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FARO DEPOSIT - ZONE 3

GEOLOGY PIT MAPPING PROGRAM
during
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CONCLUSIONS

Detailed geological pit mapping has been completed for the currently active Ramp Zone, JB, and A pit areas. This mapping indicates that the stratigraphic sequences in all three areas dips consistently to the southwest. Folding deformation does not significantly influence the overall distribution of the ore body. In contrast the fault patterns delineated during the mapping program dramatically and significantly determine the three dimensional shape and distribution of the ore body.

In the Ramp Zone the ore body is truncated to the northwest by the North Fork Fault. In the JB zone the ore body is successively downthrown to the northwest along northeast-trending faults associated with the major North Fork/Big Indian #X Fault system. The north margin of the JB phase of the ore body with the BY phase of the ore body is delineated by the JB Fault which downdrops the ore to the north. The fault pattern in the A pit area is incompletely understood at present; major faults have not been fully delineated yet.

Major faults indicated by the previous cross and long section interpretation have been successfully located through the detailed pit mapping program. The mapping program has provided a more detailed picture of the locations of single fault traces and the interactions between different faults. This picture has proven to be of interest for safety and pit design purposes as well as ore distribution purposes. Conversely the previous cross and long section interpretation has provided useful information concerning overall stratigraphic separation for each fault system located in the mapping program.

Ideally the detailed mapping program should be continued as much as possible during production. This small period has shown that it can provide useful detailed geological and engineering information. Based on my work this summer I would estimate that the equivalent of one full time geologist is required to maintain an adequate mapping and interpretation program operating.

This summer's program has also shown that the mapping cannot be suspended for indefinite periods of time. In some instances I was not able to successfully map certain geologically significant features because of logistical problems. The information missed would have been useful in interpreting the geological compilation map. It is necessary for the geologist to remain informed of current operations and to take advantage of all the outcrop exposed at all times during the mining activity.

INTRODUCTION

Curragh Resources Corporation resumed mining operations in the Faro Pit January 1986. As part of their continuing evaluation of mine planning and pit design for the Faro deposit, a geology pit mapping program was initiated to update the geological interpretation in the mining area. I have been mapping in the Zone 3 pit area (phases A and JB) and the Ramp Zone during July-August, 1986. Emphasis was on recording and interpreting the geology of the bench walls created since startup. This report briefly summarizes the results of the mapping program; it accompanies a geology pit status map for the active areas.

Geology mapping was completed at 1:600 scale (1 inch = 50 feet). Survey control for the earliest traverses was by pace and compass. It rapidly became apparent that pacing did not provide adequate control for outcrop locations. Most outcrop stations were subsequently located by chaining the geology between control stations established as the survey crews completed their regular toe pickups. For older benches additional control points were established by the survey crews at my request. I have written a separate memo briefly describing the techniques utilized for accurately recording geological information from the pit area. Detailed field notes and drawings of outcrop geology for most of the stations are stored with Faro Minesite Geology Department.

Geology traverses have been transferred to geology bench elevation maps and compiled geology pit status maps. The geology bench maps record the geology observations during regular pickups on the working face. They provide a unique opportunity to watch the geology of each bench evolve as it is revealed by the shovels. Geology of the final walls was also transferred to geology pit status maps. The pit maps provide a three dimensional view of the detailed geology in the mining areas. Three separate pit status maps for the A, JB, and Ramp zone mining areas have been drafted for this report. They reflect the geological information recorded and compiled before August 31, 1986. The topographic base map closely approximates the bench status map for August 31, 1986.

GEOLOGY-INTRODUCTION

Geology within the Anvil District has evolved through surface and drilling programs conducted during the 30 year history of exploration and development. Drilling and mapping programs in the immediate vicinity of the Faro deposit have recently been updated (where possible) to reflect the detailed lithologic, structural, and metamorphic understanding of the deposit and enclosing host rocks. Detailed discussions of the Faro deposit geology are contained in reports by Simpson et al. (1983) and Tolbert

(1986). These reports should be reviewed for more complete descriptions of the lithology and structure coding used in this mapping program.

The Faro deposit is a large, elongate, asymmetric lens of Pb-Zn-Ag +/- Ba-bearing massive and quartzose sulphides hosted in late Precambrian to early Paleozoic sedimentary rocks. The deposit is stratiform and is classified as a sedimentary exhalative type deposit. The host rocks and ores have all been subjected to an intense polyphase deformational and metamorphic history resulting in recrystallization, folding, and faulting of the ore lens. The deformational history has resulted in complex structures which add considerable uncertainty to the exact outline of the ore deposit.

STRATIGRAPHY

Table 1 lists the different stratigraphic units reported on the geology pit status maps. The lithology code follows that used in all drill holes, maps, and vertical sections for Curragh Resources. More complete descriptions of the rock types are available in the reports mentioned above.

Table 1

Breccia Cap
- 3Dbx Intrusive (?) breccia consisting dominantly of randomly oriented 3D clasts

Intrusive units
- 10E Porphyritic hornblende-biotite quartz diorite
- 10F Smokey quartz-feldspar-biotite porphyry

Vangorda formation
- 3D Calc-silicate phyllite
- 3C Metabasite sill/dyke

Transition unit (basal Vangorda formation)
- 3D Calc-silicate phyllite
- 3C or 1H Metabasite sill/dyke
- 1D2 Carbonaceous, noncalcareous phyllite
- 1E1 Siliceous, carbonaceous phyllite
- 3A Mixed unit containing all of the above lithologies

Mt Mye formation
- 1CDh Noncalcareous phyllite-above ore
- 1CDf Noncalcareous phyllite-below ore
- 1H Metabasite sill/dyke
- 1D4 Highly altered muscovite-quartz

phyllite
1D2 Carbonaceous, noncalcareous phyllite

Ore lithologies (within Mt Mye formation)
2A Carbonaceous, ribbon-banded quartzite
2C or 2D Noncarbonaceous, pyritic quartzite with disseminated sulphides
2EF Pyritic massive sulphides
2G Baritic, pyritic massive sulphides
2H Pyrrhotitic massive sulphides

Metabasite sills/dykes (3C or 1H) have been mapped and reported as separate units where possible because they potentially make useful markers for estimating fault displacements. For similar reasons I have mapped carbonaceous phyllites (1D2) and strongly altered muscovite-quartz phyllites (1D4) as distinct units.

Because I have been mapping separate metabasite and carbonaceous phyllite units, the basal Vangorda formation (3A) has not generally been reported as a separate distinct unit on the various pit geology maps. For comparison purposes the thick section of metabasite sills and carbonaceous phyllites immediately beneath the 3D calc-silicates would correspond to the 3A unit. This interval is well exposed along the west bench walls of the A phase pit.

With the noncalcareous phyllites of the Mt Mye formation, I have differentiated the mapped sequences into hanging wall and footwall phyllites relative to the ore deposit. This scheme provides for rapid delineation of the current pit bench status relative to the ore horizon. It ignores the more subtle alteration and metamorphic grade variations generally coded in detailed outcrop and drill hole logging.

DEFORMATION - FOLDING

Five deformation phases of folding have been recognized within the Anvil District. The first two deformation phases were pervasively developed and accompanied by amphibolite facies metamorphism. Consequently the deposit and enclosing host rocks have been totally recrystallized with a strongly developed pervasive planar fabric/foliation/schistosity.

Folds related to the later deformation phases (3-5) are only locally developed. Metamorphism during these deformation phases only attained greenschist facies conditions. Where the folds are strongly developed, the different rocks contain a crenulation cleavage which locally overprints the earlier pervasive schistosity.

For the Faro deposit much of the complexity implied by the five folding deformation phases can be safely ignored. Empirically the major effect of the first two deformation phases has been to recrystallize all rock types with the pervasive S2 planar fabric. The deposit may be considered a tabular unit oriented subparallel to this dominant schistosity. Minor folds associated with the first and second deformations have been transposed into parallelism with the S2 schistosity. Deep drilling through and around the deposit shows that orebody sized folds do not repeat the stratigraphy.

In the A, JB, and Ramp zone areas, the dominant S2 planar foliation/schistosity trends north to northwest and dips gently towards the west. Minor D2 folds were only rarely encountered during the mapping program. Excellent examples of isoclinal D2 folds were noted in the north wall of the Ramp Zone and the west wall of the A phase. In both cases the folds were outlined by thin metabasite sills within a thick carbonaceous shale sequence.

Both the JB and Ramp Zone areas contain locally developed folds which distort the pervasive S2 schistosity. Comparison of trends with detailed mapping in Zone 1 shows that these folds were formed during the third deformation phase (see Tolbert 1986). Folds associated with this deformation are strongly asymmetric with long southwest limbs which dip shallowly southwest and short, steep to overturned northeast limbs. Typically these northeast limbs are slightly broken and dismembered with local development of intense fracturing and minor gouge. Fold axes plunge gently to the northwest and southeast; axial planes dip steeply to the southwest. In most cases these folds are small and do not significantly distort the deposit.

D3 minor folds have been noted in both the Ramp Zone and JB zone areas. In the JB zone the D3 folds commonly have an amplitude of three to five feet. The folds are most intensely developed as small chevron folds in the phyllites and schists along the south and east walls of the current pit. Locally the S3 axial planar schistosity is the dominant deformational fabric in the rocks. Within the ore types the folds are more open to concentric. Minor folds with an amplitude up to 5 feet have been noted locally in the working_face area of the ore deposit.

As always, however, there is one exception to the smaller size stated for most of these folds. In the southeast corner of the JB pit one D3 fold with an amplitude of 20-30 feet is exposed in 2A quartzites immediately adjacent to the mapped Big Indian Fault #X. This fold cannot be traced northwest into the main part of the pit.

In the Ramp Zone a large scale D3 fold is visible in the northeast corner of the pit area. Because the ore panel is situated entirely on the same limb of this single fold, the ore horizons remain tabular and do not require special mining techniques.

DEFORMATION - FAULTING

In contrast to folding deformation, faults significantly affect the position of the orebody in Zone 3 on all scales. On the large scale, Zone 3 is separated from the largely mined out Zones 1 and 2 by the Faro and North Fork/Big Indian faults, respectively. With both faults displacement is greater than 100 feet with Zone 3 being downdropped. On the small scale mapping has delineated several examples of faults with displacements of 25 feet or less.

Detailed mapping of working faces and final walls indicates that all stratigraphic/metamorphic units are cut by a complex network of steeply dipping faults. The overall effect of the faults on the ore body is to segment it into irregular polygons situated at various bench elevations. Apparent displacements on the faults range from a few feet to several 10's of feet. The geology bench maps and the geology pit status maps indicate the locations of the various mapped fault traces; measured orientations of the traces are also indicated on the maps. In the following discussions of apparent displacements along any fault trace, I have consistently assumed that fault movement is largely normal in style. In some instances this assumption is known to be wrong because examples of nearly horizontal slickensides have locally been noted.

Faults were most readily mapped only in areas of the pit containing rapid vertical stratigraphic variation. This variation was needed to recognize the presence, amount, and sense of stratigraphic separation cross the fault zones. The stratigraphic intervals best suited to recognizing fault patterns are the 3A Transition Zone between the Vangorda and Mt Mye formations (units 3D to 1CDh) and the ore horizon.

The extent and nature of gouge are not consistently valid indicators of significant fault displacement. In the north end of the JB zone, for example, a 30 foot wide strongly gouged fault zone is consistently developed in the 3Dbx and 1CDh units; stratigraphic separation across this fault zone, however, is on the order of 10 feet. Lithologically the softer phyllites of the Mt Mye formation (units 1D2 and 1CD) are much more apt to develop major gouges than the more competent 3D calc-silicate and ore lithologies.

Commonly several faults are interrelated to form a complex network of fault traces. Although belonging to the same fault system, these traces in plan view have several orientations. Within this array an individual fault may either be truncated by another fault or merge with another fault. Major apparent displacements commonly appear to be transferred from one fault trace to another. This has the general effect of causing significant changes in trend of the actual traces exhibiting large stratigraphic separations. The Big Indian/North Fork fault system in the south end of the JB pit area is an excellent example of this situation; it will be discussed in greater detail later.

Interaction between unrelated fault systems also appear to involve either truncation or merging of the fault traces. In many cases I have been unable to delineate relations between faults because the critical intersection area has not yet been adequately exposed during mining. This presents a strong supporting argument for the continuation of the pit mapping program as an ongoing process.

Earlier analysis by Tolbert (1986) outlined four major fault trends: 050-061, 093-096, 135, and 171-175. Detailed mapping of working faces and final walls have generally confirmed these oriéntations. I would be less restrictive, however, and group the fault trends into the following general orientations: 000-035, 060-095, and 120-140. These orientations in several instances should be considered as conjugate sets within an overall stress/strain system.

RAMP ZONE

Geologically several interesting features are well exposed in the Ramp Zone pit area. All stratigraphic units in the main pit area dip moderately to the southwest (about 30 degrees). As mentioned earlier, an isoclinal D2 fold is outlined by a thin altered metabasite band within 2A quartzites on the north wall of the pit. In the northeast corner of the pit a D3 fold is well exposed in the east wall. The fold axis for ~~the D3~~ fold trends across the north end of the pit with azimuth 290.

The orebody in the Ramp Zone consists of a central massive 2EF horizon sandwiched between upper and lower 2A quartzite horizons. The lower 2A interval grades gradually into more micaceous carbonaceous phyllites. This lower 2A is typically barren of base metals. The lithology distribution recorded in the blasthole logs for the 3910 bench is best explained with a small fault trending 020 through the deposit. Stratigraphic separation on the fault is calculated as being 50 feet or less. This fault was not recognized in the northeast corner of the pit area.

The ore lithologies are abruptly truncated on the west side of the pit area by the North Fork/Big Bird fault system. This fault system consists of three separate fault traces trending north to northeast. All three faults dip to the west at about 70 degrees. The entire zone is 100 feet wide in the south end of the pit and 200 feet wide in the north end. Overall stratigraphic separation across the three fault traces is in excess of 300 feet as 3D calc-silicate phyllites are juxtaposed against ore lithologies. Apparent displacements for each trace could not be readily determined.

The easternmost fault trace is the major fault in this system. In the north part of the pit this fault has azimuth 020, and in the south end it trends 000. In the north wall it consists of a 25 foot wide siliceous breccia zone with associated gouges. The breccia is crudely banded with 1CD phyllite restricted to the west side and 2A carbonaceous quartzite restricted to the east margin. Large clasts and bands of 10F smokey quartz-feldspar porphyry are caught up within the breccia zone. This breccia zone also truncates the D3 fold trending across the north wall of the pit.

The two western fault traces trend across the pit area with azimuth 000 to 015. In the southern area of the pit the easternmost trace merges with the middle trace into a single 000 trending fault zone. The 10F porphyry is the dominant lithology exposed in the fault zone in this area.

A PHASE PIT

The geology of the A pit is delineated on the accompanying maps. To the north, the A phase is bounded by the Faro Fault, a major south dipping fault with 80 to 135 feet of stratigraphic separation (Tolbert 1986). This fault separates Zone 1 ore to the north from Zone 3 ore to the south. The southeast wall of the A pit consists of a peninsula of the 3D Breccia Cap. ~~Along the southwest margin~~ of the pit the walls contain the Unit 3A, stratigraphic transition between the Vangorda formation (3D Calc-silicate) and the noncalcareous phyllites (1CDh) of the Mt Mye formation.

All stratigraphic units in the A pit dip gently to moderately to the southwest parallel to the dominant S2 planar schistosity. Isolated isoclinal D2 folds were noted rarely within thin metabasite bands along the southwest margin of the pit. No post-D2 folds were recognized in the A phase area.

Zone 1 ore horizons are exposed at surface in the northeast corner ramp of the A pit. In addition diamond drill holes 86F-01, 86F-05, and 86F-06 cored thick sections of the Zone 1 orebody on the south Zone 1 ramp extending down to the bottom of the Zone 1 pit. No mapping was completed within this area because of the lack of outcrop exposure along the pit walls.

Previous mapping has suggested that the Faro Fault occurs along the northern contact of the 10F dyke in the northeast corner of the A pit (see Tolbert 1986). Cross section interpretation indicates it must have an east-west trend and a southerly dip. The fault must occur south of diamond drill hole 86F-06 since this DDh was collared in Zone 1 ore. With these constraints, the Faro Fault has been approximately located on the map. This fault location extends directly into a mapped fault along the northeast wall; the mapped fault has azimuth 095 and a southerly dip of 45 degrees. Tentatively this mapped fault has been correlated with the Faro Fault.

The 10F dyke trends easterly along the floor of the northeast pit margin. Outcrop exposed on the 3740 ramp indicates that the dyke is offset to the southeast by a steep fault with azimuth 135. If the dyke is assumed to dip towards the south, then the southwest side of this fault has been downthrown. The abrupt change in orientation of the dyke (as determined from blastholes) along its western limit strongly suggests that the dyke has also been truncated along its western contact by another 135-trending fault. This fault has not been drawn on the map pending verification.

The southwest wall of the A pit provides an excellent example of fault style and frequency for the A pit. The rapid vertical stratigraphic variation in the 3A Transition Unit along this wall allows close documentation of stratigraphic separation across steep faults. This wall contains several faults trending 070-095. These faults are spaced approximately every 150-200 feet. The amount of gouge associated with these faults ranges from less than 1 foot to more than 5 feet. Typically the faults displaying offset dip steeply to the south; associated north dipping fractures do not show any offset. Stratigraphic separations of 25 to 50 feet with the south side being downthrown are common.

Along the base of the southwest wall, I have mapped a fault trending 125 and dipping 50-70 degrees to the southwest. This fault correlates with the 'J' Fault as interpreted by Tolbert (1986) from cross-sections. Stratigraphic separation along this fault could not be determined exactly but must be in excess of 50 feet with the southwest side being downthrown. This fault extends into the slot between the A and JB pits; tentatively it has been connected to the Big Bird Fault which is trending northerly into the same area. Because of the lack of outcrop at the base of the wall, I have been unable to determine if the 070-095 faults are terminated against the 'J' fault. I have tentatively shown them as truncated pending further information from the next bench level.

The 3D Breccia Cap is well exposed along the southeast margin of the pit. The main clasts within the Breccia Cap are 3D Calc-silicates (hence the name). Clasts of ore lithologies, 1CD phyllites, and 10E dyke are also present. Along the east margin of the Breccia Cap the amount of 1CD phyllite clasts increases substantially. Where exposed, the contact between the breccia and the underlying phyllites is sharp, contains only very minor gouge, and is essentially horizontal.

The Cap contains at least 2 northwest trending 10E dykes. In both dykes the intrusive is massive and unfoliated. Locally fine-grained, dark brown chill margins are present. In detail the marginal contacts of the dykes are highly irregular; they are not faulted contacts. Outcrop is extensive enough for the thicker dyke to verify that it does not extend into the 1CDh and 1D2 phyllites structurally underlying the breccia (although 10E intrusives are situated in the phyllites in the same general area).

The 3A Transition Unit exposed along the southwest wall of the pit is stratigraphically and structurally about 270 feet above the top of the ore horizon. Most of the intervening thickness consists of a monotonous sequence of 1CDh phyllites and schists with only a few distinguishable carbonaceous and altered sericitic intervals. Recognition of major faults and verification of stratigraphic separation along these faults will be a difficult procedure through this interval. The recent interpretation by Tolbert (1986) contains numerous faults with an 090 orientation; these faults will be most noticeable on west facing walls and should be searched for diligently.

JB PHASE PIT

The ore horizons in the JB pit are isolated from surrounding areas by three major fault systems, the Big Bird Fault on the west, the JB Fault on the north, and the North Fork/Big Indian #X Fault zone on the south and southeast. These faults dramatically illustrate the strong impact that faulting has on the distribution of the ore horizons.

As in the Ramp Zone and A pit areas the S2 planar schistosity and stratigraphic units in the JB pit all trend northwest-southeast and dip moderately to gently to the southwest. Rare isoclinal D2 minor folds were noted in the ore body and along the west wall. These folds are extremely attenuated and do not significantly affect the distribution of the stratigraphic units.

The S2 foliation in the 1CDf schists on the south and southeast walls of the JB pit are strongly distorted by small scale D3 minor folds. D3 folds in the schists are chevron in style with long southwest-dipping west limbs and short, steep to overturned east limbs. Fold axes plunge gently to the northwest and southeast. Where intensely developed, the folds contain an S3 axial planar crenulation cleavage which dips steeply to the southwest; locally this cleavage becomes the dominant planar fabric in the outcrop. Generally these folds have an amplitude of 1 to 5 feet.

Minor D3 folds have also been locally recognized in the ore horizons in the JB pit area. Typically the folds have an open concentric style with an amplitude of 5 to 10 feet. The small nose of 2CD ore within the 2EF massive ores in the JB pit floor is interpreted to be the result of a small scale D3 fold. The extent and size of the fold is exaggerated in plan view because of its gentle northwest plunge. The one large D3 fold visible in the south wall of the JB pit has already been discussed.

The pit walls west of the ramp leading into the JB and A pits contain the 3D Calc-silicate and the underlying 3A Transition Unit. Immediately east of the ramp are the 1CDh phyllites overlying the ore horizons. A major normal fault with the west side being downthrown is needed in the ramp area to account for the juxtaposition of lithologies which are normally separated by about 250 feet of stratigraphic section. Mapping in the Ramp Zone pit has delineated a north-trending major fault which has been traced directly into the desired area. In the JB pit this fault can be seen on the east side of the slot between the JB and A pits as the steep contact between the 1D2 dark phyllites on the west and the 1CDh light grey phyllites on the east.

This fault has been correlated with the Big Bird Fault described by Jilson in Simpson et al. (1983) because it has the same general trend and offset as interpreted for that fault from the cross and long sections. Tentatively it has been connected with the 'J' Fault occurring along the west wall of the A pit although this correlation is not totally satisfactory.

The wall west of the ramp into the JB pit also contains a very noticeable fracture/fault system immediately south of the slot area between the JB and A pits. Both north and south dipping faults are visible within this system; north-dipping faults trend 070, south-dipping faults trend 110-120. The overall effect of this fault system is to downdrop the south side of the fault complex by several tens of feet.

This fault system has been correlated with the 1983 Big Gulp Fault based on location, orientation, and sense of fault offset. Stratigraphic separation for this system from the 1983 cross and long section interpretation is 60 feet with the south side being downthrown. Because the interpreted fault trends about 120 degrees, the mapped northeast-trending faults have been interpreted as being truncated by the southeast-trending faults. The entire Big Gulp Fault system appears to terminate against the Big Bird Fault.

The Big Gulp provides an excellent example of the interplay between detailed pit mapping and cross and long section interpretation. Pit mapping shows that the fault system in detail can be quite complex with several individual traces. The cross and long section interpretation provides an overall sense of stratigraphic separation and allows one to determine which of the mapped fault traces are significant.

The ore horizons in the JB pit are bounded to the north by the JB Fault which separates the JB phase ore horizons from the BY phase ore horizons. The JB Fault trends 070 to 075 and dips 60-80 degrees to the north. It is a major normal fault with the north side being downthrown; stratigraphic separation could not be determined from the pit mapping program. In outcrop it consists of white sericitic gouge containing numerous clasts of phyllite, ore lithologies, and highly altered metabasite; the gouge is at least 10 feet thick.

In the northeast corner of the JB pit, the JB fault juxtaposes 3D Breccia Cap to the north against massive and quartzose sulphides to the south. Towards the west the Breccia Cap boundary moves farther north and the fault juxtaposes 1CDh hanging wall phyllites against the ore horizons. It appears to be truncated by the Big Bird Fault on the west and the Big Indian #X Fault on the east.

The Big Indian Fault System has conventionally been considered the major normal fault separating Zone 2 from Zone 3. Several splays of this fault system have been interpreted from cross and long sections and limited blasthole data. In actuality it forms part of a complex system of faults associated with the North Fork fault system and numerous cross faults between them.

The Big Indian #X Fault forms the southeast margin of the JB pit area. I have chosen to call it the #X to indicate that it is one of a series of fault splays which combine to separate the JB phase from Zone 2, and that I do not want to attempt to correlate it with any one of the numbered splays from the cross section interpretation. The Big Indian #X is a major normal fault with the west side being downthrown. Stratigraphic separation is in excess of 150 feet as it juxtaposes footwall 1CDf phyllites to the southeast against ore lithologies to the northwest.

South of the JB pit area it trends 000 with a steep westerly dip. In the JB pit area the trend changes to 035 as it runs along the southeast wall of the pit. Mapped portions of the fault in the pit floor indicate that it consists of a wide zone of disturbed and disrupted rocks. At the south margin of the pit this disturbed zone is about 20 feet wide; at the northeast corner of the pit the disturbed zone appears to be over 100 feet wide. The west margin of the fault zone as drawn marks the contact between massive sulphides (west) and 1CDf phyllites (east). Isolated blocks of sulphides are present, however, east of this contact as large clasts caught up in the fault within the overall zone of disrupted rock east of this contact.

The North Fork Fault system enters the JB area at the very southernmost tip of the present pit. At higher benches it juxtaposes 1CDh hanging wall phyllites (west) against the orebody (east). In the floor of the JB pit it transects the ore body and separates mainly quartzose ores (west) from mainly massive pyritic ores (east).

The North Fork Fault has trends which vary between 000 and 045. It dips moderately to the west and northwest. Measured dips range from 45 to 60 degrees. It is correlated with the major fault in the Ramp Zone which truncates the ore horizons on their northwest side. In the JB pit area it appears to be either truncated by the JB Fault or else merges with the Big Indian #X Fault in the northeast corner of the pit area.

Detailed mapping in the south end of the JB pit has delineated several fault traces with orientations between 035 and 050 which run between the North Fork and Big Indian #X faults. All of these faults dip steeply to the northwest; stratigraphic separations indicate that the northwest sides are consistently downthrown. Stratigraphic separations for each fault trace are not extreme; in total however, they have the effect of dropping the ore horizons significantly towards the north.

The complex interaction of faults in the south part of the JB pit area is best envisioned by considering the North Fork Fault and the Big Indian #X Fault as being two margins of a major north to northeast trending fault zone which downthrows all units on the northwest side. Within that fault zone several cross faults extend between the two marginal faults and have the same sense of stratigraphic separation on a smaller scale. The orebody occurs as small panels/blocks of competent rock caught up in this major fault zone. Individual panels are consistently downdropped to the northwest by the different cross fault traces.

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