A MINERALOGRAPHIC STUDY OF DRILL CORE FROM THE FARO DEPOSIT OF DYNASTY EXPLORATIONS

By

R.M. Thompson, P. Eng. December 15/65

THE UNIVERSITY OF BRITISH COLUMBIA

VANCOUVER 8, CANADA

DEPARTMENT OF GEOLOGY

December 15, 1965

Dr. Aaro E. Aho, P. Eng.,
Dynasty Explorations Ltd.,
335 Burrard Street,
Vancouver 1, B.C.

Dear Aaro:

Herewith my report on the polished sections from the Faro Deposit. It is probably not in a proper form for a Board of Directors meeting but I hope it will be of value to those most concerned.

I do not forsee any particular difficulties in mineral separation as no really complex fine grained intergrowths have shown up. A lot remains to be done such as determining temperatures of deposition from x-ray studies, paragenetic sequence and studies of 409 samples which include minerals not observed in the present study.

Fifteen polished sections have been made and thirty seven more will be. Twenty three thin sections are on hand and 14 more will soon be ready. A brief look at them shows several interesting minerals and relationships, such as coarse pinkish andalusite with galena, arsenopyrite and chalcopyrite. I will await your instructions on these. With best wishes, I am

Yours sincerely,

Bob

R.M.Thompson

A MINERALOGRAPHIC STUDY OF DRILL CORE FROM THE FARO DEPOSIT OF DYNASTY EXPLORATIONS

Thirteen samples of drill core were received from Dr. Aaro Aho on November 17, 1965 for a polished section study. Mounted sections were diamond polished because of the abundance of pyrite in the samples. The results of this examination are as follows.

DDH 65-51

Section 51-82.7' This core sample consists of about 50% of rounded grains of pyrite about 1mm in diameter in a dark aphanitic groundmass.

In polished section the texture observed is a rather striking one with numerous circular grains of pyrite (up to 4mm in diameter with many showing several minute inclusions of sphalerite. Plate 1), in a groundmass of hard and soft gangue minerals, finer grained pyrite, sphalerite and scant amounts of galena and chalcopyrite.

DDH 65-51

Section 51-108' The massive sulphide core consists of pyrite, marcasite, sphalerite and minor amounts of galena and chalcopyrite. A polished section shows pyrite crystals up to 3mm that have been partially altered to marcasite with typical colloform texture. Pyrite is fractured and embayed by sphalerite. Sphalerite contains small inclusions of galena and chalcopyrite both as small grains and as exsolution blebs. Galena and chalcopyrite grains rarely exceed 100 microns in maximum dimension.

DDH 65-51

Section 51-113.5' This core consists of massive granular pyrite with interstitial grains of sphalerite and galena. A polished section shows about 75% of pyrite in the form of rounded and embayed crystals from 0.5x0.5 to 1x1mm in diameter. The interstitial sphalerite and galena rarely exceed 0.5mm and do not exhibit complex intergrowths. There is very little gangue in this section.

DDH 65-1

Section 65-1-243' Massive sulphide core with pyrite grains in a groundmass of brown sphalerite, pyrrhotite, marcasite, minor chalcopyrite and traces of galena.

A polished section reveals a large amount of pyrite in irregular areas which are in various stages of alteration to marcasite. The groundmass is largely sphalerite and a minor amount of a hard gangue mineral. Small amounts of galena and chalcopyrite are closely associated with sphalerite. Pyrrhotite occurs in areas up to 160x160 microns but the relationships of this mineral to the other metallic minerals are not evident in this section.

Section 65-1-251.4' This core sample is mainly fine grained brownish black sphalerite with irregular grains of marcasite and scattered crystals of pyrite.

The polished section shows a number of large irregular areas of pyrite variously altered to marcasite (Plate 2). The groundmass consists of approximately equal amounts of sphalerite and gangue minerals. Galena and chalcopyrite are trace constituents.

Plate 1 Section 51-82.7'

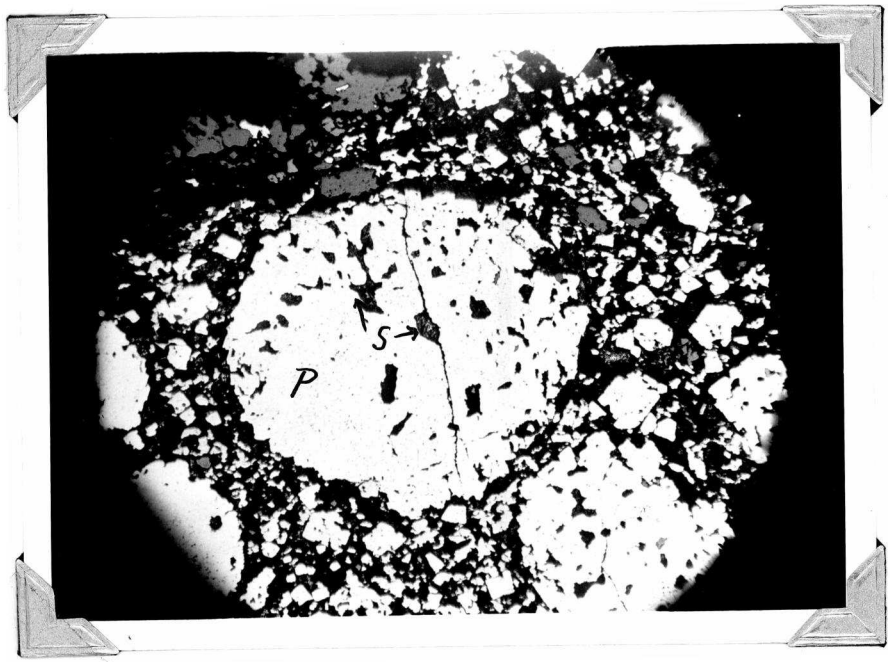
Circular areas of pyrite (P) with several small inclusions of sphalerite (S) in a groundmass of finer grained pyrite, sphalerite and gangue.

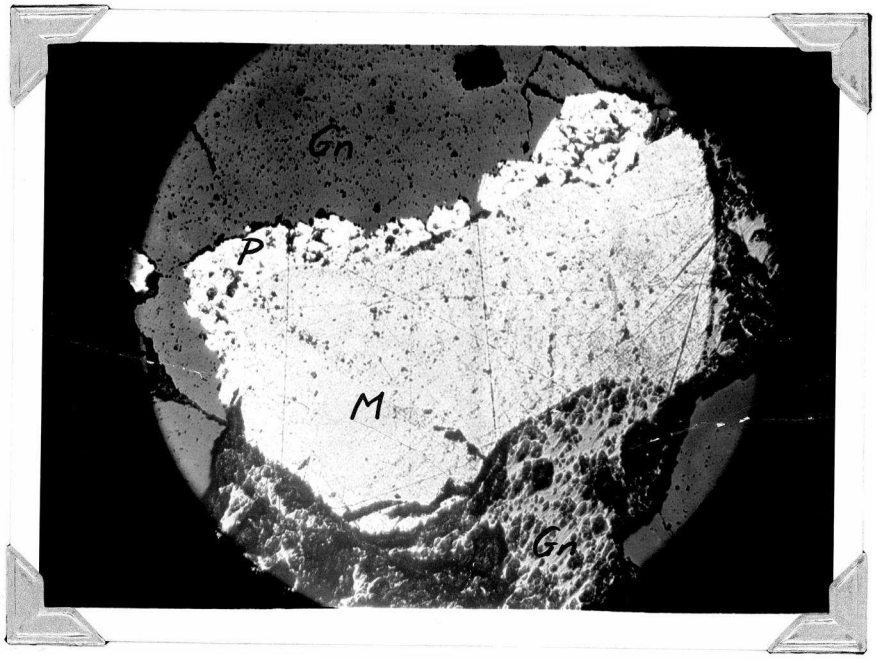
One nicol. x 32.

Plate 2 Section 65-1-251.4'

Unreplaced rim of pyrite (P) on marcasite (M) in gangue (Gn).

One nicol. x 82


S
P


Gn
P
M
Gn

Section 65-1-267.5' This core sample consists of a fine grained mixture of pyrite, sphalerite, and a small amount of galena.

Pyrite in the form of ragged areas accounts for approximately 70% of the polished section. The remainder comprises gangue, sphalerite, less than 2% of galena and traces of chalcopyrite. Galena and sphalerite are often in contact (Plate 3). Emulsion texture and other complex intergrowths involving these two minerals have not been observed. There is good evidence of pyrite having been replaced by galena and chalcopyrite. Chalcopyrite is usually in close association with sphalerite. Pyrrhotite is present as an exsolution product (finely divided dots and blebs) in some grains of sphalerite.

Section 65-4-319' This core sample shows about 50% of pyrite in the form of rounded grains varying in size from 0.5 to 1.5mm in diameter in a dark fine grained groundmass of sphalerite and gangue. Both minerals appear completely fresh and unaltered. A polished section shows rounded and more or less embayed crystals of pyrite from 4.5x2.8 to less than 0.1mm in diameter. Most grains are roughly equant and in the 1x1 to 1x2mm range. Several pyrite grains have inclusions of sphalerite (Plate 4). Distinct veining of pyrite by sphalerite is rarely seen. One pyrite crystal shows a narrow (0.1mm) vein of chalcopyrite. The groundmass of the section consists of sphalerite and a soft gangue mineral in approximately equal amounts. Galena occurs in minor amounts as small irregularly shaped grains contacting

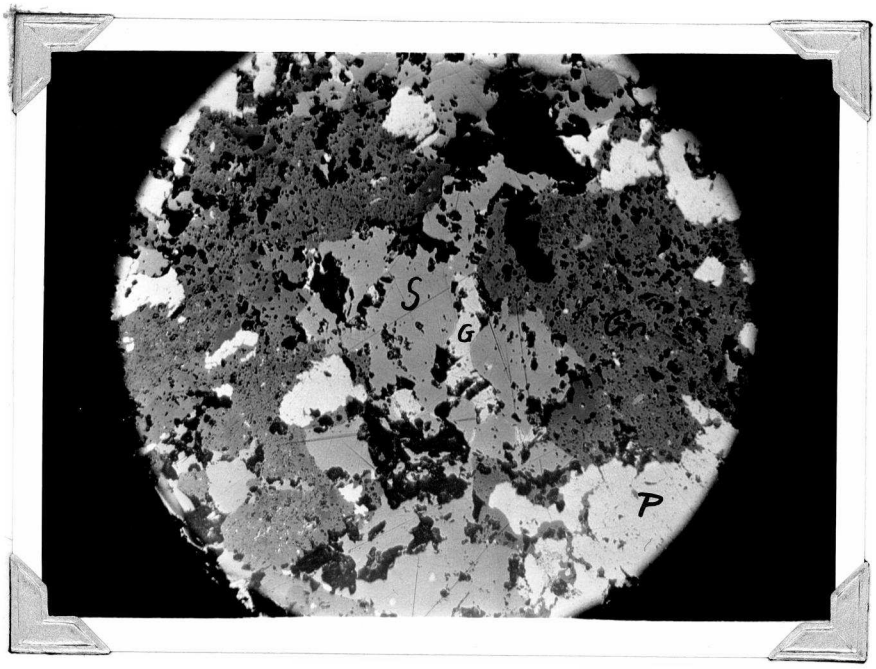
sphalerite. The size range of galena varies from 80x48 to 200x160 microns. Chalcopyrite is occasionally seen at the contact of pyrite and sphalerite. Chalcopyrite and pyrrhotite occur in small amounts in sphalerite as exsolution "dots" in the 10 to 20 micron size range.

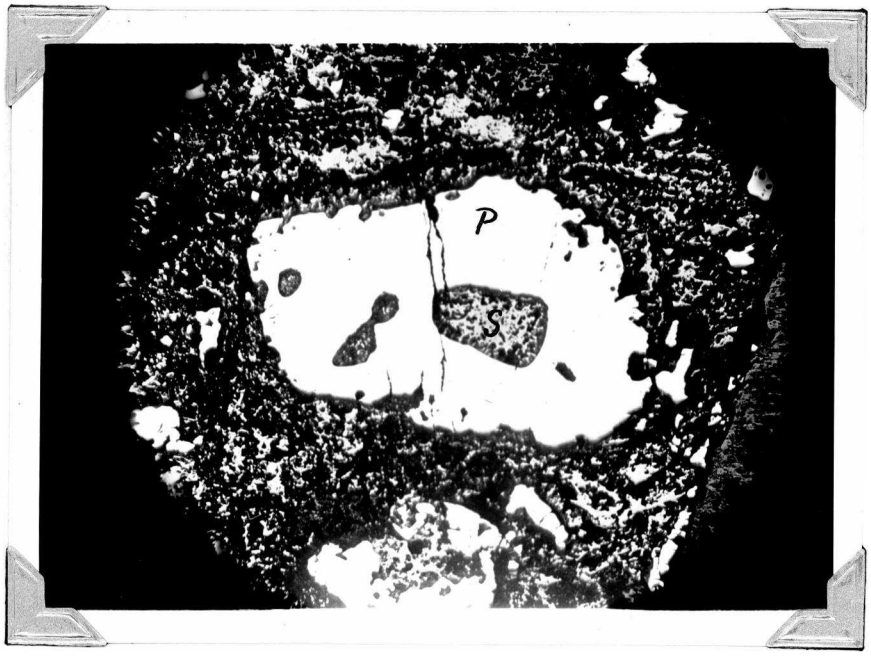
Section 65-4-341' The massive sulphide core shows bright sparkling cubes of pyrite (1-2mm) in a groundmass of dark brown coarse grained sphalerite and minor galena.
The polished section is much like that of 65-4-319 with embayed cubes of pyrite in a groundmass of sphalerite and galena. The galena in this section is the coarsest yet observed with grains up to 1.5mm. Sphalerite and galena show embayments into pyrite and sphalerite is common as inclusions within pyrite but galena inclusions within pyrite are very rare. A small amount of pyrrhotite occurs as an exsolution product in sphalerite.

Section 65-4-416' This is a massive sulphide core with about 85% of granular pyrite in crystals up to 2mm, interstitial dark brown sphalerite (13%) and galena (2%).
A polished section shows an aggregate of rounded grains of pyrite averaging about 2mm in diameter. Sphalerite and galena occur in the interstices of and as embayments into pyrite . Pyrite has a small percentage of sphalerite inclusions. The amount of gangue in the section is negligible.

Plate 3 Section 65-1-267.5
Central area of sphalerite (S) with veinlet of galena (G) in gangue (Gn). Lower right is pyrite and marcasite.
One nicol. x 82.

Plate 4 Section 65-4-319
Sphalerite inclusions in pyrite (P). The large inclusion (S) measures 483 x 168 microns.
One nicol. x 32


S
G
P


P
S

Section 65-5A-282' Massive sulphide core with irregular pyrite grains in a groundmass of white gangue, sphalerite and minor galena.

A polished section shows about 50% of rounded and fractured grains of pyrite up to 2mm in diameter in a groundmass of gangue (40%). Sphalerite (10%) and galena(1%) occur as small irregular areas in gangue. Both minerals also occur as fracture filling and replacement areas in pyrite. Some pyrite shows incipient alteration to marcasite.

Section 65-5A-387' This drill core shows disseminated grains of pyrite (1-2mm) in a dark fine grained groundmass of sphalerite, gangue and minor galena.

A polished section shows about 15% of irregularly shaped pyrite grains, 10% of sphalerite and 1-2% of galena in a soft non-carbonate gangue. This section gives the best evidence for paragenetic sequence (plates 5-7). Galena, sphalerite and chalcopyrite may all be seen as cross cutting veins in pyrite. Small inclusions of chalcopyrite and of sphalerite were noted in the pyrite of this section. Small amounts of pyrrhotite in areas up to 1mm are present but it was not observed in contact with other metallic minerals.

Section 65-6-420' This core sample consists of coarse (1-3mm) granular pyrite (80%) and dark brown sphalerite (20%).

A section shows well polished, rounded and fractured grains of pyrite with a few inclusions of sphalerite in a groundmass of sphalerite and one $\frac{1}{4}$mm area of galena.

Plate 5 Section 65-5A-387'
Pyrite (P) with inclusions of chalcopyrite (C), embayments of galena (G). Large area at right is pyrrhotite (Pr) with some alteration to marcasite. Small area of sphalerite (S) at upper right. Lower right and upper left is gangue (Gn).
One nicol. x 82

Plate 6 Section 65-5A-387'
Central area of sphalerite (S) and chalcopyrite (C) in gangue (Gn). Bright areas at centre left and right are pyrite (P). Small area of galena at lower right.
One nicol. x 82

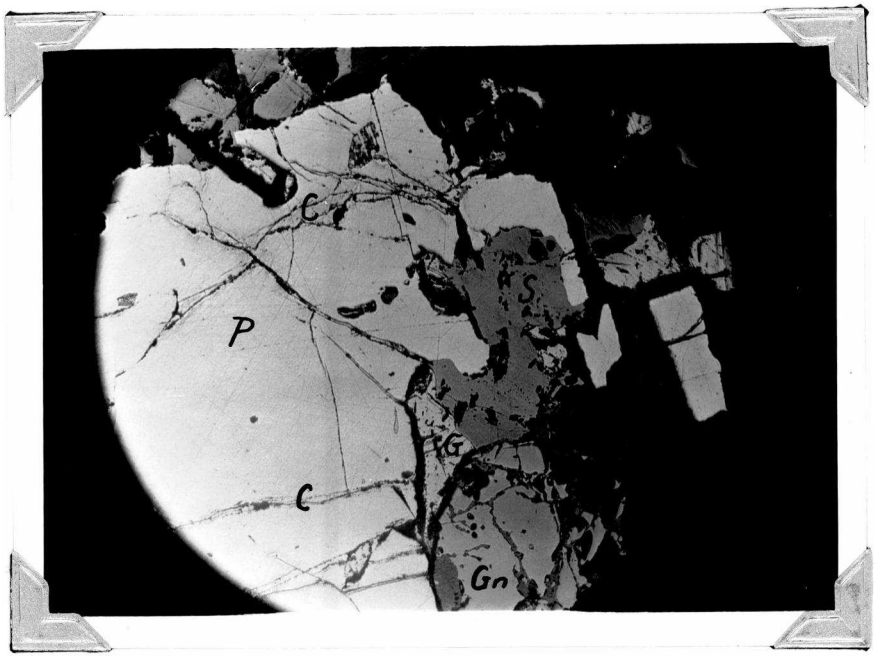


Plate 7 Section 65-5A-387'

Pyrite (P) with veinlets of chalcopyrite (C), embayments of sphalerite (S) and galena (G). One nicol. x 82. LOwer centre is gangue (Gn).

Section 65-7-264' This core ample shows pyrite, sphalerite, and minor galena in a hard white gangue. The split surface of the core shows a partial coating of a soft white fine grained mineral.

A polished section shows several grains of pyrite up to lcm by lcm bordered and veined by galena. Smaller grains of pyrite and areas of composite sphalerite-galena grains occur throughout the gangue. Marcasite is present in m inor amount.

A tentative order of metallic mineral deposition is as follows: pyrite, pyrrhotite, sphalerite, chalcopyrite, galena, marcasite. Pyrite should be freed at a relatively coarse grind. If a pyrite concentrate were to be made it would have zinc as the major impurity and negligible amounts of lead and copper. This report should be considered as a preliminary one to be followed by a more comprehensive study of both thin and polished sections.

Respectfully submitted,

R. M. Thompson

R.M.Thompson, P. Eng.
December 15, 1965.