

Saguache County

Marshall Pass Uranium District

Dunn listed the Marshall Pass District in her 2003 compendium of Colorado Districts. The District is in the Swatch Range, centered about Marshall Pass in the area where Saguache, Gunnison and Chaffee Counties meet. Cappa and Wallace (2007) described the earliest discoveries occurring on the Gunnison County side of the district along the north-trending Chester fault. Dunn points out that uranium was discovered at the mouth of Indian Creek (Saguache County) in 1955 with mining beginning in 1957.

Olson (1988) describes in detail the geology of the district and indicates that structure controlled uranium deposition. The principal deposits are located at the intersection of major faults with the Tertiary erosion surfaces. 700 meters of Paleozoic sediments in the district range from Cambrian (Sawatch quartzite) to Pennsylvanian (Belden formation). Uranium deposition occurs in three environments: in carbonaceous shales of the Belden formation; in the Harding quartzite; and in shear zones in the Precambrian rocks.

The early discoveries include the Little Indian No. 36 Mine, which is about 1,000 feet north of the Saguache-Gunnison County line. This mine produced several thousand tons of ore from the quartzites of the Harding Quartzite. Other prospects in the area that were discovered in 1955 include the Apache No. 4 deposit, which consists of uranium deposits in carbonaceous beds in the quartzites of the Harding Quartzite, and the Lookout No. 22 Mine, in which uranium deposits are in a fault zone in Proterozoic metamorphic rocks (Malan, 1959). Nelson-Moore et al. (1978) report on production from the mines.

Some of the uranium deposits of the Marshall Pass district contained very high grade ore. The Lookout 22 deposit produced 42 tons of ore averaging 4.39 percent U_3O_8 and 360 tons of ore averaging 0.55 to 0.60 percent U_3O_8 (Gross, 1965). Nash (1988) describes in detail the Pitch deposit. The Pitch deposit was developed by two adits in 1959 through 1962 and produced about 100,000 tons of uranium ore at an average grade of 0.50 percent U_3O_8 . An additional 100,000 pounds of U_3O_8 were produced through a solution-mining process.

In 1972, Homestake Mining Company acquired the property and developed an open pit-minable resource of 2.1 million tons at an average grade of 0.17 percent U_3O_8 (Nash, 1988). As the exploration program proceeded, the company geologists recognized that they had discovered a previously unrecognized type of uranium ore deposit in brecciated dolomite of the Mississippian Leadville Limestone. Homestake mined the deposit from 1975 to 1985. The ore was processed at Homestake's mill near Grants, New Mexico.

Nash (1988) suggested that iron sulfide minerals and organic material in the Leadville Limestone created a reducing environment, a favorable site for the deposition of uranium. Nash also suggested that the source of the uranium was the overlying volcanic rocks, the quartz latite ash-flow tuff and the Rawley Andesite, now both mainly eroded away in the mine area. Oxidizing ground water moved along and near the fault, and the ground water would have been able dissolve uranium from the volcanic rocks and transport it at low temperatures ($<100^\circ C$) to favorable sites of reduction and precipitation in the fractures of the Leadville Limestone and other Paleozoic rocks of the district. The district contains many rare and unusual uranium minerals (Cappa and Wallace, Ibid), as listed below.

Mines listed in the district (mindat.org; Olson, 1988; Nash, 1988) include:

- Apache No. 4 Prospect
- Beginner's Luck¹
- Big Indian Group
- Bonita claim¹
- Erie No. 33 Prospect
- Hidden Reserve claim group
- Indian Creek Claims
- Indian Creek Limonite Deposit (11; Claims: Indian Creek Placers 3-7)
- Little Indian No. 6 Prospect
- Lookout No. 22 claim¹
- Marshall Pass No. 5 Prospect¹
- Marshall Pass Nos. 33 Claim (Marshall Pass Nos. 34 Claim; Marshall Pass Nos. 35 Claim; Marshall Pass Nos. 58 Claim; Olympia Extension; Marshall Pass Nos. 36 Claim)
- Pinnacle Mine^{1,2}
- Pitch Mine (Pitch Tunnel; Erie No. 28 Claim; Pinnacle Mine)^{1,2}
- Rainbow's End¹
- Uncompahgre No. 1
- Unnamed Uranium - Feldspar Mine (MRDS - 10013132)
- Vulcan Silver-Zinc Company claims

Notes: ¹Details about mine in Olson (1988).

²Details about mine in Nash (1988).

Minerals listed in the district (mindat.org) include:

'Albite-Anorthite Series'	Hematite	Sabugalite
Autunite	Ianthinite	Schoepite
Baryte	Kasolite	Skłodowskite
Becquerelite	Liebigite	Soddyite
Boltwoodite	'Limonite'	Sphalerite
Bornite	Magnetite	Tetrahedrite
Chalcocite	Marcasite	Torbernite
Chalcopyrite	Meta-autunite	'Tourmaline'
'Chert'	Metatorbernite	Uraninite var: Pitchblende
Coffinite	Metatyuyamunite	Uranophane
Compreignacite	Metazeunerite	Xenotime-(Y)
Covellite	'Mica Group'	Yttrocolumbite-(Y)
Dolomite	Microcline	Zeunerite
Euxenite-(Y)	Phosphuranylite	Zippeite
Fourmarierite	Pyrite	Zircon
Galena	Quartz var: Jasper	
'Gummite'	Rutile var: Ilmenorutile	

References:

Cappa, J.A. and Wallace, C.A. 2007. Geology and Mineral Resources of Saguache County, Colorado. Colorado Geological Survey Resource Series 44.

Dunn, Lisa. 2003. Colorado Mining Districts: A Reference. Colorado School of Mines, Golden, Colorado.

Gross, E.B. 1965. A unique occurrence of uranium minerals, Marshall Pass, Saguache County, Colorado. *American Mineralogist*, v. 50, p. 909–923.

Malan, R.C. 1959. Geology and uranium deposits of the Marshall Pass district, Gunnison, Saguache and Chaffee counties, Colorado. Colorado Mining Association, National Western Mining Conference, Denver, 20 p.

Nash, J.T. 1988. Geology and Geochemistry of the Pitch Uranium Mine Area, Saguache County, Colorado. U.S. Geological Survey Bulletin 1797.

Nelson-Moore, J.L., Collins, D.B., and Hornbaker, A.L. 1978. Radioactive Mineral Occurrences of Colorado and Bibliography. Colorado Geological Survey Bulletin 40.

Olson, J.C. 1988. Geology and Uranium Deposits of the Cochetopa and Marshall Pass Districts, Saguache and Gunnison Counties, Colorado. U.S. Geological Survey Professional Paper 1457.

www.mindat.org, accessed September 2015.