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# ALBANY PROJECT - BLOCK 4F Graphite Deposit - 2013 Drill Program Assessment Report 

Porcupine Mining District, Ontario
Pitopiko River, Feagan Lake Areas NTS: 42K/01,02, 42F/15,16


## ZENYATTA VENTURES LTD.

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### 1.0 Summary

Zenyatta Ventures Limited's ("Zenyatta") Albany Graphite deposit is a unique hydrothermal graphite deposit situated within two near surface breccia pipes intruding host syenitic country rock. The deposit is within Zenyatta's Block 4F claim block, located in the James Bay Lowlands region of northwestern Ontario, Canada (Figures 1 and 2). Block 4F is presently part of Zenyatta's group of six Albany claim blocks which also includes Blocks 1C, 2C, 4A, 4B and 4E (Figure 2). The claim blocks are all located within in the Porcupine Mining District of the province of Ontario. Albany Block 4F is presently held $100 \%$ by Zenyatta.

Previously in 2010, Zenyatta contracted Geotech Limited to conduct an airborne magnetic and electromagnetic (VTEM) geophysical survey on the entire Albany Project claim blocks. Results of the airborne survey outlined several magnetic and electromagnetic geophysical targets that prompted Zenyatta's 2011 and 2012 drilling programs. In the fall of 2011, Zenyatta drilled one hole (Z11-4F1) targeting a strong VTEM conductor. The conductor was intersected by this first drill hole and was explained by the presence of several graphite mineralized breccia zones. In 2011, graphite increased in value due to a higher amount of technical demands for graphite; therefore, in 2012, Zenyatta continued with additional exploration drilling (Phase II) on the graphitic breccia zones and drilled eight more holes, Z12-4F2 to Z12-4F9.

Historical government mapping in the area included work done by Ontario Geological Survey (OGS) geologist Greg Stott. He interpreted the region's Precambrian geology (Stott et. al., 2007) based on government airborne geophysical surveys and limited geological data from exploratory diamond drilling conducted in the area. Stott grouped the Precambrian basement rocks into separate terranes and basins. Claim Block 4F overlies the boundary between the "Quetico Basins" in the south and the "Marmion Terrane" rocks in the north section of the block. Historical company exploration in Block 4F area has been limited. Documented assessment work from the Ministry of Northern Development and Mines (MNDM) includes ground geophysical surveys conducted by Nagagami River Prospecting in 1959, airborne and ground magnetometer surveys, and diamond drilling carried out in the 1960s by Algoma and in 1978 by Shell Canada.

Based on the research conducted to date by Dr. Andrew Conly (Lakehead University, Thunder Bay) it appears that the graphite was deposited hydrothermally and was related to the ascent of a $\mathrm{CO}_{2}$-rich magma. The deposit is a unique example of an epigenetic graphite deposit in which
a large volume of highly crystalline, fluid-deposited graphite occurs within an igneous host. The deposit is interpreted as a vent pipe breccia that formed from $\mathrm{CO}_{2}$-rich fluids that evolved due to pressure-related degassing of syenites of the Albany Alkalic Complex. Petrography indicates that the graphite-hosting breccias range in composition from diorite to granite. Graphite occurs both in the matrix, as disseminated crystals, clotted to radiating crystal aggregates and veins and along crystal boundaries, and as small veins within the breccia fragments.

The 2013 Phase III drill program included drilling an additional 48 NQ drill holes (Z13-4F10 to 4F57) and 6 HQ drill holes (Z13-4FM01 to 4FM06) all of which targeted graphitic zones within the two adjacent igneous-related breccia pipes. From March 26, 2013 to November 6, 2013 Zenyatta completed 54 holes (27 on each breccia pipe) for a total of $22,463 \mathrm{~m}$.

Every drill hole intersected significant graphite mineralized breccia zones. The drilling program was required to prepare an NI 43-101 compliant Mineral Resource Estimate which was contracted to RPA Inc., of Toronto, Ontario. RPA estimated the Indicated Mineral Resources to total 25.1 Mt at a grade of $3.89 \%$ Cg and to contain 977,000t Cg; and Inferred Mineral Resources total 20.1 Mt at a grade of $2.20 \% \mathrm{Cg}$, containing $441,000 \mathrm{Cg}$.

Results of the Phase III drilling program were successful in defining a robust graphite mineral deposit. Some of the significant, higher grade graphitic carbon intersections include the following zones (weighted averages):

- $5.06 \%$ Cg over 360 m in Z13-4F10
- $4.47 \%$ Cg over 219 m in Z13-4F13
- $5.51 \%$ Cg over 128 m in Z13-4F20
- $6.94 \% \mathrm{Cg}$ over 115 m in Z13-4F28
- $5.21 \%$ Cg over 86 m in Z13-4F36
- $7.44 \%$ Cg over 117 m in Z13-4F43
- 6.75\% Cg over 218 m in Z13-4F45
- 5.36\% Cg over 260 m in Z13-4FM03


### 2.0 Introduction

In 2013, Zenyatta Ventures Limited ("Zenyatta") initiated a Phase III detailed diamond drilling program to test additional graphite mineralized zones hosted by both the East and West breccia pipes and included a total of 48 NQ diamond drill holes (Z13-4F10 to Z13-4F57) and 6 HQ (Z134FM01 to Z13-4F06) metallurgical drill holes. Each drill hole target is briefly described in Table 1. This extensive drill program was carried out to evaluate the inferred and indicated graphite resource estimates necessary to fulfill the requirements for a NI43-101 Resource Estimate Technical Report. The NI43-101 Technical Report was prepared by an independent company, RPA Inc. (RPA) and conforms to NI43-101 Standards of Disclosure for Mineral Projects. This report is available for public viewing on the SEDAR and Zenyatta websites.

Previously in 2011, Zenyatta initiated the Block 4F, Phase I exploration drill program which included one diamond drill hole, Z11-4F1. This hole was drilled into a strong electromagnetic (EM) anomaly located west of the Nagagami River. Drill hole Z11-4F1 (discovery hole) intersected several zones of highly conductive graphitic brecciated granitic to syenitic gneiss, explaining the strong EM anomaly. In 2012, Zenyatta initiated a Phase II drill program to continue exploration for graphite mineralization and drilled eight additional holes (Z12-4F2 to Z12-4F9) targeting graphite brecciated zones. Results from the 2013 drill program showed extensive graphite mineralized zones up to 440 metres downhole (Z13-4FM03).

In 2012 and 2013, bench scale metallurgical tests on the mineralized samples indicated that the graphite can be concentrated to $99.9 \%$ purity. Zenyatta believes that this high-purity product will command higher prices and is aiming to compete in the high-purity synthetic graphite market. The 2013 drilling program demonstrated that a large volume of graphite exists hosted within the two breccia pipes. The independent RPA study reported estimates of Indicated Mineral Resources totaling 25.1 million tonnes (Mt) at an average grade of $3.89 \%$ graphitic carbon ( Cg ), containing 977,000 tonnes of Cg . Inferred mineral resources are estimated to total 20.1 Mt at an average grade of $2.20 \% \mathrm{Cg}$, containing 441,000 tonnes of Cg (RPA, 2014).

Table 1: Block 4F 2013 Phase III Drill Targets

| Drill Hole ID | Date | Target Description |
| :---: | :---: | :---: |
| Z13-4F10 | March 26-30 | The purpose of this drill hole was to test the diameter of the East Pipe on the 4F property. |
| Z13-4F11 | March 30-April 08 | Z13-4F11 was collared to the north of hole Z13-4F10 to test the graphitic breccia mineralization intersected by Z13-4F10 at depth. |
| Z13-4F12 | April 09-14 | Collared to the northeast of the East Pipe. The purpose of this drill hole was to test the East Pipe from the northeast. |
| Z13-4F13 | April 14-22 | Drilled from the eastern flank of the same breccia pipe to intersect the breccia at a vertical depth of 150 m from the surface. |
| Z13-4F14 | April 23-May 03 | This drill hole intersected two graphite mineralized breccia zones with minor intervals of graphite overprinted syenite which have also been intruded by later unmineralized mafic to intermediate dykes. |
| Z13-4F15 | May 04-08 | The purpose of this hole was to test the East Pipe at depth from the southwest. |
| Z13-4F16 | May 09-16 | This hole was collared approximately 100 metres behind hole Z13-4F12. The purpose of this hole was to intersect the East Pipe at a vertical depth of 132 metres. |
| Z13-4F17 | May 17-23 | Positioned to the east of the East Pipe approximately 100 m east of drill hole Z13-4F12 to test the graphitic breccia at depth. |
| Z13-4F18 | May 24-29 | Collared to test the East Pipe at depth from northwest. |
| Z13-4F19 | May 29-02 | Designed to test the East Pipe at depth from the northeast. |
| Z13-4F20 | June 03-06 | Planned to test the southern portion of the East Pipe at depth from northeast. |
| Z13-4F21 | June 06-10 | Collared to test the graphitic breccia at depth. |
| Z13-4F22 | June 10-12 | Collared 40 m northwest of drill hole Z13-4F21 to test the upper part of the East Breccia Pipe at depth. |
| Z13-4F23 | June 13-14 | Collared 40 m northwest of drill hole Z13-4F22. |
| Z13-4F24 | June 15-17 | The purpose of this hole was to test the south end of the East Pipe at depth. |
| Z13-4F25 | June 17-19 | This hole was drilled to a depth of 213.00 m to test the East Pipe from the northeast. |
| Z13-4F26 | June 20-28 | This hole was designed to test the West Pipe at depth from the southwest. |
| Z13-4F27 | June 28-July 05 | This drill hole was designed to test the West Pipe from the southeast. |
| Z13-4F28 | July 05-09 | The purpose of this drill hole was to test the southwestern limit of the East Pipe. |
| Z13-4F29 | July 09-13 | The purpose of this drill hole was to test the West Pipe from northwest. |
| Z13-4F30 | July 14-17 | This hole was drilled to test the northwestern limit of the West Pipe at depth. |
| Z13-4F31 | July 18-22 | This hole was collared directly north of the west pipe to help establish the north contact of the pipe. |
| Z13-4F32 | July 22-26 | This hole was drilled to test the southeastern boundary of the West pipe at depth. |
| Z13-4F33 | July 22-Aug 02 | This hole was drilled to test the southwestern boundary of the West Pipe at depth. |
| Z13-4F34 | August 02-08 | This hole was drilled to test the eastern boundary of the West pipe at depth. |
| Z13-4F35 | August 08-14 | The purpose of drill hole Z13-4F35 was to test the extension of the northwestern limit of the East Pipe at depth. |
| Z13-4F36 | August 14-18 | The purpose of this drill hole was to test the extension of the northwestern limit of the East Pipe at a shallower depth than Z13-4F35. This collar location was moved closer to the pipe. |
| Z13-4F37 | August 18-22 | The purpose of this drill hole was to drill from the southwest of the East Pipe to fill in missing data; this hole was suggested by RPA. |
| Z13-4F38 | August 23-28 | Drill hole Z13-4F38 was stepped out from Z13-4F37 to fill in missing information below that hole; this hole was also suggested by RPA. |


| Z13-4F39 | August 29 - Sept. 2 | This drill hole was collared to test the north-northwest boundary of the West Pipe near surface. |
| :---: | :---: | :---: |
| Z13-4F40 | Sept.2-6 | The purpose of drill hole Z13-4F40 was to establish the western boundary of the West Pipe. |
| Z13-4F41 | Sept.6-10 | Drill hole Z13-4F41 was collared to the northwest of the West Pipe. |
| Z13-4F42 | Sept.10-12 | The purpose of this drill hole was to define the northwestern contact of the graphitic breccia. It was drilled from the same location as drill hole Z13-4F41 but at a $-75^{\circ}$ inclination to intersect the contact at depth. |
| 213-4F43 | Sept.12-14 | This drill hole was collared to the southeast of the East Pipe. The purpose of this drill hole was to define the southeastern contact of the graphitic breccia. |
| Z13-4F44 | Sept.12-17 | Drill hole Z13-4F44 was collared to the north of the West Pipe. The purpose of this drill hole was to define the northern contact of the graphitic breccia in the West Pipe. |
| Z13-4F45 | Sept.14-17 | Drill hole Z13-4F45 was collared to the southeast of the East Pipe. The purpose of this drill hole was to define the southeastern contact of the graphitic breccia at depth. |
| Z13-4F46 | Sept. 18-22 | Drill hole Z13-4F46 was collared to the east of the West Pipe. The purpose of this drill hole was to define the eastern contact of the graphitic breccia. |
| 213-4F47 | Sept. 18-22 | The purpose of this drill hole was to test the northern contact of the East Pipe from the north. |
| Z13-4F48 | Sept. 22-26 | This drill hole was collared to the east of the West Pipe. The purpose of this drill hole was to define the eastern contact of the graphitic breccia. |
| Z13-4F49 | Sept. 26-27 | Drill hole Z13-4F49 was collared to the east of the West Pipe. The purpose of this drill hole was to define the eastern contact of the graphitic breccia. |
| Z13-4F50 | Sept. 27-29 | Drill hole Z13-4F50 was collared from the southeast of the West Pipe. The purpose of this drill hole was to define the southeastern contact of the graphitic breccia. |
| Z13-4F51 | Sept. 27 - Oct 1 | Drill hole Z13-4F51 was collared to test the West Pipe from the southeast. |
| Z13-4F52 | $\begin{aligned} & \text { Sept. } 30 \text { - October } \\ & 3 \end{aligned}$ | Drill hole Z13-4F52 was collared to the south of the West Pipe. The purpose of this drill hole was to define the southwestern contact of the graphitic breccia. |
| Z13-4F53 | October 1-5 | Drill hole Z13-4F53 was collared approximately 60 m behind drill hole Z13-4F51 to test the West Pipe at depth. |
| Z13-4F54 | October 3-6 | Drill hole Z13-4F54 was collared on the eastern edge of the West Pipe. The purpose of this drill hole was to help establish the geology of the core of the graphitic breccia. |
| 713-4F55 | October 5-8 | The purpose was to test the eastern boundary of the West Pipe at a shallower depth. |
| Z13-4F56 | October 7-13 | Drill hole Z13-4F56 was collared at relatively the same location as drill hole Z134F40. |
| Z13-4F57 | October 9-12 | Drill hole Z13-4F57 was collared northwest of the West Pipe. This drill hole tested the northwestern boundary of the West Pipe at depth. |
| $\begin{aligned} & \hline \text { Z13- } \\ & \text { 4FM01 } \\ & \hline \end{aligned}$ | August 20-29 | The purpose of this drill hole was to obtain material to be tested for metallurgical purposes; it was drilled at a steep angle in order to drill down the pipe. |
| $\begin{aligned} & \hline \text { Z13- } \\ & \text { 4FMO2 } \end{aligned}$ | August 30 - Sept. 5 | The purpose of drill hole Z13-4FM02 was to obtain more material to be tested for metallurgical purposes. |
| $\begin{aligned} & \hline \text { Z13- } \\ & \text { 4FM03 } \end{aligned}$ | Sept. 6-11 | The purpose of drill hole Z13-4FM03 was to obtain more material to be tested for metallurgical purposes. |
| $\begin{array}{\|l\|l\|} \hline \text { Z13- } \\ \text { 4FM04 } \end{array}$ | October 13-21 | Drill hole Z13-4FM04 was the first of three holes that were planned and drilled on the West Pipe in order to obtain material for metallurgical testing. |
| $\begin{array}{\|l\|} \hline \text { Z13- } \\ \text { 4FM05 } \\ \hline \end{array}$ | October 22-29 | Z13-4FM05 was the second of three planned holes drilled on the West Pipe with an HQ core size to obtain material for metallurgical testing. |
| $\begin{aligned} & \text { 213- } \\ & \text { 4FM06 } \end{aligned}$ | October 30 <br> November 6 | Drill hole Z13-4FM06 was the third of three holes that were drilled on the West Pipe in order to obtain material for metallurgical testing. |

### 3.0 Property Description, Location and Agreements

Zenyatta originally held a group of claim blocks (the Property) located in a large area of twenty townships north of Lake Superior and west of James Bay, Canada, within the Porcupine Mining District of northern Ontario, Canada (Figure 1). Block 4F is now part of six claim groups (1C, 2C, 4A, 4B, 4E, \& 4F) that presently make up the Albany Project and include a total of 157 claim blocks, 2356 claim units and 37,696 hectares (Figure 2). The claim blocks were originally staked under an agreement between Cliffs Natural Resources Exploration Canada Inc. (CNRECI), an affiliate of Cliffs Natural Resources Inc. (Cliffs) and Eveleigh Geological Consulting Inc. (EGC) to explore for Cu-Ni-PGM mineralization. The Project is located west of the communities of Constance Lake First Nation and Hearst, Ontario, within 30 km of the Trans-Canada Highway (Highway 11).

At the time of Zenyatta's Initial Public Offering in December 2010, the Albany claims were 25\% owned by Zenyatta and $75 \%$ owned by CNRECI, as defined by the 2010 Amended Albany Option and Joint Venture Agreement. The majority of these claims were staked during the summer and fall of 2009, followed by additional staking in the winter and spring of 2010. This report covers Block 4F, which contains the Albany graphite deposit and is $100 \%$ owned by Zenyatta.

Zenyatta's Albany Graphite Project claims (Block 4F) were staked during the months of March, May and June of 2010. Presently, Block 4F has a total of $\mathbf{6 1}$ claim blocks, $\mathbf{8 2 6}$ claim units, for a total of $\mathbf{1 3 , 2 1 6}$ hectares (Figure 3, Table 2). The yearly work required costs to keep the total claims in good standing amounts to $\mathbf{\$ 3 3 0 , 4 0 0}$. The property is not subject to any known environmental issues, and no abandoned mine workings or tailings are present on the property. Table 2, presented below lists the entire Block 4F claims and expiry dates. Currently, all claims are in good standing until 2016; claim P4255105 which hosts the graphite deposit has a 2021 due date and over $\$ 1.4$ million in reserve.

In November 2012, Zenyatta reached an agreement with CNRECI and acquired 100\% ownership of Claim Block 4F. Prior to this date and according to the agreement, Zenyatta had already exercised its right and acquired an $80 \%$ interest in Claim Block 4 F by having spent a total of $\$ 10$ million on exploration on the larger group of Albany Project claims. After acquiring Cliffs' remaining 20\% interest in the Claim Block 4F, Zenyatta now holds a $100 \%$ interest.

Pursuant to the terms of the transaction, Zenyatta and Cliffs agree to the following with respect to the Claim Block 4F:
a. Zenyatta will issue to Cliffs (or its designated affiliate) a total of 1,250,000 Zenyatta shares as follows: (i) 500,000 shares upon signing the agreement (completed); (ii) 250,000 shares to be issued upon completion of a pre-feasibility study; and (iii) 500,000 shares to be issued upon completion of a feasibility study; and
b. Zenyatta will grant Cliffs an NSR royalty of $0.75 \%$ on the Claim Block 4F, of which $0.5 \%$ can be purchased at any time for $\mathrm{C} \$ 500,000$.

There is an additional underlying 2\% NSR royalty on Claim Block 4F that was granted to EGC of which $1.0 \%$ can be purchased at any time for $\mathrm{C} \$ 1,000,000$. This royalty was part of the original 2009 Project Agreement between CNRECI and EGC, which subsequently became a part of the 2010 Amended Albany Option and Joint Venture Agreement between Zenyatta, Cliffs, CNRECI, and EGC.

Additionally, in order to exercise the Second Option and earn an 80\% interest on the remaining Albany Property claims Zenyatta had to drill not less than 3,000 m on the other claims (Blocks 3A, 3B and 4E; 3A and 3B have since been dropped) by December 31, 2014. A total of 2384 m were drilled on 3A and 3B in November and December, 2013 leaving a minimum of approximately 616 m remaining to be drilled on Block 4E (Carey, 2014b). It should be noted that Cliffs granted Zenyatta a three month extension beyond the December 31, 2014 deadline and the required drilling ( 625 m ) was completed in early February, 2015 (Carey, 2015).

The Block 4F claim group (Figure 3) is located in Constance Lake First Nation’s (CLFN) Traditional Territory. On July 18, 2012, Zenyatta and CLFN announced that they had signed an Exploration Agreement for a mutually beneficial and co-operative relationship regarding exploration and pre-feasibility activities on the Albany Project. Among other things, CLFN will participate in an implementation committee and receive, along with certain other First Nation communities, preferential opportunities for employment and contracting. Zenyatta also agreed to contribute to a social fund for the benefit of CLFN children, youth, and elders, which was completed in 2012 and 2013.


Figure 1: Albany Block 4F Location Map


Figure 2: Albany Project Claim Blocks


Figure 3: Albany Project Block 4F Claims

Table 2: Block 4F Claim Status

| ALBANY BLOCK 4F CLAIMS - 2015 |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Claim ID | Block <br> \# | $\begin{gathered} \text { \# } \\ \text { Units } \end{gathered}$ | Hectares | Recorded Date | Due Date | Work Required | Ownership |
| 4255101 | 4 F | 16 | 256 | Mar17/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4255102 | 4F | 16 | 256 | Mar17/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4255103 | 4F | 16 | 256 | Mar17/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4255104 | 4F | 16 | 256 | Mar17/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4255105 | 4F | 16 | 256 | Mar17/2010 | Feb 28/2021 | \$6,400 | Zenyatta |
| 4255106 | 4F | 16 | 256 | Mar17/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4255107 | 4F | 16 | 256 | Mar17/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4255108 | 4F | 16 | 256 | Mar17/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4255109 | 4F | 16 | 256 | Mar17/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4255110 | 4F | 13 | 208 | Mar17/2010 | Feb 28/2017 | \$5,200 | Zenyatta |
| 4257701 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257702 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257703 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257704 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257705 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257706 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257707 | 4F | 12 | 192 | May10/2010 | Feb 28/2017 | \$4,800 | Zenyatta |
| 4257708 | 4F | 12 | 192 | May10/2010 | Feb 28/2017 | \$4,800 | Zenyatta |
| 4257709 | 4F | 16 | 256 | May10/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4257710 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257711 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257712 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257713 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257714 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257715 | 4F | 16 | 256 | May10/2010 | Feb 28/2016 | \$6,400 | Zenyatta |
| 4257716 | 4F | 16 | 256 | May10/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4257717 | 4F | 16 | 256 | May10/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4257718 | 4F | 16 | 256 | May10/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4257719 | 4F | 16 | 256 | May10/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4257720 | 4F | 16 | 256 | May10/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4257721 | 4F | 9 | 144 | May10/2010 | Feb 28/2017 | \$3,600 | Zenyatta |
| 4257722 | 4F | 4 | 64 | May10/2010 | Feb 28/2017 | \$1,600 | Zenyatta |
| 4257723 | 4F | 16 | 256 | May10/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4257724 | 4F | 16 | 256 | May10/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4257725 | 4F | 16 | 256 | May10/2010 | Feb 28/2017 | \$6,400 | Zenyatta |
| 4257726 | 4F | 11 | 176 | May10/2010 | Feb 28/2017 | \$4,400 | Zenyatta |
| 4257727 | 4F | 9 | 144 | May10/2010 | Feb 28/2017 | \$3,600 | Zenyatta |
| 4257728 | 4F | 6 | 96 | May10/2010 | Feb 28/2017 | \$2,400 | Zenyatta |
| 4257734 | 4F | 4 | 64 | May10/2010 | Feb 28/2017 | \$1,600 | Zenyatta |


| 4248214 | 4 F | 4 | 64 | June4/2010 | Feb 28/2017 | $\$ 1,600$ | Zenyatta |
| :---: | :---: | :---: | :---: | :--- | :--- | :--- | :--- |
| 4255111 | 4 F | 7 | 112 | Mar17/2010 | Feb 28/2016 | $\$ 2,800$ | Zenyatta |
| 4255112 | 4 F | 10 | 160 | Mar17/2010 | Feb 28/2016 | $\$ 4,000$ | Zenyatta |
| 4257730 | 4 F | 14 | 224 | May10/2010 | Feb 28/2016 | $\$ 5,600$ | Zenyatta |
| 4257731 | 4 F | 12 | 192 | May10/2010 | Feb 28/2016 | $\$ 4,800$ | Zenyatta |
| 4257732 | 4 F | 12 | 192 | May10/2010 | Feb 28/2016 | $\$ 4,800$ | Zenyatta |
| 4257733 | 4 F | 14 | 224 | May10/2010 | Feb 28/2016 | $\$ 5,600$ | Zenyatta |
| 4257735 | 4 F | 7 | 112 | May10/2010 | Feb 28/2016 | $\$ 2,800$ | Zenyatta |
| 4257736 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257737 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257738 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257739 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257740 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257741 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257742 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257743 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257744 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257745 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257746 | 4 F | 16 | 256 | May10/2010 | Feb 28/2016 | $\$ 6,400$ | Zenyatta |
| 4257747 | 4 F | 2 | 32 | May10/2010 | Feb 28/2016 | $\$ 800$ | Zenyatta |
| 3002472 | 4 F | 4 | 64 | May10/2010 | Feb 28/2016 | $\$ 1,600$ | Zenyatta |
| 3002473 | 4 F | 4 | 64 | May10/2010 | Feb 28/2016 | $\$ 1,600$ | Zenyatta |
| $\mathbf{6 1}$ |  | 826 | $\mathbf{1 3 2 1 6}$ |  |  | $\$ 330,400$ |  |

### 4.0 Accessibility, Climate, Physiography, Local Resources and Infrastructure <br> 4.1 Accessibility

Access to most of the 4F claim block can be gained using helicopter, but boat or canoe access can be used along the Nagagami River in the central area of the claim block. Old forestry logging roads reach the southeast boundary of the claim block leading to several old quad trails through previously harvested forests just east of the Nagagami River (see Figures 2 and 3). The winter access trail joins the end of the all-weather forestry road to the drill site and it can be reached by travelling northwards up the Pitopiko Road from the Trans-Canada Highway. This was added as a safety route to be used in emergency situations.

### 4.2 Climate

The Albany claims are situated in northern Ontario where there are various climates and weather extremes. Most of the region has a continental climate with warm to hot summers (June, July and August) with 25 to $35^{\circ} \mathrm{C}$, and cold winters (December to March) with temperatures ranging from -10 to $-35^{\circ} \mathrm{C}$ with lows down to $-45^{\circ} \mathrm{C}$. Generally, precipitation ranges from 600 mm to around 900 mm .

Lakes and swamps are typically frozen and suitable for diamond drilling from December to April. Exploration can take place year round with minor breaks during the spring thaw and winter freeze-up. Mining operations can take place all year round.

### 4.4 Physiography

The claims are situated within the Hudson Bay-James Bay Lowlands area where the topography is essentially flat, low-lying and swampy. Overburden averages 45 m in the Block 4F deposit area with little or no outcrop exposure; Paleozoic limestone cover rocks are exposed in the bottom and along the banks of the Nagagami River. There are many creeks flowing between peat bogs throughout the area. The Nagagami River flows north through the property with several meandering tributaries flowing in from the east and west. The Pitopiko River flows into the west side of the Nagagami. Vegetation is dominated by wetlands with some areas of spruce and alder trees, and cedar swamps. Spruce and alder trees are also abundant along the banks of the Nagagami River and other smaller rivers (Figures 4 and 5).


Figure 4: Oblique View of Topography in the Deposit Area - Looking West


Figure 5: Vertical View of Drill Pads in the Deposit Area with the Nagagami River on the Right and the Pitopiko River on the Left (North is up)

### 4.3 Local Resources and Infrastructure

The claims are located approximately 50 km north of Highway 11 and the Canadian National Railway. The town of Hearst, population of approximately 5000 (see Figure 6), is located approximately 50 km southeast of the property and has many facilities to keep an exploration camp well supplied. These include hotels, restaurants, a hospital, hardware stores, gas stations, a mining supply store and an airport. Float plane and helicopter services are also available in Hearst. Mining personnel, equipment, and supplies can also be accessed from Timmins, a major mining and exploration centre.

There is currently no permanent infrastructure on the Property. An all-weather logging road runs within approximately five kilometres of the graphite deposit - access from that point is via a winter trail. The Project is near the communities of Constance Lake First Nation and Hearst. The nearest airport is in Hearst, approximately one hour by car. The Timmins airport with scheduled flights is approximately four hours away by road. A power transmission line and a natural gas pipeline run along the Trans-Canada Highway, 30 km south of the Project. A rail line is located 70 km away (Figure 6).


Figure 6: Albany Block 4F Infrastructure Map

### 5.0 Previous Work

Zenyatta's Albany Block 4F claim group covers ground that was selected based on geophysical information from OGS airborne magnetic maps, the geological interpretation (Stott, 2008) of these maps, and additional geological and geophysical data from historical exploration reports provided by MNDM. Past exploration work has been limited in this area of the James Bay Lowlands and mostly consisted of a small number of geophysical surveys and diamond drill projects. The following is a brief summary of the reported historical exploration work carried out in the Block 4F area:

1959: A ground magnetic and electromagnetic survey was initiated on claims held by Nagagami River Prospecting Syndicate in the Feagan Lake/Pitopiko River Townships area. The geophysical survey was carried out by Koulomzine and Brossard Limited but was not fully completed because of an early spring breakup. Results of the survey showed three magnetic anomalies defining basement geology contacts and several vertical-loop electromagnetic conductors. The report states that "the general lenticular nature of the conductors and their occurrence in the vicinity of a diabase dyke may suggest the presence of sulphide lenses that could contain base metals; one anomaly (magnetic \& EM) could be due to some disseminated mineralization" (Koulomzine, 1959). They recommended drilling four holes to investigate the EM anomalies, but there is no record that these holes were ever drilled.

1961: Algoma Ore Properties Limited flew an aeromagnetic survey in the Nagagami River and Pitopiko Townships area. The survey outlined a horseshoe-shaped anomaly which was confirmed on the ground in the same year. This led to further exploration in 1963.

1963: Algoma Ore Properties Limited flew an airborne magnetometer survey in the Nagagami River area, located forty miles northwest of Hearst, Ontario. The survey was flown by Hunting Survey Corporation. The survey results indicated two large low intensity circular shaped anomalies (Anomalies \#1 and \#2), underlying the Paleozoic limestones. Interpretation of the anomalies inferred that they were caused by a complex syenitic to gabbroic intrusion. It was reported that Anomaly \#1 could be associated with a basic intrusive, hosting magnetite, and thought to be mildly interesting for iron ore, niobium, and sulphides. Anomaly \#2 was interpreted to be associated with an alkaline and carbonatite complex and could contain columbium and other rare earth elements (REEs). Algoma recommended follow-up work to include a ground magnetometer survey over the anomalies and a diamond drill program (Venn, V.R., 1964).

1964-1967: Algoma Ore Properties Limited continued exploration in the Nagagami River area. Ground work involved grid cutting followed by a ground magnetometer survey and claim staking. Algoma drilled nine holes (located in the Albany blocks 4E and $4 F$ for a total of 4,868 feet. Holes 1-64 to 7-64 were drilled in Block 4E. Two holes were drilled in Anomaly \#2 (drill holes 8-64 and 9-64) and reported to be located near the northern boundary of Block 4F. Erratic sampling was done on the core, along with petrographic studies. The core was tested with scintillometer and samples were taken where radioactive responses occurred; assay results indicated columbium ( $\mathrm{Cb}_{2} \mathrm{O}_{5}$ )
content to be $0.02 \%$ to $0.04 \%$. Drilling on Anomaly \#2 intersected coarse syenite rock with $3-5 \%$ magnetite. It was concluded that the ground magnetometer survey and the diamond drilling verified the airborne survey fairly well, and although drilling did not intersect any ore minerals, the structure was still geologically interesting. Algoma reported that minerals of economic potential could possibly be associated with other parts of the structure and they recommended that the property be referred to other companies interested in intrusive structures (Venn, V.R., 1964).

1978: Shell Canada Explorations Limited initiated a diamond drill program in the area based on results of an airborne geophysical survey. Drill logs were available from MNDM, but no report was submitted with the logs. One hole, drill hole 7609-78-1, was drilled within Bock 4F in the Pitopiko River Area and it was reported to have Intersected "graphitic syenite breccia". Unfortunately, it was not possible to locate the historic drill site but it appears to have likely been drilled on the East Pipe.

1999: The Ontario Geological Survey (OGS) released aeromagnetic geophysical maps for the Hudson Bay and James Bay Lowlands areas, Geophysical Data Set 1036 (see Figure 7 for Block 4F area).

2008: The Ontario Geological Survey (OGS) Precambrian Geology Map P. 3599 was published: Hudson Bay and James Bay Lowlands Region Interpreted from Aeromagnetic Data (Stott, 2008; see Figure 5 for Block 4F area).

2010 to 2012: Exploration work conducted by Zenyatta Ventures Limited includes the initial 2010 helicopter-borne geophysical survey (VTEM Max and magnetometer) which identified airborne EM and magnetic anomalies (Geotech, 2010a; Geotech, 2010b). Follow-up drilling in Block 4F during the fall of 2011 included one drill hole (Z11-4F1) which intersected several mineralized zones of graphitic breccia (Carey and Dalby, 2012). In 2012, Zenyatta continued with a Phase II diamond drill program and drilled eight more holes (Z12-4F2 to Z12-4F9) on the graphite deposit (Carey, 2012). Results were very encouraging and several additional graphite mineralized zones were intersected; however, Zenyatta was unsure of the size, geometry and attitude of the zones.

2013: Exploration work in Block 4F conducted by Zenyatta Ventures Limited included a large loop surface DPEM survey by Crone Geophysics and Exploration Ltd. The survey confirmed the presence of two discrete breccia pipes and was used to plan the resource drill program (Crone, 2013a; Crone, 2013b; Legault et al. 2015). Between March and November 2013, Zenyatta drilled 54 holes totalling 22,463 m (Z13-4F10 to Z13-4F57 and Z13-4FM01 to Z13-4FM06) in the graphite deposit area which is located approximately 14 km to the southeast of the 4E block. Also in 2013, Geotech performed a higher powered VTEM max survey over the newly staked 4F Extension claims to the north of 4F which included the Block 4E claims (Geotech, 2013). Additionally, Zenyatta also drilled two reconnaissance drill holes on Block 4 F to test two weaker conductive zones which were defined by the 2010 VTEM survey. The EM conductors were most likely explained by zones of disseminated pyrrhotite and/or by zones of massive pyrrhotite mineralization (Carey, 2014a).

### 6.0 Geological Setting

### 6.1 Regional Geology

The Albany claims were staked based on geological information acquired from OGS Map P3599, Precambrian Geology of the Hudson Bay and James Bay Lowlands Region. Stott et al. (2007) interpreted the regional tectonic subdivisions and mapped the Albany claim blocks as part of the English River Basins, the Marmion Terrane, and the Quetico Basins of the Superior Province of the Canadian Shield (Figure 7). Based on the interpretation of Sage (1988), it appears that the Nagagami Alkalic Rock Complex underlies most of Claim Blocks 4E and 4F.

The following is a summary of the major rock units in the area, as cited in Geotech (2010b): The relatively flat-lying Hudson Bay and James Bay Lowlands consist mostly of carbonate rocks of Paleozoic to Mesozoic age. These sedimentary rocks cover a significant portion of the Precambrian rocks of Northern Ontario and, therefore, have impeded the understanding of the Precambrian geology and the tectonic framework across this region of Ontario. The region's Precambrian geology is based mainly on available re-processed aeromagnetic data and limited drill hole information. The results provide a general framework of interpreted supracrustal belts, plutonic subdivisions, major faults, and Proterozoic mafic dykes (Figure 7).

## Quetico Subprovince

The Quetico Subprovince is an east-northeast trending, 10 km to 100 km wide by $1,200 \mathrm{~km}$ long belt of variably metamorphosed and deformed clastic metasedimentary rocks and granitoids located in the west-central part of the Superior Province. The metamorphic grade varies from greenschist to amphibolite to local granulite facies. The metasedimentary rocks were deposited before 2696 Ma . The Quetico intrusions near Atikokan are typically small ( $<1 \mathrm{~km}^{2}$ ) and form sills, plugs, and small stocks composed of a variety of lithologies, mainly wehrlites, clinopyroxenites, hornblendites, monzodiorites, syenites, foidites and silicocarbonatites. They are locally enriched in Ni-Cu and PGEs (Vaillancourt et al., 2003).


Figure 7: Regional Tectonic Subdivisions Map of Northern Ontario (Stott et. al., 2008)

## Marmion Terrane / Subprovince

The Marmion Terrane consists predominately of metamorphosed felsic intrusive rocks. The 3.0 to 2.7 billion year old rocks are interpreted as an assemblage of continental fragments. These rocks were once also interpreted as part of the Western Wabigoon and Winnipeg River terranes (MNDM, Government of Ontario).

## English River Subprovince

The English River Subprovince is an east-trending 30 km to 100 km wide by 650 km long belt of metasedimentary and granitoid rocks located in the west-central Superior Province. The metasedimentary rocks contain detrital zircons as young as 2698 Ma and the granitoid rocks range between 2.65 and 2.70 Ga (Vaillancourt et al., 2003).

## Nagagami Alkalic Rock Complex

Limited data and observations obtained from drill logs and drill core, together with aeromagnetic data, suggest that the Nagagami River Alkalic Rock Complex (NRARC) is composed of two ring-shaped subcomplexes with more mafic rims and more leucocratic cores. Aeromagnetic data interpretation may indicate that the northern subcomplex is cut by the southern subcomplex, indicating the southern subcomplex is younger. The middle-to-late Precambrian diabase dykes, which are characterized by linear northwest-trending aeromagnetic patterns, do not crosscut the aeromagnetic signature of the NRARC. This indicates that the complex is younger than the regional diabase dyke swarm. Sage (1988) concluded that this observation, together with the fresh and unmetamorphosed nature of the rock point to a Late Precambrian age, is equivalent to the dominant period of alkali magmatism in Ontario. Regional structural controls on the emplacement of the subcomplexes have not been unambiguously identified, but the NRARC lies on trend with the extension of the northeast-striking Gravel River Fault.

The dominant rock type is an amphibole-pyroxene syenite which varies from fine- to coarsegrained, and locally displays a trachytoidal texture. A coarse-grained nepheline-bearing phase appears restricted to the southern subcomplex. A very coarse-grained pegmatitic phase and a minor granite phase have also been identified. Petrographic analysis indicates that the NRARC has strong similarities to the pyroxene- bearing syenites of the Port Coldwell Alkalic Rock Complex.

Based on the fact that the intrusion underwent unsuccessful testing for iron and niobium in 1964 by the Algoma Ore Properties Division of Algoma Steel Corporation, it was previously recommended that future exploration of the complex should be directed towards the type of mineralization found in equivalent syenitic rocks of the Port Coldwell Alkalic Rock Complex (Sage, 1988).

## Albany Alkalic Complex

The Albany Alkalic Complex (AAC) (Conly, 2014), which hosts the graphitic breccia pipes, occurs to the south of the two Nagagami Alkalic subcomplexes. This intrusion appears to be crosscut by the northwest-trending middle to late Precambrian diabase dykes suggesting that it predates the dyke swarm. Initial work by Dr. Conly indicates that the AAC "syenite" corresponds to a range of quartz-poor to moderate quartz-bearing felsic rocks that are albite dominant. Compositionally, the rocks of the AAC range from quartz syenite to diorite with quartz monzonite
being the most common composition (Conly and Moore, 2015). All drilling by Zenyatta has focused on the immediate area which hosts the graphite deposit. The limits of the intrusion are based on geophysical interpretation.

### 6.2 Property Geology and Graphite Mineralization

The bedrock in the Block 4F region of the James Bay Lowlands area is covered by a layer of overburden and flat-lying, Paleozoic sedimentary cover rocks. Consequently, no historical surface geological mapping projects have been carried out in the area and most of the geology has been geophysically inferred (Figure 8). The average overburden thickness (from holes Z134F10 to 4F48; Z13-4FM01 to 4FM06) is approximately 45 m and ranges from 28 m to 55 m . Precambrian geology in the southern section of Block 4F, according to Stott's Precambrian Geology Map (see Figure 9), consists of mostly paragneiss and migmatite metasedimentary rocks, and mafic with related intrusive rocks of the Quetico Subprovince. The northern section of Block 4F is underlain with metamorphosed tonalite to granodiorite, foliated to gneissic with minor supracrustal inclusions of the Marmion Terrane/Subprovince. Both subprovinces have been intruded with a younger alkalic intrusive suite made up of alkalic syenite, ijolite, associated mafic and ultramafic rocks and carbonatite (Stott, 2008). The two graphitic breccia pipes are hosted within the AAC (Figure 9).

The 2013 drilling intersected flat-lying Paleozoic sediments above the Precambrian rocks and thicknesses ranged from 0 m to 16 m . The erosional unconformity is located on the southern portion of the property and trends approximately east-west (Figure 9). The most abundant Precambrian rock types intersected by Zenyatta drilling include: graphitic brecciated syenitic gneiss, graphitic brecciated syenite, graphitic overprint syenitic gneiss, graphitic brecciated granite, graphitic brecciated granitic gneiss, and graphitic overprint granitic gneiss. Unmineralized rock types included: syenitic gneiss, syenite, granitic gneiss, granite, diorite, schist, monzonite, and mafic to intermediate dykes.

A dominant rock type that was intersected in many drill holes is a late, massive, cross-cutting, barren sill which, based on petrography, has been classified as an olivine-aegirine alkali syenite (James, 2013) (Figure 17). Based on current drill information, the sill dips shallowly to the southeast at $10^{\circ}$ to $15^{\circ}$ and likely emanates from a northwest-trending dyke that is located on the southwest side of the West Pipe and was intersected at the top of hole Z12-4F02. The sill ranges in thickness from approximately 55 m in the vicinity of the West Pipe and then appears
to narrow and bifurcate towards the East Pipe with thicknesses of 12 m and 28 m (Figure 17). James (2013) suggests that the peralkaline nature of the samples is consistent with the apparent rift-type magmatic environment from which they originated. An association with silica undersaturated silicate rocks such as nepheline syenites and carbonatites is to be expected as these types of associations are recognized in a continental rift setting. Interestingly, Conly and Moore (2015) have identified an unmineralized porphyritic, hypabyssal subvolcanic monzodiorite/foid (nepheline) monzodiorite which appears to have intruded along the margins of the West Pipe and postulate that it may have played a critical role in the formation of the graphite deposit. This unit was logged as a porphyritic intermediate dyke.

All rock types intersected in drill holes Z13-4F10 to Z13-4F57 and Z13-4FM01 to Z13-4FM06 are described in detail in the accompanying drill logs in Appendix I and shown graphically on the drill sections which are located at the back of the report.


Figure 8: Block 4F First Vertical Derivative Airborne Magnetics (OGS, 1999; Geotech, 2010)


Figure 9: Block 4F Interpreted Geology (after Stott, 2008)

### 7.0 Deposit Type

The "Arc of Fire" consists of several large multi-phased mafic-ultramafic-alkalic complexes forming an arc line approximately 150 km long. One of these complexes, called the Nagagami River Alkaline Ring Complex, shows similarities to the Mid-Continent Rift related Coldwell Complex on the north shore of Lake Superior. The "Arc of Fire" is believed to also represent a deep seated Proterozoic structure that may be related to the 1.1 Billion year old Mid-Continent Rifting. The Mid-Continent Rift is a known deep seated structural environment that hosts a number of significant mineral deposits around Lake Superior, including the recently discovered Rio Tinto's Eagle and Tamarack Cu-Ni deposits and Magma Metal's (now Panoramic
Resources) Thunder Bay North (TBN) PGM deposit. Rifting environments around the world are host to many large mineral deposits due to a tapping of the copper-nickel rich mantle by way of the structural conduits and traps for metal transport and deposit. Interestingly, Zenyatta was exploring for Cu-Ni-PGM mineralization and accidentally discovered a large graphite deposit when it tested a very large conductive body on the 4F Block.

Most economic geologists and geophysicists are familiar with graphite as a nuisance in geophysical exploration due to its excellent electric conductivity that produces an identical geophysical response to that of massive sulphide mineralization. Graphite commonly occurs in metasedimentary rocks as a result of the conversion of organic matter through regional or contact metamorphism. Graphitization of organic matter is well understood, however, the heating and compression of organic matter in situ is only one of the ways in which graphite is produced in nature. Another is the precipitation of solid carbon (i.e., graphite) from natural carbon-fluids such as those containing $\mathrm{CO}_{2}, \mathrm{CO}$, and/or $\mathrm{CH}_{4}$.

Somewhat simplified, there are three different processes leading to the formation of economic graphite deposits (Harben and Kuzvart, 1996):

1. Contact metamorphism of coal deposits - Graphite formed under these conditions is characterized by incomplete structural ordering and crystallization, resulting in low value "amorphous" graphite with its main market in foundry applications.
2. Syngenetic flake graphite deposits - The formation of these deposits involves the alteration of carbonaceous organic matter to graphite during regional metamorphism.
3. Epigenetic graphite deposits - The formation of these deposits is associated with migrating supercritical carbon-bearing (C-O-H) fluids or fluid-rich magmas. The formation
of the carbon-bearing fluids is most often a consequence of high temperature (granulite facies) metamorphism, but magmatic degassing can also produce graphite. Fluid precipitated graphite is well-ordered and can be a source of highly valued crystalline lump or vein-type graphite.

The Albany deposit is a unique example of an epigenetic graphite deposit in which a large volume of highly crystalline, fluid-deposited graphite occurs within an igneous host. The deposit is interpreted as a vent pipe breccia that formed from $\mathrm{CO}_{2}$-rich fluids that evolved due to pressure-related degassing of syenites of the Albany Alkalic Complex (Figure 10) and is described below (Conly, 2014a; Conly, 2014b; Conly and Moore, 2015).

## STAGE 1 - Emplacement of Host Syenites Forming the Albany Alkalic Complex:

Emplacement of the Albany breccia pipes is estimated to be Mesoproterozoic to Neoproterozoic based on cross-cutting relationship with the Paleoproterozoic Matachewan and Hearst quartz diabase dyke swarms and Mesoproterozoic Sudbury olivine tholeiite dyke swarm. Magma emplacement may also be structurally controlled by the Gravel River Fault which, in part, defines the southern margin Albany Alkalic Complex and separates the Marmion Terrane (to the north) and the Quetico Subprovince (to the south).

## STAGE 2 - Fluid Generation and Breccia Pipe Development:

The two breccia pipes formed as a result of a degassing magma, resulting in segregation of a $\mathrm{CO}_{2}$-bearing fluid, which occurred in response to depressurization of the magma at mid to shallow crustal levels, and accumulation of $\mathrm{CO}_{2}$ at the top of the ascending dyke. Possible sources for the carbon include: i) generation of primary $\mathrm{CO}_{2}{ }^{-}$ rich syenite; and ii) assimilation of carbonaceous Quetico metasedimentary rock by syenitic magmas. The co-existence of angular to rounded breccia fragments is evidence of mixing of juvenile fragments with earlier entrained material which has been subject to a greater extent of mechanical erosion due to rapid and turbulent upflow of the $\mathrm{CO}_{2}$-fluid.

## STAGE 3 - Graphite Deposition:

Graphite deposition likely occurred rapidly due to the sudden depressurization and quenching (from supercritical fluid to gas) of the $\mathrm{CO}_{2}$-fluid which, in turn, is due to the dyke head breaking the surface and venting $\mathrm{CO}_{2}$ gas (Figure 10). Surface venting is
evidenced from the extent of the graphite breccias to the unconformity with the overlying Paleozoic rock. Such rapid depressurization would have also imploded the walls of the vent complex; it is consistent with the higher proportion of angular syenite fragments relative to rounded syenite fragments and fragments of Archean country rock, and with localized production of xenoliths with minimal transport. Rapid deposition of graphite inferred from its fine crystal size (laths typically $100 \mu \mathrm{~m}$ to $300 \mu \mathrm{~m}$ long) and high abundances of discrete crystals and fine crystal aggregates. Coinciding with the changes in pressure, a rapid decrease in temperature would have inhibited growth of coarser crystalline graphite and led to the crystallizing of the degassing syenite magma at depth.

## STAGE 4 -Post Mineralization Magmatic and Erosional Events:

Post-mineralization events include the following (listed in temporal succession):

- Emplacement of late-stage barren olivine-aegirine syenite sills
- Intrusion of aplite and other felsic dykes
- Erosion of upper levels of the Albany Alkalic Complex and supergene alteration
- Deposition of Paleozoic carbonate rocks and Quaternary glacial sediments


Figure 10: Albany Graphite Deposit Model (from Conly, 2014a)

### 8.0 Mineralization

The following description of the graphite mineralization is based on RPA (2014):
Preliminary petrography indicates that the graphite hosting breccias range in composition from diorite to granite, and are generally described as "syenite". Graphite occurs both in the matrix, as disseminated crystals, clotted to radiating crystal aggregates, veins and along crystal boundaries, and as small veins within the breccia fragments. In addition to graphite, the matrix consists primarily of quartz, alkali feldspar and plagioclase feldspar with minor phlogopite and amphibole and trace amounts of pyrite-pyrrhotite and magnetite. Alteration is minor, and is most pronounced as a paleo-weathering profile in the upper 20 m of the breccia pipes where bleaching and late, carbonate-filled fractures are common. The stockwork graphitic veins can be several centimetres wide while the veinlets and hairline fractures are millimetre and submillimetre scale. Breccia fragments are dominantly massive to weakly foliated syenite ( $>95 \%$ ) with minor to trace chlorite-biotite-rich schist fragments, and mafic to intermediate dyke fragments. Occasional solid graphite fragments and rare altered fragments of unknown origin were also observed. Breccia fragments are angular to subangular to subrounded and range in size from subcentimetre to approximately 1 m , most being between 3 cm and 30 cm . Dyke and graphite fragments range from 1 cm to 5 cm (Figure 11). Rapid deposition of graphite inferred from its fine crystal size (laths typically $100 \mu \mathrm{~m}$ to $300 \mu \mathrm{~m}$ long) and high abundances of discrete crystals and fine crystal aggregates.

Figure 11: Core Photographs of Albany Graphite Mineralization


Description of the photographs (provided by Dr. Conly; RPA, 2014):
A) Weathering-related alteration of brecciated and carbonate-veined syenite just below the unconformity with the overlying Paleozoic carbonate rocks (Z12-4F2, West Pipe).
B) Carbonate veining in weakly to moderately brecciated syenite with weak graphite overprint (Z134 F10, East Pipe). Sample is taken just below the highly weathered zone.
C) Graphite veining in barren syenite (Z12-4F6, West Pipe).
D) Aplite dyke crosscutting moderately brecciated syenite with weak to moderate graphite overprint of syenite fragments (Z12-4F9, East Pipe).
E) Typical angular breccia texture of graphite mineralization (Z12-4F10, East Pipe).
F) Rounded syenite breccia fragments indicating more extensive mechanic erosion due to turbulent flow within the vent complex (Z12-4F3, West Pipe).
G) Laminated graphite intercalated with finely milled fragments (Z13-4F51, West Pipe). The laminated texture is interpreted to be the result of flow banding.
H) Highly altered syenite breccia with weak to no graphite mineralization (Z13-4F26, West Pipe). This style of alteration occurs at depth and is not associated with weathering-related alteration observed at the top of the breccia pipes.
I) Graphite mineralized breccia fragment partially rimmed by pyrite-pyrrhotite in a graphite and milled silicate matrix (Z13-4F26, West Pipe).

### 9.0 2013 Exploration Program

The following section is based on RPA (2014):

### 9.1 Surface Time-Domain EM Survey

Crone Geophysics \& Exploration Ltd. (Crone) was contracted by Zenyatta to perform surface time-domain EM (TDEM) surveys on the Property during February and March 2013. Crone targeted the drill-confirmed East and West graphitic breccia pipes that were initially identified in Geotech's 2010 airborne VTEM survey. Crone anticipated that surface TDEM surveys could be influenced by the top, presumably flat edge of the pipe as well as any of the vertical faces if the pipe had a significant depth extent. The survey design incorporated both an in-loop mode (Loop 1) to couple with the top, flat edge of the body and an out-of-loop mode (Loop 2) to couple with the steeply dipping edges (Crone, 2013).

The processed data from Loop 1 showed two separate isolated response patterns, apparently the result of two separate breccia pipes (Figure 12). The response pattern of the in-loop surveys is dominated by the top edge of these conductive sources and in the modelling results, excellent fits were obtained with the assumption of these being due to thin units. Bodies of varying thicknesses were utilized as well, but gave little appreciable difference in the modelling studies, suggesting the response patterns were indeed dominated by the relatively flat-lying tops of these bodies.

Overall, the modelled plates from Loop 1 and Loop 2 provided a robust model for targeting purposes. After drilling the first few holes, it was concluded that the channel 22 contoured plan map of the TDEM data provided a close correspondence to the actual outline of the breccia pipes for drill planning purposes (Legault et al., 2015).

Subsequent to Loop 1, Loop 2 was positioned with the loop located just north of the conductive features/breccia pipe identified from TDEM results. This loop was positioned to provide optimal coupling with any near vertical or steeply dipping edges. As with Loop 1, the Loop 2 results suggest the presence of two isolated bodies.

Crone completed numerical modelling on Loop 1 and 2 datasets. The results provided excellent fits with the observed data.

The TDEM ground survey appears to have outlined the lateral extent of two graphite breccia pipes (inferred from previous drilling results), although the boundary of the model is considered roughly approximate. The Western anomalous zone (West Pipe) is characterized by a rough circular response pattern with a slight elongation in the northeast-southwest direction and the Eastern anomalous zone (East Pipe) is characterized by an elongate ovoid-shaped source with its long axis oriented in a north-northwest-south-southeast sense (Figure 12).


Figure 12: Loop 1 Contoured Channel 22 Total Field TEM image with superimposed East and West Pipe boundaries (red) and drill holes (from Legault et. al., 2015)

### 9.2 Borehole Probing

In late 2013, Zenyatta contracted DGI Geoscience Inc. (DGI) to survey seven boreholes (Z13-4F14, -4F16, -4F17, -4F18, -4F26, -4F27, and -4F34) with three probes: an Acoustic Televiewer (ATV), a Focused Density probe, and a Full Waveform Sonic probe. Two of the seven holes (Z13-4F18 and Z13-4F34) were also surveyed for magnetic susceptibility, inductive conductivity, apparent resistivity, natural gamma, and fluid temperature. A total of

3,192 m was logged. Results were provided as strip logs and Wulff stereoplots and were incorporated into the Preliminary Economic Assessment (PEA) (RPA, 2015). Density and rock quality designation (RQD) data correlated well with Zenyatta's drill logs.

### 9.3 Reconnaissance Drilling

In 2013, Zenyatta also drilled two reconnaissance drill holes ( 702 m total) on Block 4F to test two weaker conductive zones which were defined by the 2010 VTEM survey. No graphite was intersected and the EM conductors were most likely explained by zones of disseminated pyrrhotite and/or by zones of massive pyrrhotite mineralization (Carey, 2014).

### 10.0 Diamond Drilling Results

From March 26, 2013 to November 6, 2013 Zenyatta completed 54 holes (27 on each breccia pipe) for a total of $22,463 \mathrm{~m}$ (Figure 13). Diamond drill holes were collared using NQ ( 47.6 mm core diameter) equipment for the 48 resource drill holes and HQ ( 63.5 mm core diameter) for the six metallurgical drill holes. Drilling was contracted to Chibougamau Diamond Drilling Ltd. (Chibougamau) of Chibougamau, Quebec. Chibougamau utilized their custom built helicopter transportable, fully hydraulic drill rigs which are capable of drilling up to 1000 m of NQ core and 800 m of HQ core. All holes were drilled with a stabilized core barrel (outer tube) in order to reduce the deflection of the hole. The program commenced with one drill and a second rig was added later in August 2013 to drill the holes required for metallurgical testwork. Expedition Helicopters Inc. of Cochrane, Ontario was contracted to provide helicopter support (Eurocopter AS350 AStar SD2) for the duration of the drill program. The drill, supplies, equipment and crews were mobilized/demobilized and moved by helicopter. Drill core was delivered via helicopter to the core shack twice daily at crew change.

The drill program was designed and supervised by Peter Wood (VP Exploration, P.Eng, P.Geo.) and all field logistics were managed by Jeff Pinksen (Field Manager). The core was logged and sampled by the following geologists: Ardian Peshkepia (M.Sc., P.Geo.), Michael Roberts (B.Sc., P.Geo.) and Clayton Kennedy (B.Sc.), and technical support services were provided by Asini Exploration Inc. (CLFN) and Texploration Limited.

A total of 23,878 samples from the 2011, 2012 and 2013 programs were submitted for assay (graphitic carbon and total sulphur) of which 94 were core duplicate samples, 1,119 were reject duplicate samples, 1,179 were blanks and 1,177 were Zenyatta's Certified Reference Material (standards). Additionally, 857 samples of representative graphite mineralized samples, graphite overprinted material and unmineralized host rock were submitted for specific gravity measurements.

It should also be noted that the drill core samples taken in 2011 and 2012 drill programs were previously analysed for total carbon only. Consequently, the sample pulps, some reject material and split core were re-assayed by ALS for graphitic carbon and total sulphur in 2013 and the database was updated accordingly. The assay results for these older holes are provided in Appendix 4.

### 10.1 Field Procedures

Holes were spotted using a hand held GPS. Three pickets were used to mark the location of each new drill hole - one to mark the collar and the other two were set up as front sights which provided the hole azimuth (Figure 13). A Silva compass was used to set the azimuth and in many cases the actual azimuth of the hole as measured by the Reflex APS (Azimuth Pointing System) was off and likely due to minor local magnetic interference. After the holes were spotted the drill pads were cleared using chain saws and were typically cut from 15 m to 20 m in diameter (Figures 4 and 5).

All the collar locations were initially surveyed with a Garmin hand-held GPS and then later, where possible, all the drill holes were also surveyed with a Reflex APS to accurately determine the collar coordinates (UTM E, UTM N and elevation) dips and azimuths (Figure 14).

After the drill hole had been completed and the drill rig had moved off the hole the drill site was inspected and all garbage was collected and removed from the site. Casings were usually capped unless the casing has been cut or damaged by the drill when it was moved off the site. At each hole or group of holes an aluminum tag with the hole number scribed on it was stapled to a wooden picket which was then hammered into the soil beside the casing(s) (Figure 15).


Figure 13: Assembled drill floor with collar and sighting pickets


Figure 14: Measuring drill hole collar coordinates, azimuth and dip with a Reflex APS


Figure 15: Clean drill site with capped casing and labeled collar picket

The first few drill holes (Z13-4F10 to Z13-4F16) were collared along a radial pattern at azimuths of $0^{\circ}, 45^{\circ}, 90^{\circ}, 180^{\circ}, 225^{\circ}, 270^{\circ}$ and $315^{\circ}$ in order to determine whether the shape of the surface TEM survey's geophysical signature defines the shape of the conductive body. Once this was confirmed, the holes were laid out to best define the geometry of the breccia pipes and to yield sufficient contact pierce points for the resource estimate.

A drill hole location map is presented below in Figure 16, the drill hole information is summarized in Table 3, and a summary of significant assay results is presented in Table 4. Additionally, diamond drill logs are in Appendix 1 and certified assay certificates from ALS Minerals can be found in Appendix 2. A 1:1,000 scale drill hole plan map and 1:500 scale vertical cross sections are also provided at the back of the report. After logging each drill hole, the Zenyatta geologists summarized the geology and mineralization that was intersected and these descriptions are presented in the following section.


Figure 16: Albany Graphite Deposit Diamond Drill Hole Location Map

Table 3: 2013 Drill Hole Location Data \& Core Samples

| Hole ID | Pipe | Start Date | End Date | UTM East <br> (NAD 83, <br> Zone 16) | UTM North (NAD 83, Zone 16) | Dip <br> ( ${ }^{\circ}$ ) | Azimuth ( ${ }^{\circ}$ ) | Length (metres) | Sample Assays |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Z13-4F10 | East | 26/03/2013 | 30/03/2013 | 682950.8 | 5545797.6 | 69.2 | 183.7 | 438.0 | 392 |
| Z13-4F11 | East | 30/03/2013 | 08/04/2013 | 682953.4 | 5545932.4 | 67 | 181.6 | 684.0 | 600 |
| Z13-4F12 | East | 09/04/2013 | 14/04/2013 | 683023.8 | 5545824.8 | 50.2 | 228.8 | 366.0 | 247 |
| Z13-4F13 | East | 14/04/2013 | 22/04/2013 | 683100.5 | 5545700 | 49.8 | 276.5 | 424.5 | 322 |
| Z13-4F14 | East | 23/04/2013 | 03/05/2013 | 683088.6 | 5545590.4 | 49.5 | 315.3 | 668.0 | 520 |
| Z13-4F15 | East | 04/05/2013 | 08/05/2013 | 682862.3 | 5545606 | 50.4 | 53.4 | 411.8 | 307 |
| Z13-4F16 | East | 09/05/2013 | 16/05/2013 | 683095.8 | 5545894.4 | 51.1 | 231.1 | 530.8 | 463 |
| Z13-4F17 | East | 17/05/2013 | 23/05/2013 | 683198.5 | 5545698 | 50.6 | 277 | 508.7 | 268 |
| Z13-4F18 | East | 24/05/2013 | 29/05/2013 | 682809.3 | 5545810.4 | 49.6 | 118.6 | 432.0 | 374 |
| Z13-4F19 | East | 29/05/2013 | 02/06/2013 | 682949.6 | 5545831.6 | 50.1 | 230.4 | 291.0 | 221 |
| Z13-4F20 | East | 03/06/2013 | 06/06/2013 | 683014.5 | 5545768 | 50.2 | 231.1 | 302.4 | 238 |
| Z13-4F21 | East | 06/06/2013 | 10/06/2013 | 682888.9 | 5545675.2 | 51.2 | 47.3 | 291.0 | 228 |
| Z13-4F22 | East | 10/06/2013 | 12/06/2013 | 682862.3 | 5545706 | 49.8 | 51.3 | 261.0 | 198 |
| Z13-4F23 | East | 13/06/2013 | 14/06/2013 | 682836.6 | 5545743.2 | 49.9 | 48.4 | 270.0 | 210 |
| Z13-4F24 | East | 15/06/2013 | 17/06/2013 | 682917.1 | 5545635.2 | 49.8 | 46.4 | 252.0 | 194 |
| Z13-4F25 | East | 17/06/2013 | 19/06/2013 | 682981.5 | 5545801.6 | 45.9 | 224.5 | 213.0 | 151 |
| Z13-4F26 | West | 20/06/2013 | 28/06/2013 | 682393.1 | 5545566 | 49.6 | 50.5 | 617.6 | 125 |
| Z13-4F27 | West | 28/06/2013 | 05/07/2013 | 682709.4 | 5545570.4 | 51.6 | 295 | 561.0 | 136 |
| Z13-4F28 | East | 05/07/2013 | 09/07/2013 | 683014.5 | 5545766 | 49.2 | 199.8 | 339.0 | 273 |
| Z13-4F29 | West | 09/07/2013 | 13/07/2013 | 682393.7 | 5545721.6 | 50 | 109.7 | 423.0 | 368 |
| Z13-4F30 | West | 14/07/2013 | 17/07/2013 | 682436.5 | 5545802.5 | 50.4 | 138.5 | 390.0 | 329 |
| Z13-4F31 | West | 18/07/2013 | 22/07/2013 | 682516.6 | 5545848.4 | 49.7 | 181.2 | 396.0 | 306 |
| Z13-4F32 | West | 22/07/2013 | 26/07/2013 | 682597.1 | 5545571.6 | 50.3 | 301.3 | 459.0 | 373 |
| Z13-4F33 | West | 27/07/2013 | 02/08/2013 | 682681.7 | 5545803.6 | 50.1 | 229.6 | 540.0 | 459 |
| Z13-4F34 | West | 02/08/2013 | 08/08/2013 | 682717.5 | 5545702.4 | 46.2 | 275.4 | 530.6 | 446 |
| Z13-4F35 | East | 08/08/2013 | 14/08/2013 | 682749.8 | 5545646.4 | 50 | 51.3 | 522.0 | 388 |
| Z13-4F36 | East | 14/08/2013 | 18/08/2013 | 682791.8 | 5545693.6 | 49.3 | 45.1 | 363.0 | 303 |
| Z13-4F37 | East | 18/08/2013 | 22/08/2013 | 682858.4 | 5545550 | 50.4 | 42.2 | 390.0 | 340 |
| Z13-4F38 | East | 23/08/2013 | 28/08/2013 | 682805.3 | 5545495.2 | 50.8 | 43.5 | 509.6 | 472 |
| Z13-4F39 | West | 29/09/2013 | 02/09/2013 | 682383.6 | 5545700.8 | 50.3 | 119.9 | 381.0 | 322 |
| Z13-4F40 | West | 02/09/2013 | 06/09/2013 | 682380.9 | 5545782.4 | 49.3 | 116.3 | 411.0 | 319 |
| Z13-4F41 | West | 06/09/2013 | 10/09/2013 | 682434.9 | 5545820 | 50.6 | 116.8 | 378.0 | 298 |
| Z13-4F42 | West | 10/09/2013 | 12/09/2013 | 682433.5 | 5545820 | 74.5 | 115.6 | 237.1 | 185 |
| Z13-4F43 | East | 12/09/2013 | 14/09/2013 | 683020.7 | 5545613.6 | 48.6 | 331.2 | 231.0 | 172 |
| Z13-4F44 | West | 12/09/2013 | 17/09/2013 | 682605.8 | 5545834.4 | 49.6 | 227.8 | 507.0 | 421 |
| Z13-4F45 | East | 14/09/2013 | 17/09/2013 | 683021.6 | 5545614 | 69.4 | 330.1 | 381.0 | 327 |
| Z13-4F46 | West | 18/09/2013 | 22/09/2013 | 682648.2 | 5545680.8 | 50.7 | 300.7 | 411.0 | 325 |
| Z13-4F47 | East | 18/09/2013 | 22/09/2013 | 682923 | 5545908.8 | 47.5 | 196.6 | 285.0 | 233 |
| Z13-4F48 | West | 22/09/2013 | 26/09/2013 | 682668.1 | 5545716.4 | 49.5 | 299.4 | 387.1 | 294 |
| Z13-4F49 | West | 26/09/2013 | 27/09/2013 | 682630.9 | 5545645.6 | 55 | 299.8 | 390.0 | 305 |
| Z13-4F50 | West | 27/09/2013 | 29/09/2013 | 682558.1 | 5545595.2 | 49 | 301.6 | 381.6 | 314 |


| Z13-4F51 | West | $27 / 09 / 2013$ | $01 / 10 / 2013$ | 682581.7 | 5545622.4 | 49.7 | 305.7 | 405.0 | 299 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Z13-4F52 | West | $30 / 09 / 2013$ | $03 / 10 / 2013$ | 682518.8 | 5545573.6 | 51.5 | 298.3 | 303.1 | 237 |
| Z13-4F53 | West | $01 / 10 / 2013$ | $05 / 10 / 2013$ | 682632.6 | 5545594 | 50 | 302.8 | 462.0 | 358 |
| Z13-4F54 | West | $03 / 10 / 2013$ | $06 / 10 / 2013$ | 682583 | 5545671 | 50.2 | 299.6 | 305.7 | 234 |
| Z13-4F55 | West | $05 / 10 / 2013$ | $08 / 10 / 2013$ | 682605 | 5545707 | 50 | 299.7 | 342.0 | 255 |
| Z13-4F56 | West | $07 / 10 / 2013$ | $13 / 10 / 2013$ | 682384 | 5545780 | 63.1 | 113.8 | 498.0 | 444 |
| Z13-4F57 | West | $09 / 10 / 2013$ | $12 / 10 / 2013$ | 682341 | 5545722 | 50 | 119 | 393.0 | 329 |
| Z13-4FM01 | East | $20 / 08 / 2013$ | $29 / 08 / 2013$ | 682957 | 5545700.4 | 85 | 332 | 624.6 | 609 |
| Z13-4FM02 | East | $30 / 08 / 2013$ | $05 / 09 / 2013$ | 682938.5 | 5545724.4 | 88 | 43.6 | 513.4 | 492 |
| Z13-4FM03 | East | $06 / 09 / 2013$ | $11 / 09 / 2013$ | 682934.6 | 5545706.4 | 86.5 | 43 | 465.0 | 229 |
| Z13-4FM04 | West | $13 / 10 / 2013$ | $21 / 10 / 2013$ | 682460 | 5545670 | 85 | 135 | 448.5 | 412 |
| Z13-4FM05 | West | $22 / 10 / 2013$ | $29 / 10 / 2013$ | 682490 | 5545647 | 85 | 185 | 489.3 | 431 |
| Z13-4FM06 | West | $30 / 10 / 2013$ | $06 / 11 / 2013$ | 682511 | 5545742 | 85 | 45 | 447.0 | 372 |
|  |  |  |  |  |  |  |  | $\mathbf{2 2 4 6 2 . 4}$ | $\mathbf{1 7 4 6 7}$ |

### 10.2 Drill Hole Descriptions

Z13-4F10: This hole intersected a felsic intrusive rock (syenite?) with weak to locally moderate graphitic overprinting from 46.85 m to 72.71 m downhole. From 86.48 m to 131.71 m , this hole intersected graphitic breccia with minor syenite intervals (1-3 m thick) with moderate to locally good graphitic content as graphitic flooding in the matrix and as randomly oriented, 1-3 mm wide, graphitic veinlets. From 131.71 m to 134.58 m , granodiorite with graphitic overprinting was intersected, and from 134.58 m to 209.19 m graphitic breccia was intersected. From 209.19 m to 265.14 m, a dark grey to black granodiorite with weak to moderate graphite overprinting was intersected. This unit was followed by 144.65 m of graphitic breccia with minor syenite intervals from 273.31 m to 280.12 m and from 283.69 m to 286.09 m with a weak graphitic overprint. Several dykes of felsic and mafic composition with no graphitic overprinting were intersected in this hole from 292.11 m to 394.72 m . These dykes vary in width from 0.5 m to 3.5 m . This drill hole was stopped at 438.00 m within a greenish-grey, fine- to medium-grained, olivine-aegirine syenite.


Z13-4F10/381.00m - Graphitic breccia zone, black graphite grey patches. From 380.0 to 381.0 m, sample L012603 assayed $11.85 \%$ Cg.

Z13-4F11: This hole started in a syenite unit with weak graphitic overprinting from 48.67 m to 168.48 m . It intersected the following: syenite with graphitic overprinting from 169.75 m to 219.80 m ; granodiorite with graphitic overprinting from 227.15 m to 283.5 m ; and, alternating intervals of graphitic breccia, graphitic overprinting and non-mineralized rock from 460.58 m to 545.52 m which averaged $5.23 \% \mathrm{Cg}$ over 84.94 m downhole. This drill hole intersected a number of mafic dykes of variable widths from 219.80 m to 316.40 m ; the widest mafic dyke was intersected from 219.80 m to 227.15 m . In the bottom half of the hole, the dykes are primarily of intermediate and felsic composition and vary in width from 1-3 m for the felsic dykes, and a 28.95 m intermediate dyke was intersected from 341.30 m to 370.25 m downhole. From
393.00 m to 423.30 m , drill hole $\mathrm{Z} 13-4 \mathrm{~F} 11$ intersected a syenite unit with weak graphitic overprinting followed by a 135.42 m thick graphitic breccia section with minor syenite and dyke intervals. From 596.00 m to 649.85 m , the hole intersected a greenish-grey olivine-aegirine syenite unit followed by a medium- to coarse-grained syenite with weak gneissic banding down to 677.00 m . From 683.80 m to 684.00 m , a conductive graphite overprinted unit, possibly graphitic breccia, with trace pyrite and carbonate veinlets at the upper contact was intersected.

Drill hole Z13-4F12 intersected syenite from 57.35 m to 93.40 m . From 93.40 m to 123.80 m , 30.40 m of syenite with weak graphitic overprinting was intersected. From 112.00 m to $119.00 \mathrm{~m}, \mathrm{Z} 13-4 \mathrm{~F} 12$ intersected a fault zone which was a mixture of altered mafic dyke with quart-carbonate veinlets, fault gouge, clay and fractured, blocky to crumbly core. The first graphitic breccia unit intersected in this drill hole was from 123.80 m to 186.54 m and was followed by a weak to moderate graphite overprinted syenite unit from 186.54 m to 191.65 m . The second graphitic breccia section was intersected from 213.00 m to 240.20 m which was followed by a syenite unit with weak graphitic overprinting that extended down to 323.25 m . This unit is followed by a medium-grained, massive syenite with weak gneissic banding and no visible graphite.

Z13-4F13: This drill hole started in weathered syenite from 66.00 m to 74.00 m , followed by a syenite section with weak to locally moderate graphitic overprinting from 74.00 m to 147.53 m downhole ( 73.53 m core length). The graphitic breccia was intersected from 147.53 m to 168.40 m ( 20.87 m core length) and from 178.27 m to 315.00 m ( 136.73 m core length). The first breccia interval contains good to very good graphite as graphitic flooding in the matrix and as locally massive graphitic veins up to 10 cm wide, as well as minor, $1-3 \mathrm{~m}$ wide syenite sections. A 9.87 m thick graphite overprinted syenite unit separates the two breccia intervals. The second graphitic breccia interval intersected in this hole extends from 178.27 m to 315.00 m ( 136.73 m core length) with few thin, 1-3 m, weak graphite overprinted syenite sections. This drill hole was stopped at 425.50 m depth in a greenish-grey, medium-grained, massive olivine-aegirine syenite unit with no visible graphite.


Z13-4F13/308.00 m - From 307.0 to 315.0 m, graphitic breccia sections alternate with less fractured/vein syenite.

Drill hole Z13-4F14:This drill hole intersected two graphite mineralized breccia zones with minor intervals of graphite overprinted syenite which have also been intruded by later unmineralized mafic to intermediate dykes. The first mineralized section is from 185.96 m to 332.28 m totalling 146.32 m and the second zone is 82.24 m long from 434.25 m to 516.49 m . Individual graphite breccia units range in thickness from 1.11 m to 41.87 m . Both breccia sections occur within an envelope of graphite overprinted syenite that extends for several metres. This drill hole was stopped at a depth of 668.00 m in unmineralized syenite.

Z13-4F15: This drill hole intersected mineralized graphitic breccia from 172.00 m to 256.74 m . Well mineralized breccia sections within this interval range in thickness from 10.37 m to 30.11 m for a total length of 84.74 m downhole. Minor syenite sections with moderate graphite overprinting occur within the breccia intervals and range in thickness from 1.55 m to 5.23 m . The moderately graphite overprinted syenite extends for approximately 100 m downhole to 365.15 m . This drill hole was stopped at a depth of 411.80 m .

Drill hole Z13-4F16 intersected graphitic breccia from 291.00 m to 353.25 m with intercalated sections of syenite with weak graphitic overprinting ranging in thickness from 3.00 m to 7.70 m . This interval contains moderate graphite within the breccia and assayed $4.20 \% \mathrm{Cg}$ over 62.25 m . A second graphitic breccia interval was intersected from 390.36 m to 393.27 m . From 393.27 m to 518.33 m this hole intersected an olivine-aegirine syenite sill and a massive medium-grained syenite with locally weak to very weak graphitic overprinting as discrete hairline fracture-filling conductive veinlets. The hole was stopped at 530.80 m into an intermediate dyke with no visible graphite.


Z13-4F16/333.00 m- Graphitic breccia with dark grey syenite fragments in graphite flooded matrix.

Z13-4F17: This drill hole intersected massive syenite with no graphite overprinting from 60.00 m to 237.00 m . From 237.00 m to 342.40 m the drill hole intersected 105.40 m of syenite with weak to locally moderate graphite overprinting. From 343.00 m to 385.00 m , several graphitic breccia intervals were intersected ranging in width from 2.70 m to 7.90 m . The graphitic breccia contains moderate to locally good graphite mainly as graphitic flooding in the matrix and as fracture-filling graphite veinlets. The graphitic breccia intervals are separated by syenite sections of comparable thickness ( 2.00 m to 5.80 m ) with weak to moderate graphite overprinting. The graphitic breccia occurs within an envelope of syenite with moderate graphite overprinting that extends from 5.00 m to 13.00 m . A second graphitic breccia section was intersected from 410.10 m to 419.48 m and from 424.68 m to 425.61 m . From 430.90 m to 466.98 m , this drill hole intersected a 36.08 m thick section of olivine-aegirine syenite containing a felsic dyke. The hole was stopped at 508.75 m in syenite with a weak graphitic overprint.

Drill hole Z13-4F18: From 135.97 m to 285.95 m this drill hole intersected several well mineralized graphitic breccia intervals that range in thickness from 1.90 m to 40.78 m . These graphitic breccia sections alternate with weak to moderate graphite overprinted syenite intervals that range in thickness from 1.19 m to 23.40 m . From 285.95 m to 432.00 m this drill hole intersected several medium- to coarse- grained syenite sections with weak graphite overprinting that have been intruded by numerous mafic to intermediate dykes ranging from 1.0 m to 4.0 m thick.

Z13-4F19: This hole intersected well mineralized graphitic breccia from 69.80 m to 138.00 m that included 5.45 m of hematite altered syenite with strong fracture-filling graphite content from 80.55 to 86.00 m . A massive syenite unit with weak graphitic overprinting was intersected from
153.00 m to 171.00 m . This drill hole was shut down at 291.00 m in a massive syenite gneiss with very weak and local fracture-filling graphite veinlets.

Drill hole Z13-4F20: This drill hole intersected 106.10 m of well mineralized graphitic breccia from 77.35 m to 181.60 m including two thin ( $<3.0 \mathrm{~m}$ thick), weakly graphitic syenite intervals. The bottom half of this drill hole intersected a weak graphite overprinted syenite intruded by numerous mafic to intermediate dykes that range in thickness from 1.78 m to 19.00 m .

Z13-4F21: This drill hole intersected massive syenite with weak graphite overprinting from 59.00 m to 90.00 m . Graphitic breccia with good graphite mineralization was intersected for 102.00 m from 90.00 m to 192.00 m downhole. This drill hole intersected massive syenite from 192.00 m to 291.00 m with local weak graphite overprinting. This section of syenite has been intruded by two mafic dykes 2.60 m and 7.00 m thick with a weak graphite overprint.

Drill hole Z13-4F22 intersected massive syenite with weak graphite overprinting from 62.40 m to 90.10 m . From 90.10 m to 187.30 m it intersected 97.20 m of graphitic breccia with good graphite content in the matrix and as fracture-filling veinlets. From 187.30 m to the end of the hole at 261.00 m this drill hole intersected massive syenite with locally weak graphite overprinting and a 1.10 m thick graphitic breccia section from 191.77 m to 192.87 m .

Z13-4F23 intersected massive syenite with weak graphite overprinting from 60.10 m to 112.15 m . From 112.15 m to 178.45 m it intersected 66.30 m of graphitic breccia with good graphite content in the matrix and as fracture-filling veinlets. From 178.45 m to 224.30 m this hole intersected massive syenite with weak graphite overprinting. This drill hole was stopped in massive syenite at 270.00 m .

Drill hole Z13-4F24: This drill hole intersected massive syenite with weak graphite overprinting from 57.20 m to 86.00 m . From 86.00 m to 178.40 m it intersected 92.40 m of graphitic breccia. This drill hole was stopped at 252.00 m in massive syenite with weak graphite overprinting.

Z13-4F25 intersected 75.80 m of well mineralized graphitic breccia from 62.25 m to 138.05 m . From 145.00 m to 157.65 m this hole intersected massive syenite with up to $20 \%$ graphitic breccia as several 15-90 cm wide brecciated sections with moderate graphite content.

Drill hole Z13-4F26 intersected well mineralized graphitic breccia from 100.57 m to 220.98 m for a total length of 120.41 m downhole. This breccia interval is interrupted by three weakly to moderately graphite overprinted syenite sections that vary in thickness from 3.03 m to 13.34 m . Few dykes of various composition and ranging in thickness from 1.12 m to 4.50 m also intrude this graphitic breccia interval. A second well mineralized graphitic breccia interval of 15.32 m thick was intersected from 205.66 m to 220.98 m. From 28.00 m to 317.76 m this drill hole intersected graphitic breccia mixed with a syenite section with moderate to strong graphite content that has been intrude by an 8.00 m thick, unmineralized intermediated dyke. The deepest graphitic breccia interval in this hole was intersected for 17.79 m from 409.96 m to 427.75 m downhole. From 427.75 m to the end of the hole, this drill hole intersected unmineralized syenite intruded by numerous intermediate dykes that vary in thickness from 1.03 m to 11.02 m . A 1.91 m thick fault zone with weak fracture-filling graphite was intersected at 556.49 m .

Drill hole Z13-4F27: This drill hole intersected several well mineralized graphitic breccia intervals from 257.50 m to 486.73 m . A well mineralized 27.16 m thick graphitic breccia section was intersected from 257.50 m to 284.66 m downhole. A 4.60 m thick graphitic breccia interval was intersected at 422.00 m . From 432.22 m to 441.27 m this hole intersected 9.05 m of well mineralized graphitic breccia. Finally, from 470.87 m to 486.73 m , this drill hole intersected well mineralized graphitic breccia intervals alternating with syenite sections.

Z13-4F28: This drill hole intersected 105.50 m of graphitic breccia from 94.30 m to 209.80 m . The top part of this interval from 94.30 m to 153.00 m is primarily well-fractured syenite with good graphite mineralization as fracture-filling veinlets. From 153.00 m to 209.80 m, this drill hole intersected the typical graphitic breccia with polymictic subangular fragments several centimetres in size in a graphite flooded matrix. The mineralized interval occurs within a graphite overprinted syenite envelope that extends for approximately 30 m on either side of the breccia body. This drill hole was stopped at 339.00 m depth in massive syenite with weak graphite overprinting.


Z13-4F28/108.00 m - Graphitic breccia mainly as fracture-filling veins and graphite flooding in matrix; some sections ( $5-15 \mathrm{~cm}$ ) almost massive graphitic veins.

Z13-4F29: This drill hole intersected graphitic breccia starting at a 60.00 m depth at the end of casing. Three main breccia intervals were intersected between 60.00 m and 275.84 m and range in thickness from 24.60 m to 62.80 m . The first graphitic breccia interval extends from 60.00 m to 84.60 m over 24.60 m of core length. From 120.70 m to $183.50 \mathrm{~m}(62.80 \mathrm{~m}$ core length), this drill hole intersected well mineralized graphitic breccia with few (less than 2 m thick) intervals of unmineralized syenite and felsic and intermediate dykes. From 225.35 m to 275.84 m this drill hole intersected a third, well mineralized graphitic breccia interval. From 275.84 m to 339.35 m , this hole went through a series of intermediate dykes that cut through unmineralized, coarse, massive syenite units. Z13-4F29 was stopped at 423.00 m in what appears to be a thick massive, fine- to medium-grained olivine-aegirine syenite sill.

Z13-4F30 intersected well mineralized graphitic breccia starting at 63.00 m at the end of the casing. This drill hole intersected four graphitic breccia sections that range in width from 11.15 m to 66.08 m . The main graphitic breccia intervals were intersected from the top of the hole down to 184.85 m . A 64.10 m thick breccia interval was intersected from 228.00 m to 292.10 m . This deeper breccia contain less graphite than the breccia at the top of the hole and appears to contain subrounded polymictic fragments of variable size in a fine-grained, dark grey, weakly conductive matrix. This drill hole was stopped at 390.00 m in a coarse-grained olivine-aegirine syenite similar to the one intersected in drill hole Z13-4F29.

Drill hole Z13-4F31: After a sedimentary unit, the hole intersected a small section of overprinted syenite before intersecting the graphitic breccia at 67.00 m . This breccia package is 125.10 m wide, ending at 192.10 m and has units of overprinted syenite separating the breccia zones. The breccia zones in this package range in width from 9.08 m to 61.35 m . At 300.00 m , after a section of no breccia and weak to no graphite overprinting, a second breccia package was
intersected down to 349.93 m . This secondary package consists of 1.13 m to 2.39 m brecciated zones separated by syenite with weak or no overprinting. The lithology between the two breccia packages is mostly diorite with a 44.85 m unit of felsic breccia (no graphite) spanning from 236.60 m to 281.45 m . Below the second breccia unit the rocks are predominantly olivineaegirine syenite and diorite with the drill hole ending in the diorite.


Z13-4F31/170.00 m - Very dark grey to black graphitic breccia; the fragments range from 1 cm , and subrounded, to large 10 cm or greater size.

Z13-4F32: This drill hole intersected several graphitic breccia intervals starting from 119.75 m down to 298.28 m with individual graphitic breccia sections ranging in width from 1.00 m to 46.00 m . The best graphitic breccia interval was intersected over 74.50 m from 164.00 m to 238.50 m . A second well mineralized graphitic breccia interval was intersected from 288.00 m to 303.00 m over a core length of 15.00 m . From 303.00 m to 459.00 m this drill hole intersected mainly mafic to intermediate intrusive rocks with minor intervals of syenite with weak graphite overprinting. This drill hole was stopped at 459.00 m in unmineralized syenite.

Z13-4F33 intersected several, well mineralized graphitic breccia intervals starting from 155.60 m down to 503.37 m . The individual graphitic breccia sections range in thickness from 2.0 to 52.0 m . The graphitic breccia encountered in this drill hole occurs in two main broad intervals. The first one starts from 155.60 m down to 301.00 m and includes several 5.0 m to 10.0 m thick graphitic breccia intervals including a 50.00 m thick, well mineralized graphitic breccia interval from 220.00 m to 270.00 m downhole. The graphitic breccia intervals occur within weakly overprinted syenite and range in thickness from 8.0 m to 25.0 m . A second graphitic breccia interval was intersected further downhole from 417.00 m to 440.00 m . A 20.50 m thick olivineaegirine syenite unit separates this breccia interval from the deepest graphitic breccia zone intersected from 460.50 m to 503.37 m . This well mineralized graphitic breccia interval has been
interrupted by mafic to intermediate dykes with weak to locally moderate graphite overprinting. These dykes vary in thickness from 2.5 to 17.0 m . Drill hole Z13-4F33 was stopped at 540.00 m length in massive olivine-aegirine syenite.

Drill hole Z13-4F34 intersected two main graphitic breccia zones. The first one was intersected from 148.80 m to 306.15 m for a total down hole length of 157.35 m . Within this interval, graphitic breccia sections alternate with two graphite overprinted syenite units that are 19.85 m and 23.85 m thick. The thickest graphitic breccia interval within this upper zone extends for 71.90 m downhole from 204.85 m to 276.75 m . A 23.77 m thick graphitic breccia section was intersected from 282.38 m to 306.15 m . The second graphitic breccia zone was intersected from 417.30 m to 443.33 m for a downhole length of 26.03 m . This zone also includes graphite overprinted syenite sections intruded by 1.0 m to 2.3 m thick mafic and/or felsic dykes. From 306.15 m to 409.69 m , a relatively thick, 103.54 m interval is composed predominantly of olivine-aegirine syenite ( $77 \%$ of interval) with lesser older syenite host and some smaller intermediate dykes separating the two main graphitic zones. This drill hole was stopped at a 530.60 m depth in massive olivine-aegirine syenite.

Z13-4F35: This drill hole intersected three zones of graphite mineralization composed of graphitic breccia and syenite with moderate graphite overprinting. The first mineralized zone extends for 41.95 m downhole from 290.43 m to 332.38 m . The second interval was intersected from 347.60 m to 360.49 m downhole for a total length of 12.89 m . The deepest mineralized interval in this drill hole was intersected from 378.80 m to 380.00 m for 1.20 m downhole. This drill hole extended the graphite mineralization on the northwest boundary of the East Pipe to a vertical depth of approximately 280 m . This drill hole was stopped at 522.00 m in massive syenite after going through an approximately 60 m thick olivine-aegirine syenite unit.

Z13-4F36 intersected an 81.93 m graphite package from 205.76 m to 287.69 m . The brecciated units within this package range in width from 7.03 m to 38.57 m . The units are separated by overprinted syenite and, in one instance, a small overprinted mafic dyke. This hole was stopped 19.90 m into an olivine-aegirine syenite unit which started at 343.10 m .


## Z13-4F36/219.00 m - Typical graphitic breccia.

Drill hole Z13-4F37: From 61.24 m to 212.10 m , this hole intersected a large amount of overprinted syenite with some minor overprinted mafic dykes and an intermediate dyke. It was not until 242.87 m that the graphitic breccia was intersected; at this depth a 68.03 m package was intersected to a depth of 310.90 m . For the most part, this package was all breccia with a small amount of syenite and a felsic dyke, both of which were overprinted and separating the breccia. The breccia intersections ranged in width from 11.40 m to 38.49 m . There was no overprinting observed below the depth of 357.51 m and the hole was stopped in a mafic dyke at 390.00 m.

Z13-4FM01 intersected the graphitic breccia at a depth of 47.15 m ; from this depth to 347.00 m the hole alternated between graphite overprinted syenite and breccia or graphite overprinted granodiorite and breccia, with the odd exception of a felsic or mafic dyke cutting through. The intersected breccia intervals ranged from less than 1.00 m to 33.28 m in width. At 347.00 m a 36.00 m olivine-aegirine syenite unit was intersected, and at 512.22 m a second 65.54 m olivine-aegirine syenite was intersected. Between these two large gabbro units the rock type is predominantly breccia separated by graphite overprinted syenite; again, the breccia ranged from less than 1.00 m up to 42.08 m with the breccia between these two gabbro units having a much stronger graphite matrix. There were more dykes in this area, especially mafic dykes. Below the second syenite unit was the older host syenite with no graphite overprinting, but there were two localized areas of breccia with graphite, one being 1.39 m from 577.76 m to 579.15 m . The hole was shut down in a massive syenite with no graphite overprinting. The hole did not produce enough material for metallurgical testing, so two more holes of a similar nature were planned.

Drill hole Z13-4F38 hole intersected a larger package of breccia 102.40 m wide from 326.20 m to 428.60 m , but there are some areas separating the actual breccia units by up to 8.76 m , specifically from 368.69 m to 377.45 m . The breccia units range from 0.66 m to 19.80 m in width. In the lower part of this hole, from 410.00 m to 420.50 m , there are some severely faulted zones that may contribute to some of the mineralization in this area. The hole was stopped after intersecting 7.79 m of granite.

Z13-4F39: The graphitic breccia intervals intersected in this drill hole can be grouped in two main zones. The first zone extends for 50.30 m downhole from 64.00 m to 114.30 m and contains two main syenite sections with variable degrees of graphite overprinting from 66.30 m to 72.82 m and from 103.30 m to 112.50 m . The second graphitic breccia interval intersected in this drill hole extends for 129.05 m downhole from 125.75 m to 254.80 m . This mineralized section contains two, less than 5.0 m thick syenite intervals with weak to moderate graphite overprinting. From 254.80 m to 285.00 m , the drill hole intersected syenite with weak to locally moderate graphite overprinting as fracture-filling graphite veinlets. This drill hole was stopped in massive, medium-grained olivine-aegirine syenite at 381.00 m .


Z13-4F39/176.00 m - Good graphite as fracture-filling veinlets and locally massive veins $5-10 \mathrm{~cm}$ wide.

In drill hole Z13-4FM02 the first brecciated unit with graphite was intersected just below the top sedimentary unit at 50.54 m ; from here to a depth of 276.29 m the breccia alternated with graphite overprinted syenite. From 276.29 m to 343.35 m , the dominant unit was still breccia, but other units were also present including a graphite overprinted granodiorite, smaller syenite units (up to 10.82 m ), and a mafic unit that is altered and has a graphite overprint. The breccia units range from 1.41 m to 31.98 m in width. At 343.35 m , the hole intersected 41.10 m of olivine-aegirine syenite down to 384.45 m . Below this syenite unit there is more breccia with graphite in the matrix and graphite overprinted syenite alternating with one another. As in M01,
the breccia below the syenite seems to have a much higher graphite content. The breccia units below the syenite ranged from 1.51 m to 11.59 m in width. This hole was shut down in a massive syenite with no graphite overprinting. A third hole is planned in similar fashion to the last two metallurgical holes in order to be sure there is enough material for sampling.


Z13-4FM02/338.00 m - Graphitic breccia; in some areas there is more intense fracture-filling as opposed to the classic breccia look. At 338.0 to 339.0 m, core sample Q185521 assayed $12.15 \% \mathrm{Cg}$.

Z13-4F40: This drill hole intersected the graphitic breccia at a depth of 84.40 m downhole after approximately 22 m of syenite. This hole intersected several graphitic breccia intervals that range in thickness from 2.55 m up to 73.60 m . The drill hole also intersected a non-conductive felsic breccia, possibly the precursor of the graphitic breccia that extends from 220.80 m to 235.00 m . The main mineralized interval extends for 136.40 m from 84.40 m to 220.80 m . It is interrupted by three syenite sections with moderate to good graphite overprinting that range in thickness from 4.90 m to 9.50 m . The deepest graphitic breccia in this hole was intersected from 289.80 m to 306.17 m .

Drill hole $\underline{\mathbf{1} 13-4 F 41}$ started in graphitic breccia at the end of casing at 63.90 m . The main graphitic breccia interval in this drill hole extends for 167.50 m from 63.90 m to 231.40 m . The mineralized breccia zones within this interval range in thickness from 5.35 m to 39.40 m . This interval also includes several syenite sections with weak to moderate graphite overprinting that range in thickness from 2.45 m to 6.80 m . A second graphitic breccia interval was intersected from 245.30 m to 255.80 m for a total length of 10.30 m downhole. The deepest graphitic breccia in this drill hole was intersected from 297.20 m to 304.90 m .

Z13-4FM03: The reason for drilling this hole was to obtain more material to be tested for metallurgical purposes. This hole was again planned to drill directly down the pipe to recover the most material for metallurgical testing. The first brecciated unit with graphite was intersected just below the top sedimentary unit at 47.23 m ; from here to a depth of 249.60 m the breccia alternated with graphite overprinted syenite and a small intermediate dyke from 140.10 m to 142.44 m . From 263.34 m to 406.08 m there is still an abundance of breccia, but the units seem to be narrower and there are more types of rock separating the units including overprinted syenite, overprinted granodiorite, and olivine-aegirine syenite. The breccia units range from 0.97 m to 74.45 m in length with the latter being at the very top of the hole from 65.65 m to 140.10 m ; there is also a 51.43 m unit from 142.44 m to 193.87 m . This hole was shut down in a massive syenite with no graphite overprint. This hole was stopped because enough material for metallurgical testing was acquired.

Drill hole Z13-4F42 started in massive syenite with weak to locally moderate graphite overprinting. The graphitic breccia was intersected from 192.55 m to 236.24 m downhole indicating a steep dip of the contact to the southeast. This drill hole was stopped in olivineaegirine syenite at 237.00 m .

Z13-4F43: This drill hole started in graphitic breccia right at the end of the casing at 60.00 m . The graphitic mineralization intersected in this drill hole is mainly as fracture-filling graphitic veins and veinlets, and several sections of graphitic flooding in a well fractured medium- to coarse-grained syenite. Well mineralized graphitic intervals that range in thickness from 3.50 m up to 86.70 m alternate with massive syenite sections with moderate to locally strong graphite overprinting that vary in thickness from 4.2 m to 8.0 m . The contact between the syenite sections and well mineralized sections are gradual and based on changes in the amount of graphite mineralization.


Z13-4F43 at 219.00 m - Graphitic breccia; well mineralized section with fracture-filling graphite veins and veinlets throughout.

Z13-4F44 intersected the graphitic breccia directly below the sediment unit at 68.07 m , and this breccia package continued to a depth of 256.94 m for a total package width of 188.87 m ; the units separating the breccia in this package are mostly overprinted syenite with a few porphyritic intermediate dykes also cutting through. Breccia units ranged in width from 1.88 m to 49.84 m . After a 42.79 m section of mostly graphitic rock, with the exception of a 1.23 m breccia from 271.10 m to 272.36 m , a second breccia package was encountered from 299.73 m to 376.87 m . In this 77.14 m package, the breccia was separated by overprinted syenite units. The breccia units in this smaller package ranged from 3.63 m to 18.47 m wide. Below the second breccia package the lithology is comprised of olivine-aegirine syenite, diorite, and porphyritc intermediate dykes. The hole was stopped after drilling 33.33 m into an unmineralized syenite.

Drill hole Z13-4F45 started in syenite with moderate fracture-filling graphite from the end of the casing at 63.20 m . This drill hole intersected well mineralized graphitic breccia from 63.20 m to 295.10 m . Within this interval, graphitic breccia sections range in thickness from 1.16 m to 48.90 m . These graphitic breccia sections alternate with syenite intervals with moderate to good fracture-filling graphite overprinting. The contacts between the syenite sections and well mineralized sections are usually gradual and based on changes in the amount of graphite mineralization. The widest breccia section was intersected from 63.20 m to 183.70 m for a total length of 120.50 m . A second, well mineralized, graphitic breccia interval was intersected from 306.26 m to 325.93 m for a length of 19.67 m downhole. The deepest graphitic breccia interval in this drill hole was intersected from 338.95 m to 368.70 m for 29.75 m downhole. This drill hole was stopped in unmineralized olivine-aegirine syenite at 381.00 m .

Z13-4F46 intersected graphitic breccia directly below the sediment at 73.00 m , and the major breccia package that consists of graphite-rich breccia separated by syenite and granodiorite units continues to a depth of 284.41 m . The syenite and granodiorite units in this package are weakly to moderately overprinted and have moderate graphite fracture-filling. The breccia units in the package range from 1.32 m to 52.22 m wide. A large 102.93 m olivine-aegirine syenite sill was intersected between 299.90 m and 402.83 m . This drill hole was stopped in the syenite at 411.00 m . As the hole intersected breccia directly below the sediments, a contact for the pipe was not located.

Z13-4F47: The graphitic breccia package was intersected at 124.25 m and continued for 78.31 m to a depth of 202.56 m . Breccia units in this package range in width from 16.24 m to 26.55 m and are separated by overprinted syenite and a small intermediate dyke. There was no overprinting observed below the depth of 207.00 m and the hole was stopped in unmineralized syenite at 285.00 m .

Drill hole Z13-4F48 intersected graphitic breccia at 101.90 m after a unit of syenite/overprinted syenite. The major breccia package that consists mostly of graphite-rich breccia separated by syenite continues to a depth of 295.60 m . The syenite in this package is weakly to moderately overprinted, and has moderate graphite fracture-filling. The breccia units in the package range from 8.48 m to 34.38 m in width. From 227.68 m to 230.00 m , there was an overprinted feldspar porphyry/felsic dyke that seems to be rich in graphite. A large olivine-aegirine syenite unit was intersected at 295.60 m and continued to the end of the hole at 387.11 m .

Z13-4F49: The drill hole intersected the graphitic breccia package from 100.16 m to 207.00 m after a 38.16 m wide unit of overprinted syenite. Included in this breccia package between zones of breccia are units of overprinted syenite and porphyritic intermediate dykes. The breccia units in the package range from 2.61 m to 24.20 m wide. From 258.36 m to 311.24 m , there was a secondary graphitic-rich breccia zone with three units ranging from 1.57 m to 17.56 m in width; these were separated by olivine-aegirine syenite dykes. The hole was shut down after drilling 39.65 m of unmineralized late syenite sill.

Z13-4F50 intersected graphitic breccia at 84.70 m after a 20.70 m unit of syenite/overprinted syenite. The major breccia package consisting mostly of graphite-rich breccia separated by syenite and porphyritic intermediate dykes continues to a depth of 239.71 m . The syenite in this
package is weakly to moderately overprinted, and has moderate graphite fracture-filling. The breccia units in the package range from 1.83 m to 69.47 m wide. Below the main breccia package, the rock consists of weakly overprinted syenite and granodiorite and olivine-aegirine syenite. The hole was shut down after drilling 16.05 m into the syenite.


Z13-4F50/90.00 m - Graphitic breccia with grey and pink sub-angular to sub-rounded fragments ranging in size from $0.5-40 \mathrm{~cm}$ with some larger $>50 \mathrm{~cm}$ fragments.

Drill hole Z13-4F51 intersected 77.00 m of graphitic breccia from 117.95 m to 194.95 m including a few sections of weakly overprinted syenite that range in thickness from 3.2 m to 14.0 m . A deeper mineralized interval was intersected from 232.66 m to 274.15 m for a total length of 41.49 m that includes 8.10 m of unmineralized syenite and intermediate dyke from 252.70 m to 260.80 m . This drill hole was shut down in unmineralized syenite after going through a relatively thick (approximately 93 m ), unmineralized intrusive rock.

Z13-4F52 intersected graphitic breccia at 91.05 m and continued in a package of breccia alternating with overprinted syenite for 89.75 m to a depth of 180.80 m . The syenite in this package is weakly to moderately overprinted, and has moderate graphite fracture-filling. The breccia units in the package range from 9.67 m to 33.94 m wide. From 180.80 m to 207.15 m , there is major fracturing in an apparent fault zone. And again at 249.00 m to 252.00 m there is a zone of rubble held together by fault gouge; the rock surrounding this area is also strongly fractured. These major structural zones are not seen as dominantly in any other holes to date. The rock between the two fault zones is predominantly granitic. Below the second fault zone is largely olivine-aegirine syenite in which the hole was shut down.

Z13-4F53: The graphitic breccia interval is interrupted by a 4.38 m syenite section and a 3.85 m porphyritic intermediate dyke. Two syenite intervals with weak graphite overprinting were
intersected from 282.30 m to 303.10 m . This section has been intruded by a 9.50 m thick, unmineralized porphyritic intermediate dyke. A second graphitic breccia interval in this drill hole was intersected for 12.16 m from 333.30 m to 345.46 m , followed by a 7.14 m syenite section with a weak graphite overprint. This drill hole was stopped at 462.00 m in an unmineralized intermediate dyke, after intersecting a relatively thick, unmineralized olivine-aegirine syenite sill from 354.15 m to 416.70 m .

Drill hole Z13-4F54 did not start in graphitic breccia as expected, but instead intersected a syenite to weakly overprinted syenite from 64.94 m to 100.86 m . At this point the drill hole intersected a weak/subtle graphitic breccia with low conductivity to a depth of 144.08 m . A weakly overprinted syenite and a porphyritic intermediate dyke unit separated this first 43.22 m wide breccia from a second 33.34 m wide breccia which was also weakly conductive and more subtle than typical West Pipe breccia. Three smaller units of more typical graphitic breccia ranging in width from 2.86 m to 11.75 m were intersected between 205.58 m to 252.20 m . The hole was stopped 23.69 m into a larger olivine-aegirine syenite sill unit.

Z13-4F55: This drill hole intersected a wide and well mineralized graphitic breccia interval from the end of the casing at 67.50 m to 231.50 m for a total of 164.00 m downhole. This intersection includes few thin (0.7-2.3 m) mafic and intermediate dykes and few graphite overprinted syenite sections that range in thickness from 1.6 m to 5.3 m . Two smaller graphitic breccia intervals were intersected from 240.50 m to 249.86 m and from 259.64 m to 264.15 m . This drill hole was stopped at 342.00 m in a medium- to coarse-grained, massive olivine-aegirine syenite sill.

Z13-4F56 intersected several graphite breccia units between 132.57 m and 264.13 m downhole with numerous 1 m wide overprinted gneiss and mafic dykes. A 40.0 m intermediate intrusive unit cuts off the upper graphitic breccia unit from the lower breccia. The lower breccia unit consist of several 3-9 m wide graphite breccias separated by gneiss and intermediate intrusive dykes throughout until 461.05 m where the hole finishes in a granodiorite unit at 498.00 m . This hole was very successful in testing the extent of the lower graphite breccia in the West Pipe. Further drill testing of this area is suggested.

Drill hole Z13-4F57 intersected well mineralized graphitic breccia from 106.80 m to 211.00 m downhole for a total interval of 104.2 m . This interval included two syenite sections with weak graphitic overprinting for a total of 7.70 m , as well as a 2.63 m thick unmineralized porphyritic
intermediate dyke. A second graphitic breccia interval was intersected from 259.65 m to 287.80 m for a total thickness of 28.15 m that includes a 2.20 m thick unmineralized syenite section. A third, well mineralized graphitic breccia interval was intersected from 296.60 m to 321.15 m totalling 24.55 m . This breccia interval has been intruded by a 5.20 m wide unmineralized intermediate dyke. A 1.10 m thick graphitic breccia interval was intersected at 335.40 m following a weakly mineralized brecciated syenite section. This drill hole was stopped in unmineralized olivine-aegirine syenite sill at 393.00 m .

Z13-4FM04: After a small 2.45 m unit of overprinted syenite directly below the limestone sediments, graphitic breccia was intersected; this unit was part of a 138.17 m breccia package that included eight graphite-rich breccias separated by mostly overprinted syenite units and a small feldspar porphyry unit. The breccia units range from 2.70 m to 42.43 m in width. A total of 54.85 m of syenite, olivine-aegirine syenite sill, and diorite separate this first package from a second smaller package of graphite-rich breccia alternating with the same syenite. The breccia units in this second smaller package range from 2.45 m to 7.36 m wide. Finally, below the 32.13 m of syenite and an olivine-aegirine syenite sill, a third package of breccia was intersected from 309.96 m to 436.78 m downhole. This 126.82 m package includes breccia units ranging from 0.86 m to 25.35 m separated by predominantly olivine-aegirine syenite. The hole was shut down at 448.50 m after drilling through 11.72 m of unmineralized syenite, olivineaegirine syenite sill, and finally diorite.

Z13-4FM05 was planned to drill directly down the pipe to recover the most material for metallurgical testing, as well as to test an area with little data at depth along the east side of the pipe. The first brecciated unit with graphite was intersected below a 4.05 m unit of overprinted syenite at a depth of 55.65 m . This first package which includes some small olivine-aegirine syenite units and feldspar porphyry dykes consists mainly of graphite-rich breccia and graphite overprinted syenite to a depth of 264.15 m . This gives a total core length of 208.50 m for the package with brecciated zones ranging in width from 6.55 m to 28.93 m . In the brecciated zone from 206.90 m to 228.92 m , there was a 2.51 m wide section of matrix dominant rock with <1 cm sized fragments from 220.04 m to 225.55 m. From 312.69 m to 407.62 m, below a thick olivine-aegirine syenite unit, there was a secondary brecciated package intersected. This 94.93 m package included more olivine-aegirine syenite and non-overprinted syenite sections, but the matrix of the brecciated units seemed to have a higher graphite content characterized by a more metallic look. Brecciated zones in this package ranged from 1.41 m to 23.23 m wide. There
were also two units of breccia - one 13.51 m wide and the other 4.42 m wide between 421.72 m and 446.06 m downhole. After drilling 6.27 m into a quartz poor granite, the hole was stopped at a final depth of 489.32 m .

Drill hole Z13-4FM06 hole intersected a graphite-rich breccia directly below the limestone sediments at a depth of 49.50 m and was the thickest of eight breccia units that made up a 183.02 m package of breccia, olivine-aegirine syenite sill, regular and overprinted syenite. The breccia units range from 6.57 m to 90.82 m in width. At a depth of 232.52 m , this package is terminated at the contact of a 64.19 m wide olivine-aegirine syenite sill. There are two small breccia units in the area below the lower contact of this sill. There is a second breccia package beginning at a depth of 358.87 m and continuing to a depth of 435.98 m . This package is again made up of graphite-rich breccia alternating with olivine-aegirine syenite as well as a feldspar porphyry unit. Breccia units in this package are 1.04 m to 21.46 m wide. The hole was stopped at 447.00 m after drilling through 11.02 m of a medium-grained syenite.

Table 4: Significant Assay Results from the 2013 Drill Program

| drilling results - Composite grade (cg) |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| HOLE ID | From (m) | To (m) | Total Length (m) | Composite Grade (\% Cg ) | HOLE ID | From (m) | To (m) | Total Length (m) | Composite Grade (\% Cg ) |
| Z13-4F10 | 49.00 | 409.79 | 360.79 | 5.06 | Z13-4F37 | 83.00 | 355.00 | 272.00 | 2.00 |
| including | 49.00 | 209.19 | 160.19 | 6.86 | including | 186.00 | 341.00 | 155.00 | 3.09 |
| Z13-4F11 | 393.00 | 596.00 | 203.00 | 3.01 | Z13-4F38 | 248.00 | 457.00 | 209.00 | 2.21 |
| including | 460.58 | 545.52 | 84.94 | 5.23 | including | 314.70 | 421.00 | 106.30 | 3.92 |
| Z13-4F12 | 90.00 | 285.00 | 195.00 | 4.00 | Z13-4F39 | 64.00 | 327.30 | 263.30 | 3.21 |
| including | 95.00 | 241.10 | 146.10 | 5.21 | including | 141.00 | 257.00 | 116.00 | 5.31 |
| Z13-4F13 | 95.15 | 315.00 | 219.85 | 4.47 | Z13-4F40 | 81.00 | 306.17 | 225.17 | 2.59 |
| including | 138.00 | 315.00 | 177.00 | 5.34 | including | 84.40 | 235.00 | 150.60 | 3.00 |
| Z13-4F14 | 118.00 | 544.00 | 426.00 | 3.02 | Z13-4F41 | 63.90 | 255.83 | 191.93 | 3.77 |
| including | 146.00 | 332.28 | 186.28 | 4.87 | including | 75.00 | 191.40 | 116.40 | 4.78 |
| Z13-4F15 | 60.00 | 360.00 | 300.00 | 2.16 | Z13-4F42 | 54.00 | 236.24 | 182.24 | 1.24 |
| including | 132.00 | 256.74 | 124.74 | 4.64 | including | 191.40 | 236.24 | 44.84 | 3.07 |
| Z13-4F16 | 258.00 | 393.27 | 135.27 | 2.25 | Z13-4F43 | 61.00 | 231.00 | 170.00 | 6.99 |
| including | 291.00 | 353.25 | 62.25 | 4.20 | including | 61.00 | 178.00 | 117.00 | 7.44 |
| Z13-4F17 | 236.64 | 429.00 | 192.36 | 1.67 | Z13-4F44 | 68.07 | 420.82 | 352.75 | 2.19 |
| including | 322.00 | 389.15 | 67.15 | 2.98 | including | 93.28 | 220.00 | 126.72 | 3.90 |
| Z13-4F18 | 101.00 | 359.00 | 258.00 | 3.07 | Z13-4F45 | 57.00 | 372.50 | 315.50 | 5.58 |
| including | 133.00 | 287.00 | 154.00 | 4.79 | including | 63.22 | 281.77 | 218.55 | 6.75 |
| Z13-4F19 | 66.00 | 242.00 | 176.00 | 2.65 | Z13-4F46 | 72.01 | 296.00 | 223.99 | 2.35 |
| including | 66.00 | 176.00 | 110.00 | 4.15 | including | 76.00 | 119.00 | 43.00 | 3.70 |
| Z13-4F20 | 61.00 | 302.45 | 241.45 | 3.08 | Z13-4FM01 | 48.00 | 512.22 | 464.22 | 4.47 |
| including | 61.00 | 189.00 | 128.00 | 5.51 | including | 48.00 | 303.50 | 255.50 | 5.46 |
| Z13-4F21 | 63.00 | 291.00 | 228.00 | 3.13 | Z13-4FM02 | 50.54 | 490.58 | 440.04 | 3.83 |
| including | 89.00 | 229.55 | 140.55 | 4.77 | including | 50.54 | 261.33 | 210.79 | 5.79 |
| Z13-4F22 | 63.00 | 261.00 | 198.00 | 3.51 | Z13-4FM03 | 47.23 | 409.00 | 361.77 | 4.66 |
| including | 63.00 | 200.00 | 137.00 | 4.96 | including | 46.78 | 307.00 | 260.22 | 5.36 |


| Z13-4F23 | 62.00 | 241.00 | 179.00 | 3.10 | Z13-4F47 | 107.00 | 241.00 | 134.00 | 3.78 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| including | 83.00 | 179.30 | 96.30 | 5.28 | including | 124.88 | 203.00 | 78.12 | 6.15 |
| Z13-4F24 | 61.00 | 252.00 | 191.00 | 3.82 | Z13-4F48 | 83.00 | 295.60 | 212.60 | 3.20 |
| including | 61.00 | 211.60 | 150.60 | 4.78 | including | 101.90 | 228.20 | 126.30 | 3.52 |
| Z13-4F25 | 62.25 | 213.00 | 150.75 | 3.88 | Z13-4F49 | 63.00 | 220.00 | 157.00 | 2.85 |
| including | 62.25 | 164.00 | 101.75 | 5.53 | including | 100.16 | 206.00 | 105.84 | 3.86 |
| Z13-4F26 | 100.57 | 317.76 | 217.19 | 2.44 | Z13-4F50 | 72.00 | 257.00 | 185.00 | 3.14 |
| including | 100.57 | 219.00 | 118.43 | 3.39 | including | 89.00 | 183.00 | 94.00 | 4.92 |
| Z13-4F27 | 183.00 | 336.13 | 153.13 | 1.30 | Z13-4F51 | 92.25 | 288.20 | 195.95 | 1.84 |
| including | 248.00 | 295.02 | 47.02 | 3.75 | including | 112.00 | 194.95 | 82.95 | 2.71 |
| Z13-4F28 | 70.00 | 339.00 | 269.00 | 3.33 | Z13-4F52 | 65.00 | 230.18 | 165.18 | 1.59 |
| including | 94.30 | 209.80 | 115.50 | 6.94 | including | 92.00 | 180.00 | 88.00 | 2.75 |
| Z13-4F29 | 60.00 | 303.00 | 243.00 | 2.00 | Z13-4F53 | 89.60 | 211.10 | 121.50 | 1.64 |
| including | 61.00 | 161.00 | 100.00 | 2.78 | including | 119.37 | 168.20 | 48.83 | 3.52 |
| Z13-4F30 | 63.00 | 292.17 | 229.17 | 2.64 | Z13-4F54 | 64.94 | 281.00 | 216.06 | 1.80 |
| including | 63.00 | 192.00 | 129.00 | 3.42 | including | 82.00 | 217.33 | 135.33 | 2.49 |
| Z13-4F31 | 65.00 | 359.00 | 294.00 | 2.61 | Z13-4F55 | 67.87 | 264.15 | 196.28 | 2.81 |
| including | 65.00 | 204.63 | 139.63 | 4.13 | including | 86.10 | 192.00 | 105.90 | 3.53 |
| Z13-4F32 | 106.84 | 367.50 | 260.66 | 2.10 | Z13-4F56 | 123.00 | 498.00 | 375.00 | 1.21 |
| including | 119.75 | 220.00 | 100.25 | 3.71 | including | 132.57 | 209.55 | 76.98 | 2.16 |
| Z13-4F33 | 123.00 | 320.23 | 197.23 | 1.63 | Z13-4F57 | 106.80 | 345.00 | 238.20 | 2.11 |
| including | 155.62 | 306.00 | 150.38 | 2.09 | including | 106.80 | 210.00 | 103.20 | 2.95 |
| Z13-4F34 | 126.00 | 313.30 | 187.30 | 2.02 | Z13-4FM04 | 49.00 | 436.78 | 387.78 | 2.08 |
| including | 211.00 | 300.00 | 89.00 | 3.07 | including | 50.22 | 188.39 | 138.17 | 3.26 |
| Z13-4F35 | 184.00 | 361.53 | 177.53 | 2.15 | Z13-4FM05 | 51.60 | 449.00 | 397.40 | 2.51 |
| including | 279.00 | 361.53 | 82.53 | 4.35 | including | 83.26 | 256.00 | 172.74 | 3.14 |
| Z13-4F36 | 95.00 | 330.00 | 235.00 | 2.16 | Z13-4FM06 | 49.50 | 437.00 | 387.50 | 2.12 |
| including | 203.00 | 289.00 | 86.00 | 5.21 | including | 61.00 | 163.00 | 102.00 | 4.20 |

Drilling information confirms the presence of widespread hydrothermal graphite mineralization which is focused in two vertical, conical-shaped breccia pipes. Graphite mineralization has
been intersected down to a minimum depth of 500 m and both pipes are still open at depth. The mineralization consists of clasts of graphite vein material, disseminated graphite matrix and discrete graphite veins, veinlets and hairline veins. The stockwork graphitic veins can be several centimetres wide while the veinlets and hairlines are millimetre and submillimetre scale. Figures 17 and 18 below, show the geometry of the vertical, conical-shaped breccia pipes which taper with depth. Note that the East Pipe has a consistent higher grade above the unmineralized sill than the West Pipe which is generally lower grade and more variable.


Figure 17: East and West Pipes - 3D view with breccia pipes (red), graphite overprinted host rock (green) and the shallow dipping, unmineralized sill (black) (RPA, 2014)


Figure 18: East and West Pipes - 3D view showing block model grade distribution (RPA, 2014) (Note that the low grade overprint mineralization is in green and the consistently higher grade of the East Pipe above the unmineralized sill)

### 11.0 Sampling Method and Approach

All diamond drill core was processed in Zenyatta's secure core shack at Eagle's Earth camp located approximately 30 km south of the property on Highway 11 (Figure 19). After the core has been delivered to the core shack, the core technician removes the lids and lays the boxes out in sequence on the logging benches. All of the core was then rotated so that the fabrics are oriented in the same direction and all broken pieces are matched and aligned. The length of the drill core recovered is then compared to the depth marker blocks to check for misplaced blocks and any significant grinding or core loss. The from-to intervals were then marked on the box and also etched on an aluminum tag along with hole number and box number and the tag was then stapled to the end of the box. The core RQD was then measured along with spot magnetic susceptibility and conductivity readings using a KT10-S/C instrument at 3 m intervals down the length of the hole. The core was then marked up and logged and sampled by an experienced and qualified geologist. Geological descriptions and data were captured directly to a notebook computer using X-Logger software that was developed by R. Pattison of Winnipeg, Manitoba. This software utilizes Microsoft Access and enables the geologist to capture a variety of geological data including basic drill logs, collar survey data, orientation survey data, assay and geochemical samples, alteration, structural measurements, RQD measurements, magnetic susceptibility and conductivity measurements, etc. Lithological names were standardized and drop down menus used to reduce data input errors. Sampling of the core was based on visual estimates of graphitic breccia content and typically were taken at 1.0 m intervals but ranged from 0.5 m to 1.5 m intervals in well mineralized breccia material. Unmineralized material was typically sampled at 1.5 m to 2.0 m intervals and the entire drill hole was sampled. Samples did not cross geological contacts. The core samples that were selected for assay were clearly marked on the core and two tags were placed at the start of each sample run (the third tag remained in the sample book with a record of hole number and sample interval). One tag was to be placed in the sample bag and the other stayed with the remaining core after splitting. At this stage the core was then photographed in batches of four NQ boxes at a time for the complete drill hole (Figure 20).

All diamond drill core was split using a diamond-blade core saw. The method employed to pump water for cooling the saw blade involves two, 25 gallon plastic garbage cans. The water is drained from the saw base into the first garbage can, where the heavier solids drop out of suspension and collect at the bottom of the garbage can. The water then flows into the second garbage can to further allow the fine particulate material to settle out. The water in the second
garbage can is then drawn by pump into the core saw. The water was routinely changed every few days and at this time the sludge at the bottom of each garbage can was disposed of. After splitting, the core was then washed down with clean water to remove any cuttings that remained on the cut surface. After the core was split, one half was put into a sample bag and the other half is returned to the core tray. All sample bags contain individual sample tickets as well as having the sample number scribed on the outside of the sample bag in black marker. Each sample bag was then stapled closed. The remaining half of the core from sampling is retained with a duplicate sample tag stapled in the core box and returned to core storage (Figure 21). All sample tickets were taken back to a secure location and all sample data were then transferred to a password protected computer at base camp. The rice bags were also sealed by Zenyatta company employees before being shipped to ALS Minerals Laboratory in Thunder Bay where all samples were opened, crushed and split into sub-samples and pulverized prior to being sent for analyses in Vancouver, Canada. See Appendix 2, at back of this report for all assay results (COAs) for the 2013 drill program.


Figure 19: Aerial View of Zenyatta's Core Shack


Figure 20: Example of Photographed Core - Drill Hole Z13-4F28


Figure 21: 2013 Drill Core in Storage Racks

### 12.0 Sample Security, Preparation, Analysis, Quality Assurance and Quality Control

As part of Zenyatta's diamond drilling program, sample chain of custody was maintained by Zenyatta from the sample collection point until delivery to a representative from the analytical laboratory or until shipped directly to the sample preparation facility. Following sample collection, samples were then packed into large rice sacks and tightly sealed using nylon tie wraps. The sacks were stored at Zenyatta's core shack until they were transported directly to the laboratory.

All samples were submitted to ALS Minerals, Thunder Bay, Ontario, for sample preparation. After ALS received the samples they verified them against the shipping documents and entered the samples into their tracing system. Sample preparation was conducted using ALS code PREP-31B. Each sample was dried, crushed and pulverized ( 1000 g to $85 \%$ ) passing $75 \mu \mathrm{~m}$ for assaying. To avoid contamination, ALS cleaned the crushers and pulverizers with barren material after each sample. Before June 3, 2013, the pulp samples were shipped to the ALS Laboratory in Brisbane, Australia for Cg and total sulphur assays. After June 3, 2013, the pulps were shipped to ALS Laboratories in Vancouver, British Columbia for graphitic carbon $(\mathrm{Cg})$ and total sulphur assays using the following methods:

- Carbon - Graphitic carbon by LECO (C-IR18) (range: 0.02\%-100\%), and
- Sulphur - Total Sulphur (LECO) (S-IR08) (range: 0.01\%-50\%)

ALS has ISO 9001:2008 and ISO 17025 Accreditation as per the Standards Council of Canada at all of its global laboratories.

A total of 22,932 samples (including QC samples) were submitted to ALS Group from April to November 2013 (drill holes 4F1 to 4F57 and metallurgical holes 4FM01 to 4FM04; assay data was still pending for holes 4FM05 and 4FM06 at the time of the QAQC report (Pastakia, 2013)). Zenyatta geologists routinely inserted standards and control samples into the sample stream in order to test the analytical quality control. QA/QC was also routinely monitored by Naaznin Pastakia (M.Sc.) and is described in detail in Pastakia (2013).

The following section is based on the reports by Pastakia (2013) and RPA (2014).

## Quality Assurance and Quality Control

Quality assurance (QA) consists of evidence to demonstrate that the assay data has precision and accuracy within generally accepted limits for the sampling and analytical method(s) used in order to have confidence in future resource estimations. Quality control (QC) consists of procedures used to ensure that an adequate level of quality is maintained in the process of sampling, preparing, and assaying the exploration drilling samples. In general, QA/QC programs are designed to prevent or detect contamination and allow assaying (analytical) precision (repeatability) and accuracy to be quantified. In addition, a QA/QC program can disclose the overall sampling - assaying variability of the sampling method itself.

## Certified Reference Material

Results of the regular submission of Certified Reference Materials (CRMs) are used to identify problems with specific sample batches and long-term biases associated with the regular assay laboratory. Zenyatta prepared custom in-house standards. Four different CRMs were prepared by CDN Resource Laboratories Ltd. in Langley, British Columbia and certified for both graphitic carbon ( Cg ) and sulphur (S): ZEN-1, ZEN-2, ZEN-3, and ZEN-4. Table 5 lists the mean and standard deviation for each CRM. A total of 1,134 CRMs were inserted with the 22,932 regular core samples submitted by Zenyatta to ALS, for a rate of approximately 1 in 20 samples.

Table 5: Expected Values for Custom CRMS

| CRM ID | Cg (\%) |  | S (\%) |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Mean | Std. Dev. | Mean | Std. Dev. |
| ZEN-1 | 0.91 | 0.045 | 0.316 | 0.025 |
| ZEN-2 | 3.13 | 0.125 | 0.374 | 0.018 |
| ZEN-3 | 7.42 | 0.415 | 0.305 | 0.017 |
| ZEN-4 | 14.12 | 0.99 | 0.306 | 0.016 |

A QC failure for a CRM was defined as an assay that fell outside either three standard deviations ( $\pm 3$ SD) or $\pm 10 \%$ of the expected value. The CRM assay results are illustrated in Figure 22 and data are summarized in Table 6.


Figure 22: Certified Reference Material Results

Table 6: Summary of CRM Results

| CRM | No. | Expected Cg (\%) <br> Average |  | Std. Dev. |  | Observed Cg (\%) | \% of <br> Avage |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Std. Dev. | Expected |  |  |  |  | Mislabels

Fourteen cases were identified where either the CRM code was recorded incorrectly or there was a sample mix-up with an adjacent sample. Two CRMs (representing $<1 \%$ of the submitted CRMs) where identified as QC failures based on sulphur results. As sulphur is of secondary interest, Zenyatta chose not to re-assay results based on these failures.

Figure 17 and Table 6 suggest that results may be biased high for three of the four CRMs. Additional discussion on this potential bias is provided below in the subsection titled Assay Check Samples. Overall, the average results are generally within $\pm 10 \%$. RPA considered the CRM results acceptable, but recommended that the expected values for the in-house CRMs be re-evaluated prior to the next drilling campaign.

## Blanks

Contamination and sample numbering errors are assessed through blank samples, on which the presence of the elements undergoing analysis has been confirmed to be below the corresponding detection limit. A significant level of contamination is identified when the blank sample yields values exceeding $0.2 \% \mathrm{Cg}$, which is ten times detection limit of $0.02 \% \mathrm{Cg}$. The matrix of the blank sample should be similar to the matrix of the material being routinely analyzed.

A blank consisting of coarse-grained granite was purchased from Analytical Solutions Ltd., Toronto. A total of 1,128 blanks were submitted with the 22,932 field and QC samples for an insertion rate of about $5 \%$, or approximately 1 in 20 samples. Blank assay results are plotted in Figure 23, and statistics are listed in Table 7. Based on these results, there is no evidence of systematic sample contamination.


Figure 23: Blank Results

Table 7: Summary of Blank Results

| Criteria | $\mathbf{C g}$ | S |
| :--- | :---: | :---: |
| No. of Cases | 1,128 | 1,128 |
| Minimum (\%) | 0.010 | 0.030 |
| Maximum (\%) | 0.200 | 0.160 |
| Arithmetic Mean (\%) | 0.030 | 0.110 |
| Standard Deviation (\%) | 0.026 | 0.020 |
| No. of Mislabeled Samples | 1 | 1 |
| No. of Failures | 2 | 1 |

## Duplicates

Field duplicates assess the variability introduced by sampling the same drill core interval. The duplicate splits are bagged separately with separate sample numbers so as to be blind to the sample preparation laboratory. The duplicates contain all levels of sampling and analytical error and are used to calculate field, sample preparation, and analytical precision. They are also a
check on possible sample over selection, that is, the sampler has either purposely or inadvertently sampled the drill core so as to preferentially place visible mineralization in the sample bag sent for analysis.

Coarse duplicates (or coarse reject duplicates) are duplicate samples taken immediately after the first crushing and splitting step. At Zenyatta's request, the coarse duplicates pairs were created by splitting the crushed sample in two equal parts. The coarse duplicates will inform about the subsampling precision, that is, they report the errors due to sample size reduction after crushing, and the errors associated with weighing and analysis of the pulp. In order to ensure repeatability conditions, both the original and the coarse duplicate samples should be submitted to the primary laboratory, in the same sample batch and under a different sample number, so that pulverization and assaying follow the same procedure.

Pulp duplicates consist of second splits of final prepared pulverized samples, analyzed by the same laboratory as the original samples under different sample numbers. The pulp duplicates are indicators of the analytical precision, which may also be affected by the quality of pulverization and homogenization. In order to ensure repeatability conditions, both the original and the pulp duplicate samples should be submitted to the primary laboratory, in the same sample batch, and under a different sample number, so that assaying follows a similar procedure.

Zenyatta incorporated core, reject, and pulp duplicates into the sample stream. Results are summarized below.

## Drill Core Duplicates

Drill core duplicates consist of two quarter core samples; the other half of the drill core is left in the box. RPA recommended that Zenyatta instead submit two half core samples instead of quarter core, to maintain a consistent sample size.

Ninety-four pairs of drill core duplicate samples were submitted for analysis. The original and duplicate sample assay results are plotted in Figure 24 and statistics are summarized in Table 8. Results confirm that there has been no bias introduced by preferentially submitting the more mineralized half of the core for assay.


Figure 24: Scatterplot of Drill Core Duplicates

Table 8: Drill Core Duplicate Results

| Element <br> (units) | Criteria | No. | Original > <br> Duplicate | Original < <br> Duplicate | Original $=$ <br> Duplicate |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | all | 94 | 46 | 47 | 1 |
| $\mathrm{Cg}(\%)$ | samples |  | $49 \%$ | $50 \%$ | $1 \%$ |
|  | $>5 \times$ DL* $^{*}$ | 91 | 44 | 47 | 0 |
|  |  |  | $52 \%$ | $0 \%$ |  |
|  | all | 94 | 28 | 45 | 21 |
| S (\%) | samples |  | $30 \%$ | $48 \%$ | $22 \%$ |
|  | $>5 \times$ DL* $^{*}$ | 85 | 27 | 43 | 15 |
|  |  |  | $32 \%$ | $50 \%$ | $18 \%$ |

*Detection Limit

## Reject Duplicates

A total of 992 pairs of reject duplicate samples were submitted for analysis. The original and duplicate sample assay results are plotted in Figure 25 and statistics are summarized in Table 9.


Figure 25: Scatterplot of Reject Duplicates

Table 9: Summary of Reject Duplicate Results

| Element <br> (units) | Criteria | No. | Original > <br> Duplicate | Original < <br> Duplicate | Original = <br> Duplicate |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | all | 992 | 414 | 426 | 152 |
| Cg (\%) | samples |  | $42 \%$ | $43 \%$ | $15 \%$ |
|  | $>5 \times$ DL* $^{*}$ | 679 | 319 | 311 | 49 |
|  |  |  | $47 \%$ | $46 \%$ | $7 \%$ |
|  | all | 992 | 310 | 286 | 396 |
| S (\%) | samples |  | $31 \%$ | $29 \%$ | $40 \%$ |
|  | $>5 \times$ DL* $^{*}$ | 795 | 275 | 259 | 261 |
| *Detection Limit |  |  | $35 \%$ | $32 \%$ | $33 \%$ |

One case was identified where the difference between reject duplicates was greater than $\pm 100 \%$ and average assays were greater than $0.1 \% \mathrm{Cg}$.

From the data above, RPA concluded that there was no bias evident between original and duplicate halves of the drill core. That is, there has been no selection bias introduced.

## Laboratory Pulp Duplicates

A total of 953 pairs of laboratory pulp duplicate samples were assayed for graphitic carbon and 809 for sulphur. The original and duplicate sample assay results are plotted in Figure 26 and statistics are summarized in Table 10.


Figure 26: Scatterplot of Pulp Duplicates

Table 10: Summary of Pulp Duplicate Results

| Element <br> (units) | Criteria | No. | Original > <br> Duplicate | Original < <br> Duplicate | Original = <br> Duplicate |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | all | 953 | 338 | 434 | 181 |
| $\mathrm{Cg}(\%)$ | samples |  | $35 \%$ | $46 \%$ | $19 \%$ |
|  | $>5 \times$ DL* $^{*}$ | 685 | 259 | 339 | 87 |
|  | all |  | $38 \%$ | $49 \%$ | $13 \%$ |
| S (\%) | samples |  | 231 | 252 | 326 |
|  | $>5 \times$ DL* $^{*}$ | 685 | 211 | $31 \%$ | $40 \%$ |
|  |  |  | $31 \%$ | 239 | 235 |
|  |  |  |  | $35 \%$ | $34 \%$ |

RPA reported that laboratory reproducibility of assays on the same pulp and at the same laboratory fall within the expected ranges. Overall, the precision for the field, reject, and pulp duplicates is very good. Most duplicates are well within $\pm 10 \%$ to $\pm 20 \%$.

### 13.0 Resource Estimate

The following section is based on RPA (2014).

Diamond drilling has outlined two graphite mineralized breccia pipes with three-dimensional continuity, and size and grades that can potentially be extracted economically. RPA has reported that Zenyatta's protocols for drilling, sampling, analysis, security, and database management meet industry accepted practices. The drill hole database was verified by RPA and was found to be suitable for Mineral Resource estimation work.

In December 2013, Zenyatta announced its maiden resource estimate for the Albany Graphite Deposit. RPA estimated Mineral Resources for the Albany graphite deposit using diamond drill hole data available as of November 15, 2013, which included drill holes Z11-4F1, Z12-4F2 to Z12-4F9, Z13-4F10 to Z13-4F57 and Z13-4FM01 to Z13-4FM03 (RPA, 2014). The Mineral Resource estimate was based on a potential open pit mining scenario. RPA estimated Indicated Mineral Resources to total 25.1 Mt at an average grade of $3.89 \% \mathrm{Cg}$, containing 977,000 tonnes of Cg (Table 11 and Figure 27). In addition, Inferred Mineral Resources are estimated to total 20.1 Mt at an average grade of $2.20 \% \mathrm{Cg}$, containing 441,000 tonnes of Cg . Mineral Resources were constrained within a preliminary optimized pit shell in Whittle software. RPA also reported that the Mineral Resource estimate is insensitive to cut-off grade up to at least $2 \% \mathrm{Cg}$.

Table 11: RPA Mineral Resource Estimate - November 15, 2013

|  | Tonnage <br> $(\mathbf{M t )}$ | Grade <br> $(\% \mathbf{C g})$ | Contained <br> Graphitic Carbon <br> $\mathbf{( t ~ C g})$ |
| :--- | :---: | :---: | :---: |
| Indicated |  |  |  |
| East Pipe and Halo | 10.0 | 5.60 | 560,000 |
| West Pipe | 15.1 | 2.76 | 417,000 |
| Total Indicated | 25.1 | 3.89 | $\mathbf{9 7 7 , 0 0 0}$ |

## Inferred

| East Pipe and Halo | 7.6 | 2.04 | 155,000 |
| :--- | :---: | :---: | :---: |
| West Pipe | 12.5 | 2.29 | 286,000 |
| Total Inferred | 20.1 | 2.20 | $\mathbf{4 4 1 , 0 0 0}$ |

Notes:

1. CIM definitions were followed for Mineral Resources.
2. Cg - graphitic carbon
3. Mineral Resources are estimated at a cut-off grade of $0.6 \% \mathrm{Cg}$.
4. Mineral Resources are estimated using a long-term price of US\$8,500 per tonne Cg , and a US\$/C\$ exchange rate of 1.0 .
5. Bulk density is $2.6 \mathrm{t} / \mathrm{m}^{3}$ in the pipes and $2.65 \mathrm{t} / \mathrm{m}^{3}$ in the halo of the East Pipe.
6. Mineral Resources are constrained by a preliminary pit shell generated in Whittle software.
7. Numbers may not add up due to rounding.

Figure 27 below shows the classified blocks for the Albany graphite deposit while Figures 28 and 29 show the Cg grades for the West and East pipes in long section.

Figure 27: 3D View of Mineral Resource Classification


Figure 28: West Pipe Long Section View Looking Northwest


Figure 29: East Pipe Long Section View Looking Southwest


### 14.0 Interpretation and Conclusions

Zenyatta has discovered a unique, igneous hosted, hydrothermal graphite deposit at its 100\% owned Claim Block 4F property. The Albany graphite deposit is located in the Superior Province of the Canadian Shield, at the terrane boundary between the Quetico Subprovince to the north and the Marmion Subprovince to the south. Preliminary petrography indicates that the graphite-hosting breccias range in composition from diorite to granite. Graphite occurs both in the matrix, as disseminated crystals, clotted to radiating crystal aggregates and veins and along crystal boundaries, and as small veins within the breccia fragments.

The Albany deposit is a unique example of an epigenetic graphite deposit in which a large volume of highly crystalline, fluid-deposited graphite occurs within an igneous host. The deposit is interpreted as a vent pipe breccia that formed from $\mathrm{CO}_{2}$-rich fluids that evolved due to pressure-related degassing of syenites of the Albany Alkalic Complex.

Zenyatta Ventures has completed the 2013, Phase III exploration program on the Albany graphite deposit and drilling has outlined two graphite mineralized breccia pipes with threedimensional continuity, and size and grades that can potentially be extracted economically (RPA, 2014). The resource drilling tested the extent of the graphitic breccia mineralization in order to establish the geometry of the breccia bodies based on the shape of their geophysical signatures. The first drill holes (Z13-4F10 to Z13-4F16) were collared along a radial pattern at azimuths of $0^{\circ}, 45^{\circ}, 90^{\circ}, 180^{\circ}, 225^{\circ}, 270^{\circ}$ and $315^{\circ}$ to test whether the shape of the geophysical signature can be used to define the shape of the conductive body (RPA, 2014).

From March 26, 2013 to November 6, 2013 Zenyatta completed 54 holes (27 on each breccia pipe) for a total of $22,463 \mathrm{~m}$. Diamond drill holes were collared using NQ ( 47.6 mm core diameter) equipment for the 48 resource drill holes and HQ ( 63.5 mm core diameter) for the six metallurgical drill holes.

A total of 23,878 samples from the 2011, 2012 and 2013 programs were submitted for assay (graphitic carbon and total sulphur) of which 94 were core duplicate samples, 1,119 were reject duplicate samples, 1,179 were blanks and 1,177 were Zenyatta's Certified Reference Material (standards). Additionally, 857 samples of representative graphite mineralized samples, graphite overprinted material and unmineralized host rock were submitted for specific gravity measurements.

RPA reported that Zenyatta's protocols for drilling, sampling, analysis, security, and database management meet industry accepted practices. The drill hole database was also verified to be suitable for Mineral Resource estimation work. RPA estimated Mineral Resources for the Albany graphite deposit using diamond drill hole data available as of November 15, 2013, which included drill holes Z11-4F1, Z12-4F2 to Z12-4F9, Z13-4F10 to Z13-4F57 and Z13-4FM01 to Z13-4FM03. The Mineral Resource estimate is based on a potential open pit mining scenario. RPA estimated the Indicated Mineral Resources to total $\mathbf{2 5 . 1} \mathbf{~ M t}$ at a grade of $3.89 \% \mathrm{Cg}$ and to contain $977,000 \mathbf{C g}$; and Inferred Mineral Resources total $\mathbf{2 0 . 1} \mathbf{~ M t}$ at a grade of $2.20 \% \mathrm{Cg}$, containing 441,000t $\mathbf{C g}$.

At the time of the drilling, bench scale metallurgical test work in 2012 and 2013 indicated that the graphite could be concentrated using conventional milling and flotation methods and purified using a caustic bake process to yield $99.9 \%$ graphitic carbon. Zenyatta believes that this highpurity product will command higher prices and is aiming to compete in the high-purity synthetic graphite market.

### 15.0 Recommendations

The 2013 drill program has indicated that the Block 4F Property hosts a significant igneousrelated, hydrothermal graphite deposit which merits considerable additional work. Additionally, on June 1, 2015, Zenyatta announced the results of a positive PEA study and RPA recommended that the project should be advanced to the pre-feasibility stage (RPA, 2015).

Additional future drill programs could include the following:

- Carry out a geotechnical drill program at pit wall locations to enhance geomechanical and rock mechanics assessments to confirm appropriate pit wall slope angles and stability. Also carry out specific hydrological/hydrogeological studies utilizing the geotechnical drill holes to refine dewatering needs in the open pit over the LOM.
- Consider upgrading areas of Inferred Mineral Resources to Indicated Mineral Resources. RPA noted that this is not necessarily required to advance to the prefeasibility stage as current Indicated Resources are adequate for the open pit production scenario described in the PEA.
- Recover more graphite mineralized material (>200 tonnes) via HQ or PQ drill holes to provide feed for a demonstration plant. Based on full-scale production rate of 30,000 tonnes per year of final product and a 1:5,000 scale factor a demonstration plant would produce 6 tonnes of product per year, or 20 kilograms a day.

RPA has proposed the following budget for the pre-feasibility study (RPA, 2015):

Table 12: Proposed Budget

| Item | C\$'000s |
| :--- | ---: |
| Geotechnical Drilling and Analysis (including hydrogeology) | 600 |
| Market Development Work | 1,000 |
| Metallurgical Testwork | 1,600 |
| Community Engagement | 200 |
| Environmental Baseline Studies (one year of a multi-year | 600 |
| program including geochemistry) | 500 |
| Pre-Feasibility Study | $\mathbf{4 , 5 0 0}$ |

### 16.0 Statement of Qualification

I, Glenda Carey, of 218 London Drive, Thunder Bay, Ontario, do hereby certify that:

1. I hold a Bachelor of Science Degree in Earth Science (1989) from Memorial University of Newfoundland, St. Johns, Newfoundland and Labrador;
2. I have practiced my profession in Newfoundland and Labrador, NWT, Alberta, Nunavut and Ontario since 1989 and have been employed directly by mining and exploration companies, the Government of Nunavut, and the Government of Newfoundland and Labrador;
3. I am presently an employee of Zenyatta Ventures Limited based in Thunder Bay, Ontario as a Geologist for the company;
4. Permission is granted to Zenyatta Ventures Limited to use this report in a prospectus or other financial offering.

Date: August 10, 2015 at Thunder Bay, Ontario

Glenda Carey, B.Sc., Geologist
Zenyatta Ventures Limited
1224 Amber Drive, Thunder Bay, Ontario, P7B 6M5
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## APPENDIX 1

PHASE III-2013
DRILL LOGS
Z13-4F10 TO Z13-4F57
Z13-4FM01 TO Z13-4M06

## APPENDIX 2

PHASE III-2013
CERTIFICATES OF ANALYSIS

## APPENDIX 3

List of Standards and Blanks
Z13-4F10 to Z13-4F57
Z13-4FM01 TO Z13-4M06

| HOLE ID | SAMPLE ID | SAMPLE TYPE | HOLE ID | $\begin{aligned} & \text { SAMPLE } \\ & \text { ID } \end{aligned}$ | SAMPLE TYPE | HOLE ID | $\begin{aligned} & \text { SAMPLE } \\ & \text { ID } \end{aligned}$ | SAMPLE TYPE |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Z13-4F10 | L012205 | Standard | Z13-4F28 | Q180524 | Standard | Z13-4F46 | N549664 | Standard |
| Z13-4F10 | L012215 | Blank | Z13-4F28 | Q180535 | Blank | Z13-4F46 | N549675 | Blank |
| Z13-4F10 | L012225 | Standard | Z13-4F28 | Q180544 | Standard | Z13-4F46 | N549684 | Standard |
| Z13-4F10 | L012235 | Blank | Z13-4F28 | Q180555 | Blank | Z13-4F46 | N549695 | Blank |
| Z13-4F10 | L012245 | Standard | Z13-4F28 | Q180564 | Standard | Z13-4F46 | N549704 | Standard |
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| Z13-4F10 | L012265 | Standard | Z13-4F28 | Q180584 | Standard | Z13-4F46 | N549724 | Standard |
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| Z13-4F10 | L012345 | Standard | Z13-4F28 | Q180664 | Standard | Z13-4F46 | N549804 | Standard |
| Z13-4F10 | L012355 | Blank | Z13-4F28 | Q180675 | Blank | Z13-4F46 | N549815 | Blank |
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| Z13-4F10 | L012375 | Blank | Z13-4F28 | Q180695 | Blank | Z13-4F47 | Q156724 | Standard |
| Z13-4F10 | L012385 | Standard | Z13-4F28 | Q180704 | Standard | Z13-4F47 | Q156735 | Blank |
| Z13-4F10 | L012395 | Blank | Z13-4F29 | Q180715 | Blank | Z13-4F47 | Q156744 | Standard |
| Z13-4F10 | L012405 | Standard | Z13-4F29 | Q180724 | Standard | Z13-4F47 | Q156755 | Blank |
| Z13-4F10 | L012415 | Blank | Z13-4F29 | Q180735 | Blank | Z13-4F47 | Q156764 | Standard |
| Z13-4F10 | L012425 | Standard | Z13-4F29 | Q180744 | Standard | Z13-4F47 | Q156775 | Blank |
| Z13-4F10 | L012435 | Blank | Z13-4F29 | Q180755 | Blank | Z13-4F47 | Q156784 | Standard |
| Z13-4F10 | L012445 | Standard | Z13-4F29 | Q180764 | Standard | Z13-4F47 | Q156795 | Blank |
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| Z13-4F10 | L012465 | Standard | Z13-4F29 | Q180784 | Standard | Z13-4F47 | Q156815 | Blank |
| Z13-4F10 | L012475 | Blank | Z13-4F29 | Q180795 | Blank | Z13-4F47 | Q156824 | Standard |
| Z13-4F10 | L012485 | Standard | Z13-4F29 | Q180804 | Standard | Z13-4F47 | Q156835 | Blank |
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| Z13-4F10 | L012505 | Standard | Z13-4F29 | Q180824 | Standard | Z13-4F47 | Q156855 | Blank |
| Z13-4F10 | L012515 | Blank | Z13-4F29 | Q180835 | Blank | Z13-4F47 | Q156864 | Standard |
| Z13-4F10 | L012525 | Standard | Z13-4F29 | Q180844 | Standard | Z13-4F47 | Q156875 | Blank |
| Z13-4F10 | L012535 | Blank | Z13-4F29 | Q180855 | Blank | Z13-4F47 | Q156884 | Standard |
| Z13-4F10 | L012545 | Standard | Z13-4F29 | Q180864 | Standard | Z13-4F47 | Q156895 | Blank |
| Z13-4F10 | L012555 | Blank | Z13-4F29 | Q180875 | Blank | Z13-4F47 | Q156904 | Standard |
| Z13-4F10 | L012565 | Standard | Z13-4F29 | Q180884 | Standard | Z13-4F47 | Q156915 | Blank |
| Z13-4F10 | L012575 | Blank | Z13-4F29 | Q180895 | Blank | Z13-4F47 | Q156924 | Standard |
| Z13-4F10 | L012585 | Standard | Z13-4F29 | Q180904 | Standard | Z13-4F47 | Q156935 | Blank |
| Z13-4F10 | L012595 | Blank | Z13-4F29 | Q180915 | Blank | Z13-4F47 | Q156944 | Standard |
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| Z13-4F10 | L012615 | Blank | Z13-4F29 | Q180935 | Blank | Z13-4F47 | Q156964 | Standard |
| Z13-4F10 | L012625 | Standard | Z13-4F29 | Q180944 | Standard | Z13-4F47 | Q156975 | Blank |
| Z13-4F10 | L012635 | Blank | Z13-4F29 | Q180955 | Blank | Z13-4F48 | N549824 | Standard |
| Z13-4F10 | L012645 | Standard | Z13-4F29 | Q180964 | Standard | Z13-4F48 | N549835 | Blank |


| Z13-4F10 | L012655 | Blank | Z13-4F29 | Q180975 | Blank | Z13-4F48 | N549844 | Standard |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Z13-4F11 | N473004 | Standard | Z13-4F29 | Q180984 | Standard | Z13-4F48 | N549855 | Blank |
| Z13-4F11 | N473015 | Blank | Z13-4F29 | Q180995 | Blank | Z13-4F48 | N549864 | Standard |
| Z13-4F11 | N473024 | Standard | Z13-4F29 | Q181004 | Standard | Z13-4F48 | N549875 | Blank |
| Z13-4F11 | N473035 | Blank | Z13-4F29 | Q181015 | Blank | Z13-4F48 | N549884 | Standard |
| Z13-4F11 | N473044 | Standard | Z13-4F29 | Q181024 | Standard | Z13-4F48 | N549895 | Blank |
| Z13-4F11 | N473055 | Blank | Z13-4F29 | Q181035 | Blank | Z13-4F48 | N549904 | Standard |
| Z13-4F11 | N473064 | Standard | Z13-4F29 | Q181044 | Standard | Z13-4F48 | N549915 | Blank |
| Z13-4F11 | N473075 | Blank | Z13-4F29 | Q181055 | Blank | Z13-4F48 | N549924 | Standard |
| Z13-4F11 | N473084 | Standard | Z13-4F29 | Q181064 | Standard | Z13-4F48 | N549935 | Blank |
| Z13-4F11 | N473095 | Blank | Z13-4F29 | Q181075 | Blank | Z13-4F48 | N549944 | Standard |
| Z13-4F11 | N473104 | Standard | Z13-4F29 | Q181084 | Standard | Z13-4F48 | N549955 | Blank |
| Z13-4F11 | N473115 | Blank | Z13-4F29 | Q181095 | Blank | Z13-4F48 | N549964 | Standard |
| Z13-4F11 | N473124 | Standard | Z13-4F29 | Q181104 | Standard | Z13-4F48 | N549975 | Blank |
| Z13-4F11 | $N 473135$ | Blank | Z13-4F29 | Q181115 | Blank | Z13-4F48 | N549984 | Standard |
| Z13-4F11 | N473144 | Standard | Z13-4F29 | Q181124 | Standard | Z13-4F48 | N549995 | Blank |
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| Z13-4F11 | $N 473355$ | Blank | Z13-4F30 | Q181335 | Blank | Z13-4F49 | Q157015 | Blank |
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| Z13-4F25 | N472855 | Blank | Z13-4F43 | N548915 | Blank | Z13-4FM04 | Q159004 | Standard |
| Z13-4F26 | N472864 | Standard | Z13-4F43 | N548924 | Standard | Z13-4FM04 | Q159015 | Blank |
| Z13-4F26 | N472875 | Blank | Z13-4F43 | N548935 | Blank | Z13-4FM04 | Q159024 | Standard |
| Z13-4F26 | N472884 | Standard | Z13-4F43 | N548944 | Standard | Z13-4FM04 | Q159035 | Blank |
| Z13-4F26 | N472895 | Blank | Z13-4F43 | N548955 | Blank | Z13-4FM04 | Q159044 | Standard |
| Z13-4F26 | N472904 | Standard | Z13-4F43 | N548964 | Standard | Z13-4FM04 | Q159055 | Blank |
| Z13-4F26 | N472915 | Blank | Z13-4F43 | N548975 | Blank | Z13-4FM04 | Q159064 | Standard |


| Z13-4F26 | N472924 | Standard | Z13-4F43 | N548984 | Standard | Z13-4FM04 | Q159075 | Blank |
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| Z13-4F26 | N472955 | Blank | Z13-4F43 | N549015 | Blank | Z13-4FM04 | Q159104 | Standard |
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| Z13-4F26 | N473404 | Standard | Z13-4F44 | Q156215 | Blank | Z13-4FM04 | Q159155 | Blank |
| Z13-4F26 | $N 473415$ | Blank | Z13-4F44 | Q156224 | Standard | Z13-4FM04 | Q159164 | Standard |
| Z13-4F26 | N473424 | Standard | Z13-4F44 | Q156235 | Blank | Z13-4FM04 | Q159175 | Blank |
| Z13-4F26 | $N 473435$ | Blank | Z13-4F44 | Q156244 | Standard | Z13-4FM04 | Q159184 | Standard |
| Z13-4F26 | N473444 | Standard | Z13-4F44 | Q156255 | Blank | Z13-4FM04 | Q159195 | Blank |
| Z13-4F26 | $N 473455$ | Blank | Z13-4F44 | Q156264 | Standard | Z13-4FM04 | Q159204 | Standard |
| Z13-4F26 | N473464 | Standard | Z13-4F44 | Q156275 | Blank | Z13-4FM04 | Q159215 | Blank |
| Z13-4F26 | $N 473475$ | Blank | Z13-4F44 | Q156284 | Standard | Z13-4FM04 | Q159224 | Standard |
| Z13-4F26 | $N 473484$ | Standard | Z13-4F44 | Q156295 | Blank | Z13-4FM04 | Q159235 | Blank |
| Z13-4F26 | N473495 | Blank | Z13-4F44 | Q156304 | Standard | Z13-4FM04 | Q159244 | Standard |
| Z13-4F26 | N473504 | Standard | Z13-4F44 | Q156315 | Blank | Z13-4FM04 | Q159255 | Blank |
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| Z13-4F26 | N473524 | Standard | Z13-4F44 | Q156335 | Blank | Z13-4FM05 | Q159275 | Blank |
| Z13-4F26 | N473535 | Blank | Z13-4F44 | Q156344 | Standard | Z13-4FM05 | Q159284 | Standard |
| Z13-4F26 | N473544 | Standard | Z13-4F44 | Q156355 | Blank | Z13-4FM05 | Q159295 | Blank |
| Z13-4F26 | N473555 | Blank | Z13-4F44 | Q156364 | Standard | Z13-4FM05 | Q159304 | Standard |
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| Z13-4F26 | N473575 | Blank | Z13-4F44 | Q156384 | Standard | Z13-4FM05 | Q159324 | Standard |
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| Z13-4F26 | N473595 | Blank | Z13-4F44 | Q156404 | Standard | Z13-4FM05 | Q159344 | Standard |
| Z13-4F26 | N473604 | Standard | Z13-4F44 | Q156415 | Blank | Z13-4FM05 | Q159355 | Blank |
| Z13-4F26 | N473615 | Blank | Z13-4F44 | Q156424 | Standard | Z13-4FM05 | Q159364 | Standard |
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| Z13-4F26 | N473675 | Blank | Z13-4F44 | Q156484 | Standard | Z13-4FM05 | Q159424 | Standard |
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| Z13-4F26 | N473715 | Blank | Z13-4F44 | Q156524 | Standard | Z13-4FM05 | Q159464 | Standard |
| Z13-4F26 | N473724 | Standard | Z13-4F44 | Q156535 | Blank | Z13-4FM05 | Q159475 | Blank |
| Z13-4F26 | N473735 | Blank | Z13-4F44 | Q156544 | Standard | Z13-4FM05 | Q159484 | Standard |
| Z13-4F26 | N473744 | Standard | Z13-4F44 | Q156555 | Blank | Z13-4FM05 | Q159495 | Blank |
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| Z13-4F26 | N473795 | Blank | Z13-4F44 | Q156604 | Standard | Z13-4FM05 | Q159544 | Standard |
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| Z13-4F26 | $N 473835$ | Blank | Z13-4F44 | Q156644 | Standard | Z13-4FM05 | Q159584 | Standard |
| Z13-4F27 | N473844 | Standard | Z13-4F44 | Q156655 | Blank | Z13-4FM05 | Q159595 | Blank |
| Z13-4F27 | $N 473855$ | Blank | Z13-4F44 | Q156664 | Standard | Z13-4FM05 | Q159604 | Standard |
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| Z13-4F27 | $N 473875$ | Blank | Z13-4F44 | Q156684 | Standard | Z13-4FM05 | Q159624 | Standard |
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| Z13-4F27 | N473895 | Blank | Z13-4F44 | Q156704 | Standard | Z13-4FM05 | Q159644 | Standard |
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| Z13-4F27 | N473955 | Blank | Z13-4F45 | N549115 | Blank | Z13-4FM05 | Q159704 | Standard |
| Z13-4F27 | N473964 | Standard | Z13-4F45 | N549124 | Standard | Z13-4FM05 | Q159715 | Blank |
| Z13-4F27 | N473975 | Blank | Z13-4F45 | N549135 | Blank | Z13-4FM05 | Q159724 | Standard |
| Z13-4F27 | N473984 | Standard | Z13-4F45 | N549144 | Standard | Z13-4FM05 | Q159735 | Blank |
| Z13-4F27 | N473995 | Blank | Z13-4F45 | N549155 | Blank | Z13-4FM05 | Q159744 | Standard |
| Z13-4F27 | Q180004 | Standard | Z13-4F45 | N549164 | Standard | Z13-4FM05 | Q159755 | Blank |
| Z13-4F27 | Q180015 | Blank | Z13-4F45 | N549175 | Blank | Z13-4FM05 | Q159764 | Standard |
| Z13-4F27 | Q180024 | Standard | Z13-4F45 | N549184 | Standard | Z13-4FM05 | Q159775 | Blank |
| Z13-4F27 | Q180035 | Blank | Z13-4F45 | N549195 | Blank | Z13-4FM06 | Q159784 | Standard |
| Z13-4F27 | Q180044 | Standard | Z13-4F45 | N549204 | Standard | Z13-4FM06 | Q159795 | Blank |
| Z13-4F27 | Q180055 | Blank | Z13-4F45 | N549215 | Blank | Z13-4FM06 | Q159804 | Standard |
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| Z13-4F27 | Q180075 | Blank | Z13-4F45 | N549235 | Blank | Z13-4FM06 | Q159824 | Standard |
| Z13-4F27 | Q180084 | Standard | Z13-4F45 | N549244 | Standard | Z13-4FM06 | Q159835 | Blank |
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| Z13-4F27 | Q180115 | Blank | Z13-4F45 | N549275 | Blank | Z13-4FM06 | Q159864 | Standard |
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| Z13-4F27 | Q180135 | Blank | Z13-4F45 | N549295 | Blank | Z13-4FM06 | Q159884 | Standard |
| Z13-4F27 | Q180144 | Standard | Z13-4F45 | N549304 | Standard | Z13-4FM06 | Q159895 | Blank |
| Z13-4F27 | Q180155 | Blank | Z13-4F45 | N549315 | Blank | Z13-4FM06 | Q159904 | Standard |
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| Z13-4F27 | Q180195 | Blank | Z13-4F45 | N549355 | Blank | Z13-4FM06 | Q159944 | Standard |
| Z13-4F27 | Q180204 | Standard | Z13-4F45 | N549364 | Standard | Z13-4FM06 | Q159955 | Blank |
| Z13-4F27 | Q180215 | Blank | Z13-4F45 | N549375 | Blank | Z13-4FM06 | Q159964 | Standard |
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| Z13-4F27 | Q180244 | Standard | Z13-4F45 | N549404 | Standard | Z13-4FM06 | Q159995 | Blank |
| Z13-4F27 | Q180255 | Blank | Z13-4F45 | N549415 | Blank | Z13-4FM06 | Q160004 | Standard |


| Z13-4F27 | Q180264 | Standard | Z13-4F45 | N549424 | Standard | Z13-4FM06 | Q160015 | Blank |
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| Z13-4F27 | Q180284 | Standard | Z13-4F46 | N549444 | Standard | Z13-4FM06 | Q160035 | Blank |
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| Z13-4F27 | Q180304 | Standard | Z13-4F46 | N549464 | Standard | Z13-4FM06 | Q160055 | Blank |
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| Z13-4F27 | Q180324 | Standard | Z13-4F46 | N549484 | Standard | Z13-4FM06 | Q160075 | Blank |
| Z13-4F27 | Q180335 | Blank | Z13-4F46 | N549495 | Blank | Z13-4FM06 | Q160084 | Standard |
| Z13-4F27 | Q180344 | Standard | Z13-4F46 | N549504 | Standard | Z13-4FM06 | Q160095 | Blank |
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| Z13-4F27 | Q180384 | Standard | Z13-4F46 | N549544 | Standard | Z13-4FM06 | Q160135 | Blank |
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| Z13-4F28 | Q180415 | Blank | Z13-4F46 | N549575 | Blank | Z13-4FM06 | Q160164 | Standard |
| Z13-4F28 | Q180424 | Standard | Z13-4F46 | N549584 | Standard | Z13-4FM06 | Q160175 | Blank |
| Z13-4F28 | Q180435 | Blank | Z13-4F46 | N549595 | Blank | Z13-4FM06 | Q160184 | Standard |
| Z13-4F28 | Q180444 | Standard | Z13-4F46 | N549604 | Standard | Z13-4FM06 | Q160195 | Blank |
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| Z13-4F28 | Q180464 | Standard | Z13-4F46 | N549624 | Standard | Z13-4FM06 | Q160215 | Blank |
| Z13-4F28 | Q180475 | Blank | Z13-4F46 | N549635 | Blank |  |  |  |
| Z13-4F28 | Q180484 | Standard | Z13-4F46 | N549644 | Standard |  |  |  |
| Z13-4F28 | Q180495 | Blank | Z13-4F46 | N549655 | Blank |  |  |  |
| Z13-4F28 | Q180504 | Standard |  |  |  |  |  |  |
| Z13-4F28 | Q180515 | Blank |  |  |  |  |  |  |

## APPENDIX 4

RE- ASSAY RESULTS OF 2011 AND 2012 PULPS, REJECT AND CORE MATERIAL

