



CUSTER GALLATIN NATIONAL FOREST, SIOUX RANGER DISTRICT

RILEY PASS NEWSLETTER

DECEMBER 2023

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This newsletter provides information on the reclamation work at the Riley Pass Uranium Mine Response and Restoration Project, located in the North Cave Hills portion of the Custer Gallatin National Forest's Sioux Ranger District. The site is located approximately 25 miles north of Buffalo, South Dakota, and consists of 12 bluffs mined for uranium bearing ore during the 1950s and 1960s. Waste materials associated with the historic mining pose a risk to human health and the environment, principally from elevated levels of arsenic and Radium-226. The Riley Pass Project is isolating the waste materials and reclaiming the site to a stable and productive state.

NEW WEBSITE!

Check out the redesigned Riley Pass website at: [Custer Gallatin National Forest - Resource Management \(usda.gov\)](https://www.usda.gov/custer-gallatin-national-forest-resource-management)
See before and after photos of completed reclamation, find project updates and reports, and check for area closures!

SITE WIDE RECLAMATION UPDATE

Through 2023 the Forest Service has reclaimed 9 of the 12 bluffs at Riley Pass and approximately 130 acres out of 300 acres. The Forest Service is currently working on the largest bluff, Bluff B, which is projected to take another 4 to 5 years to complete. The natural landform reclamation approach being implemented at Riley Pass has thus far yielded excellent results. There has been very little erosion of reclaimed areas, revegetation has been robust, and the natural looking reclaimed topography is indistinguishable from the surrounding landscape. The reclaimed areas are performing as intended and several of the reclaimed bluffs have been reopened for grazing.



Figure 1. Monitoring of successful revegetation of Bluff A.

BLUFF B UPDATE



Figure 2. 2023 photo of topsoil placement on Bluff B.

Reclamation of Bluff B began in 2022 with excavation and consolidation of mine waste in the northeast portion of Bluff B, immediately south of Bluff A. In 2023, in this same area, material disturbed during former mining activities but with concentrations below cleanup goals, was placed over the consolidated mine waste and sculpted to create landforms to match the surrounding landscape using the Natural Regrade[®] design process. This is the same reclamation approach used on Bluffs A, CDE, F, G, and I. These landforms were covered with clean borrow material and compost. In the Fall of 2023, native seeds were spread on exposed ground to encourage revegetation and anchoring the soil in place.

Due to the size and volume of waste on Bluff B to be reclaimed, reclamation will be performed over the next 4 to 5 years. Reclamation of Bluff B began with the northeast area and will continue south. Each scope of work will be limited by what can be completed in one season in order to avoid leaving disturbed areas open over winter. The work scheduled for 2024 will include excavation and consolidation of over 275,000 cubic yards of mine waste on top of the Bluff B. The material not meeting cleanup criteria will be consolidated in one location and covered with several feet of clean material and top soil. Work is estimated to last 4 to 5 months and is anticipated to begin in April 2024.



Figure 3. 2023 Aerial imagery of Bluff B progress.

GEOLOGY OF THE NORTH CAVE HILLS

Mining in the North Cave Hills was performed in the late 1950s to mid-1960s. The miners were seeking the uranium-bearing black lignite coal seams sandwiched between layers of sandstone. The North Cave Hills region is comprised of early Tertiary Period (65 to 55 million years ago) sediments. The distinctive sandstone bluffs of the North Cave Hills are outcrops of the Tongue River Member of the Fort Union Formation (estimated 600 feet thick). Due to erosion, only the lower portion remains today. Below the sandstone rimrocks of the Tongue River Member lies the Ludlow Member. The base of the Tongue River Member where it meets the Ludlow Member is where many of the freshwater springs found in the area originate.

The Tongue River Member is characterized as massive, gray to tan sandstone, with interbedded siltstone, claystone, lignite, and carbonaceous shale. There are lenticular beds of quartzite and thick persistent beds of uranium rich lignite coal. The claystone, siltstone, shale and uranium-bearing coal seams are known as the Lodgepole Facies. The Lodgepole Facies is generally located 100 to 150 feet above the base of the Tongue River Member. Coal seams are between 1 and 4 feet in thickness with an average uranium concentration of 0.2% which falls within the lower range of economical ore grade. By comparison, some of the richest deposits can run close to 20% uranium. This material was deposited in a marine or brackish environment, likely from the Cannonball Sea, the last great inland sea to cover South Dakota.

Organic material decayed and placed under pressure and heated with mineral material undergoes both physical and chemical changes to become coal. Lignite is a low-grade coal with a high moisture content and low heating value. Organic material from plants 65 to 55 million years ago was buried by these sandstone and mudstone materials, followed by great heat and pressure to form the coal seams found today in the North Cave Hills area.

Mining in the North Cave Hills was performed to supply contracts for uranium for the US Atomic Energy Commission. The volcanic ash beds of the White River Formation which lie on top of (more recent than) the Tongue River Member are the likely source of the uranium. Groundwater percolating down through the volcanic ash leached the uranium and redeposited it in the lignite coal seams of the underlying Tongue River Member. The lignite seams are known as the “host” rock for the economical grade uranium; however, uranium is also found in lesser, uneconomic concentrations in other carbon and phosphorous -rich geologic units.



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PUBLIC SAFETY CLOSURE ORDER IN EFFECT

Riley Pass mine waste contains hazardous substances including arsenic, molybdenum, thorium, radium and uranium. Due to the human health, safety and environmental concerns related to elevated levels of these substances, the Forest Supervisor has closed the bluffs and some adjacent areas to all public entry through a special order. Following reclamation and establishment of native vegetation, bluffs will be reopened to public entry. The special order has been placed on signs in the Riley Pass area and throughout the North Cave Hills. The order and closure maps are posted at the Sioux Ranger District Office and are also available upon request.

FOR ADDITIONAL INFORMATION

Documents, maps, and photos regarding site history, human health, environmental concerns and ongoing reclamation at Riley Pass are available for download from the Custer Gallatin National Forest website at:

<https://www.fs.usda.gov/detail/custergallatin/landmanagement/resourcemanagement/?cid=fseprd1149843>

A mailing list is also being maintained for this project. You can stay informed by either checking the website at your convenience, or signing up for our mailing list to receive future editions of the Riley Pass Newsletter in hard copy or electronic format.

For specific requests, additional information, or to be added to the Riley Pass newsletter mailing list, please contact On Scene Coordinator, Peter Werner, at peter.werner@usda.gov or (406) 587-6962.