Item 1. TITLE PAGE

IAMGOLD CORPORATION

NI 43-101 Technical report, Surface diamond drilling exploration program for rare earth elements, 2012

NIOBEC MINE PROPERTY

Report prepared by

Louis Grenier, Geo.

Exploration geologist, Niobec Inc.

and

Jean-François Tremblay, Geo.

Supervisor geologist, Niobec Inc.

Report reviewed and approved by

Réjean Sirois, P. Eng.

Vice President, Geology and Resources

G. Mining Services Inc.

March 18th, 2013

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Item 3. SUMMARY

In 2012, the geological team of Niobec Inc., a subsidiary of IAMGOLD Corporation Inc., acted as the operator of the Rare Earth Elements (REE) exploration project. The exploration program results and the mineral resources performed on the REE zone are published in a Technical Report complying with the National Instrument 43-101. The authors of the report are Louis Grenier, Geo. and Jean-François Tremblay, Geo. respectively exploration geologist and senior geologist at Niobec mine site. Réjean Sirois, P.Eng., of G. Mining Services Inc. undertook the role of Qualified Person for the work program and the current mineral resource estimate. All data sources come from the surface drilling done in 2011 and 2012, the underground drilling (S-3607) and the historical data since 1968, time of the discovery.

The Niobec property, which contains the REE zone in a carbonatite complex (St Honoré carbonatite complex), is located thirteen kilometres North of Ville de Saguenay (Chicoutimi), in the limits of the municipality of Saint-Honoré, in the Simard Township, Quebec. This property, held 100% by Niobec Inc., consists of 2 mining leases and 179 claims for 8,010.85 ha. An agreement dated August 31st, 2011 between Niobec Inc. and IAMGOLD granted to IAMGOLD 100% of the beneficial rights to all the non-niobium mineral rights located on the property (including the rights to the REE's).

The St-Honoré carbonatite complex (SHCC) was discovered by SOQUEM ("Société Québécoise d'Exploration Minière") in 1967. The SHCC is host in a Precambrian rocks (the Saguenay-Lac-St-Jean anorthosite complex) belonging to the Grenville orogenic province of the Canadian Shield (Figure. 3).

This annular intrusive mass, which is almost completely covered by the Trenton limestone of Paleozoic age, is elliptical in planview. The North-East major axial lengthen approximately 3 kilometres and the intrusive covered a surface of about 8 km². Dated by Potassium-Argon (K-Ar) to be 650 my old, the SHCC is part of the igneous alkaline activity related to a tectonic extension event known as Lapetan rift system of the end of Precambrian.

This Alkaline complex is composed of a central carbonatite core, surrounded by an alkaline syenite, a feldspathoid bearing syenite and syenitic foidites (Ijolites and Urtites). The Greenville basement, constituted in this area by pyroxene syenites, Diorites (with hypersthene or magnetite), syeno-diorite with aegyrine and pyroxene gneiss, is highly fenitized near the contact with the SHCC.

The carbonatite core comprises concentric lenses of calcitites (Sovites) and dolomitites (rauhaugites), interpreted as cones sheets and ring dykes. These units consist of a series of crescentric lenses of carbonatite with compositions younging progressively inwards from calcitite through dolomitite to ferro-carbonatite. The massive to brecciated ferrocarbonatite, which form the central core, contains the REE mineralization, mainly as REE fluorocarbonates and monazite. The mineralization is disseminated between the dolomite crystal phase in the massive facies or form part of the breccia cement in the brecciated facies. REE mineralization is associated with hematite, chlorite, ferroan dolomite, minor thorite, ilmenorutile and pyrite.

The property has been explored since its discovery in 1967 by SOQUEM and SOQUEM & Associates until 1986. Approximately 3500 metres of diamond drill holes have been realized on the REE Zone. The REE mineralization and its economic aspects were identified.

In 2011, IAMGOLD CORPORATION undertook a first 13,798 m drill reconnaissance campaign (29 drill holes) to a depth of 400 m. Added to the SOQUEM drill holes, a first resource estimation of 466.8 million tonnes at a grade of 1.65% total rare earth oxides (TREO) was reported by P.J. Lafleur Geo-Conseil Inc., in March 2012. In 2012, exploration and definition drilling added 23, 851 m (33 drill holes) and tested the REE zone to a depth of 1,200 m.

The drill program conducted by the company on the REE zone aimed to define the three dimensional geometry of the REE zone, upgrade some inferred into indicated resources, extend the inferred resources to the depth of 700 m, provide samples for metallurgical test work and increased the REE mineralization knowledge. The drill program was completed on a 100 by 100 metres grid down to 400 m and on a 100 by 200 metres grid down to 700 m. Three holes exceeded 1,000 metres in total length, and reach a maximum length of 1,337 metres. The two deepest holes demonstrated that the REE zone persists uninterrupted at depth, although the resource model is reported only to a depth of 700 metres below surface.

Based on these new drilling results, a resource estimate was prepared by Réjean Sirois, Eng., an independent Qualified Person, Vice President, Geology & Resources at G. Mining Services Inc., Brossard, Quebec. The REE resource corresponds to an enriched zone of Light REEs (LREE) which is characteristic of this annular carbonatite type. LREEs comprise 98.1% of the weight of the Total REEs (TREE), with the remaining 1.9% Heavy REEs (HREE) that could potentially add significant economic value. The REE zone is estimated at **531.4 Million Tonnes of Indicated resources at an average grade of 1.64% Total Rare Earth Oxides (TREO) and an Inferred Resources of 527.2 Million Tonnes at an average grade of 1.83% TREO**, to an approximately depth of 700 metres below surface (the surface lies at a reference elevation of 10,000 metres).

Item 4. INTRODUCTION AND TERMS OF REFERENCE

This report was prepared by the Niobec mine site geological team and summarized the 2012 works conducted on the Rare Earth Elements exploration project for IAMGOLD Corporation. The surface diamond drilling exploration program was realised about 1 km North of the underground Niobec mine activities, St-Honoré, Quebec. Based on the mining and the metallurgical knowledge, the exploration focused on delimiting and characterizing the rare earth elements mineralized zone while defining and increasing the mineral resources.

Geological data in this report comes from different sources. Over the 35 years of mining at Niobec, internal documents (internal Gems database, internal report, MRNFQ GM filed, historical maps and drilling data, etc.), provided numerous information to the geology department. All the references are available in the Item 23. This report is the results of a compilation and interpretation of the geological description and the geochemical analysis of thirty three new surface diamond drill holes completed in 2012 in a well-known geological environment.

The main authors of the report are M Louis Grenier, Geo. and M Jean-François-Tremblay, Geo., respectively exploration geologist and senior geologist for IAMGOLD on Niobec site. Both supervised all the REEs exploration project operation, conducted by Niobec employees and specialized contractors on mine site, and are responsible for the Item 7 to 26 (property, geology and data), except Item 18 and 19, of the report. Pierre Pelletier, Eng. and Vice-president metallurgy at IAMGOLD, contributed to Item 18 (processing) and Réjean Sirois, Eng., Vice President Geology and Resources at G. Mining Services Inc. is responsible for the Item 19 (resources). Marie-France Bugnon, P.Geo., General manager Exploration for IAMGOLD and Steve Thivierge, Eng. Special projets and geology Superintendant at Niobec contributed to the overall edition of the report. All six persons above are qualified persons (QP) according to the NI 43-101 guidelines.

Item 5. RELIANCE ON OTHER EXPERTS

5.1 Other Data Source

The technical material considered in the present report is based on the existing data produced by IAMGOLD. This material includes a technical report complying with the NI 43-101 published in 2009, 2011 and 2012 relating to the Niobec mine, a technical report complying with the NI 43-101 published in 2012 relating to the REEs zone and various other technical reports regarding the St-Honoré Carbonatite Complex hosting the niobium and REEs depots. Item 23 provides a full list of reference documents used in preparing this report. In the production of this NI 43-101 technical report, the authors has relied on the data collected essentially by new drilling on the REEs zone in 2011-2012 and by producing an updated compilation of geological data.

5.2 Limited Responsibility of the Authors

The authors responsibility are limited to using the data collected by IAMGOLD, assuming it is the best data available to perform this compilation of the REEs zone. The authors do not take any responsibility for the quality of the data that was historically produced by IAMGOLD, other than the customary verification done to comply with the NI 43-101 rules.

The authors responsibility are limited to making a statement about the mineral resources estimation based on the original data and by applying the best method to create its models. There is no mine plan to estimate the mineral reserves at this stage.

The authors had found the quality of the data to be in good standing. There is no reason to doubt or further investigate its validity based on the evidence available at the time of writing this report. The present report intends to comply with the NI 43-101 rules regarding the production of a Technical Report.

The authors are acting as technical experts in the area of geology and mining only. They has limited legal or financial expertise applied to exploration and mining.

5.3 Reasonable data verification

The authors did verify the data available to them for inconsistencies and database entry errors and applied standard statistical methods commonly used in the exploration and mining industry to characterize the data. Topographic plans, mine plans and maps showing the property limits were used to determine the volume of resources available, but the authors did not verify completely the source of information or the legal status of the property, including the rights to own, explore and extract ore material from the site. The authors are not aware of the existence of any claims on the property due to financial grievances (bankruptcy, mortgage, debts, etc.), liabilities or responsibilities due to environment rules, policies or claims to impeach the development of the project.

The authors' knowledge of the region satisfied that the geographic, topographic and geologic information used in this report is correct. The results and opinions expressed in this report are dependent on the accuracy of the geological and legal information's mentioned above, which are up to date and complete at the date of publication of the report. It is understood that no information susceptible to influence the conclusion of the present report were withheld from the study. The authors assert the right, but not the obligation, to modify this report and its conclusions if new information is presented after the date of publication.

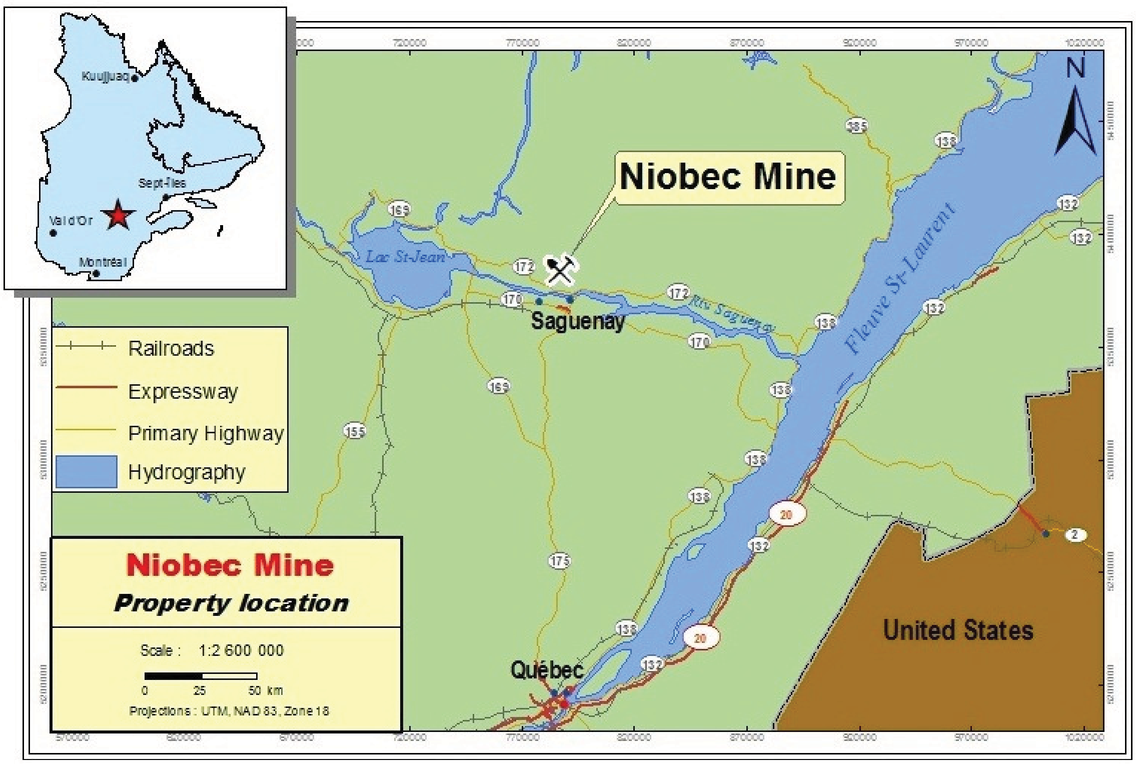
Item 6. PROPERTY DESCRIPTION AND LOCATION

This item 6 is partially summarized from the NI43-101 of February 2009 and March 2011, after validation for the mining titles status from the "Ministère des Ressources naturelles et de la Faune" (MRNF. Web site: www.mrn.gouv.qc.ca).

6.1 Property location

The Niobec property, which contains the REE Zone and the Niobec mine, is located thirteen kilometres north of Ville de Saguenay (Chicoutimi), in the limits of the municipality of St-Honoré, in Simard Township, Quebec (Figure 1).

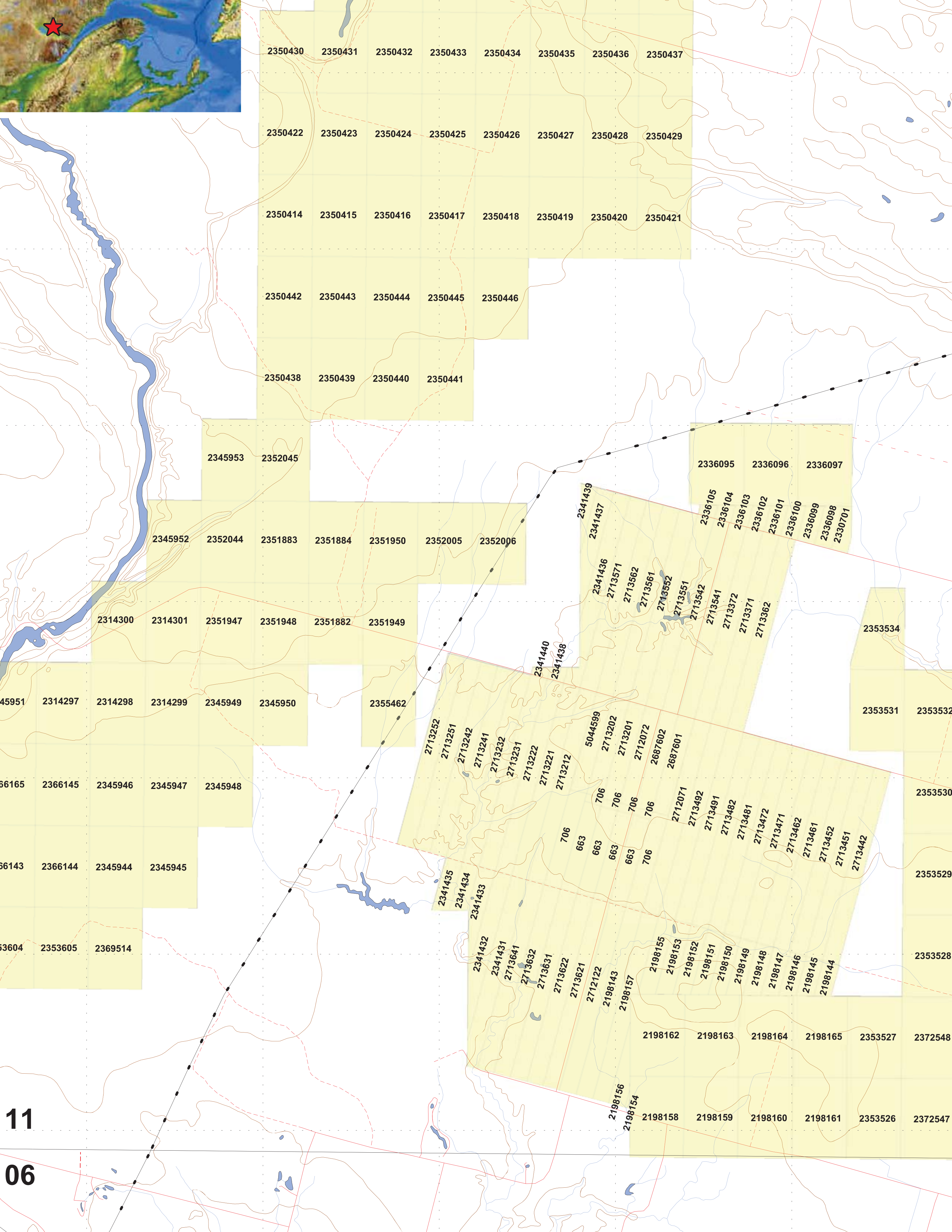
Figure 1: Niobec property location



6.2 Property description

The Niobec property is held 100% by Niobec Inc., a wholly-owned subsidiary of IAMGOLD Corporation.

The Niobec mine is located on a property of 8,010.85 hectares comprising two mining leases, No 663 and 706 (with surface area of 79.9 and 49.5 hectares respectively), and 179 claims totaling 7,881.4 hectares. The property was enlarged in 2010 with the acquisition of all rights into 23 claims. In 2011 and 2012, for the purpose of the Niobec Expension project, 113 news claims were acquired principally on the North and the West area of the mining leases. The mining leases have been renewed until 2015 (Figure 2). At the end of December 2012, four claims were suspended because they were under a new mining leases request at the MRNF.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6.3 Mining titles status

Table 1 describes the Claims and Leases of the Niobec Property, with their location shown on Figure 2. This information was taken from the Quebec Ministry of Natural Resources website http://www.mrnf.gouv.qc.ca/mines/titres/titres-gestim.jsp., with the registration certificates received by the company and validated by the authors as of December 2012.

Table 1: Mining titles status. (Property Claims = CDC and CL; Mining leases = BM)

NTS Sheet	Type of title	Title no.	Status	Registration date	Expiry date	Surface (Ha)	Registered owner (name, number and percentage)
22D11	BM	663	Active	19750116	20150115	79.93	Niobec inc. (88562) 100 %
22D11	BM	706	Active	19800605	20150604	49.52	Niobec inc. (88562) 100 %
22D11	CDC	2198143	Active	20100105	20140104	42.4	Niobec inc. (88562) 100 %
22D11	CDC	2198144	Active	20100105	20140104	7.41	Niobec inc. (88562) 100 %
22D11	CDC	2198145	Active	20100105	20140104	8.42	Niobec inc. (88562) 100 %
22D11	CDC	2198146	Active	20100105	20140104	9.4	Niobec inc. (88562) 100 %
22D11	CDC	2198147	Active	20100105	20140104	10.4	Niobec inc. (88562) 100 %
22D11	CDC	2198148	Active	20100105	20140104	11.63	Niobec inc. (88562) 100 %
22D11	CDC	2198149	Active	20100105	20140104	12.34	Niobec inc. (88562) 100 %
22D11	CDC	2198150	Active	20100105	20140104	13.34	Niobec inc. (88562) 100 %
22D11	CDC	2198151	Active	20100105	20140104	14.31	Niobec inc. (88562) 100 %
22D11	CDC	2198152	Active	20100105	20140104	15.29	Niobec inc. (88562) 100 %
22D11	CDC	2198153	Active	20100105	20140104	16.27	Niobec inc. (88562) 100 %
22D11	CDC	2198154	Active	20100105	20140104	0.54	Niobec inc. (88562) 100 %
22D11	CDC	2198155	Active	20100105	20140104	17.26	Niobec inc. (88562) 100 %
22D11	CDC	2198156	Active	20100105	20140104	11.14	Niobec inc. (88562) 100 %
22D11	CDC	2198157	Active	20100105	20140104	41.07	Niobec inc. (88562) 100 %
22D11	CDC	2198158	Active	20100105	20140104	57.05	Niobec inc. (88562) 100 %
22D11	CDC	2198159	Active	20100105	20140104	57.05	Niobec inc. (88562) 100 %
22D11	CDC	2198160	Active	20100105	20140104	57.05	Niobec inc. (88562) 100 %
22D11	CDC	2198161	Active	20100105	20140104	57.05	Niobec inc. (88562) 100 %
22D11	CDC	2198162	Active	20100105	20140104	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2198163	Active	20100105	20140104	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2198164	Active	20100105	20140104	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2198165	Active	20100105	20140104	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2314297	Active	20110930	20130929	57.01	Niobec inc. (88562) 100 %
22D11	CDC	2314298	Active	20110930	20130929	57.01	Niobec inc. (88562) 100 %
22D11	CDC	2314299	Active	20110930	20130929	57.01	Niobec inc. (88562) 100 %
22D11	CDC	2314300	Active	20110930	20130929	57	Niobec inc. (88562) 100 %
22D11	CDC	2314301	Active	20110930	20130929	57	Niobec inc. (88562) 100 %
22D11	CDC	2330701	Active	20120125	20140124	8.54	Niobec inc. (88562) 100 %
22D11	CDC	2336095	Active	20120316	20140315	56.98	Niobec inc. (88562) 100 %
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22D11	CDC	2336101	Active	20120316	20140315	6.42	Niobec inc. (88562) 100 %
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22D11	CDC	2341434	Active	20120418	20140417	10.61	Niobec inc. (88562) 100 %
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22D11	CDC	2341437	Active	20120418	20140417	22.11	Niobec inc. (88562) 100 %

NTS Sheet	Type of title	Title no.	Status	Registration date	Expiry date	Surface (Ha)	Registered owner (name, number and percentage)
22D11	CDC	2341438	Active	20120418	20140417	3.34	Niobec inc. (88562) 100 %
22D11	CDC	2341439	Active	20120418	20140417	7.36	Niobec inc. (88562) 100 %
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22D11	CDC	2351947	Active	20120620	20140619	57	Niobec inc. (88562) 100 %
22D11	CDC	2351948	Active	20120620	20140619	57	Niobec inc. (88562) 100 %
22D11	CDC	2351949	Active	20120620	20140619	57	Niobec inc. (88562) 100 %
22D11	CDC	2351950	Active	20120620	20140619	56.99	Niobec inc. (88562) 100 %
22D11	CDC	2352005	Active	20120620	20140619	56.99	Niobec inc. (88562) 100 %

NTS Sheet	Type of title	Title no.	Status	Registration date	Expiry date	Surface (Ha)	Registered owner (name, number and percentage)
22D11	CDC	2352006	Active	20120620	20140619	56.99	Niobec inc. (88562) 100 %
22D11	CDC	2352044	Active	20120621	20140620	56.99	Niobec inc. (88562) 100 %
22D11	CDC	2352045	Active	20120621	20140620	56.98	Niobec inc. (88562) 100 %
22D11	CDC	2353526	Active	20120629	20140628	57.05	Niobec inc. (88562) 100 %
22D11	CDC	2353527	Active	20120629	20140628	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2353528	Active	20120629	20140628	57.03	Niobec inc. (88562) 100 %
22D11	CDC	2353529	Active	20120629	20140628	57.02	Niobec inc. (88562) 100 %
22D11	CDC	2353530	Active	20120629	20140628	57.02	Niobec inc. (88562) 100 %
22D11	CDC	2353531	Active	20120629	20140628	57.01	Niobec inc. (88562) 100 %
22D11	CDC	2353532	Active	20120629	20140628	57.01	Niobec inc. (88562) 100 %
22D11	CDC	2353533	Active	20120629	20140628	57.01	Niobec inc. (88562) 100 %
22D11	CDC	2353534	Active	20120629	20140628	47.32	Niobec inc. (88562) 100 %
22D11	CDC	2353604	Active	20120703	20140702	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2353605	Active	20120703	20140702	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2355462	Active	20120718	20140717	57.01	Niobec inc. (88562) 100 %
22D11	CDC	2366143	Active	20121009	20141008	57.03	Niobec inc. (88562) 100 %
22D11	CDC	2366144	Active	20121009	20141008	57.03	Niobec inc. (88562) 100 %
22D11	CDC	2366145	Active	20121009	20141008	57.02	Niobec inc. (88562) 100 %
22D11	CDC	2366165	Active	20121009	20141008	57.02	Niobec inc. (88562) 100 %
22D11	CDC	2369513	Active	20121106	20141105	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2369514	Active	20121106	20141105	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2369515	Active	20121106	20141105	57.03	Niobec inc. (88562) 100 %
22D11	CDC	2369516	Active	20121106	20141105	57.02	Niobec inc. (88562) 100 %
22D11	CDC	2372547	Active	20121210	20141209	57.05	Niobec inc. (88562) 100 %
22D11	CDC	2372548	Active	20121210	20141209	57.04	Niobec inc. (88562) 100 %
22D11	CDC	2372549	Active	20121210	20141209	57.03	Niobec inc. (88562) 100 %
22D11	CDC	2372550	Active	20121210	20141209	57.02	Niobec inc. (88562) 100 %
22D11	CDC	2372551	Active	20121210	20141209	57.01	Niobec inc. (88562) 100 %
22D11	CL	2687601	Active	19671026	20130913	20	Niobec inc. (88562) 100 %
22D11	CL	2712071	Active	19671026	20130913	40	Niobec inc. (88562) 100 %
22D11	CL	2712122	Active	19671026	20130914	40	Niobec inc. (88562) 100 %
22D11	CL	2713212	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713221	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713222	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713231	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713232	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713241	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713242	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713251	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713252	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713362	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713371	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713372	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713442	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713451	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713452	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713461	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713462	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	2713471	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713472	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713481	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713482	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713491	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713492	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713541	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713542	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713551	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713552	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713561	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713562	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713571	Active	19671026	20130925	40	Niobec inc. (88562) 100 %

NTS Sheet	Type of title	Title no.	Status	Registration date	Expiry date	Surface (Ha)	Registered owner (name, number and percentage)
22D11	CL	2713621	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713622	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713631	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713632	Active	19671026	20130924	40	Niobec inc. (88562) 100 %
22D11	CL	2713641	Active	19671026	20130925	40	Niobec inc. (88562) 100 %
22D11	CL	5044599	Active	19891123	20131122	20	Niobec inc. (88562) 100 %
22D11	CL	2687602	Suspended	19671026	20130913	21.4	Niobec inc. (88562) 100 %
22D11	CL	2712072	Suspended	19671026	20130913	21.4	Niobec inc. (88562) 100 %
22D11	CL	2713201	Suspended	19671026	20130924	21.4	Niobec inc. (88562) 100 %
22D11	CL	2713202	Suspended	19671026	20130924	21.4	Niobec inc. (88562) 100 %
TOTAL :		**181**	**Titles**			**8010.85**	**ha**

Item 7. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

This item 7 is from NI43-101 Technical Report Niobec Mine 2009 (Belzile E., 2009).

7.1 Accessibility

The Niobec mine is readily accessible by existing paved roads and benefits from available water supply and electric power supply sources. The Niobec mine facilities include a head frame, a pyrochlore-to-niobium pentoxide (Nb2O5) concentrator, a concentrate-to ferroniobium converter and ancillary surface installations.

7.2 Local Resources and Infrastructures

Niobec mine is close to Ville de Saguenay with a population of about 150,000. The city is serviced several times a day by regional airlines from Montreal. It is about a two hours' drive to Quebec City and five hours to Montreal. Schools (up to University), Hospitals, Governmental services, suppliers and manpower are all available in Ville de Saguenay and at some villages in the vicinity.

7.3 Climate and Physiography

Topography is relatively flat in the vicinity of the mine with an average altitude of 144 metres above sea level. The mine is surrounded by a mix of forest and farms.

The climate of Ville de Saguenay area is temperate with warm summers and cold winters. The mean annual temperature is 2.3°C, with average daily temperatures ranging from -16.1°C in January to +18.1°C in July. The average total annual precipitation is 951 mm, peaking in July (123 mm) and at a minimum in February (51 mm). Snow falls from October to April, with most occurring between November and March. Peak snowfall occurs in December, averaging 82 cm (equivalent to 67 mm of water).

The information is based on data collected at the Bagotville meteorological station between 1971 and 2000, as reported by the CRIACC (www.CRIACC.qc.ca).

Item 8. History

Following a regional airborne radiometric survey in search for uranium in 1967, Soquem (Société Québécoise d'Exploration Minière) detected a high-intensity radiometric anomaly near St-Honoré, Quebec (Vallée and al., 1969).

Detailed exploration confirmed the radiometric anomaly (high value of thorium and presence of REE) and revealed a carbonate rock locally poor in REE and radioactive elements. The association of these features with a large roughly circular magnetic anomaly suggested the existence of a large carbonatite and alkaline rock intrusive complex. This anomaly was centered on the core of the complex, now referred to as the REE Zone, and a second radiometric anomaly on the syenite intrusive outcropping through the limestones, southeast of the carbonatite (Vallée and al., 1969).

Magnetic and radiometric anomalies were outlined by geophysical prospecting and, subsequently drilled to delineate two zones of economic concentrations of niobium and one REE enrichment zone.

In 1970, Copperfield Mining joined Soquem to explore and develop this project. Twenty one kilometres of diamond drill holes were realized until 1973 to recognize and delineate the two niobium zones. In parallel, five short drill holes ("Série 700" of REE Zone) totaling 706 metres have been realized between 1968 and 1970 on the Central radiometric and magnetic anomaly allowing the discovery of REE mineralization, grading 1.87% REO[1].

In 1974, after 700 bench scale tests, 11 months of pilot plant operation and worldwide market research, a joint decision was taken to initiate the development of 1500 t/day, Niobium mine and mill, under the management of Teck Corporation. The construction was completed in early 1976 both on time and within budget.

In 1975, parallel to the Niobium mine development, 8 drill holes ("Série 800") totaling about 958 metres realized on the central core allowed to recognize the REE Zone, particularly in its north-east part. The recognized REE mineralization gives an average of 5973 ppm in Lanthanides, equivalent to 2.8% TREO[2].

In 1978, 2 drill holes touched the southern edge of the REE Zone (total of 672 metres) while Soquem was drill testing some exploration targets at the scale of the carbonatite.

In 1985, three deep drill holes ("Série 85") totaling 1566 metres have been realized with the aim to extend the recognition on the whole central core, to locate a mineralization with coarser grains of lanthanide and to draw-up a detailed inventory of the various element of

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[1] In 1970, Vallée & Dubuc reported only 3 drillholes and 328 metres of drilling for that period.
[2] In 1986, Dénommé & al reported only 6 drillholes over 585 metres averaging 0.69% La_2O_3 for 1975.

lanthanides. This campaign allowed to define a depth limit of 60m for the hematitic weathered facies, to outline lanthanide rich zones (>2%) in the central part and to recognize the same lanthanides mineralogy and grain size down below the weathered hematitic facies (Bastnaesite and monazite in fine needles or in reddish brown-purple accumulations) (Dénommé & al, 1986).

In 1986, Cambior Inc. acquired the Soquem share in the mine and in 2001 Teck Corporation sold their interest to Mazarin Inc. of Quebec City. In December 2003, Sequoia Minerals Inc. was created as the result of a corporate reorganization of the Mazarin Inc. operations whereby the metal and industrial minerals segment (niobium, dolomite and graphite) became a separate corporation (Sequoia).

In 2004, Sequoia Minerals Inc. shareholders voted in favor of a takeover offer by Cambior Inc., clearing the way for the company to take full ownership of North America's only niobium mine.

In September 2006, IAMGOLD Corporation and Cambior announced their merge to create a new entity. IAMGOLD Corporation Inc. owns 100% of the Niobec mine since November 2006.

In September 2011, Niobec Inc., a 100% IAMGOLD Corporation owned company, is created. Niobec Inc. is the operator of Niobec mine and the owner of the beneficial right of the niobium mineral. In August 31st, an agreement between Niobec Inc. and IAMGOLD granted to IAMGOLD 100% of the beneficial rights to all the non-niobium mineral rights located on the property (including the rights to the REE's).

In 2011, after a long quiet period, REEs became in short supply and prices reached historic highs. A new economic interest for the REE Zone by IAMGOLD-Niobec Inc. boosted the exploration interest by the realization of a first drilling campaign of 29 drill holes totaling 13,798 metres to evaluate the REE resources.

In 2012, the exploration program is pursued. A total of 33 new drill holes for 23,851 metres help defined the three dimensional REEs mineralisation geometry, transform the 2011 inferred resources into indicated resources, extend the inferred resources to the depth of 700 m, provide samples for metallurgical test work and increased the REE mineralization knowledge.

Table 2: Previous exploration drilling, Niobec property.

Year	Area	Total Holes	Total Metres	Hole numbers	Comments
1967	REE Zone	2	54.86	B802-701, B802-702	First holes on the surface Rare Earth Elements discovery
1968	REE Zone & Niobec deposit	14	2,291	782-701 ext, 782-703 to 715	Follow-up on the REE Zone & discovery of the Niobec deposit
1969	Niobec deposit	5	1,493	782-716 to 782-720	Resource development drilling
1971	Niobec deposit	72	21,301	782-721 to 778; 782-101 to 114	Resource development drilling
1972	Niobec deposit	3	1,214	782-115, 116 & 779 (shaft pilot hole)	Resource development drilling & Shaft pilot hole - Feasibility study to develop an underground mine initiated
1973	Niobec deposit	8	2,901	782-780 to 787, & 782-763 ext.	Resource development drilling
1978	REE Zone	8	957	782-801 to 808	REE Zone
1978	Property	13	3,294	782-901 to 913	Property-wide exploration program
1980	Niobec deposit	15	7,978	E-001 to E-015	Exploration in deposit extensions - West & East
1980	Property	3	935	782-915, 916, 917	Exploration of Niobium satellite zone
1985	REE Zone (deep)	3	1,566	85-1 to 85-3	REE Zone (deep)
2003	Niobec deposit	1	401	E-2003-1	Exploration of Niobec deposit extensions - South
2011	Niobec deposit	15	9,345	2011-NB-001 to 2011-NB-015	Exploration of Niobec deposit extensions – East & West
2011	REE Zone	29	13,798	2011-REE-001 to 2011-REE-028 and S-3607	Exploration of the REE zone
2012	Niobec deposit	3	1,833	2011-NB-015 to 2011-NB-017	Condemnation drilling for future expansion project
2012	REE Zone	33	23,851	2011-REE-029 to 2011-REE-061	Exploration and resources development of the REE zone.
TOTAL		**227**	**93,217**	**metres**	

Item 9. Geological Setting

9.1 Regional Geology

The Saguenay region is mainly composed of Precambrian rocks (Figure. 3) belonging to the Grenville orogenic province of the Canadian Shield (Roy, 1977; Laurin and Sharma, 1975; Jooste, 1958; Denis, 1937). The metamorphism reached the upper amphibolite facies-granulite and at least three generations of folds are superimposed. More recently, the Grenville province was divided three distinct lithostructural units (modified from Belzile, 2009):

- The first Unit constitutes a gneiss complex that is divided in three Groups (Groups I, II and III) based on increasing structural complexity from the youngest to the oldest Group. All the rocks from the Group I have been migmatized and deformed during the Hudsonian Orogeny (1,735 million years ago).

- The second Unit is represented by anorthosite and charnockite-mangerite batholiths showing well preserved igneous structures and textures. Anorthosite which range from pre- to post Greenvillian age, are regarded as evidence of crustal extension, the Neohelikian extensional tectonics, which continued during the Grenville Orogeny, 935 million years ago. The mangerites are believed to have been generated by partial melting of the lower crust by the anorthosite bodies, and forms the host rocks of the St-Honoré carbonatite complex.

- The third Unit is characterized by calc-alkaline intrusions that cross-cut the host rocks. The mineralogy of these intrusions is of superior amphibolite facies. At the beginning of the Palaeozoic (or end of the Precambrian), a younger episode of rifting, south of the Neohelikian rift, referred to as the Lapetan Rift System, resulted in the development of the St-Lawrence River rift system (Figure 4). This tectonic extension event incorporated normal faulting, updoming and igneous alkaline activity (Kumarapeli, 1974), including emplacement of the St-Honoré carbonatite.

The St-Honore carbonatite is dated by Potassium-Argon (K-Ar) to be 650 million years old (Vallée and al., 1969).

Figure 3: St-Honoré carbonatite complex and regional geology (modified from Belzile, 2008)

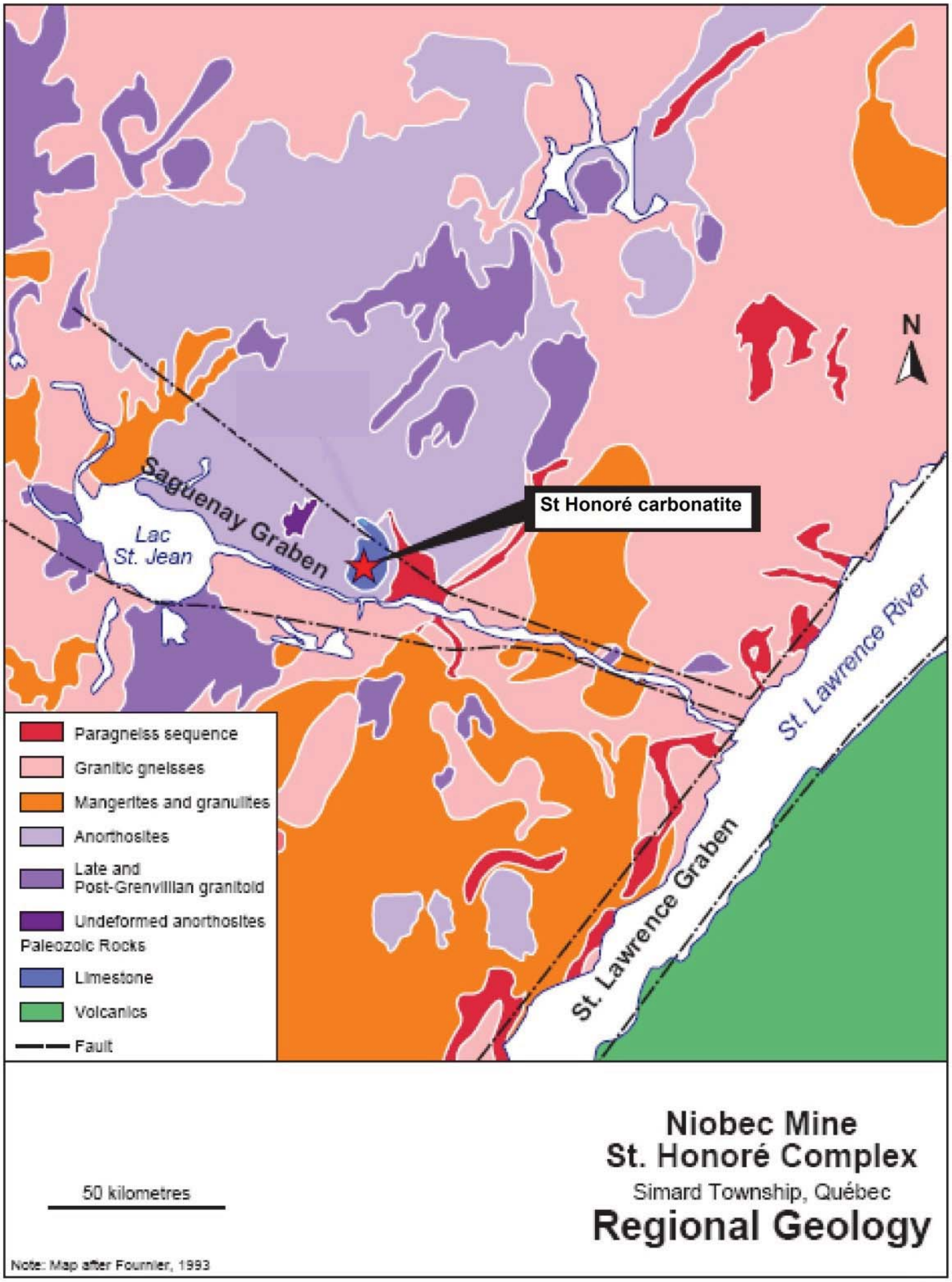
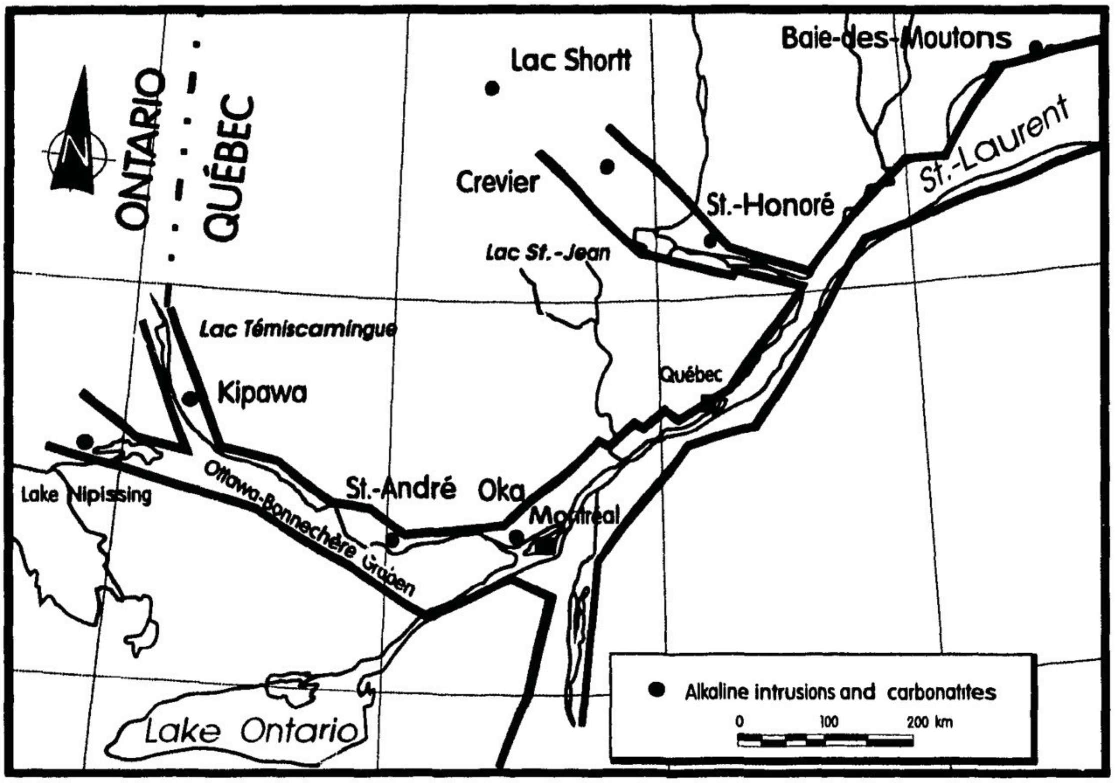


Figure 4: The Lapetan rift system (Fournier, 1993)



9.2 Property Geology

The St.-Honoré alkaline complex is located 13 km NW of Chicoutimi and 5 km West of the town of St.-Honoré. Only few areas of outcrops have been mapped and the intrusive mass is almost completely covered by flat-lying Trenton limestone of Paleozoic age. The core carbonatite intrusion can be interpreted by its regional low magnetic signature and confirmed by numerous exploration drill holes. The intrusion is elliptical in planview, with a north-east major axial length of approximately four kilometres and a surface of about 25 square kilometres.

This alkaline complex intrudes the Grenville basement constituted in this area by pyroxene syenites, diorites (with hypersthene or magnetite), syeno-diorite with aegyrine and pyroxene gneiss (Fortin, 1977).

Carbonatization of the country rocks is interpreted to be a metasomatic alteration product related to the carbonatite complex intrusion (Fortin 1977). This Fenitization is evident from the occurrences of sodic-amphiboles and aegyrine in the host rock, and associated green and red carbonates veinlets (Fortin, 1977).

This carbonatite is known as the host of two individual deposits:

- Niobium deposit in the south part of the carbonatite, which constitute the principal Niobec mine;
- REE Zone mineralized in lanthanides elements, located in the central part of the carbonatite.

9.2.1 The St-Honoré alkaline complex

9.2.1.1 Geological Highlights

The first complete geological map, using the different geophysical surveys and drill holes data realized between 1967 and 1975, has been produced by Soquem geologists (Gauthier.A and al.) in 1978. This map, based on petrographic and geochemical studies which allow the definition of the different carbonatite terms (Fortin, 1977), has been actualized and reinterpreted in 1986 by Niobec Mine geology staff using the additional drill holes data realized by Soquem in 1985.

The geological compilation map of Figure 5 is the result of a synthesis of these entire maps and the drill holes data since 1967.

The Alkaline complex is composed by a central carbonatite core, surrounded by mainly an alkaline syenite, a feldspathoid bearing syenite and syenitic foidites (Ijolites and urtites) (Fortin, 1977; Figure 5). The contact of this complex with the country rocks is marked by a phlogopite calcitite in the northern part and in the southern part by the presence of a cancrinite bearing syenite (Dénommé, 1986).

A chronology has been established for this Alkaline complex as follow from older to younger (Fortin, 1977):

Ijolite - Urtite - Foidites syenite – Feldspathoid syenite – Alkaline syenite – Lamprophyre - Carbonatite

Following a petrographic and geochemical study (Fortin, 1977) of different drill holes cores realized in the carbonatite by Soquem (Gagnon and al., 1973), different carbonatite units with different geochemical characteristics have been established. Four Sovites (Calcitites) types and three Rauhaugites (dolomitites) types have been recognized and constitute the different units of the carbonatite core. These units consist of a series of crescent shape lenses of carbonatite with younger compositions progressively inwards from calcitite through dolomitite to ferro-carbonatite (Fortin, 1997). This evolution is attested by the numerous xenolithes of the alkali syenite rocks in the carbonate at the scale complex and at a smaller scale between the different carbonates facies themselves.

9.2.1.2 St-Honoré Carbonatite Complex Geometry

The St-Honoré carbonatite complex is composed by a central carbonatite core, surrounded by mainly an alkaline syenite, a feldspathoid bearing syenite and syenitic foidites (Ijolites and urtites), where the elliptical carbonatite core is oriented mainly northeast-southwest (Fortin, 1977). From the center to the periphery (Figure 5), this core includes (Modified from Fortin, 1977):

- An eccentric core of brecciated dolomitite and ankeritite (C1), containing up to 4.5% total rare-earth elements as Cerium, Lanthanum, Neodynum, Prasaeodymium and Europium in fine-grained fluorocarbonates minerals (Bastnaesite, Synchisite and Parasite (Fournier, 1993),
- Two low REE and niobium dolomitite in small masses north and south of the brecciated core (C2) and probably a cone sheet of a syenite (S1) to the west,
- Ring dyke of a low-grade niobium and rare-earth dolomitite (C5) in the north, east and west part,
- Cone sheet of a high-grade niobium (>0.4% Nb_2O) white to pink dolomitites with apatite and magnetite in the southern sector (C3) enclosing a mega-xenolith of syenite in its southern limit,
- Cone sheet of pink dolomitites and calcitites (C5'), with high grade niobium mineralization, magnetite, phlogopite and apatite,
- Cone sheet of a barren red feldspathic dolomitite (C9) south of the mine area (C5),
- A cone-sheet of phlogopite calcitite at the northern extremity, with disseminated apatite (C4),
- A cone sheet of pyroxene calcitite, with disseminated apatite in variable thickness, at the southern limit of the core (C6),
- A circular outer ring containing feldspathic and feldspathoidal alkaline rocks mainly syenite (S1), urtite and ijolite,
- A triangular mass of cancrinite (Na-Ca-Al-silicate and carbonate mineral) and garnet syenite encountered at the extreme southeast part of the complex (S2).

Figure 5: Geological compilation map of the St-Honoré Carbonatite Complex (modified from Soquem map 1978 and Niobec map 1986).

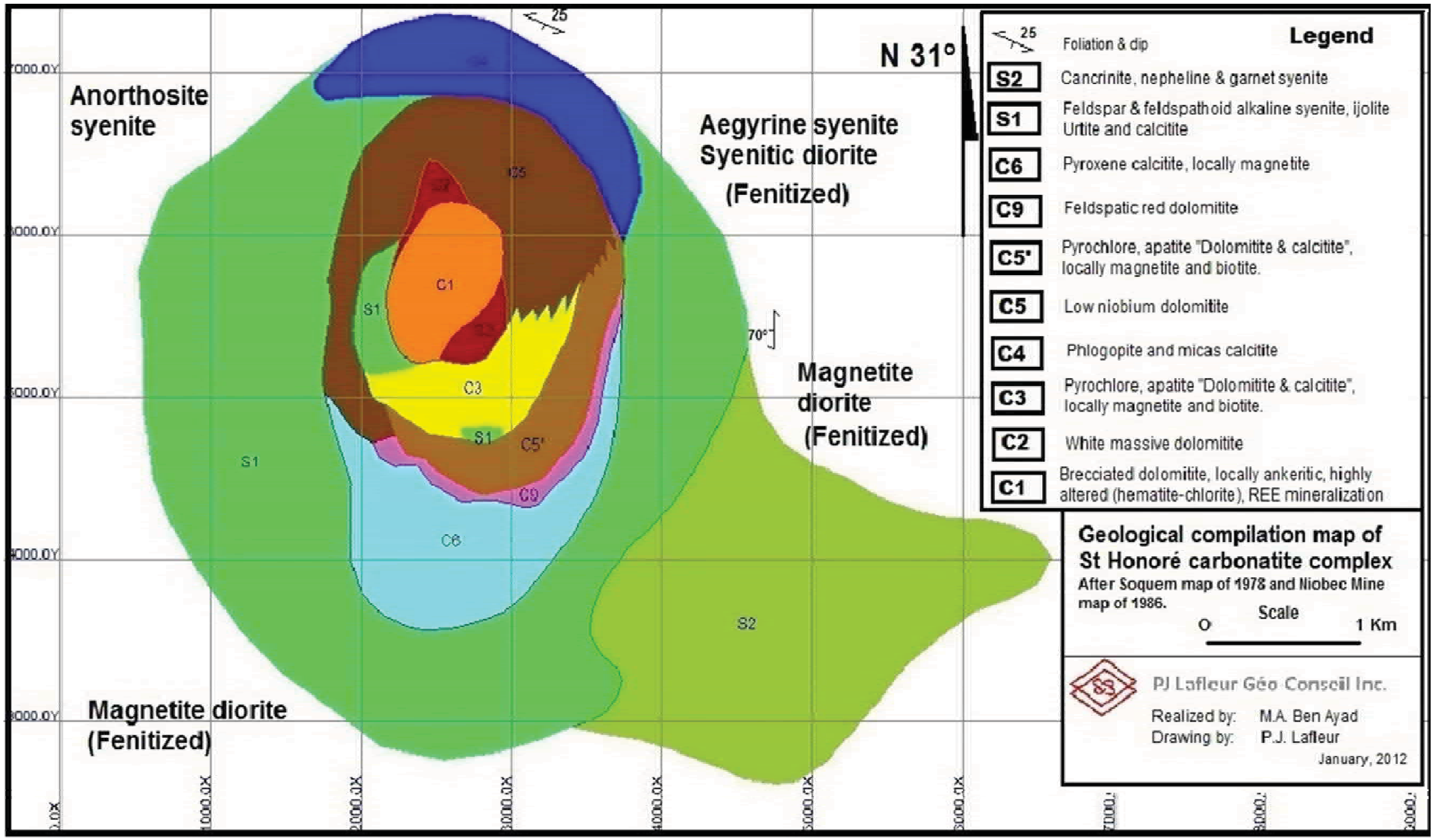
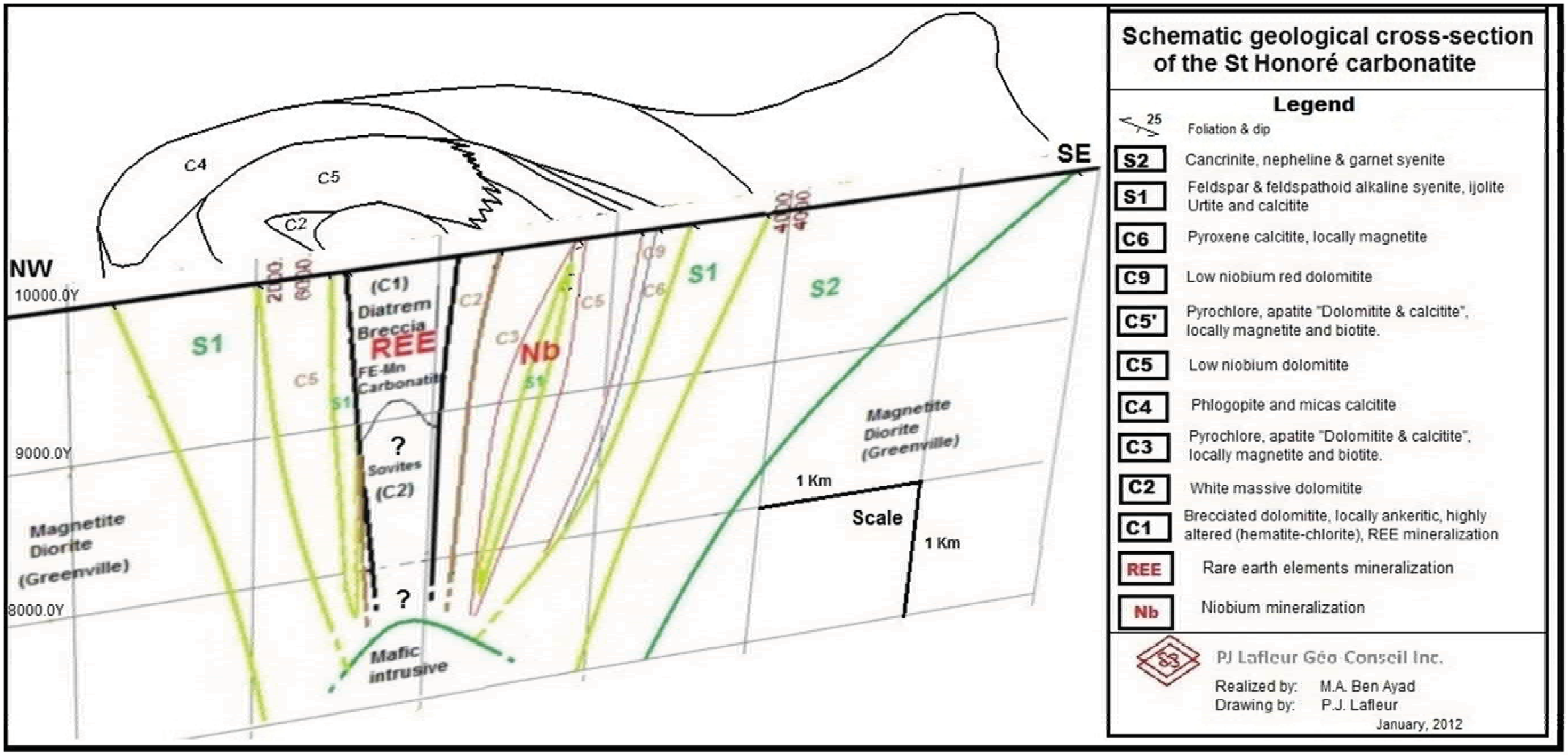


Figure 6: Geological schematic block diagram of the St-Honoré Carbonatite Complex (NW-SE cross section)



Beside these ring-dykes and cone-sheets, numerous calcitic and dolomitic dykes, cogenetic to the dolomitite and calcitite cone-sheets, have been cross-cut by Soquem drill holes (Fortin, 1977).

Regarding the dip of these different ring-dykes and cones-sheets constituting this carbonatite complex, besides the shallow exploration drill holes data of Soquem interpreted with a 70° dipping structures (Vallée and al., 1969), mine drill holes data (surface and underground), show to a depth of 800m, a sub-vertical to 70° dipping to the north of the Mine carbonatite structures (C5 and C3).

Considering the concentric structure of this carbonatite complex, a conical geometry with a strong dip of the different units toward the center of the cones remains the more probable scheme for this carbonatite complex.

A northwest-southeast schematic geological cross section has been established, to better visualize and understand the spatial internal organization of the St-Honoré carbonatite complex (Figure 6).

9.2.1.3 The Carbonatite complex Zoning

Following the petro-geochemical study of the carbonatite complex (Fortin, 1977), zoning seems to manifest itself between the different facies units of the carbonatite regarding their geochemical composition and their chronology:

- The carbonatite complex has a reniform shape consisting of a central portion of carbonatic rocks enclosed in an alkaline syenite;

- The age of the different units of the syenite show a chronologic evolution in the following magmatic suite from "Ijolite-Urtite-Foidite (to) syenite-Feldspathoidic syenite (to) Alkali syenite-Lamprophyre-Carbonatite";

- The age of the different units of carbonates decreasing progressively inwards from alkali syenite, calcitite through dolomitite to ferro-carbonatite;

- The carbonatite comprises concentric lens which evolved from calcitite through dolomitite, to a brecciated core of ferrocarbonatite;

- The carbonatite shows an outward inward carbonate evolution expressed mineralogically by the suite "calcite- dolomite- ankerite-siderite",

In spite of the similarities with other carbonatite complexes, (1) such as the presence of a carbonatite core bordered by a syenite in Oka, (2) zonality between calcitite and dolomitite as in Firesand carbonatite (Superior province, Ontario), the St-Honoré carbonatite complex is different by the absence of ultramafic rocks as in Oka (Fortin, 1977).

9.2.1.4 REE zone geology

9.2.1.4.1 First geology model (Denommé, 1985)

The REE Zone forms the core of the complex (C1), and has an oval shape, elongated towards the northeast with an area of 650 000 m^2. This zone is differentiated from the Main Zone (Niobec mine area: C3 and C5) by its extensive brecciation, the presence of ankerite and high REE content.

Immediately surrounding it (C1), Dénommé (1985) describes a zone of extensively altered dolomitite, which is brecciated but does not host REE minerals. After the 2011 and 2012 works, this surrounding zone is now called the Transition zone where a variable proportion of mineralized C1 brecciated the adjacent carbonatite facies (C2 and C5) or syenite (S1). REE mineral are observed and the proportion of C1 generally increased toward the core zone. The variable proportion of mineralization in the transition zone created a low grading halo (0.5-1% TREO) around the high grading core (>1% TREO). The economic potential of the Transition zone depend on different factors but must be seriously evaluated.

Three main types of breccia have been distinguished by different authors in the REE Zone:

- Reddish breccia corresponding to a rich hematitic breccia;
- Greenish breccia corresponding to a chlorite rich breccia;
- White to beige breccia, which looks like unaltered breccia.

A more recent petrographic, mineralogical and geochemical study (Fournier, 1993) allows a better description and understanding of the REE Zone.

9.2.1.4.2 Petrographic and mineralogical highlights of the REE zone

At a macroscopic scale and below the paleo-meteoric alteration zone (about 60m below surface), the brecciated dolomitite (C1 facies) is greenish to reddish colored, respectively made by chlorite or hematite present in the matrix, and varies from clast to matrix-supported. The clasts are rounded to sub-angular and composed of dolomite, ferroan-dolomite, ankerite and siderite. They range from 0.25 cm to a few centimetres in diametre but the described thin "horizon" of carbonatite left intact are probably larger clasts of pluri-metres scale. Locally, K feldspar clasts have been signaled in these brecciated facies, particularly in the chloritic breccia (Gauthier, 1979).

Dolomite, ankerite, siderite, calcite, feldspar K, hematite, chlorite, REE minerals (REE fluorocarbonates and monazite), sulphides (pyrite, sphalerite) are the chief minerals in the breccia and occur in varying proportions (Gauthier, 1978; Fournier 1993).

The unbrecciated horizons are whitish to buff colored, and are usually devoid of most of the accessory minerals (minor phlogopite, magnetite and apatite).

Late, 1-3 mm wide, partially to completely filled veins, containing euhedral calcite, barite and fluorite cut across the brecciated and also across the unbrecciated dolomitite (Fortin, 1977; Fournier, 1993).

The uppermost 60 m of the REE Zone were heavily weathered to an orange or red color as a result of exposure of the carbonatite to the atmosphere prior to deposition of the Trenton limestone (Figure 7). At depth, red staining of carbonates is a more local phenomenon, and the characteristics of the breccia are easier to recognize (Dénommé, 1985; Fournier, 1993).

At the microscopic scale (Fournier, 1993), dolomitite clasts range from an Mg-rich variety to a more iron-rich variety containing significant manganese. They make up a solid solution between dolomitite and ankerite, but some crystals of magnesian siderite are also found.

The carbonates cement of the breccia varies from ferroan dolomite to ankerite but is poorer in Ca than the associated clasts.

The chlorite is brownish colored, iron-rich and locally comprises up to 20% of the rock by volume in interstices between carbonates grains. This contrasts with the Mg-rich, greenish variety, which replaced phlogopite in the Niobium Zone (Fournier, 1993).

The apatite, which classifies as fluorapatite, has higher fluorine content and a more stoichiometric phosphorous content in the REE zone than in the Niobium zone. However, the REE content of apatite from the two zones does not differ significantly.

The principal REE minerals are fluorocarbonates and take the form of needles in radiating bundles or in parallel growth and measure a few microns in diametre and up to 20 micron in length. REE fluorocarbonates minerals are concentrated mainly in the breccia matrix where they are associated with either chlorite, hematite, dolomite or organic matter.

The monazite [(REE,Th) PO_4] occurs as irregular, micron size grains spatially associated with parisite but enclosed in the bastnaesite; and the thorite ($ThSiO_4$) as micron size, opaque, grains set in either chlorite or organic matter.

The oxide minerals in the REE zone, the hematite, is found either as discrete fine (<0.05 cm) metallic grains (specularite) or as a reddish coating on other minerals. The main sulfide mineral, the pyrite, occurs as euhedral grains (0.02 to 0.05 cm) or stringers of sub- to anhedral crystals in breccia zones.

Euhedral crystals are commonly replaced or surrounded by hematite.

Pyrrhotite and chalcopyrite have also been observed as inclusions within pyrite. The subhedral sphalerite is also encountered with the pyrite in the stringer.

Anthraxolite, a bituminous hydrocarbon of the asphaltite group, is commonly present in the upper, superficially altered portion of the carbonatite. The occurrence of anthraxolite is not restricted to the REE zone as originally believed, but does appear to be confined to the superficial altered portion of the carbonatite.

Phlogopite in the REE zone is a minor phase which occurs mainly as fine grained in the breccia, surrounded par a chlorite halo.

Rare ilmenorutile, a niobilum-bearing phase, form small euhedral crystals (<0.25 mm) in the breccia.

The occurrence of strontianite, celestite and rhodocrosite has been reported by Gauthier (1979).

Euhedral barite, fluorite and calcite are the late minerals phase and filled the veins and vugs.

9.2.1.4.3 Origin of the core breccia:

From the conical geometry of the REE zone, two mechanisms have been proposed to explain its formation:

- Contraction cracking due to cooling (Gauthier, 1979),
- Hydro-brecciation from igneous activity (Fournier, 1993).

Gauthier proposed that the REE zone breccias had formed by contraction during cooling, following the buildup of the multiples cones sheets corresponding to the different breccia facies defined in the deuteritic alteration zone. His model has been abandoned by different author following the results of the deeper drill holes realized since 1985. Regarding the brecciation, it seems unlikely that such a small area of the complex would have been affected by this process, and even less likely that the latter could have caused such intense brecciation (Fournier, 1993).

On the other hand, Fournier in his model of hydro-brecciation considered the brecciation analogous to resurgent boiling in the granitic systems and the residual melt could have saturated with an aqueous phase due to insufficient crystallization of hydrous minerals. Separation of this fluid from the magma could have caused a sharp buildup in pressure, resulting in overpressures that could have exceeded the strength of the carbonatite. If this was the case, hydrofracturing would have initiated, and this could ultimately have led to the production of a breccia pipe by the escaping fluid.

Support for this interpretation is provided by the high proportion of secondary vapor inclusions (Fournier, 1993) in the primary dolomite and ankerite (not reported in Heinritzi and al, 1989).

9.2.1.4.4 Conclusion of the petro-mineralogical study of REE Zone

Petrographic and mineralogical highlights are based over historical works leaded by Fortin (1977), Gauthier (1979) and Fournier (1993). Additional drilling of the REE Zone has been realized recently (2011 and 2012) by IAMGOLD-Niobec. Thus 61 drill holes, totaling 37,649 m of new data, confirmed and update, particularly at depth, the previous observations. In 2012, IAMGOLD and UQAC (Université du Québec à Chicoutimi) collaborated in a new petrographic, mineralogical and geochemical study. A master project, realised by Alexandre Neron, Geo. Stag. and supervised by Paul Bédard, Ing. Ph.D. will focus on the REE zone and the new drilling datas.

The observation, at a macroscopic scale, of some of the core of these recent drill holes confirm all the macroscopic petrographic data mentioned above with additional and complementary information, thus:

- These breccia correspond to hydrothermal breccia related to igneous activity, attested by the multiple hydraulic breccia structures;
- Presence of multiple breccia phases (brecciation of breccia);
- The REE zone is constituted by mainly ferrodolomitite breccia with the presence locally of, a mineralized or not, calcitite breccia facies;
- The breccia zone shows the existence of numerous clasts of syenite highly altered corresponding probably to xenoliths;
- Presence of at least two mineralized phases expressed by the presence of lanthanides in the carbonates elements of the breccia (impregnation) and mainly in the matrix of this breccia;
- Presence of at least a mineralized alteration front affecting all the core breccia (dolomitic and calcitic) testified by the existence of small barren zones of the different brecciated facies or small patches of different sizes in the mineralized zones.

These observations confirm the existence of multiple stages of igneous activity and a metasomatic replacement characteristic of the carbonatite complexes.

Based on petrographic observations, the paragenesis of REE Zone can be subdivided into four stages (Fournier, 1993):

- The first consisted of the crystallization of a dolomite low in Nb and REE (C2),
- This was followed by brecciation (C1) and deposition of synchisite and possibly parisite, monazite and thorite. Ankerite, ferroan dolomite, hematite and chlorite were also introduced in this stage,
- The next stage consisted of the formation of veinlets of barite, fluorite and calcite,
- The last event was the meteoric alteration which caused hematization.

This model is in accordance with the chronology of the whole carbonatite complex buildup, advanced by Fortin in 1977:

"*The setting-up chronology could be, considering the petrographic observations, the geochemical study and carbonates common setting up order:*

1. *Sovites (Calcitites) of the south (C6) and the north (C4) of the carbonatite complex,*
2. *Rauhaugites (Dolomitite) of the economic zones (C9, C5 and C3) and the low Niobium and REE dolomitite (C5),*
3. *Dolomitite of the central zone (C2 and C1 non brecciated),*
4. *REE carbonates like cement of the low REE rauhaugites cavities,*
5. *Sequent veinlets with calcite, quartz, barite and fluorite*"

Apatite-phlogopite geothermometre yielded a magmatic temperatures between 1150 and 800°C for the SHCC. The REE zone temperatures range between 380 and 346°C and reflected the subsolidus conditions. An independent chlorite geothermometre yielded similar temperatures (364 to 321°C) for the REE zone breccia cement (Fournier, 1993).

A satisfactory model for the whole carbonatite is proposed by Fournier (1993) within the framework of his master memory and is resumed by the author as follows:

"REE concentration in the magma was initially buffered by the crystallization of pyrochlore and apatite (Niobium zone), and was subsequently allowed to build up when these phases stopped crystallizing in the most evolved ferrocarbonatite. Saturation of this magma with water, late in its crystallization history, led to the separation of an acidic fluid into which the REE were strongly partitioned in fluorocomplexes. Analogous to boiling in granitic systems, this fluid brecciated the core of the carbonatite, and effervesced, causing an abrupt drop temperature due to adiabatic expansion, which combined with the pH buffering of the fluid by the dolomite, caused the precipitation of the REE as fluorocarbonate minerals".

It's important to notice that these REE correspond essentially to LREE (Light REE) which is characteristic of the REE deposit associated to carbonatite, like REE minerals develop in the late stages of carbonatite emplacement (Kupta and Krishnamurthy, 2005).

Item 10. REE DEPOSIT TYPES

The following is a summary of different papers regarding REE deposits and particularly a recent compilation of the British Geological Survey (BGS) published in November 2011.

10.1 REE Major deposit classes

REE mineral deposits are known (Walters A. & co., BGS) to occur in a broad range of igneous, sedimentary and metamorphic rocks. The concentration and distribution of REE in mineral deposits is influenced by rock forming and hydrothermal processes including enrichment in magmatic or hydrothermal fluids, separation into mineral phases and precipitation, and subsequent redistribution and concentration through weathering and other surface processes. Environments in which REE are enriched can be broadly divided into two categories:

- Primary deposits associated with igneous and hydrothermal processes, divided into two categories, one associated with carbonatites and related igneous rocks and the other with peralkaline igneous rocks (Samson and Wood, 2004).
- Secondary deposits concentrated by sedimentary processes and weathering (supergene process).

Within these two groups REE deposits can be further subdivided depending on their genetic association, mineralogy and form of occurrence.

The worldwide most advanced REE project, including IAMGOLD-Niobec REE project, are listed below and could be consulted on the Technology Metals Research website (http://www.techmetalsresearch.com/metrics-indices/tmr-advanced-rare-earth-projects-index/). The Index, last updated on December 29, 2012, currently consists of 49 rare-earth mineral resources, associated with 45 advanced rare-earth projects, 43 different companies and located in 31 different regions within 14 different countries.

Table 3: List of the REE advance projects (updated from Technology Metals Research).

Project	Country	Owner	MR (Mt)	TREO (wt%)	TREO (Mt)	In-Situ TREO ($/t(MR))	Basket Price ($/kg)
Araxá	BRA	MBAC Fertilizer Corp.	28.29	4.21	1.19	1398	33
Ashram Main	CAN	Commerce Resources Corp.	239.71	1.90	4.55	735	39
Ashram MHREO	CAN	Commerce Resources Corp.	9.35	1.61	0.15	825	51
Bear Lodge	USA	Rare Element Resources Ltd.	38.13	3.00	1.14	1280	43
Bokan	USA	Ucore Rare Metals Inc.	3.67	0.75	0.03	536	71
Buckton	CAN	DNI Metals Inc.	250.09	0.03	0.08	21	64
Canakli I	TUR	AMR Mineral Metal Inc.	49.00	0.09	0.04	39	45
Charley Creek (JV)	AUS	Crossland Uranium Mines Ltd.	805.30	0.03	0.24	17	57
Charley Creek (JV)	AUS	Pancontinental Uranium Corporation	805.30	0.03	0.24	17	57
Clay-Howells	CAN	Rare Earth Metals Inc.	8.48	0.73	0.06	359	49
Cummins Range	AUS	Navigator Resources Limited	4.90	1.74	0.09	624	36
DZP	AUS	Alkane Resources Ltd.	73.20	0.89	0.65	418	47
Eco Ridge	CAN	Pele Mountain Resources Inc.	86.60	0.11	0.10	43	38
Foxtrot	CAN	Search Minerals Inc.	9.26	1.00	0.09	499	50
Glenover (JV)	ZAF	Galileo Resources PLC	28.93	1.25	0.36	687	55
Glenover (JV)	ZAF	Fer-Min-Ore (Pty) Ltd.	28.93	1.25	0.36	687	55
Grande-Vallée	CAN	Orbite Aluminae Inc.	1209.64	0.05	0.61	21	43
Hastings	AUS	Hastings Rare Metals Limited	36.20	0.21	0.08	210	100
Hoidas Lake	CAN	Great Western Minerals Group Ltd.	2.85	2.40	0.07	1044	43
Kangankunde	MWI	Lynas Corporation Ltd.	2.53	4.24	0.11	1237	29
Kipawa (JV)	CAN	Matamec Explorations Inc.	24.45	0.42	0.10	275	65
Kipawa (JV)	CAN	Toyotsu Rare Earth Canada, Inc.	24.45	0.42	0.10	275	65
Kutessay II	KGZ	Stans Energy Corp.	18.01	0.26	0.05	234	91
Kvanefjeld	GRL	Greenland Minerals and Energy Ltd.	619.00	1.06	6.55	390	37
La Paz	USA	AusAmerican Mining Corp. Ltd.	128.20	0.04	0.06	27	61
Lavergne-Springer	CAN	Rare Earth Metals Inc.	16.90	1.16	0.20	447	38
Lofdal	NAM	Namibia Rare Earths Inc.	1.65	0.59	0.01	650	110
Milo	AUS	GBM Resources Ltd.	187.00	0.06	0.11	30	49
Montviel	CAN	Geomega Resources Inc.	250.60	1.45	3.65	497	34
Mount Weld CLD	AUS	Lynas Corporation Ltd.	14.95	9.73	1.45	3891	40

Project	Country	Owner	MR (Mt)	TREO (wt%)	TREO (Mt)	In-Situ TREO ($/t(MR))	Basket Price ($/kg)
Mount Weld Duncan	AUS	Lynas Corporation Ltd.	8.99	4.84	0.44	2586	53
Mountain Pass	USA	Molycorp Inc.	31.55	6.57	2.07	1686	26
Nechalacho Basal	CAN	Avalon Rare Metals Inc.	125.72	1.43	1.80	883	62
Nechalacho Upper	CAN	Avalon Rare Metals Inc.	177.73	1.32	2.35	644	49
Ngualla	TZA	Peak Resources Ltd.	170.00	2.24	3.82	773	34
Niobec	CAN	IAMGOLD Corporation	466.80	1.65	7.70	631	38
Nolans Bore	AUS	Arafura Resources Ltd.	47.16	2.62	1.24	1054	40
Norra Kärr	SWE	Tasman Metals Ltd.	58.10	0.59	0.34	425	72
Round Top	USA	Texas Rare Earth Resources Corp.	1033.83	0.06	0.66	42	66
Sarfartoq	GRL	Hudson Resources Inc.	8.34	1.72	0.14	656	38
Songwe	MWI	Mkango Resources Ltd.	31.75	1.48	0.47	654	44
Sørensen	GRL	Greenland Minerals and Energy Ltd.	242.00	1.10	2.66	388	35
Steenkampskraal	ZAF	Great Western Minerals Group Ltd.	0.17	16.54	0.03	6551	40
Strange Lake Enriched	CAN	Quest Rare Minerals Ltd.	20.02	1.44	0.29	979	68
Strange Lake Granite	CAN	Quest Rare Minerals Ltd.	472.46	0.87	4.12	520	60
Tantalus	MDG	Tantalus Rare Earths AG	130.00	0.08	0.10	41	52
Two Tom	CAN	Rare Earth Metals Inc.	40.64	1.18	0.48	451	38
Wigu Hill	TZA	Montero Mining and Exploration Ltd.	3.30	2.59	0.09	535	21
Wolverine	AUS	Northern Minerals Limited	1.44	0.73	0.01	778	107
Xiluvo (JV)	MOZ	Galileo Resources PLC	1.11	2.03	0.02	873	43
Xiluvo (JV)	MOZ	Rare Earth International Ltd.	1.11	2.03	0.02	873	43
Zandkopsdrift (JV)	ZAF	Frontier Rare Earths Ltd.	42.48	2.23	0.95	989	44
Zandkopsdrift (JV)	ZAF	Korea Resources Corp.	42.48	2.23	0.95	989	44
Zone 3	GRL	Greenland Minerals and Energy Ltd.	95.30	1.16	1.11	404	35

10.2 Carbonatite-associated deposits

Carbonatites are igneous rocks that contain more than 50 per cent carbonate minerals (IUGS). They are thought to originate from carbon dioxide-rich and silica-poor magmas from the upper mantle. Carbonatites are frequently associated with alkaline igneous provinces and generally occur in stable cratonic regions, commonly in association with areas of major faulting particularly large-scale rift structures.

More than 500 carbonatites occurrences are documented worldwide, with the main concentrations in the East African Rift zones, eastern Canada, northern Scandinavia, the Kola Peninsula in Russia and southern Brazil (Woolley and Kjarsgaard, 2008). Carbonatites take a variety of forms including intrusions within alkali complexes, isolated dykes and sills, small plugs or irregular masses that may not be associated with other alkaline rocks. Pipe-like bodies, which are a common form, may be up to 3-4 km in diametre (Birkett and Simandl, 1999).

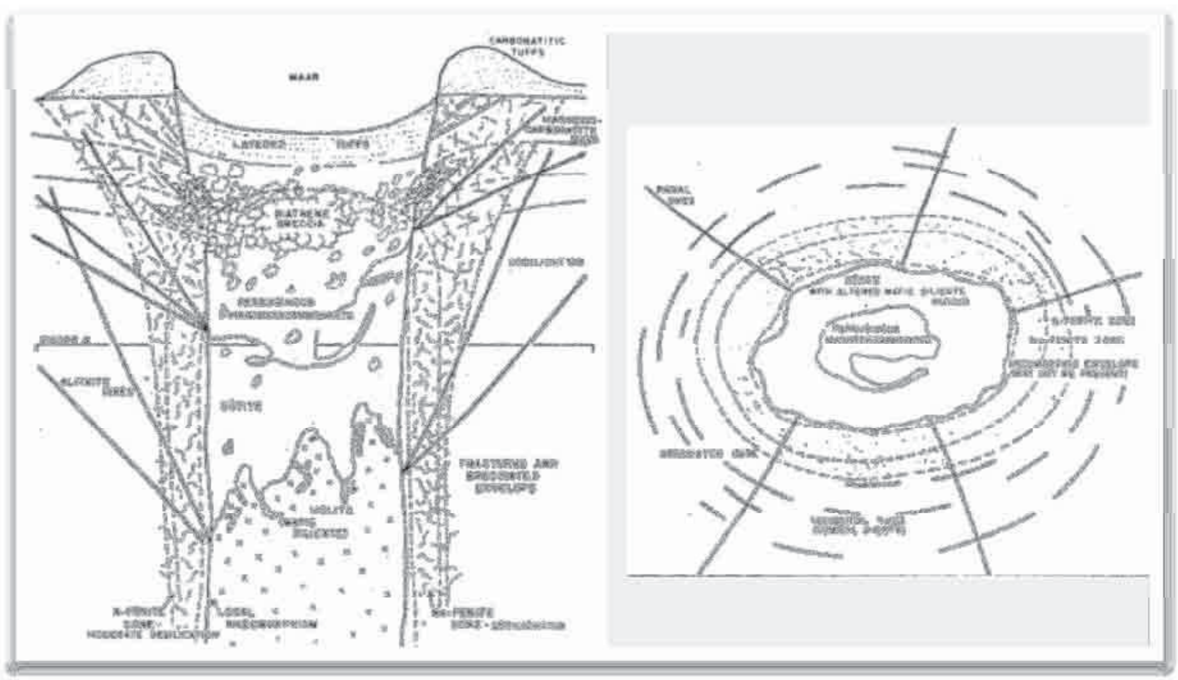
Intrusive carbonatites (Figure 7) are commonly surrounded by a zone of metasomatically altered rock, enriched in sodium and/ or potassium. These desilicified zones, known as fenite, develop as a result of reaction with Na-K-rich fluids produced from the carbonatite intrusion.

The REE are largely hosted by rock-forming minerals where they substitute for major ions. Higher concentrations of REE are required to form their own minerals (Miller, 1986). Around 200 minerals are known to contain REE, although a relatively small number are or may become commercially significant.

The REE in carbonatites are almost entirely LREE which occur in minerals such as bastnaesite, allanite, apatite and monazite (Gupta and Krishnamurthy, 2005). REE do not occur naturally as metallic elements, they occur in a wide range of mineral types including halides, carbonates, oxides and phosphates.

The vast majority of resources are associated with just three minerals, bastnaesite, monazite and xenotime. In some REE minerals, the LREE are particularly enriched relative to the HREE, which in others the opposite is the case. Bastnaesite and monazite are the primary source of the LREE, mainly Ce, La and Nd. Monazite has a different balance as it contains less La and more Nd and HREE. It is also significant to note that monazite contains the thorium, a radioactive element.

Figure 7: Schematic section and plan view of a carbonatite complex (SIDEX.ca)



Schematic section and plan view (mid-level) of a carbonatite complex, showing cylindrical shape of intrusion that evolves upwards into a diatreme breccia and layered tuffs. Late dikes (bold lines) display a radial or concentric pattern. The intrusion consists of three phases: sövite (calcite-rich carbonatite), iron-rich magnesian carbonatite, and ijolite (nepheline-pyroxene rock). The host rocks are fenitized (alkaline metasomatism) and desilicified.

Item 11. MINERALIZATION

11.1 REE mineralization general description

The principal REE minerals observed in by different authors the brecciated facies of the REE Zone (Vallée & Dubuc, 1970; Nickel & Pinard, 1970; Gauthier, 1979), correspond first to basnaesite and monazite. They are often accompanied with minor amount of pyrrhotite, chalcopyrite, huttonite ($ThSiO_4$) and molybdenite.

The following information come from a more detailed metallographic study describing the REE minerals (Fournier, 1993). The REE minerals, fluorocarbonates, are needles shaped and formed radiating bundles or growth in parallel. They typically measured a few microns in diametre and up to 20 micron in length. These REE minerals are from a solid solution produced between the Bastnaesite [$REEF(CO_3)$] and Vaterite ($CaCO_3$) end-member, including; parasite [($CaREE_2F_2(CO_3)$] and synchysite [$Ca_2REEF(CO_3)_2$] the intermediate members. The REE fluorocarbonates are consisted of an early Ca-rich phase, probably synchisite and possibly parisite, enclosed by a later Ca-poor phase, probably bastnaesite. Additional phase of intermediate compositions, as parasite, may be possible (SEM imaging and qualitative EDS from Fournier, 1993).

Fluorocarbonates minerals are concentrated mainly in the breccia matrix where they are associated with: chlorite, hematite, dolomite or organic matter.

Monazite [$(REE,Th)PO_4$] and thorite ($ThSiO_4$) are the second important host of REE after the fluorocarbonates. Monazite occurs, as irregular shaped grains of micron size, spatially associated with parisite but enclosed in the bastnaesite. The thorite occurs as micron scale and opaque grain set in either chlorite or organic matter.

Besides the REE minerals (REE fluorocarbonates and monazite), an inventory of different minerals has been established by different authors:

Carbonates:	Dolomite, calcite, ankerite, siderite.
Fluorocarbonates:	Bastnaesite, synchisite, parasite.
Silicates:	Chlorite and phlogopite, feldspaths (K), quartz, vermiculite (?), zircon, amphiboles, pyroxenes and epidote.
Phosphates:	Monazite and rare apatite.
Oxydes:	Magnetite, hematite, ilmenite, rutile, goethite, pyrolusite and pyrochlore.
Sulfures:	Pyrite, pyrrhotite, sphalerite, chalcopyrite, molybdenite (?)
Others:	Baryte, fluorite, antraxolite, and numerous non identified minerals.

Based on petrographic and metallographic observations, a paragenesis succession (Table. 3) has been established (Fournier, 1993).

Table 4: Paragenetic sequence for the REE Zone minerals (Fournier, 1993).

MINERALS	STAGE 1	STAGE 2	STAGE 4	
dolomite	____			
Ferroan dolomite	____	____		
ankerite		____		
chlorite		____		
specularite		____		
synchisite		____		
bastnaesite		____		
monazite		____		
pyrite	____	____	____	
phlogopite	____			
apatite	____			
calcite			____	
fluorite			____	
barite		____	____	
hydrocarbon				____
hematite		____	____	
sphalerite			____	

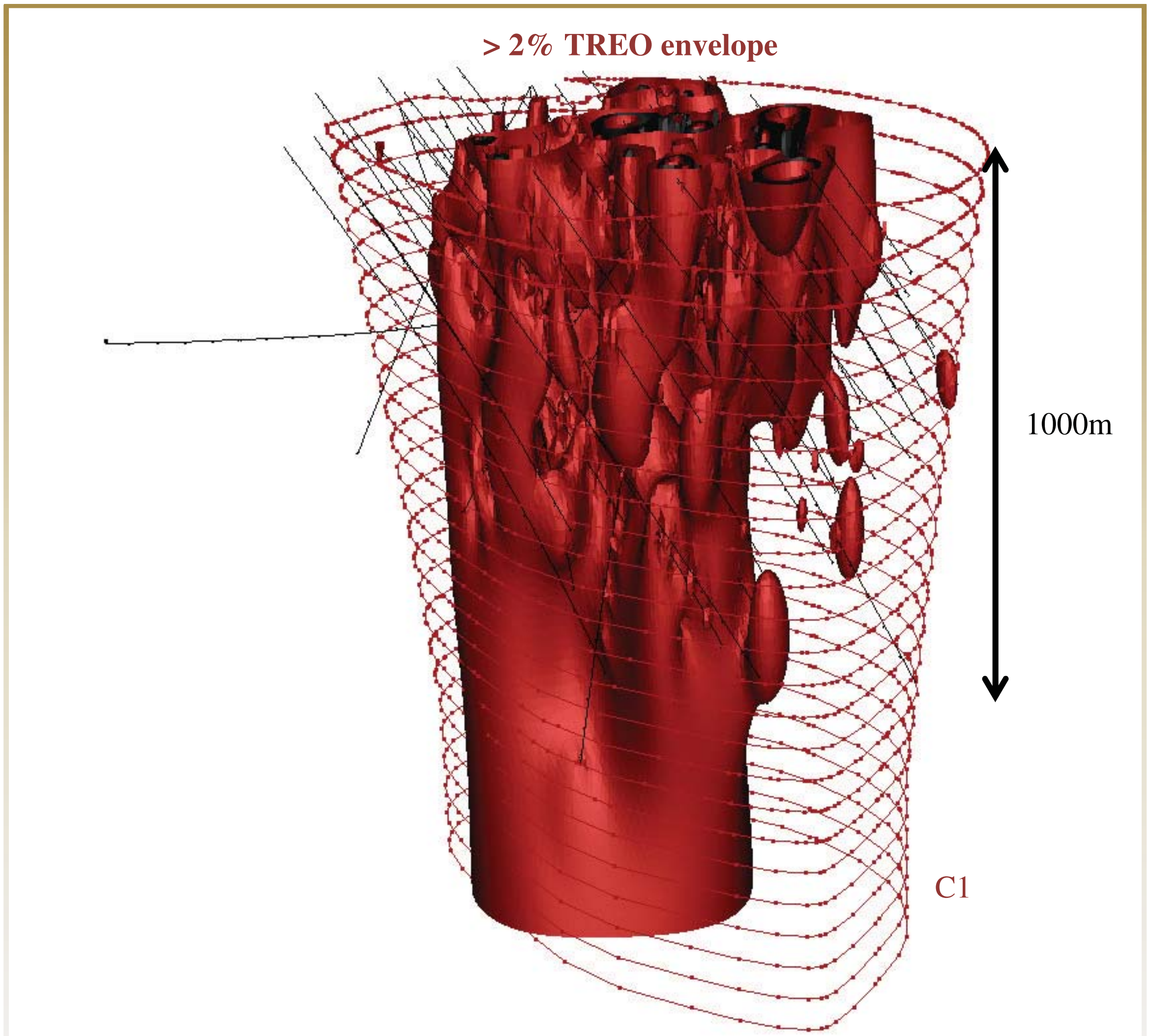
11.2 REE mineralized envelope

Considering the REE Zone drill holes compilation map (Figure 19), few drill holes were realized between 1967 and 1985 (totaling 3,902 m). The geometry of the mineralized envelope, draw as the geological core zone (C1), was principally based over the magnetic interpretation (Vallée & Dubuc, 1970).

In 2011 and 2012, 37,370 metres were drilled by IAMGOLD-Niobec. Even if the REE zone limits were better defined by the new drilling program, the mineralized envelope roughly respected the first geological interpretation. The REE deposit have a spherical shape with a North-East elongation on plan view and cover an area at the sub-surface of about 1 km^2 (Figure 5). The conical shape initially interpreted has changed to a more cylinder geometry down to 400m depth and was confirmed by the 100x100m drilling mesh. The 400m to 700m vertical axe is covered by a 100x200m drilling mesh. Based on this definition, the mineralized cylinder may be interpreted down to 700m with a high level of confidence. The deepest holes tested the mineralization continuity down to 1200m. Even if the lateral extensions are well confined, the core zone is still open at depth.

The distribution of the overall TREO values (Total REE oxides) varied from 0.01% to 12.34%. The overall average value is 1.75 % TREO. The interpreted high grade, >2% TREO, mineralized envelope (Figure 8) is associated to the brecciated and massive facies of the ferrocarbonatite.

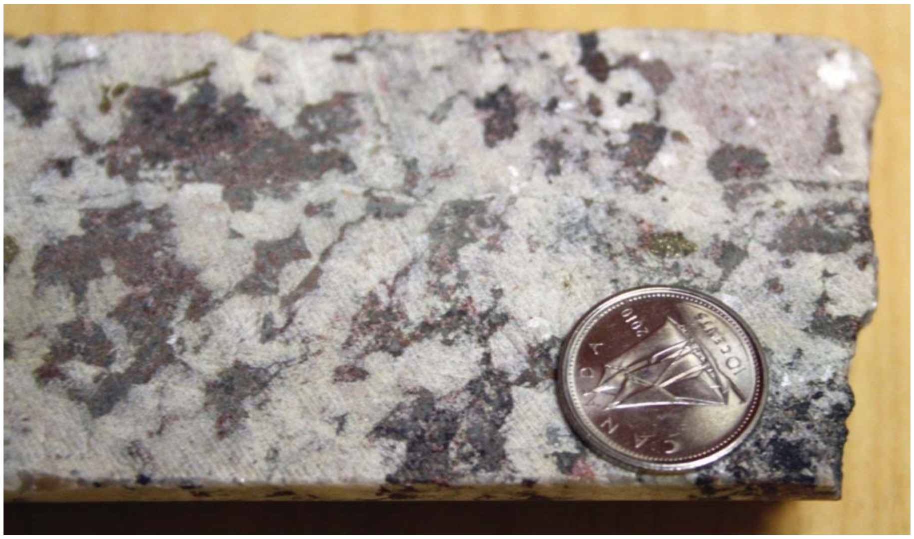
Figure 8: High grade mineralized envelope (>2% TREO).



From : R. Sirois, G Mining services ,personnel communication, 2012

The massive carbonatite is principally composed of coarse grained iron-dolomite [$Ca(Mg,Fe,Mn)(CO_3)_2$], sometime ankérite [$CaFe(CO_3)_2$], pyrite [FeS], barite [$BaSO_4$] and red/purple colored REE-rich clusters (Figure 9). The calcite [$CaCO_3$] is partially or completely replaced by siderite [$FeCO_3$] associated with yellow colored carbonates. The massive C1 facies is cut by late calcite injections, apatite/halite injections and biotite injections associated with fault plans. The open faults have idiomorphic crystals of barite, pyrite, fluorite, halite and strontianite.

Figure 9: Mineralized massive carbonatite (C1L).



The red/purple clusters composition was defined with a portable XRF and with a cartographical technic by u-XRF (UQAC University). They are composed of REE minerals, barite [$BaSO_4$], calcite [$CaCO_3$], quartz [SiO_2], hematite [Fe_2O_3] and halite [NaCl] (Figure 10). The proportion of minerals in the clusters are really variable from each to other but more homogeneous over the ore deposit. Around 400m, a differentiation of clusters composition can be identified. In the firsts hundred metres, hematite, calcite and silicate are associated with REE minerals. At depth, past 400m, the halite and the barite appeared in the clusters composition with depletion of calcite and silica. REE minerals proportion, 20% of the cluster, is stable.

The REE minerals composing the clusters are defined by scanning electron microscope (SEM). Small (10-20 microns) needles of bastnaesite [$REE(CO_3)F$] (Figure 11) and monazite [$REEPO_4$] are identified (Néron, A. communication, 2013). The exact composition of the bastnaesite should be investigated (by microprobe) to know the Ca proportion in bastnaesite. The bastnaesite is the major REE minerals in the clusters but, at the depth of 900m, the monazite proportion increased.

The massive carbonatite (C1) is brecciated by a fluid similar as the clusters composition and created the breccia facie (BRC1) (Figure 12). The mix of hematite, silice, chlorite/biotite, halite, REE-mineral, pyrite, calcite and/or calcite composed the breccia. The clasts seem from the massive facies and sometimes, but rarely, of syenitic rock. The breccia intensity is variable. Texture changed from 60% matrix supported with small and round shaped clasts to to clasts supported breccia with angular fragments. When the magmatic degree of deformation is low, the C1 clasts can be easily re-built. In general, a transition is observed between the low intensity breccia and the massive C1 facies. When the deformation degree is higher, the breccia intersects the others units, even other breccia facies, with a sharp contact.

Figure 10: Variation of the mineralized clusters composition with depth (Hole# 2012-REE-052)

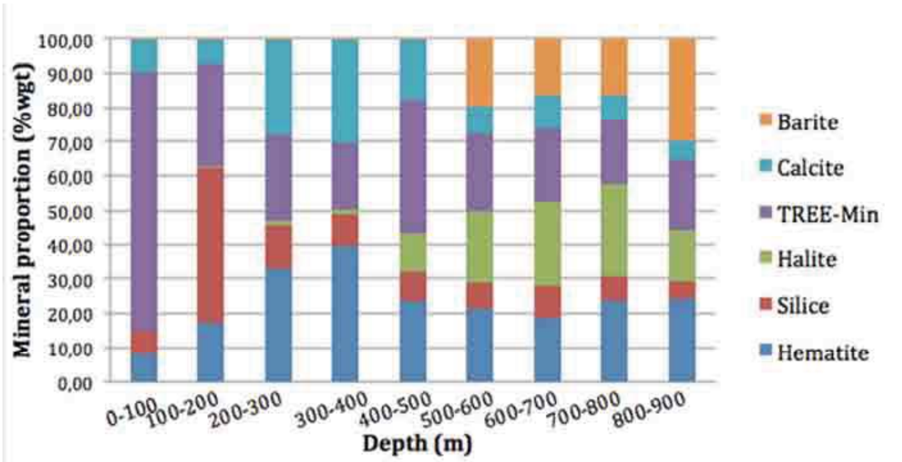
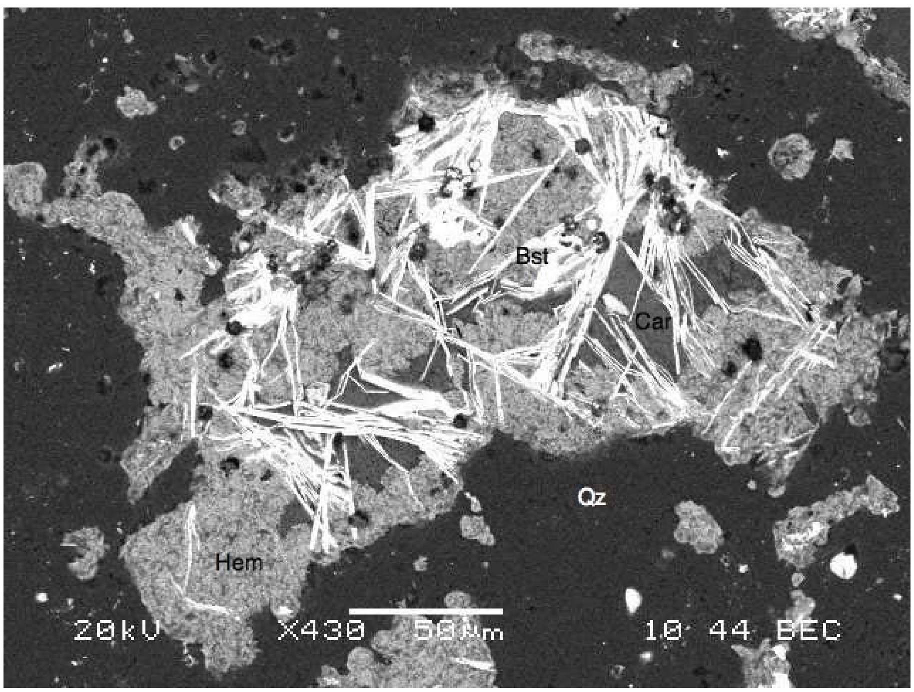


Figure 11: Mineralized cluster composition. (Hole# 2012-REE-033; Bst = bastnaesite; Qz = quartz; Car = carbonate; Hem = hematite)



Like the clusters in the massive unit, the matrix composition varied at depth. The silicate and calcite phases are observed before the 400m limit and the halite and barite phases are found below this limit. The REE minerals are disseminated in the matrix and represent 0.2 to 3 wgt% of the rock. Red to purple agglomerations of REE minerals are visible in the high intensity breccia.

Figure 12: Mineralized carbonatite breccia facies (BRC1L).

The REE mineralisation presented no relationship with the different facies of the core REE zone. Several analyses cumulate during the 2011 and 2012 drilling program show the homogeneity of the mineralization inside the ferrocarbonatite (C1) envelope. The low grade zone, are localized in the periphery and correspond to the transition zone. In this zone, the REE mineralisation is still in the C1 facies. The amount of mineralized C1 intruding the adjacent lithology (C2, C3, C5 and S1) decreased going outward from the center.

Item 12. EXPLORATION

Exploration and resource development drilling is concentrated within the carbonatite complex where the economic concentration of niobium is known. Since 1985, no exploration works for REE have been done until the drilling campaign started by IAMGOLD in 2011 and continues through 2012.

12.1 Scoping Study

Exploration program focused on the REE zone. The drilling program has continuously progressed. The delimitation program, initiated in 2011, ended in May 4th 2012 by the completion of the hole 2012-REE-039. A total of 10 holes were added in 2012 to the initial 28 holes performed in 2011, including two deep holes (2012-REE-033and 2012-REE-034), for a total of 22, 072 linear metres.

12.2 Prefeasibility study

Since May 5th, 10 other holes have been added to define the REE zone over a 100 x 100 metres drilling grid through the depth of 400 metres and a 100x200 metres drilling grid through the depth of 700 metres. The additional 15, 779 linear metres drilled between May to

August are part of the pre-feasibility program. This included the hole from 2012-REE-040 to 2012-REE-061.

Parallel to the surface activities, underground development started in October 2012. An exploration drift was driven through the core of the REE zone. The drift started from the mine level 1150, about 300m below surface, and followed the section 2600E of the exploration grid (Figure 14). Driven from the south, the transitional zone (between Niobec ore zone and REE zone) was crossed and an increasing amount of the REE mineralized carbonatite (C1L) was noted. This unit showed a clear brecciating relationship with the adjacent massive carbonatite (C2). The association between the C2 and the C1 was confirmed. The drift layout was planning to stay in the mineralized carbonatite breccia facies (BRC1L). Before the development completion, some representative mineralized material was stocked and characterized underground. Preliminary assays returned an average value of 2.0% TREO for about 3,500 tonnes bulk sample. This material is reserved for additional metallurgical testworks.

12.3 Other field work

The heliborne high resolution mag survey over the Niobec property was completed by EON geosciences Inc. during May 2012. The complete survey parameter can be consulted in the final report produced by the contractor (Appendix 3).

The carbonatite total magnetic field strongly contrast with the grenvillien hosting rock and the new airborne survey confirmed the main geometry of the complex (Figure 13). The high definition aspect outlines small variation inside the carbonatite magnetic signature. Facies variation or structural domain may create this variation. The sensibility of this magnetic survey method is affected by the Niobec mine activities. The anthropic distortion affected the nearby mine area and complicated the interpretation.

The final data has been treated by Mark Goldie, IAMGOLD chief geophysicist, and sent to Niobec geological team for validation and exploration duty. This new information, coupled with the surface diamond drilling will be used to update the Niobec geological map.

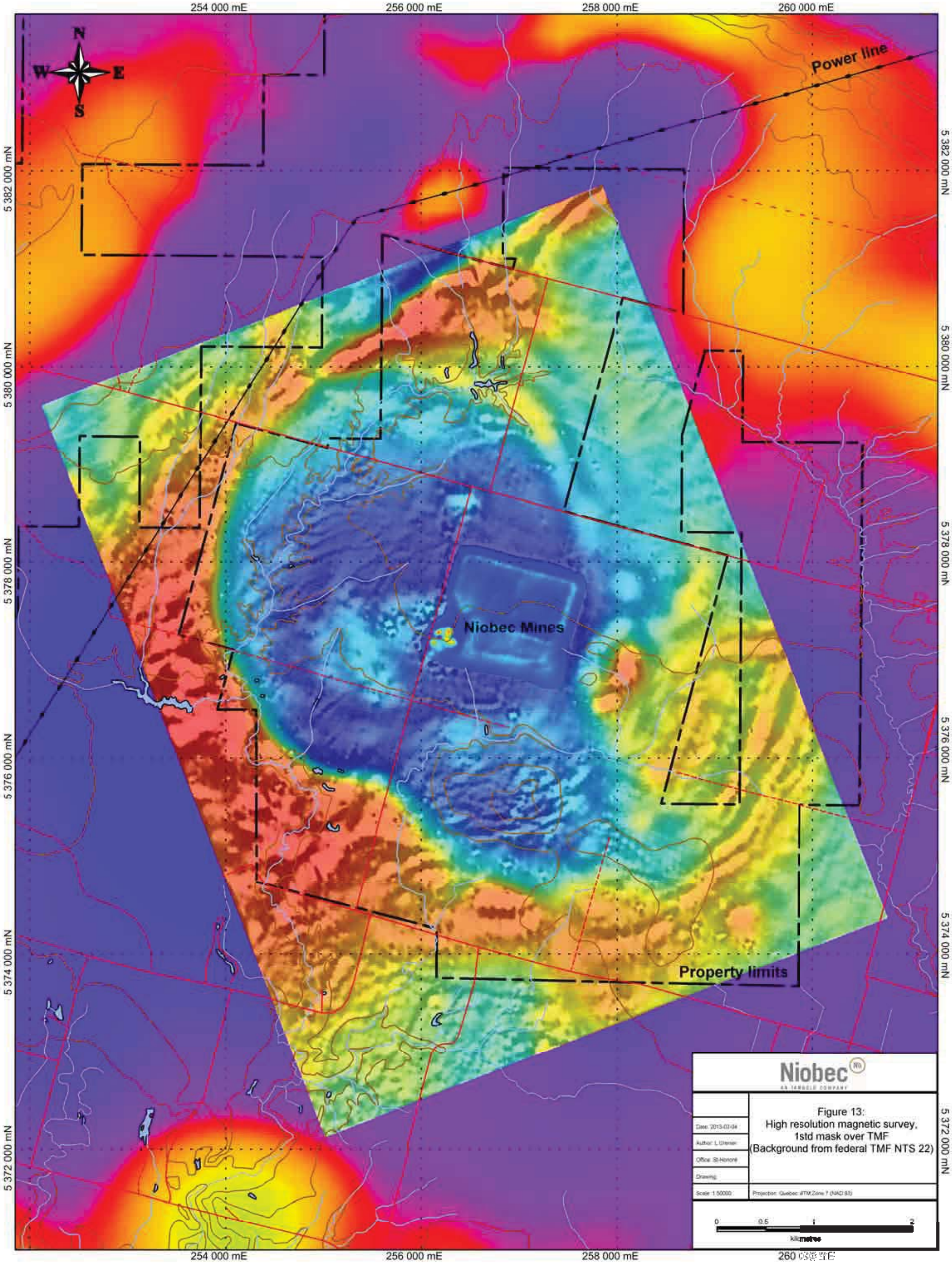


Figure 13:
High resolution magnetic survey,
1std mask over TMF
(Background from federal TMF NTS 22)

Item 13. DRILLING

13.1 Historical diamond drilling and statistics

The St-Honoré carbonatite complex is covered by a layer of Paleozoic sediment variable in thickness. Historically, the REE zone could be studied with one outcrop located in the North-East area of the core zone but the discovery showing was covered by a layer of overburden moved during the mine operation. Diamond drilling is the best and the only method of investigation used by IAMGOLD and the various site operators.

In 1967 the drilling program tested the new radiometric anomaly discovered. Few short hole confirmed the anomalous REEs concentration in the ferrocarbonatite. In 1975, a preliminary definition of the core zone (C1) was completed. In 1985, Soquem completed three long hole to characterised and test the continuity at depth of the REEs zone. The compilation map, show the historical drill holes location (Figure 14).

After a latency period of 26 years, IAMGOLD decided to launch a large diamond drilling program stimulated by a favorable REEs economical context. In the last two years (2011 and 2012) 90% of the data on the REEs zone was collected.

Table 5: Historical diamond drilling on the REEs zone.

Company name	Year	Number of Drill Holes	Average LENGTH	Longest DH LENGTH	Total LENGTH (metres)	% of Total LENGTH
SOQUEM	1968	5	141	226	706	1.7%
SOQUEM	1975	8	120	148	958	2.3%
SOQUEM	1978	2	336	443	672	1.6%
SOQUEM	1985	3	522	559	1,566	3.8%
IAMGOLD	2011	29	476	898	13,798	33.2%
IAMGOLD	2012	33	723	1,337	23,851	57.4%
	Grand Total	80	519	1,337	41,551	100.0%

13.2 Drilling realized by IAMGOLD

Drilling was performed between March 6, 2011 and October 9, 2012 over the Niobec property and specifically over the REEs zone. The first resource estimation (Lafleur, P.J. and al., 2012)was calculate with the data of the surface holes 2011-REE-001 to 2011-REE-028, and the underground hole S-3607.The program continued in 2012 with the realization of the holes 2012-REE-029 to 2012-REE-061. The 33 new holes, for a total of 23, 851 metres, were drilled under the supervision of Niobec geological team and are the object of this present report.

The objectives were to define the geological model, upgrade the resource definition for a new resource calculation and test the REE mineralization continuity at depth. The deeper holes demonstrate the uninterrupted extension of the REE zone at depth, although the resource estimate reported only to 700 metres below surface.

13.3 Diamond drill hole summaries

The diamond drill holes have been localised by the Niobec mine surveyor team. The data is summaries in Quebec MTM83, zone 7, system (Table 6 and Figure 15-16) but an exploration grid coordinate system was daily used.

A summary of each diamond drill hole realized in 2012 is available below in the 13.5 section.

Table 6: Drill holes summaries, 2011 niobium exploration program.

	Explo grid (m)					Quebec MTM83, Zone 7 (m)				
HOLE-#	Easting	Northing	Altitude	Az (°)	Dip (°)	Easting	Northing	Altitude	Title #	LENGTH
2012-REE-029	2297.71	5497.56	9999.00	122.90	-49.50	255975.73	5378378.41	142.44	2713202	651.00
2012-REE-030	2404.23	5493.02	9999.10	228.30	-49.60	256064.70	5378319.66	142.56	2713201	639.00
2012-REE-031	2313.04	5681.04	9999.70	234.40	-50.20	256083.37	5378527.79	143.14	2713201	597.00
2012-REE-032	2483.46	5783.49	10001.90	269.50	-49.30	256282.22	5378527.83	145.33	2712072	651.00
2012-REE-033	2503.80	5349.16	9997.40	3.60	-70.00	256075.95	5378145.06	140.84	2713201	1338.00
2012-REE-034	2676.56	5882.25	10010.40	178.80	-76.30	256498.52	5378513.03	153.84	2687602	1260.00
2012-REE-035	2436.84	5162.36	9997.20	352.90	-53.00	255922.35	5378019.43	140.64	2713201	924.00
2012-REE-036	2604.64	5304.95	9998.50	1.00	-51.20	256139.63	5378055.23	141.94	2712072	900.05
2012-REE-037	2300.00	5298.00	10000.00	358.20	-50.80	255874.00	5378202.00	142.24	2713202	798.00
2012-REE-038	2700.13	5300.09	9998.80	2.30	-51.40	256218.97	5378001.88	142.24	2712072	402.00
2012-REE-039	2213.69	5290.45	10000.20	0.00	-50.30	255797.05	5378244.00	143.64	2713202	564.00
2012-REE-040	2689.67	5554.18	10000.30	1.80	-50.60	256340.87	5378225.07	143.74	2712072	729.00
2012-REE-041	2606.09	5599.77	10000.20	1.00	-50.00	256292.71	5378307.19	143.64	2712072	774.00
2012-REE-042	2505.92	5602.33	9999.80	0.00	-52.60	256208.17	5378339.99	143.24	2712072	992.00
2012-REE-043	2317.70	5592.15	9999.70	359.30	-52.30	256042.93	5378447.93	140.19	2713201	741.00
2012-REE-044	2405.52	5790.37	10000.90	358.80	-52.50	256218.95	5378573.87	144.35	2713201	516.00
2012-REE-045	2505.44	5792.16	10003.80	2.70	-52.70	256305.52	5378523.95	147.26	2712072	501.00
2012-REE-046	2506.75	5411.66	9997.90	359.40	-51.20	256110.67	5378197.12	141.31	2713201	873.00
2012-REE-047	2405.69	5392.44	9998.50	0.50	-51.50	256014.15	5378232.69	141.92	2713201	903.00
2012-REE-048	2603.82	5804.62	10006.80	2.50	-50.50	256396.27	5378483.95	150.25	2712072	591.00
2012-REE-049	2605.78	5398.70	9998.70	358.00	-50.00	256188.71	5378134.72	142.19	2712072	900.00
2012-REE-050	2700.00	5740.00	10000.00	269.10	-46.20	256449.65	5378369.66	146.89	2687602	598.50
2012-REE-051	2703.04	5838.05	10006.85	0.50	-51.50	256498.54	5378461.51	150.29	2687602	351.00
2012-REE-052	2707.08	5399.67	9996.33	359.90	-59.90	256276.22	5378083.66	139.78	2712072	900.00
2012-REE-053	2808.41	5797.49	10006.99	358.70	-50.70	256567.96	5378372.47	150.44	2687602	453.00
2012-REE-054	2762.74	5286.72	9995.76	2.30	-51.00	256265.76	5377958.18	139.21	2712072	900.00
2012-REE-055	2314.18	5686.32	9997.50	271.90	-45.40	256087.07	5378531.73	140.94	2713201	276.00
2012-REE-056	2314.62	5686.36	9997.40	277.90	-75.00	256087.47	5378531.53	140.84	2713201	549.60
2012-REE-057	2812.46	5385.11	9996.85	1.00	-50.00	256359.05	5378016.91	140.30	2687602	643.40
2012-REE-058	2330.91	5487.03	9996.12	264.50	-50.90	255998.77	5378352.29	139.57	2713202	351.00
2012-REE-059	2803.26	5489.53	9996.77	359.90	-59.90	256404.94	5378111.15	140.22	2687602	892.60
2012-REE-060	2331.54	5487.06	9996.26	273.50	-75.20	255999.33	5378351.98	139.70	2713202	500.00
2012-REE-061	2314.81	5208.89	9998.17	359.90	-59.90	255841.72	5378122.17	141.62	2713202	1191.00

Figure 14: Historical drill hole location, REEs exploration program.

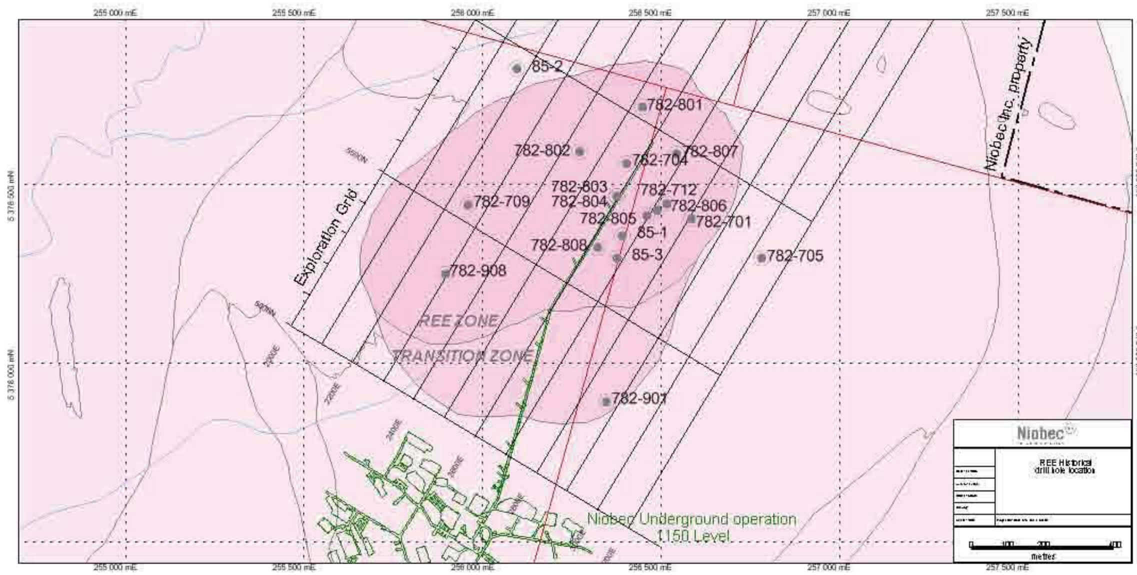


Figure 15: Drill holes locations, 2011 REEs exploration program.

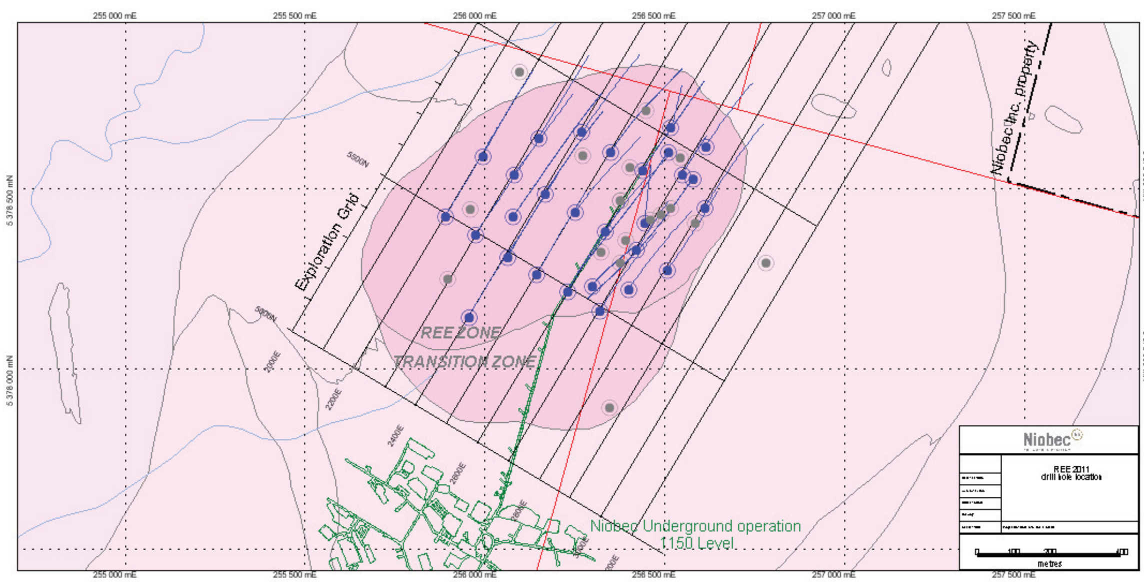
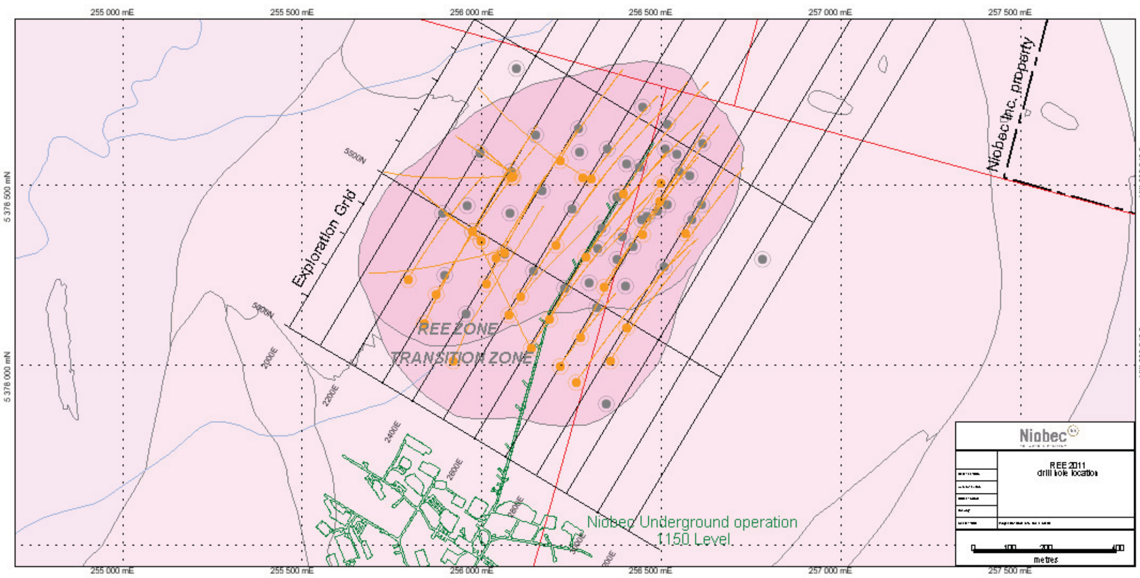


Figure 16: Drill holes locations, 2012 exploration program



13.4 Methodology

The Niobec exploration geologist, hired in March 2012, was responsible for all the steps necessary for the realization of a surface diamond drilling program. This included the drill set-up recognition, the permiting, the positioning and orientation of the drill, the supervision of drilling methods, the procedures application, the supervision of the health and safety rules, the environmental compliance and the restoration of the drill sites. Drill holes are planned by the Niobec mine geology team and approved by the IAMGOLD exploration general manager. The services of a contractor, IOS Services Géoscientifiques Inc. ("IOS"), were used to support the REE exploration program. IOS carried out core logging, sampling and shipping of the samples to the laboratory and worked in close collaboration with the Niobec mine geology team. .

The exploration geologist was also looking after the quality assurance and the quality control (QA/QC) for the REE Zone. That included the purchase of standardized material, the preparation of the blanks and compilation of results. Any samples for REE assays were performed at the Niobec mine laboratory, the entire drilling core samples were sent to SGS facilities, Lake Field Ontario after been logged, cut and bagged. See Item 16 for the details QA/QC procedures.

The whole drilling campaign has been realized by "Forage Boréal Inc.", a drilling company located in Val d'Or, Abitibi, Québec. The exploration grid was generally used has reference. At the end of 2012, drilling mesh respected a 100 by 100 metres spacing. The main direction of drilling was N031° (N000° on the exploration grid) with a magnetic declination of 18° West, and a dip generally toward the North. Deviation was measured with a multishot survey

(Reflex EZ-shot) done after the end of each hole. No additional in-hole survey was performed in the existing drill holes from 2011.

In 2011, all the casing located in the farmed field has been pulled out after the holes were finished. From the hole 2012-REE-033, most of the casing were kept for further surveys (position, radiometry, geophysics, etc.) or other verifications can be made on selected holes.

Drilling was done in the field next to the mine office parking. The core shack is on the mine site, less than 1 kilometre from the drill rig. Core is retrieved from the drill rods using conventional wire line techniques. The core is removed from the core barrel by the drill contractor employee and carefully placed in standard NQ wooden core boxes. A wooden bloc with the depth written on it is put in the box at the end of each run (3 metres). Once filled, core boxes are closed and sealed. Boxes are removed from the drill site twice daily (at the end of each work shift) by the drilling contractor personnel and delivered to the core shack. Verification of all the boxes is proceeded (Inscription on the boxes, core length and tags, continuity between the boxes, etc.).

13.5 Drill hole description, 2012 REE exploration program

The location of each drill hole and an overview of the 100m x 100m drilling mesh realised during the 2012 exploration program can be consulted at Figure 19. The dilling sections figures covering the main area of the REE zone, is also available on appendix 1.

13.5.1 2012-REE-029

The 2012-REE-029 is situated in the center west area of the REE zone (MTME 255975.73: MTMN 5378378.41). It was drilled at 156° (true North) with a dip of -50°. The objectives were to intersect the South contact and delimit the REE zone. The overburden is 7.5 m thick. From 7.2 m to 44.5 m, the REE zone is covered by the Trenton limestone. The carbonatite begin with a strongly altered breccia (BRC1L) down to 141 m. The alteration is composed of hematite, chlorite and siderite and was formed by weathering of the carbonatite during the early Paleozoic. Pass the altered zone, the breccia zone, in a fresh facies, continues down to 230 m. From 230 m to 290.3 m, the breccia is cut by a massive calcitic and dolomitic carbonatite (C1L). From 290.3 m to 450 m, the breccia zone continued. The contact between the REE zone and the surrounding dolomitic carbonatite (C1) was traversed at 450 m.

The lanthanides mineralization is found in purple coloured, centimetre scale cluster in the massive facies. Size reduction is observed in the breccia facies but the proportion of lanthanide still the same. It is easier to estimate the lanthanide percentage in a coarser cluster facies. The assays returned a value of **1.704% TREO / 405.5 m** (from 44.5m) including **0.037% HREO / 405.5 m**.

13.5.2 2012-REE-030

The 2012-REE-030 is situated in the center area of the REE zone (MTME 256064.70: MTMN 5378319.66). It was drilled at 225° (true North) with a dip of -50°. The objectives were to intersect the South-West contact and delimit the REE zone. The overburden is 6 m thick. From 6 m to 52.5 m, the Trenton limestone covered the carbonatite. At the contact between the limestone and the carbonatite, from 52.5 m to 55.5 m, a small interval of carbonatite conglomerate textured is observed. This transition unit was historically call regolith due to the in situ formation process. The strongly altered carbonatite breccia (hematite, chlorite and siderite) (BRC1L) continues to the depth of 151 m. The altered facies is followed by a fresh breccia facies (BRC1L) down to 229.5 m. From 229.5 m to 327 m, the breccia is layered with a massive dolomitic carbonatite facies (C1L). Few syenite enclaves are observed in this interval. From 327 m to 423.9 m, the breccia facies continue and the amount of syenite enclaves increased (C1S). The contact with the syenite is logged at 423.9 m depth.

The lanthanides had the same characteristics as previously described. The assays mark the contact with the REE bearing carbonatite and the not mineralized syenite. Enclave of carbonatite in the syenite returned punctual values in this interval. The mineralized carbonatite returned a value of **1.564% TREO / 277.5 m** (from 52.5m) including **0.035% HREO / 277.5 m**.

13.5.3 2012-REE-031

The 2012-REE-031 is situated in the North-West area of the REE zone (MTME 256083.37: MTMN 5378527.79) and was drilled at 235° (true North) with a dip of -50°. The objectives were to intersect the West contact and delimit the REE zone. The overburden is 8.2 m thick. From 8.2 m to 65.3 m, the Trenton limestone covered the carbonatite. The regolith, transition facies is observed from 65.30 m to 70 m. The strongly altered carbonatite (hematite, chlorite and siderite) begin with a calcitic breccia facies (BRC1L) down to184.3 m. From 184.3 m to 261.3 m, the calcitic facies change for a dolomitic facies (C1L). A transitional contact is logged from 261.3 m to 527.4 m. The syenite is dominating but layered with large interval of the dolomitic carbonatite (SC1). After 527.4 m, the carbonatite amount has decreased and the lithology becomes a syenite breccia (SB).

The lanthanides concentrated in the carbonatite and decreased proportionally with the increasing of the syenite. The main mineralized zone returned a value of **2.142% TREO / 196 m** (from 65.3m) including **0.036% HREO / 196 m**.

13.5.4 2012-REE-032

The 2012-REE-032 is situated in the North area of the REE zone (MTME 256282.22: MTMN 5378527.83). It was drilled at 270° (true North) with a dip of -50°. The objectives were to intersect the North-West contact and delimit the REE zone. The overburden is 4.5 m thick. From 4.5 m to 47.6 m, the Trenton limestone covered the carbonatite. From 47.6 m to 52.2 m, the carbonatite conglomerate textured is observed. After the regolith, the carbonatite become a calcitic breccia facies (BRC1L) strongly altered (hematite, chlorite and siderite) to the depth of 88 m. From 88 m to 262 m, a dolomitic carbonatite (C1L) was logged. A breccia facies (BRC1L) succeeded from 262 m to 376 m. From 376 m, the breccia zone continues but syenite enclaves progressively appeared (BRC1S). At 453 m, a section of syenite layered with REE-poor, coarse grained, dolomitic carbonatite facies (SC2) is logged down to 504 m. The last unit of the hole is a medium grained, massive, REE-poor, dolomitic carbonatite (C2).

The lanthanides are mainly in centimetre scale, purple coloured clusters between the carbonate minerals phases. The main mineralized zone returned a value of **2.122% TREO / 354.4 m** (from 46.7m) including **0.034% HREO / 354.4 m**.

13.5.5 2012-REE-033

The 2012-REE-033 is situated in the South-West area of the drilling zone (MTME 256075.95: MTMN 5378145.06). It was drilled at 031° (true North) with a dip at -70°. The 2012-REE-033 is being part of the deep investigation program. The objectives were to test the positive gravimetric anomaly and investigate the REE potential of the carbonatite at depth. Based on the literatures, the carbonatite complex may have an ultramafic intrusion at the root. The gravimetric anomaly could be generated by this ultramafic intrusion. The hole was drilled down to 1338 m without leaving the REE mineralized carbonatite. The gravimetric anomaly must be explained by another phenomenon. The overburden is 5.1 m thick. From 5.1 m to 43.5 m, the Trenton limestone covered the carbonatite. From 43.5 m to 44.3 m, the carbonatite conglomerate textured is logged. The strongly altered carbonatite breccia (BRC1L) (hematite, chlorite and siderite) is observed down to 93 m. From 93 m to 162 m, a layering of mineralized carbonatite (C1L) and not mineralized carbonatite with enclave of syenite (C1S) is logged. From 162 m to 1338 m, large intervals of massive dolomitic carbonatite facies (C1L) are layered with the brecciated facies (BRC1L).

The lanthanide cluster characteristic changed from 1000 m to deeper. Their grained size increased to pluri-centimetre scale, their texture change from porous to massive and their colour evolve from dark reddish to medium purple. The assays showed an augmentation of the TREO at depth. The increasing of the lanthanides ratio, heavy atomic mass elements, may create the gravimetric anomaly. The 2012-REE-033 returned an outstanding value **2.160% TREO / 1296 m** (from 42m) including **0.032% HREO / 1296 m** of and confirmed the great potential of the REE zone at depth.

13.5.6 2012-REE-034

The 2012-REE-034 is located in the North-East area of the REE zone (MTME 256498.52: MTMN 5378513.03). It was drilled at 211° (true North) with a dip of -77° and a proposal length of 1250 m. The objectives were to test the continuity of the lanthanide mineralization at depth and test the positive gravimetric anomaly based on a historic survey. This anomaly may be produced by an ultramafic intrusion at the base of the St-Honoré carbonatite complex. By drilling on the opposite side of the 2012-REE-033, a scissor pattern was created and tested the probability of different mineralized structures. The overburden is 3.75 m thick. From 3.75 m to 21.40 m, the Trenton limestone covered the carbonatite. The carbonatite begins with a strongly altered (hematite, chlorite and siderite) massive dolomitic carbonatite facies (C1L) down to 75.70 m. From 75.50 m to 1260 m, brecciated carbonatite (BRC1L) and massive dolomitic carbonatite (C1L) are layered in decimetre scale interval. A calcitic carbonatite facies C1LC) is noted from 819 m to 899.40 m.

The 2012-REE-034 stayed in the mineralized carbonatite without intercepting an ultramafic unit. The gravimetric anomaly still unexplained. The mineralogy assemblage and textures change at depth (Figure X and X) and may be explanation for the anomaly that needs to be investigated. The 2012-REE-034 returned an overall value of **1.885% TREO / 1238.6 m** (From 21.4 m) including **0.031% HREO / 1238.6 m**. Like observed in the 2012-REE-033, the lanthanide values slightly increased passed 1000 m deep.

13.5.7 2012-REE-035

The 2012-REE-035 is situated in the South-West area of the drilling zone (MTME 255922.35: MTMN 5378019.43). It was drilled at 028° (true North) with a dip of -55°. The objectives were to delimit the south contact and test the mineralization continuity at depth. The overburden is 9.80 m thick. From 9.80 m to 59 m, the Trenton limestone covered the carbonatite. A weakly altered (hematite and chlorite), lanthanides poor, massive dolomitic carbonatite (C2) is observed on the South contact of the REE zone, from 59 m to 194.2 m. A large mineralized brecciated carbonatite facies (BRC1L) is logged down to 438 m. From there, a layering of mineralized breccia (BRC1L) and massive (C1L) carbonatite is described to the end of the hole at 924 m.

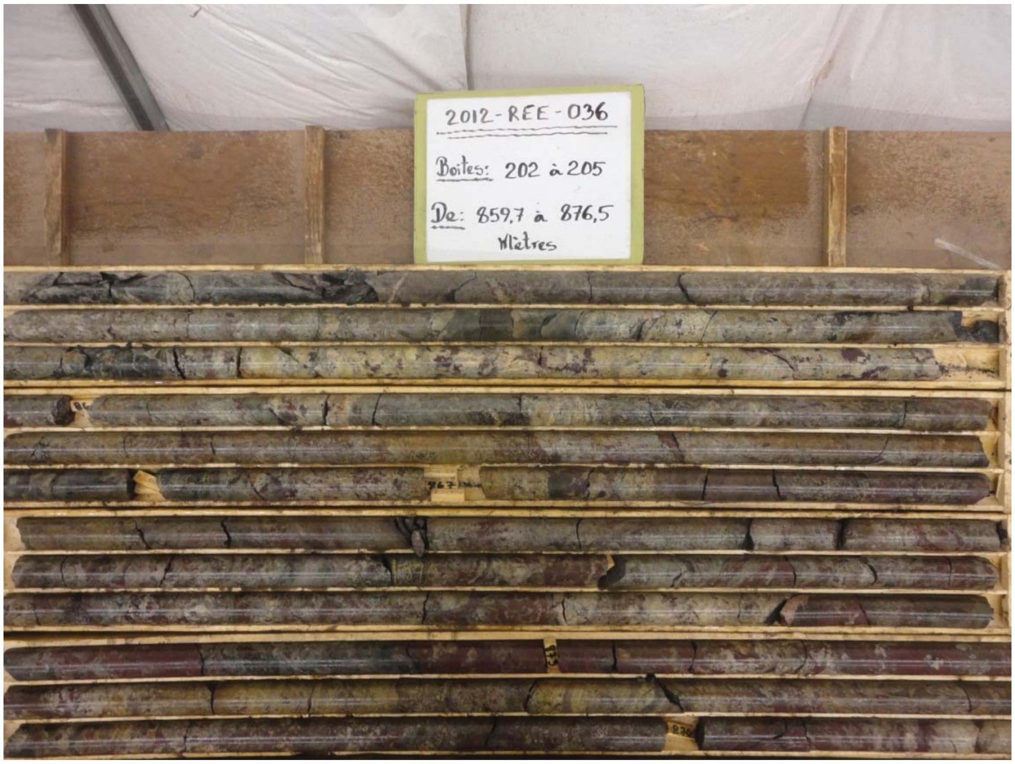
The south contact was traversed at 194.2 m. Mineralization increased over 250 m toward the center of the REE-zone. The 2012-REE-035 returned a value of **2.501% TREO / 486 m** (from 438m) including **0.035% HREO / 486 m** in the best of the REE zone. A large border on the transition zone returned an economical value of 1.315% TREO / 243.8 m.

13.5.8 2012-REE-036

The 2012-REE-036 was previously described down to 450m but was extended later during the definition program. It is located in the South area of the mineralized zone (MTME 256139.63: MTMN 5378055.23). It was drilled at 031° (true North) with a dip of -50°. The objectives were to delimit the south contact and completed a 100 m x 200 m drilling mesh for the scooping study. The extension increased the definition down to the vertical limit of 700m for the pre-feasibility need. The overburden is 5.40 m thick. From 5.40 m to 42.20 m, the Trenton limestone covered the carbonatite. From 42.20 m to 54 m, the REE-poor carbonatite (SC2) contained numerous syenite enclaves and marked the transitional contact with the dolomitic carbonatite (C2). A chlorite alteration is noted down to 177 m. From there to 261.7m, the dolomitic carbonatite (C2) changed to an ankerite carbonatite facies (C1). The lanthanide mineralization appeared around 234m but is found principally in the massive dolomitic carbonatite facies (C1L) starting at 261.7m. A layering of dolomitic breccia and massive facies (BRC1L-C1L) completed the hole down to 900 m.

The REE zone intercepted in the 2012-REE-036 returned a value of **2.141% TREO / 666 m.** (from 234m) including **0.035% HREO / 666 m.** The values increased at depth and the last carbonatite breccia interval returned a value of **2.828% TREO / 133.5 m** (from 766.5 m.) including **0.050% HREO / 133.5 m.** (Figure 3). The surrounding carbonatite (C2 and C1) on the South contact returned a low value of 0.636% TREO / 191.8 m that may be evaluated in a low grade / high volume mining technic.

Figure 17: 2012-REE-036 high grade zone

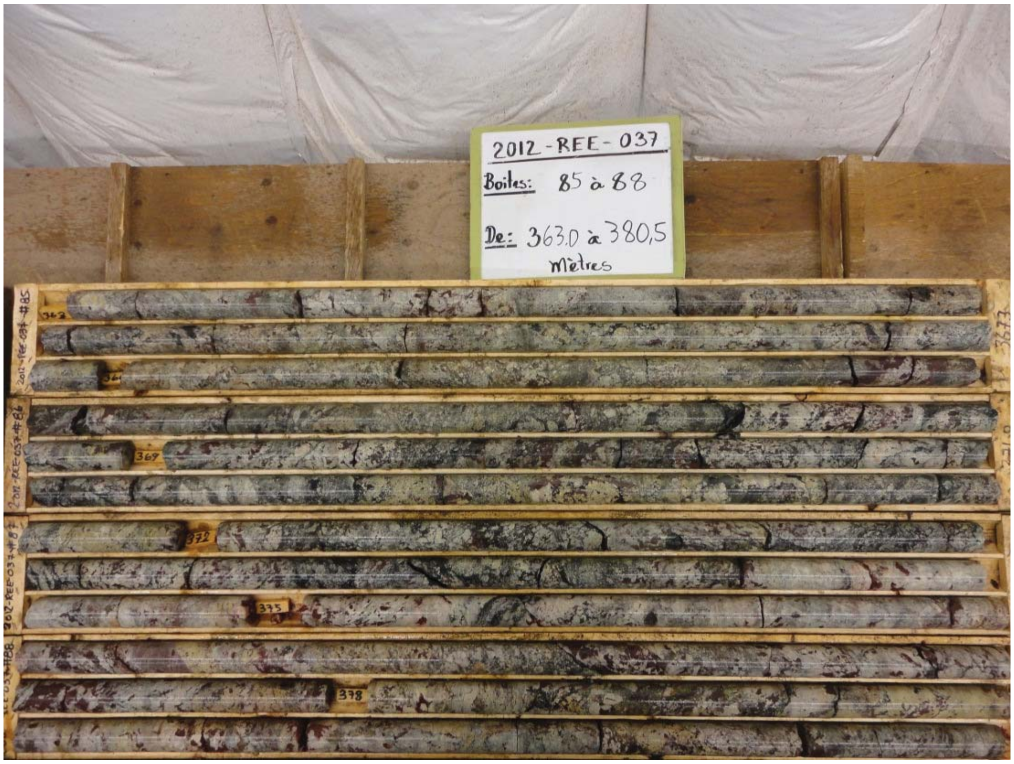


13.5.9 2012-REE-037

The 2012-REE-037 is situated in the Center-West area of the REE zone (MTME 255874.00: MTMN 5378202.00). It was drilled at 028° (true North) with a dip at -50°. The objective was to characterise the core of the REE zone with a drilling pattern of 100m x200m. The overburden is 6.8 m thick. From 6.8 m to 69.5 m, the Trenton limestone covered the carbonatite. The carbonatite begins with a strongly altered breccia facies (BRC1L) (hematite, chlorite and siderite) down to the depth of 132.2 m. From 132.2 m, the paleo-weathering alteration disappeared and the fresh carbonatite breccia facies (BRC1L) is logged down to 321 m. From 321 m to 798m, large interval of breccia (BRC1L) and massive (C1L) (Figure 17) carbonatite facies are layered.

The hole stays in the mineralized carbonatite and returned value of **2.263% TREO / 728.5 m** (from 69.5 m) including **0.031% HREO / 728.5 m**.

Figure 18: Lanthanide mineralized carbonatite (C1L), 2012-REE-037



13.5.10 2012-REE-038

The 2012-REE-038 is situated in the South-East of the REE zone (MTME 256218.97: MTMN 5378001). It was drilled at 031° (true North) with a dip at -50°. The objectives were to continue the drilling pattern of 100m x 200m and delimit the South contact. The overburden is 10.20 m thick. From 10.20 m to 38 m, the Trenton limestone covered the carbonatite. The carbonatite begin with a REE-poor dolomitic breccia facies (BRC2) down to 183 m. From 183 m to 252 m, a massive, medium grain textured calcitic facies (CCA) is observed. An ankeritic and dolomitic breccia facies (BRC1) followed down to 373.6 m. From there, the dolomitic carbonatite become massive (C1L).

The mineralization appeared at the depth of 357 m in a breccia facies. The south contact was limited by the low grade carbonatite returning a value of 0.600% TREO / 319 m (from 38 m.). The REE zone returned a value of **1.077% TREO / 45 m** (from 357 m) including **0.016% HREO / 45 m**.

13.5.11 2012-REE-039

The 2012-REE-039 is situated at the South-West of the REE zone (MTME 255797.05: MTMN 5378244.16). It was drilled at 028° (true North) with a dip of -50°. The objective was to complete a definition drilling pattern of 100m x 200m. The overburden is 15.90 m thick. From 15.90 m to 55.70 m, the Trenton limestone covered the carbonatite. The carbonatite begins with a strongly altered breccia facies (hematite, chlorite and siderite) (BRC1L) down to 98 m. The alteration decreased (hematite and chlorite) down to 207 m. From 207 m to 564 m, the dolomitic mineralized breccia facies is logged (BRC1L).

The mineralisation is observed all along the hole but increased at depth. The 2012-REE-039 returned a value of **1.802% TREO / 508.3 m** (from 55.7 m) including **0.031% HREO / 508.3 m**.

13.5.12 2012-REE-040

The 2012-REE-040 is situated at the center east of the REE zone (MTME 256340.87: MTMN 5378225.07). It was drilled at 031° (true North) with a dip of -50°. The objectives were to increases the REE definition by following a drilling mesh of 100m x100m and intersect the North contact in depth. The overburden is 8.60 m thick. From 8.60 m to 11.80 m, the Trenton limestone covered the carbonatite. A massive calcitic and dolomitic carbonatite facies (C1L) strongly altered (hematite, chlorite and siderite) is logged down to 102.70 m. A small breccia facies (BRC1L) cut the massive facies from 102.70 m to 142.40 m. From 142.40 m to 729 m, there is a layering between massive dolomitic carbonatite and calcitic carbonatite (C10 and C1C). Two breccias facies, from 405.30 m to 430.80 m and from 543 m to 600.50 m, disturbed the massive textured intervals.

The mineralization is homogeneous all along the hole. The 2012-REE-040 returned a value of **2.134% TREO / 717.2 m** (from 11.8 m) including **0.028% HREO / 717.2.3 m**.

13.5.13 2012-REE-041

The 2012-REE-041 is situated in the center area of the REE zone (MTME 256292.71: MTMN 5378307.19). It was drilled at 028° (true North) with a dip of -50°. The objectives were to complete the drilling pattern of 100m x 100m and intersect the north contact at depth. The overburden is 6.80 m thick. From 6.80 m to 36.20 m, The Trenton limestone covered the carbonatite. From 36.20m, the calcitic breccia carbonatite facies (BRC1C) is strongly altered (hematite, chlorite and siderite) down to 99.70 m. The same breccia facies becomes less altered down to 342 m. From 342 m to 434.10 m, a transition zone is noted where the carbonatite progressively changed from a calcitic to a dolomitic facies. From 434.10 m to 734.10 m, the dolomitic carbonatite (C1L) dominated but is cut by a large breccia facies (BRC1) between 539.70 m to 622.20. From 734.10 m to 774, the dolomitic breccia carbonatite facies completed the hole.

The lanthanide mineralization is transitionally decreasing in the lower part of the hole marking the North contact at depth with the not mineralized carbonatite. The hole 2012-REE-041 returned an overall value of **1.798% TREO / 697.9m** (from 36.2m) **including 0.029% HREO / 697.9m**. The best interval, without not mineralized breccia facies, returned a value of **1.987% TREO / 503.5m** (from 36.2m) **including 0.32% HREO /503.5ms**.

13.5.14 2012-REE-042

The 2012-REE-042 is situated in the center area of the REE zone (MTME 256208.17: MTMN 5378339.99). It was drilled at 029° (true North) with a dip of -52°. The objective was to complete a drilling pattern of 100m x100m for the pre-feasibility study. The overburden is 7.40 m thick. From 7.40 m to 41.60 m, the Trenton limestone covered the carbonatite. A carbonatite breccia textured facies (BRC1L), strongly altered by the paleo-weathering (hematite, chlorite and siderite) is logged down to 107.30 m. From 107.30 m to 975 m, there is a layering of breccia facies (BRC1L) and massive facies (C1L) of the dolomitic carbonatite. Between 213.70 m to 291.70 m, both facies becomes more calcitic than dolomitic composed. The North contact was traversed at the depth of 975 m. From there to 992 m, a medium grained, massive textured, and lanthanide poor dolomitic carbonatite (C5) is observed.

The 2012-REE-042 returned and overall value of **1.652% TREO / 950.4 m** (from 41.6 m) including **0.26% HREO / 950.4 m**. The last 383 m are progressing in the transition zone between the mineralized and not mineralized carbonatite and have a diluting effect on the TREO value. The best interval in the core of the REE zone returned a value of **1.934% TREO / 567.4 m** (from 41.6m) including **0.33% HREO / 567.4 m**.

13.5.15 2012-REE-043

The 2012-REE-043 is situated in the North-West area of the REE zone (MTME 256041.58: MTMN 5378449.20). It was drilled at 031° (true North) with a dip of -52°. The objective was to complete a drilling mesh of 100m x100m for the pre-feasibility study. The overburden is 7.10 m thick. From 7.10 m to 57 m, the Trenton limestone covered the carbonatite. A massive calcitic carbonatite facies (C1C), strongly altered (hematite, chlorite and siderite) is logged down to 125 m. Further, the same calcitic facies continue but with a decreasing of the paleo-weathering alteration. The massive calcitic facies continues down to 183.40 m. From 183.40 m to 723 m, a carbonatite breccia facies (BRC1L) dominated. The proportion of matrix is variable from 20% to 60%. The grain size decreased when the breccia textures increased. An interval of massive dolomitic carbonatite facies (C1L) is logged between 445.60 m and 504.80 m. The hole finished in the mineralized, massive dolomitic carbonatite (C1L) down to 743m.

Even if the hole finished in the mineralization, the analyses showed a decrease of the lanthanide values. It is explained by the transitional contact between the REE bearing carbonatite and the surrounding carbonatite and syenite complex. The 2012-REE-043 returned an overall value of **2.066% TREO / 684 m** (from 57 m) including **0.035% HREO / 684** m.

13.5.16 2012-REE-044

The 2012-REE-044 is situated in the North area of the REE zone (MTME 256218.95: MTMN 5378573.87). It was drilled at 031° (true North) with a dip of -53°. The objectives were to intersect the north contact in deep and complete the 100 m x 100 m drilling mesh for the pre-feasibility. The overburden is 21.60 m thick. From 21.60 m to 37.30 m, the Trenton limestone covered the carbonatite. A brecciated calcitic carbonatite facies (BRC1LC) strongly altered (hematite, chlorite and siderite) is described down to 53.30 m. From 53.30 m to 82.30 m, the calcite is substituted by the dolomite in the sub-surface altered facies

(BRC1L). The fresh carbonatite breccia (BRC1L) continues down to 381 m. From 381 m to 516 m, the texture changed from breccia to massive dolomitic carbonatite (C1L).

The hole 2012-REE-044 did not leave the mineralized zone. The vertical projection of the contact in the 2011-RRR-023 should have been traversed around 450 m depth. Assays results returned homogeneous lanthanides values all along the hole. **1.834% TREO / 480.7 m (**from 35.3) including **0.025% HREO / 480.7 m**. The weathered facies is enriched in REE and returned a value of 2.328% TREO / 47 m (from 35.3m).

13.5.17 2012-REE-045

The 2012-REE-045 is situated in the North area of the REE zone (MTME 256305.52: MTMN 5378523.95). It was drilled at 031° (true North) with a dip of -53°. The objectives were to intersect the north contact at depth and continue the 100m x 100m mesh for the pre-feasibility. The overburden is 2.70 m thick. From 2.70 m to 52 m, the Trenton limestone covered the carbonatite. The carbonatite begins in a strongly altered calcitic breccia facies (BRC1LC). The paleo-weathering alteration is composed of hematite, chlorite and siderite. The colour of the altered carbonatite varied in the warm shade of red and yellow. The calcitic breccia facies continue down to 114 m. From 114 m to 498 m, massive dolomitic facies (C1L) are layered with breccia facies (BRC1L).

The hole did not intercept the not mineralized carbonatite located on the north contact but the assays showed a lower concentration of lanthanide after 378 m depth. Even if the mineralisation decreased, the Northern transition contact can be considerate economically. The 2012-REE-045 returned an overall value of **1.701% TREO / 443 m** (From 52m) including **0.027% HREO / 443 m** but the best interval without the transitional contact returned 1.976% TREO / 323 m (from 52m) including 0.031% HREO / 323 m.

13.5.18 2012-REE-046

The 2012-REE-046 is situated in the middle-south area of the REE zone (MTME 256110.67: MTMN 5378197.12). It was drilled at 031° (true North) with a dip of -60°. The objectives were to create a drilling pattern of 100m x100m and test the continuity of the lanthanide mineralisation at depth. The overburden is 5.70 m thick. From 5.70 m to 32 m, The Trenton limestone covered the carbonatite. A strongly altered breccia facies carbonatite (BRC1L) (hematite, chlorite and siderite) is described down to 54 m. From there, the alteration disappeared and the fresh breccia facies continues down to 444 m. From 444 m to 873 m, massive dolomitic (C1L) and breccia carbonatite (BRC1L) facies are layered. Large intervals are more calcitic composed (C1LC and BRC1LC), from 444 m to 480 m and from 673.40 m to 714 m.

The 2012-REE-046 returned a homogeneous value all along the hole of **2.064% TREO / 873 m.** (from 32m.) including **0.037% HREO / 873 m.** This great interval confirmed the homogeneous distribution of the lanthanides in the REE zone.

13.5.19 2012-REE-047

The 2012-REE-047 is situated in the middle-South area of the REE zone (MTME 256014.15: MTMN 5378232.69). It was drilled at 029° (true North) with a dip at -54°. The objectives were to create a drilling pattern of 100m x100m and verify the mineralization continuity at depth. The overburden is 6.40 m thick. From 6.40 m to 51 m, the Trenton limestone covered the carbonatite. The carbonatite begins with a strongly altered (hematite, chlorite and siderite) breccia facies (BRC1L) down to 84.40 m. The alteration decreased and the breccia facies (BRC1L) continues down to 210.80 m. From 210.80 m to 903 m, there is a layering of massive facies (C1L) and breccia facies (BRC1L) in the mineralized dolomitic carbonatite.

The 2012-REE-047 did not leaved the mineralized body and returned a homogeneous value of **2.251% TREO / 853 m.** (from 50m.) including **0.035% HREO / 853 m.** In the previous results, the altered layer is usually enriched in lanthanide but the 2012-REE-047 showed depletion compare to the fresh carbonatite (Table 4). The relation between the lanthanide concentration and the weathered layer must be investigated.

13.5.20 2012-REE-048

The 2012-REE-048 is situated in the North-East of the REE zone (MTME 256396.27: MTMN 5378483.95). It was drill at 031° (true North) with a dip at -50°. The objectives were to continue the drilling pattern of 100m x100m and intersect the North contact at depth. The overburden is 3.20 m thick. From 3.20 m to 44 m, the Trenton limestone covered the carbonatite. The calcitic breccia carbonatite facies (BRC1LC) was affected, down to 105 m, by the paleo-weathering alteration characterised by the pervasive hematite, the chlorite and the siderite. From 105 m to 351m, the dolomitic carbonatite was layered in breccia (BRC1L) and massive (C1L) facies. From 351 to 567 m, the lithology was described has the previous interval but the lanthanides contain decreased. The low grading carbonatite is usually called the transition zone. At 567m, the North contact was intercepted. From there, a medium grained carbonatite (C5) without lanthanides was logged.

The main mineralized zone returned a value of **2.366% TREO / 307 m.** (from 44m.) including **0.041% HREO / 307 m.** The transition zone returned a value of 1.259% TREO / 216 m. (from 351). Even if the grade is lower in the transition zone, it must be evaluated for a potential lanthanide resource.

13.5.21 2012-REE-049

The 2012-REE-049 is situated in the middle-South area of the drilling zone (MTME 256188.71: MTMN 5378134.72). It was drilled at 029° (true North) with a dip of -50°. The objectives were to create a drilling pattern of 100m x100m, to intersect the South contact and verify the mineralization extension at depth. The overburden is 15 m thick. From 15 m to 36.90 m, the Trenton limestone covered the carbonatite. From 36.90 m to 144.50 m, a coarse grained, REE-poor carbonatite facies (C2) was logged. This facies is weakly altered (hematite, siderite and chlorite) by the paleo-weathering. From 144.50 m to 175.60 m, a calcitic massive carbonatite facies is described (C1C). The South contact was intercepted at 175.6 m and is characterised by the increase of the lanthanide mineralization. From 175.60 m to 304.60 m, a mineralized calcitic breccia facies is observed (BRC1LC). From 304.60 m to 900 m, pluri-metre scale massive dolomitic carbonatite breccia facies and massive are layered. Between 614 m and 672 m the dolomitic carbonatite was replaced by a calcitic facies.

In the 2012-REE-049, the carbonatite at the South contact (C2) returned a value of 1.030% TREO / 138.7 m. (from 36.9 m.). The main REE zone returned a excellent value of **2.172% TREO / 724.4 m.** (From 175.6) including **0.035% HREO / 724.4 m.** The south contact was delimited and the lanthanides mineralization still open at depth.

13.5.22 2012-REE-050

The 2012-REE-050 is situated on the North-East Edge of the REE zone (MTME 256449.65: MTMN 5378369.66). It was drilled at 031° (true North) with a dip of -50°. The objectives were to intersect the North contact at depth and completed the 100m x100 m drilling mesh. The overburden is 6.8 m thick. From 6.8 m to 15.3 m, the Trenton limestone covered the carbonatite. The carbonatite, down to 69 m., was described like a strongly altered (hematite, chlorite and siderite) breccia facies poor in rare earth minerals (3-4%) (BRC1). From 69 m to 102 m, the same facies continue but the alteration stopped and the percentage of rare earth minerals increased (5%) (BRC1L). From 102 to 159.3 m, a massive dolomitic carbonatite facies (C1L), composed of 5% rare earth minerals (in cluster and disseminated) and 2-3% of disseminated pyrite, is described. From 159.3 m to 177 m, a breccia facies (BRC1L) containing 1-2% of disseminated pyrite (locally in cluster) and 6% of rare earth minerals in cluster or disseminated is logged. From 177 m to 284.7 m, the massive dolomitic carbonatite facies (C1L) contains an average of 6% of rare earth minerals and 2-3% of disseminated pyrite locally in mm/cm scale clusters. From 284.7 to 365.5 m., the breccia facies contained 1-2% of disseminated pyrite (locally in mm/cm scale clusters) and 7% of rare earth minerals (disseminated and in small clusters). From 365.5m to 428.5m, the same breccia facies is observed but the rare earth minerals decrease (3-4%). From 428.5m to 552m, the massive dolomitic carbonatite facies contained an average of 5-6% of rare earth minerals (in cluster and disseminated), apatite (2-4% in stringers) and 2-3% of disseminated pyrite (locally in mm/cm cluster). From 552m to 598.5m, the same massive dolomitic carbonatite facies continued but the percentage of rare earth minerals decreased, the apatite stringer increased (3%) and the disseminated pyrite stayed the same (2-3%).

Assays values delimited the North contact between the mineralized carbonatite and the surrounding carbonatite. The contact is transitional and lanthanides values degreased progressively but small lanthanides enriched layer created punctual peaks. The 2012-REE-050 returned and overall value of 1.734% TREO / 583.2m (from 15.3m) including 0.026% HREO / 583.2m. The main mineralized core returned a value of **1.985% TREO / 359.5m** (from 69m) including **0.029% HREO / 359.5m**. The surrounding carbonatite (C2) was also weakly mineralized and returned not negligible values of 1.203% TREO / 170m. The mining potential of the nearby carbonatite should be seriously evaluated.

13.5.23 2012-REE-051

The 2012-REE-051 is situated on the North-East of the REE zone (MTME 256498.54: MTMN 5378461.51). It was drilled at 031° (true North) with a dip of -50°. The objectives were to intersect the North contact at depth and complete the 100m x100m drilling mesh. The overburden is 3 m thick. From 3m to 17.6m, the Trenton limestone covered the carbonatite. A carbonatite breccia facies (BRC1L), strongly altered (hematite, chlorite and siderite) and composed of 5% rare earth minerals, was logged down to 108.7 m. From 108.7m to 192 m, the same facies, without the alteration, have a similar percentage of rare earth minerals. From 192 to 241.4 m, a massive dolomitic carbonatite facies (C1L) with 5-6% rare earth minerals (in cluster and disseminated) and 2-3% disseminated pyrite is observed. A dolomitic breccia facies followed down to 327.5m. This facies contained 1-2% pyrite and 2-3% rare earth minerals in cluster. Locally, there are massive carbonatite (C1L) enriched in REE minerals clusters (5-6%). From 327.5 m to 351 m, a massive dolomitic carbonatite facies closed the hole. Rare earth minerals decreased (average of 2-3%).

Once again, the hole achieved is objective of delimiting the North contact. Assays results showed a net depletion of the lanthanides from 261m. The hole 2012-REE-051 returned an overall value of 1.944% TREO / 333.4m (from17.6m) including 0.032% HREO / 333.4m. the sub-surface altered carbonatite is enriched in TREO and de main mineralized carbonatite returned a value of **1.985% TREO / 152.3m** (from 108.7m) including **0.031% HREO / 152.3m**.

13.5.24 2012-REE-052

The 2012-REE-052 is located on the South-East of the REE zone (MTME 256276.22: MTMN 5378083.66). It was drilled at 031° (true north) with a dip at -50°. The objective were to intersect the South contact at depth and complete a 100m x100m drilling mesh. The overburden is 3 m thick. From 3 m to 16.5 m, the Trenton limestone covered the carbonatite. A massive coarse grained dolomitic carbonatite facies (C2S), depleted in rare earth minerals, with over 5% of syenitic enclave and 2-3% apatite stringer, is logged down to 176 m. From 176 m to 264 m, a carbonatite breccia facies (BRC1) with 3% of rare earth minerals clusters and 2-3% of apatite stringer is described. From 264 m, the massive dolomitic carbonate facies (C1) was poor in rare earth minerals (2-3% disseminated clusters), composed of 2-3% disseminated pyrite and 2-4% apatite stringers. From 399 m and down to 492 m, the breccia facies (BRC1) returned. This facies contained 1-2% disseminated pyrite disseminated (locally in clusters) and 2-3% of rare earth minerals in clusters. Locally, there is massive layers of carbonate with rare earth minerals clusters reaching 5-6% in proportion. From 492 m to 634.5 m, the same breccia facies (BRC1L) is logged but the percentage of rare earth minerals increased (an average of 5-6%) when the pyrite and the apatite decrease. From 634.5 m to 767.5 m, a massive calcitic carbonate facies (C1LC), whit 5-6% (locally 8%) of rare earth minerals. The mineralization is associated with the barite and the halite. From 767.5 m to 900 m, the dolomitic breccia facies (BRC1L) composed of 7% disseminated rare earth minerals in clusters is logged to the end of the hole.

The first interval drilled was composed of the carbonatite (C2) from the transition zone. The REE contain increased toward the core and the value returned is 1.185% TREO / 274.5m (from16.5m). In the REE zone, where the mineralization is concentrated, the value returned is **1.844% TREO / 609m** (from 291m) including **0.031% HREO / 609m**.

13.5.25 2012-REE-053

The 2012-REE-053 is located on the East of the REE zone (MTME 256567.96: MTMN 5378372.47). It was drilled at 031° (true north) with a dip of -50°. The objectives were to intersect the North contact at depth and completed the 100m x100m drilling mesh for the pre-feasibility study. The overburden is 3.5m thick. From 3.5m to 28m, the Trenton limestone covered the carbonatite. The upper part of the dolomitic carbonatite was massive textured, coarse grained, strongly altered (hematite, chlorite and siderite) and poorly mineralized down to 67.5 m. From 67.5 m to 139.5 m, the same facies continued with an incretion of lanthanides (3%) disseminated between carbonates minerals and rarely in clusters. Apatite stringers (5-7%) and disseminated pyrite (1-2%) are noted. From 139.5m to 175.3m, the massive facies changed for a breccia facies (BRC1) poor in REE minerals (2% disseminated), 2-3% disseminated pyrite and 4-7% apatite stringer. From 175.3m to 207m, a massive dolomitic carbonate (C1L) containing disseminated pyrite (1-2%) and rare earth minerals in cluster (2-3%) was logged. Locally, massive carbonates with rare earth minerals clusters (5-6%) are observed. From 207 m to 279 m, the massive dolomitic carbonatite is enriched in rare earth minerals (an average of 6-8%) and depleted in apatite. From 279 m to 369 m, the breccia facies was poorly mineralized (3-5% lanthanides). In this interval a clear relationship with the barite was noticed. A massive, coarse grained dolomitic carbonatite depleted in REE minerals completed the hole down to 453m.

The 2012-REE-053 returned a value of 1.501% TREO / 425m (from 28m) including 0.024 HREO / 425m. Excluding the surrounding carbonatite, the core zone returned a value of **1.658% TREO / 257m** (from 28m) including **0.029% HREO / 257m**. The hole delimited the North-East corner of the REE zone by is lower average value compare to the middle area.

13.5.26 2012-REE-054

The 2012-REE-054 is located on the South-East area of the REE zone (MTME 256265.76: MTMN 5377958.18). It was drilled at 033° (true north) with a dip of -50°. The objectives were to intersect the South contact at depth, to delimit the REE zone and also completed the 100m X 100m drilling mesh. The overburden is 9.8 m thick. From 9.8 m to 55 m, the Trenton limestone covered the carbonatite. The carbonatite begin with a massive textured and a coarse grained dolomitic facies (C2), poor in rare earth minerals and strongly altered (hematite, chlorite and siderite) down to 117 m. From 117 m to 223 m, the paleo-weathering alteration disappeared. Apatite stringer (5-8%) and disseminated pyrite (1-2%.) are logged. From 223 m to 256.5 m, a syenite enclave is dislocated by the massive coarse grains dolomitic carbonate facies. From 256.5 m to 519 m, the same C2 facies, low in rare earth minerals returned. The apatite content seems to decreases with depth. From 519 m to to the end of hole, 900 m, a massive dolomitic facies (C1) is logged. This facies locally contained rare earth minerals but non continuity was observed.

The hole did not intersect the REE zone. Assays results reflect the low rare earth minerals content. The coarse grained dolomitic facies (C2) returned a value of 0.539% TREO / 848m (from 52m) including 0.014% HREO / 848m. The low grading transition zone, C2, may have an economical interest depending on the economical context and the exploitation method choose.

13.5.27 2012-REE-055

The 2012-REE-055 is situated on the North-West area of the REE zone (MTME 256087.07: MTMN 5378531.73). It was drilled at 301° (true north) with a dip of -45°. The objective was to intersect the West contact at depth for delimiting the REE zone. The overburden is 12.5m thick. From 12.5m to 57m, the Trenton limestone covered the carbonatite. A massive dolomitic carbonatite facies (C1L) rich in rare earth minerals and strongly altered (hematite, chlorite and siderite) is logged down to 99 m. From 99m to 159m, the same facies without the alteration contained apatite stringer (5-8%) and disseminated pyrite (1-2%). From 159m to 276m, log described a breccia facies with a rare earth minerals percentage of decreasing and an increasing amount of syenite enclaves.

The 2012-REE-055 intercepted the west contact has plan. It returned an overall value of 1.747% TREO / 216m (from 57m) including 0.029% HREO / 216m. The main REE zone, intercepted in the upper part of the hole returned a value of **1.900% TREO / 147m** (from 57m) including **0.032% HREO / 147m**.

13.5.28 2012-REE-056

The 2012-REE-056 is located on the North-West area of the REE zone (MTME 256087.47: MTMN 5378531.53). The same set-up was used to drill the 2012-REE-055 and 2012-REE-056. It was drilled at 301° (true north) with a dip of -75°. The objective was to intersect the West contact at depth. The overburden is 9 m thick. From 9 m to 43.5 m, the Trenton limestone covered the carbonatite. From 43.5m and down to 108m, a mineralized carbonatite breccia facies (BRC1L) is logged. The sub- surface alteration (hematite, chlorite and siderite) is observed. From 108 m to 147 m, the same facies is noted. The rare earth minerals content decreased toward depth. There average proportion varied around 4%) and are associated to disseminated pyrite clusters (1-2%). A calcitic facies (BRC1C) is logged from 147 m to 193.1 m. The same breccia facies, but no calcitic, is intersected down to 516 m. The REEs minerals content seems to increase with the degree of breccia intensity. A light decrease of REE is visible from 285 to 351 m. Other mineralisation are pyrite (1-2% in disseminated cluster) and apatite (2-5% in stringer). From 516 m to 549.6 m, many syenite enclaves (75%) are observed. This changed mark the contact between the REE zone and the surrounding transition zone composed of massive dolomitic coarse grain carbonatite (C2).

The REE zone returned an excellent value of **2.242% TREO / 475.5m** (from 43.5m) including **0.033% HREO / 475.5m**. The small interval drilled in the transition returned also a good value of 1.297% TREO / 30m (from 519m).

13.5.29 2012-REE-057

The 2012-REE-057 is located on the South-East area of the REE zone (MTME 256359.05: MTMN 5378016.91). It was drilled at 031° (true north) with a dip of -50°. The objectives were to intersect the South contact at depth and delimit the REE zone. The overburden is 12.7 m thick. From 12.7 m to 41.6 m, the Trenton limestone covered the carbonatite. A massive textured, coarse grained carbonatite (C2), poor in Lanthanide is mainly logged down to the end of hole, 643.4m. There is locally presence of Lanthanides (trace). Many stringers of apatite (4-8%) and disseminated pyrite cluster (1-3%) are observed. Few syenites enclaves are disseminated through the facies. The hole never reached the mineralized REE zone. The contact is slightly off set on the West and parallel to the drilling direction.

The 2012-REE-057did not leaves the transition zone and returned a value of 0.643% TREO / 601.8m (from 41.6m) including 0.018% HREO / 601.8m. The REEs distribution is homogeneous with the 2012-REE-054 and 2012-REE-059 values drilled on the same section (2800E).

13.5.30 2012-REE-058

The 2012-REE-058 is located on the West area of the REE zone (MTME 255998.77: MTMN 5378352.29). It was drilled at 301° (true north) with a dip of -50°. The objective was to intersect the west contact at depth. The overburden is 5.9 m thick. From 5.9 m to 54 m, the Trenton limestone covered the carbonatite. The first interval of carbonatite facies is interpreted as the regolith, a hematite, chlorite and siderite strongly altered facies. From 54 m to 111 m, a breccia facies strongly altered (hematite, chlorite and siderite). It is difficult to determinate mineral phase. From 111 m to 149 m, a massive dolomitic facies (C1L), rich in REEs minerals (5%), with disseminated pyrite and locally apatite stringers is logged. At 149 m, the contact with the transition zone is traversed. A syenite enclave's rich breccia facies (SC2) composed of 60-70 % syenite and 30-40% of carbonatite (C2) is described. This facies is depleted in REEs minerals but included disseminated pyrite (1-2% and apatite stringer (3%). From 207 m to 351 m, the syenite enclaves proportion decreased (4-5%).

The REEs zone interval returned a value of **1.319% TREO / 95m** (from 54m) including **0.032 HREO / 95m** when the transition zone returned a value of 0.800% TREO / 202m (from 149m).

13.5.31 2012-REE-059

The 2012-REE-059 is located on the South-East area of the REE zone (MTME 256404.94: MTMN 5378111.15). It was drilled at 031° (true north) with a dip of -50°. The objective was to intersect the South contact at depth. It was plan to begin in the transition zone and finish in the REE zone. The overburden is 12.2 m thick. From 12.2 m to 22.3 m, the Trenton limestone covered the carbonatite. The first facies encounter was a massive textured and a coarse grained carbonatite facies (C2). There is few syenite enclaves through this facies except between 197.4 m and 208 m where the syenite (SC2) become the main lithology. The mineralisation is composed of apatite stringers (4-8%), pyrite clusters (1-3%), disseminated REE minerals (trace) and disseminated pyrochlore (trace to 1%). From 600 m to 892.6 m, a mine facies (C3NA) was recognized, but strongly brecciated. Layer of massive textured and coarse grained carbonatite faices (C2) are mixted with the syenite enclaves. The Pyrochlore crystal are visible in the C3NA facies. Other mineralisations are composed of pyrite (1-2% disseminated and locally in cluster), apatite (8% stringer) and disseminated REE (trace).

The C2 facies is homogeneous and returned a value of 0.576% TREO / 546.3m (from 20.7m) including 0.018% HREO / 546.3m. The mine facies (C3NA) is slightly enriched in REEs compared to the transition zone and returned a value of 0.819% TREO / 325.6m.

13.5.32 2012-REE-060

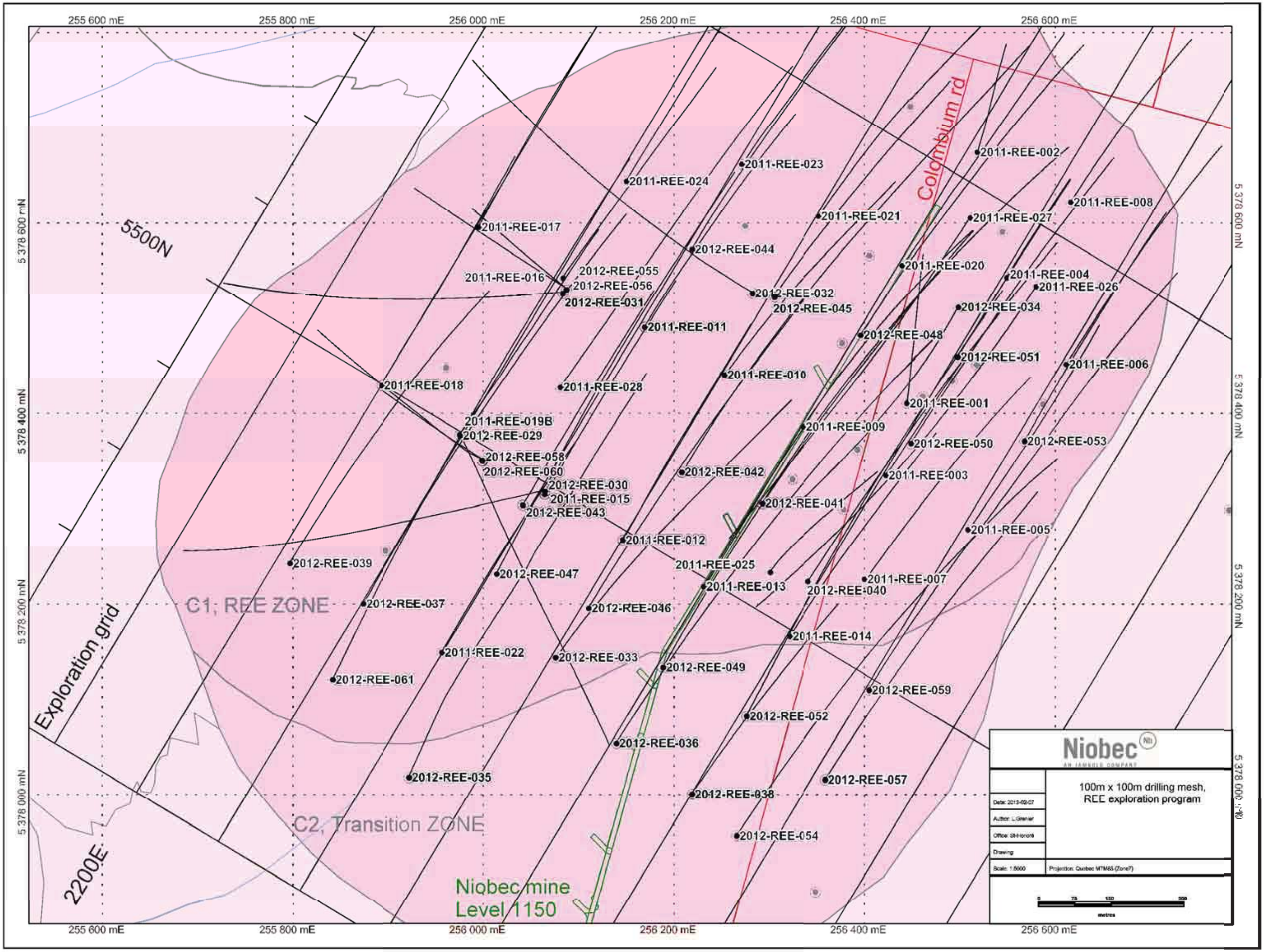
The 2012-REE-060 is located in the West area of the REE zone (MTME 255999.33: MTMN 5378351.98). It was drilled on the same set-up of the 2012-REE-055. It was drilled at 301° (true north) with a dip of -75°. The objective was to intersect the West contact at depth. The overburden is 4.4 m thick. From 4.4 m to 30.8 m, the Trenton limestone covered the carbonatite. The breccia facies (BRC1L), rich in rare earth minerals, strongly altered (hematite, chlorite and siderite) is logged down to 86 m. From 86 m to 471 m, the same facies is encounter but without the alteration. From 471 m to 500 m, the REE amount is decreasing (1-3% disseminated) when the syenite enclaves amount increased (10-20%). Tha apparition of the syenite mark the contact with the transition zone.

The first interval, drilled in the REE zone returned a value of **1.840% TREO / 428.2m** (from30.8m) including **0.033% HREO / 428.2m**. The transition zone returned a value of 0.913% TREO / 41m. Once again, the assay results confirmed the grade diminution in the transition but show his economic potential.

13.5.33 2012-REE-061

The 2012-REE-061 is located on the South-West area of the REE zone (MTME 255841.72: MTMN 5378122.17). It was drilled at 30.9° (true north) with a dip of -59.9°. The objectives were to test the depth extension of the lanthanides high grade zone returned in the 2012-REE-037. The overburden is 6.7 m thick. From 46.7 m to 57.6 m, the Trenton limestone covered the carbonatite. The regolith (hematite, chlorite and siderite alteration) is breccia textured and depleted of lanthanides (BRC1). From 108.5 m, the altered facies is followed by a fresh breccia facies (BRC1). From 372 m to 546 m, the REE mineralization begin in a massive carbonatite facies (C1L). Breccia component (10%) are omnipresent. The lanthanides mineralization (7%) is found in purple coloured, centimetre scale cluster in the massive facies and disseminated in the breccia facies. From 546 m to 603 m, the breccia dominate (80%). The lanthanides mineralization (7%) is principally disseminated, but some centimetre scale clusters are still visible. From 603m to 687 m, the breccia decreased (30%) and is remplaced by the massive carbonatite facies (C1L). The mineralization of lanthanides (6%) includes disseminated apatite. From 687 m to 858 m, breccia facies dominate. The breccia matrix composed of halite and chlorite (locally, there is dark coloured matrix). The sub-angular fragments are composed of dolomite. The majority of the mineralization is disseminated in the breccia. Locally, syenite enclaves are noted. From 858 m to 945 m, the lanthanides decrease abruptly to 1-2% (BRC1). There still few zones mineralized (metrics zones of C1L). Apatite stringer increased. From 945 m to 997.3 m, syenite dominated (SC2). There is massive carbonatite (30%), with 2-3% lanthanides, mixed with syenite. From 997.3 m to 1076.1 m, a massive carbonatite (C2) is logged. In this interval, the syenite enclave amount decreased, apatite stringer still noted, and ,locally, presence of Niobium facies (C3NA) are observed. From 1076.1 m to 1191 m, a breccia facies, depleted of lanthanides (BRC1) finished the hole.

The REE zone was intercepted in the middle of the hole. The high grade zone was confirmed. It returned a value of **2.728% TREO / 513m** (from 342m) including **0.033% HREO / 513m**. The South transition zone, intercepted previously, returned a value of 1.088% TREO / 287.3 (from 54.7m) and the North transition zone returned a value of 0.989% TREO / 316m (from 855).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255 800 mE
256 000 mE
256 200 mE
256 400 mE
256 600 mE
5 378 600 mN
5 378 400 mN
5 378 200 mN
5 378 000 mN
5500N
2200E
Exploration grid
Colombium rd
C1, REE ZONE
C2, Transition ZONE
Niobec mine
Level 1150
2011-REE-001
2011-REE-002
2011-REE-003
2011-REE-004
2011-REE-005
2011-REE-006
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Niobec
100m x 100m drilling mesh,
REE exploration program
metres

13.7 Drill holes results, 2012 REE exploration program.

The 2012 exploration and definition drilling program confirmed the REE mineralisation distribution homogeneity. The 100 x 100 metres drilling mesh performed help the geology team to define the core of the REE rich carbonatite and the relationship with the surrounding units. The transition zone returned interesting results on large interval and must be evaluated for it economic value.

The new 100m x 100m drilling pattern increased the resource confidence from sub-surface to 350m below. The 2011 inferred resources were all transformed in indicated resources. The drilling accuracy from 350m to 700m, 100m x 200m drilling mesh, added inferred resources at depth. Even if the resources calculation was limited to 700m, the deepest holes confirmed the mineralisation continuity down to 1200m below surface.

Mineralogical studies are under progress to evaluate the REEs mineral affinities and distribution. The 2012 drill hole reached deeper than ever historically. Preliminary interpretation based on the core description and the Assays results show a relationship between the REEs mineral content and the deepness. Pass 1000m deep, the texture of the hosting carbonatite and the lanthanide minerals change. Simultaneously, the average REE content slightly increased. This observation are currently investigated and tested by a master project conjointly realised by IAMGOLD-Niobec and the UQAC University.

The deep holes also tested gravimetric anomaly hypothesis. In 2011, based on theory projection, an ultra-mafic source, located at the base of the Saint-Honoré carbonatite complex, was interpreted to be the explanation of the gravimetric anomaly. Excepted few angular enclaves of mafic to ultra-mafic rock intercepted by drilling and observed in the drift, no major units was discovered. The ultra-mafic basement theory may be transferred to a lower level. The geophysics interpretations plan the anomaly around 500m deep. This may be explained by the vertical distribution of the barium. From the surface and down to 200m, the barium is completely depleted. Assays are returning value under the limit detection. Abruptly, the average barium contain rise above 3%, higher than all the other carbonatite facies of the complex. The phenomenon is also slightly observed in the rock density..

Over all, the 2012 drilling exploration program returned excellent results and a lot of new geological data that will be interpreted in 2013. Each drill hole results are summarised in Table 7 below.

Table 7: Drill hole results summary, 2012 REEexploration campaign.

HOLE #	From (m)	To (m)	Lenght (m)	TREO (%)	HREO (%)	LA2O3 (PPM)	CE2O3 (PPM)	PR2O3 (PPM)	ND2O3 (PPM)	SM2O3 (PPM)	EU2O3 (PPM)	GD2O3 (PPM)	TB2O3 (PPM)	DY2O3 (PPM)	NB2O5 (PPM)	MO (PPM)
2012-REE-029	44.5	651	606.5	1.348	0.031	3134.179	6373.003	708.999	2621.721	301.053	66.208	160.424	17.852	63.785	1602.525	104.750
including																
	44.5	**450**	**405.5**	**1.704**	**0.037**	**4028.978**	**8085.264**	**889.943**	**3259.118**	**366.437**	**80.559**	**196.068**	**21.968**	**75.272**	**1514.108**	**116.286**
	450	651	201	0.616	0.017	1291.947	2847.761	336.466	1309.434	166.438	36.662	87.040	9.377	40.135	1784.559	81.000
2012-REE-030	52.5	639	586.5	0.991	0.027	2254.773	4665.385	534.016	1916.772	231.980	54.440	128.701	15.953	67.702	1525.154	62.945
including																
	52.5	**330**	**277.5**	**1.564**	**0.035**	**3654.043**	**7450.806**	**841.897**	**2964.794**	**343.897**	**78.498**	**178.680**	**19.915**	**70.977**	**1192.417**	**97.021**
	330	423.9	93.9	0.592	0.032	1275.391	2671.251	297.700	1096.762	152.924	42.481	124.519	21.797	126.604	2503.195	24.688
	423.9	639	215.1	0.405	0.014	824.362	1837.771	228.537	883.857	117.894	27.678	63.922	8.073	37.156	1534.119	34.514
2012-REE-031	65.3	597	531.7	1.284	0.025	2682.281	6029.893	730.834	2809.689	317.195	67.908	136.238	12.356	36.086	1267.224	155.945
including																
	65.3	**261.3**	**196**	**2.142**	**0.036**	**4805.437**	**10164.129**	**1198.715**	**4406.347**	**473.565**	**99.394**	**194.402**	**17.045**	**46.363**	**880.446**	**245.574**
	261.3	527.4	266.1	0.833	0.019	1545.688	3840.351	490.087	2004.733	237.655	51.547	105.186	9.467	28.176	1219.820	114.371
	527.4	597	69.6	0.526	0.017	881.534	2435.775	297.943	1270.869	169.110	39.369	86.590	9.784	36.296	2538.883	56.167
2012-REE-032	47.6	651	603.4	1.441	0.028	3249.840	6816.394	799.527	2913.733	324.804	68.538	145.393	14.609	48.701	1640.016	166.000
including																
	47.6	**402**	**354.4**	**2.122**	**0.034**	**4857.683**	**10117.557**	**1176.361**	**4255.378**	**457.286**	**93.042**	**188.689**	**16.642**	**41.204**	**835.544**	**240.189**
	402	453	51	0.670	0.017	1459.067	3060.486	377.255	1440.823	175.988	42.230	89.294	8.734	30.042	1709.393	136.588
	453	651	198	0.382	0.019	739.025	1681.674	211.721	813.109	118.245	30.018	79.810	12.365	67.366	3109.202	36.439
2012-REE-033	**42**	**1338**	**1296**	**2.160**	**0.032**	**5845.375**	**10515.933**	**1077.193**	**3461.655**	**343.496**	**80.095**	**169.741**	**17.496**	**57.317**	**1466.517**	**113.088**
including																
	42	162	120	1.227	0.024	3245.308	5728.377	626.528	2151.294	253.766	54.072	123.839	13.223	48.230	2269.045	78.488
	162	1002.4	840.4	2.132	0.037	5516.814	10318.611	1095.450	3605.905	379.035	89.644	194.732	20.522	68.293	1657.884	138.132

HOLE #	From (m)	To (m)	Lenght (m)	TREO (%)	HREO (%)	LA2O3 (PPM)	CE2O3 (PPM)	PR2O3 (PPM)	ND2O3 (PPM)	SM2O3 (PPM)	EU2O3 (PPM)	GD2O3 (PPM)	TB2O3 (PPM)	DY2O3 (PPM)	NB2O5 (PPM)	MO (PPM)
	1002.4	1338	335.6	2.580	0.023	7653.269	12818.532	1201.218	3592.760	287.868	65.870	124.139	11.490	33.112	682.034	63.088
2012-REE-034	**21.4**	**1260**	**1238.6**	**1.885**	**0.031**	**4445.759**	**9032.327**	**1026.313**	**3598.090**	**411.689**	**87.729**	**169.188**	**14.138**	**42.016**	**799.687**	**193.955**
including																
	21.4	75.7	54.3	2.401	0.051	5766.956	11239.975	1250.392	4601.679	623.749	136.757	285.121	22.657	61.673	1167.007	217.737
	75.7	999	923.3	1.752	0.031	4004.721	8369.394	969.277	3445.615	405.310	85.937	167.060	13.742	40.955	801.809	204.863
	999	1260	261	2.250	0.029	5749.014	10942.854	1183.232	3929.229	388.403	83.490	151.549	13.706	41.554	711.809	149.391
2012-REE-035	60	924	864	1.831	0.030	4965.686	8854.602	902.485	2953.771	304.115	70.973	159.345	16.626	52.504	1686.969	98.057
including																
	60	194.2	134.2	0.410	0.017	972.154	1767.636	206.673	811.007	144.335	35.255	83.479	9.355	37.996	1895.476	9.404
	194.2	438	243.8	1.315	0.028	3161.382	6256.566	677.683	2460.103	279.398	64.789	147.020	15.992	56.736	1908.404	99.282
	438	**924**	**486**	**2.501**	**0.035**	**7032.728**	**12211.697**	**1216.492**	**3818.448**	**362.361**	**84.332**	**187.304**	**19.023**	**54.456**	**1513.504**	**122.679**
2012-REE-036	42.2	900	857.8	1.810	0.031	4238.809	8663.008	986.707	3473.669	402.684	85.443	165.244	14.490	46.710	1113.508	210.137
including																
	42.2	234	191.8	0.636	0.016	1462.590	2866.975	342.052	1331.265	173.239	38.106	77.435	7.673	32.483	2030.175	73.500
	234	**900**	**666**	**2.141**	**0.035**	**5017.002**	**10285.198**	**1168.058**	**4088.740**	**467.129**	**98.757**	**188.297**	**16.208**	**50.838**	**853.851**	**248.841**
including	766.5	900	133.5	2.828	0.050	7023.867	13250.042	1522.454	5299.775	655.051	140.006	267.689	21.869	68.224	749.341	370.800
2012-REE-037	**69.5**	**798**	**728.5**	**2.263**	**0.031**	**5861.642**	**10967.245**	**1180.464**	**3916.453**	**382.952**	**80.742**	**169.821**	**15.752**	**41.317**	**1347.947**	**183.125**
including																
	69.5	132.2	62.7	1.046	0.036	2306.098	4767.643	564.412	2124.404	305.716	76.897	184.314	23.177	75.956	2011.578	19.273
	132.2	798	665.8	2.382	0.030	6207.757	11570.746	1240.433	4090.900	390.471	81.116	168.410	15.029	37.945	1283.345	199.075
2012-REE-038	38	402	364	0.661	0.014	1611.725	3091.157	344.779	1245.528	157.376	33.212	72.368	7.262	26.442	2263.578	50.349
including																
	38	357	319	0.600	0.014	1462.768	2797.869	312.368	1130.435	146.954	31.896	70.666	7.147	25.906	2381.993	40.945

HOLE #	From (m)	To (m)	Lenght (m)	TREO (%)	HREO (%)	LA2O3 (PPM)	CE2O3 (PPM)	PR2O3 (PPM)	ND2O3 (PPM)	SM2O3 (PPM)	EU2O3 (PPM)	GD2O3 (PPM)	TB2O3 (PPM)	DY2O3 (PPM)	NB2O5 (PPM)	MO (PPM)
	357	**402**	**45**	**1.077**	**0.016**	**2635.807**	**5107.514**	**567.604**	**2036.792**	**229.023**	**42.264**	**84.069**	**8.057**	**30.127**	**1449.479**	**115.000**
2012-REE-039	**55.7**	**564**	**508.3**	**1.803**	**0.031**	**4679.364**	**8606.867**	**923.599**	**3146.583**	**337.973**	**75.030**	**167.096**	**16.991**	**52.980**	**1321.855**	**170.831**
including																
	55.7	207	151.3	1.181	0.032	2300.214	5416.946	715.919	2693.667	332.719	74.709	153.143	18.637	70.627	1166.951	85.692
	207	564	357	2.072	0.031	5710.329	9989.166	1013.593	3342.847	340.249	75.169	173.142	16.277	45.334	1388.980	207.725
2012-REE-040	**11.8**	**729**	**717.2**	**2.134**	**0.028**	**5688.182**	**10235.403**	**1098.327**	**3632.370**	**385.490**	**76.640**	**150.277**	**13.143**	**37.933**	**1166.505**	**160.263**
including																
	11.8	102.7	90.9	2.203	0.032	5818.786	10385.595	1171.415	3877.123	430.868	87.749	176.819	14.711	44.437	1106.511	75.875
	102.7	729	626.3	2.124	0.027	5669.098	10213.457	1087.648	3596.607	378.859	75.017	146.398	12.913	36.983	1175.271	172.594
2012-REE-041	**36.2**	**734.1**	**697.9**	**1.798**	**0.029**	**4550.507**	**8541.979**	**963.349**	**3247.782**	**352.999**	**76.355**	**157.942**	**14.528**	**42.816**	**1336.110**	**196.819**
including																
	36.2	99.7	63.5	2.281	0.038	5967.282	10879.596	1127.761	3993.264	431.692	95.055	203.332	19.881	60.149	1848.368	81.773
	99.7	539.7	440	1.944	0.031	4823.187	9212.515	1038.420	3637.374	395.208	84.208	168.773	14.566	43.348	1328.648	246.568
	539.7	734.1	194.4	1.323	0.022	3498.657	6326.291	746.766	2158.662	235.674	53.214	119.686	12.712	36.051	1186.620	125.765
2012-REE-042	41.6	992	950.4	1.652	0.026	4202.827	7778.259	871.851	3037.856	345.740	70.725	142.732	12.975	37.289	1127.197	200.073
including																
	41.6	**609**	**567.4**	**1.934**	**0.033**	**4768.926**	**9071.886**	**1040.186**	**3673.287**	**428.364**	**87.760**	**180.800**	**16.641**	**47.421**	**1092.736**	**247.313**
	609	992	383.0	1.213	0.016	3320.766	5762.608	609.563	2047.767	217.000	44.181	83.417	7.263	21.504	1180.893	126.465
2012-REE-043	**57**	**741**	**684**	**2.066**	**0.035**	**4957.054**	**9765.763**	**1127.172**	**4004.841**	**441.996**	**93.529**	**187.817**	**16.835**	**49.154**	**1062.659**	**289.150**
including																
	57	125	68	2.499	0.041	5555.374	12010.715	1416.594	5032.172	538.967	111.060	221.854	20.468	61.576	742.318	70.565
	125	741	616	2.019	0.034	4891.524	9519.887	1095.473	3892.324	431.375	91.609	184.089	16.437	47.793	1097.744	313.090

HOLE #	From (m)	To (m)	Lenght (m)	TREO (%)	HREO (%)	LA2O3 (PPM)	CE2O3 (PPM)	PR2O3 (PPM)	ND2O3 (PPM)	SM2O3 (PPM)	EU2O3 (PPM)	GD2O3 (PPM)	TB2O3 (PPM)	DY2O3 (PPM)	NB2O5 (PPM)	MO (PPM)
2012-REE-044	**35.3**	**516**	**480.7**	**1.834**	**0.025**	**4739.873**	**8744.721**	**958.512**	**3288.621**	**333.015**	**67.160**	**137.480**	**12.809**	**36.550**	**1201.658**	**186.920**
including																
	35.3	82.3	47	2.328	0.040	5334.162	10967.087	1319.208	4720.602	513.450	104.342	228.026	20.910	51.646	1073.609	26.611
	82.3	516	433.7	1.772	0.024	4666.099	8468.841	913.736	3110.858	310.616	62.544	126.239	11.804	34.676	1217.554	206.821
2012-REE-045	**52**	**498**	**443**	**1.701**	**0.027**	**4215.571**	**8087.065**	**912.536**	**3167.346**	**333.968**	**68.287**	**145.752**	**13.996**	**41.309**	**1443.085**	**166.767**
including																
	52	114	62	3.120	0.063	7766.549	14405.631	1677.456	5969.648	709.019	151.854	347.212	33.653	96.242	1929.914	123.524
	114	378	261	1.707	0.023	4360.870	8215.149	892.861	3044.909	303.714	60.147	123.097	11.833	34.740	1190.502	201.596
	378	498	120	0.943	0.017	2028.018	4484.832	554.731	1968.559	204.381	42.525	90.394	8.489	27.085	1749.496	111.975
2012-REE-046	**32**	**873**	**841**	**2.064**	**0.037**	**5197.705**	**9873.396**	**1096.666**	**3664.785**	**411.314**	**91.333**	**200.771**	**20.076**	**59.542**	**1555.183**	**163.477**
including																
	32	54	22	1.543	0.032	3922.925	7282.435	819.223	2727.873	329.040	73.673	174.189	17.697	51.502	2110.024	78.250
	54	873	819	2.080	0.037	5234.789	9948.769	1104.738	3692.041	413.707	91.847	201.545	20.145	59.776	1539.042	165.956
2012-REE-047	**50**	**903**	**853**	**2.251**	**0.035**	**5779.675**	**10787.853**	**1169.715**	**3988.301**	**411.443**	**87.039**	**185.872**	**18.412**	**54.407**	**1275.930**	**201.412**
including																
	50	84.4	34.4	1.576	0.048	3539.068	7237.611	873.237	3166.275	424.596	101.719	265.368	28.510	88.460	3042.396	39.231
	84.4	903	818.6	2.282	0.034	5884.451	10953.872	1183.579	4026.741	410.828	86.353	182.155	17.940	52.814	1193.325	208.996
2012-REE-048	44	591	547	1.875	0.032	4827.978	8884.412	969.728	3335.786	394.829	85.674	169.274	15.947	45.457	1069.440	195.538
including																
	44	**351**	**307**	**2.366**	**0.041**	**5977.048**	**11220.533**	**1230.490**	**4275.446**	**518.105**	**113.335**	**221.009**	**20.642**	**57.839**	**1134.487**	**242.509**
	351	567	216	1.259	0.019	3391.431	5948.151	642.049	2154.403	237.398	50.161	102.823	9.975	29.904	978.042	136.736
	567	591	24	0.921	0.015	2531.723	4357.162	463.738	1517.753	178.290	38.791	81.836	7.482	21.376	1030.157	102.375
2012-REE-049	36.9	900	863.1	1.985	0.033	4869.800	9462.630	1059.974	3692.666	418.052	87.404	177.158	15.355	45.431	1065.381	174.891

HOLE #	From (m)	To (m)	Lenght (m)	TREO (%)	HREO (%)	LA2O3 (PPM)	CE2O3 (PPM)	PR2O3 (PPM)	ND2O3 (PPM)	SM2O3 (PPM)	EU2O3 (PPM)	GD2O3 (PPM)	TB2O3 (PPM)	DY2O3 (PPM)	NB2O5 (PPM)	MO (PPM)
including																
	36.9	175.6	138.7	1.030	0.018	2584.743	4816.890	554.194	1920.640	226.849	47.837	95.523	8.129	26.875	1576.826	133.792
	175.6	**900**	**724.4**	**2.172**	**0.035**	**5315.665**	**10369.115**	**1158.662**	**4038.428**	**455.359**	**95.124**	**193.087**	**16.764**	**49.052**	**965.587**	**182.911**
2012-REE-050	15.3	598.5	583.2	1.734	0.026	4613.005	8300.198	874.151	2950.357	329.761	69.161	139.745	11.817	34.719	1088.701	149.357
including																
	15.3	69	53.7	1.596	0.017	4062.925	8075.245	795.816	2581.347	258.013	48.199	88.247	7.913	25.608	1705.007	34.938
	69	**428.5**	**359.5**	**1.998**	**0.029**	**5400.197**	**9536.751**	**1000.388**	**3371.494**	**367.086**	**77.803**	**156.839**	**13.223**	**38.085**	**1199.604**	**177.808**
	428.5	598.5	170	1.203	0.021	3068.217	5697.269	623.699	2144.532	269.110	56.319	117.110	9.863	29.978	679.672	119.603
2012-REE-051	**17.6**	**351**	**333.4**	**1.944**	**0.032**	**4640.036**	**9441.023**	**1050.764**	**3537.553**	**430.256**	**91.846**	**176.480**	**13.614**	**38.032**	**1053.150**	**152.371**
including																
	17.6	108.7	91.1	2.950	0.048	7090.736	14299.442	1630.517	5312.676	663.223	140.669	268.895	20.087	51.905	1137.913	99.032
	108.7	261	152.3	1.985	0.031	4657.211	9720.108	1065.856	3646.668	436.143	90.769	168.858	12.469	33.878	798.630	225.019
	261	351	90	0.866	0.018	2159.415	4096.458	444.721	1572.357	187.034	44.898	97.340	9.134	31.395	1411.743	79.161
2012-REE-052	16.5	900	883.5	1.639	0.027	4194.159	7781.310	844.435	2926.950	341.657	73.633	146.228	12.634	40.335	1355.005	175.477
including																
	16.5	291	274.5	1.185	0.019	3182.502	5593.808	596.862	2031.509	236.162	50.227	101.294	8.998	30.556	2311.790	80.366
	291	**900**	**609**	**1.844**	**0.031**	**4653.105**	**8773.689**	**956.749**	**3333.175**	**389.516**	**84.252**	**166.612**	**14.284**	**44.771**	**920.951**	**218.624**
2012-REE-053	28	453	425	1.501	0.024	4055.025	7259.172	744.859	2414.246	265.261	60.888	128.733	12.781	42.528	1188.726	72.090
including																
	28	**285**	**257**	**1.658**	**0.029**	**4381.506**	**7997.847**	**831.458**	**2742.453**	**309.142**	**70.660**	**151.098**	**15.290**	**51.946**	**1146.842**	**80.818**
	285	453	168	1.254	0.018	3541.984	6098.396	608.774	1898.493	196.306	45.531	93.588	8.838	27.729	1254.545	58.375
2012-REE-054	52	900	848	0.539	0.014	1221.536	2516.444	290.444	1063.248	145.501	33.531	71.697	6.704	23.497	1981.693	61.646

HOLE #	From (m)	To (m)	Lenght (m)	TREO (%)	HREO (%)	LA2O3 (PPM)	CE2O3 (PPM)	PR2O3 (PPM)	ND2O3 (PPM)	SM2O3 (PPM)	EU2O3 (PPM)	GD2O3 (PPM)	TB2O3 (PPM)	DY2O3 (PPM)	NB2O5 (PPM)	MO (PPM)
2012-REE-055	57	273	216	1.747	0.029	3624.357	8269.401	1020.290	3818.925	436.787	86.008	156.708	12.997	35.706	932.960	271.736
including																
	57	**204**	**147**	**1.900**	**0.032**	**3941.474**	**9009.774**	**1093.889**	**4135.653**	**480.884**	**95.044**	**172.963**	**14.658**	**40.614**	**877.817**	**287.959**
	204	273	69	1.422	0.022	2948.759	6692.084	863.491	3144.157	342.841	66.757	122.077	9.458	25.249	1050.441	237.174
2012-REE-056	43.5	549.6	506.1	2.187	0.032	4611.964	10409.236	1282.806	4732.967	491.539	97.457	174.330	13.683	37.415	839.516	259.782
including																
	43.5	**519**	**475.5**	**2.242**	**0.033**	**4698.861**	**10660.187**	**1319.753**	**4885.313**	**509.069**	**101.007**	**180.745**	**14.165**	**38.483**	**765.796**	**267.819**
	519	549.6	30.6	1.297	0.014	3221.607	6394.019	691.6579	2295.437	211.0492	40.64321	71.69281	5.985245	20.31406	2019.043	131.2
2012-REE-057	41.6	643.4	601.8	0.643	0.018	1506.955	2973.718	339.740	1233.823	171.645	41.267	90.823	9.031	34.652	2052.576	40.401
2012-REE-058	54	351	297	0.966	0.024	1948.914	4478.858	563.508	2139.026	261.260	58.672	127.629	12.189	46.435	797.861	106.490
including																
	54	**149**	**95**	**1.319**	**0.032**	**2707.639**	**6197.903**	**753.758**	**2862.736**	**324.329**	**73.528**	**162.015**	**15.862**	**64.163**	**817.858**	**49.156**
	149	351	202	0.800	0.021	1591.867	3669.897	473.979	1798.456	231.581	51.681	111.448	10.461	38.093	788.451	133.471
2012-REE-059	20.7	892.6	871.9	0.667	0.019	1555.905	3061.439	357.846	1295.638	185.696	44.471	99.235	9.554	34.113	2327.264	46.334
including																
	20.7	567	546.3	0.576	0.018	1351.238	2641.873	307.336	1093.862	164.173	41.497	94.483	9.433	35.254	2492.907	46.424
	567	892.6	325.6	0.819	0.020	1901.398	3769.696	443.110	1636.250	222.028	49.493	107.257	9.757	32.188	2047.645	46.183
2012-REE-060	30.8	500	469.2	1.758	0.032	4408.003	8349.976	928.011	3203.072	355.249	79.992	169.717	15.839	51.668	989.617	220.371
including																
	30.8	**459**	**428.2**	**1.840**	**0.033**	**4610.777**	**8735.489**	**970.718**	**3356.924**	**372.115**	**83.674**	**177.201**	**16.598**	**53.941**	**966.226**	**234.648**
	459	500	41	0.913	0.017	2307.850	4357.162	485.682	1609.606	180.568	41.851	92.209	7.975	28.118	1231.886	72.500
2012-REE-061	54.7	1191	1136.3	1.795	0.029	4701.625	8556.768	932.832	3124.469	320.573	69.397	153.728	15.423	48.419	1724.974	121.326

HOLE #	From (m)	To (m)	Lenght (m)	TREO (%)	HREO (%)	LA2O3 (PPM)	CE2O3 (PPM)	PR2O3 (PPM)	ND2O3 (PPM)	SM2O3 (PPM)	EU2O3 (PPM)	GD2O3 (PPM)	TB2O3 (PPM)	DY2O3 (PPM)	NB2O5 (PPM)	MO (PPM)
including																
	54.7	342	287.3	1.088	0.034	2688.673	4920.464	558.857	2055.235	272.329	67.518	168.306	19.852	81.995	1380.574	54.979
	342	**855**	**513**	**2.728**	**0.033**	**7253.737**	**13176.426**	**1414.928**	**4650.469**	**432.966**	**88.972**	**186.094**	**16.757**	**40.810**	**1754.331**	**152.198**
	855	1191	336	0.989	0.017	2563.846	4680.806	523.666	1731.871	192.048	41.462	92.492	9.642	31.330	1973.723	131.202

Item 14. Sampling Method and Approach

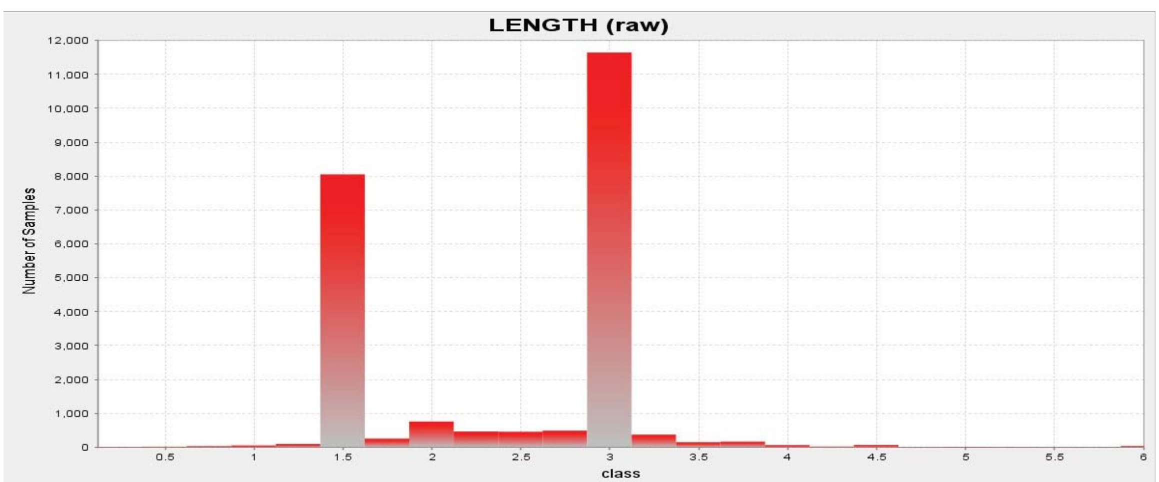
For the exploration purpose, sampling for rare earth elements mineralization is limited to diamond drill core. The complete core logging and core sampling method are described below. Detailed description of the drill core is carried out by experienced and qualified personnel under the supervision of Louis Grenier and Jean-Francois Tremblay, members in good standing of the Ordre des Géologues du Québec.

14.1 CORE LOGGING

The core was described by the IOS geologist using the mine geological facies nomenclature, which is based on Soquem modified facies definition (C1, C2, C3, etc.). Description includes the alteration types, the major structures appearance, a visual quantification of the key minerals abundance (Lanthanides, apatite, etc…) and the others minerals associated the mineralization (magnetite, hematite, chlorite-biotite, pyrite, ankerite, barite, fluorite and sphalerite). Rock Quality Designation (RQD) is systematically measured. All the core boxes are photographed and additional detail photos are taken at a smaller scale when necessary. Since the core is slightly radioactive, a BGO-SPEC SUPER RS-230 device from Radiation Solutions Inc. was used to measure the core radiometry. The radiometric readings are giving in Gy/hr and µSv / hr.

Following the 2012 P.-J. Lafleur recommendation, the core was sampled on a nominal 3 metres interval (Figure 20). To respect the geological setting, the samples can be shorter or longer. The logger records the sampling intervals (from, to) in the log. A rock code based on the lithology and mineralogy is assigned to each interval. This rock code has an influence in the resource estimation.

Figure 20: Sample lenght distribution, REE project.



Finally, the hole number, collar coordinates, azimuth, dip, final depth, down-hole survey data, facies description, radiometry core measures and assays (once they have been received) are incorporated, by the geological mine staff, on the computer log using Gemcom Logger and LabLogger softwares. The geological sections are then published using Gems software from Gemcom for the geological interpretation and the grade visualization.

14.2 CORE SAMPLING

Following the logging procedure described previously, the whole core is sampled based on the intervals identified by the geologist. Core is broken into manageable lengths and cut in half with a diamond blade equipped rock saw. One half is removed from the box and bagged with a serial tag number. The other half is puzzle back into the box with the corresponding analytical tag placed at the beginning of each interval. Core boxes are systematically piled and stored for further needs. Samples bags are shipped in batches (metallic or plastic pails) to IOS warehouse, located at Laterrière (Chicoutimi area, Québec), before shipping to SGS laboratory where the samples are prepared and analyzed.

IOS is a geological service provider independent from IAMGOLD. Samples were prepared by IOS and shipped expeditiously. The quality of their professional services is very high, particularly on issues of sampling and assaying.

It is important to note that several blanks, standard and duplicates samples from IAMGOLD are inserted alternatively every 10 samples (30 metres) approximately. The laboratories also use blanks, standard and duplicates samples of their own to verify their work. The blanks should return no significant REE value within one standard deviation. The standard sample should return their certified REE values within one standard deviation. The duplicates should return the same value as the original sample within a reasonable range of variation. This QA/QC procedure was applies only to the data produced in 2011 and 2012. The details of the QA/QC of historical data (1968 to 1985) are not the same and not entirely documented.

14.2.1 Blank sample

IAMGOLD is using blanks to check the laboratory. The blank is not a certified commercial blank sample. It is coarse material prepared by IOS coming from a quartz vein near Lac St-Jean. It does carry some very low TREE values (119 ppm) as would be the background value of most rocks. The laboratories should return the “standard blank sample” measured low value grade within the range of measured standard deviation over multiple assays or values below detection limits for these blank samples.

Blanks are not like the certified commercial graded samples designed to test the final assay reading instrument. Those standard samples are delivered as fine powder to the laboratory. The blanks are designed to make sure the sample preparation (crushing, splitting and pulverizing) equipment are clean. Therefore, coarse material is sent to the laboratory in larger quantity (2 Kg) in the usual sample bag. It should have as little REE as possible and is the case. If the blanks return much higher values than its measured grade, it means that the sample preparation facility needs to improve its cleaning procedure. SGS laboratory have been informed of anomalies when they were detected and they applied solutions promptly. The results of using a blank sample in this fashion will inevitably produce results that are more variable than with the certified standard samples. See section 16 for blank results.

14.2.2 Standard

Three different commercial certified standard samples were used alternately:

1. Orea S 101a (low grade),
2. Orea S 146 (medium grade) from Ore Research & Exploration PTY Ltd. and
3. GRE-02 (high grade) from Geostat PTY Ltd.

At the beginning of each hole, a low-grade standard, a high grade standard and a blank were inserted.

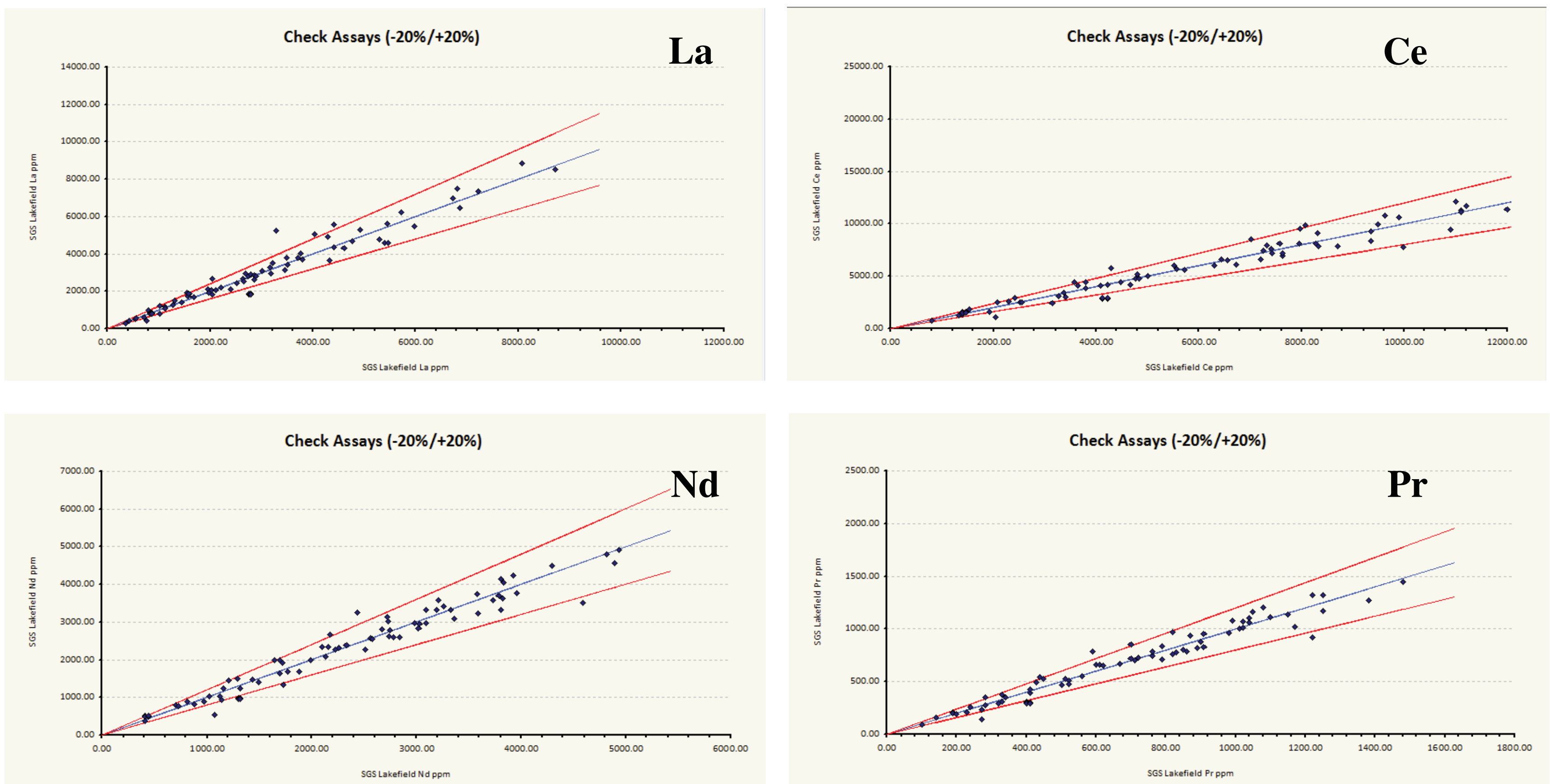
Table 8: Blank and standard samples values (ppm).

STANDARDS	Ce	Dy	Er	Eu	Gd	Ho	La	Lu	Nd	Pr	Sm	Tb	Tm	Yb	Y	U	Th	TREE
Blanks	56	0.3	0.1	0.5	2.0	0.2	29	< 0.05	21	6.3	2.6	0.1	< 0.05	< 0.1	1			*119*
OREAS 101a	1651	38	23	9.3	54	6.9	897	3.1	475	155	52	7.4	3.4	20	198	482	42	*3,394*
OREAS 146	5771	272	108	154	428	45	3068	7.2	2758	656	549	57	12	65	1064	3.4	1119	*13,951*
GRE-02	19308	33	24	167	351	3.7	10449	0.8	8416	2234	866	27	0.7	5.7	69	0.0	0.0	*41,886*

14.2.3 11.1.2.3 Check sampling (Core Duplicates)

IAMGOLD took 286 valid duplicate samples using split core to test repeatability of results. The laboratories duplicates would be made from crushed or pulverized rock from the split core. Laboratory duplicates are made of smaller portions that are more homogeneous. The results were good. Below are showed the scatter plots of the four principal REE elements.

Figure 21: Core duplicate QA / QC report, REE project 2012.



Item 15. SAMPLE PREPARATION, ANALYSES AND SECURITY

15.1 SAMPLE PREPARATION

Samples were sent to SGS Minerals Services ("SGS") of Lakefield in Ontario, where all the samples were prepared (crushed, ground, dried) and analyzed. A summary of the sample preparation is following but the detailed SGS analysis and preparation techniques can be consulted on their website (www.sgs.com).

As a routine practice with core, the entire sample is crushed to a nominal minus 10 mesh (2 mm), mechanically split via a riffle splitter in order to divide the sample into a 250 gr sub-sample for analysis and the remainder is stored as a reject. Samples are pulverized to 85% passing 75 micron (200 mesh) or otherwise specified by client. SGS used their own sample preparation control for more accuracy (Table 9).

Table 9: Internal quality control for sample preparation by SGS Ontario.

Crushing Parametres	Frequency	Quality Control Requirement
Prep. Blank	At the start of batch	To Clean Crusher
Prep. Replicates	every 50 samples	75% passing 10 mesh (2mm)
Passing Checks	Every 50 samples	75% passing 10 mesh (2mm)

Regarding samples analysis, SGS laboratory used the following methods:

- **ICM90A**, for 55 elements, by sodium peroxide fusion and a combination of Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES), and Inductively Coupled Plasma Mass Spectrometry (ICP-MS).
- **IMS91B** by sodium peroxide fusion / ICP-MS, for lanthanides surplus upper limit.

15.2 ANALYSIS

15.2.1 ICM90A

Crushed and pulverized rocks are fused by Sodium peroxide in graphite crucibles and dissolved using diluted HNO3. During digestion the sample is split into 2 and half is given to ICP-OES and the other half is given to ICP¬MS. The digested sample solution is analyzed by ICP-OES and ICP-MS. Samples are analyzed against known calibration materials to provide quantitative analysis of the original sample.
The data results fed to the SGS Laboratory Information Management System (SLIM) with secure audit trait are exported online via computer. This method has been fully validated for the range of samples typically analyzed. Method validation includes the use of certified reference materials, replicates and blanks to calculate accuracy, precision, linearity, range, detection limits, and limit of quantification, specificity and measurement uncertainty.

Table 10: Elements analyzed by ICM 90A.

Element	Reporting Limit (ppm)	Upper Limit	Element	Reporting Limit (ppm)	Upper Limit	Element	Reporting Limit (ppm)	Upper limit	Element	Reporting Limit (ppm)	Upper Limit
Ag	1.00	0.01%	**Er**	0.05	0.10%	**Mn**	10	10%	**Tb**	0.05	0.10%
Al	0.01(%)	25%	**Eu**	0.05	0.10%	**Mo**	2.00	1.0%	**Th**	0.10	0.10%
As	5.00	10%	**Fe**	0.01(%)	30%	**Nb**	1.00	1.0%	**Ti**	0.01(%)	25%
Ba	0.50	1.0%	**Ga**	1.00	0.10%	**Nd**	0.10	1.0%	**TI**	0.50	0.10%
Be	5.00	0.25%	**Gd**	0.05	0.10%	**Ni**	5.00	1.0%	**Tm**	0.05	0.10%
Bi	0.10	0.10%	**Ge**	1.00	0.10%	**P**	0.01(%)	25%	**Ta**	0.50	1.0%
Ca	0.01(%)	35%	**Hf**	1.00	1.0%	**Pb**	5.00	1.0%	**U**	0.05	0.1%
Cd	0.20	1.0%	**Ho**	0.05	0.10%	**Pr**	0.05	0.1%	**V**	5.00	1.0%
Ce	0.10	1.0%	**In**	0.20	0.10%	**Rb**	0.20	1.0%	**W**	1.00	1.0%
Co	0.50	1.0%	**K**	0.01(%)	25%	**Sb**	0.50	1.0%	**Y**	0.50	0.1%
Cr	10	10%	**La**	0.10	1.0%	**Sc**	5.00	5.0%	**Yb**	0.10	0.1%
Cs	0.10	1.0%	**Li**	10	5.0%	**Sm**	0.10	0.1%	**Zn**	5.00	1.0%
Cu	5.00	1.0%	**Lu**	0.05	0.10%	**Sn**	1.00	1.0%	**Zr**	0.50	1.0%
Dy	0.05	0.1%	**Mg**	0.01(%)	30%	**Sr**	0.10	1.0%			

15.2.2 ICPMS

ICPMS diluted samples to be analyzed on Elan 9000 for 90A samples and Nexion for 91B packages.

Working Calibration solutions and 2nd source calibration check solution was prepared for each analysis run. Re-calibration was done before the analysis of each tray. Additional fusion QC was analyzed every other tray in addition to the QC on each tray.

REE interference corrections were evaluated and corrected.

15.2.3 ICP/OES

Samples are analyzed with a minimum of 10 certified reference materials for the required analyses, all prepared by sodium peroxide fusion. Every 10th sample is prepared and analyzed in duplicate; a blank is prepared every 30 samples and analyzed. Samples are analyzed using a Varian 735ES ICP or a Thermo 6500 ICAP and the method of internal standardization.

For High concentration of REE, the IMS91B analysis technic was used.

Crushed and pulverized rock, samples (0.20 gr) are fused by Sodium peroxide in glassy carbon crucibles in a muffle furnace and dissolved using diluted HNO3. The fused solution sample is aspirated into the Inductively Coupled Plasma Dynamic Reaction Cell Mass Spectrometre (ICP-DRC-MS). Samples are analyzed against known calibration materials to provide quantitative analysis of the original sample.

The results are exported via computer, on line, data fed to the SGS Laboratory Information Management System (SLIM) with secure audit trail.

Table 11: Reporting limits for REE by IMS91B analysis technic.

Element	Reporting Limits (mg/kg)	Element	Reporting Limit (mg/kg)
Ce	50	Pr	10
Dy	1.0	Sm	10
Er	0.5	Tb	1.0
Eu	1.0	Th	5.0
Gd	5.0	Tm	0.10
Ho	0.10	U	1.0
La	50	Y	5.0
Lu	0.20	Yb	1.0
Nd	50		

Instrument calibration is performed for each batch or work order and calibration checks are analyzed within each analytical run. Quality control materials include method blanks, replicates, duplicates and reference materials and are randomly inserted with the frequency set according to method protocols at -14%.

Quality assurance measures of precision and accuracy are verified statistically using SLIM control charts with set criteria for data acceptance. Data that fails is subject to investigation and repeated as necessary.

15.3 SAMPLE SECURITY

Core samples collected at the drill site are stored in closed wooden core boxes and are delivered to the core-shack facility by the contractor where it is then taken by mine geology personnel. All core logging and sampling takes place in the core-shack. The site is fenced, monitored by close-circuit video cameras and has a security guard posted at all times at the entrance. After the logging and the splitting process, the samples are bagged and packed into plastic or metal pails for shipping. When a hole is completed, IOS Geoservices personnel collect the pails and bring them to their warehouse. The radiometry of each pail is verified to respect the radiometric transportation rules and the shipment is completed. IOS is an independent contractor specialized in the sample management. They follow rigorous methods verified and approved by IAMGOLD-Niobec geological staff. Finally, a carrier transports the sample to SGS facility where they are handled by the laboratory personnel.

Item 16. DATA VERIFICATION

16.1 Verification with laboratory certificates

IAMGOLD-Niobec geological team was receiving electronic Laboratory certificates during the entire program. They were verified and numerically archived on the informatics mine system. SGS also kept a certificate version on their SLIM program. They are available at all time.

In 2012, the Lablogger software from Gems was used to import the certificate into the Gems data base. The data manipulations were restricted and the probability of error decreased. By referring to only one laboratory, SGS, the certificate presentation were standardized and constant all year long.

Lablogger is also used for the QA / QC program.

16.2 QA / QC program

IAMGOLD carried out a QA/QC program with blanks samples, 3 certified REE standards samples (low, medium and high grade) and core duplicates (discussed in Item 14). This is without mentioning the laboratories own check assays and duplicates. Small anomalies were found through the year and were immediately signaled and corrected by SGS. Re-assayed was realised when necessary. A large number of elements, 15 for REE plus numerous associated elements (Ce, Dy, Er, Eu, Gd, Ho, La, Lu, Nd, Pr, Sm, Tb, Tm, Yb, Y, Sc, Nb, U, Th,…), were involved in the QA / QC program but only the four majors REE elements are presented as director line.

16.2.1 Blank sample results and interpretation

The blank sample, which is not a certified commercial blank, is not truly blank. It has a very low average grade of 119 ppm TREE (Table 8) and a relatively high coefficient of variation. The blanks were used 331 times (Table 11) to check the SGS laboratory samples preparation protocol. The TREE averaged valued is 179 ppm and varied from 107 ppm to 334 ppm during the year (Table 12). The coefficient of variation seems to increase with the volume of samples processed in a month. However the average TREE value can reach almost twice the value of the original "blank" sample, those values still very low and near the TREE background limit. Looking at the lanthanum values (Figure 22 and Table 12), the highest level of contamination noticed is 0.06% La (600 ppm). Even if a correction measures was taken in this case, the 0.06% La contamination is very low compared to the 0.4% La mean value for all 2012 samples.

The outliers limits were placed very low for all REEs. In Table 12, the cerium had an all year bad performance with 27% of the sample being above the 100 ppm Ce imposed limit. Once again, even the highest level of Ce contamination (near 1200ppm) is considered marginal compared to the Ce high average value returned in the REE zone. The high variability of the blank samples was not considered problematic for the data base validity.

Table 11: QA / QC summary, REE exploration program.

	March		April		May		June		July		August		September		October		November		December		YTD	
	Sent	Rec.	Sent	Rec.	Sent	Rec.	Sent	Rec.	Sent	Rec.	Sent	Rec.	Sent	Rec.	Sent	Rec.	Sent	Rec.	Sent	Rec.	Sent	Rec.
Samples assessment	899	13	968	357	1793	1027	818	882	1362	1339	536	1770	1099	761	1292	959	83	1470	12	216	8862	8794

QA /QC

	Assays	Check Ratio	Assays	Check Ratio	Assays	Check Ratio	Assays	Check Ratio	Assays	Check Ratio	Assays	Check Ratio	Assays	Check Ratio	Assays	Check Ratio	Assays	Check Ratio	Assays	Check Ratio	Assays	Check Ratio
Total Assays Received	13		357		1027		882		1339		1770		761		959		1470		216		8794	
SRM[1]																						
GRE-02	0	0.00%	6	1.68%	16	1.56%	14	1.59%	15	1.12%	26	1.47%	12	1.58%	14	1.46%	16	1.09%	0	0.00%	119	1.35%
Oreas 146	0	0.00%	5	1.40%	18	1.75%	8	0.91%	15	1.12%	25	1.41%	8	1.05%	7	0.73%	27	1.84%	5	2.31%	118	1.34%
Oreas 101a	0	0.00%	3	0.84%	6	0.58%	9	1.02%	15	1.12%	24	1.36%	12	1.58%	15	1.56%	17	1.16%	2	0.93%	103	1.17%
Total SRM	0	0.00%	14	3.92%	40	3.89%	31	3.51%	45	3.36%	75	4.24%	32	4.20%	36	3.75%	60	4.08%	7	3.24%	340	3.87%
Blanks[2]	0	0.00%	13	3.64%	41	3.99%	28	3.17%	44	3.29%	76	4.29%	30	3.94%	37	3.86%	55	3.74%	7	3.24%	331	3.76%
Core duplicate[3]	0	0.00%	12	3.36%	34	3.31%	27	3.06%	39	2.91%	61	3.45%	26	3.42%	32	3.34%	49	3.33%	6	2.78%	286	3.25%
Total QA / QC	0	0.00%	39	10.92%	115	11.20%	86	9.75%	128	9.56%	212	11.98%	88	11.56%	105	10.95%	164	11.16%	20	9.26%	957	10.88%

Figure 22: Blank QA / QC report, REE project 2012.

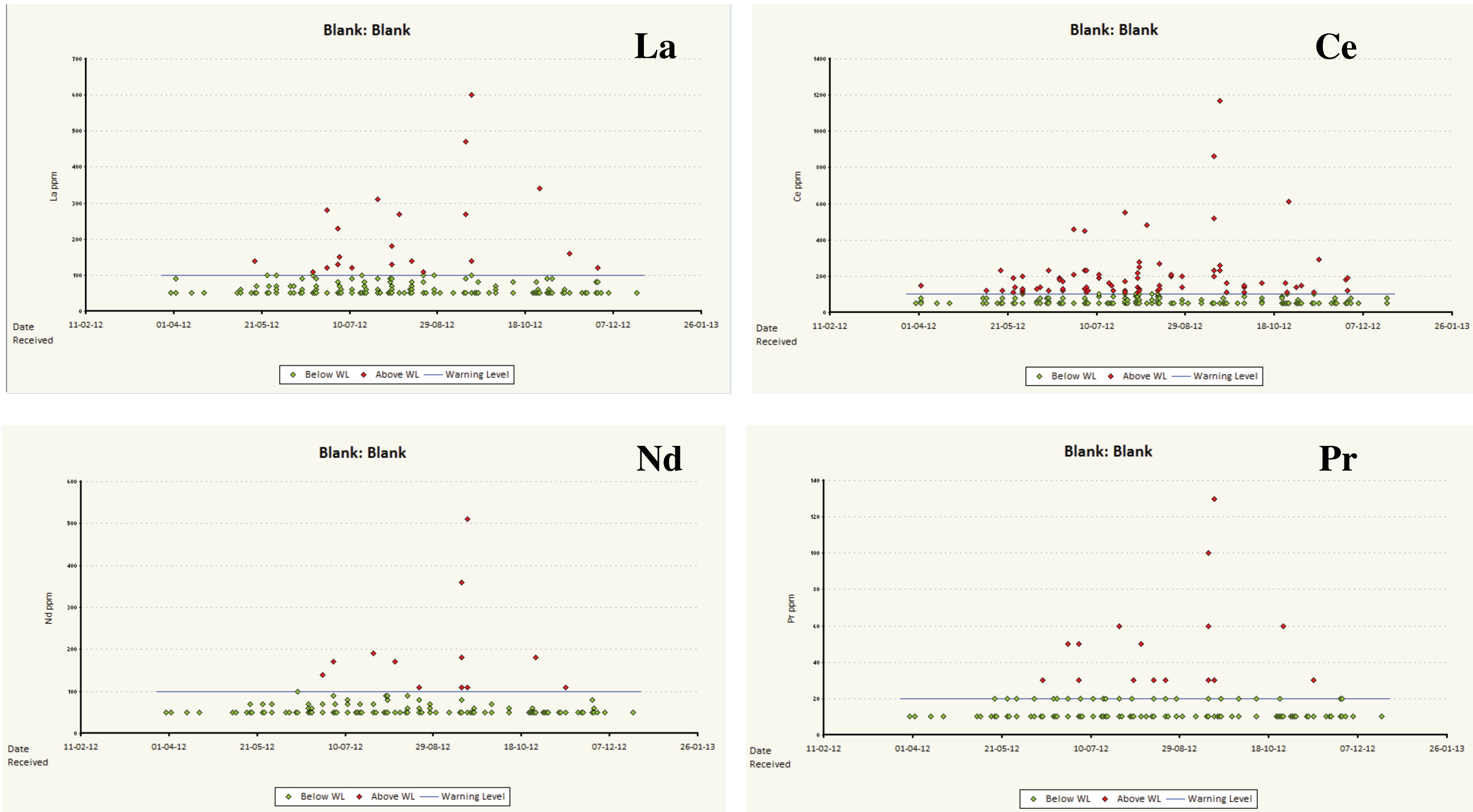


Table 12: Summary of Blanks results, REE project 2012.

Blank																
	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
SGS	Warning level	100	100	20	100	10	1	5	1	1	0.1	0.5	0.1	1	0.2	5
April	Number of sample	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
	Average value	25.000	45.769	5.000	25.000	5.000	0.500	2.500	0.500	0.500	0.050	0.250	0.050	0.500	0.100	2.500
	1 STD	0.000	37.961	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Coeff. of variation	0.0%	82.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Above warning level	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	%AWL	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
May	Number of sample	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
	Average value	39.024	66.951	6.463	28.293	5.000	0.573	2.500	0.500	0.610	0.072	0.273	0.056	0.537	0.110	2.500
	1 STD	26.745	56.190	4.506	11.864	0.000	0.327	0.000	0.000	0.395	0.072	0.148	0.039	0.234	0.044	0.000
	Coeff. of variation	68.5%	83.9%	69.7%	41.9%	0.0%	57.1%	0.0%	0.0%	64.9%	100.8%	54.3%	69.6%	43.7%	39.7%	0.0%
	Above warning level	1	11	0	0	0	0	0	0	0	2	1	1	0	0	0
	%AWL	2.4%	26.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	2.4%	2.4%	0.0%	0.0%	0.0%
June	Number of sample	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
	Average value	12.463	21.635	7.048	10.541	6.571	5.998	6.214	5.929	6.011	6.089	6.017	5.990	5.979	5.904	6.214
	1 STD	15.991	23.827	12.484	14.263	12.647	12.804	12.727	12.838	12.798	12.770	12.796	12.810	12.813	12.849	12.727
	Coeff. of variation	128.3%	110.1%	177.1%	135.3%	192.5%	213.5%	204.8%	216.5%	212.9%	209.7%	212.7%	213.8%	214.3%	217.6%	204.8%
	Above warning level	3	11	2	1	0	0	0	0	0	2	0	1	0	0	0
	%AWL	10.7%	39.3%	7.1%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	7.1%	0.0%	3.6%	0.0%	0.0%	0.0%
July	Number of sample	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
	Average value	59.205	104.545	10.227	39.886	5.682	0.795	2.773	0.500	0.591	0.057	0.250	0.050	0.500	0.105	2.500
	1 STD	56.732	102.184	11.859	36.047	3.161	0.831	1.269	0.000	0.435	0.032	0.000	0.000	0.000	0.030	0.000
	Coeff. of variation	95.8%	97.7%	116.0%	90.4%	55.6%	104.4%	45.8%	0.0%	73.6%	55.6%	0.0%	0.0%	0.0%	28.8%	0.0%
	Above warning level	5	18	3	2	0	2	0	0	1	0	0	0	0	0	0
	%AWL	11.4%	40.9%	6.8%	4.5%	0.0%	4.5%	0.0%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
August	Number of sample	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
	Average value	48.224	89.868	10.000	36.974	5.329	0.750	2.546	0.500	0.546	0.061	0.255	0.050	0.500	0.100	2.559
	1 STD	41.647	80.693	8.406	25.911	1.886	0.520	0.401	0.000	0.247	0.039	0.040	0.000	0.000	0.000	0.516
	Coeff. of variation	86.4%	89.8%	84.1%	70.1%	35.4%	69.3%	15.8%	0.0%	45.3%	63.4%	15.8%	0.0%	0.0%	0.0%	20.2%

Blank																
	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	Above warning level	5	25	5	2	0	1	0	0	0	1	0	0	0	0	0
	%AWL	6.6%	32.9%	6.6%	2.6%	0.0%	1.3%	0.0%	0.0%	0.0%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%
September	Number of sample	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
	Average value	80.500	145.500	17.833	69.000	9.333	1.600	4.100	0.567	0.917	0.105	0.318	0.055	0.500	0.100	3.317
	1 STD	134.833	263.796	29.410	108.170	12.847	2.752	4.956	0.286	1.287	0.170	0.272	0.027	0.000	0.000	3.133
	Coeff. of variation	167.5%	181.3%	164.9%	156.8%	137.7%	172.0%	120.9%	50.4%	140.4%	162.3%	85.5%	49.8%	0.0%	0.0%	94.5%
	Above warning level	4	9	6	6	2	4	2	0	2	3	1	0	0	0	1
	%AWL	13.3%	30.0%	20.0%	20.0%	6.7%	13.3%	6.7%	0.0%	6.7%	10.0%	3.3%	0.0%	0.0%	0.0%	3.3%
October	Number of sample	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
	Average value	45.270	77.027	9.054	32.297	5.405	0.730	2.770	0.500	0.608	0.069	0.281	0.054	0.541	0.103	2.905
	1 STD	53.515	100.654	9.849	27.147	2.466	0.662	1.200	0.000	0.473	0.084	0.189	0.025	0.247	0.016	1.859
	Coeff. of variation	118.2%	130.7%	108.8%	84.1%	45.6%	90.8%	43.3%	0.0%	77.8%	121.3%	67.3%	45.6%	45.6%	16.0%	64.0%
	Above warning level	1	8	1	1	0	1	0	0	1	2	1	0	0	0	1
	%AWL	2.7%	21.6%	2.7%	2.7%	0.0%	2.7%	0.0%	0.0%	2.7%	5.4%	2.7%	0.0%	0.0%	0.0%	2.7%
November	Number of sample	55	55	55	55	55	55	55	55	55	55	55	55	55	55	55
	Average value	23.006	37.985	11.413	18.779	9.443	8.561	8.705	8.111	8.365	8.397	8.198	8.118	8.125	8.058	8.619
	1 STD	29.519	51.162	17.039	24.679	17.204	17.413	17.369	17.605	17.492	17.485	17.566	17.603	17.599	17.629	17.397
	Coeff. of variation	128.3%	134.7%	149.3%	131.4%	182.2%	203.4%	199.5%	217.0%	209.1%	208.2%	214.3%	216.8%	216.6%	218.8%	201.8%
	Above warning level	2	6	1	1	0	1	0	0	0	0	0	0	0	0	0
	%AWL	3.6%	10.9%	1.8%	1.8%	0.0%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	Number of sample	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	Average value	10.4741	17.2672	6.3272	8.7984	5.9115	6.0043	5.8450	5.8145	5.8246	5.8274	5.8178	5.8148	5.8150	5.8125	5.8392
	1 STD	12.6258	21.7178	6.8208	10.4781	6.7496	6.5471	6.7152	6.7319	6.7193	6.7204	6.7273	6.7318	6.7311	6.7349	6.7150
	Coeff. of variation	120.5%	125.8%	107.8%	119.1%	114.2%	109.0%	114.9%	115.8%	115.4%	115.3%	115.6%	115.8%	115.8%	115.9%	115.0%
	Above warning level	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	%AWL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YTD	**Number of sample**	**331**	**331**	**331**	**331**	**331**	**331**	**331**	**331**	**331**	**331**	**331**	**331**	**331**	**331**	**331**
	Average value	**38.130**	**67.394**	**9.263**	**29.952**	**6.408**	**2.835**	**4.217**	**2.547**	**2.664**	**2.303**	**2.407**	**2.249**	**2.555**	**2.266**	**4.106**
	1 STD	**41.290**	**82.021**	**11.153**	**28.729**	**6.329**	**4.651**	**4.960**	**4.162**	**4.428**	**4.152**	**4.193**	**4.137**	**4.180**	**4.145**	**4.705**
	Coeff. of variation	**108.3%**	**121.7%**	**120.4%**	**95.9%**	**98.8%**	**164.1%**	**117.6%**	**163.4%**	**166.2%**	**180.3%**	**174.2%**	**184.0%**	**163.6%**	**182.9%**	**114.6%**
	Above warning level	**21**	**89**	**18**	**13**	**2**	**9**	**2**	**0**	**4**	**10**	**3**	**2**	**0**	**0**	**2**
	%AWL	**6.3%**	**26.9%**	**5.4%**	**3.9%**	**0.6%**	**2.7%**	**0.6%**	**0.0%**	**1.2%**	**3.0%**	**0.9%**	**0.6%**	**0.0%**	**0.0%**	**0.6%**

16.2.2 OREAS 101a results and interpretation

The Oreas 101a was used to verified the REE low grade values accuracy. It is a certified standard provide by an external laboratory. It average value, 3,394 ppm TREE, is detailed in Table 8. During 2012, the Oreas 101a was systematically sent at the beginning of each batch (each hole) to test the instruments calibration and after inserted randomly with the others standard to validate the accuracy of the analysis.

The Oreas 101a returned an excellent 2012 QA / QC performance (Figure 23). Two isolated certificate needed more supervision and interpretation. In those cases, on the same certificate the other standard and the blank performance were evaluated. Overall, 103 Oreas 101a standards were analyzed and the percentage of outliers reported is very low. The worst performance is coming from the yttrium element. The yttrium is excluded of the total rare earth element contain and it was analyzed for the geochemical knowledge of the REE zone and does not influence the resource estimation.

The 2012 average value of each element is generally under the certified average value (Table 13) which means a probable under evaluation of the REE contain on the rare low grading assays.

Based on the previous observations, the REE low grading samples were controlled and their data are validated for the purpose of this 43-101 report.

16.2.3 OREAS 146 results and interpretation

The Oreas 146 was used to verify the medium grade REE values accuracy. This certified standard is provided by an external laboratory and the average value of 13,951 ppm TREE is detailed in Table 8. During the 2012 drilling program, the Oreas 146 was inserted randomly with the others standard to validate the accuracy of the analysis.

The Oreas 146 returned an excellent QA / QC performance during all year long (Figure 24). No assays returned values over or under twice the standard deviation limits for the main REE elements. Only the lutetium and the yttrium have shown outlier's values. For both elements, it was judge has isolated cases and not enough significant to altered the data base quality.

Better QA / QC statistic cannot be hoped for a standard. The year average value of each element is almost the same has the certified average value (Table 14) and the coefficient of variation is very low. The Oreas 146 confirmed the laboratory expertise and increased the confidence level of the data base, especially for the medium grading assays.

Figure 23: OREAS 101a QA / QC report, REE project 2012.

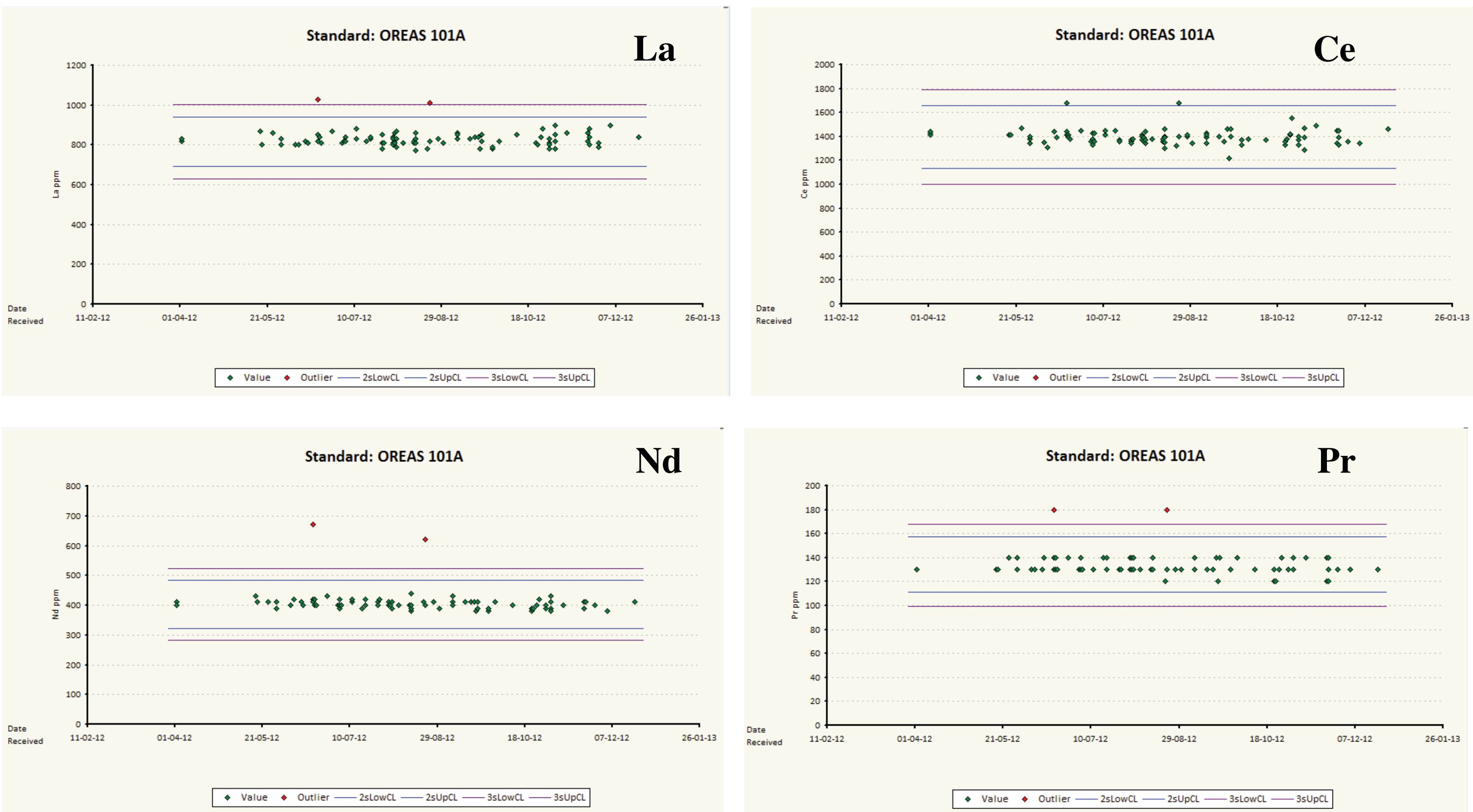


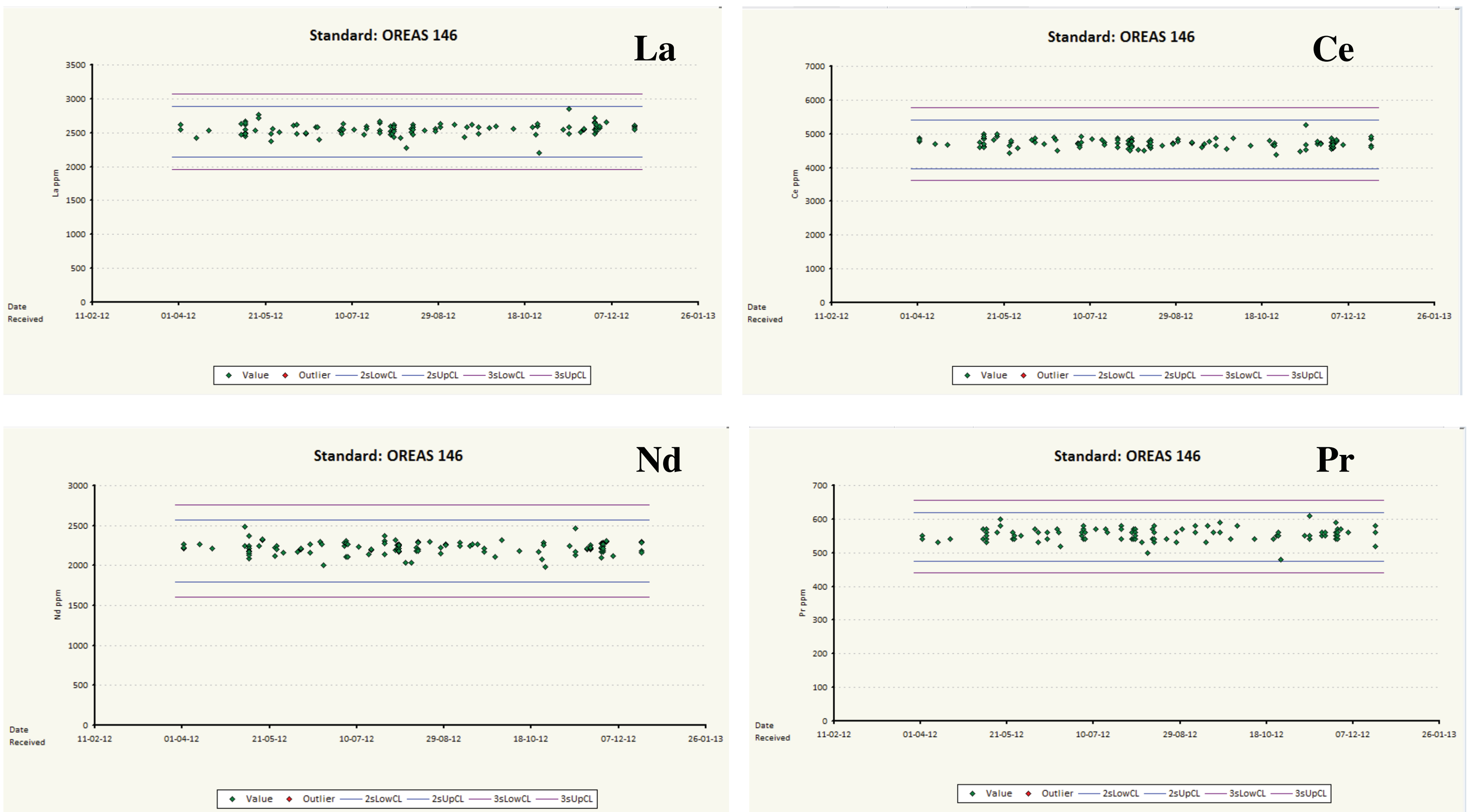
Table 13: Summary of the OREAS 101a QA / QC results, REE project 2012.

Oreas-101a																
	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	Certified Value	816	1396	134	403	48.8	8.06	43.4	5.92	33.3	6.46	19.5	2.9	17.5	2.66	183
	Tolerance	62	131	12	40	3.8	0.72	5.9	0.71	2.3	0.52	1.8	0.22	1.7	0.19	8
	Coefficient of variation	7.60%	9.38%	8.96%	9.93%	7.79%	8.93%	13.59%	11.99%	6.91%	8.05%	9.23%	7.59%	9.71%	7.14%	4.37%
SGS																
April	Number of sample	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Average value	823.3	1426.7	130.0	406.7	50.0	8.0	39.7	6.0	33.3	6.8	19.6	2.9	19.0	2.7	173.3
	1 STD	5.8	15.3	0.0	5.8	0.0	0.0	0.6	0.0	0.6	0.1	0.2	0.1	0.0	0.1	2.1
	Coefficient of variation	0.7%	1.1%	0.0%	1.4%	0.0%	0.0%	1.5%	0.0%	1.7%	0.8%	1.1%	2.0%	0.0%	2.1%	1.2%
	% Difference on average	0.9%	2.2%	3.0%	0.9%	2.5%	0.7%	8.6%	1.4%	0.1%	5.8%	0.7%	1.1%	8.6%	2.8%	5.3%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
May	Number of sample	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Average value	826.7	1401.7	133.3	406.7	51.7	8.2	39.0	6.0	33.0	6.7	20.3	2.9	18.8	2.7	179.3
	1 STD	32.0	42.6	5.2	15.1	4.1	0.4	2.2	0.0	1.3	0.1	1.1	0.1	0.4	0.1	3.4
	Coefficient of variation	3.9%	3.0%	3.9%	3.7%	7.9%	5.0%	5.6%	0.0%	3.8%	1.8%	5.3%	2.8%	2.2%	2.8%	1.9%
	% Difference on average	1.3%	0.4%	0.5%	0.9%	5.9%	1.3%	10.1%	1.4%	0.9%	3.2%	4.1%	1.1%	7.6%	2.1%	2.0%
	Nb. Outliers	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
June	Number of sample	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
	Average value	109.2	182.4	19.2	54.6	9.0	3.0	7.0	2.6	6.2	2.7	4.6	2.3	4.3	2.2	24.7
	1 STD	290.1	492.9	46.3	142.4	17.5	4.0	13.3	3.7	11.4	3.8	7.2	3.5	6.8	3.5	62.6
	Coefficient of variation	265.6%	270.2%	241.0%	260.8%	194.8%	136.6%	189.4%	142.3%	184.3%	139.7%	158.2%	154.3%	158.6%	155.9%	253.0%
	% Difference on average	86.6%	86.9%	85.7%	86.5%	81.5%	63.3%	83.8%	55.6%	81.5%	57.7%	76.6%	22.2%	75.5%	16.2%	86.5%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
July	Number of sample	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	Average value	825.3	1385.3	132.0	406.0	50.0	8.0	38.0	5.9	32.5	6.6	19.7	2.9	18.6	2.7	173.5
	1 STD	22.3	38.9	4.1	10.6	0.0	0.0	1.4	0.3	0.9	0.1	0.6	0.1	0.6	0.1	6.7
	Coefficient of variation	2.7%	2.8%	3.1%	2.6%	0.0%	0.0%	3.6%	4.4%	2.8%	1.5%	3.0%	3.2%	3.4%	2.4%	3.9%
	% Difference on average	1.1%	0.8%	1.5%	0.7%	2.5%	0.7%	12.4%	0.2%	2.3%	2.9%	1.0%	1.6%	6.3%	0.0%	5.2%

Oreas-101a																
	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%
August	Number of sample	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
	Average value	102.7	171.2	18.6	51.8	8.8	3.5	7.2	3.3	6.5	3.3	4.9	2.9	4.8	2.9	24.0
	1 STD	249.1	421.2	39.6	122.2	15.6	6.3	12.2	6.1	10.8	6.2	7.9	6.1	7.7	6.1	52.7
	Coefficient of variation	242.5%	246.0%	212.4%	236.0%	177.2%	178.3%	168.8%	187.8%	166.4%	184.6%	159.5%	207.3%	160.7%	209.2%	219.3%
	% Difference on average	87.4%	87.7%	86.1%	87.2%	82.0%	56.5%	83.3%	44.8%	80.6%	48.3%	74.6%	1.1%	72.8%	9.2%	86.9%
	Nb. Outliers	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1
	% Outliers	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	0.0%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
September	Number of sample	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Average value	825.0	1380.8	133.3	401.7	50.0	8.0	37.8	5.8	32.3	6.6	20.0	2.8	18.6	2.6	172.4
	1 STD	27.5	65.6	6.5	14.7	0.0	0.4	1.3	0.4	1.4	0.2	0.8	0.1	0.7	0.1	4.7
	Coefficient of variation	3.3%	4.7%	4.9%	3.7%	0.0%	5.3%	3.3%	6.7%	4.2%	3.3%	4.1%	3.2%	3.6%	4.5%	2.7%
	% Difference on average	1.1%	1.1%	0.5%	0.3%	2.5%	0.7%	12.8%	1.5%	3.2%	2.2%	2.4%	2.0%	6.2%	2.6%	5.8%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%
October	Number of sample	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	Average value	822.0	1380.7	131.3	400.7	50.0	8.1	37.2	5.7	31.9	6.5	19.7	2.8	18.6	2.6	173.1
	1 STD	31.0	55.7	7.4	16.7	0.0	0.3	1.0	0.5	0.5	0.2	0.4	0.1	0.5	0.1	2.9
	Coefficient of variation	3.8%	4.0%	5.7%	4.2%	0.0%	3.2%	2.7%	8.6%	1.4%	2.3%	2.1%	2.2%	2.7%	4.0%	1.7%
	% Difference on average	0.7%	1.1%	2.0%	0.6%	2.5%	0.1%	14.3%	4.3%	4.1%	0.6%	0.8%	1.8%	6.3%	0.8%	5.4%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
November	Number of sample	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17
	Average value	1115.3	1951.8	206.5	728.8	122.9	29.5	95.1	12.6	66.6	12.1	32.0	4.2	24.9	3.3	309.2
	1 STD	638.7	1267.2	165.7	724.3	162.5	47.5	127.3	15.4	76.2	12.1	26.6	2.9	14.4	1.6	306.3
	Coefficient of variation	57.3%	64.9%	80.3%	99.4%	132.2%	161.2%	133.9%	122.1%	114.5%	100.4%	83.3%	69.4%	57.8%	47.4%	99.1%
	% Difference on average	36.7%	39.8%	54.1%	80.8%	151.9%	265.6%	119.0%	113.6%	100.0%	86.7%	64.1%	43.4%	42.2%	25.8%	68.9%
	Nb. Outliers	3	3	3	3	3	3	3	3	3	3	3	3	3	3	5
	% Outliers	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	17.6%	29.4%
December	Number of sample	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Average value	870.0	1400.0	130.0	395.0	50.0	8.0	38.0	6.0	31.5	6.7	20.4	3.0	18.5	2.7	172.5

Oreas-101a																
	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	1 STD	42.4	84.9	0.0	21.2	0.0	0.0	0.0	0.0	0.7	0.1	0.5	0.1	0.7	0.1	4.9
	Coefficient of variation	4.9%	6.1%	0.0%	5.4%	0.0%	0.0%	0.0%	0.0%	2.2%	1.1%	2.4%	2.4%	3.8%	5.2%	2.9%
	% Difference on average	6.6%	0.3%	3.0%	2.0%	2.5%	0.7%	12.4%	1.4%	5.4%	2.9%	4.4%	1.7%	5.7%	1.5%	5.7%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YTD	**Number of sample**	**103**	**103**	**103**	**103**	**103**	**103**	**103**	**103**	**103**	**103**	**103**	**103**	**103**	**103**	**103**
	Average value	**650.5**	**1091.1**	**103.5**	**315.4**	**39.9**	**6.8**	**30.5**	**5.2**	**25.9**	**5.7**	**16.1**	**2.8**	**15.1**	**2.6**	**136.6**
	1 STD	**87.5**	**152.1**	**13.6**	**43.6**	**4.6**	**1.4**	**4.0**	**1.4**	**3.4**	**1.3**	**2.3**	**1.3**	**2.2**	**1.3**	**17.5**
	Coefficient of variation	**13.5%**	**13.9%**	**13.2%**	**13.8%**	**11.6%**	**20.8%**	**13.1%**	**26.6%**	**13.2%**	**23.3%**	**14.5%**	**44.5%**	**14.4%**	**47.8%**	**12.8%**
	% Difference on average	**20.3%**	**21.8%**	**22.8%**	**21.7%**	**18.2%**	**15.2%**	**29.7%**	**12.7%**	**22.2%**	**11.1%**	**17.2%**	**3.1%**	**13.4%**	**0.5%**	**25.3%**
	Nb. Outliers	**4**	**4**	**4**	**4**	**5**	**4**	**3**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**11**
	% Outliers	**3.9%**	**3.9%**	**3.9%**	**3.9%**	**4.9%**	**3.9%**	**2.9%**	**3.9%**	**3.9%**	**3.9%**	**3.9%**	**3.9%**	**3.9%**	**3.9%**	**10.7%**

Figure 24: OREAS 146 QA / QC report, REE project 2012.



3400, chemin du Columbium, St-Honoré-de-Chicoutimi, QC G0V 1L0 Canada – tel. : 418 673-4694 Fax : 418 673-3179
E-mail : info.niobec@iamgold.com www.niobec.com

Table 14: Summary of the OREAS 146 QA / QC results, REE exploration project.

Oreas-146																
	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	Certified Value	2513	4691	548	2182	441	127	359	47.2	224	36.8	87.7	9.9	53.5	6.3	905
	Tolerance	185	360	36	192	36	9	23	3.4	16	2.7	7	0.8	3.9	0.3	53
	Coefficient of variation	7.36%	7.67%	6.57%	8.80%	8.16%	7.09%	6.41%	7.20%	7.14%	7.34%	7.98%	8.08%	7.29%	4.76%	5.86%
SGS																
April	Number of sample	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Average value	2532.0	4768.0	540.0	2236.0	442.0	124.8	368.4	49.8	231.0	37.9	84.6	10.1	54.4	6.8	897.4
	1 STD	71.9	84.1	7.1	31.3	8.4	2.2	7.8	0.8	2.4	0.4	1.8	0.1	1.1	0.2	25.1
	Coefficient of variation	2.8%	1.8%	1.3%	1.4%	1.9%	1.7%	2.1%	1.7%	1.1%	1.0%	2.1%	1.5%	2.1%	2.4%	2.8%
	% Difference on average	0.8%	1.6%	1.5%	2.5%	0.2%	1.7%	2.6%	5.5%	3.1%	3.0%	3.6%	2.2%	1.7%	7.6%	0.8%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%
May	Number of sample	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	Average value	2553.3	4763.3	553.9	2230.0	448.9	127.4	355.1	47.1	224.6	36.5	85.8	10.0	53.6	6.6	900.1
	1 STD	103.1	156.5	17.5	99.2	14.5	4.8	14.5	1.7	8.3	0.8	2.4	0.3	1.3	0.3	28.1
	Coefficient of variation	4.0%	3.3%	3.2%	4.4%	3.2%	3.8%	4.1%	3.7%	3.7%	2.2%	2.8%	2.5%	2.4%	4.4%	3.1%
	% Difference on average	1.6%	1.5%	1.1%	2.2%	1.8%	0.3%	1.1%	0.3%	0.3%	0.9%	2.2%	1.0%	0.2%	4.7%	0.5%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.6%	0.0%
June	Number of sample	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Average value	2533.8	4755.0	551.3	2197.5	451.3	126.1	365.8	48.3	222.9	37.4	87.7	10.1	53.6	6.5	897.0
	1 STD	76.0	125.2	18.9	94.4	15.5	3.7	7.3	2.3	5.1	0.8	1.4	0.2	1.2	0.2	13.2
	Coefficient of variation	3.0%	2.6%	3.4%	4.3%	3.4%	2.9%	2.0%	4.7%	2.3%	2.0%	1.6%	1.9%	2.2%	2.8%	1.5%
	% Difference on average	0.8%	1.4%	0.6%	0.7%	2.3%	0.7%	1.9%	2.2%	0.5%	1.6%	0.0%	2.0%	0.2%	3.8%	0.9%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
July	Number of sample	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	Average value	2555.3	4743.3	562.0	2231.3	454.7	128.4	360.9	48.5	229.1	37.2	86.9	10.1	54.0	6.6	915.2
	1 STD	57.2	99.4	14.2	80.3	15.5	3.9	13.6	1.3	6.0	0.7	2.3	0.3	1.5	0.2	26.8
	Coefficient of variation	2.2%	2.1%	2.5%	3.6%	3.4%	3.1%	3.8%	2.7%	2.6%	1.8%	2.7%	2.9%	2.7%	2.7%	2.9%
	% Difference on average	1.7%	1.1%	2.6%	2.3%	3.1%	1.1%	0.5%	2.7%	2.3%	1.2%	0.9%	2.5%	0.9%	4.2%	1.1%

Oreas-146	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
August	Number of sample	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	Average value	2527.6	4687.6	549.6	2214.0	453.6	128.1	363.0	48.4	227.4	36.9	87.2	10.0	53.7	6.5	912.0
	1 STD	76.4	103.0	18.1	71.0	12.9	3.3	9.6	1.0	4.2	0.5	1.8	0.2	1.3	0.2	19.3
	Coefficient of variation	3.0%	2.2%	3.3%	3.2%	2.8%	2.6%	2.6%	2.0%	1.8%	1.5%	2.1%	2.3%	2.4%	3.1%	2.1%
	% Difference on average	0.6%	0.1%	0.3%	1.5%	2.9%	0.9%	1.1%	2.5%	1.5%	0.2%	0.5%	1.1%	0.3%	3.2%	0.8%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
September	Number of sample	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	Average value	2565.0	4706.3	562.5	2227.5	453.8	129.5	363.6	47.4	219.8	37.0	87.0	10.0	52.9	6.4	898.1
	1 STD	66.3	96.4	20.5	60.9	16.0	3.3	9.7	1.8	5.6	1.2	2.7	0.3	0.6	0.3	18.6
	Coefficient of variation	2.6%	2.0%	3.6%	2.7%	3.5%	2.5%	2.7%	3.9%	2.5%	3.1%	3.1%	3.2%	1.2%	5.3%	2.1%
	% Difference on average	2.1%	0.3%	2.6%	2.1%	2.9%	2.0%	1.3%	0.4%	1.9%	0.5%	0.8%	0.5%	1.2%	1.4%	0.8%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
October	Number of sample	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
	Average value	2518.6	4677.1	542.9	2182.9	452.9	127.1	360.7	47.0	226.0	36.7	86.1	10.1	54.3	6.5	924.3
	1 STD	149.2	152.8	30.9	121.2	21.4	5.6	14.5	2.2	5.8	0.8	3.8	0.3	1.0	0.3	70.9
	Coefficient of variation	5.9%	3.3%	5.7%	5.6%	4.7%	4.4%	4.0%	4.6%	2.6%	2.3%	4.4%	2.5%	1.8%	4.6%	7.7%
	% Difference on average	0.2%	0.3%	0.9%	0.0%	2.7%	0.1%	0.5%	0.4%	0.9%	0.3%	1.8%	2.5%	1.5%	3.6%	2.1%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%
November	Number of sample	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
	Average value	2580.0	4713.0	558.9	2235.6	455.6	128.5	358.3	46.3	222.9	37.0	86.6	10.0	53.5	6.5	907.8
	1 STD	75.8	143.8	15.5	71.2	14.0	3.0	13.7	2.0	4.3	0.7	2.0	0.2	1.4	0.2	23.9
	Coefficient of variation	2.9%	3.1%	2.8%	3.2%	3.1%	2.4%	3.8%	4.4%	1.9%	2.0%	2.3%	1.9%	2.6%	2.5%	2.6%
	% Difference on average	2.7%	0.5%	2.0%	2.5%	3.3%	1.2%	0.2%	1.8%	0.5%	0.6%	1.3%	1.4%	0.0%	2.7%	0.3%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
December	Number of sample	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	Average value	2592.0	4742.0	556.0	2210.0	456.0	129.2	361.4	48.4	222.0	36.8	87.6	10.1	53.4	6.3	900.8

Oreas-146																
	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	1 STD	41.5	131.6	21.9	80.6	8.9	2.5	5.0	0.9	4.8	0.7	0.8	0.2	1.1	0.3	15.4
	Coefficient of variation	1.6%	2.8%	3.9%	3.6%	2.0%	1.9%	1.4%	1.8%	2.2%	1.9%	1.0%	1.5%	2.1%	5.1%	1.7%
	% Difference on average	3.1%	1.1%	1.5%	1.3%	3.4%	1.7%	0.7%	2.5%	0.9%	0.1%	0.1%	1.6%	0.2%	0.3%	0.5%
	Nb. Outliers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
YTD	**Number of sample**	**118**	**118**	**118**	**118**	**118**	**118**	**118**	**118**	**118**	**118**	**118**	**118**	**118**	**118**	**118**
	Average value	**2547.2**	**4730.3**	**552.3**	**2216.1**	**451.6**	**127.6**	**362.4**	**48.1**	**225.3**	**37.0**	**86.6**	**10.1**	**53.7**	**6.5**	**905.6**
	1 STD	**80.2**	**118.6**	**18.7**	**79.9**	**14.1**	**3.7**	**10.3**	**1.5**	**5.3**	**0.7**	**2.1**	**0.2**	**1.1**	**0.2**	**27.2**
	Coefficient of variation	**3.1%**	**2.5%**	**3.4%**	**3.6%**	**3.1%**	**2.9%**	**2.8%**	**3.1%**	**2.4%**	**2.0%**	**2.5%**	**2.3%**	**2.1%**	**3.8%**	**3.0%**
	% Difference on average	**1.4%**	**0.8%**	**0.8%**	**1.6%**	**2.4%**	**0.5%**	**0.9%**	**1.9%**	**0.6%**	**0.7%**	**1.2%**	**1.7%**	**0.4%**	**3.6%**	**0.1%**
	Nb. Outliers	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**1**
	% Outliers	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.7%**	**0.8%**

16.2.4 GRE 02 results and interpretation

The GRE 02 was used to verify the REE high grade values accuracy. It is a certified standard is provided by an external laboratory and the average value of 41,886ppm TREE is detailed in Table 8. During 2012, the GRE 02 was sent systematically at the beginning of each batch (each hole) to test the instruments calibration and inserted randomly with the others standard to validate the accuracy of the analysis.

The GRE 02 returned a good QA / QC performance during all year long (Figure 25) with a more wide-ranging tendency in the last quarter. The high variation on the low REEs values, especially in the heavy rare earth element rage, for a high grade standard like the GRE 02 is considered normal.

Overall, 119 GRE 02 standards were analyzed. The number of outliers for the lanthanum is elevated but the year total average values are similar to the average certified value (Table 15). The coefficient of variation was higher compared to the certified value. On the other hand, the cerium performed better. The all year average value of dysprosium is inferior compared to the certified value. The large amount of the under limit outliers suggest a probable global under estimation of the dysprosium resource for the high grade zone.

Knowing the complexity of analyzing 15 elements with contrasting proportion, the laboratory results for the high grade values are judged acceptable for the resource estimation.

16.3 12.4 Historical Data Verification

The geological data generated after the 1968 discovery up to 1978 included some 546 samples tested for REE over 2,444 metres inside and outside the REE Zone. Most of the assays done on a regular basis were reported on the “paper” (now in PDF) logs for La_2O_3. The few of those drill holes inside the REE Zone are either surrounded by new data, therefore of no importance, or a good temporary support where new data is in progress. The older historical data identified the presence of REE but this data is shallow compared with more recent data (1985, 2011 and 2012).

The data from the surface drill holes 85-01, 85-02 and 85-03 were compared to the data produced by IAMGOLD in 2011. The quality of the data is better today. The 2012 drilling program made the older data least insignificant in number.

At this stage of the REE project exploration, the older historical data is useless. The mineral resource was estimated without this old data.

Figure 25: GRE 02 QA / QC report, REE project 2012.

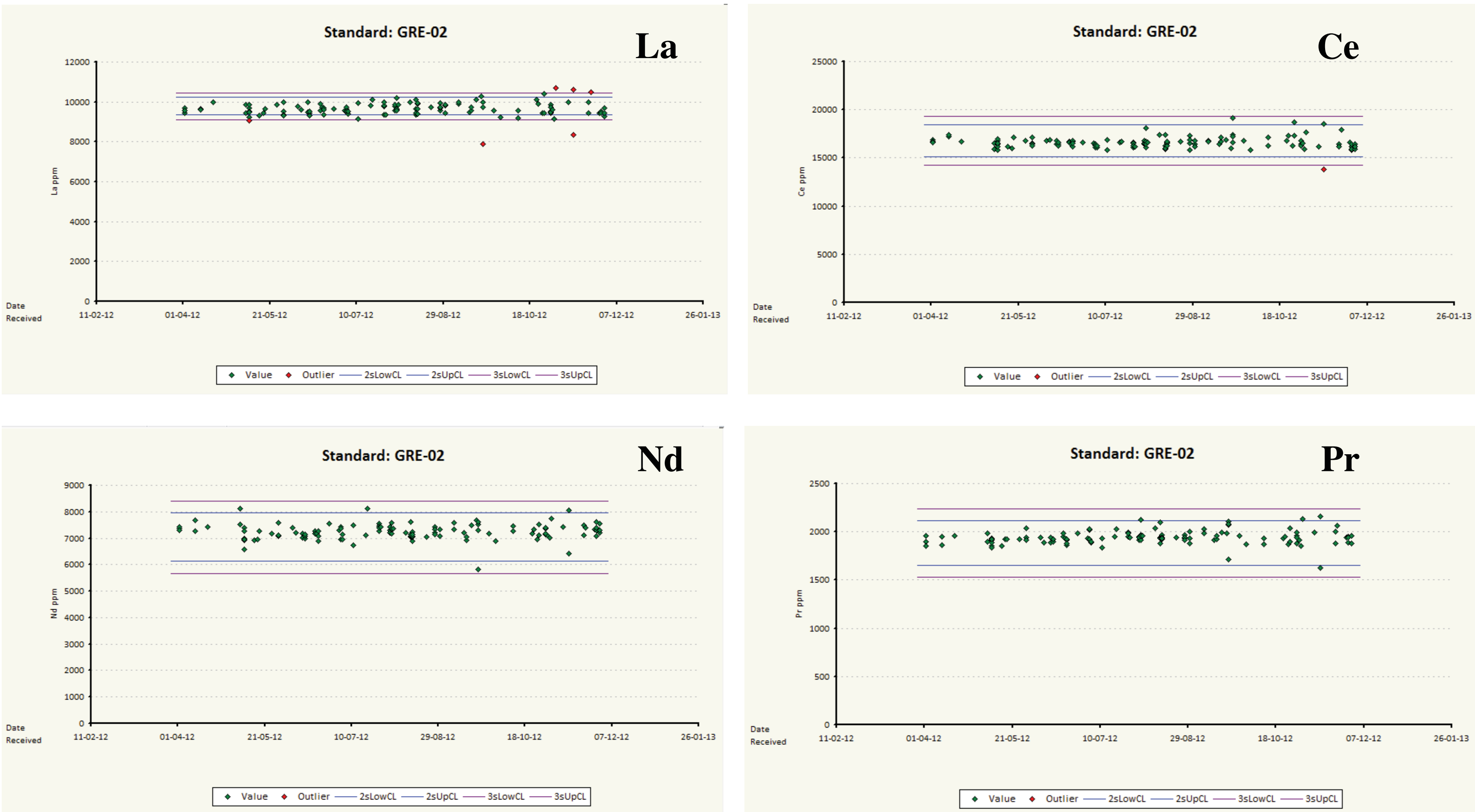


Table 15: Summary of the GRE-02 QA / QC results.

GRE-02	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	Certified Value	9786	16797	1883	7048	769.2	139.9	262.2	14.62	28.56	2.87	7.96	0.527	2.96	0.42	55.97
	Tolerance	221	837	117	456	32.2	9.07	29.6	4.13	1.51	0.27	5.29	0.066	0.91	0.14	4.39
	Coefficien tof variation	2.26%	4.98%	6.21%	6.47%	4.19%	6.48%	11.29%	28.25%	5.29%	9.41%	66.46%	12.52%	30.74%	33.33%	7.84%
SGS																
April	Number of sample	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
	Average value	9658.3	16916.7	1913.3	7406.7	770.0	141.2	232.5	14.2	26.2	3.0	4.8	0.5	2.3	0.3	51.3
	1 STD	186.3	318.9	50.5	146.0	20.0	6.8	25.6	2.6	1.0	0.1	0.3	0.1	0.5	0.0	1.2
	Coefficient of variation	1.9%	1.9%	2.6%	2.0%	2.6%	4.8%	11.0%	18.1%	3.8%	4.0%	6.3%	12.6%	22.1%	12.9%	2.4%
	% Diff. on average	1.3%	0.7%	1.6%	5.1%	0.1%	0.9%	11.3%	3.1%	8.4%	5.7%	39.7%	5.1%	21.2%	24.6%	8.3%
	Nb. Outliers	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	0.0%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
May	Number of sample	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
	Average value	9545.0	16468.8	1914.4	7186.9	747.5	140.4	234.1	13.9	26.1	3.0	5.1	0.5	2.3	0.3	51.4
	1 STD	262.2	406.2	48.8	350.3	28.4	4.7	16.5	2.0	1.2	0.1	0.2	0.1	0.5	0.1	1.7
	Coefficient of variation	2.7%	2.5%	2.6%	4.9%	3.8%	3.4%	7.1%	14.7%	4.6%	3.0%	4.5%	10.5%	20.7%	18.2%	3.3%
	% Diff. on average	2.5%	2.0%	1.7%	2.0%	2.8%	0.4%	10.7%	4.7%	8.5%	4.5%	36.6%	1.6%	21.9%	21.1%	8.1%
	Nb. Outliers	4	0	0	1	1	0	0	0	4	0	0	1	0	0	0
	% Outliers	25.0%	0.0%	0.0%	6.3%	6.3%	0.0%	0.0%	0.0%	25.0%	0.0%	0.0%	6.3%	0.0%	0.0%	0.0%
June	Number of sample	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
	Average value	9577.9	16578.6	1916.4	7156.4	757.9	138.3	227.8	13.4	25.4	3.0	5.0	0.5	2.1	0.3	50.9
	1 STD	184.6	215.5	31.3	183.0	18.9	3.9	15.1	1.3	1.1	0.1	0.1	0.0	0.3	0.0	1.4
	Coefficient of variation	1.9%	1.3%	1.6%	2.6%	2.5%	2.8%	6.6%	10.0%	4.3%	4.3%	2.0%	0.0%	12.9%	11.6%	2.7%
	% Diff. on average	2.1%	1.3%	1.8%	1.5%	1.5%	1.2%	13.1%	8.6%	11.2%	3.3%	37.1%	5.1%	30.0%	25.2%	9.0%
	Nb. Outliers	1	0	0	0	0	0	1	0	9	0	0	0	0	0	0
	% Outliers	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	7.1%	0.0%	64.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
July	Number of sample	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	Average value	9646.0	16360.0	1952.7	7310.0	772.0	141.0	228.7	13.7	25.2	3.0	5.0	0.5	2.0	0.3	50.3
	1 STD	270.4	282.3	54.6	323.2	31.4	5.3	11.4	2.0	0.8	0.1	0.2	0.0	0.0	0.0	1.5
	Coefficient of variation	2.8%	1.7%	2.8%	4.4%	4.1%	3.7%	5.0%	14.5%	3.1%	4.3%	3.9%	0.0%	0.0%	8.4%	3.1%
	% Diff. on average	1.4%	2.6%	3.7%	3.7%	0.4%	0.8%	12.8%	6.5%	11.8%	4.3%	37.6%	5.1%	32.4%	27.0%	10.2%

GRE-02	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	Nb. Outliers	1	0	0	1	1	0	0	0	9	0	0	0	0	0	0
	% Outliers	6.7%	0.0%	0.0%	6.7%	6.7%	0.0%	0.0%	0.0%	60.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
August	Number of sample	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
	Average value	9725.8	16600.0	1953.8	7235.8	766.5	138.5	237.1	15.0	26.0	3.1	5.3	0.5	2.2	0.3	50.9
	1 STD	217.5	511.5	56.9	171.4	18.5	4.6	15.6	2.1	0.7	0.2	0.2	0.0	0.4	0.0	1.1
	Coefficient of variation	2.2%	3.1%	2.9%	2.4%	2.4%	3.3%	6.6%	14.0%	2.9%	5.4%	4.6%	8.4%	19.3%	13.3%	2.1%
	% Diff. on average	0.6%	1.2%	3.8%	2.7%	0.3%	1.0%	9.6%	2.9%	9.0%	9.0%	33.1%	2.9%	24.6%	23.1%	9.0%
	Nb. Outliers	0	0	1	0	0	0	1	0	5	0	0	0	0	0	0
	% Outliers	0.0%	0.0%	3.8%	0.0%	0.0%	0.0%	3.8%	0.0%	19.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
September	Number of sample	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
	Average value	9688.3	16975.0	1975.0	7223.3	773.3	140.0	217.3	11.7	25.0	3.1	5.2	0.5	2.3	0.3	51.2
	1 STD	616.6	762.9	104.2	504.2	42.1	8.9	16.5	1.4	1.3	0.1	0.2	0.0	0.5	0.0	1.9
	Coefficient of variation	6.4%	4.5%	5.3%	7.0%	5.4%	6.3%	7.6%	12.3%	5.4%	3.6%	4.4%	5.9%	20.1%	12.3%	3.8%
	% Diff. on average	1.0%	1.1%	4.9%	2.5%	0.5%	0.1%	17.1%	20.2%	12.5%	7.4%	35.1%	6.7%	24.0%	24.6%	8.6%
	Nb. Outliers	2	1	0	1	1	1	2	0	6	0	0	0	0	0	0
	% Outliers	16.7%	8.3%	0.0%	8.3%	8.3%	8.3%	16.7%	0.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
October	Number of sample	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
	Average value	9643.6	16764.3	1922.9	7214.3	763.6	139.1	216.4	12.2	24.9	3.1	5.2	0.5	2.2	0.3	51.6
	1 STD	333.8	703.4	50.8	183.4	23.1	5.2	5.4	0.6	0.5	0.1	0.2	0.0	0.4	0.0	2.0
	Coefficient of variation	3.5%	4.2%	2.6%	2.5%	3.0%	3.7%	2.5%	4.7%	1.9%	2.9%	3.4%	0.0%	19.2%	8.7%	3.8%
	% Diff. on average	1.5%	0.2%	2.1%	2.4%	0.7%	0.6%	17.5%	16.5%	12.7%	7.3%	34.4%	5.1%	25.2%	26.9%	7.7%
	Nb. Outliers	3	1	0	0	0	0	0	0	13	0	0	0	0	0	0
	% Outliers	21.4%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	92.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
November	Number of sample	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
	Average value	9651.3	16375.0	1948.1	7340.0	776.9	139.1	230.4	13.1	25.8	3.0	5.1	0.5	2.1	0.3	51.2
	1 STD	592.8	1045.9	120.8	357.3	39.3	6.2	17.1	1.7	0.7	0.1	0.2	0.0	0.3	0.0	2.4
	Coefficient of variation	6.1%	6.4%	6.2%	4.9%	5.1%	4.4%	7.4%	13.3%	2.7%	4.3%	4.4%	0.0%	16.1%	12.6%	4.7%
	% Diff. on average	1.4%	2.5%	3.5%	4.1%	1.0%	0.6%	12.1%	10.7%	9.8%	5.6%	35.9%	5.1%	28.2%	24.1%	8.5%
	Nb. Outliers	6	2	3	1	2	0	1	0	4	0	0	0	0	0	1
	% Outliers	37.5%	12.5%	18.8%	6.3%	12.5%	0.0%	6.3%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%
December	Number of sample	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Average value															

GRE-02																
	REE	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Y
	1 STD															
	Coefficient of variation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	% Diff. on average	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Nb. Outliers															
	% Outliers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
YTD	**Number of sample**	**119**	**119**	**119**	**119**	**119**	**119**	**119**	**119**	**119**	**119**	**119**	**119**	**119**	**119**	**119**
	Average value	**9640.7**	**16666.2**	**1935.5**	**7247.6**	**764.4**	**139.8**	**227.7**	**13.4**	**25.5**	**3.0**	**5.1**	**0.5**	**2.2**	**0.3**	**51.1**
	1 STD	**295.9**	**457.2**	**56.7**	**265.9**	**26.1**	**5.6**	**15.2**	**1.7**	**0.9**	**0.1**	**0.2**	**0.0**	**0.4**	**0.0**	**1.5**
	Coefficient of variation	**3.1%**	**2.7%**	**2.9%**	**3.7%**	**3.4%**	**4.0%**	**6.7%**	**12.8%**	**3.7%**	**3.9%**	**4.1%**	**5.4%**	**16.7%**	**12.3%**	**3.0%**
	% Diff. on average	**1.5%**	**0.8%**	**2.8%**	**2.8%**	**0.6%**	**0.1%**	**13.2%**	**8.1%**	**10.6%**	**5.9%**	**36.2%**	**4.5%**	**25.6%**	**24.6%**	**8.7%**
	Nb. Outliers	**17**	**4**	**4**	**4**	**5**	**1**	**6**	**0**	**52**	**0**	**0**	**1**	**0**	**0**	**1**
	% Outliers	**14.3%**	**3.4%**	**3.4%**	**3.4%**	**4.2%**	**0.8%**	**5.0%**	**0.0%**	**43.7%**	**0.0%**	**0.0%**	**0.8%**	**0.0%**	**0.0%**	**0.8%**

Item 17. Adjacent Properties

The recent growing interest for Niobium and REE minerals has generated interest in the general area of the Niobec mine.

At the end of February 2010 DIOS Exploration published the discovery of a satellite carbonatite seven (7) km south of Niobec Mine, the Shipshaw discovery. This prompted the need to review the global setting of the Niobec alkaline and carbonatite complex at the regional scale and evaluate the presence of potential satellite deposits.

The results obtained by DIOS to date in the Shipshaw carbonatite are only anomalous in terms of Nb and REE but this could lead to higher grade or to different styles of mineralization associated to this new carbonatite. An Offer from IAMGOLD to participate in a private Placement of CDN$1.2 M in DIOS Exploration and to enter in an Exploration Option to Joint Venture on the Shipshaw project was accepted and signed by DIOS on January 13th 2011.

On the closing of the private placement IAMGOLD was granted an exclusive option (the "Option") to enter into an Option and Joint Venture Agreement to earn sixty percent (60%) of DIOS's interest in the Shipshaw Project, Saguenay area, Quebec, within two (2) years of the private placement in DIOS, which Option may not be exercised until the earliest of the time taken by DIOS to spend 80% of the placement on the Shipshaw Carbonatite program (under DIOS' management), or of a period of one year after IAMGOLD has subscribed to the initial private placement. No less than 80% of the placement would be committed to DIOS' Shipshaw Carbonatite program, and any surrounding claims. This has given to IAMGOLD 8.95 % of the then issued and outstanding Common Shares of DIOS after the closing of the placement.

DIOS Exploration is planning various field surveys to execute in the coming months and is currently executing a drilling exploration campaign on their main carbonatite discovery. Several prospective areas staked by DIOS and interpreted from government regional geophysical surveys will be also explored in the current year program.

IAMGOLD-Niobec is following the DIOS exploration results to evaluate the potential of the area for their economic activities.

Item 18. Mineral Processing and Metallurgical Testing

Preliminary metallurgical testwork was initiated. Four metallurgical drill holes were executed in March 2011 to provide the metallurgical samples. Samples from two drill holes were combined to make a master composite to begin the metallurgical testwork. In july 2012, all the rejects coming from the 2011 drilling campaign was assembled and sent to a laboratory for a pilot test. In 2012, an exploration drift was developed in the core of the REE zone, about 300m below surface equivalent to mine level 1150, giving and all year round accessibility. About 3,500 tonnes of bulk material was also stocked underground for future study. Testwork still ongoing and the sections below are based on the 2011 evaluation.

18.1 Mineralogy

Mineralogy (QEMSCAM) has been done on three historical drill hole core samples and two additional on two selected new core samples from 2011 drill holes. The objectives of those mineralogy tests were to identify the major REO minerals, the grain size and form (shape and other physical properties). The major REO identified are Bastnaesite and Monazite in fine cluster assemblage.

Additional mineralogy (QEMSCAM) will be performed on new drillholes to try to do a mapping of the REO minerals to confirm their types and the particle size variability inside the deposit.

18.2 Metallurgical testwork

Metallurgical testwork are ongoing on the cumulate material. Different physical separation methods are investigated including gravity, magnetic, flotation and attrition scrubbing. Preliminary testwork showed results in the range of 58% to 70% REO recovery in a 25% to 40% mass pull respectively. Flotation as per other methodologies continues to improve concentration ratio. Preliminary pre leach tests showed a mass reduction in the range of 80% with the majority of the REO reporting to solid. Additional pre leach test are ongoing as well as REO extraction leach tests.

An average recovery of TREO of 53.5% was assumed for the estimate of the mineral resources.

Item 19. Mineral Resource and Mineral Reserve Estimates

19.1 Presentation of the REE Zone Mineral Resources Estimates

The REE resource corresponds to an enriched zone of light REEs ("LREE") which is characteristic of the annular carbonatite type. LREEs comprise 98% of the Total REEs ("TREE") weight, with the remaining 1.9% of heavy REEs ("HREE") that could potentially add significant economic value. As indicated in the tables below, the REE zone contains a total Indicated Resources of 531.4 Million tonnes at a grade of 1.64% (8.7 billion kilograms contained) Total Rare Earth Oxides (TREO) and a total Inferred Resources of 527.2 Million tonnes at a grade of 1.83% (9.7 billion kilograms contained) TREO, to a depth of approximately 700 metres.

The estimated resource is enclosed within the core of the carbonatite complex. In 2012, the near surface "footprint" of the mineralization has been confirmed in all directions. Given the homogeneity of the grade values in the block model, it is difficult to outline a low and a high grade zones inside the REE resources. Three holes extended well below the resource model, and reach a maximum length of 1,337 metres. The two deepest holes demonstrated that the REE zone persists uninterrupted at depth and show comparable or higher grades to other intercepts in the resource model. Based on the low variability and all the preceding information, the mineral resources have been classified by level. The indicated resources are from sub-surface to level 9650 (350m depth) and the inferred resources are from levels 9650 to 9300 (700m depth).

All assay results are reported in Total Rare Earth Element Oxides ("TREO"). The main rare earth elements found are LREEs: Cerium (Ce), Lanthanum (La), Neodymium (Nd), Praseodymium (Pr) and Samarium (Sm), and HREEs: Gadolinium (Gd), Europium (Eu), Dysprosium (Dy) and Terbium (Tb).

Table 16: REE mineral resources by grade groups.

	Indicated resources			Inferred resources		
GRADEGROUP % TREO[3]	Tonnage Millions T.	Grade % TREO	TREO Cont. Millions kg	Tonnage Millions T.	Grade % TREO	TREO Cont. Millions kg
> 2.5	32.1	2.72	873.2	82.1	2.83	2,326.5
2.0 to 2.5	116.9	2.19	2,562.9	141.3	2.22	3,137.4
1.5 to 2.0	175.0	1.78	3,109.1	140.1	1.77	2,483.4
1.0 to 1.5	120.8	1.25	1,516.0	90.2	1.27	1,145.2
0.5 to 1.0	86.6	0.77	669.1	73.4	0.76	559.2
TOTAL	**531.4**	**1.64**	**8,730.3**	**527.2**	**1.83**	**9,651.7**

[3] TREO is for Total Rare Earth Oxides which include: La_2O_3, Ce_2O_3, Pr_2O_3, Nd_2O_3, Sm_2O_3, Eu_2O_3, Gd_2O_3, Tb_2O_3, Dy_2O_3, Ho_2O_3, Er_2O_3, Tm_2O_3, Yb_2O_3, and Lu_2O_3.

Table 17: REE mineral resources by depth.

	Indicated resources			Inferred resources		
Level	Tonnage Millions T.	Grade % TREO	TREO Cont. Million kg	Tonnage Millions T.	Grade % TREO	TREO Cont. Million kg
10000	4.8	1.77	85.9	0.0	0.00	0
9950	65.3	1.74	1133.6	6.2	1.37	85.1
9900	82.7	1.59	1312.8	8.7	1.41	122.0
9850	84.5	1.59	1345.7	6.1	1.38	83.6
9800	86.3	1.60	1380.0	3.8	1.25	47.5
9750	85.0	1.62	1375.5	2.3	1.15	26.8
9700	82.2	1.70	1400.4	1.2	1.23	14.9
9650	40.5	1.72	696.4	41.7	1.70	710.4
9600	-	-	-	79.1	1.76	1390.0
9550	-	-	-	74.9	1.87	1398.0
9500	-	-	-	71.9	1.88	1355.4
9450	-	-	-	69.6	1.88	1307.1
9400	-	-	-	67.2	1.95	1311.1
9350	-	-	-	63.8	1.93	1230.9
9300	-	-	-	30.7	1.85	568.7
TOTAL	**531.4**	**1.64**	**8,730.3**	**527.2**	**1.83**	**9,651.5**

NOTES:

- Results are presented in situ, unconfined and undiluted
- Resource modeling used 15,973 samples from the 2011 and 2012 drilling program with 54 elements assayed (with re-assays for high grade samples).

19.1.1 Methodology

19.1.1.1 Software

The Gems LabLogger and Logger software application from Gemcom Software International Inc. were used for core logging, database management, modeling the geology, analyzing the data, to perform the grade interpolations, to create and manage the block model as well as report the mineral resources. The software was used by Louis Grenier and supervised by Réjean Sirois, the qualified person for the resource evaluation according to the NI 43-101.

19.1.1.2 Data

The systematic drilling program of 2011 and 2012, confirmed the results found in the historical drill holes. The question was raised as to whether the historical data should be used in the mineral resource estimation of 2012. Every project goes through the same process of discovery and evaluation from sparse data to detailed data. Each activity from exploration through development and production has different goals and method of investigation.

Between 1968 and 1985, the carbonatite hosting the REE Zone was discovered and studied using various means, including drilling, airborne and ground geophysics, mapping, bulk sampling, petrographic and mineralogy studies, etc. Some 22 shallow surface drill holes were assayed for REE, some sporadically (1968 to 1978), some systematically (1985) and 18 drill holes reported an REE Zone intersect. The original hand written drill logs (*in PDF*) reported values for La2O3 only (*to represent the REE group*) in the first 15 drill holes (1968 to 1978). The 3 drill holes from 1985 report 22 assays, including the major REE. All available data were captured into Gems database.

All historical drill holes compared favorably to the 2011 and 2012 drilling results. Most of this data, especially from the period of 1968 to1978 does not have the QA/QC support to comply with the NI 43-101 standards but there is no evidence that it would not comply with it. The historical data deemed to match the geology and the new grade data available. In fact, it made little difference whether it was used or not. It made no difference in the grade as the old data is completely surrounded by new data. Since new data has been acquired in 2012, the historical data (1968 to 1985) were put aside to favor a more uniform quality of data. The following table summarizes the database tables and fields used in the resources estimation at the 31st of December.

Table 18: Statistics summary of the original assay intervals used in the 2012 resource estimation.

Samples statistics	2012-12-31
Number of samples	15,973
Average length (m)	2.21
Minimum (ppm TREO)	89.82
Maximum (ppm TREO)	123403.10
Mean (ppm TREO)	17106.96
Median (ppm TREO)	16611.10
Variance	91535769.77
Standard deviation	9567.43
Coefficient of variation	0.56

19.1.1.3 Composites

Compositing is a set of techniques to split, group and regroup existing samples to make them "even" and ready for the interpolation process on a regular 3D grid, the block model. Drilling and sampling is not even. It is done on line, sections and levels where the access is available to take the samples most efficiently. Drilling is also a process to discover the shape of a mineral resources and increase the detail as the exploration program is going on. For the interpolation process of assigning a grade value to each block, the blocks and the samples must have a matching rock type.

For the estimation of the REE Zone mineral resources in 2011, several sets of data were tested against several geological models (Lafleur, P.-J., 2012). Those are:

- Up to 9,398 original assay data from the ICP table in variable length but mostly 1.5m;
- 3,126 5m composites including all drill holes intersecting the REE Zone;
- 2,871 5m composites for 1985 to 2011 drill holes exclusively;
- 1,672 10m composites including all drill holes intersecting the REE Zone.

Because the drill hole samples in the REE Zone vary in length, it was deemed valid to group samples in equal length. Composites of 10 metres appear to be a good choice according to the geology, the sampling statistics and the variography. The final length of 5 metres was retained after looking at different block models section and plan views. Composites of larger size smooth the data. Five metres equal length composites appeared to be a better choice than the 10 metres composites to preserve a certain level of details in the grade model. No top grade capping value was used before or after compositing. This can be done dynamically during interpolation in Gems.

The 2011 composites parametres were applied to the data set used for the 2012 block model. The data set is formed of 7,110 of 5 metres composites including 2011 and 2012 drill holes intersecting the REE zone (Table 15). The 2011 samples were principally of 1.5 to 2 metres long and the 2012 samples were uniformly set at 3 metres long. An equal length composite of 5 metres was judged appropriate to keep a detailed grade distribution in the model.

Table 19: Composites statistics summary used in 2012 resource estimation.

5 m Composites statistics	2012-12-31
Number of samples	7,110
Minimum (% TREO)	0.02
Maximum (% TREO)	8.17
Mean (% TREO)	1.69
Median (% TREO)	1.72
Variance	0.71
Standard deviation	0.84
Coefficient of variation	0.50

19.1.1.4 Variography

The variography is used for the 2012 rare earth elements resources estimation. It was made for the reported total rare earth oxide (TREO). A standard approach was used to generate and model the variography. The following steps were followed:

- Orientation and the dips examination of the solids representing the REE zone to determine the continuity axes.
- Generated and model the down hole correlogram, witch determine the nugget effect (closed space variability).

- Calculate and model the major, semi-major and minor axes of continuity.

The anisotropy direction was determined using the regressions rules in “SAGE” software. The variogram was modeled with a nugget effect and two structures representing the larger scale spatial variability of the datasets. The modeled correlogram is summarized in Table 20. The rotation angles use the Gemcom convention around the ZYZ axes based on the orientation of the block model.

The set of rules would be the same for all REO as for TREO except the limits on grade for the Top Cut Value and the Cut-Over High Grade Value would have to be adjusted accordingly.

Table 20: Variography statistics

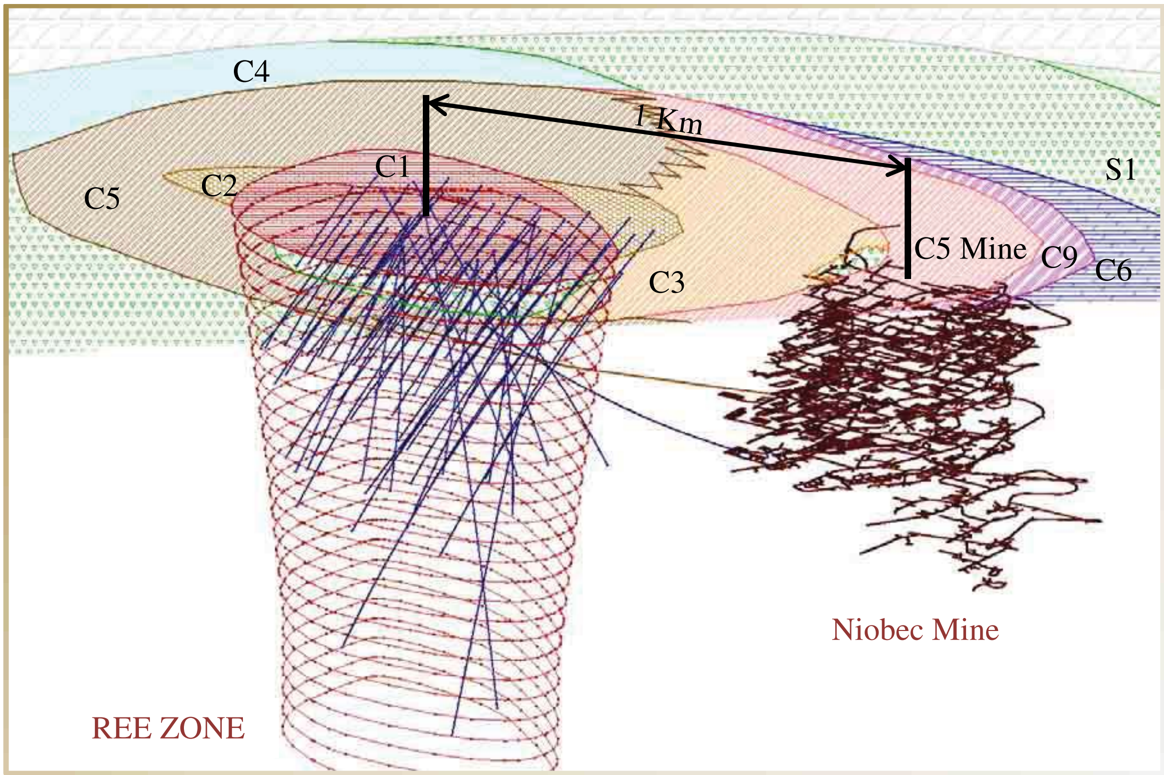
		Ranges (m)		Rotation (°)		
Element	**Nugget effect**	**1st Structure**	**2nd Structure**	**Z**	**X**	**Z**
TREO (%)	0.422	X:50 Y:150 Z:360 Sill:0.431	X:750 Y:360 Z:700 Sill:0.147	0	0	0

19.1.2 Domain and Volume

The REE Zone mineral resources model is limited to the core of the Saint-Honoré carbonatite complex. The C1 rock type is (the REEs mineralized carbonatite) containing the majority of the mineralization but a surrounding crown, called the transition zone, included the low grade values. The transition zone is formed of mineralized C1 injected in the C2 (massive carbonatite) and the S1 (syenite). The geological model outlying the REE host rock was drawn in 2011. A vertical projection was drawn from the surface compilation map (Figure 5) using a 70° dip cone shape truncated first at 1000m depth in 2011 and extend at 1400m depth in 2012 (Figure 26). The volume is adjusted to the drill hole rock type description and assay values to obtain a 3D cone shape confining the grade interpolation process.

The geological model will be reviewed in 2013 with all the new data collected by drilling in 2012. The core zone and the transition zone will be separated for a better definition of the resource. However the geological model is not up to date, the 2011 model is judged enough close to the reality to use it for generating a valid resource interpolation.

Figure 26: 3D Shape of REE Zone (left) and Niobec mine (right)

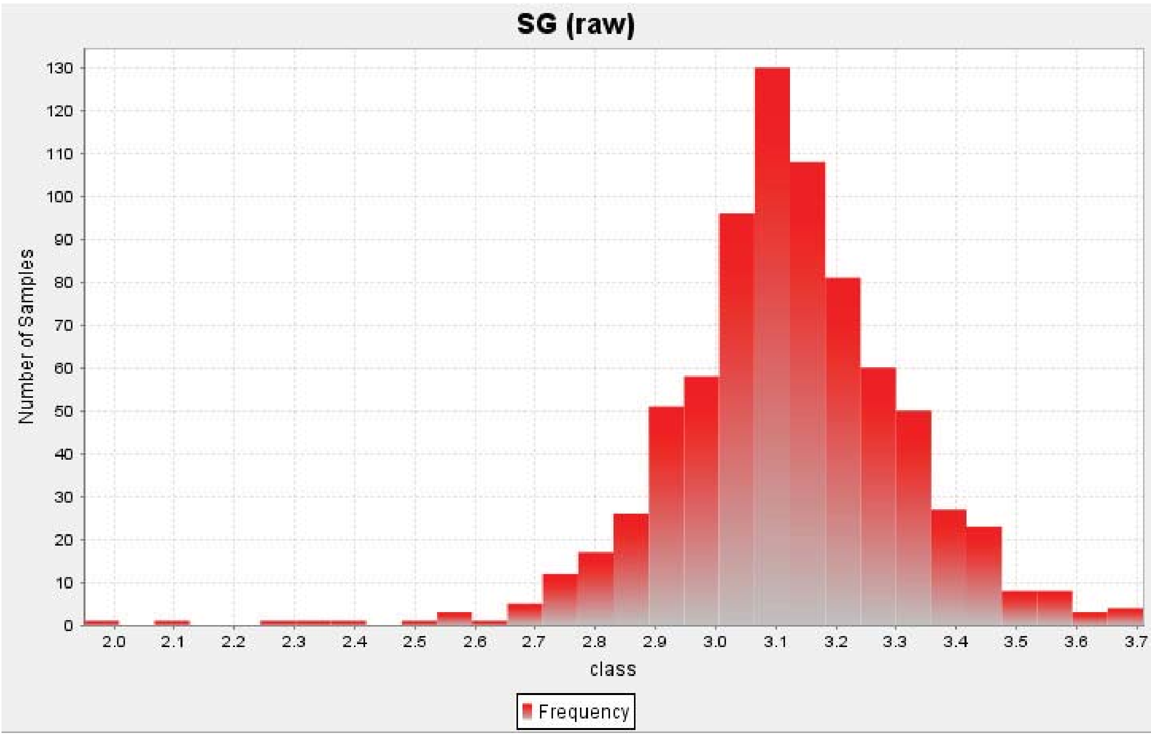


19.1.3 Specific Gravity (SG)

A systematic specific gravity measurement was realized during the 2012 drilling campaign. The density test was realized by Niobec staff using the water immersion technique on representative core sample of ±15cm long. Each corresponding 3 metres long sample sent for analysis was also analyzed by SGS using an air pycnometre on pulverized samples. Both technic returned similar SG values, the SGS values were choose to be including in the database. The density is now available not only for every different geological interval described but also on a 30 metres frequency along each hole. Coupled with the 2011 values, 777 density measurements, mainly located in the C1, were used for the interpolation (Figure 27).

Even if the new sample average density is 3.11 t/m^3, the 2011 density value of 2.86 t/m^3 was used has default value for the blocks with insufficient data during the interpolation process.

Figure 27: Histogram of 777 Density Measures.



19.1.4 Block Model

The REE2012 block model was built within the GD_TR_2012 database, Gems 6.3.1 software. The estimated mineral resources have been modeled using a 10-metre cubic block model and grades were estimated using Ordinary Kriging (OK) over 5 metres equal length composites. The block model parametres are summarized in Table 21.

Table 21: REE zone block model parametres (Exploration metres).

	Easting	Northing	Elevation
Minimum coordinates	2,000	5,00	8,600
Maximum coordinates	3,200	6,400	10,100
Block size	10	10	10
Number of blocks	120	140	150
Rotation	0	0	0
References: Exploration Grid; **Unit:** metres			

The domain coding (rock type model) was based on the various wireframe constraints (Table 22). Each block was given a rock type attribute following a rule of precedence. All blocks were first selected and given the rock type 0 (air). Then, all blocks between the topographic surface and the overburden surface were given the rock type 1 (overburden). The rock type 2 (Trenton limestone) was attributed to all blocks between the overburden surface and the Trenton limestone surface. Finally, the Saint-Honoré carbonatite complex was divided in domain based on the vertical interpolation of the compilation surface map (Figure 5). All blocs under the Trenton limestone surface were given the rock type number associated to their domain (Table 22).

Table 22: Block model coding.

Type	Name	Description	Block Model Code
Topography	Topo	Topography based on header altitude.	0 “air” (above the surface)
Surface	OB	Overburden	1 (above the surface)
Surface	Trenton	Base of the Trenton limestone	2 (above the surface)
Geology	C1	REE mineralized dolomite	10
Geology	C2	Massive dolomite	20
Geology	C3	Nb mineralized, foliated dolomite or calcitite	30
Geology	C5	Nb mineralized, coarse grained dolomite	50
Geology	C6	Pyroxene bearing calcitite	60
Geology	S1	Syenite	110

Within the block model project, a series of models were incorporated for recording the different attributes assigned and calculated in the block model development. These attributes are listed in Table 23 below.

Table 23: Block model attributes.

Attribute name	Description and Content	Unit	Update or creation procedure	Default value	Mapping	Data type
Rock type	Geologic code 0 =Air 1=Overburden 2=Trenton limestone 10=C1 20=C2 30=C3 50=C5 60=C6 110=S1	-	Limited by surfaces 50% over topo 50% over OB 99% over Trenton C1 domain C2 domain C3 domain C5 domain C6 domain S1 domain	0	Rock type	Integer
Density	Density value from actual data Air=0 Overburden=1.8 Trenton=2.78 Carbonatite=2.86	t/m^3	Updated from the rock code profile.	2.86	Density	Single
TREO_PCT	TREO grade	%	Interpolation, ordinary kriging	0	TREO	Single
CAT	Resource classification 1=Measured 2=Indicated 3=Inferred 4=Mineral inventory	-	Based on the search ellipse and limited by depth with the drill hole mesh coverage.	0	CAT	Integer

19.1.5 Grade Interpolation

Grade estimation was done using an ordinary kriging method in Gems 6.3.1 software. The method was applied with a numerical digitation of the 3 x 3 x 3 blocks. The interpolation threatened a data base of 5 metres equal length composites obtained from the original assays. The ordinary kriging was completed using a sample search approach as summarized below:

- The first interpolation for each block is calculated with a minimum of 6 and a maximum of 12 composites within the search ellipse. The ellipse dimension is limited to 100m x 100m x 100m (Figure 28). There is no maximum number of samples per drill hole.
- Then, a second interpolation is calculated with a minimum of 2 and a maximum of 12 composites within the search ellipse. The ellipse is less restrictive and has a dimension of 150m x 150m x150m (Figure 29). Once again, there is no maximum number of samples per drill hole.

A top value capping is used in both cases. A value of 10% TREO was used for this purpose. In addition, Gems allow reducing the range of influence of high grade values. A high grade cut-over of 5% TREO was used. The high grade values are used in the interpolation up to 10% with a range half of the rest of the data. This way, if a cluster of high grade value is intersected, Gems will generate a high grade zone in the block model. Otherwise, an isolated high grade value will be discounted more heavily.

The TREO value was the only one interpolated in 2012. It perfectly reflects the global distribution and the economic value of the REE zone. Each 14 rare earth elements could be interpolated individually for comparison or other specific purpose. These elements could be estimated using the same methodology as described for TREO.

Table 24 shows the complete search parametres, Appendix 1 the main section view and plan view of the 2012 block model TREO grade interpolation.

Table 24: Interpolation rules

		Interpolation element		TREO	TREO
		Interpolation profile name		**TREO_IND**	**TREO_INF**
	Interpolation	Calculation method		Ordinary kriging	Ordinary kriging
	Interpolation	Block variance		Variance by level	Variance by level
	Interpolation	Discretization		3x3x3	3x3x3
	Interpolation	Number of sample used	Min.	6	2
	Interpolation		Max.	12	12
Data and Constraints	Block model	Block model		REE2012	REE2012
Data and Constraints	Block model	Block selection		All blocks	All blocks
Data and Constraints	Composites	Point area source		Compo5_2013-01-18	Compo5_2013-01-18
Data and Constraints	Composites	Point area Wrk – source name		COMPO5	COMPO5
Data and Constraints	Composites	Number used	Min.	6	2
Data and Constraints	Composites		Max.	12	12
Data and Constraints	Composites	Max. per hole			
Data and Constraints	Value	Min. (%)		0	0
Data and Constraints	Value	Max. (%)		8	8
Data and Constraints	Value	High grade limit (%)		10	10
Data and Constraints	Rock code	Description		REE mineralized C1	REE mineralized C1
Data and Constraints	Rock code	Target rock code		10	10
Data and Constraints	Searching ellipse	Profile name		GMS_TREO	GMS_INF
Data and Constraints	Searching ellipse	Rotation	Z	0	0
Data and Constraints	Searching ellipse		Y	0	0
Data and Constraints	Searching ellipse		Z	0	0
Data and Constraints	Searching ellipse	Range (m)	X	100	150
Data and Constraints	Searching ellipse		Y	100	150
Data and Constraints	Searching ellipse		Z	100	150
Data and Constraints	Searching ellipse	High grade transition limit (%)		5	5
Data and Constraints	Searching ellipse	High grade range (m)	X	50	75
Data and Constraints	Searching ellipse		Y	50	75
Data and Constraints	Searching ellipse		Z	50	75
Data and Constraints	Semi variogram	Profile name		GMS_TREO	GMS_TREO
Data and Constraints	Semi variogram	Nugget effect	CO	0.422	0.422
Data and Constraints	Semi variogram	Spherical (1) – rotation ZXZ Range of influence for anisotropy:	Sill	0.431	0.431
Data and Constraints	Semi variogram		X	50	50
Data and Constraints	Semi variogram		Y	150	150
Data and Constraints	Semi variogram		Z	360	360
Data and Constraints	Semi variogram	Spherical (2) – rotation ZXZ Range of influence for anisotropy:	Sill	0.147	0.147
Data and Constraints	Semi variogram		X	750	750
Data and Constraints	Semi variogram		Y	360	360
Data and Constraints	Semi variogram		Z	700	700
Data and Constraints	Results	Saving		Overwrite Completely	Update only bocks that have zero grade
Data and Constraints	Results	Grade results attribute		TREO_PCT	TREO_PCT

Figure 28: TREO indicated resources search ellipse and variography (9900 Level).

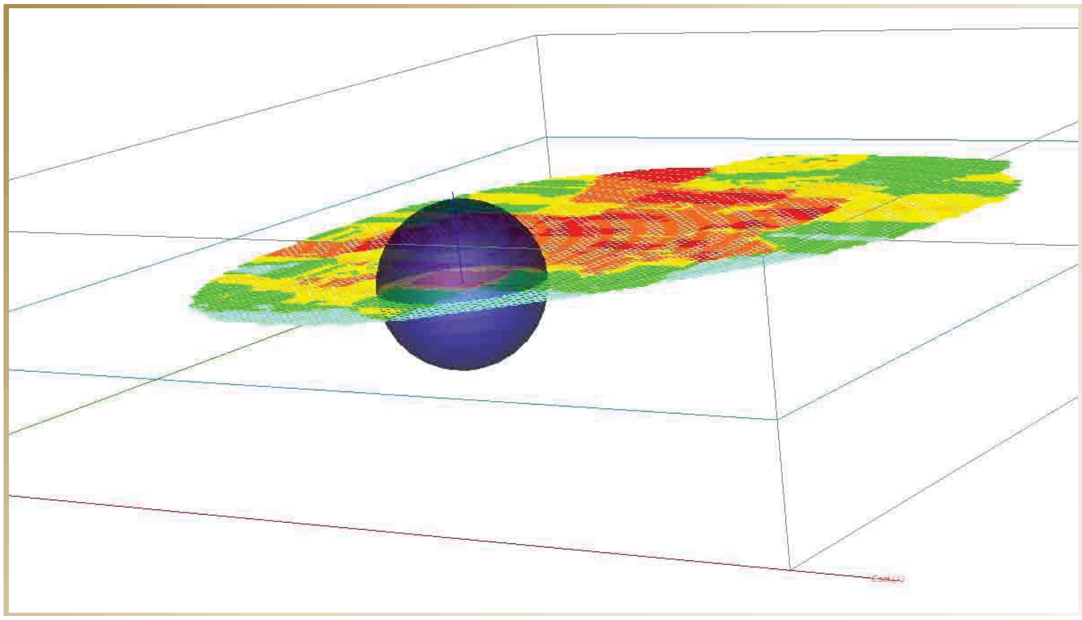
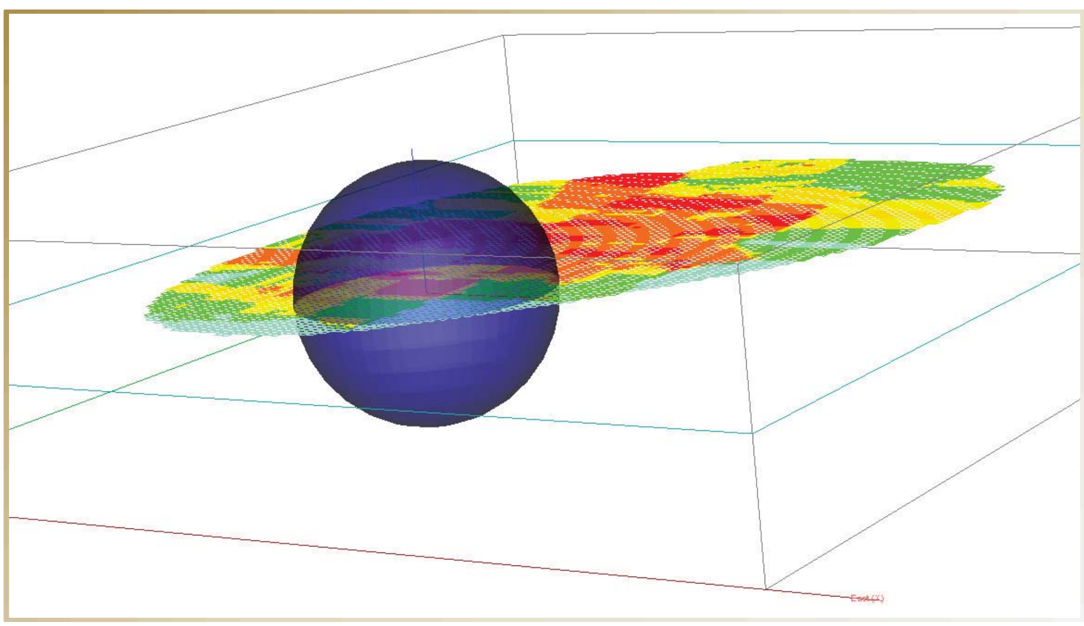


Figure 29: TREO inferred resource search ellipse and variography (9900 Level).



19.1.6 Classification

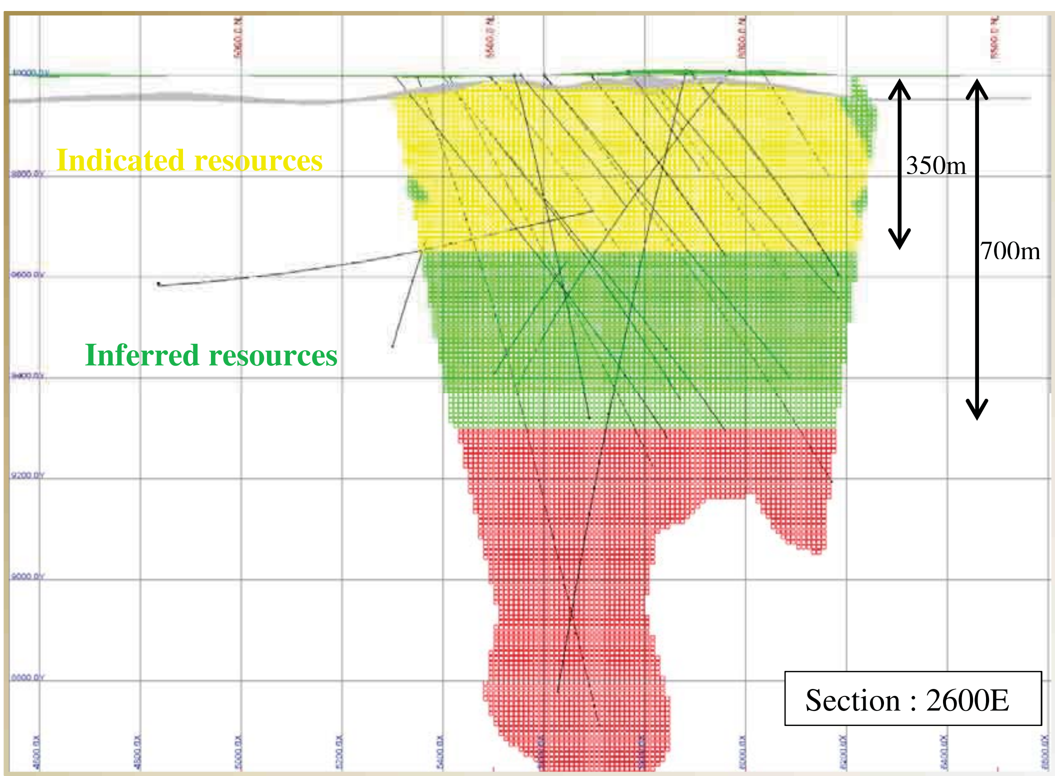
The Mineral Resources estimated for the REE deposit were classified according to the "CIM Definition Standards for Mineral Resources and Reserves" (December 11, 2005).

IAMGOLD mandated the consulting firm G Mining Services to support the Niobec geology team in achieving and validating the 2012 resources calculation. These resources are classified according to the drill hole coverage and the REE mineralization continuity interpreted by the qualified person.

The new drilling grid, 100m x 100m down to 350m below surface, define the rare earth elements hosting rock (C1). All limit, north, east, west and south, were intersected and the geometry of the ore body is trace on sub surface. From 350m to 700m below surface, is spaced by a drilling grid of 100m x 200m. The cylinder shape of the mineralized C1 can be, without confusion, extended at depth. With only a few holes going down to ±1200 metres, the REE zone is judged continuous in grade and still open at depth.

Base on the actual knowledge of the REE zone, the indicate resource correspond to the first interpolation rules and are limited to the 9650 level (350m below surface) (Figure 30). From 350m the drill definition decreased and the resources were called inferred. Even if the block model was extended at depth, the resource calculations were limited to 700 metres below surface. At this stage, no reserves were defined for the REE zone.

Figure 30: Resource classification, typical section view.



Sections 19.2 to 19.9 are required for advanced project only

19.2 Mineral reserves estimates

No mineral reserves estimates were outline for the REE Zone at this stage.

19.3 Mining methods

No mine plan was drawn for the REE Zone. However, the proximity to the existing IAMGOLD Niobec underground mine makes it an obvious choice as long as the value of the mineral resources is equal or higher than the niobium ore. The value of the REE Zone material has been more valuable than the niobium ore recently with the peak in REE prices but that was not always the case historically. The alternative of mining at surface with an open pit is also attractive given the facts:

- The REE Zone outcrops or is under less than of 30m Trenton limestone and overburden;
- it would be a lower cost operation than underground near the surface; however contemplating a very deep pit is much less attractive;

The REE Zone could be mined from surface and underground at the same time also. But with the actual works made on the Niobec underground feasibility project (based on a Blocks Caving method), an underground mining method should be preferred for this project.

19.4 Recovery methods

Preliminary metallurgical test work results of a REO bulk concentrate shows recoveries between 58% and 70%. Optimization test will continue throughout 2013 and preliminary leach tests as well as extraction leach tests are ongoing. A final recovery of 53.5% of the REE is for the moment assumed.

19.5 Project infrastructure

There is no specific project infrastructure for the REE Zone at the moment. However, IAMGOLD owns Niobec Inc. which operates an underground niobium mine just 1km from the REE Zone with an on-site mill and tailings disposal facilities.

19.6 Market studies and contracts

This section will be addressed when IAMGOLD produces a preliminary economic assessment or scoping study.

19.7 Environmental studies, permitting and social impact

This section will be addressed when IAMGOLD produces a preliminary economic assessment or scoping study.

19.8 Capital and operating costs

This section will be addressed when IAMGOLD produces a preliminary economic assessment or scoping study.

19.9 Economic analysis

This section will be addressed when IAMGOLD produces a preliminary economic assessment or scoping study.

Item 20. Other Relevant Data and Information

There is no other relevant data or information that will make this technical report more understandable and not misleading.

Item 21. INTERPRETATION AND CONCLUSIONS

21.1 Geological compilation:

The large 2012 drilling program bring new geological information about the REE zone. A complete compilation of the historical data was done in 2011 and not repeated in 2012. The new data was merged into the global data base. In the well-known Saint-Honoré carbonatite complex context, the anterior version of the geological model was judged enough realistic for the purpose of this report. The geological model will be actualised in 2013 by interpreting the high definition magnetic survey and the new drilling information.

The 2012 definition program focused on the carbonatite complex. The REE mineralization is limited to the REE Zone which corresponds to the central core of the carbonatite complex. The main REE minerals are: bastnaesite and synchysite, both disseminated in the ferrocarbonatite. It is accompanied with hematitic and /or chloritic alteration in the breccia facies but also find as centimetre scale, reddish coloured clusters in the massive facies. The change of textures, from breccia to massive, are often but the mineralisation contain is homogeneous.

21.2 Drilling

IAMGOLD drilling 2012 campaign (33 holes totalling 23, 851 m) tested the REE zone to a vertical depth of 1,200 m. This drilling campaign, defined the tridimensional shape of the REE zone, detailed the resources model and proved the mineralization continuity down to ±1,200m.

It is important to notice that this drilling campaign used a N031°grid orientation (to keep the same orientation as the mine grid) and completed a 100m X 100m grid down to 350m below surface. From 350m to 700m, the drilling grid is spaced to 100m x 200m. This new spacing allowed to transform the 2011 inferred resources into indicated resource and stretched the grade interpolation at depth.

The 2012 drill campaign, drill core handling, logging and sampling protocols were improved and are according to conventional industry standards and conform to generally accept best practices.

21.3 Mineral resources estimation – REE zone

This report include a new resource estimate based on 2012 REE exploration and definition update. The drilling added in 2012 increased the confidence level of the block model interpolation and double the resource estimation compared to last year. The REE resource corresponds to an enriched zone of REEs mineral which is characteristic of this annular carbonatite type.

As shown in Table 25 below, the REE zone contains a **total Indicated Resources of 531.4 Million Tonnes at a grade of 1.64% Total Rare Earth Oxides (TREO) and a total Inferred Resources of 527.2 Million Tonnes at a grade of 1.83% TREO**, to a depth of approximately 700 metres (the surface lies at a reference elevation of 10,000 metres). The exploration drilling confirmed the mineralization continuity below the fixed level of 700m and still open at depth.

Table 25: 2012 REE resources and reserves estimation.

REE (Rare Earth Elements) Project		December 31, 2011			December 31, 2012		
		Tonnes (000)	% TREO	Kg TREO (000)	Tonnes (000)	% TREO	Kg TREO (000)
Iamgold (100%)	Proven reserves						
	Probable reserves						
	Total reserves	0	0.00	-	0	0.00	0
	Measured ressources						
	Indicated ressources				531,400	1.64	8,730
	Measured and Indicated resources	0	0.00	-	531,400	1.64	8,730
	Inferered ressources	466,800	1.65	7,702	527,200	1.83	9,652

Item 22. Recommendations

22.1 Geological compilation and resources modelling.

The new geological information collected during the 2012 drilling program was not totally interpreted. The REE zone contacts were frequently intercepted, especially at depth, and an update of the geological model is needed. In the Saint-Honoré carbonatite complex context, the 2011 geological model (Lafleur, P.J., 2012) contained enough detail to update the TREO resources without any doubt on the reliability of the results. By modeling the transition zone (“low grade zone”) and the REE core zone (“high grade zone”) a grade interpolation could be applied individually to those new geological volumes. The expected results on the resources model will be an increasing of the TREO concentration coupled with a decreasing of the tonnage in the core zone. With cumulative mineral inventory of over 1 billion tonnes, decreasing the tonnage won’t have a negative aspect compared to the benefit of increasing the concentration.

The specific gravity used for the 2012 block model included the 2011 back ground value for the carbonatite of 2.86 t/m^3. Basic statistics made over the new available density data base returned an average value for the carbonatite of 3.11 t/m^3. This change must be studied. An increasing amount of barite is noted at depth and must necessarily affect the density. A density distribution pattern, within different geological domain or inside one domain, must be integrated to the next geological interpretation and blocks model.

The TREO value is a composite of 14 individual rare earth elements values added together. A proportion relationship between each element was established by P.J. Lafleur. Base on this information only the TREO attribute was calculated for the 2012 block model. The statistic and the variography of each element should be added for validation or comparisons.

22.2 Mineralogical characterisation and metallurgy.

A Mineralogical study is ongoing. The petrographic, the geochemical and the mineralization characterisation of the REE zone at depth, under 500 metres below surface, are the objects of a master project. Preliminary report should be produced to help the geological modeling and metallurgical test works. A synergy between geological improvement and metallurgical testing would be benefit to the REE project.

The hyper spectral technology might help the geological team to build a homogeneous data base to improve the actual geological model. Even if the traditional core logging description seems to work for outlying the core zone, the spectral technology can precisely evaluated the REE mineral concentration and nature especially in the brecciated facies where the granulometry become smaller. It is recommended to test the benefit of the hyper spectral technology by building the library with the entire representative and available core.

22.3 Drilling

Below surface to 700 metres few drill holes crossed the inferred resources bottom line and demonstrated the continuity at depth of the mineralized zone at depth. An increasing of the REE mineral contain is visually observed and reported by the assays. With the actual drilling pattern, the geological property change, in the holes 2012-REE-033 and 2012-REE-034, may be considered local. Local grade variation can be observed in the well define upper level. Tighten the drilling mesh would confirmed the increasing grade with depth hypothesis or at leases confined the high grade zone.

More drilling will be necessary to upgrade resources into reserves. A 50m x 50m drilling mesh pattern could be tested. The underground access could provide an easy all year round access.

Item 23. References

Anders, E. and Grevesse, N. (1989), Abundances of the elements: Meteoritic and solar", Geochimica et Cosmochimica Acta 53, pages 197-214.

Belzile, E. (2009), NI43-101 Technical report for Niobec mine, Québec, Canada. 104 pages.

Birkett, T. C. and Simandl, G. J. (1999), Carbonatite-associated deposits: magmatic, replacement and residual. British Columbia Mineral Deposit Profiles, Volume 3

Bonneau, J. and Gauthier, A. (1979), Campagne de sondage, projet St-Honoré. GM 34947, 353 pages. 19 cartes. 11 microfiches.

Denis, T.C. (1937), Mines-minéraux de la région du Lac St-Jean et de Chibougamau. Ministère des ressources naturelles, 25 pages.

Dénommé, E., Villeneuve, D. (1986), Campagne de forages 1985, Zone à TR (Lanthanides). Complexe alcalin de St-Honoré. Niobec, Services TMG Inc., Forages-Rapport.

Dubuc, F. and Lambert, R. (1970), Relevé de scintillomètre, aéroporté, St-Honoré 11-782. SOQUEM, 4 pages, 2 plans.

Fortin, M. (1977), Le Complexe annulaire à carbonatites de St-Honoré (P.Q. Canada) et sa minéralisation à Niobium: Etude Pétrographique et géochimique. Thèse de 3ême cycle, Université Claude Bernard, Lyon, France.

Fournier, A. (1993), Magmatic and Hydrothermal Controls of LREE Mineralization of the St-Honoré Carbonatite, Québec. M.Sc Thesis, McGill University, Montréal, Québec, 147 pages.

Gauthier, A. and Landry, D. (1980), Campagne de sondage, projet St-Honoré. GM 36558, 101 pages. 15 cartes. 7 microfiches.

Gauthier, A. (1979). Étude minéralogique, pétrographique et géochimique de la zone à terres rares de la carbonatite de St.-Honoré. M.Sc. thesis, Université du Québec à Chicoutimi, Québec, Canada, 181 pages.

Gauthier, A. and Sergerie, G. (1978), Étude de la minéralisation de terres rares. GM 34953, 343 pages. 1 carte. 8 microfiches.

Gagnon, G. and Vallée, M. (1973), A summary of the St. Honoré columbium deposits. GM 28923, 60 pages. 6 cartes. 3 microfiches.

Gupta, C. K. and Krishnamurthy, N. (2005), Extractive Metallurgy of Rare earths, CRC Press, 508 pages.

Hardy, R. and Sauvé, P. (1968), Rapport géologique, projet St-Honoré 13-782. GM 24554, 21 pages. 1 carte. 1 microfiche.

Hébert, C. and Lacoste, P. (1998), Géologie de la région de Jonquière-Chicoutimi (22D/06). RG 96-08, 32 pages, 1 microfiche.

Jooste, R.F. (1958), Bourget area, Chicoutimi and Jonquiere-Kenogami electoral district. Ministère des ressources naturelles, 63 pages, 2 plans.

Kumarapeli, S. (1974), The St-lawrence valley system and its tectonic significance, Doctoral thesis, McGill University, 394 pages.

Lafleur, P.J. and Ben Ayad, A. (2012), NI43-101 technical report to present the mineral resources of the rares earth elements zone, Niobec min, Iamgold Corporation. P.J. Lafleur Geo-Conseil Inc, 145 pages.

Lambert, G. (2003), Compilation de levés géophysiques, propriété Niobec-St-Honoré (P.N. 163). Gérard Lambert Géosciences, 8 pages.

Laurin, A.F. and Sharma, K.N.M. (1975), Région des rivières Mistassini, Péribonka, Saguenay, (Grenville 1965-1967). Ministère des ressources naturelles, 97 pages, 10 plans.

Villeneuve, D and Thivierge, S. (2007), Réserves minières et ressources au 31 Décembre 2007. IAMGOLD Corporation, Mine Niobec, 78 pages

Rankin, A. H. (2004), Carbonatite-associated rare metal deposits: composition and evolution of ore-forming fluid – The fluid inclusion Evidence. In Linneh, R. L. and Samson, I. M., rare-element geochemistry and mineral deposits. Geological ass. of Canada, SC notes Vol 17. GAC, 299-314.

Roy, D.W. (1977), Excursion Géologique au Saguenay; camp de géologie régionale, géologie structurale et pétrographie. Université du Québec à Chicoutimi.

Samson, I. M. and al. (2004), The rare earth elements: behaviour in hydrothermal fluids and concentration in hydrothermal mineral deposits, exclusive of alkaline settings. in: LINNEN, R. L. and Samson, I. M. Rare ¬ element geochemistry and mineral deposits. Geological Association Of Canada Short Course Notes Volume 17, pages 269-298.

Services techniques, Iamgold corporation (2012), Étude de préfaisabilité, projet d'expansion de la Mine Niobec. 361 pages.

Taylor S. R. and McClennan S. M. (1985), The Continental Crust: Its Composition and Evolution. Blackwell, Oxford. 312 pages.

Thivierge, S., (2011), Niobec mine, St-Honoré, Québec, Canada, NI43-101 Technical report. 139 pages

Vallée, M. and al. (1969), Projet St-Honoré. GM 25865, 112 pages. 12 cartes. 4 microfiches.

Wall, F. and Mariano, A. N. (1996), Rare earth minerals in carbonatites: a discussion centre on the kangankunde carbonatite, Malawi. ln: Jones, A. P., Wall, F. and Williams, C. T., Rare earth minerals: chemistry, origin and ore deposits. Mineralogical Society Series 7. Chapman and Hall, London, pages 193-225.

Walters A. & co. (2010). British Geological Survey.

Woolley, A. R. and Kjarsgaard, B. A. (2008), Carbonatite occurrences of the world: map and database. Geological Survey of Canada, Open file report 5796.

Gupta, C. K. and Krishnamurthy, N. (2005), Extractive Metallurgy of Rare earths, CRC Press, pages 508.

Item 24. CERTIFICATE OF QUALIFICATION

CERTIFICATE OF QUALIFICATION

As an author of this report on a mineral property of Niobec inc. (Niobec Mine 100% owned by IAMGOLD CORPORATION) located at 3 400 chemin du Columbium, St-Honoré de Chicoutimi, Québec, G1V 1L0, I Louis Grenier, do hereby certify that :

1. I reside at 88 4E Chemin Lac Brochet, Saint-David-de-Falardeau, province of Québec, Canada, G0V 1C0
2. I am registered professional geologist, member in good standing of Ordre des Géologues du Québec, (OGQ #800);
3. I graduated from the Université Laval, Quebec city, in 2003 and have a Bachelor's degree in Geology;
4. I have practiced my profession as geologist in, mineral exploration and mineral production over the last 10 years.
5. I have been working for Virginia Mines from 2004 and 2012 as an exploration and project geologist.
6. As a surface exploration geologist since March 2012, I am a full–time employee of Iamgold-Niobec (Iamgold/Niobec, Quebec, Canada) and I own shares of IAMGOLD CORPORATIONS;
7. I have been in charge since 2012 of the drilling campaigns and involved in resources calculation of the Iamgold Rare-Earth project.
8. I am not aware of any new information on events occurring subsequent to February 22nd, 2013 that could have a material effect on the resource estimates presented in this Document.

Prepared in St-Honoré-de-Chicoutimi, this 22nd day of February 2013,

2013-02-22

GÉOLOGUE * LOUIS GRENIER # 800 * QUÉBEC

Louis Grenier, geo. (OGQ, #800)
Exploration Geologist
Niobec inc. (IAMGOLD)

CERTIFICATE OF QUALIFICATION

As an author of this report on a mineral property of Niobec inc. (Niobec Mine 100% owned by IAMGOLD CORPORATION) located at 3 400 chemin du Columbium, St-Honoré de Chicoutimi, Québec, G1V 1L0, I Jean-Francois Tremblay, do hereby certify that :

1. I reside at 2972, St-Etienne, in city of Jonquière, province of Québec, Canada, G7S 1H6
2. I am registered professional geologist, member in good standing of Ordre des Géologues du Québec, (OGQ #958);
3. I graduated from the Université du Québec à Chicoutimi in 1999 and have a Bachelor's degree in Geology;
4. I have practiced my profession as geologist in, mineral exploration, environment and mineral production over the last 12 years.
5. I have been working for Falconbridge/Xstrata Nickel From 2000 and 2001 and from 2004 to 2009) as a project geologist and production geologist on different Canadian geological environment;
6. As a Senior Geologist since March 2010, I am a full–time employee of Niobec mine (Iamgold/Niobec, Quebec, Canada) and I own shares of IAMGOLD CORPORATIONS;
7. I have been involved in the last tree (3) reserves and resources Estimation for Niobium type mineralization with different mining method.
8. I have been in charge since 2011 of drilling campaigns and involved in resources calculation of the IAMGOLD Rare-Earth project.
9. I am not aware of any new information on events occurring subsequent to February 22nd, 2013 that could have a material effect on the resource estimates presented in this Document.

Prepared in St-Honoré-de-Chicoutimi, this 22nd day of February 2013,

2013/02/22

Jean-Francois Tremblay, geo. (OGQ, #958)
Senior Geologist
Niobec inc. (IAMGOLD)

CERTIFICATE OF QUALIFICATION

I, Réjean Sirois, *Vice President, Geology and Resources*, at G Mining Services Inc., 1950 Blvd Taschereau, D Building, Suite 200, Brossard, Québec J4X 1C2, hereby certify that:

1. I am a registered member of Ordre des Ingénieurs du Québec, # 38754;
2. I am a member of the Prospectors & Developers Association of Canada, # 14892;
3. I graduated from the Université du Québec à Chicoutimi in 1983 and have a Bachelor's degree in Geological Engineering;
4. I have practiced as a geological engineer since my graduation in exploration and mine geology. Over the last 27 years, I have completed numerous resource estimates for gold, silver, base metals and industrial minerals;
5. I have been working for G Mining Services Inc. since September 2012 as Vice President, Geology and Resources. I have worked for Cambior/IAMGOLD for 25 years as senior geologist, chief geologist, geology superintendent, mine manager and as Manager – Mining Geology;
6. I have visited all IAMGOLD`s projects and mines and I have a good understanding of their geological environment;
7. Denis Miville-Deschenes (SVP, Project Development) gave me the following mandate:
   a) Assessment of the various QPs (member of professional association recognized by NI 43-101 and pertinent experience in resource or reserve estimation);
   b) Assessment of the Mineral Resource & Mineral Reserve "MRMR" from each mine or project as December 31st, 2012;
   c) Make appropriate validation and checks to insure that the MRMR are in line with the CIM standard definitions for Resource and Reserve reporting and can be reproducible.
   d) Validate all the process and assumptions used for resource and reserve estimations and reporting.
   e) Prepare the corporate MRMR statements, the year-end report and sign-off on the IAMGOLD MRMR.
8. At the date of this certificate, to the best of my knowledge, the report entitled: "NI 43-101 Technical report, Surface diamond drilling exploration program for rare earth elements, 2012 NIOBEC MINE PROPERTY", dated March 18th , 2013 contains all the necessary information that is required to be disclosed to make the reports not misleading.
9. I am a "Qualified Person" according to the NI 43-101 definition;
10. I am independent of IAMGOLD Corporation as set out in Section 1.5 of National Instrument 43-101.
11. I am a full-time employee of G Mining Services Inc. and do not own shares of IAMGOLD CORPORATION.

Effective on this 18th Day of March 2013

/s/ R Sirois, ing.

Réjean Sirois, Ing.
Vice President, Geology and Resources
G Mining Services Inc.

Item 25. Additional Requirement for Technical Reports on Development Properties and Production Properties

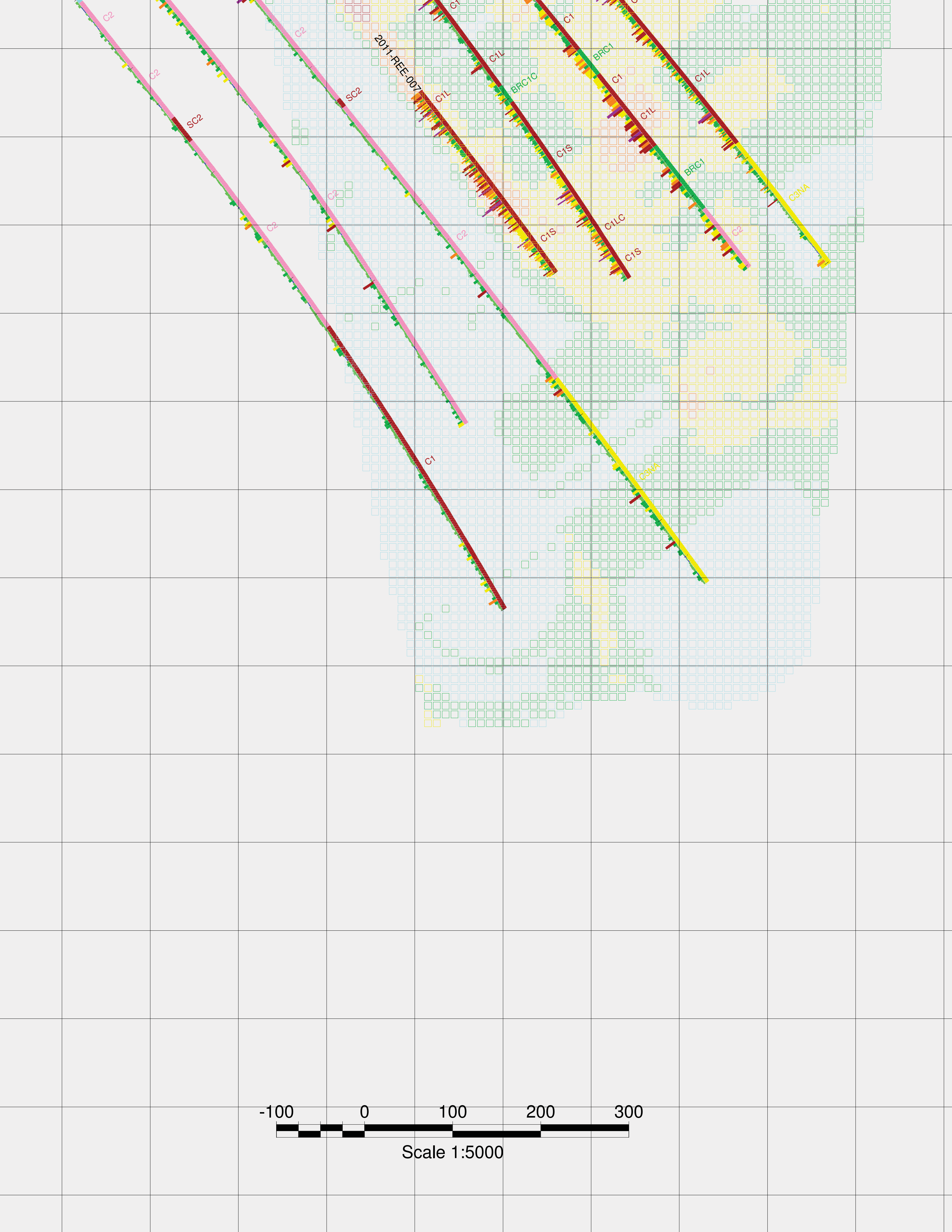
There is no additional requirement for this technical reports.

Item 26. Illustrations

The Illustrations are included in the text.

Item 27. APPENDIX

Appendix 1: Main section view and plan view, REE zone 2012.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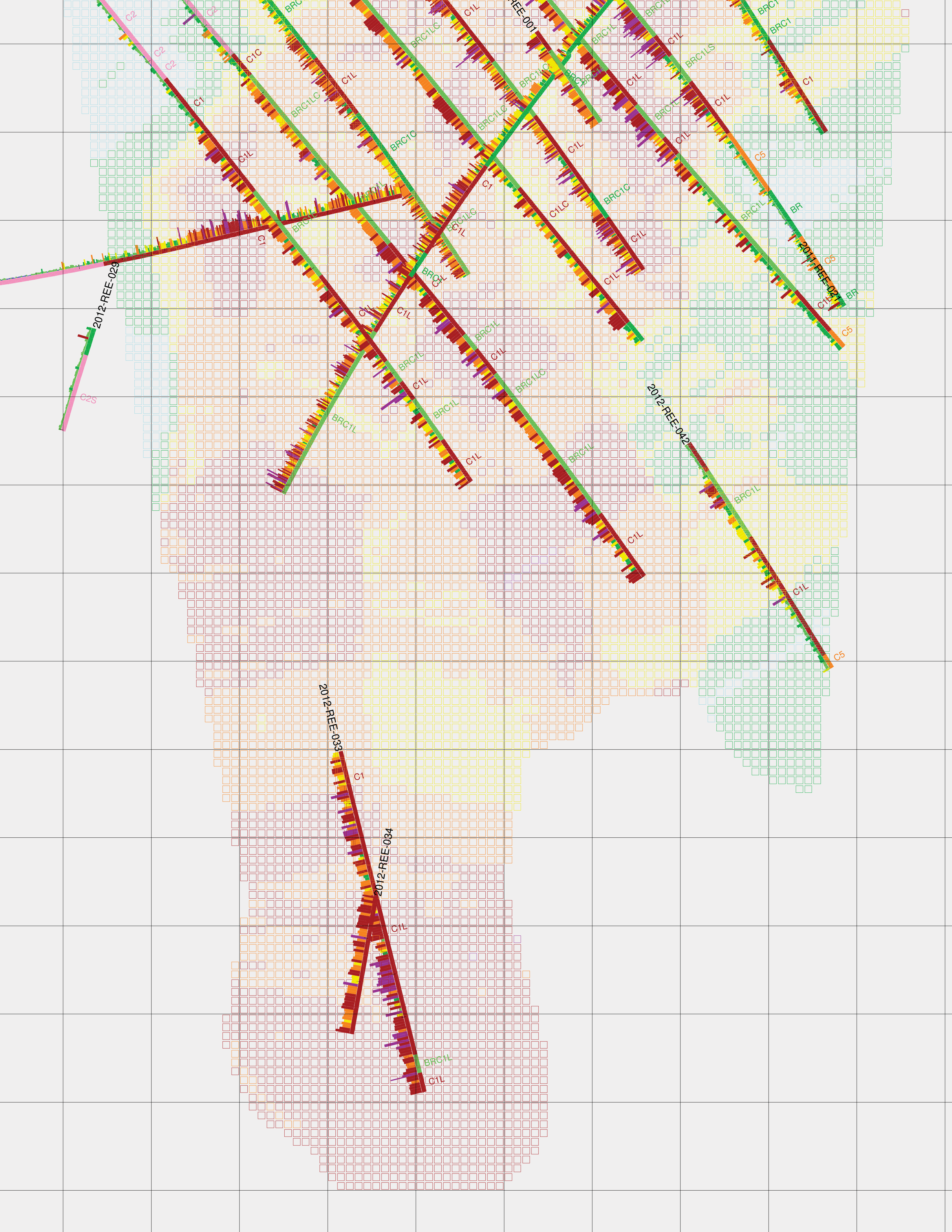

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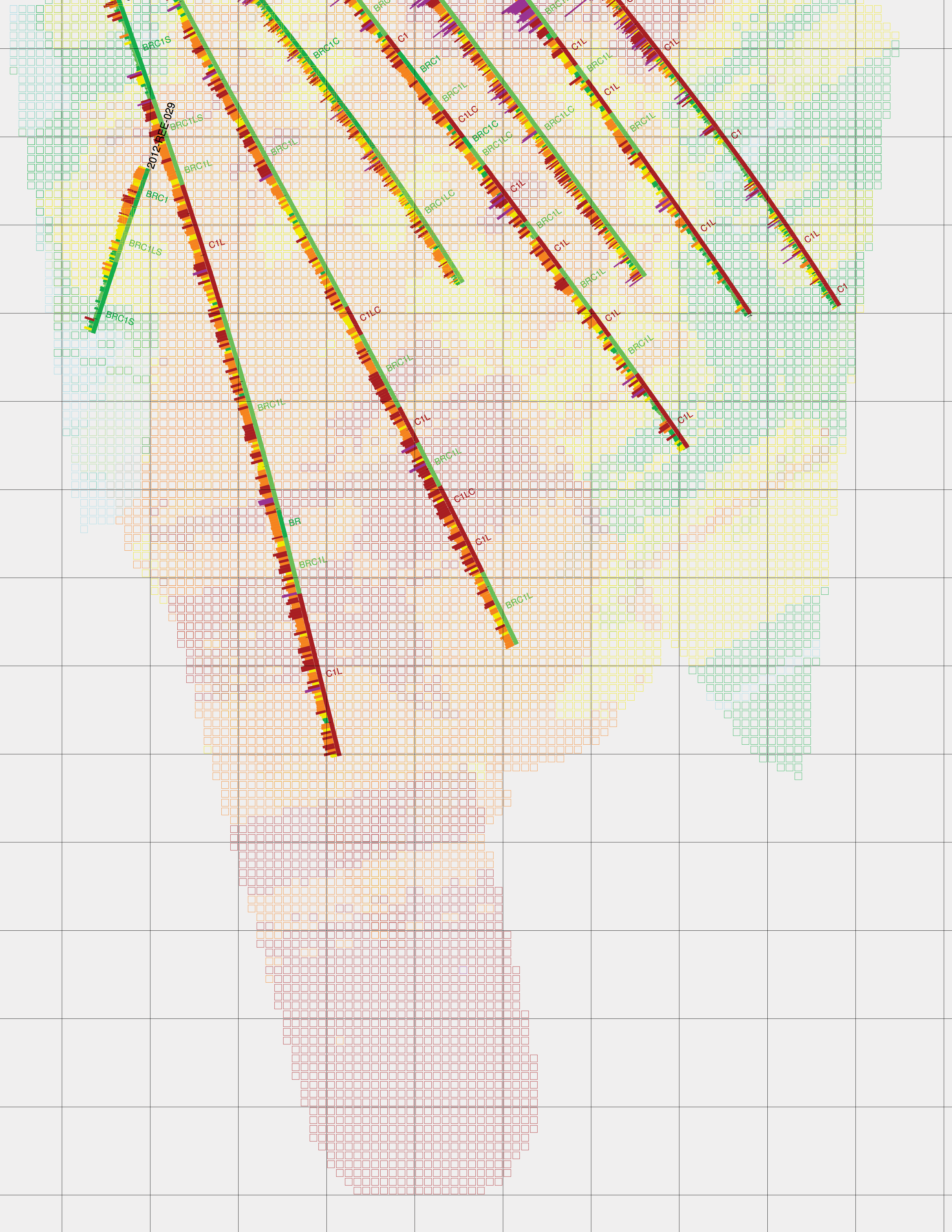

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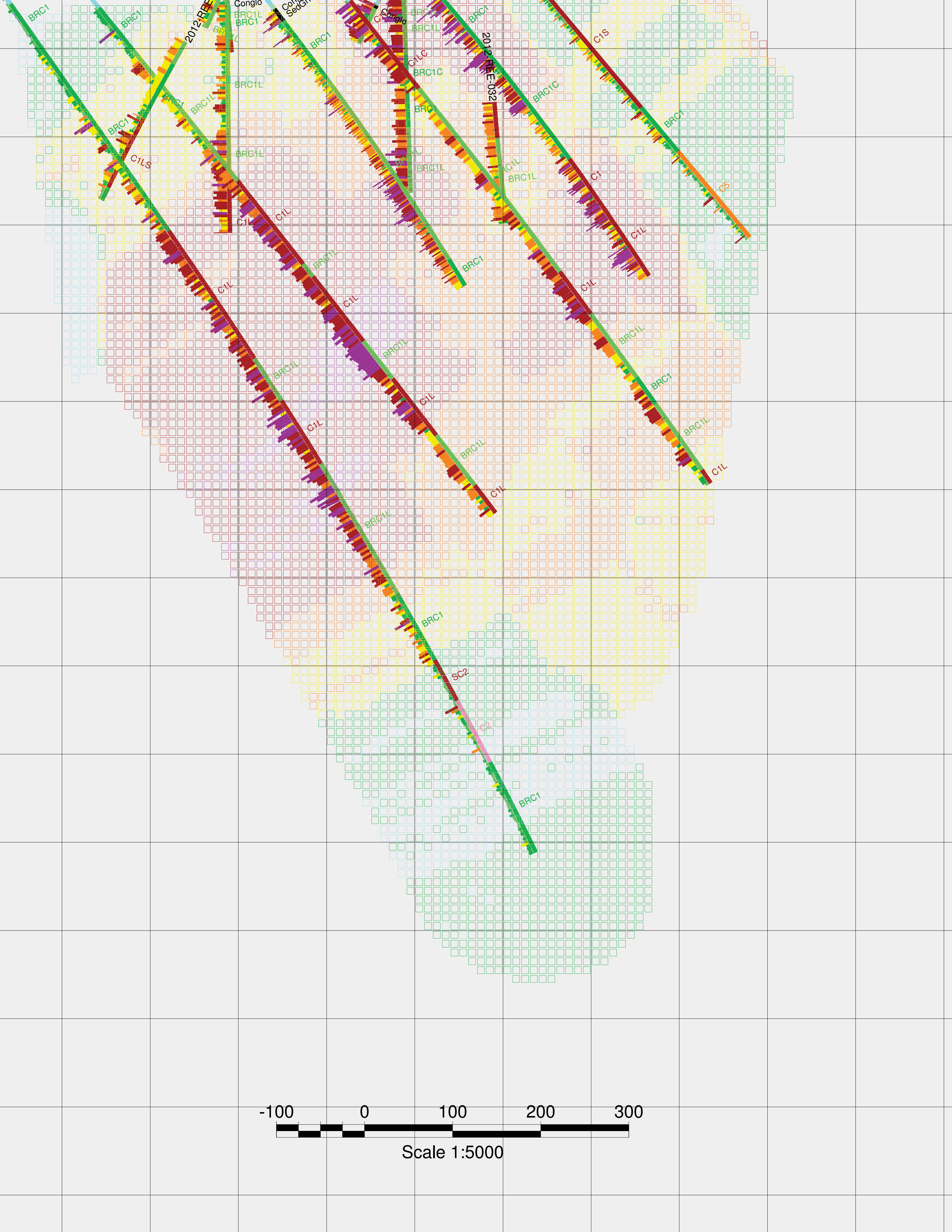

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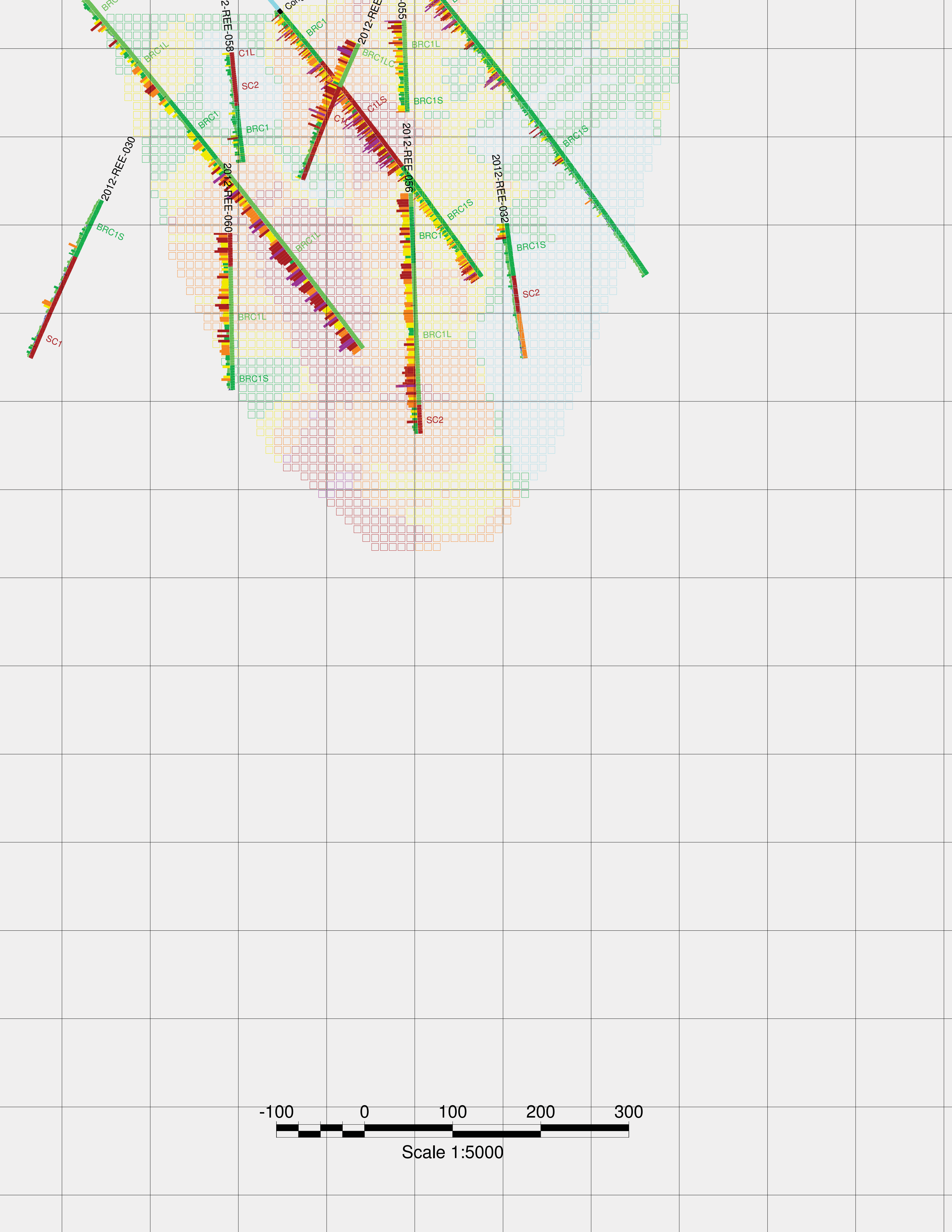

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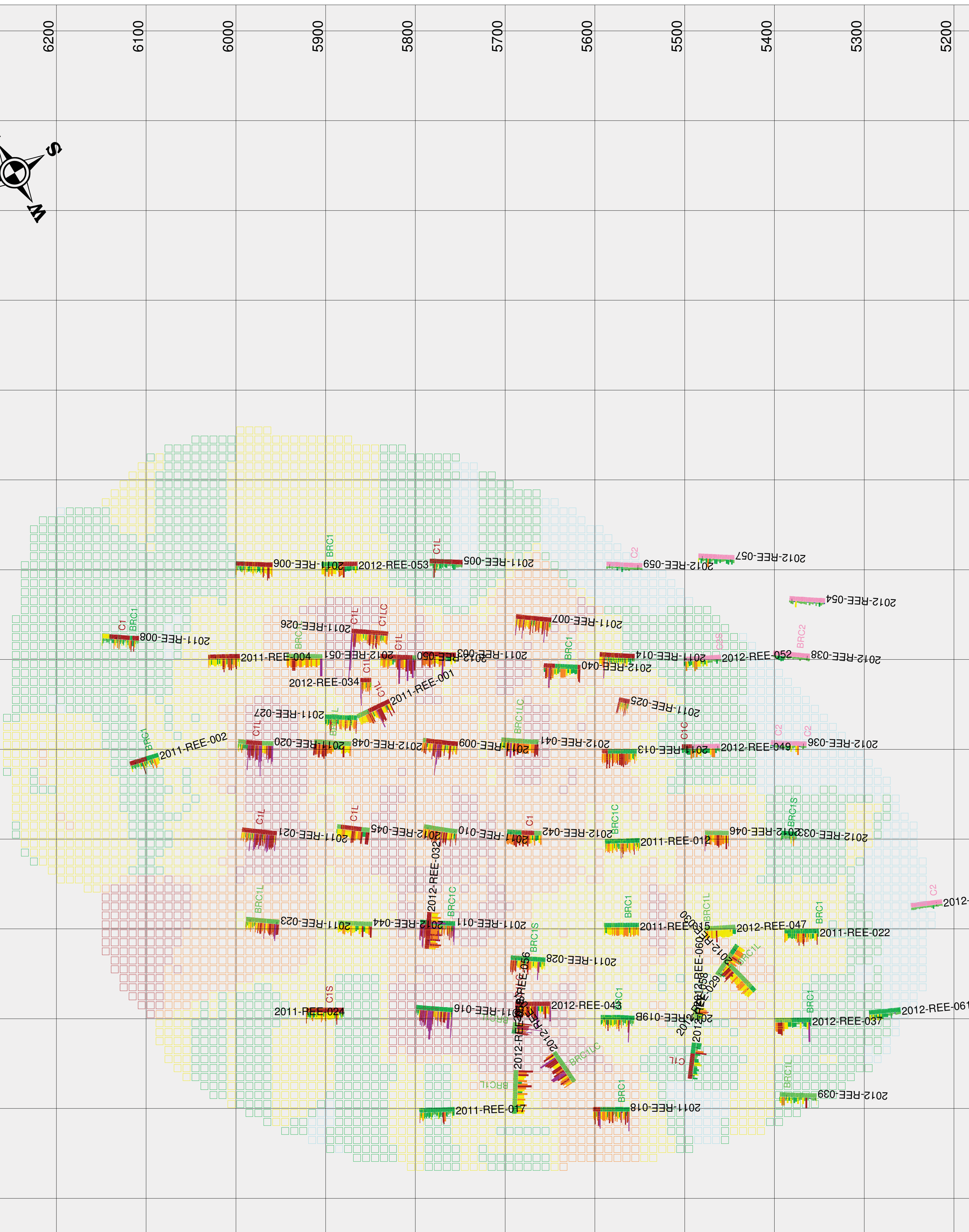

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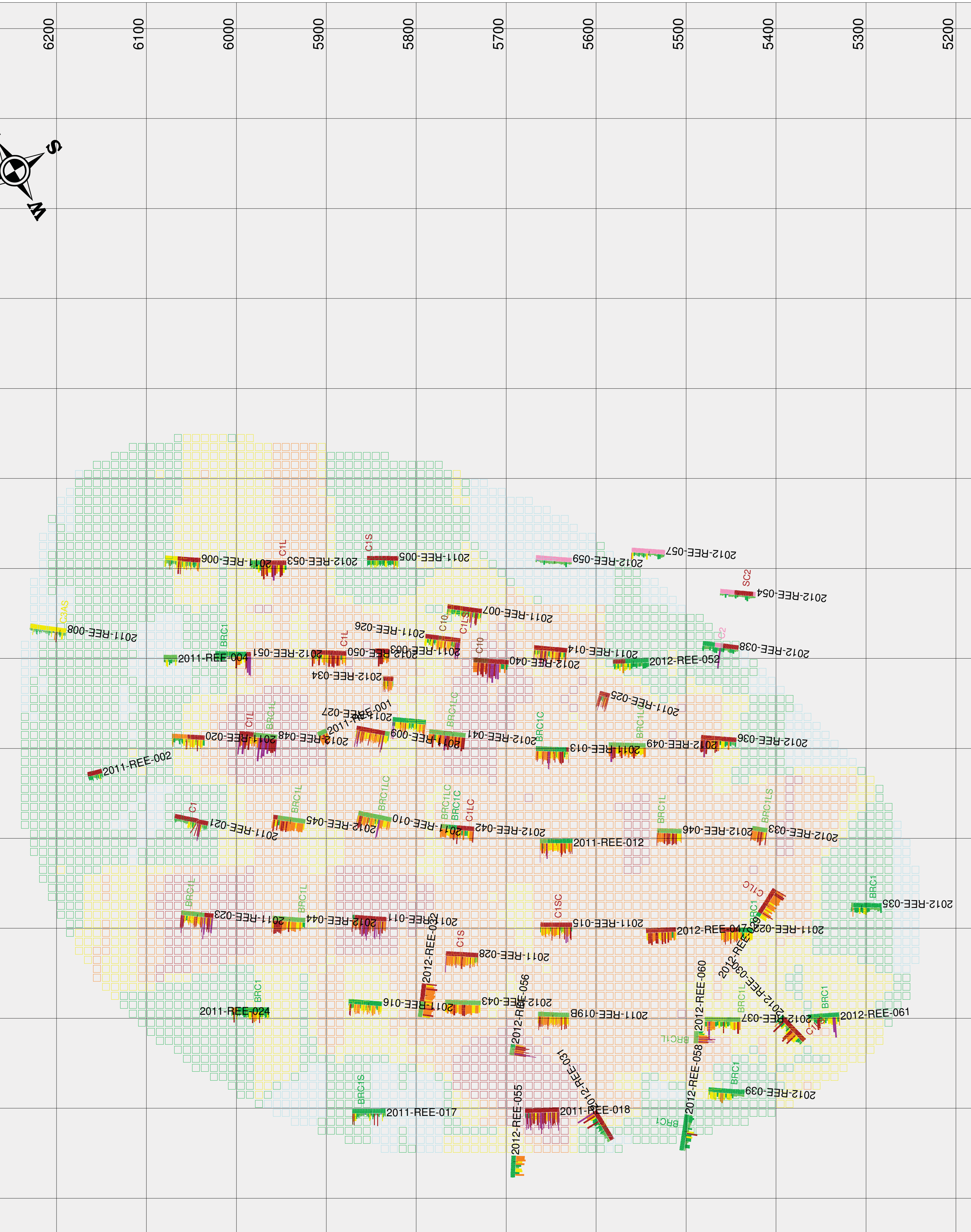

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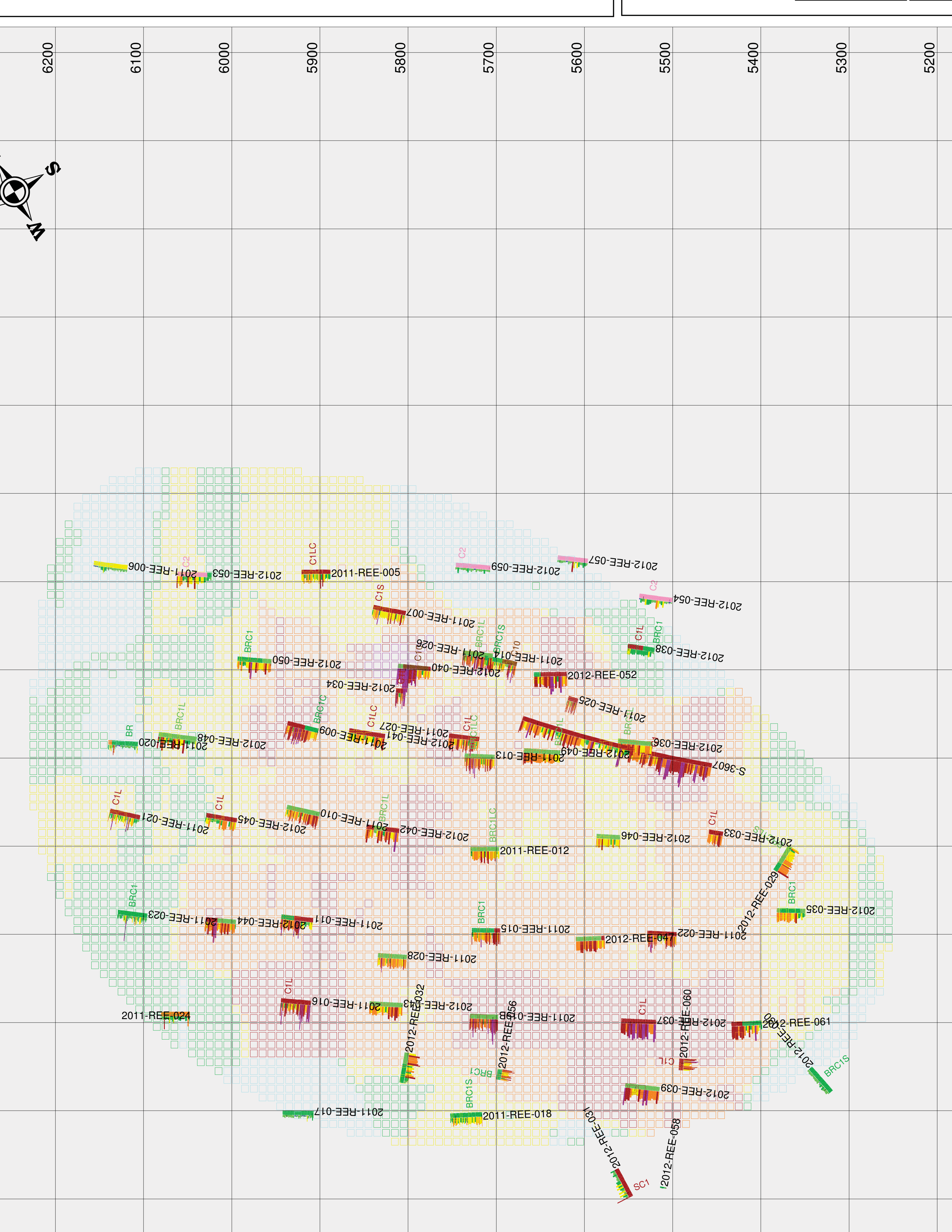

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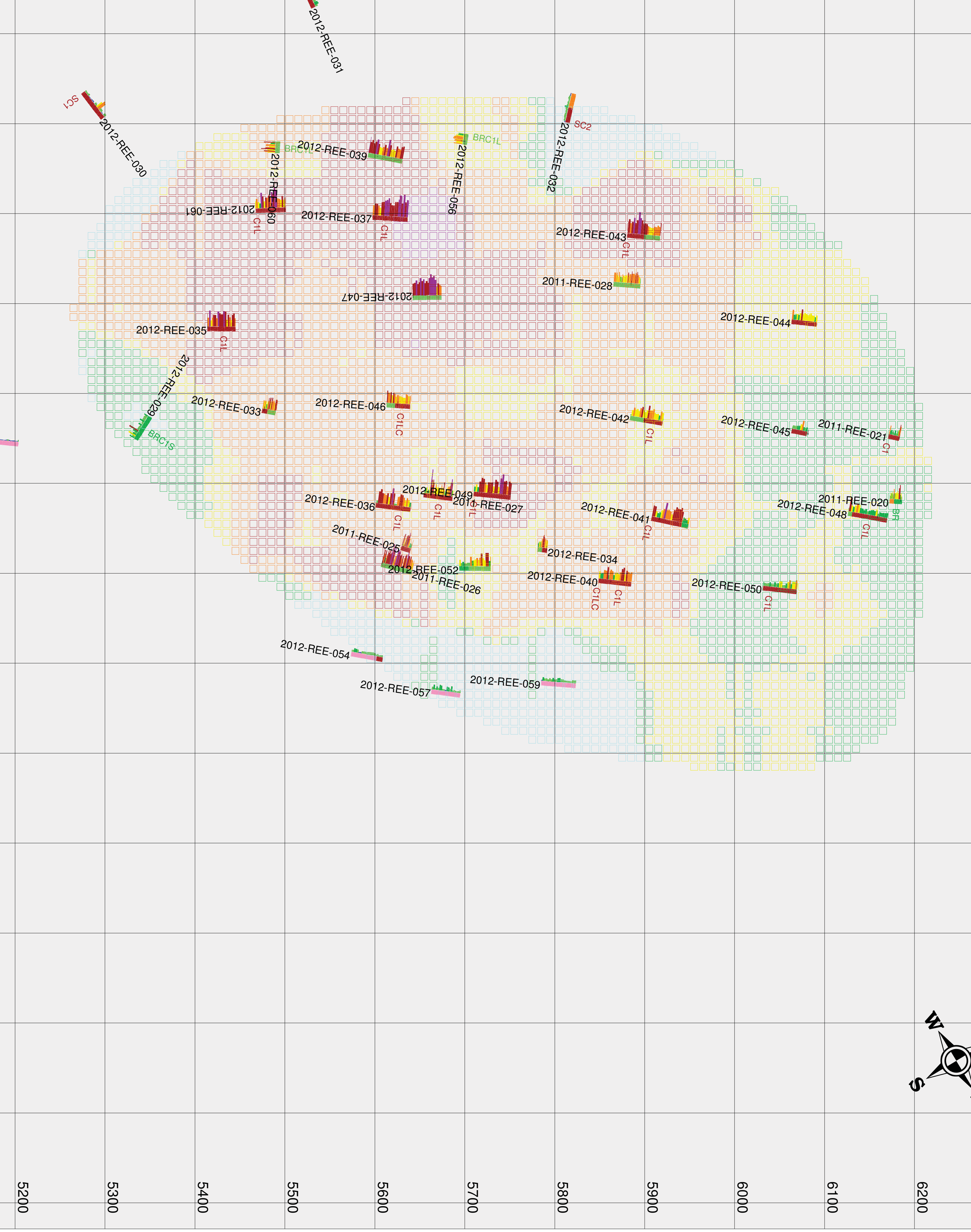

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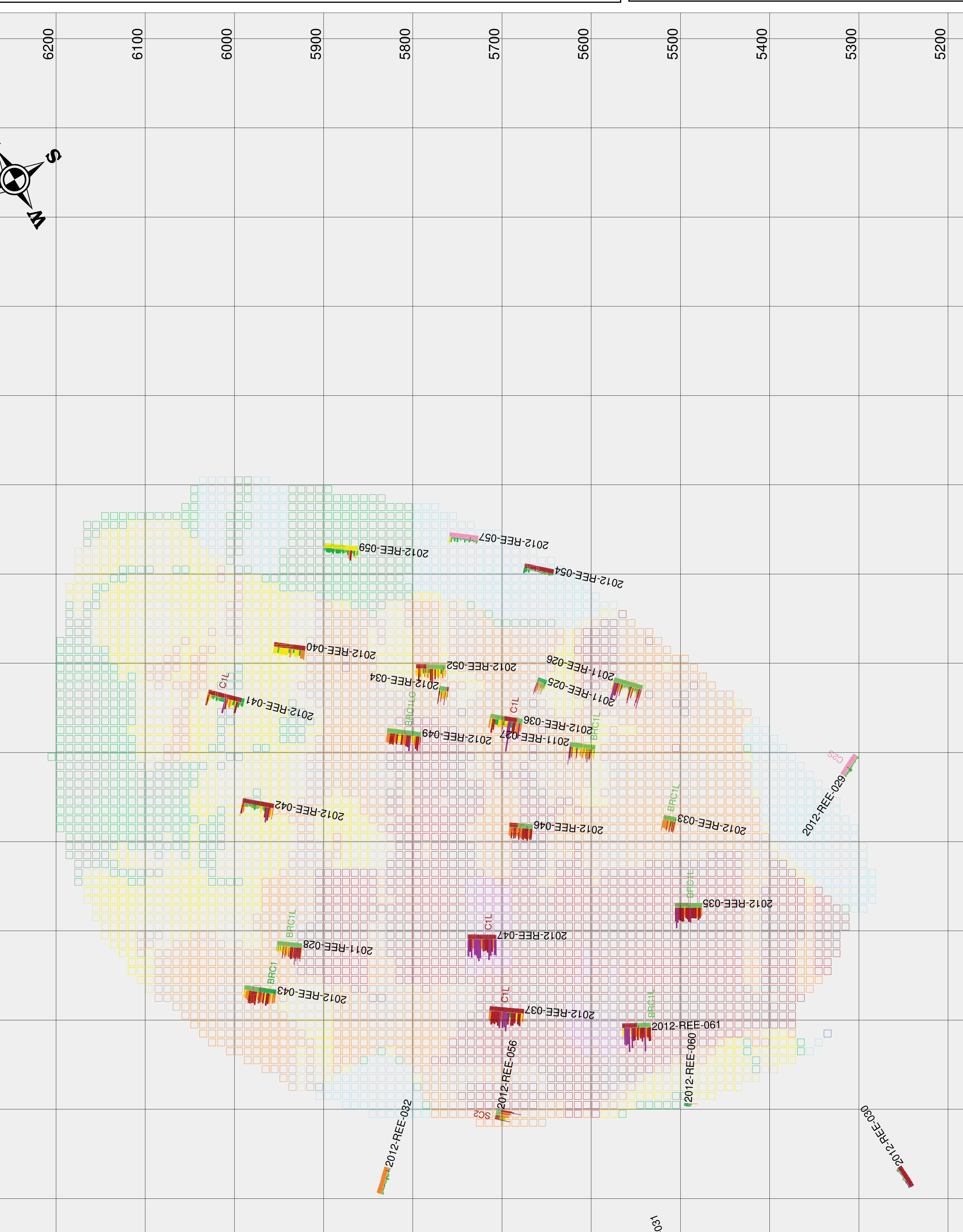

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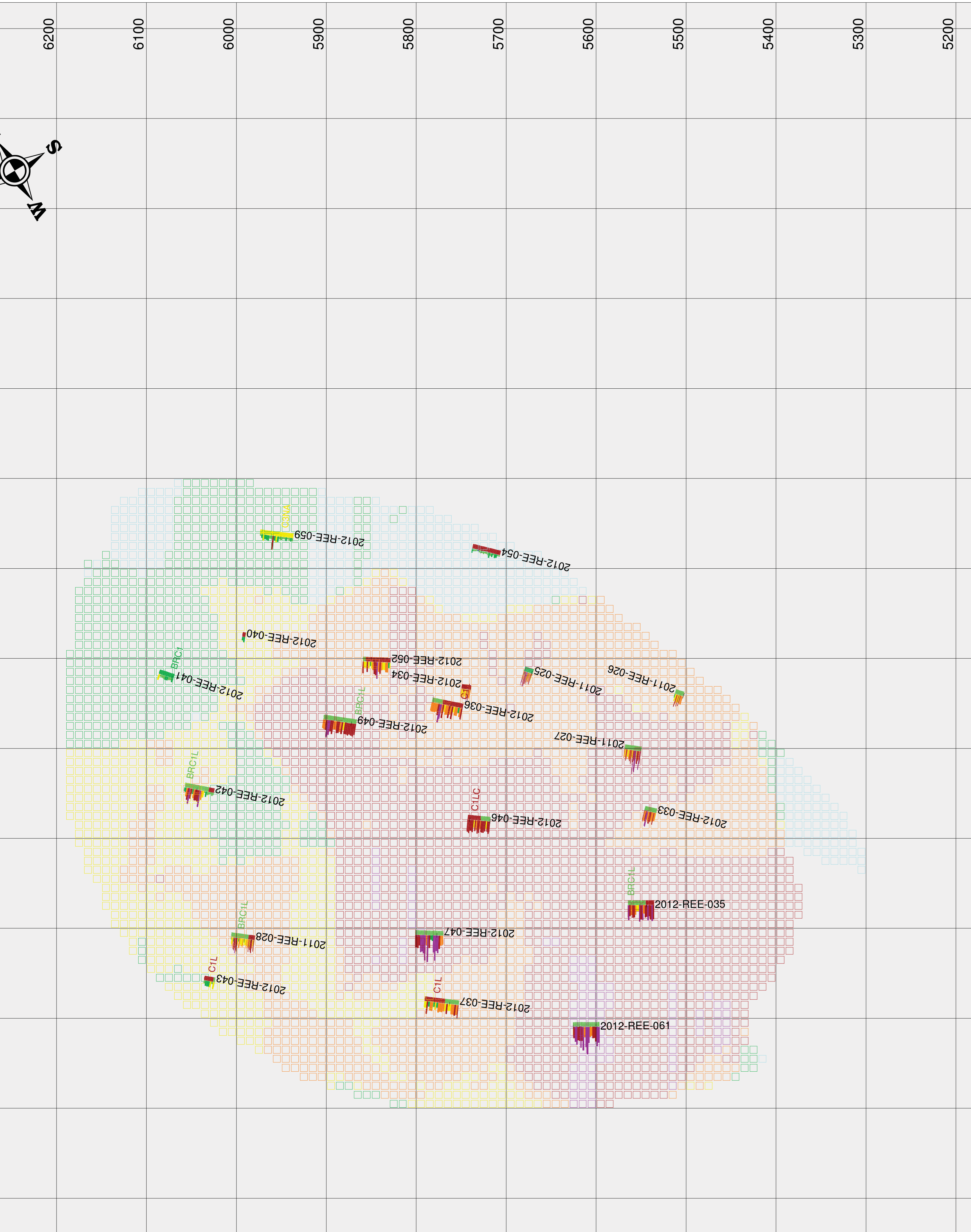

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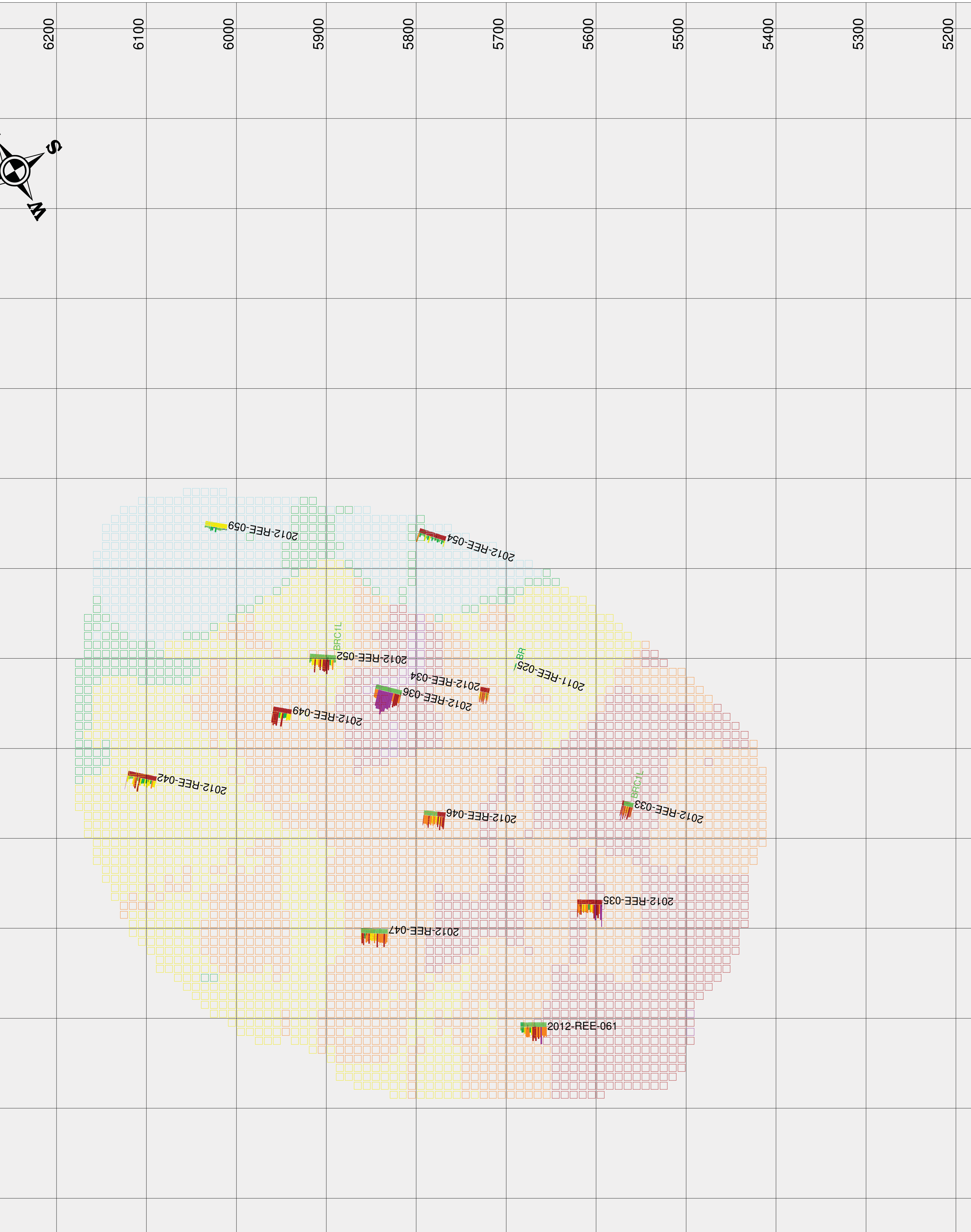

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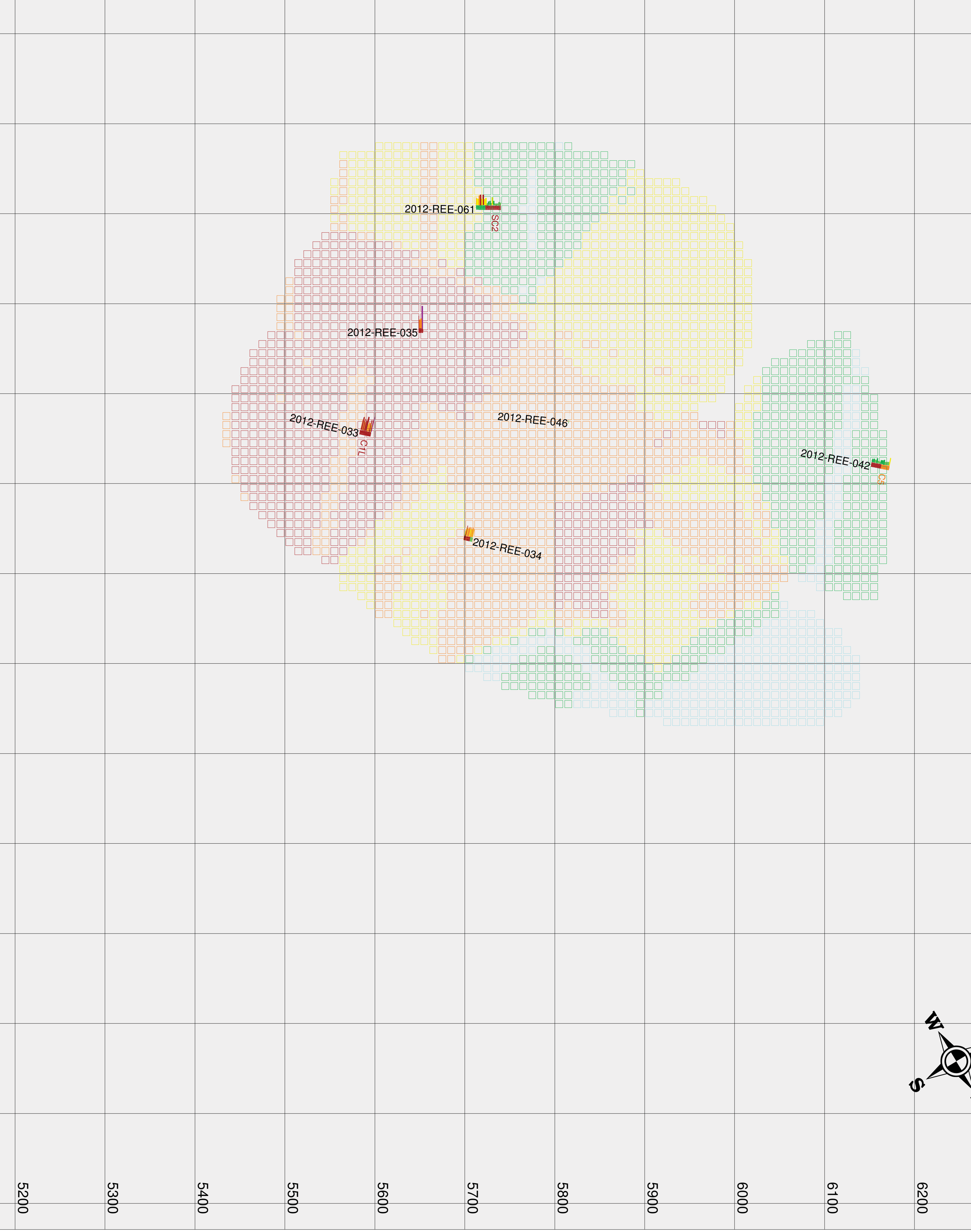

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Appendix 2: Reporting checklist

1.0 - Reporting Criteria for Sampling Techniques and Data

Item	Criteria	Essential Reporting Queries	Reserve Reporting Standards Reference	Sign Off/Comment
1.1	Sampling Techniques	Has the nature and quality of sampling (e.g. cut channels, random chips, etc) and measures taken to ensure sample representativeness been noted?	CIM- (43-101-Item 14) JORC- (Sect A: Criteria 1) SAMREC- (Sect A: Criteria 4) SME- (Criteria B.3)	Yes, Item 13 and 14, LG, JFT
1.2	Drilling Techniques	Has the drill type used (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka etc.) and the details of this drilling (e.g. core diameter, triple or standard tube, depth of diamond tails, face sampling bit or other type, whether core is oriented and if so, by what method, etc.) been specified?	CIM-(43-101-Items 13& 14) JORC- (Sect A: Criteria 2) SAMREC- (Sect A: Criteria 1) SME- (Criteria B.3)	Yes, Item 13 LG, JFT
1.3	Drill Sample Recovery	Were the core and chip sample recoveries properly recorded and results assessed?	CIM-(43-101-Item 14) JORC- (Sect A: Criteria 3) SAMREC- (Sect A: Criteria 3) SME- (Criteria B.3)	Yes, Item 14, the recovery is recorded in Gemcom databases and all the core is photographed LG, JFT
		Were measures taken to maximize sample recovery and ensure representative nature of the samples?		Yes, Item 13 and 14, the sample recovery is cheked during the drilling and logging LG, JFT
		Is there a relationship between sample recovery and grade and has sample bias occurred due to preferential loss/gain of fine/coarse material?		The recovery is excellent and there is no relationship between sample recovery and the REE grade. LG, JFT
1.4	Logging	Have core and chip samples been logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies?	CIM-(43-101-Item 14)	Yes, Item 14, complete logging information are recorded in Gemcom databases

			JORC- (Sect A: Criteria 4)	LG, JFT
		Is logging qualitative or quantitative in nature? Is there systematic core (or costean, channel, etc.) photography?	SAMREC- (Sect A: Criteria 2) SME-(Criteria B.3)	Yes, Item14, the logging is qualitative (geological unit) and quantitative (mineralization, alteration, structures). The core is photographed and stored in special folders on the computer. The core photos are linked with the Accces database into Gems LG, JFT
1.5	Sub-sampling techniques and sample preparation	If core, has it been cut or sawn and was it done in quarters, halves or was all core taken?	CIM-(43-101-Item 15) JORC- (Sect A: Criteria 5) SAMREC- Sect A: Criteria 5) SME-(Criteria B.3)	Yes, Item 14, core is systematically sawed in halves (one sent for assaying the other kept for reference material or metallurgical testing). LG, JFT
		If non-core, has it been riffled, tube sampled, rotary split, etc, and was it sampled wet or dry.		N/A LG, JFT
		Were the nature, quality and appropriateness of the sample preparation technique consistent for all sample types?		Yes, Item 14, LG, JFT
		Were quality control procedures adopted for all sub-sampling stages to maximize representativeness of samples?		Yes, Item 14-15 and 16 LG, JFT
		Were measures taken to ensure that the sampling is representative of the in situ material collected?		Yes, paragraph 11 to 13 JFT
		Were sample sizes appropriate to the grain size of the material being sampled?		Yes LG, JFT
1.6	Quality of assay data and laboratory tests	Has the nature, quality and appropriateness of the assaying and laboratory procedures used been noted along with whether the technique used is considered partial or total.	CIM-(43-101-Item 15) JORC- (Sect A: Criteria 6)	Yes, Item15 LG, JFT

		Were the nature of the quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) of acceptable levels of accuracy (i.e. lack of bias) and precision?	SAMREC-(Sect A: Criteria 6) SME-(Criteria B.3)	Yes, Item 14-15 and 16 LG, JFT
1.7	Verification of sampling and assaying	Was there verification of significant intersections by either independent or alternative company personnel?	CIM- (43-101-Item 16) JORC- (Sect A: Criteria 7)	No LG, JFT
		Was there any use of twinned holes?	SAMREC-(Sect A: Criteria 7) SME-(Criteria B.3)	No LG, JFT
1.8	Location of data points	Were accurate and quality surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation? (Includes the quality and adequacy of topographic control.)	CIM-(43-101-Item 12) JORC- (Sect A: Criteria 8) SAMREC-(Sect A: Criteria 8) SME-(Criteria B.2)	Yes, Item 13, the topography surveys and drillhole collars are executed by surveyors. Surveys (Reflex) are performed by the dillng contractor and controlled by the Geology Department. LG, JFT
1.9	Data spacing and distribution	Has the data spacing of exploration results been denoted?	CIM- (43-101-Item 14) JORC- (Sect A: Criteria 9)	Yes, Item, 13, LG, JFT
		Is the data spacing and distribution sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied?	SAMREC-(Sect B: Criteria 9) SME-(Criteria B.2)	Yes, Item 13 and 19 LG, JFT
		Has sample compositing been applied?		Yes, Item 19 LG, JFT
1.10	Orientation of data in relation to geological structure	Does the orientation of sampling achieve unbiased sampling of possible structures and has the extent to which this is known been denoted (considering the deposit type)?	CIM- (43-101-Items 13&14) JORC- (Sect A: Criteria 10)	Yes, Item9-13 and 19, the data collect respect the homogenety of the ore body. LG, JFT
		[If the relationship between the drilling orientation and the orientation of key mineralized structures is considered to have introduced a sampling bias, this should be assessed and reported if material.]	SAMREC-(Sect B: Criteria 5) SME-(Criteria B.2)	No LG, JFT

1.11	Audits or Reviews	Are there results of any audits or reviews of sampling techniques and data?	CIM- (43-101-Items 13&14) JORC- (Sect A: Criteria 11) SAMREC-(Sect A: Criteria 9) SME-(Criteria B.1, B.3 & H)	No LG, JFT
		Can the date of the last independent audit be specified?		No LG, JFT

2.0 - Reporting of Exploration Results

Item	Criteria	Essential Reporting Queries	Reserve Reporting Standards Reference	Sign Off/Comment
2.1	Mineral tenement and land tenure status.	Has the type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings been noted?	CIM- (43-101-Item 6) JORC- (Sect B: Criteria 1) SAMREC-(Sect B: Criteria 1) SME-(Criteria A.3 & A.4)	Yes, Item 6, LG, JFT
		Was security of the tenure held at the time of reporting along with any known impediments to obtaining a license to operate in the area noted?		N/A LG, JFT
2.2	Exploration done by other parties	Was there any exploration done by other parties and if so, has it been acknowledged or appraised?	CIM- (43-101-Item 8) JORC- (Sect B: Criteria 2) SAMREC-(Sect B: Criteria 2,9 &10) SME-(Criteria A.2)	No, Item 8-12 and 13 LG, JFT
2.3	Geology	Has the deposit type, geological setting and style of mineralization been denoted?	CIM- (43-101-Items 7, 9, 10, 11& 17)) JORC- (Sect B: Criteria 3) SAMREC-(Sect B: Criteria 3) SME-(Criteria B.2)	Yes, Item 9 and 10 LG, JFT
2.4	Data aggregation methods	Have weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades been stated?	CIM- (43-101-Items 14, 15 & 19) JORC- (Sect B: Criteria 4)	Yes, Item 19 LG, JFT

		Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, has the procedure used for the aggregation of intercepts been stated and have some typical examples of such aggregations been provided?	SAMREC-(Sect B: Criteria 4)	Yes, Item 13 LG, JFT
		Were any metal equivalent values reported?	SME-(Criteria B.3)	Yes, Item 19, LG, JFT
2.5	Relationship between mineralization widths and intercept lengths	Is the geometry of the mineralization with respect to the drill hole angle known? (If it is not known and only the down-hole lengths are reported, there should be a clear statement to this effect.)	CIM- (43-101-Items 13&14) JORC- (Sect B: Criteria 5) SAMREC-(Sect B: Criteria 5) SME-(Criteria B.2 & C.1)	Yes, Item 13, test hole defined the circular shape of the REE zone, LG, JFT
2.6	Diagrams	Is the information being reported considered material, If so, are maps and sections (with scales) and tabulations of intercepts included to clarify the report?	CIM- (43-101-Item 26) JORC- (Sect B: Criteria 6) SAMREC-(Sect B: Criteria 6) SME-(Criteria C.1)	Yes, in the report and a complet section-plan view in annexed, LG, JFT
2.7	Balanced reporting	Where comprehensive reporting of all Exploration Results is not practicable, has the reporting been representative of both low and high grades and/or widths to avoid misleading reporting of the Exploration Results?	CIM- (43-101-Items 12&14) JORC- (Sect B: Criteria 7) SAMREC-(Sect B: Criteria 7) SME-(Criteria F.)	Yes, Item 12 and 13, LG, JFT
2.8	Other substantive exploration data	Have all other meaningful and material data been reported? [Including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.]	CIM- (43-101-Item 20)	Yes, Item 12 and 19,

			JORC- (Sect B: Criteria 8) SAMREC-(Sect B: Criteria 8) SME-(Criteria G)	LG, JFT
2.9	Further Work	Is the nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling) known? Has it been reported?	CIM- (43-101-Item 22) JORC- (Sect B: Criteria 9) SAMREC-(Sect B: Criteria 11) SME-(Criteria.)	Yes, Item 22 LG, JFT

3.0 - Criteria for the Estimation and Reporting of Mineral Resources

Item	Criteria	Essential Reporting Queries	Reserve Reporting Standards Reference	Sign Off/Comment
3.1	Database integrity	Were measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes?	CIM- (43-101-Items 15&16) JORC- (Sect C: Criteria 1)	Yes, Item 14-15 and 16, LG, JFT
		Were data validation procedures used?	SAMREC-(Sect C: Criteria 1) SME-(Criteria B.3)	Yes, Item 16 LG, JFT
3.2	Geological interpretation	Has the level of confidence in (or conversely, the uncertainty of) the geological interpretation of the deposit been denoted?	CIM- (43-101-Items 10,11 & 21) JORC- (Sect C: Criteria 2) SAMREC-(Sect C: Criteria 2) SME-(Criteria C.1)	Yes, Item 16-19 and 21 LG, JFT
		Has the nature of the data used, and any assumptions, been documented?		Yes, In several places in the report JFT
		Is there an effect, if any, of alternative interpretations on Mineral Resource estimation?		Yes, Item 19 and 21, LG, JFT
		Was geology used in guiding and controlling Mineral Resource estimation?		Yes, Item 19, LG, JFT
		Were there any factors affecting continuity both of grade and geology?		No, LG, JFT
3.3	Dimensions	Was the extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the	CIM- (43-101-Item 11) JORC- (Sect C: Criteria 3)	Yes, Item 9-11-19 and 21, LG, JFT

		Mineral Resource?	SAMREC-(Sect C: Criteria 3) SME-(Criteria C.1)	
3.4	Estimation and modeling techniques	Was the nature and appropriateness of the estimation technique(s) applied reported? (Includes any assumptions regarding the treatment of extreme grade values, domains, interpolation parameters, and the maximum distance of extrapolation from data points.)	CIM- (43-101-Item 19) JORC- (Sect C: Criteria 4) SAMREC-(Sect C: Criteria 3) SME-(Criteria C.1 & C.2)	Yes, Item 19, LG, JFT
		Were check estimates, previous estimates and/or mine production records available and does the Mineral Resource estimate take account of such data?		Yes, Item 19 and 21, previous estimate was used to compare, LG, JFT
		Were there assumptions made regarding recovery of by-products?		No, LG, JFT
		Have any deleterious elements or other non-grade variables of economic significance been estimated (e.g. sulphur for acid mine drainage characterization)?		No, LG
		In the case of block model interpolation, have the block size in relation to the average sample spacing and the search been denoted?		No, LG
		Were any assumptions made regarding modeling of selective mining units?		No, LG
		Were any assumptions made about correlation between variables?		No LG
		Have the processes used for validation, checking, and comparison of the model data to drill-hole data been reported? Did the validation process include any use of reconciliation data?		No, LG
3.5	Moisture	Were the tonnages estimated on a dry basis or with natural moisture, and has the method of determination of the moisture content been denoted?	CIM- (43-101-Item 19) JORC- (Sect C: Criteria 5) SAMREC-(Sect C: Criteria 3) SME-(Criteria C.1)	Yes, dry basis, Item 19, JFT
3.6	Cut-off parameters	Has the basis of the adopted cut-off grade(s) and/or the quality parameters applied been detailed?	CIM- (43-101-Item 19) JORC- (Sect C: Criteria 4) SAMREC-(Sect C: Criteria4) SME-(Criteria C.2)	Yes, Item 19, LG, JFT

3.7	Mining factors or assumptions	Were any assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution? [It may not always be possible to make assumptions regarding mining methods and parameters when estimating Mineral Resources. Where no assumptions have been made, this should be reported.]	CIM- (43-101-Item 25) JORC- (Sect C: Criteria 7) SAMREC-(Sect C: Criteria 5) SME-(Criteria D)	No, LG, JFT
3.8	Metallurgical factors or assumptions	Were the sources for assumptions or predictions regarding metallurgical amenability clearly stated? [It may not always be possible to make assumptions regarding metallurgical treatment processes and parameters when reporting Mineral Resources. Where no assumptions have been made, this should be reported.]	CIM- (43-101-Item 18) JORC- (Sect C: Criteria 8) SAMREC-(Sect C: Criteria 6) SME-(Criteria D)	Yes, Item 18, Predictions were made from ungoing metallurgical tests, LG, JFT
3.9	Bulk density	If assumed, were the sources for bulk density assumptions clearly stated? If determined, was the method used clearly stated (e.g. whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples)?	CIM- (43-101-Item 14) JORC- (Sect C: Criteria 9) SAMREC-(Sect C: Criteria 7) SME-(Criteria B.3)	Yes, Item 19 LG, JFT
3.10	Classification	Was the basis for the classification of the Mineral Resources into varying confidence categories denoted?	CIM- (43-101-Item 19) JORC- (Sect C: Criteria 10) SAMREC-(Sect C: Criteria 8) SME-(Criteria C.2)	Yes, Item 19, LG, JFT
		Have all other relevant factors been taken into account and reported? (I.e. relative confidence in tonnage/grade computations, confidence in continuity of geology and metal values, quality, quantity and distribution of the data.)		Yes, Item 19 and 21 LG, JFT
		Do the results reflect the Competent/Qualified Person(s)' view of the deposit?		Yes, Item 19 LG, JFT
3.11	Audits or reviews	Are there any audits or reviews of the Mineral Resource estimates, and have the results been reported.	CIM- (43-101-Item 19) JORC- (Sect C: Criteria 11) SAMREC-(Sect C: Criteria 9) SME-(Criteria B.1, B.3 & H)	No, LG, JFT
		Has the date of the last independent audit been specified?		No, LG, JFT
3.12	Discussion of relative	Was a statement made regarding the relative accuracy and/or confidence in the Mineral	CIM- (43-101-Item 19)	Yes, Item 19

	accuracy /confidence	Resource estimate, as well as, the approach or procedure deemed appropriate by the Competent Person? [For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.]	JORC- (Sect C: Criteria 12)	LG, JFT
		Does the statement specify whether or not it relates to global or local estimates, and, if local, have the relevant tonnages or volumes, which should be relevant to technical and economic evaluation been stated? [Documentation should include assumptions made and the procedures used.]	SAMREC-(Sect C: Criteria 8) SME-(Criteria F)	Yes, Item 19-21, LG, JFT
		Have the statements of relative accuracy and confidence of the estimate been compared with production data, where available?		No, LG, JFT

4.0 - Criteria for the Estimation and Reporting of Ore Reserves

Item	Criteria	Essential Reporting Queries	Reserve Reporting Standards Reference	Sign Off/Comment
4.1	Mineral Resource estimate for conversion to Ore Reserves	Is there a description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve?	CIM- (43-101-Item 19) JORC- (Sect D: Criteria 1)	No, Item 19, no reserves are reported, LG, JFT
		Is there a clear statement as to whether the Mineral Resources are reported additional to, or inclusive of the Ore Reserves?	SAMREC-(Sect D: Criteria 1) SME-(Criteria G)	Yes, Item 19 and 21, LG, JFT
4.2	Study Status	Was the type and level of study undertaken to enable the conversion of Mineral Resources to Ore Reserves denoted? [The Codes do not require that a final feasibility study be undertaken to convert Mineral Resources to Ore Reserves, but it is required that appropriate studies have been carried out to determine a mine plan that is technically achievable and economically viable, and that all Modifying Factors have been considered.]	CIM- (43-101-Item 19) JORC- (Sect D: Criteria 2) SAMREC-(Sect D: Criteria 1) SME-(Clause 13)	Yes, Item 19, Studies on the geology and recovery are underway LG, JFT
4.3	Cut-off parameters	Has the basis of the adopted cut-off grade(s) or the applied quality parameters been designated?	CIM- (43-101-Item 19) JORC- (Sect D: Criteria 3)	yes, Item 19, the cut-off grade (0.5% TREO) was used only for the volumetric clculation LG, JFT

			SAMREC-(Sect D: Criteria 3) SME-(Criteria C.2)	
4.4	Mining factors or assumptions	Have the method and assumptions used to convert the Mineral Resource to an Ore Reserve (i.e. either by application of appropriate factors by optimization or by preliminary or detailed design) been reported?	CIM- (43-101-Item 25) JORC- (Sect D: Criteria 4)	No, Item 19, LG, JFT
		Have the choice of, the nature and the appropriateness of the selected mining method(s), and other mining parameters (including associated design issues such as pre-strip, access, etc) been denoted?	SAMREC-(Sect D: Criteria 4) SME-(Criteria D)	No, Item 19, LG, JFT
		Were the assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc), grade control and pre-production drilling denoted?		No, Item 19, LG, JFT
		Were the major assumptions made as well as the Mineral Resource model used for pit optimization clearly described? (if appropriate)		No, Item 19, LG, JFT
		Were the mining dilution factors, the mining recovery factors, and the minimum mining widths used, clearly denoted?		No, Item 19 LG, JFT
		Have the infrastructure requirements of the selected mining methods been stated?		No, Item 19, LG, JFT
4.5	Metallurgical factors or assumptions	Are the proposed metallurgical processes stated, and are they appropriate to process the described style of mineralization?	CIM- (43-101-Item 18) JORC- (Sect D: Criteria 5)	No, Item 19, LG, JFT
		Are the proposed metallurgical processes well-tested technologies or novel in nature?	SAMREC-(Sect D: Criteria 7&8) SME-(Criteria D)	No, Item 19, LG, JFT
		Are the nature, amount and representativeness of metallurgical test work undertaken and the metallurgical recovery factors applied well denoted?		No, Item 19, LG, JFT
		Have any assumptions or allowances made for deleterious elements been reported.		No, Item 19, LG, JFT
		Has the existence of any bulk sample or pilot scale test work and the degree to which such samples are representative of the ore body as a whole been denoted?		Yes, Item19, LG, JFT
4.6	Cost and Revenue	Have the derivation of or assumptions made, regarding projected capital and operating	CIM- (43-101-Item 25)	No, Item 19,

	factors	costs been noted and are the assumptions and parameters used reasonable and justifiable?	JORC- (Sect D: Criteria 6) SAMREC-(Sect D: Criteria 2, 9, 10, & 11) SME-(Criteria D & E)	LG, JFT
		Have the assumptions made regarding (but not limited to) revenue including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, etc, been stated?		No, Item 19, LG, JFT
		Are there any allowances made for royalties payable, both Government and private and have they been stated?		No, Item 19, LG, JFT
4.7	Market assessment	Have the demand, supply and stock situation for the particular commodity, the consumption trends and the factors likely to affect supply and demand into the future been denoted?	CIM- (43-101-Item 25) JORC- (Sect D: Criteria 7) SAMREC-(Sect D: Criteria 5,6 & 14) SME-(Criteria E)	No, Item 19, LG, JFT
		Has a customer and competitor analysis along with the identification of likely market windows for the product been completed?		No, Item 19, LG, JFT
		Are there price and volume forecasts and has the basis for these forecasts been denoted?		No, Item 19, LG, JFT
4.8	Other	Are there any effects of natural risk, infrastructure, environmental, legal, marketing, social or governmental factors on the likely viability of a project and/or on the estimation and classification of the Ore Reserves?	CIM- (43-101-Item 25) JORC- (Sect D: Criteria 8) SAMREC-(Sect D: Criteria 10,11,15 & 16) SME-(Criteria G)	No, Item 19, LG, JFT
		Has the status of titles and approvals critical to the viability of the project, such as mining leases, discharge permits, government and statutory approvals been verified?		Yes, Item 6 LG, JFT
4.9	Classification	Has the basis for the classification of the Ore Reserves into varying confidence categories been denoted?	CIM- (43-101-Item 19) JORC- (Sect D: Criteria 9) SAMREC-(Sect D: Criteria 17) SME-(Criteria C.2)	Yes, Item 19, LG, JFT
		Does the result of the classification appropriately reflect the Competent/Qualified Person(s)' view of the deposit?		Yes, Item 19, LG, JFT
		Has the proportion of Probable Ore Reserves which have been derived from Measured Mineral Resources (if any) been denoted?		No, Item 19, LG, JFT
4.10	Audits or reviews	Have the results of any audits or reviews of Ore Reserve estimates been denoted?	CIM- (43-101-Item 19) JORC- (Sect D: Criteria 10) SAMREC-(Sect D: Criteria 18)	Yes, Gmining, Réjean Sirois, Q1 2013 LG, JFT
		Can the date of the last independent audit be specified?		Yes, Q1 2013

			SME-(Criteria B.1, B.3 & H)	LG, JFT
4.11	Discussion of relative accuracy /confidence	Was a statement made regarding the relative accuracy and/or confidence in the Reserve estimate as well as, the approach or procedure deemed appropriate by the Competent Person? [For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.]	CIM- (43-101-Item 19) JORC- (Sect D: Criteria 11) SAMREC-(Sect D: Criteria 17) SME-(Criteria F)	Yes, Item 19 and 21, LG, JFT
		Does the statement specify whether or not it relates to global or local estimates, and, if local, have the relevant tonnages or volumes, which should be relevant to technical and economic evaluation been stated? [Documentation should include assumptions made and the procedures used.]		Yes, Item 19, LG, JFT
		Have the statements of relative accuracy and confidence of the estimate been compared with production data, where available?		No, LG, JFT

5.0 - Reserve & Resource Management - Risk and Controls Matrix (and supplementary controls)

Item	Risks Identified	Control measures	Implementation	SignOff/Comment/Doc reference (Note and comment on any deficiencies)

IAMGOLD CORPORATION

LEVÉ MAGNÉTIQUE HÉLIPORTÉ
BLOCS LEPINE, BOUSQUET-ODYNO ET NIOBEC

RAPPORT FINAL

Préparé par:

GEOSCIENCES INC.

Montréal, Québec

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GEOSCIENCES INC.

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2. Introduction

Ce rapport décrit en détail les opérations de terrain ainsi que toutes les étapes d'acquisition, de vérification et de traitement nécessaires pour l'obtention de données finales de haute qualité par le biais d'un levé magnétique héliporté effectué par **EON Geosciences Inc.** (**EON**) pour **IAMGOLD Corporation** (**IAMGOLD**) dans les régions de Rouyn-Noranda et St-Honoré, au Québec.

En incluant les tests et calibrations préparatoires et l'acquisition des données, la réalisation du levé magnétique héliporté s'est échelonnée du 3 au 15 mai 2012. Un total de 2 616 km linéaires a été nécessaire afin de couvrir la totalité des blocs Lepine, Bousquet-Odyno et Niobec.

3. Spécifications du levé

3.1. Localisation du levé

Le levé magnétique héliporté, dont fait mention le présent rapport, est situé dans les secteurs de Rouyn-Noranda (blocs Lepine et Bousquet-Odyno) et de St-Honoré (bloc Niobec).

Les limites des différents blocs sont définies par les coordonnées suivantes :

Coordonnées des périmètres du levé (WGS-84)								
Lepine (UTM Zone 17N)			Bousquet-Odyno (UTM Zone 17N)			Niobec (UTM Zone 19N)		
Coin No.	**X**	**Y**	**Coin No.**	**X**	**Y**	**Coin No.**	**X**	**Y**
1	647000	5367795	1	674503	5342002	1	336642	5380106
2	657200	5367795	2	674503	5344198	2	342418	5382251
3	657200	5371094	3	676507	5344198	3	345194	5374704
4	656095	5371094	4	676508	5345305	4	339394	5372579
5	656095	5376009	5	679600	5345305			
6	647000	5376009	6	679606	5344708			
			7	681002	5344708			
			8	680997	5343007			
			9	678102	5343002			
			10	678102	5341993			

Tableau 1 : Coordonnées des zones des travaux

3.2. Topographie de la zone des travaux

Le relief dans les régions du levé est relativement plat. Plus spécifiquement, à l'intérieur des limites du levé, des valeurs topographiques qui varient entre 274 m et 379 m pour Lepine, entre 290 m et 364 m pour Bousquet-Odyno, et entre 85 m et 163 m pour Niobec, sont observées.

3.3. Spécifications de vol

3.3.1. Plans de vol

Selon les spécifications des plans de vol présentées aux Tableaux 2, 3 et 4, 2 349 km de traverses et 267 km de lignes de contrôle ont été enregistrées pour un total de 2 616 km de lignes.

	Traverses	**Lignes de contrôle**	**Total**
Espacement des lignes	75 m	600 m	
Direction des lignes	N 0º E	N 90º E	
Kilométrage	1 043 km	134 km	**1 177 km**

Tableau 2 : Spécifications du plan de vol – Bloc Lepine

	Traverses	**Lignes de contrôle**	**Total**
Espacement des lignes	50 m	500 m	
Direction des lignes	N 0º E	N 90º E	
Kilométrage	311 km	34 km	**345 km**

Tableau 3 : Spécifications du plan de vol – Bloc Bousquet-Odyno

	Traverses	**Lignes de contrôle**	**Total**
Espacement des lignes	50 m	500 m	
Direction des lignes	N 160º E	N 70º E	
Kilométrage	995 km	99 km	**1 094 km**

Tableau 4 : Spécifications du plan de vol – Bloc Niobec

Les déviations des plans de vol par rapport aux plans de vol théoriques (fichiers d'entrée pour la navigation) ont été analysées afin d'éliminer les portions de ligne pour lesquelles l'espacement entre deux lignes adjacentes était inférieur à 50% ou supérieur à 150% de l'espacement nominal sur une distance de plus de 2 000 mètres.

Les portions de lignes devant faire de nouveau l'objet d'un vol ont été revolées en prenant soin de respecter les exigences minimales de chevauchement telles que décrites dans les spécifications de vol du contrat.

3.3.2. Altitude de vol

Le levé magnétique héliporté a été réalisé avec une altitude théorique de 30 m.

Afin d'assurer une différence d'altitude minimale aux intersections entre les traverses et les lignes de contrôle, et par le fait même assurer une meilleure qualité des données nivelées, une surface moulant le relief topographique a été utilisée pour la navigation. Cette surface a été calculée en considérant le relief topographique et une pente de 15%. Les données topographiques disponibles sur SRTM furent utilisées pour le calcul de la surface de vol.

Les tolérances d'altitude ont été limitées à ± 20% de la surface de vol. De plus, cette limite de tolérance de ± 20% fut conservée afin d'évaluer les endroits où la déviation verticale entre l'élévation GPS de l'hélicoptère et la surface de vol calculée dépassait les normes acceptables et semblait affecter les données en maille.

3.4. Spécifications techniques

Lors du contrôle de la qualité effectué quotidiennement, les spécifications techniques suivantes, telles que définies dans le contrat, en plus des spécifications de vol, ont été considérées pour la sélection des lignes ou des parties de ligne à revoler ainsi que pour l'acceptation finales des données.

3.4.1. Variations diurnes

Pour la station de base magnétique, la déviation maximale tolérée sur une longueur de corde d'une minute fut de 2,0 nT (crête à crête) sur un total cumulatif de 20% ou plus de chaque ligne de vol.

3.4.2. Niveau de bruit sur les données magnétiques

En tout temps, la $4^{ième}$ différence fut utilisée pour détecter et évaluer la présence de bruit sur les données magnétiques. Une enveloppe de bruit de 0,1 nT fut prise en compte pour l'acceptation finale des données.

4. Équipements utilisés

4.1. Hélicoptère

Un hélicoptère AS350BA, immatriculation C-GOVD, a été utilisé pour ce projet (Figure 1). Cet hélicoptère était équipé d'un rostre attaché au patin d'atterrissage de l'hélicoptère d'une longueur de 9 mètres permettant l'installation du senseur magnétique.

Les caractéristiques de l'hélicoptère utilisé sont les suivantes:

Type :	AS350BA
Immatriculations :	C-GOVD
Autonomie (km) :	600
Vitesse de levé (m/s) :	Moyenne de 41 (varie de 21 à 57) → Lepine Moyenne de 45 (varie de 26 à 56) → Bousquet-Odyno Moyenne de 45 (varie de 17 à 58) → Niobec
Essence :	Jet
Consommation d'essence (L/hr) :	170
Valeur pour le FOM (nT) :	2,115

5. **Figure 1 : Hélicoptère (C-GOVD) utilisé pour l'exécution du levé magnétique**

5.1. Systèmes aéroportés

Pour l'exécution de ses levés magnétiques héliportés, **EON** utilise des équipements à la fine pointe de la technologie tel que décrit dans les sections suivantes.

5.1.1. Magnétomètre

Un senseur Geometrics G822A, combiné à un compteur de haute résolution, a été utilisé pour mesurer les variations du champ magnétique total. Les spécifications de ce type de magnétomètre sont les suivantes :

Manufacturier :	Geometrics
Type et Modèle :	Césium G822A
Plage ambiante (nT) :	20 000 – 100 000
Sensibilité (nT) :	± 0,0005
Précision absolue (nT) :	± 3
Enveloppe de bruit (nT) :	< 0,01
Intervalle d'échantillonnage (sec) :	0,1
Effet de cap (nT) :	< 0,15

5.1.2. Système d'acquisition de données et compensateur

Le système d'acquisition et de compensation ''Airborne Data Acquisition & Adaptive Aeromagnetic Real-Time Compensation (DAARC500)'' de RMS Instruments a été utilisé par **EON**. Ce système permet un taux d'échantillonnage de 10 Hz (0,1 sec) et utilise un magnétomètre « fluxgate » à trois axes afin de suivre la position et les mouvements de l'hélicoptère par rapport au champ magnétique ambiant et d'ainsi calibrer la compensation selon une série de manœuvres standards de « roll », « pitch », et « yaw » dans les directions du levé.

Les entrées analogues et sérielles sont échantillonnées au même taux, ou à un sous-multiple, que les données du magnétomètre. Les données géophysiques et les données de positionnement GPS brutes sont enregistrées dans des fichiers binaires avec des marqueurs de temps et d'événement de début qui permettent une corrélation simple avec les autres données et le signal PPS du récepteur GPS. Le système d'acquisition est synchronisé au temps GPS par un signal GPS d'une seconde (PPS). Puisque la position GPS et l'UTC sont liés au « pulse » GPS, une corrélation précise est maintenue.

Ce système fournit une sortie graphique de haute résolution à un écran couleur intégré qui permet le suivi en temps réel de l'acquisition des données par l'opérateur.

5.1.3. Système de navigation

Le tableau suivant décrit le système de navigation ainsi que le système GPS différentiel héliporté utilisés pour la navigation en temps réel et l'enregistrement de la trajectoire de vol :

Système GPS différentiel héliporté	
Manufacturier :	NovAtel
Modèle :	ProPak-V3
Système différentiel temps-réel :	WAAS
Système différentiel post-mission :	PPP
Fréquences :	L1-L2
Précision (m) :	± 1
Nombre de canaux :	12

Système de navigation :	Ag-Nav Linav
Affichage pour pilote :	ACL avec indicateurs «up/down» et «left/right»
Intervalle d'échantillonnage (sec) :	1

Les principales caractéristiques du système de navigation sont les suivantes:

1) Affichage graphique du plan et de la trajectoire de vol à partir des données GPS différentielles en temps réel;
2) Navigation verticale utilisant une surface moulant le relief topographique (LiNav-3D);
3) Indicateurs d'écarts par rapport à la ligne suivie et indicateurs de distance effectuée et à faire, indicateurs d'écarts verticaux par rapport a la surface suivie;
4) Modes d'opération en carte, points de destination *waypoint* ou selon des lignes planifiées;
5) Enregistrement des données GPS brutes pour traitement post-mission.

5.1.4. Altimètre radar

Les principales caractéristiques de l'altimètre radar installé dans l'hélicoptère sont les suivantes:

Manufacturier :	FreeFlight Systems
Modèle :	TRA-3000
Plage (pi) :	40 – 2 500
Précision :	± 5 pi (0-100 pi) ± 5% (100-500 pi) ± 7% (500-2500 pi)
Intervalle d'échantillonnage (sec) :	0.1

5.1.5. Altimètre barométrique

L'altitude barométrique a été calculée des données de pression et de température acquises en vol. Le tableau suivant décrit les caractéristiques des senseurs de pression et de température utilisés pour ce levé :

Manufacturier :	Vaisala	Vaisala
Modèle :	PTB110	HMP155
Paramètre mesuré :	Pression atmosphérique	Température ambiante
Précision:	± 0,3 hPa (mbar)	± 0,17 °C
Intervalle d'échantillonnage (sec) :	0.1	0.1

5.2. Station de contrôle au sol

5.2.1. Magnétomètre

Une station de contrôle au sol du champ magnétique (voir les caractéristiques ci-dessous) fut installée à chaque base (Rouyn-Noranda et St-Honoré) afin d'enregistrer sans interruption les variations diurnes.

Manufacturier :	GEM Systems
Type :	Overhauser
Modèle :	GSM-19
Plage dynamique (nT) :	15 000 – 120 000
Sensibilité (nT) :	± 0,001
Précision absolue (nT) :	± 0,1
Intervalle d'échantillonnage (sec) :	1
Niveau de bruit (nT) :	< 0,1 nT

5.3. Système utilisé pour le contrôle de la qualité

Durant les opérations de terrain, la vérification quotidienne des données, provenant des tests et calibrations ou du levé magnétique, a été réalisée en utilisant les composantes suivantes.

Ordinateurs portables :	Pentium PCs
Logiciel :	Geosoft Oasis montaj
Transmission des données :	Site FTP

6. Personnel

Le personnel d'**EON** ayant participé au bon déroulement du projet est présenté dans le Tableau 5 ci-dessous :

Opérations de terrain	
Gestionnaire de projet	Khaled Moussaoui Abbas Moussaoui
Gestionnaire de terrain/Géophysicien Contrôleur de la qualité sur le terrain	Rick Bailey
Pilote	Stéphane Caron
Responsable des instruments	Paul Beaubien
Ingénieur de l'entretien	Hélicoptères Panorama
Traitement des données	
Traitement des données finales	Rick Bailey Gérard Tessier
Produits finaux	
Préparation des cartes	Marc Richard
Rapport final	Khaled Moussaoui Rick Bailey

Tableau 5 : Personnel impliqué dans le projet

7. Opérations de terrain

7.1. Bases des opérations

Pour les blocs Lepine et Bousquet-Odyno, la ville de Rouyn-Noranda fut utilisée comme base des opérations. L'aéroport de Rouyn-Noranda a offert tous les services nécessaires, incluant l'essence Jet et la planification de vols. Pour le bloc Niobec, la ville de St-Honoré fut utilisée comme base des opérations. L'aéroport de St-Honoré a offert tous les services nécessaires, incluant l'essence Jet et la planification de vols.

7.2. Calendrier

Le Tableau 6 qui suit, présente le déroulement des différentes étapes du projet incluant les tests et les calibrations ainsi que la mobilisation et démobilisation. L'acquisition des données fut complétée le 15 mai 2012, pour un total de 2 616 km.

Hélicoptère	Date	Description
AS350BA (C-GOVD)	1 – 2 mai 2012	Installation des équipements dans l'hélicoptère à Alma
	2 – 3 mai 2012	Tests pré-mobilisation
	3 mai 2012	Mobilisation à Rouyn-Noranda
	3 mai 2012	Tests pré-levé
	4 – 5 mai 2012	Acquisition des données du bloc Lepine
	6 mai 2012	Acquisition des données du bloc Bousquet-Odyno
	7 mai 2012	Mobilisation à St-Honoré
	7 mai 2012	Tests pré-levé
	9 – 15 mai 2012	Acquisition des données du bloc Niobec
	15 mai 2012	Fin du levé / Démobilisation

Tableau 6 : Calendrier des étapes du projet

7.3. Défis opérationnels

La réalisation du levé magnétique héliporté a nécessité une collaboration et une communication constantes avec **IAMGOLD**, afin de coordonner les opérations avec les municipalités locales.

L'acquisition des données magnétiques fut interrompue principalement par les restrictions de vol au-dessus de la municipalité de St-Honoré (fins de journée et fins de semaines). De plus, les conditions météorologiques difficiles ont causé quelques journées de production perdues.

Tous ces problèmes sont détaillés dans le rapport quotidien présenté en Annexe C.

7.4. Tests et calibrations

Avant de débuter l'acquisition des données magnétiques, les tests et calibrations suivants ont été exécutés par l'hélicoptère en utilisant l'équipement décrit à la section 3.

- "*Figure of Merit*" (FOM)
- Étalonnage des altimètres

Les résultats détaillés de ces tests sont présentés en Annexe A.

8. Traitement des données

L'objectif principal du levé était l'acquisition et le traitement des données héliportées magnétiques. Le traitement préliminaire des données sur le terrain ainsi que le traitement final des données furent entièrement exécutés avec le logiciel Oasis montaj de Geosoft.

8.1. Projection cartographique

Les projections suivantes ont été utilisées pendant le projet (navigation, traitement des données, préparation des cartes) :

- Projection : UTM Zone 17N (Lepine et Bousquet-Odyno)
  UTM Zone 19N (Niobec), MTM Zone 7 pour les mailles et cartes finales
- Type : Transverse Mercator
- Datum : WGS-84
- Ellipsoïde de référence : WGS-84
- Transformation locale : WGS-84 World
- Unité de longueur : Mètres

8.2. Traitement des données sur le terrain et contrôle de la qualité

À la fin de chaque vol, les données acquises étaient copiées et sauvegardées sur une unité USB, et transférées au géophysicien sur le terrain afin qu'il effectue le contrôle de la qualité et le traitement préliminaires des données tel que décrit dans ce qui suit.

En premier lieu, la trajectoire de vol était vérifiée afin de s'assurer que les lignes volées respectaient les exigences du contrat, espacement des lignes de vol, chevauchement advenant des portions de lignes ou des reprises de ligne, extension à l'extérieur du levé, etc. Une vérification de la couverture était réalisée et le kilométrage accepté était calculé et noté dans le rapport journalier de vol.

Par la suite, chacun des canaux de données enregistrés était affiché en profil, puis mis en maille, afin de vérifier que les spécifications mentionnées au contrat étaient respectées et afin de détecter rapidement d'éventuels problèmes au niveau du système d'acquisition ou de l'instrumentation. Une analyse statistique était également réalisée afin d'identifier les valeurs erronées et compléter ainsi le contrôle de la qualité.

À ce stade, toute ligne ou tout segment de ligne pouvant nécessiter un re-vol était noté. Un nivellement préliminaire était régulièrement exécuté de façon à évaluer l'impact de ces segments de lignes sur la qualité générale du produit final. Spécifiquement, la couverture, les déviations du plan et de la surface de vol, l'activité diurne, le niveau de bruit sur les données magnétiques, et les problèmes opérationnels (tel que le manque de données) sont vérifiés et les reprises de vol ensuite identifiées. Toutes les données finales ont respecté les spécifications du contrat.

8.3. Données de positionnement

Les données de positionnement RT-DGPS étaient transmises en temps réel à partir de l'unité GPS ProPak-V3 (NovAtel) vers le système d'acquisition DAARC500 pour synchronisation, enregistrement et navigation horizontale/verticale. Les corrections différentielles captées en temps réel par l'unité ProPak-V3 provenaient du système WAAS. Un contrôle quotidien de la qualité des données RT-DGPS était effectué de façon à s'assurer que leur précision demeurait appropriée pour fins de navigation (<5 m).

Les données GPS brutes enregistrées en vol ont été utilisées dans le traitement post-mission du positionnement (PP-DGPS), en utilisant le système CSRS-PPP disponible sur le site web de Ressources naturelles Canada, afin d'obtenir des données de positionnement GPS finales en moins de quatre (4) heures. Le contrôle de la qualité final du GPS incluait l'inspection des profils de vitesse PP-DGPS ainsi qu'une comparaison avec les données RT-DGPS et d'altitude barométrique, de façon à s'assurer de l'amélioration de la précision en PP-DGPS (<1 m). Les données PP-DGPS furent de haute qualité et ne nécessitèrent aucune correction pour sauts ponctuels.

Les données de positionnement finales sont sans exception de type PP-DGPS. Elles furent utilisées pour le contrôle final du suivi de la trajectoire de vol planifiée, pour le contrôle de la qualité et l'édition des données radar via le calcul d'un modèle numérique de terrain, ainsi que pour le calcul des différences d'altitude aux intersections. Cette procédure a permis un contrôle additionnel du GPS, des données radar plus fiables, ainsi qu'une détection précise des segments de ligne présentant des déviations excessives pouvant justifier un re-vol, si la qualité des données en maille s'en trouve affectée.

8.4. Données altimétriques et modèle numérique de terrain

Tel que mentionné à la section précédente, le contrôle de la qualité sur le site et la correction finale des données radar ont été réalisés à partir du calcul d'un modèle numérique de terrain (DEM) utilisant l'altitude finale PP-DGPS et sa comparaison avec le modèle topographique publié par SRTM.

Les corrections requises sur les données radar ont été déterminées comme suit :

- Corrections distinctes des données ponctuelles erronées (*spikes*) et des sauts de niveau;
- Correction initiale, basée sur le nivellement des intersections DEM entre les lignes traverses-contrôles, visant le retrait des dérives radar à basse fréquence;
- Nivellement brut DEM basé sur un filtre de 0,6 sec appliqué sur les données radar et la décorrugation directe de la maille DEM résultante.

Les données radar finales ont été maillées en utilisant uniquement les lignes de traverse et une cellule de maillage de 10 m (pour Bousquet-Odyno et Niobec) et de 15 m (pour Lepine), en utilisant l'algorithme de courbure minimale du logiciel Oasis montaj de Geosoft.

8.5. Données aéromagnétiques

Les données magnétiques provenant de la station de contrôle au sol étaient analysées quotidiennement afin de s'assurer qu'aucune donnée en vol n'ait été enregistrée durant des périodes présentant des micro-pulsations ou de l'activité diurne excédant les spécifications. Bien que toutes les précautions aient été prises afin d'installer la station de base dans des zones magnétiquement calmes, loin de toute activité humaine, passage de véhicules, lignes de transmission ou autre, les données magnétiques des stations de base furent également vérifiées afin de noter, et corriger s'il y a lieu, tout signal d'origine culturelle.

La correction du signal magnétique dû à la direction et aux manœuvres de l'hélicoptère fut effectuée durant l'acquisition via une compensation en temps réel utilisant les coefficients de compensation calculés lors des tests de FOM. Tel que mentionné auparavant dans la section 5.4, les résultats détaillés de ces tests sont présentés en Annexe A. La compensation en temps réel permet également le contrôle de la qualité des données par l'opérateur, lui permettant ainsi d'établir si les turbulences ou autres conditions de vol sont nuisibles à la qualité des données et par le fait même, déterminer si l'arrêt du vol en cours est nécessaire.

Après application d'une correction de décalage sur les données du champ magnétique total compensées, les données en profil furent vérifiées sur une base quotidienne afin d'évaluer l'efficacité de la compensation. Par la même occasion, une quatrième différence fut calculée à partir des données du champ magnétique total compensé afin de déterminer le niveau de bruit et de procéder à l'édition des données en profil, où les données ponctuelles erronées (*spikes*) ont été éliminées.

Dans le but d'éliminer les variations diurnes des profils de données magnétiques enregistrées en vol, une correction diurne fut calculée en utilisant les profils de la base éditée. La correction diurne fut obtenue par la soustraction d'une valeur moyenne de 55 979,9 nT (pour Lepine et Bousquet-Odyno) et de 55 586,9 nT (pour Niobec), et par l'application subséquente d'un filtre spatial *1-D FFT Butterworth* de 1 200 m. La longueur du filtre fut déterminée selon l'espacement des lignes de contrôle et le degré d'amélioration observé suite à la correction sur les différences du champ magnétique aux intersections.

Un signal IGRF partiel fut ensuite utilisé afin de minimiser l'effet des déviations de la surface de vol entre lignes adjacentes. Les champs IGRF 2010 furent premièrement calculés pour les surfaces de vol. Un filtre passe-bas de 5 sec fut ensuite appliqué. Puis, le signal IGRF partiel fut calculé et enlevé du champ magnétique total (TMF) édité pour obtenir un TMF corrigé pour l'altitude.

La prochaine étape du traitement du TMF fut le nivellement, qui consiste à la distribution statistique appropriée des erreurs d'intersections traverses-contrôles, afin d'obtenir le modèle de correction le plus lisse possible sur chaque line. Un modèle de correction simple initial (moyenne) est premièrement appliqué sur les lignes de contrôle, et ensuite sur les lignes de traverse après avoir mis à jour les intersections sur les lignes de contrôle corrigées. Ce processus est poursuivi de façon itérative, utilisant des modèles de correction de longueur d'onde progressivement décroissante, afin de corriger davantage les erreurs résiduelles des passes précédentes. Les modèles de correction finaux ont été basés sur une *spline* à tension, avec tension = 0,0 et aspect lisse = 0,1 (traverse), tel que permis par le réseau des lignes.

Du micro-nivellement, un processus basé sur l'application de filtres en maille directionnels, a été exécuté, afin d'enlever les corrugations sur le TMF résiduel nivelé (visibles sur la première dérivée) observées surtout dans les intervalles de traverse entre les lignes de contrôles. De telles corrections furent inévitables dus, en partie, au ratio de réseau 10:1/8:1, mais surtout aux grandes déviations en altitude de la surface de vol tel que requis au-dessus des zones habitées. Les corrugations sont souvent les plus fortes dans des régions de haut gradient magnétique. Comme tel, un processus de micro-nivellement à deux (2) passes est appliqué. Les deux (2) passes utilisent un seuil limite variable pour minimiser l'application de filtres dans les zones où le nivellement par intersection est efficace. La première passe est contrôlée par la déviation en altitude de la surface de vol, tandis que la deuxième passe est contrôlée par l'activité relative du bloc, utilisant le signal analytique du TMF nivelé. Les paramètres de contrôle et de seuil limite sont spécifiés dans le Tableau 7 ci-dessous.

Bloc	Longueur du filtre en maille (m)	Longueur du filtre en profil (m)	Passe 1 Déviation de la surface de vol (m)	Seuil limite (nT)	Passe 2 Signal analytique (nT)	Seuil limite (nT)
Lepine	450	300	-6 à 6	7	<2,0	7
			-10 à -6 et 6 à 10	Interpolation linéaire 7 à 50	2,0 à 3,0	Interpolation linéaire 7 à 50
			<-10 ou >10	50	>3,0	50
Bousquet-Odyno	250	250	-6 à 6	5	<1,0	0
			-10 à -6 et 6 à 10	Interpolation linéaire 5 à 25	1,0 à 1,5	Interpolation linéaire 0 à 25
			<-10 ou >10	25	>1,5	25
Niobec	250	250	-6 à 6	7	<2,0	7
			-10 à -6 et 6 à 10	Interpolation linéaire 7 à 50	2,0 à 3,0	Interpolation linéaire 7 à 50
			<-10 ou >10	50	>3,0	50

Tableau 7 : Paramètres de micro-nivellement

Le micro-nivellement dans la première passe a été appliqué en calculant la maille d'erreur sur le TMF en appliquant un filtre passe-haut *Butterworth* (se référer au Tableau 7 pour les longueurs d'onde limites, ordre=0) et un filtre cosinus directionnel (direction=180° pour Lepine et Bousquet-Odyno, direction=340° pour Niobec, degré de la fonction cosinus=1,5). La maille d'erreur est enlevée du TMF nivelé par lignes de contrôle pour produire une maille corrigée. Cette maille est ré-échantillonnée dans la base de données et le champ d'erreur est créé par la soustraction des profils nivelés par lignes de contrôle. Ce champ d'erreur est ensuite limité (seuil limite contrôlé par la déviation de la surface de vol) et un filtre passe-bas est appliqué. Ceci devient la première passe de la correction de micro-nivellement, qui est appliquée au champ magnétique nivelé par lignes de contrôle. Ce processus est ensuite répété sur le TMF micro-nivelé résultant (première passe), cette fois utilisant le signal analytique comme contrôle pour le degré de limitation. La correction totale de micro-nivellement est l'addition des deux (2) passes.

Finalement, le champ géomagnétique de référence (IGRF) fut calculé selon le modèle IGRF-2010 en utilisant une date fixe, la position d'acquisition et une altitude de vol moyenne fixe, pour chaque bloc. Les paramètres de correction IGRF sont spécifiés dans le Tableau 8 ci-dessous. Le champ magnétique total résiduel fut obtenu par la soustraction du champ géomagnétique de référence du champ magnétique total micro-nivelé.

Bloc	Altitude IGRF (m)	Date IGRF
Lepine	342,5	2012/05/04
Bousquet-Odyno	348,2	2012/05/06
Niobec	163,0	2012/05/12

Tableau 8 : Paramètres de correction IGRF

6.4.3. Données maillées

Les données magnétiques finales ont été maillées en utilisant uniquement les lignes de traverse et une cellule de maillage de 10 m (pour Bousquet-Odyno et Niobec) et de 15 m (pour Lepine), en utilisant l'algorithme de courbure minimale du logiciel Oasis montaj de Geosoft. Le calcul de la dérivée première verticale a été réalisé en utilisant la fonction magmap1 de ce logiciel.

9. Produits finaux

9.1. Particularités de la compilation

Échelle des cartes :	1:10 000 (Lepine et Niobec) 1:5 000 (Bousquet-Odyno)
Coordonnées (WGS-84) :	UTM Zone 17N (Lepine et Bousquet-Odyno) UTM Zone 19N (Niobec), MTM Zone 7 pour les mailles et cartes finales
Quadrillage des mailles :	15 mètres (Lepine) et 10 mètres (Bousquet-Odyno et Niobec)

9.2. Cartes finales

Les cartes finales suivantes ont été remises à **IAMGOLD** en deux (2) copies papier :

- Le champ magnétique total (avec et sans contours)
- Le champ magnétique total résiduel (avec et sans contours)
- La dérivée première verticale du champ magnétique total
- La trajectoire de vol

9.3. Données numériques

Les données numériques suivantes ont été livrées à **IAMGOLD** en trois (3) exemplaires sur DVD :

Résumé des produits numériques finaux		
Produit	**Données**	**Format et projection**
Bases de données	Données magnétiques	Geosoft GDB, WGS-84
Mailles	Champ magnétique total	Geosoft GRD, WGS-84
	Champ magnétique total résiduel	Geosoft GRD, WGS-84
	Dérivée première verticale du champ magnétique total	Geosoft GRD, WGS-84
Cartes 1:50 000	Champ magnétique total (avec et sans contours)	Geosoft MAP et PDF, WGS-84
	Champ magnétique total résiduel (avec et sans contours)	Geosoft MAP et PDF, WGS-84
	Dérivée première verticale du champ magnétique total	Geosoft MAP et PDF, WGS-84
	Trajectoire de vol	Geosoft MAP et PDF, WGS-84
Rapport	Logistique, traitement et documentation des produits	WORD et PDF

Une description complète des bases de données finales est fournie en Annexe B.

9.4. Autres produits

- Trois (3) copies papier du rapport final

3400, chemin du Columbium, St-Honoré-de-Chicoutimi, QC G0V 1L0 Canada – tel. : 418 673-4694 Fax : 418 673-3179
E-mail : info.niobec@iamgold.com   www.niobec.com

10. Conclusion

L'acquisition des données magnétiques héliportées des blocs Lepine, Bousquet-Odyno et Niobec, situés dans les régions de Rouyn-Noranda et St-Honoré, a été complétée en utilisant un hélicoptère AS350BA, C-GOVD, permettant la mesure du champ magnétique total, grâce à un magnétomètre monté dans un rostre fixé au patin d'atterrissage de l'hélicoptère.

Une fois mobilisé sur le site des travaux, environ deux (2) semaines ont été nécessaires pour acquérir les 2 616 km linéaires de données magnétiques.

Les problèmes majeurs rencontrés lors de ce levé, qui ont quelque peu ralenti la production, sont les restrictions de vol au-dessus de la municipalité de St-Honoré et les mauvaises conditions météorologiques. La totalité des données acquises respecte les exigences d'**IAMGOLD** et a permis la production de produits finaux de haute qualité.

Soumis par : ________________________________

Abbas Moussaoui, Ing. (#29152)
Directeur général
EON Géosciences Inc.

11. Annexe A – Résultats des tests et calibrations

A.1. "Figure of Merit" (FOM)

EON Geosciences Inc.

FOM Test:	**MAG1: Front stinger**	Date:	03-May-12
Slot file	**mat6.x**	Flight:	802
Project:	12002	Location:	Rouyn-Noranda
Client:	IAMGOLD	Helicopter	C-GOVD
Pilot:	Stephane Caron	Sensors:	front stinger
Operator	Paul Beaubien	Altitude:	3100m
Processor:	Rick Bailey	Comp:	**RMS Comp**

Notes: **8 seconds** high pass filter used to determine amplitudes.

MAG 1 Results	**ucomp**	**comp**	**IR**
Total	**119.472**	**2.413**	**49.512**

S	Line	Fid range start	end	ucomp	comp	IR
Pitch	S180	81159	81285	6.750	0.225	30.000
Roll		81305	81349	20.070	0.231	86.883
Yaw		81357	81386	6.450	0.120	53.750
Total				**33.270**	**0.576**	**57.760**

E	Line	Fid range start	end	ucomp	comp	IR
Pitch	S90	81117	81117	5.986	0.200	29.930
Roll		81159	81159	0.530	0.067	7.910
Yaw		81178	81204	4.960	0.181	27.403
Total				**11.476**	**0.448**	**25.616**

N	Line	Fid range start	end	ucomp	comp	IR
Pitch	S360	80925	80964	9.160	0.409	22.396
Roll		80973	81014	21.721	0.207	104.932
Yaw		81023	81053	6.885	0.188	36.622
Total				**37.766**	**0.804**	**46.973**

W	Line	Fid range start	end	ucomp	comp	IR
Pitch	S270	81439	81475	8.350	0.252	33.135
Roll		81492	81532	26.340	0.223	118.117
Yaw		81538	81579	2.270	0.110	20.636
Total				**36.960**	**0.585**	**63.179**

GEOSCIENCES INC.

3400, chemin du Columbium, St-Honoré-de-Chicoutimi, QC G0V 1L0 Canada – tel. : 418 673-4694 Fax : 418 673-3179
E-mail : info.niobec@iamgold.com   www.niobec.com

EON Geosciences Inc.

FOM Test:	**MAG1: Front stinger**	Date:	07-May-12
Slot file	**mat7.x**	Flight:	803
Project:	12002	Location:	St. Honoré
Client:	IAMGOLD	Helicopter	C-GOVD
Pilot:	Stephane Caron	Sensors:	front stinger
Operator	Paul Beaubien	Altitude:	3050m
Processor:	Rick Bailey	Comp:	**RMS Comp**

Notes: **8 seconds** high pass filter used to determine amplitudes.

MAG 1 Results	**ucomp**	**comp**	**IR**
Total	**142.972**	**2.115**	**67.599**

S	Line	Fid range start	end	ucomp	comp	IR
Pitch	S160	81634	81653	5.993	0.395	15.172
Roll		81658	81684	21.761	0.150	145.073
Yaw		81692	81709	8.019	0.081	99.000
Total				**35.773**	**0.626**	**57.145**

E	Line	Fid range start	end	ucomp	comp	IR
Pitch	S70	81509	81536	7.041	0.083	84.831
Roll		81540	81566	20.570	0.304	67.664
Yaw		81570	81595	6.110	0.160	38.188
Total				**33.721**	**0.547**	**61.647**

N	Line	Fid range start	end	ucomp	comp	IR
Pitch	S340	81402	81425	9.935	0.210	47.310
Roll		81431	81454	22.694	0.278	81.633
Yaw		81464	81481	1.797	0.140	12.836
Total				**34.426**	**0.628**	**54.818**

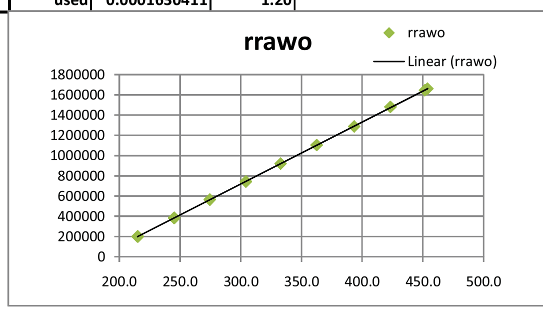
W	Line	Fid range start	end	ucomp	comp	IR
Pitch	S250	81754	81777	13.120	0.105	124.952
Roll		81794	81818	21.616	0.140	154.400
Yaw		81826	81846	4.316	0.069	62.551
Total				**39.052**	**0.314**	**124.369**

3400, chemin du Columbium, St-Honoré-de-Chicoutimi, QC G0V 1L0 Canada – tel. : 418 673-4694 Fax : 418 673-3179
E-mail : info.niobec@iamgold.com www.niobec.com

A.2. Étalonnage de l'altimètre

C-GOVD May 3rd 2012 EON Geosciences Inc.			Altimeter calibration								Roberval Airport	AntH	179.0 mMSL 2.5 m	
		Units	mMSL	uV	m		m	mMSL	mbar	C	mMSL	mMSL	mMSL	m
Line		fid range	z	rrawAo	raltAo		raltAerr	DTM	PrawBo	TrawBo	bstpBo	brawBo	baltBo	baltBerr
80100	57963.0	58019.0	215.1	199167	33.7	110.5	*0.1*	178.9	990.4	14.5	195.7	192.1	184.3	*-30.8*
80200	57858.0	57909.0	245.2	382973	63.6	208.8	*-0.1*	179.1	988.0	14.2	216.5	212.3	204.5	*-40.7*
80300	57740.0	57792.0	274.6	564180	93.2	305.7	*0.1*	178.9	983.1	13.9	259.2	253.8	246.1	*-28.5*
80400	57621.0	57671.0	304.2	743307	122.4	401.5	*-0.3*	179.3	981.0	13.7	277.6	271.6	263.9	*-40.3*
80500	57505.0	57557.0	332.7	921128	151.4	496.7	*0.2*	178.8	975.8	14.5	323.2	317.1	309.4	*-23.3*
80600	57390.0	57442.0	362.6	1104362	181.3	594.7	*0.2*	178.8	973.6	13.4	342.5	334.8	327.1	*-35.5*
80700	57268.0	57321.0	393.4	1287884	211.2	692.8	*-0.7*	179.7	969.1	13.3	382.3	373.5	365.8	*-27.6*
80800	57154.0	57199.0	423.3	1482051	242.8	796.7	*1.0*	178.0	965.7	13.5	412.4	403.3	395.6	*-27.7*
80900	57033.0	57082.0	453.8	1662007	272.2	893.0	*-0.1*	179.1	962.0	13.7	445.4	435.8	428.1	*-25.7*
81000	56914.0	56964.0	451.6	1647075	269.7	885.0	*-0.4*	179.4	962.9	14.2	437.4	428.7	421.0	*-30.6*
	Statistics						***0.0***	**179.0**						***-31.1***
	Calibrations		**raltAo**	a	b							**baltBo**	a	b
			linest	0.0001630411	182.70							linest	0.9668049	34.05
→			**used**	**0.0001630411**	**1.20**							**used**	**1.0000000**	**-7.73**

Roberval, YRJ, 586', 179m Aircraft C-GOVD (RMS System)		
Constants and formulaes below are valid under 11000m		
Baro	**Constants (sea level)**	**units**
8314.32	**R** - Universal Gas Constant	kmol-1
273.15	**T** - Celsius zero in Kelvin	K
28.96442	**M** - Molecular Weight of Air	kg*kmol-1
9.80665	**g** - acceleration of gravity	m*s-2
0.00	**H** - Datum Height	m
1013.25	**P** - Datum Pressure	mbar
20.00	**st** - Standard Temperature	Celsius
Formula for **MSL** baro altitude from pressure and temperature		
brawBo= **H** + (**R***(TrawBo+**T**)/**M*****g**)*ln(**P**/PrawBo)		
Formula for **STP** baro altitude from pressure and STP temperature		
bstpBo= **H** + (**R***(**st**+**T**)/**M*****g**)*ln(**P**/PrawBo)		



12. Annexe B – Description des champs des bases de données finales

12002 - Lepine, Bousquet-Odyno, Niobec - Quebec, Canada 2012
Final database (June 7th 2012)
EON Geosciences Inc.
Rick Bailey

Notes: -All data were acquired from Astar 350 BA aircraft, registration C-GOVD, (RMS acquisition system).
-Data channels were kept at their original field sampling rates.
-Lags have been applied to raw and processed data channels, unless otherwise specified.
-See processing notes below.

Channel description (1-21):

	Channel Name	Sampling Rate	Units	Description	Comments
1	Line10	10Hz		Line Number	
2	Lon	01Hz	deg	Longitude	
3	Lat	01Hz	deg	Latitude	
4	x	01Hz	m	UTM Easting	WGS-84, Z17N(L,B)/19N(N), Differential GPS
5	y	01Hz	m	UTM Northing	WGS-84, Z17N(L,B)/19N(N), Differential GPS
6	fid10	10Hz	s	Fiducial Time	UTC seconds past midnight
7	hgps	01Hz	HH:MM:SS.SS	Time	
8	raltlc	10Hz	m	Radar altitude, edited	AGL, corrected for spikes, noise, adjusted through DTM levelling
9	z	01Hz	m	GPS altitude	MSL, from Differential GPS
10	DTMc	01Hz	m	Digital Topographic Model, edited	Calculated from the difference between z, raltlc and the gps antenna - altimeter offset. MSL
11	baseA	01Hz	nT	Base A TMF	Mag base station, edited
12	m31	10Hz	nT	TMF	Lag removed
13	mreslc	10Hz	nT	TMF, partial IGRF removed	Partial IGRF to drape surface removed from m31
14	mreslcb	10Hz	nT	TMF, diurnals corrected	Filtered diurnal signal removed from mreslc
15	mreslvl	10Hz	nT	TMF, levelled	Intersection levelling correction applied on mreslcb
16	mreslvli	10Hz	nT	TMF, levelled, IGRF removed	IGRF removed from mreslvl
17	mreslvld2	10Hz	nT	TMF, micro-levelled	Micro-levelling correction applied on mreslvl
18	mreslvld2i	10Hz	nT	TMF, micro-levelled, IGRF removed	IGRF removed from mreslvld
19	migrfz2	10Hz	nT	IGRF	Applied IGRF Field
20	x_MTM	01Hz	m	MTM Easting	WGS-84, MTM Zone7, Niobec only
21	y_MTM	01Hz	m	MTM Northing	WGS-84, MTM Zone7, Niobec only

Processing Notes:

1. Base station data were manually edited for cultural interference.
2. A 'height correction' based on IGRF was applied to account for height deviations from drape.
3. IGRF was removed after levelling.
4. Corrugation still remains between ties after tie-line levelling. As a result, two passes of micro-levelling were used. Both passes use a variable clip to minimize filtering in areas where intersection levelling is effective. In pass 1, the degree of micro-levelling is limited by altitude deviation from drape, while pass 2 is limited by the relative activity of the block, using the analytic signal of mreslvl. See Table I below for processing parameters.
5. IGRF is calculated at a fixed average survey height on a fixed date (Table I).

PROCESSING PARAMETERS (Table I):

	Block	Grid Filter Length (m)	Pass 1 – Deviation from drape (m)	Clip (nT)	Pass 2 – Analytic Signal (nT)	Clip (nT)	IGRF Altitude (m above MSL)	IGRF Date
1	Lepine (L)		<-10 or >10	50	<2.0	7	342.5	2012/05/04
			-6 to 6	7	2.0 to 3.0	Lin. Interp 7 to 50		
			-10 to -6 and 6 to 10	Lin interp. 7 to 50	>3.0	7		
2	Bousquet-Odyno (B)	250	<-10 or >10	25	<1.0	0	348.2	2012/05/06
			-6 to 6	5	1.0 to 1.5	Lin. Interp 0 to 25		
			-10 to -6 and 6 to 10	Lin interp. 5 to 25	>1.5	25		
3	Niobec (N)	250	<-10 or >10	50	<2.0	7	163.0	2012/05/12
			-6 to 6	7	2.0 to 3.0	Lin. Interp 7 to 50		
			-10 to -6 and 6 to 10	Lin interp. 7 to 50	>3.0	7		

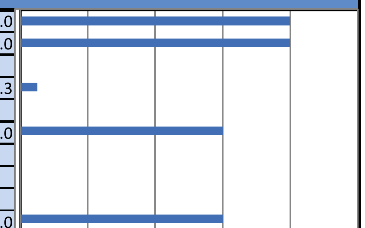
GRIDS (TABLE II):

	Grid Name	Units	Comments
1	12002_L_TMF.grd 12002_B_TMF.grd 12002_N_TMF.grd	nT	Gridded from mreslvld2 channel (Micro-levelled total field magnetic) WGS-84 UTM17N, (B),(L) WGS-84 MTM Zone7 (N)
2	12002_L_RTF.grd 12002_B_RTF.grd 12002_N_RTF.grd	nT	Gridded from mreslvld2i channel (Micro-levelled total field magnetic, IGRF corrected) WGS-84 UTM17N, (B),(L) WGS-84 MTM Zone7 (N)
3	12002_L_FVM.grd 12002_B_FVM.grd 12002_N_FVM.grd	nT/m	First Vertical Derivative of mreslvld2 (Micro-levelled total field magnetic) WGS-84 UTM17N, (B),(L) WGS-84 MTM Zone7 (N)

13. Annexe C – Rapport quotidien

EON GEOSCIENCES INC Daily report (C-GOVD sheet 1/1)					6500 Transcanadienne, bureau 120, St-Laurent QC, Canada H4T 1X4 Tel: +1-514-341-3366, Cell: +1-514-651-6391, Fax: +1-514-341-5366 info@eongeosciences.com
Aircraft		**Projects**	**Area & Client**	**Crew chiefs:**	
Code:	C-GOVD	12002, L	IAMGOLD, Lepine (Abitibi)	**Pilots:**	Stephane Caron
Type:	ASTAR-350BA	12002, B	IAMGOLD, Bousquet-Odyno (Abitibi)	**Engineers:**	
FBO:	Panorma Helicopters	12002, N	IAMGOLD, Niobec (Saguenay)	**Operators:**	Paul Beaubien
Inst:	Stinger Mag			**Processors:**	Gerard Tessier, Khaled Moussaoui, Richard Bailey

Project / Aircraft	12002 C-GOVD	12002 C-GOVD	12002 C-GOVD		**Total Project**	C-GOVD Activity Histogram	
BLOCK	L	B	N				
Planned Kms	1176.83	344.86	1094.24		**2615.93**		
Total flown Kms	1193.32	344.87	1118.31		**2656.50**	Set-up (SE)	4.0
Total accepted Kms	1176.90	344.87	1094.24		**2616.01**	Production (P)	4.0
Total survey hours	11.20	5.10	10.00		**26.30**	Maintenance (M)	
Total test-training hours	1.60		1.00		2.60	Electronics (E)	0.3
Total ferry hours	6.80	1.00	5.30		13.10	Diurnals (D)	
Total aircraft hours	19.60	6.10	16.30		**42.00**	Weather (W)	3.0
Total aircraft days					**14.25**	Training (TR)	
Average kms/day (total)					183.58	Safety (SAF)	
Average kms/hour (survey)	105.08	67.62	109.42		99.47	Crew (CR)	
Project Completion	100.0%	100.0%	100.0%		100.0%	Other (X)	3.0



Flight information					**Aircraft hours**				**Kilometreage**		**Daily activity report**				**Comments**
Date	Project no.	BLK	Flt	Crew (initials)	Ferry	Test Train	Sur-vey	Total	Flown	Accepted	Activity Code (per 1/4 days)				
1-May-12	12002			mr,pb,sc,rb							SE	SE	SE	SE	**AM**: Installation of equipment into helicopter in Alma. **PM**: Installation and testing of mag base at Rouyn-Noranda airport.
2-May-12	12002			mr,pb,sc,rb							SE	SE	SE	SE	**AM**: Equipment Installation continues. **PM**: Equipment testing
3-May-12	12002	L	801	mr,pb,sc,rb	0.4	0.6		1.0			SE	SE	SE	SE	**AM**: Lag test and Radar Altimeter test flown near Roberval. **PM**: C-GOVD ferries from Alma to Rouyn-Noranda. FOM flight near Rouyn-Noranda airport. Full crew on site.
	12002	L		pb,sc,rb	2.8			2.8							
	12002	L	802	pb,sc,rb		1.0		1.0							
4-May-12	12002	L	001	pb,sc,rb	0.6			0.6			P	P	P	P	**AM**: Flt001 aborted due to low cloud and rain. Flt002 (lines 1010,-1020; to be re-flown. Drape deviation). **PM**: Flt003 (lines 1030-1340). Flt004 (lines 1350-1540).
	12002	L	002	pb,sc,rb	0.5		0.2	0.7	16.42						
	12002	L	003	pb,sc,rb	0.5		2.7	3.2	262.72	262.72					
	12002	L	004	pb,sc,rb	0.5		1.4	1.9	164.20	164.20					
5-May-12	12002	L	005	pb,sc,rb	0.5		2.5	3.0	246.30	246.30	P	P	P	P	**AM**: Flt005 (lines 1550-1820, lines 1010 & 1020 re-flown). Flt006 (lines 1830-2010, ties 8010-8140) **PM**: Flt007 (lines 2020-2360). Lepine Block completed.
	12002	L	006	pb,sc,rb	0.5		2.4	2.9	289.98	289.98					
	12002	L	007	pb,sc,rb	0.5		2.0	2.5	213.70	213.70					
6-May-12	12002	B	008	pb,sc,rb	0.4		2.6	3.0	173.99	173.99	P	P	P	P	**AM**: Flt008 (lines 3010-3660). **PM**: Flt009 (lines 3670-3990, ties 7010-7070). Flt010 (lines 4000-4300).
	12002	B	009	pb,sc,rb	0.3		1.5	1.8	116.31	116.31					
	12002	B	010	pb,sc,rb	0.3		1.0	1.3	54.57	54.57					
7-May-12	12002	N		pb,sc,rb	3.4			3.4			SE	SE	SE	SE	**AM**: Demobilization **PM**: C-GOVD ferries from Rouyn-Noranda to Roberval and from Roberval to St. Honoré. FOM flight near St. Honoré airport.
	12002	N	803	pb,sc,rb		1.0		1.0							
8-May-12	12002	N		pb,sc,rb							W	W	W	W	**AM**: No flight due to poor weather conditions. Rain and low cloud. **PM**: Rain and low cloud continues through afternoon. Full crew on-site.
9-May-12	12002	N	011	pb,sc,rb	0.4		2.6	3.0	272.65	264.63	W	W	P	X	**AM**: No flight due to rain and low clouds. **PM**: Flt011 (lines 1010-1240, ties 8010-8130). Flt012 (lines 1250-1380). Flt012 terminated early by client's request.
	12002	N	012	pb,sc,rb	0.2		1.0	1.2	112.30	104.28					
10-May-12	12002	N	013	pb,sc,rb	0.4			0.4			W	W	W	X	**AM**: Flt013 terminated early due to rain and low visibility. No lines flown **PM**: No flight due to rain and low visibility.
11-May-12	12002	N		pb,sc,rb							W	W	W	X	**AM**: No flight due to rain and low clouds. **PM**: Rain and low cloud continues through afternoon.
12-May-12	12002	N		pb,sc,rb							X	X	X	X	**AM/PM**: No flight due to flying restrictions over