December 23, 1966

Mr. Charles P. Knaebel,
Utah Construction and Mining Company,
70 Linden Street,
Reno, Nevada.

Dear Mr. Knaebel:

Please find attached our appraisal of possibilities at the Opalite mine, a Bradley Mining Company property in Malheur County, Oregon.

This mercury possibility was recentley examined at your request.

An original and five copies are provided.

Interpretation and analysis are submitted without qualms. However, the lack of precision, a characteristic of any reconnaissance study, is regretted.

This opportunity to be of service has been greatly appreciated.

Yours very truly,

David LeCount Evans

AN APPRAISAL

OPALITE MINE

Mercury

Malheur County, Oregon

INTRODUCTION:

Examined at the request of the Utah Construction and Mining Company, this property was visited from December 17th through the 19th, 1966. Five days to complete this study have been divided, more or less, equally between field studies and office preparation.

PURPOSE:

Submitted for Utah consideration, prior to field study, have been data from Bradley Mining Company files, including a 1955 study by Mr. Peter Joralemon, San Francisco geologist; as well as results from recent drilling efforts by El Paso Natural Gas and the Cordero Mining Company.

Our purpose has been to examine the property, using reconnaissance methods, employing previously submitted maps for a base, and by admittedly rapid work, to determine whether further detailed studies would be justified. This preliminary approach seemed warranted since the Cordero Mine, in the same district, has continued to 900 feet of depth.

PROCEEDINGS:

Accepting the Joralemon 1955, 200 scale map as accurate, field observations were fitted to such control.

Full use has been made of Mr. Joralemon's 1955 report. Details from Bulletin 55, "Quicksilver in Oregon", by that state's Department of Geology and Mineral Industries (1963), provided underground details, which were not mapped by the writer.

With reference to the Plats, accompanying this appraisal, note Plats C-1 and C-2, providing alternatives for the Tunnel Level. State of Oregon's figures 63 and 64 indicate disagreement in the location of Tunnel 1 with respect to Tunnel 2. Mr. Joralemon, obviously, adjusted his mapping to figure 64; the writer concurs in this choice and the distribution of mappable units in plan and section has been guided accordingly.

CONCLUSIONS:

It is concluded that:

(1) Ores mined at the Opalite have favored brecciated chertification at the crest of a domal development, which has been recemented by later darker chert, accompanied by cinnabar.

(2) The Central area of chertification is decreasing with depth; 600,000 square feet at surface has become 360,000 square feet in 80 vertical feet.

(3) The opalite ore zone occurs at the 'elbow' or curve of postulated controlling structure; structure is either a curving sharp recumbent fold or a line of normal faulting.

(4) 1000 feet of inclined diamond drilling would be required to prove or disprove the continuation of mineralization with depth. A target of 240,000 tons per inclined 300 feet is indicated.

RECOMMENDATIONS:

Recommended are:

(1) A review of Bradley Mining's files for purposes of checking information supplied for publication; and to add to maps other assay and geological data, possibly not released.

(2) Further mapping to tie in, by instrument, the patterns presented herein, and the product of hurried mapping.

(3) With patterns and information verified, three holes, drilled exactly in line with the axis of the dome, two from a close location at 45 and 75 degrees to the south, and a third from a further-out location, at 75 degrees south; and with total footage approaching 1000 feet.

(4) Eventual study of the Bretz property, to determine if similar possibilities exist.

(5) A consideration of the full 'graben' area, using details and theory developed at the Opalite and the Bretz.

LOCATION (see Plat A)

The Opalite mine lies in section 33, Township 40 South, Range 40 East, in the Opalite mining district, which covers parts of Nevada and Oregon. Distance from McDermitt, Nevada is 21 miles.

From McDermitt, proceed west on the Cordero paved road a distance of 4.7 miles, turning right on the road marked "Bretz Mine-Disaster Peak Road". At 18.4 miles from McDermitt turn right on the Opalite access road and proceed 2.5 miles to the property.

GENERAL AND LIMITING CONDITIONS:

Access: No problem is presented; roads are graded and in good shape; and serviceable even after recent winter snows.

Power: A power line of undetermined capacity passes within three miles of the property.

Water Supply: Probably low but adequate for past operations.

Labor: Supply appears abundant with good miners in the McDermitt area, because of Cordero activities.

Mill Sites: Sites are adequate on the basis of past operations.

Climate: The usual Nevada-type weather assures, more or less, all year operation; however, in the late 30's the Opalite was closed for three months by severe snows. High day-time temperatures characterize the summer, but nights, at 5400 feet of altitude are cool. Summer flash floods must be anticipated.

LEGAL TITLE:

The Bradley Mining Company (Mr. James P. Bradley) 323 Crocker Building, San Francisco, is the owner of the property.

HISTORY OF PROPERTY AND DISTRICT:

Cinnabar was discovered at the Bretz Mine in 1917; initial development was low grade. Continued prospecting from the Bretz area uncovered the Opalite in 1924. F. W. Bradley's Mercury Mining Syndicate purchased the Opalite in 1925 and completed a 90 ton rotary furnace by 1926. From 1927 to 1944, 12,333 flasks of mercury were produced from approximately 6 pound ore (probably from selective mining). 1944 marked the end of major Opalite activity.

In 1931 high grade ore was found at the Bretz. Bradley Mining, leasing from Bretz, to 1936 produced 7,751 flasks. A new ore body was found and produced another 2,531 flasks from 1940 to 1942. Bradley gave up the property in 1944. Total Bretz production to that time amounted to 10, 309 flasks from 18.8 pound ore.

Additional ore was found at the Bretz in 1955. In 1956 Samuel S. Arentz put in a flotation plant and, by concentrating before roasting, recovered an additional 3,699 flasks. The above detail is from Oregon State Bulletin 55.

In December 1964 Arentz was reported to be reopening the Bretz property and anticipating an annual recovery of 4000 flasks. Apparently the effort was without success. The Bretz is now idle.

The Cordero Mine, also in the Opalite district, discovered in the late 20's, was leased by Bradley Mining in 1935. Lessee produced 45 flasks from scattered opalite 'shows', down to 50 feet of depth, and gave up the lease.

In 1940, Sun Oil Company leased the property and its subsidiary, Cordero Mining, starting in 1941, became Nevada's largest mercury producer. Through drilling and underground development, the ore has been taken to 900 feet below its opalite croppings. These deeper ores were first cut in 1943. In 1965 production was coming from the 850 level. A fire in 1965 necessitated the flooding of levels to the 600 level. By 1966, according to the Nevada Mining Association's "News Letter", "it was deemed too costly to recover the 800, 850 and 900 levels".

Nevertheless, in July 1966 , New Idria Mining was consumating a deal to buy the Cordero, with transfer planned for August 1. However, by July 18 New Idria stopped negotiation.

At the date of this report, Cordero is being taken over by the Fred H. Lemway Company, of San Francisco, with occupancy plannedfor January 1, 1967.

With reference to Plat A, the Disaster Peak property completes the list of four properties making up the district, all with the common feature of being in an "embayment" or "graben" of lake beds, surrounded by Tertiary volcanics. Discovered in 1941, the property has had no significant production record.

Production for the district is summarized as follows:

Mine	Discovery	Tonnage Treated	Production Flasks	Production Pounds	Recovered Lbs /Ton
Bretz	1917	161,326	14,008	1,064,608	6.6
Cordero	1929	650,000	95,000	7,220,000	11.1
Disaster	1941	------	-----	---------	---
OPALITE	1924	170,125	12,367	939,892	5.5

GEOLOGY:

Regional:

According to Fisk (Min.Eng. Nov. 1961) "Cordero Mine is situated on the southeast corner of an elevated and tilted graben block, bounded on the north and south by east-west normal faults, and on the east by a northwesterly striking reverse fault."

The Bretz and Cordero mines lie at margins of the graben, six miles apart. The Opalite mine and the Disaster peak are also at the margins of the graben.

Our Figure A roughly outlines the inlier of lake-bed deposits, surrounded by Tertiary volcanics.

Neighboring Deposits:

Cordero:

" The ore bodies at Cordero are found in rhyolites along two roughly parallel faults, M Fault and Harper Fault, that cut off the corner of the graben block at a 45 degree angle-------".

" M fault, a normal fault, is the major ore-controlling structure, strikes from N45E to N50E, and dips 80 degrees northwest to 90 degrees. The change of strike occurs over a lineal distance of 100 feet by warping and faulting. The main ore body lies against the concave surface resulting from change in direction."

"Harper fault, also normal, lies 700 feet southeast of M fault, is nearly parallel to M, and almost vertical."

The Harper fault localizes a new ore body (the Corderito), which was averaging 12 pounds per ton in 1961.

"Minor faults and/or fractures appear to control cinnabar mineralization along M fault." These controls are flatter in dip, but steepen as they approach M fault in depth.

"The Cordero ore body extends from just above No 3 level down to No. 8 level. In plan it is 250 feet long and 50 feet wide, with the long axis oriented parallel to M. fault. In this zone ore-bearing slips are so spaced that the ore averages 10 pounds."

"The main ore zone and subsidiary ore-shoots have a nearly common top, between the No. 3 and No. 4 levels, about 250 feet below the surface. Ore above that level is insignificant when compared to that below. The small mass of opalite overlying the main ore body only extends downward about 100 feet."

Note that 150 feet seperates the bottom of the lower grade opalite zone from the top of the major 10 pound ore body. And, note, too, that the ore body and brecciation in hard rhyolites is localized at the "elbow" or curve in structure.

The Fisk reference states, "When the Cordero deposit was discovered the only outcrops were opalite masses which were similar to those at the Opalite mine------ the roots of the oplaite have been found approximately 124 feet below the surface."

Neighboring Deposits:

Bretz Mine:

Ores from the Bretz mine were mined by open pit from an east pit and a west pit. Rocks include rhyolite flows and tuffs and thin bedded shales and sandstones.

Ore bodies were formed only in the shales in the east area, but ore has been mined from both shales and tuffs in the west area. Masses of silicified tuff lie north of the mine workings.

The east area workings lie along a northwest trending fault. Faults were probably the channel-way for the ore-bearing solutions, and the solutions that silicified rocks to the north.

In contrast to the Opalite mine deposit, practically all of the ore occurs in unsilicified shales and tuffs, adjacent to masses of silicified rocks, with cinnabar as thin, discontinuous veinlets, fracture coatings in shales, and disseminations in sandstones and tuffs.

Opalite Mine:

General:

Oregon Survey Bulletin reports as follows:

"The Opalite ore-body occurs in a mass of chalcedony, some 1200 feet long, 800 feet wide, and more than 100 feet in maximum thickness."

Bulletin 55, quoting Yates of the U.S.Geological Survey, states:

"The lower workings follow in general the contact between the unsilicified beds and overlying chalcedony. There are traces of cinnabar in the chalcedony of these lower workings, and a little low grade ore has been stoped from the soft lake beds on the southeast side of the west winze." (note--close to the portal of Tunnel No. 1 on our plat C-1).

"The main ore body was in the northern part of the east pit, and in general the present borders of the pit coincide with the limits of this ore body. Ore from the mine has averaged a little less than 6 pounds of mercury per ton." *

*Without some areas of 40 pound rock, the general average would have been about 4 pounds.

From Personal Reconnaissance:

Note: Plats B and D are by rapid surface study, have not been tied in by instrument and are interpretative.

Reference is made to submitted Plats
B, C-1 and D.

Units:

The surface distribution of silicified and fresh lake beds is shown on Plat B. Unit A and Unit B, in yellow and buff, respectively, represent massive chertification. Unit A, in yellow, is massive white, opaque chert with voids lined with crystalline quartz; Unit C is the same massive white chert, locally brecciated with fragments recemented by darker chert. Unit C brecciation is particularly well developed and recemented with some cinnabar evident, at the center of C unit, in the pit area.

Lake beds, denoted by fine parallel lines and uncolored, consists of soft, laminated clays, shales and probably intercalated tuffs.

Structural Suggestions:

Note that this study suggests an overall anticlinal environement for the pit area, with dips in the unsilicified clastics all away from the center of the small dome, which coincides with the pit or mineralized area.

Too, the writer has not categorically accepted the necessity of having normal faulting to limit chertification and cinnabar mineralization along the north margin.

North Limiting Structure:

Development to date indicates sharp recumbent folding, as shown by Section X-X' on Plat D. Continued effort may, eventually, indicate this to be faulting. The decision is not considered critical, since tight folding eventually becomes faulting with continued movement.

However, because of the curving alligment from the pit area to the southwest corner of the plat, and on the basis of the exposure in the most northerly cut, in the northeast corner of the plat, this analysis prefers the sharp recumbent fold approach.

Broad Anticlinal Development:

On Plat B the indications are obvious.

Minor Structure:

Lines of pre and post-mineral movement appear scattered throughout opened areas. These have not been mapped.

Geological Inferences:

Preliminary observations suggest:

(1) An area of broad doming, culminating in sharp recumbent folding along the north flank. Such development (in both oil and mining geological thinking) would assure the development of better permeability and porosity, shattering and brecciation, certainly at the crest of domal development, and, hopefully, down the dip of the steep north limb, to the north.

(2) The steep northdip of the flank of the fold (or fault line, if such it is) would provide an ideal line of weakness for the control of ascending mineralizing solutions.

(3) Lake beds of varying permeability and porosity, dipping into the line of weakness, would be replaced on the basis of capabilities.

(4) The first surge of mineralization would be represented by the massive white chertification of Unit A and, in part, of Unit C. Continuing structural growth would further shatter this initial chertification and continuing mineralization, consisting of darker charts, accompanied by cinnabar, would recement the brecciation developed at the crest of the dome and, hopefully, down dip to the north.

(5) The similarity to Cordero observations and possibilities at Opäite, at depth flanking the mined area north of the pit, would justify exploration at depth.

DEVELOPMENT

Development consists of the drifting and crosscutting at the 5315 datum in Tunnels 1 and 2. Both, following the under-contact between the chert Unit C and unsilicified lake beds, should be mapped in detail.

The lack of values where Tunnel 2 cuts through Unit C, cannot condemn future possibilities since the line of penetration of the Unit is down flank from the crest and well removed from the postulated line of ore control. The Unit at this point should be massive and without ore possibilities.

Holes, drilled from ill-chosen locations by El Paso Natural Gas and Cordero Mining, theoretically merit the negative results they provide.

The mineralization, reported in the West Winze, close to the portal of Tunnel 1, and considered so important that drilling for the area was recommended in 1955, is of less interest to the writer than the immediate exploration down dip from the center of production, as proposed by this study.

The results of El Paso and Cordero efforts, both very negative, are not included in this preliminary report. Records can be had from Utah Construction and Mining Company files.

SAMPLES

No samples were cut during the course of this Reconnaissance study.

ORE RESERVES:

The property is without mineable reserves.

For purposes of establishing a "size of target", be it observed that the pit area developed a strike-length of about 200 feet, and a thickness of 50 feet. Drilling, as shown on Section X-X', (see Plat D) provides 300 feet of inclined dip-length below the Tunnel 2 datum. Such dimensions provide a 240,000 ton 'target'.

Reference is made to the description of the main Cordero orebody, with length of 250 feet and thickness of 50 feet, extending from the 300 to the 900 level.

TREATMENT COSTS; PROFIT OR LOSS:

These major items are not included in this analysis.

METAL PRICES:

Our submitted plat I reflects the mercury price curve from August 1963 through November 1966. Monthly averages are those reported by the Engineering and Mining Journal.

The straight-line projection from July 1964 indicates future averages in excess of $475 per flask or about $5 per pound. Such price and an average in excess of 6 pounds per ton would invite serious consideration of an underground mining program.

RECAPITULATION

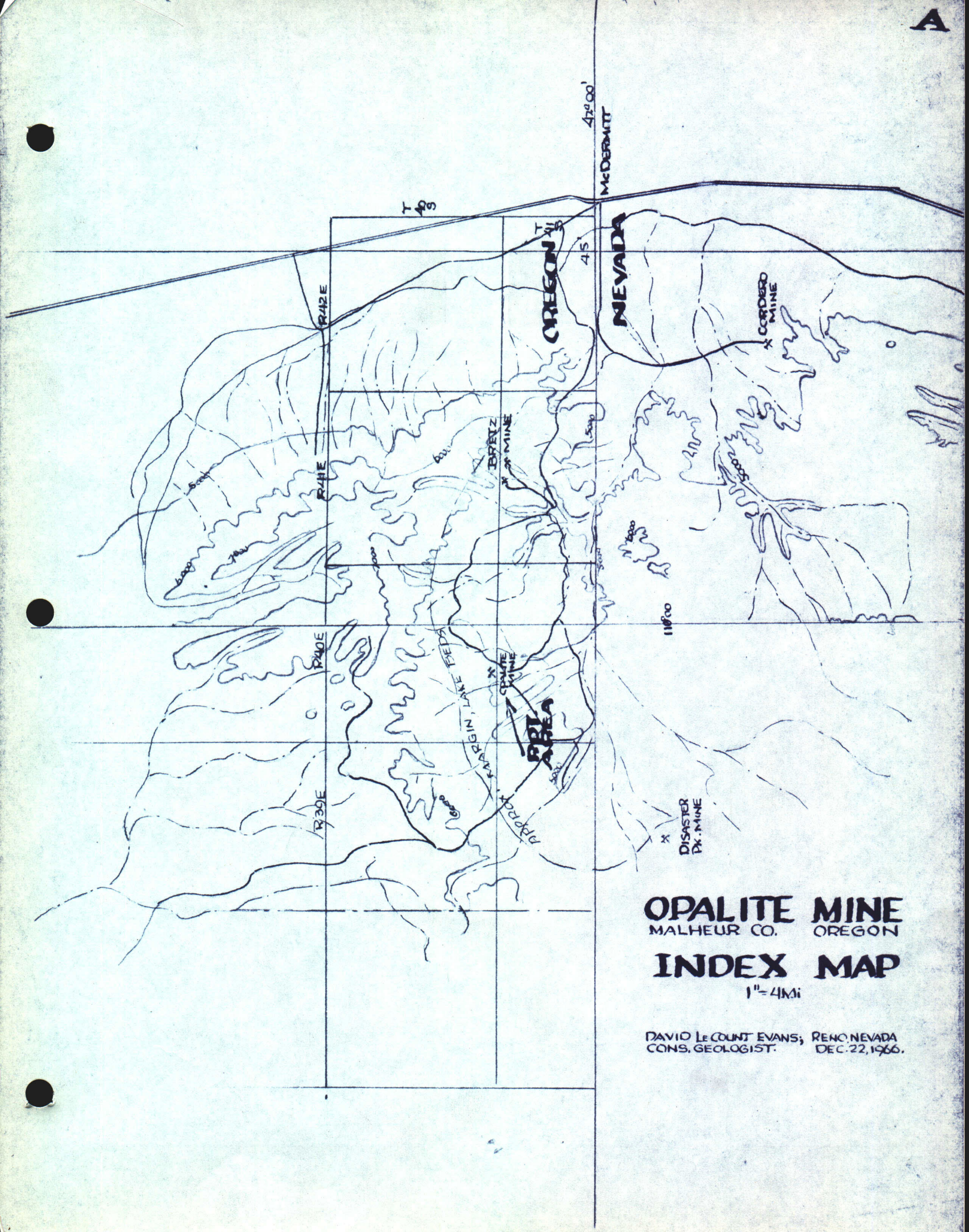
The writer concurs that the Opalite property is similar in many respects to the Cordero mine. The property, per se, cannot be categorically recommended or condemned at this stage in the study. But a reasonable amount of inclined diamond drilling, as indicated on Section X-X', as outlined under "Recommendations" is urged.

Respectfully submitted,

David LeCount Evans

December 22, 1966
Reno, Nevada.

A



OPALITE MINE

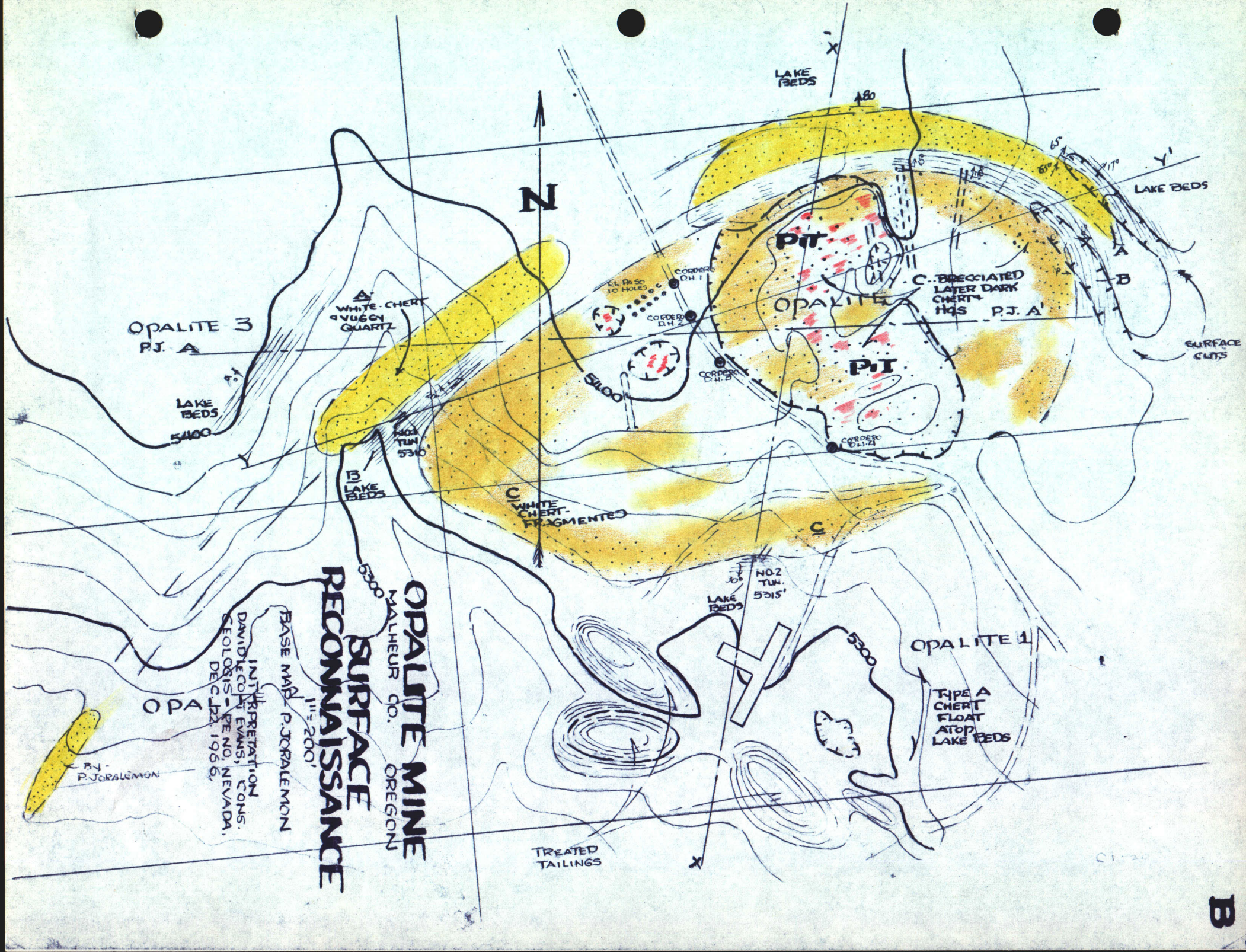
MALHEUR CO. OREGON

INDEX MAP

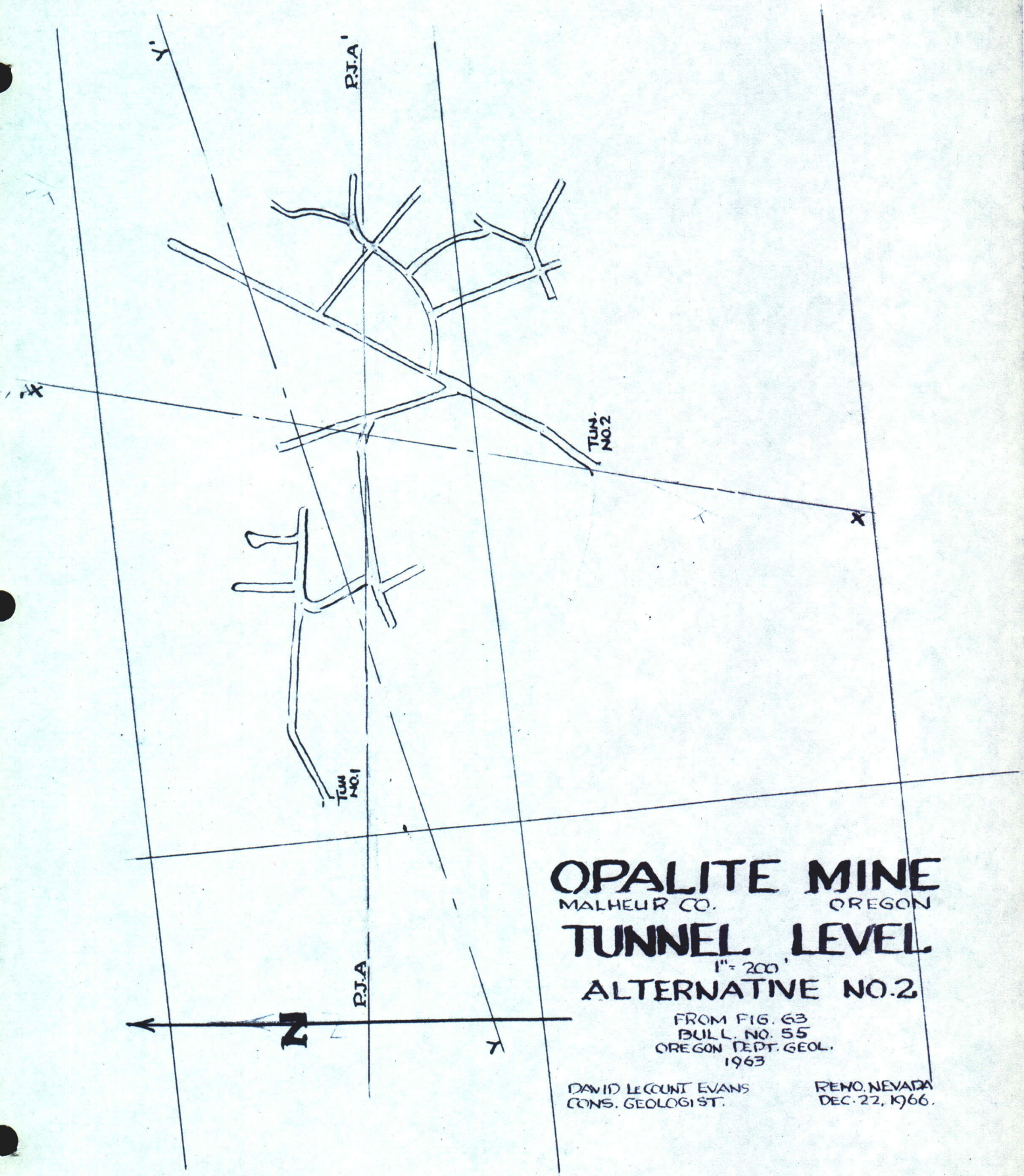
1" = 4 Mi

DAVID LE COUNT EVANS; CONS. GEOLOGIST.

RENO, NEVADA DEC. 22, 1966.


OPALITE MINE
MALHEUR CO. OREGON
SURFACE RECONNAISSANCE
BASE MAP P. JORALEMON
1" = 200'
INTERPRETATION
DAVID LECOMPTE EVANS, CONS. GEOLOGIST
PE NO. NEVADA,
DEC. 22. 1966.
N
OPALITE 3
P.J. A
LAKE BEDS
5400
A
WHITE CHERT
& VUGGY QUARTZ
NO.1 TUN. 5310'
B
LAKE BEDS
C
WHITE CHERT FRAGMENTED
5300
EL PASO 10 HOLES
CORDERO DH 1
CORDERO DH 2
CORDERO DH 3
CORDERO DH 4
5400
PIT
PIT
OPALITE
C. BRECCIATED LATER DARK CHERT HAS
P.J. A'
LAKE BEDS
Y'
A
B
SURFACE CUTS
C
NO.2 TUN. 5315'
LAKE BEDS
5300
OPALITE 1
TYPE A CHERT FLOAT ATOP LAKE BEDS
TREATED TAILINGS
X
X'
B-N - P. JORALEMON
OPA


P.J.A'
Y'
X'
X
NO.2 TUN.
NO.1 TUN.
Y
N
P.J.A
OPALITE MINE
MALHEUR CO. OREGON
TUNNEL LEVEL
1"=200'
ALTERNATIVE NO.1
FROM P. JORALEMON
JAN. 7. 1955
DAVID LECOUNT EVANS; CONS. GEOLOGIST
RENO. NEVADA
DEC. 22. 1966.



OPALITE MINE

MALHEUR CO. OREGON

TUNNEL LEVEL

1" = 200'

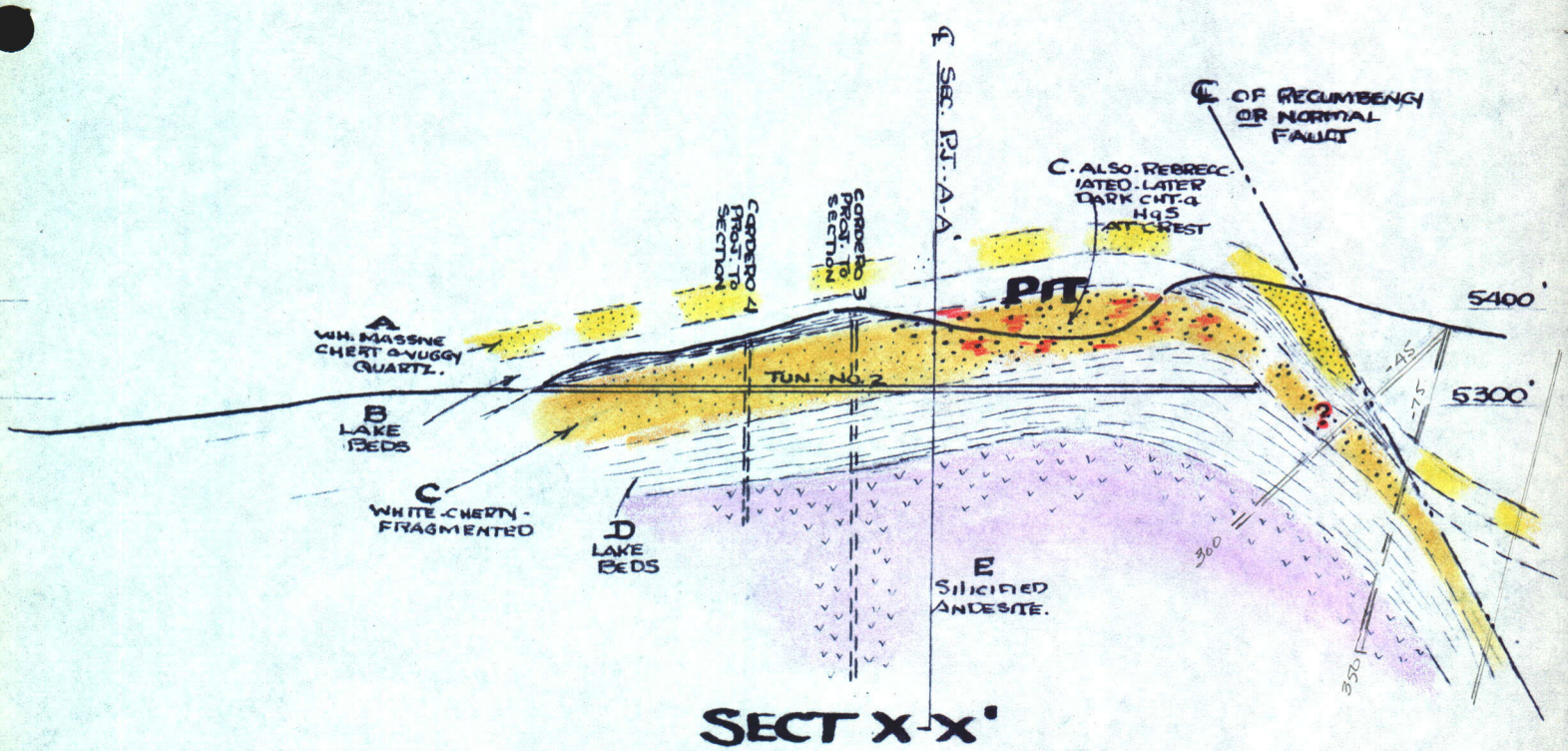
ALTERNATIVE NO.2

FROM FIG. 63
BULL. NO. 55
OREGON DEPT. GEOL.
1963

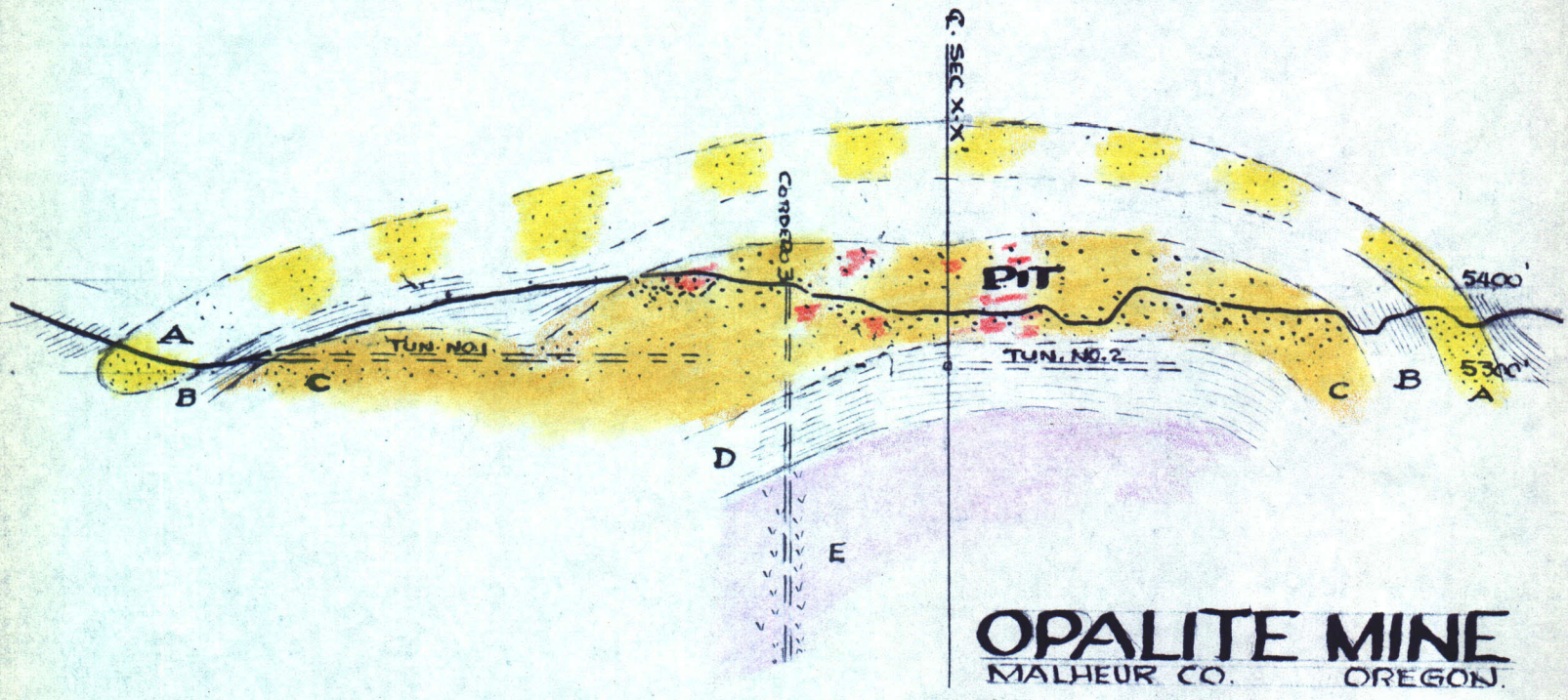
DAVID LECOUNT EVANS
CONS. GEOLOGIST.

RENO, NEVADA
DEC. 22, 1966.

D



SECT X-X'



OPALITE MINE

MALHEUR CO. OREGON.

SECT Y-Y'

CROSS SECTIONS

1" = 200'

DAVID LE COUNT EVANS
CONS. GEOLOGIST

RENO, NEVADA
DEC. 22. 1966

I

MERCURY PRICES
MONTHLY AVERAGES
SOURCE-E.M.J.

TO ACCOMPANY REPORTS BY
DAVID LeCOUNT EVANS
CONSULTING GEOLOGIST
RENO, NEVADA