ASSESSMENT REPORT TITLE PAGE AND SUMMARY

TITLE OF REPORT: Diamond Drilling and Geophysical Surveys on the Vine Property

TOTAL COST: $156924.30

AUTHOR(S): Douglas Anderson, P.Eng.
SIGNATURE(S):

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S):
STATEMENT OF WORK EVENT NUMBER(S)/DATE(S):5463300

YEAR OF WORK:2013

PROPERTY NAME: Vine

CLAIM NAME(S) (on which work was done):
380410,380411,380412,3800413,380414,380415,380416,380417,380418,380419,380422, and832821.

COMMODITIES SOUGHT: Lead, zinc, silver

MINERAL INVENTORY MINFILE NUMBER(S),IF KNOWN:082GSW050

MINING DIVISION: Fort Steele MD
NTS / BCGS: 082G05/082G041
LATITUDE: __49________ ° _24_________ ' 00__________ "
LONGITUDE: 115__________ ° 49__________ ' 14__________ " (at centre of work)
UTM Zone:11 EASTING:585272 NORTHING:5472748

OWNER(S):PJX Resources Inc.

MAILING ADDRESS:5600-100 King St. W.; Toronto, Ontario, Canada; M5X 1C9

OPERATOR(S) [who paid for the work]: PJX Resources Inc.

MAILING ADDRESS: as above

REPORT KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude. **Do not use abbreviations or codes**) The Vine property is a northwest-oriented Pb/Zn/Ag vein cutting through Proterozoic-age Lower Aldridge and Middle Aldridge turbidites. A resource is present but not NI43-101 compliant. Alteration includes silica, chlorite, albite and sericite.

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:
7087,7677,20518,23740

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (in metric units)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic		All llisted above	64424.44
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for ...)			
Soil			
Silt			
Rock			
Other			
DRILLING (total metres, number of holes, size, storage location)			
Core			67825.41
Non-core			
RELATED TECHNICAL			
Sampling / Assaying			
Petrographic			
Mineralographic			
Metallurgic			
PROSPECTING (scale/area)			
PREPATORY / PHYSICAL			
Line/grid (km)			
Topo/Photogrammetric (scale, area)			
Legal Surveys (scale, area)			
Road, local access (km)/trail			
Trench (number/metres)			
Underground development (metres)			
Other			24674.45
		TOTAL COST	$156924.30

DIAMOND DRILLING AND GEOPHYSICAL SURVEYS ON THE VINE PROPERTY

FORT STEELE MINING DIVISION

Tenure Numbers – Claims optioned to PJX resources (by Klondike Gold and Spirit Gold) include the Vine and Vine Extension 970629, 970649, 506105,506107-506108, 506110,506114 through 506120, 506122-506123, 506125 through 506148, 506150,506155-506157, 506159-506160, 506162, 506165 through 506169, 506171, 506173 through 506177, 506185 through 506189, 506089 through 506092, 505873, 505880 through 505887, 380410 through 380424, and 832821.

UTM's at Drill Location 585272E 5472748N

NTS Mapsheet 082G05

BCGS Mapsheet 082G041

Operator – PJX Resources Inc.
5600 – 100 King Street West
Toronto, Ontario
M5X 1C9

Report by:

D. Anderson, P. Eng.
Geological Consultant
Anderson Minsearch Consultants
#100 – 2100 13th St. South
Cranbrook, B.C.
V1C 7J5

Date: November 5, 2013

DIAMOND DRILLING AND GEOPHYSICAL SURVEYS ON THE VINE PROPERTY

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DIAMOND DRILLING AND GEOPHYSICAL SURVEYS ON THE VINE PROPERTY

1.0 Introduction

This report describes and summarizes exploration work completed on the Vine property during the March through May, 2013 period. This large property is located about 12 air-kilometres southwest of Cranbrook to about 16 air-kilometres south of Cranbrook. It was the site of the discovery of sulfide boulders during the late 1970's and subsequent exploration activities by Cominco Ltd. initially, then several junior companies later stretching through to the present day. Access is via Highway 3/95 south from Cranbrook for approximately 24 kilometers then along Hidden Valley road about 5 kilometes. The property is north of Moyie Lake within the Moyie Range of the Purcell Mountains. It covers moderate topography ranging from 940 to 1390 metres. Forest cover is extensive with a mixture of spruce, larch, fir and pine with portions of the property having been logged and in a variety of stages of regeneration.

2.0 Property Definition, History and Background Information

2.10 Property Definition

The Vine property consists of 19 contiguous claims (648Ha) with the majority (16) of the claims under option from Spirit Gold Inc. The Vine Extension property to the northwest is 84 contiguous claims (6301 Ha) under option from Klondike Gold Corp. The work currently being reported on in this report was completed on the Vine property with the drill hole extension of V-78-1 located on Tenure #380415 with the hole extending onto 380416. The borehole geophysics was the same but the surface EM survey covered a much larger area encompassing most of the southeastern part of the Vine property. The loop was roughly centered on the drill hole and survey lines were completed to the north, south, and west from the hole. (see Crone report included as Appendix C.)

Figure 1 – Vine Property Location in BC

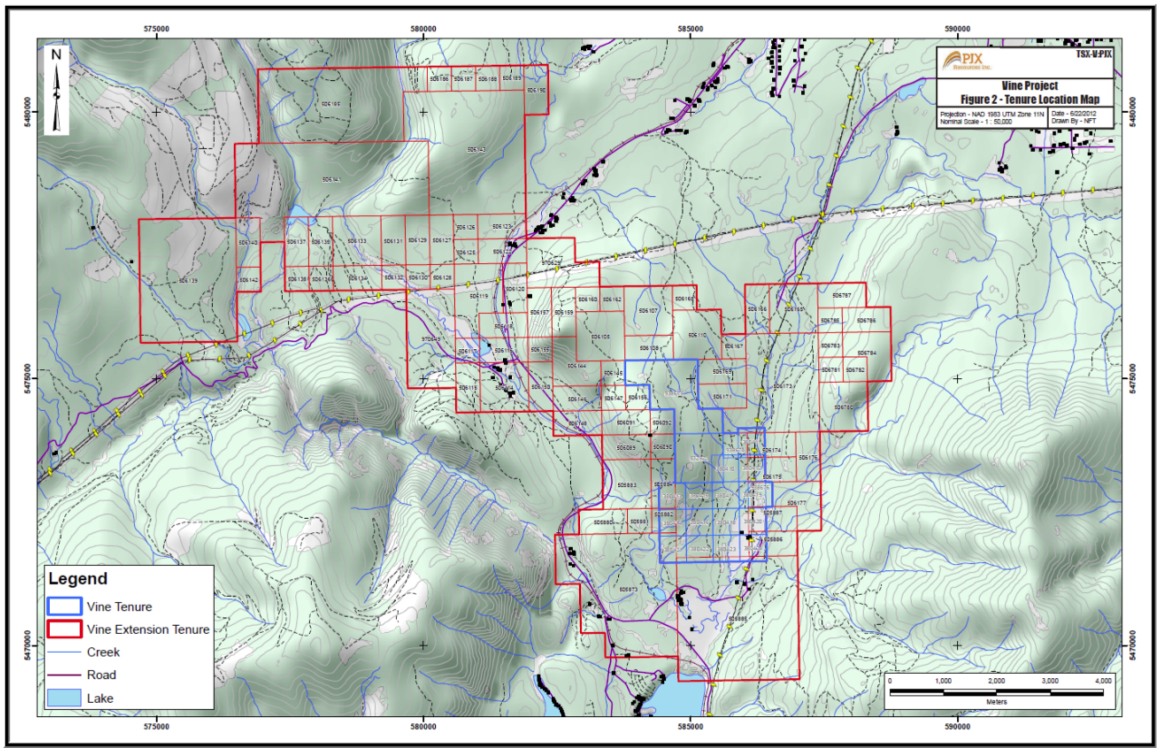

Figure 2 – Vine Property Claims – Vine Extension

2.20 History of Exploration

The Vine property in the Peavine Creek drainage was staked in the late 1970's after high-grade lead-zinc-silver boulders were found along the base of slope. Cominco work led to the identification of a massive sulphide vein trending about azimuth 310° which extends up the hillside (eventually defined by trenching, mapping and drilling) hundreds of metres. The exploration focus for Cominco was to look for Sedex-style mineralization, particularly at the Lower to Middle Aldridge contact (referred to as the LMC or Sullivan Time). The vein was tested by a few short holes with deeper holes (3) testing the LMC at depth away from the vein. These holes intersected the LMC basin interval which does contain anomalous amounts of lead and zinc. Exploration activity then ceased until 1989 when Kokanee Exploration Ltd. acquired the Vine vein portion from Cominco Ltd. From 1989 thru 1991 Kokanee conducted geochemical, geophysical(VLF), mapping, trenching, and diamond drilling (of the vein structure). Their work defined a resource of:

Proven: 264,000 tons at 5.2%Pb, 2.24%Zn,1.96oz/t Ag, and 0.056 oz/t Au.
Probable: 337,000 tons at 4.22%Pb, 2.51%Zn,1.16oz/t Ag, and 0.050oz/t Au.
This estimate is not NI43-101 compliant.

Consolidated Ramrod Gold Corp. took control in 1992 but did little to advance the property. The claims lapsed. In 2000 Supergroup Holdings Ltd. acquired the ground, did minor VLF looking for additional northwest trending structures. In 2005 Ruby Red Resources optioned the property and continued the ground VLF and drilled a five-hole program testing the vein for cross-cutting structures which might enhance the tonnage. This was not successful.

In 2007, a small soil geochem survey was conducted over an area 600 metres northeast of the Vine vein because a parallel-trending gabbro dyke was present. This work returned a modest Zn-Cu anomaly.
The property has been dormant since 2007.

3.00 Regional Geology

The Vine property lies within the Purcell Anticlinorium, a gently north plunging structure that is cored by Paleoproterozoic sedimentary and minor volcanic rocks of the Purcell Supergroup and flanked by unconformably overlying Neoproterozoic clastic and carbonate rocks of the Windermere Supergroup. These are generally overlain by either Cambrian or Devonian rocks, part of the North American “miogeoclinal” sequence.

The Purcell Supergroup, and correlative Belt Supergroup in the United States, comprises a syn-rift succession, the Aldridge Formation, and an overlying, generally shallow water post-rift or rift fill sequence, including the Creston and Kitchener Formation, and younger Purcell rocks (Hoy,1993).

The host rocks at the Vine are part of the Aldridge Formation. The exposed part of the Aldridge in the region is comprised of more than 3000 metres of mainly turbidite deposits within which are numerous, laterally extensive gabbroic sills referred to as the Moyie Intrusions. The Aldridge in Canada can be divided into three divisions: the Lower Aldridge (base not exposed) which is a predominantly argillaceous/siltstone package of more distal turbidites and inter-turbidites; the Middle Aldridge (about 2100 metres) is the greatest percentage of exposed Aldridge in Canada. It is dominantly quartzitic consisting of medium to thick, more proximal turbidites with enclosed thin bedded to laminated marker beds as inter-turbidite units; the upper division is the Upper Aldridge (about 300 metres) a sequence of thin bedded, very rusty weathering argillaceous sediments representing the basin fill or cap sequence. The Aldridge uniquely contains widespread pyrrhotite.

The Aldridge is overlain by the shallow water to subaerial sediments of the Creston Formation. It is composed of green, mauve, and grey siltstone, argillite, and quartzite. There are three recognized subdivisions: a basal argillaceous to silty succession of thin-bedded grey to green sediments with frequent lenticular bedding; the middle is again mauve, green or grey with thin to medium to thick bedded quartzites dominating; the upper division is intermixed green argillaceous siltstone and minor quartzite.

Subsequent to basin fill by the Creston, the overlying Kitchener Formation is a carbonate/argillite sequence of lower green dolomitic siltstone and an upper dark grey, carbonaceous/argillaceous silty dolomite and limestone.

Structurally, the region is within the Foreland Thrust and Fold belt, the most eastern physiographic belt in the Canadian Cordillera (Monger et al., 1982). The belt is characterized by shallow, east verging thrust faults and generally broad open folds in rocks that range in age from the middle Proterozoic Purcell Supergroup to Phanerozoic miogeoclinal rocks. The Purcell Supergroup is mainly exposed as a broad, shallow north plunging anticlinal structure, the Purcell Anticlinorium in the Purcell Mountains west of the Rocky Mountain trench.

Along with the east verging thrust faults there are regional northeast-trending, right lateral reverse faults (Moyie, St. Mary, and Hall Lake), and open to tight folds of various scales. There is also a complex set of normal faults which trend dominantly northward parallel to the Rocky Mountain trench and these structures cut the earlier thrust faults.

The northeast-trending St. Mary and Moyie faults characterize a broad structural zone that cuts across the Purcell Anticlinorium and Rocky Mountain trench and extends to the northeast across the Foreland Thrust belt. This structural zone is marked by change in the structural grain being northerly north of the zone to northwesterly south of the zone and corresponding changes in the thickness and facies of sedimentary rocks that range from middle Proterozoic to early Paleozoic (Hoy, 1993).

4.00 Property Geology

The Vine property lies just in the hangingwall of the major Moyie right lateral reverse fault. The strike of the sedimentary rocks of the Aldridge Formation sub-parallel the Moyie fault ranging from Lower Aldridge to middle of the Middle Aldridge. The sediments dip variably to the northwest going up topography in that direction.

The Vine vein structure is complex with anastomosing sulphide veins contained within a shear also containing gabbro and lamprophyre intrusions. The vein tracks northwest and dips 70 to 80° to the southwest. It has been traced by mapping, geophysics, and geochemistry for about 5 kilometres. More proximally, it has been trenched for about 2 kilometres and drilled over about 700 metres. Mineralization includes pyrrhotite, sphalerite, galena (silver), arsenopyrite, chalcopyrite, pyrite and locally gold.

The vein cuts at least 1500 metres of Aldridge stratigraphy from below the Footwall Quartzites of the Lower Aldridge through the Lower/Middle Aldridge contact (Sullivan Time) up to at least Meadowbrook marker time. The other exploration target aside from the vein continues to be Sullivan Time, in search of a Sedex type occurrence.

The 2013 exploration work included extending a hole drilled in 1978 by Cominco Ltd. It had been stopped after reaching a depth of 551 metres having cored the Sullivan Time interval. The hole was extended to test the stratigraphy beneath the Footwall Quartzites which are Middle Aldridge-style turbidites occuring within the Lower Aldridge. The additional drilling was 403.69 metres. A Pulse time domain EM survey was done down the drill hole and a surface survey was completed around the Vine vein.

5.00 Diamond Drilling Results

The Vine vein has been drilled quite intensely over a 700 metre strike interval. These specific drill tests of the vein were supplemented by several drill holes designed to test to depth (Sullivan Time) lateral to the vein structure for Sedex-style mineralization. One of these holes was V-78-1 collared just west of the vein and drilled steeply to the southwest. This hole originally was drilled to 545.7 metres according to this year’s measurements by FB Drilling. It tested the Lower/Middle Contact and bottomed in Lower Aldridge sediments. The objective of this year’s drilling was to extend V-78-1 to core the Lower Aldridge below the Footwall Quartzite section which is contained within the Lower Aldridge. This required coring to a depth of 949.39 metres – an extension of the original hole by 403.7 metres.

The drilled extension was entirely within Lower Aldridge stratigraphy. It encountered several faults (four of which are shown on the accompanying section) which are interpreted to offset the Footwall Quartzites to expand its hole thickness to a total thickness greater than that normally seen in the basin. The Lower Aldridge sediments are thin to very thin bedded, pyrrhotitic argillites and siltstones with lesser medium bedded units which are interpreted as distal turbidites. The Lower and Middle Aldridge are viewed as the basin fill part of the overall sequence, the turbidites of the Middle Aldridge are overlain by Upper Aldridge sediments then the shallower water (to aerially exposed) Creston Formation. Within the Lower Aldridge, some 150 metres below the Lower/Middle Contact is an interval of medium to thick bedded, siltstones to quartzites labelled the Footwall Quartzites (expected thickness 150 metres). The Footwall Quartzites in the drill hole are at least 200 metres thick. Near or at the base of the FWQ the hole entered a fault which is interpreted to offset the top portion of the underlying Lower Aldridge, the hole entering a gabbro dyke and then normal Lower Aldridge rocks.

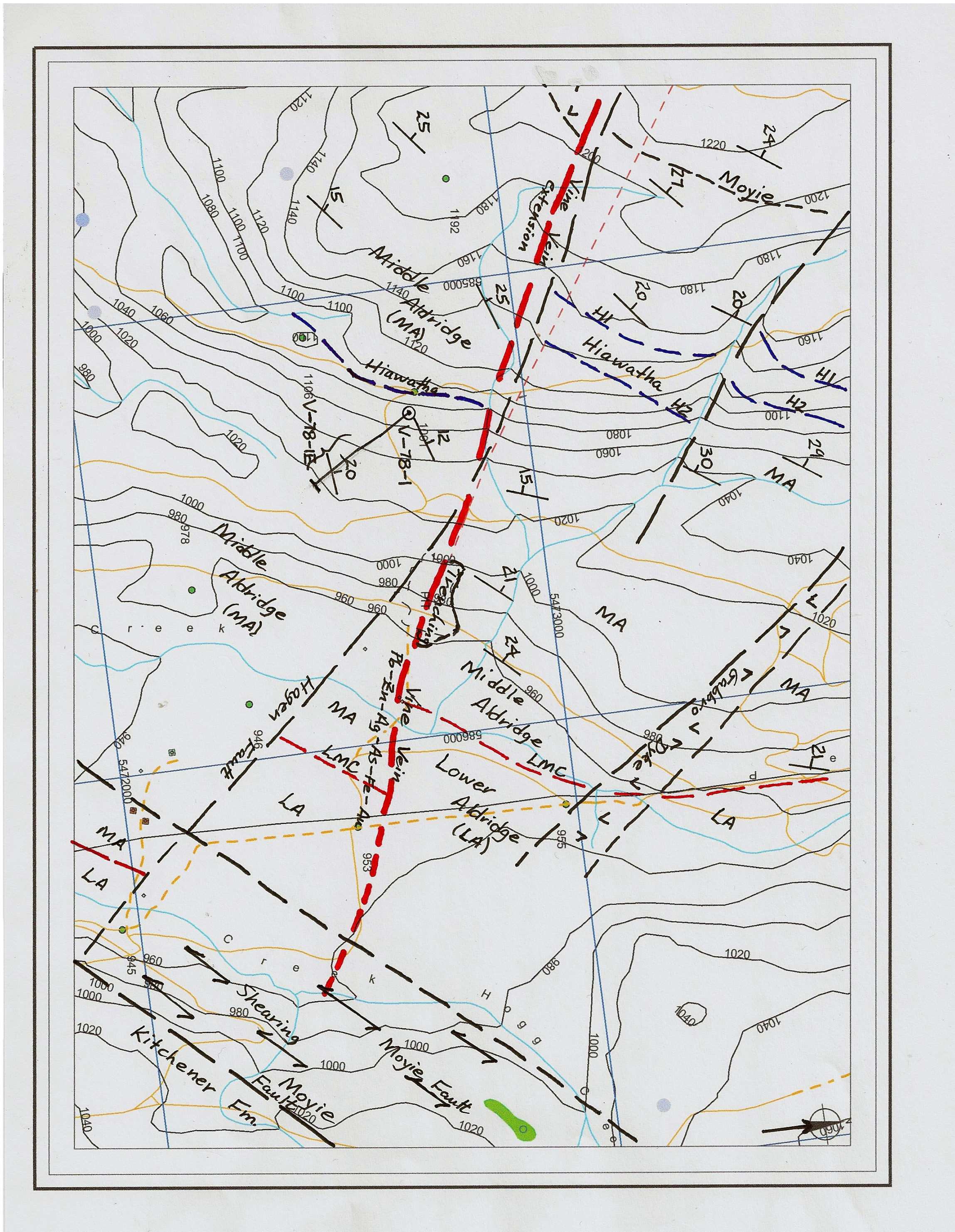

Figure 3 - Vine Vein Geology Map
Scale 1:10000

Gabbro Intrusion = G
Middle Aldridge=MA – contains matchable laminations (markers such as Hiawatha)
Lower Aldridge =LA LMC = Lower/Middle Aldridge Contact (Sullivan Time)

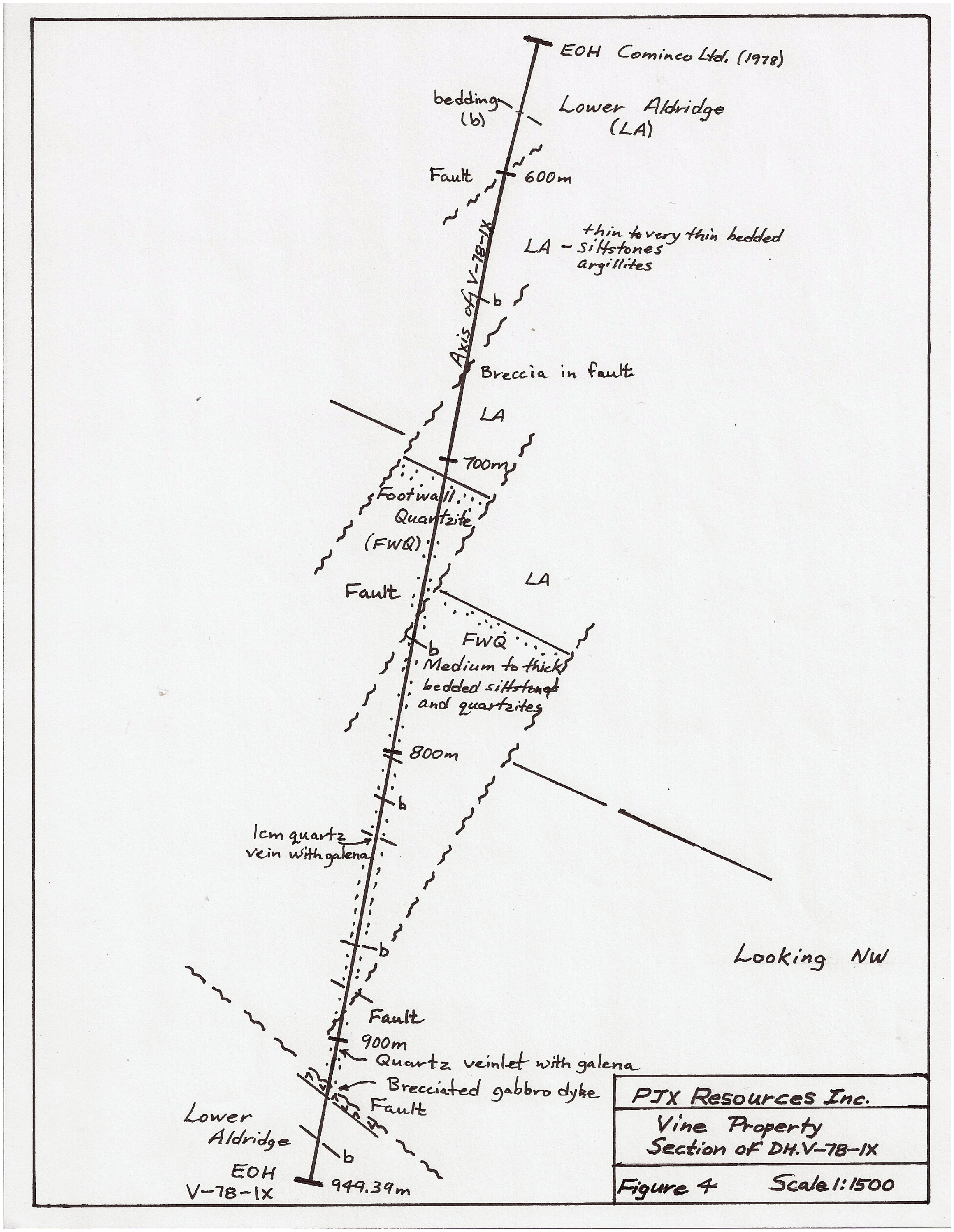

Figure 4 - Drill Hole Section V-78-1X

Middle Aldridge – more proximal, medium to thick bedded quartzitic turbidites.
Lower Aldridge – distal, thin to medium bedded turbidites with pyrrhotite.
Footwall Quartzites(FWQ) – thick bedded quartzites.

6.00 Summary and Conclusions for Diamond Drilling

The drilling campaign successfully re-entered a drill hole drilled 35 years previous. The hole was cored from about 545.7 metres to 949.39 metres. The stratigraphic succession anticipated was encountered. The 2013 hole continued the existing hole below Sullivan Time, coring about 150 metres of Lower Aldridge then the Footwall Quartzite sequence which has been thickened by minor faults. At 914.2 metres the hole entered a moderate dipping fault with contained gabbro at the base of the FWQ. However, the V-78-1X drill hole of 2013 was unsuccessful in testing the upper portion of the Lower Aldridge immediately below the FWQ due to this normal fault. The hole finished in Lower Aldridge sediments.

7.00 Geophysical Surveys – Introduction to Appendix C

Two types of surveys were conducted on the Vine Property by Crone Geophysics and Exploration Limited during spring, 2013. A borehole (downhole) survey was completed on the entire V-78-1 and V-78-1X hole and a surface survey consisting of one loop and three survey lines. These Pulse EM surveys lasted from April 22 to May 6, 2013 with the surface survey covering 4.975 kilometres.

8.00 Summary and Conclusions for the Geophysics Surveys
(see Appendix C for more detail)

The surface survey was a test of the effectiveness of Time Domain EM in this geological terrain. Three lines were surveyed, two across the strike of the Vine vein and one sub-parallel to it. The lines were surveyed inside and outside of the loop. It appears this EM technique is effective in this environment – it successfully detected the Vine vein and another conductor to the northeast and although modeling limitations are a factor in evaluation because of the limited area surveyed, the survey indicates a large conductive unit is present with a moderate north dip.

The Borehole survey of V-78-1 and V-78-1X detected a conductor at Sullivan Time in the old hole (expected) plus several shorter wavelength responses at depth which need resolution.

9.00 Itemized Cost Statement

There were costs incurred throughout the January to July period in preparation for what was done on the ground in April and May and then the reporting on work completed.

In January/February – High Grade Geological Consulting - $3150.00
7 days planning,plotting for drilling at $450 per day

Cost cont'd.

In March – 2 days High Grade Geological Consulting - Planning and rental of facilities ($200/day) Collection of Samples by High Grade Geological.	$ 830.60
March 13 – Tipi Mountain archaelogical visit to drill site -	$ 1185.00
April – FB Drilling of 403.69 metres	$ 67825.41
April/May – rental of core logging facilities from High Grade Geological Consulting at $200/day	$ 4000.00
April/May – High Grade Geological Consulting – logging of core and plotting at $450/day.	$ 6975.00
April through June 4 – Crone Geophysics	$ 64424.44
April – moving and storage of core – EK Expediting 4 days at $250/day	$ 1000.00
In June – 2 days for High Grade Geological at $450/day and Maple Leaf Forestry map production at $400/day	$ 1300.00
In the April through July 10 period, TerraLogic Consultants compiled and produced maps and surveyed drill holes	$ 3233.85
Anderson Minsearch Assessment Report compilation, map production and writing – 6 days at $500/day	$ 3000.00
Total Cost for 2013	$156924.30

10.0 Author's Qualifications

I, Douglas Anderson, Consulting Geological Engineer, have my office at #100 – 2100 13th St. South in Cranbrook, B.C. V1C 7J5.

I graduated from the University of British Columbia in 1969 with a Bachelor of Applied Science in Geological Engineering.

I have practiced my profession since 1969, mainly with one large mining company, in a number of capacities all over Western Canada and since 1998 within southeastern B.C. as a mineral exploration consultant.

I am a Registered Professional Engineer and member of the Association of Professional Engineers and Geoscientists of B.C., and I am authorized to use their seal.

D. Anderson
Douglas Anderson, P. Eng.

11.0 References

Webber G. L. (1978): Geology Report, Vine Property, Fort Steele Mining Division; BC Ministry of Energy and Mines, Assessment report 7087, 15 pages.

Webber G.L. (1979): Diamond Drilling Report, Vine Property, Fort Steele Mining Division; BC Ministry of Energy and Mines, Assessment report 7677, 36 pages.

Stephenson L. (1990): Diamond Drilling and Geochemistry Report, Fort Steele Mining Division; BC Ministry of Energy and Mines, Assessment report 20518, 58 pages.

Pighin D.L. (1995): Diamond Drilling Report, Vine Property, Fort Steele Mining Division; BC Ministry of Energy and Mines, Assessment report 23740, 24 pages.

Hoy, T. (1993): Geology of the Purcell Supergroup in the Fernie W-half area, southeastern BC; BC Ministry of Energy and Mines, Bulletin 84, 157 pages.

Monger, J.W., Price, R.A., and Tempelman-Kluit, D.J. (1982): Tectonic accretion and the origin of two major metamorphic and plutonic welts in the Canadian Cordillera; Geology, v. 10, pages 70-75.

APPENDIX A

DRILL HOLE RECORD

PJX RESOURCES

Drill Hole V-78-1X **Vine Property – Peavine Creek** (located 16 kilometres SSW from Cranbrook, B.C.)

Commenced: March 25,2013 Completed: April 15,2013
The drill hole was an extension to an old hole drilled in 1978 by Cominco Ltd.
UTM's: 585272E 5472748N Elevation: 1075m
Collar of original hole -75° to Azimuth 148°. NQ Core stored at the Peavine property. Contractor: FB Drilling of Cranbrook, B.C.
Objective: To test deeper in the stratigraphy, below the Footwall Quartzites for possible bedded sulphides. Logged by: D.L. Pighin

0	545.7m	To base of original hole.
545.7 – 601.5m		Typical Lower Aldridge sediments – biotitic, calcareous in part siltstones. Interbedded with sericitic siltstones. Sediments are dark reddish grey and light grey. Mainly thin to very thin bedded, rarely medium bedded rhythmically. Siltstones are fine-grained with flat bedding planes which are sharp. Calcareou biotitic beds are very finely parallel laminated. Bedding to core axis 73° at 551m; 73° at 589.8m. Structures: 579.8 – 580m is a shear zone at 38° to core axis which is strongly foliated sericitic gouge and breccia. From 599.8 – 601.5m a fault cuts the core axis at 43° - composed of soft gouge and angular clasts of brecciated siltstones; some calcite veining. Alteration is regional nature with the calcareous beds mainly biotite and later sericite. There is some silicification. Mineralization is limited to rare tension cracks at 9° to ca with pyrrhotite and pyrite. At 597.8m a 1.5cm thick bedding parallel quartz vein hosts galena, sphalerite and pyrite.
601.5 – 704.0m		Dominantly (85%) medium to thin bedded calcareous, biotitic siltstone with rare beds of silty limestone; less sericitic argillites. Siltstones are dark reddish brown while argillites are light grey. There are a some sequences of very thin beds. Bedding to core axis 80° at 602.5m; 80° at 617.98m; 75° at 648.5m; 77° at 664m; and 78° at 672m. Structures: 609 to 612m is weakly crackle brecciated, healed mainly by calcite and quartz. 669 to 670.2m is a fault at 24° to ca which consists of brecciated sediments in a matrix of fault gouge

healed in part by calcite, with pyrite. At 647.8m is 1cm of shearing at 15° to ca. Alteration is similar to previous section. Mineralization is limited: 601.5 to 603.3m is smoky quartz vein at 5° to ca which is 5cm thick with weak pyrite and scattered crystals of tourmaline. At 607.8m a 1cm thick quartz-sericite vein parallels bedding having pyrite and sphalerite. In general, the calcareous, biotitic siltstone beds host disseminated pyrrhotite and pyrite but rarely more than 2% by volume. There are tension cracks up to 5mm thick which cut the core axis at 20° with calcite, pyrite, and quartz. There some irregular cracks which cut the core at a variety of steep angles also.

704m – 914.2m This is the Footwall Quartzite interval – dominated by siltstone with lesser quartzite and silty argillites. Mainly medium to thick bedded with minor 1.0m thick sequences of very thin bedded silty argillite and argillite, scattered throughout the interval. In the thicker beds bedding is indistinct verses the sharp and flat beds of the argillites. The siltstones graded, fining upwards; some have flame structures or scattered rip-up clasts. Mostly more proximal turbidites. They contain soft sediment slump zones from about 786m down. Bedding 75° at 737.5m and 772m; 68° at 781m; 74° at 800m; 76° at 815m. Structures: 753 to 755.2m beds are strongly fractured – F1 fractures then F2 type. Alteration is generally sericitic and biotitic reflecting more regional type alteration. 721.9 to 731.5m late intense silicification speckled with sericite and rare subhedral pink garnets. There is weakly developed late calcite. Garnets become more common from about 758m and continue to end of the hole. Mineralization is restricted to weakly disseminated pyrrhotite and lesser pyrite. This is to about 820m.

Deeper in this same section – Footwall Quartzites continue with:

822.5 to 829.5m Lower Aldridge type, fine grained silty argillite beds. In the more quartz-rich sediments there are continued soft sediment deformation features,slump features are more abundantly developed from 851m down. Bedding: 76° at 829.5m; 85° at 866.3m; 73° at 882m; 81° at 900m; and 82° at 911.65m. Structures: again fracturing common; at

	821.6m chlorite-calcite filled shear 1.5cm thick at 48° to ca. Fault zone 889.3 to 890.4m cuts ca at 20° - brecciated sediments in a soft gouge. The pink garnets continue. Also calcite after selenite crystals throughout the quartzites and siltstones. There is silicification, particularly from 854m down. Mineralization restricted; at 828.8m 1cm thick, bedding parallel quartz vein with galena, pyrrhotite and pyrite. Pyrrhotite forms thin 2 to 3mm layers in some argillite beds. At 902.3m quartz-pyrrhotite-galena vein 5mm thick cutting core axis at 20°.
914.2 – 926.7m	Brecciated Gabbro dyke 914.2 – 917.4m. The remainder of the zone is silicified and brecciated siltstone. The package qualifies as a fault zone. The gabbro is dark green together with whitish silicified sediments. The fault gouge is best developed along the gabbro contacts which cuts the core axis at 61°. The dyke is healed by calcite. The sediment is crackle brecciated with irregular hairline fractures and silicified with veinlets of quartz and calcite. Mineralization-pyrite is disseminated in the breccia but best developed in the gabbro dyke. (five samples were taken in this interval but not analysed to date.)
926.7 – 949.39m	Primarily siltstones with interbedded silty argillite. These are Lower Aldridge type sediments. Thin, very thin to medium bedded, with alteration from 926.7 to 935.5m which masks structures.Otherwise bedded seen is flat and distinct at about 79° to core axis. The alteration mentioned is silica with later sericite and chlorite. This in turn is cut by late calcite and quartz veinlets. Mineralization is weak – pyrite is present as disseminations in siliceous sediments and along hairline fractures. Rare veins – one at 945.4m is 1 cm of pyrrhotite, pyrite, chlorite and calcite at 18° to ca.

End of Hole

The original 1978 hole was surveyed as well as this extension:

10.7m	-68.2	Azimuth=148°
551.5m	-78.2	Azimuth=147.2°
676.5m	-78.5	Azimuth=159.9°
900.0m	-77.8	Azimuth=153.1°

APPENDIX B

Property	Tenure#	Owner	Name	Owner	Tenure	Type	Map#	Issue Date	Good to	Status	Area
Vine	380410	SG	VP 6	145300 (100%)	Mineral	Claim	082G041	2000/sep/04	2019/nov/01	GOOD	25
Vine	380411	SG	VP 7	145300 (100%)	Mineral	Claim	082G041	2000/sep/04	2019/nov/01	GOOD	25
Vine	380412	SG	VP 8	145300 (100%)	Mineral	Claim	082G041	2000/sep/04	2019/nov/01	GOOD	25
Vine	380413	SG	VP 9	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380414	SG	VP 10	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380415	SG	VP 11	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380416	SG	VP 12	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380417	SG	VP 13	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380418	SG	VP 14	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380419	SG	VP 15	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380420	SG	VP 16	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380421	SG	VP 17	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380422	SG	VP 18	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380423	SG	VP 19	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	380424	SG	VP 20	145300 (100%)	Mineral	Claim	082G031	2000/sep/04	2019/nov/01	GOOD	25
Vine	832821	SG	VINENW	145300 (100%)	Mineral	Claim	082G	2010/sep/05	2019/nov/01	GOOD	84.0848
Vine	938674	PJX		256589 (100%)	Mineral	Claim	082G	2011/dec/23	2015/dec/23	GOOD	21.0201
Vine	938675	PJX		256589 (100%)	Mineral	Claim	082G	2011/dec/23	2015/dec/23	GOOD	147.108
Vine	938676	PJX		256589 (100%)	Mineral	Claim	082G	2011/dec/23	2015/dec/23	GOOD	21.0235
Vine Ext	505873	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/04	2013/sep/05	GOOD	434.882
Vine Ext	505880	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/04	2013/sep/05	GOOD	42.052
Vine Ext	505881	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/04	2013/sep/05	GOOD	21.026
Vine Ext	505882	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/04	2013/sep/05	GOOD	21.026
Vine Ext	505883	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/04	2013/sep/05	GOOD	84.093
Vine Ext	505884	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/04	2013/sep/05	GOOD	42.046
Vine Ext	505885	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/04	2013/sep/05	GOOD	509.463
Vine Ext	505886	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/04	2013/sep/05	GOOD	42.054
Vine Ext	505887	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/04	2013/sep/05	GOOD	42.05
Vine Ext	506089	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.041
Vine Ext	506090	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	21.02
Vine Ext	506091	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.038
Vine Ext	506092	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	21.019
Vine Ext	506105	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	84.044
Vine Ext	506107	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	84.036
Vine Ext	506108	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.023
Vine Ext	506110	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	84.043
Vine Ext	506114	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	84.059
Vine Ext	506115	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.03
Vine Ext	506116	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.024
Vine Ext	506117	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	21.012
Vine Ext	506118	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.021
Vine Ext	506119	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	105.042
Vine Ext	506120	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.016
Vine Ext	506122	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.011
Vine Ext	506123	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.007
Vine Ext	506125	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	21.005
Vine Ext	506126	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	21.004
Vine Ext	506127	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.009
Vine Ext	506128	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	21.007
Vine Ext	506129	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.009
Vine Ext	506130	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	21.007
Vine Ext	506131	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	42.009
Vine Ext	506132	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	21.007
Vine Ext	506133	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/sep/05	GOOD	84.019
Vine Ext	506134	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.014
Vine Ext	506135	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.009
Vine Ext	506136	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	21.007
Vine Ext	506137	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.009
Vine Ext	506138	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	21.007
Vine Ext	506139	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	420.137
Vine Ext	506140	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.009
Vine Ext	506141	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2014/nov/30	GOOD	525.013
Vine Ext	506142	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	21.007
Vine Ext	506143	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/20	GOOD	461.962
Vine Ext	506144	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/20	GOOD	63.04
Vine Ext	506145	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/20	GOOD	21.014
Vine Ext	506146	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/20	GOOD	42.031
Vine Ext	506147	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/20	GOOD	21.015
Vine Ext	506148	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.038
Vine Ext	506150	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.029
Vine Ext	506155	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	21.012
Vine Ext	506156	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	21.015
Vine Ext	506157	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.019
Vine Ext	506159	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.019
Vine Ext	506160	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	21.009
Vine Ext	506162	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	21.009
Vine Ext	506165	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	84.037
Vine Ext	506166	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.018
Vine Ext	506167	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	21.012
Vine Ext	506168	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	21.008
Vine Ext	506169	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.027
Vine Ext	506171	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.031
Vine Ext	506173	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	273.198
Vine Ext	506174	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.04
Vine Ext	506175	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.043
Vine Ext	506176	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	42.041
Vine Ext	506177	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	63.072
Vine Ext	506185	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	398.91
Vine Ext	506186	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	20.993
Vine Ext	506187	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	20.993
Vine Ext	506188	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	20.993
Vine Ext	506189	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	20.993
Vine Ext	506190	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/07	2013/nov/19	GOOD	41.988
Vine Ext	506780	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/11	2013/nov/19	GOOD	84.068
Vine Ext	506781	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/11	2013/nov/19	GOOD	21.014
Vine Ext	506782	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/11	2013/nov/19	GOOD	21.014
Vine Ext	506783	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/11	2013/nov/19	GOOD	21.012
Vine Ext	506784	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/11	2013/nov/19	GOOD	63.04
Vine Ext	506785	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/11	2013/nov/19	GOOD	21.011
Vine Ext	506786	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/11	2013/nov/19	GOOD	42.022
Vine Ext	506787	KG		100809 (100%)	Mineral	Claim	082G	2005/feb/11	2013/nov/19	GOOD	42.018
Vine Ext	970629	KG	LUMB 1	100809 (100%)	Mineral	Claim	082G	2012/mar/23	2013/aug/30	GOOD	105.031
Vine Ext	970649	KG	LUMB 2	100809 (100%)	Mineral	Claim	082G	2012/mar/23	2013/aug/30	GOOD	168.092
Vine Ext (1km)	1018945	PJX		256589 (100%)	Mineral	Claim	082G	2013/apr/29	2014/apr/29	GOOD	105.029
Vine Ext (1km)	1018946	PJX		256589 (100%)	Mineral	Claim	082G	2013/apr/29	2014/apr/29	GOOD	84.0818
Vine Ext (1km)	1018947	PJX		256589 (100%)	Mineral	Claim	082G	2013/apr/29	2014/apr/29	GOOD	84.0137
Vine Ext (1km)	1018962	PJX		256589 (100%)	Mineral	Claim	082G	2013/apr/30	2014/apr/30	GOOD	189.218
Vine Ext (1km)	1018964	PJX		256589 (100%)	Mineral	Claim	082G	2013/apr/30	2014/apr/30	GOOD	294.272
Vine Ext (1km)	1018966	PJX		256589 (100%)	Mineral	Claim	082G	2013/apr/30	2014/apr/30	GOOD	147.088
Vine Ext (1km)	1018967	PJX		256589 (100%)	Mineral	Claim	082G	2013/apr/30	2014/apr/30	GOOD	315.195

APPENDIX C

Geophysical Survey Report – Crone Geophysics

Geophysical Survey Report

covering

Surface & Borehole Pulse EM Surveys

over the

Vine Property

for

PJX Resources Inc.

during
April - May 2013
by

CRONE GEOPHYSICS & EXPLORATION LTD.

Survey Area:	**Vine Property, south of Cranbrook, British Columbia.**
Survey Type:	**Surface & Borehole Pulse EM Surveys**
Survey Operators:	**John Carter**
Surface Surveys:	**Loop Surf-1, Line: 1E, 1N, 1W**
Borehole Surveys:	**Hole: V-78-1X**
Survey Period:	**April - May 2013**
Report By:	**A.M.Khan**
Report Date:	**June 2013**

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PULSE ELECTROMAGNETIC SURVEY

APPENDICES

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

Crone Geophysics & Exploration Limited was contracted by PJX Resources to conduct Borehole/Surface Pulse Electromagnetic Surveys on its Vine Property located south of Cranbrook, British Columbia. This report summarizes the geophysical work carried out in April – May 2013.

Three (3) surface lines utilizing one (1) surface loop and one (1) hole were surveyed from one transmitter loop during the survey period April 22nd – May 06th 2013.

The appendices to this report contain page size profile plan maps, section maps, the PEM profiles (linear 5-axis and logarithmic scale) and a description of the Crone Instrument Specifications.

2.0 PROPERTY LOCATION

The Vine property covers a northeast-oriented tract of land located immediately north of Moyie Lake, from approximately 7 to 20km southwest of Cranbrook, B.C. The property is centered on the following UTM coordinates: Nad83 Zone 11N Easting 585298, Northing 5473220.

Access is via Highway 3/95 south from Cranbrook for approximately 24 kilometers then turning onto the Hidden Valley road which takes you to the Vine property.
The Vine property is situated north of Moyie Lake within the Moyie Range of the Purcell Mountains. Topography varies from gentle valley bottoms and rounded ridges to steep, rocky mountain slopes. Elevations range from 940m to 1390m. Forest cover is generally a mixture of spruce, larch, fir, and pine with lesser cedar and hemlock.

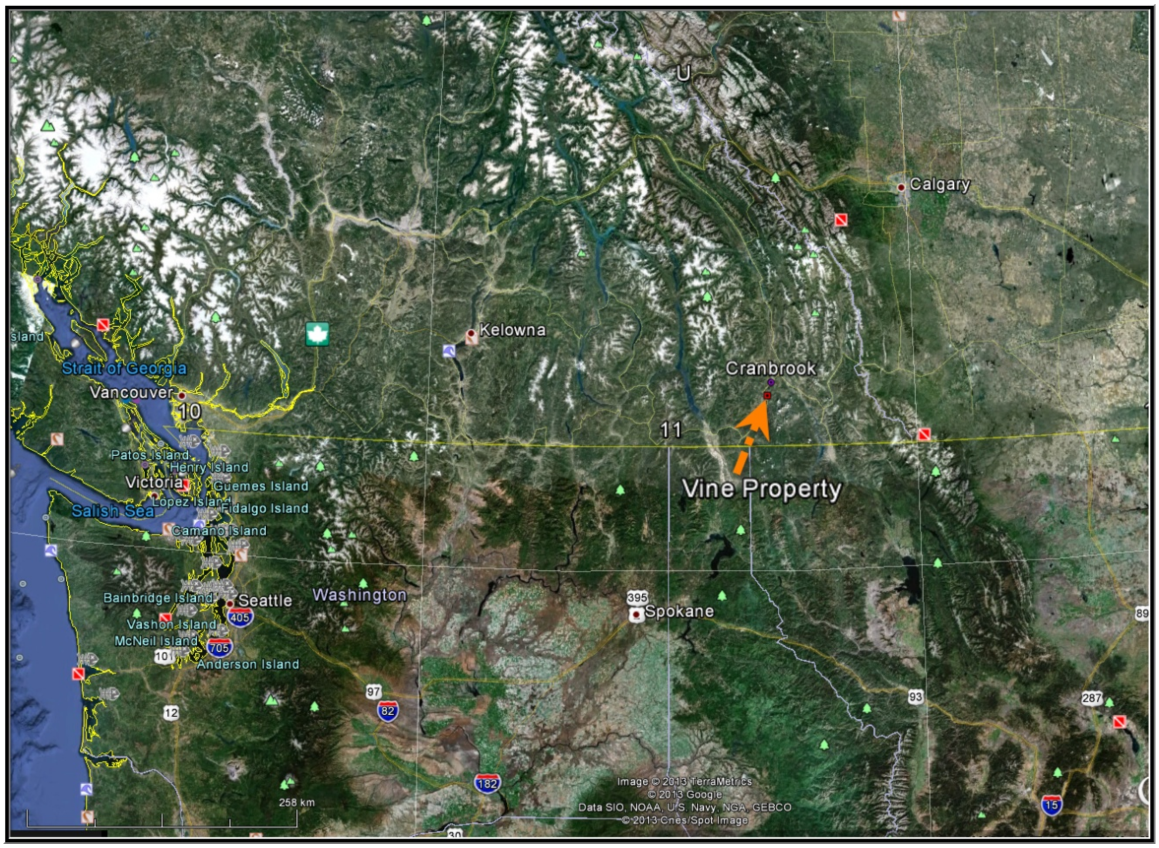


Figure 1: Property General Location Google map

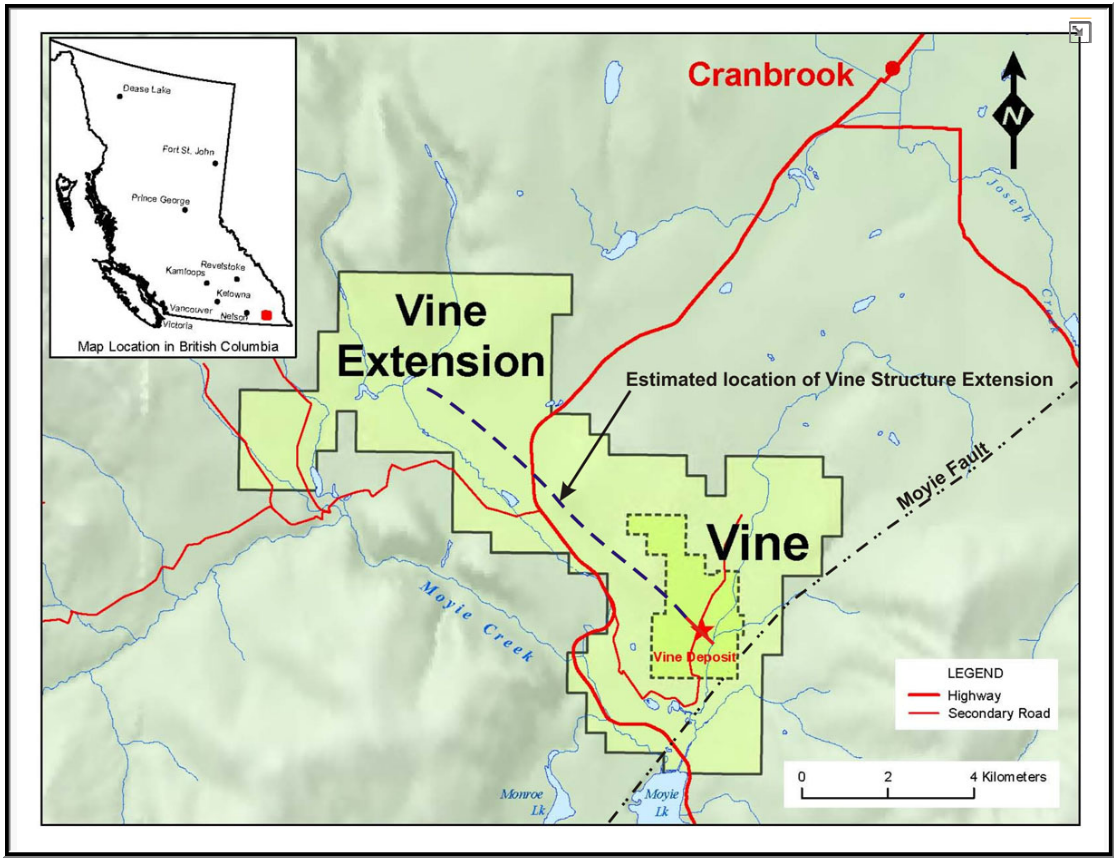


Figure 2: Vine Property Location and Access Map

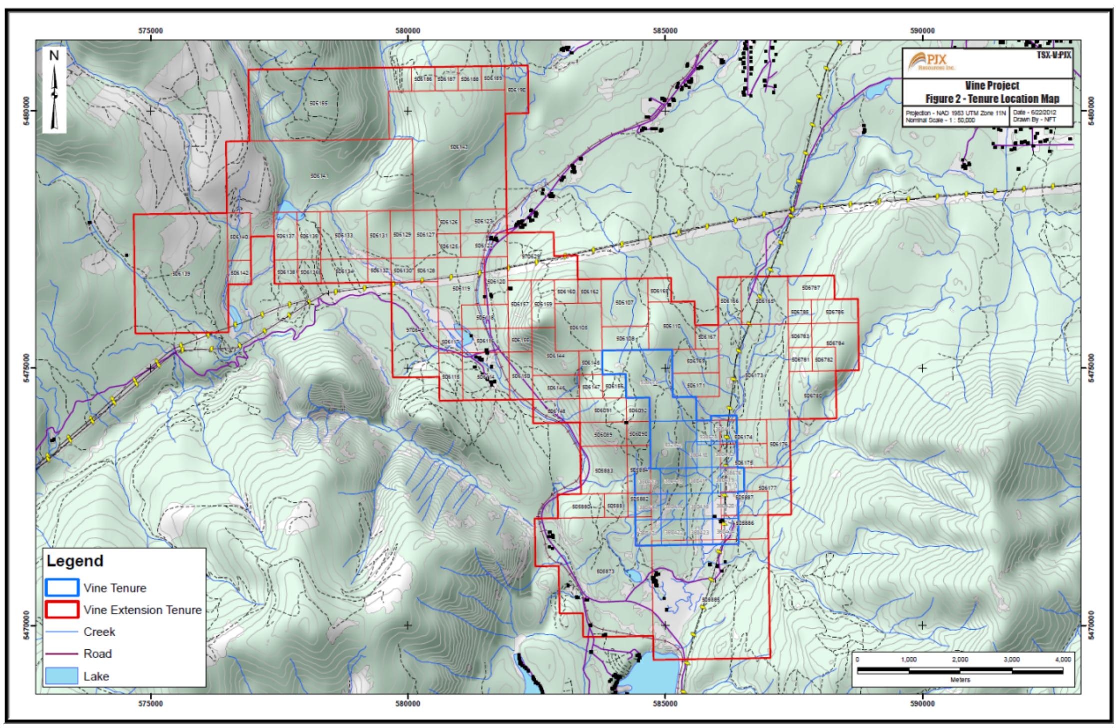


Figure 3: Property Claim Map

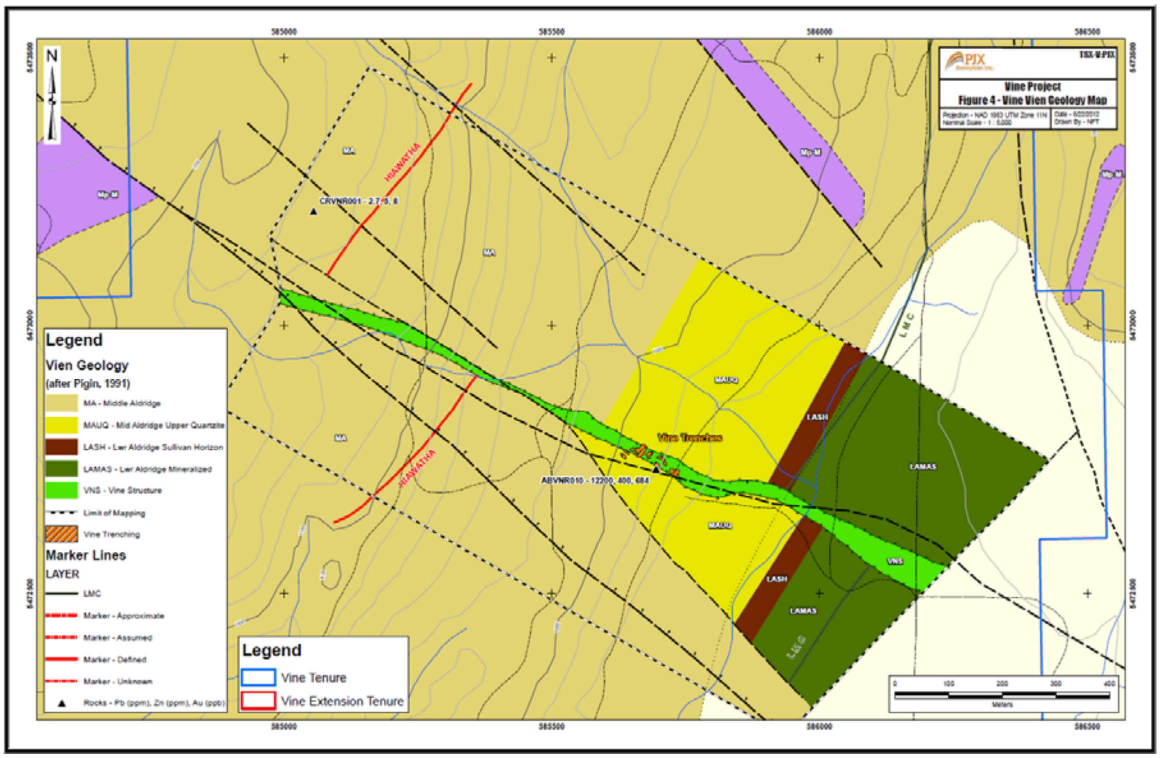


Figure 4: Vine Vein Geology Map

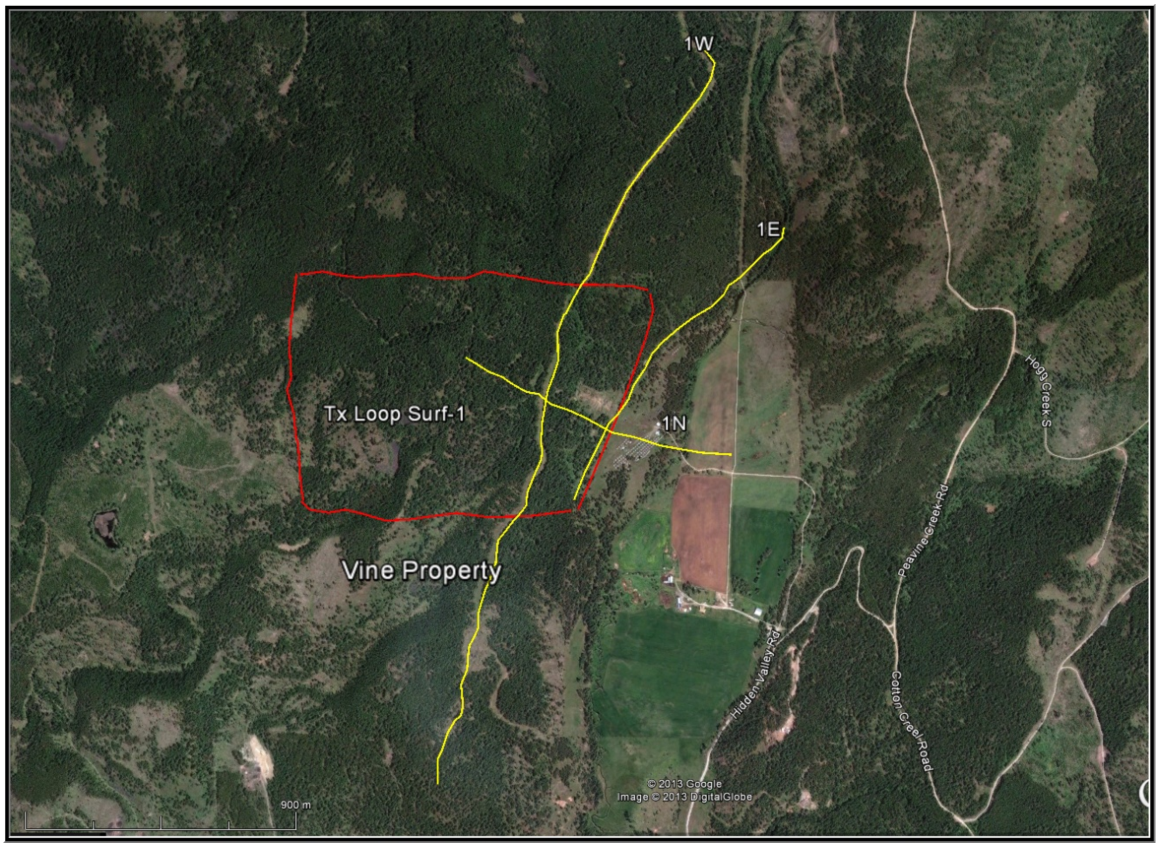


Figure 5: Tx Loop Surf-1 & Surveyed line 1N, 1E, 1W Locations Map

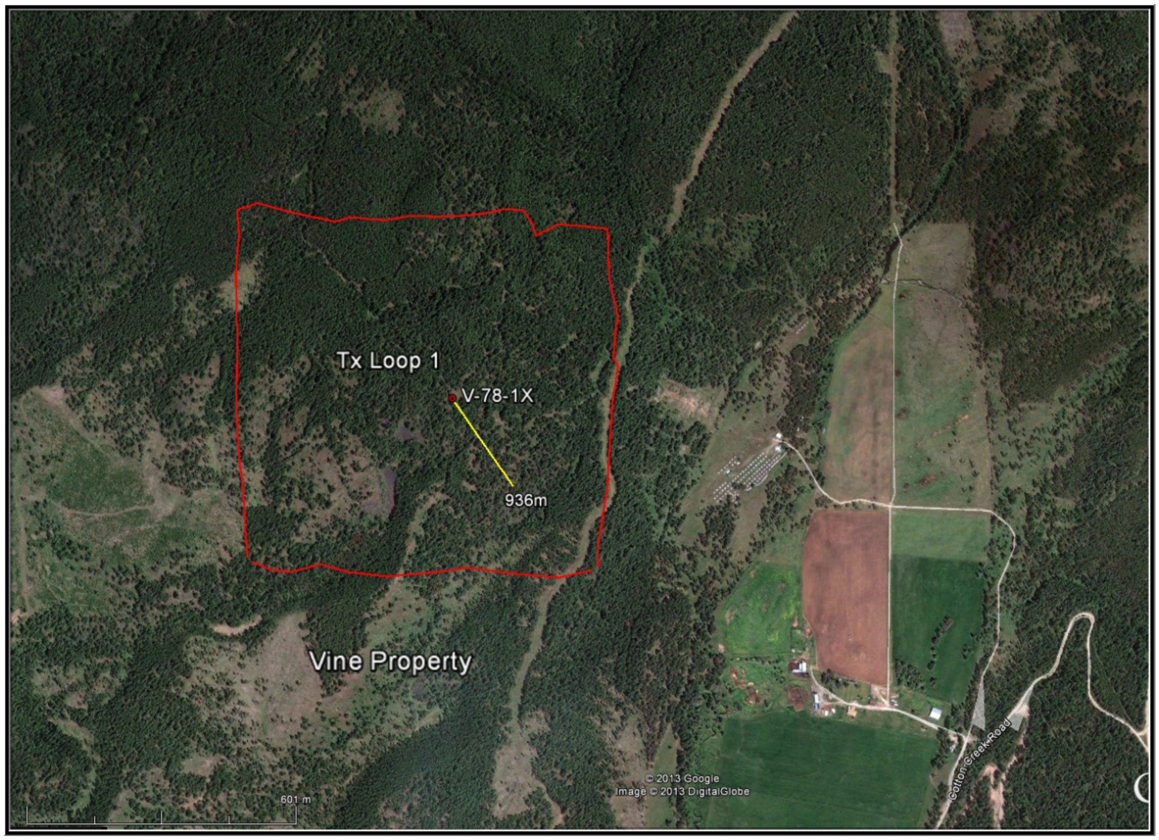


Figure 6: Tx Loop 1, Hole V-78-1X Location Map

3.0 PERSONNEL

The personnel involved in this project during the reporting period include:

Survey Operators:	John Carter
Data Processing:	Kevin Ralph
Report:	A.M.Khan

4.0 SURVEY METHODS

Crone Pulse EM is a time domain electromagnetic method in which a precise pulse of current with a controlled linear shut off is transmitted through a large loop of wire on the ground and the rate of decay of the induced secondary field is measured across a series of time windows during the off-time. The EMF created by the shutting-off of the current induces eddy currents in nearby conductive material thus setting-up a secondary magnetic field. When the primary field is terminated, this magnetic field will decay with time. The amplitude of the secondary field and the decay rate are dependent on the quality and size of the conductor.

On this project, a 3D Borehole Pulse EM system was assembled in which an axial component (Z) probe and a cross component (XY) probe were used to measure the three components of the induced secondary field. The first pass with the 'Z' probe detects any in-hole or off-hole anomalies and gives information on size, conductivity, and distances to the edge of conductors. The second pass with the 'XY' probe measures two orthogonal components of the EM field in a plane orientated at right angles to the borehole. These results give directional information to the center of the conductive body. Data is usually collected at a nominal sample interval of 10m.

The borehole surveys were carried out using a time base of 50.00 ms (5 Hz) with a 1.5 ms shut-off ramp time (*Table III*). The primary inducing field is defined as positive up inside the transmitter loop.

The surface survey was carried out using a time base of 50.00ms (5 Hz), with a 1.5 ms shut-off ramp time (*Table III*). Vertical (Z-component) and in-line (X-component) data was collected at a nominal survey interval of 25 meters.

The equipment used on this project was a Crone Pulse EM Borehole system. This includes a 4.8 kW transmitter with a 220V voltage regulator which is powered by an 11 hp motor generator. The Crone Digital Receiver was used to collect the field data. The synchronization between the Transmitter and the Receiver was maintained by direct cable link.

Data units are nT/s.

5.0 SURVEY PARAMETERS

Table I: Surface Survey Transmitter Loop Coverage

Loop	Property	Size (meters)	Corner Coordinates UTM NAD83 Canada Zone 11N
Loop Surf-1	Vine	~1200 x 800	584707E, 5473151N 584710E, 5472388N 585610E, 5472371N 585876E, 5473129N

Table II: Surface Survey Coverage

Line	TX loop	Timebase (ms)	Ramp (ms)	Current (Amps)	Station		Length (m)	Comp
					From	To		
1E	Surf-1	50.00	1.5	15	25	1175	1150	XZ
1N	Surf-1	50.00	1.5	15	25	1000	975	XZ
1W	Surf-1	50.00	1.5	15	900S	1950N	2850	XZ

Table III: Borehole Survey Transmitter Loop Coverage

Loop	Property	Size (meters)	Corner Coordinates UTM NAD83 Canada Zone 11N
Loop 1	Vine	~800 x 800	584709E, 5473151N 584708E, 5472384N 585477E, 5472357N 585495E, 5473151N

Table IV: Borehole Survey Coverage

Hole	Tx loop	Timebase (ms)	Ramp (ms)	Current (Amps)	Station		Length (m)	Comp
					From	To		
V-78-1X	Loop 1	50.00	1.5	20	20	935	915	XYZ

The following table shows the various time gates that constitute the channel configurations set up in the Crone PEM Receiver used in the surveys discussed in this report. The 50.00 ms timebase uses off-time channels 1 – 22.

Table III: Channel Configuration for the 50.00 ms time base

Channel	Start	Finish	Channel	Start	Finish
PP	-2.000e-04	-1.000e-04			
1	4.800e-05	6.400e-05	**2**	6.400e-05	8.400e-05
3	8.400e-05	1.120e-04	**4**	1.120e-04	1.520e-04
5	1.520e-04	2.040e-04	**6**	2.040e-04	2.680e-04
7	2.680e-04	3.600e-04	**8**	3.600e-04	4.800e-04
9	4.800e-04	6.400e-04	**10**	6.400e-04	8.480e-04
11	8.480e-04	1.128e-03	**12**	1.128e-03	1.496e-03
13	1.496e-03	1.992e-03	**14**	1.992e-03	2.644e-03
15	2.644e-03	3.512e-03	**16**	3.512e-03	4.664e-03
17	4.664e-03	6.192e-03	**18**	6.192e-03	8.220e-03
19	8.220e-03	1.092e-02	**20**	1.092e-02	1.440e-02
21	1.440e-02	3.107e-02	**22**	3.107e-02	4.774e-02

6.0 PRODUCTION SUMMARY

Table VI: Production Summary

22-Apr-2013	MOB.
23-Apr-2013	MOB.
24-Apr-2013	Started laying the loop. Had help from the driller’s helper today Dan which was a huge help in getting the entire loop out and GPS'd today.
25-Apr-2013	Surveyed the bottom section of the hole V-78-1X. The x component was pretty noisy today never got finished til 4pm then we packed everything up and let the drillers pull out the last 550m of NQ and 550m of HQ rods left in the hole.
26-Apr-2013	Started reading the top section of the hole V-78-1X. We surveyed with 256 samples today.
27-Apr-2013	Laid the new loop extension for the surface survey. Gps'd the new loop but when we went to start surveying.
28-Apr-2013	Got out setup and started surveying Line 1E, 1N with the coil. I slipped and feel coming down the hill with the receiver on my back earlier this morning and seem to have pulled or strained a muscle in my back.
29-Apr-2013	Continued surveying Line 1E from yesterday. Very windy again today and we had a lot of noise from the power lines as well today. Finished up, headed back to town to dump the data so we could get conformation on whether or not to pick up the loop yet. Rained for most of the day.

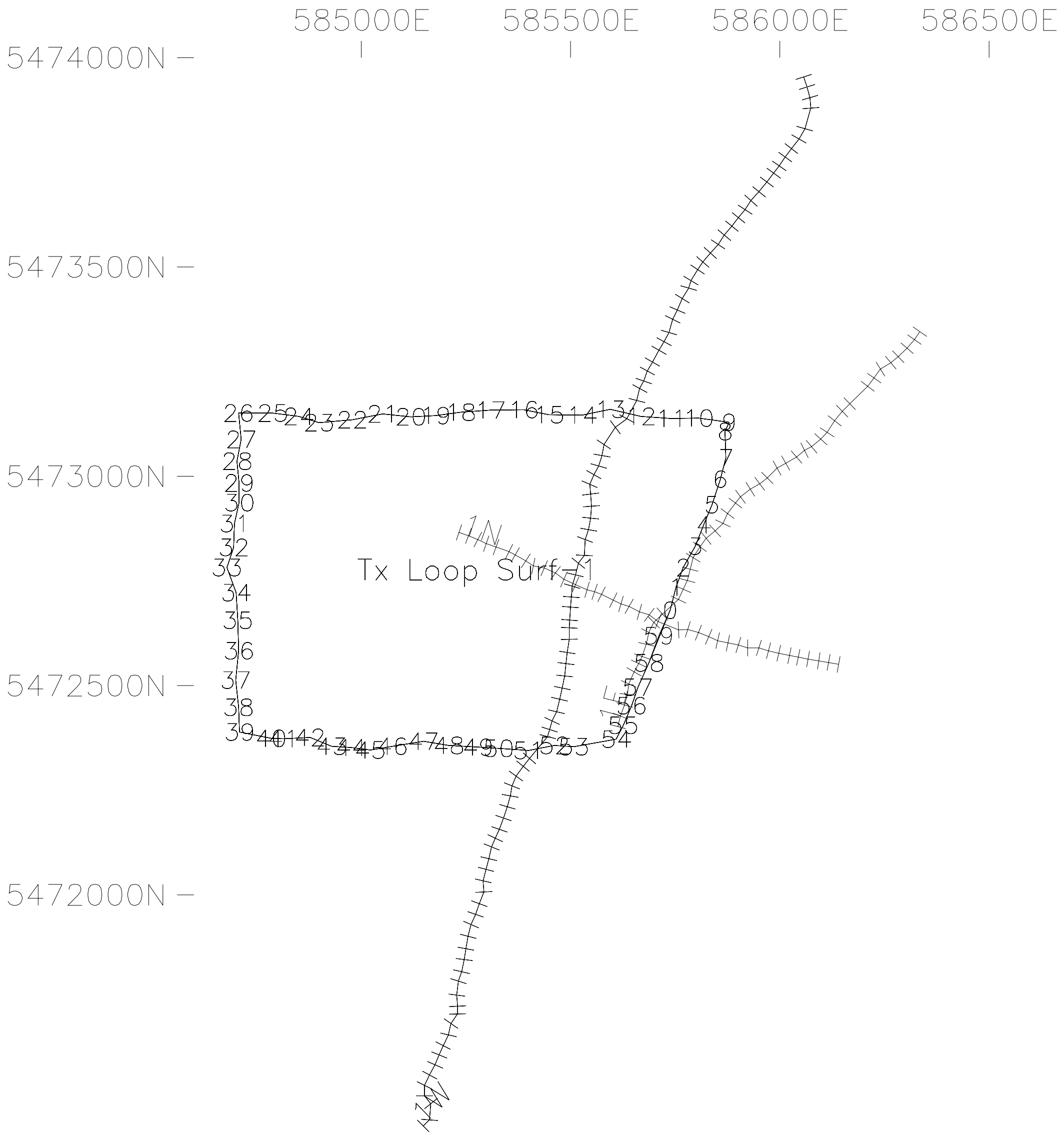
30-Apr-2013	Surved an extra line 1W today down an old fire safety road to compare data with an earlier parallel line. Finished that up the line.
01-May-2013	Still some more surveying to do so we extended the line to the south an extra 800m. Another beautiful day on the grid finished up early then headed back to the hotel for the day to send off the data.
02-May-2013	Setup and started surveying some more of the extension of line 1W. The transmitter cut out on us today so we lost a bit of time having to go back and re-start it.
03-May-2013	Surveyed another 400m on line 1N. Once we were done that we started picking up some wire. Got half the loop picked up today.
04-May-2013	Picked up the rest of the loop. Then we took all the equipment on site and packed it on pallets on the back of the foreman's Sterling truck with crane to be shipped to Manitoulin after we shirked wrapped it.
05-May-2013	DEMOB.
06-May-2013	DEMOB.

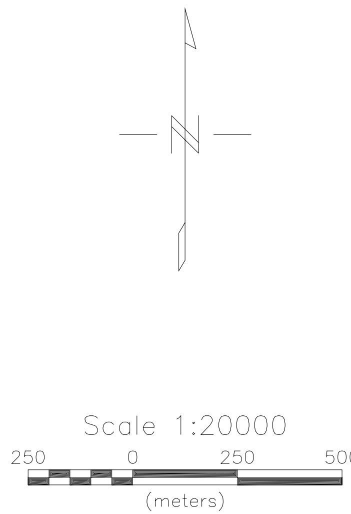
Respectfully submitted,

A.M.Khan, M.Sc.
Crone Geophysics & Exploration Ltd.

APPENDIX I

PLAN AND SECTION MAPS





PJX Resources

Vine Grid

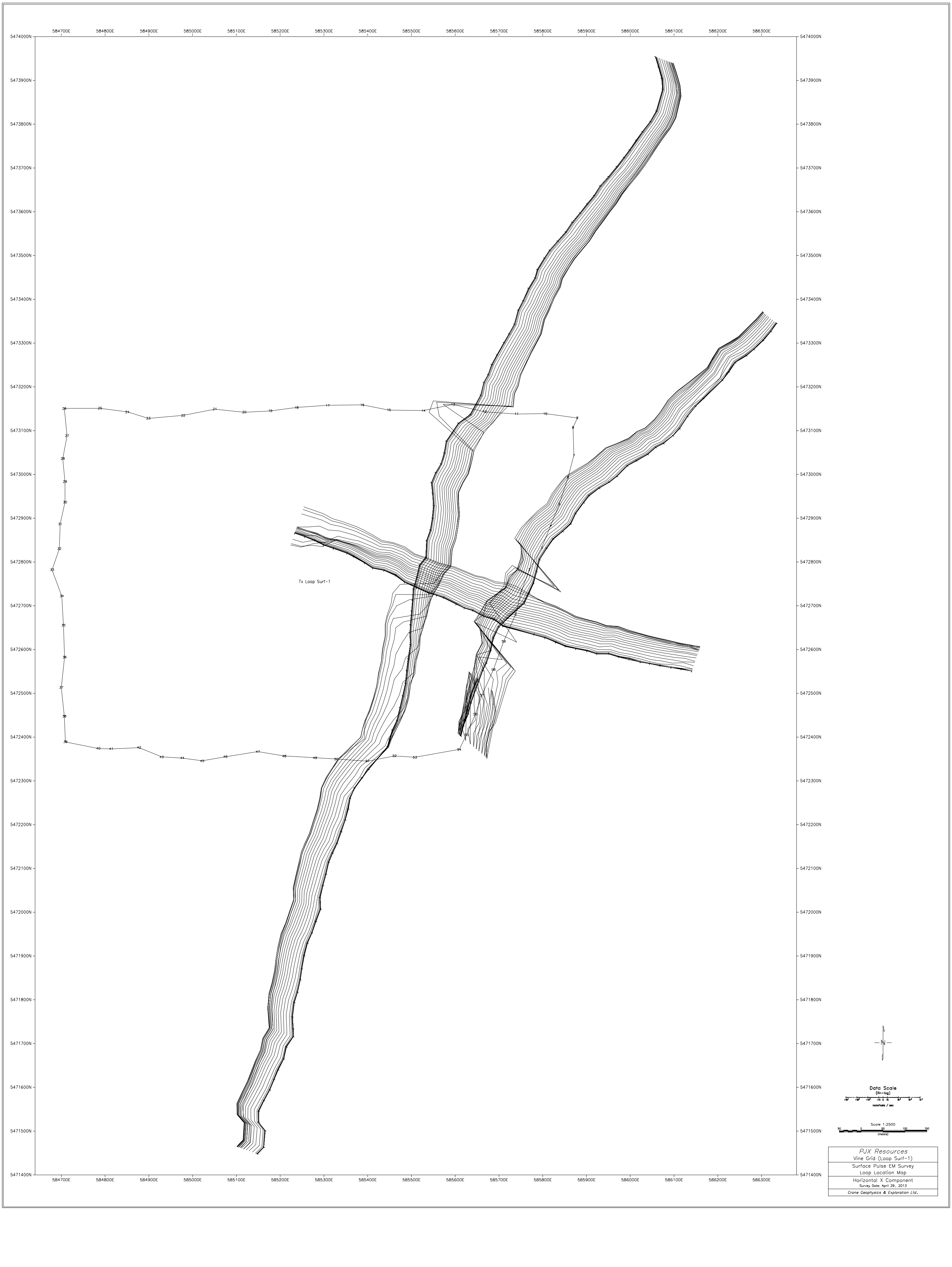
Surface Pulse EM Survey

Lines & Loop Location Map

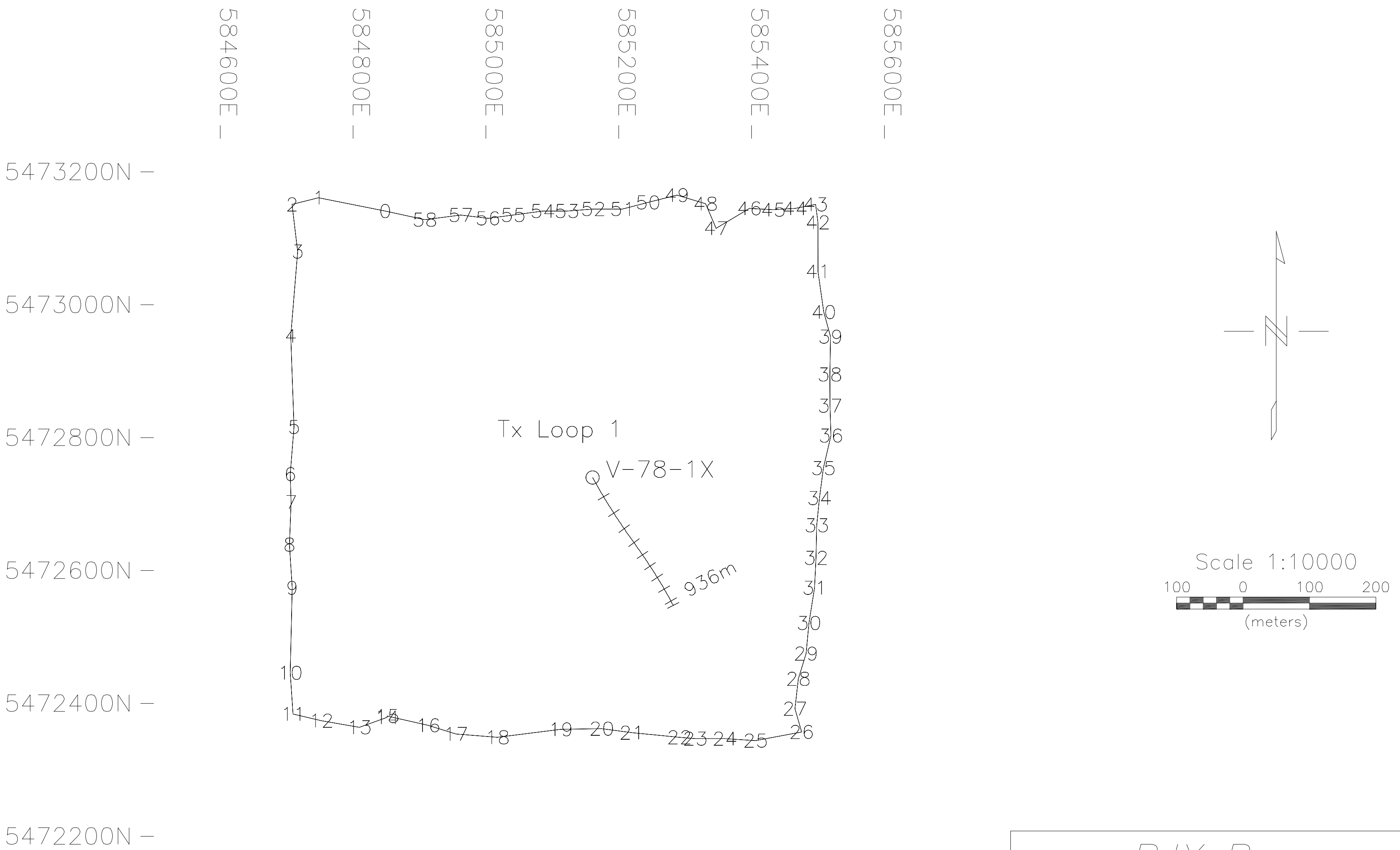
Loop: Surf-1

Survey Date: May 5, 2013

Crone Geophysics & Exploration Ltd.



Tx Loop Surf-1
Data Scale
(lin-log)
nanoTesla / sec
Scale 1:2500
(meters)
PJX Resources
Vine Grid (Loop Surf-1)
Surface Pulse EM Survey
Loop Location Map
Horizontal X Component
Survey Date: April 29, 2013
Crone Geophysics & Exploration Ltd.



PJX Resources

Vine Grid

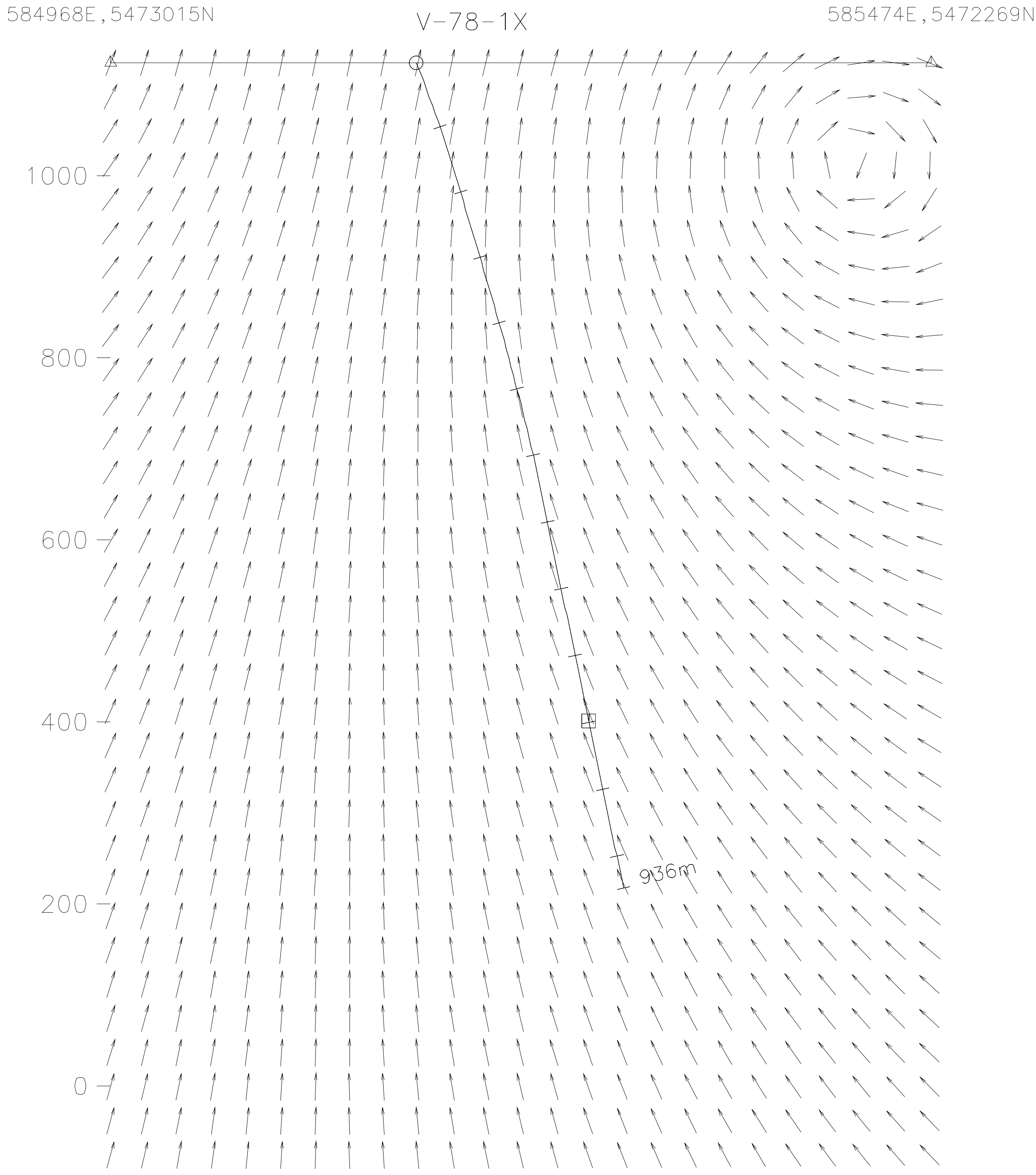
3-D Borehole Pulse EM Survey

Borehole & Loop Location Map

Hole: V-78-1X

Survey Date: April 26, 2013

Crone Geophysics & Exploration Ltd.



Scale 1:7500

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(meters)

PJX Resources

Vine Grid

3-D Borehole Pulse EM Survey

Hole Section with Primary Field

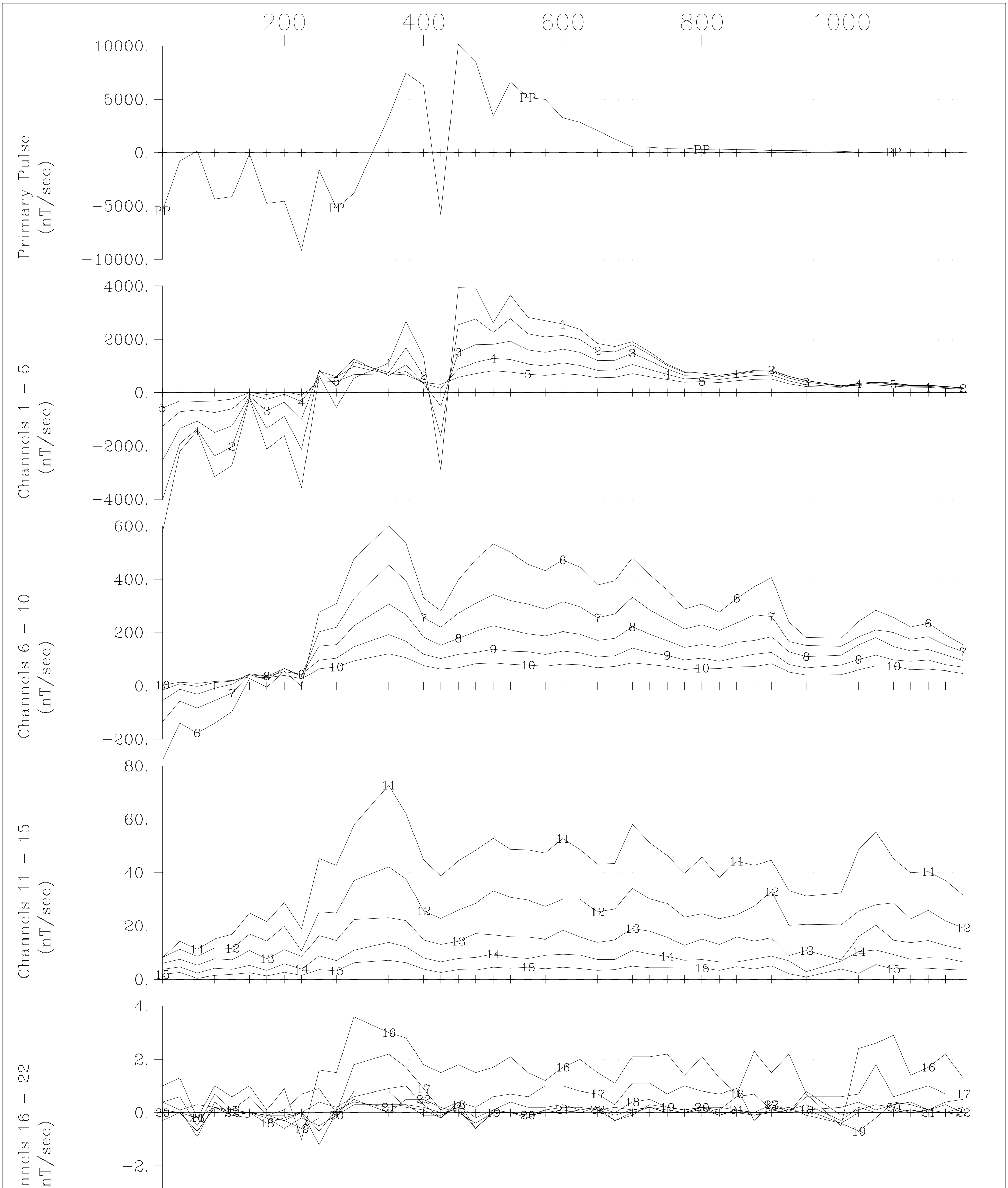
Hole: V-78-1X

Survey Date: April 26, 2013

Crone Geophysics & Exploration Ltd.

APPENDIX II

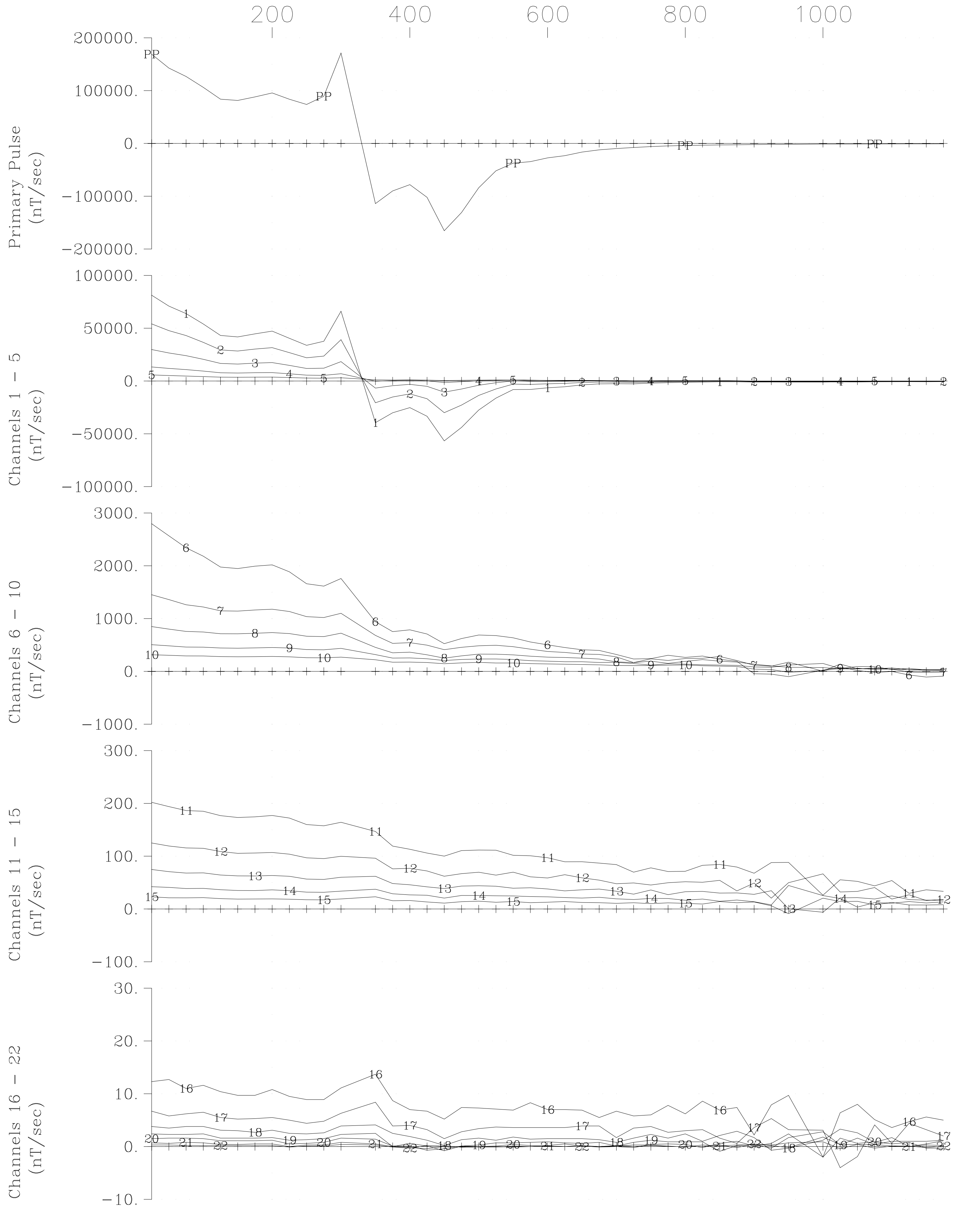
LINEAR (5-AXIS) PULSE EM DATA PROFILES



PJX Resources Vine Grid

Loop Surf-1,Line 1E X Component

Crone Geophysics & Exploration Ltd.



PJX Resources Vine Grid

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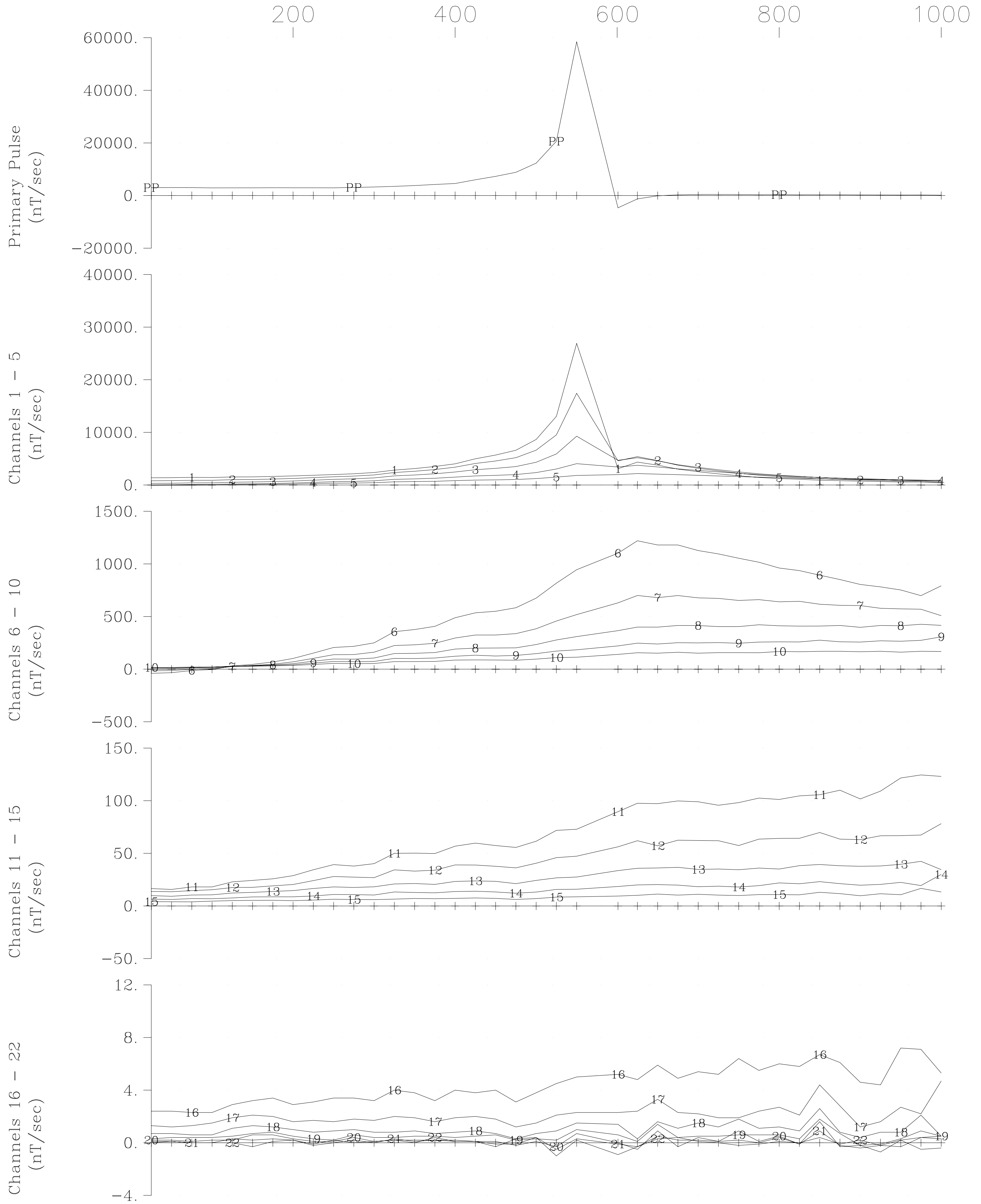
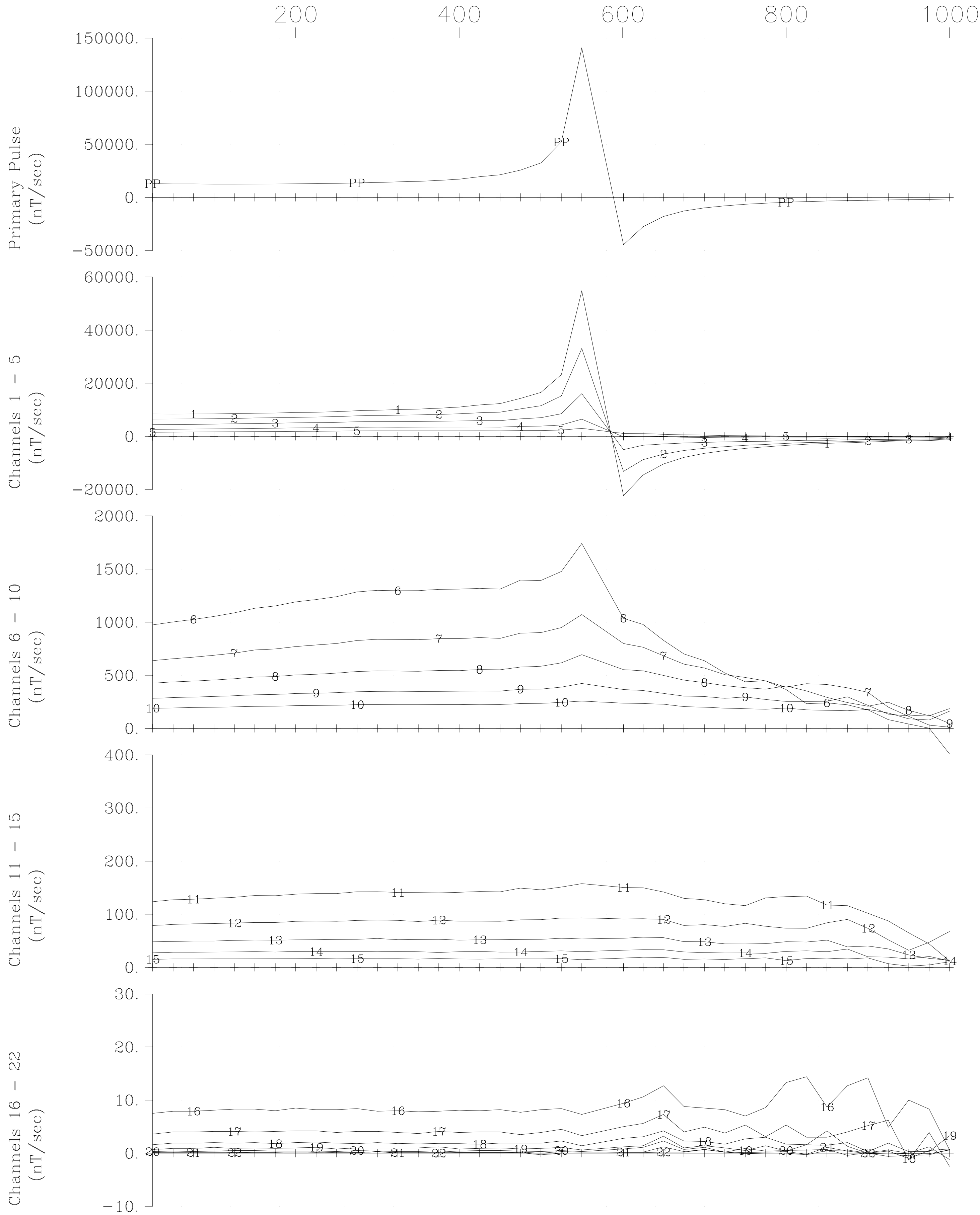
Crone Geophysics & Exploration Ltd.



PJX Resources   Vine Grid

Loop Surf-1,Line 1N   X Component

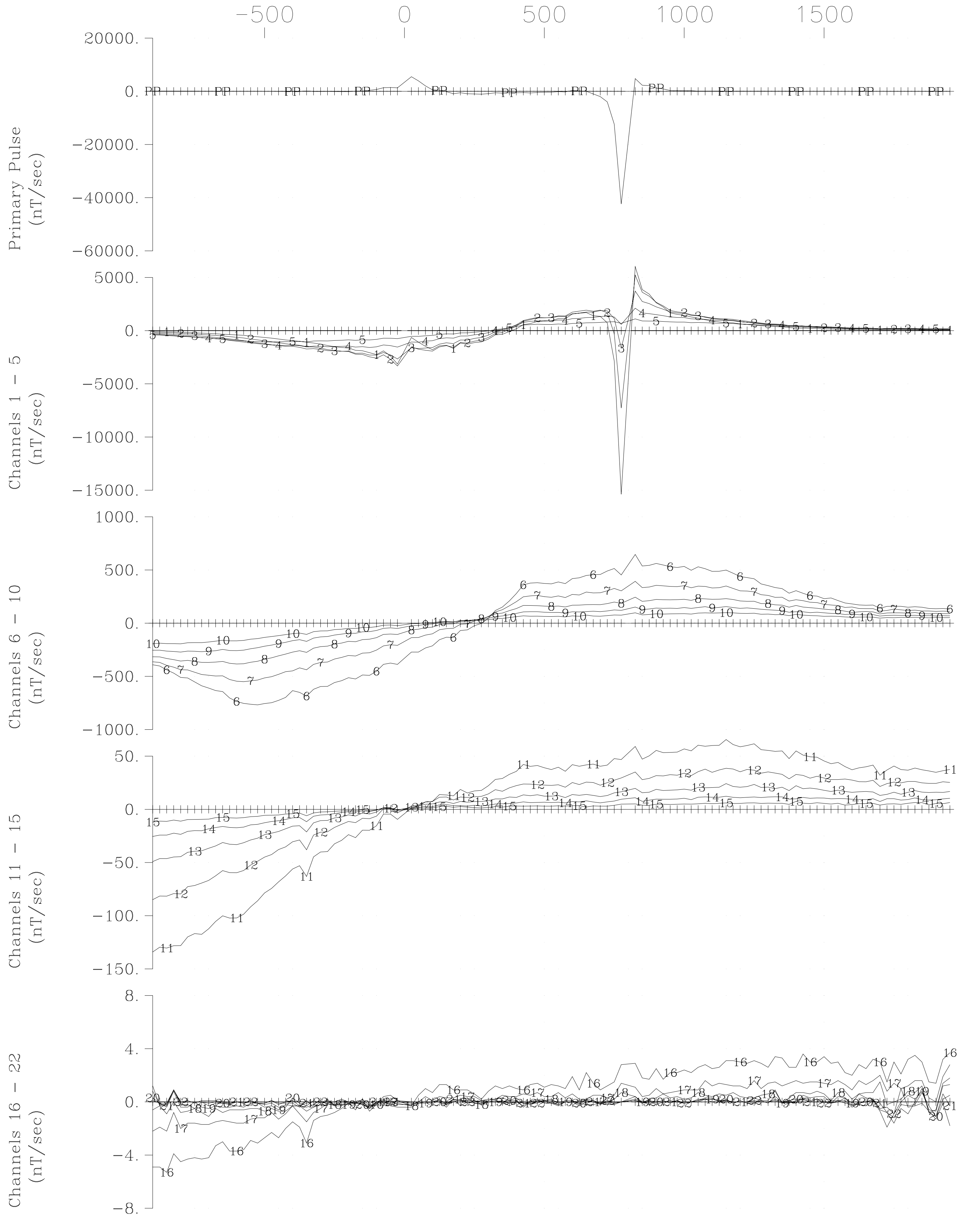
Crone Geophysics & Exploration Ltd.



PJX Resources Vine Grid

Loop Surf-1, Line 1N Z Component

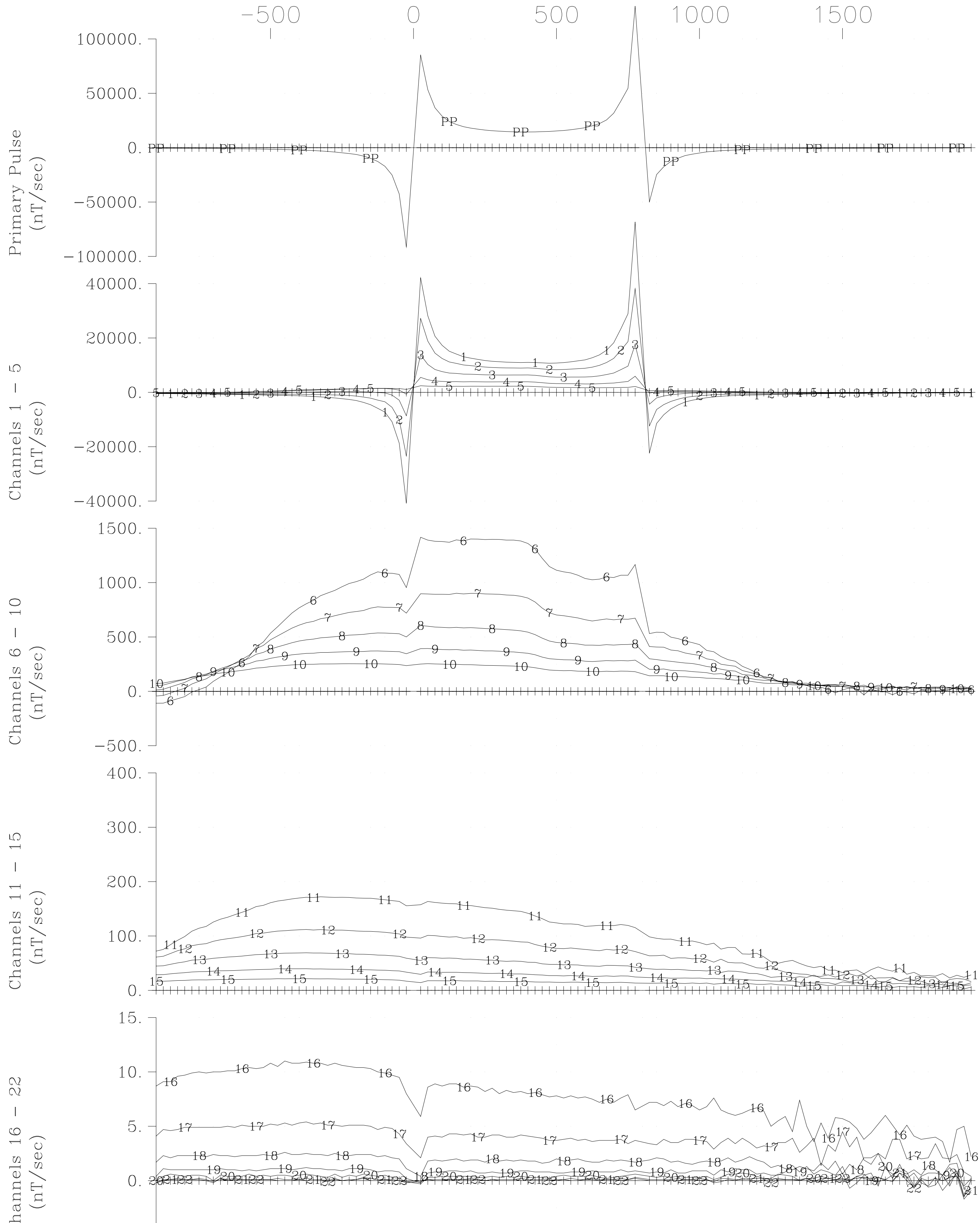
Crone Geophysics & Exploration Ltd.



PJX Resources Vine Grid

Loop Surf-1,Line 1W X Component

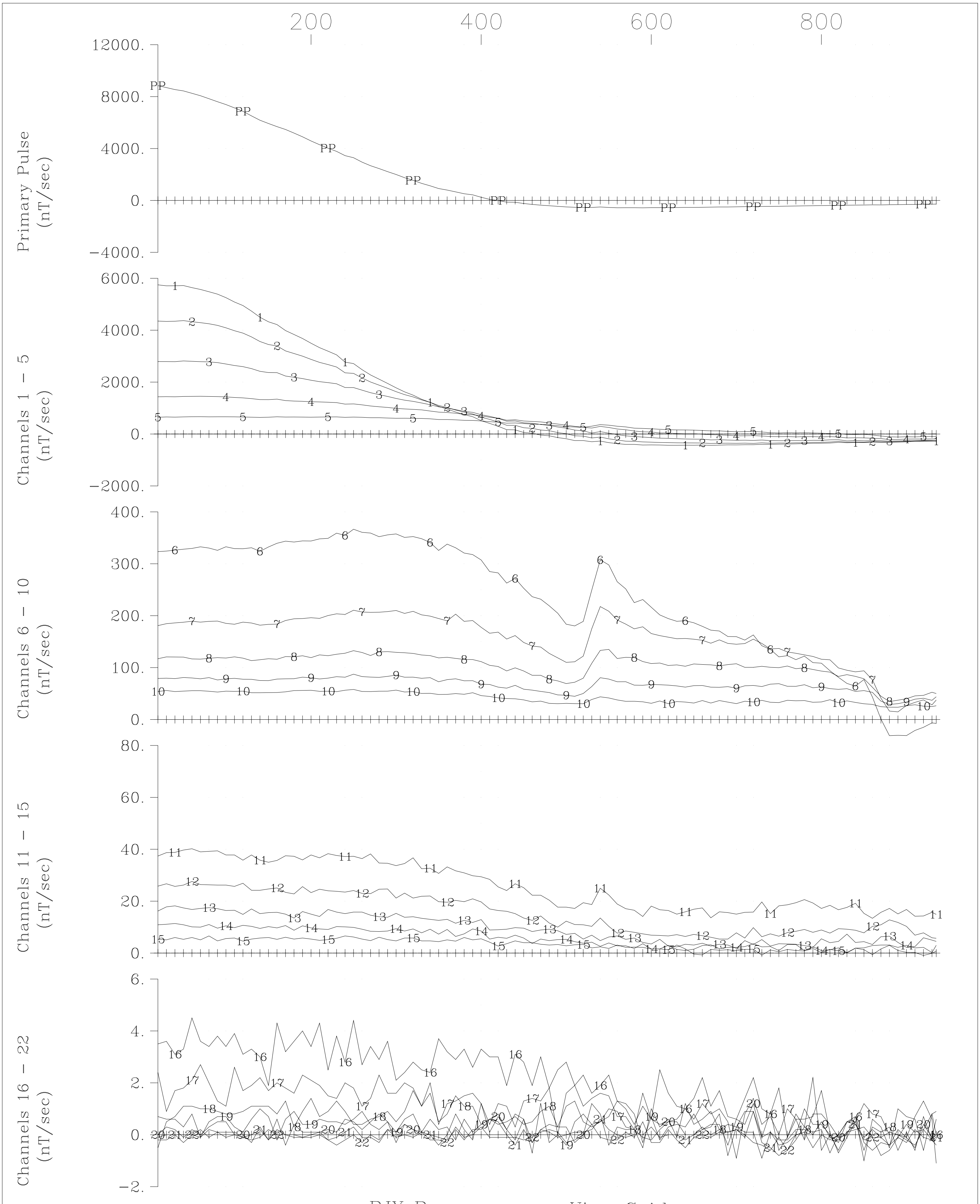
Crone Geophysics & Exploration Ltd.



PJX Resources Vine Grid

Loop Surf-1,Line 1W Z Component

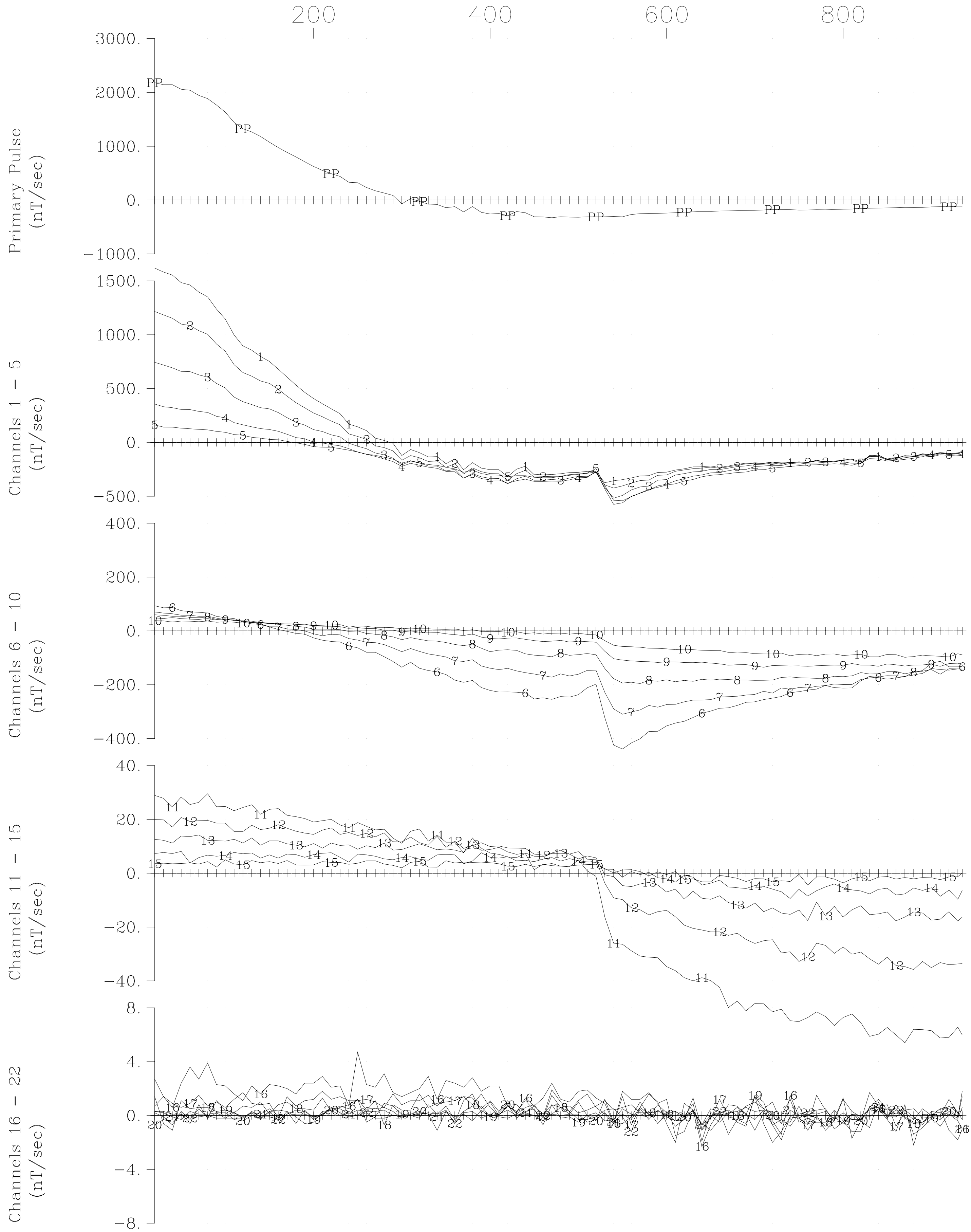
Crone Geophysics & Exploration Ltd.



PJX Resources Vine Grid

Loop 1,Hole V-78-1X X Component

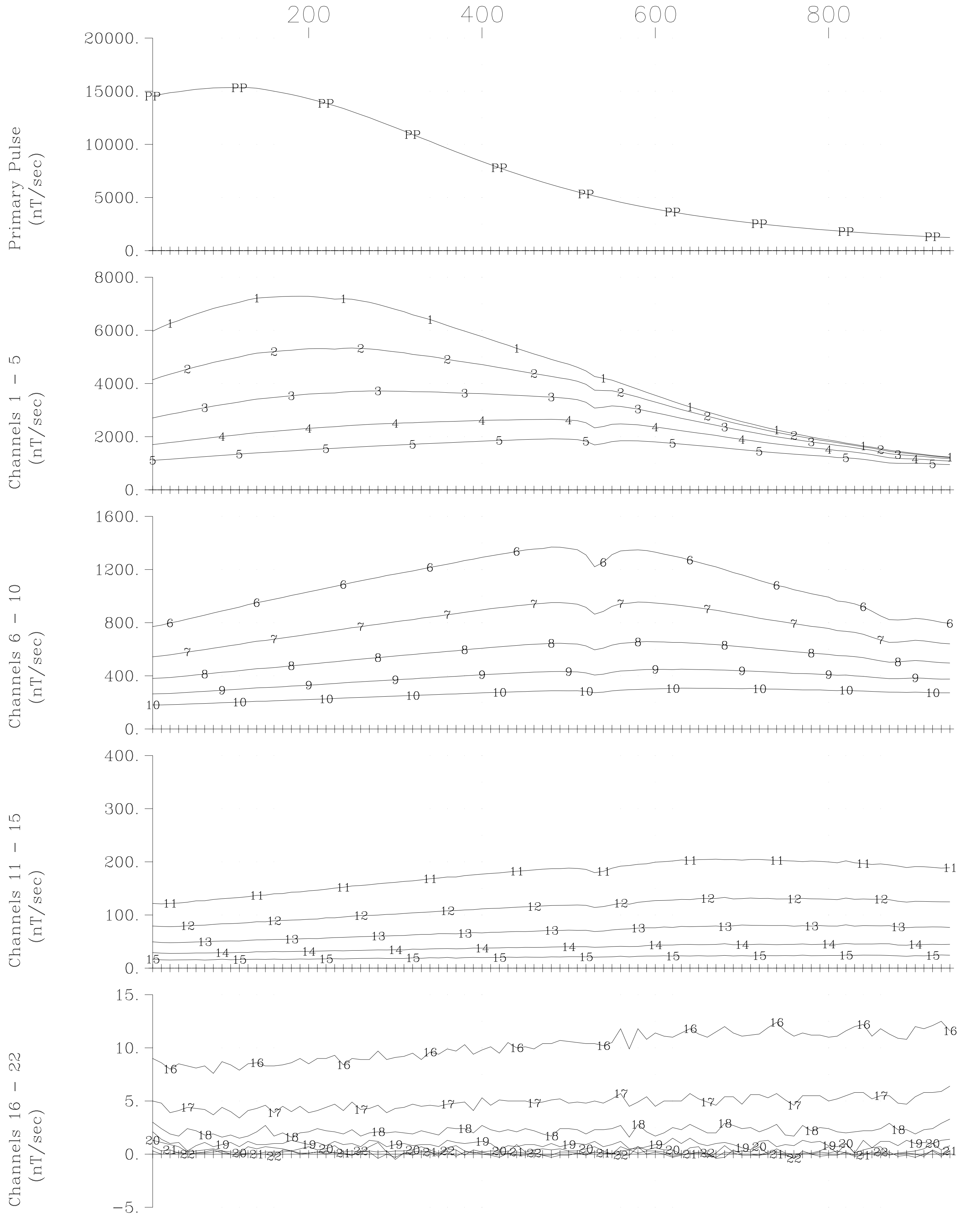
Crone Geophysics & Exploration Ltd.



PJX Resources   Vine Grid

Loop 1,Hole V-78-1X   Y Component

Crone Geophysics & Exploration Ltd.



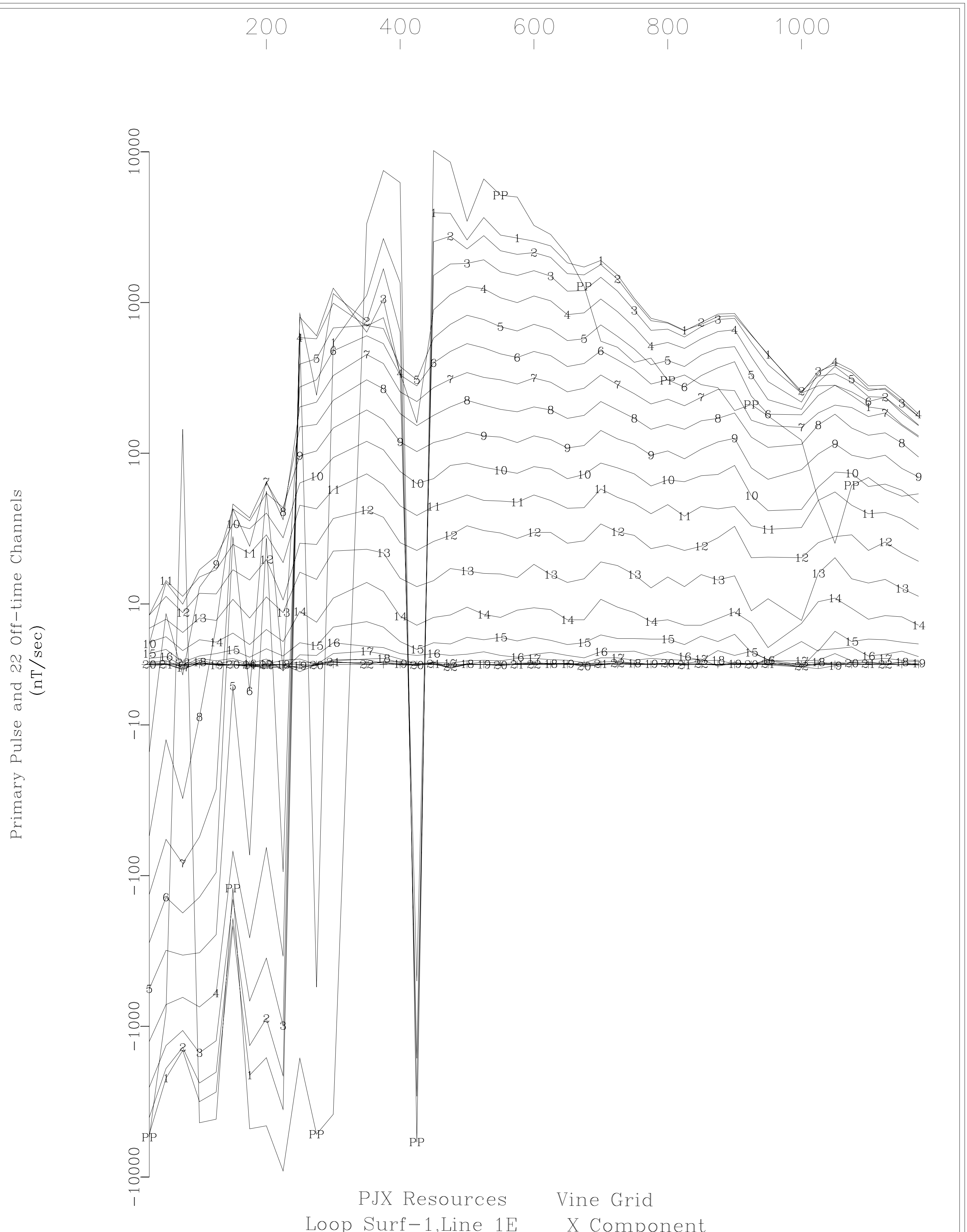
PJX Resources Vine Grid

Loop 1,Hole V-78-1X Z Component

Crone Geophysics & Exploration Ltd.

APPENDIX III

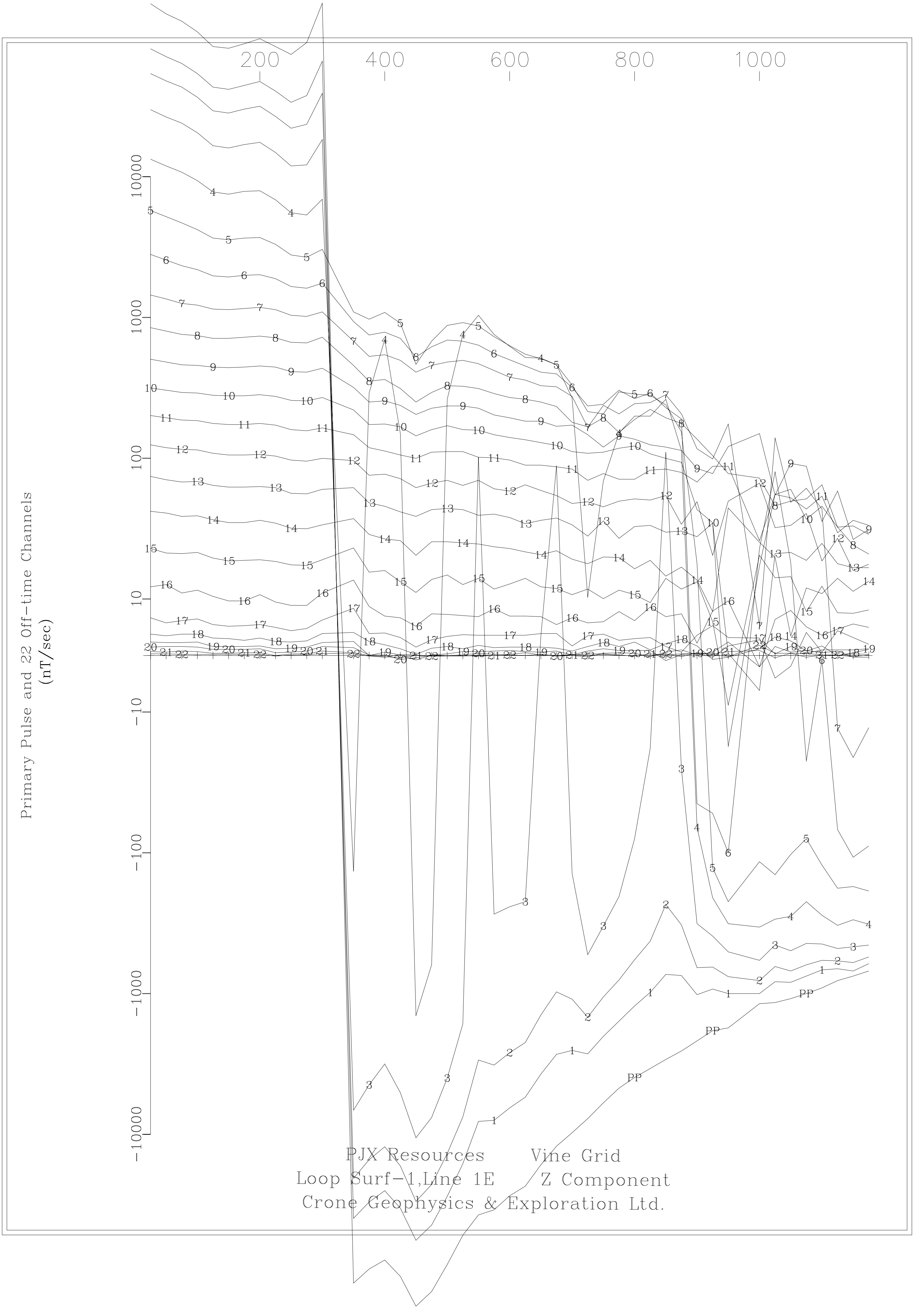
PULSE EM DATA PROFILES (LIN-LOG SCALE)

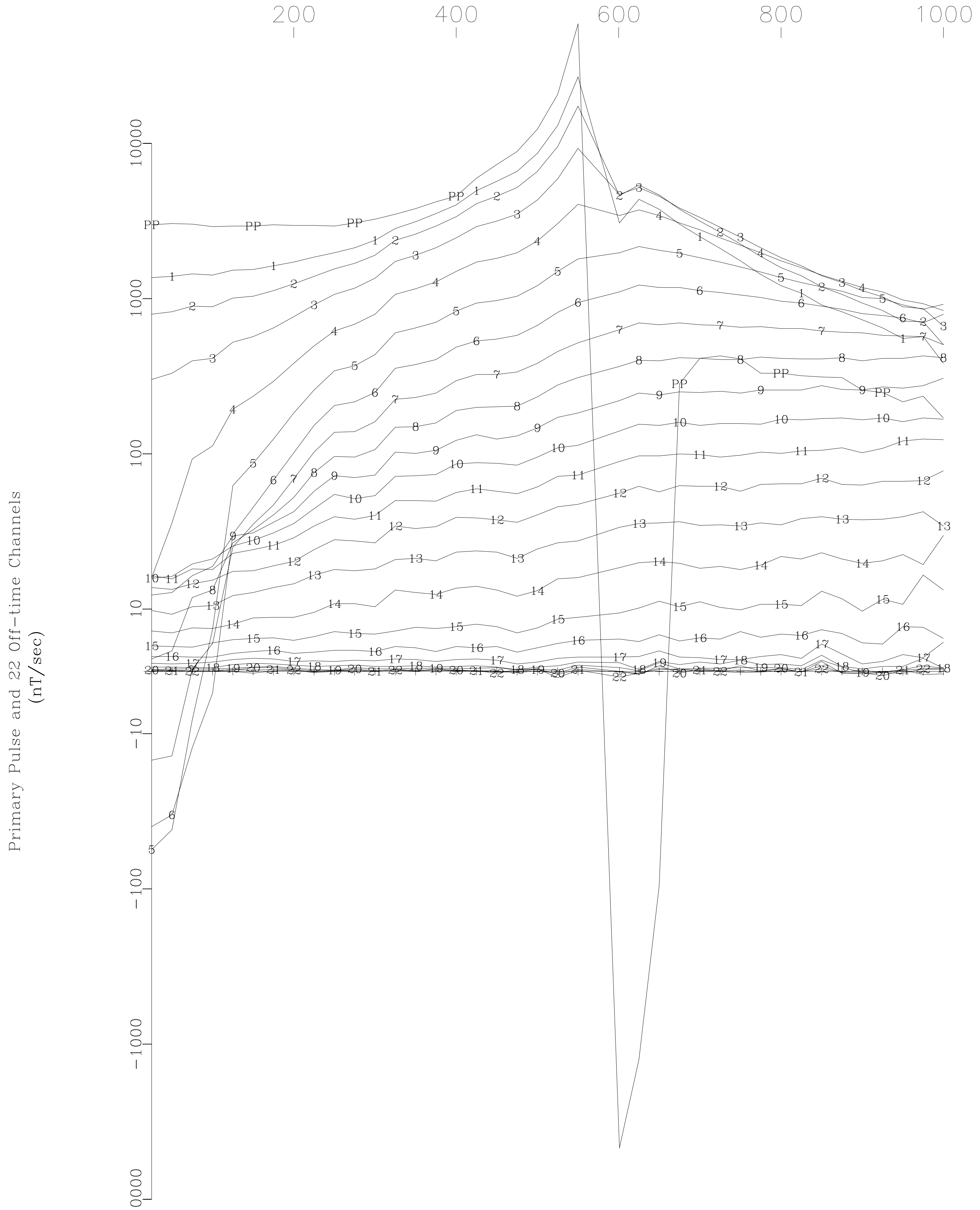


PJX Resources Vine Grid

Loop Surf-1,Line 1E X Component

Crone Geophysics & Exploration Ltd.


Primary Pulse and 22 Off-time Channels
(nT/sec)
200
400
600
800
1000
10000
1000
100
10
-10
-100
-1000
-10000
PJX Resources Vine Grid
Loop Surf-1,Line 1E Z Component
Crone Geophysics & Exploration Ltd.



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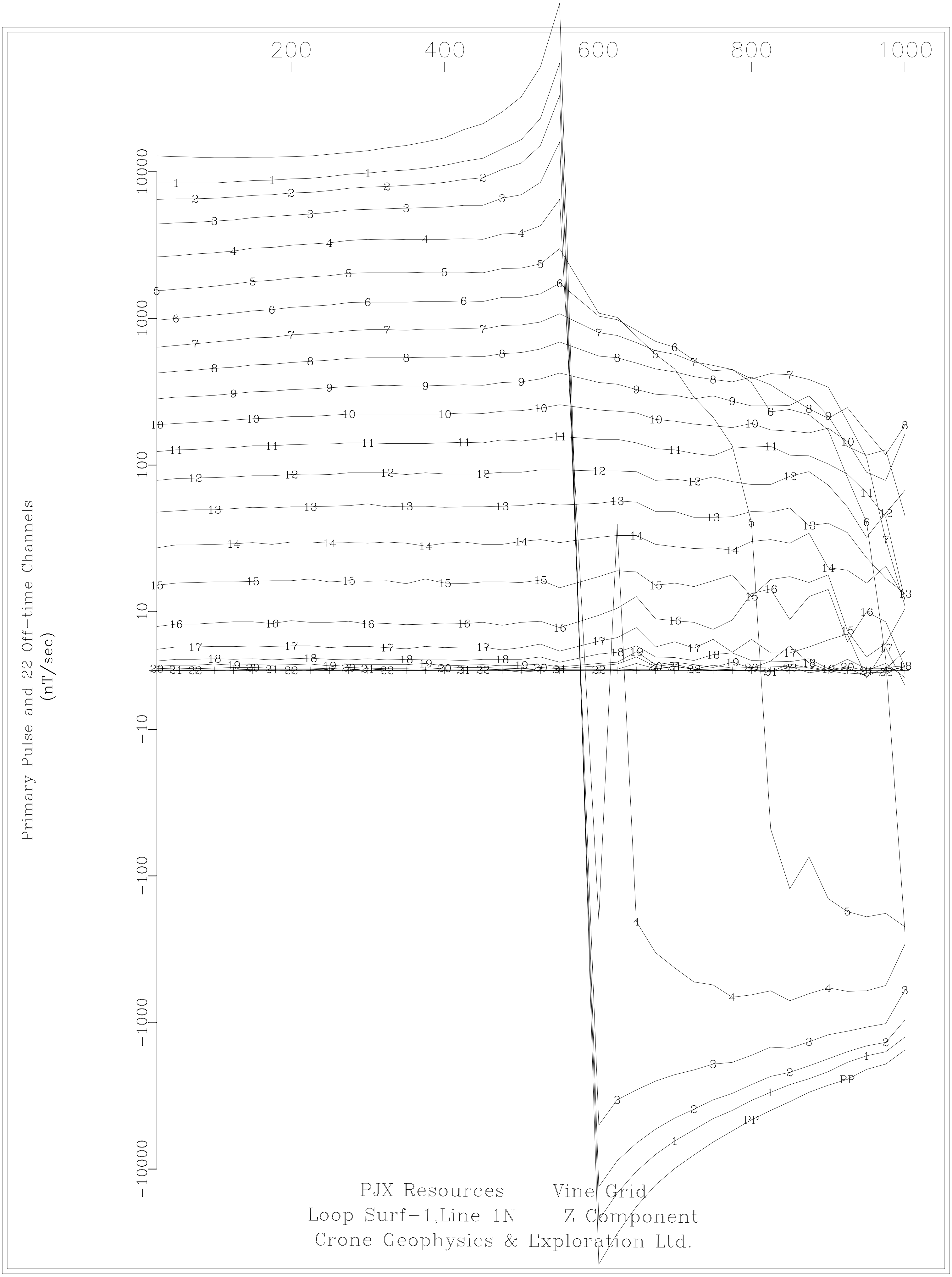
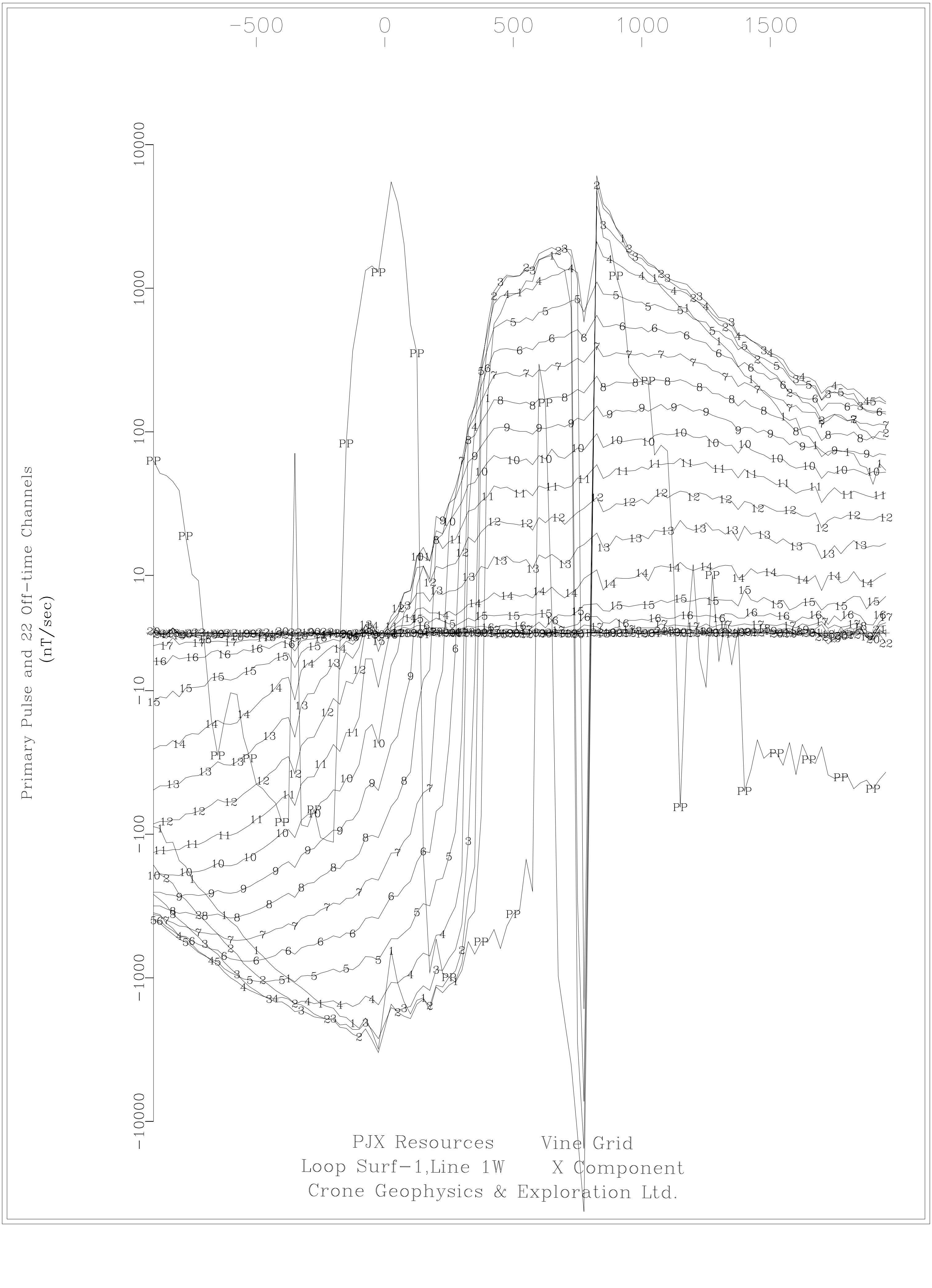
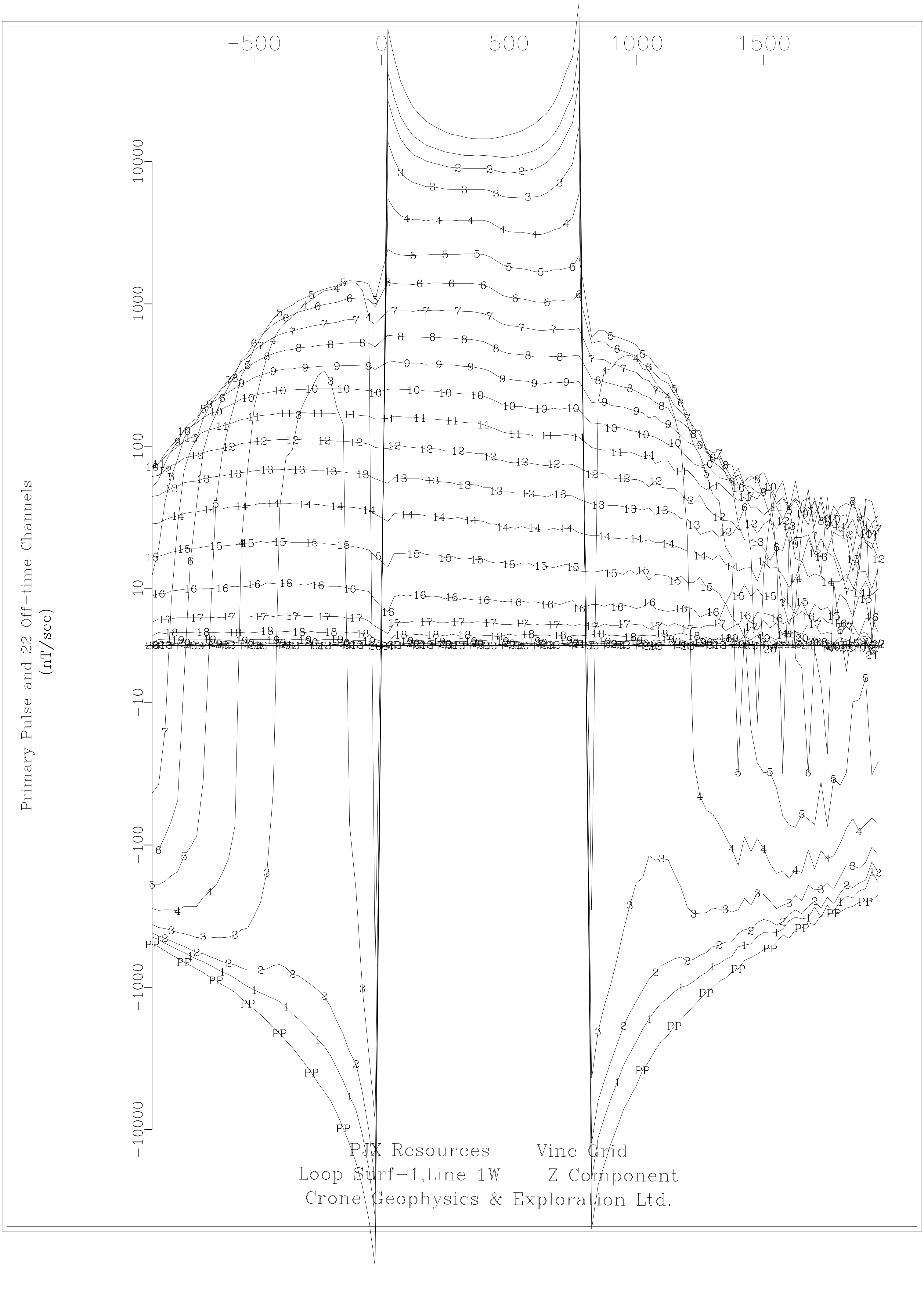
Loop Surf-1,Line 1N X Component
Crone Geophysics & Exploration Ltd.

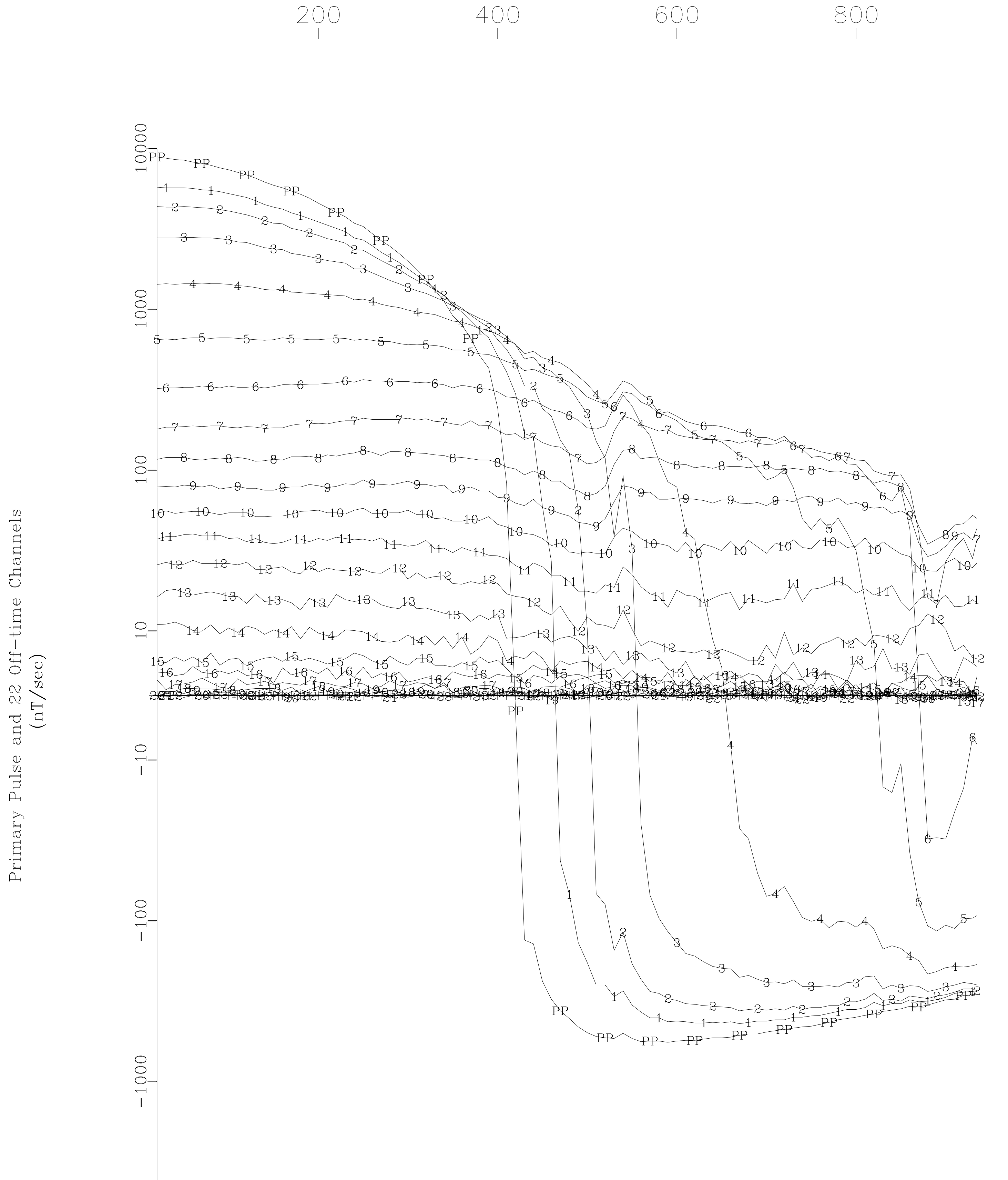


Primary Pulse and 22 Off-time Channels
(nT/sec)
200
400
600
800
1000
10000
1000
100
10
-10
-100
-1000
-10000
PJX Resources Vine Grid
Loop Surf-1,Line 1N Z Component
Crone Geophysics & Exploration Ltd.

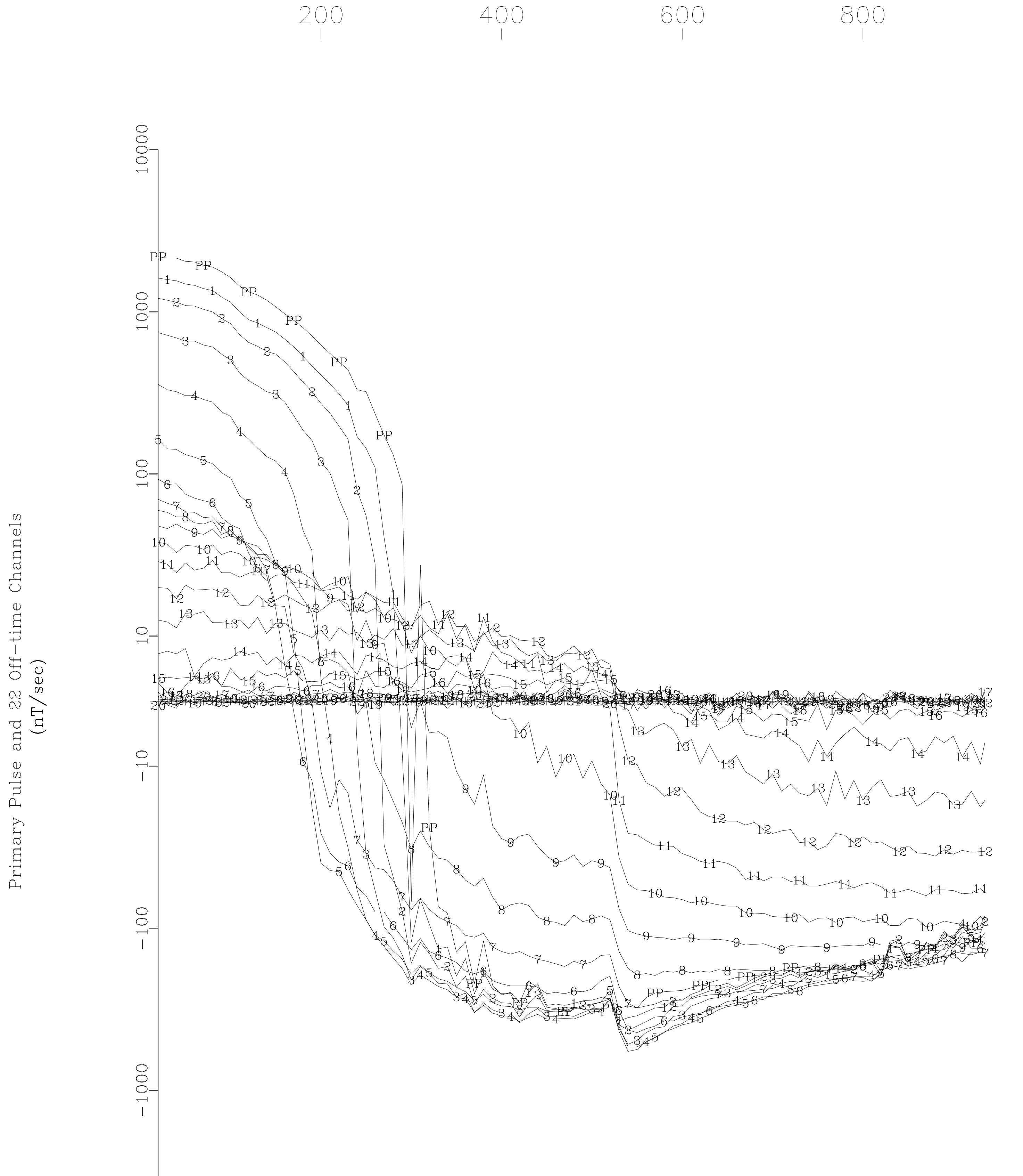


-500
0
500
1000
1500
10000
1000
100
10
-10
-100
-1000
-10000
Primary Pulse and 22 Off-time Channels
(nT/sec)
PJX Resources Vine Grid
Loop Surf-1,Line 1W X Component
Crone Geophysics & Exploration Ltd.

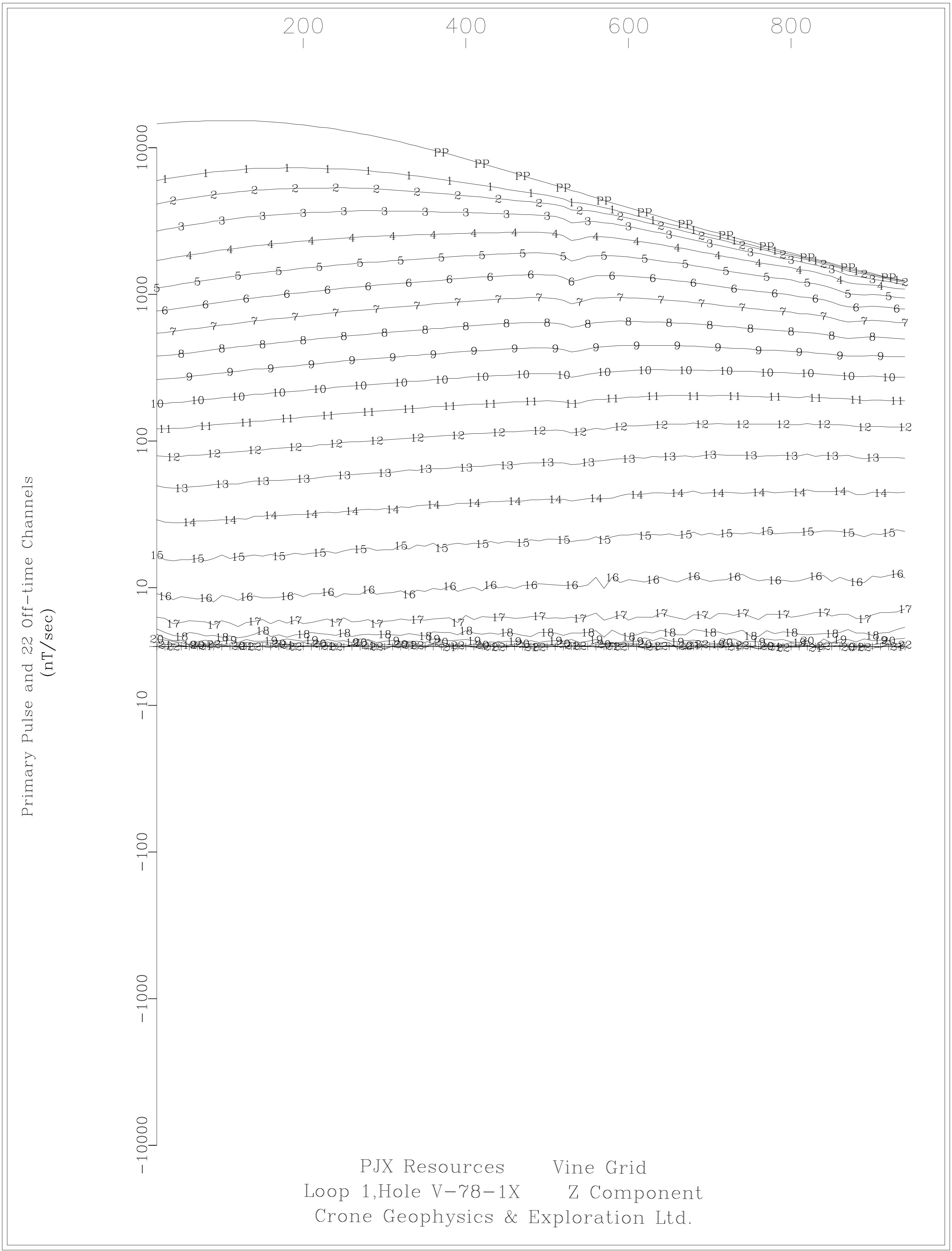

-500
0
500
1000
1500
10000
1000
100
10
-10
-100
-1000
-10000
Primary Pulse and 22 Off-time Channels
(nT/sec)
PJX Resources Vine Grid
Loop Surf-1,Line 1W Z Component
Crone Geophysics & Exploration Ltd.



PJX Resources Vine Grid
Loop 1,Hole V-78-1X X Component
Crone Geophysics & Exploration Ltd.



PJX Resources Vine Grid
Loop 1,Hole V-78-1X Y Component
Crone Geophysics & Exploration Ltd.


200
400
600
800
Primary Pulse and 22 Off-time Channels
(nT/sec)
10000
1000
100
10
-10
-100
-1000
-10000
PJX Resources Vine Grid
Loop 1,Hole V-78-1X Z Component
Crone Geophysics & Exploration Ltd.

APPENDIX IV

DATA DISCUSSION

DATA COMMENTS

The TDEM surveys conducted on this property consisted of a BHEM survey on one hole, V-78-1X, and 3 surface survey lines. The purpose of the EM surveys and tests conducted here was to determine the effectiveness of TDEM in this geological terrain (from the surface EM lines) and to determine if any off-hole features could be identified from the BHEM survey which could represent a potential follow-up target. The surface survey consisted of 3 lines, two of which were surveyed roughly perpendicular to the interpreted Vine Structure Extension and one line roughly parallel to this interpreted trend.

The results of the surface survey are complex but notable in that there are very strong anomalous response patterns observed on these lines. With such a limited coverage it is very difficult to provide specific details or provided detailed interpretations as there simply isn't enough information to provide a comprehensive analysis. In general terms though, it can be stated with some confidence that these TDEM surveys are picking up a very large conductive feature.

In attempts to quantify the observed response patterns seen from these surveys, numerical modeling was performed with Maxwell. It is important to note here that Maxwell is a thin plate modeling algorithm and best suited for isolated conductive sources. It does not model true 3D electromagnetic effects, and as such its effectiveness as a modeling tool for data dominated by a conductive host response is quite limited. However, given the expense of getting an outside group involved who specializes in 3D EM software (with such a limited data set), it is likely not warranted at this stage, and the author has utilized Maxwell with the stated goal of producing simplistic explanations (and images) which may be of use to the project geologist. In these modeling efforts then all that the author is attempting to show is one possibility to explain the distribution of current flow in the subsurface for a select time channel(s). It is very important for the reader to note that there are a multitude of body sizes, shapes and conductivities (even while ignoring the 3D effects) that can produce the exact same modeling results, and the models shown in the images below are meant to be very crude approximations of current flow within the subsurface which may or may not correspond with discrete lithological units.

Figure 1 below shows a typical response of what would be expected for a TDEM response of a line over a conductive host rock (or half space) utilizing the same loop size and line geometry as utilized on this project. The key features to note here are the 'channel migration' effects evident in the Z component profile corresponding with a peak in the X component near the middle of the transmit loop.

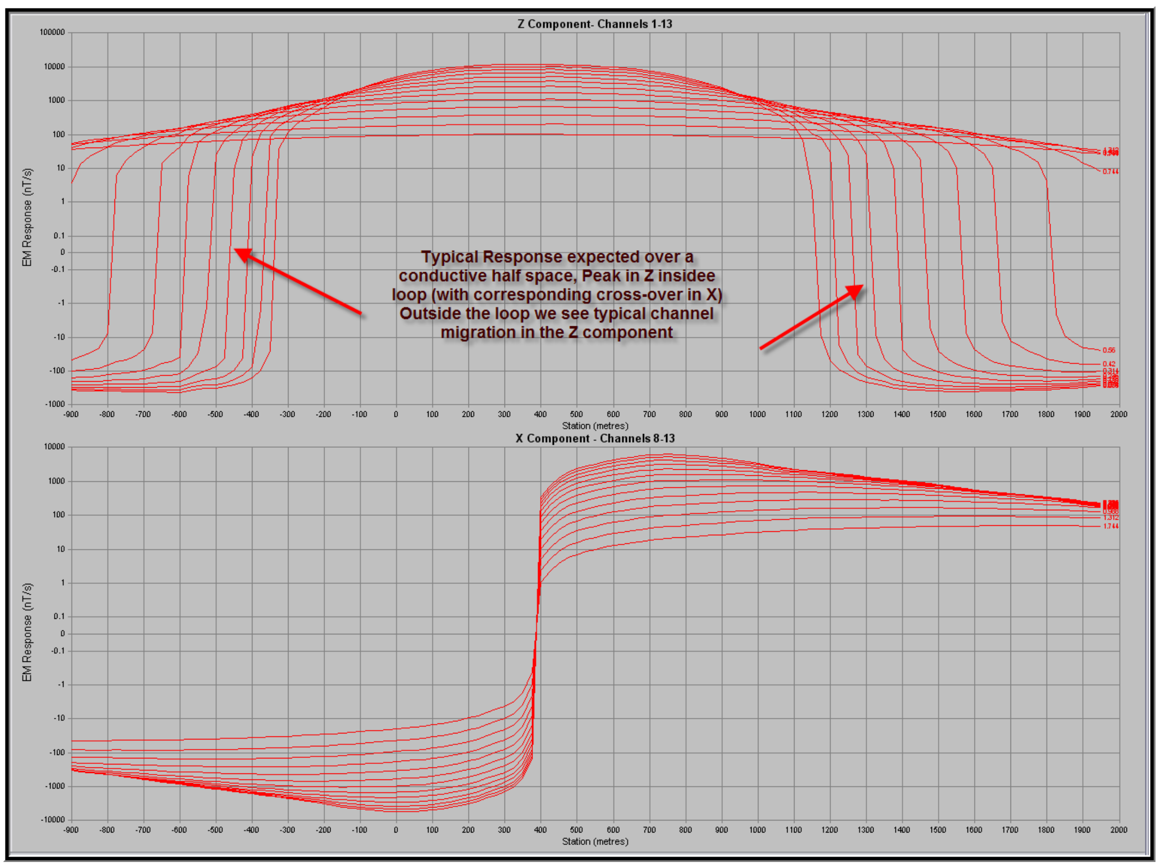


Figure 1: Typical TDEM response over a conductive host.

Figure 2 below shows some similiarites between the field data (in black) and the forward model (in red) suggesting there are likely effects of a conductive host evident in this data set. Note the assymetry evident in the field profile, Z component in particular, with a higher amplitdue response on the South end of the line when compared to the North end. This response pattern suggests, that though the host unit itself here ‘appears’ to be conductive, there must be a dip (or plunge) component to this source, with the profile suggestive of a source with a moderate (<20 degree) northerly dip.

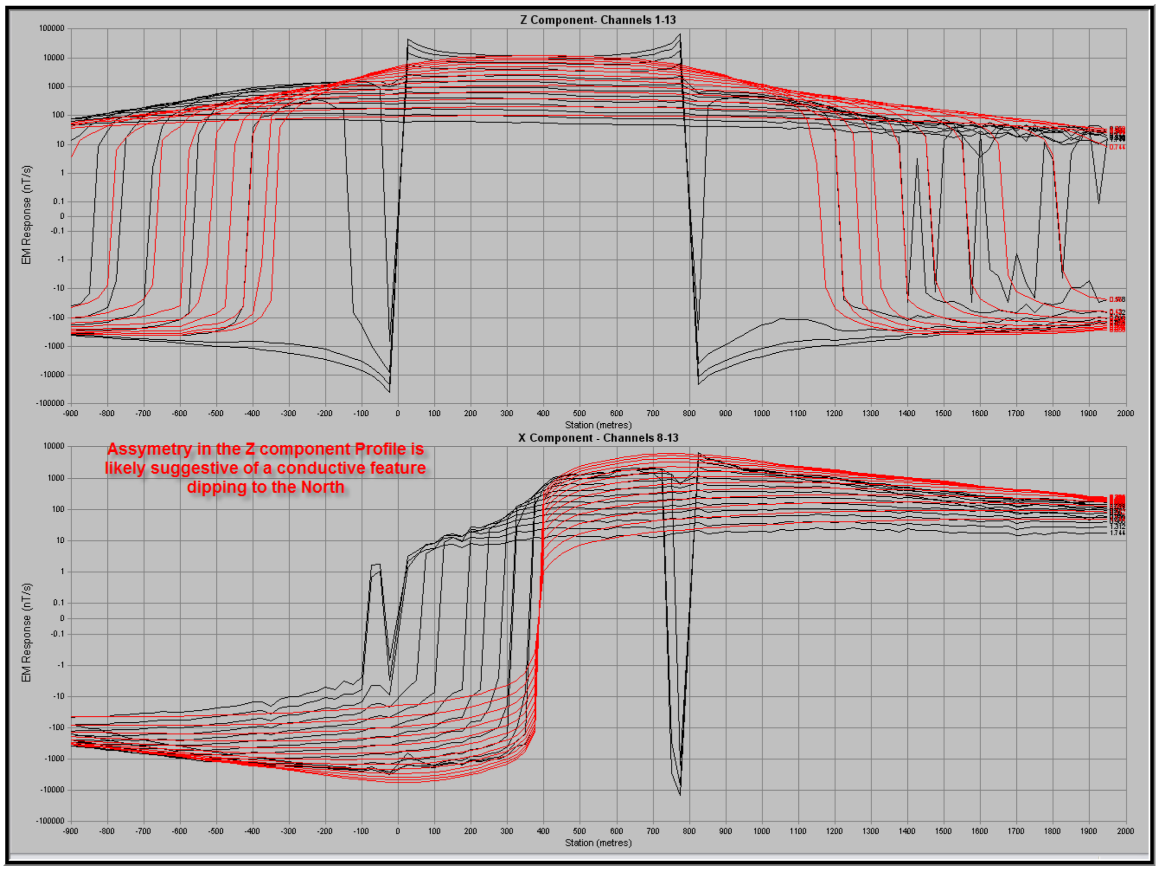


Figure 2: Typical TDEM response over a conductive host – compared to response of Line 1W

It is also worth mentioning that in areas where the response is dominated by that of a conductive host, or a large conductive formational unit, the early time response, near the loop edge, can be dominated by “Loop Edge Effects”. It is important to note this so these are not confused with discrete/isolated bedrock conductors. Shown below are anomalous response patterns near the transmit loop wire.

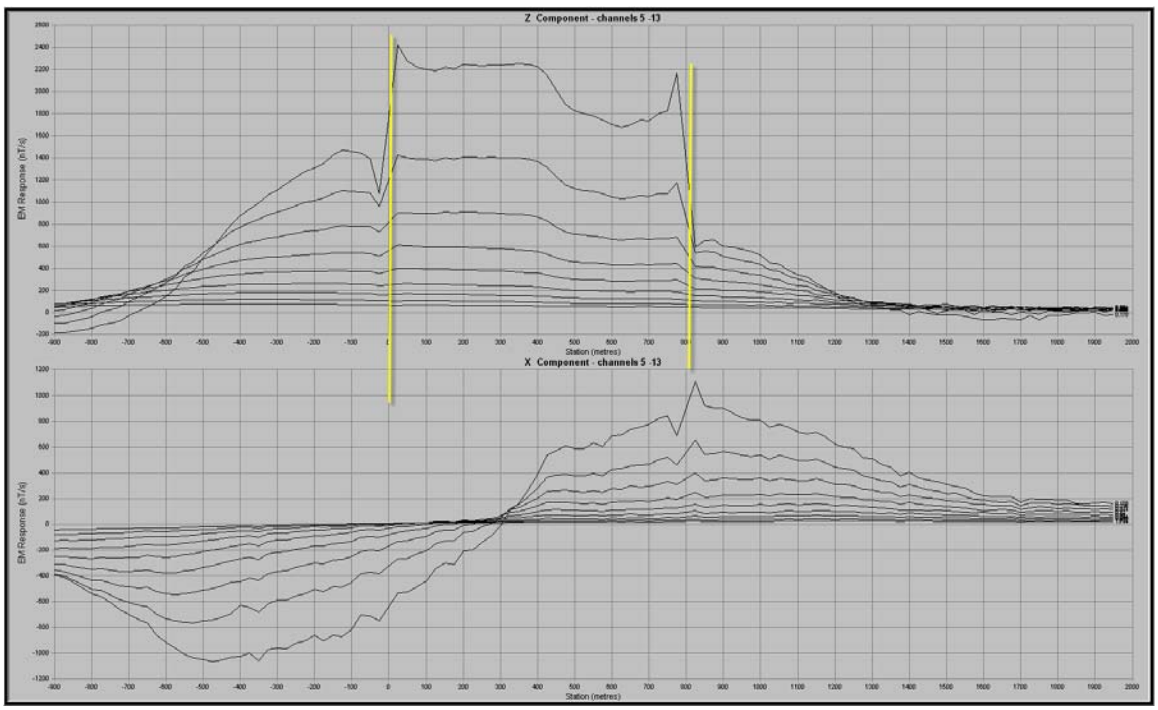


Figure 3: Line 1W showing Loop Edge Effects

Figure 4 below shows an early channel response pattern near station 450N on the profile (corresponding with a UTM coordinate of 585532E 5472810N). The response pattern is characterized by a peak in the X component with a corresponding cross-over shape in the Z component which is suggestive of a steeply dipping source. If this is near the Vine Vein, it would suggest this structure is moderately conductive and has such TDEM techniques may possibly be an effective tool to map the surface expression of this or similar structures.

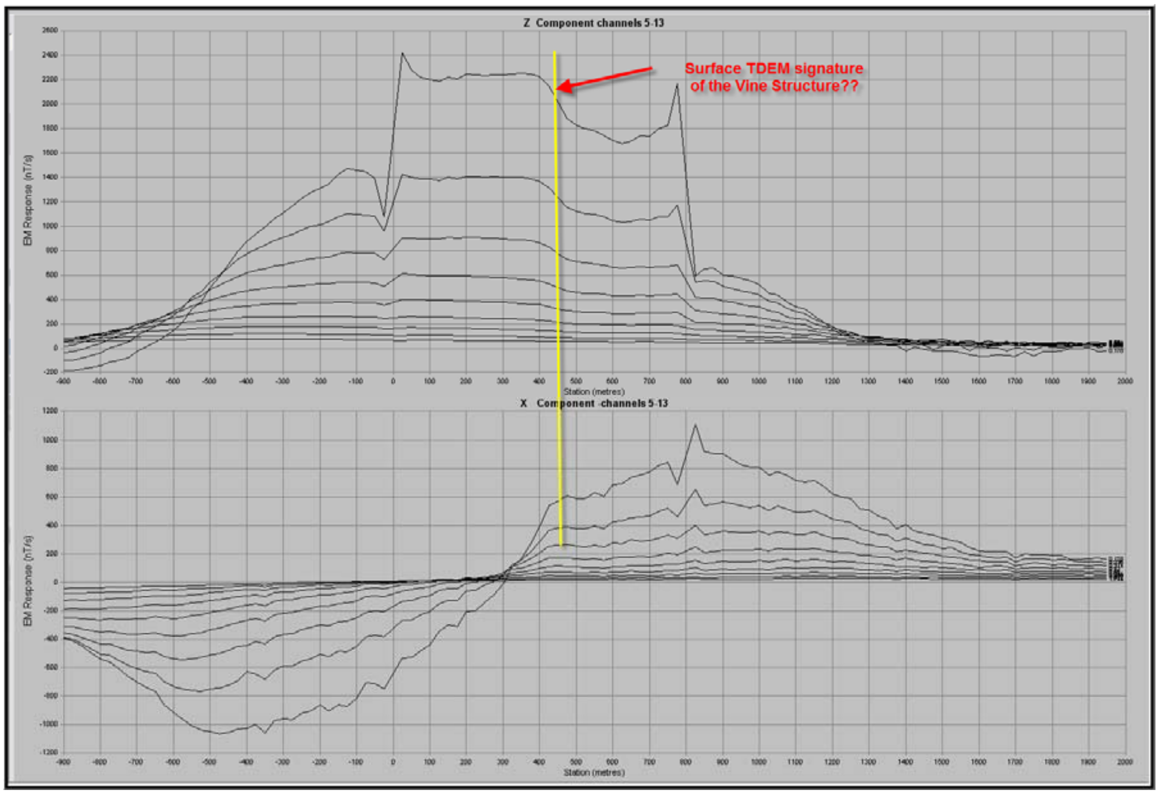


Figure 4: Line 1W showing anomalous response near station 450N (Possibly seeing the surficial expression of the Vine Vein

Shown below in figure 5 is a plot of channels 8-13 showing the dominant response pattern evident on this line, i.e. a very broad positive response in the Z component which is evident over the entire length of the line. The broad anomaly wavelength is suggestive of a very large source and one which likely exceeds the dimensions of the transmit loop. With such large wavelength anomalies, the terms 'formational' and/or 'host rock' responses are sometimes utilized in the explanation of the geophysical response patterns (and may or may not have any geological meaning). Here the author has interpreted this response pattern as being due to very large source which is dipping moderately to the North. Numerical modeling (utilizing Maxwell, with limitations noted) was performed to fit this background utilizing either the thin or thick plate approximations. These models to fit this 'background' are shown in figures 6-8 below. (Please note again that it is very important to realize there are a multitude of conductor sizes, orientations and conductance values which can yield the exact same response.) The results shown here are meant as general observations only to show the approximate body size and orientation which can be invoked to explain the observed field data.

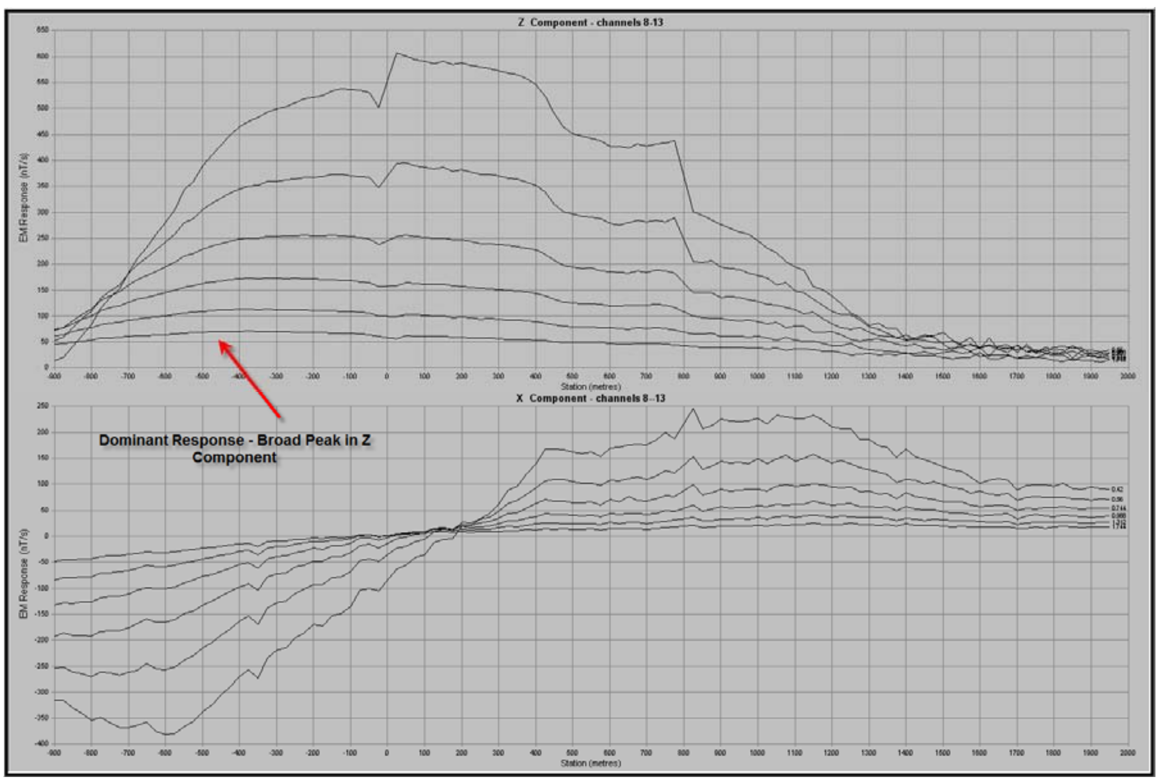


Figure 5: Line 1W showing broad anomalous response pattern

Figures 6 and 7 below show two different thin plate models (varying parameters) which provide reasonable fits to the field data. Figure 8 shows a thick plate version (of model shown in figure 7) and provides a reasonable fit as well.

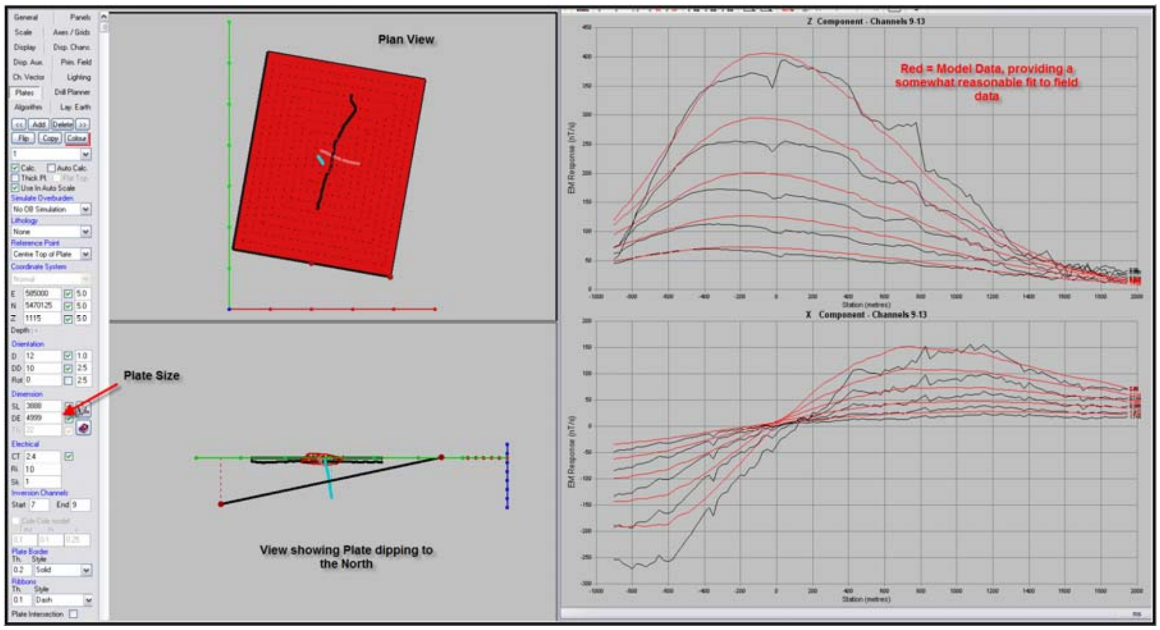


Figure 6: Line 1W – Thin Plate Modeling Results

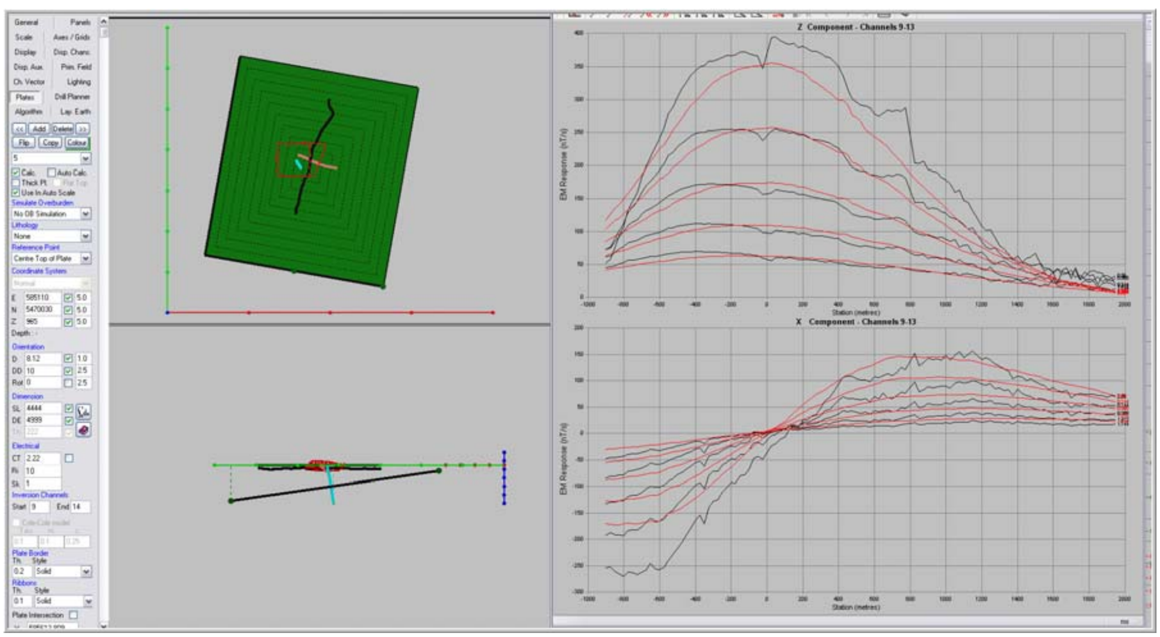
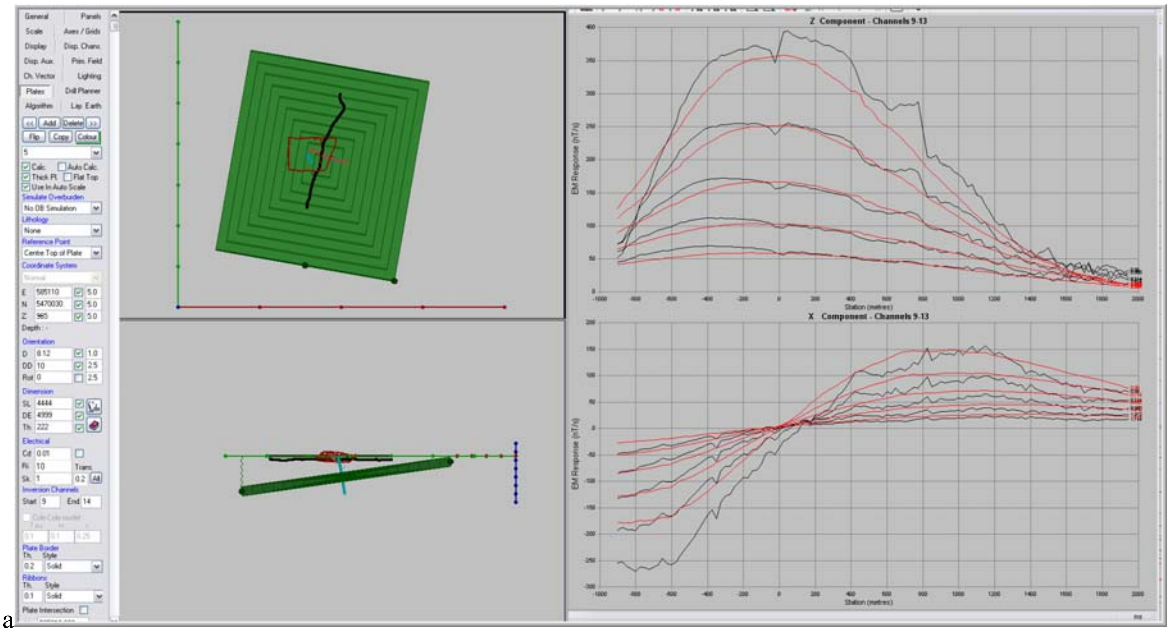


Figure 7: Line 1W – Thin Plate Modeling Results – Plate 2



a
Figure 8: Line 1W – Thick Plate Modeling Results – Plate 2 (Showing a place thickness of ~222m)

Based on these limitied modeling results, it ***appears*** as if the long wavelength response pattern evident on this line can possibly be explained by a current flow pattern set-up on a very large unit with an apparent moderate, northly dip.

The Borehole survey results are presented in the figures 9 -12 below. Figure 9 below shows the Z component profile displaying a discrete in-hole response pattern centered near a hole depth of ~530m. Figure 10 below shows the results of a forward model (predictive results) of the hole intersecting the plate shown in figure 6 above. Note that without any modifications at all to this model geometry, the forward model in-hole is at the exact same level as that noted in the actual field results suggesting the anomalous surface response has been explained by the material intersected near this level in the hole.

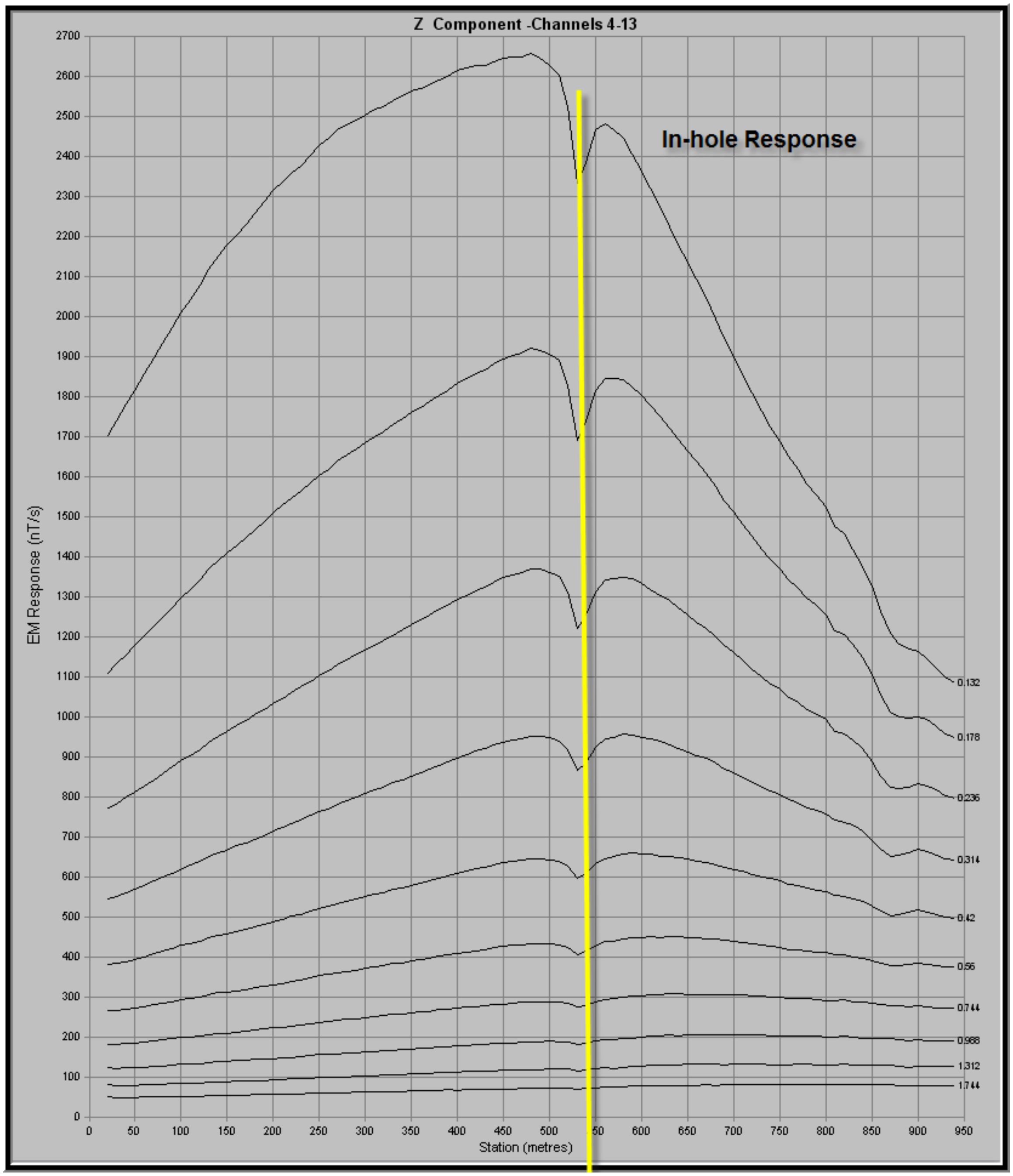


Figure 9: Hole V-78-1X -Z component Response – Channels 4-13

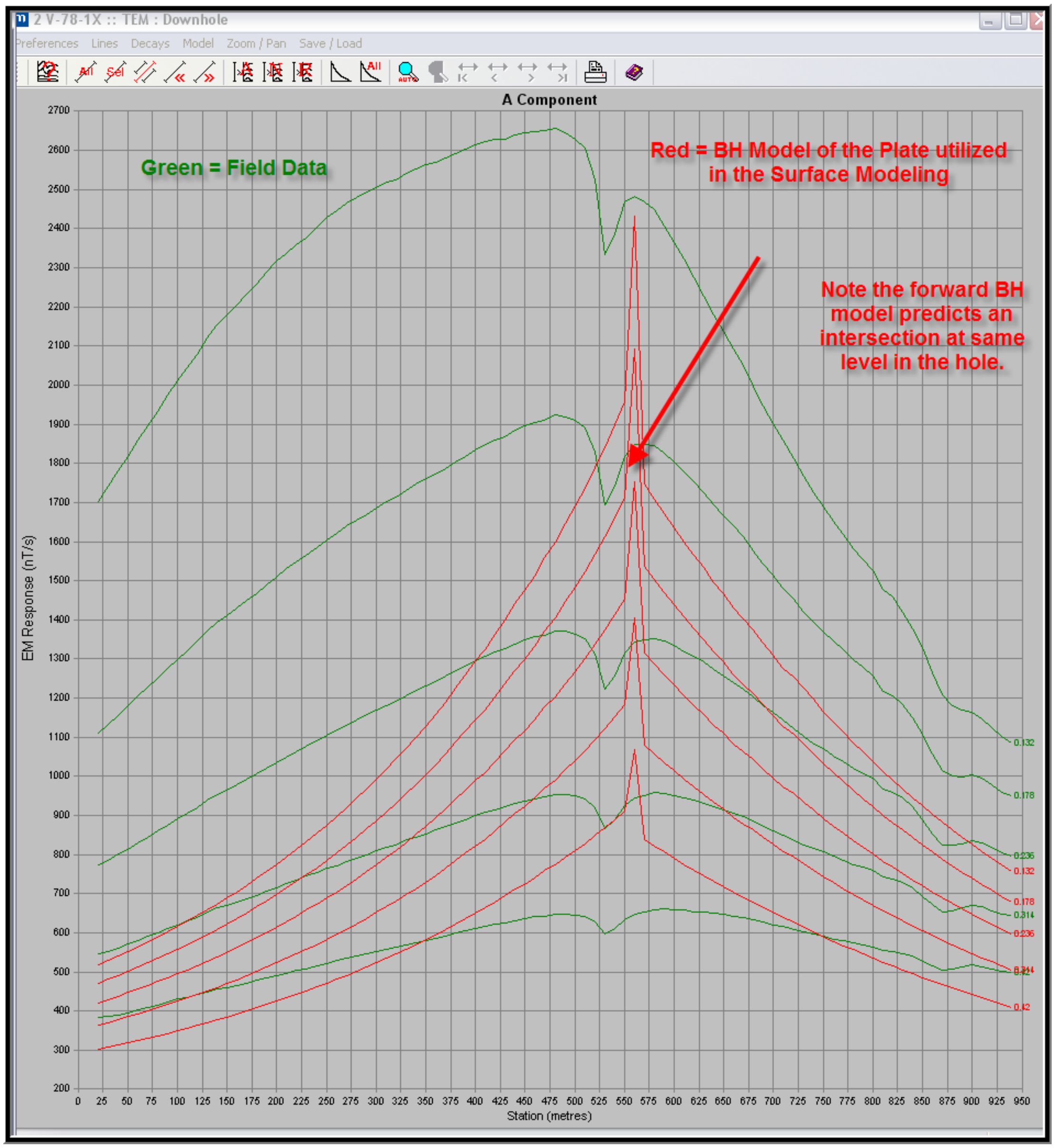


Figure 10: Comparison of Field Data to Model Generated from Surface TDEM

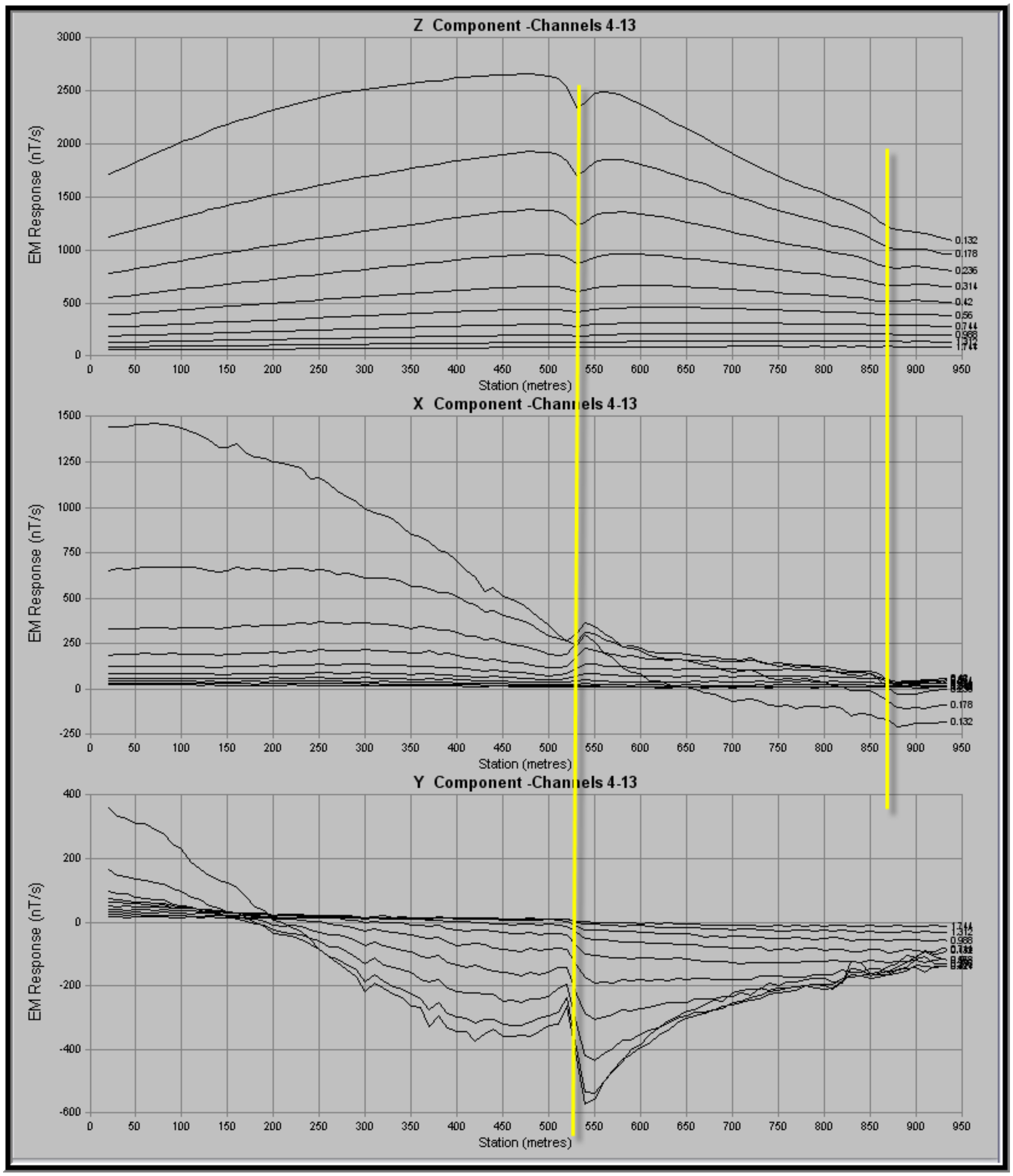


Figure 11: Hole V-78-1X Showing Early Time Anomalous Response patterns

It is noteworthy though that there is a short wavelength response, possibly from an isolated source, located at the exact same depth in the hole (ie. at 530m and highlighted in figure 11 above). The Z component shows a slight negative 'dip' at this point which could be related (most likley scenario) to the in-hole intersection, or could posssibly be due to a separate, low conductance off-hole source. The corresponding short wavelength, XY anomaly points above and right of the hole (convention being looking down the hole, in direction of hole azimuth, in a south west direction. The signficance of this anomalous response is unclear. The short wavelength response pattern seems to indicate a relatively small source, with the early channel response pattern suggestive of low to moderate conductivity. Modeling of this response pattern is not possible. On its own, and given the depth to this source, this would **not normally appear** as a potential exploration target, unless there was compelling geological support. It is noteworthy here that the hole (at 530m depth) intersected 1% disseminated pyrrhotite (parallel to the bedding plane over a 1 m interval) and from 540-544m the hole intersected 1-2% disseminated pyrrhotite and 1% sphalerite parallel to bedding. While the significance of these in relation to the geophysical response pattern is not fully known, this does offer somewhat compelling geological evidence to make this a potential follow-up (geological) target.

Near a hole depth of ~870m another short wavelength anomalous feature is evident. A weak apparent off-hole is seen here in the Z component with the XY response indicating this source is located (centered) below the hole (i.e. to the northwest). The short wavelength response pattern appears to indicated a small source and as such would **not normally appear** as an attractive geophysical (exploration) target. However, it is important to put these resposnes in a geological context. This hole was testing for bedded massivey pyrite, galena and sphalerite at a depth of 900m, but unfortunately at this depth the hole intersected a (14m wide) fault zone. The geological model utilized by the company suggests the expected horizon here may have been 'dropped' to the north. As the geophysical expression of this expected horizon is an unknown, it would be unwise to rule out the significance of any of these weak BHEM responses. With compelling geological evidence, this may represent an area for future work.

There are several issues which must be addressed though with regards to the data itself and indeed these broad generalizations. One of the goals of this BHEM survey was to look for potential massive sulfide zones within the formations which occur around the Sullivan time and at the base of the Footwall Quartzite that occurs at an earlier time, approximatley 350 metres below the Sullivan time. However, in order to properly rate the significance of these anomalous responses, what is truly required is a BHEM survey of a hole near or through typical massive sulphides which are similar to those of the Sullivan Deposit itself. Pyrite, Sphalerite, and Galena are sometimes (often!) notoriously poor conductors, and as such rating weak anomalous responses as not being a potential exploration target is wrought with extreme dangers if the geophysical characteristics of the target response are an unknown!

The depth of these targets has played a key role here in the author categorizing these as not being potential geohysical targets of interest, however, if there are compelling geological reasons for potential (weakly conductive) massive sulphide zones near either noted anomaly (which there appears to be), then these may well rank very highly from a geological perspective.

With this in mind then, there are a couple of subtle features evident in the surface data (Line 1W in particular) which need to be highlighted. Figure 12 below shows 2 separate potential zones of interest.

The first is seen over a broad interval from station 550S (585232E 5471793N –700S (585195 E 547164N) and represents a very subtle feature. The second feature is seen near station 1150N, (585803 E- 5473494N). This feature looks even more compelling as a potential bedrock source (with a very rough depth to top estimate of 250-300m) and could be possibly due to a steeply dipping structure/fault/ shear zone.

It must be noted that both are very subtle responses and normally very little signficance would be assigned to features such as this. In this environment though if faults, shears zones etc (yielding zones similar to the Vine Vein) are potentially important exploration targets, these features may be worthy of a closer look. The anomolous response near 1150N (UTM – 585803E 5473494N) on Line 1W would appear to have the most potential in this respect.

One last thing to note here is that the anomaly wavelength and response pattern has not been completely defined here. An extension of this line by at least another 500m to the South would likely be required for this.

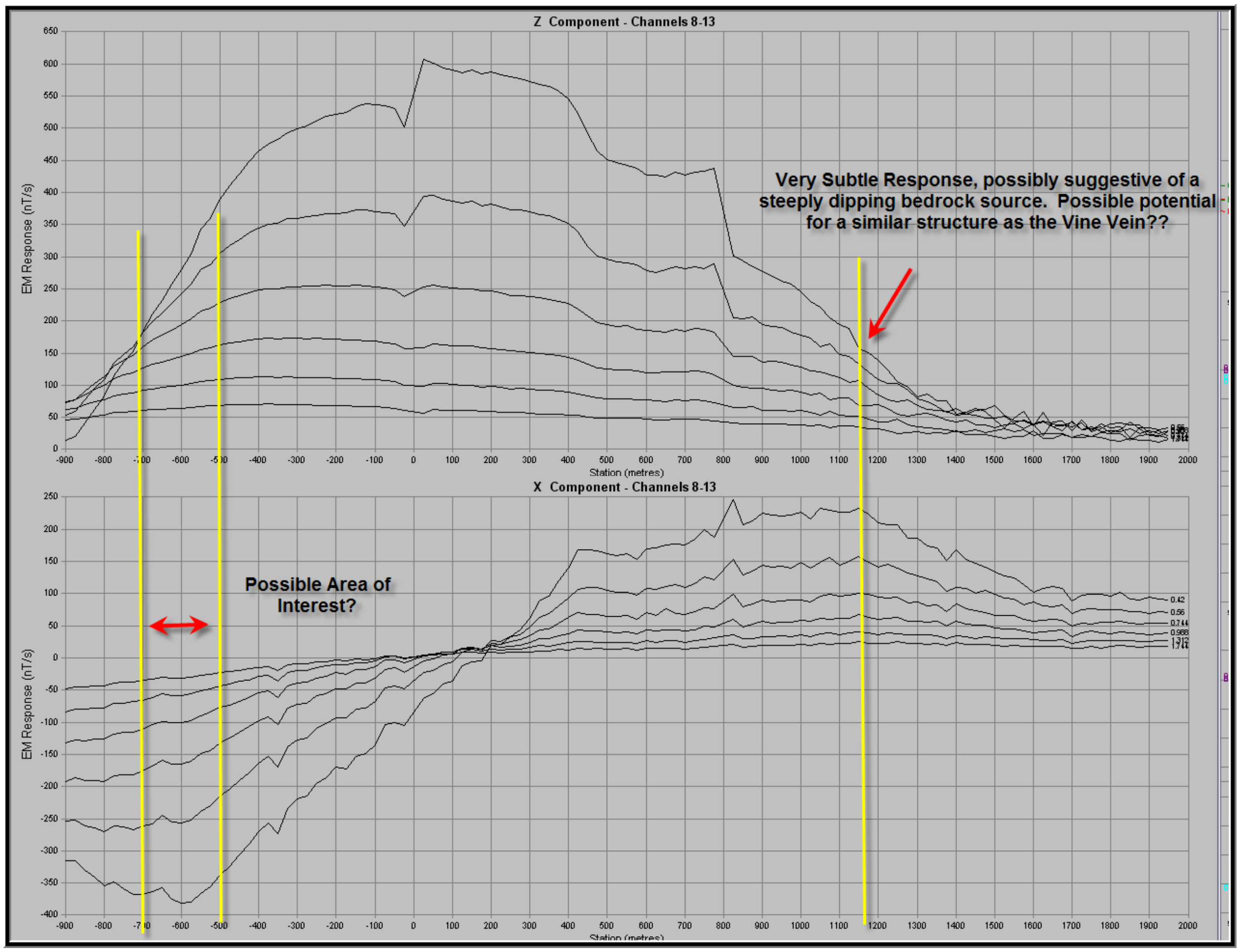


Figure 12: Line 1 W Highlighting Possible Areas of Interest

Conclusions

The trial TDEM surveys conducted over this property have shown several anomalous response patterns indicating the electromagnetic prospecting technique may be a potentially effective tool in this environment. The results are complex and with such a limited data set it is very difficult to draw definitive conclusions or perform detailed analysis of the data. In very general terms, it can be stated with some confidence that the immediate survey area is underlain by a very large conductive feature giving rise to a very broad wavelength anomalous response evident on all lines. The exploration significance of this response is unclear to the author. If this response is due to a large conductive unit, which may represent a potential marker horizon, than surface TDEM surveys should help in mapping this unit. Determining the exact location though to drill within this response would be a decision best left to the project geologist.

Within the broad wavelength response (Line 1 W) several isolated responses have been highlighted. The response near 450N should be analyzed closely by the project geologist to ascertain whether this is the surficial TDEM signature of the Vine Vein. If so, the implication is that the TDEM method would be an extremely effective tool in searching for similar structures (if they are to become an exploration focus). With this in mind, the response near 1150N would certainly look somewhat intriguing and may warrant further investigation.

The BHEM surveys yielded several anomalous response patterns. The response pattern is dominated by a long wavelength in-hole type response near a hole depth of 550m with modeling studies suggesting this is likely the source highlighted by the surface survey. Several shorter wavelength response patterns were noted but the author is uncertain if they represent potential exploration targets (namely due to the fact the expected electromagnetic signature of typical massive sulphide bodies in this environment is unknown).

APPENDIX V

CRONE INSTRUMENT SPECIFICATIONS

Crone Pulse EM

System Description

SYSTEM DESCRIPTION

The Crone Pulse EM system is a time domain electromagnetic method (TDEM) that utilizes an alternating pulsed primary current with a controlled shut-off and measures the rate of decay of the induced secondary field across a series of time windows during the off-time. The system uses a transmit loop of any size or shape. A portable power source feeds a transmitter which provides a precise current waveform through the loop. The receiver apparatus is moved along surface lines or down boreholes.

The transmitter cycle consists of slowly increasing the current over a few milliseconds, a constant current, abrupt linear termination of the current, and finally zero current for a selected length of time in milliseconds. The EMF created by the shutting-off of the current induces eddy currents in nearby conductive material thus setting-up a secondary magnetic field. When the primary field is terminated, this magnetic field will decay with time. The amplitude of the secondary field and the decay rate are dependent on the quality and size of the conductor. The receiver, which is synchronized to the off-time of the transmitter, measures this transient magnetic field where it cuts the surface coil or borehole probe. These readings are across fixed time windows or "channels".

SYSTEM TERMINOLOGY

Ramp Time

"Ramp time" refers to the controlled shut-off of the transmitter current. Three ramp times are selectable by the operator; 0.5ms, 1.0ms, and 1.5ms. By controlling the shut-off rather than having it depend on the loop size and current ensures that the same waveform is maintained for different loops so data can be properly compared.

The 1.5ms ramp is the normally used setting for good conductors. It keeps the early channel responses on scale and decreases the chance of overload. The faster ramp times of 1.0ms and 0.5ms will enhance the early time responses. This can be useful for weak conductors when data from the higher end of the frequency spectrum is desired.

Time Base

Time base is the length of time the transmitter current is off (it includes the ramp time). This also equals the on time of the current. Time bases are available for both 60Hz and 50Hz noise rejection respectively:

- 8.33ms (30Hz), 16.66ms (15Hz), 50ms (5Hz), 100ms (2.5Hz), 150ms (1.67Hz), 300ms (0.833Hz), 500ms (0.5Hz), 750ms (0.33Hz), 1000ms (0.25Hz)
- 10ms (25Hz), 20ms (12.5Hz), 50ms (5Hz), 100ms (2.5Hz), 150ms (1.67Hz), 300ms (0.833Hz), 500ms (0.5Hz), 750ms (0.33Hz), 1000ms (0.25Hz)

Since readings are taken during the off cycles, the time base will have an effect on the receiver channels. Normally, a standard time base is selected for the type of system and survey being used, but this can be changed to suit a particular situation. A longer time base is preferred for conductors of greater time constants, and in surveys such as resistive soundings where more channels are desired.

Zero Time Set

The term "zero time set" or "ZTS" refers to the starting point for the receiver channel measurements. It is manually set on the receiver by the operator thus allowing adjustments for the ramp times and fine tuning for any fluctuations in the transmitter signal.

Receiver Channels

The rate of decay of the secondary field is measured across fixed time windows which occupy most of the off-time of the transmitter. These time windows are referred to as "channels". These channels are numbered in sequence with "1" being the earliest. The analog and datalogger receivers measured eight fixed channels. The digital receiver, being under software control, offers more flexibility in the channel positioning, channel width, and number of channels.

PP Channel

The PEM system monitors the primary field by taking a measurement during the current ramp and storing this information in a "PP channel". This means that data can be presented in either normalized or normalized formats, and additional information is available during interpretation. The PP channel data can provide useful diagnostic information and helps avoid critical errors in field polarity.

Synchronization

Since the PEM system measures the secondary field in the absence of the primary field, the receiver must be in "sync" with the transmitter to read during the off-time. There are three synchronization methods available: cable connection, radio telemetry, and crystal clock. This flexibility enhances the operational capabilities of the system.

SURVEY METHODS

The wide frequency spectrum of data produced by a Pulse EM survey can be used to provide structural geological information as well as the direct detection of conductive or conductive associated ore deposits. The various types of survey methods, from surface and borehole, have greatly improved the chances of success in deep exploration programs. There are eight basic profiling methods as well as a resistivity sounding mode.

Moving Coil

A small, multi-turn transmitter loop (13.7m diameter) is moved for each reading while the receiver remains a fixed distance away. This method is ideal for quick reconnaissance in areas of high background conductivity.

Moving Loop

Same as Moving Coil method, but with a larger rectangular transmit loop (100 to 300 meters). This method provides deeper penetration in areas of high background conductivity, and works best for near-vertical conductors. This method can be used in conjunction with the Moving In-loop survey for increased sensitivity to horizontal conductors.

Moving In-Loop

A rectangular transmit loop of size 100 to 300 meters is moved for each reading while the receiver remains at the center of the loop. This method provides deep penetration in areas of very high background conductivity, and works best for near-horizontal conductors. It can be used in conjunction with the Moving Loop survey.

Large In-Loop

A very large, stationary transmit loop (800m square or more) is used, and survey lines are run inside the loop. This mode provides very deep penetration (700m or more) and couples best with shallow dip conductors (<45 deg.) under the loop.

Deep EM

A large, stationary transmit loop is used, and survey lines are run outside the loop. This mode provides very deep penetration, and couples best with steeply dipping conductors (>45 deg.) outside the loop.

Borehole (Z Component only)

Isolated Borehole: A drill hole is surveyed by lowering a probe down a hole and surveying it with a number of transmit loops laid out on surface. The data from multiple loops gives directional information on the conductors.

Multiple Boreholes: One large transmit loop is used to survey a number of closely spaced holes. The change in anomaly from hole to hole provides directional information. These methods have detected conductors to depths of 2500m from surface and up to 200m from the hole.

3-D Borehole

Drill holes are surveyed with both the Z and the XY borehole probes. The X and Y components provide accurate direction information using just one transmit loop. Since the probe rotates as it moves down the hole a correction is required for the X-Y data. This is accomplished in one of two ways. The measurement of the primary field from the "PP" channel can be used to apply a "cleaning" algorithm to remove most of the secondary field contamination, and compare this to theoretical values. The amount of probe rotation is then calculated, and the correction can be made. The second method involves the use of an optional orientation tool for the X-Y probe. This attachment uses dip meters to calculate the probe rotation. A third method uses another rotation tool with integrated 3-axis accelerometers and 3-axis magnetometers which can be used to correct rotation on steeply dipping holes including vertical.

Underground Borehole

Underground drill holes can be surveyed in any of the above mentioned borehole methods with one or more transmit loops on the surface. Near-horizontal holes can be surveyed using a push-rod system.

Resistivity Soundings

By reading a large number of channels in the centre of a transmit loop it is possible to perform a decay curve analysis giving a best-fit layer earth model using programs such as ARRTI or TEMIX.

EQUIPMENT

Transmit Loops

The PEM system can operate with practically any size of transmit loop, from a multi-turn circular loop 13.7m in diameter, to a 1 or 2 turn loop of any shape up to 1 or 2 kilometers square using standard insulated copper wire of 10 or 12 gauge. The multi-turn loop is made in two sections with screw connectors. The 10 or 12 gauge loop wire comes on spools in either 300m or 400m lengths. The spools can be mounted on pack frame wire winders for laying out or retrieving.

Power Supply

The PEM system has been produced in 2 varieties: high power (4.8 KW), and low power (2.4 KW). The low power PEM system normally operates with an input voltage from 24V to 240V with a maximum output current of 20 amps. For very low power surveys a 20amp/hr 24V battery can be used. The high power system operates on a continuously variable voltage input up to 240V with a maximum output current of 30 amps. The power supply requires a motor generator and a voltage regulator to control and filter the input voltage to the transmitter.

Specifications: PEM Motor Generator

- (2.4 KW) 4.5 hp Robin EH34 engine, 120V 3-phase alternator
- (4.8 KW) 11 hp Robin RGV6100 240V/120V generator (1-phase)
- cable output to regulator
- fuse type overload protection
- steel frame
- external gas tank

- optional packframe for low-power generator
- wooden shipping box
- unit weight: 33kg (2.4 KW); 81kg (4.8 KW)
- shipping weight: 47kg (2.4 KW); 100kg (4.8 KW)

Specifications: PEM Variable Voltage Regulator

- High Power
  - Continuously variable voltage output up to 240V
  - 30 amp maximum current
  - Integrated sealed aluminum case ruggedized for shipping
  - Shipping weight 18kg
- Low Power
  - selectable voltage between 24v and 120v
  - 20amp maximum current
  - anodize d aluminum case
  - padded wooden shipping box
  - unit weight 10kg; shipping weight 18kg
- fuse and internal circuit breaker protection
- cable connections to motor generator and transmitter

Specifications: PEM Transmitter

- High Power
  - Timebases
    - 8.33ms (30Hz), 10ms (25Hz), 16.66ms (15Hz), 20ms, (12.5Hz), 50ms (5Hz), 100ms (2.5Hz), 150ms (1.67Hz), 300ms (0.833Hz), 500ms (0.5Hz), 750ms (0.33Hz), 1000ms (0.25Hz)
  - ramp times: 0.5ms, 1.0ms, 1.5ms
  - operating voltage: continuously variable input up to 240V
  - output current up to 30amp maximum
  - optional current control feedback system features constant current output with ±0.1 amp precision
  - integrated sealed aluminum case ruggedized for shipping with shock protection
- Low Power
  - Timebases
    - 8.33ms (30Hz), 10ms (25Hz), 16.66ms (15Hz), 20ms, (12.5Hz), 50ms (5Hz), 100ms (2.5Hz), 150ms (1.67Hz), 300ms (0.833Hz)
  - operating voltage: 24v to 120v
  - output current: 5amp to 20amp
  - anodized aluminum case
  - optional pack frame
  - unit weight 12.5kg; shipping weight 22kg
  - padded wooden shipping box
- monitors for input voltage, output current, shut-off ramp, tx loop continuity, instrument temperature, and overload output current
- automatic shut-off for open loop, high instrument temperature, and overload
- fuse and circuit breaker overload protection
- three sync modes:
  - built-in radio and antenna
  - cable sync output for direct wire link to receiver or remote radio
  - crystal clock connection with built-in optical isolation

Receiver

The receiver measures the rate of decay of the secondary field across several time channels. The Crone Digital Receiver, in use since 1987 uses software control, offering a variety of programmable channel configurations.

Specifications: Digital PEM Receiver

- 26 bit (156dB) dynamic range
- operating temperature -40°C to 50°C
- built-in non-volatile memory
- optional pack frame
- unit weight 15kg; shipping weight 25.5kg
- padded wooden shipping box
- Menu driven operating software system offering the following functions:
    - controls channel positions, channel widths, and number of channels
    - Timebases: 8.33ms (30Hz), 10ms (25Hz), 16.66ms (15Hz), 20ms, (12.5Hz), 50ms (5Hz), 100ms (2.5Hz), 150ms (1.67Hz), 300ms (0.833Hz), 500ms (0.5Hz), 750ms (0.33Hz), 1000ms (0.25Hz)
    - ramp time selectable
    - sample stacking from 1 to 65536
    - automatic gain and spike rejection
    - scrolling routines for viewing data
    - graphic display of decay curve and profile with various plotting options
    - routines for memory management
    - control of data transmission
    - provides information on instrument and operating status

Sync Equipment

There are three modes of synchronization available; radio, cable, and crystal clock. The radio sync signal can be transmitted through a booster antenna from either the PEM Transmitter internal radio or through a Remote Radio.

Specifications: Sync Cable

- 2 conductor, 24awg, Teflon coated
- approx. 900m per aluminum spool with connectors

Specifications: Remote Radio

- operating frequency 27.12mhz
- 12V rechargeable gel cell battery supply
- fuse protection
- sync wire link to transmitter
- coaxial link to booster antenna
- anodized aluminum case
- unit weight 2.7kg

Specifications: Booster Antenna

- 8m, 4 section aluminum mast
- guide rope support
- ¼ wave CB fiberglass antenna
- range up to 2km
- coaxial connection to transmitter or remote radio

Specification: Crystal Clocks

- heat stabilized crystals
- 24V rechargeable gel cell battery supply

- anodized aluminum case
- rx unit can be separate or housed in the receiver
- outlet for external supplementary battery supply

Surface PEM Receive Coil

The Surface PEM Receive Coil picks up the EM field to be measured by the receiver. The coil is mounted on a tripod that can be positioned to take readings of any component of the field.

Specifications: Surface PEM Receive Coil

- ferrite core antenna
- VLF filter
- 10khz bandwidth
- two 9v transistor battery supply
- tripod adjustable to all planes
- unit weight 4.5kg; shipping weight 13.5kg
- padded wooden shipping box

Surface SQUID sensor

CSIRO 1-, 2- or 3- axis high-sensitivity superconducting sensor measures magnetic field in the sub-pT range.

Specifications: Surface SQUID sensor

- liquid nitrogen cooled, 12 hour operation between reservoir refills
- low-noise floor ~350fT/√Hz
- man-portable sensor and control system
- moving loop, or large loop survey configuration
- solid teflon non-magnetic housing
- operational temperature range: -40°C to 40°C
- total system packaged shipping weight (without liquid nitrogen): 62kg

Borehole PEM Z Component Probe

The Z component probe measures the axial component of the EM field. The Z component data is not affected by probe rotation so no correction is required.

Specifications: Borehole PEM Z Component Probe

- ferrite core
- dimensions: length - 1.6m; dia - 3.02cm (3.15cm for high pressure tested probes)
- internal rechargeable NiCd battery supply
- replaceable heat shrink tubing for abrasion protection
- pressure tested for depths 1300m, 2000m, and 2800m
- packaged in padded cover and aluminum tube
- shipped in padded wooden box; total weight 17kg

Borehole PEM XY Component Probe

The XY probe measures two orthogonal components of the EM field perpendicular to the axis of the hole. Correction for probe rotation can be achieved by mathematical theoretical primary field reduction or more commonly with an attached orientation tool sensor.

Specifications: Borehole PEM XY Component Probe

- ferrite core
- dimensions: length - 2.01m; dia - 3.02cm
- internal rechargeable ni-cad battery supply

- selection of X or Y coils by means of a switch box on surface or automatic switching with Digital receiver
- replaceable heat shrink tubing for abrasion protection
- pressure tested for depths to 2800m
- packaged in padded cover and aluminum tube
- shipped in padded wooden box; total shipping weight 20kg

Specifications: Orientation Tool

- 2 axis tilt sensors
- accuracy ± 0.1 deg.
- operating range -88 to -10 deg.
- dimensions: length - 0.94m; dia - 28.5mm
- packaged in padded cover and aluminum tube
- shipped in padded wooden box; total shipping weight 14kg

Specifications: Rotation Angle Direction (RAD) Tool

- integrated 3-axis accelerometers and 3-axis magnetometers
- dip and roll accuracy: ±0.5°, azimuth accuracy: ±1.0°
- operating range: all
- simultaneous 3D magnetometer borehole survey by station
- optional continuous logging mode
- dual 3-axis sensors provide an alternative complete borehole Dip-Azimuth measurement
- dimensions: length – 0.75m; dia – 31.8mm
- packaged in padded cover and aluminum tube
- shipped in padded wooden box; total shipping weight 14kg
- NiCd battery provides all-day operation
  - Length - 0.93m; dia – 28.6mm
  - Packaged in padded cover and aluminum tube
  - Shipped in padded wooden box; total shipping weight 14kg

Borehole Equipment

To lower the probe down a drill hole requires a cable and spool, winch assembly frame and cable counter. Borehole surveys also require equipment to "dummy probe" the hole before doing the survey.

Specifications: Borehole Cable

- two conductor shielded cable
- kevlar strengthened
- lengths are available up to 2600m on three sizes of spools
- shipped in wooden box

Specifications: Slip Ring

- attaches to side of borehole cable spool providing a connection to the receiver while allowing the spool to turn.
- VLF filter
- pure silver contacts

Specifications: Borehole Winch Frame

- welded aluminum frame
- removable axle
- chain driven, 3 speed gear box
- hand or optional power winding
- hand brake and lock

- optional chain-gear safety cover
- two sizes: standard for up to 1300m cable; large for longer cables
- shipped in wooden box

Specifications: Borehole Counter

- attaches to the drill hole casing
- calibrated in meters
- shipped in wooden box; total weight 13kg

Specifications: Dummy Probe and Cable

- solid steel or steel pipe
- same dimensions as borehole probe
- shear pin connection to dummy cable
- steel dummy cable on aluminum spool
- cable mounts on borehole frame
- various lengths to 2600m on 3 spool sizes.