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# TELEFAX TRANSMISSION

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**DATE:** JAN 20/92 **TIME:** _____

**ORIGINAL TO FOLLOW:** **YES** ☐ **NO** ☐

**SUBJECT:** FARO ORE TYPE DESCRIPTIONS.

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Chris

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**THIS TRANSMISSION CONSISTS OF ___ PAGE(S)**
**(including cover page)**

### 3.1.5 Ore Deposits

#### 3.1.5.1 General Description

The lead, zinc, silver deposits of Anvil Range are of the sediment hosted, stratiform, massive pyritic sulphide type (Gustafson & Williams, 1981; Large, 1980) or sedex type (Carne and Cathro, 1982). They occur as a single thick sulphide lens with little or no interbanded metasedimentary rocks (e.g. Faro) or as multilayered deposits with several thinner lenses stacked approximately one above the other with substantial metasedimentary or metavolcanic interlayers (e.g. Grum and Dy). An individual mineralized layer was deposited parallel to the bedding of the host sediments. It consisted of an upper, often centrally positioned, lead-zinc rich, massive sulphide facies and a lower and peripheral, lower grade, quartzose, disseminated sulphide facies.

These sulphide sheets, or horizons, have since been deformed into complex fold structures. The deposits are thus elongate parallel to the fold axes and associated lineations in the host metasediments. The Faro deposit, which appears to be an exception to this generalization, actually shows great internal complexity in the geometry of high grade and waste layers.

Present day deposit lengths are generally two to three times widths; unfolded deposit dimensions range up to 4000 m across their ameboid shapes. Individual sulphide horizons commonly are 10 to 40 m in thickness. The upper and lower contacts of sulphide horizons are invariably sharp while laterally the sulphides grade into the enclosing host rocks.

All deposits are composed of a small number of different sulphide rock types. As noted above the suplhide rock types are broadly divisable into massive sulphides and quartzose, disseminated sulphides. There are pyritic, baritic, pyrrhotitic and carbonate bearing variants of massive sulphide types and carbonaceous and non-carbonaceous variants of the quartzose sulphide rock types. The typical spatial distribution of these different types is shown in figure 3.6 with great vertical exaggeration.

The simplified arrangement of the sulphide rock types in the horizons is important since lead-zinc grade and metallurgical performance varies by ore type. The baritic massive sulphides are always high grade, easily grindable and yeild good grade concentrates with good recoveries. On the other hand the lower and distal graphitic quartzites are commonly low grade, hard and produce lower grade concentrates or low recoveries. Other ore types exhibit intermediate characteristics and performance.

All deposits show a variably developed, white mica-dominant, alteration overprint in the wallrocks.

There are presently five known lead zinc bearing mineral deposits along a prominant curvilinear trend on the south flank of Anvil Arch (Figure 3.3). From northwest to southeast they include Faro, Grum, Vangorda, Dy and Swim. Additionally two lead-zinc deficient sulphide occurances, the SB and Sea, are also known. Diagramatic sections through each of the major deposits are shown in Figures 3.7 through 3.12.

3.1.5.2 Description of Sulphide Rock Types

3.1.5.2.1 Massive Pyritic Sulphides: (Unit 2E / 2F)

The massive sulphides consist of banded to homogenous, usually weakly foliated and/or lineated, massive pyrite with lesser sphalerite and galena. Total sulphide content is at least 60%, generally greater than 80% and commonly nearly 100%. Gangue consists of quartz and/or barite and/or carbonates (calcite, dolomite, ankerite). Accessory minerals include pyrrhotite, chalcopyrite, magnetite, arsenopyrite and marcasite. At amphibolite facies metamorphic grade, this rock type commonly develops a buckshot porphyroblastic texture of pyrite in a matrix of dark reddish brown to black lead-zinc sulphides. This texture usually is restricted to rocks with economic lead-zinc grades (Unit 2F). Hard, barren, massive pyrite, commonly with disseminated, black, magnetite porphyroblasts, is widespread at Faro particularly in the northeast part of the deposit.

3.1.5.2.2 Baritic, Massive Pyritic Sulphides:

The baritic sulphides (Unit 2G) are strongly and thinly banded massive sulphide/sulphate rock consisting of pyrite, galena, sphalerite and commonly magnetic in a gangue of off-white barite and lesser carbonates (calcite, dolomite, ankerite and probably barytocalcite). The amount of barite may be as high as 50%; non-sulfidic, massive barite does not occur in the Anvil deposits. There is a complete gradation between this and the above facies with 10% visible barite by volume being the dividing line. This facies is usually quite high grade (10-15% combined lead-zinc). Sphalerite is characteristically honey coloured to reddish brown. Pyrrhotite is not commonly seen in the baritic facies except in the Faro deposit where overall pyrrhotite is more abundant.

3.1.5.2.3 Carbonate-bearing, Massive Pyritic Sulphides:

The carbonate bearing sulphides (Unit 2K) are similar to massive pyritic sulphides but contain greater than 10% carbonate (calcite, dolomite, ankerite) either as interstitial gangue or as coarse patches and irregular blebs. This is a minor facies and is not known with certainty to always be an original composition variant. The most common occurance of coarse pinkish beige to tan, ankerite patches may represent recrystallized original carbonate or re-worked pre/syn-metamorphic veins. This variant is generally lead-zinc

poor. The variants with white interstitial gangue can be high grade and locally they texturally resemble the baritic sulphides

3.1.5.2.4 Pyrrhotitic Massive Sulphides:

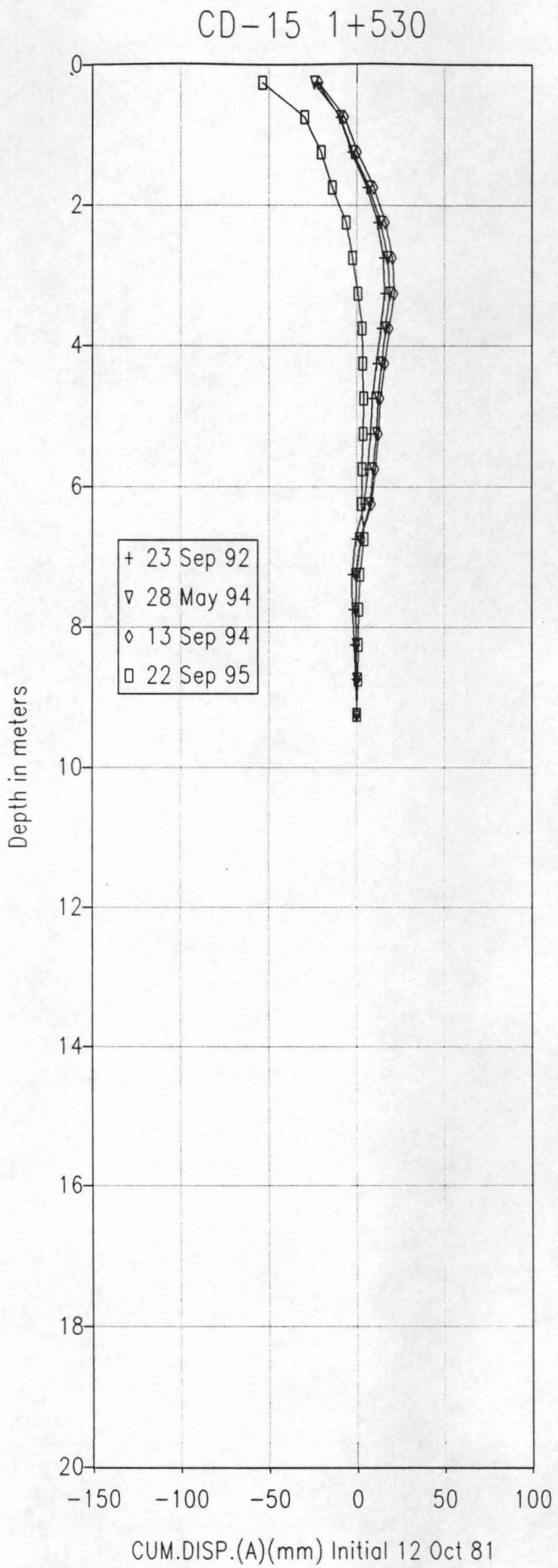
This rock type (Unit 2H) consists of massive, finely crystalline, usually well foliated pyrrhotite with less than 50% pyrite porphyroblasts and highly variable amounts of sphalerite and galena. Minor chalcopyrite is characteristic of this relatively copper-rich facies. Rounded to angular, rotated, foliated quartzite or quartz-vein clasts 2 cm or less in diameter are typical. This is a minor facies and is not known with certainty to be primary as some pyrite in the massive facies may invert to pyrrhotite during regional metamorphism. At Faro the pyrrhotitic facies is more volumetrically important than the other deposits. Pyrrhotite rich ores are generally much finer grained than non pyrrhotitic ores at Faro.

3.1.5.2.5 Ribbon banded, "graphitic", pyritic quartzite:

This unit (Unit 2A)is a dark grey to black, well banded, sulphide-bearing quartzite (metamorphic usage). Bands are: (a) dark grey, very fine grained carbonaceous phyllitic quartzite to siliceous phyllite (presumed metachert) and (b) light grey, quartz-sulphide (pyrite-sphalerite-galena) bands. These bands are usually 2 mm to 2 cm thick. Total sulphide content of unit 2A is usually between 10 to 30% but ranges from 2% to 60%. Pyrite is usually the dominant species but higher grade examples have sub-equal pyrite and lead-zinc sulphides. Lead-zinc dominant variants with little pyrite occur but are not common unless total sulphide content is low. Strong sulphide species differentiation between bands, such that barren pyrite bands are adjacent to or near sphalerite or galena rich bands, occurs but is not generally the case.

3.1.5.2.6 Pyritic quartzite:

The pyritic quartzites (Units 2B, C, D)are light to medium grey, generally poorly banded, moderately to weakly foliated, micaceous quartzites with highly variable lead-zinc and pyrite contents. Pyrite contents are generally 10% to 40% ranging between 2 and 60%. Although there is a complete gradation from massive to quartzose ores there is usually little problem in separating this facies from the massive pyritic sulphides as the vast majority of examples have less than 40% total sulphides. A minor variant of this facies (unit 2B) shows low pyrite (< 5%) content with lead-zinc sulphides predominant. Barite in major amounts is uncommon in the quartose this facies; carbonate species are not typical but locally are abundant. Chalcopyrite, pyrrhotite and magnetite-bearing varieties are common. Sphalerite in the high grade examples is characteristically a vibrant reddish brown. At Faro the more sulphide rich variants of this facies are well developed along the northeast edge of zone 3. They are spectacularly barren but contain elevated copper contents and are rich in magnetite. A similar facies is developed at Vangorda and locally at Grum where the rocks are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Depth in meters
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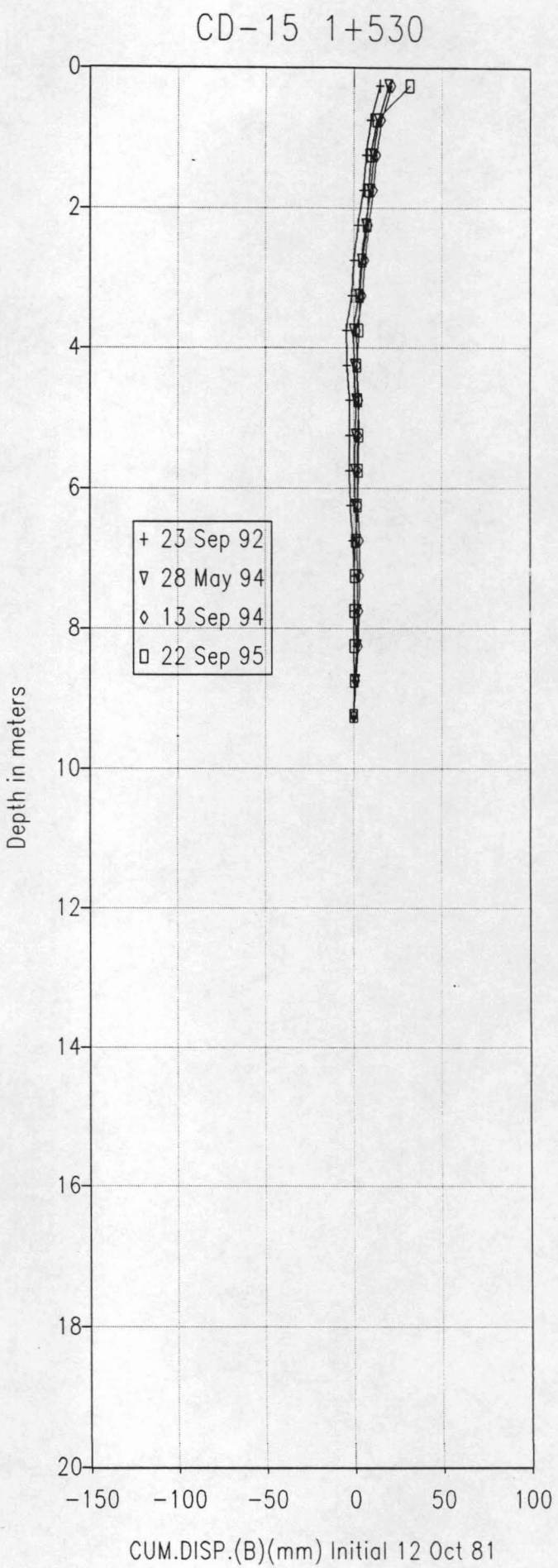
CUM.DISP.(A)(mm) Initial 12 Oct 81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Depth in meters
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▽ 28 May 94
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CUM.DISP.(B)(mm) Initial 12 Oct 81

TABLE 3.1 THE ALPHA PART OF THE LITHOLOGIC CODE FOR SULPHIDE ROCK TYPES

| | |
|---|---|
| A | thinly banded carbonaceous pyritic quartzite |
| B | weakly to non-pyritic quartzite |
| C | lead-zinc poor pyritic quartzite |
| D | lead-zinc rich pyritic quartzite |
| E | pyritic massive sulphide |
| F | buckshot textured pyritic massive sulphide |
| G | pyritic massive sulphide with >10% barite gangue |
| H | pyrrhotitic massive sulphide |
| J | non-pyritic or pyrrhotitic massive sulphide or massive magnetite |
| K | pyritic massive sulphide with >10% carbonate gangue |
| Q | foliated vein type quartz with sulphides |

TABLE 3.2 LITHOLOGIC MODIFIERS FOR SULPHIDE ROCK TYPES

| | |
|---|---|
| 0 | normal |
| 1 | siliceous |
| 2 | coarse porphyroblastic pyrite bearing |
| 3 | fine pyrite rich |
| 4 | lead-zinc rich |
| 5 | carbonaceous |
| 6 | barite bearing |
| 7 | pyrrhotitic |
| 8 | magnetite bearing |
| 9 | chalcopyrite bearing |
| * | undifferentiated carbonate bearing |
| # | calcite bearing |
| @ | ankerite bearing |
| $ | dolomite bearing |