c), Final stage in the contraction of Cirque sub-basin showing duplexing of Road River Group in the footwall of the original extensional fault and imbrication of the Earn Group.

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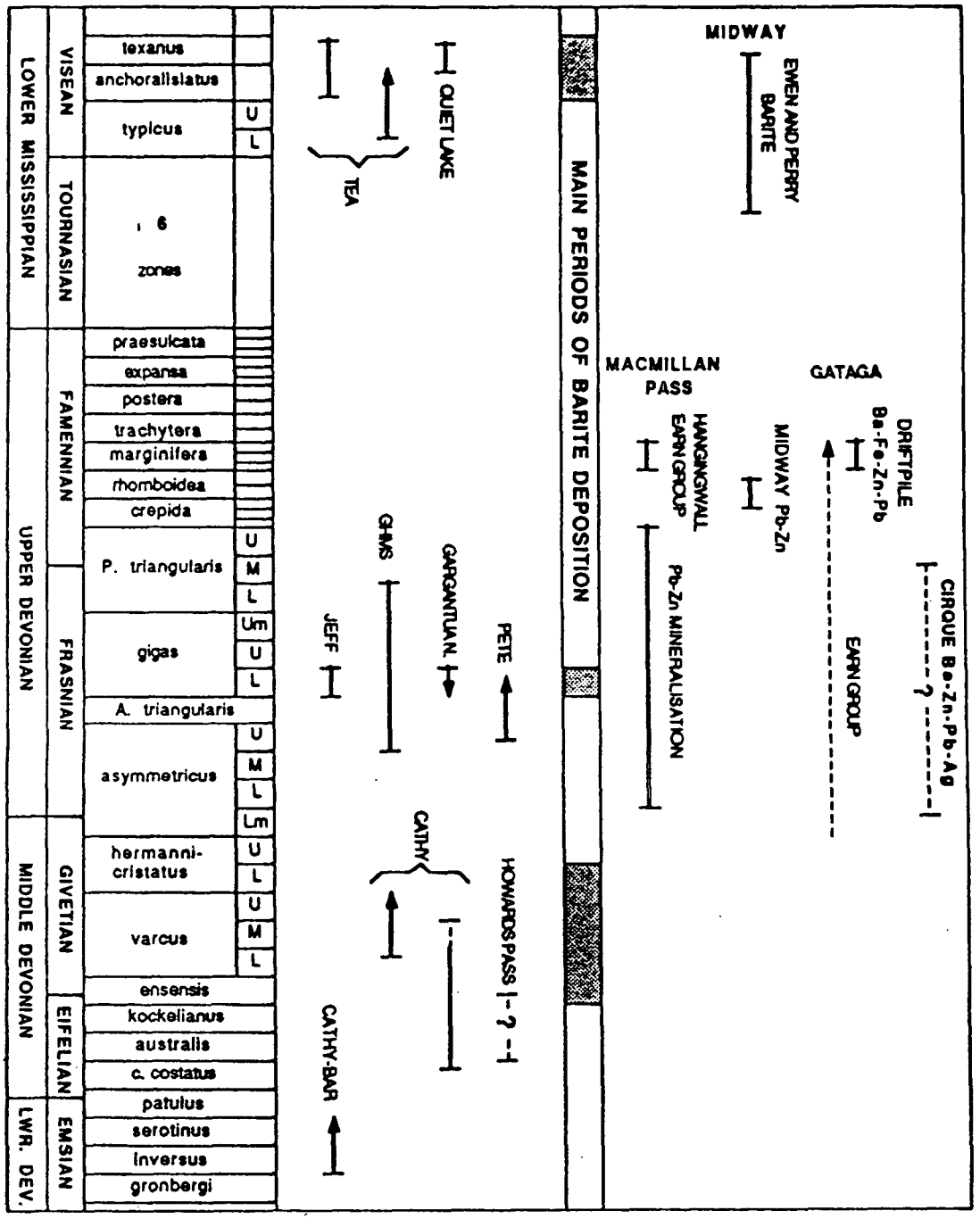
SCHEMATIC MODELS

Date: 90/06/21	Drawn by: H.D.S.
Drawing No. AK-AK-90-006	Figure No. 14



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CONODONT BIOSTRATIGRAPHY BARITE-SULPHIDE MINERALIZATION KECHIKA TROUGH & SELWYN BASIN

Date: 90/06/21	Drawn by: H.D.S.
Drawing No. AK-AK-90-007	Figure No. 15

Fluke Claims - Statement of Costs

Personnel	
Geologist , Martin Insley; Aug 22-30/89; 9 days at $250/day	$2,250.00
Field assistant, Chuck Hubert; Aug 22-30/89; 9 days at $120/day + benefits($112.72)	$1,192.72
Report writing, Martin Insley; Jan/90; 4 days at $250/day (50%)	$500.00
Drafting, Holly Stirling; June 1,11,15,18,19/90; 33 hours at $17.50/hour	$577.50
Report Compilation, Lee Pigage; Mar 8,20, Apr 3, June 15,18,19,20; 3 days at $250/day	$750.00
Subtotal	$5,270.22
Travel	
Whitehorse to Prince George return; Martin Insley, Chuck Hubert; Aug 12/89 (50%)	$818.00
Prince George to Finbow; Martin Insley, Chuck Hubert; Aug 13/89 (50%)	$676.00
Mackenzie to Finbow; groceries/gear; Aug 22/89 (100%)	$322.00
Ingenika to Prince George; Martin Insley; Sep 1/89 (50%)	$296.50
Hotel in Prince George; Aug 12/89	$44.28
Groceries for Fluke camp; Aug 13/89	$275.95
Subtotal	$2,432.73
Helicopter	
Finbow to Cirque camp; M. Insley, C. Hubert & gear; Aug 13/89 (50%)	$590.45
Cirque camp to Fluke claims; M. Insley, C. Hubert & gear; Aug 22/89	$843.50
Fluke claims to Cirque camp; M. Insley, C. Hubert & gear; Aug 30/89	$1,687.00
Subtotal	$3,120.95
Purchase of camp gear for Fluke camp	
Dome tent & 2 tarps	$227.94
2 Foamies	$99.98
Propane lantern & fuel	$80.92
Propane campstove	$69.99
Propane heater, regulator	$101.50
Propane tank	$36.98
Propane adaptor	$16.46
Flashlight	$19.98
Insect repellant	$13.96
Shovel, 2 pails	$36.09
Hammer, screwdriver, pliers	$54.96
Dishes, pots & utensils	$247.11
SBX 11A radio (prorated to 1 month rental)	$348.36
Shotgun & accessories	$563.96
Subtotal	$1,918.19
Conodont analysis/report; Steve Irwin; Jan/90 (50%)	$3,000.00
Total	$15,742.09

Note: (50%) following description indicates only 50% of total cost is reported for application to Fluke claims; report covers Cirque & Fluke; cost listed are Fluke portion only

STATEMENT OF QUALIFICATIONS

Martin William Insley of London, England, has the following qualifications in the geological sciences:

1. He graduated with a Bachelor of Science-geology degree from the University of London in 1982.

2. He graduated with a Master of Science -DIC in structural geology and rock mechanics from the University of London-Imperial College in 1985.

3. He is currently working on a PhD these concerning aspects of the ore forming processes and metallogenesis of the Driftpile Creek Ba-Fe-Zn-Pb deposit, British Columbia.

4. He has completed regional and detailed mapping projects for mining companies and universities during the interval 1981-1989.

5. He is currently a Fellow of the Geological Society of London.

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(Irwin and Orchard, 1989). The possibility of conodont biostratigraphic correlation of the Fluke and Cirque is therefore important in identifying key horizons within the 'pregnant' shale as potential exploration targets.

LEGEND

EARN GROUP (DEVONIAN - MISSISSIPPIAN)

WARNEFORD FORMATION

- DMwr — soft grey shale with sandstone interbeds
- DMwbx — dark grey shale with chert and quartz sand to pebble conglomerate lenses
- DMwp — ribbon bedded, black chert with limestone concretions

CONUNDRUM SILTSTONE

- Dcs — light grey, speckled, soft, siltstone

AKIE FORMATION

- DAp — grey, faintly laminated, soft, phyllitic shale
  - DAph - hangingwall to mineralization
  - DApf - footwall to mineralization
- DAss — dark brown-grey, thick bedded, silty shale
- DAsl — thinly laminated, silty shale

GUNSTEEL FORMATION

- DGpr — black, siliceous shale - immediate host to mineralized horizons
- DGc — ribbon bedded, black chert
  - DGch - hangingwall to mineralization
  - DGcf - footwall to mineralization
- DGt — dark grey, siliceous shale with numerous siltstone laminae
  - DGth - hangingwall to mineralization
  - DGtf - footwall to mineralization
- DGlb — black, siliceous shale with interbands of finely laminated, framboidal pyrite
- DBbs — barite with lesser pyrite

KWADACHA REEF (DEVONIAN)

- Dkr — grey, thick bedded, fossiliferous limestone

ROAD RIVER GROUP (ORDOVICIAN - SILURIAN)

SILURIAN SILTSTONE

- Sss — tan-weathering, grey, slightly dolomitic siltstone
- Ssh — dark grey, shaly, laminated siltstone

SILURIAN CHERT

- Src — streaky white-striped, ribbon bedded porcellanite

SILURIAN LIMESTONE

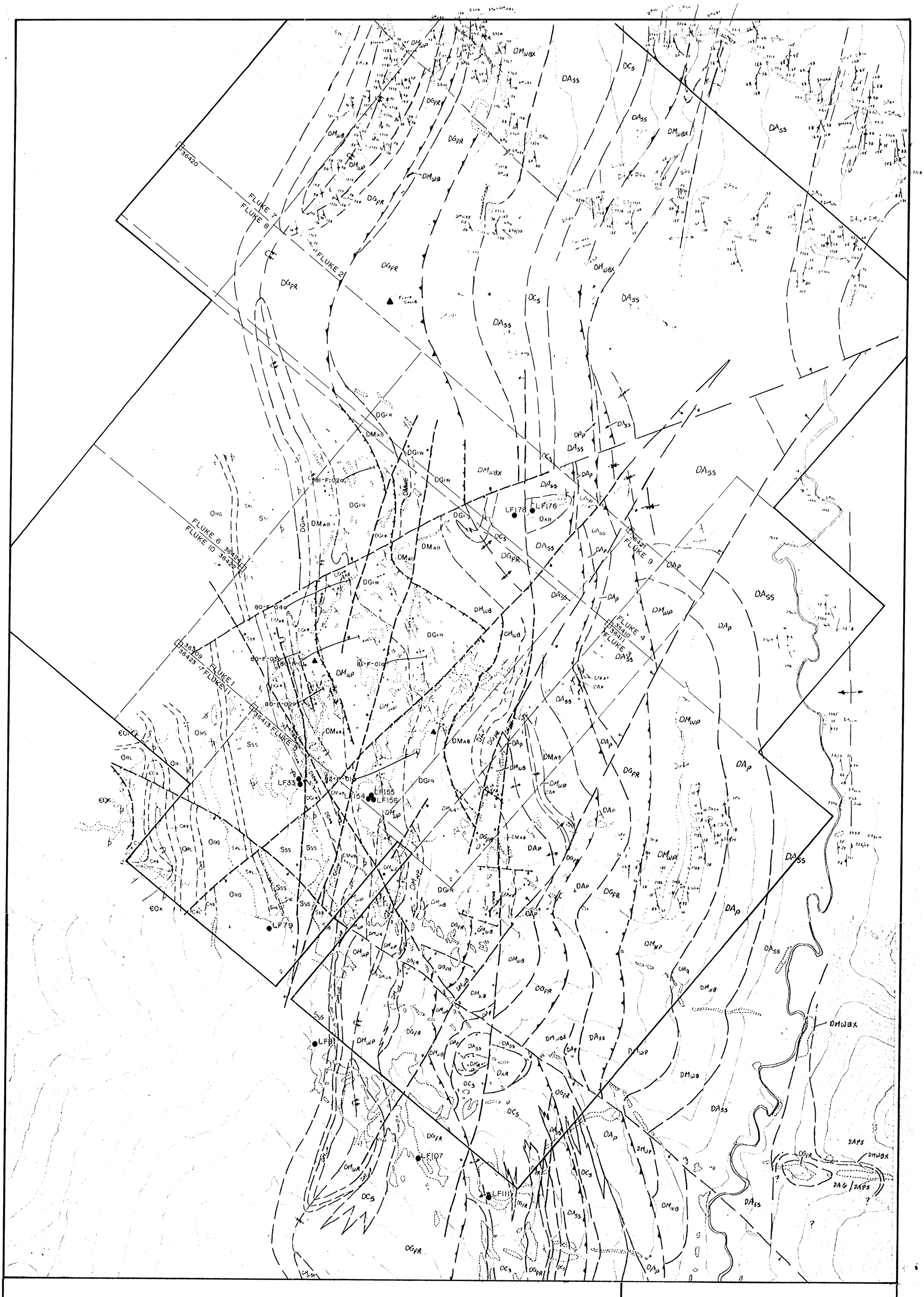
- Srl — grey, rhythmic limestone with shale interbeds

ORDOVICIAN SHALE

- Org — black, variably calcareous, graptolitic shale
- Ors — tan-weathering, dark grey, finely laminated, silty shale to siltstone

KECHIKA GROUP (CAMBRIAN - ORDOVICIAN)

- COk — silvery grey, argillaceous, nodular limestone



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NOTES: Compiled from aerial photography at an approximate scale of 1:20,000 flown in 1979.

Contours are at 20 metre intervals.

Curragh Resources Inc.

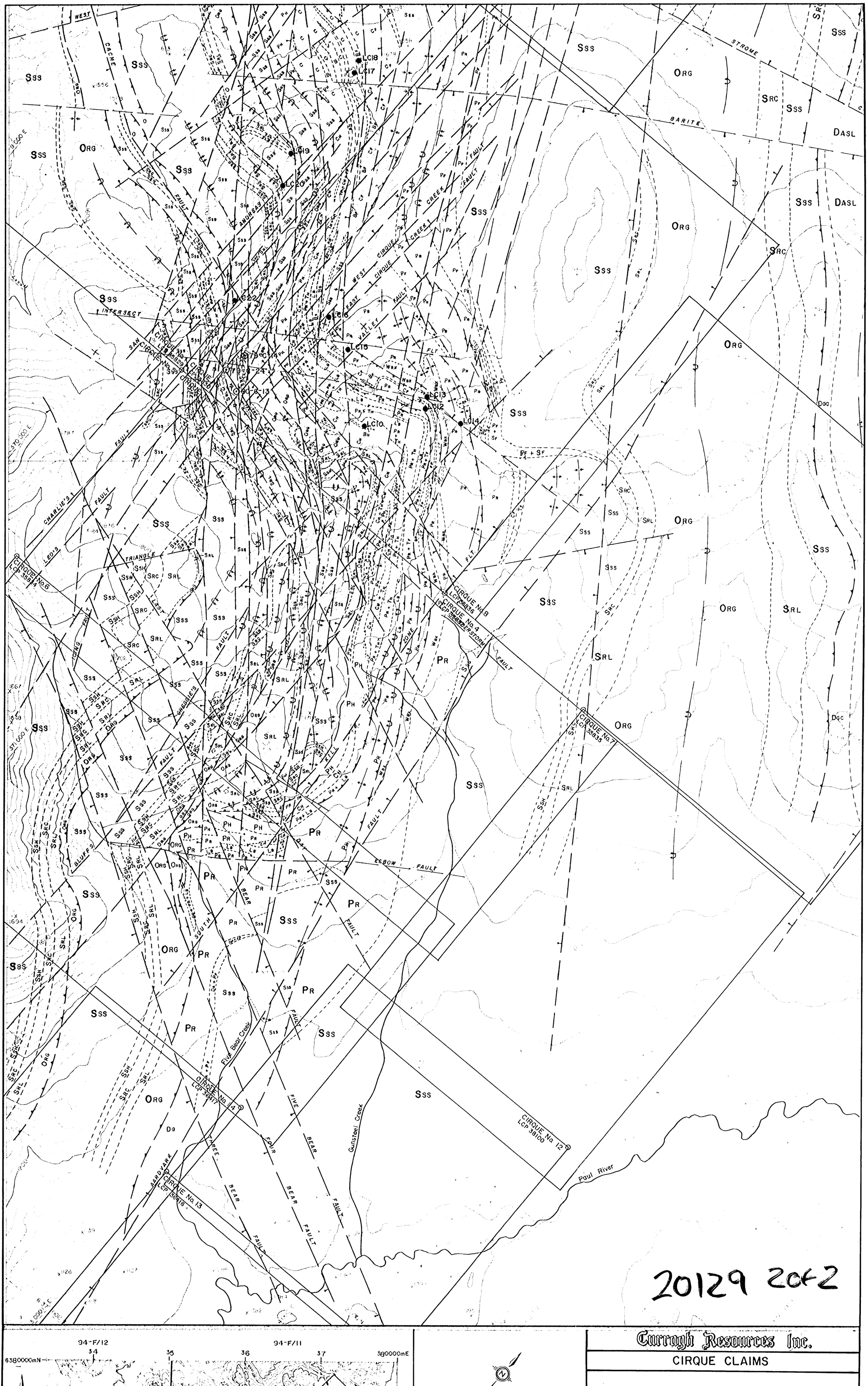
FLUKE CLAIMS

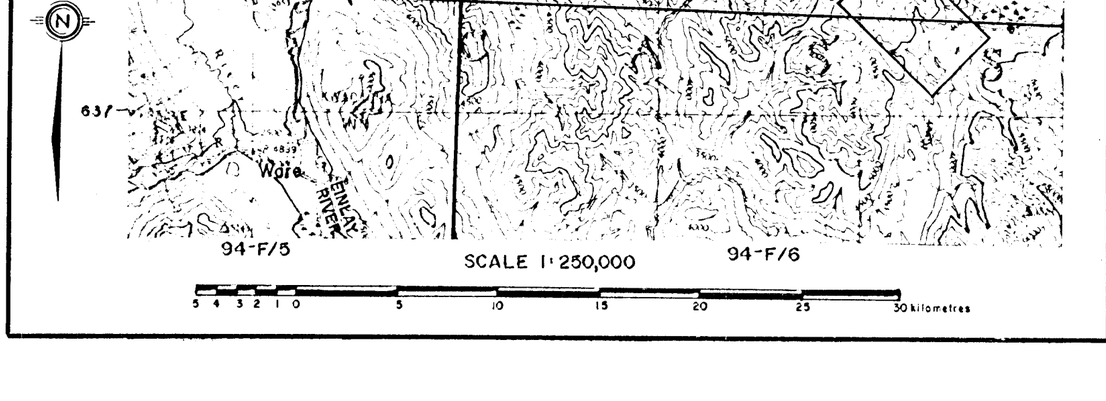
FLUKE CLAIMS GEOLOGY
CONODONT SAMPLE LOCATIONS

SCALE 1:10,000

100m 50m 0 100m 200m 300m 500m 1,000m

Design by: M.INSLEY	DRAWING NO. AK-FL-90-001	N.T.S. Sheet No. 94-F/7
Drawn by: H.D.S.		Report No. WH90-004
Date: 90/06/18		Figure No. 10
Revisions:		





Notes: Compiled from aerial photography at an approximate scale of 1:20,000 flown in 1979.

Contours are at 20 metre intervals.

Curragh Resources Inc.

CIRQUE CLAIMS

CIRQUE CLAIMS GEOLOGY CONODONT SAMPLE LOCATIONS

SCALE 1:10000

100m 50m 0 100m 200m 300m 500m 1000m

Design by: M.INSLEY	DRAWING NO. AK-CQ-90-005	N.T.S. 94-F/6,11 Sheet No.
Drawn by: H.D.S.		Report No. WH90-004
Date: 90/06/14		Figure No. 5
Revisions:		

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