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M E M O R A N D U M

TO: John, Doug Hodgson

FROM: Harold Porath

SUBJECT: Buck Mountain DNR Mineral Well

DATE: August 17, 1983

This memo is meant to update the memo of July 11, 1983, which described the investigation of the Buck Mountain mineral well on June 28, 1983. Analytical results of the well water samples collected that date are now available and are shown below, along with the water quality standards (from Quality Criteria for Water (EPA Red Book, 1976)):

Parameter	Concentration Measured	Water Quality Criteria
pH	7.5	5.0 to 9.0
Spec. Conductivity	4080 umhos/cm	
Tot Hardness (as $CaCO_3$)	1400 mg/l	classified as very hard water
NO_3-N	<0.05 mg/l	10.0 mg/l
NO_2-N	<0.05 mg/l	10.0 mg/l
NH_3-N	0.02 mg/l	0.02 mg/l
O-PO_4-P	0.01 mg/l	
Tot Phos-P	0.02 mg/l	
Copper	<0.02 mg/l	1.0 mg/l
Zinc	0.01 mg/l	5.0 mg/l
Nickel	<0.02 mg/l	0.01 mg/l
Chromium	<0.02 mg/l	0.05 mg/l
Cadmium	<0.01 mg/l	0.01 mg/l
Lead	0.10 mg/l	0.05 mg/l
Mercury	< 0.2 ug/l	2.0 ug/l
Arsenic	36 ug/l	50 ug/l
Selenium	4 ug/l	10 ug/l

Only the concentration of lead exceeds the water quality standards (0.1 mg/l vs. 0.05 mg/l). For some reason, this sample was never tested for iron, but I would expect it to be high. I would also expect high levels of sulphur probably in the form of hydrogen sulfide, although the pH was essentially neutral (probably being buffered by dissolved minerals).

Based on these results and on field observations, the very small discharge from this well poses no adverse environmental impacts and will not cause surface water pollution. Without well log information, it is impossible to determine from what depth this water is from and if it will contaminate other water-bearing zones (if any). From the number of tracks around the well, it does appear that it is being used as a source of water and minerals by the local deer population. If concerned, DNR should drive a plug into the cap to prevent further discharge.

HP:mjj

M E M O R A N D U M

TO: John

FROM: Harold

SUBJECT: Buck Mountain DNR Mineral Well

DATE: July 11, 1983

On June 28, 1983, I visited, along with two representatives of the Department of Natural Resources, the artesian mineral well located on Buck Mountain.

The well, along with another mineral well, was drilled in 1981 by Spenst Hansen for Gulf Mineral Resources. The wells are located in the NE¼ of Sec. 29, T. 34 N., R. 24 E.W.M. Both were drilled as mineral exploration wells, one to a depth of 931 feet, the other to a depth of 1236 feet. Apparently, numerous other mineral exploration wells have been drilled in the area. It is unclear to which depth (931 feet or 1236 feet) the artesian well was drilled.

Little other information on the well is available. DNR has no well logs or records of the materials encountered in the drilling. A DNR memo of October 23, 1981, states that some information regarding the wells was obtained by DNR in conversations with David Morris, the business manager for Hansen. These conversations indicate that zones were encountered during the drilling where there was no return of drilling fluids or rock cuttings. DNR geologists apparently feel there is potential for contamination of these zones by the artesian flow encountered or for possible mixing between zones.

During my visit, water from the well was observed to be spraying 66 inches into the air from a 1/4 inch hole in the cap. Flow was estimated at 2-3 gallons per hour, and the discharge did not flow any appreciable distance on the surface before soaking into the ground. There was no direct contamination of surface waters, nor was there any potential for a direct discharge into surface waters at the flow rate observed. Samples were collected and sent to the DOE lab at Tumwater for analysis. Numerous deer tracks were observed in the mud immediately adjacent to the well indicating that the deer have been drinking the water.

To John
From Harold
Buck Mountain DNRMineral Well
July 11, 1983

The immediate solution to the situation is to plug the hole in the cap. This can easily be done by hammering in a wooden or metal plug into the hole. This will, of course, not eliminate the potential for contamination of various zones within the well. When results of the chemical analysis become available, the data should allow us to determine if further work will need to be undertaken.

Without well logs or other drilling information, it is difficult, if not impossible, to speculate about the chances for contamination of the various zones. DNR should consider regulation changes requiring that more information be provided to them during the drilling of mineral wells so that situations like this are not repeated.

HP:mjj