MINERAL INDUSTRY

Yukon mining and exploration overview, 1999

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Placer mining overview, 1999

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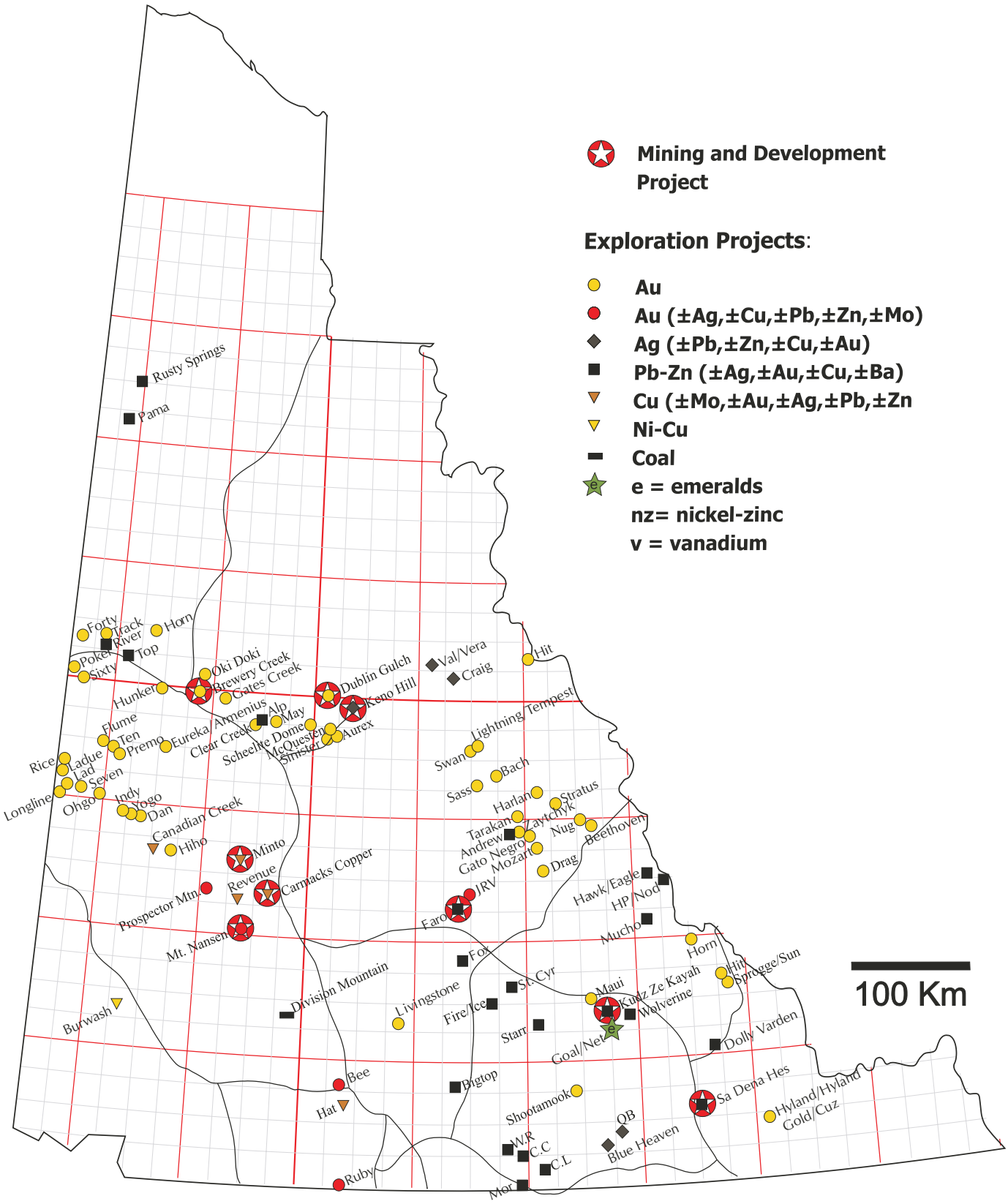

Figure 1. *Location of active Yukon mines, development and exploration projects in 1998. Not all projects are shown on the map.*

YUKON MINING AND EXPLORATION OVERVIEW, 1999

Mike Burke[1]
Yukon Geology Program

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RÉSUMÉ

L'or a dominé la scène de l'exploration en 1999 (Fig. 1); plus de 75 % des 9,5 millions de dollars (environ) qui ont été dépensés pour l'exploration au Yukon ont été dirigés vers la recherche du précieux métal jaune (Fig. 2). La plupart des cibles se situent dans la ceinture aurifère de Tintina, une série arquée d'indices et de gisements aurifères associés au plutonisme, au Yukon et en Alaska. Le Yukon a subi une forte activité plutonique au Crétacé moyen et la ceinture aurifère de Tintina comprend plusieurs séries intrusives du Crétacé moyen. Plusieurs projets reliés aux Séries intrusives de Tombstone et de Tungsten faisaient l'objet de programmes de forage en 1999, dont les projets Scheelite Dome, Clear Creek, Dragon Lake et Hit. Depuis plusieurs années, les Séries de Tombstone et de Tungsten ont été la cible de programmes d'exploration à la recherche d'or associé aux intrusifs et plusieurs régions offrent des cibles de forage et de nouvelles découvertes. La ceinture intrusive de Dawson Range, dans le centre-ouest du Yukon, a été intensément jalonnée sur la foi de travaux de recherche et de reconnaissance basés sur un modèle POGO (un gisement d'or associé au plutonisme en Alaska). La plupart des projets situés dans la ceinture de Dawson Range ont été soumis à une première phase d'exploration cette année et les résultats positifs générés pourraient aboutir à des projets plus avancés et à des découvertes. Le projet Longline dans la ceinture de Dawson Range est le projet le plus avancé dans cette ceinture intrusive; le succès des forages continuera à faire avancer le projet et servira de point d'ancrage pour augmenter les activités d'exploration dans la région.

L'exploration à la recherche de métaux communs a été orientée vers toute une gamme de types de gisements. L'exploration à la recherche de gisements de sulfures massifs volcanogènes continue dans le district de Finlayson Lake et dans les roches équivalentes du terrane de Yukon-Tanana, dans le sud du Yukon et dans la région de Dawson. En outre, on a examiné le district d'Ag-Pb de Rancheria à la recherche de gisements de veines d'argent à haute teneur et de gisements de remplacement des carbonates; la région de Howard's Pass à la recherche de gisements sédimentaires-exhalatifs (Sedex); ainsi que les régions de Kathleen Lakes et de Rusty Springs à la recherche de gisements de type Mississippi Valley et de type remplacement. Curieusement, il y a eu très peu d'exploration pour les cibles de Cu-Ni-EGP dans le sud-ouest du Yukon; pourtant cette région avait produit certaines des valeurs en EGP des plus spectaculaires au Canada ces dernières années. Les valeurs obtenues sur la propriété Klu d'Inco ltée en 1997 atteignaient jusqu'à 3,1 % de nickel, 10,4 % de cuivre, 0,19 % de cobalt, 75,8 g/t de platine, 20,6 g/t de palladium et 7,0 g/t d'or dans des échantillons choisis. L'exploration pour les métaux communs a été principalement axée sur l'affinage des cibles de forages dans les propriétés existantes. On prévoit plusieurs programmes de forage pour l'année 2000.

La mine d'or Brewery Creek de Viceroy Resources, produisant par lixiviation en tas à l'est de Dawson, était l'unique producteur à temps plein au Yukon en 1999. On avait extrait 1 890 000 tonnes de minerai au cours des trois premiers trimestres. La production d'or,

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jusqu'à la fin septembre, se chiffrait à 34 682 onces (107 600 grammes) à un coût de production réel de 289 $ US/oz. On prévoit que la production annuelle atteindra 55 000 onces (1 700 000 grammes) à un coût de production réel de 250 $ US/oz. Les travaux de mise en valeur à la mine Brewery Creek comprennent un agrandissement de 80 000 mètres carrés du remblai de lixiviation et le prolongement de la route de service jusqu'à la zone Lucky. Les dépenses en travaux préparatoires à la mine Brewery Creek se sont chiffrées à 6,1 millions de dollars en 1999 ce qui constitue presque la totalité des investissements de 6,5 millions de dollars qui ont été dépensés au Yukon en 1999 pour la mise en valeur de mines. Au début de 1999, les réserves de Brewery Creek étaient de 11,8 millions de tonnes titrant 1,13 g/t.

La mine d'or-argent Mt Nansen de BYG Natural Resources a fermé en février. La production jusqu'à la fin de février a atteint 15 500 tonnes titrant 7,5 g/t d'or et 50 g/t d'argent ce qui représente 3738 onces (116 200 grammes) d'or et 24 917 onces (775 000 grammes) d'argent.

Il y a eu de nouveaux travaux d'aménagement au projet minier de cuivre-or-argent Minto de Minto Explorations ltée. Un court programme de construction a été complété à la fin de septembre. On a déménagé jusqu'au site Minto deux broyeurs appartenant à la société, qui étaient temporairement entreposés. Toutes les composantes des broyeurs ont été nettoyées, passées au jet de sable et repeintes et on a assemblé les deux broyeurs. De plus, on a complété des travaux routiers et préparatoires qui permettront de continuer la construction au cours de l'hiver qui vient. Ce projet a régulièrement progressé pendant une période de faibles prix du cuivre pour en arriver au stade de prochaine mine du Yukon. Les réserves géologiques en place du gisement se chiffrent à 8 818 000 tonnes titrant 1,73 % de cuivre, 0,48 g/t d'or et 7,5 g/t d'argent, la teneur de coupure du minerai se situe à 0,50 % de cuivre. La quantité de minerai qui sera extraite selon le plan actuel de la mine se chiffre à 6 510 000 t titrant 2,13 % de cuivre, 0,62 g/t d'or et 9,3 g/t d'argent, le coefficient de recouvrement est de 4,9/1. Pendant la durée d'exploitation prévue de la mine, le coût de production réel moyen sera de 0,46 $ US/lb, après les crédits pour l'or et l'argent, et en tenant compte de tous les coûts attribuables au transport ainsi que des tarifs de fonderie et d'affinage. On prévoit commencer la production vers la fin de 2000.

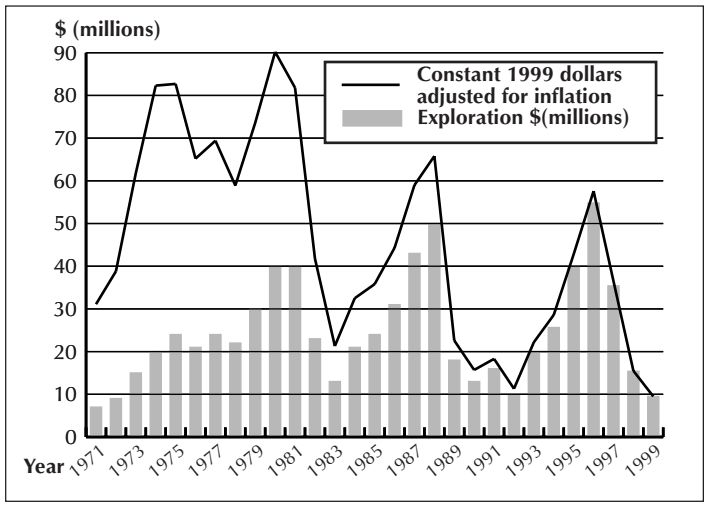

Figure 2. *Yukon exploration expenditures: 1971-1999.*

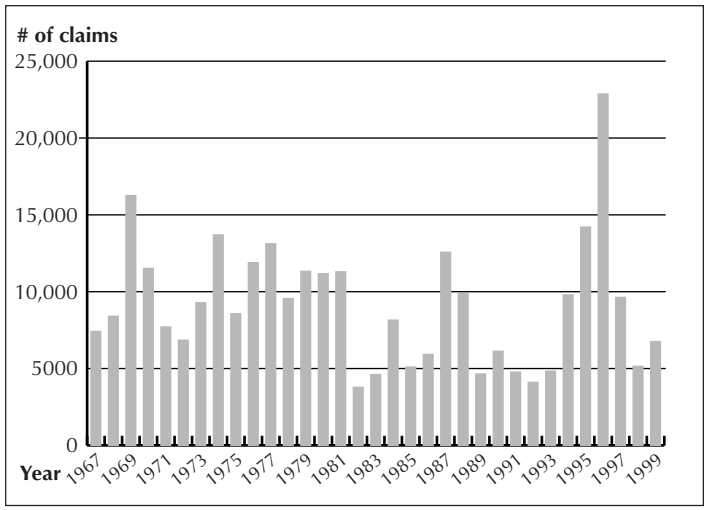

Figure 3. *Quartz claims staked: 1967-1999 (to end of October).*

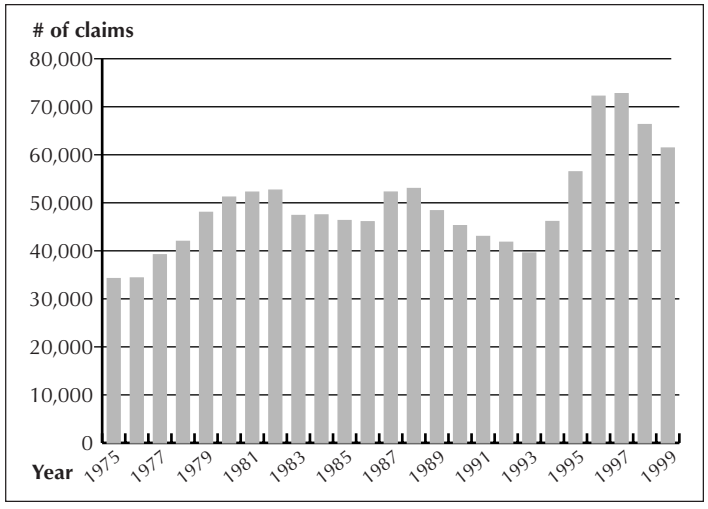

Figure 4. *Quartz claims in good standing: 1975-1999 (to end of October).*

INTRODUCTION

Gold dominated the exploration scene in 1999 (Fig. 1); over 75% of the approximately $9.5 million spent on Yukon exploration was directed towards the search for the precious yellow metal (Fig. 2). Most targets are within the Tintina gold belt, an arcuate sequence of intrusive-related gold occurrences and deposits in Yukon and Alaska. The Yukon experienced extensive plutonism in the mid-Cretaceous, and the Tintina gold belt encompasses several of these mid-Cretaceous intrusive suites. Several projects, such as Scheelite Dome, Clear Creek, Dragon Lake and Hit which are related to the Tombstone and Tungsten intrusive suites, had drill programs in 1999. The Tombstone and Tungsten suite have received several years of exploration for intrusive-related gold targets, and several areas are generating drill targets and new discoveries. The Dawson Range intrusive belt in west-central Yukon experienced a large amount of claim staking on targets generated by research and reconnaissance using a POGO model (Alaskan intrusive-related gold deposit). Most projects in the Dawson Range were subjected to first pass exploration this year, and positive results generated could lead to more advanced projects and discoveries. The Longline project within the Dawson Range is the most advanced project in this intrusive belt; positive drill results will continue to advance this project and anchor expanded exploration in this area.

Base metal exploration focussed on a variety of deposit types. Exploration continued in the Finlayson Lake district, and equivalent Yukon-Tanana Terrane rocks in southern Yukon and the Dawson area, for volcanogenic massive sulphide deposits. In addition, the Rancheria Ag-Pb district was investigated for high grade silver vein and carbonate replacement deposits, the Howard's Pass area for sedimentary-exhalative (Sedex) deposits, and the Kathleen Lakes and Rusty Springs areas for Mississippi Valley-type and replacement deposits. Surprisingly, only a small amount of exploration was conducted in southwestern Yukon on Cu-Ni-PGE targets; this area has in recent years produced some of Canada's most spectacular PGE numbers. Results reported in 1997 from Inco Ltd.'s Klu property returned values from grab samples of up to 3.1% nickel, 10.4% copper, 0.19% cobalt, 75.8 g/t platinum, 20.6 g/t palladium and 7.0 g/t gold. Most exploration for base metals was directed at refining drill targets on existing properties and several drill programs are anticipated in 2000.

The number of quartz claims staked to the end of October, 1999 was 7258 (Fig. 3), an increase over 1998 figures. The bulk of new claims were staked on targets in the Tintina gold belt. Claims in good standing had dropped to 61,407 (Fig. 4) in the same period, a decrease of approximately 5000 claims from 1998 levels.

MINING AND DEVELOPMENT

Viceroy Resources Ltd.'s **Brewery Creek gold mine** (Yukon Minfile, 1997, 116B 160) was the Yukon's only full-time producer in 1999. Production to the end of September, 1999 from the heap leach gold mine, located east of Dawson City, was 34,682 ounces (107,600 grams) at a cash cost of US$289 per ounce. Brewery Creek is host to a range of intrusive-related gold deposits including the intrusive-hosted Classic Zone (10.9 Mt of 0.52 g/t Au), to more distal deposits hosted in sills and sedimentary rocks outside the thermal aureole of the pluton (Lindsay et al., this volume). It is these more distal deposits which are currently the producing ore bodies. Production to the end of 1999 is estimated at 55,000 ounces (1,700,000 grams) of gold at a cash operating cost of US$250 per ounce. Earlier forecasts projected production of 74,000 ounces (2,300,000 grams) but longer leach cycles for sediment-hosted ore, and lower recoveries have resulted in a shortfall. Minesite development at Brewery Creek included expansion of the heap leach pad by 80,000 square metres and extension of the haul road to the Lucky Zone. Development costs at Brewery Creek were $6.2 million, which was the bulk of the $6.5 million spent on mine development in the Yukon in 1999. Reserves at Brewery Creek were 11.8 million tonnes grading 1.13 g/t at the beginning of 1999, based on a gold price of US$375 per ounce. Ore mined to the end of the third quarter was 1,890,000 tonnes (Fig. 5).

Figure 5. *Mining at Brewery Creek occurred in the Golden open pit seen in the photo, and in the Kokanee and Lower Fosters pit in 1999. Photo by H. Copeland*

Viceroy also conducted extensive exploration on the mine site in an effort to upgrade resources into the reserve category. Reverse circulation drilling was conducted mainly in the Bohemian and Schooner zones, with lesser drilling in the North Slope and Classic zones. Trenching was also conducted in the Classic and Schooner zones.

Late February saw the closure of the **Mt. Nansen gold-silver mine** (Yukon Minfile, 1997, 115I 064, 065; Stroshein, 1999) of BYG Natural Resources. Production to the end of February was 15,500 tonnes at a grade of 7.5 g/t gold and 50 g/t silver, or 3738 ounces (116,200 grams) of gold and 24,917 ounces (775,000 grams) silver.

New mine development occurred at the **Minto copper-gold-silver project** (Yukon Minfile, 1997, 115I 21, 22) of Minto Explorations Ltd. A short construction program was completed at the end of September. Two grinding mills owned by the company were moved from a temporary storage area to the property (Fig. 6). All mill components were cleaned, sandblasted and painted, and the two mills were assembled. In addition, some roadwork and preparations to allow construction to continue through the coming winter were also completed. The project

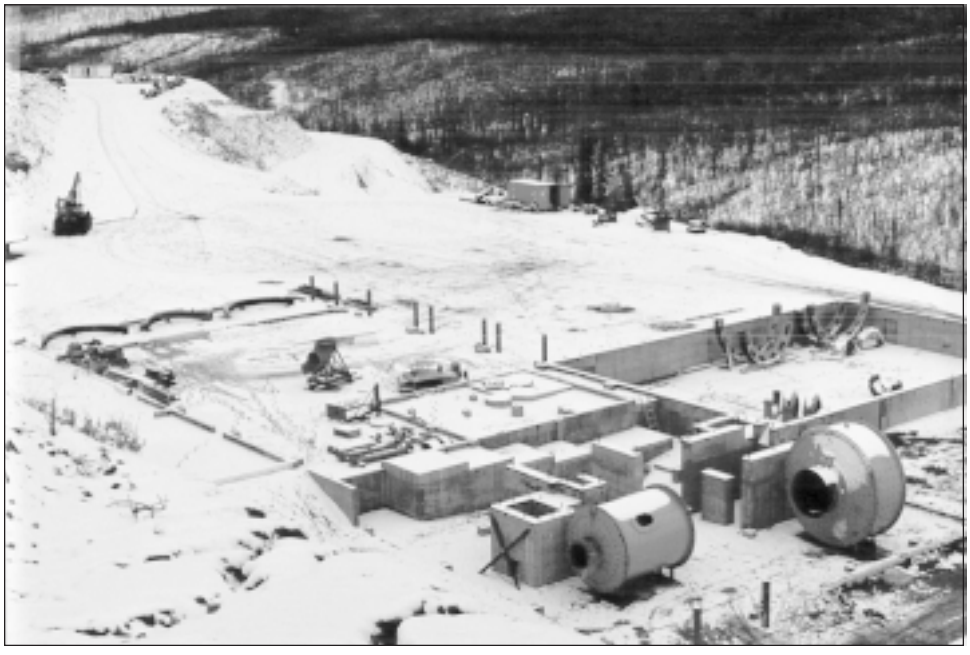

Figure 6. *Assembly of the semi-autogenous grinding (SAG) and ball mills were completed in the fall of 1999 at the Minto project. The completed mills are ready for installation on the mill foundation. Photo by Minto Explorations Limited*

has made steady progress despite a period of depressed copper prices. It is hoped that the Minto property may develop into the Yukon's next mine. The *in-situ* geological reserve for the deposit is 8,818,000 t with grades of 1.73% copper, 0.48 g/t gold and 7.5 g/t silver above a cut-off grade of 0.50% copper. The ore that will be mined as per the current mine design is 6,510,000 t with grades of 2.13% copper, 0.62 g/t gold and 9.3 g/t silver with an overall stripping ratio of 4.9:1.0. The average cash operating cost per pound of copper produced is US$0.46 over the estimated mine life, including all freight, and smelting and refining charges, and after gold and silver credits. The project is fully permitted and production is currently anticipated for late in 2000.

GOLD EXPLORATION

Gold exploration was the main focus of companies working in the Yukon in 1999. Intrusive-related gold deposits of the Tintina gold belt were the main targets sought. Deposit styles in this relatively young exploration play include intrusion-hosted, proximal (in contact) zones, or within the thermal aureole, as well as in distal settings beyond the horfels zone (Hart et al., in press). Exploration in recent years has shifted from intrusion-hosted targets to encompass a wider range of prospects in the proximal and distal settings. The high potential for discoveries in this belt is emphasized by the recognition of the multiple styles of deposit types, combined with the expansion of the belt to include most of the mid-Cretaceous plutonic suites in the Yukon. These factors, combined with overall low exploration expenditures in recent years, illustrate that the Tintina gold belt in the Yukon is under-explored.

Shawn Ryan of Canadian United Minerals Incorporated, a locally based private exploration company, made a significant discovery of high-grade gold skarn in 1997. The discovery on the **HORN** claims (NTS 116B/07) covers part of a roof pendant of sedimentary rocks of Devonian to Jurassic age enclosed by quartz monzonite of the Tombstone Plutonic Suite. Pyroxene and pyrrhotite skarns containing gold, silver, copper, lead, zinc, arsenic and bismuth are developed in Permian Takhandit Formation limestone. In 1999, Canadian United performed Kubota trenching, geological mapping, prospecting and AX-size core drilling (Fig. 7) on the discovery. Channel sampling in the walls of Trench 99-01 returned values of 58.9 and 85.44 g/t Au over widths of 5.94 metres and 4.45 metres, respectively. The

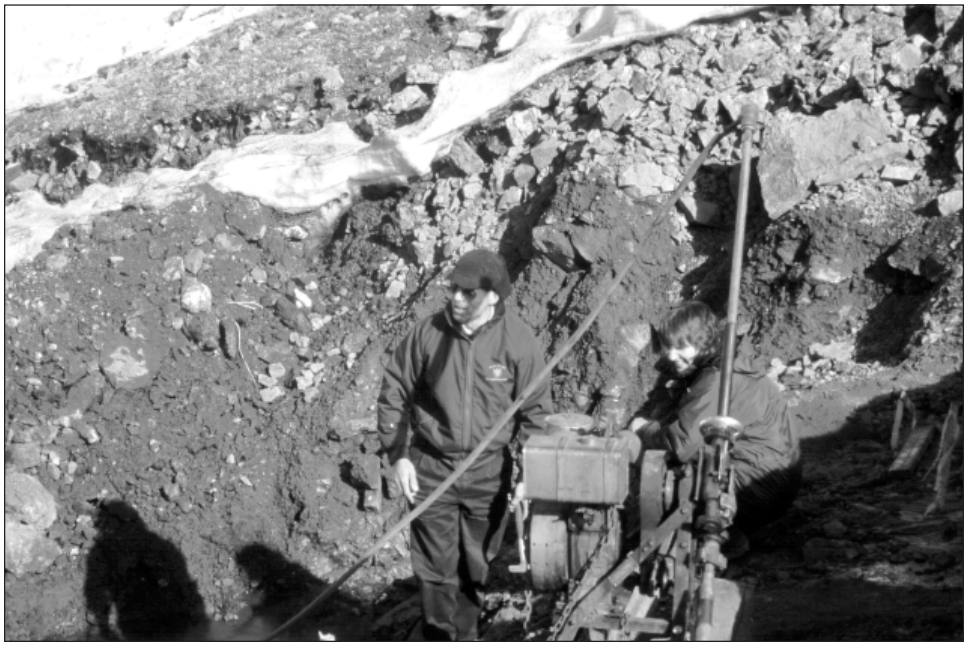

Figure 7. *An X-ray drill capable of drilling AX core is pictured in trench 99-01 on the Horn property. Photo by J. Duke*

Figure 8. *Discordant quartz-sulphide vein in quartz sericite schist from the Scheelite Dome property.*

channel samples were on opposite walls of the trench, approximately 10 metres apart. Ten holes were drilled from the floor of the 99-01 trench, with seven holes intersecting significant mineralization. Hole 99-04 returned 11.03 metres of 21.6 g/t Au, and 99-11 returned 5.30 metres of 180.8 g/t Au (Tenney, 1999). Dave Tenney, an independent consulting geologist, has proposed an exploration program based on a model derived from the Little Chief copper skarn deposit in the Whitehorse Copper Belt. Further drilling will be required to define the extent of this new discovery and other high-grade showings on the property.

Copper Ridge Exploration conducted a 13-hole, 1357-metre diamond drilling program, structural analysis, ground magnetics, geochemical sampling, and mapping and prospecting on the large **Scheelite Dome** property (Yukon Minfile, 1997, 115P 033). Drilling was directed at several targets within a large 6 by 2 kilometre, >100 ppb gold-in-soil anomaly, which is underlain by Neoproterozoic to Lower Cambrian Hyland Group metasedimentary rocks adjacent to the Scheelite Dome granitic intrusion of the Tombstone suite. Mineralization on the property consists of structurally controlled, metasedimentary-rock-hosted, quartz-sulphide veins, skarn, and replacement occurrences (Hulstein et al., 1999; Fig. 8). Fort Knox-type, intrusive-hosted low sulphide veins occur in the Scheelite Dome intrusion. Work to date has concentrated on the mineralization hosted in metasedimentary rocks. The 1999 drilling was successful in continuing to delineate widespread gold mineralization on the property. Structural interpretation, followed by ground-based magnetometer surveys and diamond drilling, was successful at demonstrating the importance of northwest-striking veins. Holes 99-23 and 99-24 were drilled to test a newly interpreted northwest structure; these holes had the two best results from the 1999 program, yielding 3.7 g/t Au over 4.6 metres and 2.5 g/t Au over 5.9 metres, respectively. Drill intersections were characterized by correlation with key pathfinder elements including bismuth, arsenic and antimony. Drill interesections also correlate well with areas of strong alteration, fracturing and shearing, and the presence of a large quantity of discordant quartz veining.

Figure 9. *Diamond drill on the Clear Creek property of Redstar Resources in October, 1999. Photo by M. Stammers*

Redstar Resources conducted a late season, 2-hole diamond drilling program (Fig. 9) totalling 219.2 metres on the **Clear Creek** (Yukon Minfile, 1997, 115P 012, 023) property. The two

holes targeted the Bear Paw breccia zone, a quartz breccia zone cutting metasedimentary and intrusive rocks. The breccia is dominantly clast-supported, with fragments consisting of quartz monzonite and minor quartz biotite schist and hornfels. Intervening sections of quartz monzonite are highly silicified, have limonitic fractures, and contain minor disseminated and fracture-controlled pyrrhotite and arsenopyrite. The zone is defined by a large 1300 by 1100 metre gold-arsenic-bismuth geochemical anomaly, which coincides with a magnetic-low geophysical anomaly. Surface sampling of limited exposures returned values up to 9.24 g/t Au from sulphide-rich float samples. Drill hole BP99-01 returned three separate intersections, including: 1) 7.25 m grading 2.17 g/t Au within a section of mainly quartz breccia; 2) 26.70 metres grading 2.00 g/t Au (including 10.5 metres at 3.35 g/t Au) within quartz monzonite; and 3) 0.50 metres grading 3.02 g/t Au from a quartz-sulphide vein within a larger section of quartz breccia. Gold grades from the 26.70 metre intersection are evenly distributed, with the highest assay within a zone of 5.4 g/t over 1.5 metres. Drill hole BP99-02, located 250 metres from BP99-01, intersected 0.44 metres of 10.21 g/t Au from a quartz-sulphide vein and 1.68 metres of 3.32 g/t Au within quartz breccia. This discovery of a new style of intrusive-related gold mineralization at Clear Creek illustrates the potential for new discoveries, even in areas with a long exploration history.

International Kodiak Resources continued to evaluate the large 68,000 hectare **Oki Doki** (Yukon Minfile, 1997, 116BA 013, 033) property that adjoins the Brewery Creek mine. The property covers intrusive-related gold targets within Selwyn Basin stratigraphy that is intruded by the Tombstone Plutonic Suite. The 1999 program followed up on anomalous stream and soil geochemical anomalies generated by previous work. Grid and contour soil sampling, prospecting, geological mapping, blast- and hand-trenching were performed in three main areas (Areas 1, 5 and 3). A quartz monzonite plug that contains areas of sheeted veins underlies Area 1, northeast of Brewery Creek near Mike Lake. East-trending shears with silicic, argillic, sericitic and carbonate alteration, and quartz-sulphide veining were also investigated. Chip sampling of sheeted veining (Fig. 10) returned an average value of 340 ppb Au over 40 metres with a peak value of 584 ppb Au. Quartz sulphide veining within the shears assayed up to 1.23 g/t Au, 66.1 g/t Ag, 16,755 ppb As, 6492 ppb Sb, 97 ppm Bi, 2198 ppb Hg and 5434 ppm Zn over 0.60 metres. Area 5, east of Brewery Creek, covers a small monzonite intrusive, where gold values up to 480 ppb have been obtained from hornfelsed sedimentary rocks containing finely disseminated arsenopyrite. Hand trenching in Area 3 revealed Earn Group and Road River Group lithologies with anomalous silver, vanadium, selenium, chromium, barium and phosphorous indicative of "Nick" style Sedex mineralization. Silver values averaged 5500 ppb over the entire 100-metre-length of the hand trench (Penner et al., 1999).

Figure 10. *Don Penner and Marco Vanwermeskerken (back) examine a zone of sheeted quartz veins in quartz monzonite on the Oki Doki property.*

Expatriate Resources performed a small program of geochemical sampling, mapping and prospecting on the **Aurex** (Yukon Minfile, 1997, 105M 060) property, adjacent to their wholly-owned **Sinister** property. Expatriate Resources optioned the Aurex property from YKR International. The property is underlain by Hyland Group metasedimentary rocks in the immediate hanging wall of the regional-scale Robert Service Thrust. Values up to 8.8 g/t Au have been obtained from arsenopyrite-pyrrhotite-bearing skarn exposed on the Aurex property. Shallow air-track drilling by YKR International between 1992 and 1994 outlined three zones containing widespread gold mineralization with highly anomalous arsenic, antimony and tungsten. The best intersection within these holes averaged 7.9 g/t Au over 6.1 metres. Late in the year, Expatriate entered into a joint venture agreement on the Aurex-Sinister with Newmont Mining Corporation.

NovaGold Resources Inc. conducted a small program of auger soil sampling to test ground and airborne magnetic anomalies on the **McQuesten** (Yukon Minfile, 1997, 105M 029) property optioned from Eagle Plains Resources. The property adjoins the Aurex-Sinister ground to the north and covers similar geology. Previous work has identified two major zones: the West and East zones. The West Zone covers a Cretaceous quartz monzonite dyke, which variably crosscuts reactive and non-reactive stratigraphy. Reverse circulation drilling in 1997, north of the dykes, drilled through intersections within calcareous sedimentary rocks with abundant gouge zones. Intersections returned values of 1.77 g/t Au over 35.3 metres and 3.23 g/t Au over 21.3 metres. Trenching in 1998, 500 metres to the east, across an extension of the dyke hosted by calcareous rocks, returned a value of 5.18 g/t Au over 10 metres. This intersection is part of a larger intersection of 2.05 g/t Au over 36 metres. The East Zone, located roughly 600 metres east-southeast of the West Zone, consists of thick mineralized horizons in calcareous sedimentary rocks. Gold is associated with zones of structural disturbance visible only in trench excavation and drill core. Trench results from an east-trending trench illustrate the lateral extent of mineralization and include: 0.33 g/t Au over 148 metres; 1.59 g/t Au over 14 metres, open to the east; and 0.82 g/t Au over 98 metres. The McQuesten and Aurex-Sinister properties represent the potential for an emerging gold camp. Moreover, the McQuesten and Aurex-Sinister properties are located adjacent to the prolific Keno Hill silver-lead-zinc district, which has produced over 200 million ounces of silver.

Eagle Plains Resources conducted geochemical sampling, mapping and prospecting on several intrusive-related gold targets related to the Tombstone suite. The properties included the **May** (Yukon Minfile, 1997, 115P 056) in the Mayo area, **Nug** (Yukon Minfile, 1997, 105O 048) near McMillan Pass, **Dragon Lake** (Fig. 11; Yukon Minfile, 1997, 105J 007), and

Figure 11. *Ken Galambos, Mineral Development Geologist with the Yukon Government, examines core on the Dragon Lake property of Eagle Plains Resources Ltd.*

Hit (Fig. 12; NTS 105P/5). The programs at Dragon Lake and Hit were followed up with helicopter-supported diamond drilling. Mineralization at Dragon Lake consists of widespread oxidized skarn mineralization hosted in Neoproterozoic to Lower Cambrian Hyland Group calcereous sedimentary rocks adjacent to a small quartz monzonite plug. Four holes totalling 288 metres were drilled, with each hole intersecting hornfels to calc-silicate rocks, to garnet-actinolite skarn with minor pyrrhotite, pyrite, chalcopyrite. The highest value returned from drilling was in a skarn interval which assayed 3.66 g/t Au over 1.2 metres. An outcrop of oxidized grey limestone near the contact of a small Tombstone suite granitic plug on the Hit property was tested with two diamond drill holes. Samples from outcrop on surface assayed 7.85 g/t Au over 7.0 metres, while drilling intersected calc-silicate skarn mineralization which assayed 2.56 g/t Au over 0.9 metres.

NovaGold Resources Inc. explored several properties with geochemical sampling, mapping and prospecting in the eastern portion of the Tombstone belt. These included the **Lightning/ Tempest, Sass, Bach, Tarakan, Stratus, Zaytchyk, Gato Negro, Mozart, Beethoven and Harlan** properties. NovaGold acquired 100% of the properties early in 1999 from Viceroy Resources. Viceroy staked most of the properties in 1997 and 1998 as a result of a large regional exploration program aimed at intrusive-related gold targets in Selwyn Basin. Most of these properties cover new prospects. The Harlan property is a new discovery located approximately 150 kilometres north-northeast of Ross River. The geology of the property is described in detail by Schulze in this volume. Two zones have been described on the property: the Vortex and West Porphyry zones. The Vortex Zone consists of a thick sequence of heavily argillically altered and silicified Earn Group chert-pebble conglomerate with quartz veining and interstitial replacement quartz-arsenopyrite mineralization. Contour soil sampling has outlined a 600 by 400 metre area of greater than 1000 ppb Au. Select

Figure 12. *Chuck Downey examines the surface showing on the Hit property, consisting of limonitic weathering grey siliceous limestone.*

grab sampling of quartz-arsenopyrite talus within the zone returned up to 4.64 g/t Au. Exploration in 1999 also identified a breccia underlying part of the Vortex Zone (Fig. 13). Samples of the breccia returned values to 6.5 g/t Au. The West Porphyry Zone occurs approximately 2.5 kilometres west of the Vortex Zone. The West Porphyry Zone consists of a swarm of altered quartz monzonite dykes intruding mainly Road River Group sedimentary rocks. Chip sampling of various dykes has returned values up to 0.86 g/t Au over 20.8 metres and 1.08 g/t Au over 1.5 metres. The Vortex Zone represents a significant new discovery as the host conglomerates have previously been thought to have low mineral potential. NovaGold plans to aggressively explore this new discovery in 2000.

Prospector International Resources Inc. conducted an airborne magnetics survey on their **Swan** (Yukon Minfile, 1997, 105O 024) property which adjoins NovaGolds' Lightning/ Tempest property.

Hudson Bay Exploration explored the **Hit** property in southeastern Yukon with geochemical sampling, mapping, prospecting, airborne geophysics, as well as a 4-hole, 642-metre diamond drilling program (Fig. 14). The property is one of a group of properties that define a northwesterly trend including NovaGold's Sun/Sprogge, Rimfire's Fer (described by Jones and Caufield in this volume), and Phelps Dodge's Hy property. The properties are in general underlain by Neoproterozoic to Lower Cambrian Hyland Group clastic rocks. The closest mapped intrusive rocks are at the Tuna occurrence (Yukon Minfile, 1997, 105H 082), approximately five kilometres to the south, and several monzonitic to granitic dykes on the Sun/Sprogge property to the southeast. Hudson Bay has not released any results from this year's program.

NovaGold conducted a minor program of mapping and sampling on the **Sun/Sprogge** (Yukon Minfile, 1997, 105H 034) property. Three main mineralized zones occur on the property. The Ridge Zone consists of a wide west-northwest-trending, moderately north-northeast-dipping coarse clastic member comprised of quartz-pebble conglomerate and sandstone, with lesser fault-bounded phyllite. The entire unit has undergone variable argillic alteration of feldspathic members, silicification and quartz veining, and limonitic staining after fine disseminated sulphides. Narrow auriferous quartz-arsenopyrite veins occur throughout this

Figure 13. *Quartz breccia with argillite and clay-altered intrusive fragments from the Harlan property of NovaGold Resources Inc.*

zone, but comprise only a small percentage of the rock mass. This is unlikely to totally account for the large surrounding gold anomalies within talus fines. Gold values up to 1130 ppb Au were obtained from limited soil development directly along the ridgeline within limonitic 'grits,' returning 0.33 g/t Au from rock chip sampling. In 1999, NovaGold Resources recognized the presence of fine north-northeast-trending, fracture-controlled, strongly limonitic mineralization. Selective sampling returned values up to 536 ppb Au; north-northeast-trending fractures may host the bulk of gold mineralization across the zone. NovaGold also obtained a value of 6.79 g/t Au from a grab sample of silicified vuggy breccia float with clasts of sedimentary rock. This sample was collected from talus along the northern flank of the Ridge Zone.

The Main Skarn/Confluence Zone area is the second major exploration target. The Main Skarn has recently been identified as a gently east-southeast-dipping zone of retrograde skarn roughly five metres thick, underlain by strongly brecciated phyllite, and associated with abundant proximal skarn 'pods.' Surface chip sampling, oblique to true width, returned 2.38 g/t Au over 22.5 metres, extending into a monzonitic dyke along the west margin. Mineralization consists of locally nearly massive pyrite and pyrrhotite, with up to 3% chalcopyrite and minor arsenopyrite veins. The Confluence Zone is a zone at least 500 metres in length of chalcedony and arsenopyrite veining within silicified and argillically altered, limonitic coarse clastic sedimentary rocks. Abundant anomalous values to 8.19 g/t Au over 0.1 m and 0.525 g/t Au over 5.0 metres were returned from 1998 sampling, as well

Figure 14. *Mike Buchanan (right) and Anna Fonseca (left) of Hudson Bay Exploration examine core on the Hit property.*

as a value of 4.24 g/t Au over 4.5 metres from 1997 sampling. Exploration by NovaGold in 1999 resulted in the discovery of fairly abundant rubble of strongly mineralized skarn and arsenical breccia returning values of 2.00 g/t Au within the Confluence Zone.

The third target is a broad gold-in-soil anomaly with values of up to 875 ppb Au. Gold values are greatest along the south flank of the Ridge Zone and proximal to similar altered coarse clastic members to the west; mineralization may be associated with the extension of the Ridge Zone coarse clastic unit. Anomalous values appear to occur along lower, often discreet elevations, suggesting partial structural control. (Schulze, pers. comm., 1999).

Expatriate Resources conducted a small geological program on the **Hyland** (Yukon Minfile, 1997, 95D 011) property approximately 70 kilometres northeast of Watson Lake in southeastern Yukon. The property is underlain by Neoproterozoic to Lower Cambrian Hyland Group metasedimentary rocks. Structural interpretation, the presence of narrow intrusive dykes, geophysics and a gold-bismuth-arsenic soil geochemical signature suggest the property overlies a buried intrusive. The Hyland property surrounds the Hyland Gold property, now 100% owned by Cash Resources, and the Cuz property of Nordac Resources. Previous work on Hyland Gold, including rotary percussion drill holes, has produced significant results, including intersections of 3.0 g/t Au over 16.7 metres, and 1.1 g/t Au over 142 metres.

Several properties were staked in west-central Yukon in the early part of 1999. Properties were staked based on regional compilations done over the winter. These compilations utilized exploration concepts generated by the POGO discovery in Alaska (8.98 million tonnes grading 17.8 g/t Au). The bulk of the claims were staked in the northern extent of the mid-Cretaceous Dawson Range intrusive belt. The area has had a long history of placer gold production, but no major hard rock source of the gold has ever been discovered.

Figure 15. *Geologist Sara Gougeon examines core at the Longline property of Barramundi Gold. Photo by S. Sears*

Barramundi Gold continued to work on their **Longline** (Yukon Minfile, 1997, 115N 024) property, which is the most advanced property in the northern portion of the Dawson Range. The company carried out two phases of diamond drilling (Fig. 15), 53 kilometres of Gradient Induced Polarization, 25 kilometres of Real Section Induced Polarization surveys, geochemical surveys, prospecting and sampling. The property is underlain by granodiorite of the Klotassin Batholith, which is host to several high-grade quartz-sulphide vein occurrences. The first phase of drilling was directed at outlining a small reserve on the V2 vein, which could then be bulk sampled. The vein was tested with 22 holes totalling 550 metres. Assays up to 386.6 g/t Au over 0.66 metres were obtained from the drilling. The drilling was difficult with variable core recovery, and the results reflect the strong nugget effect that is evident from surface sampling. A second phase of drilling was conducted after a financing arrangement and joint venture agreement with Newmont Exploration. This phase of drilling targeted coincident gold-arsenic-geochemical and geophysical (gradient I.P.) anomalies, which had never been previously tested. Twelve holes totaling 2100 metres were drilled. High-grade quartz veining, similar to veining cutting the granodiorite on surface, was intersected at depth with values up to 45.7 g/t Au over 0.20 metres. Several drill holes intersected altered granodiorite, consisting of locally intense sericite and silica alteration with disseminated arsenopyrite and pyrite. The alteration zones assay as high as 3.19 g/t Au over 27 centimetres and 2.23 g/t Au over 1.00 metre. These zones generally range between 0.10 and 0.30 g/t Au over widths of 10 to 20 centimetres; these zones average 1-2 per metre over several metres cored width. An average of 20 alteration zones occur per hole, with 52 found in hole LL99-10.

Troymin Resources Ltd. conducted an exploration program consisting of stream sediment sampling, ridge-and-spur soil sampling, rock sampling and mapping on its newly staked **Moosehorn Property** adjacent to the Longline property. The property covers 294 LAD claims in the Moosehorn Range mountains, 80 kilometres north of Beaver Creek. The stream sediment sampling program identified three areas of anomalous metal zonation: 1) the northwest part of the property is Bi-rich; 2) the central part of the property is Au, Ag and As-rich; and 3) the south-central part of the property is Sb-rich. Anomalous Zn, W and Hg values are irregularly distributed throughout the property. Gold values in stream sediments range from less than detection (< 0.2 ppb) to 701.6 ppb, with 5 samples greater than 100 ppb. The ridge-and-spur soil sampling program returned values up to 364 ppb Au, with 4 samples > 100 ppb. Three areas of coincident, anomalous Au, Ag, As, Sb, Bi, Pb and Zn were identified, two of which are greater than 400 metres long. Rock samples from the property returned values up to 432 ppb Au, 0.4% Pb, 1.2% Zn, 10.2 g/t Ag and 0.45% As (S. Casselman, pers. comm., 1999).

Kennecott Canada conducted geochemical surveys, geological mapping, prospecting, minor trenching and airborne geophysical surveys on the Sixty and Poker Creek properties in the Sixty Mile Creek, Glacier Creek and Miller Creek areas. No results from the program were released.

Nordac and Expatriate Resouces formed the Eureka Joint Venture to explore the Eureka-Armenius, Forty and Track properties in west-central Yukon. The properties are all within historic placer gold mining areas. The properties were explored with geochemical sampling, mapping, prospecting and hand trenching. The **Track** (Yukon Minfile, 1997, 116C 137) property, about 50 kilometres northwest of Dawson City, hosts tungsten-bearing skarns developed in metasedimentary rocks along the north side of a Cretaceous intrusion. Prospecting in a heavily vegetated area near one of the skarn showings located float specimens that returned anomalous gold, bismuth and tungsten values. The best specimen yielded 3.59 g/t Au, 1655 ppb bismuth and 810 ppm tungsten.

The **Eureka/Armenius** (Yukon Minfile, 1997, 115N 057) properties adjoin one another and collectively total 386 claims covering 8000 hectares. They are located in the southern part of the Klondike Goldfields and are easily accessible by an extensive network of roads serving

local placer miners. Creeks draining the property have produced more than 140,000 ounces (4.3 million grams) of placer gold. The claims are underlain by metasedimentary and metavolcanic rocks of the Devonian to Mississippian Nasina Assemblage of the Yukon-Tanana Terrane. The best bedrock exposures are in a few bulldozer trenches excavated by a previous owner. Sampling on the floor of one of these trenches returned a weighted average of 0.33 g/t Au across a 6.5-metre-wide limonitic fracture zone. Prospecting along access roads and in soil profiles on the banks of trenches discovered abundant previously unbroken and unreported boulders of limonite breccia. Samples of the breccia assayed in the range of 0.85 to 15.00 g/t Au. A regional-scale thrust was mapped and sampled in a placer miner's cut and one of seven samples taken assayed 75.38 g/t Au. Before the crew could return to the area, placer mining had progressed upstream and the sampled area had been reburied. Subsequent sampling of another bedrock exposure adjacent to an area that was being actively placer mined and was producing gold, returned low values. Results from this target suggest the gold is erratically distributed within strongly fractured rocks developed along the thrust fault.

Teck Exploration performed a program of geological mapping, prospecting, and soil and stream sediment sampling on the **Ten Mile** (Yukon Minfile, 1997, 115N 110) Creek property. The claims are underlain by a quartz monzonite intrusive of probable Cretaceous age (Fig. 16) intruding Yukon-Tanana Terrane metamorphic rocks. Phelps Dodge has a large block of **FLUME** claims that adjoin the Teck property and cover similar geology. Phelps Dodge performed a small program of mapping, geochemical sampling and prospecting on the FLUME claims. No results have been released from either program.

Prospector International optioned six properties staked by Prime Properties Syndicate on targets modelled after the POGO deposit in Alaska. The properties include the **HIHO, YOGO, OHGO, PREMO, TKO and LADUE** claims. Prospector International performed stream-sediment geochemistry, reconnaissance soil geochemistry and prospecting on the various targets. The properties produced several areas with anomalous gold, arsenic, antimony and mercury, which warrant follow-up programs.

Figure 16. *Jean Pautler of Teck Exploration examines quartz mineralization hosted in Cretaceous quartz monzonite on the Ten Mile Creek property.*

Other major claim holders in the Dawson Range who have also performed small programs of geochemical sampling and prospecting include Canandian United Minerals Incorporated and Deltango, both private Yukon-based exploration companies.

Pacific Ridge Exploration conducted a 9-hole, 995-metre diamond drilling program on the **JRV** (Yukon Minfile, 1997, 105K 051, 052, 053) property near Faro in central Yukon (Fig. 17). The property hosts silver-gold mineralization within the mid-Cretaceous Anvil Range plutonic suite. Mineralization, discovered as float in High Ace Creek, consists of quartz-sulphide breccia, quartz stockwork and sheeted veins. Grab sampling of this material within the Kulan zone averaged 138 g/t Ag and 1.7 g/t Au. Geochemical sampling and geophysical (Induced Polarization) surveys produced

coincident Au-Ag-As-Sb-Pb soil anomalies and IP chargability highs, which were subsequently drilled. Drilling failed to intersect mineralization of the same tenor as that found on surface. The best intersection was in Hole 99-8 with an interval assaying 87.7 g/t Ag and 0.04 g/t Au over 9 metres. Hole 99-3 intersected a 7-metre interval grading 35.2 g/t Ag and 0.10 g/t Au. A new discovery, called the Risby zone, consists of quartz-chalcedony stockwork. Initial sampling by a prospector of 18 mineralized float samples averaged 426.9 g/t Ag and 3.31 g/t Au. Twelve samples were collected during a follow-up traverse that averaged 302.3 g/t Ag and 1.76 g/t Au. A chip sample across 4 metres of exposed quartz-chalcedony vein assayed 384.7 g/t Ag and 2.12 g/t Au.

Yukon Yellow Metal Exploration Ltd. explored the **Shootamook Creek** (Yukon Minfile, 1997, 105B 045) property in south-central Yukon with a program of AX core drilling. A single hole totalling 25.8 metres was drilled, and encountered altered granite with pyrite mineralization; the highest gold value was 39 ppb.

Figure 17. *Wayne Roberts (left), John Brock (right) and Pete Risby (background) discuss the geology of the JRV property.*

Tiberon Minerals explored the **Ruby** (Yukon Minfile, 1997, 105D 090) silver-gold project, 78 kilometres south of Whitehorse, with a program of mapping, prospecting and diamond drilling. The property is located near the centre of the Eocene Bennett Lake Caldera, a circular (23 kilometres in diameter) sequence of flat-lying tuffs and ignimbrites, bounded by a discontinuous ring dyke. The Bennett Lake Caldera occurs within crystalline rocks of the Coast Plutonic Complex. Prospecting discovered four new epithermal quartz-galena-arsenopyrite-silver sulphosalt-pyrite veins called the Brian, Tom, Mike and North. These newly discovered epithermal veins are located in the vicinity of the two main target veins, the Steve and Connie. The veins on the property average approximately 1 metre in width and assay up to 5311 g/t Ag. Drilling consisted of 4 holes totalling 326 metres, targeted at the Connie and Steve veins. The Connie was intersected in 2 holes with values up to 396 g/t Ag, 1.3 g/t Au over 4.7 metres, and 286 g/t Ag over 1.0 metre. The two holes drilled at the Steve vein failed to intersect the mineralized zone. A quartz-carbonate fault breccia with silver-copper-lead-zinc mineralization was discovered late in the season. The zone has a strike length of 250 metres and averages 1-2 metres in width. Channel samples averaged 1.7 metres grading 220 g/t Ag, 1.81% Cu, 1.86% Pb, 0.48% Zn and 1.4 metres grading 361 g/t Ag, 2.71% Cu, 4.7% Pb and 1.06% Zn.

In 1999, Troymin Resources Ltd. conducted an exploration program consisting of mapping, rock sampling and 336 metres of diamond drilling in 2 holes on its **Prospector Mountain** (Yukon Minfile, 1997, 115I 034, 036) property. The property is underlain by mafic to intermediate volcanic rocks of the Late Cretaceous to Early Tertiary Carmacks suite. These have been intruded by slightly younger monzonitic to quartz monzonitic rocks of the Prospector Mountain suite. Two styles of mineralization have been observed on the property: 1) precious-metals-bearing quartz-tourmaline veins; and 2) 'porphyry-type' disseminated pyrite with variable copper and molybdenum contents. The vein mineralization occurs in both the volcanic and intrusive rocks, but tends to be more widespread and have a greater gold content in the volcanic rocks. The veins are generally less than a few metres in width with the occasional vein set up to 10 metres wide. They contain variable amounts of galena, sphalerite, chalcopyrite, gold and silver. Porphyry-type alteration and mineralization were observed in the Prospector Mountain monzonite on the Lightning Grid and consist of two large areas of sub-cropping, disseminated pyrite mineralization with anomalous copper and molybdenum in soils (Casselman, pers. comm., 1999).

The 1999 drill program targeted IP chargeability anomalies with coincident Cu-Mo soil anomalies, and ground/airborne magnetic and radiometric anomalies in the Lightning Grid area. Both holes intersected disseminated pyrite mineralization at the target depth, but no anomalous Cu, Au or Mo values were returned. Troymin interprets the initial drill program as having penetrated the outer pyrite shell of a porphyry system.

BASE METALS EXPLORATION

Base metal exploration investigated a wide range of deposit types and geographic areas of the Yukon. Although the level of exploration was very low with only four small drill programs, a number of new discoveries were made, and several properties were advanced to a drill-ready stage.

CanAustra Resources conducted a 3-hole, 617-metre diamond drilling program on the **Rusty Springs** (Yukon Minfile, 1997, 116K 003) project optioned from Eagle Plains Resources (Fig. 18). The geologic setting, genesis and potential of the Rusty Springs occurrence is described in detail by Charlie Greig in this volume. The 1999 exploration targeted the stratabound silver-lead-zinc-copper-mineralized horizon located at the top of the Devonian Ogilvie Formation dolomite (Fig. 19). Drilling was conducted to the east and south of Orma Hill in an attempt to penetrate the unoxidized mineralized horizon below the water table. Drilling encountered silicified and brecciated mudstones, which are indicative of the underlying mineralization, however the drill was unable to penetrate the siliceous zone in all

Figure 18. *The landing gear collapsed on this Skyvan on the first trip into the Rusty Springs property. No one was injured and, with the aid of a satetllite phone and subsequent arrival of a Twin Otter, the program was only set back a few hours.*

three holes. One hole encountered a 16.6-metre intersection of fine- to medium-grained disseminated sphalerite within the mudstone and in quartz or quartz-carbonate microbreccia which assayed 3000 ppm Zn, suggesting the possibility that sedimentary-exhalative mineralization also exists on the property.

Eagle Plains Resources also staked the **PAMA** claims, which cover the former Bern (Yukon Minfile, 1997, 116K 009) occurrence approximately 40 kilometres south of Rusty Springs. The claims were staked as a result of a regional compilation of the Rusty Springs area. Satellite imagery, a regional-scale airborne magnetic survey, the Rusty Springs geologic model and Yukon Minfile were used to define targets for exploration. The property is host to a two-kilometre-long quartz-carbonate breccia zone containing tetrahedrite,

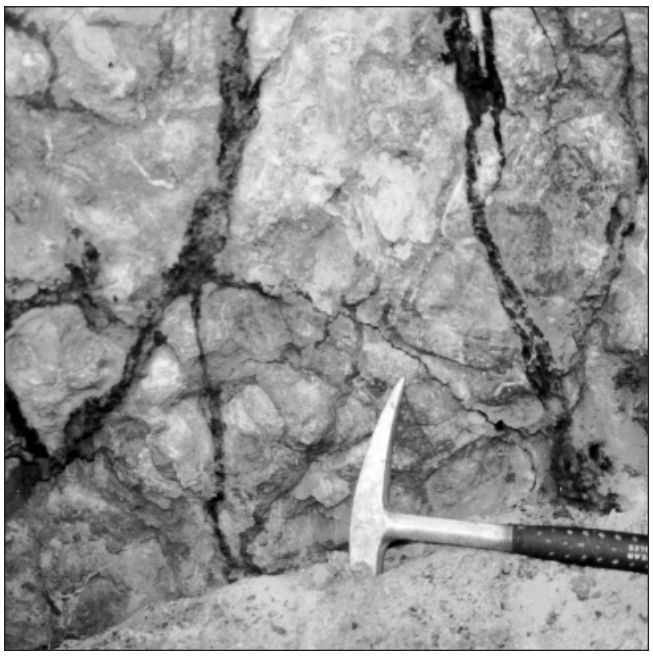

Figure 19. *Heavily oxidized and veined 'Katshat unit' at the top of the Devonian Ogilivie Formation dolomite at Rusty Springs.*

copper oxides, and lead and zinc sulphates hosted in a carbonate unit. Smithsonite-rich samples assayed up to 47.8% Zn.

Manson Creek Resources conducted an 8-hole, 1177-metre drill program (Fig. 20) on the **Kathleen Lake** (Yukon Minfile, 1997, 106C 065, 083, 085, 073) project, approximately 80 kilometres east of Keno Hill. Line cutting, Real Section Induced Polarization surveys, prospecting and sampling were also conducted. Drill holes were targeted on anomalies generated by the geophysical survey in the area of the Val/Vera (Yukon Minfile, 1997, 106D 083, 085) and Craig (Yukon Minfile, 1997, 106D 073) deposits. Replacement, vein and Mississippi Valley-type mineralization hosted in Proterozoic dolomites were the target of the 1999 drilling. The geophysical anomalies were explained in the drilling; unfortunately no economic mineralization was encountered. One hole in the vicinity of the Craig deposit encountered rhythmically bedded pyritic shale and argillite. Up to 30% pyrite occurs as conformable finely disseminated bands. Anomalous values up to 62 ppb Au, 3.0 ppm Ag, 71 ppm Pb and 622 ppm Zn occur in the shale unit.

Figure 20. *Drilling on the Vera property of Manson Creek Resources.*

Expatriate Resources explored the **HP-Nod** (Yukon Minfile, 1997, 105I 012) property in the Howard's Pass district with geochemistry, geological mapping, prospecting and sampling. The HP-Nod claims are adjacent to the Howard's Pass (Yukon Minfile, 1997, 105I 012) sedimentary-exhalative Pb-Zn-Ag deposits which host an indicated geological resource of 113 million tonnes grading 5.4% Zn and 2.1% Pb with approximately 16 g/t Ag. The claims cover extensions to the 'active member' of the Ordivician-Silurian Road River Group, which host the deposits in the district. Soil geochemical sampling by Expatriate returned strongly anomalous values of up to 1% Pb. Geochemistry and drilling by previous operators indicates that the active member extends for 3500 metres on the claims. Expatriate is planning on an 8000-metre drill program to test the active member on the property in 2000.

Nickelodeon and Tanquery Resources also conducted an exploration program of geochemical sampling, mapping and prospecting in the Howard's Pass district on the **Hawk and Eagle** (Yukon Minfile, 1997, 105I 043, 044) claims. These claims are located approximately 15 kilometres to the west of the Howard's Pass deposits.

In the Rancheria silver district in south-central Yukon, Nordac Resources explored the **Blue Heaven** (Yukon Minfile, 1997, 105B 020), **Touchdown** and **Quarterback** (Yukon Minfile, 1997, 105B 098) properties for carbonate replacement and high-grade silver vein deposits. Hand trenching on the Quarterback property uncovered a broad zone of limestone-hosted, galena-sphalerite fracture-filling mineralization containing an average of about 120 g/t Ag. The best individual chip sample returned 519 g/t Ag, 14.2% Pb and 0.6% Zn over 2.0 metres. On the Blue Heaven, an excavator trenching program along high-grade silver veins at the Blue Heaven property was completed. A total of 48 ore bags of galena-rich material was recovered during the exploration (Fig. 21). Complete assay results are not yet available. However, a composite sample of sphalerite-bearing mineralization representing the lower end of the recovered material assayed 2790 g/t Ag, 26.3% Pb and 27.8% Zn. In addition, a specimen of tetrahedrite-bearing galena representing the highest grade mineralization returned 27,561 g/t Ag, 65.3% Pb and 2.2% Zn. Each bag contains between 0.9 and 1.5 tonnes of ore. Carbonate replacement style mineralization also occurs on the property where high-grade veins intersect favourable carbonate stratigraphy.

Volcanogenic massive sulphide (VMS) deposits hosted in Yukon-Tanana Terrane continued to be the focus of exploration in the Finlayson Lake district, Teslin area, and near Dawson City. Recent 1:50 000 scale mapping (Murphy, 1999 and references therein; Hunt, 1999a and in prep.) in the Finlayson Lake district has led to the identification of four horizons which host VMS deposits. In general, VMS deposits are known to occur in clusters; however, in the Finlayson Lake district, only four major deposits have been discovered to date in each of the favourable stratigraphic horizons. This suggests that there is vast potential remaining in this district for the discovery of additional VMS deposits. Coeval stratigraphy in Cassiar Platform, which hosts the recently discovered Wolf VMS deposit, was also the subject of several exploration programs (Gibson et al., 1999; Hunt, 1999b).

In the Finlayson Lake district, Cominco Ltd. released an inferred reserve on a small satellite deposit discovered in 1998 on the **Kudz Ze Kayah** (Yukon Minfile, 1997, 105G 117) property. The deposit hosts reserves of 1.5 Mt grading 6.4% Zn, 3.1% Pb, 0.1% Cu, 90 g/t Ag, 2.0 g/t Au. It is hosted in the same stratigraphic horizon as the ABM deposit and illustrates the potential for additional discoveries in this area. In the spring of 1999, Cominco conducted a small program of geophysics on the Kudz Ze Kayah property.

Expatriate and Atna Resources conducted metallurgical studies for the treatment of selenium in mineralzation from the **Wolverine** (Yukon Minfile, 1997, 105G 072) VMS deposit. The deposit contains reserves of 6,237,000 tonnes grading 12.66% Zn, 1.33% Cu, 1.55% Pb, 370.9 g/t Ag and 1.76 g/t Au. The deposit remains open to the northwest on the property, as well as down dip to the north where it crosses onto claims owned by Cominco. The conversion of zinc sulphide concentrate to a high-grade clean zinc oxide using traditional roasting is preferred from the various on-site metallurgical treatment options considered for zinc processing. This treatment eliminates the selenium, allows slightly higher zinc recoveries to concentrate, and reduces transportation and marketing costs, partially offsetting higher operating costs. The selenium and other contaminants are captured through standard recovery technology. Two on-site treatment options are being evaluated for processing the precious-metal-rich bulk copper-lead concentrate: firstly, bio-leaching of bulk concentrate to recover the precious metals by conventional cyanidation; and secondly, bio-leaching to reduce selenium levels to produce an attractive precious-metal-rich copper concentrate for shipment to smelters. The Wolverine joint venture commissioned AGRA Simons Ltd. to conduct a scoping study on these selections to evaluate the technical viability, capital requirements, and operating costs. Results indicate these two metallurgical processes would produce readily saleable products and are economically attractive. The preferred process options use proven technology and require minimal additional infrastructure cost beyond that required for mine development.

Figure 21. *Excavator with loaded ore bags at the Blue Heaven property of Nordac Resources. Each bag contains between 0.9 and 1.5 tonnes of ore.*

Expatriate holds a large number of claims covering 81,000 hectares in the Finlayson area. The claims cover stratigraphy that is host to all the major deposits in the Finlayson Lake district. In 1999, they conducted a program of geological mapping, geochemical sampling and prospecting on many of the claims. Several of the properties contain attractive drill targets that will be tested when exploration returns to healthier levels.

In the Teslin area, Brett Resources optioned the **MOR** (NTS 105C/1) and **Caribou Creek** (NTS 105C/5) properties from Fairfield Minerals. The two properties are underlain by stratigraphy that has been correlated to the Nasina Assemblage of the Yukon-Tanana Terrane, which hosts VMS deposits in the Finlayson Lake district. Both properties cover previously unstaked targets. Geological mapping and reconnaissance rock sampling at the MOR property have identified felsic volcanic horizons traceable over a strike length of 900 metres. This is within the zone of anomalous, multi-element soil geochemistry and geophysical conductors previously outlined by Fairfield Minerals. Grab samples from mineralized quartz-sericite schist/rhyolite tuff at the Discovery showing have returned assays of up to 8910 ppb Au, 82.2 ppm Ag, 10,500 ppm Cu, 5081 ppm Pb and 5515 ppm Zn. Another occurrence within the same stratigraphy, approximately 450 metres to the east of the Discovery showing, has yielded assays of 570 ppb Au, 9.2 ppm Ag, 411 ppm Cu, 1050 ppm Pb, 714 ppm Zn, 8800 ppm Ba. Further soil geochemical sampling by Brett Resources has outlined significant copper-silver anomalies in other areas of the property. At Caribou Creek, a limited geological mapping program has shown that strongly gossanous horizons hosted within a bimodal (mafic-felsic) volcanic sequence occur in the vicinity of strong soil geochemical anomalies containing values of up to 2675 ppm Cu, 2047 ppm Pb, 1346 ppm Zn, 8.5 ppm Ag and 2320 ppb Au.

Elsewhere in the Teslin area, Fairfield Minerals carried out further reconnaissance exploration. The program consisted of an evaluation of regional base metal and gold geochemical anomalies from an extensive proprietary database.

15053 Yukon Inc. conducted a program of Winkie drilling (Fig. 22) on the **Bigtop** (Yukon Minfile, 1997, 105C 021) VMS target south of Quiet Lake. The drill was successful in revealing flat-lying stratigraphy previously interpreted to be steeply dipping from a Kubota trenching program. Exposure on the property is limited and the new drilling will greatly aid in a re-interpretation of the geology of this prospect.

A three-week program, including prospecting, geophysics and geochemistry, was completed in August on the **Starr** (Yukon Minfile, 1997, 105G 090) base metal property, located 80 kilometres southeast of Ross River. The Starr property is an extensive package of claims that cover 25 kilometres of the same Mississippian volcanic stratigraphy that hosts the Wolf deposit (4.1 Mt grading 6.2% Zn, 1.8% Pb and 84 g/t Ag). Petra Resources has the option to earn a 50% interest in the Starr Property from Pathfinder Resources Ltd. Detailed results will be reported once all analytical results have been received and a comprehensive evaluation of the data has been completed.

Eagle Plains Resources conducted small programs of prospecting, mapping and geochemistry on their **Fire/Ice** (Yukon Minfile, 1997, 105F 071, 073) claims and **St. Cyr** (Yukon Minfile, 1997, 105F 102) properties that cover the same volcanic stratigraphy to the north of the Wolf deposit and Starr claims. Previous work on the claims has identified baritic horizons with base metal mineralization.

Further to the north in this package of volcanic rocks, 15053 Yukon Inc. staked the **FOX** (Yukon Minfile, 1997, 105F 036) claims to cover a previously documented VMS target. Previous work identified float of white siliceous material with banded sphalerite and minor galena that assayed up to 11.5% Zn, 10.2% Pb and 78.9 g/t Ag. A new area of mineralization representing possible feeder-zone mineralization exposed in a talus slope was discovered in 1999 which assayed up to 17.3% Zn and 28 ppm Hg.

H. Coyne and Sons acquired a large package of claims and leases from Hudson Bay Mining and Smelting Co. to add to their current holdings in the **Whitehorse Copper Belt** (Yukon Minfile, 1997, 105D 053). The Copper Belt is host to numerous iron-rich and calc-silicate skarn deposits which have produced over 10 million tonnes of copper ore with an average grade of 1.5% Cu, 0.55 g/t Au and 8.1 g/t Ag. The Coynes commissioned a compilation report by an independent geologist which utilized the voluminous collection of information that Hudson Bay released with the sale of their interest in the Copper Belt. Utilizing this information, the Coynes drilled two holes between the former producing Pueblo and Grafter mines in a largely overburden covered area. Hole Gin-1 intersected 2.5 metres of garnet-

Figure 22. *Steve Traynor, geologist with 15053 Yukon Inc., oversaw the Winkie drilling on the Bigtop VMS property.*

magnetite skarn (Fig. 23) grading 13.8% Cu, 0.29 g/t Au. Trenches on the Hat claims in the Whitehorse landfill site have revealed altered granodiorite which has produced assays up to 1.05% Cu, 180 ppb Au, 8.7 g/t Ag and 0.061% MoS_2 indicating possible porphyry mineralization.

Nordac Resources was the only active company in the Kluane mafic-ultramafic belt. The belt is composed of Triassic mafic-ultramafic intrusive complexes along the eastern margin of Wrangellia in western Yukon. Nordac performed hand trenching on platinum-palladium-nickel-copper showings hosted by gabbro on the margin of an ultramafic sill. The main trenching targets are in areas where sampled float specimens produced assays ranging from 0.13 to 2.20 g/t Pt, 0.34 to 2.17 g/t Pd, 0.36 to 1.02% Ni and 0.24 to 0.49% Cu.

Cash Resources explored the **Mucho** (Yukon Minfile, 1997, 105I 004) property, located about 120 kilometres east of Ross River, with prospecting and soil sampling. The program outlined an extensive system of silver-rich vein, skarn and replacement-type mineralization within a three to five square kilometre area of strongly anomalous silver-lead-zinc soil-geochemical response. Other locally anomalous elements include gold, copper, arsenic, antimony, bismuth and tin. The 1999 program explored previously unrecognized veins, some of which are exposed intermittently within recessive-weathering linears over strike lengths exceeding 1000 kilometres. Where exposed, the veins are up to eight metres wide and are composed of massive quartz bands, gouge zones, and crushed or silica-cemented wallrock. Most vein material is strongly oxidized, but a variety of sulphide minerals, including galena, sphalerite, arsenopyrite, pyrite, tetrahedrite and bismuthinite have been discovered. Specimens of anglesite-coated galena from different veins returned silver assays of 19,480, 10,748 and 5436 grams per tonne. Chip sampling from widely separated outcrops and hand pits also returned encouraging assays. These include: 421 g/t Ag, 6.8% Pb and 0.6% Zn across 130 centimetres; 712 g/t Ag, 1.5% Pb and 2.1% Zn across 30 cm; and 279 g/t Ag, 2.4% Pb and 0.1% Zn across 80 cm.

Gee-Ten Ventures conducted a 5-hole, 439-metre diamond drilling program on the **Dolly Varden** (Yukon Minfile, 1997, 105H 005) property, 128 kilometres north of Watson Lake. Silver-lead-zinc ± copper-tungsten skarn mineralization was targeted in the drilling program.

Figure 23. *Garnet-magnetite-chalcopyrite-bornite skarn from hole Gin-1 drilled by H. Coyne and Sons in the Whitehorse Copper Belt.*

Figure 24. *Ron Berdahl on the upper portion of the kill zone on the Andrew property.*

Local prospectors continued to play an important role in generating new mineral discoveries. Ron Berdahl staked the **Andrew** (Yukon Minfile, 1997, 105K 089) claims in Selwyn Basin which cover an old occurrence described as silver-lead-zinc-copper veins. While investigating the vein showings, Berdahl focussed on an area marked by a large (75 by 150 metre) kill zone (Fig. 24). Hand trenching revealed stratabound lead-zinc mineralization at the contact of quartzites, and overlying maroon and green shale of the Neoproterozoic to Lower Cambrian Hyland Group. A composite grab sample of oxidized surface material at the head of the kill zone returned a value of 17% Zn. The property is an exciting new discovery, which needs to be re-evaluated based on the new style of mineralization discovered by Berdahl.

Figure 25. *Shawn Ryan, 1999 Yukon Prospector of the Year, points out the Zn-Pb-Cu-Ag mineralized horizon on his Alp claims.*

Shawn Ryan also discovered a new zinc occurrence while investigating a gold geochemical anomaly in the Clear Creek area on his **ALP** (Yukon Minfile, 1997, 115P 051) claims. Ryan discovered a stratabound horizon of quartz-sphalerite-chalocpyrite-galena mineralization hosted in Neoproterozoic to Lower Cambrian Hyland Group psammites (Fig. 25). Grab samples from the horizon assayed up to 22% Zn. The property now has potential for significant base metal mineralization, as well as the gold potential highlighted by its proximity to the new discovery made by Redstar Resources on the Clear Creek property.

EMERALD EXPLORATION

Expatriate Resources conducted a field program to define the extent of emerald-bearing host rock, and to evaluate the quality of the emeralds and their extractability on the Goal-Net property in the Finlayson Lake area. Detailed prospecting in the vicinity of the discovery showing has located numerous emerald-bearing float trains in an 800- by 400-metre-area that straddles a ridge top. A Cretaceous granite body occurs approximately 600 metres east of the emerald locality, while a small ultramafic body occurs just to the west. Bedrock consists of interfingered metagabbro and chlorite schist. Hand trenching has exposed four golden-weathering chlorite-phlogopite(?)-tourmaline schist horizons which range from 50 centimetres to 4 metres thick, intersected by gently dipping, subparallel quartz-tourmaline veins. Emeralds occur in the golden-weathering schist horizon and the quartz-tourmaline veins. Where the veins intersect the favourable schist horizons, a higher concentration of emeralds occur. Both the host schists and veins project subhorizontally beneath the ridge at a shallow depth, making the emerald prospect potentially suitable for open pit mining. Washing and hand sorting of about one-half tonne of material from trenches in the first phase of the program yielded about one kilogram of green beryl. The sampling program recovered small gem quality emeralds up to approximately one-quarter carat in size (Fig. 26) with excellent colour and clarity. The sampling program was confined to talus trains. The program was designed to establish geological controls for the emeralds, define the limits of favourable host lithologies (more than three square kilometres at present), identify additional emerald showings, and evaluate the abundance of gem quality stones and potential for larger stones.

Figure 26. *A gem quality emerald is pictured beside a one carat diamond for scale. Photo by North Light Images Ltd.*

COAL EXPLORATION

Usebelli Coal Mine Inc, conducted a spring 1999 exploration program on Cash Resources **Division Mountain** (Yukon Minfile, 1997, 115H 013) coal property. This program successfully discovered coal seams up to 14 metres thick in a previously undrilled area at Corduroy Mountain, 10 kilometres east of Division Mountain. The coal was found in a reverse-circulation drill hole that was one of a fence of holes. Drilling took place across favourable stratigraphy, in a till-covered area, on the west limb of a seven-kilometre-long syncline. Only one additional hole tested the coal-bearing unit along strike, and is located about 200 metres to the north. Both holes intersected a thick sequence of coal-bearing sandstone, with one seam having a true thickness of 14 metres. Preliminary results indicate that the thickness, coal quality and stratigraphic position of the new discovery are very similar to the coal in the Division Mountain area. For a description of the stratigraphy and associated coal quality in the Division Mountain area, see Allen, this volume.

ACKNOWLEDGMENTS

This report is based on public information gathered from a variety of sources. It also includes information provided by companies through press releases, property summaries provided to the department by companies, and from property visits conducted in the 1999 field season. The cooperation of companies, in providing information and their hospitality during field tours are gratefully acknowledged. Editing by Diane Emond and Leyla Weston is appreciated.

Companies and individuals exploring in the Yukon and wishing to be included in future reports are encouraged to contact the author by phone at (867) 667-3202 or by e-mail at burkem@inac.gc.ca.

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APPENDIX 1: 1999 EXPLORATION PROJECTS

BS – Bulk Sample
D – Development
DD – Diamond Drilling
ES – Environmental Studies
F – Feasibility
G – Geology
GC – Geochemistry
GP – Geophysics
M – Mining
PD – Percussion Drilling
PF – Pre-feasibility
R – Reconnaissance
T – Trenching
U/GD – Underground Development

PROPERTY	COMPANY	MINING DISTRICT	MINFILE # or (1:50 000 NTS)	WORK TYPE	COMMODITY
Armenius	Expatriate Resources / Nordac	Dawson	115N 057	G,GC,T	Au
Aurex	Expatriate Resources/ YKR International	Mayo	105M 060	G,GC	Au
Bigtop	15053 Yukon Inc.	Whitehorse	105C 021	G,DD	Pb-Zn-Cu-Ag-Au
Blue Heaven	Nordac Resources	Watson Lake	105B 020	G,GC,T	Ag-Pb-Zn-Cu
Brewery Creek	Viceroy Resources	Dawson	116B 160	M,G,GC,RC	Au
Caribou Creek/MOR	Brett/Fairfield Minerals	Watson Lake	(105C/1, 5)	G,GC	Pb-Zn-Ag-Cu
Canadian Creek	Alexis/Wildrose Resources	Whitehorse	115J 036		Cu-Au
Clear Creek	Redstar/Newmont	Mayo	115P 012, 013	DD	Au
Cuz	Nordac Resources	Watson Lake	95D 011	G,GC	Au
Cy/St	Eagle Plains Resources	Watson Lake	105F 102	G,GC	Pb-Zn-Ag
DDL	Nordac Resources	Whitehorse	105E 006	GC,T	Cu-Au
Division Mountain	Cash Resources	Whitehorse	115H 013	G,T,RC	Coal
Dolly Varden	Gee-Ten Ventures	Watson Lake	105H 005	DD	Zn-Pb-Ag-Cu
Drag	Eagle Plains Resources	Mayo	105J 007	G,DD	Au
Eureka	Expatriate/Nordac	Dawson	115N 057	G,GC,T	Au
Fyre Lake	Pacific Ridge	Watson Lake	105G 034	Reclamation	Cu-Co-Au
Gates Creek	Viceroy/Tr'ondëk Hwëch'in First Nation	Dawson	(116A/4, 115P/13)	G,GC	Au
Goal-Net	Expatriate Resources	Watson Lake	(105G/7, 8)	G,GC,T,BS	Cu-Co-Au/ emeralds
Harlan	NovaGold Resources	Mayo	(105O/4, 5)	G,GC	Au
Hat	Coyne & Sons	Whitehorse	105D 053	G,GC,T	Cu-Au-Ag
Hawk/Eagle	Nickelodeon/Tanqueray	Watson Lake	105I 043, 044	G,GC	Pb-Zn-Ag
Hit	Hudson Bay	Watson Lake	(105H/9)	G,GC,DD	Au
Hit	Eagle Plains Resources	Mayo	(105P/5)	G,DD	Au
HP/Nod	Expatriate Resources	Watson Lake	105I 012	G,GC,T	Pb-Zn-Ag
Hunker	Klondike Source/ Barramundi Gold Ltd.	Dawson	(115O/14, 15)	G	Au
Hyland	Expatriate Resources	Watson Lake	95D 011	G,GC	Au

Appendix 1: continued

PROPERTY	COMPANY	MINING DISTRICT	MINFILE # or (1:50 000 NTS)	WORK TYPE	COMMODITY
JRV	Pacific Ridge Exploration	Watson Lake	105K 051, 052, 053	G,GC,DD	Au-Ag
Kathleen Lakes	Manson Creek Resources	Mayo	106C 065, 083, 085, 073	G,GC,GP,DD	Ag-Pb-Zn
Keno Hill	United Keno Hill	Mayo	105M 001	D	Ag-Pb-Zn
Kudz Ze Kayah	Cominco Ltd.	Watson Lake	105G 117	GP	Pb-Zn-Cu-Ag-Au
Livingstone	Larry Carlyle/ Max Fuerstner	Whitehorse	105E 001, 042, 049, 054	G,GC,T	Au-Ag
Longline	Barramundi Gold Ltd./ Newmont	Whitehorse	115N 024	G,GC,GP,DD	Au
May	Eagle Plains Resources	Mayo	115P 056	G,GC	Au
Minto	Minto Resources	Whitehorse	115I 021, 022	D,DD	Cu-Ag-Au
Mos	Barker/Risby	Dawson	115N 039, 040	G,GC	Au-Ag
Mount Nansen	BYG Natural Resources	Whitehorse	115I 064, 065	M,G,GC,T,DD	Au-Ag
Nug	Eagle Plains Resources	Mayo	105O 048	G,GC	Au
Ohgo, etc.	Prospector International	Dawson	(115N, O)	G,GC	Au
Oki-Doki	International Kodiak	Dawson	(116B/1, A/4)	G,GC,T,GP	Au
Pama	Eagle Plains Resources	Dawson	116K 009	G,GC,SD	Zn-Pb-Cu-Ag
Prospector Mtn.	Troymin/Almaden Res.	Whitehorse	115I 034, 036	G,GC	Au-Ag
Revenue	ATAC/YKR International	Whitehorse	115I 042	G,GP	Cu-Au-Ag-WO_3-MoS_2
Ruby	Tiberon	Whitehorse	105D 090	G,GC,DD	Ag-Au
Rusty Springs	CanAustra Resources Eagle Plains Resources	Dawson	116K 003	G,GP,DD	Ag-Cu-Pb-Zn
Scheelite Dome	Copper Ridge/Kennecott	Mayo	115P 033	G,GC,GP,DD	Au
Shootamook	Yukon Yellow Metal	Watson Lake	105B 045	DD	Au
Starr	Pathfinder/Petra Resources	Watson Lake	105G 090, etc.	G,GC	Pb-Zn-Ag
Swan	Prospector International	Mayo	105O 024	GP	Au
Tak, etc.	Canadian United Minerals	Dawson	(116B/7, etc.)	G,GC,GP	Au
Track	Expatriate Resources/ Nordac Resources	Dawson	116C 137	G,GC,T	Au
Wash	Nordac Resources	Whitehorse	115G 100	G,GC,T	Ni-Cu-Au-PGE's

APPENDIX 2: 1999 DRILLING STATISTICS

PROPERTY	COMPANY	DIAMOND DRILL		RC/PERCUSSION DRILL	
		METRES	# HOLES	METRES	# HOLES
BEE	Silver Sabre Resources	139	3		
Brewery Creek	Viceroy Resources			2500	21
Clear Creek	Redstar Resources/Newmont	219	2		
Division Mountain	Cash Resources/Usebelli Coal			1874	20
Dolly Varden	Gee-Ten Ventures	439	5		
Dragon Lake	Eagle Plains Resources	288	4		
Hit	Hudson Bay Mining	642	4		
Hit	Eagle Plains Resources	178	2		
JRV	Pacific Ridge Exploration	995	9		
Kathleen Lakes	Manson Creek/Prism Resources	1177	8		
Longline	Barramundi Gold	550	22		
Longline	Newmont/Barramundi Gold Ltd.	2100	12		
Minto	Minto Explorations	936	6		
Prospector Mountain	Troymin/Almaden Resources	336	2		
Rusty Springs	CanAustra Resources/Eagle Plains Resources	617	3		
Scheelite Dome	Copper Ridge Exploration	1357	13		
Ruby	Tiberon Minerals	326	4		
Whitehorse Copper	Coyne and Sons	280	2		
TOTAL		**10,579**		**4374**	

PLACER MINING OVERVIEW, 1999

William LeBarge[1]
Yukon Geology Program

A late season surge in world gold prices, which resulted in higher than average September production, was one of the few bright spots for the Yukon Placer Mining Industry in 1999. A total of 171 mines operated, with approximately 600 people directly employed in the industry. This represents a 6% increase in the number of mines from 1998. The majority of active mining operations (101) were in the Dawson Mining District, followed by Whitehorse (43), Mayo (26) and Watson Lake (1).

Following historical trends, in 1999, over 80% of the Yukon's placer gold was produced in the Dawson District. This area includes the unglaciated drainages of Klondike River, Indian River, west Yukon River (including Fortymile, Sixtymile, Moosehorn) and lower Stewart River. The remaining gold came from glaciated regions including Clear Creek, Mayo, Dawson Range, Kluane and Livingstone.

Placer gold production to the end of October, 1999 totalled 89,141 crude oz. (2,772,597 g), compared to 84,265 crude oz. (2,620,936 g) for the same period in 1998. Based on this trend, total placer gold production for 1999 is projected to be 92,500 crude oz. (2,877,073 g), which is 6% higher than the 87,488 crude oz. (2,721,183 g) produced in 1998. Despite this moderate increase, the actual total dollar value of Yukon placer gold dropped for the third consecutive year due to the continuing fall of world gold prices. The value of 1999 production is $29.7 million, falling $900,000 short of the $30.6 million produced in 1998.

The operating conditions for Mining Land Use regulations were implemented for all placer mining operations in 1999; the 2000 mining season will be the first time operators will be required to have Mining Land Use licenses. Along with the upcoming 2001 review of effluent discharge standards set under the Yukon Placer Authorization, these are some of the many challenges facing the Yukon placer mining industry in the near future.

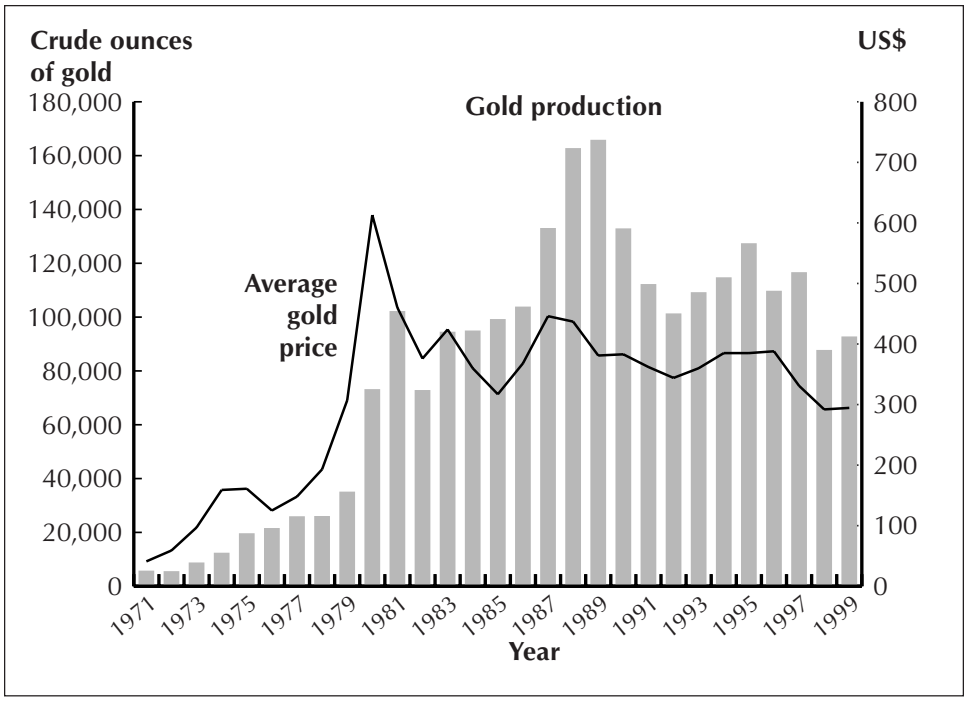

Figure 1. *Yearly gold production figures for the Yukon.*

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RÉSUMÉ

Un des rares événements positifs pour l'industrie d'exploitation des placers du Yukon en 1999 a été la soudaine montée des prix mondiaux de l'or qui a causé une production plus élevée que la moyenne pour le mois de Septembre. Au total, 171 mines ont été exploitées, ce qui a fournit des emplois directs à environ 600 personnes dans l'industrie. Ces chiffres représentent une hausse du nombre des mines en exploitation de 6 % par rapport à 1998. La majorité des exploitations actives se situaient dans le district minier de Dawson (101) suivi par les districts de Whitehorse (43), Mayo (26) et Watson Lake (1).

En 1999, conformément à la tendance historique, plus de 80 % de l'or placérien du Yukon a été produit dans le district de Dawson. Cette région comprend les bassins versants non touchés par la glaciation des rivières Klondike, Indian, ceux de l'ouest du fleuve Yukon (les rivières Fotymile, Sixtymile et Moosehorn) ainsi que le cours inférieur de la rivière Stewart. Le reste de la production aurifère provient des régions qui ont été glaciées ce qui comprend les districts de Clear Creek, Mayo, Dawson Range, Kluane et Livingstone.

À la fin d'octobre 1999, la production d'or a atteignait 89 141 onces brutes (2 772 597 g) comparativement à 84 265 onces brutes (2 620 936 g) pour la même période en 1998. Si on se fie à cette tendance, la production d'or placérien de 1999 sera de 92 500 onces brutes (2 877 073 g), ce qui représente une augmentation de 6% par rapport à la production de 87 488 onces brutes (2 721 183 g) en 1998. Malgré cette modeste hausse, la valeur totale de la production d'or placérien du Yukon a baissé pour la troisième année consécutive en raison de la chute des prix de l'or sur les marchés mondiaux. En 1999, la valeur de la production est de 29,7 millions de dollars, ce qui représente une diminution de 900 000 dollars par rapport à la production de 30,6 millions de dollars de 1998.

En 1999, on a mis en application le règlement sur les conditions d'exploitation et d'utilisation du territoire pour toutes les exploitations d'extraction placériennes et la saison d'extraction minière de l'an 2000 sera la première pendant laquelle les exploitants devront détenir un permis d'utilisation du territoire minier. Pour l'année 2001, Il y a de plus une révision des normes concernant les rejets d'effluents qui sont déterminés par la Yukon Placer Authorization, tout ceci constitue une partie des défis auxquels doit faire face, dans un avenir rapproché, l'industrie de l'exploitation des placers au Yukon.