

TECHNICAL MEMORANDUM



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**RE: RESULTS OF THE STATIC GEOCHEMICAL TEST WORK
CARMACKS COPPER PROJECT, YUKON TERRITORY**

1.0 INTRODUCTION

Western Copper Corporation (WCC) is currently investigating the potential for development of its Carmacks Copper Project (Carmacks), near Carmacks, Yukon Territory. M3 Engineering and Technology Corporation (M3) has prepared an updated Feasibility Study for the Project for WCC and Golder Associates (Golder) assisted in the preparation of portions of the Feasibility Study.

As part of its role in the Feasibility Study, Golder conducted a review of historic geochemical data from Carmacks to characterize the acid rock drainage (ARD) and metal leaching (ML) properties of the waste rock to be mined during the proposed 8 to 10 year mine life. Results of the data review identified several limitations (Golder, 2007a) in both the number and types of tests conducted to date and the type and number of samples tested. Golder proposed and WCC authorized a supplemental testing and sampling program (Golder, 2007b) to better characterize the ARD/ML properties of the waste rock. This memorandum summarizes the results of the first phase of the supplemental geochemical testing program.

The data presented in the memorandum are not intended to characterize either the short-term or long-term performance of the site. However, the data presented in the report are the results of industry standards test procedures that can be used in conjunction with other models (i.e. surface water discharge models) to estimate or predict discharge levels.

2.0 BACKGROUND

Two geochemical sampling and testing programs using a battery of static test procedures were previously conducted to characterize the geochemistry of the waste rock at Carmacks. The first one was conducted by Hallam Knight Piesold (HKP) in 1995, and the second was conducted by Access Consulting Group (Access) in 2006. Table 2-1 summarizes the number and types of geochemical tests conducted by HKP and Access.

The sampling and testing program conducted by HKP included acid-base accounting (ABA) tests, whole rock chemical analyses of solid samples, and short term leaching tests using the British Columbia Leachate Extraction Procedure (BC-LEP) to characterize 23 waste rock samples. A Tessier extraction test, which is a sequential leaching test, was used by HKP to identify the mineralogy that hosts the various metals in the waste rock. The HKP test work and report were part of the 1995 EIS for Carmacks (HKP, 1995).

The program conducted by Access tested 20 samples of core from the same intervals as the HKP investigation, supplemented with seven samples of additional core. The Access investigation included petrographic analysis of each sample along with ABA analysis, whole rock chemical analysis, and short term leaching tests using the shake flask extraction (SFE) protocol (24 hour NanoPure Leach Extraction test).

TABLE 2-1: Summary of Historic Geological and Geochemical Investigations of Waste Rock

Geochemical Test Protocol	Hallam Knight Piesold 1995	Access Consulting Group 2006	Golder Associates Ltd. 2007
Petrography	n/a	27	n/a
ABA	23	27	7
Whole rock	23	27	7
24 hour leach tests	6	27	7
Tessier Extraction	1	n/a	n/a
Kinetic test	n/a	n/a	6

The Golder (2007) test program is designed to augment the existing static geochemical database by:

1. Collecting and analyzing additional samples to a) provide additional results, b) sample the periphery of the pit near the proposed pit walls where there are no existing samples, and c) include samples of alteration and mineralization types not previously sampled.
2. Including kinetic testing (humidity cell tests) to quantify reaction rates and long term leaching properties of the waste rock.

The current program includes seven ABA analyses, whole rock chemical analysis, and SFE tests using assay pulps from historic drill holes, and six humidity cell kinetic tests using splits of samples from the Access core sample set (refer to Table 2-1). In addition, the total inorganic carbon (TIC) has been analysed for 24 of the Access samples. Nine additional samples will be collected from the 2008 drilling program. These samples will undergo the same suite of testing as the 2007 pulp samples (i.e. ABA, whole rock, and SFE). A separate phase of the 2007 scope of work includes geochemical testing of neutralized spent ore samples which will be conducted upon completion of the metallurgical testing.

The ABA, whole rock analyses, and SFE testing for the seven existing assay pulp and the 24 TIC analyses of the Access samples are complete and reported below. The kinetic tests using the six Access samples are also complete and the results discussed in the text. The additional test work using waste rock samples and the neutralized spent ore samples will be conducted following completion of the geotechnical drilling program and metallurgical testing.

3.0 SAMPLING PROGRAM

The geology of the Carmacks deposit consists of two major rock types: granodiorite and gneiss (Access, 2006) and volumetrically minor igneous textural subfacies. Alteration assemblages reported in the Access summary include silicate, oxide, and sulfate gangue mineral assemblages (primarily potassium feldspar, gypsum, and hematite) and oxide and sulfide mineralization. The rock type model consists of granodiorite (waste rock) and gneiss (ore) and the other igneous facies are not included in the model. Alteration typically amounts to narrow veins and thin alteration salvages adjacent to veins rather than pervasive alteration haloes as observed in typical porphyry copper type deposits. For this reason, alteration assemblages have not been included in the rock model.

Table 3-1 summarizes the properties of the samples selected for the 2007 geochemical testing program. Samples 1 through 7 are from the historic drill-hole sample assay pulps and have been selected for the ABA, whole rock chemical analyses, and SFE testing.

Samples 8 through 13 are from the Access core sample suite and have been selected for the humidity cell test work.

The samples selected for the Golder test program:

- included a range of textural types within the granodiorite lithologic unit;
- included each of the alteration types (K-feldspar, hematite, and unaltered rocks);
- were located along the length of the pit footprint (sections L200N, L400N, L800N, and L1500N);
- included samples from the hanging wall and footwall of the deposit;
- had adequate sample material for testing (greater than 1 kg of sample); and
- included a range of NP values from 4.7 to 48.7 tonnes CaCO₃/ kilo tonnes rock (Access range was 4.7 to 48.4 tonnes CaCO₃/ kilo tonnes rock).

The total sulphur concentrations of the Access samples were small, ranging from less than the detection limit to 0.03 wt%, and therefore sulphur content was not a selection criterion. In addition, total inorganic carbon (TIC) was not included as part of the Access test program and as a consequence, CaCO₃ NPR was not available at the time of the humidity cell selection. TIC analyses were part of the 2007 program and TIC analyses were conducted on the 2006 samples but only after the start of the humidity cell tests.

Samples for the humidity cell tests were not collected from the supplemental sample suite because: 1) the samples from the Access library were originally selected in conjunction with the site geologist and were considered to be representative of the waste rock in the Zone 1 ore body, 2) the supplemental samples were selected to expand the characterization of the waste rock but not necessarily within the confines of the pit and 3) the supplemental samples consisted of assay pulp rejects which are not suitable for humidity cell tests. Assay pulps, when tested in either standard humidity cells or tailings humidity cells are too fine grained to allow proper flow of air through the sample during the dry and moist air cycles of the test.

The attached plan map, Figure 3-1, shows the proposed pit outline, the locations of the collars of drill holes sampled and the locations of the cross sections that include the sampled drill holes. Figure 3-2 to Figure 3-9 are cross-sections of areas 300S, 100N, 400N, 800N, 1100N, 1500N, 1600N, and 1700N, respectively. These cross-sections include the drill hole traces, approximate locations of the geochemical samples, the sample drill hole ID and footage, the pit outline, and geology. The geological data includes the location of the oxide and sulphide ore zones as well as the geologic units used in the block model: overburden and waste rock. The waste rock in the cross sections is subdivided into granodiorite, gneiss and intermediate dykes and the granodiorite is further subdivided into facies: granodiorite, pegmatite, gneissic granodiorite, and mixed gneiss and granodiorite.

TABLE 3-1: Data Summary Table for the Static and Kinetic Test Samples

	Sample ID	Kinetic test	Drill hole	Interval		Rock type	Alteration	Mineralization	Location
				From	To				
1	C229560		WC-025	53	54	granodiorite	Hematite	None	Hanging wall
2	C229587		WC-025	80	81	granodiorite	Potassium feldspar	Weak (0.50 % Cu)	Hanging wall
3	C490366		WC-025	488	489	granodiorite	Unaltered	None	Interbed
4	C490395		WC-025	517	518	mixed gneiss/ granodiorite	Gypsum	Weak (0.365 % Cu)	Footwall
5	C490422		WC-025	544	545	mixed gneiss/ granodiorite	Gypsum	Weak (0.150 % Cu)	Footwall
6	C228435		WC-009	195	196	foliated granodiorite	Unaltered	Weak (0.620 % Cu)	Hanging wall
7	C228666		WC-018	182	183	granodiorite	Chlorite/epidote	None	Hanging wall
8	DDH 1-33-91 348'-350'	HC-1	DDH 1-33-91	107.8	108.5	granodiorite	Potassium feldspar	None	Footwall
9	DDH 1-37-91 149'-151'	HC-2	DDH 1-37-91	46.2	46.8	granodiorite	Potassium feldspar	None	Hanging wall
10	DDH 1-53-92 452'-454'	HC-3	DDH 1-53-92	140.1	140.7	granodiorite	Hematite	None	Hanging wall
11	DDH 92-157 139'-141'	HC-4	DDH 92-157	43.1	43.7	granodiorite	Unaltered	None	Hanging wall
12	WC-001 43'-45'	HC-5	WC-001	13.3	14.0	foliated granodiorite	Unaltered	None	Footwall
13	WC-006 312'-314'	HC-6	WC-006	96.7	97.3	granodiorite	Unaltered	None	Hanging wall

Table 3-2 is from the *Carmacks Copper Project, NI 43-101 Technical Report, Feasibility Study Volume I*, May, 2007 (Table 1.20-17) and provides the proposed tonnages by material type. Owing to the simplified geology at the site and the dominance of granodiorite over other minor lithologic units, a simplified rock type model was constructed for the project that consists of: two ore zones (sulphide and oxide) and two waste rock units (overburden and granodiorite). Since the mine plan assumes only oxide ore will be mined and since the overburden over the ore zone is very thin, the model is reduced to two units: oxide ore and granodiorite. The ore is confined to the gneiss and so the oxide ore zone is synonymous with mineralized gneiss. The model used the hanging wall and footwall contacts as surfaces to bound the mineralized zones. The hanging wall and footwall waste rock tonnages were not distinguished in the model results although geochemical samples were collected from both the footwall and hanging walls.

TABLE 3-2: Summary of Proposed Tonnages to be Mined from the Block Model

Material type	Tonnages Ktonnes	Proportions	Samples (Access and 2007)
Ore	9651	14%	0
Overburden waste	2021	4%	2 ⁽¹⁾
Rock waste	55,663	83%	32

(1) Access collected two samples of heavily weathered granodiorite gravel and rubble (DDH1-25-91 12'-14' and DDH1-33-91 50-52' which a representative of the site overburden. The samples have been included with the other granodiorite samples.

The mineralized gneiss/granodiorite contact is reported to be very sharp and it is anticipated that the ore will be mined back to unmineralized granodiorite. The oxide and sulphide ore boundary was coded into the block model using a minimum 20% ratio of oxide to total copper. The base of the pit is planned to be one bench or approximately 6 m (20 ft) above the oxide ore/sulphide ore boundary in order to have oxidized ore in the bottom of the pit, and not exposing the sulphide ore (WCC, Personal Communication, 2007).

4.0 GEOCHEMICAL TESTING

The section that follows discusses the test protocols and criteria used to evaluate the test results. All of the laboratory tests were conducted by Canadian Environmental & Metallurgical Inc. (CEMI), in Vancouver, BC.

4.1 Acid-Base-Accounting (ABA)

ABA testing is a screening level tool that is used to estimate the amount of acid generating and acid neutralizing material in a sample. It is designed to provide the following:

- The maximum acid generation potential of a material assuming all of the sulphide sulphur can be attributed to pyrite and is allowed to oxidize; and
- The maximum acid neutralization potential of the material assuming all acid buffering capacity of a sample, as fast acting carbonate neutralizing potential, is allowed to react.

ABA testing addresses neither reaction kinetics nor the availability of pyrite or carbonate to react. The test results include paste pH, TIC, total sulphur, sulphate sulphur, sulphide sulphur (by difference, i.e. total sulphur minus sulphate sulphur), and bulk neutralizing potential (bulk NP). Paste pH is the pH measured for a paste consisting of water and crushed rock. The bulk NP is the neutralizing potential of a rock from carbonate, hydroxide (OH⁻) and other forms of acid-neutralizing chemical species such as alumino-silicate minerals. Alumino-silicate minerals would include alkali feldspars which are commonly present in granodiorite (Price, 1997). TIC is an estimate of the amount of carbonate (HCO₃⁻ and CO₃⁻²) neutralizing material present in a rock. TIC is used to calculate the carbonate portion of the bulk NP (CaCO₃ NP). The use of CaCO₃ NP is a more conservative estimate of the acid neutralizing potential of a rock. Other methods for estimating the ARD potential of rock material are the Net Carbonate Value (NCV), which uses combustion-infrared detection for carbon and sulphide analysis and the Net Acid Generating (NAG) test which uses hydrogen peroxide (H₂O₂) to promote sulphide mineral oxidation and acid generation. The NCV is not in common use and the NAG test is designed primarily for identification of ARD material in the field.

The ABA analyses are conducted using the modified Sobek method. Total sulphur concentration is analyzed by pyrolysis and infrared spectroscopy (LECO furnace) and acid soluble sulphate sulphur is measured by LECO furnace analysis of total sulphur after reaction with HCl. Bulk NP is measured by titrating the sample with a strong acid and measuring the amount of strong base required to return the solution to a specified pH.

The sulphide sulphur, CaCO₃ NP, and bulk NP are used to calculate: the acid generating potential AP which is derived from the weight percent sulphide sulphur concentration, and the neutralizing potential ratios: 1) bulk NPR (bulk NPR = bulk NP/AP) and 2) CaCO₃ NPR (CaCO₃ NPR = CaCO₃ NP/AP). The neutralizing potential (bulk NPR or CaCO₃ NPR) has historically been used to classify acid generation potential.

Table 4-1 summarizes the criteria suggested by Price (1997) for such classification.

TABLE 4-1: Acid Rock Drainage Screening Criteria (Price, 1997)

Potential for ARD	Initial Screening Criteria	Comments
Likely	NPR <1	Likely acid generating, unless sulphide minerals are non-reactive.
Possible (uncertain)	1 < NPR < 2	Possibly acid generating if NP is insufficiently reactive or is depleted at a rate faster than sulphides.
Low	NPR 2-4	Not potentially acid generating unless significant preferential exposure of sulphides along fractures planes, or extremely reactive sulphides in combination with insufficiently reactive NP.
None	NPR >4	

4.2 Whole Rock Chemical Analysis

The whole rock major and trace element chemical composition of mineralized rock is used to identify samples with anomalous (e.g. elevated or depleted) concentrations of metals when compared to equivalent, unmineralized rock. The application of whole rock analyses is based upon the assumption that water in contact with unmineralized rock will have a “normal” chemical composition, meeting standard water quality guidelines. Elevated whole rock metal concentrations suggest the increased potential for metal leaching and elevated metal concentrations in the adjacent water. The actual availability of an element to leach depends upon factors not measured in the whole rock chemical analyses such as mineralogy or water rock interaction.

Whole rock major element chemical analyses were conducted using lithium meta-borate bead fusion followed by nitric acid digestion and inductively coupled plasma mass spectroscopy (ICP-MS) analysis. Trace element analyses were conducted using an aqua regia digestion followed by ICP-MS analyses.

4.3 Shake Flask Extraction (SFE)

The SFE is a short term leaching test (24 hours or less) that measures the solubility of acids and metals from readily solubilized mineral acidity and soluble salts (e.g. oxidation products), respectively. Results of the SFE tests are compared with the Metal Mining Effluent Regulations (MMER) and the Canadian Council of Ministers of the

Environment (CCME) fresh water aquatic life water quality standards for reference purposes only. The MMER guidelines are the federal environmental regulations applied to all metal mines (except placer mines) in Canada. As such, effluent from the Carmacks Project will be required to comply with the MMER standards at all final discharge points. The CCME fresh water aquatic life standards are receiving water quality guidelines. The aquatic life standards are not directly applicable to the SFE extraction leachate however provide guidelines for a broader suite of analytes than the MMER standards and are applied for reference purposes only. The derivation of the guidelines is discussed in the footnotes of Appendix A for the pH or hardness dependent concentrations. Owing to the short duration of the test, metal-bearing sulphide minerals do not contribute to the SFE leachate chemical load because of insufficient time for sulphide mineral reaction.

In the SFE test 250 g of minus 9.52 mm (3/8 inch) crushed material is mixed with 750 ml of deionized water (3:1 water to rock ratio). The water and rock mixture is then agitated on a shaker table for 24 hours. The leachate is extracted, filtered, and analyzed for the desired parameters by ICP-MS/ES (emission spectroscopy).

Concentrations of dissolved elements in the leach solutions from SFE tests are compared with relevant water quality standards. The comparison is strictly qualitative because:

- the water to rock ratio (3:1) of the SFE may or may not simulate the actual water to rock ratio at the site (e.g. precipitation infiltrating a waste storage facility);
- the test format is aggressive, which may over estimate the dissolution of soluble minerals and mineral crusts (e.g. sample agitation promotes abrasion and increased chemical load in the leachate similar to semi-autogenous grinding); and
- the grain size and surface area of the sample material prior to leaching is also not representative of actual conditions at the site.

4.4 Humidity Cell Testing

The humidity cell test is a long term (typically 20 weeks) laboratory protocol designed to simulate the natural cycles of precipitation that occur in mine facilities. The long duration of the test coupled with the short cycle times of flushing followed by rest periods (typically one week) promotes the aggressive oxidation of metal-bearing sulphide minerals, acid production, and metals leaching. There are many different controls on metals mobility (e.g. As, Se and some other metals/metalloids are labile in both acidic and alkaline conditions) but humidity cells are designed to simulate those conditions unique to the rocks tested when exposed to natural oxidative conditions encountered during subaerial weathering. Metals may indeed be mobile under acidic conditions for

example, however if the leachate pH of a test sample is neutral and remains neutral, the humidity cell test protocol allows the investigator to focus the assumptions on rock behaviour (e.g. neutral drainage) and limit other environmental controls (e.g. acidic drainage) on ARD/ML at the site.

The results of humidity cell testing can be compared with water quality guidelines but are most often applied to predictive geochemical modeling to estimate the long term discharge water chemistry from waste rock piles or other mine facilities and pit wall runoff for pit lake water chemistry estimates. Although ABA analyses are commonly used to estimate the acid generating and neutralizing potential of mined material, humidity cell tests are considered to be a more reliable measure of the on-set of sulphide oxidation and acid generation, particularly for low sulphur and low NP systems where silicate neutralizing potential may be significant (Maest et al., 2005)

Humidity cell tests use a standard test format. A 1 kg sample of 80% minus 6.35 mm ($\frac{1}{4}$ inch) material is placed in a humidity cell vessel and flushed with 740 mL of demineralised water (cycle 1). The leachate is recovered, filtered, and preserved for analysis. Weekly cycles follow in which dry air is passed over and through the sample for three days, followed by moist air passed over and through the sample for three days, followed by flushing of the sample with 500 mL of demineralised water on the seventh day. The weekly cycle is repeated for a minimum of 20 weeks or until the leachate achieves a steady state chemical composition. For this study weekly samples are analyzed for pH, conductivity, acidity, alkalinity, and sulphate. Cycles 1, 2, 4, 8, 12, 16 and 20 samples are analyzed for a full range of anions and cations that include the weekly parameters plus 35 major and trace element concentrations. A grain size analysis of the samples is also conducted to estimate the reactive surface area of the test material in the cell.

The four week format was adopted for the Carmacks humidity cell tests because of the low anion and cation concentrations in the leach solutions. Additional cycles could have been included but the generally low metals and sulphate concentrations did not warrant further sampling. In the absence of evidence of elevated metals concentrations in the Carmacks waste rock (e.g. that mercury was present at the site) the industry standard detection limits were used for all metals analyses.

5.0 RESULTS

The text that follows presents the results of the ABA, whole rock analyses, SFE test work and the results of the humidity cell testing. All of the data are summarized in Appendix A - 2007 Golder Static Data, Appendix B - 2006 Access Data, and Appendix C – Golder Humidity Cell Data.

5.1 ABA

The majority of the rocks analyzed as part of the current geochemical investigations have low sulphur concentrations and low acid neutralizing potentials. Table 5-1 summarizes the ABA test results.

The paste pH values of all of the samples are slightly alkaline; over 8. The TIC and the derived CaCO₃ NP are low and average 0.03 weight percent and 2.2 kg CaCO₃/tonne, respectively. Total sulphur concentrations are all less than 1 weight percent and range from the detection limit (0.01 weight percent) to near 0.9 weight percent. Sulphate and sulphide sulphur concentrations are generally low and average 0.1 weight percent each. Sulphate sulphur ranges from the detection limit to 0.6 weight percent and sulphide sulphur is between the detection limit and 0.3 weight percent. The AP derived from the sulphide sulphur concentration lies between 0.3 kg CaCO₃/tonne (the detection limit) and 9.7 kg CaCO₃/tonne and the bulk NP ranges from 10 to 20 kg CaCO₃/tonne.

The ABA results appear to be controlled by the:

- host rock; and
- alteration assemblages.

Since the Carmacks ore body is an oxide assemblage dominated by secondary mineral phases (86%), including malachite (CuCO₃(OH)₂), cuprite (Cu₂O), azurite [Cu₃(CO₃)₂(OH)₂], and tenorite (copper limonite) (Access, 2006), the samples generally have low sulphur concentrations. The ABA data suggests the following:

- TIC (and CaCO₃ NP) (**bold** in Table 5-1) is highest in the chlorite/epidote assemblage (0.1 weight percent). This is consistent with the common occurrence of calcite (CaCO₃) in a chlorite and epidote-bearing propylitic alteration assemblage. Low but measurable carbonate is also present in the unaltered samples.
- Gypsum veining appears to be associated with the mixed gneiss and granodiorite. The association may be the result of textural properties of the gneiss or proximity to mineralization.

- Total sulphur (**bold** in Table 5-1) concentrations are highest in the gypsum-bearing samples (0.4 to 0.9 weight percent) which also have the highest sulphide sulphur concentrations (0.3 weight percent).
- The potassium feldspar and hematite alteration assemblages have carbonate and sulphur concentrations at or below the respective detection limits.
- The bulk NP is independent of rock type or alteration assemblage.

TABLE 5-1: ABA Results Summary

Sample ID	Rock Type	Alteration	Paste pH	TIC %	CaCO ₃ NP *	S(T) %	S(SO ₄) %	S(S-2) %	AP *	Bulk NP *	Bulk NPR	CaCO ₃ NPR
C228666	granodiorite	Chlorite/epidote	9.28	0.1	8.3	0.02	<0.01	0.02	0.6	19.3	30.9	13.3
C490395	gneiss/ granodiorite	Gypsum	8.92	<0.01	<0.8	0.88	0.57	0.31	9.7	9.5	1.0	0.1
C490422	gneiss/ granodiorite	Gypsum	8.57	<0.01	<0.8	0.38	0.08	0.30	9.4	13.5	1.4	0.1
C229560	granodiorite	Hematite	9.37	<0.01	<0.8	0.01	<0.01	0.01	0.3	8.5	27.2	2.6
C229587	granodiorite	Potassium feldspar	9.33	<0.01	<0.8	0.02	<0.01	0.02	0.6	12.8	20.5	1.3
C228435	foliated granodiorite	Unaltered	9.18	0.03	2.5	0.05	<0.01	0.05	1.6	18.8	12.0	1.6
C490366	granodiorite	Unaltered	8.69	0.02	1.7	0.26	0.24	0.02	0.6	9.5	15.2	2.7

*kg CaCO₃/tonne

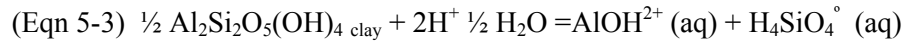
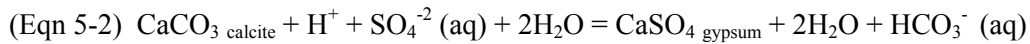
Values reported as below the detection limit use the detection limits for any calculations.

Bold numbers in Table 5-1 identify elevated concentrations of TIC, CaCO₃ NP, and sulphur species for different alteration assemblages.

Figure 5-1 is a plot of CaCO₃ NP versus bulk NP. The figure shows that the bulk NP:

1. Is consistently higher than the CaCO₃ NP; and
2. Increases in proportion of the acid neutralizing capacity of the rock as the CaCO₃ NP decreases.

The source of the difference between the bulk NP and the CaCO₃ NP is believed to be the result of acid buffering by aluminosilicate mineral reactions. Equations 5-1, 5-2, and 5-3 are examples of chemical reactions of acid generation by pyrite oxidation, acid neutralization by carbonate reaction, and acid buffering by aluminosilicate minerals, respectively (Langmuir, 1997).



Reactions 5-1 and 5-2 are potentially very rapid and are the basis for ABA predictions of acid generating potential. Reaction 5-3 is less rapid but may be the dominant form of acid neutralization in the deeply weathered, oxide-bearing ores of the Carmacks deposit.

Figure 5-2 is a semi logarithmic plot of AP versus NP composite of the Golder and Access ABA results including both the bulk NP and CaCO3 NP for the Golder and Access samples. The data show that the 94% of all of the samples analyzed (24 of the 24 Access samples and five of the seven Golder samples) have NPR ratios, based upon the bulk NP, that fall in the field of non-acid generating rock according to Price (Table 4-1). The NPR values based upon the CaCO3 NP for the Golder and Access samples are lower.

Figure 5-2 also shows that samples C490395 and C490422 plot in the field of “possibly” acid generating for the bulk NP and in the field of “likely” acid generating for the CaCO3 NP. Both samples are from over 500 m depths and, based upon the current mine plan, are roughly 200 m below the bottom of the pit. It is unlikely either sample will be mined. Four additional samples C228435, C490366, C229587 and C229560 which have bulk NP values in the “none” acid generating category have CaCO3 NP values that fall in either the “possibly” or “low” acid generating fields.

Price (1997) uses a cut off of 0.3% sulphide sulphur as the criteria for ARD testing suggesting that samples with less than 0.3% sulphide sulphur and which do not occur in “base poor material” or have sulphide minerals that contain heavy metals, are not acid generating regardless of the AP and NP classification. Based upon the Price criteria, the four samples (C228435, C490366, C229587 and C229560), shown in the Table 5-2, have sulphide sulphur concentrations that are sufficiently low as to be non-acid generating.

TABLE 5-2: Summary of Bulk NP, CaCO3 NP and Sulphide Sulphur Results for Selected ABA Samples

Sample	Bulk NP	CaCO3 NP	S (S-2)
C228435	None	Possibly	0.05
C490366	None	Low	0.02
C229587	None	Possibly	0.02
C229560	None	Low	0.01

The humidity cell test work (refer to Section 5.5) clearly demonstrates that the CaCO₃ NP underestimates the actual neutralizing potential of the rock. Samples DDH 1-33-91 348'-350' (HC-1), DDH 92-157 139-141 (HC-4), WC-001 43'-45' (HC-5), and WC-006 312-314 (HC-6) (refer to Table 5-5), with TIC values less than 0.02 wt% (the detection limit for TIC is 0.01 wt%) have humidity cell leachate with pH values consistently of 7 or above and alkalinity of between 10 and 20 mg CaCO₃/L. The humidity cell tests suggests that the bulk NP and the bulk NPR are the best indicators of the acid generating potential of the low sulphur and low sulphide-bearing rocks at Carmacks.

5.2 Major Element Chemistry

The waste rock samples from the Carmacks Project site have gross chemical compositions similar to unmineralized rocks. The whole rock major element analyses are shown graphically in Figure 5-3. The figure includes unaltered granodiorite, altered granodiorite, and gneiss (refer to Table 3-1 for rock types) compared to the major element chemistry of an "average" granodiorite and an "average" diorite (Price, 1997). The altered and unaltered granodiorite samples are very similar in major element chemistry. Both are low in silica and high in aluminium compared to an "average" granodiorite. The Carmacks granodiorite samples also have generally high concentrations of iron, calcium, magnesium, and sodium compared to "average" granodiorite. The major element chemistry of the gneiss very closely approaches the major element chemistry of an "average" diorite protolith.

5.3 Trace Element Chemistry

The waste rock samples have trace element chemistry similar to equivalent unmineralized rock with the exception of copper and molybdenum. Figure 5-4 is a plot of the average metal concentrations for mineralized and unmineralized granodiorite from the Carmacks Project compared with "average" granodiorite (Price, 1997). The figure uses the detection limits for concentrations reported as below the detection limits. The figure excludes arsenic, bismuth, cadmium, lanthanum, antimony, thorium, and tungsten which are all below the respective detection limits for all samples.

The trace metal concentrations in the unmineralized and mineralized waste rock from the Carmacks Project match the trace metal concentrations in the "average" granodiorite except:

- When the concentrations in the Carmacks samples are at and below the respective detection limits and detection limits exceed the “average” concentrations. Examples of this include silver (detection limit of 0.2 ppm), mercury (detection limit of 1 ppm), thallium (detection limit 10 ppm), and uranium (detection limit of 10 ppm), which all exceed the respective concentrations in the “average” granodiorite.
- When the trace metals are enriched in the sample. Examples of this include average copper concentrations which are 4000 ppm in the mineralized samples as compared to 75 ppm in the unmineralized rocks and 30 ppm in the “average” granodiorite. Average molybdenum concentrations which are over 30 ppm in the mineralized samples as compared with 2 ppm in the unmineralized rock and 1 ppm in the “average” granodiorite.

Only copper, of the MMER metal parameters (arsenic, copper, lead, nickel, and zinc), occurs in elevated concentrations in the mineralized waste rock at the Carmacks Project. As noted in Section 4.2, the implication of the elevated copper concentration compared to “average” granodiorite in the Carmacks waste rock, is that water in contact with the Carmacks waste may have corresponding elevated copper concentrations compared with the MMER standards. The whole rock chemical analysis does not measure the actual mobility of the metal.

Results using the average of the trace element chemical analyses of the Access samples are also included in Figure 5-4. Average trace element chemistry of these 27 samples is very similar to the unmineralized granodiorite composition with slightly higher concentrations of chromium (125 to 80 ppm) and copper (131 to 75 ppm).

5.4 Shake Flask Extraction (SFE)

The SFE leachates from all seven samples have neutral pH values (7.2 to 7.8) and very low dissolved metals concentrations. Results of the SFE leachate analyses are shown graphically in Figures 5-5 and 5-6 where the data are compared with the MMER and the CCME fresh water aquatic life water quality standards, respectively. The average concentrations shown in Figures 5-5 and 5-6 use one half the detection limits for concentrations reported below the detection limit. Table 5-3 lists the MMER and CCME water quality guidelines and the average concentrations for the mineralized and unmineralized rocks. As noted in Section 4.3, the MMER guidelines and CCME reference standards do not directly apply to the SFE leachates but are provided for reference purposes only. Individual analyses may exceed specific reference standards however, average concentrations have been used for simplicity of presentation and because all of the analyses represent a single rock type in the ore reserve rock type model.

Figure 5-5 shows that the average SFE leachate concentrations are one to three orders of magnitude below the respective MMER, Maximum Authorized Monthly Mean Concentration (the most rigorous of the MMER guidelines). The concentrations of lead and zinc are both near or below the detection limit (Table 5-2).

With the exception of the average aluminum, cadmium and copper, the metal concentrations in the SFE leachate are near or below all of the CCME freshwater aquatic life standards. The concentrations of mercury, silver, chromium, lead, thallium, and zinc are all near or below the respective detection limits.

The leachates from the SFE tests conducted by Access are near neutral but the range of pH values is slightly lower than for the tests conducted by Golder (6.45 to 7.75). In addition, the concentrations of dissolved metals in samples tested by Access show higher average metal concentrations than the samples tested by Golder, including copper, lead, and zinc. Three samples from the Access sample suite bias the average analyses: DDH-90 WC03 (copper = 0.137 mg/L and zinc = 0.027 mg/L), DH1-153-92 152-154 (iron = 0.157 mg/L), and DH1-37-91 250-252 (copper = 0.125 mg/L). Figures 5-5 and 5-6 include the average metal concentrations for the Access samples for comparison with the MMER and CCME guidelines. Table 5-3 also includes the average Access metals concentrations.

TABLE 5-3: Average Dissolved Metal Concentrations for Mineralized and Unmineralized SFE Leachate

Parameters	Units	Guidelines		Unmineralized	Mineralized	Access
		CCME	MMER			
pH	s.u.	6.5 - 9.0	6.0 - 9.5	7.61	7.27	6.91
Aluminum	(mg/L)	0.005 - 0.1		0.077	0.045	0.15
Arsenic	(mg/L)	0.005	0.5	0.0003	0.0004	0.0003
Cadmium	(mg/L)	0.000005 - 0.000338		<0.00001	0.00007	0.00003
Chromium	(mg/L)	0.001/0.0089		<0.0002	<0.0002	<0.0002
Copper	(mg/L)	0.002 - 0.004	0.3	0.0002	0.004	0.017
Iron	(mg/L)	0.3		<0.005	0.006	0.033
Lead	(mg/L)	0.001 - 0.007	0.2	0.00003	<0.00002	0.00007
Mercury	(mg/L)	0.000026		<0.00005	<0.00005	<0.00005
Molybdenum	(mg/L)	0.073		0.005	0.03	0.0077
Nickel	(mg/L)	0.025 - 0.15	0.5	0.0007	0.0006	<0.0005
Selenium	(mg/L)	0.001		<0.0005	0.001	<0.0005
Silver	(mg/L)	0.0001		<0.00001	<0.00001	0.00002
Thallium	(mg/L)	0.0008		<0.00005	<0.00005	<0.00005
Zinc	(mg/L)	0.03	0.2	0.0005	<0.0005	0.0018

As noted in Section 2.0, the 2007 sample set is intended to augment the Access geochemical library both spatially and mineralogically in alteration and mineralization, although alteration is limited to thin veins and narrow salvages and mineralization is primarily concentrated in the oxide and sulphides zone in gneiss. Table 5-4 summarizes the distribution of samples by alteration, mineralization and host rock types for the Access and 2007 samples. Based upon Table 5-4, it is apparent that any average comparing Access and 2007 data will differ. Since the rock type model uses a single bedrock waste rock type (granodiorite), the variation in the lithology, alteration, and mineralization in the material tested between the Access and 2007 sample sets will eventually need to be averaged to generate a single chemical signature for the unit.

TABLE 5-4: Summary of Access and 2007 Sample Types by Alteration, Rock Type, and Mineralization

Alteration			Lithology			Mineralization		
	Access ⁽¹⁾	2007		Access	2007		Access	2007
Epidote	2		GRDR	25	4	Mineralized	2	4
K-feldspar	5	1	GN-GRDR	2	3	Unmineralized	25	3
Hematite	4	1						
Chlorite	1	1						
Gypsum	2	2						
Sericite	1							
Unaltered	12	2						
Total	27	7		27	7		27	7

GRDR = granodiorite

GN-GRDR = gneiss granodiorite

⁽¹⁾ alteration and mineralization descriptions are based upon Golder interpretation of the Access sample descriptions and drill hole logs and are not directly reported in the Access report

5.5 Humidity Cell Tests

The humidity cell tests were begun on March 30, 2007 and completed following cycle 21 (August 10, 2007). The tests were terminated based upon two sets of criteria:

Criteria 1: Classic ARD criteria that address acid generation and ML:

1. the stability of weekly parameters pH, alkalinity concentration and sulphate concentration indicating stasis in the late cycles of the test; and
2. the low dissolved sulphate concentration in the humidity cell leachate. The sulphate concentration was less than the detection limits for all cells over the last seven weeks of the test indicating the absence of evidence of sulphide oxidization. Without the potential of physical change to perturb the system (such as the onset of acid generation), it is unlikely that the leachate chemistry will change, i.e. the cells have reached a steady state condition.

Criteria 2: Non-ARD related processes:

Price noted (1998) that under non-ARD conditions (i.e. neutral conditions) metals such as antimony, arsenic, cadmium, molybdenum, selenium, and zinc are relatively soluble. The concentrations of these metals over the last seven weeks of the tests are 1) stable and 2) low (generally within an order of magnitude of the detection limits and generally several orders of magnitude below the relevant reference standards).

Table 5-5 lists the samples selected for the humidity cell test work from the Access sample suite. The table includes the sulphur species, TIC, AP, Bulk NP and CaCO₃ NP for each of the samples.

Samples selected for humidity cell testing consist of a range of material types including granodiorite and foliated granodiorite or gneissic granodiorite. The foliated granodiorite appears to occur outside of the ore zone, adjacent to the gneiss, is generally thin and of limited extent. Since the mineralization is fundamentally confined to the “gneiss”, WCC intends to selectively mine the gneiss as the marker for mineralization and therefore the gneiss unit represents ore rather than waste and as such will be delivered to the heap rather than the waste rock pile (WCC, Personal Communication, 2007).

TABLE 5-5: Sample Selection for Humidity Cell Tests

HC	Sample	Rock type	S(T)	S(SO ₄)	S(S-2)	TIC	AP	Bulk NP	CaCO ₃ NP
			%	%	%	%	t CaCO ₃ / 1000 t	t CaCO ₃ / 1000 t	t CaCO ₃ / 1000 t
1	DDH 1-33-91 348'-350'	granodiorite	0.01	<0.01	0.01	<0.01	0.3	5.4	0.8
2	DDH 1-37-91 149'-151'	granodiorite	0.02	<0.01	0.02	0.32	0.6	42.9	26.7
3	DDH 1-53-92 452'-454'	granodiorite	0.02	0.01	0	0.49	0.3	48.7	40.8
4	DDH 92-157 139-141	granodiorite	0.01	<0.01	0.01	<0.01	0.3	4.7	0.8
5	WC-001 43'-45'	foliated granodiorite	0.03	<0.01	0.03	<0.01	0.9	7.1	0.8
6	WC-006 312-314	granodiorite	0.01	<0.01	0.01	0.02	0.3	8.4	1.7

5.5.1 Weekly Analyses

The leachate from the humidity cell tests is near neutral with low alkalinity and low sulphate concentrations. Figures 5-7 to 5-9 are time series plots of the results of the weekly parameters pH, alkalinity and sulphate concentrations for cycles 1 to 21, respectively. Since pH is an MMER regulated parameter, Figure 5-7 includes the MMER authorized levels. The pH of the leachate from the six cells over the 21 reported cycles ranges from 5.87 to 8.17. The alkalinity ranges from over 90 mg CaCO₃/L to less than 10 mg CaCO₃/L and shows a consistent decline following cycle 2 to relatively steady-state concentrations after cycle five. Table 5-6 summarizes 1) the maximum and minimum pH and alkalinity for cycles 1-21 and 2) the average of the last 5 cycles for pH and alkalinity for the leachate from the six humidity cells. The table shows that 1) samples with high bulk NPR and CaCO₃ NPR have higher maximum and average steady-state pH and alkalinity concentrations in the leachate compared with samples with lower bulk NPR and CaCO₃ NPR values and 2) even samples with low CaCO₃ NPR that fall within the range of either low potential for ARD or even likely potential, maintain neutral pH values with measurable alkalinity (i.e. the CaCO₃ NP under estimates the neutralizing potential of the waste rock at Carmacks; refer to Section 5.1).

Individual weekly analyses show marked spikes in pH (e.g. that minimum pH's indicated for HC1 (pH 5.87), HC4 (pH 6.29) and HC5 (pH 6.35 all recorded on cycle 6). The range of pH is small and (with the exception of a single analysis of pH 5.87) within the MMER regulatory guidelines of 6 to 9.5 and the individual spikes do not appear to reflect a change in pH resulting from changes in any individual test sample. It is highly unlikely that all six humidity cells should undergo 1) the same type of chemical reaction resulting in a drop in pH, 2) over the same week and 3) and for the same duration (a single week). A more likely explanation for the spikes is changes in the pH (e.g. a slightly lower pH) of the lixiviant applied to all of the humidity cells on the same date (e.g. effectively false positives or noise).

The results of the weekly humidity cell analyses suggests that a mix of waste rock types as shown by the present humidity cell sample suite will maintain a neutral pH and have excess, albeit limited, neutralizing capacity. The average alkalinity concentration for the leachate for all of the humidity cells for the last five weeks is 19 mg CaCO₃/L.

TABLE 5-6: Access ABA Data and Summary of Leachate Chemistry for Weekly Humidity Cell Results

	Access data		Humidity cell results				
			Minimum and maximum for cycles 1-21			Average for cycles 15-21	
	Bulk NPR	CaCO ₃ NPR	Maximum pH	Minimum pH	Alkalinity	pH	Alkalinity
					Mg CaCO ₃ /L		mg CaCO ₃ /L
HC 1	17.3	2.8	7.55	5.87	21.7	6.91	5.7
HC 2	68.6	44.4	8.03	7.21	97.9	7.58	35.9
HC 3	155.8	136.1	8.17	7.33	56.9	7.74	36.5
HC 4	15	2.8	7.83	6.29	33.4	7.31	7.7
HC 5	7.6	0.9	7.55	6.35	18.0	7.15	7.7
HC 6	26.9	5.6	7.76	6.74	30.1	7.50	17.6

The sulfate concentrations in the humidity cell leachates are low, less than 10 mg/L, and the conductivity ranges from 5 to 240 µmhos/cm. The conductivity of the leachates is determined by the dissolved alkalinity (Figure 5-10). In typical sulfide-bearing hydrothermal systems the electrical conductivity of the leachate solution is controlled by the sulphate ion because sulphate is the dominant ion in solution and can reach concentrations of 100's to 1000's of mg/L.

The source of the alkalinity in the Carmacks samples is uncertain (refer to Section 5.1). In the absence of measurable carbonate alkalinity in several of the static test samples, possible alternative sources of acid buffering capacity are alumino-silicate mineral reactions. Figure 5-11 is a plot of silica concentration versus alkalinity which shows a possible correlation of increasing alkalinity with increasing silica concentration indicative of a source of acid neutralizing potential within the aluminosilicate minerals.

5.5.2 Full Chemical Analyses

Results of the 20 cycles of the humidity cell testing indicate that the dissolved metal concentrations are very similar for all samples and very low. Figures 5-12 to 5-16 show time series plots of the results for cycles 1, 2, 4, 8, 12, 16, and 20 for MMER metals arsenic, copper, nickel, lead, and zinc from the full chemical analyses. The figures include the MMER maximum monthly mean and maximum grab sample concentrations.

Figures 5-17 to 5-20 are time series plots of metals mobile under non-ARD conditions (i.e. neutral conditions) such as antimony, cadmium, molybdenum, and selenium. Arsenic and zinc are also metals mobile under non-ARD conditions, but are discussed as MMER parameters. The time series plot of mercury concentrations is shown in Figure 5-21.

The dissolved metal concentrations of the humidity cell leachates are low. Using one half the detection limits for water analyses reported as below the detection limit, the average concentrations of beryllium, bismuth, boron, chromium, lithium, mercury, nickel, phosphorous, selenium, silver, thallium, zinc, and zirconium for the six samples are at or below the respective detection limits. Table 5-7 lists dissolved metals concentrations with regulatory standards and the CCME fresh water aquatic and MMER guidelines for reference purposes. Average concentrations have been used to summarize a large set of data for ease of reading and because the data represent a “single” rock type unit in the rock type model. Individual “peaks” (and lows) would be expected in any population and the presence of “peaks” (and lows) suggests that the sampling is representative of the unit as a whole and not falsely biased. All of the results of the analyses for all of the samples have been included in the appendices to aid the reader in understanding the geochemical properties of the waste rock at the Carmacks Project site.

With the exception of the average concentration of aluminum which exceeds the CCME guidelines and mercury where the average of the analyses is below the detection limit (and the detection limit exceeds the CCME guidelines) all of the average concentrations of the other metals are near or below the CCME and MMER standards. The concentrations of cadmium and copper exceed the lower limits of the CCME guidelines. However, the CCME guidelines for cadmium and copper are hardness dependent, and since the background hardness level for Williams Creek is high (over 180 mg/L), the concentrations of cadmium and copper do not exceed the CCME guidelines that apply to the receiving water (CCME hardness adjusted guidelines for cadmium is 0.00006 mg/L and copper is 0.004 mg/L).

The concentrations of the dissolved metals in the humidity cell leachate samples show a pattern of decrease from relatively elevated concentrations early in the test period to lower concentrations late in the test period except for beryllium, phosphorous, thallium, and zirconium which are below the respective detection limits for all analyses. Figures 5-12 to 5-16 show graphically the MMER metals concentrations over time. The similarity in leachate chemistry for the six humidity cells may result from a) the similarity in rock type (all of the samples are granodiorite) and b) the lack of mineralization (all of the samples are unmineralized). The alteration among the samples includes unaltered rock as well as potassium and hematite alteration; however the alteration overprint may be too small to seriously impact the leachate chemistry. The

concentrations of copper, lead, and zinc show a slight increase in several of the samples for cycle 20. The observed fluctuations are viewed as background variation rather than the onset of a change in leaching properties of the rock because: 1) there is no change in pH for example that would cause a change in leaching rate, 2) the fluctuations are small often within the range of analytical error of the analysis, and 3) the maximum concentrations of copper, lead, and zinc observed in the cycle 20 samples are still over two orders of magnitude less than the lowest regulatory standards (0.0026 versus 0.3 mg/L for copper, 0.00027 versus 0.2 mg/L for lead, and 0.0015 versus 0.5 mg/L for zinc).

The concentrations of metals reported to be released under neutral pH conditions including antimony, cadmium, molybdenum, and selenium are shown in Figures 5-17 to 5-20. The figures include the CCME standards where applicable. The concentrations show a decline from initially higher values to stable concentrations in the later weeks of the test period of less than 0.0001 for antimony, less than 0.00001 mg/L for cadmium, less than 0.005 mg/L for molybdenum, and below the detection limits for selenium (0.0005 mg/L). The measurable concentrations of molybdenum are consistent with the common association of molybdenum with copper mineralization.

The concentration of mercury declines rapidly after week 1 to below the detection limit (0.05 µg/L) (Figure 5-21). The cause of the single elevated concentration in mercury (0.16 µg/L HC-5, June 15, 2007) is unknown. Since the spike represents a single analysis rather than a consistent increase in mercury concentration over time in HC-5, the spike may be the result of analytical error, sampling error, contamination of the leachate sample, or another source of error. As noted in Section 4.4, the humidity cell test used industry standard detection limits for all analyses. Unfortunately, the MDL of 0.05 µg/L exceeds the CCME guidelines of 0.026 µg/L for mercury however at the time of the humidity cell test design, no mercury exceedences were expected and so the humidity cell testing program used the industry standard.

TABLE 5-7: Average Dissolved Metal Concentrations for Humidity Cell Leachate

Parameters	Units	Guidelines		Humidity Cell Leachate
		CCME (fresh water aquatic guidelines)	MMER	
Aluminium	mg/L	0.005 - 0.1		0.11
Arsenic	mg/L	0.005	0.5	0.00041
Cadmium	mg/L	0.000005 - 0.000338		0.000017
Chromium	mg/L	0.001/0.0089		<0.0002
Copper	mg/L	0.002 - 0.004	0.3	0.0037
Iron	mg/L	0.3		0.025
Lead	mg/L	0.001 - 0.007	0.2	0.000054
Mercury	mg/L	0.000026		<0.00005
Molybdenum	mg/L	0.073		0.0056
Nickel	mg/L	0.025 - 0.15	0.5	<0.0005
Selenium	mg/L	0.001		<0.0005
Silver	mg/L	0.0001		<0.00001
Thallium	mg/L	0.0008		<0.00005
Zinc	mg/L	0.03	0.5	<0.0005

6.0 CONCLUSIONS

The results of the static and the kinetic tests allow several conclusions:

- The samples have low sulfur concentrations and low alkalinity. Higher total sulphur and sulphide sulphur concentrations are associated with gypsum veining in the gneisses. Generally speaking, the carbonate concentrations in the samples are low or below the detection limits in all of the rock and alteration types except for the epidote-chlorite alteration assemblage. The likely sources of alkalinity in the samples are reactions with alumino-silicate minerals.
- Using the bulk NP, 94% of the Access and Golder samples fall into the non-acid generating category. The two gypsum-bearing samples are classified as possibly acid generating, but both samples are from beneath the pit bottom and unlikely too be mined. Using the CaCO₃ NP, a more conservative estimate of the ARD potential of waste rock, the 2006 and 2007 samples have a slightly higher probability of generating acid drainage.

- The whole rock major element composition of the samples tested by Access and Golder samples show that the bulk chemistries of the Carmacks granodiorite and gneiss are similar to “average” granodiorite and diorite (Price, 1997), respectively. The data suggests that there has been little mass transfer of major elements into or out of the Carmacks rock as a result of the hydrothermal event or subsequent weathering.
- The trace element chemistry of the samples tested by Access and Golder shows enrichment in copper and molybdenum in the mineralized samples when compared with 1) the unmineralized samples and 2) the “average” granodiorite.
- The SFE leachate is near neutral and dilute. The average pH values of the leachate from the SFE tests conducted by Access and Golder range from 6.9 (2006) to 7.3 (mineralized 2007) or 7.6 (unmineralized 2007). Alkalinity in the two sets of data average 37 mg CaCO₃/L (2006) and 29 mg CaCO₃/L (2007). The average concentrations of dissolved metals are all less than the MMER and CCME guidelines with the exception for aluminum, cadmium, and copper which exceed the CCME guidelines.
- The humidity cell results show that the pH of the leachate after 21 cycles of testing is neutral to slightly alkaline and stable, ranging from 7 to 8. Alkalinity is low particularly in the samples with low bulk NPR and CaCO₃ NPR values but measurable ranging from less than 5 to 40 mg CaCO₃/L. Sulfate concentrations range from less than 10 mg/L at the onset of the test to below the detection limits (1.0 mg/L) for all of the cells for the last 7 cycles (cycles 15 to 21). Dissolved metal concentrations in the leachate are low and stable. The average humidity cell leachate concentrations meet all of the MMER authorized levels and all of the CCME guidelines except for the average aluminum concentration and the mercury concentration where the average concentration is below the detection limit but the detection limit for mercury is above the CCME guideline (<0.00005 versus 0.000026 mg/L).

Results of the static and kinetic tests suggest that the waste rock has low acid generating and metals leaching potential. Metal mobility is typically related to pH (e.g. most metals are both more soluble at low pH and less likely to sorb to iron, aluminum, or manganese oxide and oxyhydroxide minerals at low pH). The neutral pH of the humidity cell leachate and the lack of evidence of pyrite oxidation and acid generation in the test cells suggest that over the long term the waste rocks will continue to satisfy the MMER authorized levels.

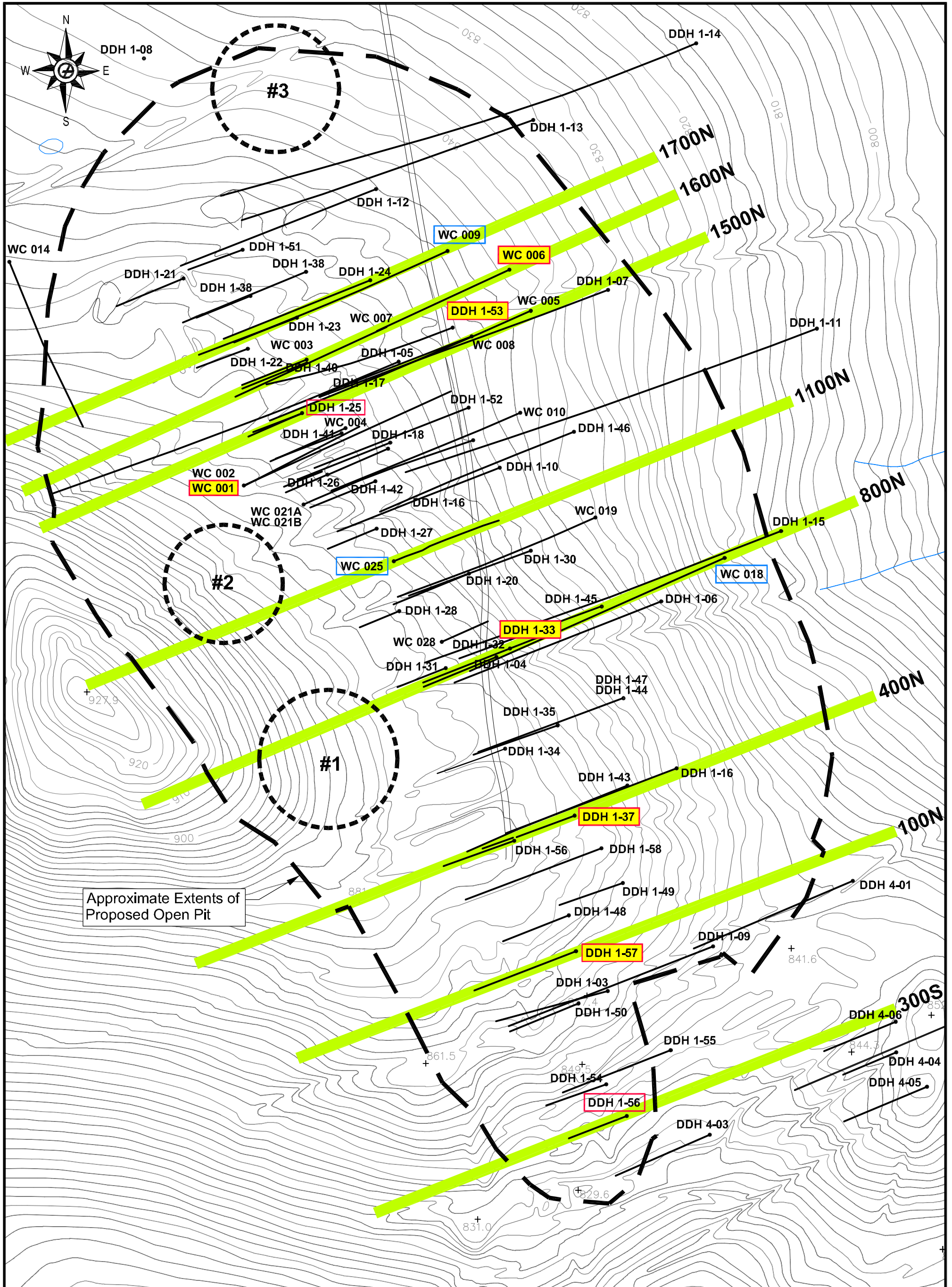
As noted in the introduction (Section 1.0), this memorandum reports only the results of the static and kinetic testing. Application of the MMER authorized levels or CCME guidelines, are for reference purposes only. It is beyond the scope of this investigation to draw comparisons of the test results reported here in Section 5.5.2 or Section 5.4 and any water quality standard regarding the short-term or long-term environmental impact of the mine facilities. In addition, although the SFE and humidity cell analyses include 35 major and trace metal analyses, the text generally addresses only those for which there are regulatory guidelines for comparison purposes. For those metals for which there are no reference standards and identified environmental concerns, the reader is directed to the attached appendices.

SAA/JAH/FCE/TO/mrb/lw/kt
Attachments

O:\Final\2006\1413\06-1413-077\doc 059 TM-0325_08 Carmacks-Results of the Static Geochemical Test Work - Rev.2.doc

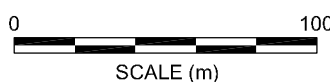
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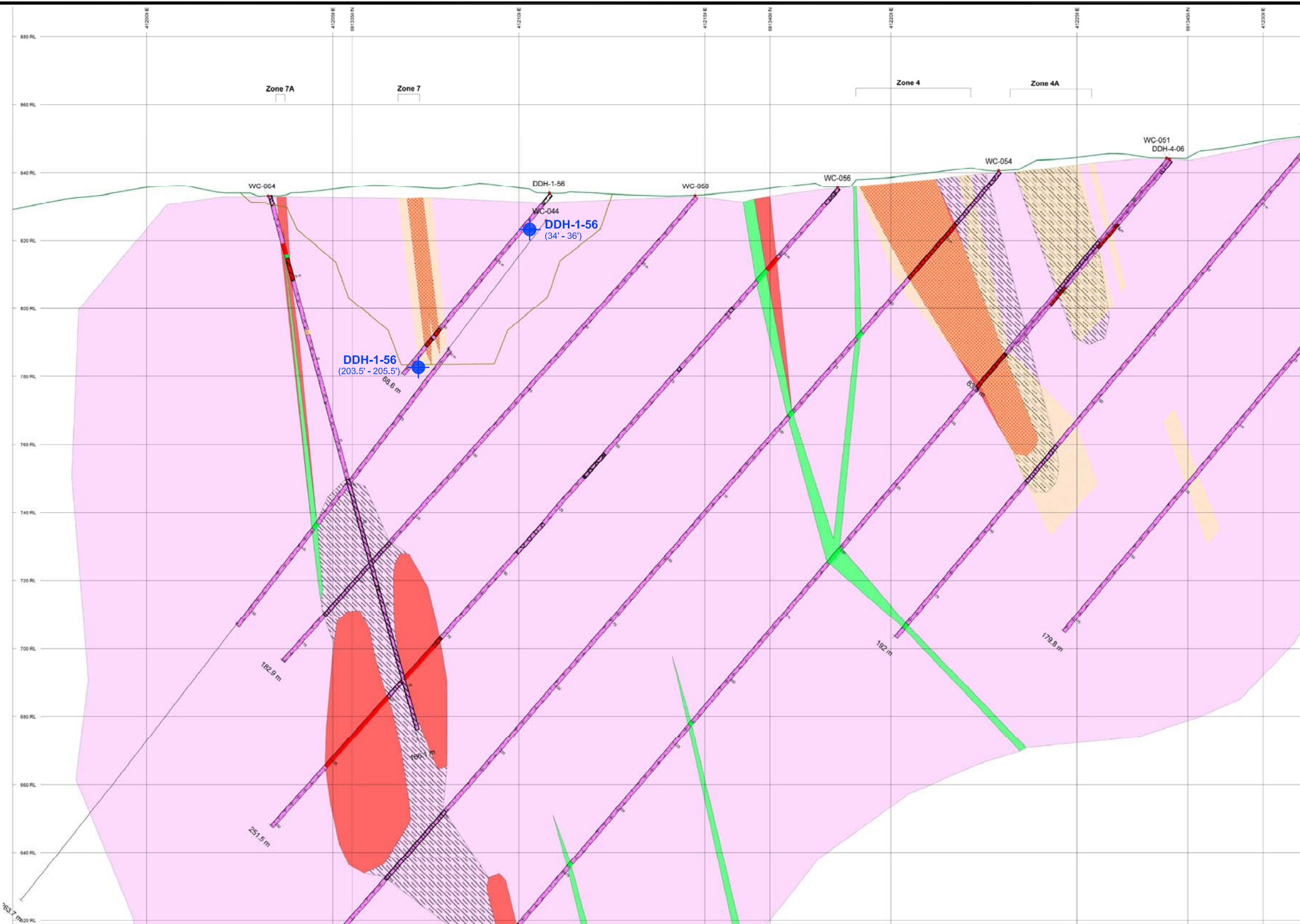
LEGEND

- WC 009 Approximate Golder Sample Location; Samples for Static Testing
- WC 003 Approximate Access Consulting Group Sample Locations
- WC 006 Access Consulting Group Samples Used for 2007 Kinetic Testing
- #3 Approximate 2007 Drilling Area
- 800N** Approximate Location of Cross Section



PROJECT WESTERN COPPER CORPORATION CARMACKS COPPER PROJECT YUKON TERRITORY			
TITLE STATIC AND KINETIC TEST SAMPLING LOCATIONS			
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DESIGN	F.E.	01/05/07	SCALE AS SHOWN
CADD	S.S.S.	08/05/07	REV. 0
CHECK			
REVIEW			
Golder Associates Abbotsford, BC			FIGURE 3-1

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LEGEND

DDH-1-56
 (34' - 36') - Approximate location of Drillhole Sample Interval

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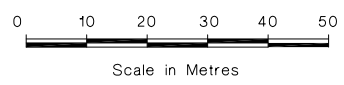
1) PDF files from Western Copper Corporation.

NUMBER BANDS	L/R	COL	RANGE
nonsul_pct	R		0.2

ROCK CODES	L/R	PAT	LABEL	DESCRIPTION
Code	R		OVB	Overburden
			GRDR	Granodiorite
			PEG	Pegmatite
			GNIC-GRDR	Gneissic Granodiorite
			GN-GRDR	Mixed Gneiss and Granodiorite
			GN	Gneiss
			INT-DK	Intermediate Dyke

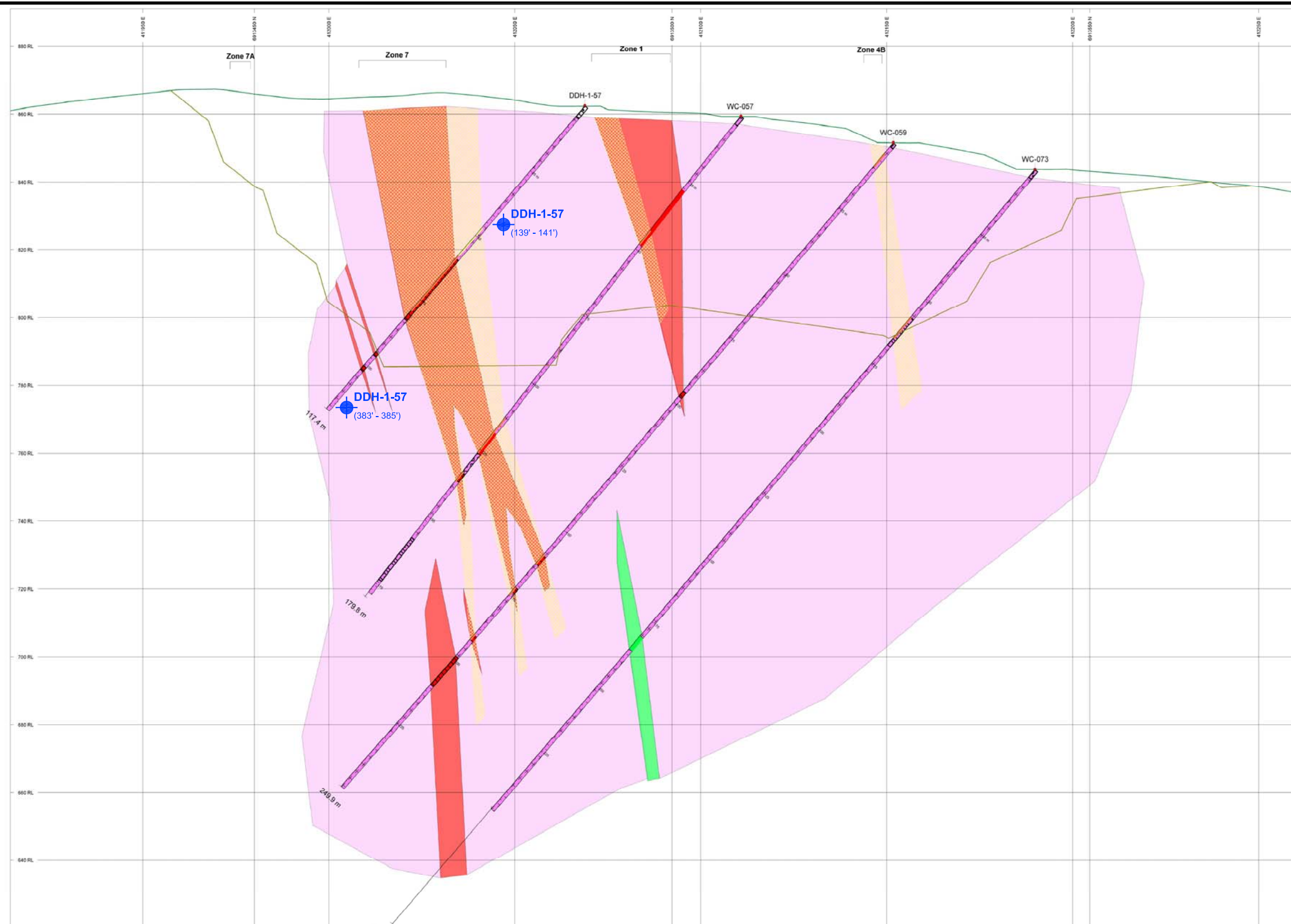
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 REF. PT. E, N 412133 m 6913518 m
 EXTENTS 479.5 m 408.5 m
 SECTION TOP, BOT 890.9 m 482.3 m
 TOLERANCE +/- 15.24 m



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	CHECK		
REVIEW			FIGURE 3-2

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LEGEND

DDH-1-57
(139' - 141') - Approximate location of Drillhole Sample Interval

REFERENCES

1) PDF files from Western Copper Corporation.

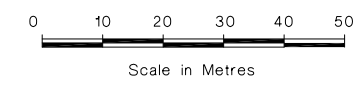
NUMBER BANDS	L/R	COL	RANGE
nonsul_pct	R		0.2

ROCK CODES	L/R	PAT	LABEL	DESCRIPTION
Code	R		OVB	Overburden
			GRDR	Granodiorite
			PEG	Pegmatite
			GNIC-GRDR	Gneissic Granodiorite
			GN-GRDR	Mixed Gneiss and Granodiorite
			GN	Gneiss
			INT-DK	Intermediate Dyke

Code	No data plotted
ASSAYS	L/R TEXT
nonsul_pct	L -----
Width_m	L -----

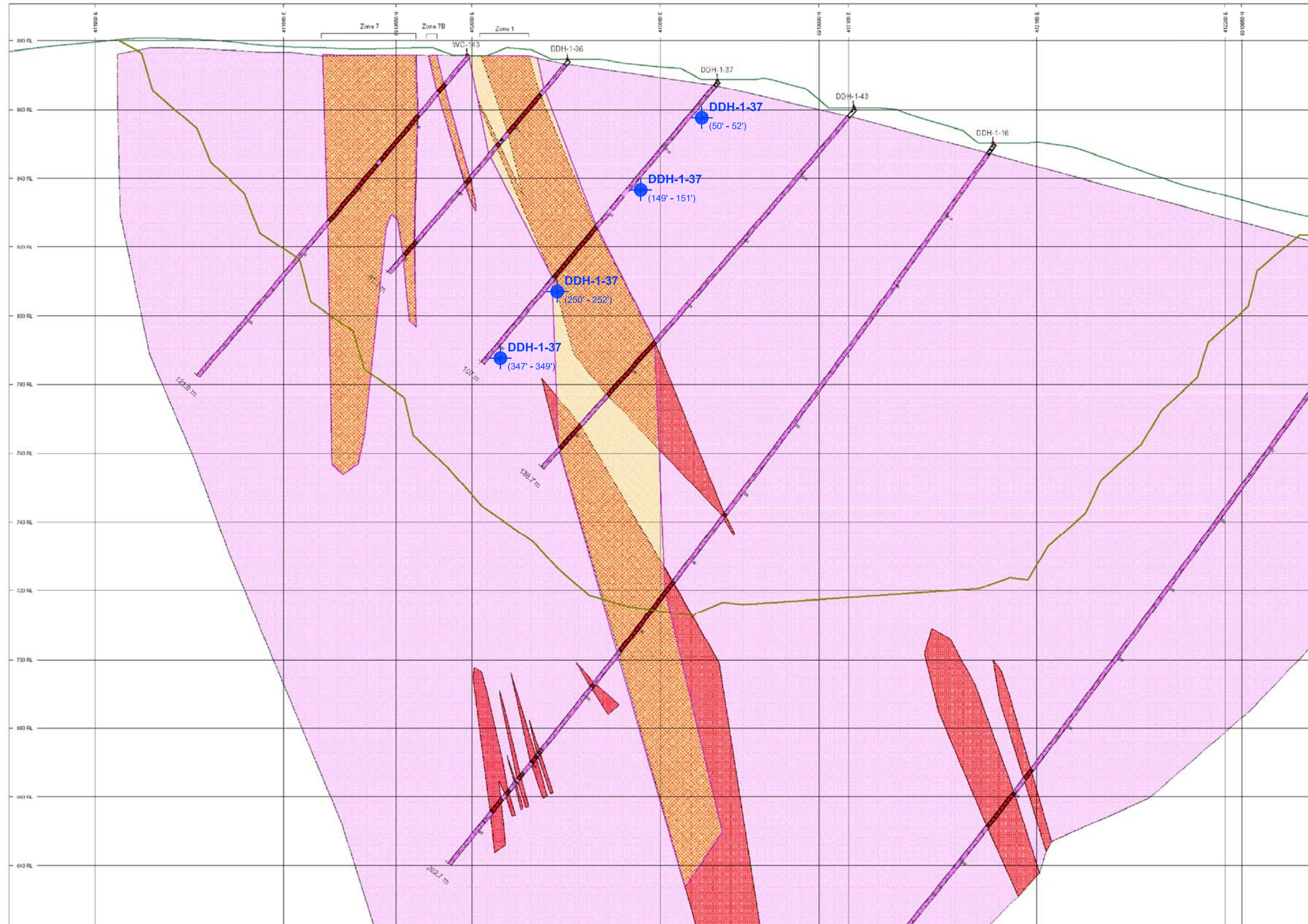
SECTION SPECS:

REF. PT. E, N	412133 m	6913518 m
EXTENTS	479.5 m	408.5 m
SECTION TOP, BOT	890.9 m	482.3 m
TOLERANCE +/-	15.24 m	



PROJECT		WESTERN COPPER CORPORATION CARMACKS COPPER YUKON			
TITLE		SECTION 100N			
	PROJECT No. 07-1413-0077	FILE No.			
	DESIGN LL 27NOV07	SCALE AS SHOWN	REV.	-	
	CADD BAD 27NOV07				
	CHECK				
REVIEW					
FIGURE 3-3					

REVISION DATE: 08/03/13 09:33AM By: bdrozdjak CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0077\Drafting\1000\0714130077-1000-A_01.dwg



LEGEND

DDH-1-37
 (50' - 52') - Approximate location of Drillhole Sample Interval

REFERENCES

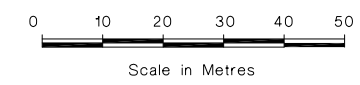
1) PDF files from Western Copper Corporation.

NUMBER BANDS	L/R	COL	RANGE
nonsul_pct	R		0.2

ROCK CODES	L/R	PAT	LABEL	DESCRIPTION
Code	R		OV B	Overburden
			GRDR	Granodiorite
			PEG	Pegmatite
			GNIC-GRDR	Gneissic Granodiorite
			GN-GRDR	Mixed Gneiss and Granodiorite
			GN	Gneiss
			INT-DK	Intermediate Dyke

Code	No data plotted
ASSAYS	L/R TEXT
nonsul_pct	L -----
Width_m	L -----

SECTION SPECS:
 REF. PT. E, N 412133 m 6913518 m
 EXTENTS 479.5 m 408.5 m
 SECTION TOP, BOT 890.9 m 482.3 m
 TOLERANCE +/- 15.24 m



PROJECT		WESTERN COPPER CORPORATION CARMACKS COPPER YUKON	
TITLE		SECTION 400N	
	PROJECT No. 07-1413-0077	FILE No.	
	DESIGN LL 27NOV07	SCALE AS SHOWN	REV. -
	CADD BAD 27NOV07	FIGURE 3-4	
	CHECK		
REVIEW			

REVISION DATE: 08/03/13 09:33AM By: bdrozdjak CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0077\Drafting\1000\0714130077-1000-A_01.dwg



LEGEND

WC 018 - Approximate location of Drillhole Sample Interval (182m - 183m)

REFERENCES

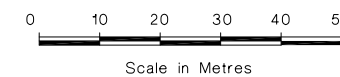
1) PDF files from Western Copper Corporation.

NUMBER BANDS	L/R	COL	RANGE
nonsul_pct	R		0.2

ROCK CODES	L/R	PAT	LABEL	DESCRIPTION
Code	R		OVB	Overburden
			GRDR	Granodiorite
			PEG	Pegmatite
			GNIC-GRDR	Gneissic Granodiorite
			GN-GRDR	Mixed Gneiss and Granodiorite
			GN	Gneiss
			INT-DK	Intermediate Dyke

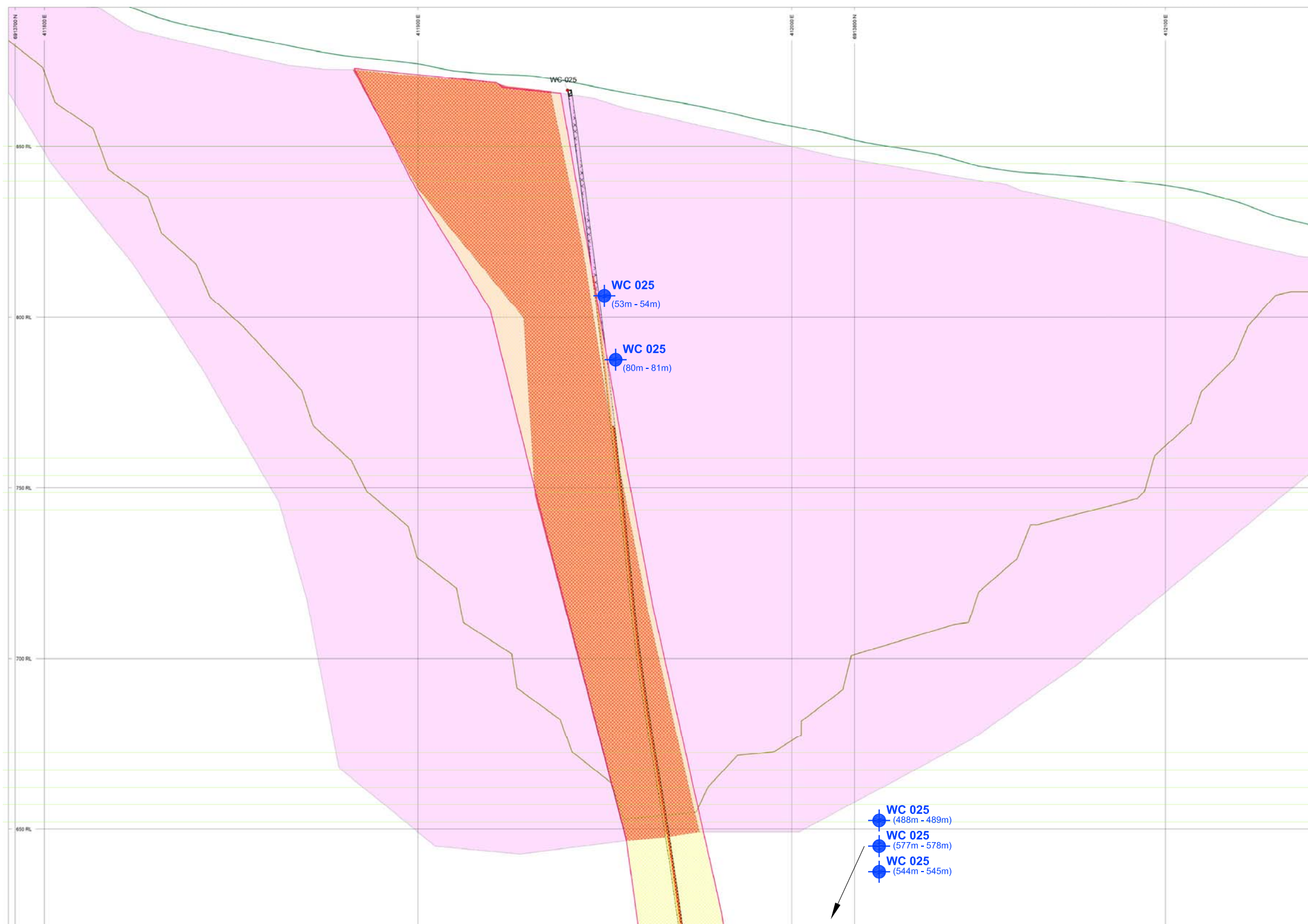
Code	No data plotted
ASSAYS	L/R TEXT
nonsul_pct	L -----
Width_m	L -----

SECTION SPECS:
 REF. PT. E, N 412133 m 6913518 m
 EXTENTS 479.5 m 408.5 m
 SECTION TOP, BOT 890.9 m 482.3 m
 TOLERANCE +/- 15.24 m



PROJECT	WESTERN COPPER CORPORATION CARMACKS COPPER YUKON			
TITLE	SECTION 800N			
	PROJECT No.	07-1413-0077	FILE No.	
	DESIGN	LL 27NOV07	SCALE	AS SHOWN REV. -
	CADD	BAD 27NOV07		
	CHECK			
REVIEW				
			FIGURE 3-5	

REVISION DATE: 08/03/13 09:33AM By: bdrozdjak CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0077\Drafting\1000\0714130077-1000-A_01.dwg



LEGEND

WC 025 - Approximate location of Drillhole Sample Interval
(53m - 54m)

REFERENCES

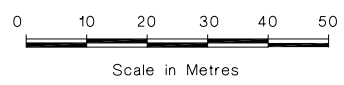
1) PDF files from Western Copper Corporation.

NUMBER BANDS	L/R	COL	RANGE
nonsul_pct	R		0.2

ROCK CODES	L/R	PAT	LABEL	DESCRIPTION
Code	R		OVB	Overburden
			GRDR	Granodiorite
			PEG	Pegmatite
			GNIC-GRDR	Gneissic Granodiorite
			GN-GRDR	Mixed Gneiss and Granodiorite
			GN	Gneiss
			INT-DK	Intermediate Dyke

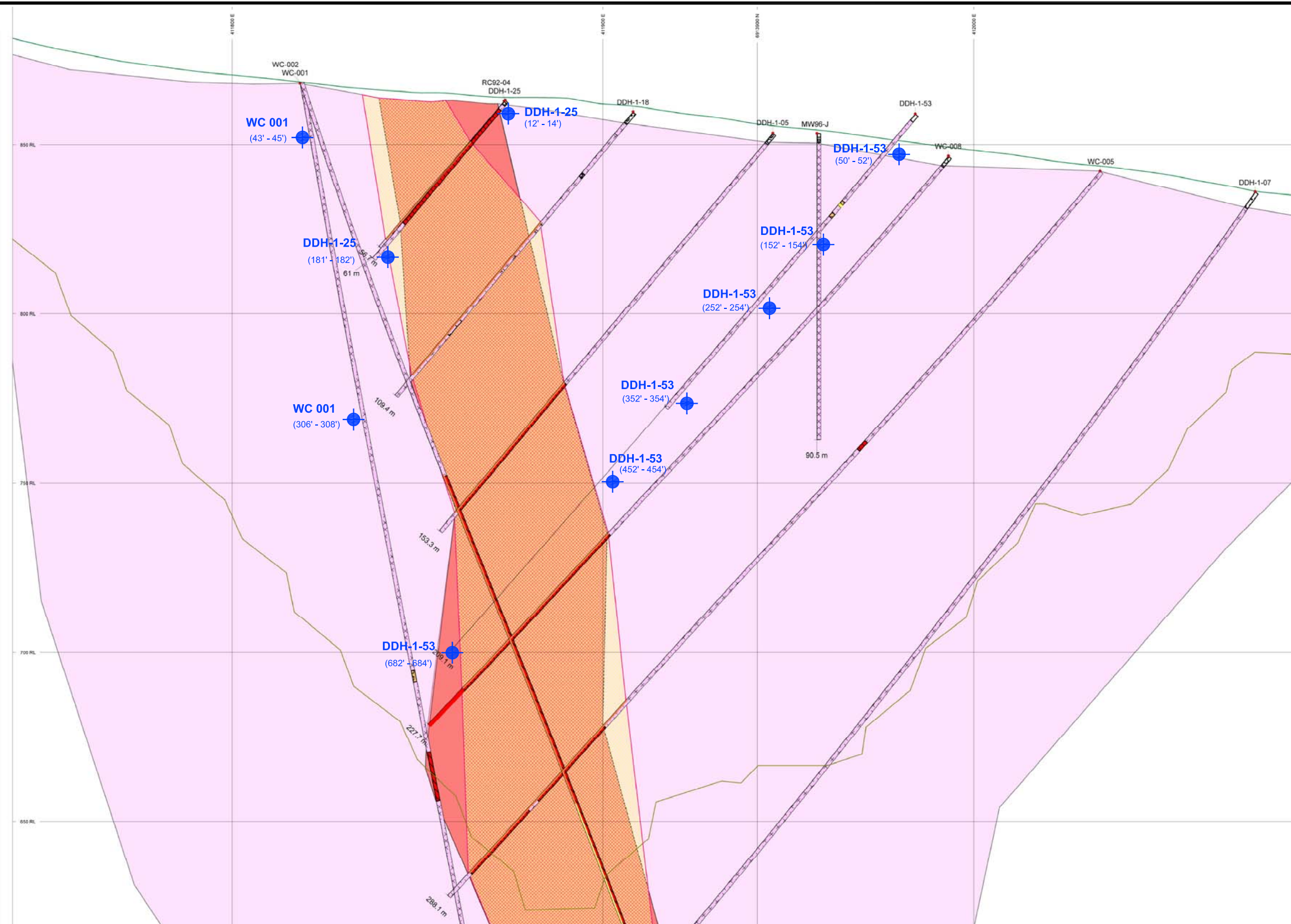
Code No data plotted
 ASSAYS L/R TEXT
 nonsul_pct L -----
 Width_m L -----

SECTION SPECS:
 REF. PT. E, N 412133 m 6913518 m
 EXTENTS 479.5 m 408.5 m
 SECTION TOP, BOT 890.9 m 482.3 m
 TOLERANCE +/- 15.24 m



PROJECT		WESTERN COPPER CORPORATION CARMACKS COPPER YUKON			
TITLE		SECTION 1100N			
	PROJECT No.	07-1413-0077		FILE No.	
	DESIGN	LL	27NOV07	SCALE	AS SHOWN REV. -
	CADD	BAD	27NOV07		
	CHECK				
REVIEW					
					FIGURE 3-6

REVISION DATE: 08/03/13 09:33AM By: bdrozdjak CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0077\Drafting\1000\0714130077-1000-A_01.dwg



LEGEND

DDH-1-53
 (252' - 254') - Approximate location of Drillhole Sample Interval

REFERENCES

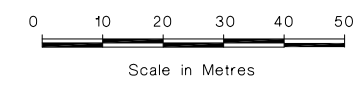
1) PDF files from Western Copper Corporation.

NUMBER BANDS	L/R	COL	RANGE
nonsul_pct	R		0.2

ROCK CODES	L/R	PAT	LABEL	DESCRIPTION
Code	R		OV B	Overburden
			GRDR	Granodiorite
			PEG	Pegmatite
			GNIC-GRDR	Gneissic Granodiorite
			GN-GRDR	Mixed Gneiss and Granodiorite
			GN	Gneiss
			INT-DK	Intermediate Dyke

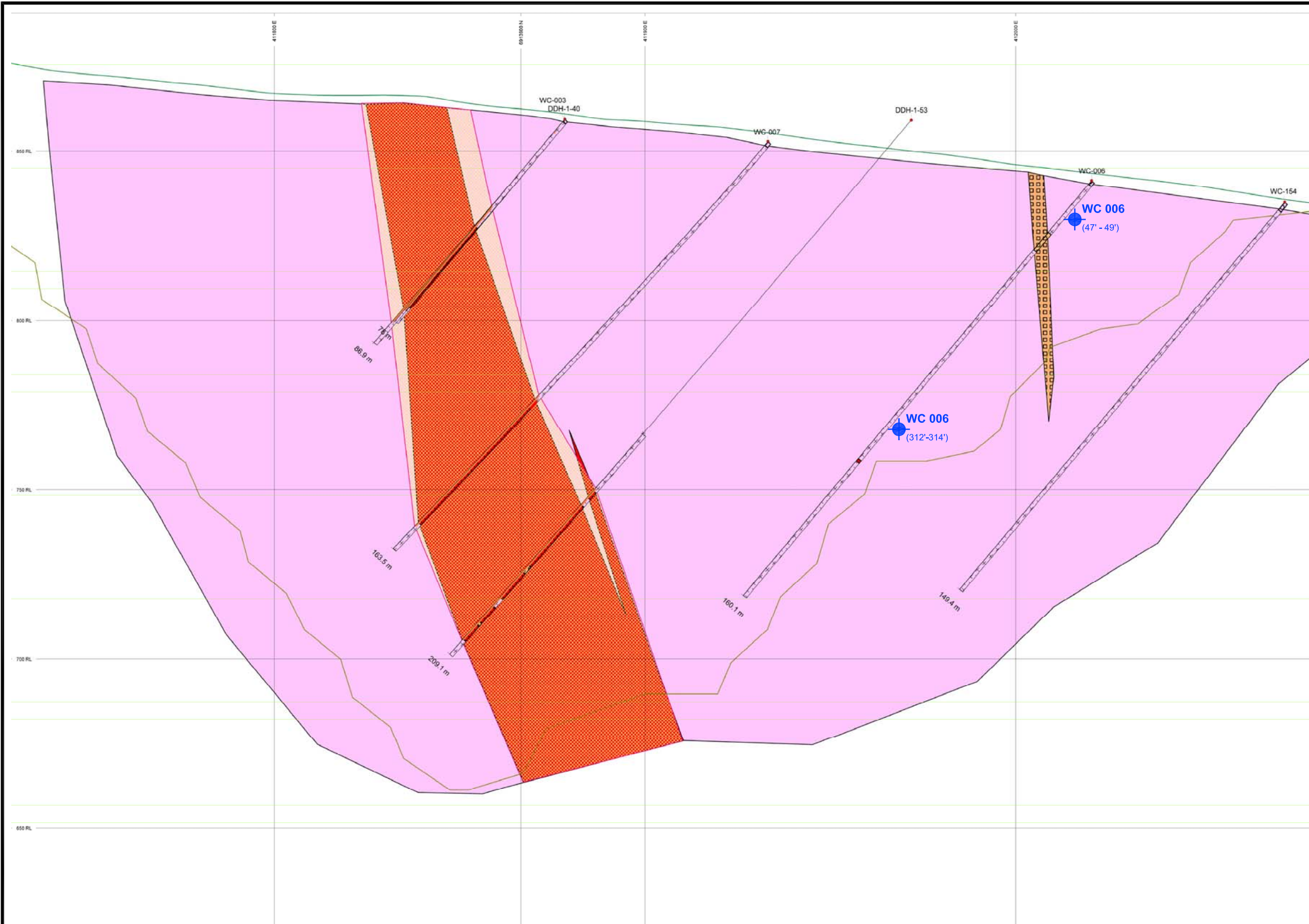
Code	No data plotted
ASSAYS	L/R TEXT
nonsul_pct	L -----
Width_m	L -----

SECTION SPECS:
 REF. PT. E, N 412133 m 6913518 m
 EXTENTS 479.5 m 408.5 m
 SECTION TOP, BOT 890.9 m 482.3 m
 TOLERANCE +/- 15.24 m



PROJECT		WESTERN COPPER CORPORATION CARMACKS COPPER YUKON	
TITLE		SECTION 1500N	
	PROJECT No. 07-1413-0077	FILE No.	
	DESIGN LL 27NOV07	SCALE AS SHOWN	REV. -
	CADD BAD 27NOV07		
	CHECK		
REVIEW			FIGURE 3-7

REVISION DATE: 08/03/13 09:22AM By: bdrozdjak
 CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0077\Drafting\1000\0714130077-1000-A_01.dwg



LEGEND

WC 006
 (47' - 49') - Approximate location of Drillhole Sample Interval

REFERENCES

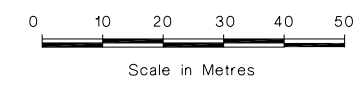
1) PDF files from Western Copper Corporation.

NUMBER BANDS	L/R	COL	RANGE
nonsul_pct	R		0.2

ROCK CODES	L/R	PAT	LABEL	DESCRIPTION
Code	R		OV B	Overburden
			GRDR	Granodiorite
			PEG	Pegmatite
			GNIC-GRDR	Gneissic Granodiorite
			GN-GRDR	Mixed Gneiss and Granodiorite
			GN	Gneiss
			INT-DK	Intermediate Dyke

Code	No data plotted
ASSAYS	L/R TEXT
nonsul_pct	L -----
Width_m	L -----

SECTION SPECS:
 REF. PT. E, N 412133 m 6913518 m
 EXTENTS 479.5 m 408.5 m
 SECTION TOP, BOT 890.9 m 482.3 m
 TOLERANCE +/- 15.24 m



PROJECT	WESTERN COPPER CORPORATION CARMACKS COPPER YUKON		
TITLE	SECTION 1600N		
	PROJECT No. 07-1413-0077		FILE No.
	DESIGN	LL 27NOV07	SCALE AS SHOWN REV. -
	CADD	BAD 27NOV07	
	CHECK		
REVIEW			FIGURE 3-8

REVISION DATE: 08/03/13 09:33AM By: bbrozdick CADD FILE: N:\Bur-Graphics\Projects\2007\1413\07-1413-0077\Drafting\1000\0714130077-1000-A_01.dwg



LEGEND

WC 009 - Approximate location of Drillhole Sample Interval
(195m - 196m)

REFERENCES

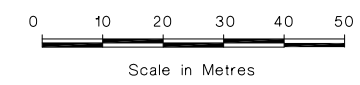
1) PDF files from Western Copper Corporation.

NUMBER BANDS	L/R	COL	RANGE
nonsul_pct	R		0.2

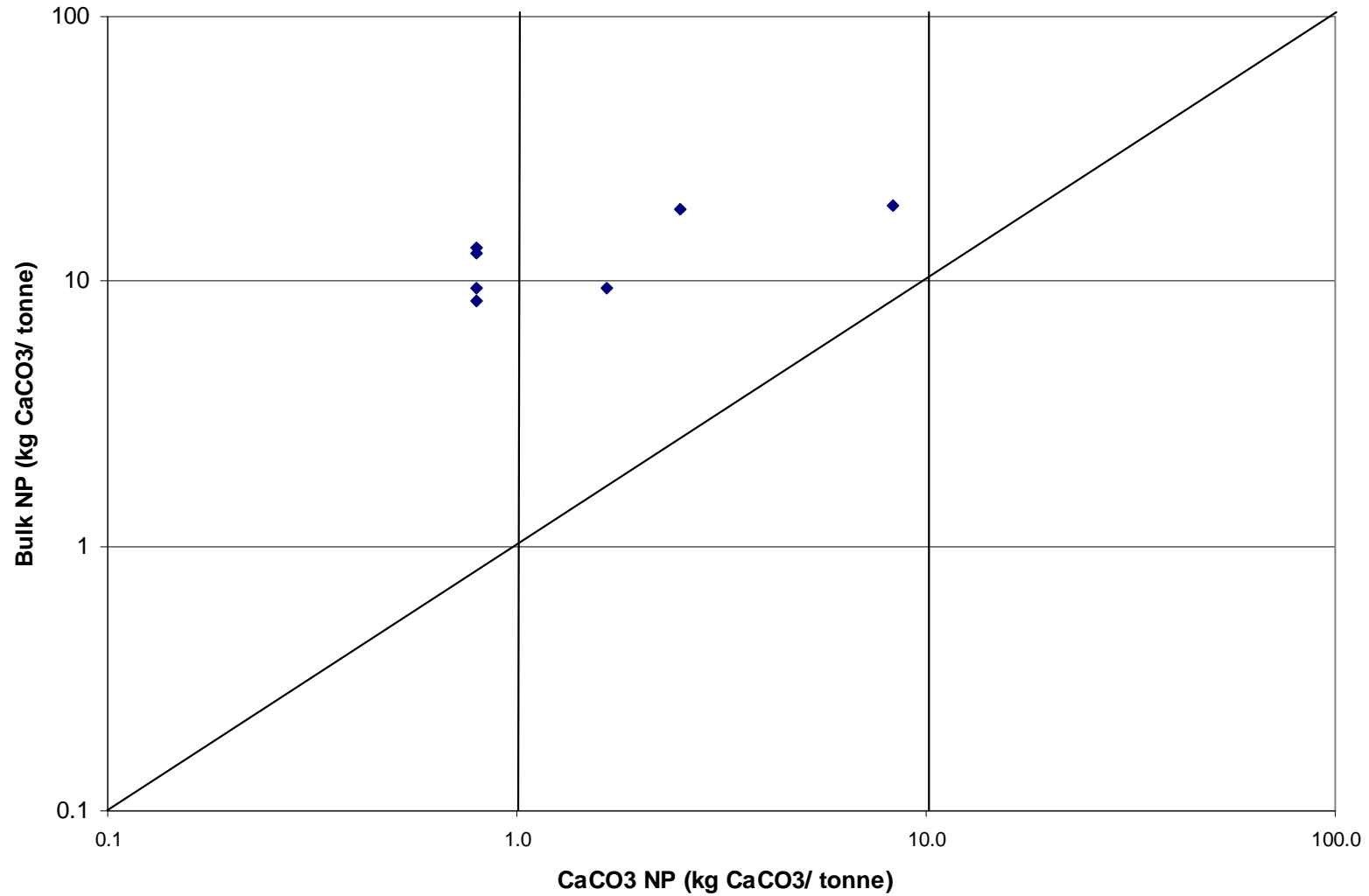
ROCK CODES	L/R	PAT	LABEL	DESCRIPTION
Code	R		OVB	Overburden
			GRDR	Granodiorite
			PEG	Pegmatite
			GNIC-GRDR	Gneissic Granodiorite
			GN-GRDR	Mixed Gneiss and Granodiorite
			GN	Gneiss
			INT-DK	Intermediate Dyke

Code	No data plotted
ASSAYS	L/R TEXT
nonsul_pct	L -----
Width_m	L -----

SECTION SPECS:
 REF. PT. E, N 412133 m 6913518 m
 EXTENTS 479.5 m 408.5 m
 SECTION TOP, BOT 890.9 m 482.3 m
 TOLERANCE +/- 15.24 m

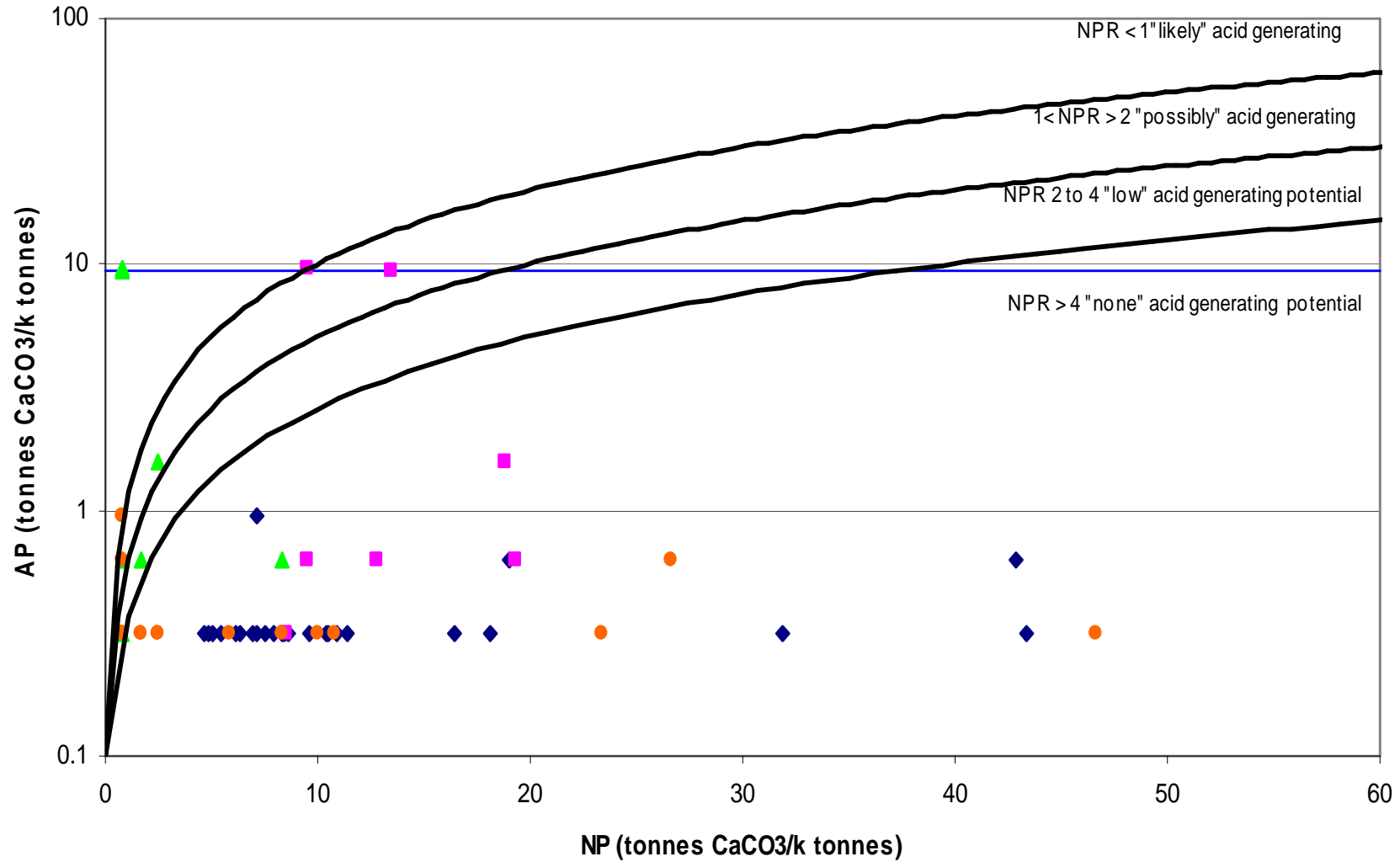


PROJECT				WESTERN COPPER CORPORATION CARMACKS COPPER YUKON				
TITLE				SECTION 1700N				
		PROJECT No. 07-1413-0077		FILE No.				
		DESIGN	LL	27NOV07	SCALE	AS SHOWN	REV.	-
		CADD	BAD	27NOV07	FIGURE 3-9			
		CHECK						
REVIEW								



PROJECT				WESTERN COPPER CORPORATION CARMACKS COPPER	
TITLE				AP Versus Bulk NP and CaCO ₃ NP (2007 samples)	
PROJECT No.		07-1413-0077	FILE No.		
DESIGN	LL	10MAR08	SCALE	N/A	REV. --
CADD					
CHECK	SA	10MAR08	FIGURE 5-1		
REVIEW					

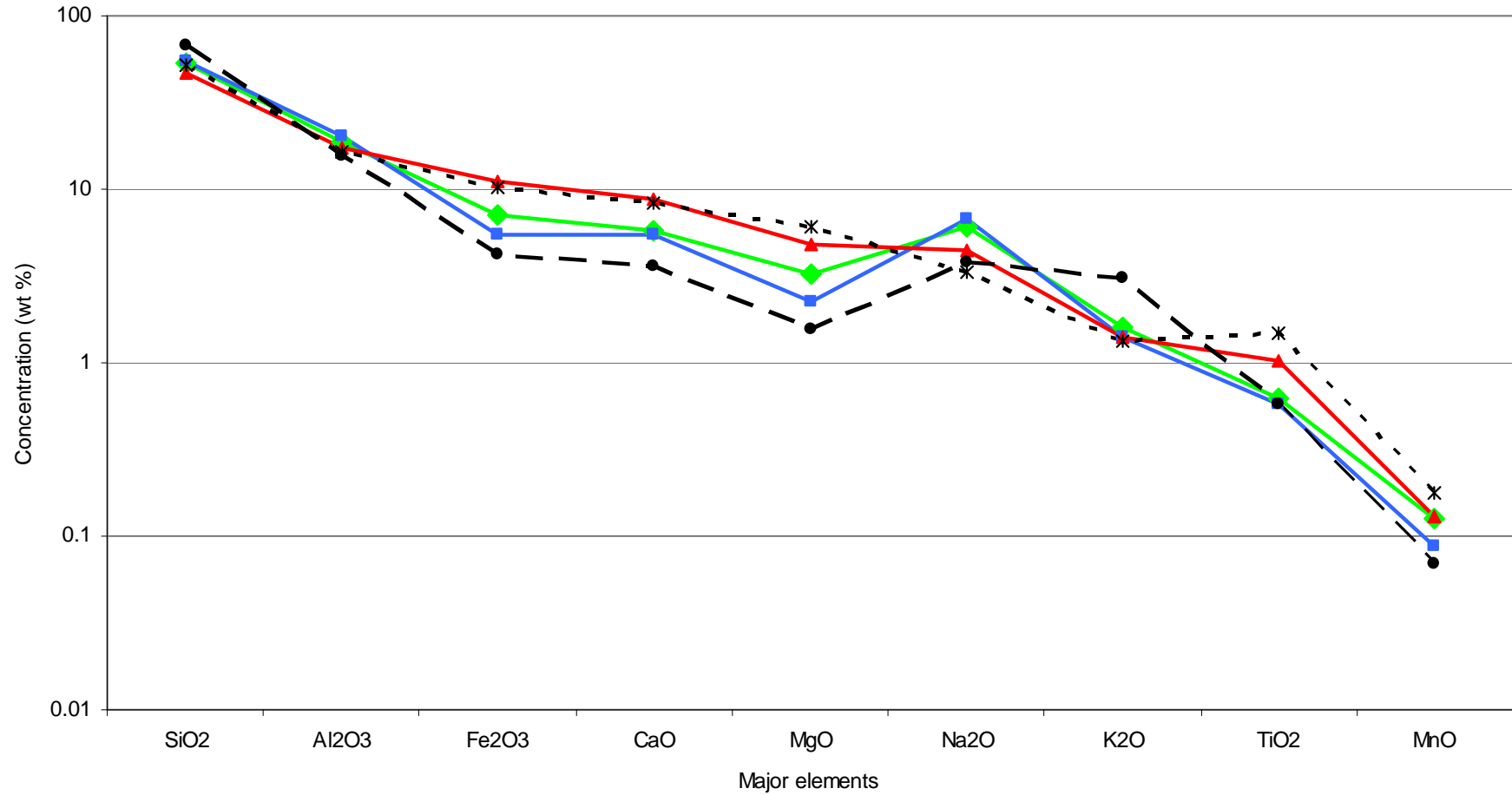





◆ 2006 Samples (Bulk NP) ■ 2007 Samples (Bulk NP) ▲ 2007 Samples (CaCO₃ NP)
 ● 2006 Samples (CaCO₃ NP) — AP (0.3% sulphide)

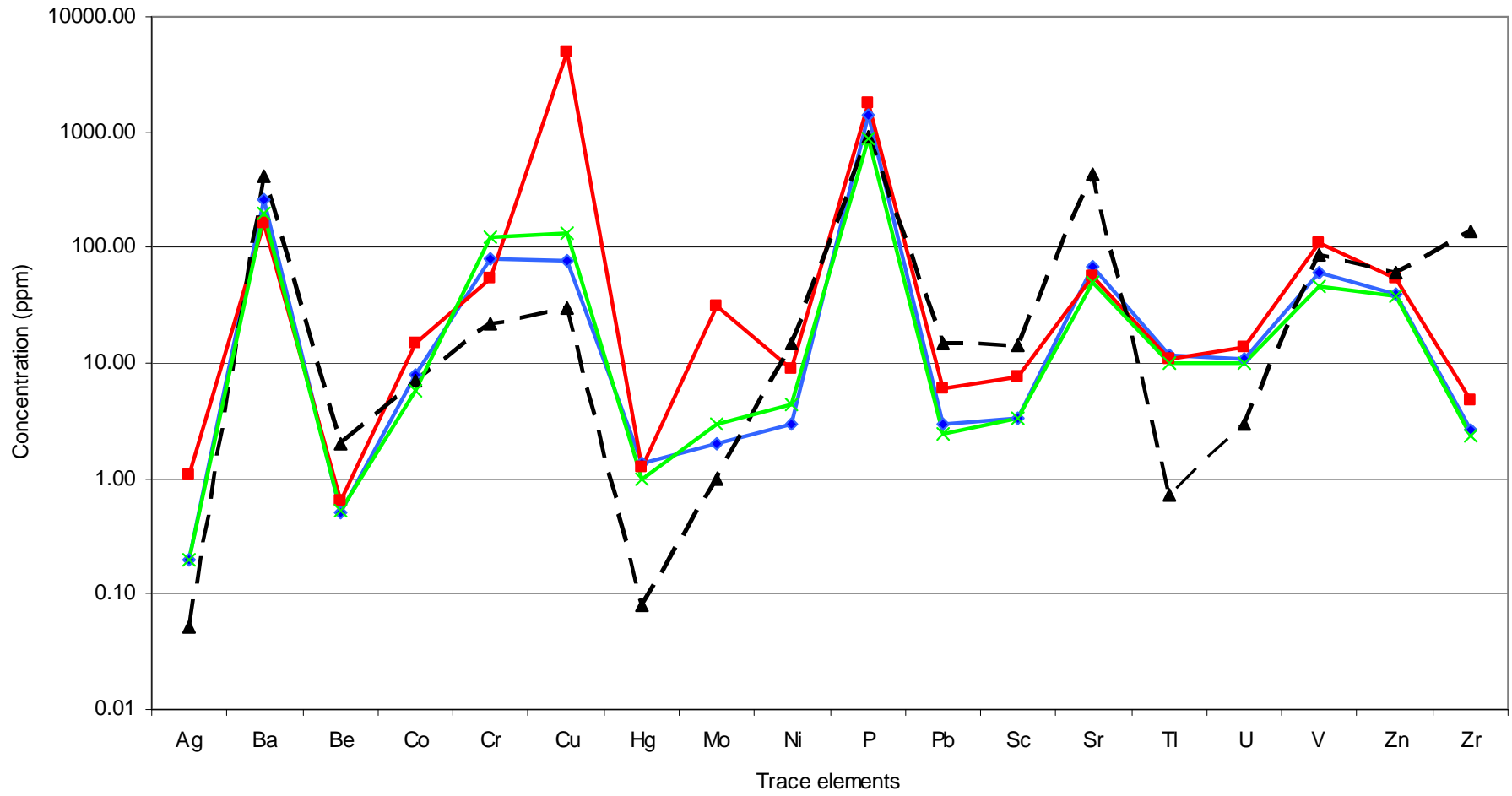
PROJECT				
WESTERN COPPER CORPORATION CARMACKS COPPER				
TITLE				
AP Versus Bulk NP and CaCO ₃ NP (2006 and 2007 samples)				
PROJECT No.	07-1413-0077	FILE No.		
DESIGN	LL	10MAR08	SCALE	N/A
CADD				REV. --
CHECK	SA	10MAR08	FIGURE 5-2	
REVIEW				





◆ granodiorite (unaltered)
 ■ granodiorite (altered)
 ▲ gneiss
 ● granodiorite (avg)
 -X- diorite (avg)

PROJECT			
WESTERN COPPER CORPORATION CARMACKS COPPER			
TITLE			
Whole Rock Analysis Results			
		PROJECT No. 07-1413-0077 FILE No. DESIGN LL 10MAR08 SCALE N/A REV. -- CADD CHECK SA 10MAR08 FIGURE 5-3 REVIEW	



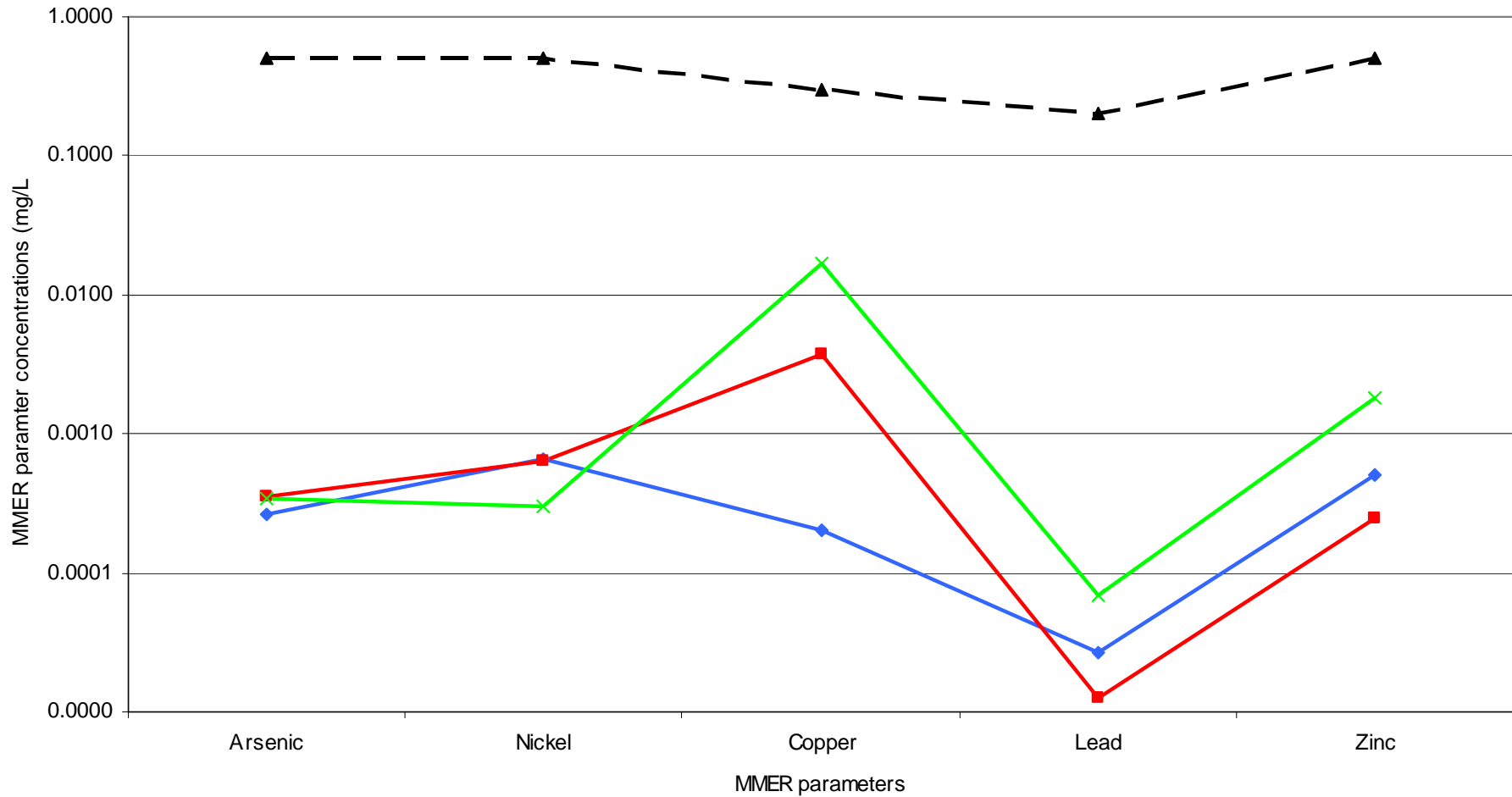
—◆— unmineralized
 —■— mineralized
 -▲- granodiorite (avg)
 —×— ACCESS

PROJECT **WESTERN COPPER CORPORATION
CARMACKS COPPER**

TITLE **Average Metal Concentrations for
Mineralized and Un-mineralized rock**



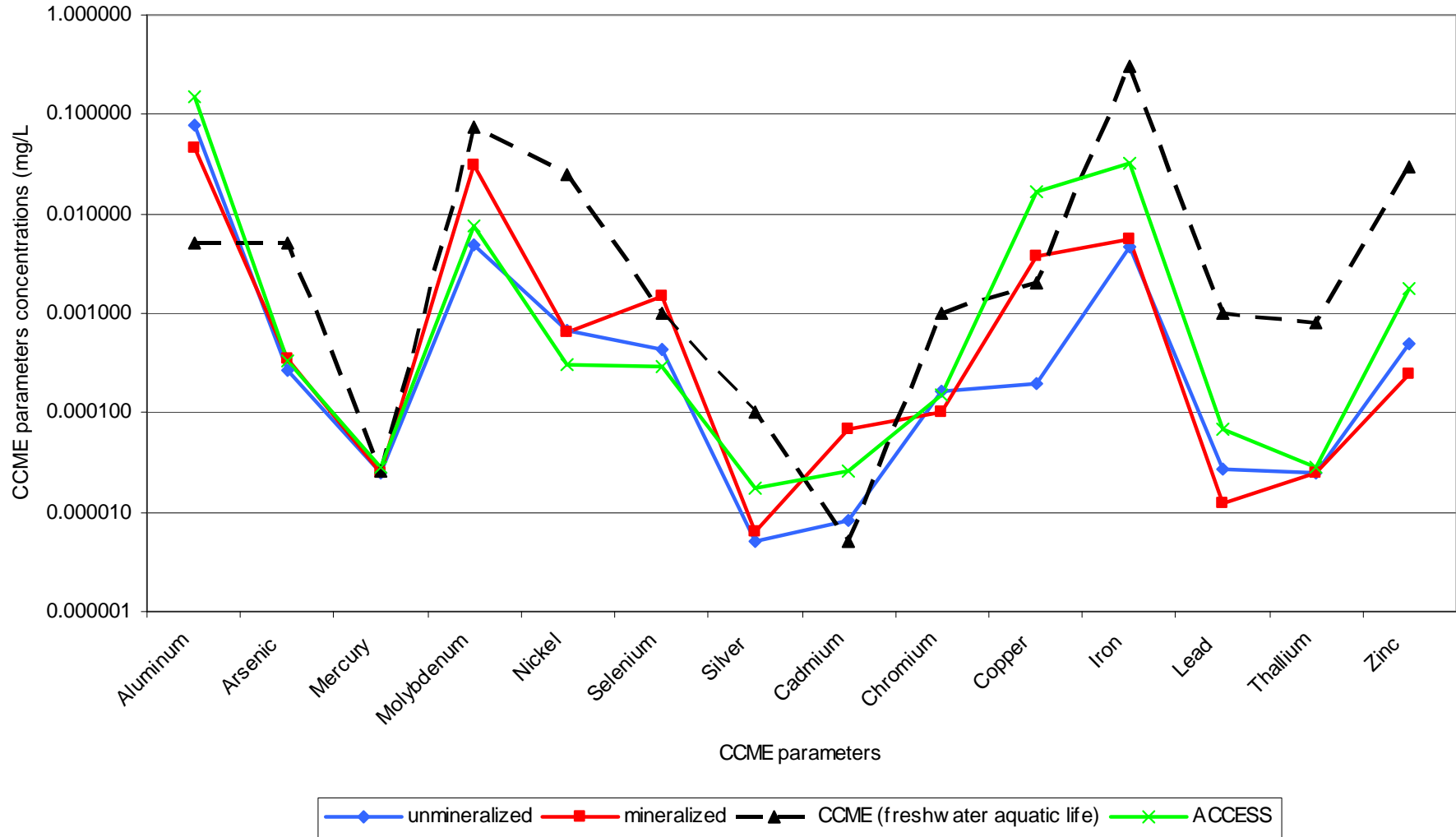
PROJECT No.	07-1413-0077	FILE No.	
DESIGN	LL	10MAR08	SCALE N/A
CADD			REV. —
CHECK	SA	10MAR08	FIGURE 5-4
REVIEW			



—◆— unmineralized
 —■— mineralized
 -▲- MMR
 —×— ACCESS

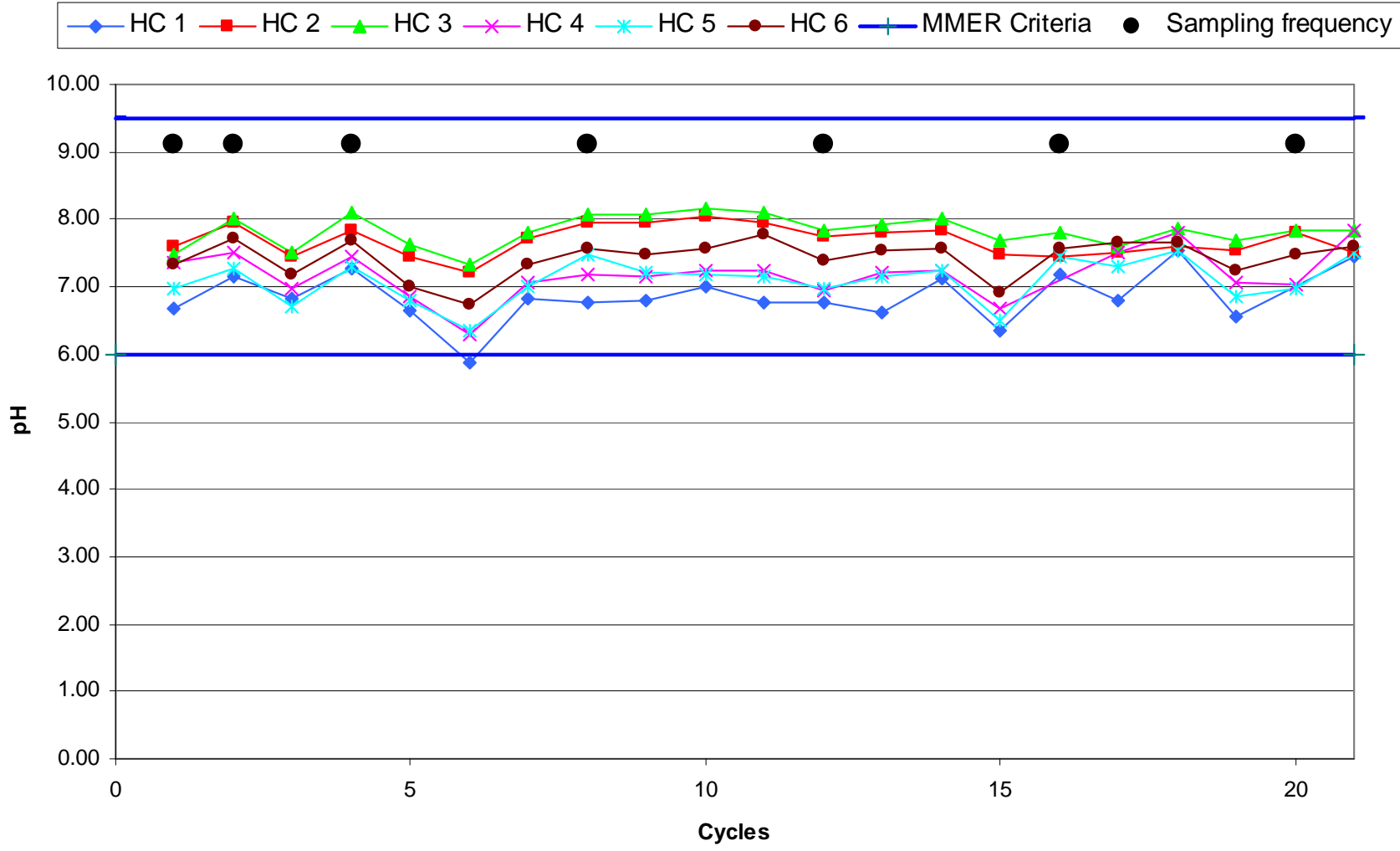
PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER				
TITLE					SFE Leachate Concentrations Versus MMR Parameters				
PROJECT No.			07-1413-0077		FILE No.				
DESIGN	LL	10MAR08	SCALE	N/A	REV.	—			
CADD									
CHECK	SA	10MAR08	FIGURE 5-5						
REVIEW									





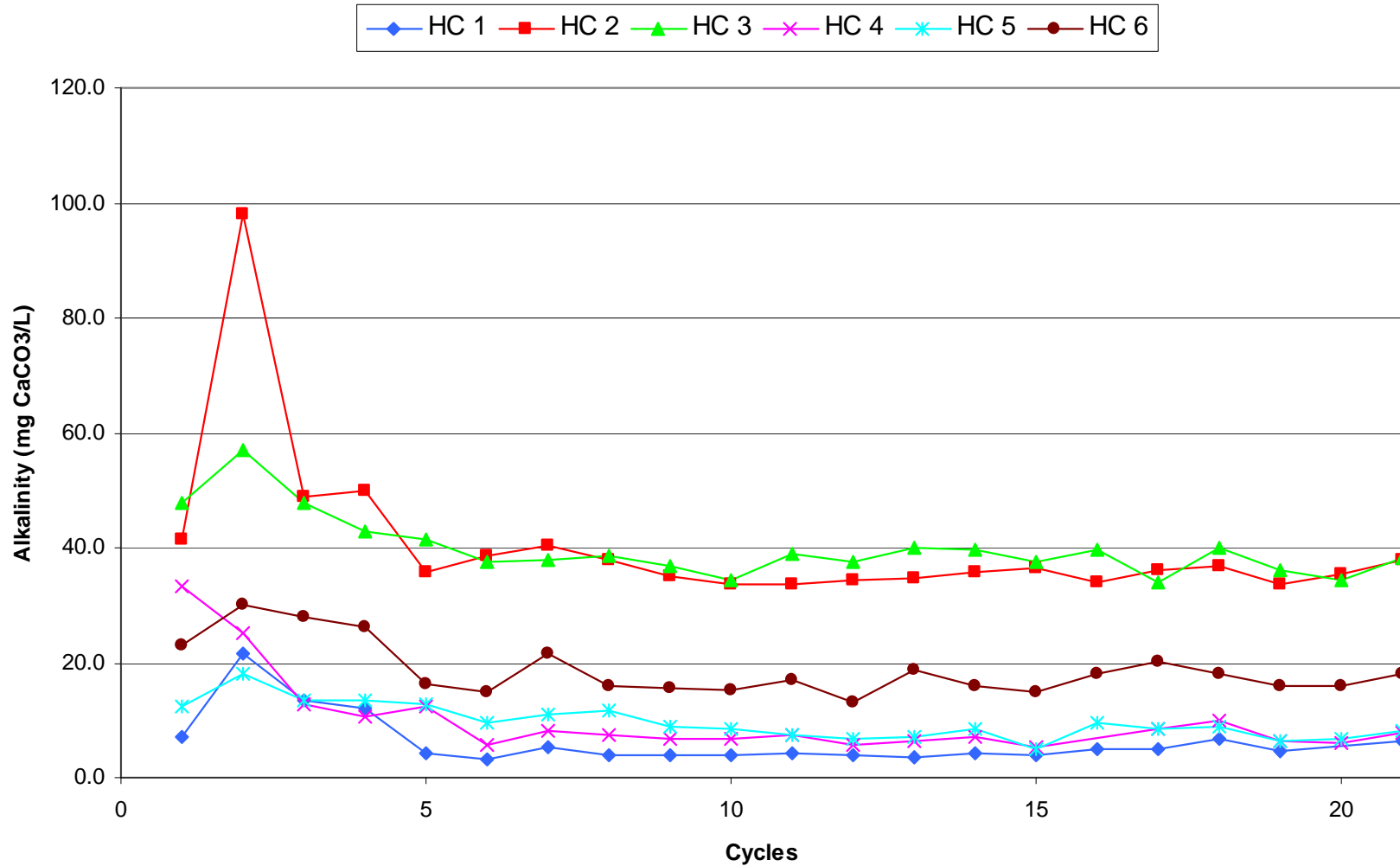
PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER				
TITLE					SFE Leachate Concentrations Versus CCME Parameters				
PROJECT No.			07-1413-0077		FILE No.				
DESIGN	LL	10MAR08	SCALE	N/A	REV.	—			
CADD									
CHECK	SA	10MAR08	FIGURE 5-6						
REVIEW									





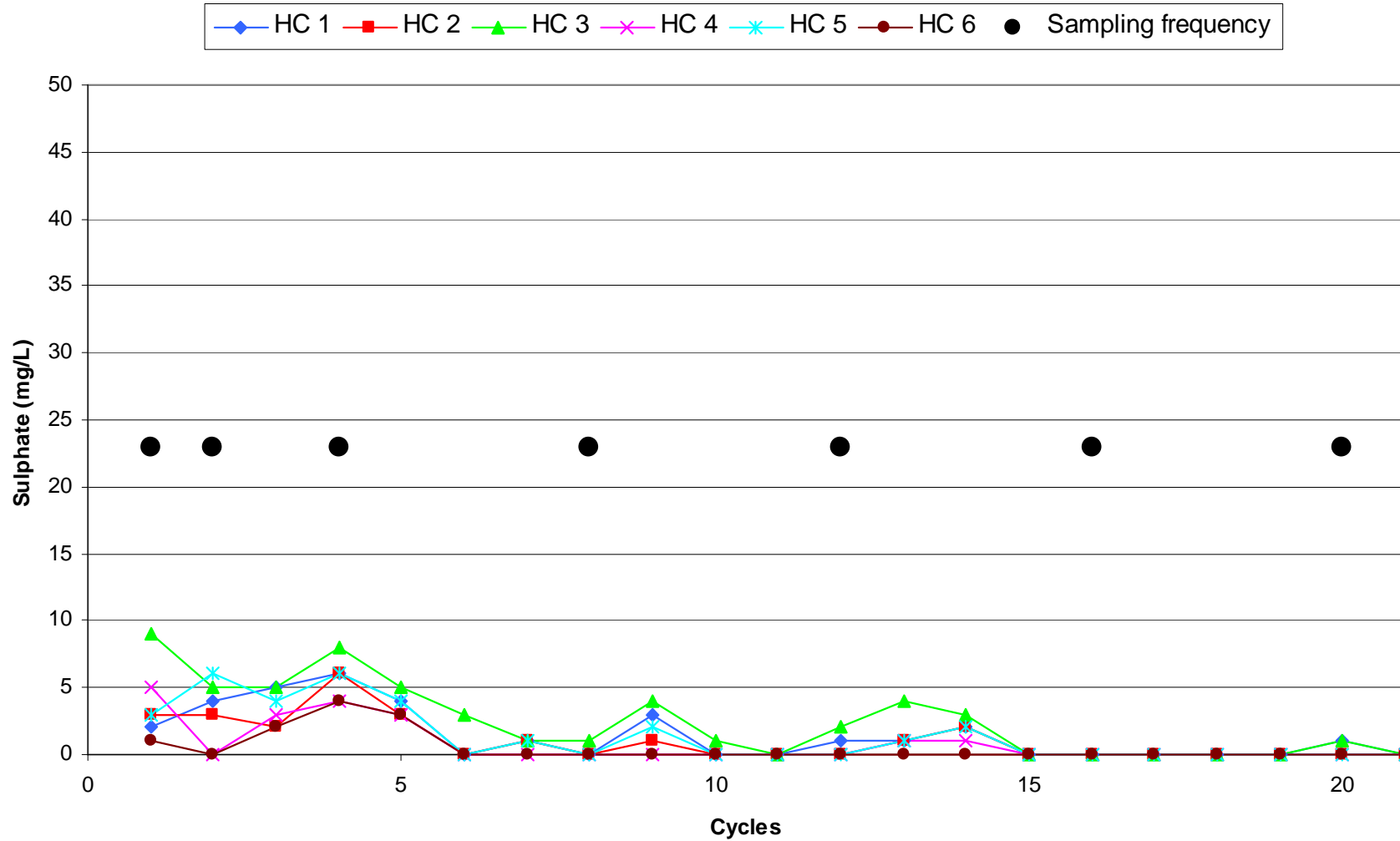
PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER									
TITLE										Humidity Cell pH				
PROJECT No.		07-1413-0077			FILE No.									
DESIGN	LL	10MAR08			SCALE	N/A	REV.	--						
CADD														
CHECK	SA	10MAR08			FIGURE 5-7									
REVIEW														





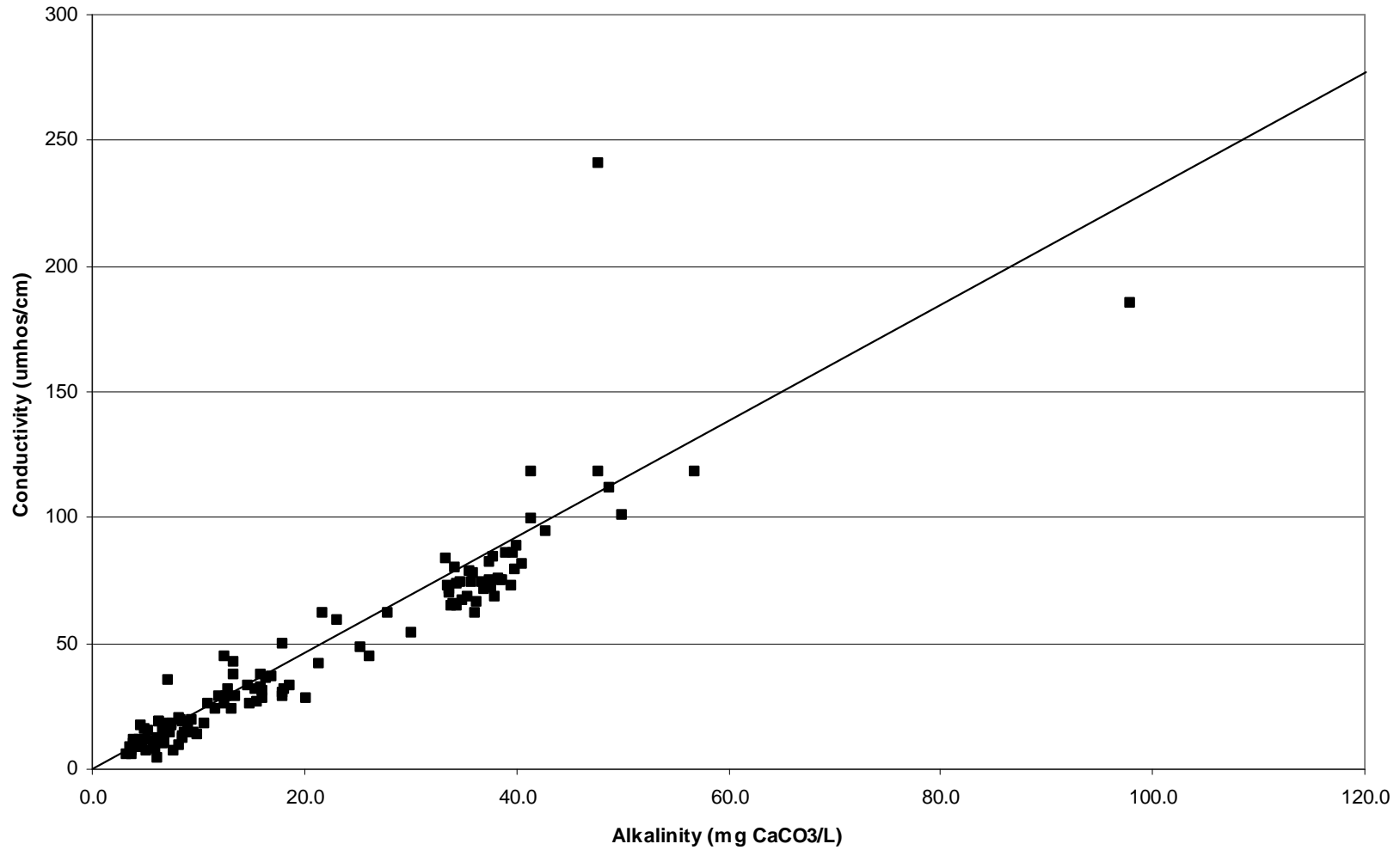
PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER									
TITLE										Humidity Cell Alkalinity (mg CaCO ₃ /L)				
PROJECT No.		07-1413-0077			FILE No.									
DESIGN	LL	10MAR08			SCALE	N/A	REV. --							
CADD														
CHECK	SA	10MAR08			FIGURE 5-8									
REVIEW														





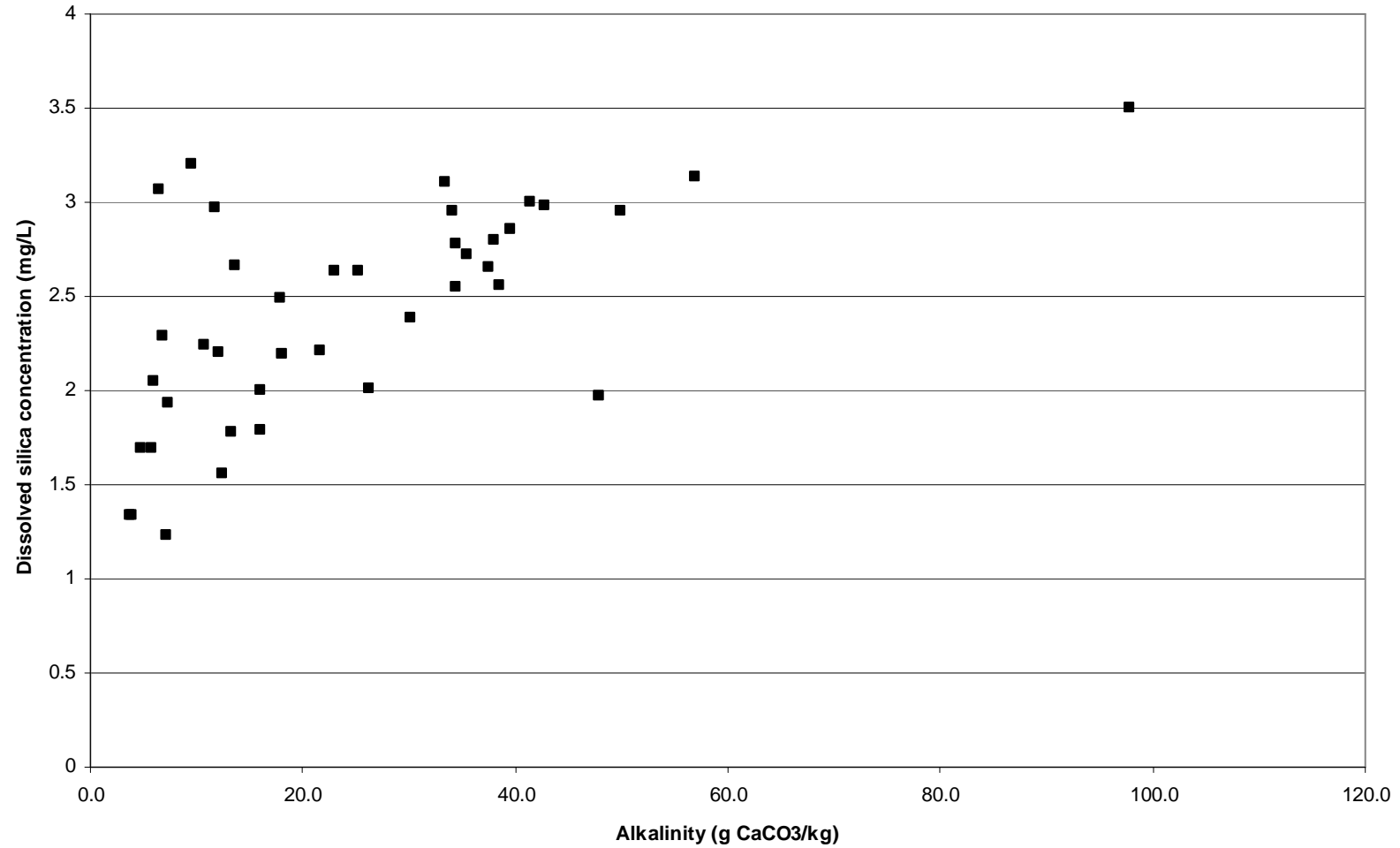
PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER				
TITLE					Humidity Cell Sulphate Concentration (mg/L)				
PROJECT No.			07-1413-0077		FILE No.				
DESIGN	LL	10MAR08		SCALE	N/A	REV.	--		
CADD									
CHECK	SA	10MAR08		FIGURE 5-9					
REVIEW									





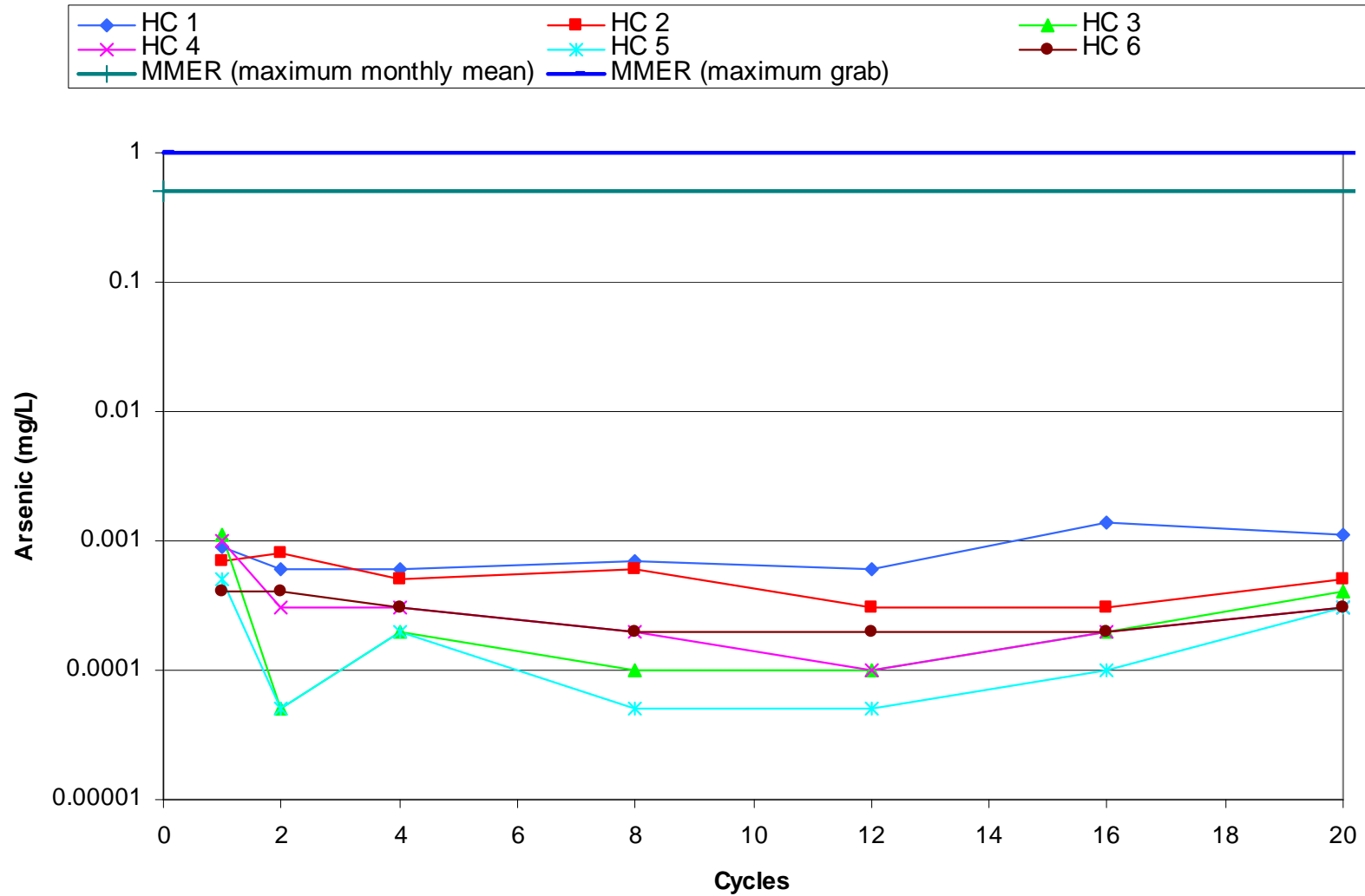
PROJECT				
WESTERN COPPER CORPORATION CARMACKS COPPER				
TITLE				
Conductivity Versus Alkalinity				
PROJECT No. 07-1413-0077			FILE No.	
DESIGN	LL	10MAR08	SCALE N/A	REV. --
CADD				
CHECK	SA	10MAR08	FIGURE 5-10	
REVIEW				





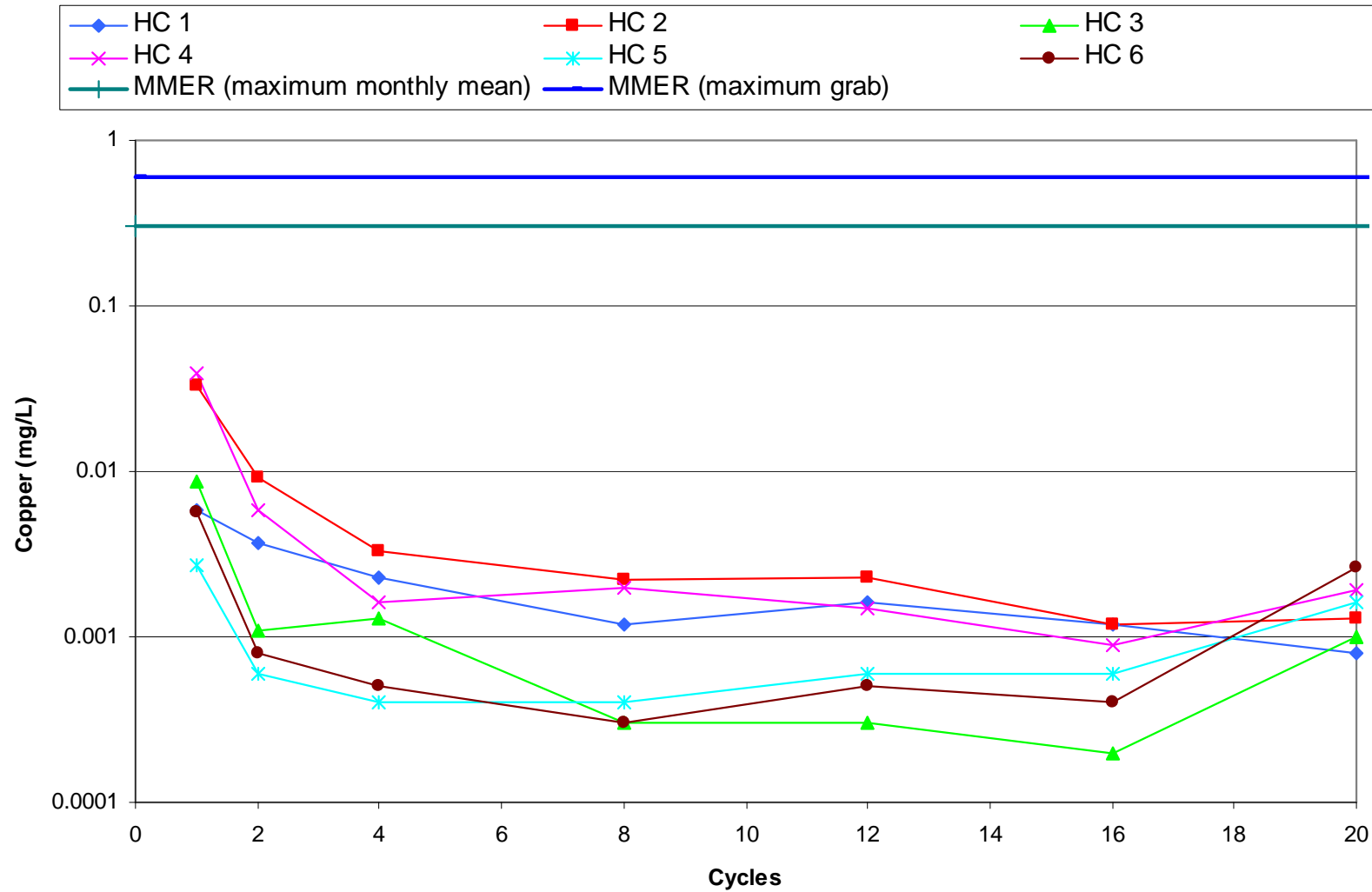
PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER		
TITLE					Dissolved Silica Versus Alkalinity		
PROJECT No.		07-1413-0077		FILE No.			
DESIGN	LL	10MAR08	SCALE	N/A	REV.	--	
CADD							
CHECK	SA	10MAR08	FIGURE 5-11				
REVIEW							





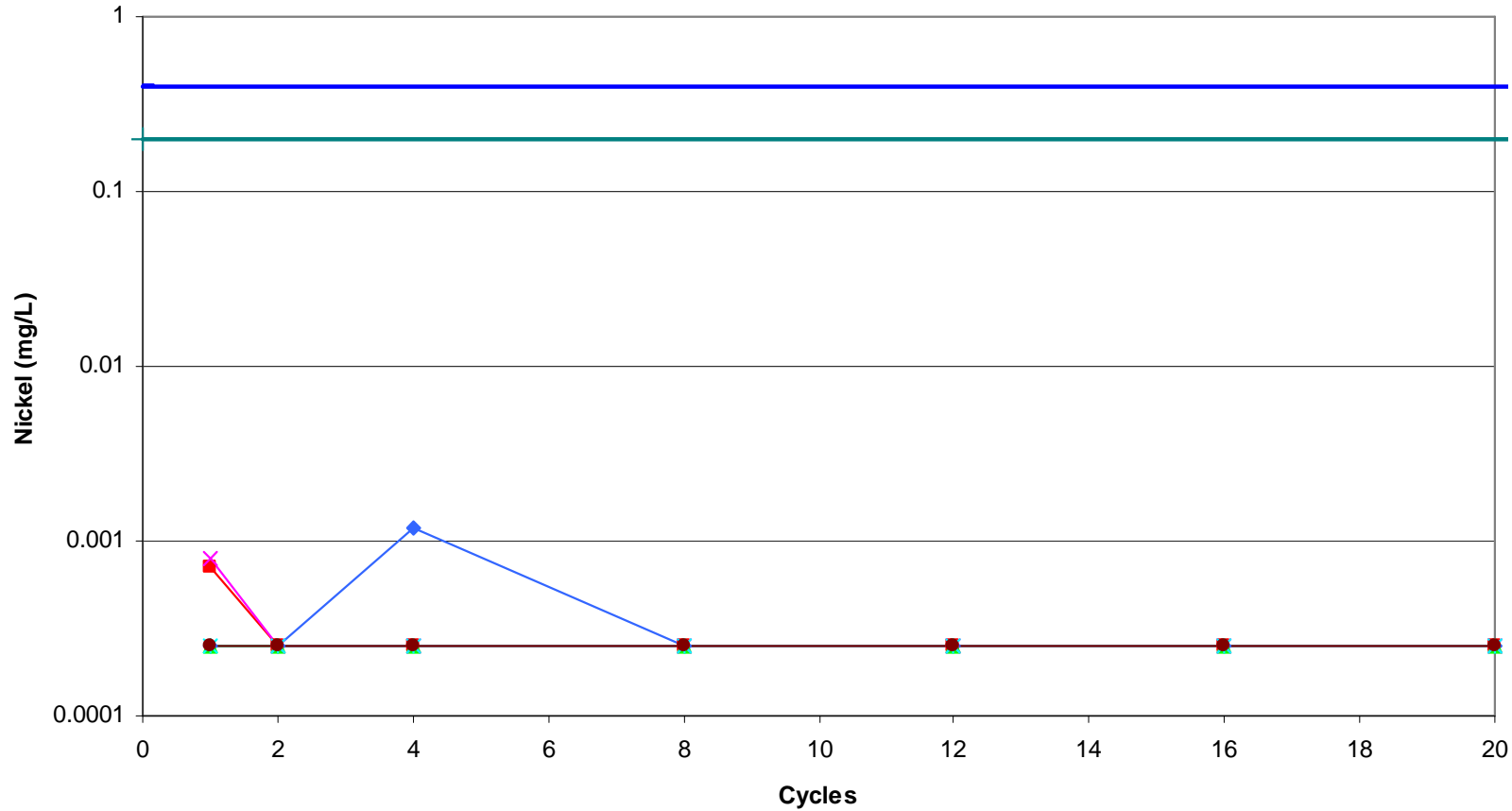
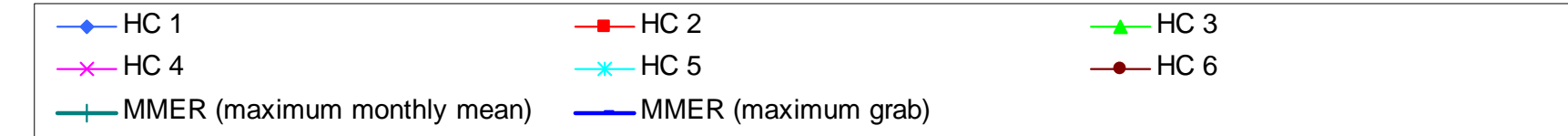
PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER								
TITLE					Humidity Cell Arsenic Concentration (mg/L)								
PROJECT No. 07-1413-0077			FILE No.		DESIGN			LL	10MAR08	SCALE	N/A	REV.	--
CADD					CHECK			SA	10MAR08	FIGURE 5-12			
REVIEW													






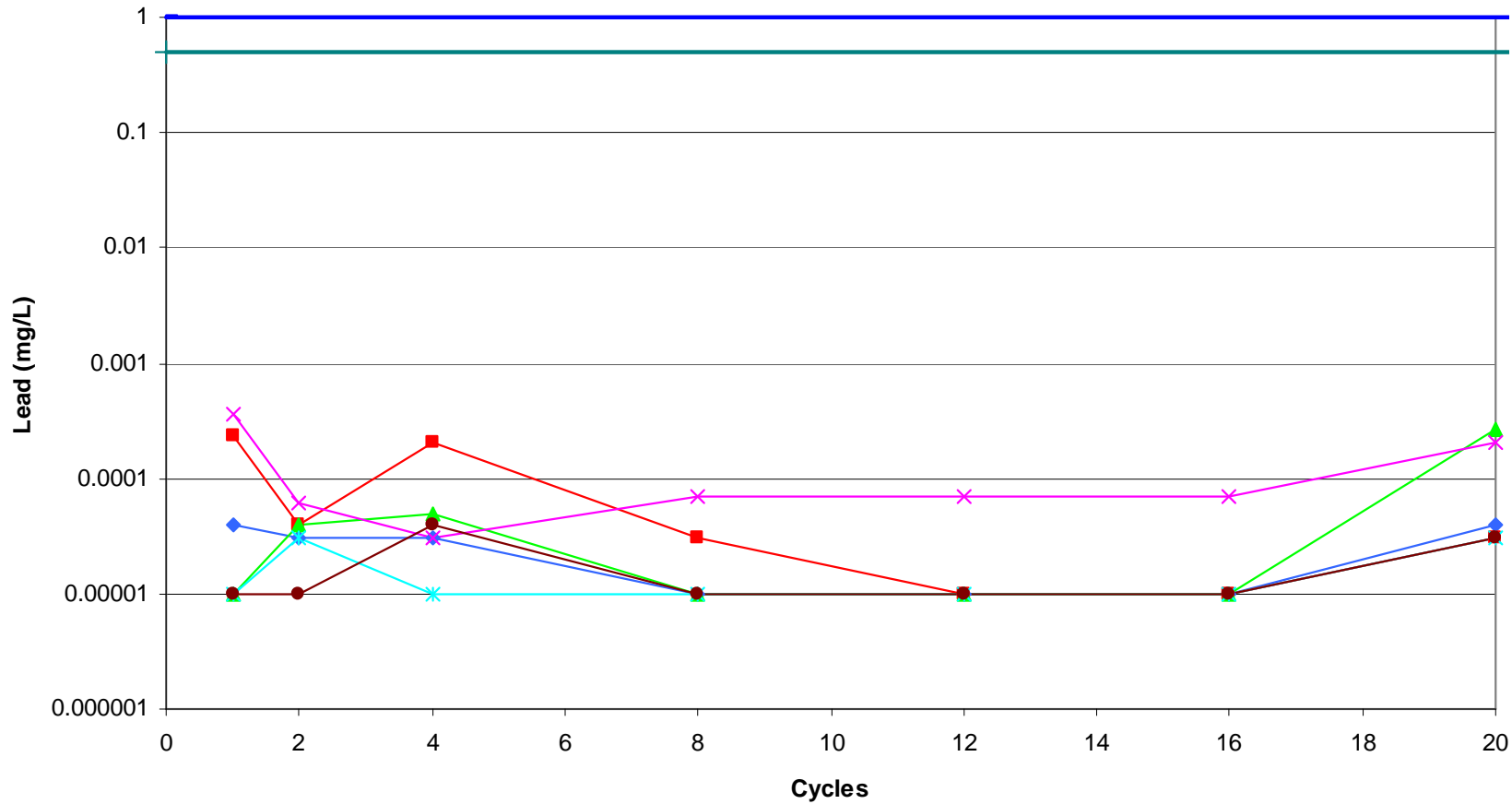
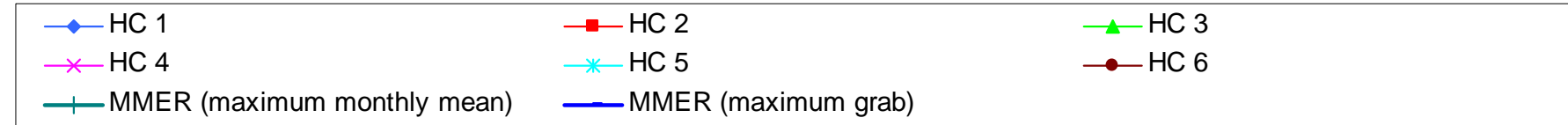
PROJECT				WESTERN COPPER CORPORATION CARMACKS COPPER	
TITLE				Humidity Cell Copper Concentration (mg/L)	
PROJECT No.		07-1413-0077		FILE No.	
DESIGN	LL	10MAR08	SCALE	N/A	REV. --
CADD					
CHECK	SA	10MAR08	FIGURE 5-13		
REVIEW					





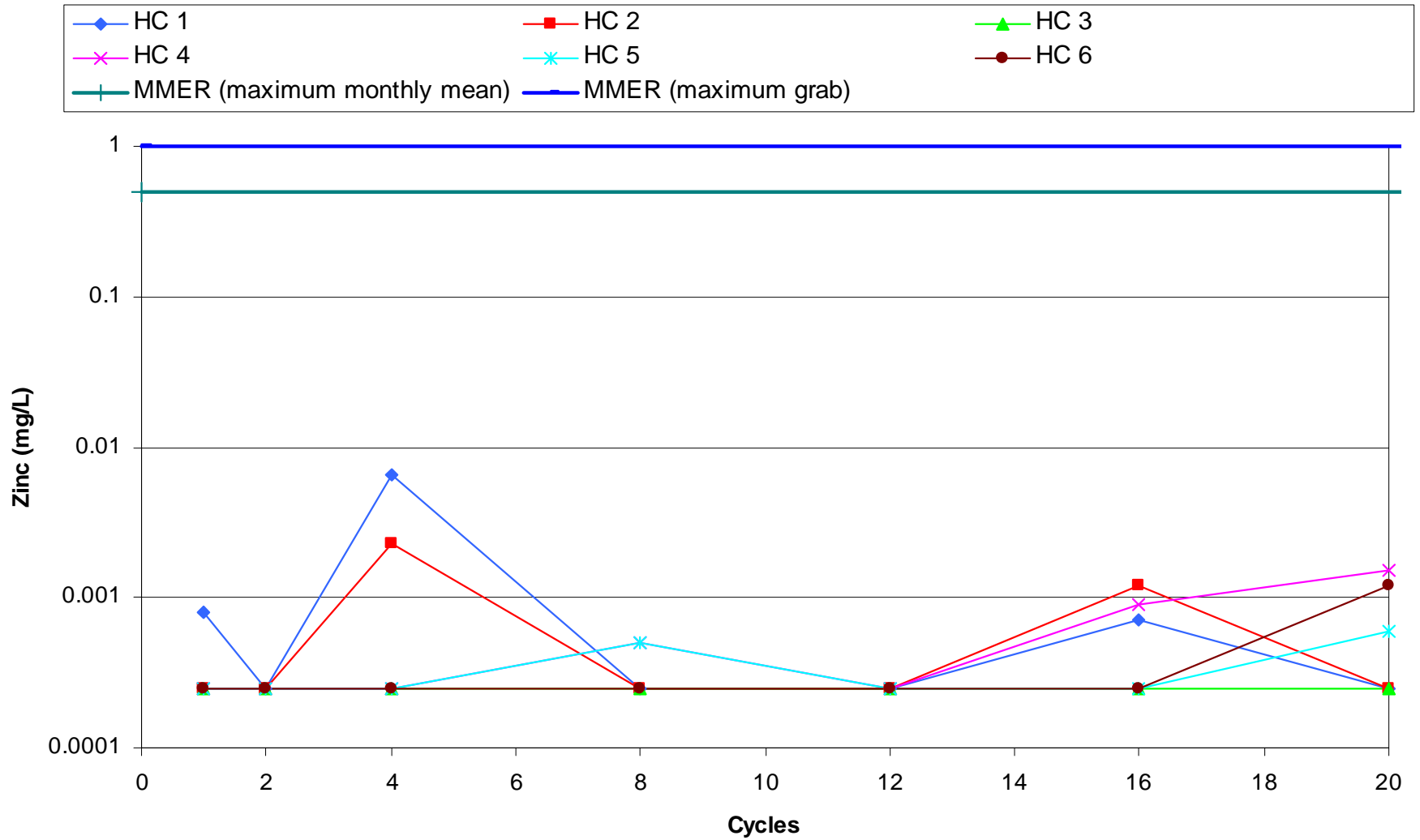


PROJECT				WESTERN COPPER CORPORATION CARMACKS COPPER			
TITLE				Humidity Cell Nickel Concentration (mg/L)			
PROJECT No.		07-1413-0077		FILE No.			
DESIGN	LL	10MAR08	SCALE	N/A	REV.	--	
CADD							
CHECK	SA	10MAR08	FIGURE 5-14				
REVIEW							



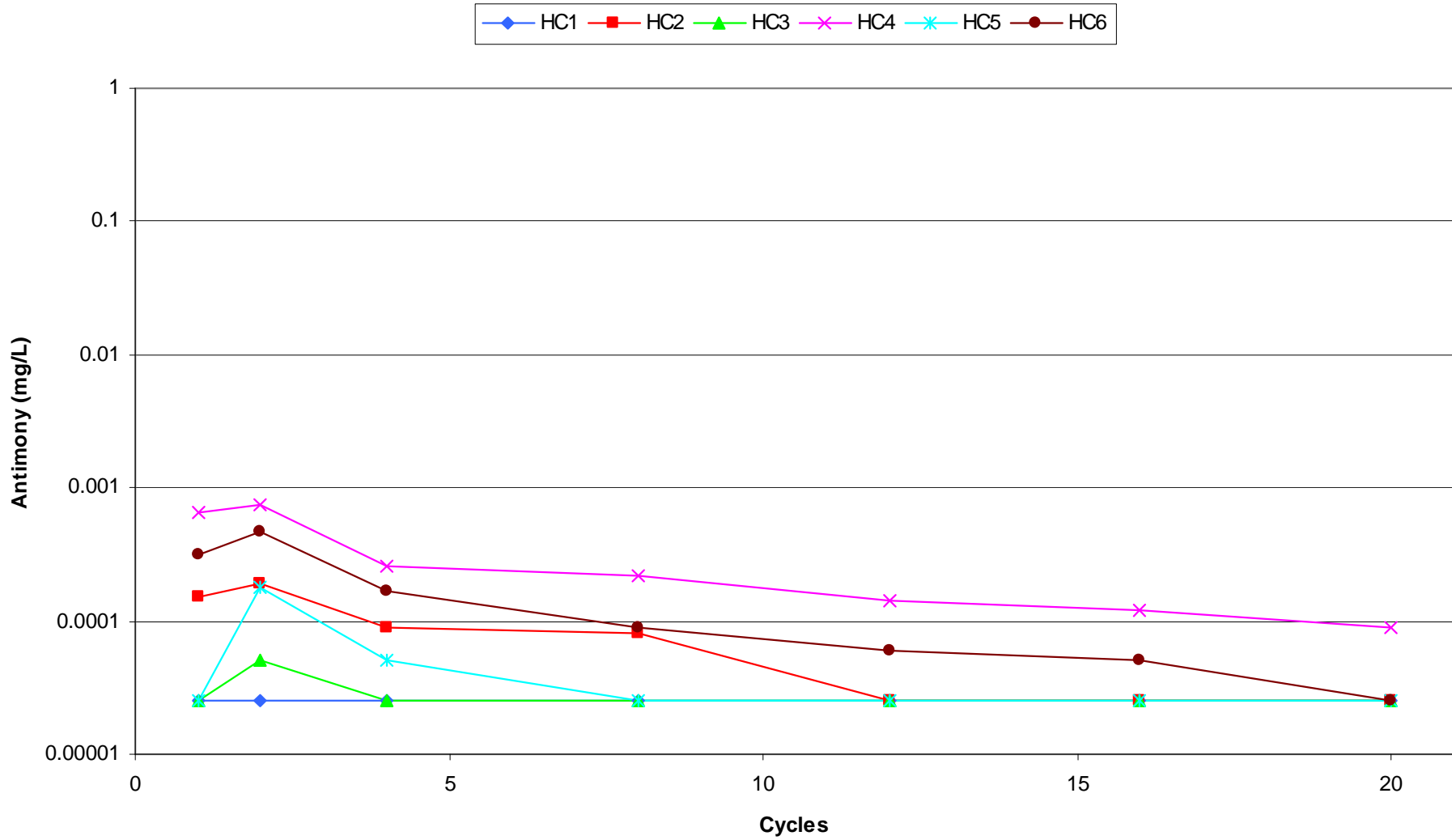


PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER					
TITLE					Humidity Cell Lead Concentration (mg/L)					
PROJECT No. 07-1413-0077			FILE No.		DESIGN			SCALE N/A		REV. --
DESIGN LL 10MAR08					CADD					
CHECK SA 10MAR08					REVIEW					
										FIGURE 5-15



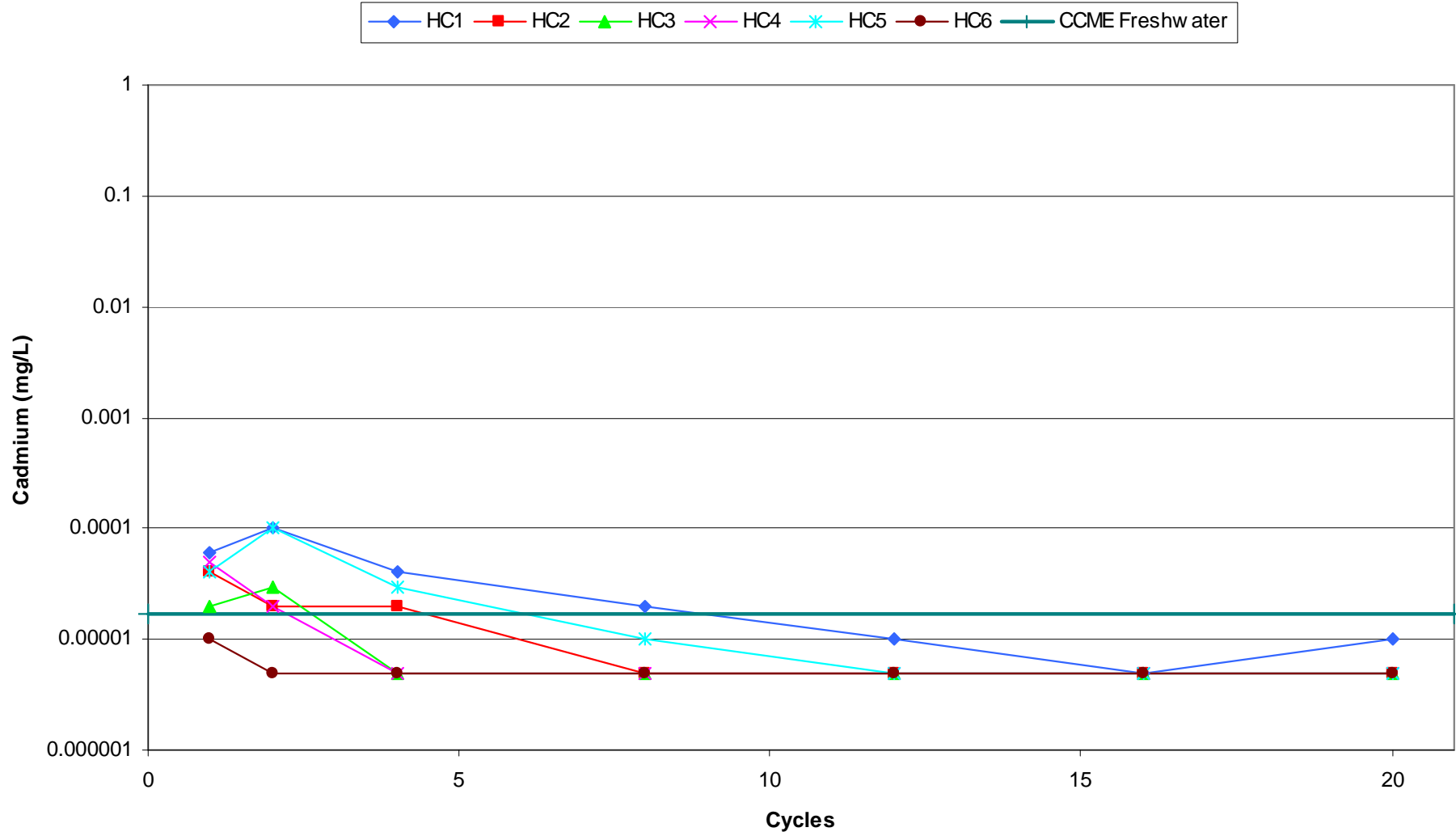
PROJECT				
WESTERN COPPER CORPORATION CARMACKS COPPER				
TITLE				
Humidity Cell Zinc Concentration (mg/L)				
PROJECT No. 07-1413-0077			FILE No.	
DESIGN	LL	10MAR08	SCALE	N/A
CADD			REV.	--
CHECK	SA	10MAR08	FIGURE 5-16	
REVIEW				





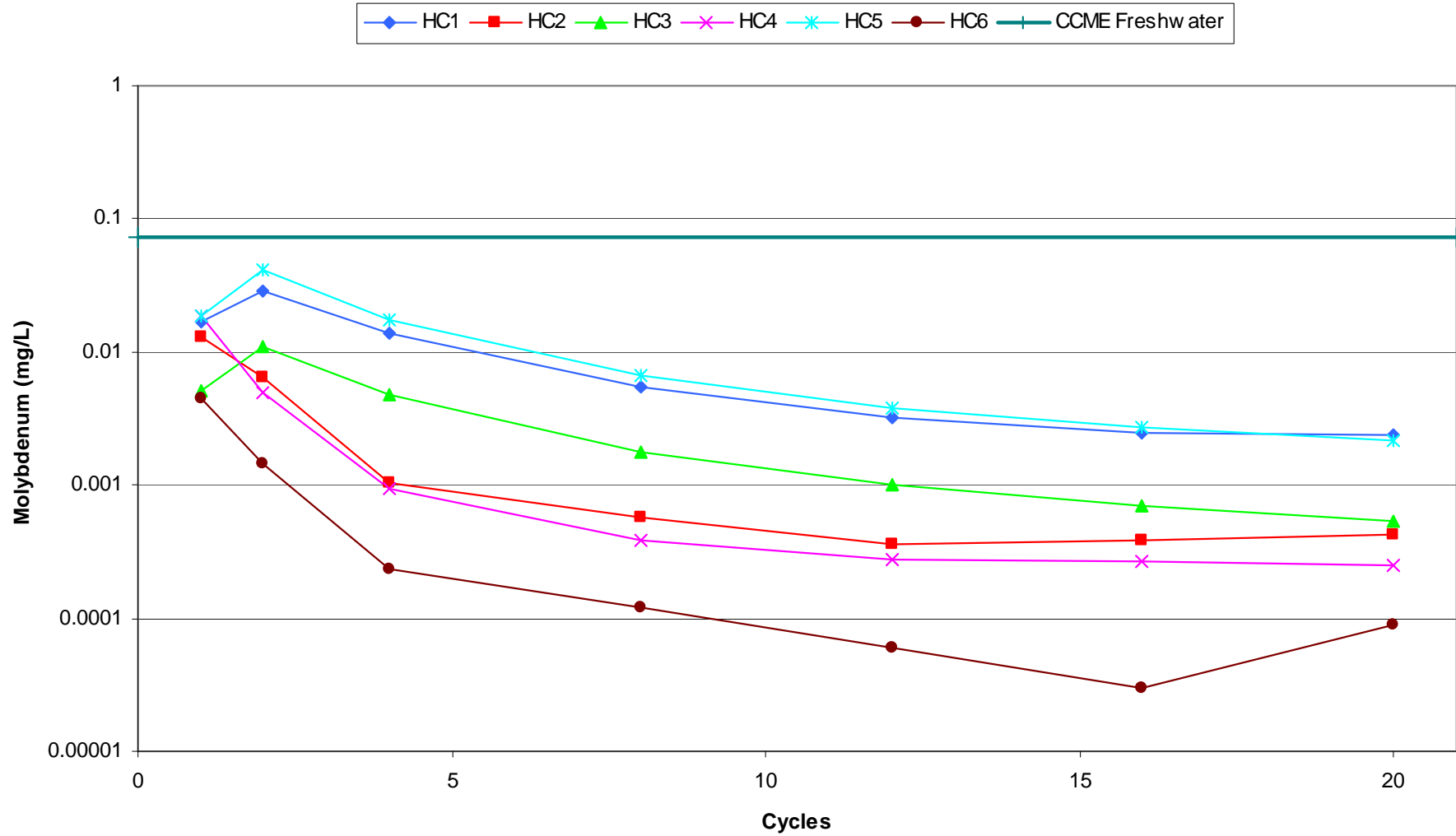
PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER		
TITLE					Humidity Cell Antimony Concentration (mg/L)		
PROJECT No.		07-1413-0077		FILE No.			
DESIGN	LL	10MAR08	SCALE	N/A	REV.	--	
CADD							
CHECK	SA	10MAR08	FIGURE 5-17				
REVIEW							





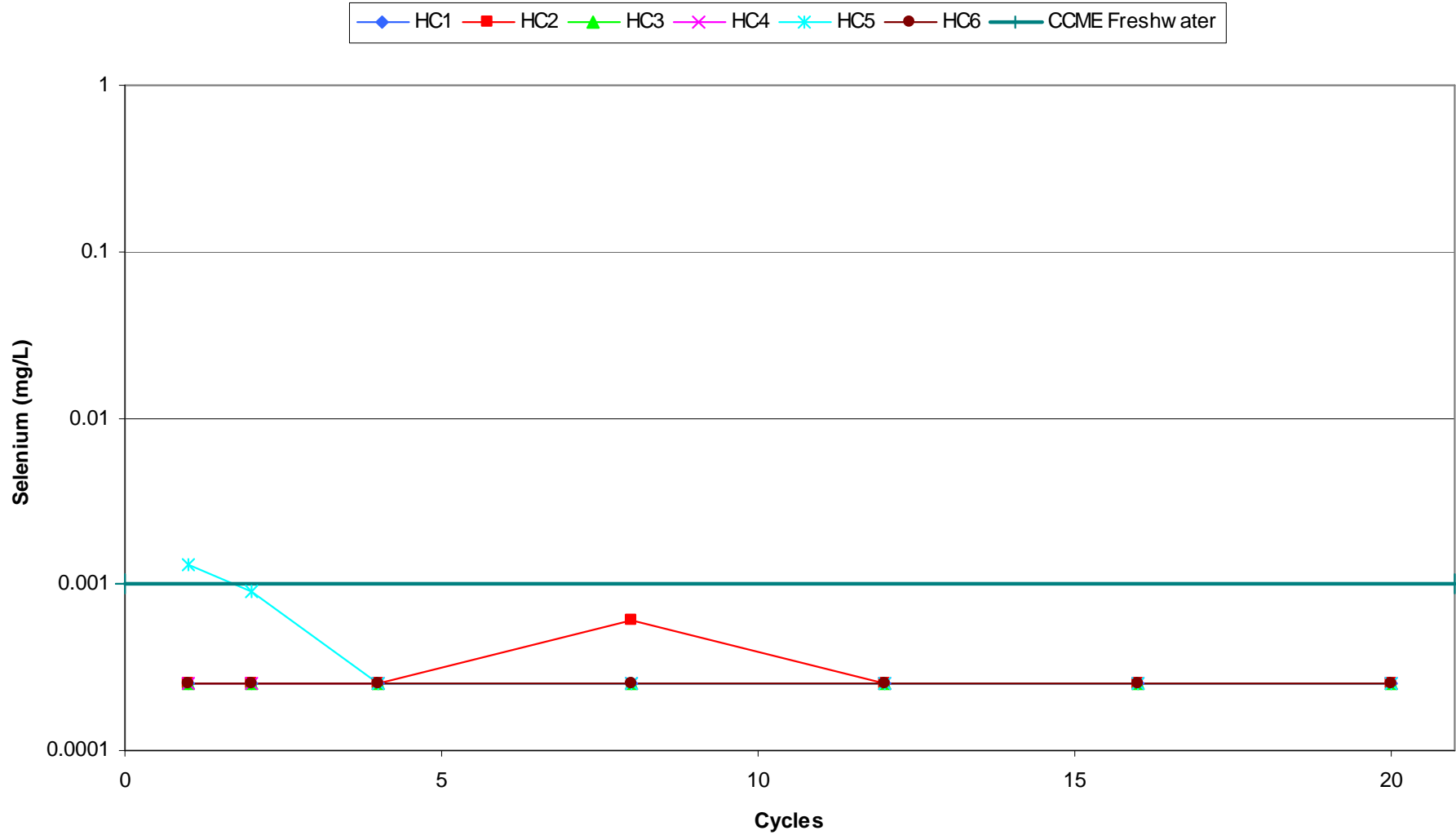
PROJECT				
WESTERN COPPER CORPORATION CARMACKS COPPER				
TITLE				
Humidity Cell Cadmium Concentration (mg/L)				
PROJECT No.		07-1413-0077		FILE No.
DESIGN	LL	10MAR08	SCALE	N/A
CADD			REV.	--
CHECK	SA	10MAR08	FIGURE 5-18	
REVIEW				





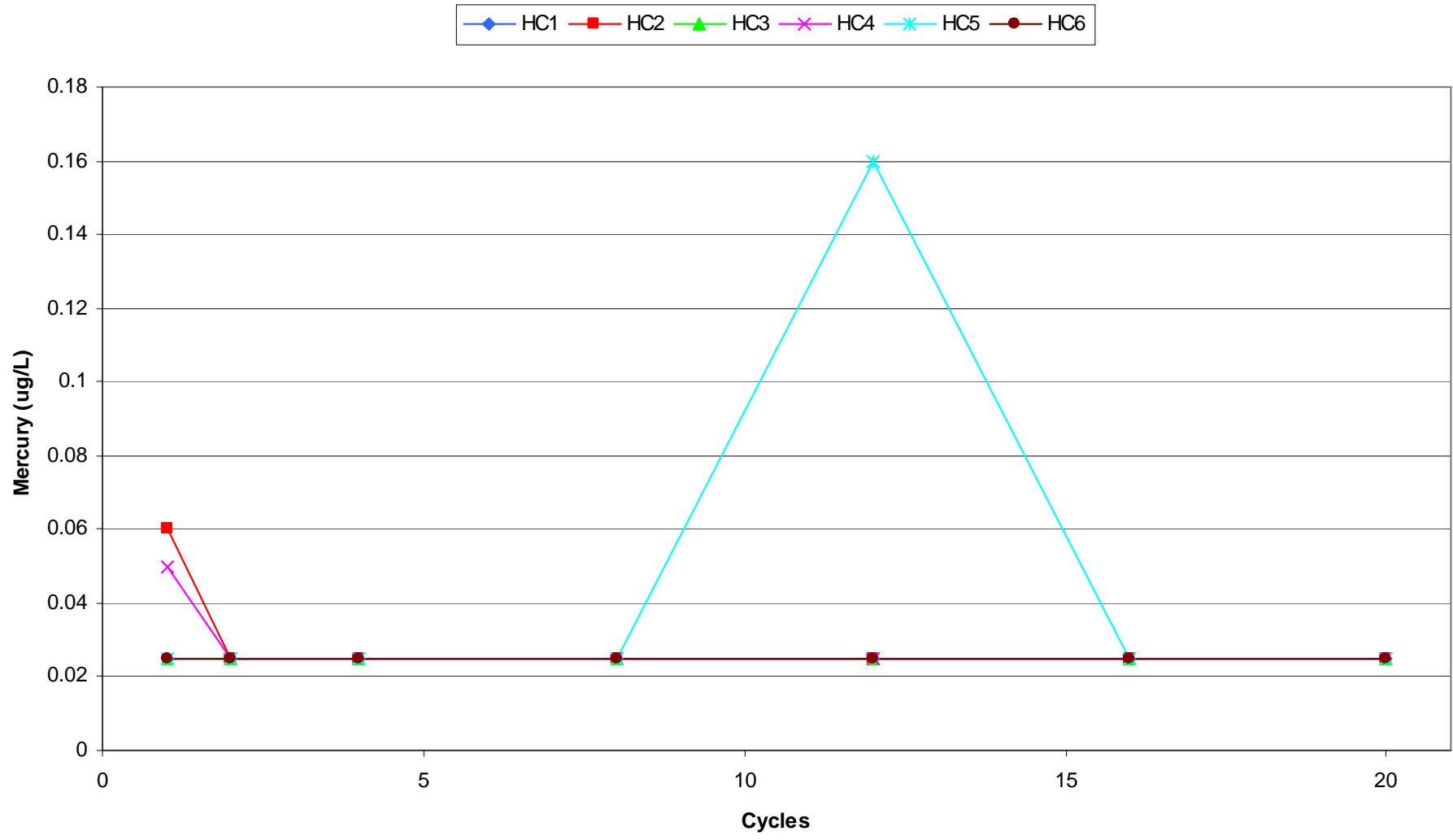
PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER				
TITLE									
Humidity Cell Molybdenum Concentration (mg/L)									
PROJECT No.			07-1413-0077			FILE No.			
DESIGN	LL	10MAR08	SCALE		N/A	REV. --			
CADD									
CHECK	SA	10MAR08	FIGURE 5-19						
REVIEW									





PROJECT					WESTERN COPPER CORPORATION CARMACKS COPPER		
TITLE					Humidity Cell Selenium Concentration (mg/L)		
PROJECT No.		07-1413-0077		FILE No.			
DESIGN	LL	10MAR08	SCALE	N/A	REV.	--	
CADD							
CHECK	SA	10MAR08	FIGURE 5-20				
REVIEW							





PROJECT				
WESTERN COPPER CORPORATION CARMACKS COPPER				
TITLE				
Humidity Cell Mercury Concentration (mg/L)				
PROJECT No.		07-1413-0077		FILE No.
DESIGN	LL	10MAR08	SCALE	N/A
CADD				REV. --
CHECK	SA	10MAR08	FIGURE 5-21	
REVIEW				



APPENDIX A
2007 GOLDER DATA

Appendix A-1
Whole Rock Analysis Results
2007 Samples
Carmacks Copper Project, YT

Average Amounts of Chemical Elements* (%)					66.88	15.66	1.33	3.56	1.57	3.84	3.07	0.57	0.21	0.07						
Sample ID	Rock type	Alteration	Mineralization	Location	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	CaO	MgO	Na ₂ O	K ₂ O	TiO ₂	P ₂ O ₅	MnO	BaO	Cr ₂ O ₃	LOI	Total	C	S
					%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
C228435	foliated granodiorite	Unaltered	Weak (0.620 % Cu)	Hanging wall	51.65	16.95	8.71	4.85	4.41	5.39	2.23	0.65	0.34	0.16	0.21	0.01	2.74	98.29	0.05	0.05
C228666	granodiorite	Chlorite/epidote	None	Hanging wall	53.1	20.1	7.05	6.63	2.42	6.65	0.98	0.68	0.3	0.11	0.13	0.01	1.36	99.52	0.12	0.02
C229560	granodiorite	Hematite	None	Hanging wall	58.41	20.14	4.01	5.18	1.52	6.85	1.55	0.51	0.11	0.07	0.16	0.02	1.05	99.56	0.01	0.01
C229587	granodiorite	Potassium feldspar	Weak (0.50 % Cu)	Hanging wall	54.05	20.13	5.42	4.68	2.78	6.65	1.7	0.55	0.23	0.08	0.15	0.01	2.18	98.6	0.02	0.02
C490366	granodiorite	Unaltered	None	Interbed	54.03	20.5	5.5	6.64	2.01	6.85	0.94	0.6	0.18	0.09	0.11	0.02	1.85	99.31	0.03	0.26
C490395	mixed gneiss/ granodiorite	Gypsum	Weak (0.365 % Cu)	Footwall	46.82	17.86	9.29	9.79	4.56	4.91	0.96	0.94	0.14	0.13	0.07	0.02	2.74	98.22	0.02	0.88
C490422	mixed gneiss/ granodiorite	Gypsum	Weak (0.150 % Cu)	Footwall	47.16	16.79	13.09	7.58	5.01	3.95	1.83	1.11	0.13	0.13	0.1	0.01	2	98.88	0.02	0.38

Notes:

< = less than detection limit

* For Granodiorites (Price, 1997)

Appendix A-2
Trace Element Analysis Results
2007 Samples
Carmacks Copper Project, YT

Sample ID	Rock type	Alteration	Mineralization	Location	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Hg ppm	K %	La ppm	Mg %	Mn ppm
C228435	foliated granodiorite	Unaltered Chlorite/epidote	Weak (0.620 % Cu)	Hanging wall	2.1	2.14	<5	89	0.8	<5	1.7	<1	17	40	8268	3.66	1	0.12	<10	1.49	595
C228666	granodiorite	dote	None	Hanging wall	<0.2	1.18	<5	516	0.5	<5	1.46	<1	11	77	45	2.92	2	0.26	<10	0.78	397
C229560	granodiorite	Hematite Potassium feldspar	None	Hanging wall	<0.2	0.85	<5	106	<0.5	<5	0.9	<1	6	82	158	1.61	<1	0.12	<10	0.46	247
C229587	granodiorite	Unaltered	Weak (0.50 % Cu)	Hanging wall	1.4	1.53	<5	343	0.6	<5	0.78	<1	13	57	6299	2.77	1	0.45	<10	1.14	368
C490366	granodiorite mixed gneiss/	Unaltered	None	Interbed	<0.2	0.95	<5	165	<0.5	<5	1.42	<1	7	83	24	2.09	1	0.1	<10	0.6	293
C490395	granodiorite mixed gneiss/	Gypsum	Weak (0.365 % Cu)	Footwall	0.6	1.03	<5	128	<0.5	<5	2.03	<1	9	77	2520	2.24	1	0.19	<10	0.76	285
C490422	granodiorite	Gypsum	Weak (0.150 % Cu)	Footwall	<0.2	2.53	<5	81	0.7	<5	2.25	<1	21	44	2630	5.21	2	0.32	<10	1.76	528

Sample ID	Rock type	Alteration	Mineralization	Location	Mo ppm	Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Sr ppm	Th ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Zn ppm	Zr ppm
C228435	foliated granodiorite	Unaltered Chlorite/epidote	Weak (0.620 % Cu)	Hanging wall	15	0.1	9	2697	10	0.03	<5	8	58	<5	0.21	13	15	102	<10	70	6
C228666	granodiorite	dote	None	Hanging wall	<2	0.09	3	1880	2	0.01	<5	4	44	<5	0.16	15	12	82	<10	54	3
C229560	granodiorite	Hematite Potassium feldspar	None	Hanging wall	2	0.09	3	991	3	<0.01	<5	3	30	<5	0.11	<10	<10	44	<10	27	3
C229587	granodiorite	Unaltered	Weak (0.50 % Cu)	Hanging wall	6	0.07	11	2013	6	<0.01	<5	5	42	<5	0.18	10	13	81	<10	64	5
C490366	granodiorite mixed gneiss/	Unaltered	None	Interbed	2	0.09	3	1300	4	0.25	<5	3	132	<5	0.13	10	<10	53	<10	37	2
C490395	granodiorite mixed gneiss/	Gypsum	Weak (0.365 % Cu)	Footwall	62	0.13	7	1225	3	0.8	<5	5	60	<5	0.14	<10	10	77	<10	29	3
C490422	granodiorite	Gypsum	Weak (0.150 % Cu)	Footwall	42	0.16	9	1266	5	0.36	<5	12	66	<5	0.31	<10	16	183	<10	50	5

Notes:

< = less than detection limit

Non-detect values assumed to be equal to one half of the detection limit in calculations of average, median and standard deviation, where applicable.

Appendix A-3
Acid Base Accounting Results
2007 Samples
Carmacks Copper Project, YT

Sample ID	Rock type	Alteration	Mineralization	Location	Paste pH	S(T) %	S(SO4) %	S(S-2) %	AP	NP	TIC %	CaCO3 NP	Net NP	NPR	CaNPR
C228435	foliated granodiorite	Unaltered	Weak (0.620 % Cu)	Hanging wall	9.18	0.05	<0.01	0.05	1.6	18.8	0.03	2.5	17.2	12.0	1.60
C228666	granodiorite	Chlorite/epidote	None	Hanging wall	9.28	0.02	<0.01	0.02	0.6	19.3	0.1	8.3	18.7	30.9	13.33
C229560	granodiorite	Hematite	None	Hanging wall	9.37	0.01	<0.01	0.01	0.3	8.5	<0.01	<0.8	8.2	27.2	1.28
C229587	granodiorite	Potassium feldspar	Weak (0.50 % Cu)	Hanging wall	9.33	0.02	<0.01	0.02	0.6	12.8	<0.01	<0.8	12.2	20.5	0.64
C490366	granodiorite	Unaltered	None	Interbed	8.69	0.26	0.24	0.02	0.6	9.5	0.02	1.7	8.9	15.2	2.67
C490395	mixed gneiss/ granodiorite	Gypsum	Weak (0.365 % Cu)	Footwall	8.92	0.88	0.57	0.31	9.7	9.5	<0.01	<0.8	-0.2	1.0	0.04
C490422	mixed gneiss/ granodiorite	Gypsum	Weak (0.150 % Cu)	Footwall	8.57	0.38	0.08	0.30	9.4	13.5	<0.01	<0.8	4.1	1.4	0.04

Notes:

< = less than detection limit

* S(S2-) sulphide sulphur calculated as S(T)total sulphur - S(SO4)sulphate sulphur

Where S(SO4) is reported as <0.01%, it is assumed to be zero for the AP calculation.

TIC = Total inorganic carbon, used in calculation of CaNP

AP = Acid potential in kg CaCO3 equivalent per tonne of rock. AP is determined from calculated sulphide sulphur content: S(T) - S(SO4), assuming total conversion of sulphide to sulphate.

Bulk NP = Neutralization potential in kg CaCO3 equivalent per tonne of rock.

CaNP = Carbonate mineral neutralization potential in kg CaCO3 equivalent per tonne of rock

NET NP = Net neutralization potential in kg CaCO3 equivalent per tonne of rock. Calculated as the difference between NP and AP.

NPR = Neutralization potential ratio: NP/AP

CaNPR = Neutralization potential ratio calculated using CaNP: CaNP/AP

Non-detect values assumed to be equal to one half of the detection limit in calculations of average, median and standard deviation, where applicable.

Appendix A-4
Shake Flask Extraction Results
2007 Samples
Carmacks Copper Project, YT

CCME (CEQG) (freshwater aquatic life)* (mg/L)					6.5 - 9.0							0.005 - 0.1		0.005	
Metal Mining Effluent Regulations (MMER) [†] (mg/L)					6.0 - 9.5									0.5	
Sample ID	Rock type	Alteration	Mineralization	Location	pH s.u.	REDOX mV	Conductivity µS/cm	Acidity (pH 8.3) mg/L as CaCO3	Alkalinity mg/L as CaCO3	Hardness mg/L as CaCO3	Sulphate (mg/L)	Aluminum ² (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)
C228435	foliated granodiorite	Unaltered	Weak (0.620 % Cu)	Hanging wall	7.41	406	93	2.9	3.2	17.8	5	0.051	<0.00005	0.0002	0.0363
C228656	granodiorite	Chlorite/epidote	None	Hanging wall	7.84	393	156	2.6	72.6	74	5	0.0798	0.00015	0.0002	0.288
C229550	granodiorite	Hematite	None	Hanging wall	7.55	357	84	2.6	37.7	28.3	1	0.0992	0.00005	0.0002	0.0221
C229587	granodiorite	Potassium feldspar	Weak (0.50 % Cu)	Hanging wall	7.13	391	49	3.2	18.0	10.9	4	0.0337	<0.00005	0.0005	0.0534
C490366	granodiorite	Unaltered	None	Interbed	7.5	412	1648	3.8	31.3	1100	1017	0.0509	<0.00005	0.0004	0.0497
C490395	mixed gneiss/ granodiorite	Gypsum	Weak (0.365 % Cu)	Footwall	7.17	399	2052	3.7	14.6	1490	1320	0.0378	0.00005	0.0004	0.0941
C490422	mixed gneiss/ granodiorite	Gypsum	Weak (0.150 % Cu)	Footwall	7.49	375	850	3.4	28.9	513	427	0.0586	<0.0005	0.0003	0.0266

CCME (CEQG) (freshwater aquatic life)* (mg/L)								0.000005 - 0.000338		0.001/0.0089		0.002 - 0.004	0.3	0.001 - 0.007	
Metal Mining Effluent Regulations (MMER) [†] (mg/L)												0.3		0.2	
Sample ID	Rock type	Alteration	Mineralization	Location	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium ⁷ (mg/L)	Calcium (mg/L)	Chromium ³ (mg/L)	Cobalt (mg/L)	Copper ² (mg/L)	Iron (mg/L)	Lead ⁴ (mg/L)	Lithium (mg/L)
C228435	foliated granodiorite	Unaltered	Weak (0.620 % Cu)	Hanging wall	<0.00005	<0.00005	<0.008	0.00018	4.36	<0.0002	0.00003	0.00102	0.006	0.00002	0.001
C228656	granodiorite	Chlorite/epidote	None	Hanging wall	<0.00005	<0.00005	<0.008	0.00001	25.6	<0.0002	<0.00002	0.0003	<0.005	<0.00002	0.0017
C229550	granodiorite	Hematite	None	Hanging wall	<0.00005	<0.00005	<0.008	0.00001	9.96	0.0003	<0.00002	<0.0001	0.009	0.00004	0.0007
C229587	granodiorite	Potassium feldspar	Weak (0.50 % Cu)	Hanging wall	<0.00005	<0.00005	<0.008	0.00003	3.5	<0.0002	0.00003	0.0136	0.011	<0.00002	0.0008
C490366	granodiorite	Unaltered	None	Interbed	<0.00005	<0.00005	0.016	<0.00001	439	<0.0002	<0.00002	<0.0005	<0.005	0.00003	0.0008
C490395	mixed gneiss/ granodiorite	Gypsum	Weak (0.365 % Cu)	Footwall	<0.00005	<0.00005	0.008	0.00004	595	<0.0002	<0.00002	0.0003	<0.005	<0.00002	0.0017
C490422	mixed gneiss/ granodiorite	Gypsum	Weak (0.150 % Cu)	Footwall	<0.00005	<0.00005	0.063	0.00002	199	<0.0002	<0.00002	<0.0001	<0.005	<0.00002	0.0043

Notes:

1. CEQG freshwater guidelines and criteria are based on **total** metal concentrations, except for aluminum (dissolved aluminum criterion)
 2. Freshwater aquatic life criterion for aluminum depends on pH, [Ca2+] and DOC. In this table, only the pH criterion has been applied to highlight exceedances.
 3. Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.
 4. Freshwater aquatic life criterion or guideline is hardness dependent.
 5. Maximum authorized monthly mean concentration (based on **total** concentration).
 6. < = less than the analytical detection limit.
 7. Cadmium guideline = 10⁴(0.86*log(hardness)-3.2)
- * December 2003
[†] June 6, 2002

Non-detect values assumed to be equal to one half the detection limit in calculations of average, median and standard deviation, where applicable.

Appendix A-4
Shake Flask Extraction Results
2007 Samples
Carmacks Copper Project, YT

CCME (CEQG) (freshwater aq)							0.000026	0.073	0.025 - 0.15			0.001		0.0001
Metal Mining Effluent Regulations									0.5					
Sample ID	Rock type	Alteration	Mineralization	Magnesium (mg/L)	Manganese (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel* (mg/L)	Phosphorus (mg/L)	Potassium (mg/L)	Selenium (mg/L)	Silicon (mg/L)	Silver (mg/L)	
C228435	foliated granodiorite	Unaltered	Weak (0.620 % Cu)	1.69	0.00899	<0.00005	0.101	<0.0005	<0.1	2.41	0.0032	3.47	0.00001	
C228666	granodiorite	Chlorite/epidote	None	2.44	0.0105	<0.00005	0.00586	<0.0005	<0.1	2.79	<0.0005	1.97	<0.00001	
C229560	granodiorite	Hornblende	None	0.84	0.00417	<0.00005	0.00853	<0.0005	<0.1	1.49	<0.0005	2.39	<0.00001	
C229587	granodiorite	Potassium feldspar	Weak (0.50 % Cu)	0.53	0.00514	<0.00005	0.0175	<0.0005	<0.1	2.83	0.0007	3.87	<0.00001	
C490366	granodiorite	Unaltered	None	1.01	0.0184	<0.00005	0.00045	0.0015	<0.1	4.28	0.0008	0.93	<0.00001	
C490395	mixed gneiss/ granodiorite	Gypsum	Weak (0.365 % Cu)	1.27	0.0176	<0.00005	0.0031	0.0018	<0.1	5.7	0.0011	0.92	<0.00001	
C490422	granodiorite	Gypsum	Weak (0.150 % Cu)	3.75	0.164	<0.00005	0.000711	<0.0005	<0.1	4.16	0.0009	1.35	<0.00001	

CCME (CEQG) (freshwater aq)							0.0008					0.03	
Metal Mining Effluent Regulations												0.5	
Sample ID	Rock type	Alteration	Mineralization	Sodium (mg/L)	Strontium (mg/L)	Sulphur (mg/L)	Thallium (mg/L)	Tin (mg/L)	Titanium (mg/L)	Uranium (mg/L)	Vanadium (mg/L)	Zinc (mg/L)	Zirconium (mg/L)
C228435	foliated granodiorite	Unaltered	Weak (0.620 % Cu)	10.1	0.119	1.9	<0.00005	<0.00005	<0.0005	<0.00001	0.00102	<0.0005	<0.005
C228666	granodiorite	Chlorite/epidote	None	4.53	0.153	2	<0.00005	<0.00005	<0.0005	<0.00001	0.00209	<0.0005	<0.005
C229560	granodiorite	Hornblende	None	6.96	0.0437	0.7	<0.00005	<0.00005	<0.0005	<0.00001	0.00178	<0.0005	<0.005
C229587	granodiorite	Potassium feldspar	Weak (0.50 % Cu)	4.73	0.0298	1.6	<0.00005	<0.00005	0.0009	<0.00001	0.00151	<0.0005	<0.005
C490366	granodiorite	Unaltered	None	9.62	2.01	336	<0.00005	<0.00005	0.0028	0.00004	0.00052	0.001	<0.005
C490395	mixed gneiss/ granodiorite	Gypsum	Weak (0.365 % Cu)	5.85	1.44	495	<0.00005	<0.00005	0.0037	0.00003	0.00068	<0.0005	<0.005
C490422	granodiorite	Gypsum	Weak (0.150 % Cu)	14.4	1.01	159	<0.00005	0.00006	0.0011	0.00012	0.00144	<0.0005	<0.005

- Notes:
1. CEQG freshwater guidelines and criteria are based on **total** metal concentrations, except for aluminum (dissolved aluminum criterion)
 2. Freshwater aquatic life criterion for aluminum depends on pH, [Ca²⁺] and DOC. In this table, only the pH criterion has been applied to highlight exceedances.
 3. Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.
 4. Freshwater aquatic life criterion or guideline is hardness dependant.
 5. Maximum authorized monthly mean concentration (based on **total** concentration).
 6. < = less than the analytical detection limit.
 7. Cadmium guideline = 10*(0.86*log(hardness)-3.2)
- * December 2003
** June 6, 2002
Non-detect values assumed to be equal to one half the detection limit in calculations of average, median and standard deviation, where applicable.

APPENDIX B
2006 ACCESS DATA

Appendix B-1
Trace Element Analysis Results
2006 Samples
Carmacks Copper Project, YT

Sample ID	Ag ppm	Al %	As ppm	Ba ppm	Be ppm	Bi ppm	Ca %	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe %	Hg ppm	K %	La ppm	Mg %	Mn ppm	Mo ppm
DDH 1-25-91 12'-14'	<0.2	0.84	<5	251	<0.5	<5	0.71	<1	6	84	549	2.01	<1	0.21	<10	0.49	368	<2
DDH 1-25-91 181'-183'	<0.2	0.94	<5	155	<0.5	<5	1.67	<1	5	84	28	2.06	<1	0.15	<10	0.45	350	6
DDH 1-33-91 50'-52'	<0.2	0.95	<5	212	<0.5	<5	2.19	<1	7	73	9	2.66	<1	0.08	<10	0.44	393	<2
DDH 1-33-91 150'-152'	<0.2	0.94	<5	244	<0.5	<5	0.88	<1	7	126	<1	2.37	<1	0.2	<10	0.56	291	<2
DDH 1-33-91 248'-250'	<0.2	0.89	<5	161	<0.5	<5	0.82	<1	6	141	<1	1.69	<1	0.2	<10	0.49	321	<2
DDH 1-33-91 348'-350'	<0.2	0.83	<5	119	<0.5	<5	0.62	<1	6	138	12	1.95	<1	0.11	<10	0.43	327	2
DDH 1-37-91 50'-52'	<0.2	1.01	<5	135	<0.5	<5	1.09	<1	7	104	<1	2.28	<1	0.09	<10	0.57	302	<2
DDH 1-37-91 149'-151'	<0.2	2.59	<5	135	1	<5	3.88	<1	6	70	2	2.11	<1	0.09	<10	0.51	321	<2
DDH 1-37-91 250'-252'	<0.2	0.84	<5	157	<0.5	<5	0.67	<1	6	151	581	2.07	<1	0.15	<10	0.49	396	3
DDH 1-37-91 347'-349'	<0.2	1.17	<5	223	<0.5	<5	1.16	<1	6	111	3	1.99	<1	0.17	<10	0.66	452	<2
DDH 1-53-92 50'-52'	<0.2	1.08	<5	535	0.5	<5	1.08	<1	5	88	1	1.99	<1	0.08	<10	0.43	262	<2
DDH 1-53-92 152'-154'	<0.2	0.66	<5	212	<0.5	<5	0.77	<1	5	110	5	1.59	<1	0.12	<10	0.4	206	<2
DDH 1-53-92 252'-254'	<0.2	0.35	<5	60	<0.5	<5	0.32	<1	2	126	6	0.61	<1	0.03	<10	0.1	72	2
DDH 1-53-92 352'-354'	<0.2	0.84	<5	178	<0.5	<5	1.01	<1	6	119	<1	1.83	<1	0.09	<10	0.48	264	<2
DDH 1-53-92 452'-454'	<0.2	1.19	<5	332	0.6	<5	2.21	<1	6	69	<1	2.44	<1	0.07	<10	0.77	501	<2
DDH 1-53-92 682'-684'	<0.2	0.91	<5	100	<0.5	<5	0.91	<1	6	125	<1	2.07	<1	0.09	<10	0.51	350	<2
DDH 92-1-56 34'-36'	<0.2	0.7	<5	125	<0.5	<5	0.84	<1	5	170	1	1.9	<1	0.11	<10	0.42	327	2
DDH 92-1-56 203.5'-205.5'	<0.2	1.07	<5	138	0.5	<5	0.79	<1	6	83	16	2.1	<1	0.1	<10	0.61	477	<2
DDH 92-157 139'-141'	<0.2	0.58	<5	163	<0.5	<5	0.36	<1	4	121	8	1.18	<1	0.16	<10	0.32	234	2
DDH 92-157 383'-385'	<0.2	1.27	<5	105	0.5	<5	1.23	<1	6	110	<1	2.22	<1	0.09	<10	0.57	426	2
WC-001 43'-45'	<0.2	0.81	<5	160	<0.5	<5	0.48	<1	6	124	72	2.05	<1	0.34	16	0.54	354	4
WC-001 306'-308'	<0.2	0.92	<5	218	<0.5	<5	0.93	<1	6	128	121	1.98	<1	0.15	<10	0.52	292	2
WC-006 47'-49'	<0.2	0.93	<5	267	<0.5	<5	0.91	<1	6	95	<1	2.09	<1	0.09	<10	0.52	252	<2
WC-006 312'-314'	<0.2	1.08	<5	223	0.5	<5	1.28	<1	8	129	<1	2.75	<1	0.14	<10	0.74	454	<2
DDH 90 WC-01	<0.2	0.73	<5	111	<0.5	<5	0.62	<1	4	233	181	2.06	-	0.15	-	0.4	365	8
DDH 90 WC-02	<0.2	1.36	<5	274	<0.5	<5	1.5	<1	6	200	62	2.95	-	0.34	-	0.63	500	11
DDH 90 WC-03	<0.2	1	<5	329	<0.5	<5	0.56	<1	6	263	1881	2.25	-	0.44	-	0.51	402	6

Sample ID	Na %	Ni ppm	P ppm	Pb ppm	S %	Sb ppm	Sc ppm	Sn ppm	Sr ppm	Th ppm	Ti %	Tl ppm	U ppm	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm
DDH 1-25-91 12'-14'	0.05	6	746	4	<0.01	<5	2	-	23	<5	0.03	<10	<10	39	<10	-	48	1
DDH 1-25-91 181'-183'	0.09	3	1076	<2	0.01	<5	4	-	53	<5	0.07	<10	<10	47	<10	-	34	3
DDH 1-33-91 50'-52'	0.06	4	1122	<2	0.01	<5	5	-	53	<5	0.02	<10	<10	55	<10	-	51	2
DDH 1-33-91 150'-152'	0.14	4	1006	<2	<0.01	<5	3	-	48	<5	0.14	<10	<10	60	<10	-	46	2
DDH 1-33-91 248'-250'	0.11	4	799	<2	<0.01	<5	3	-	34	<5	0.1	<10	<10	40	<10	-	29	2
DDH 1-33-91 348'-350'	0.1	5	736	<2	<0.01	5	3	-	33	<5	0.11	<10	<10	45	<10	-	34	2
DDH 1-37-91 50'-52'	0.13	3	859	<2	<0.01	5	3	-	54	<5	0.1	<10	<10	55	<10	-	36	4
DDH 1-37-91 149'-151'	0.07	3	1106	<2	<0.01	<5	5	-	96	<5	0.1	<10	<10	63	<10	-	39	3
DDH 1-37-91 250'-252'	0.13	5	934	<2	<0.01	<5	3	-	42	<5	0.1	<10	<10	47	<10	-	41	3
DDH 1-37-91 347'-349'	0.1	4	503	<2	0.01	<5	3	-	68	<5	0.08	<10	<10	43	<10	-	37	2
DDH 1-53-92 50'-52'	0.15	4	1088	<2	<0.01	<5	3	-	116	<5	0.09	<10	<10	48	<10	-	29	2
DDH 1-53-92 152'-154'	0.12	4	1150	<2	0.01	<5	2	-	44	<5	0.09	<10	<10	38	<10	-	33	2
DDH 1-53-92 252'-254'	0.1	3	251	<2	<0.01	<5	1	-	47	<5	0.03	<10	<10	13	<10	-	10	1
DDH 1-53-92 352'-354'	0.13	4	1134	<2	<0.01	<5	3	-	46	<5	0.1	<10	<10	42	<10	-	32	2
DDH 1-53-92 452'-454'	0.09	4	877	2	<0.01	<5	7	-	55	<5	0.07	<10	<10	57	<10	-	51	3
DDH 1-53-92 682'-684'	0.1	4	717	<2	<0.01	<5	3	-	51	<5	0.09	<10	<10	50	<10	-	44	2
DDH 92-1-56 34'-36'	0.08	5	691	<2	<0.01	<5	3	-	28	<5	0.09	<10	<10	40	<10	-	40	2
DDH 92-1-56 203.5'-205.5'	0.1	3	1042	<2	<0.01	<5	4	-	51	<5	0.09	<10	<10	45	<10	-	48	3
DDH 92-157 139'-141'	0.09	4	398	<2	<0.01	<5	2	-	28	<5	0.06	<10	<10	26	<10	-	23	1
DDH 92-157 383'-385'	0.07	4	743	<2	<0.01	<5	4	-	52	<5	0.09	<10	<10	45	<10	-	46	2
WC-001 43'-45'	0.06	7	839	<2	0.02	<5	3	-	24	6	0.1	11	<10	42	<10	-	34	3
WC-001 306'-308'	0.14	4	1231	<2	<0.01	<5	3	-	46	<5	0.12	<10	<10	50	<10	-	31	2
WC-006 47'-49'	0.12	4	1115	<2	<0.01	<5	3	-	59	<5	0.11	<10	<10	47	<10	-	39	2
WC-006 312'-314'	0.16	5	1495	<2	<0.01	<5	5	-	51	<5	0.16	<10	<10	70	<10	-	44	3
DDH 90 WC-01	0.11	6	758	6	-	<5	3	<10	38	-	0.11	-	-	43	<10	6	36	3
DDH 90 WC-02	0.06	8	863	6	-	<5	4	<10	50	-	0.06	-	-	53	<10	7	54	4
DDH 90 WC-03	0.13	6	821	5	-	<5	3	<10	36	-	0.14	-	-	49	<10	7	40	3

Notes:

< = less than detection limit

Non-detect values assumed to be equal to one half of the detection limit in calculations of average, median and standard deviation, where applicable.

Appendix B-2
Acid Base Accounting Results
2006 Samples
Carmacks Copper Project, YT

Sample ID	Paste pH	S(T) %	S(SO4) %	S(S ²⁻) %	AP	NP	TIC %	CaCO3 NP	Net NP	NPR	CaNPR
DDH 1-25-91 12'-14'	9.2	0.01	<0.01	0.01	0.3	16.4	0.13	10.8	16.1	54.7	36.1
DDH 1-25-91 181'-183'	9.3	0.01	<0.01	0.01	0.3	43.4	0.28	23.3	43.1	144.7	77.8
DDH 1-33-91 50'-52'	9.3	0.01	0.01	0	0	50.5	0.06	5.0	50.5	-	-
DDH 1-33-91 150'-152'	9.4	0.01	<0.01	0.01	0.3	8.3	0.02	1.7	8	27.7	5.6
DDH 1-33-91 248'-250'	10.3	0.01	<0.01	0.01	0.3	8.6	0.03	2.5	8.3	28.7	8.3
DDH 1-33-91 348'-350'	9.9	0.01	<0.01	0.01	0.3	5.4	<0.01	0.8	5.1	18.0	2.8
DDH 1-37-91 50'-52'	9.6	0.01	<0.01	0.01	0.3	10.5	0.56	46.7	10.2	35.0	155.6
DDH 1-37-91 149'-151'	9.5	0.02	<0.01	0.02	0.6	42.9	0.32	26.7	42.3	71.5	44.4
DDH 1-37-91 250'-252'	9.7	0.01	<0.01	0.01	0.3	7.9	<0.01	0.8	7.6	26.3	2.8
DDH 1-37-91 347'-349'	9.5	0.02	<0.01	0.02	0.6	19	<0.01	0.8	18.4	31.7	1.4
DDH 1-53-92 50'-52'	9.8	0.01	<0.01	0.01	0.3	9.6	<0.01	0.8	9.3	32.0	2.8
DDH 1-53-92 152'-154'	10.1	0.01	<0.01	0.01	0.3	7.1	<0.01	0.8	6.8	23.7	2.8
DDH 1-53-92 252'-254'	10	0.01	<0.01	0.01	0.3	4.9	0.01	0.8	4.6	16.3	2.8
DDH 1-53-92 352'-354'	10.4	0.01	<0.01	0.01	0.3	10.4	0.03	2.5	10.1	34.7	8.3
DDH 1-53-92 452'-454'	9.4	0.02	0.01	0	0.3	48.7	0.49	40.8	48.4	162.3	136.1
DDH 1-53-92 682'-684'	9.8	0.01	<0.01	0.01	0.3	11.4	0.07	5.8	11.1	38.0	19.4
DDH 92-1-56 34'-36'	9.6	0.01	<0.01	0.01	0.3	10.9	0.1	8.3	10.6	36.3	27.8
DDH 92-1-56 203.5'-205.5'	9.4	0.01	<0.01	0.01	0.3	7.5	<0.01	0.8	7.2	25.0	2.8
DDH 92-157 139'-141'	9.7	0.01	<0.01	0.01	0.3	4.7	<0.01	0.8	4.4	15.7	2.8
DDH 92-157 383'-385'	9.4	0.01	<0.01	0.01	0.3	18.1	0.12	10.0	17.8	60.3	33.3
WC-001 43'-45'	9.7	0.03	<0.01	0.03	0.9	7.1	<0.01	0.8	6.2	7.9	0.9
WC-001 306'-308'	9.7	0.01	<0.01	0.01	0.3	6.9	<0.01	0.8	6.6	23.0	2.8
WC-006 47'-49'	10	0.01	<0.01	0.01	0.3	6.1	<0.01	0.8	5.8	20.3	2.8
WC-006 312'-314'	9.9	0.01	<0.01	0.01	0.3	8.4	0.02	1.7	8.1	28.0	5.6
DDH 90 WC-01	9.2	<0.01	<0.01	<0.01	<0.3	5	-	-	5	33.3	-
DDH 90 WC-02	8.6	<0.01	<0.01	<0.01	<0.3	31.9	-	-	31.9	212.7	-
DDH 90 WC-03	9.6	<0.01	<0.01	<0.01	<0.3	6.3	-	-	6.3	42.0	-

Notes:

< = less than detection limit

* S(S²⁻) sulphide sulphur calculated as S(T)total sulphur - S(SO₄)sulphate sulphurWhere S(SO₄) is reported as <0.01%, it is assumed to be zero for the AP calculation.

TIC = Total inorganic carbon, used in calculation of CaNP

AP = Acid potential in kg CaCO₃ equivalent per tonne of rock. AP is determined from calculated sulphide sulphur content: S(T) - S(SO₄), assuming total conversion of sulphide to sulphate.Bulk NP = Neutralization potential in kg CaCO₃ equivalent per tonne of rock.CaNP = Carbonate mineral neutralization potential in kg CaCO₃ equivalent per tonne of rockNET NP = Net neutralization potential in kg CaCO₃ equivalent per tonne of rock. Calculated as the difference between NP and AP.

NPR = Neutralization potential ratio: NP/AP

CaNPR = Neutralization potential ratio calculated using CaNP: CaNP/AP

Non-detect values assumed to be equal to one half of the detection limit in calculations of average, median and standard deviation, where applicable.

Appendix B-3
Shake Flask Extraction Results
2006 Samples
Carmacks Copper Project, YT

CCME (CEQG) (freshwater aquatic life) ¹ (mg/L)		6.5 - 9.0										0.005 - 0.1		0.005
Metal Mining Effluent Regulations (MMER) ²⁻⁴ (mg/L)		6.0 - 9.5												0.5
Sample ID	pH s.u.	REDOX mV	Conductivity uS/cm	Acidity (pH 8.3) mg/L as CaCO3	Alkalinity mg/L as CaCO3	Hardness mg/L as CaCO3	Sulphate (mg/L)	Aluminum ⁵ (mg/L)	Antimony (mg/L)	Arsenic (mg/L)	Barium (mg/L)			
DDH 1-33-91 50-52	7.25	266	129	7.8	64.8	58	<1	0.0788	<0.00005	0.0003	0.0673			
DDH 1-25-91 181-183	7.28	292	113	7.4	60	61	<1	0.0975	0.00009	0.0002	0.0526			
DDH 1-37-91 50-52	7.28	298	117	6.5	57.6	53	<1	0.249	<0.00005	0.0004	0.0992			
DDH 92-1-56 34-36	7.34	294	122	6.7	61.7	62	<1	0.152	0.00016	0.0004	0.0567			
DDH 92-157 383-385	7.3	297	139	6.6	62.7	63	2	0.175	0.00007	0.0004	0.0539			
DDH 92-157 139-141	7.01	292	56	4.8	23.9	5.8	1	0.279	0.00025	0.0004	0.0117			
WC-001 312-314	7.09	307	68	6	32.4	29	1	0.166	0.00014	0.0003	0.0269			
DDH 1-33-91 150-152	7.27	309	98	6	48.7	40	1	0.242	<0.00005	0.0002	0.0407			
DDH 1-25-91 12-14	7.23	311	98	6.5	48.9	40	<1	0.074	0.00017	0.0005	0.102			
DDH 1-37-91 149-151	7.14	188	105	6	54.5	49	<1	0.165	0.00021	0.0003	0.0824			
DDH 1-33-91 248-250	7.06	195	85	6.5	43.3	34	<1	0.159	0.00011	0.0002	0.0265			
DDH 1-37-91 250-252	6.51	217	38	5.4	11.7	5.7	<1	0.133	0.00018	0.0004	0.00808			
DDH 1-53-91 50-52	6.52	231	98	4.5	12.1	7.0	<1	0.078	0.00012	0.0004	0.011			
WC-006 47-49	6.55	237	33	5.1	11.8	7.2	<1	0.0875	0.00026	0.0003	0.012			
DDH 1-53-92 252-254	7.05	230	64	6	30.4	18	<1	0.315	0.00015	0.001	0.0111			
DDH 1-53-92 152-154	6.9	238	55	4.4	24.6	12	2	0.521	0.00014	0.0007	0.0179			
DDH 1-33-91 348-350	6.45	253	35	6.2	10.6	8.5	2	0.0859	0.0002	0.0009	0.0738			
DDH 1-53-92 452-454	7.14	249	144	7	62.3	71	3	0.0919	0.00008	0.0002	0.28			
DDH 92-1-56 203.5-205.5	6.71	253	52	4.6	17.2	18	<1	0.0351	0.00007	0.0002	0.0289			
DDH 1-53-92 682-684	7.17	254	116	5.9	53.6	55	<1	0.183	0.00007	0.0002	0.0481			
DDH 1-37-91 347-349	7.24	250	127	7.6	61.7	55	<1	0.164	0.00007	0.0002	0.0496			
DDH 1-53-92 352-354	6.99	256	77	6.4	35.2	36	<1	0.172	0.00005	0.0002	0.152			
WC-001 43-45	6.55	288	32	4.9	11.2	8.3	<1	0.128	0.00016	0.0002	0.0121			
WC-001 306-308	6.59	276	40	4.4	12	9.9	2	0.196	0.00022	0.0001	0.0612			
DDH 90 WC-01	7.12	-	23	3.75	11.5	12	<1	0.0436	0.00009	0.0002	0.019			
DDH 90 WC-02	7.75	-	156	3.25	63.25	77	<1	0.0277	0.00005	0.0001	0.0441			
DDH 90 WC-03	7.24	-	34	3.5	18.75	18	<1	0.0352	0.00005	0.0002	0.0303			

CCME (CEQG) (freshwater aquatic life) ¹ (mg/L)		0.000003 - 0.000026										0.001/0.0089		0.002 - 0.004		0.3	0.001 - 0.007	
Metal Mining Effluent Regulations (MMER) ²⁻⁴ (mg/L)														0.3		0.2		
Sample ID	Beryllium (mg/L)	Bismuth (mg/L)	Boron (mg/L)	Cadmium ^{6,7} (mg/L)	Calcium (mg/L)	Chromium ⁸ (mg/L)	Cobalt (mg/L)	Copper ⁴ (mg/L)	Iron (mg/L)	Lead ⁴ (mg/L)	Lithium (mg/L)							
DDH 1-33-91 50-52	<0.00005	<0.00005	0.011	<0.00001	21	<0.0002	0.00003	0.0041	0.027	0.00002	0.0004							
DDH 1-25-91 181-183	<0.00005	<0.00005	0.008	0.00003	23.4	<0.0002	<0.00002	0.0056	0.02	0.00002	<0.0002							
DDH 1-37-91 50-52	<0.00005	<0.00005	0.015	<0.00001	18.6	<0.0002	0.00002	0.0053	0.092	0.00005	<0.0002							
DDH 92-1-56 34-36	<0.00005	<0.00005	<0.0008	<0.00001	19.6	<0.0002	<0.00002	0.0061	0.027	0.00016	0.0002							
DDH 92-157 383-385	<0.00005	<0.00005	<0.0008	0.00002	22.1	<0.0002	0.00012	0.0072	0.042	0.00012	0.0007							
DDH 92-157 139-141	<0.00005	<0.00005	<0.0008	0.00002	2.03	<0.0002	0.00006	0.0076	0.072	0.00004	<0.0002							
WC-001 312-314	<0.00005	<0.00005	0.008	<0.00001	10.3	<0.0002	<0.00002	0.0017	0.015	<0.00002	0.0003							
DDH 1-33-91 150-152	<0.00005	<0.00005	<0.0008	<0.00001	14.7	<0.0002	<0.00002	0.0033	0.022	0.00003	0.0004							
DDH 1-25-91 12-14	<0.00005	<0.00005	0.016	0.00001	15.5	<0.0002	<0.00002	0.0401	0.021	0.0001	0.0005							
DDH 1-37-91 149-151	<0.00005	<0.00005	0.014	<0.00001	17.8	<0.0002	0.00003	0.0145	0.059	0.00011	<0.0002							
DDH 1-33-91 248-250	<0.00005	<0.00005	<0.0008	<0.00001	11.2	<0.0002	<0.00002	0.0055	0.024	0.00004	0.0006							
DDH 1-37-91 250-252	<0.00005	<0.00005	0.012	0.00006	2.11	<0.0002	0.00015	0.125	0.078	0.0001	0.0008							
DDH 1-53-91 50-52	<0.00005	<0.00005	0.01	0.00002	2.57	<0.0002	0.00026	0.108	0.016	0.00006	<0.0002							
WC-006 47-49	<0.00005	<0.00005	<0.0008	<0.00001	2.22	0.00003	<0.00002	0.0067	0.012	0.00006	0.0003							
DDH 1-53-92 252-254	<0.00005	<0.00005	0.012	0.00002	6.67	<0.0002	0.00007	0.0078	0.012	0.00005	0.0006							
DDH 1-53-92 152-154	<0.00005	<0.00005	0.013	0.00003	4.05	0.00003	0.00015	0.0086	0.157	0.00017	0.0004							
DDH 1-33-91 348-350	<0.00005	<0.00005	0.013	0.00006	2.97	<0.0002	0.00005	0.0098	0.024	0.00003	0.0004							
DDH 1-53-92 452-454	<0.00005	<0.00005	<0.0008	0.00002	24.7	<0.0002	0.00009	0.0034	<0.005	0.00002	0.0004							
DDH 92-1-56 203.5-205.5	<0.00005	<0.00005	<0.0008	0.00007	5.94	<0.0002	<0.00002	0.0024	<0.005	<0.00002	0.0003							
DDH 1-53-92 682-684	<0.00005	<0.00005	0.011	0.00002	18.9	<0.0002	<0.00002	0.0034	<0.005	0.00002	0.0005							
DDH 1-37-91 347-349	<0.00005	<0.00005	0.02	0.00002	18.9	<0.0002	<0.00002	0.004	0.027	0.00003	0.0007							
DDH 1-53-92 352-354	<0.00005	<0.00005	<0.0008	<0.00001	13.2	<0.0002	<0.00002	0.0018	<0.005	<0.00002	0.0003							
WC-001 43-45	<0.00005	<0.00005	0.008	0.00003	2.58	<0.0002	0.00003	0.005	0.054	0.00007	0.0004							
WC-001 306-308	<0.00005	<0.00005	<0.0008	0.00001	3.36	<0.0002	<0.00002	0.0002	0.042	0.00003	0.0004							
DDH 90 WC-01	0.00005	0.00005	<0.0008	0.00001	3.98	0.00004	0.00009	0.0204	0.023	0.00009	0.0004							
DDH 90 WC-02	0.00005	0.00005	0.000008	0.00009	29.2	0.00005	0.00011	0.0032	<0.005	0.00002	0.0005							
DDH 90 WC-03	0.00005	0.00005	<0.0008	0.00003	6.14	0.00004	0.00006	0.137	0.008	0.00006	0.0006							

Notes:
 1. CEQG freshwater guidelines and criteria are based on total metal concentrations, except for aluminum (dissolved aluminum criterion)
 2. Freshwater aquatic life criterion for aluminum depends on pH, [Ca²⁺] and DOC. In this table, only the pH criterion has been applied to highlight exceedances.
 3. Freshwater aquatic life criteria for chromium depends on the valence of chromium ion. In the above table, the Cr(VI) criterion of 0.001 mg/L is shown.
 4. Freshwater aquatic life criterion or guideline is hardness dependent.
 5. Maximum authorized monthly mean concentration (based on total concentration).
 6. < = less than the analytical detection limit.
 7. Cadmium guideline = 10⁻⁴(0.86*log(hardness)-3.2)
 * December 2003
 ** June 6, 2002
 Non-detect values assumed to be equal to one half the detection limit in calculations of average, median and standard deviation, where applicable.

APPENDIX C
HUMIDITY CELL RESULTS

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 1
DDH 1-33-91 348-350'

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity (pH 4.5) mgCaCO3/L	Acidity (pH 8.3) mgCaCO3/L	Alkalinity mgCaCO3/L	Sulphate mg/L	Hardness CaCO3 mg/L	Al mg/L	Sb mg/L	As mg/L	Ba mg/L	Be mg/L	Bi mg/L	B mg/L	Cd mg/L	Ca mg/L	Cr mg/L	Co mg/L	Cu mg/L	Fe mg/L	Pb mg/L	Li mg/L
		Input	Output																						
23-Mar-07	1	750	615	6.67	35	#N/A	2.4	7.1	2	6.2	0.0694	<0.00005	0.0009	0.0052	<0.00005	<0.00005	<0.008	0.00006	2.23	<0.0002	0.00009	0.0059	0.044	0.00004	<0.0002
30-Mar-07	2	500	500	7.16	62	#N/A	2.6	21.7	4	17.9	0.0383	<0.00005	0.0006	0.0117	<0.00005	<0.00005	0.013	0.0001	6.42	<0.0002	0.00007	0.0037	0.013	0.00003	0.0004
6-Apr-07	3	500	480	6.82	42	#N/A	3.9	13.3	5																
13-Apr-07	4	500	470	7.26	29	#N/A	2.2	12.1	6	8	0.0392	<0.00005	0.0006	0.0063	<0.00005	<0.00005	0.011	0.00004	2.82	<0.0002	0.00004	0.0023	0.024	0.00003	<0.0002
20-Apr-07	5	500	450	6.65	9	#N/A	3.4	4.4	4																
27-Apr-07	6	500	440	5.87	6	#N/A	4.5	3.2	<1																
4-May-07	7	500	475	6.82	15	#N/A	2.7	5.3	1																
11-May-07	8	500	450	6.78	10	#N/A	2.1	4.0	<1	2.2	0.0177	<0.00005	0.0007	0.0034	<0.00005	<0.00005	<0.008	0.00002	0.78	<0.0002	<0.00002	0.0012	<0.005	<0.00002	<0.0002
18-May-07	9	500	430	6.80	5	#N/A	1.8	3.8	3																
25-May-07	10	500	405	7.01	12	#N/A	1.9	4.0	<1																
1-Jun-07	11	500	425	6.77	12	#N/A	1.9	4.4	<1																
8-Jun-07	12	500	420	6.76	8	#N/A	2.6	3.8	1	2.6	0.0889	<0.00005	0.0006	0.0045	<0.00005	<0.00005	<0.008	0.00001	0.88	<0.0002	0.00002	0.0016	0.03	<0.00002	<0.0002
15-Jun-07	13	500	430	6.63	8	#N/A	2.6	3.7	1																
22-Jun-07	14	500	425	7.11	10	#N/A	1.9	4.1	2																
29-Jun-07	15	500	425	6.35	7	#N/A	3.1	3.8	<1																
6-Jul-07	16	500	440	7.19	9	#N/A	3.2	4.8	<1	2.3	0.0864	<0.00005	0.0014	0.0038	<0.00005	<0.00005	<0.008	<0.00001	0.8	<0.0002	0.00002	0.0012	0.035	<0.00002	0.0002
13-Jul-07	17	500	420	6.81	7	#N/A	3.5	5.1	<1																
20-Jul-07	18	500	410	7.55	10	#N/A	3.5	6.7	<1																
27-Jul-07	19	500	450	6.57	17	#N/A	3.3	4.7	<1																
3-Aug-07	20	500	435	#N/A	19	#N/A	1.4	#N/A	1	3.2	0.096	<0.00005	0.0011	0.0044	<0.00005	<0.00005	<0.008	0.00001	1.13	<0.0002	<0.00002	0.0008	0.026	0.00004	<0.0002
10-Aug-07	21	500	450	7.45	4.0	#N/A	4.5	6.2																	

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 1
DDH 1-33-91 348-350

Date	Cycle No.	Mg mg/L	Mn mg/L	Hg ug/L	Mo mg/L	Ni mg/L	P mg/L	K mg/L	Se mg/L	Si mg/L	Ag mg/L	Na mg/L	Sr mg/L	S mg/L	Tl mg/L	Sn mg/L	Ti mg/L	U mg/L	V mg/L	Zn mg/L	Zr mg/L	Major Anions	Major Cations	Diff (%)	Diff (%)
23-Mar-07	1	0.16	0.0388	<0.05	0.0168	<0.0005	<0.1	0.375	<0.0005	1.23	0.00002	5.11	0.0112	0.9	<0.00005	<0.00005	0.0016	<0.00001	0.0022	0.0008	<0.005	0.18	0.36	0.18	32.8%
30-Mar-07	2	0.46	0.0685	<0.05	0.0286	<0.0005	<0.1	0.736	<0.0005	2.21	<0.00001	6.85	0.0306	1.4	<0.00005	0.00008	0.0006	3E-05	0.0019	<0.0005	<0.005	0.52	0.68	0.16	13.5%
6-Apr-07	3																								
13-Apr-07	4	0.22	0.0219	<0.05	0.0138	0.0012	<0.1	0.542	<0.0005	2.2	0.00001	3.93	0.0161	1	<0.00005	<0.00005	0.0007	1E-05	0.0022	0.0066	<0.005	0.37	0.35	-0.02	-2.6%
20-Apr-07	5																								
27-Apr-07	6																								
4-May-07	7																								
11-May-07	8	0.06	0.0096	<0.05	0.0054	<0.0005	<0.1	0.298	<0.0005	1.34	<0.00001	1.56	0.0047	0.4	<0.00005	0.00022	<0.0005	<0.00001	0.0023	<0.0005	<0.005	0.08	0.12	0.04	20.6%
18-May-07	9																								
25-May-07	10																								
1-Jun-07	11																								
8-Jun-07	12	0.1	0.0078	<0.05	0.0033	<0.0005	<0.1	0.295	<0.0005	1.34	<0.00001	1.44	0.0057	0.4	<0.00005	<0.00005	0.002	<0.00001	0.0023	<0.0005	<0.005	0.10	0.13	0.04	15.6%
15-Jun-07	13																								
22-Jun-07	14																								
29-Jun-07	15																								
6-Jul-07	16	0.08	0.0057	<0.05	0.0025	<0.0005	<0.1	0.29	<0.0005	1.69	<0.00001	1.1	0.0051	0.2	<0.00005	<0.00005	0.0018	<0.00001	0.0025	0.0007	<0.005	0.10	0.11	0.02	7.6%
13-Jul-07	17																								
20-Jul-07	18																								
27-Jul-07	19																								
3-Aug-07	20	0.1	0.0046	<0.05	0.0024	<0.0005	<0.1	0.414	<0.0005	2.35	<0.00001	1.29	0.0071	0.3	<0.00005	0.00016	0.0019	<0.00001	0.0042	<0.0005	<0.005	#N/A	0.14	#N/A	#N/A
10-Aug-07	21																								

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 2
DDH 1-37-91 149-151'

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity	Acidity	Alkalinity	Sulphate	Hardness CaCO3 mg/L	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg
		Input	Output			(pH 4.5) mgCaCO3/L	(pH 8.3) mgCaCO3/L				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
23-Mar-07	1	750	605	7.60	118	#N/A	2.6	41.4	3	46.3	0.287	0.0002	0.0007	0.0965	<0.00005	<0.00005	0.024	0.00004	17.4	<0.0002	0.0003	0.0326	0.298	0.00023	0.0003	0.67
30-Mar-07	2	500	490	7.96	185	#N/A	2.7	97.9	3	90.7	0.0981	0.0002	0.0008	0.18	<0.00005	<0.00005	0.017	0.00002	33.5	0.0005	8E-05	0.0093	0.061	0.00004	<0.0002	1.74
6-Apr-07	3	500	480	7.46	112	#N/A	4.6	48.7	2																	
13-Apr-07	4	500	475	7.82	101	#N/A	1.9	50.0	6	49.7	0.0897	9E-05	0.0005	0.0884	<0.00005	<0.00005	0.01	0.00002	18.5	0.0007	<0.00002	0.0033	0.03	0.00021	<0.0002	0.83
20-Apr-07	5	500	425	7.45	78	#N/A	3.6	35.7	3																	
27-Apr-07	6	500	425	7.21	75	#N/A	5.8	38.7	<1																	
4-May-07	7	500	450	7.72	81	#N/A	2.2	40.5	1																	
11-May-07	8	500	415	7.94	69	#N/A	1.4	38.0	<1	34.8	0.113	8E-05	0.0006	0.0658	<0.00005	<0.00005	<0.008	<0.00001	13	0.0003	<0.00002	0.0022	0.008	0.00003	<0.0002	0.6
18-May-07	9	500	410	7.94	67	#N/A	1.3	34.9	1																	
25-May-07	10	500	390	8.03	70	#N/A	1.0	33.7	<1																	
1-Jun-07	11	500	400	7.96	71	#N/A	1.2	33.8	<1																	
8-Jun-07	12	500	385	7.75	65	#N/A	2.1	34.4	<1	35.5	0.136	<0.00005	0.0003	0.0557	<0.00005	<0.00005	<0.008	<0.00001	13.2	<0.0002	<0.00002	0.0023	0.028	<0.00002	<0.0002	0.64
15-Jun-07	13	500	425	7.79	74	#N/A	1.8	34.8	1																	
22-Jun-07	14	500	395	7.83	74	#N/A	1.7	35.7	2																	
29-Jun-07	15	500	405	7.49	66	#N/A	3.8	36.3	<1																	
6-Jul-07	16	500	410	7.46	65	#N/A	3.9	34.0	<1	33.7	0.152	<0.00005	0.0003	0.0597	<0.00005	<0.00005	0.008	<0.00001	12.6	0.0004	<0.00002	0.0012	0.013	<0.00002	<0.0002	0.55
13-Jul-07	17	500	385	7.50	62	#N/A	3.9	36.1	<1																	
20-Jul-07	18	500	430	7.61	71	#N/A	4.6	36.9	<1																	
27-Jul-07	19	500	435	7.53	73	#N/A	3.4	33.5	<1																	
3-Aug-07	20	500	430	7.79	69	#N/A	2.5	35.4	<1	35.7	0.123	<0.00005	0.0005	0.0597	<0.00005	<0.00005	<0.008	<0.00001	13.4	0.0004	<0.00002	0.0013	0.009	0.00003	<0.0002	0.51
10-Aug-07	21	500	430	7.52	71.8	#N/A	6.2	37.7																		

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 2
DDH 1-37-91 149-151

Date	Cycle No.	Mn mg/L	Hg ug/L	Mo mg/L	Ni mg/L	P mg/L	K mg/L	Se mg/L	Si mg/L	Ag mg/L	Na mg/L	Sr mg/L	S mg/L	Ti mg/L	Sn mg/L	Ti mg/L	U mg/L	V mg/L	Zn mg/L	Zr mg/L	Major Anions	Major Cations	Diff	Diff (%)
23-Mar-07	1	0.0697	0.06	0.0128	0.0007	<0.1	0.994	<0.0005	3	<0.00001	11.1	0.0408	0.7	<0.00005	0.00006	0.0037	0.0001	0.0074	<0.0005	<0.005	0.89	1.46	0.57	24.3%
30-Mar-07	2	0.0446	<0.05	0.00649	<0.0005	<0.1	1.13	<0.0005	3.5	<0.00001	10.5	0.0875	0.3	<0.00005	<0.00005	0.0007	0.0003	0.004	<0.0005	<0.005	2.02	2.31	0.29	6.7%
6-Apr-07	3																							
13-Apr-07	4	0.0015	<0.05	0.00103	<0.0005	<0.1	0.548	<0.0005	2.95	0.00001	4.37	0.044	0.2	<0.00005	<0.00005	0.0006	8E-05	0.004	0.0023	<0.005	1.13	1.21	0.08	3.5%
20-Apr-07	5																							
27-Apr-07	6																							
4-May-07	7																							
11-May-07	8	0.0004	<0.05	0.00057	<0.0005	<0.1	0.484	0.0006	2.8	<0.00001	2.13	0.0332	0.1	<0.00005	0.00047	<0.0005	3E-05	0.0045	<0.0005	<0.005	0.76	0.82	0.06	3.5%
18-May-07	9																							
25-May-07	10																							
1-Jun-07	11																							
8-Jun-07	12	0.0013	<0.05	0.00036	<0.0005	<0.1	0.417	<0.0005	2.78	<0.00001	1.84	0.0336	0.2	<0.00005	<0.00005	0.0011	2E-05	0.0047	<0.0005	<0.005	0.69	0.82	0.13	8.6%
15-Jun-07	13																							
22-Jun-07	14																							
29-Jun-07	15																							
6-Jul-07	16	0.0008	<0.05	0.00038	<0.0005	<0.1	0.37	<0.0005	2.95	<0.00001	1.2	0.032	<0.1	<0.00005	<0.00005	<0.0005	<0.00001	0.0046	0.0012	<0.005	0.68	0.75	0.07	5.0%
13-Jul-07	17																							
20-Jul-07	18																							
27-Jul-07	19																							
3-Aug-07	20	0.0004	<0.05	0.00043	<0.0005	<0.1	0.328	<0.0005	2.72	<0.00001	1.04	0.0338	0.1	<0.00005	0.00008	<0.0005	1E-05	0.0044	<0.0005	<0.005	0.71	0.78	0.07	4.7%
10-Aug-07	21																							

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 3
DDH 1-53-92 452-454'

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity	Acidity	Alkalinity	Sulphate	Hardness CaCO3 mg/L	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg
		mgCaCO3/L	(pH 4.5)			(pH 8.3)	mgCaCO3/L				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
23-Mar-07	1	750	615	7.48	241	#N/A	2.3	47.8	9	106	0.0318	<0.00005	0.0011	0.253	<0.00005	<0.00005	<0.008	0.00002	34.8	<0.0002	0.0004	0.0086	<0.005	<0.00002	<0.0002	4.66
30-Mar-07	2	500	520	8.01	118	#N/A	1.4	56.9	5	52	0.0432	5E-05	<0.0001	0.151	<0.00005	<0.00005	<0.008	0.00003	17.1	0.0003	0.0002	0.0011	<0.005	0.00004	0.0002	2.24
6-Apr-07	3	500	475	7.52	118	#N/A	4.3	47.8	5																	
13-Apr-07	4	500	460	8.09	94	#N/A	1.1	42.8	8	43.9	0.05	<0.00005	0.0002	0.124	<0.00005	<0.00005	<0.008	<0.00001	14.7	<0.0002	3E-05	0.0013	0.005	0.00005	0.0003	1.77
20-Apr-07	5	500	440	7.64	100	#N/A	3.3	41.5	5																	
27-Apr-07	6	500	440	7.33	82	#N/A	5.2	37.4	3																	
4-May-07	7	500	475	7.79	84	#N/A	2.2	37.9	1																	
11-May-07	8	500	425	8.06	75	#N/A	1.0	38.6	1	37.3	0.069	<0.00005	0.0001	0.14	<0.00005	<0.00005	<0.008	<0.00001	12.5	<0.0002	<0.00002	0.0003	<0.005	<0.00002	<0.0002	1.51
18-May-07	9	500	410	8.07	75	#N/A	1.0	36.8	4																	
25-May-07	10	500	425	8.17	80	#N/A	0.7	34.2	1																	
1-Jun-07	11	500	425	8.09	86	#N/A	0.9	39.0	<1																	
8-Jun-07	12	500	415	7.83	75	#N/A	1.8	37.5	2	38.5	0.0768	<0.00005	0.0001	0.131	<0.00005	<0.00005	<0.008	<0.00001	12.7	<0.0002	<0.00002	0.0003	0.01	<0.00002	<0.0002	1.67
15-Jun-07	13	500	420	7.92	88	#N/A	1.6	40.1	4																	
22-Jun-07	14	500	420	8.01	86	#N/A	1.3	39.7	3																	
29-Jun-07	15	500	420	7.70	72	#N/A	2.9	37.7	<1																	
6-Jul-07	16	500	440	7.81	73	#N/A	3.2	39.6	<1	37.5	0.0979	<0.00005	0.0002	0.131	<0.00005	<0.00005	0.009	<0.00001	12.5	<0.0002	<0.00002	0.0002	0.01	<0.00002	<0.0002	1.54
13-Jul-07	17	500	405	7.59	65	#N/A	4.4	33.9	<1																	
20-Jul-07	18	500	405	7.85	79	#N/A	4.8	39.8	<1																	
27-Jul-07	19	500	440	7.68	78	#N/A	3.1	36.0	<1																	
3-Aug-07	20	500	450	7.83	73	#N/A	1.4	34.4	1	36.2	0.115	<0.00005	0.0004	0.121	<0.00005	<0.00005	<0.008	<0.00001	12.2	<0.0002	<0.00002	0.001	0.016	0.00027	<0.0002	1.4
10-Aug-07	21	500	450	7.84	75.7	#N/A	5.7	38.4																		

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 3
DDH 1-53-92 452-454

Date	Cycle No.	Mn mg/L	Hg ug/L	Mo mg/L	Ni mg/L	P mg/L	K mg/L	Se mg/L	Si mg/L	Ag mg/L	Na mg/L	Sr mg/L	S mg/L	Tl mg/L	Sn mg/L	Ti mg/L	U mg/L	V mg/L	Zn mg/L	Zr mg/L	Major Anions	Major Cations	Diff	Diff (%)
23-Mar-07	1	0.0071	<0.05	0.0052	<0.0005	<0.1	1.6	<0.0005	1.97	<0.00001	11.3	0.162	1.5	<0.00005	<0.00005	<0.0005	0.00003	0.0021	<0.0005	<0.005	1.14	2.66	1.51	39.8%
30-Mar-07	2	0.0012	<0.05	0.0111	<0.0005	<0.1	1.4	<0.0005	3.13	<0.00001	7.22	0.0872	1.9	<0.00005	<0.00005	<0.0005	0.00006	0.004	<0.0005	<0.005	1.24	1.39	0.15	5.7%
6-Apr-07	3																							
13-Apr-07	4	0.0015	<0.05	0.0048	<0.0005	<0.1	0.832	<0.0005	2.98	<0.00001	3.53	0.0668	1.5	<0.00005	<0.00005	<0.0005	0.00006	0.0051	<0.0005	<0.005	1.02	1.06	0.04	1.8%
20-Apr-07	5																							
27-Apr-07	6																							
4-May-07	7																							
11-May-07	8	0.0016	<0.05	0.0018	<0.0005	<0.1	0.877	<0.0005	2.56	<0.00001	1.62	0.0607	1	<0.00005	0.00038	<0.0005	0.00005	0.0053	<0.0005	<0.005	0.79	0.85	0.06	3.5%
18-May-07	9																							
25-May-07	10																							
1-Jun-07	11																							
8-Jun-07	12	0.0026	<0.05	0.001	<0.0005	<0.1	0.848	<0.0005	2.65	<0.00001	1.46	0.0657	1.1	<0.00005	<0.00005	<0.0005	0.00006	0.0057	<0.0005	<0.005	0.79	0.86	0.07	4.4%
15-Jun-07	13																							
22-Jun-07	14																							
29-Jun-07	15																							
6-Jul-07	16	0.0015	<0.05	0.0007	<0.0005	<0.1	0.81	<0.0005	2.86	<0.00001	0.91	0.0671	0.8	<0.00005	<0.00005	<0.0005	0.00005	0.006	<0.0005	<0.005	0.79	0.82	0.03	1.9%
13-Jul-07	17																							
20-Jul-07	18																							
27-Jul-07	19																							
3-Aug-07	20	0.0037	<0.05	0.0005	<0.0005	<0.1	0.681	<0.0005	2.55	<0.00001	0.83	0.0631	0.7	<0.00005	0.00009	0.0006	0.00004	0.0054	<0.0005	<0.005	0.69	0.79	0.10	6.9%
10-Aug-07	21																							

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 4
DDH 92-157 139-141

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity	Acidity	Alkalinity	Sulphate	Hardness CaCO3 mg/L	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg
		(pH 4.5) mgCaCO3/L	(pH 8.3) mgCaCO3/L			mgCaCO3/L	mg/L																			
23-Mar-07	1	750	595	7.36	83	#N/A	2.8	33.4	5	13.1	0.247	0.0007	0.001	0.0183	<0.00005	<0.00005	0.011	0.00005	4.9	0.0005	0.0002	0.0392	0.056	0.00036	0.0004	0.21
30-Mar-07	2	500	515	7.50	48	#N/A	2.0	25.3	<1	11.7	0.121	0.0007	0.0003	0.0177	<0.00005	<0.00005	<0.008	0.00002	4.34	<0.0002	3E-05	0.0059	0.01	0.00006	0.0004	0.21
6-Apr-07	3	500	430	6.97	29	#N/A	3.1	12.7	3																	
13-Apr-07	4	500	425	7.46	18	#N/A	1.9	10.7	4	5.7	0.123	0.0003	0.0003	0.0094	<0.00005	<0.00005	<0.008	<0.00001	2.03	<0.0002	<0.00002	0.0016	0.012	0.00003	0.0004	0.15
20-Apr-07	5	500	435	6.85	26	#N/A	3.6	12.5	3																	
27-Apr-07	6	500	245	6.29	10	#N/A	3.9	5.7	<1																	
4-May-07	7	500	400	7.05	20	#N/A	2.4	8.2	<1																	
11-May-07	8	500	365	7.19	14	#N/A	1.8	7.4	<1	4.9	0.0608	0.0002	0.0002	0.0115	<0.00005	<0.00005	<0.008	<0.00001	1.78	<0.0002	<0.00002	0.002	0.011	0.00007	<0.0002	0.11
18-May-07	9	500	360	7.16	11	#N/A	1.6	6.8	<1																	
25-May-07	10	500	360	7.23	15	#N/A	1.5	6.7	<1																	
1-Jun-07	11	500	365	7.23	17	#N/A	1.7	7.6	<1																	
8-Jun-07	12	500	365	6.94	11	#N/A	2.0	5.8	<1	4.9	0.0749	0.0001	0.0001	0.0129	<0.00005	<0.00005	<0.008	<0.00001	1.74	<0.0002	<0.00002	0.0015	0.023	0.00007	<0.0002	0.13
15-Jun-07	13	500	370	7.22	12	#N/A	1.9	6.2	1																	
22-Jun-07	14	500	360	7.25	14	#N/A	1.6	7.0	1																	
29-Jun-07	15	500	370	6.69	12	#N/A	3.0	5.2	<1																	
6-Jul-07	16	500	360	#N/A	26	#N/A	1.2	#N/A	<1	5	0.0964	0.0001	0.0002	0.0122	<0.00005	<0.00005	<0.008	<0.00001	1.83	<0.0002	<0.00002	0.0009	0.026	0.00007	0.0002	0.11
13-Jul-07	17	500	365	7.52	12	#N/A	3.2	8.5	<1																	
20-Jul-07	18	500	355	7.81	14	#N/A	3.3	9.9	<1																	
27-Jul-07	19	500	370	7.06	19	#N/A	2.7	6.4	<1																	
3-Aug-07	20	500	360	7.02	8	#N/A	1.4	6.0	<1	5.3	0.122	9E-05	0.0003	0.0151	<0.00005	<0.00005	<0.008	<0.00001	1.9	<0.0002	3E-05	0.0019	0.047	0.00021	0.0003	0.13
10-Aug-07	21	500	375	7.83	6.9	#N/A	4.2	7.8	<1																	

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 4
DDH 92-157 139-141

Date	Cycle No.	Mn mg/L	Hg ug/L	Mo mg/L	Ni mg/L	P mg/L	K mg/L	Se mg/L	Si mg/L	Ag mg/L	Na mg/L	Sr mg/L	S mg/L	Tl mg/L	Sn mg/L	Ti mg/L	U mg/L	V mg/L	Zn mg/L	Zr mg/L	Major Anions	Major Cations	Diff	Diff (%)
23-Mar-07	1	0.0349	0.05	0.0186	0.0008	<0.1	0.807	<0.0005	3.11	0.00001	14.4	0.0204	0.7	<0.00005	0.00005	0.0025	7E-05	0.0135	<0.0005	<0.005	0.77	0.94	0.16	9.6%
30-Mar-07	2	0.0428	<0.05	0.005	<0.0005	<0.1	1.11	<0.0005	2.63	<0.00001	7.09	0.0181	0.4	<0.00005	0.00007	0.0006	7E-05	0.005	<0.0005	<0.005	0.51	0.58	0.08	7.2%
6-Apr-07	3																							
13-Apr-07	4	0.0259	<0.05	0.001	<0.0005	<0.1	0.73	<0.0005	2.24	<0.00001	2.82	0.0092	0.3	<0.00005	<0.00005	0.0008	1E-05	0.0046	<0.0005	<0.005	0.30	0.27	-0.03	-5.0%
20-Apr-07	5																							
27-Apr-07	6																							
4-May-07	7																							
11-May-07	8	0.0231	<0.05	0.0004	<0.0005	<0.1	0.705	<0.0005	1.93	0.00001	0.91	0.0085	0.1	<0.00005	0.00139	0.0005	<0.00001	0.0028	0.0005	<0.005	0.15	0.16	0.02	4.9%
18-May-07	9																							
25-May-07	10																							
1-Jun-07	11																							
8-Jun-07	12	0.0248	<0.05	0.0003	<0.0005	<0.1	0.668	<0.0005	1.69	<0.00001	0.71	0.0087	0.1	<0.00005	0.0001	0.0014	<0.00001	0.0021	<0.0005	<0.005	0.12	0.15	0.04	14.2%
15-Jun-07	13																							
22-Jun-07	14																							
29-Jun-07	15																							
6-Jul-07	16	0.0213	<0.05	0.0003	<0.0005	<0.1	0.695	<0.0005	2.28	<0.00001	0.57	0.0084	<0.1	<0.00005	0.00007	0.0014	<0.00001	0.0023	0.0009	<0.005	#N/A	0.15	#N/A	#N/A
13-Jul-07	17																							
20-Jul-07	18																							
27-Jul-07	19																							
3-Aug-07	20	0.0223	<0.05	0.0003	<0.0005	<0.1	0.664	<0.0005	2.05	<0.00001	0.55	0.0091	0.1	<0.00005	0.00009	0.0017	<0.00001	0.0025	0.0015	<0.005	0.12	0.16	0.04	14.4%
10-Aug-07	21																							

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 5
WC-001 43-45'

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity	Acidity	Alkalinity	Sulphate	Hardness CaCO3 mg/L	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg
		mgCaCO3/L	mgCaCO3/L			mg/L	mg/L				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
23-Mar-07	1	750	585	6.98	45	#N/A	2.1	12.4	3	9.3	0.0482	<0.00005	0.0005	0.0062	<0.00005	<0.00005	<0.008	0.00004	2.98	<0.0002	<0.00002	0.0027	0.015	<0.00002	<0.0002	0.44
30-Mar-07	2	500	515	7.27	50	#N/A	2.1	18.0	6	14.1	0.0421	0.0002	<0.0001	0.0086	<0.00005	0.00006	<0.008	0.0001	4.59	<0.0002	<0.00002	0.0006	0.006	0.00003	<0.0002	0.64
6-Apr-07	3	500	490	6.70	37	#N/A	3.7	13.3	4																	
13-Apr-07	4	500	470	7.30	29	#N/A	2.1	13.6	6	8.4	0.0544	5E-05	0.0002	0.0062	<0.00005	<0.00005	<0.008	0.00003	2.72	<0.0002	<0.00002	0.0004	0.014	<0.00002	<0.0002	0.39
20-Apr-07	5	500	485	6.81	32	#N/A	3.3	12.8	4																	
27-Apr-07	6	500	470	6.35	19	#N/A	5.2	9.4	<1																	
4-May-07	7	500	485	6.99	26	#N/A	2.5	11.0	1																	
11-May-07	8	500	455	7.48	23	#N/A	1.5	11.7	<1	6.2	0.0836	<0.00005	<0.0001	0.0067	<0.00005	<0.00005	<0.008	0.00001	1.99	<0.0002	<0.00002	0.0004	0.021	<0.00002	<0.0002	0.29
18-May-07	9	500	455	7.20	17	#N/A	1.9	9.0	2																	
25-May-07	10	500	450	7.19	20	#N/A	1.8	8.4	<1																	
1-Jun-07	11	500	445	7.14	18	#N/A	1.9	7.5	<1																	
8-Jun-07	12	500	450	6.97	14	#N/A	2.4	6.9	<1	4.9	0.0784	<0.00005	<0.0001	0.0066	<0.00005	<0.00005	<0.008	<0.00001	1.63	<0.0002	<0.00002	0.0006	0.031	<0.00002	<0.0002	0.21
15-Jun-07	13	500	440	7.16	18	#N/A	2.4	7.2	1																	
22-Jun-07	14	500	460	7.23	19	#N/A	1.7	8.5	2																	
29-Jun-07	15	500	460	6.49	16	#N/A	4.0	4.9	<1																	
6-Jul-07	16	500	465	7.45	15	#N/A	2.9	9.6	<1	4.6	0.107	<0.00005	0.0001	0.0062	<0.00005	<0.00005	<0.008	<0.00001	1.51	<0.0002	<0.00002	0.0006	0.033	<0.00002	<0.0002	0.21
13-Jul-07	17	500	440	7.30	13	#N/A	3.8	8.5	<1																	
20-Jul-07	18	500	445	7.55	14	#N/A	4.0	8.8	<1																	
27-Jul-07	19	500	475	6.85	19	#N/A	2.8	6.4	<1																	
3-Aug-07	20	500	465	6.98	11	#N/A	1.4	6.6	<1	4.6	0.105	<0.00005	0.0003	0.006	<0.00005	<0.00005	<0.008	<0.00001	1.5	<0.0002	<0.00002	0.0016	0.027	0.00003	<0.0002	0.2
10-Aug-07	21	500	460	7.5	9.7	#N/A	5.2	8.2																		

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 5
WC-001 43-45'

Date	Cycle No.	Mn mg/L	Hg ug/L	Mo mg/L	Ni mg/L	P mg/L	K mg/L	Se mg/L	Si mg/L	Ag mg/L	Na mg/L	Sr mg/L	S mg/L	Tl mg/L	Sn mg/L	Ti mg/L	U mg/L	V mg/L	Zn mg/L	Zr mg/L	Major Anions	Major Cations	Diff	Diff (%)
23-Mar-07	1	0.0043	<0.05	0.0186	<0.0005	<0.1	1.18	0.0013	1.56	<0.00001	4.89	0.0104	1.4	<0.00005	<0.00005	0.001	<0.00001	0.0013	<0.0005	<0.005	0.31	0.43	0.12	16.4%
30-Mar-07	2	0.0075	<0.05	0.0416	<0.0005	<0.1	1.76	0.0009	2.49	0.00002	4.89	0.0157	1.8	<0.00005	0.00011	<0.0005	3E-05	0.0017	<0.0005	<0.005	0.48	0.54	0.06	5.8%
6-Apr-07	3																							
13-Apr-07	4	0.006	<0.05	0.0173	<0.0005	<0.1	1.19	<0.0005	2.66	<0.00001	2.93	0.0093	0.7	<0.00005	<0.00005	0.0008	2E-05	0.0024	<0.0005	<0.005	0.40	0.33	-0.06	-8.9%
20-Apr-07	5																							
27-Apr-07	6																							
4-May-07	7																							
11-May-07	8	0.005	<0.05	0.0068	<0.0005	<0.1	1.42	<0.0005	2.97	<0.00001	1.42	0.0077	0.3	<0.00005	0.00012	0.0015	2E-05	0.0032	0.0005	<0.005	0.23	0.23	0.00	-0.7%
18-May-07	9																							
25-May-07	10																							
1-Jun-07	11																							
8-Jun-07	12	0.006	0.16	0.0039	<0.0005	<0.1	1.17	<0.0005	2.29	<0.00001	0.84	0.0068	0.3	<0.00005	<0.00005	0.002	<0.00001	0.0019	<0.0005	<0.005	0.14	0.17	0.04	11.8%
15-Jun-07	13																							
22-Jun-07	14																							
29-Jun-07	15																							
6-Jul-07	16	0.0048	<0.05	0.0027	<0.0005	<0.1	1.27	<0.0005	3.2	<0.00001	0.66	0.0064	0.2	<0.00005	<0.00005	0.0023	<0.00001	0.0027	<0.0005	<0.005	0.19	0.17	-0.03	-7.4%
13-Jul-07	17																							
20-Jul-07	18																							
27-Jul-07	19																							
3-Aug-07	20	0.0037	<0.05	0.0022	<0.0005	<0.1	1.14	<0.0005	3.07	<0.00001	0.67	0.0062	0.2	<0.00005	0.00008	0.0018	<0.00001	0.0029	0.0006	<0.005	0.13	0.16	0.03	10.3%
10-Aug-07	21																							

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 6
WC-006 312-314'

Date	Cycle No.	Volume mL		pH	Cond. umhos/cm	Acidity	Acidity	Alkalinity	Sulphate	Hardness CaCO3 mg/L	Al	Sb	As	Ba	Be	Bi	B	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mg
		(pH 4.5) mgCaCO3/L	(pH 8.3) mgCaCO3/L			mgCaCO3/L	mg/L																			
23-Mar-07	1	750	590	7.32	59	#N/A	2.1	23.1	1	10.8	0.203	0.0003	0.0004	0.0163	<0.00005	<0.00005	<0.008	0.00001	3.84	0.0002	0.00005	0.0057	0.019	<0.00002	0.0003	0.31
30-Mar-07	2	500	520	7.72	54	#N/A	1.5	30.1	<1	16.9	0.109	0.0005	0.0004	0.0238	<0.00005	<0.00005	<0.008	<0.00001	5.89	<0.0002	<0.00002	0.0008	0.006	<0.00002	0.0004	0.53
6-Apr-07	3	500	510	7.18	62	#N/A	4.2	27.9	2																	
13-Apr-07	4	500	475	7.69	44	#N/A	1.7	26.3	4	17.6	0.0884	0.0002	0.0003	0.0248	<0.00005	<0.00005	<0.008	<0.00001	6.02	<0.0002	<0.00002	0.0005	0.008	0.00004	0.0006	0.61
20-Apr-07	5	500	440	7.01	36	#N/A	3.2	16.4	3																	
27-Apr-07	6	500	450	6.74	26	#N/A	4.7	14.9	<1																	
4-May-07	7	500	465	7.34	42	#N/A	2.5	21.4	<1																	
11-May-07	8	500	440	7.57	31	#N/A	1.6	16.1	<1	12.9	0.108	9E-05	0.0002	0.0202	<0.00005	<0.00005	<0.008	<0.00001	4.46	<0.0002	<0.00002	0.0003	<0.005	<0.00002	0.0005	0.42
18-May-07	9	500	415	7.49	27	#N/A	1.7	15.6	<1																	
25-May-07	10	500	410	7.58	32	#N/A	1.5	15.3	<1																	
1-Jun-07	11	500	425	7.76	37	#N/A	1.1	16.9	<1																	
8-Jun-07	12	500	415	7.39	24	#N/A	2.1	13.2	<1	11.1	0.161	6E-05	0.0002	0.0162	<0.00005	<0.00005	<0.008	<0.00001	3.79	<0.0002	<0.00002	0.0005	0.018	<0.00002	0.0003	0.4
15-Jun-07	13	500	440	7.53	33	#N/A	1.9	18.6	<1																	
22-Jun-07	14	500	425	7.57	33	#N/A	1.7	16.0	<1																	
29-Jun-07	15	500	430	6.91	33	#N/A	3.8	14.8	<1																	
6-Jul-07	16	500	435	7.56	32	#N/A	3.0	18.1	<1	13.7	0.191	5E-05	0.0002	0.0183	<0.00005	<0.00005	<0.008	<0.00001	4.76	<0.0002	<0.00002	0.0004	0.008	<0.00002	0.0004	0.45
13-Jul-07	17	500	430	7.67	28	#N/A	2.7	20.1	<1																	
20-Jul-07	18	500	405	7.65	31	#N/A	3.8	18.0	<1																	
27-Jul-07	19	500	445	7.24	37	#N/A	3.0	16.0	<1																	
3-Aug-07	20	500	455	7.47	28	#N/A	2.6	16.1	<1	13.3	0.208	<0.00005	0.0003	0.0173	<0.00005	<0.00005	<0.008	<0.00001	4.7	<0.0002	<0.00002	0.0026	0.005	0.00003	0.0003	0.38
10-Aug-07	21	500	445	7.61	28.5	#N/A	4.8	17.9	<1																	

Appendix C
Humidity Cell Results
Carmacks Copper Project, YT

HC 6

WC-006 312-314'

Date	Cycle No.	Mn mg/L	Hg ug/L	Mo mg/L	Ni mg/L	P mg/L	K mg/L	Se mg/L	Si mg/L	Ag mg/L	Na mg/L	Sr mg/L	S mg/L	Tl mg/L	Sn mg/L	Ti mg/L	U mg/L	V mg/L	Zn mg/L	Zr mg/L	Major Anions	Major Cations	Diff	Diff (%)
23-Mar-07	1	0.0038	<0.05	0.0044	<0.0005	<0.1	0.989	<0.0005	2.63	0.00003	8.02	0.0196	0.9	<0.00005	<0.00005	0.0018	0.00002	0.0066	<0.0005	<0.005	0.48	0.61	0.13	12.0%
30-Mar-07	2	0.0071	<0.05	0.0014	<0.0005	<0.1	1.12	<0.0005	2.38	0.00002	6.01	0.0286	0.2	<0.00005	0.00012	<0.0005	0.00003	0.0045	<0.0005	<0.005	0.60	0.64	0.04	3.0%
6-Apr-07	3																							
13-Apr-07	4	0.0066	<0.05	0.0002	<0.0005	<0.1	0.789	<0.0005	2.01	<0.00001	2.7	0.028	<0.1	<0.00005	<0.00005	0.0005	0.00002	0.0033	<0.0005	<0.005	0.61	0.50	-0.11	#####
20-Apr-07	5																							
27-Apr-07	6																							
4-May-07	7																							
11-May-07	8	0.0044	<0.05	0.0001	<0.0005	<0.1	0.906	<0.0005	1.79	<0.00001	1.04	0.0218	<0.1	<0.00005	0.00019	<0.0005	<0.00001	0.0029	<0.0005	<0.005	0.32	0.34	0.02	2.4%
18-May-07	9																							
25-May-07	10																							
1-Jun-07	11																							
8-Jun-07	12	0.0038	<0.05	6E-05	<0.0005	<0.1	0.907	<0.0005	1.78	<0.00001	0.92	0.0195	<0.1	<0.00005	0.00007	0.0014	<0.00001	0.003	<0.0005	<0.005	0.26	0.30	0.04	6.7%
15-Jun-07	13																							
22-Jun-07	14																							
29-Jun-07	15																							
6-Jul-07	16	0.003	<0.05	3E-05	<0.0005	<0.1	0.924	<0.0005	2.19	<0.00001	0.67	0.0231	<0.1	<0.00005	<0.00005	0.0006	<0.00001	0.0029	<0.0005	<0.005	0.36	0.35	-0.01	-1.8%
13-Jul-07	17																							
20-Jul-07	18																							
27-Jul-07	19																							
3-Aug-07	20	0.0023	<0.05	9E-05	<0.0005	<0.1	0.868	<0.0005	2	<0.00001	0.62	0.0217	<0.1	<0.00005	<0.00005	<0.0005	<0.00001	0.0026	0.0012	<0.005	0.32	0.34	0.02	2.4%
10-Aug-07	21																							