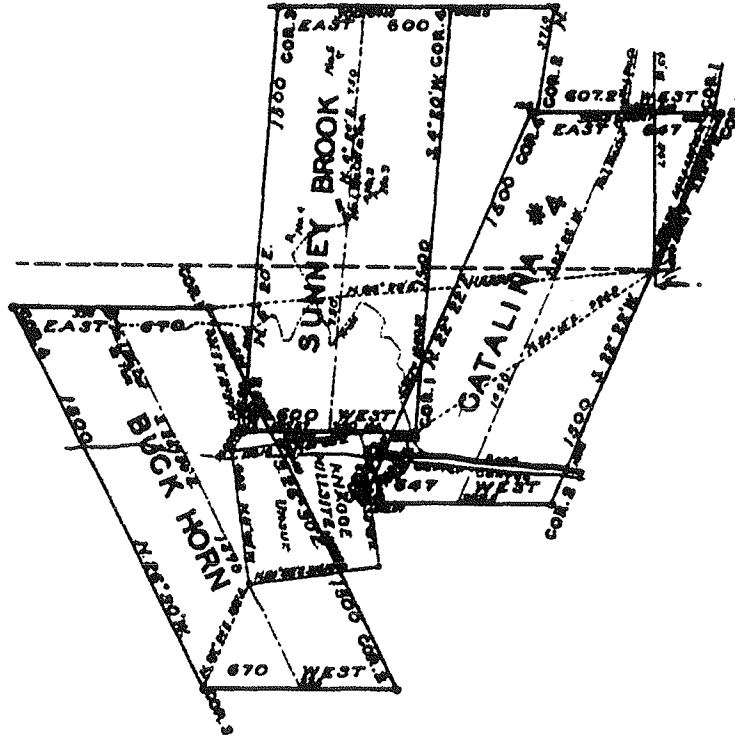


# Retracing Mineral Surveys

A seminar for the Land Surveying Profession



Dennis J. Mouland, PS  
Course Instructor

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# Retracing Mineral Surveys

## Course Outline

- A. Introduction
  - Meet Participants
  - Establish Course Goals
  - Administer “Friendly” pre-test
  
- B. Background of Mineral Claim Surveys
  - Brief history
  - The 1872 Mining Law
  - The patenting process
  - Role of the US Mineral Surveyor
  - Types of claims
  
- C. The Anatomy of a Mine
  - Terms you should know
  
- D. The Patent Survey
  - What was *supposed* to be done
  - What was *really* done
  
- E. Using the Record Data for your Resurvey
  - What and where are the records?
  - Getting adjoining surveys
  - The private record
  
- F. The Actual Resurvey
  - Corner search techniques
  - Using topo calls
  - Ties to improvements
  - Ties to PLSS and/or other monuments
  - Control survey
  - Analysis of data
  
- G. Restoration of Lost Corners
  - Is it *really* lost??
  - No hard fast rules
  - Consider the intent
  - Using topo calls
  - The “Look Again” principle

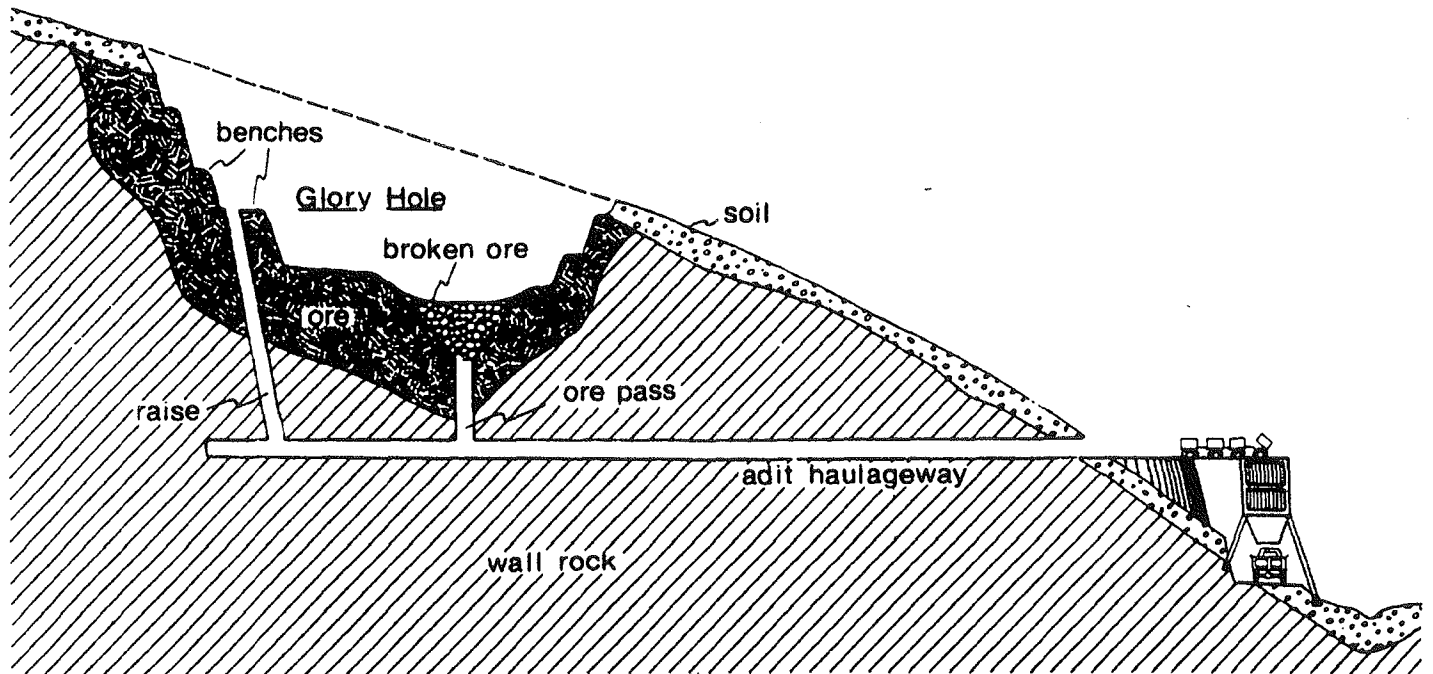
# Course Outline, Continued-

## H. Documentation

- Your plat
- Corner descriptions
- Re-monumentation

## I. Summary

- Questions and Answers
- Review pre-test
- Course Evaluations



## Course Goals

- Understand how claims were originally created and surveyed
- Learn terms and principles of mineral surveys
- Discuss records research needed
- Learn use and purpose of USLM's and USMM's
- Explore procedures and considerations for resurveys
- Discuss options for re-setting of lost corners
- Look at the issues involving "crossing closing corners" (CCC)

## The "Friendly" Pre-test

1. From where do you measure on a bearing tree set during a mineral survey?
2. What are the three types of mining claims that can go to patent?
3. Who can perform a retracement of a patented mining claim?
4. What method of proportioning does the BLM Manual suggest for re-setting lost corners on a mining claim?
5. What is an adit? *horizontal tunnel*
6. Where is the original source for the plats and notes of mineral surveys?
7. How do you deal with a crossing closing corner that is found to be on neither of the lines?  
*Survey corner controls survey line  
5-41 BLM manual  
A true survey controls neither line*
8. What concerns should you have regarding the use of a tie to a USLM or USMM?  
*tie may not have been measured*
9. What kind of useful information is found in the back pages of the notes for a mineral survey?  
*ties to improvements*
10. Is a side-center or an end-center considered an actual corner of a mining claim?  
*yes, if set during original survey*

# Mineral Claims in General

## The 1872 Mining Law

This act, with amendments, contains the basics for discovery, location, survey, and the patenting process. Subsequent volumes of agency regulations have addressed most of the details involving these processes. This includes the labor and assessment work required until the patent is issued. (17 Stat. 91; 30 USC Ch. 2; Title 43 CFR)

### Lode Claims

A lode is a deposit of ore firmly in place or embraced in solid rock. This is normally a vein of ore. The discovery requirements of a lode claim are that a mineral must be in place as part of an exposed geologic entity. A float (or loose piece of ore) does not qualify as a lode claim. According to the law, the maximum size of a lode claim is parallelogram 1500 feet by 600 feet. The 1500 feet dimension must be along the course of the vein. Further, the claim cannot extend more than 300 feet from either side of the vein. Some states have affected laws that reduce these sizes and otherwise adapt some of the rules of size and shape.

### Placer Claims

The placer claim was for minerals that are not consolidated in one geologic source (as was a vein of ore). The most common source of placer claims is in a stream, as minerals are moving or are suspended in other types of soil away from the vein or source. Some other types of minerals qualify for placer claim status, including uranium and oil shale. They could be claimed up to 20 acres as an individual and up to 160 acres by an association of persons (20 acres per person in the association, 160 acre maximum). Early placer claims were elongated to obtain maximum stream frontage. Later amendments to the law required placers to conform to the PLSS if practical and if the PLSS existed in the area.

### Millsites

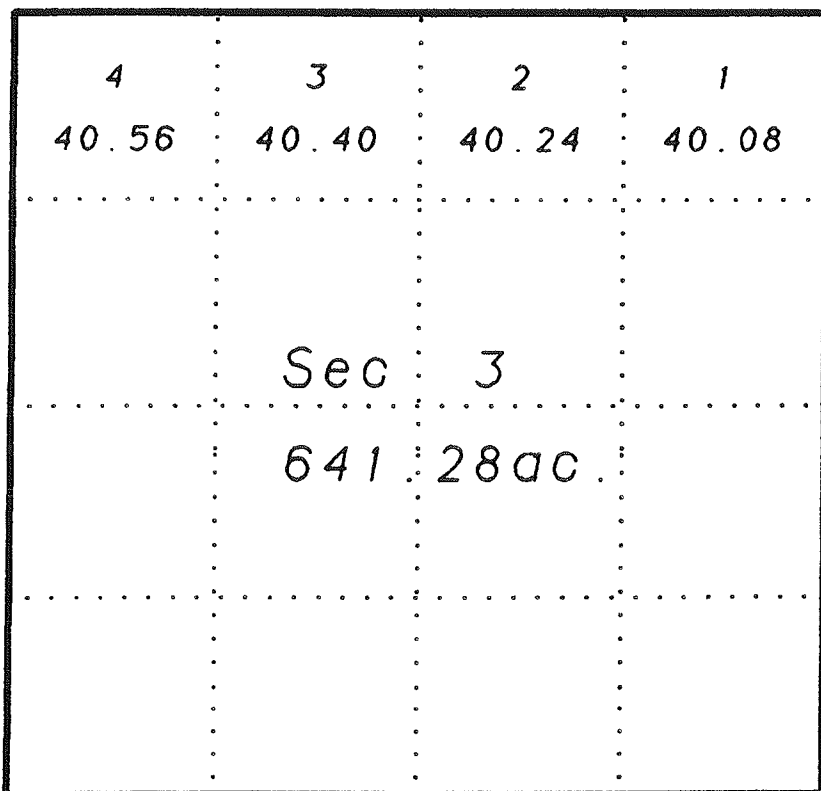
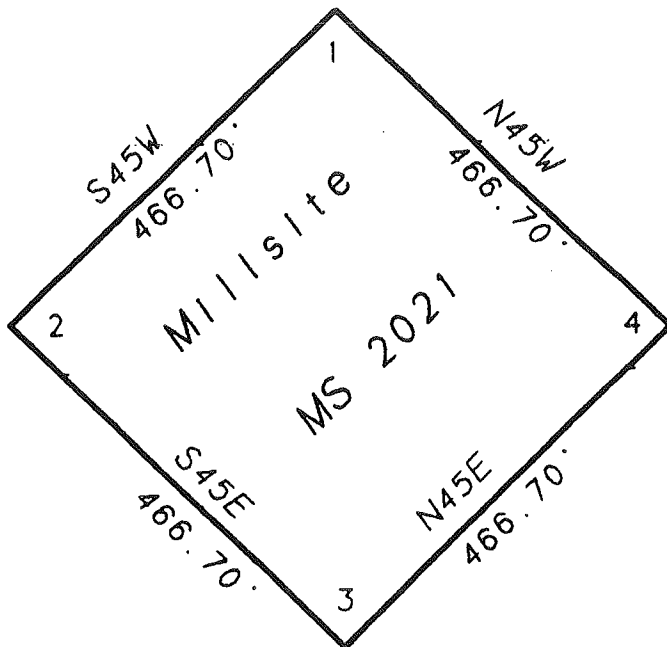
The Act of 1872 allowed five acre millsites to be claimed in conjunction with lode claims for the purpose of building a mill or smelter. These were separate surveys, complete with notes, plats, and monuments on the ground. A law in 1960 extended this to placer claims, but said the millsite must be described in the same manner as the placer itself. This resulted in most later placer-related millsites to be described as aliquot parts. Lands under a millsite were not to be mineral in nature, but once a millsite was patented, any minerals found belonged to the patentee. There was no limit to the number of millsites as long as they were all needed for the operation of the mine.

### Tunnel Sites

The tunnel site was a special type of right to protect the interests in any "blind lodes" discovered in a tunnel. The tunnel site could not be patented. But their existence and sometimes permanent monumentation is still of great use to the retracing surveyor.



# Millsite and a PLSS Placer



Locate these:

1. S2 SWNW
2. NENE
3. Lot 4
4. W2SE
5. E2NW



## Terms You Should Know

A. Adit: *HORIZONTAL SHAFT*

B. Apex:

C. Collar:

D. CCC:

E. Cut:

F. Dip:

G. Drift:

H. End Center:

I. Extra-lateral rights:

J. Flume:

K. Hiatus:

L. Overlap:

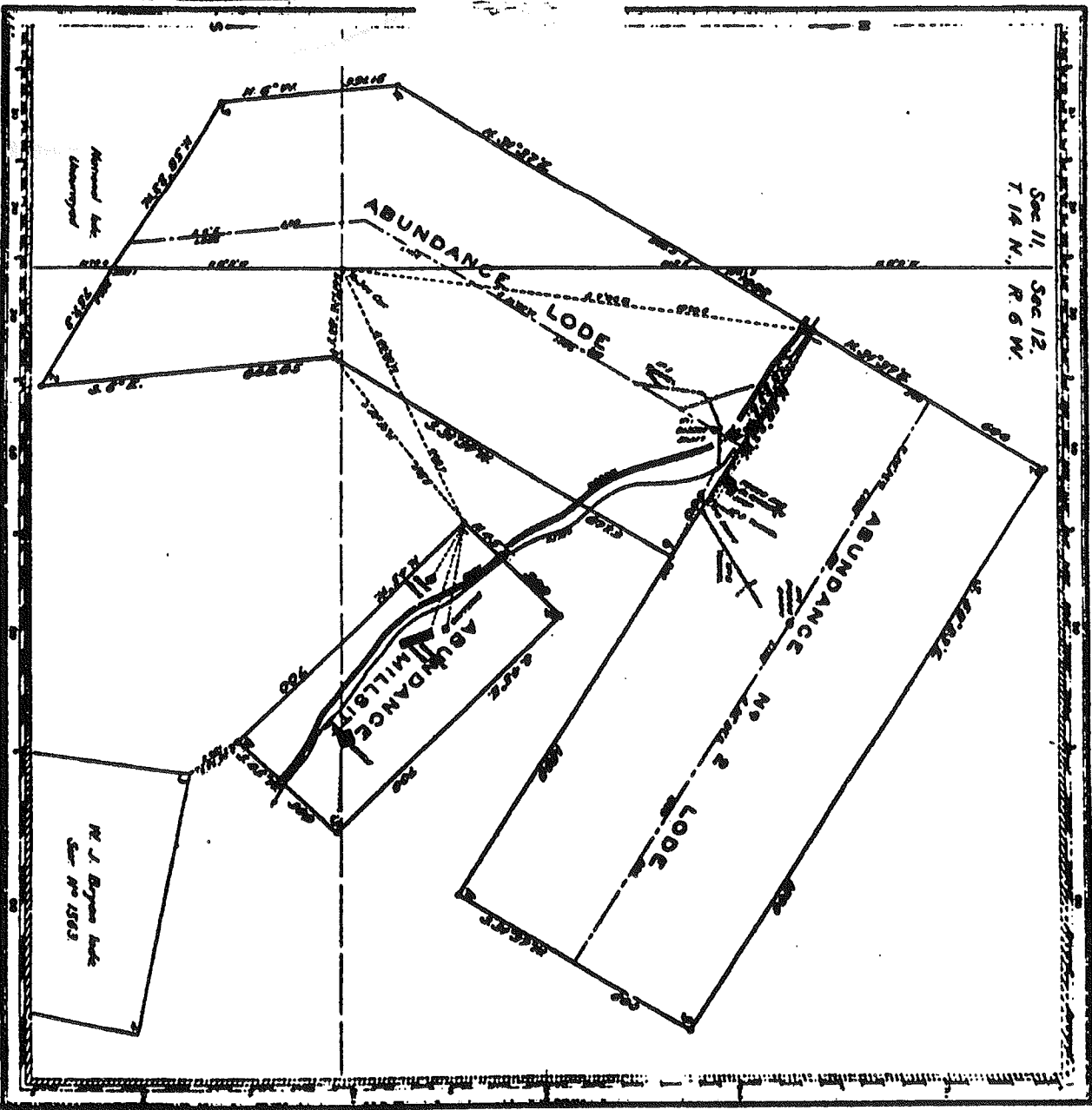
M. Shaft:

N. Side Center:

O. Tunnel:

P. USLM/USMM:

Q. Vein:



101

... of Sec 11  
 ... of Sec 12  
 ... of T 14 N.  
 ... of R. 6 W.

Title Limited Abundance and Abundance No. 2 Lode under  
 Order 2 029 and Abundance Mine Order 2 109  
 Mineral Survey No. 2925 A and B PATENTED

Lot No. \_\_\_\_\_  
 Plat  
 OF THE CLAIM OF  
 JOHN J. BRYAN  
 KNOWN AS THE  
 ABUNDANCE GROUP

BEING  
 1/4 SECTION 11  
 1/4 SECTION 12  
 1/4 SECTION 13  
 1/4 SECTION 14  
 1/4 SECTION 15  
 1/4 SECTION 16  
 1/4 SECTION 17  
 1/4 SECTION 18  
 1/4 SECTION 19  
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 1/4 SECTION 96  
 1/4 SECTION 97  
 1/4 SECTION 98  
 1/4 SECTION 99  
 1/4 SECTION 100

The original field notes of the Survey of the Abundance Mine of  
 John J. Bryan  
 done on the Abundance Group comprising the  
 Abundance and the Abundance No. 2 Lodes and  
 Abundance Mine

Now, that the plat has been made under my direction,  
 I have examined and approved and am so on the plat,  
 and I hereby certify that the bearings and distances shown  
 on the plat are correct and that the plat is a true and  
 correct copy of the original field notes and that the  
 plat is a true and correct copy of the original field notes  
 and that the plat is a true and correct copy of the  
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 a true and correct copy of the original field notes

J. J. Bryan  
 Surveyor

23 Thompson demands  
 23 Thompson demands  
 23 Thompson demands  
 23 Thompson demands

Sample Plat

# Field Notes

1

MINERAL SURVEY No. 4221

ARIZONA Land District

## FIELD NOTES

OF THE SURVEY OF THE MINING CLAIM OF

Randolph Smith

KNOWN AS THE CATALINA # 1, CATALINA # 2, CATALINA # 3, CATALINA # 4, SUNNEY BROOK and SUGGESTION LODES

614 Mt Mining District

Yuma County, Arizona

Section 29 and 30 Township 11 S Range 18 E

Surveyed under instructions dated December 12, 1902

By Ralph L. Harp U.S. Mineral Surveyor, L.C.

Claim located See back of this sheet, 19

Survey commenced December 12, 1902

Survey completed December 22, 1902

Address of claimant Randolph Smith, Suite 1, Box 782, Tucson, Arizona

BASES OF ASSUMED LOCATIONS See back of this sheet

MINERAL SURVEY NO. 4221

Feet

Mineral Survey No. 4221 was made with a Gurley & Sons Precise Transit, Light Mountain Model, with horizontal limb 6.25 inches in diameter, having two double opposite verniers, and full vertical circle 6 inches in diameter, having one double vernier; the verniers read to one minute of arc; the eye piece is equipped with a prismatic eye piece with colored glass slide for making direct observations upon the sun. The instrument was in good condition at the time of the survey and all adjustments were in good order. An a.m. altitude observation of the sun for azimuth, and at noon on the meridian for latitude, were made at Cor. No. 1 of the Sunney Brook lode, the data of which observations are shown in the calculation sheets herewith submitted for examination. All azimuths in this record are referred to the true meridian thus determined, by the method of deflection angles and calculated courses.

The lines were measured with a Lufkin steel tape, 25 feet in length, graduated to feet, inches and fractions of inches for the entire length; a Kueffel & Esser steel tape, 100 feet in length, graduated to feet, tenths and hundredths for the entire length; a Kueffel & Esser steel tape, 300 feet in length, graduated to feet, tenths and hundredths for the entire length. All tapes were compared with a Lufkin standard at the time of beginning the survey, and found correct.

All lines and connections of this survey were run by direct methods.

The magnetic variation observed at each corner of the survey gave a uniform value of 14° 00' E.

### CATALINA # 1

Beginning at Corner No. 1 of the Catalina # 1 lode identical with Cor. No. 4 of the Catalina # 2 lode of this survey.

Set a schist rock, 2 1/2 x 5 ins., 18 ins. in the ground, blk. C1-1-4221; C2-4-4221; from which

A pine post, 4 inches in diameter, set in the ground in a mound of rocks bears southerly 3 ft.

A fir tree, 48 inches in diameter, 80 ft. high, blk. B3 x C1-1-4221 bears North 7.5 ft.

A fir tree, 36 in. diam., 100 ft. high, blk. B7 x C2-4221 bears S 54° 03' E 25.0 ft.

This Sec. Cor. between Sec. 25, T 11 S, R 15 E and Sec. 30, T 11 S, R 15 E bears N 71° 24' E 725.1 ft.

thence S 8° 57' W

- 465.0 Cross road, 10 feet wide, course easterly
- 495.0 Cross Sabino Canyon, 25 feet wide, course easterly
- 885.0 Cross road, 10 feet wide, course northeasterly
- 650.0 Cross trail, 3 feet wide, course northeasterly
- 445.4 Cross road, 20 feet wide, course northwesterly
- 730.0 Cross trail, 3 feet wide, course northerly
- 665.0 Cross trail, 3 feet wide, course northeasterly
- 875.0 Cross trail, course northwesterly, 3 feet wide

# Field Notes

MINERAL SURVEY NO. 4221, ARIZONA

3

Feet	
	A fir tree 12 ins. diam, 60 ft. high, mkt. BT x C1-4-4221 bears West 6.8 ft.
	thence EAST
300.0	To the original location for the north end center being a mound of rocks 3 ft. high with 3 ft. base
600.0	Cor. No. 1 end place of beginning.
	CATALINA # 2
	Beginning at Cor. No. 1 of the Catalina # 2 lode.
	Set a schist rock, 27x25 ins., 15 ins. in the ground, mkt. C2-1-4221; from which
	A pine post 6 ins. diam, 4 ft. long, set in the ground in a mound of rocks, bears westerly 3.0 ft.
	A pine tree 24 ins. diam, 80 ft. high, mkt. BT x C2-1-4221 bears S 73° 55' E 87.0 ft.
	A pine tree 20 ins. diam, 60 ft. high, mkt. BT x C2-1-4221 bears N 87° 10' W 31.8 ft.
	The $\frac{1}{2}$ Sec. Cor. between Sec. 25, T 11 N, R 15 E and Sec. 30, T 11 N, R 16 E bears N 19° 06' E 244.7 ft.
	thence S 8° 57' E
871.4	Cor. No. 3 of the Catalina # 2 lode of this survey
974.4	Cross road, 10 feet wide, course southeasterly
811.4	Cross Sabine Canyon, 25 feet wide, course southeasterly
1500.0	Cor. No. 2
	Situated on line 2-3 of the Catalina # 2 lode of this survey
	Set a granite rock, 25x12x2 ins., 15 ins. in the ground, for Cor. No. 2, mkt. C2-2-4221; from which
	A pine post, 4 ins. diam, 4 ft. long, set in the ground in a mound of rocks, bears westerly 5.0 ft.
	A fir tree, 8 ins. diam, 50 ft. high, mkt. BT x C2-2-4221 bears S 4° 08' W 3.4 ft.
	thence WEST
208.6	Original location for the south end center being a mound of rocks, 3 ft. high with 3 ft. base
248.6	Cor. No. 4 of the Junney Brook lode of this survey
607.8	Cor. No. 5, which is identical with Cor. No. 2 of the Catalina # 2 lode of this survey.
	thence N 8° 57' E
171.0	Cross trail, 3 ft. wide, course northwesterly
270.0	Cross road, 10 ft. wide, course westerly
505.0	Cross trail, 3 ft. wide, course northeasterly
625.0	same trail, course northwesterly
647.0	same trail, course northeasterly

MINERAL SURVEY NO. 4221, ARIZONA

2

Feet	
995.0	Cross trail, 3 feet wide, course northeasterly
1250.0	Cross road, 10 feet wide, course easterly
1329.0	Cross trail, 3 feet wide, course southeasterly
1500.0	Cor. No. 2
	Identical with Cor. No. 3 of the Catalina # 2 lode of this survey and situated on line 2-4 of the Junney Brook lode of this survey, where I
	Set a schist rock, 25x12x2 inches, 10 ins. in the ground for Cor. No. 2, mkt. C1-2-4221; C2-2-4221; from which
	A pine post, 6 inches diam, 4 feet long, set in the ground in a mound of rocks, bears easterly 3.0 ft.
	A fir tree 20 ins. diam, 80 ft. high mkt. BT x C1-2-4221 bears S 85° 02' E 30.0 ft.
	A fir tree, 20 ins. diam, 80 ft. high, mkt. BT x C1-2-4221 bears S 45° 34' W 4.4 ft.
	thence WEST
41.4	to north end center of the Junney Brook lode of this survey
157.2	To original location for the south end center, being a mound of rocks, 3 ft. high with 3 ft. base
341.4	To Cor. No. 3 of the Junney Brook lode of this survey
457.2	To Cor. No. 3
	Set a schist rock 25x12x2 inches, 16 inches in the ground for Cor. No. 3, mkt. C1-3-4221; from which
	A pine post 6 ins. diam, 4 ft. long, set in the ground in a mound of rocks, bears easterly 2.8 ft.
	An aspen tree, 20 ins. diam., 80 ft. high, mkt. BT x C1-3-4221 bears N 88° 04' E 7.6 ft.
	A fir tree 16 ins. diam, 70 ft. high, mkt. BT x C1-3-4221 bears S 44° 12' W 4.4 ft.
	thence N 8° 30' E
1114.5	To southwest corner of Tract A, the southeast corner of this tract bears S 84° 30' E 200.0 ft. from this point
1180.0	Cross Sabine Canyon, 20 feet wide, course easterly
1180.0	Cross road, 10 feet wide, course easterly
1314.5	To northwest corner of Tract A, the northeast corner of this tract bears S 84° 30' E 200.0 ft. from this point. The northeast corner of this tract bears N 8° 30' E 200.0 ft. from the southeast corner.
1484.50	Cor. No. 4
	Set a granite rock 25x15x3 ins., 17 ins. in the ground for Cor. No. 4, mkt. C1-4-4221; from which
	A pine post, 4 ins. diam, 4 feet long, set in the ground in a mound of rocks, bears southerly 3 ft.
	A fir tree 18 ins. diam, 80 ft. high, mkt. BT x C1-4-4221 bears N 65° 07' E 3.0 ft.

# Field Notes

T 23 S, R 16 E, G11a and G11a River Mer., Arizona

Chassis

The following field notes are those of the dependent survey of portions of M.S. 1400 Dozo Loda, and M.S. 1405 Georgia Loda, and the survey of Tract 37 in the Unsurveyed Township 23 South, Range 16 East, G11a and G11a River Meridian, Arizona.

Mineral Survey No. 1400 Dozo Loda, and Mineral Survey No. 1405 Georgia Loda, were surveyed in 1899 by John A. Storm, U.S. Deputy Mineral Surveyor. U.S. Mineral Monument No. 1 was established in 1880 by Bolton H. Allen.

The survey was executed in accordance with the specifications set forth in the Manual of Surveying Instructions, 1873, and the special Instructions for Group No. 659, Arizona, dated September 12, 1884.

The directions of lines were determined by altitude observations on the sun and refer to the true meridian. The angles and distances were measured with a Sells EDM 48 Total Station Instrument.

Before restoring the corners, the lines of the original survey were retraced and a diligent search was made for any evidence of the original monuments and other calls of the official record. The identified corners were remonumented in their original positions; where available, collateral evidence was used to reestablish obliterated corners; lost corners were reestablished by the rules of proportionate measurement.

The geographic position of corner 4, M.S. 1400 Dozo Loda, as determined from a tie to the U.S. Army Corps of Engineers triangulation station, "TRUCK 21 (50 BARR 08) 1956", is as follows:

Latitude: 31°22'39.17" N Longitude: 110°41'18.96" W

The mean magnetic declination is 13° E.

Dependent Survey of a Portion of M.S. 1400 Dozo Loda, in Unsurveyed T 23 S, R 16 E, G11a Mer., Arizona

Reestablishment of the survey by  
John A. Storm, U.S. Deputy Mineral Surveyor, in 1899

From cor. 2, M.S. 1400 Dozo Loda, identical with cor. 5, M.S. 2314 Wedge Loda, on line 1-2, M.S. 1405 Georgia Loda, monumented with a rock, 18 ins. long, 5/8 in. diam., projecting 3 ins. above ground. The rock was set by Frank Vasquez, L.S. No. 13189, AZ. In 1983 to remonument a position determined by Robert Lanza, Mining Engineer, No. 1221, AZ. In 1969, using original ties to accessories as shown on the plate of their survey, on file with VBA listed Consulting Engineers, Tucson, Arizona.

From which the evidence of an original 1899 accessory

A position picked out to us by a resident as  
the location of an abandoned well bears  
S 35°40' E, 182 lbs. dist.

Dependent Survey of a Portion of M.S. No. 1400 Dozo Loda,  
in Unsurveyed T 23 S, R 16 E, G11a Mer., Arizona

Chassis

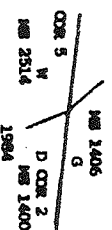
and from which the original 1908 bearing trees from  
M.S. 2514 Wedge Loda

An oak, 14 ins. diam., bears N 56° E, 86 lbs.  
dist., with beveled blades.

A stump, 10 ins. diam., 6 ins. high, bears  
S 61½° E, 81 lbs. dist.

At the cor. point

set a stainless steel post, 28 ins. long, 2½ in. diam.,  
23 ins. in the ground, and in a mound of stones, 2½ ft.  
diam., to top, with brass cap bed.



from which

A bent oak rock, of unknown origin, 5/8 in.  
diam., projecting 6 ins. above ground, bears  
N 67° E, 31½ lbs. dist.

An open end iron pipe, 2 ins. diam., projecting  
8 ins. above ground, bears N 84½° E, 64 lbs.  
dist. This pipe was set in 1967 by George  
Barr, Jr No. 4670, AZ. to monument a dead cor.,  
as shown on the plat of his survey of the  
Georgia and Dozo claims on file with Callie E  
Barr Engineers, Tucson, AZ.

An angle iron, of unknown origin, 1 in. wide,  
flush with the ground, bears S 68½° E, 19  
lbs. dist.

A rock, 4 in. diam., flush with the ground,  
bears S 77½° E, 29½ lbs. dist. This rock  
was set in 1983 by Frank Vasquez, L.S. No.  
13189, AZ. to monument a dead cor., as shown  
on the plat of his survey of the Georgia and  
Dozo claims, on file with VBA listed Consulting  
Engineers, Tucson, AZ.

A juniper, 8 ins. diam., bears S 49½° W,  
8½ lbs. dist., sbd. D COR 2 BR.

Deposit a magnet in a 1 x 1 x 2 5/8 in. plastic case  
bearing the stainless steel post.

S 81°32' E, on line 2-3, M.S. 1400 Dozo Loda, identical  
with a portion of line 2-1, M.S. 1405 Georgia Loda.

Over rolling land, through juniper, oak and unbranded.

5.99  
Rede for cor. 1, M.S. 1405 Georgia Loda, identical with  
AP1, Tract 37, at proportionate dist., hereinafter  
described; there is no remaining evidence of the  
original cor.

# Field Notes

Dependent Resurvey of a Portion of M.S. No. 1400 Dooc Lodge,  
In Unsurveyed T 23 S, R 16 E, G46R Nev., Arizona

CHAIN	
7.51	Intersect the W side of a 16 x 6.8 ft. brick extension to an adobe house, the NE cor. bears N 12° E, 24 lns. dist., the long side bears S 12° W.
7.88	Intersect the E side of the adobe house, 24 x 18 ft., the NE cor. bears N 12° E, 7 1/2 lks. dist., the long side bears S 12° W.
8.58	Cor. 3, M.S. 1400 Dooc Lodge, identical with AP2, Tract 37, surrounded with a rotted portion of a very old wood post, about 2 ft. below ground surface and perforated by numerous unknown, with a very old iron cylindrical roller, 32 lns. long, 1 1/2 lns. diam., with an excessive, 24 lns. long, 2 1/4 lns. diam., buried 2 lns. below ground surface.  from which collateral evidence of an original necessary

The determined position of the NE cor. of "Thomas's adobe house" bears N 41° 40' W, (Bearing N 41° 15' W) 66 1/2 lks. dist., this position was determined by measuring from the original NE cor., along the existing portion of the E side, projecting beyond to the dist. equaling the length of the original house, as shown on a plat of a survey showing encroachments onto U.S. Forest Service land, done by Nlke Kolan, U.S.P.S., in 1964, on file with the Coronado National Forest Service Office, Tucson, AZ. Verifications of the history of the house was provided by long time residents.

At the cor. point  
Set a stainless steel post, 28 lns. long, 2 1/2 lns. diam., 26 lns. in the ground, with brass cap sid.

D COR 3      AP2  
NS 1400      3837  
1984

from which

An open end iron pipe, of unknown origin, 1 1/2 lns. diam., projecting 8 lns. above ground, bears N 19 1/2° E, 24 lks. dist.

A rebar, of unknown origin, 5/8 in. diam., flush with the ground, bears N 39 1/2° E, 7 lks. dist.

A rebar, of unknown origin, 5/8 in. diam., projecting 1 in. above ground, bears N 53° E, 12 lks. dist.

An open end iron pipe, of unknown origin, 1 1/2 lns. diam., flush with the ground, bears N 62 1/2° E, 3 1/2 lks. dist.

A rebar, of unknown origin, 5/8 in. diam., projecting 5 lns. above ground, bears N 81 1/2° E, 19 lks. dist.

Dependent Resurvey of a Portion of M.S. No. 1400 Dooc Lodge,  
In Unsurveyed T 23 S, R 16 E, G46R Nev., Arizona

CHAIN	
0.12	An open end iron pipe, of unknown origin, 1 1/2 lns. diam., flush with the ground, bears S 19 1/2° W, 11 1/2 lks. dist.  A pecan tree, 12 lns. diam., bears N 56 1/2° W, 44 1/2 lks. dist., with no base.  A drill bit, of unknown origin, 7/8 in. diam., buried 3 lns. below ground, bears N 37 1/2° W, 27 lks. dist.
1.41	Deposit the portions of the wood post inside the stainless steel post and a magnet in a 1 x 1 x 2 5/8 in. plastic case beneath the stainless steel post, and bury the iron roller alongside the stainless steel post.  From this cor. a U.S. Forest Service aluminum pipe, 2 1/2 lns. diam., projecting 15 lns. above ground, bears S 24 1/2° E, 7.8 lks. dist., and NS1400 D003 E83145. This monument is shown at record bearing and dist. from Robert Lancer's determination of the position of cor. 2, M.S. 1400 Dooc Lodge, as shown on the plat of the resurvey and transcription of M.S. 1400 Georgia Lodge, on file with the Coronado National Forest Service Office, Tucson, AZ, and is not utilized in the course of this survey.
0.12	8 22° 18' E, on lms 3-4, M.S. 1400 Dooc Lodge, identical with lms 2-3, Tract 37.
1.41	Over dist. cleared ground.  Chain link fence, bears S 75° E and N 75° W.  Point for AP3, Tract 37, at intersection with a chain link fence, bears S 16° E and N 16° W, hereinafter described.  Circum measurement on lms 3-4, M.S. 1400 Dooc Lodge; no search was made for remnants of nearby chains.  Over rolling land, through juniper, oak and undergrowth.
22.69	Cor. 4, M.S. 1400 Dooc Lodge, surrounded with a wood post, 4 x 5 x 24 lns. long, projecting 1 ft. above ground, in a mound of stone, 2 1/2 ft. base, 10 lns. high.  from which evidence of an original bearing tree  Portions of a rotted wood stump, bears S 35° W, 180 lks. dist.  At the cor. point Set an aluminum post, 28 lns. long, 1 in. diam., 22 lns. in the ground, with cap sid.

NS 1400  
D COR 4  
1984

from which

# Evidence Considerations

## Bearing Trees and Bearing Objects (Accessories)

1. Mineral surveys measured to the *face* of the blaze on a BT, not the center of the tree. Be aware that there are a few exceptions to this out there. It is best to examine all your found evidence and compare accessories with monuments to determine what method was used.
2. If only one accessory is found, use record bearing and distance to set the corner. Be sure to think about your basis of bearings when doing this.
3. When you have two (or more) accessories, use the distance-distance solution first, letting the bearings tell you which solution works. The bearings should make some sense when you get the D-D location determined.
4. If the bearing-distance solution from both accessories does not even remotely come to the same place, there is probably an error in the notes (or your reading of them). If distance-distance never meets, you obviously have a distance error. If they meet but do not make sense, check the notes for typos, reversed bearings, wrong quadrants, or reversed numbers. Check ALL the evidence available before you give up. Often, topo calls (see below), ties to improvements, or ties to other surveys can shed light on which accessory is correct. If you cannot get any of these possibilities to work out, the general rule is "closest is best". This means you need to use the closest accessory to the corner position; the idea being that if they made an error in writing or measuring the accessory, it would have been more easily caught by the Mineral Surveyor taking the notes.

## Topographic calls

1. As always, the absence of topo calls may indicate a less than diligent original survey, or even a survey run contrary to the actual running notes.
2. Absence of topo calls (or just a very poor fit of topo calls) on the sidelines only may indicate a centerline stub out had been done.
3. Do the topo calls fit amongst themselves? Always ask that question before you use topo calls to set a corner or as an analysis tool for proportioning.
4. Topo calls over 330 feet are less desirable for actual corner establishment.
5. If you are faced with a proportioning situation, check several methods and see which will fit the topo calls best. This may be your best solution when all else fails.

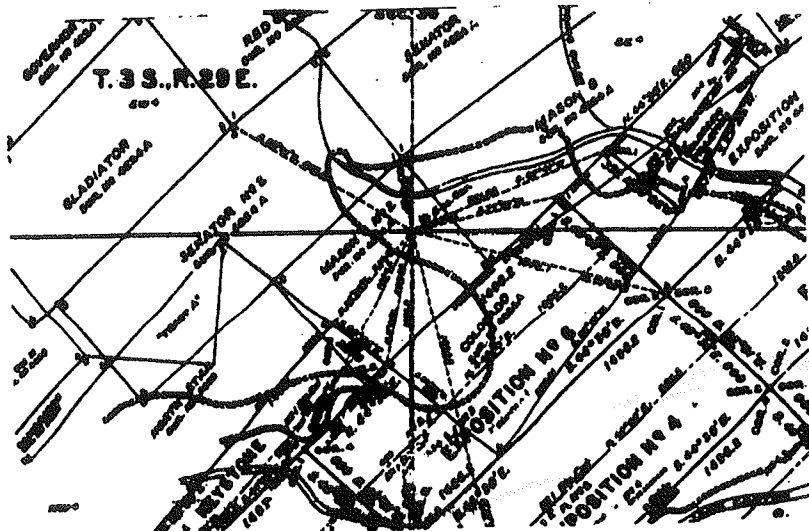
# Evidence Considerations, Continued-

## Other Ties to Improvements

1. Mineral surveys often include multitudes of ties to sites of mining activity, cultural features, structures, and other improvements.
2. These can be found throughout the running notes themselves, including the last pages of the notes. The USMS was required to list and locate the improvements (and estimate their dollar value) in the notes. This can be very valuable information, so read the whole story!
3. Some ties were shown on the plat, but not mentioned in the notes at all. And the reverse can also happen.
4. These ties can be used like a BT or BO if less than 330 feet, and if it fits other factors reasonably.

## Adjacent and Previous Claims

1. One of the most often overlooked sources of information for performing a retracement of a mineral survey is to research the record of all of the claims in the area, past and present. Surveyors often look up the one claim they have been hired to work on, and nothing else.
2. Look at the Mining District Sheets (or equivalent) to see what other claims are in the area. This can include claims that were surveyed for patent, but never went to patent.
3. Read the notes for your claim before you leave the Public Room. Does your claim refer to any of these?
4. Surveys that came after your survey may have found evidence of your claim at that time, and tied it in. This takes a little extra time, but often can be your salvation in one of these surveys.
5. Being good at records research is one of the real keys to being a truly Professional Surveyor. There are many "licensed measurers" out there.

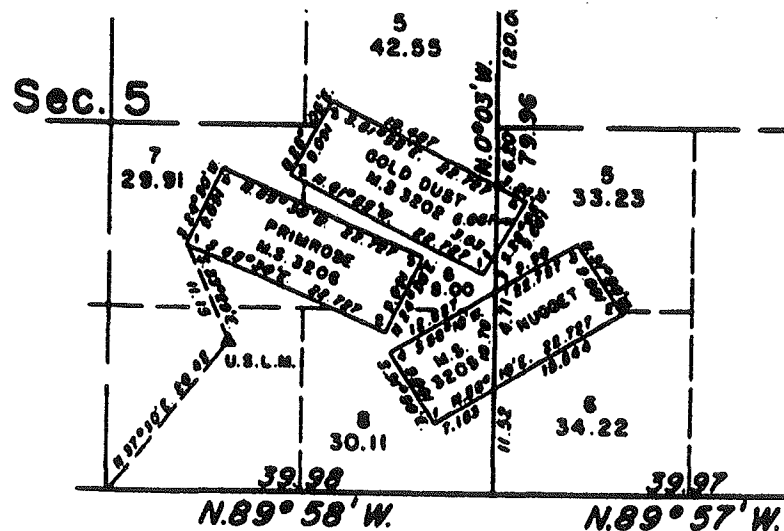




# Special Monuments

## 1. USLM/USMM

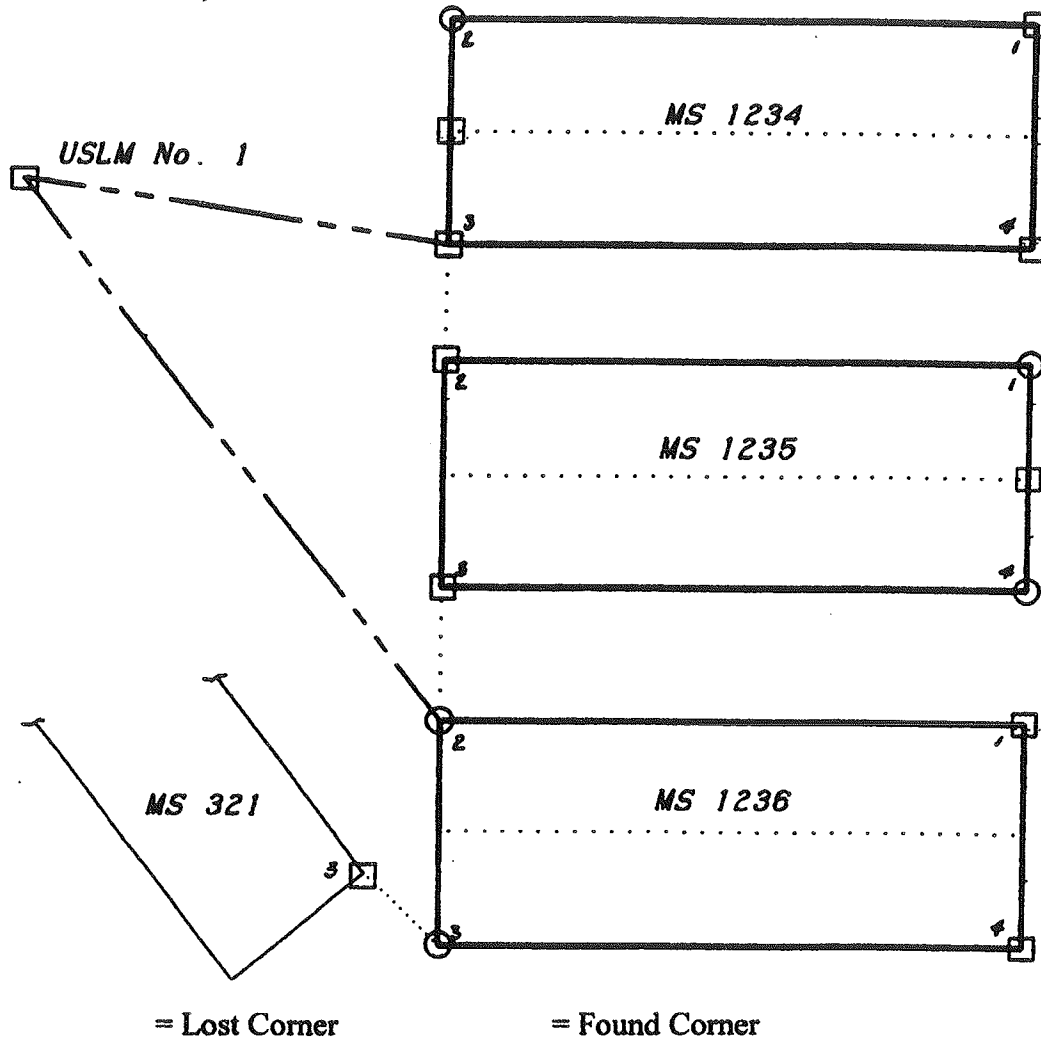
- A. A monument established to tie a mineral claim survey to a known point, usually not at the claim site itself. These were the original "GIS", as they tied loose claims to points with known positions.
- B. Unless reasonably close to the claim, the tie was calculated. Newer claims with newer survey technology are more reliable.
- C. Often on a prominent hill or peak that could be seen from many claims.
- D. Numbering/naming system within each mining district.
- E. Usually your last resort in establishing lost corners on a claim.



## 2. Crossing Closing Corners

- A. Intent was to mark the intersection of a junior line across a senior line.
- B. When retracing, be sure you know which line is senior.
- C. If a CCC is lost, reset it at bearing-bearing intersection.
- D. If a CCC is found, but is *not* at the true point of intersection:
  - It is an angle point on the *junior line*.
  - It cannot affect the senior line (BLM Manual 5-41)
  - It can be good for proportioning a lost corner on the junior line.
  - If the off-line CCC was set by a resurvey, it is ignored for both lines.

# Lost Mineral Claim Corners

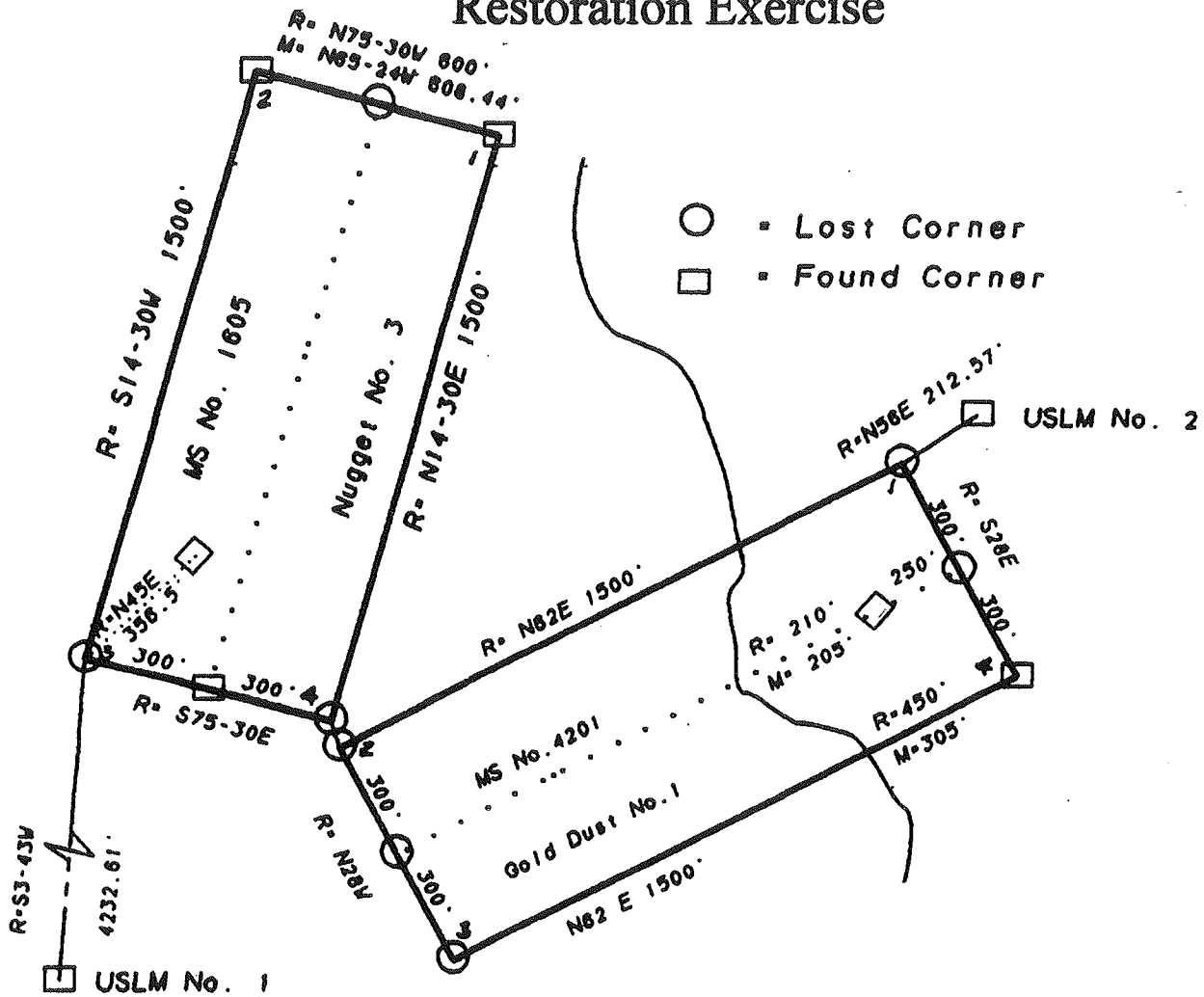


If you truly have a *lost* corner, a mathematical solution will be needed. Remember: **THERE ARE NO HARD FAST RULES FOR SETTING LOST CORNERS ON MINERAL CLAIMS.** Your intent is to put it where it was, not where it should have been, nor where your client wants it to be. Look for patterns in the evidence you have found. Was it a faithful survey?

## Possible Solutions

1. Grant Boundary Method (preserves shape at lost corners) [BLM 5-44]
2. Compass Rule (assumes angle and distance error are equal) [BLM 5-43]
3. Distance-distance intersection (especially on ties of less than 200 feet)
4. Bearing-bearing intersections (not usually reliable, but applicable in complexes)
5. Record bearing and distance (especially when stub-outs are suspected; use indexing)
6. Single proportion (when straight lines were intended with adjoining claims) [BLM 5-30]
7. Combinations of the above.....just don't get too creative!

# Restoration Exercise



## Discussion Items

### MS 1605:

- Line 3-4  
*TOPO CALL C3, C4 RECORD*
- SW Corner  
*RECORD DIST*

### MS 4201:

- North corner  
*RECORD DIST FROM USLM No. 2*
- East corner  
*END*
- Line 2-3  
*CENTER END-TOPO CALL, C2 RECORD FROM C4 MS No 1605, C3 RECORD DIST.*

**REMEMBER:** Proportioning is always the last resort. Do you have all the record, including adjoining and previous claims? Did you check all the topo calls and improvement ties?

# Summary

Today we have seen:

- Mineral surveys can be a complex task when retraced by the modern surveyor
- They require extensive records research
- Evidence analysis must be done carefully and systematically
- A knowledge of the history and possible short cuts made in the original surveys is important
- Lost corners are a real gray area, and one should carefully consider the choices available
- Assumptions and poor attitudes will get in the way of a successful survey of these claims

**We wish you the best....at being the best at what you do!**

**Thank you for your participation today.**

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