

LOG NO: JAN 15	RD.
ACTION:	
FILE NO:	

Diamond Drilling and Geophysical Report
 Chu Chua Property

Kamloops Mining Division
 NTS 92P/8E

Latitude: 51° 22' N Longitude: 120° 04' W

**SUB-RECORDER
 RECEIVED**
 JAN 7 1992
 M.R. # _____ \$ _____
 VANCOUVER, B.C.

Owner: Minnova Inc.
 Operator: Minnova Inc.

Claims:

CC1-11 incl.
 CH 1, CH 2, CH 4, CH 9
 Dixie #4

**GEOLOGICAL BRANCH
 ASSESSMENT REPORT**

22,039

Minnova Inc.
 Vancouver, B.C.

G. S. Wells
 November, 1991

Table of Contents

	Page
1. Introduction	1
a. Location, Access and Physiography	1
b. Mineral Rights	3
c. History	5
2. Work Done	5
3. Geology	6
4. Results	
a. Diamond Drilling	8
b. Downhole Pulse E.M.	10
5. Conclusions	10
6. Itemized Cost Statement	12
7. References	15
8. Author's Qualifications	16

List of Figures

Figure 1:	Location Map	2
Figure 2:	Claim Map	4
Figure 3:	Diamond Drill Hole Locations (1:5000)	in pocket
Figure 4:	Generalized Geology	7

Appendices

Appendix I	Diamond Drill Logs CCF63 - 70 incl.
Appendix II	PEM Technical Report and Profiles

Diamond Drilling and Geophysical Report
Chu Chua Property

1. Introduction

Minnova acquired the Chu Chua property in 1985 and is currently exploring the claims under a joint venture agreement with Pacific Cassiar, Quinterra Resources and International Vestor Resources. The property is underlain by pillow basalts of the Fennel formation which host the Chu Chua massive sulphide deposit. The mineral inventory of this zone is estimated at 2.7 million tonnes which grade 1.67% Cu, 0.31% Zn, 7.4 g/T Ag and 0.31 g/T Au. The 1991 exploration program tested the strike and down-dip extent of the Chu Chua massive sulphide horizon. The work was done during the period July 12, 1991 to October 24, 1991. Paragon Drilling did the diamond drilling and downhole pulse E.M. geophysical surveys were done by Woods Geophysical.

a. Location, Access and Physiography

The Chu Chua property is located 24 km northeast of Barriere, B.C. (Figure 1). It is readily accessible via the paved Barriere Lakes road and the North Barriere Lake and Birk Creek logging roads. A network of recent logging roads provides good access to the southern part of the property.

Topographic relief in the area is moderate with elevations ranging from 1250 to 2000 meters above sea level. The work season is generally restricted to the period between late June and mid October due to the high elevations and subsequent heavy snow pack.

At lower elevations, the area is covered by mature stands of spruce, balsam and pine but at elevations above 1800 meters the trees are stunted which is typical of subalpine and alpine environments. Logging activity is ongoing and much of the central and southern parts of the claim group has been clear-cut logged.



Little Fort

Dunn Lake

Clearwater

CHU CHUA NORTH DEPOSIT *

CHU CHUA

5

THOMPSON RIVER

North Barriere Lake

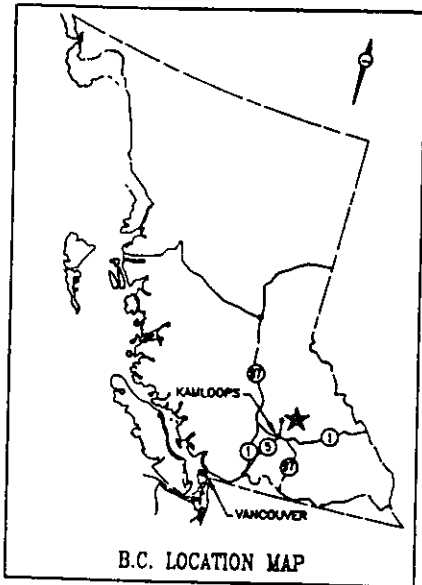
East Barriere Lake

Barriere

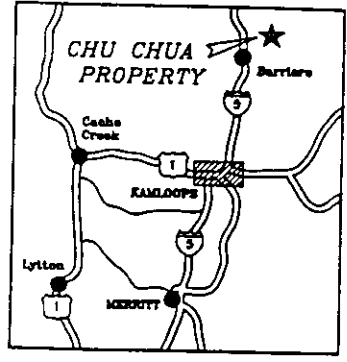
Johnson Lake

SAMATOSUM MINE

Adams Lake



B.C. LOCATION MAP



10 kilometres

MINNOVA Inc.

ADAMS/BARRIERE CHU CHUA PROPERTY
LOCATION MAP

CRH/sg

FIGURE 1

AUGUST 1990

b. Mineral Rights

The 1991 exploration program was carried out on the CC1 and CC4 claims. These claims have been included in the 91A, 91B and 91C groups which are outlined in Figure 2. The claim status of each group is as follows:

91A Group

<u>Claim</u>	<u>Units</u>	<u>Record Number</u>	<u>Month of Record</u>
CC 1	16	216779	March
CC 2	4	216797	August
CC 3	3	216798	August
CC 4	9	216805	October
CC 5	20	216809	October
CC 6	9	216810	October
CC 7	20	216811	October
CC 8	6	216806	October
Dixie #4	<u>12</u>	217701	November
Total	99 units		

91B Group

<u>Claim</u>	<u>Units</u>	<u>Record Number</u>	<u>Month of Record</u>
CC 1	16	216779	October
CC 10	20	216813	October
CC 11	20	216814	October
CH 1	20	216815	October
CH 2	20	216816	October
Total	96 units		

91C Group

<u>Claim</u>	<u>Units</u>	<u>Record Number</u>	<u>Month of Record</u>
CC 1	16	216779	October
CC 9	12	216812	October
CC 11	20	216814	October
CH 2	20	216816	October
CH 4	20	216817	October
CH 9	12	216818	October
Total	100 units		

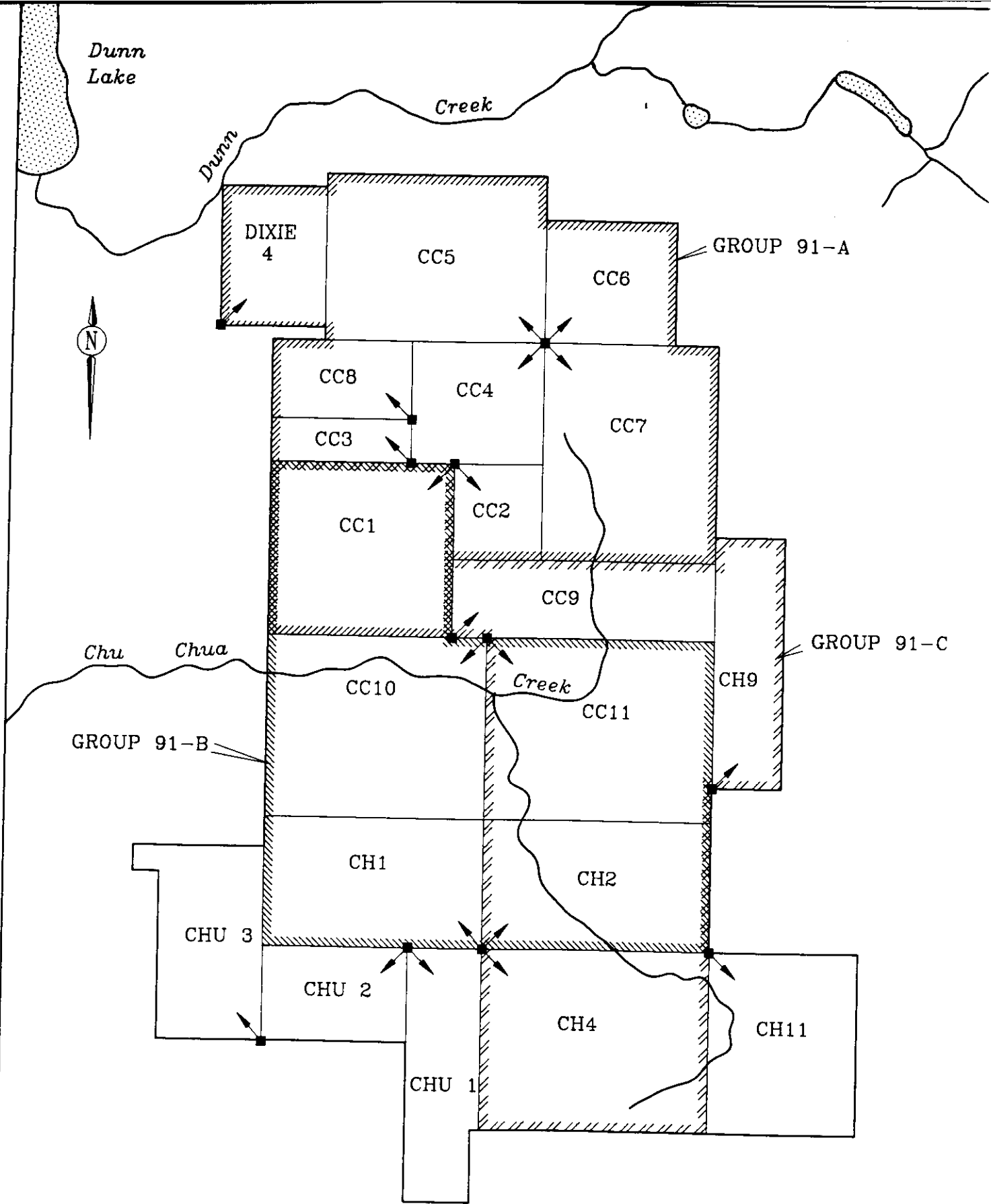


FIGURE 2
 CHU CHUA OPTION
 CLAIM CONFIGURATION

c. History

In 1978, Craigmont Mines Ltd. discovered the Chu Chua massive sulphide deposit. In 1979, a Dighem airborne EM survey was flown over the area. This was followed up by linecutting, soil geochemistry, geological mapping, VLF, magnetometer and HLEM surveys. Minnova acquired the claims in 1985 and have been systematically exploring the ground using surface surveys (geology, litho and soil geochem, MaxMin II, DEEPEM, airborne mag and EM) and diamond drilling.

2. Work Done

This report summarizes the results of an eight hole, 4240.5 meter diamond drill program and downhole pulse EM surveys. The diamond drilling tested the Chu Chua massive sulphide horizon along strike and down-dip of the known massive sulphide lens. Lithogeochemical samples were taken routinely throughout the drill holes and analyzed for major and trace elements (SiO_2 , TiO_2 , Al_2O_3 , CaO , Na_2O , K_2O , MgO , MnO_2 , Fe_2O_3 , Ba, S, Cu, Pb, Zn, Ag, Au, As) using ICP and atomic absorption techniques at Min-En Laboratories in North Vancouver. Mineralized sections were analyzed for Cu, Pb, Zn, Ag and Au using atomic absorption and/or fire assay techniques. All of the work was done on the CC 1 and CC4 claims (Figure 3). Detailed diamond drill logs are included in Appendix I. The drill core is stored at Minnova's warehouse facility in Barriere, B.C.

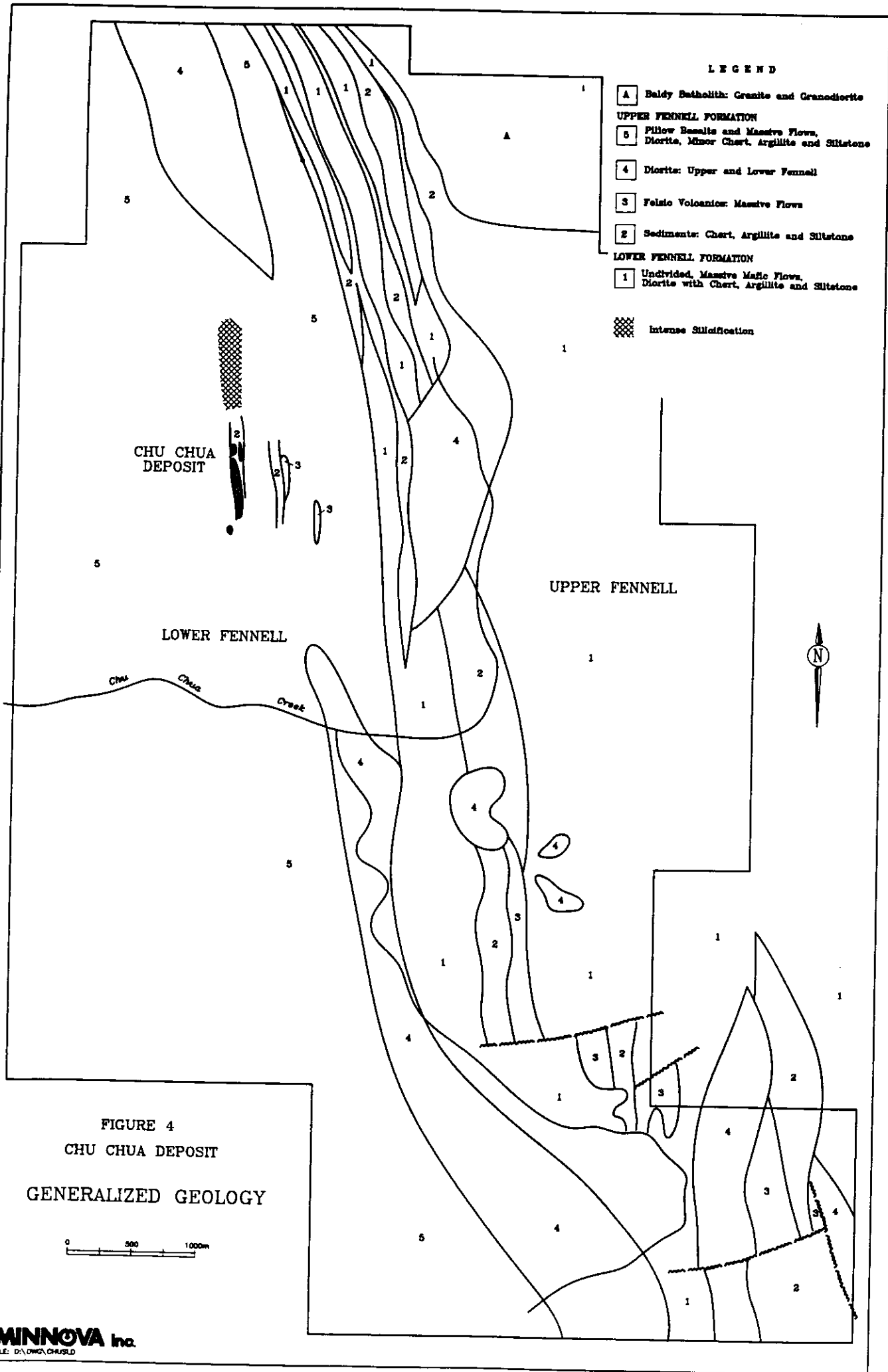
3. Geology

The Chu Chua property is underlain by rocks of the Mississippian to Permian Fennell formation (Schiarizza and Preto, 1987) (Figure 4). This formation has been subdivided into an upper and lower division. The lower Fennell forms a north-south trending belt of interbedded and thrust fault slices of massive basalt, sediments and QFP rhyolites. This sequence is exposed over a strike length of at least 30 km which extends from the Barriere River to Clearwater.

The Upper Fennell is inferred to be in fault contact with the Lower Fennell on the basis of conodont ages determined from chert beds in both divisions (Schiarizza and Preto, 1987). It consists of pillowed and massive basalt flows, diabase sills, argillite and chert. This sequence underlies most of the Chu Chua property and hosts the Chu Chua massive sulphide deposit.

The Fennell formation is intruded by the Cretaceous-aged Baldy granitic batholith which forms a prominent easterly trending mountain range to the northeast of Barriere.

Deformation in the Fennell is not intense even though units have been rotated into a vertically dipping, west-facing homocline. Schiarizza and Preto suggest that this sequence occurs on the western link of a thrust-dismembered anticline. The regional metamorphic grade is lower greenschist. Within 500 meters of the Baldy Batholith there is a hornblende hornfels contact metamorphic aureole.



4. Results

a. Diamond Drilling

Eight holes totalling 4240.5 meters tested the Chu Chua sulphide horizon along strike and down-dip of the known massive sulphide lens (Figure 3). Drill hole locations and significant results are summarized in Table 1.

Holes CCF-63, 64, 65, 66 tested the CC horizon to the north of the Mains Lens. Hole CCF-65 which is the most northerly hole, intersected a sequence of diorite dikes which truncate the Chu Chua sulphide horizon and alteration zones. Holes CCF-63, 64 and 66 intersected wide zones of silicified basalts and sulphide stringers which are interpreted as footwall alteration features. Sulphide stringer mineralization is best developed in the holes which were drilled vertically below the Chu Chua Main massive sulphide lens (ie. CCF-63, 66). Hole CCF-66 also intersected a thin pyritic exhalite which is locally enriched in copper (0.21%) and zinc (360 ppm).

Holes CCF-67 and CCF-68 tested the Chu Chua horizon at depth to the south of the Main Lens. Neither hole intersected sulphides or altered pillow basalts. It appears that the sulphide sheet associated with the Chu Chua massive sulphide is restricted to an area that occurs vertically below the Main Lens.

Hole CCF-69 was drilled down-dip of the Main Lens and a zone of pyrite-chalcopyrite stringers which occur on the southern fringe of the intense silicification noted in holes CCF-63 and 66. CCF-69 intersected a 22.45 meter wide zone of massive sulphides which is hosted in unaltered pillow basalts. This mineralization occurs 70 meters into the hanging wall of the Chu Chua horizon. Assays for the zone are given in Table 1. The high gold values are probably related to magnetite-hematite veining

Table 1. 1991 Chu Chua Drill Program

Hole #	Location	Collar Azimuth	Collar Dip	Final Depth	Results
CCF-63	103N; 97+83E	090	-58	529.1 m	379.6-438.0 silicified pillows, sulphide stringers (5-15% py, tr cp) includes 387.5-399.2: 0.12% Cu
CCF-64	106+15N; 98+56E	093	-60	346.3 m	160.6-188.7 5-15% py, cp stringers includes 185.6-188.7: 0.23% Cu over 3.1 m
CCF-65	108+00N; 98+50E	090	-69	427.3 m	CC horizon diked out
CCF-66	101+30N; 97+41E	090	-68	716.6 m	470.9-479.65 7-15% py stringers and py exhalite includes 471.7-476.0: 0.21% Cu, 360 ppm Zn over 4.3 m 483.4-489.5 py exhalite includes 486.4-487.9: 0.33% Cu, 330 ppm Zn over 1.5 m 584.7-587.5 15% py stringers
CCF-67	94+96N; 97+47E	090	-58	539.2 m	no mineralization or alteration
CCF-68	92+50N; 101+21E	270	-55	390.7 m	no mineralization or alteration
CCF-69	99+97N; 97+27E	090	-68	588.2 m	381.2-396.05 0.97% Cu, 5.4 g/t Ag, 0.84 g/t Au over 14.85 m = massive sulphides + siliceous fragments includes 381.2-385.55: 2.13% Cu, 8.4 g/t Ag, 0.82 g/T Au over 4.35 m 391.4-396.05: 0.75% Cu, 5.6 g/t Ag, 1.37 g/t Au over 4.65 m 397.95-403.65 0.75% Cu, 5.9 g/t Ag, 1.26 g/t Au over 5.7 m = massive sulphides py-cp-mt-hem
CCF-70	99+25N; 96+00E	090	-63	703.1 m	665.5-677.05 chert, magnetite-hematite-pyrite exhalite
				8 holes	4240.5 m

which occurs throughout the massive sulphide zone. Hole CCF-69 ended in patchy silicified basalts with only minor sulphides (<1% py)

Hole CCF-70 tested the down-dip and southern strike extent of the CCF-69 massive sulphide zone. It intersected an 11.55 meter zone of chert and bedded magnetite-hematite-pyrite exhalite which is tentatively correlated with the CCF-69 zone. This mineralization occurs approximately 230 meters down-dip of CCF-69 and suggests that the zone has a steep (80°) easterly dip.

b. Downhole PEM

Downhole PEM surveys were done on holes CCF-63, 64, 66, 67 and 69 by Woods Geophysical Ltd. A technical report and PEM profiles are included in Appendix II.

No anomalies were detected in holes CCF-63, 64, 66 and 67. Hole CCF-69 has a sharp in-hole response which can be correlated with the massive sulphides intersected in the hole. Directional data suggests that there is a weak off-hole response to the south of CCF-69.

5. Conclusions

An eight hole, 4240.5 meter diamond drill program was completed on the Chu Chua property during the summer and fall of 1991. These holes tested the extent of the Chu Chua horizon at depth to the north and south of previous drilling. A zone of intense silicification was identified north of the deposit and it is interpreted as a reflection of hydrothermal alteration associated with the deposition of massive sulphides. The Chu Chua deposit occurs on the southern edge of this intense silicification and the sulphide exhalite associated with this deposit appears to be restricted to an area that occurs vertically below the Main Lens.

The diamond drill program also successfully intersected a new hanging wall massive sulphide zone (CCF-69: 0.97% Cu, 0.84 g/T Au over 14.85 m and 0.75% Cu, 1.37 g/T Au over 4.65 m). This mineralization occurs at a vertical depth of 365 meters below the surface. To the south and a further 230 meters down-dip the horizon occurs as a chert and magnetite-hematite-pyrite exhalite (CCF-70). Further drilling of this zone is required to determine if it is the up-dip fringe of a large massive sulphide body

Gary Wells

6. Itemized Cost StatementsA. Claim Group 91A filed for \$92,200

-work on claims CC-4 and CC-1

1. Diamond Drilling

Contractor costs:

CCF-63	22,578.90
CCF-65	18,964.23
CCF-68	18,213.44

Salaries:

Paul Baxter 35 days @ \$300/day	10,500.00
G. S. Wells 4 days @ \$350/day	1,400.00
S. Fraser 5 days @ \$150/day	750.00

Accommodation/food:

39 man days @ \$40/day	1,560.00
------------------------	----------

Truck/gas:

35 days @ \$50/day	1,750.00
--------------------	----------

Analyses:

32 ICP Litho samples @ \$23.50	752.00
13 geochem Cu, Pb, Zn, Ag, Au @ \$15.50	201.50

Subtotal	<u>76,670.07</u>
----------	------------------

2. Downhole PEM surveys

Contractor Costs (CCF-63, 64, 66):	7700
------------------------------------	------

Subtotal	<u>84,370.07</u>
----------	------------------

Pac withdrawal	7,829.93
----------------	----------

Total	<u>92,200.00</u>
-------	------------------

B. Claim Group 91B

filed for \$92,000

-work on claim CC-1

1. Diamond Drilling

Contractor costs:

CCF-64	15,395.43
CCF-66	33,351.25
CCF-67	22,929.15

Salaries:

Paul Baxter 40 days @ \$300/day	12,000.00
G. S. Wells 5 days @ \$350/day	1,750.00
S. Fraser 6 days @ \$150/day	900.00

Accommodation/food:

45 man days @ \$40/day	1,800.00
------------------------	----------

Truck/gas:

40 days @ \$50/day	2,000.00
--------------------	----------

Analyses:

36 ICP Litho samples @ \$23.50	846.00
19 assays Cu, Pb, Zn, Ag, Au @ \$39	741.00
31 geochem Cu, Pb, Zn, Ag, Au @ \$15.50	480.50

Subtotal	91,452.33
----------	-----------

PAC withdrawl	547.67
---------------	--------

Total	\$92,000
-------	----------

C. Claim Group 91C filed for \$68,800

-work on claim CC-1

1. Diamond Drilling

Contractor costs:

CCF-69	25,500.50
CCF-70	33,342.71

Salaries:

Paul Baxter 6 days @ \$300/day	1,800.00
G. S. Wells 20 days @ \$350/day	7,000.00
R. Muzyka 18 days @ \$150/day	2,700.00

Accommodation/food:

26 man days @ \$40/day	1,040.00
------------------------	----------

Truck/gas:

26 days @ \$50/day	1,300.00
--------------------	----------

Analyses:

26 ICP Litho samples @ \$23.50	611.00
11 geochem Cu, Pb, Zn, Ag, Au @ \$15.50	170.50
19 assays Cu, Pb, Zn, Ag, Au @ \$39.00	741.00

Subtotal	<u>74,205.71</u>
----------	------------------

2. Downhole PEM surveys

Contractor costs (CCF-67, 69)	6525
-------------------------------	------

Total	<u>\$80,730.71</u>
-------	--------------------

7. References

Schiarizza, P. and Preto. V.A. (1987): Geology of the Adams Plateau-Clearwater-Vavenby Area, BCDM paper 1987-2

8. Statement of Qualifications

I, Gary S. Wells, hereby certify that:

1. I hold an Honours Bachelor of Science degree in combined geology and chemistry (1975) from Carleton University, Ottawa, Ontario and a Ph.D degree in geology (1980) from Queen's University, Kingston, Ontario.
2. I am an associate member of the Geological Association of Canada and a member of the Canadian Institute of Mining and Metallurgy.
3. I have practised my profession in exploration continuously since graduation in 1980.



Gary S. Wells

Date: November 19, 1991

Appendix I

Diamond Drill Logs: CCF 63-70 incl.

HOLE NUMBER: CCF-63

MINNOVA INC.
DRILL HOLE RECORD

IMPERIAL UNITS: METRIC UNITS: X

PROJECT NAME: CHU CHUA
PROJECT NUMBER: 616
CLAIM NUMBER: CC1
LOCATION: NTS 92 P/8

PLOTTING COORDS GRID: FIELD
NORTH: 10300.00N
EAST: 9783.00E
ELEV: 1813.00

ALTERNATE COORDS GRID:
NORTH: 0+ 0
EAST: 0+ 0
ELEV: 0.00

COLLAR DIP: -58° 0' 0"
LENGTH OF THE HOLE: 529.10m
START DEPTH: 0.00m
FINAL DEPTH: 529.10m

COLLAR GRID AZIMUTH: 90° 0' 0"

COLLAR ASTRONOMIC AZIMUTH: 90° 0' 0"

DATE STARTED: July 12, 1991
DATE COMPLETED: July 28, 1991
DATE LOGGED: 0, 0

COLLAR SURVEY: NO
MULTISHOT SURVEY: NO
RQD LOG: NO

PULSE EM SURVEY: YES
PLUGGED: NO
HOLE SIZE: NQ

CONTRACTOR: PARAGON DRILLING LTD.
CASING: 9.1m
CORE STORAGE: BARRIERE WAREHOUSE

PURPOSE: TEST THE CC HORIZON DOWN-DIP AND NORTH OF THE MAIN SULFIDE LENSES.

DIRECTIONAL DATA:

Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments	Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments
91.40	-	-56° 0'	ACID	OK		-	-	-	-	-	-
137.20	-	-58° 0'	ACID	OK		-	-	-	-	-	-
289.60	-	-58° 0'	ACID	OK		-	-	-	-	-	-
335.30	-	-57° 0'	ACID	OK		-	-	-	-	-	-
381.00	-	-56° 0'	ACID	OK		-	-	-	-	-	-
434.60	-	-55° 0'	ACID	OK		-	-	-	-	-	-
472.40	-	-53° 0'	ACID	OK		-	-	-	-	-	-
507.80	81° 0'	-52° 0'	SING.SHOT	OK	058+23 decl.	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

HOLE NUMBER: CCF-63

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
0.00 TO 1.50	«OB»					
1.50 TO 303.10	Pillowed and massive Basalt «MAFIC PILL, MASS»	<p>Medium olive green, grey/green. Fine to medium grained.</p> <p>1.5-200.0m: Large fine to medium grained pillows, occasionally with coarse grained cores. 10cm light green finer grained pillow margins and <0.5-1cm dark green pillow rims.</p> <p><0.5-3cm epidotized interpillow fine grained hyaloclastite. Locally large well preserved glass shards.</p> <p>103.5-107.1m: Pillow fragment breccia. Tightly packed angular 1-10cm pillow fragments in a fine to coarse hyaloclastite.</p> <p>194.7-201.5m: Fault zone, rubbly core but no fault gouge, poor recovery. Possible mismatches.</p> <p>200.0-243.0m: Massive basalt with patchy 1.5-5m wide flow breccia zones with <10cm and up to 20cm flow fragments in an epidotized matrix. Fragment supported.</p> <p>1-2cm wide green mafic veins with fine hornblende phenocrysts.</p> <p>232.65-232.7m and 239.6-239.8m thinly bedded interflow mafic ashes.</p> <p>243.0-303.1m: Massive to patchy pillowed basalt. Pillows not as distinct as first pillowed interval val. No color change at pillow margins, lighter green interpillow material.</p> <p>301.5-303.1m: Fine black veining storkwork.</p>		<p>Weak interpillow epidote, minor chlorite +/- epidote veinlets-some possibly cooling cracks.</p> <p>192.95-199.8m: Pale green pervasive epidote silica.</p> <p>Patchy green/grey bleaching.</p>	<0.5% interpillow diss. po.	
303.10 TO 304.40	Argillaceous Basalt, rhyolite breccia «ARG, BX»	Dark green/grey to black. Fine grained. Indistinctly fragmental to pseudofragmental, some distinct fragments of rhyolite and bleached grey/green basalt. Weakly graphitic fractures. 20cm grey black gougy milled core at lower contact.				Trace pyrite.
304.40 TO 308.50	«MAFIC ASH»	<p>Medium olive green. Fine ash.</p> <p>304.4-305.7m: Bleached basalt and rhyolite fragments.</p> <p>305.7-308.5m: Finely laminated often distorted, some massive zones-possible basalt fragments.</p> <p>BEDDING - 306.4m at.....</p>	30	Moderate bleached appearance.	{304.4-306.5} «3-5% py» Patchy 3-5% pyrite, trace cp interfragmentals and as fine pyrite ash from 306.25-306.4m.	

HOLE NUMBER: CCF-63

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 2

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
308.50 TO 379.60	«MAFIC PILL OWS»	<p>Light to medium green, green/grey, tan grey. Fine grained. Massive basalt with occasional pillows.</p> <p>308.5-314.0m: Weak layered appearance from parallel alignment of fine quartz veins.</p> <p>315.15-315.7m: Massive light olive green chert.</p> <p>Pillows becoming more common below 325m.</p> <p>344.3-347.6m, 352.3-355.4m: Red discoloration of pillows.</p> <p>357.2-379.6m: Massive to locally pillowed flow. Abundant <<1mm rose colored leucoxene? specks.</p> <p>361.5-366.3m: Pillowed or fragmented with 10-30cm wide interpillow/interfragmental massive chert.</p> <p>373.0-374.6m: Fault zone, rubbly core, minor fault gouge.</p> <p>375.5m: Graphitic fracture coatings.</p>		<p>308.5-315.9m: Moderate green/grey, tan grey bleached appearance. <0.5cm to 1cm quartz veins common with stronger bleached selvages.</p> <p>320.4-337.2m: Light grey/green bleached appearance.</p> <p>321.3-326.9m: 5-25cm quartz veins common.</p> <p>{337.2-343.4} «wk-mod sil» Weak to moderate silicification.</p> <p>{343.4-357.2} «int sil» Intense silicification. Pillow outlines still distinct. 349.5-353.0m: abundant 1-2mm wide quartz veinlets. Sharp lower contact to silicified zone.</p>		
379.60 TO 437.95	Silicified Pillow Basalt, Flow Breccia, Chert. «SIL BASALT, CHT»	<p>Light-medium green, light grey, white. Fine grained, aphanitic.</p> <p>379.6-387.2m: Green white silicified pillows. 5-10% possible zoned 1mm amygdules or possible alteration mineral as they also occur interpillow.</p> <p>387.2-402.85m: Strong fragmental/brecciated appearance with fine sulphide stockwork. Possible flow top breccia, pillow breccia, or brecciated white chert. Some fragments have possible pillow rinds.</p> <p>402.85-415.8m: Pillowed to fragmentally textured. Light grey to white silicified pillows, pillow fragments and chert with a tan sericitic interpillow/interfragmental material.</p> <p>415.8-419.7m: Dyke. mafic? Light creamy green, fine grained, massive, uniform, 1-2mm mafic? phenocrysts. Sharp upper and lower contacts.</p>		<p>{379.6-415.8} «S-1 sil» 379.6-382.8m: Strong silicification, patchy less silicified green intervals.</p> <p>382.8-387.2m: Intense silicification of mafic pillows, tan green sericite alteration of interpillow material.</p> <p>Intense silicification.</p> <p>Strongly silicified.</p>	<p>{383.9-387.2} «7-10% py» 7-10% pyrite, trace cp as diss. interpillow sulphides.</p> <p>{387.2-399.4} «10-15% py stockwk» Interfragmental matrix/stockwork.</p> <p>{399.4-415.8} «5-7% py, tr cp» Interfragmental/interpillow fine disseminated pyrite and trace cp. Locally semi-massive over 5cm widths.</p> <p>1-2%, 3-7mm brassy pyrite cubes.</p>	

HOLE NUMBER: CCF-63

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		419.7-437.95m: Very indistinctly pillowed. Distinctive feature of grey chert fragments in a fine grained grey sericitic? matrix (mafic flow) matrix supported. Locally poorly developed altered pillows. 432.0-433.3m: Grey and white chert, patchy fine black veining. Possible BEDDING at..... 437.6-437.95m: White chert and black cherty argillite.	20	{419.7-437.95} «Mod Sil» Less silicified then previous.	{432.0-433.3} «5% py, <1% cp» Disseminated and weak stringer py. Two 1cm wide massive bands of py-cp.	
437.95 TO 446.80	Mafic Flow «MAFIC MASSIVE»	Light to medium grey. Fine grained. Massive flow with occasional 40-80cm wide white chert intervals and 10cm chert fragments. Chert intervals often cut by fine black veinlets, argillite?.		Fine black silica veinlets, minor chlorite pyrite veinlets.	«3-5% py» 3-5% fine disseminated pyrite.	
446.80 TO 456.50	«CHERT»	White, light grey. Aphanitic. Moderate to strongly brecciated, patchy fine black veining, locally black cherty argillite and chert argillite fragments.		Patchy chloritic fracture coatings.	<1% py, trace cp as occasional 5mm wide py-cp stringers.	
456.50 TO 529.10	Mafic Flow «MAFIC PILL OWS,CHT»	Medium grey. Fine grained. Grey siliceous, poorly developed indistinct mafic pillows generally <1m, occasionally up to 2m. No distinctive pillow selvages. Thick interpillow white and grey chert 5-50cm wide. Fine black veining within chert. Common chert and flow fragmental breccia texture. Crudely layered appearance of mafic flow and chert. 526.1-529.1m: Fragments to layers of black cherty argillite common. Weak layering at..... END OF HOLE.	50	«mod-str sil» Moderate to strong pervasive silicification of mafic pillows. Minor chlorite associated with rare pyrite stringers.	Rare pyrite stringers with traces of cp. 485.2m: 5cm pyrite stringer 30-40% very fine disseminated pyrite. Possible interpillow exhalite.	

HOLE NUMBER: CCF-63

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 4

HOLE NUMBER: CCF-63

ASSAY SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	ASSAYS						GEOCHEMICAL						COMMENTS		
				Cu %	Pb %	Zn %	Ag g/t	Au g/t	SG g/cc	Ba %	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb		Ba ppm	
34751	383.90	385.55	1.65									82	12	33	0.5	5		
34752	385.55	387.20	1.65									70	9	21	0.5	5		
34753	387.20	388.70	1.50									1240	10	12	1.5	5	3000	
34754	388.70	390.20	1.50									1590	9	731	2.2	10	3250	
34755	390.20	391.70	1.50									411	5	90	0.2	5		
34756	391.70	393.20	1.50									2150	4	10	0.8	5		
34757	393.20	394.70	1.50									266	4	19	0.1	5		
34758	394.70	396.20	1.50									1200	7	49	0.7	5		
34759	396.20	397.70	1.50									1420	8	11	0.9	15		
34760	397.70	399.20	1.50									1600	9	15	1.1	45		
34761	399.20	400.70	1.50									84	9	8	0.3	5		
34762	432.00	433.30	1.30									1530	7	80	0.5	10		

HOLE NUMBER: CCF-63

ASSAY SHEET

PAGE: 5

HOLE NUMBER: CCF-63

GEOCHEM. SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	AL2O3 %	BAT %	CAO %	FE2O3 %	K2O %	MGO %	MNO2 %	NA2O %	P2O5 %	SiO2 %	TiO2 %	S %	TOT %	AG PPM	AS PPM	BA PPM	CU PPM	PB PPM	SB PPM	ZN PPM	AU PPB
35201	11.00	14.00	3.00	14.83	0.005	9.36	11.19	0.2	6.46	0.19	2.66	0.09	49.93	1.77	0.19	96.89	3.1	1	41	67	1	1	62	5
35202	62.20	65.20	3.00	14.87	0.005	9.52	11.62	0.16	6.4	0.21	2.94	0.08	49.24	1.77	0.22	97.04	3.3	1	34	63	1	1	65	5
35203	114.60	117.70	3.10	14.86	0.005	8.94	11.6	0.32	6.53	0.2	3.11	0.06	49.51	1.72	0.22	97.07	3.4	1	37	62	1	1	55	10
35204	166.40	169.40	3.00	15.03	0.005	10.37	11.42	0.17	6.29	0.19	1.96	0.06	49.88	1.76	0.18	97.32	2.7	1	15	59	1	1	61	5
35205	218.20	221.20	3.00	14.68	0.005	9.49	11.83	0.14	6.32	0.19	2.34	0.09	49.58	1.87	0.1	96.62	3.7	1	22	56	1	1	75	5
35206	270.70	273.70	3.00	14.44	0.005	8.98	12.59	0.28	6.71	0.2	2.95	0.09	49.1	1.86	0.09	97.31	2.8	1	77	85	1	1	67	5
35207	327.65	330.65	3.00	8.67	0.09	3.01	8.8	0.98	2.65	0.27	0.01	0.17	69.81	0.49	0.09	95.03	0.2	18	200	103	31	1	78	15
35208	352.30	355.30	3.00	8.29	0.725	2.73	3.3	1.92	1.34	0.12	0.17	0.01	76.47	0.39	0.26	95.72	0.5	18	396	33	8	1	35	10
34751	383.90	385.55	1.65	6.2	0.375	0.01	4.89	1.39	1.16	0.06	0.13	0.01	80.6	0.29	2.61	97.7	0.2	37	295	83	16	6	36	5
34755	390.20	391.70	1.50	3.57	0.37	0.01	3.49	0.76	0.13	0.01	0.01	0.01	88.27	0.15	2.45	99.2	0.2	23	284	443	6	2	103	5
35209	422.50	425.50	3.00	9.38	0.75	0.01	3.02	1.14	4.6	0.04	0.01	0.01	76.23	0.48	0.41	96.05	0.7	13	473	362	6	1	85	5
35210	453.00	456.00	3.00	3.61	0.01	0.01	5.05	0.44	1.17	0.02	0.01	0.01	85.21	0.17	2.83	98.52	0.2	22	153	303	7	1	17	15
35211	480.40	483.40	3.00	9.09	0.745	0.01	3.66	1	3.89	0.15	0.01	0.01	76.93	0.43	0.55	96.43	0.3	16	550	84	11	1	113	5
35212	517.00	520.00	3.00	4.04	0.075	0.21	3.15	0.26	2.86	0.03	0.01	0.01	85.98	0.22	0.56	97.38	0.8	23	316	900	9	1	47	5

HOLE NUMBER: CCF-63

GEOCHEM. SHEET

PAGE: 6

HOLE NUMBER: CCF-64

MINNOVA INC.
DRILL HOLE RECORD

IMPERIAL UNITS: METRIC UNITS: X

PROJECT NAME: CHU CHUA
PROJECT NUMBER: 616
CLAIM NUMBER: CC1
LOCATION: NTS 92 P/8

PLOTTING COORDS GRID: FIELD
NORTH: 10615.00M
EAST: 9856.00E
ELEV: 1825.00

ALTERNATE COORDS GRID:
NORTH: 0+ ON
EAST: 0+ OE
ELEV: 0.00

COLLAR DIP: -60° 0' 0"
LENGTH OF THE HOLE: 346.25m
START DEPTH: 0.00m
FINAL DEPTH: 346.25m

COLLAR GRID AZIMUTH: 93° 0' 0"

COLLAR ASTRONOMIC AZIMUTH: 93° 0' 0"

DATE STARTED: July 28, 1991
DATE COMPLETED: August 5, 1991
DATE LOGGED: 0, 0

COLLAR SURVEY: NO
MULTISHOT SURVEY: NO
RQD LOG: NO

PULSE EM SURVEY: YES
PLUGGED: NO
HOLE SIZE: NQ

CONTRACTOR: PARAGON DRILLING LTD
CASING: 9.1M
CORE STORAGE: BARRIERE WAREHOUSE

PURPOSE: TEST CHU CHUA HORIZON NORTH OF THE DEPOSIT AT AN ELEVATION OF 1630m. PULSE EM PROBE LOST IN HOLE.

DIRECTIONAL DATA: FISHING TOOLS LOST AT 170m.

Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments	Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments
15.20	-	-59° 0'	ACID	OK		-	-	-	-	-	
61.00	-	-59° 0'	ACID	OK		-	-	-	-	-	
121.90	-	-57° 0'	ACID	OK		-	-	-	-	-	
182.90	-	-55° 0'	ACID	OK		-	-	-	-	-	
274.30	-	-53° 0'	ACID	OK		-	-	-	-	-	
331.00	88° 0'	-51° 0'	SING.SHOT	OK	065 + 23 decl.	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	

HOLE NUMBER: CCF-64

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
0.00 TO 9.10	«OB»					Bedrock at 3m, casing driven to 9.1m.
9.10 TO 20.30	Mafic Flow «MAFIC PILL ,MASS»	Medium green. Fine to medium grained. Massive to weakly fragmented/pillowed. Interpillow/fragmental material fine grained, light green, with <1-1.5cm flow fragments. Sharp lower contact.		Fine calcite veinlets.		
20.30 TO 31.40	«CHERT»	Light green/grey. Fine grained. Weak pseudo fragmental texture. 20.3-23.7m: Possible silicified pillows with wispy interpillow/interfragmental light green material. Remainder of unit strong silicified pseudo frag. Abrupt lower contact.		Intense silicification.		Silicified basalt?, rhyolite? chert.
31.40 TO 83.90	Mafic Flow «MAFIC MASS »	Medium to dark green. Medium to coarse grained. Massive, fairly uniform throughout, patchy feldspar porphyritic. Abundant <1mm cream and rose leucoxene. Sharp lower contact at.....	70	Weak fine calcite veining. Patchy weak bleaching.	Trace coarse brassy pyrite.	
83.90 TO 201.20	Silicified Basalt, Chert «SIL BASALT ,CHT»	Light creamy grey, black. Aphanitic to fine grained. Fragmented to massive grey silicified basalt/chert with patchy very fine black silica veining. Common breccia texture of silicified basalt or chert fragments (pillows) in a bleached tan brown mafic matrix. Some of these zones contain definite pillows in a tan brown hyaloclastite. Locally graphitic. ‡83.9-89.9‡ «Chy Arg» 95.3-111.0m: Silicified pillows or chert frags. 115.4-117.6m: Zone of pillow development. ‡123.8-130.4‡ «Cht, Arg» Chert, cherty argillite. Grey chert/silicified basalt fragments in a black graphitic, argillaceous matrix. 130.0-130.4m: Black gougy graphitic argillite. 132.6-141.4m: Definite mafic flow. Light greenish tan grey, patchy pillow development with lighter tan soft interpillow material. 138.3-141.4m: Becoming fragmental with chert or sil basalt fragments in a mafic matrix. 150.1-151.2m: Fault zone, grey fault gouge with fragments of chert/silicified basalt.		«Str Sil» Strong silicification. Strong soft micaceous alteration of fragmental or interpillow matrix. Strongly silicified, weak fine black veining.	Rare 1-2mm wide pyrite stringers. 2-5% disseminated pyrite, trace cp. Local interpillow pyrite up to 10%. Pyrite very fine exhalitive.	150.1-160.5m: rubbly core, poor recovery.

HOLE NUMBER: CCF-64

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 2

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		<p>171.7-176.5m: Cherty appearance, abundant very fine black veining.</p> <p>176.5-191.6m: Silicified mafic flow, massive at top becoming pillowed with chert fragments down-hole. Locally well developed pillows.</p> <p>181.4-191.6m: Intensely silicified flow or chert, brecciated with well developed pyrite stockwork.</p> <p>191.6-201.2m: Mafic flow or ash with interpillow or interbeds of white grey chert and chert fragments.</p>		<p>‡176.5-191.6‡ «Int sil» Intense silicification.</p>	<p>‡160.6-171.5‡ «wk py stringers» Patchy 10-50cm wide zones of 0.5-2cm wide semi-massive to massive pyrite stringers. Best zone of mineralization from 169.65-170.2m. 10% pyrite as 1-2cm massive pyrite stringers.</p> <p>‡171.5-179.7‡ «5% py, stockwork» Weak interfragmental/interpillow pyrite stockwork.</p> <p>‡179.7-183.3‡ «10-15% py stockwork» 10-15% pyrite as <1-2cm wide semi massive to massive pyrite stringers.</p> <p>‡183.3-184.1‡ «50% py» 50% silicified fragments and 50% pyrite as <1-3mm rounded, rolled, pyrite grains. Suggesting exhalative origin.</p> <p>‡184.1-188.7‡ «10-15% py, <1% cp» 10-15% pyrite, <1% cp as well developed massive stringers up to 2cm wide.</p> <p>188.7-191.6m: 2-3% pyrite stringers. Below 191.6m: Trace pyrite.</p>	<p>169.65-170.2m: Strong conductor.</p> <p>Moderately conductive.</p> <p>Strong conductor.</p>
201.20 TO 241.10	«SIL BASALT ,CHT?»	<p>White, grey, black. Aphanitic to fine grained. Creamy grey chert, black coloration comes from abundant very fine black silica veinlet network and black silica patches. Black patches have both sharp and diffuse boundaries. Strong brecciated/fragmented texture (flow bx?). Locally graphitic fracture coatings. Minor zones of soft mafic material.</p> <p>223.8-229.2m: Ribbon chert and chert fragments in a green/grey mafic matrix.</p> <p>229.2-241.1m: Grey and white chert, black silica veining and patches not as abundant as previous. Weak layered appearance with softer interlayers of grey mafics.</p>		Intense silica.	<p>Patchy 2-3% pyrite, trace cp.</p> <p>‡229.6-232.4‡ «wk chl-py stringers» 1-4mm wide chlorite pyrite +/- cp stringers.</p> <p>236.73-236.85m: <2cm wide massive pyrite stringers.</p>	Brecciated & healed chert or intensely silicified mafic flow, flow breccia.

HOLE NUMBER: CCF-64

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
241.10 TO 293.10	Silicified Mafics, Chert «SIL BASALT, CHT»	Medium grey. Fine grained. Weak fairly pervasive pseudofragmented, pillowed texture. Occasional distinctive grey chert ribbons and fragments. Patchy possible pillow development, with interpillow chert. 266.6-273.5m: Abundant grey-black chert mixed with mafics. 288.2-288.5m: Dark grey fault gouge, with chert fragments, minor graphite.		«Str sil» Strong pervasive silicification, makes distinguishing between mafics and chert very difficult.	‡241.1-245.0‡ «wk chl-py-cp string» 3-5mm wide chlorite stringers with disseminated py-cp. 249.75-253.3m: <1% py, trace cp, po as minor chloritic stringers, disseminations and siliceous clots.	
293.10 TO 327.70	«CHERT»	Medium grey, black. Aphanitic. Abundant very fine black veinlets to black patches. Brecciated/fragmented appearance locally with a silicified green/grey mafic matrix. Patchy 5-10% <1mm white specks. 303.0-304.5m: Medium green silicified pillowed mafic flow. ‡314.65-318.6‡ «M Dyke» ‡322.5-324.35‡ «M Dyke» Mafic dykes? tan, beige. Patchy rose leucoxene specks. Sharp upper and lower contacts. 324.9-327.5m: Massive black silicified argillite with fine calcite veinlets. 327.7m: 20cm grey fault gouge at lower contact.		Bleached soft altered appearance.	Trace pyrite. Py-cp stringers at 309.4m, 321.9m, and 325.5m.	Chert or zone of extreme silicification.
327.70 TO 346.25	Diorite Dyke «DIORITE»	Medium green, beige. Medium to coarse grained. 327.7-330.7m: Beige discoloration, patchy weak black veinlets, fine grained. 330.7-346.25m: Medium green, patchy beige, medium to coarse grained, equigranular intergrowths of fsp and mafics. 2-4% <1mm rose colored leucoxenes massive. END OF HOLE.			Patchy <1% disseminated pyrite.	327.7-330.7m: Altered dyke margin. Pulse EM probe lost in hole, fishing tools lost btw 170 - 175m.

HOLE NUMBER: CCF-64

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 4

HOLE NUMBER: CCF-64

ASSAY SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	ASSAYS				Au g/t	SG g/cc	Ba %	GEOCHEMICAL					COMMENTS
				Cu %	Pb %	Zn %	Ag g/t				Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	
34775	125.70	126.70	1.00								313	30	123	2.2	40	
34763	128.80	129.80	1.00								115	21	63	1.2	15	
34764	169.65	170.20	0.55								7	15	12	0.8	5	
34765	173.85	174.80	0.95								8	12	7	0.6	5	
34766	179.70	180.90	1.20								9	9	8	0.6	5	
34767	180.90	182.10	1.20								8	10	3	0.5	5	
34768	182.10	183.30	1.20								9	11	8	0.6	10	
34769	183.30	184.10	0.80	.009	.03	.01	1.6	.04								
34770	184.10	185.60	1.50								287	8	12	0.7	5	
34771	185.60	187.10	1.50								1720	10	21	1.2	10	
34772	187.10	188.70	1.60								2870	18	35	1.9	10	
34773	188.70	190.20	1.50								460	10	11	0.5	5	

HOLE NUMBER: CCF-64

ASSAY SHEET

PAGE: 5

HOLE NUMBER: CCF-64

GEOCHEM. SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	AL2O3 %	BAT %	CAO %	FE2O3 %	K2O %	MGO %	MNO2 %	NA2O %	P2O5 %	SiO2 %	TiO2 %	S %	TOT %	AG PPM	AS PPM	BA PPM	CU PPM	PB PPM	SB PPM	ZN PPM	AU PPB
35213	26.20	29.20	3.00	5.7	0.08	0.71	3.4	0.86	2.8	0.03	0.01	0.01	83.44	0.33	0.04	97.38	0.5	18	299	214	8	1	24	5
35214	65.80	68.80	3.00	14.28	0.005	8.13	12.82	0.06	7.53	0.14	1.9	0.11	46.05	1.8	0.11	92.94	1.3	1	369	17	1	1	25	5
35222	102.40	105.50	3.10	10.63	0.845	0.01	2.86	1.37	5.01	0.02	0.01	0.01	74.98	0.62	0.07	96.41	0.6	18	507	12	5	1	24	5
35215	120.00	123.00	3.00	4.83	0.005	0.46	3.51	0.08	4.54	0.02	0.01	0.01	83.21	0.27	0.32	97.25	0.4	16	48	26	32	1	178	5
35216	135.00	138.00	3.00	6.46	0.735	0.48	8.65	1.32	0.79	0.02	0.09	0.01	75.54	0.34	4.84	99.27	0.2	12	350	521	7	1	31	5
35223	158.80	161.50	2.70	6.17	0.195	0.04	4.54	0.54	3.67	0.01	0.01	0.01	80.12	0.34	1.93	97.56	0.2	13	246	10	11	1	30	5
34768	182.10	183.30	1.20	3.36	0.07	0.01	10.41	0.48	1.5	0.01	0.01	0.01	75.75	0.18	7.55	99.31	0.2	11	238	10	8	1	5	10
35217	215.20	218.20	3.00	3.43	0.005	0.01	2.81	0.28	1.63	0.01	0.01	0.01	88.72	0.17	0.41	97.46	0.2	17	104	78	13	2	15	5
35218	250.20	253.20	3.00	8.8	0.095	0.04	5.42	0.78	3.45	0.03	0.05	0.01	77.1	0.52	0.65	96.95	0.2	22	234	321	8	1	30	5
35219	289.00	292.00	3.00	6.94	0.24	0.67	2.39	0.64	3.55	0.05	0.1	0.01	81.82	0.35	0.09	96.84	0.6	31	248	251	9	1	66	5

HOLE NUMBER: CCF-64

GEOCHEM. SHEET

PAGE: 6

HOLE NUMBER: CCF-65

MINNOVA INC.
DRILL HOLE RECORD

IMPERIAL UNITS: METRIC UNITS: X

PROJECT NAME: CHU CHUA
PROJECT NUMBER: 616
CLAIM NUMBER: CC4
LOCATION: CHU CHUA MOUNTAIN

PLOTTING COORDS GRID: FIELD
NORTH: 10800.00N
EAST: 9850.00E
ELEV: 1811.00

ALTERNATE COORDS GRID:
NORTH: 108+ 0N
EAST: 98+50E
ELEV: 1811.00

COLLAR DIP: -69° 0' 0"
LENGTH OF THE HOLE: 427.30m
START DEPTH: 0.00m
FINAL DEPTH: 427.30m

COLLAR GRID AZIMUTH: 90° 0' 0"

COLLAR ASTRONOMIC AZIMUTH: 90° 0' 0"

DATE STARTED: August 6, 1991
DATE COMPLETED: August 14, 1991
DATE LOGGED: 0, 0

COLLAR SURVEY: NO
MULTISHOT SURVEY: NO
RQD LOG: NO

PULSE EM SURVEY: NO
PLUGGED: NO
HOLE SIZE: NO

CONTRACTOR: PARAGON DRILLING LTD.
CASING: 16.5M
CORE STORAGE: BARRIERE WAREHOUSE

PURPOSE: TEST CHU CHUA HORIZON 600M NORTH OF THE DEPOSIT AT AN ELEVATION OF 1500M.

DIRECTIONAL DATA:

Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments	Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments
30.50	-	-68° 0'	ACID	OK		-	-	-	-	-	
91.40	-	-66° 0'	ACID	OK		-	-	-	-	-	
152.40	-	-67° 0'	ACID	OK		-	-	-	-	-	
213.40	-	-66° 0'	ACID	OK		-	-	-	-	-	
274.30	-	-64° 0'	ACID	OK		-	-	-	-	-	
335.30	-	-63° 0'	ACID	OK		-	-	-	-	-	
411.50	-	-63° 0'	ACID	OK		-	-	-	-	-	
421.20	93° 0'	-64° 0'	SING.SHOT	OK	070 + 23 DEGREES.	-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	

HOLE NUMBER: CCF-65

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
113.20 TO 125.40	«MAFIC PILLOWS» MAFIC FLOW PILLOWS	Light grey. Fine to medium grained. Massive to weakly pillowed downhole with darker green chloritic interpillow hyaloclastite. 124.2-124.8m: Fault zone, grey fault gouge. Lower contact in rubble.		«Mod chl» Interpillow chlorite.	Trace pyrite.	
125.40 TO 130.70	«CHERT»	Light grey. Fine grained. Massive to weakly brecciated, rubbly, poor core recovery.			«2-3% py stockwork» 2-3% and locally 5% pyrite as fine stockwork.	
130.70 TO 137.70	«M DYKE» MAFIC DYKE	Medium. Fine grained. Massive, rare chert fragments, weak brecciated texture at top of unit. Sharp lower contact <10 degrees to core axis.		Soft, not as altered in appearance as previous mafic flow. Fine calcite veinlets throughout.		
137.70 TO 141.10	«CHERT»	Light grey. Fine grained. Massive to weakly brecciated with fine calcite gashes. Rubbly core, poor recovery.				
141.10 TO 232.10	«M DYKE» MAFIC DYKE	Medium green. Fine grained, patchy coarser equigranular, patchy feldspar porphyrite. Occasional <10cm screens of ash and hyaloclastite? Locally 5-7% leucoxene. 181.1-220.8m: Coarse feldspar/hornblende equigranular texture, patchy hornblende porphyritic.		Weak pervasive calcite and fine calcite veinlets. Patchy beige bleaching. 153.8-155.3m: Quartz vein and bleached mafic flow. 167.75-181.1m: Core becomes mottled with darker green patches and irregular veining networks.	Pyritic fracture coatings. Locally 1-2% disseminated po. 155.3-158.05m: 1-2% disseminated py-po. 167.0-168.6m: 1-2% disseminated po.	Coarse grained dyke core.
232.10 TO 269.25	«SIL BASALT, CHT» SILICIFIED MAFICS, CHERT	Light grey, green/grey, and black. Fine grained. Massive to indistinctly fragmented grey strongly silicified mafics. Patchy fine black silica veining and black patchy discoloration. Some zones of more cherty appearance - interflow/interpillow chert?. Chalky color to these zones. Occasional <10-30cm zones of 2-3%. 1mm rounded zoned spots = amygdules or radiolaria in cherts? Patchy strong brecciation. 256.8m: Argillaceous, graphitic. ‡256.8-260.9‡ «M dyke» Mafic dyke. Medium grey, fine grained, massive, weakly feldspar phyruc at lower contact. 260.9-269.25m: Fine black veining more pervasive. Sharp lower contact at.....	50	«Str sil» Strongly silicified. 258.55-258.75m: White quartz vein.	Trace disseminated pyrite. <1-1% disseminated po. Traces of galena and pyrite. 260.9-261.95m: <1-1% fracture controlled pyrite and chalcopyrite.	Characteristics of black discoloration: -occurs as fine black veining network. -patches with diffuse edges. -thick intervals that are brecciated or fragmental with light grey stockwork. -black veining and discoloration is an alteration feature associated with silicification or is being over printed by silicification.

HOLE NUMBER: CCF-65

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 3

HOLE NUMBER: CCF-65

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
269.25 TO 390.40	«M DYKE» MAFIC DYKE	Medium green. Massive, fine to medium grained patchy <20cm coarser grained feldspar rich intervals. 2-5% <1mm leucoxene. 306.6m: Becoming coarser grained often hornblende porphyritic, patchy equigranular coarse intergrowths of feldspar and hornblende. 374.6-390.4m: Multiple intrusive episodes numerous chilled margins.		Weak calcite. Quartz veining. 303.9-306.6m: Moderate bleaching grey beige coloration.	Locally 1-2% disseminated po, rare quartz-calcite veins containing diss. grains of py and cp.	303.6-304.2m: Rubbly core, poor recovery.
390.40 TO 397.80	«SIL BASALT» SILICIFIED MAFIC FLOW	Mottled dark and medium grey. Fine grained. Massive, abundant fine dark grey-black veinlets and diffuse patches. Unit cut by numerous fine grained mafic dykes.		«Str sil» Strong silicification.	«<1% py-cp stringers» Occasional <5mm chloritic pyrite - chalcopyrite stringers.	
397.80 TO 427.30	«M DYKE» MAFIC DYKE	Medium green. Fine to medium grained with patchy coarser grained equigranular feldspar-hornblende. Multiple intrusive episodes with brecciation along fine grained dyke margins. END OF HOLE.		Minor quartz-calcite veining.	Trace po, locally 2-3% po. Trace cp.	

HOLE NUMBER: CCF-65

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 4

HOLE NUMBER: CCF-65

ASSAY SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	ASSAYS							GEOCHEMICAL						COMMENTS
				Cu %	Pb %	Zn %	Ag g/t	Au g/t	SG g/cc	Ba %	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	Ba ppm	
34774	258.40	258.80	0.40									58	400	48	1.5	2	

HOLE NUMBER: CCF-65

GEOCHEM. SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	AL2O3 %	BAT %	CAO %	FE2O3 %	K2O %	MGO %	MNO2 %	NA2O %	P2O5 %	SiO2 %	TiO2 %	S %	TOT %	AG PPM	AS PPM	BA PPM	CU PPM	PB PPM	SB PPM	ZN PPM	AU PPB
35220	23.20	26.20	3.00	10.7	0.955	1.47	3.27	1.65	2.59	0.02	0.93	0.01	73.38	0.63	0.17	95.77	0.4	23	547	21	17	1	13	5
35221	65.80	68.80	3.00	14.02	0.005	7.38	12.93	0.06	10.16	0.2	1.26	0.09	45.91	1.85	0.25	94.11	1.7	1	166	69	2	1	84	5
35224	105.50	108.50	3.00	5.77	0.005	0.58	2.34	0.19	2.14	0.02	1.53	0.01	83.84	0.35	0.16	96.92	0.4	21	107	5	18	1	9	5
35225	120.70	123.40	2.70	17.61	1.17	4.41	6.07	0.93	11.29	0.08	1.22	0.17	43.85	2.05	0.11	88.97	0.9	1	626	7	3	1	34	10
35226	168.90	172.20	3.30	15.3	0.005	8.62	10.85	0.11	4.22	0.19	3.08	0.1	49.77	1.82	0.18	94.23	2.5	1	98	21	12	1	31	5
35227	211.80	214.00	2.20	13.8	0.005	10.73	11.34	0.14	6.11	0.18	1.78	0.05	46.57	1.73	0.12	92.55	2.6	1	237	8	4	1	24	20
35228	242.60	245.70	3.10	4.01	0.005	0.78	1.91	0.33	2.47	0.03	0.26	0.01	87.3	0.24	0.11	97.44	0.6	23	159	4	23	1	10	5
35229	309.70	312.70	3.00	15.69	0.005	8.29	10.09	0.1	5.13	0.15	3.69	0.08	49.6	1.75	0.13	94.69	2.7	1	363	10	4	1	9	5
35230	364.50	367.50	3.00	15.71	0.005	8.57	11.07	0.09	6.57	0.21	2.95	0.05	48.76	1.55	0.27	95.8	2.4	1	76	185	5	1	33	10
35231	395.60	397.80	2.20	6.65	0.005	1.54	4.2	0.17	2.98	0.06	1.73	0.01	79.73	0.28	0.08	97.41	0.5	27	30	272	32	1	41	5

HOLE NUMBER: CCF-65

GEOCHEM. SHEET

PAGE: 6

HOLE NUMBER: CCF-66

MINNOVA INC.
DRILL HOLE RECORD

DATE: 27-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
0.00 TO 6.70	«OB»					Rubby bedrock on surface, cased to 6.7m.
6.70 TO 166.20	Mafic Flow «MAFIC MASS ,PILL»	Medium green/grey. Fine to coarse grained. 6.7-10.5m: Medium grained massive mafic flow. 10.5-39.0m: Pillowed mafic flow 1-2m fine grained pillows with up to 5cm wide bleached light green margins and <5mm wide dark green pillow rims. 2-3mm to 2-3cm wide cherty and epidotized interpillow material, locally coarse grained shardy hyaloclastite & pillow fragments. Larger pillows fine-medium grained cores. 39-84.1m: Pillow outlines less common, medium to coarse grained massive flows. 84.1-163.6m: Pillowed mafic flow. Patchy mottled maroon & green pillow margins 2-4cm and commonly to 10cm interpillow hyaloclastite, creamy green chert/epidote and up to 2cm pillow fragments. Medium grained pillow cores, finer grained towards margin. Sharp but irregular lower contact.		66.2-69.8m: moderate 1-2cm wide calcite-quartz veining.	<1-2% disseminated interpillow po. Occasionally 1-2% interpillow po.	
166.20 TO 267.70	«M DYKE» FLOW?	Medium green. Medium to coarse grained. Equigranular to porphyritic with 20-30% mafic (pyroxene) phenocrysts in a lighter green groundmass. 1-2% leucoxene specks, massive. Sharp lower contact.		Minor epidote and calcite veinlets.		Possible thick massive mafic flow?.
267.70 TO 274.70	WEAKLY PILLOWED MAFIC FLOW «MAFIC PILL OWS»	Medium green. Fine grained. Faint pillow outlines marked by <1-1cm light green interpillow material. Pillows poorly developed, pillow rims not distinctive as in previous flows. 274.0-274.7m: FAULT ZONE at..... Milled gougy sheared core.	10	Minor calcite & fine epidote veinlets.		
274.70 TO 281.60	«M DYKE, FLOW?»	Medium green. Medium grained. Massive, equigranular. Same as previous dyke. Lower contact in rubble.				
281.60 TO 534.60	MAFIC FLOW PILLOWED & MASSIVE	Medium green. 281.6-364.2m: Fine grained pillows with <5mm-1cm dark green pillow margins and <1-5cm lighter green epidotized interpillow hyaloclastite. Patchy maroon/green mottled texture near pillow margins. Pillow cores locally coarse grained equigranular			Trace interpillow disseminated po.	281.6-321.0m: Rubby core recovery.

HOLE NUMBER: CCF-66

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 2

HOLE NUMBER: CCF-66

MINNOVA INC.
DRILL HOLE RECORD

DATE: 27-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		<p>with appearance similar to mafic dykes. 364.2-380.8m: Massive mafic flow. 364.2-365.0m: Gradual increase in grain size to become coarse grained, equigranular. Same appearance as units previously logged as dyke. 380.8-446.5m: Pillowed mafic flow. Interpillow epidotized hyaloclastite. 446.5-465.1m: Pillowed flow and flow breccia, light green chert with <1-5cm flow fragments as interpillow/breccia matrix. 465.1-466.2m: Light green massive to weakly bedded (distorted) chert. 466.2-467.8m: «Flt» Fault zone. Milled green gougy core with fragments of mafic flow, pyrite, pyritic chert. Interpillow py and hyaloclastite bedding. @ 471.1m: @ 472.7m: @ 474.0m: @ 474.7m:</p> <p>472.95-473.3m and 476.5-479.3m light to medium grey interpillow pyritic chert.</p> <p>475.7m: 7cm pyritic fault gouge @.....</p> <p>530.4-531.1m: Light grey, strongly silicified fragments in a chloritic matrix. Fragment of silicified mafic from next unit.</p>	<p>07 25 07 33</p> <p>50</p>	<p>470.9-483.4m: Bleached lighter green altered appearance.</p> <p>514-528m: Calcite weak to moderately pervasive. Bleached medium grey/green below 525.9m. 530.4-534.6m: Stronger stringery chlorite, stronger bleaching.</p>	<p>Trace interpillow po, cp.</p> <p>448.5-449.6m: Hematitic interpillow material.</p> <p>470.9-479.65m: «Interpillow py exh» 10-15% fine py as pyrite rich interpillow laminations mixed with fine hyaloclastite. Locally 25-30% disseminated py.</p> <p>471.7-472.95m: 25-30% fine disseminated pyrite. Chert intervals - pyrite occurs as 2mm-1.5cm stringery laminations.</p> <p>479.65-483.4m: <1% py.</p> <p>483.4-496.6m: «Interpillow py exh» 5-10% py locally <1% cp as semi-massive distorted (pinch and swell) py rich siliceous laminations. Laminations generally <10 degrees to core axis.</p>	<p>Leucoxene.</p> <p>Locally weak conductively over <10cm interpillow interpillow intervals.</p> <p>Increasing alteration downhole, lower contact marked by sharp increase in silicification.</p>

HOLE NUMBER: CCF-66

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 3

HOLE NUMBER: CCF-66

MINNOVA INC.
DRILL HOLE RECORD

DATE: 27-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
534.60 TO 716.60	Silicified Mafic Flow «SIL BASALT »	<p>Light to medium grey. Fine grained. Poorly defined pillow outlines, possible brecciated flows. Strong bleaching and silicification overprint. Some silicification possible interflow chert. Some zones of definite pillow outlines with strongly sericitized interpillow material.</p> <p>566.3-567.2m: Mafic dyke. Light grey, massive, <1% relict feldspar phenocrysts. Similar appearance as dyke in hole CCF-63.</p> <p>Below 576.4m: Well defined pillow outlines, grey/white siliceous pillows and tan grey/brown sericitic interpillow material. Local breccia texture over <50cm widths with chloritic matrix.</p> <p>630.0-666.7m: Tan grey colour, strong altered appearance but not as silicified as previous.</p> <p>678.5-716.6m: Grey/white mafic pillows and dark grey/green, and patchy tan altered interpillow material.</p>		<p>‡534.6-576.4‡ «Str - I Sil» Strong to intense silicification and bleaching. Weak chlorite as occasional 1-3mm wide stringers (possible interpillow alteration in places). Patchy strongly sericitized interpillow material, locally strongly chloritic. Rare fine black veinlets.</p> <p>‡576.4-630.4‡ «Str Sil-Ser-Chl» Strong grey white silicification of pillows & strong sericite and chlorite alteration of interpillow material.</p> <p>‡630.4-678.5‡ «Str Ser, Mod Sil» Strong tan beige sericite alteration, less pervasive patchy silicification of pillows increasing from 666.7-678.5m.</p> <p>‡678.5-716.6‡ «Int Sil, Str Chl» Intense grey/white silicification of pillows and strong chlorite +/- sericite alteration of interpillow material. Patchy silicification appearance from preferential silicification of pillow and preferential chlorite of interpillow material.</p>	<p>Patchy 2-4% disseminated and weak stringery py. Over 10cm widths.</p> <p>1-2% py.</p> <p>‡584.7-587.15‡ «15% Py String» 15% fine brassy py as up to 5cm wide stringers and lesser disseminations. 586.4-587.15m: Fine stringers and 10% very fine disseminated pyrite.</p> <p>‡587.15-590.1‡ «3% Py» 3% fine pyrite stringers.</p> <p>‡592.9-595.2‡ «1-2% Py» 1-2% interpillow pyrite.</p> <p>‡627.9-630.0‡ «2-4% Py» 2-4% interpillow disseminated and stringer pyrite.</p> <p>686.0-702.47m: 2-3% interpillow disseminated and stringer pyrite. Locally 5% pyrite.</p> <p>‡702.43-703.0‡ «10-12% Py» 10-12% disseminated & stringer pyrite.</p> <p>‡703.0-710.9‡ «3-5% Py» 3-5% pyrite stringers & disseminations within interpillow material.</p>	554.2-572.0m: Rubbly core recovery.

HOLE NUMBER: CCF-66

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 4

HOLE NUMBER: CCF-66

MINNOVA INC.
DRILL HOLE RECORD

DATE: 27-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		END OF HOLE.				

HOLE NUMBER: CCF-66

ASSAY SHEET

DATE: 27-November-1991

Sample	From (m)	To (m)	Length (m)	ASSAYS							GEOCHEMICAL						COMMENTS
				Cu %	Pb %	Zn %	Ag g/t	Au g/t	SG g/cc	Ba %	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	Ba ppm	
34776	470.90	471.70	0.80								547	21	202	2.7	20		
34777	471.70	472.95	1.25								1730	35	319	1.7	20		
34778	472.95	474.50	1.55								2260	20	235	2.5	10		
34779	474.50	476.00	1.50								2250	29	522	0.8			
34780	476.00	477.50	1.50								375	16	103	0.4	10		
34781	477.50	478.60	1.10								36	10	71	1.2	5		
34782	478.60	479.65	1.05								175	17	111	1.2	5		
34783	483.40	484.90	1.50								553	31	229	2.1	20		
34784	484.90	486.40	1.50								573	28	282	2.3	10		
34785	486.40	487.90	1.50								3250	26	330	3.0	10		
34786	487.90	489.50	1.60								923	37	313	2.4	5		
34790	489.50	491.00	1.50								641	13	242	0.1	2		
34791	491.00	492.50	1.50								778	5	249	0.8	1		
34792	492.50	494.00	1.50								761	2	268	1.4	2		
34793	494.00	495.50	1.50								153	8	584	1.1	4		
34794	495.50	496.60	1.10								238	14	306	1.3	1		
34787	584.70	586.00	1.30								30	29	19	1.8	5		
34788	586.00	587.15	1.15								17	16	10	0.9	10		
34789	702.43	703.00	0.57								34	12	8	1.0	10		

HOLE NUMBER: CCF-66

ASSAY SHEET

PAGE: 6

HOLE NUMBER: CCF-66

GEOCHEM. SHEET

DATE: 27-November-1991

Sample	From (m)	To (m)	Length (m)	AL2O3 %	BAT %	CAO %	FE2O3 %	K2O %	MGO %	MNO2 %	NA2O %	P2O5 %	SI02 %	TIO2 %	S %	TOT %	AG PPM	AS PPM	BA PPM	CU PPM	PB PPM	SB PPM	ZN PPM	AU PPB
35232	14.00	17.00	3.00	14.19	0.005	9.12	11.02	0.16	6.22	0.2	3.11	0.1	50.06	1.65	0.3	96.12	2.5	1	4	115	14	1	52	5
35233	63.00	66.00	3.00	14.71	0.005	10.01	11.57	0.15	6.38	0.2	1.97	0.11	48.4	1.8	0.23	95.52	2.9	1	5	103	9	1	59	5
35234	117.70	120.70	3.00	14.48	0.005	9.98	11.19	0.23	6.22	0.2	3.03	0.09	49.28	1.7	0.26	96.66	4.4	1	5	67	11	1	48	5
35235	172.00	175.00	3.00	14.69	0.005	9.07	11.56	0.38	6.47	0.2	2.75	0.11	48.87	1.84	0.26	96.19	2.9	1	8	73	13	1	57	5
35236	224.00	227.00	3.00	15.14	0.005	9.46	10.73	0.2	7.05	0.18	2.82	0.09	48.25	1.63	0.21	95.77	2.8	1	6	66	12	1	52	5
35237	270.00	273.00	3.00	14.6	0.005	8.71	11.21	0.11	6.53	0.19	3.74	0.12	48.93	1.76	0.3	96.2	3.9	1	14	70	7	1	51	5
35238	322.00	325.00	3.00	14.82	0.005	9.6	11.07	0.16	6.35	0.19	2.57	0.09	49.71	1.74	0.21	96.5	3	1	139	65	11	1	52	10
35239	374.00	377.00	3.00	14.29	0.005	9.97	11.07	0.32	6.7	0.2	2.11	0.09	48.22	1.64	0.29	94.91	2.4	1	26	65	13	1	58	5
35240	425.50	428.50	3.00	14.61	0.005	9.37	11.13	0.21	6.62	0.2	2.96	0.1	49.59	1.72	0.19	96.7	2.8	1	23	67	17	1	56	5
34779	474.50	476.00	1.50	12.32	0.415	4.63	14.44	0.65	6.38	0.2	0.47	0.08	50.48	1.03	4.82	95.91	0.3	1	79	2217	23	1	489	5
35241	511.00	514.00	3.00	14.51	0.005	9.21	11.93	0.05	6.74	0.23	2.81	0.14	48.53	1.96	0.15	96.25	3.9	1	152	81	9	1	53	5
35242	544.40	547.40	3.00	6.29	0.385	0.01	2.66	0.89	2.92	0.02	0.01	0.01	83.56	0.31	0.12	97.14	0.2	13	277	9	9	1	33	80
35243	591.00	594.00	3.00	6.1	0.005	0.01	3.52	0.12	5.36	0.02	0.01	0.01	79.22	0.29	0.66	95.29	0.2	13	49	6	13	1	37	5
35244	642.00	645.00	3.00	7.65	0.5	0.01	2.14	0.89	2.76	0.01	0.02	0.01	82.56	0.48	0.17	97.2	0.3	15	347	8	12	1	35	5
35245	684.60	687.60	3.00	8.39	0.095	0.01	4.26	0.34	6.18	0.01	0.01	0.01	74.97	0.48	1.16	95.89	0.1	1	219	9	3	1	23	5

HOLE NUMBER: CCF-66

GEOCHEM. SHEET

PAGE: 7

HOLE NUMBER: CCF-67

MINNOVA INC.
DRILL HOLE RECORD

IMPERIAL UNITS: METRIC UNITS: X

PROJECT NAME: CHU CHUA
PROJECT NUMBER: 616
CLAIM NUMBER: CC1
LOCATION: CHU CHUA MOUNTAIN

PLOTTING COORDS GRID: CC
NORTH: 9496.00N
EAST: 9747.00E
ELEV: 1690.00

ALTERNATE COORDS GRID: FIELD
NORTH: 94+96E
EAST: 97+31E
ELEV: 1690.00

COLLAR DIP: -58°30' 0"
LENGTH OF THE HOLE: 539.20m
START DEPTH: 0.00m
FINAL DEPTH: 539.20m

COLLAR GRID AZIMUTH: 90° 0' 0"

COLLAR ASTRONOMIC AZIMUTH: 90° 0' 0"

DATE STARTED: September 3, 1991
DATE COMPLETED: September 13, 1991
DATE LOGGED: 0, 0

COLLAR SURVEY: NO
MULTISHOT SURVEY: NO
RQD LOG: NO

PULSE EM SURVEY: NO
PLUGGED: NO
HOLE SIZE: NQ

CONTRACTOR: PARAGON DRILLING LTD.
CASING: 10.7M
CORE STORAGE: BARRIERE WAREHOUSE

PURPOSE: TEST THE CC HORIZON SOUTH OF THE DEPOSIT AT AN ELEVATION OF 1300M.

DIRECTIONAL DATA:

Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments	Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments
21.30	-	-58° 0'	ACID	OK		-	-	-	-	-	
61.00	-	-58° 0'	ACID	OK		-	-	-	-	-	
121.90	-	-57° 0'	ACID	OK		-	-	-	-	-	
182.90	-	-57° 0'	ACID	OK		-	-	-	-	-	
243.80	-	-56° 0'	ACID	OK		-	-	-	-	-	
304.80	-	-56° 0'	ACID	OK		-	-	-	-	-	
365.80	-	-55° 0'	ACID	OK		-	-	-	-	-	
426.70	-	-55° 0'	ACID	OK		-	-	-	-	-	
487.70	-	-53° 0'	ACID	OK		-	-	-	-	-	
267.30	92° 0'	-56° 0'	SING.SHOT	OK		-	-	-	-	-	
517.20	104° 0'	-53° 0'	SING.SHOT	OK		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
0.00 TO 10.70	«OB»					
10.70 TO 539.20	«MAFIC PILLOWS»	<p>Medium green-grey. Fine grained <1-2m pillows often with a weak to moderately developed very fine black veining network. Occasional coarse grained pillow cores in larger pillows. Light green bleaching towards pillow margins. 1cm dark green granular (devitrification) pillow rims. <5cm + occasionally to 15cm interpillow material composed of a mix of creamy white chert and medium green coarse glassy flow detritus and glassy shards - Hyaloclastite. Locally massive over 5-10m widths 34.3-39.3m. Increasing black veinlets, black weakly siliceous & calcareous argillaceous? interpillow material.</p> <p>Black veining network stops at 102.4m.</p> <p>138.2-160.0m: Interpillow hyaloclastite olive green-epidotized, mixed with minor green chert.</p> <p>173.35-173.8m: Flow breccia, pillow fragments.</p> <p>173.8-185.0m: Weakly pillowed to massive, coarse grained mafic flow.</p> <p>198.0-227.0m: Patchy 7-10m wide intervals of coarse grained massive flow with minor pillow development.</p> <p>227.0-275.2m: 10-40cm wide zones of mottled maroon grey and green at pillow margins.</p> <p>248.7-256.1m: Occasional 20-30cm wide zones of interpillow pillow fragment breccia.</p> <p>301.0-302.9m: Pillow fragment breccia.</p>		<p>Patchy weak calcite veinlets associated with black veinlets. Weak epidote alteration within interpillow material.</p> <p>74.6-95.7m: 50-10cm wide brecciated zones with black siliceous material (basalt) fragments mixed with a highly calcareous matrix. Occasionally looks like alteration within hyaloclastite but pillow rims are absent. Other locations appears as a thicker black veining often associated with calcite, whitish green mafic flow fragments.</p> <p>134.4-179.5m: Weak fine calcite +/- quartz veinlets.</p>	Traces of fine disseminated po common.	
					347.0-390.8m: <1-1% disseminated in-	

HOLE NUMBER: CCF-67

GEOCHEM. SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	AL2O3 %	BAT %	CAO %	FE2O3 %	K2O %	MGO %	MNO2 %	NA2O %	P2O5 %	SI02 %	TIO2 %	S %	TOT %	AG PPM	AS PPM	BA PPM	CU PPM	PB PPM	SB PPM	ZN PPM	AU PPB
35246	13.70	16.70	3.00	14.49	0.005	9.72	10.91	0.23	6.03	0.19	2.58	0.09	49.71	1.7	0.19	95.85	1	1	2	58	7	1	55	5
35247	63.10	66.10	3.00	13.68	0.005	8.77	11.79	0.09	9.03	0.2	2.36	0.1	46.01	1.61	0.21	93.85	0.9	1	1	78	8	1	64	10
35248	112.00	115.00	3.00	14.38	0.005	9.04	11.22	0.16	6.21	0.19	3.24	0.09	48.83	1.72	0.33	95.42	1.8	1	1	70	8	1	57	5
35249	163.70	166.70	3.00	14.15	0.005	8.95	11.25	0.1	6.17	0.19	3.1	0.1	48.23	1.74	0.37	94.34	2.2	1	1	74	5	1	62	10
35250	212.50	215.50	3.00	14.68	0.005	8.88	11.6	0.2	6.42	0.2	2.49	0.09	48.44	1.77	0.28	95.07	2.3	1	1	65	2	1	59	5
35251	264.30	267.30	3.00	14.54	0.005	9.9	11.25	0.28	6.43	0.19	2.27	0.09	48.08	1.66	0.34	95.02	2.4	1	4	62	3	1	51	5
35252	313.00	316.00	3.00	12.25	0.005	8.18	11.85	0.21	9.43	0.2	0.77	0.07	45.14	1.49	0.23	89.81	1.4	23	4	69	1	2	60	5
35253	368.00	371.00	3.00	14.9	0.005	8.86	11.84	0.24	6.55	0.2	3.16	0.09	49.18	1.8	0.25	97.08	2.5	1	9	71	5	1	57	15
35254	416.70	419.70	3.00	13.82	0.005	9.32	10.46	0.22	6.03	0.19	3.37	0.08	48.23	1.57	0.25	93.52	2.6	1	11	76	94	1	78	45
35255	468.00	471.00	3.00	14.81	0.005	8.98	11.37	0.28	6.61	0.19	2.71	0.09	48.78	1.75	0.23	95.8	2.6	1	13	80	61	1	82	15

HOLE NUMBER: CCF-67

GEOCHEM. SHEET

PAGE: 5

MINNOVA INC.
 DRILL HOLE RECORD

HOLE NUMBER: CCF-68

IMPERIAL UNITS:

METRIC UNITS: X

PROJECT NAME: CHU CHUA
 PROJECT NUMBER: 616
 CLAIM NUMBER: CC1
 LOCATION: CHU CHUA MOUNTAIN

PLOTTING COORDS GRID: FIELD
 NORTH: 9250.00N
 EAST: 10121.00E
 ELEV: 1695.00

ALTERNATE COORDS GRID: FIELD
 NORTH: 92+50N
 EAST: 101+21E
 ELEV: 1695.00

COLLAR DIP: -55° 0' 0"
 LENGTH OF THE HOLE: 390.75m
 START DEPTH: 0.00m
 FINAL DEPTH: 390.75m

COLLAR GRID AZIMUTH: 270° 0' 0"

COLLAR ASTRONOMIC AZIMUTH: 270° 0' 0"

DATE STARTED: September 13, 1991
 DATE COMPLETED: September 21, 1991
 DATE LOGGED: 0, 0

COLLAR SURVEY: NO
 MULTISHOT SURVEY: NO
 RGD LOG: NO

PULSE EM SURVEY: YES
 PLUGGED: NO
 HOLE SIZE: NQ

CONTRACTOR: PARAGON DRILLING LTD.
 CASING: 28.0m
 CORE STORAGE: BARRIERE WAREHOUSE

PURPOSE: TEST THE CC HORIZON SOUTH OF THE DEPOSIT AT AN ELEVATION OF 1480m.

DIRECTIONAL DATA:

Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments	Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments
29.60	-	-55° 0'	ACID	OK		-	-	-	-	-	
61.00	-	-55° 0'	ACID	OK		-	-	-	-	-	
121.90	-	-56° 0'	ACID	OK		-	-	-	-	-	
185.00	-	-56° 0'	ACID	OK		-	-	-	-	-	
243.80	-	-56° 0'	ACID	OK		-	-	-	-	-	
304.80	-	-57° 0'	ACID	OK		-	-	-	-	-	
390.75	-	-57° 0'	ACID	OK		-	-	-	-	-	
361.80	267° 0'	-57° 30'	SING. SHOT	OK		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	

HOLE NUMBER: CCF-68

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
0.00 TO 28.00	OVERBURDEN «OB»					Casing, no core recovered.
28.00 TO 316.65	PILLOWED & MASSIVE MAFIC FLOWS «MAFIC PILLOWS»	<p>Medium green-grey, fine to coarse grained. Large - up to 5m mafic pillows with coarse grained leucoxene bearing pillow cores, fine grained pillow margins and <1cm dark green pillow rims. Narrow, <3cm wide light to medium green inter-pillow hyaloclastite, usually <1cm.</p> <p>47.2: Fault Zone, 20cm brown oxidized clay gouge and quartz veining.</p> <p>68.3 - 170.05: Poor pillow development, large coarse grained pillows to massive coarse grained flows with minor finer grained intervals and interflow hyaloclastite. Leucoxene phyrlic, locally feldspar porphyritic.</p> <p>146.05 - 147.9 feldspars up to 3-5mm.</p> <p>179.4 - 181.2 «FLT» Fault Zone. Milled ground texture, minor fault gouge. Gougy slip planes @.....180.75 180.8 181.1</p> <p>181.2 - 225.0: Fine grained mafic flows, weak pillow development, locally weak fragmented texture.</p> <p>214.0 - 215.5: Brecciated fragmented texture, tectonic in origin.</p> <p>225.0 - 252.0: Pillows smaller and more abundant.</p> <p>252.0 - 266.8: Occasional pillow development, abundant fine creamy grey to dark grey irregular wormy calcareous network, best developed from 252.2 - 261.4.</p>	<p>15 23 20</p>	<p>170.05 - 179.4: Beige siliceous veining with finer black veining within.</p> <p>weak creamy siliceous veining and weak calcite veinlets.</p>	<p>Trace interpillow disseminated pyrite and pyrrhotite.</p> <p>Trace disseminated pyrite and pyrrhotit mainly interflow/interpillow.</p>	

HOLE NUMBER: CCF-68

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		270.4 - 273.4: Fault Zone: Weak brecciated texture, fairly common clay coated breakage surfaces parallel to core axis. 316.65 sharp lower contact, 5 - 10cm light green chert layer at lower contact.				
316.65 TO 366.60	MASSIVE MAFIC FLOW «MASS MAFIC FLOW»	Medium grey green, medium grained. 20cm finer grained upper margin quickly grading into medium grained speckled porphyritic to equigranular flow. 20-25% 1mm brown mafic (pyroxene) phenocrysts, some which are also biotite in a lighter green finer groundmass. Locally more equigranular with a green weakly epidotized feldspathic groundmass and locally fine amphibole needles. Abundant creamy rose leucoxene. 362.8 - 366.6: Finer grained margin grading downhole into pillowed flow.				
366.60 TO 390.75	PILLOWED MAFIC FLOW «PILLOW MAFIC FLOW»	Medium green, fine grained, <1.5m pillows, patchy maroon green weak mottling near pillow margins, dark green pillow rims and well developed weakly epidotized interpillow hyaloclastite. 374.9 - 379.85: Pillow Breccia. <10cm pillows and pillow fragments in a light green weakly epidotized, locally cherty, hyaloclastite matrix. Matrix supported. 386.0 - 386.2: Fault Zone. Strong brecciated milled texture, minor fault gouge. Weak brecciation continues for 30cm downhole. End of Hole.		Weak interpillow epidote.	Trace interpillow pyrite/pyrrhotite.	

HOLE NUMBER: CCF-68

DRILL HOLE RECORD

LOGGED BY: P. BAXTER

PAGE: 3

HOLE NUMBER: CCF-68

ASSAY SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	ASSAYS						GEOCHEMICAL						COMMENTS	
				Cu %	Pb %	Zn %	Ag g/t	Au g/t	SG g/cc	Ba %	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb		Ba ppm
	0.00	0.00	0.00														

HOLE NUMBER: CCF-68

GEOCHEM. SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	AL2O3 %	BAT %	CAO %	FE2O3 %	K2O %	MGO %	MNO2 %	NA2O %	P2O5 %	SiO2 %	TiO2 %	S %	TOT %	AG PPM	AS PPM	BA PPM	CU PPM	PB PPM	SB PPM	ZN PPM	AU PPB
35257	32.60	35.70	3.10	14.17	0.005	9.06	10.06	0.15	6.07	0.18	3.54	0.07	47.93	1.57	0.22	93.01	1.9	1	10	66	27	1	52	5
35258	84.40	87.50	3.10	14.63	0.005	9.4	10.64	0.16	5.87	0.18	2.28	0.09	49.52	1.64	0.28	94.7	2	1	11	62	23	1	64	5
35259	133.20	136.20	3.00	14.3	0.005	9.85	10.04	0.22	6.3	0.19	2.97	0.06	48.91	1.48	0.22	94.55	2	1	17	59	20	1	55	5
35260	185.00	188.00	3.00	15.14	0.005	8.43	11.04	0.05	6.33	0.19	3.57	0.09	48.74	1.66	0.23	95.46	2	1	3	61	21	1	60	5
35261	236.80	239.90	3.10	13.92	0.005	9.63	10.53	0.65	5.86	0.18	1.93	0.1	45.93	1.63	0.2	90.56	1	15	10	58	21	4	61	5
35262	285.60	288.60	3.00	14.52	0.005	8.69	10.94	0.22	6.12	0.19	3.45	0.1	48.8	1.73	0.28	95.04	1.6	12	4	61	18	2	57	5
35263	334.40	337.40	3.00	14.69	0.005	8.82	10.92	0.32	6.53	0.19	3.04	0.09	48.81	1.66	0.2	95.27	1.8	1	3	64	15	1	53	10
35264	380.00	383.00	3.00	14.52	0.005	8.88	11.03	0.21	6.44	0.19	2.64	0.1	48.4	1.71	0.22	94.34	2.1	1	2	64	12	1	56	5

HOLE NUMBER: CCF-68

GEOCHEM. SHEET

PAGE: 5

HOLE NUMBER: CCF-69

MINNOVA INC.
DRILL HOLE RECORD

IMPERIAL UNITS: METRIC UNITS: X

PROJECT NAME: CHU CHUA
PROJECT NUMBER: 616
CLAIM NUMBER: CC1
LOCATION: CHU CHUA MOUNTAIN

PLOTTING COORDS GRID:
NORTH: 9997.00N
EAST: 9727.00E
ELEV: 1780.00

ALTERNATE COORDS GRID: FIELD
NORTH: 100+ 3N
EAST: 97+12E
ELEV: 1780.00

COLLAR DIP: -68° 0' 0"
LENGTH OF THE HOLE: 588.20m
START DEPTH: 0.00m
FINAL DEPTH: 588.20m

COLLAR GRID AZIMUTH: 90° 0' 0"

COLLAR ASTRONOMIC AZIMUTH: 90° 0' 0"

DATE STARTED: September 21, 1991
DATE COMPLETED: October 5, 1991
DATE LOGGED: 0, 0

COLLAR SURVEY: NO
MULTISHOT SURVEY: NO
ROD LOG: NO

PULSE EM SURVEY: YES
PLUGGED: NO
HOLE SIZE: NQ

CONTRACTOR: PARAGON DRILLING LTD.
CASING: 4.6M
CORE STORAGE: BARRIERE WAREHOUSE

PURPOSE: TEST CHU CHUA HORIZON 250M DOWNDIP OF MASSIVE SUL-PHIDES WITH FOOTWALL STRINGER ZONE IN HOLE CC-55.

DIRECTIONAL DATA:

Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments	Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments
30.50	-	-67° 0'	ACID	OK		-	-	-	-	-	
61.00	-	-67° 0'	ACID	OK		-	-	-	-	-	
121.90	-	-68° 0'	ACID	OK	POOR ETCH	-	-	-	-	-	
179.80	-	-67° 0'	ACID	OK		-	-	-	-	-	
304.80	-	-67°30'	ACID	OK		-	-	-	-	-	
365.80	-	-67° 0'	ACID	OK		-	-	-	-	-	
426.70	-	-67° 0'	ACID	OK		-	-	-	-	-	
487.70	-	-67° 0'	ACID	OK		-	-	-	-	-	
548.60	-	-66°30'	ACID	OK		-	-	-	-	-	
249.30	91° 0'	-67° 0'	SING.SHOT	OK	068+23	-	-	-	-	-	
492.70	84° 0'	-67° 0'	SING.SHOT	OK	061+23	-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	

HOLE NUMBER: CCF-69

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
0.00 TO 4.60	«OB»					
4.60 TO 187.70	Pillowed Mafic Flow «MAFIC PILL OWS»	Medium grey/green. Fine grained. Generally <2m pillows weak narrow bleaching near pillow margins, <1-1cm dark green granular (deritrification) pillow rims. <1-15cm medium to coarse weakly epidotized interpillow hyaloclastite often fragmental (pillow rhinds?) with a light green chert and epidote matrix. 100.7-101.4m: Pillow Breccia.		Weak interpillow epidote.	Trace to 1% interpillow disseminated pyrrhotite.	
187.70 TO 221.45	Massive Mafic Flow «MAFIC MASS IVE»	Medium green. Medium grained. Massive, speckled, equigranular to weakly porphyritic texture from green (hornblende and brownish (pyroxene) mafic crystal clots mixed with lighter green epidotized feldspars. Locally pyroxene porphyritic. Leucoxene flecks common. Upper and lower contacts pillowed.				
221.45 TO 381.20	Pillowed Mafic Flow «MAFIC PILL OWS»	Medium green, grey/green. Fine grained. As described previously. Occasional coarse grained pillow cores. 265.8-270.9m: Pillow Breccia. 3-4cm and up to 25cm pillows and pillow fragments in a coarse hyaloclastite matrix. Matrix supported. 276.45-278.2m: Pillow Breccia, as above.		Weak interpillow epidote, rare inter-pillow chlorite. Epidote within hyaloclastite increasing downhole. Below 352.7m: Weak chlorite within hyaloclastite.	Trace interpillow disseminated pyrrhotite. 380.65-381.2m: <1-1% cp, 1-2% py fine veining and as clots in quartz veins.	
381.20 TO 403.65	Massive Pyrite «MASSIVE SULPHIDES»	Brassy bronze. Fine grained. 381.2-385.55m: Massive pyrite, patchy 2-3cm wide magnetite rich zones/layers. Below 383.8m 15-20% up to 5cm light grey chert or silicified basalt fragments and minor medium green, medium grained, massive flow fragments. 385.55-386.65m: Fragmented mafic flow, weakly pillowed.		Patchy very strong chlorite.	381.2-385.55m: 70% py, 3-5% cp, locally 10% cp over 10cm widths. Stringery interfragmental pyrite, minor magnetite. 25% py, 3-5% mt, <0.5%cp.	Excellent conductor.

HOLE NUMBER: CCF-69

DRILL HOLE RECORD

LOGGED BY: P.BAXTER/G.S.W.

PAGE: 2

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		<p>386.65-391.4m: Semi-massive to massive pyrite. 30% 1-3cm light grey chert or silicified basalt fragments in a pyrite rich matrix composed of semi-massive to massive pyrite layers, siliceous pyritic exhalite and pyritic hyaloclastite. Layers often distorted, folded, wrapping around fragments. Rare sulphide fragments.</p> <p>391.4-396.05m: Massive pyrite. 10-15% baritic matrix minor magnetite.</p> <p>396.05-297.95m «Basalt» Pillow Basalt.</p> <p>397.95-403.05m: Massive pyrite. 5-7% magnetite and minor hematite as 1-2cm massive veins and as stringery veining hosting pyrite.</p> <p>403.05-403.65m: Up to 10cm wide beds of massive pyrite interbedded with 5mm-1cm wide sulphide rich beds of very fine py-cp and 3-5cm wide beds of mafic flow and hyaloclastite. BEDDING @ 50-55 deg.</p>	53	Epidote-chlorite altered interpillow hyaloclastite.	<p>40-50% py, <1% to locally 1% cp.</p> <p>80% py, <0.5% cp.</p> <p>No sulphides.</p> <p>85% py, 5-7% magnetite, 2-3% hematite. «0.5% cp.»</p> <p>45-50% py, 4-5% cp.</p>	Transported ore? Chert/basalt frags in pyrite matrix. Sulphide not fragmented possible soft sediment deformation of py rich layers.
403.65 TO 523.00	Mafic Pillows «MAFIC PILL OWS»	<p>Greyish green. Fine grained. Similar to previous pillowed flows. Occassional coarse grained pillow cores.</p> <p>493.2-523.0m: 1-2% cherty material in pillow interstices and as matrix to pale brown - creamy greenish white in colour - very fine grained.</p>		<p>Weak epidote, minor chlorite alteration of interpillow material.</p> <p>521.9-523m: Core bleached greenish white due to pervasive silicification.</p>	Trace interpillow py, po - primarily as micro veinlets.	444.0-452.0m: Rubbly broken core recovery, no fault gouge.
523.00 TO 531.20	Fault «FAULT»	<p>Grey. Fault gouge + milled + broken core. Host rock silicified basalt, q.v.'s; pyritic basalt + variolitic basalt. Upper contact sharp @ 523.0m:</p>	40			
531.20 TO 541.75	Silicified Basalt? «SIL BASALT?»	Light grey. Fine grained. Massive. Locally has brecciated look.		Pervasive silicification + trace veinlets of light brown ser.	1% py, tr cp in veinlets.	

HOLE NUMBER: CCF-69

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
541.75 TO 588.20	Mafic Pillows, Bx, Sil <MAFIC PILLOWS, BX, SIL>	Greyish green. Fine grained. Pillow rims contain mm-sized variolite. Locally brecciated. 571.9-588.2m: mm-sized varioles? in fine grained grey siliceous material. These zones occur as patches. END OF HOLE.		Matrix material weakly chloritic. Patches of intensive silicification at: 549.5-561.65m and 571.9-588.2m.	Trace pyroveinlets and disseminated cubes. 562.95-563.1m: Trace sph in quartz vein.	578.5-588.2m: Blocky core.

HOLE NUMBER: CCF-69

DRILL HOLE RECORD

LOGGED BY: P.BAXTER/G.S.W.

PAGE: 4

HOLE NUMBER: CCF-69

ASSAY SHEET

DATE: 21-November-1991

Sample	From (m)	To (m)	Length (m)	ASSAYS						GEOCHEMICAL						COMMENTS		
				Cu %	Pb %	Zn %	Ag g/t	Au g/t	SG g/cc	Ba %	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb		Ba ppm	
34795	380.20	381.20	1.00															
34797	381.20	382.30	1.10	2.53	0.01	0.02	11.4	1.00										
34796	382.30	383.40	1.10	1.35	0.01	0.01	6.0	0.71										
34798	383.40	384.50	1.10	3.26	0.02	0.01	10.1	0.97										
34799	384.50	385.55	1.05	1.326	0.02	0.01	5.9	0.58										
34800	385.55	386.65	1.10	0.517	0.02	0.01	4.1	1.38										
34801	386.65	387.80	1.15	0.696	0.01	0.01	3.9	0.44										
34802	387.80	389.00	1.20	0.140	0.01	0.01	2.6	0.20										
34803	389.00	390.20	1.20	0.097	0.01	0.01	2.2	0.16										
34804	390.20	391.40	1.20	0.116	0.01	0.01	2.3	0.11										
34805	391.40	392.50	1.10	0.762	0.01	0.03	5.3	1.38										
34806	392.50	393.70	1.20	0.720	0.01	0.01	5.2	1.40										
34807	393.70	394.90	1.20	0.613	0.01	0.01	5.0	1.00										
34808	394.90	396.05	1.15	0.847	0.01	0.01	6.8	1.73										
34809	396.05	397.95	1.90															
34810	397.95	399.00	1.05	0.297	0.01	0.01	4.4	1.23										
34811	399.00	400.00	1.00	1.001	0.01	0.02	7.0	1.61										
34812	400.00	401.00	1.00	1.066	0.01	0.02	6.4	1.52										
34813	401.00	402.00	1.00	0.402	0.01	0.01	4.9	1.20										
34814	402.00	403.05	1.05	0.327	0.02	0.01	4.2	1.02										
34815	403.05	403.65	0.60	2.031	0.01	0.03	10.7	0.83										
34816	403.65	404.65	1.00															
AVE.	381.20	396.05	14.85	0.973	0.01	0.01	5.38	0.84										
ALT.AVG.	381.20	385.55	4.35	2.126	0.01	0.01	8.38	0.82										
ALT.AVG.	391.40	396.05	4.65	0.734	0.01	0.01	5.57	1.37										
AVE.	397.95	403.65	5.70	0.762	0.01	0.02	5.92	1.26										

HOLE NUMBER: CCF-69

ASSAY SHEET

PAGE: 5

HOLE NUMBER: CCF-69

GEOCHEM. SHEET

DATE: 27-November-1991

Sample	From (m)	To (m)	Length (m)	AL2O3 %	BAT %	CAO %	FE2O3 %	K2O %	MGO %	MNO2 %	NA2O %	P2O5 %	SI02 %	TIO2 %	S %	TOT %	AG PPM	AS PPM	BA PPM	CU PPM	PB PPM	SB PPM	ZN PPM	AU PPB
35265	8.50	11.50	3.00	14.29	0.005	9.91	11.2	0.41	6.22	0.2	2.54	0.09	48.9	1.69	0.28	95.74	2	20	6	71	16	1	54	5
35266	60.35	63.40	3.05	14.45	0.005	10.03	11.1	0.27	5.97	0.19	2.61	0.08	48.49	1.74	0.24	95.16	2.6	1	8	74	18	1	58	5
35267	109.10	112.20	3.10	14.24	0.005	9.06	11.55	0.28	6.34	0.19	2.84	0.1	48.37	1.73	0.22	94.93	2.2	1	7	69	19	1	61	5
35268	157.80	160.90	3.10	14.8	0.005	9.18	11.13	0.29	6.31	0.2	3.27	0.11	49.23	1.76	0.18	96.46	2.5	1	6	64	16	1	52	5
35269	205.40	208.40	3.00	14.43	0.005	10.1	10.37	0.38	6.55	0.19	2.26	0.08	47.69	1.63	0.14	93.82	2	1	19	69	18	1	58	5
35270	255.40	258.40	3.00	14.46	0.005	8.87	10.95	0.14	6.14	0.19	3.26	0.11	48.2	1.69	0.3	94.32	2.6	1	180	69	18	1	63	5
35271	304.20	307.20	3.00	14.72	0.005	9.21	11.45	0.21	6.62	0.2	2.82	0.09	48.97	1.75	0.18	96.21	2.5	1	16	64	17	1	56	5
35272	353.00	356.00	3.00	14.82	0.005	9.12	10.96	0.19	6.38	0.19	3.38	0.09	49.41	1.72	0.17	96.43	2.8	1	13	63	15	1	52	5
35273	404.70	407.70	3.00	14.66	0.31	9.23	11.35	0.45	6.2	0.19	2.45	0.08	49.15	1.73	0.19	96	2.3	1	319	74	18	1	51	5
35274	465.50	469.60	4.10	14.20	0.015	9.19	10.73	0.21	6.25	0.19	3.11	0.08	48.36	1.66	0.37	94.35	3.1	1	217	71	5	1	59	5
35275	516.90	520.00	3.10	14.39	0.005	9.92	9.92	0.22	6.88	0.32	3.46	0.05	47.25	1.38	0.23	91.81	0.1	1	68	60	12	1	67	5
35076	550.10	553.20	3.10	13.97	0.005	4.41	14.03	0.15	10.79	0.14	0.38	0.14	44.62	1.63	1.16	91.41	0.1	1	86	480	5	1	38	5
35077	566.30	569.30	3.00	9.39	0.045	2.09	5.27	0.19	3.98	0.11	2.34	0.06	71.56	0.57	0.12	95.73	0.2	1	437	65	17	1	28	5

HOLE NUMBER: CCF-69

GEOCHEM. SHEET

PAGE: 1

HOLE NUMBER: CCF-70

MINNOVA INC.
DRILL HOLE RECORD

IMPERIAL UNITS:

METRIC UNITS: X

PROJECT NAME: CHU CHUA
PROJECT NUMBER: 616
CLAIM NUMBER: CC-1
LOCATION: NTS 92 P/8

PLOTTING COORDS GRID: FIELD
NORTH: 9925.00N
EAST: 9600.00E
ELEV: 1750.00

ALTERNATE COORDS GRID:
NORTH: 0+ 0
EAST: 0+ 0
ELEV: 0.00

COLLAR DIP: -63° 0' 0"
LENGTH OF THE HOLE: 703.10m
START DEPTH: 0.00m
FINAL DEPTH: 703.10m

COLLAR GRID AZIMUTH: 90° 0' 0"

COLLAR ASTRONOMIC AZIMUTH: 90° 0' 0"

DATE STARTED: October 6, 1991
DATE COMPLETED: October 22, 1991
DATE LOGGED: 0, 0

COLLAR SURVEY: NO
MULTISHOT SURVEY: NO
RQD LOG: NO

PULSE EM SURVEY: NO
PLUGGED: NO
HOLE SIZE: NQ

CONTRACTOR: PARAGON DRILLING LTD
CASING: 3.05M
CORE STORAGE: BARRIERE

PURPOSE: TO TEST THE DOWNDIP AND SOUTHERLY EXTENT OF MAS- SIVE SULPHIDES INTERSECTED IN CCF-69.

DIRECTIONAL DATA:

Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments	Depth (m)	Astronomic Azimuth	Dip degrees	Type of Test	FLAG	Comments
28.70	-	-63° 0'	ACID	OK		-	-	-	-	-	
94.50	-	-61° 0'	ACID	OK		-	-	-	-	-	
164.60	-	-59° 0'	ACID	OK		-	-	-	-	-	
213.60	-	-56° 0'	ACID	OK		-	-	-	-	-	
304.80	-	-55° 0'	ACID	OK		-	-	-	-	-	
365.80	-	-56° 0'	ACID	OK		-	-	-	-	-	
426.70	-	-57° 0'	ACID	OK		-	-	-	-	-	
487.70	-	-55° 0'	ACID	OK		-	-	-	-	-	
548.60	-	-56° 0'	ACID	OK		-	-	-	-	-	
609.60	-	-56° 0'	ACID	OK		-	-	-	-	-	
670.60	-	-55° 0'	ACID	OK		-	-	-	-	-	
242.90	87° 0'	-56° 0'	SING.SHOT	OK		-	-	-	-	-	
523.30	89° 0'	-56° 0'	SING.SHOT	OK		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	
-	-	-	-	-		-	-	-	-	-	

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
0.00 TO 3.20	«OB»					
3.20 TO 341.00	«MAFIC PILL OWS»	<p>Greenish grey. Fine grained. Pillowed flow with thin (<5cm) hyaloclastite selvages-pillow cores locally medium grained. Variolitic texture near pillow rims - white mm sized rounded specks in silicified sections. Locally 1-2% pipe vesicles-chlorite & po filling.</p> <p>81.7-89.45m: Thin white chert beds (up to 0.5m thick) in pillow interstices.</p> <p>107.15-113.2m: Cherty pillow interstices. BEDDING @ 112.5m</p> <p>134.75-136.25m: Sheared zone with minor fault gouge. SHEAR @ 134.75m</p> <p>193.-211.55m: Massive medium to coarse grained flow. 1-2% leucoxene. Top of flow = fine grained pillows.</p> <p>211.55-213.75m: Fine grained mafic dyke with chilled margins. Lower contac sharp at 213.75m</p> <p>213.75-227.0m: Medium to coarse grained mafic flow? as above. Lower contact obscured by blocky core.</p> <p>227.0-341.0m: Well formed pillows. Locally have cream coloured chert in pillow interstices.</p>	30 45 90	Patchy weak epidote veining. Chloritic on fracture faces.	Trace po, py as disseminations and veinlets.	<p>Numerous small scal faults with minor displacements (1-5cm) on fracture planes. Especially noticeable at pillow rims.</p> <p>300-343m: Blocky core.</p>
341.00 TO 378.00	«MAFIC MASS»	<p>Greyish green. Medium grained. Upper contact. Blocky core. Massive mafic flow or dyke. Black spotted appearance due to intergranular texture. 1-2% white leucoxene crystals. Trace 2% greenish white fsp crystals. Minor pillow development from 351-352.8m & 359.2-363.2m. Lower contact into pillow breccia.</p>		Weak pervasive epidote.	None.	

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
378.00 TO 382.10	Pillow Fragment Breccia «MAFIC P BX »	Medium green. Fine grained. Angular pillow fragments and ameboidal pillows in a creamy green cherty hyaloclastite.			Trace po.	
382.10 TO 562.20	«MAFIC PILL OWS»	Medium green. Fine grained pillows. Darker green granular (devitrified) pillow rims. Light green epidotized interpillow hyaloclastite. Pillow cores locally medium grained in larger pillows. 382.1-419m: Light green cherty hyaloclastite. 437.9-446.2m: Very broken & rubbly core, no fault gouge. Weakly pillowed below 446.2m. 474.3-573.3m: Rubbly broken core, no fault gouge. 518-533.4m: Pillows mottled maroon green colour-accentuates variolitic texture. 537.8-539.2m: Patchy weak brecciation.		Chloritic breakage surfaces. Interpillow epidote. 470-470.9m: Bleached, silicified zone. 473.3-562.2m: Minor chlorite alteration of hyaloclastite, chlorite coated fracture coatings.		
562.20 TO 589.80	Mafic Flow, Massive Pillowed «MAFIC MASS , PILL»	Medium green. Medium to coarse grained. Massive, <1mm green mafics in a olive green feldspathic matrix. Locally well developed pillow interstices with minor white chert bands. Soft healed fault from 570.8-571.5m. Contact obscured by rubbly core.		Chloritic fracture coatings.	None.	Rubbly core throughout.
589.80 TO 606.40	Mafic Pillows, Pillow Breccia «MP, MPBX»	Medium grey-green, light green. Fine grained. Interpillow and interfragmental light green chert and cherty epidotized hyaloclastite. Massive sections with fine light green chert in fractures. 595.7-596.1m: Chert - weakly bedded. BEDDING @ 596m Pillow rims exhibit variolitic texture within 1cm of rim = devitrification features.	60	Weak epidote - primarily in veinlets (1-2%) and in pillow cores.	None.	

HOLE NUMBER: CCF-70

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
606.40 TO 609.45	Silicified, Chloritic Mafic Pillows «SIL, CHL M P'S»	Grey-white. Fine to medium grained. Well foliated. Upper and lower contacts marked by fault gouge. FAULT @ 609.45m 25% white spherules/varioles. 1-2mm diameter - looking at glassy base of a flow?	60	Pervasive moderate to strong chlorite - silica. 608.05-609.4m: Shattered looking quartz vein.	Trace py as blebs and veinlets.	
609.45 TO 644.90	Mafic Breccia, Massive Flow «MAFIC BX, MASS»	Green. Fine grained. Massive with local thin (<0.1m) breccia zones. Matrix to breccia frags = greenish white chert/epidote. 1% patches of medium grained intergranular textured mafic - chloritic matrix to plagioclase? 638.4-638.5m: Greenish red chert? - interfragment material red colour due to fine grained hematite. Also at 643.1-643.2m.		Moderate weak epidote. Fracture faces chloritic and weakly hematitic.		
644.90 TO 650.50	«CHERT»	Light green to reddish brown. Very fine grained. Well bedded siliceous chert. Upper contact sharp. CONTACT @ 644.9m Minor screens of mafic flow/tuff? at 645.55-645.85m, 649.0-649.5m. BEDDING @ 645.55m Chert has reddish brown hue due to fine grained hematite at 645.2-645.5m, 646.1-646.9m. BEDDING @ 646.1m 647.0m	52 20 10 35		Trace py-primarily in quartz veinlets.	649.5-650.4m: Blocky core.
650.50 TO 665.50	Massive Mafic Flow «MAFIC MASSIVE»	Green. Fine to medium grained. Similar to unit above chert. Locally have patches with 1-2% white <mm - sized leucoxene crystals. Massive. Medium grained patches have 2-3mm diameter rounded specks of mafic crystals - porphyritic texture. 655.55-665.5m: Greenish white chert in matrix to thin breccia zones.		Pervasive weak epidote.		
665.50 TO 677.05	Chert, Mafic Ash, Mt-Hem Py Tuff «CHT, MT-HEM-PY ASH»	Light greenish grey to black. Fine grained. Upper contact sharp at 665.5m..... Magnetite-hematite-pyrite zone at 668.0-668.8m. 668.8m: Fault gouge. 668.9-676.6m: Primarily mafic ash with very fine grained pyritic and magnetite beds.	40	668.9-676.6m: Pervasively weakly to moderately chloritic.	668-668.8m: 2-3% very fine grained py associated with mt & hem. 668.9-676.6m: 1-2% very fine grained py as irregular beds in mafic ash. Trace cp.	666.8-677.05m: Extremely blocky core. Mt-hem-py zones = Chu Chua horizon!

HOLE NUMBER: CCF-70

DRILL HOLE RECORD

LOGGED BY: GSW/PB

PAGE: 4

HOLE NUMBER: CCF-70

MINNOVA INC.
DRILL HOLE RECORD

DATE: 21-November-1991

FROM TO	ROCK TYPE	TEXTURE AND STRUCTURE	ANGLE TO CA	ALTERATION	MINERALIZATION	REMARKS
		676.6-677.05m: Mt-hem-py exhalite well bedded weakly conductive. Lower contact sharp but irregular. BEDDING @ 676.8m	25			
677.05 TO 680.20	Silicified Mafic Bas- alt «SIL MAFIC MASS»	Grey. Fine grained. Massive with local brecciated zones.		Pervasively strongly silicified.	1% py as disseminations and stringers.	
680.20 TO 703.10	Mafic Mas- sive «MAFIC MASS IVE»	Greenish grey. Fine grained. Massive. Weakly magnetic throughout. 686.5-688.15m: Screen of silicified basalt? - very fine grained, light grey, massive. Locally have trace 3% white specks = leucoxene. END OF HOLE.		Tr - 1% epidote veinlets. Tr quartz-carb-hematite veinlets.	None.	

HOLE NUMBER: CCF-70

DRILL HOLE RECORD

LOGGED BY: GSW/PB

PAGE: 5

HOLE NUMBER: CCF-70

ASSAY SHEET

DATE: 28-November-1991

Sample	From (m)	To (m)	Length (m)	ASSAYS							GEOCHEMICAL						COMMENTS	
				Cu %	Pb %	Zn %	Ag g/t	Au g/t	SG g/cc	Ba %	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Au ppb	Ba ppm		
34817	666.50	668.00	1.50									179	29	114	1.0	6	150	
34818	668.00	668.80	0.80									1388	67	111	0.1	22	75	
34819	668.80	670.30	1.50									231	47	194	0.8	16	74	
34820	670.30	671.80	1.50									351	32	172	0.4	4	74	
34821	671.80	673.30	1.50									702	35	127	0.4	5	42	
34822	673.30	674.80	1.50									984	27	88	0.7	2	98	
34823	674.80	676.60	1.80									562	28	63	0.3	10	162	
34824	676.60	677.05	0.45									1176	24	61	0.1	2	50	
AVE.	666.50	677.05	10.55									599.21	35.052	120.58	0.53	8.1517	97.735	

HOLE NUMBER: CCF-70

ASSAY SHEET

PAGE: 1

HOLE NUMBER: CCF-70

GEOCHEM. SHEET

DATE: 27-November-1991

Sample	From (m)	To (m)	Length (m)	AL2O3 %	BAT %	CAO %	FE2O3 %	K2O %	MGO %	MNO2 %	NA2O %	P2O5 %	SiO2 %	TiO2 %	S %	TOT %	AG PPM	AS PPM	BA PPM	CU PPM	PB PPM	SB PPM	ZN PPM	AU PPB
35078	63.10	66.10	3.00	15.07	0.005	8.46	9.88	0.52	6.48	0.17	2.80	0.02	52.29	1.11	0.27	97.07	2.2	1	16	73	10	1	55	5
35079	124.05	127.10	3.05	14.68	0.005	8.94	9.52	0.42	6.25	0.17	2.89	0.02	51.73	1.07	0.21	95.91	16.6	1	15	103	9	1	51	5
35080	185.00	188.00	3.00	14.27	0.005	9.06	10.82	0.20	6.07	0.19	3.45	0.08	49.57	1.71	0.27	95.70	3.5	1	6	60	5	1	56	5
35081	246.00	249.00	3.00	14.36	0.005	9.45	11.11	0.23	6.32	0.19	2.82	0.08	49.29	1.70	0.26	95.81	3.3	1	5	62	5	1	59	5
35082	315.15	318.50	3.35	14.72	0.005	9.01	11.65	0.21	6.48	0.19	3.37	0.14	48.86	1.79	0.20	96.62	3.5	1	4	65	6	1	61	5
35083	371.00	374.00	3.00	14.57	0.005	9.24	11.43	0.33	6.47	0.19	2.16	0.08	49.44	1.75	0.31	95.97	2.9	1	7	62	6	1	64	5
35084	435.00	438.00	3.00	15.13	0.005	10.62	11.38	0.16	5.59	0.19	1.37	0.08	49.58	1.77	0.24	96.12	3.6	1	10	72	7	1	57	5
35085	489.00	492.00	3.00	14.78	0.005	7.93	11.15	0.50	6.40	0.19	2.82	0.08	49.11	1.74	0.24	94.94	3.3	1	14	55	5	1	66	5
35086	523.00	526.00	3.00	14.74	0.005	10.42	10.99	0.19	6.00	0.19	2.12	0.07	49.47	1.66	0.23	96.09	3.3	1	12	59	8	1	54	5
35087	571.80	574.80	3.00	14.50	0.005	9.36	11.49	0.11	6.78	0.20	2.32	0.09	49.49	1.72	0.25	96.31	3.0	1	10	62	8	1	64	5
35088	606.50	608.00	1.50	13.34	0.065	6.62	7.23	2.30	10.45	0.14	0.01	0.09	47.14	1.55	0.26	89.16	0.7	1	162	19	5	1	71	5
35089	640.00	643.10	3.10	14.32	0.005	9.15	11.01	0.16	6.66	0.21	2.66	0.10	49.93	1.70	0.19	96.09	3.3	1	26	65	9	1	54	5
35090	683.00	686.10	3.10	13.92	0.005	7.25	12.01	0.05	6.89	0.14	2.60	0.14	50.55	1.80	0.21	95.53	3.2	1	96	17	5	1	38	5

HOLE NUMBER: CCF-70

GEOCHEM. SHEET

PAGE: 1

Appendix II

PEM Technical Report and Profiles

Pulse E.M. Technical Report

G. S. Wells
December, 1991

1. Introduction

Five diamond drill holes (CCF-63, 64, 66, 67, 69) located on the Chu Chua property were surveyed using a Crone borehole pulse E.M. system. This work was done by Woods Geophysical Ltd. during the periods: August 31 to September 5, 1991 and October 9 to 20, 1991.

The purpose of the surveys was to explore for zones of conductive sulphide mineralization in the vicinity of the drill holes.

2. Borehole Pulse EM Technique

The Crone borehole pulse EM system is a time domain downhole EM instrument capable of detecting conductive mineralization intersected by the drillhole or lying offhole. The borehole pulse EM system utilizes a special downhole receiver coil attached to a 750 m cable and winch, and a standard PEM transmitter and receiver normally employed in surface surveys.

The primary field is produced by a 200 m by 200 m or 300 m by 300 m square surface wire loops energized by a 2000 watt PEM transmitter. Large loop surveys (e.g. 500 m by 1000 m) using the 2000 watt transmitter, and small loop surveys using the 10 m diameter portable equipment, can be carried out depending on the depth and size of the expected conductive target.

The time derivative of the secondary EM field is measured using an axial receiver coil lowered down the diamond drillhole. The minimum size of drillhole which can be accommodated is AQ (1 $\frac{1}{4}$ " diameter). The receiver obtains eight samples of the secondary field during the primary field off-time. Sample times range from

0.15 to 6.4 ms after primary field shut-off on a 10.8 ms transmitter time base.

Multiple transmitter loops may be used to provide various loop to conductor coupling geometries in order to obtain conductor attitude and position information. A complete survey of a given borehole may entail logging the hole from five transmitter loops setups. One of these loops would be approximately centred over the area of interest with the remaining four loops away from and distributed around the borehole.

When an anomalous response is observed in a borehole log from a single transmitter loop, the nature of this anomaly allows the determination of the location of the conductive source relative to the drillhole. As shown by Woods and Crone (1980, Figs. 7 & 8), the response can indicate whether the borehole is intersecting the centre of the conductor, the margin of a conductor, with the bulk of conductive material away from the hole, or whether the conductor is entirely off-hole.

Model study curves for various conductor to borehole geometries from Woods (1975) are employed in the interpretation. Quantitative analysis of the conductor's attitude, position and conductance is made using nomograms presented by Woods, et al. (1980). Computer plate modelling, using the routines developed by Dyck, et al (1980), can be used to confirm the interpretation.

In the case of a dike-like or tabular conductor, the magnitude of an anomaly varies with the angle that the primary field cuts the conductor. Thus, the degree to which coupling is obtained to the conductor, in coverage or a borehole from several loop setups, will provide the information on the attitude and position of the conductive mineralization.

If the conductor tends towards a more spheroidal shape, the anomaly character will change, as well as its magnitude, when the primary field angle is altered. This occurs because the eddy currents are not constrained to flow within a conductive sheet. Thus, multiple transmitter loop coverage can also provide information on the shape of a conductive body.

In practice the responses observed in field situations are much more complex than those of simple models, but the results are sufficiently interpretable that the method has general acceptance and a number of discovery case histories exist.

3. Survey Procedure

Holes CCF-63, 64, 66, 67 and 69 were surveyed using the Crone 2000 watt, PEM 8-channel transient EM system. Transmitter loops were laid out around the holes as shown in Figure 1. Collar (c) loops for holes CCF-63, 64, 67 and 69 are 200 meters square but the collar loop for CCF-66 is 300 meters square. Four additional 200 meter square loops were laid out around hole CCF-69 to evaluate the in-hole anomaly. These loop sizes and positions give the maximum EM coupling for the orientation of the mineralization in the vicinity of the drill holes. The use of the 2000 watt transmitter and the larger loops increases the ability to detect weakly conductive zones and decreases the noise level on the later channels. The PEM probe was lowered down each hole and the primary and secondary fields were recorded at 10 meter intervals down the hole. This data was entered into a field laptop computer and after processing, profiles were produced. These have been included in the attached pocket as profiles 1a to 9a inclusive. In profile 3a (hole CCF-66) there is no data for depths 0 to 350 m and 470 m - 580 m respectively. These areas were not surveyed due to poor ground conditions. Other parts of the hole were surveyed by leaving the rods in the hole and passing the probe through them.

4. Discussion of Results

There are no significant downhole anomalies in holes CCF-63, 64, 66 and 67. The broad 8 channel off-hole anomaly near the top of each hole is caused by the Chu Chua Main Lens of massive sulphides. Hole CCF-69 has a narrow, well-defined 8-channel, in

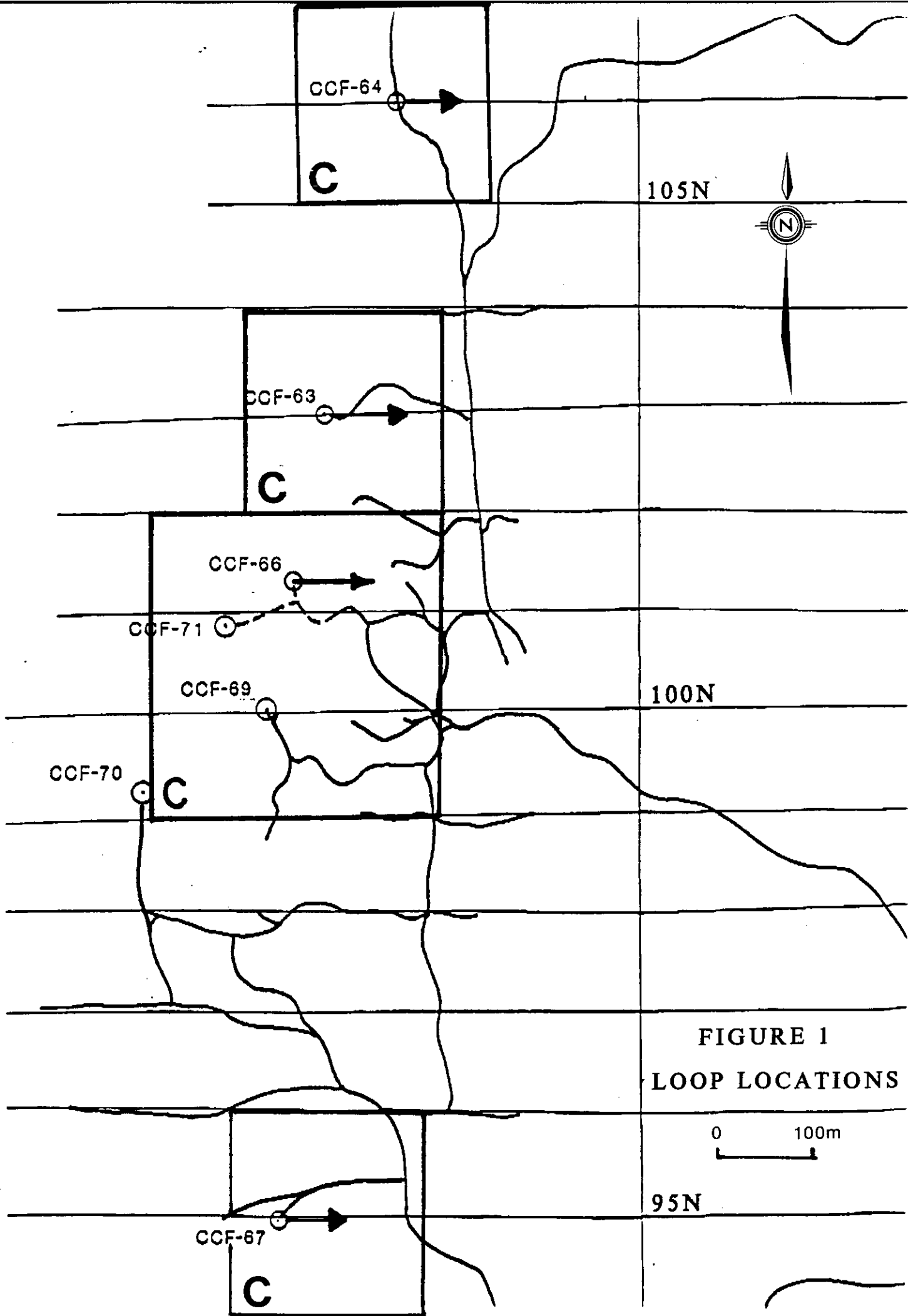
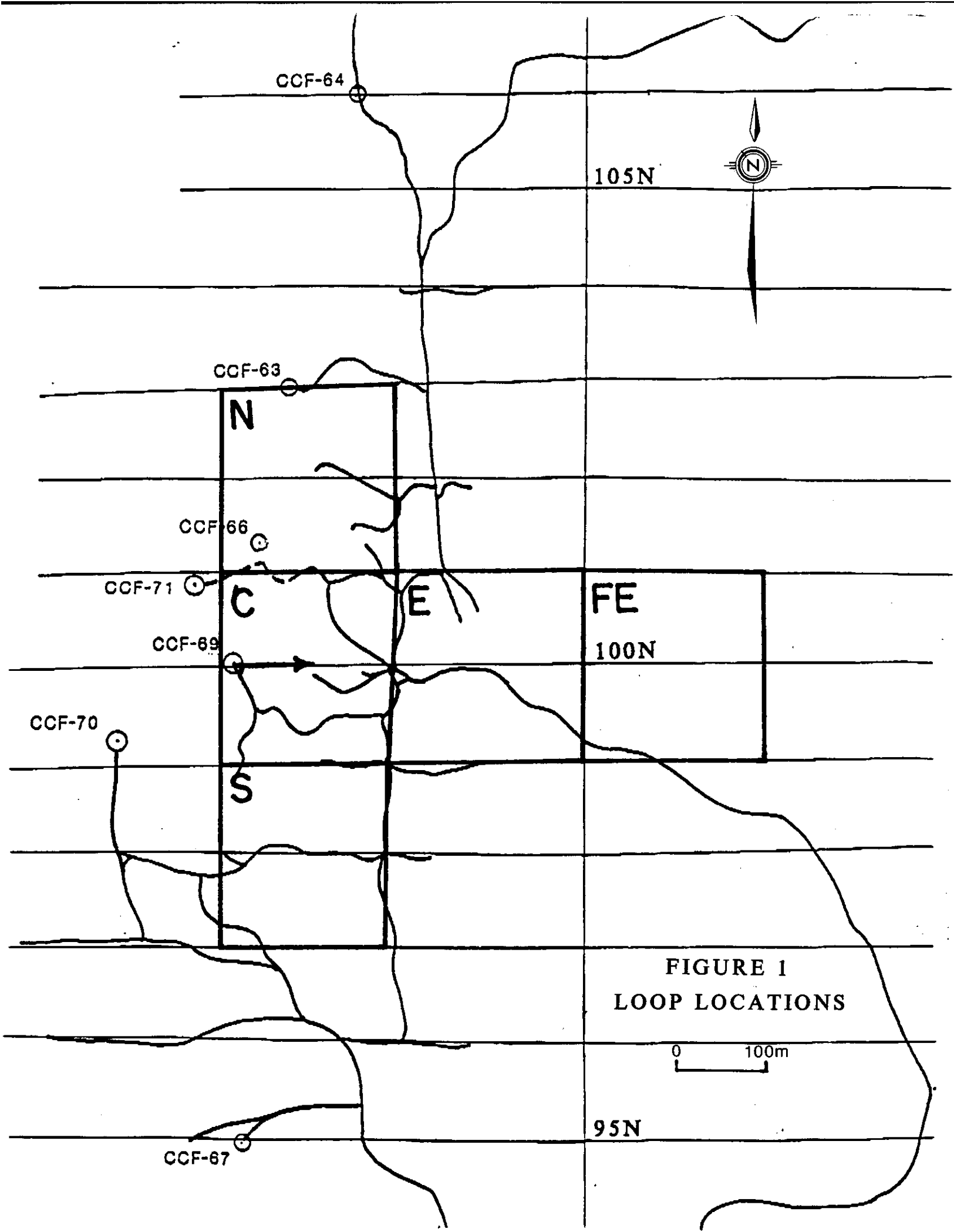


FIGURE 1
LOOP LOCATIONS

0 100m

95N



hole anomaly centred about 395 m which correlates with the massive sulphide zone intersected in the hole . Data from the directional loops suggests that the geophysical response is stronger to the south of the hole.

REFERENCES:

- Woods, D.V., 1975: A model study of the Crone Borehole pulse electromagnetic (PEM) system; unpublished M.Sc. thesis, Queen's University, Kingston, Ontario.
- Woods, D.V. and Crone, J.D. 1980: Scale model study of a borehole pulse electromagnetic system; C.I.M. Bulletin, vol.73, no. 817, pp.96-104.
- Woods, D.V., Rainsford, D.R.B. and Fitzpatrick M.N. 1980: Analogue modelling and quantitative interpretation of borehole PEM measurements (abstract only); EOS Transactions of the American Geophysical Union, vol. 61, no. 17, pp. 414-415.

SPECIFICATIONS – PULSE EM TRANSMITTER EQUIPMENT

MOTOR GENERATOR:

4-1/2 H.P. Wisconsin, 4 cycle engine with belt drive to D.C. alternator; maximum output 120V, 30 amps; external gas tank; frame unit weight: 33 kg, shipping: 47 kg.

REGULATOR:

Controls and filters the alternator output; continuously variable between 24V and 120V D.C.; 20 amp maximum current; weight: 10 kg, shipping: 24 kg.

PEM WAVEFORM TRANSMITTER:

Controls bipolar, on-off waveform and linear current shut-off ramp time. Radio and cable time synchronization with housing for optional crystal clock sync system; on-off times for 60 Hz areas 8.33ms, 16.66ms, 33.33ms; for 50 Hz areas 10.0ms, 20.0ms, 40ms; for analog PEM operation 10.9ms, 21.8ms; linear controlled current shut-off ramp times of 0.5, 1.0 and 1.5ms; monitors for shut-off ramp operation, instrument temperature, Tx loop continuity, and overload output current; automatic shut-down for open Tx loop. Weight: 12.5 kg, shipping: 22 kg.

REMOTE RADIO, ANTENNA AND MAST:

Used for radio timing synchronization on large survey grids; range up to 2 km; radio has 12V rechargeable gell cell battery supply; antenna is fiberglass mounted on a 4 section aluminum mast each 2m long. Radio weight: 2.7 kg, shipping: 6.0 kg; mast and antenna shipped as bundle: 6.4 kg.

OPTIONAL CRYSTAL CLOCK TIMING LINK:

Installed in the Digital Rx and external box mounted to be plugged into PEM-Tx. Gel rechargeable power supply. Weight: 10 kg, shipping: 15 kg.

WIRE, SPOOLS AND WINDERS:

Transmitter wire is usually No. 10 or No. 12 AWG copper in 310m or 410m lengths, 1 length per spool; 2 spools in a shipping box; winder is mounted on a magnesium packframe.

MULTI-TURN MOVING COIL:

7 turn, 13.7 meter diameter Tx loop with plugs to break into 2 sections. Aluminum or copper wire and various coverings depending on area being used.

BATTERY POWER SUPPLY:

24V, 20 amp hour; rechargeable battery supply for use with PEM-Tx as power source rather than motor-generator-regulator. In aluminum case, with clamp connectors. Weight: 20.5 kg, shipping: 29 kg.

- Battery chargers supplied for all rechargeable battery units
- All instruments and equipment operational from -40°C to +50°C.
- Shipping boxes are reusable plywood construction with closed cell foam shock protection.

SPECIFICATIONS – CRONE BOREHOLE PULSE EM EQUIPMENT

PROBE:

- Measures dB/dt of axial component of borehole
- Ferrite cored antenna with preamplifier and self contained power supply (Ni.-Cd. rechargeable)
- 30 hours continuous operation
- Weight: 3.6 Kg.
- Length: 1.63 M.
- Diameter: 2.9 cm (for "E" holes and larger)
- Pressure tested to 13.8 MPa (2000 PSI)

WINCH ASSEMBLY:

- 3 speed gear box, gear ratios 1:1, 2:1, 3:1
- Optional power winching for deep holes
- Borehole cable capacity of up to 2000 meters
- Portable

UNDERGROUND PUSHROD SYSTEM:

- For use in horizontal boreholes (< 45 degrees)
- Powered Pushrod assembly for holes > 500 meters

BATTERY SUPPLY:

±12 VDC, two internal, rechargeable, 12V gel type batteries

MEASURED QUANTITIES:

Primary shut-off voltage pulse (PP). Time derivative of the transient magnetic field by integrative sampling over eight, contiguous time gates (microseconds).

CH. NO.	WINDOW	WIDTH	MID PT.	REL. GAIN	WINDOW	WIDTH	MID PT.
PP	-100 to 0	100	-50	1.00	-200 to 0	200	-100
1	100 to 200	100	150	1.00	200 to 400	200	300
2	200 to 400	200	300	1.39	400 to 800	400	600
3	400 to 700	300	550	1.93	800 to 1400	600	1100
4	700 to 1100	400	900	2.68	1400 to 2200	800	1800
5	1100 to 1800	700	1450	3.73	2200 to 3600	1400	2900
6	1800 to 3000	1200	2400	5.18	3600 to 6000	2400	4800
7	3000 to 5000	2000	4000	7.20	6000 to 10K	4000	8000
8	5000 to 7800	2800	6400	10.00	10K to 15.6K	5600	12.8K

10.8ms. Time Base

21.6ms. Time Base

READOUT:

Readings are output on an analog meter (6V FSD), over three sensitivity ranges (X1, X10, X100). Data retrieval made by channel select switch.

TIMING:

A telemetry link ("sync") is maintained by radio signal, or a back-up cable, between the transmitter and the receiver, and is meter monitored.

SENSITIVITY:

Adjustable through a ten turn, calibrated gain pot.

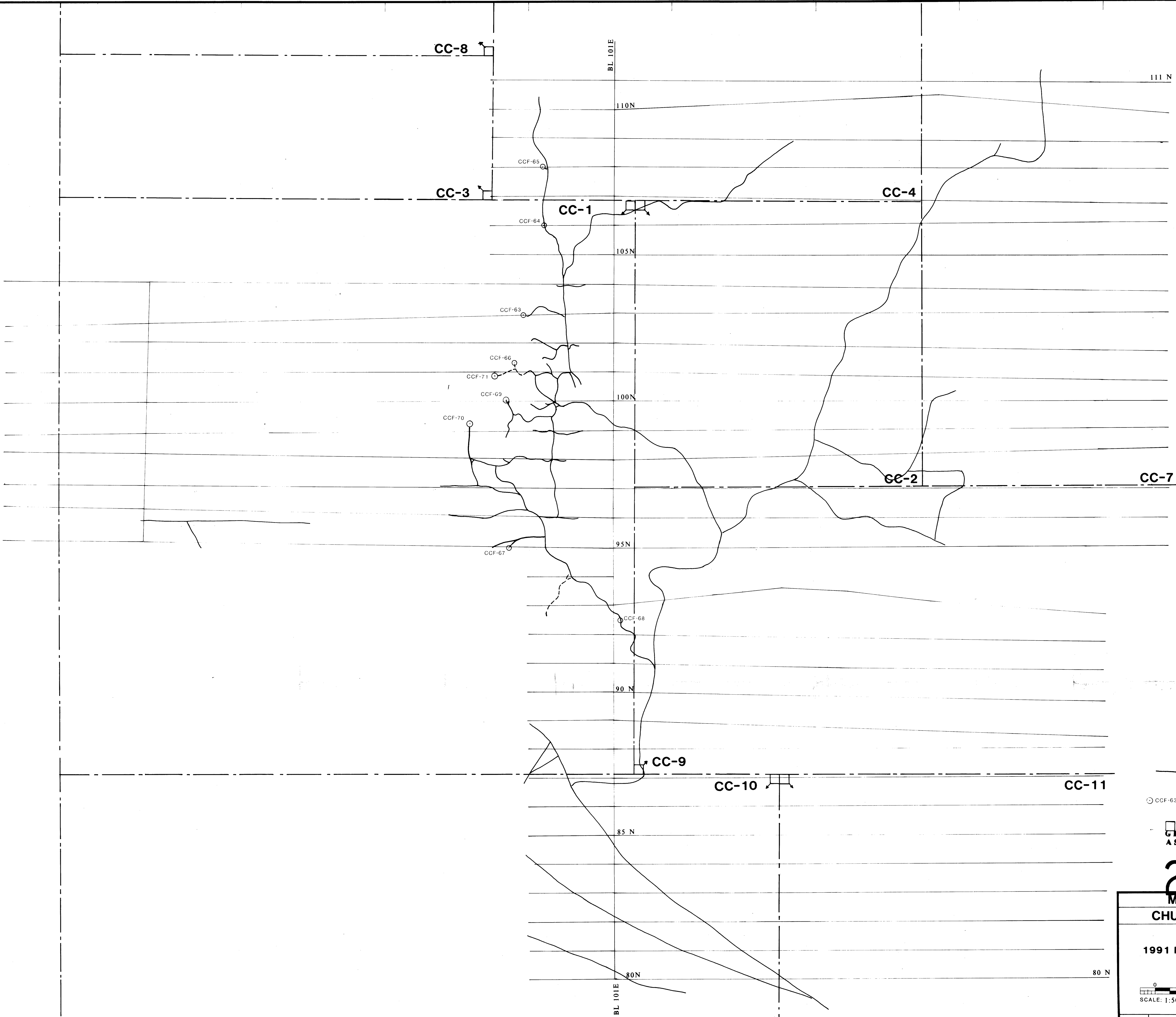
SAMPLING MODES:

"S & H" (Sample & Hold)

The receiver averages 512 (10.8 ms), or 256 (21.6ms), readings for all channels, and stores the results for display.

"CONT" (Continuous)

A running average for all channels is stored, enabling the operator to reject thunderstorm spikes and power line noise by visual inspection.



LEGEND

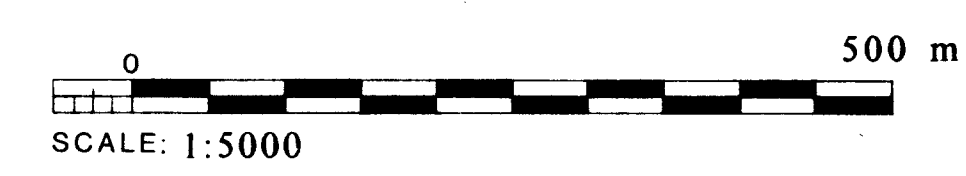
- Existing Roads
- CCF-63 1991 Diamond Drill Hole Collar

Legal Corner Post
GEOLOGICAL BRANCH
ASSESSMENT REPORT

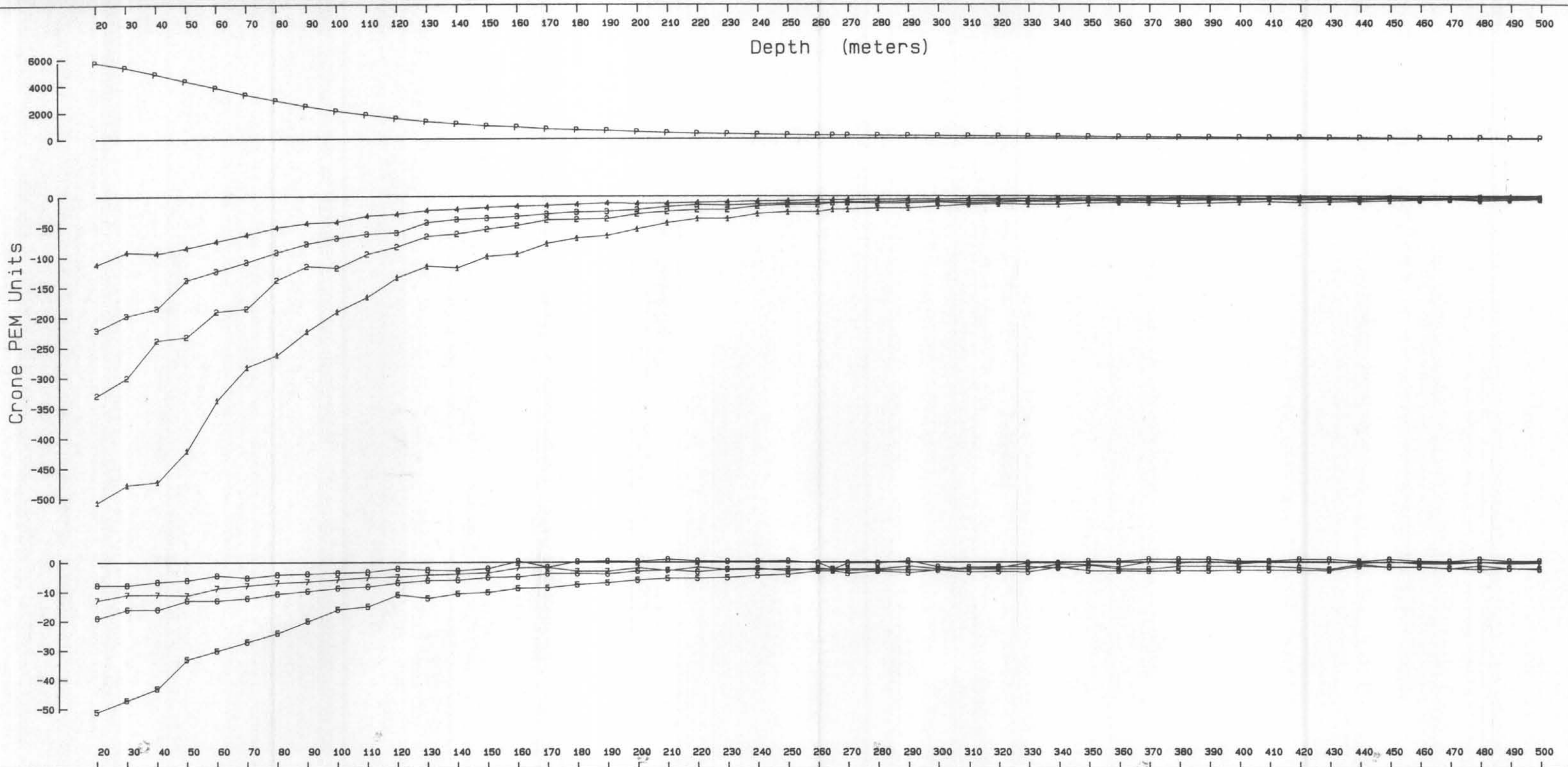
22,039
 MINNOVA Inc.

CHU CHUA PROJECT

1991 DRILL HOLE LOCATIONS



	N.T.S. 92 P/8	<i>Jay Zell</i>	MAP: 3
	DRAWN BY:		



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

22,039

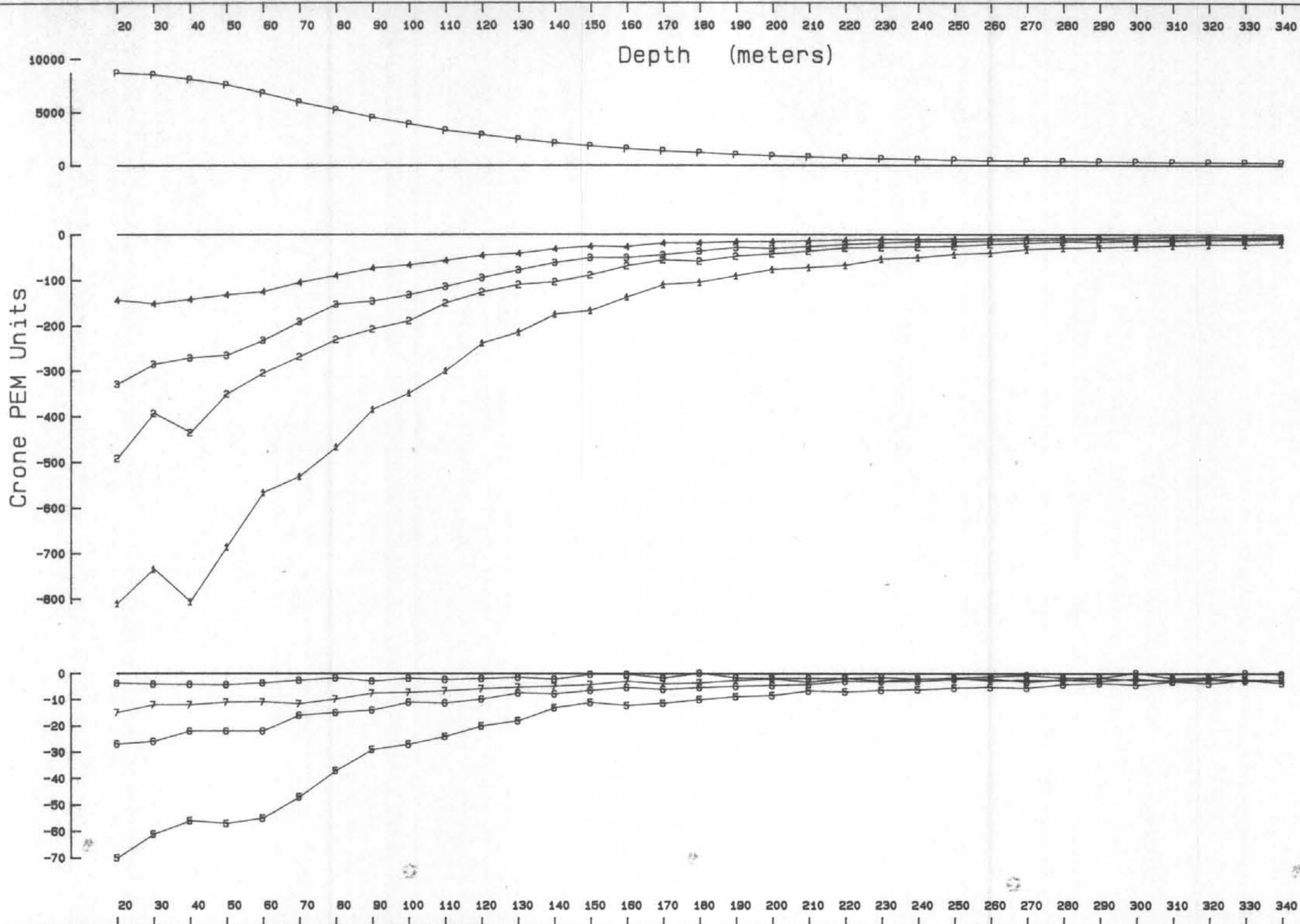
MINNOVA INC.

CHU CHUA PROJECT
BOREHOLE PULSE EM SURVEY
HOLE CCF-63 LOOP C
Scale 1: 1000.0



Date: Dec 1991 Survey: Sept 1991 Profile: 1a

WOODS GEOPHYSICAL CONSULTING



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

22,039

MINNOVA INC.

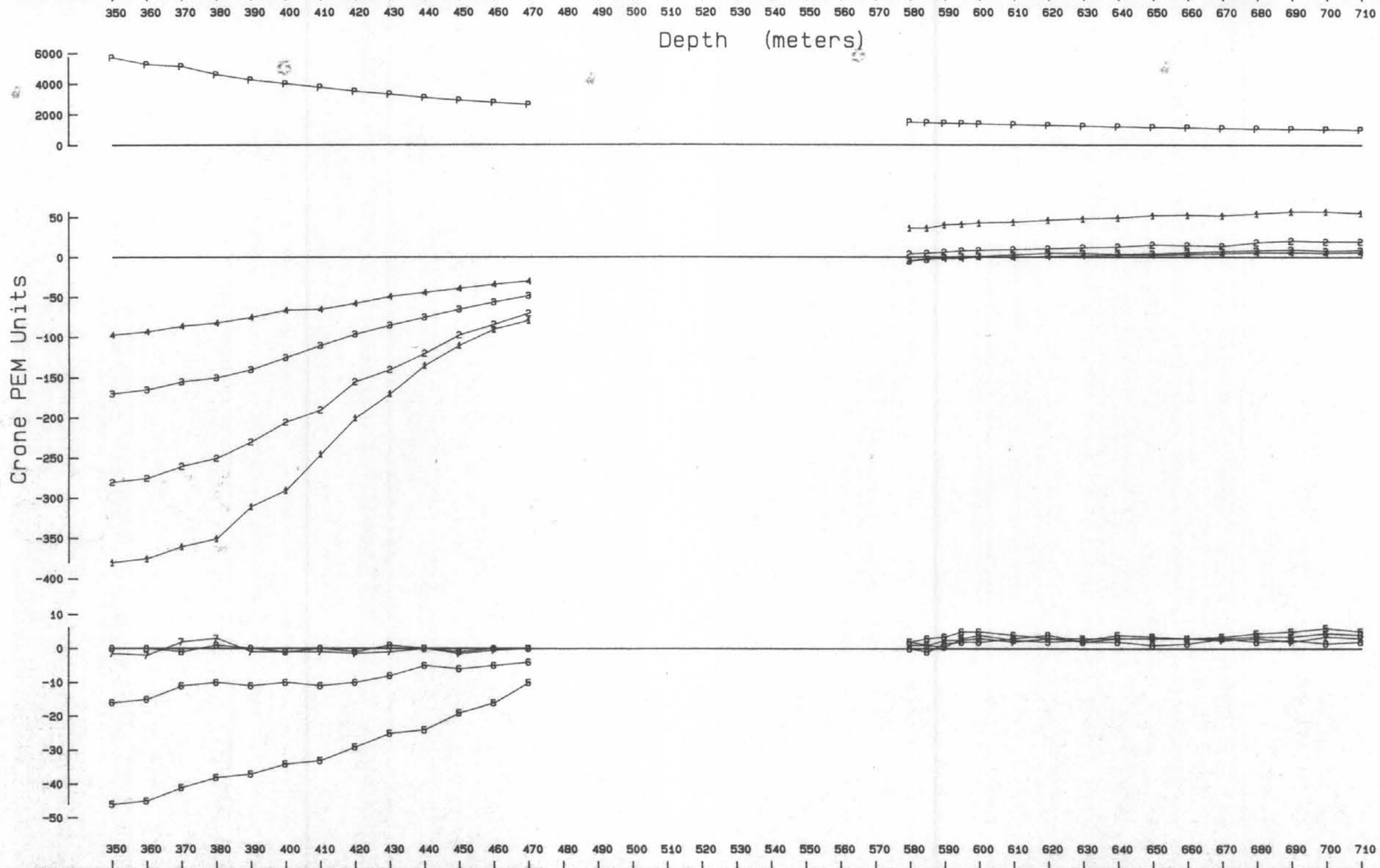
CHU CHUA PROJECT
BOREHOLE PULSE EM SURVEY
HOLE CCF-64 LOOP C

Scale 1: 1000.0



Date: Dec 1991 | Survey: Sept 1991 | Profile: 2a

WOODS GEOPHYSICAL CONSULTING



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

22,039

MINNOVA INC.

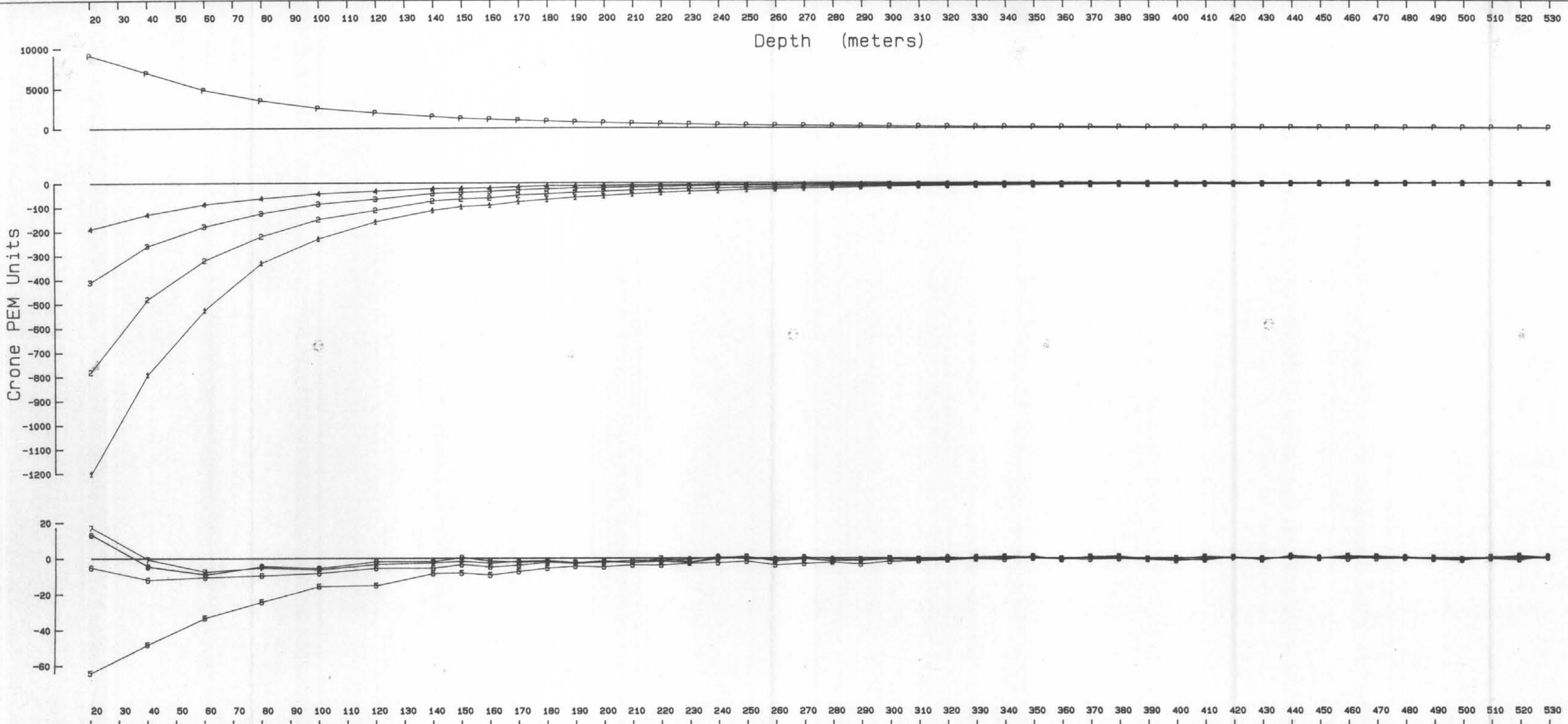
CHU CHUA PROJECT
BOREHOLE PULSE EM SURVEY
HOLE CCF-66 LOOP C

Scale 1: 1000.0



Date: Dec 1991 Survey: Sept 1991 Profile: 3a

WOODS GEOPHYSICAL CONSULTING



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

22,039

MINNOVA INC.

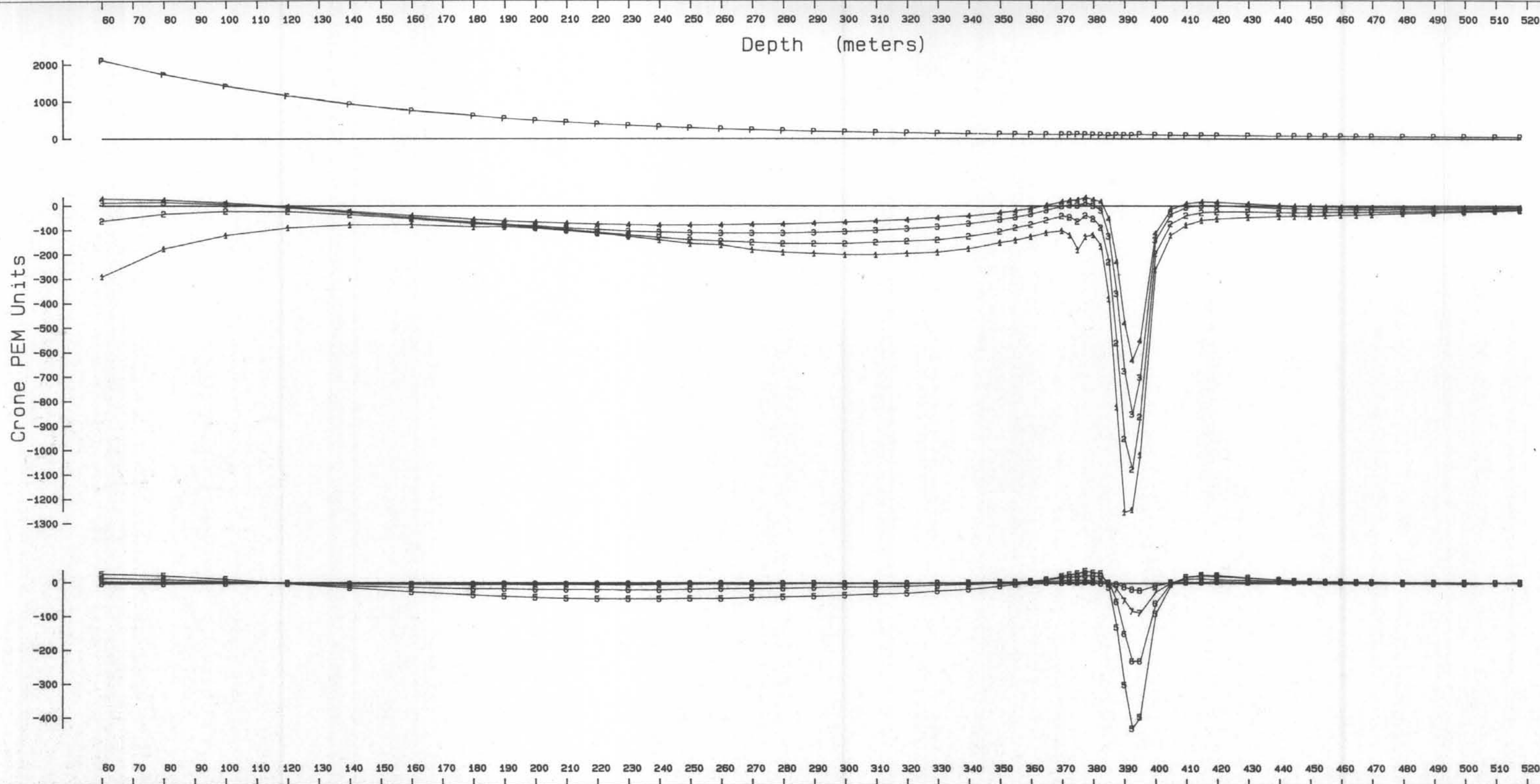
CHU CHUA PROJECT
BOREHOLE PULSE EM SURVEY
HOLE CCF-67 LOOP C

Scale 1: 1000.0



Date: Dec 1991 Survey: Sept 1991 Profile: 4a

WOODS GEOPHYSICAL CONSULTING



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

22,039

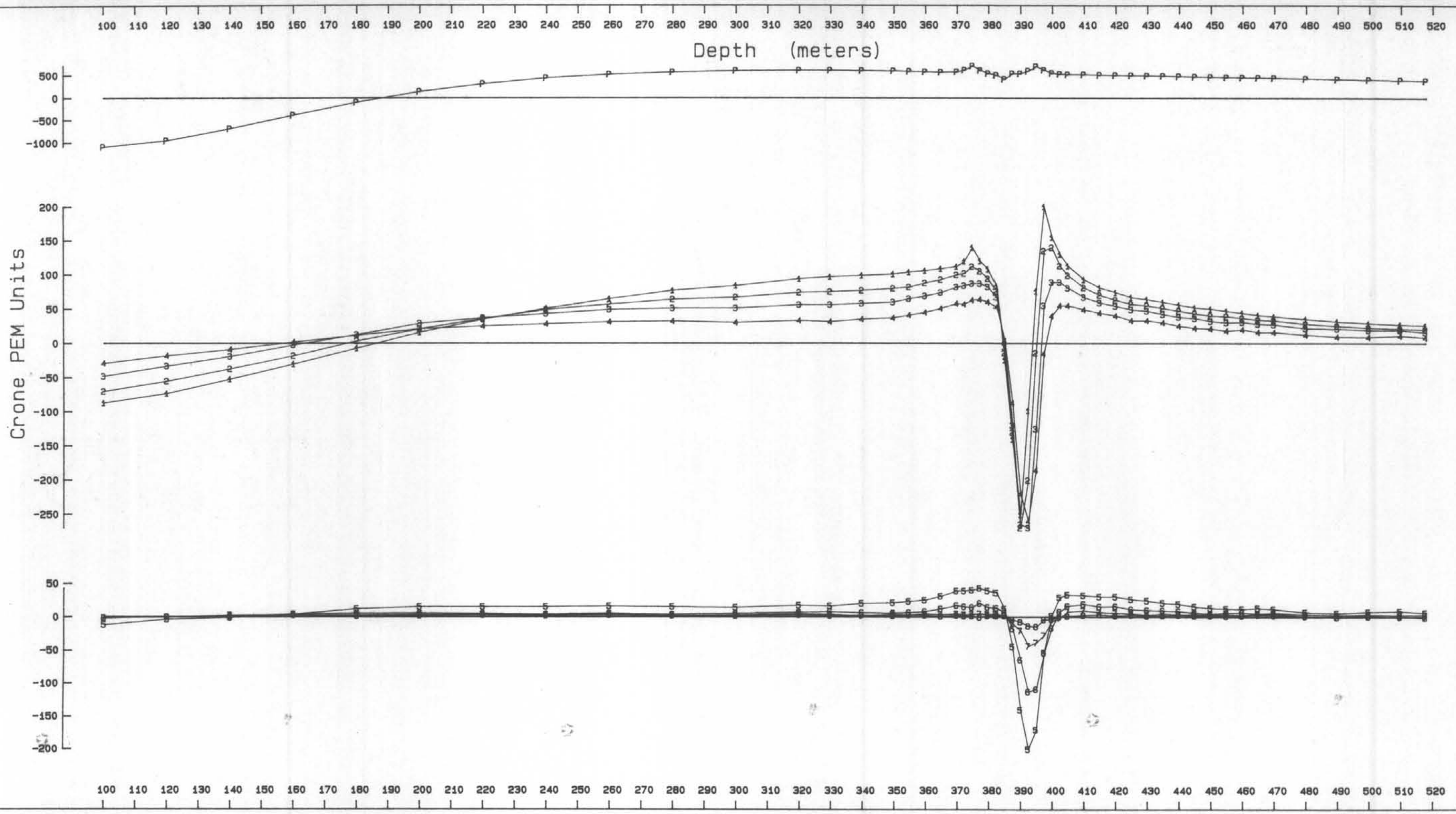
MINNOVA INC.

CHU CHUA PROJECT
BOREHOLE PULSE EM SURVEY
HOLE CCF-69 LOOP C
Scale 1: 1000.0



Date: Dec 1991	Survey: Sept 1991	Profile: 5a
----------------	-------------------	-------------

WOODS GEOPHYSICAL CONSULTING



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

22,039

MINNOVA INC.

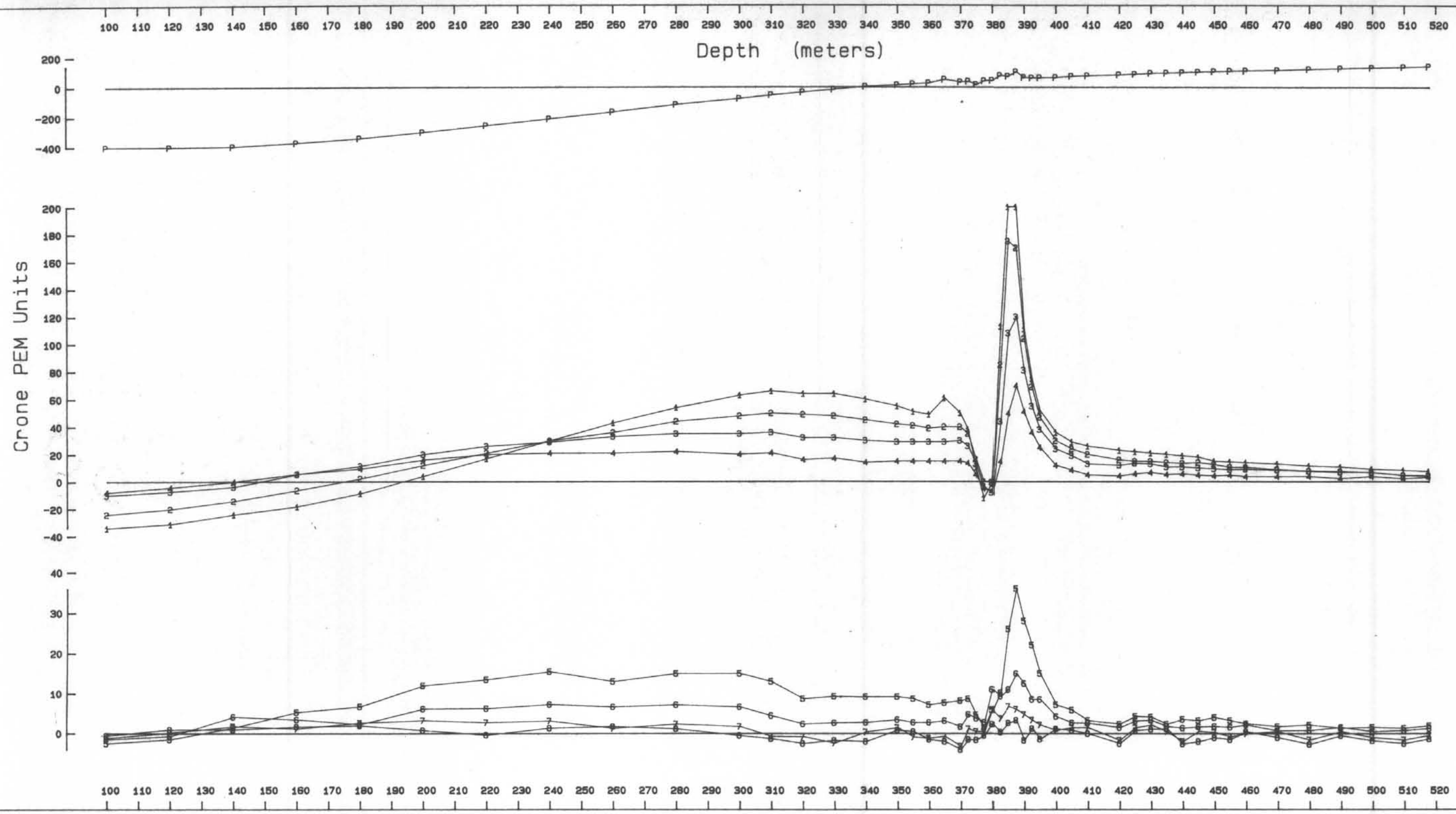
CHU CHUA PROJECT
BOREHOLE PULSE EM SURVEY
HOLE CCF-69 LOOP E

Scale 1: 1000.0



Date: Dec 1991 | Survey: Sept 1991 | Profile: 6a

WOODS GEOPHYSICAL CONSULTING



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

22,039

MINNOVA INC.

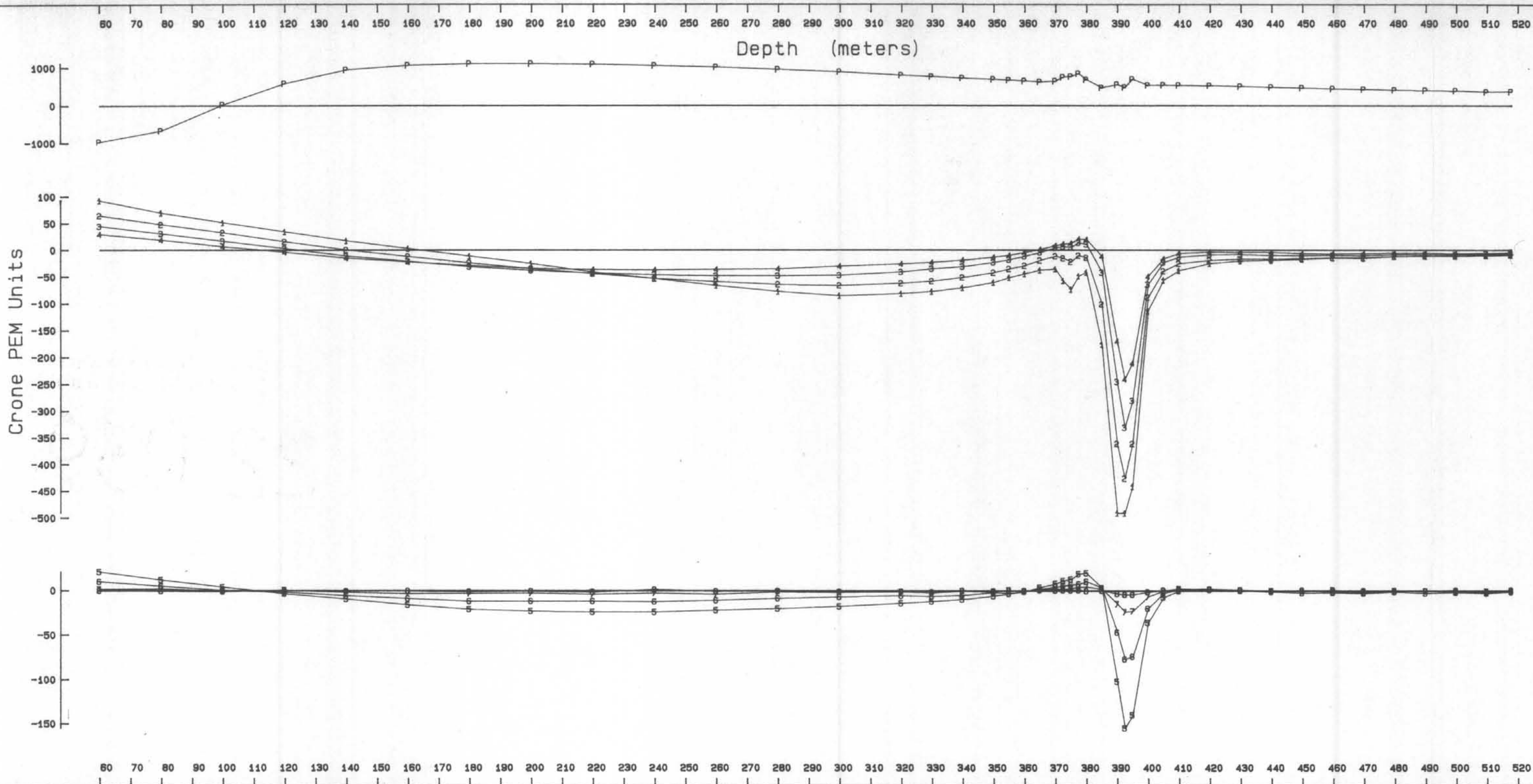
CHU CHUA PROJECT
BOREHOLE PULSE EM SURVEY
HOLE CCF-69 LOOP FE

Scale 1: 1000.0



Date: Dec 1991	Survey: Sept 1991	Profile: 7a
----------------	-------------------	-------------

WOODS GEOPHYSICAL CONSULTING



GEOLOGICAL BRANCH
ASSESSMENT REPORT

22,039

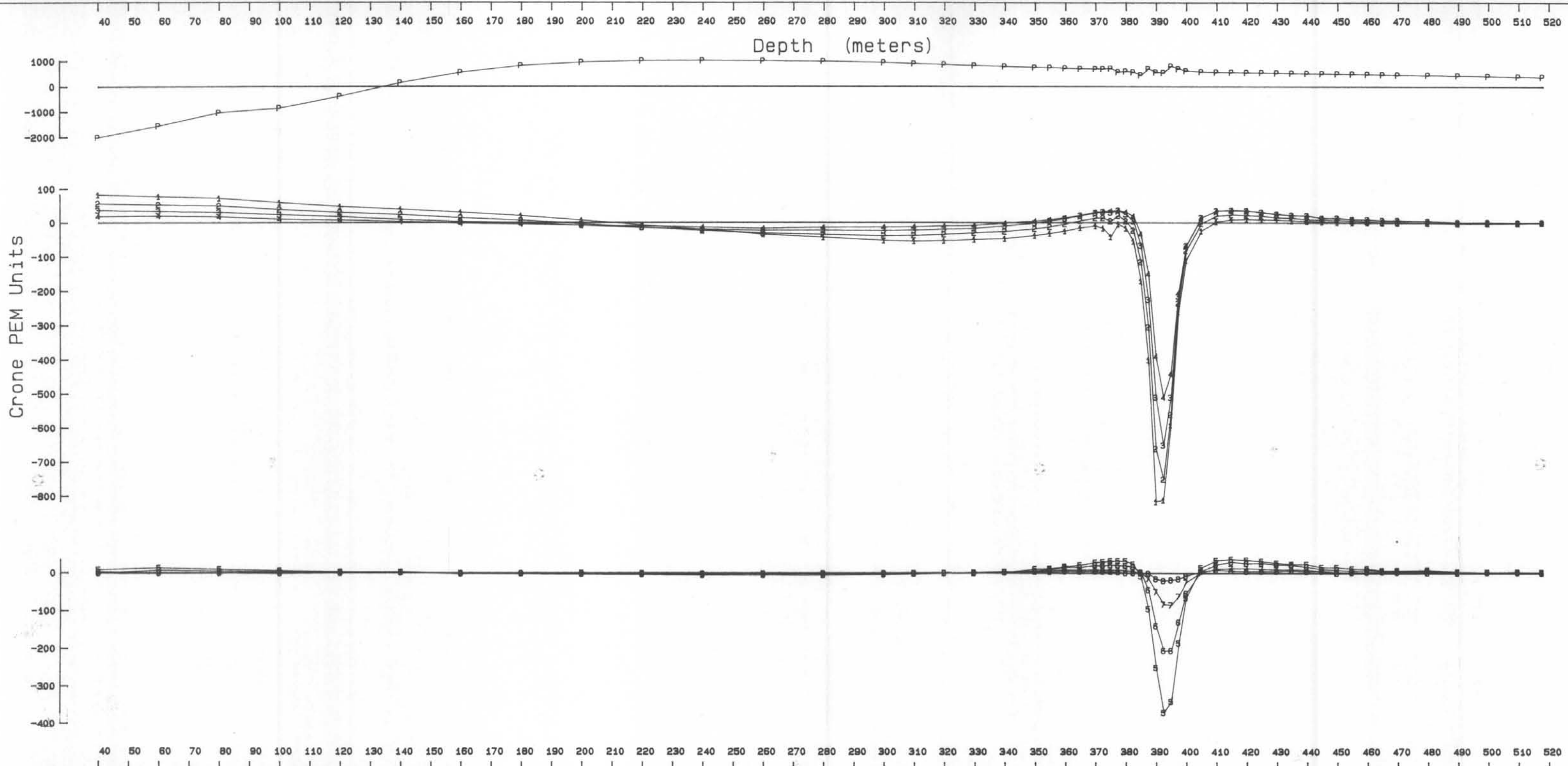
MINNOVA INC.

CHU CHUA PROJECT
BOREHOLE PULSE EM SURVEY
HOLE CCF-69 LOOP N
Scale 1: 1000.0



Date: Dec 1991	Survey: Sept 1991	Profile: 8a
----------------	-------------------	-------------

WOODS GEOPHYSICAL CONSULTING



**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

22,039

MINNOVA INC.

CHU CHUA PROJECT
BOREHOLE PULSE EM SURVEY
HOLE CCF-69 LOOP S
Scale 1: 1000.0



Date: Dec 1991 Survey: Sept 1991 Profile: 9a

WOODS GEOPHYSICAL CONSULTING