

SOUTHEAST REGION

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SUMMARY AND TRENDS

Activity levels for exploration, development and mining in the Southeast Region of British Columbia were generally affected by the global economic downturn which began in late 2008. In particular, difficulty in raising investment funds had a negative impact on all levels of exploration for various mineral commodities.

Significant events in 2009 included:

- a large fill-in drill program on the Mount Michael coal property in the Elk valley;
- entry of Teck Coal Limited's Line Creek Operations Phase II Expansion Project, encompassing Mount Michael and Burnt Ridge North, into the Environmental Assessment Process;
- increased coal sales to China for Teck Coal Limited;
- application for expansion at Roca Mines Inc's MAX molybdenum mine;
- strong gold intersections on Valterra Resource Corporation's Star project near Nelson;
- strong gold intersections on MAX Resource Corp's Crownest project in the Flathead valley south of Fernie;
- underground drilling programs at the Silvana mine, part of Klondike Silver Corp's Slocan Silver project, and at the Kenville Gold Mine property of Anglo Swiss Resources Inc; and
- strong tungsten intersections on outlying portions of Sultan Minerals Inc's Jersey-Emerald property near Salmo, and the acquisition of the adjacent HB mine property.

As in previous years, past-producing metal mines and camps were actively explored. These included programs in the Slocan, Greenwood, Nelson, Ymir, Salmo and Rossland areas. The Nelson area in particular is witnessing resurgence in exploration activity.

Exploration expenditures in 2009 are projected to be about \$14 million, down significantly from the high levels of the previous two years (Figure 6.1). This total was divided between metals (about 67%), coal (28%) and industrial minerals (5%).

Exploration expenditures in 2009 may be roughly broken down as follows (see Figure 6.2):

- grassroots exploration – 1%
- early-stage exploration – 49%
- advanced exploration – 32%
- mine lease exploration – 6%
- mine evaluation – 12%

An estimated 43 000 m of exploration drilling was carried out in the Southeast Region in 2009 (Figure 6.3). Of this total, roughly 63% represents drilling for metals, 32% for coal (not including mine in-pit and development drilling) and 5% for industrial minerals.

In addition to the exploration expenditures, approximately \$8.8 million was spent on mine development projects in the Southeast Region in 2009.

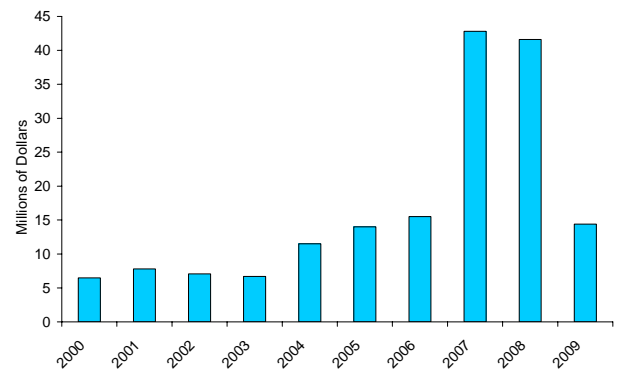


Figure 6.1. Annual exploration spending in millions of dollars, 2000 to 2009, Southeast Region.

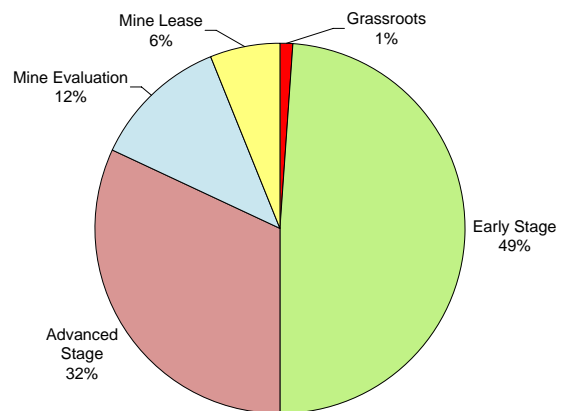


Figure 6.2. Proportions of 2009 exploration expenditures by category.

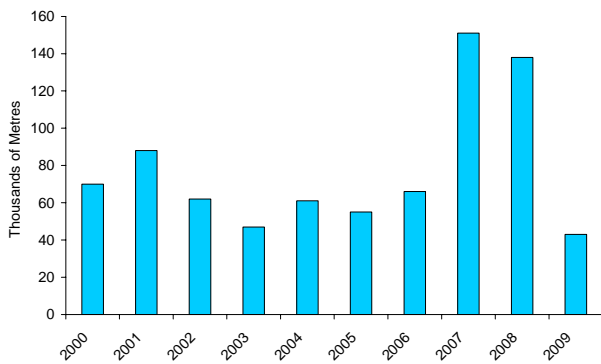


Figure 6.3. Annual exploration drilling in thousands of metres, 2000 to 2009. Note that prior to 2004 in-pit drilling at operating coal mines was included in the total.

MINES AND QUARRIES

Current major producing mine and quarry locations in the Southeast Region are shown on Figure 6.4 and basic data concerning these operations are listed in Table 6.1 and outlined below.

COAL

Teck Coal Limited, the world's second-largest supplier of seaborne metallurgical coal, operates five large open-pit coal mines in the Elk Valley area. Projected total 2009 coal production at the company's **Coal Mountain, Elkview, Line Creek, Greenhills** (Figure 6.5) and **Fording River** operations is approximately 18.3 Mt of clean coal (predominantly metallurgical). This compares with an actual production total of 22.3 Mt in 2008. The mines employ 2872 people and make a major contribution to the Elk Valley and East Kootenay economies.



Figure 6.5. Rail loadout silo at Teck Coal Limited's Greenhills Operations. The coal preparation facilities are on the opposite side of the highway to the silo. The wash plant is on the sky line in the distance, and the dryer is immediately opposite the silo in the middle distance.

Commercially mineable coals in southeast BC belong to the Jurassic-Cretaceous Mist Mountain Formation (Kootenay Group), and are contained in three structurally distinct coalfields in the Front Ranges of the Rocky Mountains, known collectively as the East Kootenay coalfields. The more northerly Fording River, Greenhills and Line Creek operations (Figure 6.4) are in the Elk Valley coalfield, which is formed by the Alexander Creek and Greenhills synclines. The Elkview and Coal Mountain operations are in the Crowsnest coalfield, which occupies the Fernie basin, a broad synclinorium that has hosted coal mining since before the turn of the twentieth century. There are no mines or active coal exploration projects in the Flathead coalfield.

Proven and probable raw coal reserves at the five mines are listed in Table 6.1; in addition there is a very large resource base in the southeast British Columbia coalfields. With the exception of Coal Mountain Operations, all of the mines produce from multiple seams. Currently productive coal seams are typically medium-volatile bituminous in rank, and are low in sulphur. Clean metallurgical product coal ash contents are typically in the 8.6 to 9.5% range; thermal coal ash contents are higher.

METALS

Roca Mines Inc's **MAX** molybdenum mine (MINFILE 082KNW087) at Trout Lake began shipping concentrate in November 2007 and achieved full commercial production in April 2008. MAX is an underground mine with a production rate of 500 tonnes-per-day on a campaign basis, for a permitted annual production rate of 72 000 t. In December 2009 Roca submitted an application to expand the MAX operation to 1000 tonnes-per-day and to extend the mine life beyond the initial permit limits (sub-Environmental Assessment).

The MAX deposit contains measured plus indicated resources of 42.9 Mt grading 0.20% MoS₂ using a 0.10% cut-off. The first phase of production is focusing on a high-grade zone which at start-up contained 280 000 t of measured plus indicated resources grading 1.95% MoS₂ using a 1.00% cut-off. The proposed expansion will make a greater proportion of the known resource economic at current prices. Roca did not carry out any exploration in 2009, but analysis of recent data has identified target zones of potential additional high-grade material as well as a potential larger-scale porphyry deposit at depth.

Metasediments of the Lower Cambrian to Middle Devonian Lardeau Group at the MAX property are intruded by the Cretaceous Trout Lake stock. The deposit is a pipe-like quartz vein stockwork that extends from surface to a depth of at least 1000 m, in which molybdenite occurs mainly along margins of veins (Figure 6.6). The vein stockwork is best developed in close proximity to the margins of the intrusive body and its associated offshoots.

Operating Mines and Selected Major Exploration Projects in South East British Columbia, 2010

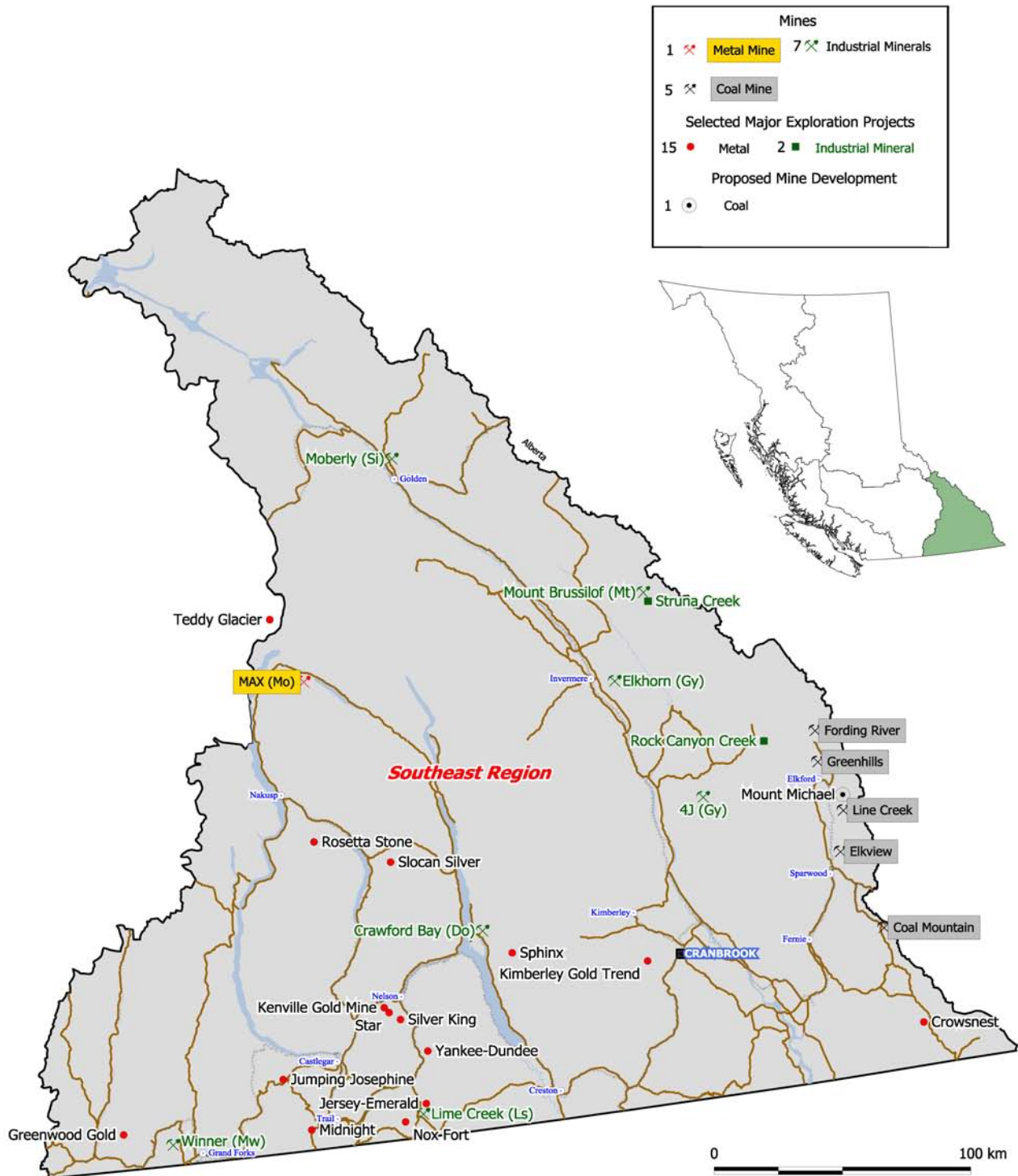


Figure 6.4. Mines, quarries and selected exploration projects, Southeast Region, 2009.

TABLE 6.1. PRODUCING MINES AND QUARRIES, SOUTHEAST REGION, 2009

Mine	Operator	Commodity	Employment	Production (2008)	Proven and Probable Reserves as of December 31, 2008 or as indicated	Reference for Reserves
Coal						
Coal Mountain	Teck Coal Limited	Metallurgical coal	209	2.52 Mt	27.9 Mt	Annual Information Form
Elkview	Teck Coal Limited	Metallurgical coal	800	4.67 Mt	232.6 Mt	Annual Information Form
Fording River	Teck Coal Limited	Metallurgical coal	1036	8.09 Mt	256.5 Mt	Annual Information Form
Greenhills	Teck Coal Limited	Metallurgical coal	480	4.60 Mt	81.3 Mt	Annual Information Form
Line Creek	Teck Coal Limited	Metallurgical and thermal coal	347	2.37 Mt	14.9 Mt	Annual Information Form
Metals						
MAX	Roca Mines Inc	Mo	74	744 738 kg Mo	Measured and indicated resource of 1.7 Mt at 0.73% Mo (December 2009)	Application to amend permit (expansion)
Industrial Minerals (selected)						
4J	Georgia-Pacific Canada Inc	Gypsum				
Crawford Bay	Imasco Minerals Inc	Dolomite				
Elkhorn	CertainTeed Gypsum Canada	Gypsum	17	513 000 t		
Lime Creek	Imasco Minerals Inc	Limestone				
Moberly	HCA Mountain Minerals (Moberly) Ltd	Silica sand	6	100 000 t		
Mount Brussilof	Baymag Inc	Magnesite	30	108 000 t		
Winner	Roxul (West) Inc	Gabbro (mineral wool)				



Figure 6.6. Molybdenite-bearing quartz vein stockworks underground at the Roca Mines Inc MAX molybdenum mine.

INDUSTRIAL MINERALS

The Southeast Region continues to be an important source of a variety of industrial minerals, including magnesite, gypsum, silica sand, dolomite, limestone, tufa, flagstone, aggregate and smelter slag. The larger operations are described below, listed in Table 6.1 and shown on Figure 6.4.

Baymag Inc produces high-quality magnesite from its open pit mine near **Mount Brussilof** (MINFILE 082JNW001), northeast of Radium. Magnesite is transported by truck to the company’s processing facilities in Exshaw, Alberta for production of magnesia (MgO), used as a refractory material. Production in 2009 is projected to be approximately 136 000 t. This is a significant increase over 2008, and indicates that the Mount Brussilof mine output continued to be in demand through the recent difficult economic times. The deposit, a large alteration zone, occurs in Cambrian carbonates. The company carried out an exploration drilling program in 2009 at nearby Struna Creek (see below), and this is

expected to extend the life of the mine, which has been in operation since 1982.

There are two gypsum mines in the Kootenay region, both producing from Devonian evaporate units. CertainTeed Gypsum Canada operates the **Elkhorn** mine (MINFILE 082JSW021) east of Windermere (Figure 6.7). The Elkhorn West Extension pit is now in production. 2009 production is projected to be approximately 375 000 t. The company holds other properties with potential for future expansion in the area.

Georgia-Pacific Canada Inc operates the **4J** gypsum mine (MINFILE 082JSW009) southeast of Canal Flats.

Silica sand is produced from a friable Ordovician quartzite by HCA Mountain Minerals (Moberly) Ltd at the **Moberly** mine (MINFILE 082N001) and plant, north of Golden. Mine production in 2009 decreased relative to 2008.

Imasco Minerals Inc produces a variety of crushed and ground rock products at its Creston Operations Plant at **Sirdar**; rock types include limestone, dolomite, granite and quartzite. Raw sources for these products include an underground dolomite mine at **Crawford Bay** (MINFILE 082FNE113), a limestone quarry at **Lime Creek** (MINFILE 082FSW307) east of Salmo, and a granite quarry at **Sirdar** (MINFILE 082FSE072).

The **Winner** gabbro quarry (MINFILE 082ESE265) west of Grand Forks supplies feed for the Roxul (West) Inc mineral wool insulation manufacturing plant in Grand Forks. There was no production at the Winner quarry in 2009, as only stock-piled material was shipped to the plant.



Figure 6.7. Handling and loadout facilities at the CertainTeed Gypsum Canada Elkhorn gypsum mine.

MINE DEVELOPMENT PROJECTS

At the Line Creek Operations 26 km northeast of Sparwood Teck Coal Limited constructed benches and drilled in the new MSA West Extension pit. At the MAX

molybdenum mine Roca Mines Inc carried out underground development and drilling.

MINE EVALUATION PROJECTS

Teck Coal Limited carried out baseline environmental and other studies at Line Creek Operations' Phase II Expansion Project. The expansion, which encompasses Mount Michael and Burnt Ridge North, will extend Line Creek's production activities to the north of current active pits. Mount Michael was also the site of a large fill-in rotary exploration drilling program (see below).

EXPLORATION HIGHLIGHTS

Selected 2009 mineral and coal exploration projects in the Southeast Region are listed in Table 6.2, and their locations are shown on Figure 6.4. Generally the selected exploration programs involved expenditures in excess of \$250,000 on work that included mechanized ground disturbance, for example, drilling, trenching or bulk sampling. However, some projects of particular interest whose expenditures were below the expenditure threshold are included. The information in this section was mainly derived from discussions with exploration project staff, site visits, company reports, presentations, press releases and websites. All resource estimation numbers are compliant with NI 43-101.

COAL PROJECTS

EAST KOOTENAY COALFIELDS

Teck Coal Limited Line Creek Operations drilled the **Mount Michael** property (MINFILE 082JSE008), 3 km north of the **Line Creek mine** and roughly 9 km southeast of Elkford (Figures 6.8 and 6.9) in the Elk Valley coalfield. The coal-bearing Mist Mountain Formation of the Jurassic-Cretaceous Kootenay Group occurs on the east limb of the Alexander Creek syncline and in the hanging-wall of the Ewin Pass thrust fault, which repeats almost the entire coal-bearing section. The 500 m-thick section contains about 10 major coal seams with a cumulative total representing roughly 10% of the section. Strata dip moderately to steeply westward and are partially in a dip-slope situation.

Together with **Burnt Ridge North**, which is immediately to the west on the west limb of the Alexander Creek syncline, Mount Michael has entered the Environmental Assessment Process as part of the Line Creek Operations Phase II Expansion Project. Mount

GOLD PROJECTS

BOUNDARY DISTRICT



Figure 6.8. View southwest from Mount Michael to two of Line Creek Operations' active mine areas, Burnt Ridge South and North Line Creek.



Figure 6.9. View looking north of rotary drilling at the north end of Teck Coal Limited's Mount Michael property.

Michael and Burnt Ridge North are intended to provide new reserves to replace Line Creek Operations' current pits. Drilling in 2009 was mainly of a fill-in nature and was targeted at delineating mineable reserves.

Teck Coal Limited Elkview Operations carried out rotary drilling on **Baldy Ridge**, **Natal Ridge** and **Adit Ridge** in the immediate area of the current mine. The Mist Mountain Formation at Elkview is at the north end of the Crowsnest coalfield. This work is intended to extend known mineable reserves. In addition, two large-diameter reverse-flood holes were drilled on Natal Ridge. This is a relatively inexpensive technique for obtaining bulk samples for carbonization testing. Baldy Ridge is anticipated to be the next expansion area for Elkview Operations, and an application (sub-Environmental Assessment) is anticipated in 2010.

These proposed expansions at Line Creek and Elkview operations, along with the significant drilling program at each site, represent the first of a number of mine expansion applications anticipated in the coming years and confirm Teck Coal's faith in the future of the East Kootenay coal industry.

Grizzly Diamonds Ltd's extensive **Greenwood Gold** Project was active for the second year. Grizzly Diamonds has assembled what it claims is the largest-ever land position in the Boundary District. Their holdings extend from west of Grand Forks to west of Anarchist Summit, and include the **Motherlode** (MINFILE 082ESE034) and **Copper Mountain** areas to the west of Greenwood, the **Sappho** (MINFILE 082ESE147) and **Overlander** (MINFILE 082ESE174) areas south and east of Greenwood, and the **Rock Creek** and **Sidley-Dayton** properties in the Rock Creek area. There are many mineral occurrences and varying types of known mineralization within the overall project area, including gold-quartz veins, polymetallic veins, skarns and intrusion-related precious metals. The common target for Grizzly Diamonds Ltd is gold. The proximity to Kinross' Buckhorn Mine in Washington state is helping drive exploration interest north of the border. The project area is underlain by the Paleozoic Knob Hill Group and Triassic Brooklyn Formation which are intruded by Jurassic, Cretaceous and Eocene igneous rocks.

Work in 2009 included an AeroTEM III survey of the Rock Creek and Sidley-Dayton properties in the west, to follow on from a successful airborne geophysical program of the Greenwood area in 2008. Ground geophysics and initial drilling were concentrated mainly on the **Lawless** (MINFILE 082ESW231) and **Ket 28** (MINFILE 082ESW210) showings in the Rock Creek area.

West High Yield (W.H.Y.) Resources Ltd carried out diamond drilling on its **Rossland** project on the western outskirts of the town of Rossland. Past gold producers on the company's property include the **Midnight**, **OK** and **IXL** (MINFILE 082FSW119, 116 and 117). Gold mineralization is associated with ultramafic contacts and a regional tectonic boundary, and consists of gold-bearing quartz-carbonate veins in contrast to the more typical Rossland-style sulphide-rich veins. The property is also being evaluated for its potential for magnesium and nickel associated with ultramafics. The major effort in 2009 was focused on the **Midnight** Crown-granted mineral claim, specifically 3000 m of close-spaced (10 m) diamond drilling in preparation for a gold resource estimate.

Activities at the **Jumping Josephine** or **JJ** property, 22 km west of Castlegar and just north of Highway 3, undertaken by joint venture partners Astral Mining Corporation (60% owner) and Kootenay Gold Inc have been centred on a 2003 discovery of high-grade gold mineralization known as the **JJ Main** zone (MINFILE 082ESE275). Mineralization in this zone is hosted by Jurassic intrusive rocks of the Nelson plutonic suite, and may be related to a later-phase Jurassic intrusion that does not reach surface. Occurrences of Eocene Coryell syenite

TABLE 6.2. SELECTED EXPLORATION PROJECTS, SOUTHEAST REGION, 2009

Property	Operator	MINFILE	NTS	Commodities	Target Type	Work program	Metres of drilling (estimated in some cases)
Crowsnest	MAX Resource Corp	082GSE070	82G/2E	Au	intrusion-related	TR, RC	799
Elkview (Baldy and Natal ridges)	Teck Coal Limited (Elkview Operations)	082GNE013, 016, 017	82G/15W	coal	sedimentary	RC, RC-BU, CT	7191
Greenwood Gold	Grizzly Diamonds Ltd	082ESE/034, 147, 174, 082ESW231	82E/2W, 3E	Au, Ag, Cu, Mo, Zn, Pt	vein	P, G, GC, MG, EM, AB-EM	2000
Jersey-Emerald	Sultan Minerals Inc	082FSW009, 010, 011, 059, 218	82F/3E	W, Zn, Pb, Mo	skarn (W), replacement (Pb, Zn), porphyry (Mo),	GC, MG, DD	1422
Jumping Josephine (JJ)	Astral Mining Corp and Kootenay Gold Inc	082ESE275	82E/8E, 82F/5W	Au	vein	TR, GC	0
Kenville Gold Mine	Anglo Swiss Resources Inc	082FSW086	82F/6W	Au, Cu	vein, porphyry	AB-EM, DD, GC	5300
Kimberley Gold Trend (KAT)	Ruby Red Resources Inc	082FSE116, 122	82F/E, 82G/W	Au, Cu, Ag, Pb	vein	G, GC TR	0
Mount Michael	Teck Coal Limited (Line Creek Operations)	082GNE022	82G/15W	coal	sedimentary	A, G, RC, EN	6811
Midnight	West High Yield (W.H.Y.) Resources Ltd	082FSW119, 116, 117	82F/4W	Au, Mg, Ni	vein, ultramafic	VLF, G, DD	3000
Nox Fort	Jaxon Minerals Inc	082FSW002	82F/3W	Au, Bi, Te, Pb, Zn, W, Mo	intrusion-related	A, GC, DD, MG	2717
Rock Canyon Creek	Spectrum Mining Corporation	082JSW018	82J/3E	fluorite, REEs, Nb	carbonatite	DD	1200
Silver King	Excalibur Resources Ltd	082FSW176	82F/6W	Ag, Cu, Au, Pb, Zn	vein	DD	2100
Slocan Silver	Klondike Silver Corp	082FNW013, 043, 050	82F/14W	Ag, Pb, Zn	vein	G, GC, TR, DD, UG (100m)	1240
Sphinx	Touchdown Capital Inc/Eagle Plains Resources Ltd	082FNE004, 094, 095, 166	82F/10E	Mo, W	porphyry	IP, DD	650
Star	Valterra Resource Corporation	082FSW083, 084, 294	82F/6W	Au, Ag, Cu	vein	P, DD	478
Struna Creek	Baymag Inc	082JNW006	82J/13E	magnesite	sedimentary	G, GC, DD	817
Teddy Glacier	Jazz Resources Inc	082KNW069	82K/13	Ag, Pb, Zn, Au, Cu	vein	A, U-BU	0
Yankee –Dundee	Dundee Mines Ltd	082FSW067, 068	82F/6E	Au, Ag, Pb, Zn	vein	DD	2832

Work Program Abbreviations:

A = access; trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totaling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping, etc; GC = geochemical sampling (rock, soil, silt, etc); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing-primarily for industrial mineral products; MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot plant, R = reclamation; RC = reverse circulation drilling; TR = trenching, UG (X m) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

are also widespread. Mineralization (chiefly pyrite and arsenopyrite) occurs with quartz in stockworks, vein-breccias, ladder veins and sheeted veins and is associated with a prominent northeast-trending shear zone. The JJ Main zone has been intersected in trenching and drilling over 900 m along strike and at up to 240 m vertical depth in drillholes. Geology, geophysics and geochemistry suggest that the host structure may extend for over 2.5 km. The possibility of more deep-seated porphyry-style mineralization is also being considered.

Exploration in 2009 was scaled back compared with previous years but included trenching and a large soil geochemical survey. An application for a 10 000 t bulk sample at the JJ Main zone, proposed for 2010, has been submitted.

WEST KOOTENAYS

Jaxon Minerals Inc's **Nox Fort** property is an intrusion-related gold prospect with bismuth and tellurium located about 15 km southwest of Salmo (Figures 6.10 and 6.11). Known mineralization on the property includes the Bunker Hill mine (MINFILE 082FSW002), a minor past-producer of gold with tungsten, silver, molybdenum and zinc prior to 1942.

Mineralization on the Nox Fort property occurs with quartz veins and skarns and is closely associated with the Bunker Hill intrusion, a possible sill related to the Cretaceous Wallack Creek stock. A significant portion of the known mineralization is associated with the north-trending western contact of the Bunker Hill intrusion, which intrudes metasediments of the lower Cambrian Laib Formation at the south end of the Kootenay Arc. Rosslund Group volcanics and sediments on the hanging wall of the Waneta thrust fault occupy the northwest portion of the property. Two bodies of ultramafic rock of unknown affinity also occur on the property.

The company believes that mineralization on the property, particularly in the vicinity of the Bunker Hill mine, represents a reduced, intrusion-related gold system, perhaps analogous to deposits in the Tintina gold belt including the Fort Knox mine in Alaska. Thin, low-sulphide veins are characteristic of this type of system, and may occur in swarms and skarn zones and other settings. Pyrrhotite is the most common sulphide mineral, with lesser pyrite, galena and chalcopyrite.

Drilling in 2009 (2700 m) was focused on the intrusive contact.

Anglo Swiss Resources Inc was very active on its **Kenville Gold Mine** property, roughly 6 km west of Nelson (Figures 6.12 and 6.13). The Kenville (MINFILE 082FSW086), also known as the Granite-Poorman, operated intermittently between 1890 and 1954, with the bulk of production prior to 1912. More than 180 000 t of ore was mined, yielding over 2 million g Au and 861 000 g Ag. Production averaged more than 17 g/t Au, from a



Figure 6.10. View looking west of the Pend D'Oreille River from the Bunker Hill mine area on Jaxon Minerals Inc's Nox Fort property.



Figure 6.11. Sheeted quartz veins in the Bitel Hill area on Jaxon Minerals Inc's Nox Fort property.



Figure 6.12. Mineralized quartz veining underground in Anglo Swiss Resources Inc's Kenville Gold Mine.



Figure 6.13. Sulphide minerals in quartz vein material in drill core at the Kenville Gold Mine property. Eagle Creek intrusive material is visible adjacent to the scale card.

series of northeast-dipping quartz veins.

Mineralized veins occur in two groups, one being the system that was mined in the past on the east or Kenville Mine side of the property, and the other a system of more recently-discovered veins on the west side of the property referred to collectively as the Eagle vein. Surface drilling in 2009 was directed at evaluating both groups of veins. In addition, a significant copper-bearing shear zone with possible porphyry affinities on the west side of the property has been outlined through drilling.

The company's objectives have been to explore for extensions of known ore-grade material and new mineralization. Anglo Swiss intends to embark on an underground bulk sample program, and also proposes to assess the viability of processing old mine waste dumps and to develop a known sand-and-gravel resource. The upgraded pilot plant mill was expected to be ready before the end of the year.

2009 work by Anglo Swiss focused on underground rehabilitation, mapping, sampling and diamond drilling on the 257 level, as well as surface diamond drilling. New zones of underground gold-silver mineralization were identified. A metallurgical study was completed in 2009, as well as a resource estimate of the 257 level of the old workings. The latter outlined 24 624 t grading 20.58 g/t Au in the measured and indicated categories, and 522 000 t grading 23.01 g/t Au in the inferred category.

Anglo Swiss has recently optioned the **Ron** and **Referendum** (MINFILE 082FSW177) properties to the south of the Kenville and along the trend of the Silver King shear zone. It now holds what it claims is the largest contiguous property in the history of the Nelson Mining Camp. Late in the year the company embarked on an airborne VTEM survey of its overall holdings. These developments represent a shift in focus from relatively locally-developed vein systems to broader, more-disseminated zones of potential mineralization, perhaps analogous to porphyry-style deposits.

Hostrocks at the Kenville are within the lower Jurassic Eagle Creek plutonic complex which is intruded into, and may be the intrusive equivalent of, basalts of the Early Jurassic Elise Formation of the Rossland Group.

Middle Jurassic (Nelson suite) and Tertiary intrusive rocks are also common in the immediate area.

Valterra Resource Corporation's gold-silver-copper **Star** property is 7 km southwest of Nelson (Figure 6.14). It includes the past-producing Star (MINFILE 082FSW083) and Eureka (MINFILE 082FSW084) occurrences, as well as the Alma N Zone (immediately to the south of the Star) and the newly-acquired Toughnut property (MINFILE 082FSW294) to the southeast. The property contains five gold zones within the Silver King shear zone. Mineralization is associated with felsic alteration and is hosted by both the lower Jurassic Elise Formation volcanics (Rossland Group) and the lower Jurassic Eagle Creek pluton. Production from the Eureka Mine between 1905 and 1954 totalled about 9000 t of ore averaging over 2 g/t Au, 125 g/t Ag and 1.77% Cu. Mineralization, consisting primarily of pyrite with or without chalcopyrite, appears to be both vein-type and disseminated and may have affinities to both alkaline porphyry deposits and vein-hosted deposits and camps in southeast British Columbia. Drilling in 2009 was focused on the Alma N zone. All of the 2009 drillholes intersected anomalous gold and silver with or without copper mineralization to a maximum depth of 135 m, and demonstrated approximately 250 m of mineralized strike length.

Excalibur Resources Ltd's **Silver King** property is located about 9 km south of Nelson and is southeast of both the Kenville and Star properties along of the trend of the Silver King shear zone. It includes the past-producing Silver King mine (MINFILE 082FSW176), which produced over 200 000 t, mainly between 1896 and 1914, grading 672 g/t Ag, 0.5 g/t Au and 3.2% Cu. Mineralization, predominantly pyrite, chalcopyrite and galena, is confined to three vein systems that are contained within and are parallel to the Silver King shear zone. Hostrocks are volcanics of the lower Jurassic Elise Formation (Rossland Group). The Jurassic Silver King Porphyry occurs in close proximity. Excalibur is currently drill-testing one kilometre strike length along the shear



Figure 6.14. Mineralized quartz-veined breccia from Valterra Resource Corp's Star project.

zone and is evaluating both open pit and underground mining potential. The company reported the discovery of a new mineralized vein system in 2009.

EAST KOOTENAYS

The **Kimberley Gold Trend**, or KAT, is a newly-developed geological concept (Thompson, 2009) intended to encompass a number of gold showings and prospects held mainly by Ruby Red Resources Inc occurring both east and west of the Rocky Mountain Trench in the Cranbrook-Kimberley area. The KAT represents a belt 30 km wide by more than 100 km long that cross-cuts the southern Purcell Mountains and terminates in the Rocky Mountains to the east. It includes more than one hundred mineralized occurrences, most containing gold, as well as placer gold. It includes individual mineral properties such as Eddy (MINFILE 082FSE116), Zeus, Gar, Lov, Zinger (MINFILE 082FSE122) in the Purcell Mountains and Spirit Dream in the Rocky Mountains.

In the Purcell Mountains the KAT is bounded by the Moyie Fault to the south and the St. Mary's and Kimberley fault system to the north. Eastward these faults cross the Rocky Mountain Trench to the Rockies where they bend sharply northward parallel to typical Rocky Mountain structures. Hence the overall shape of the KAT is an arc concave to the north. Known occurrences in the KAT have been classified as a variety of types including gold-quartz veins, polymetallic veins and iron oxide copper-gold, and have been variously described as shear-hosted, fissure-hosted, stockwork-hosted and intrusion-related. Hostrocks range from Proterozoic to Paleozoic in age. Relationship to Cretaceous igneous activity is often implied, although repeated episodes of mineralization (in concert with repeated episodes of fault movement) are strongly suggested. Alteration, which can be intense, may include silica, iron oxide, iron carbonate, chlorite, sericite and talc.

The main effort with respect to the Kimberley Gold Trend in 2009 was on the **Spirit Dream** gold property in the Wildhorse River area 30 km northeast of Cranbrook, where Ruby Red Resources carried out a trenching and detailed mapping program. Gold values at the Spirit Dream property are associated with quartz veins and stockworks hosted by a Proterozoic quartzite unit.

At the **Crowsnest** property (MINFILE 082GSE070), on Trachyte Ridge approximately 50 km southeast of Fernie in the Flathead River valley, MAX Resource Corp carried out a trenching, sampling and reverse-circulation drill program (Figure 6.15). The focus was on the so-called discovery trench area, and the objective was to outline the known high-grade mineralization and to define the mineralized structure. New trenches have extended the mineralized zone 200 m to the west of the discovery trench. The Crowsnest property is underlain by Pennsylvanian and Mississippian sedimentary rocks, chiefly carbonates, intruded by Cretaceous sills, dykes and plugs of alkalic affinity. Mineralization is related to



Figure 6.15. View to the northwest of Trachyte Ridge on MAX Resource Corp's Crowsnest property.

the intrusions and occurs in limestone, siltstone and syenite. Analogies to the Cripple Creek deposit have been made; the similarities include the association with alkalic intrusions and the occurrence of tellurium. Positive 2009 drill results were reported.

BASE METALS PROJECTS

WEST KOOTENAYS

The **Slocan Silver** project, east of New Denver, is in a rich past-producing district of vein-style silver-lead-zinc mineralization (Figure 6.16). Major progress was made in 2009 by Klondike Silver Corp. Klondike's holdings are divided into six areas, each of which encompasses several past producers. These include Sandon, Hewitt-Van Roi, Silverton Creek, Cody Creek, Payne and Jackson Basin. The company's Silvana mill at Sandon, a 100 tonnes-per-day concentrator, is operational and processes ore-grade material from this project and another project in western Canada. Concentrates from the mill are shipped to a smelter for refining.

Klondike Silver activities on the Slocan Silver project included prospecting, geological mapping, geophysics, rock and soil geochemistry, trenching, drilling, and underground development, drilling and test mining. The company's overall objective is to discover new lodes or extensions of the known occurrences.

Underground work in 2009 took place at the **Silvana** (MINFILE 082FNW050) and **Wonderful** (MINFILE 082FNW043) mines, both past-producers in the Sandon area. The focus was on rehabilitation, development, drilling and small-scale test mining. A major achievement was the demonstration of the probable westward extension of the Silvana mine lode structure (Figure 6.17). The so-called "Main Lode" was historically a major source of ore in the Slocan Camp. Another objective was to outline and recover bodies of mineralized rock in the range of thousands to tens of thousands of tonnes.



Figure 6.16. Entrance to Klondike Silver Corp's Silvana Mine, Slovan Silver project.



Figure 6.18. Entrance to the Jackson Mine in the Jackson Basin camp, part of Klondike Silver Corp's Slovan Silver project.



Figure 6.17. The Silvana lode structure underground in the Silvana Mine.

Surface work was partly focused on following up on anomalies and mineralization identified in 2008, as well as undertaking new surface geophysics and soil geochemistry programs. Highlights included trenching in the **Jackson Basin** (Figure 6.18; MINFILE 082KSW015) and **Payne** (MINFILE 082KSW006) areas, and trenching and drilling at the **Hewitt-Van Roi** (MINFILE 082FNW065). Positive results were reported from the Jackson Basin area, and the company intends to explore this area aggressively in 2010.

Vein-related mineral occurrences in the Slovan are hosted by sheared and brecciated argillite and slate of the Triassic Slovan Group, which are intruded by granodiorite and quartz monzonite dikes.

POLYMETALLIC PROJECTS

WEST KOOTENAYS

The large **Jersey-Emerald** property 10 km south of Salmo was the site of significant work by Sultan Minerals

Inc again in 2009. It is a polymetallic project in the sense that it is host to a variety of different types and styles of mineralization. It is situated near the south end of the Kootenay Arc. Tungsten is associated with skarn near the contact between Paleozoic sedimentary carbonate rocks and Cretaceous intrusions. Stratabound zinc-lead mineralization is associated with Paleozoic carbonates. Molybdenum-bearing, granitic intrusion-hosted quartz stockworks lie beneath some of the old tungsten mine workings and in some cases molybdenum is also associated with tungsten.

The underground **Jersey** lead-zinc and **Emerald** tungsten mines (MINFILE 082FSW009, 010, 011 and 218) closed in 1973. The Jersey mine was British Columbia's second largest lead-zinc producer, and the Emerald was Canada's second-largest tungsten producer. Work in 2009 included surface diamond drilling programs designed to test new acquisitions and recent discoveries of tungsten and zinc.

An updated resource calculation released early this year outlined 2.719 Mt measured-plus-indicated resources averaging 0.341% WO₃, at a 0.15% WO₃ cut-off, mainly in the area of the old workings. Six unmined tungsten targets were reported by the operator at the time of the closure of the Emerald mine. These targets occur as broad linear bands trending for more than 1500 m to the north and south of the old mine workings. Drilling for tungsten in 2009 focused on the **Lost Creek** valley, 1.5 km south of the Emerald mine (site of 2008 zinc and tungsten discoveries), and the newly-acquired **Victory** (MINFILE 082FSW059) property, approximately 3.5 km to the north. Results suggest there is a tungsten-mineralized corridor up to 7 km in length, as well as the potential for a high-grade tungsten resource on the Victory.

Sultan Minerals has recently announced that it has acquired the rights to the **HB** (MINFILE 082FSW004) and **Garnet** (MINFILE 082FSW249) lead-zinc mines, which closed in 1978. With this addition, Sultan now holds British Columbia's second and third-largest (HB) lead-zinc past producers. Soil geochemistry and

geophysical surveys were carried out on the new holdings.

Duncastle Gold Corp carried out a third diamond drilling program on the **Yankee-Dundee** property near Ymir (Figure 6.19). The property includes several past producers, including the **Yankee Girl** (MINFILE 082FSW068), **Dundee** (MINFILE 082FSW067) and **Goodenough** mines, which produced gold, silver, lead and zinc from polymetallic veins. The objective of the current exploration program is to identify extensions of the high-grade material in past workings. In particular, the Yankee Girl and Goodenough vein systems were targeted. The Yukon ore shoot, an enriched lens within the Yankee Girl structure and the thickest and most continuous portion of the vein, was a major focus in 2009, along with other zones primarily to the west of the Yankee Girl. Drill results extended known mineralization in the Yukon ore shoot to 90 m strike length and over 280 m downdip. Overall results indicate potential for resources readily accessible to underground mining.

Mineralized veins are mainly hosted by argillites and quartzites of the Jurassic Ymir Group, which were intruded by granodiorites of the Jurassic Nelson plutonic suite. Veins are typically composed of quartz, pyrite, galena and sphalerite.

At the **Teddy Glacier** property (MINFILE 082KNW069) 16 km north of Beaton, Jazz Resources Inc extracted a 2000-tonne underground bulk sample. The Teddy Glacier occurrence was a very minor past-producer of 5 t in 1929. It is a polymetallic vein occurrence containing silver, lead, zinc, gold and copper. The property is underlain by folded and sheared Paleozoic sedimentary rocks of the Lardeau Group and is situated near the north end of the Kootenay Arc. Mineralization, chiefly galena, pyrite, sphalerite and lesser chalcopyrite and tetrahedrite, is mainly associated with two quartz veins in separate fracture zones that cut across the structural grain. A new showing in the adjacent **Vimy Ridge** area (MINFILE 082KNW070) was uncovered during blasting for a road upgrade.



Figure 6.19. View to the south along the Salmo River valley from Duncastle Gold Corp's Yankee-Dundee property.

MOLYBDENUM PROJECTS

EAST KOOTENAYS

At the **Sphinx** molybdenum property (MINFILE 082FNE004, 094, 095 and 166), 45 km west of Kimberley near Gray Creek Pass, Touchdown Capital Inc and Eagle Plains Resources Ltd carried out a geophysical and diamond drilling program. The Sphinx property is underlain by sedimentary strata of the upper part of the Purcell Supergroup, which have been intruded by Cretaceous quartz monzonite. Molybdenum (and associated tungsten) mineralization is hosted by quartz-pyrite stockwork veins and fractures within a pervasive alteration zone associated with both the sedimentary and igneous rocks. An indicated resource estimate of 41.45 Mt grading 0.041% Mo, using a cut-off grade of 0.03% Mo, was calculated in 2009. Earlier resource calculations were described as being open in two directions and at depth, and the potential deposit has been described as a bulk-tonnage target.

INDUSTRIAL MINERALS PROJECTS

EAST KOOTENAYS

Spectrum Mining Corporation carried out a diamond-drilling program on the **Rock Canyon Creek** fluorite-rare earth element niobium prospect (MINFILE 082JSW018) 48 km east of Canal Flats in the White River drainage (Figure 6.20). Mineralization, which occurs in an extensive brecciated alteration zone, is believed to be related to a carbonatite intrusion that does not reach the surface. Fluorite mineralization is known to occur within a Paleozoic carbonate sequence over a length of more than 4 km parallel to strike. The predominant form of mineralization consists of disseminations and veinlets in a dolomitic matrix (Pell, 1987). Mineralized rock tends to be high in fluorine, rare earth elements and barium, and enriched in strontium, yttrium, phosphorus and niobium. In 2009 mineralized material was cored over a strike length of greater than one kilometre and all holes were mineralized to the drill limit of 125 m.

Baymag Inc carried out a close-spaced drilling program at the **Struna Creek** magnesite occurrence (close to MINFILE 082JNW006), roughly 3 km south of the company's **Mount Brussilof** mine. In the Mount Brussilof and adjacent areas sparry magnesite generally occurs as irregular alteration bodies in dolomite and limestones of the Cambrian Cathedral Formation east of the Cathedral escarpment. The objective of the program was to delineate ore reserves to replace those at the current mine.



Figure 6.20. Diamond drilling on Spectrum Mining Corporation's Rock Canyon Creek project.

OUTLOOK FOR 2010

By the end of 2009 some junior mineral exploration companies were attracting investment funding and were undertaking late-season programs and/or beginning to develop plans for significant programs in 2010. In addition, companies and prospectors in the region were able to option properties, particularly in the Nelson area. This bodes well for 2010.

We can safely expect some of the 2008 highlight projects that were dormant or scaled back in 2009 to be revived next year. These may include the Jumping Josephine gold (now Astral Mining Corporation), Swift Katie gold-copper (with its new owner, JRTL Capital Corp) and Thor polymetallic (Taranis Resources Inc) projects. Successful 2009 programs such as the Star gold-silver-copper (Valterra Resource Corporation) and Jersey-Emerald tungsten (Sultan Minerals Inc) projects are expected to continue and expand. Activity levels in the Nelson, Rossland, Beaverdell and Lardeau areas are expected to increase significantly, and in the busy Salmo and Greenwood areas levels are expected to at least be maintained. The Nelson area, in particular, is anticipated to be a major hub of mineral exploration in 2010, with companies holding properties along the Silver King shear zone, including Anglo Swiss Resources Inc, Valterra Resource Corporation, Excalibur Resources Ltd and Sultan Minerals Inc, all active.

The main exploration focus for the Southeast Region in 2010 will undoubtedly continue to be gold. The fact that recent gold discoveries in the West Kootenays and Boundary District, such as the Jumping Josephine and Rosetta Stone, are yielding positive results bodes well for grassroots gold properties in the region (Kootenay Gold Inc and others). Assessment of gold potential in the Cranbrook area, including the Kimberley Gold Trend, is anticipated to ramp up in 2010 (Ruby Red Resources Inc and others). Continuing favourable silver prices will

probably benefit the West Kootenays, including the Slocan and Kootenay Lake areas (Klondike Silver Corp, Goldcliff Resource Corporation and others). Lead-zinc (with lesser silver) should also be a factor, and we may see some resurgence in exploration for sedex mineralization in the East Kootenays (Klondike Gold Corp and others).

2010 should be a strong year for the coal mining industry, as the economic recovery strengthens worldwide and the steel industry rebounds. Coal exploration is expected to increase, with Teck Coal Limited active on projects that were dormant in 2009 such as Coal Mountain Operations' Marten-Wheeler property and the Greenhills Range side of the Fording River Operations.

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