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Hole DH1-45° Page 1

COMINCO?

DRILL HOLE LOG

CAI-141

Property Orizaba | Length 386 feet | Lat. | Hor. component | Ver. component

District Maricopa County, Arizona | Bearing S 45 E | Dep. | Etch. at | Total recovery %

Commenced | Dip 45° | Elev. | True Dip | Logged by W.R.H. Oct. 1973

Completed | Objective To. test Geophysical Anomaly | Location Approx. 150 ft. N37E of shaft

FOOTAGE From	FOOTAGE To	Description	Sample number	Length ft.	ANALYSES %	%	%	%	oz/t	oz/t
27	36	Chlorite schist-green, dark gre n sheared somewhat brecciated. Schistosity parallel to core horizontal. Milky to opague quartz with pyrite. Considerable limonite stain.		7NX						
36	44	Chlorite schist-green. schistosity @ about 20° to core horizontal and denoted by calcite blebs and stringers. Minor drag folding in calcite. High angle and low angle shearing to core horizontal, calcite and limonite.		7NX						
44	55	Chlorite schist-green, dark green, Schistosity at about 20° to core horizontal and denoted by quartz and calcite stringers. Minor pyrite and chalcopyrite in quartz. 50-55-- abundant white quartz with mar pyrite and chalcopyrite, limonite stain. Inclusions of black-green chlorite.		7NX						
55	62	55-57 green chlorite schist, schistosity parallel to core horizontal. 57-62 milky quartz with black green chlorite inclusions-some oxidized and iron stained (Limonite). Minor pyrite and chalcopyrite in gray quartz sections.		7NX						
62	69	Chlorite schist-(siliceous quartz section to 63'), green. Schistosity @ approx 20° to core horizontal and denoted by calcite and minor quartz partings and stringers. Drag folding in schistosity @ 64 feet. Fractures minor (hi & lo), limonite stained.		6.5						
69	75	Ground core-fragments of chlorite schist and quartz white and gray with minor pyrite and chalcopy and black-green chlorite. Minor "seal brown, live" limonite.		3						
75	82	4 feet green chlorite schist-ground core-schistosity apparently at low angle to core horizontal. 79-82 quartz, milky and opague inclusions of black green chlorite. Minor pyrite, limonite and seal borwn live limonite.		6-7						
82	87	Quartz-gray, opague, milky scattered veinlets of pyrite and chalcopyrite, considerable limonite staining. Some minor"live" limonite and boxwork.		4						
87	93	Quartz-Same as above		6						

Continuation of Drill Hole Log

FOOTAGE From	FOOTAGE To	Description	Sample number	Length ft.	ANALYSES %	%	%	%	oz/t	oz/t
93	100	Box 172 Missing								
100	107	Chlorite schist-green-schistosity @ 15° - 20° to core horizontal "S" drag folding at 100.5. Scattered drag folding to 105. Schistosity denoted by calcite and very minor quartz stringers	105 change from NX to BX	7						
107	116	Chlorite schist-green, black green. Schistosity at about 20° to core horizontal Minor shearing. Fracture zone 113.5 to 115 green and black chlorite. Minor black sooty mineral that looks similar to chalcocite and weathered graphite. It is not graphite. Possibly ferro-manganese mineral.		9						
116	125	Chlorite schist-green. Schistosity @ approx 20° to core horiz and denoted by calcite. Minor pyrite on minor fracs Minor limonite.		8						
125	135	Chlorite schist-green, dark green. Schistosity @ 20° - 40° to core horizontal and denoted by quartz and calcite stringers. Minor pyrite on fractures 127.5 129.5. Shearing and drag folding.		9						
134	145	Chlorite schist-green, dark green, schistosity parallel to core horizontal to 10° to core horizontal and denoted by calcite and quartz stringers 141-143 drag folding in calcite (possible shear).		9						
145	155	Chlorite schist-green, dark green. Schistosity grading from parallel to core horizontal to 45°-50° to core horizontal and denoted by calcite-shear zone or fold zone. Minor black chlorite in calcite.		9.5						
155	165	Chlorite schist green-green black. Schistosity parallel to core horizontal to 10° to core horizontal-drag folds. Schistosity denoted by calcite and quartz 157-163- Siliceous mineralized with pyrite and chalcopy, split for assay. Green black chlorite.		9.5						
165	175	Chlorite schist-green-schistosity denoted by calcite stringers. High andgle to vertical fractures to core horizonta. with calcite. 166 quartz and green black chlorite with pyrite and chalcopyrite. Scattered drag folding.		9.5						
175	185	Chlorite schist-green, dark green. Schistosity @10° -20° to core horiz. and with considerable drag folding, denoted by calci, Minor quartz blebs and plugs.		9.5						

Continuation of Drill Hole Log

FOOTAGE From	FOOTAGE To	Description	Sample number	Length ft.	ANALYSES %	%	%	%	oz/t	oz/t
185	194	Chlorite schist-green. Schistosity almost parallel to core horizontal to 10° to 15° denoted by calcite stringers. Minor quartz blebs and partings. Minor muscovite banding ll to schistosity. Considerable tight drag folding.		9.5						
194	203	Chlorite schist-green, minor dark green. Schistosity parallel to 5 to 10 degree to core horizontal denoted by calcite-calcite decreases. Minor quartz blebs. Minor scattered pyrite and chalcopyrite parallel to schistosity (there appears to be very fine biotite flakes, not numerous, possibly indicative of an ash fall; ie, bentonite now destroyed.)								
203	213	Chlorite schist green, dark green. Schistosity almost parallel to core horizontal or at 5°-10° Denoted by calcite, ninor quartz blebs. Scattered tight "S" folded drags. Again possible very minor biotite 203-204- pyrite and chalcopyrite incorporated in quartz stringer.		9.5						
213	223	Chlorite schist-dark green to black green. Schistosity parallel to core horizontal. grading downward to about 20° from core horizontal, denoted by calcite. Black to green-black shing, slickensided chlorite on shears. 219-220 chalcopyrite and pyrite in chlorite schist associated with black quartz or silica 222-230.5 Split for assay		9.5						
223	233	Chlorite schist-dark green, black green. Siliceous to 230.5 with black and white quartz with the white quartz apparently later. Schistosity essentially parallel to core horizontal to 10° to core horizontal. Minor pyrite and chalcopyrite disseminated parallel to schistosity or associated with quartz, stringers. 222 to 230.5		9.5p						
233	239	Chlorite schist-green black green, black. Schistosity parallel to 10°-20° to core horizontal and denoted by quartz banding and stringers. 233.5 242.0- split for assay. Again siliceous unit, black qtz or fine quartz in black chlorite. Minor pyrite and chalcopyrite associated with silica. Black shiny mineral slickensided probably called graphite but isn't. It is black bhlorite with minor greasy feel on slickensides, no black smear or smudge and when scratched is black-green in color. Minor sooty black to gray ferro-manganese mineral in some fractures.		6						
239	249	Core split to approx 242, siliceous wi minor mineralization as described above. Chlorite schist-green, schistosity parallel to core horizontal denoted by quartz and calcite- 247 vug wi white quartz truse.		9						
249	259	Chlorite schist-green, green black. Schistosity essentially parallel to core horizontal denoted by calcite and minor quartz stringers and partings. 253-255.5 split for assay. (why I don't know?) Minor disseminated pyrite and chalcopyrite siliceous.		9.5						

Continuation of Drill Hole Log

FOOTAGE From	FOOTAGE To	Description	Sample number	Length ft.	ANALYSES %	%	%	%	oz/t	oz/t
259	268	Chlorite schist-green, dark green. Schistosity essentially parallel to core horizontal, denoted by calcite stringers. 263-266.5 . Shear zone. Highly contorted vertical shistosity. 266.5-268 back to normal.		9.5						
268	277	Chlorite schist-green-schistosity essentially parallel to core horizontal to 271, dip then becomes gradually steeper to 45° @ end of box. Drag folded, calcite in blebs in fold axes. Foliation denoted by calcite. Possible shear zone 275.5-277.5.		9.5						
277	287	Chlorite schist-green. Schistosity grading from top to bottom 10° to vert. to core Horizontal, denoted by calcite. 283-285 minor pyrite and chalcopyrite v.f.g. Vertical schistosity highly contorted "S" drag folds.		9.5						
287	296	Chlorite schist-green. Schistosity grading down from 40° to 10° to core horizontal, denoted by calcite.291-293 contorted drag folding.		9.5						
296	306	Chlorite schist-green. Schistosity essentially parallel to core horizontal except 297-297.5 and 304-305 where contorted and drag folded (hi angle to vert). Schistosity denoted by calcite.		9						
306	315	Chlorite schist-green. Schistosity grading from horizontal to vert back to horizontal and back to "S" folded vert with respect to core horizontal. Schistosity denoted by calcite. Minor dissem pyrite and chalcopyrite in minor fracts and paralleling schistosity.		9.5						
315	324	Chlorite schist-green. Schistosity essentially parallel to core horizontal but exhibiting horizontal drag folds. 320-327 Schistosity disappears. 322-324 vert fract (to core horizontal) with quartz and calcite. Minor pyrite and chalcopyrite.								
324	333	Chlorite schist-green, dark green, black green and black. 326-329.7 split for assay. dark green to black chlorite with chalcopyrite and pyrite blebs. Some silicification in this interval (minor). 329.7-333 schistosity shows shearing but is essentially parallel to core horizontal or to 10°.		9.5						
333	343	Chlorite schist-green. Schistosity essentially parallel to core horizontal to low angle (10°). Minor disseminated pyrite and chalcopyrite. Schistosity denoted by calcite. Minor quartz druse on fractures and calcite filled fractures.		9.5						

Continuation of Drill Hole Log

FOOTAGE From	FOOTAGE To	Description	Sample number	Length ft.	ANALYSES %	%	%	%	oz/t	oz/t
343	357	Chlorite schist-green. Schistosity where present horizontal to 45° to core horizontal. More coarse material towards lower part of box. Calcite denoting schistosity. Minor drag folds. Core well ground; especially from 346-356.		9.5						
357	365	Chlorite schist-green, dark green. Schistosity essentially parallel to core horizontal but appears to have horizontal drag folds. Last two feet schistosity @ 20° -30° to core horizontal. Scattered disseminated sulfides, pyrite and chalcopyrite. 364-365.5 gray quartz with minor sulfides.		8.5						
365	374	Chlorite schist-green-Schistosity essentially parallel to core horizontal with minor deviations. Schistosity denoted by calcite and minor quartz stringers. Minor disseminated pyrite and chalcopyrite.		9.5						
374	384	Chlorite schist-green- same as above but with an increase in the size and frequency of the disseminated pyrite and chalcopyrite belbs. These sulfides appear to parallel the schistosity.		9.3						
384	386	Chlorite schist-green- same as above with sulfides, dissem pyrite and chalcopyrite.		2.0						
	TD									

Bagdad

Miami

Safford

Sure Susan

ORIZABA

BELCHER

Pima

Courtland

Hualapai

North Central

South Central

Ore bodies in the probable importance

1

2

3

GEOEX

File Inventory ORIZABA N. 11/10/82

1. Ink, paper copy of IP lines + Topo. Elevations
2. Work copy Bo of Mag. data. Red Pencil
3. Work copy of SP data. Red Pencil

} Paper

smaller sheets

4. SP Profiles, Ink, Final, Tracing graph paper
5. Mag Profiles, Ink, Final, Tracing graph paper

6 Mag. data in map form, not contoured, on Mylar, claims shown

7. Mag + SP data contoured, similar to one found in reports on Reverse sepia, in pencil

8 Mag data contoured, on Reverse sepia, in Ink, Final
9. SP data contoured, on " sepia, in ink, Final

10. Topo showing IP, SP, Mag lines, Reverse sepia
11. Map showing claim group along with section corner Paper

12. Mylar Copy showing some claims, Mineral Appas
13-17 IP plots → line 14, 10, 6, 6 @ 500', 2

HEINRICHS GEOEXPLORATION COMPANY

P.O. BOX 5964. TUCSON, ARIZONA 85703. 806 WEST GRANT ROAD. PHONE: (602) 623-0578

November 12, 1982

Santa Fe Mining, Inc.
4775 Indian School Rd. NE
Suite 100
P.O. Box 3588
Albuquerque, N.M. 87190

Attention: Mr. J.R. Lawrence

Re: Orizaba Mine
GEOEX # 1610

Dear Rick

In response to our recent meeting in Phoenix on November 10, 1982 Heinrichs GEOEXploration will as discussed collate our files concerning the Orizaba mine in order to evaluate and plan future geophysics that would be useful in the development of this prospect. Time required to complete this phase would be approximately one man week. Our rates for this type office work are $25.00 per hour for professional and $35.00 per hour for master professional plus directly incidental expenses at 120% of our invoiced costs.

Field work and/or outside consulting charges are based on: per diem for personnel being $40.00 per day or at cost whichever is greater. Our four man crew rate is $55.00 per hour, up to 40 hours in a 7 day period from Sunday through Saturday. An additional 25% per hour is charged for any labor over forty hours during a given week. Work days are estimated at 10 hours per day and 60 hours per week on the average. Vehicles are charged at $35.00 per day and $0.40 per mile.

Field or office routine data reduction when done exclusive of field operations, like at night or on weekends on the job or in Tucson is $25.00 per man hour. Directly incidental job expendable supplies and expenses such as communications, reproductions, field and drafting supplies, and mutually agreed sub-contracting is charged at 120% of the invoiced or payroll cost including additional labored-help if needed. Standby and weathered out days are charged at one-half the working crew rate per 10 hour day, i.e.: $225.00 but, only if standby and weather

time cannot be otherwise made up on production work.

As customary, an advance statement in the amount of 1/3 of estimated costs to defray our initial start up and positioning expenses maybe submitted with proposals. If so, these will be allocated against subsequent detailed billings. Our receipt of the advance amount will then serve as firm notice for us to proceed. Interim billings are then submitted periodically and final billing accompanies final data and report.

A quick review of our files indicates considerable useful data including IP, resistivity, SP and magnetic geophysical methods, drill logs for five holes, but little or no topography, plan geology or geochemistry. Much of the data is GEOEX proprietary. However, it will be most helpful for us to receive from you right away an inventory of pertinent data you have which we can borrow for use in our review. Included in this would be such items we discussed as topo maps, cross sections of drilling and geology and written reports, aerial photos etc.

To a considerable extent, most consideration for any additional field geophysics will be confined to detailed fill in (for more resolution), deeper coverage (for greater penetration and depth analysis), extension coverage (for information in areas of interest not previously covered-especially toward the northeast along strike and possibly worth while methods or techniques not previously employed such as EM, in-hole, or electrical probing or expanders etc.

Regarding EM, the Androtex people of Mississauga (Toronto), Canada have offered us a no cost test of their state of the art simultaneous multiple (five) frequency turam system which is worth serious consideration. Technically this may be applicable including effective drill hole involvement. Decisions on this should be made as soon as possible because of lead time required for detailed arrangements. They agree that the results would be kept confidential. Their motivation is entirely to promote equipment sales.

Ideally, we understand initial preliminary field work, as recommended by us and accepted by you should start on or about 1 December and conclude as near 15 December as feasible.

Chances are that to expedite matters we should first try to

3 phone these to you as soon as we have concluded anything pertinent and then follow up with something in writing.

If this letter correctly reflects our mutual understanding and meets with your approval, for our joint convenience, this may be indicated by executing as provided below and returning to us the executed copy of the duplicate of this letter provided.

Truly
Heinrichs GEOEXploration Co.

Mark E. Anders
Geophysicist-Geologist

Walter E. Heinrichs Jr.
Geol. Engn.-Geop.
P.E. & C.P.G.

Approved and accepted: _____ (date)
Santa Fe Mining Co.

by: _____ (signature)

Title: _____

22 Nov 82
Bell Motel, Phoenix

Dear Mark,

Here are cross sections for the six drill holes completed to date (ORZ-1 thru-6) with as much surface and down-hole data as I know of. I believe the locations of these holes are shown on the preliminary geologic map you've received earlier. Holes ORZ-7 and -8 are in progress.

Other data, such as geochem, topographic maps, air photos etc. will be available when field work begins.

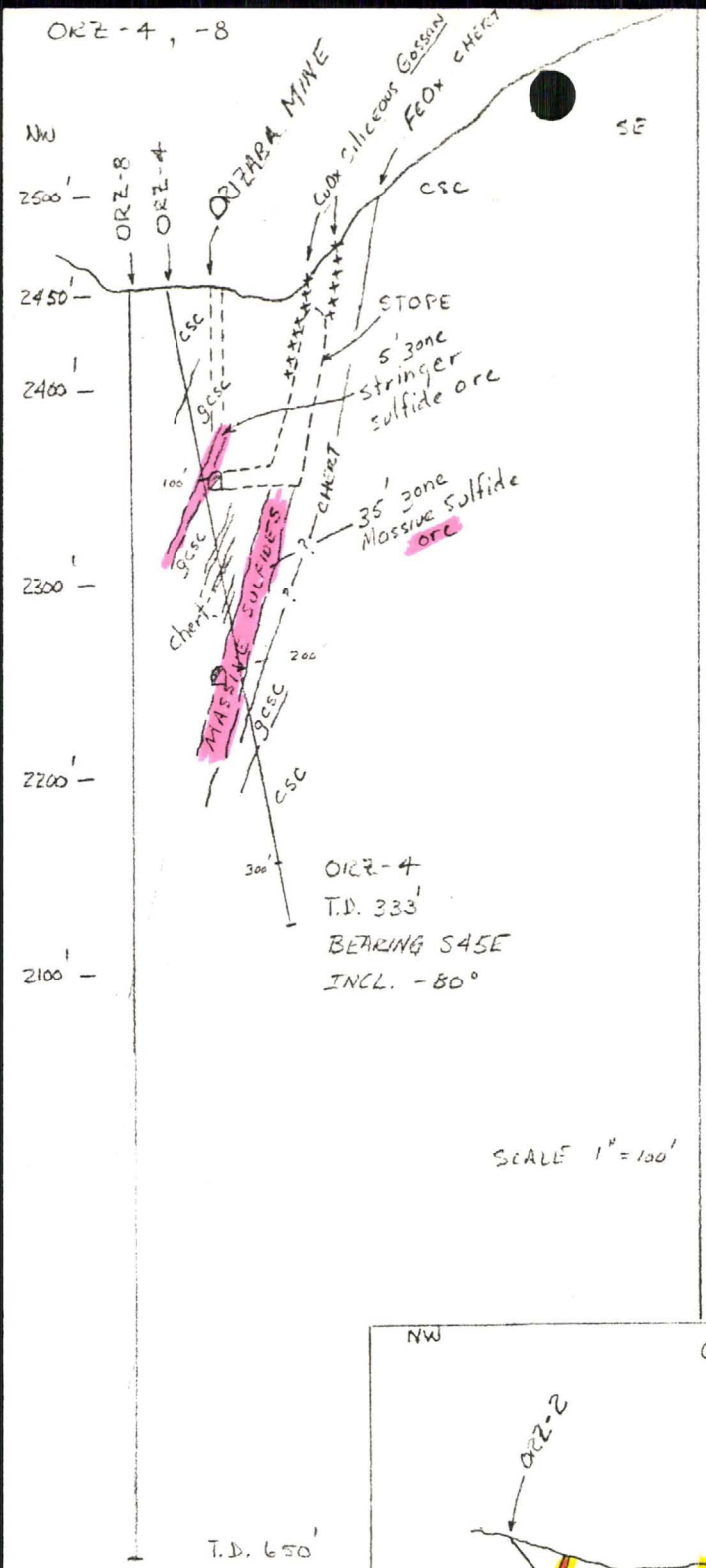
Here's signed authority to go ahead with review of data at hand. I await your proposal as to fieldwork. I'll be in touch by phone.

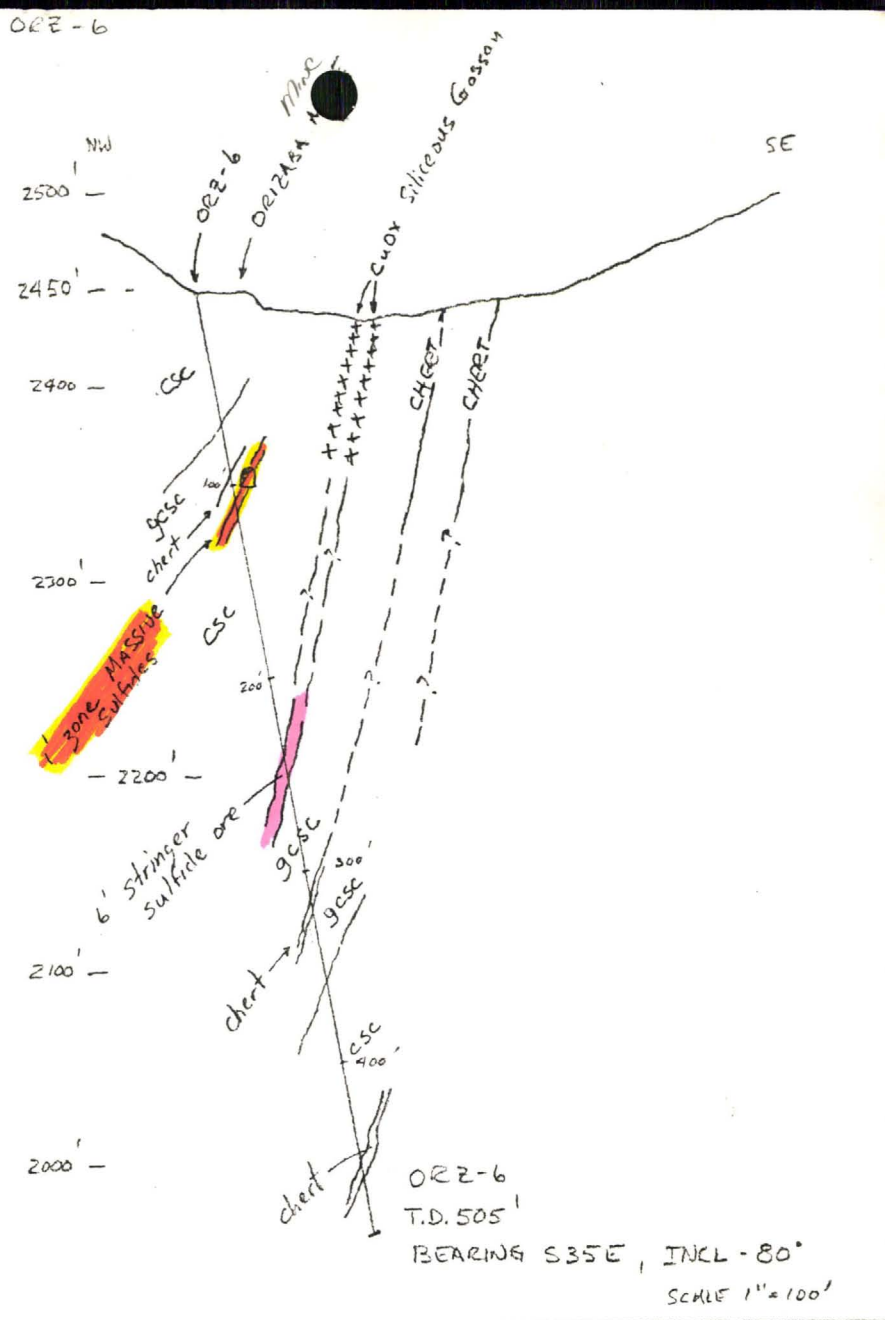
Sincerely

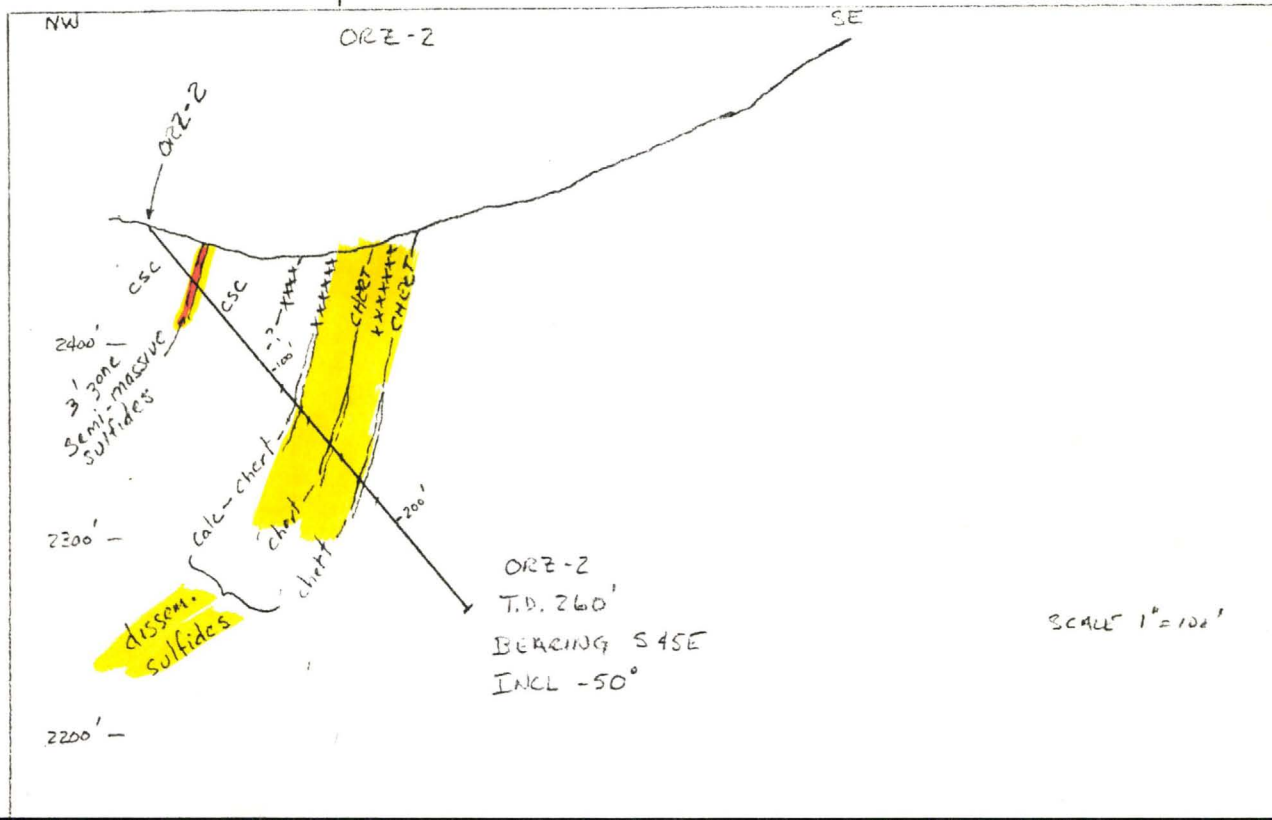
Rick LAWRENCE

Nov. 24 1982

Rick called, on way back to N.M., drilling not going very well, he is not sure if we need to start as early as previously talked about. Will read 2nd letter and call us on Monday Nov. 29.


ORZ-4, -8
NW
SE
ORZ-8
ORZ-4
ORIZABA MINE
CuOx siliceous Gossan
FeOx CHERT
CSC
2500'
2450'
2400'
2300'
2200'
2100'
STOPE
5' zone stringer sulfide ore
gcsc
100'
chert
35' zone Massive Sulfide ore
MASSIVE SULFIDES
200'
300'
ORZ-4
T.D. 333'
BEARING S45E
INCL. -80°
T.D. 650'
SCALE 1" = 100'

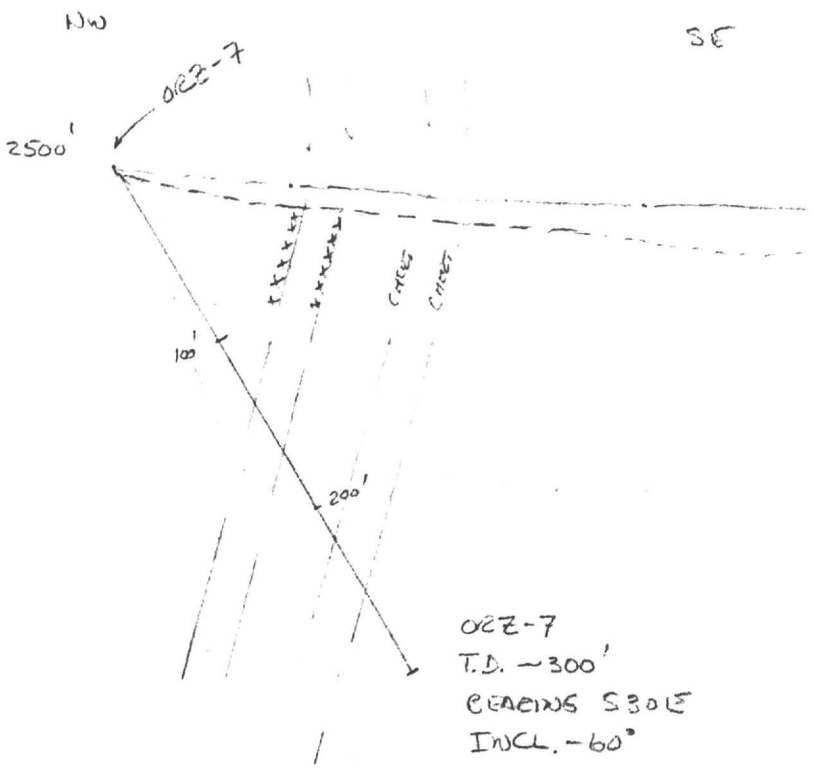

ORZ-6
NW
SE
ORZ-6
ORIZABA MINE
CuOx siliceous Gossan
2500'
2450'
2400'
2300'
2200'
2100'
2000'
CHERT
CSC
gcsc
100'
chert
1 zone MASSIVE SULFIDES
200'
6' stringer sulfide ore
300'
400'
ORZ-6
T.D. 505'
BEARING S35E, INCL -80°
SCALE 1" = 100'

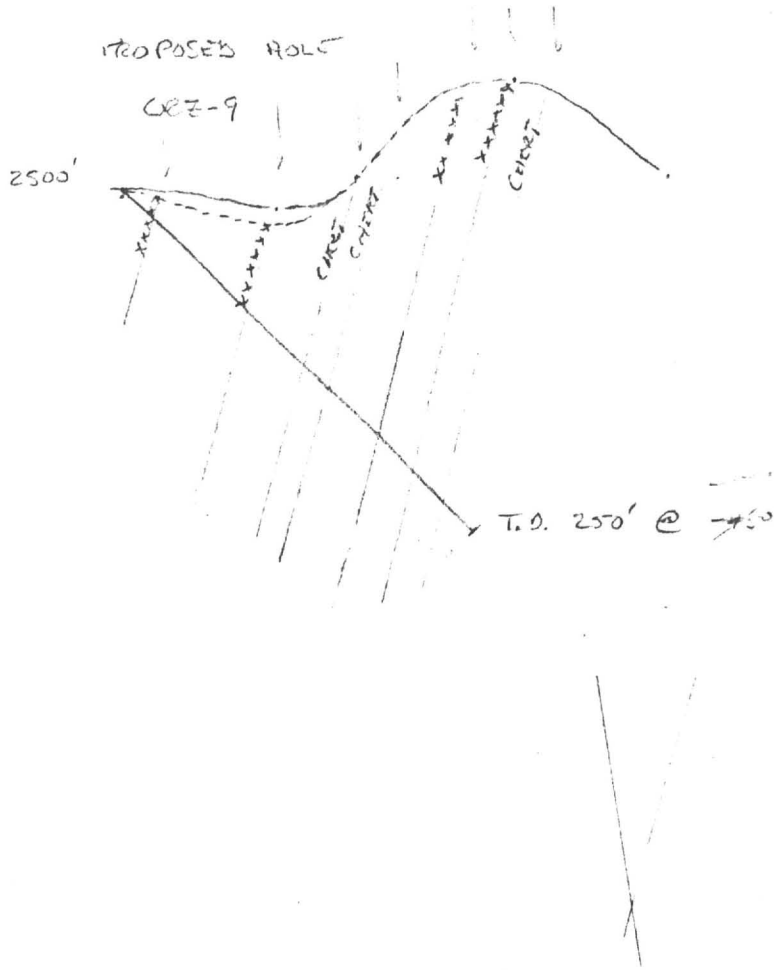

NW
ORZ-2
SE
ORZ-2
CSC
2400'
3' zone semi-massive sulfides
100'
CHERT
calc-chert
chert
2300'
200'
dissem. sulfides
2200'
ORZ-2
T.D. 260'
BEARING S45E
INCL -50°
SCALE 1" = 100'

OEZ-3A ~ 21 NE / 9 SE
ELEV. 2490
BEARING S 30 E

OEZ-7

OEZ-3B ~ 22.4 NE / 8.7 SE
ELEV. 2490'
BEARING S 25 E





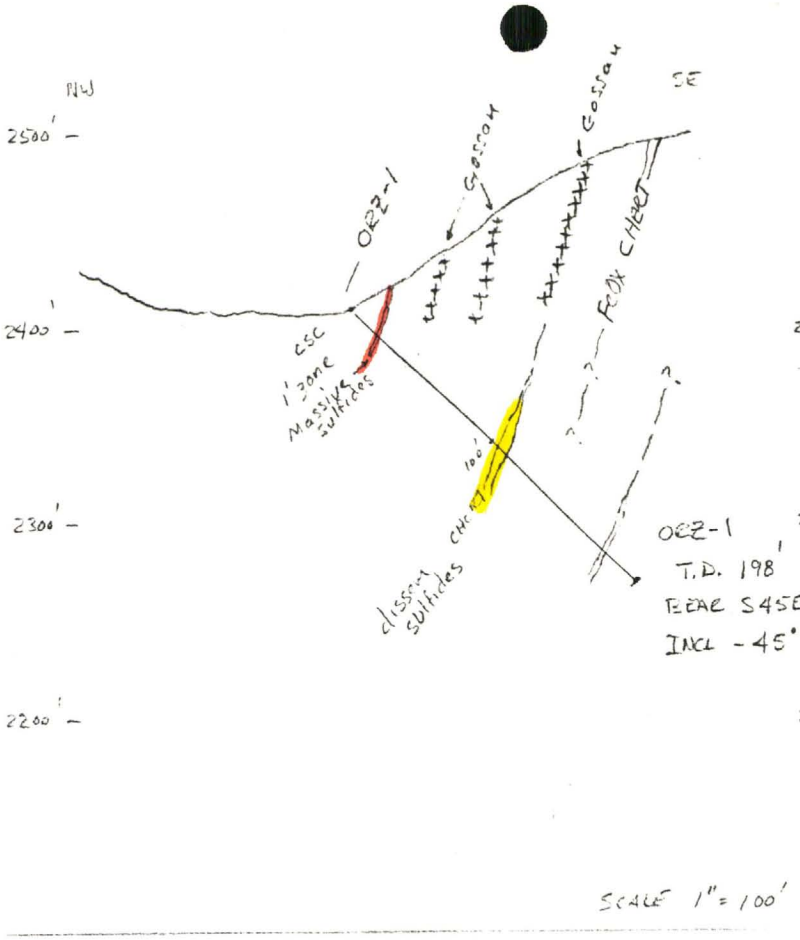
SCALE 1" = 100'

11 PADS

1A	250' @ -45°	2A	200' @ -45°	3A	250' @ -45°
1B	300' @ -45°	2B	200' @ -45°		
1C	300' @ -45°	2C	400' @ -45°		
	850'		800'		250'

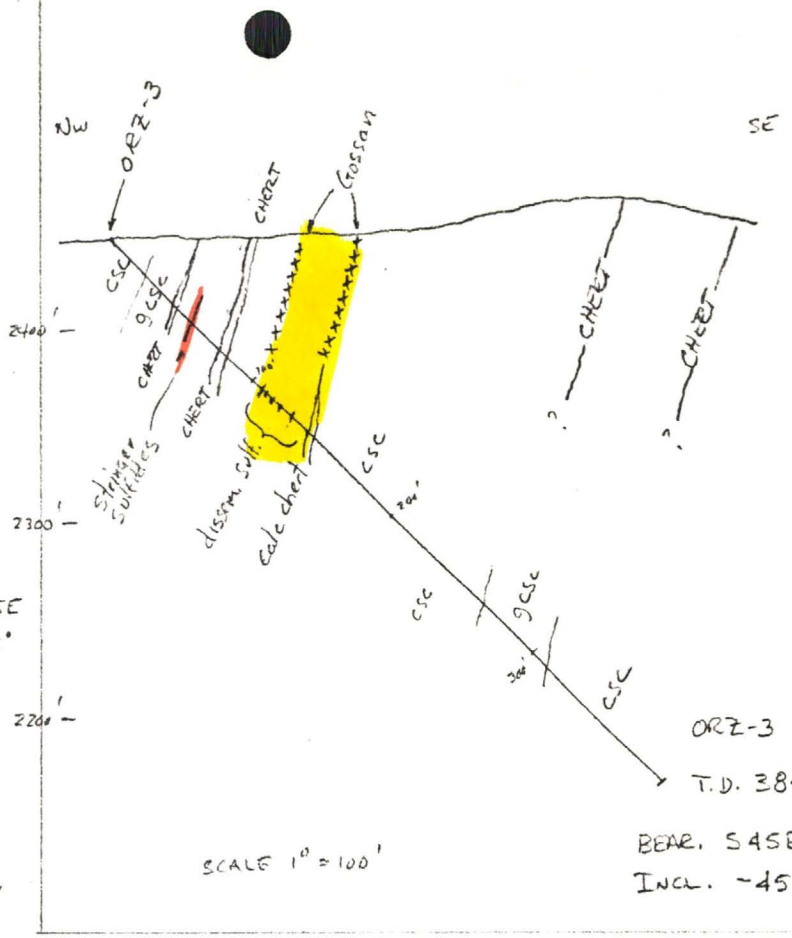
TOTAL FOOTAGE 1900'

ORZ-1



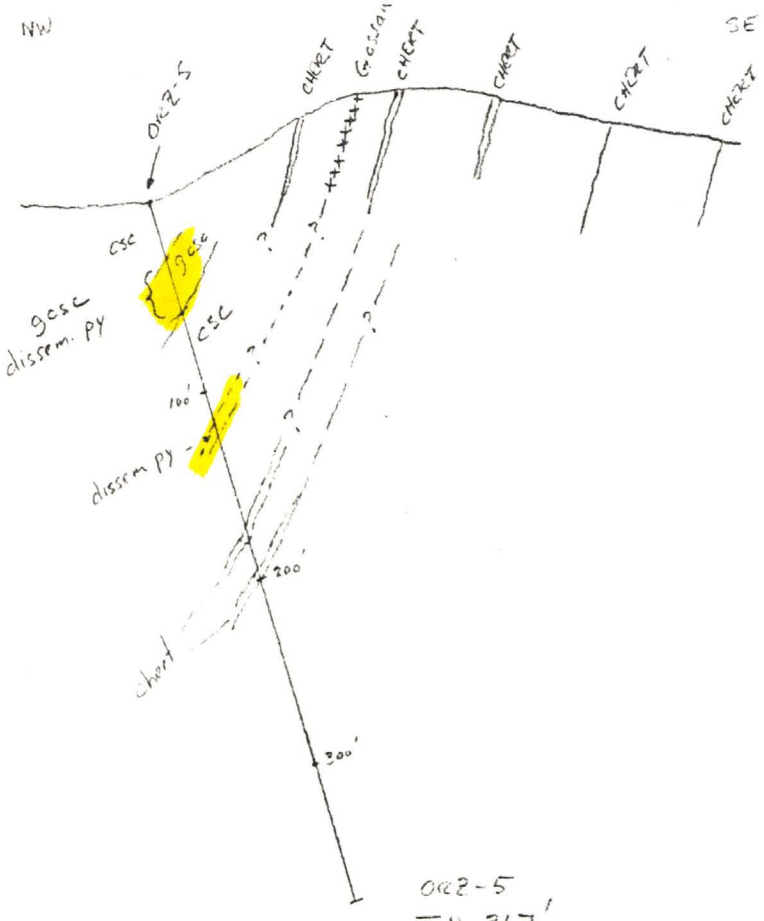
SCALE 1" = 100'

ORZ-3



SCALE 1" = 100'

ORZ-5



SCALE 1" = 100'

HEINRICHS GEOEXPLORATION COMPANY

P.O. BOX 5964. TUCSON, ARIZONA 85703. 806 WEST GRANT ROAD. PHONE: (602) 623-0578

November 22, 1982

Santa Fe Mining, Inc.
4775 Indian School Rd. NE, Suite 100
P.O. Box 3588
Albuquerque, N.M. 87190

Attention: Mr. J.R. Lawrence

Re: Orizaba Mine
Maricopa County, AZ
GEOEX # 1610

Dear Rick

In follow up to our proposal letter of November 12, 1982, the following report will present our conclusions and recommendations for the Orizaba Mine area.

INTRODUCTION

At the request of Mr. J. R. Lawrence, project geologist for Santa Fe Mining, Inc., Walter E. Heinrichs Jr., Geol. Eng.-Geophysicist, and Mark E. Anders, Geophysicist-Geologist conferred with Mr. Lawrence at your Phoenix core storage facility and at the Orizaba mine property, Maricopa County, Arizona.

Purpose of the consultation and property examination was to personally and directly familiarize Messrs Heinrichs and Anders with the project and property. Of primary concern was present logistics, access, terrain and geology and the current results, objectives and problems involved in the project, particularly from a geophysical point of view.

Since during the late 1950's GEOEX had been retained in various consulting and contracting capacities in connection with the Orizaba property. Except for the drilling, one preliminary geophysical survey, one semi-reconnaissance follow up geophysical survey, and one integrated data compilation effort, much of this post 1940's exploration work did not provide significant ore development progress.

Based on this background, it was agreed for GEOEX to review the pertinent files proprietary to GEOEX and any data furnished

by Santa Fe, in the context of appropriate geophysical conclusions and recommendations and to submit a proposal for additional geophysical considerations. Of special interest would be anything that might serve to better guide drilling by supplementing and complementing presently available geologic and geochemical results.

INVENTORY OF DATA REVIEWED

Anderson, P. and Guilbert, J.M., 1978, The Precambrian Massive Sulfide Deposits of Arizona- a Distinct Metallogenic Epoch and Province, paper presented at 5th Annual Symposium, AIME-IAGOD, Snowbird, Utah.

G.T. Bator & Associates, 1970, Orizaba Copper Property of the Paradox Production Corp.

Heinrichs GEOEXploration Co., Private Reports.

Jaggar, T.A., and Palache, C., 1905, Description of Bradshaw Mountains Quadrangle, U.S.G.S. Folio.

Klugman, M.A., 1970, Report on Orizaba Claims, Arizona.

Lickus, R.J., 1970, Geology and Ore Deposits of the Orizaba Mine Area Maricopa County, Arizona: G.T. Bator & Associates, Golden, Colorado.

Lindsey, E.H., 1964, Geology and exploration possibilities, Orizaba Copper District, Maricopa County, Arizona: Manning W. Cox Associates, San Francisco.

Ludwig, C.S., and Heinrichs, W.E., 1974, I.P. Survey Orizaba Mine Area: Heinrichs GEOEXploration Co.

Lundin, R.J., 1982 , Personal Communication.

Marlatt, J. W., and Ludwig, C.S., 1963, Geophysical investigations, Orizaba Mine vicinity Maricopa County, Arizona: Heinrichs GEOEXploration Co., Tucson, Arizona

Pye, W.D., 1970, Orizaba Mine, Maricopa County, Arizona

Swan, M.M., Hausen, D.M., and Newell, R.A., Lithological, Structural, and Mineralogical Patterns in a Precambrian Stratiform Gold Occurrence Yavapai County, Arizona, unpublished (re: the Bell Ranch property).

CONCLUSIONS

Review of geologic data confirms initial field impressions of a fairly complex situation in detail, especially from an economic point of view while in a broader sense, the zone of assumed sulfide concentration based mainly on the IP results appears to be somewhat more simple and straight forward. Electrical geophysical results correlate very well with the latter interpretation. Magnetic survey results also tend to confirm and support the major regional trends of geology and topography.

Brief field observations made with Mr. Lawrence, suggest that folding, shearing and probably faulting may play a significant part in the controls related to concentration of ore mineralization. Past erratic drilling results may be in part caused by or at least augmented by such complexity. A 1970 report by Dr. Lickus (and private communications with Phillip Anderson and R.A. Lundin) seem to support such a possibility in referring to a 60 degree N35W plunging axis folded ore structure mapped in the old mine workings. Lickus further notes that such folding mainly, or perhaps only, appears within the main sulfide zone.

If in fact such folding proved to be a crucial ore-control factor, differentiating the folding within the so-called main sulfide zone could be a very difficult if not impossible task by any indirect method and especially so with depth. Offhand, the best geophysical chance would seem to lie with IP (Induced Polarization), resistivity, (SP) self potential, EM, magnetics or scintillation work relative to surface or near surface applications. If such differentiation proved successful where folding was exposed or situated within say a couple of hundred feet of the surface, then tests might be reasonably considered for trying to map extensions with depth.

Geometrically, such a (postulated) plunging tight folded target, may tend to approximate a tilted pencil-like cylinder.

If this is the case we will have a very tough target to pursue with depth. On the other hand, identifying such a potential target at or near surface along the presumed main sulfide zone as indicated by IP results might prove feasible and worthwhile.

Detailed tests over the known Orizaba mine area first might be followed by similar tests over the area farther to the northeast along strike where possible folding is indicated by recent surface mapping done by Mr. Lawrence.

Extending the main sulfide zone northeast beyond known existing geophysical coverage can be done by more reconnaissance IP and/or other electrical methods, scintillation, and perhaps indirectly by magnetics but, that might only provide further areas for wildcat drilling rather than specific drill targets hopefully for ore. The worth of considering such coverage should first be integrated with areal photo study and comparison with results of recon geology of the same area and the recently completed geochemical sampling program.

Full consideration of possible drill hole geophysical applications cannot be effectively concluded until a careful review of all recent drill logs and sections can be made.

As you are well aware, the presence of considerable pyrite and graphite is not really discouraging (only a complicating fator) as these minerals are often intimately related to and associated with economic mineral deposition.

RECOMMENDATIONS

We visualize three approaches to any geophysical work done, or to be considered, subject to receipt of additional information (drill logs, geometry of vein and drill holes, and geochemical data etc.) from Santa Fe Inc., these include:

DETAILED WORK------ Over the main Orizaba workings in order to delineate the main ore structure, making use of scintillation, magnetic, and electrical methods. If successful then similar tests as indicated by the prior results over next best zone of known or suspected folding within the main sulfide-graphitic zone. Also included, may be experimental EM as performed by Antrotex Ltd.

SPECIAL WORK-------- 1. Depending on results of detailed work above, considerations of drill hole IP could be made. 2. If desired, longer dipole IP coverage would further test for the depth extent of the main sulfide zone below 500 feet in depth.

RECONNAISSANCE WORK- Extended electrical coverage to continue delineation of the main sulfide zone to the northeast along strike. Hopefully, this would be done to include new and additional ore zones.

We hope this report will be found satisfactory and useful. We welcome any questions you might have.

Truly,
Heinrichs GEOEXploration Co.

Walter E. Heinrichs Jr.
Geol. Engn.-Geoph.
P.E. & C.P.G.

Mark E. Anders
Geophysicist-Geologist

Enclosures: Discussion, November 23, 1983
Downhole Radial Array IP
Statement
I.P. Gradient Array Response Cases

HEINRICHS GEOEXPLORATION COMPANY

P.O. BOX 5964. TUCSON. ARIZONA 85703. 806 WEST GRANT ROAD. PHONE: (602) 623-0578

November, 23 1982

DISCUSSION

Today we received Mr. Lawrence's letter of November 22, 1982. Included were copies of Santa Fe's drill hole sections 1 thru 6 and indicating the location of drill hole 8. These tend to amplify the question regarding what controls the ore deposition at the Orizaba Mine. Whether folding or some other factor or, combination of factors, is involved, the primary exploration objective seems to be one of trying to delineate ore within the main sulfide zone.

We recommend that detailed radiometrics, magnetics, EM, gradient array IP survey, and an experimental downhole IP survey (most likely in drill hole #5) be run during approximately a ten day period. This detailed geophysics around the Orizaba per se may give some further clues as to the geology and for future drill hole targets. This recommendation is based on the assumption that the Orizaba ore occurrence is a key model for ore occurrences within the main sulfide zone and that by studying it we may learn enough about its geophysical signature to identify other such zones within or along the main sulfide trend, again on the assumption that such effort would be worth while, ie that more Orizabas are worth finding.

To prove the latter point, work will have to be concentrated around the Orizaba. Drill hole casing and other artificial features will be an adverse factor to contend with when working around the mine. Just how adverse is impossible to tell without actually collecting some data. However all known specifics regarding such artificial effects should be quantified as much as possible before conducting any geophysical field work. Information obtained in drill hole #8 should also contribute toward aiding in answering the question of Orizaba ore potential.

On the possibility that the Orizaba mine itself does not represent a key model for ore occurrence within the main sulfide trend or, even a typical one, will require more reconnaissance study to more fully delineate the trend-especially to the northeast. Previous geophysical work seems to indicate some sort of termination and/ or plunging of the sulfide zone toward the south west.

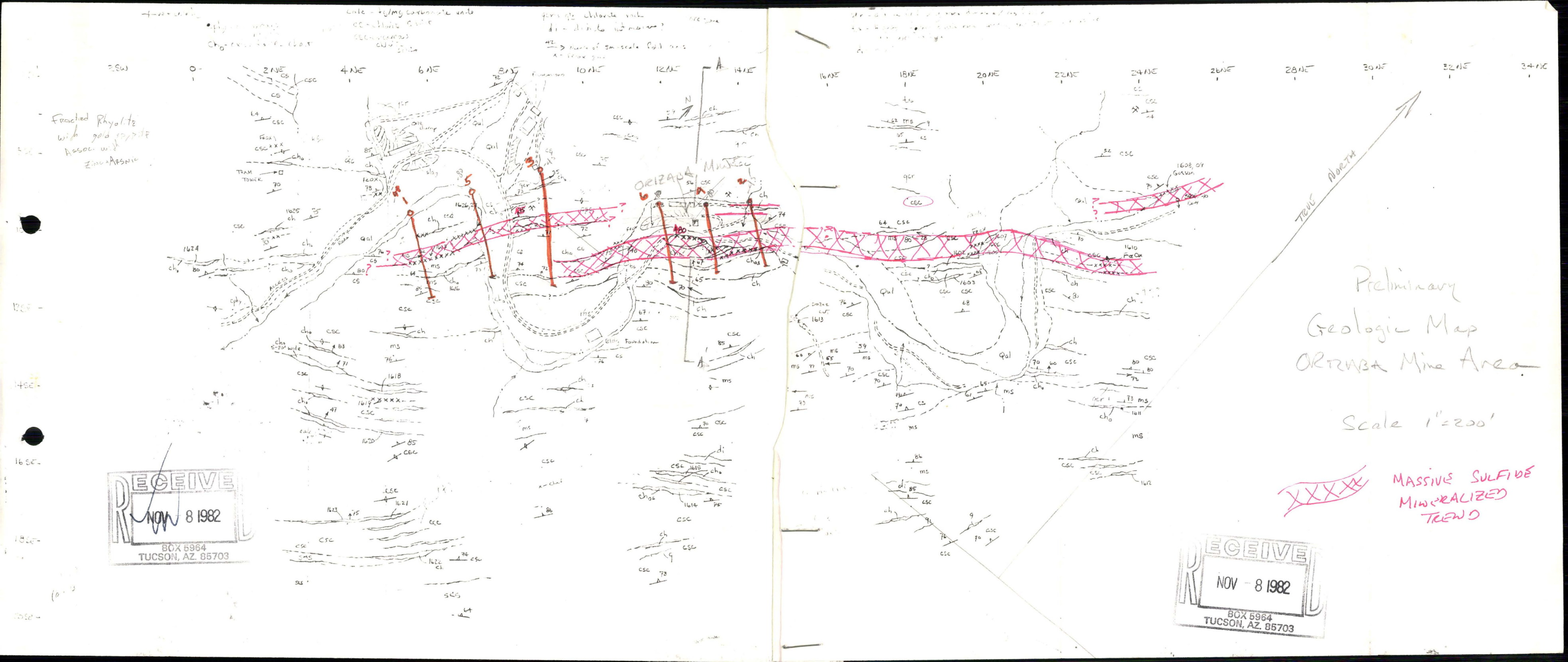
2

One reminder matter is that regarding physical property testing samples. It may be helpful for us to have a suite of say six to ten fist-size specimens (total) of typical host rock, county rock, and ore. If any core is supplied for this purpose, split core is ok but unsplit is preferable because it represents a more simple geometric shape which tends to contribute toward a more accurate and representative analysis.

Costing of such a survey would be approximately $10,500.00 dollars.

Walter E. Heinrichs Jr.
Geol. Eng.-Geop.
P.E. & C.P.G.

Mark E. Anders
Geophysicist-Geologist


Fractured Rhyolite with gold pyrite Assoc. with Zinc+Arsnic
TRAM TOWER
ORIZABA Mine
Qal
csc
ch
ms
qcr
TRUE NORTH
Preliminary
Geologic Map
ORIZABA Mine Area
Scale 1"=200'
MASSIVE SULFIDE MINERALIZED TREND
RECEIVED
NOV 8 1982
BOX 5964
TUCSON, AZ. 85703

HEINRICHS GEOEXPLORATION COMPANY

P.O. BOX 5964. TUCSON, ARIZONA 85703. 806 WEST GRANT ROAD. PHONE: (602) 623-0578

November 12, 1982

Santa Fe Mining, Inc.
4775 Indian School Rd. NE
Suite 100
P.O. Box 3588
Albuquerque, N.M. 87190

Attention: Mr. J.R. Lawrence

Re: Orizaba Mine
GEOEX # 1610

Dear Rick

In response to our recent meeting in Phoenix on November 10, 1982 Heinrichs GEOEXploration will as discussed collate our files concerning the Orizaba mine in order to evaluate and plan future geophysics that would be useful in the development of this prospect. Time required to complete this phase would be approximately one man week. Our rates for this type office work are $25.00 per hour for professional and $35.00 per hour for master professional plus directly incidental expenses at 120% of our invoiced costs.

Field work and/or outside consulting charges are based on: per diem for personnel being $40.00 per day or at cost whichever is greater. Our four man crew rate is $55.00 per hour, up to 40 hours in a 7 day period from Sunday through Saturday. An additional 25% per hour is charged for any labor over forty hours during a given week. Work days are estimated at 10 hours per day and 60 hours per week on the average. Vehicles are charged at $35.00 per day and $0.40 per mile.

Field or office routine data reduction when done exclusive of field operations, like at night or on weekends on the job or in Tucson is $25.00 per man hour. Directly incidental job expendable supplies and expenses such as communications, reproductions, field and drafting supplies, and mutually agreed sub-contracting is charged at 120% of the invoiced or payroll cost including additional labored-help if needed. Standby and weathered out days are charged at one-half the working crew rate per 10 hour day, i.e.: $225.00 but, only if standby and weather

time cannot be otherwise made up on production work.

As customary, an advance statement in the amount of 1/3 of estimated costs to defray our initial start up and positioning expenses maybe submitted with proposals. If so, these will be allocated against subsequent detailed billings. Our receipt of the advance amount will then serve as firm notice for us to proceed. Interim billings are then submitted periodically and final billing accompanies final data and report.

A quick review of our files indicates considerable useful data including IP, resistivity, SP and magnetic geophysical methods, drill logs for five holes, but little or no topography, plan geology or geochemistry. Much of the data is GEOEX proprietary. However, it will be most helpful for us to receive from you right away an inventory of pertinent data you have which we can borrow for use in our review. Included in this would be such items we discussed as topo maps, cross sections of drilling and geology and written reports, aerial photos etc.

To a considerable extent, most consideration for any additional field geophysics will be confined to detailed fill in (for more resolution), deeper coverage (for greater penetration and depth analysis), extension coverage (for information in areas of interest not previously covered-especially toward the northeast along strike and possibly worth while methods or techniques not previously employed such as EM, in-hole, or electrical probing or expanders etc.

Regarding EM, the Androtex people of Mississauga (Toronto), Canada have offered us a no cost test of their state of the art simultaneous multiple (five) frequency turam system which is worth serious consideration. Technically this may be applicable including effective drill hole involvement. Decisions on this should be made as soon as possible because of lead time required for detailed arrangements. They agree that the results would be kept confidential. Their motivation is entirely to promote equipment sales.

Ideally, we understand initial preliminary field work, as recommended by us and accepted by you should start on or about 1 December and conclude as near 15 December as feasible.

Chances are that to expedite matters we should first try to

3 phone these to you as soon as we have concluded anything pertinent and then follow up with something in writing.

If this letter correctly reflects our mutual understanding and meets with your approval, for our joint convenience, this may be indicated by executing as provided below and returning to us the executed copy of the duplicate of this letter provided.

Truly
Heinrichs GEOExploration Co.

Mark E. Anders
Geophysicist-Geologist

Walter E. Heinrichs Jr.
Geol. Engn.-Geop.
P.E. & C.P.G.

Approved and accepted: 22 Nov 82 (date)
Santa Fe Mining Co.

by: John R. Lawrence (signature)

Title: Senior Geologist, SFM

FILE: SANTA FE

83T038H26V12W

November 12.1982

Santa Fe Mining, Inc.]
4775 Indian School Rd. NE]
Suite 100]
P.O. Box 3588]
Albuquerque, N.M. 87190]

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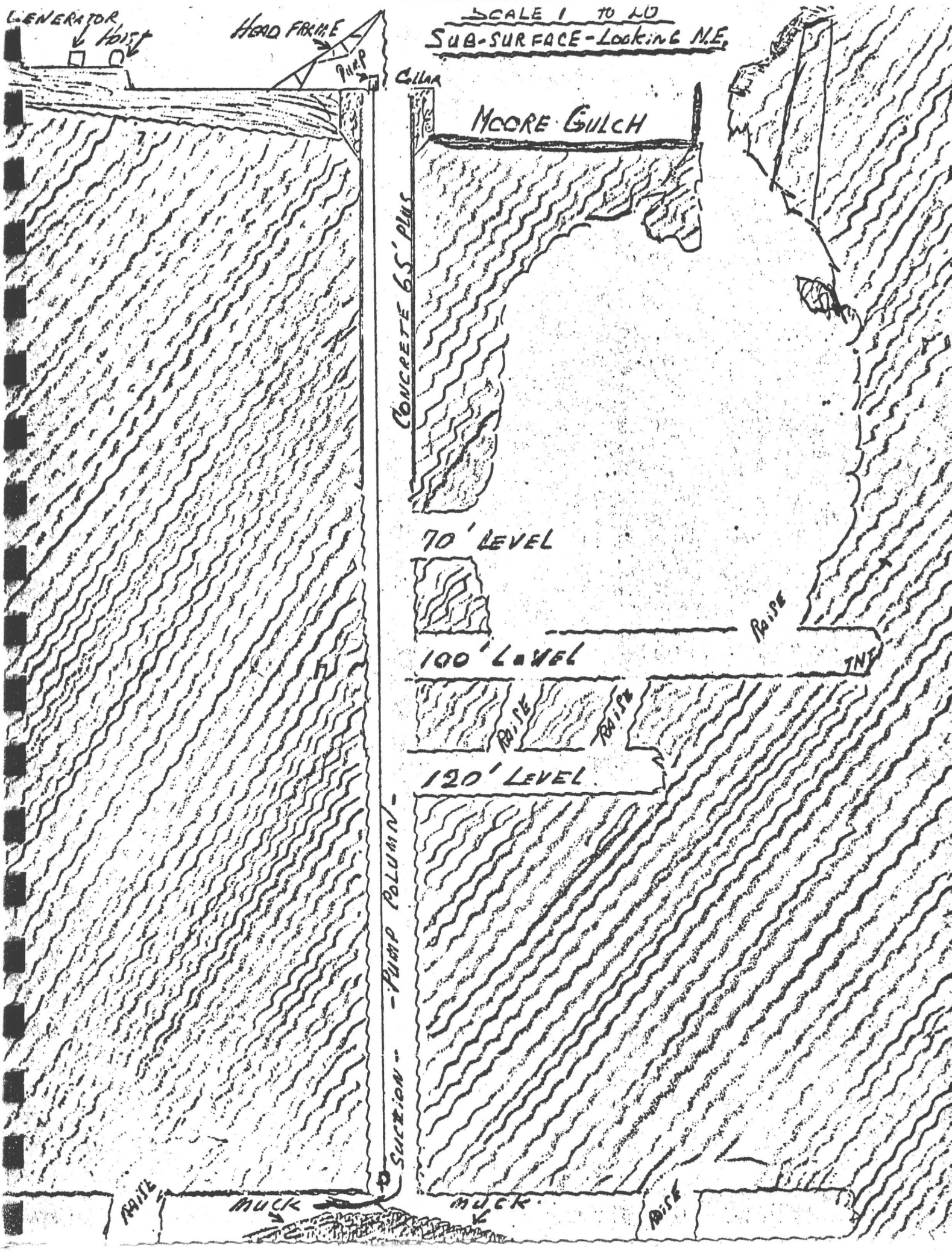
Heinrichs GEOEXploration Co.


SCALE 1 TO 20
SUB-SURFACE - Looking N.E.
GENERATOR
HOIST
HEAD FRAME
PUMP
CILLAR
MOORE GULCH
CONCRETE 65' PLUG
70' LEVEL
RAISE
100' LEVEL
INT
RAISE
RAISE
120' LEVEL
- PUMP COLUMN -
SUCTION
RAISE
MUCK
MUCK
RAISE