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GEOLOGIC EVALUATION

REPORT

on the

HOOPES LIMESTONE PROPERTY

in

Gila County, Arizona

by

R. E. Mierits
Mining Consultant
Phoenix, Arizona

June 26, 1970

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INTRODUCTION:

At the request of and authorization by Mr. G. A. Freeman, Home-Stake Production Co., Phoenix, the writer completed a geologic examination of the Hoopes Lime Plant limestone deposit in Parts of Sec. 31, T. 2 N., R. 15 E. and Sec. 6 T. 1 N., R. 15 E., G. & S. R. B. & M., approximately 5 miles by road from the junction of State Route 88 with U. S. Route 60-70, halfway between the towns of Globe and Miami, Gila County, Ariz.

The writer spent several days on the property examining the surface geology and mapping those areas from which limestone had and is being mined to supply the Lime Plant.

CONCLUSIONS:

Based on the information gained during the examination and the writers geologic knowledge of such deposits, the following conclusions are forwarded for your consideration:

(1) - The limestone deposits are not developed by drilling, consequently no measured or assured reserves exist except those small amounts which are developed by the presently worked pit or quarry.

(2) - It is estimated that the property has an inferred potential of 1.5 million tons of material suitable for lime production from the Escabrosa formation. It is also likely that an equivalent amount may exist in the Martin formation adjacent to the Escabrosa formation on the west.

(3) - Exploration of the deposits by diamond drilling would be required to reclassify the estimated inferred tonnage of conclusion 2 to a more positive status.

PROPERTY, LOCATION and ACCESSIBILITY:

The property consists of two groups of Placer claims, one group is patented. The first group, patented, includes seven claims and the second group includes eight claims - or a total of approximately 300 acres. Mr. Hoopes has a print of a surveyed plat of the claims.

Travel to the property from the junction of State Route 88 and U. S. Route 60-70 is north on State Route 88 for 4.35 miles to a sign "Hoopes Lime Plant" on the left side of State Route 88. From this point it is 0.9 mile over a well maintained gravel road to the "workshop" area on the property. A network of roads lead to the lime plant, open pit quarrys and underground mine operations. Travel over most of the property can be completed by automobile.

FACILITIES:

Hoopes Lime Plant is operated by "piped in" natural gas and "highline" electric power. Water, when needed, is hauled the short distance from Pinal Creek Valley to the property. A 3 inch water line is in place

from the workshop area to Pinal Creek and was probably used during the underground operation.

GEOLOGY:

The general geology of the area is that of the Escabrosa limestone, Naco limestone formation and Martin limestone formation with nearby exposures of dacite, diabase and two conglomerates, the Whitetail and Gila.

The area is also one of many faults creating tilting of the limestone formations as well as upward and downward displacements of the limestone formations which has had an overall effect of creating "islands" of limestone and presents a most difficult problem of attempting to determine depth and extension of the formations for the purpose of estimating tonnage.

The Escabrosa limestone in the particular area trends approximately N. 10-20° W. and dips 35 to 55° to the east. Part of the formation is indistinctly bedded, but most of it is quite thinly bedded, oolytic, fine grained to moderately crystalline, mostly medium gray and in some instances contains chert nodules which are sparse to abundant.

From the evidence at hand, it appears there is, within the Escabrosa formation, but one layer (composed of several beds), approximately 50 to 60 feet wide normal to the dip which is suited to the production of lime for use in the copper mills in the area. A second but much narrower zone might possibly meet lime production specifications. It is not possible, without petrographic study, to clearly determine the stratigraphic position of this former "good" layer within the formation. The writer suspects its position to be in the upper third of the formation, but can not be certain.

There are three exposures of the Escabrosa limestone formation within the property. The largest of these is at the location of the lime plant and extends westward and northward. This area, approximately 1600 feet long and 800 feet wide, probably exposes the full formation thickness (250 feet normal to dip) which strikes N. 20° W. and dips 25 to 30° E. Hoopes obtained limestone by underground mining from an area just west of the lime plant. See Map No. 4. The position of this layer is probably in the middle of the formation. This outcropping has not been prospected except by a few larger than normal surface pits along its strike. The outcropping formation must be drilled.

The second Escabrosa formation exposure is currently providing the "feed" to the lime plant. This exposure, approximately 900 feet long and 300 feet wide, striking N. 10° W. to North and dipping 40 to 55° E., may or may not represent the full thickness of the formation, but it does contain a 50 to 60 foot, normal to dip, thinkness of limestone which is being mined. The writer suspects this "layer" is in the upper third of the formation. The Footwall of the "good" bed is controlled by a bedding fault with a smooth wall. The underlying layer is siliceous and argillaceous.

The third outcropping is a very small faulted "block" or "island", approximately 300 feet southeast of the second exposure. Area-wise, it is too small for consideration at this time. It has not been explored.

The Martin limestone Formation crops out to the west of the Escabrosa formation currently being mined. (See Map No. 3) Sample #1092 indicates a good lime content with a silica content just under 2%. With adequate exploratory drilling it may be possible to indicate 1.5 million tons of near marginal specification limestone.

DEVELOPMENT:

To supply the lime plant, Mr. Hoopes has mined fair amounts of material from two large underground "rooms" in a canyon above, or west of, the lime plant, attempted excavation (removal of surface debris) in three separate localities and is currently obtaining his raw material from one 50 to 60 foot wide zone approximately 0.8 miles from the lime plant. (See Maps No. 2 and 3 and 4).

The operation at the latter has opened up a 50 to 60 foot wide "good" raw material for about 400 feet along the N. 10° W. strike. The zone dips from 40 to 55° E. Production comes from two benches or levels with an approximate 50 to 60 foot difference in elevation. The upper bench is approximately 50 feet lower than the surface at its northern face. In the vicinity of this operation, the "good" limestone zone forms part of the hillside and thus has a favorable mining situation, but extensions to the northwest and southeast "enter" the hill and could require overburden removal on the hanging wall to attain any great depth.

The footwall of the "good zone" is controlled by a "bedding fault" with a slick-smooth face and is quite continuous except where offset short distances by minor cross faults.

The hanging wall also appears to be a bedding fault. This is based on the results of sample #1083. The silica content increased a fair amount east of this fault. The dacite-limestone contact is about 50 to 60 feet east of the hanging wall bedding fault and the contact dip is 48° E. near the throat of the Pit.

SAMPLING:

To obtain some information as to calcium carbonate and silica contents of the raw material being mined, the footwall material and other portions of the Escabrosa formation, the writer took 13 samples. This figure includes other samples taken elsewhere on the property to aid the writer in determining the location and extent of the raw material which might be suited for lime production. The assay results and sample discriptions are as follows:

	% $CaCO_3$	% SiO_2
#1080 - Grab, below upper bench and west of Footwall.	99.1	0.90
#1081 - 40 ft. across "good zone", north Face, U. B.	91.6	8.18
#1082 - 50 ft. along "good zone", east face, U. B.	93.2	5.36

		% $CaCO_3$	% SiO_2
#1083 -	40 Ft. across zone, north bank Pit throat, east of fault.	92.5	5.79
#1084 -	25 Ft. across F.W. zone, west of fault, L. B.	87.8	3.62
#1085 -	40 Ft. along F. W. zone, west of fault, L. B.	86.9	11.50
#1086 -	Grab of muck being mined June 16, 1970, L. B.	96.9	1.08
#1087 -	50 Ft. across zone, north bank, L. B.	96.9	2.53
#1088 -	50 Ft. across zone underlying F.W. zone, West of Pit.	96.2	2.71
#1089 -	Chip sample of large float pieces approx. 350 feet north of upper bench face, in saddle.	95.7	3.23
#1090 -	70 Ft. chip sample along west wall of south underground room.	99.4	0.43
#1091 -	70 Ft. chip sample along west wall of north underground room.	92.5	1.17
#1092 -	40 Ft. chip sample across south bank of Quarry, ± 600 feet west of present Quarry (Martin Lms ?)	95.3	1.87

Note: - U. B. indicates upper bench.
L. B. indicates lower bench.
See Maps No. 3 and 4 for sample locations.

SAMPLE COMMENTS:

Results of the 13 samples would indicate that silica is quite a problem - even in the present quarry operation which utilises the "better" layer of the Escabrosa formation.

Samples 1086, 87, 81, 82 and 89 indicate there is a trend for the silica content as well as the R_2O_3 content, to increase to the north.

Samples 1084 and 85, taken in the Footwall material has high silica content as well as a high R_2O_3 content, particularly as shown in sample 1084 which cross cut the Footwall zone.

Sample 1083 represents the hanging wall material east of the bedding fault shown on Map No. 3. This material is also very siliceous, thus limiting the "good layer".

Samples 1080 and 1088 represent the material underlying the Footwall zone. The silica content of this material may be acceptable - but could be very erratic in distribution. This zone might well be the same zone that was mined by underground method near the lime plant.

Sample 1092 could represent a portion of the Martin formation. The silica content is just within specifications, however, it appears there may be a 3% R_2O_3 content (aluminum and iron).

Samples 1090 and 91 represent a portion of the Escabrosa limestone mined by underground method. (See Map No. 4). It is thought that this zone is identical to the zone underlying the Footwall zone in the present quarry operation. The physical characteristics are similar and the chemical compositions compare favorably. (Samples 1080 and 1088).

RAW MATERIAL RESERVE:

In the vicinity of the present Pit, it is only possible for the writer to project the "good zone" approximately 300 feet to the north and 100 feet to the south. Depth-wise, below the present pit bottom, only a 40 foot projection is justified because of the inconsistancy and geologic nature of the area.

This basically resolves itself into a block with dimensions of 800 feet long, 50 feet wide and an average of 120 feet high - or approximately 480,000 tons less approximately 125,000 tons which have already been mined which leaves a resulting inferred reserve of 355,000 tons.

If this same criteria for the "good layer" in the Escabrosa formation should exist in the exposure west and north of the lime plant, then 1.2 million tons may exist as a block 50-60 feet wide, 150 feet deep (down dip) and 1600 feet long.

Based on the results of sample #1092 and the area of exposure of the Martin limestone in the area, the writer could infer approximately 1.5 million tons of suitable limestone for lime production.

EXPLORATION:

The two main Escabrosa formation areas should be explored by diamond drilling as well as the Martin limestone exposure to the west of the present Pit.

In the main quarry area, two holes should be drilled between the north bank of the upper bench and the "saddle" to the north to determine the possible extension and grade of the zone being mined.

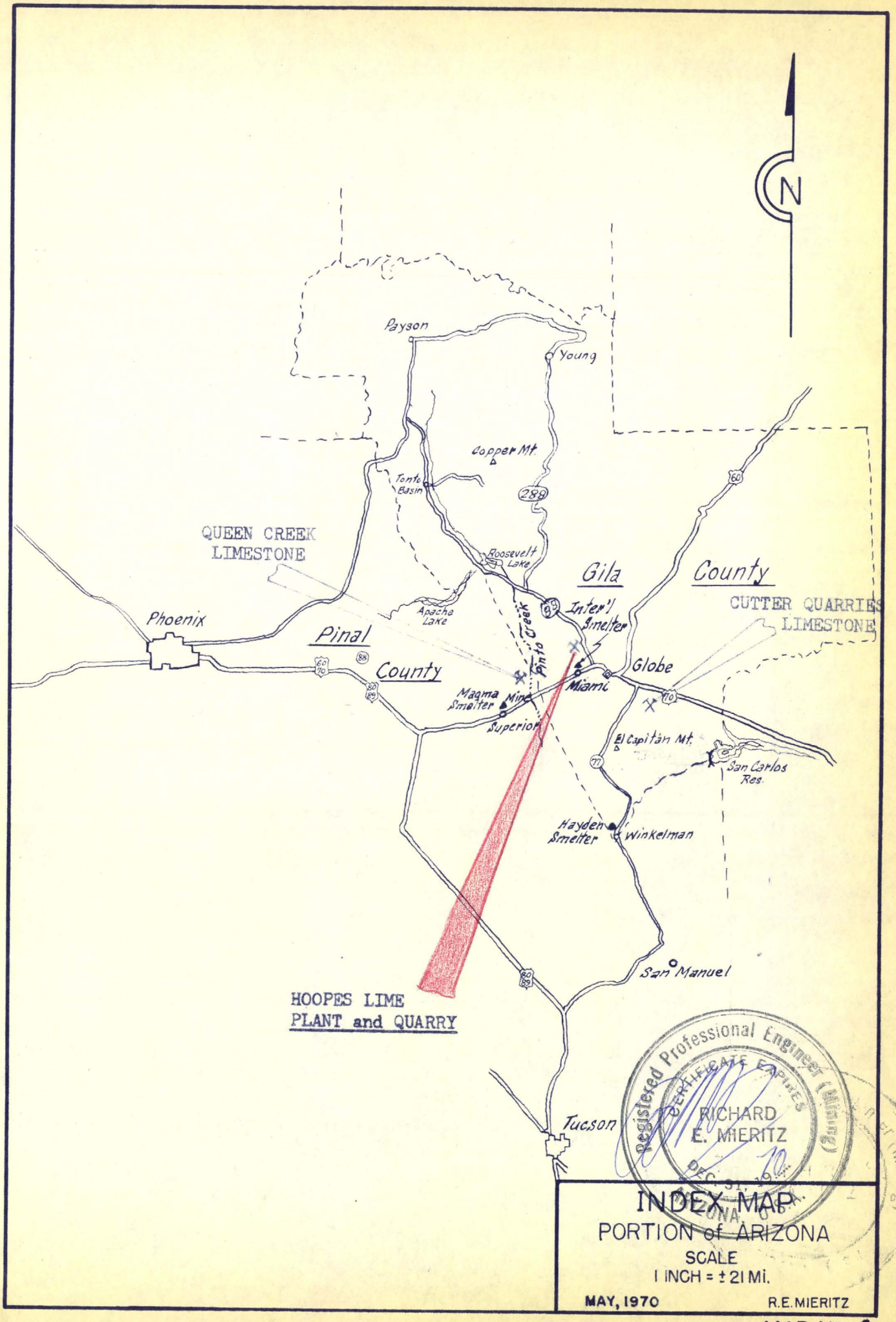
In the exposure west and north of the lime plant, two holes should be drilled at approximately 600 foot intervals to penetrate the full thickness of the formation to determine the presence of the "good layer" in this area as well as to test for the presence of the layer mined by underground method.

Several 300 to 400 foot drill holes would be required to explore the Martin limestone formation adjacent to and west of the present quarry operation.

Respectfully submitted,

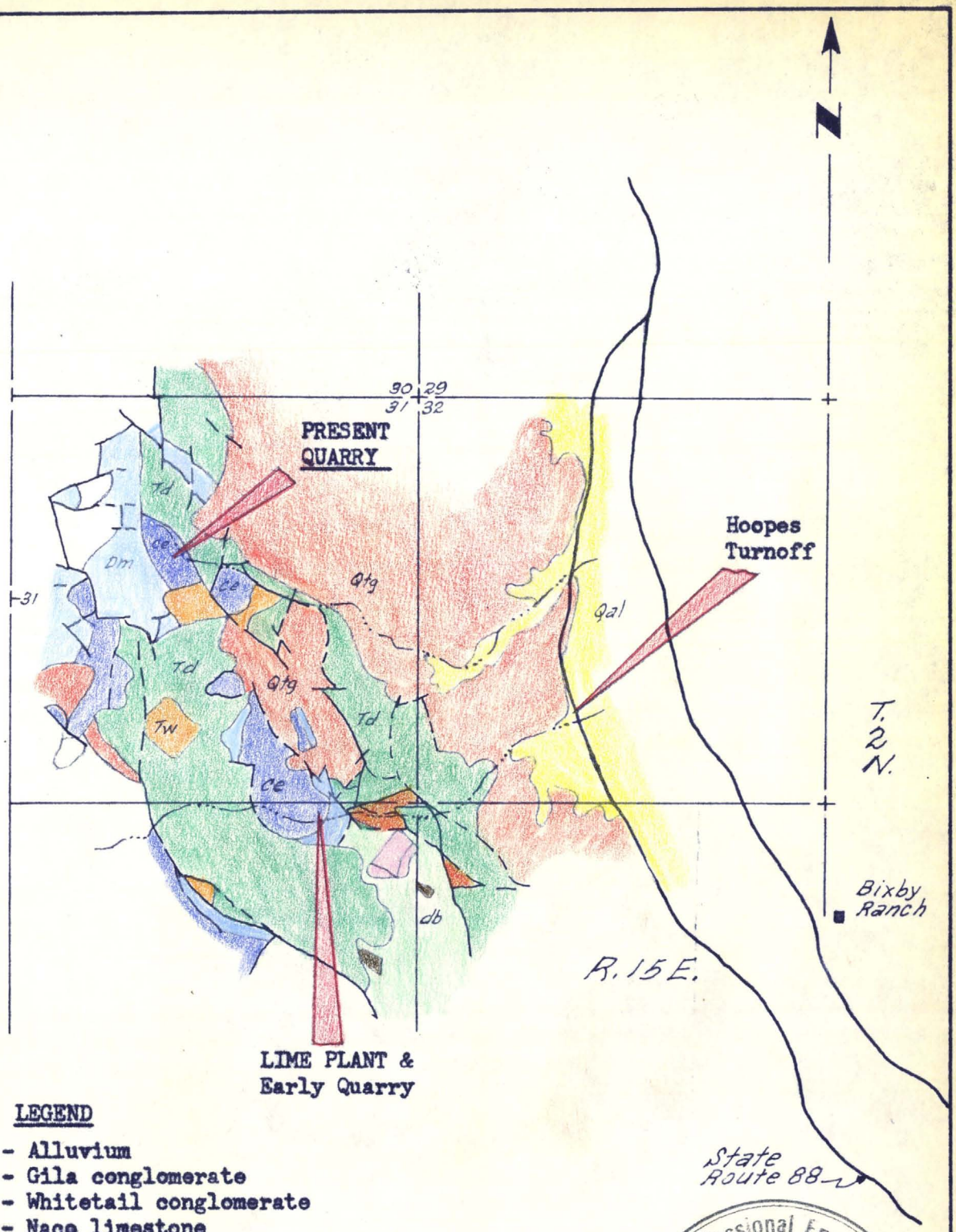
R..E. Mierits,
Mining Consultant
Phoenix, Arizona

June 26, 1970



INDEX MAP
PORTION of ARIZONA
SCALE
1 INCH = ± 21 Mi.
MAY, 1970 R.E. MIERITZ

MAP № 1



LEGEND

104	Qal	- Alluvium
117	Qtg	- Gila conglomerate
118	Tw	- Whitetail conglomerate
146	Cn	- Naco limestone
144	Ce	- Escabrosa limestone
147	Dm	- Martin Limestone
175	pEp	- Pioneer Formation
129	lgm	- Lost Gulch monzonite
161	Td	- Dacite
162	db	- Diabase

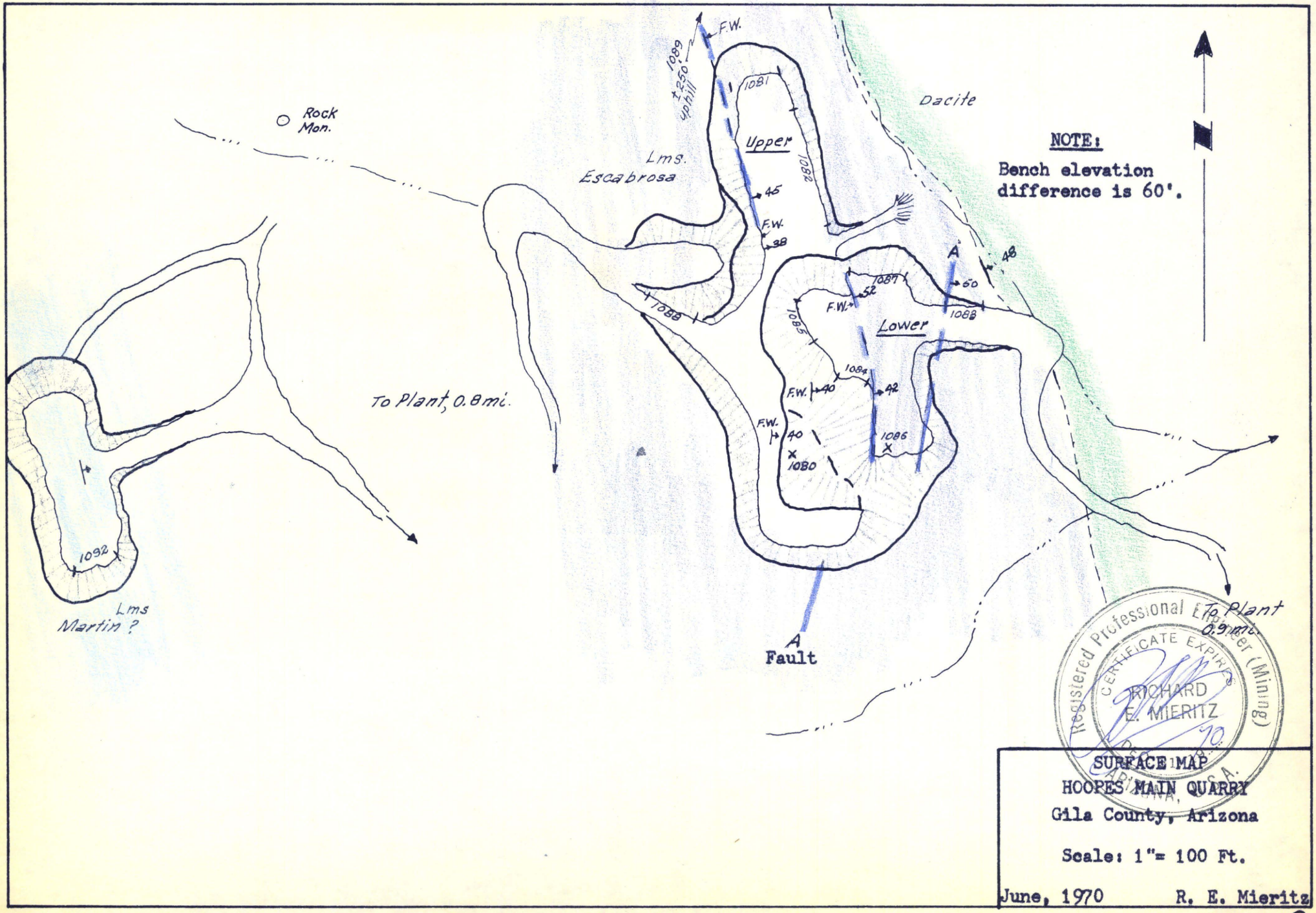
Registered Professional Engineer (Mining)
CERTIFICATE EXPIRES
RICHARD E. MIERITZ
DEC. 31, 19 70
ARIZONA, U.S.A.

GENERAL GEOLOGIC MAP
HOOPES LIMESTONE PROPERTY
Gila County, Arizona

Scale: 1" = 2000 Ft.

June, 1970 R. E. Mieritz

MAP No. 2

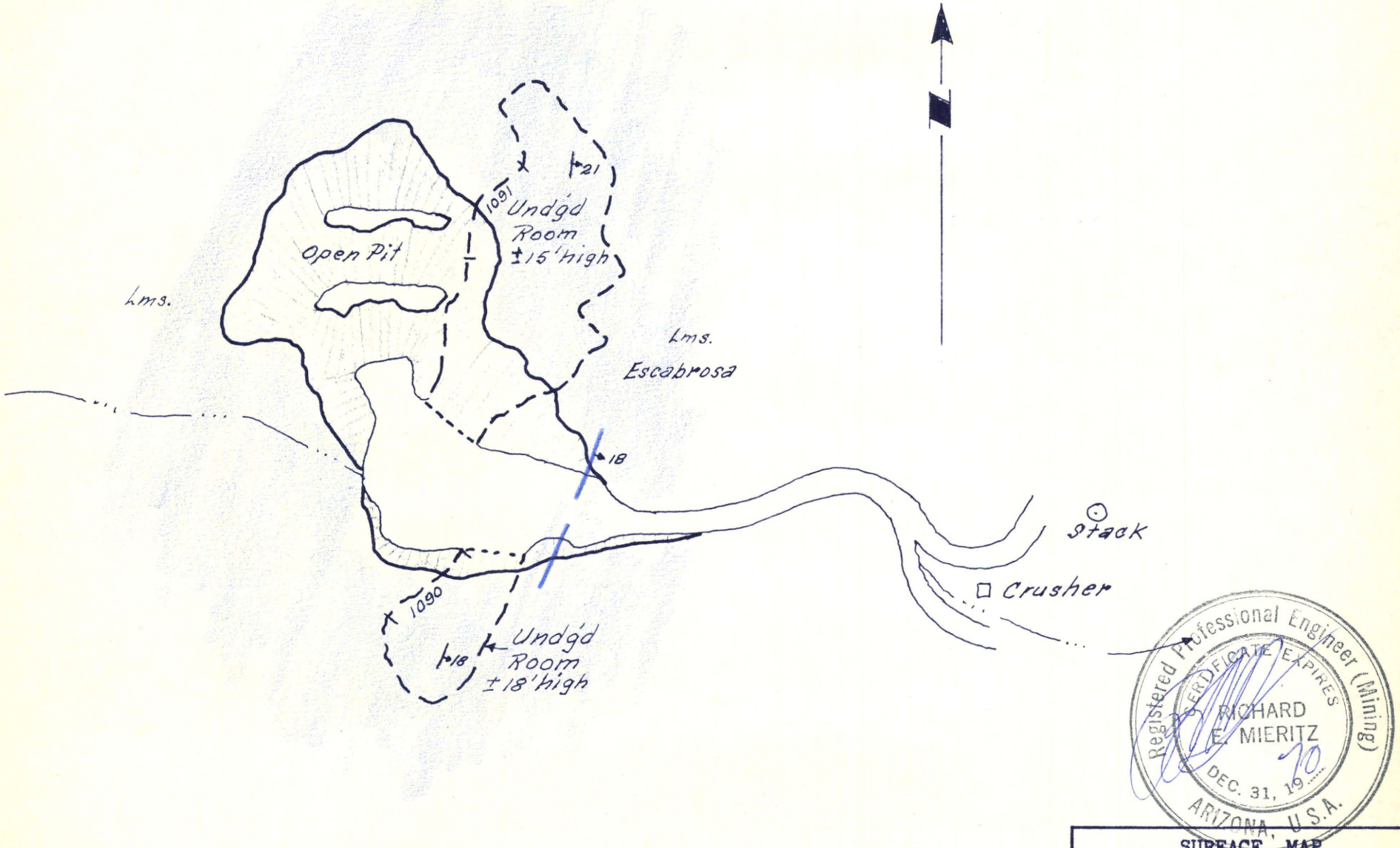


SURFACE MAP
HOOPES MAIN QUARRY
Gila County, Arizona

Scale: 1" = 100 Ft.

June, 1970 R. E. Mieritz

MAP No. 3



SURFACE MAP

HOOPES EARLY OPERATION

Gila County, Arizona

Scale: 1"= 100 Feet.

June, 1970 **R. E. Mieritz**

MAP No. 4