

Location: Secs.16 and 17, T.30 S., R.6 W.

Parks and Swartley 16:173 describe the deposit as follows:

"The property is reached by a good wagon road 5 miles west of Riddle station on the Southern Pacific Railway. There are 816 acres patented, under the management of W. Q. Brown of Riddle.

"The rocks in the neighborhood of Nickel Mountain are mostly of a basic igneous variety called peridotite by Diller. The nickel ore is a silicate of nickel, genthite, and is found in veins or irregular bodies, probably produced by the action of rising hot waters from some deeper seated magma.

"These nickel deposits have been prospected quite extensively and considerable effort has been made to satisfactorily solve the ore treatment problem in order to make the mine commercially successful. No satisfactory solution has yet been reached.

"In certain parts of Nickel Mountain the basic igneous rocks have been altered to serpentine and considerable bodies of chromic iron ore are found similar to its occurrence in other sections of southwest Oregon. Some of these chromite deposits have been developed somewhat, a few cars being shipped during the past summer, by the Oregon Nickel Mining Company to the Illinois Steel Company, which Mr. Brown states averages 55 percent chromic oxide."

Kay 06:120-125 gives the following information:

"The nickel deposits are associated with saxonite or harzburgite, a variety of peridotite, a basic igneous rock consisting chiefly of olivine and enstatite. Olivine constitutes more than two-thirds of the whole rock. Chromite and magnetite are in general present as disseminated grains, though in places within the peridotite area there are segregations of almost pure chromite. The peridotite readily breaks down to a dark-greenish serpentine, a rock that in the Nickel Mountain region is widely distributed as small isolated patches and elongated masses, the trend of which is northeast and southwest. Such an elongated mass of serpentine extends for several miles both to the northeast and to the southwest of Nickel Mountain. In some places the band is narrow; in others it is more than a mile in width. The serpentine has but a thin covering of soil, which is comparatively free from vegetation.

"Practically all the known occurrences of nickel silicate in this region are within an area of $1\frac{1}{2}$ square miles, lying on the slopes to the south, southwest, and southeast of the mountain. The thin soil peculiar to this area is composed almost entirely of iron oxides, which give it a distinctly reddish-brown color. The ores occur chiefly as flat-lying deposits on the surface of the peridotite and subordinately as veinlets in the peridotite or its decomposition product, serpentine. Only one nickel mineral is known to occur in these deposits, namely, genthite, which is a soft hydrous nickel-magnesium silicate. The proportions of the nickel and magnesium vary considerably in the best specimens obtainable, as shown by the subjoined analyses:

Analyses of nickel silicates from Riddle, Oreg.

	1.	2.	3.	4.
Loss at 110° C.	8.87	6.63	7.00	12.29
Loss on ignition	6.99			
Al ₂ O ₃ plus Fe ₂ O ₃	1.18	1.38	1.33	.06
SiO ₂	44.73	48.21	40.55	48.82
MgO	10.56	19.90	21.70	18.49
NiO	27.57	23.88	29.66	19.04
	99.90	100.00	100.24	98.70

1. Clarke, F.W., Am.Jour.Sci., 3rd ser., vol.35, 1888, p.484.
- 2-3 Hood, Dr., Mineral Resources U.S., 1882, U.S.Geol.Survey 1883, p.404
- 4 Von Foullon, H.B., Jahrbuch K.k.geol.Reichsanstalt, vol.42, p.272, 1892

"From all the analyses thus far published of the nickel silicates of New Caledonia and of Riddles it appears that the average content of nickel in the New Caledonia minerals is higher than that in the genthite of the Riddles deposits. Perhaps sufficient amounts of the Riddles ores have not been smelted to permit safe estimates to be made of their average nickel content; but the treatment by different methods of about 20 tons of the ore, which constituted the shipments made by the Oregon Nickel Mines Company, gave results varying from 5 to 8 percent in nickel. Two specimens, taken by the writer as average samples of the ore, were analyzed in the Survey laboratory by George Steiger. The results were 5.35 and 4.94 percent of nickel. Each of the two analyses also showed 0.11 percent of cobalt. The New Caledonia ores now being shipped to the smelters contain between 6 and 7 percent of nickel.

"The gangue consists of quartz, iron oxides, and serpentine. The quartz, the most abundant of these minerals, is in general of a whitish color, but the surface of much of it has a yellowish to brownish-red tint, due to a coating of iron oxide. The quartz appears to be chiefly chalcedonic, but in places it has a weak greenish color, resembling chrysoprase, a mineral that has been shown to be present in these deposits. The iron oxides are of a distinctly yellow to reddish-brown color, and the evidence is clear that these oxides represent one of the final products of decomposition of the serpentine, which is itself produced by the alteration of the peridotite.

"The deposits, which lie flat, occur as brecciated and conglomeratic irregular masses on the surface of the peridotite and consist of silica, nickel silicate, iron oxide, and serpentine, with a very subordinate amount of chromite. The most striking feature of the ore is the green color of the nickel silicate. Where the ores have been exposed to weathering action for a considerable time, these nickel silicates have been dissolved and carried away and a honeycombed quartz skeleton remains.

"The distinctly conglomeratic ore differs from the brecciated ore in that the constituents are rounded rather than angular. This is particularly well shown by the nickel silicate itself, which consists of rounded concretions varying from the size of a pin's head to that of a walnut. When broken open, these are usually found to consist of homogeneous, apple-green amorphous-looking nickel silicate, which on close inspection is seen to be penetrated by minute films of white silica; but in some of the ore the nickel silicate forms only a shell on the outside of the pebble, the inside consisting of decomposed serpentine or of brecciated ore, in which the small fragments of nickel silicate, iron oxide, and serpentine are plainly seen. Many specimens of the ore, both brecciated and conglomeratic, show slickensided surfaces, indicating movement subsequent to the formation of the ores.

"The ore found beneath the flat-lying deposits occurs as small veins and minute veinlets in the peridotite, which contains innumerable fractures. These veins and veinlets run in various directions, forming an irregular network, but in the main they appear to be related to zones of fracture and brecciation that have a general northeast-southwest direction. These zones are of considerable width, but the individual fractures are narrow, the largest vein observed being not more than 6 inches wide and most of them less than 1 inch. The vein filling consists of nickel silicate and silica, but iron oxides are also present, and in some places the material is of the nature of a cemented breccia."

Reference: Kay, C6:120-125.