

**Ministry of Energy and Mines**  
BC Geological Survey

**Assessment Report**  
**Title Page and Summary**

TYPE OF REPORT [type of survey(s)]: Geology

TOTAL COST: \$20,801.51

AUTHOR(S): Nicholas Johnson

SIGNATURE(S):



NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): \_\_\_\_\_

YEAR OF WORK: 2011

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): 5186017 - 10 Feb 2012,

PROPERTY NAME: Pie Property

CLAIM NAME(S) (on which the work was done): CZM 1, CZM 2, CZM 3

COMMODITIES SOUGHT: Zinc, Lead, Silver

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN: N/A

MINING DIVISION: Omenica

NTS/BCGS: 94F11

LATITUDE: 57 ° 27 ' \_\_\_\_\_ " LONGITUDE: 125 ° 1 ' \_\_\_\_\_ " (at centre of work)

OWNER(S):

1) Canada Zinc Metals Corp.

2) \_\_\_\_\_

MAILING ADDRESS:

Royal Centre Suite 2055 - 1055 West Georgia St.

Vancouver, BC V6E-3P3

OPERATOR(S) [who paid for the work]:

1) Canada Zinc Metals Corp.

2) \_\_\_\_\_

MAILING ADDRESS:

Royal Centre Suite 2055 - 1055 West Georgia St.

Vancouver, BC V6E-3P3

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):

Kechika Trough, Gataga District, Sedex, Gunsteel Formation, Shales, Pie Property, Road River Group

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS: Assessment Reports #'s 7373, 7506, 8647

AR# 10744, 19829, 21676, 22678, 23077, 23563, 28976

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
<b>GEOLOGICAL (scale, area)</b>			
<b>Ground, mapping</b>	~1:10,000 ~919ha	CZM 1, CZM 2, CZM 3	\$20,801.51
<b>Photo interpretation</b>			
<b>GEOPHYSICAL (line-kilometres)</b>			
<b>Ground</b>			
<b>Magnetic</b>			
<b>Electromagnetic</b>			
<b>Induced Polarization</b>			
<b>Radiometric</b>			
<b>Seismic</b>			
<b>Other</b>			
<b>Airborne</b>			
<b>GEOCHEMICAL (number of samples analysed for...)</b>			
<b>Soil</b>			
<b>Silt</b>			
<b>Rock</b>			
<b>Other</b>			
<b>DRILLING (total metres; number of holes, size)</b>			
<b>Core</b>			
<b>Non-core</b>			
<b>RELATED TECHNICAL</b>			
<b>Sampling/assaying</b>			
<b>Petrographic</b>			
<b>Mineralographic</b>			
<b>Metallurgic</b>			
<b>PROSPECTING (scale, area) ~1:10,000 ~919ha</b>		CZM 1, CZM 2, CZM 3	
<b>PREPARATORY / PHYSICAL</b>			
<b>Line/grid (kilometres)</b>			
<b>Topographic/Photogrammetric (scale, area)</b>			
<b>Legal surveys (scale, area)</b>			
<b>Road, local access (kilometres)/trail</b>			
<b>Trench (metres)</b>			
<b>Underground dev. (metres)</b>			
<b>Other</b>			
		<b>TOTAL COST:</b>	\$20,801.51



TSX-V:CZX

**CANADA ZINC**

**METALS CORP.**

**SUMMARY REPORT ON EXPLORATION ACTIVITIES**

**ON THE CZM CLAIMS**

**PIE PROPERTY**

OMINECA MINING DIVISION, NORTHEAST BRITISH COLUMBIA

NTS map sheet 94F11

Latitude 57°27' N, Longitude 125°1' W

Prepared for:

**Canada Zinc Metals Corp.**

Royal Centre

Suite 2050 – 1055, W. Georgia St.

Vancouver, BC V6E 3P3

FMC#: 202429

By:

**Nicholas Johnson B.Sc.H**

**30 April, 2012**

## Summary

In early July of 2011 Canada Zinc Metals conducted a short mapping program across the CZM claims in the central area of the Pie property in order to obtain a better understanding of the geology which has seen little, if any, exploration activity since the late 1970's.

The three CZM claims are central to the Pie property which is situated in the Kechika Trough, the southern extension of the Selwyn Basin. The Kechika-Selwyn trend is host to numerous SEDEX type mineral deposits. The Kechika Trough is bounded to the west and east by carbonate and shallow water clastic rocks of the Cassiar and MacDonald platforms, respectively. The Kechika Trough hosts a sequence of upper Devonian to Mississippian basinal facies clastic sedimentary rocks that is a regional target for SEDEX type zinc lead silver deposits, such as the Cardiac Creek deposit (43-101 compliant indicated resource of 12.7 million tonnes at grades of 8.38 % zinc, 1.68 % lead and 13.7 g/t silver, and an inferred resource of 16.3 million tons at 7.38 % zinc, 1.34 % lead and 11.6 g/t silver ) and the nearby Cirque deposit (non 43-101 compliant resource of 54.0 million tonnes grading 7.7 % zinc, 2.0 % lead, 42.8 grams per tonne silver, and 47.5% barite ). The most favourable horizon at Akie property is a stratiform barite-sulphide layer, hosted within Upper Devonian shale of the Gunsteel Formation. Mapping on the nearby Akie property identified a number of northwest-trending panels of Gunsteel Formation shale. This shale has been the target of exploration for SEDEX type ore deposits since 1978.

The reconnaissance mapping across the CZM claims encountered units including rhythmic limestone and shale, Silurian siltstone, Ordovician graptolitic shale, and minor volcanics of the Ospika Volcanics of the Road River Group. Mapping suggests the CZM claims are covered by Road River Group rocks and that these units are part of a large antiformal structure present in the central area of the Pie property. Neither the rocks of the prospective Earn Group nor any significant mineralisation were encountered during the mapping program.

## Table of Contents

Title Page	i
Summary	ii
Table of Contents	iii
List of Figures	iii
Lists of Tables	iv
List of Plates	iv
List of Appendices	iv
1.0 Introduction & Terms of Reference	1
2.0 Property Location & Description	1
3.0 Accessibility, Infrastructure, Climate & Physiography	1
4.0 Exploration History	5
5.0 Geology	6
5.1 Stratigraphic Units	9
5.1.1 Kechika Group	9
5.1.2 Road River Group	9
Lower Road River Group	9
Ospika Volcanics	10
Silurian Siltstone	10
Upper Road River Group	10
5.1.3 Earn Group	10
Gunsteel Formation	10
Akie Formation	11
Warneford Formation	11
5.2 Regional Structure	11
5.3 Property Geology	12
6.0 Deposit Types	13
6.1 Regional Deposit Types	13
6.2 Deposit Model	14
6.3 Property Mineralisation	15
7.0 Exploration Program	16
7.1 Introduction	16
7.2 Program Objectives	17
7.3 Mapping	17
7.4 Prospecting	18
8.0 Discussion	19
9.0 Conclusions & Recommendations	19
10.0 References	20
11.0 Statement of Qualifications	22

## LIST OF FIGURES

Figure 1: Pie property location map	2
Figure 2: Pie property Tenure map	3

Figure 3: Regional Geology	8
Figure 4: Stratigraphic Column	10
Figure 5: Pie property Geology	In Pocket
Figure 6: Genetic Model of SEDEX deposit	15
Figure 7: CZM geology map	In Pocket

## LIST OF TABLES

Table 1: Pie property Tenure listing	4
Table 2: Exploration History	9
Table 3: Proposed Budget	19

## LIST OF PLATES

Plate 1: Akie Camp	16
Plate 2: Looking WSW towards West Pie area	17
Plate 3: Looking N across CZM claims	18
Plate 4: Looking S across CZM claims	18

## LIST OF APPENDICES

Appendix 1: Cost Statement	
----------------------------	--

## 1.0 Introduction & Terms of Reference

This report documents exploration work carried out in 2011 by Canada Zinc Metals Corp. (Canada Zinc) on its CZM claims which are a part of the Pie property claim block. Historical work by other operators prior to 2011 is summarized herein. The CZM claims (and the Pie property) are part of Canada Zinc's much larger Kechika Trough claim holdings. The author oversaw the field work in 2011 which was directed by a senior geologist under contract to Canada Zinc and supported by an able field crew supplied by Coast Mountain Geological. Field work on the CZM claims during 2011 focused on reconnaissance geological mapping and prospecting.

Field data was recorded in Universal Transverse Mercator (UTM) projection using North American Datum (NAD 83), located within Zone 10. All measurements in this report are in metric units. Monetary amounts are expressed in Canadian dollars.

## 2.0 Property Location & Description

Canada Zinc holds 100% of the CZM claims, a part of the Pie property, comprising 36 contiguous mineral claims, which cover a total of 116.8 square kilometres (11,680 hectares). The claims are located in the western ranges of the Northern Rocky Mountains in the Province of British Columbia (Figure 1). The CZM 1-3 claims were recently renewed to 2016. The remaining 33 Pie claims are in good standing until 2021 (Figure 2, Table 1). The Pie property claims adjoin Canada Zinc's Akie claim block to the south and their Cirque East claim block to the north; part the contiguous Kechika Trough block of claims with over 140 kilometres of total strike length.

The nearest town is Mackenzie BC, located approximately 250 kilometres southeast of the Pie property (Figure 1). The property lies within topographic map units 94F11, with the geographic centre located at approximately latitude 57° 27' N and longitude 125° 1' W. There are no historical workings or indications of previous exploration on the property.

## 3.0 Accessibility, Infrastructure, Climate & Physiography

Access to the property is via helicopter from Canada Zinc's Akie exploration camp, located 20 kilometres south of the Pie claims. The Cirque Mine access gravel road - currently not maintained - runs to within 2.6 kilometres of the CZM 1 claim block boundary, however the Paul River forms an obstacle in between. An unmaintained forestry road crosses into the western Pie claim block, but is similarly not suitable for four wheel drive access. Northern Thunderbird Air (NT Air) currently provides air transport services on a five day/week schedule to a gravel airstrip at the village of Tsay Keh, BC. Tsay Keh is located at the northern end of Williston Lake and is 60 kilometres south of the Pie property.

Prince George ('PG'), the major population and supply centre, is located 420 kilometres to the south. PG is a major hub for transportation, communications, and commerce. Some supplies are derived locally in Tsay Keh or from Mackenzie; the latter is located at the southern end of Williston Lake 250 kilometres southeast of the property (Figure 1). A gravel road connects Tsay Keh with Mackenzie. All of these communities have an active forestry industry, as well as a growing mining and exploration industry nearby - including a new mining operation at Mt Milligan - providing a growing local skilled labour force to draw on.



Figure 1: Pie property location map.



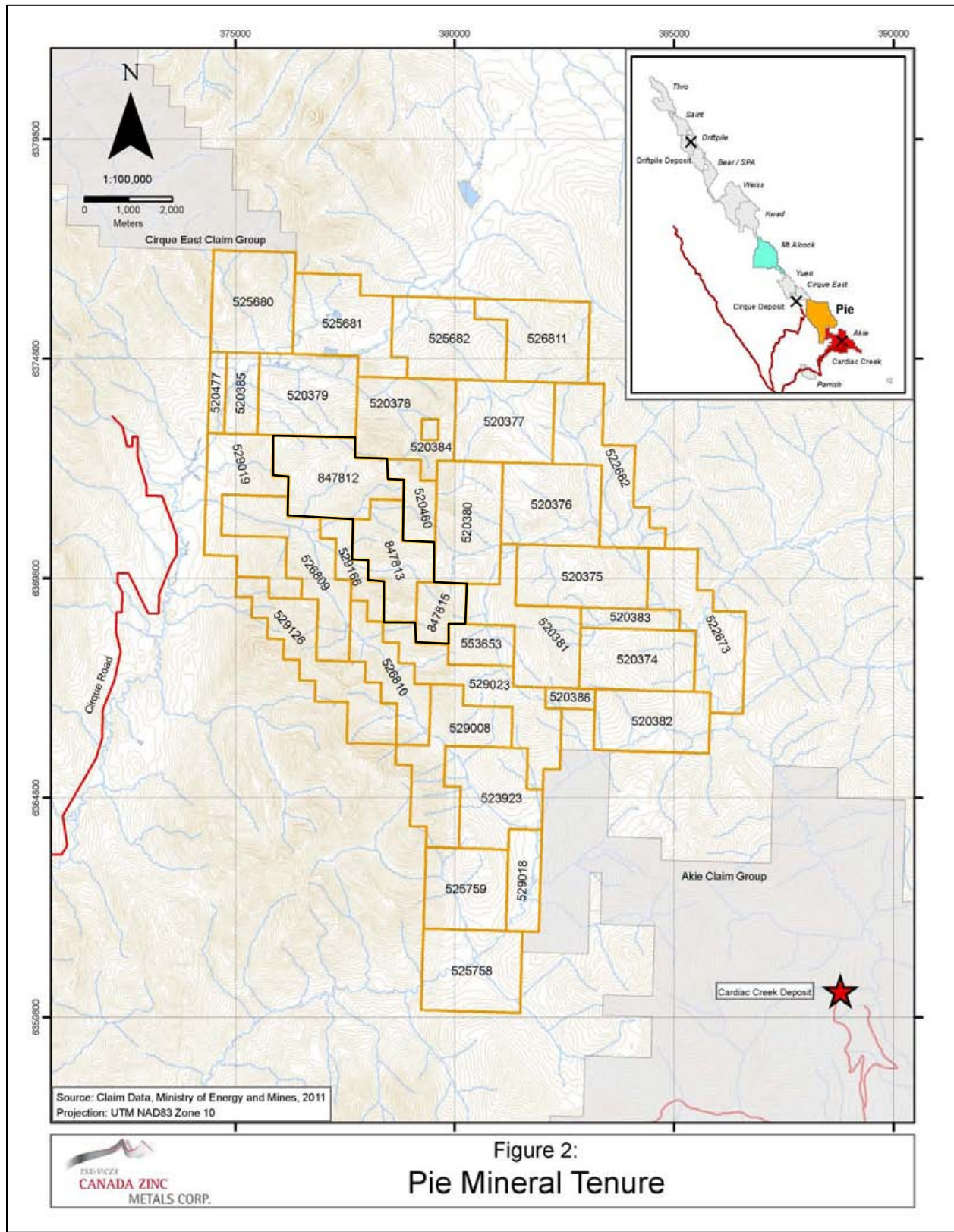


Figure 2: The Pie property tenure map. The CZM claims are 847812, 847813, and 847815 and outlined in black.

# Canada Zinc Metals Corp.

---

Claim name	Tenure No.	Owner	Expiry Date	Hectares
CZM1	847812	Canada Zinc Metals Corp.	27-Aug-16	417.63
CZM2	847813	Canada Zinc Metals Corp.	27-Aug-16	313.36
CZM3	847815	Canada Zinc Metals Corp.	27-Aug-16	139.31

**Table 1: CZM Claims tenure status**

The nearest BC Hydro electric transmission power source is the W.A.C. Bennett dam, capable of up to 2,730 megawatts of electricity, located on the Peace River approximately 220 kilometres southeast of the property (Figure 1). The privately owned Kemess power line runs north from BC Hydro's Kennedy substation, near Mackenzie, to the idled Kemess South mine northwest of the Pie property. The straightline distance from the Pie to the Kemess mine is approximately 145 kilometres. The cost of construction of a power line from the dam (or the Kemess mine site) to any future mining operation on Canada Zinc's Kechika Trough properties has not been assessed; however diesel generation is an alternative primary fuel source option.

The property and surrounding region is an area of moderate to steep mountainous terrain, ranging between 800 to 2300 metres above sea level. Parts of the area are above the tree line; covered by alpine meadow with mosses, lichen, and alpine flowers in summer, and with sparsely vegetated scree on steep slopes. Lower hillsides and valleys are thickly forested with willow, black spruce, alder, and black birch.

Northwest trending ridges predominate, following the dominant strike direction, transected by northeast trending drainages of the Paul River and Dell Creek. Northeast facing ridge slopes are generally steep, with outcrop exposure. Southwest facing ridge slopes tend to dip more moderately and are covered in vegetation.

The climate is influenced by both the Pacific Coast and the Rocky Mountains, resulting in highly variable, localized conditions for rainfall, snowfall, temperature and the number of sunshine hours. During the summer months, temperatures range between +5 to +30 degrees Celsius with moderate rainfall and/or snowfall at higher altitudes. During winter, temperatures can drop to minus 40 degrees Celsius, and can be accompanied by moderate accumulations of snow. The optimal season for field work is from May or June; when valleys become free of snow, through to late September; when winter weather generally returns.

## 4.0 Exploration History

Exploration history of the CZM claims has been very limited. No specific exploration program has focused strictly on the CZM claims. Exploration on the Pie property between 1957 to the present is summarized in Table 2, below.

**Table 1: Exploration History**

Year	Operator	Exploration Work
1957	Frobisher Ltd.	Prospected north of Gataga Lakes
1970	Geophoto Surveys	Reconnaissance stream sediment sampling for syndicate
1973	Pembina Pipeline Ltd, Sun Oil (Delaware) Ltd., General Crude Oil Co., Northern Ltd. JV with Canex Placer Ltd.	Exploration of stream sediment anomalies resulting in discovery of mineralized float on Driftpile Creek.
1974	Pembina Pipeline Ltd, Sun Oil (Delaware) Ltd., General Crude Oil Co., Northern Ltd. JV with Canex Placer Ltd.	Discovery of several barite-sulfide occurrences at Driftpile Creek from follow up of mineralized float found in 1973
1977	Cyprus Anvil Mining Corp., Hudson Bay Oil and Gas Ltd.	Completed geological mapping, diamond drilling on adjacent Cirque deposit 1978-1982
1978	Riocanex Inc.	Staked the Pie claims, undertook reconnaissance mapping, prospecting, silt sampling on Pie, hand trenching on the Main Pb showing
1979	Riocanex Inc.	Staked additional Pie claims, enlarged hand trenches at Main Pb, further geological mapping, soil sampling
1980	Rio Tinto Canadian Exploration Ltd.	Explored Main Pb showing: drilled 6 core holes for 1249.46m, completed detailed geological mapping, prospecting, silt and soil sampling, hand trenching, orientation HLEM and VLF-EM surveys
1982	Riocanex Inc. JV with BP Minerals Ltd.	Drilled 3 core holes for 1116.7m at Main showing
1991	Ecstall Mining Corp.	DIGHEM airborne survey over Pie and Cirque
1992	Minnova optioned from Ecstall	Soil sampling south of Main showing
1993	Metall Mining Corp.	Continued soil sampling program south of Main showing
1994	Metall Mining Corp.	Drilled 1 core hole for 520 m, conducted lithogeochemical survey
2006	Ecstall Mining Corp.	Drilled 12 holes on Pie; only 7 core holes for 2653 m reported
2007	Mantle Resources Inc.	Geological mapping, confirmation soil sampling at Main Pb showing
2008	Mantle Resources Inc.	Major soil sampling survey at North Pie, South Pie over entire known Pie Gunsteel panel, review of selected drill core, mapping at Main and Main Pb showings, compilation of data 1979-2006 including digitizing of selected silt, soil and rock geochemistry samples
2009	Canada Zinc Metals Corp.	Reconnaissance geological mapping and prospecting of central and western Pie property areas resulting in the discovery of the high-grade Pie Breccia showing, and of a new panel of Gunsteel shale along the western margin of the Pie property

## 5.0 Geology

The Pie property is located within the Rocky Mountain fold and thrust belt of northeastern British Columbia. The area lies at the margin of ancestral North America and was a depositional environment for clastic and carbonate sedimentary rocks of Late Cambrian to Late Triassic age (MacIntyre 2005).

The property is situated in the Gataga district - within the Kechika Trough; a southeastern extension of the Selwyn Basin. The Kechika Trough comprises a 1,200 kilometre long belt of sediments which formed off the western edge of ancestral North America. The Selwyn Basin is bounded to the west and east by carbonates and shallow water clastic rocks of the Cassiar and MacDonald Platforms, respectively (Taylor and MacKenzie 1970 *in* MacIntyre 2005). Cambrian to Devonian rocks of the Selwyn Basin host world-renowned sedimentary exhalative (SEDEX) base metal deposits, including the Howards Pass, Anvil and MacMillans Pass districts (Abbott and Turner 1991).

The Kechika Trough was an area of deposition for a thick succession of basinal facies clastic and subordinate carbonate rocks along 180 kilometres of Palaeozoic and Early Mesozoic age sediments, and was subsequently thrust up into a series of southwest dipping fault slices or 'panels' (Figure 3). A generalised stratigraphic column for the Kechika Trough is presented in Figure 4. As noted on this figure, at least three stratigraphic levels within the basinal succession are prospective for sedimentary exhalative (SEDEX) type zinc-lead-silver (Zn-Pb-Ag) mineralization. Two of the prospective horizons are within the Gunsteel Formation - a carbonaceous shale unit, the third prospective unit is in the underlying Road River Group.

The basinal facies rocks occur in a number of southwest-dipping, north easterly-vergent thrust fault panels which repeat the stratigraphy. The following is a summary of the stratigraphic units present in the general area of the Pie property.

This description of the geological setting and regional geology above was largely derived from a report written for Mantle Resources Inc. by D.G. MacIntyre (2005), with only minor modifications. A description of the regional stratigraphy and structure follows from work by MacIntyre and others, as synthesized in MacIntyre (1998, 2005). A more detailed review of the geological history is available by the individual authors cited by MacIntyre.



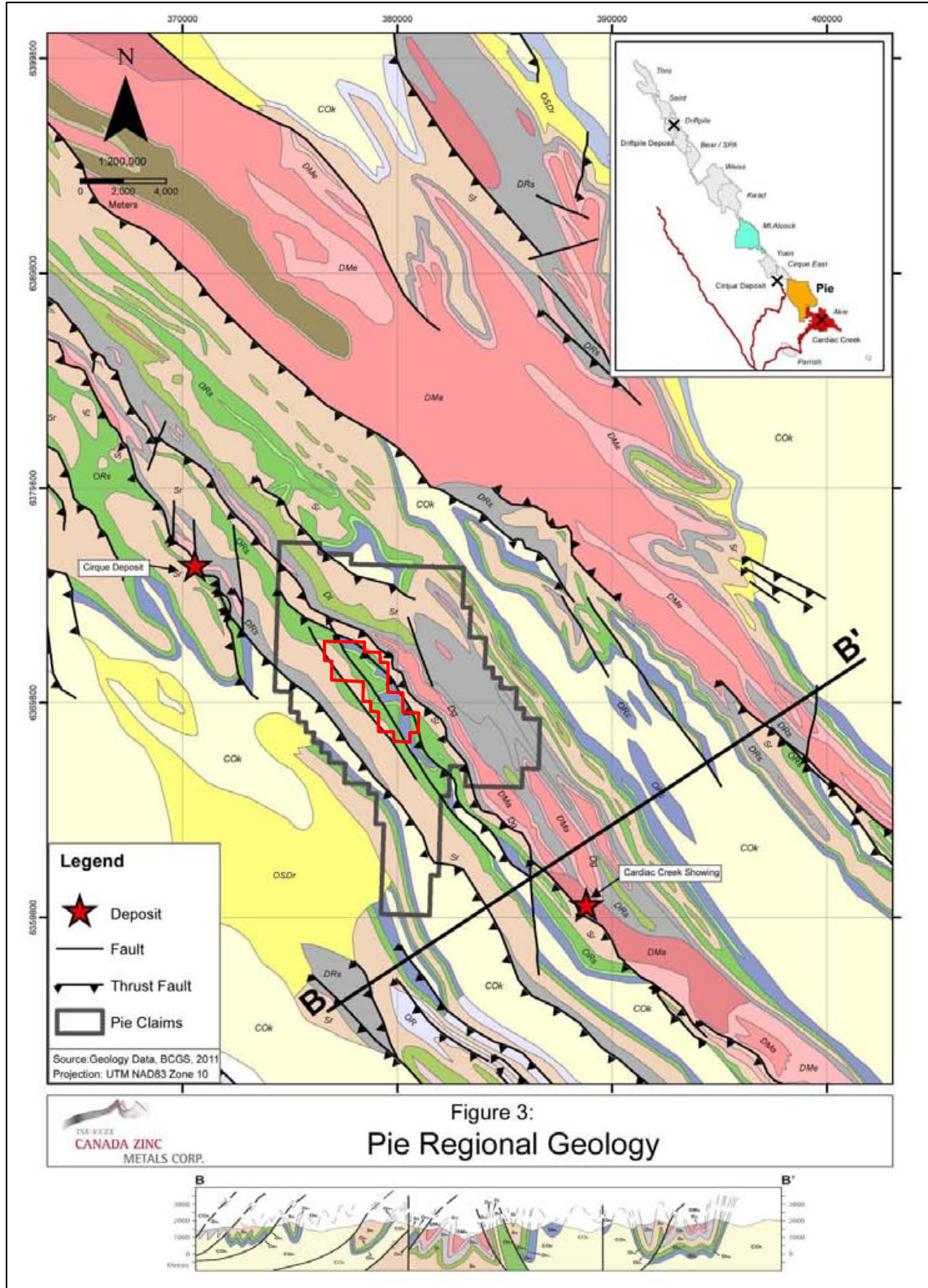




Figure 1: Regional Geology with Pie Property claim boundary and CZM claims outlined in red

## KECHIKA TROUGH GEOLOGY LEGEND


### TRIASSIC


 Ts Dolomitic siltstone, minor limestone, dolostone.


### CARBONIFEROUS to PERMIAN


 Mp Pale grey to greenish grey chert.

### UPPER DEVONIAN to MISSISSIPPIAN


 DMe Argillite, slate, shale, locally carbonaceous and pyritic; chert arenite and pebble conglomerate, polymictic conglomerate; limestone

 DMa AKIE FORMATION: brown weathering silty shale; minor siltstone.


 Dg GUNSTEEL FORMATION: blue grey weathering chert, cherty mudstone, argillite, shale; nodular and bedded barite +/- sulphides; minor pelagic limestone.

 Db Black, siliceous shale, minor sandstone and pebble conglomerate, barite.

### LOWER to MIDDLE DEVONIAN

 Dl Medium to thick-bedded micritic and bioclastic limestone reefs and carbonate buildups; minor shaley argillite and chert; limestone, dark grey, argillaceous.


### UPPER SILURIAN to MIDDLE DEVONIAN

 Dc Mainly limestone in western part of 94F; basal quartzities, shale and limestone debris flows in eastern part of 94F.


### ORDOVICIAN to DEVONIAN

 OSDr Undivided, shale, black, graptolitic, mainly Ordovician; siltstone, tan, platy, mainly Silurian; sandstone, calcareous shale.


### UPPER SILURIAN to MIDDLE DEVONIAN

 DRs Rusty-weathering black silty shale, limey siltstone; lower section includes interbedded limestone debris flows, crinoidal siltstone, calcarenite, graptolitic black shale, quartzose conglomerate and wacke near carbonate platform and reefs; basal chert.

### SILURIAN


 Sr Brown to buff weathering dolomitic siltstone; platy, flaser-bedded; minor quartz wacke, limestone olistostromes; includes basal unit of dolostone, mudstone, black chert and argillite.

### ORDOVICIAN

 OR Undivided shale, limestone, siltstone, limestone debris flows.


### MIDDLE to UPPER ORDOVICIAN


 ORs Black graptolitic shale, minor black chert, siltstone.

 ORv Orange weathering ankeritic tuffs, altered flows and sills.


 ORq Mainly quartz wacke turbidites with minor interbeds of graptolitic black shale.

### LOWER to UPPER ORDOVICIAN

 ORc Platy, laminated buff to cream weathering, limey siltstone, mudstone, limestone and debris flows near base.


 OSk SKOKI FORMATION: medium to thin-bedded dolostone, limestone, limey mudstone, crinoidal.

### CAMBRIAN - ORDOVICIAN

 COk Nodular, wavy-banded phyllitic siltstone, limestone, shale, minor green tuff.

### CAMBRIAN

 mCc Medium to thick-bedded limestone patch reefs, minor quartz wacke.

 Cp Quartzite, orange-weathering dolostones, minor siltstone, shale; may locally include Lynx Formation equivalents.

Legend for Figure 3 Regional Geology (after BCGS 2011)

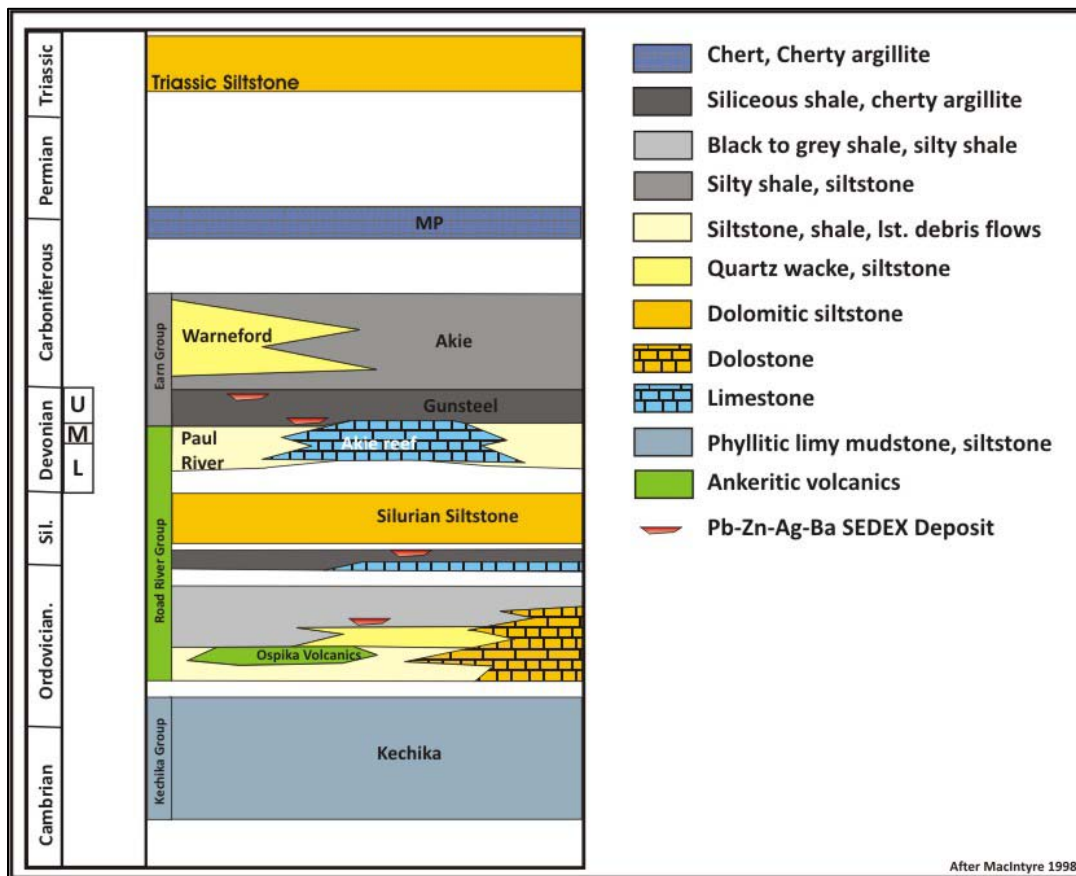


Figure 2: Stratigraphic Assemblages of the Kechika Trough after MacIntyre (1998, 2005)

## 5.1 Stratigraphic units

### 5.1.1 Kechika Group (Cambrian to early Ordovician)

The oldest rocks exposed in the vicinity of the Pie property are assigned to the Kechika Group (Figure 4). This stratigraphic unit comprises mainly calcareous argillite and argillite of Late Cambrian to Early Ordovician age. The Kechika Group also includes limestone and rare tuffaceous strata. The unit is distinguishable in the field by the ubiquitous presence of boudins (T. Strate *pers. Comm.*).

### 5.1.2 Road River Group (Ordovician to latest Middle Devonian)

The Kechika Group is overlain unconformably by the Road River Group. This stratigraphic unit comprises a succession of calcareous siltstone, shale, limestone and minor volcanic rocks. This report uses the revised description from Road River Formation to Road River Group, recommended by MacIntyre (1998, 2005).

#### Lower Road River Group

The lower (Ordovician) part of the Road River Group includes a lower unit of thinly bedded cream, beige and reddish brown-weathered, laminated calcareous siltstone and shale with intercalated limestone



turbidites and debris flows. The calcareous siltstone grades up section into a distinctive black shale unit with abundant Middle to Late Ordovician graptolites.

## **Ospika Volcanics (Late Ordovician)**

Late (?) Ordovician volcanic rocks occur as discontinuous lenses, beds of green mafic flows or microdioritic sills, and as orange-weathering ankeritic crystal and lapilli tuff (MacIntyre 2005). These rocks depart from the stratigraphic relationship indicated in Figure 4; they are listed in the BC government database (Massey *et al.* 2005) with an age range from Middle Ordovician to Middle Devonian in age. However, MacIntyre (2005) notes that in some areas, such as the Akie River area, the volcanic rocks are interbedded only with the late Early to early Middle Ordovician black shale facies and time-equivalent platformal rocks, within an areal extent parallel to the central axis of the Kechika Trough. Their composition and linear distribution suggest they were erupted along trough-bounding rifts.

## **Silurian Siltstone Unit**

The Ordovician graptolitic black shale of the Road River Group rocks is overlain unconformably by basal Silurian thin-bedded to cross-laminated limestone and dolostone beds. A second unconformity separates the basal Silurian calcareous beds from the overlying tan to orange-brown weathered dolomitic siltstone interbedded with varying proportions of orange-weathering limestone and dolostone.

## **Upper Road River Group**

Thick carbonate buildups of the Akie, Kwadacha and Pesika Reefs, which range in age from late Early to late Middle Devonian, disconformably overlie the Silurian siltstone unit. Early Devonian limestone turbidites and shale is absent below the thickest parts of the reefs, suggesting that these areas were topographic highs where the Early Devonian strata were either eroded away or never deposited. Beneath the reefs, the upper part of the Silurian section is often red to pink-weathered, suggesting possible exposure and oxidation prior to the main episode of marine transgression and carbonate deposition (MacIntyre 1998).

The Akie and Kwadacha Reefs are up to 200 metres thick along their western margins and appear to thin gradually to the north and east. The reefs are mainly composed of micritic and bioclastic limestone with occasional thin bedded shaley and argillaceous intervals. Locally, the reefs are very fossiliferous with crinoid, coral and stromatoporoid-rich zones. The presence of crinoid ossicles with twin axial canals, typically occurring near the tops of the reefs, indicates a probable late Early to early Middle Devonian age (MacIntyre 1998).

### **5.1.3 Earn Group (Late Devonian to Mississippian)**

The contact between the top of the Road River Group and base of the conformably or para-conformably overlying Earn Group is probably diachronous. Until shown otherwise, the contact is inferred to lie at the transition from Givetian to Frasnian.

MacIntyre (1992) and other workers informally divided the Earn Group into three formations. From oldest to youngest, these are the Gunsteel, Akie, and Warneford Formations. Rocks of the Gunsteel and the Akie Formations occur throughout the belt. The Akie Formation should not be confused with the Akie Reef; the latter is a facies of the Road River Group.

## **Gunsteel Formation**



The Gunsteel Formation is a thick, fairly homogeneous sequence of black, graphitic, generally massive, featureless shale, with a distinctive Gunsteel-blue coloured weathering. These shales are locally weakly siliceous, with cherty, carbonaceous and silty beds. Angular to sub-rounded, somewhat flattened and often weakly calcareous clasts occur throughout the unit but appear to increase down-section. MacIntyre (1998) suggests these clasts are derived from the crinoidal interbasinal reefs. Small, millimetre scale barite and calcite nodules often define bedding in otherwise featureless shale.

At or near the base of the unit, the shale is richer in silt, more siliceous and, as noted above, contain greater amounts of reef-derived clasts and barite nodules, which decrease up-section. The silty shale is thickly to thinly laminated. Pyritic banding with zinc-lead-silver mineralization decreases up-section from the base of the formation. MacIntyre (2005) suggested that the pyritic bands are situated closer to the top of the Gunsteel Formation. Information acquired during the 2006 Ecstall drill program indicates that sulphide bands also occur near the base of the Formation. Barite beds with sulphide mineralization (pyrite, sphalerite and galena) are typically situated at the base of the Gunsteel Formation. These beds are locally deformed and vary from massive to laminar. The barite beds are interbedded with black shale layers up to 5 metres thick.

## **Akie Formation**

Gunsteel rocks are conformably overlain by the Akie Formation; recessive, thick bedded, non-siliceous, rusty brown to tan weathered medium grey aluminous shale of probable Late Devonian to Mississippian age. These formations were deposited during a major, eastward advancing, marine transgression that occurred in Late Devonian to Mississippian time. The Akie Formation shale is difficult to distinguish from other shale members in the district. However, in general they have a phyllitic sheen on cleavage surfaces and shows faint colour banding, which is less common in other shale members. Orange weathered calcarenite beds, although rare, are also locally present. The basal part of the Akie Formation typically weathers to a rusty brown and in places contains pyrite laminae and barite nodules.

## **Warneford Formation**

The Warneford 'Formation' informally comprises quartzose turbidites, characterized by grey-weathered resistant beds of chert pebble conglomerate, quartz wacke and siltstone. These rocks interfinger with Late Devonian to Mississippian black shale of the Akie Formation in the Warneford River area, north of the Pie property. This Formation is thin, intermittent or absent in many parts of the Pie area. However, thin quartzose siltstone and wacke beds that occur in the Gunsteel section that hosts the Cirque deposit may be distal equivalents of the Warneford Formation.

## **5.2 Regional structure**

The geology of the Kechika Trough is typical of the thin-skinned tectonic style of the Rocky Mountain Fold and Thrust Belt (MacIntyre 1998, 2005). Northeast-vergent compression caused detachment of Palaeozoic strata from the rigid crystalline basement, partially stacking and also folding the relatively incompetent plates (composed of basinal facies rocks) along a series of imbricate thrust faults.

The structural style changes across the map area from west to east. In the west, imbricate, southwest dipping reverse faults bound asymmetric northeast vergent overturned folds; in the east, outwardly dipping reverse faults bound major synclinoria and truncate folds within overriding anticlinoria. These eastern synclinoria are characterised by large-scale upright folds and preserve the Devonian strata MacIntyre (1998, 2005).

MacIntyre also infers that high-angle growth faults bounding the Devonian-Mississippian depositional troughs were reactivated to form major thrust faults during Tertiary compression. He cites the proximity of Palaeozoic rift-style volcanism, fracture-channelled mineralizing fluids, clastic fans and reef margins to the present thrust faults as evidence that these faults were active in Palaeozoic time.

Pigage (1986) recognized two coaxial phases of deformation at the Cirque deposit, the largest known Pb-Zn-Ag deposit within the Kechika Trough. The earlier ubiquitous (D1) phase includes northeast-vergent tight asymmetric folds with gently dipping southwest limbs and steep to overturned northeast limbs; the latter are often offset by high angle reverse faults, juxtaposing Ordovician and Silurian strata against Devonian Gunsteel shales. The shale typically has a penetrative slaty cleavage that is axial planar to the S1 folds. At the Cirque deposit, a second (D2) phase of deformation folded the early slaty cleavage and developed a penetrative crenulation cleavage, axial planar to these late, open to upright, northeast vergent folds (Pigage 1986).

North to northeast trending high angle faults, some with a strike-slip component, are interpreted as synthetic shears related to an oblique compressional stress regime of inferred Tertiary age (MacIntyre 2005).

## 5.3 Property Geology

The following geological description was taken from Morrison's (2006) report with minor modifications. The similarity of many of the geologic units presents a major challenge in geologically mapping the Kechika Trough area. Complicating this, the Rocky Mountain fold and thrust belt has caused structural complexities such as older-over younger stratigraphy due to folding and thrust faulting.

The Pie property is underlain by four main northwesterly trending zones of sediments. The westernmost belt comprises a package of Ordovician and Silurian siltstone interbedded with recessive, steel grey to black weathered upper Devonian to Mississippian shale and siltstone of the Gunsteel Formation – part of the Earn Group. The adjacent belt immediately to the east consists of brown to orange weathered Silurian siltstone. The next belt adjacent to the east consists of further recessive, steel grey to black weathered shale and siltstone of the Gunsteel Formation. The most eastern belt of rocks consists of grey weathered, fossiliferous limestone of the lower to middle Devonian Kwadacha Formation.

Mapping suggests that the Kwadacha limestone is folded into a gentle anticlinal structure with a plunge of 10° to the southeast. Drilling has shown however that the limestone is folded into more than one subordinate semi-parallel anticline southwest of the main anticlinal structure.

The Gunsteel Formation shale and siltstone overlying the limestone is locally folded into tight synclines, some of which are slightly overturned. The Silurian siltstone is in thrust fault contact with the Devonian shale. Sulphide-bearing deposits including Mt. Alcock, Cirque, Fluke and Elf are restricted to a belt of Gunsteel Formation rocks bounded by the Akie reef to the east and uplifted Ordovician and Silurian rocks to the west. The West Pie panel of Gunsteel Formation shale lies along this strike trend. A recent interpretation of the Pie property geology can be seen in Figure 5.



## 6.0 Deposit Types

### 6.1 Regional Deposit Types

The discovery of the Tom zinc-lead-silver deposit in 1951 and the Faro and Jason deposits in 1965 and 1975, respectively, demonstrated potential for large tonnage, sediment-hosted stratiform massive sulphide and barite deposits in the Paleozoic rocks of the Selwyn Basin. The discovery of these sedimentary-exhalative massive sulfide (SEDEX) deposits in the Yukon prompted subsequent regional geological and geochemical exploration programs during the 1960s and 1970s. As a result of these exploration activities, a number of SEDEX mineral occurrences with pyrite, sphalerite and galena were discovered within the southeastern extension of this basin into British Columbia; known as the Kechika Trough.

Exploration activity in the Kechika Trough has, to date, targeted zinc-lead +/- silver mineralization associated with stratiform bedded barite, which occurs associated with exhalative pyrite beds near the base of the Late Devonian Gunsteel Formation. Deposits in the area include Cirque/South Cirque, Cardiac Creek (Akie) (Figure 3), and Driftpile. Several other showings, drill tested since the 1970s, include Pie, Fluke, Elf and Mount Alcock; all of which exhibit similar SEDEX style mineralization hosted by Gunsteel Formation shale.

The Cirque deposit, the most significant discovery in the Kechika Trough, was discovered near Paul River in 1977 by the Cyprus Anvil-Hudson's Bay Oil and Gas Ltd. joint venture. Cirque and South Cirque deposits, separated by a distance of 1 kilometre, currently have a combined historical resource estimate of 54 million tonnes grading 7.7 % zinc, 2.0 % lead, 42.8 g/t silver, and 47.5 % barite (not 43-101 compliant) (MacIntyre 1983). The undeveloped deposits, located 20 kilometres northwest of Cardiac Creek, are held under a joint venture by Teck Resources Ltd and Korea Zinc Company.

The Cardiac Creek deposit, part of the Akie claims held by Canada Zinc, currently has an indicated resource of 12.7 million tonnes at grades of 8.38 % zinc, 1.68 % lead and 13.7 g/t silver, and an inferred resource of 16.3 million tonnes at 7.38 % zinc, 1.34 % lead and 11.6 g/t silver (CZX 2012). The deposit was discovered in 1994 by Metall Mining Corporation (later Inmet Mining Corporation) during a geological mapping and geochemical sampling program on ground optioned from Ecstall Mining Corp.

Canada Zinc intersected semi-massive nickel mineralization in drill hole A-10-72, during step-out drilling along the Cardiac Creek deposit in 2010 (*pers.obs.*). This style of polymetallic nickel-sulfide mineralization in sediments is similar to the Nick deposit, also located in the Selwyn Basin (Hulbert *et. al* 1992). Stratiform nickel, zinc and platinum group element mineralization is hosted by Devonian black shale in the Nick deposit, in the Yukon Territory. Hulbert (1992) refers to similar-style deposits of nickel-molybdenum mineralization currently being mined from thin (centimetre scale), high-grade lenses in China.

Driftpile Creek, held by Teck and discovered in 1972 in the central part of the Kechika Trough, has a small but high grade historical resource of 2.44 million tonnes grading 11.9 % zinc and 3.1 % lead, at 8 % zinc cut-off (not 43-101 compliant) (Nelson *et. al* 1994).

The Mt. Alcock property, located 20 kilometres north of the Cirque deposits, yielded a historic drill intercept of 8.8 metres grading 9.3% combined zinc-lead, and 1.2 oz/ton silver (Murrell and Roberts 1990).

The Kechika Regional claims package held by Canada Zinc encompasses the Cardiac Creek deposit on the Akie claims, the claims surrounding Teck's Driftpile deposit, in addition to the Pie and Mt. Alcock showings. The Elf showing, located nearby to the southeast, is held by others.

## 6.2 Deposit Model

Zinc, lead and silver mineralization discovered on the Pie property is SEDEX style, deposited within basinal facies rocks of the Gunsteel Formation (MacIntyre, 1995, 1998). Sedimentary exhalative (SEDEX) deposits formed by the precipitation of sulphide and sulphate minerals from metalliferous (zinc, lead and silver-rich) brines exhaled along submarine faults into marine sediments. These hydrothermal fluids were most likely derived from the sedimentary pile during basin subsidence or by seawater convection processes (MacIntyre (2005). Metalliferous fluids were vented on the seafloor and in sub-seafloor vents, then bound in sphalerite and galena to form tabular ore bodies, interbedded with iron sulphides (Goodfellow and Lydon 2007). Bedding-parallel bands of barite nodules and laminated pyrite are common near the deposits, suggesting distal and proximal mineralization respectively (*pers. obs.*). Figure 6 shows a schematic diagram of a SEDEX deposit in cross-sectional view, in the context of the Kechika Trough.

Footwall units comprising siltstone, shale, limestone and other sedimentary units are typically rhythmically bedded and variably silicified. The high silica, high carbon and low clastic content of these footwall rocks suggest that they were deposited in a restricted marine basin with low sedimentation rates (MacIntyre 2005).

Host rocks are generally not well exposed on Pie and the surrounding properties; and baritic 'kill zones' and iron seeps are often the only surface indicators of mineralization. Both barren barite and mixed barite-sulphide deposit types occur in the district. The mineralogy of these deposits is simple, consisting of pyrite with varying proportions of sphalerite and galena, sometimes in a barite host. Copper content is generally very low.

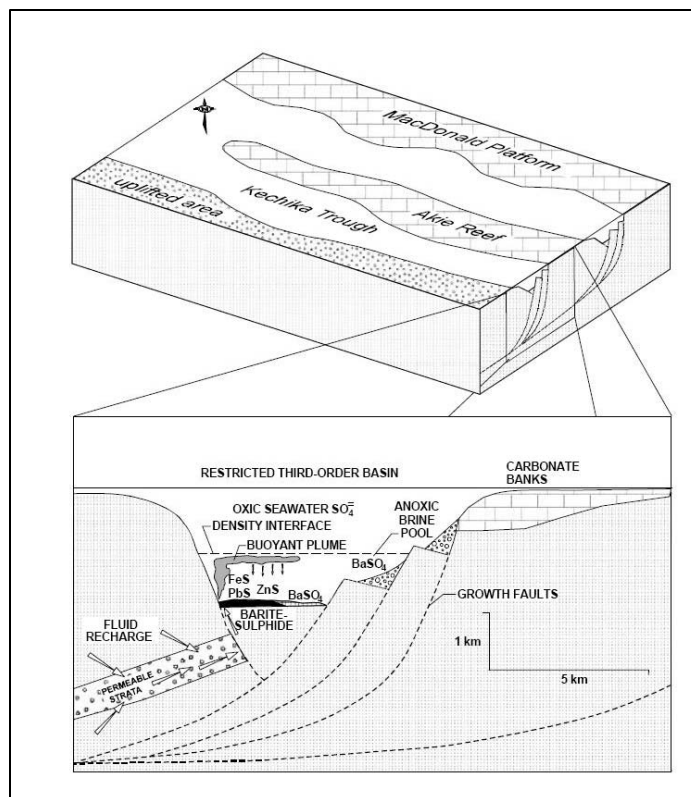


Figure 6: Genetic model for formation of SEDEX deposits in the Kechika Trough (after MacIntyre 1998)

### 6.3 Property Mineralisation

Mineralization on the Pie property consists of five types including four types of zinc+/-lead, and one type of copper mineralization (Baxter 1994, *pers. obs.*). Sulphides are generally spatially associated with barite gangue. Sulphide and barite crystallinity and distribution vary from very fine-grained and (generally) laminated, to relatively coarse-grained and massive (MacIntyre 2005). In order of importance, the known mineralization types are:

- (1) Middle Devonian bedded barite and baritic shale with sulphides in two apparently continuous zones which underlie the north-central and southeast parts of the property. Upper Devonian nodular barite at the base of the Gunsteel Formation in the south-central part of the Pie property,
- (2) Galena-bearing, baritic vein float in a narrow gully on the north-central part of the Pie claim group,
- (3) Coarsely crystalline, white barite and quartz veins, commonly containing sphalerite, in float trains, outcrops and drill core at several localities across the Pie property,
- (4) Sphalerite, accompanied by quartz, pyrite and manganese minerals, associated with intensely silicified breccia zones in limestone in the east-central part of the Pie property,
- (5) Very minor chalcopyrite, as disseminations with pyrite in the matrix of a middle Devonian debris flow or intraformational conglomerate in the southeast corner of the Pie claim group (Baxter 1994), associated with carbonate veins in Silurian siltstone, and as vein-hosted malachite with sphalerite in Gunsteel Formation at West Pie (T. Strate, *pers. Comm.*), located west of the CZM claims.

Where present, massive barite or barite-sulphide deposits grade laterally into thin (less than 10 metres) beds of unmineralized sediment with laminae and lenses of nodular barite, forming a widespread stratigraphic marker near the top of the Gunsteel Formation. Close to the barite-sulphide deposits, the

basal beds of the overlying Akie Formation often contain carbonate nodules and pyrite laminae in distal turbidite units (MacIntyre 2005).

The exploration target on the Pie claims is Cardiac Creek style mineralization; discovered on the adjacent Akie claims. A description of this style of mineralization follows, modified from MacIntyre (2005).

*“In 1994, massive sulphide mineralization was discovered in gossanous outcrops in Cardiac Creek. The stratigraphic position of this mineralization corresponds to the base of the Gunsteel Formation [defined to date by drilling over a strike length of 1500m and tested to depths of 800m below surface]. Mineralization occurs as centimeter scale layers of finely laminated, fine grained pyrite, sphalerite and galena interbedded with barren black shales and cherty argillites of the Gunsteel Formation”.*

Age-dating of conodonts from fragments of deposit footwall sedimentary breccias define these units as being Famennian or younger in age. Comparison of a goniatite (ammonoid) fossil from the massive sulfide ore zone in the Cardiac Creek deposit of lower to middle Famennian (upper Devonian) age range, with conodonts of upper Famennian age from the Cirque deposit, suggests the Cardiac Creek horizon is slightly older (Paradis et al. 1998 in MacIntyre 2005).

The age of mineralization of the West Pie showings most likely correlates with the age of the Cirque deposit, since West Pie is located along strike on the same panel of Gunsteel Formation shale (T. Strate, *pers. Comm.*). Similarly, the age of mineralization of the Pie showings likely correlates with the age of the Cardiac Creek deposit.

Nick style nickel mineralization intersected in drilling elsewhere in the Selwyn basin (Hulbert *et. al* 1992), including at the Cardiac Creek deposit (*pers. obs.*) suggests potential exists for this style of mineralization on the Pie claims.



## 7.0 Exploration Program

### 7.1 Introduction

The 2011 exploration program was based out of a trailer camp located at the 24.5km mark of the Akie mainline forestry service road, which is situated in an old Canfor forestry cut block (Plate 1). The camp can accommodate up to a maximum of 50 people. The camp is seasonal and was re-opened in early June. The short mapping and prospecting program on the CZM claims occurred over three days between the 8<sup>th</sup> to the 13<sup>th</sup> of July. Exploration personnel for the duration of this short program consisted of 5 people.

An expediter in Mackenzie provided logistical support for the camp, arranging the shipment of major supplies. Minor supplies were obtained locally from the village of Tsay Keh Dene located at the northern end of the Williston Lake reservoir.

There were a variety of contractors on site providing services to the program. The key contractors are listed below.

- **Coast Mountain Geological Inc.:** Provided administrative, logistical and technical support to the project in the form of geologists, geotechnicians, and a safety officer.
- **Interior Helicopters:** Provided helicopter support to the project.
- **ESS:** Provided catering and management services for the camp.
- **Kwadacha Natural Resources Agency & Ingenika Logging:** Provided local labour, and forestry services.



Plate 1: Akie Camp Photograph



Claimed expenditures on the CZM claims during the 2011 exploration program total \$20,801.51 spent primarily on mapping, prospecting and their associated costs. The breakdown of these costs can be found in Appendix 1.

## 7.2 Program Objectives

The 2011 exploration program focused on the three CZM claims (1 to 3) with the intent to prospect and map the area at a reconnaissance level. The results of this short program are summarised below.

## 7.3 Mapping

Basic reconnaissance mapping was completed across the CZM 1 to 3 claims. Traverses were restricted primarily to ridgelines and open ground, above the tree line, due to ease of access and availability of outcrop. However, outcrop exposure along the northwestern extents of the claims was poor due to vegetation and forest cover. The mapping identified rocks of the Road River Group predominantly in the southeastern parts of the claims. The mapping suggests that the claims are covered entirely by rocks of the Road River Group, consisting of rhythmic limestone of the Silurian Siltstone unit and the Ordovician graptolitic shale. Outcrops of the Silurian Siltstones occurred outside the boundaries of the CZM claims with the exception of a few present along the northeastern boundaries. There are a few scattered outcrops of the Ospika volcanic unit present, intercalated with siltstone and shale noted above. Rocks of the Kechika Group were not identified, though historical mapping by Rio Tinto in the late 1970's observed this unit adjacent to the southeast of the claims. The rocks of the prospective Earn Group were not mapped in the claim area. Cleavages were oriented in two primary directions at 125° to 140° and 310° to 340° with shallow dips at 40° to 45° degrees. Minor faulting was inferred across the central area of the claims based on field observations and topographical lineaments, with an unknown amount of displacement. Plates' 2 to 4 show the terrain and some of the geology of the CZM claims. A basic geological interpretation can be seen in Figure 7.



Plate 2: Looking WSW towards West Pie area of the Pie property  
(photo taken by Tanya Strate 2011)



**Plate 3** Looking N across CZM claims. Note the contact between the dolomitic siltstones and the graptolitic black shales (Photo taken by Tanya Strate 2011)



**Plate 4** Looking S across CZM claims towards the hinge of the anticline that covers the claims. (Photo taken by Tanya Strate 2011)

## **7.4 Prospecting**

Prospecting during the mapping did not identify any occurrences of SEDEX style mineralisation nor mineralisation present in veining or other hosts.

## 8.0 Discussion

Results from the 2011 mapping program on the CZM claims has allowed a basic geological interpretation to be completed. Rocks of the Road River Group were encountered in the survey and no new lithological units were recognised. The mapping completed by Rio Tinto in the late 1970's suggested the presence of a large scale antiform present throughout the CZM claims. The basic mapping conducted on the CZM claims by Canada Zinc appears to support this idea with progressively younger rocks being present away from the core of the fold; represented by the Kechika Group rocks located just to the southeast of the claims. However, structural information is limited to support this idea conclusively.

## 9.0 Conclusions & Recommendations

The mapping program allowed for a basic geological interpretation to be completed across the CZM claims which historically had seen little exploration work. The mapping identified Road River Group rocks and has improved the understanding of the stratigraphy across the CZM claims. However, neither the prospective Earn Group rocks nor any mineralisation were identified on the CZM claims.

Limited follow up work is recommended for the CZM claims. A proposed budget is outlined in Table 3. This work should include:

- Additional mapping across the CZM claims to enhance the geological and structural understanding of the central area of the Pie property, and tie in with prospective units mapped to the east and west.
- A VTEM or ZTEM airborne electromagnetic survey over the entire Pie property to help delineate geology, structure and possibly identify other areas of interest within the CZM claims which would warrant follow-up ground work. The amount outlined in the proposed budget would represent just a portion of the overall cost associated with the entire Pie property.

ITEM	COST
Geophysics Survey (VTEM/ZTEM)	\$25,000
Personnel (3p over 1wk)	\$15,000
Sampling	\$2,500
Helicopter	\$25,000
Accommodations	\$5,000
Expenses	\$2,500
Subtotal	\$75,000
Contingency (10%)	\$7,500
<b>Total</b>	<b>\$82,500</b>

Table 3 Proposed budget

## 10.0 References

- Abbott, J.G. and Turner R.J.W., (comps.), 1991, Setting of stratiform, sediment-hosted lead zinc deposits in Yukon and northeastern British Columbia. In *Mineral Deposits of the Northern Canadian Cordillera, Yukon-Northeastern British Columbia, Field Trip 14*, J.G. Abbott and R.J.W. Turner (eds.), Geological Survey of Canada, Open File 2169, 320p.
- Baxter, P. 1994, Diamond Drilling and Soil Geochemical Assessment Report: Pie Claims. Metall Mining Corporation (operator) for Ecstall Mining Corporation. Assessment Report 23563.
- Carne, R.C. 1982 Report on Diamond Drilling on the Pie Claims. Archer Cathro & Associates Ltd. for Riocanex Inc. Assessment Report 10744.
- CZX 2012 Akie Property-Cardiac Creek Zn-Pb-Ag Deposit: Updated Resource Estimate for Canada Zinc Metals Corp. Press release 14 March 2012 available [www.SEDAR.com](http://www.SEDAR.com)
- Dadson, P.A. 2008 Assessment Report on the Pie Property: Data Compilation, Prospecting, Rock Sampling, Geological Mapping and Soil Geochemistry, for Mantle Resources Inc. *Unpublished*.
- Goodfellow, W.D. and Lydon, J.W. 2007 SEDEX Deposits in *Mineral Deposits of Canada: A Synthesis of Major Deposit Types, District Metallogeny, the Evolution of Geological Provinces, and Exploration Methods* pp. 163-184. W.D. Goodfellow (Ed.) *Special Publication No. 5* of the Geological Association of Canada.
- Hodgson, G.D. 1979 Pie Claims. Riocanex Ltd. Assessment Report 7373.
- Hodgson, G.D. and Faulkner, R.L. 1979 Pie Claims. Riocanex Ltd. Assessment Report 7506.
- Hodgson, G.D. and Thompson, J.F.H. 1980 Pie Claims, BC. Rio Tinto Canadian Exploration Ltd. Assessment Report 8647.
- Hulbert, L.J., Carne R.C., Gregoire D.C., and Paktunc D. 1992 Sedimentary nickel, zinc, and platinum-group-element mineralization in Devonian black shales at the Nick Property, Yukon, Canada; a new deposit type. *Exploration and Mining Geology, January 1992, v. 1, pp. 39-62*.
- MacIntyre, D.G. 1983 Geology and Stratiform Barite-Sulphide Deposits of the Gataga District, Northeast British Columbia; 3 in *Short Course in Sediment-Hosted Stratiform Lead-Zinc Deposits*, Mineralogical Association of Canada Annual Meeting, Victoria B.C., Edited by Sangster, D.F., Short Course Handbook, Volume 8, Mineralogical Association of Canada, 309 p, p.85-120.
- MacIntyre, D.G. 1992 Geological setting and genesis of sedimentary exhalative barite and barite-sulphide deposits, Gataga District, Northeastern British Columbia. Canadian Institute of Mining, Metallurgy and Petroleum, *Exploration and Mining Geology Vol. 1 pp.1-20*.
- MacIntyre, D.G. 1998 Geology, Geochemistry and Mineral Deposits of the Akie River Area, Northeast British Columbia, BC Ministry of Energy and Mines, *Bulletin 103, 99pp*.
- MacIntyre, D.G. 2005 Geological Report on the Akie Property, for Mantle Resources Inc.
- Massey, N.W.D., MacIntyre, D.G., Desjardins, P.J. and Cooney, R.T. 2005 Digital Geology Map of British Columbia, B.C. Ministry of Energy and Mines, Open File 2005-2, DVD.
- McConnell, D.L. 1991 DIGHEM Survey for Ecstall Mining Corporation - Pie Block, Cirque Deposits, Omineca Mining Division, British Columbia. Ecstall Mining Corporation. Assessment Report 21676.
- Morrison, M.S. 2006 Diamond Drilling Assessment Report on the Pie Claim Group, Del Creek Area. Ecstall Mining Corporation. Assessment Report 28976. [Report covers first 7 drill holes for 2,653 m].
- Murrell, M., and Roberts, W. 1990 Summary Report: 1989 Exploration Program on the Mt Alcock Property. Assessment Report for Triumph Resources Ltd. Assessment Report 19829.
- Nelson, J.L., Paradis, S., and Farmer, R. 1994 Geology of the Driftpile Stratiform, Sediment Hosted Ba-Zn-Pb Deposit, Northern British Columbia (94K/4) in *Geological Fieldwork 1994*, Grant, B. and Newell, J.M., Editors, *British Columbia Ministry of Energy, Mines and Petroleum Resources*, Paper 1995-1, pages 261-268.

## Canada Zinc Metals Corp.

---

- Pigage, L.C., 1986 Geology of the Cirque barite-zinc-lead-silver deposits, Northeastern British Columbia, in Mineral Deposits of Northern Cordillera, J. Morin (editor), *Canadian Institute of Mining and Metallurgy*, Special Volume 37, pages 71-86.
- Wells, G.S. 1992 Soil Geochemical Assessment Report: Pie Claims. Minnova Incorporated (operator) for Ecstall Mining Corporation. Assessment Report 22678.
- Wells, G.S. 1993 Soil Geochemical Assessment Report: Pie Claims. Metall Mining Corporation (operator) for Ecstall Mining Corporation. Assessment Report 23077.



## **11.0 Statement of Qualifications**

I, Nicholas L. Johnson, do hereby state:

1. That I am a resident of Ontario, with an address of 436 Alfred St., Kingston, Ontario, K7K 4H9.
2. That I am a graduate of Queens University (B. Sc. Hons in Geology, 2001);
3. That I have been continuously employed in geology since May 2002 since graduating from Queens.
4. That I am currently under the employ of Canada Zinc Metals Corp. a British Columbia corporation with a business address of 1304-925 West Georgia Street, Vancouver, B.C., V6C-3L2.
5. I oversaw the work described in this report and I am the principle author of the report entitled “Summary Report on Exploration Activities on the CZM Claims: Geology, Kechika Project, Pie Property, CZM Claims”.

Dated in Vancouver, B.C., on the 30<sup>th</sup> of April, 2012.



Nicholas L. Johnson, B.Sc. (Hon.)

Pocket



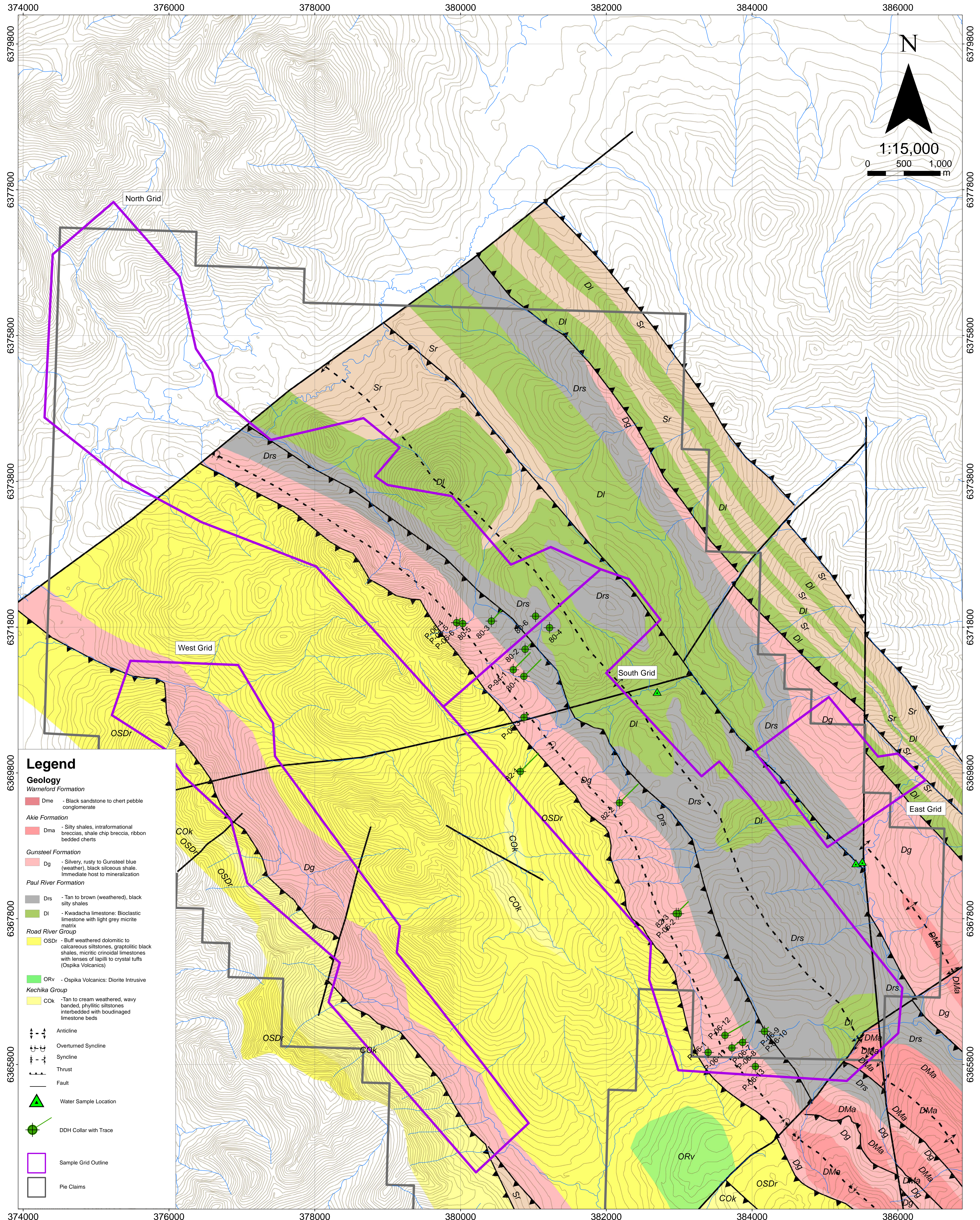


Figure 5:  
Pie Local Geology



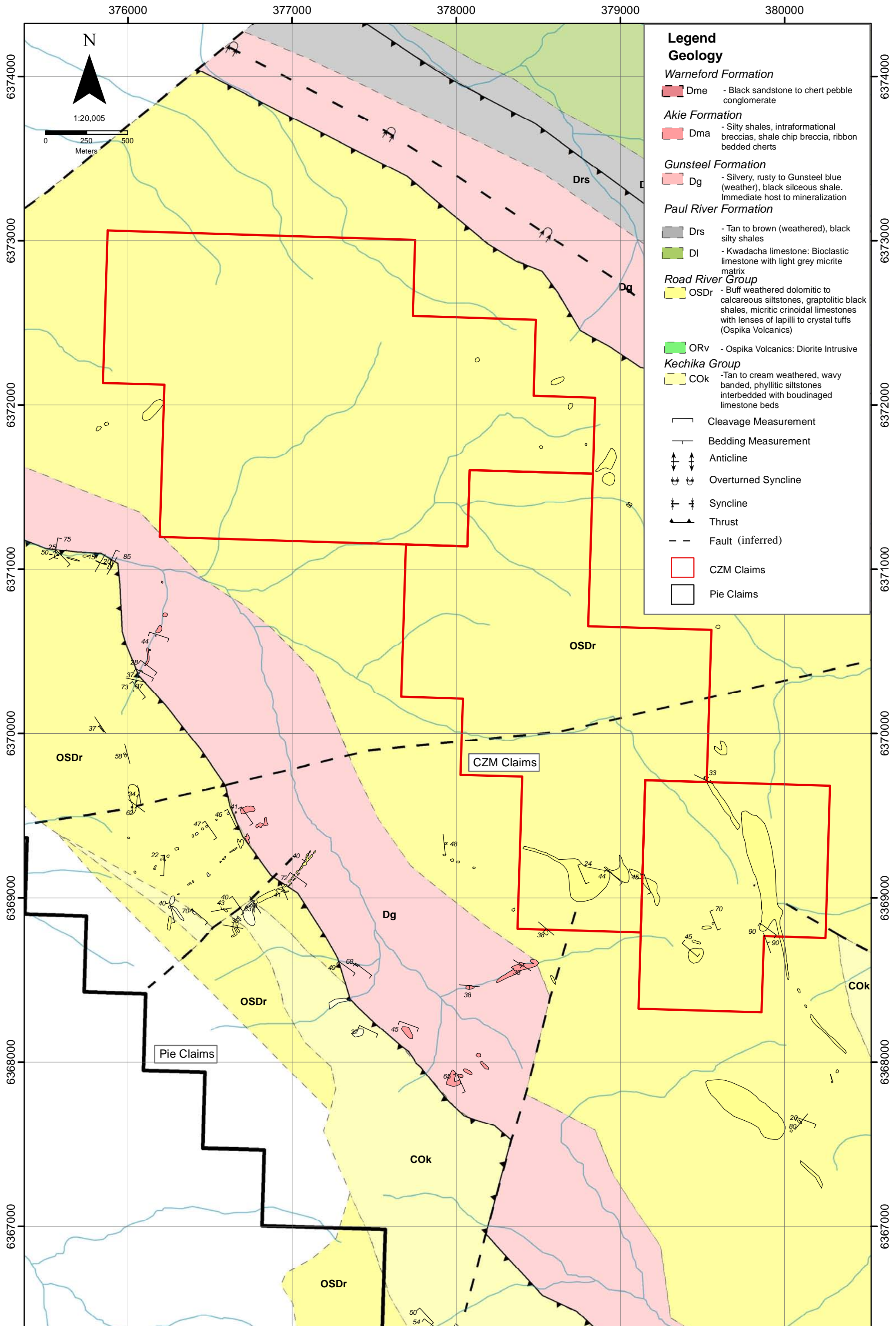


Figure 7 Pie - CZM Geology and Claims

## Appendix 1 Cost Statement

CONTRACTOR	CATEGORY	Who	Dates	Type	Units	Month/Day	Unit Rate	Total	
Coast Mountain Geological Ltd.	MOB/DEMOB			Type					
				Airfare				\$4,959.82	
				Accommodation (Hotels, Motels, etc.)				\$922.08	
				Expenses (Meals, etc.)				\$701.92	
		COMMUNICATIONS			Type	Units	Month/Day	Unit Rate	Total
				Radio Repeater	1		\$500.00	\$500.00	
					Radios (Handheld)	3	3d	\$4.00	\$36.00
		EQUIPMENT			Type	Units	Month/Day	Unit Rate	Total
				Spot Trackers	3	3d	\$3.00	\$27.00	
				First Aid Equipment	1	3d	\$50.00	\$150.00	
				Field Gear	1	9d	\$15.00	\$135.00	
		PERSONNEL	Who	Dates	Type	Units	Month/Day	Unit Rate	Total
			Tanya Strate	8 July 2011	Senior Project Geologist	1	1d	\$775.00	\$775.00
			Emily Roeder	8, 11, 13 July 2011	Geologist	1	3d	\$600.00	\$1,800.00
	Anthony Moore		8 July 2011	Geotechnician	1	1d	\$425.00	\$425.00	
			13 July 2011	First Aid Attendant	1	1d	\$425.00	\$425.00	
	Simon Parada		8, 11, 13 July 2011	Geotechnician	1	3d	\$425.00	\$1,275.00	
		Dave Edge	13 July 2011	Geotechnician	1	1d	\$425.00	\$425.00	
Bev Trombely First Aid Services	PERSONNEL	Who	Dates	Type	Units	Month/Day	Unit Rate	Total	
		Bev Trombely	8, 11 July 2011	First Aid Attendant	1	2d	\$400.00	\$800.00	
Interior Helicopters				Type	Units	Hours/Litres	Unit Rate	Total	
	HELICOPTER			Bell 206B Longranger	1	3.5hrs	\$1,250.00	\$4,375.00	
	FUEL					560L	\$1.65	\$924.00	

CONTRACTOR	CATEGORY	Who	Dates	Type	Units	Month/Day	Unit Rate	Total
ESS	OPERATING RATE				Units	Month/Day	Unit Rate	Total
						3d	\$266.67	\$800.01
	ACCOMMODATIONS			Type	Units	Month/Day	Unit Rate	Total
			Daily Room Rates @	0 to 10 People		0d	\$193.81	-
			Akie Camp	11 to 20 People		0d	\$136.78	-
			Variable based upon #	21 to 30 People		12d	\$112.14	\$1,345.68
			of people in camp	31 to 40 People		0d	\$95.64	-
				41 to 50 People		0d	\$80.20	-
							<b>Total</b>	\$20,801.51