~~Group 32 - Drill Log 1972~~ 105
Group 9 Mina

HUGHES TOOL CO. 105
MINING PAPERS
GROUP 9, MINA

1940 6000 0319

60000319 (1940)
Gr. 9 Geology
orig. Saunders
cc: Lutz
LV
Tonopah ✓
9-29-75 Sfm.

P. O. Box 872
Douglas, AZ 85607
September 10, 1975

Robert L. Lutz
687 Cleveland Street
Fallon, Nevada 89406

Dear Bob:

Enclosed are descriptions of your recent batch of samples. I studied an extra one from set 10 that you sent.

I see absolutely no similarity between this suite and a massive sulfide environment. In fact, all evidence points the other way, and the suite looks classically like a contact metasomatic one. The alteration is very similar to that at Sylvanite, New Mexico.

Best regards,

Sid

Sidney A. Williams

SAW:bj
encls.

9 - 1 - 75

The rock is a chaotic breccia of volcanic fragments. These are invariably andesites, usually very chilled or pilotaxitic ones showing good flowage alignment and virtually devoid of phenocrysts. A few coarse porphyry fragments were noted. In places the matrix seems fragmental, in others it seems to be occupied by a chilled plagioclase - rich andesite. The rock has been metamorphosed in the upper epizone.

Plagioclase carries little sericite and seems fresh; actually it is albitized and shows degenerate twinning. Clumps of coarse Fe-rich epidote derived from plagioclase and mafites occurs in the matrix or in veinlets, often associated with actinolite. Minor disseminated (and oxidized) pyrite occurs here. The veins may turn to slip planes occupied by matted scales of incipient secondary biotite. Rarely does tourmaline occur in the matrix.

9 - 2 - 75

The original rock was a chaotic breccia of large andesite fragments. Although not identical, all show highly fluidal plagioclase-rich matrices and carry a small amount of plagioclase phenocrysts. The rock was again mildly brecciated prior to upper mesozonal metamorphism.

Plagioclase is mildly sericitized or prehnitized only in rubbly zones. Elsewhere it seems fresh but is albitic and shows degenerate twinning. Crackled phenocrysts host sprays of coarse prismatic diopside, and this mineral also replaces plagioclase and mafites in the matrix. It may be accompanied by pyrite but, if so, is apt to be corroded by thuringite. Late epidote veins cut all other features.

Mineral percentages are estimated as: plagioclase 67%, diopside 24%, pennine 2%, epidote 2%, goethite 0.5%, orthoclase 0.5%, thuringite tr., sericite 2%, prehnite 0.5%, calcite tr., sphene 1%, apatite 0.5%.

9 - 3 - 75

The rock is a syenite with a few very large, equant plagioclase phenocrysts set in a matrix of slender, twinned orthoclase laths that lie in random orientations. Some of these show textures suggestive of replaced plagioclase, and the ultimately original rock is uncertain. The rock has been mesozonally metamorphosed.

Plagioclase is heavily sericitized whilst orthoclase remains fresh except that it is riddled with anastamosing seams of late kaolin. Dark ferrohastingsite, as polycrystalline aggregates with interstitial magnetite, replaces original hornblende phenocrysts. It also veins the fabric with rare epidote and is again accompanied by magnetite. Traces of quartz occur in thin, discontinuous crushed zones.

Minerals are present in the following estimated amounts: orthoclase 58%, plagioclase 4%, hornblende 20%, magnetite 3%, sericite 3%, apatite 0.5%, tourmaline 0.5%, kaolin 8%, quartz 0.5%, sphene 2%, epidote tr..

9 - 4 - 75

The nature of the original rock is uncertain but it was clearly fragmental. It could have been a lithic tuff. Fragments of generally granular texture are clearly visible and consist largely of quartz and feldspars. Isolated angular grains of quartz and feldspars litter the matrix. Broad zones cutting the fabric were impregnated with pyrite. It subsequant alteration to hisingerite and minor goethite in place, and abundant satellitic cryptocrystalline jarosite, has resulted in strong supergene alteration.

As a result, all orthoclase is selectively replaced by smectite, allophane, and minor jarosite. Similar but much weaker alteration has afflicted plagioclase. Quartz has behaved neutrally, although during pyritization it showed minor growth.

9 - 5 - 75

The rock is an andesite composed of small feathery plagioclase laths in almost random orientation. Mafites occur in the interstices with accessory magnetite and sparingly (hornblende) as phenocrysts. A few large plagioclase crystals were also noted. The rock has been metamorphosed in the mesozone.

Plagioclase remains virtually unaffected. All mafites, however, are replaced by dense scaly masses of pale brown biotite. The biotite may attack adjacent plagioclase along fractures. Thin veinlets of granular quartz cut the fabric.

Percentages of minerals present are as follows: plagioclase 61%, biotite 28%, magnetite 6%, apatite 1%, quartz 3%, hydromicas 0.5%, calcite tr..

9 - 6 - 75

The original rock was a siltstone, a fine-grained layered rock composed primarily of angular detrital grains of quartz and feldspars. Some argillaceous and calcareous materials doubtless occurred in the matrix. The rock has been strongly metamorphosed in the upper mesozone with accompanying Cl - metasomatism.

Effects very from one lamina to another. In coarse silty areas quartz survives unchanged as inclusions in poikiloblastic diopside prisms and Fe-rich epidote. The same two silicates occur in shaly laminae but are much finer grained and may be accompanied by ragged prisms of ferrohastingsite and clusters of minute biotite scales. One lamina carries coarse andradite anhedra and huge poikiloblastic masses of scapolite. Retrograde calcite and clinochlore are more prevalent here. Orthoclase is recrystallized in the matrix of shaly layers.

9 - 7 - 75

The rock is a tactite. Mesozonal metamorphism has been intense and resulted in thorough recrystallization but some features of the fabric suggest that the original rock was a coarse grained basic volcanic.

The rock consists essentially of irregular islands and connected masses of granular garnet. These are set in a matrix of very coarse poikiloblastic anhedra of prehnite. The prehnite envelops beads and small corroded (to calcite) prisms of diopside. Coarser calcite and granular quartz fill - interstices and may also occur as inclusions.

The following mineral percentages appear: garnet 27%, prehnite 56%, calcite 8%, quartz 5%, sphene 1%, hematite tr., apatite tr., diopside 3%.

9 - 8 - 75

The original rock was an andesite composed of coarse ragged plagioclase laths showing a crude flowage alignment. Some granular plagioclase and probably mafites were confined to the interstices. The rock has been strongly metamorphosed in the upper mesozone with accompanying Cl - and K - metasomatism.

Plagioclase shows varying degrees of alteration. First it may grade into fresh clear albite showing typical chessboard twinning. Such crystals may have a core replaced by coarse shreddy tablets of scapolite. The albite then mingles with K - rich plagioclase and eventually, in some areas is replaced by clear granular orthoclase. Mafites are represented by loose clusters of anhedral or skeletal diopside, accessory sphene, garnet, and clinozoisite. Chalcopyrite (oxidized to hematite and chrysocolla) tends to occur here but favors veins of garnet slightly. Retrograde calcite has slightly attacked garnet and diopside.

9 - 9 - 75

The rock is a thick bedded siltstone much like 9 - 6. Here, however, most laminae are rich in small angular quartz grains with argillic material in the matrix, and shaly laminae uncommon. The rock has been metamorphosed in the mesozone, and the mineralogy varies with the original chemistry of the particular bed.

Generally detrital quartz and plagioclase remain unchanged while argillic material appears as microcrystalline orthoclase in the interstices. In some laminae the orthoclase is stained with hematite and dusted to wholly replaced by bundles of fine scaly biotite. The matrices of coarser laminae carry pale hornblende, diopside, and clinozoisite in the interstices. These minerals may also occur in ill-defined veins with crystalloblastic quartz.

6000 0319 (1940)

9 - 10 - 75

The rock originally was an arkosic sandstone showing massive bedding and a uniform grain size except for an occasional eye of quartz. It may have been to some degree calcareous as well. Strong recrystallization has been effected by upper mesozonal metamorphism and Cl - metasomatism.

In most places detrital quartz and orthoclase are merely cemented by growth with skeletal diopside prisms and granular garnet in the interstices. In coarser laminae some albitized plagioclase was noted but most has been the nucleus for coarse scapolite that spreads out and invades the surrounding rock. Clusters of coarse diopside and garnet occur in and adjacent to the scapolite. A few patches of calcite occur in the interstices but generally retrograde effects have been mild.

10 - 1 - 75

The original rock was a tonalite composed of coarse plagioclase anhedra, ragged but very large hornblende prisms, and interstitial quartz. Textures have been blurred by simultaneous crushing and mesozonal metamorphism.

Some plagioclase has recrystallized as granular aggregates of albite where most severely crushed. Generally, however, the cores are charged with granular to almost earthy epidote and the rims are a dense mush of tiny biotite and sericite flecks and earthy epidote. Biotite and epidote are also drawn out into crushed zones as "veinlets". Hornblende survives but is stippled with epidote prisms and shows marginal attack by biotite. The few primary biotite tablets present, however, are converted directly to pennine. Quartz has been perfectly neutral.

6000 0319 (1942)

9 - 11 - 75

The rock is a quartzite derived from an arkosic sandstone by metamorphism, probably of mesozonal grade. The original rock was rich in subround to round quartz grains with lesser amounts of plagioclase, minor orthoclase, and chert.

As a result of metamorphism quartz has grown to the point of coalescing along smooth grain boundaries. Plagioclase and orthoclase trapped in the interstices show concave embayments by the quartz. Sphene has also migrated into grain boundaries. Mafites originally present may have been converted to biotite, but this has since retrogressed to interlayered smectite and sericite.

9 - 12 - 75

The rock is a quartzite almost identical to 9 - 11 - 75. This rock was also an arkosic sandstone with plagioclase as the second most abundant constituent. By contrast, however, quartz grains here were somewhat more angular. The rock has been epizonally altered with mild accompanying B - metasomatism.

Quartz has grown strongly, coalescing along sutured mutual boundaries. It generally shows strain and the overall fabric comes close to exhibiting foliation. Bunches of coarse sericite replace the plagioclase completely. Sprays of pale green tourmaline prisms may lie in the sericite but individual crystals can penetrate quartz.

Minerals are present in the following estimated amounts: quartz 91%, sericite 5%, kaolin 1%, tourmaline 2%, hisingerite 0.5%, rutile tr..

9 - 13 - 75

The original rock appears to have been an intrusive, possibly one carrying β quartz as phenocrysts. All further textural evidence has been obliterated by intense epizonal metasomatism.

The present rock is a dense granular aggregate of albite. These are small interlocking anhedra showing degenerate twinning. There are a few large eyes of quartz, usually with some corroded albite inclusions; these seem to represent former phenocrysts that were extensively enlarged. Smears or twisted aggregates of sericite and occasional anatase bipyramids may represent former mafites.

The rock is cut by a thick quartz vein (not sectioned) carrying minor (oxidized) chalcopyrite, but some is also scattered in the walls and pseudomorphosed now by hisingerite.

Mineral percentages are estimated as: quartz 7%, plagioclase 80%, sericite 11%, anatase 0.5%, hisingerite 1%.

6000 0319 (1940)

9 - 14 - 75

The rock is a breccia of uncertain origin. It contains recognizable fragments of andesite, limestone, and calc-siltstone. The matrix is coarse granular calcite. The rock has been strongly Cl-metasomatised in the upper mesozone.

The resulting tactite carries large irregular patches or granular masses of strongly zoned garnet. These show a tendency to occur in fragments of impure limestone. The matrix calcite is merely recrystallized. Large portions of the fabric, even the andesite fragments, are extensively replaced by coarse poikiloblastic scapolite. Fe-rich epidote may fill the interstices, and sphene and actinolite occur as inclusions as well as innumerable blebs of calcite. Minor retrograde pennine occurs in the interstices.

9 - 15 - 75

The original rock was a dense black shale. Its textures have been obliterated by intense recrystallization occasioned by mesozonal thermal metamorphism.

The rock is now a hornfels, a granular mosaic of andalusite, cordierite, and biotite. All three species are heavily dusted with minute inclusions, mostly magnetite, leucoxene, and possibly carbonaceous material. Although andalusite tends to show euhedral outlines, in detail the grains show intricate frilly boundaries. So do biotite and cordierite. The few quartz clasts noted have behaved meutrally. The rock is cut by innumerable rigorously parallel "veinlets". These are merely thin zones along which all minerals are purged of inclusions.

6000 0319 (1940)
Gr. 9 Geology.
orig: Saunders
cc. Lutz
LV
Tohopah ✓
9-29-75 8fm.

P. O. Box 872
Douglas, AZ 85607
September 20, 1975

Robert L. Lutz
687 Cleveland Street
Fallon, Nevada 89406

Dear Bob:

Sorry I cost you a sixpack. I'll buy you a beer next time I see you.

As for the Sylvanite district, I refer you to P.P. 208 by Lasky. The similarities may not be as apparent from reading this as from study of suites from both localities. I can assure you that they are striking.

Best regards,

Sidney A. Williams

SAW:bj
encls.

Gr 9 Geology 6000 0319 (1940)

summa

Internal Communication

Date: October 31, 1975

To: Dave Gribbin

From: Fred Saunders

Subject: Group 9 -- Bluelights

This spectrographic analysis is of a piece of the ore that we would be looking for at Group 9. The mineral name would be tetrahedrite.

The sample represents a solid solution series of tetrahedrite CuAsS to tennantite CuSbS, but the mineral has varying high amounts of silver and zinc.

The assay would be 87 ounces/ton silver and greater than 1% copper/ton and 0.7% zinc.

Fred Saunders

Fred Saunders

Pr 9 ✓ 6000 0319 (1940)
FS
LV

SKYLINE LABS, INC.
SPECIALISTS IN EXPLORATION GEOCHEMISTRY
12090 WEST 50TH PLACE • WHEAT RIDGE, COLORADO 80033 • TEL.: (303) 424-7718

REPORT OF SPECTROGRAPHIC ANALYSIS

Job No. M-3567
October 27, 1975

Summa Corporation
P.O. Box 1126
Tonopah, Nevada 89049

Attention: Fred Saunders

Values reported in parts per million, except where noted otherwise, to the nearest number in the series 1, 1.5, 2, 3, 5, 7 etc.

Element	Sample Number Bluelight 9-1Sp-75
Fe	3%
Ca	1.5%
Mg	.1%
Ag	3,000
As	>10,000
B	15
Ba	1,500
Be	<2
Bi	3,000
Cd	300
Co	<5
Cr	<10
Cu	>10,000
Ga	<10
Ge	<20
La	<20
Mn	50
Mo	2
Nb	<20
Ni	<5
Pb	30
Sb	>10,000
Sc	<10
Sn	<10
Sr	150
Ti	<20
V	15
W	<50
Y	<10
Zn	7,000
Zr	<20

Charles E. Thompson
Chief Chemist