



Mineral Land Surveying Primer and Colorado Example

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**Prepared by
Jack M. Kesler, RLS, USMS
C. Eugene Kooper, PLS, CFedS**

MINERAL LAND SURVEYING

By

Jack M. Kesler, RLS, USMS

Kingman, Arizona

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INTRODUCTION

From the forward of James Underhill's book, "Mineral Land Surveying"[1]:

"Mineral surveys are made to mark the legal boundaries of mineral deposits or ore-bearing formations on the public domain where the boundaries are determined by lines other than the normal subdivisions of the public lands. These surveys include the usual surveying technical procedures and the examination and documentation of various reports and certificates necessary to substantiate legal procedures."

Obviously, it is imperative that the U.S. Mineral Surveyor understand the basics for performance of mineral surveys. In the past, it could often fall to the local land surveyor to provide expertise in locating and staking claims on the public domain. Hence, it behooved all surveyors to understand at least the basics of the mining laws appropriate to the type of claim being staked. These claims can be lodes, placer, mill sites, and tunnel sites. Unfortunately, due to the changing times it is less likely that a land surveyor will be involved in the original surveying process of such claims because there are fewer and fewer such locations. It is however most likely that a land surveyor will be involved in retracement and dependent resurveys of old mineral surveys and hence the impetus of this discussion.

The following brief digression will serve to provide the reader with a basic background in terms, laws and procedures sufficient to allow further discussion of dependent resurvey procedures.

MINING LAWS, MINING DISTRICTS AND STATE MINING LAWS

Mining Law

The act of May 10, 1872 (17 Stat. 91; 30 U.S.C. Ch. 2; Title 43 C.F.R.) often referred to as the mining law of 1872 contains the General Mining Laws, which, with amendments, are still in force to this day. The act provides in detail for discovery, location, and survey of lode, placer claims, mill sites and tunnel sites.

The specifics of location procedures, size of claims, etc. may be found in numerous publications and updates of the rules set forth in Title 43 C.F.R. beginning with Circular No. 2289 (July 15, 1971) ; The Federal Register (January

27, 1977); amendments and letters updating minor changes to the present. See list of references for some of these documents.

Mining Districts

In the beginning of mining in the U.S.A. the function of mining districts were to create rules governing the size of claims, manner of location and discovery requirements, recording of locations, work required to hold a claim and requirements for abandonment. Today the mining districts prevail in name only. County governments took over the task of recording notices, etc. and state governments took over the task of making and enforcing local mining laws.

State Mining Laws

Federal mining law provides for recognition of “local customs or rules of miners in the several mining districts so far as the same are applicable and not inconsistent with the laws of the United States.” State Statutes provide additional constraints regarding location, recording, etc. that must be followed.

For example in Arizona lode, placer and mill site claims have the following additional requirements (mirrored in the federal law) [1]:

- 1.) Location noticed posted on a conspicuous monument of stone not less than 3 feet high or a post 4 feet above ground.
- 2.) Within 90 days erect 6 substantial posts projecting at least 4 feet above ground or substantial stone monuments at least 3 feet high one at each corner and one at the center of each end line and each contain a sufficient description so as to identify it.
- 3.) Within 90 days record the notice of location with the county recorder as prescribed by law together with a map of the premises containing:
 - a.) The name of the claim;
 - b.) Whether the claim is a lode, placer or mill site;
 - c.) The locality in the public land system;
 - d.) The scale of the map;
 - e.) The county in which the claim is situate;
 - f.) A north arrow;
 - g.) The type of corner and location monuments used; and
 - h.) Bearing and distance between corners.

DISCOVERY OF MINERALS AND TYPES OF LOCATIONS

What Is Locatable

Locatable minerals include both metallic minerals (gold, silver, lead, etc.) and nonmetallic minerals (fluorspar, asbestos, mica, etc.). Common varieties of

sand, gravel, stone, pumice, pumicite, cinders and clay though salable are not locatable. However, uncommon varieties may be locatable. Petrified wood is not locatable.

What Is Discovery

Federal law does not describe what constitutes a valuable mineral deposit. Case law has filled that gap with what is known as the “prudent man rule” which is: “...where minerals have been found and the evidence is of such character that a person of ordinary prudence would be justified in the further expenditure of his labor and means, with a reasonable prospect of success in developing a valuable mine, the requirements of the statutes have been met.”[2]

TYPES OF LOCATIONS

Lode claim

Federal statutes limit their size to a maximum of 1,500 feet in length along the vein or lode. Their width is a maximum of 300 feet on each side of the centerline of the vein or lode. The end lines of the lode claim must be parallel to qualify for underground extralateral rights. Extralateral rights involve the rights to minerals that extend at depth beyond the vertical boundaries of the claim [2]. Refer to Figure 1 for some possible claim line configurations.

Placer Claim

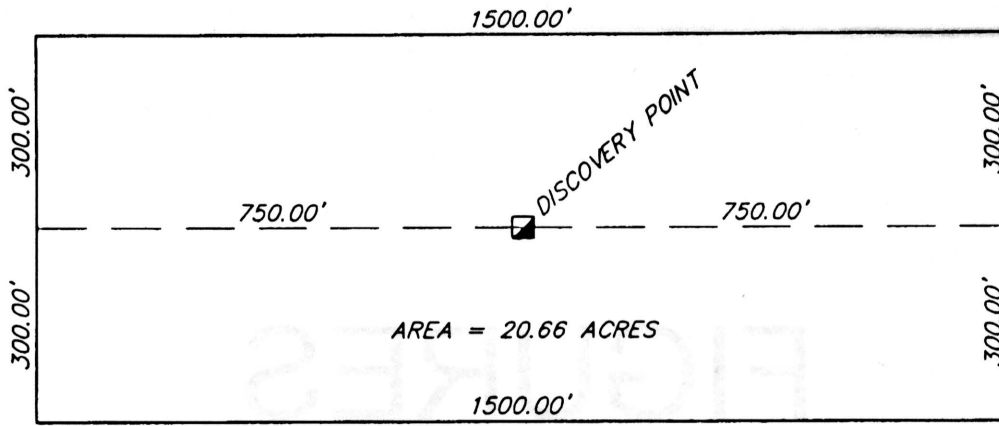
Mineral deposits subject to placer claims are all those not subject to lode claims. These include deposits of unconsolidated materials, such as sand and gravel containing free gold or other minerals. Placer claims, where practical, are located by legal subdivision (NE $\frac{1}{4}$, etc.). The maximum size of a placer claim is 20 acres per claimant and an association of eight persons may locate placer claims up to a maximum of 160 acres.

Mill Site

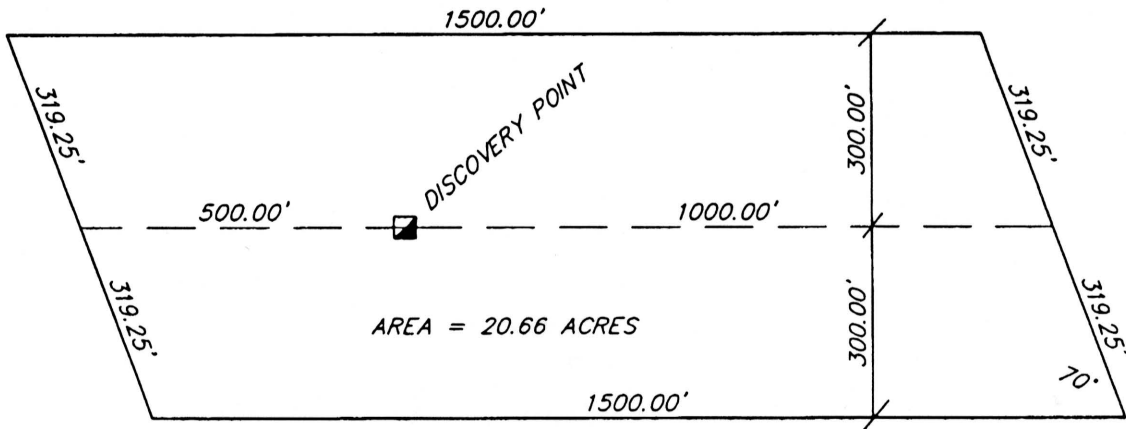
A mill site is a portion of public land, which is shown to be non-mineral in character and is limited in size to 5 acres.

Tunnel Site

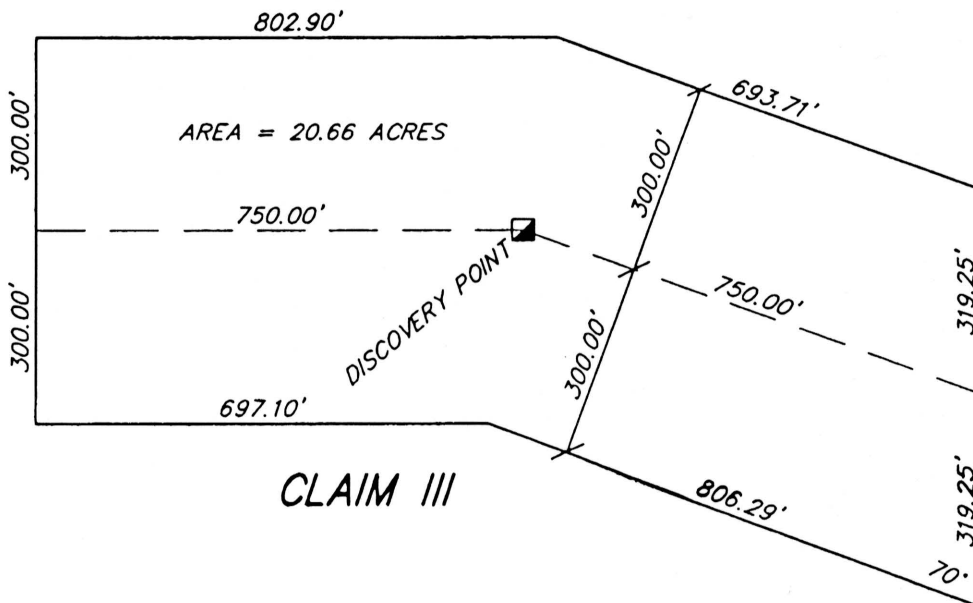
A tunnel site is a portion of public land where a tunnel (or adit) is run to develop a vein or lode or for the discovery of an unknown vein or lode. Two stakes are placed 3000 feet apart on the line of the proposed tunnel and the maximum distance left or right is 1500 feet therefore allowing a parcel of 3000 x



CLAIM I



CLAIM II



CLAIM III

FIGURE 1

3000 feet for exploration. Patents are not issued for tunnel sites. Hence these sites are of no importance to the Mineral Surveyor.

MINERAL SURVEYORS AND THE APPLICATION PROCESS

Mineral Surveyors

Historically Mineral Surveyors were appointed by the Surveyors General (General Land Office) and were appointed to serve in one state only. As times changed and districts failed it became necessary for the surveyors to be more mobile and hence today Mineral Surveyors are appointed by the Chief, Division of Cadastral Survey of the USBLM to serve in all states subject to federal mining law. This appointment was for life however again times have changed and the appointment is for only three years subject to renewal. This is based on the number of mineral surveys the surveyors have had approved and the timely manner in which the work is performed. In order to qualify for appointment the applicant should be registered land surveyor at least in the state in which he desires to practice and pass a 16-hour exam administered by the USBLM which also requires taking a solar and a star observation for bearing. These examinations are given on an as needed basis only and may be many years apart.

The Mineral Surveyor's duties begin with an order for survey and cease with the approval of the survey. The surveyor must execute a new survey of the premises following the date of the order and may not rely on old data. The surveyor cannot act as agent for the claimant. Though he may post notices for the claimant, he is prohibited from taking any part in the patent application. The mineral surveyor must make the survey in person. The surveyor cannot be an employee of the claimant nor may the claimant be employed to execute the survey. The survey must be an actual survey on the ground. This last statement precludes the calculation of ties and other lines through prior surveys.

The Application Process

Fundamentally, once the claimant has identified his claim and completed everything required under the law he must maintain title by performing the necessary work, etc. Should he deem the claims value to merit the additional expense he may strive to receive a patent. If the claim is not an aliquot portion of the public land system than as mentioned above the services of a mineral surveyor are required.

What follows is a very brief synopsis of events:

- 1): The claimant applies for a mineral survey through the BLM and he is provided a list of mineral surveyors.
- 2): The mineral surveyor is chosen and a contract drafted for services rendered.

- 3): The order for the survey is issued to the mineral surveyor from the state office of the BLM.
- 4): The survey is executed and the results filed by the mineral surveyor with the state office.
- 5): The mineral surveyor is finished upon approval of his returns by the state office and the claimant is now on his own to pursue the patent.

PATENT SURVEYS, METHODS AND RESULTS

Mineral surveys by definition carry the same weight, as does any segregation survey of the public lands. Whereas the normal cadastral standards are lenient all lines run in a mineral survey must be executed so that the error is less than $\frac{1}{2}$ foot per 1000 feet. By the very nature of mineral deposits it usually follows that these surveys are executed in extremely difficult if not hostile terrain. Hence what follows is a very brief summary of methods developed and used historically to make the survey.

Lines were run with small mountain transits having verniers to one minute both on the vertical and horizontal limbs. Courses could either be computed by deflection angle, angle to the right or by carrying the course on the plate of the transit so that bearings were directly observed for each course (See figure 2). The deflection angle method and carrying the bearing on the plate were civil engineering practices inherited from route surveys and were very prone to errors/blunders. Most often times the Mineral surveyor was a mining engineer or a surveyor accomplished at underground surveys and hence angles to the right were most prevalent in use. The primary reason being that underground surveying (working in limited light) makes measuring a deflection angle very uncertain because left and right are often difficult to judge. These observations were taken as the mean of numerous repetitions the limit being the age and condition of the transit and the result rounded to the nearest arc minute. Solar transits were not used due to the limits of accuracy available in direction with these instruments. The author has successfully used a Smith for preliminary work however a constant vigil was necessary to maintain adjustments and because of the bad terrain it was ultimately deemed not worth the added weight or effort. The basis of bearings was usually a direct solar observation reduced by the altitude method backed up by a Polaris observation or additional solar observations. The transit needed a good compass, as a declination was determined at each corner of the claim and a mean reported in the field notes. Because of the convergence of meridians the latitude and longitude of the station at which the observations were made is included in the field notes so that should a dependent resurvey be executed the bearings can all be reduced to the same meridian!

| FIELD AT STA. | BOOK B.S. STA | DATA: | | S.D. | H.D. | TRUE COURSE | TO STA. | REMARKS |
|------------------|------------------|--------|-------|---------------|------|-------------|---------|--|
| | | V.A. | | | | | | |
| 1 | 0 | 0°00' | 335.6 | 335.6 | | N75°00'E | 4 | 1=ON END LINE |
| 4 | 1 | 10°00' | 294.6 | 290.1 | | N75°00'E | 7 | POL |
| 7 | 4 | 11°15' | 424.5 | 416.3 | | N75°00'E | 8 | POL |
| 8 | 7 | 6°30' | 461.0 | 458.0 | | N75°00'E | 9 | ON END LINE |
| | | | | <u>1500.0</u> | | | | |
| 1 | 0 | 12°00' | 405.2 | 396.2 | | N81°00'W | 2 | LODE LINE LENGTH FOR SEC. TIE |
| 2 | 1 | 9°00' | 333.7 | 329.5 | | N50°00'W | 3 | SEC.COR 6X9X16 INS. ABOVE GROUND |
| 1 | 0 | 0°00' | 110.0 | 110.0 | | N75°00'E | 19 | 1111 SOUTH EDGE DISC. 4X6 65 DEEP TIMBERED 30 FEET |
| 4 | 1 | 10°00' | 482.1 | 474.8 | | N14°46'E | 5 | PI |
| 5 | 4 | 5°00' | 218.8 | 217.9 | | N29°39'W | 10 | 1-16591 STONE |
| 5 | 4 | 5°00' | 232.5 | 231.5 | | N54°03'E | 11 | 2-16591 STONE |
| 4 | 1 | 0°00' | 703.3 | 703.3 | | S04°02'W | 6 | PI |
| 6 | 4 | 4°00' | 240.6 | 240.0 | | S58°19'W | 12 | 4-16591 STONE |
| 6 | 4 | 4°00' | 201.7 | 201.2 | | S26°53'E | 13 | 3-16591 STONE |
| 4 | 1 | 3°00' | 87.5 | 87.4 | | S50°16'E | 14 | 1-17541 STONE |
| 7 | 4 | 0°00' | 56.6 | 56.6 | | N89°22'E | 15 | 2-17541 STONE |
| 8 | 7 | 0°00' | 62.3 | 62.3 | | N40°32'W | 16 | 2-12716 STONE |
| 16 | 7 | 0°00' | 300.0 | 300.0 | | N39°00'W | 17 | 1-12716 STONE |
| 8 | 7 | 8°00' | 151.0 | 149.5 | | S45°10'E | 18 | 4-17560 STONE NO CORS. OR DISC. FD. ON 1462 |

FIGURE 2

Lengths were measured using long steel tapes in catenary (300 or 500 foot canyon lines were most common) the slope distances so measured were taken from the transit spindle to a long stake set firmly in the ground with a nail at the station point. Large nails could be used as well though were often hard to find later and required the helper to plumb down. The vertical angles were observed to the nearest minute and the slope distances reduced using versine tables and a slide rule. Some surveyors used the vertical angle and the external secant to correct the slope distance so that the horizontal distance was an even number. As the surveyor might have an inexperienced helper (usually a two man crew was used unless a great deal of brush was encountered) often the zero end was held on the forward stake by the helper and the distance measured at the spindle by the surveyor. The author was always fortunate to have an experienced helper and so "high and low" was used to provide a check for distance. The tape was stretched using a tension handle and if one were not available then the tape was made to oscillate using hard pulls and then relaxing same until the tape began to float and the minimum length was marked on the tape at the spindle with a clothes pin or such and the length determined. As most old tapes were graduated only to the nearest 5 feet it required a small pocket tape for determining the actual length. Other methods for determining lengths were encountered though not common place. Such methods were stadia, short base triangulation and the 5 degree 43 minute angle. Stadia observations though expedient fail to provide accuracy sufficient to meet the requirements. Short base triangulation worked well for going from ridge to ridge but required the use of logarithms for reduction thus costly in time. The 5 degree and 43 minute angle was more likely to be used. This method depends on the fact that an angle of 5 degrees, 42 minutes and 38 seconds has a natural tangent of 0.10000. The method required the tape to be laid at right angles to the transit line and extended until subtended by the angle as measured at the transit and hence the distance was 10 times the short base distance. Regardless of the methods used the distance was used to the nearest 0.1 of a foot.

Very seldom were the sidelines of a location run it was more likely that the lode line (centerline of the claim) was run directly or by traverse and the corners set by offset or by angle and distance. This was the case for one or two lodes however for large blocks of claims perimeter traverses were run if possible. Refer to figures 2 and 3, which have been excerpted from [3.] and modified slightly. This is a beautiful example of how mineral surveys were executed in the early days of the surveying system and the associated field survey notes kept. Often level books were used though some, the author included, preferred mining transit books so that a running sketch could be kept on the right hand side and the book would double for underground work as well. Most surveyors tend to take notes down the page and to separate side shots with a line or a star. Some however take notes up the page just as the progress of the survey proceeds and is a much better method in the opinion of this author. This method works extremely well

TRAVERSE AND CLAIM BOUNDARY PLAT SHOWING RESULTS OF THE SURVEY IN FIGURE 2 AS PER [3.]

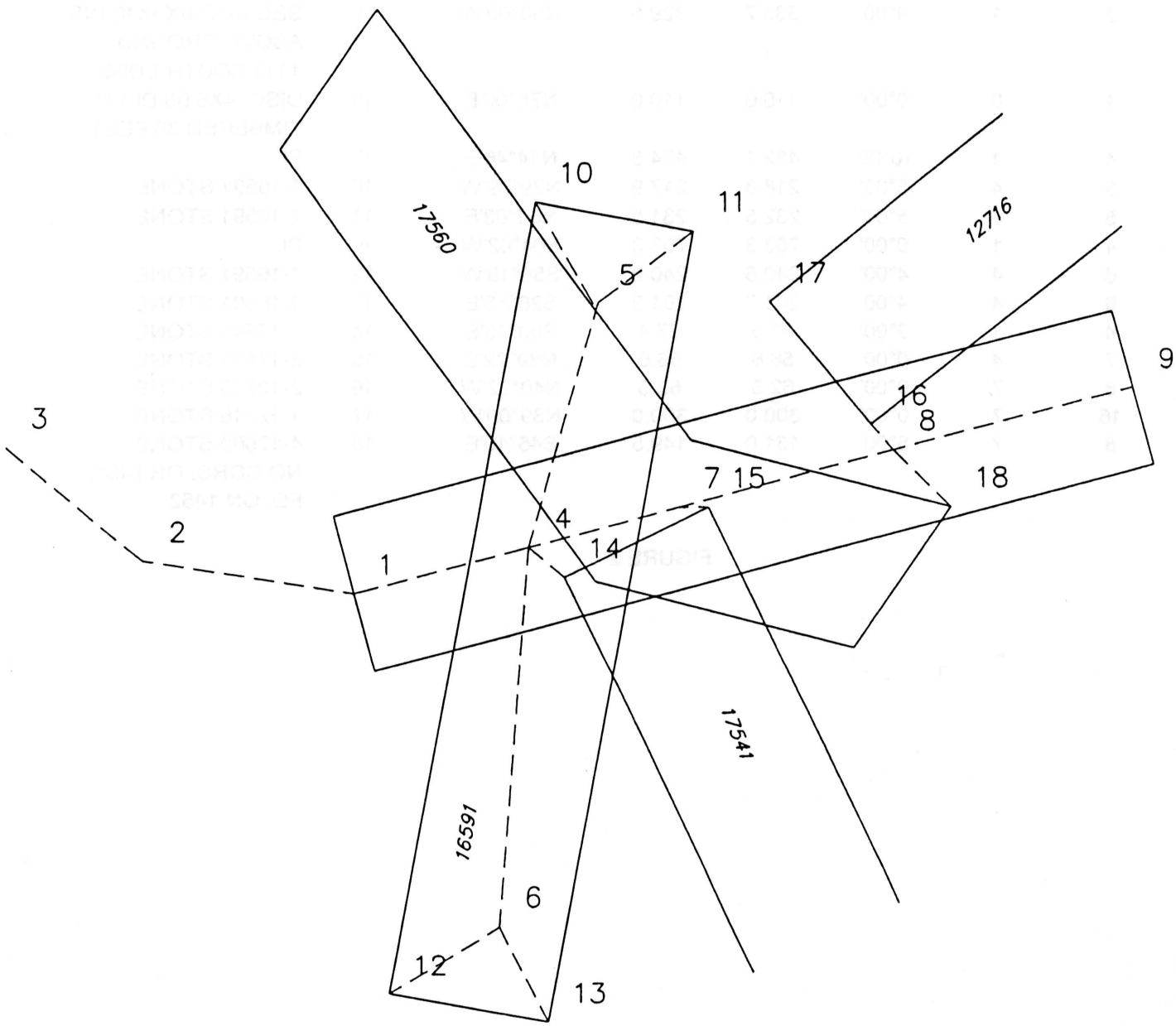


FIGURE 3

for nderground surveys because crosscuts and topographic features are sketched as they appear.

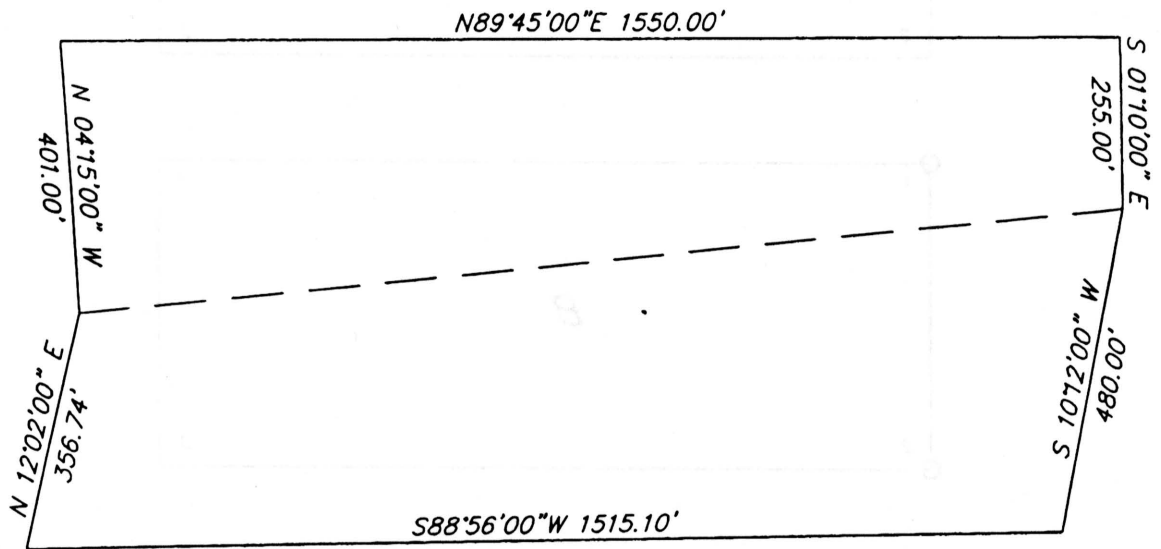
It is hoped that the person using this paper will take the time to reduce these sample notes (figure 2) and see how they work in the plotting and solution process as shown in figure 3. When the notes refer to 1-16591 this is corner number 1 of the lode surveyed under Mineral Survey Number 16591. Several dependent resurvey principles were employed in this example, which are worth noting.

The other two corners for MS 12716 and MS 17541 were presumed obliterated. Because the retraced end lines were substantially as approved the sidelines were given the bearing as approved. To the contrary all corners for MS 16591 were found and the surveyor was obligated to retrace it in its entirety. MS 17560 had only one original corner left and hence the record calls were used as approved. Not shown on figure 3 is MS 1462 as no evidence was found and it had to be used entirely as approved. Figure 3 is not meant to be all encompassing but only as a picture of the traverses run and the manner in which the claims overlap. Once lines have been established for all claims involved it then became necessary to compute the intersections of all lines, compute areas, etc. in order to finish the survey.

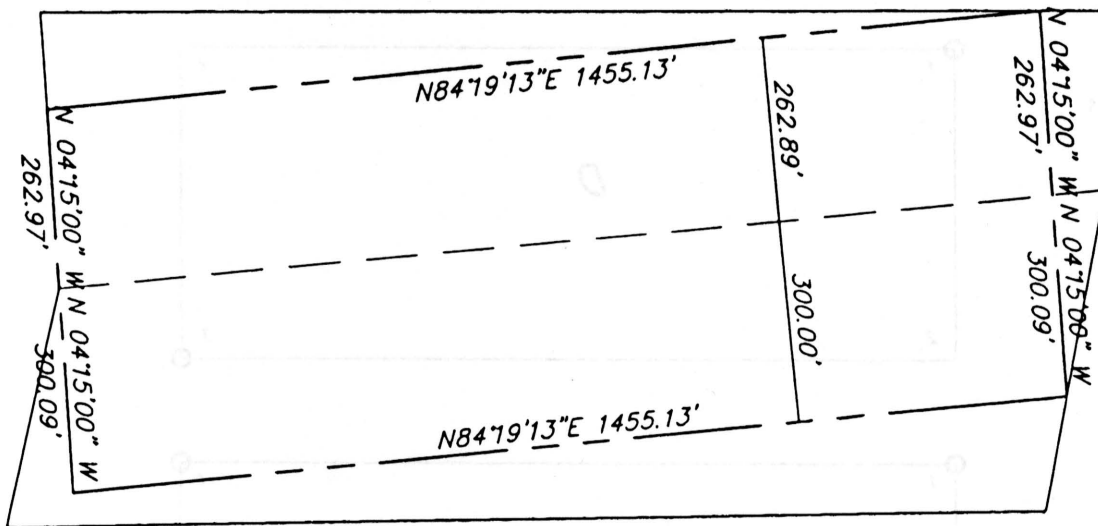
Because the sidelines were seldom run the topographic calls were usually determined by either a stadia detail survey or by estimating the sidelines with a stadia run line. The other details such as buildings, etc. would be located off of the lode line by offsets or by angle and distance. The distances were determined either by stadia or by direct measure.

Because of a lack of surveying skill on the part of most claimants another challenge usually met the mineral surveyor soon after retracing the existing evidence. This is shown in figure 4. The law is very specific and the claimant cannot claim anything outside of his location. It then became a challenge for the surveyor to create a legal claim within those limits. One such example is shown in figure 4 and the author has seen a lot worse. The reality of this situation fathered a solution, which is still used today by most mineral surveyors.

During the early stages of the claim process and before the order is requested and issued a "pre-patent survey" is executed and all claims amended to reflect the law. The dimensions were often shortened in the field to prevent a hiatus. At this time permanent monuments are set at all corners and new amended notices recorded and posted. This process then allows the patent survey to proceed in a timely manner and avoids amended orders. Because the work has to be redone often the client would question this but the savings in time, lack of hiatuses and overlaps makes it worth it in the long run. A major



BOUNDARIES AS STAKED BY THE CLAIMANT



THAT PORTION ALLOWED BY LAW AS DETERMINED BY THE MINERAL SURVEYOR AT THE TIME OF SURVEY

FIGURE 4

benefit is two independent surveys, which hopefully check and give the same result!

The sample field notes as published in the manual [4] are always well worth reading as they are all inclusive of the different types of monuments, evidence, accessories and improvements encountered.

Field Notes

Like any cadastral survey the field survey notes (field tablets) are the notes showing the field ties, monument description, etc. The actual field notes for the mineral survey as tendered by the Mineral Surveyor are as transcribed and follow a very rigid format. The notes as published in the Manual of Instructions are the best possible sample of what data is included and hence will be briefly discussed here. The contents of the field notes will be considered in the order in which they appear in the final transcription.

Preamble

Excluding the title page the first information set forth is a complete description of the instruments (transit and tape, etc.) employed together with a brief discussion of the field methods used. The mean solar observation is set forth with sufficient detail to allow its reduction by anyone. Often as stated before the actual survey may be the results of several solar observations, however only one is chosen and reproduced here. The rule and method was to take the mean of at least 6 separate observations and reduce this mean. Many surveyors, the author included reduced each separately so as to provide an immediate check on the quality of the observations. The altitude method was employed until recently when the hour angle method became the one of choice because of the availability of accurate time.

Running Notes

The next sequence of pages constitutes the “running notes” for each of the separate locations within the claim. The first covered are the Lode locations in this case MS No. 20220 A. When a mill site is included with Lodes it or they are relegated to an MS No. suffixed by a “B”. Hence the running notes for the DUMP MILLSITE are included as MS No. 20220 B.

Areas

This section contains a complete tabulation of the areas of each location together with the area it may have in conflict with other locations within the survey or prior official surveys. This data determines the final cost of the patent.

Tract A

Should a Tract be involved with the survey, it is described here.

Location

This data indicates the location of the survey within the Public Land Surveying System and comments regarding whether the current surveyed lines are coincident with those of the original locations or any differences discovered and described in the running notes.

Expenditures

This is a tabulation of each physical improvement embraced within the survey as claimed by the claimant. The results of these descriptions are usually from stadia ties or compass surveys. If the underground workings were extensive then a steel tape traverse was used. It is important to note that any such traverse was run using temporary points in the floor and no permanent points were set in the back as the need is for an estimated volume of rock removed or the length of workings. In the case of a vertical shaft same had to be plumbed from station to station in the shaft using heavy plumb bobs and piano wire. The plumb bob movement was dampened in oil. The total value of these expenditures was applied to the required expenditure for patenting the locations.

Other Improvements

These improvements are those not claimed by the claimant and were pre-existing at the time he or she began expending funds on the locations. It is important to note that a Mineral Survey for Patent is as complete an inventory of the workings as is physically possible. That is to say if an underground working is not safe to enter it is noted but no detail included unless underground surveys exist as executed by others.

Other Corner Descriptions And Supplemental Data

It is here that valuable information, such as the exact descriptions of other corner evidence and discrepancies in senior lines as disclosed by this survey.

Memorandum

Here would be the place to disclose or discuss any other disagreement with the location certificates such as typos, etc.

It must go without saying that this short and very condensed effort is just a basic overview as mineral surveys can be very complicated compared with normal land surveys. As an example, refer to “TRACT A” included in the sample field notes of the Manual. This is not unique to these claims in which prior rights are established and allowed for so that the claims may overlap but the ownership is limited. This is one reason why a land surveyor should always acquire a copy of the actual patent for a lode claim as a portion of the original may be excluded and will only be defined in the description.

DEPENDENT RESURVEYS

As with any other retracement and dependent resurvey patented lode claims and mill sites are no different. A complete and thorough records search must be made this includes but is not limited to:

- 1.) Obtain a copy of the plat of the survey.
- 2.) Obtain a copy of the field notes for the survey.
- 3.) Obtain a copy of the plat submitted to the GLO or BLM by the Mineral surveyor.
- 4.) Obtain copies of plats and notes for all other claims that overlap the subject of the retracement.
- 5.) Obtain copies of the section subdivision survey and the approved plat.
- 6.) Obtain a copy of the patent document.

All of the above contain a wealth of information, which will afford the retracement and dependent resurvey to replace obliterated corners in their location as approved!

Figure 5 affords some “rules” to be used as a last resort [1]. Assume that all else has failed and that only the original corners identified with the circle have been found hence for each case denoted by a letter:

Case A: In this situation only one corner was recovered and hence the other three must be replaced using record bearings and distances.

Case B: Lines 4-1 and 2-3 should be shown at the record distance, regardless of the length of line 1-2. The bearings of lines 4-1 and 2-3 may be the record bearing or at the same variation from the record as line 1-2. If this was a rectangular claim, the bearing of the missing lines probably should be at right angles to line 1-2, unless this would give a distorted relationship between the claim and the workings on it, particularly the discovery. Line 3-4 should be shown parallel and of equal length to line 1-2 [1].

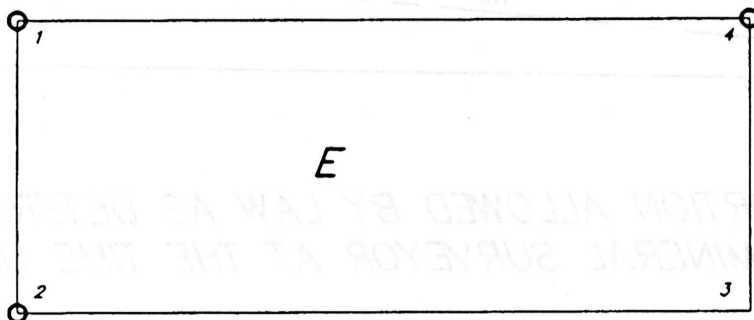
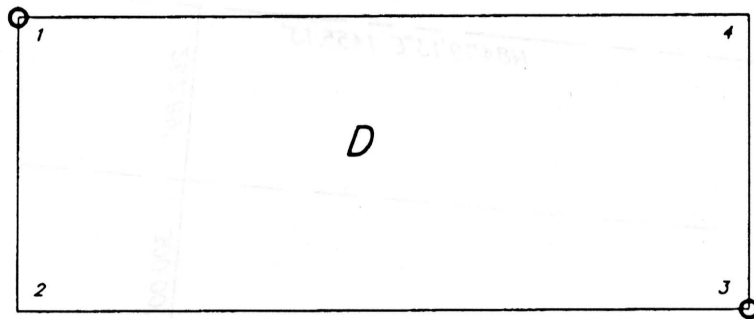
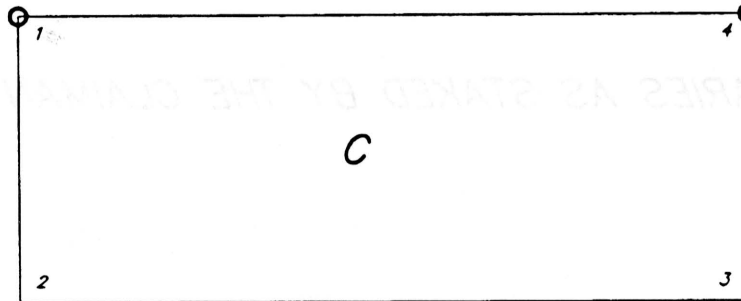
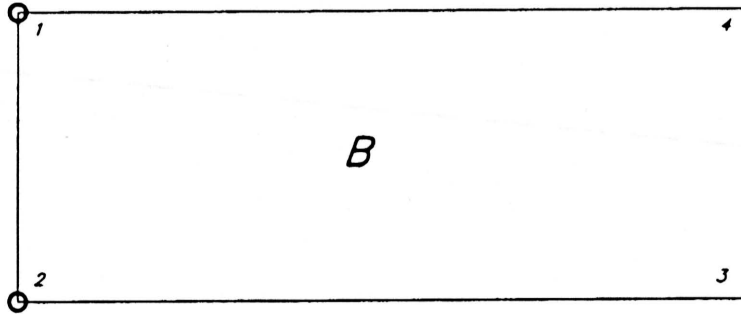
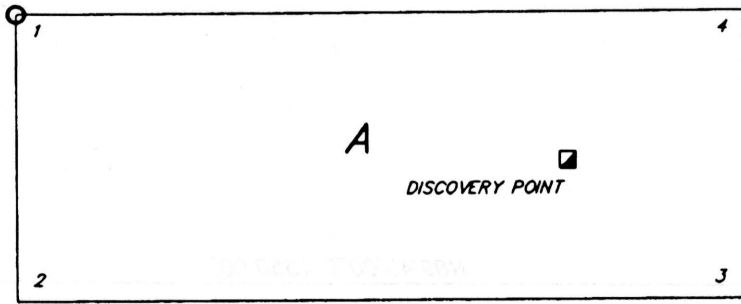


FIGURE 5

Case C: Line 2-3 should be shown parallel and of equal length to line 4-1, if the record was such. Lines 1-2 and 3-4 should be shown at the record distance, and at the record bearing or with the same variance for line 4-1[1].

Case D: Missing Corner Numbers 2 and 4 can be restored by using the Grant Boundary method. See section 5-44 [4]. They may also be shown at the record bearing and distance from Corners number 1 and 3, using either the end lines or sidelines, with the resulting missing lines being the bearing and distance required to close. The method selected should restore the lines in the best relative position to the workings [1].

Case E: Line 2-3 is shown parallel and of equal length to line 4-1. Line 3-4 is shown parallel and of equal length to line 1-2 [1].

In retracing blocks of claims the rules of proportionate measure might be considered [1] however it is more appropriate in particular for irregularly shaped locations to use the Grant Boundary Method [4]. It is hoped the following vignettes of actual problems and the author's solutions will assist the reader:

Situation No. 1:

A patented mill site was retraced and one original corner remained, however because the lode claim associated with this mill site was located some 30,000 feet distance the mineral surveyor set a USMM and tied the mill site to it. The GLO made ties to this USMM some years later. The problem was to restore the mill site monuments. The USMM had been a large 8 ins. diameter well casing approx. 300 feet away from the found mill site corner. It was decided to use the record bearings, as the casing was so large as to absorb the difference between the record and measured directions.

Situation No. 2:

In order to stake a block of lodes it was necessary to make their end line contiguous with a patented lode circa early 1900s. The only evidence of this patent was a bearing rock. Once the lines were run record it fit the workings within a few feet.

Situation No. 3:

A block of patented lodes had to be retraced and monuments placed. All corners and accessories were obliterated. In researching it was discovered that the original order covered more lodes than just the few, which received a patent. These corners were found and used effectively to replace those obliterated.

Situation No. 4:

A very old patented lode claim was in contention between a rancher who was using the water from a windmill and the owner of the patent. The section tie wound its way up a canyon making it suspect, as it appeared the mineral surveyor had tied it to some older patented properties and computed his tie. The Section corner tied was some 5280 feet away and turned out to be the only original stone corner along the entire south township boundary. During the research for this project it appeared that the cadastral surveyor while doing the sectional survey had made a tie as he passed one of the old patented lode corners this data was contained only in the field notes. This section line was run and at the falling a small mound of stone remained. When the stones were removed and the ground scraped the remnants of the post were found. From this corner it was possible to run record and evidence of two other corners was found. From this information and the lack of any other evidence the fourth corner was deemed to be lost and was replaced using Case E above. The windmill was on the claim and the BLM had assured the rancher that it was not when he dug the well!

Situation No. 5:

The sideline of a patented lode had to be retraced for purposes of completing a mineral survey for patenting of a mill site. This claim was located on the top of a mountain and brush was intense. This particular situation brings little new to the discussion but it is interesting from the point of view of the tenacity of the old surveyors. We floundered around in the brush for several hours before we found a corner of the location. We brushed it out and were able to take a solar late in the afternoon. The next day we began running the sideline. We cut brush for almost a day and a half until we got to the end of the line. The corner was there and fit within a couple of tenths. The notes for this survey indicated that all four corners and the section tie had been executed in one day!

Situation No. 6:

An old mill site had to be retraced. The patent for this location was issued in the 1880s. Surprisingly enough we found one old post which when carefully examined showed signs of scribing. The problem was that using record courses did not fit the improvements. Using a backhoe we were able to find the original foundation of the mill building. By holding the ties to the improvements we were able to construct a rotation allowing the claim and improvements to fit together.

CONCLUSION:

It is hoped that this paper and the oral discussion will assist the land surveyor in dealing with mineral surveys and patents. The by word of dealing

with these old boundaries is “research” and more “research”. Furthermore, it is important to remember that when working with these lines one is normally dealing with a line between private property and the public domain and as such is always subject to change and review by the BLM!

Sadly our country is moving away from developing its own mineral resources and as such mineral surveying and mineral surveyors are becoming a part of history hence any new surveys are unlikely at least in the author’s lifetime. The last survey I had approved was some 4 years ago and I have not had a nibble since then. It is likely that dependent resurveys will go on forever.

REFERENCES:

[1.] “Mineral Survey Procedures Guide”, by John V. Meldrum, USMS, Cadastral and Mapping Training Staff, Denver Service Center, Bureau of Land Management, 1980.

[2.] Brochure: “Mining Claims and Sites on Public Domain Lands”, No.: BLM-AA-GI-007-4130, Bureau of Land Management, October 1989.

[3.] “Mineral Land Surveying”, by James Underhill, Ph.D., Landmark Enterprises, 10324 Newton Way, Rancho Cordova, CA 95670, (Originally published 1906).

[4.] “Manual of Instructions for the Survey of the Public Lands of the United States”, Bureau of Land Management Technical Bulletin 6 United States Department of the Interior, 1973.

[5.] Brochure: “ Patenting a Mining Claim on Federal Lands”, No.: IS #4-78 USGPO O-247-983, Bureau of Land Management.

[6.] Federal register: Thursday, January 27, 1977, Part IV, Department of the Interior, Bureau of Land Management, “Mining Claims Recordation, Filing of Assessment Work and Notice of Intent To Hold Mining Claims” and Amendments thereto published: February 14, 1979 and April 5, 1979.

COLORADO SPECIFIC EXAMPLE

By Jack M. Kesler and C. Eugene Kooper

January 10, 2005

The State of Colorado is rich in mining and mineral land surveying history and because of the vintage of many of the “rushes”, many interesting examples are available to show the extremely complicated problems for the dependent re-surveyor. The discussion and dissection of the data for the puzzle illustrated below could easily take an entire day.

The problem began when the returns for Mineral Survey No. 12577 were submitted and approved by the Denver Office of the General Land Office (GLO) outlining flaws in MS No. 540 as approved which of course was and has always been the practice. The Commissioner of the General Land Office, the Hon. Binger Hermann, ultimately decided that from July 1899 forward that all surveys would stand as approved and henceforth all conflicts with new and prior official surveys would be determined from the record calls as approved. It should be obvious what kind of serious problems this created. The GLO rescinded the order after passage of the Act of April 28, 1904.

The challenge for the dependent re-surveyor is the importance of acquiring as nearly all of the data surrounding the premises at hand as possible. In this case, that includes the surveys and notes for all of the locations, the surveys taken to patent and the surveys that were abandoned. The last and most important bit of information is the patent, which limits lands conveyed to the claimant. The notes and plats for the surveys outlined in MS 12577 indicate a rich history of the surveys, methods, results and errors made in this small area of the public land system. There is also an example of the “tract” and how it is used in mineral land surveying. The two plats are appended for the reader to study and consider namely the original plat with all conflicts determined from field ties and the Binger plat (Amended) showing conflicts and ties per the record calls.

The BLM maintains a card file for each location and on each card is either the patent issuance date or an indication that the patent was applied for but not received; or the application was abandoned. Title information for the prior official surveys and Sur. No. 12577 are listed below.

| <u>MS No.:</u> | <u>Location Name:</u> | <u>Patent Date:</u> |
|----------------|-----------------------|---------------------|
| 244 | ARCTIC | 9-19-1881 |
| 245 | HIGHLAND MARY | Abandoned |
| 319 | GRIFFITH | 11-20-1875 |
| 540 | HOOD | 6-15-1882 |
| 620 | CLEVELAND | Abandoned |

| <u>MS No.:</u> | <u>Location Name:</u> | <u>Patent Date:</u> |
|-----------------------|------------------------------|----------------------------|
| 1493 | F.W. CRAM | 5-15-1883 |
| 1499 | HIGHLAND | 9-7-1887 |
| 1882 | UNKNOWN | 10-1-1884 |
| 1930 | GRIFFITH | Abandoned |
| 2061 | LESLIE NORWOOD | 8-19-1887 |
| 2370 | ALEXANDER | 11-20-1891 |
| 5887 | LAFAYETTE | 1-8-1892 |
| 11300 | AMERIC | 10-2-1897 |
| 11300 | ARTIC | 10-2-1897 |
| 11300 | IONIC | 10-2-1897 |
| 11300 | MASONIC | 10-2-1897 |
| 11300 | BRITANNIC | 10-2-1897 |
| 11300 | CELTIC | 10-2-1897 |
| 11300 | DORIC | 10-2-1897 |
| 12577 | PORTIA | 8-20-1900 |
| 12577 | EDISON | 8-20-1900 |
| 12577 | SILVER PINE | 8-20-1900 |

The plats for these surveys are available from the local BLM office or the BLM GLO Records web site. An advantage of the GLO Records plats is that they are color scans and disclose the areas patented using colored shading. Further they are often more legible than the BLM microfiche copies (in particular the small dimensions).

The following excerpts are from the official field notes of selected minerals surveys that indicate variety of instruments and methods used in the surveys:

Instruments and Methods Used in the Surveys

MS 1882: Executed with a small Gurley mountain transit with solar attachment and all bearings as determined from the attachment directly. No tape indicated.

MS 1930: Executed with a small Gurley mountain transit and lengths by 100 ft. tape. No mention as to whether angles were measured or not.

MS 2061: Executed with a small Gurley mountain transit with solar attachment and all bearings as determined from the attachment directly. Lengths measured with a 700 ft. steel tape.

MS 5887: Executed with a small Gurley mountain transit with solar attachment all bearings as determined from the attachment and lengths measured with a 500 ft. steel tape.

MS 12577: Executed with a small Gurley mountain transit by deflection angles from a true meridian determined by a solar observation (latitude or longitude not given). Lengths measured with a 100 ft. and 500 ft. steel tapes.

The General Situation Regarding Original Corners of This Location; and Those of Adjoining Locations

MS 2061: “The City Grove, Griffith and Chicago lodes are shown in the foregoing notes from connections personally made on the ground.”

MS 2370: “The survey is identical with the corners of the location.”

MS 540: “None of the posts of Sur. No. 245 were standing.”

MS 540 (Amended): Less area in conflict with Sur No. 245 & claim no. 7 NE on GRIFFITH LODE..... “. The claim No. 7 referred to is a tract and is completely described within the notes by a metes description. The need for this is that important workings for the GRIFFITH had been excluded before, hence a “Tract” became necessary to segregate the area of confusion with a prior claimant.

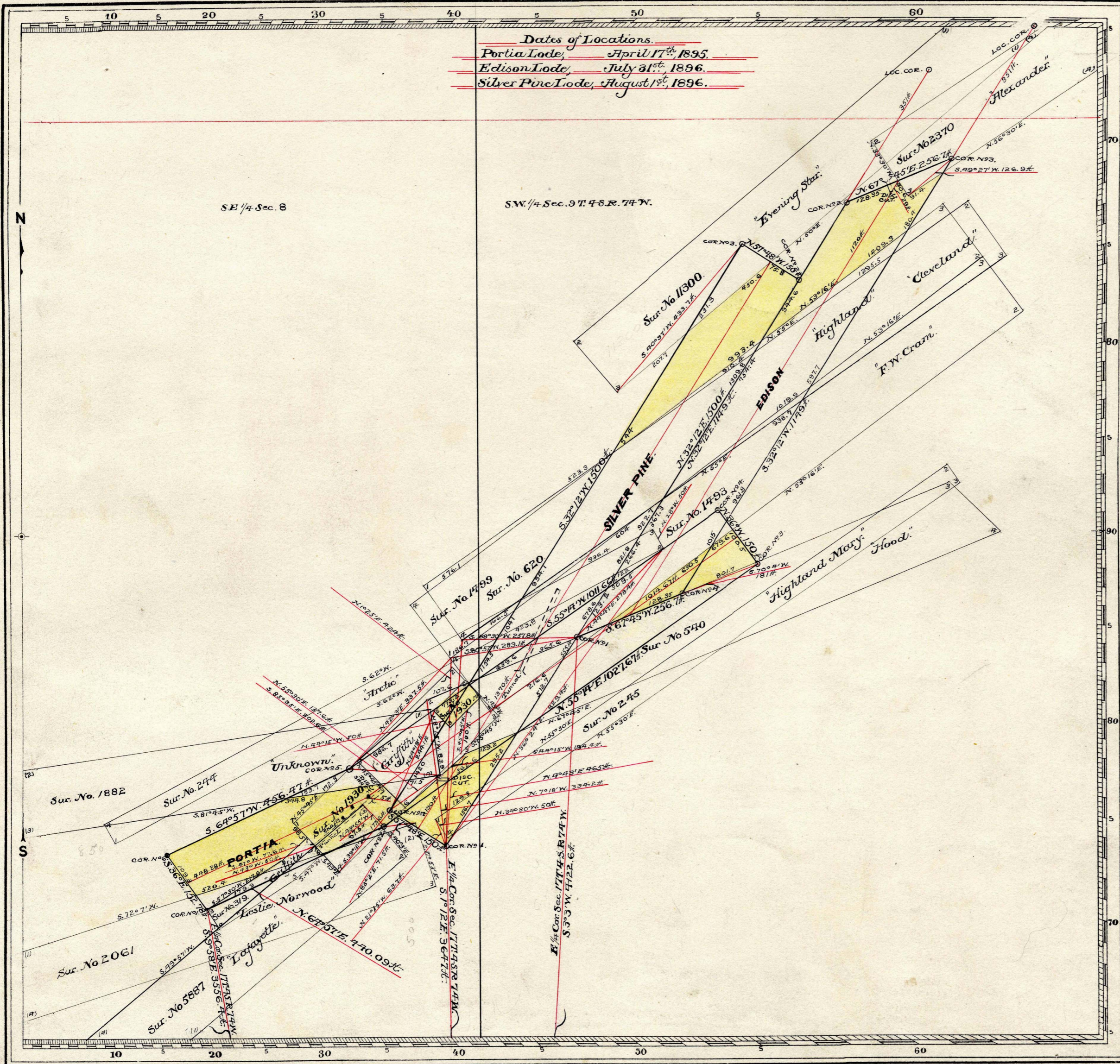
MS 12577: “The discrepancies between these field notes and the certificates of location are due to errors in the latter.”

MS 12577 (Amended): Survey No. 245 HIGHLAND MARY LODE, Survey No. 620 CLEVELAND LODE and Survey No. 1930 GRIFFITH LODE are shown in these field notes as they exist on the ground relative to this survey, being all abandoned claims.

MS 12577 (Amended): “The disagreements between these field notes and the original survey are due to errors in the latter.”

It is hoped that the reader will take advantage of the data contained herewith and spend some time studying the plats. Mineral surveys can be very complicated to resurvey and simple rules such as “proportion” do not always apply. It would behoove any land surveyor contemplating the retracement and dependent resurvey of patented lode or mill sites to study this paper carefully.

*Richard L. O. June 15 1898
June 28 1898
July 25*



Dates of Locations.
Portia Lode, April 17th, 1895.
Edison Lode, July 31st, 1896.
Silver Pine Lode, August 1st, 1896.

Claim Located _____
 Mineral Survey No. 12577
 L.O.T. No. _____
 Denver, _____ Land District.
PLAT
 OF THE CLAIM OF
THE ANNETTA MINING AND MILLING CO.,

KNOWN AS THE
PORTIA, EDISON AND SILVER PINE
LODES,

IN GRIFFITH MINING DISTRICT,
CLEAR CREEK COUNTY, COLORADO.
 Containing an Area of 4.344 Acres.
 Scale of 200 Feet to the inch.
 Variation 15° 30' East.
 SURVEYED May 27th, 1898 BY
Frank A. Maxwell, U.S. Deputy Mineral Surveyor,

The Original Field Notes of the Survey of the Mining Claim of
The Annetta Mining and Milling Co.,
 known as the
Portia, Edison and Silver Pine Lodes,

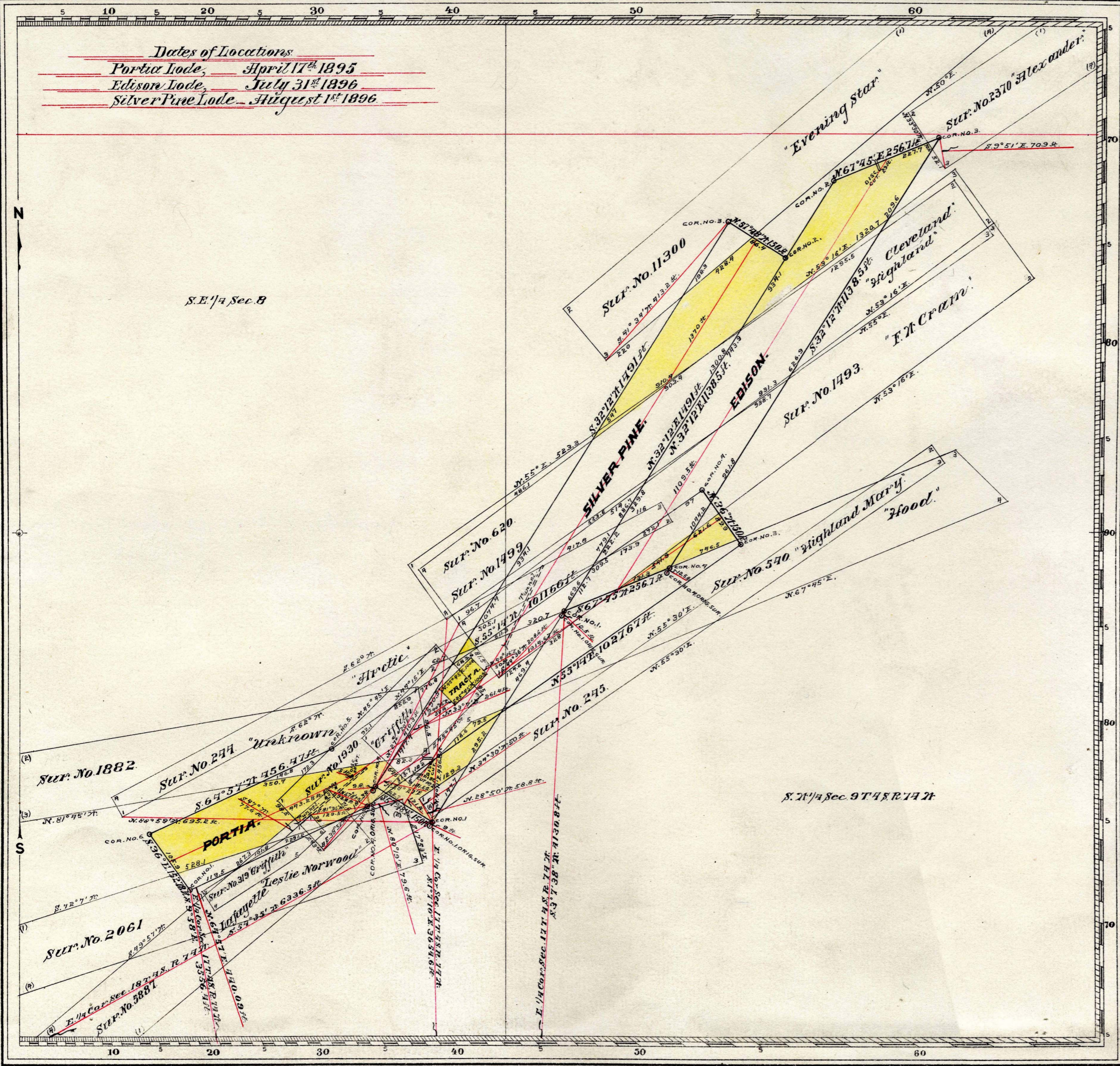
from which this plat has been made under my direction, have been examined and approved, and are on file in this Office; and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.
 I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon said Mining Claim by claimant _____ or its grantors, and that said improvements consist of three shafts, two cuts and two tunnels as appears by the affidavit of the deputy surveyor _____

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.
 And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office. Richard Le Bert.
 Denver, Colorado U.S. Surveyor General for
August 13th, 1898 Colorado.

F.L.C.
A.P.L.
M.A.K.
A.C.
A.D.

Recd S. G. O. September 12th 1899.
" " " " March 9th 1900.
" " " " June 11th 1900.



Claim Located _____
 Mineral Survey No. 12577 Amended
 L.O.T. No. _____
 Denver _____ Land District.

PLAT
 OF THE CLAIM OF
THE ANNETTA MINING AND MILLING CO.

KNOWN AS THE
SILVER PINE, EDISON AND PORTIA LODES.

IN GRIFFITH MINING DISTRICT,
CLEAR CREEK COUNTY, COLORADO
 Containing an Area of 5.076 Acres.
 Scale of 200 Feet to the inch.
 Variation 15° 30' East
 SURVEYED September 7th 1900 BY
Frank A. Maxwell U.S. Deputy Mineral Surveyor,

Amended
 The Original Field Notes of the Survey of the Mining Claim of
The Annetta Mining and Milling Co.
 known as the
Silver Pine, Edison and Portia Lodes,

from which this plat has been made under my direction,
 have been examined and approved, and are on file in this Office;
 and I hereby certify that they furnish such an accurate description
 of said Mining Claim as will, if incorporated into a patent,
 serve fully to identify the premises, and that such reference
 is made therein to natural objects or permanent monuments
 as will perpetuate and fix the locus thereof.

I further certify that Five Hundred Dollars worth of labor has
 been expended or improvements made upon said Mining
 Claim by claimant _____ or its grantors, and that
 said improvements consist of three cuts, three shafts and two
 two wheels, as appears by the affidavit of the deputy surveyor; that said amended
 survey has been made in compliance with instructions from the Hon. Commissioner
 of the General Land Office contained in letter No. dated June 17th 1899,
 that the location of said improvements is correctly shown
 upon this plat, and that no portion of said labor or im-
 provements has been included in the estimate of expendi-
 tures upon any other claim.

And I further certify that this is a correct plat of said Mining
 Claim made in conformity with said original field notes of the
 survey thereof, and the same is hereby approved.

U.S. Surveyor General's Office. W. C. Brodal
Denver, Colorado U.S. Surveyor General for
July 7th 1900 Colorado