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

The following file is part of the Edwin Noel Pennebaker Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

P.O. Box 1493
Globe, Arizona
April 8, 1944.

Mr. Edward H. Molson
P.O. Box 607
Tucson, Arizona.

Revised Draft

Dear Mr. Molson:

On March 25 and 26, 1944, I examined the geology on and near the Pure Gold mining claim near Oracle, Arizona. Information was noted in detail around the perimeter of the glory hole so that a record is preserved of features that might be destroyed by mining or slumping of the margins with attendant destruction of matural surface relations.

I am sending you a sketch of the geology, but am writing you this letter to give you my opinion regarding your extralateral rights.

There are two veins. The one that you have been mining has a curving southeasterly-northwesterly course over the natural surface near the common bounday between the Pure Gold and Morning Star claims. The hanging wall edge passes out of the Pure Gold claim (on the surface) and enters the Morning Star at a point about 264' west of Corner No. 4 of the Pure Gold claim. Its dip to the south into the Morning Star claim appears to average about 45 degrees, but it may be somewhat steeper.

Lying south of this vein, and separated from it by 5' to 15' of dark gray limestone, is a minor vein of quartz and low-grade scheelite. So far as can be seen now on the natural surface and in mining excavations, this minor vein is not connected to the major vein. They are separated by relatively fresh dark-gray limestone. This limestone carries low values in WO_3, but it is not unusual to find low mineral values in the rock outside of vein walls. As now revealed, the veins appear structurally distinct and separate. I do not believe that these low values in WO_3 constitute a connection between the two veins. The minor vein appears to dip southerly about 45 degrees or possibly flatter. It is mostly within the Pure Gold mining claim, but it's southeast and extends southeasterly across the side-line into the Morning Star claim for a distance of about six feet, beyond which it dies out on the surface. Where it crosses the side-line, this

minor vein has an outcrop width of 22 feet measured along the side line.

If further work demonstrates that this upper or more southerly vein is connected below ground with your main vein, then the owner of the Morning Star may possibly claim that this minor vein is a branch vein, and if this contention is upheld, he would be entitled to extralateral rights below the point of underground intersection for the 22 feet of strike which outcrops on his ground. As it would probably be impractical for him to work this 22 feet, you could probably make arrangements to mine it for him and pay him a royalty.

It is my opinion, with the possible exception of the 22 feet of the minor vein referred to above, that extralateral rights to the vein, which you are now working, belong to the Pure Gold claim, and that the tungsten-bearing ore shoot can be claimed down its dip into the Morning Star claim on to the west from the point where its hanging wall crosses the side line and enters the Pure Gold claim.

Yours truly,

E. N. Pennebaker

ENP/as

P.O. Box 1493
Globe, Arizona
April 8, 1944.

Mr. Edward H. Molson
P.O. Box 607
Tucson, Arizona.

Revised Draft

Dear Mr. Molson:

On March 25 and 26, 1944, I examined the geology on and near the Pure Gold mining claim near Oracle, Arizona. Information was noted in detail around the perimeter of the glory hole so that a record is preserved of features that might be destroyed by mining or slumping of the margins with attendant destruction of matural surface relations.

I am sending you a sketch of the geology, but am writing you this letter to give you my opinion regarding your extralateral rights.

There are two veins. The one that you have been mining has a curving southeasterly-northwesterly course over the natural surface near the common bounday between the Pure Gold and Morning Star claims. The hanging wall edge passes out of the Pure Gold claim (on the surface) and enters the Morning Star at a point about 264' west of Corner No. 4 of the Pure Gold claim. Its dip to the south into the Morning Star claim appears to average about 45 degrees, but it may be somewhat steeper.

Lying south of this vein, and separated from it by 5' to 15' of dark gray limestone, is a minor vein of quartz and low-grade scheelite. So far as can be seen now on the natural surface and in mining excavations, this minor vein is not connected to the major vein. They are separated by relatively fresh dark-gray limestone. This limestone carries low values in WO_3, but it is not unusual to find low mineral values in the rock outside of vein walls. As now revealed, the veins appear structurally distinct and separate. I do not believe that these low values in WO_3 constitute a connection between the two veins. The minor vein appears to dip southerly about 45 degrees or possibly flatter. It is mostly within the Pure Gold mining claim, but it's southeast end extends southeasterly across the side-line into the Morning Star claim for a distance of about six feet, beyond which it dies out on the surface. Where it crosses the side-line, this

minor vein has an outcrop width of 22 feet measured along the side line.

If further work demonstrates that this upper or more southerly vein is connected below ground with your main vein, then the owner of the Morning Star may possibly claim that this minor vein is a branch vein, and if this contention is upheld, he would be entitled to extralateral rights below the point of underground intersection for the 22 feet of strike which outcrops on his ground. As it would probably be impractical for him to work this 22 feet, you could probably make arrangements to mine it for him and pay him a royalty.

It is my opinion, with the possible exception of the 22 feet of the minor vein referred to above, that extralateral rights to the vein, which you are now working, belong to the Pure Gold claim, and that the tungsten-bearing ore shoot can be claimed down its dip into the Morning Star claim on to the west from the point where its hanging wall crosses the side line and enters the Pure Gold claim.

Yours truly,

E. N. Pennebaker

ENP/as

1493

Mr. Edward H. Molson
P.O. Box 607
Tucson, Arizona

April 1, 1944

Proposed Revision

Dear Mr. Molson:

On March 25 and 26, 1944, I examined the geology on and near the Pure Gold mining claim near Oracle, Arizona. Information was noted in detail around the perimeter of the glory hole so that a record is preserved of features that might be destroyed by mining or slumping of the margins with attendant destruction of natural surface relations.

I am sending you a sketch of the geology ~~more detailed report on the geology~~, but am writing you this letter to give you my opinion regarding your extralateral rights.

There are two veins. The one that you have been mining has a curving southeasterly-northwesterly course over the natural surface near the common boundary between the Pure Gold and Morning Star claims. The hanging wall edge passes out of the Pure Gold claim (on the surface) and enters the Morning Star at a point about 264' west of Corner No. 4 of the Pure Gold claim. Its dip to the south into the Morning Star claim appears to average about 45 degrees, but it may be somewhat steeper.

Lying south of this vein, and separated from it by 5' to 15' of dark gray limestone, is a minor vein of quartz and low-grade scheelite. So far as can be seen now on the natural surface and in mining excavations, this minor vein is not connected to the major vein. They are separated by relatively fresh dark-gray limestone. "A" This minor vein appears to dip southerly about 45 degrees or possibly flatter. It is mostly within the Pure Gold mining claim, but its southeast end extends southeasterly across the side-line

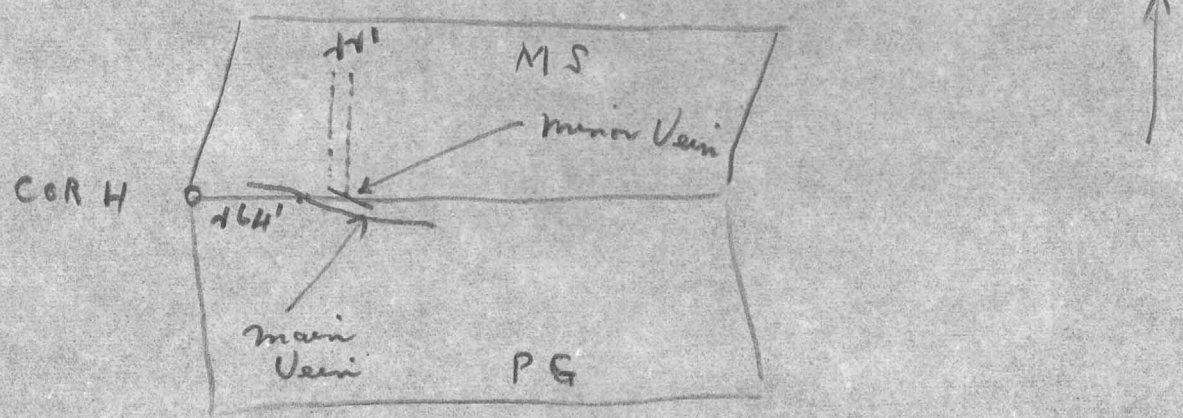
into the Morning Star claim for a distance of about six feet, beyond which it dies out on the surface. Where it crosses the side-line, this minor vein has an outcrop width of 22 feet measured along the side line.

If further work demonstrates that this upper or more southerly vein is connected below ground with your main vein, then the owner of the Morning Star may possibly claim that this minor vein is a branch vein, and if this contention is upheld, he would be entitled to extralateral rights below the point of underground intersection for the 22 feet of strike which outcrops on his ground. As it would probably be impractical for him to work this 22 feet, you could probably make arrangements to mine it for him and pay him a royalty.

It is my opinion, with the possible exception of the 22 feet of the minor vein referred to above, that extra-lateral rights to the vein, which you are now working, belong to the Pure Gold claim, and that the tungsten-bearing ore shoot can be claimed down its dip into the Morning Star claim on to the west from the point where its hanging wall crosses the side line and enters the Pure Gold claim.

Yours truly,

R N P



Globe, Arizona
April 1, 1944.

Original Draft

Mr. Edward H. Molson
P. O. Box 607
Tucson, Arizona.

Dear Mr. Molson:

On March 25 and 26, 1944, I examined the geology on and near the Pure Gold mining claim near Oracle, Arizona. Due to the limited time available, this work was principally confined to the close vicinity of the glory hole where tungsten ore is being extracted. Information was noted in detail around the perimeter of the glory hole so that a record is preserved of features that might be destroyed by mining or by slumping of the margins with attendant destruction of natural surface relations.

Certain additional geological details should be carefully mapped if ~~s~~stra-lateral property rights are contested.

A broad vein zone cuts through the area near the common side-line of the Pure Gold and Morning Star mining claims. Both claims are patented, the Morning Star's patent being the older. This zone is defined on the north, or footwall side, by the Mogul fault and by fissures lying adjacent to and just north of this fault. The Mogul fault strikes about N75 W and dips 35 degrees to the south. The hanging wall of the vein zone is defined by relatively fresh, dark-gray limestone. Between its footwall and hanging wall, the vein zone is over 40 feet thick and is composed of fissured and fractured limestone in which silica has been deposited by mineral-izing action. Mineralization in fissured and fractured granite in the footwall of the Mogul fault gives added thickness to the zone.

Its hanging wall, southern, portion (just beneath the dark-gray limestone) has been intensely mineralized with abundant deposition of quartz accompanied by sufficient scheelite to form a merchantable tungsten ore. It is this hanging wall lens of the zone that is now commercially valuable, but it is here pointed out that

this is but a part of a broader, continuous zone of fissuring and mineralization related to the Mogul fault.

The hanging wall of this hanging wall ore lens (which is also the hanging wall of the broad vein zone) has a curving northwesterly course over the natural surface near and along the common boundary between the Pure Gold and Morning Star mining claims. Following on northwesterly, this hanging wall edge passes out of the Morning Star claim (on the surface) and enters the Pure Gold claim at a point about 264 feet west of corner No. 4 of the Pure Gold claim. (The precise position can be determined when the surface is carefully cleaned.) This hanging wall boundary is fairly sharp but is somewhat irregular in detail. Its average dip to the south (into the Morning Star claim) appears to average about 45 degrees, but it may be somewhat steeper.

Lying above the ore lens, and separated from it by 5 to 15 feet of dark gray limestone, is a minor vein of quartz and low-grade scheelite. So far as can be seen now on the natural surface and in mining excavations, this minor vein is not connected to the major vein zone and ore lens. They are separated by relatively fresh, dark-gray limestone. This minor vein appears to dip southerly at about 45 degrees or possibly flatter. It is mostly within the Pure Gold mining claim, but its southeast end extends southeasterly across the side line into the Morning Star claim for a distance of about 6 feet, beyond which it dies out on the surface. Where it crosses the side-line, this minor vein has an autcrop width of 22 feet measured along the side-line.

The main broad vein zone presents a continuous width of fissuring, fracturing, and mineralization. It is held that the minor vein is not a part of the main zone because they are separated, so far as can now be determined, by dark-gray limestone cut only sparingly by irregular fractures and thin stringers.

However, this intervening bans of limestone shows by assay a small amount of WO_3. ~~Seven~~ Five samples give an average of 0.27% WO_3. Although the veins appear physically distinct, they are narrowly separated, and the intervening limestone carries some tungsten. Thus it might be held that they are continuous.

The footwall part of the amin zone (the Mogul fault and nearby veins in its footwall) crosses the east end-line of the Pure Gold claim.

From my examination of the ground, from my understanding of the law of extra-lateral rights, and from the opinions of your attorneys as reported to me, I believe that extra-lateral rights belong to the Pure Gold claim and that the tungsten-bearing ore shoot can be claimed down its dip into the Morning Star claim on to the west from the point where its hanging wall crosses the side-line and enters the Pure Gold claim.

As pointed out above, a small part of the minor vein projects into the Morning Star claim. No physical connection can now be seen between the two veins, and this extension of the minor vein lying in Morning Star ground at the outcrop may not confer any extralateral right to Morning Star on the ore lens of the main vein. Should such a connection be found by mining operations, or should the low assays of tungsten be considered to join them, then a segment would probably be excluded from Pure Gold's extralateral rights on the main vein. Mining down the dip west of this controversial segment (about 350 feet west of corner No.4) would avoid this area of possible conflict.

Very truly yours,

E. N. Pennebaker

ENP/as

Globe, Arizona
April 1, 1944.

Mr. Edward H. Molson
P. O. Box 607
Tucson, Arizona.

Dear Mr. Molson:

On March 25 and 26, 1944, I examined the geology on and near the Pure Gold mining claim near Oracle, Arizona. Due to the limited time available, this work was principally confined to the close vicinity of the glory hole where tungsten ore is being extracted. Information was noted in detail around the perimeter of the glory hole so that a record is preserved of features that might be destroyed by mining or by slumping of the margins with attendant destruction of natural surface relations.

Certain additional geological details should be carefully mapped if extra-lateral property rights are contested.

A broad vein zone cuts through the area near the common side-line of the Pure Gold and Morning Star mining claims. Both claims are patented, the Morning Star's patent being the older. This zone is defined on the north, or footwall side, by the Mogul fault and by fissures lying adjacent to and just north of this fault. The Mogul fault strikes about N75 W and dips 35 degrees to the south. The hanging wall of the vein zone is defined by relatively fresh, dark-gray limestone. Between its footwall and hanging wall, the vein zone is over 40 feet thick and is composed of fissured and fractured limestone in which silica has been deposited by mineralizing action. Mineralization in fissured and fractured granite in the footwall of the Mogul fault gives added thickness to the zone.

Its hanging wall, southern, portion (just beneath the dark-gray limestone) has been intensely mineralized with abundant deposition of quartz accompanied by sufficient scheelite to form a merchantable tungsten ore. It is this hanging wall lens of the zone that is now commercially valuable, but it is here pointed out that

this is but a part of a broader, continuous zone of fissuring and mineralization related to the Mogul fault.

The hanging wall of this hanging wall ore lens (which is also the hanging wall of the broad vein zone) has a curving northwesterly course over the natural surface near and along the common boundary between the Pure Gold and Morning Star mining claims. Following on northwesterly, this hanging wall edge passes out of the Morning Star claim (on the surface) and enters the Pure Gold claim at a point about 264 feet west of corner No. 4 of the Pure Gold claim. (The precise position can be determined when the surface is carefully cleaned.) This hanging wall boundary is fairly sharp but is somewhat irregular in detail. Its average dip to the south (into the Morning Star claim) appears to average about 45 degrees, but it may be somewhat steeper.

Lying above the ore lens, and separated from it by 5 to 15 feet of dark gray limestone, is a minor vein of quartz and low-grade scheelite. So far as can be seen now on the natural surface and in mining excavations, this minor vein is not connected to the major vein zone and ore lens. They are separated by relatively fresh, dark-gray limestone. This minor vein appears to dip southerly at about 45 degrees or possibly flatter. It is mostly within the Pure Gold mining claim, but its southeast end extends southeasterly across the side line into the Morning Star claim for a distance of about 6 feet, beyond which it dies out on the surface. Where it crosses the side-line, this minor vein has an outcrop width of 22 feet measured along the side-line.

The main broad vein zone presents a continuous width of fissuring, fracturing, and mineralization. It is held that the minor vein is not a part of the main zone because they are separated, so far as can now be determined, by dark-gray limestone cut only sparingly by irregular fractures and thin stringers.

However, this intervening bans of limestone shows by assay a small amount of WO_3. ~~Seven~~ Five samples give an average of 0.27% WO_3. Although the veins appear physically distinct, they are narrowly separated, and the intervening limestone carries some tungsten. Thus it might be held that they are continuous.

The footwall part of the amin zone (the Mogul fault and nearby veins in its footwall) crosses the east end-line of the Pure Gold claim.

From my examination of the ground, from my understanding of the law of extra-lateral rights, and from the opinions of your attorneys as reported to me, I believe that extra-lateral rights belong to the Pure Gold claim and that the tungsten-bearing ore shoot can be claimed down its dip into the Morning Star claim on to the west from the point where its hanging wall crosses the side-line and enters the Pure Gold claim.

As pointed out above, a small part of the minor vein projects into the Morning Star claim. No physical connection can now be seen between the two veins, and this extension of the minor vein lying in Morning Star ground at the outcrop may not confer any extralateral right to Morning Star on the ore lens of the main vein. Should such a connection be found by mining operations, or should the low assays of tungsten be considered to join them, then a segment would probably be excluded from Pure Gold's extralateral rights on the main vein. Mining down the dip west of this controversial segment (about 350 feet west of corner No.4) would avoid this area of possible conflict.

Very truly yours,

E. N. Pennebaker

ENP/as

Globe, Arizona
March 29, 1944.

Mr. Edward H. Molson
P. O. Box 607
Tucson, Arizona.

Dear Mr. Molson:

On March 25 and 26, 1944, I examined the tungsten mining operations and the geology on the Pure Gold mining claim about six miles from Oracle, Arizona.

I had with me copies of the plan map and section recently prepared by T. N. Stevens, registered civil engineer of Tucson, Arizona.

With the aid of the map, I identified the common boundary between the Pure Gold and Morning Star claims. This boundary line has been clearly marked by Mr. Stevens by means of iron pipes set firmly in the ground and by additional wooden stakes set along the line.

By sighting along the marked property line, I satisfied myself that tungsten ore stoping operations in the open cut had been confined to the Pure Gold claim and that no ore had been extracted across the boundary and within the Morning Star claim prior to March 25, 1944. I did no instrument surveying on this problem because such work had recently been done by Mr. Stevens, whose results you now have.

Yours very truly,

E. N. Pennebaker
Box 1493
Globe, Ariz.

ENP/as

Globe, Arizona
March 29, 1944.

Mr. Edward H. Molson
P. O. Box 607
Tucson, Arizona.

Dear Mr. Molson:

On March 25 and 26, 1944, I examined the tungsten mining operations and the geology on the Pure Gold mining claim about six miles from Oracle, Arizona.

I had with me copies of the plan map and section recently prepared by T. N. Stevens, registered civil engineer of Tucson, Arizona.

With the aid of the map, I identified the common boundary between the Pure Gold and Morning Star claims. This boundary line has been clearly marked by Mr. Stevens by means of iron pipes set firmly in the ground and by additional wooden stakes set along the line.

By sighting along the marked property line, I satisfied myself that tungsten ore stoping operations in the open cut had been confined to the Pure Gold claim and that no ore had been extracted across the boundary and within the Morning Star claim prior to March 25, 1944. I did no instrument surveying on this problem because such work had recently been done by Mr. Stevens, whose results you now have.

Yours very truly,

E. N. Pennebaker
Box 1493
Globe, Ariz.

ENP/as

EDWARD H. MOLSON - R F C ACCOUNT
- MAUDINA TUNGSTEN MINE -
Docket No. ND-8282, ND-5748 ∴ P. O. Box 607
TUCSON, ARIZONA

March 28, 1944

Mr. E. N. Pennybaker
P. O. Box 1493
Globe, Arizona

Dear Mr. Pennybaker:

I enclose a photostat of Mr. Joralemon's first report, dated October 21, 1943, on this property with a copy of his letter to me, dated March 18, 1944.

I am also attaching a copy of his second report, dated March 13, 1944, with a photostat of a map. Please see that no reference is made to this second report as I am not sure that I am entitled to a copy of it.

I am also enclosing a copy of Mr. Stevens's survey with the north-south vertical section added, and a photostat of Mr. Stevens's affidavit with the additional paragraph regarding the extraction of ore added.

I want to thank you for your cooperation and help that you had given me.

Very truly yours,

Edward H. Molson

EHM/L
Enc.

AFFIDAVIT OF T. N. STEVENS

State of Arizona)
: ss.
County of Pima)

T. N. STEVENS, being duly sworn, deposes and says:

That he is now and has been since 1915, a duly appointed, qualified and acting Mineral Surveyor, General Land Office, (formerly designated as United States Mineral Surveyor), with his office at Tucson, Pima County, Arizona.

That as such Mineral Surveyor, General Land Office, he was designated by Sherman C. Fiske, Office Cadastral Engineer, Public Survey Office, U. S. Land Office, Phoenix, Arizona, to make the survey for U. S. Patent, of the group of 29 lode mining claims situate in the Old Hat Mining District, Pinal County, Arizona, known as the Campo Bonito Group, among which group is the Pure Gold lode mining claim which is north of and immediately adjacent to the Morning Star lode mining claim, patented under Mineral Survey 1836.

That pursuant to said designation and under Mineral Survey No. 4250, and between June 9 and July 22, 1941, he made such survey and the field notes and plats thereof, and same have been duly approved and the entry for said group of claims (with the exception of the Colonel Bill lode) was, on Mar. 1, 1944, duly approved for patent by the Hon. Fred W. Johnson, Commissioner of the General Land Office.

That the south side line of the Pure Gold and the north side line of the Morning Star are identical; that the S.W. Cor. (No. 1) of the Pure Gold is identical with the N. W. Cor.

(No. 3) of the Morning Star; that the S. E. Cor. (No. 4) of the Pure Gold is identical with the N.E. Cor. (No. 4) of the Morning Star; that said N. E. Cor. (No. 4) M.S. is also identical with S. W. Cor. (No. 3) of the Mogul and the N. W. Cor. (No. 4) of the Mogul No. 2 lodes of the Campo Bonito Group, M. S. 4250.

That upon the survey of the Bonito group, M. S. 4250, he found the said N. E. Cor. (No. 4) of the M. S. in place, and at said point he set a 2" iron pipe in the ground, marking the identical corners of the M. S. Cor. 4, P. G. Cor. 4, M. Cor. 3 and M. 2 Cor. 4, and placed a lead cap thereon so designating said identical corners.

That from said point he surveyed and measured West 1500' and found the N. W. Cor. No. 3 of the M. S. lode in place, said point being identical with the said S. W. Cor. No. 1 of said P. G. claim, and at said point he set a 2" iron pipe in the ground and placed a lead cap thereon, appropriately marking same as Cor. 3, M. S., Cor. 1, P. G., Cor. 4, G. B., M. S. 1836, and Cor. 1, G.T.

That in the latter part of 1943, Mr. Richards and associates, who hold a lease on the Morning Star, employed him to go with them to the property and mark the identical side line boundary of the Morning Star and Pure Gold claims, whereupon he accompanied them to the property and pointed out to them the corners of the Pure Gold and Morning Star claims, and showed them the identical side line along its course, adjacent to the open pit on the P. G. claim marked with several wooden stakes placed squarely on said boundary line by him.

That on the 21st day of March, 1944, Mr. Molson and

associates, who hold a lease on the Pure Gold claim, employed him to survey and mark said identical boundary line and to survey and plat same and the open pit and tunnel workings on said Pure Gold claim in relation thereto.

That on March 21 and 22, 1944, he so made said survey, marked said boundary line, in addition to said wooden stakes on said line, with a 1" iron pipe sunk in a drilled hole 3' in the solid rock on said line, and surveyed and platted the open pit and tunnel workings on said Pure Gold claim.

That attached hereto and made a part hereof is the plat of survey of said workings, and that said plat correctly shows same in conformity with said survey.

That the photograph attached hereto supported by the affidavits of J. M. Garrett, E. H. Molson and I. M. KcKinley, correctly shows the open pit workings on said Pure Gold claim with relation to the identical South side line of the Pure Gold and the North side line of the Morning Star claims and the correct position of the wooden stakes theretofore placed by him on said identical side line of said claims and now added to by said 1" iron pipe as above set forth.

That, from his survey and examination of the mining operations on said Pure Gold claim, no ore has been extracted from any place South of said identical surface side line extended downwards vertically; all of said operations having been carried on North of said side line as so extended and entirely within the lines of the Pure Gold claim.

L. N. Stevens

Subscribed and sworn to before me this 25th day of March, 1944.
(Notarial work)

Tom K Richey

Notary Public, Pima County, Arizona.

My commission expires:
Jan. 30-1946

IRA B. JORALEMON
315 MONTGOMERY STREET
SAN FRANCISCO

March 18, 1944.

Mr. Edward H. Molson,
P. O. Box 607,
Tucson, Arizona.

Dear Mr. Molson:

In reply to your letter of March 14th, I am sending you herewith a copy of my memorandum of October 21, 1943, on the Maudina mine.

Referring to the apex situation at Maudina, I discussed this on the telephone with Mr. John E. Norton, Consultant to Metals Reserve Company. It developed during this conversation that Metals Reserve Company cannot depend on the side line stakes set on your instructions when the line is so exceedingly close to the outcrop. In order to protect us from possible later suits, Mr. Norton felt that it will be necessary for you to obtain a release from the neighboring properties, agreeing on the location of the line and if possible on the entire side line situation.

Mr. Richards seemed to be a reasonable person when we met him and I am sure that at least there would be no difficulty in obtaining an agreement to the effect that the side line stakes are correctly set and that the portion of the orebody north of these stakes belongs to you without question.

I hope it will also be possible for you to agree on a division of ore down the dip from the outcrop.

Yours sincerely,

Ira B Joralemon

IBJ:CS
Enc.
cc: Mr. John E. Norton

C O P Y

October 21, 1943

MEMORANDUM: Mr. Henry DeWitt Smith, Vice Pres.,
Metals Reserve Company.

FROM: Ira B. Joralemon

RE: New Maudina Mine, Campo Bonito, Pinal County, Arizona.

The Maudina group is on the north slope of the Santa Catalina Mountains, 43 miles by road north of Tucson, Arizona. The workings are reached by a fair branch road. There is no mine equipment. The old Campo Bonito mill has a 9 by 14 crusher; 2 sets of 14 by 27 inch rolls; trommel; home made jig; 2 tables and a vanner. The mill building has been largely removed, but equipment could be renovated. Wells produce water enough to allow milling 25 to 50 tons per day.

The New Maudina showing is one mile west of the old Maudina Mine, on the same group of claims. The old mine had small lenses of rich tungsten ore in a vein or shear zone. The new showing is in a band of limestone about 300 feet wide, between two large faults that strike north of west and dip 30 to 40 degrees south. Below the lower "Mogul" fault is a great mass of granite, and above the upper "Mogul" fault is the main mass of quartzite shale, etc. of the upper slopes of the Catalina Mountains. The limestone band between the faults has been dropped down many hundred or thousand feet.

In the limestone block the beds strike northwest, with some folding, and dip 50 to 70 degrees southwest. Near the footwall fault an irregular band or bed is almost completely silicified for a length of 300 feet or more. Part of this may be a quartzite bed, but at least part is a silicified limestone. The width of quartzitic material varies from 8 to 50 feet, the maximum width being where an irregular lens of quartz makes out in the hanging wall of the main band.

Most of the silicified material has only occasional spots of scheelite. A lens 100 feet long by 15 to 25 feet wide, near the center of the quartz band, is more heavily mineralized. This ore has been well exposed by stripping and a shallow open cut. It strikes northwest and dips steeply southwest, with the footwall from 10 to 30 feet south of the Mogul Fault. The ore consists of dense quartz or quartzite with abundant finely disseminated scheelite that sometimes is hardly more than a stain in the quartz. The best sample is a 50 ton shipment to the Tucson Ore Milling Co. (Jacobs) in Tucson, which assayed 2%WO_3. Results have not been received from an 18 ton shipment to the Phoenix stockpile.

An old tunnel 120 feet long, running southwest, cuts 70 feet vertically below the southeast end of the outcrop. The first 100 feet are in footwall granite. Then the large Mogul Fault is cut, dipping 30 degrees south. Above the fault is 10 feet of quartzitic material like that in the outcrop, and then partly silicified limestone. Only the 3 or 4 feet of quartz next to the fault carries good scheelite. Either the tunnel is at the end of the ore, where it is pinching, or the Fault has cut off part of the width. As the Fault is much flatter than the ore, it will cut off the entire body at slightly greater depth.

Accepting 20 feet as the average width on surface and 4 feet on the tunnel level, the possible tonnage above the tunnel is 5,000 to 7,000 tons. Raising and drifting must be done to prove the continuity. No great additional tonnage seems likely, as the large fault is almost sure to cut off the ore. The average grade may be 1.5 to 2% WO_3. though further development will be necessary to prove this.

Milling of Maudina ore will be difficult because of the very fine scheelite in a hard quartz gangue. Results have not been obtained on the sample sent to the Galigher Company in Salt Lake for testing. A run on 51.3 tons of 2% ore in the Jacobs (Tucson Ore Milling Company) mill in Tucson yielded a 25% in a 60.6% table concentrate plus 27% recovery in an 8% flotation concentrate. By more careful work, with perhaps finer grinding and a lower grade flotation concentrate, the recovery should be greatly increased.

If the Galigher tests are successful, the Maudina can make a profit of about $25 per ton on a 2% ore by shipping to the Phoenix stockpile. The profit through shipping to the Jacobs mill, assuming a 75% recovery, largely in 5% flotation concentrates, would be about $20 per ton. In either case the Maudina owners will need financial help in preparing to mine the ore by glory-hole to the tunnel level. It will be difficult to mine and haul more than 25 tons per day, the capacity of the Jacobs mill.

The Maudina is at best a rich little mine. The best way to dispose of the ore will be to the Jacobs mill, with technical help from Galigher and from U. S. Vanadium, Agents. No definite plans can be made until milling tests are completed.

IBJ:CS

cc: Mr. D. M. Reit
cc: Mr. W. B. Gohring
cc: War Production Board (2)

Copy of letter of Instruction from Ira B. Joralemon
to Metals Reserve Company, Washington, D. C.

Confidential

March 13, 1944

MEMORANDUM: Mr. H. DeWitt Smith
Executive Vice Pres.,
Metals Reserve Co.,

FROM: Ira B. Joralemon

RE: Maudina Tungsten Mine of
E. H. Molson and Associates,
Pima County, Arizona

The Maudina tungsten mine on the northwest slope of the Santa Catalina Mountains was revisited on March 6, 1944.

PRODUCTION AND WORKINGS

In the four and a half months since my previous examination approximately 1700 tons of ore averaging 1.9% WO_3 have been shipped to Metals Reserve Co. stockpiles. Of the total, 700 tons of 2.15% ore were shipped to Phoenix, and 1000 tons of 1.7% ore to the new stockpile at the Jacobs Mill in Tucson. Returns from ore shipped are more than sufficient to repay the $20,000 R.F.C. loan, but Mr. Molson is anxious to accumulate a moderate working capital before repaying the loan.

While one small shipment was made in August, 1943, shipments to stockpiles were then discontinued until the latter part of the year, at the request of Metals Reserve Company. This resulted in a considerable reduction in the amount of production that will receive the $30.00 price, through being shipped prior to April 30. To make up for this enforced delay in starting regular shipments, it is recommended that the August shipments shall not be considered as beginning production, but that liquidating damages be based on production from the date of resumption of shipments to March 31, divided by four or five months, depending on whether the shipments starting in November or December.

At the present rate of shipment, the total production paid for by March 31 will have been nearly 6,000 units. If this is credited to five months, the liquidating damages under Plan Three will be about $20,000.

Since production was resumed, production has been chiefly from an open pit with maximum dimensions of 120 by 40 feet by 25 feet deep. This pit includes nearly all of the ore outcrop. All material taken out has been shipped except for a horse of limestone 40 by20 feet in size in the northwest part of the pit. The south edge of the pit broke into two intersecting open water-courses, surrounded by ore, that extend 25 feet south of the south side of ore outcrop. They show that while the footwall, or northeast wall of the ore dips 70 degrees or more down to the point where ore is cut off by the large Mogul Fault, the hanging wall is much flatter, and isnearly parallel with the fault. This greatly increases the possible size of the ore-body, as there is nothing to indicate how far down the dip to the southwest the ore may continue.

In addition to the open pit work, a drift was run 50 feet west from the old tunnel, which is 47 feet vertically below the floor of the pit. The drift is in the quartzite footwall of the Mogul Fault. A raise was put up from the drift to the pit, and crossed the fault into the orebody 18 feet above the rail. Ore is now being glory-holed into the raise. Shipments for a few days before the examination were at the rate of 80 tons per day.

MINING PROBLEM

There are two threats to the continued success of the Maudina operation. First is the fact that thesouthwest wall of the pit, now 25 feet high, is nearly vertical, and in places overhangs by several feet. Sideline complications prevent cutting down the bank to a safe slope. The Mine Inspector will certainly soon stop the open pit or glory-hole mining. The alternative will be to put in strong stulls with head boards from the limestone horse in the northwest part of the orebody to the hanging wall and clear across the body in the narrower southeast end; and if necessary, to change to square-set stoping to hold the hanging wall. The change to underground mining will soon reduce the production per day.

APEX QUESTION

The second, and still more serious threat is the exceedingly complicated apex situation. This is shown in the attached sketch, which is based on a compass survey by the undersigned and on sideline stakes set by the Maudina engineers.

As the sketch shows, the main outcrop crosses the sideline from the Pure Gold claim of the Maudina group into the Morning Star claim, leased by Richards and associates, about 30 feet east of the end of the open pit and of the better ore. For 97 feet west of here the south edge of the outcrop is barely within Maudina ground. Then an irregular projection of low grade quartz makes out in the hanging wall, and the edge of this is in the Morning Star for 17 feet length. As the Morning Star is the older claim, it owns all the ore south of the sideline, and within lines parallel with its projected north-south endlines, wherever any part of the outcrop is in the Morning Star.

For the rest of the length the Pure Gold (Maudina) may claim extra-lateral rights for the length of its outcrop, within planes parallel with its N 23 degree E endline. As the tungsten bearing lode does not cross the Pure Gold endline, it depends for its rights on the outcrop of the Mogul Fault, which crosses the endlines and which carries a little gold. The tungsten outcrop would then be a spur or branch vein.

A further complication comes from the fact that itis now certain that the projection of low grade quartz that crosses the sideline for 17 feet in length is part of the main deposit. A shaft of this projection would be necessary to prove which claim owns the part of the deposit down the dip from this short stretch of outcrop.

Metals Reserve Company is vitally interested in this apex question because both Mr. W. L. Merritt and the undersigned of Metals Reserve Company, and Mr. Frisbie of R.F.C. know that there is some uncertainty as to rights. Therefore if Metals Reserve Company pays Maudina for ore that is now within its rights, Metals Reserve Co. would probably be liable for damages to the Morning Star.

Fortunately the only Maudina workings that have crossed the line thus far are the last 15 or 20 feet of the old tunnel, which are in low grade material, and the open watercourses south of the bottom of the pit, from which only a little loose ore was shipped.

In order to avoid any dispute, which might involve Metals Reserve Co., the question was discussed with Mr. Molson and the following strong recommendations were made:

1. Mr. Molson should give Mr. Richards, lessee of the Morning Star, all the information available.

2. Molson should try to arrange for a sub-lease or for joint operation of any areas in which Morning Star may have rights, and to arrange to have Morning Star allow removal of the hanging wall on its property, which will make possible the extension of safe open pit mining.

3. Molson should arrange with Richards for a joint survey by a reputable geologist ~~or~~ engineer, who will map the sideline and the outcrop with great care. There will then be a record on which to base determination of rights after the hanging wall is mined or slumps into the pit.

Mr. Molson will follow these recommendations, and until the question is settled will mine no ore that is not north of a vertical plane through his sideline. He will notify Metals Reserve Company before he crosses the sideline.

As a further protection, Mr. W. B. Gohring, Supervising Engineer of R.F.C. in Phoenix, will have Mr. Frisbie of his office make occasional visits to the mine. Mr. Frisbie is familiar with the situation, and can make sure that Maudina ships no ore from beyond the sideline until an agreement is reached with Mr. Richards.

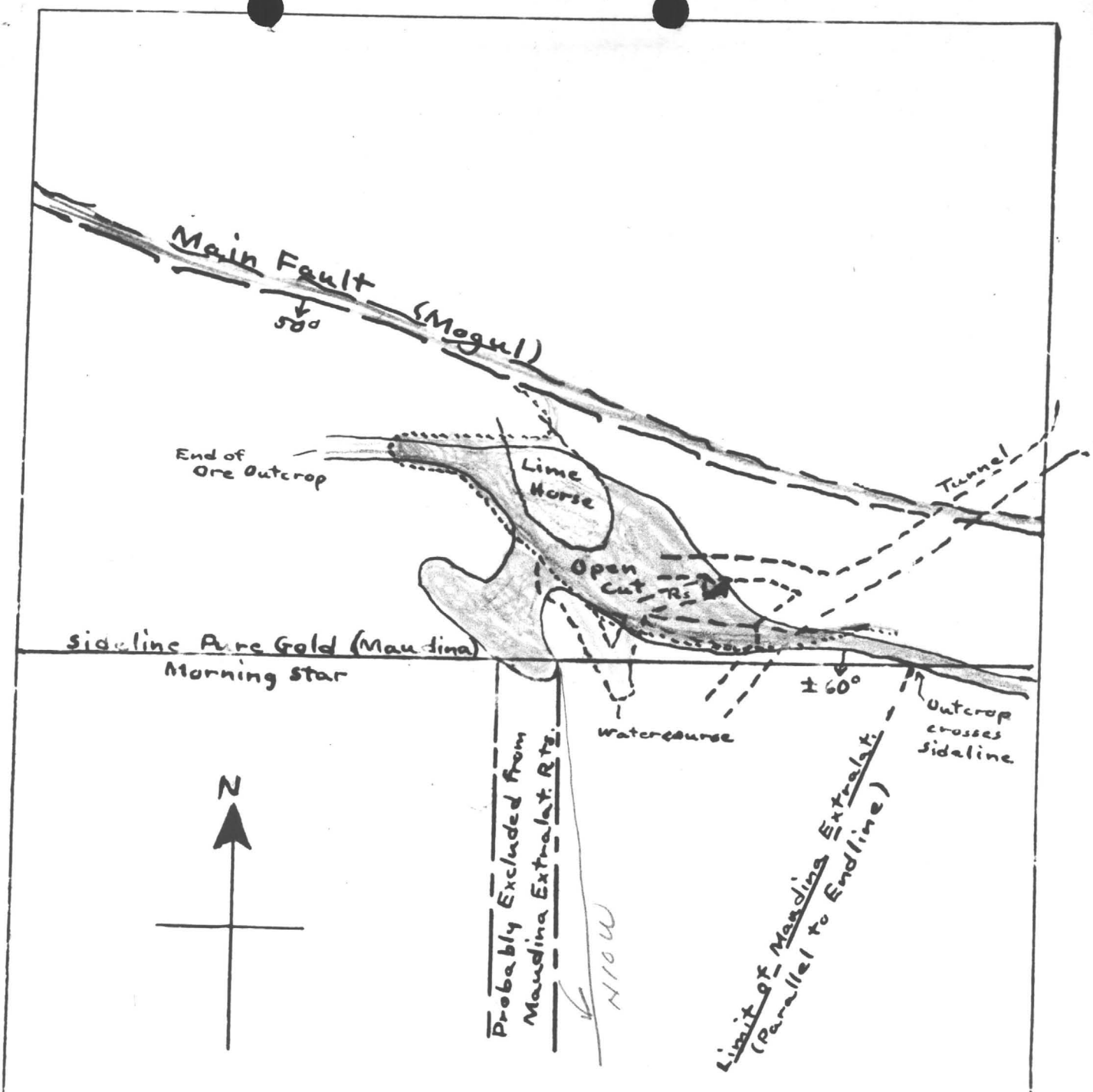
ORE RESERVES

In the wedge shaped block north of the sideline, coming to a point against the Mogul Fault at or slightly below the tunnel level, the probable remaining ore totals 6,000 to 8,000 tons, averaging 1.7% WO_3. It will be difficult for the Maudina to mine this ore before June 30, the final date for shipments under Plan Three of the Cancellation notice, unless an arrangement is made with Mr. Richards to allow an extension of the pit on to Morning Star ground.

The orebody should produce about 200 tons for every inclined foot it continues under Morning Star surface. There is nothing to show how far it will continue, and Morning Star can claim part of the ore. If the apex question is settled, Maudina should be able to ship to the Jacobs mill at a profit as long as tungsten sells above $20.00 per unit.

Ira B. Joralemon (signed)

IBJ:CS
cc: Mr. D. N. Rait
Mr. W. B. Gohring
Mr. W. L. Merritt



Outcrop of Orebody

Limit of Open Pit

Underground Workings

SKETCH SHOWING

MAUDINA OREBODY

AND PROBABLE APEX SITUATION

Scale 1"=40' Mar. 10, 1944

RAJ

TYPES OF TUNGSTEN DEPOSITS

Ore deposits are usually classified according to the processes involved in their origin. Tungsten deposits are represented in almost every type of deposit. These include: (1) Segregation deposits, (2) pegmatites, (3) replacement deposits, (4) contact-metamorphic deposits, (5) veins and (6) placers.

Segregation Deposits

As the name implies, this type of deposit is formed by the segregation of certain minerals from an igneous mass on cooling. The minerals thus differentiated are present in greater amounts in the deposit than in the rock as a whole.

Segregation deposits are characterized by their irregular form and their freedom from fissures. These deposits are a part of igneous intrusions, and the gangue minerals are those of the parent rock. A tungsten deposit of this type occurs in the Whetstone Mountains, Cochise County, Arizona, where small, flat crystals of wolframite are distributed through granite in irregular masses that lie close to small, irregular gash veins.

Pegmatites

Pegmatite deposits are related closely to segregation deposits, as they are also end products of crystallization that have been thrust into openings in rocks already consolidated. Pegmatites are commonly found in dikes but sometimes show pipelike or other irregular forms. The constituent crystals of pegmatites generally are larger than the crystals of igneous rocks or veins; quartz, feldspars, and mica predominate. In addition to these minerals, which are also present in the parent granite from which the pegmatites are derived, pegmatites may include a great variety of other minerals, such as tourmaline, apatite, spodumene, amblygonite, garnet, beryl, columbite, triphylite, lithiophilite, cassiterite, and wolframite. These latter minterals if present in the parent rock occur in very small amounts, so that pegmatites may be considered a type of segregation deposit. On the other hand, some pegmatites which consist largely of quartz show the characteristics of veins.

The best examples of tungsten-bearing pegmatites in the United States are in the Harney Peak and Tinton districts, South Dakota. Although these pegmatites are important as a source of some rare minerals and gems, they have been of minor importance as tungsten producers.

Replacement Deposits

Replacement deposits are formed where solutions have dissolved the original rock and material of different composition is deposited in the space left by the solution. Deposition may follow solution so closely that the form and texture of the original material are preserved. Because of their solubility, carbonate rocks are favorable for replacement.

The best known examples of this type of tungsten deposit in the United States occur in the northern Black Hills near Lead, S. Dak., where flat-lying dolomitic limestone has been partly replaced by silica and wolframite. The ore bodies average about 2 feet in thickness, although they range from lenticular seams a few inches thick to large lens-shaped bodies about 6 feet thick. In general, replacement deposits of tungsten ores are irregular in form and erratic in mineral distribution.

Contact-Metamorphic Deposits

Contact-metamorphic deposits are formed in intruded rocks of calcareous composition by solutions and gases emanating from the intruded magma. Metamorphism destroys the original composition of the carbonate rocks; during the process of destruction an aggregate of characteristic contact-metamorphic minerals is developed--garnet, epidote, calcite, diopside, actinolite, scheelite, and numerous silicates of calcium, magnesium, and iron. This type of tungsten deposit is readily recognized by these minerals. The tungsten mineral in contact-metamorphic deposits is invariably scheelite; it occurs as grains ranging from the size of a pinhead to 1 inch or more in diameter, but the smaller sizes usually predominate.

Mineralization of the contact-metamorphic deposits generally follows the structure of the original sedimentary beds. The scheelite usually is distributed throughout the beds more uniformly than tungsten ores in the other types of deposits.

Nearly all the known contact-metamorphic tungsten deposits in the Unites States were discovered during the World War when the demand for tungsten was great and the rpices rose to unprecedented heights. In recent years most of the domestic production of tungsten concentrates has been derived from the contact-metamorphic deposits of the GreatBasin region. Contact-metamorphic deposits have been worked in the Mill City and Nightingale districts, Nevada, and near Bishop, California.

Veins

Veins are formed by solutions that have filled cracks or fissures within the rocks. The mineralizing solutions in some places have replaced the wall rocks, but ordinarily such replacement is not so extensive as to obliterate the relationship of these deposits to the fissures. In other places the walls of the veins are frozen to the vein matter. Veins containing tungsten ores may occur in single crevices or in two or more parallel zones of shearing. If shearing has been intense a series of interlacing veins or stockworks may be formed. Tungsten veins are subject to all the vagaries common to veins containing silver, gold, or other ores, such as branching, alternate pinching and swelling, brecciation, and sudden changes of direction. The tungsten minerals may be any of the important ones, with wolframite a little more common than ferberite, hubnerite, or scheelite. Little byproduct tungsten is produced in the United States from veins carrying ores of other metals, although gold, usually in small amounts, is found associated with scheelite and silver in the Wolframite group tungsten minerals. In veins in other parts of the world gold, molybdenum, bismuth, tin, and copper occur with tungsten ores. In general, tungsten ores in veins are erratic in form, size, and distribution of tungsten content.

Quartz and calcite are the most abundant gangue minerals in this type of deposit, although virtually all minerals ordinarily associated with veins may be present. Inclusions of wall rock are often found in the vein filling.

Representative vein-type tungsten deposits occur at Boulder, Colo., at Atolia, Calif., and in theSilver Dyke district near Mina, Ven. In the past the major production of tungsten concentrates in the United States has been derived from veins.

EDUCATION AND QUALIFICATIONS

Revised Copy
July 22, 1944

NAME: E. N. Pennebaker

AGE: 42

RESIDENCE: Kimberly, Nevada

PLACE OF BIRTH: Visalia, California

Registered Professional Engineer, State of Nevada, Member of Committee of Mining Geology, American Institute Mining and Metallurgical Engineers.

EDUCATION:

Graduate with degree of Bachelor of Science from College of Mining, University of California, class of 1924. Major subject: Economic Geology. Appointed Teaching Fellow in Geology, Geological Department, University of California, for academic year 1924-25, continuing post-graduate study in geology at same time. Similar appointment and graduate study in fall of 1927.

PROFESSIONAL EXPERIENCE:

1925-1927 -- Assistant Geologist on staff of Compania Real Del Monte y Pachuca at Pachuca and Parral, Mexico.

1927 -- Consulting engagements in Oaxaca and Parral, Mexico.

1928-1943 -- Chief Geologist, Consolidated Coppermines Corp., Kimberly, Nevada.

1943 to date-Consulting Geologist, Consolidated Coppermines Corp.

SPECIAL AND CONSULTING ENGAGEMENTS:

1933 -- Geological study of the Mountain City area, Nevada, for "The Congdon Office", Duluth, Minn.

1935-1937 -- Special study of surface geology at Bisbee, Arizona, for Phelps-Dodge, Corp.

1936 -- Examination of Golden Queen Mine near Mojave, Calif., for Golden Queen Mining Company.

1937 -- Examination of Bagdad Copper Co. property for American Metal Co., Ltd.

1938 -- Study of surface geology for Reno Gold Mines, Ltd., Sheep Creek, B. C., Canada.

1937 -- Detailed Examination of Sunshine Mine for Sunshine Mining Co.

1938-1944 -- Consulting Geologist for Minas de Matahambre, S. A., Matahambre, Cuba, including 21 months at the property on detailed investigations.

1939 -- Examination of geology for Park City Consolidated Mines Co., at Park City, Utah.

1939 -- Re-examination of Sunshine Mine and Mountain City, Nevada, area for Sunshine Mining Co.

1941 -- Examination of Dan Tucker Extension mining property near Fallon, Nevada.

1942 -- Geological examination of Portovelo mining district, Ecuador, for South American Development Co.

1942 -- Examination of Mercedes Mine, Macuchi, Ecuador, for American Metal Co., Ltd.

1942 -- Geological examination of Crescent Mine, Kellog, Idaho, for Bunker Hill and Sullivan M. & C. Co. at Kellog, Idaho.

1943 -- Geological examination of Bunker Hill mine for Bunker Hill and Sullivan M. & C. Co. at Kellog, Idaho.

1943 -- Geological study for Bradley Mining Company of their open pit tungsten mine at Stibnite, Idaho.

1943 -- Examination of United Verde mine at Jerome, Arizona for Phelps-Dodge Corp.

1944 -- Geological examination of mining property for Miami Copper Co. near Miami, Arizona.

1934 to date-Short examinations of various properties in the western states.

TUNGSTEN PROPERTIES STUDIED OR VISITED:

1 - Consulting geologist for Bradley Mining Co. during 1943 for their open pit tungsten mine at Stibnite, Idaho. Largest producer in United States. Detailed examinations during seven trips.

2 - Preliminary study of Tungsten Metals property near Ely, Nevada.

3 - Visits to Bay State mine near Eureka, Nevada, and Nevada-Massachusetts property near Winnemuca, Nevada.

4 - Brief examination of property at Tungstonia, Nevada.

5 - Study of tungsten occurence in Taylor mine of Consolidated Copper-mine Corp. at Kimberly, Nevada.

DEFINITION OF "VEIN"

Definition of "Vein" from U. S. Bureau of Mines Bulletin 95 entitled "A Glossary of the Mining and Mineral Industry", 1920.

"A vein or lode as used in the law applies to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock. (Iron Silver Mining Co. v. Cheeseman, 116 United States, p. 531; Mammoth Mining Co. v. Grand Central Mining Co., 213 United States, p. 77.)"

"Vein or lode does not mean merely a typical fissure or contact vein, but any fairly well-defined zone, or belt of mineral-bearing rock in place. (East Tintic Cons. Min. Claim, In re, 50 Land Decisions, p. 273)".

Definition of "Vein" from No. 8669 in the United States Circuit Court of Appeals for the Ninth Circuit, Empire Star Mines Company, Ltd. (a corporation), Appellant, vs. Grass Valley Bullion Mines (a corporation), et al., Appellee. Appellant's Opening Brief.

"According to the Supreme Court of the United States a vein or lode must have (1) boundaries, or (2) mineral-bearing rock."

The leading case on the subject is Iron Silver Mining Co. v. Cheesman, 116 U. S. 529, 6 Sup. Ct. Rep. 481, 29 L. Ed. 98. There the Supreme Court of the United States remarked on the extreme difficulty of defining a vein or lode for the guidance of a jury:

"We are not able to see how the judge who presided at the trial of the case could have better discharged his delicate task than he has in the charge before us to which the exceptions are taken, and we give here verbatim that part of it relating to this point, as found in the bill of exceptions: (535) ****'' "

"The trial Court in charging the jury accepted Judge Field's oft quoted definition of a lode or vein as a"body of mineral, or mineral-bearing rock, within defined boundaries".

"'In this definition the elements are the body of mineral or mineral-bearing rock and the boundaries; with either of these things well established, very slight evidence may be accepted as to the existence of the other.'"

The first element "gives prominence to the mineral body, and the second to the boundaries".

"'Proof of either proposition goes far to establish a lode, and it may be said without proof of one of them a lode cannot exist.**'" (536-537)

The Supreme Court of the United States requoted the language of the trial judge that

"'***with well defined boundaries, very slight evidence of ore within such boundaries will prove the existence of a lode.'" (538)

A vein is thus a deposit of mineral matter in or along a fissure or zone of broken rock that cuts through the bedrock. Its length is several times greater than its width as we follow its course over the ground at the earth's surface or underground through mine workings. Its width, however, is very commonly variable, and, as a consequence, many veins are seen to pinch and swell as we follow them. The pinching may be locally severe enough to leave nothing but a scantily mineralized fissure. On the other hand, swelling may be pronounced and give prominent lenses along the vein's course. Nevertheless, the mineralized zone still remains a vein, wherever we can follow either ore or the walls. We must look at the zone as a whole, not at some peculiarity of form of one of its component parts.

A vein, then, is an irregularly tabular body slicing down through the bedrock. Veins stand vertical or inclined. Where inclined, the upper surface is termed the "hanging wall"; the lower surface the "footwall".

These walls may be sharp and clean or irregular and fading. They are walls, nevertheless, for here the miner leaves the vein and enters the wall rock.

The vein material between the walls comprises a wide range of material. Very commonly, however, the vein filling consists of quartz through which there are scattered minerals carrying a valuable constituent that has a commercial value. This valuable mineral is not evenly distributed through the vein, and the quartz, likewise, is in variableabundance in different parts of the vein. Unmineralized fragments and chunks of wall rock are commonly found within a vein. These are called "horses" and are well known to miners, who have to extract and discard them during the course of mining.

Vein material is matter that has been introduced along a fissure or broken zone of bedrock. It comes from an unknown source within the earth. It is deposited within or near the fissure or may "eat" its way out of the fissure to give irregular walls. Movement along the fissure after mineralization may break through and re-establish the walls so that they are more easy to follow.

The vein may be distinguished from the wall rock (if we wish to ignore the fissure walls) by their character. The vein shows quartz and other minterals introduced by the vein-forming action along with the valuable constituent. The walls are(1) simply the ordinary bedrock free of introduced minerals, (2) bedrock lightly impregnated by vein-type minerals that have escaped outward from the vein, or (3) bedrock strongly impregnated or "altered" by introduced minterals accompanying vein-forming action but usually not accompanied by the valuable mineral for which we mine. In the latter case, the waste wall rock must located by assay, or by the presence of a fissure wall, or by its physical appearance gained from experience at the mine.

DISSEMINATED DEPOSIT

"Disseminated" deposit is a term restricted by current mining usage to great deposits of low-grade copper ore in schist or "porphyry". One great deposit of molybdenum ore is properly included in this group. These deposits are characteristically flat, rolling, or gently inclined blanket-like bodies whose horizontal dimensions are far greater than their vertical depth. Rather than being confined to a fissure or fissure walls, or related thereto, they occupy a great mass of fractured rock in which a great multitude of small cracks and fissures abound. (These have never been involved in apex litigation, and their extra-lateral rights have never been defined.)

PURE GOLD TUNGSTEN VEIN

EXAMINATION

I examined the Pure Gold tungsten vein on March 25 and 26, 1944, and again on July 21, 1944. Mr. E. J. Ewing accompanied me while at the property. Also on Dec. 10, 1944.

The surface near the workings was examined, the open cut was inspected carefully, and the underground tunnel and related workings were studied. Many exposures were gone over repeatedly.

GENERAL SETTING

The Pure Gold tungsten vein is found cutting through sedimentary rocks in the immediate hanging wall of the Mogul Fault. This great fault is traced on the geologic map of Arizona for several miles where it has placed sedimentary rocks against granite. In the mining area near the Pure Gold claim the vein is about 50 feet from the fault and is rudely parallel to it. The vein is related to profound fissuring accompanying this faulting.

THE VEIN

The Pure Gold tungsten vein was observed on the ground along a course of (over 300) 325 feet from southeast to northwest. Its maximum width at right angles to its walls was found to be ~~40~~ 57 feet (~~52 feet if we include the upper, minor vein~~). Toward the northwest it is continueing with substantial thickness but is covered by soil and loose surface rock. Toward the southeast it becomes narrow (about ~~10~~ 15 feet) where it crosses the property line. However, it does not pinch out here but continues for at least ~~75~~ 110 feet in the Morning Star claim with about an 8 foot width exposed. (Mr. Ewing might measure this length and width for us here).

THE FOOTWALL

The footwall of the Pure Gold tungsten vein is a sharp, clean wall separating quartz with scheelite from gray, crushed ~~silicified~~ limestone. This fracture or fissure plane of separation is well exposed in open cut and underground excavations. On June 21, 1944, it could be followed for 50 feet where exposed by excavations on the northerly margin of the open cut. It is clearly shown in the haulage tunnel and in No. 3 raise (the new raise) where the fluorescent lamp shows tungsten ore lying against the sharp, regular footwall. It crosses the Morning Star-Pure Gold side-line through a trench marked by a wooden stake placed 214.87 feet west of the No. 4 corner of the Pure Gold claim. Here it is not well exposed, but its nearby presence is indicated by strongly fractured rock. The footwall strikes N. 45° to 85° W. and thus shows some curvature along its course. Its dip varies from 20 to 60 degrees but averages about 45 degrees toward the southwest.

THE HANGING WALL

The hanging wall of the Pure Gold tungsten vein was clearly revealed in the northwesterly surface excavations on June 21, 1944. It was exposed as a clear fracture plane and a series of closely spaced fracture planes of somewhat irregular altitude for a length of about 45 feet. Immediately underneath the hanging wall there is a zone of several feet of good ore according to Mr. Ewing. The hanging wall is also clearly shown along the southerly margin of the open cut, near the southeasterly end of the open pit. Here it is somewhat irregular in detail but is clearly visible and forms the boundary between black limestone and the quartz-scheelite vein. In the above two localities the hanging wall strikes from east-west to N. 15° W. and develops a strong curvature. This permits the vein to swell and become thicker through the area of mining operations. Through the central part of the open cut the hanging wall (of the main vein) is more irregular and is

defined by several steep fracture planes with northwesterly trend.

VEIN FORM

The vein in its broader outlines thus shows a lenticular swelling. It is bounded by a pronounced footwall fissure and more irregular hanging wall fissures, locally clean and sharp. The vein strikes northwest and dips southwest at 45 degrees on the average.

In detail it is seen to be a main vein with a minor spur vein lying a short distance in its hanging wall. This was formerly believed to be a separate vein, but it is possible that they join on the northwest, the hanging wall vein fitting in underneath the hanging wall fissure observed in the northwesterly surface workings. However, this relation has not been proved yet by mine excavations. Blasting will soon give the answer.

RELATION TO PROPERTY LINE

The relation of the hanging wall to the property line was carefully observed on March 25 and 26, 1944, before slumping of the margin of the open cut destroyed the natural relations of the surface outcrop of the vein to the property line. The hanging wall of the main vein was seen to cross the property line at a point 264 feet west west of Corner No. 4 of the Pure Gold claim. Here it entered the Pure Gold claim and followed just inside the claim (6 inches to 5 feet away from the line) for about 60 feet. There it turned sharply northwest and rapidly left the side-line. As stated in an earlier memorandum, the minor hanging wall vein (or spur) is mostly in Pure Gold ground but its southeast end juts across the line and extends into the Morning Star claim for a distance of about six feet. Where it crosses the side-line, this minor vein has an outcrop width of 22 feet measured along the side-line.

VEIN FILLING

The vein filling of the pure Gold tungsten vein consists of white quartz and the tungsten-bearing mineral scheelite. The amount

of quartz and scheelite varies considerably in the vein between the footwall and the hanging wall. There are chunks and horses of limestone waste rock between the walls, and these become more abundant toward the northwest.

HANGING WALL ROCKS

The hanging wall is composed of black limestone cut by a few thin cracks carrying quartz and calcite. The hanging wall rocks stand in clear contrast to the white vein.

FOOTWALL ROCKS

The immediate footwall is composed of silicified limestone. ~~In other words~~ silica (quartz) of very fine texture has flooded this limestone. Where seen underground it has a light brownish color and is not easily confused with the white quartz vein. Furthermore, the sharp footwall fracture makes the demarcation easy, and the presence of scheelite in the white vein quartz can be readily determined with the fluorescent lamp.

MINE WORKINGS AND DEPTH OF DEVELOPMENT

The Pure Gold tungsten vein is mined by means of an open cut in conjunction with an underground tunnel. Ore is drawn down through raises from the cut into the tunnel. To the tunnel horizon, the ore has been followed down its dip for about ~~75~~ 100 feet. Although the footwall shows a little flatter dip here, mining has not been stopped because of pinching of the zone or because the bottom of a kidney-shaped zone of ore has been reached. Mining has been deferred solely because of the controversy in ownership near the property line. The vein and its walls give strong evidence of extending downward. Only exploration can tell the commercial value of the vein at added depth.

(Taken from U. S. Geological Survey report on Strategic Minerals)
(Investigations Preliminary Maps, G-44.)

MAUDINA AND MORNING STAR TUNGSTEN MINES, PINAL COUNTY, ARIZONA

Deposits of scheelite (calcium tungstate) occur in silicified limestone breccia localized along the Mogul fault and its related structures at the Maudina and Morning Star mines, Pinal County, Arizona. The mines are in the northern part of the Santa Catalina Mountains, in the SW¼ sec. 17, T. 10 S., R. 16 E., Gila and Salt River Base and Meridian. The Pure Gold workings, the only active development on the Maudina property in January 1944, and the workings of the Morning Star mine are only 240 feet apart; both may be reached by 7 miles of fair gravel road from Oracle, Arizona.

The Morning Star mine was examined briefly in April 1943 by Konrad Krauskopf and Robert Stopper of the Geological Survey, United States Department of the Interior. In early January 1944, Paul C. Batemen and Max P. Erickson of the Geological Survey spent 3 days mapping and studying the deposits on both properties.

The principal geologic feature of this area is the Mogul fault which trends north of west across the Santa Cataline Range and brings Paleozoic and pre-Cambrian sedimentary and metamorphic rocks on the south into contact with pre-Cambrian granite on the north. The general dip of this fault is from 30° to 60° S. The fault includes many planes of movement over a wide area; the principal zone of brecciation is about 50 feet thick where it is exposed at the Pure Gold workings. We include the whole broad zone. On Pure Gold ground the fault itself may be defined more closely.

Scheelite mineralization occurs in silicified zones in a small body of limestone just south of the main fault zone. The limestone is bordered by pink quartzite on all sides except the northeast where it is cut off by the fault. Although the contact between the limestone and the quartzite is nowhere exposed, it seems probable that parts of it are faulted, especially to the south. The limestone is fine-grained and locally dolomitic. In most places bedding is not recognizable, but on the ridge southwest of the Pure Gold workings traces of bedding appear to strike N. 20° W. and to dip 75° E.

The Maudina property is owned by the Campo Bonito Tungsten Mines Company, Inc. and was operated in January 1944 by Edward H. Molson in association with E. J. Ewing and I. M. McKinley, under lease and option from this company. A substantial amount of scheelite ore was produced during the first World War from old workings about 1,000 feet northeast of the Pure Gold development.

The deposit on the Pure Gold claim was discovered in the summer of 1943. Workings on this claim consist of an open cut, from which all the ore mined by January 1944 was produced; a 120-foot adit; and several trenches. Most of the ore was shipped to the Metals Reserve Company stockpile at Phoenix, Arizona. Molson planned, however, to ship the ore to the Hilton-Jacobs custom mill at Tucson as soon as reconstruction of that mill, in progress in January 1944, was completed.

During the latter part of December 1943 and in January 1944, more that 840 tons of ore containing at least 2.0% of WO_3 was shipped from the Maudina mine to the Metals Reserve Company stockpile at Phoenix. The rate of production in January 1944 was 24 tons of ore per day.

The Pure Gold ore body is localized in silicified breccia in the principal Mogul fault zone. The ore body appears to dip with the fault about 40° to 50° S. The ore zone ranges from 5 to 50 feet in width at the surface where it is exposed for a length of about 200 feet. It may continue under alluvium to the south and connect with a mineralized breccia exposed near the portal of the lower adit on the Morning Star property.

The 120-foot adit barely reaches the downward extension of the mineralized zone, 50 feet below the level of the open cut (section A-A'). Only a trace of scheelite appears under ultraviolet light in the face of the adit, and samples taken by B. R. Frisbie of the Reconstruction Finance Corporation contained only 0.14 and 0.05 percent of WO_3. The adit, however, does not penetrate the mineralized zone far enough to permit adequate sampling on this level.

About 300 tons of ore may be assumed per foot of depth, and the ore body may be expected to continue downward for at least 15 feet beneath the floor of the cut. On the further assumption that the grade of ore remains constant, this block consisting of 4,500 tons would contain 9,000 units of WO_3. Available information gives no basis for estimating how far the ore may persist below this depth.

The Morning Star mine, owned by Mrs. Elizabeth Lambert Wood, was leased in January 1944 by the Morning Star Mining Company which acquired the least from the Fortuna Mining Company in August 1943. Total production from the Morning Star mine since 1940 amounts to an estimated 1,450 units of WO_3. The ore was treated in a small gravity mill about 1½ miles from the mine.

All the ore produced was mined from a glory hole and some small stopes west of the glory hole. Other workings comprise a haulage level for the glory hole and stopes, a 23-foot shaft, a 120-foot adit, and several small pits. In January 1944, the 120-foot adit was being extended to cut the ore zones in the glory hole at a depth of 60 feet below the bottom of the glory hole.

Scheelite in the glory hole and stopes is erratically distributed in an irregular, elongate body of silicified limestone that trends northeast. Large crystals of scheelite are concentrated along two faults which strike at right angles to each other, uctting the silicified limestone (Morning Star glory hole level, fig. 2). The northwest-trending fault, along which some post-mineral movement took place, offsets the southwest-trending fault about 10 feet. Under ultraviolet light, the ore along the faults appears in places to contain as much as 10 percent of WO_3 across widths of from 0.5 to 2.0 feet, although in most places the grade is not over 1 percent of WO_3. In the remainder of the silicified zone, scheelite is sparsely disseminated.

A 5-foot layer of silicified limestone breccia near the portal of the lower adit contains substantial amounts of scheelite so fine-grained that the WO_3 content is difficult to estimate under ultra-violet light. This zone may be a continuation of the ore zone on the Pure Gold claim. The first 60 feet of the adit is also in silicified limestone that contains little scheelite.

Reserves of ore beneath the glory hole and stope with at least 1.0 percent of WO_3 may amount to 2,000 to 3,000 tons. The extension of the Pure Gold ore zone may also contain reserves of commercial ore, but there was not sufficient information in January 1944 on which to base an estimate of its amount or grade.

The Mogul fault zone is believed to offer opportunities for further exploration which might lead to the discovery of additional ore bodies. The most favorable areas are those where limestone is adjacent to the fault.

EDUCATION AND QUALIFICATIONS

NAME: E. N. Pennebaker

AGE: 42

RESIDENCE: Kimberly, Nevada

PLACE OF BIRTH: Visalia, California

Registered Professional Engineer, State of Nevada, Member of Committees on Mining Geology, American Institute Mining and Metallurgical Engineers.

EDUCATION:

Graduate with degree of Bachelor of Science from College of Mining, University of California, class of 1924. Major subject: Economic Geology. Appointed Teaching Fellow in Geology, Geological Department, University of California, for academic year 1924-25, continuing post-graduate study in geology at same time. Similar appointment and graduate study in fall of 1927.

PROFESSIONAL EXPERIENCE:

1925-1927 -- Assistant Geologist on staff of Compania Real Del Monte y Pachuca at Pachuca and Parral, Mexico.

1927 -- Consulting engagements in Oaxaca and Parral, Mexico.

1928-1943 -- Chief Geologist, Consolidated Coppermines Corp., Kimberly, Nevada.

1943 to date-Consulting Geologist, Consolidated Coppermines Corp.

SPECIAL AND CONSULTING ENGAGEMENTS:

1933 -- Geological study of the Mountain City area, Nevada, for "The Congdon Office", Duluth, Minn.

1935-1937 -- Special study of surface geology at Bisbee, Arizona, for Phelps-Dodge, Corp.

1936 -- Examination of Golden Queen Mine near Mojave, Calif., for Golden Queen Mining Company.

1937 -- Examination of Bagdad Copper Co. property for American Metal Co., Ltd.

1937 -- Detailed examination of Sunshine Mine for Shnshine Mining Co.

1938 -- Study of surface geology for Reno Gold Mines, Ltd., Sheep Creek, B. C., Canada.

1938-1944 -- Consulting Geologist for Minas de Matahambre, S. A., Matahambre, Cuba, including 21 months at the property on detailed investigations.

1939 -- Examination of geology for Park City Consolidated Mines Co. at Park City, Utah.

1939 -- Re-examination of Sunshine Mine and Mountain City, Nevada, area for Sunshine Mining Co.

1941 -- Examination of mining property near Fallon, Nevada.

1942 -- Geological examination of Portovelo mining district, Ecuador, for South American Development Co.

1942 -- Geological examination of Crescent Mine, Kellog, Idaho, for Bunker Hill and Sullivan M. & C. Co.

1943 -- Geological study for Bradley Mining Company of their open pit tungsten mine at Stibnite, Idaho.

1943 -- Geological examination of the Bunker Hill mine for Bunker Hill and Sullivan M. & C. Co. at Kellog, Idaho.

1943 -- Examination of United Verde mine at Jerome, Arizona for Phelps-Dodge Corp.

1944 -- Geological examination of mining property for Miami Copper Co. near Miami, Arizona

1934 to date-Short examinations of various properties in the western states.

TUNGSTEN PROPERTIES STUDIED OR VISITED

1 - Consulting geologist for Bradley Mining Co. during 1943 for their open pit tungsten mine at Stibnite, Idaho. Largest producer in United States. Detailed examinations during seven trips.

2 - Preliminary study of Tungsten Metals property near Ely, Nevada.

3 - Visits to Bay State mine near Eureka, Nevada, and Nevada-Massachusetts property near Winnemuca, Nevada.

4 - Brief examination of property at Tungstonia, Nevada

5 - Study of tungsten occurence in Taylor mine of Consolidated Copper-mine Corp. at Kimberly, Nevada

Insert A
Insert B

DEFINITION OF "VEIN"

A vein is a deposit of mineral matter in or along a fissure or zone of broken rock that cuts through the bedrock. Its length is several times greater than its width as we follow its course over the ground at the earth's surface or underground through mine workings. Its width, however, is very commonly variable, and, as a consequence, many veins are seen to pinch and swell as we follow them. The pinching may be locally severe enough to leave nothing but a scantily mineralized fissure. On the other hand, swelling may be pronounced and give prominent lenses along the vein's course. Nevertheless, the mineralized zone still remains a vein, We must look at the zone as a whole, not at some peculiarity of form of one of its compenent parts.

A vein, then, is an irregularly tabular body slicing down through the bedrock. Veins stand vertical ~~and~~ or inclined. Where inclined, the upper surface is termed the "hanging wall"; the lower surface the "footwall".

These walls may be sharp and clean or irregular and fading. They are walls, nevertheless, for here the miner leaves the vein and enters the wall rock.

The vein material between the walls comprises a wide range of material. Very commonly, however, the vein filling consists of quartz through which there are scattered minerals carrying a valuable constituent that has a commercial value. This valuable mineral is not evenly distributed through the vein, and the quartz, likewise, is in variable abundance in different parts of the vein. Unmineralized fragments and chunks of wall rock are commonly found within a vein. These are called "horses" and are well known to miners, who have to extract and discard them during the course of mining.

Vein material is matter that has been introduced along a fissure or broken zone of bedrock. It comes from an unknown source within the earth. It is deposited within or near the fissure or may "eat" its way out of the fissure to give irregular walls. Movement along the fissure after mineralization may break through and reestablish the walls so that they are more easy to follow.

The vein may be distinguished from the wall rock (if we wish to ignore the fissure walls) by their character. The vein shows quartz and other minerals introduced by the vein-forming action along with the valuable constituent. The walls are (1) simply the ordinary bedrock free of introduced minerals, (2) bedrock lightly impregnated by vein-type minerals that have escaped outward from the vein, or (3) bedrock strongly impregnated or "altered" by introduced minerals accompanying vein-forming action but usually not accompanied by the valuable mineral for which we mine. In the latter case, the waste wall rock must be located by assay, or by the presence of a fissure wall, or by its physical appearance gained from experience at the mine.

DISSEMINATED DEPOSIT

"Disseminated" deposit is a term restricted by current mining usage to great deposits of low-grade copper ore in schist or "porphyry". One great deposit of molybdenum ore is properly included in this group. These deposits are characteristically flat, rolling, or gently inclined blanket-like bodies whose horizontal dimensions are far greater than their vertical depth. Rather than being confined to a fissure or fissure walls, or related thereto, they occupy a great mass of fractured rock in which a great multitude of small cracks and fissures abound. (These have never been invelved in apex litigation, and their extralateral rights have never been defined.)

PURE GOLD TUNGSTEN VEIN

EXAMINATION

I examined the Pure Gold tungsten vein on March 25 and 26, 1944, and again on June 21, 1944. Mr. E. J. Ewing accompanied me while at the property.

The surface near the workings was examined, the open cut was inspected carefully, and the underground tunnel and related workings were studied. Many exposures were gone over repeatedly.

GENERAL SETTING

The Pure Gold tungsten vein is found cutting through sedimentary rocks in the immediate hanging wall of the Mogul Fault. This great fault is traced on the geologic map of Arizona for several miles where it has ~~faulted~~ placed sedimentary rocks against granite. In the mining area near the Pure Gold claim the vein is about 50 feet from the fault and is rudely parallel to it. The vein is related to profound fissuring accompanying this faulting.

THE VEIN

The Pure Gold tungsten vein was observed on the ground ~~over~~ along a course of over 300 feet from southeast to northwest. Its maximum width at right angles to its walls was found to be ~~40~~ about 50 feet (52 62 feet if we include the upper, minor vein). Toward the northwest it is continueing with substantial thickness but is covered by soil and loose surface rock. Toward the southeast it becomes narrow (about 10 feet) where it crosses the property line. However, it does not pinch out here but continues for at least 75 feet in the Morning Star claim with about an 8 foot width exposed. (Mr. Ewing might measure this length and width for us here).

Note ←

THE FOOTWALL

The footwall of the Pure Gold tungsten vein is a sharp, clean wall separating quartz with scheelite from silicified limestone. This fracture or fissure plane of separation is well exposed in open cut and underground excavations. On June 21, 1944, it could be followed for 50 feet where exposed by excavations ~~near~~ on the ~~northwest~~ northerly margin of the open cut. It is clearly shown in the haulage tunnel and in No. 3 raise (the new raise) where the fluorescent lamp shows tungsten ore lying against the sharp, regular footwall. It crosses the Morning Star-Pure Gold side-line through a trench marked by a wooden stake placed 214.87 feet west of the No. 4 corner of the Pure Gold claim. Here it is not well exposed, but its nearby presence is indicated by strongly fractured rock. The footwall strikes N. 45° to 85° W. and thus shows some curvature along its course. Its dip varies from 20 to 60 degrees but averages about 45 degrees toward the southwest.

THE HANGING WALL

The hanging wall of the Pure Gold tungsten vein was clearly revealed in the northwesterly surface excavations on June 21, 1944. It was exposed as a clear fracture plane and a series of closely spaced fracture planes of somewhat irregular altitude for a length of 45 feet. Immediately underneath the hanging wall there is a zone of several feet of good ore according to Mr. Ewing. The hanging wall is also clearly shown along the ~~southeast~~ southerly margin of the open cut, near the southeasterly end of the open pit. Here it is somewhat irregular in detail but is clearly visible and forms the boundary between black limestone and the quartz-scheelite vein. In the above two localities the hanging wall strikes from east-west to N. 15° W. and develops a strong curvature. This permits the vein to swell and become thicker through the area of mining operations. Through the

central part of the open cut the hanging wall (of the main vein) is more irregular and is defined by several steep fracture planes with northwesterly trend.

VEIN FORM

The vein in its broader outlines thus shows a lenticular swelling. It is bounded by a pronounced footwall fissure and more irregular hanging wall fissures, locally clean and sharp. The vein strikes northwest and dips southwest at 45 degrees on the average.

In detail it is seen to be a main vein with a minor spur vein lying a short distance in its hanging wall. This was formerly believed to be a separate vein, but it is possible that they join on the northwest, the hanging wall vein fitting in underneath the hanging wall fissure observed in the northwesterly surface workings. However, this relation has not been proved yet by mine excavations. Blasting will soon give the answer.

RELATION TO PROPERTY LINE

The relation of the hanging wall to the property line was carefully observed on March 25 and 26, 1944, before slumping of the margin of the open cut destroyed the natural relations of the surface outcrop of the vein to the property line. The hanging wall of the main vein was seen to cross the property line at a point 264 feet west west of Corner No. 4 of the Pure Gold claim. Here it entered the Pure Gold claim and followed just inside the claim (6 inches to 5 feet away from the line) for about 60 feet. There it turned sharply northwest and rapidly left the side-line. As stated in an earlier memorandum, the minor hanging wall vein (or spur) is mostly in Pure Gold ground but its southeast end juts across the line and extends into the Morning Star claim for a distance of about six feet. Where it crosses the side-line, thisminor vein has an outcrop width of 22 feet measured along

the side-line.

Relation of FW to line 218' from #A cut

VEIN FILLING

The vein filling of the Pure Gold tungsten vein consists of white quartz and the tungsten-bearing mineral scheelite. The amount of quartz and scheelite varies considerably in the vein between the footwall and the hanging wall. There are chunks and horses of limestone waste rock between the walls, and these become more abundant toward the northwest.

HANGING WALL ROCKS

The hanging wall is composed of black limestone cut by a few thin cracks carrying quartz and calcite. The hanging wall rocks stand in clear contrast to the white vein.

FOOTWALL ROCKS

The immediate footwall is composed of silicified limestone. In other words silica (quartz) of very fine texture has flooded this limestone. Where seen underground it has a light brownish color and is not easily confused with the white quartz vein. Furthermore, the sharp footwall fracture makes the demarcation easy, and the presence of scheelite in the white vein quartz can be readily determined with the fluorescent lamp.

MINE WORKINGS AND DEPTH OF DEVELOPMENT

The Pure Gold tungsten vein is mined by means of an open cut in conjunction with an underground tunnel. Ore is drawn down through raises fromthe cut into the tunnel. To the tunnel horizon, the ore has been followed down its dip for about 75 feet. Although the footwall shows a little flatter dip here, mining has not been stopped because of pinching of the zone or because the bottom of a kidney-shaped zone of ore has been reached. Mining has been deferred solely because of the controversy in ownership near the property line. The vein and its walls give strong evidence

of extending downward. Only exploration can tell the commercial value of the vein at added depth.

B

(Insert Page 3)

Definition of "Vein" from No. 8669 in the United States Circuit Court of Appeals For the Ninth Circuit, Empire Star Mines Company, Ltd. (a corporation), Appellant, vs. Grass Valley Bullion Mines (a corporation), et al., Appellee. Appellant's Opening Brief.

According to the Supreme Court of the United States a vein or lode must have (1) boundaries, or (2) mineral-bearing rock.

The leading case on the subject is Iron Silver Mining Co. v. Cheesman, 116 U. S. 529, 6 Sup. Ct. Rep. 481, 29 L. Ed. 98. There the Supreme Court of the United States remarked on the extreme difficulty of defining a vein or lode for the guidance of a jury:

> "We are not able to see how the judge who presided at the trial of the case could have better discharged his delicate task than he has in the charge before us to which the exceptions are taken, and we give here berbatim that part of it relating to this point, as found in the bill of exceptions: (535) *****"

The trial Court in charging the jury accepted Judge Field's oft quoted definition of a lode or vein as "a body of mineral, or mineral-bearing rock, within defined boundaries".

"'In this definition the elements are the body of mineral or mineral-bearing rock and the boundaries; with either of these things well established, very slight evidence may be accepted as to the existence of the other.'"

The first element "gives prominence to the mineral body, and the second to the boundaries".

"'Proof of either proposition goes far to establish a lode, and it may be said without proof of one of them a lode cannot exist. ***''' (536-537)

The Supreme Court of the United States requoted the language of the trial judge that

"'*** with well defined boundaries, very slight evidence of ore within such boundaries will prove the existence of a lode.'" (538)

A

(Insert Page 3)

Definition of "Vein" from U. S. Bureau of Mines Bulletin 95 entitled "A Glossary of the Mining and Mineral Industry", 1920. A vein or lode as used in the law applies to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock. (Iron Silver Mining Co. v. Cheeseman, 116 United States, p. 531; Mammoth Mining Co. v. Grand Central Mining Co., 213 United States, p. 77.)

Vein or lode does not mean merely a typical fissure or contact vein, but any fairly well-defined zone, or belt of mineral-bearing rock in place. (East Tintic Cons. Min. Claim, In re, 50 Land Decisions, p. 273)

DEFINITION OF VEIN

A vein is a body of mineral-bearing rock, of general tabular form whereby its length is several times its thickness. It is composed of material that differs in character from that of the enclosing country rock, and one or more of its constituents may have a commercial value. The margins of the vein against the country rock are called its walls, and these may be either sharp and well-defined, or they may be gradational and less obvious. Where the wall is sharp or where the vein material shows a definite contrast against the country rock, the limits of the vein may be readily determined by visual inspection. Where the limit of mineralization is less obvious, analyses by physical or chemical means must be employed. The margin thus determined define the walls against which the miner limits the extraction of ore.

The walls of a vein need not everywhere be parallel. Pinches and swells are common in all veins.

A vein does not proceed in a strictly regular course. It may curve and make rather sharp turns.

The valuable constituent ~~of the vein~~ varies in quantity along the vein's course, and chunks or "horses" or waste rock are commonly found within the vein material. During the vein's formation, small ammounts of vein matter may "leak" outside the vein's walls.

In its simplest aspect, a vein is a fissure in the earth's crust filled by mineral matter. Other veins may be formed by replacement of rock by mineralizing solutions pro-

ceeding outward from the fissure.

Apex: The edge of a vein where it comes up to the surface of the earth along the plane of its dip.