Key Elements for Mineral Exploration Success: *an example from Neves-Corvo, Portugal*

April 30, 2013

Toronto Geological Discussion Group, Toronto

Neil O'Brien, SVP Exploration & Bus Dev

Dick West, Tech Director, Exploration

Cautionary Statements

lundin mining

Caution Regarding Forward Looking Statements

This presentation contains forward-looking statements. These forward-looking statements are not based on historical facts, but rather on current expectations and projections about future events. These forward-looking statements are subject to risks and uncertainties. These risks and uncertainties could cause actual results to differ materially from the future results expressed or implied by the forward-looking statements.

Such risks may include, without limitation: risks and uncertainties relating to foreign currency fluctuations; risks inherent in mining including environmental hazards, unusual or unexpected geological formations, ground control problems and flooding; risks associated with the estimation of mineral resources and reserves and the geology, grade and continuity of mineral deposits; the possibility that future exploration, development or mining results will not be consistent with the Company's expectations; the potential for and effects of labor disputes or other unanticipated difficulties with or shortages of labor or interruptions in production; actual ore mined varying from estimates of grade, tonnage, dilution and metallurgical and other characteristics; the inherent uncertainty of production and cost estimates and the potential for unexpected costs and expenses; and commodity price fluctuations.

For further details of other risks and uncertainties see Risk Factors Relating to the Company's Business in the Company's Annual Information Form and in each management discussion and analysis.

Note: All dollar amounts are in US dollars unless otherwise denoted

Presentation Outline

lundin mining

1. ***Corporate overview – Lundin Mining Corp***
2. ***Background***
   - Neves-Corvo Mine today
   - Pre-Lundin History (up to 2007)
3. ***The Road to New Discovery***
   - Lundin period (2007 – present)
4. ***Future directions for Continuing Exploration Success***
5. ***Key Elements of Mineral Exploration Success***

Lundin Mining: Key Asset Overview

lundin mining

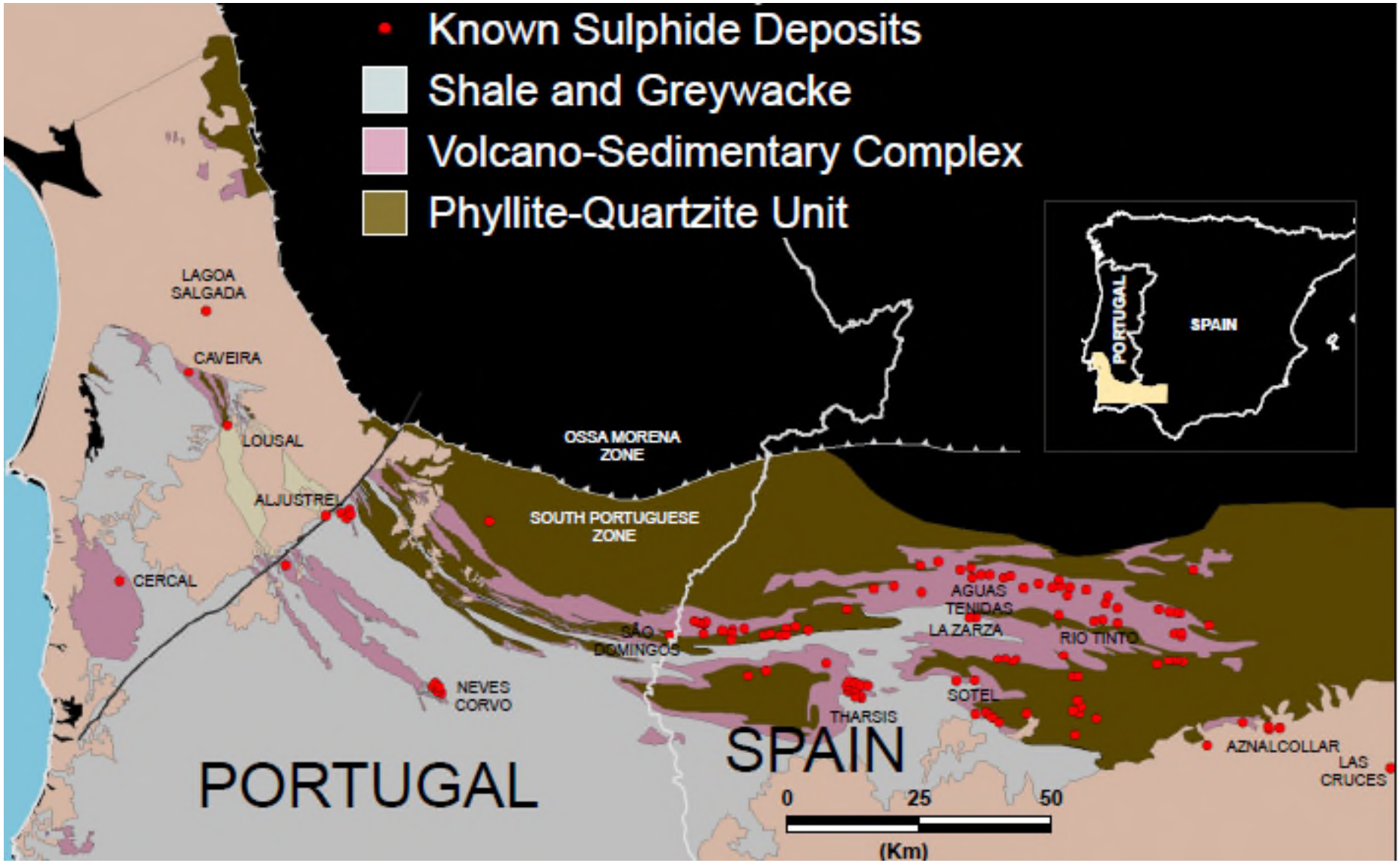
- **European Operations**
  - **Neves-Corvo, Portugal** (Cu/Zn)
  - **Zinkgruvan, Sweden** (Zn/Pb/Cu)
  - **Aguablanca, Spain** (Ni/Cu)
  - **Galmoy, Ireland** (Zn/Pb); in closure
- **Tenke Fungurume**
  - **Tier 1 Cu/Co asset**
  - 24% interest
  - Freeport-McMoRan operator
  - Phase II Expansion to 195ktpa Cu underway
- **Kokkola Co Refinery**
  - 24% interest; same Tenke partnership
- **Growth Projects**
  - Lombador Phases I & II
  - Semblana
- **Exploration**
  - Brownfields (Neves-Corvo, Zinkgruvan)
  - Greenfields in strategic regions of Europe & South America

Neves-Corvo: Today

- Portugal – a mining-friendly EU country
- Excellent infrastructure (rail, port, hwy, power, airports).
- Close to European suppliers and customers.
- Storage and ship loading facility at Setubal Port.
- Skilled, stable work force.

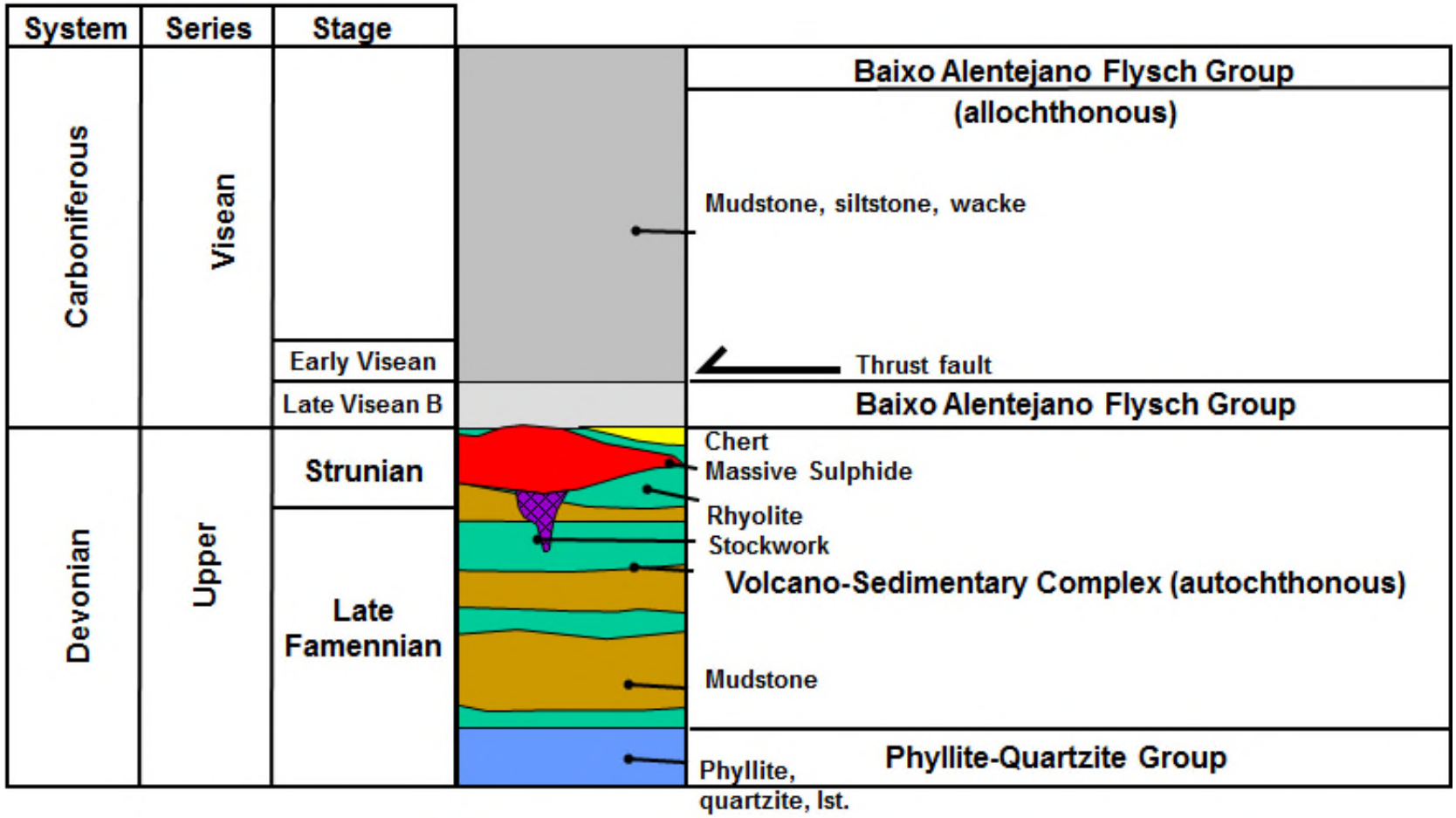
Regional Geology: Iberian Pyrite Belt

lundin mining



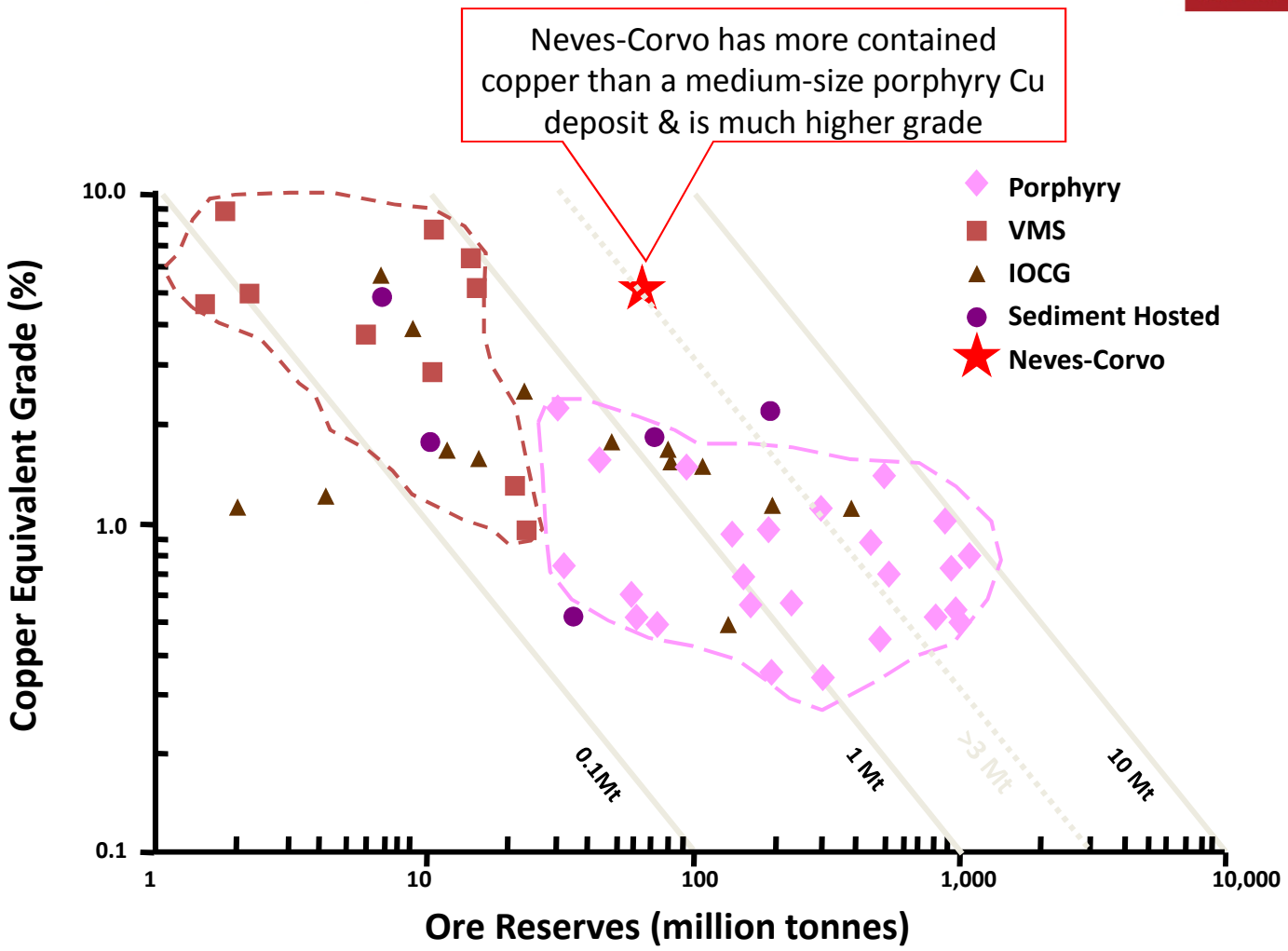
Iberian Pyrite Belt: Structure & Stratigraphy

lundin mining



Neves-Corvo: An Outlier in Copper Orebodies

lundin mining



Grade-tonnage plot for 65 copper development projects from 1992 to 2004 (Leveille and Doggett 2004)

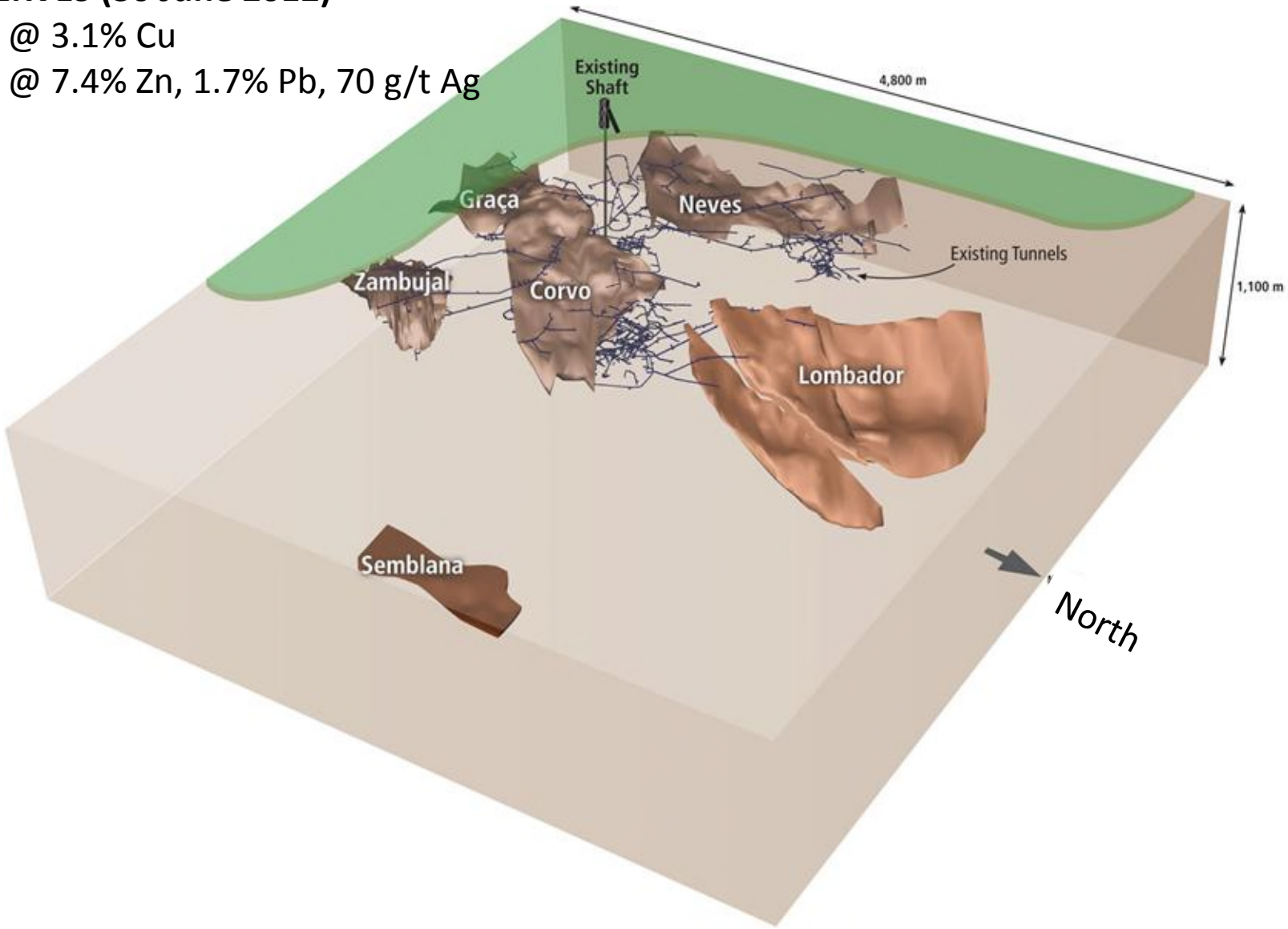
Neves-Corvo: Big Massive Sulphide Deposits

lundin mining

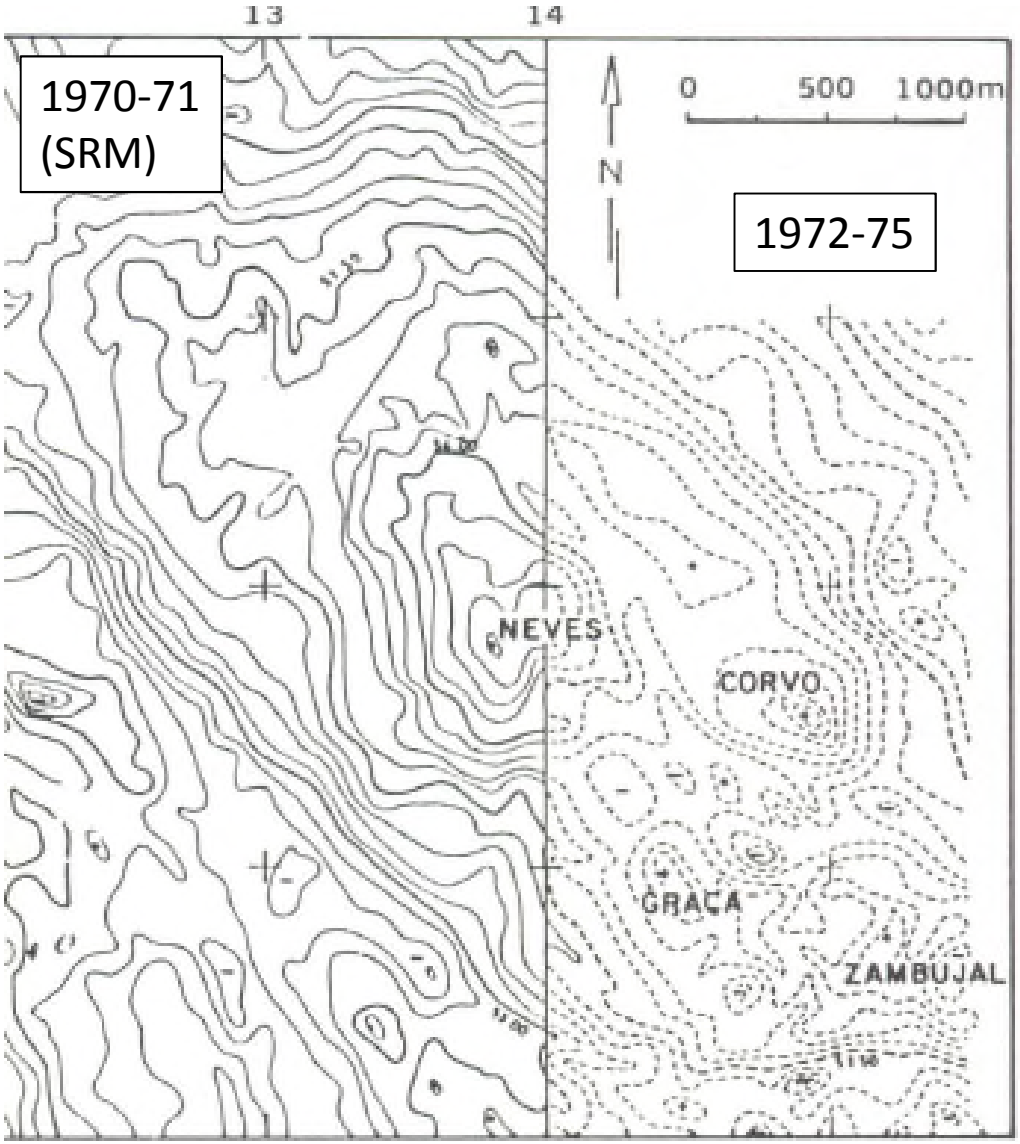
2P RESERVES (30 June 2012)

24.1Mt @ 3.1% Cu

22.7Mt @ 7.4% Zn, 1.7% Pb, 70 g/t Ag



Discovery History – 1973 to 1978



Bouguer Anomaly Map, Contour Interval 0.1 mGal (after Leca, 1999)

SMS/Penarroya/BRGM Consortium

June 1972:

- Granted a 5-year exploration license

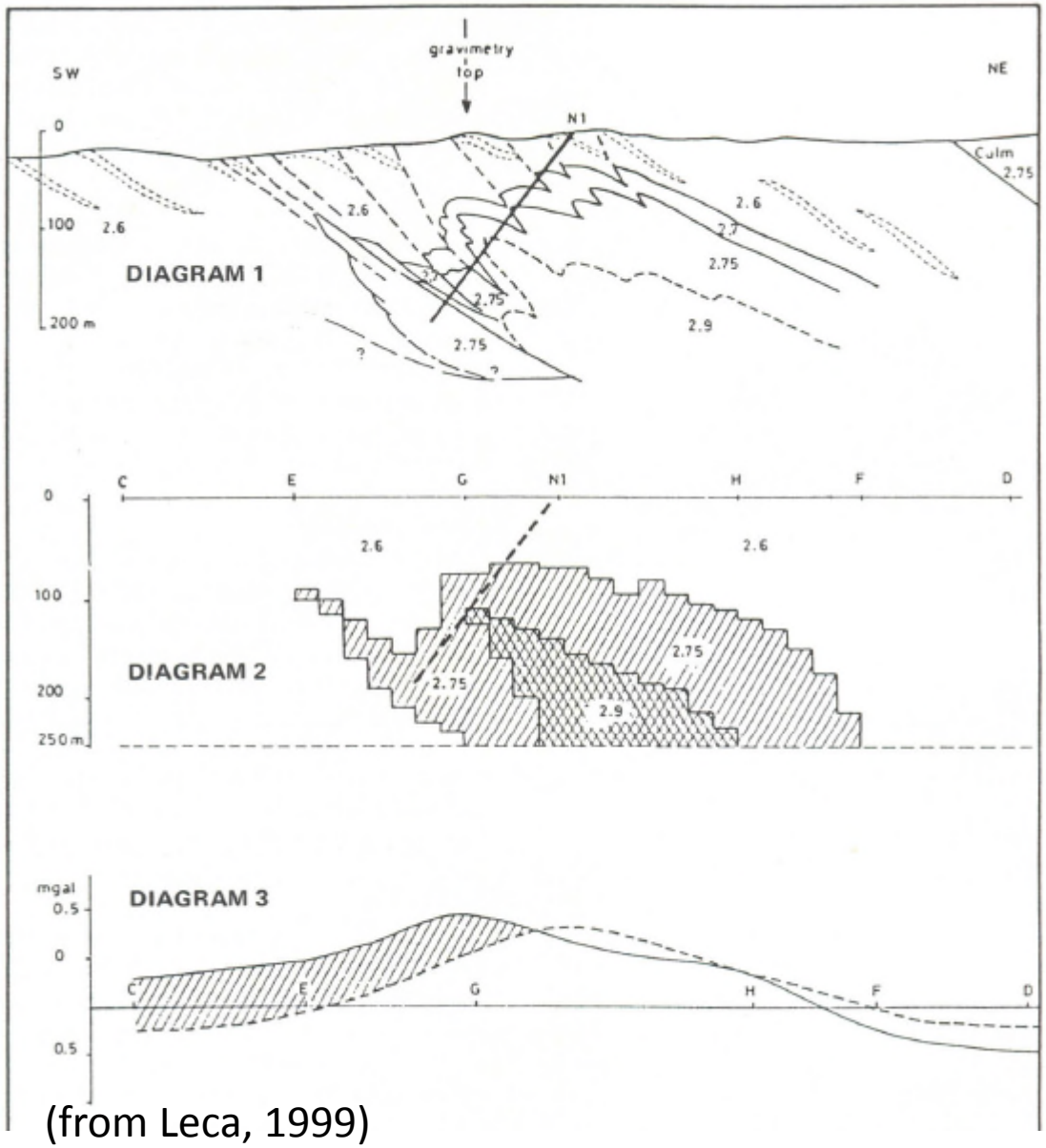
1972:

- 15 gravity anomalies denoted
- top-ranked anomaly coincident with the position of the Neves deposit & modeled at 80 m (180 m hole length).

1973:

- "Borehole N1" was drilled to final depth of 244m, only ~100m short of the Neves orebody.

Discovery History – 1973 to 1978

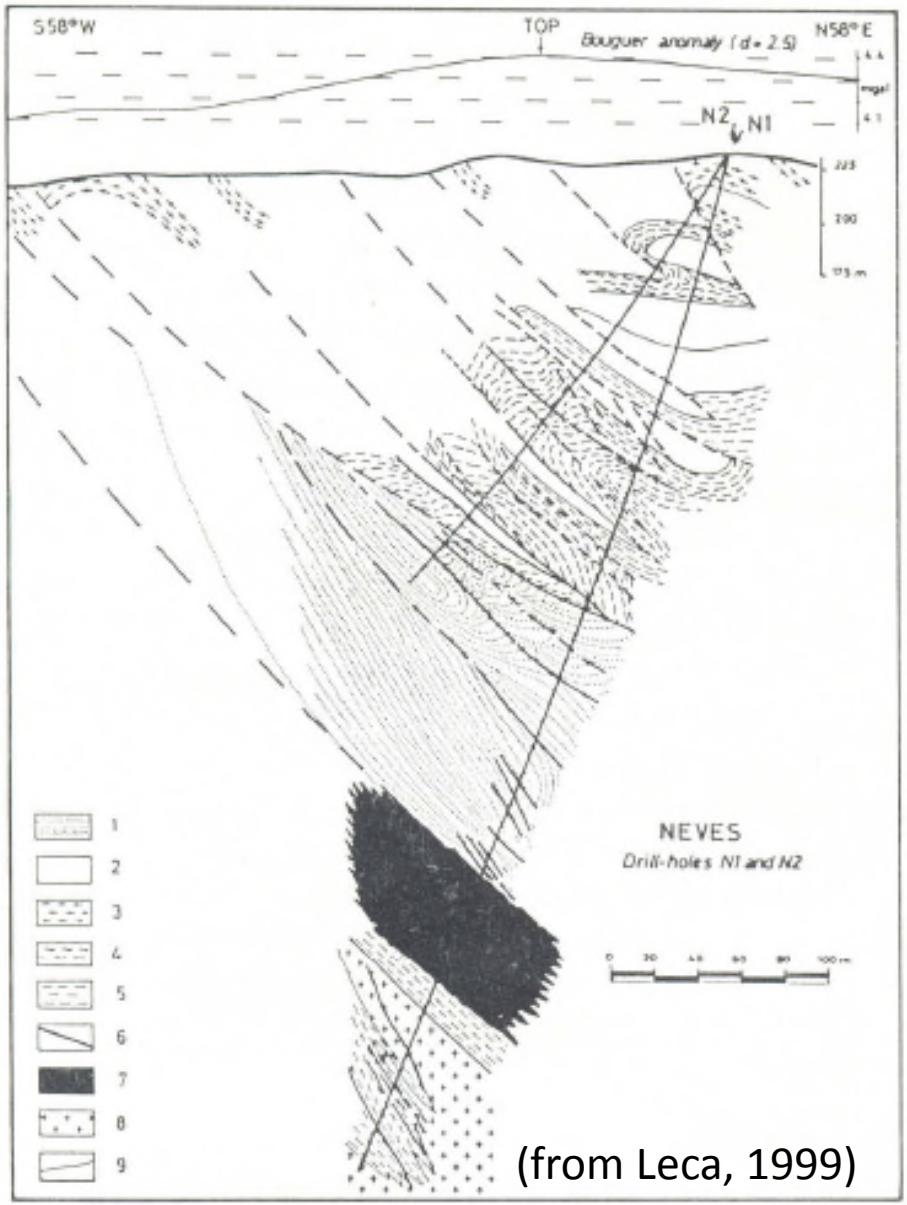


(from Leca, 1999)

SMS/Penarroya/BRGM Consortium

- Period of Regional Work
- Improved geological understanding leads to better gravimetric model
- Neves gravity anomaly now has “Excess Mass” that cannot be explained by the N1 drill results
- Decision to retest anomaly

Neves-Corvo: Discovery History



(from Leca, 1999)

1977 to 1978: SMS/Penarroya/BRGM Consortium

- May 15,1977: Neves orebody discovered
- 53m of massive sulphides are intercepted, starting at 350m depth
- 1977-1978: Subsequent discoveries of the Corvo, Graça and Zambujal orebodies rapidly follow

Neves-Corvo: Mining History

lundin mining

RIO TINTO/EDM

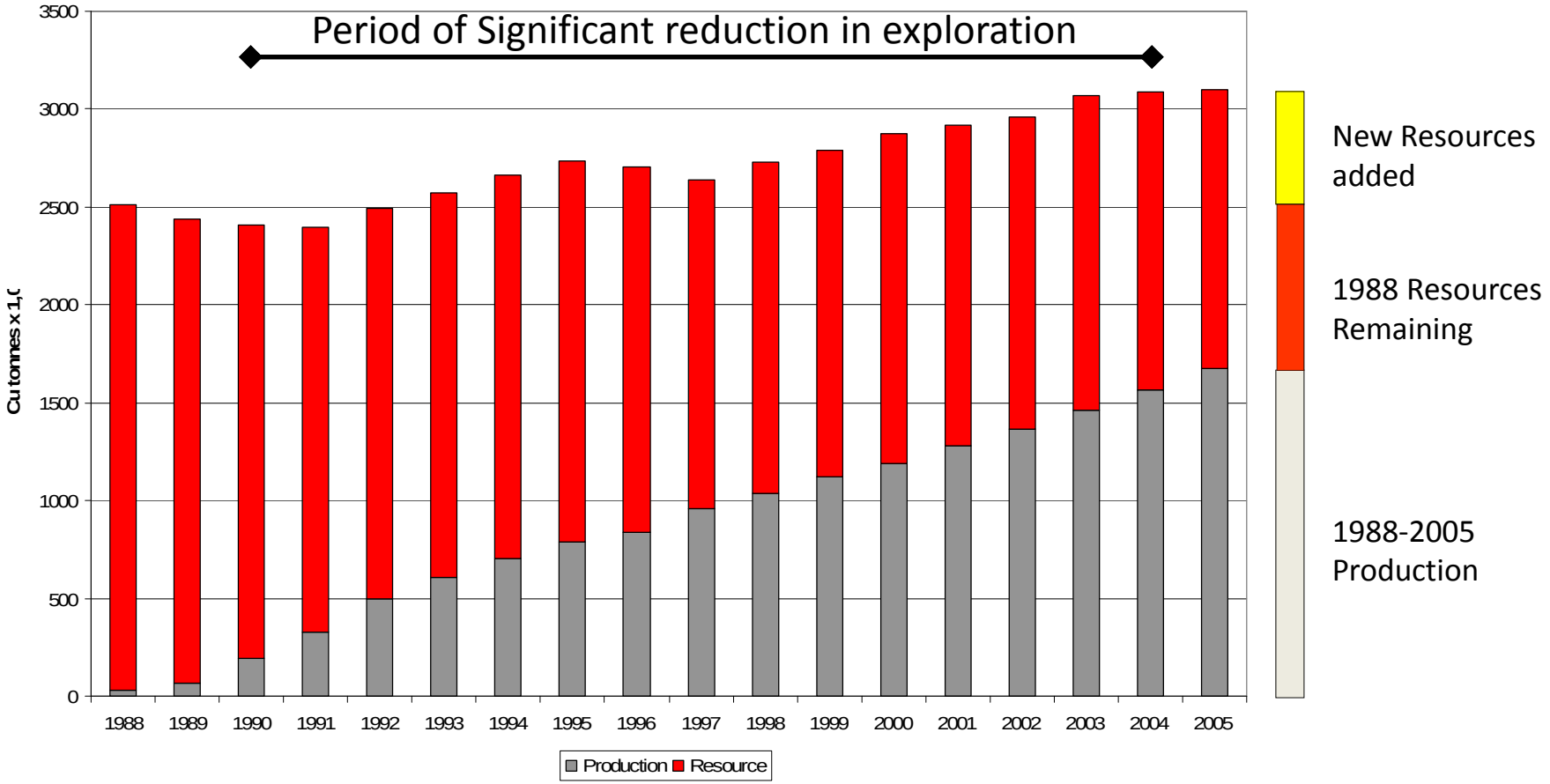
- 1985: RTZ buys a 49% interest in Somincor
- 1989: Official mine production commences

EUROZINC MINING

- 2001: RTZ announces its intention to sell its 49% interest
- 2002: Canadian junior Eurozinc Mining acquires the nearby Aljustrel Mine Complex
- 2004: Eurozinc Mining acquires 100% of Somincor
- 2005: After 16 years of mining, there is a renewed interest and investment in resource exploration at Neves Corvo

Production vs Resources: 1988 - 2005

lundin mining



Lundin Mining & Eurozinc Merger

lundin mining

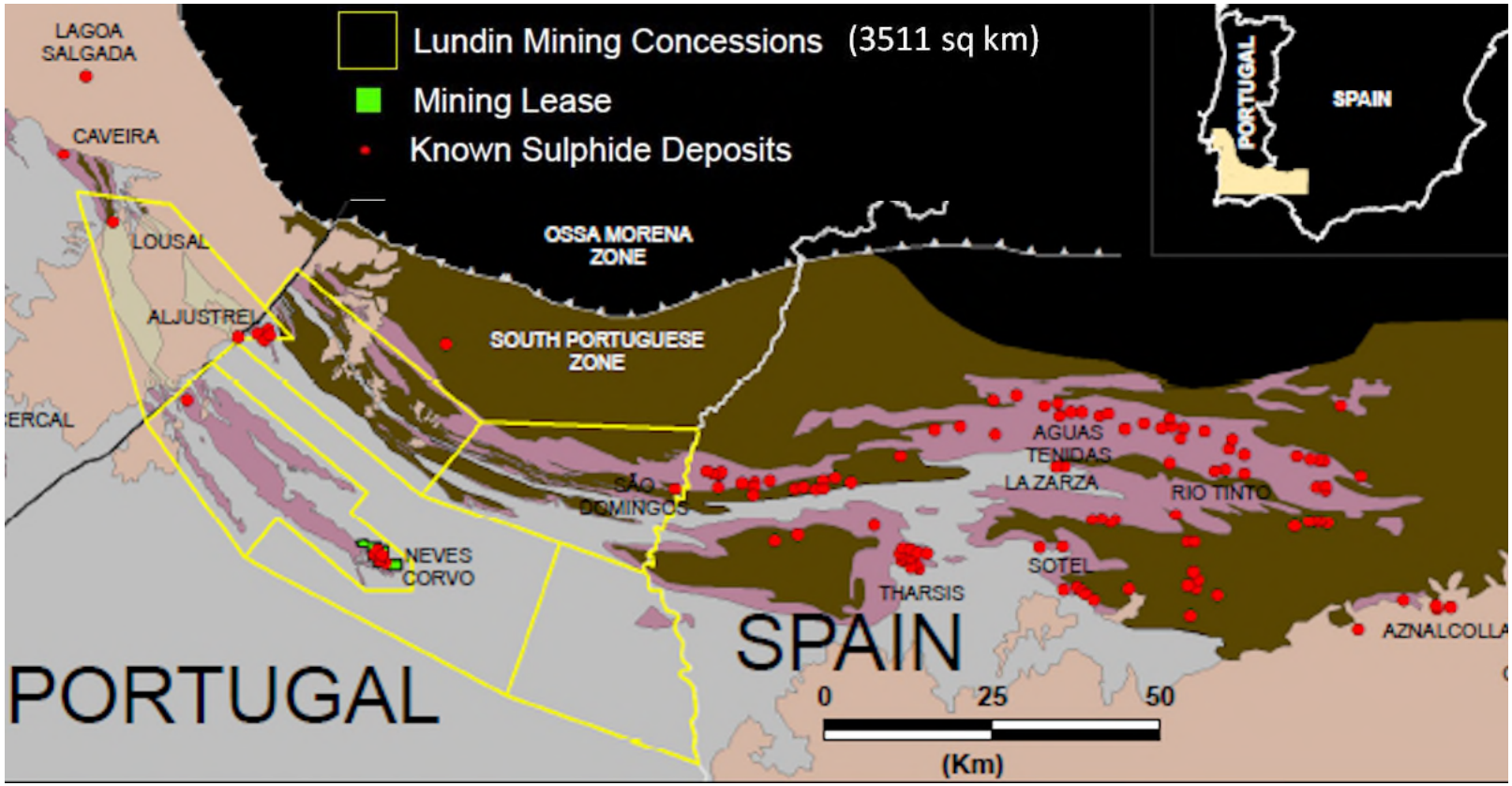
- October, 2006: Lundin Mining merges with Eurozinc
- Activities brought into the merged company:
  - Neves-Corvo Cu-Zn mine
  - Aljustrel Zn mine development project
  - Four large exploration programs:
    1. Neves-Corvo near-mine resource exploration
       - Lombador Cu-Zn deposit
    2. Aljustrel Mine Exploration
    3. Gaviao JV (EDM)
    4. IPB Regional Exploration

State of Play in 2007

lundin mining

1. Neves-Corvo near-mine resource exploration (Lombador focus)
2. Aljustrel Mine Exploration
3. Gaviao JV
4. IPB Regional Exploration (3,511 km^2) - clock is ticking on mandatory tenement reduction

3-5 year goal – add to Cu resource & discovery of new Cu mineralization

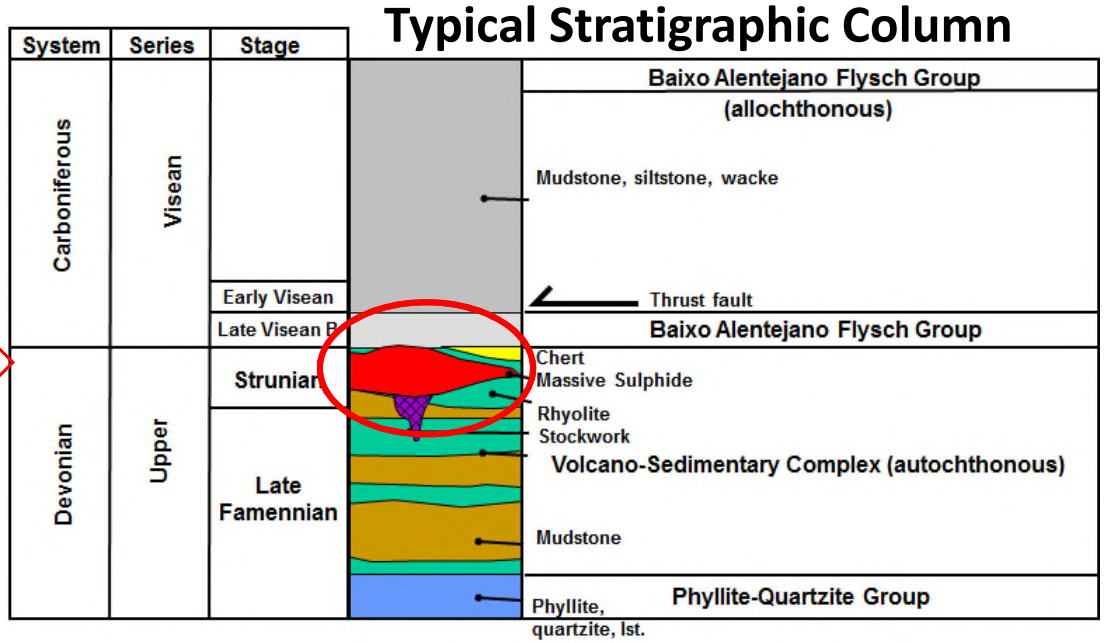


Exploration Challenge in Portuguese Iberian Pyrite Belt

lundin mining

- **Complex structural geology with thrusting**
  - **Surface geology does not always represent subsurface**
- **Mature terrain = deep targeting >500m**
  - **30 years of exploration focused within upper 500m**
- **Economic mineralization is difficult to target with conventional methods**
  - **All geophysical and many geochemical surveys tried with limited significant success**

Target – massive sulfides & stockwork associated with volcanics



Integrated Exploration Approach

lundin mining

- **Data Mining Historical Data**
  - Organize historical data (3D Geologic Model)
  - Merge small data sets into regional set
  - Complete integrated interpretation of all data
  - Learn from previous exploration efforts & extend

- **New Approach**
  - Constrained inversion of Gravity
  - Deeper EM investigation
    - Borehole TEM
    - Ground TEM with SQUID sensor – 1 km depth
    - Airborne EM (ZTEM)
  - 3D & 2D Reflection Seismic

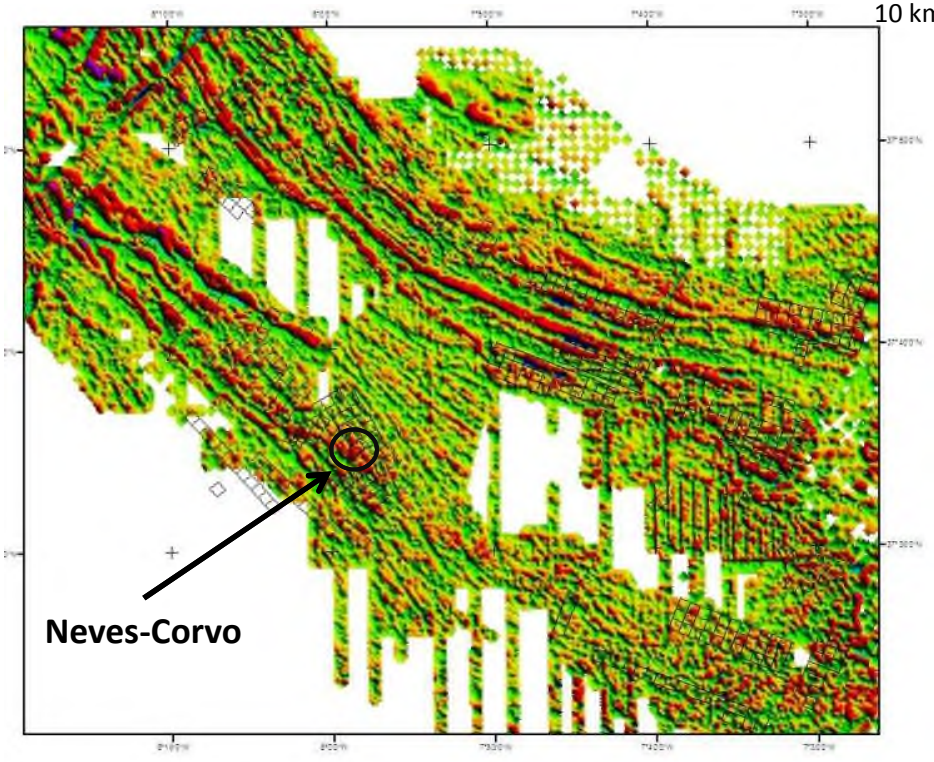
Regional Gravity

lundin mining

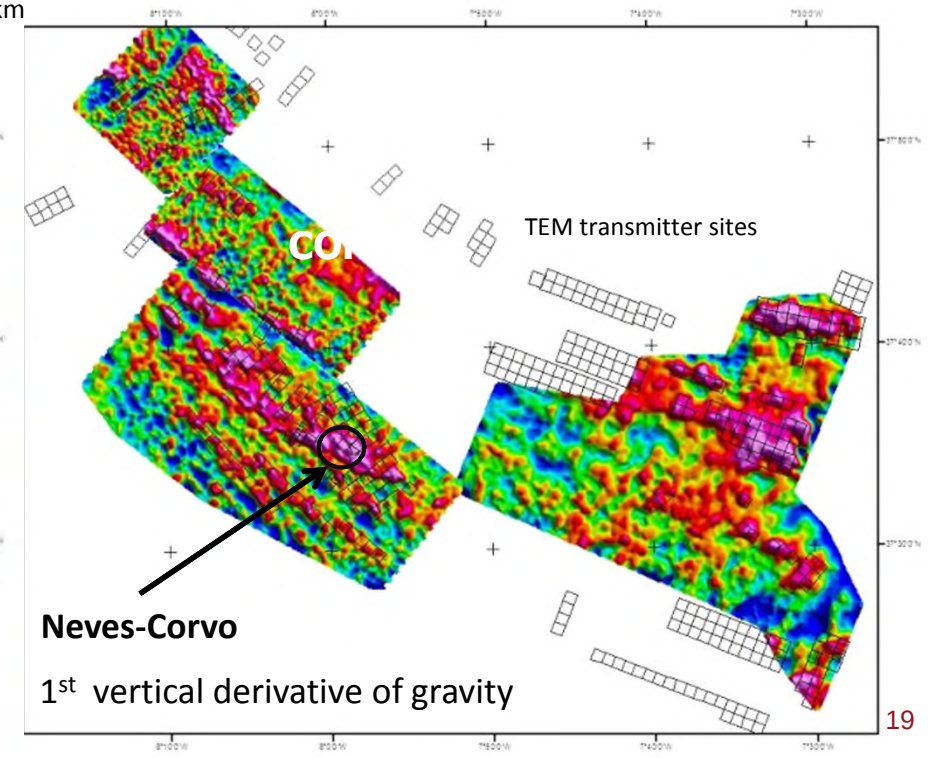
- Stitch hundreds of ground surveys together (D Woods)
- Infill sparsely covered areas with airborne gravity
- Integrate with geology to provide targeting for TEM
  - Gravity highs + prospective rocks = Area of Interest

Residual Ground Gravity Stitch

10 km



Bell Geospace Full Tensor Gravity



Electromagnetics

lundin mining

Borehole TEM completed for all boreholes (near-mine and regional)

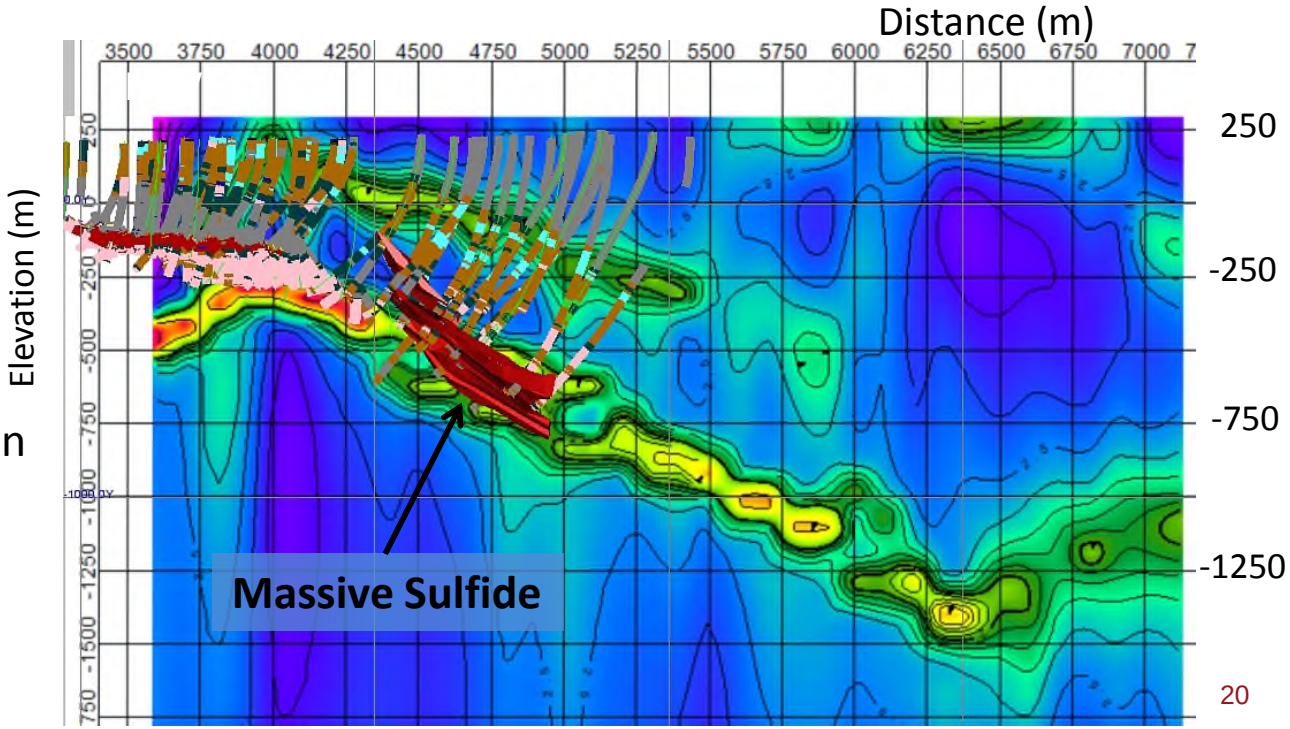
- Expand effective diameter of hole to ≥ 300m

Large Loop TEM using High-Temperature SQUID sensor

- 1 km depth of exploration at Lombador
- *Transform* numbers to Geology by inverting data (1D modeling)

Physical property measurements of ore and host

- Characterize response & forward model data



Lombador geo-electric section with drill intercepts shown

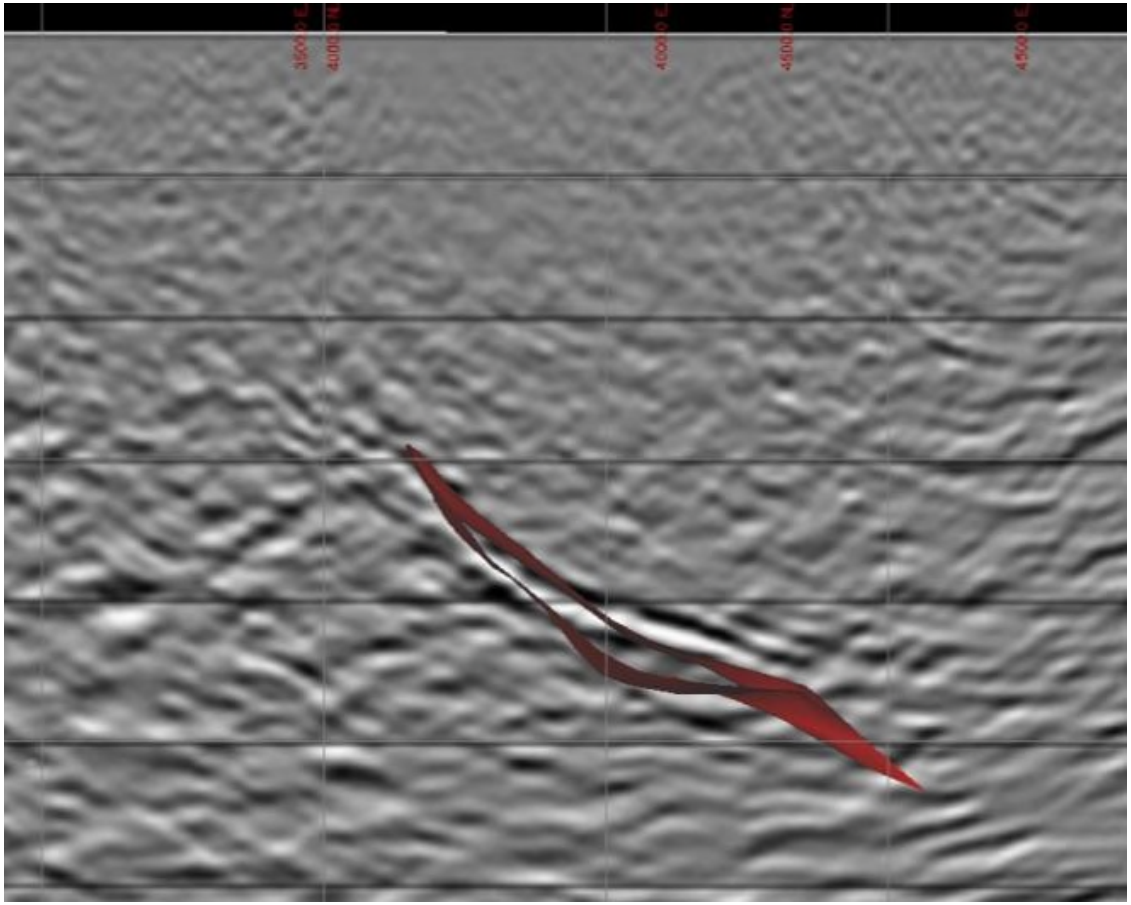
Warm colors are conductive

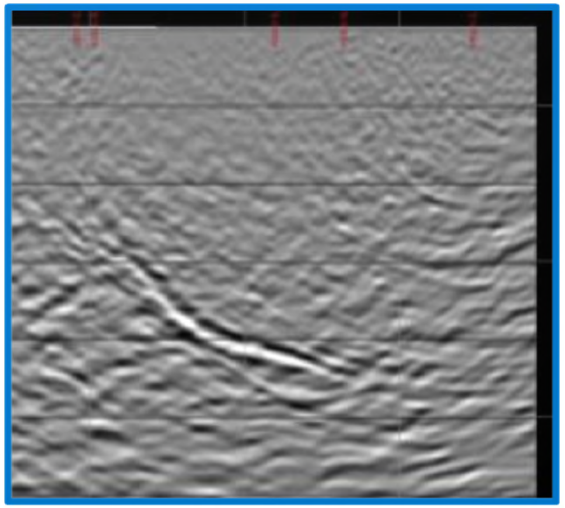
Data acquisition: Crone Geophysics

Re-Processing 1996 Seismic Section - Lombador

lundin mining

- Re-process Reflection seismic data (1996)
- Lombador is a strong reflector
- Decision made to continue with TEM survey ➡ 2008 Financial Crisis





Re-Processed seismic section (above) with Lombador ore-body draped on top of the section (right)

Drill Technology

lundin mining

Drill production disappointing & unwanted drill deviation

- **HY-TECH Drilling chosen & drill production increased significantly**
- **Deviation drilling by DEVICO was initiated**
  - **Improved ability to hit target**
  - **Improved cost of testing deep targets with *kick-offs***

More Accurate
More Cost & time effective drilling

Program Acceleration

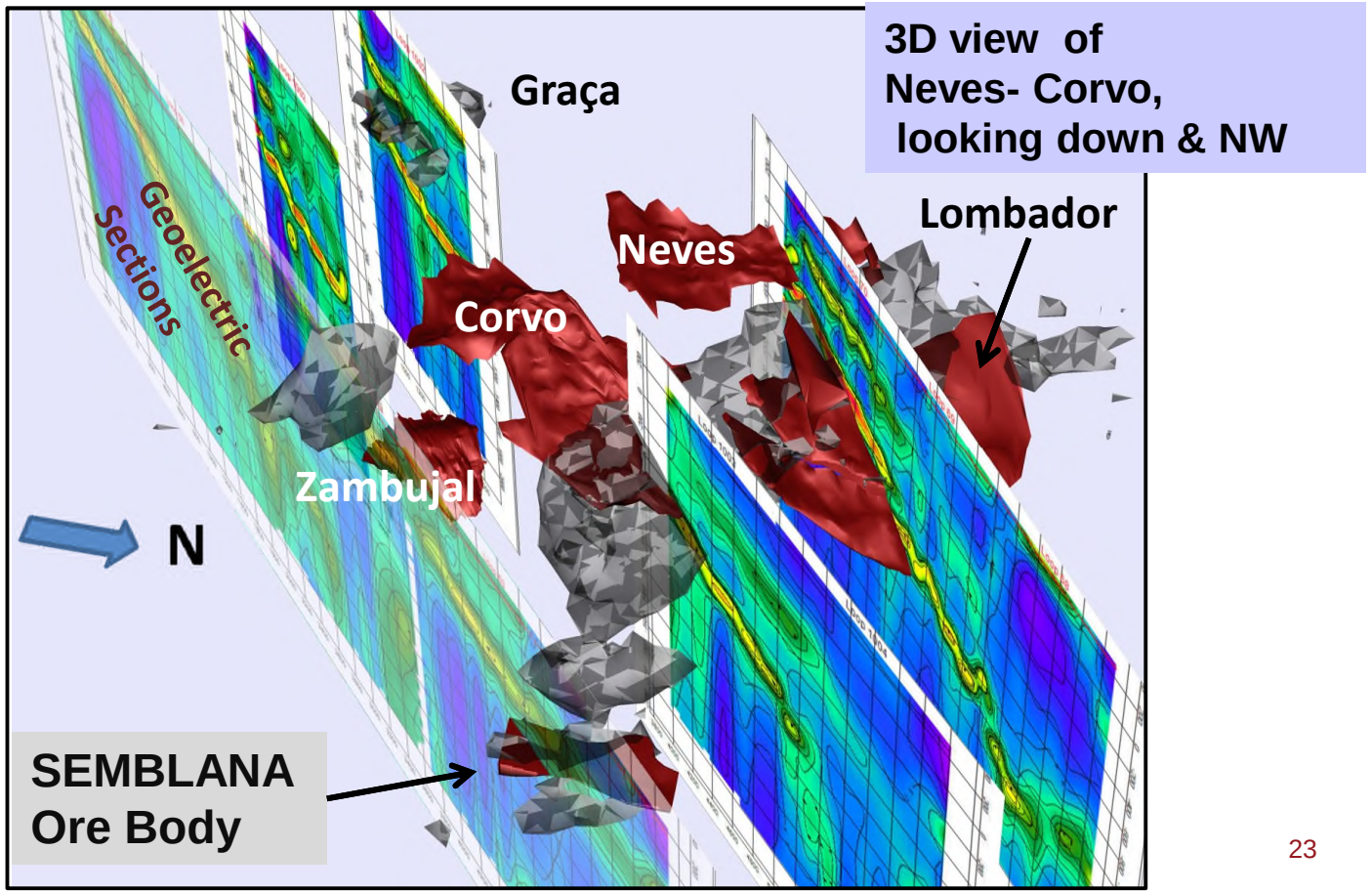
3D Visualization

lundin mining

- New data adds to Geologic 3D model
- Visualization of all data provides additional insights
  - Drill hole, density, resistivity & geologic data on regional and local scales
  - Promotes greater interaction between geologist and geophysicists

Semblana partially correlates with density high, TEM conductor and prospective geology

Legend:
Red = ore body volumes
Grey = anomalous density

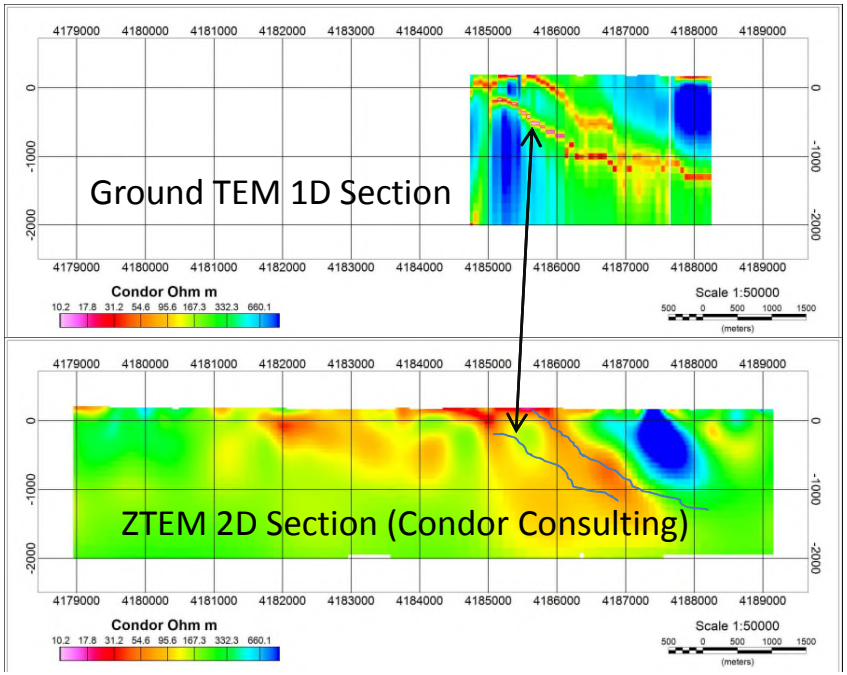


2010 A Tipping-Point

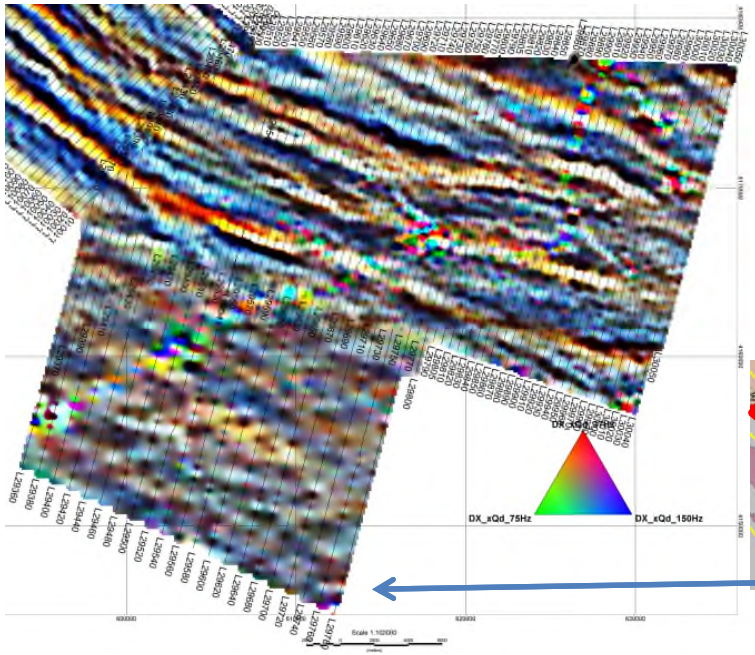
lundin mining

- One year before drastic tenement reduction (2011)
- Airborne EM (ZTEM) survey completed over N & E tenements
  - Mapped regional conductors but no new targets generated
    - July - decision to drop ground & focus on Castro Verde tenement
- Large tenement holding *no longer a distraction*
- In July HISEIS contacted to conduct 3D seismic survey at Neves-Corvo

Comparison of Ground TEM & ZTEM



Portion of Geotech ZTEM Ternary Quadrature

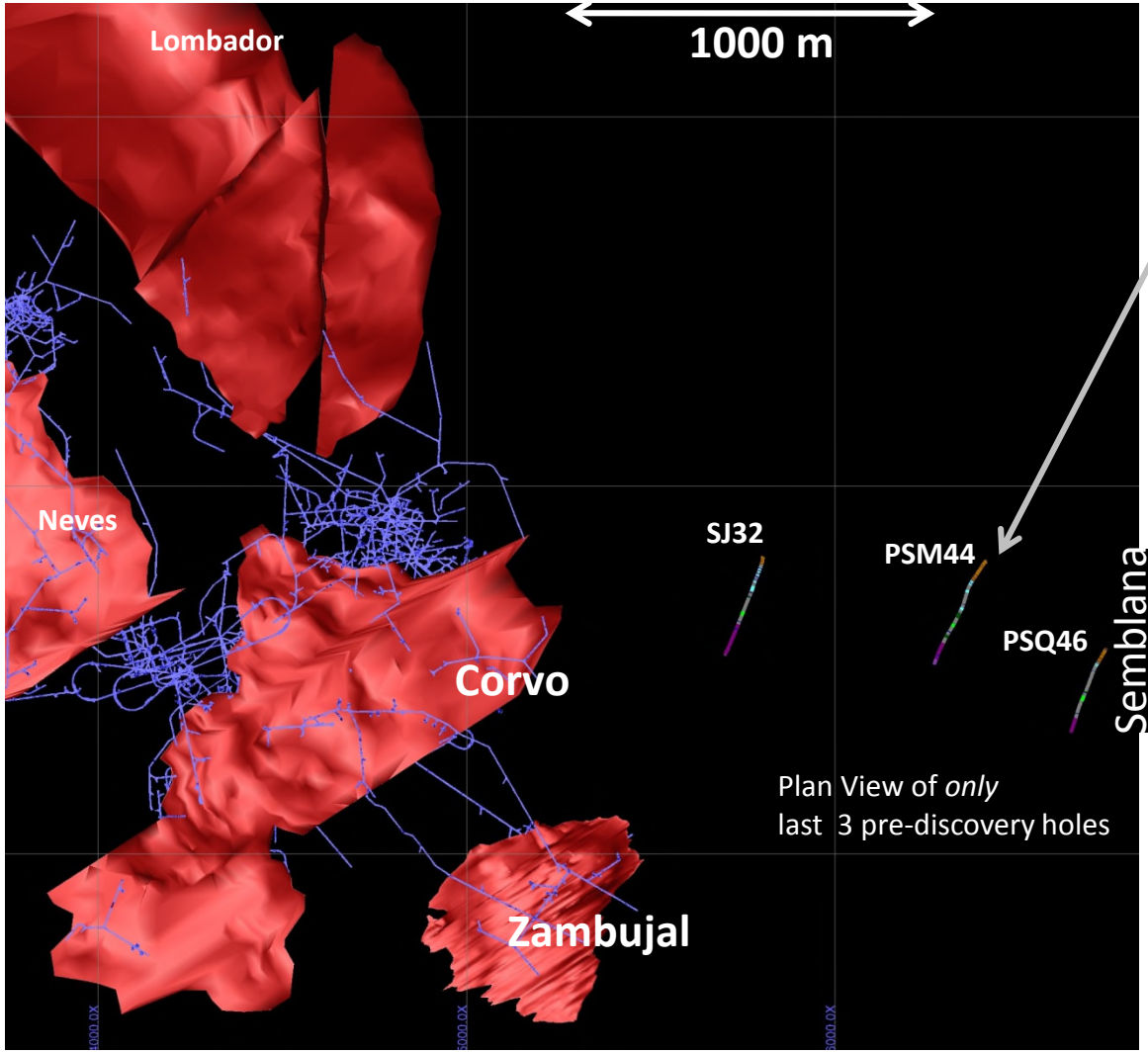


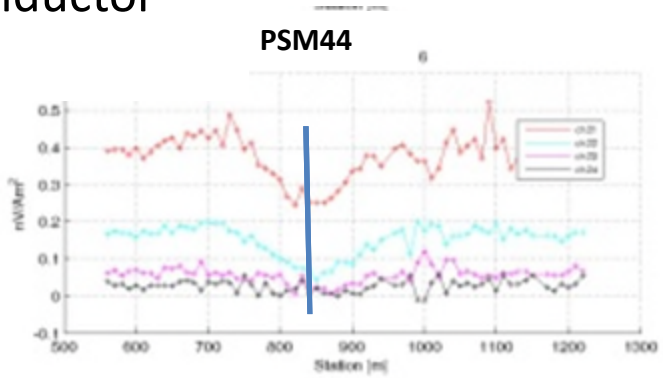
ZTEM Survey

Semblana Discovery August 2010

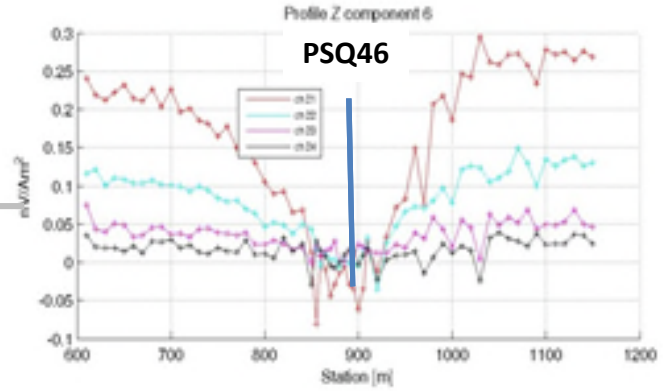
lundin mining

Drilling down dip from Corvo towards gravity & EM conductor leads to Semblana Discovery





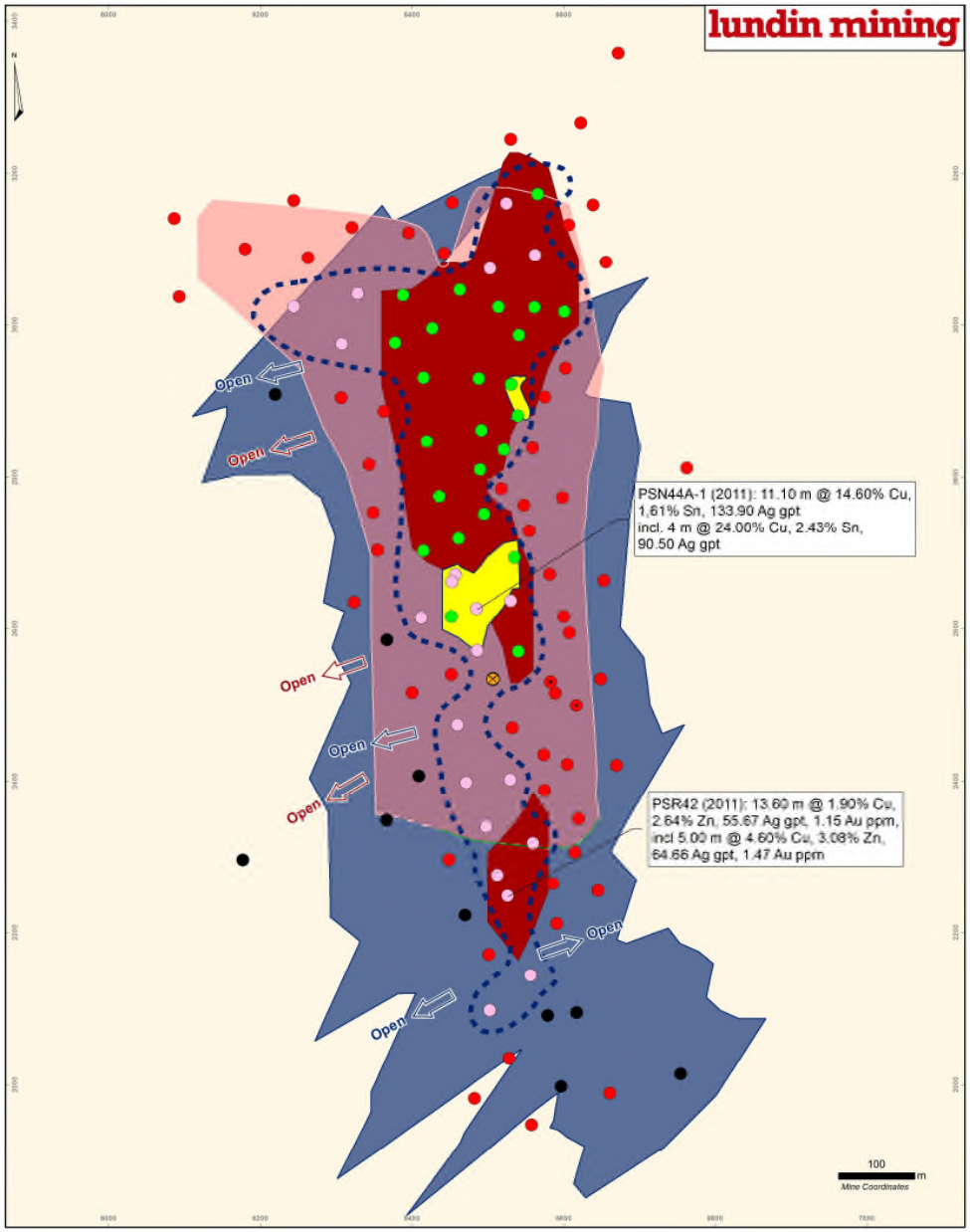
Borehole TEM responses indicating off-hole conductor (Crone Geophysics)



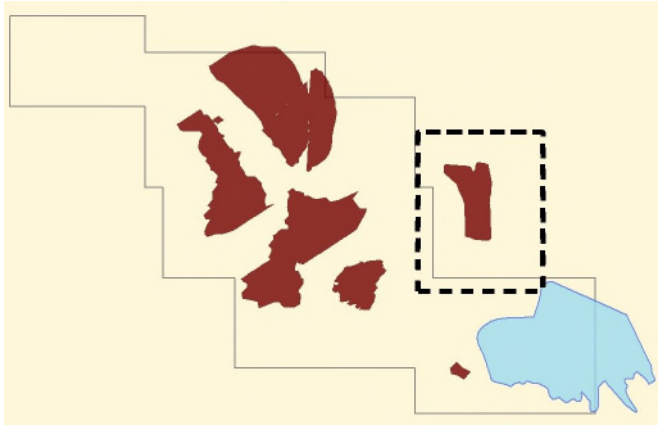
Borehole TEM detects Semblana

Semblana Copper Deposit

lundin mining



- **Plan view of deposit in February 2013**
- **Inferred Resource = 7.1 Mt at 2.8% copper and 26 g/t silver**
- **Discovery south of deposit, within seismic reflector is being drilled**

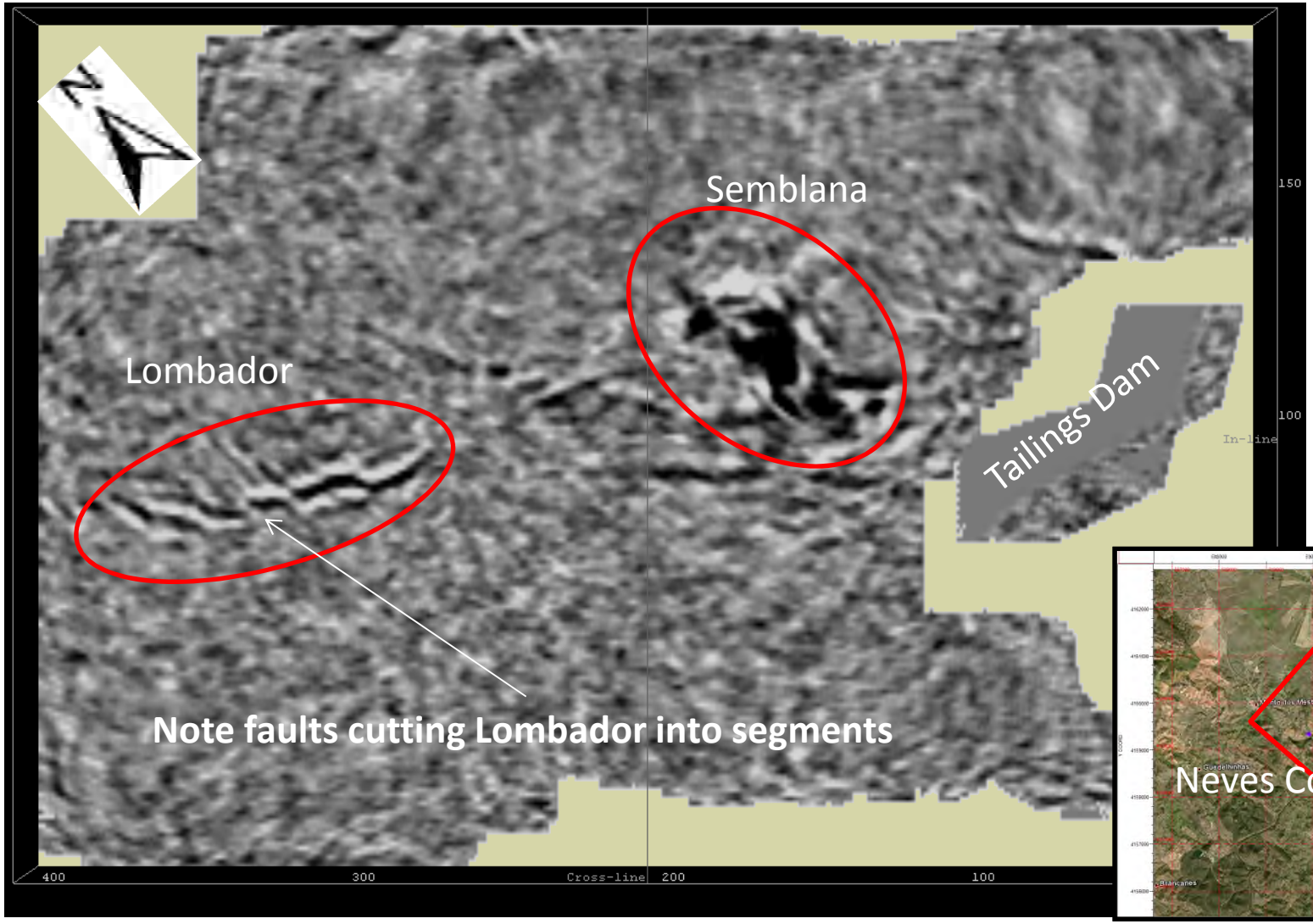


2013 Drillholes
2010-2012 Drillholes
Drillhole in progress
Copper Rich Sulphides
Polymetallic Sulphides
Pyrite/Minor Base Metals
No Significant Sulphides

Polymetallic Ore
3D Seismic Reflector
Massive Sulphide Lens
Cu/Ag Resource (Massive)
Cu/Ag Resource (Stockwork)

3D Seismic Survey Depth Slice at 894 m

lundin mining



High Resolution
Rx 90 x 15m
Tx 90 x 45

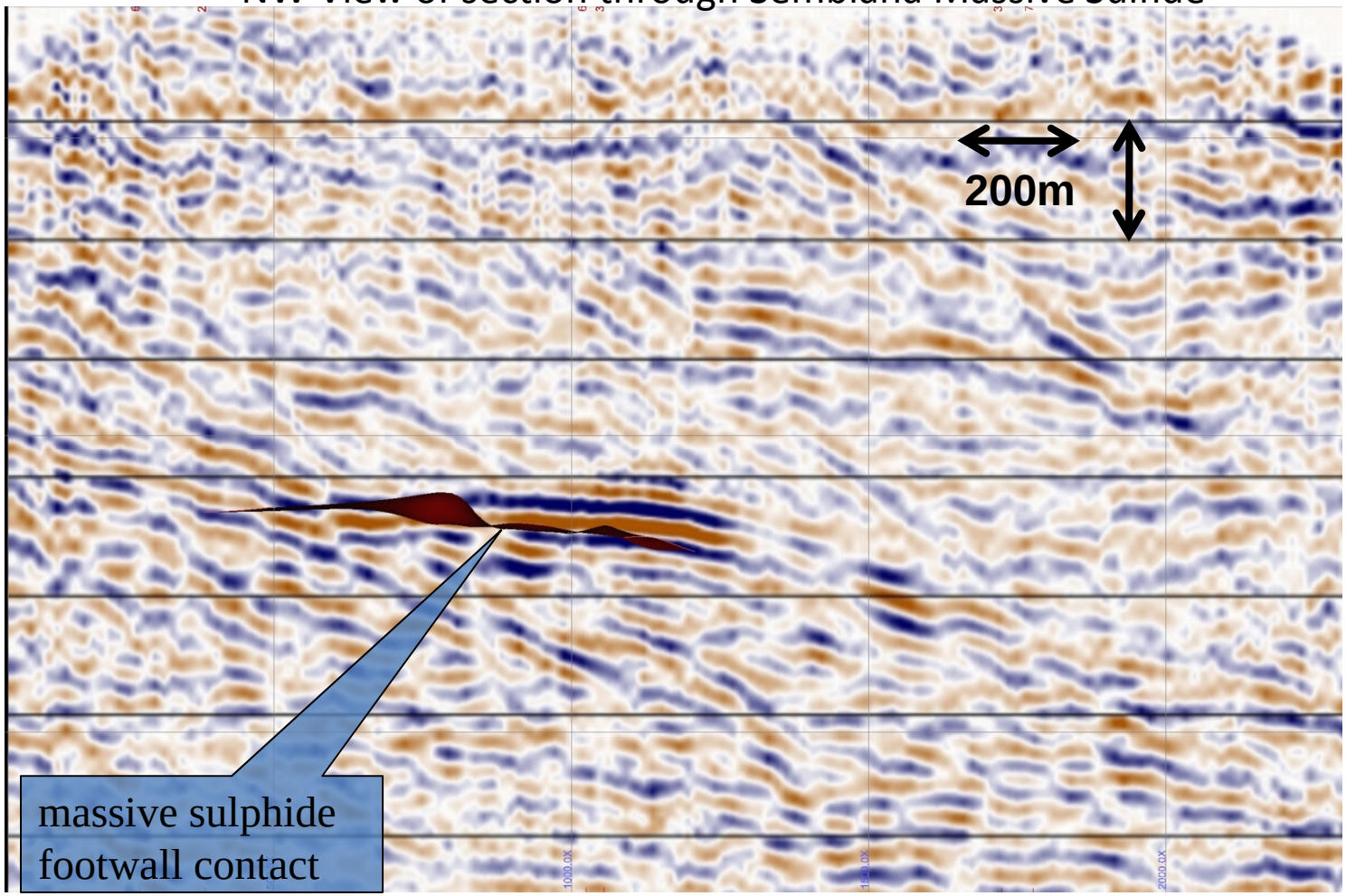
Survey Block
6.4 x 4.6 km

3D Seismic Survey at Neves-Corvo – Section

lundin mining

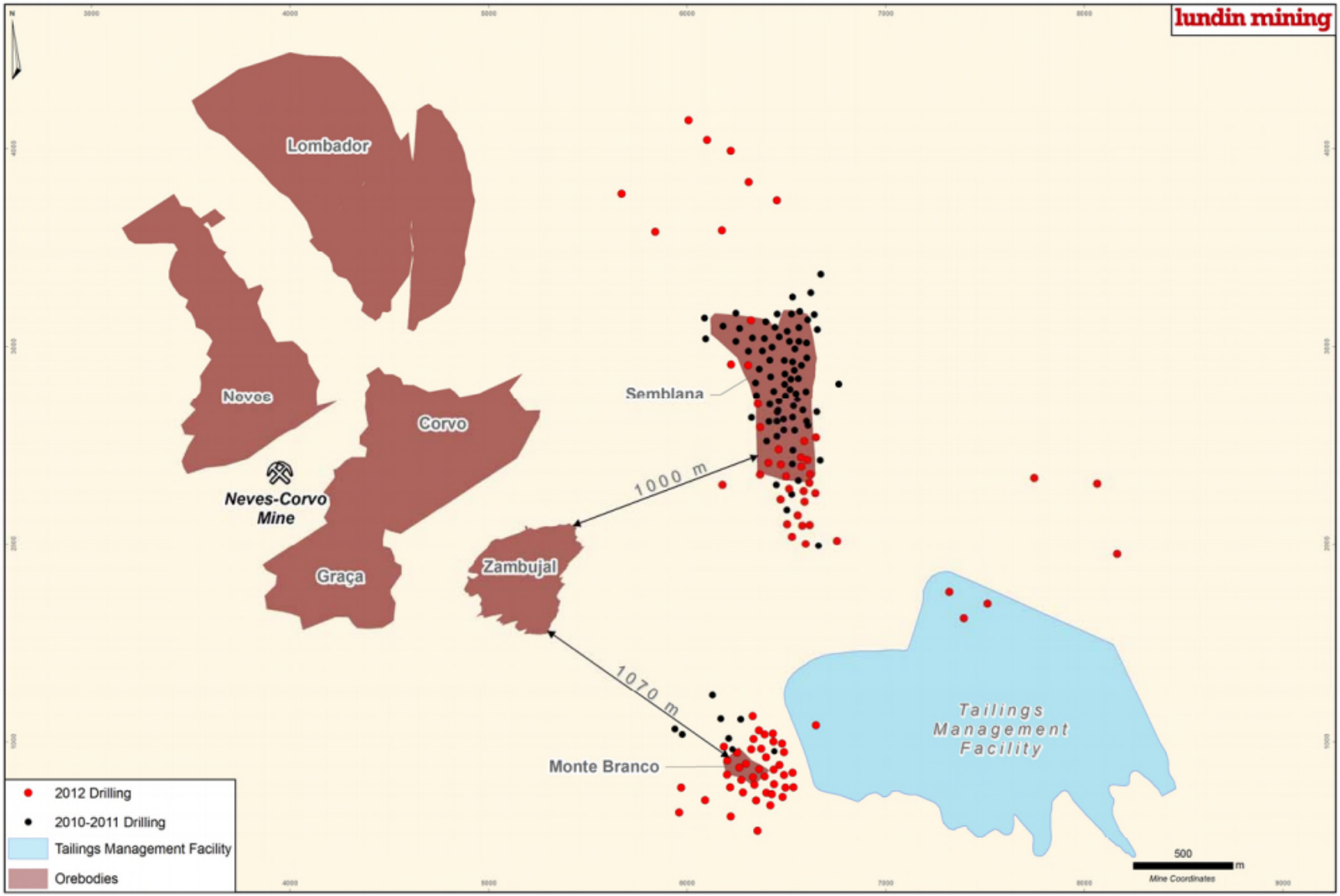
- **Very good correlation between mineralization and strong reflectors**
- **Targeting more effective, saving time and money.**

NW View of section through Semblana Massive Sulfide

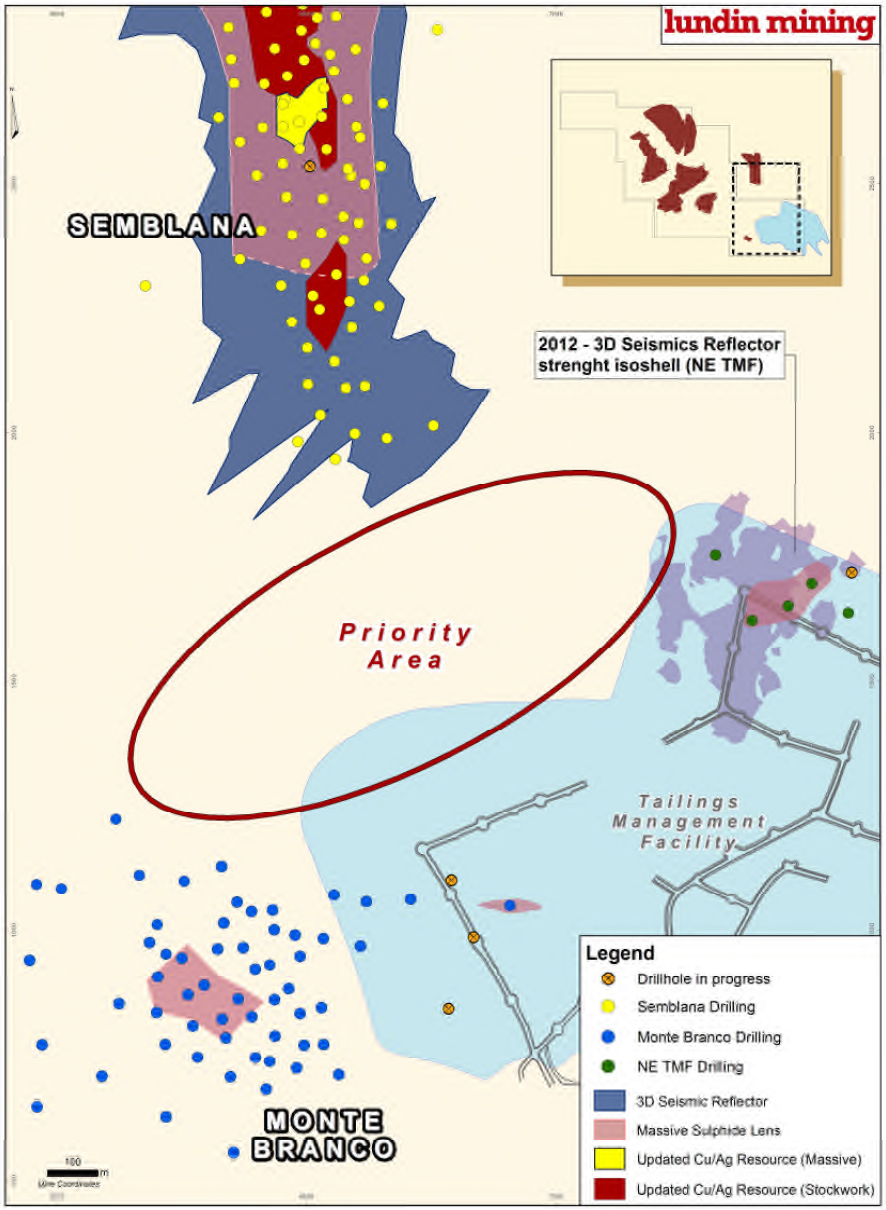


Semblana & Monte Branco Location Map

lundin mining



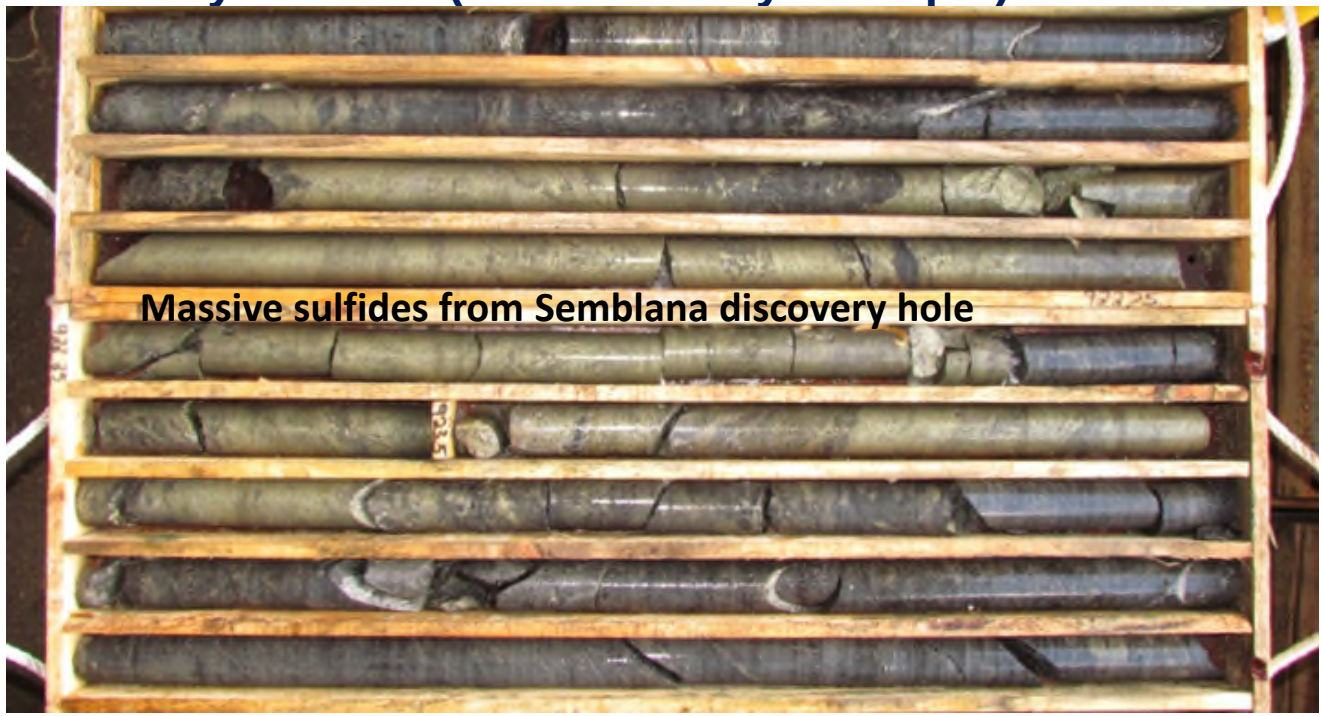
Future Directions for Discovery



Future Directions for Discovery

lundin mining

- Integrated approach - Seismic Survey Tailings Dam + NW & SE
- Use our Toolbox (3D & 2D seismology + borehole TEM + Best-in-Class Drilling Technology & Contractors)
- More cost-effective seismics acquisition & better products
- Keep an eye out for new technologies
  - *But* Use them *only* if needed
- Use what you learn (Neves Gravity Example)



Massive sulfides from Semblana discovery hole

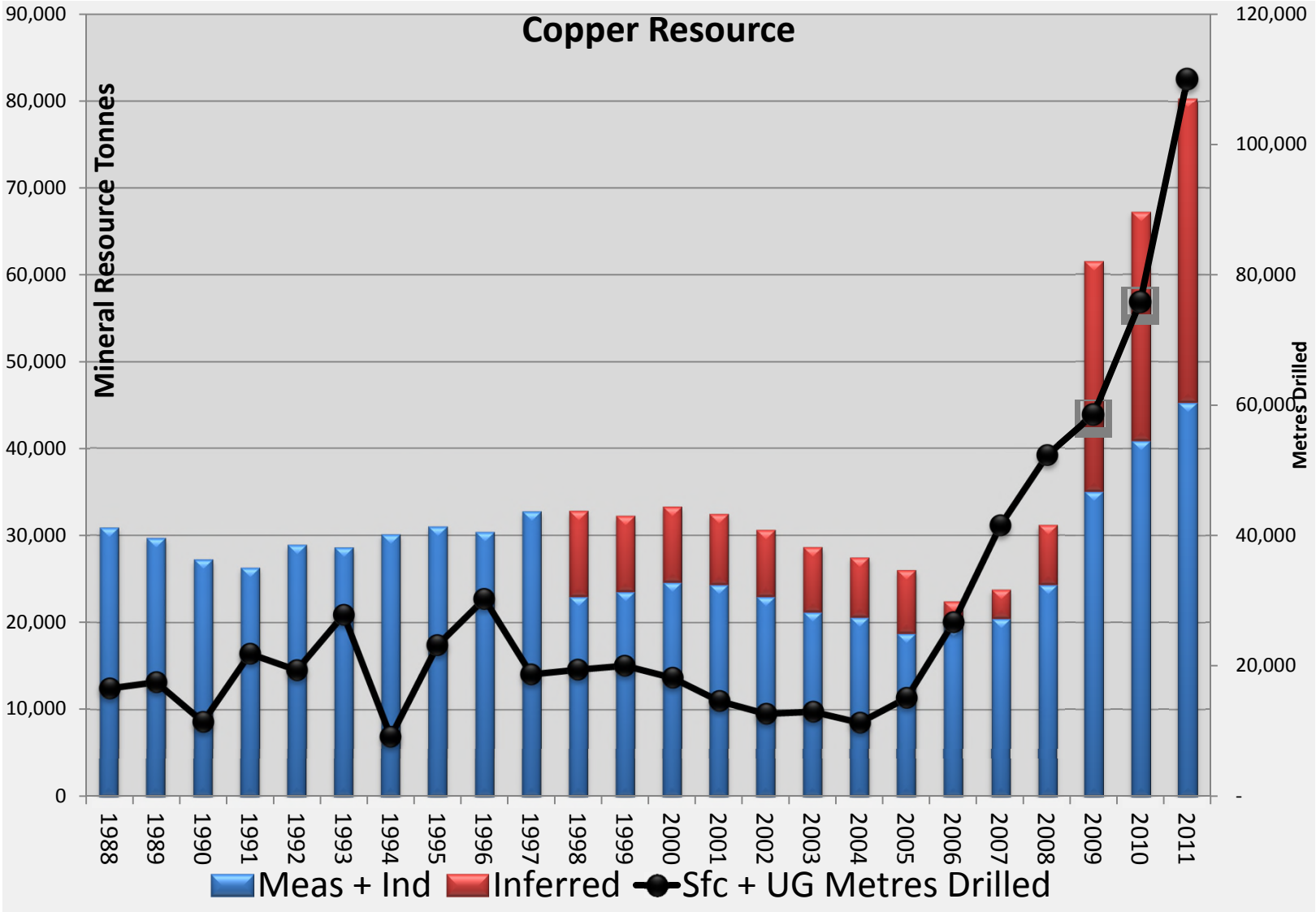
Key Elements of Exploration Success

lundin mining

- Endowed rocks, good explorability, access to explore
- Knowing what to Deliver & When
- Sustained, smart, disciplined work programs & budgets
- Develop & implement better targeting techniques as needed
- Improve drilling performance
- Successful management and work cultures; *sustained spend through difficult times*
- Focus on the best asset
- Don’t forget what worked in the past
- Drill all *good* & varied targets

Drill Baby Drill……

lundin mining



Thank you

Any Questions?