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February 26, 2001

Mr. M.M. Underwood, Jr.  
Director of Physical Resources  
U.S. Forest Service - Rocky Mountain Region  
P.O. Box 25127  
Lakewood, CO 80225-0127

Dear Mr. Underwood:

This is in response to your January 24, 2001 request for information on locatable mineral resources in a land exchange proposal in which Rodney and Marian Johnson have offered certain non-Federal lands within the Black Hills National Forest in exchange for Federal lands also within the Black Hills National Forest.

In accordance with the working agreement under Public Law 86-509, we are providing you with a report on the locatable mineral resources on the lands described in "Exhibits A and B", included with your request. These lands comprise 128.6 acres, more or less, in Pennington County, South Dakota.

Sincerely yours,

Anna B. Wilson, Geologist  
Mineral Resources Program, Central Region

Copies:       W.C. Day  
                  E.A. duBray

LOCATABLE MINERAL REPORT FOR  
THE JOE DOLLAR (JOHNSON) LAND EXCHANGE OFFER,  
BLACK HILLS NATIONAL FOREST,  
PENNINGTON COUNTY, SOUTH DAKOTA

By  
Anna B. Wilson  
U.S. Geological Survey

February 26, 2001

*The following report is based on information contained in USGS mineral resource and commodity files, mineral information databases (MRDS and MAS), and on reports and maps available in the USGS library. These data are occasionally augmented with unpublished documents, personal communications, and professional experiences. No field studies or on-site visits were performed in preparing this report. Emphasis is primarily on locatable mineral resources. Leasable and salable resources are covered only if they appear in the above documents. Mineral resource assessments are subjective: the opinions expressed herein are entirely those of the author.*

For the legal location description of lands considered for exchange, please refer to Attachments A and B, as supplied by the U.S. Forest Service . The Parcels are also shown on maps as Attachments D and F.

**Non-Federal: Joe Dollar/Niagria Parcel** (see Attachments A, C, D)  
Mount Rushmore 1:24,000 quadrangle

A geologic map of the Keystone area including much of the Mount Rushmore quadrangle shows the area surrounding the Joe Dollar/Niagria parcel, about 4 1/2 mi ENE of Hill City, as quartz schist interbedded with mica schist and mica-staurolite schist (Norton, 1976; Attachment C). The entire parcel is east of the Empire Fault and west of the Keystone Fault. A western splay of the latter fault cuts the eastern parts of the parcel.

There are four mineral deposits on two northeast-striking sub-parallel veins in the immediate vicinity (Attachment D): Joe Dollar (Halcyon), and the Golden Slipper, Climax, and Forest City that are associated with the Empire Mine (DeWitt and others, 1988a). All are Early Proterozoic veins and shear zones containing discordant deposits of gold, silver, lead, and minor amounts of zinc, copper, and arsenic formed in a metamorphic and tectonic environment about 1.6-1.9 Ga. Hydrothermal solutions concentrated the metals in metasedimentary rocks (DeWitt and others, 1986, 1988a). All 4 of these deposits are in the Three Forks metallic mineralized area (Wilson and DeWitt, 1995). The nearby Edna Hazel deposit is an Early Proterozoic pegmatite formed in an igneous and metamorphic environment about 1.6 - 1.9 Ga. Late magmatic processes associated with the formation of the Harney Peak Granite concentrated tin and tungsten in this small pegmatitic body emplaced in the surrounding metamorphic rocks (DeWitt and others, 1988a). Edna Hazel is in the Hill City metallic mineralized area (Wilson and DeWitt, 1995).

At a scale of 1:250,000, the property is in an area assigned moderate potential for small gold- and silver-bearing, Proterozoic vein and shear zone deposits (DeWitt and others, 1986). Based on geological similarities to adjacent properties, at 1:24,000 scale, the mineral resource potential for Early Proterozoic veins and shear zones containing gold, silver, lead, and minor amounts of zinc, copper, and arsenic is high. The property is in an area assigned moderate resource potential for small to medium size, tin- or lithium-bearing pegmatite deposits by DeWitt and others (1986). Pegmatite bodies are not mapped on the property (Norton, 1976; Attachment C) at 1:20,000 scale, so the potential is assumed to be moderate at the larger scale as well.

**Federal Property** (See attachments B, E, F)  
Hill City 1:24,000 quadrangle

Ratte and Wayland (1969) map the area of the parcel as Bugtown Formation, primarily quartz-mica, staurolite, and sillimanite schists interlayered with thick-bedded quartz schist and metagraywacke (Attachment E). The parcel is bisected by the northeast-striking Rabbit Gulch Fault; sense of movement is down to the southeast. Locally, some small pegmatitic bodies of Harney Peak Granite intrude the Bugtown Formation. Quaternary alluvium and isolated terrace deposits, largely gravels, are located along Palmer Creek.

The Federal Parcel is located between two patented claim blocks with the February/Golden Summit patented claim block to the west, the Elkhorn Tungsten (Heart of the Black Hills) claim block on the east, and the Home Sweet Home Placer claim along Palmer Creek on the south (Attachment F). Minor prospects or diggings are in the vicinity of the parcel (DeWitt and others, 1988b). The parcel overlaps both the Hill City and Three Forks metallic mineralized areas (Wilson and DeWitt, 1995). The Palmer Gulch tin and gold placer district is along the southern margin of the parcel (Wilson and DeWitt, 1995).

At a scale of 1:250,000, DeWitt and others (1986) assigned the area in the vicinity of the Federal parcel high potential for small to medium sized pegmatite deposits. Based on proximity to known deposits, the potential for finding small pegmatite bodies in the vicinity of the parcel is moderate. The parcel is also within the area assigned high potential for small to medium size pegmatite deposits (DeWitt and others, 1986). Lack of mines and prospects on this property in an area of intense exploration suggests that this parcel may have a lower resource potential than adjacent properties.

## REFERENCES:

- DeWitt, Ed, Buscher, D.P., Wilson, A.B., and Johnson, T.M., 1988a, Map of mines, prospects, and patented mining claims, and classification of mineral deposits in the Mount Rushmore 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-K, scale 1:24,000.
- DeWitt, Ed, Buscher, D.P., Wilson, A.B., and Johnson, T.M., 1988b, Map of mines, prospects, and patented mining claims, and classification of mineral deposits in the Hill City 7 ½-minute quadrangle, Black Hills, South Dakota: U.S. Geological Survey Miscellaneous Field Studies Map MF-1978-J, scale 1:24,000.
- DeWitt, Ed, Redden, J.A., Wilson, A.B., and Buscher, David, 1986, Mineral resource potential and geology of the Black Hills National Forest, South Dakota and Wyoming, *with a section on salable commodities*, by J.S. Dersch: U.S. Geological Survey Bulletin 1580, 135 p, 4 pls. (scale 1:250,000) in pocket.
- Norton, J.J., 1976, Field compilation of the geology of the Keystone area, Black Hills, South Dakota: U.S. Geological Survey Open-File Report 76-297, scale 1:20,000.
- Ratte, J.C., and Wayland, R.G., 1969, Geology of the Hill City quadrangle, Pennington County, South Dakota—A preliminary report: U.S. Geological Survey Bulletin 1271-B, 14 p., scale 1:24,000.
- Wilson, A.B., and DeWitt, Ed, 1995, Maps showing metallic mineral districts and mines in the Black Hills, South Dakota and Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-2445, scale 1:100,000.

LIST OF ATTACHMENTS:

- A. Exhibit A. Land description verification, as supplied by U.S. Forest Service.
- B. Exhibit B. Land description verification, as supplied by U.S. Forest Service.
- C. Geology of the Mount Rushmore 1:20,000 quadrangle in the vicinity of the Joe Dollar/Niagria (Johnson) parcel (from Norton, 1976).
- D. Map showing mines, prospects, and patented claims in the vicinity of the Joe Dollar property, Mount Rushmore quadrangle (from DeWitt and others, 1988a).
- E. Geology of the Hill City 1:24,000 quadrangle in the vicinity of the Federal parcel (from Ratte and Wayland, 1969).
- F. Map showing mines, prospects, and patented claims in the vicinity of the Federal property, Hill City quadrangle (from DeWitt and others, 1988b).