Soil Geochemical Analysis and Kimberlite Indicator Minerals Report

"Infrastructure Corridor Property"

Thunder Bay and Porcupine Mining Division, Ontario

Prepared For:

Canada Chrome Corporation
141 Adelaide Street West, Suite 420
Toronto, Ontario
M5H 3L5

Prepared By:

Liane Boyer
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INTRODUCTION

This report contains the results of geochemical analysis and kimberlite indicator minerals analysis completed on 543 samples collected by Canada Chrome Corporation's on the Infrastructure Corridor Property located in Northwestern Ontario. The geochemical interpretations and maps is a follow-up to a previously submitted soil sampling and geochemical analysis report submitted in September 2012 (W1260.02297). The property is 100% owned by Canada Chrome Corporation, a wholly owned subsidiary of KWG Resources Inc. The maps and interpretations on the soils geochemistry and kimberlite indicator minerals were carried out from September 24th, 2012 to April 15th, 2013 and this report was completed May 7th, 2013.

The Infrastructure Corridor property consists of 290 unpatented mining claims (4406 claim units) and is located in the Thunder Bay and Porcupine Mining Divisions of Ontario. The property consist of a north-south oriented linear arrangement of staked claims originating near the village of Nakina and terminating near McFaulds Lake, approximately 328 km to the north, an area known as the “Ring of Fire” in the James Bay Lowlands.

The purpose of staking these claims is to link the potential development of mining operations on a chromite deposit on KWG claims with existing transportation infrastructure. Heavy haul transportation infrastructure developed on the claims would be a necessary component of mining infrastructure, and as such, these claims, in addition to the claims underlying the chromite deposit, were staked for mining purposes and are necessary for mine infrastructure development.

PROPERTY DESCRIPTION, LOCATION AND ACCESS

The Infrastructure Corridor Property is located approximately 300 km northeast of Thunder Bay, Ontario at Nakina, Ontario. The property consists of 290 unpatented mining claims (4406 claim units) and extends northward from Nakina, Ontario for approximately 328 km to the “Ring of Fire” Area in the James Bay Lowlands of Northern Ontario. The southern 65 km's of the property can be easily accessed from Nakina, Ontario using the Exton Road. All other access to the property, north of the Little Current River, can be done using helicopter or fixed-wing aircraft.

CLAIM STATUS

The claims are 100% owned by Canada Chrome Corporation, a wholly owned subsidiary of KWG Resources Inc. This program samples were selected from 142 of the 290 claims that make up the property, with all 290 claims being part of 6 segments that are separated by Waterway Parks or previously existing claims not owned by Canada Chrome. A complete list of the claims that make up the Infrastructure Corridor property is provided in Appendix A.

PREVIOUS WORK

Apart from earlier reconnaissance geology and geophysics performed by the federal and provincial geological surveys, there has been no previous work on the Infrastructure Corridor property itself and the property was virtually unexplored prior to the hand auger soil sampling program and borehole drilling program, conducted by Canada Chrome Corporation in 2009 and 2010, respectively. Previous work on properties in the greater McFaulds Lake or “Ring of Fire” area has assisted in developing a regional analysis of the area leading up to the planning of this soils program. Previous work in the surrounding areas has been summarized as follows:

1962 Bostock, H.H. of the Geological Survey of Canada first did a geological map of the Lansdowne House area delineating the unnamed greenstone belt in the area of Fishtrap Lake including the extent of the hornblende gabbro in the Fishtrap Lake area. Rock units can be outlined by an original aeromagnetic trend that can be seen from the results of the aeromagnetic survey flown from 1959 to 1960.

1963 Duffell, S., MacLaren, A.S. and Holman, R.H.C. of the Geological Survey of Canada wrote a report on bedrock geology, geophysical and geochemical investigations of the Red Lake-Lansdowne House Area, Northwestern Ontario in the interest of the "Roads to Resources" program: the Federal Government's policy to aid the provinces in building roads to northern areas for developing the country's resources. The bedrock geology of the volcanic belt from Wunnummin to Mameigwess Lakes was first described as containing metabasalts that are coarse grained and resembles meta-diorites, suggesting they are metamorphosed lava flows.

1970 Thurston, P.C. and Carter, M.W. of the Ontario Department of Mines did the geological mapping project Operation Fort Hope designed to provide rapid coverage of little known regions of the province for the compilation of geologic maps. Mafic metavolcanics in all the belts of the Fort Hope area have been described as representing andesitic to basaltic flows metamorphosed to greenschist, almandine-amphibolite or hornblende hornfels facies.

1979 Thurston, P.C., Sage, R.P., and Siragusa, G.M. of the Ontario Geological Survey wrote a report along with maps on the Geology of the Winisk Lake Area, further outlined the extent of the Wunnummin Lake Belt and also described outcrops of hornblende gabbro and serpentinized peridotite in the Fishbasket Lake area of the eastern section of the belt.

2003 Spider Resources and KWG Resources performed an airborne magnetic survey of the Attawapiskat area that provided an accurate depiction of subsurface geology displaying an arcurate belt of highly magnetic rocks of the "Ring of Fire" in the McFauld's Lake area. This survey was later purchased by MNDMF and made public.

2010 Canada Chrome Corporation performed a geotechnical soils sampling program on its Infrastructure Corridor property in Northwestern, Ontario. A total of 508 samples were collected at 188 samples sites as well as 11 rock samples at 11 outcrop sites.

2011 Canada Chrome Corporation carried out a Borehole Drilling program and geotechnical field investigations, terrain unit mapping, laboratory and field testing, geophysical surveys, and hydro-technical support for major river crossings on its Infrastructure Corridor Property located in Northwestern Ontario. A total of 811 boreholes were drilled and a total of 5,906 samples were tested.

2012 Canada Chrome Corporation carried out a Soil Sample and geochemical analysis program on its Infrastructure Corridor Property located in Northwestern Ontario. A total of 507 samples were analyzed for precious and base metals.

GEOCHEMIC AL ANALYSIS

In 2010, Canada Chrome Corporation enlisted Golder Associates, of Duluth, Minnesota, to carry out a borehole drilling program from January 3rd to May 15th, whereby a total of 811 boreholes were drilled and a total of 5,906 samples were collected (W1140.00694). Golder Associates' investigations provided the geotechnical information needed to generally characterize the subsurface conditions in the proposed infrastructure corridor and to make preliminary evaluations of potential material sites, proposed embankments, water crossing structures, and other related facilities. Subsequent to this study, Golder then shipped all 5,906 samples from their Anchorage, Alaska, Duluth, Minnesota and Toronto, Ontario labs to the True North Minerals Lab in Timmins, Ontario in the spring of 2011.

Canada Chrome Corporation and Debut Diamond have continued to utilize the samples collected to generate baseline geochemical data in order to advance their mineral exploration programs by processing the till samples from the 5,906 samples collected and to perform geochemical analysis and separate out kimberlite indicator minerals from the till within these samples. The samples were sorted by M.J. Lavigne of Canada Chrome and by P. Barnett of the Ontario Geological Survey for till identification. Within each of the original 811 boreholes, approximately 1kg of material was collected at 1m intervals and bagged individually. The individual samples were then logged and those that were identified as being from a particular till sheet were combined as one sample from that hole. Up to three distinct till sheets were identified in some holes. Many holes only contained glacial fluvial and lacustrine sediments and these samples were not processed.

The sorting, washing and sieving of the samples were conducted at the True North Minerals Lab from April 28th, 2011 to July 25th, 2012 with a total of 507 samples being selected for analysis. True North Minerals submitted the -200 mesh fraction of each of the samples for geochemical analysis. The geochemical analysis was conducted by Act Labs in Ancastor, Ontario from June 20th, 2011 to August 12th, 2012. The maps and interpretations on the soils geochemistry and kimberlite indicator minerals were carried out from September 24th, 2013 to April 15th, 2013 and the report was completed May 7th, 2013.

CONTENTS

Table of Figures

Tables

Appendices

SECTION 1: EVALUATION OF METAL ORE POTENTIAL FOR THE INFRASTRUCTURE CORRIDOR PROPERTY

1.1 MINERAL ANALYSES

The sorting, washing and sieving of the samples was conducted at True North Minerals Lab from April 28th, 2011 to July 25th, 2012 with a total of 543 samples being selected for analysis (Appendix 1). True North Minerals submitted the -200 mesh fraction of each of the samples for geochemical analysis. The geochemical analysis was conducted by Act Labs in Ancastor, Ontario from June 20th, 2011 to August 12th, 2012. The Act Labs Assay Certificates are provided in Appendix 2. The maps and interpretations was conducted from January 3rd, 2013 to April 15, 2013 and the report was completed on May 7th, 2013.

Percentiles were calculated for every element assayed. Comparison of the 10th percentile against the 95th and 99th percentiles was done to look for highly elevated values. Elements of economic interest; Au, Ag, Cu, Ni, Co, Pb, Zn, Cr, V and Li were selected for more detailed description. Individual elements were sorted by assay value and plotted on a log – linear (semi-log) plot with sample id on the x-axis. This was done to establish a background value and to determine what values are elevated in the population. Values were sorted and colour coded to their percentile category. Elevated values were then compared for coincidence with elevated values of other elements in the same sample.

GOLD

Gold values ranged from <1 ppb to 57 ppb over the study area. Of the 543 analyses 62 were above the 2 ppb detection limit. A log linear plot of the gold values shows a break at 7ppb gold (Figure 1) and this is used as the cutoff for background vs elevated values. A plot of the 95th percentile and higher gold values over the study area (6 ppb – 57 ppb Au) is shown in Figure 2. A total of 16 samples returned results with above background gold (>7ppb). The highest value received was 57 ppb gold from sample 4013(2-11).

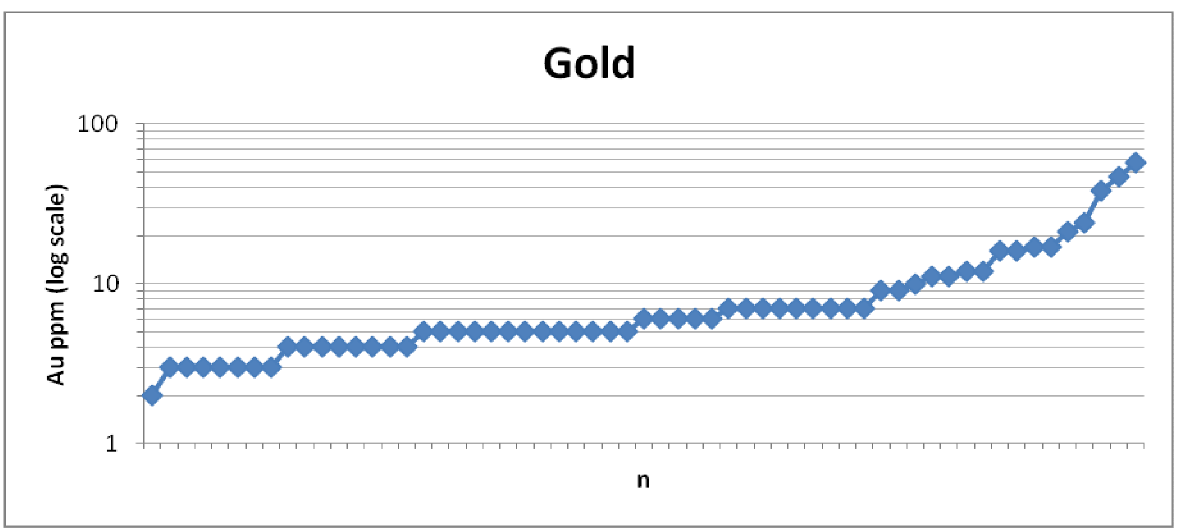

FIGURE 1: LOG-LINEAR PLOT OF GOLD VALUES

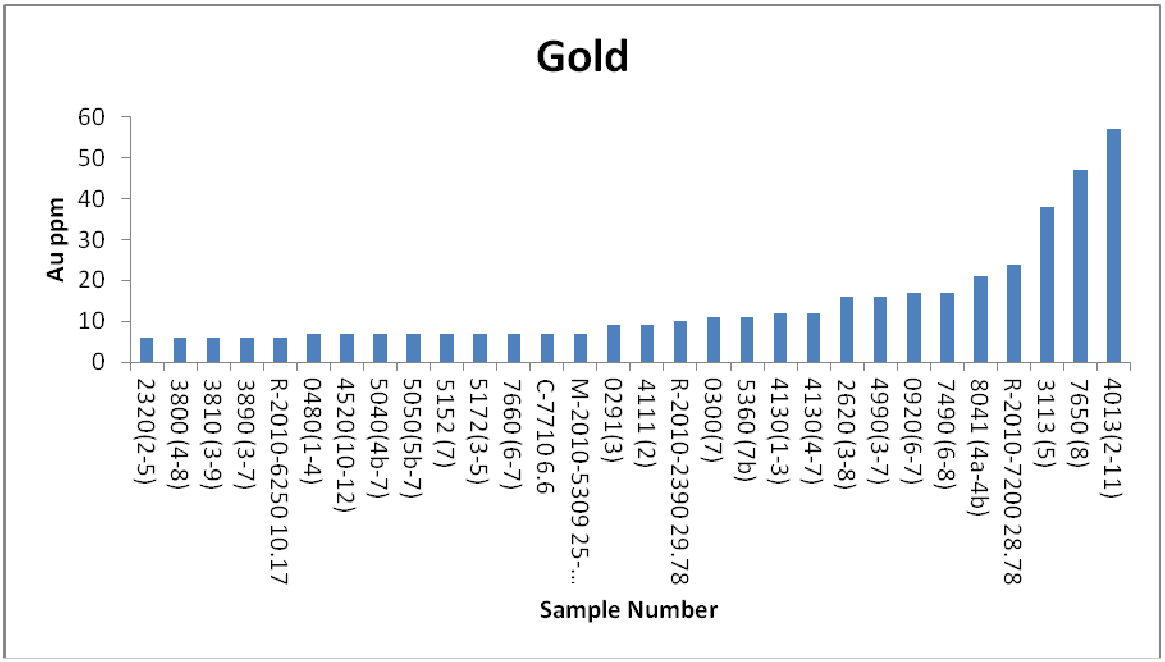

FIGURE 2: PLOT OF ELEVATED GOLD VALUES (6 – 57 PPB)

SILVER

Silver values ranged from 0.2 to 1.3ppm over the study area. Of the 543 analyses 58 were above the 0.3 ppm detection limit. A log linear plot of the silver values shows a break at 0.6 ppm silver (Figure 3) and this is used as the cutoff for background vs elevated values. A plot of the 95th percentile and higher silver values over the study area (0.5 ppm – 1.3 ppm Ag) is shown in Figure 4. A total of 6 samples returned results with above background silver (>0.6 ppm). The highest value received was 1.3 ppm silver from sample 2360(7)- Figure 4.

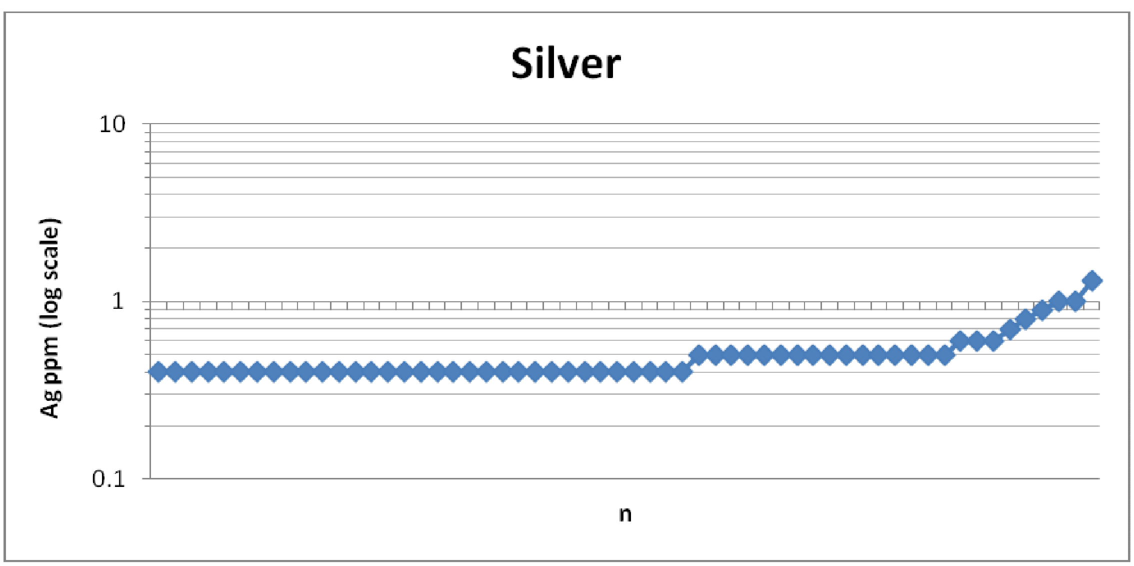

FIGURE 3: LOG – LINEAR PLOT OF SILVER VALUES

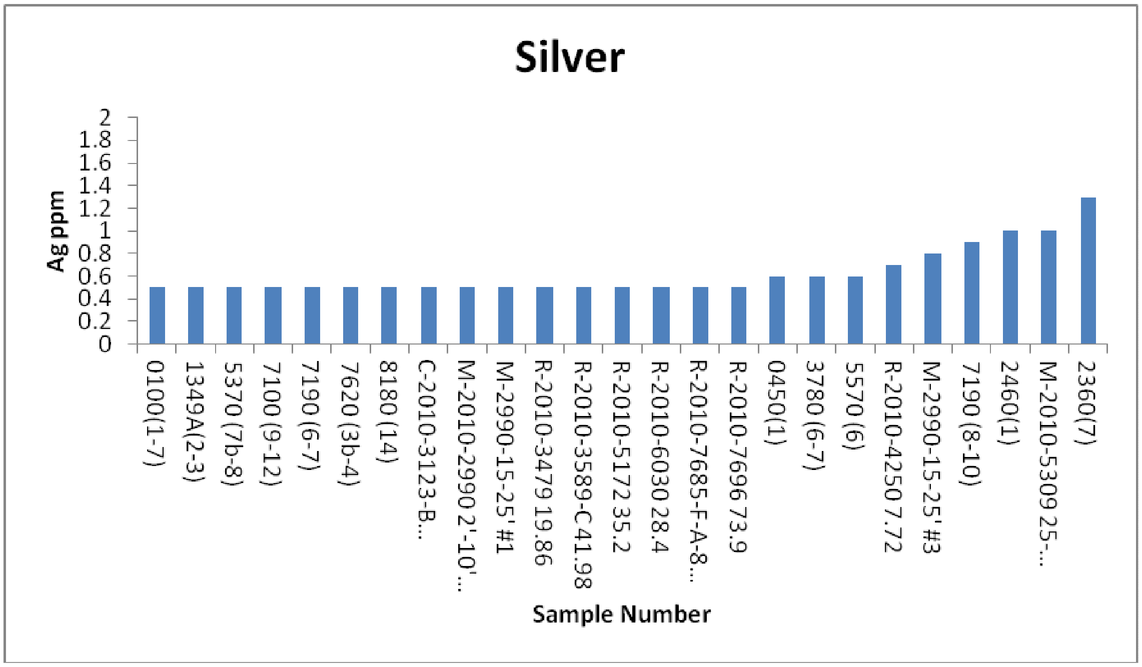

FIGURE 4: PLOT OF SILVER VALUES

COPPER

Copper values ranged from 2 to 67 ppm over the study area. All 543 analyses were above the 1 ppm detection limit. A log linear plot of the copper values shows a break at 11 ppm copper (Figure 5) and this is used as the cutoff for background vs elevated values. The 95th percentile and higher copper values over the study area range from (34 ppm – 67 ppm Cu) Figure 6. A total of 121 samples returned results with above background copper (>11 ppm). The highest value received was 67 ppm copper from sample 3350(3-4). The number of samples above background Cu appears to be high (27% of the population). This is an effect of the detection limit being low enough to find a measurable amount of Cu in every sample. In comparison, above background Au was found in 19 samples out of 62 above detection limit (30% of the population).

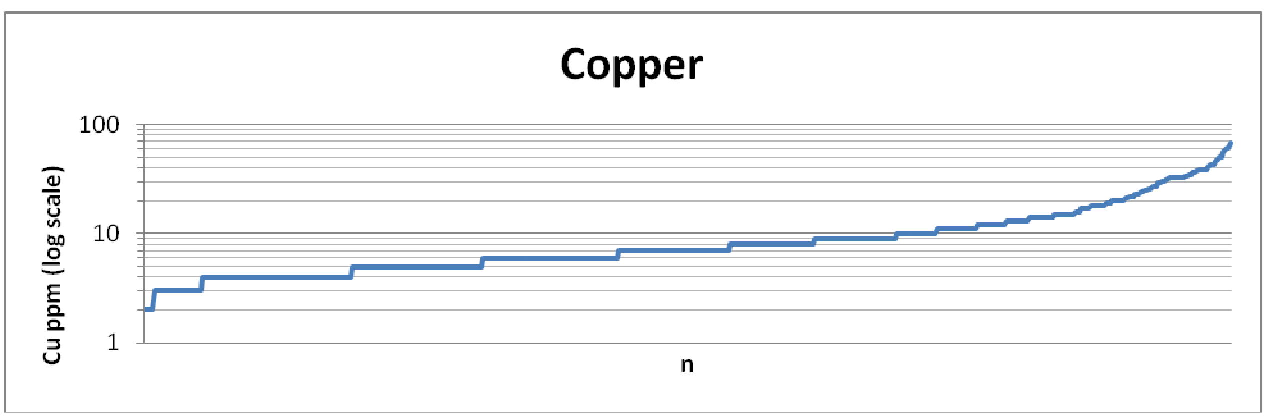

FIGURE 5: LOG - LINEAR PLOT OF COPPER VALUES

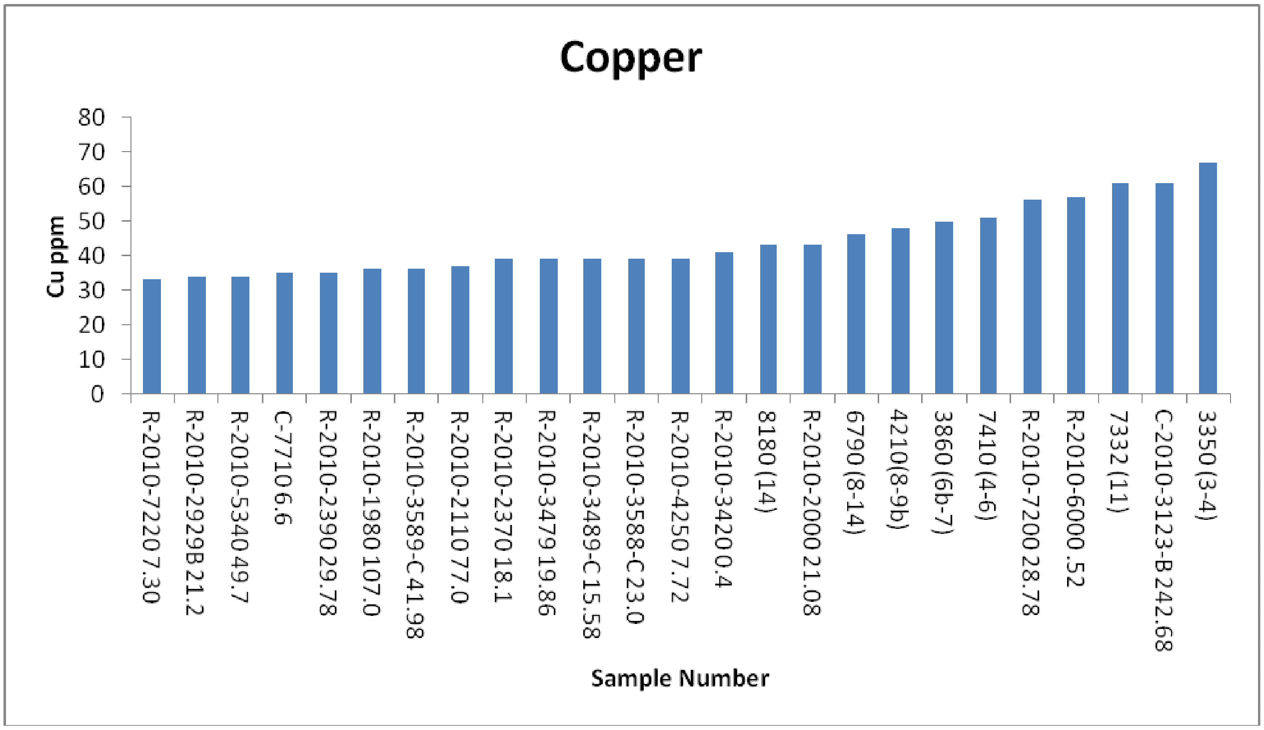

FIGURE 6: PLOT OF COPPER VALUES

NICKEL

Nickel values ranged from 7 to 421 ppm over the study area. All 543 analyses were above the 1 ppm detection limit. A log linear plot of the nickel values shows a break at 13 ppm nickel (Figure 7) and this is used as the cutoff for background vs elevated values. The 95th percentile and higher nickel values over the study area range from (35 ppm – 421 ppm Ni) Figure 8. A total of 118 samples returned results with above background nickel (>13 ppm). The highest value received was 421 ppm nickel from sample 7591(4-7). This sample also had the highest Cr assay from the data set and a 99th percentile Co value.

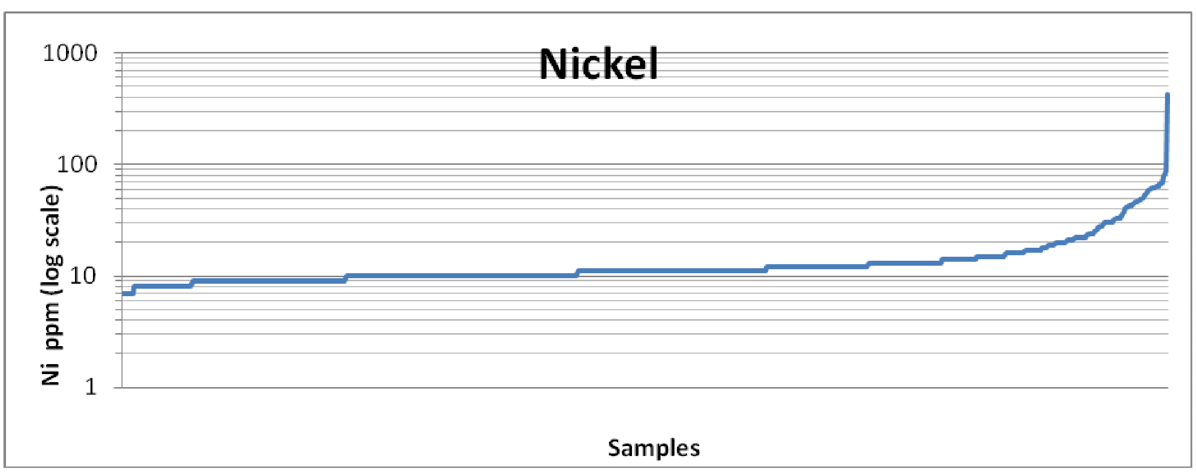

FIGURE 7: LOG - LINEAR PLOT OF NICKEL VALUES

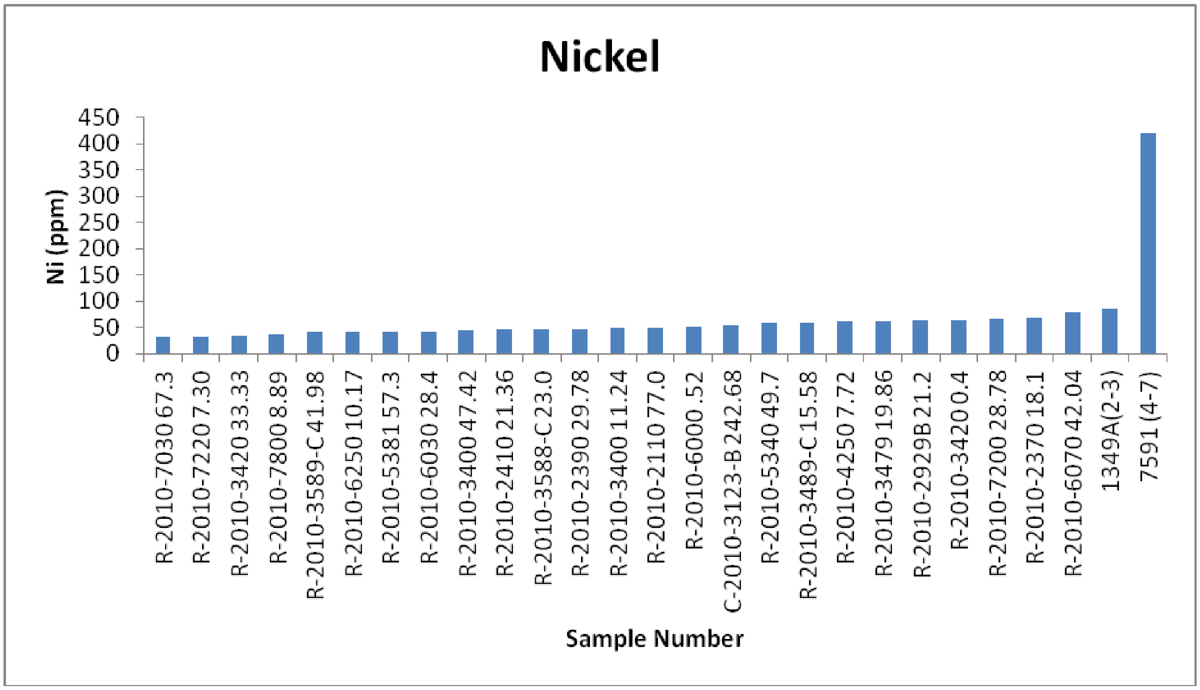

FIGURE 8: PLOT OF NICKEL VALUES

COBALT

Cobalt values ranged from 3 to 56 ppm over the study area. All 543 analyses were above the 1 ppm detection limit. A log linear plot of the cobalt values shows a break at 7 ppm cobalt (Figure 9) and this is used as the cutoff for background vs elevated values. The 95th percentile and higher cobalt values over the study area range from (13 ppm – 56 ppm Co) Figure 10. A total of 57 samples returned results with above background cobalt (>7 ppm). The highest value received was 56 ppm cobalt from sample R-2010-6070 42.04. This sample also had the highest Pb and V assays from the data set and a 99th percentile Ni value.

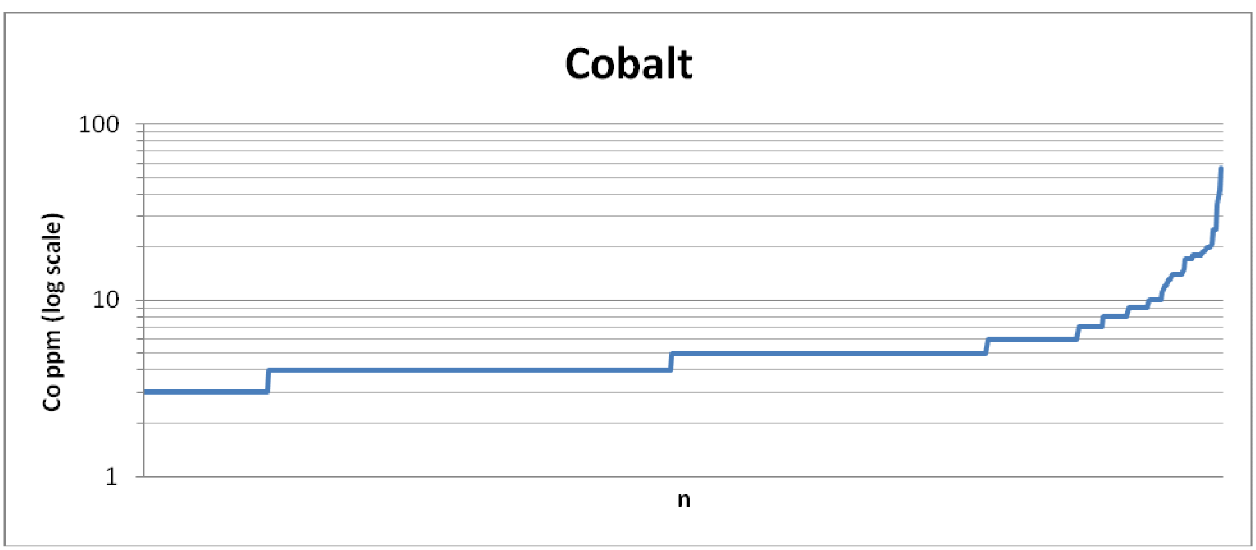

FIGURE 9: LOG - LINEAR PLOT OF COBALT VALUES

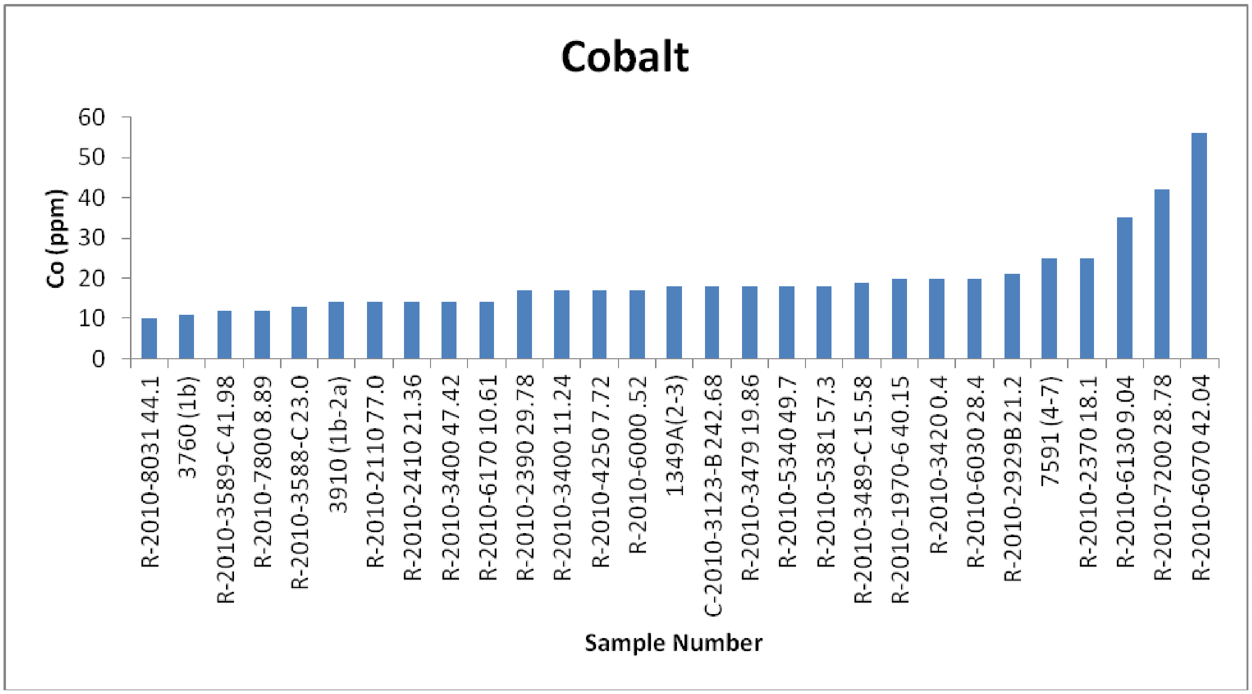

FIGURE 10: PLOT OF COBALT VALUES

LEAD

Lead values ranged from 2 to 103 ppm over the study area. Of the 543 analyses all but 4 were below the 3 ppm detection limit. A log linear plot of the lead values shows a break at 11 ppm lead (Figure 11) and this is used as the cutoff for background vs elevated values. The 95th percentile and higher lead values over the study area range from (15 ppm – 103 ppm Pb) Figure 12. A total of 78 samples returned results with above background lead (>11 ppm). The highest value received was 103 ppm lead from sample R-2010-6070 42.04. This sample also had the highest Co and V assays from the data set and 95th percentile values for Ni, Zn, Cr, Li and Rb.

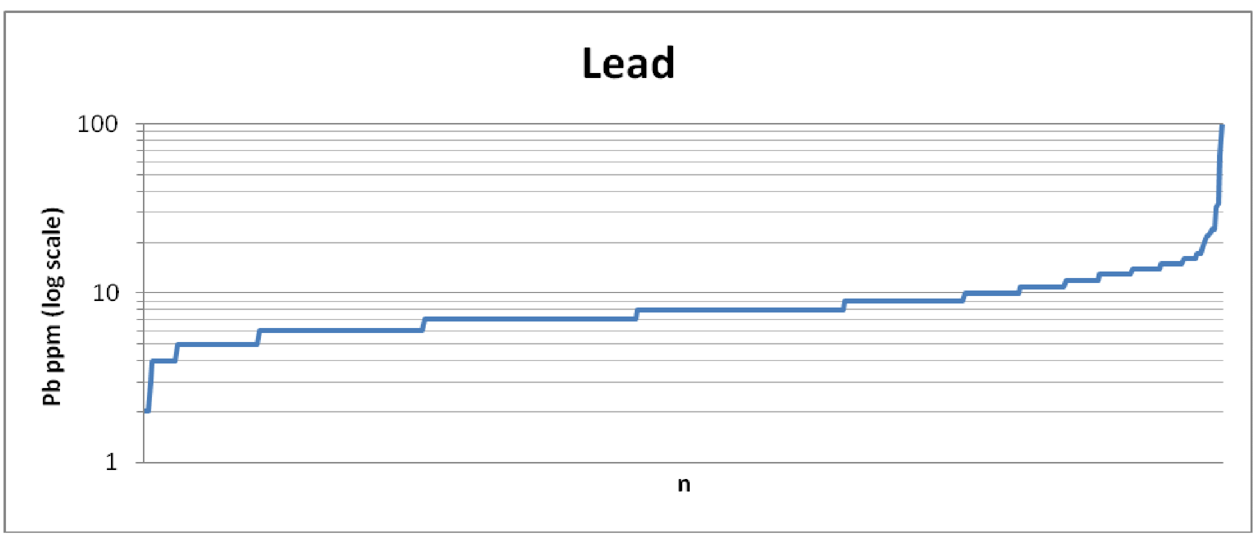

FIGURE 11: LOG - LINEAR PLOT OF LEAD VALUES

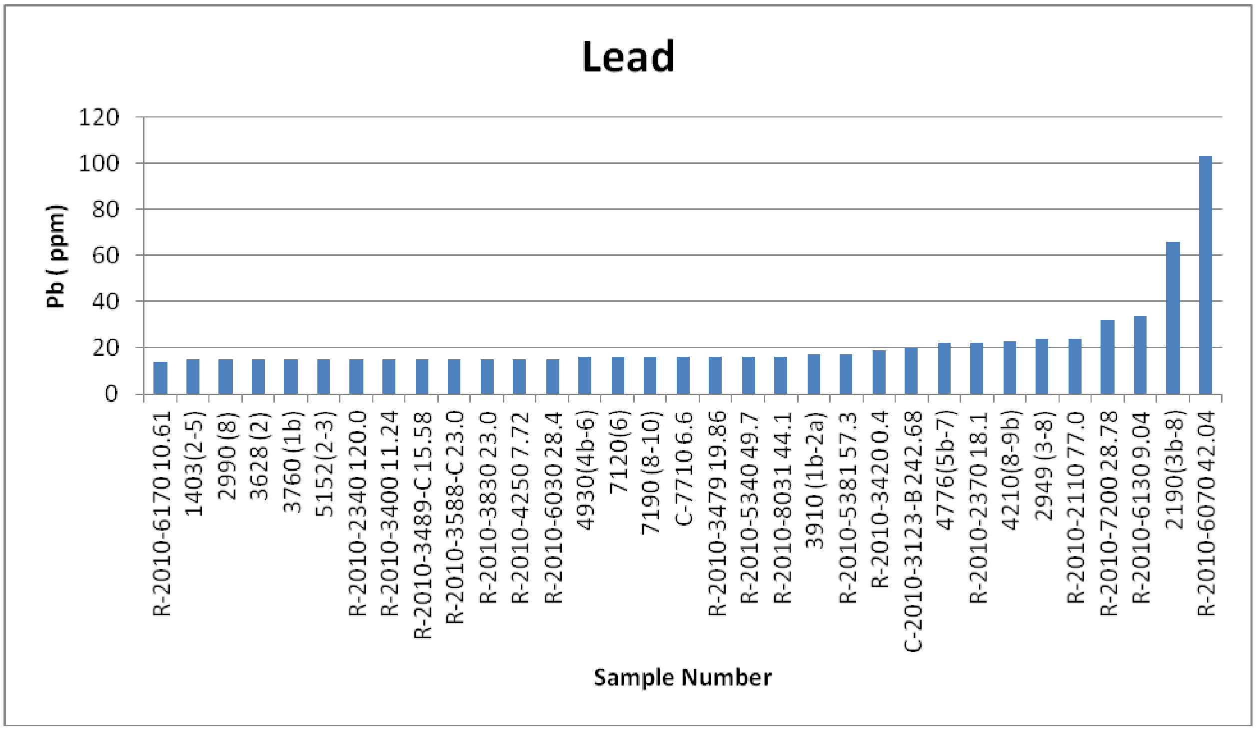

FIGURE 12: PLOT OF LEAD VALUES

ZINC

Zinc values ranged from 5 to 99 ppm over the study area. All 543 analyses were above the 1 ppm detection limit. A log linear plot of the zinc values shows a break at 20 ppm zinc (Figure 13) and this is used as the cutoff for background vs elevated values. The 95th percentile and higher zinc values over the study area range from (43 ppm – 99 ppm Zn) Figure 14. A total of 121 samples returned results with above background zinc (>20 ppm). The highest value received was 99 ppm zinc from sample R-2010-4250 7.72. This sample also had the highest Li and Rb assays from the data set and 95th percentile values for Ag, Cu, Pb, Ni, Co, Cr and V.

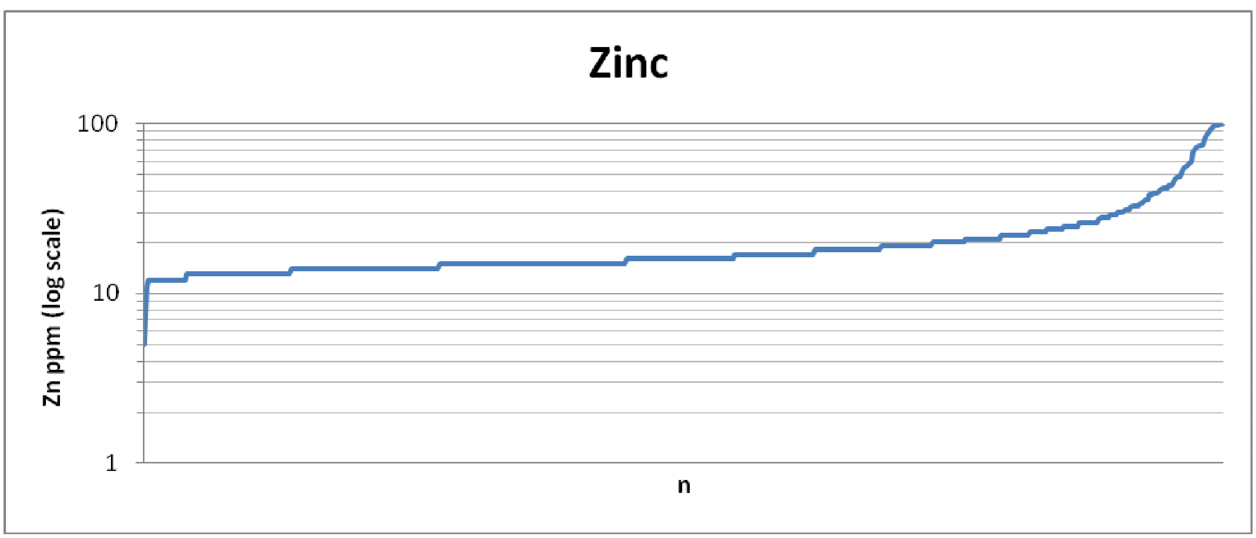

FIGURE 13: LOG - LINEAR PLOT OF ZINC VALUES

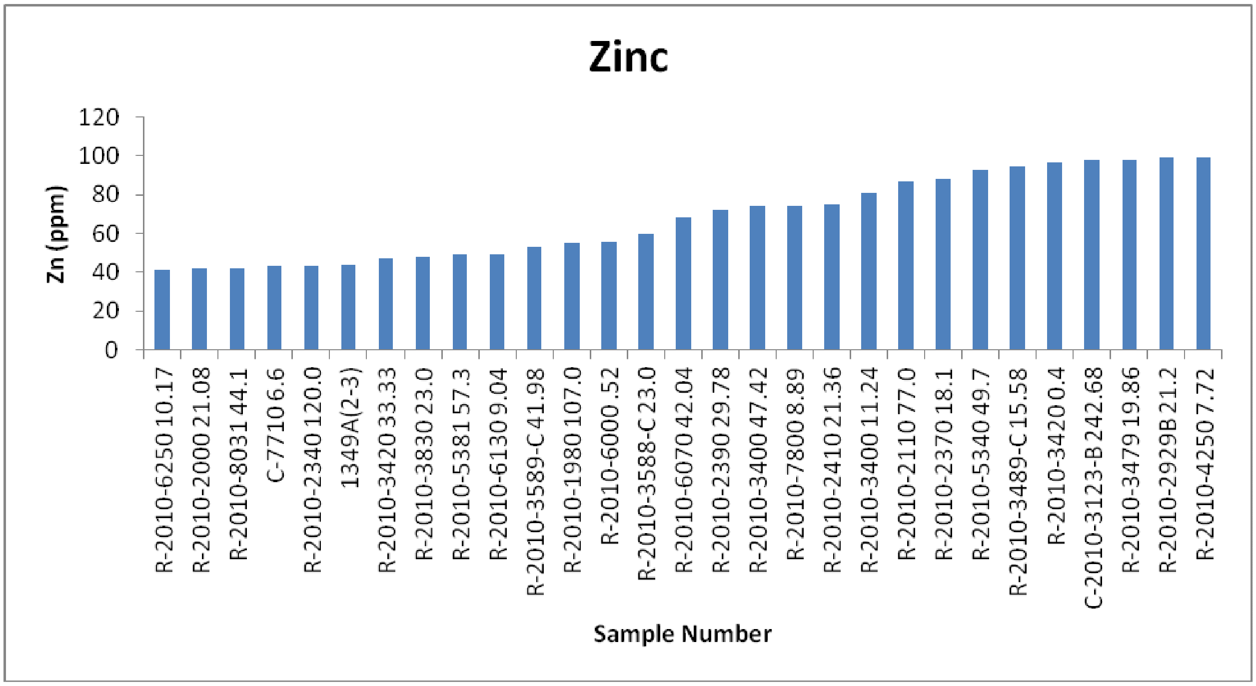

FIGURE 14: PLOT OF ZINC VALUES

CHROME

Chrome values ranged from 22 to 715 ppm over the study area. All 543 analyses were above the 2 ppm detection limit. A log linear plot of the chrome values shows a break at 60 ppm chrome (Figure 15) and this is used as the cutoff for background vs elevated values. The 95th percentile and higher zinc values over the study area range from (94 ppm – 715 ppm Zn) Figure 16. A total of 99 samples returned results with above background chrome (>60 ppm). The highest value received was 715 ppm chrome from sample 7591(4-7). This sample also had the highest Ni assay from the data set and a 99th percentile Co value.

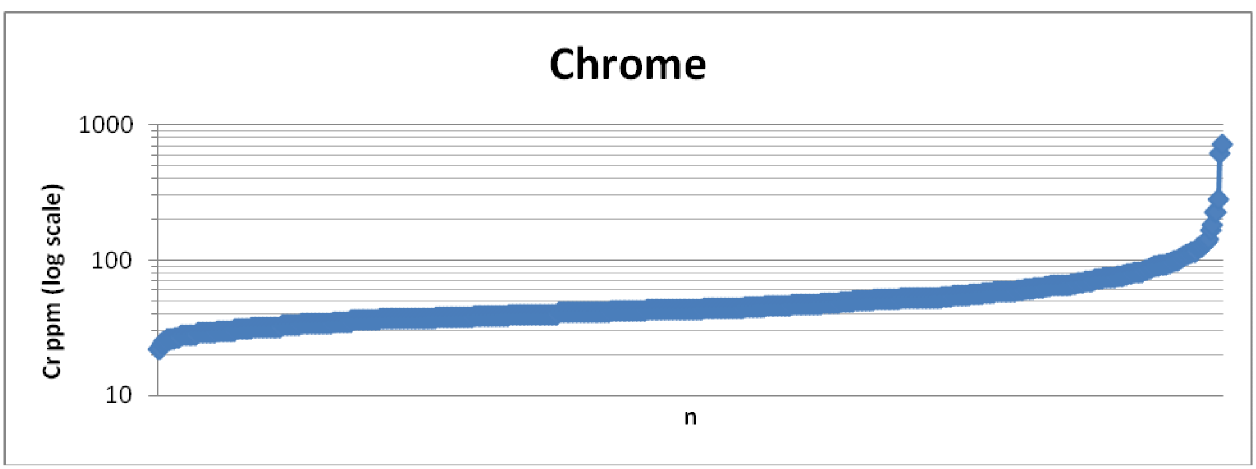

FIGURE 15: LOG - LINEAR PLOT OF CHROME VALUES

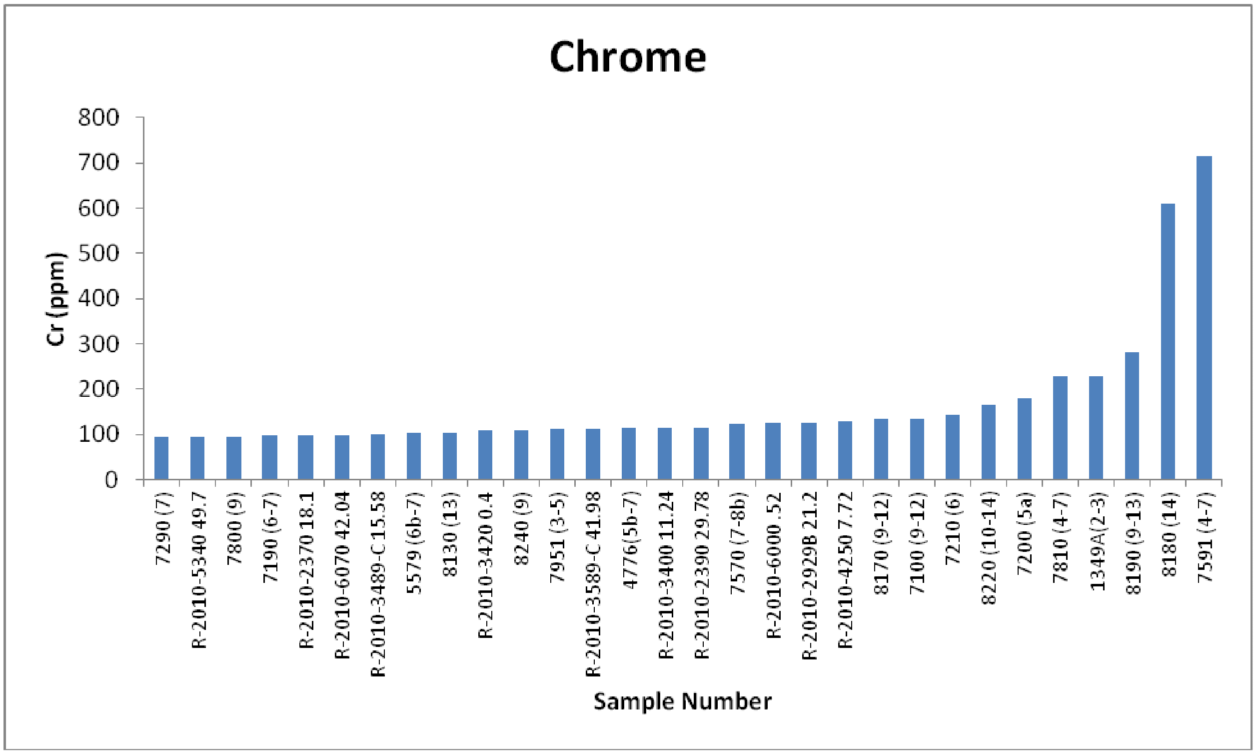

FIGURE 16: PLOT OF CHROME VALUES

VANADIUM

Vanadium values ranged from 12 to 159 ppm over the study area. All 543 analyses were above the 2 ppm detection limit. A log linear plot of the vanadium values shows a break at 45 ppm vanadium (Figure 17) and this is used as the cutoff for background vs elevated values. The 95th percentile and higher vanadium values over the study area range from (64 ppm – 159 ppm V) Figure 18. A total of 71 samples returned results with above background Li (>45 ppm). The highest value received was 159 ppm V from sample R-2010-6070 42.04. This sample also had the highest Co and Pb assays from the data set and 95th percentile values for Ni, Zn, Cr, Li and Rb.

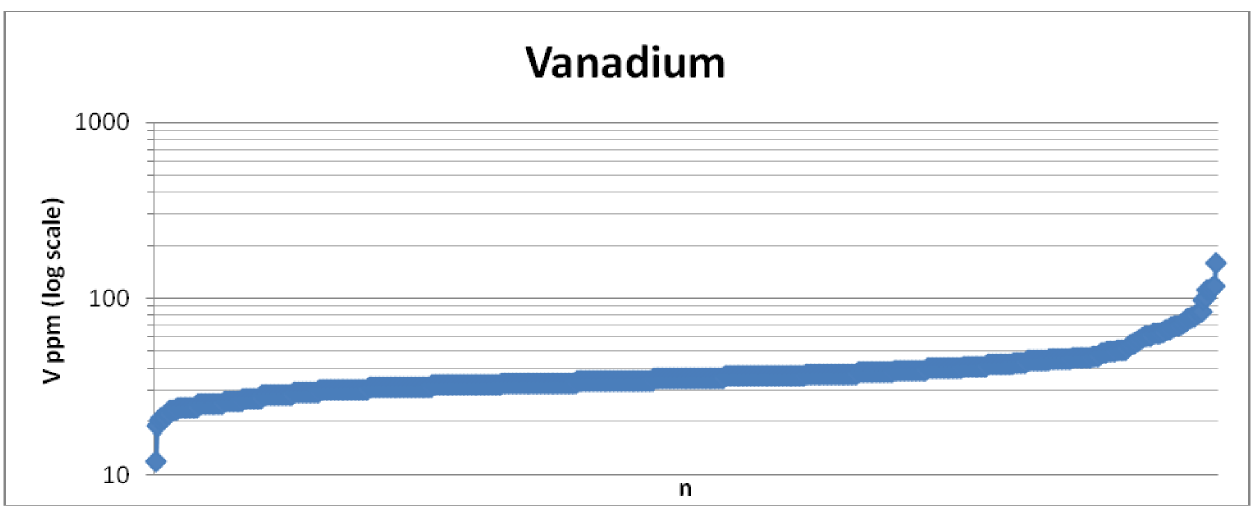

FIGURE 17: LOG - LINEAR PLOT OF VANADIUM VALUES

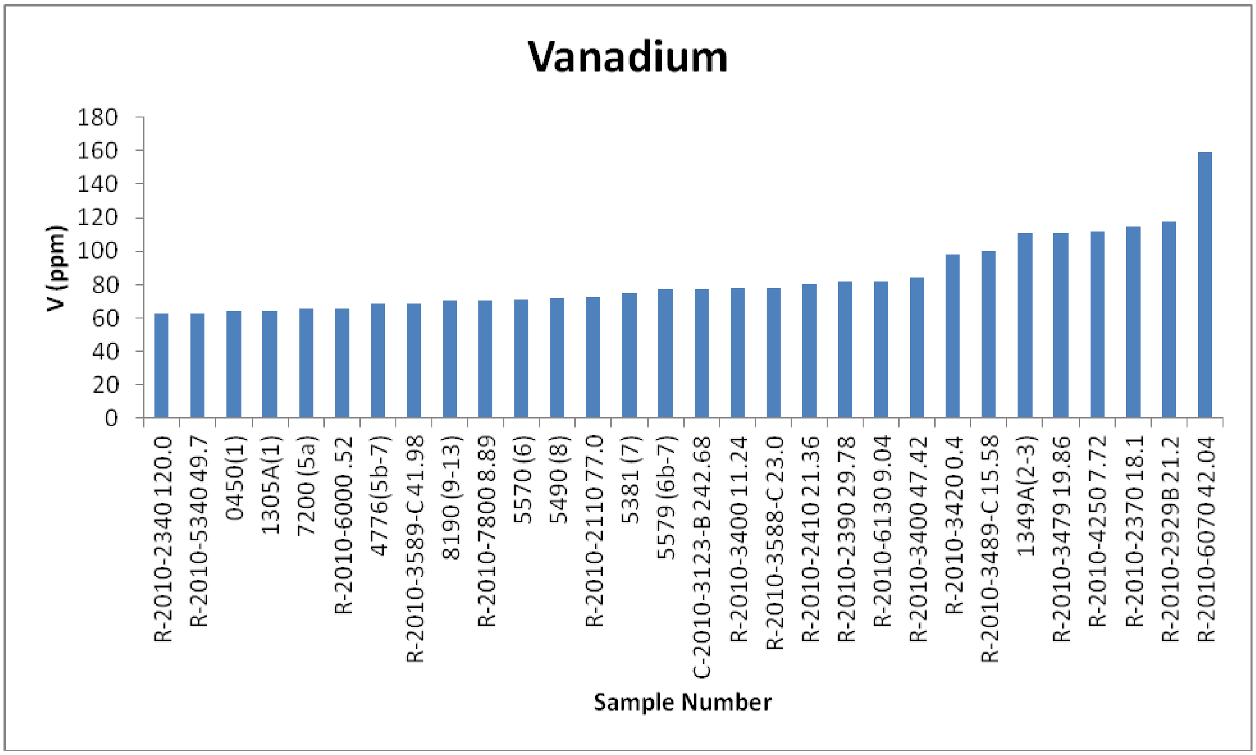

FIGURE 18: PLOT OF VANADIUM VALUES

LITHIUM

Lithium values ranged from 4 to 64 ppm over the study area. All 543 analyses were above the 1 ppm detection limit. A log linear plot of the lithium values shows a break at 10 ppm lithium (Figure19) and this is used as the cutoff for background vs elevated values. The 95th percentile and higher lithium values over the study area range from (25 ppm – 64 ppm Li) Figure 20. A total of 89 samples returned results with above background Li (>10 ppm). The highest value received was 64 ppm Li from sample R-2010-4250 7.72. This sample also had the highest Zn and Rb assays from the data set and 95th percentile values for Ag, Cu, Pb, Ni, Co, Cr and V.

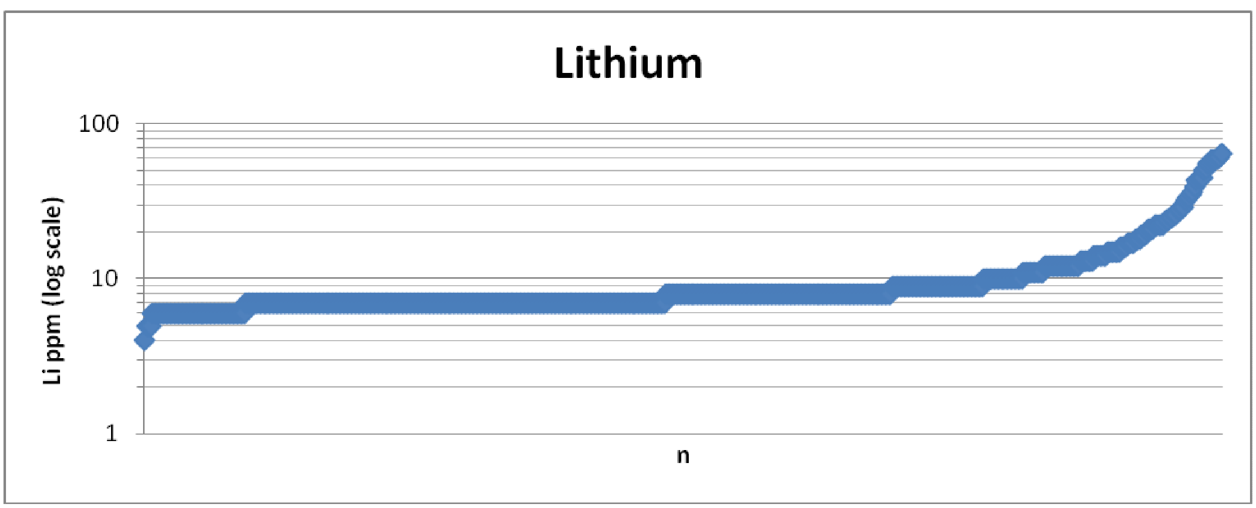

FIGURE 19: LOG - LINEAR PLOT OF LITHIUM VALUES

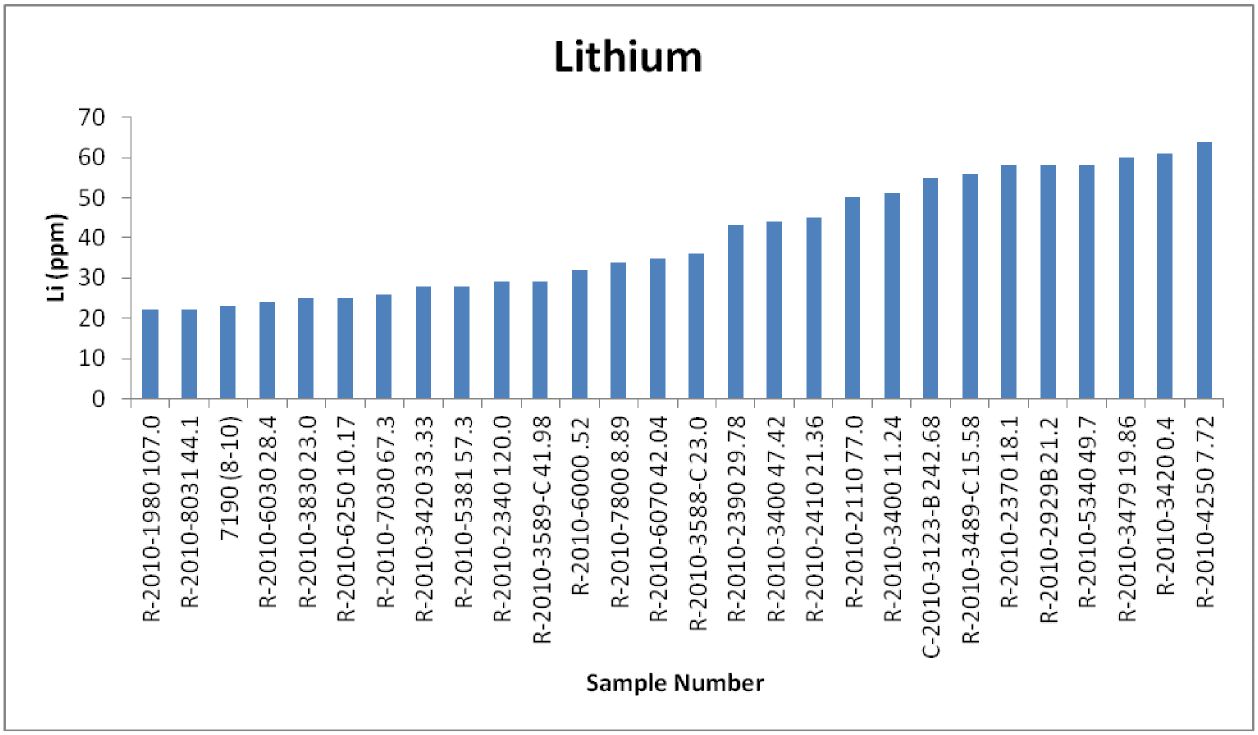

FIGURE 20: LITHIUM VALUES

1.2 Correlation Analysis

The log linear (semi – log) plots for individual element show that elemental values elevated above background occur. Background is established by the linear portion of the plot. The positive deviation from this line indicates where values are elevated. Table one shows the highest assay value for each element of economic interest and the respective sample number.

TABLE 1: HIGHEST VALUES FOR EACH ELEMENT FROM THE DATASET

element	value	sample_id
Au	57 ppb	4013(2-11)
Ag	1.3 ppm	2360(7)
Cu	67 ppm	3350 (3-4)
Ni	421 ppm	7591 (4-7)
Co	56 ppm	R-2010-6070 42.04
Pb	103 ppm	R-2010-6070 42.04
Zn	99 ppm	R-2010-4250 7.72
Cr	715 ppm	7591 (4-7)
Li	64 ppm	R-2010-4250 7.72
V	159 ppm	R-2010-6070 42.04

A more selective method is to calculate the upper percentiles from the population. Table 2 shows 30 samples selected based on the coincidence of elements in the 90th, 95th and 99th percentiles.

TABLE 2: COINCEDENT ELEVATED VALUES

Analyte Symbol	Au	Ag	Cu	Ni	Co	Pb	Zn	Cr	Li	Rb	V
Unit Symbol	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
99th %ile	18.4	0.6	50.3	63.3	20.3	23.3	93.7	171.8	56.7	104.5	103.7
95th %ile	6.0	0.4	33.0	33.0	12.7	15.0	42.7	94.0	24.0	77.5	64.0
90th %ile	3	0.4	20	21	8	13	29	75.4	15	68.8	50
R-2010-3400 47.42	1	0.2	30	44	14	10	74	78	44	93	84
1349A(2-3)	1	0.5	5	86	18	6	44	227	16	42	111
4013(2-11)	57	0.2	4	11	0.09	11	16	6	61	8	< 15
7591 (4-7)	5	0.2	5	421	25	2	25	715	5	< 15	38
8180 (14)	1	0.5	43	19	9	7	26	610	14	35	63
C-2010-3123-B 242.68	1	0.5	61	55	18	20	98	90	55	101	77
C-7710 6.6	7	0.4	35	30	7	16	43	74	21	61	50
R-2010-2110 77.0	1	0.2	37	50	14	24	87	73	50	83	73
R-2010-2370 18.1	1	0.2	39	69	25	22	88	99	58	108	115
R-2010-2390 29.78	10	0.3	35	47	17	14	72	116	43	65	82
R-2010-2410 21.36	1	0.4	33	46	14	14	75	67	45	106	80
R-2010-2929B 21.2	1	0.4	34	63	21	9	99	126	58	117	118
R-2010-3400 11.24	1	0.2	32	49	17	15	81	114	51	76	78
R-2010-3420 0.4	1	0.4	41	64	20	19	97	108	61	75	98
R-2010-3479 19.86	1	0.5	39	62	18	16	98	92	60	93	111
R-2010-3489-C 15.58	1	0.4	39	60	19	15	95	101	56	116	100
R-2010-3588-C 23.0	1	0.4	39	46	13	15	60	88	36	90	78
R-2010-3589-C 41.98	1	0.5	36	41	12	12	53	113	29	62	69
R-2010-4250 7.72	1	0.7	39	61	17	15	99	130	64	140	112
R-2010-5340 49.7	1	0.2	34	58	18	16	93	94	58	87	63
R-2010-5381 57.3	1	0.2	30	43	18	17	49	55	28	59	56
R-2010-6000 .52	2	0.2	57	53	17	13	56	125	32	< 15	66
R-2010-6030 28.4	1	0.5	27	43	0.01	15	39	20	61	24	< 15
R-2010-6070 42.04	1	0.3	33	78	56	103	68	99	35	82	159
R-2010-6130 9.04	1	0.2	8	32	35	34	49	56	18	84	82
R-2010-6250 10.17	6	0.2	33	42	0.19	11	41	10	70	25	50
R-2010-7200 28.78	24	0.2	56	67	42	32	38	75	19	82	61
R-2010-7800 8.89	1	0.3	25	37	12	10	74	76	34	81	70

1.3 Geographic Analysis

The samples that contained high coincident metals values (Table 2) were plotted with geology (Appendix 3) to determine if there are any spatial patterns to the higher metals values. It is important to note that these are till samples and as a result the source of the material being sampled can be highly varied and does not necessarily reflect the bedrock material below the samples. However it is not unlikely that these samples would include local material. Map 4 (Appendix 3) shows 4 consecutive samples spaced over >10km which all have elevated coincident metals values. In this area there are major contacts between mafic and felsic units which can be favourable environments for the formation of ore deposits. Map 7 also shows several consecutive samples spaced over a few kilometres that have elevated metals values with no apparent geological explanation. Map 8 has perhaps the most interesting cluster of 3 coincedent elevated metals values located adjacent to a major geological contact between intrusive and sedimentary rocks. As noted above, major geologic contacts can be favourable environments for the formation of ore deposits.

1.4 Discussion

Within the dataset there are no samples with significantly elevated values in any one metal to warrant follow up on their own. However, when coincedent metals values are considered in the context of the regional geology there are several areas where follow up could be merited. The most striking of these is the cluster of samples on Map 8 (Appendix 3) where three samples with elevated metals occur adjacent to a major geological contact. This relationship could indicate an area favourable to the formation of an ore deposit. In general however, care must be taken in relying too much on the relationship between the samples and the underlying bedrock as the source of the materia till samples is not necessarily local.

1.5 Recommendations

In the areas where there are several samples with elevated coincident metals content follow up work should begin with review of more detailed geological and structural data as well as any publicly available geophysical data. Once a more thorough analysis of the selected areas is complete follow up work could consist of mapping and sampling of bedrock in the selected area.

SECTION 2: KIMBERLITE INDICATOR MINERAL POTENTIAL

SECTION 2.1 KIMBERLITE INDICATOR MINERAL ANALYSES

The Analysis of Indicator minerals was done partially by SRC laboratories in Saskatchewan which operates in accordance with ISO/IEC 17025:2005 (CAAN-P-4E), General Requirements for the Competence of Mineral Testing and Calibration Laboratories; and is also compliant to CAN-P-1579 Guidelines for Mineral Analysis Testing Laboratories.

C.F. Mineral Research Ltd. laboratories in Kelowna was also used for mineral analysis. C.F. laboratories are ISO 9001:2008 certified and ISO 17025:2005 compliant. They have been providing mineral processing services since 1977.

A total of 311 grains were sent to SRC laboratories for analysis. Of the 311 grains, 207 analyses were returned, 88 grains were deemed unworthy of probing and were analyzed using EDS, and 16 grains were lost during polishing. Of the results returned 28 of the grains were classified as garnet, 25 as ilmenite, 2 as chromite, 46 as clinopyroxene and 106 as other (Table 3). For a summary of the detailed analyses of all grains please see Appendix 4 and for SRC Assay certificates please see Appendix 5.

A total of 1932 grains were analyzed by CF Mineral Research Ltd, and results returned for 262 grains. The remaining grains were processed but found not worthy of probing by CF labs. A summary of the detailed analyses can be found in APPENDIX 4 and the assay certificates are in Appendix 6. Of the results returned 31 of the grains were classified as garnet, 1 grain ilmenite, 52 grains chromite, 143 grains clinopyroxene, 12 grains olivine, 8 grains orthopyroxene, 13 grains of picroilmenite, 1 tourmaline grain and 1 tremolite grain (Table 3)

TABLE 3: CLASSIFICATION OF KIMBERLITE INDICATOR MINERALS

SRC Laboratories

Grain Classification	Number of Grains
Garnet	28
Ilmenite	25
Chromite	2
Clinopyroxene	46
Other	106
Total	**207**

CF Laboratories

Grain Classification	Number of Grains
Garnet	31
Ilmenite	1
Picroilmenite	13
Chromite	52
Clinopyroxene	143
Olivine	12
Orthopyroxene	8
Other	2
Total	**262**

Garnet

A total of 28 garnet grains were analyzed by SRC laboratories and the results are summarized on the left hand side of Table 4. SRC provided classification of the garnets and in the final column of the table the garnets have been classified after Grutter (2004).

A total of 31 garnet grains were analyzed by CF laboratories and the results are summarized on the right hand side of Table 4. CF laboratories provided classification of the source of the garnets (R-regional, P-peridotitic, and E-eclogitic) as well as a CF classification modified after Dawson. In the final column of the table below the garnets have been classified after Grutter (2004).

A summary of the analyses is provided in Appendix 4 and Assay certificates are presented in Appendices 5 and 6.

TABLE 4: GARNET CLASSIFICATION

SRC Laboratory Results

Vial	Source	Classfication by Lab		Grutter (2004) Classification
180		garnet	crustal	G0
206		garnet	G3	G3
212		garnet	crustal	G0
258		garnet	G3	G3
260		garnet	crustal	G0
261		garnet	crustal	G0
263		garnet	crustal	G0
333		garnet	crustal	G0
501		garnet	crustal	G0
503		garnet	G3	G3
507		garnet	crustal	G0
513		garnet	crustal	G0
516		garnet	crustal	G0
517		garnet	crustal	G0
523		garnet	G3	G3
526		garnet	crustal	G0
530		garnet	crustal	G0
531		garnet	G3	G3
616		garnet	crustal	G0
201/202		garnet	crustal	G0
201/202		garnet	crustal	G0
208/209		garnet	crustal	G0
617/618		garnet	crustal	G0
621/622		garnet	crustal	G0
623/624		garnet	crustal	G0
627/628		garnet	crustal	G0
627/628		garnet	crustal	G0
629/630		garnet	crustal	G0

CF Laboratory Results

Vial	Source	Classfication by Lab		Grutter (2004) Classification
V1376	P	G11-1		G9
V1381	P	G11-1		G9
V1817	R	ALM-Mn		G0
V1820	R	G 5		G0
V1839	R	ALM-Mn		G0
V1852	R	G 5		G0
V1857	R	ALM		G0
V2112	E	G 3	G2/G1	G3
V2117	R	G 5		G0
V2453	R	ALM		G0
V2474	E	G 3	G1/HPM	G3
V2475	R	ALM-Mn		G0
V2683	R	ALM		G0
V2683	E	G 5	LPM/G1	G3
V2717	R	ALM-Mn		G0
V3093	E	G 5	LPM	G4
V3102	P	G11-1		G9
V3115	E	G 5	G2/G1	G0
V3123	P	G11-1		G9
V3125	R	ALM		G0
V3264	E	G 3	G2	G3
V3264	P	G11-1		G9
V3377	E	G 3	G2	G3
V3529	P	G11-1		G9
V3532	E	G 3	G2/G1	G3
V3538	E	G 3	G2/G1	G3
V3543	E	G 5	G2/G1	G3
V3737	E	ALM	LPM/G2	G4
V3742	E	G 3	G2/G1	G3
V3744	E	G 5	G2	G4
V3746	R	G 5		G0

The garnet analyses from both labs were plotted on standard discrimination diagrams showing fields for diamond inclusion chemistry (Figures 21-22). Figure 21 is a plot of Cr2O3 vs CaO in Garnets. The red line is the “Diamond in/diamond out” line of Gurney (1984); and the grey line is the “graphite diamond constraint” of Grutter et al. (2006). Garnet compositions on the high-Cr side of the grey line indicate derivation from within the diamond stability field (assuming a typical geothermal gradient). Garnets are colour coded by paragenesis on the basis of the Grütter et al. (2004) classification. Figure 22 is a plot of TiO2 vs Na2O in garnet. The reference line is the 0.07 wt% Na2O lower cut-off for diamond inclusion type eclogitic garnet (McCandless and Gurney 1989) None of the grains show chemistry consistent with the diamond inclusion field with the exception of one grain that plots as a possible eclogitic garnet in the diamond stability field. Although the remaining grains are not within the diamond inclusion field they may still be of kimberlitic origin and as a result are interesting from an exploration perspective.

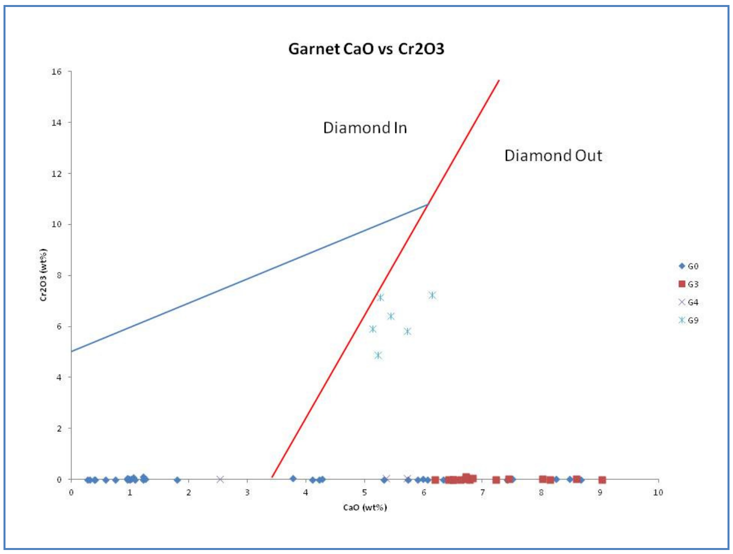

FIGURE 21: GARNET CR2O3 VS CAO PLOT

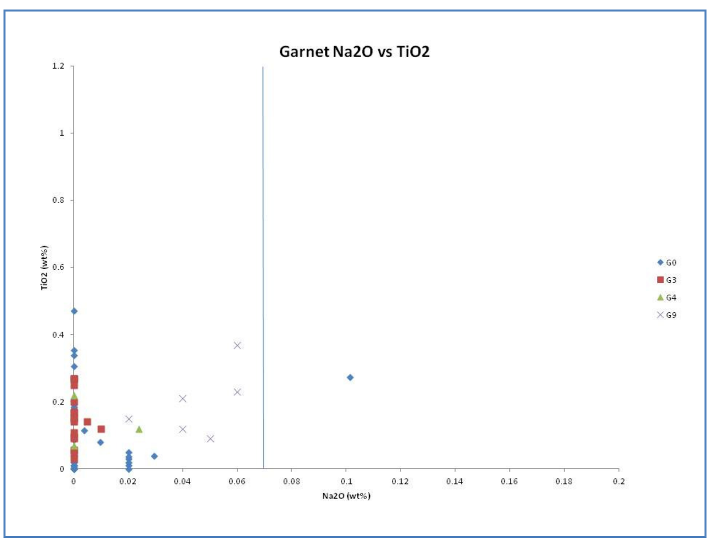

FIGURE 22: PLOT OF TIO2 VS NA2O IN GARNET

Ilmenite/Picroilmenite

SRC labs returned 25 grains identified as ilmenite and CF laboratories returned results for 13 grains identified as picroilmenite and 1 grain identified as ilmenite. These grains are plotted in Figures 23-24 on the ilmenite classification diagrams of Wyatt (2004).The curved area seperates kimberlitic from non-kimberlitic ilmenite. Non-kimberlitic ilmenites usually have less than 4 wt.% MgO, less than 1.0 wt% Cr2O3 and, with few exceptions, have less than 0.5 wt% Cr2O3 (Wyatt et al. 2004). For full analyses see Appendices 4-6.

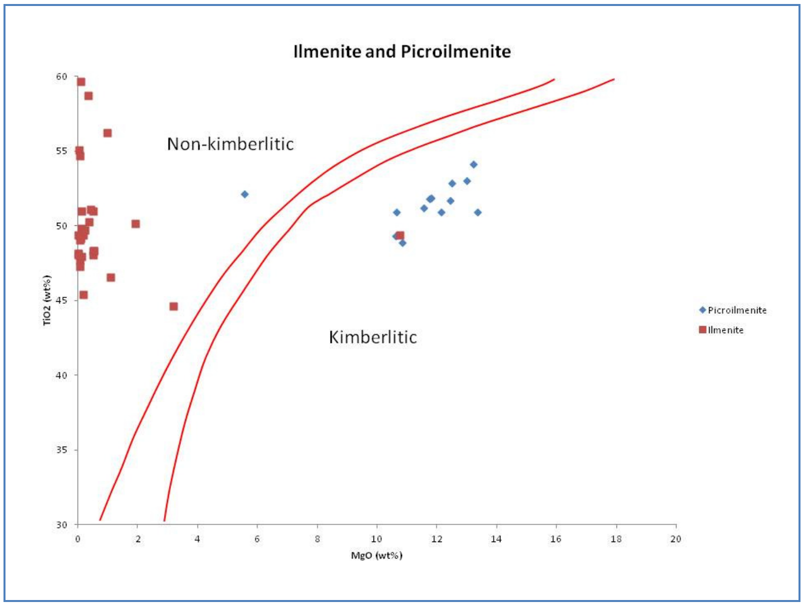

FIGURE 23: TIO2 VS MGO IN ILMENITE

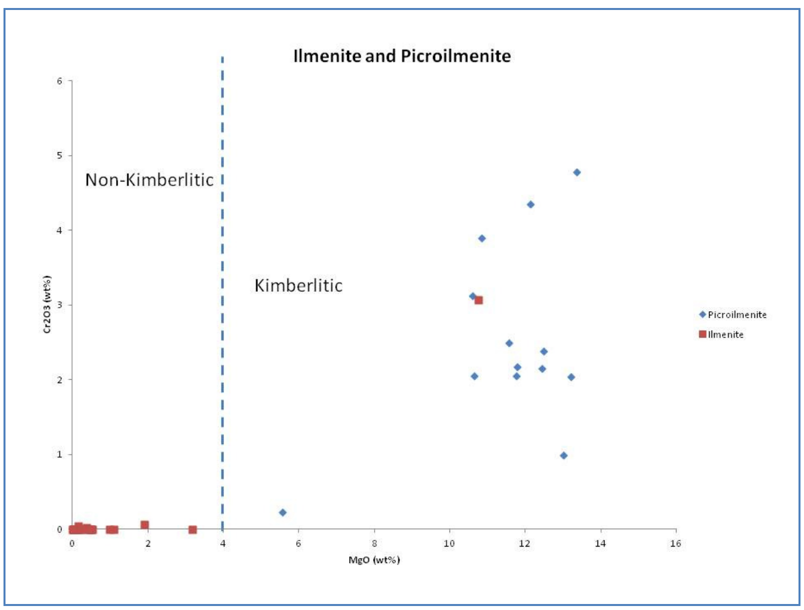

FIGURE 24: CR2O3 VS MGO IN ILMENITE

Chromite

Chromites associated with diamonds have a high average chrome content (>60% Cr_2O_3) together with moderate to high levels of magnesium (~12-16 wt% MgO). They are characterized by very low contents of titanium, usually less than 0.3 wt% TiO_2 but in rare cases up to 0.6 wt% TiO_2. The chrome content of macrocryst chromites is the most critical indicator of diamond potential from this source (Fipke et al 1995). For exploration purposes however, three compositional types of chromites are recognized as important (Fipke 1995). These include chromites of diamond inclusion and intergrowth compositions, and high-content chrome-titanium or Cr-Ti chromites.

Cr-Ti chromites contain >0.8 wt% TiO_2 and plot within the high Cr-Ti field characteristic of lamproites and kimberlites. The identification of high Cr-Ti chromites can be useful in identifying the presence of a kimberlite or lamproite source (Figure 25 Fipke et al 1995).

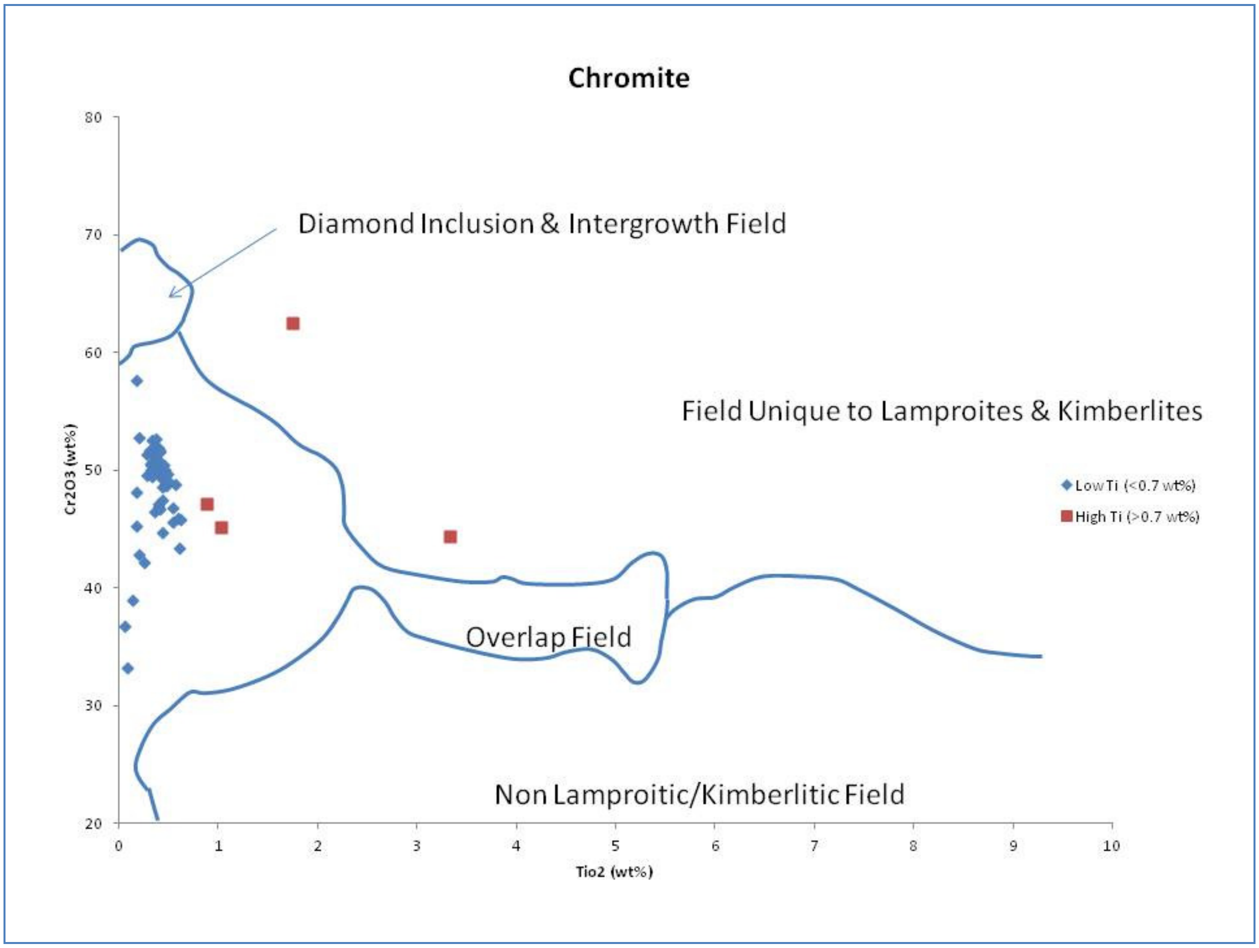

FIGURE 25: TIO2 VS CR2O3 IN CHROMITE

Typical diamond inclusion chromites contain exceptionally high concentrations of Cr and Mg while being Al- and Ti-poor containing >62.0 wt% Cr_2O_3; >11wt% MgO; and <0.5wt% TiO_2 (Sobolev et al.2004). Standard Indicator mineral discrimination plots are presented in Figures 25-26. Of the 59 Chromite analyses from this dataset, all but 4 fall within the low TiO_2 field defined by the boundary of 0.7 wt% TiO_2 (Figure 5)(Sobolev et al. 2004). For typical diamond inclusion chromite, 2 of the grains fall within the field unique to lamproites and kimberlites (Figure 25). One of the grains falls on the border of the diamond inclusion field (Figure 26) defined by Fipke et al. (1995).

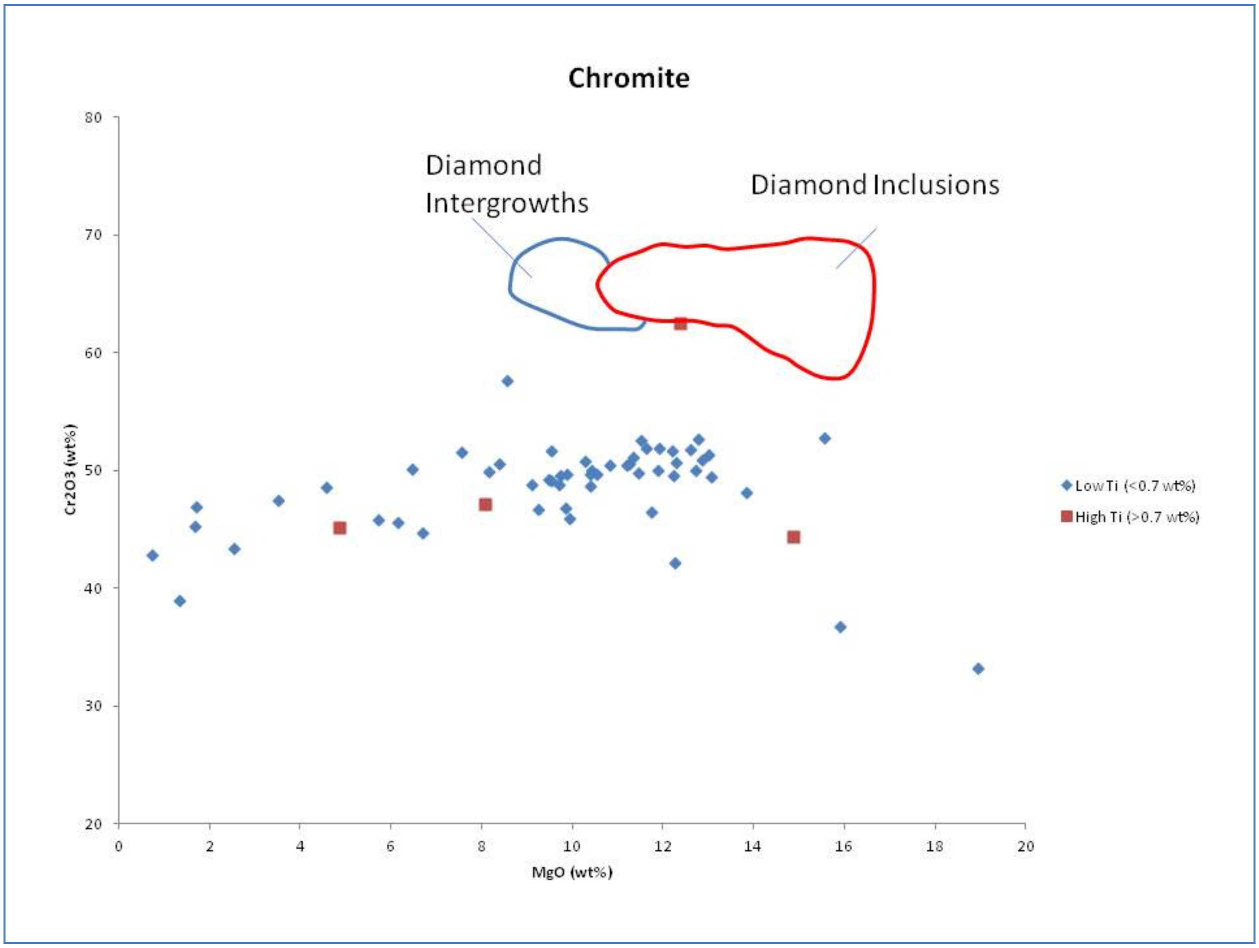

FIGURE 26: CR203 VS MGO IN CHROMITE

Clinopyroxene

Results for 46 clinopyroxene grains were returned from SRC laboratories. They were classified simply as CPX. They are presented in figure 7 along with the results from CF laboratories. These results are plotted on a Cr2O3 versus Al2O3 bivariate diagram with compositional fields from Ramsay 1992 (Figure 27).

Results for 143 clinopyroxene analyses were returned from CF laboratories (Appendix 1). Of these 62 were classified by CF as Eclogitic (CE) and 77 as Peridotitic (CP). Of the 77 Peridotitic Clinopyroxene 24 were further subdivided as follows: 1 grain showed a composition consistent with diamond inclusions that form with large diamonds (CP6 DIO), 2 belonged to group 6 (CF grouping modified after Dawson) and were consistent with diamond inclusion compositions (CP6 DI), 2 were categorized as group 1 (CP1), 8 as group 2 (CP2), 1 as group 3 (CP3) and 15 as group 5 (CP5). Of the Eclogitic clinopyroxene 33 were subclassified as group 2 (CP2).

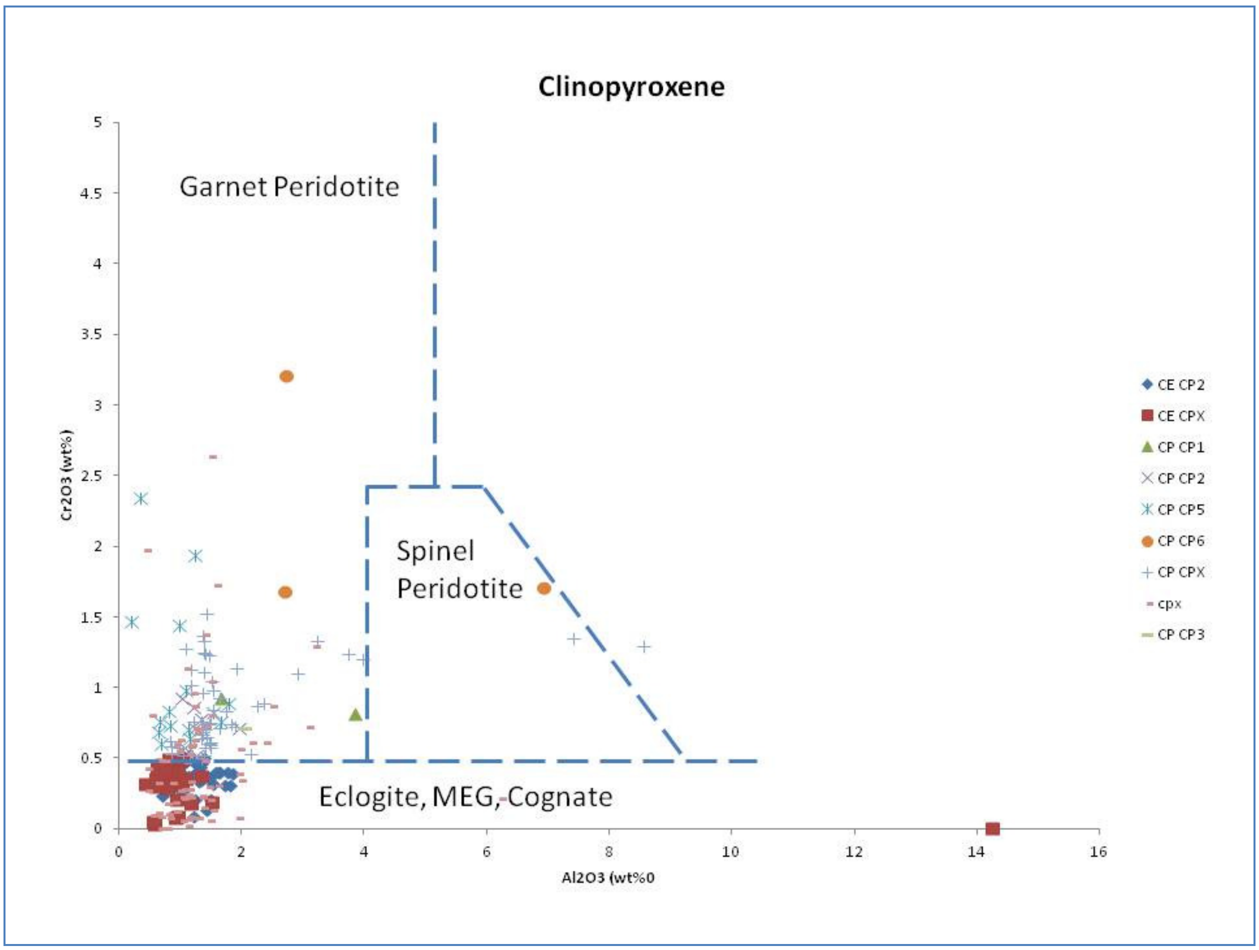

FIGURE 27: CR2O3 VS AL2O3 IN CLINOPYROXENE

Olivine

A total of 12 olivine grains were analyzed by CF labs. Of the 12, 9 were classified as forsteritic and two as having compositions consistent with diamond inclusion chemistry (Table 5). No olivine analyses were returned from SRC.

TABLE 5: OLIVINE CLASSIFICATION

Vial	**CFM Classification**	
V3099	OLV	-
V3108	OLV	-
V3664	OLV	-
V1398	OLV-FORS	-
V3265	OLV-FORS	-
V1399	OLV-FORS	-
V1399	OLV-FORS	-
V1398	OLV-FORS	-
V1399	OLV-FORS	-
V3529	OLV-FORS	-
V2087	OLV-FORS	DI
V3268	OLV-FORS	DI

ORTHOPYROXENE

Orthopyroxene is a relatively common mineral inclusion in diamonds associated with peridotite paragenesis (Fipke et al. 1995) and typically has a restricted compositional range. Eight analyses for OPX were returned from CF labs, one of which was classified as OP1 by CF labs, which indicates chemistry consistent with orthopyroxenes included in diamond (Appendix 4).

OTHER MINERALS

Results for other minerals were also returned, 2 from CF labs tremolite and tourmaline and 150 analyses from SRC, including: 35 amphibole, 5 calcite, 2 dolomite, 15 epidote, 4 hematite, 4 quartz, 1 rutile, 1 serpentine, 2 staurolite, 1 Ti-magnetite, 4 titanite, 21 tourmaline, 3 unknown, and 7 zircon grains. As none of these minerals is typically used as a kimberlite indicator mineral, they are not discussed further here. For complete results please refer to Appendix 4.

2.2 Geographic Analysis and Recommendations

Kimberlite Indicator Minerals occur throughout sample area in low abundance (Appendix 7, Figures 1-10) The highest number of kimberlite indicator minerals per sample is 5 and occurs in samples 4210 (8-9b) and 2939 (4-9). The average number of Indicator minerals per sample is 1. In general the results do not show any areas that represent obvious targets for follow up work. However there are Indicator Minerals in the study area with chemistry consistent with diamondiferous rocks and if follow up work where to take place these areas should be prioritized.

There are small clusters within the dataset of areas with slightly higher indicator mineral abundance (Map 6, Appendix 7) and these areas would also be higher priority for follow up.

2.3 References

Fipke, C.E., Gurney, J.J., and Moore, R.O., 1995, Diamond exploration techniques emphasizing indicator mineral geochemistry and Canadain examples: Geological Survey of Canada, Bulletin 423, 80p

Grutter, H.S., Gurney, J.J., Menzies, A.H., and Winter, F., 2004, An updated classification scheme for mantle-derived garnet, for use by diamond explorers; Lithos, v.77, p.841-857.

Gurney, J.J., 1984, A correlation between garnets and diamonds in kimberlites, in Kimberlite Occurrence and Origin: a basis for conceptual models in exploration: Geology Department and University Extension, Universtiy of Western Australia, Publication No.8, p.143-166

McCandless, T.E., and Gurney, J.J., 1989, Sodium in garnet and potassium in clinopyroxene: criteria for classifying mantle eclogites, in Ross, J., ed., Kimberlites and Related Rocks: Geological Society of Australia, Special Publication 14, p.827-832

Sobolev, N.V., Logvinova, A.M., Zedgenizov, D.A., Seryotkin, Y.V., Yefimova, Floss, C., and Taylor, L.A., 2004, Mineral inclusions in microdiamonds and macrodiamonds from kimberlites of Yakutia: a comparative study: Lithos, v.77, p.225-242

Ramsay, R.R., 1992. Geochemistry of diamond indicator minerals. PhD Thesis, Univ Western Australia, Perth.

Wyatt, B.A., Baumgartner, M., Anckar, E., and Grutter, H., 2004, Compositional classification of kimberlitic and non-kimberlitic ilmenite: Lithos, v.77, p.819-840