

# Feature

## Mine of the Month

### Kingman Feldspar Quarry

(Wallapai District, AZ)



Once the largest and most continuous pegmatite operation in Arizona, the Kingman Feldspar Quarry is a feldspar and silica mine located about 5 air miles north of Kingman, at the base of the southeastern flank of the Cerbat Mountains.

This large, easily accessible pegmatite, over a mile long and several hundred feet thick, is a sill-like magma body that intruded into a medium-grained granitic rock, mainly biotite-rich quartz diorite, that locally exhibits a well-developed gneissic texture and, in other locations, a porphyritic texture with orthoclase phenocrysts. The granitic rocks are foliated to the west and higher up the ridge, and capped by basaltic to dacitic flows which form bold cliffs.

Contacts between the pegmatite and diorite are sharp and, in some locations, exhibit significant reaction boundaries as the melt intruded and baked the host rock. The pegmatite itself had a well-defined internal structure with a 1- to 2-foot-thick *border zone* composed of fine-grained quartz and feldspar; a *wall zone* of medium-grained (1 to 3 inches) quartz, feldspar, and muscovite that was 10 to 20 feet thick; and a 40- to 200-foot-thick *core zone* with microcline up to 12 feet and quartz to 15 feet. As crystallization progressed, the incompatible elements became progressively enriched, producing such accessory minerals as allanite, bastnaesite, zircon, monazite, garnet, and magnetite.

Near the northern end of the pegmatite there are several roof pendants of gneissic metamorphic rocks exposed within the granite and pegmatite. Additionally, there is a very conspicuous, almost horizontal, diabase dike exposed in the northernmost portion of the quarry.

Operations began in 1923, and continued steadily through the 60s under various ownership, with intermittent operation at least into the mid 80s. Most of the pegmatite material was mined circa 1950s for feldspar and silica, in some places down to the country rock leaving behind only minimal exposures of the wall zone and little of the core zone. The mining process has left the pegmatite exposed in three separate excavations. The northernmost is known as **Cut A**; the centermost, **Cut B**; and the southernmost, **Cut C**. Several hundred thousand tons of crude and ground feldspar was ultimately produced and marketed to manufacturers of ceramic glazes, dishes, pottery, sanitary fixtures, etc. The white color of the K-feldspar (microcline), reflecting the lower than usual ferric iron impurity, makes it ideal for high-class, colorless glass. Feldspar is also used as a bonding agent in the manufacture of bonded abrasives such as wheels, and discs of garnet, emery, etc.

Though considerable reserves of feldspar remain in situ and on the dumps, currently the mine sits idle, with no machinery on property or signs of imminent restoration.

# LOCATION

**DISTRICT:** Wallapai Mohave County, Arizona

**TOPO MAP:** Stockton Hill Quadrangle  
Sec 26 T 22 N R 17 W

**GPS:** 35° 16' 6.71" N, 114° 3' 34.68" W

**DIRECTIONS:** From I-40, Exit 52 Stockton Hill Rd, head north about 5 miles to Cammelback Rd. Left to the end of paved road. Mine is conspicuously visible on mountainside. Continue on dirt road for a short distance to water storage tank to the right. Take rutted road up to the mine.

# GEOLOGY

## SETTING:

Pegmatite sill hosted predominantly by coarse grained, biotite-rich quartz diorite. Local Precambrian schistosity is N30° E. Veins, fissures, and dikes trend NW to NNW regionally.

## REFERENCES:

Dings, MG (1951), The Wallapai Mining District, Cerbat Mts, Mohave Co, AZ, USGS Bll. 978-E

Brown, TJ, "Geology and Geochemistry of the Kingman Feldspar, Rare Metals and Wagon Bow Pegmatites" (2010). University of New Orleans Theses and Dissertations. Paper 1280

# OBSERVATIONS and COMMENTS

Though the pickings are getting rather slim, rockhounds can still find some specimens worthy of their collections. The prizes, of course, are allanite and bastnaesite. Some hard-rock mining will be required to claim pods of allanite in the feldspar matrix. Cut C has some good exposures in displaced boulders. Look for the conspicuous brown halos surrounding the black-brown mineral. Some of the specimens show signs of alteration to canary yellow *thorogummite* (now considered a mixture rather than a specific mineral, much like *limonite* or *wad*); the samples are small, thus requiring some type of magnification to appreciate (preferably a microscope, but a 10x loupe will suffice). Most of the allanite specimens are Ce dominant, but of special note is that some specimens are actually enriched with neodymium, making them the very rare allanite-Nd! It is impossible to differentiate these by mere optical observation, as specialized equipment found only in professional labs or universities would be required to make a precise determination of the exact species. Nevertheless, you can be pretty sure that at least some of your specimens are of the Nd variety, so far found only from this location in the world!

Good specimens of biotite are also certain to be found. Biotite in itself is very common, thus often ignored or discarded when found. However, the biotite at this mine is enriched in Rb, giving it some bragging rights for inclusion in your collection.

Naturally, good cleavages of microcline will be the most common mineral to collect. This potash feldspar was particularly prized due to its very low ferric iron content, making for nearly pure white material highly sought after by the ceramics industry—thus the reason for the mine's existence. No collection is complete without at least one specimen of all the various feldspars. Microcline from this location would be a good choice for that reason alone, but can also be collected for classroom teaching, hardness test pieces, etc.

Other species I have found here include ilmenite, magnetite, almandine garnet, muscovite, quartz, a couple samples of monazite, and one specimen each of zircon (v. cyrtolite) and uraninite.



**Cut A**

View NE, of the main excavation. Dark layer of diabase is a conspicuous feature.



**Cuts B and C**

View south, of the secondary excavations, Cut B (left) and Cut C (right).

# OBSERVATIONS and COMMENTS

For the geology enthusiast, this quarry provides excellent exposures of interesting geologic features and a “window” into the lithological structure of the Cerbat Range. The most conspicuous is the meters-thick, dark greenish brown layer within the white pegmatite of Cut A. At first glance it appears very much like a shale, with typical horizontal bedding that breaks easily along these planes. It also features a schistosity bordering large rounded boulders trapped within the layer. In fact, it is—or originally was—a diabase, as evidenced by the interlocking laths of feldspar crystals within it. But the intrusion has definitely suffered considerable alteration, and in some places, as mentioned earlier, very distinctly.



## Diabase Intrusion

At first glance, it is inconclusive which came first, the pegmatite or the diabase, but the latter's apparent schistose alteration, plus faulting that offset the dike, suggests it was deposited first, followed by intrusion of the pegmatite.



## Distinct Contact

Miners quarried this section of the pegmatite, Cut B, right down to the sharp contact with the host diorite. As the granitic rock was already forged in a magmatic furnace, it suffered little additional alteration by the intruding magma.

Another feature worth inspection is the very sharp contact between the host diorite and the intruding magma, as seen in the above right photo. As mentioned in the caption, the diorite was already a magmatic rock, thus was little affected by the intrusion, unlike other types of rocks, especially limestones. If you exit the excavation and hike to the area as shown at the skyline of the same photo, you can better appreciate the surface features of the contact, which could come in quite handy for your ability to recognize a potential unearthed pegmatite in future expeditions into the wilderness.

This is an invaluable learning opportunity that one day may lead you to discovering a treasure trove of mineral riches, which makes a trip to the Kingman Feldspar Quarry a worthy excursion.

# PHOTOS OF MINE and MINERALS

## Extensive Excavation

The quarry, manifested as a lighter patch of rocks against a darker background, first comes into view as one travels north on Stockton Hill Rd in Kingman, AZ. The farthest excavation to the right is known as Cut A.



## Long Outcrop

The significant length of the pegmatite can be seen from the turnoff at Camelback Rd. The extent of the workings is very clearly appreciated as it spans almost the entire base of Bull Mountain at the southeastern tip of the Cerbat Range.

## View of Kingman, AZ

The northeastern outskirts of Kingman as seen from the quarry. The relatively unobstructed scenery is a testament to how easily accessible this mine is. View is to the east. The famous Route 66 runs along the boundary of greenery and desert in the center distance.



# PHOTOS OF MINE and MINERALS



## The Main Event

The entrance to the primary workings, the so-called Cut A, trenches through an assemblage of host rocks, including a conspicuous diabase sill.

## Intrusive Interruptus

The light color of the pegmatite's feldspar is easily distinguished against the darker country rocks it intruded. The greenish brown layer in the center of the excavation, a diabase sill, has been pinched off in the center.



## Xenolithic Fly Eyes

These two boulders peer out of the diabase at the entrance of Cut A like a pair of watchful insectoid eyes. The diabase shows marked schistosity in some places, such as the brows around these "eyes" which are probably xenoliths (host country rock) broken off and caught in the intruding magma.

# PHOTOS OF MINE and MINERALS



## Hollowed Out

View looking southwest along the length of the pegmatite between Cuts B and C. Almost the entire pegmatite was mined, leaving little behind for future commercial operations, but rockhounds can still find worthy specimens to add to their collections.

## Local Denizen

This chuckwalla greeted me upon my arrival and supervised my trespass through his territory without showing any heightened concern over my presence.



## Straight Passage

This is the view northeast through the quarried pegmatite from the head of Cut C, looking out to the Hualapai Valley and the Peacock Mountains in the distance. A small ridge denoted by the yellow arrow separates Cut C from Cut B, and marks an entrance trench between the two.

# PHOTOS OF MINE and MINERALS



**XVIII 44 D**

Allanite-Nd

*1.88 x 1.38 inches*



**VII 134 D**

Hydroxylbastnaesite-Ce

*2.25 x 2 inches*



**VII 135 D**

Bastnaesite-Ce

*2.75 x 1.6 inches*



**IV 85 C**

Ilmenite

*5 x 4 inches*



**XVII 61 D**

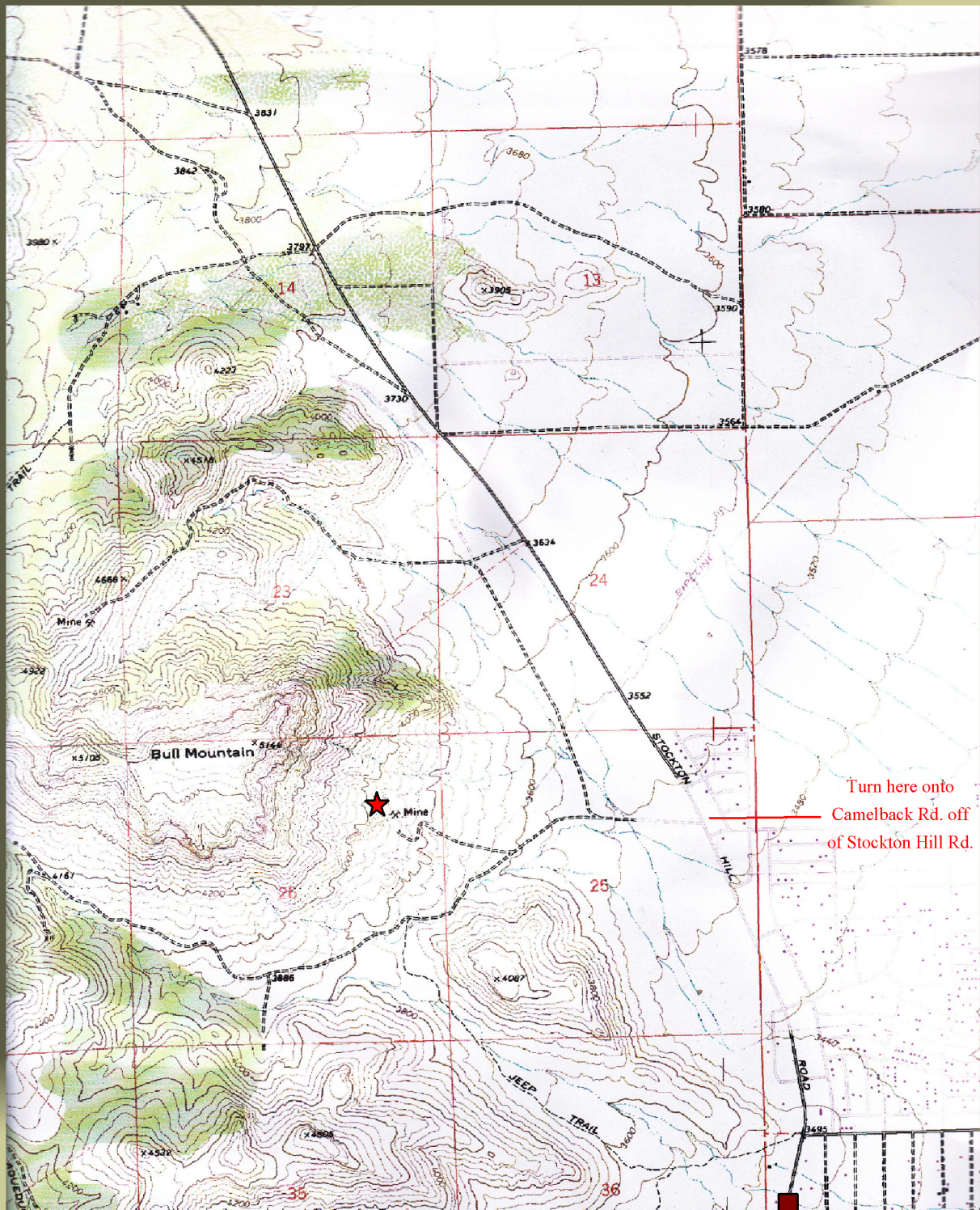
Thorogummite

*1.5 x 1.38 inches*

A visitor to the Kingman Feldspar Quarry can expect to find at least some of these minerals.

*All specimens from the G. Miles Lehman Collection*

# TOPOGRAPHIC MAP



This is a scan of the southeastern section of the Stockton Hill Quadrangle where the Kingman Feldspar Quarry is located. The city of Kingman, AZ, is about 5 miles south of the mine.

To  
Kingman

# Plan of Workings



This satellite view acquired from Google Earth shows the three major workings of the Kingman Feldspar Quarry looking north. While Cut A at the top is completely isolated from the remaining excavations, Cuts B and C are connected by trenches from the outside of the cuts, allowing access to each independantly, and between the cuts, permitting one to traverse the entire lengths of both cuts without having to exit to get to the other.