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## VLF EM-16 Survey / Interpretation Report

## Over Legacy Claim 4252867 (now Cell Claims 104679, 164402, 183867, 231144, 260983 & 268352)

## **Riggs Township**, Ontario

Prepared For

Alamos Gold Inc.

Completed By Shaun Parent

Superior Exploration, Adventure & Climbing Co. Ltd

May 8, 2019

## Table Of Contents

List of Tables, Maps & Appendices	2
Table List	2
Map List	2
Appendix A TX NAA Figures	3
Appendix B TX NML Figures	4
Preamble	5
Executive Summary	6
Property Access	6
Introduction	7
Personnel	7
Work Performed	11
Fieldwork	11
VLF Data Collection Process	11
Interpretation & Modelling	
VLF2DMF Data Processing	
Discussion of Results	13
VLF Anomalies	15
TX NAA (14 Trends)	15
TX NML (9 Trends)	21
Conclusions	27
Recommendations	
List of References	29
Certificate of Qualifications	

## List of Tables, Maps & Appendices

## Table List

Table 1 Example of VLF Data Collection	11
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## Map List

Map 1 General Location Map of Claim 4252867	8
Map 2 Location Map Showing VLF Grid & Dubreuilville	9
Map 3 VLF Grid Showing Start & End Lines	10
Map 4 Grid Elevation Map	14
Map 5 Elevation Map with NAA Picks & Trends	16
Map 6 NAA Fraser In Phase Contours with Picks & Trends	17
Map 7 NAA Fraser Quadrature Contours with Picks & Trends	18
Map 8 NAA Resistivity 4000 Ohm Contours with Picks & Trends	19
Map 9 Google Image of TX NAA Picks & Trends	20
Map 10 Elevation Map with NML Picks & Trends	22
Map 11 NML Fraser In Phase Contours with Picks & Trends	23
Map 12 NML Fraser Quadrature Contours with Picks & Trends	24
Map 13 NML Resistivity 4000 Ohm Contours with Picks & Trends	25
Map 14 Google Image of TX NML Picks & Trends	26

## Appendix A TX NAA Figures

NAA Figure 1 Line 00 Raw Data Profile	32
NAA Figure 2 Line 00 Model 4000 Ohm with Fraser Picks	32
NAA Figure 3 Line .5E Raw Data Profile	33
NAA Figure 4 Line .5E Model 4000 Ohm with Fraser Picks	33
NAA Figure 5 Line 1E Raw Data Profile	34
NAA Figure 6 Line 1E Model 4000 Ohm with Fraser Picks	34
NAA Figure 7 Line 1.5E Raw Data Profile	35
NAA Figure 8 Line 1.5E Model 4000 Ohm with Fraser Picks	35
NAA Figure 9 Line 2E Raw Data Profile	36
NAA Figure 10 Line 2E Model 4000 Ohm with Fraser Picks	36
NAA Figure 11 Line 2.5E Raw Data Profile	37
NAA Figure 12 Line 2.5E Model 4000 Ohm with Fraser Picks	37
NAA Figure 13 Line 3E Raw Data Profile	38
NAA Figure 14 Line 3E Model 4000 Ohm with Fraser Picks	38
NAA Figure 15 Line 3.5E Raw Data Profile	39
NAA Figure 16 Line 3.5E Model 4000 Ohm with Fraser Picks	39
NAA Figure 17 Line 4E Raw Data Profile	40
NAA Figure 18 Line 4E Model 4000 Ohm with Fraser Picks	40
NAA Figure 19 Line 4.5E Raw Data Profile	41
NAA Figure 20 Line 4.5E Model 4000 Ohm with Fraser Picks	41
NAA Figure 21 Line 5E Raw Data Profile	42
NAA Figure 22 Line 5E Model 4000 Ohm with Fraser Picks	42
NAA Figure 23 Line 5.5E Raw Data Profile	43
NAA Figure 24 Line 5.5E Model 4000 Ohm with Fraser Picks	43
NAA Figure 25 Line 6E Raw Data Profile	44
NAA Figure 26 Line 6E Model 4000 Ohm with Fraser Picks	44
NAA Figure 27 Line 6.5E Raw Data Profile	45
NAA Figure 28 Line 6.5E Model 4000 Ohm with Fraser Picks	45
NAA Figure 29 Line 7E Raw Data Profile	46
NAA Figure 30 Line 7E Model 4000 Ohm with Fraser Picks	46
NAA Figure 31 Line 7.5E Raw Data Profile	47
NAA Figure 32 Line 7.5E Model 4000 Ohm with Fraser Picks	47
NAA Figure 33 Line 8E Raw Data Profile	48
NAA Figure 34 Line 8E Model 4000 Ohm with Fraser Picks	48

## Appendix B TX NML Figures

NML Figure 1 Line 00 Raw Data Profile	50
NML Figure 2 Line 00 Model 4000 Ohm with Fraser Picks	50
NML Figure 3 Line .5E Raw Data Profile	51
NML Figure 4 Line .5E Model 4000 Ohm with Fraser Picks	51
NML Figure 5 Line 1E Raw Data Profile	52
NML Figure 6 Line 1E Model 4000 Ohm with Fraser Picks	52
NML Figure 7 Line 1.5E Raw Data Profile	53
NML Figure 8 Line 1.5E Model 4000 Ohm with Fraser Picks	53
NML Figure 9 Line 2E Raw Data Profile	54
NML Figure 10 Line 2E Model 4000 Ohm with Fraser Picks	54
NML Figure 11 Line 2.5E Raw Data Profile	55
NML Figure 12 Line 2.5E Model 4000 Ohm with Fraser Picks	55
NML Figure 13 Line 3E Raw Data Profile	56
NML Figure 14 Line 3E Model 4000 Ohm with Fraser Picks	56
NML Figure 15 Line 3.5E Raw Data Profile	57
NML Figure 16 Line 3.5E Model 4000 Ohm with Fraser Picks	57
NML Figure 17 Line 4E Raw Data Profile	58
NML Figure 18 Line 4E Model 4000 Ohm with Fraser Picks	58
NML Figure 19 Line 4.5E Raw Data Profile	59
NML Figure 20 Line 4.5E Model 4000 Ohm with Fraser Picks	59
NML Figure 21 Line 5E Raw Data Profile	60
NML Figure 22 Line 5E Model 4000 Ohm with Fraser Picks	60
NML Figure 23 Line 5.5E Raw Data Profile	61
NML Figure 24 Line 5.5E Model 4000 Ohm with Fraser Picks	61
NML Figure 25 Line 6E Raw Data Profile	62
NML Figure 26 Line 6E Model 4000 Ohm with Fraser Picks	62
NML Figure 27 Line 6.5E Raw Data Profile	63
NML Figure 28 Line 6.5E Model 4000 Ohm with Fraser Picks	63
NML Figure 29 Line 7E Raw Data Profile	64
NML Figure 30 Line 7E Model 4000 Ohm with Fraser Picks	64
NML Figure 31 Line 7.5E Raw Data Profile	65
NML Figure 32 Line 7.5E Model 4000 Ohm with Fraser Picks	65
NML Figure 33 Line 8E Raw Data Profile	66
NML Figure 34 Line 8E Model 4000 Ohm with Fraser Picks	66

## Preamble

Superior Exploration, Adventure & Climbing Co. Ltd. is an Incorporated Company specializing in Mining Exploration and Geophysics as well as Professional climbing.

Our VLF surveys (YVLF) are a non-invasive way to complete first pass ground geophysics. No cut lines are needed and an exploration permit is not generally required.

We have worked in many countries and have experience working in a wide variety of environments such as VMS, Breccia Pipes, Epithermal Veins and Shear Hosted Gold Deposits.

Shaun Parent, BSc. P. Geo is a member of the Association of Professional Geoscientists of Ontario as well as the Prospectors & Developers Association of Canada. He has over 30 years' experience working in the Geological and Geophysical Field. Although he specializes in Ground VLF, he is also experienced working with I.P., Max Min, Surface & Borehole Pulse EM, Airborne Magnetics and Ground Magnetometer.

Sandra Slater is a member of the Prospectors & Developers Association of Canada. She has been working in the Geological/Geophysical field for over 10 years and specializes in data analysis and VLF2DMF software, as well as assisting in the field.

Shaun began working with the developer of the VLF2DMF software since its inception in 2008 and he and Sandra continue to do so. Superior Exploration has completed many successful "blind" case history test VLF surveys over various ore bodies and mineralized zones.

#### **Executive Summary**

This Ground VLF survey was completed on Legacy Claim 4252867, which is now comprised of Cell Claims 104679, 164402, 183867, 231144, 260983 & 268352 (the "Claim 4252867") The property is located approximately 20 kilometers east of Dubreuilville. Ontario.

The survey was carried out between April 4 and April 13, 2019 using a VLF EM-16 unit and a handheld Garmin GPS-60CSX. Two transmitters were read at each station: NAA 24.0 KHz – Cutler, Maine and NML 25.2 KHz- La Moure, North Dakota. A total of 8.94 km of VLF was carried out over 17 VLF lines.

The main objective of the survey was to determine if the VLF Survey could delineate zones carrying mineralization and or structures. No geological information was known at the time of the VLF survey.

## **Property Access**

Access is by the following: from (Brisson, A.D March 19<sup>th</sup>)

- There is a good drop off point for the snowmobile at UTM coordinate (692916E
   5351521N) which is located on an actual drill trail.
- Driving South East for 175m's turn left onto the federation trail at UTM coordinate (693031E 5351403N).
- Using the federation trail for 3.4 km going North East, you will arrive at the old logging road which will lead to the area surveyed at UTM coordinate (695518E 5353126N).
- Turn right from the federation trail onto the old logging road.
- Once on the logging road following the main trail, there are several forks but obviously narrower than the principal road at the exception of one located at UTM coordinate (697644E 5351473N). Keep to the right branch with the sign 21. Always stay on the main road.
- Arriving at UTM coordinate (702154E 5352483N), the main road is turning left going uphill and there is a narrow trail on the right. Stay on the main road. Exercise diligence as there is trenching/excavations that have been done really close to the road and at a few places, almost on the road.
- Arriving at UTM coordinate (705075E 5352125N), there is a big trench on the left hand side of the road. From that point on, the road returns to a narrow grown in trail. From there, it is 851 meters to the claim border.

#### Introduction

A VLF-EM16 survey is a relatively simple and economic geophysical survey that is used to better understand shallow, vertical and sub vertical bedrock conductors.

This report describes the findings and results of the VLF EM-16 survey utilizing the VLF2DMF processing software of which the author of this report has assisted in its development since 2007. It enables the processing and inversion of electromagnetic (EM) induction data acquired along a survey area using a Very Low Frequency (VLF) (Santos 2013). The software generates profiles of Raw Data, Fraser Filtered Data, Fraser Filter Pseudo Sections, KH Filtered Data, Resistivity, JY Inversions, and (2-D) Modelled Inversions.

VLF data collected in the surveyed area was also compiled onto separate plan maps of contoured Fraser Filter In Phase, Fraser Filter Quadrature as well as Resistivity data.

#### Personnel

The VLF EM-16 operator and GPS field navigator responsible for the collection of all raw data was Shaun Parent.

Processing, Profiling, Modelling and Interpretation of the VLF data using the VLF2DMF Software was completed by Sandra Slater and Shaun Parent.



#### Map 1 General Location Map of Claim 4252867



#### Map 2 Location Map Showing VLF Grid & Dubreuilville

#### Map 3 VLF Grid Showing Start & End Lines



## **Work Performed**

#### **Fieldwork**

The VLF EM-16 survey consisted of running 17 VLF reconnaissance lines, 50 meters apart. Basic prospecting was attempted during the survey to discover pertinent findings such as outcrops, however, ground snow cover hampered this.

The following parameters were used throughout the survey

Equipment Used: VLF EM-16 unit and a handheld Garmin 60-CSX PS

VLF Transmitters Used:	NAA - 24.0 KHz. Cutler, Maine (East) @ Azimuth 108 degrees 1360 Km
	NML - 25.2 KHz. La Moure, North Dakota (West) @ Azimuth 258 degrees 1086 Km

**VLF survey direction:** The VLF Em-16 receiver faced a direction of 00 degrees true azimuth for each reading taken.

**VLF survey stations:** VLF readings began at the south end of each VLF line and were taken approximately 20 meters apart along each survey line.

**Parameters of Measurement:** In-phase and Quad-phase components of a vertical magnetic field is measured as a percentage of horizontal primary fields. (Tangent of tilt angle and ellipticity). VLF transmitter NAA was to the east while transmitter NML was to the west. The transmitters are chosen so that the direction to the transmitting station is as close to the orientation of the bedrock strike.

#### **VLF Data Collection Process**

Field data was collected as follows on each surveyed line.

- Each station was saved onto the Handheld Garmin 60CSX GPS Unit (including any local features such as power lines, fences and geological structures)
- VLF readings for each station were recorded on the GPS as In-Phase and Quadrature corresponding to the line number and station number. (See example in Table 1)
- Garmin and VLF data were compiled and processed. All UTM Values are NAD 83.

Line 2E	NAA In phase	NAA Quadrature	NML In phase	NML Quadrature	Notes
3+00N	10	6	4	5	swamp
3+20N	8	4	2	4	ос

#### Table 1 Example of VLF Data Collection

#### **Interpretation & Modelling**

#### **VLF2DMF Data Processing**

All VLF data collected was processed and interpreted separately for TX NAA and TX NML. The following filters, inversions, profiling and modelling were completed and used in the interpretation process, however, only the Raw Data and 2D Modelled Inversions are included in the appendix at the end of this report.

#### **Raw Data Profiles**

The raw data for each frequency was plotted for each line surveyed. No filtering or smoothing of the raw data was done. (NAA-Appendix A) & (NML Appendix B)

#### **Fraser Filter Profile with Fraser Peaks**

Raw data was run through the Fraser filter. This filter transforms In-Phase cross overs and inflections into positive peak anomalies. (Fraser 1969) In-Phase inflections and cross overs are usually plus to minus, while Quadrature responses are negative to positive giving a negative peak anomaly when the Fraser Filter is applied. Fraser filter data was compiled separately to produce Plan Maps.

#### **Fraser Pseudo Section Profiles**

Fraser Filter pseudo section is built by applying the Fraser Filter of various lengths along the survey line.

#### Karous Hjelt (KH) Profiles

Raw Data was run through the Karous-Hjelt (K-H) filter. The filter is applied to obtain a section of current density. The higher values are generally associated with conductive structures. (Karous, Hjelt 1983)

#### Resistivity Profiles: 2000 & 4000 Ohm's

The apparent resistivity was calculated. The resistivity can be calculated if the mean environmental resistivity is known at the beginning of the VLF profile. A mean resistivity of 2000 ohm's and 4000 ohm's was used for all lines. Resistivity data from each profile was combined to produce plans maps. This report contains Plan Maps for Resistivity results at 4000 Ohm's.

#### JY Section Model:

A 2D inversion that looks for the best distribution of the density of current (JY). The output is the apparent current density with positive values associated with conductors and negative values associated to resistors.

#### 2D Inversion Resistivity Models 2000 Ohm's & 4000 Ohm's

A resistivity of 2000 Ohm's and 4000 Ohm's was used to build initial models used in the inversion to obtain a realistic cross section of the line surveyed. Conductive zones are red/yellow while resistive zones are blue. A depth scale is found on the left side of model profiles. Surface conductive zones show little depth extent, have a horizontal display and are limited in depth.

The maximum depth slice with a bedrock resistivity of 2000 Ohms is 144.3 meters for transmitter NAA (24.0 KHz.) and 140.9 meters for TX NML (25.2 KHz.).

The maximum depth slice with a bedrock resistivity of 4000 Ohms is 204.1 meters for transmitter NAA (24.0 KHz.) and 192.2 meters for TX NML (25.2 KHz.).

All Inversion models have the same color scaling using a minimum resistivity of 10 and a maximum of 10000. The vertical exaggeration of all models is 1.0. Fraser Filter anomaly picks are found across the top of all models.

Models with a resistivity of 4000 Ohm's were selected for this report due to a more detailed response. (NAA-Appendix A) & (NML Appendix B)

#### **Discussion of Results**

Lines 00, .5E, 1E, 1.5E, 2E, 2.5E, 3E, 3.5E, 4E, 4.5E, 5E, 5.5E, 6E, 6.5E, 7E, 7.5E, 8E

Map-4 shows the layout of the 17 VLF lines on an elevation contour map.

The stronger anomalies were interpreted into main trends. Other weaker anomalies could not be defined as trends since they might indicate single line geological contacts or VLF noise. As well there was a lack of knowledge of the geological strike prior to interpretation.

#### Map 4 Grid Elevation Map



14

### **VLF Anomalies**

VLF Trends were identified for TX NAA (14 trends) and TX NML (9 trends). Trends are signified as the following example: .5E-A, 1E-A, 1.5E-A (Line .5 East-VLF Pick-A to Line 1 East- VLF Pick-A to Line 1.5 East- VLF Pick A)

#### TX NAA (14 Trends)

Map- 5	Elevation Contours with NAA Picks and Trends		
Maps 6 & 7	Fraser Filters Contours of In Phase and Quadrature Values		
Map 8	Resistivity Contours:		
	<ul> <li>Trend 3 occurs in a resistivity high</li> </ul>		
	<ul> <li>Trend 1, 4, 5 &amp; 14 occur in a resistivity low</li> </ul>		
	<ul> <li>Trend 10 follows the edge of the resistivity high</li> </ul>		
Map 9	NAA Picks and Trends on a Google Image		

TX NAA Trends with those suggested for ground follow up in Red

- 1 4E-A, 5E-A
- 2 .5E-A, 1E-A, 1.5E-A
- 3 2.5E-B, 3E-A
- 4 6E-A, 6.5E-A, 7E-A
- 5 7.5E-B, 8E-B
- 6 5E-B, 5.5E-B
- 7 6.5E-B, 7E-B
- 8 1E-B, 1.5E-C, 2.5E-C, 3E-B, 3.5E-C
- 9 00-C, .5E-C, 1.5E-D, 2E-D
- 10 .5E-E, 1E-D, 1.5E-E, 2E-E, 3E-C, 3.5E-C, 4E-D
- 11 4.5E-B, 5E-C, 5.5E-C, 6E-B
- 12 3.5E-D, 4E-E, 4.5E-C, 5E-D, 5.5E-D
- 13 6.5E-C, 7E-C, 7.5E-E
- 14 5.5E-E, 6E-C

#### Map 5 Elevation Map with NAA Picks & Trends





#### Map 6 NAA Fraser In Phase Contours with Picks & Trends



#### Map 7 NAA Fraser Quadrature Contours with Picks & Trends

#### Map 8 NAA Resistivity 4000 Ohm Contours with Picks & Trends



#### Map 9 Google Image of TX NAA Picks & Trends



#### TX NML (9 Trends)

Elevation Contours with NML Picks and Trends
Fraser Filter Contours of In Phase and Quadrature Values
Resistivity Contours:
Trends 1, 4, 5, 6 & 7 follow a resistivity low
Trend 3 occurs within a resistivity high
Trends 4 & 8 follow the edge of the resistivity high
NML Picks and Trends on a Google Image

TX NML Trends with those suggested for ground follow up highlighted in Blue

- 1 4E-A, 4.5E-A, 5E-A, 5.5E-A, 6E-B
- 2 00-B, .5E-A, 1.5E-B, 2E-B, 2.5E-B, 3E-A, 3.5E-A
- 3 1E-B, 1.5E-C, 2E-C, 2.5E-C, 3E-C, 3.5E-D
- 4 .5E-E, 1E-E, 1.5E-E, 2E-E, 2.5E-D, 3E-D, 3.5E-D, 4E-C, 4.5E-C, 5E-C, 5.5E-C 6E-C, 6.5E-C 6C
- 5 5E-D, 5.5E-D, 6E-D
- 6 5E-B, 5.5E-B, 6E-B, 6.5E-A, 7E-A
- 7 7.5E-A, 8E-B
- 8 3.5E-E, 4E-D, 4.5E-D
- 9 6.5E-B, 7E-C







#### Map 11 NML Fraser In Phase Contours with Picks & Trends



#### Map 12 NML Fraser Quadrature Contours with Picks & Trends

#### Map 13 NML Resistivity 4000 Ohm Contours with Picks & Trends



## Map 14 Google Image of TX NML Picks & Trends

![](_page_27_Figure_1.jpeg)

## Conclusions

This Ground VLF EM-16 survey over the 4252867 Grid area was successful in:

- Defining Several VLF bedrock conductors.
- Using a bedrock background resistivity of 4000 ohms gave us modelled sections to 204 meters in depth and outlined several highly resistive and minimally resistive rock units.
- Without geological information or geological strike information, it is difficult to match many of the VLF Picks and Trends.

## Recommendations

- Given the VLF survey was limited to the claim perimeter, additional 25 meter spaced VLF lines in the vicinity of VLF Picks and Trends close to the claim lines could define the weaker anomalies.
- Overlay the TX NAA and TX NML Picks and Trends on Google Earth images as well as geology maps and airborne magnetic maps in order to identify surface lineaments and geological contacts.
- Run depth slice plan maps of both the KH data and the Inversion models at increasing depths. This will eliminate shallow conductors and isolate deeper bedrock conductors to a depth of 204 meters. This will also determine if the bedrock conductor has a dip or plunge.
- Overlay TX NAA and TX NML VLF Picks and Trends with airborne EM and magnetic survey data.
- Overlay TX NAA and TX NML Picks and Trends with historical geochemistry data.
- Proposed drill holes should be projected on both the inversion models and the JY models using a vertical exaggeration of 1.0 to determine if the proposed hole will intersect the VLF Bedrock conductor.
- Ground follow-up of the VLF Picks and Trends outlined in this report in order to ground proof the targets with historical data and geology
  - > VLF NAA Picks recommended for Ground follow up are:

Line:	.5E-A	4.5E-A, B
	1E-D	5E-A, D
	1.5E-E	5.5E-E
	2E-E	6E-A, C
	2.5E-B, C, D	6.5E-A, B
	3E-C, 3.5E-D	7E-A, B
	3.5E-C	7.5E-B
	4E-A, D	8E-A, B

> VLF NML Picks recommended for Ground follow up are:

Line:	0.5Е-А, В	4.5E-A, C, D
	1E-E	5E-A, C
	1.5Е-В, Е	5.5E-A, C, D
	2E-C, E	6E-B, D, E
	2.5E-C, D	6.5E-A, B
	3E-D, E	7E-A, C
	3.5E-D, E	7.5E-A
	4E-A, C	8E-B

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## **Certificate of Qualifications**

I, Shaun Parent, P. Geo . Residing at 282 B Whispering Pines Road, Batchawana Bay, Ontario do certify that:

- 1. I am a consulting Geoscientist with Superior Exploration, Adventure & Climbing Co. Ltd.
- 2. I graduated with a Geological Technician Diploma from Sir Sandford Fleming College in 1986.
- 3. I graduated with a BSc. from the University of Toronto in 1986
- 4. I am a member in good standing with the Association of Professional Geoscientists of Ontario #1955 and a member of the Prospectors and Developers Association of Canada.
- 5. I have been employed continuously as a Geoscientist for the past 27 years since my graduation from University.
- 6. The nature of my involvement with this project was to carry out the interpretation of the VLF data using the EMTOMO VLF2D Software of which I have been developing with Dr. Fernando Santos of Lisbon, Portugal.

Dated this 8<sup>th</sup> day of May 2019

Shaun Parent, Diploma-Geo, BSc. P. Geo

# **APPENDIX A**

## **TX NAA Figures**

#### NAA Figure 1 Line 00 Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 00 stations Azimuth: -0.5 0+00 1+00N 2+00N 3+00N 4+00N 5+00N Freq.(kHz) 23.0 -18.0 - R 24.0 13.0 --<del>0</del>-- I 24.0 8.0 3.0 8 -2.0 -7.0 -12.0-17.0-22.0 -27.00 100 200 300 400 500 Distance (m) E 10000.0 507.8 Elevation (m) 362.8 Rho (ohm-m) 1000.0 290.3 100.0

NAA Figure 2 Line 00 Model 4000 Ohm with Fraser Picks

![](_page_33_Figure_3.jpeg)

Transmitter: NAA

#### NAA Figure 3 Line .5E Raw Data Profile

![](_page_34_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 0.5E Azimuth: -1.7

#### NAA Figure 4 Line .5E Model 4000 Ohm with Fraser Picks

![](_page_34_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 5 Line 1E Raw Data Profile

![](_page_35_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 1E Azimuth: -2.7 stations

#### NAA Figure 6 Line 1E Model 4000 Ohm with Fraser Picks

![](_page_35_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 7 Line 1.5E Raw Data Profile

![](_page_36_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 15E Azimuth: 0.6

#### NAA Figure 8 Line 1.5E Model 4000 Ohm with Fraser Picks

![](_page_36_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 9 Line 2E Raw Data Profile

![](_page_37_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 2E Azimuth: -2.1

#### NAA Figure 10 Line 2E Model 4000 Ohm with Fraser Picks

![](_page_37_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 11 Line 2.5E Raw Data Profile

![](_page_38_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 2.5E Azimuth: -1.8

#### NAA Figure 12 Line 2.5E Model 4000 Ohm with Fraser Picks

![](_page_38_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 13 Line 3E Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 3E stations Azimuth: -3.5 3+00N 4+00N 1+00N 2+00N 5+00N5+40N 0 + 00Freq.(kHz) 29.8 -22.0 -14.3 --<del>0</del>-- I 24.0 6.5 --1.3 -9.0 8 -16.8 -24.5 -32.3-40.0-47.8 -100 200 300 400 500 Ω Distance (m) F 10000.0 492.8 Elevation (m) 8228 8228  $\mathbf{Rho}$ (ohm-m) 1000.0 284.3 100.0

NAA Figure 14 Line 3E Model 4000 Ohm with Fraser Picks

![](_page_39_Figure_3.jpeg)

Transmitter: NAA

#### NAA Figure 15 Line 3.5E Raw Data Profile

![](_page_40_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 3.5E Azimuth: -2.4

#### NAA Figure 16 Line 3.5E Model 4000 Ohm with Fraser Picks

![](_page_40_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 17 Line 4E Raw Data Profile

![](_page_41_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 4E Azimuth: -2.1

#### NAA Figure 18 Line 4E Model 4000 Ohm with Fraser Picks

![](_page_41_Figure_4.jpeg)

Transmitter: NAA

Vertical Exaggeration: 1.0

#### NAA Figure 19 Line 4.5E Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 4.5E Azimuth: -1.9

![](_page_42_Figure_2.jpeg)

#### NAA Figure 20 Line 4.5E Model 4000 Ohm with Fraser Picks

![](_page_42_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 21 Line 5E Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 5E stations Azimuth: -2.31+00N 4+00N 5+06N20N 0+00 2+00N 3+00N Freq.(kHz) 36.3 -+30.0 -- R 24.0 23.8 ---<del>0</del>-- I 24.0 17.5 -11.3 -8 5.0 --1.3-7.5-13.8-20.0 -26.3 100 200 300 400 500 0 Distance (m)493.1 F 10000.0 Elevation (m) 828'58'58' Rho 1000.0 (ohm-m) 291.8 100.0

NAA Figure 22 Line 5E Model 4000 Ohm with Fraser Picks

![](_page_43_Figure_3.jpeg)

Transmitter: NAA

#### NAA Figure 23 Line 5.5E Raw Data Profile

-2.22+00N 3+00N 0+00 1+00N 4+00N 5+00N 5+40N 25.5 + Freq.(kHz) 18.0 -10.5 --<del>0</del>-- I 24.0 3.0 -4.5€ -12.0 -19.5 -27.0 --34.5-42.0-49.5 300 100 200 400 500 Ð Distance (m) 478.1 10000.0 Elevation (m) 415.8 1000.0 Rho (ohm-m 100.0 282.0 10.0

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 5.5E Azimuth: -2.2

#### NAA Figure 24 Line 5.5E Model 4000 Ohm with Fraser Picks

![](_page_44_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 25 Line 6E Raw Data Profile

![](_page_45_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 6E Azimuth: -2.2

#### NAA Figure 26 Line 6E Model 4000 Ohm with Fraser Picks

![](_page_45_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 27 Line 6.5E Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 6.5E stations Azimuth: -1.50+00 1+00N 2+00N 3+00N 4+00N 5+00N5+40N 26.8 -Freq.(kHz) 20.0 - R 24.0 13.3----- I 24.0 6.5 -0.3 -7.0 8 -13.8 -20.5 -27.3-34.0-40.8Ó 100 200 300 400500 Distance (m) 482.8 F 10000.0 Rho (ohm-m) 1000.0 Elevation (m) 6022 Elevation 285.0 100.0

NAA Figure 28 Line 6.5E Model 4000 Ohm with Fraser Picks

![](_page_46_Figure_3.jpeg)

Transmitter: NAA

#### NAA Figure 29 Line 7E Raw Data Profile

![](_page_47_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 7E Azimuth: -2.4 stations

#### NAA Figure 30 Line 7E Model 4000 Ohm with Fraser Picks

![](_page_47_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 31 Line 7.5E Raw Data Profile

0+00 1+00N 2+00N 3+00N 4+00N 5+06M20N 26.3 -Freq.(kHz) 20.0 - R 24.0 13.8----- I 24.0 7.51.3 8 -5.0 -11.3 -17.5 -23.8-30.0-36.3Ó 100 200 300 400500 Distance (m) 482.2F 10000.0 Rho (ohm-m) 1000.0 Elevation (m) 348'5 Elevation 281.3 100.0

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 7.5E stations 0+00 1+00N 2+00N 3-

#### NAA Figure 32 Line 7.5E Model 4000 Ohm with Fraser Picks

![](_page_48_Figure_4.jpeg)

Transmitter: NAA

#### NAA Figure 33 Line 8E Raw Data Profile

![](_page_49_Figure_1.jpeg)

#### NAA Figure 34 Line 8E Model 4000 Ohm with Fraser Picks

![](_page_49_Figure_3.jpeg)

Transmitter: NAA

# **APPENDIX B**

## **TX NML Figures**

#### NML Figure 1 Line 00 Raw Data Profile

![](_page_51_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 00 Azimuth: -0.5

#### NML Figure 2 Line 00 Model 4000 Ohm with Fraser Picks

![](_page_51_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 3 Line .5E Raw Data Profile

![](_page_52_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 0.5E Azimuth: -1.7

#### NML Figure 4 Line .5E Model 4000 Ohm with Fraser Picks

![](_page_52_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 5 Line 1E Raw Data Profile

![](_page_53_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 1E Azimuth: -2.7

#### NML Figure 6 Line 1E Model 4000 Ohm with Fraser Picks

![](_page_53_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 7 Line 1.5E Raw Data Profile

![](_page_54_Figure_1.jpeg)

#### VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 1.5E stations

#### NML Figure 8 Line 1.5E Model 4000 Ohm with Fraser Picks

![](_page_54_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 9 Line 2E Raw Data Profile

![](_page_55_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 2E Azimuth: -2.1

#### NML Figure 10 Line 2E Model 4000 Ohm with Fraser Picks

![](_page_55_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 11 Line 2.5E Raw Data Profile

![](_page_56_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 2.5E Azimuth: -1.6

#### NML Figure 12 Line 2.5E Model 4000 Ohm with Fraser Picks

![](_page_56_Figure_4.jpeg)

Transmitter: NAA

#### NML Figure 13 Line 3E Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 3E stations Azimuth: -3.5 3+00N 4+00N 0+00 1+00N 2+00N 5+00N5+40N Freq.(kHz) 31.0 + 22.0 -13.0 --<del>0</del>-- I 25.2 4.0 --5.0 8 -14.0 --23.0-32.0 --41.0-50.0-59.0 100 200 300 400 500 Ð Distance (m) F 10000.0 492.8 Elevation (m) 82228 8228 Rho (ohm-m) 1000.0 284.3 100.0

#### NML Figure 14 Line 3E Model 4000 Ohm with Fraser Picks

![](_page_57_Figure_3.jpeg)

Transmitter: NML

Vertical Exaggeration: 1.0

#### NML Figure 15 Line 3.5E Raw Data Profile

![](_page_58_Figure_1.jpeg)

NML Figure 16 Line 3.5E Model 4000 Ohm with Fraser Picks

![](_page_58_Figure_3.jpeg)

Transmitter: NML

#### NML Figure 17 Line 4E Raw Data Profile

![](_page_59_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 4E Azimuth: -2.1

#### NML Figure 18 Line 4E Model 4000 Ohm with Fraser Picks

![](_page_59_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 19 Line 4.5E Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 4.5E stations Azimuth: -1.92+00N 3+00N 4+00N 5+06<del>N</del>20N 0+001+00N Freq.(kHz) 50.5 42.0 · 33.5 --<del>0</del>-- I 25.2 25.0 -16.5 8 8.0 --0.5-9.0 --17.5 -26.0-34.5 -100 200 300 400 500 0 Distance (m) 509.7 F 10000.0 Elevation (II) 864.9 Rho1000.0 (ohm-m) 292.5 100.0

NML Figure 20 Line 4.5E Model 4000 Ohm with Fraser Picks

![](_page_60_Figure_3.jpeg)

Transmitter: NML

#### NML Figure 21 Line 5E Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 5E Stations 0+00 1+00N 2+00N 3+00N 4 29.8

![](_page_61_Figure_2.jpeg)

#### NML Figure 22 Line 5E Model 4000 Ohm with Fraser Picks

![](_page_61_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 23 Line 5.5E Raw Data Profile

0+00 1+00N 2+00N 3+00N 4+00N 5+00N 5+40N 38.3 + Freq.(kHz) 30.0 -—<mark>—</mark> R 25.2 21.8 --<del>0</del>-- I 25.2 13.5 -5.3 -3.0 -11.3 8 -19.5 --27.8-36.0-44.3100 200 300 400 500 0 Distance (m) F 10000.0 478.1 Elevation (II) 87274 87274 1000.0 Rho (ohm-m) 100.0 282.0 10.0

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 5.5E Azimuth: -2.2

#### NML Figure 24 Line 5.5E Model 4000 Ohm with Fraser Picks

![](_page_62_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 25 Line 6E Raw Data Profile

![](_page_63_Figure_1.jpeg)

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 6E Azimuth: -2.2 stations

#### NML Figure 26 Line 6E Model 4000 Ohm with Fraser Picks

![](_page_63_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 27 Line 6.5E Raw Data Profile

![](_page_64_Figure_2.jpeg)

5+00N5+40N

Freq.(kHz)

—<mark>—</mark> R 25.2

#### NML Figure 28 Line 6.5E Model 4000 Ohm with Fraser Picks

![](_page_64_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 29 Line 7E Raw Data Profile

1+00N 2+00N 3+00N 4+00N 5+0**9N**20N 0+00 + Freq.(kHz) 30.0 + 24.0 -- R 25.2 18.0 ---<del>0</del>-- I 25.2 12.0 -6.0 8 0.0 -6.0-12.0 -18.0-24.0 -30.0100 200 300 400 500 0 Distance (m) F 10000.0 480.0Elevation (m) 3414'9 Rho9 (0hm-m) 100.0 284.3

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 7E Azimuth: -2.4 stations

#### NML Figure 30 Line 7E Model 4000 Ohm with Fraser Picks

![](_page_65_Figure_4.jpeg)

Transmitter: NML

#### NML Figure 31 Line 7.5E Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 7.5E stations Azimuth: -2.1 0+00 1+00N 2+00N 3+00N 5+06N20N 4+00N 16.8 -Freq.(kHz) 12.0 7.3--<del>0</del>-- I 25.2 2.5 -2.38 -7.0 -11.8 -16.5-21.3-26.0-30.8100 200 300 400 500 Ó Distance (m) 482.2 - 10000.0 (m) 415.2 348.2 Elevation Rho(ohm-m) 1000.0 100.0 281.3

NML Figure 32 Line 7.5E Model 4000 Ohm with Fraser Picks

![](_page_66_Figure_3.jpeg)

Transmitter: NML

#### NML Figure 33 Line 8E Raw Data Profile

VLF-EM raw data Line: Alamos Gold Inc - Riggs Township Claim 4252867 Line 8E Azimuth: -2.8

![](_page_67_Figure_2.jpeg)

#### NML Figure 34 Line 8E Model 4000 Ohm with Fraser Picks

![](_page_67_Figure_4.jpeg)

Transmitter: NML