CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
3550 N. Central Ave, 2nd floor
Phoenix, AZ, 85012
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the Grover Heinrichs 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.

32,000 N

26,000 N

20,000 N

14,000 N

12,000 E

20,000 E

28,000 E

35,000 E

N

4591
HEX RIDGE 3

4456

HEX RIDGE 10

4457

4590

LEGEND

- ALLUVIUM & TALUS
- BASALT
- TUFF
- INTERMEDIATE VOLCANICS
- LITHIC TUFF
- LATITE
- QTZ DIORITE - DIORITE
- ANDESITE
- GRANODIORITE
- QUARTZITE

- DRILL HOLES
- A — A' CROSS SECTIONS
- MINERAL SURVEY BOUNDARY
- CLAIMS IN THIS APPLICATION
- BOUNDARY OF GEOCHEMICAL ANOMALY
- BOUNDARY OF GEOPHYSICAL ANOMALY
- BOUNDARY OF PATENTED CLAIMS

AR- 032664

KENNECOTT COPPER CORPORATION

SAFFORD PROJECT

LONE STAR MINING DISTRICT - GRAHAM CO. ARIZONA

GEOLOGICAL MAP

SCALE 1"=1000'

1000 0 1000 2000 3000

SKS 4-19-79

EXHIBIT F

32,000 N

26,000 N

20,000 N

14,000 N

12,000 E

20,000 E

28,000 E

36,000 E

N

GEOPHYSICAL BASELINE

LEGEND

- ALLUVIUM & TALUS
- BASALT
- TUFF
- INTERMEDIATE VOLCANICS
- LITHIC TUFF
- LATITE
- QTZ. DIORITE-DIORITE
- ANDESITE

- DRILL HOLES
- A—A' CROSS SECTIONS
- MINERAL SURVEY BOUNDARY
- GEOPHYSICAL ANOMALY BOUNDARY

KENNECOTT COPPER CORPORATION

SAFFORD PROJECT

LONE STAR MINING DISTRICT - GRAHAM CO. ARIZONA

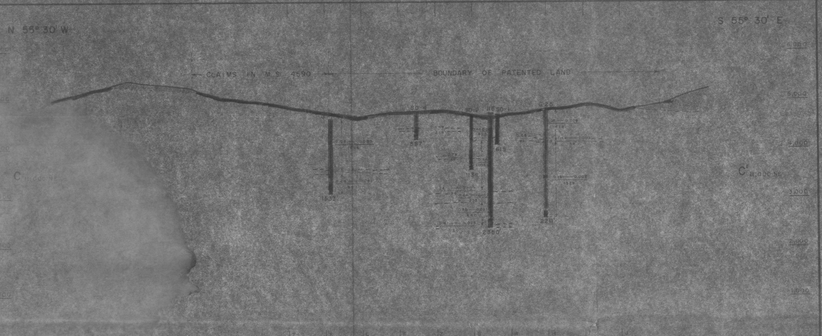
GEOLOGICAL MAP

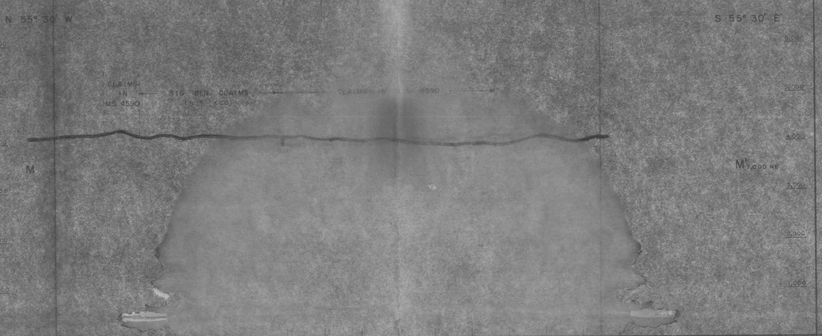
SCALE 1"=1000'

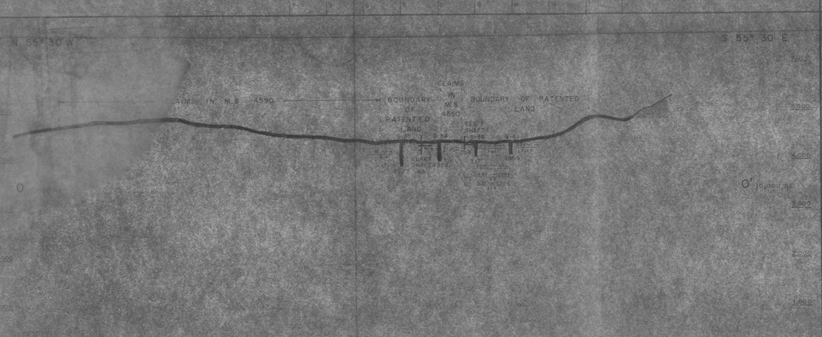
1000 0 1000 2000 3000

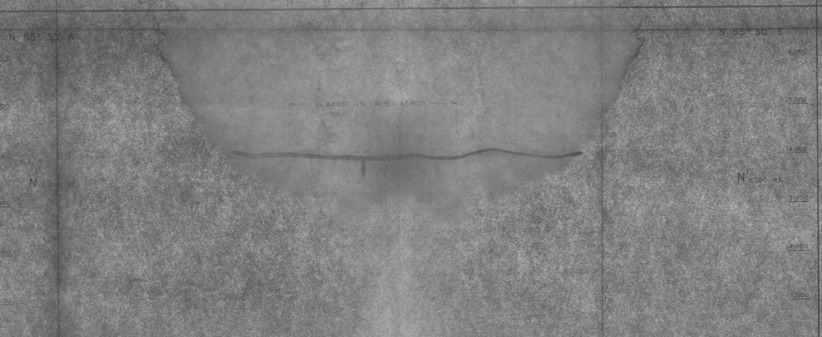
GKS 9-25-58

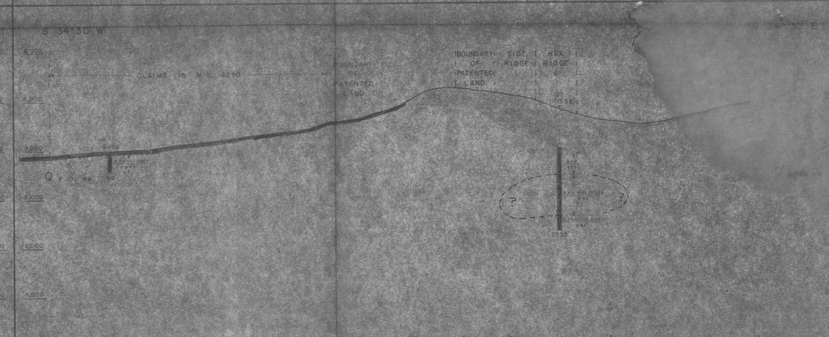
PLATE I

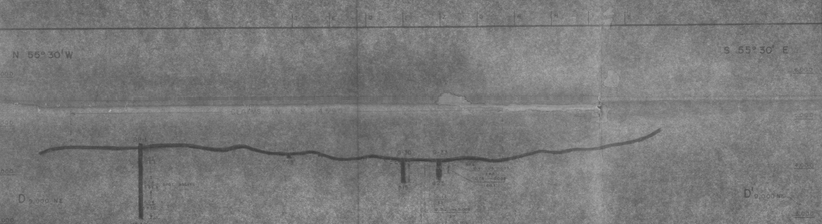


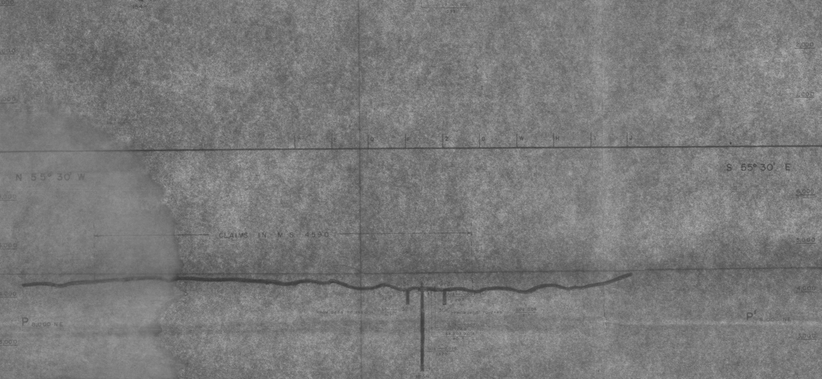


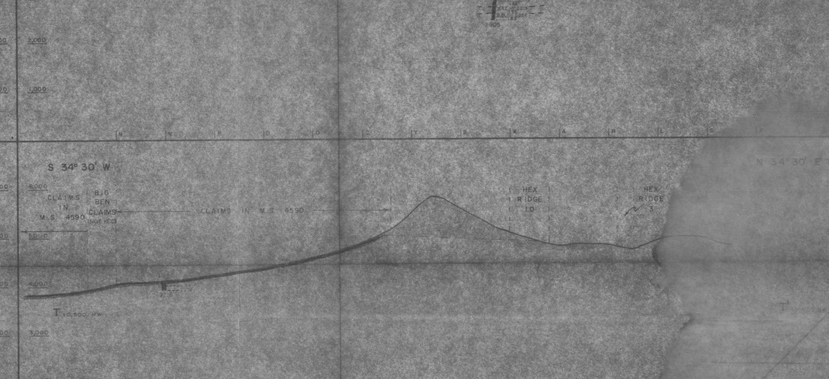












LEGEND

INTRUSIVE ROCKS

- RHYOLITE, QUARTZ-LATITE, LATITE, DACITE
- GRANODIORITE
- QFP-DIORITE, DIORITE
- QFP-MONZONITE, MONZONITE
- INTRUSIVE BRECCIA

SEDIMENTARY & VOLCANIC ROCKS

- ALLUVIUM
- GRAVELS & CONGLOMERATES
- UPPER VOLCANICS (UPPER TOPEX SERIES)
- LOWER VOLCANICS & SEDIMENTARY ROCKS

INTERMEDIATE VOLCANICS

—— SOURCE BLOCK POSIT. (Possible Limits)

NOTE: Datum Ordinates Are Mine Grids Datum As Shown

KENNECOTT COPPER CORPORATION
SAFFORD PROJECT
LONE STAR MINING DISTRICT GRAHAM CO. ARIZONA

CROSS SECTIONS
C, D, E, F, G, M, N, O, P, Q, T, Z

SCALE 1" = 1000' DATE MAY 1, 1963

EXHIBIT

SAFFORD

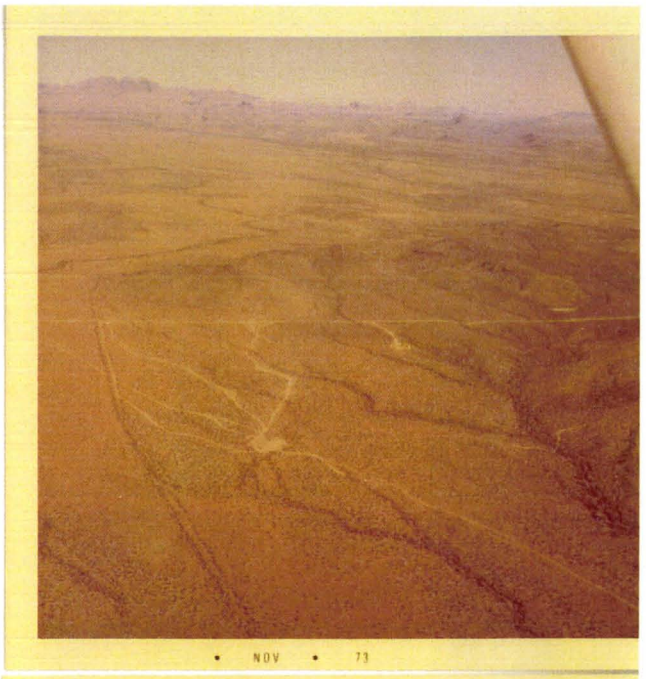
Kennecott
Extension
Photos & info

ESSEX INTERNATIONAL, INC.
[redacted]

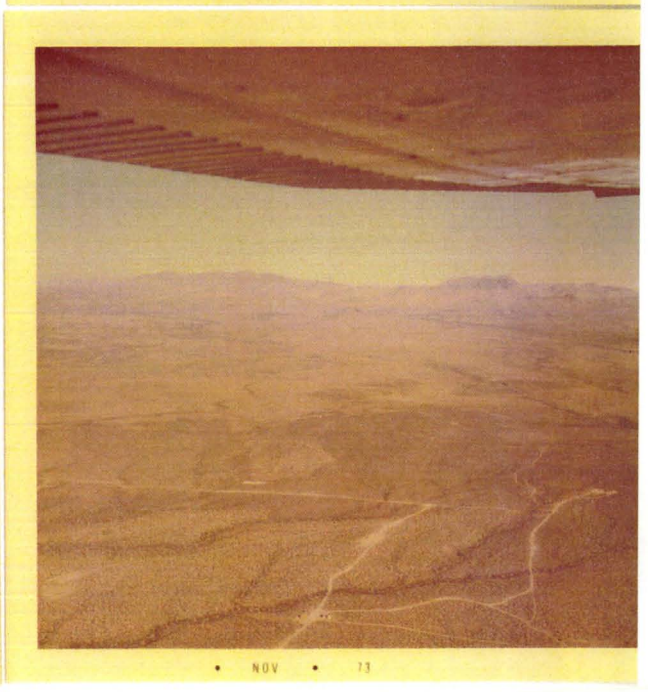
ESSEX INTERNATIONAL, INC.
2410 NORTH HUACHUCA DRIVE
TUCSON, ARIZONA 85705

ESSEX


• NOV • 73


• NOV • 73


• NOV • 73


• NOV • 73

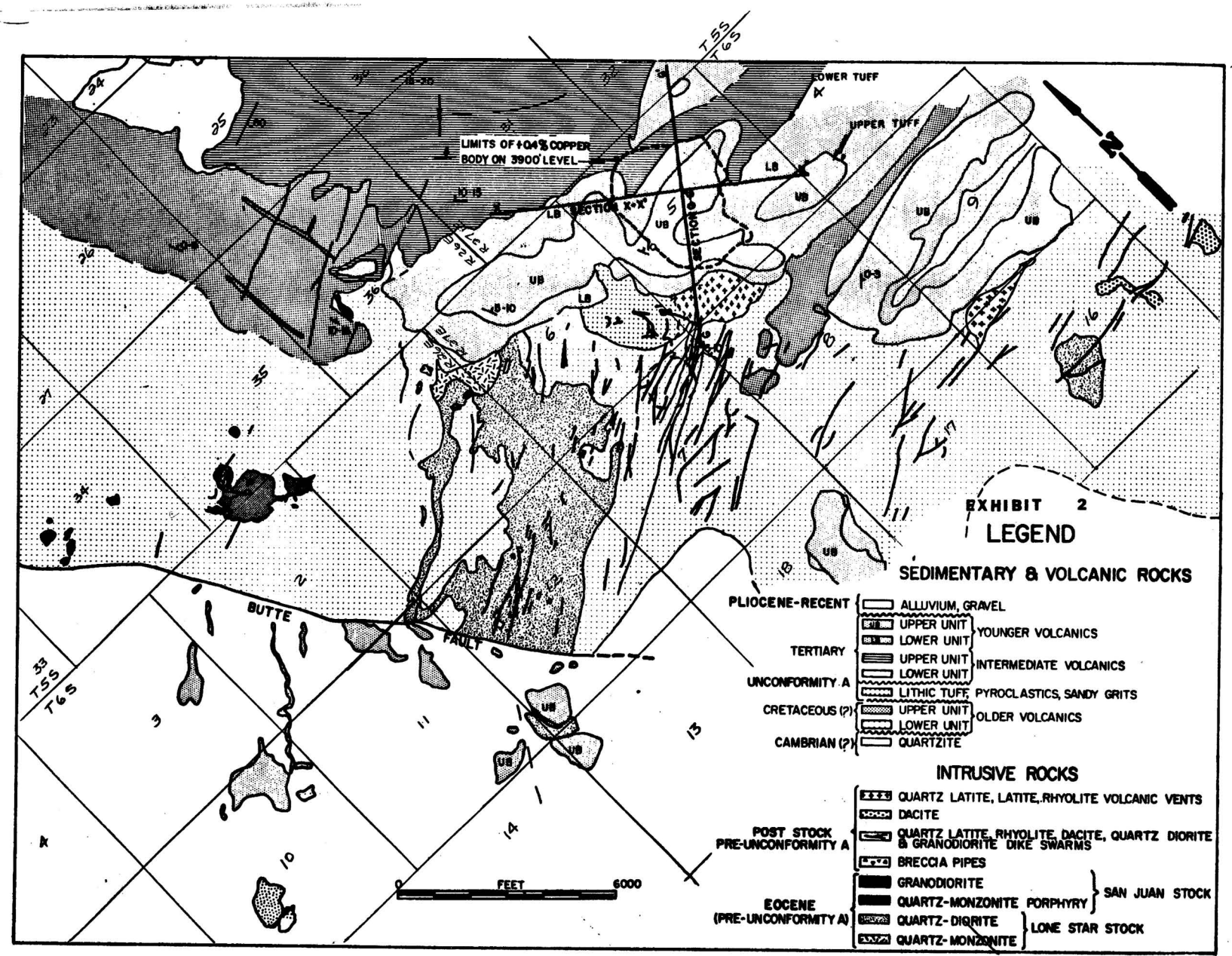

• NOV • 73

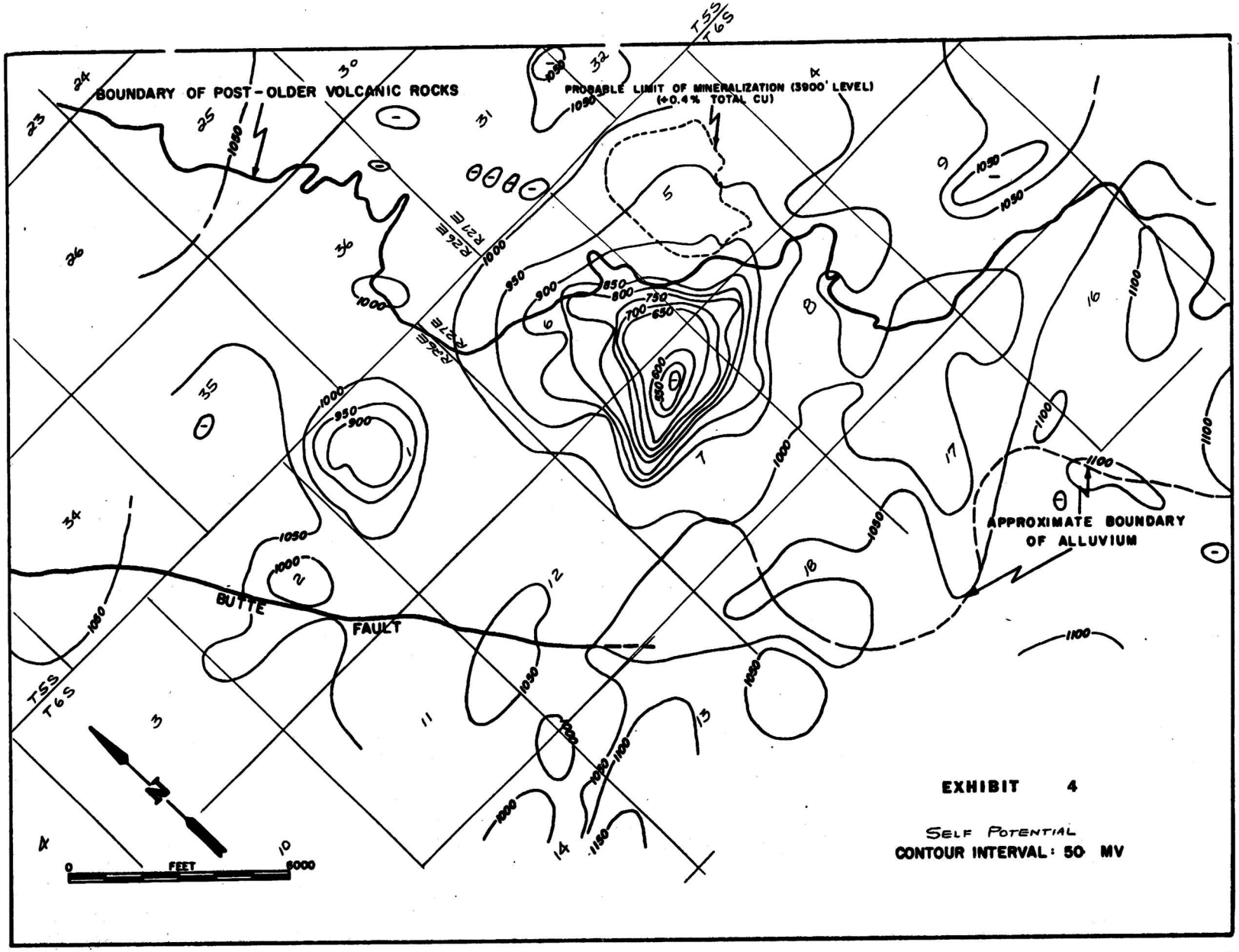
Six
of
these
aerials

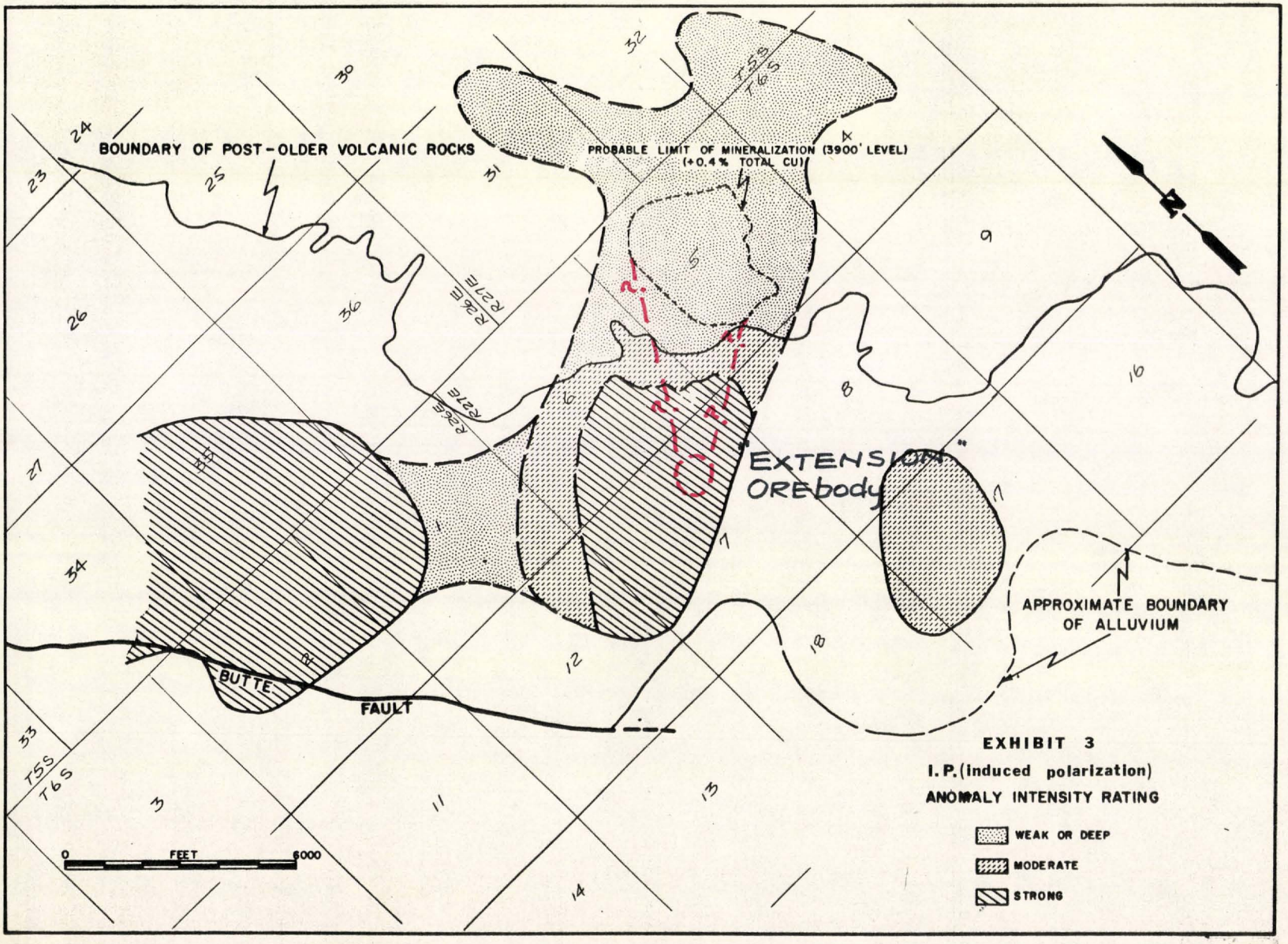
ESSEX

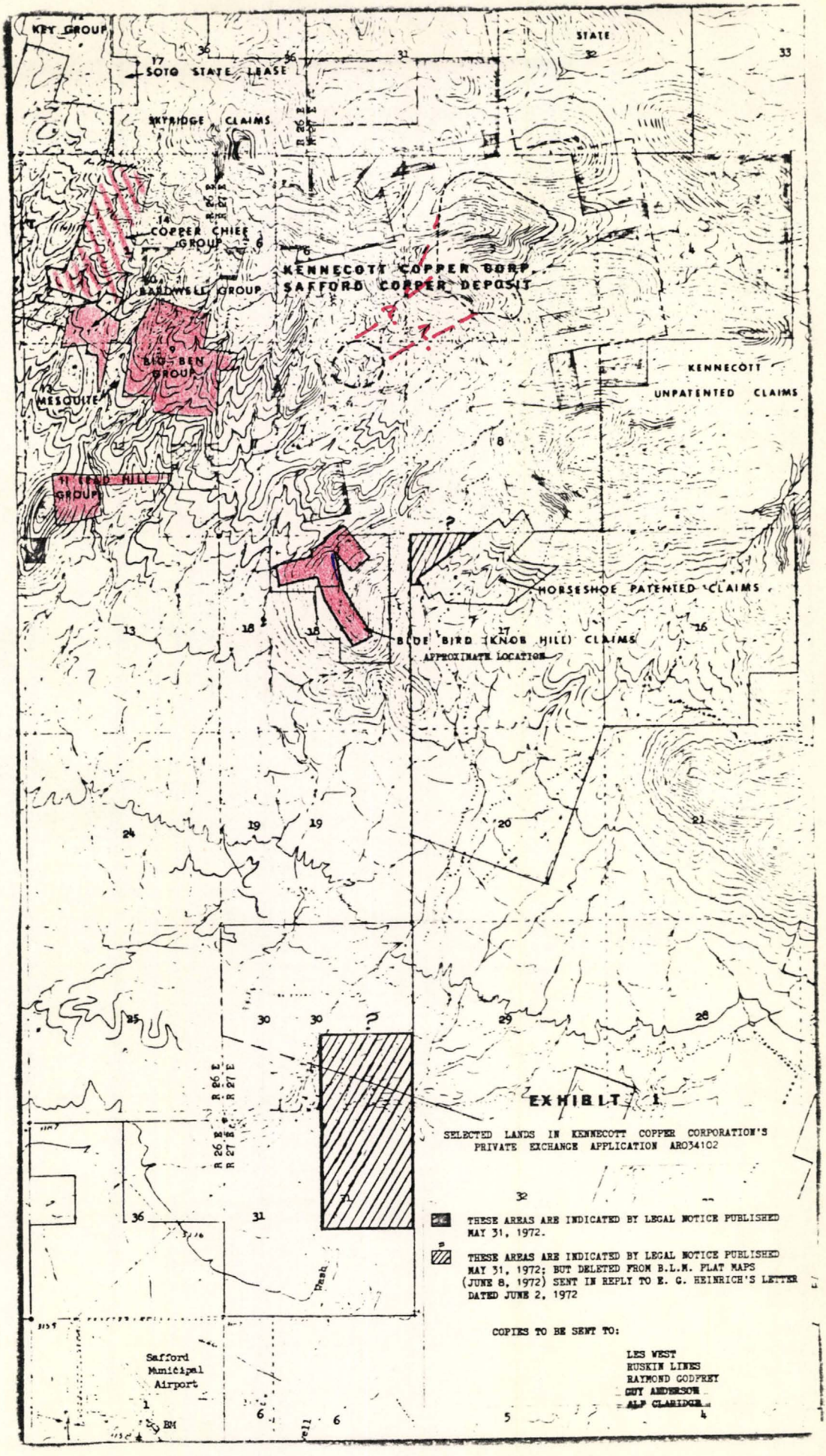
ESSEX INTERNATIONAL, INC.
METALLURGICAL & MINING DIVISION
1704 WEST GRANT RD., TUCSON, ARIZONA 85705 • PHONE (602) 624-7421

"EXTENSION"
ORE BODY
OCT. 1973


LIMITS OF +04% COPPER BODY ON 3900' LEVEL
LB SECTION X-X'
SECTION
LOWER TUFF
UPPER TUFF
LB
UB
BUTTE FAULT
T5S
T6S
R7E
R8E
FEET
6000
EXHIBIT 2
LEGEND
SEDIMENTARY & VOLCANIC ROCKS
PLIOCENE-RECENT
ALLUVIUM, GRAVEL
TERTIARY
UPPER UNIT
LOWER UNIT
YOUNGER VOLCANICS
UPPER UNIT
LOWER UNIT
INTERMEDIATE VOLCANICS
UNCONFORMITY A
LITHIC TUFF, PYROCLASTICS, SANDY GRITS
CRETACEOUS (?)
UPPER UNIT
LOWER UNIT
OLDER VOLCANICS
CAMBRIAN (?)
QUARTZITE
INTRUSIVE ROCKS
POST STOCK PRE-UNCONFORMITY A
QUARTZ LATITE, LATITE, RHYOLITE VOLCANIC VENTS
DACITE
QUARTZ LATITE, RHYOLITE, DACITE, QUARTZ DIORITE & GRANODIORITE DIKE SWARMS
BRECCIA PIPES
EOCENE (PRE-UNCONFORMITY A)
GRANODIORITE
QUARTZ-MONZONITE PORPHYRY
SAN JUAN STOCK
QUARTZ-DIORITE
QUARTZ-MONZONITE
LONE STAR STOCK


BOUNDARY OF POST-OLDER VOLCANIC ROCKS
PROBABLE LIMIT OF MINERALIZATION (3900' LEVEL)
(+0.4% TOTAL CU)
APPROXIMATE BOUNDARY
OF ALLUVIUM
BUTTE
FAULT
T5S
T6S
R21E
R22E
R23E
0
FEET
9000
EXHIBIT 4
SELF POTENTIAL
CONTOUR INTERVAL: 50 MV


BOUNDARY OF POST-OLDER VOLCANIC ROCKS
PROBABLE LIMIT OF MINERALIZATION (3900' LEVEL)
(+0.4% TOTAL CU)
EXTENSION
OREbody
APPROXIMATE BOUNDARY
OF ALLUVIUM
BUTTE
FAULT
T5S
T6S
R26E
R27E
0
FEET
6000
EXHIBIT 3
I.P. (induced polarization)
ANOMALY INTENSITY RATING
WEAK OR DEEP
MODERATE
STRONG


KEY GROUP
SOTO STATE LEASE
SKYRIDGE CLAIMS
COPPER CHIEF GROUP
BALDWELL GROUP
KENNECOTT COPPER CORP.
SAFFORD COPPER DEPOSIT
BIG BEN GROUP
MESQUITE
LEAD HILL GROUP
KENNECOTT
UNPATENTED CLAIMS
HORSESHOE PATENTED CLAIMS
BLUE BIRD (KNOB HILL) CLAIMS
APPROXIMATE LOCATION
STATE
Safford Municipal Airport
EXHIBIT 1
SELECTED LANDS IN KENNECOTT COPPER CORPORATION'S PRIVATE EXCHANGE APPLICATION AR034102
THESE AREAS ARE INDICATED BY LEGAL NOTICE PUBLISHED MAY 31, 1972.
THESE AREAS ARE INDICATED BY LEGAL NOTICE PUBLISHED MAY 31, 1972; BUT DELETED FROM B.L.M. PLAT MAPS (JUNE 8, 1972) SENT IN REPLY TO E. G. HEINRICH'S LETTER DATED JUNE 2, 1972
COPIES TO BE SENT TO:
LES WEST
RUSKIN LINES
RAYMOND GODFREY
GUY ANDERSON
ALP CLARIDGE

Visitors cordially welcome
tfc

LEGAL NOTICES

UNITED STATES
DEPARTMENT OF
THE INTERIOR
Bureau of Land Management
Arizona State Office
3022 Federal Building
Phoenix, Arizona 85025

Under provisions of the Taylor Grazing Act of June 28, 1934 (48 Stat. 1272; 43 U.S.C. 315g; 43 CFR, Part 2200, as amended, Kennecott Copper Corporation has filed application AR 034102 to select the public land described as lots 3 to 7, inclusive, N½SE¼ and NE¼SW¼ sec. 31, T. 5 S., R. 27 E.; lots 11 and 12, sec. 1, lot 4, sec. 12, and NW¼NW¼-NW¼ sec. 13, T. 6 S. R. 26 E.; lots 1, 2 and 3, lots 9 to 12, inclusive, S½NE¼, SE¼NW¼, SE¼ and E½SW¼ sec. 4, lots 3 to 7, inclusive, sec. 5, lots 9, 10, 11, 15, 16, and 17, and SW¼NE¼, sec. 6, lots 10 and 11, sec. 7, lot 9, sec. 8, lot 8, sec. 9, lot 2, sec. 17, SE¼, sec. 30, and NE¼, sec. 31, T. 6 S., R. 27 E., in exchange for the offered land described as lots 2 to 8, inclusive, lots 11 and 12, sec. 7, T. 13 N., R. 13 E., all GSR Mer., Arizona.

The purpose of this notice is to allow any person asserting a claim to the lands to file their claim in this office. Any claim should be filed, with evidence that a copy thereof has been served on the applicant, within 60 days from date of first publication.

First publication date: May 17, 1972.

Roy T. Helmandollar
Chief,
Branch of Lands

4t 6-7f

JEA

JOH
WORT
THE
to the
JOHN
WORT
YOU
MONE
pear a
entitled
entitled
DAYS,
service,
summo
within
within
clusive
if serve
Arizona
notified
so to d
will be
for the
complai
The n
plaintiff
S. WE
WELKE
Street,
GIVE
the seal
of the S
for the
28th day
(SEAL)
L
C
B
D

IN THE
OF G
STA

NOTIC
F
OF A

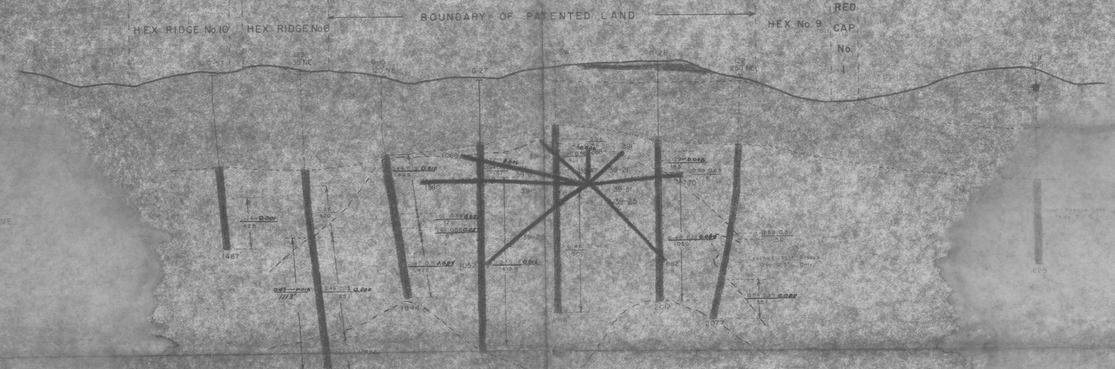
ESSEX

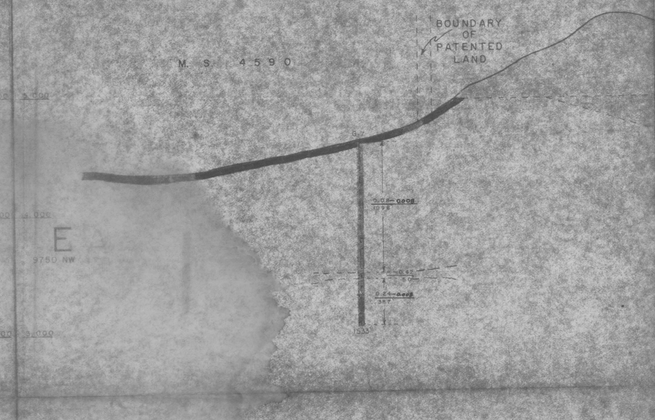
ESSEX INTERNATIONAL, INC.
1704 WEST GRANT RD., TUCSON, ARIZONA 85705
PHONE (602) 624-7421

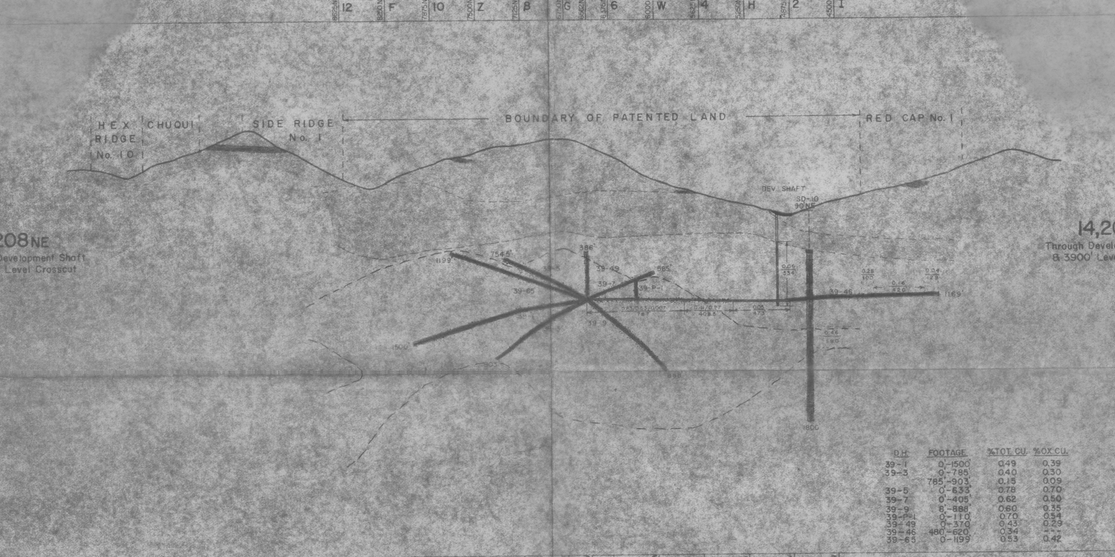
SAFFORD AREA

SCALE:	1" = 1000'
DATE:	4/16/74
DATA BY:	ESSEX
PREPARED BY:	EGH & ATC

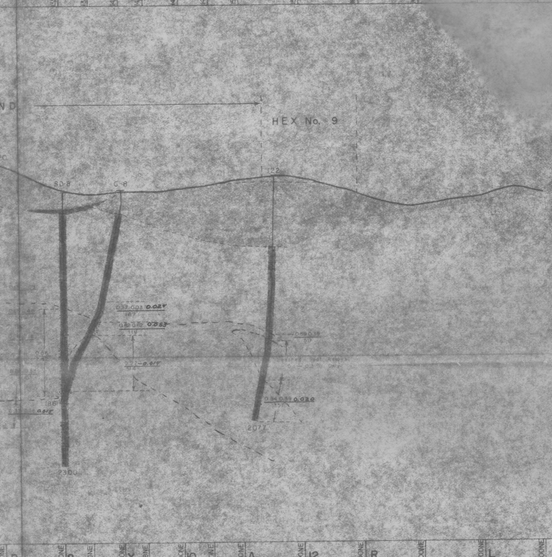
COOPER AERIAL SURVEYS
1692 WEST GRANT ROAD
TUCSON, ARIZONA 85705
PHONE 884-7580

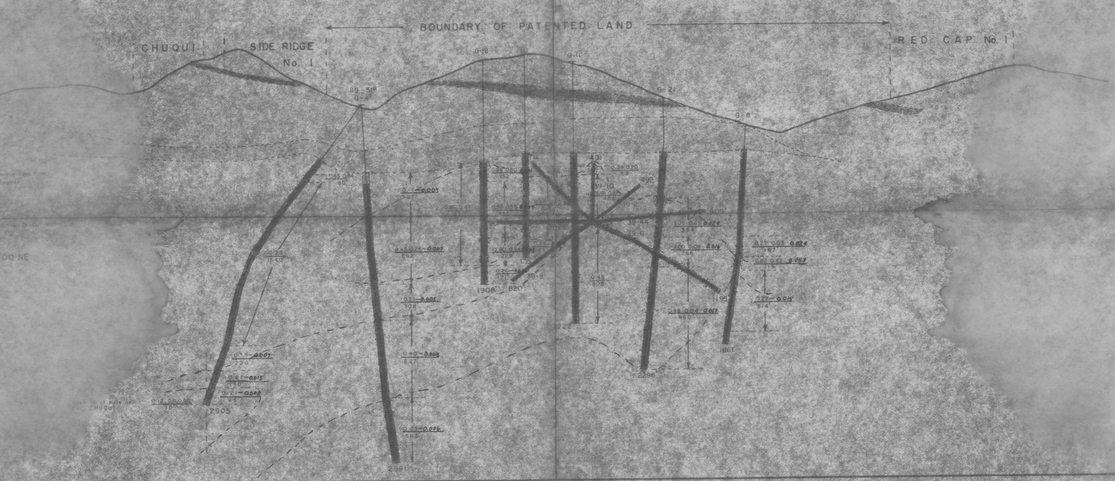






D.H.	FOOTAGE	%TOT CU	%OX CU
39-1	0-1500	0.49	0.39
39-3	0-785	0.40	0.30
	785-903	0.15	0.09
39-5	0-833	0.78	0.70
39-7	0-405	0.62	0.50
39-9	8-888	0.60	0.35
39-41	0-170	0.70	0.54
39-49	70-370	0.43	0.29
39-45	480-600	0.34	0.24
39-63	0-1199	0.53	0.42





LEGEND

- QUATERNARY ALLUVIUM
- BASALT
- TUFF
- INTERMEDIATE VOLCANICS
- RHYOLITE, QTZ. LATITE, LATITE
- QTZ. MONZONITE, MONZONITE
- GRANODIORITE
- QTZ. DIORITE, DIORITE
- DACITE
- LITHIC TUFF, GRITS
- ANDESITE
- OXIDE / SULFIDE MINERALIZATION

%Tot Cu. %Ox Cu. %Mo S. Footage

COPPER DEPOSIT Probable Limits

AR- 032965

KENNECOTT COPPER CORPORATION
SAFFORD PROJECT
LONE STAR MINING DISTRICT, GRAHAM CO., ARIZONA

CROSS SECTIONS
A, E, H, X, 14208 NE

SCALE 1" = 500' DATE MAY 1, 1963

EXHIBIT G

GENERAL GEOLOGY AND MINERAL CHARACTER OF THE SOUTHWEST PORTION OF THE GILA MOUNTAIN RANGE

The Bear Creek Mining Company, a subsidiary of the Applicant (Kennecott Copper Corporation), initiated the Safford Project which was the Geological Exploration of the Gila Mountains in Graham County, Arizona. The general area is located in the Lone Star Mining District, which is situated 8 1/2 to 10 miles northeast of the Town of Safford on the Gila River, along the southwest flank of the Gila Range. The most intense geological exploration was centered on the lands of Mineral Surveys Nos. 4453, 4454, 4455, 4456, 4457, and 4475 and the lands surrounding and contiguous thereto. The geological data submitted in this patent application is the result of exploration during the period 1956 to 1957. Exploration has continued from 1957 to the present to determine the full extent of the copper ore body which will be described herein.

The Gila Mountains trend northwesterly and represent an uplifted and easterly tilted block of volcanic flows and tuffs. The topography is rugged with an abrupt rising face to the west and southwest and a deeply dissected slope to the east. Local relief is 1800 to 2000 feet.

Drainage to the southwest of the main exploration area is by a series of shallow incised washes that flow to the Gila River, five miles from the foot of the range. Bonita Creek, a perennially flowing stream, drains the east flank of the Gila Mountains.

Rainfall is less than ten inches per year, principally in July and August, due to summer storms. Mild rains and light snows occur during December and January. The area may be classified as semi-arid and is favorable to year-round operations.

Grass and small shrubs cover the Gila Mountains; however, the area is not suitable for farming or agricultural purposes.

The geology in brief as stated in the summary and progress report of the Safford Project and compiled by Mr. Raymond F. Robinson, Senior Geologist, is:

> "A series of andesitic volcanic rocks of unknown thickness have been strongly sheared by northeast fault zones. Plutonic rocks in the form of small stocks (plug-like masses ranging through quartz diorite, quartz monzonite, granodiorite) have intruded the area apparently guided by the inherent weakness of the sheared zone. Still later, intrusive rocks, including latites, quartz latites and rhyolites, intruded the same area in the form of dikes, sills and as a plug-shaped mass, the occurrence of which suggests it filled a volcanic vent. Shearing and fracturing along the northeast shear zones continued after the later intrusions. Following this, the area was hydrothermally altered and then mineralized principally by iron and copper bearing sulfides. Erosion and time formed a porphyry type mineralized body which was then covered by a later volcanic sequence: The Intermediate and Younger series. Northwest block faulting and uplift then took place and the old "orebody" along with the Gila Mountains was tilted to the east. Renewed erosion stripped the west flank of the Gila Mountains to the primary core of the old mineralization, and the copper from that area probably migrated northeasterly into the still covered and less eroded portion of the original mineralized zone.
>
> "It is suggested, tentatively, that some migrating copper precipitated as chrysocolla, in the cap rock in the clay filled fractures of the oxidized veinlets and openings. Some irregularly displaced the older chalcocite blanket and some continued to penetrate the primary zone even to below the present levels of drilling. Also, oxidation of the whole body was renewed and due to uplift and lowering of the water table, oxidation passed through the old chalcocite blanket and into the primary zone to an undisclosed extent below the present level of drilling. A chalcocite blanket, deeper than our present depth of drilling, theoretically could exist."

The following methods were used to obtain and correlate this geological data:

1. Geological mapping.
2. Diamond drilling.
3. Geophysical prospecting.
4. Geochemistry.
5. Sampling.
6. Metallurgical testing.

The geological map is entered in this application as "Exhibit G - Plate 1" for the benefit of all the lands of Mineral Surveys Nos. 4453, 4454, 4455, 4456, 4457, and 4475 for which patent application is being made, with the exception of the claims in Mineral Survey No. 4456 for which patent application is not being filed at this time. Plotted on the geological map is the grid system used for control in diamond drilling, the location of the drill holes, the outline of the claims in Mineral Surveys Nos. 4453, 4454, 4455, 4456, 4457, and 4475, and the geophysical anomaly boundary.

Geological cross sections which outline the presently known limits of the copper ore body were made by referring the diamond drill hole data to the vertical plane through the grid line, nearest the drill hole. These cross sections are entered in this application as "Exhibit G - Plates 2, 3, 4," for the benefit of the lands of Mineral Surveys Nos. 4453, 4454, 4455, 4456, 4457, and 4475. Geological exploration has continued since 1957 to determine the extent of the ore body beyond the limits shown in this application.

A macroscopic examination of each diamond drill core was made and the data noted in a special drill log. Cuts were made from the core and sludge and used for assay and microscopic purposes. This data is also noted on the drill log. A drill log is attached as an exhibit in each of the patent applications for Mineral Surveys Nos. 4453, 4454, 4455, 4457, and 4475. Each log is of one hole drilled within the limits of the particular survey for which patent application is being made. The drill holes corresponding to the mineral surveys are G-35, Mineral Survey No. 4453; G-41, Mineral Survey No. 4454; G-25, Mineral Survey No. 4455; G-21, Mineral Survey No. 4457; and G-38, Mineral Survey No.4475.

During the interval from June, 1956, through November, 1958, a considerable amount of geophysical work was done in connection

with the Safford Project. In a memorandum, written December 17, 1959, to Mr. Annan Cook, Resident Geologist of Kennecott Copper Corporation, Mr. George R. Rogers, Senior Geophysicist of Bear Creek Mining Company, states:

> "The most diagnostic technique employed was an electrical prospecting method known as "Induced Polarization." This method attempts to reveal the presence of metallic minerals at depth by virtue of the blocking or polarization action of these particles when a direct electrical current is passed through the earth. This polarization effect does not occur when an alternating current is passed through the earth. Therefore, information relating to the presence of metallic minerals can be derived from electrical resistivity measurements of the earth made first using direct current and then with alternating current.
>
> "The sulfide ores of copper are among the metallic minerals that can be detected. The non-metallic ores of copper are usually derived from and associated with the sulfide minerals. An electrical indication of metallic minerals, in an area where a relationship has been established between sulfide and oxide minerals and copper ore, would lead a prudent man to suspect significant copper mineralization may be present in the vicinity of the electrical indication. Such a sulfide-oxide-copper ore relationship has been established by the many drill holes in the Safford Project area.
>
> "An outline of the anomalous area wherein metallic mineral indications were obtained with the Induced Polarization method is shown on the attached map. Numerous drill holes have demonstrated that sulfide and oxide ores of copper do occur within this area. It is reasonable to conclude that significant mineralization most likely occurs beneath almost all of this anomalous area."

The outline of the anomalous area referred to in Mr. Roger's memorandum is shown on the Geological Map in dashed red lines.

EXHIBIT F

17

KENNECOTT COPPER CORPORATION

SAFFORD PROJECT AREA

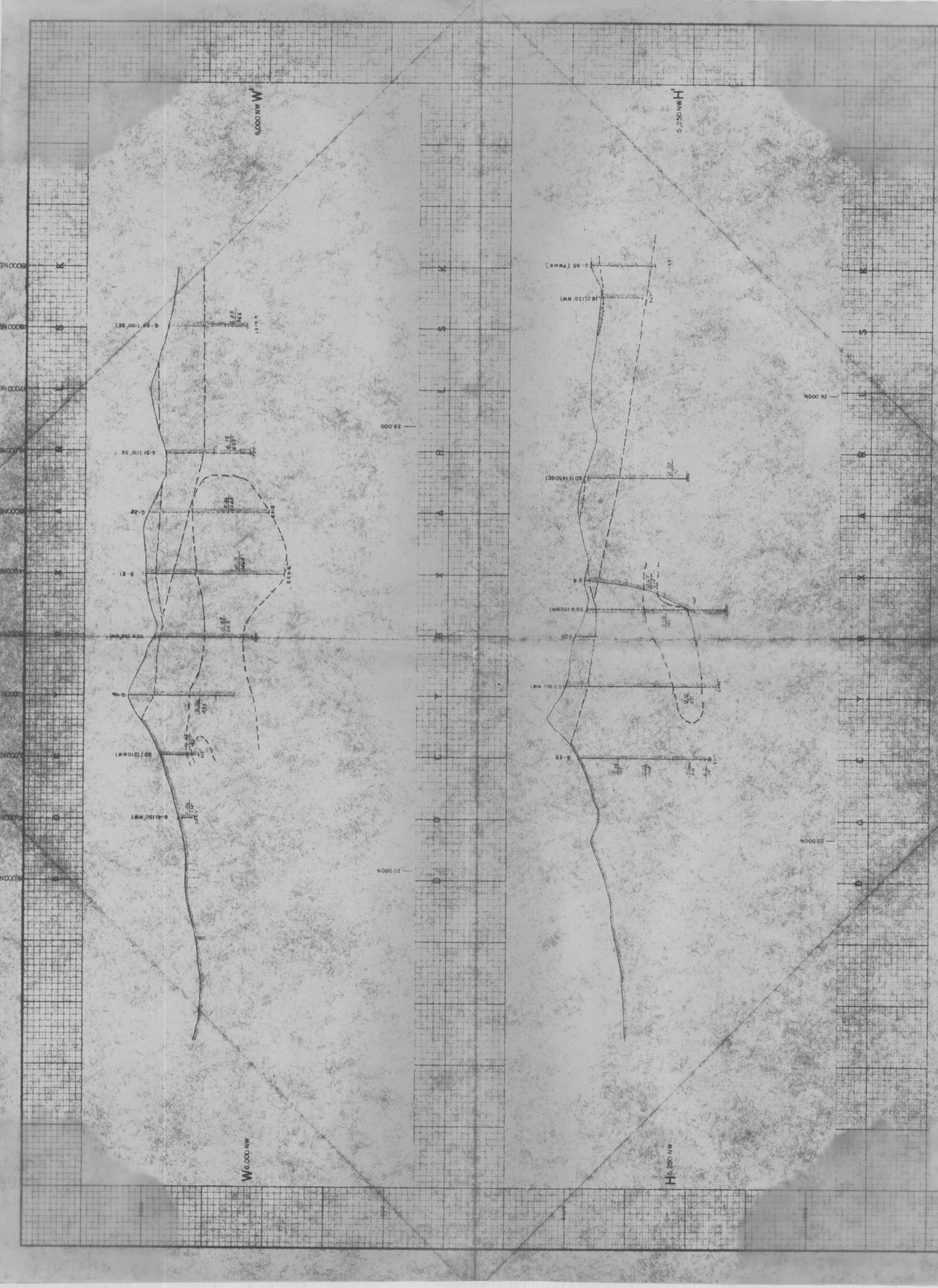
LONE STAR MINING DISTRICT GRAHAM CO. ARIZONA

SECTIONS Q·F·Z·G N34°30E

SCALE 1" = 1000'

0 1000 2000

MAP NO.



KENNECOTT COPPER CORPORATION

SAFFORD PROJECT AREA

LONE STAR MINING DISTRICT GRAHAM CO. ARIZONA

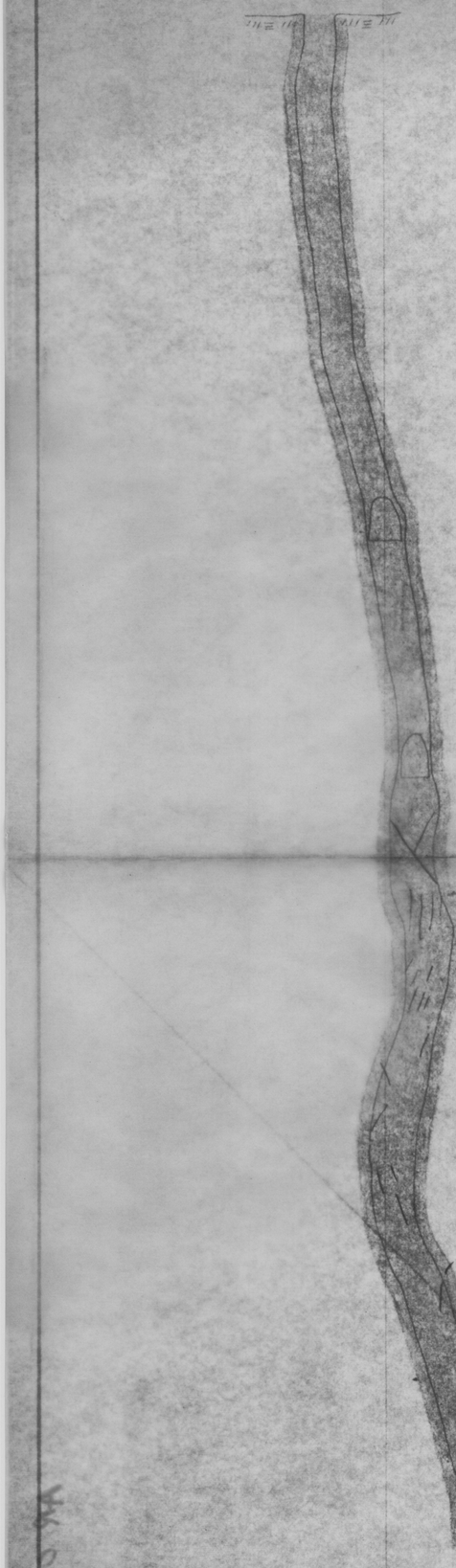
SECTIONS W·H I J N34 30E

SCALE 1" = 1000'

1000 0 1000 2000 3000 FEET

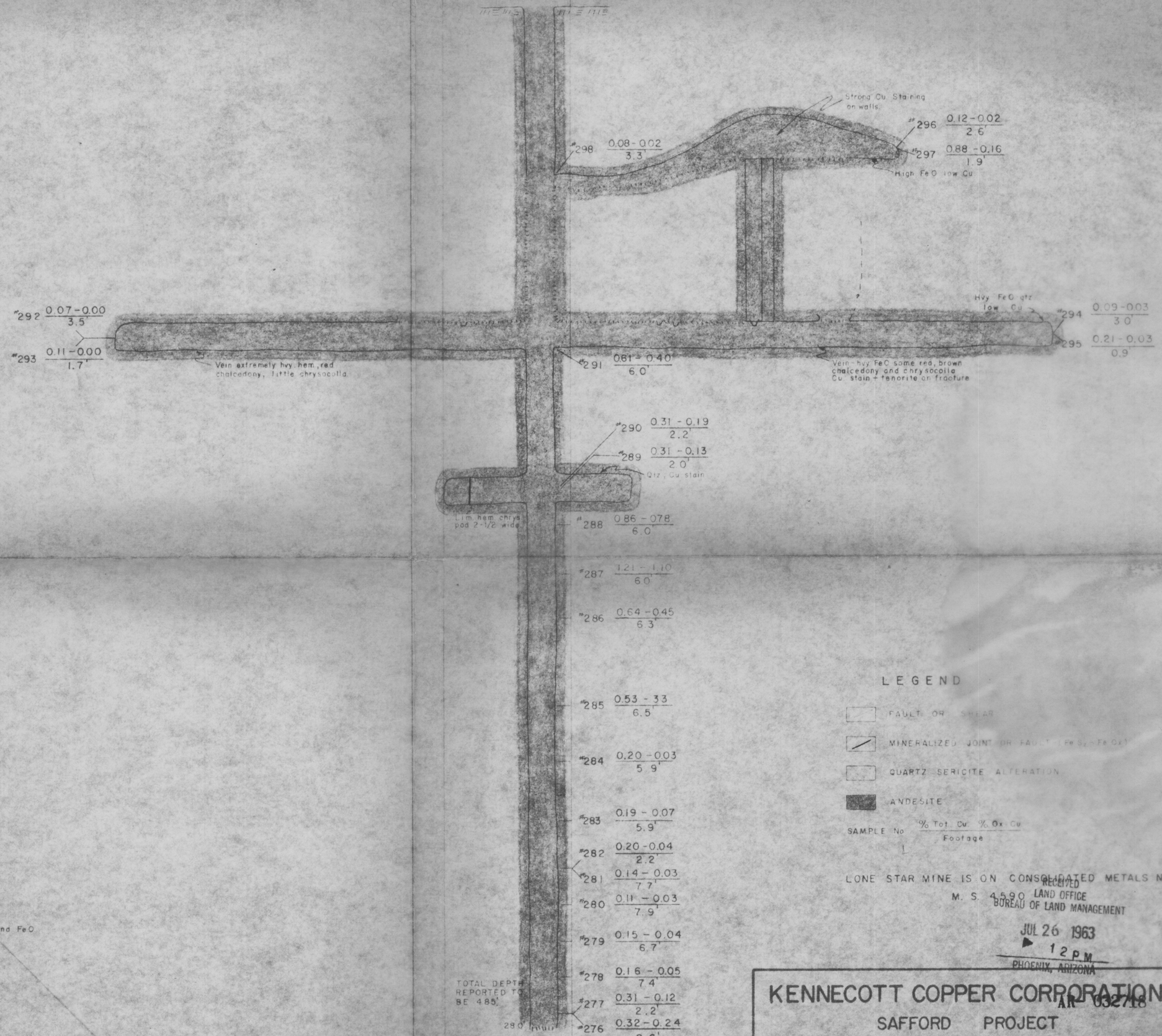
MAP NO.

PLATE 3



VERTICAL SECTION LOOKING WESTERLY

LONE STAR



LONGITUDINAL SECTION LOOKING NORTHERLY

LONE STAR

LEGEND

- FAULT OR SHEAR
- MINERALIZED JOINT OR FAULT (FeS_2 - FeOx)
- QUARTZ SERICITE ALTERATION
- ANDESITE

SAMPLE No | % Tot. Cu. | % Ox Cu | Footage

LONE STAR MINE IS ON CONSOLIDATED METALS No 2 M. S. 4590

KENNECOTT COPPER CORPORATION

SAFFORD PROJECT

LONE STAR MINING DISTRICT GRAHAM CO., ARIZONA

LONE STAR MINE SECTIONS

SCALE 1" = 20' DATE MAY 1, 1963

EXHIBIT G

GENERAL GEOLOGY AND MINERAL CHARACTER OF THE SOUTHWEST PORTION OF THE GILA MOUNTAIN RANGE

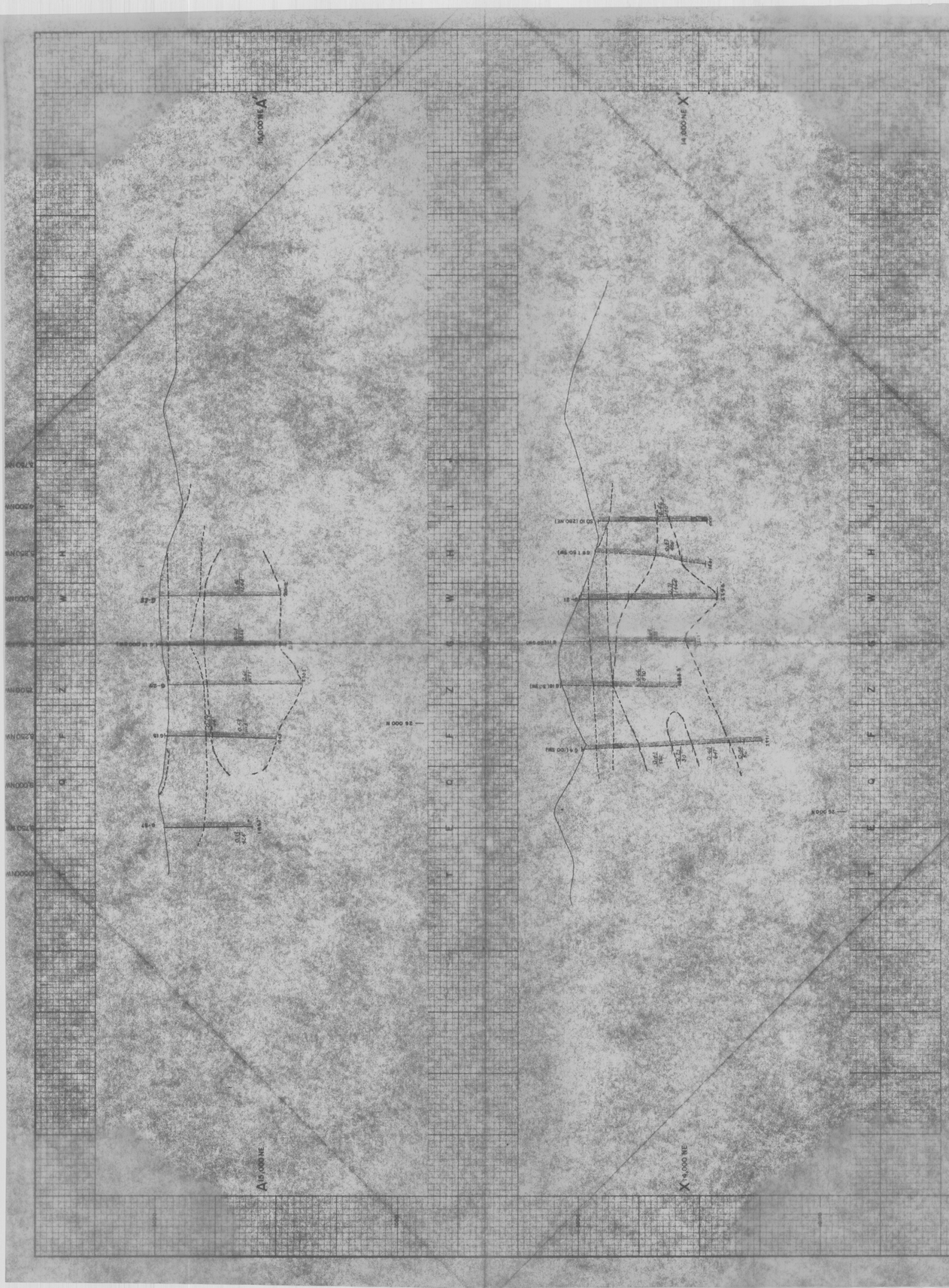
The Bear Creek Mining Company, a subsidiary of the Applicant, Kennecott Copper Corporation, initiated the Safford Project which was the Geological Exploration of the Gila Mountains in Graham County, Arizona. The general area is located in the Lone Star Mining District, which is situated 8 1/2 to 10 miles northeast of the Town of Safford on the Gila River, along the southwest flank of the Gila Range. The most intense geological exploration was centered on the lands of Mineral Surveys Nos. 4453, 4454, 4455, 4456, 4457, and 4475 and the lands surrounding and contiguous thereto. The geological data submitted in this patent application is the result of exploration during the period 1956 to 1957. Exploration has continued from 1957 to the present to determine the full extent of the copper ore body which will be described herein.

The Gila Mountains trend northwesterly and represent an uplifted and easterly tilted block of volcanic flows and tuffs. The topography is rugged with an abrupt rising face to the west and southwest and a deeply dissected slope to the east. Local relief is 1800 to 2000 feet.

Drainage to the southeast of the main exploration area is by a series of shallow incised washes that flow to the Gila River 5 miles from the foot of the range. Bonita Creek, a perennially flowing stream, drains the east flank of the Gila Mountains.

Rainfall is less than 10 inches per year, principally in July and August, due to summer storms. Mild rains and light snows occur during December and January. The area may be classified as semi-arid and is favorable to year round operations.

Grass and small shrubs cover the Gila Mountains; however, the area is not suitable for farming or agricultural purposes.


A
A' 16,000 NE
A 15,000 NE
X
X' 14,000 NE
X 13,000 NE
B
B' 13,000 NE
B 12,000 NE
Y
Y' 12,000 NE
Y 11,000 NE
N
S
E
W
26 000 N
25 000 N
SECTIONS N55°30'W
LOOKING NE
LITHIC TUFF, GRITS
INTERMEDIATE VOLCANICS
ANDESITE
BASALT
TUFF
RHYOLITE PORPHYRY
QTZ LATITE PORPHYRY
QTZ LATITE PORPHYRY
QTZ MONZONITE-MONZONITE
GRANODIORITE
QTZ DIORITE-DIORITE
SULPHIDE ORE
KENNECOTT COPPER CORPORATION
SAFFORD PROJECT AREA
LONE STAR MINING DISTRICT GRAHAM CO. ARIZONA
SECTIONS A X B Y N55 30W
SCALE 1" = 1000'
0
1000
2000
MAP NO.

The geology in brief as stated in the summary and progress report of the Safford Project and compiled by Mr. Raymont F. Robinson, Senior Geologist, is:

> "A series of andesitic volcanic rocks of unknown thickness have been strongly sheared by northeast fault zones. Plutonic rocks in the form of small stocks (plug like masses ranging through quartz diorite, quartz monzonite, granodiorite) have intruded the area apparently guided by the inherent weakness of the sheared zone. Still later, intrusive rocks, including latites, quartz latites and rhyolites, intruded the same area in the form of dikes, sills and as a plug-shaped mass, the occurrence of which suggests it filled a volcanic vent. Shearing and fracturing along the northeast shear zones continued after the later intrusions. Following this, the area was hydrothermally altered and then mineralized principally by iron and copper bearing sulfides. Erosion and time formed a porphyry type mineralized body which was then covered by a later volcanic sequence: The Intermediate and Younger series. Northwest block faulting and uplift then took place and the old "orebody" along with the Gila Mountains was tilted to the east. Renewed erosion stripped the west flank of the Gila Mountains to the primary core of the old mineralization, and the copper from that area probably migrated northeasterly into the still covered and less eroded portion of the original mineralized zone.
>
> "It is suggested, tentatively, that some migrating copper precipitated as chrysocolla, in the cap rock in the clay filled fractures of the oxidized veinlets and openings. Some irregularly displaced the older chalcocite blanket and some continued to penetrate the primary zone even to below the present levels of drilling. Also, oxidation of the whole body was renewed and due to uplift and lowering of the water table, oxidation passed through the old chalcocite blanket and into the primary zone to an undisclosed extent below the present level of drilling. A chalcocite blanket, deeper than our present depth of drilling, theoretically could exist."

The following methods were used to obtain and correlate this geological data:

1. Geological Mapping
2. Diamond Drilling
3. Geophysical Prospecting
4. Geochemistry
5. Sampling
6. Metallurgical Testing

The geological map is entered in the application for Mineral Survey No. 4453 as "Exhibit G - Plate 1" for the benefit of all the lands of Mineral Surveys Nos. 4453, 4454, 4455, 4456, 4457, and 4475 for which patent applications are simultaneously filed, with the exception of the claims in Mineral Survey No. 4456 for which patent application is not being filed at this time. Plotted on the Geological Map is the grid system used for control in diamond drilling, the location of the drill holes, the outline of the claims in Mineral Surveys Nos. 4453, 4454, 4455, 4456, 4457, and 4475, and the geophysical anomaly boundary.

Geological cross sections which outline the presently known limits of the copper ore body were made by referring the diamond drill hole data to the vertical plane through the grid line, nearest the drill hole. These cross sections are entered in the application for Mineral Survey No. 4453 as "Exhibit G - Plates 2, 3, 4," for the benefit of the lands of Mineral Surveys Nos. 4453, 4454, 4455, 4456, 4457, and 4475. Geological exploration has continued since 1957 to determine the extent of the ore body beyond the limits shown in this application.

A macroscopic examination of each diamond drill core was made and the data noted in a special drill log. Cuts were made from the core and sludge and used for assay and microscopic purposes. This data is also noted on the drill log. A drill log is attached as an exhibit in each of the patent applications for Mineral Surveys Nos. 4453, 4454, 4455, 4457, and 4475. Each log is of one hole drilled within the limits of the particular survey for which patent application is being made. The drill holes corresponding to the Mineral Surveys are: G-35, Mineral Survey No. 4453; G-41, Mineral Survey No. 4454; G-25, Mineral Survey No. 4455; G-21, Mineral Survey No. 4457; G-38, Mineral Survey No. 4475.