
The Stratigraphic Relationship between the Reef Package and Adjacent Layers of the Stillwater Complex, Montana

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Extensive underground geologic mapping and diamond drilling at the Stillwater Mine have provided detailed information on the stratigraphic relationship between the PGE-rich Olivine-Bearing Zone 5B (OBZ-5B), also known as the Reef Package, and the rest of Troctolite-Anorthosite Zone I (TAZ-I) as described by Todd and others (1982). Within TAZ-I, discordant contacts have been identified both above and below the Reef Package.

West of the Stillwater River the base of the Reef Package converges down-section westward at angles of three to ten degrees over a distance of 2400 meters, truncating all of Gabbro Zone I (GZ-I) which is typically 125 meters thick. In this area of the mine a cross section would have the Reef Package, which contains OBZ-5B and the J-M Reef in close proximity to the stratigraphy of Norite Zone I (NZ-I). The convergence is generally gradual, but local relief up to twenty meters is noted. Along the same trend the upper contact of the Reef Package, also truncates upper TAZ-I stratigraphy. At the western end of the Stillwater

mine there is a marked (seven degree) westward divergence as the units of GZ-I re-emerge and thicken below the Reef Package and the upper layers of TAZ-I begin to reappear.

East of the Stillwater River there is an overall very gradual (less than one degree) convergence of the Reef Package with underlying GZ-I. However, the contact is generally irregular and local relief on the contact is as much as twenty meters in fifteen meters of strike length, where the base of the Reef Package intersects underlying layers at steep angles. The upper contact of the Reef Package also shows very gradual convergence and local irregularities.

References

Todd, S.G., Keith, D.W., LeRoy, L.W., Shissel, D.J., Mann, E.L., and Irvine, T.N., 1982, The J-M platinum-palladium Reef of the Stillwater Complex, Montana: I. Stratigraphy and petrology: *Economic Geology*, v. 77, p. 1454-1480.