



SUMMARY: GEOLOGY AND HYDROLOGY IN URANIUM AREAS IN THE SOUTHERN BLACK HILLS

- In situ leach uranium mining is done directly in a water-bearing aquifer. That's the only way it will work.
- In the Dewey-Burdock area, Powertech/Azarga Uranium wants to mine in the Inyan Kara aquifer, which is made up of the Lakota and Fall River formations.
- The Fall River formation is the largest producing aquifer in Fall River County, and the Lakota is the second largest.
- In order for in situ leach uranium mining to happen without contaminating multiple aquifers, the rock layers above and below the uranium mining aquifer must be continuous and without fractures.
- Geological research indicates that the rock layers in the proposed mining area are sporadic, vary in depth, and vary in their relationships to each other.
- The rock layer above the Inyan Kara aquifer contains faults and sandstone dikes that could allow mining fluids to move upward.
- There are approximately 4,000 old drill holes in the proposed Dewey-Burdock mine site. Most of these were drilled before there were regulations requiring that drill holes be lined or closed properly.
- The condition of most of these drill holes is unknown, but there is one place on the Dewey-Burdock site where an old drill hole leaks to the surface. A 1979 study also indicated that water leaks between the Fall River and Lakota formations, which the study said was probably due to the old drill holes and fractures in the rock.

- Faults run on both the north and south ends of the proposed mining area, and there are also “randomly oriented” faults in the area of the proposed mine.
- Chimneys in the rock, called breccia pipes, which are as much as 1300 feet high and several hundred feet across, are present in the proposed mining area. These reach from the Minnelusa aquifer up into the Inyan Kara aquifer, even through otherwise impermeable rock layers.
- There have been at least 11 earthquakes in Fall River and Custer Counties since 1872, measuring up to 4.0 on the Richter Scale.
- Powertech/Azarga indicates that there are at least 30 flowing wells within 2 kilometers of its permit boundary. Among other things, these discharges recharge riverbank aquifers, which mixes subsurface and surface water.
- Research indicates that the water from the Inyan Kara aquifer in the proposed mining area moves west into Wyoming and south then east around the edge of the southern Black Hills.
- The Inyan Kara is one of the most porous of the major aquifers in the area, meaning that its water can move quickly. One test indicated that water in the Inyan Kara aquifer in the proposed mining area moved 4 miles in approximately 15 years, while another test indicated that it moved 15 feet per day.
- Even under the best conditions, spills and leaks – both above-ground and underground – are typical of in situ leach uranium mining.

This information is taken from geological studies, most of which are available at the South Dakota School of Mines and Technology library. Sources for specific information available upon request.

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