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CLAIM BLOCK, Hyman Township, Sudbury District, Ontario

MINING PROPERTY WITH POTENTIAL FOR SUDBURY FOOTWALL MINERALIZATION (OFFSET DYKES AND PGE MINERALIZATION)

Ownership: Frank Charles Racicot 50%, Hadyn Robin Butler 50%

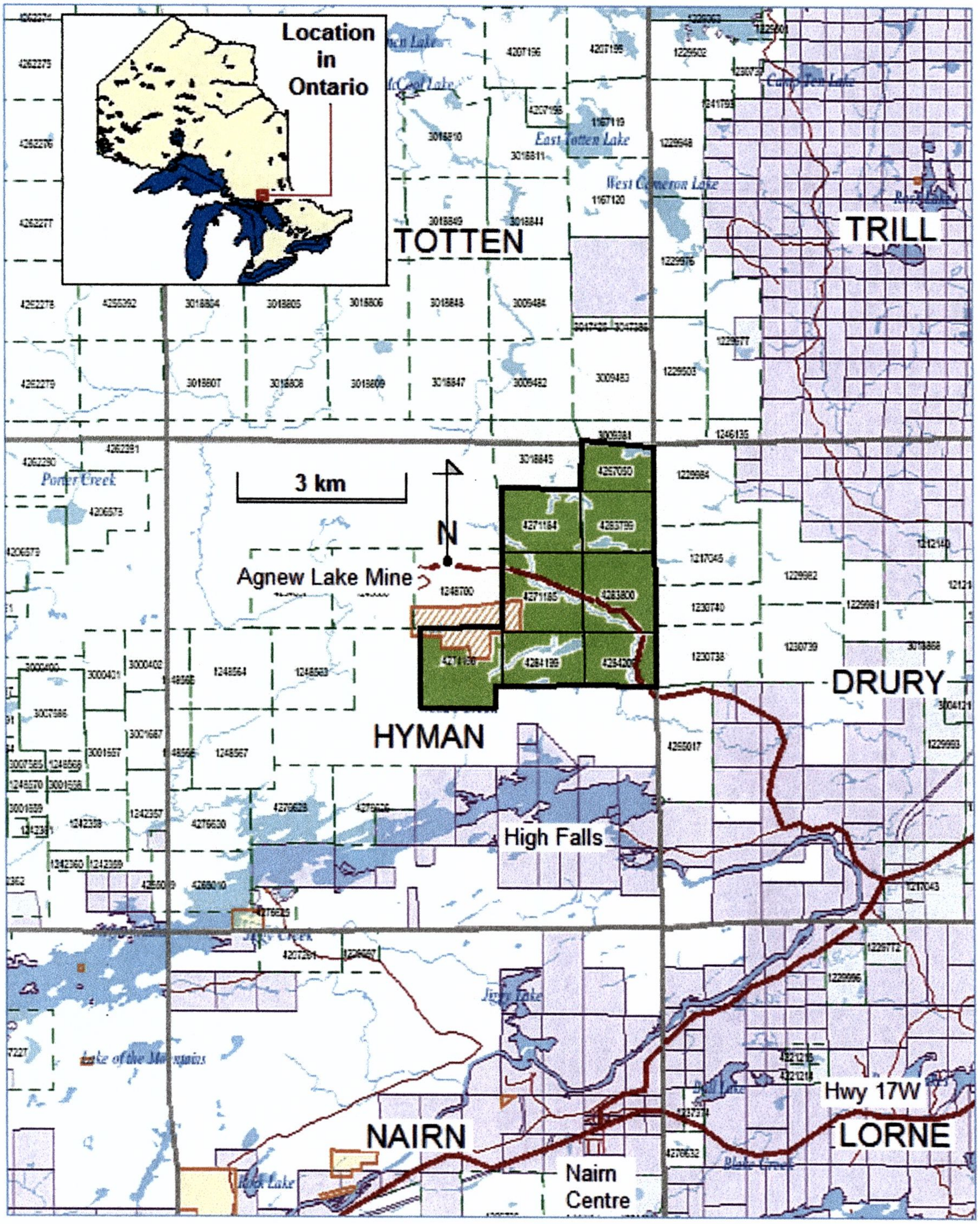
A block of **8** contiguous mining (mineral) claims for **100 claim units** was staked and recorded in the northeast corner of Hyman Township, Sudbury District, Ontario ***(Figures 1 & 2)*** by Frank Racicot P.Geo and Hadyn R. Butler P.Geo and is available for option and/or purchase on mutually agreed terms.

Table of Mineral Claims, Hyman Township

Claim Number	No. of Claim Units	Work Required (Canadian $)	Recorded Date	Due Date
4267050	12	4,800	March 6, 2015	March 6, 2017
4271184	13	5,200	March 6, 2015	March 6, 2017
4283799	11	4,400	March 6, 2015	March 6, 2017
4271185	16	6,400	March 6, 2015	March 6, 2017
4283800	14	5,600	March 6, 2015	March 6, 2017
4271166	12	4,800	March 6, 2015	March 6, 2017
4284199	12	4,800	March 6, 2015	March 6, 2017
4284200	10	4,000	March 6, 2015	March 6, 2017

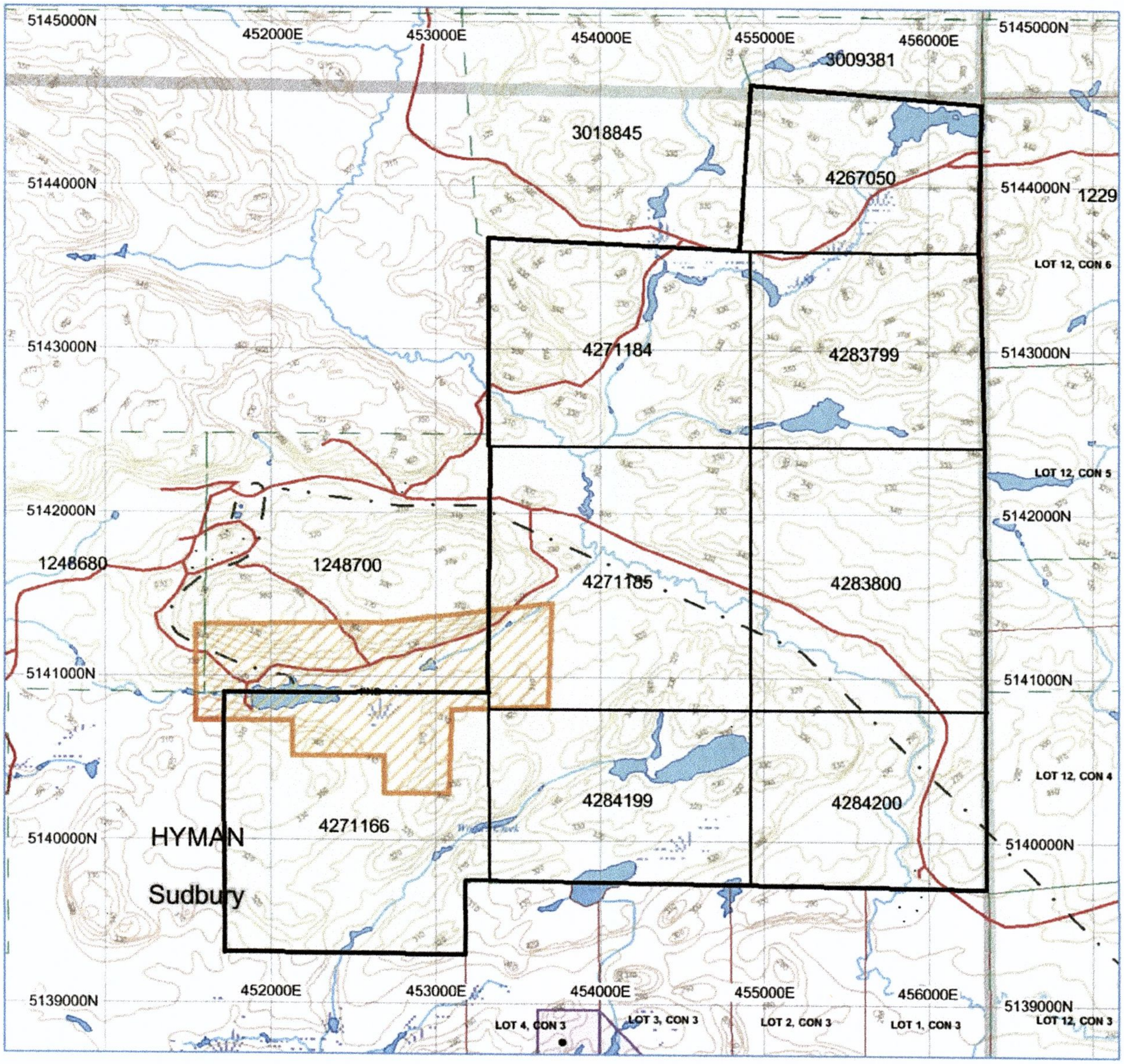
Data can be confirmed @ http://www.geologyontario.mndmf.gov.on.ca/website/claimapsiii/viewer.asp & http://www.mci.mndm.gov.on.ca/Claims/Cf_Claims/clm_cssm.CFM?Claim_View__Claim_Number

Figure 1 – Location of claim block in Hyman Township, Sudbury District, Ontario.



Note: Base map courtesy of the MNDM website

Figure 2 – Location of claim block in Hyman Township showing further topographic details (topographic contours) and access roads. Also, a 1 kilometer UTM grid (NAD 83) is also shown. The claim block is outlined with a bold black line and an area covering a federal reserve (former Agnew Lake Mine tailings is shown in orange – Identifier FND, Type N, Class FND: Permission was given by the MNDMF to stake across this tailings area as this in part of their defined authority to allow this activity).



Note: Base map courtesy of the MNDM website

1. Location, Access and Topography

The contiguous 8 claim block is located in the northeast corner of Hyman Township, Sudbury District, Ontario. Access from the Greater City of Sudbury (to the east) is via Provincial Highway 17 West (the Trans-Canada Highway to Sault Saint Marie) to the Totten Mine turnoff across a CPR railway line, thence via provincial roads to the former Agnew Lake Mine - a distance of just over 50 kilometers to the southeast corner of the claim block. Alternatively, the same corner of the claim block can be accessed from the sawmill town of Nairn Centre for a distance of about 15 kilometers from Highway 17 West (***Figure 1***). In ***Figure 2***, local access roads are shown criss-crossing the claim block.

The landscape was stripped by Pleistocene glaciers revealing ridges with reasonable expanses of outcrop and glacial lodgement till (on southern slopes and scours) with various unconsolidated sedimentary washes in the valley bottoms. Small lakes and swamps occupy parts of the valleys that form part of the Spanish River drainage system flowing into the north shore of Lake Huron.

Elevations vary between 250m in the valleys to the southeast and up to 370m on some ridge tops – i.e., a mildly rugged landscape for the southern Canadian Shield. Nonetheless, most areas are not too far from roads that are readily accessible with trucks in the summer and with snow machines in the winter along with walking traverses during all seasons.

2. Bedrock Geology

The claim block sits to the southwest of the margin of the Sudbury Igneous Complex ("SIC") and contains the contact between the Lower Proterozoic Huronian Supergroup (and etc.) to the south as well as Archean granite gneisses, the Cartier batholith, to the north (***Figure 3***). NW-striking later Proterozoic diabase dykes as part of the Sudbury Dyke Swarm (Mackenzie Dyke Swarm-aged) cross the claim block as well as interpreted SW-striking faults that cut the SW corner of the Sudbury Basin.

The Sudbury impact event dated at 1.85 Ga is evidenced in all pre-impact units on the claim block, for instance, complex Sudbury Breccia zones which will be discussed further below. The SW-striking faults noted above are regarded as part of the post-impact part of the Penokean Orogeny. By editing Ames *et al.* (2005),[1] bedrock units on the claim block include:

1) Archean Cartier Batholith; foliated granodiorite to granite ~2,640 Ma.
2) Units equivalent to the east Bull Lake Gabbro; gabbro, gabbro norite and anorthosite ~ 2,480 Ma.[2]
3) Matachewan Dyke Swarm; diabase dykes ~ 2,473 +18/-9 and 2448 ± 3 Ma shown with quite variable strikes and likely, in part, to be of a similar age to the East Bull Lake gabbro complexes – both contain very similar large plagioclase megacrysts, for instance.
4) Nipissing Mafic Intrusive Suite; Noritic quartz gabbro and amphibolitic equivalents. These units form variably differentiated sill-like sheets both cross-cutting and conformable to the Huronian Supergroup units ~ 2210-2217 Ma.
5) Ramsey Lake Formation; matrix supported polymictic conglomerate, minor mudstone, greywacke and arenites (Huronian Supergroup).
6) Pecors Formation; laminated to thin planar and wavy laminated greywacke, mudstone, siltstone and arenite (Huronian Supergroup).
7) Matinenda Formation; cross-bedded arkose, greywacke, and uraniferous quartz pebble conglomerate (Huronian Supergroup).
8) McKim Formation; laminated to thin-bedded greywacke and siltstone (contains turbidites Ta-Te) (Huronian Supergroup).
9) Sudbury Breccia; randomly oriented blocks of country rock in fine-grained pseudotachylyte.

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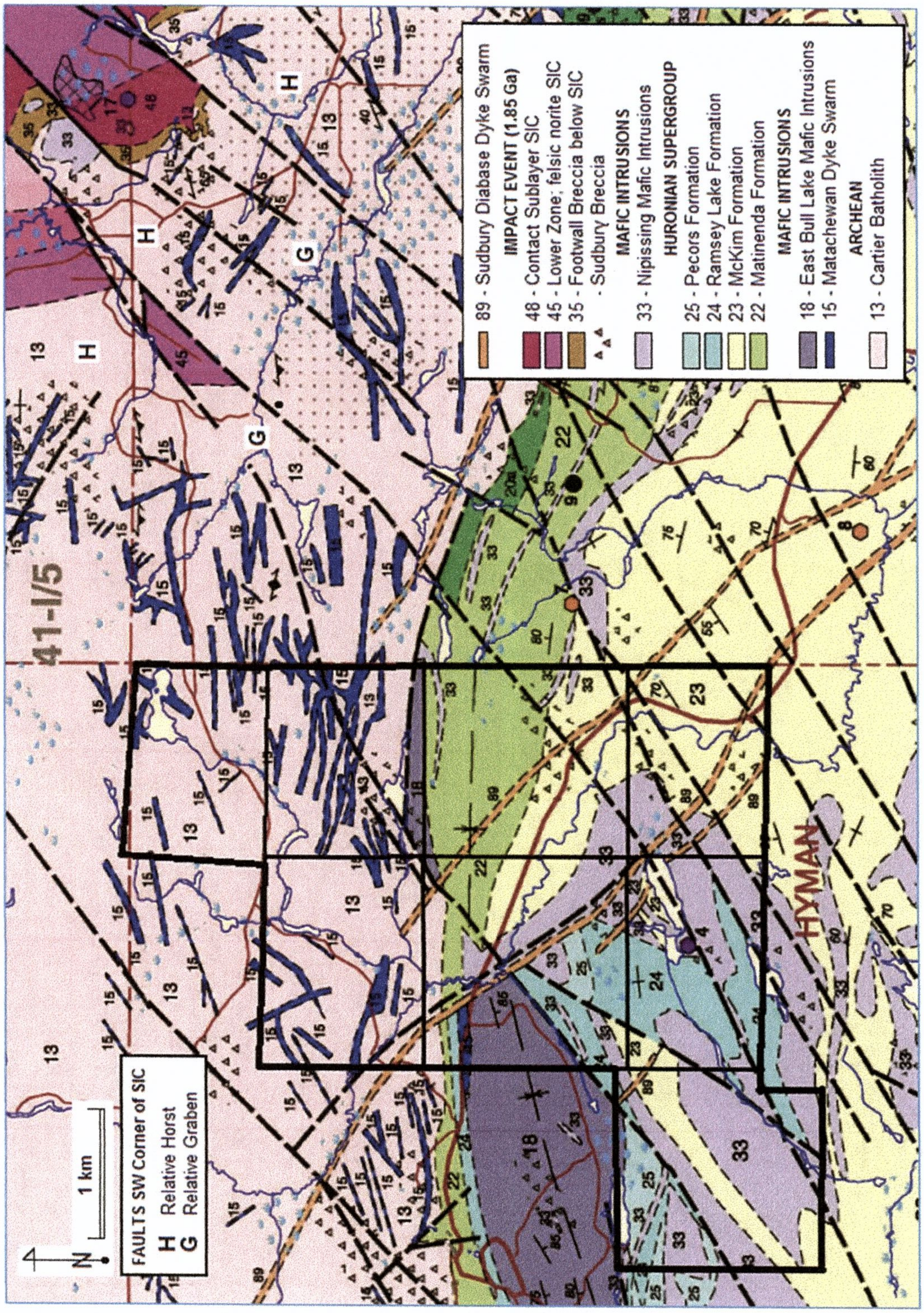
[1] Ames, D.E., Davidson, A., Buckle, J.L. and Card, K. (2005): Sudbury Bedrock Compilation, a map at 1:50,000 scale, *Ontario Geological Survey* Open File Report 4570. See also Card, K.D. and assistants (1964): Hyman and Drury Townships, Sudbury District; *Ontario Geological Survey*, Map 2055.
[2] Easton, R.M., Jobin-Bevans, L.S. and James. R.S. (2004): Geological Guidebook to the Paleoproterozoic East Bull Lake Intrusive Suite Plutons at East Bull Lake, Agnew Lake and River Valley, Ontario; *Ontario Geological Survey* Open File Report 6135.

Figure 3 – Geological Sketch modified from OGS Open File Report 4570. Note the position of relative Horst and Graben associated with the SW-striking fault swarm coming from the SW corner of the Sudbury Basin. Note also that these faults do not displace the Huronian – Cartier Batholith contact particularly. In short, the faulting pattern has not been fully determined.



3. Mineralization

Disseminated sulphide mineralization has been reported in a ***Nipissing mafic intrusion*** on the Claim Block (the Pond Showings in Card and assistants, 1964, Footnote 1). Many of these showings were examined by Namex Exploration (Thayer, 2005),[3] and 4 showings were named – Raven's Cliff, Southern Contact Breccia, Western Contact Breccia and Eastern Contact Breccia, *edited quote*:

"*All four zones contain sulphide-bearing* [Nipissing] *in concentrations ranging from trace to 10%* [*pyrrhotite*] *plus* [*chalcopyrite*].

The best assay reported at Raven's Cliff was 0.66% Ni, 0.90%Cu and 0.07% Co in a zone with slightly elevated Chromium in what Thayer reported to be a "*massive sulphide pod.*" To quote Thayer further:

"*Significantly elevated concentrations of Pt+Pd, in several instances combined with elevated concentrations of Cu, Ni and Cr were encountered in rock samples collected from Ravens Cliff and from the Eastern Contact Breccia. Both mineralizations occur in contact breccias, i.e. breccias formed at or near the footwall contact of the Nipissing Gabbro with Huronian sediments; a geological environment proven to have a high PGE and Ni-Cu mineralization potential* [...]. *I suggest that further investigations for this type of mineralization would be worthwhile on this property. First priority, in view of the limited size of the mineralization on Raven's Cliff, would be to find its continuation on strike. It is possible that the sulphide-bearing breccia exposed in the forest service road "Southern contact breccia" may be the prolongation of the Raven's Cliff mineralized horizon since: a) lithologies and appearance are comparable, and b) they are separated by distance of approximately 1300 m* [by] *sandy and clayey expanse*[s] *lacking outcrops that, according to Card (1965)*[4] *is underlain by Huronian sediments.*"

Subsequent drilling on the then Woods Creek Property in 2005 (5 drill holes for an aggregate 846.8m) and 552 line kilometers of helicopter-borne magnetometer and time domain AEM survey (Geotech Ltd.) was also undertaken (Fedikow, 2005).[5] [6] Four holes tested Induced Polarization (chargeability and resistivity) targets and hole WC-B (-45°) included one assay of 1.09% Ni, 0.37 Cu and 329 ppb combined precious metals (Pt, Pd, Au) – significant but of quite small size.

Hart (2010)[7] describes trenching on the Claim Block as well as additional prospecting and a beep-mat surveys with small but notable elevated Ni (>10,000 ppm), several Cu assays (>10,000 ppm), highest Pt (210 ppb) together with highest Pd (363 ppb).

Bell Geospace Inc. (2010)[8] on behalf of the Wallbridge Mining Company Limited flew a broad airborne magnetic and gravity survey for the northeast part of the Claim Block. The information may be too broad to be of use in finding mineralization.

That high Pt-Pd mineralization does occur elsewhere at the base of the Nipissing is seen, for instance, farther east in the Chiniguchi River Property in Janes Township also at the base of a Nipissing sheet with mineralization penetrating into the underlying Huronian sediments (Butler, 2009).[9]

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[3] Thayer, P. (2005): Report on the results of a geological survey of the Woods Creek Property, Hyman Twp., Ontario on behalf of Namex Explorations Inc., Montreal, QC – *Filed Assessment Report*, text, maps and assays.
[4] Card, K.D. (1965): Geology of Hyman and Drury Townships District of Sudbury; Geological Report No. 34, Geological Map 2065, *Ontario Department of Mines*, 38 p.
[5] Fedikow, M. (2005): Report on results of diamond drilling on the Woods Creek Property, Hyman Township, Namex Explorations Inc.; *Filed Assessment Report*, text, drill hole logs and assays.
[6] Thomson, V. (2011): Full Tensor Gravity Gradient and magnetic Data Inversion Modelling of the Drury Survey, Sudbury, Ontario; *Filed Assessment Report*, text, maps and 3D block models.
[7] Hart, T.R. (2010): Report on behalf of David Beilhartz; *Filed Assessment Report*, text, trench maps and assays.
[8] Bell Geospace Inc. (2010): Final report, Processing and acquisition of Air-FTG Data and airborne magnetics, Trill Project and Extension, Sudbury Basin, Ontario, Canada; *Filed Assessment Report*, text and maps.
[9] Butler, H.R. (2009): Technical (Geological) Report on the Chiniguchi River Property, Janes Township, Sudbury Mining Division, Ontario, Canada; *NI43-101 report* prepared as a *Technical Report* on behalf of Goldwright Explorations Inc.

4. The Sudbury Impact Structure and its Range.

The Sudbury Impact Structure is defined by the *Sudbury Basin*, the *Sudbury Igneous Complex* (SIC), *Footwall Breccias* and *Melt Bodies* immediately beneath the SIC, so-called *"Offset Dykes," Shattercones* forming a crude annulus in units immediately beneath the SIC and small to large-scale *"Sudbury Breccias"* extending past the town of Spanish to the west, within Lake Temagami to the northeast, north nearly to the James Bay Watershed and to the southwest near Whitefish Falls. Sudbury Breccia distribution defines the impact to be at least 250 km across.[10] [11] Lineament analysis and extraction techniques (Butler, 1994) seems to suggest that the Sudbury Basin is surrounded by "possible lineament rings." Such features are subtle and have been definitely confirmed topographically (Ring 3 with an apparent diameter of 135-140 km in an independent M.Sc thesis by Underhay, 2011),[12] *but* have been argued against by important contributors to the Sudbury impact problem such as Riller (2005)[13] possibly because he has concentrated on the center of the structure (SIC and surrounds) and has not gone far enough afield to gain a large-scale context. The same can be said for a limited automated lineament extraction study by Shankar and Osinski (2015)[14] – too limited a study area. The ***true problem***, however, is not enough boots on the ground.

The Sudbury impact event occurred on the foreland edge of an early Proterozoic mountain range – a highly asymmetric portion of the continental crust. The southern side of the current SIC ***roughly*** represented the axis of the main mountain range and the current East Range footwall of the SIC represented the edge of the Cobalt Embayment – as a transverse mountain belt parallel to underlying Archean greenstones – the reason; thick platform (anorogenic) covers like the Cobalt Embayment have behaved differently through time. For instance, it is quite common for pre-middle Proterozoic platform covers to fold into underlying greenstone belts but remain horizontal over adjacent large granitoids (e.g., Nullagine Group platform cover overlying the Warrawoona Group in the Pilbara of Western Australia). In short, the substrate of the impact was not uniform. Where there are mountain ranges, whether longitudinal or transverse, there are likely to be isostatic-thickened roots. Once the impact strips off 10-15 km of the upper crust then isostatic rebound will deform the central uplift (and/or peak ring) in unexpected ways – the mountain ranges will readjust relatively higher due to their thicker isostatic roots and, for instance, explain the fold origin of the northeast lobe of the SIC (clearly determined by Klimczak *et al.*, 2007).[15] Of course, the post-impact phases of the Penokean orogeny deformed the structure even further.

Now, it is important not to use craters on the other rocky planets (Mercury, Moon, Venus and Mars) as direct ring analogs because their rings represent the little eroded top surface of the impact – in Sudbury, the analogous visible horizon would be the top of the Onaping Formation. Everything that is stratigraphically beneath the top of the Onaping Formation is not visible on these planetary bodies, and the rings seen there are scars formed by multiple landslides created on these planets in some fashion after the passage of coherent shock waves and sound wave interference patterns proceeding from the collision center – equivalent surface materials are eroded away at Sudbury. In other words, *the putative rings structures*

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[10] Butler, H.R. (1994): Lineament Analysis of the Sudbury multiring impact structure; *In*, Large Meteorite Impacts and Planetary Evolution; *eds*. B.O. Dressler, R.A.F. Grieve, and V.L. Sharpton: *Geological Society America*, Special Paper 293, pp.319-329.

[11] Spray, J.G., Butler, H.R. and Thompson, L.M. (2004): Tectonic influences on the morphometry of the Sudbury impact structure: Implications for terrestrial cratering and modeling; *Meteoritics and Planetary Science*, 39, No.2, pp.287-301.

[12] Underhay, S.L. (2011): Structure and Deformation of the Sudbury Impact Crater; A Thesis submitted to the School of Geography and Earth Sciences, *McMaster University*.

[13] Riller, U. (2005): Structural Characteristics of the Sudbury impact structure, Canada: Impact-induced versus orogenic deformation – a review; *Meteoritics and Planetary Science* 40, No 11, pp. 1723-1740.

[14] Shankar, B. and Osinski, G.R. (2015): Revisiting the lineament study of the Sudbury impact structure using recent remote imagery; *Abstract in* 46th Lunar and Planetary Science Conference.

[15] Klimczak, C., Wittek, A., Doman, D. and Riller, U. (2007): Fold origin of the NE-lobe of the Sudbury Basin, Canada: Evidence from heterogeneous fabric development in the Onaping Formation and the Sudbury Igneous Complex; *Journal of Structural Geology*, 29, pp. 1744-1756.

seen for the Sudbury impact structure are not direct analogs of surface impact rings at all, but have to be strictly associated with underlying crustal rebound (Newton's 3rd Law) and other adjustments ***beneath***.

Moreover, most of the impact action is more or less over in the first half hour. From that point at least, most subsequent processes will be normal Earth processes except for the superheat of the impact melt – not present in endogenous volcanoes to any great extent - as well as the electrically charged plasma cloud above the center of the impact whose enormous EM field reorders magnetism in the crustal rocks beneath. Normally magnetic Matachewan diabase dykes near the impact center are demagnetized completely up to the position of *putative Ring 2* (Spray *et al.*, 2004, ***Figure 4***) a "ring" that also defines the approximate northern limit of the Foy Offset Dyke extension near La Forest.

Because the Sudbury impact occurred on the margin of mountain ranges, all of the melt sheet is quite unlikely to pool in the exact center of the structure because of large-scale regional topographic slopes. In an ideal scenario, the melt sheet and fallback breccias would pool about 1km topographically lower than the surrounds, but at Sudbury, there would be melt flow from the sides of adjacent mountain ranges as well as to the north, northwest and west away from and along the margins of the mountain ranges. This would carry undifferentiated melt immediately into unexpected places ***prior to the separation and pooling of "magmatic" Fe-Ni-Cu sulphides down to the melt bottom***. Because of the pre-existing topography, gravity would not allow the impact melt to stay in one place. For instance, the dominance of Mississagi quartzites at the base of the Onaping Formation on the Notre Dame Avenue extension is likely due to the flow of such fragments from the south (*i.e.*, they were not created in their current position). The large scale flow of melt sheet and fallback ***down topographic slopes*** would form surface fissures with fire fountains, vitric lapilli and lava bombs (as described by Ames *et al.*, 2009).[16] Excellent examples of melt flow away from an impact down-topography are seen on Venus (NASA Magellan Radar Mission; the Crater Isabella, just 176 km across – melt sheet flows more than twice the diameter of the crater downslope).

5. Sudbury Breccia

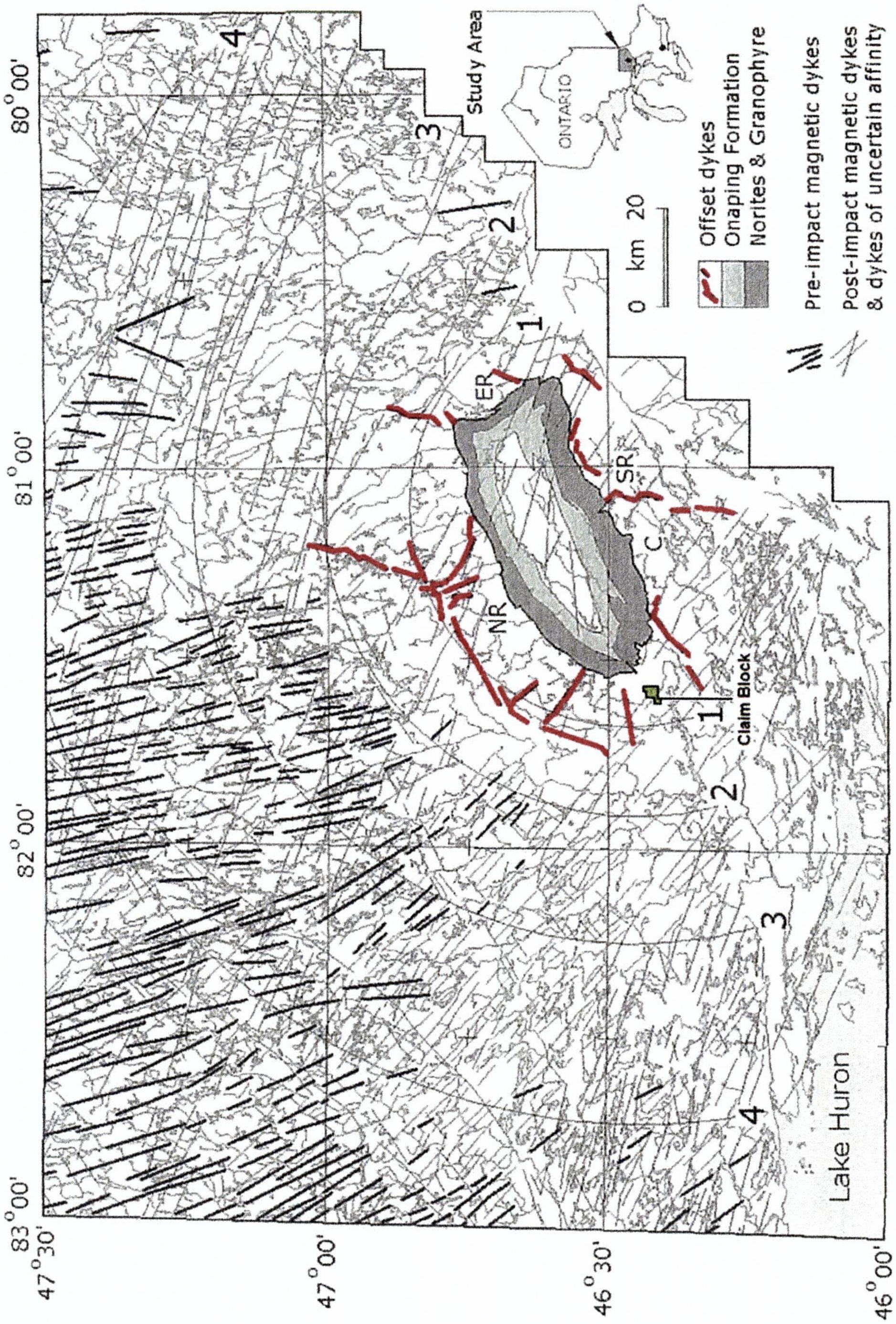
Sudbury Breccia comprises several elements - a "shock melt" component filled with rounded country rock blocks (showing a "milled" appearance), fragments and partly digested crystals within a pseudotachylyte matrix. Pseudotachylyte is really a so-called *friction melt* deriving its composition from the most adiabatically compressive minerals in a rock mass (shock wave passage compression). In short, its composition does not mimic Bowen's Reaction Series of partial melt derivation, but is more likely to be derived from the more compressible mafic mineral suite in the rock, something that has been confirmed in the laboratory.[17] Compressive shock waves from the impact centre cause pseudotachylyte production along contrasting specific gravity rock type boundaries by wave-refraction focusing at contacts and stratigraphic bends. In the South Range footwall, large pseudotachylyte bodies commonly occur parallel to Huronian stratigraphy and as irregular cross-stratigraphic bodies. Because of continual earthquake activity during the on-going adjustment of the under-crater footwall, pseudotachylyte melts flow towards the base of the crater fill such that pseudotachylyte chilled margin fragments can be scoured and reincorporated into still-liquid pseudotachylyte (pseudotachylyte fragments within pseudotachylyte), and country rock blocks can accumulate in choke zones as heterogeneous block mixtures after fissures close. Different batches of pseudotachylyte melt can show partial mixing (pseudo-immiscibility, but really minimal-distance coherent flow) and crystallization (mineral nucleation) in some batches can mimic textures found in ***the marginal facies*** of Quartz Diorite ("QD") Offset Dykes.

Of particular interest, however, is the fact that the giant Frood Ni-Cu-PGE deposit is hosted in ***>90% recrystallized pseudotachylyte***. In short, a widening fissure containing pseudotachylyte liquid was available for injection from above by components of what is called Inclusion-bearing (plus sulphide) Quartz

[16] Ames, D. E., Stoness, J.A. and Rousell, D.H. (2009): Whitewater Group, in, A Field Guide to the Geology of Sudbury, Ontario; *eds*, Rousell, D.H. and Brown, H., *Ontario Geological Survey*, Open File Report 6243, pp.37-44.
[17] Spray, J.G. (2010): Frictional Melting Processes in Planetary Materials: From Hypervelocity Impact to Earthquakes; *Annual Review Earth and Planetary Science*, 38, pp221-254.

diorite ("IQD") components. At Frood, the recrystallized pseudotachylyte envelope around ore can be seen in outcrop as a "smoothing" – recrystallized material shows smooth outcrop surfaces and unrecrystallized material shows fingernail-sized lumps, an effect emphasized by local industrial acid rain on the outcrop.

Figure 4 – Distribution and intensity of magnetic dykes of the pre-impact Matachewan and post-impact Sudbury swarms in relation to an *idealized ring structure* (based on a √2 assumption). The Matachewan dykes lose their magnetic signature on approaching *putative* Ring 2 and they are magnetically invisible within Ring 2. This is likely due to a massive EM field caused by the plasma cloud generated above the impact center.



6. Quartz Diorite Offset Dykes

As shown in ***Figure 4*** above, Quartz Diorite ("QD") offset dykes occur in the footwall stratigraphically beneath the SIC. The marginal facies of these dykes can be, in the field, somewhat similar to blobs of crystallized pseudotachylyte and likely has a similar history ***but*** with a more-prolonged magmatic evolution. Textures in QD are quite variable but show rapid cooling (Lesher, 2014).[18] QD dyke centres can contain Fe-Ni-Cu-PGE sulphides as veins and disseminations, local falls from country-rock sidewalls (e.g., Nipissing large blocks at Worthington and Totten), fragments of QD (scouring of chilled margins by later magma batches, that is, the fissures did not open all at once but episodically), anatexites that are outcrop prominent in the North Range offset dykes, and so-called "exotic blocks." A new map outlining the extent of currently known QD offset dykes has been published by *Smith et al.* (2013)[19] and has been sketched in ***Figure 4***. Interestingly, these authors posit the centre of the impact based on the curvature of the Hess Offset Dyke to a similar position as that proposed by the ring structure of Butler (1994).

In South Range QDs, exotic blocks include numerous small fragments of Huronian mafic volcanics, rare ultramafic pieces, larger rounded to blocky chunks of pyroxenite and grey gabbro, and etc. These compositions have a slightly higher specific gravity and are the most difficult to melt-digest and most likely represent fragments from pre-existing mafic-ultramafic complexes (possibly like the East Bull Lake complex) settling down with sulphides in the melt footwall. These fragments rarely carry sulphides except along margins (sulphide wetting and strain shadows during subsequent deformation) and as small penetrative crack fillings.[20] Volumetrically, they are quite unlikely to have been a direct pre-impact sulphide source. The sulphides would have precipitated due to the large volume of siliceous melt generated by the impact which lowered the sulphide saturation of the melt (like adding silica to a furnace to create a matte).

7. Post-impact Faulting

The Sudbury Basin is crossed by south-facing arcuate faults as part of the post-impact Penokean Orogeny. These units penetrate the SW corner of the SIC and form a relative horst-graben complex that crosses the claim group (***Figure 3***). In the NW-corner of the SIC sections of a hornfels beneath the SIC are missing most likely due to unmarked south-dipping thrusts which also likely define the edges of retrogressed granulites in the footwall there.[21] Such faulting is also likely to occur subparallel to units within the SIC itself (Ann Theirault *pers. comm.* – she established repetition of SIC cumulate sections in North Range drill core).

The offset dykes do not really conform to simple radial and concentric patterns. Indeed, it is highly likely that during the impact event itself, post-shock wave time was almost immediately dominated by the Penokean far-field stress system. Directionality is likely to be an important factor in the brittle fracturing of the SIC footwall, and NE-structures that are parallel to Frood.

8. Geophysical Traverses

Work to date comprises some preliminary geophysical traverses (VLF; stations and data collected by Frank Racicot). This was conducted in April (over compacted snow cover and frozen lakes) across known Nipissing Ni-Cu-PGE mineralization, the probable footwall of an East Bull Lake gabbro intrusion and along a NE-trending feature (a potential QD strike direction in the NE of the claim block). The data was interpreted by Shaun Parent who has proprietary algorithms. That his algorithms work have been confirmed by a blind

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[18] Lesher, C.M. (2014): Recent Advances in Understanding the Petrogenesis and Metallogenesis of the Sudbury Igneous Complex; *MERC Workshop*, November, 2014.

[19] Smith, D.A., Bailay, J.M. amd Pattison, E.F. (2013): Discovery of New Offset Dykes and Insights into the Sudbury Impact Structure; Abstract, Large Meteorite Impacts and Planetary Evolution V.

[20] Davis, G.C. (1984): Little Stobie Mine: A South Range Contact Deposit; in, the Geology and ore deposits of the Sudbury Structure, *Ontario Geological Survey* Special Volume 1, pp.361-369. Of general interest, Davis' Figure 16.3 shows the Little Stobie Number 2 orebody in cross-section and the ore looks exactly like a strain shadow bounded by the margin of the Murray Pluton.

[21] Boast, M. (2006): The metamorphic aureole of the Sudbury Igneous Complex; PhD thesis, *University of New Brunswick*.

survey on the Parkin Offset Dyke (NE corner of the Sudbury Basin footwall). Because the VLF transmitter is out-of-country, and no lines were blazed in the bush during the survey (walking traverses only), no permits are required under the new Ontario Mining Act. Locations are collected by GPS (Easting, Northing and Elevation) such that topographic profiles were also collected along the traverses – very useful for interpretation (especially when separating topographic responses from conductive sulphide responses).

1. **Conclusion**

Geologically, the claim block is within the potentially mineralized footwall of the Sudbury Impact Structure. In other words, Fe-Ni-Cu-PGE mineralization is potentially present in; a) known Nipissing units, b) East Bull Lake gabbro on the claim block as well as being associated with, c) the Sudbury Impact Structure (Footwall Mineralization and offset dykes).

Frank Racicot,

734 Whittaker Street,

SUDBURY, Ontario, Canada, P3E 4B2

(705) 691-5920 (cell), (705) 673-7117 (office)

Hadyn R. Butler,

647 Silver Lake Road,

SUDBURY, Ontario, Canada, P3G 1J9

(705) 522-1173 (office)

VLF EM-16

Interpretation Report

Based on

Reconnaissance VLF Surveying

For

Offset Dikes

West of the Sudbury Basin

Prepared For

Hayden Butler, Frank Racicot

Claim Holders

By

Shaun Parent

Superior Exploration, Adventure & Climbing Co. Ltd.

May 20, 2015

Executive Summary:

A series of VLF EM-16 survey lines were carried out in March 2015, with a Geonics VLF EM-16 and a handheld Garmin GPS-60C. 2 transmitter stations were read during the course of the survey: NAA 24.0 KHz – Cutler, Maine and NLK 24.8 KHz- Jim Creek, Washington (Figure-1)

While the costs associated with the VLF survey will be used for assessment work, the main objective of the 2015 VLF EM-16 survey was to determine if the VLF Survey could delineate economic mineralization and/or structures similar to that of the Parkin Offset Dike held by Wallbridge Mining. This report focuses on some of the VLF –NAA anomalies (Figure 2) and compares them with the response of the Parkin Offset Dike and Parkin Ore zone as delineated in a VLF survey carried out in June 2013

Introduction

A VLF-EM16 survey is a relatively simple and economic geophysical survey that is used to better understand shallow, vertical and sub vertical bedrock conductors.

This report compares the findings and results of the VLF EM-16 survey carried out by Frank Racicot utilizing the new VLF2DMF processing software of which the author of this report has assisted in developing with Dr. Fernando Santos of Lisbon, Portugal.

VLF2DMF is a software package that has been developed in order to enable the processing and inversion of electromagnetic (EM) induction data acquired at a Very Low Frequency (VLF).

The software produces profiles of the Raw Data, Fraser Filtered Data, KH, Resistivity and a (2-D) Modelled Inversion as well as plan maps, slices of Fraser, KH and Inversion models of separate VLF survey lines.

Personnel

The VLF EM-16 operator and GPS field navigator responsible for the collection of all raw data was Frank Racicot.
Processing and Interpretation of the VLF data using the VLF2DMF Software was completed by Shaun Parent.

Figure 1: VLF Reconnaissance Line

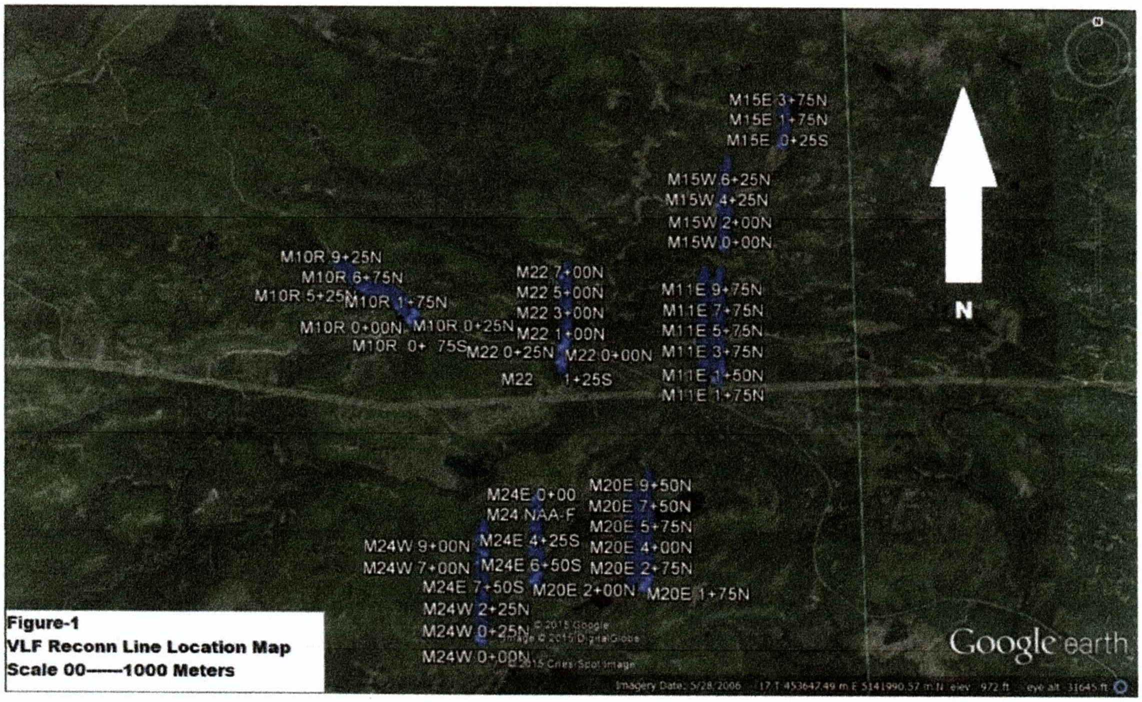


Figure-1
VLF Reconn Line Location Map
Scale 00——1000 Meters

Work Performed

The VLF EM-16 survey consisted of running 10 Reconnaissance VLF lines (Figure 1).

The VLF lines were completed while using a handheld Garmin 60-CSX GPS. Each VLF station was located based on a northerly azimuth and distance from the start of the survey line. At each line station, 2 transmitter stations were read using the Geonics VLF- Em-16 receiver. The following parameters were used throughout the survey:

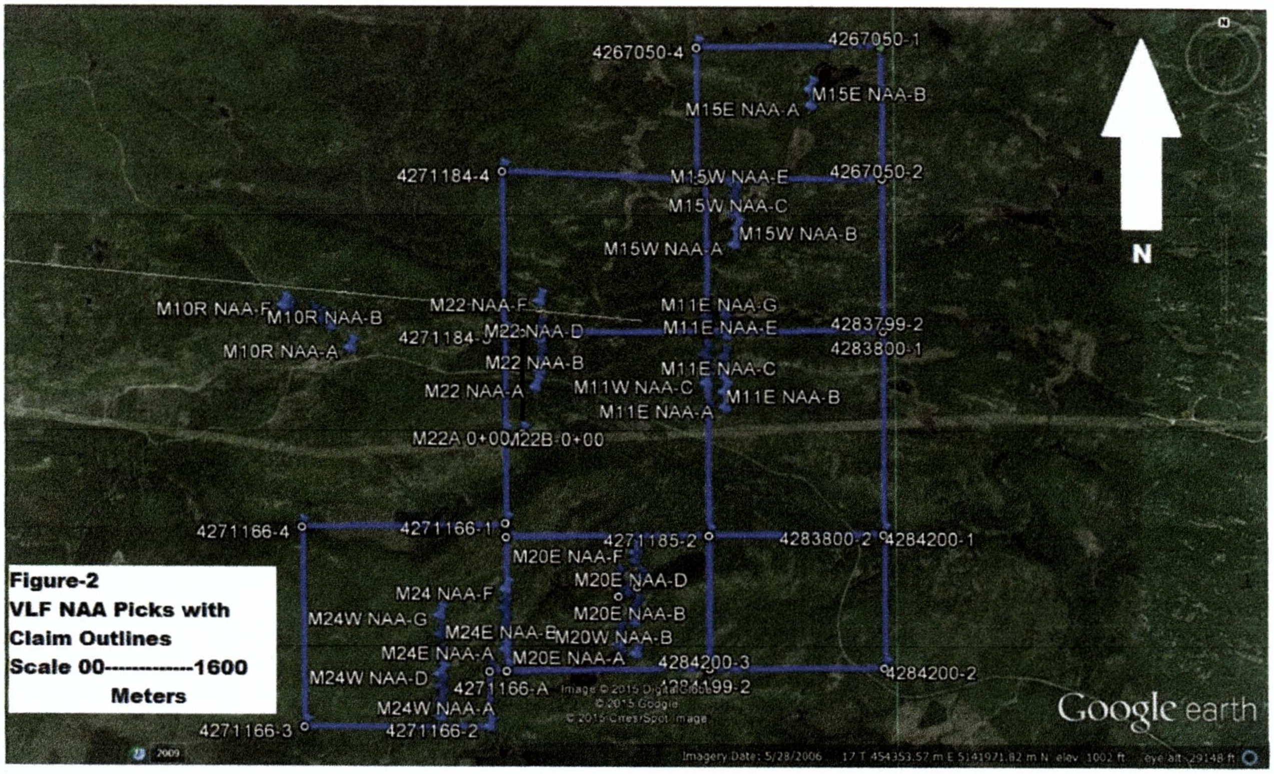
VLF Transmitters Used: NAA-24.0 KHz. - Cutler, Maine and NLK-24.8 KHz.- Jim Creek, Washington

VLF survey direction: The VLF Em-16 receiver was facing north along all lines. (Except M10R)

VLF survey stations: All VLF readings were taken at approximately 20 meter stations along the survey line.

Parameters of Measurement: In-phase and Quad-phase components of a vertical magnetic field is measured as a percentage of horizontal primary fields. (Tangent of tilt angle and ellipticity). VLF transmitter NAA was to the east. The transmitters are chosen so that the direction to the transmitting station is as close to the orientation of the bedrock strike.

Figure 2: VLF NAA Picks with Claim Outline



VLF Data Processing

- Field data was collected as follows on each surveyed line.
- Each station was saved onto the Handheld Garmin 60CSX. GPS Unit (including local features such as power lines, fences and geological structures)
- VLF readings for each station were recorded in a notebook as In-Phase and Quadrature corresponding to the line number and station number. (See example in Table 1)

Table 1: Example of VLF Field Data Collection

L1 W	NAA In phase	NAA Quadrature	NLK In phase	NLK Quadrature	Notes
0+00	10	6	4	5	Rusty
0+20N	8	4	2	4	Outcrop
0+40N	6	5	0	2	

- Field information data was transferred to a Garmin map source program so line and station information could be viewed.
- Garmin and VLF data were compiled onto an excel spreadsheet and then inputted into the VLF2DMF processing software.

VLF Data Profiles

VLF data collected on the reconnaissance lines were processed using the VLF2DMF software. Profiles for each frequency (NAA-24.0 KHz.-Cutler, Maine and NLK-24.8 KHz.-Jim Creek, Washington) were reviewed, however, for this report and simplicity, only NAA 24.0 data was interpreted and the VLF Inversion Models are included in the report. These VLF inversion models from the reconnaissance lines were compared to the NAA VLF inversion models from the Parkin Offset Dike for Lines, 0+00, 0+50S, 1+00S and 1+50S.

1: **VLF Raw and Filtered Data Profiles**

Raw data for each frequency was plotted for each line surveyed. A running average filter of the raw data can be run to smooth the survey profile.

2: **Fraser Filter Profiles**

Raw data for frequency NAA and NLK was run through the Fraser Filter. This filter transforms In-Phase cross overs and inflections into positive peak anomalies. In-Phase inflections and cross overs are usually plus to minus, while Quadrature responses are negative to positive giving a negative peak anomaly when the Fraser Filter is applied. VLF anomalies were chosen based on the location of the peaks on the Fraser Filter profile.

3: **VLF K-H Profiles**

Filtered data for frequency NAA and NLK was run through the Karous-Hjelt (K-H) filter. The filter is applied to obtain a section of current density. The higher values are, in general, associated with conductive structures.

4: **VLF Resistivity Profiles** - 1000 Ohm

The Apparent Resistivity for frequency NAA and NLK was calculated and plotted. The resistivity can be calculated if the mean environmental resistivity is known at the beginning of the VLF profile.

5: **VLF Inversion Models** - 1000 Ohm

Resistivity's of 1000 was used to build an initial model used in the inversion to obtain a realistic cross section of the line surveyed. Conductive zones are colored blue while resistive zones are colored orange. An elevation scale is found on the left side of model profiles. Surface conductive zones show little depth extent, have a horizontal display and are limited in depth. Deeper conductors have more depth extent with a vertical display. The location of the Parkin Offset Quartz Diorite Dike is marked on all the Parkin offset Model profiles. All Reconnaissance VLF line models are compared with the Parkin Models

Discussion of Results

- The maximum depth slice for transmitter NAA 24.0 with a bedrock resistivity of 1000 Ohms is 102.0 meters.
- All Inversion models including the Parkin Offset data were calculated using 1000 Ohms.
- All Inversion models including the Parkin Offset data have the same color scaling using a minimum resistivity of 10 and a maximum of 10000.
- The VLF Inversion Models for transmitter NAA collected over the Parkin Offset Quartz Diorite Dike are shown in Figure A: 0+00, Figure B: 0+50S, Figure C: 1+00S and Figure-D: 1+50S

Conclusions

The Ground VLF EM-16 reconnaissance survey was successful in:

a) Defining Several VLF bedrock conductors.
b) Several of the reconnaissance lines have similar inversion profiles as the Parkin Offset profiles. Refer to Figures I, J, K, L, M, N.
c) The March 20 East Line and March 20 West Line (Figures J, K) show a good inversion response which could be the trend of a copper showing located at 454280E/5140360N. Both lines show a well-defined conductor on their profiles with depth extent to 102 meters
d) Using a bedrock background resistivity of 1000 ohms gave us a modelled section to 102 meters in depth and outlined several highly resistive and minimally resistive rock units.
e) Reconnaissance VLF lines are a fast and low cost exploration tool in the Sudbury area to identify possible mineralized offset dikes.

Recommendations

Ground follow-up of the copper showing located between March 20 East Line and March 20 West Line.

a) Run additional VLF survey lines parallel to lines in Figure I, J, K M, N.
b) View the Reconnaissance VLF lines on Google earth images in order to identify linear structures that might indicate offset dikes.
c) Further VLF survey lines parallel to VLF line in Figure L.
d) Processing of the VLF Raw data to calculate the apparent resistivity.
e) Processing of all VLF data for Transmitter (NLK) using the VLF2DMF software.

Figure A: Parkin Offset VLF Line 0+00

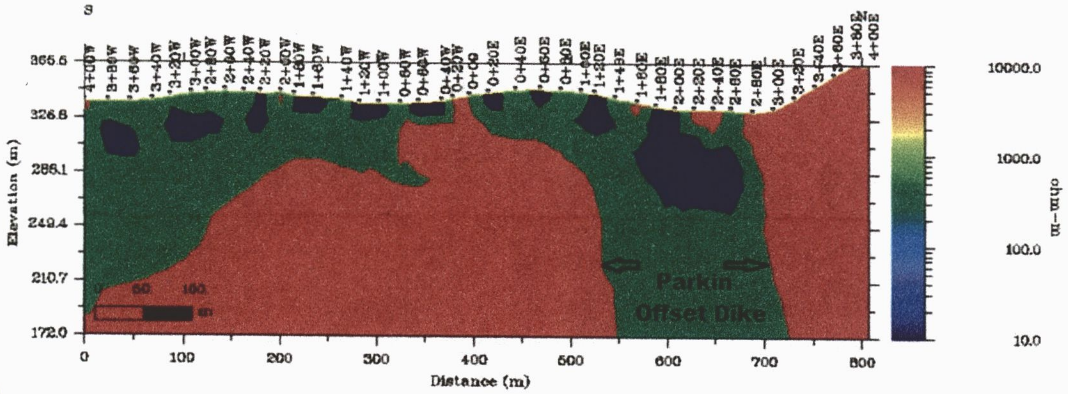


Figure-A
Parkin Offset VLF
Line 0+00

Figure B: Parkin Offset VLF Line 0+50S

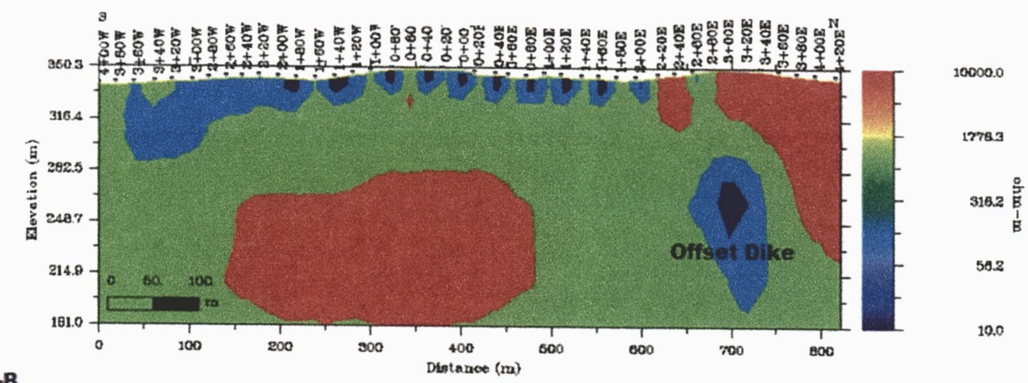


Figure-B
Parkin Offset
VLF Line 0+50S

Figure C: Parkin Offset Dike VLF Line 1+00S

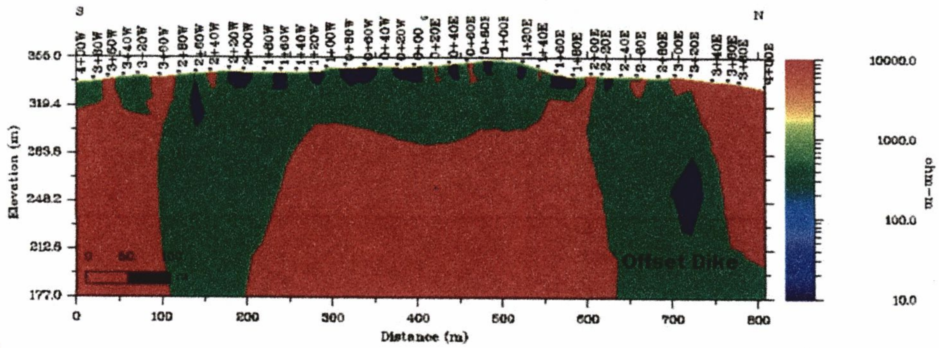


Figure-3
Parkin Offset Dike
VLF Line 1+00S

Figure D: Parkin Offset Dike VLF Line 1+50S

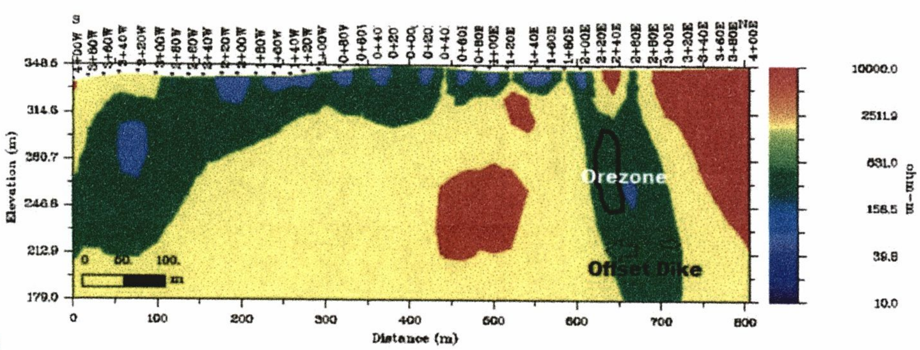


Figure-D
Parkin Offset Dike
VLF Line 1+50S

Figure E: March 10 Road Line VLF NAA Model 1000 Ohm

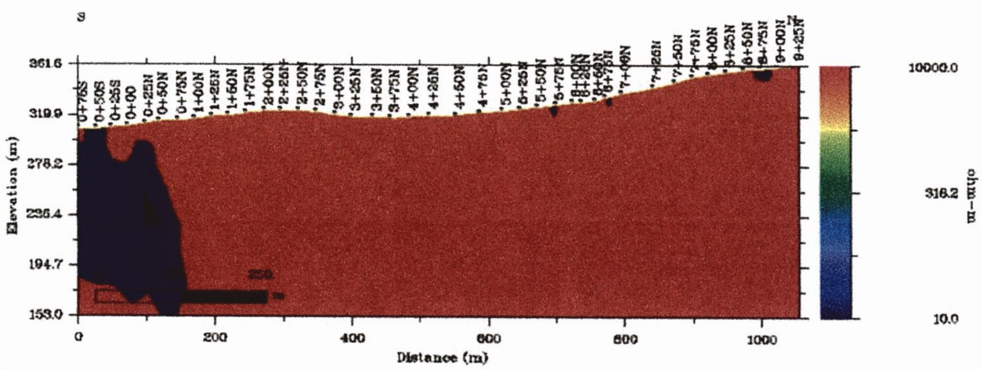


Figure-E
March 10 Road Line
VLF NAA Model 1000 Ohm

Figure F: March 11 East Line – VLF NAA Model 1000 Ohm

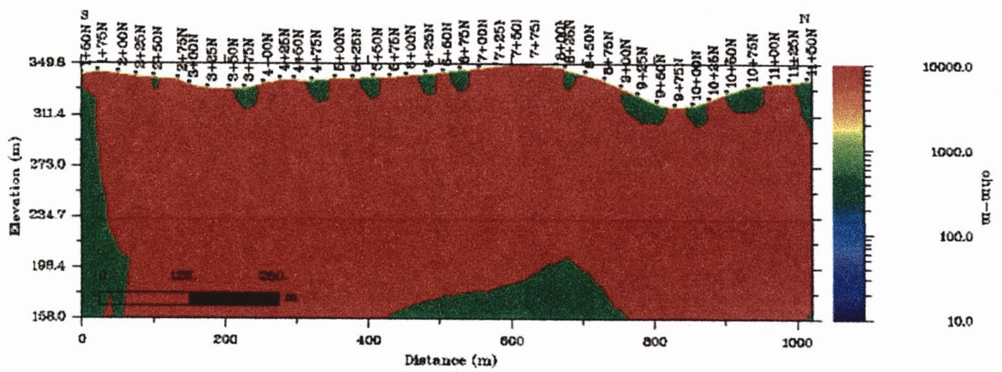


Figure-F
March 11 East Line
VLF NAA Model 1000 Ohm

Figure G: March 11 West Line – VLF NAA Model 1000 Ohm

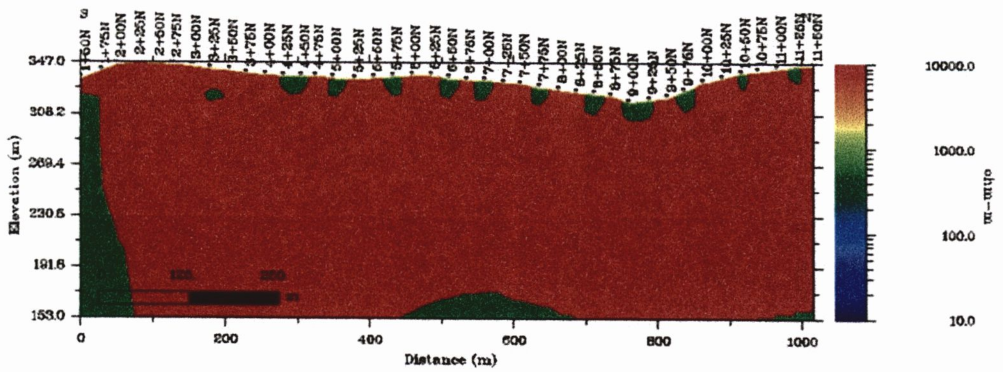


Figure-G
March 11 West Line
VLF NAA Model 1000 Ohm

Figure H: March 15 East Line – VLF NAA Model 1000 Ohm

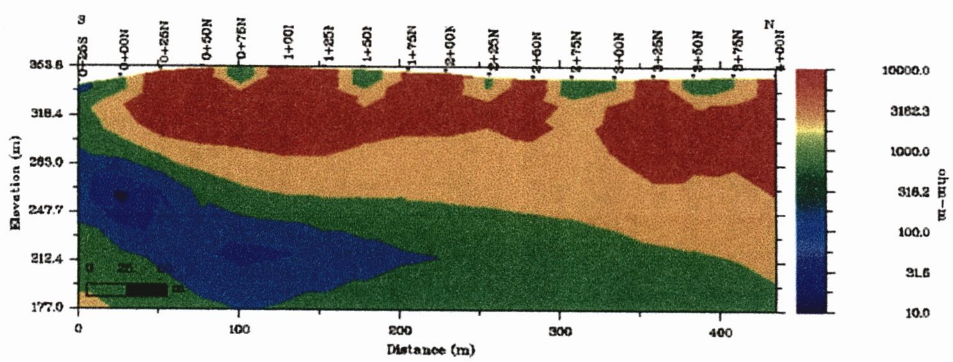


Figure-H
March 15 East Line
VLF NAA Model 1000 Ohm

Figure I: March 15 West Line – VLF NAA Model 1000 Ohm

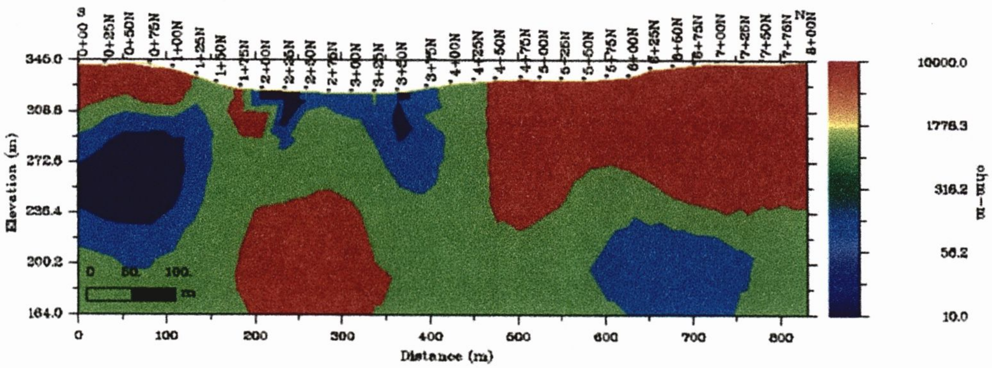


Figure-I
March 15 West Line
VLF NAA Model 1000 Ohm

Figure J: March 20 East Line – VLF NAA 1000 Ohm (copper showing trend)

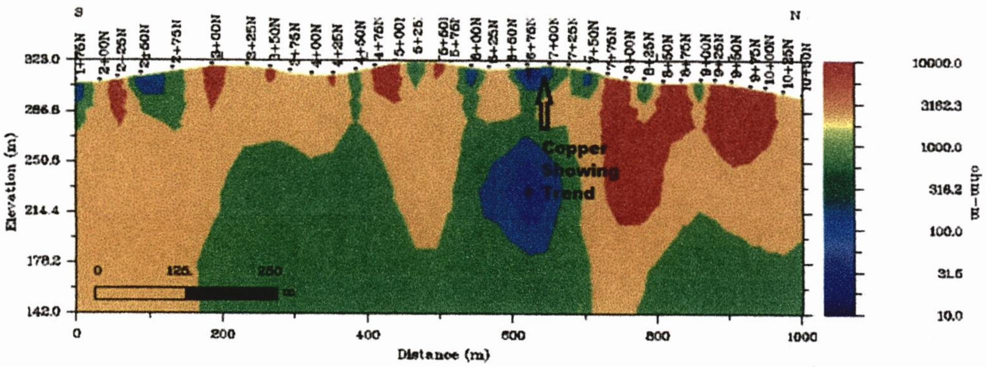


Figure-J
March 20 East Line
VLF NAA 1000 Ohm
with copper showing trend

Figure K: March 20 West Line – VLF NAA 1000 Ohm (copper showing trend)

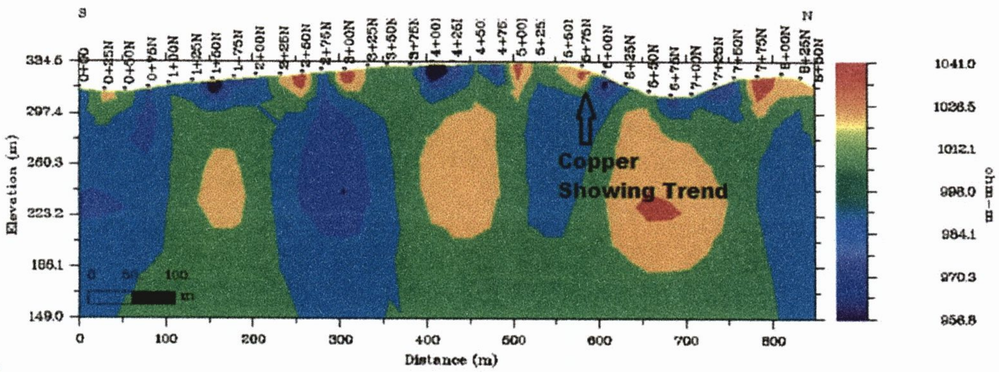


Figure-K
March 20 West Line
VLF NAA 1000 Ohm
with copper showing trend

Figure L: March 22 Single Line – VLF NAA Model 1000 Ohm

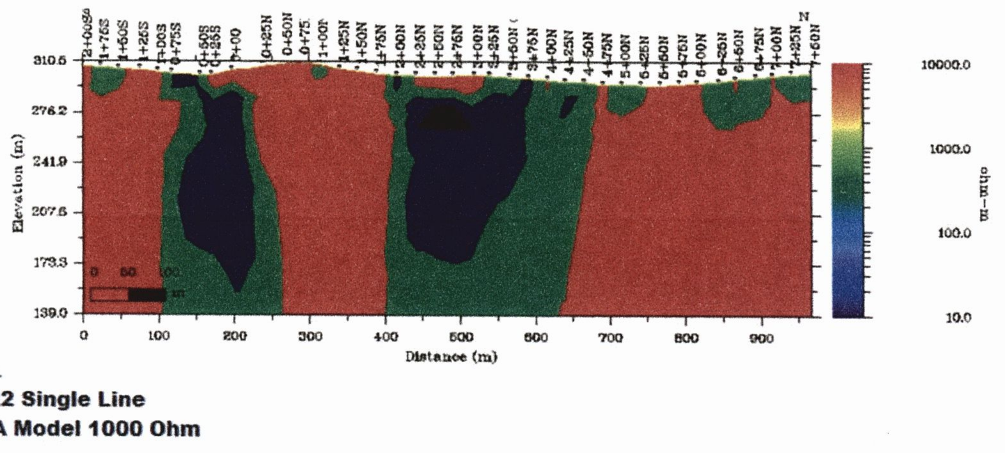


Figure-L
March 22 Single Line
VLF NAA Model 1000 Ohm

Figure M: March 24 East Line – VLF NAA Model 1000 Ohm

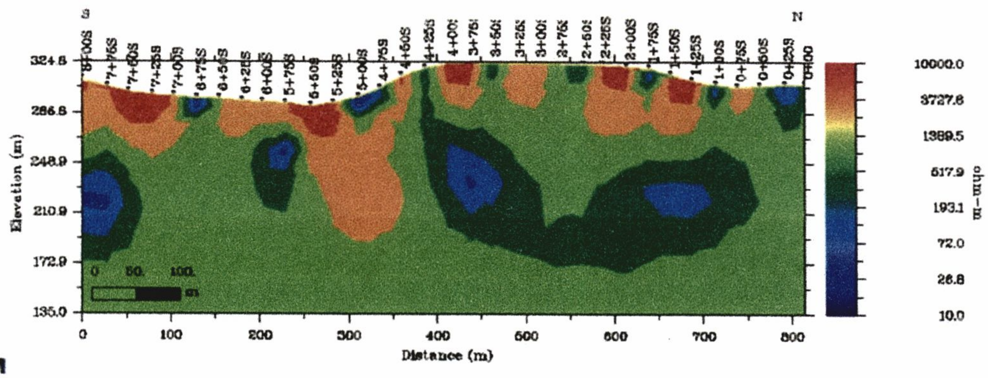


Figure-M
March 24 East Line
VLF NAA Model 1000 Ohm

Figure N: March 24 West Line – VLF NAA Model 1000 Ohm

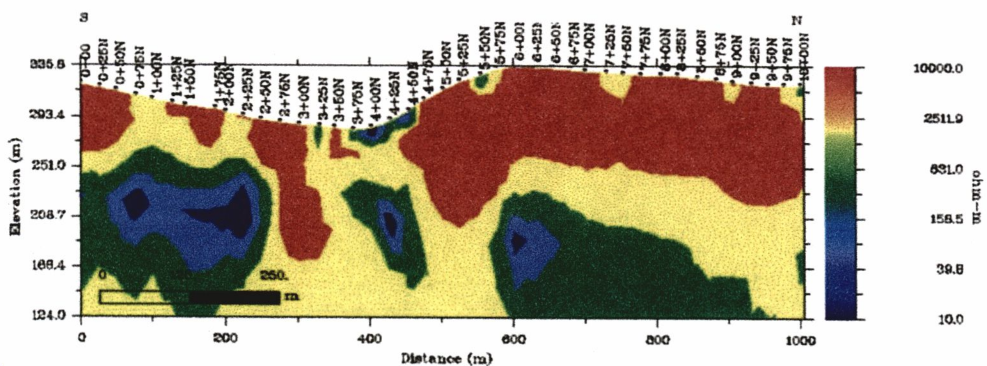


Figure-N
March 24 West Line
VLF NAA Model 1000 Ohm

List of References

Baker, H.A,. and J.O. Myers, 1979, VLF-EM model studies and some simple quantitative applications to field results: Geoexploration 17, 55-63

Fraser, D.C., 1969. Contouring of VLF-EM data. Geophysics, 34 958-967

Geonics Ltd., 1997: Operating Manual for VLF Em-16

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McNeil, J.D. and Labson; 1991: Geological Mapping using VLF radio fields. In Nabghian, M.N Ed, Electrical Methods in Applied Geophysics 11. Soc. Expl. Geoph, 521-640

Sayden, A.S, Boniwell, J.B; 1989: VLF Electromagnetic Method, Canadian Institute of Mining and Metalurgy, Special Volume 41, 111-125 of VLF-EM Data

Monteiro Santos, F.A; 2013: VLF 2D V1.3 A program for 2D inversion

Certificate of Qualifications

I, Shaun Parent, P. Geo . Residing at 282 B Whispering Pines Road, Batchawana Bay, Ontario do certify that:

1. I am a consulting Geoscientist with Superior Exploration, Adventure & Climbing Co. Ltd.
2. I graduated with a Geological Technician Diploma from Sir Sandford Fleming College in 1986.
3. I graduated with a BSc. from the University of Toronto in 1986
4. I am a member in good standing with the Association of Professional Geoscientists of Ontario #1955 and a member of the Prospectors and Developers Association of Canada.
5. I have been employed continuously as a Geoscientist for the past 26 years since my graduation from University.
6. The nature of my involvement with this project was to carry out the interpretation of the VLF data using the EMTOMO VLF2D Software of which I have been developing with Dr. Fernando Santos of Lisbon, Portugal.

Dated this 23th day of May 2015

Shaun Parent, Diploma-Geo, BSc. P. Geo (Limited)

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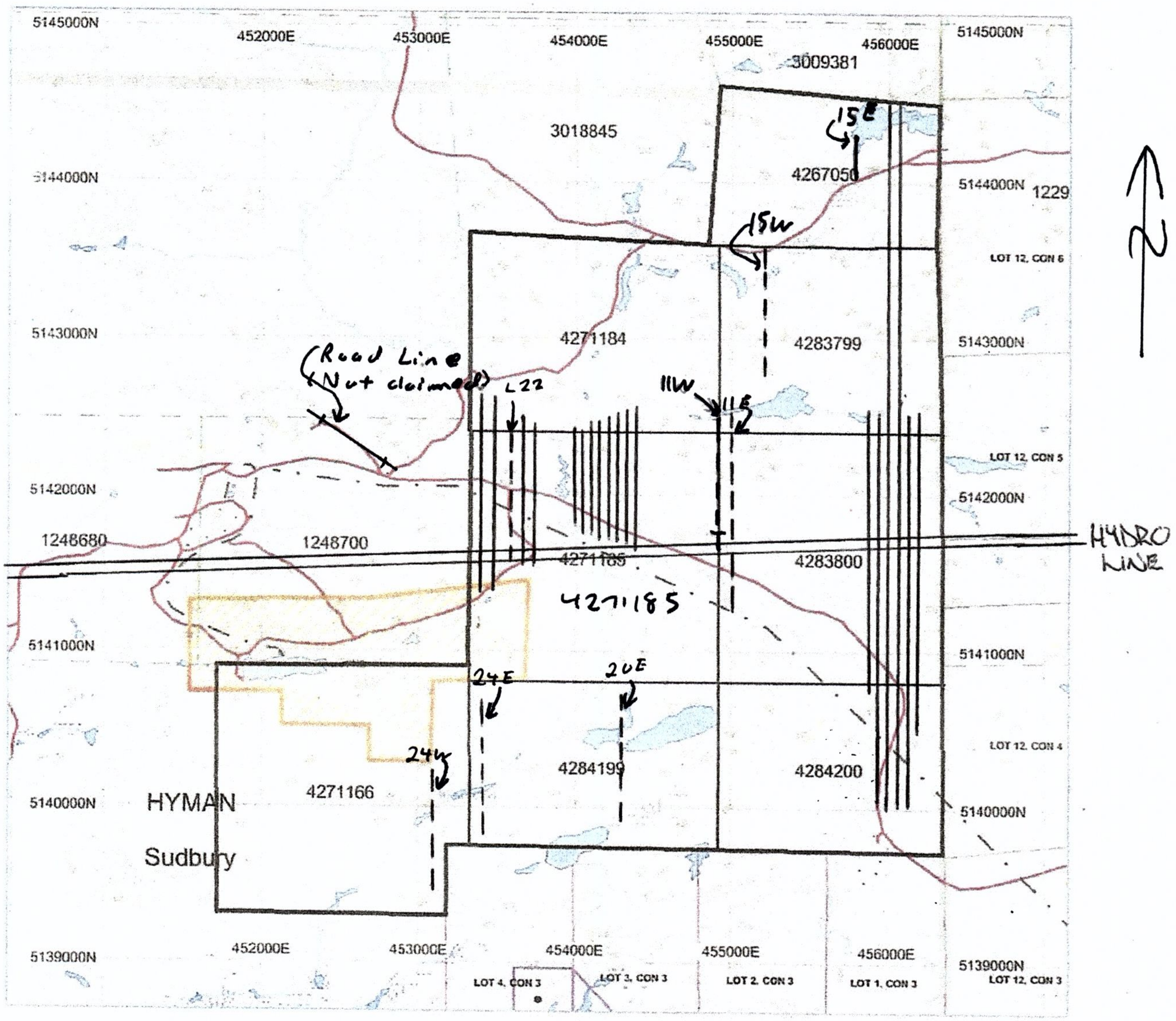
Figure 2 – Location of claim block in Hyman Township showing further topographic details (topographic contours) and access roads. Also, a 1 kilometer UTM grid (NAD 83) is also shown. The claim block is outlined with a bold black line and an area covering a federal reserve (former Agnew Lake Mine tailings is shown in orange – Identifier FND, Type N, Class FND: Permission was given by the MNDMF to stake across this tailings area as this in part of their defined authority to allow this activity).



Note: Base map courtesy of the MNDM website

— VLF LINES FEB./2017

- - - VLF LINES PREVIOUS 2015

Scale

0 1cm 2cm 3cm 3.6cm

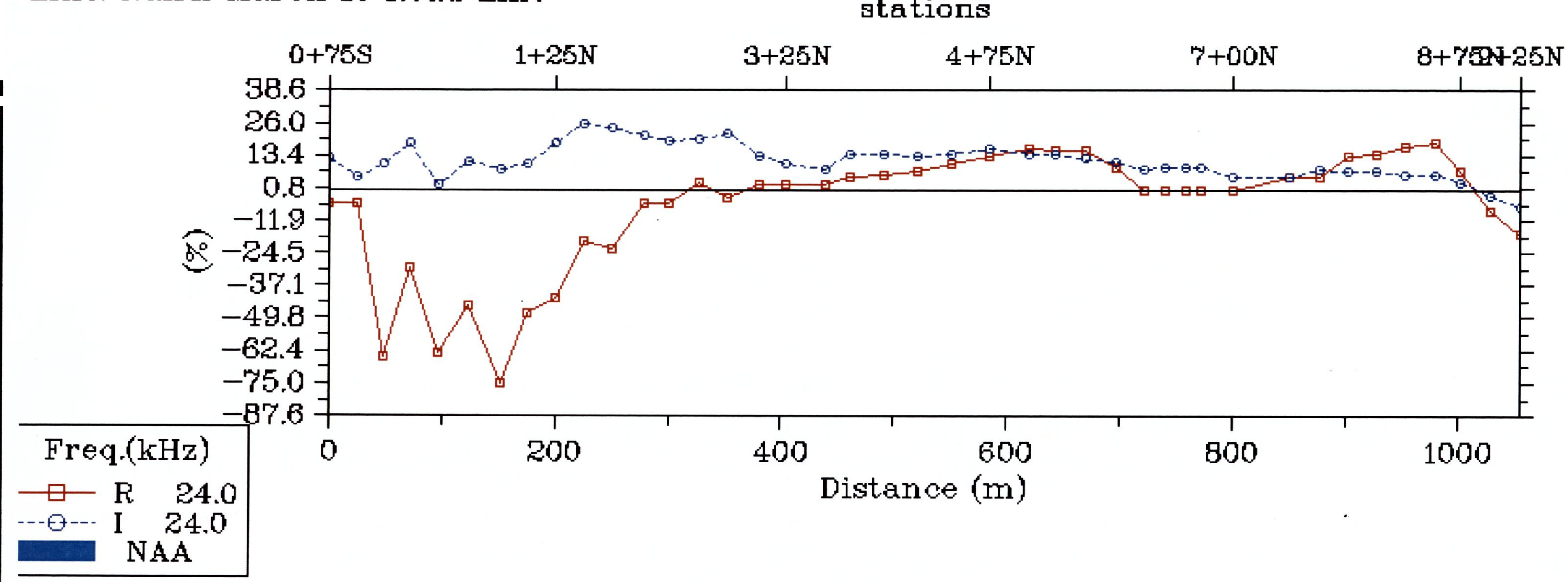
1. Location, Access and Topography

The contiguous 8 claim block is located in the northeast corner of Hyman Township, Sudbury District, Ontario. Access from the Greater City of Sudbury (to the east) is via Provincial Highway 17 West (the Trans-Canada Highway to Sault Saint Marie) to the Totten Mine turnoff across a CPR railway line, thence

1cm = 445m

1: 44,500

VLF–EM raw data
Line: Nairn March 10 Road Line



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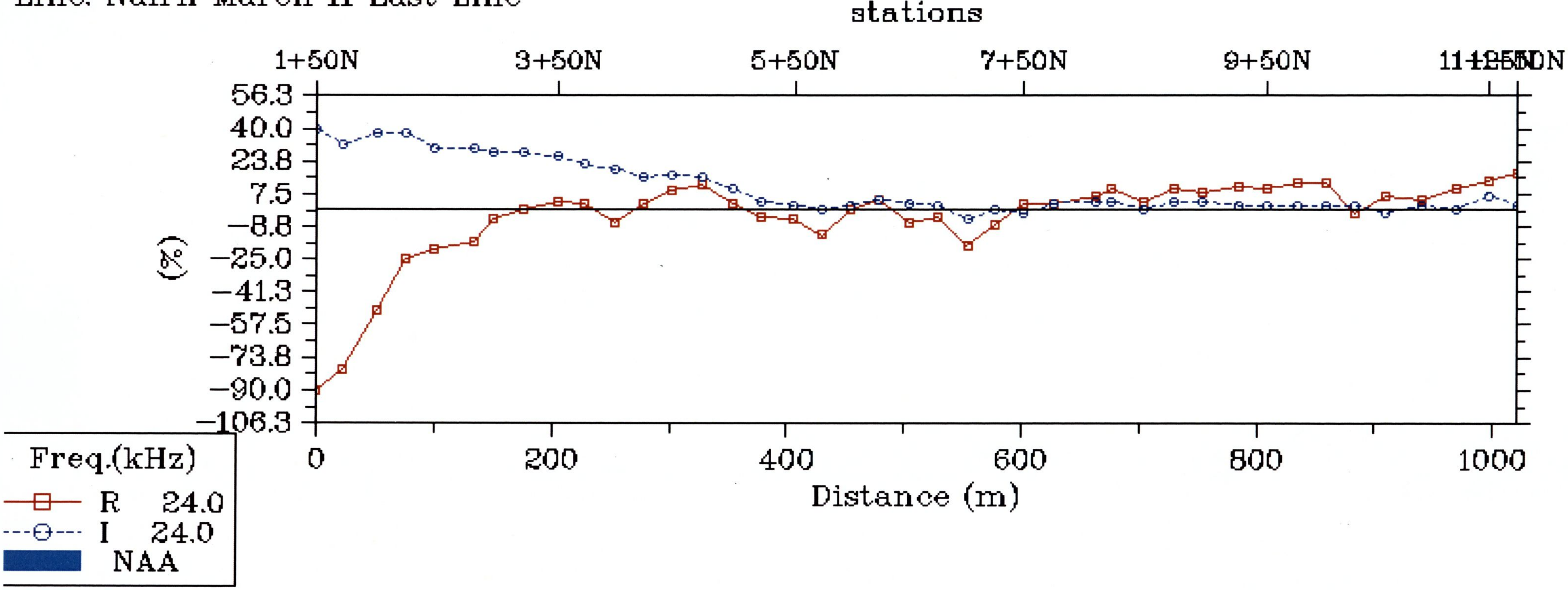
VLF–EM raw data
Line: Nairn March 11 East Line



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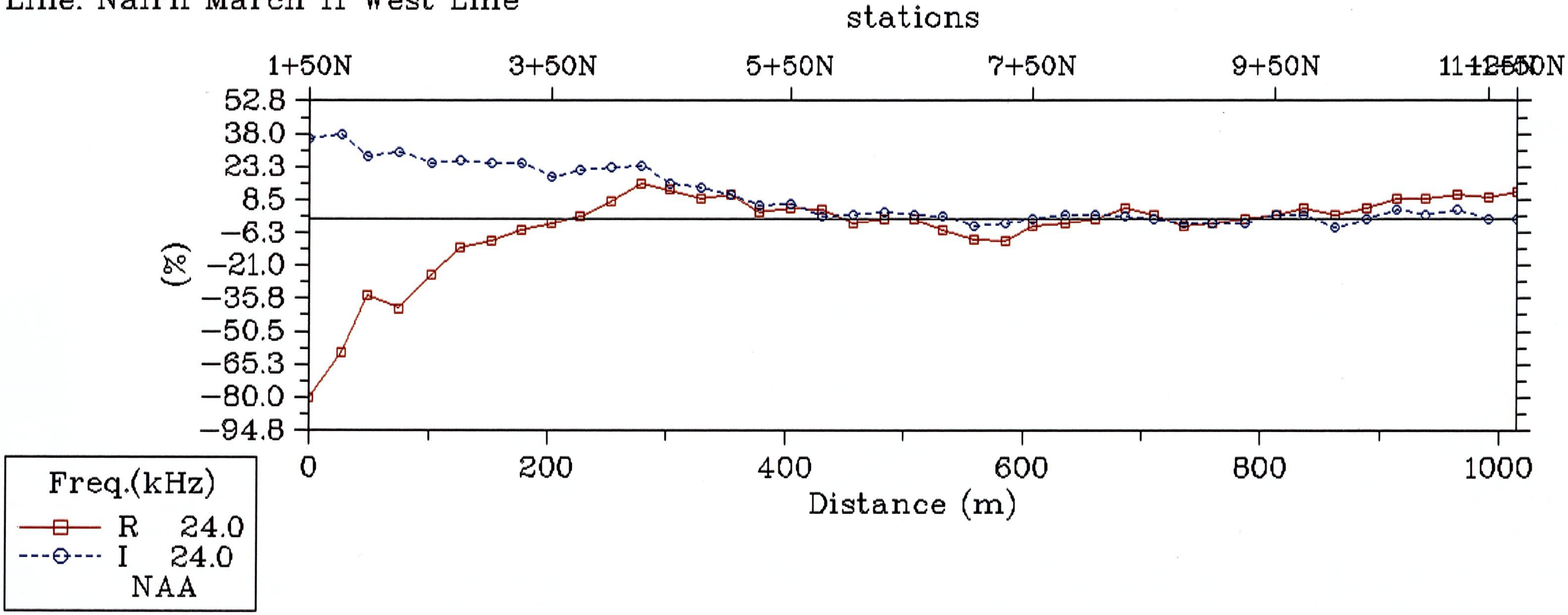
VLF-EM raw data
Line: Nairn March 11 West Line



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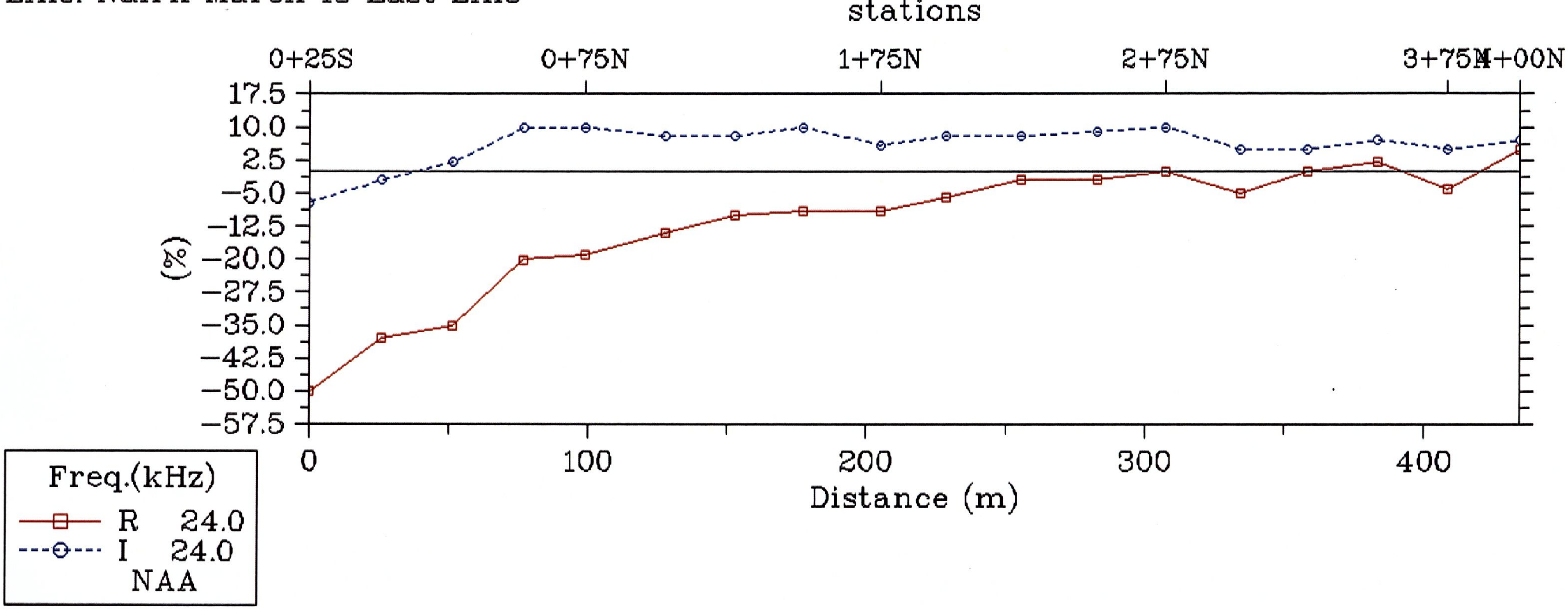
VLF-EM raw data
Line: Nairn March 15 East Line



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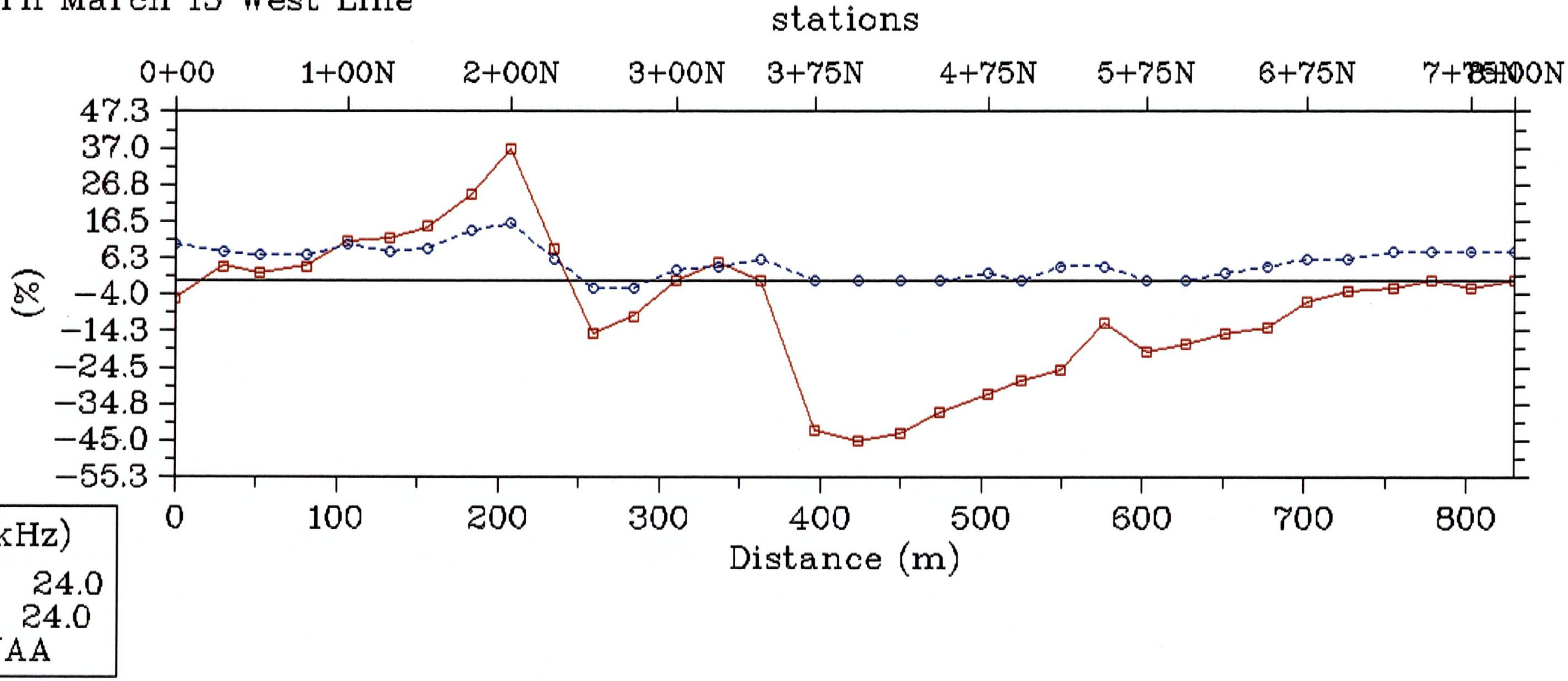

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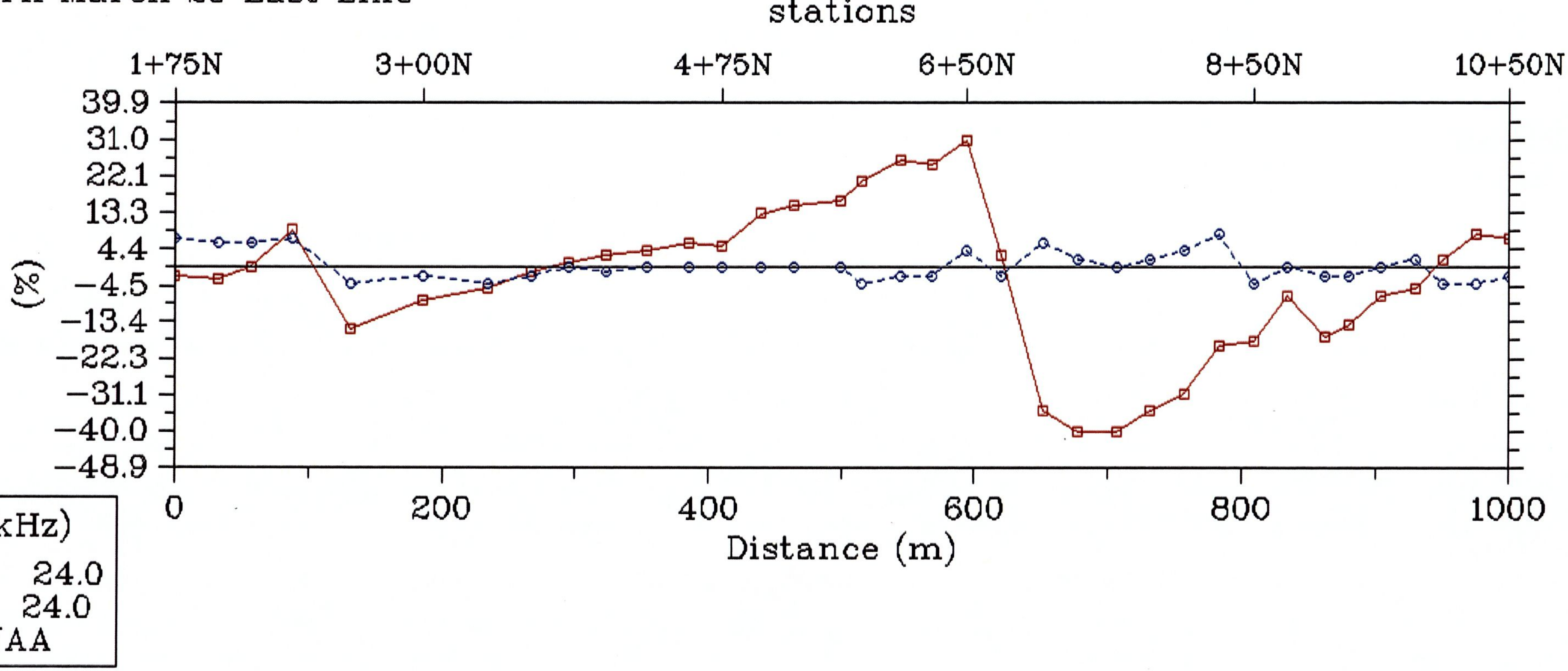

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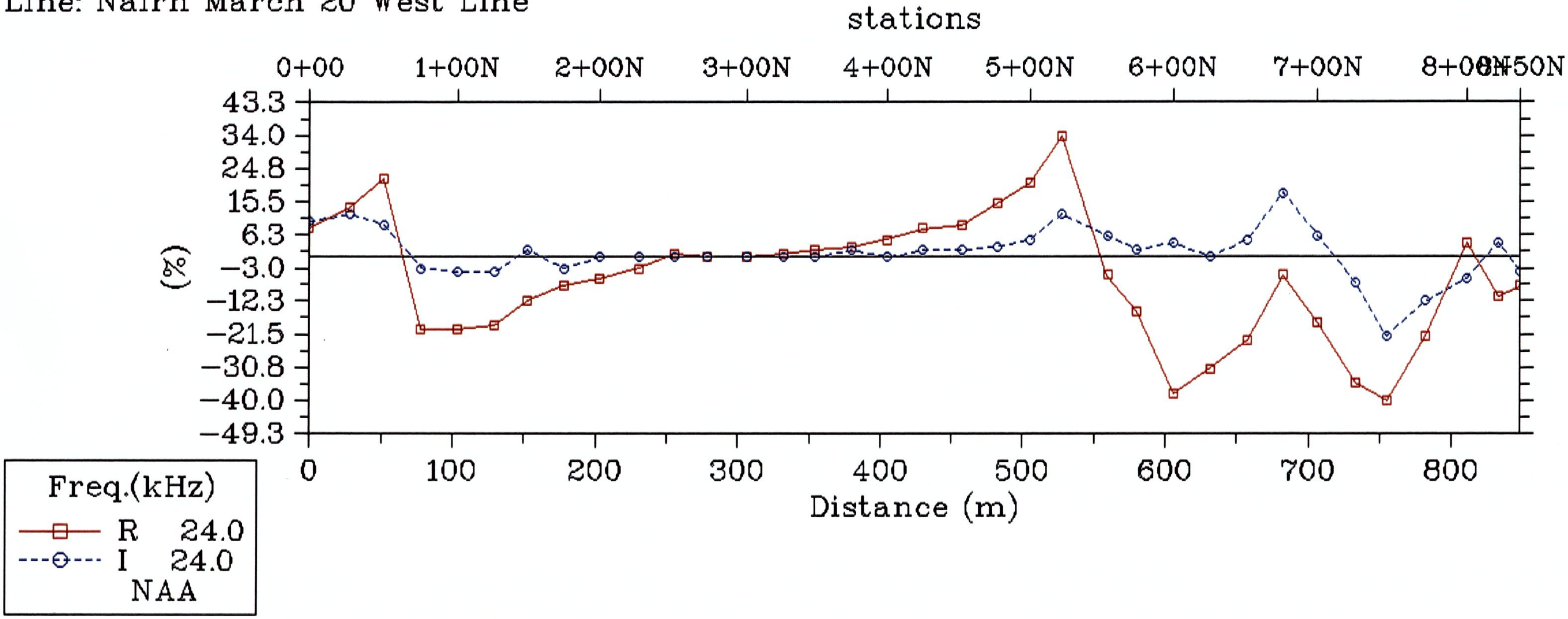
Line: Nairn March 20 West Line



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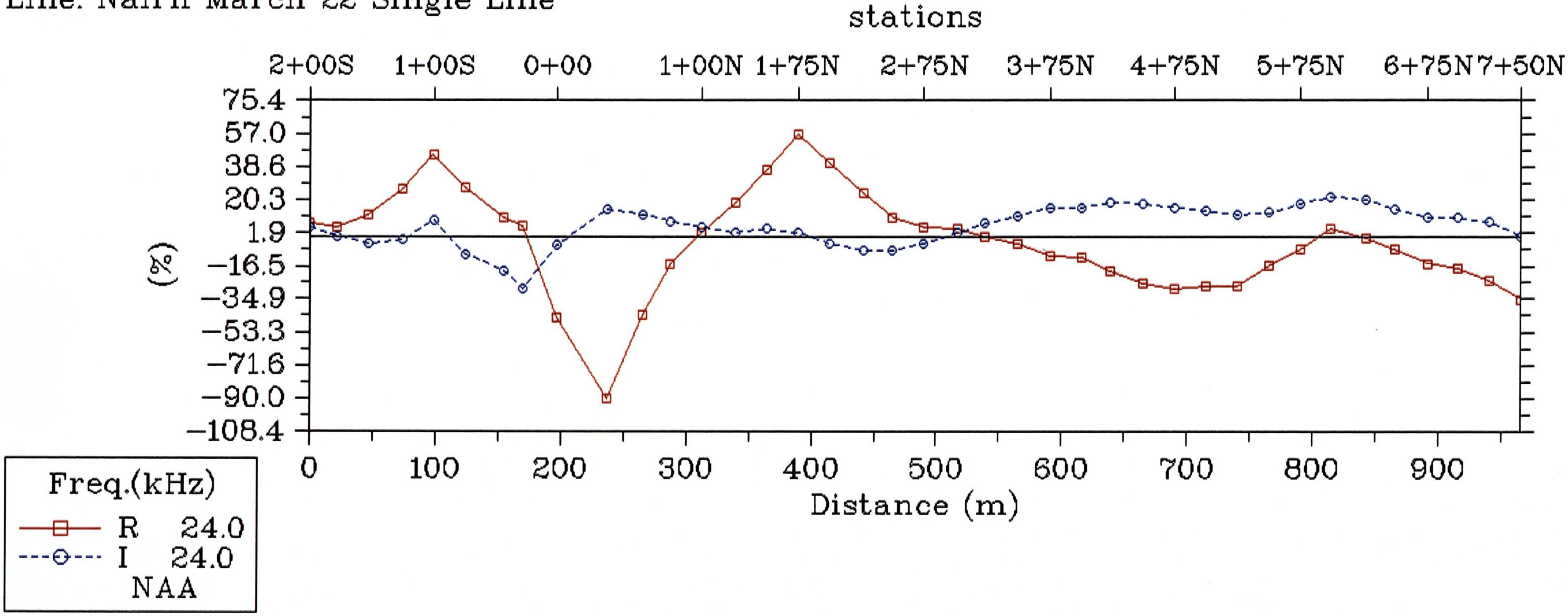
VLF-EM raw data
Line: Nairn March 22 Single Line



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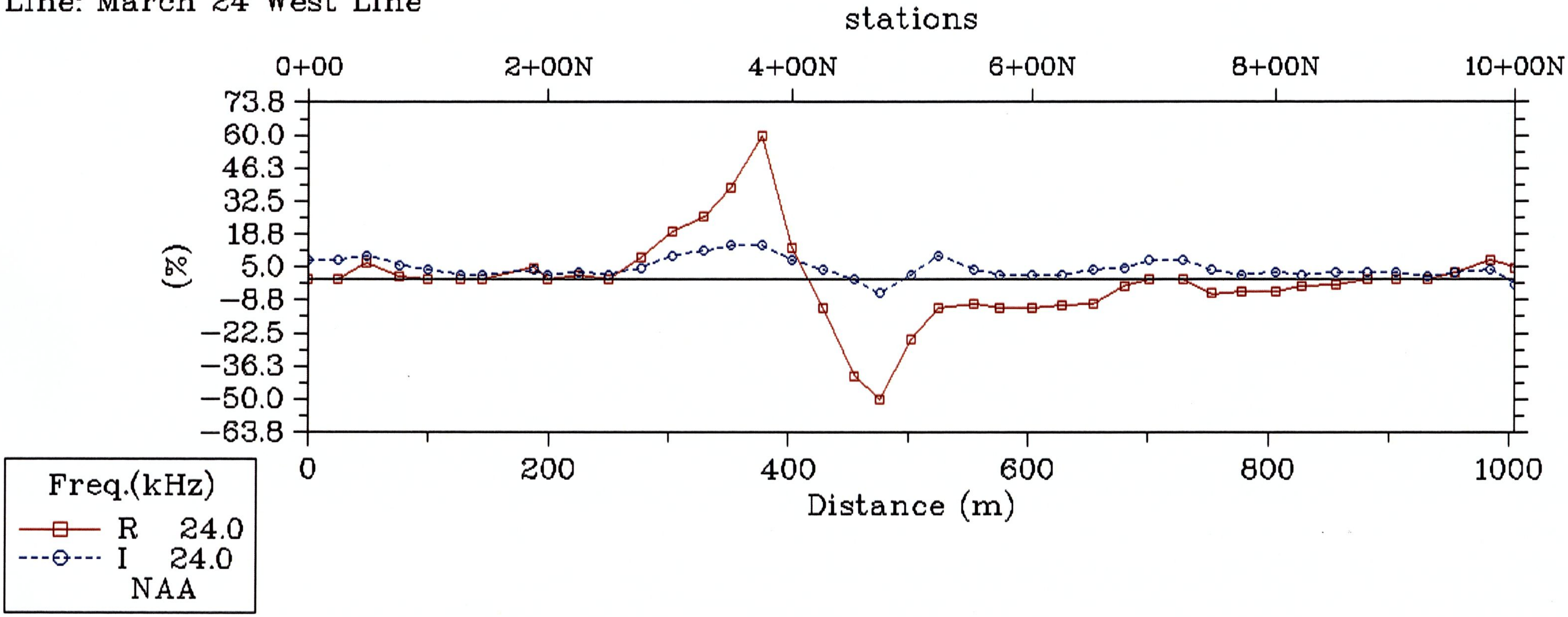
VLF-EM raw data
Line: March 24 West Line



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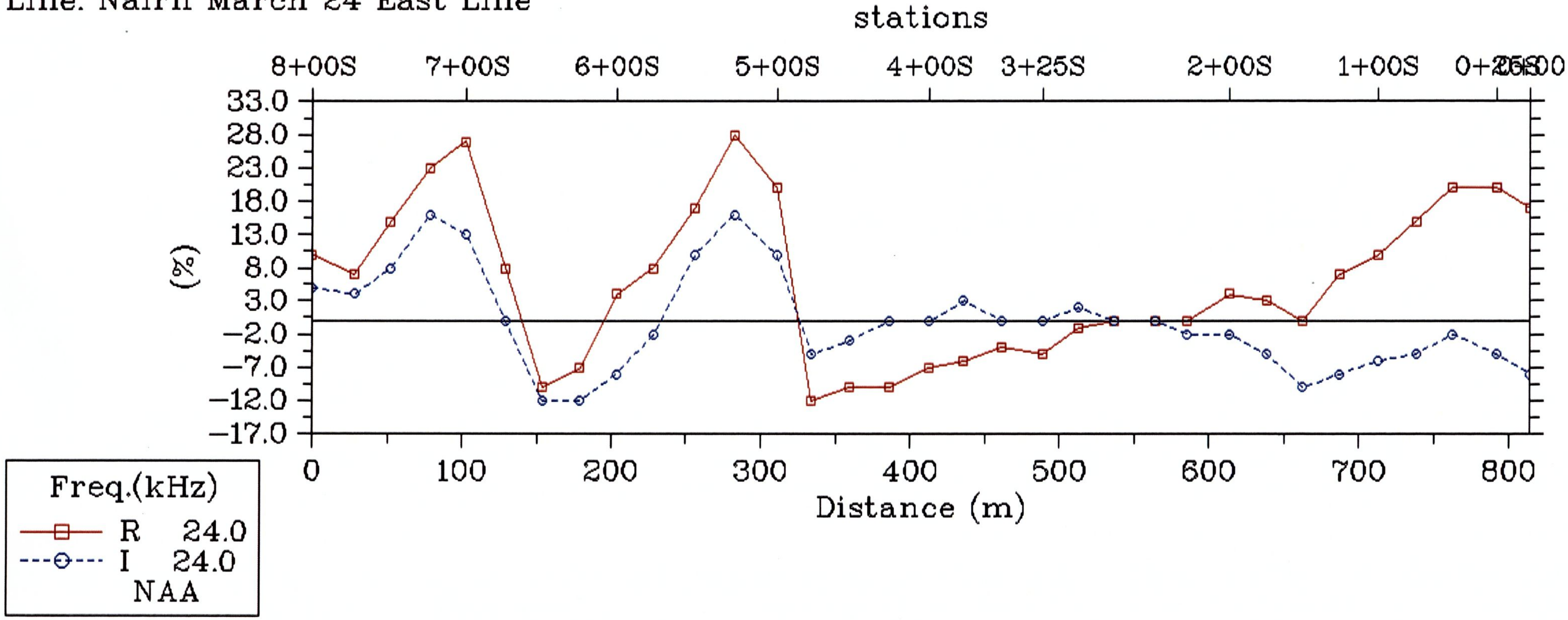
VLF–EM raw data
Line: Nairn March 24 East Line



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Compliance Letter

Date: April 25, 2017

From: Frank Racicot

To: Jim Mcauley

Subject: 45 day notice for claim 4267050, dated March 28, 2017 (W1770.00450)

Enclosed are several items in response to the 45 day notice regarding claim 4267050.

The items are:

1) A plot of the various raw data profiles for all lines mentioned in the 2015 VLF report

2) A map showing the location of the various VLF lines doen in 2015
(note: the road line listed and mentioned in the VLF report was not claimed for any assessment credits)

3) A signed Certificate of Qualifications by the author of the VLF report, Shaun Parent.
Do you need one for myself (Frank Racicot) or geologist Hadyn Butler?

4) With respect to the comment that "one line was completed off of the subject claims."

It appears to me that all of the VLF lines were completed on existing claims that were in
good standing as of March 2, 2017.

The one exception is the road claim (located to the west of the claim group). As mentioned
above, that line was not claimed as assessment work.

Please advise if this is satisfactory.

Respectfully submitted

Frank C. Racicot P. Geo

Frank Racicot

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