CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the Kelsey Boltz Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

1215 1st Avenue
Safford, Arizona 85546
November 8, 1972

Mr. David A. Rhoades
Chief Exploration Geologist--North America
NL Industries
5950 McIntyre Street
Golden, Colorado 80401

Dear Mr. Rhoades:

Thank you for your letter of 2 November 72 and for the opportunity to present the Noland Ranch property. Mr. Noland lives on the property and we can arrange to show it to you at your convenience.

Enclosed you will find your forms and attached sheets. Also, I have enclosed a copy of a recent paper by Eyde describing the stratigraphy of Southern Arizona with particular reference to beds favorable to mineralization.

Please advise if I can furnish any additional information.

Very truly yours,

K. W. FOOTE

KWF:A

N L INDUSTRIES, INC.
Mining and Exploration Department
5950 McIntyre Street, Golden, Col. 80401

Name: KW Foote Date 6 Nov 72

Address: 1215 1st Ave, Safford AZ 85546

In order to determine the suitability of your mineral for our use and the merits of your property as a profitable producer, we would appreciate receiving from you as much of the following information as you can furnish us without going to unreasonable expense. Copies of any maps, sketches, reports, photographs or information pertaining to any reports written about the property would be appreciated. A ten-pound sample representing typical material should be forwarded which will be sufficient for initial laboratory tests.

1. Mineral products: Assays Show Cu, Pb & Zn with Au & Ag
2. Name of property: Noland Ranch
3. Owner of property: A.F. Noland

   Address: San Simon, Arizona

   How are mineral rights held (fee land, by location, concession, denouncement, lease or other)?: Combination of patended & unpatended Claims, fee or patended ground and State leases
4. Location: Country: USA State: Arizona

   County: Cochise Mining District:

   Section: 29, 30, 31, 32 Township: T16S Range: 31E

   Nearest town: San Simon

   Distance and direction from nearest town: South — 19 miles
5. Nearest railroad shipping point, name of railroad, and distance from mine: San Simon, Southern Pacific 19 miles
6. Type and condition of haulage road to railroad shipping point: Graded Gravel — Surfaced part way
7. Nearest port suitable for handling ocean going vessel and distance from mine: Los Angeles, California ± 650 miles
8. Brief description of deposit: (Write on back or attach separate sheets if necessary) Sheets attached

   Is the deposit flat lying or steeply dipping? dips ± 45° S

   What is the deposit's width? 3 miles* Length? 2 miles*

   Depth? Varies

* approximate spread of surface indications

Mining method, open pit or underground? probable underground

Type and average depth of overburden? Varies

Nature of terrain, mountains, hilly or flat? hilly

Nature of climate, arid, high rainfall, tropical? Arid

9. Do owners or lessees desire to sell property, sell production or lease to others? Sell or exchange property for assets

10. Estimated ore potential: Maximum: to be determined Minimum: _____

11. Tonnage available for immediate shipment: few cars from Surface Veinlets

12. Examined by: Various Date: various

Report Title: A.F. Noland has fragments of various reports

13. Description of Mineralization: On the Surface there are many porphery dikes & veinlets. Grab samples from veinlets go upto 12% combined Pb+Zn+Cu with Au & Ag present. No deep exploration

14. Typical analysis of ore: Sheets attached

15. Geology and rocks of area: letter & sheets attached

16. History of exploration and production (If any shipments have been made indicate dates, amount and to whom shipped): Several small operations on small veins and enriched areas near surface. Probably reached peak during copper boom of WWI. No accurate records available. Possibly few Hundred Cars total ore Shipped. Phelps Dodge Shipped Oxide Silver to Douglas.

17. Are there any ore processing plants near the deposit and if so, what types and where located? Douglas plant of Phelps Dodge (Cu) Also new Playas Smelter (Cu) Phelps Dodge Located about 40 mi SE. AS&R has Lead smelter at El Paso

18. What is the nearest source of water to the deposit and how large is it?: Abundant Ground water in valley fill near base of Mountains ± 1 miles North

19. What and where is the nearest source of power?: REA District — REA interconected to Rio Grande, Salt River & Colorado River Projects El Paso Natural Gas has Gas line near San Simon.

20. Is labor available locally?: yes Rates of pay: Miner ± $30.00/shift base pay

21. Would housing facilities need to be provided for mining personnel?: yes A Few houses are available at San Simon

22. Remarks (Do not hesitate to add additional comments on the back of this sheet or on attachments if you feel it will help to give us a better understanding of the nature of the deposit and the economics of its production): Should prove a large enough deposit to support its own concentrator and reduction works. Very near New Mexico line, so could locate smelter in either state - taking advantage of most favorable conditions. there is not now a Pb-Zn operation in Ariz - New Mexico area. Might be able to attract custom ore when in operation. With Cu+Ag values indicated, Pb-Zn could be produced very cheaply.

NOLAND RANCH

For geology I have had to rely on FF Sabins, a petroleum geologist. Sabins did seperate the Limestone in to its various formations. He also brought his formation names with him from the "oil patch." It makes little difference whether his Upper Cambrian and Devonian more closely resembles the formations at Bisbee or Morenci. In both area they were mineralized.

The formations present are as given by FF Sabin's Table I, enclosed. Most of the surface is Mississippian Escabrosa and Pennsylvanian Horquilla limestone. The underlaying Devonian and Cambrian formations are far more receptive to mineralization in Southern Arizona. None of the shallow workings or drill holes have been prospected below the Escabrosa.

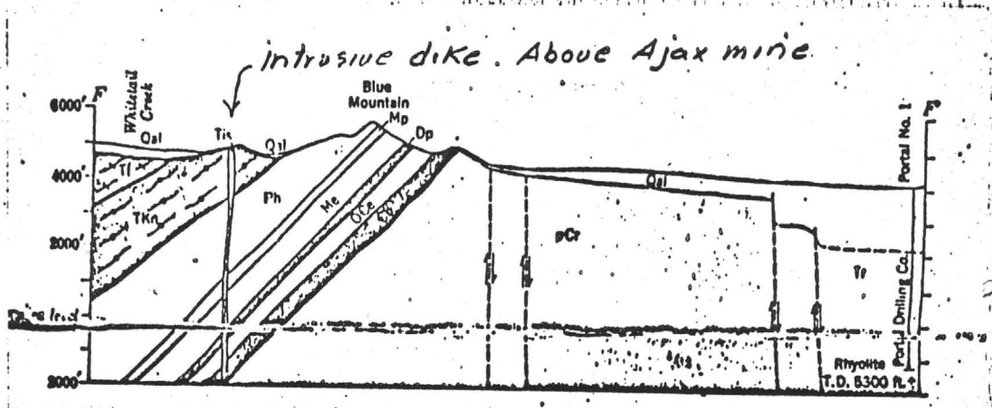
T. Eyde explains in his paper, attached, that where the mineralization is strong enough to show in an unfavorable bed-in this case the tight Escabrosa & Horquilla formations-then theunderlying favorable beds should be mineralized and are good exploration targets. Sabins has measured 445' of Cambrian El Paso and about 320' of Devonian Portal. This total of over 750' of favorable beds could give a very large ore body.

In the field, Blue Mt. and Harris Mt. seem to be part of the same large fault block. At the north-high end-beds can be traced across without major displacement. The center (Whitetail Creek) was, for some reason, more easily erroded. Hopefully, this erosion was caused by many dikes and the upwelling of a porphyry stock. If this is true, then the stock itself and the contact zone around and over the stock would be additional exploration Targets.

A usuable geologic map of the Noland Ranch Area could be compiled from (1) Geologic field studies by San Manuel geologic party in possession of A.F. Noland, (2) F.F. Sabin's-Cochise Head & Vanar Quadrangle, (3) Thesis on Hilltop mine at University of Arizona, and (4) Arizona State geologic Map. Additional field work would have to be done to locate and map the porphory dikes.

TABLE 1.—PALEOZOIC AND MESOZOIC FORMATIONS OF THE CHIRICAHUA AND DOS CABEZAS MOUNTAINS

System	Series	Group and Formation	Thickness (feet)	Lithology	Bisbee	Morenci
					(Nearest Equivalent)	
Cretaceous	Lower Cretaceous (Comanche)	Bisbee Group: "Middle and upper Bisbee strata"	2500±	Quartzite and siltstone member Limestone member Reddish-purple siltstone member.		
		Glance Conglomerate	0–1000±	Rounded cobbles and boulders of limestone, quartzite, and volcanic rocks		
		Major Angular Unconformity				
	Guadalupe (?) to Leonard	Naco Group: Concha Limestone	245–730	Light- to dark-gray limestone with abundant chert and silicified fossils		
Permian	Leonard	Scherrer Formation	120–150	Quartzitic sandstone with basal red bed member		
	Leonard to Wolfcamp	Colina Limestone	473–535	Black aphanitic limestone with locally abundant silicified fossils		
	Wolfcamp to Virgil	Earp Formation	2700±	Alternating limestone, shale, and sandstone beds; large fusulinids common		
Pennsylvanian	Virgil to Morrow	Horquilla Limestone	1605	Pure limestone with abundant chert and Pennsylvanian fossils—fusulinids, corals, and brachiopods		
		Disconformity				
Mississippian	Upper Mississippian	Paradise Formation	0–150	Brown shaly limestone, alternating with shale and sandstone; abundant *Archimedes*		
	Lower Mississippian	Escabrosa Limestone	630–730	Massive, light-gray, pure limestone; crinoidal; chert nodules common		
		Disconformity				
Devonian	Upper Devonian	Portal Formation	200–342	Thick-bedded shale and limestone member Thin-bedded shale and limestone member Black, fissile, siliceous shale member Thin-bedded shale and limestone member	Martin	Morenci Shales
		Disconformity				
Ordovician and Cambrian	Canadian to Croixian	El Paso Formation	340–715	Thin- to medium-bedded limestone and dolomite; some chert	Abrigo	Longfellow
Cambrian	Croixian to Albertan (?)	Bolsa Quartzite	320–600	Cross-stratified quartzite, shaly toward top Basal conglomerate		
		Major Unconformity				
		Precambrian Basement				



BULLETIN OF THE GEOLOGICAL SOCIETY OF AMERICA
VOL. 68, PP. 1315-1342, 3 FIGS., 3 PLS. OCTOBER 1957

GEOLOGY OF THE COCHISE HEAD AND WESTERN PART OF THE VANAR QUADRANGLES, ARIZONA

BY FLOYD F. SABINS, JR.

BULLETIN OF THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS
VOL. 41, NO. 3 (MARCH, 1957), PP. 466-510, 15 FIGS.

STRATIGRAPHIC RELATIONS IN CHIRICAHUA AND DOS CABEZAS MOUNTAINS, ARIZONA[1]

FLOYD F. SABINS, JR.[2]
La Habra, California

ABSTRACT

The Chiricahua and Dos Cabezas mountains are typical of the Basin-and-Range Province in southeast Arizona. Well exposed Paleozoic and Mesozoic marine strata overlie a Precambrian basement complex of schist and granite. The 7,600 feet of Paleozoic strata were deposited on a slowly subsiding shelf, beginning in middle(?) or late Cambrian time. Sedimentation was interrupted by an epeirogenic uplift that caused the widespread unconformity between Lower Ordovician and Upper Devonian strata. The pronounced angular discordance between the Paleozoic strata and the Lower Cretaceous beds was caused by a pre-Cretaceous orogeny. Compressive stresses during the post-Comanche—pre-Pliocene orogeny strongly deformed all the strata. The range was uplifted later in the Cenozoic by high-angle faulting.

The oldest formation is the Bolsa quartzite (Middle(?) to Upper Cambrian), which unconformably overlies the basement rocks. It is arkosic to quartzose and ranges from 320 to 600 feet in thickness. The El Paso formation (Upper Cambrian-Lower Ordovician) conformably overlies the Bolsa and ranges in thickness from 340 to 715 feet. It consists of dolomite and limestone. The overlying Portal formation (Upper Devonian) is here named for exposures 2½ miles northwest of the village of Portal. The formation ranges from 200 to 342 feet in thickness and consists of the following four members, in ascending order: (1) alternating limestone and shale, (2) black siliceous shale, (3) alternating limestone and shale, (4) bioclastic limestone. The Escabrosa limestone (Lower Mississippian) consists of cherty crinoidal limestone ranging from 630 to 730 feet in thickness. It is overlain by the Paradise formation (Upper Mississippian) which consists of about 150 feet of alternating thin limestone and clastic strata.

The Pennsylvanian and Permian systems are represented by the Naco group, composed of about 5,500 feet of limestone and clastic strata. The Naco group is subdivided into the following five formations, in ascending order: Horquilla, Earp, Colina, Scherrer, and Concha. The Horquilla is dominantly limestone and ranges in age from the Morrow to Missouri series. It is conformably overlain by the Earp formation (Missouri to Wolfcamp age) which consists of alternating limestone, sandstone, and shale. The Colina (Wolfcamp to Leonard age) is aphanitic black limestone. The Scherrer (Leonard age) consists of quartzitic sandstone with a basal red siltstone member. The uppermost formation is the Concha limestone (Leonard to Guadalupe? age) which is very fossiliferous and cherty. The dominantly carbonate Naco sequence of southeast Arizona is equivalent to the thinner, dominantly clastic Pennsylvanian-Permian strata of the Colorado Plateau.

The Mesozoic era is represented by the Bisbee group of Lower Cretaceous clastic strata. The Glance conglomerate at the base reaches a maximum thickness in excess of 1,000 feet. The overlying 2,500 feet of the Bisbee group is divided into three lithologic units, but no formal names are proposed. The lowest unit is a red siltstone. This is overlain by the thin middle limestone unit, which is probably equivalent to the Mural limestone at Bisbee. The uppermost unit consists of alternating quartzite and siltstone.

INTRODUCTION

[redacted]

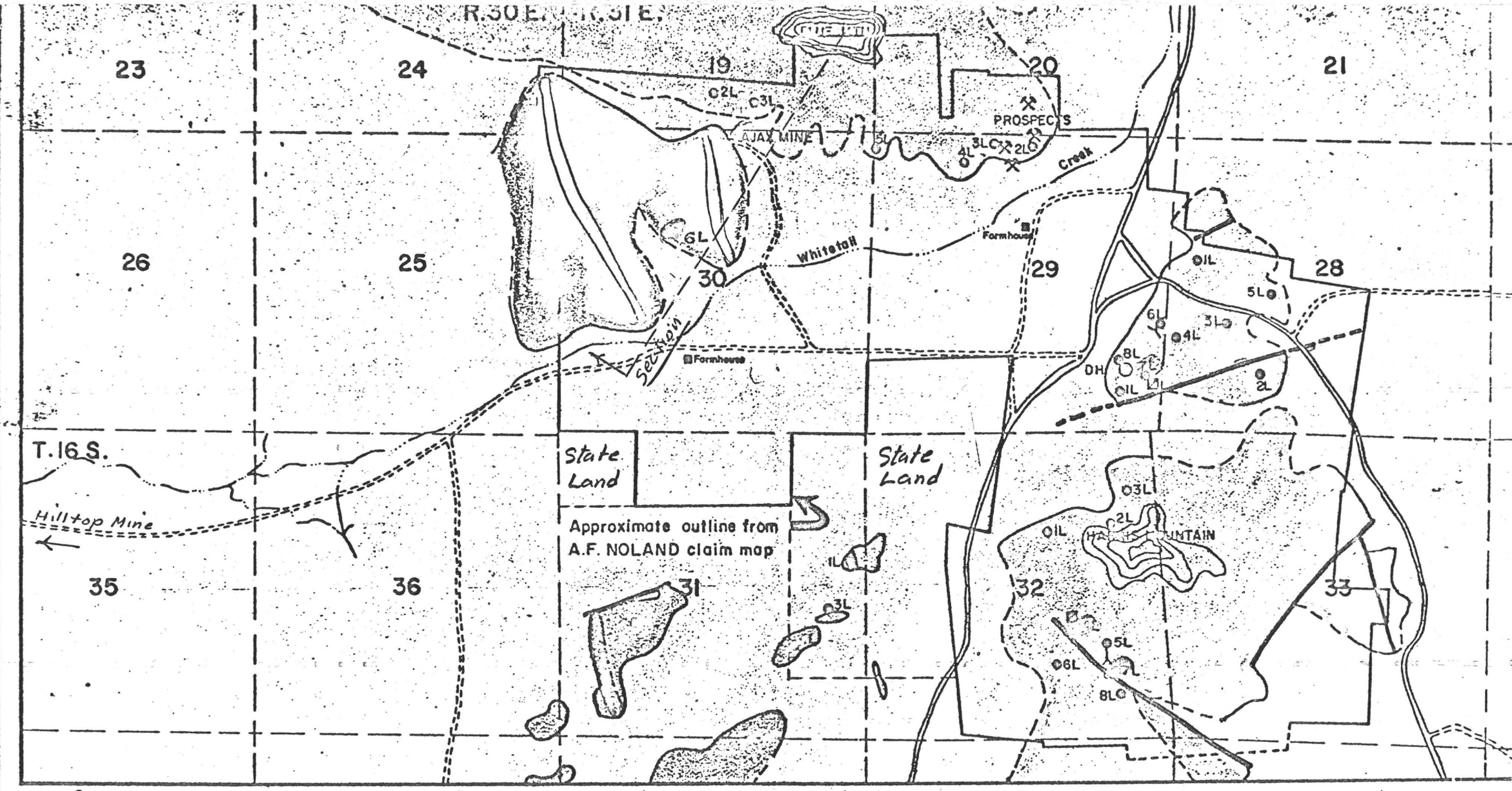
[redacted] John [redacted]

east Arizona and adjacent parts of New Mexico are typical of the Basin-and-

[redacted]

shades of olive. The basal 150 feet of dolomite contains laminae of silt and sand

called the Abrigo limestone, named by Ransome (1904, p. 39) from the Bisbee



Alluvium

Volcanic rocks (Tertiary - Cretaceous)

Quartz monzonite (Laramide?)

Undifferentiated Paleozoic limestone

(Many small dikes not shown)

O1 Sample site

Stateland (controlled by AF Noland)

A.F. NOLAND PROPERTY

COCHISE COUNTY, ARIZONA

A.F. Noland

APPENDIX — SAMPLE DESCRIPTIONS

Number	Type	Geochem (PPM) or Assay Mo	Pb	Zn	Cu	Ag .025			Rock and Description
16-31-28-1L		65		140	45				Limestone - qtz-calcite-fex vnlets
-2L		4		5	20				Quartzite
-3L		<35	0	35	82				Quartz latite dike; intrudes limestone; w/ cpy replaced by hisingerite & malachite
-4L		<35	9	52	41				Quartz latite dike, 1-2% disseminated ex py; epidote some hydrobiotite
-5L		<35	1.28%	9435	5500	.292			limestone skarn adjacent to qtz latite dike; gangue = qtz brecciated & cemented w/ calcite, minor cpy, hisingerite
29-1L		<1		<5	10				Limestone
-2L		75		+1000	+1000				Quartz vein in limestone. 1½' wide; contains malachite, cerussite, fex
-3L		N.1	8.35%	6.00%	.81%	.965			Mineralized limestone, 7-10' thick; qtz-calcite gangue w/ galena, cpy, hisingerite, cerussite, smithsonite, rosarite
-4L		5		20	40				Limestone, some fex stain
-5L		2		20	40				Limestone

Δ = Hand Lens Description, □ = Binocular Microscope, O = Thin Section; Solid for Geochem or Assay

APPENDIX — SAMPLE DESCRIPTIONS

Number	Type	Geochem (PPM) or Assay Mo	Pb	Zn	Cu	Ag oz/t			Rock and Description
29-6L		3		10	35				Quartz latite dike; Tr-1% ea py
[redacted] -7L			3.1%	1.0%	8.5%	2.85	[redacted]	[redacted]	Limestone; dump sample; qtz-calcite gangue w/ galena, cpy, malachite, cerussite, Fe ox
-8LA		<35	1720	1830	3550	.05			Granite porphyry; Core sample @ 200'±; 2% disseminated pyrite biotite → chlorite, some epidote; deuteric alteration
-8LB		<35	630	705	1650	.02			Silicified limestone – core sample @ 260'; 1-2% py, Tr galena, Tr cpy; epizonal silicification and mild K-metasomatism
30-1L		N:1	.41%	.30%	.097%				Andesite; underground @ Ajax Mine; qtz-calcite veins w/ pyrite, galena, Tr cpy
[redacted]			7.65%	14.5%	9.10%	7.52	[redacted]	[redacted]	Grab Sample of high grade from Ajax mine
-2L		2		60	85				Andesite; weakly propylitized; a few qtz veinlets
-3L		2		45	35				Quartz latite dike
-4L		7		55	70				Andesite; some epidote

Δ = Hand Lens Description, □ = Binocular Microscope, O = Thin Section; Solid for Geochem or Assay

APPENDIX — SAMPLE DESCRIPTIONS

Number	Type	Geochem (PPM) or Assay Mo	Pb	Zn	Cu	Ag ozs.			Rock and Description
16-31-30-5L		—		70	10				Rhyolite
-6L		—	1.0%	1.0%	1.8%	1.12	—		Latite (?) qtz-calcite veins w/ py, galena, sphalerite, cpy, minor tet → chlorite; alteration = deuteric
-7L		<35	235	279	259				Andesite (?) strongly silicified; qtz vein 1-2' wide; ox pyrite
-8L		<35	80	160	165				Andesite; altered zone with 2-5% ox pyrite
31-1L		<35	464	435	2980				Quartz monzonite; weakly altered but some qtz-calcite-orthoclase veins; chrysocolla, hisingerite
-2L		<35	81	38	240				Meta-arkose (?) intense sericite + silicification; iron stainings from Tr. oxidized py
-3L		<35	12	37	142				Arkose; Tr. ox pyrite; epidote v.p.l. common
-4L		<35	0	12	53				Granite; intense sericitization; 3-4% disseminated ox pyrite

Δ = Hand Lens Description, □ = Binocular Microscope, O = Thin Section; Solid for Geochem or Assay

APPENDIX — SAMPLE DESCRIPTIONS

Number	Type	Geochem (PPM) or Assay Mo	Pb	Zn	Cu	Ag .025			Rock and Description
16-71-32-1L		10		30	15				Limestone with calcite, fault veins
-2L		1		40	95				Limestone; 1-3% pyrite in garnet skarn
-3L		10		65	25				Limestone; qtz-calcite-py vein
-4L		<35	4.7%	2.3%	1.9%	3.2			Mineralized limestone, veined w/ qtz epidote, chlorite w/ abundant galena, cpy, minor sphalerite Tr argentite
-5L		<35	106	44	41				Silica breccia (silicified limestone?)
-6L		<35	860	146	405				Fault gossan in limestone, nearly all hisingerite; 8-10' thick
-7L		<35	3.7%	1.9%	1.8%	.835			Siliceous limestone w/ qtz, epidote chlorite, galena, cpy, sphalerite Dump sample
-8L		<35	3250	7118	2300				Silica breccia - appears to be silicified limestone 1-2% disseminated py

Δ = Hand Lens Description, □ = Binocular Microscope, O = Thin Section; Solid for Geochem or Assay

Stratigraphy is a Sometimes Overlooked Guide to Porphyry Coppers

Theodore H. Eyde

Contrary to widespread belief, porphyry copper deposits do not occur solely within intrusive bodies.