



crone

Crone Pulse-EM Survey

Wallbridge Mining Company Ltd.
Ermatinger Project – Sudbury, Ontario

*Geophysical Survey & Logistics Report
July 2015*



Conducted by:
Crone Geophysics & Exploration Ltd.



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Introduction

Crone Geophysics & Exploration Limited was contracted by Wallbridge Mining Company Ltd. to conduct Surface Pulse Electromagnetic Surveys on its Ermatinger property located in Sudbury, Ontario. This report summarizes the geophysical work carried out during July 6th – July 11th, 2015.

Five (5) surface lines utilizing one (1) transmitting loop were surveyed during this period. The appendices to this report contain page size plan maps, PEM profiles (linear 5-axis and logarithmic scale), and the Step response profiles.

Property Location & Access

The Ermatinger Property is approximately 70 kilometers from downtown City Greater Sudbury. The property is accessible by a combination of primary and secondary paved roads, gravel-topped roads, logging roads, ATV trails, and lastly on foot. From Sudbury, take Highway 17 West and turn north onto Highway 144. Follow Highway 144 for about 50 km, passing through the towns of Chelmsford and Dowling. Turn left onto Old Cartier Road at the Windy Lake Motel keep right and continue west to the Fox Lake Road turn off (Figure 1).

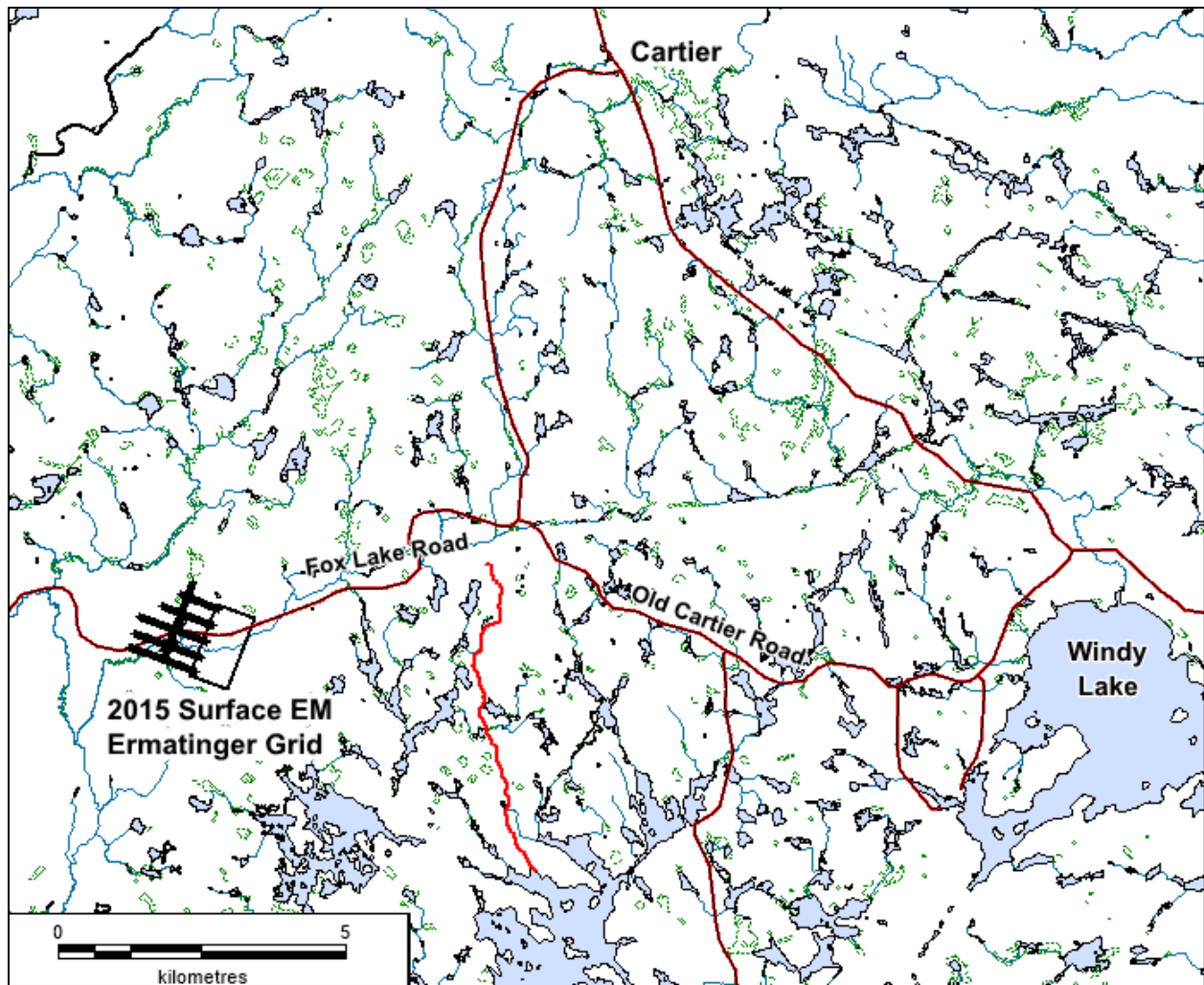


Figure 1: Location of the Ermatinger property, west of Windy Lake.

Personnel

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

Survey Operators: Serge Timoshenko, Caley Loft, Nick McKay

Data Processing: Josh Lymburner

Report: Eric Meunier



Equipment



Pulse-EM CDR2 Receiver

- 26-Bit equivalent A/D resolution
- Programmable gate configurations and optional full waveform
- Crone *Smartstacking* algorithm
- Sampling Rate: 250K samples/second | Sampling Interval: 4µsec
- Precision crystal oscillator or cable synchronization

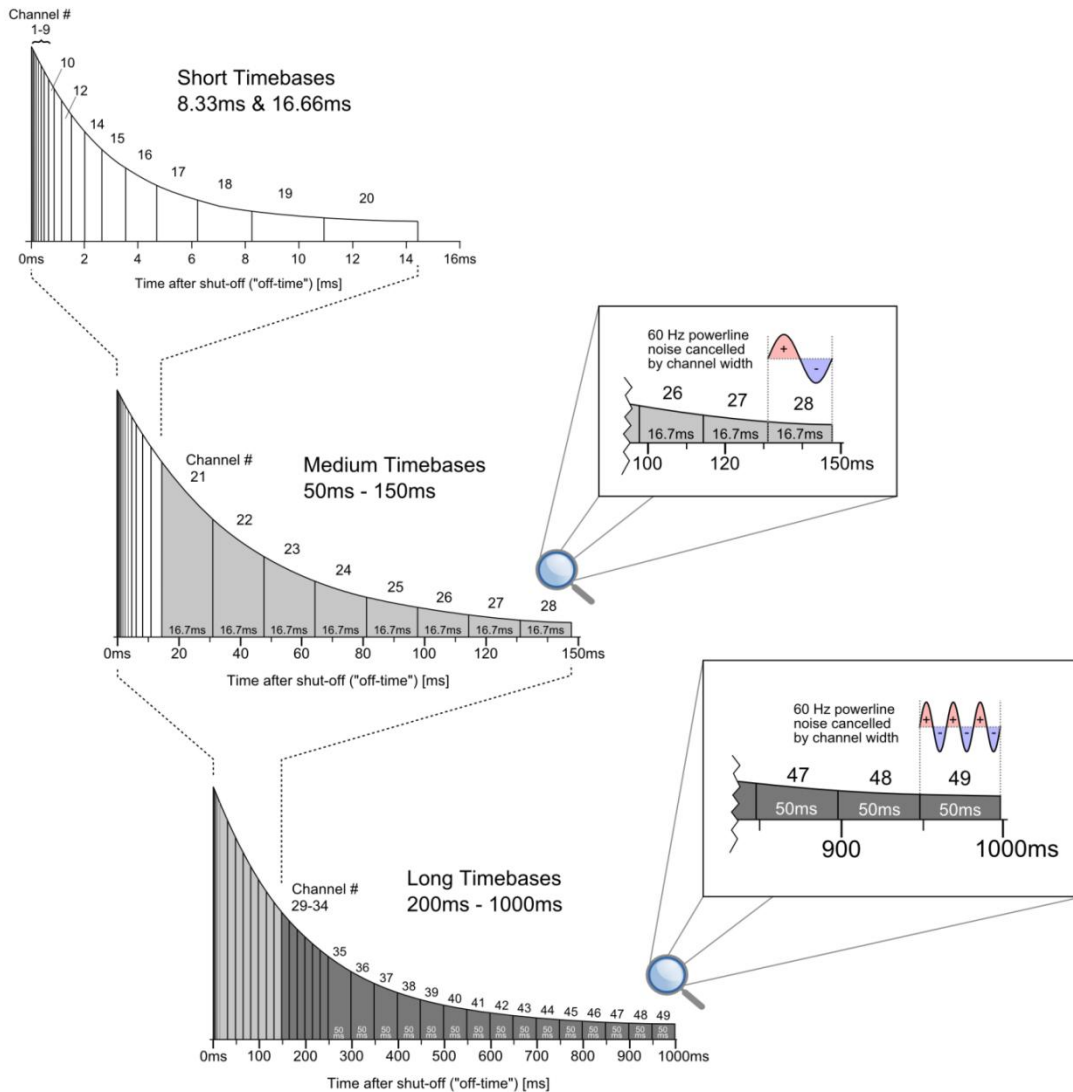


Figure 2: Standard Channel Configuration



Pulse-EM Transmitter

- 4.8kW for up to 30 amps in single or 60 amps in dual modes
- Timebases: 8.33ms to 2000ms
- Ramp Settings: Fast Ramp, 0.5ms, 1.0ms or 1.5ms
- Powered by Standard Motor Generator
- Current control and monitoring with optional loop damping
- Auto Shutdown and grounded case for safety

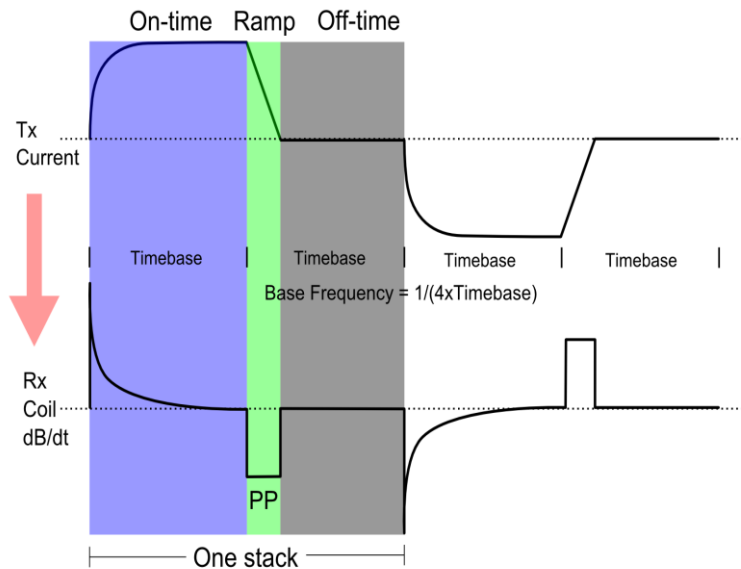


Figure 3: Standard Crone Pulse-EM Waveform

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.

In addition to measuring the standard Primary Pulse channel in the Tx shut-off ramp and the off-time channels, the Step Response was also be calculated. Step Response requires accurate geometrical control in which the loop position and the hole geometry are accurately determined. In the current surveys positional information was collected by Crone using a sub-meter capable GPS and regional base station. Positional information is provided in the UTM projection (Zone 17 North), utilizing the NAD1927 (Canada) datum.

The Step Response is widely regarded as a very important tool in the search for high conductance massive sulphides. Bill Ravenhurst shows the details of the Step Response transformation which is a unique feature of the Crone Pulse EM System (Ravenhurst, W. R., 2001).

The surface surveys were carried out using time base of 50.00 ms, with 1.5 ms shut-off ramp time (Table 1). The primary inducing field is defined as positive up inside the transmitter loop.

Data units are nT/s for the surface coil.



Data Acquisition Parameters

The following table's show the various time gates that constitute the channel configurations set up in the Crone PEM Receiver used in the surveys discussed in this report.

Table 1: 22-Channel Configuration for the 50.00 ms time base

Channel	Start	Finish	Channel	Start	Finish
PP	-0.0002	-0.0001			
1	4.8e-05	6.4e-05	2	6.4e-05	8.4e-05
3	8.4e-05	0.000112	4	0.000112	0.000152
5	0.000152	0.000204	6	0.000204	0.000268
7	0.000268	0.00036	8	0.00036	0.00048
9	0.00048	0.00064	10	0.00064	0.000848
11	0.000848	0.001128	12	0.001128	0.001496
13	0.001496	0.001992	14	0.001992	0.002644
15	0.002644	0.003512	16	0.003512	0.004664
17	0.004664	0.006192	18	0.006192	0.00822
19	0.00822	0.010916	20	0.010916	0.0144
21	0.0144	0.031068	22	0.031068	0.047736



Table 2: Surface Survey Transmitter Loop Coverage

Tx Loop	Property	Size (meters)	Corner Coordinates	
			UTM Zone 17N (NAD27)	
1	Ermatinger	~ 1300 x 700	449956N, 5161380N	
			450598N, 5161145N	
			451071N, 5162346N	
			450418N, 5162590N	

Table 3: Surface Survey Coverage

Line	TX loop	Timebase (ms)	Ramp (ms)	Off Time Channels	Current (Amps)	Station		Length (m)	Comp
						From	To		
0N	1	50.00	1.5	22	23	600W	600E	1200	X,Z
250N	1	50.00	1.5	22	23	600W	600E	1200	X,Z
550N	1	50.00	1.5	22	23	650W	600E	1250	X,Z
850N	1	50.00	1.5	22	23	300W	600E	900	X,Z
1150N	1	50.00	1.5	22	23	100W	600E	700	X,Z



Production Summary

Table 4: Production Summary

Date (d.m.y)	Type of Day	Comments
06-Jul-15	Survey	Laid most of the transmitter loop.
07-Jul-15	Survey	Finished laying the transmitter loop. Partially surveyed line 850N in the XZ-direction and completed surveying line 1150N in the XZ-direction.
08-Jul-15	Survey	Completed surveying line 850N and partially surveyed lines 0N, 250N, and 550N in the XZ-direction.
09-Jul-15	Survey	Completed surveying lines 0N and 250N in the XZ-direction.
10-Jul-15	Survey	Picked up some of the transmitter loop.
11-Jul-15	Survey	Finished picking up the transmitter loop.

References

Ravenhurst, W. R., 2001, Step and impulse calculations from pulse-type electromagnetic data: 68th Ann. Internat. Mgt., Soc. Expl. Geophys., Extended Abstracts, 814-816.

Respectfully submitted,

Eric Meunier, M.Sc.

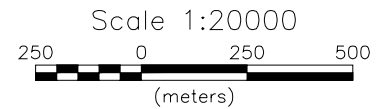
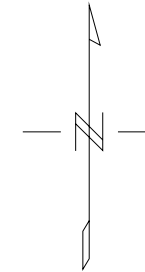
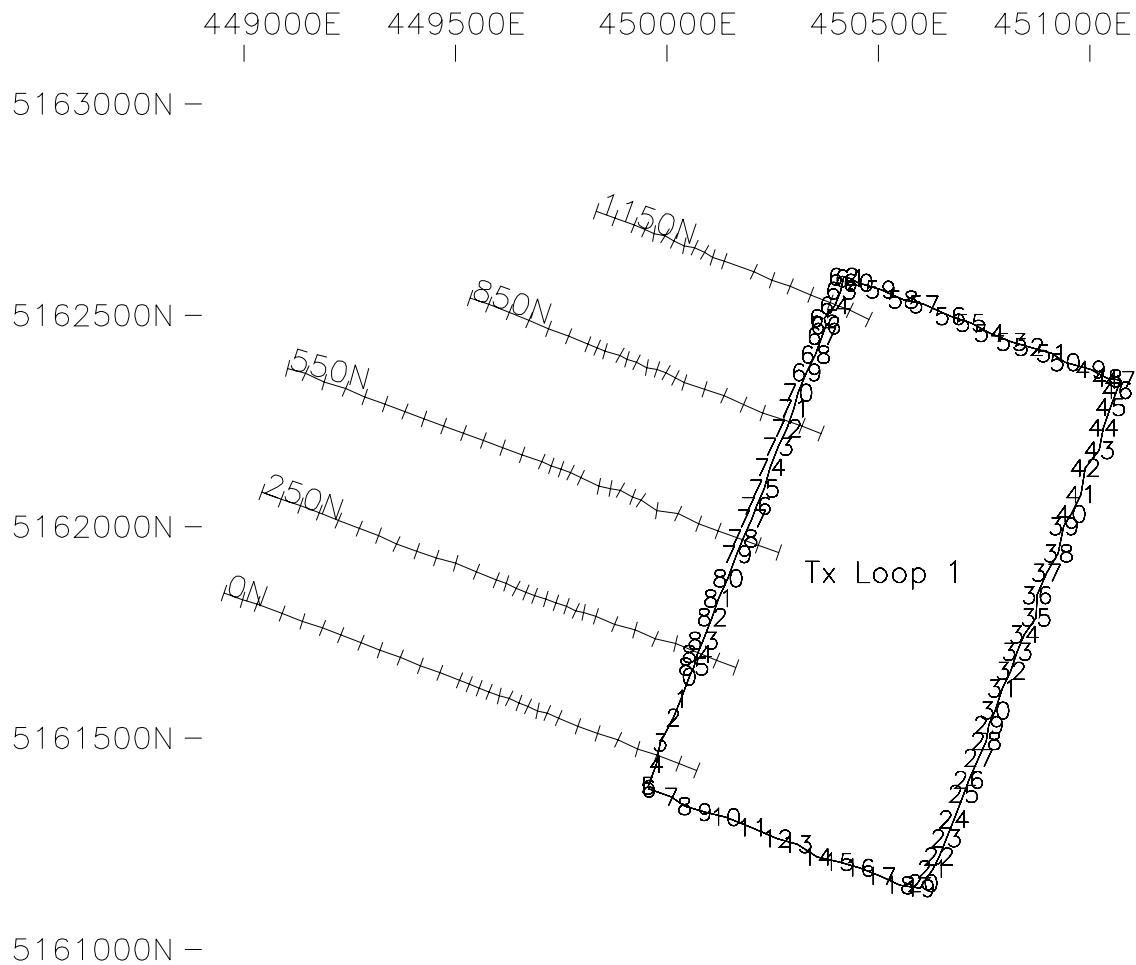
Project Geophysicist

Crone Geophysics & Exploration Ltd.



Appendix 1: Profile Plan Maps





Wallbridge Mining Company Ltd.
Ermatinger Property

3-D Borehole Pulse EM Survey
Borehole & Loop Location Map

Loop: 1

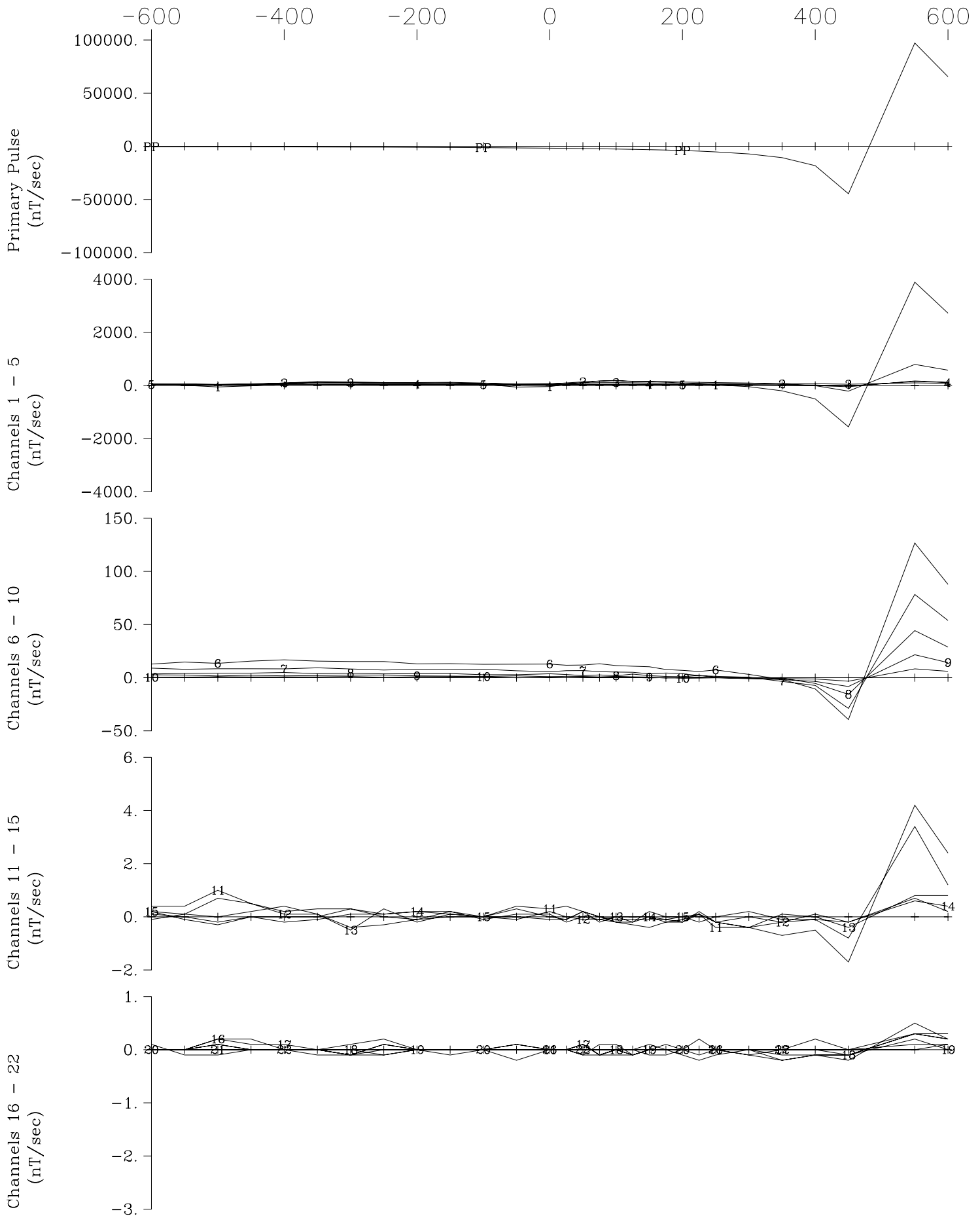
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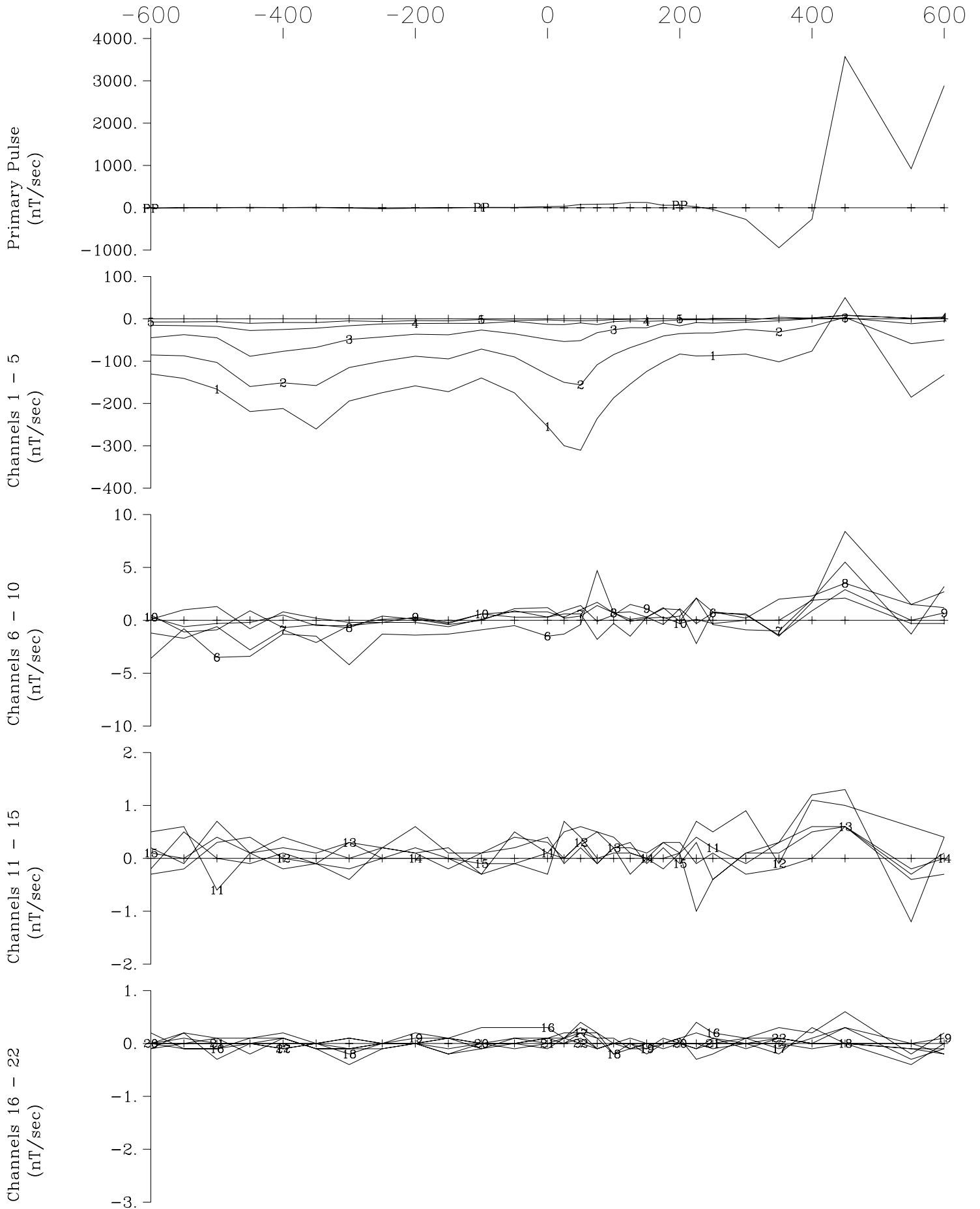


Appendix 2: Linear (5-Axis) Pulse-EM Data Profiles

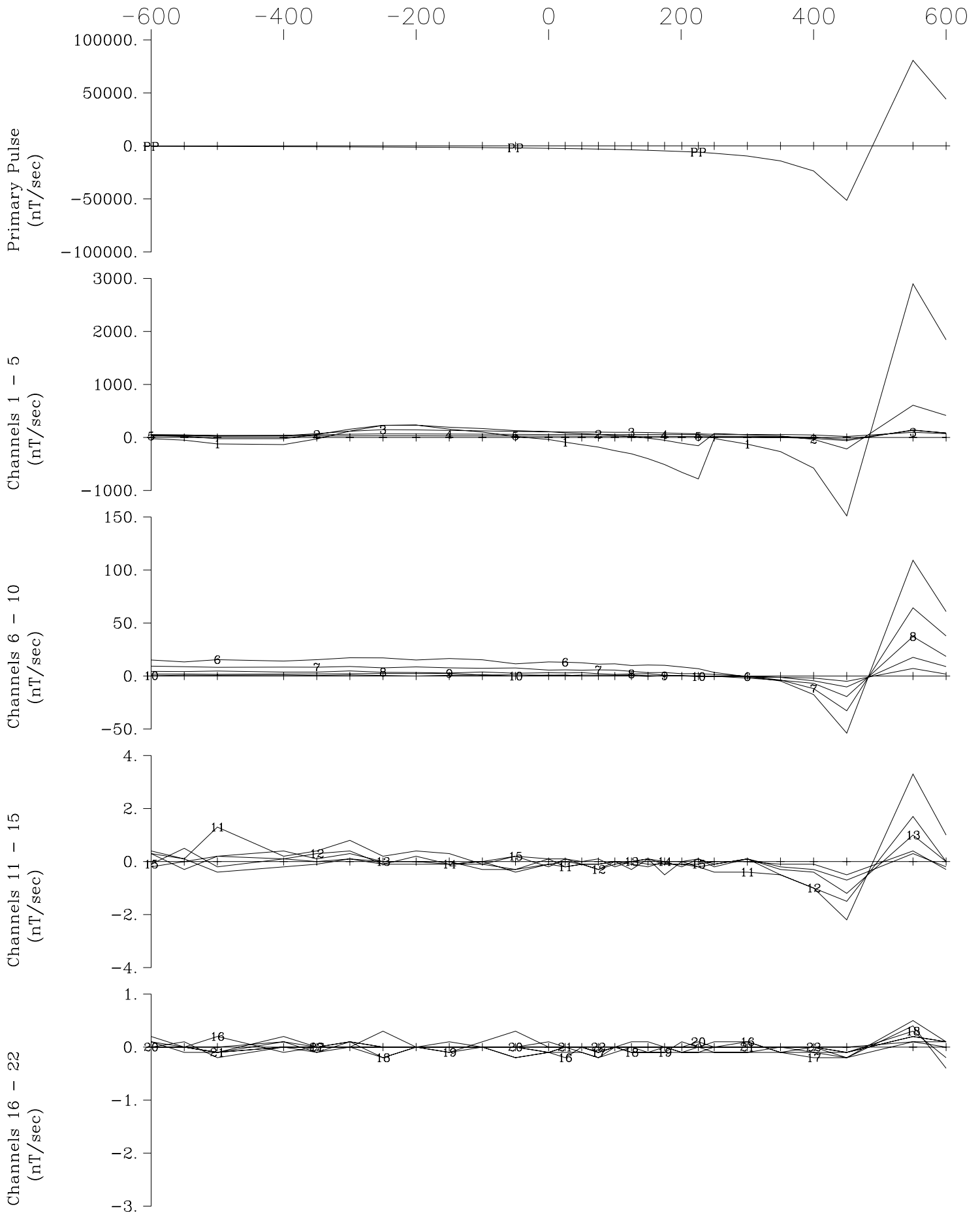




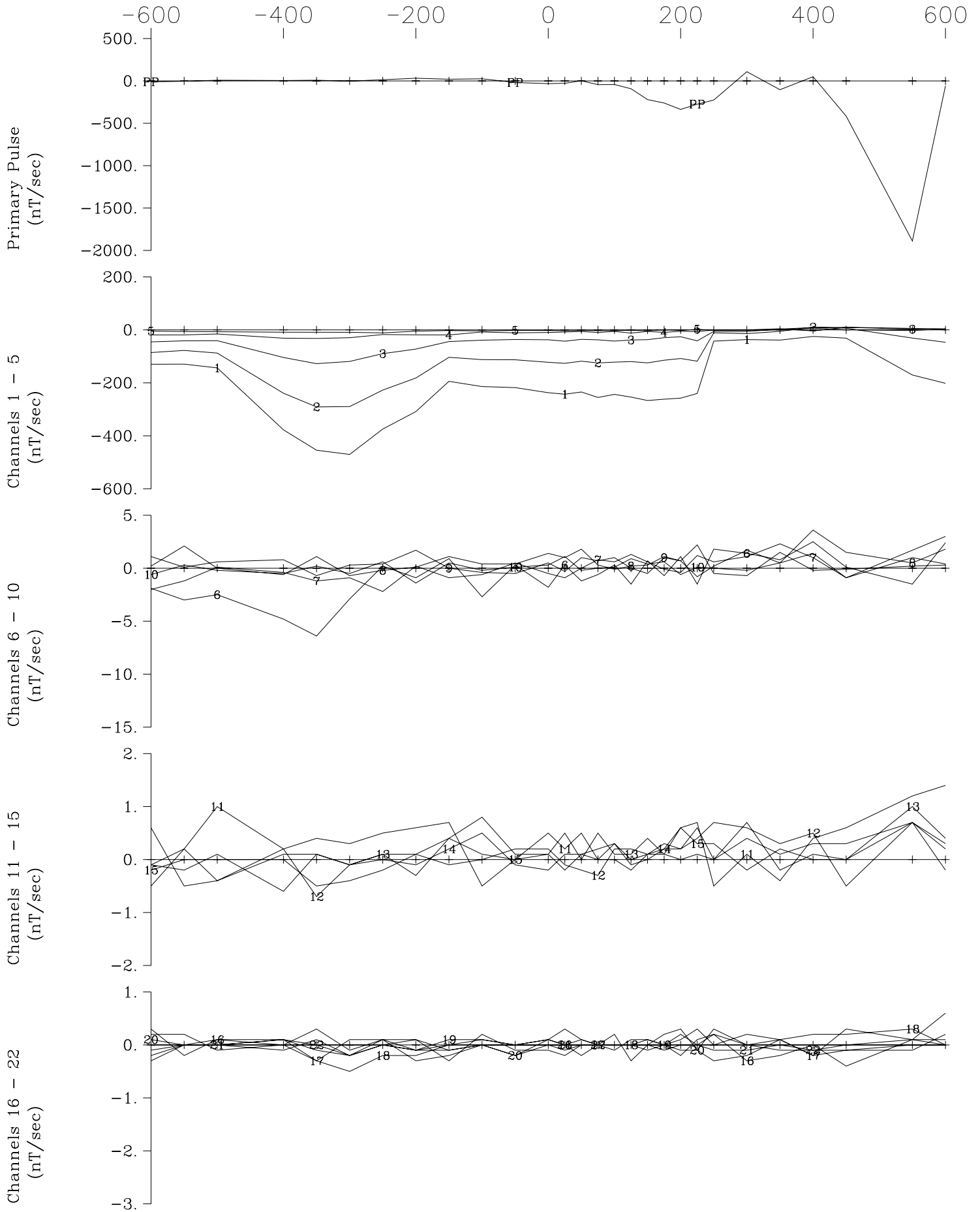
Wallbridge Mining Company Ltd. Ermatinger Property
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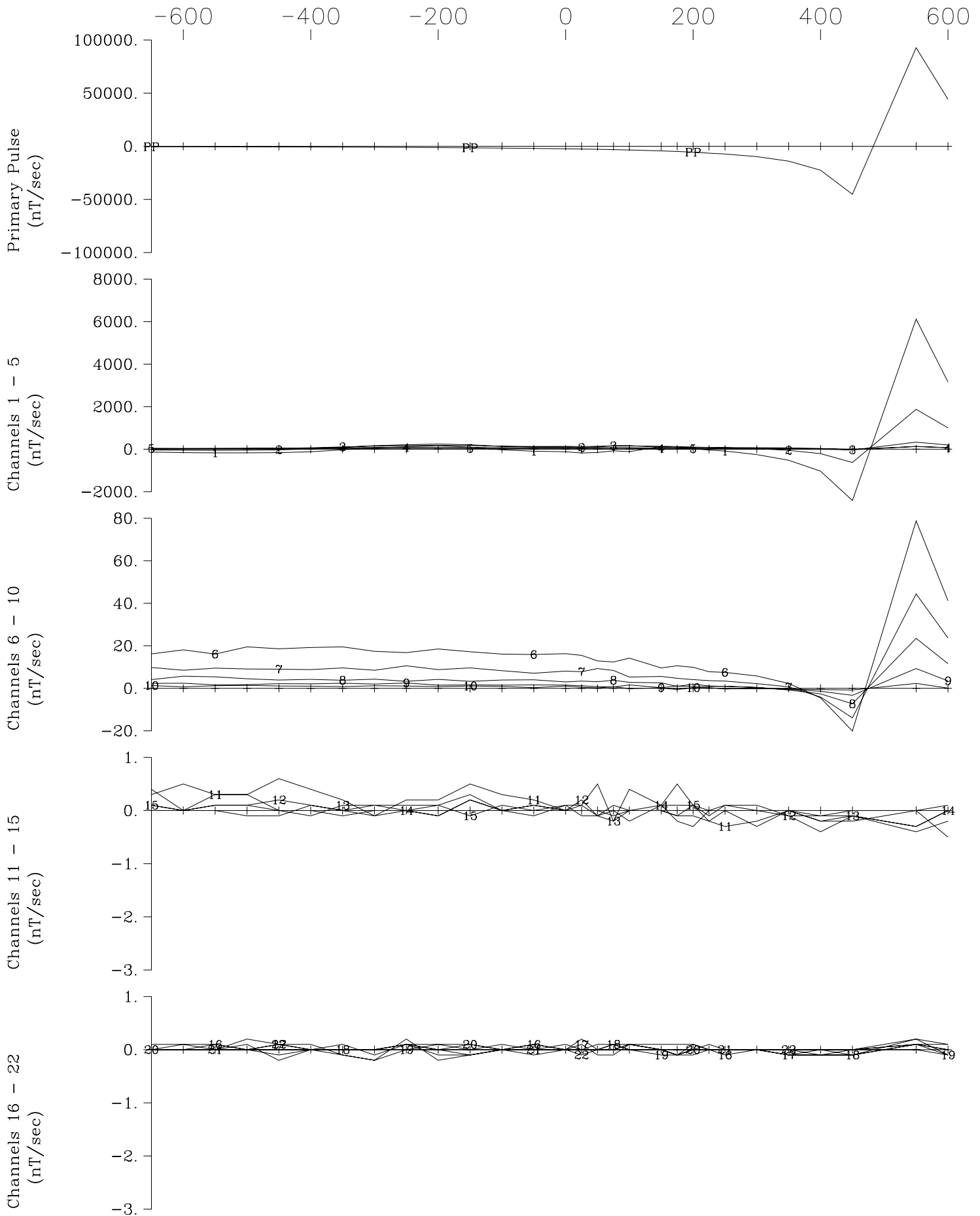
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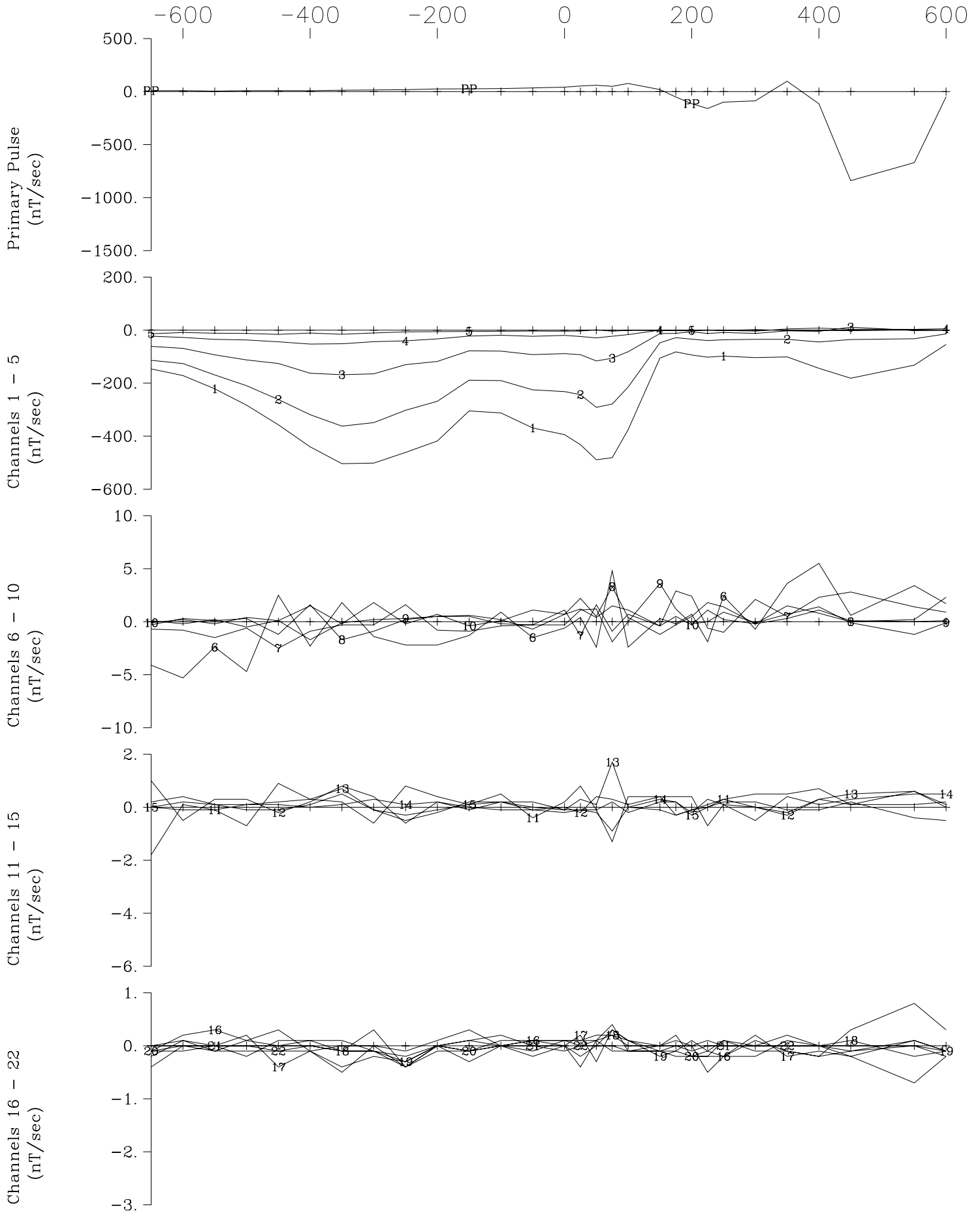
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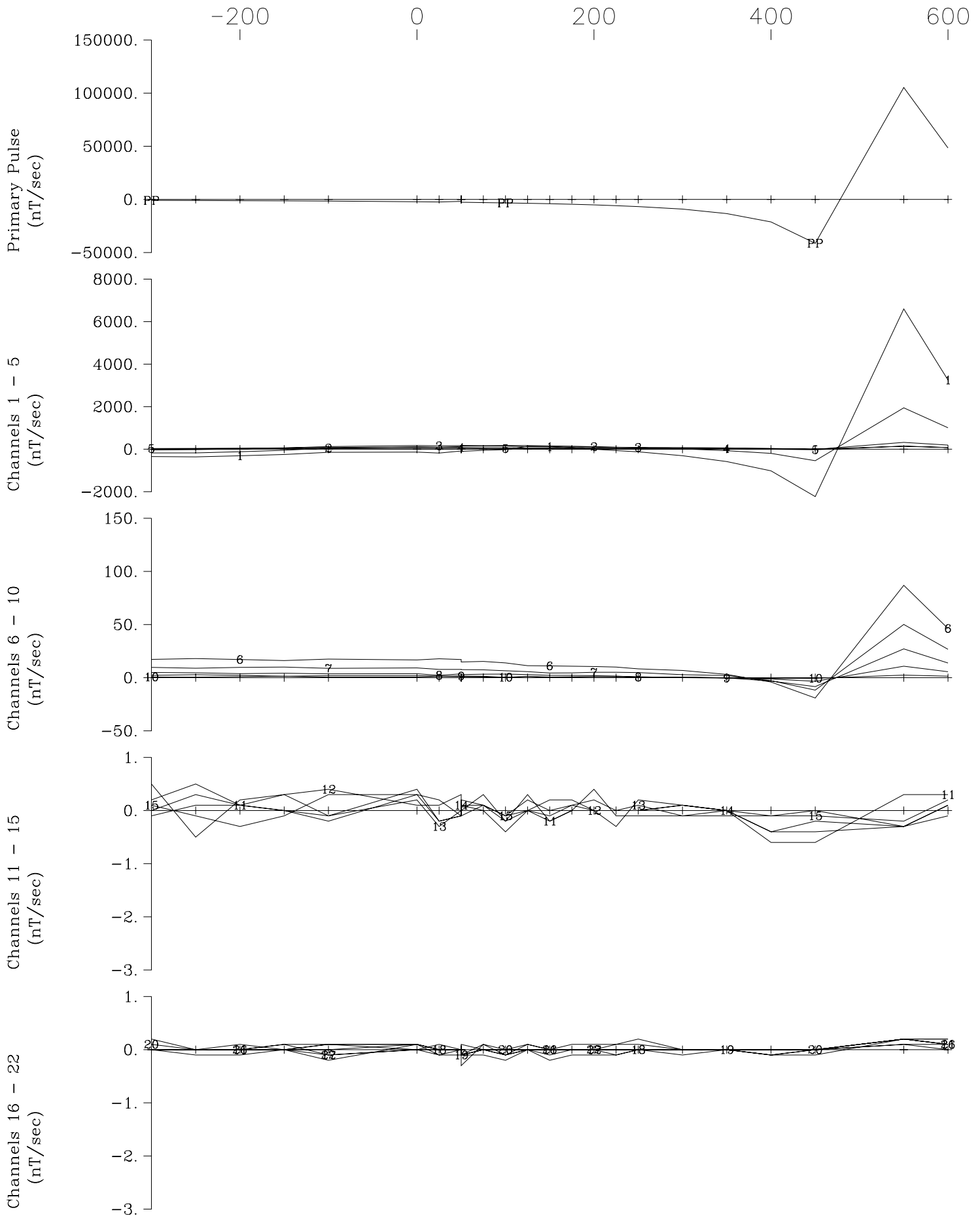
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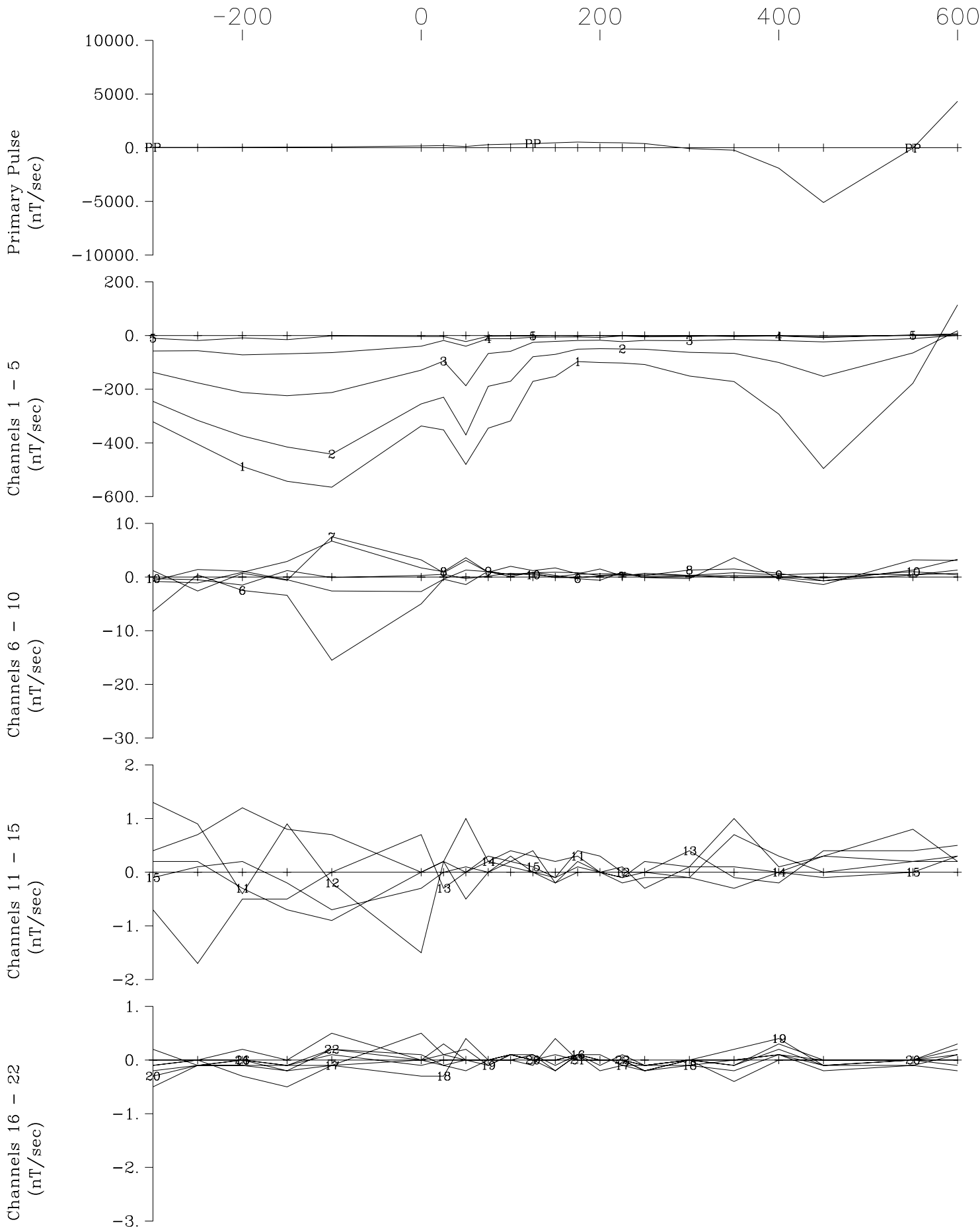
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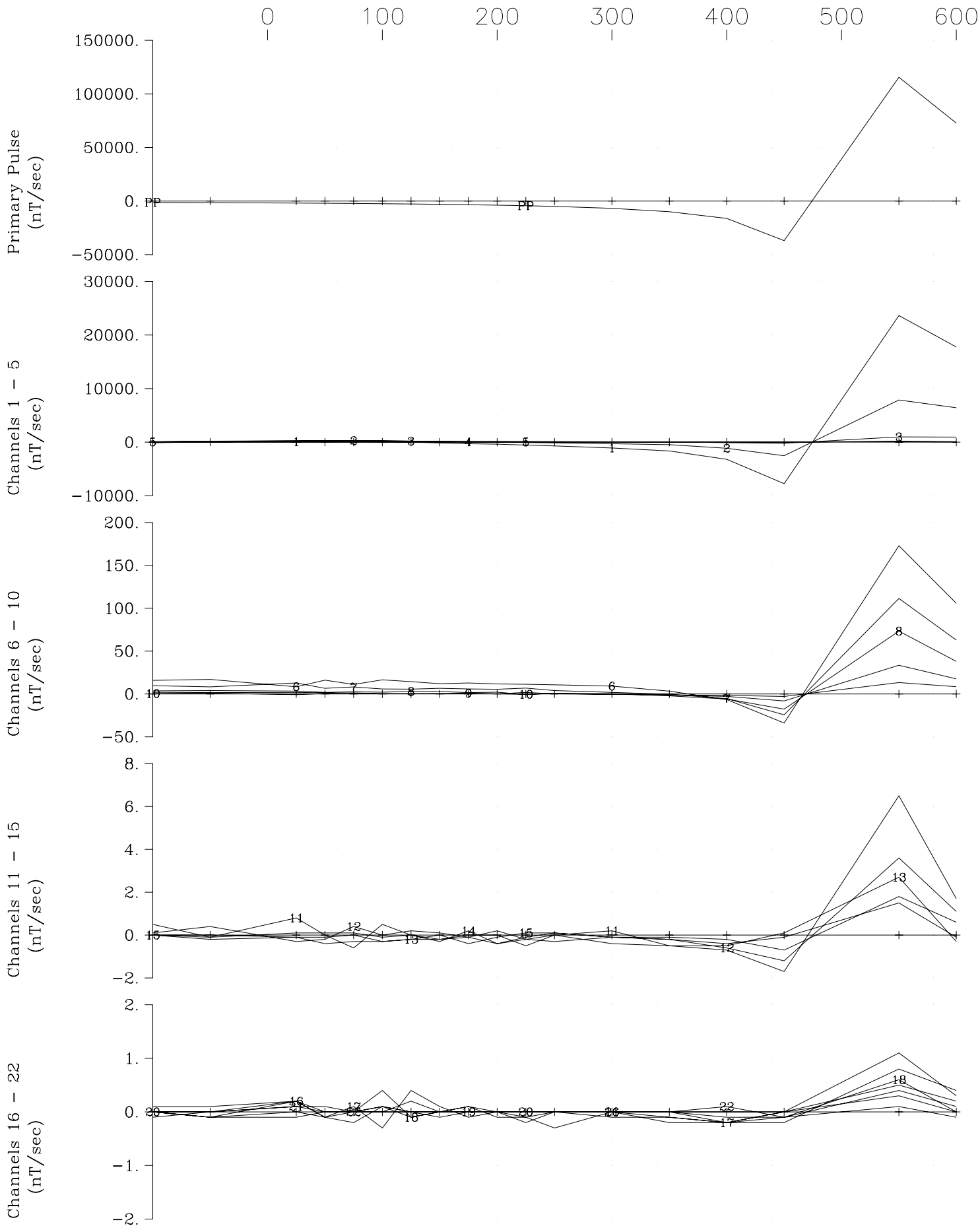
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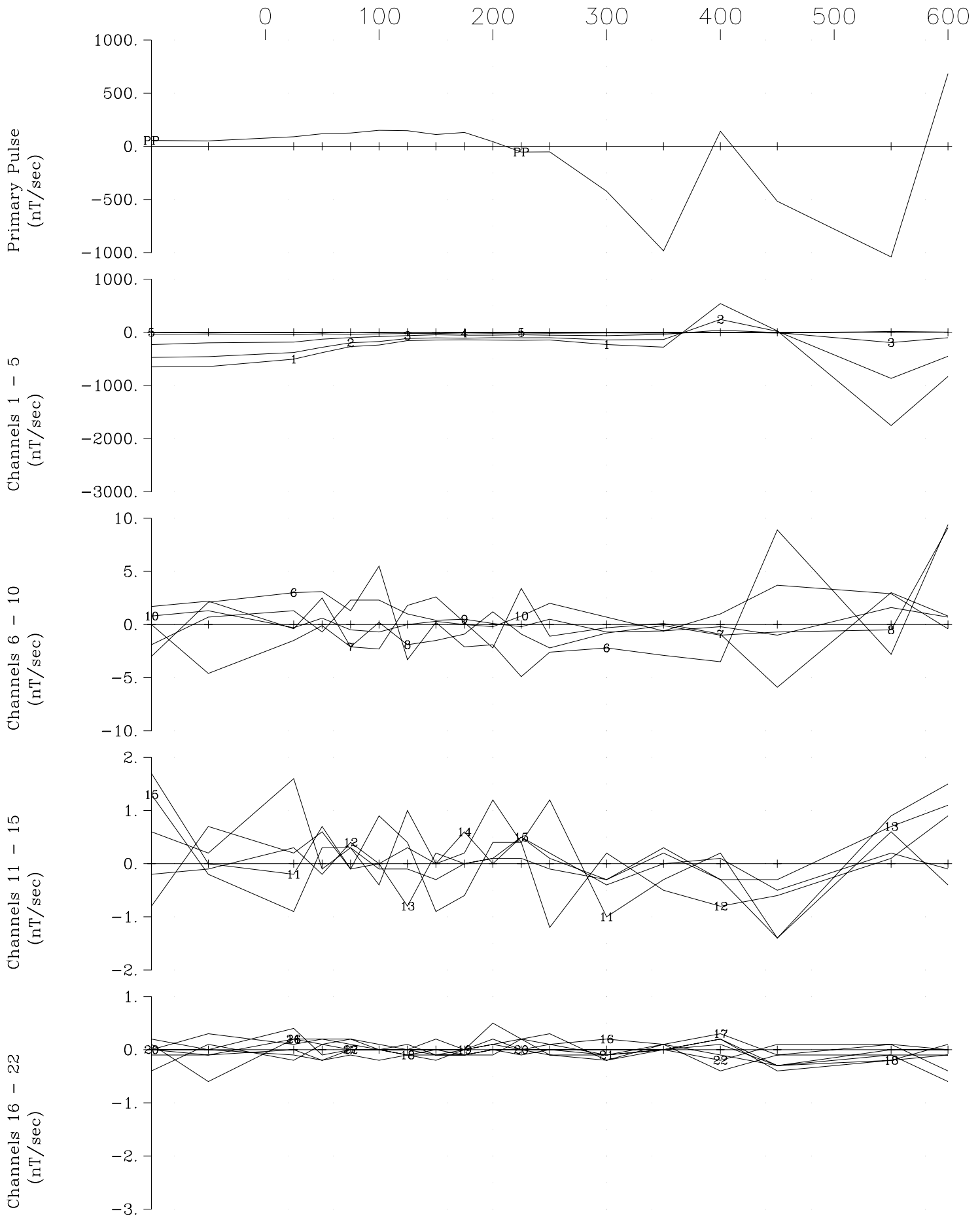
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 Line 850N Z Component
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Wallbridge Mining Company Ltd. Ermatinger Property
 Line 850N X Component
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Wallbridge Mining Company Ltd. Ermatinger Property
 Line 1150N Z Component
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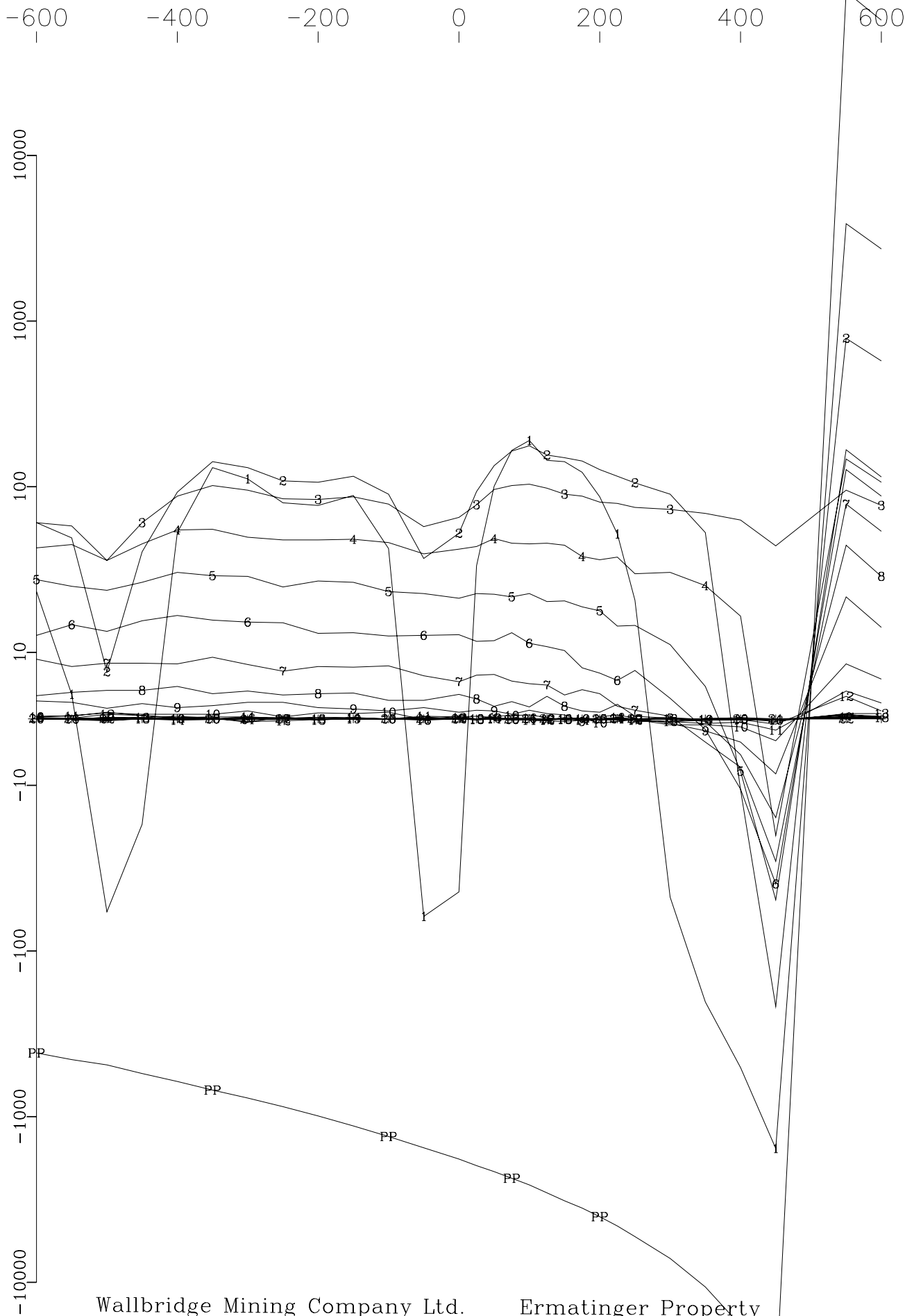
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Appendix 3: Pulse-EM Data Profiles (Lin-Log) Scale

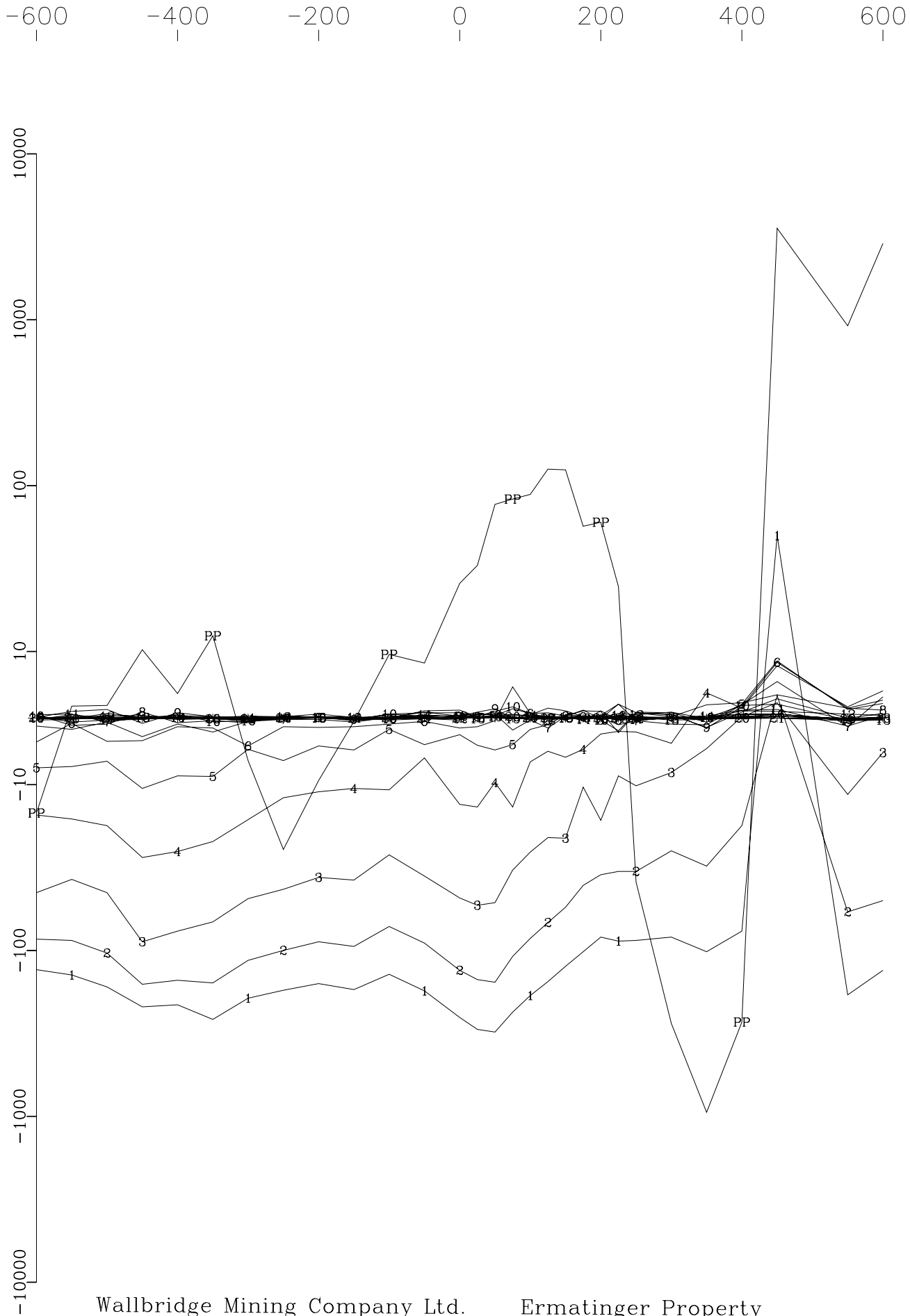


Primary Pulse and 22 Off-time Channels
(nT/sec)



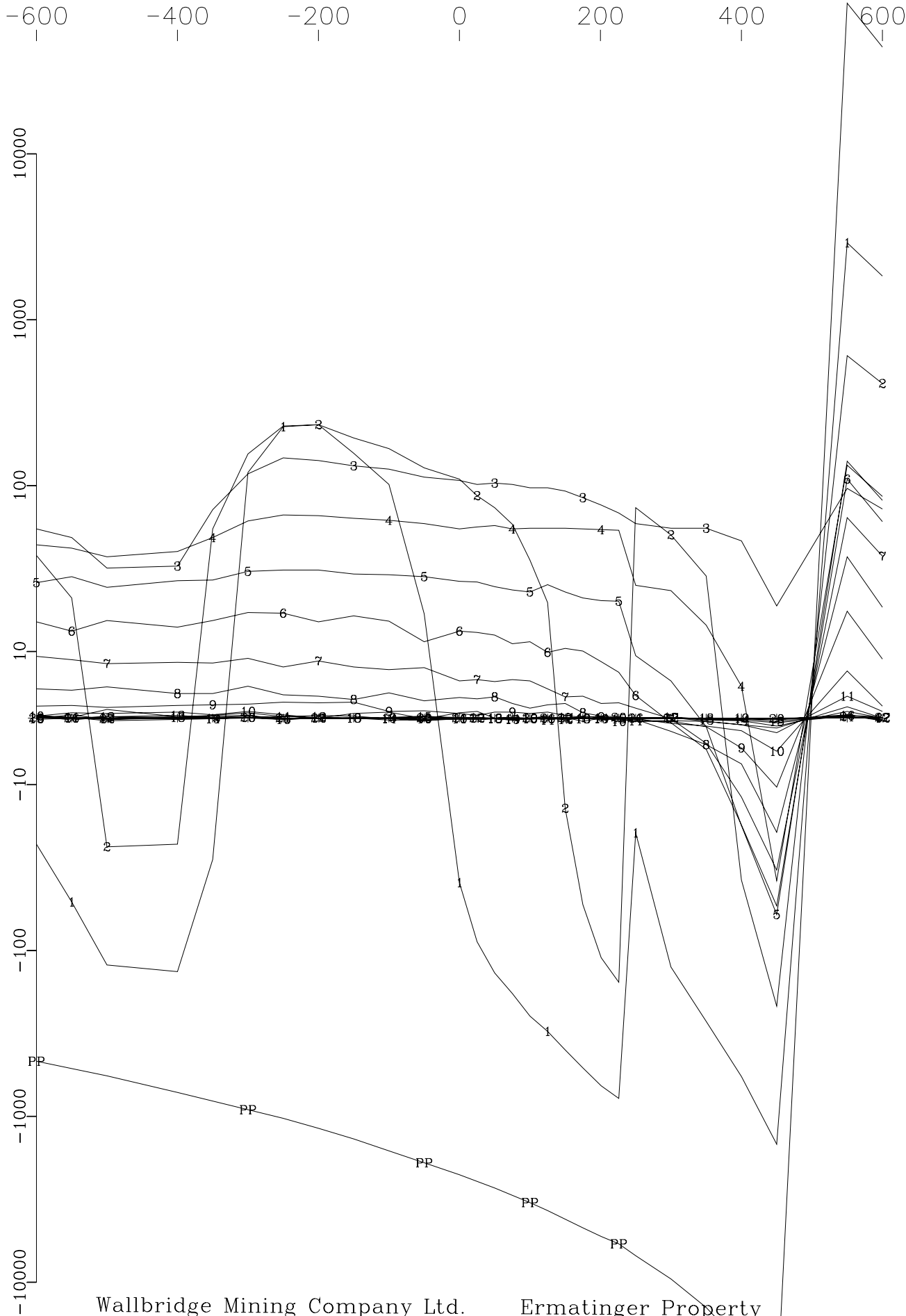
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Line ON Z Component
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Primary Pulse and 22 Off-time Channels
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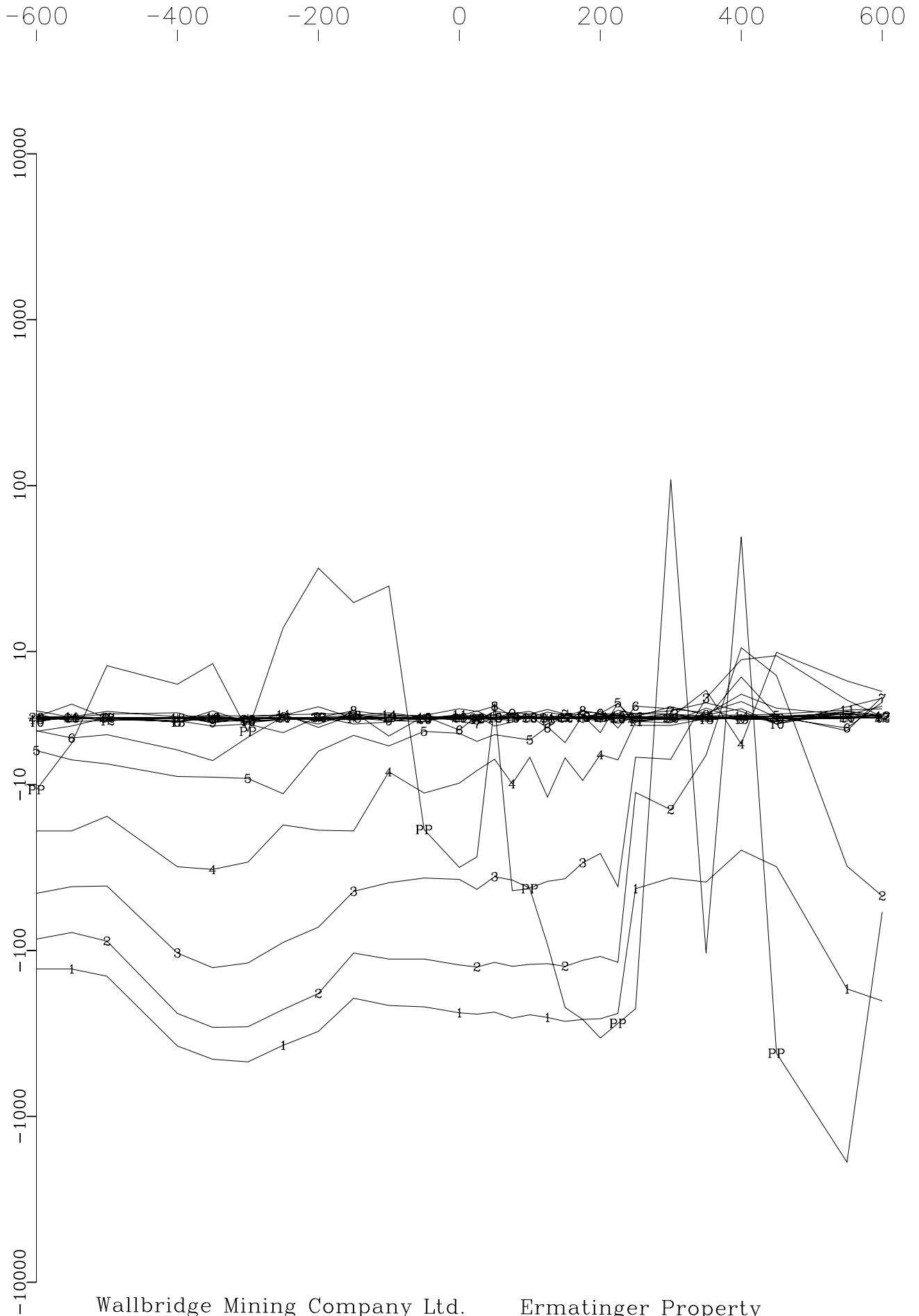
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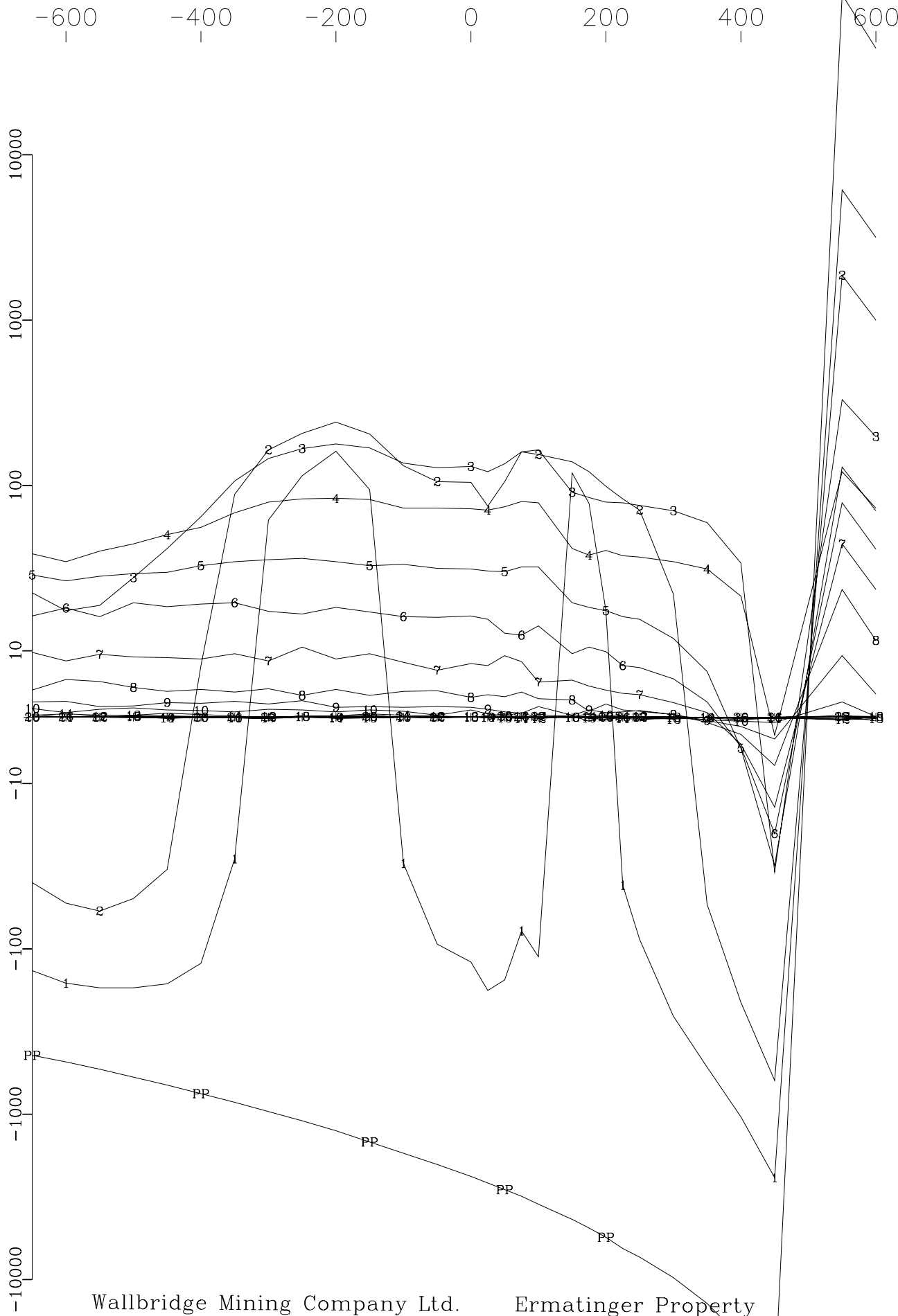
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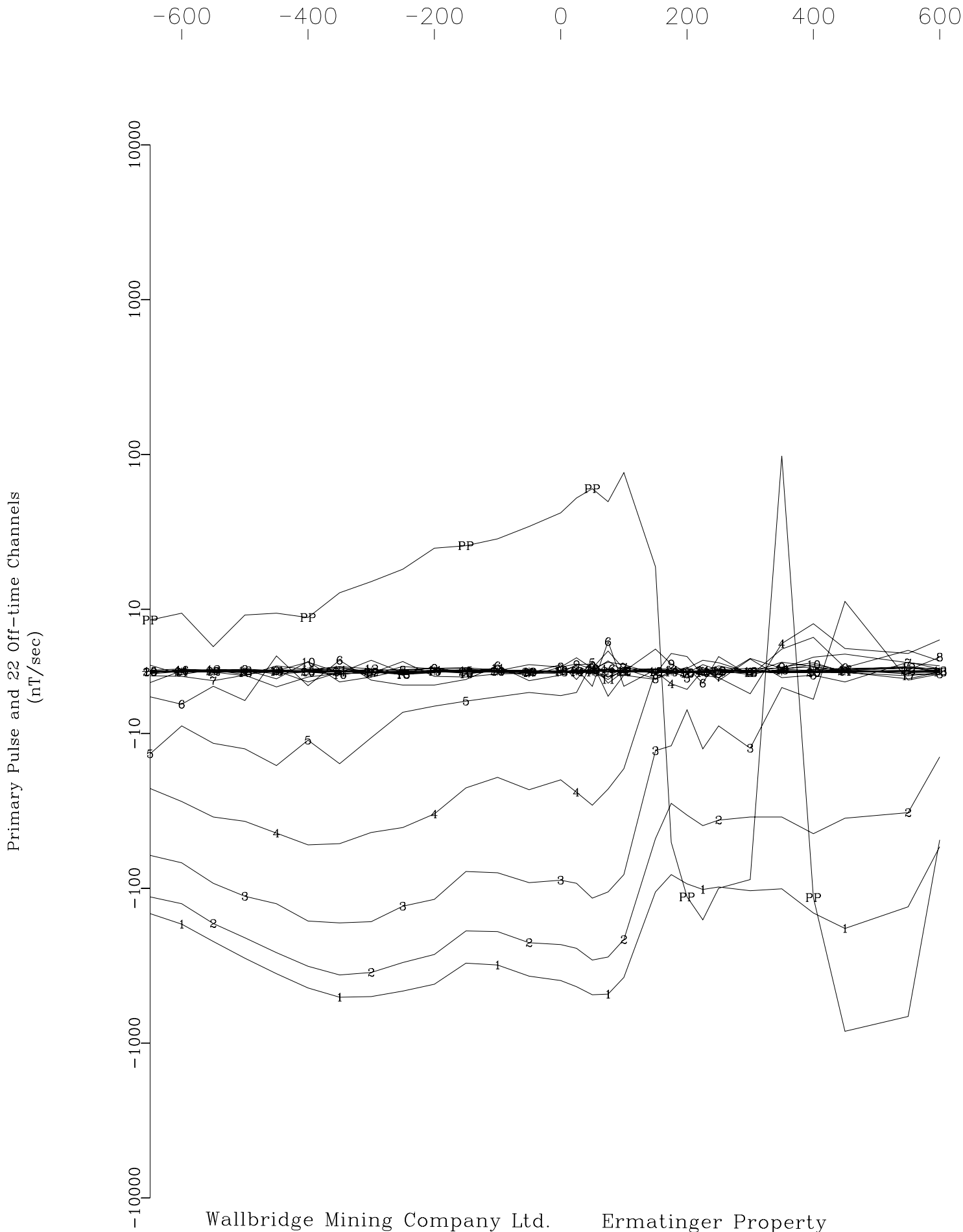


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Crone Geophysics & Exploration Ltd.

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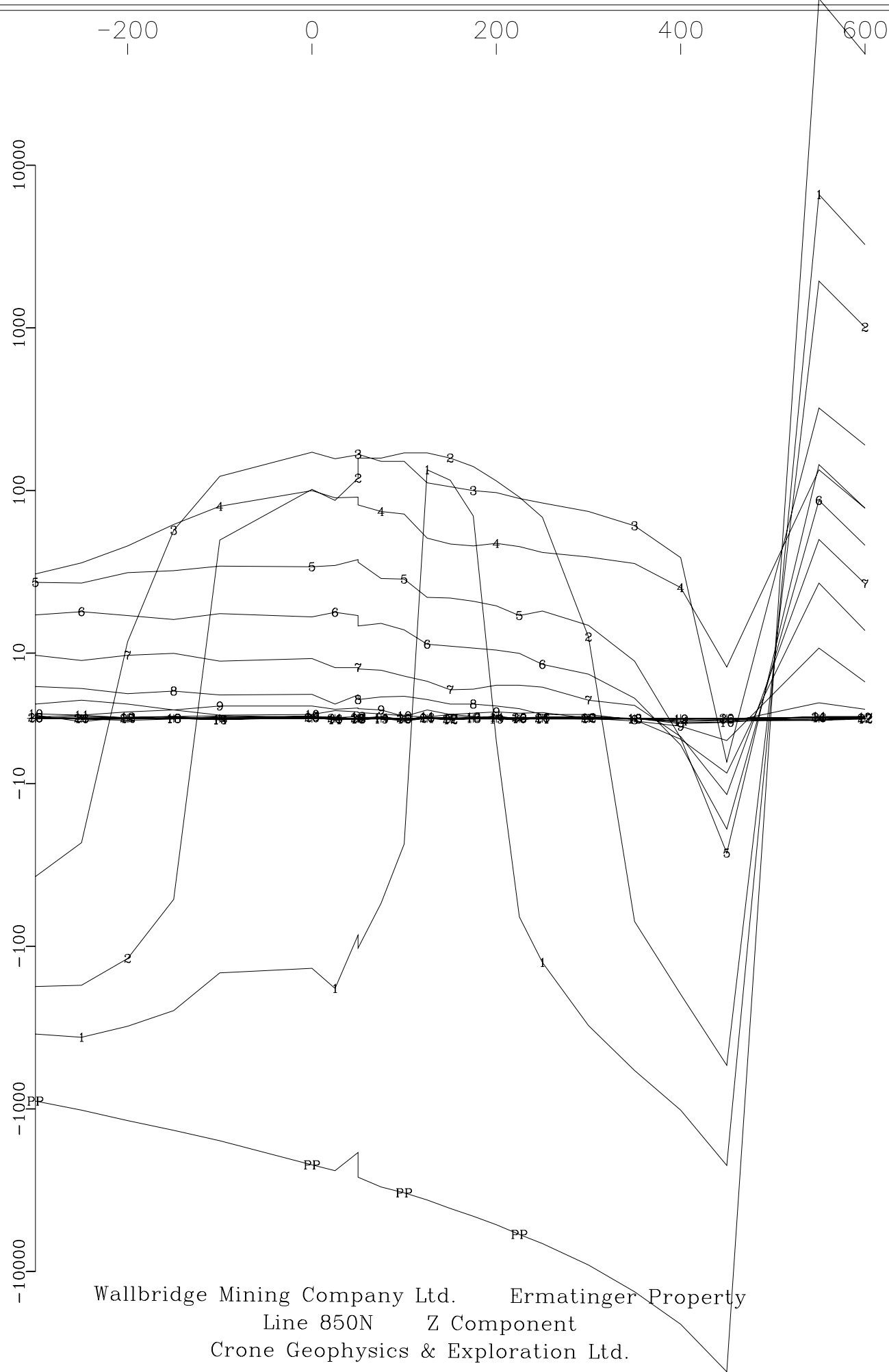


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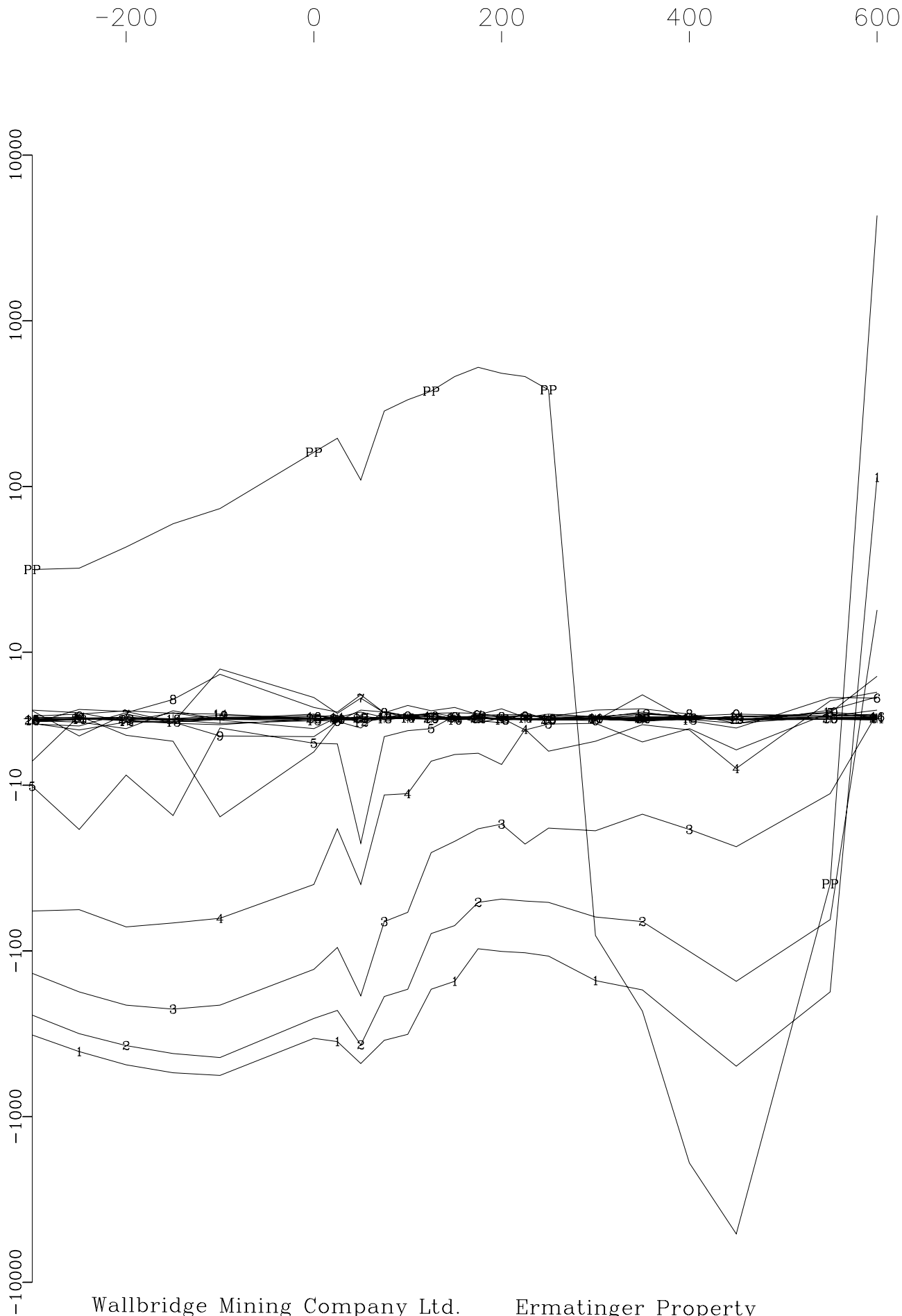
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Primary Pulse and 22 Off-time Channels
(nT/sec)



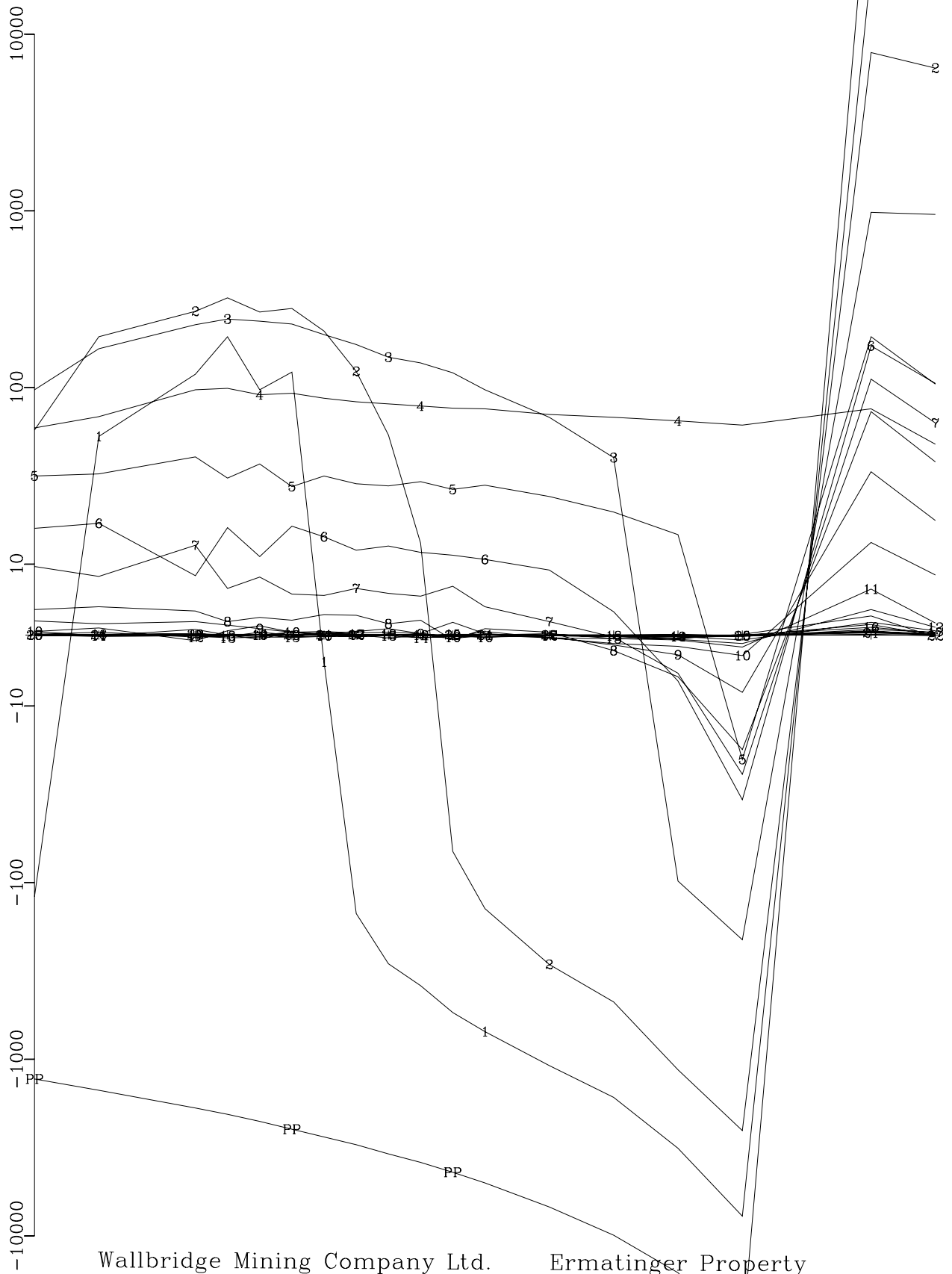
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Primary Pulse and 22 Off-time Channels
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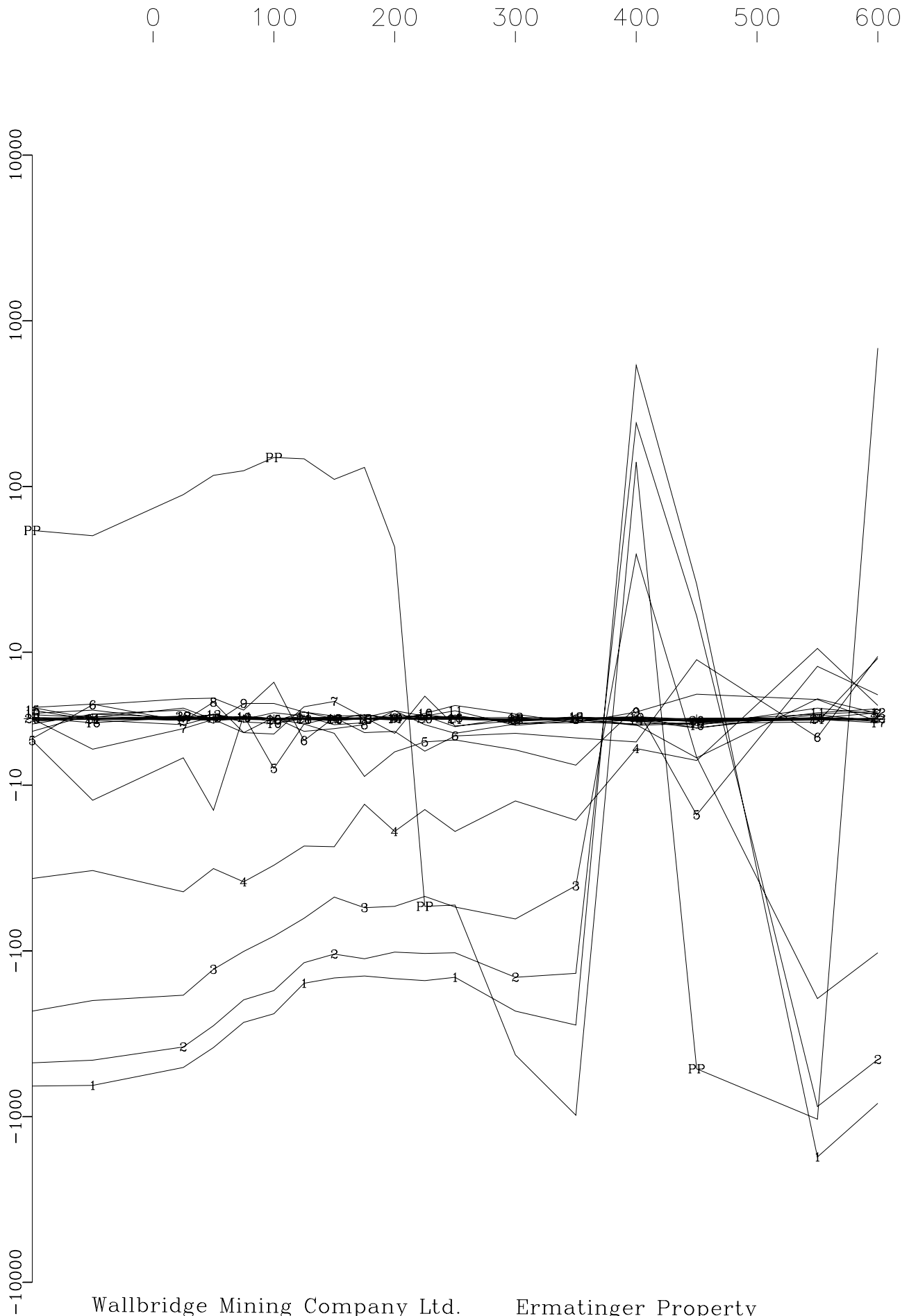
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Line 850N X Component
Crone Geophysics & Exploration Ltd.

Primary Pulse and 22 Off-time Channels
(nT/sec)



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Line 1150N Z Component
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Primary Pulse and 22 Off-time Channels
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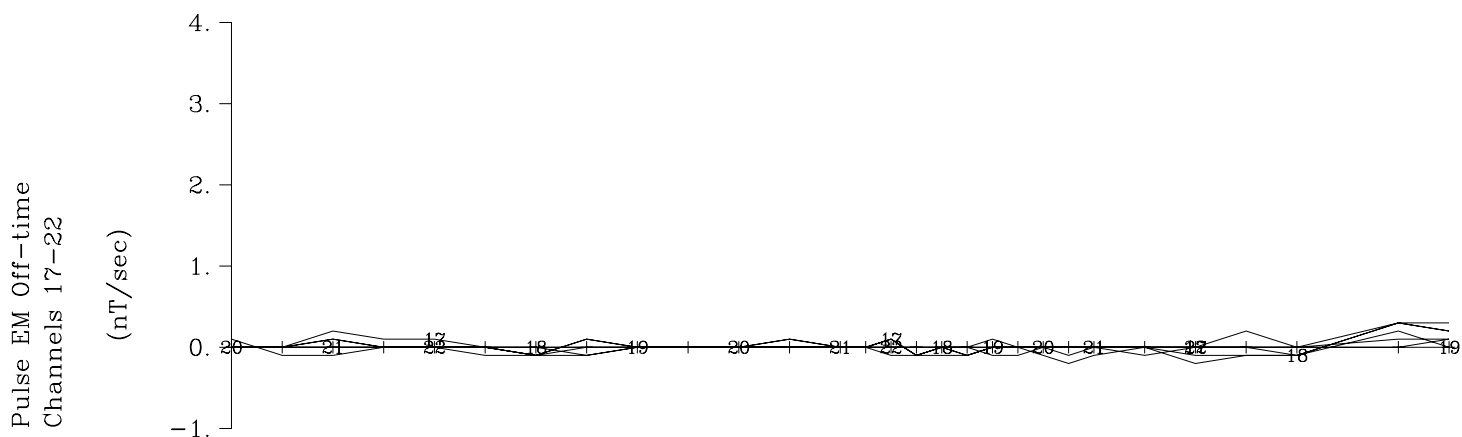
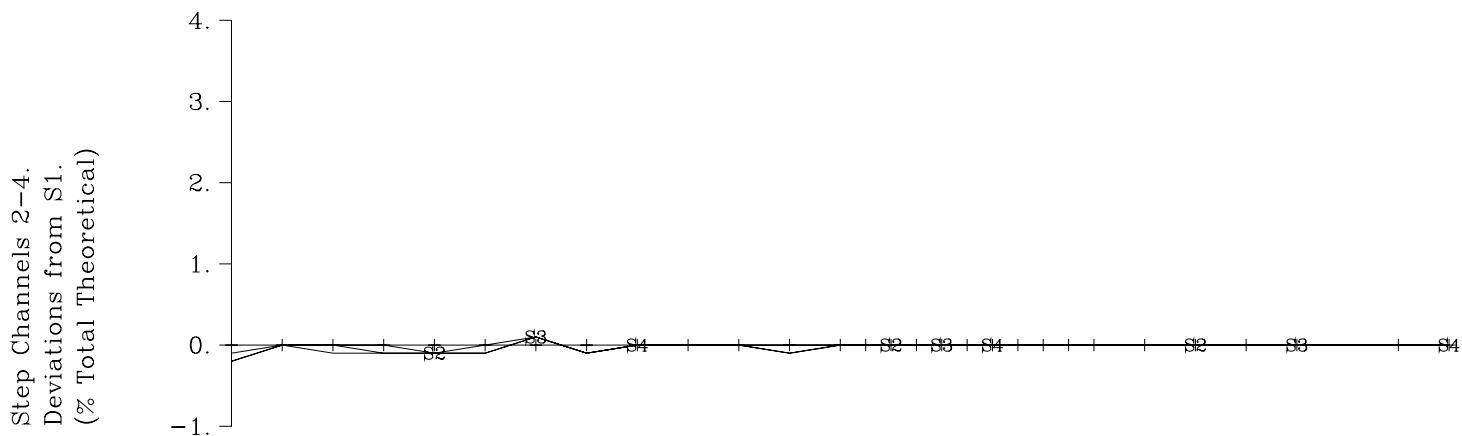
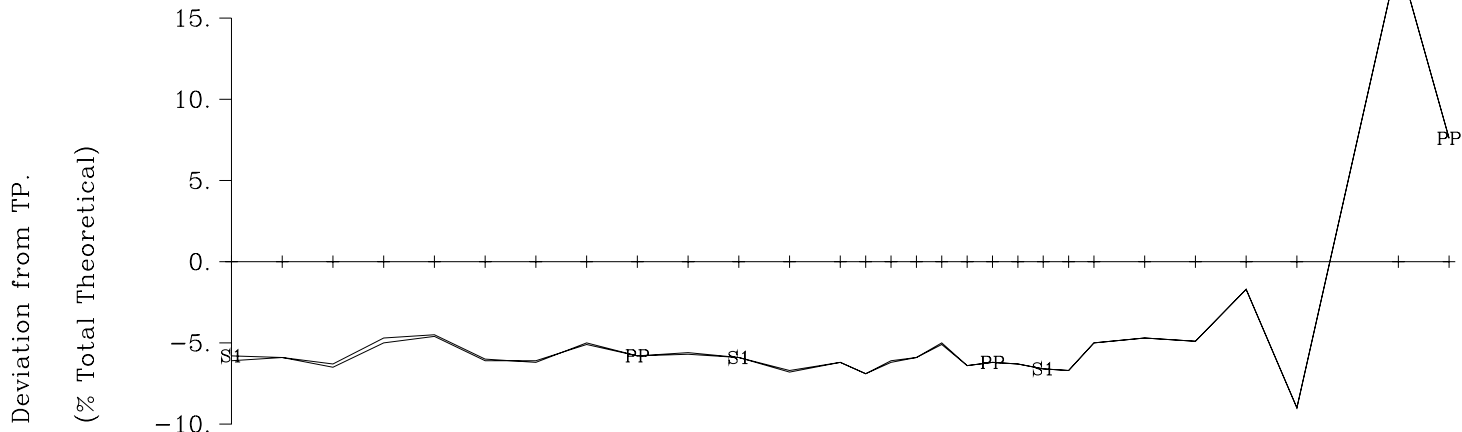
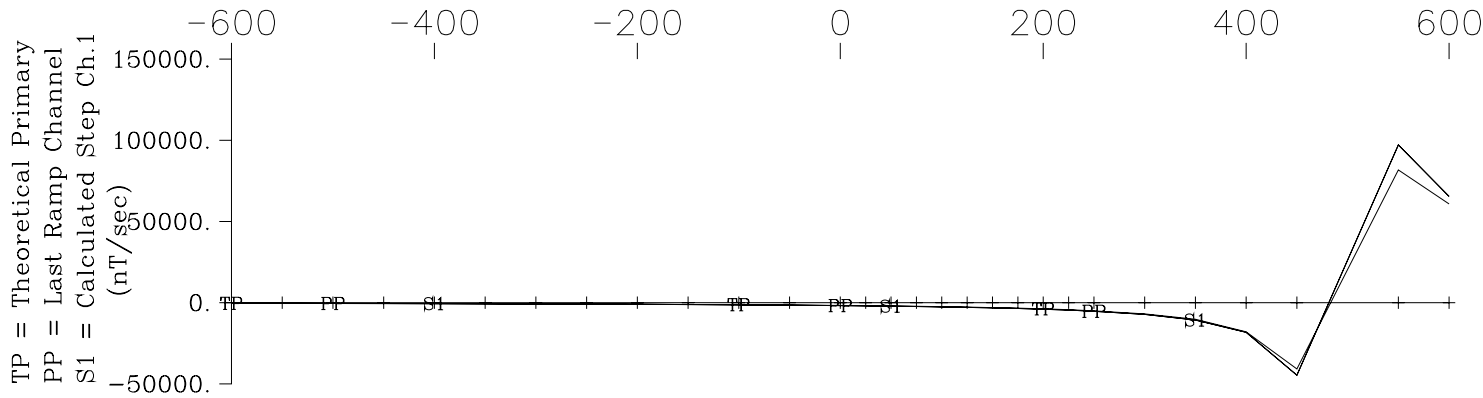


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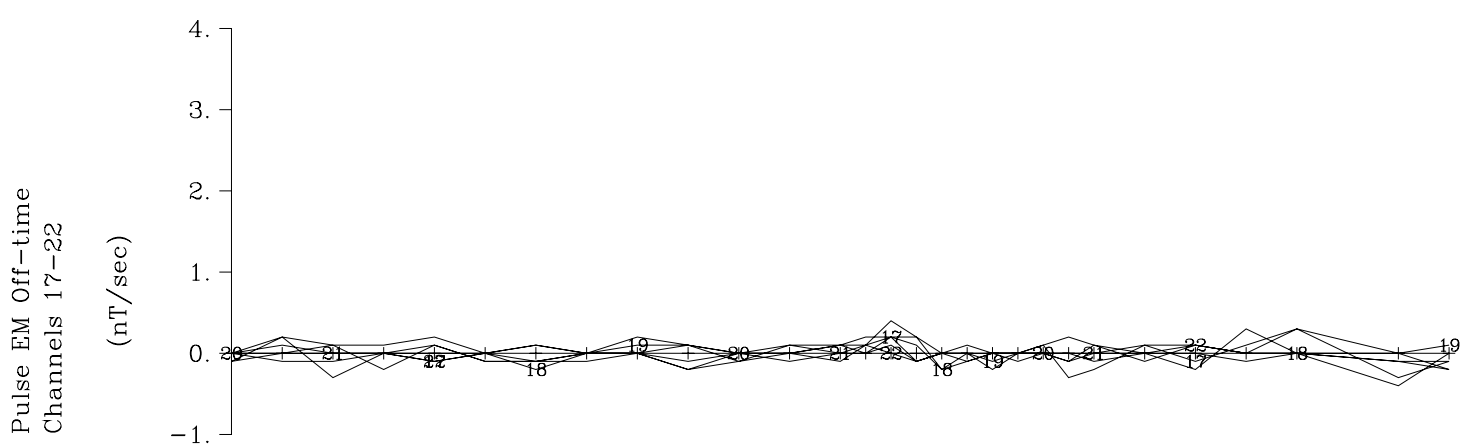
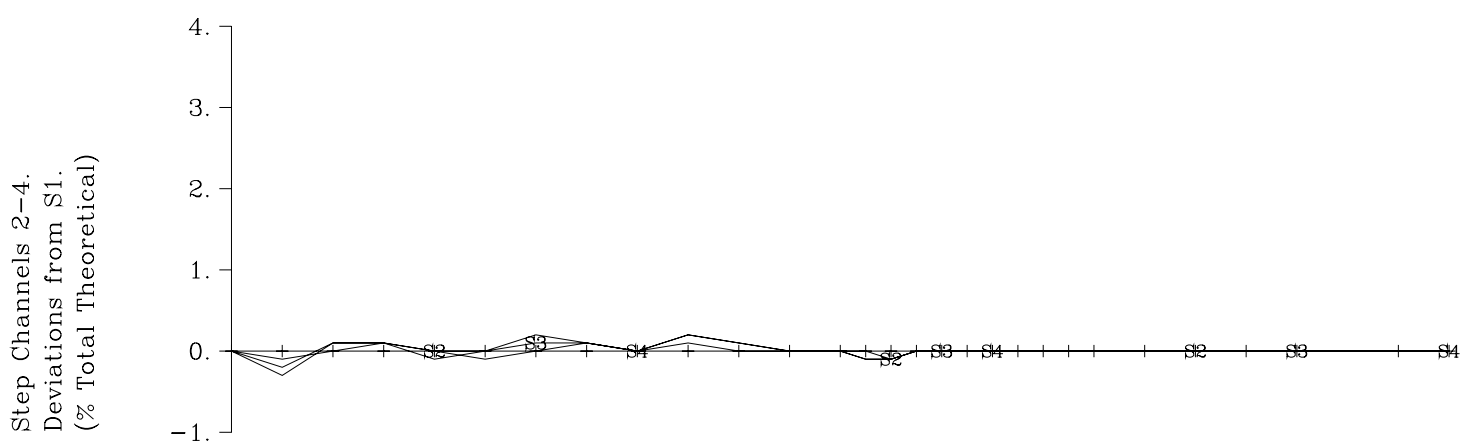
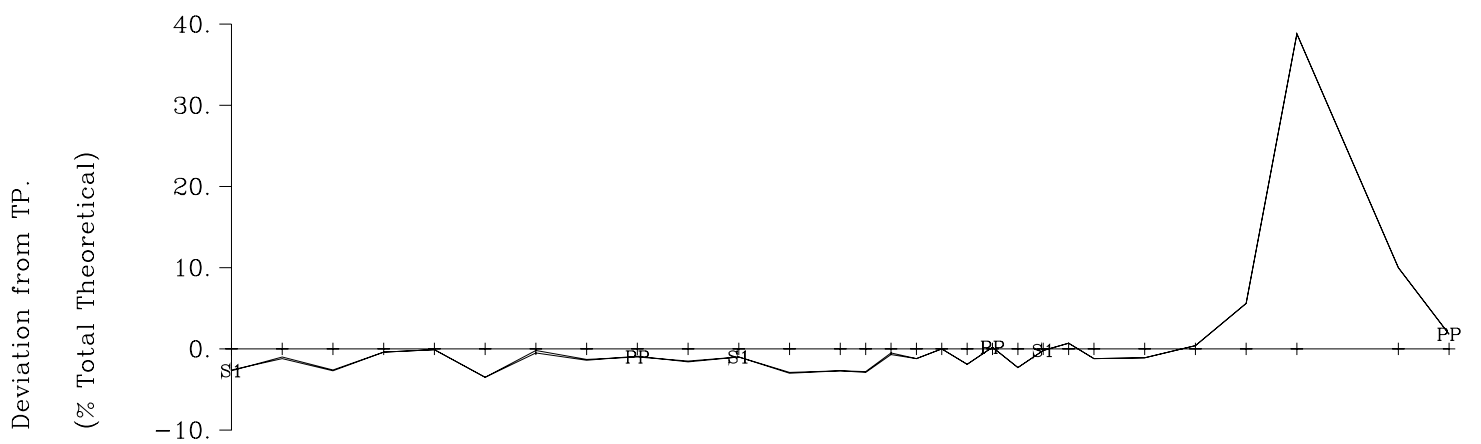
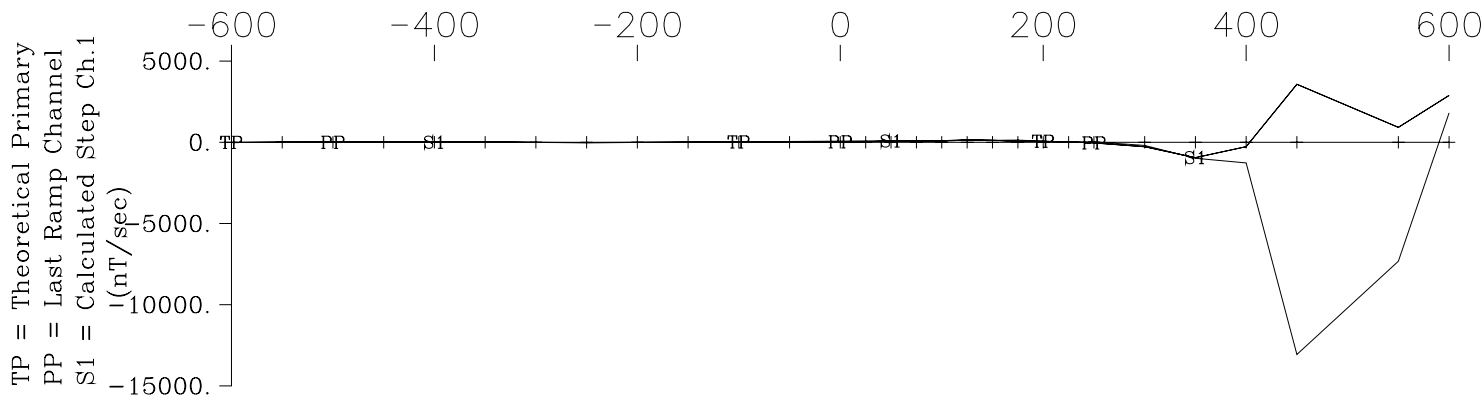


Appendix 4: Step Response Data Profiles

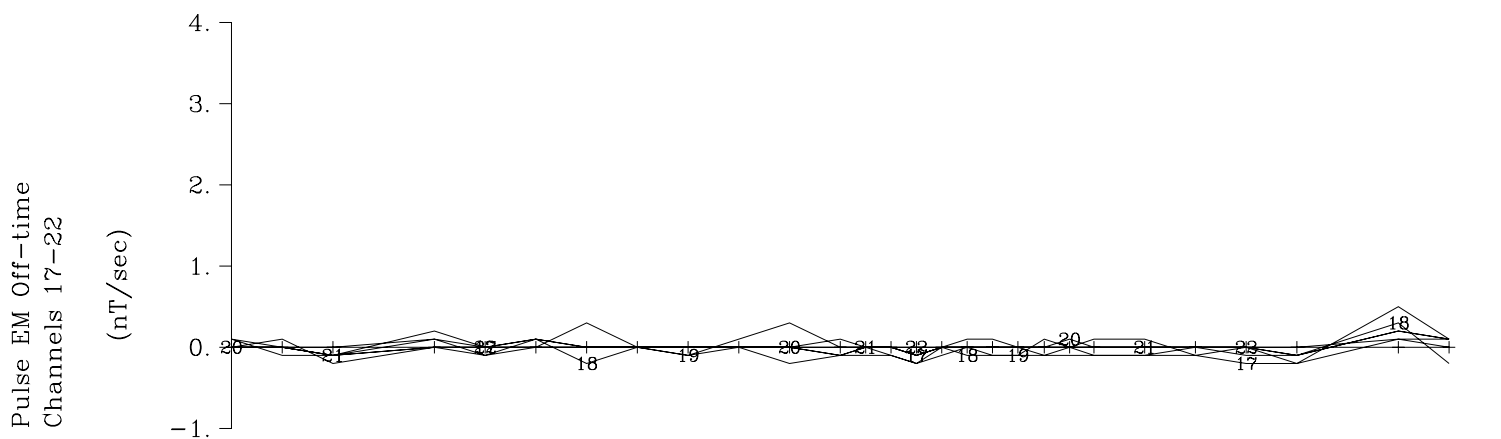
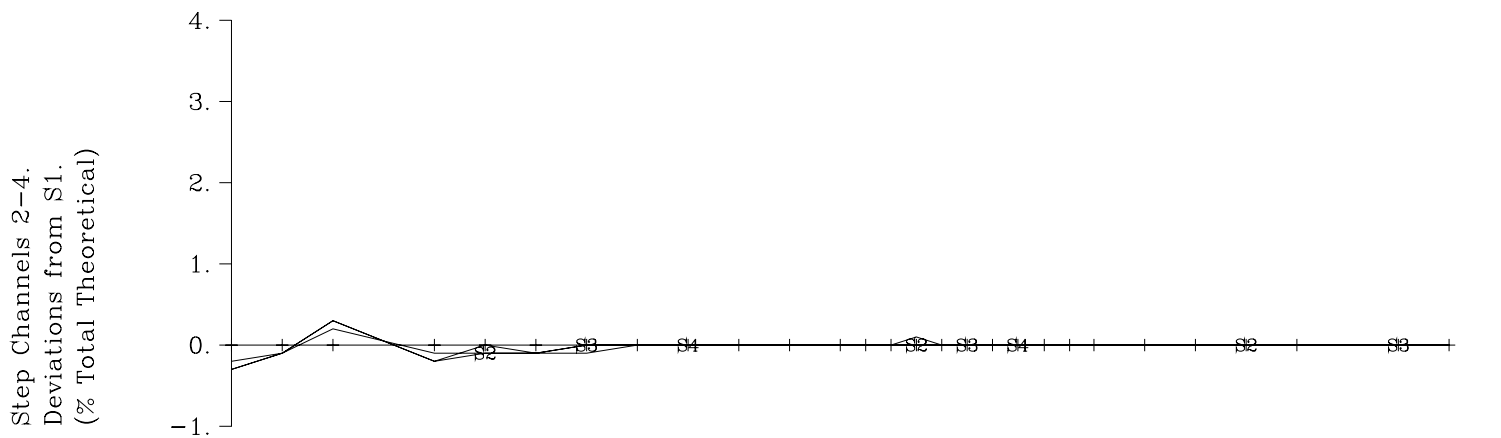
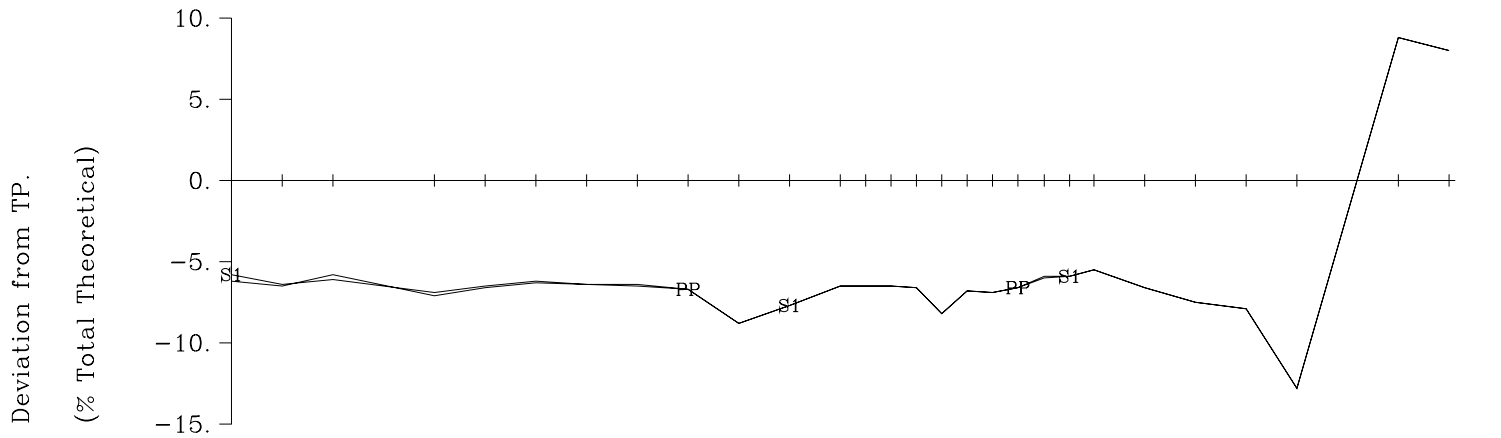
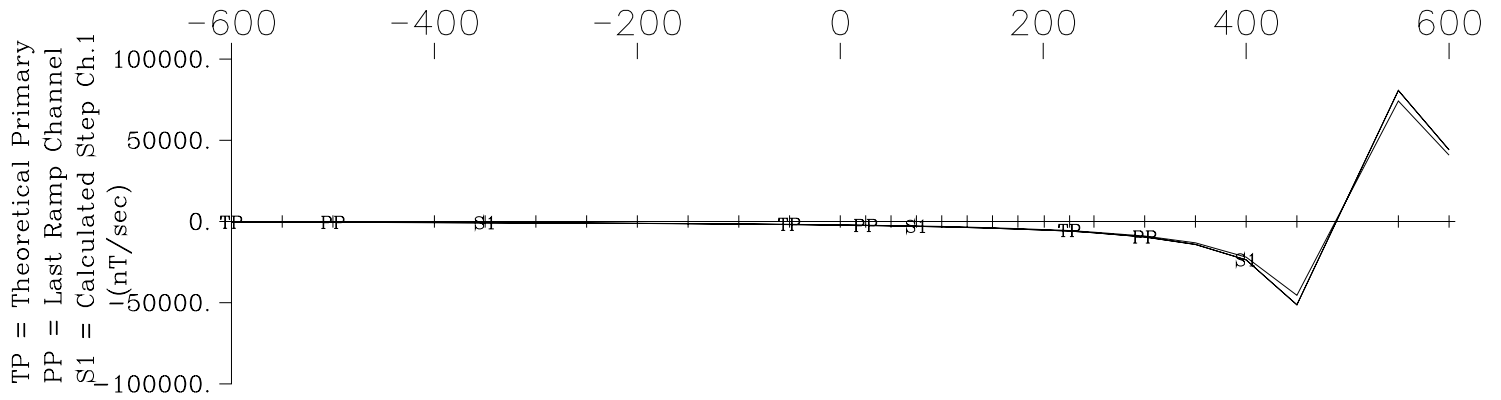




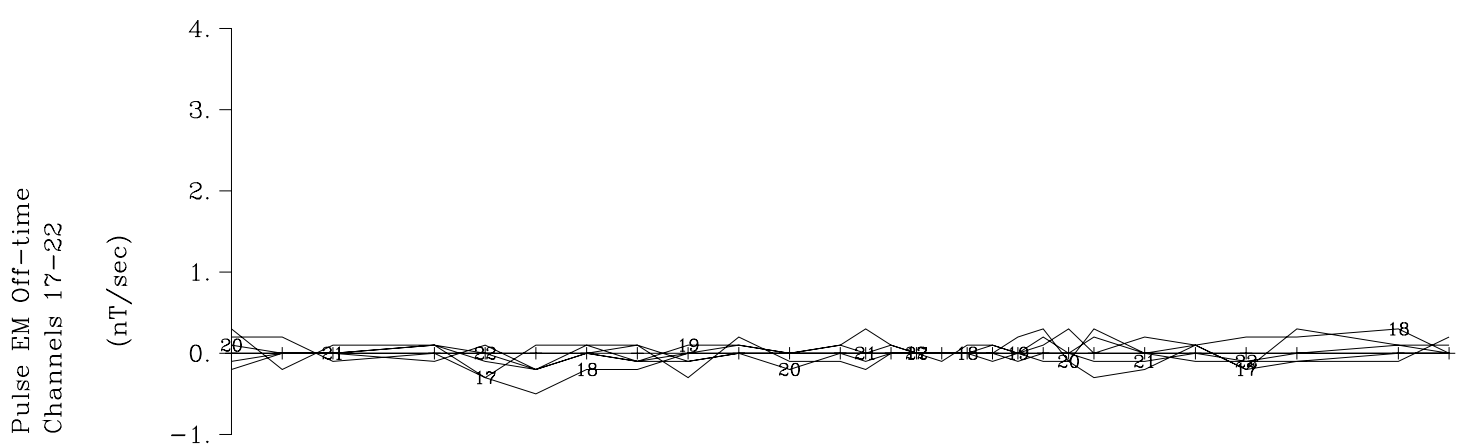
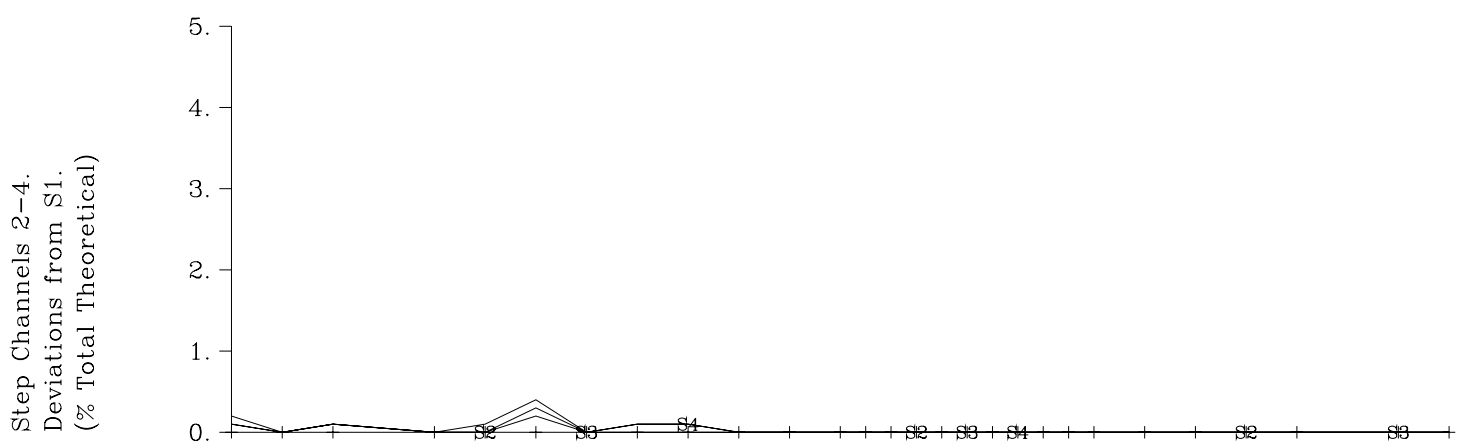
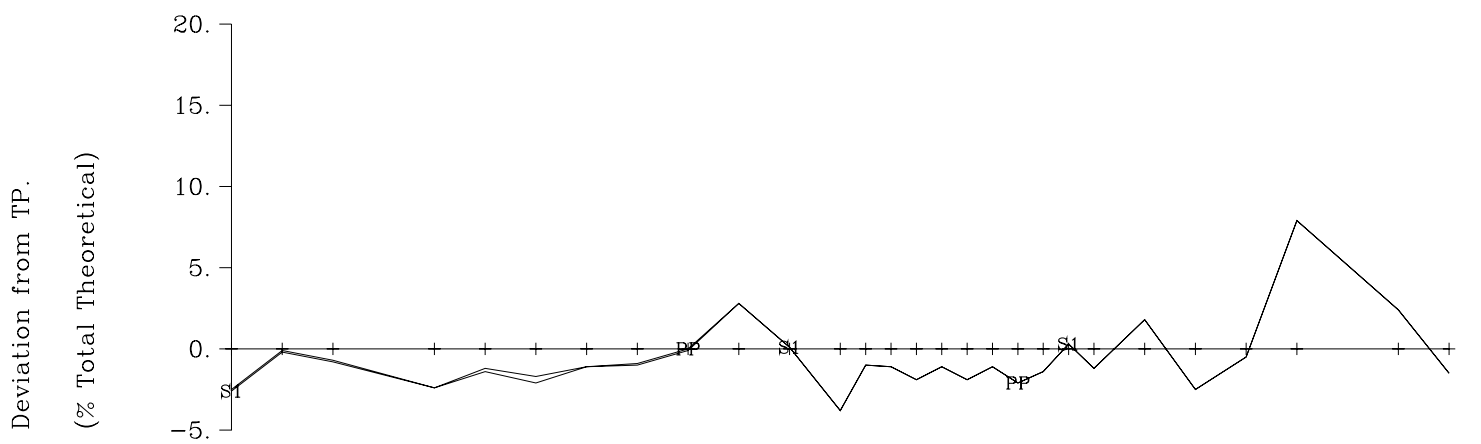
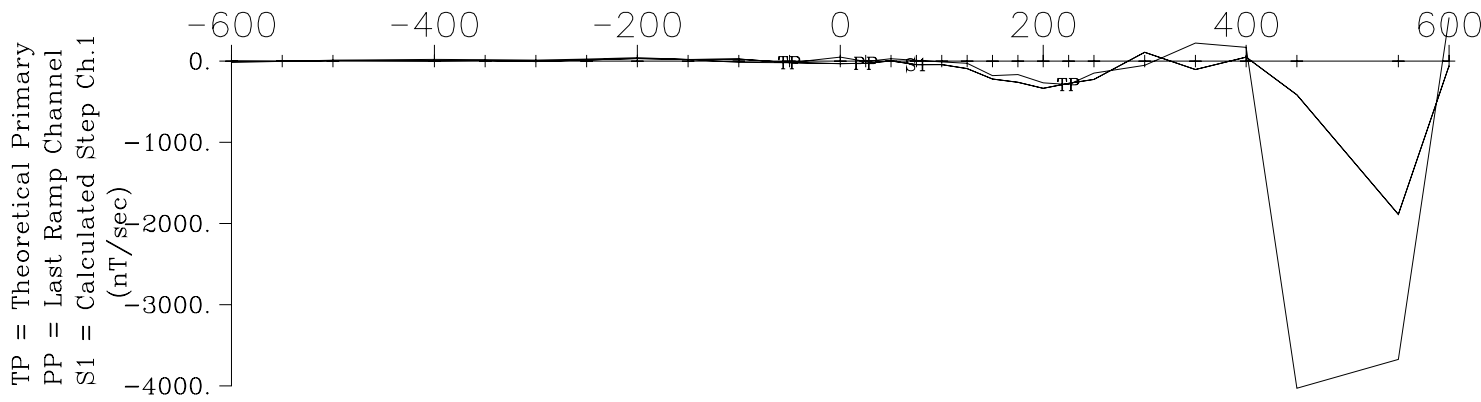
Wallbridge Mining Company Ltd. Ermatinger Property
 Loop 1, Line 0N Z Component
 Crone Geophysics & Exploration Ltd.



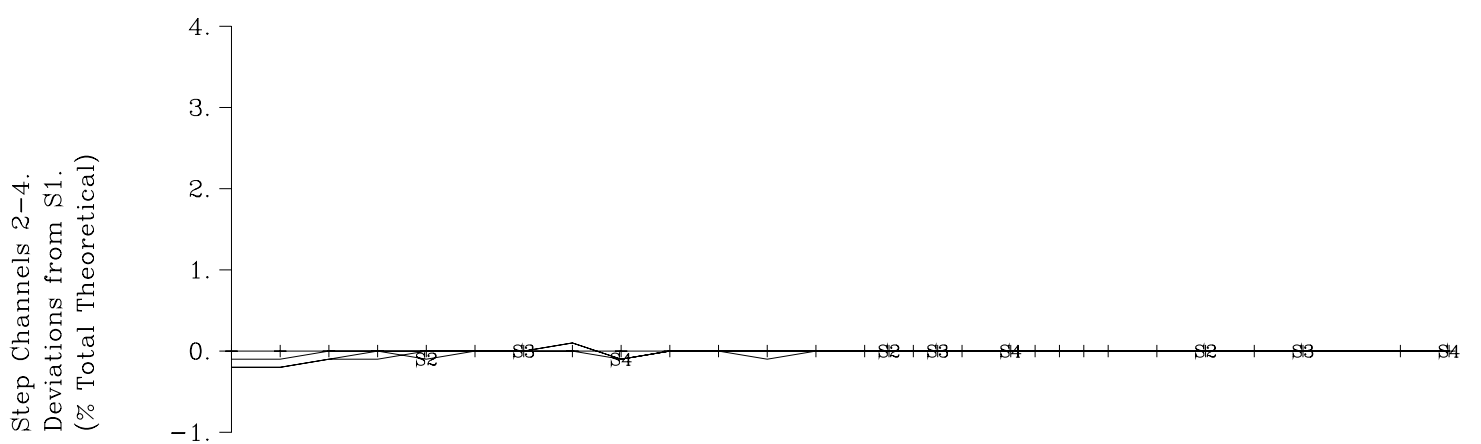
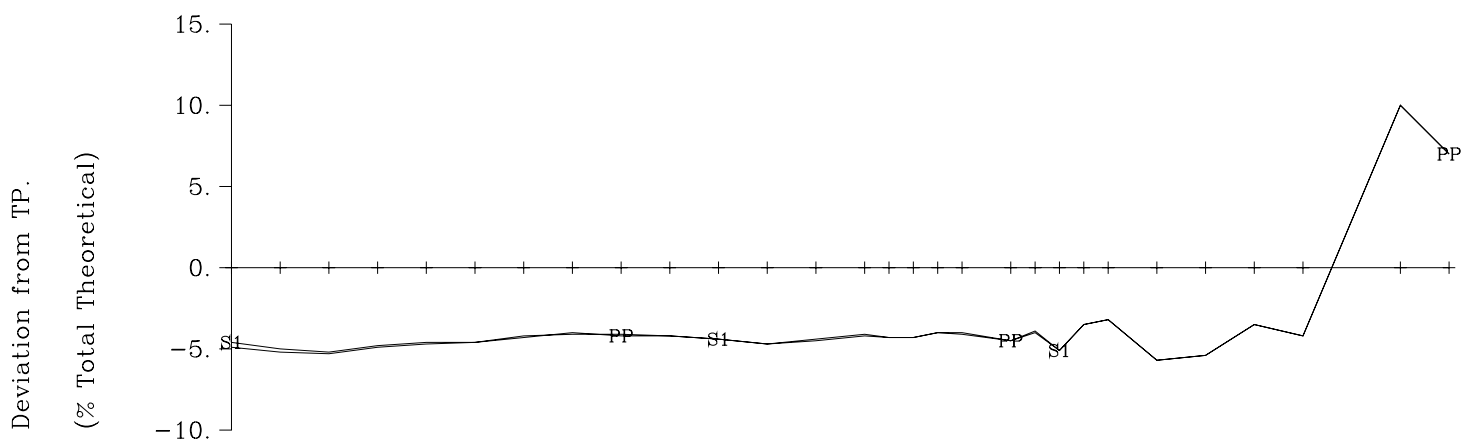
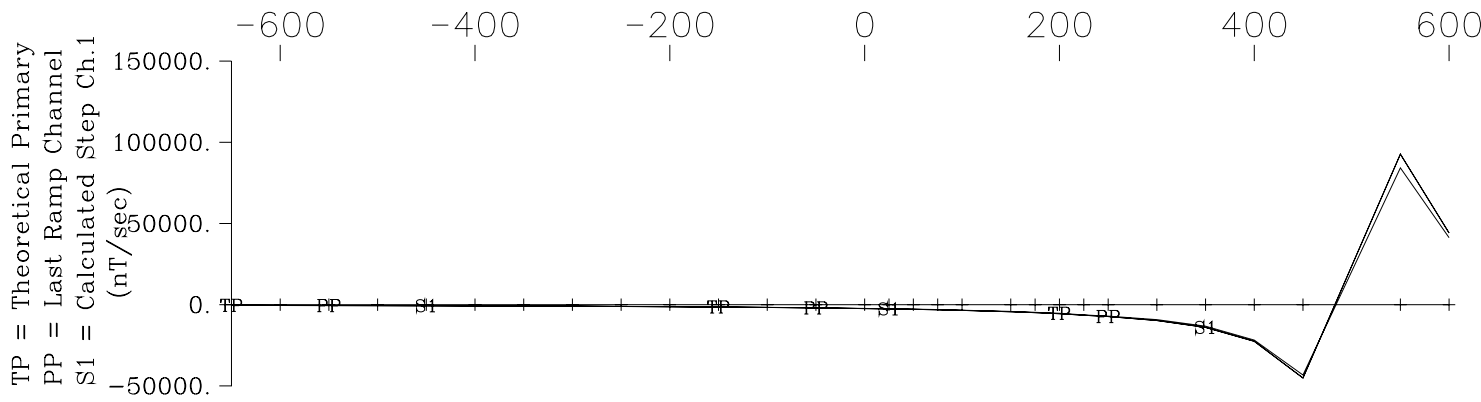
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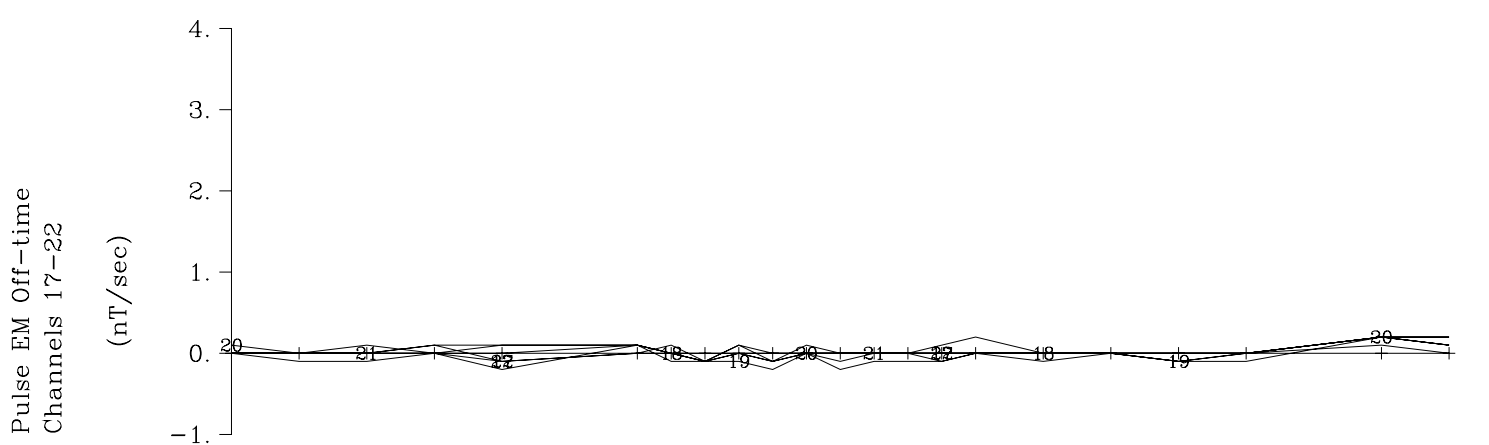
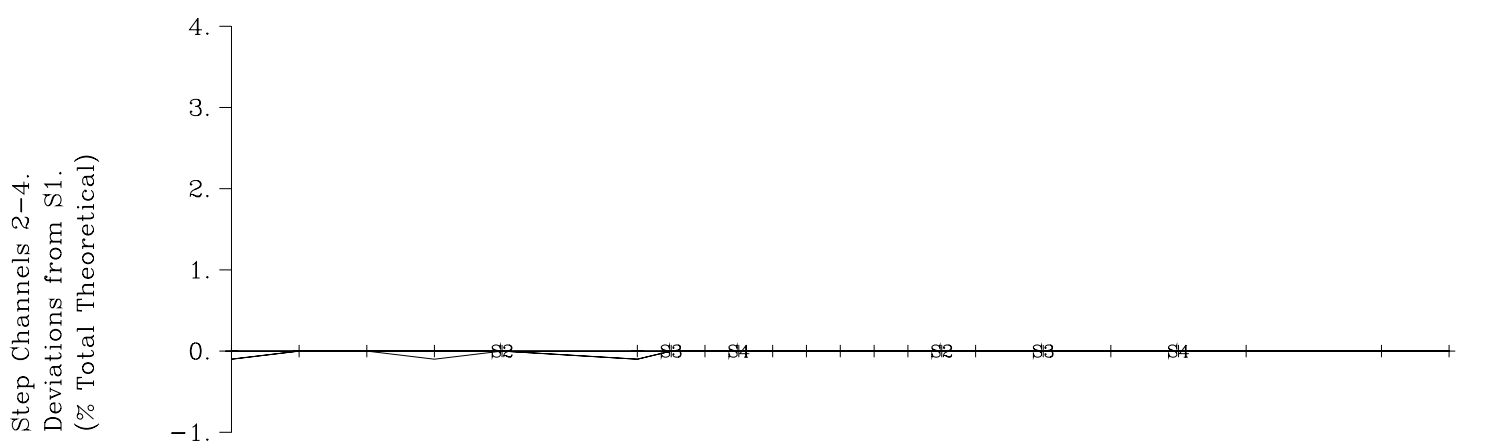
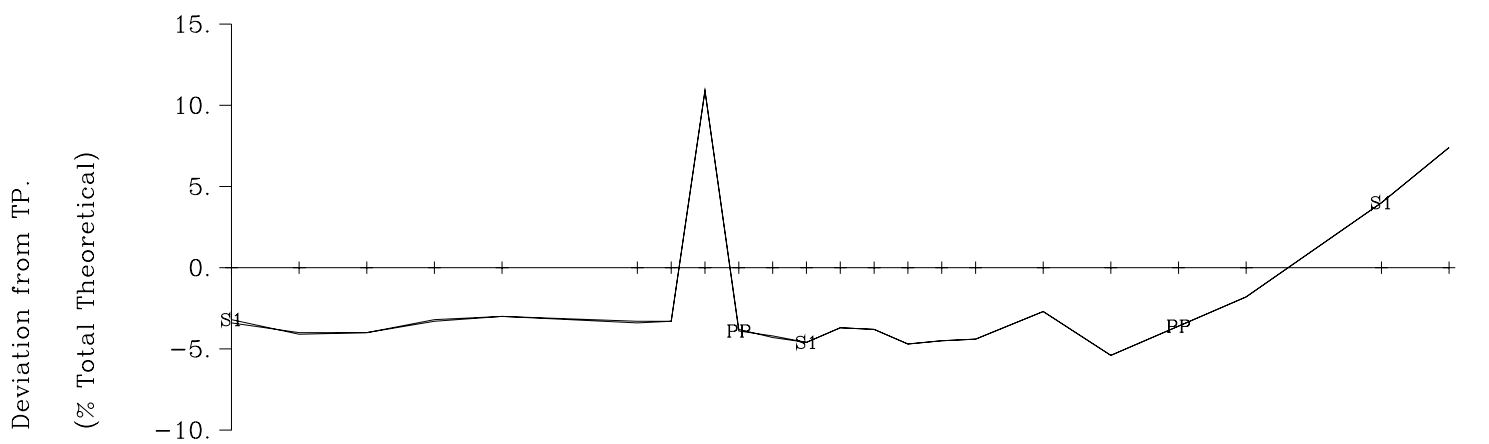
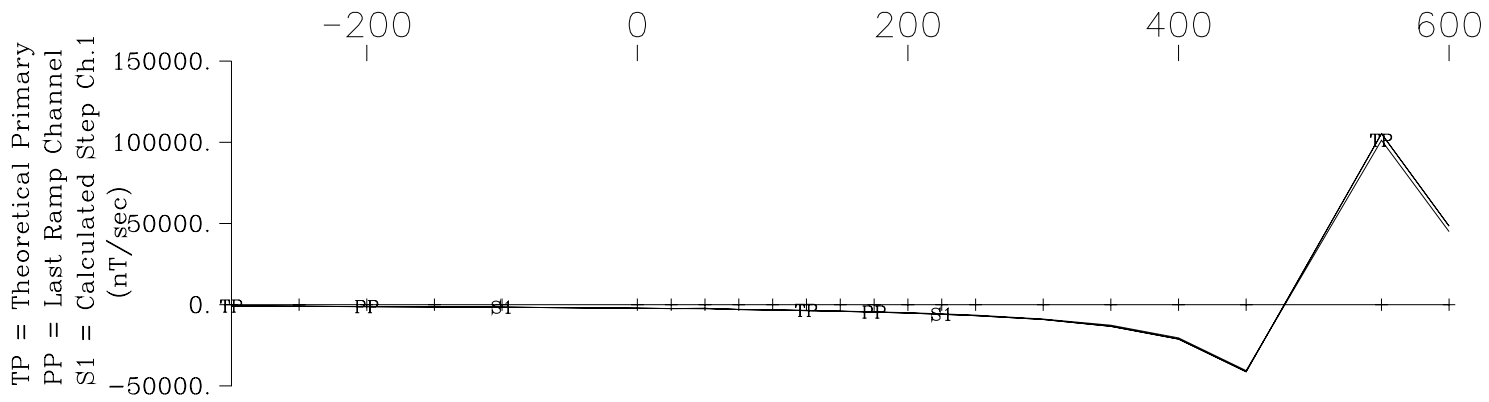
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 Loop 1, Line 250N Z Component
 Crone Geophysics & Exploration Ltd.



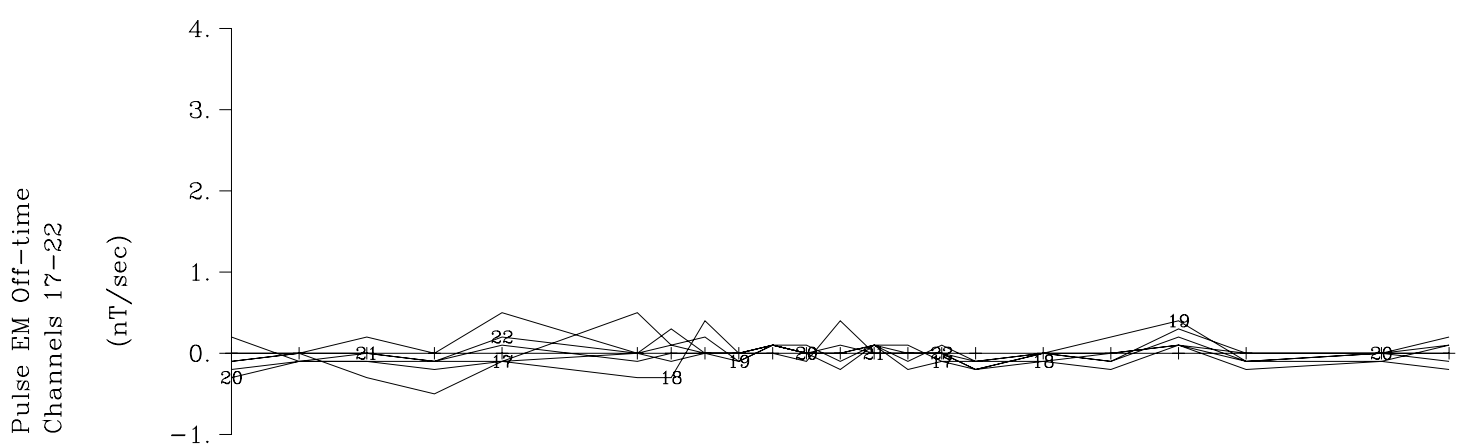
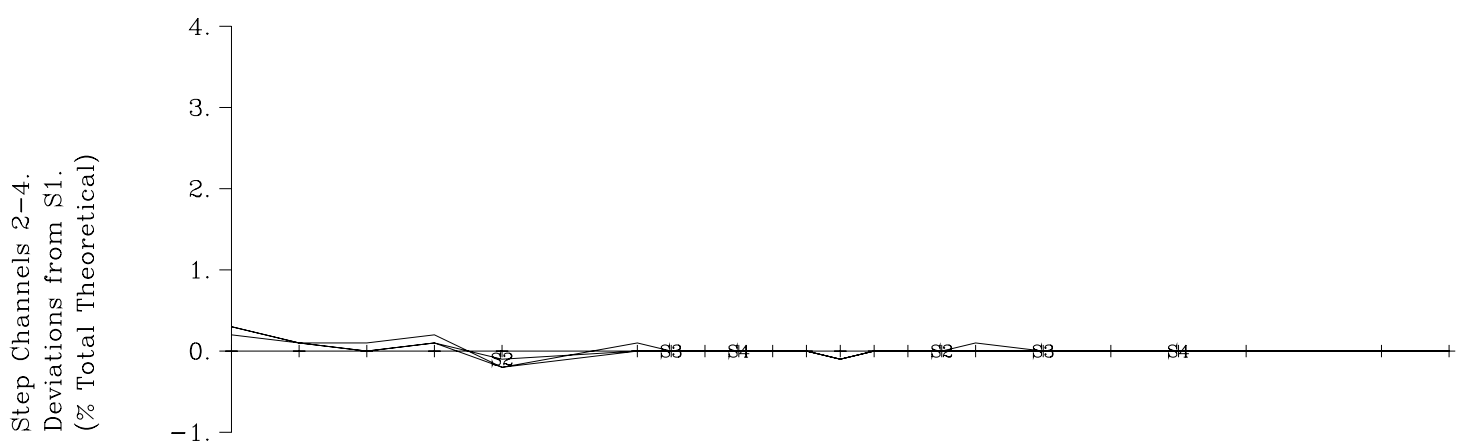
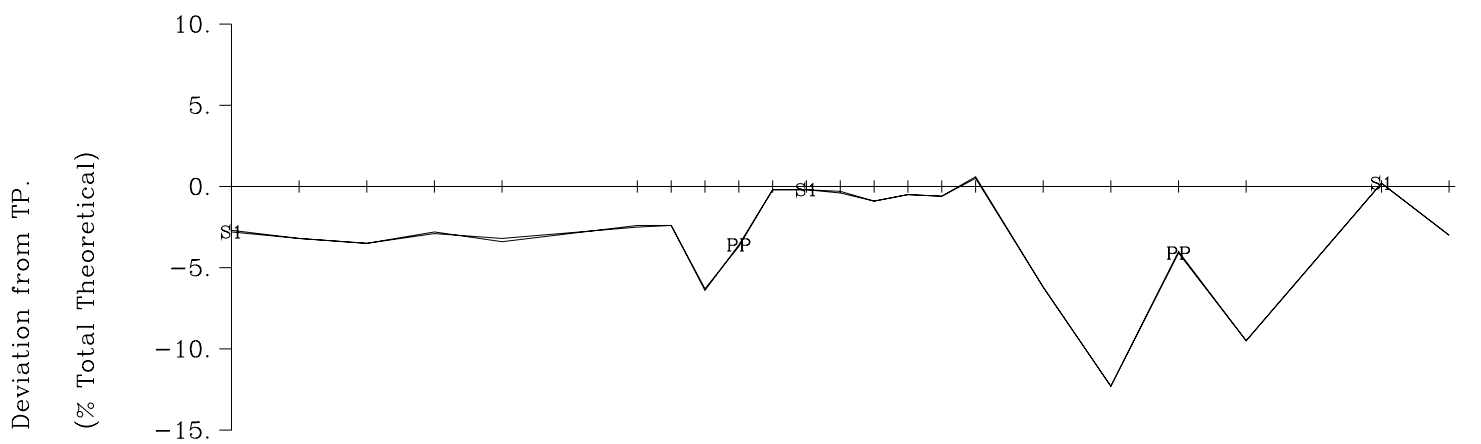
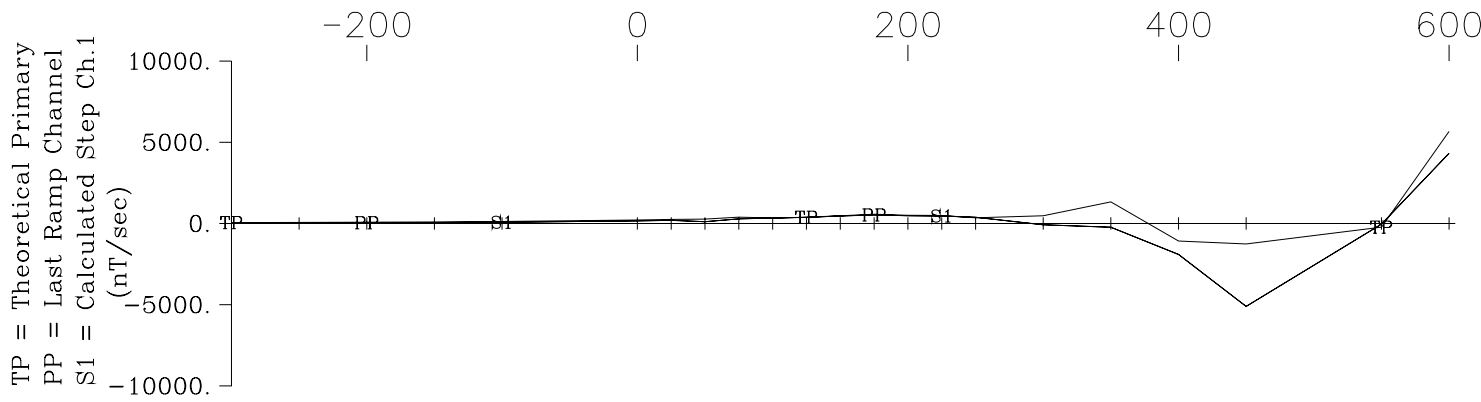
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 Loop 1, Line 250N X Component
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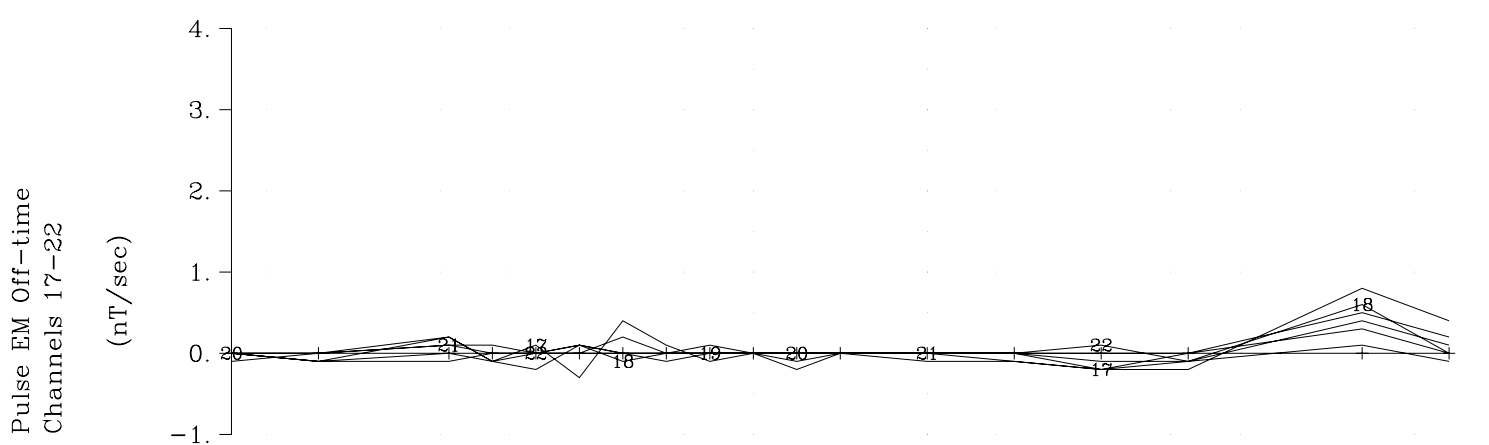
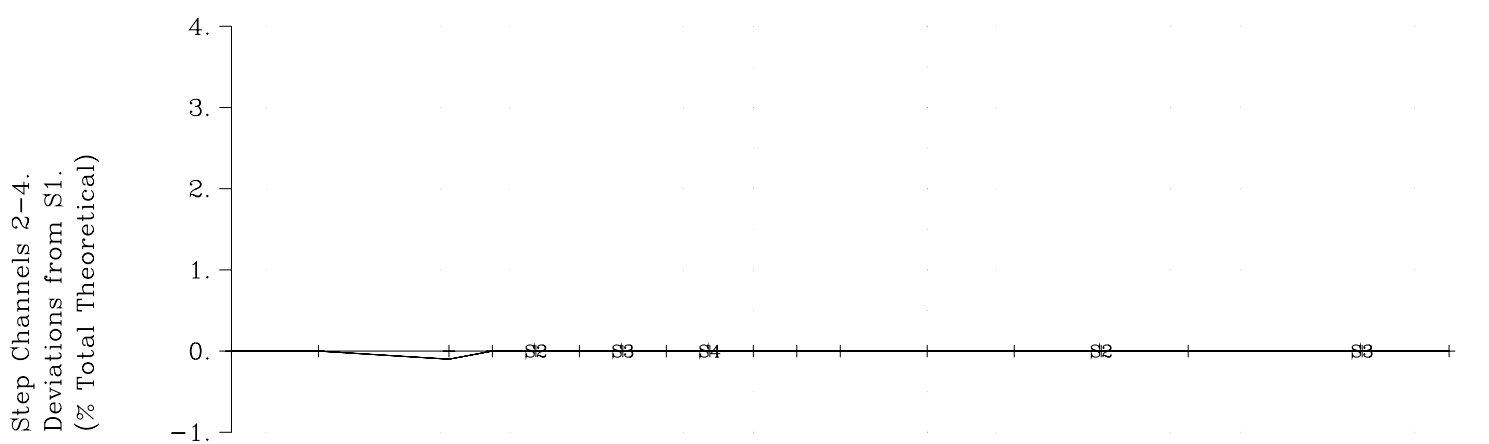
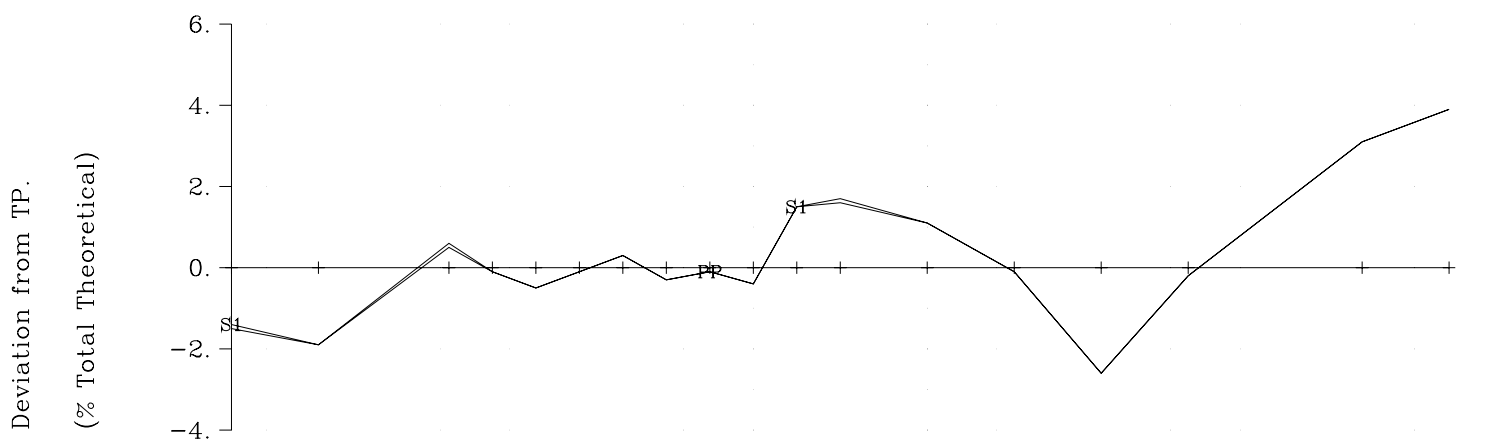
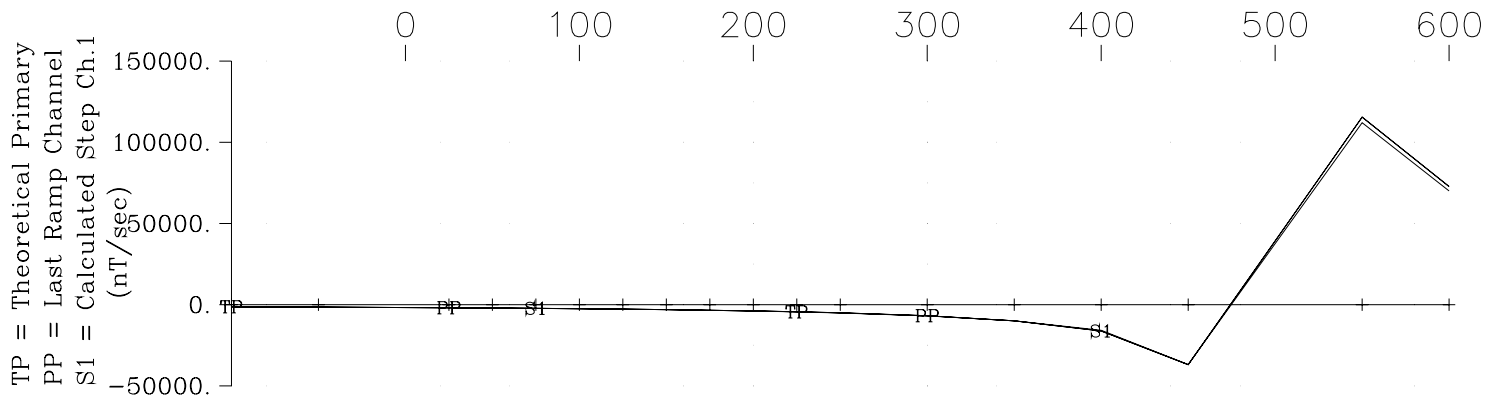
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 Loop 1, Line 550N Z Component
 Crone Geophysics & Exploration Ltd.



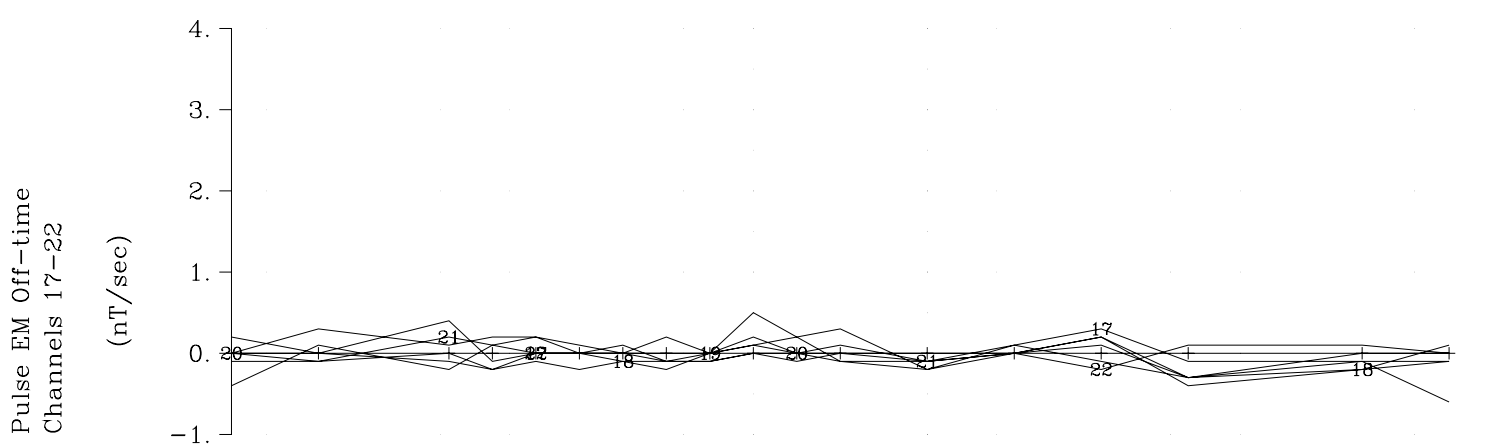
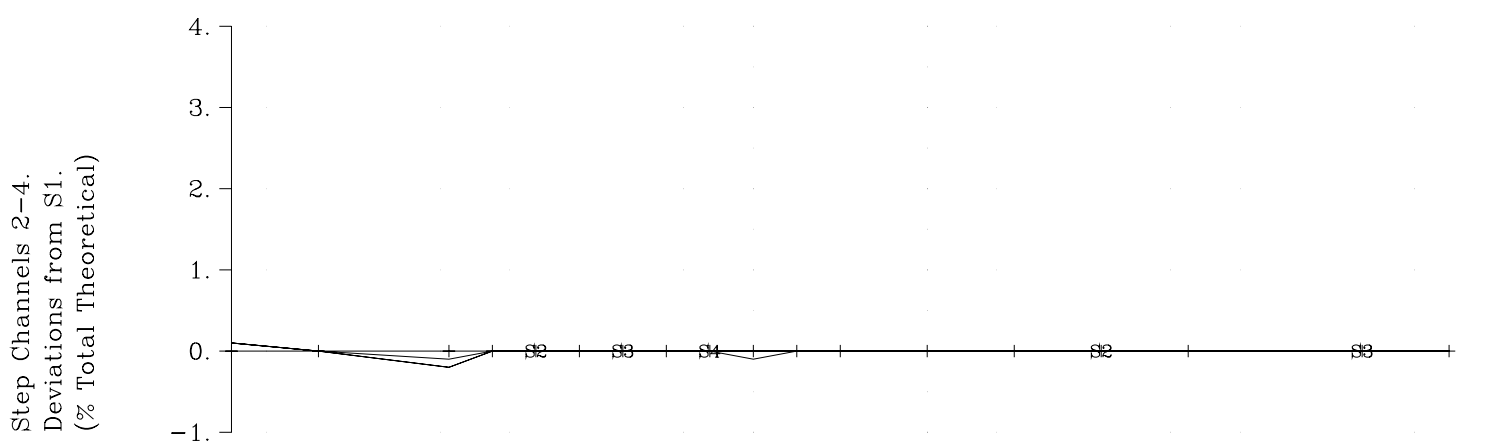
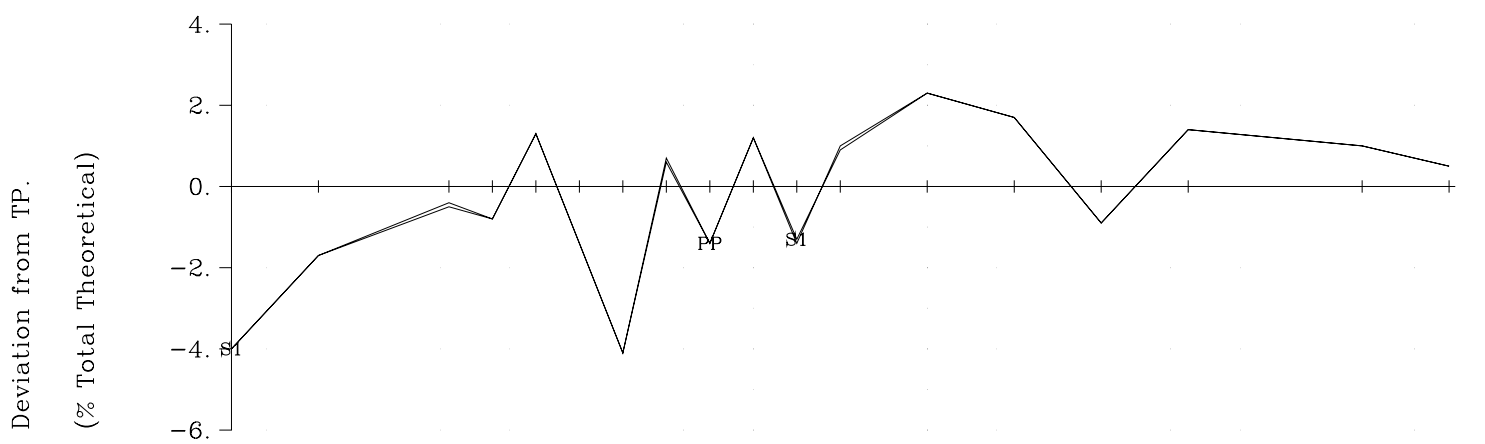
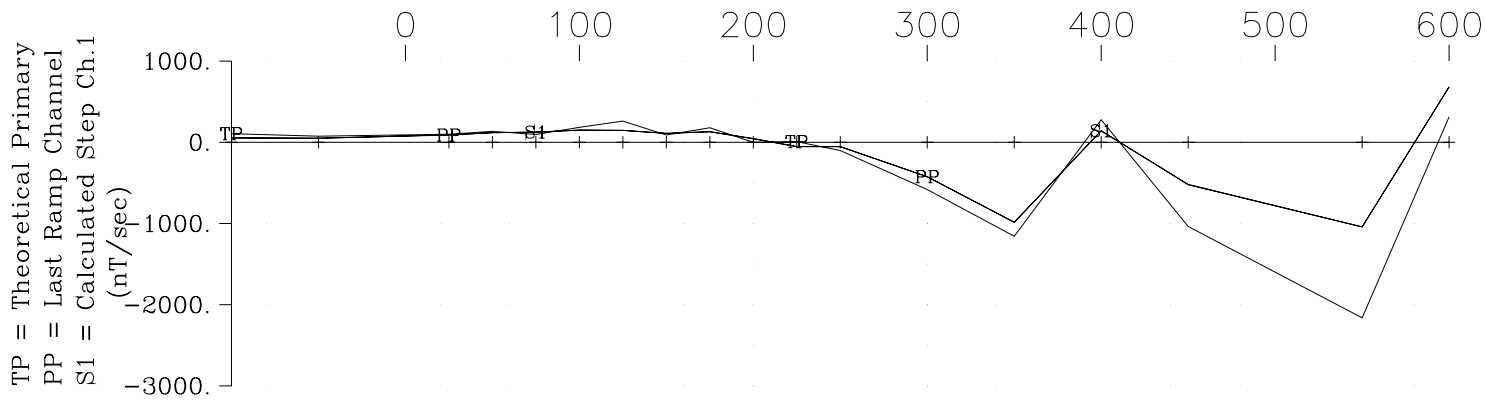
Wallbridge Mining Company Ltd. Ermatinger Property
 Loop 1, Line 850N Z Component
 Crone Geophysics & Exploration Ltd.



Wallbridge Mining Company Ltd. Ermatinger Property
 Loop 1, Line 850N X Component
 Crone Geophysics & Exploration Ltd.



Wallbridge Mining Company Ltd. Ermatinger Property
 Loop 1, Line 1150N Z Component
 Crone Geophysics & Exploration Ltd.



Wallbridge Mining Company Ltd. Ermatinger Property
 Loop 1, Line 1150N X Component
 Crone Geophysics & Exploration Ltd.