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019406

11 SEPT/81

GEORGE'S LEGACY

OR

THE GOSPEL ACCORDING TO GORZYNSKI

NOTES ON A FIELD SEASON SPENT IN THE ANVIL DISTRICT, 1981

(I) GENERAL NOTES

(A) LESSONS LEARNED FROM THE PIT

(1) THE ORE GRADES LATERALLY INTO INTO A BLACK GRAPHITIC QUARTZITE WITH NO OR MINOR SULPHIDES IN FARO PIT No. 2. THIS WAS MAPPED AS "2A1 - NO SULPHIDES".

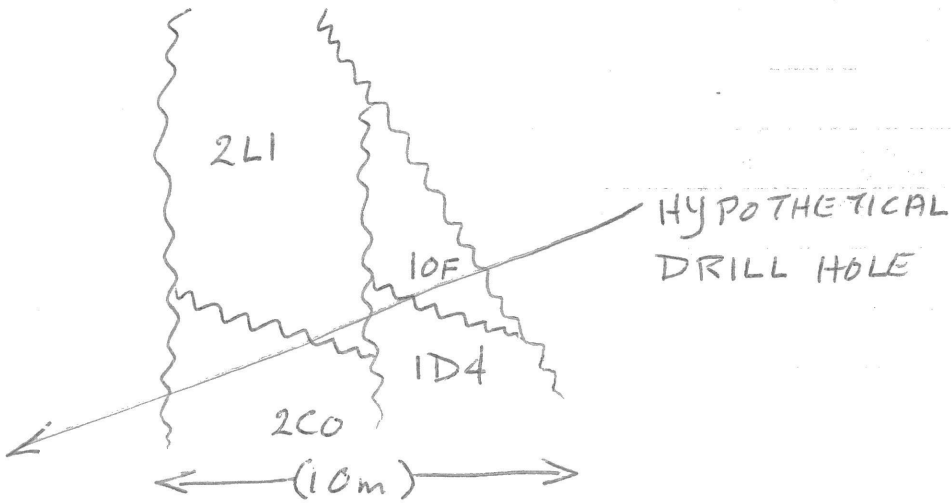
(2) 2HO (4HO) NORMALLY IS A SULPHIDE - 4L BRECCIA COMPRISING 4L ± OTHER CLASTS IN AN OPEN PYRRHOTITE ± BASE METAL MATRIX. THIS SUGGESTS THAT THESE 4HO BRECCIAS ARE POSSIBLY HEALED FAULT ZONES IN WHICH (PYRITE)-DESULPHURIZING SOLUTIONS HAVE BEEN MOVED.

or more likely (?) brias produced during $D_1 \rightarrow D_5$ in units of extreme S_1 or

(3) FAULTS CUTTING QUARTZITES AND MANY MASSIVE SULPHIDES ARE TIGHT, SOMETIMES SLICKENSIDED AND ~~SHO~~ USUALLY SHOW NO ASSOCIATED

GOUGE ZONES. ALTHOUGH DEFINITE SIGNIFICANT MOVEMENT HAS YET TO BE DEMONSTRATED ON SUCH A FAULT, THE POSSIBLY SUGGESTS THAT THERE IS MOVEMENT ON FAULTS IN DRILLCORE WHICH LACK GOUGE. THEY MAY BE RECOGNIZED IN SOME CASES BY NOTING SLICKENSIDED CONTACTS BETWEEN DIFFERENT SULPHIDE UNITS.

(4) LOCAL ZONES ARE CUT BY COMPLEX SYSTEMS OF FAULTS IN WHICH THE RECONSTRUCTION OF THE OFFSETS IS NOT POSSIBLE GIVEN THE PRESENT EXPOSURES. THE FOLLOWING IS AN EXAMPLE FROM THE EASTERN NORTH WALL OF PIT No. 2 (FARO):→



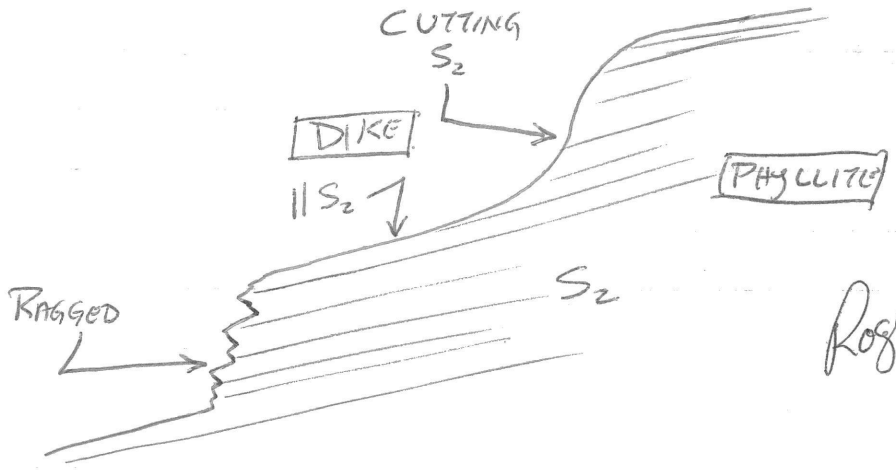
SUCH CASES AT BEST CAN ONLY BE GENERALIZED

(5) OCCASSIONALLY ONE WILL FIND A QUARTZ-BIOTITE PHYLLITE WHICH HAS A SIMILAR APPEARANCE TO A HIGHLY BIOTITIC DIKE (Cf - SAMPLES P1-Z4A (PHYLLITE) & P1-Z4D (DIKE)). IF DIKE CONTACTS CANNOT BE DISCERNED, THE DISTINCTION MAY BE BASED ON -

(1) IDENTIFICATION OF PLAGIOCLASE IN THE DIKE

(2) BIOTITE IN THE PHYLLITE IS ORIENTED ALONG S_2; THE DIKE'S BIOTITE IS NOT.

(6) DIKE CONTACTS VARY FROM PLANAR TO SINUSOIDAL OR IRREGULAR AS BELOW →



Roger!

(7) A VARIETY OF FACIES CHANGES WERE OBSERVED IN PIT MAPPING. THESE FACIES CHANGES ARE RARER IN PIT No. 1 (IN THE MAIN PORTION OF AN OREBODY) AND MORE COMMON IN PIT No. 2, (TOWARD THE PERIMETER OF AN OREBODY). (?) SOME OF THE FACIES CHANGES ARE PREDICTABLE (EG - SA1 → 4A1 → 4C0) AN INTERESTING COMMON FACIES CHANGE FOUND IN

PIT NO. 2 WAS 2AI (WITH THIN CARBON PARTINGS) → 2LI (WITH THIN SERICITIC PARTINGS), TWO TEXTURALLY SIMILAR ROCKS, THE 2L BASICALLY LACKING CARBON. WHERE OBSERVED, THESE FACIES CHANGES COMMONLY OCCUR OVER LATERAL DISTANCES OF <20m AS AREAS OF INTERFINGERING UNITS.

Was this a facies change or alteration of 2AI to 2LI !!

(8) SOME ZONES IN BOTH PITS 1 & 2 HAVE UNITS WHICH ARE MIXTURES OF 2F & 2E, BEST MAPPED AS 2FE.

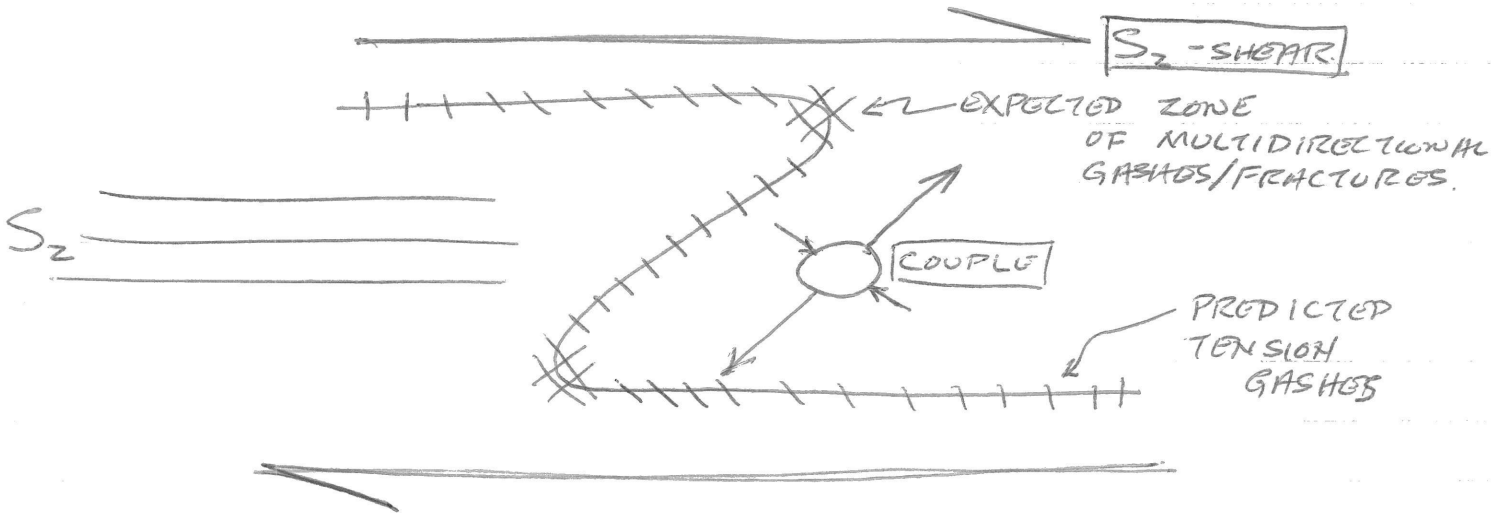
(9) THE "BRECCIA AU SPECTACLE" (SEE LITHOLOGY ORE DISPLAY BOARD I) FOUND IN Dg DRILLCORE IS ALSO PRESENT IN FARO PIT NO. 1 WHERE IT APPEARS TO BE A TONGUING END TO A LATE STAGE smokey qz eye DIKE AND THE RESULT OF A LATE EXPLOSIVE INTRUSIVE WITH HIGH P_{H_2O}. THUS IT [redacted] DOES NOT NECESSARILY REPRESENT A SIGNIFICANT FAULT.

Hooray! someone else sees it the same way!

(B) OTHER NOTES

(1) 4L*-ANK IS ASSOCIATED WITH 5C NEAR THE TOP OF A-60 AND PROBABLY REPRESENTS AN ALTERED 5C OR 5F. ELSEWHERE 4L CAN BE SHOWN TO BE ALTERED 5B OR 5D. THUS GENERALLY 4L IS A PERVASIVE ALTERATION WHICH SERICITIZED THE MATERIAL IT INVADED AND THE FINAL PRODUCT ~~WHICH~~ MAY OR MAY NOT RETAIN SOME ~~NOT~~ OF THE CHARACTERISTICS OF THE ORIGINAL MATERIAL.

(2) TENSION GASHES HAVE BEEN NOTED IN THE LOGGING. THEY AND THEIR ANGLE WITH RESPECT TO S_2 MAY REPRESENT THE FOLLOWING SITUATION →



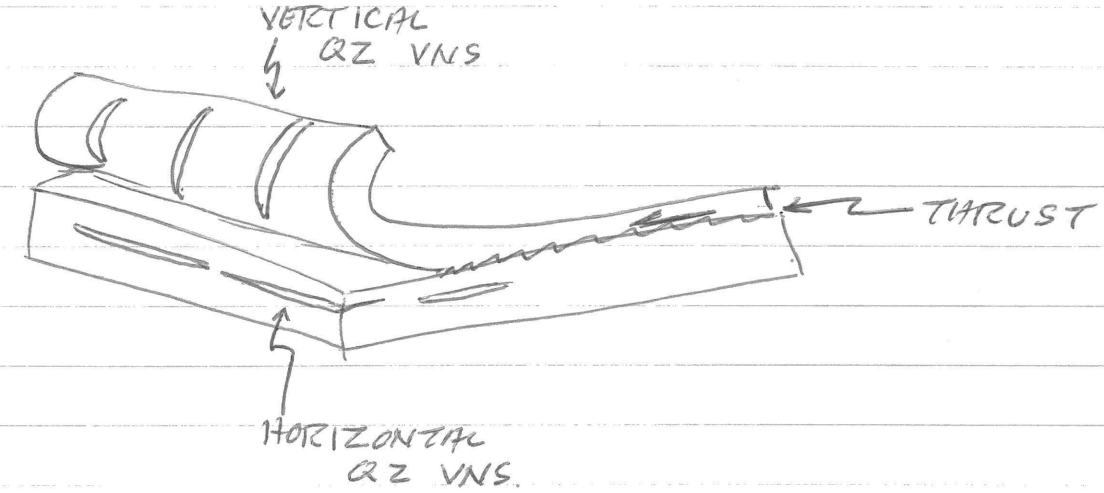
THE LACK OF GASHES PROBABLY INDICATE
(1) RELATIVELY LOW EXTENSIONAL STRESS ENVIRONMENT.

OR.

(2) RELATIVELY INCOMPETENT HOST ROCK.

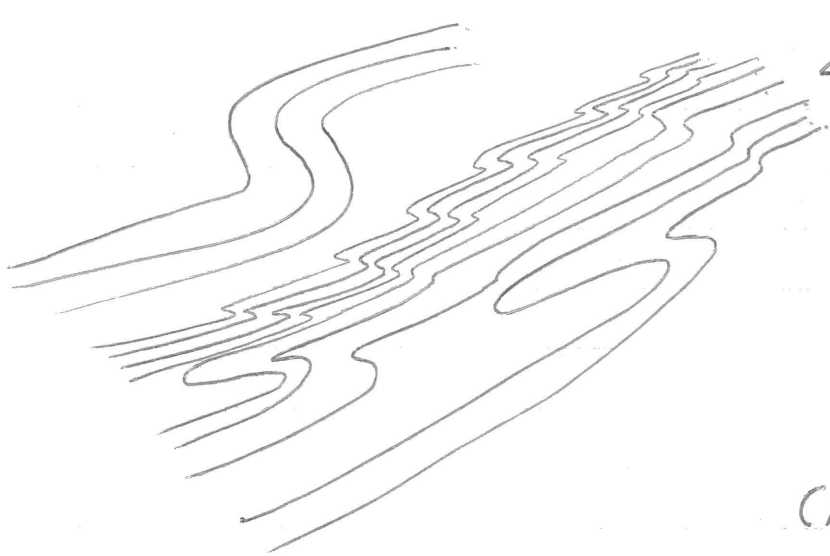
SOME CAUTION MUST BE TAKEN THAT THE TENSION GASHES NOTED ARE NOT A-C JOINTS (RELATED TO D_2) WHICH ARE PRESENT IN THE FIELD AND CAN BE USEFUL IN FIELD MAPPING (NOTED DURING SHORT LOOK~~S~~ AT THE FIRTH DEPOSITED BY GG, RST & JSM).

(3) ABUNDANCE AND ORIENTATION OF QUARTZ VEINS ASSOCIATED WITH GOUGE ZONES IN DRILLCORE WAS NOTED IN THE GRUM RELOGGING AS PER RST'S IDEAS ON QUARTZ VEINS & THRUST FAULTS - IE-



OCCASSIONALLY THIS PATTERN WAS PRESENT. HOWEVER, IN MOST CASES WHERE QZ VNS WERE PRESENT THEY SHOWED A DEFINITE PREFERENCE TO EITHER THE HANGINGWALL OR FOOTWALL OF THE FAULT GOUGE. THERE MAY BE SOME SIGNIFICANT ASPECT TO THIS ASSYMETRIC VEIN DISTRIBUTION ONCE IT IS PLOTTED UP ON THE ~~CRC~~ GRUM CROSS-SECTIONS.

(4) DRILLCORE SHEET DIP MEASUREMENTS ARE GENERALLY RED HERRINGS AND SHOULD ONLY BE APPLIED WHEN A GENERALLY CONSISTENT SHEET DIP OCCURS OVER SEVERAL METRES OF DRILLCORE WHICH IS NOT THE NORMAL CASE. IN RETROSPECT, SHEET DIP MEASUREMENTS SHOULD ONLY HAVE BEEN TAKEN IN SUCH EXCEPTIONAL CASES.



THIS SORT OF CASE IS NOT UNCOMMON AND MAY BE THE RULE RATHER THAN THE EXCEPTION (AND IT PROBABLY IS VERY APPLICABLE TO DEFORMATION OF THE ORE ZONES WHEN ONE TAKES INTO ACCOUNT THE LOCAL HIGHLY CONTRASTING DUCTILITIES)

(5) THE 5C DEFINITION HAS NOW ENCOMPASSED SEVERAL LITHOLOGIES. FIRST IT DESCRIBES THE GOOD METABASITE OF THE Dy. SECOND IT DESCRIBES THE CHLORITE/FUCHSITE SPOTTED DOLOMITES/ANKERITES/±CALCARE HIGH IN THE SECTION AT GRUM WHICH HAVE ~~BEEN~~ TENTITIVELY BEEN CALLED DOLIMITIZED METABASITES. FINELY THE LABEL HAS BEEN APPLIED TO THOSE THICK (1-5m) TO VERY THIN (<10cm) FUCHSITIC OR LESS COMMONLY CHLORITIC CARBONATE ROCKS WITHIN OR NEAR THE SULPHIDE ZONES. IN PIT MAPPING THESE 3RD TYPES OF 5C* ARE OFTEN JUST CONFORMABLE ZONES OF GOUGE. THE 5C* ASSOCIATED WITH THE ORES WAS ORIGINALLY ~~IS~~ ~~AS~~ PROBABLY A MAFIC TUFF OR A PARTIAL OF WHOLLY DERIVED METASOMATIC/HYDROTHERMAL PRODUCT OF THE ORES (SEE DSJ).

(6) THE ORIGIN OF 5D REQUIRES SOME CAREFUL STUDY & OBSERVATION. THERE ARE SEVERAL VARIETIES OF IT AND SOME MAY REPRESENT TUFFS (GRADED WHERE GRADATIONAL UPPER CONTACTS OCCUR) WHILE OTHERS MAY BE ALTERED TURBIDITES (?) THERE'S BEEN ALOT OF DISSCUSSION ON THESE LITHOLOGIES BUT FEW CONCLUSIONS.

Very!

II - PIT MAPPING NOTES

(1) LITHOLOGIES IN THE PIT WERE SUBDIVIDED ON A FEW SIMPLE-MINDED IDEAS, AS PER THE FOLLOWING ALGORITHM →

IF THE PHYLLITE ~~ROCK~~ HAS →

VERY CARBONACEOUS TO SOOTY ~~GRAPHITIC~~ SURFACES

~~HIGHLY CARBONACEOUS~~, DULL SOOTY SURFACES
||
1E0
(=5A - HIGH CARBON)

SHINY SURFACE BUT HIGH CARBON
||
1E4
(=5A PHYLLITIC OR ~~SERICITIC~~)

DARK PHYLLITIC SURFACES
||
1D0
(INITIALLY LABELLED 1D42 BY GG IN PIT No. 2)
(=3G2)

WHITE SERICITIC SURFACES

BROKEN OPEN THE ROCK IS DARK INSIDE
||
1D4
(=3G42)

BROKEN OPEN THE ROCK IS WHITE INSIDE
||
2L0
(=4L0)

→ ALL OF THESE ROCKS MAY BE SILICIFIED. A "1" MODIFIER IS USED IF A NAIL SCRATCH LEAVES SOME METAL. IF IT APPEARS TO BE SOMEWHAT SILICIFIED BUT DOES NOT LEAVE METAL, A NOTE ~~etc~~ REGARDING THIS IS MADE ~~MADE~~ BUT NO MODIFIER USED.

THIS AND OTHER GUIDELINES ARE AS PER GROUM LOGGING.

THE DIKES ARE OF 2 MAIN TYPES IN THE PIT.

(1) ~~Early~~ LATE SMOKEY QUARTZ-EYE FELSIC DIKES — CAUTION - THE QUARTZ NORMALLY FORMS 5-15% OF THE ROCK BUT CAN OCCUR AS SPARSELY AS $\ll$ 0.2% - IE - SEVERAL PIECES MUST BE BROKEN BEFORE A SINGLE QZ-EYE WILL BE SEEN.

(2) VARIABLE FROM VERY FELSIC ± BIOTITE (<15%) (TEMPORARILY CLASSED AS TYPE III) TO VERY BIOTITE-RICH (TEMPORARILY CLASSED AS TYPE II) TO BIOTITIC (>15%) WITH AMPHIBOLE AND/OR RARER PYROXENE (USUALLY WHITE) (TYPE I)

THE CALC-SILICATES HAVE GENERALLY BEEN LUMPED AS 3D EXCEPT FOR A 1D-3D TRANSITION ROCK WHICH ALMOST ENTIRELY COMPRISES BIOTITE & CHLORITE AND HAS BEEN DESIGNATED 3K0. A DISTINCTIVE TYPE HAS BEEN DESIGNATED 3K4 - BIOTITE-CHLORITE WITH VERY SERICITIC PARTING SURFACES.

III - Re: Precious Metals Possibilities

(1) The following page contains a list of altered SC's of different types and associations which should be assayed for Au-Ag.

These are all highly dolomitized/ankeritized, chloritic and/or fuchsitic rocks. Similar rocks with known Au-values occur as thoroughly ankeritized, fuchsite-spotted former serpentinites near Cache Creek, B.C, the Au-deposits of Timmins, Ontario have some similarly associated carbonitized (siderite) rocks. And the Poison Mountain Au-showings, Southcentral B.C occur in dolomitized mafic volcanic flows indistinguishable from SC*!!!

(2) Pt & Pd are associated with Au at Rammelsberg. Does the same correlation occur in the Anvil District?

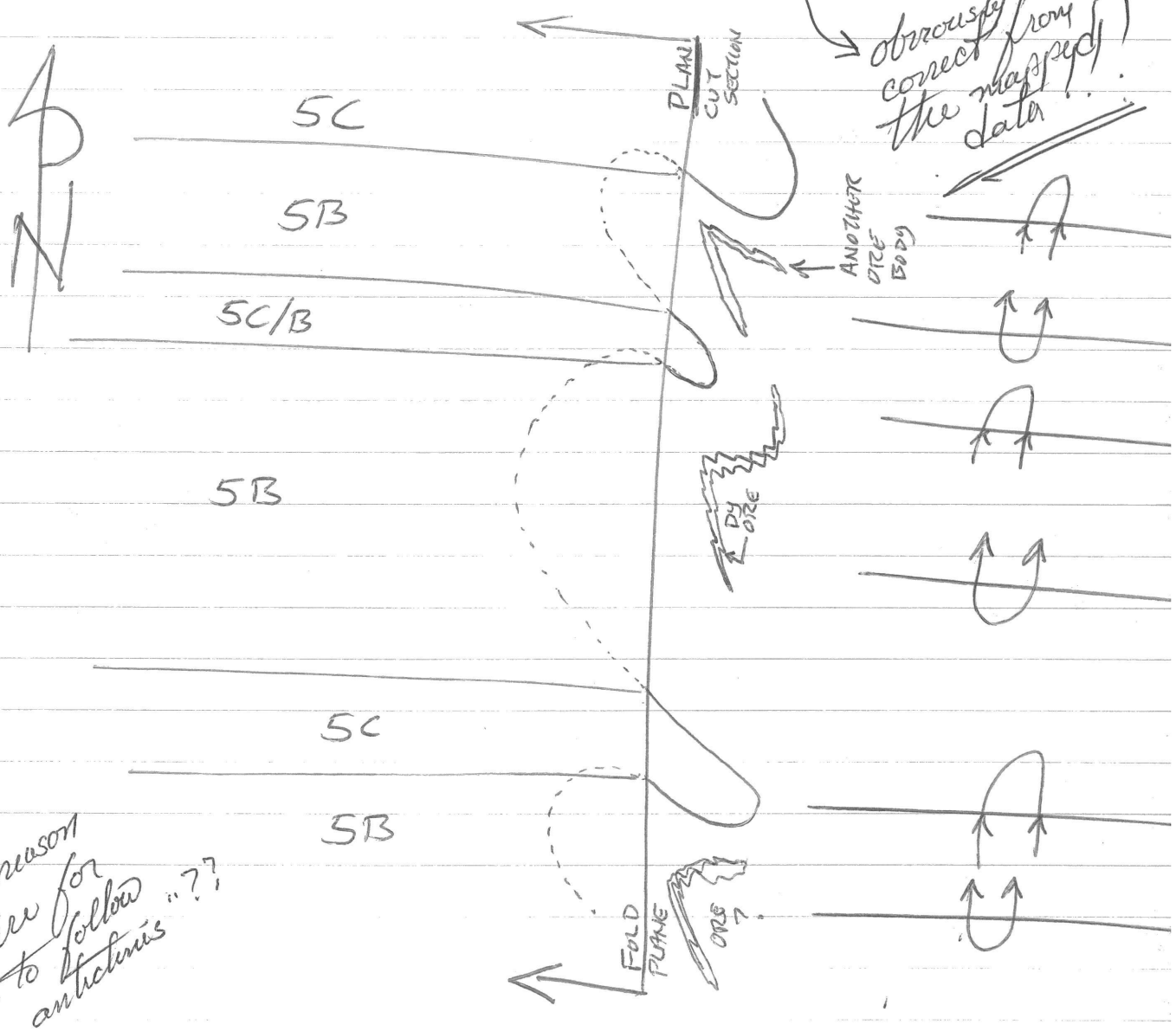
RECOMMENDED SECTIONS FOR Au ASSAY

DDH	M/Ft	Reason:
FAGA-83 72W	238.2-247.7m.	5C* - 80% DOLO; 3% CHLORITE MOTTLES HIGH IN SECTION.
FAGA-60 72W	210.5-221.8m	5C* - V. DOLO, ABUNDANCE OF CHLORITE, SERICITIZED & KAOLINITIZED HAS ASSOCIATED SF4 AND SEVERAL OTHER 5C4* HORIZONS.
FAGA-01 76W	187.0-191.0 ft	5C* - 70% DOLO-ANK; 10% CHLORITE -LOCATED AT OUTER EDGES OF DEPOSIT, HIGH IN SECTION.
FAGA-01 76W	202.0-209.0 ft	5C* - ANKERITIC WITH 1% FUCHSITE; -LOCATED AT EDGES OF DEPOSIT HIGH IN SECTION;
FAGA-14 (76W)	143.5-148.6 ft	5C3 - V. CALC; ~1% FUCHSITE; +1-3cm CHERTY BANDS
FAGA-160 (80W)	102.1-108.1	5C4* - DOLO - CHLORITE TOWARD H/W FUCHSITE TOWARD F/W 10cm QZ-CALCITE-Py-SPHAL BRECCIA @ H/W;
FAGA 127 (62W)	130.7-131.8m	5C6 (?* - DOLO) 2% FUCHSITE; LOCATION WEST END OF DEPOSIT → NOTE 5C IS RARE AT WEST END + ASSOCIATED GOUGE.

IN ADDITION OTHER ROCK TYPES (ESPECIALLY 4L NOT ASSOCIATED WITH SULPHIDES) SHOULD BE CHECKED. THERE ARE ALSO SEVERAL INTERESTING LITHOLOGIES IN FAGA-01 WHICH SHOULD BE CHECKED. FINALLY CHECK OUT SOME ROCKS AT Dy & Swim AS WELL.

IV Re: Dy Deposit

(1) Just staring at the Dy geology map the following general interpretation is suggested →



obviously from the mapped data!

What reason is there for "ore to follow anticlinis"??

The obvious implication of this interpretation is that the other 5B anticlines should be drilled for more ore bodies AFTER some careful surface mapping.

asshole — the surface has been carefully mapped!

(2) My work with Dy sections was done in 2 basic steps.

Step 1 - Work with the Quartz Diorite Dikes

The object of this exercise was to determine the apparent vertical offset of post-dike faults and thereafter applying these ~~as~~ offsets ~~as~~ (vertical &/or horizontal) as they run through the sulphides.

In order to do this, it was necessary to define a general strike and dip for the dike and assume that in section all apparent dike offsets >~15m are ~~as~~ defacto fault offsets and not deviations in the plane of the dike itself. This has actually worked out quite well.

The definition of this general strike and dip was accomplished via a two-prong attack.

First estimates of apparent strike and dip on cross- and long-sections ~~was~~ were made by recording all localities where the dike cuts 3 adjacent drillholes without apparent offset or 2 drillholes ~~a~~ with a lack of appropriately located gouge zones that might represent faults offsetting the dike (See results in Appendix). From this, a stereonet adjusted true orientation of the dike was determined at ~045° (to grid north)/24° SE.

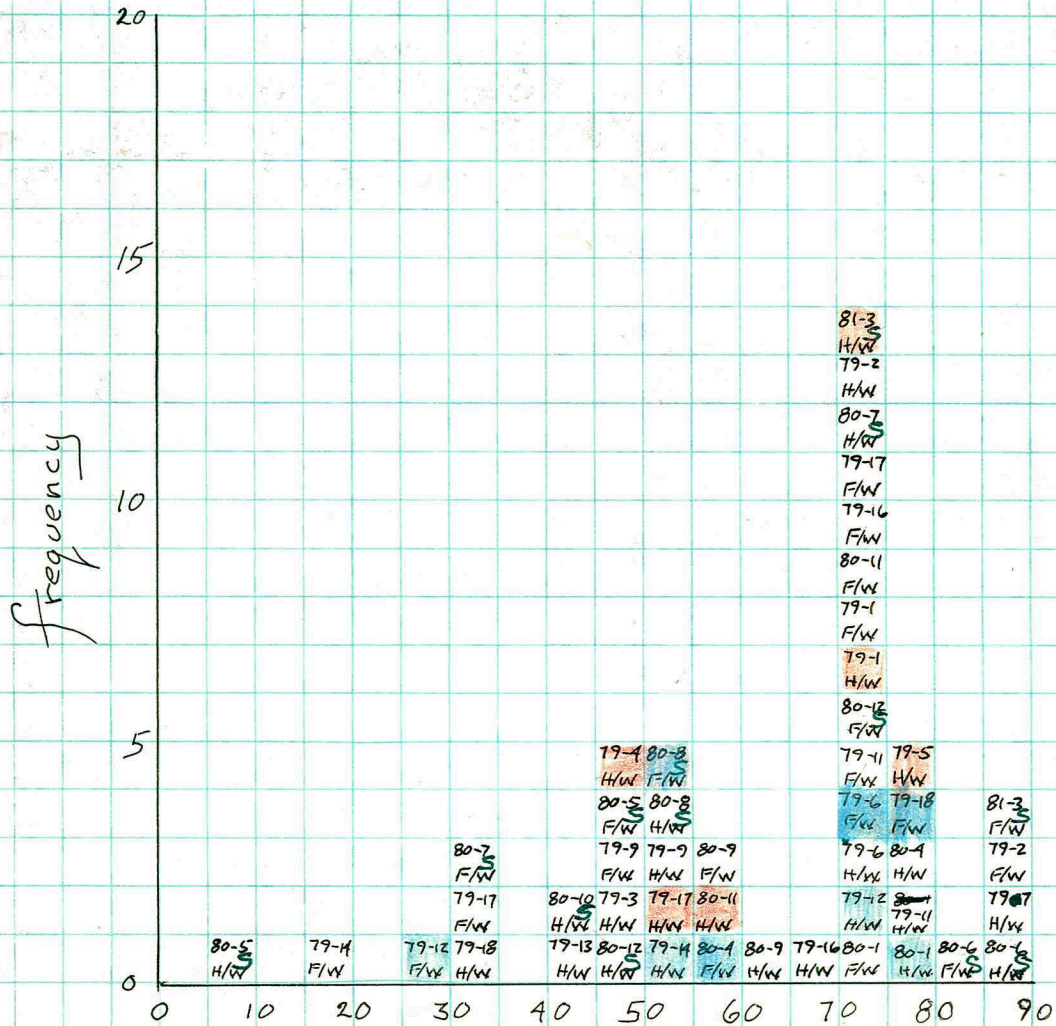
THIS TRANSLATES TO AN AVERAGE OF ~73° TO C.A. FOR DIKE CONTACTS ADJUSTING FOR DRILLHOLE DEVIATION.

SECONDLY, THE CONTACT ANGLES WITH RESPECT TO CORE AXES FOR ALL DIKES IN DRILLCORE STORED AT GRUM CAMP, WERE MEASURED. THESE WERE PLOTTED UP IN A FREQUENCY HISTOGRAM (ATTACHED). NO ATTEMPT WAS MADE TO RESOLVE THESE CONTACT ANGLES TO TRUE STRIKE AND DIP BECAUSE IT WOULD INVOLVE TIME-CONSUMING TRIG PROBLEMS AND THE PHYSICAL PROBLEM OF REFITTING CORE TOGETHER TO DETERMINE THE DIKE CONTACT ANGLE WITH RESPECT TO THE GENERAL STRIKE/DIP OF S_2 AWAY FROM THE DIKE. (IT BECAME APPARENT WHEN MEASURING THESE CONTACTS, THAT S_2 DEVIATES IN THE IMMEDIATE VICINITY OF THE DIKES.)

THE RESULTING FREQUENCY HISTOGRAM IS BIMODAL WITH THE SHARPEST PEAK AT 70-75° TO CORE AXIS COINCIDENT WITH THE PREVIOUS ESTIMATE OF 73°. THE SECOND BROAD PEAK AT 50° TO C.A. PROBABLY ARISES FROM THE SINUSOIDAL NATURE OF DIKE CONTACTS AS OBSERVED IN PIT MAPPING. THIS IS FURTHER CONFIRMED IN THAT RARELY WERE HANGINGWALL AND FOOTWALL DIKE CONTACTS SIMILAR IN THE SAME DRILLHOLE.

THUS ARMED WITH THIS GRID ORIENTATION OF 045/24°±SE WHICH TRANSLATES TO APPARENT DIPS OF 18°± ON BOTH CROSS- AND LONG-SECTIONS, APPARENT

DRILLCORE DIKE CONTACTS - DY DEPOSIT



NOTES

(1) BIMODAL DISTRIBUTION

(2) THE FIRST ASSUMPTION OF ~73° TO C.A. IS LOOKING PRETTY GOOD!

* RED ONES ARE POOR MEASUREMENTS.

* DIKE CUTS S_2

OFFSETS WERE DETERMINED ON THE DIKE. IN MOST CASES APPARENT OFFSETS $<\sim 15m$ HAVE BEEN IGNORED AND ATTRIBUTED TO DEVIATIONS IN THE DIKE PLANE.

NEXT, THE ~~APPARENT~~ APPROXIMATE SURFACE PROJECTION OF ALL THESE FAULTS WERE PLOTTED ON THE Dy GEOLOGY MAP AND THERE BEGAN THE ARDUOUS TASK OF CREATING A SURFACE PATTERN OF FAULTS THAT ALLOWED FOR ALL THE APPARENT OFFSETS AND FIT THE SURFACE GEOLOGY. THE RESULT OF THIS WORK IS IN THE ATTACHED MAP ROLE.

SOME FINAL NOTES → (1) SOME OF THESE FAULTS ALIGN THEMSELVES WITH AIRPHOTO LINEARS, BUT THERE IS NO STRIKING CORRELATION. MANY OF THESE LINEARS MAY BE PRE-DIKE FAULTS OR TENSION JOINTS.
(2) TRANSLATIONAL OFFSET ON THESE FAULTS IS GENERALLY $<200m$ EXCEPT FOR THE ONE NORTH OF THE DEPOSIT FOR WHICH THE OFFSET IS UNKNOWN. MANY/MOST OF THESE FAULTS MAY BE SIMPLE VERTICAL BLOCK FAULTS.

STEP 2

HAVING RUN THESE POST-DIKE FAULTS THROUGH THE SECTIONS AND APPROPRIATE GOUGE AND/OR BRECCIA ZONES, THE NEXT MOST RELIABLE MARKERS, THE SULPHIDE ZONES, WERE CONSIDERED. USING POLISH REVERSE LOGIC, AFTER HAVING GONE THROUGH THE

JOB OF DEFINING THE TRACES OF THESE FAULTS, THE UNFAULTED CROSS-SECTIONS (19+50E & 13+50E) WERE CHOSEN FOR STUDY. COINCIDENTALLY THESE SECTIONS ALSO HAVE ABUNDANT SYMMETRY DATA.

THE ASSUMPTION WAS MADE THAT THE Dy WAS DEFORMED IN A GROSSLY SIMILAR STYLE TO GRUM. USING LITHOLOGICAL CORRELATIONS, SYMMETRY DATA AND ANVIL CYCLES IN AS BEST AGREEMENT AS POSSIBLE, THE INTERPRETATIONS WERE MADE. BOTH SECTIONS, ESPECIALLY 19+50E, COULD USE CONSIDERABLE MORE HEAD-SCRATCHING, BUT THEY DO DEMONSTRATE THAT THE Dy DEPOSIT IS AMENABLE TO "GRUM GAMES".

THE Dy CAN BE INTERPRETED IN GRUM STYLE ~~AS DEM~~ DESPITE THE WIDE DRILLHOLE SPACING, AND WITHOUT NECESSARILY TAKING INTO ACCOUNT F_1 FOLDS. THIS IS DEMONSTRATED BY THE INTERPRETATION I MADE ON SECTION 80W - GRUM DEPOSIT - WHERE A GOOD FACSIMILE OF THE PRESENT INTERPRETATION MINUS THE F_1-FOLDS, WAS MADE WHEN ALL THE DRILLHOLES WERE BLACKED OUT WITH THE EXCEPTION OF A FEW RANDOMLY CHOSEN ONES AT APPROXIMATELY THE SAME SPACING AS THE Dy DRILLING. LESSONS GLEANED FROM THIS EXERCISE AND USED EXTENSIVELY IN THE Dy INTERPRETATIONS ARE LISTED ON THE THE ATTACHED GRUM SECTION 80W INTERPRETATION IN THE MAP ROLE

IT IS AT THIS POINT THAT I'VE RUN OUT OF TIME. THE NEXT INTENDED STEP WAS TO DRAW UP THE

OTHER SECTIONS AND ATTEMPT TO CORRELATE FOLDS THROUGH LONG- & CROSS-SECTIONS.

A FINAL NOTE - WHAT IS THE STYLE OF THE FOLDING? - IT WOULD APPEAR TO COMPRISE LARGE S-FOLDS; THE NORTHERN PORTION OF SECTION 13+50E IS VERY DIFFICULT TO INTERPRET OTHERWISE.

(3) ~~D~~ DRILLHOLES GENERALLY DEVIATE TO BECOME APPROXIMATELY PERPENDICULAR TO THE S_2 PLANE. LOOKING AT THE PLANE MAP OF THE SURFACE TRACES OF DRILLHOLES ON THE Dy, IT BECOMES OBVIOUS THAT S_2 STRIKES ALONG A LINE OF ~45° TO THE GRID PATTERN.

IMPLICATION - IF THE MAIN ~~MAJOR~~ FOLDING EVENT TO BE CONSIDERED IN INTERPRETATION OF THE Dy IS F_2, AS IT IS AT THE GRUM AND SWIM DEPOSITS, THOSE FOLD AXES RUN ~45° TO THE Dy GRID, AND THE FOLDS SHOULD APPEAR ON BOTH LONG- & CROSS-SECTIONS. IDEALLY SECTIONS SHOULD BE DRAWN ALONG THE LINE OF THE DRILLHOLE DEVIATION.

THE END

P.S.- I'VE JUST SEEN SOME AU-BEARING SAMPLES FROM POISON MOUNTAIN AND THEY'RE DEAD-RINGERS FOR 5C*. I BETCHA A FINE BOTTLE OF SCOTCH, DAVE, THAT WE GET SOME GOOD AU-ASSAYS BACK FROM SOME OF THESE 5C* UNITS → BUT NOTE THAT THE SMALL SAMPLE TESTED MAY CAUSE ERRATIC ASSAYS.