DRILLING - GEOLOGICAL

REPORT

OG 1-12 YC25491 – YC25502
OG 13 - 30 YC43582 – YC43599
UG 1-18 YC43600 – YC43617
OG 31-36 YC44737 – YC44742
FM 1-176 YC60800 – YC60975

NTS # 116 B \ 13

LAT: 64° 49 N

LONG: 139° 58 W

DAWSON MINING DISTRICT

AUTHOR OF REPORT SHAWN RYAN

WORK PERFORMED AUGUST 10 to SEPTEMBER 15, 2008

DATE OF REPORT APRIL 3, 2009

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1.0 SUMMARY

The OG 2008 exploration program consisted of more gravity work and 2100 meters of drilling. A total of 8 drill holes from five set ups targeted the down dip extension of the mineral horizon and also tested the gravity anomaly.

2.0 PROPERTY DESCRIPTION AND LOCATION

2.1 LOCATION AND ACCESS

The OG carbonate-hosted lead-zinc-silver prospect is located in the Ogilvie Mountains, approximately 110km north-northwest of Dawson City, Yukon Territory, Canada. Approximate coordinates are 64° 50’ north latitude, 140° 00’ west longitude. The majority of the claim group is situated within a tributary of Coal Creek. It includes the drainage divide between the north-draining Coal Creek, and a south flowing stream basin. Both are eventual tributaries to the Yukon River.
Access to the Property is achieved through helicopter. An existing winter road, historically used for mineral exploration on Properties less than 20 kilometers away could be utilized during winter months. The winter road is accessed off the Dempster Highway, just north of Dawson City.

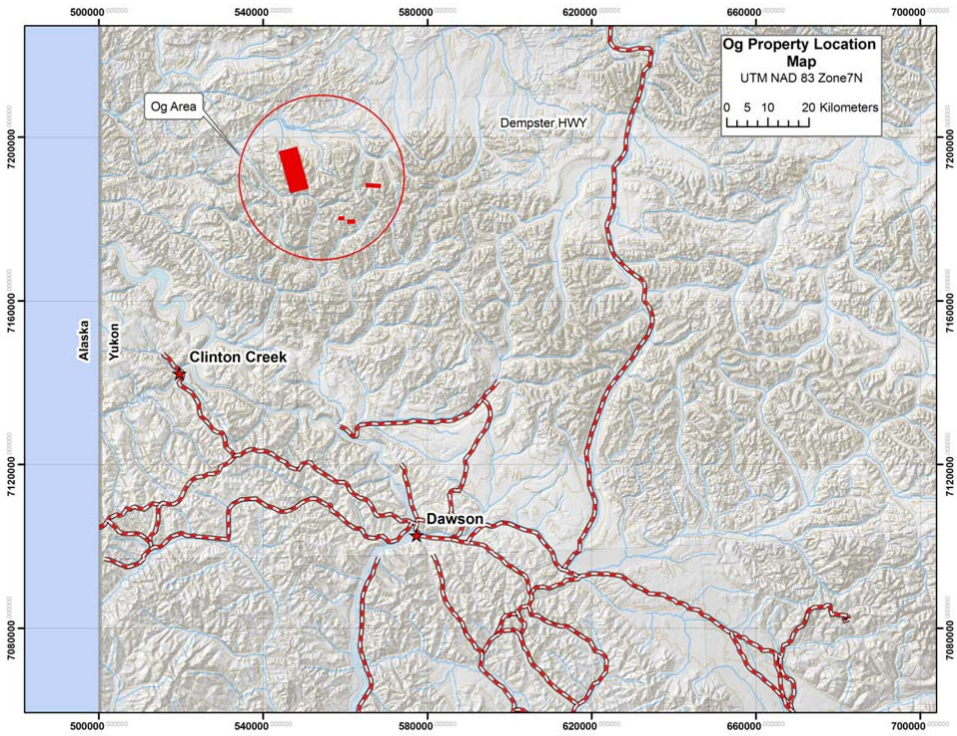

Figure 1: OG Project Location

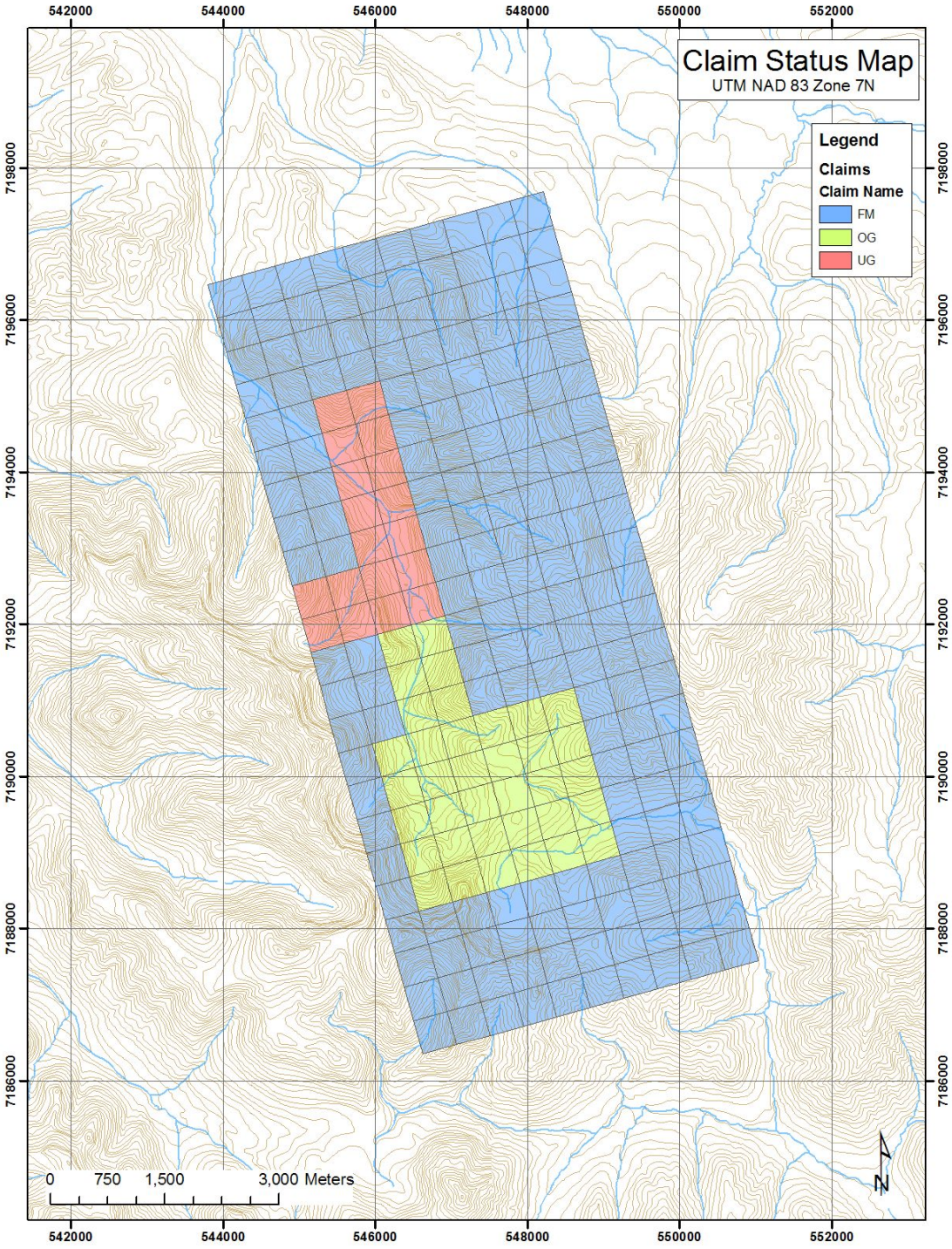

Figure 2: OG Claim Map

3.0 PHYSIOGRAPHY, CLIMATE AND INFRASTRUCTURE

The OG project is located along the northern margin of the Oglivie Mountain, north of Dawson City and the Yukon River. The mountain range fades out gradually to the north into foothills, approximately 10 km north of the Property.

The OG area is comprised of high-relief Alpine-style Mountains. Elevations within the immediate Property range between 1,800 meters and 1,200 meters. Most of the Property is above tree line, and covered by tundra and alpine vegetation. Significant scree slopes cover and overburden cover the majority of the Property. Some alpine-style glaciations has occurred on the Property, with remnant glacial outwash and moraine covering low lying areas.

The Yukon has a sub-arctic continental climate with temperatures reaching as high as 36.1ºC in the summer and as low as minus 60ºC in the winter. Dawson City, the nearest access point, has an average of 90 frost free days per year.

The field season for the OG Property commences in late spring (April or May) and extends for at least five months. The first snows fall as early as mid September. Daylight hours are greatly extended at this northerly latitude in conjunction with the warmer summer months.

There is no infrastructure on the OG Property. Access to the property is attained by helicopter.

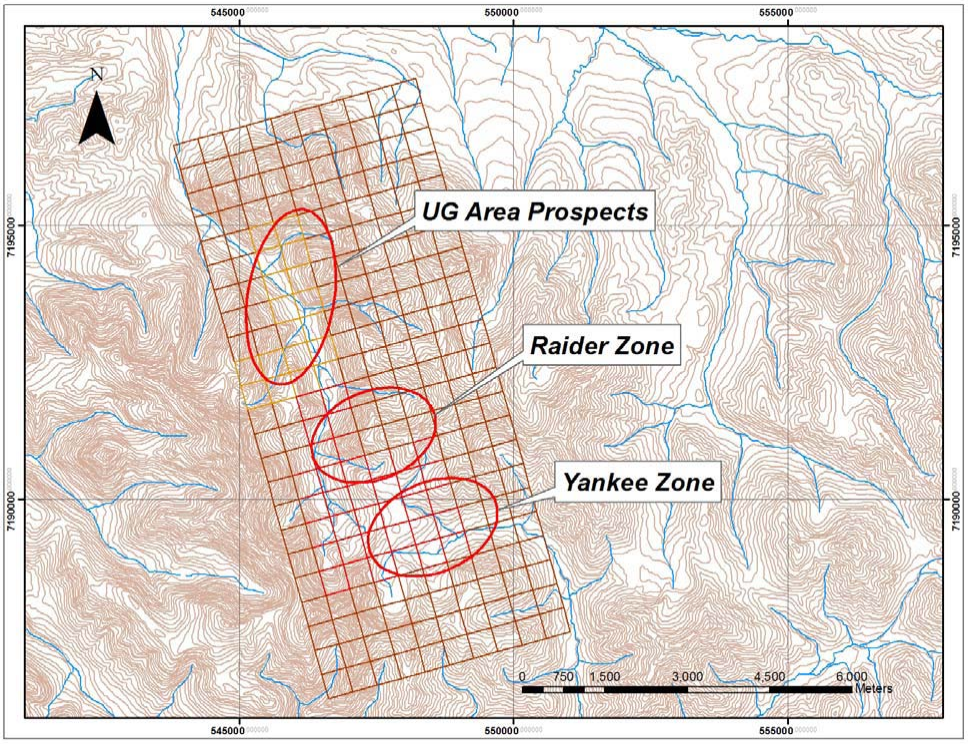

Figure 3: **Location of Mineralized Zones**

4.0 HISTORY

The initial reported exploration programs in the area are from the mid-1970's when multiple companies explored the district for CRD deposits, including: Hudson Bay Exploration and Development Company, Cypress Anvil Mining Corp, Minorco, Tombill Mines Ltd., Dynasty Exploration Ltd., Union Miniere and Shell Oil.
Also in the 1970's several of these companies explored for iron-oxide copper-gold (IOCG) deposits in the Wernecke breccias. From 1993 to 1998, Blackstone Resources explored the Monster Copper IOCG prospect four kilometer southeast of the OG Prospect. Work included airborne and ground magnetic and radiometric surveys, mapping and soil sampling. In 2001, Monster Copper Corporation purchased the Property from Blackstone, and explored the Property until 2003.
At the OG Property (Yukon Minfile 116B 083 – Monster Occurrence), Hudson Bay, Minorco, Cypress Anvil and Tombill performed exploration is multiple adjacent claim blocks. These operators completed soil sampling, mapping and IP geophysics. At OG, a 6,400 by 5,000 foot IP survey identified two anomalies parallel with stratigraphy associated with the Yankee Zone. In 1975, Hudson Bay completed twelve core holes (1,966.3 meters), with a follow-up program of a further twelve holes (1,894.6 meters) in 1976. Assay results are only available from historic assessment reports for the 1975 drilling campaign.

In 2006, Ryanwood Exploration, owned by Property Vendor Shawn Ryan, completed a soil survey and ground magnetometer survey at OG. A total of 532 soil samples were collected from the Yankee Zone. This work outline a coincident 1.4 square kilometer multi-element soil anomaly (>1000 ppm Pb, 750 ppm Zn, 2 ppm Ag) that was sampled on 50 meter by 50 meter. Several soil samples returned over 1% Zn and Pb, and 32 g/t Ag.

5.0 GEOLOGIC SETTING
5.1 REGIONAL GEOLOGY

The OG property is located northeast of the Tintina Trench, in the Ancestral North American Terrane of the Canadian Cordillera. Rocks are dominated by a thick sequence of platformal and deep marine sediments deposited on the western margin of the North American Craton. Og occurs within the Proterozoic Coal Creek inlier, one of a series of stratigraphically related platformal and deep water sedimentary sequences exposed above the 60th parallel in a broad belt extending from the western Northwest Territories to the Yukon-Alaska boundary, as well as the high Arctic. These sedimentary sequences are the result of a series of extensional-basin forming events along the ancestral North American craton margin that were punctuated by orogenesis, magmatism, and hydrothermal activity during the Early to Mid Proterozoic (Young 1979, Laughton et al, 2001, Thorkelson et al 2005)
Stratigraphically, the region is divided into three tectonostratigraphic, unconformity bounded sequences, sequences A, B, and C respectively (Young 1979). Sequence A consists of deformed, predominately sedimentary rocks of the Wernecke Supergroup (1.7 – 1.0 Ga) and the intruded hydrothermal Wernecke Breccia (1.6 Ga), sequence B consists of marine platform and terrestrial 2007 OG Property Full Metal Minerals - 14 -
sedimentary rocks of the Pinguicula and Fifteen Mile Groups (1.0 – 0.78 Ga). Group C consists primarily of volcanic strata of the Windermere Supergroup (<780 Ma, Young, 1979, Symons et al, 2005, Thorkelson et al, 2005)

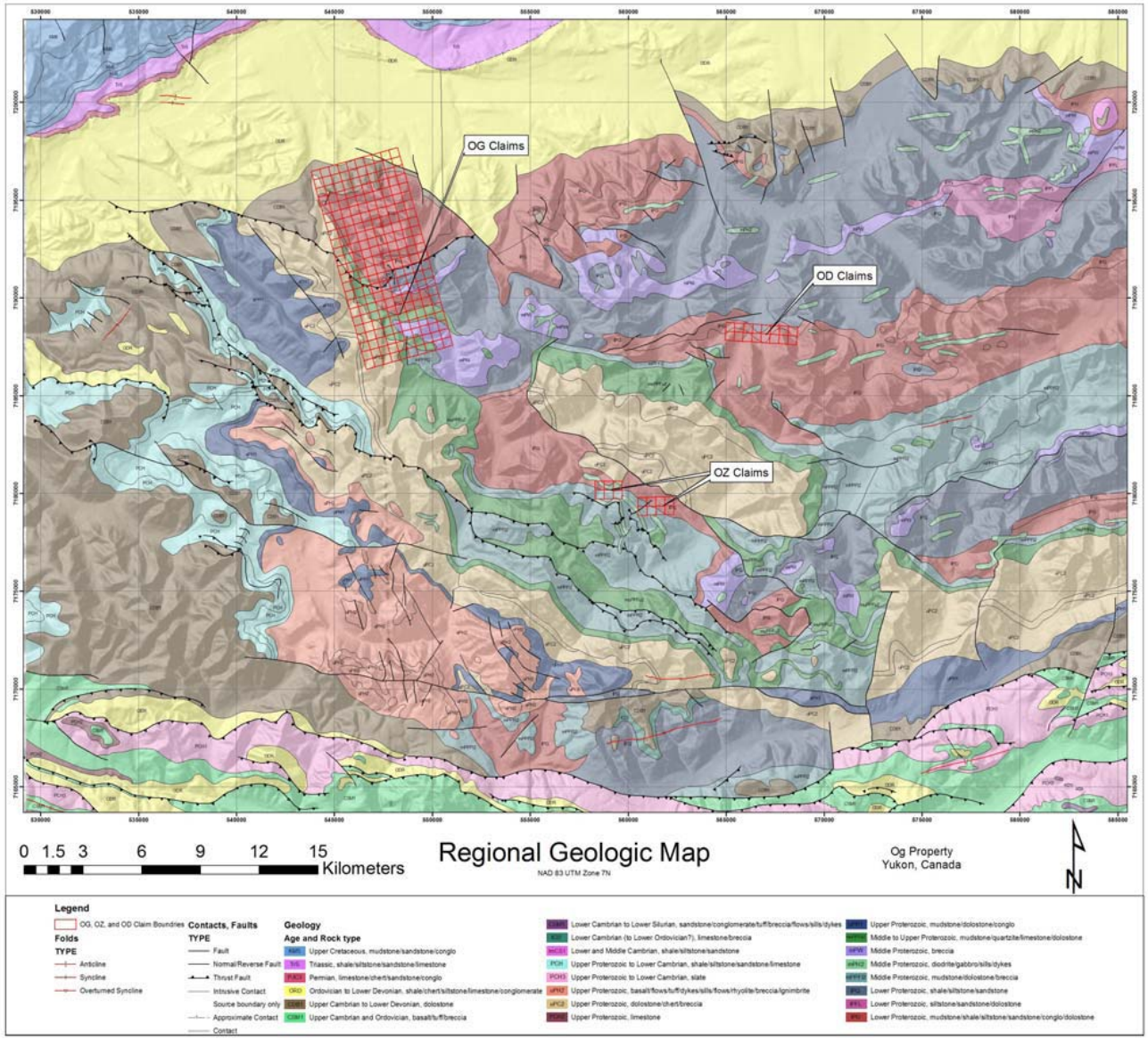

Figure 4: Regional Geology

5.2 PROPERTY GEOLOGY

The geology of the OG property falls within the upper A and B sequences of Young (1979) and consists of three distinct rock packages, an “upper plate” assemblage of carbonate and siliclastic sedimentary rocks of the Fifteen Mile Group; a “lower plate” assemblage of carbonate and siliciclastic sedimentary rocks of the Werneke Supergroup (Gillespie Lake Group); and a mega-tectonic/hydrothermal breccia (Werneke Breccia) that is unconformable with both sedimentary rock packages. In general, the upper and lower plate succession differ from each other primarily in bedding attitudes and less so in lithology, with the lower plate assemblage hosting known Pb-Zn sulfide mineralization.

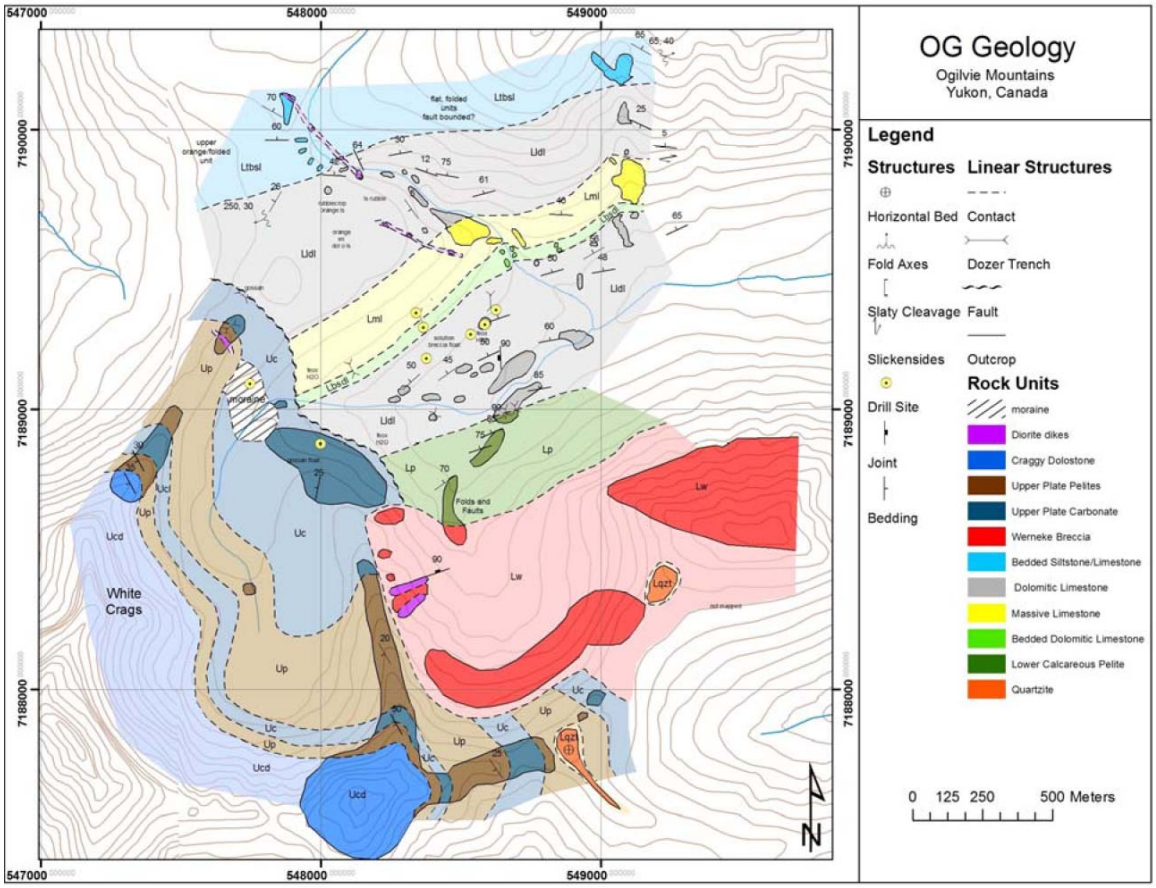

Figure 5: Property Geology

5.2.1 FIFTEEN MILE GROUP

The “upper plate” package is comprised of conformable strata of massive dolomitic limestone beds with interbedded fissile black and red shales that crop out in the southwestern portion of the OG property. The sedimentary succession strikes north-northwest and dips shallow-to-moderately to the southwest. The upper most carbonate unit of this succession, also called the “Craggy Dolostone,” typically forms jagged white peaks that characterize the Ogilvie Mountain scenery. The Craggy Dolostone (Ucd) , and possibly the underlying remainder of the upper plate package, are reported to belong to the Middle to Late Proterozoic (1.38 – 1 Ga) Fifteen Mile Group, also synonymous with the Pinguicula group of the Wernecke Mountains (Thompson et al, 1992, Abbott, 1997, Thorkelson et al, 2005) The upper plate rocks do not appear to be significant hosts to Pb-Zn minerlization at OG, but may overlie mineralized lower plate rocks in the property’s western portion.

5.2.2 GILLESPIE LAKE GROUP

The lower plate sedimentary package consists of fine to coarse grained dolomitic limestones with interbedded calcareous pelites and quartzites. The rocks belong to the 1.8 Ga Gillespie Lake Group, which is the upper unit of the Wernecke Supergroup. Locally, the unit strikes west-southwest and dips northwest. The unit also exhibits one fold event along a northwest to northeast shallowly plunging fold axis. Generally, the folding is weakly developed with exception to one thinly bedded siltstone and limestone unit (Ltbsl) where low amplitude chevron folds with vertical fold hinges are common. Folding of the Wernecke Supergroup sediments is thought to be concurrent with the 1.6 Ga Racklan orogeny. The unit is also cross-cut by fine to medium grained diorite dikes and sills of unknown age. Generally, the dikes strike northwest and dip northeast. Mineralization in the lower plate unit appears to be constrained to a bedded pelitic dolomitic limestone unit (Ldsdl). The stratigraphy and descriptions of the Gillespie Lake Group units are listed below:

Thin Bedded Siltstone and Limestone (Ltbsl)

This is the structurally highest unit within the lower plate package within the property. It consists of cm-scale beds of gray micritic dolostone, white coarsely crystalline limestone, and thinner interbeds of calcareous siltstone. Disseminated sphalerite and galena occur rarely within the lighter limestone interbeds. The unit typically weathers brownish-orange and exhibits more folding than any other mapped unit. Symmetrical chevron-style folding is locally well-developed in the northern region of the property.

Laminated Dolomitic Limestone (Lldl)

Dark gray to black, micritic dolomitic limestone with up to 10cm bedding and local shaley partings. The unit weathers buff gray and displays weakly developed folding. The unit hosts widespread calcite veinlets that contain trace sphalerite and galena. Solution breccia textures are also common.

Lower Cretaceous Pelite (Lp)

Dark gray to black, incipiently metamorphosed, thin to thickly bedded carbonate to quartz rich pelite. The unit may grade into a quartzite along the southern boundary of the property. The unit has been depicted as the Middle to Late Proterozoic Lake Fairchild Unit within government geologic maps, but mapping by FMM personnel during the 2007 season suggests it is conformable and gradational to the overlying laminated dolomitic limestone (Lldl).

Massive Limestone (Lml)

Gray massive micritic dolomitic limestone with abundant authigenic silica concretions and irregular elongate silica masses. Bedding is not recognizable and the unit displays buckskin weathering.

Bedded Silty Dolomitic Limestone (Lbsdl)

Gray to dark gray thinly bedded silty dolomitic limestone with shaley interbeds increasing towards the upper contact with the massive limestone (Lml). It appears this unit is the primary host of coarse grained sphalerite and galena mineralization. The upper shaley portions of the unit may be an important control on the distribution of Pb-Zn mineralization on the property as either the primary host or as the caprock of mineralization.

5.2.3 WERNEKE BRECCIA

The Wernecke Breccia (Lw) is a group 1.6 Ga hydrothermal breccias that intruded the Wernecke Supergroup and is associated with several iron-oxide copper-gold occurrences throughout the Yukon. Locally, the breccia consists of quartzite, argillite, and carbonate clasts in a dark silica and hematite matrix. The breccia is unconformable to both the upper and lower plate sedimentary units, and the contact is well exposed in both the southern and northeastern portions of the property. Breccia clasts were likely derived from intrusion through the Werneke Supergroup sediments.

5.2.4 STRUCTURE

Locally, the upper and lower plate assemblages appear to be separated by a poorly-exposed fault that strikes north-northwest and dips moderately to the west. The trace of the fault is marked by iron-oxide depositing springs that issue through talus cover. The fault zone is exposed to the north of the OG property (on the UG claim block) and contains pyrite-bearing breccia. The sense of movement on the fault is unknown, however, based on the geologic history of the area, reverse or reverse slip movement is most likely due to compressional or transtensional tectonics.

6.0 DEPOSIT TYPE

The zinc-lead-silver deposits of the OG Property Group fit the Mississippi Valley-type (MVT) ore deposit model. Mississippi Valley-type deposits host approximately twenty-seven percent of the zinc and lead resources found throughout the world (Tikkanen, 1986). Mississippi Valley-type deposits acquired their name in tribute to the classic districts of the Mississippi River drainage basins of the central United States. Mississippi Valley-types are deposited over hundreds of square kilometres which comprise individual ore districts. MVT districts can be quite distinct from each other while hosting deposits that are composed of similar depositional characteristics and ore control. Large district examples of this deposit type include Pine Point in Canada which contains one hundred ore bodies deposited over 1,600 square kilometers, and the Upper Mississippi Valley which contains almost four hundred ore bodies deposited over 7,800 kilometres (Leach et al 2005). Production from Pine Point was approximately 64,300,000 tonnes of 6.95% Zn and 3.0% Pb (Paradis, Hannigan, and Dewing 2007).
Mississippi Valley-type deposits are epigenetic, low-temperature, stratabound, deposits of galena, sphalerite, iron sulphides, and carbonates. The deposits are hosted with carbonate bodies primarily of dolostone, limestone, and dolomitized limestone. Dolostone-hosted deposits tend to be larger than limestone-hosted deposits and contain higher grades of zinc, lead, and silver. This propensity towards dolostone-hosted mineralization could possibly be due to a higher transmissivity of fluid flow within dolostone in comparison to limestone. However, large deposits have been found within limestone such as the high-grade Navan deposit in the Irish Midlands. Host rock age has peaks in the Cambrian to Carboniferous and Triassic to Cretaceous, with a small number occurring in rocks of Silurian and Permian age. While there is a large quantity of carbonate rocks in the Proterozoic, there are very few MVT deposits within these rocks (Leach et al 2005).There are a variety of sediment-hosted base metal deposits that are associated with MVT deposits including high-temperature carbonate replacement Pb-Zn (±Fe, ±Cu, ±Au, ±Ag) deposits and carbonate-hosted manto-type Ag-Pb-Zn deposits (Paradis, Hannigan, and Dewing 2007).

MVT deposits vary in size from massive replacement zones to void fillings of fractures and breccias, and to groups of crystal dispersed within intergranular pore spaces (Leach and Sangster 1993). Usually, sulphide-hosting bodies are zones of highly brecciated dolomite. The breccia zones are irregular and can form either concordant tabular structures or discordant and roughly cylindrical structures. In the case of Pine Point, the ore bodies are either tabular or prismatic structures (Paradis, Hannigan, and Dewing 2007).
The mineralogy of most MVT deposits is simple and consists of sphalerite, galena, iron sulphides, and minor amounts barite, fluorite, celestite, gypsum, anyhydrite, native sulphur, and pyrrhotite. Copper minerals are rare to MVT deposits and only occur in certain districts.

7.0 MINERALIZATION

Visible lead-zinc silver mineralization at the OG Property is limited to historic trenches and rare outcrop exposures. Mineralization occurs within both the upper-plate clastic rocks, and lower plate carbonates. This suggests that upwelling mineralizing fluids ponded within and underneath the capping upper-plate, commonly observed in CRD deposits. In trenches, mineralization consists primary of honey-colored to brown sphalerite, coarse galena, marcasite framboids and rare chalcopyrite. It is generally associated with iron gossan, and commonly with unknown zinc oxides/carbonates identified with 'zinc zap' stain. Mineralization style is indicative of carbonate-replacement style mineralization commonly observed in MVT-type deposits worldwide.
In most outcrops observed of dolomitic limetone, the rocks are cut by sub-cm-scale calcite veinlets, locally with euhedral grains of galena and sphalerite. In addition, solution breccias have been observed, preferentially developed in the dolomitic limestones. In addition, the breccias appear to be better developed in limestone along a stratigraphic horizon that corresponds with the bottom contact of the Bedded Silty Dolomitic Limestone (Lbsdl) unit, a politic unit that may have been an important cap rock to mineralizing fluids and/or the formation of the solution breccias. These solution breccias may have been the focus of replacement mineralization at OG. The origin of the breccias and the relative timing of mineralization at OG is poorly constrained, however the historic trenches and coincident Pb-Zn-Ag geochemical anomaly follow this pelitic stratigraphic horizon.
CRD-style mineralization at OG occurs near Wernecke breccias, and a genetic relationship has been suggested, however little information has been generated to support this theory. Broad areas of iron metasomatism surround the Wernecke breccias, however this alteration is limited to dolomitic limestones within a few hundred meters of the breccias contacts, and does not extend into the strong lead-zinc-silver anomalies at OG. No galena or sphalerite mineralization has been observed within, or adjacent to the Wernecke breccias, however some copper mineralization has been recorded.

8.0 EXPLORATION

8.1 GRAVITY GEOPHYSICS

From June 2th to June 25, 2008, Aurora Geosciences Ltd. of Whitehorse, Yukon was contracted to complete a gravity geophysical survey. The survey was completed using a CG-3 Autograv Gravimeter. A total of 417 points were collected at 50 meter station intervals, covering the eastern portion of the Yankee Zone. Stations were marked with a nail, tag and flagging.
Geophysical consulting Company Vox Geosciences of Delta B.C. leveled the gravity data removing the regional gradient. A strong > 1 mGal gravity high is noted in Figure 6. The 2007 survey outlined a 1.1 to 1.6 mGal anomaly, measuring approximately 600 by 600 meters. The 2008 survey closed off the 2007 gravity anomaly to the east and indicated a new potential trend running in a north-east direction up small creek drainage. Gravity geophysical surveys identify denser rock, with the intent of identifying massive sulphide mineralization. Only the eastern half of the Yankee Zone was covered by the 2008 survey.

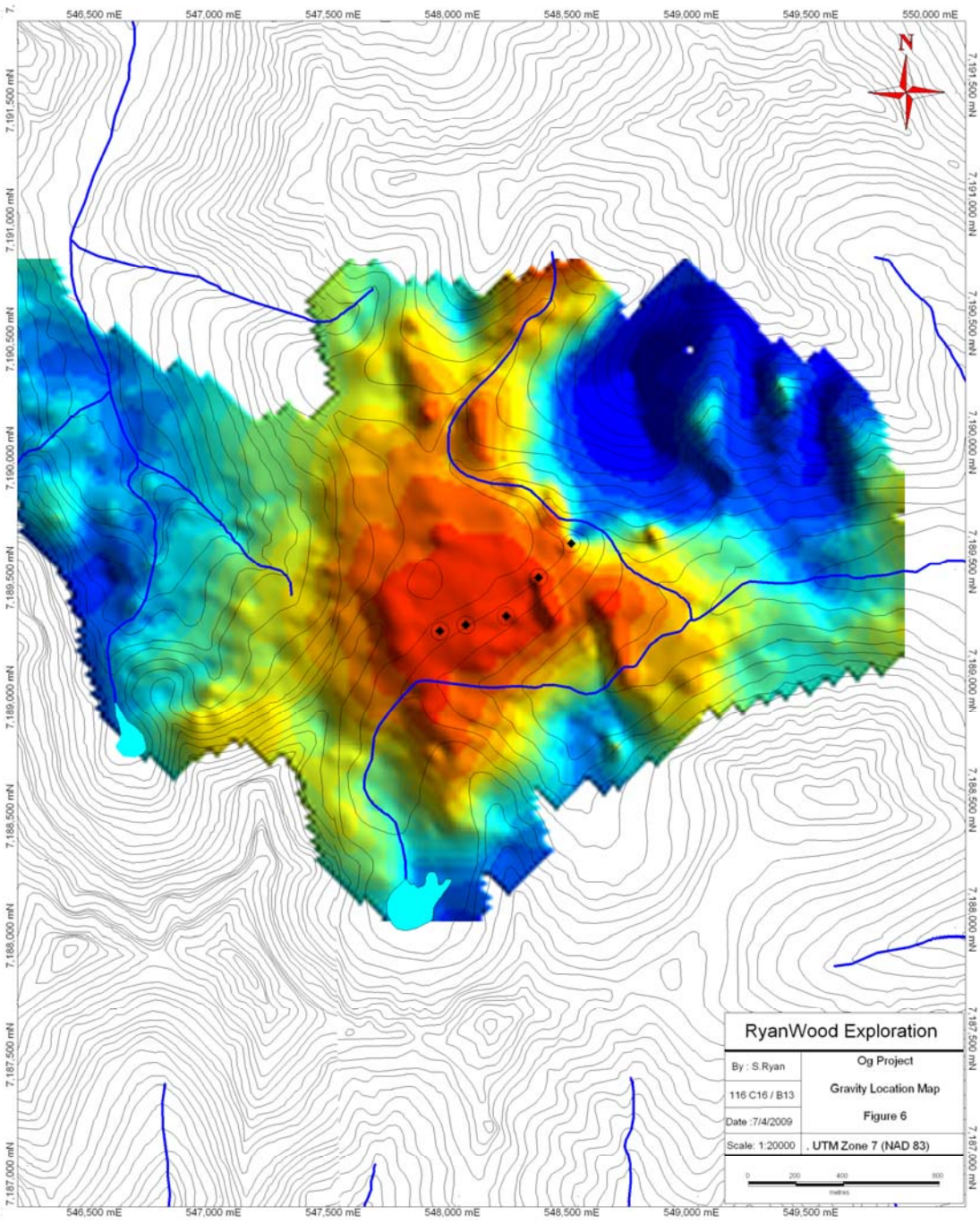

Figure 6: Gravity Map

8.2 DRILLING

Drilling tested a 1.7 square kilometer soil anomaly, as well as a strong 1.5 mgal gravity geophysical high. The highlight of the drilling program was the discovery of a new area of mineralization at depth (Sundar Zone), likely responsible for the gravity anomaly. Within the Sundar Zone, higher grade massive to semi-massive sphalerite/galena/pyrite/chalcopyrite mineralization within broad zones of disseminated and brecciated mineralization was discovered. Holes OG08-07 and 08 were completed from the same setup; Drill Hole OG08-07 encountered **11.7% Zn, 5.5% Pb and 35.8 g/t Ag over 7.76 meters** within a broader zone of **4.9% Zn, 1.6% Pb and 12.7 g/t Ag over 57.8 meters**. Drill hole OG08-08 intersected two strong zones of mineralization; **11.96 meters averaging 14.0% Zn, 5.7% Pb, and 26.6 g/t Ag including 8.96 meters averaging 17.3% Zn, 7.4% Pb and 33.3 g/t Ag, as well as 44.81 meters averaging 3.0% Zn, 0.5% Pb and 3.8 g/t Ag, including 4.96 meters averaging 14.4 % Zn, 0.5% Pb and 18 g/t Ag**.

Hole OG-07 and 08 were 100 meter step-outs along strike from OG08-05 and 06. **Hole OG08-05 intersected 5.8 meters averaging 10.6% Zn, 2.1% Pb and 52.2 g/t Ag within a broader interval of 4.4% Zn, 1.2% Pb and 21.2 g/t Ag over 17.89 meters**. Hole OG08-06 was drilled updip of OG08-05, and drilled over top of the zone due due to brittle faulting. **Mineralization within the Sundar Zone is open for expansion in all directions**.

Complete drill results are as follows:

Hole-ID	From	To	Length	Ag (g/t)	Pb%	Zn%	Pb + Zn%
OG08-01	124.38	126.96	2.58	11.6	1.7	0.8	2.5
	222.09	222.9	0.81	14.0	4.1	1.5	5.6
OG08-02	115.74	116.58	0.84	14.0	0.7	3.6	4.3
OG08-03	72.00	74.38	2.38	6.9	1.0	4.1	5.1
	141.14	146.12	4.98	28.5	0.2	0.9	1.1
OG08-04	47.50	49.17	1.67	11.0	4.8	0.5	5.3
OG08-05	265.57	283.46	17.89	21.2	1.2	4.4	5.6
including	268.58	274.38	5.80	52.2	2.1	10.6	12.7
	307.35	334.39	27.04	4.5	0.2	1.3	1.5
OG08-07	163.08	220.9	57.82	12.7	1.6	4.9	6.5
including	174.88	182.64	7.76	35.8	5.5	11.7	17.2
and	185.69	188.02	2.33	18.9	5.4	13.5	18.9
	306.48	307.54	1.06	10.0	2.0	10.9	12.9
OG08-08	190.82	202.78	11.96	26.6	5.7	14	19.7
including	193.82	202.78	8.96	33.3	7.4	17.3	24.7
	229.51	274.32	44.81	3.8	0.5	3	3.5
including	233.37	238.33	4.96	18.0	0.5	14.4	14.9
including	252.98	257.1	4.12	12.1	3.7	7.5	11.2

Holes OG08-01 to 04 covered 300 meters of strike length along the southern portion of the Yankee zone geochemical anomaly, in the vicinity of historic drilling. One to three percent disseminated sphalerite plus galena were encountered over the majority of the drill core, with narrower zones of semi-massive sulphides. These holes may have been too shallow to intersect deeper, higher grade mineralization in the Sundar Zone.

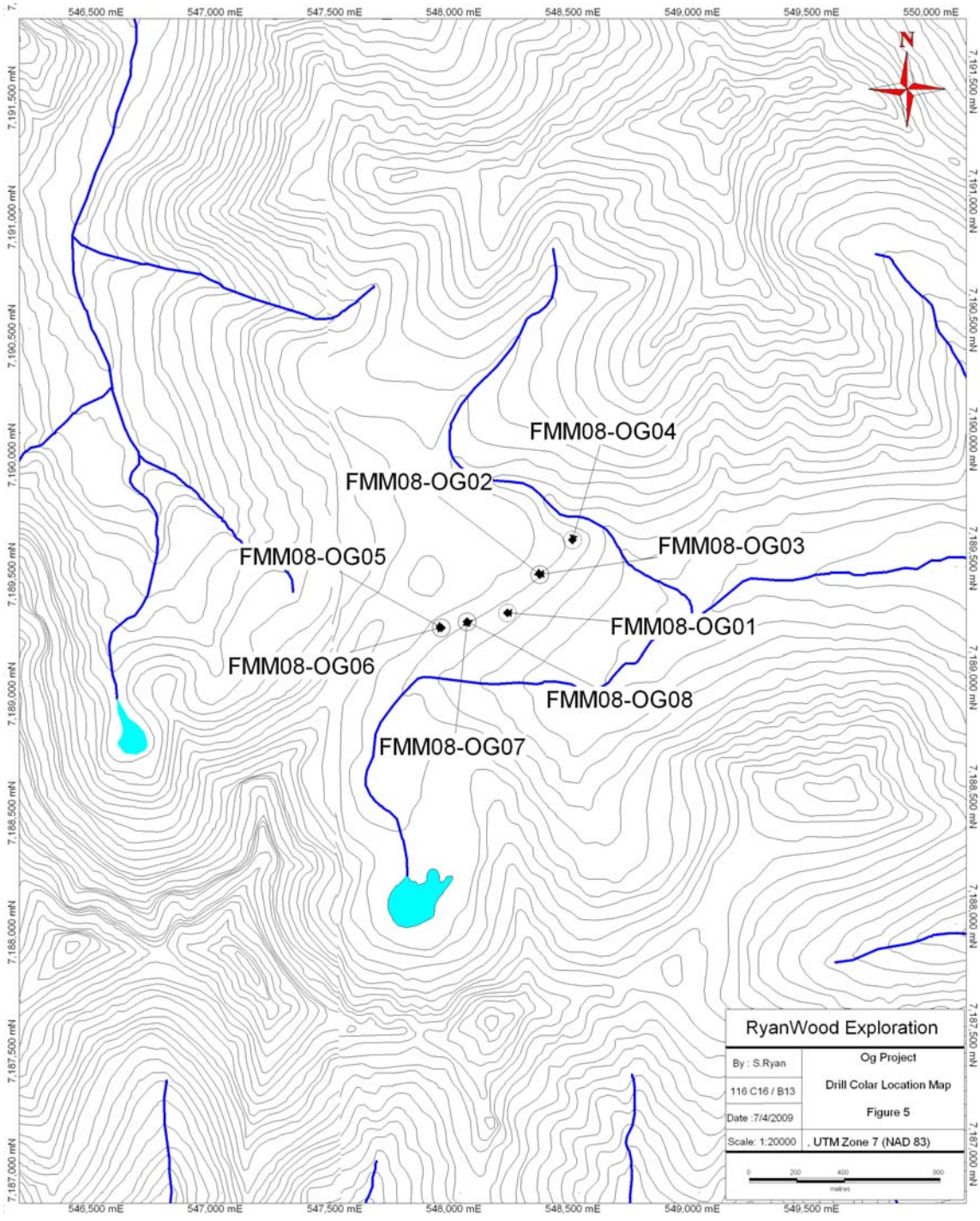

Figure 7: Drill Hole Location Map

9.0 INTERPRETATION AND CONCLUSIONS

The 2008 drilling program was very encouraging with the best over all drill intersection running 57.82 meters of 6.5% percent combined lead zinc. The high grade sections ran as high as 8.96 meters of 24.7% percent combined lead zinc.

The 2008 gravity survey help close off the 2007 gravity anomaly and help locate another north-east trending anomaly found along a small north-east trending creek drainage. More gravity work would be required to see if this is a real anomaly or cause by topographic affects.

10.0 RECOMMENDATIONS

I would recommend more drilling for the 2009 field program. I would recommend drilling on the soil anomaly covering Hudson Bay historical workings. I would also think about drilling a few holes in the large Raider soil anomaly located two kilometers to the north of 2008 drill holes.

11.0 COST

Helicopter	20 hours @ $1350.00	$27,000.00
Peak Drilling	2000 meters of Drilling @$75.00 per meter	$150,000.00
Aurora Geoscience	40 man days @ $600.00 per day	$24,000.00
	Total	$201,000.00

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13.0 STATEMENT OF QUALIFICATIONS

I Shawn Ryan located in Dawson City, Yukon work as a professional prospector. I run a small exploration company located in Dawson City.

I have worked in the exploration business for the last 25 years. I worked the first 12 years as a contractor working on numerous projects in the NWT, Ontario, Quebec and the Yukon. I have worked the last 8 years as a local prospector for myself.

I have being trained to run various geophysical instruments and surveys such as magnetic surveys, max-min surveys, induce polarity surveys and VLF surveys.

I own 100% of the OG Claims and have option the claims to Full Metal Minerals.

Dated this 03 of April 2009 in Dawson City, Yukon.

Respectfully submitted

Shawn Ryan

Hole:	FMM-08-OG-01			
Logged by:	D. White			
From (m)	To (m)	Lithology (mapping)	Lithology Core	Description
0.00	2.44	Overburden	Overburden	Glacial Drift
2.44	87.40	Lml	Massive Dolostone	Finely Crystalline (<0.5mm to 1.0mm locally), light grey, massive. Tectonically undeformed showing a massive fabric. Dolostone is weakly effervescent on scratched surface. Interval ranges from non-brecciated to very intensely brecciated. Brecciation (see photos for variety of textures): Solution breccia ranges from weakly brecciated appearing fracture- or vein-controlled to intensely brecciated where >80% of the core is breccia/. Both cases show rounded through angular clasts of massive Dolostone. Matrix may be massive to finely crystalline to colliform, alternating dark and lighter grey. Matrix dolomite is commonly darker grey than the host massive Dolostone; however, there is also a milky white phase that appears to be pre-pyrite mineralization and post mineralization and nearly coeval a with final stage bitumen. Matrix mineralogy includes dolomite >> pyrite (py)> sphalerite (sp) > galena (gn) > chalcopyrite (cp) >> bitumen. Where cp is present with other sulphides it appears to be an earlier phase in the mineralization sequence (py+/-cp before sp+/-gn) as shown by brecciated relationships and banded matrix/vein relationships. Chalcopyrite may rarely occur as a solo sulphide in dolomite matrix material. All brecciated, fracture, veined intervals appear to show no common orientation relative to core axis. Mineralization: Pyrite is finely crystalline, locally oxidied, occures in fractures and breccia matrix - may be banded, massive, colliform (marcasite); along margins, brecciated by dolomite, or 100% of fracture or breccia material. Commonly associated with sphalerite, but may occur with any of the other sulphides. Sphalerite is massive to finely crystalline, honey brown to brown and rarely drk brown or red. It is observed in veins fractures and breccia matrix associated with all sulphides or exlusively dolomite and/or calcite. Galena is massive to finely crystalline, cleavage commonly observed, associated with all other sulphides; uncommonly in veins or breccia as only sulphide. Dolomite, spalerite, pyrite, calcite common accessories. Commonly in small crystal aglomerates, rarely forming in direct contact with vein/fracture/breccia margin unless only ore sulphide (+pyrite). Bitumen is rare and usually last stage of mineralization in breccia, or vein, not observed in fracture fillings. Commonly hosted in white calcite.
87.40	286.51	Lldl	Micritic Dolomitized Limestone	Lml/Lldl conatact is sharp and at 50 degrees TCA. Finely laminated (1mm to 10cm) micritix dolomitize limestone or dolostone. Grey to dark grey, v.f.gr. to f.gr. (~0.5mm avg.). Fabric (shale-rich laminae) and bredding are parallel and commonly 50 to 85 degrees to core axis - average ~50 degrees. Three beds are distinguished based on mudstone (clastic) content: 1) nearly massive calcareous (lmst) beds up to 40cm thick and as thin as 0.5cm; 2) may show rhythmic laminae that grades from high (>90%) mudstone to<20% mudstone, local occurrances of soft sediment deformation by irregular changes in bedding of offset in bedding unrealated to tectonism, carbonate grains ~1.0mm as seen in coarser beds show augan texture with shale laminae, grains may be elongate up to 2:1; 3) calcareous shale beds, pelitic beds finely laminated, py-bearing along bedding planes, host to semi-ductile deformation more than breccciation - though may show extensive fracture networking, brecciated intervals show high carbonate content (strong matrix development). Contacts between (3) and (1) are sharp at the shale base of the bed and gradational to top. (1)+(2)>>(3) bedding ratio. Bedding mm laminaw to dm scale (larger beds are carbonate-rich). Beccia zones are less common and on a cm-scale. 160.23-160.35 and 161.161.25 appear to be hydrothermal (angular clasts - strong matrix content) and are host to multiple clasts lithologies suggesting transport.- these two breccias show late stage Sp+Py matrix in white carbonate. 135.35-206 unit (1) dominates, locally 5cm thick beds of (2) - foliation and bedding remains at ~50 degees TCA. 191.88-194.88 (2)>(1); 201-206 lighter grey (1) with

				rare (2) laminae. Shale rich bed at 206 marks interval of >> (2) beds. 206-217.69m vein density decreases and in dominately calcite>dolomite annealed. Vein thinkness decreases from 1-5mm avg. to 1.2mm avg. Fault rubble at 267.45-270.48m and 274.10-274.25m. Mineralization: from ~135m sulphide and secondary dolomite becomes from vein-controlled that carbonate replacement breccia. Veins are synuous and commonly at a high angle TCA. Veins may be massive sulphide to sulphide+carbonate of varying % ratios - mm to cm scale in width. Vuggs commonly host euhedral and crs gr. sphalerite, galena, chalcopyrite. Cp, Sp, Gn concentrations in veins/beccia are commonly less than 5% but may be as high as 10% locally. Many veins show massive py/marcasite @ margins with carbonate+sp+gn+cp towards center. Most abundant sulphide is pyrite.
Hole:	**2008-DDH-OG-02**			
Logged by:	**J. Foley**			
From (m)	**To (m)**	**Lithology (mapping)**	**Lithology (core)**	**Description**
0	2.13	Overburden	Overburden	Overburden
2.13	3.88	Lml	Massive limestone	Very rubbly fractured dolomitic limestone. Little to no reaction to 10% HCl. Rusty yellow to brown staining throughout.
2.13	182.43	Lml	Massive limestone/ laminated limestone	Very fine grained dolomitic limestone with moderate to strong fracturing. Very little reaction to 10% HCl. Minor solution breccia in places. Fractures and or veins are infilled with fine grained dolomite. Dolomitic limestone is interbedded on the metre scale with laminated dark gray to black, very fine grained dolomitic limestone (Lldl). Approximately 80:20 Lml:Lldl. Within the laminated dolomitic limestone there are numerous fractures, abundant crystalline dolomite veins. Trace amounts of mineralization (chalcopyrite (cp), sphalerite (sp), galena (gn)). Laminae are generally <1mm and beds are cm scale. The laminae show beds are steeply dipping at ~45-90 deg tca. Towards the base of the Lml around 173.50 m it begins ti grade into a more laminated dark gray to black semi-pelitic dolomitic limestone. Beds are cm scale. Laminae are <5mm thick.
22.5	22.5	Lml	Massive limestone/ laminated limestone	Laminae show beds dipping at ~60 deg tca.
35.66	35.66	Lml	Massive limestone/ laminated limestone	Laminae show beds dipping at ~80-90 deg tca.
55.38	55.75	Lml	Massive limestone/ laminated limestone	Trace mineralization (sphalerite, galena, chalcopyrite). Found in fractures or veins within massive limestone, associated pyrite.
58.33	58.83	Lml	Massive limestone/ laminated limestone	Trace mineralization (sphalerite, galena, chalcopyrite). Found in fractures or veins within massive limestone, associated pyrite.
82.65	82.75	Lml	Massive limestone/ laminated limestone	Trace galena, chalcopyrite, sphalerite <1% occur in thin veins.
95.00	95.12	Lml	Massive limestone/ laminated limestone	Trace galena, chalcopyrite, sphalerite <1% occur in thin veins.
96.62	101.5	Lml/Lldl	Laminated dolomitic limestone	Subunit within Lml of laminated dark gray to black dolomitic limestone. Laminae are <1mm. Beds are cm scale. Highly fractured. Moderate dolomitic veining.
103.83	111.77	Lml	Massive limestone/ laminated limestone	Massive limestone with moderate (1-2%) sphalerite > chalcopyrite > galena. Most occur in thin <1cm veins/network fractures and also in localized solution breccias.
114.55	114.61	Lml	Massive limestone/ laminated limestone	Laminated shaly dolomite.

122.67	122.92	Lml	Massive limestone/ laminated limestone	Fault. Dark gray/black gouge with a clay texture.
121.88	123.10	Lml	Massive limestone/ laminated limestone	Brecciated massive limestone. Rounded to subangular light gray clasts with a darker gray matrix.
122.67	127.10	Lml	Massive limestone/ laminated limestone	Highly fractured rubbly core.
128.48	128.67	Lml	Massive limestone/ laminated limestone	Fault? Some black clay like gouge.
140.75	144.35	Lml	Massive limestone/ laminated limestone	Moderate veining and fracturing with abundant pyrite, trace cp.
134.10	139.29	Lml	Massive limestone/ laminated limestone	Minor fracturing with trace sp+-cp.
165.80	166.60	Lml	Massive limestone/ laminated limestone	Some minor breccia and veining/fracturing. Fractures/veins are up to 1 cm thick and have abundant (1-3%) gn with pyrite around the edges surrounding the gn.
182.43	242.62	Lp/Lldl	Pelitic dolomite	Lp (possibly the Lldl although quite dark). Very dark gray to black thinly laminated carbonate pelite. Moderate to abundant carbonate veinlets and/or fractures that contain pyrite and trace - low % amounts of gn, sp, cp. Bedding is dipping ~45-60 deg tca. There is minor solution breccia in areas. Brecciated clasts show laminae and are on the mm-cm scale and are subrounded to subangular. The Lp (of Lldl) unit has varying amounts of pelitic carbonate laminae. Some intervals are very black (more pelitic) whereas some are lighter gray which indicates more carbonate. Up to the end of the hole the unit is still moderately to intensely fractured and infilled with white carbonate, although it does not react to 10% HCl, possibly dolomite. There is still intervals of breccia, although localized and short. Trace amounts of sp, cp, and gn mineralization occur with pyrite in fractures/veins and breccia.
191.93	192.92	Lp/Lldl	Pelitic dolomite	Breccia. Trace - <1% cp, sp, gn.
196.53	197.00	Lp/Lldl	Pelitic dolomite	Fault. Very dark black, dry, coal like gouge. Probably shale.
196.53	197.21	Lp/Lldl	Pelitic dolomite	Shale.
200.61	200.92	Lp/Lldl	Pelitic dolomite	Shale.
206.35	209.15	Lp/Lldl	Pelitic dolomite	Moderate breccia and fractures with dolomitic and pyrite fill. Some trace-1% gn and cp mineralization.
241.72	241.72	Lp/Lldl	Pelitic dolomite	Trace gn and cp near the end of the hole.
218.5	218.5	Lp/Lldl	Pelitic dolomite	Irregular contact (see photo) between dark black pelite and gray laminated pelitic carbonate.

Hole:	2008-DDH-OG-03			
Logged by:	J. Foley			
From (m)	To (m)	Lithology (mapping)	Lithology (core)	Description
0	2.44	OB	OB	Overburden
2.44	130.03	Lml	Massive limestone	Fine grained <1mm dolomitic limestone. No reaction to 10% HCl except for sparse veins/fractures with carbonate fill, but that is mostly dolomitic. ~5% of the unit is localized beds on the cm scale of dark to light gray <1mm laminae. Unit is moderately to intensely fractured and has rusty staining expecially in fractures. Localized areas of solution breccia, cm scale with subangular to subrounded massive limestone clasts supported by a darker gray dolomitic matrix. Clasts range from mm up to 3 cm in size. Trace mineralization of cp, gn, sp occur in fractured and /or brecciated intervals. Some iron stained dolomite resembles sphalerite. Around 108 m, within the last ~20 m of the Lml unit it begins to grade into the Lldl unit. There are cm-m scale subunits of laminated dolomitic limestone and silty laminae. The silt is black and the dolomite is gray. Laminae are generally less than 5mm. There are also localized cm scale shale beds. There is moderate mineralization with trace-2% sp, gn, cp found usually in network fractures and/or dolomitic veins with associated pyrite. Minor brecciated intervals with little mineralization. At the base of the Lml unit there is ~2m of abundant py in veins/fractures with trace-2% cp, gn, sp.
14.2	16.44	Lml	Massive limestone	Intensely brecciated and fractured. Rusty staining. Possible fault although close to surface.
41.33	42.49	Lml	Massive limestone	As above.
42.71	43.85	Lml	Massive limestone	Rubble, rusty stained core. Possible a fault. Could be just highly fractured.
27.22	29.62	Lml	Massive limestone	Trace gn, sp, cp in dolomitic fracture fill.
47.24	48.85	Lml	Massive limestone	Trace-1% gn, sp, cp in dolomitic fracture fill.
67.19	67.36	Lml	Massive limestone	Irregular vein of sparry dolomite/calcite stained by iron 0.5-1.0 cm calcite crystals. 1-2% sp in thin 1-2mm bands with pyrite. Limestone appears to be laminated with minor folds. See photo DDH-08-OG-03 1 and 2

68.86	68.98	Lml	Massive limestone	Fault? Rubbly/crushed pieces of massive limestone <1cm.
107.76	109.38	Lml	Massive limestone	Subunit of laminated dolomitic limestone and silt. Bedding is at ~0-30 deg tca. Laminae are <5mm. The dolomite laminae are generally thicker than the silty laminae. No mineralization.
130.03	136.12	Lldl	Laminated dolomitic limestone	Laminated dolomitic limestone and silt. Bedding is at ~0-30 deg tca. Laminae are <5mm. The dolomite laminae are generally thicker than the silty laminae. No mineralization. Varying amounts of carbonate throughout noted by darkness of core. More gray than black when there is more carbonate. Occasional localized shale beds on cm scale, no greater than 10 cm. Some breccia intervals. There are occasional <1m subunits of Lml in the Lldl unit, mostly near the contact between the two units. Within the top ~20 m of the Lldl there is abundant breccia and intense fracturing. With these there is abundant mineralization of pyrite and trace to low percentages of cp, sp, and gn. Further down into the unit breccia and fracturing, along with mineralization decrease, although there are still occurrences. It appears the unit has an increasing shale content as it gets deeper. This may indicate that there is more breccia and fracturing occurring where carbonate is more abundant, and the associated mineralization. The Lldl has areas which have ductile and brittle deformation.
134.15	135.8	Lldl	Laminated dolomitic limestone	Breccia. Clasts range from 3mm-40mm and are laminated. Dolomitic matrix, white to gray. No mineralization.
137.71	139.98	Lldl	Laminated dolomitic limestone	Breccia, moderate mineralization. Cp and sp.
141.14	146.65	Lldl	Laminated dolomitic limestone	Intensely fractured interval with abundant py and associated cp + sp +- gn.
147.83	158.02	Lldl	Laminated dolomitic limestone	Interval of shaly Lldl with abundant dolomitic fractures. Moderate amounts of cp and sp spread throughout, some trace gn.
173.76	175.26	Lldl	Laminated dolomitic limestone	Some breccia with trace amounts of gn.

Hole:	2008-DDH-OG-04			
Logged by:	J. Foley			
From (m)	**To (m)**	**Lithology (mapping)**	**Lithology (core)**	**Description**
0.00	3.05	Overburden	Overburden	Glacial Drift
3.05	71.02	Lml	Massive Limestone	Very fine to fine grained massive dolomitic limestone. Little to no reaction to 10% HCl. Moderate to intensely fractured, filled with predominantly (>97%) white dolomite, and by massive sulphides (py, sp, cp, gn) where mineralization occurs. Abundant Fe-oxidation in fractures producing rusty staining in dolomite. Minor hematitic dolomite in fractures. Intervals of fine laminated dolomitic limestone occur, on the cm to m scale. There is breccia usually associated with these intervals and potentially mineralization of sulphides. 20.52-25.96: Brecciated and intensely fractured Lml. Abundant 2-3 cm clasts. No mineralization. 25.96-35.25: Intensely fractured Lml. Some trace gn. 70.1-72.1: Breccia with transition from massive limestone to calcareous pelite (laminated). You can see the change from massive limestone clasts to laminated calcareous pelitic clasts @ ~71.02 m.
47.45	65.42	Lldl or Lbsdl	Laminate dolomitic limestone	Subunit of very fine grained laminated calcareous pelite. Intense fracturing causing rubbly core in the first 7-8m. There is also breccia in the first 2.5 m. Within the breccia there is moderate amounts of gn as part of the dolomitic matrix. Near the end of the subunit it is highly fractured for ~5m, the fractures have dolomitic fracture fill with some gn. The calcareous pelite is very hard, possibly silicified. It is also very smooth, an argillitic texture, although it reacts to 10% HCl when scratched with a knife.
65.42	71.02	Lml	Massive Limestone	Massive limestone is very smooth, possibly silicified.
71.02	83.35	Lldl	Calcareous pelite	Calcareous pelite. Very fine grained laminated, very hard and smooth texture, possibly some silicification? Reacts to 10% HCl when scraped with a knife. Color ranges from black-gray-beige, there are also red oxidized laminae. Bedding is from 0-20 deg tca. Minor amount of fractures with white carbonate fill.

83.35	94.35	Lml	Massive Limestone	Back into massive limestone. Very smooth and hard, possibly semi-silicified. Reacts to 10% HCl when scratched. In contact with dioritic dyke. Contact is not sharp. Evidence of the dyke such as alteration and smaller branch-like intrusions begin around 90.0 m. There is also some solution breccia. 90.26-90.45: Possible beige clay fault gouge. @ 50-60 deg tca. Or simply alteration of muddy bed due to dyke.
94.35	108.95	Diorite Dyke	Diorite dyke	Fine grained holocrystalline diorite dyke. Gray to green, mineralogy is likely predominantly plagioclase, possibly pyroxene and serpentine. There are abundant fractures and slips with slickensides. Fracture faces are have rusty staining. Slickensides are green-black, possibly chlorite? They are at various angles tca. Generally at 35-45 deg tca although some are at 0 and some are at 90. Slickensides are oblique-perpendicular to slip movement.
108.95	124.75	Lml	Massive Limestone	As above. Hematized dolomitic veins.
124.75	155.33			Fine grained laminated dolomitic limestone. Varying ratios of carbonate and muddy laminae. Beds dipping @ ~20-30 deg tca. Minor intervals (cm) of breccia. No mineralization. Occasional localized 1 cm shale partings. 151.67-152.14: Breccia in Lldl.
155.33	179.83	Lp	Pelite	Black very fine grained laminated (<0.5mm) calcareous pelite. Reacts to HCl when scratched with a knife. Bedding is shallow tca (0-10 deg tca). Minor amount of thin 1-5mm white carbonate (dolomite) filled fractures. Minor solution breccia. Little sulphide mineralization. Contact with overlying Lldl is gradational over ~10 m, going back and forth in cm scale beds until the pelite becomes dominant. Trace gn, cp near the end of the hole. 175.48-176.44: Breccia in Lp.

Hole:	2008-DDH-OG-05			
Logged by:	J. Foley			
From (m)	To (m)	Lithology (mapping)	Lithology (core)	Description
0	6.1	Overburden	Overburden	
6.1	84.43	Lml	Massive Limestone	Very fine grained gray to dark gray massive limestone. The first 33.16 m is very rubbly and fractured, with rusty (limonite) staining. There are also areas of breccia. Difficult to measure intervals of breccia due to rubble. Intense network fracturing with carbonate fil stained by rust or with hematization. Increased amount of fractures, breccia, and hematite may be due to a nearby fault. Abundant sparry dolomite veins with red hematite. Some pyrite mineralization in breccia matrix. Breccia clasts are up to 10 cm. Matrix is white-gray dolomite. Some crystalline quartz veins. 34.64-53.14:Breccia and possibly faulted interval. Subangular clasts. Some rust/limonite alteration in limestone, possibly due to nearby fault. 41.68-46.75: Abundant (>70%) sparry dolomite with red hematite. Beige rusty limestone which is most likely from a fault. Around 55m there are some laminated beds which may indicate that the Lml is grading into a more laminated unit such as the Lldl. 67.12-70.92: Breccia with subangular to subrounded clasts up to 5 cm. Dolomitic matrix with abundant hematite. 74.56-84.43: (Solution) Breccia. ~0.5-2cm subangular clasts. White-gray dolomitic matrix. Clast supported. Minor hematite in matrix. 79.25-81.80: Highly fractured @ 80-90 deg tca. Limonite on fracture faces. Rusty staining. Fault?
84.43	143.03	Lbsdl or Lldl	Laminated dolomitic/silty limestone	Underlying the massive limestone breccia is gray to black thinly laminated dolomitic limestone. Laminae vary from gray micritic dolomite to black mud/silt. Most bedding is parallel tca. Abundant breccia with laminated 0.5-2cm clasts. Abundant fracturing and veins with white carbonate fill. Minor quartz veins. Fractures/slips oblique-parallel tca. Brecciated intervals are common throughout, often separated by <1m of non-brecciated core. Trace amounts of sp and gn in pyritic and carbonate veins/fractures. ~90% of the unit is breccia or has abundant network fracturing. Possible contact @ ~128.85 m between the Lldl and Lbsdl. It appears to get more shaly after that, up until 143.03. Trace mineralization begins around 101 m.
143.03	160.7	Lml	Massive Limestone	As above. Breccia above contact between Lldl and Lml. Some sulphide mineralization. This Lml has some fractures/slips but is very hard and solid core. It reacts to 10% HCl when scrathed with a knife.
160.7	167.23			Breccia: At the start it is massive limestone clast breccia which grades into a finely laminated clast breccia. Clasts are subangular to subrounded, generally <2cm. Matrix ranges from light gray to black with increased shale content. The breccia then grades back into massive limestone.
167.23	177.25	Lml	Massive Limestone	Predominantly massive limestone (could be micritic dolostone) with some minor interspursed shale content in short brecciated intervals. No apparent bedding. Moderate sparry dolomite veins with pyrite and trace sulphides.
177.25	183.28			Brecciated silty laminated dolostone. High silt/shale content, gray to black color. Some bedding present (179.90 m @ ~45 deg tca). Clasts supported, dolomite/shale matrix. Clasts are generally 1-2 cm and subangular.
183.28	191.92	Lml/Lldl	Massive limestone and laminated dolostone	Predominantly massive limestone with interbedded silty laminated micritic dolostone. Abundant brecciated intervals of both. Abundant network fractures with carbonate fill. Some associated trace sulphide mineralization. Some sharp contacts between beds. 185.31 m: Distinct sharp contact between brecciated silty laminated dolostone and massive limestone.

				185.71 m: Distinct sharp contact between massive limestone over brecciated silty laminated dolostone.
191.92	207.98	Lml/Lldl	Massive limestone and laminated dolostone	Light gray interbedded micritic massive limestone and Lldl. Beds are on the cm scale. In some areas bedding laminae are present, in others It appears massive. Moderate fractures. Moderate breccia throughout. 192.68-193.41: Rubble clasts <5cm, possibly a fault.
207.98	220.43	Lldl	Laminated dolomitic limestone	Light gray to gray laminated dolostone. Laminae range from 30-60 deg tca and 1-3 mm thick. Occasional breccia with trace sulphides. Moderate fractures with carbonate fill. 1 localized shale interbed (10cm).
220.43	229.6	Lp or Lbsdl	Laminated silt/shale and carbonate	Laminated unit with much more shale content. Either calcareous pelite (Lp) or Lbsdl. Dark gray to black. Laminae are 1-2 mm thick and bedding ranges from 0-80 deg tca, possibly due to deformation/faulting? Minor breccia at the base with trace gn, overlying massive limestone.
229.6	237.86	Lldl or Lml	Laminated silt/shale and carbonate	Abundant network fracturing and some breccia. Most is laminated although some massive. Abundant sparry dolomite with pink hematite.
237.86	242.34	Lbsdl/Lp/Lldl	Laminated silt/shale and carbonate	Increased shale content. Breccia and network fractures. Varying amounts of laminated and massive clasts. Abundant sulphide mineralization. Mainly py +- gn and sp, cp. Sharp contact at 242.34 m (erosional?) which goes back into Lml/Lldl.
242.34	256.70	Lldl	Laminated silt/shale and carbonate	As above. Grades into more shaly unit. Fracturing and breccia increase towards the base and contact.
256.70	265.62	Lbsdl or Lldl	Laminated silt/shale and carbonate	Increased shale content. Still laminated 1-2mm thick, silty and carbonate. Abundant fractures and some breccia. Trace - low %s mineralization of sp and gn. 256.70-258.12: breccias
265.62	273.40	Lp	Laminated silt/shale and carbonate	High shale to carbonate ratio. Dark gray to black. Abundant network fracturing and solution breccia. Abundant sulphide mineralization, mainly sp and gn. Large sphalerite growths in carbonate breccia matrix and/or fractures. Associated gn is spread out in matrix in very small crystals generally < 1 or 2 mm although up to 5mm. 265.62-272.83: Breccia with abundant sulphides. Massive >50% py +- sp and gn. ~5-20% sp and ~1-5% gn. 272.83-273.40: ~5% sp, 1-2% gn in fractures/veins.
273.40	282.40	Lbsdl or Lldl	Laminated silt/shale and carbonate	Shale content begins to decrease. Still laminated. Highly brecciated, ~1-2 cm clasts.. Abundant semi-massive py and sp +- gn in carbonate matrix. Gn is difficult to see in core. Desseminated thoughout.
282.40	344.43	Lldl	Laminated silt/shale and carbonate	Much like the units that overlie this one, it consists of predominantly laminated silt/shale and carbonate interbedded with minor (<1m) beds of massive limestone. There are various ratios of silt/shale to carbonate throughout the laminated intervals. It is probably consisered the Lldl or Lbsdl, it does not appear pelitic enough to be considered as the Lp, although there are intervals (<1m) with abundant shale. There is abundant fractures throughout with white crystalline sparry dolomite (possibly calcite too). Some fractures also contain sulphide mineralization (py>sp>gn>cp). There are also abundant intervals of breccia. Breccia has white to gray dolomitic matrix, 1-3 cm subangular to subrounded clasts. Sulphide mineralization is most abundant in the breccia matrix (py>sp>gn>cp). Sp is abundant, forming in bands with py or it can be patchy. Gn generally forms near sp, much less abundant. There also appears to be some large dolomitic veins which have abundant sulphide mineralization, mainly sp. Some carbonate veins have 1-3cm vugs which contain euhedral dolomite/calcite, and sometimes sp, gn, and cp. 313.42-316.75: Breccia with ~5% sp, tr gn. 323.98-325.73: Breccia. 329.08-340.66: Breccia with abundant py, ~5% sp, tr-1% gn, tr cp.

Hole:	2008-DDH-OG-06			
Logged by:	J. Foley			
From (m)	To (m)	Lithology (mapping)	Lithology (core)	Description
0.00	6.10	overburden	overburden	Glacial drift
6.10	201.84	Lml	Massive dolomitic limestone	Intensely fractured and brecciated, rubbly massive dolomitic limestone. Abundant limonite staining (rust) on fractures faces, in facture fillm and in breccia matrix. Rare sulphide mineralization. Numerous fault possibilities, definitly in a fault zone, indicated by rubbly core, clay gouge and limonite. Limestone is very fine to fine grained, light gray to gray. Breccia clasts are generally subangular to subrounded and 1-3cm. This unit may be grading into or have subunits of the Lldl. 6.10-40.0: Breccia 48.77-55.16: Breccia with red hematitic/limonitic matrix. Clasts range from <1cm-5cm, subangular to subrounded. 58.11-59.01: As above. 9.14-10.50: Possible fault, rubbly core, clay gouge. 15.0-15.08: As above. 19.18-19.73: As above. 29.28-29.95: As above. 30.48-39.17: As above. 59.68-64.25: Breccia 74.77-140.00:Solution breccia. Subrounded clasts. Generally clasts <1cm. Dolomitic light gray matrix. matrix supported. Clasts are gray, stand out from matrix. Abundant hairline fractures with white fill (dolomite). Abundant (rust) limonite staining on fractures. Some light red hematite alteration in matrix. 88.55-99.53: Fault. Rubbly core. Clay gouge among rubble. Limonite staining. Difficult to determine orientation due to abundance of fractures and rubble. 115.99-118.00: Fault. Rubbly core. Clay gouge. Numerous fractures, ~30-40 deg tca. 118.50: ~1cm thick vein with gn and dolomite. No other mineralization around it. 124.54: Tr-1% sp in dolomitic fractures/veins. 134.11-144.45: Fault. Rubble. 1-5cm clasts. No limonite (rust). Possibly some faint laminae in massive limestone after this interval. 159.99-185.33: Fault. Rubbly 1-3cm clasts. Very brittle. Abundant rust/limonite staining. No orientation, too fine. Fractures are at all angles, but it may be at 30-40 deg tca (possible orientation). 159.99-185.33: Fault. Rubbly 1-3 cm. Very brittle. Abundant rust/limonite staining. No orientation, too fine. Fractures at all angles, but it may be at 30-40 deg tca (possible orientation). 185.33-214.20: Solution breccia, subangular to subrounded clasts. Intense fracturing at various angles tca. Rusty limonite staining. Rubbly sections with clay gouge. Minor hematite staining. Presumably all faulted. Grading into more laminated unit. 192.02-193.56: Fault? rubble. 195.96-196.27: Fault. Clay gouge and <0.5cm clasts. Very soft. 197.15-199.13: Angular rubble. Fault.

144.45	159.99	Lldl	Laminated dolomitic limestone subunit	Breccia. Massive limestone appears interbedded with laminated beds. Minor shale content. Breccia is more angular, larger clasts (2-5cm). Still has dolomitic matrix, less hematite. Some minor sulphides, mainly py, trace sp, gn.
214.20	298.70 EOH	Lldl	Laminated dolomitic limestone	Predominant lithology appears to be laminated dolomitic limestone. Still interbedded with minor amounts of massive limestone. Breccia is common among both, solution breccia is more apparent in massive limestone. Generally the core is more in tact, so possibly leaving the major fault zone. Still abundant hairline fractures, most are oblique tca, filled with white dolomite. Trace mineralization of gn, sp. Lldl is still carbonate rich. Light gray-gray, very little black laminae. 217.37-246.89: Abundant solution breccia interbedded with Lldl. 243.84-246.89: Rubble. Fault. 249.10: Bedding lamiane at ~60 deg tca. 246.89-259.84: Lldl as above, bedding at ~60-70 deg tca. 267.36-273.71: Fractured rubbly core. Fault? Possible cause of breccia? 279.30-280.48: Solution breccia. 279.81-280.11: Rubble, fault? 292.61-298.70: Solution breccia. 290.97: Bedding at ~60 deg tca. 285.61-289.56: Fault? Abundant fractures sub-parallel tca (0-10 deg tca). Minor rubble at base. Note: There are fractures parallel and perpendicular tca in this hole. 2 directions of faulting?

Hole:	2008-DDH-OG-07			
Logged by:	J. Foley			
From (m)	To (m)	Lithology (mapping)	Lithology (core)	
0.00	3.05	Overburden	Overburden	Glacial Drift
3.05	140.00	Lml/Lldl	Massive (dolomitic) limestone and laminated dolomitic limestone	Dolomitic massive limestone with minor cm scale beds of laminated dolomitic limestone. Abundant fracturing with white dolomitic fill, often with limonite staining. Occasional faults. Pyrite mineralization occurs in fractures with dolomite fill. Sp, gn, and cp can occur in fractures too, mainly further down in the hole though. Some minor breccia in areas. Occasional quartz veins or quartz in fractures and vugs. Unit is highly fractured and rubbly near the top. Some hematite in the dolomite fracture fill. 35.23-35.67: Fault? Rubbly core, <1-2cm pieces. 10cm of breccia at base. 46.20: Laminae @ ~60 deg tca. 55.16-59.02: Solution breccia (massive ls). Hematite in matrix with dolomite. Subangular clasts, clast supported. 62.48: Begin to see moderate py in fracture fill. 67.55-76.62: Breccia, surrounding fault. Pyrite mineralization. 70.10-73.46: Fault. Very rubbly core. No clasts >10cm. Most are 1-3cm. Abundant fractures below fault @ ~60 deg tca. 79.50-81.95: Breccia (Laminated dolostone) with abundant py and trace sp. 87.55-92.04: Solution Breccia (Laminated dolostone). Hematite staining in dolomitic matrix. 92.76: Sharp contact between dark gray Lldl and light gray massive limestone. 91.44: Laminae @ ~45 deg tca. 98.20-100.52: Breccia. 1-5 cm clasts of laminated Lbsdl or Lp. Gray to black in color. Dolomitic matrix. 94.49-104.31: Begin to see darker (black) laminated beds. Possibly Lbsdl or the Lp. Some breccia wihtin. Abundant network fracturing. 104.31-107.55: Subunit of Lldl/Lml with minor breccia. Contact with overlying unit is sharp. 114.33-123.61: Light gray Lldl breccia (subunit). Some undeformed laminae dipping @ ~60 deg tca. Abundant py in breccia matrix. Trace sp and gn. Sharp (erosional?) contact with underlying shaly breccia. 131.76-140.00: Breccia. Interbedded cm-m Lldl and calcareous pelite. Some beds have sharp contacts although most is breccia. Dolomite matrix with moderate py.

107.55	114.33	Lp or Lbsdl	Calcareous Pelite Subunit	Very fine grained black laminated calcareous pelite with minor fractures and white dolomitic fill. Around 111m it starts to get lighter (gray) 20-30 cm beds. Possibly grading into a more calcareous lithology. Breccia at base and sharp contact with breccia of underlying unit. (Erosional contact?). 114.00-123.61: breccia, mostly Lldl and or Lml.
123.61	131.76	Lp or Lbsdl	Calcareous Pelite Subunit	Subunit of calcareous pelite. Very fine grained black laminae @ ~60 deg tca. Abundant hairline fractures with dolomite and pyrite. Trace sp and gn.
140.00	335.28 EOH	Lp or Lbsdl	Calcareous pelite to silty laminated dolostone	Lp or Lbsdl. Very fine grained dark gray to black laminated calcareous pelite/silty dolostone. Moderate amount of fractures. Minor amounts of breccia with dolomitic matrix. Moderate py. Begin to see more sp and gn. The amount of mud/silt varies throughout different beds. Beds are on cm-m scale. There are shaly interbeds. There are minor massive dolomitic limestone beds which grade down into laminated dolostone, and further get more rich in shale. They often have sharp contacts with the overlying shaly beds. These graded beds are on the m scale, generally <0.5m of massive dolomitic limestone before it grades into laminated shaly core. there are minor brecciated intervals, and/or highly fractured intervals which may have sulphide mineralization including sp, gn, and cp. These occur with dolomite matrix/fracture fill, or in vugs. The unit decreases in breccia and network fractures, as well associated mineralization as it deepens. The zone: 162.48-~219.74: Breccia and abundant network fractures. Abundant sulphide mineralization, trace-10% sp and gn and some massive intervals. . Large >4cm bands of gn, sp, and pyrite. Massive (>50%) gn and sp in some intervals. Sulphide bands occur in either large fractures, veins, or brecia matrix. Rounded contact with host rock may imply that it is a vein rather than a fracture. Areas with no deformation have little mineralization. ~30 cm of massive gn and sp at the base. 176.75-178.55: massive gn and sp. The last ~5m of the zone becomes less brecciated and fractured. Bedding is more apparent, @ ~60-70 deg tca. Still short intervals of breccia and sulphide mineralization. 228.68-229.48: Breccia with large 4-5 cm subangular clasts and abundant dolomitic matrix. ~5-10% gn and sp in matrix. 240.79-243.00- Highly fractured, oblique to parallel tca. No apparent alteration. Underlain by mineralized breccia. Fault? 243.00-243.99: Breccia with 2-5% sp and trace cp and gn in dolomitic matrix. 251.76-253.31: Moderate breccia and network fractures. ~1% cp and sp and trace-1% gn. 262.13: Bedding @ ~45 deg tca. 269.80-270.82: 2 short intervals of breccia, 15-30 cm thick. Abundant sp +- gn in dolomitic matrix. 276.23-285.00: Breccia (Lp), with some interbedded undeformed Lp in between breccia intervals. Abundant py, tr-5% sp+-gn. trace cp. Also some fractures with the same mineralization. Fractures are generally @ 45deg tca, with the bedding but also against it. 295.15-297.49: Some minor breccia and fractured intervals with moderate sp+-gn, abundant py. 301.37-303.09: as above. 306.50-308.35: as above. 317.71-317.98: Breccia with abundant dolomite, large clasts. Abundant sp. 319.30-319.37: Short breccia interval. Subangular, 2-3 cm clasts. Abundant sp in matrix. 335.04: Bedding at ~50-60 deg tca.

Hole:	2008-DDH-OG-08			
Logged by:	J. Foley			
From (m)	**To (m)**	**Lithology (mapping)**	**Lithology (core)**	**Description**
0	3.05	Overburden	Overburden	Glacial Drift
3.05	88.39	Lml	Massive dolomitic limestone	Dolomitic massive limestone, highly fractured and rubbly near the top of te hole, with abundant limonite alteration. Abundant hairline fractures throughout with dolomite and hematite alteration. Minor to moderate breccia intervals, some sulphide mineralization, mostly py, nearing the base of the unit. Minor interbeds (<0.5m) of laminated dolostone. Trace amounts of gn throughout, mostly small specks. 68.10-70.10: Some irregular breccia with large laminated clasts and laminated dolostone with bedding parallel tca. 70.10-70.43: Breccia with abundant py. 73.00-73.70: Fault. Gray clay gouge, rubbly core. 73.70-79.25: Solution breccia underlying fault. Abundant py. Trace cp, sp. Intense hairline fractures. Limonite alteration.
88.39	135.38	Lml/Lbsdl/Lldl	Laminated silty dolomitic limestone	Laminated silty dolomitic limestone, mm scale laminae. Dark gray to black. Laminae @ ~60 deg tca. Contact with overlying Lml is fractured and has some breccia with py. Interbedded with laminated dolostone and with massive dolomitic (and possibly partly silicified) limestone. Beds range from ~30 cm up to ~2-3 m. There are breccia intervals and moderate fracturing with dolomite fill. In the massive dolomitic limestone there are occasional vugs with crystalline dolomite and seomtimes quartz, also trace gn and cp. This unit may be a gradual change into the underlying unit which appears to be a laminated calcareous siltstone/pelite (not really fissile). Contact with underlying unit is fairly sharp, laminated dolostone over brecciated laminated silty dolostone @ ~ 30 deg tca. Generally the silty beds are shorter and this unit is dominated by massive to laminated dolostone. Brecciated intervals are short and separated by undeformed beds. 88.39-93.75: Silty laminated dolostone (dark gray to black). Laminae @ ~ 50-60 deg tca. Breccia at the base, and some short <30 cm intervals throughout. Tr-1% sp +- gn in dolomitic matrix and fractures, also py. 93.12-95.00: Breccia of silty laminated dolostone and laminated dolostone (contact). Some minor sp +-gn.

135.38	204.22	Lbsdl	Thinly bedded silty dolostone	Thinly bedded silty dolostone. Gray-dark gray, beds are cm scale. Laminae are generally <1mm thick. There is abundant fractures and breccia. Sulphide mineralization includes sp +- gn and trace cp. It occurs in fractures and/or veins, also in sparry dolomite breccia matrix. Often in contact (zoned) with py. Breccia is usually clasts supported, clasts are subangular to subrounded. 135.38-153.42: ~90% breccia. Abundant py, sp and minor gn in dolomite matrix. Usually in bands zoned with sp in the middle of py. Also mineralization in fractures, generally <1cm thick. 158.16-168.90: 75% breccia. Little to no mineralization. 164.12-164.59: Possible fault. Highly fractured, surrounded by breccia. Some minor black fault gouge. Crushed angular fragments. 171.92-175.66: Clast supported breccia with dolomite matrix. 1-2cm subangular-subrounded clasts. Moderate py with minor sp +- gn in matrix. Clasts are laminated. 183.66-184.78: Breccia with more abundant matrix, some is clast supported, some matrix supported. Subangular clasts, which range from <1cm to 5 cm. Some minor disseminated pyrite. Trace sp +- gn. 189.81-204.22: "The Zone": Breccia, similar to above at the start of the interval. It then changes into a coarser clast breccia with abundant sparry dolomite matrix and replacement sp and gn. Sp is predominantly red "ruby jack", gn is grey to silver. Clasts range from 1-10 cm. Still silty laminated dolostone. Some edges of clasts appear to be embayed by matrix minerals (py and sp). Some clasts have mineral growth on the edges, either py or sp. There is semi-massive to massive sp and gn. Some good zoning with gn to sp to py. Breccia is not typical jigsaw breccia (i.e. pieces do not appear to go back together). Possibly some extension with an influx of fluids? 193.91-195.88: Massive sp and gn with dolomite and py. 199.71-203.04: Massive sp and gn with dolomite and py.
204.22	274.32	Lldl	Laminated dolomitic limestone	Grading out of Lbsdl into a less silty Lldl. Still has similar bedding. Some major breccia intervals with abundant py, sp +- gn. Breccia similar to that in previous "Zone" (189.81-204.22). Also areas with large fractures and minor breccia with good sulphide mineralization. 206.05-207.12: Breccia with dolomitic and muddy matrix. Moderate sulphide mineralization. Clasts are 1-3cm, subangular to subrounded. Possibly a continuation of the overlying breccia, although not as much mineralization. 214.09-217.36: Short 15-30 cm of breccia interbedded with laminated dolostone. 233.40-238.33: Breccia with abundant py and sp. Zoned with bands of sp in py or vice versa. Often coating clasts. Dolomitic to muddy fine grained matrix. Sulphides often replacing mud, when pathway is available. Very little (trace) visible gn. Clasts are subangular to subrounded, and can be up to 15 cm. The contact at 233.40 m is at ~45 deg tca and is very sharp, between Lldl and breccia. The edges of the clasts in this breccia appear very "worn down" or eaten away by the intruding fluids. Breccia grades out at the end of the interval, some minor bits and pieces of sp in fractures after the main interval ends. 238.33-242.86: Moderate amount of large fractures and/or veins, with short breccia intervals. Abundant py and sp in these features, some gn. Occasional vugs with sp and gn crystals within. Bedding @ ~50-60 deg tca. 252.98-256.95: Some moderate breccia intervals, and fractures with abundant sp and gn. 252.98-253.55: Breccia/fractures with semi-massive sp +- gn. 256.78-256.94: Breccia/fractures with semi-massive sp +- gn. Minor short intervals of breccia and moderate fractures with sp +- gn mineralization. Still zoned py and sp bands. Breccia intervals are generally only 10-15 cm thick. Some vugs with dolomite crystals and sparse gn and sp crystals. Still good signs of mineralization although at the end of the hole. 274.22: Bedding @ ~60 deg tca.