



United States Department of the Interior

NATIONAL PARK SERVICE
Water Resources Division
1201 Oak Ridge Drive, Suite 250
Fort Collins, CO 80525

December 19, 2003

L54(2380)
GRTE/General

Memorandum

To: Pam Holtman, Historian, Grand Teton National Park

From: Larry Martin, Hydrogeologist, Water Operations Branch, WRD

Subject: Water supply well at White Grass Ranch

Summary: Prospects are poor for constructing a water supply well capable of producing more than 1-2 gallons per minute anywhere near the White Grass Ranch. The area is underlain mostly by unsorted glacial deposits having low permeability. The nearest good prospect for construction of a water supply well is in the Snake River Valley, southeast of the Moose-Wilson Road, probably about 1¼-1½ miles from the ranch and about 350 feet lower in elevation.

Discussion: The White Grass Ranch is located in the SE¼ of Section 28, T43N, R116W. It is about 1 mile northeast of Phelps Lake and a mile northwest of the Snake River Valley. It is about 3 miles due west of park headquarters at Moose. The Park would like to redevelop this former dude ranch as a "Western Preservation Center" where park service employees and volunteers would be trained to preserve, rehabilitate, and find new uses for historic, rustic buildings in national parks.

Reportedly, the water supply for the dude ranch was obtained by capture and collection of surface water. Residents at other private properties within about a mile northeast of White Grass Ranch collect surface water and use bottled water. A search of records at the Wyoming State Engineer's Office showed that the only wells in the general area are completed in the alluvium of the Snake River Valley and two wells located at JY Ranch at the southeast end of Phelps Lake. There is no record of any wells being constructed, or attempted, at White Grass Ranch or the

vicinity. The White Grass Ranger Station reported collects water from a small creek near the ranger station.

Geologically, the area is underlain by a variety of unsorted glacial deposits, such as till or drift. Glacial drift is material that was deposited directly by, or underneath, a glacier that has not been subsequently reworked by running water. Till and drift generally have very low permeability because they contain significant amounts of clay and silt mixed in with the sand, gravel, and boulders. (The glacial deposits in the Snake River Valley have been reworked by running water, resulting in the fine-grained sediments being washed downstream. The reworking of sediments by running water leaves behind a very permeable alluvial deposit of mostly sand and gravel.) Other geologic material in the vicinity of White Grass Ranch includes alluvial fan deposits and loess. Both of these units are likely to be relatively thin and not a reliable source of groundwater. Underlying the sedimentary and glacial deposits are the granitic and metamorphic rocks forming the base of the mountains. These rocks are likely to be nearly impermeable. In short, there are no geologic formations underlying the White Grass Ranch that could reasonably be considered as potential groundwater sources for development at the ranch. It is possible, even likely, that a well constructed anywhere at the ranch could obtain 1-2 gpm, but any more than that would be mostly a matter of exceptionally good luck.

There are two wells located at JY Ranch at the southeast end of Phelps Lake, about a mile southwest of White Grass Ranch. Well driller's logs and construction records for these wells indicates they were completed in glacial deposits, a mixture of clay, sand, gravel, boulders, and decomposed granite. One of these wells reportedly produces 5 gpm and the other well has "very good yield". These wells are located in the valley of a large drainage basin, a very short distance downgradient from a very large lake. That the wells do not produce more water than they do is evidence of the low permeability of the glacial deposits in this area. There are no similar large drainage basins or lakes at White Grass Ranch and thus no source of water to provide continuous recharge to local groundwater aquifers.

The only reasonably certain source of groundwater for construction of a well in the vicinity of White Grass Ranch is the alluvium in the Snake River Valley. A well would probably need to be located some distance southeast of the Moose-Wilson Road to have a reasonable chance of intercepting enough saturated thickness in the alluvium to insure both a reliable source of water and a reasonably large production rate. A well located in the Snake River Valley would probably be 1¼-1½ miles from White Grass Ranch and about 350 feet lower in elevation.

Alternatives to constructing a new well in the Snake River Valley include identifying an existing well in the valley that is either not used or has excess capacity. These options would require construction of a pipeline from the valley to the ranch and probably a pumping station to provide the lift necessary to transport water to the ranch. Another alternative is to divert surface water from one of the creeks near the ranch and provide a treatment plant to meet public health standards.

If there are any questions regarding this report, please call me at (970)-225-3515.

References

Love, J.D., John C. Reed, and Ann Coe Christiansen, 1992, Geologic Map of Grand Teton National Park, Teton County, Wyoming, U.S. Geological Survey Miscellaneous Investigations Map I-2031

cc:

GRTE – Wemple

IMR – Reber



United States Department of the Interior

NATIONAL PARK SERVICE
Water Resources Division
1201 Oak Ridge Drive, Suite 250
Fort Collins, CO 80525

May 24, 2004

L54(2380)
GRTE/General

Memorandum

To: Bob Wemple, Engineer, Grand Teton National Park
Pam Holtman, Historian, Grand Teton National Park

From: Larry Martin, Hydrogeologist, Water Operations Branch, WRD

Subject: Water supply well at White Grass Ranch

Summary: On May 19-20, 2004 a test well was constructed at White Grass Ranch. The well is capable of producing approximately 50 gallons per minute from a gravel zone about 75-95 feet below ground surface. The well was completed in accordance with the construction standards of the Wyoming State Engineers Office. It may be necessary to conduct additional development of the well to obtain clear water prior to its being used as a public water supply.

Discussion: The White Grass Ranch is located in the SE¼ of Section 28, T43N, R116W. It is three miles west of Moose, at the base of Buck Mountain at an elevation of 6720 feet. It is about a half mile east of the Death Canyon trailhead and ranger station. The Park would like to redevelop this former dude ranch as a “western historic preservation training and technology center” where park service employees and volunteers would be trained to preserve, rehabilitate, and find new uses for historic, rustic buildings in national parks.

A test well was constructed at the ranch on May 19-20, 2004 to determine whether there would be sufficient groundwater to supply water for the planned development at the site. Since the test well produced a significant quantity of water, it was completed as a water supply well constructed to the standards of the Wyoming State Engineers Office.

The well penetrated a mix of unconsolidated glacial sediments ranging from clay to boulders. The total depth of the well is 98 feet. Several permeable zones of sand and gravel with only a little clay or silt were encountered and produced significant amounts of groundwater. One such zone was from 75-95 feet below ground surface. The well casing was perforated from 75-90 feet below ground surface and this interval was developed by air lifting for about 3 hours. At the end of this development period, the water was still slightly turbid, but was getting progressively cleaner. It may be necessary to conduct additional development when the well is brought on-line as a water supply source. Alternatively, it might turn out that when the well is pumped at a lower rate, such as 5-10 gpm, there will be much less turbulence in the well and the water pumped from the well might be crystal clear.

Geologic log for the test well at White Grass Ranch	
Depth, feet	Description
0-20	Sand and gravel, saturated below 15 feet, produced a couple gpm at 20 feet
20-25	Water bearing gravel with some sand
25-33	Increasing amount of clay mixed in with the sand and gravel, Does not produce water
33-35	Much more clay mixed in with the sand and gravel. Material easily rolls into balls and worms, indicating presence of clay. No water.
35-50	Less clay, but significant amount of silt mixed with sand and gravel. Water bearing, producing about 20 gpm, but the water is very turbid due to large amount of fine-grained sediments.
50-75	Alternating layers of silt mixed with sand and gravel and layers of runny clay. Sand and gravel layers produce water.
75-95	Mostly sand and gravel with lesser amounts of silt and clay than overlying sediments. Produces about 20 gpm through the bottom of the casing (no perforations yet). Water remains turbid.
95-98	Runny clay. Saturated with water

If there are any questions regarding this report, please call me at (970)-225-3515.

References

Love, J.D., John C. Reed, and Ann Coe Christiansen, 1992, Geologic Map of Grand Teton National Park, Teton County, Wyoming, U.S. Geological Survey Miscellaneous Investigations Map I-2031

A 24-hour pumping test was conducted at this well in August 2007

White Grass Well
Grand Teton National Park

