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# **CROWSNEST PROPERTY, BRITISH COLUMBIA**

## **EXECUTIVE SUMMARY**

for

## EASTFIELD RESOURCES LTD.

by

## MINCORD EXPLORATION CONSULTANTS LTD.

Fort Steele Mining Division NTS: 82G/2E Latitude: 49°10'10" N Longitude: 114°32'50" ' W G. L. Garratt, P. Geo. May, 2000

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#### INTRODUCTION

The Crowsnest Property lies approximately 50 air-kilometers southeast of the town of Fernie, B.C., just west of the Flathead River, in the Fort Steele Mining Division. The property comprises 181 mineral claim units (3025 hectares) which are held 100% by Eastfield Resources Ltd. The 1999 exploration program included: geological mapping; grid placement and line-cutting; Induced Polarization and Magnetic geophysical surveying; trenching; geochemical rock and soil sampling; and diamond drilling.

The property is underlain by a thick sequence of Pennsylvanian and Mississippian carbonate and clastic rocks, of which the Mississippian Rundle Group of dominantly carbonate stratigraphy shows the greatest exposure. Mid-Cretaceous syenite and trachyte intrusions, as sills, stocks and dykes, have intruded the sedimentary sequence in great volume throughout the property. These intrusions are generally propylitically altered in surface exposure, but trenches and drill holes have intersected strongly altered intrusives displaying silicification, sericitization, pyritization and clay alteration. At surface, alteration in the carbonate rocks is generally limited to marbleization, recrystallization and bleaching, while in drill holes skarn and hornfels alteration has been noted.

The regional structural setting is basin and range thrust belt, which is evidenced on the property by an abundance of low to moderate angle structures. These structures have been displaced by high angle northerly, easterly, northwesterly and northeasterly normal faults that are believed to be related to a regional scale Tertiary extensional event. The low to moderate angle structures appear to have favoured shaly parts of the section and may also be the pathways for the many large intrusive sills observed in the subsurface.

Previous workers defined an extensive gold geochemical anomaly on the B Grid which was determined to have been transported in till down the main drainage in the central grid area. Coincident with this work was the discovery of numerous gold mineralized boulders and cobbles of syenite, heterolithic breceia and intrusive breccia in the glacial till cover. Treneling in the K grid, up-slope from the B Grid anomaly, discovered altered syenite and quartz veining that carried high-grade gold values. The 1999 Grid was placed and cut to expand upon the old K Grid in the head of the basin that defined the source of the till materials deposited downslope in the B Grid anomaly. As the mineralized rocks generally contained evidence of sulphides and magnetite, a geophysical survey of Induced Polarization and Magnetics was carried out on the 1999 Grid to attempt to locate their source under the extensive valley till cover.

The geophysical surveys outlined a large, circular magnetic high, flanked by a strong magnetic low, in the southern half of the grid area. A strong chargeability anomaly was defined coincident to the outer northeastern border of the magnetic anomaly for a length of approximately 700 meters. A second chargeability anomaly trended east-west along the northern edge of the grid for approximately 900 meters. A third chargeability anomaly was defined on two lines in the central portion of the grid, associated with a magnetic low.



Soil sampling on the 1999 Grid confirmed the up-slope edge of the B Grid gold anomaly and the K Grid anomaly and added a small gold anomaly on the southern flank of Fortress Peak. Trenching in the vicinity of previous trenching on the K Grid comprised the completion of six trenches, for a total of approximately 90 meters of bedrock exposure in four trenches. Trench TK-99-1 returned 16.5 meters grading 0.25 oz./t gold across syenite, decalcified siltsone and limestone breccia. Rock sampling indicated anomalous gold in syenite and carbonate along Spur 2, above the trench area.

Boulder and cobble samples taken from road cuts in the glacial till yielded seven samples that exceeded 1 g/t gold and these averaged 19.27 g/t gold. Mineralized boulders have now been located from the southern end of the valley at 1355 meters elevation, to the north flank of Fortress Peak at 1810 meters elevation, a distance of 2.5 kilometers. These boulders are invariably sygnite or sygnite intrusion breccia.

The geophysical anomalies defined targets for which a ten hole, 1056.13 meter core drilling program was completed. Moderate to strongly altered syenitic intrusions, with intercepts up to 130 meters, were encountered in several holes. Holes CP-99-3 and 8, which are 350 meters apart, returned 46 and 56 meter intervals of anomalous gold associated with syenitic intrusion. A thick section of carbonaceous limestone/shale was encountered in the top of several holes in thicknesses up to 40 meters; this unit may be a partial cause of the IP chargeability responses.

The 1999 program confirmed that the northwest head of the valley remains the high priority area for discovering sources of the mineralized boulders. The mineralization encountered in TK-99-1 is considered to be a partial source for the boulders; this occurrence is fault bound and will require further trenching and drilling to locate its continuation. The Spur 2 road and trench area displays intense structural disruption by moderate to steep dipping faults, strong alteration in both the dominantly carbonate stratigraphy and in the syenitic intrusions and, in the subsurface, is characterized by a large volume of highly altered syenitic intrusion carrying zones of anomalous gold. Till, float, talus and soil sampling indicate that other occurrences have yet to be located in this area, which measures at least 500 m by 500 m. Mineralization is considered to be dominated by structural control rather than lithologic control, though ultimately the excellent host rock lithologies in the area will be found to display stratiform mineralization. The dominance of strongly mineralized syenitic boulders in the till over a broad area suggests that a large volume of mineralized intrusion has yet to be located.

A program of extensive trenching to further test geochemical targets, outline structural controls on mineralization and extend known occurrences is recommended for the 2000 season. This work will require a core drilling program follow-up.

## LOCATION, ACCESS AND PHYSIOGRAPHY

The Crowsnest property is located adjacent the Flathead River in southeastern British Columbia, some 25 kilometers west of the Alberta border and 20 kilometers north of the



Montana border. The property lies in the Fort Steele Mining Division, which is administered out of Cranbrooke, B.C., in NTS map sheet 82G/2E at latitude 49 10' 10" N and longitude 114 32' 50" W.

Access to the property is gained by turning off Highway 3 at Morrissey, 15 kilometers south of Fernie, B.C., and following the Morrissey, Lodgepole and Harvey Forest Access roads to kilometer 71. One hundred meters past this road marker a seismic line leads into the property. Four wheel drive trails lead into the heart of the property.

Elevations on the property rise from 1820 meters at the Flathead River to 2100 meters at the center of the property. Tree-line occurs at approximately 1900 meters. Most slopes are steep and heavily covered with dense pine forest and thick willow. Logging is the main industry in the region of the property, though no active logging occurs on the claims at present.

#### LAND STATUS

Eastfield obtained a 100% interest in the 15 unit Flat claim group from P.E. Fox and then staked an additional 166 units, part of which over-stake the Flat claims (to reduce titles and fractions). International Curator Resources Ltd. has an option to earn either a 50% or 75% interest from Eastfield by completing certain cash payments and exploration expenditures.

Claim Name	Record Number	Number of Units	Expiry Date
Flat 1	359452	9	Sept.21, 2002
Flat 2	359453	1	Sept 21, 2002
Flat 3	359454	1	Sept 21, 2002
Flat 4	359455	1	Sept 21, 2002
Flat 5	359456	1	Sept 21, 2002
Flat 6	359513	1	Sept 21, 2002
Flat 7	359514	1	Sept 21, 2002
Crow 1	365637	20	Sept 13, 2002
Crow 2	365638	6	Sept 11, 2002
Crow 3	366740	20	Oct 29, 2001
Crow 4	366741	20	Oct 30, 2001
Crow 5	366742	20	Oct. 31, 2001
Crow 6	367032	20	Nov 2, 2002
Crow 7	368123	20	March 19, 2002
Crow 8	368124	20	March 19, 2002
Crow 9	368487	20	April 15, 2002
Total: 16 Claims		181 units	

Claim locations are shown on figure 2 and have the following status:

\* Fort Steele Mining Division

## **EXPLORATION HISTORY**

Several active oil seeps occur in the Sage Creek watershed approximately 8 kilometres southeast of the Flat claims. It was these seeps which attracted the earliest economic interest in the Flathead area. In the early part of the century several different groups drilled a number of shallow wells in their vicinity and two deep tests were completed at a later date. In recent times a consortium headed by Shell Canada Resources has been exploring the Flathead valley for carbon dioxide reservoirs. If successful the Shell project would develop a large volume of CO2, which would then be piped to Alberta, for secondary oil enhancement. Shell's model is predicated on the effect of volcanic intrusions liberating large volumes of CO2 from Mississippian or Devonian carbonate rocks. The consortium had completed a seismic survey and at least four test wells by the early 1990's.

Coal has been known to occur in the Flathead Valley for many years. Early exploration for coal was predominantly conducted in and around the abandoned village of Flathead (15 km north of the property). More recent coal exploration has occurred immediately south of the project area in the Cabin Creek valley by the Sage Creek Coal Consortium. In 1997 Fording Coal Ltd. drilled nine exploration holes in the upper Flathead valley (Lodgepole Leases).

1969: The first known mineral claims in the area were staked in the Howell Creek watershed approximately 14 kilometres northwest of the Crow and Flat claims. The original (Howell Creek) claims lapsed and were subsequently restaked by Cominco in 1972 and again in 1983. The Howell claims are currently in good standing and are owned 50% each by Cominco and Placer Dome Inc. and are under option to Eastfield Resources Ltd.

**1984 to 1991:** In 1984 Fox Geological Consultants Ltd., working on behalf of Dome Exploration (Canada) Limited, initiated a silt sampling and prospecting program. This program resulted in the identification of several anomalous drainages in the Trachyte Ridge area (up to 750-ppb Au). The 236 unit Flathead 1 to 12 claim group was staked later that year. Exploration initially focused on the A grid, at the western end of the present Crowsnest property where a large gold soil anomaly overlies a syenite intrusion. Several test pits and drill holes returned modest results, although the extent of the anomaly was not fully tested. Work progressed in stages on the B grid until a 1.0 km long gold geochemical anomaly was outlined, which was believed to have sourced to the southwest where a mapped fault zone partly coincides with the up-slope edge of the anomaly. Drill testing failed to support this interpretation. During this time the access road up the B grid drainage progressed and several occurrences of mineralized syenite boulders and cobbles were located in the till cut-banks. Many samples returned high assays, with a peak value of 620 g/t (18 oz./t).

**1992 to 1994:** Phelps Dodge Corporation of Canada optioned the Flathead claims from Placer Dome Inc in 1992. Fox Geological Consultants was retained as the geological contractor. The "B" grid was expanded to the northwest in what was called the "K" grid.

Prospecting completed in this program located a poorly exposed quartz vein within the "K" grid. The tote road was again extended to the northwest (approximately 800 metres) to the vein and a mechanical trenching was completed in the vieinity of it. The vein was intermittently exposed over a strike length of 47 metres. The vein, which consists of a vuggy quartz rich complex associated with a syenite dyke, varied between 3 and 4 metres in thickness. Several samples from the vein exceeded 100-gms/t gold with a high value of 350.7 grns/t. The vein material is deemed to be noticeably different than the mineralized syenite and syenite breccia and is interpreted to represent a separate source of gold mineralization. In 1994 four diamond drill holes totaling 364 metres were completed in the area of the vein. None of the holes, which were all angled to the south, were successful in intersecting the vein complex. Recent work suggests that the vein/dyke (sill) complex dips to the south into the hill and parallel to the drill holes; cross-faulting also appears to have precluded these holes from intersecting the mineralization..

1997: The original Flathead claims expired and the "B" and "K" grins were partially restaked by P.E. Fox in the form of the 15-unit Flat claim group. Total expenditure of \$760,688 dollars was incurred on exploring the Flathead claims from 1984 to 1994.

**1998:** Eastfield optioned the Flat claims from P.E. Fox in September and commenced staking an additional 86 claim units – the Crow claims.

**1999:** Eastfield completed geophysical, geochemical and geological surveys on the 99 Grid, outlining a large circular magnetic anomaly with strong chageability anomalies on its outer edge. Trenching and a ten hole drill program tested this area and defined large volumes of intensely altered synite intrusion. Trench CP-99-1 cut 16.5 m grading 0.25 opt Au across altered clastics and synite intrusive.

#### **GEOLOGY**

P.B. Jones documents the most coherent geological framework for the area of the Crowsnest property in an unpublished graduate thesis completed in 1966 at the Colorado School of Mines titled "Geology of the Flathead Area, Southeastern B.C., Canada". The area of the claims (Trachyte Ridge) consists of a thick sequence of Devonian and Mississippian limestones, dolomites and black shale and Permo-Pennsylvanian quartz arenite and dolomitic sandstone. Numerous small Cretaceous stocks have intruded and locally altered the enclosing sedimentary strata.

The Flathead Fault represents a major tensional fracture, which is the northern continuation of the system of normal faults, which define the Basin and Range structural province in the western United States. The principal structural features of this area are low angle thrusts and large normal faults, which strike roughly parallel to regional structural trends (northwest). The Crowsnest property occurs on the down thrown side of the Flathead Fault (large normal) and within what is best described as a half graben. In the early 1970's Imperial Oil Ltd. et al attempted an interpretive restoration of the Flathead basin using stratigraphic information derived from a 1970 hydrocarbon





exploration well. Their reconstruction indicates that approximately 6 to 8 miles of extension have occurred across a present basin width of 17 miles.

In 1961 R.A. Price, working for the Geological Survey of Canada, recognized and described the alkaline intrusive rocks in the Flathead valley. These relatively small bodies of igneous rock occur in a belt that trends 15 to 20 kilometres northwest from the Crowsnest claims (Trachyte Ridge to Twenty-nine Mile Creek). These bodies vary from narrow dykes to irregular anastomosing stock like masses up to 2 square miles (~500 hectares) in size. The three dimensional extent of these intrusions is not discernable from surface exposures but based on an oil exploration well located north of Howell Creek (7.5 kilometres northwest of the property) are extensive. Hole Howell a-16-B, drilled in 1970, bottomed at a depth of 4632 feet (1412 m). The hole encountered intermittent syenite from 3400 to 4200 feet (800 feet thick interval) in a sequence of Cambrian, Devonian and Mississippian carbonates and sediments.

The "Flathead" alkaline rocks are believed to have been emplaced contemporaneously with a period of explosive volcanism that culminated in the deposition of the adjacent fragmental Crowsnest Formation in southwestern Alberta.

Gold with subordinate copper and zinc mineralization is related to alkalic plugs, sills and dykes as evidenced by: the strong (16.5 m of 0.25 opt Au) gold mineralization found within an intensely altered (argillic-phyllic) feldspar porphyry dyke and its host rocks in 1999 Grid trenches; feldspar porphyry hosted mineralization encountered in A Grid drilling; and in significant gold intercepts in carbonate host rocks, associated with alkalic intrusive breccias and sills, at the nearby Howell property. The entire area has been subjected to alpine glaciation, which has created numerous circues and glacial-trough valleys. Glacial drift covers the floors and lower slopes of most valleys and locally it has been eroded and re-deposited to form a system of alluvial terraces. Within the Crowsnest property, there appears to be zones of inter-stratified till and proximal talus indicating episodic glaciation and erosion.

#### **MINERALIZATION**

Several phases of alkalic feldspar porphyries were intercepted in the 1999 drilling which contained limited concentrations of gold. Holes CP99-3 and 8 carried anomalous levels of gold associated with a pink, close-packed, two-phase feldspar, hornblende, porphyry with 1-2% disseminated pyrite and magnetite. The productive phases tend to have lower phosphorous levels (500-1000 ppm) than the barren phases (1500-5000 ppm) but other trace elements indicated no systematic trends. Cu and Bi tend to be elevated in strong gold zones in the trenches and in glacial erratics. The following table summarizes rock sampling that returned  $\geq$  100 ppb gold values and highlights the anomalous trace elements associated with each sample:

It can be seen in the table that no consistent trace element suite can be attributed to the gold mineralization. Silver values generally increase with increasing gold and copper is



more commonly strongly anomalous with high gold values, though exceptions to the latter occur. Thin section study indicated the possibility that drusy, probably late stage, quartz veining and silicification may be the controlling feature for gold mineralization. This might indicate that most of the trace elements listed above are related to earlier hydrothermal events that were responsible for the various alteration phases that have been noted, including pervasive silicification, sericitization and skarning. This also suggests that the gold enriched fluids were gold-silver rich and base metal deficient.

The trace elements ascribe well to the alkalic intrusive hosted model by including molybdenum, bismuth, low but anomalous levels of copper, zino, lead, and elevated levels of barium. Tellurium was not analysed but earlier workers had reported elevated Te values. Fluorite has been noted as a common, but not prolific, occurrence.

Trench TK-99-1(a) was located at approximately the same site as a 1993 trench completed by Phelps Dodge (Canada) Limited which encountered quartz-veined syenite and quartz veins that returned assays in excess of one ounce per ton gold. TK-99-1(a) uncovered an altered and partly silicified syenite intrusion into limestone breccia, with an intervening block of decalcified siltstone dividing the intrusive. A 16.5 meter channel sample, comprising five separate samples, across the hanging-wall limestone breccia and the intrusion returned 0.24 oz./ton gold. A series of three samples across the intrusion and enclosed siltstone returned 0.46 oz./ton gold. A separate sample along a strongly silicified portion of the intrusion returned 0.556 oz./ton gold over 3 meters. The limestone breccia in the footwall carried 165 ppb across 3 meters. The hanging-wall limestone breccia, which displays bleaching and argillization, carried 0.075 oz./ton across 5.3 meters; this unit showed no appreciable silicification or pyritization.

## DISCUSSION

The 1999 Crowsnest exploration program targeted a 1.6 km by 1.2 km area that was interpreted to likely host bedrock mineralization as observed in till and overburden hosted boulders and cobbles. The geophysical survey resulted in the outline of sizeable anomalous zones which, for the most part, lay up-ice and up-slope from the extensive gold in soil geochemical anomalies. These targets were chosen as the focus of the drilling program.

Drilling resulted in the documentation of large volumes of alkaline intrusions into the dominantly carbonate stratigraphy. These intrusions display moderate to strong alteration, locally duplicating observed textures and alteration seen in mineralized boulders. Only two intersections of anomalous gold were encountered and it is not clear how these intersects differ from similar alteration in other holes. Thin section study of drill cores, trench samples and mineralized till boulders suggests that the gold mineralization accompanied a late stage, probably open-space filling, quartz infusion. While this thesis can be generally supported by observations in the field, some gold mineralization occurs without visual evidence of quartz veining or flooding.

The significant mineralization encountered in trench TK-99-1(a) is generally associated with silicification of an alkalic intrusion, though adjacent sediments are mineralized without a similar degree of silicification. This occurrence appears to represent one probable source of the transported boulders, but is not believed to constitute a volume which would adequately supply the number and distribution of mineralized boulders observed and sampled in the till.

Attempts, via cross-sectional and plan map plots, to reconcile the geology encountered in drilling with the surface geology and the mineralization in trench TK-99-1 led to the conclusion that considerable off-sets by faulting have disrupted the area, and that the mineralization is likely related to fault zones, more particularly than any one intrusive phase. The trench area appears to be dissected by numerous, probably high angle, faults, with apparent displacements of up to 100 meters. Intrusions are observed as sills as well as cross-cutting, although fault contacts are common and post-intrusion faulting may complicate this interpretation.

Northerly trending faulting through the trench area is easily extrapolated from mapped faults on Fortress Peak and would explain some of the stratigraphic off-sets apparent in drill sections. Northeasterly to easterly trending faults are required to account for other apparent displacements; these fault orientations are largely interpretive in field mapping but have been observed locally.

The IP survey defined several significant anomalies. In the drill hole cross-sections it becomes apparent that the carbonaceous siltstone/limestone(shaly) unit is much more extensive than observed in surface mapping. This unit appears to have suffered greater structural damage than its bounding massive limestone hosts and as a result it is often not recovered in drilling or occurs as a recessive feature on surface. The ability for this unit to be the cause for the IP chargeability anomalies is somewhat speculative but it is apparent that it must be considered as at least a partial cause of the anomalies. Pyritization has been observed in the carbonaceous unit and this would enhance its chargeable character.

It is apparent that large bodies of altered alkalic intrusions underlie Fortress Peak and that the only observed significant bedrock occurrence of gold mineralization is in Trench TK-99-1(a) in association with an alkalic intrusion and strong alteration of the hosting calcareous sediments. It appears that the structures and intrusive locale peripheral to the larger intrusive bodies may hold better exploration potential. The structural intensity observed and interpreted in the trench area suggests an anomalous condition that would support this idea. If the mineralized trench is viewed as testing in a fault bound block, then extensions to this mineralization might be found beyond this block. If however, one or more of the bounding structures are the controls on the mineralization, then testing adjacent fault blocks might prove frustrating. The anomalous gold intervals in holes CP-99-3 and 8, in intrusive host rocks, suggest that the mineralizing event extends at least 350 meters east-west. If this mineralization is a peripheral zone to the mineralization exposed in trench TK-99-1, then it is likely that significantly more high-grade mineralization exists in this area.



It is suggested that future exploration should include trenching and drill testing across probable fault sites, initially in the vicinity of and extending outward from trench TK-99-1. The concept that this mineral occurrence represents a down-dropped fault block should be followed up by exploration at higher elevations along the north flank of Fortress Peak, above the existing drilling elevations. A soil gold anomaly near the top of Fortress Peak has not been adequately explained, and trenching should be carried out there. The topographic suggestion in the trench area that blocks are down dropped to the north requires follow-up work to continue northward toward the valley bottom, which is interpreted to be a large fault zone. The anomalous character of holes CP-99-3 and 8 indicates that exploration should also continue to the east and west of TK-99-1.

While the 1999 program did not succeed in discovering the major source of the mineralized boulders, it is believed that confirmation was gained that the 1999 Grid area, and particularly the trench area, remains the probable area for the bedrock sources. The initial concept of moving up-ice from the geochemical anomalies remains valid. The large area of covered terrain, largely in the lower elevations of the grid area remains very prospective ground.

## RECCOMMENDATIONS

The next exploration program on the Crownest property should focus on excavator followed by drill testing. The program would comprise approximately 500 meters of trenching and 500 meters of drilling with the following budget estimate:

ITEM	DESCRIPTION	AMOUNT (Cdn\$)
Personell:		
Supervision:	15 days x \$450/day	6,750
Geologist/Mgr.:	70 days x \$450/day	31,500
Field Assistants:	3 men x 60 days x \$270/day/man	48,600
Cook:	60 days x \$280/day	16,800
Rentals:		
Camp:	60 days x \$250/day	15,000
Equipment (genset, saws, etc.)	60 days x \$100/day	6,000
Truck:	60 days x \$70/day	4,200
ATV's	2 units x \$60/unit/day x 60 days	7,200
Satellite Phone:	2 months x \$1,000/mo.	2,000
Handheld Radios:	2 units x \$125/mo. x 2 mo.	500
Contractors:		
Excavator:	150 hours x \$125/hr.+ mob/demob	19,500
Drilling:	500 meters x \$82/m	31,250
Expenses:		
Food:	350 man-days x \$20/man/day	7,000
Fuel:		2,500
Field Supplies:		1,500
Travel:		1,000
Transportation:		
Commercial Air:	8 trips x \$600/trip	4,800
Freight:	camp mob/demob; sample shipments, etc.	6,000
Analytical:		
Rock Samples:	500 samples x \$25/ sample	12,500
Core samples:	500 samples x \$25/ sample	12,500
Communication:		
Telephone:		3,000
Courier:		800
Reporting:		
Drafting and Reproduction:		4,000
Report Preparation:		4,500
Filing Fees:		6,000
Sub-Total:		255,400
Contngency:	5%	12,770
Total:		\$268,170