Feature

Mine of the Month

Three Kids Mine

(Las Vegas District, NV)

It should be of no surprise that many metal elements find their greatest applications during years of human conflict. Manganese, not withstanding, provides a good example. As World War One erupted into a global calamity, manganese became a critical commodity for the war effort for its resistance to wear and ability to toughen alloys (namely, steel). Thus the exigency to find more extensive and economical domestic deposits than previously known.

Such a deposit was discovered in 1917 east of the then small train depot called Las Vegas, Nevada, along the northern flank of the River Mountains. The mineralized zone, named the Three Kids Mine, produced 10,000 tons of low-grade ore from the *Three Kids Pit* during this period of the nation's history. Subsequently, The Three Kids Mine operated intermittently through three periods of war and internal tensions: WW1, WWII, and the Korean/Cold War. It was the largest open-pit deposit of good-grade Mn ore in the US.

In 1952, a mining company known as *Manganese, Inc.* began large-scale operations. Excavations called the *A* and *B Pits* yielded 15% Mn ores that were successfully concentrated by a floatation process. Since 1942, an estimated 900,000 tons of low-grade ore was mined from the *A*, *B*, and *Hydro Pits* which adjoin the *Three Kids Pit* on the west. Moderate amounts of lead, copper, silver, and gold were produced as by-products from the ore.

In all, over 2 million tons of ore were produced from 1917-1961. In the earliest years of the mining operation, the ore averaged 40% Mn, 1.5% Fe, and 15% silica. Since that time, avarage grade dropped to only 15-20% Mn. Although the mine and mill closed in 1962, core drillings in 1959, west of the old workings, revealed extensive deposits of good ore 250 to 300 feet below the surface.

In the area of the Three Kids Mine, an open syncline striking NE was cut by the NW-trending Lowney Fault. A graben east of this fault is the downfaulted eastern limb of the syncline. The Mn-oxide deposits occur as interbedded manganiferous sandstone and siltstone in the lower beds of what's now called the **Muddy Creek Formation (MCF)** of Pliocene age (~ 2-5 MA). The Mn is likely derived from hot springs arising from underlying Miocene volcanic layers deposited about 12-14 MA. Two of the three principle concentrations of Mn ore were along the eastern edge of the graben. These were mined in the *A*, *B*, and *Three Kids* pits, the last of which contained the highest grade ore. The third concentration of manganiferous material, in the east limb of the synscline, was later developed as the *Hydro Pit*.

Abundant gypsum in these deposits, as well as beds and plugs of rock salt in Virgin Valley before formation of Lake Mead, indicates deposition of **MCF** in interior basins before the Colorado River was in its present position as a through-flowing stream. The **MCF**, underlain by basalts and tuffs of the Mount Davis volcanic unit, lies unconformably above the **Horse Spring Formation (HSF)**, evidenced by beds of sedimentary breccias containing conspicuous fragments of **HSF** limestone. It is likely that a considerable passage of time occurred between deposition of the mostly undisturbed and horizontal **MCF** onto the steeply tilted **HSF**.

LOCATION

DISTRICT: Las Vegas Clark County, Nevada

TOPO MAP: Henderson Quadrangle 7.5 minute series
Secs 35, 36 T 21 S R 63 E

GPS: 36° 04' 56" N, 114° 54' 48" W

DIRECTIONS: From downtown Las Vegas, take US 93/95/515 south 11 miles to Exit 61B, east onto Lake Mead Pkwy (NV-564) about 4 miles to Boulder Highway; continue straight about 5 miles. Mine is on the right behind Laker Plaza and the Lake Mead Boat Storage property.

GEOLOGY

SETTING:

Manganiferous sandstone, siltstone, and tuffs in the lower beds of the Pliocene age Muddy Creek Formation, overlying volcanic flow rocks, breccias, and tuffs. Mn likely derived from hot springs emanating from underlying volcanic formations.

REFERENCES:

Longwell, C.R. and others, *1965, Geology and Mineral Deposits of Clark County, NV*, Nevada Bureau of Mines and Geology; Bulletin 62

Vanderburg, William O., *Mines of Clark County*, Las Vegas, NV, Nevada Publications, 1989.

OBSERVATIONS and COMMENTS

The Three Kids Mine was never an exciting location to collect mineral specimens. Regardless, nice blocks of satin spar gypsum could (and for the moment, still can) be obtained, along with samples of various manganiferous materials (mainly *wad*, which can also be found opalized).

I cover the mine here because it serves as a quintessential example of why I launched the journal *Discover Minerals* in the first place…to preserve the memory of the mining history of the southwest US that is continuously threatened by the encroachment of urbanization.

When I first visited this site in the late 1980s, the Three Kids Mine was remotely located, even from the nearest town of Henderson, which then was primarily centered around the nearby industrial center that included Timet (produces titanium alloys), BMI (Basic Magnesium, Inc.), PEPCON (produced ammonium perchlorate, an oxidizer in solid rocket boosters), and others.

With the exponential growth in the Las Vegas Valley from about 150,000 to now over 2 million residents as a result of the opening of the Mirage Hotel/Casino in 1989 (which ultimately became the new standard that all subsequent establishments measured themselves, by being bigger and grander), urbanization relentlessly plowed over the undisturbed desert and infringed on the Three Kids property.

Lake Mead Highway was a scenic two-lane road that provided access to the mine on its way to the west entrance of the Lake Mead National Recreation Area along Lake Shore Road. It is now the main artery into new developments, such as the very exclusive Lake Las Vegas Resort. With new communities continuing to sprout up all along this thoroughfare, The Three Kids Mine has become an eyesore, and is now slated for reclamation (Three Kids Mine Remediation and Reclamation Act of 2013) that will erase this once-strategic metals excavation from mining history, save for such publications as *Discover Minerals*!

Urban Encroachment

The growth of Las Vegas from just under 200,000 before 1990 to nearly three million today has consumed almost the entire expanse of the once pristine desert of the Las Vegas Valley, which not only imposes a devastating toll on native plant and animal habitats, but also infringes upon a part of Nevada's mining history. This view is from the north rim of the Three Kids Mine Hydro Pit, across the valley to the famous Las Vegas Strip. The snow-capped Charleston Peak in the Spring Mountains looms in the distance.

PHOTOS OF LOCATION and MINERALS

And the Plot Thickens

Part of the milling process involved leaching the Mn ore in a series of seven concrete ***thickeners***, the first two of which were of acid-proof construction and 250 feet in diameter (the largest of their kind at the time). In recent years, one had been cleverly painted and dubbed "The Wheel of Misfortune" by a street artist named Aware.

PHOTOS OF LOCATION and MINERALS

Persistent Guardian

Frenchman Mountain in the background maintains a resolute vigil over the abandoned quarries and dumps of the Three Kids Mine. The mountain is a fault block shifted from the Grand Canyon region to its present location along a major shear zone, as if in preparation for its new duties.

Proximity to Las Vegas

The Three Kids Mine lies about 20 miles east of downtown Las Vegas, but the metropolitan area that includes the city of Henderson has filled the valley and now encroaches right up to the border of the property.

Mill Ruins

This is all that remains of the once-proud mill that stood here in the 1950s. The plant was closed permanently in 1961, and was subsequently dismantled following auction of anything of value in 1963.

PHOTOS OF LOCATION and MINERALS

Pit A

Good exposure revealing the complex geology of the area. The smooth wall on the right is the footwall composed of the underlying Tertiary volcanics. The overlying Muddy Creek Formation that hosts the Mn deposits is the hanging wall that has been downthrown along this fault to form a graben exploited by the Three Kids Mine.

Pit B

The black Mn layers observed in the above photo were excavated along the trench connecting Pit A to the subsequent quarry called Pit B. The low-grade ore from these workings had to be concentrated by a floatation process to a more economical grade.

Hydro Pit

This quarry was the largest of the four that comprise the Three Kids Mine, which in its early years was the country's primary supplier of domestically produced Mn during World Wars I and II. Small amounts of gold and silver, as well as copper and lead, were recovered as valuable by-products.

PHOTOS OF MINES and MINERALS

What was once a booming operation (center) has turned into a graffiti artist's palette where the mills which ground ore (top left) from manganiferous sandstone (top right) have been turned into concrete canvasses for contemporary works of spray-paint art.

Occurring with the Mn ore (center), veins of satin spar are prevalent in the mine dumps throughout the property, an unmistakable indicator of an area under water (inland basin) in the geologic past. Gypsum is a salt that forms from evaporating seawater and lakes.

PHOTOS OF MINES and MINERALS

IV 13 C

Pyrolucite

Compact, massive aggregate.

Specimen 5.25 x 4 inches

XXI 23 C

Celadonite

Earthy alteration of ultramafic matrix.

Specimen 5.5 x 3 inches

X 105 C

Gypsum

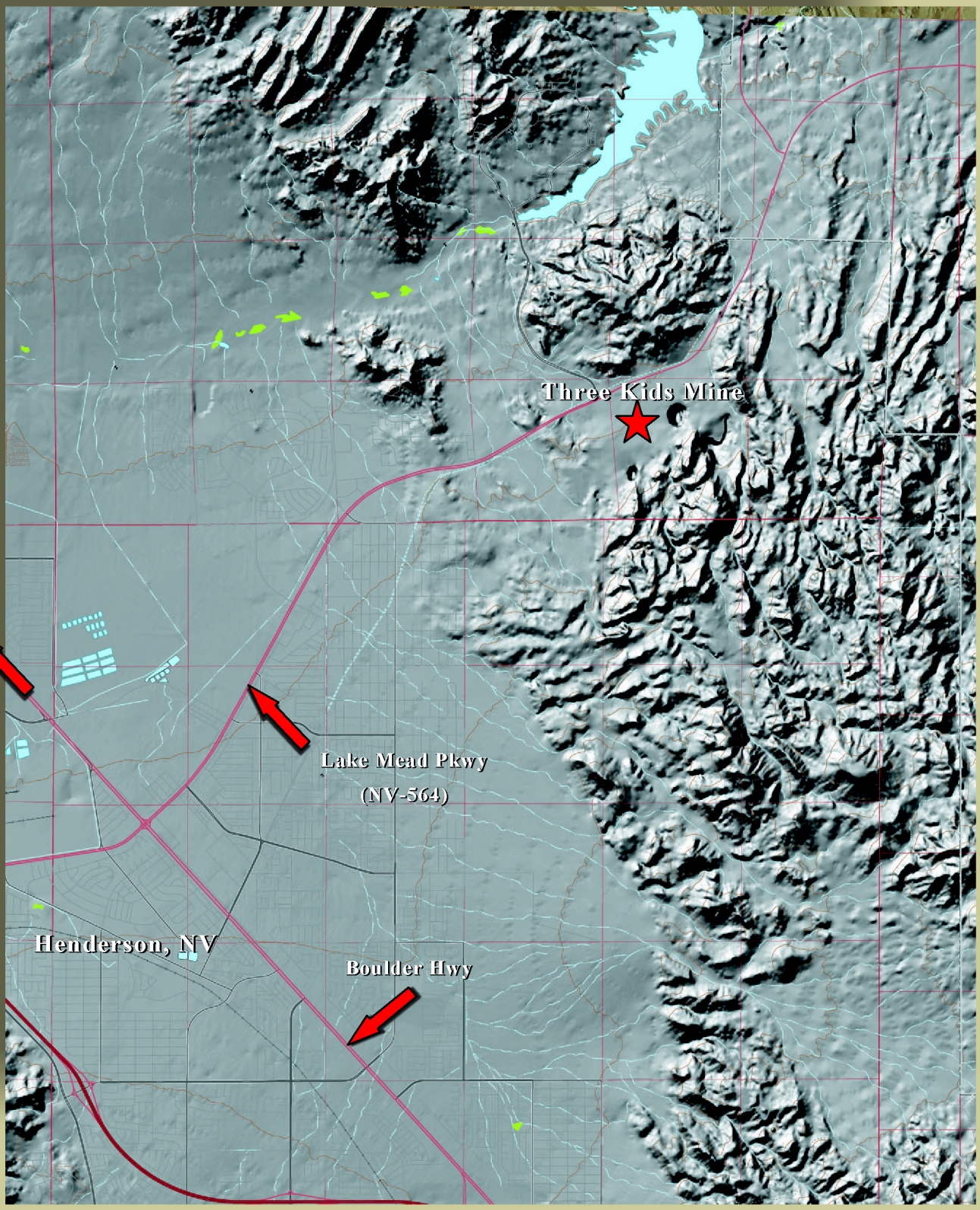
Cross-fiber aggregate of Satin Spar.

Specimen 3 x 2 x 2 inches

A visitor to the Three Kids Mine can expect to find at least some of these minerals.

All specimens from the G. Miles Lehman Collection

TOPOGRAPHIC MAP



This scan is a rastered image of the USGS 7.5 minute topographic map of the Henderson Quadrangle.

View of Workings

Aerial view of the Three Kids Mine excavations on the northern flank of the River Mountains east of Las Vegas, Nevada.