



# Non-Rectangular Surveys

**2009**



**UNIT 2 STUDY GUIDE**

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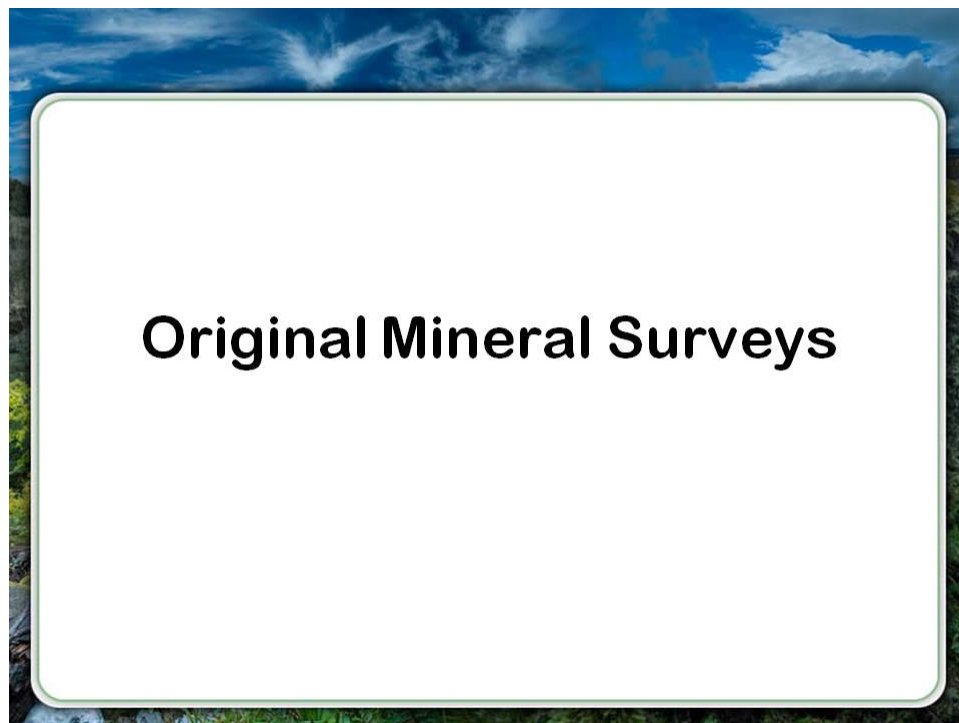
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# Original Mineral Surveys

## *Introduction*

Welcome to another module of advanced cadastral four, non-rectangular surveys. I am Dennis Mouland; you have already seen me in this course and others before that so no need to spend any more time on introducing myself.



## *Mining Claims*

We are here to talk about mining claims. What you and I do for the most part is retrace existing surveys especially when it comes to these non-rectangular surveys. It is always important to go through historical issues as well as to understand what has happened before us and why these things exist and why they are the way, they are.

We will develop and define what minerals we are talking about here. But let us understand that in the public domain especially in the 1700's and 1800's and most of the 1900's was seen as a place to extract various forms of wealth and resources from the land. Here in the 21<sup>st</sup> century there is still a lot of that going on but there is more of an emphasis on conservation and that sort of thing, but still people have land rights.



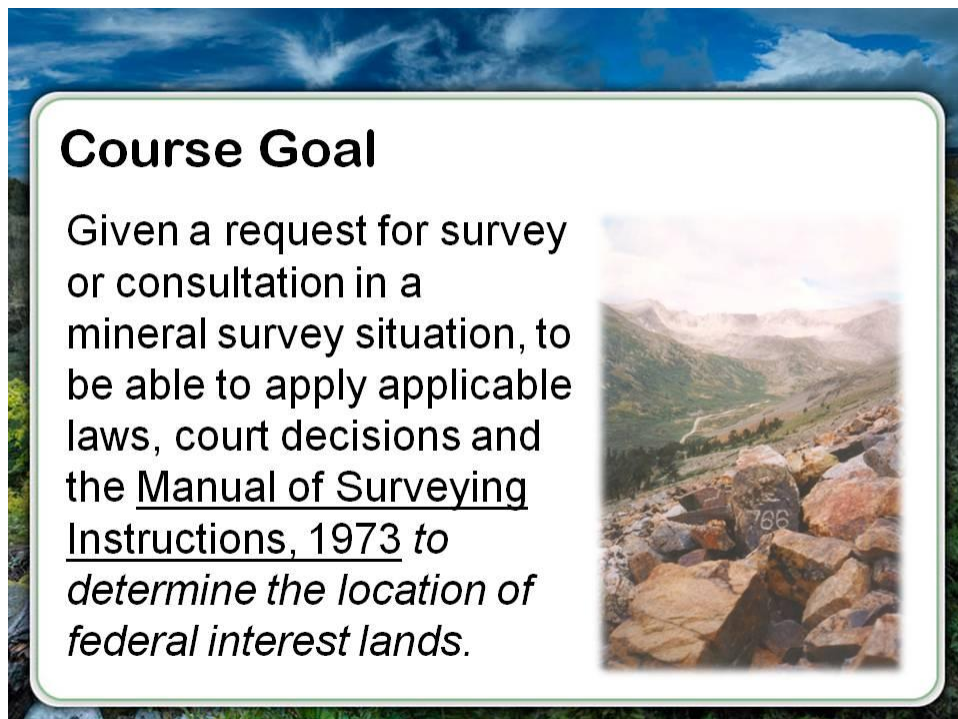
And there are probably tens of thousands, probably hundreds of thousands of mineral claims out there on the public domain. Most of them have not gone to patent, but they are things that people or private individuals, and/or corporations have a right to and it needs to be dealt with. That is one thing about this country at least so far, is we do not mess with people's rights. If we do the constitution guarantees especially with land rights, that we compensate them in fair market value.

Land ownership rights are taken very seriously despite what your politicians and others may say. Many of us land management agencies like BLM, Forest Service or Park Service, are involved tremendously in realty related actions that involve people having rights inside what otherwise looks like is federal land.

We are going to talk about some of those things and how it affects us, as we retrace these especially retracing patented claims.

## **Course Goal**

Upon completion if you are given a request for survey or consultation in a mineral survey situation then you will be able to apply the applicable laws, court decisions, and the 1973 Manual Surveying of Instructions to determine the location of federal interest lands.



### **Course Goal**

Given a request for survey or consultation in a mineral survey situation, to be able to apply applicable laws, court decisions and the Manual of Surveying Instructions, 1973 to *determine the location of federal interest lands.*

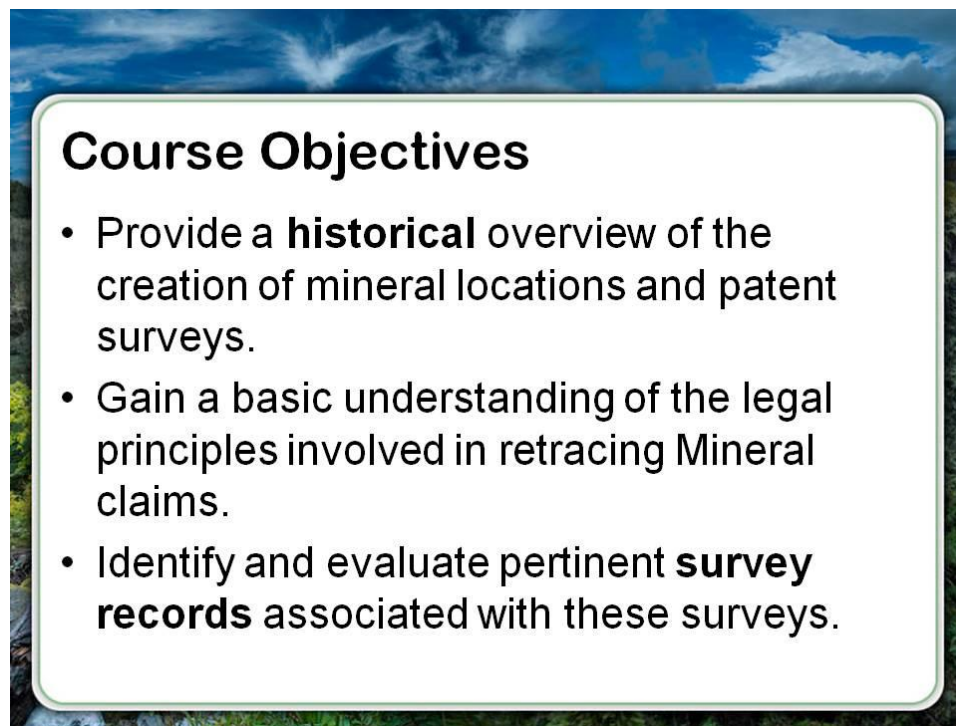
Those of you who are CFedS, if its Indian or trust land, well then it's a federal interest because of the trust responsibility's that the U.S. government has to the various tribes. The rules and principles are exactly the same if we are working on private land. Private against private, just a

bunch of mining claims up against each other, and they are owned by one or more people, it doesn't really change that much. So that is kind of our overall goal.

## ***Objectives***

Let us look at our objectives. We will provide as always a historical overview of the creation of mineral locations and patent surveys. Get a basic understanding of legal principles involved in retracing mineral claims. Identify and evaluate some of the pertinent survey records associated with these surveys.

Think about it, you have the thirteen original colonies, getting them to seed back the government their holdings west of the mountains, west of the Appalachians. Here is all this vast land out there and of course, as you know that is when Jefferson and those people got together and did their public lands things in 1885.



**Course Objectives**

- Provide a **historical** overview of the creation of mineral locations and patent surveys.
- Gain a basic understanding of the legal principles involved in retracing Mineral claims.
- Identify and evaluate pertinent **survey records** associated with these surveys.

## ***Mining Law***

This land was all seeded to the United States so it became what we call the public domain, federal land and it belonged to everybody. There was very little, even in the 1785 Land Ordinance Act there was some mentions to the surveyors, that they should identify any mineral deposits that they find, salt licks, obvious things that they find on the surface of the ground, they were supposed to note those things in their survey notes.

It was kind of reconnaissance not just to lay out the section lines and recon the area, not just topo it. But you had to get enough information and get an idea what it is like, what kind of timber, soil and minerals; and various other related things that were of use to the nations and used to be extracted to earn income or whatever.

So when we look back in history, we see that prior to the public domain being created, there was not really much about mining activity but we need to realize that historically there was mining activity on the public domain. It was just chaos.

They did whatever they wanted and that was from 1785 to 1866 for almost 100 years. In 1866, a mining law was passed; it was very limited in what it did. It gave some general guidelines as to mining and it provided some general rules for the mining districts to operate under.

## Synopsis of Mining Law

- Mining activity on the public domain from 1785 to 1866.
- The 1866 Mining Law.
- Mining Districts establish local rules.
- The 1872 Mining Law (still the basis of all we do today, as amended).
- State Laws on mining also applicable.
- Effect of FLPMA.

So in every mining area, every valley, canyon, or mountain side the local miners have set up their own mining district and they have established their own local rules, and you can imagine the chaos with that. This was on federal land. But these mining districts there were people running scams to benefit themselves. You would be in one valley and you could have a claim up to a million acres then you could only go up to five acres. It was just total chaos and seen by Congress as these resources are things that the whole nation should benefit from.

And people should be able to go out there, find these ores and veins of minerals and not just use them to become a wealthy person but to tax on them and to provide jobs and make the nation stronger by having a vast mineral industry and whatever else goes along with that.

Congress passed a few years later the 1872 Mining Law and it is still the law today. It has been amended in little places here and there through the FLPMA Act. But I just might mention, we are filming this towards the end on 2007, we don't usually mention the time frame but I will just mention that to you, because in Congress right now is the first really serious attempt that has a chance to pass amending the 1872 Mining Law, and greatly changing mining activity.



Of course the typical battle is in Congress, the mining interest. Some are totally opposed to it. They want to put together royalties out of certain types of mining that have not had to pay royalties to before. So there are issues and however that turns out we might have to amend this part of the course. For now, the 1872 Mining Act is still in effect. Other than that fact it was slightly amended in a couple of other laws, it is still the basis of everything we do today. And even if they completely change the rules tomorrow in Congress, which they probably will not, and even if they did all of the mining activity up until today falls under the 1872 mining Act. We have to learn it no matter what, and if Congress changes things then fine.

There are state laws on mining also and they have the option through the 1872 Mining Law, they can control certain things about maximum size of claims, and how the claims were to be monumented. So federal law left some things up to the states to determine. We need to be reminded that in mining, laws are different even though they are on federal land. How things were done, basic differences, especially the size and monumentation, which of course is of interest to us as land surveyors.

## ***Types of Minerals***

There are three types of minerals on federal lands. We have leasable, saleable, and locatable. Notice what is involved here.

**Leasable** is oil, gas and coal. The government will issue a lease they will pay for the lease and to go out and experiment or not experiment but explore.

If they find some, they can start producing, then the government collects a royalty and that's the way that is with leasable.

**Saleable** are things the government sells or gives you a permit. Common varieties are like sand and gravel. Just get a permit to dig that stuff up and pay by the ton or whatever. The government is earning money from that too. So leasable and saleable are money generators for the federal government. However, **locatable**



### **Types of Minerals**

- Law provides for 3 basic types of mineral operations on federal lands:
  - Leaseable (oil/gas/coal)
  - Saleable under permits (common varieties, gravel ,etc.)
  - Locatable (most others)
- 1872 Act pertains *only* to locatable
- Other two covered by regulations only

which is almost everything else that is not listed there, does not generate money for the government other than indirectly and that is what we are going to be speaking about.

The 1872 Act pertains only to locatable minerals. The other two, leasable and saleable, are covered by a myriad collection of regulations. Usually when you hear about the Energy Act of 2007 or whenever the last one was passed, Congress was dealing with leasable, the big money makers, oil, gas and coal.

Saleable is more of a local thing that you know is nothing special, it didn't qualify for location, location meaning you could actually identify it, and get a permanent, or not permanent but a potentially permanent right to that mineral. So locatable are the ones you can go out and locate, and are what the 1872 Mining Act references.

## ***What is Discovery?***

I want to talk about the discovery of valuable mineral on the ground and what that means. Because that is a key part, of what goes on and you will see on many old mineral surveys and plats the word discovery referring to something. Federal law does not describe what constitutes a valuable mineral deposit. So think about this, case law since then, a lot of IBLA cases and many court cases have filled that gap with what is known as the prudent man rule.

And this is what that is in italics. *"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 that the requirements of the*

*statutes have been met."* So when we come to locatable minerals and some miner or prospector is out there and comes across something in the geology that makes them think there is a possibility there is something out there they can stake a claim.

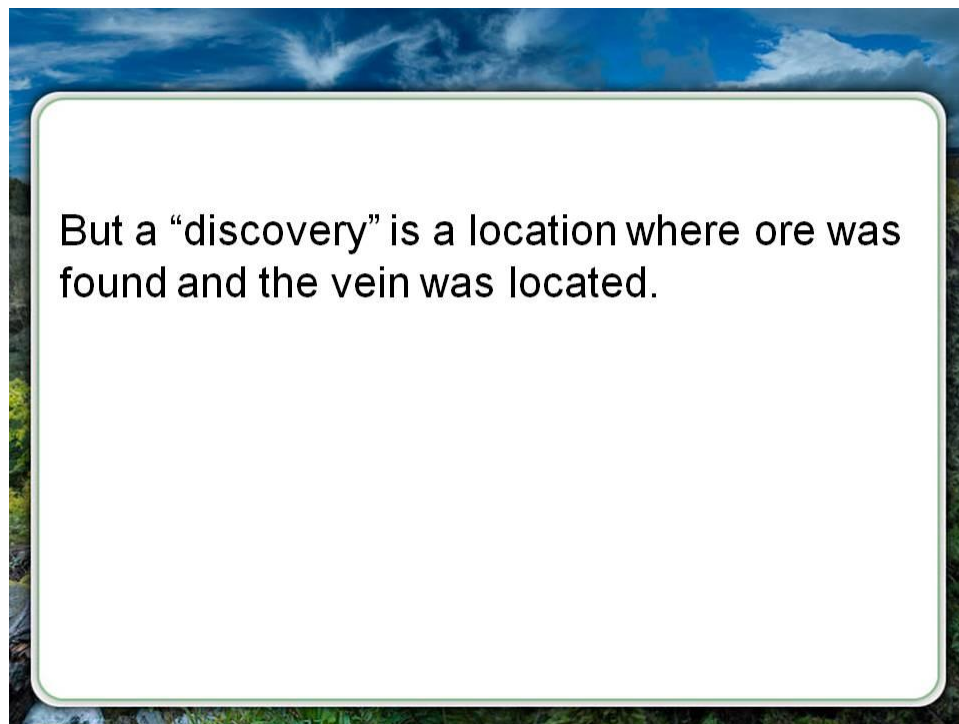
## **What is Discovery?**

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."*

They can stake a claim on the federal land, some states allow you to stake claims under different rules on state owned land. But we are not going there in this course. On federal lands, you could stake a claim and that gives you an opportunity for a set period to discover minerals.

If you make a discovery then your claim has the potential to being valid. It does not mean it has to go to patent. It just means it is a valuable mine. This is really loose, that's why we have a lot of mining claims out there that you look at and you wonder how in the world, what prudent man found this? What did they find here?

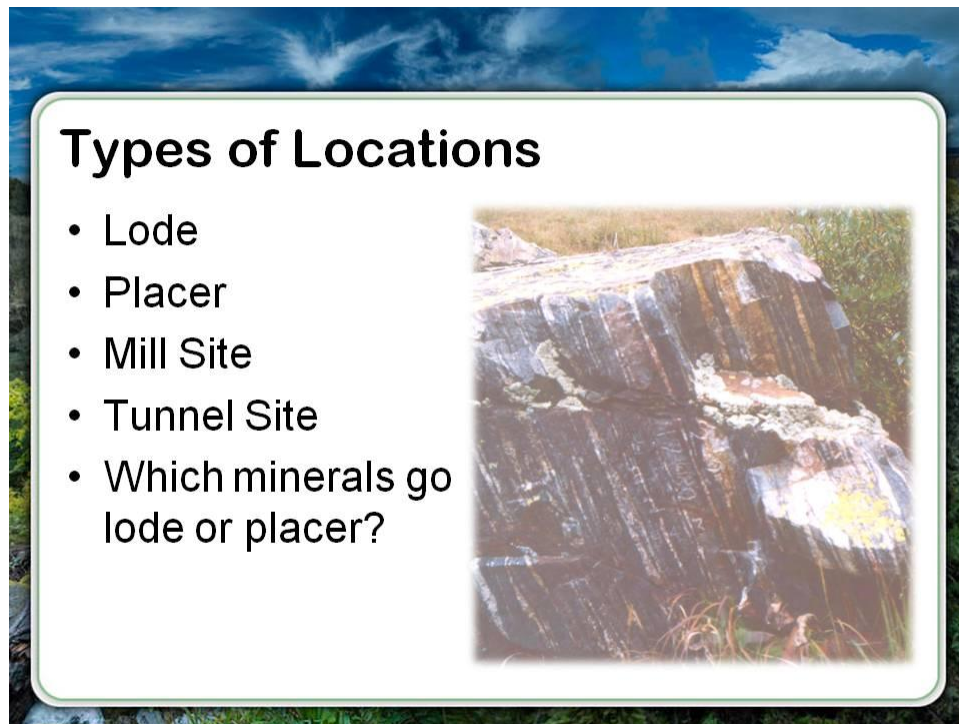
Who knows what was going on or how short the government was on people back in the late 1800 has to go out and validate these things. My point is that there is a term that we use called discovery and its talking about the discovery of a locatable mineral. Let us understand when we talk about discovery from a survey point of view, is a location where ore was found and the vein was located.



That is important because with locatable minerals you have three different categories. We are going to look at those in just a second. The three types of locations that can be made and a discovery is the identification of where the vein is located. You will see here in a second that the discovery does not apply in some locations.

## ***Types of Locations***

Here are the four types of locations. First, we have lode. Lode is where the mineral is found in place or in other words a vein. So with lode claims you will usually see a discovery, you will see a discovery point. It might be shaft, it may be a tunnel or just a discovery cut which means they just cut into the earth, found the vein in there, and based their claim on that.



So a **lode** claim is a mineral or ore that is found in its original location. That is the general rule with lodes.

**Placer** is a second type of claims those are big especially back in 1849 Sutters Mill, all that sort of stuff in the Sacramento area.

Placer lines had to do with water, not necessarily water. But a placer is the location where you found ore, but it is not at its original location, it has washed down from somewhere else. So most placer claims especially the old ones were in water ways or gulches because that is you know the ore was starting to be washed away up at the mountains from the veins, which would have been a lode claim.

It was washing down into the creek and is washed down over the century that is what we call a placer claim. Placers then therefore are where the ore is not in its original location but has been transported and it technically still in the process of transporting. When you have a miner out doing, what you call a gold panning, that is placer. Even though there may not be any natural water there and he has to add water from his canteen to get it.

What he is doing is sorting the gravel and dirt that is in the area that had transported from somewhere else, because he is trying to get rid of all the other materials but to have the color, if it's gold. Have the color show in there when he is panning. Placer operations in many places in the west used, hydraulic pumps to blast away the mountainsides. They have created the devices that are on rafts or actually, on boats or from the side that could steam shovel up the dirt and rocks out of a creek. And run it through sieves, but all of that is a placer operation.

Lode operations are an open pit mine or an underground mine. Whereas placer operations are dealing with the surface and minerals that have transported from somewhere else. There are other locations that could be made the mill site is one that 1872 Act allowed for which did not need to have any minerals on it at all.

A **mill site** was simply a provision in the law that said you could have up to five acres basically any shape and as many as you wanted that you could claim, that didn't have any minerals on it. You could just claim it to build your mill on so you could mill and at least initially process the ore that you are finding. Then transport it out or whatever, so the mill site was another type of location that could be made but did not require discovery.

By the way, this comes up sometimes if someone got a mill site just to build a mill but they found minerals on it do they get to keep those minerals. The idea is that if you had minerals you staked either a lode claim or a placer claim and if you staked a mill site claim that was to protect you from someone coming in and making a claim that could destroy your mill. In other words, people may not be as willing to invest in construction and development of the mill site unless they had exclusive rights to the land. They do not own it yet its still federal land.

Now there is one other type of location allowed and that was the **tunnel site**. That was to allow you to, come in from the side and get to your vein from underground and you had an exclusive right to that tunnel.

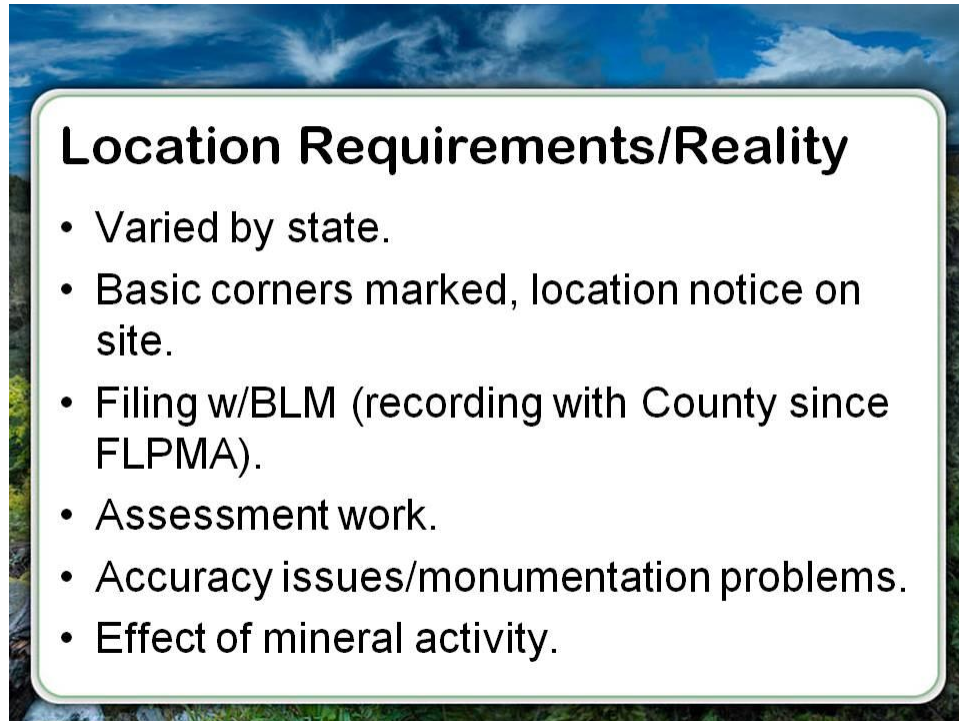
So the bottom-line with a tunnel site, you had exclusive use, and no one could do anything to damper your ability to use the tunnel. Let me explain that a little bit, sometimes because of the geology or whatever, the vein may be best accessed from the side, rather than just following the vein down it may be best to tunnel in from the side to get to that vein.

You could stake a claim on your tunnel site here and someone could not come in and destroy that, thereby stopping your access to your vein. Of those four lodes, placer, mill site and tunnel site, let us understand that the first three could go to patent. Tunnel sites could never go to patent.



## ***Location Requirements***

What were the requirements for them to do their location? Let us just talk about that, these varied a little bit by state, but the basic rules are when you did a location survey when we call it a location survey we are talking about is the miner or the prospector or the engineer, or he might hire a surveyor.



It did not have to be anybody licensed. It could be just who marked their corners. They had to put a location notice on the site which gave a legal description of the parcel, and identified some information, what section, township, and range if that existed, that is was located in and tied it into, and who you were, and what the date and time was that you were staking your claim. Those were the basics.

You had to file this with the General Land Office and BLM. Since the FLPMA Act in 1976, you had to record this and any subsequent things that you did with the claim with the county court house as well. So these are the processes that they were going through and then they had to do assessment work.

See you did not own the land you just had to right to mine it and extract its wealth. They had assessment work and that term, means they had to put so many dollars back then it was one hundred a year that they had to put onto the claim I think it became five hundred later. I do not even remember exactly, we will check with Jack Kesler who will be teaching a little bit later in this class. You know the assessment work, bottom line, it really did not matter what the dollar amount is. If they went out and did their assessment work, they could keep the claim for another year or whatever the interim.

Still to this day, I mean I've been out surveying up in Colorado, inside wildernesses, way up in 13,000 feet elevation here you are surveying and here comes some old miner, not always old but usually old and still got a sparkle in their eye waiting for the mother load. They'll come up to some mining claim they have way up there at 13,000 feet and you can't even get to it except two or three months of the year because of the snow. He comes and does his assessment work. He wants to keep that claim and he keeps digging on it every year. Many people do it for hobbies actually.

The government, that is one of the changes in the law gets these people off the federal land digging for hobbies or make them pay a lot more. I don't know what the ultimate plan is, but you know that's what assessment work was, so you'll find information recorded at the court house and in the BLM files of these guys doing their assessment work. That's how we know, if we go back to look at a mining claim to see if it's still valid as far as mineral rights are concerned. We will look at it, and see if he did his assessment work each year and determine what his assessment was and did it meet what the minimum was at the time.

Let's understand though for that actual location survey by the miner or whoever he or she hired to do, it did not have to be super accurate, the monumentation was actually, you know depending on state law, 4 X 4 wood posts and a pile of rocks. On the other hand, 2 X 2 wood posts in some states. They used to put, and this is fun when you find the old mining claims, and they put their location notice that has the description and who they are and what date. They used to put those in the old tobacco tins. I have found many of those down in the pile of rocks.

You can find it and still read it; many times, they are still readable; unless it got real wet or damaged somehow. Many times these are not monumented to last forever those are some of the monumentation problems. They blow over, the wind or the snow or whatever. In some states, they were allowed to put out PVC pipe in the ground sticking up 10 feet. So you will see that, here is a 6-inch PVC pipe sticking out there, and you go look at it and it may have something written on it or stamped on it or carved on it. Or you might look through the pile of rocks or whatever.

Back in the early 70's when I was staking claims for a company we put the locations notices we just filled them out there on the spot, rolled them up and stuffed them in a pill bottle, you know a prescription bottle, plastic one and just nailed it to the wood post. This was kind of a quick and dirty survey, they did not know how to survey they did not know how to measure very well most of the time, but they were staking their claim.

That is what we call the location survey, and that is when the miner first located himself or herself on the ground out there and that is the minute, the date, that their rights began of exclusive exploration of minerals and extraction of minerals on that piece of land. So of course one of the reality things that I talk about here with these activities, is they do this Mickey Mouse little survey and that isn't a real survey, it doesn't meet any accuracy standards at all, and they do it and they put these little Mickey Mouse monuments up and they start mining.

One of the first things you start destroying is the evidence of your location survey, and this makes it very difficult. Moreover, there are times that when private surveyors or BLM surveyors are out doing work on mineralized areas and were trying to find some of the location evidence, and boy it can be very sparse. Even worse than the patent evidence. So those are some of the things about the location and the process that was that they went through.

Now are going to have more about that and the process that one would go through to adjust things and what was going on. And just a little later, we have Jack Kesler who is a long time friend of mine and he is a U.S. Mineral Surveyor as well as a licensed land surveyor. He is based up in Kingman, Arizona. We will actually be taking you to the field with Jack to have him discuss some of these things about how they adjusted their claims and that sort of thing. So I am just giving an overview so you will know what Jack is talking about and what goes on.

Bottom line there is millions of these claims in federal lands. Some are still valid and some are not valid. But you have to go and challenge and we go through the records to find out if it is valid or not, I am talking about unpatented claims they are still federal land, but some individual has the right to extract and explore for minerals. Now these claims they are an outstanding right. The federal government cannot just go in and say you do not get to have it anymore. We would have to catch them not doing their assessment work or failing to do something else that they may have been required to do.

We have to, or for some reason their claim goes invalid and there are millions of those out there. I know that when I was in the Forest Service and it was a big priority in the Forest Service and still is to this day is acquiring the rights in other words, buying them from these miners inside wilderness areas. It is a wilderness area and of course the Sierra Club is, oh its wonderful wilderness, nothing happens there that can hurt it.

The Wilderness Act specifically excludes mineral activity on mining claims that predated that becoming a wilderness. We get new wilderness bills every year, so you can understand that somebody may have staked their claim a year ago. Congress just made it a wilderness yesterday, and that person can continue to work his claim inside the wilderness, because it is a right that he has and Congress cannot take that right away. Although they have tried a few times. We have this activity and that is why many federal agencies especially the Forest Service, Park Service, have either wilderness areas or areas that they want to have appeared to be wilderness, they may not be legally wilderness to get rid of mining activity, but it still goes on inside these areas. As long as these people have rights. There are all kinds of issues as you can imagine with access and transportation in and out of it if it is in a wilderness.

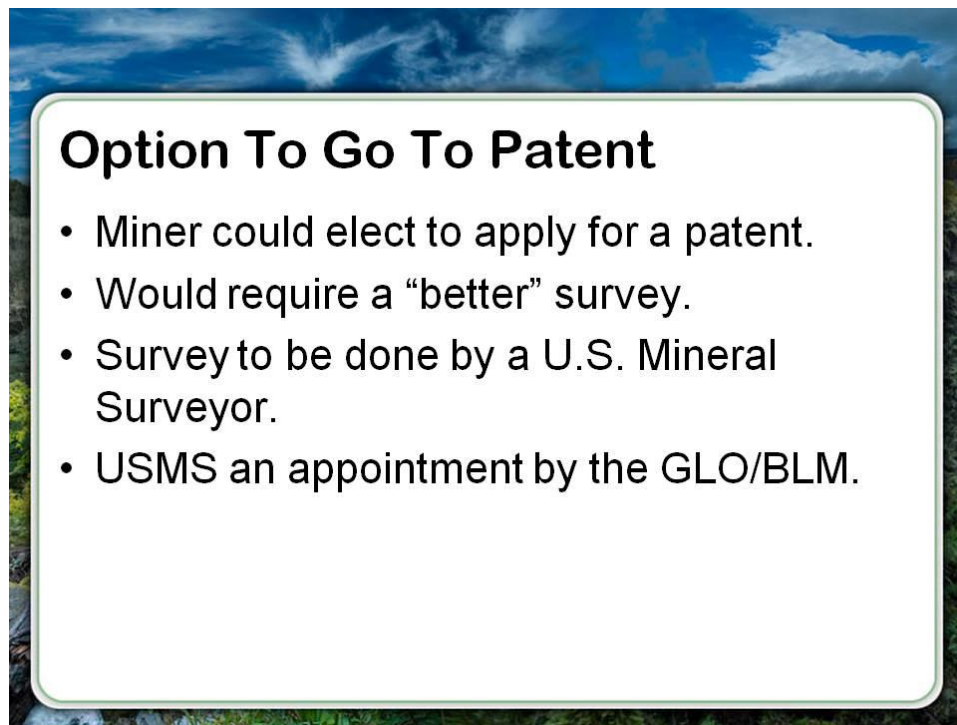
But my point is this; the government tries to buy up all those rights hundreds of claims at a time especially if it is by one person, corporation or group. Buy it up so what they are doing is solidifying that the government had all the rights inside the wilderness, when in fact the government does not.

## ***Option to go to Patent***

What we are interested in is the option to go to patent. A miner could elect to apply for a patent, and as you know, a patent is the equivalent to a quick-claim deed from the federal government. Our deed begins chain of title outside federal interest. The miner could elect to do that. There are reasons for that, under the original law you could buy it for a \$1.25 an acre. So he could actually buy the land, get a loan on the land; he can build structures that are permanent that do not have anything to do with mining so there is quite a bit of motivation for them.

I am sure that in Congress' mind in 1872, we have to do all we can to encourage and mine and live in these tough situations. So let us let them buy the land for cheap. It went up to \$2.50 an acre and people were still buying that land. For the most part, I would say the vast majority of claims never went to patent. What you and I deal with so much these days is the patent to claim, there are still tens of thousands of them in each of the western states. They are private land.

In some places, they are the most primo land here in Arizona. If you have a 20 acre mining claim in the mountains up near Prescott, that's the kind of primo thing if you're a doctor or a lawyer down here in Phoenix. Work down here in the big city and you slave away and its 114 degrees then you get away for the weekend and go up to your 20 acres to your mining claim up in the mountains inside the national forest, and you are surrounded by federal land.



**Option To Go To Patent**

- Miner could elect to apply for a patent.
- Would require a “better” survey.
- Survey to be done by a U.S. Mineral Surveyor.
- USMS an appointment by the GLO/BLM.

Those are the real primo properties. So these lands that some people might have said, oh who would ever want that, why did you pay \$1.25 an acre, it is on this 40 percent slope up there and cannot even get to it. Well now, those primo lands are where the majority of the town of Aspen is sitting on those mining claims. It is \$5 million dollars an acre regardless of how steep it is. The

steeper the better, then the architect gets to be creative, with the condominiums that are going to go up.

So you know that is very common we have these huge mineral complexes that are where there are just hundreds and hundreds of claims overlapping each other going in different directions and we have a lot of that in the west national forest land and BLM land and believe it or not even inside some national parks and monuments. The miner could elect to go for patent, and if he did, that is where we get all these in holdings inside federal land, but its private land that is in there. So they could elect for whatever reasons to go to patent but a patent was going to require a much better survey it could not be based on the location survey.

The better survey is what we call the patent survey. That survey had to be done by U.S. Mineral Surveyor, and to this day, that is still true. The survey for patent would not be done by the GLO or the BLM; it would be done by a U.S. Mineral Surveyor. The mineral surveyors are not licensed people, they are appointed by the GLO and now the BLM. In the BLM we still have I forget, they are winnowing out because a lot of them were older, and there is not mineral activity. In fact, Congress has had a moratorium, I do not know maybe 10 or 12 years, it was the Clinton administration that put a moratorium on patenting mining claims.

There is a whole bunch of claims that were about to go to patent but are sitting in limbo because of this action by Congress. My point being the mineral surveyors there is not a lot of them and they have not been kept very busy, and it is not necessarily worth their time. We are down in the United States to about 50 or 60 Mineral Surveyors at least in the time that I am speaking here. The mineral survey appointment is something that BLM does not offer, you have to pass a test, and you have to do some things to do that. It is not offered on a regular basis, it is basically offered only when we really needed someone. If Congressman Ray Hall and others have it their way, then we will not be patenting any more mining claims. So the U.S. Mineral Surveyor will be about done, so who knows where that will go. We will see where the law and the changes in the law will take us. I am saying that because anytime anybody hears, U.S. Mineral Surveyor, they say, well I want to be one of those too; well it may not be worth the effort. It might look good behind your name, USMS, if you are a surveyor that carries some weight. It is an appointment not a license and it has only done on an as needed basis.

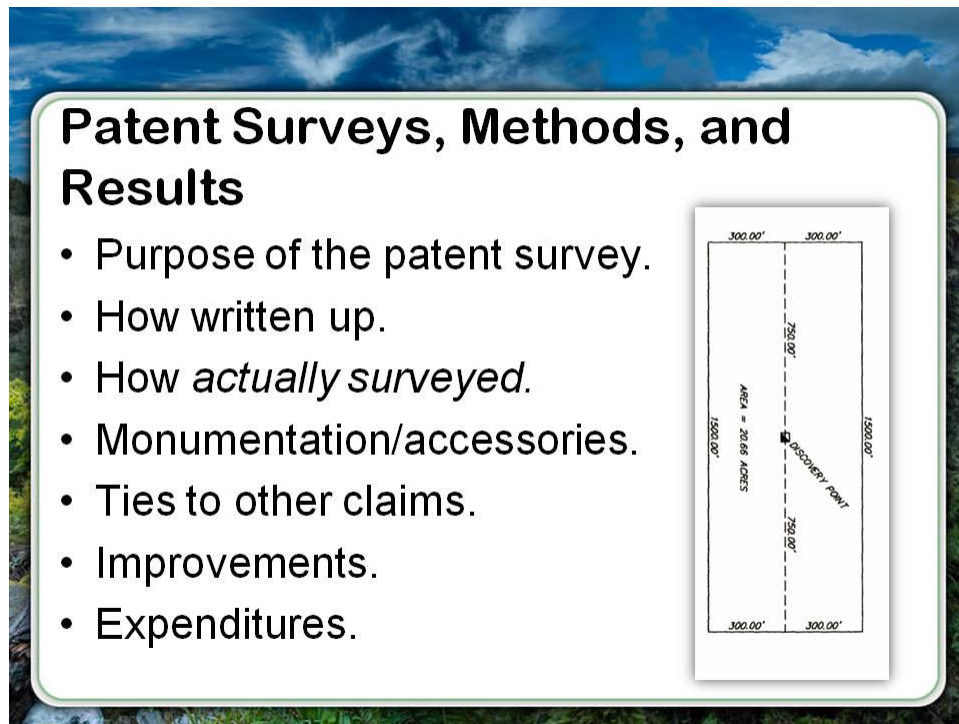
It's been a quite a while since BLM has gone out and opened up the roster of what we say to taking additional U.S. Mineral Surveyor, test or the solar. I do not know if we have changed that yet because we do not do solar anymore. But the test has always been required in the past. Here is our point, if you were a miner, you went out and staked your claim, and you have been doing your thing. You found some minerals and now decide to go for a patent, you the miner have to go hire a surveyor not a registered surveyor, or an engineer, but a U.S. Mineral Surveyor, who may be registered as a land surveyor in his state or not.

They cannot survey anything else but they are appointed by the BLM as a Mineral Surveyor and they can do a patent survey. They go out and they do the patent survey and let us take a look at it.



## Patent Surveys, Methods and Results

The whole purpose of the patent survey is to identify on the ground specific places at a much higher standard. To monument it put in the record, have plats and notes, which we did not have in the location survey.



We need to understand that they would go out and as you can see there is a discovery point and that is where he found the vein. That is the actual place where he found the vein. He discovered the vein was running in this direction, so he lined his claim up, this is in a state that allowed 1500 X 600 which is the maximum size under federal law anyway. Some states are half that, but he could have 1500 X 600 feet.

If you want to maximize that, you are going to run the 1500 feet along the vein. So you have as much of the vein as possible and go 300 feet out each direction, so you get maximum ability to dig into the vein and go after it. What you will find when they did the survey, they will actually say I began at the discovery or he ties at the discovery, or maybe the corner one, then he runs down around here and sets corner 2, 3, and 4 does all this.

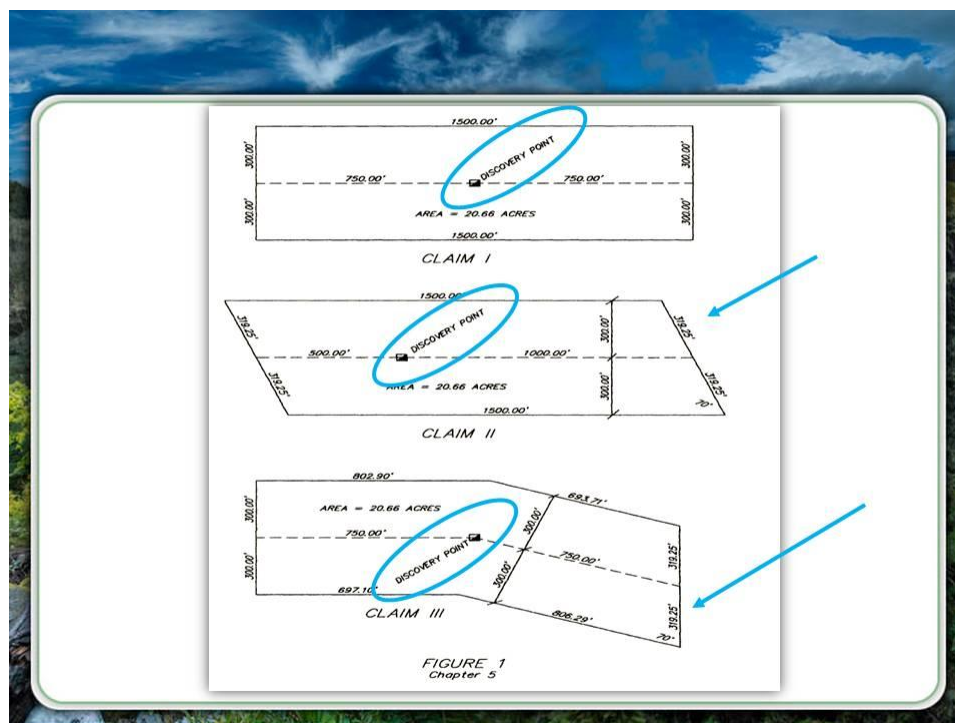
What we will see here as we go through this is, many times the old mineral surveyors did not exactly do it that way, and they actually surveyed it a little differently. That is really important to us as we begin to discuss retracement and the restoration of lost corners and we find out some of their shortcuts. We began realize why certain things are different about mining claims in the retracement process. Why you really need to be careful proportioning claims and lost claim corners.

In this patent survey, it is just like a regular GLO survey in the public land system, they had to go out and do good measurements all in feet, the one unique thing with minerals. That is because the reason they are done in feet is the law that Congress passed was 1500 feet by 600 feet, so they are all measured in feet. Rather than chains like in public lands. They went out and they had to set monuments, good monuments, wood posts, rocks, stone corners, nowadays brass or aluminum caps.

Whatever they had to set good monuments and take bearing trees or bearing objects to them. They had to have topo calls, they had many other things they had to tie in the improvements that were on the land. One of the things that a mineral surveyor was required to do was verify for the GLO and BLM that he had \$500 dollars worth of permanent improvements on the property to get a patent. That is in addition to just your assessment work. That could just be digging, rented a dozer for a few hours that ran up my assessment cost, but the \$500 dollars was what was required to be on the claim.

That was there such as the buildings, structures, mining equipment, that is sort of thing. So the mineral surveyor had to do the improvement and show all the improvements and location, as well as validate the expenditures. So when you read the set of notes from the mining claims for a patent survey, you will see the mineral surveyor will have in the back, a list of all the expenditures and improvements, it always comes out \$500 bucks. What he is doing is he is showing this person has his \$500 dollars. That is what is going on. We are going to look at a few more things here about this process and then we will go talk to Jack.

Let me just show you three mining claims here and just to point out a couple of things. The different ways these claims, it is very important that the end lines be parallel to each other, so you notice that with very few exceptions that they attempted to do.



Now the reason for that is because this has to do with something we call extra-lateral rights. Let me explain that just for a moment. It is not something you have to understand really well except to know that is the reason for the parallel end lines and it will help you when you are doing retracement to realize some of the issues with restorations of lost corners, the goal for that is. You see when you get a mining claim on the surface of the ground. You are allowed, we called extra-lateral rights, you are allowed to follow that vein down underground no matter where it goes, what shape, you are allowed to follow that.

On the surface in these examples, you have 1500 feet. You have 1500 feet of that vein that you can follow down in to the ground all the way to china, just keep following that. But you are limited only by your end lines.

That is why you want the end lines to be parallel. If the end lines are like this not parallel as you go down in the ground you will eventually get the extension of where the end lines meet, and have to stop following the vein. Of course, the other could have gone the other way but you did not know you could have dug up enough to know the dip in the vein was going down and around. So keeping those end lines always meant you have 1500 feet if that is the length of your claim. You always had 1500 feet of the vein. Whereas having the sidelines not parallel meant that eventually, you had the potential to run out.

In order to protect extra-lateral rights with very few exceptions they made the end lines parallel. So that is what you are seeing in these diagrams here in all three of them they made them parallel. I am just showing you that the thing could be a parallelogram like this one, well this one is a parallelogram the first is a rectangle. 1500 feet X 600 feet. Now of course these distances here are longer than 300 feet on each side because it is at an angle but the law is talking about the total distance across here. Same thing down here. Notice we have a bearing brake that looks like it is halfway but maybe not. You can have bearing brakes that is fine if he found that the lode turned. Notice that on this one, you might not be able to read it clearly but this is the discovery point right here.

He may have discovered it somewhere else but he dug along here and got to a point where the vein turned and he realized that look, my vein actually has this 20 degree bend in it and I want to follow it as far as I can each way. So he has a bearing brake in it. Kept his end lines parallel but still did not exceed his 1500 X 600 feet. What we have is the kinds of layout the discovery points and the lode lines or vein itself are oriented. These claims over time and the rules were especially when they were important going to go to patent. The principles of parallelograms and end lines were important even with the location survey. Not that they got them very good at times, but that was not the plan.

## ***Anatomy of a Mine (Terminology)***

Now I want to give you a few terms here that you will hear used by me or Mr. Kesler and I want to explain those a little bit called the Anatomy of a Mine and talk about some of this terminology.

An **adit** is actually a tunnel that goes into the hillside and does not go out the other end. You will see some people use the term adit to refer to shafts but they are not. Now if you got a tunnel that is going in at 45 degrees into the ground, I do not know if that is an adit or a shaft. Whatever they called it. See the thing is when you and I go out to retrace one of these claims, the corner monuments themselves may have all been destroyed by the mining activity or just Mother Nature. The notes especially in a patent survey have got all the improvements tied down.

So you may go to the back page of the notes where it lists all the improvements and where they are tied and you may see where corner #2 used to be. One hundred eighty feet at this bearing kind of like a bearing tree or bearing object was an adit so what do you look for and that is why we are going through these terms.

So an adit is some kind of opening into the mountain, Generally they are supposed to be horizontal and at what point they turn into a shaft which is straight down it doesn't matter.

The **apex** is the highest point of something and in mining that is referring to the highest point in the vein. These terms are listed in alphabetical order only.

A **collar** is that wooden structure if you will, could be concrete too that surrounds a shaft. They build a collar around the shaft to hold rocks from falling down inside and maybe there is equipment mounted on it to run elevators or something up and down. But when you see these old mines talking about a collar usually that was woodwork at the top of the shaft. Sometimes you find that evidence that helps you know that it is a collar and not at another shaft.

**Crossing closing corners (CCC)** we will talk about those later. But CCC is a term used in the 1973 BLM Manual and its talking about where junior and senior lines intersect each other. They set a special kind of closing corner we call it a crossing closing corner. That is what CCC is and you will see those on some plats.

A **cut** is any kind of excavation into the surface of the earth. It does not have to be very deep. I have seen plenty of discovery cuts that were done with just shovels. Maybe six by four by five feet, knee deep that sort of thing or others that were done with a D9.

A **dip** is the angle at which the vein leaves the surface of the earth. So if angular relationship for the surface of the earth down, you could have a 40 degree dip that means it is running at 40 degrees.

A **drift** is a type of adit that comes off another adit or it can come off a shaft. Let us say you have shaft going straight down into the ground then there is another opening or exploration that goes off that. That is actually called a drift. It does not go out the other side. An adit is one that technically comes out the side but does not come out the other side of the mountain or it would be a tunnel if it went all the way through. A drift is basically a side adit that never gets to the surface of the ground. Now you will find slight deviations of the meaning of these words as you go to different localities and all that.

We learned a lot about many things about how the name shaft and they say shaft here. If just did not matter if it was an adit, drift, shaft, tunnel they sometimes just called them all shafts. That is what the mineral surveyor did at the time. The point is we are going to use that stuff for survey evidence potentially, so we want to have some idea what it is we are looking for.

An **end center** folks is an extra monumented position that was required only in some states. You may still find it, let me just explain what they are. Normally, a minimum mining claim would be four corners right? If the mineral surveyor was to set the mid points where the vein line or the lode lines intersected his sidelines or his end lines, let us say like here and here, if he was to set a monument here or there. Those are called end centers because they are on the end lines at the center. Usually they may not be at the center but they are where the lode line intersects this.

Sometime you get claims that are a different size or distance on one side. But still that end center is still going to be that. So what you can see is that you have four basic corners of every mining claim. But if you set the end centers you have six corners. Some states require side centers. In Nevada, they required side centers so then you get points here at the midpoint of these claims.

The point is this when you're out there doing the survey and you're looking for corners and evidence in there you read the notes carefully and your familiar with what laws exist in your area and then you realize that man there is a lot of evidence out there that I could be looking for. So besides just the four corners, and that is my point, and so that is what an end center is. I have already described for you **extra-lateral rights**.

A **flume** is some kind of usually wooden device that narrows water down and then expands it out, slows it down. What they are doing is extracting. This is usually used in a placer operation.

A **hiatus/overlaps**, we have hiatus/overlaps in all kinds of surveys. I gave you a little bit of background on those in the general metes and bounds issues course module that you took earlier in this course. The point is that there are hiatus/overlaps in minerals we will talk about them towards the end of this module. But I am defining them now and that is you have little places where the mining claims everybody thought they touched, but in fact they are not touching or overlapping on top of each other.

So with minerals you have lots of hiatuses and overlaps and other mineral fractions and gores, and we will talk about those things and how we deal with it.

Another term, **shaft**, I have already mentioned it several times, that is generally a vertical opening into the ground. I mentioned **side centers** to you already, and we looked at those drawings. I mentioned **tunnels** to you, and hey I have seen an awful lot of adits called tunnels but in the technical sense a tunnel has an opening on both ends, but do not get too picky with those people.

We have **USLM's (United States Location Monuments)** and **USMM's (United States Mineral Monument)** and I want to talk about those in a second. Those are special monuments usually not on the claim that your survey was tied to. The **vein** of ore we are all familiar with. It is spelled this way not vain. People get lots of our gold out of their vein and then they become



vain. But that's misuse of the different word. So those are just a few basic terms there. There are many other things, and you know I put that in there not just so we would learn those terms and those only.

But to make you aware that there is terminology that is peculiar to mining. It can differ from one area to another, but you need to know what they are talking about, because sometimes and this is my personal experience, I have retraced quite a few mining claims, sometimes the only evidence left is this stuff. The corners, the bearing trees they are all gone, or they are so hard to find that you are not going to find them until you start finding this stuff and piecing it together then maybe start popping a couple corners.

In some cases, base your whole survey off them, but this information is not just casually just thrown out topo. In many cases, you will get a specific bearing and distance from a corner of your claim to these items, or to a cabin. I did not mention that, but everyone should know what a cabin is. To specific things on the ground and you go out on the ground and your mining claim corners have been destroyed by the mining activity.

There is that cabin still sitting there, there is that shaft, there is an adit, he gave me bearing, and distances to this corner I cannot find from those, so I am going to use that to put those back. It is funny because when you think about the nature of mining it is as if the very nature of mining destroys survey evidence and that is somewhat true. I have personally found that although they are not very precisely done in the sense of real accurate measurements and that sort of thing, mineral claims often have more evidence than you could possibly imagine. Because as we will see in the retracement of mineral claim you are not only looking for the all of this stuff not just the corner evidence you're looking for all of these improvements and things. Many times you have dozens and dozens of other claims that have come before or after yours that can help you piece that together.

It is actually a tremendous amount of information that you get, and I guess there is many possibilities for evidence discovery when you are retracing mineral claims. A lot of it comes from other claims and from the improvement not from the direct corners that your surveyor set because sometimes they have just been wiped out or they are buried under 50 feet of fill that came out of the mine the tailings piled out. Those are things to consider and that is why we are going through these things historically and terminology wise. Because we want to understand it and be able to apply it to what it is we find what the notes do tell us and what we are about to piece together.

## ***Conclusion***

I am going to end this lecture here and we will pick it up with another one. We will talk about some more of the evidence that is left out especially the USLM, the records that they produce, and get an idea about some of that stuff. Then we will go over to the field with Jack.

# Mineral Survey Retracement

## ***Introduction***

Welcome back to the next lecture now on retracing mineral surveys. We are again covering various things that are related to the history, records and the process that they went through. Next we will speak to the U.S. Mineral Surveyor that we have available to us and he will be explaining some of those things and make reference to them and you will understand what he's talking about.



One of the last things that we did in the previous lecture was going through the verbiage and some terminology where we talked about how they lay out claims. Just imagine somewhere out in the middle of nowhere, some miner stakes a claim and it's going to go to patent so the mineral surveyor goes to stake it for patent and the rectangular system doesn't exist.

Now, obviously, these do not conform to the rectangular system. In most cases that is because they are tied to where the vein, placer, water, the course is that has the ore in it. Or the mill sites are just random 5-acre sites for you know construction and maintaining a mill operation. So they do not conform to the public lands but in many cases the public lands was not even there.

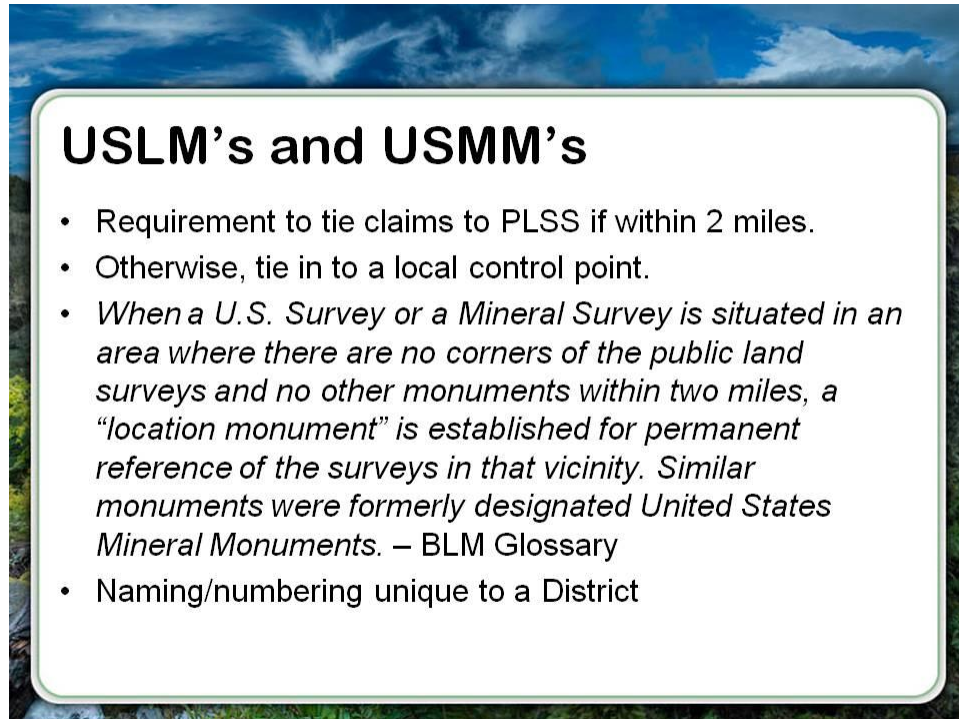
There are still places here in the United States, not just Alaska where they are doing original surveys. There are places here in the U.S. up in the real high country, in the Rockies, and in some other areas that are very inaccessible but the rectangular system was never spread out over there, there was no reason to. Those are a lot of times the mineralized areas so that's where these

folks would go and stake their claims and find something or claim they found something and dig on it and do their assessment work or whatever.

How do we know where that claim is? He can mark the four corners of it and some of those claims are under snow nine months a year. How do we relate them to other claims that are in the area or how do we relate them to the rest of the world. Until we had GIS, we had what we called paper GIS. Paper GIS was county assessor maps, BLM's master title plats, and even USGS quads. How do we know where these mines and patented claims or un-patented were located.

## ***USLM's and USMM's***

The rule, when the mineral surveyor went out and did the survey of the mining claims so this would be the patent survey in particular. He or she had to tie the patent into the public land survey system, as long as there was a corner for the public land system within two miles.



### **USLM's and USMM's**

- Requirement to tie claims to PLSS if within 2 miles.
- Otherwise, tie in to a local control point.
- *When a U.S. Survey or a Mineral Survey is situated in an area where there are no corners of the public land surveys and no other monuments within two miles, a "location monument" is established for permanent reference of the surveys in that vicinity. Similar monuments were formerly designated United States Mineral Monuments. – BLM Glossary*
- Naming/numbering unique to a District

If it was not, then they had to tie it to what we call a local control point. So let me give you a quote here on this slide from the BLM glossary. *"When a U.S. survey or a mineral survey is situated in an area, where there are no corners of the public land surveys and no other monuments within two miles, a location monument is established for permanent reference of the surveys in that vicinity. Similar monuments were formally designated United States Mineral Monuments."* That is the definition from the glossary; I added a note there at the bottom. The naming and the numbering of those mineral monuments or location monuments are unique to each mining district when it comes to mining.

They would go establish these points and monument them, then they would occupy them with the instruments and obtain as well as they can at the time, latitude and longitude. So what you had was an area of unsurveyed federal land and there was nothing to tie these in so we did not even know what township they were in, even unsurveyed townships. Did not even know where they were back in the 1880's. So, what they had to do is establish something with good lat and long on it, and then they would tie from there down to the point.

## Example USLM Tie

The diagram illustrates a USLM Tie between two parcels. A blue diamond at the top left is labeled "USLM No. 1". A dotted line extends from this diamond to an orange rectangle below it. Another dotted line extends from the same blue diamond to a yellow rectangle on the right. The background is a scenic view of a river and trees.

How do you suppose the longer ties were actually made?

Another claim might be done a few years later. They would survey the claim itself and then tie, as you can see all the way over to the LM. This gave the General Land Office a paper GIS

which gave them the ability to know the relationship of one claim to another. As you can imagine in the area it is very possible then that another claim came in and was sitting in here maybe, like this, and they would tie off to the LM and this is how the GLO would, or one of the methods, would compute whether there was a conflict.

Now if you are thinking, you will realize that could be many problems depending on the precision of the measurements that went up to the LM. In order to make a decision whether one claim was slightly encroaching on another when you're trying to an LM, some distance away and the ability of the surveyor to measure it and to correctly compute it. Then for the GLO to draft it because that is what they would do is put it on paper and see if it intersects. Well sometimes, those were not very precise.

In fact many times they were not very precise. So, let me ask you something and this is just kind of a practical thing as well as it gets to the reality of it with USLM's. If you had a tie from a claim to a short one like that one on the left, you know maybe it is just a couple pulls away of your chain. You turn an angle to it and you measure it but how do you suppose the longer ties were actually made like that one on the right that may be a half a mile away.

Sometimes you look at these things, the LM's up on a steep cliff top, mountaintop and there is a canyon between your claim and that LM, do you really think that that surveyor chained that? And if he did chain it, what do you think the precision is of that measurement? Given the fact that it is not, the instrumentation, the chaining, having to break chain or slope chain or whatever they did across the canyon and back up the mountain and all of that. The precision might fall apart there and that's one of the rules and we'll discuss it again later in this course but one of the rules is being very cautious about ties to USLM's that are more than 2 or 3 pulls of the chain away.

Now, what I have discovered and many others have too and there is some evidence to this and that is that they did not actually make those ties especially for a longer direction. What they did was compute them and that of course becomes a real problem because the precision that they had especially an angle turning. They had some real difficulties with that. Going back to the slide I will just illustrate what I know has been done on a number of occasions. Here we see this claim, with a tie as shown to USLM No.1, and so what that is implying is he measured this bearing and distance up to here to get that information.

However, many times what they did was at this point, they would turn an angle. They would turn the angle and then they would turn an angle from another point, say down here, and measure that bearing. So what he was doing, he would have a bearing going up here from that corner or bearings from the other corner, he knew his distance and angular relationship here, and so he would use trigonometry, triangulation in other words to compute where he was.

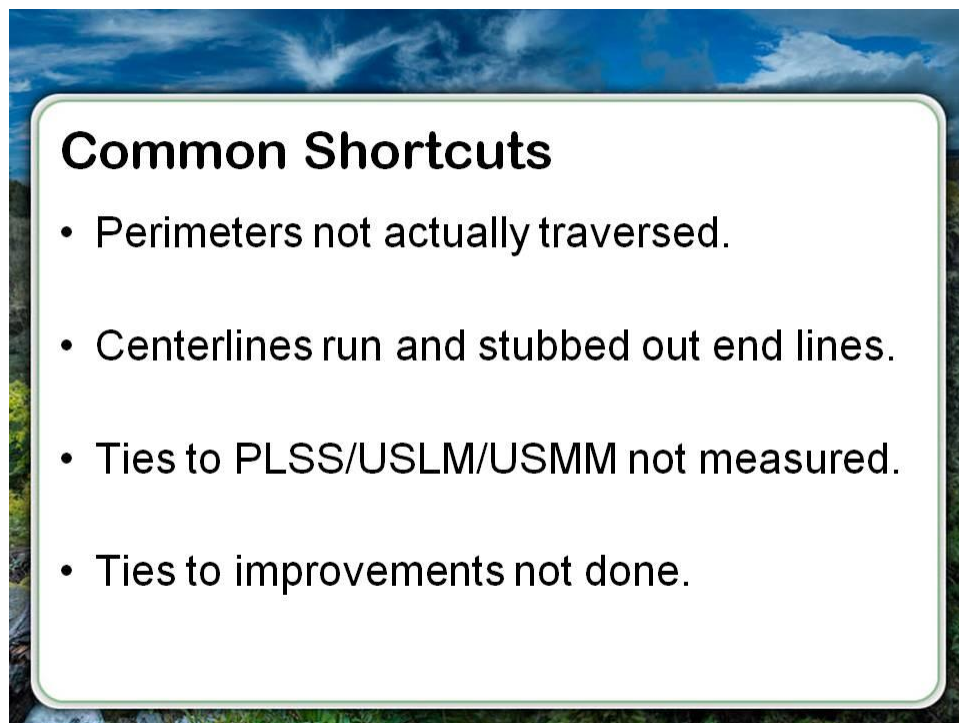
Now I have experienced twice now over the years, where the claim I was retracing, he showed the bearing and distance on this corner and just screwed up because he had actually measured this one and that was the one he computed but he had it drawn to the wrong corner. Of course that puts the claim way out of position. From where it is on the ground but it puts it way out of position from the reality of where the claim is on paper. You have to be careful, so I found this a



couple times but what is it? That is where he cheated, if you will, and falsified on how he tied it in, and he left evidence that he had done that. Because he put the wrong line on there, the bearing and distance worked quite well until the other corner if you re-computed what he had done. But that is how it has been mapped now, that is how it was shown on the paper GIS, that is how it is shown on the master title plat. So, what I have discovered is that most of those have been short cutted like that. At least put it on the correct corner when they drew up the notes and the plat.

## ***Common Shortcuts***

So that leads us to this slide about common short cuts that they took, and it is going to involve a number of things here.



First of all, you are going to find that many of these people never actually traversed the perimeter of the claim. In other words, rather than going around the 1500 by 600 and then 1500 and 600 and do the whole rectangle, they would go down the centerline of it and stub out. Or they would go down one side of it and stub out. Because many of these are in very rough and difficult country. I've got some records that I have found that were the mineral surveyors notes, where you find that they in fact were just traversing down they didn't even run down the vein line.

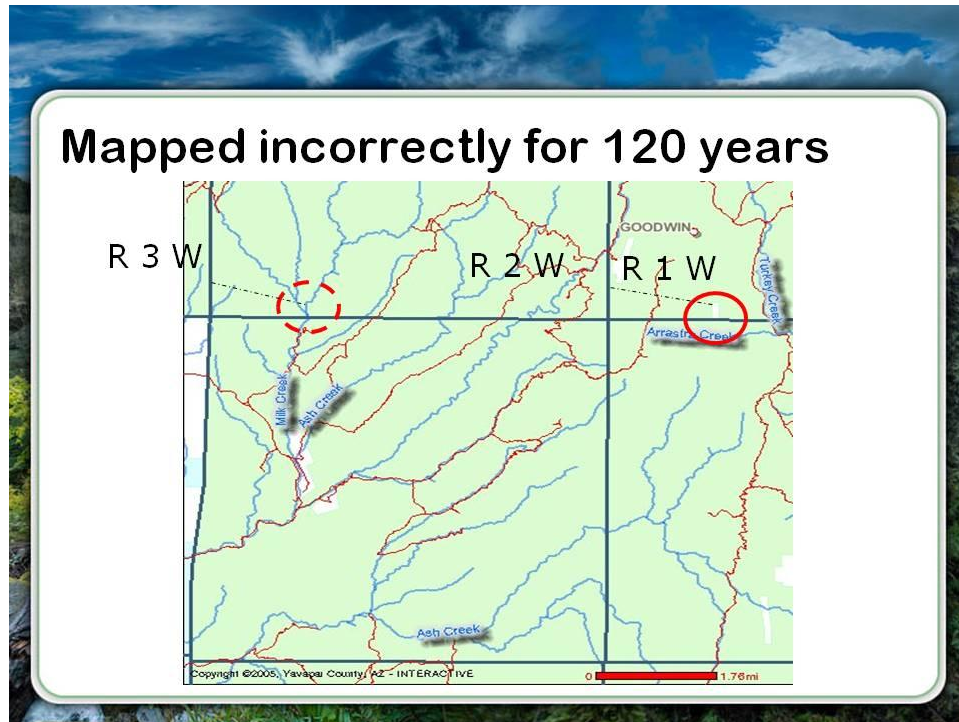
They just traversed down the ridge top or the path of least resistance with the spider web looking traverse and tying out and that sort of thing. You know, we use those procedures although there are ways to have a redundancy with that, whether they did or not. It starts to make you wonder. Because what I find is that when the perimeters have not been traversed, that is where most of

the error occurs. Whatever measurements he did do, there is error in them and that error is magnified down a 1500-foot length that you just computed rather than measured. And you might say well what does that matter? Well it matters because if they did not actually traverse the perimeter, then you want to be cautious about proportioning using that distance.

So at best, they ran the centerlines and stubbed out the end lines or they did these other traverse methods. But what I have found is that this is very common. And we will ask Jack Kesler about that, to see what he thinks. And so now bringing this specifically to the USLM's, USMM's, those were generally not measured, they were triangulated. You see, think about it, you are out there as a surveyor in 1880 and you are doing this mining claim in the middle of nowhere. What was faster? Really, that was what they would look at. He had to show a tie to the LM. If the LM is just a couple pulls of the chain away and he is not that far away, it is easier. There is no canyon or something in between. It is probably easier just to turn the angle and measure to it. The farther you get away, the more it was economically viable to triangulate that thing in and not compute your distance away rather than actually measure it.

I do not know where that cut off is, and of course it was a function of the time and the conscientiousness of the mineral surveyor. The time of day and you know it is getting dark and they got to get out of there or whatever. Who knows, but my point is simply this that the ties whether it was even to a PLSS corner, you know a mile and a half or whatever or to an LM or MM, you have to just be really cautious with those whether they were actually measured. I have also seen discussing improvements. I have seen where there were places some of them more common shortcuts, they did not tie the improvements and when they did they just faked them in. I do not find that to be as often as the others that I have talked about here. But those are some of the common shortcuts.

Now I want to show you an example of just a mistake that a mineral surveyor made and how it played for well over 100 years in the BLM's master title plats and Forest Service records. What I have here in this slide is this is just how I pulled it up from the county's GIS site.



What you see is a mining claim actually sits right here in that spot. He tied in this case, not to LM but to a public lands corner. He tied into some quarter corner of something at this point. Notice that the claim is in range one west, and he tied to something that is on range one west and range two west. So that is where the records show it. However, when the surveyor in 1880, was actually doing the survey, when he got to this corner, he said that it was on the line between two west and three west. So, the claim had been shown for a hundred and twenty years on the master title plat as being here and all of our status work and the assumptions was a piece of private land down there. All of that was based on this tie and yet it was just an honest mistake by a surveyor when he put two west three west instead of one west two west.

I am just showing you another source of error. That is just amazing of how simple that can be and if it was corrected once we discovered the problem, because we were surveying this claim for possible trespassing. We realized it was six miles away, from where all the records had said it has always been simply based on this surveyor's mistake. The way we figured it out was the topo calls; the topography calls on the true claim did not even remotely match these others. The others were calling from creeks by a name, which did not exist, where the actual claim was. So, that is just an example folks of even the simplest typo errors by the draftsmen or the mineral surveyor in this case, could greatly change the records and the position somebody could say the government went and moved that six miles. No the government never moved it an inch. It was just a mistake that got into the record and so we have always shown the wrong township for that mining claim. Just an example of some of the things that happen.

## Records

When the mineral surveyor went out on the ground, he had to produce some records. Here is just a simple list of those, just what you would expect on any official survey.

He had to do an official plat and notes. We are going to take a look at a couple things on the Elmo here in a minute with this sample minerals plat. It is at the back of your 73 Manual and the sample field notes are in Appendix A of your BLM Manual.

### Records Produced

- Official plat.
- Official notes.
- See sample Minerals plat in back of 1973 BLM Manual.
- Also see sample field notes in Appendix A of 1973 BLM Manual (page 313).

SAMPLE FIELD BOOK PAGE  
[3]

AT STA	BS STA	VA	SD	HD	TRUE COURSE	TO STA	REMARKS
1	0	0°00'	335.6	335.6	N75°00'E	4	1=ON END LINE
4	1	10°00'	294.5	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
				1500.0			LODE LINE LENGTH
1	0	12°00'	405.0	396.2	N81°00'W	2	FOR SEC. TIE
2	1	9°00'	333.7	329.5	N50°00'W	3	SEC COR 6X9X16
							INS. ABOVE THE
							GROUND 1111 ON
							SOUTH EDGE
							DISC 4X8 65' DEEP
							TIMBERED 30 FT.
1	0	0°00'	110.0	110.0	N75°00'E	19	PI
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 COR. OR
							DISC. FD. ON
							MS 1462

Note: In the above, AT STA is the location of the transit, BS STA is the back sight station, VA is the vertical angle measured from the horizon, SD is the slope distance, HD is the reduced horizontal distance and the TO STA is the fore sight station. This page has been modified slightly from the published version to preclude round off errors.

FIGURE 2

# SAMPLE FIELD BOOK PAGE

[3.]

AT STA	BS STA	VA	SD	HD	TRUE COURSE	TO STA	REMARKS
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	<u>458.0</u>	N75°00'E	9	ON END LINE
				1500.0			LODE LINE LENGTH
1	0	12°00'	405.0	396.2	N81°00'W	2	FOR SEC. TIE
2	1	9°00'	333.7	329.5	N50°00'W	3	SEC COR 6X9X16
							INS. ABOVE THE
							GROUND 1111 ON
							SOUTH EDGE.
1	0	0°00'	110.0	110.0	N75°00'E	19	DISC 4X6 65' DEEP
							TIMBERED 30 FT.
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
							MS 1462

Note: In the above: AT STA is the location of the transit; BS STA is the back sight station; VA is the vertical angle measured from the horizon; SD is the slope distance; HD is the reduced horizontal distance and the TO STA is the fore sight station. This page has been modified slightly from the published version to preclude round off errors.

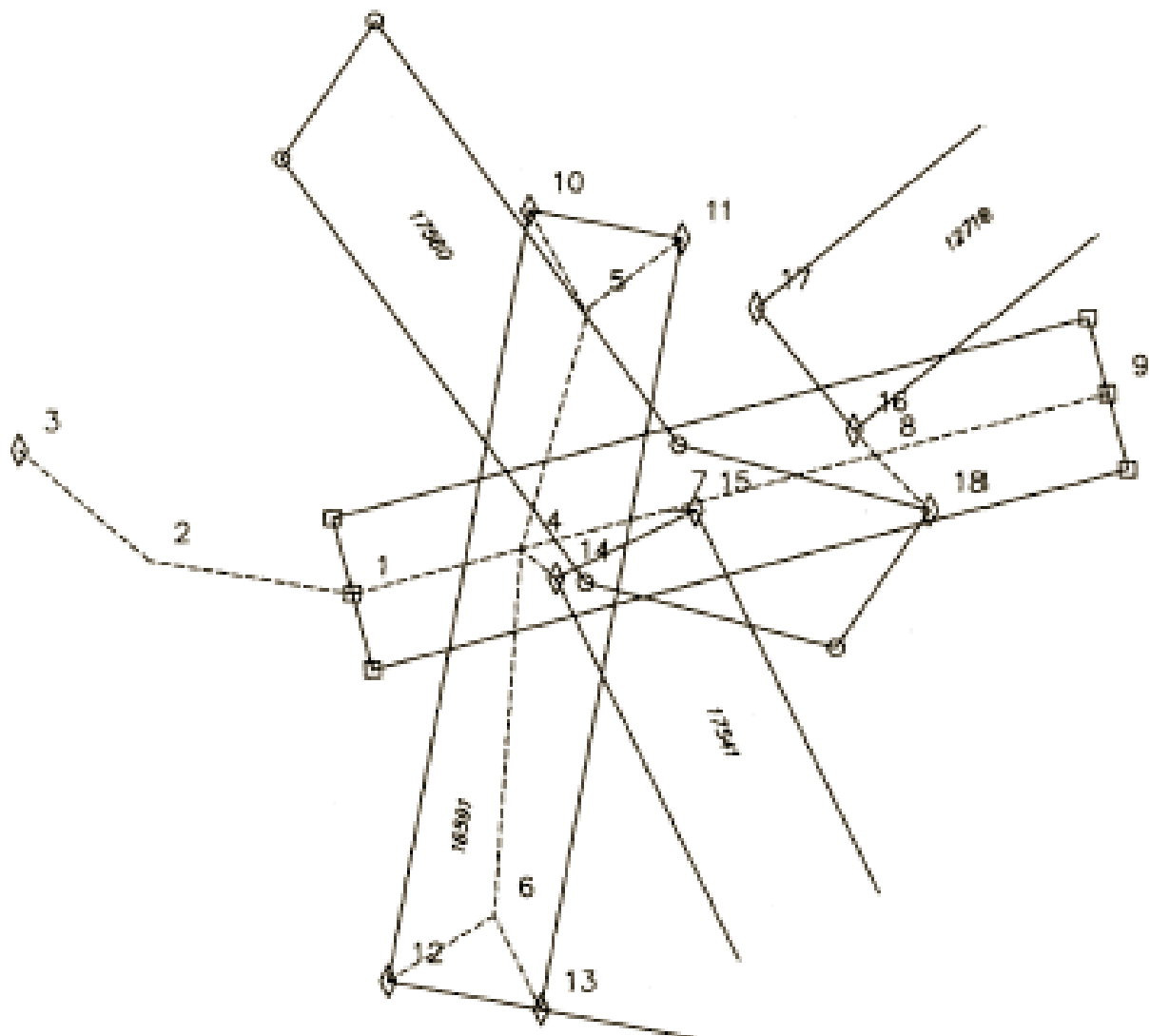
FIGURE 2



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

*LEGEND:*

- = MONUMENT FOUND.*
- = MONUMENT LOST.*
- = MONUMENT SET.*



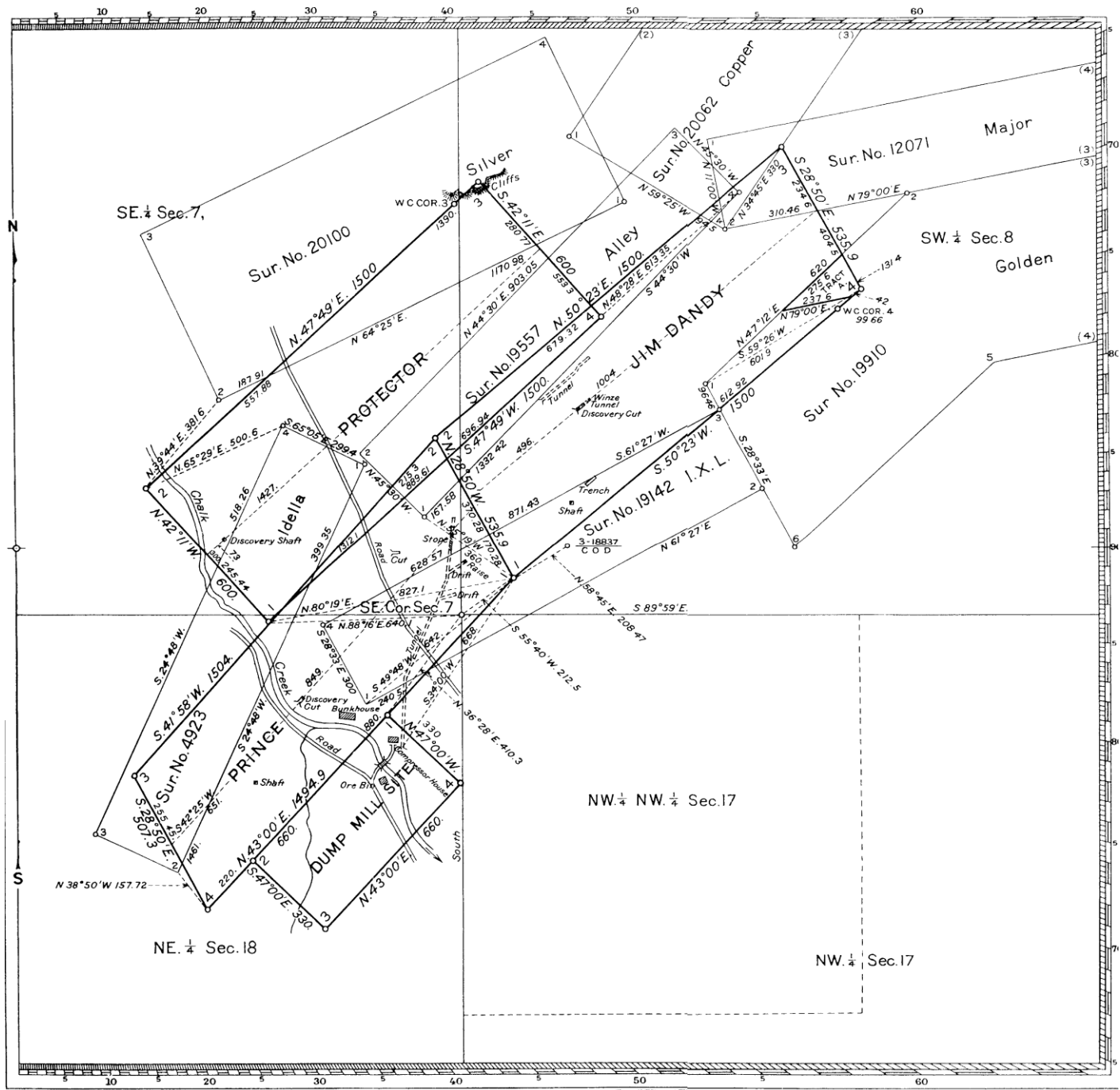
*FIGURE 3*

The 73 Manual has very brief instructions for how mineral survey is to be done. It has virtually no information about retracing mineral surveys. That's one of the reasons we have this module in this course is because there isn't much there yet we know a lot of how to do it and things to look for and that kind of stuff but it is not in the record or it's not in the Manual.

Now this is being filmed in December of 07. I have had the opportunity to read the next edition in the Manual and that is not going to be out for another year because it takes to go through the process and get it printed and everything but I know it has been greatly expanded. And really well done too. As to not just the original survey of the mining claim but more important with the restoration of the lost corners and retracing of mineral surveys and it's going to bring into it some of the things that we have in this course. The course will still have more information. But you know the Manual is going to catch up with some of the issues that exist regarding mineral surveys so that is a good thing. So we have these official records.

Now remember what are we talking about here? We are talking about the patent survey we are not talking about the location survey by the miner. This is the patent surveyor, this is the mineral surveyor who's charge was go out, monument, and set accessories for all of the corners are required and that differed from state to state as I mentioned earlier. It included tying in all of the improvements. It included him noting what the value was of those improvements to make sure that this person had his minimum 500 dollars done. He is kind of an appraiser in some ways, mining activity and construction appraiser at the same time. This was all part of the duties of the U.S. Mineral Surveyor. All of this stuff provides us information that ends up on the official plat or in the official notes.

I want you to do is go to your 73 Manual and in the inside back cover you know where you found the township plat that we use so much in all of the original CFedS and ARCS courses, let's take a look at that. Now folks, this is a sample that is made up survey in Colorado but it's, and the claims that we are actually after are the bolder lines.



These here and the prosecutor and there is a mill site. But if you just take a look at this because you have your own full size copy of it, if you take a look at it you will see the, some of the things that we have been discussing.

Now the rectangular system obviously already exists here or at least existed at the time of this plat. And I do not see any USLM's or MM's and you would not have really needed them as you can see many things are tied to the corners of the claims. There is a section corner here and it seems to have quite a few things tied to it. So you know they fulfilled that. You will see, and I want to zoom in a little bit just so you see what I am talking about here. Discovery cut here's a tunnel, another tunnel, a shaft, a trench, a raise, you have to go look all these up.

There is a drift, a slope, all kinds of mineral terms and you can again get into your dictionaries and look these kinds of things up. You can see that we have parallel end lines on these. Just as we were talking about, here is his mill site next to his claim; I have seen mill sites many miles away from the claims. Many times, I mean think about it, if you are a miner you want your mill site on a road or a stream or a you know boat your minerals out, truck them out, or railroad but it was important. You are taking raw material you are processing it or semi-processing it and it now needs to go to market or to some other facility if you are doing something else with it.

So this did not have to have any minerals on it but that is an example of a mill site and this one is a nice rectangular 660 X 330 so it is exactly 5 acres. But you could just see all of these things and of course there are other things you notice, there are topo has shown here because the surveyors are required to do topo. So we know where the roads are, where the creeks are, what is this? Chalk creek. Notice also, we are getting our buildings and things remember we are talking about all the improvements the surveyor had to show they are discovery cut here, a bunkhouse. These are all things that cost money that could qualify. What is that say, compressor house I think? You know an ore bin. These are all things that cost money so they each help to justify the 500 bucks.

These are generally not only just sketched in by the surveyor but rather he tied them, in his notes. We're not going to use this as a sample or an example in the training itself, we're going to do something in the extreme effort with it you know computations or something like that but rather a sample back there in the back of the Manual that you can look at and it gives you an idea of what's going on in minerals. In particular, when you back out and look at the bigger picture you see the claims that we are surveying but their overlapped by claims that already existed. And there are ties to those things and computations of how many acres are overlapped which are often shown in the margins. So a lot of information there and that's where we are studying and looking at and just realizing what all is shown there and why it has shown there.

For instance, the Jim Dandy we are 535 feet here. The lode line is not at the center. That is where he found the vein, so that is where he wants to chase that vein. But, they did not center this on there because they did not have to. So even though the corner here might be called end center or center end, in some parts of the country. But they did not; it is not on the exact center. Not even close. So you just get an idea of other things that are shown, there are some topo calls, some cliffs could not set that corner so he set a witness corner. Hey things that we are used to seeing and that we understand. And now you can relate them to mineral type applications.

Now, in your Manual page 313, there are all kinds of sample field notes written for BLM and that sort of application but it, we can use them as a great tool here so let us see am I zoomed all the way out?

On page 313 of the Manual, what we have is the front cover sheet of the mining claim and you know the specimen here of course. Mineral surveys, field notes of this tells us what mining districts there in what section of township they're in, name of the mineral surveyor the date that the survey was ordered. Survey commenced and it talks about the claimant and who that was when he first located. Notice there is other locations out there this is apparently the Jim Dandy lode which was first located in 1932 and here it is 1971 or 72. When I guess the Mineral Survey goes out and yeah he starts April 9<sup>th</sup>, got his order that day started the survey May 10<sup>th</sup> finished May 14<sup>th</sup> so you know you can track quite a bit of information on here and of course you got this in front of you, you can see this full size.

As you turn the page then as you go to the first page of the claim or of the notes themselves. The survey was made, he's going to tell you just like the GLO notes are going to tell you, what kind of instrument that the surveyor used on his chain and all that and a bunch of information about it solar observations out there. Whatever he did and then down here at the bottom we are going to get started on the Jim Dandy lode.

Now is not this typical of the notes that we are used to seeing and reading. At corner number one of the Jim Dandy lode, identical with corner number one of the Prince lode of this survey set granite stone twenty 6 X 10 X 8 so here is our monument information. It is all about evidence and the records is not it. Fourteen inches into the ground to bedrocks, so he buried it as far as he could in the ground and then surrounded it by a mound of stones to the top. And he marked J.D.1.

Now folks, you remember in Chapter 4 of the (original) BLM Manual, and how we learned about the coding of the corners and I provided you back in the old CFedS course, with pictures of how the notches were supposed to work and a diagram that showed all of that stuff. So there is obviously a code that also goes along with the mineral surveys and just to make it simple for you, J.D. is Jim Dandy. It is the name of corner one, we are at corner one. The Prince is on the other side, so PRI1, so now you know that this is corner one for both Jim Dandy and the Prince and the mineral survey is 20220A. Our monument has been described, here are ties to accessories or other objects that might help us in the survey retracement process.

The corner of sections 7, 18, 17, and 18 and by the way you could be following this on the plat if you wanted to because these samples coincide here. Of 16 South 80 West 6 pm bears south 55, 40 west, 212.5 feet distance, monumented with an iron post. He describes the section corner in detail and tells us the bearing and distance over to it. Then, and I am going to switch sides here on the book. So at the top of the page 315, he continues with information. I mean we just read the monument description in a tie to the section corner but now I notice he is going to tie in another claim. The 19557 bearing distance to its corner. Here is a claim to the 19142 now these are not computed usually these are actually ties he actually made. Here is a tie to corner three of the 18837 COD lode, whatever that stands for. So, cash on delivery maybe. So what did we get?



We got the monument itself, we got a tie to a section corner and a description of the section corner and tie 1, 2, 3 more claims. So now, we have a total of 5 pieces of evidence to look for here. Then he takes a bearing tree, a yellow pine, 14-inch diameter, and these are generally useless but a distant peak known as Barren Mountain bears North 55 degrees 7 West. That will get you within a couple thousand feet.

In fact, having worked in Colorado quite a bit myself, it'll say a distant unnamed peak and you'll look out there and within just a few degrees of range there's ten peaks that it could have been you can't even tell which one it is but my point is that's not the most useful information. Other than to get you generally into the area of a claim. But all the other is precise survey data.

If somebody comes in and tells me, if I was field chief and they came in and said "well we looked for the Jim Dandy going to one and couldn't find it." You know I would say so they wiped out everything within 700 feet because see I know that there is claim corners here 642 away, 360 away, 208 away, section corner 212 away. All of those are gone? And even that bearing tree is gone, and you know it is possible. But that is one of the things I am going to look at and ask about to make sure we really have thoroughly searched for that corner. Because many people will go out, look for the stone and the bearing tree, and not realize they have all of these other ties.

Now understand, these are ties being made at the time of your survey. As we will see later, there are more records to research, obviously I would want to have the notes for the 19557 and whatever they were the 18837, the ones that he tied. I would want to have those notes because, they do not describe the corner here they just say I found corner one and I tied it. What I want to do is have the notes and records so I can find that corner and know that I am at the right one. And if I cannot find it I can find another one and bring this one back in. That is the sort of reasoning we are using here. So I want all of those notes but recognize that any survey that came after mine, may have tied my corner. Corner one of the Jim Dandy maybe tied by corner; you know by mineral survey number 22,000 that came a few years later.

So you know there are tremendous evidence situations out there and we still have not even seen all of it. The notes take off in the same direction that you and I are quite used to as you slide down here, distance except it's in feet, 170 feet. He tells us he intersects another claim, 301 he is on the lode line, 370. So we have all kinds of topographic information, here's corner 2 of his survey, he sets an iron post with a brass cap on it and marks a rock, a bearing object. How far away is that? Just 10.5 feet away, that is pretty cool. So we get all of this information and it continues on down.

Now what we are talking about here are the records that are being produced, therefore what kind of information is in those records as well, and I am going to skip way to the back now. We have all of these claims and even the mill site is described and that sort of thing. But then when you go to the back of his information, this would be page 320 in your Manual if you were following along in it. We get a summary of the areas. He talks about how much area some of the other claims that might be overlapping, how much they overlap. He gives all of his acreages there. Now I am going to switch over to the next page, which would be what, 321. And at the top of

321, he gives a description of the claim and then a general location statement as you can see, this is located in this township and you know sometimes they'll say it's on a west facing slope that sort of thing which helps you if you're out there and you don't really have any idea what you are doing but then as you slide down that page you get the expenditures. And so you can see he starts naming off these things. Let us look at one.

A discovery cut of the Jim Dandy lode the face of which being the discovery point is on the lode line. 496 feet from a point on line one-two. 301.3 feet from corner number one. We are getting information here about this discovery cut and he says value of the cut, tunnel, and winds are 380 dollars. We do not really care about that but we are very interested in is that we have this information in a bearing and a distance tie and offsets and that sort of thing.

Let's look at another one, number 2 here, expenditure number 2, a tunnel, 5 X 7 feet in size, the portal of which, so we're right at the portal of it, bears north 70,57 East, 373.5 feet from corner 2. See if I cannot find corner 2 and I do not really have any other survey data, you know that ties to other claim corners, that sort of thing. I'm going to come over here and look at this portal, this tunnel, and it may have collapsed and I'm going to have to take some of that into consideration, it's not an exact science but once I decide where that is I'm going to go that bearing and distance back over and do another corner search depending on how badly damaged, I might not be able to use it. But other times I may be able to use it to set the corner.

Now, let us go down to the Prince and I think its number two, we switched to the Prince so the numbering starts over again. Look at this a shaft now as you remember from our discussions earlier, a shaft is generally a vertical deal so a shaft, the center of which bears north 200, 421 east 450 feet from corner 4 Prince lode. It's 4 X 7 feet, its only 3 feet deep so it's only going to be a value of 130 bucks but you see there's a good chance that still exists out there in the ground. You can go find that and see a shaft, it's only 4 X 7 and this was at this time anyway 3 feet deep it may have got a lot deeper after this but the 4 X 7 you can get within a foot or so within the center of the that in order to pull back this bearing and distance. Here is a discovery shaft. Another piece of information I would use, so as you can see we are very interested in these expenditures that are in the back of the Manual because they have all of this information, all these not just the values, we're not really interested in, but their other information.

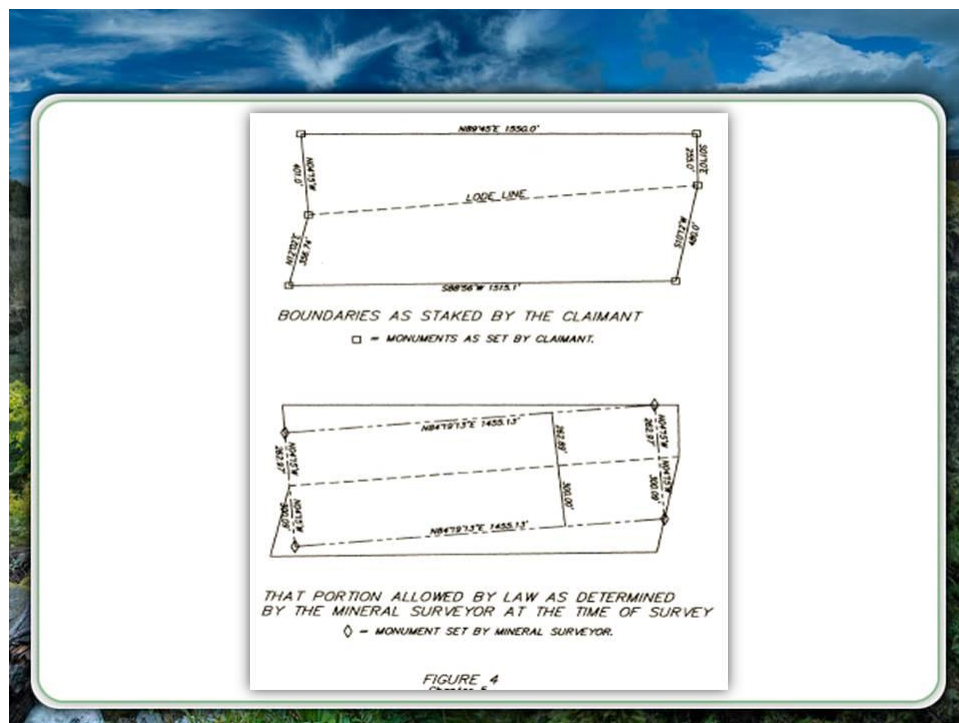
Page 322 I think I said that at the bottom of it. Notice he had some discussion up above about values and how some of them had been apportioned to other claims in the past. That is somewhat normal. But notice now that we have other improvements but he is not going to use these improvements as part of the dollar valuation, they were not needed. This claim up here came up to 14,000 bucks so it is definitely over the 500 dollars. But notice we still have a cut and he gives a bearing and distance to it, a shaft.

A plank or bin, look at this one here, remember when we saw on the plat, we say a bunkhouse, an ore bin, and a compress house, like a frame compressor house and shop. And notice he did not just tie the center of it or just shoot it from somewhere; he got the Northeast corner that is great for surveyors are not it? The northeast corner of which bears south 25 degrees East 80 feet from corner one of the dump mill site. 16 X 30 in size the long size is bear North 85 West. So man he told us everything we need to know and if you go out and just find one corner of the

remains of that compression shop, you got the dimensions of it, you can replicate where the north east corner of it is and be able to use that to come back to which one was it, corner one of the dump mill site. If that is what you were surveying.

So we get tremendous amount of information in the back of these notes I have seen so many surveyors you are lucky if they go get the notes to begin with but then you just want to save a couple books and not get these back pages but yet these back pages are where the tremendous amount of information lies. The last thing we are going to do is look on 323 and just to see; you know he names a few more things. And other corner descriptions and supplemental data, and who knows what is in there almost a full page of corner descriptions and other information that may be very useful to you. The point is the records that were produced when the claimant was paying for his patent survey, the records he produced are incredibly valuable and detailed. That the mineral survey put into the plat and or the notes.

So we want to recognize the value of that as evidence value because usually more evidence available or potential anyway in minerals than just about any other kind of survey. I have seen some claims where he just went four corners and tied in a discovery cut and there is no topo calls yet you can see a creek running through it, a road running through it. Those are slopped together, unless you are in the wrong place. Hey, we cannot do it, that is what is in the record and we have to try to do our best. I wanted to make sure now you understand what they were doing and this refers back to a few minutes ago with the fact that maybe they were not doing everything exactly the way the record says. Take a look at this slide and it is a just a sketch that the mineral surveyor produced, of how he did the survey.



Look he did this claim here, from here to here, but notice how he did it. He has a traverse out here, he side shotted over there, he came down here, side shotted over to there, so just typical spider-web survey. So you can see a similar process went on. Running this way, and out to

some other corners or the LM or something. My point is just hey sometimes that stuff is not' quite as they said it would be.

There are some other things though that we need to realize that the mineral surveyor had the authority to do when he got out there. When the mineral surveyor got out there, this is what he found was actually staked. The lode lines running off at a funny angle, the miner got his end lines all screwed up, it isn't square, it's in fact more than the acreage he is allowed. So this gets into some important stuff that this mineral surveyor is doing because the mineral surveyor has the authority to adjust what is going to go to patent to make it fit the law. And not only had to fit the law it has to fit what the miner staked. This was in a state that you could you know go 300 feet on each side of the lode line.

And yet, he only let him go 240 or so here and the reason for that is because if you went 300, see notice that they are protecting the lode line, that is the most important thing. If he went 300 feet off that it takes him outside of his claim. And he only had the rights for minerals in here. That makes sense. I said that backwards sorry. He did not have the rights for minerals out there. Let us say that again. That is where the 300 feet takes you; he has no rights to these minerals out here. He only had rights to what was inside his staked claim. And so the mineral surveyor was forced to make this smaller than normal claim in here and notice that he still got the end lines parallel. He still got them parallel; in fact he pulled this claim back this way. Here so that he could make this without an angle point or an angle point in the end line. So he could make the end line a straight line all the way across.

So what you are seeing here is mineral surveyor at the time of the patent survey, which had the responsibility and the authority to adjust this person's claim to meet the law and to fit what he had staked or located to begin with. That's you know really not an important subject for us as we enter retracement except understand why stakes are not the size or the shape or the exact dimensions you expected, there are reasons for that. A lot of it had to do with what the original miner did. The only thing a miner had a right to up until the time this guy does that patent is the minerals within his original stake location so if he screwed it up, then he was really limited because the patent could not go more than 1500 feet by 600 feet and in some states its even smaller than that. So recognize that the mineral surveyor had this authority and had these opportunities if you fix things up and make them right than answer a lot of why things are the way they are.

## ***Conclusion***

Now, at this point in the course, what we are going to do is go to the field and interview Jack Kesler who I mentioned earlier and he'll introduce himself and give you a little bit about his background but he is a U.S. Mineral Surveyor and a Registered Land Surveyor and he is going to be showing us a little bit and talking to us a little bit about mineral surveys out in the town of Oatman which is an old abandoned mining community out in northwest Arizona, so we'll go do that and when we come back we'll start talking about some really specific retracement issues.

## ***Handout***



## Sample Field Notes

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SPECIMEN  
FIELD NOTES  
OF THE SURVEY OF THE  
THIRD STANDARD PARALLEL NORTH  
ALONG THE SOUTH BOUNDARY OF TOWNSHIP 13 NORTH,  
THROUGH RANGES 21, 22, 23, AND 24 EAST;  
THE SIXTH GUIDE MERIDIAN EAST  
THROUGH TOWNSHIPS 13, 14, 15, AND 16 NORTH,  
BETWEEN RANGES 24 AND 25 EAST;  
AND THE  
WEST AND NORTH BOUNDARIES OF  
TOWNSHIP 13 NORTH, RANGE 24 EAST.

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(Note: Remainder of title omitted.)

T.17 N., R.24 E.



## APPENDIX

241

3d Stan. Par. N., S. Bdy. of T. 13 N., R. 21 E., \_\_\_ Mer., (State)

CHAINS	<p>The Third Standard Parallel North, through Range 20 East, was surveyed by Joseph P. Smith in 1884. The Fourth Standard Parallel North, through Range 24 East, was surveyed by John C. Collins in 1887 and was resurveyed by Andrew Porter in 1906.</p> <p>The following field notes describe the survey of the Third Standard Parallel North along the south boundary of Township 13 North, through Ranges 21, 22, 23, and 24 East; the Sixth Guide Meridian East between Ranges 24 and 25 East, through Townships 13, 14, 15, and 16 North; and the west and north boundaries of Township 13 North, Range 24 East.</p> <p>The survey was executed in accordance with the Manual of Surveying Instructions, (Year), and Special Instructions for Group No. ___, (State), dated ____.</p> <p>The directions of lines refer to the true meridian as determined by observations of Polaris, projected by fore- and backsights. Standard lines were chained twice, and the mean of the measurements is given in the field notes.</p> <p>The geographic position of the standard corner of Tps. 13 N., Rs. 24 and 25 E., as scaled from the quadrangle map, "SHEEPSHEAD ROCK," published by the Geological Survey in 1963, is as follows:</p> <p style="text-align: center;">Latitude 36° 59.6' N.    Longitude 104° 38.3' W.</p> <p>The mean magnetic declination is 18° 10' E.</p> <hr/> <p style="text-align: center;">Third Standard Parallel North, on the South Boundary of T. 13 N., R. 21 E., ___ Meridian, (State)</p> <hr/> <p>Beginning at the stan. cor. of Tps. 13 N., Rs. 20 and 21 E., monumented with a granite stone, 12 x 10 x 8 ins. above ground, firmly set, mkd. SC 13N on N, 20E on W, and 21E on E face, from which the original bearing trees</p> <p style="padding-left: 40px;">A yellow pine, 10 ins. diam., bears N. 10° E., 30 lks. dist., with healed blaze.</p> <p style="padding-left: 40px;">A yellow pine, 18 ins. diam., bears N. 25° W., 50 lks. dist., with healed blaze.</p> <p>East, with the establishment of the 3d Stan. Par. N., on the S. bdy. of sec. 31, T. 13 N., R. 21 E., on a transit line describing the secant, which starts from a point 4 lks. South of the Tp. cor., and bears N. 89° 58' E.</p> <p>Over gently rolling land, through scattering timber.</p> <p>28.10 Enter heavy timber, edge bears NW and SE.</p> <p>40.00 Point for the stan. 1/4 sec. cor. of sec. 31, North 2 lks. from the secant.</p> <p>Set an iron post, 28 ins. long, 2 1/2 ins. diam., 24 ins. in the ground, with brass cap mkd.</p> <div style="text-align: center;">       SC        T 13 N R 21 E        1/4 S 31        1972     </div> <p>from which</p>
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Form 9180-7 (October 1964) (formerly 4-673b) USDI-BLM

FIELD NOTE PAPER

## MANUAL OF SURVEYING INSTRUCTIONS

3d Stan. Par. N., S. Bdy. of T. 13 N., R. 21 E., Mer., (State)

CHAINS	
	<p>A yellow pine, 10 ins. diam., bears N. <math>61\frac{1}{2}^{\circ}</math> E., 48 lks. dist., mkd. <math>\frac{1}{4}</math> S31 SC BT.</p> <p>A blue spruce, 8 ins. diam., bears N. <math>11\frac{1}{4}^{\circ}</math> W., 127 lks. dist., mkd. <math>\frac{1}{4}</math> S31 SC BT.</p>
46.50	Enter clearing, edge bears N. $35^{\circ}$ E. and S. $35^{\circ}$ W.
47.00	Road, dirt, 25 lks. wide, follows edge of clearing.
58.00	SE cor. of cabin, 20 x 10 ft., bears North, 16 chs. dist., long side bears E and W.
63.50	Enter heavy timber, edge bears N and S.
80.00	Point for the stan. cor. of secs. 31 and 32, on the secant.
	<p>Set an iron post, 28 ins. long, <math>2\frac{1}{2}</math> ins. diam., 24 ins. in the ground, with brass cap mkd.</p> <div style="text-align: center;">           SC            T 13 N   R 21 E            S 31   S 32            1972         </div>
	from which
	<p>A yellow pine, 9 ins. diam., bears N. <math>31\frac{3}{4}^{\circ}</math> E., 22 lks. dist., mkd. T13N R21E S32 SC BT.</p> <p>A yellow pine, 8 ins. diam., bears N. <math>67^{\circ}</math> W., 114 lks. dist., mkd. T13N R21E S31 SC BT.</p>
	<p>Land, gently rolling.            Soil, loam.            Timber, yellow pine and blue spruce, with some juniper; no undergrowth.</p>
	<p>East, on the S. bdy. of sec. 32, on a transit line describing the secant, which bears N. <math>89^{\circ}58.7'</math> E.</p> <p>Over rolling land, through heavy timber.</p>
12.00	Begin descent of 60 ft. over NE. slope.
18.40	Turkey Creek, 20 lks. wide, course S. $50^{\circ}$ E.; asc. 175 ft. over broken SW slope.
40.00	Point for the stan. $\frac{1}{4}$ sec. cor. of sec. 32, South 1 lk. from the secant, falls on a sandstone boulder, 7 x 5 x 2 ft. above ground.
	<p>Set a brass tablet, <math>3\frac{1}{4}</math> ins. diam., <math>3\frac{1}{2}</math>-in. stem, in drill hole in boulder, with top mkd.</p> <div style="text-align: center;">           SC            T 13 N R 21 E  <math>\frac{1}{4}</math> S 32            1972         </div>
	from which
	<p>A juniper, 8 ins. diam., bears N. <math>33\frac{3}{4}^{\circ}</math> E., 22 lks. dist., mkd. <math>\frac{1}{4}</math> S32 SC BT.</p> <p>A juniper, 11 ins. diam., bears N. <math>84\frac{1}{2}^{\circ}</math> W., 192 lks. dist., mkd. <math>\frac{1}{4}</math> S32 SC BT.</p>

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## APPENDIX

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3d Stan. Par. N., S. Bdy. of T. 13 N., R. 21 E., Mer., (State)

CHAINS 46.20	Top of sandstone rimrock, 12 ft. high, bears N. 45° W. and S. 60° E.; thence over nearly level land.
55.72	A bench mark of the U.S. Geological Survey, published elevation 7,946.987 ft. above mean sea level, bears South, 5.62 chs. dist.; a brass tablet seated in a sandstone boulder, conforming to the Geological Survey record.
80.00	Point for the stan. cor. of secs. 32 and 33, South 2 lks. from the secant.  Set an iron post, 28 ins. long, 2½ ins. diam., 18 ins. in the ground to bedrock, encircled by a mound of stone, 3 ft. base to top of brass cap, mkd.  <div style="text-align: center;">           SC            T 13 N   R 21 E            S 32   S 33            1972         </div> from which  A yellow pine, 9 ins. diam., bears N. 43 3/4° E., 27 lks. dist., mkd. T13N R21E S33 SC BT.  A large sandstone outcropping, the highest point of which bears N. 57°35' W., 87 lks. dist., mkd. X B0.  Land, rolling west of creek; level table land above top of slope east of creek. Soil, rich sandy loam and rocky loam. Timber, mostly juniper, with some yellow pine and blue spruce; undergrowth, sagebrush.
	NOTE. — The field notes of the survey of the S. bdy. of secs. 33, 34, and 35 continue on the same form, and are omitted. The field notes of the survey of the S. bdy. of sec. 36 have been varied in order to show certain other forms of record.
	East, along the S. bdy. of sec. 36, on a transit line describing the secant, which bears S. 89°58.7' E.  Over level land, through dense undergrowth.
40.00	Point for the stan. ¼ sec. cor. of sec. 36, North 2 lks. from the secant.  Set a sandstone, 24 x 10 x 6 ins., 16 ins. in the ground, mkd. SC¼ on N face.  Raise a mound of stone, 4 ft. base, 2 ft. high, N of cor.
45.00	Begin gradual descent.
48.92	Bank of Crystal Lake, bears N. 42° E. and S. 37° W.; point for the meander cor. of sec. 36, North 2.4 lks. from the secant.  Set a sandstone, 27 x 8 x 8 ins., 18 ins. in the ground, mkd.  6 grooves on N, MC on E, and 6 grooves on W face.

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FIELD NOTE PAPER

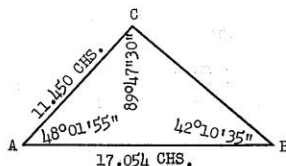


3d Stan. Par. N., S. Bdy. of T. 13 N., R. 21 E., \_\_\_ Mer., (State)

CHAINS

Raise a mound of stone, 3 ft. base, 2½ ft. high, W of cor.

To determine the dist. across the lake by triangulation: using the above station on the secant as point A, set a flag on the secant on the opposite side of the lake at point B; point C is taken northeasterly on the west side; the dist. from A to C is 11.450 chs.



All angles by 3 repetitions, with a closing error of 0°00'20" balanced to 180°, as follows:

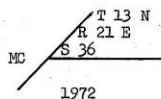
At point A = 48°01'55"  
 At point B = 42°10'35"  
 At point C = 89°47'30"

Dist. across lake = 17.054 chs.

65.974 Point B.

66.00 Bank of Lake, bears N. 50° E. and S. 45° W.; point for the meander cor. of sec. 36, North 3.3 lks. from the secant.

Set an iron post, 28 ins. long, 2½ ins. diam., 24 ins. in the ground, with brass cap mkd.



from which

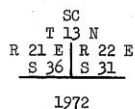
A yellow pine, 8 ins. diam., bears N. 62½° E., 29 lks. dist., mkd. T13N R21E S36 MC BT.

A blue spruce, 14 ins. diam., bears N. 78 ¾° E., 313 lks. dist., mkd. T13N R21E S36 MC BT.

Enter heavy timber, edge bears N. 50° E. and S. 45° W.; asc. 215 ft. over rocky NW slope.

80.00 Point for the stan. cor. of Tps. 13 N., Rs. 21 and 22 E., North 4 lks. from the secant.

Set an iron post, 28 ins. long, 2½ ins. diam., 24 ins. in the ground, with brass cap mkd.



from which

## APPENDIX

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3d Stan. Par. N., S. Bdy. of T. 13 N., R. 21 E., \_\_\_ Mer., (State)

CHAINS	<p>A blue spruce, 12 ins. diam., bears N. <math>37\frac{1}{4}^{\circ}</math> E., 114 lks. dist., mkd. T13N R22E S31 SC BT.</p> <p>A blue spruce, 9 ins. diam., bears N. <math>64\frac{3}{4}^{\circ}</math> W., 127 lks. dist., mkd. T13N R21E S36 SC BT.</p> <p>Land, nearly level, west of lake; broken, east of lake. Soil, sandy loam, somewhat rocky east of lake. Timber, blue spruce with some yellow pine and aspen; undergrowth, oak brush.</p>
	<p>Third Standard Parallel North, on the South Boundary of T. 13 N., R. 22 E., ___ Meridian, (State)</p>
	<p>East, with the establishment of the 3d Stan. Par. N., on the S. bdy. of sec. 31, T. 13 N., R. 22 E., on a transit line describing the secant, which starts from a point 4 lks. South of the stan. Tp. cor. and bears N. <math>89^{\circ}58'</math> E.</p> <p>Asc. 65 ft. over rocky NW slope, through heavy timber and scattering clumps of undergrowth.</p>
3.50	<p>Ridge, bears N. <math>60^{\circ}</math> E. and S. <math>60^{\circ}</math> W.; desc. 240 ft. over SE slope.</p>
22.30	<p>Base of ridge, bears N. <math>65^{\circ}</math> E. and S. <math>65^{\circ}</math> W.; descent becomes gradual.</p>
38.40	<p>Point for the witness stan. <math>\frac{1}{4}</math> sec. cor. of sec. 31, North 2.1 lks. from the secant.</p> <p>Set an iron post, 28 ins. long, <math>2\frac{1}{2}</math> ins. diam., 24 ins. in the ground, with brass cap mkd.</p> <div style="text-align: center;"> <p>WC SC T 13 N R 22 E <math>\frac{1}{4}</math> S 31 → 1972</p> </div>
	<p>from which</p> <p>A yellow pine, 9 ins. diam., bears North, 16 lks. dist., mkd. X BT.</p> <p>A yellow pine, 10 ins. diam., bears N. <math>57\frac{1}{2}^{\circ}</math> W., 92 lks. dist., mkd. X BT.</p>
40.00	<p>True point for the stan. <math>\frac{1}{4}</math> sec. cor. of sec. 31, falls at center of stream, 60 lks. wide, course N. <math>70^{\circ}</math> E., where it is impracticable to establish a permanent monument; asc. gradually over bottom land.</p>
54.96	<p>Intersect W. bdy. of the Las Animas Land Grant, North 1.2 lks. from the secant; point for the closing cor. of sec. 31, T. 13 N., R. 22 E.</p> <p>Set an iron post, 28 ins. long, <math>2\frac{1}{2}</math> ins. diam., 24 ins. in the ground, with brass cap mkd.</p> <div style="text-align: center;"> <p>T 13 N R 22 E S 31 CC — PL — LA IG 1972</p> </div>

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## MANUAL OF SURVEYING INSTRUCTIONS

3d Stan. Par. N., S. Bdy. of T. 13 N., R. 22 E., Mer., (State)

CHAINS	
	<p>from which</p> <p>A yellow pine, 11 ins. diam., bears N. <math>22\frac{3}{4}^{\circ}</math> W., 57 lks. dist., mkd. T13N R22E S31 CC BT.</p> <p>A yellow pine, 7 ins. diam., bears N. <math>7\frac{1}{4}^{\circ}</math> W., 135 lks. dist., mkd. T13N R22E S31 CC BT.</p> <p>From this point the 14th Mi. Cor. of the grant bdy. bears N. <math>33^{\circ}38'</math> E., 27.84 chs. dist., monumented with a sandstone, 16 x 12 x 6 ins. above the top of a mound of stone, 5 ft. base, 3 ft. high, mkd. 14M on NW and 1A IG on SE face.</p> <p>From the same point the 15th Mi. Cor. of the grant bdy. bears S. <math>33^{\circ}38'</math> W., 51.96 chs. dist., occupied by the original cor. tree, a yellow pine, 34 ins. diam., with healed blazes on NW and SE sides, from which the original bearing trees</p> <p>A yellow pine, 20 ins. diam., bears N. <math>10^{\circ}</math> E., 15 lks. dist., with healed blaze.</p> <p>A yellow pine, 15 ins. diam., bears S. <math>50^{\circ}</math> E., 10 lks. dist., with healed blaze.</p> <p>Land, gently rolling and broken. Soil, sandy loam. Timber, yellow pine; undergrowth, sagebrush.</p>
392.78	<p>Continue the secant on a blank line across the grant.</p> <p>Intersect E. bdy. of the Las Animas Land Grant, North 2.4 lks. from the secant; point for the closing cor. of sec. 36, T. 13 N., R. 22 E.</p> <p>Set a sandstone, 32 x 10 x 8 ins., 22 ins. in the ground, mkd.</p> <p>13 N on N, CC 22E and 1 groove on E, and 1A IG on W face.</p> <p>Raise a mound of stone, 2 ft. base, <math>1\frac{1}{2}</math> ft. high, E of cor.</p> <p>From this point the 7th Mi. Cor. of the grant bdy. bears S. <math>0^{\circ}42'</math> E., 19.12 chs. dist., monumented with a sandstone boulder, 8 x 5 x 3 ft. above ground, mkd. + 7M, from which the original bearing trees</p> <p>A yellow pine, 12 ins. diam., bears N. <math>75^{\circ}</math> E., 15 lks. dist., with healed blaze.</p> <p>A yellow pine, 14 ins. diam., bears S. <math>30^{\circ}</math> W., 20 lks. dist., with healed blaze.</p> <p>From the same point the 8th Mi. Cor. of the grant bdy. bears N. <math>0^{\circ}42'</math> W., 60.62 chs. dist., monumented with a sandstone, 12 x 8 x 6 ins. above ground, firmly set, mkd. 1A IG on W and 8M on E face, with a mound of stone, 3 ft. base, 2 ft. high, W of cor.</p> <p>Thence East, on the S. bdy. of sec. 36, on a transit line describing the secant, which bears S. <math>89^{\circ}58.3'</math> E. and counting measurement (47.74 chs.) from the theoretical point for the stan. cor. of secs. 35 and 36.</p> <p>Over nearly level land.</p>

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# APPENDIX

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3d Stan. Par. N., S. Bdy. of T. 13 N., R. 22 E., \_\_\_ Mer., (State)

CHAINS 80.00	<p>Point for the stan. cor. of Tps. 13 N., Rs. 22 and 23 E., North <math>\frac{1}{4}</math> lks. from the secant.</p> <p>Set a sandstone, 36 x 10 x 8 ins., 24 ins. in the ground, mkd.</p> <p>SC 13N on N, 23E on E, and 22E on W face.</p> <p>Raise a mound of stone, 5 ft. base, 3 ft. high, N of cor.</p> <p>Land, nearly level. Soil, sandy loam with many small stones. No timber or undergrowth.</p>
	<p>NOTE.— The field notes of the survey of the 3d Stan. Par. N., on the S. bdy. of Tps. 13 N., Rs. 23 and 24 E., continue on the same form and are omitted.</p>
	<p>MEMORANDUM</p> <p>The form of the record of the survey of a standard parallel by the tangent method is similar to that of the specimen field notes describing the secant method. If the solar transit method is used, the line will conform to the parallel without the making of offsets.</p> <p>A summary description of the region crossed by a standard parallel is supplied at the close of the field notes, or the information may be carried in the general description of the subdivisional survey.</p>
	<p>Sixth Guide Meridian East, Through T. 13 N., Between Rs. 24 and 25 E., ___ Meridian, (State)</p>
	<p>From the stan. cor. of Tps. 13 N., Rs. 24 and 25 E.</p> <p>North, with the establishment of the 6th Guide Mer. E., through T. 13 N., bet. Rs. 24 and 25 E.</p> <p>Over nearly level land.</p>
40.00	<p>Point for the <math>\frac{1}{4}</math> sec. cor. of secs. 31 and 36.</p> <p>Set an iron post, 28 ins. long, 2<math>\frac{1}{2}</math> ins. diam., 24 ins. in the ground, with brass cap mkd.</p> <div data-bbox="711 1255 846 1381" data-label="Diagram"> </div> <p>Dig pits, 18 x 18 x 12 ins., N and S of iron post, 3 ft. dist.</p>
43.50	<p>Begin gradual ascent.</p>
67.00	<p>Top of ascent; enter heavy timber, edge bears NE and SW; desc. over gradual NW slope.</p>
80.00	<p>Point for the cor. of secs. 25, 30, 31, and 36.</p>

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## MANUAL OF SURVEYING INSTRUCTIONS

6th G.M. East, T. 13 N., bet. Rs. 24 and 25 E., \_\_\_ Mer., (State)

CHAINS									
	<p>Set a sandstone, 24 x 10 x 6 ins., 16 ins. in the ground, mkd. with 5 notches on N and 1 notch on S edge.</p> <p>from which</p> <p>A juniper, 10 ins. diam., bears N. <math>64\frac{3}{4}^{\circ}</math> E., 70 lks. dist., mkd. T13N R25E S30 BT.</p> <p>A juniper, 12 ins. diam., bears S. <math>69\frac{3}{4}^{\circ}</math> E., 44 lks. dist., mkd. T13N R25E S31 BT.</p> <p>A juniper, 10 ins. diam., bears S. <math>79\frac{1}{2}^{\circ}</math> W., 59 lks. dist., mkd. T13N R24E S36 BT.</p> <p>A juniper, 20 ins. diam., bears N. <math>74\frac{3}{4}^{\circ}</math> W., 220 lks. dist., mkd. T13N R24E S25 BT.</p> <p>Land, level and gently rolling. Soil, sandy loam, and rocky. Timber, juniper and pinon; undergrowth, sagebrush.</p>								
	<p>North, bet. secs. 25 and 30.</p> <p>Desc. gradually through heavy timber.</p>								
21.50	Road, ungraded, 20 lks. wide, bears NW and SE, from Fort Meyer to Valley City.								
23.20	Arroyo, drains SW; asc. 100 ft. over SE slope.								
40.00	Point for the $\frac{1}{4}$ sec. cor. of secs. 25 and 30.								
	<p>Set a sandstone, 21 x 8 x 6 ins., 14 ins. in the ground, mkd. <math>\frac{1}{4}</math> on W face.</p> <p>from which</p> <p>A juniper, 8 ins. diam., bears N. <math>60\frac{1}{2}^{\circ}</math> E., 28 lks. dist., mkd. <math>\frac{1}{4}</math> S30 BT.</p> <p>A juniper, 11 ins. diam., bears West, 89 lks. dist., mkd. <math>\frac{1}{4}</math> S25 BT.</p>								
64.20	Top of ascent; leave timber, edge bears N. $60^{\circ}$ W. and S. $60^{\circ}$ E.; desc. gradually.								
76.00	Arroyo, drains S. $65^{\circ}$ W.; asc. 50 ft. to sec. cor.								
80.00	Point for the cor. of secs. 19, 24, 25, and 30.								
	<p>Set an iron post, 28 ins. long, <math>2\frac{1}{2}</math> ins. diam., 24 ins. in the ground, with brass cap mkd.</p>								
	<table border="1"> <tr> <td colspan="2">T 13 N</td> </tr> <tr> <td>R 24 E</td> <td>R 25 E</td> </tr> <tr> <td>S 24</td> <td>S 19</td> </tr> <tr> <td>S 25</td> <td>S 30</td> </tr> </table> <p>1972</p>	T 13 N		R 24 E	R 25 E	S 24	S 19	S 25	S 30
T 13 N									
R 24 E	R 25 E								
S 24	S 19								
S 25	S 30								
	<p>Raise a mound of stone, 4 ft. base, 2 ft. high, W of cor.</p> <p>Land, broken and rolling. Soil, sandy loam, and rocky. Timber, juniper and pinon; undergrowth, sagebrush.</p>								
	<p>North, bet. secs. 19 and 24.</p> <p>Asc. over broken land.</p>								

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## APPENDIX

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6th G.M. East, T. 13 N., bet. Rs. 24 and 25 E., Mer., (State)

CHAINS	
2.10	Top of ascent; enter scattering timber and dense undergrowth; edge bears E and W.
40.00	Point for the $\frac{1}{4}$ sec. cor. of secs. 19 and 24. Set an iron post, 28 ins. long, $2\frac{1}{2}$ ins. diam., 24 ins. in the ground, with brass cap mkd.  <div style="text-align: center;">           T 13 N  <math>\frac{1}{4}</math>            R 24 E   R 25 E            S 24   S 19            1972         </div>
	Raise a mound of stone, 4 ft. base, 2 ft. high, W of cor.
56.00	Leave scattering timber; edge bears E and W.
64.20	Arroyo, drains N. $60^{\circ}$ W.; asc. 85 ft. to sec. cor.
80.00	Point for the cor. of secs. 13, 18, 19, and 24. Set an iron post, 28 ins. long, $2\frac{1}{2}$ ins. diam., 24 ins. in the ground, with brass cap mkd.  <div style="text-align: center;">           T 13 N            R 24 E   R 25 E            S 13   S 18            S 24   S 19            1972         </div>
	Raise a mound of stone, 4 ft. base, 2 ft. high, W of cor.
	Land, broken. Soil, sandy loam, and rocky. Timber, scattering pinon; undergrowth, sagebrush.
	NOTE.— The field notes of the survey of the line bet. secs. 13 and 18, and bet. secs. 7 and 12, continue on the same form and are omitted.
	North, bet. secs. 1 and 6. Desc. 40 ft. over broken NE slope, through dense undergrowth.
7.90	Road, graded, 25 lks. wide, bears N. $80^{\circ}$ W. and S. $80^{\circ}$ E., from Fort Meyer to Douglass Post Office.
9.10	Right bank of the South Fork Trapper River, course S. $80^{\circ}$ E.; banks 2 to 6 ft. high; water at present low stage from 1 to 3 ft. deep; point for the meander cor. of secs. 1 and 6. Set an iron post, 28 ins. long, $2\frac{1}{2}$ ins. diam., 24 ins. in the ground, with brass cap mkd.  <div style="text-align: center;">           MC            S 1   S 6            R 24 E   R 25 E            T 13 N            1972         </div>

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FIELD NOTE PAPER



## MANUAL OF SURVEYING INSTRUCTIONS

6th G.M. East, T. 13 N., bet. Rs. 24 and 25 E., \_\_\_\_ Mer., (State)

CHAINS	
	Raise a mound of stone, 4 ft. base, 2 ft. high, S of cor. Dist. across river by steel tape measurement, 4.60 chs.
13.70	Left bank of the South Fork Trapper River; point for the meander cor. of secs. 1 and 6.  Set a washed flint boulder, 32 x 14 x 8 ins., 24 ins. in the ground, mkd.  1 groove on N, 6 grooves on E, MC on S, and 6 grooves on W face.  Raise a mound of stone, 5 ft. base, 3 ft. high, N of cor. Asc. 160 ft. over broken S slope.
29.80	Ridge, bears E and W; desc. 60 ft. through scattering timber, edge bears E and W.
40.00	Point for the $\frac{1}{4}$ sec. cor. of secs. 1 and 6, falls on a sandstone boulder, 8 x 5 x 2 ft. above ground.  Set a brass tablet, $\frac{3}{4}$ ins. diam., $\frac{3}{4}$ -in. stem, in drill hole in boulder, with top mkd.  <div style="text-align: center;">           T 13 N  <math>\frac{1}{4}</math>            R 24 E   R 25 E            S 1   S 6            1972         </div> from which  A pinon, 8 ins. diam., bears S. $54\frac{3}{4}^{\circ}$ E., 297 lks. dist., mkd. $\frac{1}{4}$ S 6 BT.  A juniper, 9 ins. diam., bears S. $65^{\circ}$ W., 84 lks. dist., mkd. $\frac{1}{4}$ S 1 BT.
46.60	Arroyo, drains N. $75^{\circ}$ E.; continue over nearly level land.
67.50	Leave scattering timber; edge bears E and W.
80.00	Point for the cor. of Tps. 13 and 14 N., Rs. 24 and 25 E.  Set an iron post, 28 ins. long, $2\frac{1}{2}$ ins. diam., 24 ins. in the ground, with brass cap mkd.  <div style="text-align: center;">           T 14 N            R 24 E   R 25 E            S 36   S 31            S 1   S 6            T 13 N            1972         </div> Raise a mound of stone, 5 ft. base, 3 ft. high, S of cor.  Land, southern portion broken, balance level. Soil, sandy loam, and rocky. Timber, juniper and pinon; undergrowth, sagebrush.

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FIELD NOTE PAPER

## APPENDIX

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6th G.M. East, T. 16 N., bet. Rs. 24 and 25 E., Mer., (State)

CHAINS	
	<p>NOTE.— The field notes of the survey of the 6th Guide Mer. E., through Tps. 14, 15, and 16 N., bet. Rs. 24 and 25 E. continue on the same form, and all but the last mile are omitted.</p>
	<p>North, bet. secs. 1 and 6.</p>
	<p>Asc. 25 ft. along broken W slope, through heavy juniper and pinon timber and dense undergrowth.</p>
3.00	<p>Spur, slopes W; desc. slightly along steep W slope.</p>
12.70	<p>Gulch, course S. 30° W.; asc. 350 ft. along W slope; timber changes to mostly pine.</p>
29.80	<p>Spur, slopes SW; continue ascent of 125 ft. along steep W slope.</p>
40.00	<p>Point for the <math>\frac{1}{4}</math> sec. cor. of secs. 1 and 6.</p> <p>Set an iron post, 28 ins. long, <math>2\frac{1}{2}</math> ins. diam., 12 ins. in the ground to bedrock, and in a mound of stone, 8 ft. base, <math>1\frac{1}{2}</math> ft. high, with brass cap mkd.</p> <div style="text-align: center;"> <p>T 16 N  <math>\frac{1}{4}</math>  R 24 E   R 25 E  S 1   S 6  1972</p> </div> <p>from which</p> <p>A yellow pine, 14 ins. diam., bears S. 36 3/4° E., 54 lks. dist., mkd. <math>\frac{1}{4}</math> S6 BT.</p> <p>A yellow pine, 12 ins. diam., bears S. 72 1/4° W., 96 lks. dist., mkd. <math>\frac{1}{4}</math> S1 BT.</p> <p>Corner falls in a small wash which drains SW. Asc. slightly.</p>
41.00	<p>Spur, slopes W; desc. 125 ft. along W slope.</p>
44.20	<p>Deep draw, drains W; asc. 300 ft. over steep SW slope.</p>
57.00	<p>Top of steep ascent; asc. gradually.</p>
67.00	<p>Divide bet. South Fork and North Fork Trapper River, bears East and S. 75° W.; desc. 225 ft. over NW slope.</p>
81.44	<p>Intersect the Fourth Standard Parallel North; point for the closing cor. of Tps. 16 N., Rs. 24 and 25 E.</p> <p>Set an iron post, 28 ins. long, <math>2\frac{1}{2}</math> ins. diam., 12 ins. in the ground to bedrock, encircled by a mound of stone, 4 ft. base, to top of brass cap, mkd.</p> <div style="text-align: center;"> <p>T 17 N R 24 E  S 36  S 1   S 6  R 24 E   R 25 E  T 16 N  CC  1972</p> </div> <p>from which</p>

Form 9180-7 (October 1964) (formerly 4-673b) USDI-BLM

FIELD NOTE PAPER

## MANUAL OF SURVEYING INSTRUCTIONS

6th G.M. East, T. 16 N., bet. Rs. 24 and 25 E., \_\_\_ Mer., (State)

CHAINS	<p>A juniper, 12 ins. diam., bears S. <math>33\frac{1}{4}^{\circ}</math> E., 58 lks. dist., mkd. T16N R25E S6 CC BT.</p> <p>A yellow pine, 9 ins. diam., bears S. <math>72\frac{3}{4}^{\circ}</math> W., 129 lks. dist., mkd. T16N R24E S1 CC BT.</p> <p>From this point the stan. <math>\frac{1}{4}</math> sec. cor. on the S. bdy. of sec. 36, T. 17 N., R. 24 E., bears S. <math>89^{\circ}56'</math> E., 12.76 chs. dist., monumented with a sandstone, 12 x 8 x 6 ins. above ground, firmly set, mkd. <math>\frac{1}{4}</math> on N face, with a mound of stone, 3 ft. base, 2 ft. high, N of cor.</p> <p>From the same point the stan. cor. of secs. 35 and 36, T. 17 N., R. 24 E., bears N. <math>89^{\circ}56'</math> W., 27.18 chs. dist., monumented with a sandstone, 14 x 8 x 8 ins. above the top of a mound of stone, 4 ft. base, 2 ft. high, mkd. with 1 groove on E and 5 grooves on W face, with a mound of stone, 3 ft. base, 2 ft. high, N of cor.</p> <p>Land, mountainous. Soil, sandy and rocky. Timber, yellow pine, juniper, and pinon; undergrowth, service and oak brush.</p>
	MEMORANDUM
	A summary description of the region crossed by a guide meridian is supplied at the end of the field notes, or it may be included in the general description of the subdivisional survey.
	(West Boundary of T. 13 N., R. 24 E.)
	NOTE.— The field notes of the survey of a meridional township boundary ordinarily take the form of the specimen field notes of the 6th Guide Meridian East, with only one set of measurements. The specimen field notes for the survey of this boundary are omitted.
	North Boundary of T. 13 N., R. 24 E., ___ Meridian, (State)
	NOTE.— Latitudinal township boundaries are generally run by the random and true method, but the random line is not described in the field notes unless required for some special circumstance. Detail of the random line is given here to show the form.
	<p>May 19, 1972, at the cor. of Tps. 13 and 14 N., Rs. 24 and 25 E., in latitude <math>37^{\circ}04.8'</math> N., and longitude <math>104^{\circ}38.3'</math> W., as computed by reference to the values given for the stan. cor. of Tps. 13 N., Rs. 24 and 25 E., turn <math>90^{\circ}</math> from flag point previously located on the 6th Guide Meridian East, and run</p> <p>West, on a random line, making proper offsets to the north from the tangent to the parallel at intervals of 40.00 chs., setting temp. <math>\frac{1}{4}</math> sec. and sec. cors. on the line bet. Tps. 13 and 14 N., R. 24 E. At 479.25 chs. the parallel falls 25 lks. South of the cor. of Tps. 13 and 14 N., Rs. 23 and 24 E. The correction is 4.2 lks. North per mile, counting from the point of beginning.</p> <p>Thence S. <math>89^{\circ}58'</math> E., bet. secs. 6 and 31, marking and blazing the true line.</p>

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## APPENDIX

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N. Bdy. of T. 13 N., R. 24 E., \_\_\_ Mer., (State)

CHAINS	
	Asc. over SW slope, through dense growth of sagebrush.
30.25	Ridge, bears N. 15° E. and S. 15° W.
34.00	Head of draw, drains S.
39.25	Point for the $\frac{1}{4}$ sec. cor. of secs. 6 and 31. Set an iron post, 28 ins. long, $2\frac{1}{2}$ ins. diam., 24 ins. in the ground, with brass cap mkd.  <div style="text-align: center;"> <math display="block">\begin{array}{r} T\ 14\ N\ R\ 24\ E \\ \quad \quad S\ 31 \\ \frac{1}{4} \quad S\ 6 \\ T\ 13\ N \end{array}</math> </div> 1972
	Raise a mound of stone, 5 ft. base, 3 ft. high, N of cor.
46.90	Ridge, bears N. 15° E. and S. 15° W.; desc. 100 ft. over gradual E slope.
77.50	Draw, drains NE; asc. gradually.
79.25	Point for the cor. of secs. 5, 6, 31, and 32. Set an iron post, 28 ins. long, $2\frac{1}{2}$ ins. diam., 24 ins. in the ground, with brass cap mkd.  <div style="text-align: center;"> <math display="block">\begin{array}{r l} T\ 14\ N &amp; R\ 24\ E \\ \hline S\ 31 &amp; S\ 32 \\ S\ 6 &amp; S\ 5 \\ T\ 13\ N &amp; \end{array}</math> </div> 1972
	Raise a mound of stone, 4 ft. base, 2 ft. high, W of cor. Land, rolling mountainous. Soil, sandy. No timber; heavy cover of sagebrush.
	S. 89° 58' E., bet. secs. 5 and 32. Over rolling N slope, changing to E slope; through dense growth of sagebrush.
29.50	Gulch, drains SE; asc. to spur.
35.50	Spur, slopes S; leave sagebrush and enter scattering timber; desc. gradually.
40.00	Point for the $\frac{1}{4}$ sec. cor. of secs. 5 and 32. Set a sandstone, 24 x 8 x 6 ins., 16 ins. in the ground, mkd. $\frac{1}{4}$ on N face. Dig pits 18 x 18 x 12 ins., E and W of stone, 3 ft. dist.
44.50	Draw, drains S; asc. gradually.
53.00	Top of slope; desc. 50 ft. to creek.
60.00	Crooked Wash Creek, dry, 30 lks. wide, course S. 20° W.; asc. 150 ft.
77.00	Ridge, bears N and S; desc. gradually to cor.

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## MANUAL OF SURVEYING INSTRUCTIONS

N. Bdy. of T. 13 N., R. 24 E., \_\_\_ Mer., (State)

CHAINS 80.00	<p>Point for the cor. of secs. 4, 5, 32, and 33.</p> <p>Set a sandstone, 20 x 10 x 8 ins., 13 ins. in the ground, mkd. with 4 notches on E and 2 notches on W edge from which</p> <p>A juniper, 20 ins. diam., bears N. <math>36^{\circ}</math> W., 423 lks. dist., mkd. T14N R24E S32 BT.</p> <p>No other suitable bearing trees available.</p> <p>Raise a mound of stone, 4 ft. base, 2 ft. high, W of cor.</p> <p>Land, rolling mountainous. Soil, sandy and rocky. Timber, scattering juniper; undergrowth, sagebrush.</p>
	<p>NOTE.— The field notes of the survey of the line bet. secs. 4 and 33, 3 and 34, and 2 and 35 continue on the same form and are omitted.</p>
	<p>S. <math>89^{\circ}58'</math> E., bet. secs. 1 and 36.</p> <p>Desc. gradually through heavy pinon timber and dense undergrowth.</p>
11.40	<p>Road, graded, 25 lks. wide, bears N. <math>55^{\circ}</math> W. and S. <math>55^{\circ}</math> E., from Fort Meyer to Douglass Post Office.</p>
16.20	<p>Right bank of the South Fork Trapper River, course S. <math>50^{\circ}</math> E.; banks 2 to 5 ft. high, water at present low stage from 1 to 3 ft. deep; point for the meander cor. of secs. 1 and 36.</p> <p>Set an iron post, 28 ins. long, <math>2\frac{1}{2}</math> ins. diam., 24 ins. in the ground, with brass cap mkd.</p> <div style="text-align: center;"> </div> <p>from which</p> <p>A juniper, 14 ins. diam., bears N. <math>76\frac{1}{4}^{\circ}</math> W., 142 lks. dist., mkd. T14N R24E S36 MC BT.</p> <p>A juniper, 10 ins. diam., bears S. <math>21\frac{3}{4}^{\circ}</math> W., 98 lks. dist., mkd. T13N R24E S1 MC BT.</p> <p>Width of river about 4.50 chs.; dist. across on line by steel tape measurement, 7.15 chs.</p>
23.35	<p>Left bank of the South Fork Trapper River; point for the meander cor. of secs. 1 and 36.</p> <p>Set a washed flint boulder, 28 x 16 x 8 ins., 21 ins. in the ground, mkd.</p> <p>6 grooves on N, 1 groove on E, 6 grooves on S, and MC on W face.</p> <p>Raise a mound of stone, 5 ft. base, 3 ft. high, E of cor.</p>

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## APPENDIX

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N. Bdy. of T. 13 N., R. 24 E., \_\_\_ Mer., (State)

CHAINS	
	Asc. 150 ft. over broken SW slope, through scattering pinon timber.
40.00	Point for the $\frac{1}{4}$ sec. cor. of secs. 1 and 36.
	Set an iron post, 28 ins. long, $2\frac{3}{4}$ ins. diam., 24 ins. in the ground, with brass cap mkd.
	<div style="text-align: center;">           T 14 N R 24 E  <math>\frac{1}{4}</math> S 36                      S 1            T 13 N            1972         </div>
	from which
	A pinon, 9 ins. diam., bears S. $29\frac{1}{2}^{\circ}$ W., 387 lks. dist., mkd. $\frac{1}{4}$ S1 BT.
	Raise a mound of stone, 4 ft. base, 2 ft. high, N of cor.
45.70	Ridge and edge of heavy timber, bear NW and SE; desc. 35 ft.; timber changes to pine, spruce, and fir.
65.20	Base of slope and edge of timber, bear NW and SE; leave timber; continue over nearly level land.
80.00	The cor. of Tps. 13 and 14 N., Rs. 24 and 25 E.
	Land, mostly broken; eastern part nearly level. Soil, sandy loam, and rocky. Timber, juniper, pinon, yellow pine, blue spruce, and fir; undergrowth, sagebrush.
	<div style="text-align: center;">MEMORANDUM</div> <p>A summary description of the region crossed by the township exterior is supplied at the close of the field notes except where it may be included in the general description of the subdivisional survey.</p>

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## Mineral Survey Historical Background

Well hello everyone. Dennis Mouland here back with you again. This time in the field in a remote area of northwestern Arizona, mining country. Of course that's our subject right now retracement of mining claims and I'm here with someone that I promised you, Mr. Jack Kesler, a surveyor, a mineral surveyor, so Jack, glad to have you here.

Thank you Dennis, it is a pleasure to be here. Always a great opportunity that I cherish to be able to talk about I love dearly, mainly mining surveying, and mineral surveying. A little about myself, I am a registered land surveyor in Arizona, I have been since the early 70's.

I am a registered land surveyor in the state of Nevada, which I have been since the early 70's. Then I was lucky enough to take the examination and be appointed as a United States mineral surveyor in the early 80's. I had an opportunity most of my life to work in the mining industry.

I started out as a ten-year-old boy, my father was a prospector and an avid small miner and I was cheap labor. So I learned about mining the hard way. We had the jackhammers and compressors and we dug many holes, blew up a lot of rock, and did not make any money but that is typical. I learned early in life that I wanted to be a surveyor and I think that is one of the fortunate things I can pass on to people. If you get a chance to do something you like to do or love to do, you are made. Life gets a lot easier and I learned early on my father bought me a brunton compass and we did a lot of surveying.

Later on in life I moved up into the surveying world, I worked with an old mining engineer, and mineral surveyor in Patagonia, Arizona, that is where I got my first real mineral surveying experience was with him. So that's what gave me the background and this and allowed me to get appointed and since then I've done about 6 mineral surveys of my own. One's that are going to patent.

Absolutely, the problem that we of course all ran into was when we had President Clinton, our funding was stopped for approving of these things and it stopped mineral surveying in its tracks. They are probably about 60 of us left; I think that is probably the number. It's hard to get re-appointed, the law was changed so that every three years you have to be re-appointed and they are very good about, the BLM's have been very good in notifying us, and because of the fact I do things like this, I've taught many seminars, they tend to re-appoint me every time. I keep promising them that I can still get around the mountains and that's one of the crux's of this, us mineral surveyors have to do these things ourselves, you can't hire it done.

Did you go to college for this kind of stuff? Or did you get some other kind of degree?

Actually, you are right Dennis, I did. I went to the University of Arizona, got a bachelor's degree in physics. Had a little time off in the Navy, and I came back and a little problem with the physics department. I wanted to be a geodesist, is a high-powered physicist surveyor and we deal with the figure of the earth and magnetic fields and so forth. That is what I really love to do. They did not want me to do that, they only wanted nuclear physics so I wound up over in the

engineering department where I got a masters in civil but in surveying and geodesy. Then I went to Ohio State to work on a PHD in geodesy. I did not complete that because by that time I was tired of school.

Well we did not want to have to call you Dr. Kesler, either

Well that would be hopeless.

Well we sure appreciate you being out here. So what we're going to do here folks is I am going to step off camera for a while and just interview Jack and kind of pick his brain on some of the things he's done, and not just in this area, but just his knowledge about mineral surveying and retracement in general, so we'll do that here in just a moment.

Well Jack, we should go ahead and put our sun glasses here, just a little bright out here in the Arizona sun, but can you tell me just a little bit about this area, we're near the town of Oatman, just a little background of these folks that most of you don't know.

Sure, as you pointed out, its south of Oatman and the area part of this district is not highly mineralized but there were many, many patented lode claims set out here and this particular area we are standing on right now, or we are sitting on, we did a dependent resurvey of this. The client was a man who was purchasing this from a local realtor and of course, there is a convoluted story here of people out here selling land and doing the usual promotion deal with mining that always happens. There really was not much here.

This person thought he was going to get some land and so we surveyed it for him and we ran into some problems with it. There were 4 X 4 posts, which you have seen. You all know what 4 by 4 posts look like. We discovered we had an overlap here with pre-existing senior located mining claims that were non-patented but they were located and they were senior so they had to give way. So unfortunately, for the poor man he discovered he did not have as much land as he thought he had.

That's another point I'd like to raise here is that when you do dependent resurveys like this, we're probably going to discuss in detail some of the tools, but one of the things you've got to look for and look at is the patent. If you do not look at that, if you look at the mineral survey plat, you are going to come away with an idea that, they have 20.66 acres when in point in fact they maybe only have five. So if you are going to get involved with this you have to be careful. In this particular instance was one of those times.

That starts out with the original steps with any kind of re-survey process is a research in the record. So with this you had to research not only the claims that you are looking at but also the adjoiners and other things that have gone in, in the area.

Absolutely. In fact in this particular situation, and probably the primary reason why I think this is a good place to sit and have this, is the fact that we not only had patented claims that had gone to patent but we had several of them that surveys had been made of and approved and filed, but

the patent never processed. So you are going to see a picture of a monument that was a stone that was very important to re-establishing the end lines of these claims. It was there and approved, it is just there was no patent to it. So those were kinds of things that are particularly of interest in this particular job.

You mentioned a minute ago, I am kind of changing the subject a little bit. This is not a heavily mineralized area but there are all types of claims out here. You mentioned the promotion in some of the scamming and of course, the mining is just notorious for that sort of thing, it strikes me, it helps me understand some things. I have worked many claims myself and you get out here and you do not see any workings, there is no sign of any mining and somehow that went to patent. Maybe some of that fraud was going on even with the government.

I do not have any firsthand knowledge about that but I can give you an example of this particular thing. As you look at it, you can look back over the rolling hills and see that there are very little if any, however every now and again you will see a discovery hole. You will have a hole that somebody dug.

A one-compartment shaft for the purposes of discovery. You will also if you look back down the road here, which I promised I was not going to do is point, but if you look back down here there is a heavily mined shaft on one of these claims. Hence fourth, I think you can generalize some of these situations and the fact that they were trying to cover the ground so they would not have problems. I am going to take a little back step in history and give you a little background on why I am sure that became a process here more than we would like to know. The Tom Reed Gold Mining Company versus United Eastern Gold Mining Company in the town of Oatman got into a lawsuit, heavy one because the geology over here says there was a fault called a Mallory fault and it separated the ore body.

If you are familiar with mining law and if you have ever read Morrison's Mining Law or any of those things, you are going to find out about the Apex Law. The Apex Law is a big key here. The apex law says a miner, a normal human being, not a surveyor or engineer can get on this lode or vein, and mine it, clear the bottom of it, side it's limits if his end lines are parallel. He can do this until that vein stops.

Well that vein stopped at the Mallory fault so they got in a lawsuit because the vein did start up again about 300 feet away. But unfortunately for them that was a different apex. That created a problem in a sense that Tom Reed and the United Eastern sitting side by side now if the Tom Reed Gold Mining Company had sense enough to have located claims outside their, they'd probably never have this problem. But this is I think some of it is just pure fraud. The mountains they are just covered, it was a giveaway. Five dollars per acre, you could get free land and many people took advantage of it.

When a miner would call you, you acting as a mineral surveyor, to do a survey for a patent, what were some of the first things you do when you came out, what were some of the first things in the field or in the office you had to do.

The first thing we usually do to get into it with these people and it is usually a context situation. BLM gives them a list of mineral surveyors and they pick out the one closest in the area. If they are really serious about this they will contact that mineral surveyor, and we will have the first meeting usually on the ground, at which point we discover that one they have to stake the claims themselves and two they have not had any surveying experience.

So the third thing that usually happens in my position is I tell them look, in order to do this without creating hiatus and gores of all kinds of shapes and sizes in this thing. We are going to do what we call a pre patent survey of it. We're going to go back and resurvey all the boundaries, this time with all the instruments, with know-how, we're going to put monuments out there that are semi permanent and we're going to make new location notices. You have to understand that mining law you can get away with amending locations over and over without detracting the original claimant's rights. So we can amend these things over and over which is the first step that we would then do, was amend these locations and get him a new set of location notices and then send him to the BLM with the idea that okay he's chosen me, the BLM then sends me the order to proceed.

Now intrinsic to all that, is research. Now if he has adjoiners, if there is other patented lode claims out there all these items have to be found before we really get into the pre patent survey.

So the pre patent survey is really like an As-Built almost of what it is he staked versus where the lode is or I am assuming it is a lode claim. Adjusting or at least seeing the picture what you are going to have to do to adjust it then you call it an amendment. Then amend his location and then you are patent survey later is based on that new location, is that what it is?

That is correct, you see mining law patent lets you do three things, locate, relocate, or you can amend. We amend the original notices. By doing so we have created better boundaries with bearings distances that are conformance with statutes so we do not have 1600-foot long claims. End lines that are so far out of parallel that it is ridiculous. The things that we have seen will just make you turn to stone.

The average person does not know a thing about how to stake that out of rough country like this. So the next step after this pre patent survey. The next step was the actual patent survey. Did you actually survey it all over again, what did you leave behind, and what was your process?

What we did, I should say we meaning myself and several of the other people that I have known in business a long time. We discovered early on that re-bar were a lot easier to use. 5-8 inch re bar or 2 feet long or whatever it took. As claim corners that are actual final patent locations for monuments. We did this because in the old style of doing things you use 4 by 4 wooden post that had to be dug and buried, or you chiseled stones, and it's just easier now cause we have a nice aluminum cap we can stamp we don't have to be a stone carver out here, literally.

If anybody has ever tried to carve stone I wish him or her best of luck, especially out here. This stuff is hard and it does not give very easy. So we would go without pre patent survey, we would leave 5/8 inch rebar where we were going to put the corners. We would come back and yes, the answer is we go over it all again. We have to have original set of notes that post date the patent

issue order. We redo it and if we like it, which gives the opportunity to find any mistakes, and we found them. Get this thing all fixed up, conformed, put the caps on them, make the topo calls, make any ancillary ties like the mill buildings, anything like of sort, and write the notes up.

In your experience of retracing some of these, because we were just speaking of you doing a patent survey but when you retrace these, especially the older ones, do you get an indication that maybe they did not always traverse all the way around it like a closed traverse of metes and bounds?

Yes in fact this has been a common situation. Let us take example where we are sitting here. I honestly believe they actually traversed the boundaries of these claims because there really was not anything in their way. But when you get in the mountains or brush country, I know that they ran centerline traverse, or they run a traverse in the general direction of the lode line and stubbed out the corners because there is just no way.

That kind of heavy brush cutting is just prohibited. In fact the last mine we worked at extensively was north of Alma, Colorado. And we have the man's field notes. It is just a whole series of traverses that ran over the side of that mountain. But if you saw that mountain you would understand why. Its 13,000 feet high. So yeah, you see all kinds of different things.

Generally, what you are saying is it was just as easy to do it with good accurate survey around the exterior; you could probably count on that. But if the circumstances were just really tough, you should be more aware or looking for the possibility that things have been stubbed out. I have seen where the end lines have gone 20 feet one way and 20 the other. Obviously, they were not doing what the notes said.

Nor were they cautious. But the joy of it is that sometimes you can tell from their notes. You can tell from the notes they publish that there are no topo calls, the topo calls on the sidelines do not really jive with Mother Nature and that is the first indication that somebody did some serious getting around the rules. The rules really state that you are supposed to traverse the thing but it is like GPS or total stations, people learn how to cheat. You just have to become aware of it because our job is to retrace the footsteps the man that did it, but sometimes that is a challenge.

About a half mile southwest of us here is a rugged peak hill there. There is a USLM up there, right?

Yes there is.

You have been up there.

Unfortunately, yes.

What was the monument? Just out of curiosity.

The monument is a very large stone in place with the X chiseled on it and the USLM. I do not recall a mineral survey number on it. It is mineral survey number for this particular block of claims. Next to it was a mound but the post was gone.

When you guys did your retracement here, you were using distance meters. Maybe GPS?

Historically with this particular area, I was involved with this back in 1975, it was the Victoria Gold Mine and they wanted lode claims retraced and some new ones staked, and at the time I just started in did business and I didn't have a lot of man power. So I got some friends of mine in Lake Havasu and we used distant meters. In fact, we used HP3800's and 10-second theodolite. We retraced most of these and when this job came back at us like bad pennies tend to rise, we used GPS on this one. RTK

That is when you went up to the LM. You have a precise measurement up to the LM. Historically when these claims were first done or the adjoiner senior claims that were here and whatever, they tied to that LM, what kind of precisions is you finding there.

You know I wish I had thought to check that because we could have spotted a number here but it is very close. As you can see where it is at and you see where we are sitting here. We are sitting on the east end line of these lode claims. It is very close they may have measured it. Often times they did not, as I think we have talked before, we have described these things. The LM itself is the stone up there in place.

Sometimes these LM's were actually stones that were chiseled and the post was put over the top of them. It built a huge caron of stone so this thing might have been 8-9 feet high with an 8-inch square post in it. You could see that for miles. So what would happen the guys would be out there on the ground and they would intersect that with a bearing line from several different places on their survey. Compute their tie and never make it on the ground. If it was really long ways away like it can be up here that was the way it was done.

That is what I was going to say especially if it was a long ways or really rugged causes even that face over there that would not be very fun to chain up.

No it is better to get up back around the hill but I do not think they did that. The beauty to it would be the quarter corner is sitting right here behind us so it is easily gotten too and that is the primary tie.

That is an interesting question, what is the rule if you are doing a new patent survey, not that there is any of those happening now, what is the rule about tying these into real world or if you are out away from anything?

If I remember, you can correct me here, because this is just memory, if you are within two miles of cadastral monument, then that is what you should do in the public land system. If you are not then you can establish I location monument. These location monuments now, let me elaborate, they used to be called USMM's or United States Mineral Monuments and they were given



numeric numbers, serialized numbers, so you might find USMM number one half a dozen places.

Later on, they started using the USLM designation, which was United States Location Monument, and they gave them the mineral survey number of the particular survey that was being done at the time.

So the LM number would be the same as the first claims that were staked, or not staked but surveyed.

Yeah

I have noticed that, you just made me remember that I have noticed that you have mineral monument number one in like each land district. There is another number one, as you just started over.

It was not a very good idea.

Jack, you mentioned on this particular claim that we are sitting, and I know it happens elsewhere, overlaps. Obviously, you are going to have to get the records for whatever those adjoined claims are, right?

That is correct.

Then you have to look for all that evidence and all that. What happens when say a previously patented claim are actually inside the claim that you are staking? Or not staking but you are retracing, let us assume that yours is patented too but are a junior to that.

All right. That is a good question because that is very much like this one, although the overlaps with this one are senior entitled they were not patented. However with a patented lode claim, one, in the retracement process you've got to get the field notes, you got to get the plats, and the patents if you will for all the adjoining properties that have any inference whatsoever to deal with your boundary. The reason for that is very simple.

As these things tend to age, these mineral surveyors make new ties to these corners, they uncover evidence sometimes they overlook evidence, but the bottom line is we have a chain of evidence, starting with the original patent survey, the next patent survey, the next patent survey. The key to this is we have to look at the fact we have overlaps if we were talking two patent surveys. Mine was junior to the senior one. Obviously, the patent would reflect that this particular overlap was excluded to the senior claimant; it is also possible as it often happens, and we have seen it many times, where a Tract A was formed around the discovery. Say I am doing this old patent survey, and there was a Tract A around it, you have to be careful about Tract A. You have to find out if Tract A was ever conveyed to the junior claimant as often times they were things of that sort of that have to be studied but the notes, the patent, and the plat will give you a pretty good indication of the exclusions that were believed to be. Sometimes you will find that

the senior actually will not exclude. They will not exclude some of the seniors, so you have to be careful with it, study it very carefully.

Also, just a slight twist, what you're saying here is that if your adjointer is unpatented but valid claims, then will those be excluded also on the patent or would they patent over it but just the mineral rights didn't go?

The unpatented claim brings on another challenge because often times you will find that those lode claims were not staked by a registered or a professional surveyor so you have some very strange looking overlaps. But it is not our place normally to try to iron that out. That is something that we find with unpatented lodes that we would wish would go away but they do not. Oftentimes, particular case here, they were excluded because they were senior entitled.

If you were doing just a retracement, somebody just hired you to retrace unpatented claims and you found overlaps that had not been caught in the patent. Do you just note that on your dependent resurvey plat or how do you deal with that.

Well that is another one of those typical things that now removes us from mining and puts us into the common problem of common law because now you have a situation that these surveys were faithfully done and faithfully approved, the patents were faithfully given, and now we have a boundary problem. Usually what that comes to is an agreement by the parties at hand as to who gets what and to divvy this thing up, there is not solution to it to BLM's point of view or anybody else is because the patent has already been issued.

Right, that makes sense. So that would be true even with unpatented claims.

Usually what happens with unpatented claims, particularly with this bunch, they were released years ago. The people did not keep up with their assessment work. Fundamentally there is an exception here. These are excluded but they are not really mining claims its open public land. Unless these people actually maintain them. That is always a question that is why the law was changed so you could not just hold onto them forever.

Now when you came and did the survey, you had to retrace the, or I am talking about doing an original survey now for patent. When you leave you have all these monuments at the corners, you have tied in all the improvements and if I remember right, the mineral surveyor is also the one that does the estimate of the dollar value of those improvements?

Absolutely, the structure here is one of mapping everything on the property that has any bearing whatsoever as to the amount of expenditure made on this particular property. That means if we have underground workings we have to traverse them. What we normally do with that, none of us are really qualified anymore, unless you are a mining engineer or you have a mining contractor, which is conflict of interest, you could not be a mineral surveyor anyway, well you could if you are a mining engineer.

But the key is here normally the client can provide you records that say it cost us so many feet to drive this drift and so many feet, and that is how we measure it and determine the value. Nobody

really questions it, same thing with diamond drill holes, they have a log and they know how deep they were, they know how much they paid per foot and that is how we do it.

I see, now the surface improvements, say buildings or where you can see a shaft or that sort of thing, all of that is actually tied in, by the survey process is that correct. Barring other issues where it may have moved over time, that is potential good evidence information if some of your corners are gone you have some of these other structures still there right.

Yes, and you have to of course qualify that a little bit because sometimes instrument surveys are the key here. If you did a complete instrument survey, sometimes we might have stated those building ties but still are within a foot or two and yes the ancillary evidence of the building foundations, the mill site foundations, the caller of the shaft, any of those things, even down to a small adit is driven into the vein structure. Those have been valuable tools to put the corner back into the ground within reason. Here we are not building rockets and we are not building skyscrapers, this is mineral surveying and if we are within a foot of some of these old ones, we are thankful.

It was a miracle.

Yes, it was a miracle.

So after you have done the fieldwork, what is it that you have to prepare to submit to BLM?

We prepare a map, used to be a plat that was prepared on cloth. Gray imperial cloth. We would then draft up a set of draft notes and send them into the BLM office. Now every BLM office is not created equal. We have had people that used to take that beautiful cloth drawing, fold it up, stick it in the envelope and send it back. Of course they ruined it, if you know anything about cloth. We have had those problems. These are just problems that are probably typical of every human being.

This one doesn't like aforementioned, this one's doesn't like lines previously described, so your notes get a good widdling away at and your plat gets a good widdling away at and once you get them back, and re-drawn it probably because they folded it up. You have re-typed all the notes that used to be in legal size and three carbons. Once you have that finally finished, you send that in, it's approved, and we are usually given a copy of our approved, the BLM actually draws a little mineral survey plats that you see in the record, the one with the little compass road. We do not; we can make it as big as a bed sheet, whatever it takes.

But they redraw them and usually send us a copy of them with a letter saying you are survey number so and so was approved this date. Once this is done we are finished with it.

The notes are a typical set of running notes as GLO and BLM have always done, except it is in feet.

It is in feet and that is probably the one thing that is most impressive about this is the beauty and the simplicity and yet, the extreme amount of evidence that is supported in these field notes and

that is one of the things that private surveying, people do not understand the importance of these things. We even talked a little earlier about these unpatented claims and sometimes we go out and sometimes the claim itself is not that bad and the claimant doesn't want to do the pre patent survey and we have to go out and sometimes the field notes will actually disclose a corner of the location. In other words, we will say and in the corner location bears 30 degrees, 12 minutes northwest, 21.7 feet. That's a key cause what we have done now is we have constructed legal boundary within the limits of the location which may be a lot smaller than the 1500 by 600 feet that they're allowed, so you'll run into that.

I want to ask you about monuments, obviously if you just say you're doing one isolated lode claim to keep it simple so there's four corners but in some parts of the country they're either required or optional but side centers and end centers, first of all what's the rules here in Arizona?

Any patented lode claim or unpatented lode claim when it is staked requires six substantial monuments and one at the discovery. Now the six substantial monuments are classified as the corners obviously and the end centers. The end centers are a necessity they are supposedly reportedly shows the actual strike if you will of the vein so the end centers were always set.

In the state of Nevada and other states they also put in side centers and these side centers radiate out to the point of discovery so that they split the actual sidelines if you will in half. They are also very good evidence sometimes, also very naughty because they can be very badly out of position and had not had a clue. Yes, we have some claims in this state. We finished one not long ago out at White Hills, and it was pre-dates time almost. It was so old that it was all part of Piute, County of Nevada. It was under Nevada rules so it had side centers. These are things that are out there and in Arizona we only require end centers.

In a retracement of those things then, unless you are finding some incredibly gross error, fraud, or something that went wrong especially with side centers, you are treating those as the limits of the claim when you do a retracement, when you do a resurvey.

Absolutely. If we are talking in general terms like we were earlier about lode claims that are staked by the claimant and not really conformable to the statutes but they are close, and they do not want to redo it, we are limited to work within those limits and this end center is certainly the part that creates these limits. If the claim line is dished inward toward the claim then you cannot go past that end center you have to create your new lode end line on that end center. I have had to do that. Cause you cannot go out past it.

If you have two claims overlapping each other, or say a section line crosses your patented claim or whatever, at least in the past there has been a setting of really what amounts to a point of intersection of those lines and they are called crossing closing corners, have you had any experience with that?

No. In fact the only time I have ever heard about those things is the first time that we started creating this course. Those are your crossing closing corners and I have never seen any and these mining claims, the intersections are computed, they were never monumented out here. Not saying that there are not places in Arizona because I am sure there are, and I am not saying this is

a universal rule but the thing is the crossing closing corners itself is just like any other monument. So if you are going to use it, if you are going to find it you are going to need to use it. At least consider it. I put a long series of monuments on these sidelines out here, in places where I know construction is going to take out the claim corners. I put them out there and put them in the field notes on purpose.

Okay, so you have additional evidence in that way.

We put as much evidence as we can, a D8 Cat can take out a corner in a heartbeat but I have never had a chance to use a crossing closing corner.

I guess my experience with the crossing closing corners are much more recent things where BLM has been in doing dependent resurveys and identifying those little fractions of federal land.

I think you will find that just because I have not done any, you can find that to be true out here in Oatman because the government did a tremendous amount of dependent surveying with the express purpose of determining what was public and what was not. So we may have some and I just have not been to them.

Changing the subject just a little bit, can you just explain the general rule of lode versus placer, how does that break out?

A lode claim by definition is a location of mineral in place. The geologist have a word for this stuff, it's called the vein or vugs, it's a place in the earth where the fisher opened up and the minerals deposited so you have an ore deposit in solid rock.

Placer claims on the other hand are strictly free gold, gold that appears, I could have washed away from a vein, it could have done a number of different things but that is the free-goal concept of placer. So a placer than does not even reflect. You can have what we call an association placer where you are allowed eight people each one of them claiming 20 acres, so you can have 160-acre placer claim. Obviously, for obvious reasons a vein is very restrictive, a placer is free gold it could be pure all over the place.

So that's one of the differences but of course the lode claim can be 600 feet wide, 300 on each side of the lode line measured at right angles and 1500 feet long, that's the statutory requirement.

I understand it's different in some states cause I know Colorado is 300 wide total 150 each side.

Yeah and they have change, it can be anywhere from 50 up two, in Arizona at least we do not have those.

Now, we have one other type of claim that can go to patent, and that of course is the mill site. Does a mill site have to have minerals on it?

No. In fact a mill site does not need minerals. A mill site would not be valid mill site if it did have, although that has happened. I have seen mill sites actually put on the end line of a lode

claim which fly's against the completely descriptive process, but they are supposed to be non-mineral grounds, five acres in limit, and for the express purpose for processing ore.

Is there a limit on how many they can have?

Not really, in fact if you can see a lode claim or two lode claims with a series of mill sites you'll find that it's classified as mineral survey number xxx a and b will give you all the mill sites so they usually go right together.

Jack, you had mentioned, we were talking about evidence and corners, here on this claim apparently some land surveyors or engineers have been out here and attempted to do things, you have some bad positions out here is that right?

What we discovered when we got here, and we're not certain where they came from but there appeared to be four by four posts that aren't quite substantial as the original claim corners, which is in itself indication that somebody else has been playing with it. But these things were purporting to be where the intersection of these lines was. Between the old unpatented lodes and the overlap of the slope survey.

We discovered that they were not very good and as a consequence we discovered that too many feet were involved here so we just ignored them and sometimes you have to do that. They are not called for any field note or anything like that so they were probably not approved in any form, but I did not feel too bad about it.

Would you say retracement of these especially the older claims, is kind of a science, not as well known as the average surveyor?

It is very much a science and very much an art form. We would like to make this sound as if all these things are just paper cutter neat and clean and you can go out here, start here, take a solar, and run this line and you're going to get the corner. You might get there but it may be all over the chart when you get there.

It is difficult to have to admit but the great majority of these things, particularly these speculative things like this. Sometimes mineral surveyors are not just very careful. So you have an area in which you follow the descriptive call to, you look and search, you find evidence, and sometimes it just doesn't make any sense. So then you try to go to the ancillary ties if there was a claim that had any workings on it and try to get a point of discovery if you can find it. Try to find as much evidence as you can to what you consider to be at the time this thing was executed and then try to work back and make it all fit together the best you can.

Sometimes the reality of it is, is that you just wind up having to take it. If you can find one corner or two corners to put your hat too and follow the actual approved field notes and stake it out, remonument it just like it was approved, cause there is no other alternative.

So you are saying there maybe times where you do not have any other evidence and you just have to run record? Is that what you are saying?



Exactly

Since that takes us to our last subject who is lost corners, any advice, any thoughts on that? Should everybody always use grant boundary or compass rule or what do you think?

Well, we have numerous examples that I am sure all the people that are going to watch this thing, have had a chance to look at. So without sitting here and trying to describe them, I'm going to preface this by saying there are times when particularly dealing with lode claims, particularly single lode claims, it's wiser to use the grant boundary method cause we want to maintain the bearing integrity and the parallelism of the end lines.

On the other side of the coin, if you have large blocks of claims, I am going to specify why we have large blocks of claims. Most of the vein structure lode claims that you find out here are over an apex and because they are they are usually only one or two lodes. They may traverse the vein for quite a while. That is a typical situation when you have hard rock in place with an apex. On the other side of the coin when you have large blocks of claims, sometimes the compass rule is a good idea cause if you can find corners on both sides of the one that's missing then you can put them back.

People say well you have said before that your end lines have to be parallel; well they do for these apex veins. But with these horizontal bedded deposits, that is not the case because there is no apex. The apex is defined by something coming out of the surface not the sidewall of a canyon. You got two things working against you here. What I have seen done is compass rule adjustment used on single lode claims which is distorted and I will not say who did it but they did it all over Oatman over here. They really did not leave us the legacy.

You were mentioning that the parallel end lines, what is the case where it does not really matter as much.

It does not matter as much when you got these horizontally bedded deposits like uranium or copper like that.

Is uranium under lodes?

Uranium is under lodes even though it is in pockets and bugs it is under lodes. In fact one of our mutual friends, Mr. Jim Simpson, he did a lot of those in New Mexico. And found out all about argon gas.

Kind of wrapping it up here, for folks that are watching this that have a had a little bit or no experience with retracing minerals, what kind of advice can you give us that gets us headed in the right direction?

First off, you need a good client. One that understands what you are trying to do. This is something that I will defy you to give somebody a bid price on retracing these claims. That is almost impossible to do because you have no idea what you are getting into. On the other side of

the coin, you have to do research. You have got to be able to get the patent, field notes, plat, we were lucky enough to actually have a field notes of a man, the actual field tablets of the man that did the ones up in Alma and that was valuable cause now we know what he had set for traverse points, we were able to retrace it and find his points. From that we could restore the claim corners because they were in a ski slope and they were sliding down hill every time it snowed. Things like that are very important, hunt and hunt and hunt. Of course had had the adjoiners, every claim that even touches it, any potential that it actually touched it because there may be evidence. The BLM section sub divisional surveys, they have been excellent in old areas like this that were done prior to the sub-divisional surveys cause they will make ties to corners as they pass them. We have been saved several times thanks to the cadastral surveyors. Have a sense of humor too.

It is obvious talking to you that you enjoy working in mineral claims.

I truly do. It started off as a child for me and it has never waned. I guess it is because, just a little side light issue here. My father was a very kind man and there were many of the old miners that lived in what we call the old bore's nest downtown, which was actually the original cathouse. These old guys even though they were broken up and hurt and old, he would take them a bottle of whiskey or take them some cigarettes and we would talk to them. These are nice old guys. You get the impression of history and stupid movies about how mean and tough, they were not. It just gives you a brand new perspective on the human element here that was required to mine and pack up these hills to dig this rock out these were tremendous people.

Sounds like some pretty good background for giving with the spirit that went on out here.

Oh I think so.

Well Jack, many BLM surveyors will be seeing this and even the CFedS and who knows what other surveyors will see this and I really want to thank you for your passion for the subject and sharing some of that with us today.

Thank you Dennis, I have enjoyed being here and I enjoy doing this. I hope it is a value. Thank you very much

Thank you sir.

# Mineral Survey Retracement Issues, Part 1

## ***Introduction***

As you can tell from the interview, Jack is very experienced and shares that passion for surveying.



Now we have the perspective of an actually mineral surveyor and what it was they were doing out there. It meshes in quite well with what we have been talking about, what they're supposed to do versus what they did do and how all that worked out and what the mineral surveyors responsibilities were.


So, now with that we are going to change gears here and you know we are still talking about retracing mineral surveys but now we are going to go into some real specific retracement issues and that is some of the evidence things.

## Unique Evidence Considerations

There is some unique evidence things in minerals that we want to talk about for a minute. One is recognize that bearing trees when you're giving a bearing and distance that distance is to the face of the blaze to wherever the **X** is, and that's different than in the public land system so be aware of that.

### Unique Evidence Considerations

- Bearing Trees to the **face of the blaze @ "X"**
- Ties to improvements/mining activity
- Ties to other claims already surveyed or located



In the public land system, we go to the center of the tree at the top of the root crown, wherever the **X** is does not matter. With minerals, it was done differently so be aware of that. If you find one that you think is done differently either in minerals or in public lands, well document it and prove why. Otherwise, that is it.

This we've already mentioned but it is unique, is the ties to all of the improvements and all of the mining activity and they didn't do it necessarily for surveying points for you but it is certainly useful to us and that it's unique because you didn't really get that in most of the other surveys.

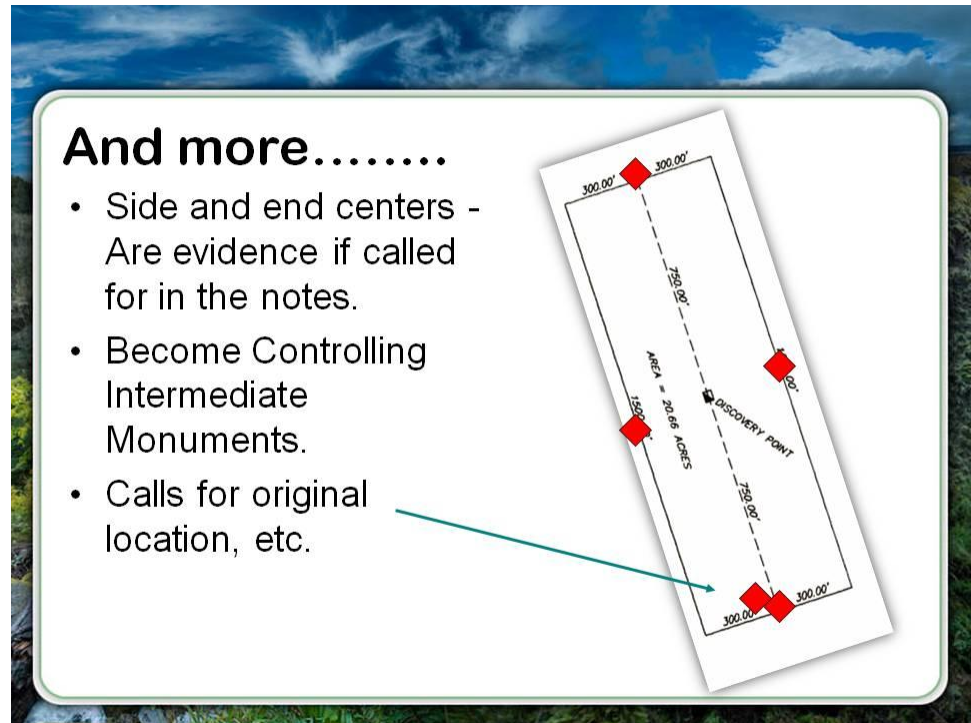
The ties to other claims that was already located or surveyed. So these are extra special evidence considerations but there is even more. That is that the side and end centers which we defined earlier in the course. If they are there, then they are evidence if they are called for in the notes.

It is a corner of the survey. They become as you may recall, controlling intermediate monuments so that could be the side ones or the end ones.

And then if you notice down at the south end of this claim I've got a double diamond there for you, one is at the end center and the other one is off a little bit and that's this last point here.

That sometimes you will have calls for the original location. Do you remember I showed you a slide back before the interview with Jack?

It was a slide where the mineral surveyor had gone in and adjusted what had been done and sometimes the evidence of the original location is still there at the time the mineral surveyor is there.



If not he had to figure out where it was. What is important sometimes when you and I get there, now, we are surveying, and we cannot find maybe the end center or one of the other corners it does not matter, but you read in the notes where he calls for the original location being at a slightly different place.

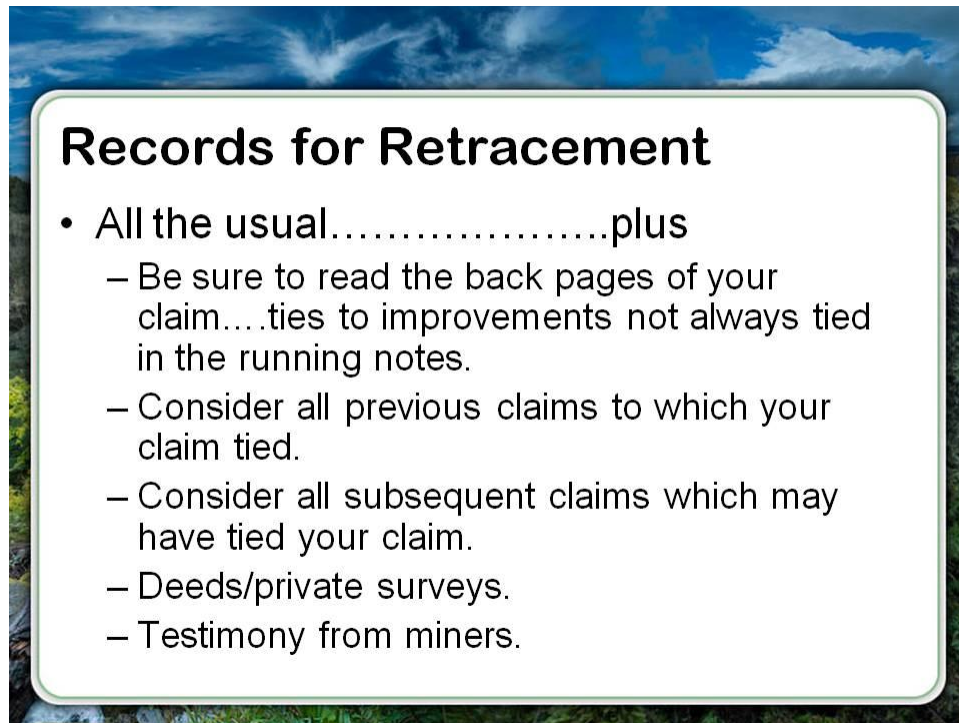
Let us say that the end center is there and yet there is a note that north 80 degrees west at 27 feet is the original location. What that means is there is probably a pile of stones there. There might even be the old wood post from the original claimant, you know locating himself there and you might be able to find that. Like this one I drew. If you lost the end center you probably lost it to but what I have found is one of the exterior corners of the claim will have a tie to a location. They had to adjust because their claimant screwed up, its 50 or 60 feet away and you go out there, here is this pile of rocks, and the old rotted remains of the point of the wood post are still there.

You know and you got to be careful because there are a lot thing it could be but it you know it could be claims for other adjoining claims or something else but that's another piece of information, calls, ties that he makes to his location or even somebody else's location, you might be able to find evidence to that. That makes that pretty valuable.



## ***Records for Retracement***

Now I have already mentioned that a records for retracement but let us just think through this again. All of the usual things, the record, plat, and the notes and we just looked at samples of that from the '73 BLM Manual.



### **Records for Retracement**

- All the usual.....plus
  - Be sure to read the back pages of your claim....ties to improvements not always tied in the running notes.
  - Consider all previous claims to which your claim tied.
  - Consider all subsequent claims which may have tied your claim.
  - Deeds/private surveys.
  - Testimony from miners.

Be sure to read the back pages of the claim, I mentioned this earlier, all of the ties to improvements are there they are not always tied in the running notes. In fact, you will find most of the time they are not tied to the running notes. Consider all of the previous claims to which you are claim tied. Pull those claim records at the same time while you are in the area or the public room or wherever you are getting your information and here is the other one that I eluded to consider all of the subsequent claims that may have tied your claim. You could have had a claim come in ten years after yours was done, found one of your corners, and he tied yours. You cannot find your claim corner but you can find their claim corner and you got a bearing and distance tie. These are very, very valuable. Obviously, the usual things, deeds, other private surveys that might be in the area could give you information as to the location, plus, testimony to from the miners themselves.

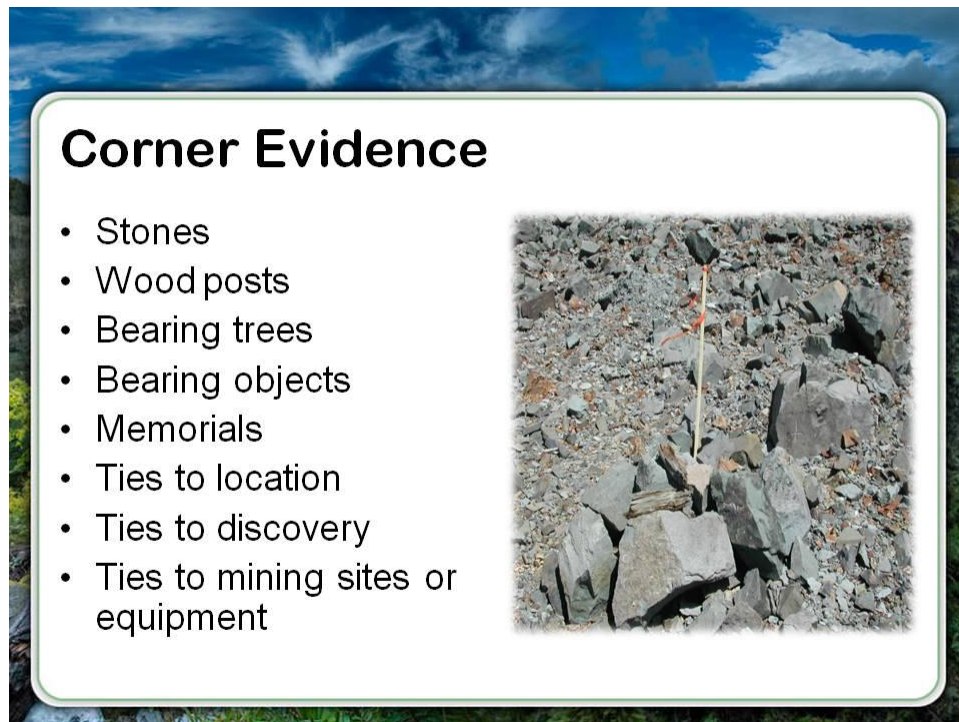
Now you have to be careful of that because minors are just like any other landowner interested in only you know they may lead you astray or they may not have very clear memories. Many people do not have clear memories but they want to be helpful so their trying to be helpful but you have to try to wade through that. But recognize that that is perfectly a viable means of pointing out. I will tell you, I have had the minor point to something he thought was his corner, and it helped me get on the right side of the hill and you know all this. Then I realize he says that's the corner of my claim and then you realize that's the bearing tree to another claim but I



can use it to get to that claim, to get to his claim, that sort of thing. So there is a lot of connecting the dots out there, literally and figuratively.

## **Corner Evidence**

When you are doing mineral surveys, now the corner evidence that you find out there is the same as we have always had with other surveys you know and that is the stones and I have been throwing some pictures in here for you along the way.

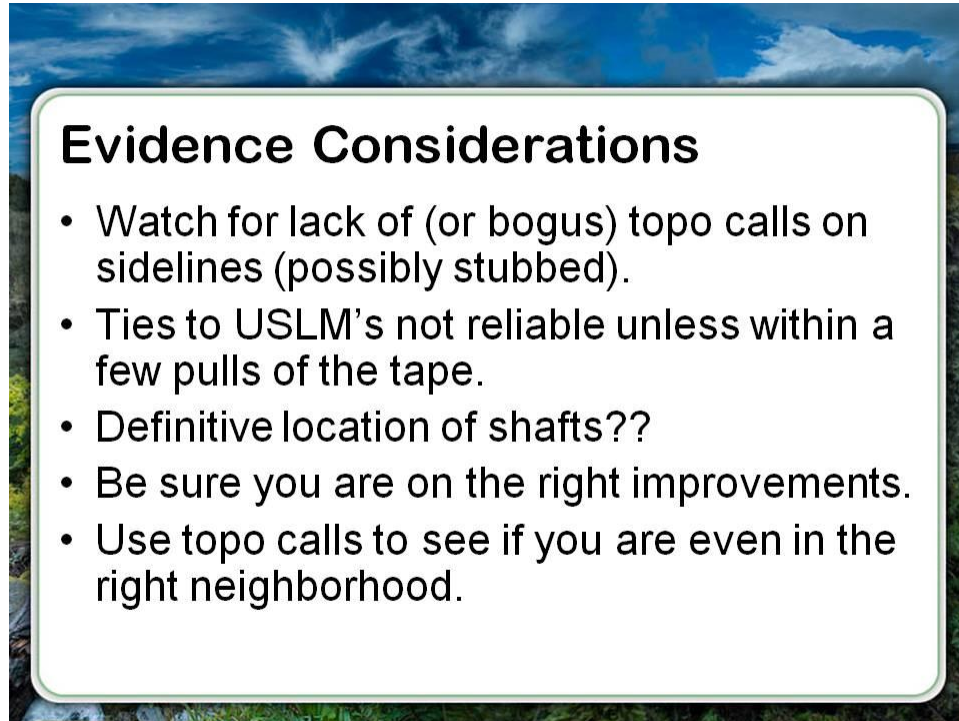


Stone corners, wood posts, very popular. Again a lot of times you don't find the whole post, it may be laying there it may be broken up but the rotted points, pointed ends are usually in the middle of that pile of rocks down in the ground, preserved.

Bearing trees with the slight deviation that I mentioned earlier, bearing objects where you measure to the **X** on the object. Usually those are out crops of rock or other major boulders or something that is not going to move even in the mining operation. Do not forget memorials, you may remember from public lands. Memorials are other objects deposited under or at the corner, point and that can be broken glass, pottery, ashes, charcoal, that kind of stuff. Then your other evidence for your corners, ties to your location, ties to the discovery, ties to mining sites or equipment. So all of this evidence is there available for us to try to determine where corners are.

## ***Evidence Considerations***

One important thought I'd just mention here. You think about some other evidence considerations.



Watch for the lack of topo calls especially on the sidelines. That is one for the keys that I find that "oh I don't know that he really ran this." You know this sideline, he did not really run the claim out to the full rectangle because the topo calls do not make sense, or there is none. I am always suspicious of that especially when you cross here in Arizona, if you cross a stream that actually has water in it, in the summer, it is like something significant, and he never even mentions it in his notes. That makes you wonder whether he actually run that line at least in particular there.

You know I am looking for proof or something at least telling me that maybe this was stubbed out and it was not actually surveyed the way he said. Because then I am cautious to use a topo calls for anything, and I am even more cautious to even proportion, which we will talk about here in a minute. Remember that the ties to the USLM's or MM's are not reliable unless they are within a few pulls of the tape but it is rare that they did anything otherwise. Definitive location of shafts, I got that little diagram there on the right just to show you that you know this is the shaft down here.

That's fine but the top of the shaft you know appear maybe it's begun to wear away erosion you know on this side more than on the other side so that's why I kind of drew it the way I did. You know when you are measuring to a shaft as far as a tie that they made; usually they measure to the center of the shaft so you want to figure out where the center of that shaft is too. It may not

be the exactly center of the opening that you are looking at. Obviously, there are some safety factors here.

Things have changed you know at the time that your mineral surveyor did the patent survey, there is a shaft there but it may now have been used, between that patent survey and now. It may have been used for sixty years with hundreds of miners coming up and down it with all types of gold coming out of it. Accidents and things that have happened. They rebuilt the collar and generally the shaft, they are not going to re-dig it but you know the top of it may be much bigger.

One side is bigger than the other because of the way dirt and the rocks that have fallen down. That is just trying to get us a little more precise in our measurements. You know another consideration is being sure you are on the right improvements.

It could be a neighbor's shaft here is another point. It is on your claim, but was sunk after your patent survey was done so it is not tied in. So make sure you are not on one or the other which means you need to start piecing together evidence to make sure of everything and that makes it a little more complicated but that is part of the challenge and the fun of retracing mineral surveys.


I have used topo calls in the past, let's see if I'm in the right neighborhood, but again you know you have to be careful of the topo calls on the sidelines if he in fact did not retrace those or not retrace them but actually run them in the original survey so that's a few more considerations.

## ***Proportioning Cautions***

Now, we are very used to when we have a lost corner, we're very used to doing proportions, and I want to remind you of a few basic assumptions that proportioning is based on.

### Proportioning Cautions

- Purpose of proportioning: to compare your chain to their chain.
- Proportioning assumes two things:
  - The distances were faithfully measured by the same chain.
  - The error is equitably distributed along the line.
- If these assumptions are not true, you should consider not proportioning a lost corner.



First, the purpose of proportioning is comparing your chain to their chain. It does not matter what your measuring device is. You are comparing the two distances together. In addition, the reason why you do that is you are looking to see you know if his chain is a little bit longer or shorter than your chain.

So you are in essence laying the two chains down next to each other. Proportioning assumes these two things. The same chain faithfully measured the distances. Your chain is the same chain and it was faithfully measured. It assumes that the difference between those two is equitably distributed along that line. Now in reality, do you think that is true? You think it is true that the difference between your chain and his chain is that you know that may be true out in the flat country and you do not have any real topographic geologic issues that you have to deal with. In reality, many of these mining claims are in difficult country. If he measured it with a tape, even if he faithfully measured it with the tape, how much error does he have? With all of these short shots and slope chaining at forty degrees and breaking chain and if you've ever done that in the old days breaking chain down a hillside and you goof up which foot you're holding or the chain isn't held level and you introduce a lot of error. Here you are retracing it with GPS.

Well to assume that the error between those two is equitably distributed is somewhat of a fallacy. So if those assumptions are not true and I would submit to you that they are rarely true, you should not consider proportioning a lost corner. I would even say that the public lands. In the public lands, we often have more of precise data to come into but that is an issue here. Now that is the purpose of proportioning and the issues and all of the legal assumptions and all of the mathematical assumptions behind proportioning.

Let us go to a few other items on proportioning. Even if the record measurements were faithfully done, we have to think outside the box on lost corners with minerals.



## More on Proportions

- Even if record measurements were faithfully done, we must think outside the box on lost corners on mineral surveys.
- Grant boundary not a great solution in many cases.
- Indexed single point control may often serve us better.
- Consider compass rule, parallel end-lines.
- Let's look at a few possibilities.....

This is true with some of the other non-rectangular but not all of them. However, you will even find this true with HES' where Roger Green will be talking to you about it. Because when you get them linked up, together things start to change. You know there is a tendency in the Bureau to say well any kind of a non-rectangular entity like this; we use a grant boundary method. In the 73 Manual, that is 5-41, or 5-44. Well you know the grant boundary method, but you know what, that is not a very good idea in certain circumstances and I will show you an example here in a little while on why that is not a good idea.

The grant boundary method really works well for something that is isolated. This is even true with the compass rule. When the parcel is isolated, it is just one lode claim or placer claim sitting out there in the middle of BLM or in a National Forest Land, well so what. A grant boundary would probably work okay for you. However, grant boundary and a compass rule, and frankly most of the proportioning methods that we use do not work well when you are in a group of claims. When they are in a complex of claims and the circumstances are far more complicated then it would be with the single lode or placer sitting out there by itself. You will find that often using a single point control method, may serve you better. It will be indexed, and we have talked about indexing.



## Lost Corner Examples

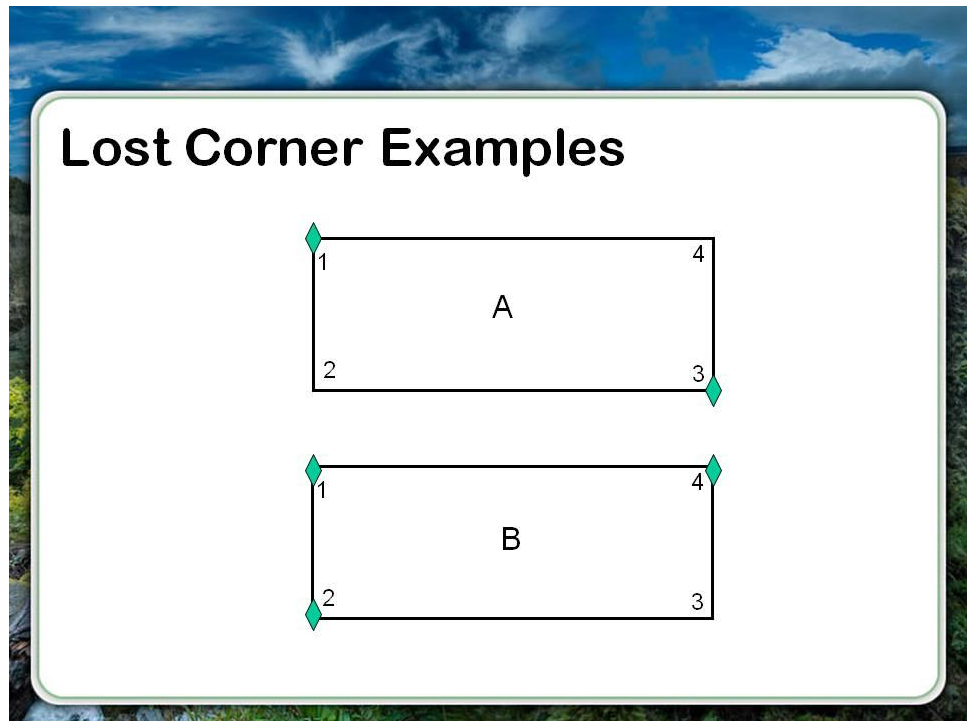
I will show you this rather simplified here in minerals but I will show you a couple ideas of how to do that. You might consider the compass rule, you might consider depending on the corner of the loss, just making parallel end lines. There are many possibilities and that is what we want to do is look at a few of those within minerals. Here are a couple of claims. Let us just talk about these for a minute.

Let us do claim B first it is even simpler. Three of its four claims corner is in existence. Now corner three here is missing, so I need to proportion it in.

If this claim is truly, as it's shown here, surrounded by, if this is all federal land out here. It is isolated, well then maybe a grant boundary adjustment from corner four to corner two, would work. Or maybe a compass rule. Both of those are reasonable mathematical solutions. Compass rule frankly is a little better in some circumstances than the other. You know actually it would be wonderful if you had this good of evidence with three corners in and you only had one missing.

Another possibility here is to see what bearing and distance line one two runs at. Mimic that down here. What you are going to do is indexing. You are indexing this one line to this one. What that does it is going to force you to put corner three in at the exact same bearing and distance as this is. Now what does that do? Well first, it will help preserve the parallel end lines, which is the plat.

If the plat is telling you that is the intent, it will preserve that. Second, it keeps you from proportioning that sideline, I have mentioned that to you earlier, and you might be wondering just what is wrong with the sideline. Let us go back to that slide and I will just show you. This is my problem. With proportioning and mining claims, if the mineral surveyor who actually did this ran down the center and then stubbed out. It stubbed out at these places. Then what that means is that his chain never went down the sidelines.





Proportioning as we just saw assumes that it was faithfully measured and it assumes that the difference between the record measure based on, well the error, the two corners equitably distribute the difference between them. I submit to you that if he ran, stubbed this out, and ran this line, and this line, is very out of whack. His chain was actually here. His chain was never down the sideline.

So to me, to mathematically proportion around here like this, is to give weight to a line, which never was chained. Because see whether you use grant boundary or compass rule you think that is actually proportion. You are saying this was measured faithfully and exactly the same way this was measured faithfully and I do not find that to be true. Now you can certainly measure from four to one and see how close it is and that might give you an idea. I will not say most common but one of the, I found this a number of times in the field that it is obviously that the surveyor, where he was stubbing out.

Here is what happens. Maybe on this end the end line is like this, and he ran down the centerline fifteen hundred feet. Rather than turn the angle which would have made the end lines parallel. He, using a transit with a vernier turned it backwards. Which if any of you have ever used transits that can be easily done. The claim may show that the parent end lines are parallel but in fact, they are running like this. You turn the angle here that he should have turned the other way here to make this parallel you see.

I have seen that several times, which is obvious proof that not only did he stub out, but also then he goofed up when he stubbed out one of them when he turned the angle the wrong way. You know I am always looking at the topo calls and the information on those sidelines. You see the end lines probably were run; there are only three hundred feet in the end center, at least where the vein came through, and then another three hundred feet.

Those were easier to measure but the fifteen hundred down usually the worse length of the claim, not only the furthest but also the worst topographically. So be careful, I cannot emphasize that enough that you want to be super careful with proportioning on mineral claims. I do not believe that the assumptions made by proportioning work.

Now go on back to slide and let us use A. Claim number A. This is a little different. All we have is two corners, that one and that one, what are we going to do? Again, if the claim is sitting out by itself and if you believe that, the sidelines were run, then I suppose that a grant boundary here or a grant boundary here or similarly a compass rule on each side could come up with a claim. Come up with your corner positions for the claim. The odds though of these lines being parallel are slim with that because you have two very different solutions you are going to use.

Now I am not telling you that the claim line, end lines have to be parallel. What I am saying is that if there is opportunity to force them to be parallel or close to parallel in your restoration, that is at least a major consideration. If you go out and find a corner or a claim, and all four corners are found, you are not going to find these to be parallel. What went to patent is what is in between those corners; it is just the way it is. With something like this, I might look at ways that I could do that, I have seen this done, a grant boundary here, and then force this one to be parallel to this.

Those are possible when you think about it there is a bunch of different ways that these can be done. If you suspect that these sidelines have been stubbed here, it may be better to take your position on corner one or position at corner three or do your own kind of adjustment that forces these to be parallel or run record bearing and distance to keep them parallel, hey I don't know, there are all kinds of possibilities here.

Let us look at C, D, and E.

For each one of these I got something different. All I got is one corner on the claim, that is not much to go by but I have a discovery shaft or something out here.

You see in my mind that is not even a lost corner, if I have good ties to one or more corners from here.

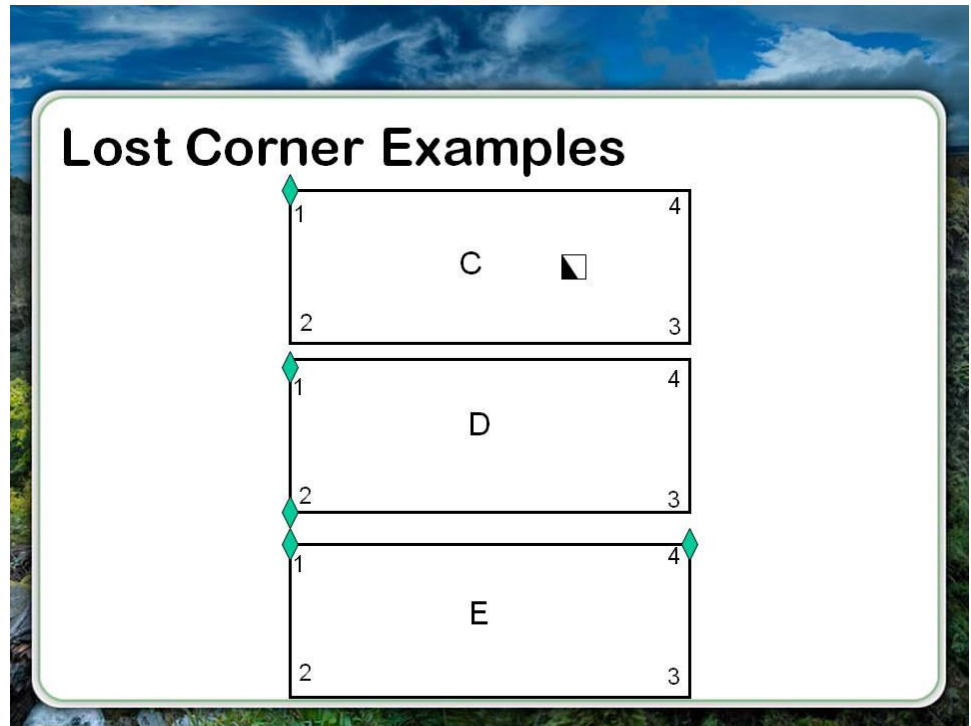
I am going to try to piece that together and get one of those established.

Now that gives me that one established and then I can use that to proportion or parallel end line.

I do not even consider if there is a tie from corner three to the shaft. I would not consider it a lost corner; I would consider it an existent, because I have a tie from the original surveyor to it. This is a worst-case scenario. If the shaft or discovery is not there and all you have is one corner, you are going to have to go out and look at other evidence. Try to figure out something because you could run record bearing and distance.

That would be your ultimate indexed or grant boundary method, where you just find one corner and run record. I suppose there might be some places where that is all you were left to do. That is under the assumption that the claim is sitting out by itself. Now look at number E, here. I have two of its corners. But I also have on this one a tie across here. Let us just say that on the ground D and E sit like this with each other and there is a gap in the record. But I have got one to two and I have a tie here. But two is missing down here.

If this were by the same surveyor in the same mineral survey, I would be tempted to take that bearing and distance and project it over here and then come up with those positions. With mining claim D, I have the two corners down here on the west end and I do not have anything on

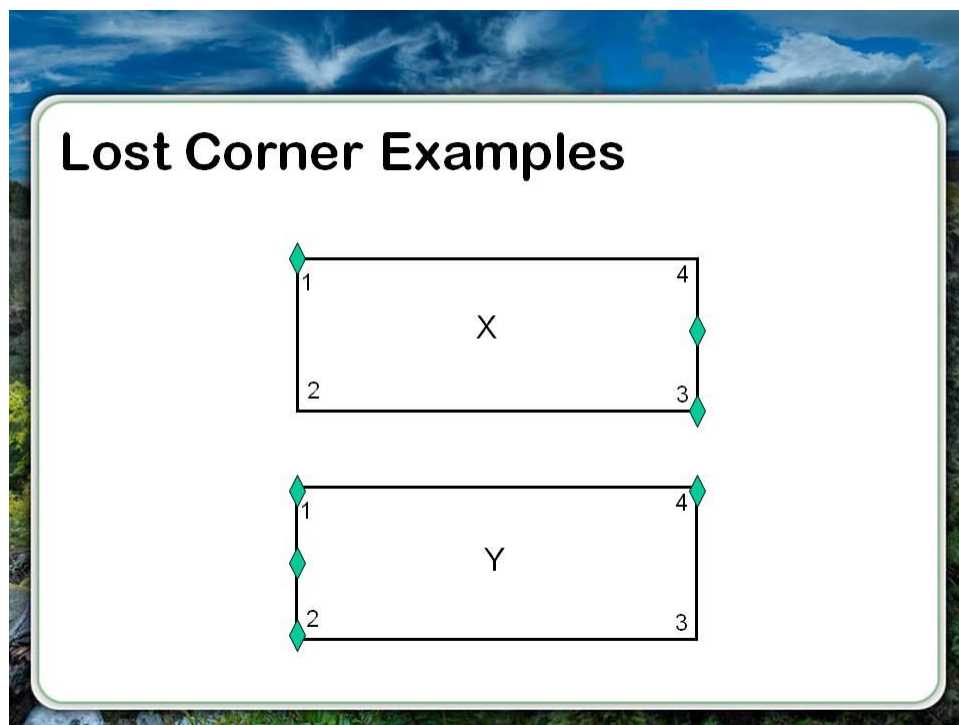


the east end. These are some of your worst situations because you do not know what else to come up with if you have no evidence down there. You can use this as a basis of a proportion.

You could do a grant boundary, compass rule, or record it in, which really is kind of a single point control. You could just run a record and use this as your basis of bearings and you could index to that distance and not just this one but probably index your sidelines too. But I would sure want to make sure there is no other evidence out there that would change that situation or give somebody else a viable alternative as to where that corner might be.

Here is another idea for this one. Let us assume that the vein and lode line running down the middle of it. You can set the end center even if they had not set it. , come ninety degrees off it, come down the fifteen hundred feet, and then stub these out the same as these bearing and distance. I am maintaining parallel end lines now because I do not have evidence that says they are not, so I am trying to lean that way but that is not an absolute requirement.

I have four examples here X and Y. Now we get some end center tied in. Now with these, I absolutely hate doing a proportion like this to get corner four in.



When I have both the end center and one of the corners, I am nine times out of ten going to project that right out there and come up with that position. I will not proportion here because again even if that fifteen hundred feet was faithfully measured, all of the error because remember the error you're talking about, the difference between recorded and measured is what occurred between one and four and down to three. Usually those are not the same topography. Not the same circumstances so they do not fit the assumptions that proportioning is based on.

So I would be able to set that corner four with just a projection there, and then I would use from corner one I would come back down and run those parallel.

Now with claim Y another set of circumstances here, we have an end center down on this end. We have all three corners, and you know folks when you find all three of those corners, I will guarantee you, now I am exaggerating for scale but I will guarantee you it looks like this, or this. It is very rare it is going to be a perfect straight line. But hey, what is monumented and called for is what the claim is.

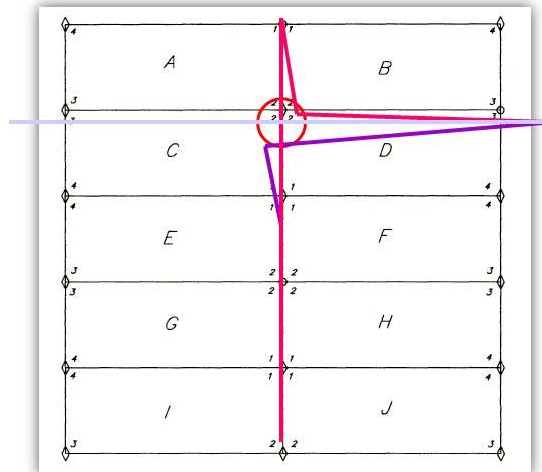
In this case, I also have corner four down here. Again what do you want to do with it? Do you want to take this six hundred feet and throw it into a mathematical computation with that fifteen hundred feet? If you feel that the claim was faithfully measured, then that might not be a bad solution. I cannot find any topo calls here or other objects inside the claim that we are tied to the corner. If I cannot find any then I guess I am going to have to do some type of mathematical solution but you can think about this now, what would you do?

Would you, let us say this is shaped like this, would you mimic that down here? I would not. I would probably compute line one two, and then in other words ignoring this. I am not going to ignore the end boundary for this end, but I would use the direct bearing or you could use the mean bearing. You could mean the two and then run this line parallel to that mean. So as you can see there are a number of possibilities. I am not telling you that it is improper or it is illegal to tie claims or to use proportioning methods on mining claims.

What I am saying is that I find that the nature of mining claims themselves, their shape, as well as their history and how they were actually done, should cause you great caution and concern about just doing some quick proportion on it because it does not really fulfill the intent or not intent, or the principles upon which, an assumption upon which proportioning of any method is based.

Now contrast that with this situation here. We have multiple sets of claims that we are all done probably at the same time as a block of claims and may have gone to patent, may not. But you are out there trying to do some work on it. Let us just say that their corner two there of ABC and D, was to become lost.

## Lost Corner Examples



Let us say that you are just surveying claim B that is the only thing that you are doing. Well then you can justify using our smaller thinking, you can say well I will do a grant boundary or a compass rule on that claim. I guarantee you it is not going to preserve the straightness or relationship down between AB and CD and EF and GH. It is going to do something like that. And if that is the only claim, this happens in the private sector a lot, well that is a claim that I am working on, and I did a grant boundary. But that is not looking at the bigger picture. Not looking at whom else you are affecting.

See I could be hired the next day to do claim D and I could use your exact same reasoning. I would say all right well I am doing D and I am going to do grant boundary. You are going to start creating gaps or gores that do not exist and never did exist. Yet you're going to create them so you need to think about what method or proportioning you're going to use when you have multiple claims done at the same time or that are shown to be lined up like that. You know another possibility is to run the red line you know go down to the next found corner in the center and run that, straight. And do a single proportion on it. That is not a bad idea. You could do a single proportion on the east west line between A and C and B and D. Or you could do a bearing, bearing intersection I suppose. Different solutions here.

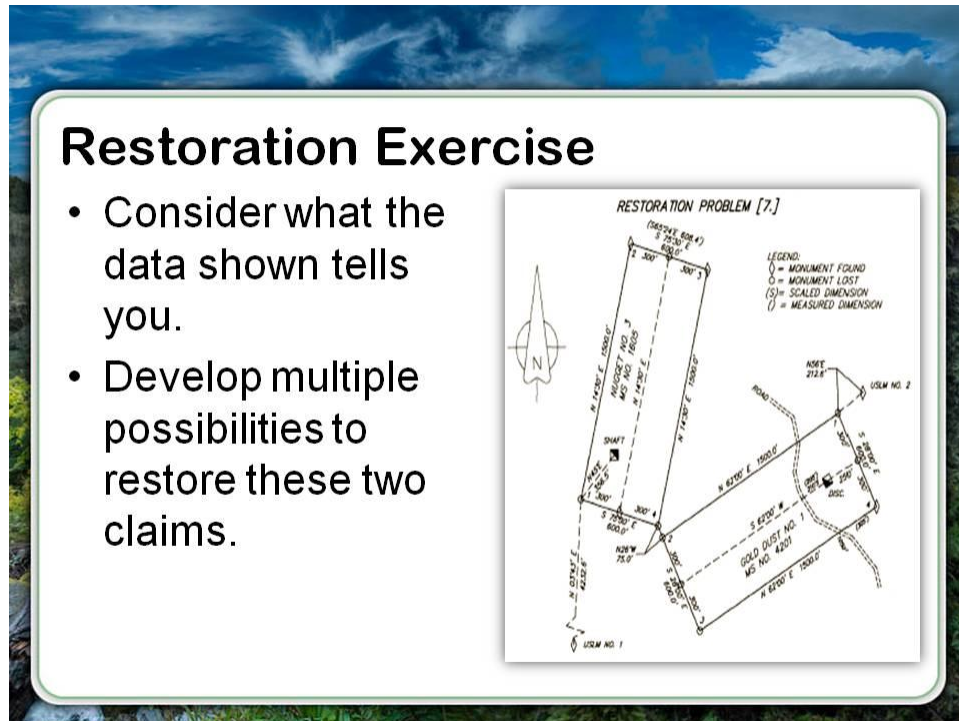
I would be cautious doing a double proportion because they are for section corners and township corners. Many times that process requires cardinal equivalents. Recognize that many times the claims are not oriented north and south as if I have them drawn here and then you start having problems with those other methods. So they are not intended to be cardinal therefore cardinal equivalents is not an issue.

Double proportioning, two point control, and three point control both of which are subsets of double proportioning are not very logical. I would even look at single proportions and bearing,

bearing intersections, other solutions here. To not just set the corner of my claim but to maintain the integrity of the area. That is really what is going on here. To maintain the integrity of that entire area.

## Restoration Exercise

Now we are going to take some time here then for an exercise. If you look on the slide here this is a small version of it but you need to consider what data is given to you.



This is an old example that I made up twenty years ago and I've used it out teaching seminars even at the University of Wyoming two or three times. But what I am going to ask you to do is to develop multiple possibilities of how to restore the lost corners of these claims. You've got a hard copy paper version in front of you and this is blown up a little bit but just so you see if it's a circle it's lost, if it's a square it's found.



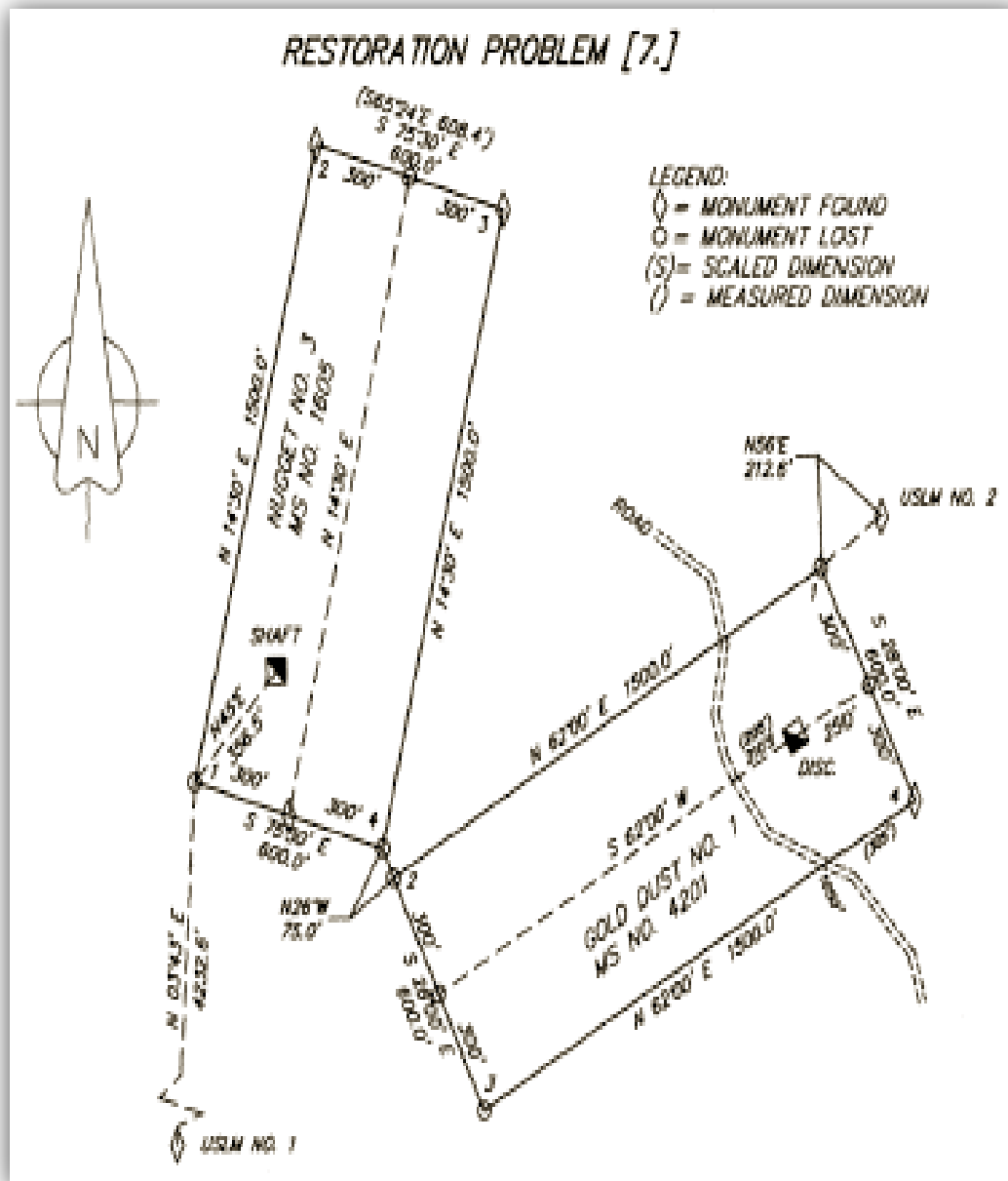


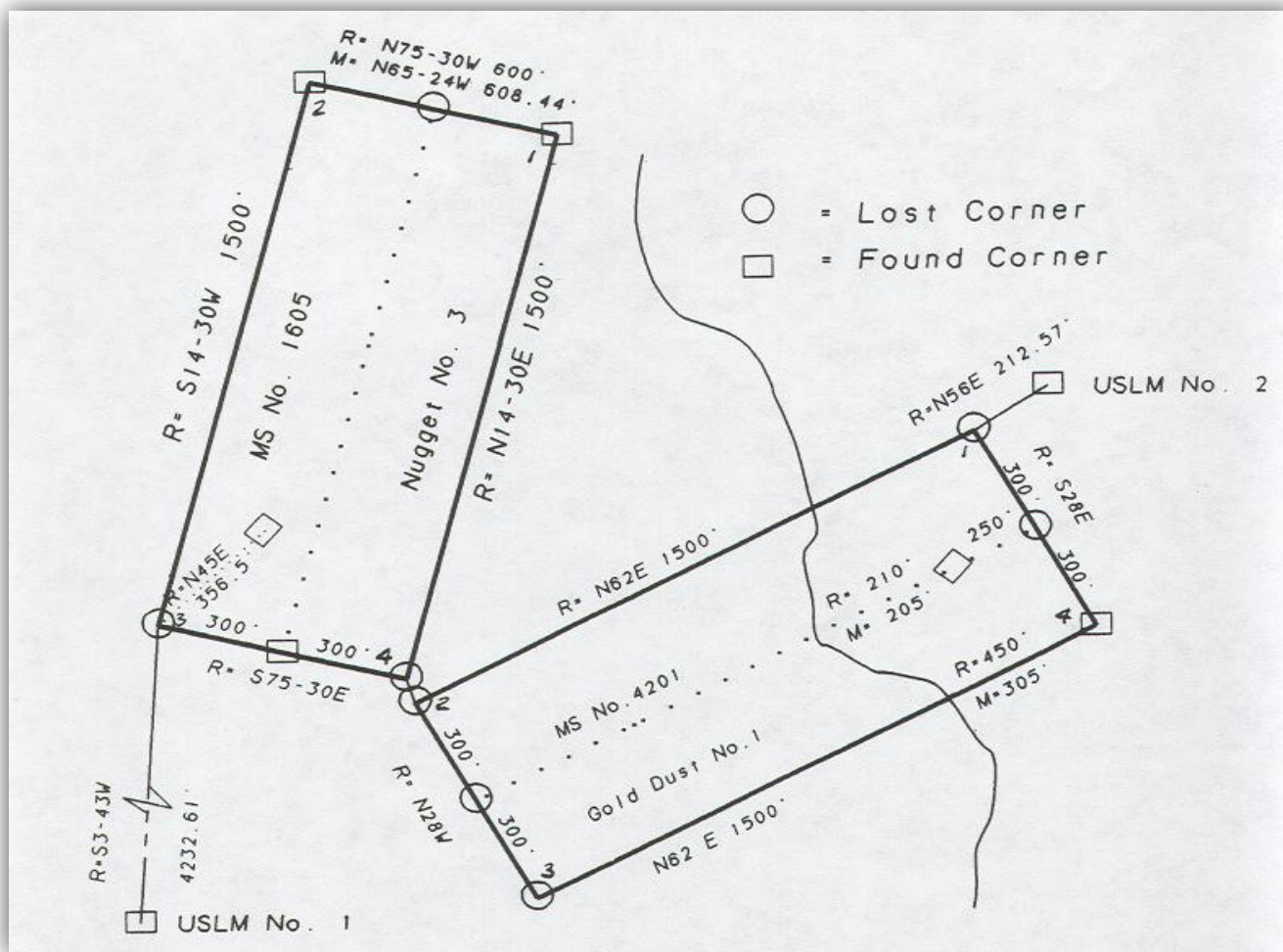
## Exercise 1

### Mineral Survey Retracement Issues Restoration

### Exercise #1

Consider what the data shown tells you. Develop multiple possibilities to restore these two claims.





## Mineral Survey Retracement Issues, Part 2

You have had a chance to take a look at that restoration exercise for the mineral surveys, so let us discuss it. It does not really matter which one you start with but let us start with the Nugget that is up here. You have got it made up on the north end and you have both corners one and two of the Nugget are there. Apparently the end centers were set although this one is lost on the north end but on the south end it is found. The north end you already have resolved as far as I am concerned.

On the south end, all we have is the end center but notice we have whatever a cabin. We have a cabin there with a tie. That tie is three hundred and some feet. If that were a bearing tree you would not mind using it at record bearing and distance. What I am saying is I would go record bearing and distance and I would make that a search area. I would also go distance, distance, using the end center and the cabin. Between the two you probably have to come up with a pretty good solution somewhere to set this corner. You notice you have a USLM tie down here but that is four thousand feet away.

The odds of having that having actually been measured, let alone have that accurate, even if I had been measured and useful, are pretty slim. I would not use the LM tie at all. What I would do is probably either record bearing or distance off the cabin or bearing, not bearing, distance. Distance intersection from these two because this end center is original evidence, this is an accessory at the cabin. Once I had reestablished that corner should there be three off the Nugget.

I would probably project this line back from the corner; I just set through the end center and mimic that distance. Index it in other words. To me that would be a great restoration of the Nugget. Now, if you were suspicious about anything or something was not working out here then maybe you would not want to do that. I will tell you another way you can check it. You can come back to the north end and reestablish the end center, at midpoint, probably where it was on the record. Turn ninety degrees, that is probably what is in the record.

Come down that line, see how you hit that end center there. You are not going to hit perfectly but it might give you an index for bearing but I would not use it for distance. It might rotate things a little for you so then you might hold these at slightly different bearing. I like using the local data you know in surveying we are so used to something missing.

I will go way out here and do this big proportion or something. With minerals, you have so much evidence and unreliability on the sidelines that I am very anxious you know. I am the type that would say they let me solve this problem up here and then I will use the data that is down here to solve this one. Not really connect them I mean you are going to connect them in your survey but not really connect them in a sense of using them to restore each other, now you do not always have that luxury but that works out there.

But the main point there is use the evidence that you got, be creative. I do not see a reason for corner three to be existent. As far as I am concerned you got other evidence for corner four. I do not see a reason to do a proportion up to corner one. The odds of that falling in its original position or pretty slim.

Now that leads us to the Gold Dust. We have a little less evidence here. All we have is one of its original corners, corner four. But we do have a USLM over here and it is only two hundred and twelve feet away. In fact actually when you look at it we have more information. We have the discovery cut here and distance in the record, so there are quite a few possibilities there.

Well first things I would do are do a distance, distance intersection here. See how that fits this tie. I would do all those things to see what I can try to resolve up on this end. If that did not fit, I am pretty sure the two twelve was chained, so I feel pretty good about that distance. But maybe there is something else wrong up there. Then I would come from the center of this cut and come up on record bearing or ninety degrees to this other solution. Come up with a position here and then see how that works see how that checks over to here. I would do those things and see how they fit.

Notice I am using the LM as an accessory. But you know let us look at the other end of the Gold Dust for a minute. The south on the west end of it. All three of the corners apparently end centers were set on this one too. All three of those were missing. Now if they in fact sit like this on the ground, relationship to each other, there is probably going to be a record tie right here. Probably going to be a record bearing and distance between those it does show a line between them anyway. So you might be able to pull record bearing and distance.

From corner four of the Nugget. If you did that, because that is pretty short distance, if you did that, that could be a pretty good position right here. Using that position you could, what you determine what you're doing on the east end of the Nugget, or the Gold Dust I'm sorry, well then maybe once you've identified corner two here, you could run this at parallel bearing and equal distance to the east end, see how that fits.

One of the things that I would be cautious here, and I threw this in so this was discussion point. Notice we have a creek coming through here, or a road or whatever it is. Let us say it is for discussion purposes. It is some topographic feature that does not change so maybe it is a creek in a well to find a little channel. You want to take a look at the topo calls that you have here. Well notice we have a topo call out here on the sideline. But notice that the record and the measure are well over a hundred feet apart. Almost a hundred and fifty feet apart.

What does that tell you? Either the creek moved which I just said it has not. Or it was not very well measured. Or maybe it was well measured but was not well reported, one-way or the other, something is wrong with that topographic information. Yet, when I look at the center line, and when I read the notes and I see that he ran or that on the center line he told me that from the discovery to the creek, it's two hundred and ten feet and I go out and measure it and it's only two hundred and five well that's only five feet difference, that's pretty close.

Five feet that could be me guessing the center of the creek compared to where he guessed, and me guessing the center of that discovery cut compared to what he guessed. So that is really reasonable. Now what does that tell you then, if the topo call in here looks good to the creek but

the topo call out here to the same creek is far off? That means that he probably faked in his topo calls on the sidelines and folks that are more common than you think with minerals.

That tells me for absolute sure that I do not want to do a proportion out here at all. Not along that line. I did this on purpose but I have seen a few times where this is the case. We have topo calls in one place and the creek never leaves, so it is very suspicious if you have something significant. Or that you have already picked up in two other places and then you did not call for it where it exits the claim. It makes you really wonder whether this line was run too.

What I am seeing here is that this line probably was, and because of that, once I have determined this I do not have a problem setting the end center. Running through that discovery and coming down here and getting a position and seeing how that fits to the tie over here or how it fits other things. Notice what I am trying to do is base my solution more on the things that I'm quite certain he measured, versus the things I quite seriously doubt that he measured.

If all you want to do is math and cogan games, then hey just do a mass of grant boundary adjustment and do whatever it is. What's going to happen when you do that, whatever or compass rule, or record, you're going to end up looking something like this, I'm exaggerating but, you're going to overlap a claim that you didn't, you had a positive tie that said you didn't overlap and yet you're just going to use a math solution that's going to cause it to overlap. Or do something else; you know you are going to take the discovery right off of the vein here.

So you want to be careful what you do and that is perhaps the best advice I can offer you, regarding these claims, and the restoration of those claims. So I hope that you got something out of it and again you may have come up with a couple other solutions for it and that is fine.

There are many solutions there and I think me just give you some ideas about how I would approach it. Not that everything I'm doing is perfect and complete, but it gives you an idea that there is variety there and see that I kind of lean towards the parallel end lines and if I don't I'm still trying to solve the situation at one end of the claim and make it almost independent of the situation on the other. If I am going to make them dependent on each other I am going to make sure that there was really some kind of connection either in the vein, the lode line, or on the sidelines.

I really want to make sure that was done before I use proportioning especially regarding the length. Some people said well I went out and found one of the corners of the claim and I found an end center and its three hundred and five feet, it's supposed to be three hundred feet, it's three hundred and five feet, that's bigger than the, if I project that on out to the other claim corner well then you'll have six hundred and ten feet, don't let that bother you.

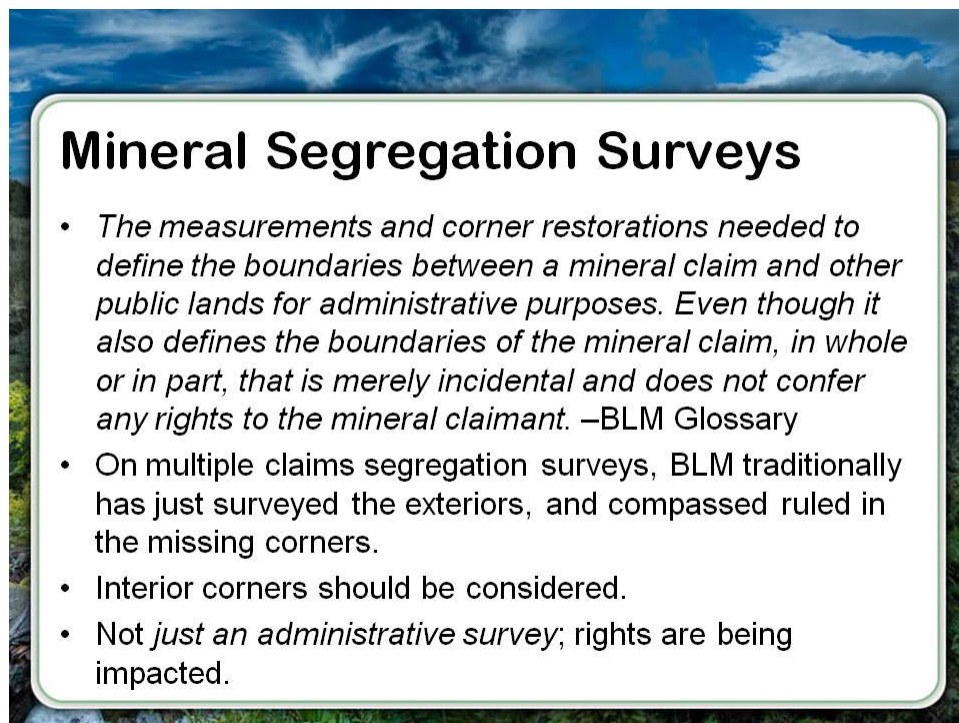
Patented mineral claims just like any other patented thing. Yeah there were rules and laws about the maximum acreage and all that. We have technical differences that come up all the time. But it is just like anything else. What is inside the monuments is what went to patent. What is in those monuments is what went to patent. So in a restoration it does not bother me if I am going to make the claim ten feet wider than the law said because I am basing it on proof that the claim



probably was ten feet wider than the law allowed. Hey, it is too late for the law to step in. A patent was issued based on those monuments and other evidences.

## ***Mineral Segregation Surveys***

Now I am going to change gears for a little bit for something that is more for you BLMers, and that is what we call mineral segregation surveys. Let us define that. From the BLM glossary, “The measurements and corner restorations needed to define the boundaries between a mineral claim and other public lands for administrative purposes. Even though it also defines the boundaries of the mineral claim in whole or in part, that is merely incidental and does not confer any rights to the mineral claimant.”



Let us understand that BLM has done segregation surveys on patented claims as well as on patent, sometimes you have a patented claim sitting inside of what are just aliquot parts and it needs to be lotted around that. We are not quite sure where the claim is so we go out, we tie that claim, and it is kind of a dependent resurvey really. Finding that but it has to segregate the mineral survey and lot the remaining federal land especially if it is available for entry and disposal.

Where you see mineral segregation surveys, probably the majority of them run are where the mining claims have not gone to patent but there's a whole series of claims there and the government is trying to define the out limits of that so something else can happen.

Say we want a land exchange but we are not going to go in to where the claims are. But then we need to determine where those claims are. Even if they are un-patented, never had a patent

surveyed. You could imagine that is somewhat difficult if it is just a bunch of location surveys because the quality of the survey, especially the quality of the monumentation is so poor.

Now on multiple claim segregations, back to the slide, when we are doing the segregation surveys of multiple claims. BLM has traditionally just surveyed the exteriors and basically compassed ruled on the missing corners. They did not consider the interior corners and I have some heartburn with that and just going to throw this out for you for an idea.

Just remember it is not just under administrative survey, there are rights being impacted, the rights being impacted are going to be who you are patenting to or doing something on the outside of that. As well as possible things inside the claim too. So or inside the claims.

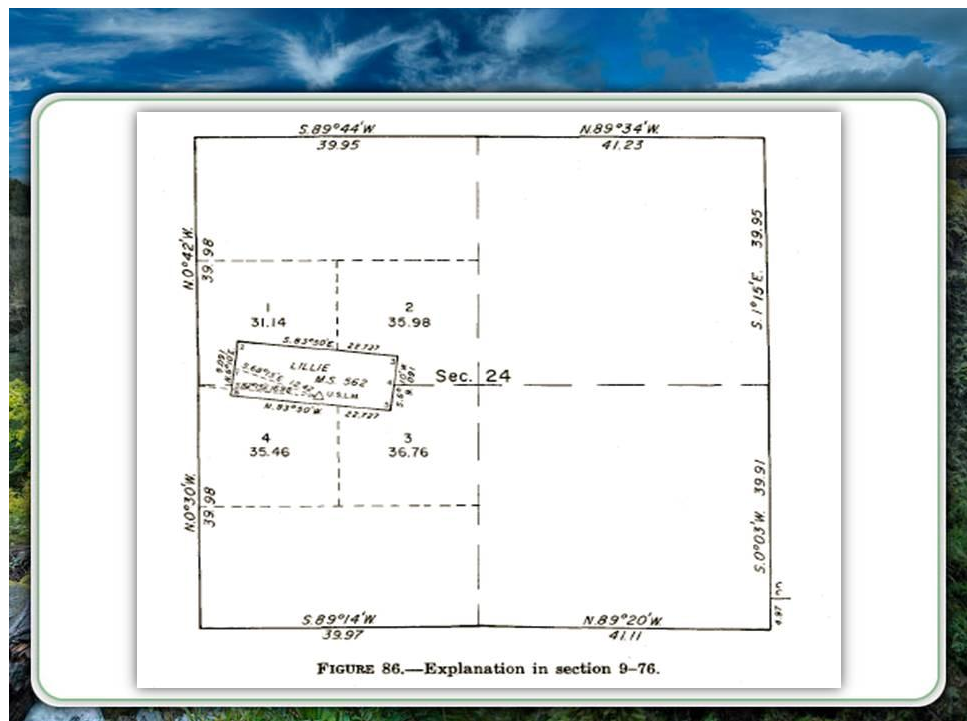
Now this is Figure 86 of the '73 Manual and you know this is just an isolated claim.

It has a mineral survey number, so and an LM, looks to me like it was patented, they went in and noticed that it was in section twenty four that normally doesn't have any lotting.

That section has been invaded by mineral surveys so they had to go back and did a resurvey of the exterior of the section

tied in the LM to a quarter corner tied that to a claim, retraced the claim and that gives us very precise areas and positions so we can determine the new legal descriptions and areas of the remaining federal land that are impacted by that invasion of a mining claim. So that is a simple one whether it was patented or not, it is kind of a simple one. But things can get a lot more complicated.

We have here on this one to the north, or what we will say, or what we will call our non-entered federal lands.



# Non-entered Federal Lands

The map displays a grid of land sections. The parcels are labeled as follows:

- Horseshoe 2550
- Home 1941
- Home No.1 1934
- Japan No.1 1934
- Japan No.2 1934
- Japan Co. 1934
- Red Chief 1954
- Bendigo 1954
- Haserodt Placer
- Durst Placer
- Tubbs Placer

The map also shows a grid of section numbers (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26) and a note "H.E.S. No. 412 - John T. Durst".

Many times what will happen is we will just start at one corner, and it will be down here, and we will go all the way to the other corner on the right and we will just do a giant compass rule through there. Maybe we find one or two pieces of evidence or whatever. But let us recognize it, let us say that this red line is the limits of this mineral segregation survey that we are doing. Or in other words we are interested in identifying what remaining federal lands there are north of that red line. These may be patented, may not be. But what happens here?

You see we just went through a restoration exercise to talk about what is going on.

## Non-Rectangular Surveys

I just find that a real quick look for just the corners on the line you need is not a really good solution and you need to go inside and look at those claims and maybe be able to pull some information out. Either find more evidence or establish those other corners in a better way than just some generic compass rule adjustment for a mile and a half across the section. So we want to think about those kinds of things. Now there is one bigger subject, with minerals and that is the gaps and overlaps.

## Gaps/Overlaps

Now let us understand that the very nature of mining, of mining claims I should say, is going to create difficulties, take a look at this slide.

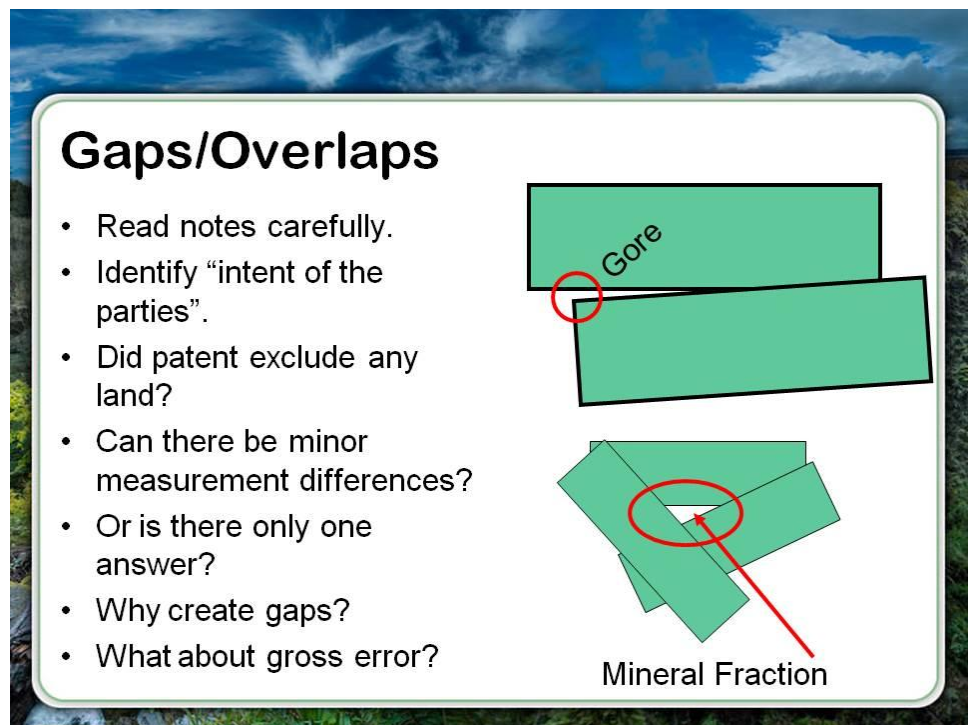
Down at the bottom, hey, there are places, there are thousands and thousands of these where we have what has called a mineral fraction.

It is a piece of federal land surrounded by these claims but it was not included in anybody's claims and hey Congress set it up this way in 1872 so that is what happens. You got land trapped in there.

Now the Forest Service actually has authority on their lands to sell those fractions, up to forty acres in size, under the Small Tract Act just to get rid of them because they are impossible to manage because you cannot even get to them in many cases. So that is a mineral fraction.

Lets understand that a gap and you know we talk about this and other things in surveying all the time you know when we talk to earlier in, not this module but in this course where I gave you the general metes and bounds issues. You will recall that we talked about junior/ senior and we had the situation where the parcels did not meet so we had a gap, or where they overlapped sold it twice, we had overlaps.

I introduce you here to another term and that is gore, and that is not Al Gore that is a gore is a sliver that comes down to nothing, okay. It starts out there maybe it's just five feet across there



where it says gore, and then it goes to the easy maybe a thousand feet then it finally comes down to a triangle to nothing. That is a gore. In fact many highway departments you know when you get on and off the freeway, that painted triangle that takes the lane off or brings you onto the lane is called a gore. So a gore is something that eventually comes down to a point, and then ends there. It is wider at the other end. So we call them slivers sometimes. Technically a gore is a little more different from a gap because a gap is where the parcels never touched technically and you have a space all the way through so a gore is where you have a triangle like that.

Now, the fact of the matter is that there are many, many of these, they are in the record and that is the way they are. But you know when you go out on the ground, I have seen places where it is all platted where there is some triangle left, I should do it over here against that darker, okay. When you actually find all the claim corners and put them together there is no gap at all, no fraction at all. Hey, that is the way it is, what is monumented and restored properly is what went to patent okay. But there are, there is a place where they purposely created gaps or gores, and if that still exists on the ground, leave it, you do not have any choice there.

The one thing I want to address is if you have small gaps or gores or even overlaps in some cases, that we are not intended in the record. Here is some advice I got for you. First of all, read the notes very carefully and the claims that you are working on and that you are involved in. Second, identify what the intent of the parties was. I will give you an example of that here in a minute. Did your patent, read the patent for the mining claim, did the patent exclude any land?

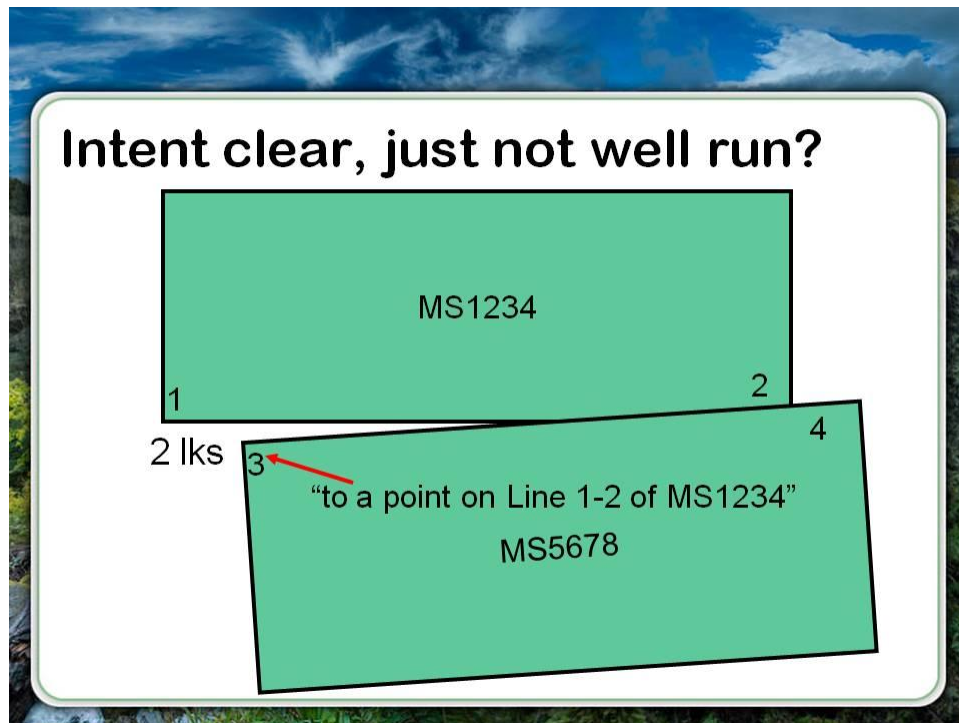
Because you will see that patents say okay you are getting MS number whatever, except that portion line was within MS number whatever that was senior. You will see exclusions in mineral patents, so you want to read the patent clearly and see if something was excluded. Because if so then the second guy did not get a patent to it period. But the question is how much minor measurement difference we allow. And I am not here to tell you what that is I do not have the answer. I'm going to tell you that in each state office that'll be different, that'll be different of who the surveyor is that BLM's got out there working on it, and for you CFedS when you're doing this kind of work, you're retracing patented claims, you're going to have different opinions that sort of thing, I just want to offer you some basic guidance.

How much minor measurement difference are you going to allow? Let us say on this picture that you are looking at that that gore is not in the record. And in fact there is only half a foot between there. Do you think that the government really wants to own a half a foot by a thousand foot sliver or gore through the middle of this land? I do not think so. But in some cases if the record shows that's what happened then that's what happened, just the way it is. We need to be careful about that and you know if it's ten feet okay fine, as you get bigger then everybody gets more relaxed we'll just let the gore stay there.

What I am talking about is the difference between, is looking at the intent of the parties, as well as understanding minor technical differences. Do we only have one answer to these or do we need to think about that. I am saying let us not, you and I, creates gaps that were not intended. That means they are going to be small. If there is incredibly gross error, then fine, that is there, but let me give you this example.



MS1234 already exists on the ground. And some ten years later a mineral surveyor comes out and he is going to, he surveys MS5678 in the notes.



The 5678, when he runs the line, you know, from corner two to corner three, okay, or in other words this line. When he runs that line, in the notes he says to corner three being a point on line one two of MS1234 and you see what I'm saying here is the intent of the parties was to set that stone or wood post or whatever they've got there, was to set it on this line.

So we have to decide how close is close got to be, and I am not going to tell you I do not know the answer to that. But notice what I have here, we are two links. You go out on the ground, you actually have the monument, and it is, for corner 3 of the 5678, you have the monument there but its two links short.

Now the question is are you going to make a gap or are you going to say well they have created a gap that is two links by nothing wide by a thousand feet or whatever that is down there. But I want you to realize that wait a minute, the intent of the parties I believe was clear, and people say well you got to, they called for this monument and that is all I can do, I cannot do anything else. They did not just call for that monument. When he said he put it on line one-two of MS1234, he not only called for your monument, he called for those two as well.

Now you have to decide; now maybe two links is beyond what you are willing to accept, fine. Again, I cannot give you a number. To me it's very different situation. Let me just offer you this thought. If I'm out there in this site, and it's on some steep slope and it's rocky and it's got lots of trees and it's a big mess, and that I find corner three and the stones a little loose and all of that, and I'm two links off, am I going to create a gap that does not exist on the record and technically doesn't even exist on the ground because it's just this small amount.



You say two links is too much, fine, you do not want to give away government land, fine. One link, I mean whatever distance we make it, you are giving away federal land, whatever distance we make it, and you are not honoring that monument. It is on the brass cap, how about that? It is on the cap. The question is are you going to bend line one two through that or are you going to not accept any or just accept everything where it is and forget the gap or here's your third option. How about in these situations you treat corner three like a closing corner because that is exactly what they said. They said here is a stone and it is on line one two. Hey is that not exactly what a closing corner does.

So what I am saying here is when you have the minor technical differences that we should look at the circumstances. The terrain, the situation, the age of the survey, the equipment he used, whatever. Look at those things but realize that at some point, whether it is two links for you or one link or a half link or ten links, at some point, you have to say, you know that is close enough. That is close enough. And then if you say that is close enough, what are you going to do are you going to bend line one two, no I have a problem with that. I do not want to bend line one two because it is senior.

What I'm going to do is extend line two three of the junior claim, up to that, that fits all the principles that we've learned about metes and bounds and about how all this stuff works. And it meets the intent of the parties. It's not just a legal description but the notes in the plat, both said that those are both one on the same line, so you need to decide at what point you're willing to accept that and like I said I think that differs on every job.

I want to open you up to is to realize that at some point there you don't have to create little tiny slivers, half a foot wide by two thousand feet depending on what kind of a claim it is, that are ridiculous. It's not even worth it to the government to administer these and people say well that's not your choice, no I know it's not my choice, but what I'm saying is at some point minor technical differences is the source of your problem. Now if that were ten, twenty feet off, I would not use it as a closing corner.

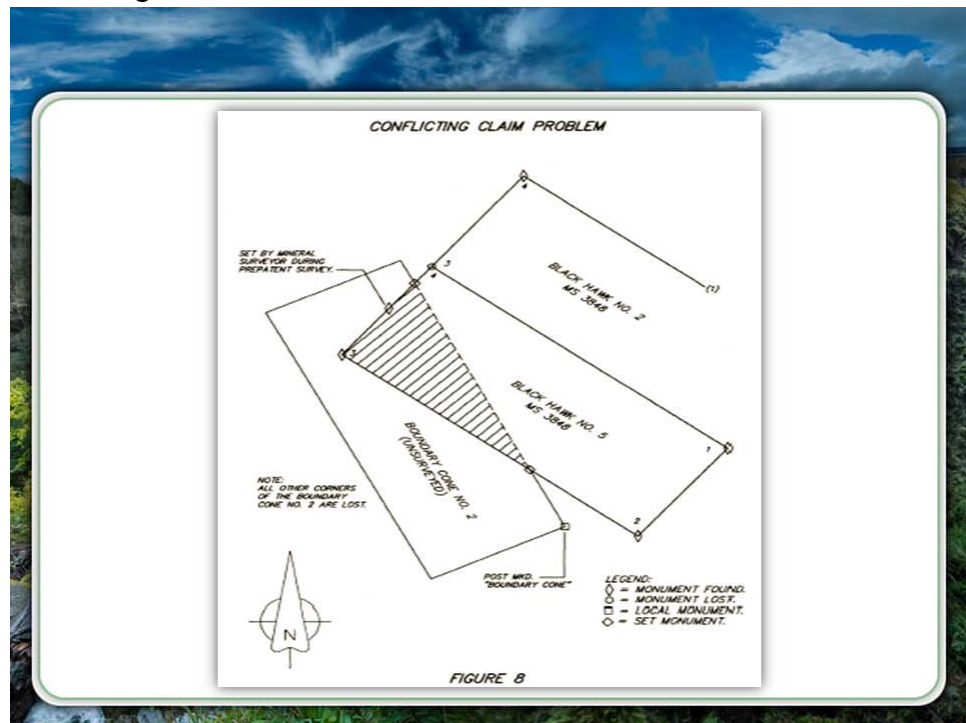
Because even if their intent was to do that, he's so far off the line that I question whether he retraced line one, two to put it on the line. So to me that's gross error. That's where there is a blunder. That's where there is some fraud. He said he set it there but he didn't do it. I'm looking at all the facts, reading the notes, trying to figure out what exactly their intent was. And then trying to do a good job at it. Now I mentioned earlier about accepting out patents, just make sure that they have an accepted out a patent.

Here's an example, this is a drawing from a mineral surveyor and what he's got here is, he's got these mining claims that he's doing the Black Hawk, which Black Hawk two and three are over here, and this is called the Boundary Cone number two.

It already existed. It's unsurveyed but it already existed and noticed that when they went to patent with the Black Hawk number three, the mineral surveyor had to identify an area that's overlapped.

These are the kind of things that you find potentially accepted or excluded in the patent. So recognize

I'm saying this one more time, because even though you may think you're in one of these situations especially with an overlap see what I'm talking about, an overlap now.



It may very well be that they recognize that there was a minor overlap. Say down here on this east end of these two, there's recognition that these are overlapping and you find in the patent a 5,6,7,8 that they excluded a small triangle from 1,2,3,4 then I'm not going to go in and fix that because it is a part of the record. But when you have overlaps, overlaps that they did exclusions on, leave it.

However if you have minor little overlaps or gaps then think about possibility of using things as closing corners, and holding the senior line which is what we do in every other type of survey. Now I've given you several things to think about, here about retracing mineral surveys. Hopefully we've, you know it's not everything, there are all types of other things to learn and of course, I am amazed how unique things are, from one mining district to another within the same state.

Where the other end of the state, it's quite unique as to how they marked things or how they, what the rules were. Or how many LM's there are and what a mess the thing is. But what I am saying is that hopefully I've given you some ideas to think about in retracement with this to make sure you get all the record, past, present, future, if you know what I'm saying. That you think about all the evidence potential that you have there, and then that you piece very together and come up with reasonable solutions especially in light of knowing what kinds of shortcuts they most often took.

## Conclusion

So let's take a look at this slide and just review what our goals were for this course, or this module. We said we were going to look at some historical overview of the creation of mineral location and patent surveys we did that.

Hope I've given you a little basic understanding of the legal principles involved in retracing mining claims based on that historical data. I hope above all things I've pointed out to you as true with all kinds of surveying, that you should be identifying and evaluating all the pertinent survey records associated with the surveys and sometimes there are far more involved as you are and I think.

### Conclusion

- Provide a **historical** overview of the creation of mineral locations and patent surveys.
- Gain a basic understanding of the legal principles involved in retracing Mineral claims.
- Identify and evaluate pertinent **survey records** associated with these surveys.

There's the bottom line, you want to find that stone there with those numbers and a bearing tree back there and all of that evidence, this is a mining claim up in Colorado. Then you need to do your homework. It comes down to that with just about anything with cadastral surveying doesn't it? You have to do your homework, pass the record research, and then you go out on the ground, do a diligent search, and might I remind you of something I taught you in course number three of the original CFedS, go out there in a positive attitude about that. We are going to find some evidence.

That helps set the stage for finding evidence because the worse person you can send to the field is some party chief or crew member, that's got the "oh we never find it, just we can't find that, it's hard to find that evidence, I don't think it's even there, it's fraudulent." Hey, those whiners you need to have them run an AutoCAD or do something, in the office so you can keep a close eye on them. You sure don't want them out in the field making evidence decisions about what's going on.

So I'm very big on be prepared, have the record completely ready. This course has tried to help you also be prepared by knowing what kind of evidence, what kind of data there is out there. All of the things and how to connect it and link it and some historical things here, understand what a good idea is and what aren't. Then when you go out there you have the right attitude, we're going to solve this problem. Although there are some other surveyors like HES, they are so fun

to work on because they are so precise, so well done. I'll tell you what my favorite survey is, is to retrace our mining claims and that's because yeah there is a lot of challenge, a lot of opportunity, there's a lot of connect the dots, boy that doesn't fit and let me figure this out, let me try that option and all of that stuff. That's what surveyors are good at. Or at least supposed to be.

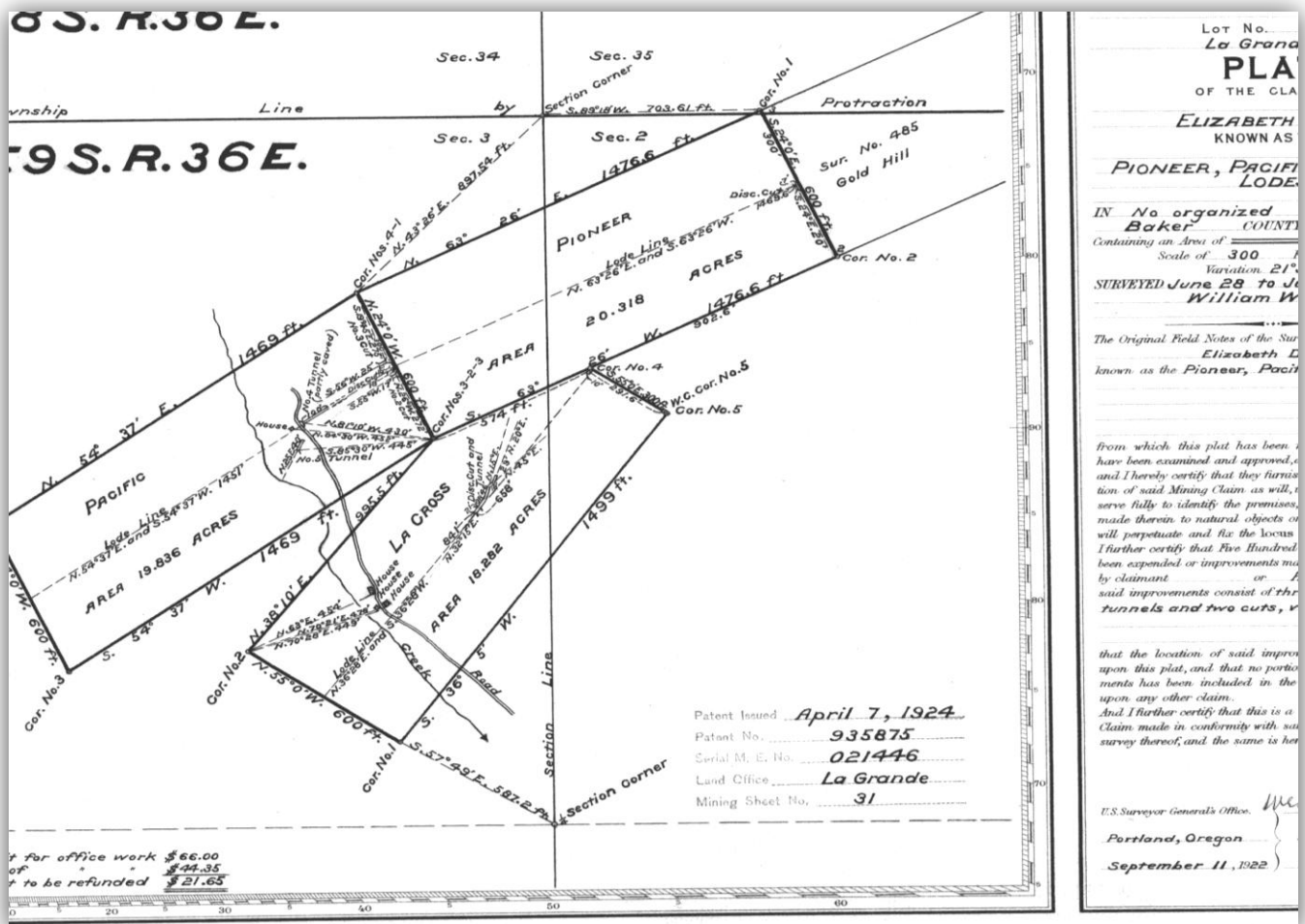
You really need to be good at that, be very patient and very creative, not imaginative but creative in how you apply things to figure things out. If you do those things you will be successful. And the retracement of mineral surveys, so I hope I've given you some things to think about and I'll see you in one more module later in this course, on wilderness boundaries and that sort of thing. For now, that's it for mineral surveys, thanks for your attention.

## Exercise 2

# Mineral Survey Retracement Issues Application

## Exercise #2

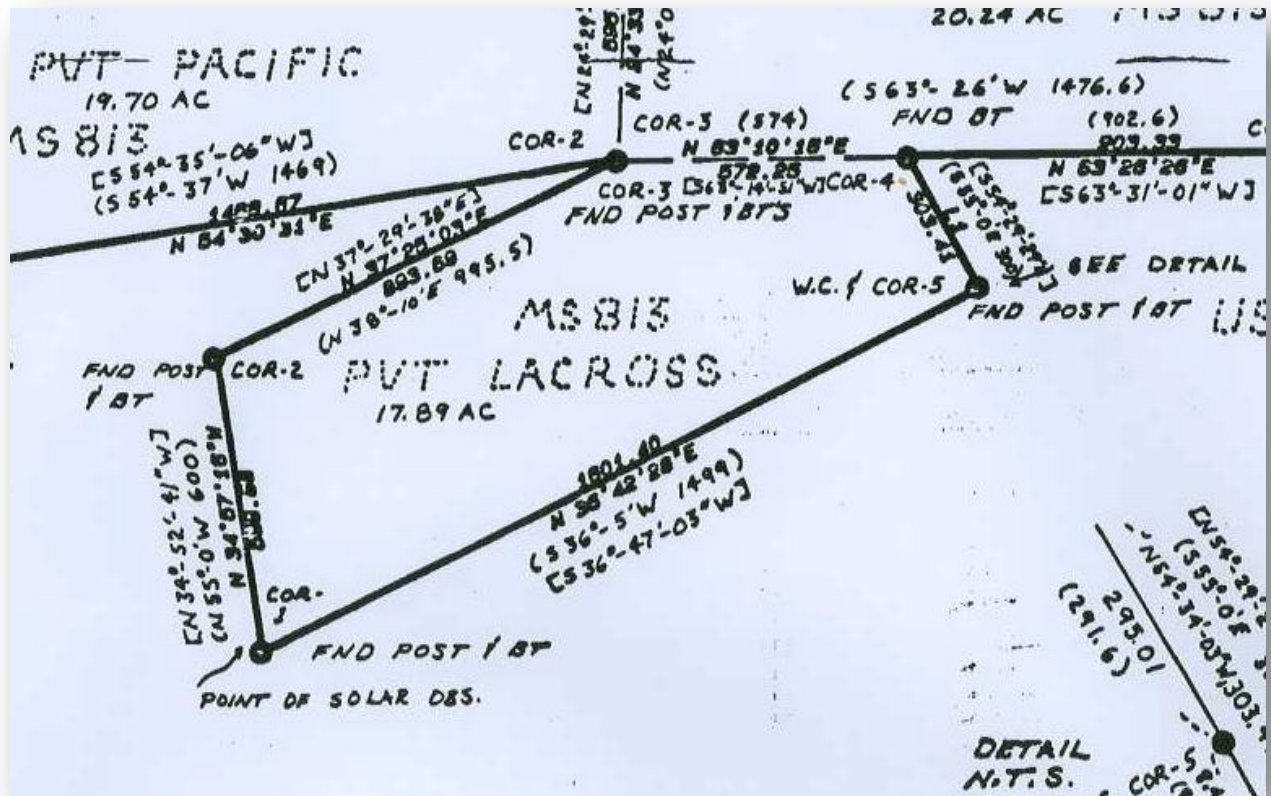
Study the original plat below to see the procedures and results the US Mineral Surveyor claimed he had of the survey of MS813 Lacross Lode. A standard lode claim appears to have been surveyed and platted. The end lines are parallel as required by law<sup>1</sup> (S55° E/N55° W).



<sup>1</sup> The parallel end lines requirement was to protect the miner's rights once the vein goes below ground. He was allowed to follow the vein forever, or until it crossed one of his end lines as projected underground. Thus, non-parallel lines could potentially meet below ground and cut him off from following the vein. On the other side where they diverge, the law says he gets NO rights. This is called "extra-lateral rights" and has been a critical issue in many cases.



Now look at the retracement data provided by a surveyor in 1990 of where he found the corners of the Lacross. Notice the east end line is close to the record bearing, per the plat, from the lode line. But the westerly end line is almost exactly  $20^{\circ}$  off from the plat.



This is another one of those clues you should look for when retracing claims. It is obvious the mineral surveyor ran the lode line and stubbed out his corners. It's just that on one end he turned the transit  $20^{\circ}$  from his intent, and then flopped his scope to set the other corner. Had he actually run a traverse around the claim and closed it, as his notes read, this blunder could never have occurred.

What is monumented is what went to patent, and if extra-lateral rights are impacted, it is simply the way it is. But as a retracing surveyor, think about the warning sign you should be seeing when on one end of a claim you find nothing at the  $90^{\circ}$  (or other record data) solutions; it is possible he stubbed and erred in his placement. *Complete evidence search* is usually more than most of us imagine at first, but is a requirement of doing the job correctly.

Additional things to notice:

- Sidelines differ in length to correspond to this error
- If you had found corner 1 as shown, would you have thought to search for corner 2 where it was found? Or at record bearing from corner 1, where it was not set?