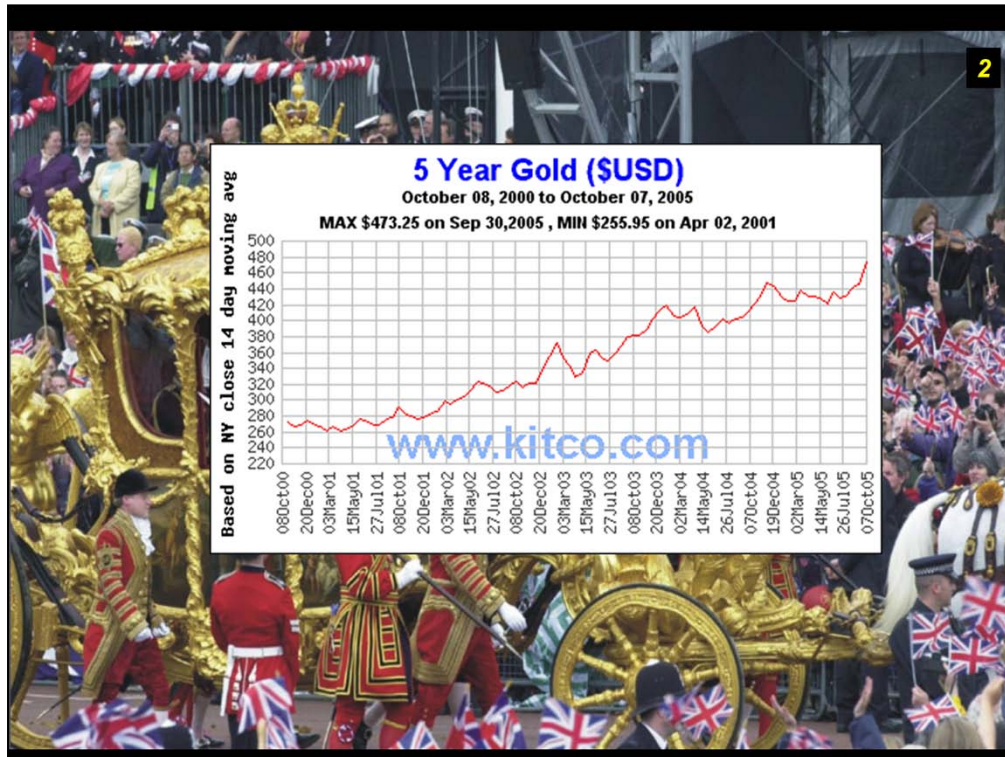




SLIDE 1 and 2: This talk is about gold. Some erroneously consider gold as a "barbarous relic" of eras long since passed. But gold, now, more than ever communicates value.

And valuable it is. Companies are looking for it and want to hear from prospectors with interesting new gold finds.



SLIDE 1 and 2: This talk is about gold. Some erroneously consider gold as a “barbarous relic” of eras long since passed. But gold, now, more than ever communicates value.

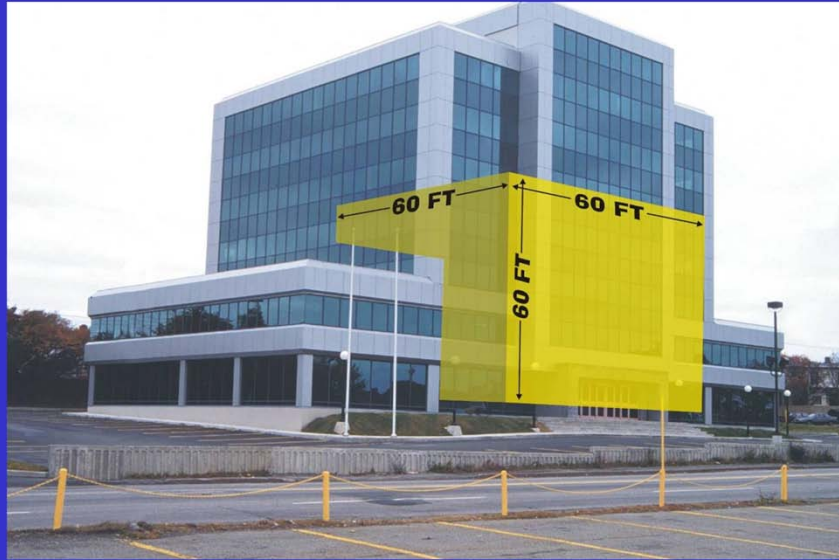
And valuable it is. Companies are looking for it and want to hear from prospectors with interesting new gold finds.



SLIDE 3: There is an old saying, well known to prospectors: "Gold is where you find it"

GOLD IS A **RARE** COMMODITY: ALL THE GOLD EVER MINED
WORLDWIDE WOULD FIT INTO A CUBE MEASURING
ABOUT 60 FEET ON A SIDE

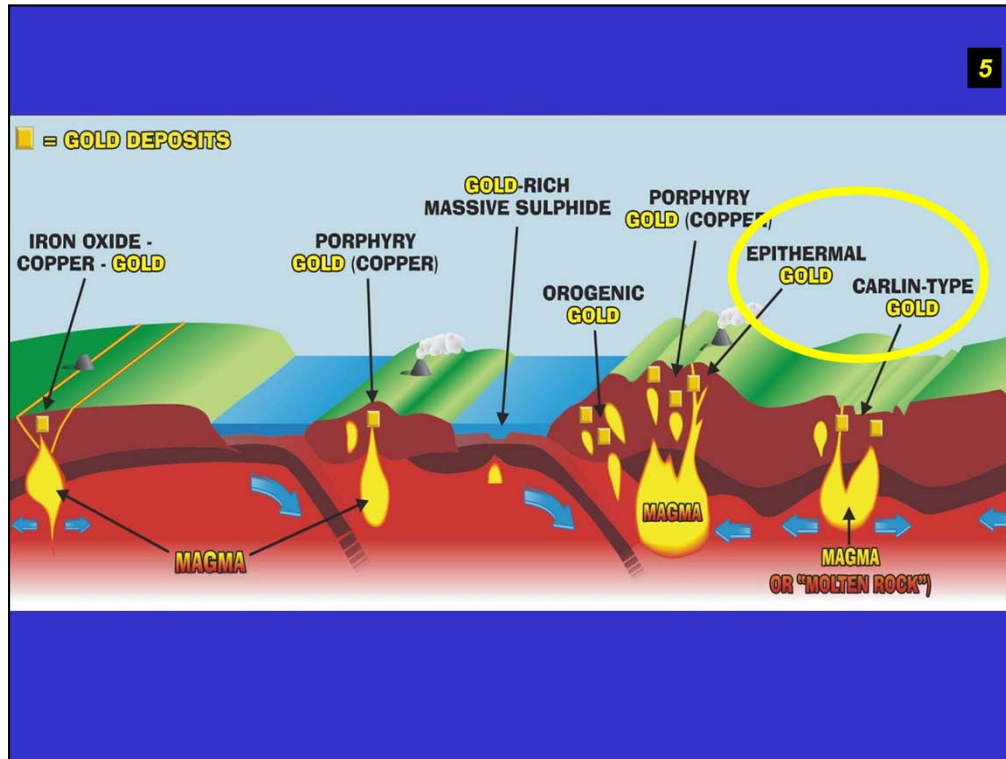
4



Natural Resources Building, St. John's, NL

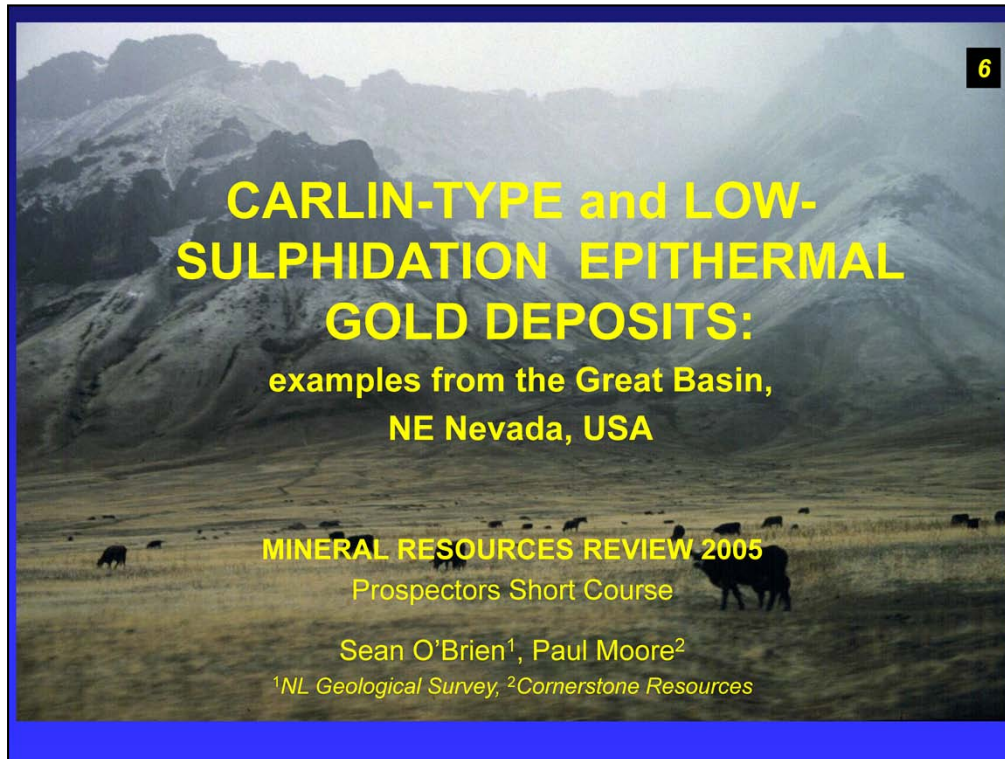
SLIDE 4: People haven't found much of it.... and that includes the lucky people. Gold is a very rare commodity, and rarely found in any great concentration. In fact, all the gold ever mined worldwide would fit into a cube measuring about 20 metres (or 60 feet) on a side.

Gold's concentration in rocks is measured in parts per million (ppm), grams per tonne (g/t) or ounces per ton (oz/t). One ounce per ton (equivalent to about 34 g/t or 34 ppm) is high-grade material. An equivalent 34 ppm of Cu, Zn or Ni is a background concentration or lower in most rocks.



SLIDE 5: Mother Nature concentrates gold in the upper crust by way of geological processes tied to “plate tectonics”. There are several types of gold deposits and several plate tectonic environments in which they are formed. Most are related (directly or indirectly) to magmatism – or formation and rise - in some cases to the surface - of molten rock.

We'll look at two of these and take a trip to part of the world where one sees world class examples of these types of gold deposits.



SLIDE 6: We'll take a short trip to a part of our continent where one can see the type area of sediment-hosted Carlin-type gold deposits *and* world-class examples of low-sulphidation epithermal gold deposits.

"Newfoundland meets Nevada"

7



SLIDE 7: We'll share with you some of what we learned a while back, during a consultant-led field trip to the metal-rich Southwestern USA to visit major sediment-hosted and epithermal gold mines in Northern Nevada. Interspersed with pictures from this area are a few pictures of rocks a little closer to home, as well as some cartoons depicting how these deposits are thought to form, and some tips on what to look for when you're prospecting for them.

- **Barrick Goldstrike:**
Al Lander, Russ Hardisty
- **AngloGold–Meridian Gold (Jerritt Canyon):**
Don Colli, Phil Everhart
- **Newmont (Twin Creeks):**
Fred Braite
- **Newmont (Midas):**
Brian Harris
- **Glamis Gold (Marigold):**
Doug McGibbon
- **Kinross–Barrick Gold (Round Mountain):**
Craig Pickens
- **University of NV at Reno:**
Greg Arehart + colleagues.

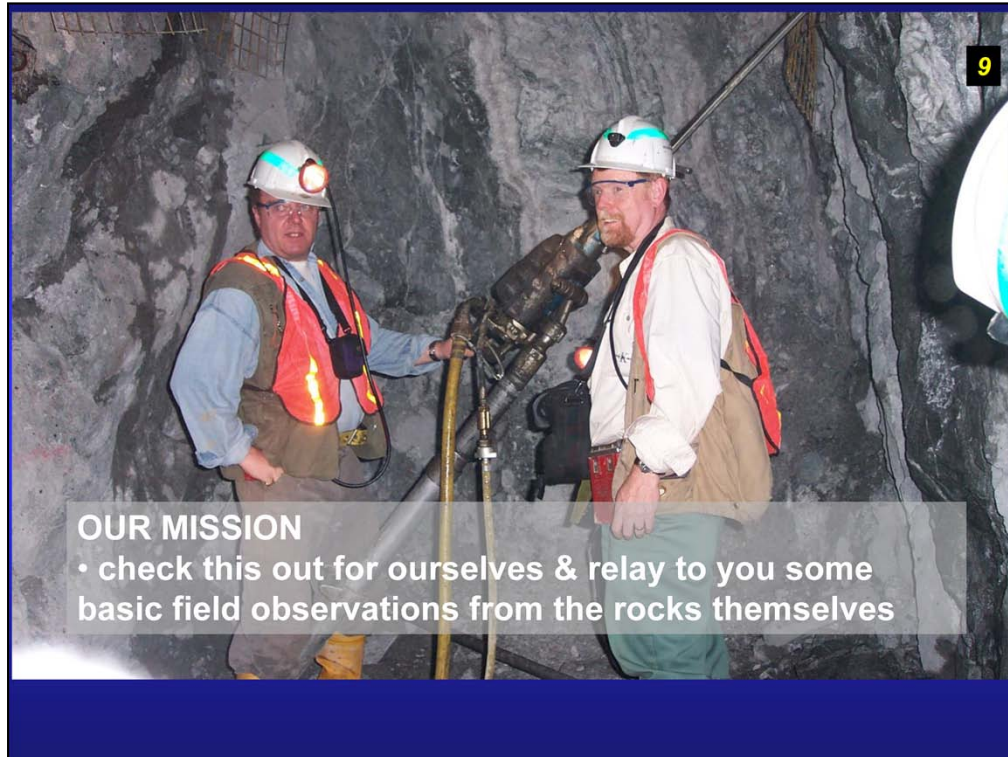
Acknowledgements:

8



SLIDE 8: We were fortunate enough to visit several world class open-pit and underground gold mines and spend lots of time with the folks who were most familiar with the outcrops – in particular the mine geologists.

We want to acknowledge these people, who took time out of very hectic schedules, to show us a lots of rocks, and bring us to places not everyone gets to see; we also thank their employers.



SLIDE 9: We gave a somewhat different version of this presentation earlier this year. At that time, we stated our wish avoid serving up a rehash of models and theories about Carlin and epithermal gold deposits.

We went to Nevada to check these gold systems for ourselves, learn a little regional and local geology, ask a few questions and see what the rocks had to say for themselves. We'll look at a few rocks and textures, some pictures of alteration, and relay to you some basic field observations. We'll pass on a few tips picked up from mine geologists, all of this to be interspersed with pictures and information on mining operations.

NEVADA: GEOLOGICAL and GEOGRAPHICAL SETTING

10



TWIN CREEKS MINE, NEVADA: CARLIN-TYPE GOLD (SEDIMENT-HOSTED)

We'll look at
**2 IMPORTANT
TYPES OF GOLD
DEPOSITS**
found in the
Great Basin of
the North
American
Cordillera.



This gold
occurs in
variety of rocks
of widely
differing age
and origin,
some of which
are like those
found in Nfld.

Slide 10: We'll look at 2 important types of gold deposits found in the Great Basin of the North American Cordillera. This gold occurs in variety of rocks of widely differing age and origin, some of which are like those found in Newfoundland.

MIDAS MINE:
HIGH-GRADE LOW-SULPHIDATION GOLD
IN VOLCANIC ROCKS

The is gold linked to geological processes tied to large-scale extension of the Earth's crust.

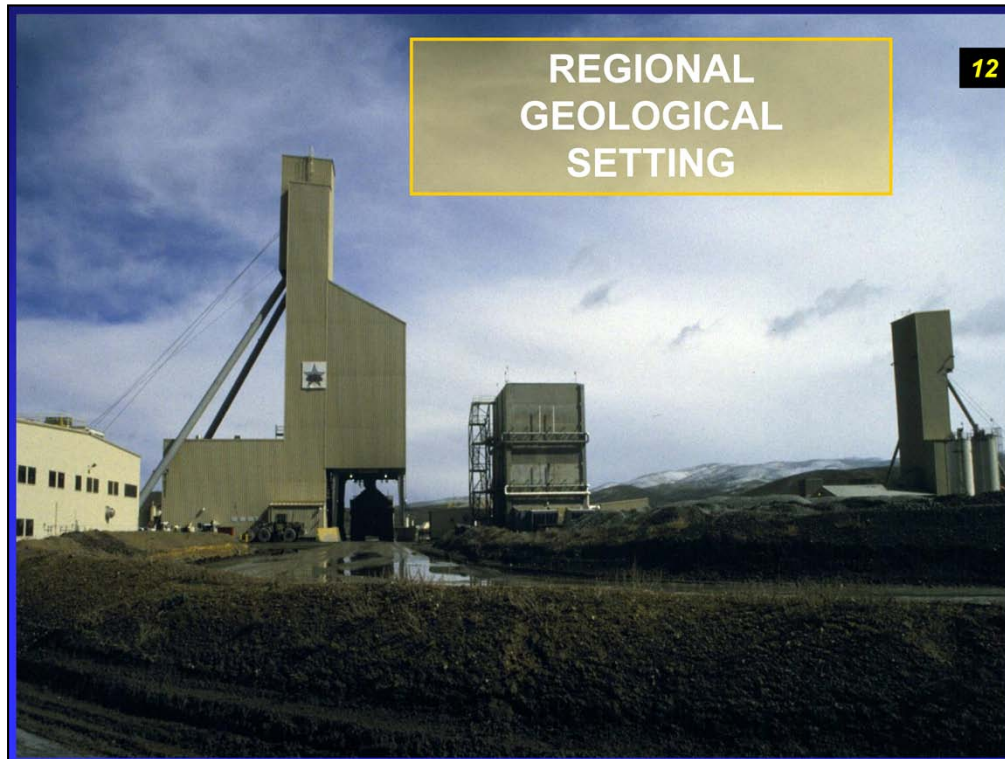
As you might expect, not everyone agrees on how all the gold was formed... but all agree there is great potential to find more of it.

ROUND MOUNTAIN MINE:
BULK TONNAGE, LOW SULPHIDATION GOLD

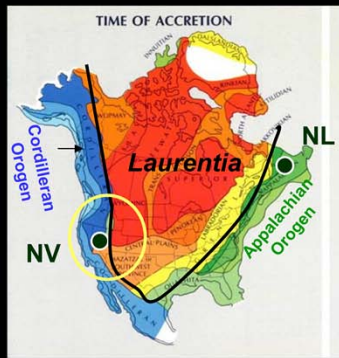


The slide features a blue background with two photographs. The left photograph shows a dark, textured rock face with prominent red mineral veins. A pneumatic drill is visible at the bottom. The right photograph shows a large, terraced open-pit mine with a winding road and a small body of water in the foreground.

SLIDE 11: The gold is linked to geological processes tied to large-scale extension of the Earth's crust. As you might expect, not everyone agrees on how all the gold was formed... but all agree there is great potential to find more of it.



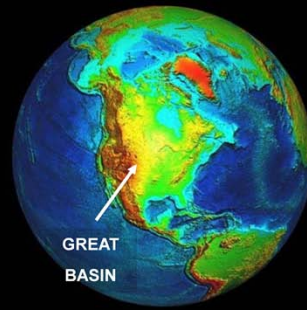
SLIDE 12: We begin with a brief discussion of the geological setting of this part of the continent.



THE GREAT BASIN

Complex, long-lived geological evolution along fringe of ancient continent called "Laurentia"

In terms of metals, this is FERTILE GROUND: lots of geological opportunity to get metal into upper crust of the Earth in this region, move it around, and concentrate it.



13

GOLD! THE GREAT BASIN HOSTS THE LARGEST ACCUMULATION OF GOLD DEPOSITS IN NORTH AMERICA

200 million ounces – USGS estimate

Nevada Alone produces
- 8 million ounces/yr
- US\$3.76 billion/ yr (@\$470/oz Au)

SLIDE 13: The Great Basin of SW North America records the complex, long-lived geological evolution along the fringe of an ancient continent called "Laurentia". In terms of metals, this is fertile ground: there was lots of geological opportunity to get metal into the upper crust of the earth in this region, move it around, and concentrate it. The Great Basin hosts the largest accumulation of gold deposits in North America. The USGS has estimated a total resource of as much as 200 million ounces in this region. Earlier this decade, Nevada alone was producing nearly 8 million ounces per year – with a value (2005) approaching US \$3.76 billion/yr (@\$470/oz Au)

GREAT BASIN GOLD, NEVADA

14

THE GOLD DEPOSITS RELATED TO COMBINATION OF 3 GEOLOGICAL PROCESSES:

Sedimentation –

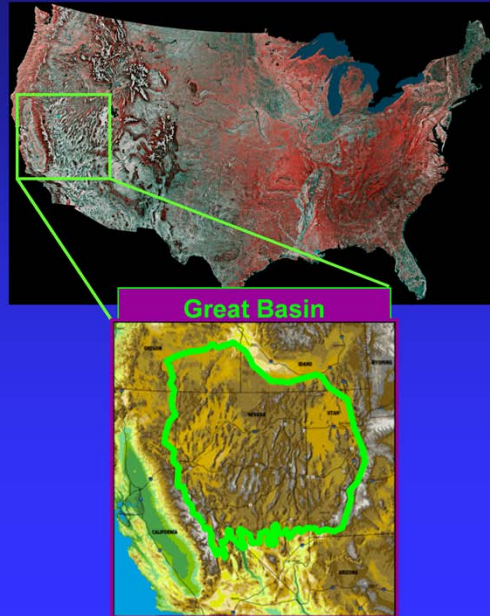
deposition of limestones and silica-rich clastic sediments (800 to 340 Million years ago) ... development of “passive continental margin”

Deformation

of the sedimentary rocks during tectonic squeezing or “accretion” along that margin (340 to 65 Million years ago); formation of *thrust faults* etc

Magmatism (volcanism, plutonism) and “extension”

(65 Million years ago to present-day).



SLIDE 14: The gold deposits in this region are related to the combination of 3 geological processes: 1) *sedimentation* – deposition of limestone and silica-rich clastic sediments (800 to 340 Million years ago) and the development of a “passive continental margin”; 2) *deformation* - the sedimentary rocks were folded and faulted during tectonic squeezing or “accretion” along that margin (340 to 65 Million years ago); at this time, important *thrust faults* formed (e.g., the Roberts Mountain Thrust); and 3) *magmatism* (volcanism, plutonism) and “extension” of the crust: the emplacement of molten magma into the upper part of the crust, which began about 65 Million years ago and continues to the present-day.

CARLIN TYPE GOLD GREAT BASIN, NEVADA

15



Carlin-type gold is hosted
by sedimentary rocks



- Mainly bulk tonnage, typically low grade deposits.
- Gold formed about 40 million years ago in older carbonate rocks like those in west Nfld

SLIDE 15: Carlin-type gold deposits are hosted by sedimentary rocks. They are mainly bulk tonnage (big), typically low-grade deposits. The gold formed about 40 million years ago in older carbonate rocks. The host rocks are much like the carbonate rocks that occur in western Newfoundland. Shown in the photo on the right are the arsenic-rich minerals orpiment (yellow) and realgar (red) – sure signs of high-grade ore in Carlin deposits.

LOW-SULPHIDATION EPITHERMAL GOLD: GREAT BASIN, NEVADA

16

Gold forms both high-grade, vein deposits (typical) and low-grade, bulk tonnage deposits

We'll visit 2 examples:

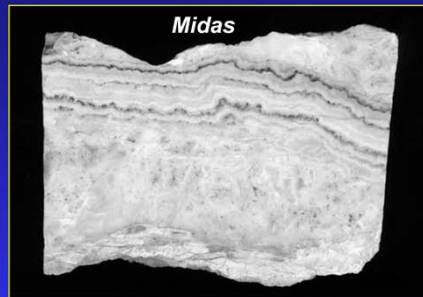
MIDAS MINE – gold in basalt-rhyolite (bimodal) volcanic rocks

One of many vein-type LS deposits in NV: **Sleeper, Mule Canyon, Ivanhoe...**

ROUND MOUNTAIN MINE – gold in felsic to mafic pyroclastic rocks: basalt, andesite, dacite, rhyolite compositions (volcanic calderas)

In both cases, gold found in volcanic rocks that are about same age as gold mineralization

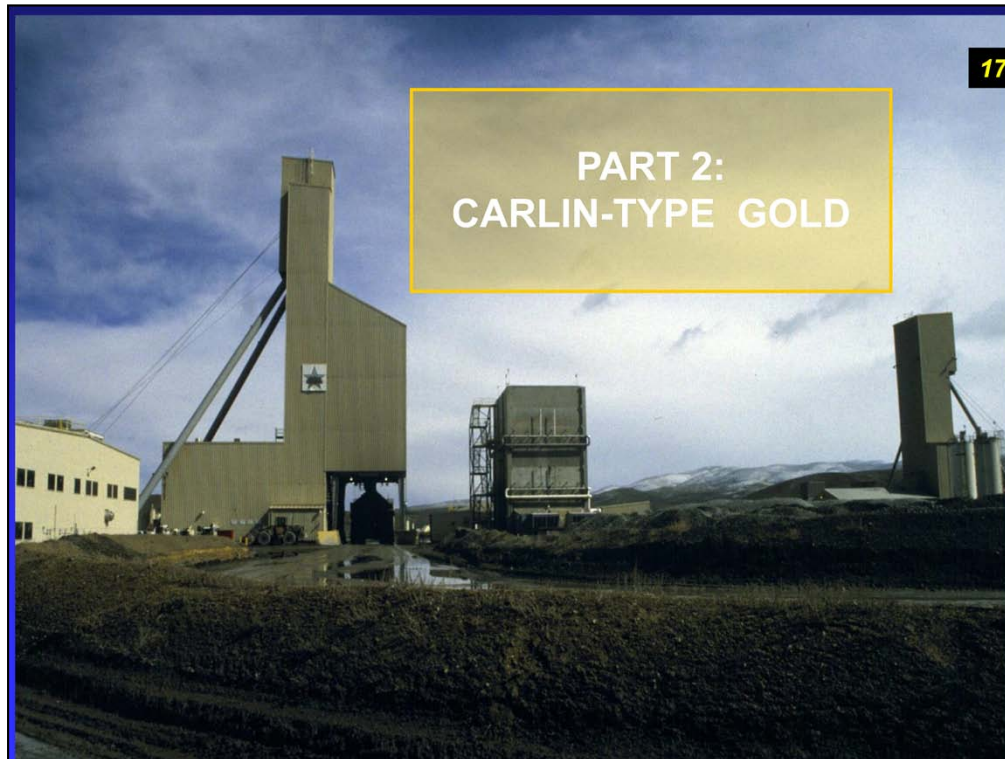
Gold deposits formed between 40 and 15 million years ago



SLIDE 16: Gold in this region also forms high-grade, vein deposits and low-grade, bulk tonnage deposits that are hosted by volcanic rocks. We'll visit 2 examples of the volcanic-hosted deposits. The first is the Midas Mine, where high-grade gold occurs in veins in basalt-rhyolite ("bimodal") volcanic rocks. This is one of many vein-type (epithermal) deposits in Nevada. Others of this type include Sleeper, Mule Canyon, and Ivanhoe deposits

The second is the Round Mountain Mine, where gold occurs in felsic to mafic pyroclastic (formed by volcanic explosions in calderas) rocks. These are not bimodal, and include rocks that share the chemical compositions of basalt, andesite, dacite, and rhyolite compositions.

In both cases, gold found in volcanic rocks that are about same age as gold mineralization. These gold deposits formed between 40 and 15 million years ago. Also shown is a "multi-ounce" gold bearing vein from Midas, and a low-grade vein and associated disseminated ore from the Round Mountain gold deposit.



Slide 17: From here we will lead you on a brief tour of the Carlin deposits. We'll start by taking a closer look at the regional setting, followed by a brief look at how the mineralization occurs and what controls the mineralization. We hope to set you up with some prospecting criteria that you could use if you were exploring for these deposits.

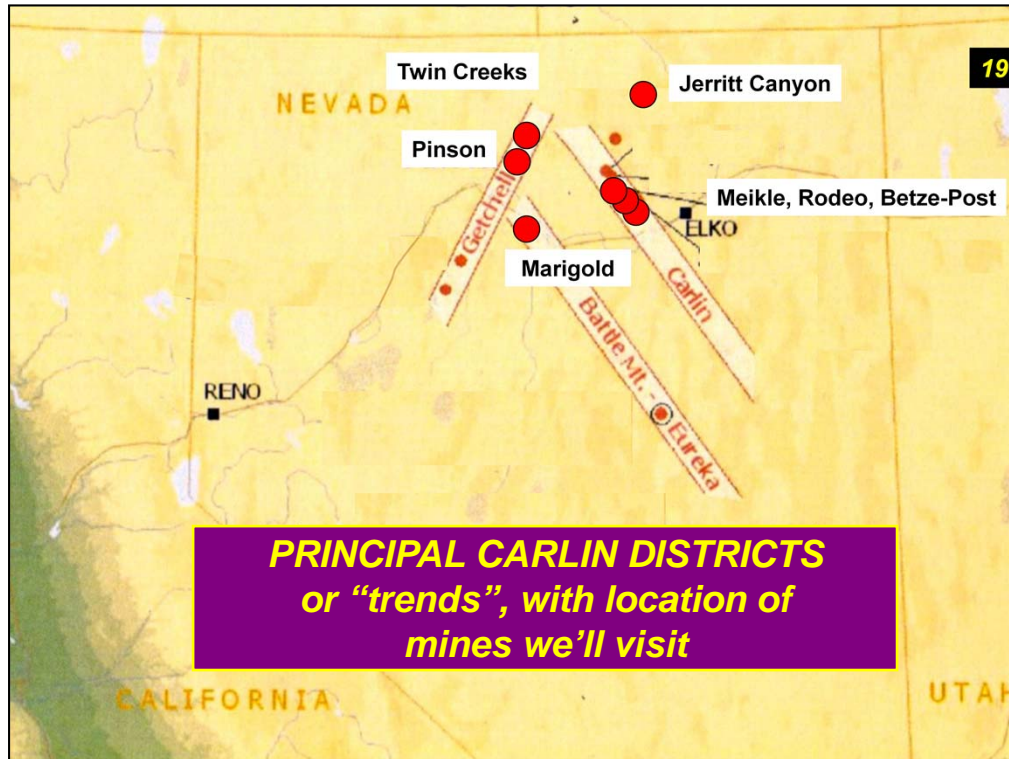
CARLIN TYPE GOLD

is one of three things that make Nevada famous, & underpin its economy.



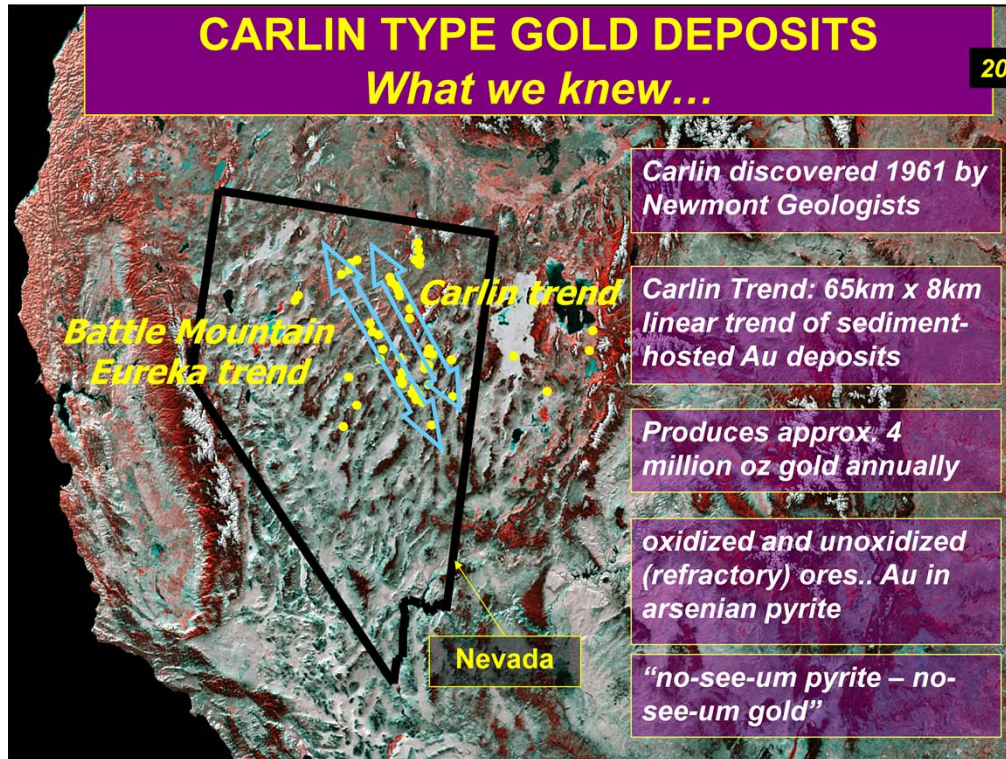
Named after the town of **Carlin, NV**, and first discovered in 1960's, these are deposits of "no-see-um" gold that are found in limestones and related sedimentary rocks

SLIDE 18: Carlin –type gold deposits are one of three things that make Nevada famous & underpin its economy. Named after the town of Carlin, these deposits were first discovered in 1960's and are characterized as deposits of "no-see-um" gold found primarily in limestones and related sedimentary rocks.

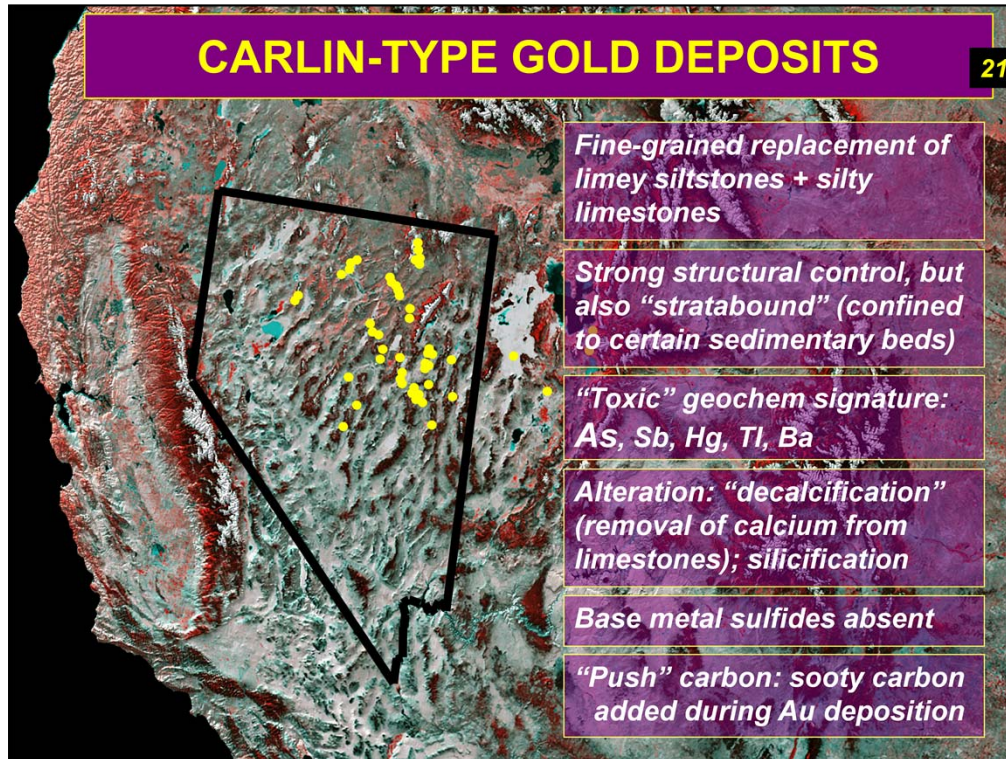


SLIDE 19: Here are principal Carlin-type Au districts or trends, with the locations of deposits that we visited and that we will talk about in this presentation.

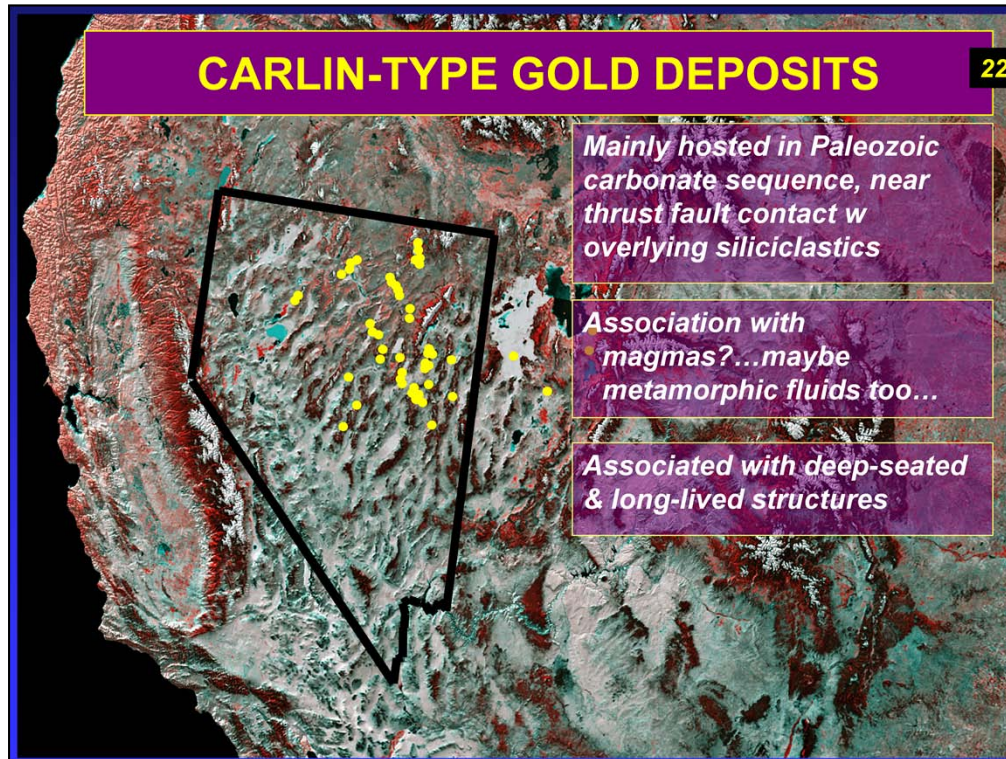
There are essentially three main districts which fall along three linear trends.



SLIDE 20: Now before getting into what we saw, let's start by telling you what we knew about these things before we visited Nevada: 1) the first such deposit was discovered in 1961 by Newmont geologists; 2) the Carlin Trend is a 65km x 8km linear belt (or trend) of sediment-hosted gold deposits; 3) the area produces about 4 million ounces of gold annually; 4) gold ores may be oxidized or unoxidized (refractory); 5) gold occurs in arsenic-rich pyrite which is effectively invisible ("no-see-um pyrite"; "no-see-um gold").

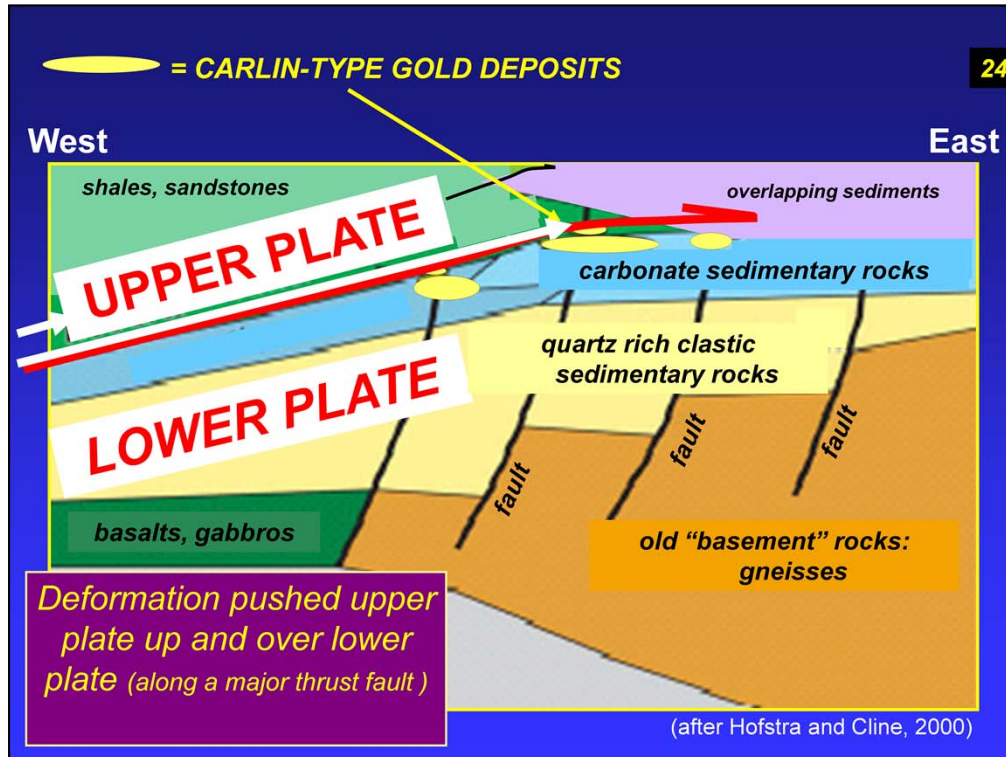


SLIDE 21: The geological literature describes them as fine-grained replacement deposits in limey siltstone and silty limestone. There is a strong structural control, but they are also "stratabound" (confined to certain sedimentary beds). The deposits have a "toxic" geochemical signature: As, Sb, Hg, Tl, and Ba. The gold deposits are associated with unique alteration: "decalcification" (removal of calcium from limestone), silicification, and the introduction of "push" carbon - sooty carbon added during gold deposition

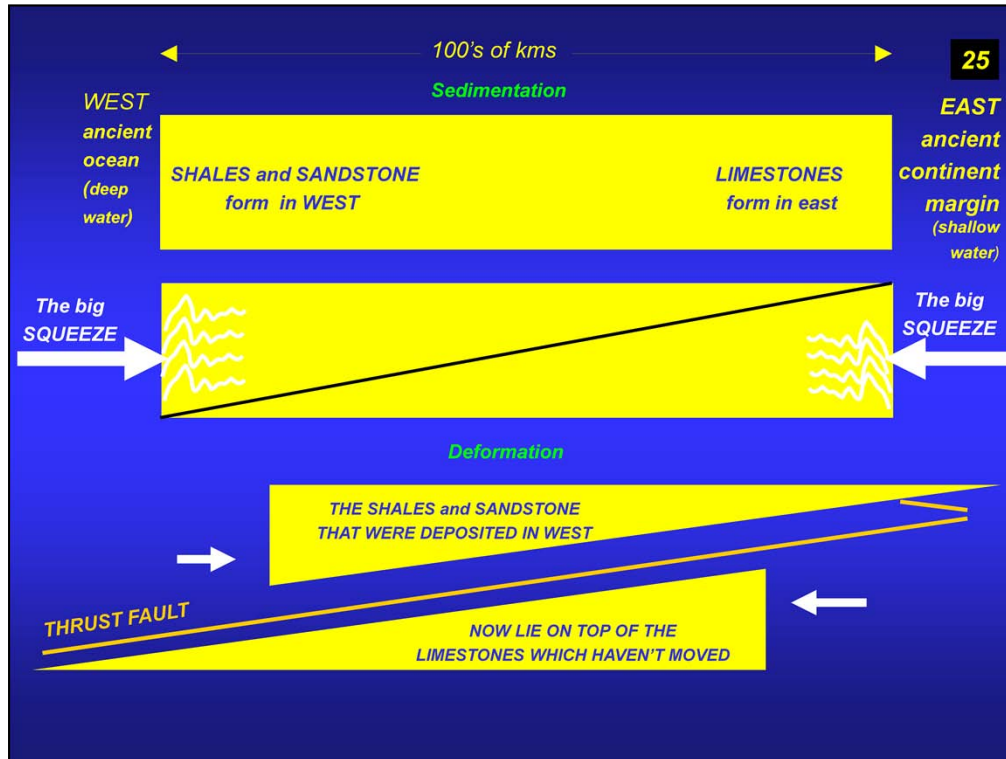


SLIDE 22: They are mainly hosted by Paleozoic-aged carbonate rocks, near thrust contact with (structurally) overlying deep-water, silicate-bearing clastic rocks (we'll explain this point a little further in some of the next few slides).

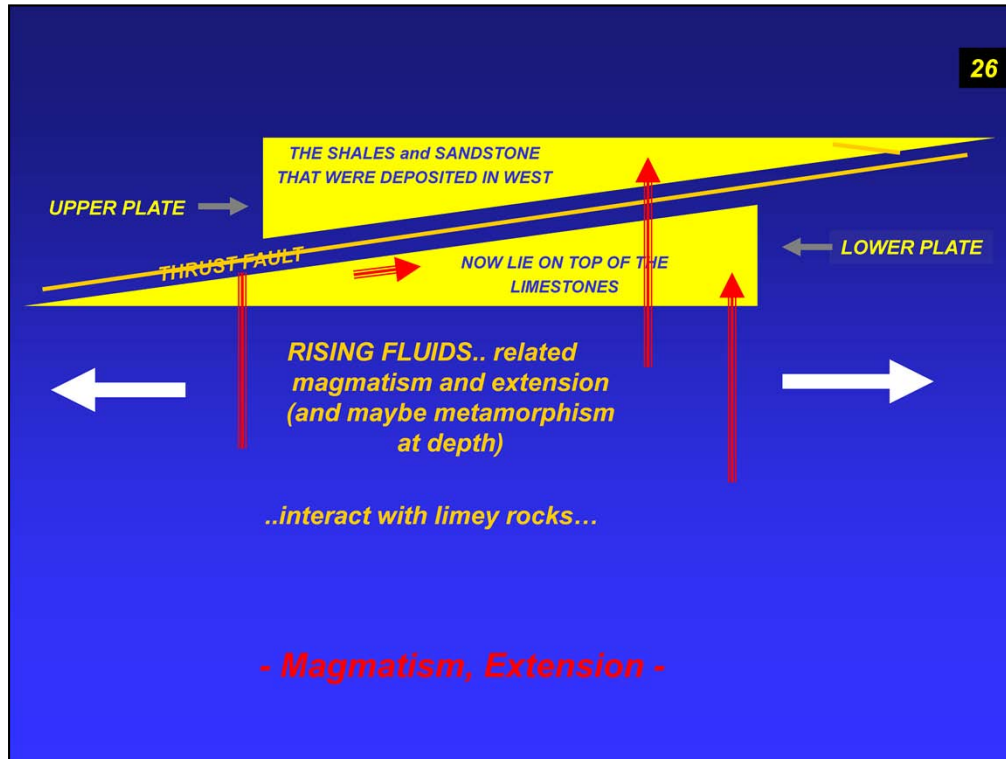
Gold deposits formed over a short time interval in mid-Tertiary era, about 40 million years ago. The theory suggests they are associated with magmas (deeper in the crust). They are also associated with structures: inferred to be deep-seated and long-lived faults.



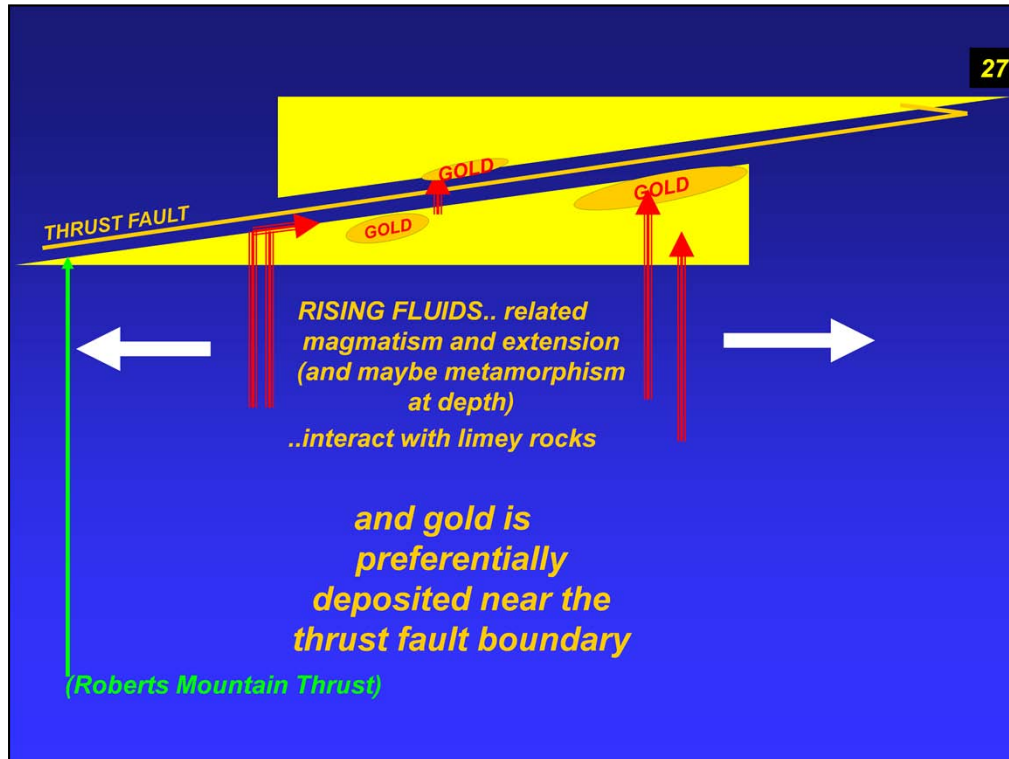
SLIDE 24: We will use a schematic published elsewhere to show the basic rock framework of the Carlin deposits. These include silica-rich clastic rocks and carbonate rocks deposited on different parts of the old continental margin of western North America. Also depicted here, in addition to the gold deposits, are old, deep-seated faults and the major regional fault associated with the gold deposits (the Roberts Mountain Thrust). .



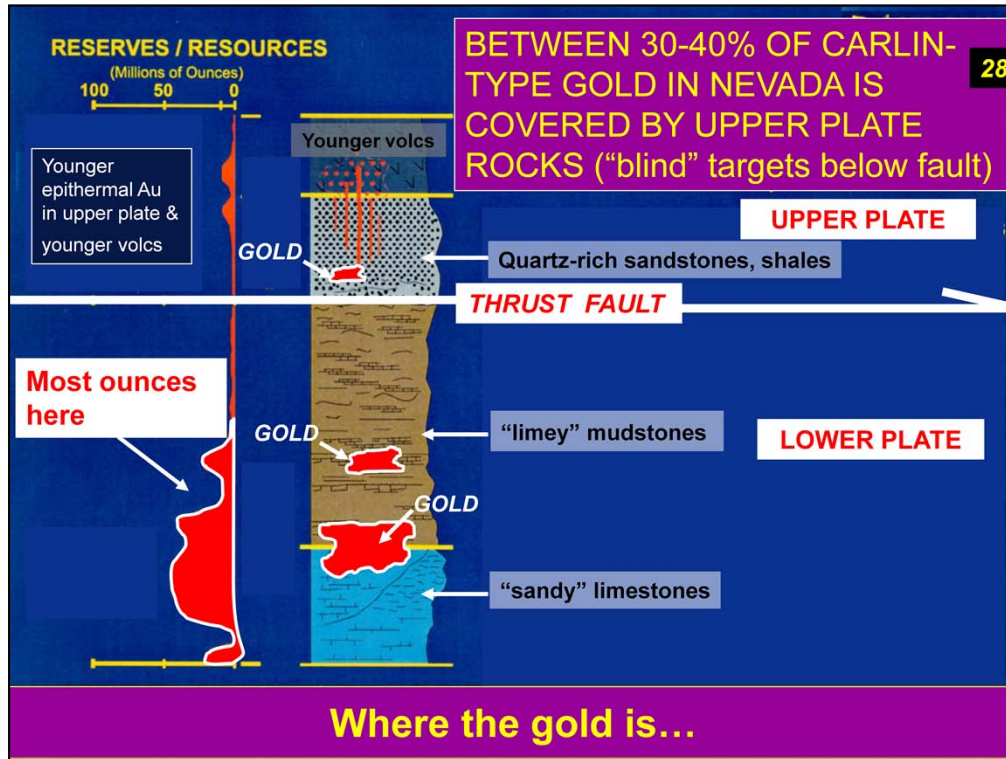
SLIDE 25: This graphic is designed to show you the role of the Roberts Mountain Thrust fault. We start with a “west-facing” continental margin... deep water sediments to the west, and shallow-water sediments (closer to land) in the east. Tectonic compression (the big squeeze) pushed the shales and sandstones that were deposited in the west over the top of the limestones that were deposited in the east (the limestone didn’t move).



SLIDE 26: The gold bearing fluids migrated up and along structures to interact (react) with the lime-rich rocks (CaCO_3 -rich carbonates, etc.).

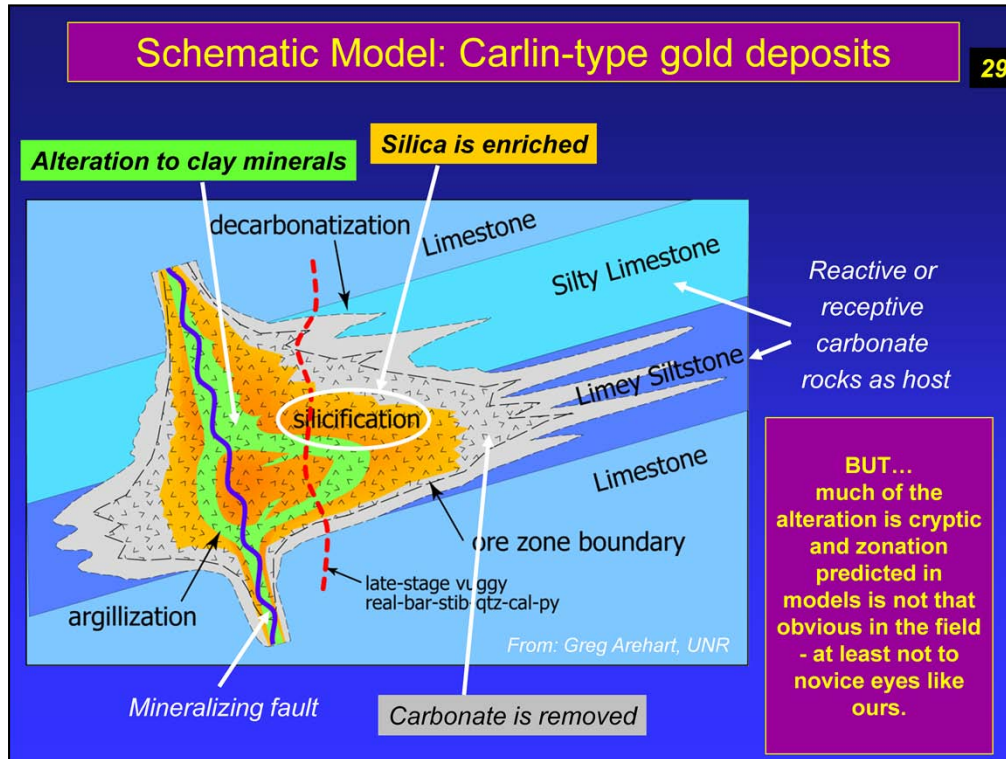


SLIDE 27: And the gold is then deposited in the receptive host rocks...this is the basic "Carlin Model" in a nut shell. To see where the gold ends up, we can look at the next slide.



SLIDE 28: Here we see a composite stratigraphic section that shows where most of the gold is located – here in a thick pile of Siluro-Devonian carbonate rocks, below the thrust fault. These are the “structurally lower” rocks Nevada geologists refer to as the “Lower Plate”. Most of the gold is in the Lower Plate, covered by the structurally overlying Upper Plate rocks and younger rocks.

The same section shows the location of the younger low-sulphidation Au that we’ll revisit later in this presentation. These deposits are in Cenozoic and Paleozoic rocks



SLIDE 29: Finally, before stepping into the mines, we will review the basic elements of Carlin-type deposits by showing this schematic model. The model “requires” 1) dirty limey host rocks that are reactive and receptive to ore bearing fluids; 2) mineralizing fault(s); 3) fluid migration that causes alteration (argillitization is the formation of clay minerals, decarbonatization is the removal of carbonate) and mineralization.

The zonation implied by this diagram was not obvious to novice eyes (like ours), especially given that all alteration types are cryptic in nature. Also, there is often a late arsenic-antimony-mercury stage that is less cryptic, but you can have orebodies without this event. This model paints a very simple picture of bulk mineable deposits.

From here let's see what these things actually look like at mine sites.



SLIDE 30: Now that we've set all this up, let's jump in and see what these things look like. In this section of the talk we discuss the controls, distribution of these ores and try to give you all a glimpse of their footprints and what they look like.

Here is a photo of the huge Twin Creeks pit, where gold is mined for \$235oz – note the pickup truck for scale.



Carlin Type Gold Deposits - VERY BIG SYSTEMS with big alteration and/or geochemical footprints

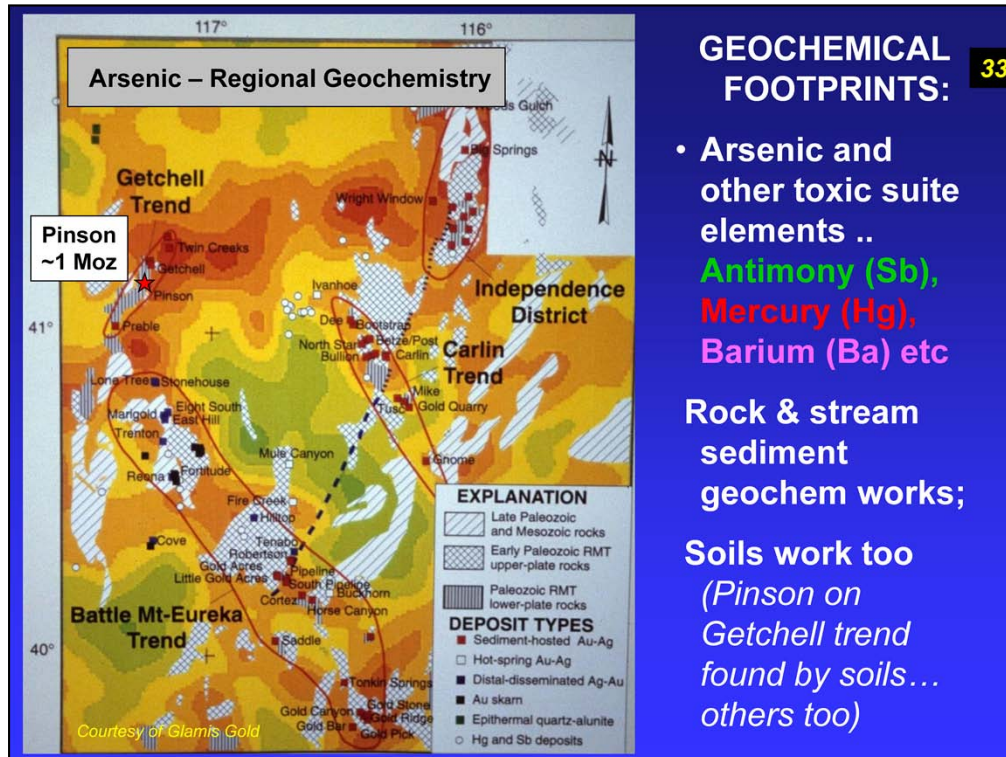
31

- **GOLDSTRIKE (BETZE-POST)**
- 23 million ounces accessible from pit (35M oz total)
- Average grade 0.12 to 0.16 oz/t (4.1 to 5.5 g/t)
- 400,000 tons of rock moved a day
- move 22,000 tons ore per day
- pour >2000 oz per day
- 6 autoclaves treat 18,000 tons per day

SLIDE 31: Carlin-type deposits are BIG, with big footprints. This photo is the Betze-Post mine, located in the Carlin Trend. This deposit contains 23 million ounces accessible from pit (35M oz total), with an average grade of 4-to-5.5 g/t Au. They move 400,000 tons of rock a day, including 22,000 tons ore. They pour >2000 oz per day. Six autoclaves treat 18,000 tons of ore per day.



SLIDE 32: Here we see another giant, Twin Creeks, this time on the Getchell Trend, Newmont mines from 3 open pits over a 7 x 2.5 km area hosting 13 M oz of Au at grades of 2.4 to 6.2 g/t.



SLIDE 33: We were told at several operations that the deposits have good geochemical footprints defined by Au and toxic-suite elements such as arsenic and antimony.

This slide shows arsenic defining “hot” areas surrounding the main mine trends. The mine geologists told us that soil, stream sediment and rock chemistry worked well as an effective exploration tool.

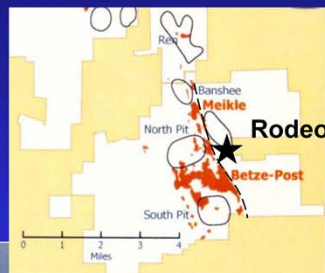
A case in point is Pinson, which was found by soil geochemistry undertaken along the trace of a major fault. Other deposits have been found by geochemical surveys as well. In terms of controls on mineralization within these deposits, there are many. Faulting is one such control.

Carlin-type gold mineralization is typically associated with MAJOR FAULTS

34

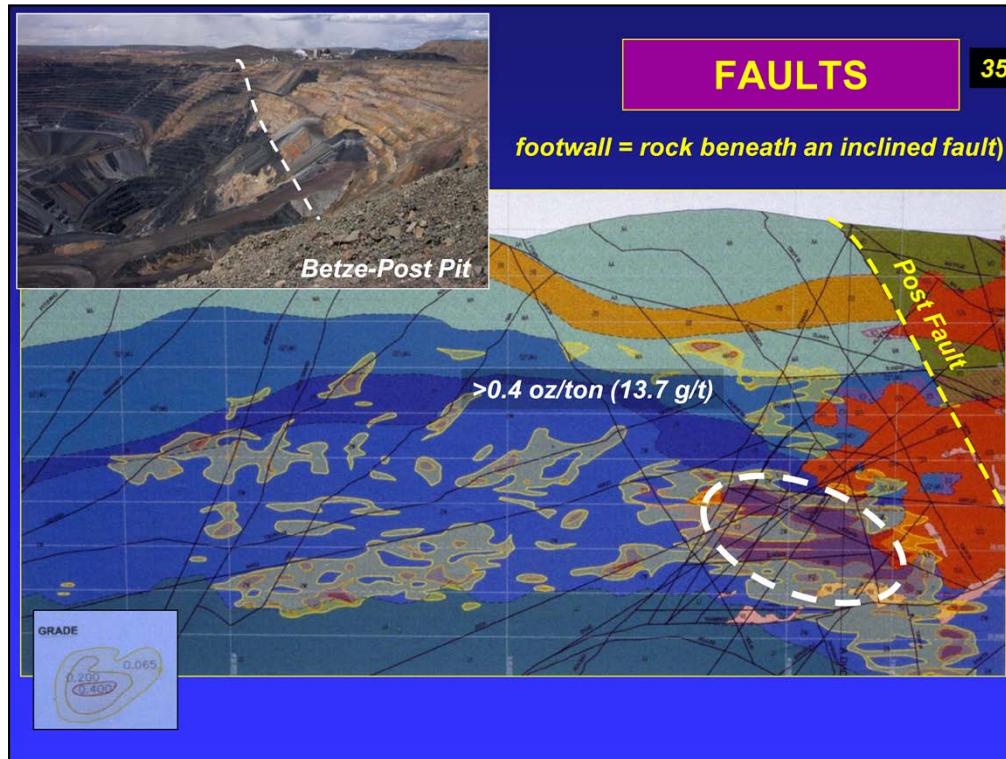
Take the Rodeo Mine as an example:

- A structure known as the Post Fault is the critical feature for Au – a reactivated old major structure that controls all ore
- Fault itself may or may not be mineralized
- Gold ore is in zones bounded by NNW, ENE and EW faults
- Ore extends over ~2.5 km along strike & 300 m vertical
- Mining (10 g/t Au) mainly in the fault's "footwall"



SLIDE 34: This point – that faulting is important - was made time and time again at each of the mines we visited. At the Rodeo Mine, the Post Fault is the critical feature – a reactivated old major structure (shelf to basin break) that the mine geologists told us controls all ore.

At the Rodeo deposit, Barrick mines 10 g/t rock along a 2.5 km structure over a 300 m vertical depth. Several other faults affect the ore and may have played a role in the genesis of the deposits, including NNW, ENE & EW structures.



SLIDE 35: It's broadly the same again here in the Betze Post pit: we see high grades concentrated in an area of concentrated faulting, as well as the coincidence of gold along several faults.

PINSON PIT

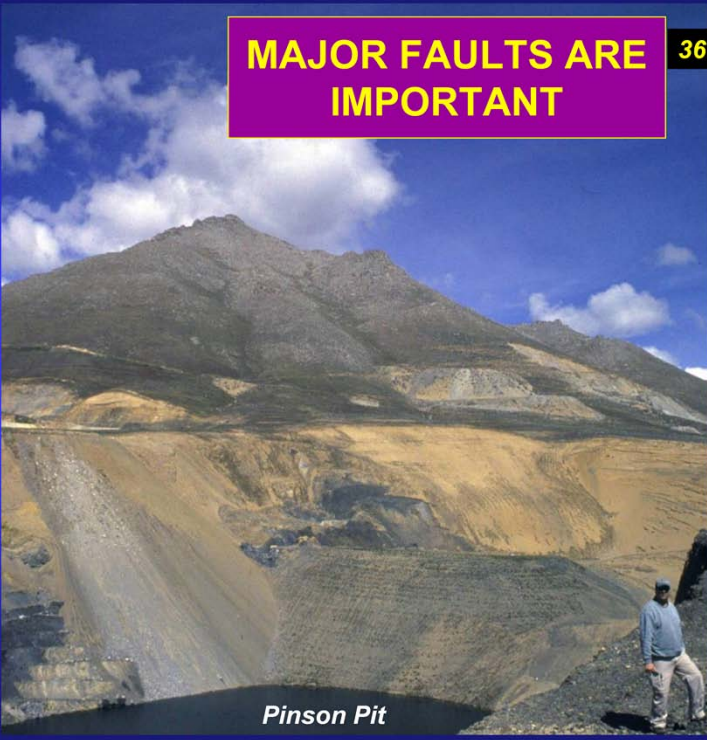
Mineralization occurs in a major fault where it intersects a “reactive” rock (dirty limestone)

Lesson learned here is that if you get gold in a fault, it’s wise to explore in adjacent rocks as significant tonnage can be added in this way

This mine produced 1 Moz gold

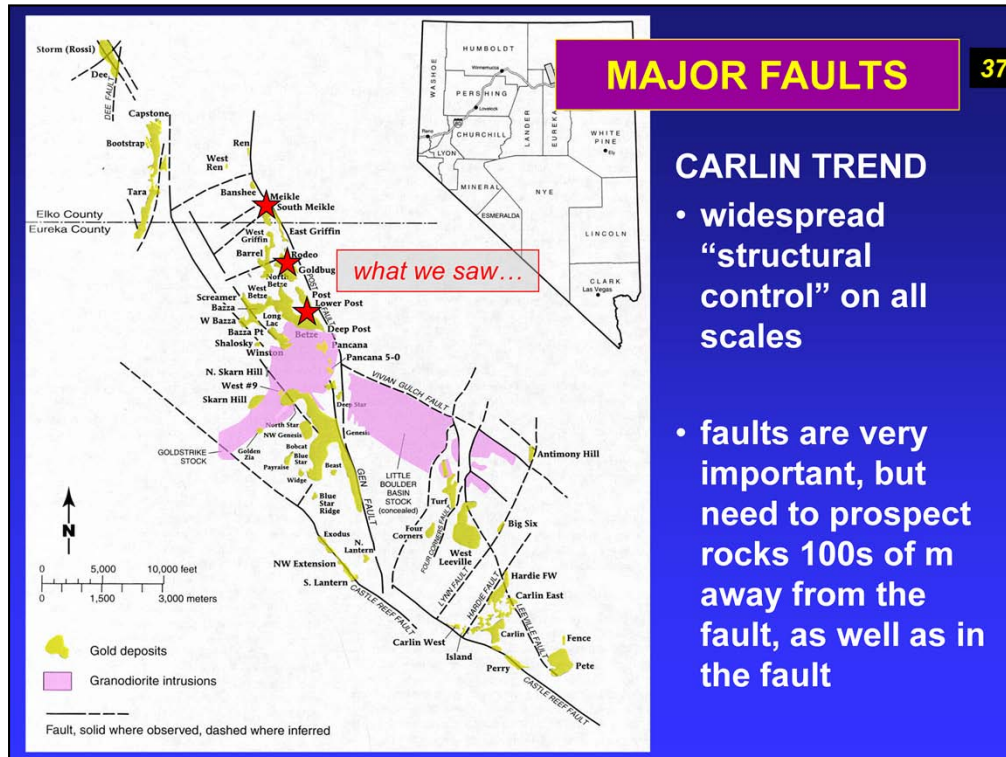
MAJOR FAULTS ARE IMPORTANT

36

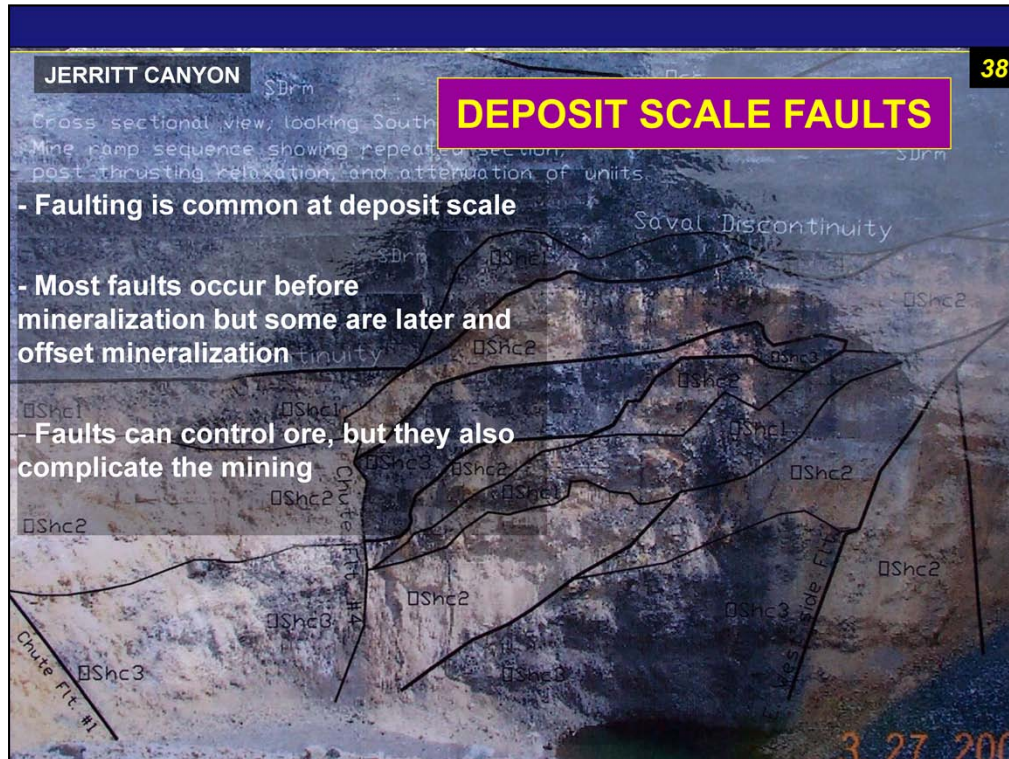


Pinson Pit

SLIDE 36: Another example of fault control is the former Pinson Mine where a major fault known as the Getchell fault was mineralized where it intersected favourable reactive rocks.



SLIDE 37: On a more regional scale, back in the Carlin trend, we see here a 20 km long section of the trend and notice strong spatial correlation between regional faults and ore and we know that there is widespread structural control on all scales in this trend



SLIDE 38: We will now move back to deposit scale. In the Dash Pit at Jerritt Canyon Mine we see what looks like relatively simple geology in what we would otherwise assume to have been a simple bulk mineable deposit. But the deposit geology is anything but simple. There are blocks or “panels” of different units shuffled along old thrusts and cut by younger steep structures. Together, these flat and steep faults complicate the distribution of ore in this pit.



SLIDE 39: But before leaving faults, based on what we saw, we would say that: 1) major faults (on scale of Post or Getchell structures) are absent in other mine areas; 2) nevertheless, structural complexity is everywhere a major factor with respect to gold mineralization. The message is: while these are bulk tonnage deposits they are not necessarily “simple” bulk tonnage deposits.

STRUCTURAL CONTROLS - FOLDS

40

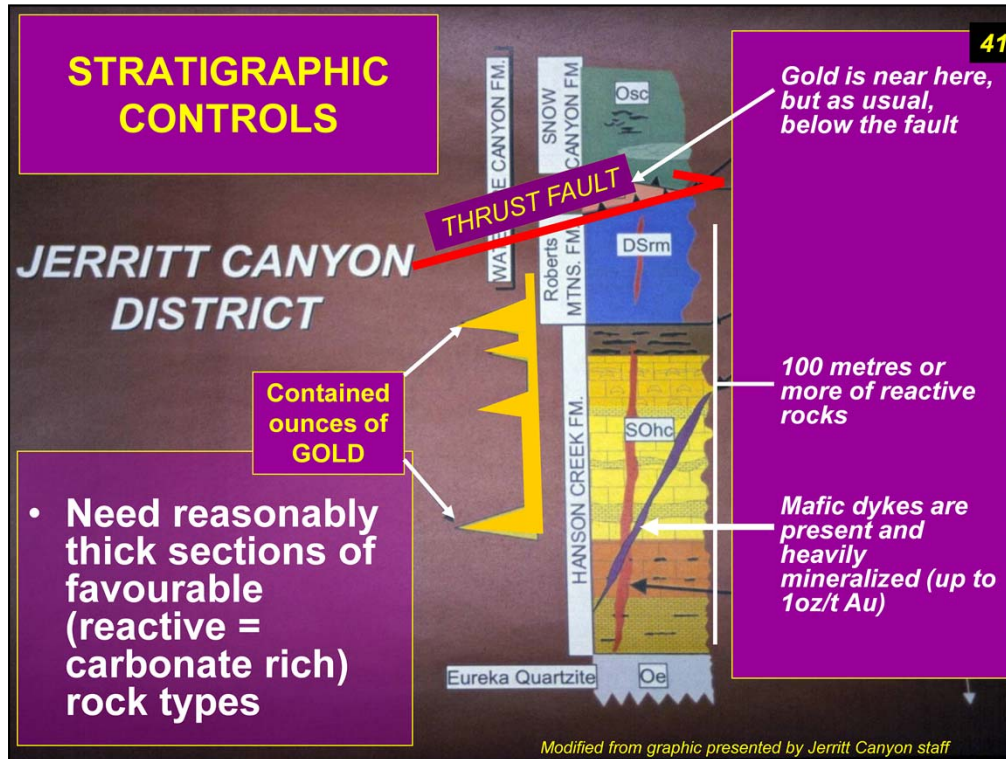


- folded basalt sills act as confining layers that “pond” the gold rich fluids
- dykes & sills at other mines also act as receptive hosts for gold

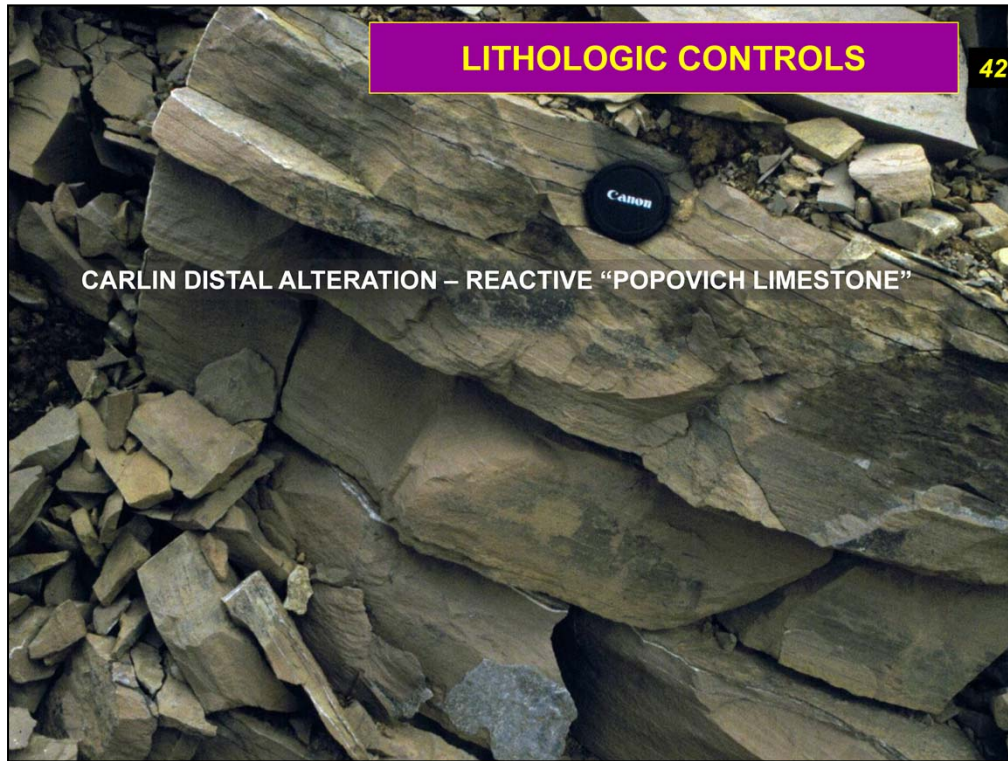
ORE



SLIDE 40: In terms of other structural controls, folds can also play a role. At Twin Creeks Mega Pit we see that folds control ore while the faults on this section are essentially barren. In this case folded sills have acted as “aquitards” concentrating gold in a large fold hinge. Also note that similar-looking dark rocks outside the hinge area lack grade compared to the hinge zone.



SLIDE 41: Another control is “lithologic” (type of rock). Here at Jerritt Canyon, this schematic stratigraphic section demonstrates that gold is primarily hosted by “dirty” or impure limestones and lime-rich rocks (lime= CaCO_3). One needs a significant thickness of favourable rock to get significant tonnages of ore. In this case, it’s about 100 m thickness. But even here, the structural control of the Roberts Mountain Thrust is important.



SLIDE 42: Now to see what these favourable host rocks can look like within the trend but kilometres from active mines. Here the weakly altered limey rocks take on a purplish hue related to their minute contents of very fine grained “no-see-um” (invisible) sulphide.



SLIDE 43: Here we see another example. If you were to assay this rock, you would get anomalous assays of gold and pathfinder elements.



SLIDE 44: At a mine, these rocks take on a different appearance where they have undergone decalcification or removal of carbonate leaving a soft, sandy ore behind (Carlin-district geologists use the term “punk” to describe this type of ore).

For the prospector, this presents a problem as even in ore material there is no obvious alteration nor are there obvious sulphides or other features like quartz veins to let you know you are on to something special. In fact we saw no quartz veins in any of the Carlin-type deposits we visited. So, if you’re a prospector it means you can’t just look for rusty rocks or obvious quartz veins to find mines here.



0.483 oz/t (16.5 g/t)

Jerritt Canyon

Cryptic Ores



0.137 oz/t (4.7 g/t)

SLIDE 45: As another example of cryptic ores here we have two samples from Jerritt Canyon. As you can appreciate, you're better off splitting and assaying all of your core when you start drilling on these targets or you could miss ore bodies.

LITHOLOGIC CONTROLS

46

**“PUSH CARBON” – GRAPHITIC ROCK
WE SAW LOTS OF SOOTY BLACK ROCK:**

Jerritt Canyon

Rodeo

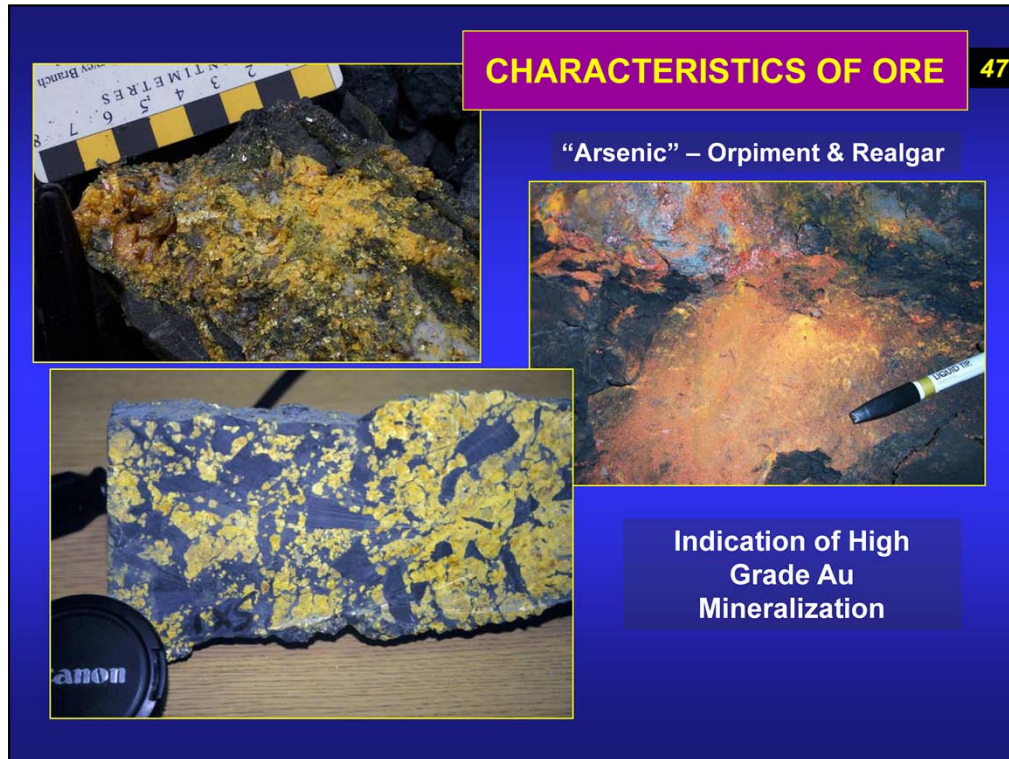
Betze-Post

Twin Creeks...

*Researchers have proposed C - played
important role - moving and concentrating large
amounts of Gold*



SLIDE 46: Another potential lithologic control is that of what the local exploration and mine geologists call “push carbon”. We visited several mines and in almost every case, when you came out, you could have passed for a coal miner...we saw black carbonaceous rock over and over again. The theory behind carbon’s role in these deposits is beyond the scope of this talk but suffice it to say that researchers have proposed that carbon plays a role in moving and concentrating large amounts of gold in Carlin systems.



SLIDE 47: Another visible indicator of ore grades is the presence of the arsenic-bearing minerals realgar and orpiment. In many deposits, these are typically associated with zones of enriched gold grades.

LITHOLOGIC CONTROLS 48

- *iron-rich* lamprophyre dykes of various ages host high-grade ore (e.g., Jerritt Canyon & Rodeo)
- 5 oz/t in deformed & altered pre-mineral (Jurassic) dykes



SLIDE 48: There are other lithologic controls. For example, reactive rocks such as the (pre-mineral) iron-rich lamprophyre dykes at Jerritt Canyon can host exceptionally high grades up to 5 oz/ton and create sweet spots that help make some of the lower grade bulk ore zones economic.

LITHOLOGIC CONTROLS

49

- Relative “favourability” of lithology is variable
- Lithology/unit that hosts ore in one district may be typically barren in another district nearby
- System strength can over-ride other factors

Gold in basalt at Vista Pit – Twin Creeks Mine – 0.1 oz/t ore (3.5 g/t)

SLIDE 49: The relative “favorability” of a host rock can be hard to assess, as a barren rock type in one district may be a main ore host in another district nearby. It seems that, if a system is robust enough, it can over-ride other factors and deposit gold anywhere.

This is demonstrated in this shot from the Vista Pit at Twin Creeks where pillow basalts can host ore grades up to 3.5 g/t Au

PROSPECTING TIPS FOR “CARLIN-TYPE” GOLD

50

- Prospect along major faults intersecting reactive rocks. Also, if there is mineralization in the fault, probably good potential in adjacent rocks.
- Don't get too caught up in “favourable lithology” mindset. Prime host in one deposit might be unmineralized in another deposit nearby.

SLIDE 50: So from here we can compile our observations into a few key prospecting tips. Prospect along major faults intersecting reactive rocks. If there is mineralization in the fault, there is probably good potential in adjacent rocks. Don't get too caught up in the “favourable lithology” mindset. The prime host in one deposit might be unmineralized in another deposit nearby.

PROSPECTING TIPS FOR “CARLIN-TYPE” GOLD

- Look for limey rocks (*dirty limestone*)
- These take on “sanded” or “punky” character near ore - related to silicification and replacement of carbonate, leaving sand grains in dirty limestone (i.e. *permeability*)

SLIDE 51: Look for limey rocks (*dirty limestone*). These take on “sanded” or “punky” character near ore. This is related to silicification and replacement of carbonate, leaving sand grains in dirty limestone. This increases their permeability, which makes them a better geological site for gold deposition.

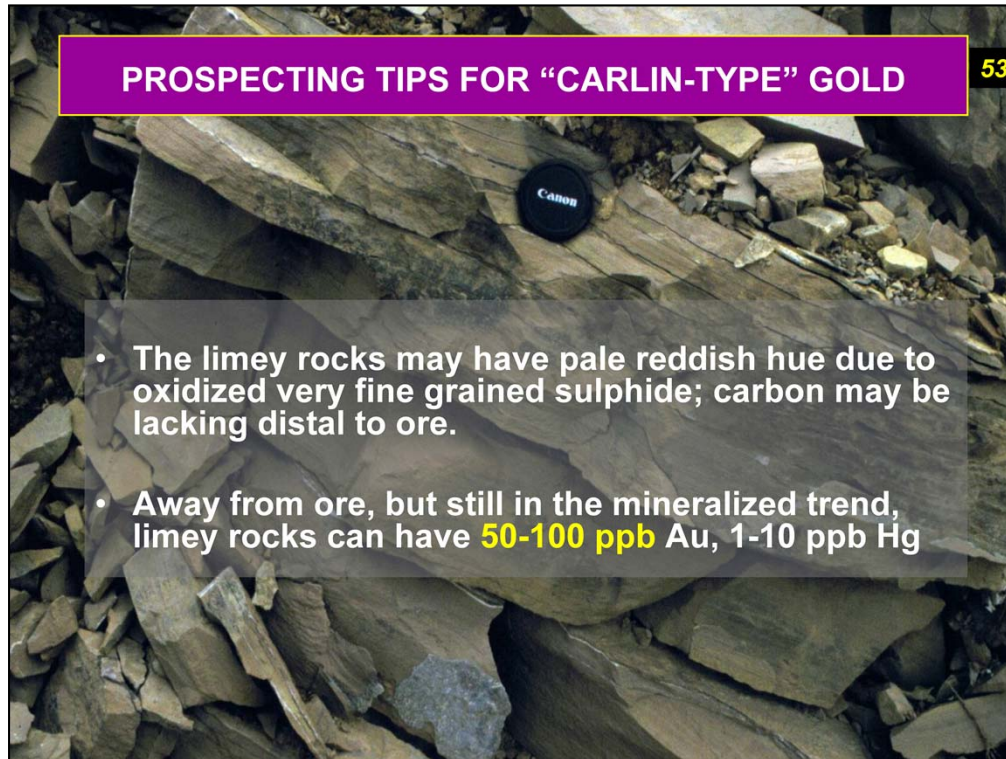


PROSPECTING TIPS FOR “CARLIN-TYPE” GOLD

52

- Silicification related to decalcification may produce “Jasperoids” – SiO₂-rich rock
- Jasperoid has great textural variability and takes on many shapes and forms.
- Jasperoids vary from mildly anomalous to high grade Au. Anything greater than 15 ppb Au in jasperoid may be significant.

SLIDE 52: We haven't highlighted a rock known as jasperoid in this talk - perhaps because we didn't see too much of it in mine sites we visited. It is present in the Carlin District though, and its presence could mean you are getting close to a deposit. Silicification related to decalcification may produce a SiO₂-rich rock known in the Carlin Trend as “jasperoid”. Jasperoid has great textural variability and takes on many shapes and forms. They vary from mildly anomalous to high grade gold. Any assay greater than 15 ppb Au from a jasperoid may be significant.



SLIDE 53: Within productive trends/ districts limey rocks may have pale reddish hue due to oxidized very fine-grained (“no-see-um”) sulphide. Carbon may also be lacking, distal to the ore. Away from ore, but still in the mineralized trend, limey rocks can have 50-100 ppb gold, and 1-10 ppb mercury.



SLIDE 54: Carbon is common, and the ore is "sooty". The waste rocks may take on a graphitic sheen close to the orebodies.

PROSPECTING TIPS FOR “CARLIN-TYPE” GOLD

55

- **Geochemistry works**
 - Look for Au, As (Sb, Hg) – soils/ stream sediments & rock

SLIDE 55: Geochemistry definitely works and is an important prospecting tool. Look for Au, As Sb (antimony) and Hg (mercury) in soils, stream sediments and rock.

PROSPECTING TIPS FOR “CARLIN-TYPE” GOLD

56

Antimony is present – but is typically late.

- In some mines, antimony is associated with jasperoid almost exclusively.
- Looking for antimony could get you gold - Jerritt Canyon was found during antimony exploration program.

SLIDE 56: Antimony may be present, but is typically a “late-stage” mineral. In some mines, antimony is associated with jasperoid almost exclusively. Looking for antimony could get you gold. For example, the Jerritt Canyon deposit was found during antimony exploration program.

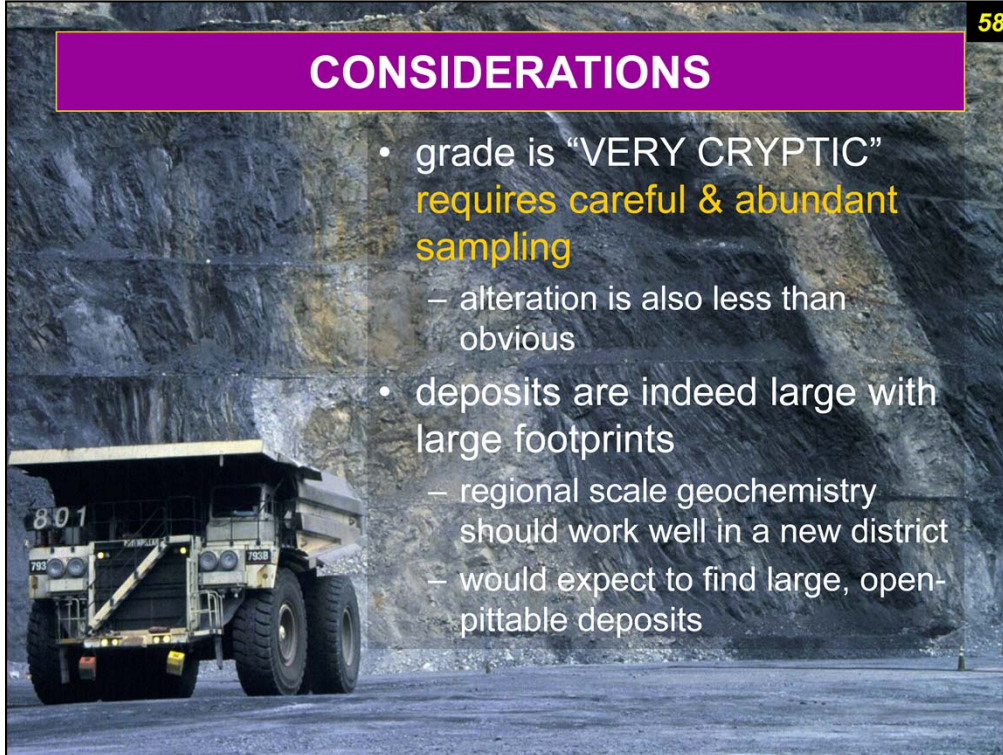


57

CONSIDERATIONS

- “deposit scale” – gold distribution is not simple
- multiple factors control grade & distribution of ounces
 - sweet spots often help carry a deposit (*could be anything*)
 - oxidation can be important too but we haven’t focused on it here

SLIDE 57: Some of the other considerations for a successful prospecting venture include the following: 1) at “deposit scale” - gold distribution is anything but simple with multiple factors controlling grade and distribution of ounces; 2) “sweet spots” of higher grade often help carry a deposit; these could be associated dykes, structures, local lithologic controls, etc.; 3) oxidation can be important too (refractory ores) but we haven’t focused on it here; 4) grade is “very cryptic” requiring careful and abundant sampling; 5) alteration is also less than obvious; 6) deposits are LARGE with large footprints; 7) regional scale geochemistry should work well in a new district.



58

CONSIDERATIONS

- grade is “VERY CRYPTIC”
requires careful & abundant sampling
 - alteration is also less than obvious
- deposits are indeed large with large footprints
 - regional scale geochemistry should work well in a new district
 - would expect to find large, open-pittable deposits

SLIDE 58: Some of the other considerations for a successful prospecting venture would be: 1) at “deposit scale” - gold distribution is anything but simple with multiple factors controlling grade and distribution of ounces; 2) sweet spots often help carry a deposit - “could be anything”: dykes, structures, local lithologic controls, etc.. 3) oxidation can be important too (refractory ores) but we haven’t focused on it here; 4) grade is “VERY CRYPTIC” requiring careful and abundant sampling; 5) alteration is “less than obvious”; 6) deposits are indeed large with large footprints; 7) regional scale geochemistry should work well in a new district; and 8) one would expect to find **large** open-pittable deposits

CONSIDERATIONS

A key to Newmont's early success was to stop looking for quartz veining & apply systematic empirical sampling methods

Sulfides are very fine grained - not visible to naked eye
(even when rock has several percent)

You won't see free gold in a pan

"Take-home message": sample, sample, sample
(do so systematically and over large areas)

SLIDE 59: A key to Newmont's early success was to stop looking for quartz veining and apply systematic empirical sampling methods. Sulfides are very fine-grained and not visible to naked eye - even when rock has several percent sulfide. Also, you won't see free gold in a pan. The "take-home message": sample, sample, sample (do so systematically and over large areas).

CARLIN DEPOSITS WORLDWIDE

60

Carlin Type Deposits appear to be an unusual & geographically limited type of "sediment-hosted" Au deposit

3 known examples: Nevada (~5000 t Au) & China (~450 t Au) & Indonesia (~65 t Au) (USGS, 2002)

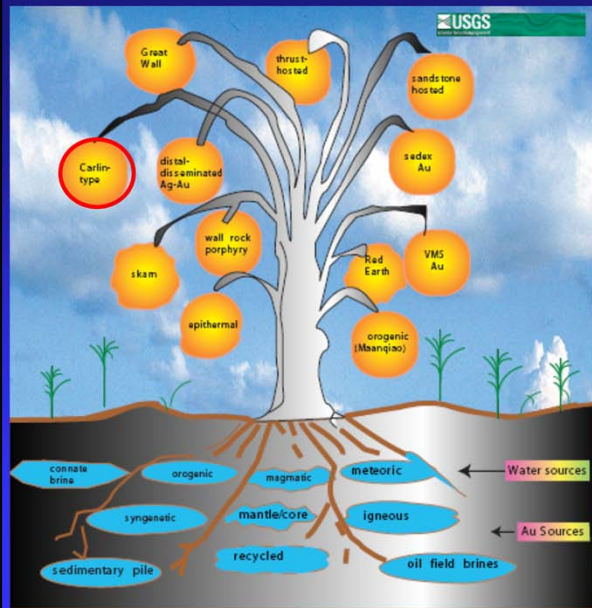


SLIDE 60: Carlin-type deposits are a relatively new class of gold deposit. They were not found and identified until the early 1960's, even though Nevada has a long mining history (known as 'The Silver State'). That said, it's been over 40 years since the discovery of Carlin-type gold in NV, and as of 2002, there were only 3 known examples (outside the SW USA) described credibly as "Carlin-Type" by the USGS. So one would have to assume they are "rare beasts".

The other side of this coin is that there are lots of deposits with gold in sedimentary rocks, but they are not necessarily "Carlin-Type". If I had to speculate on one of the criteria that should be used to classify Carlin, it's that they are large systems with lots of gold and big deposits occurring over regional-scale districts.

CARLIN DEPOSITS WORLDWIDE

61



(USGS, 2002)

You can form Au in sedimentary rocks, in many environment, that are not "Carlin" Deposits

it still comes back to...

"Gold is where you find it"

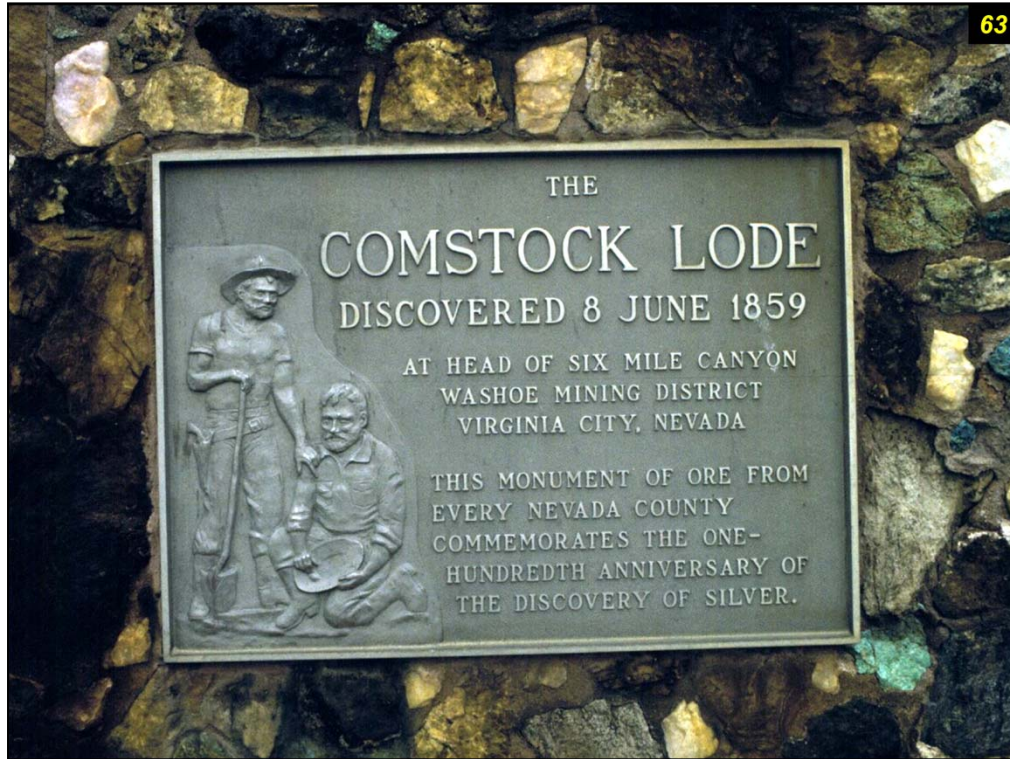
Good prospecting is and always has been the best way to find it!

SLIDE 61: Here we see just a sampling of the various deposit types that can put gold in sedimentary host rocks. As you can appreciate, it's hard to know if you are "barking up the right tree", or in this case, "the right branch". But from a prospecting point of view it still comes back to: Gold is where you find it. Good prospecting is and always has been the best way to find it!

At this point in the presentation we will leave the Nevada's Carlin deposits and move on to look at some of that state's epithermal gold deposits. While they are overshadowed in terms of contained ounces by the Carlin deposits, these still amount to significant gold districts in themselves.



SLIDE 62: We will now look at an important type of gold deposit found in Nevada – and many other parts of the world: low-sulphidation epithermal gold.



SLIDE 63: Nevada's epithermal gold, unlike its Carlin-type deposits, have been known since the mid-1800s. Silver and gold mined from world-class Comstock lode (an epithermal system near Reno) helped finance the winning Union side in US Civil war.

64

MIDAS
- high-grade veins

**LOW-SULPHIDATION
EPITHERMAL GOLD
DEPOSITS**

*Unlike Carlin Type Deposits –
these are not unique to Great
Basin – important targets
worldwide – including Nfld.*

ROUND MOUNTAIN
- mainly bulk tonnage



SLIDE 64: In Nevada we look at the low-sulphidation class of epithermal deposits. Unlike Carlin-type gold deposits, these are not unique to the Great Basin. They are important targets worldwide. Some famous Nevada examples are Comstock, Sleeper, Tonopagh, Goldfield. Most current production from these deposits in Nevada comes from Round Mountain and Midas.

But first we will step back to look at epithermal deposits in general.

*Ore deposit styles: Relative amounts of gold;
Deposits with more than 5 million ounces (from Arribas, 2000)*

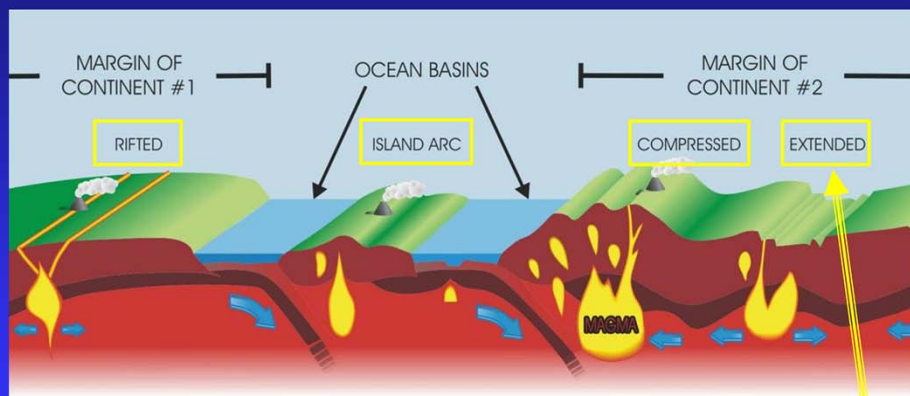
- **50%** Witswatersrand (S. Africa, paleo-placer Au)
- **12%** **Epithermal**
- **10%** Porphyry and intrusion-related
- **12%** Sediment-hosted (incl. 4% Carlin)
- **9%** Greenstone lode (orogenic)
- **7%** Other.. iron formation, VMS etc.

***25% of non-Wits gold deposits are EPITHERMAL**
25% of giant gold deposits (>20 moz) are EPITHERMAL*

SLIDE 65: Epithermal gold deposits are a major source of gold production and very much on the radar of the world's largest mining companies as well as junior companies. In 2005, about 25% of gold deposits in the world (other than the Witwatersrand deposits of S Africa) are epithermal in origin. 25% of giant gold deposits (those with >20 moz) are epithermal.

EPITHERMAL GOLD

is linked to magmatism (volcanoes) formed during subduction and/or rifting or extension of the Earth's crust



**ALL ARE PROSPECTIVE ENVIRONMENTS FOR
EPITHERMAL GOLD DEPOSITS**

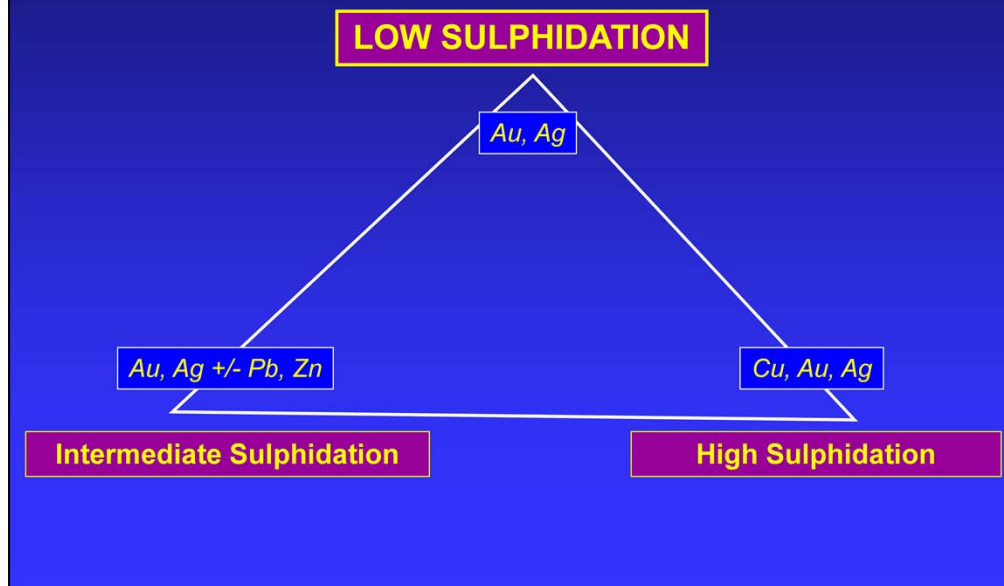
EPITHERMAL ("Epi" = above; thermal = refers to the heated fluids)
HIGH LEVEL IN CRUST; LOW TEMPERATURE (~300°C)

*We'll visit this
environment*

SLIDE 66: Epithermal gold is linked to magmatism (volcanoes) formed during subduction and/or rifting or extension of the Earth's crust. These are all prospective environments for epithermal gold deposits. We'll visit this environment: the "extended" margin of a continent.

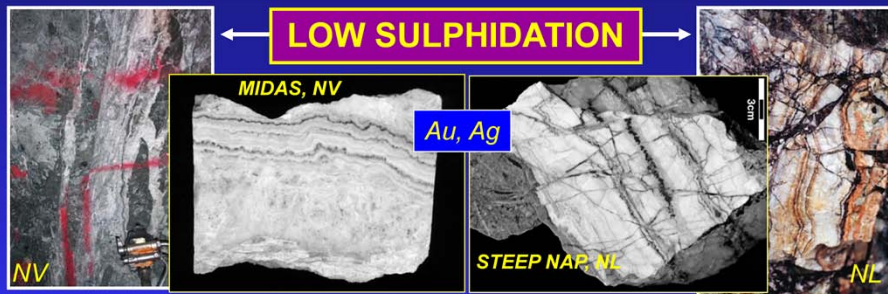
The word epithermal comes from "epi" = above, and "thermal" (refers to heated fluids). They form at high levels in the Earth's crust, at relatively low temperatures (300°C or less), as compared to porphyry deposits.

Epithermal Gold Deposits: 3 names you'll read about



SLIDE 67: When you read about epithermal gold deposits, you'll likely hear names of three deposit types: high-, low- and intermediate sulphidation types. The names do not reflect presence / absence of sulfide. Low sulphidation gold is the one we'll discuss today.

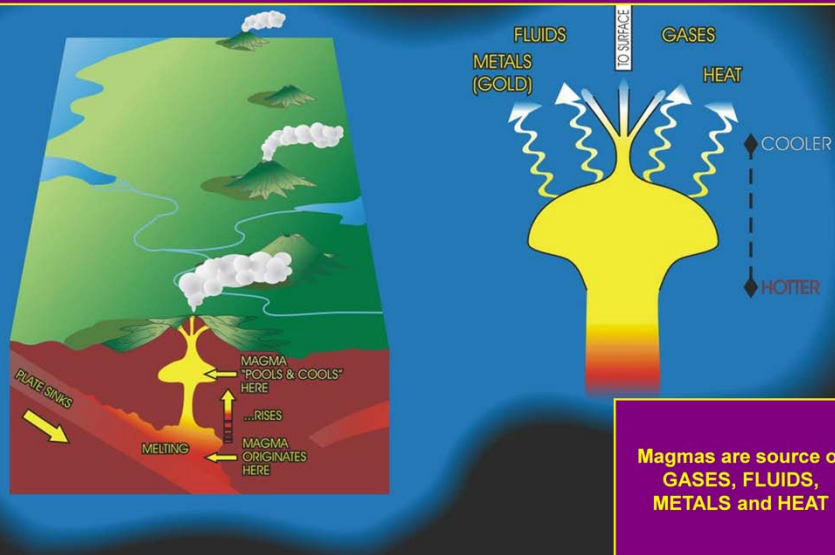
Epithermal Gold Deposits: 3 names you'll read about



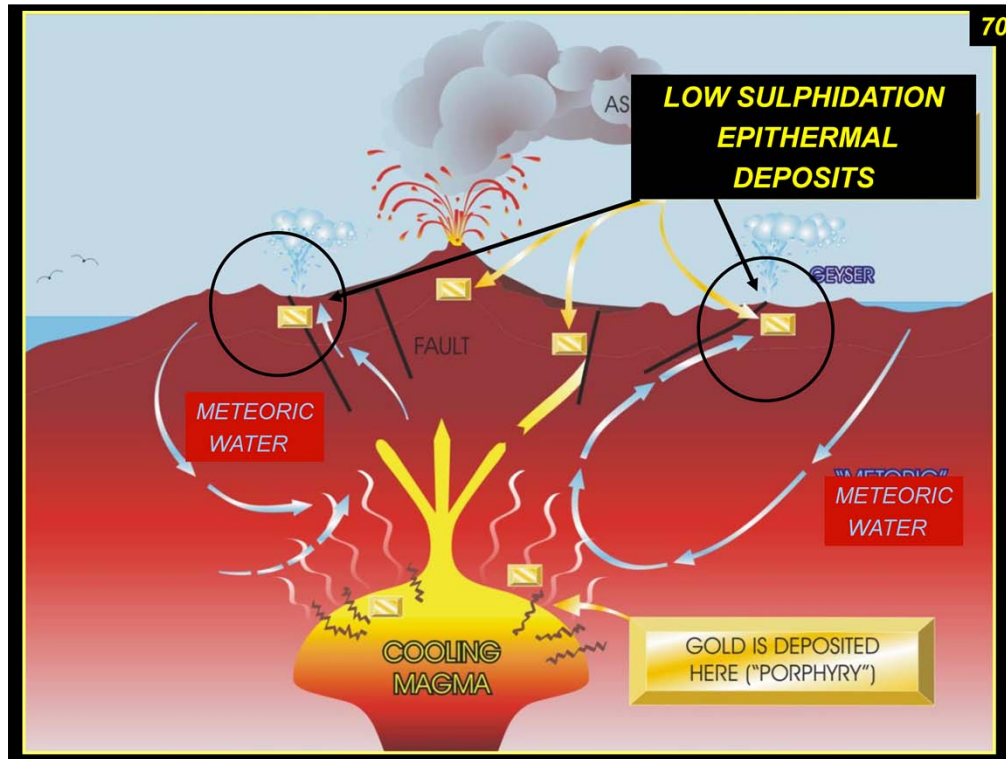
**EXCELLENT PROSPECTING TARGETS in
both NEVADA and NEWFOUNDLAND**

SLIDE 68: They represent excellent, largely overlooked prospecting targets in both Nevada and Newfoundland. First, let's talk a little about how they are formed.

Magmatism and Epithermal Gold Deposits

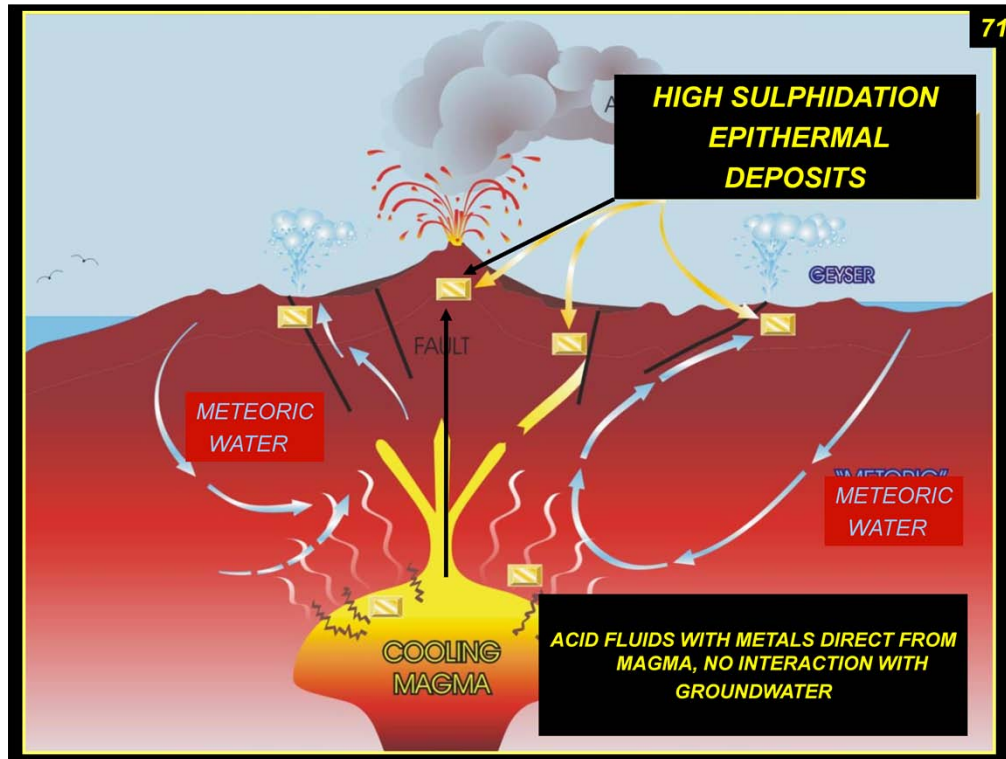


SLIDE 69: Magmas (molten rock) are important in epithermal systems as the source of gases, fluids, heat and most if not all of the metals.



SLIDE 70: This cartoon shows a spectrum of gold deposits associated with magmas. Epithermal deposits encompass the end-member located high in the crust, while porphyries are the deeper level "cousins". Low-sulphidation epithermal gold is typically deposited in areas spatially removed from main vents and are associated with hot springs, geysers etc. Meteoric water is a key ingredient and is circulated by heat associated with cooling magmas.

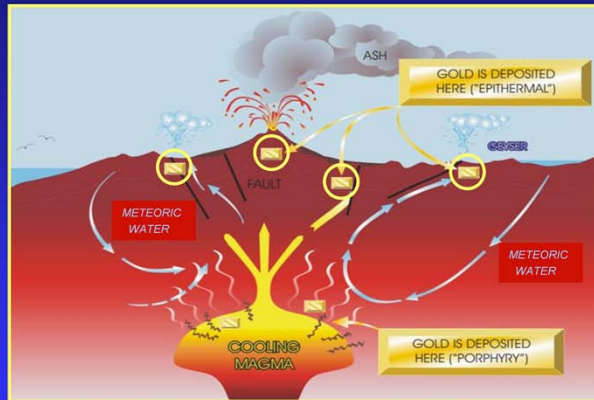
In some instances, low-sulphidation systems can overprint earlier high-sulphidation gold and porphyry systems.



SLIDE 71: In high-sulphidation epithermal deposits, multiple acid fluids (first is acidic, the second carries the metals in solution) direct from magma, react with country rock. There is little or no interaction with groundwater. The fluids are acidic (pH 2, like battery acid), not neutral.

The Hope Brook mine is a Newfoundland example of a high-sulphidation epithermal deposit.

A PLUMBING SYSTEM (ie., FAULT) BRINGS FLUIDS FROM MAGMA TO POROUS OR FRACTURED HOST TO ORE ZONE HIGH IN THE CRUST



- **HIGH SULPHIDATION**

(Au-Cu-Ag)= *tight plumbing system*, acidic (ph= battery acid) fluids from magmas rise react with porous rock units

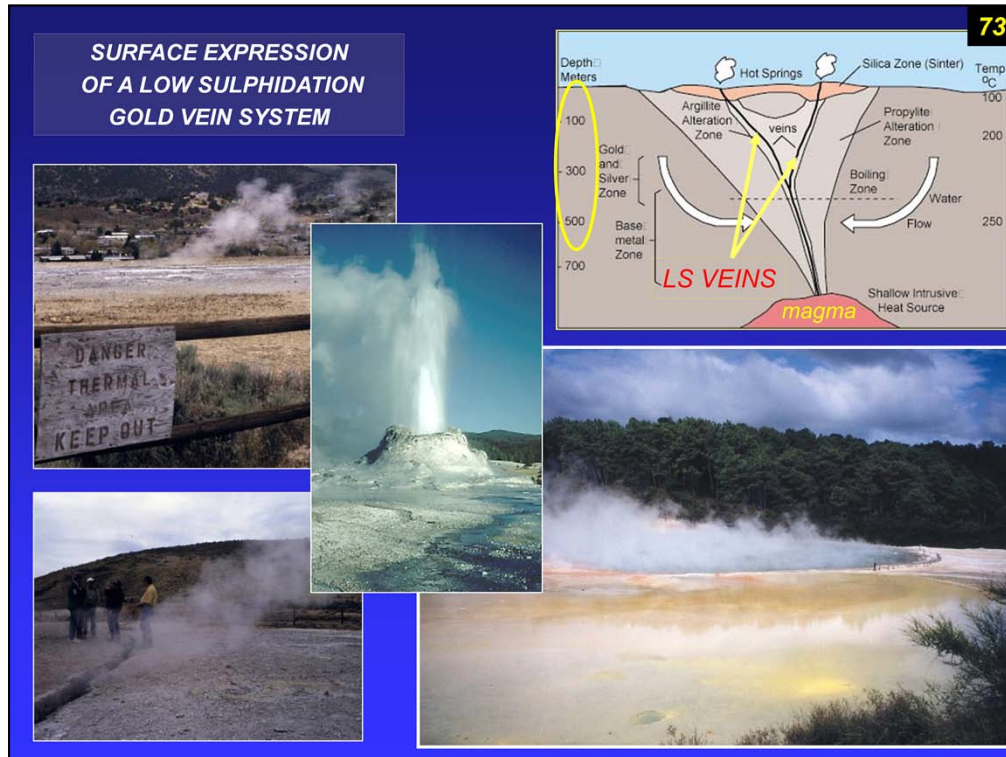
- **INTERMEDIATE SULPHIDATION**

(Ag,Zn,Pb,Au) – *leaky plumbing system*, some mixing of fluids from magma with groundwater (meteoric water)

- **LOW SULPHIDATION:** MOST OF THE FLUIDS ARE FROM THE SURFACE – GROUNDWATER (also called meteoric water), WHICH IS NOT ACIDIC.
- typically form slightly away from main vent -
FLUIDS HEATED BY MAGMA, RISE, BOIL and DEPOSIT GOLD

SLIDE 72: A geological “plumbing system” (for example, a fault) brings fluids from magma to porous or fractured host to ore zone higher in the Earth’s crust.

High sulphidation systems are gold-, copper- and silver-bearing. They form in a tight geological plumbing system, where acidic (ph= battery acid) fluids from magmas rise and react with porous rock units. Intermediate sulphidation systems contain silver, zinc, lead and gold and form in a leaky geological plumbing system, where there is some mixing of fluids from magma with groundwater (meteoric water). In low sulphidation systems most of the fluids are from the surface – groundwater (also called meteoric water), which is not acidic. These typically form slightly away from main vent as fluids, heated by magma, rise, boil and deposit gold.

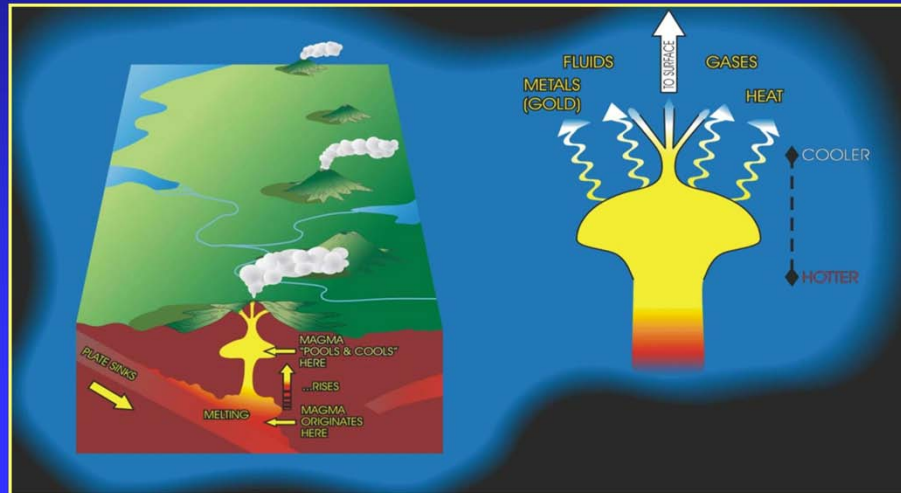


SLIDE 73: Here is the schematic showing veins in the upper 700 m of the earth's crust and coming to surface. This is what that looks like in an active system...note the hot springs and geysers. Of key importance to this model are the structures along which the epithermal "plumbing system" is running and what controls these structures.

Volcanoes burst through the old landscape

Area shaken by earthquakes; cracks & fissures form in the rocks

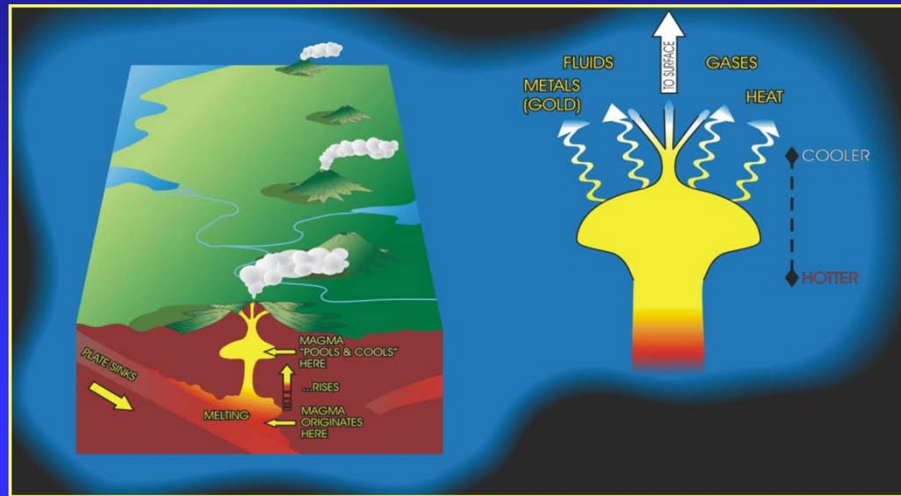
These fractures become channel ways for rising fluids (geothermal waters), driven upwards by heat from magma below



SLIDE 74: Volcanoes burst through the old landscape. The area is shaken by earthquakes; cracks and fissures form in the bedrock. These fractures become channel-ways for rising fluids (geothermal waters), which are being driven upwards by heat from the magma below.

- Metal rich waters rise, cool and pressure is released & minerals (including GOLD) are deposited on sides of fractures

- Volcanic ranges are eroded to reveal gold bearing veins



SLIDE 75: As metal-rich waters rise and cool, pressure is released, and minerals and metals (including gold) are deposited on the sides of fractures. Volcanic ranges are eroded to reveal gold-bearing veins.

So that's the recipe.

What they look like

76

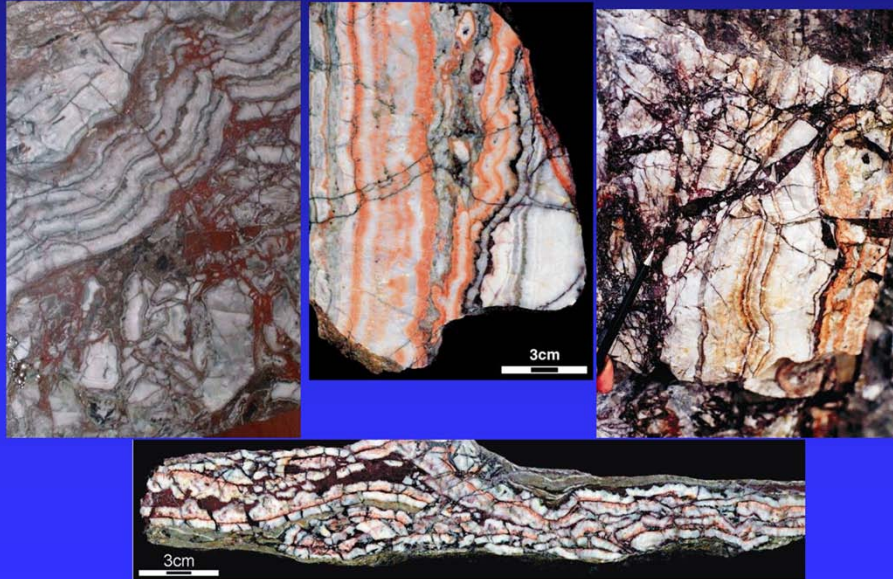
- ALTERATION IS SUBTLE:
Clay minerals – illite, smectite
- are important but hard to identify. *Adularia* (low-temperature feldspar) is key.
Calcite common.
- TEXTURES ARE STRIKING:
Banded texture, *bladed* texture, *crustiform* texture, drusy cavities, breccia veins...



SLIDE 76: So what do they look like? The alteration can be subtle, and is normally developed near the veins. Clay minerals – illite, smectite - are important but hard to identify. Adularia (a unique *low-temperature* K-feldspar) is a key mineral in these systems. Calcite is common

But the textures are striking: *banded* texture, *bladed* texture, *crustiform* texture, *drusy cavities*, *breccia-fill* veins.

VEINS ARE INTERNALLY COMPLEX – multiple phases of opening, silica deposition, brecciation etc



SLIDE 77: Low-sulphidation epithermal veins are internally complex: this is due to multiple phases of opening, silica deposition, and brecciation. Here is a photo of crustiform banding. In this photo the adularia has an orange color due to fine “dusting” of the adularia with hematite. Note multiple bands, also brecciation or rupturing of the sealed veins (bottom and right).

LOW-SULPHIDATION EPITHERMAL GOLD DEPOSITS

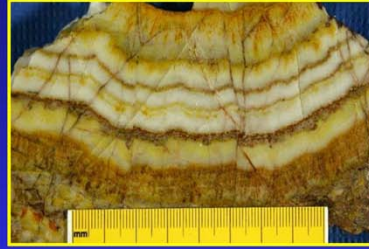
- Typically most ore is in veins
- Ore may be single vein, vein stockworks, or breccia zones with vein-like form
- Disseminated ore is uncommon but does form some deposits (Round Mountain, NV)



菱刈鉱山 HISHIKARI MINE



SLIDE 78: Typically (but not always) most ore is in veins. Ore may be a single vein, vein stockworks, or breccia zones with vein-like form. Disseminated ore is relatively uncommon but does form some deposits (for example, Round Mountain, NV).

BANDED TEXTURE IN VEINS: “Crustiform” bands

SLIDE 79: Here is the diagnostic crust-like or “crustiform” banding. Silica in these bands has a white or grey “waxy” look, and is amorphous (not crystalline) in its form. This is chalcedonic silica, not quartz. The yellow in the photo is the mineral adularia, stained yellow in the lab to help identify it. The banded texture and the adularia form as the fluids boil.

BLADED TEXTURE IN VEINS



SLIDE 80: Distinctive forms of calcite are also formed during boiling of the fluids, and in certain instances, the silica can replace the calcite. This gives a bladed texture in the silica – the blades are inherited from the original calcite. The bladed silica occurs with hematite and adularia in the top left photo.

A FEW GENERAL POINTS ...

- mainly gold- and silver-bearing (*gold equivalents*)
- zoned systems: grade varies with depth; bonanza grades can occur very near low grades. Take lots of samples!
- generally, presence of base metals means you are deep in system and below main gold zone .. Keep looking but “go higher” (typical base metals – cpy, gn)
- surface expression is often weak ... can be a difficult (but rewarding!) target
- mafic dykes may be important

SLIDE 81: This type of epithermal system is mainly gold- and silver-bearing (where silver is often reported as *gold equivalents*). They are zoned systems: grade varies with depth, also textures and mineralogy; bonanza grades can occur very near low grades. The message – when prospecting with these deposits in mind, take lots of samples!

Generally speaking, the presence of base metals means you are deep in system and below main gold zone. No gold? Keep looking but “go higher”. Typical base metals in these deposits are chalcopyrite and galena.

Surface expression of these deposits is typically weak ... can be a difficult (but rewarding!) target. Mafic dykes may be important as they are present in many vein systems.

A FEW GENERAL POINTS

- most are *vein-type* deposits but in rare situations, *bulk tonnage - low grade* deposits are also formed
- Stockwork ore is common
- Nevada has both; Newfoundland (so far) has vein type only

SLIDE 82: Most are vein-type deposits but in rare situations, bulk tonnage - low grade deposits are also formed. Stockwork ore is common. Nevada has both; Only the vein-type has been recognized in Newfoundland, at this point.

PROSPECTING TIPS...

WHERE TO START LOOKING...

Gold is where you find it. But could start by looking...

- in volcanic sequences,
- near the contact with shallow marine or terrestrial sediments,
- especially where there is some area of silica or silica+sericite alteration, with or without pyrite (altered rocks can be & often are barren). These deposits are often covered by barren silica cap.

WHAT TO LOOK FOR...

Evidence of veins with “waxy” silica (*chalcedonic*) & distinctive textures (banded, bladed etc).

Presence of vein-breccias and stockworks of silica veinlets

SLIDE 83: Where should a prospector start looking? Well, gold is where you find it. But could start by looking for lake sediment or other geochemical anomalies in volcanic sequences, near the contact with shallow marine or terrestrial sediments, especially where there is some area of silica or silica-sericite alteration, with or without pyrite. Altered rocks can be, and often are, barren.

What should you look for? Take note of any evidence of veins with “waxy” or non-crystalline silica (*chalcedonic*) & distinctive textures (banded, bladed, etc). Look for vein-breccias and stockworks of silica veinlets. Sample and assay! Even a thin waxy silica veinlet with 50 ppb gold may lead you to something bigger elsewhere in the region.

PROSPECTING TIPS

GEOCHEM SIGNATURE...

- Au, Ag, Te, Se, Hg for starters, also As, Sb
- rock, soil, silt & lake sediment

REGIONAL GEOPHYSICS...?

- techniques that map faults are useful
- sometimes a mag low might be significant (*magnetite destructive*)
- radiometrics may show alteration (potassic - K)

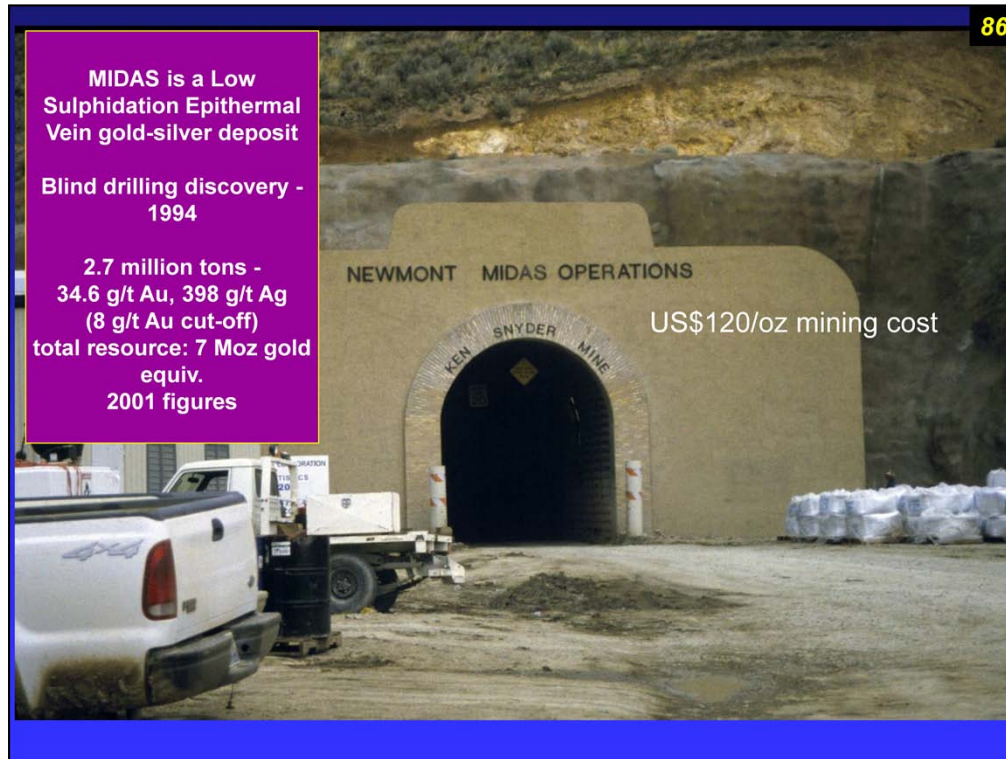
SLIDE 84: It's important to know the geochemical signature of these deposits: Au, Ag, Te (tellurium), Se (selenium), and Hg (mercury) for starters; also As, Sb (antimony). Look for anomalous values of these elements in rock, soil, silt and lake sediment. Sample yourself, but also search the geofiles and government resource atlas for industry and government geochemical data.

Regional geophysics may be useful. Techniques that map faults are useful. In some cases a magnetic low might be significant (*magnetite-destructive*). Radiometrics may show alteration (potassic - K).

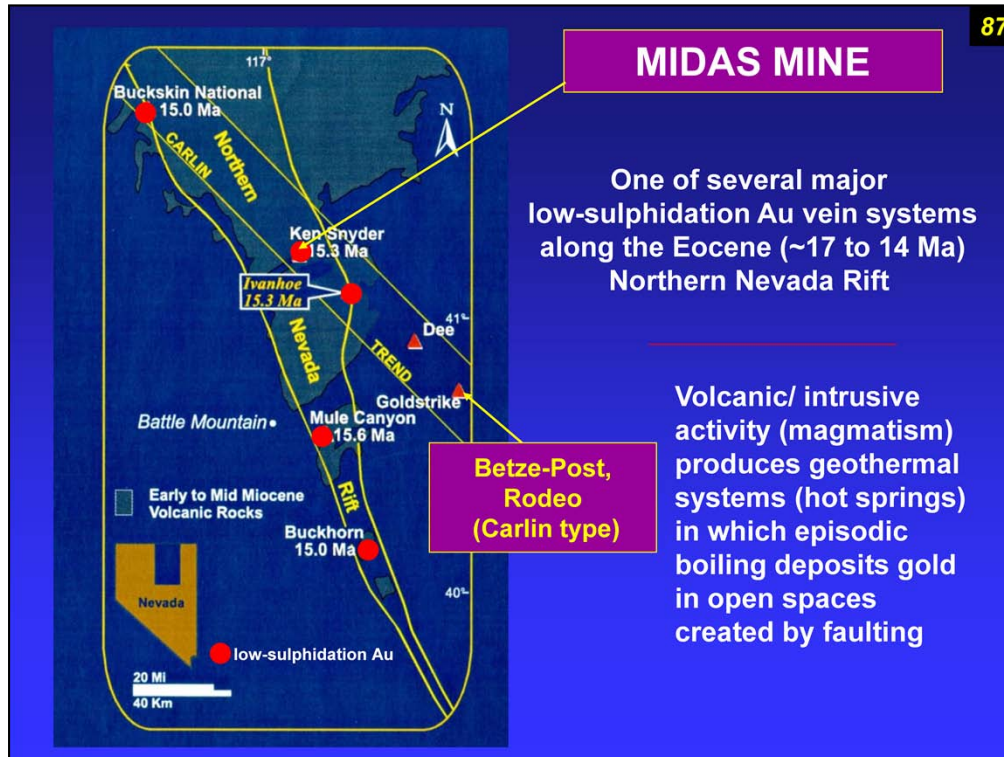
Getting back to Nevada - we saw several examples of epithermal systems. In this presentation, we will show you two examples of low sulphidation-type gold mines.



SLIDE 85: These are the two mines we will talk about: Midas and Round Mountain



SLIDE 86: The Midas Mine is an epithermal vein deposit that was a blind drilling discovery made in 1994. It contains 2.7 million tons - 34.6 g/t Au, 398 g/t Ag (8 g/t Au cut-off), and a total resource of 7 million ounces of gold equivalent (2001 figures).



SLIDE 87: Midas is located in one of several major low-sulphidation gold-silver vein systems along the Eocene (~17 to 14 Ma) Northern Nevada Rift. Volcanic/ intrusive activity produces geothermal systems having neutral waters, in which episodic boiling deposited gold in open spaces created by faulting that accompanied development of the rift. Note that Midas sits within the Northern Nevada Rift where it intersects the Carlin Trend.

First vein-type gold in this part of Northern Nevada Rift discovered 1907



MIDAS MINE

But...

by early 1990's, "old-style veins" written off as legitimate target

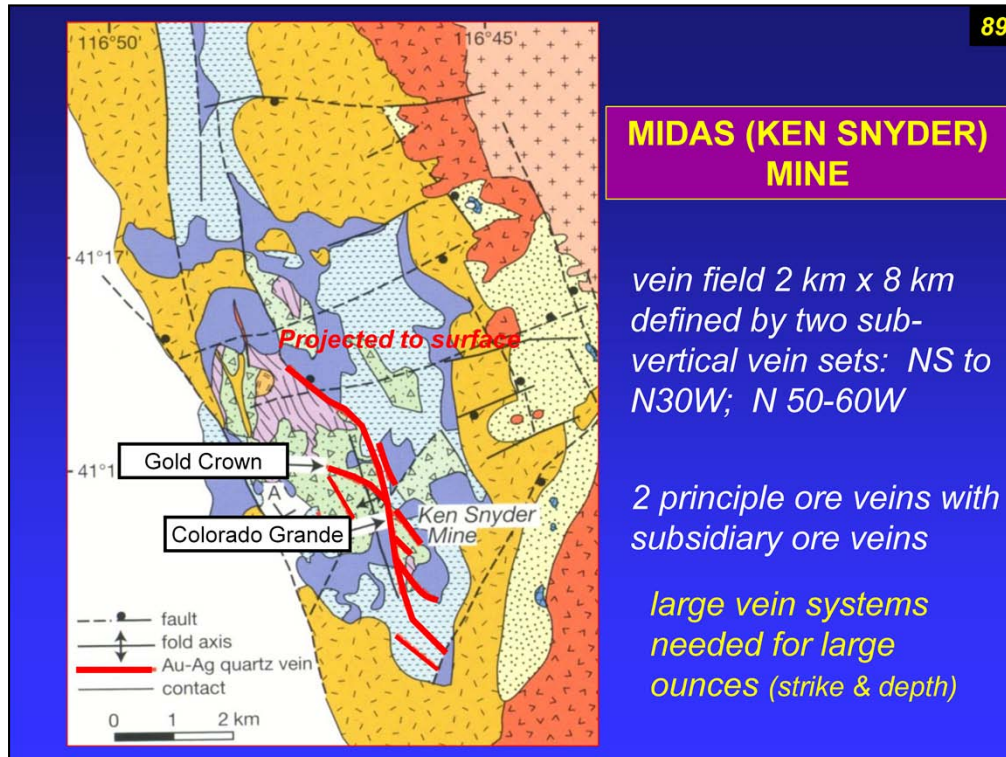
Found by Franco-Nevada while drilling deep Carlin targets under Miocene volcanics

Hole #8 (vertical) : 7.8 m of 16 g/t Au, 387 g/t Ag... kept management intrigued while geologist/discoverer Ken Snyder sorted out the true extent of the deposit.

88

SLIDE 88: The first vein-type gold in this part of Northern Nevada Rift discovered in 1907. But by early 1990s, "old-style veins" as they were called, had been written off as legitimate targets. The Midas deposit was found by Franco-Nevada and Euro-Nevada while drilling for *deep Carlin-type gold targets* under Miocene volcanics.

Hole #8 at Midas was a vertical hole that intersected 7.8 m of 16 g/t Au, 387 g/t Ag... these results kept management intrigued while geologist/discoverer Ken Snyder sorted out the true extent of the deposit.

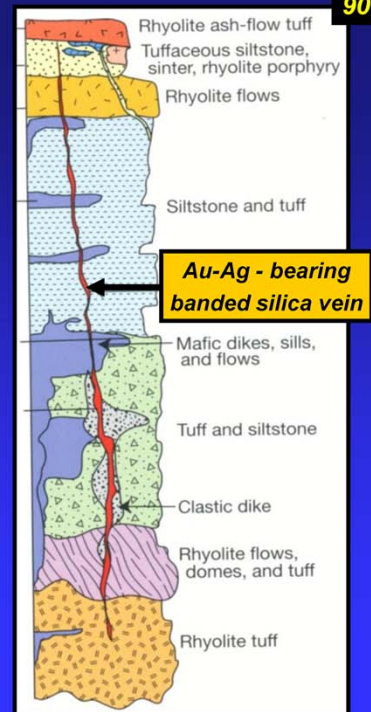
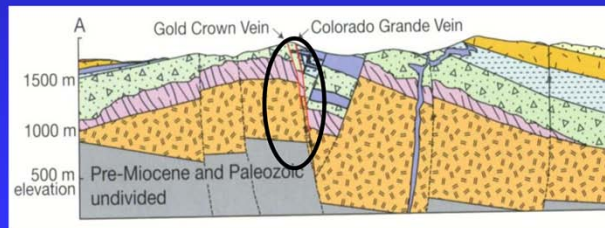


SLIDE 89: The vein field is about 2 km x 8 km, and defined by two sub-vertical vein sets: NS to N30W, and N 50-60W. There are 2 principle ore veins with subsidiary ore veins. A general point - large low-sulphidation epithermal vein systems are needed for large ounces (need strike length & depth).

MIDAS - SCHEMATIC SECTION

Veins occur in multiple rock types

Host rock's ability to fracture is important for (mineable) vein width



90

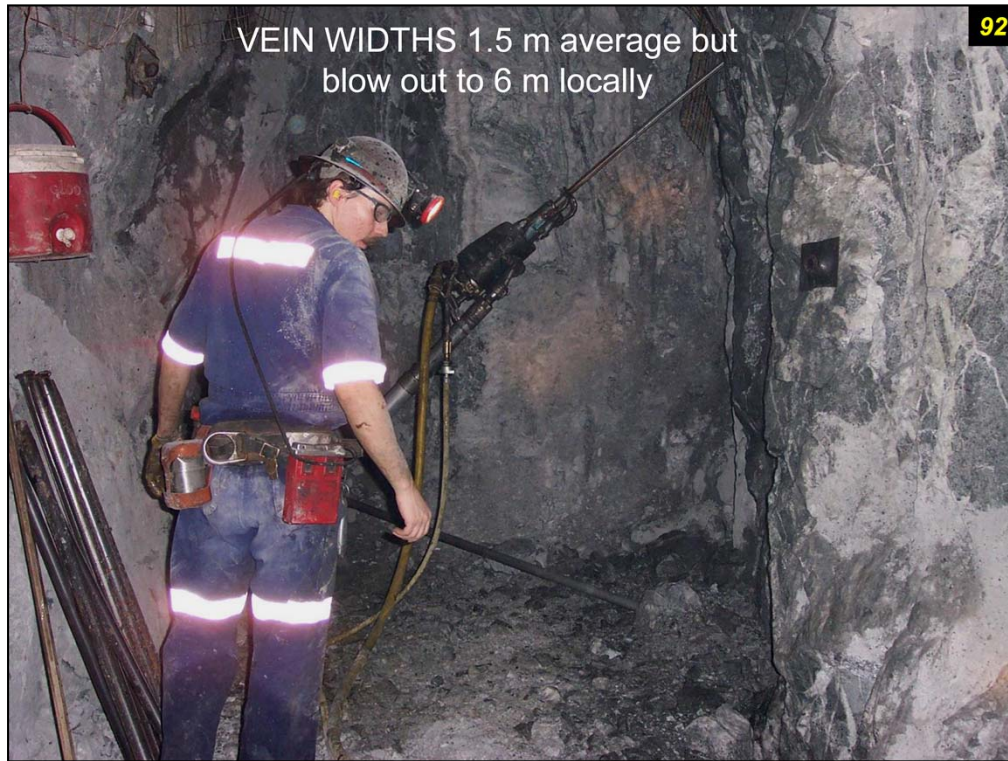
SLIDE 90: Veins occur in multiple rock types. The host rock's ability to fracture is important for (mineable) vein width.

Mineable reserves from 7 veins

Veins occupy faults, mineable
along strike up to ~ 2 km
without offset
& at depth for 500 m



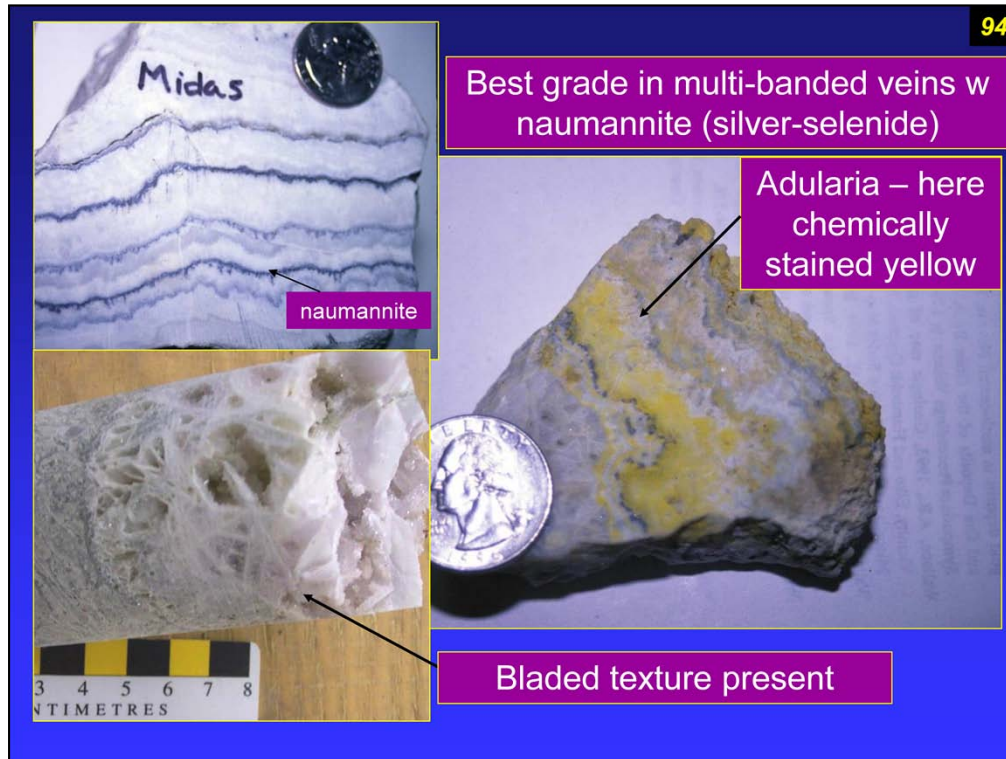
SLIDE 91: The mineable reserves occur in 7 veins. The mineralized veins occupy pre-mineral faults, mineable along strike up to 2 km without offset. They extend at depth for about 500 m.



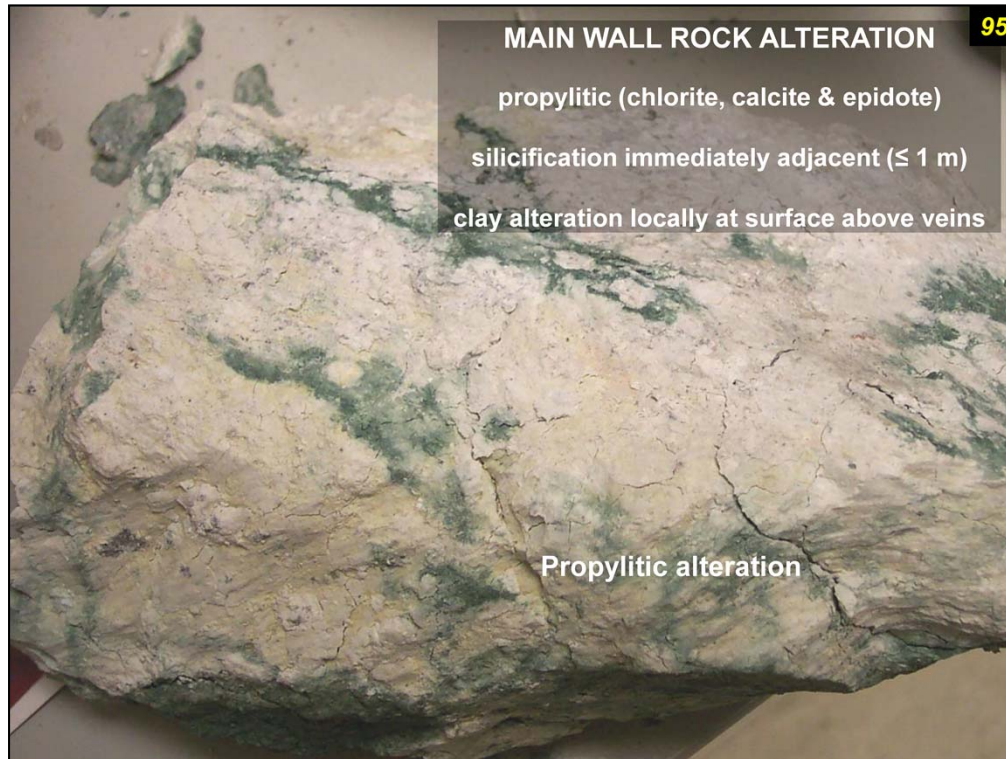
SLIDE 92: Vein width is, on average, 1.5 m; they may be as narrow as 30cm but “blow out” to 6 m locally. This isn’t like Newmont’s Twin Creeks deposit. Here is a miner with a jackleg drill - no 250 ton trucks here. At Midas, “Grade Is King”.



SLIDE 93: Here is a classic, banded low-sulphidation vein from Midas: crustiform bands, colloform texture, bladed texture, fine grained visible gold.



SLIDE 94: The best grade is in multi-banded veins with the dark mineral naumannite, which is a silver-selenide. Adularia – here chemically stained yellow – is ubiquitous. Bladed silica replacement texture is present. All of these features indicate boiling in the geothermal system, which causes the gold to precipitate



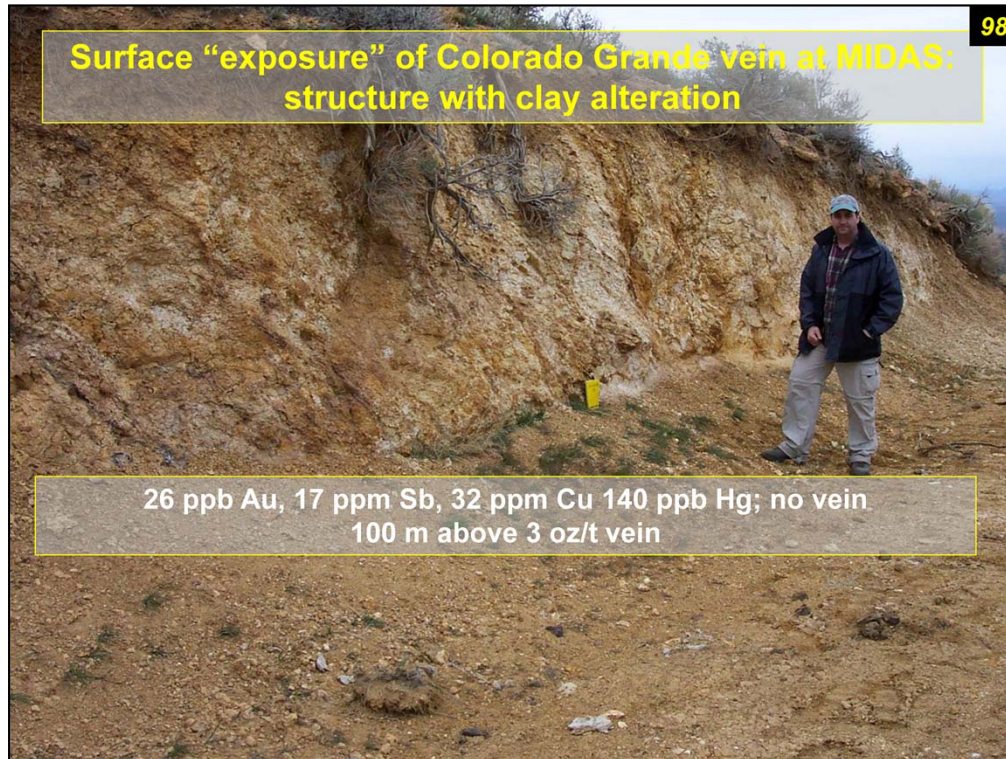
SLIDE 95: The main wall rock alteration is propylitic (chlorite, calcite & epidote); silicification occurs immediately adjacent (≤ 1 m) to veins. Clay alteration is developed locally at surface above veins. There are further, more subtle variations in alteration (vertically) that are not visually obvious, and best documented with specialized instruments (PIMA or X-Ray diffractometer).



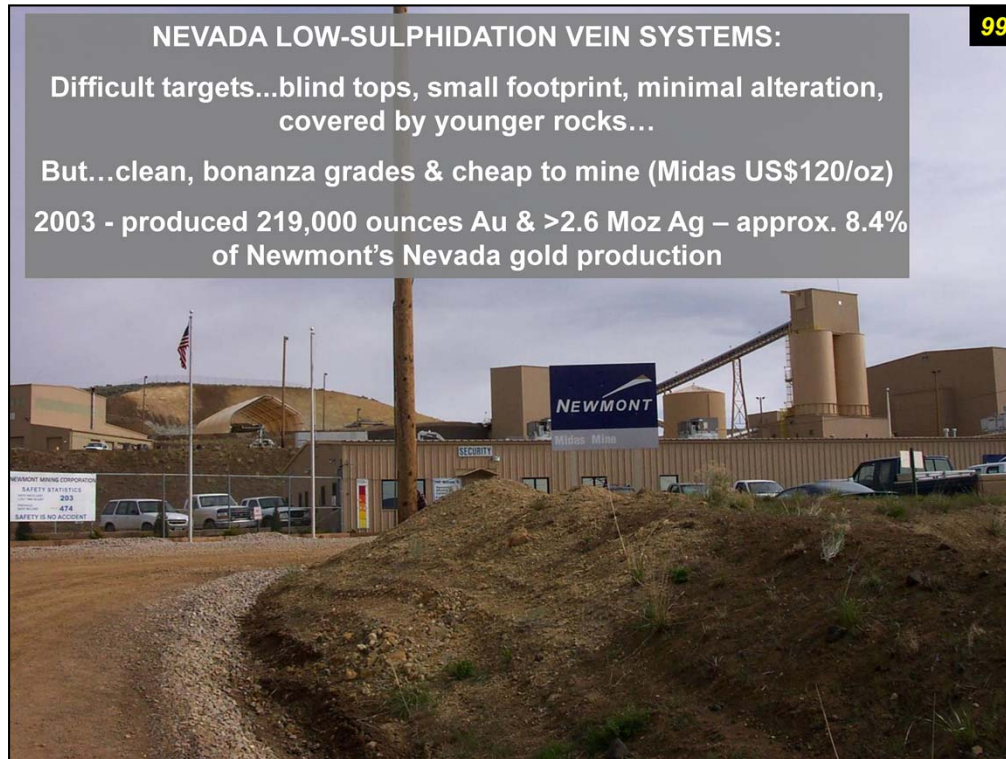
SLIDE 96: These are “blind” veins. They don’t reach surface to form outcrop. There are no well developed veins/ reserves above 1700 m elevation. (i.e. the veins are below current erosion level). In this photo, note the note drill pad on hill, and also the site of old workings.



SLIDE 97: The surface “exposure” of Gold Crown vein at Midas is a narrow structure marked by weak clay alteration, 150 ppb Au and no veins.

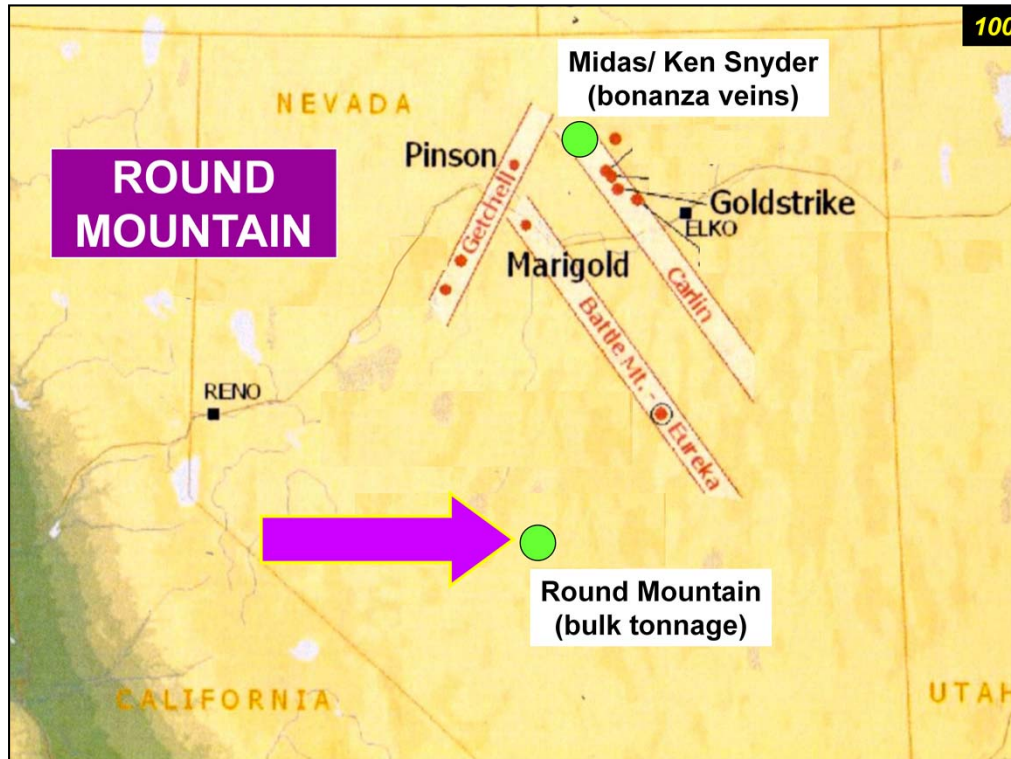


SLIDE 98: The surface “exposure” of Colorado Grande vein (about 100 m above 3 oz/t Au-bearing vein) is a narrow structure with clay alteration grading 26 ppb Au, 17 ppm Sb, 32 ppm Cu and 140 ppb Hg; there are no actual veins at this elevation in the Midas epithermal system.




SLIDE 99: Nevada's low-sulphidation vein systems (like many elsewhere) are a difficult target, with blind tops, small footprint, minimal alteration, and in many instances, covered by younger rocks. But they are clean, with bonanza grades, and cheap to mine (Newmont mines Midas for US\$120/oz – 2005 figures). In 2003, Midas produced about 219,000 ounces of gold and more than 2.6 million ounces of silver, which amounted to approximately 8.4% of Newmont's Nevada gold production

In the last few minutes of this presentation we will look at a very different, and quite unique, low-sulphidation gold deposit ...the Round Mountain Mine.




SLIDE 100: Our next stop is located well south of the Carlin district and an unusual example of a bulk-tonnage low sulphidation gold deposit. It is primarily a bulk mineable deposit with some unusual sweet spots, as opposed to the high-grade selective mining situation of the traditional veins.

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ROUND MOUNTAIN MINE



- Bulk tonnage/ low grade (>8 million oz, pre-2003, 10 Moz total)
- 192 million tons @ 0.02 oz/t (0.7 g/t)
- Bonanza veins/ “pockets” (5 to 206,000 oz/ pocket)
- Open pit – heap leach operation
- Discovered ~1900 – placer & underground mining 1906-35
- Annual production ~750,000 ounces (2002)

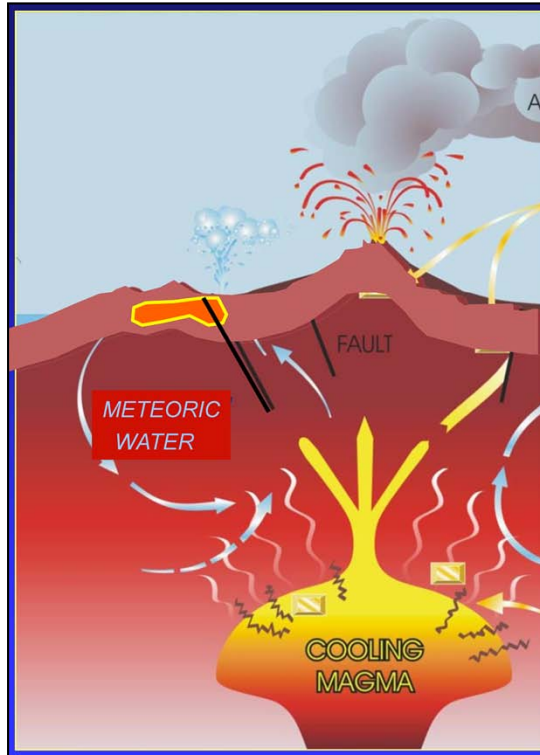
SLIDE 101: The Round Mountain Mine is a Kinross-Barrick joint venture, one of the largest open-pit operations in the world. Importantly, it also has pockets of some of the highest grade gold mined anywhere in the world.

It is characterized as a bulk tonnage / low-grade deposit: more than 8 million ounces of gold, pre-2003, with 10 million ounces total resource. It is a 220,000 ton/day operation (ore and waste). It contains 192 million tons @ 0.02 oz/t (0.7 g/t) but has “bonanza-grade” veins or pockets (5 to 206,000 oz/ pocket). Round Mountain is an open pit - heap leach operation. Gold at Round Mountain was first discovered in 1900 by a rancher. There was placer and underground mining in the period 1906-1935. The annual production at Round Mountain is about 750,000 ounces (2002).



SLIDE 102: Ore occurs in thick units of volcanic tuffs that were deposited in a volcanic caldera about 26.5 million years ago. There are 3 styles of gold: 1) low-grade high-tonnage in poorly welded tuff, where oxidized ores are key; 2) vein-hosted gold on fractures in welded tuffs and sediments; and 3) bonanza-grade “pockets”.

ROUND MOUNTAIN MINE



deposit straddles a volcano-bounding fault

1 km thick "permeable" tuffs

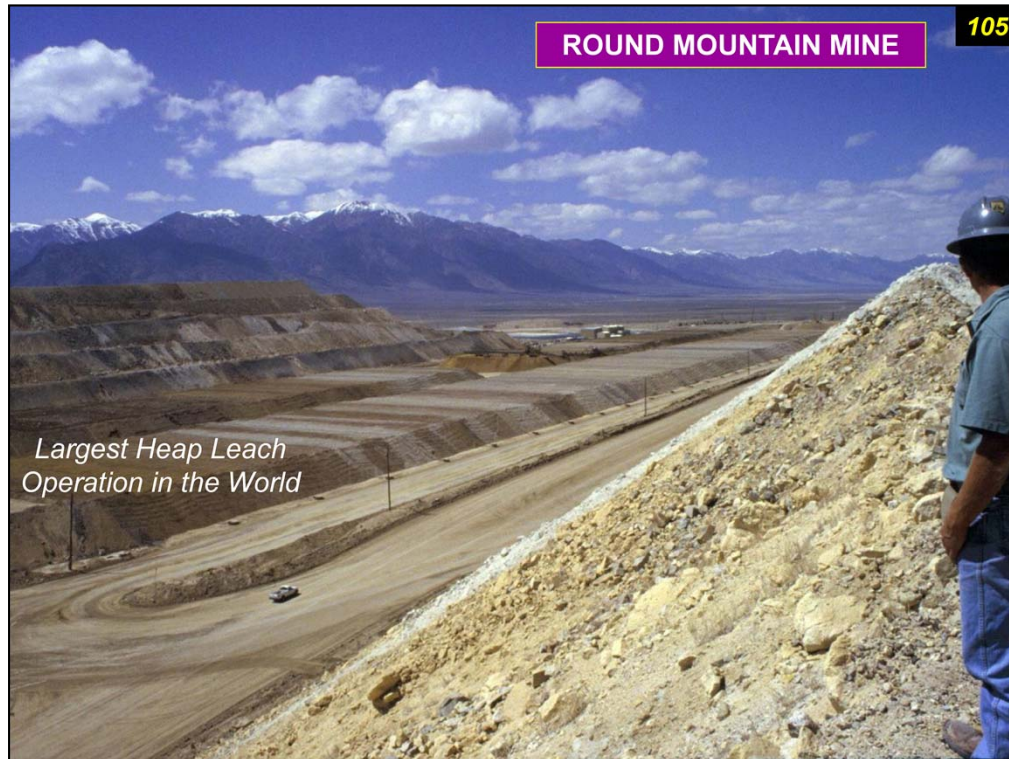
upward movement of fluids,
precipitation of Au+Ag & qtz-
adularia alteration

later but important oxidation at
surface (i.e. deep weathering)
changes bulk refractory
(sulphide) ores to leachable oxide
ores required for bulk-mining

SLIDE 103: The deposit straddles a volcano-bounding fault, within 1-km-thick "permeable" tuff units. The upward movement of fluids in and around the caldera precipitated gold and silver together with silica and adularia as alteration minerals. Later - but important - oxidation at surface (i.e. deep weathering) changed the refractory (sulphide) ores to leachable oxide ores required for bulk-mining and heap-leaching.



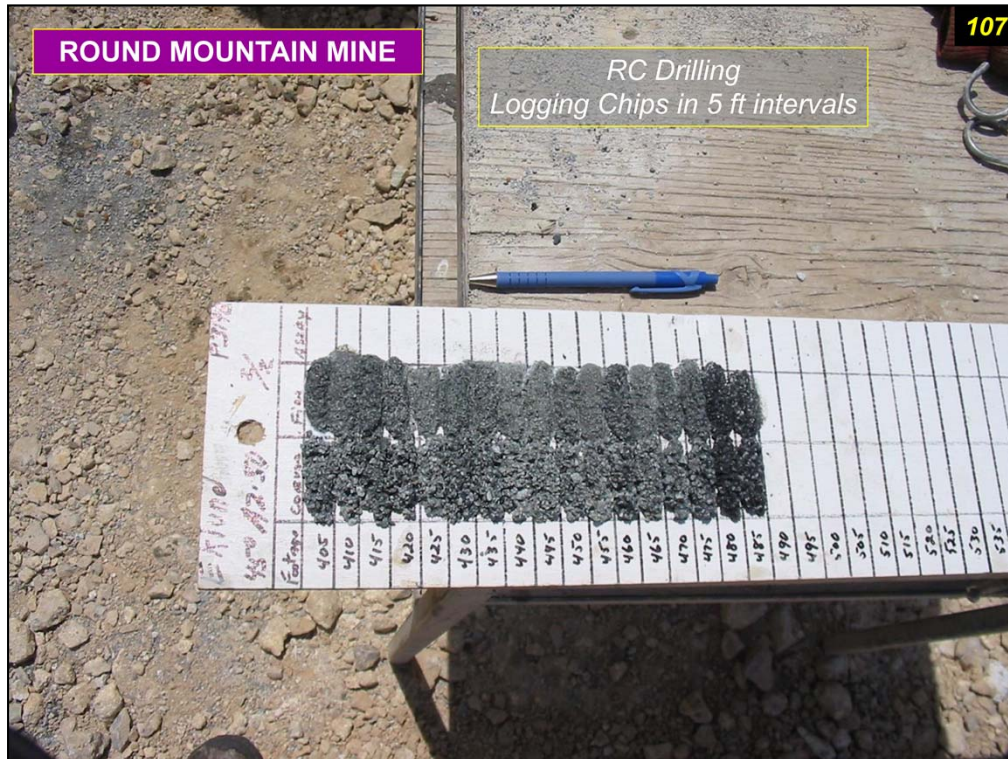
SLIDE 104: This photo helps show the size of the open pit - see the workers & trucks. The open pit is 2.5km x 1.5km, and extends to a depth of 365m.



SLIDE 105: Shown here are the leach pads. Round Mountain is the largest heap leach operation in the world. In a heap leach mining operation, ore is crushed into small pieces and heaped on an impermeable leach pad where it can be irrigated with a chemical solution that dissolves the valuable metals.



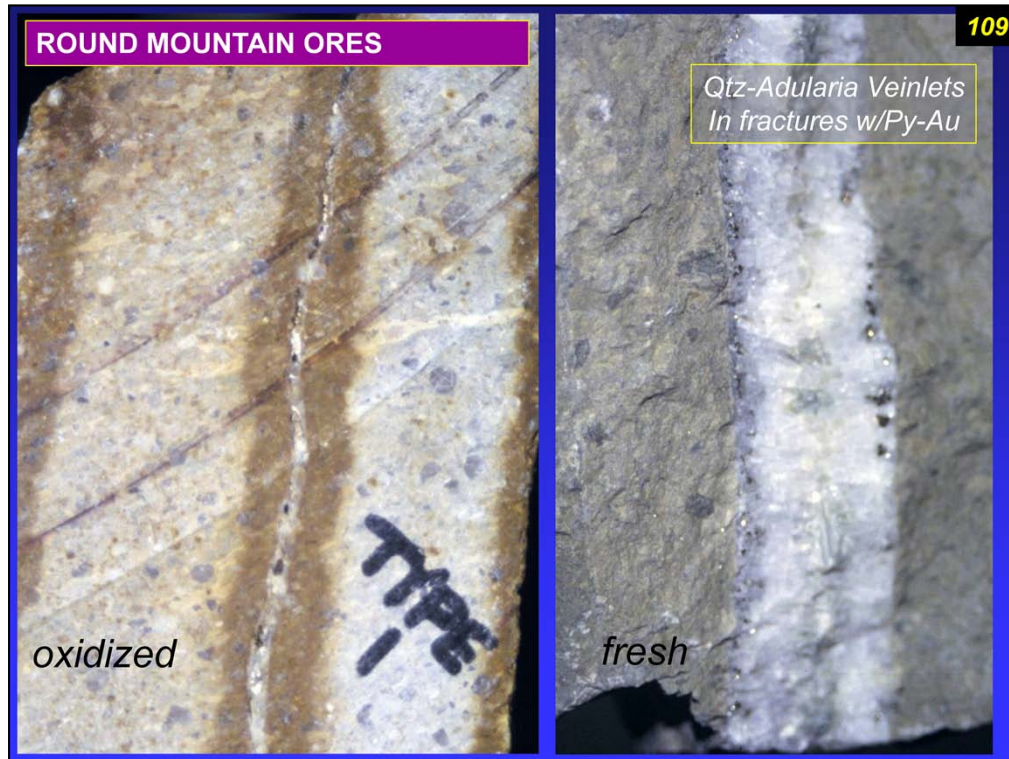
SLIDE 106: Because the rocks are relatively soft, the drilling at Round Mountain is done using reverse-circulation (RC) drills. The groundwaters at depth are heated geothermal waters at about 110 degrees F.



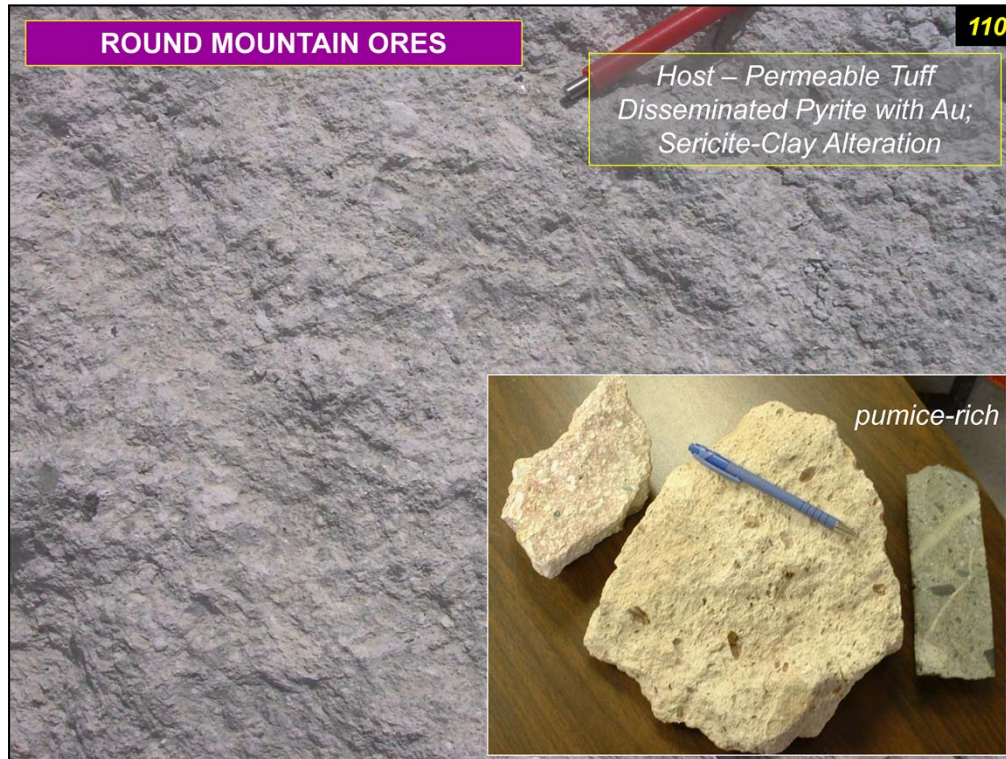
SLIDE 107: Mine geologists log the RC chips in 5 ft intervals.



SLIDE 108: RC drilling returns rock chips not core. Chips are glued to boards. The Chip Board Library at the Round Mountain Mine contains the record of over 3 million feet of RC drilling.



SLIDE 109: Here are quartz-adularia veinlets in fractures with pyrite and gold.



SLIDE 110: Here are photos of “Type 2 Ore” at Round Mountain, where the host is unwelded lithic tuff. There is disseminated pyrite, with sericite-clay alteration. The tuffs contain volcanic pumice, which is very permeable..

The pumice sites that contain sericite and quartz are higher grade, while the pumice sites with clay minerals have lower grade. Mine geologists scratch the pumice with steel needles and, by the sound, can accurately estimate grade.



SLIDE 111: Here are examples of the bonanza grades. The biggest sample in this photo weighs 100 ounces and contains 63 ounces of gold.



SLIDE 112: Finally – here is one of the bigger nuggets found – “The Badger Nugget”, which weighs 50 pounds. Mine geologists do detailed prospecting in the deposit using metal detectors!