



GROUNDWATER AT WIPP

2005 EPA WIPP RECERTIFICATION FACT SHEET No. 5

What is Groundwater?

Groundwater is water that exists under the Earth's surface. Depending on the types of rock present, groundwater can be stored in different quantities, and move at different speeds. In general, groundwater travels through dense rock exceptionally slowly, as slow as a few feet over hundreds and even thousands of years. Groundwater moves more quickly through porous rocks where cracks, or fractures, exist. Such rocks are said to be permeable to groundwater.

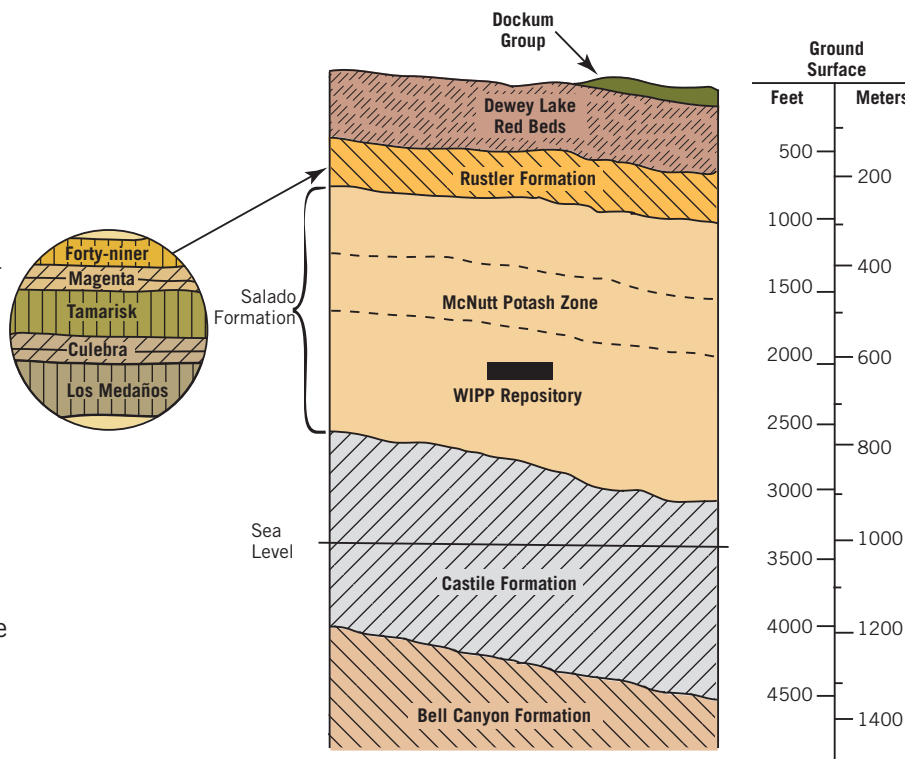
How Does Groundwater Affect WIPP?

DOE scientists have studied groundwater flow and conditions at the WIPP site to determine potential pathways for radioactive releases. DOE's Certification Application identified two geologic units that are potential groundwater pathways for radioactive releases to the environment:

1. The Culebra Dolomite unit in the Rustler Formation
2. The Salado Anhydrite units within the salt bed and close to the waste.

Although none of the geologic units above the repository are highly permeable, the most permeable unit is the Culebra Dolomite. Because the Culebra is located over 1,000 feet above the WIPP repository, radioactive releases into this rock unit would only be possible if a borehole was drilled through the repository.

The Salado Formation contains thick layers of salt, thin layers of anhydrites, and some clay. The Salado Anhydrite units are located above and below the zone where waste is being placed. (You may see them referred to as marker beds 138 and 139.) Even though the Salado has very low permeability to groundwater, it is still modeled (via the marker beds) as a potential pathway for radioactive releases.



Cross section showing major geologic units above and below the WIPP repository.

Both groundwater units were included in DOE's calculations for the Certification Performance Assessment. Both units were found to have only very minor contributions to releases from the WIPP repository. This is due to the large amount of time it would take radionuclides to travel through them, and the limited amount of radionuclides expected to reach them.

Monitoring of Groundwater at WIPP

- As part of the overall monitoring plan for WIPP, DOE maintains an extensive groundwater monitoring program.
- EPA conducts annual inspections of the DOE's groundwater monitoring program and receives and analyzes periodic reports on groundwater data from DOE.
- Since 1998, DOE has reported overall increases in water levels in the wells that monitor the Culebra Dolomite unit.
- DOE is drilling new wells to enhance monitoring of the Culebra Dolomite unit.
- EPA has identified the need for DOE to increase understanding of the hydrologic characteristics of the geologic units above the repository, such as the Magenta.

Appearance of Water in the Exhaust Shaft

In 1995 DOE observed water in the air exhaust shaft at a depth of about 80 feet below the ground surface. No water was observed in this zone when the shaft was created. The appearance of water in the exhaust shaft is of concern because it may impact air sampling activities. See Issue Paper #4, *Air Monitoring at WIPP-Station A*, for more information.

DOE conducted an investigation into the source of the water by drilling 15 wells around the site surface facilities and monitoring the occurrence of water. One of the 15 wells was found to be dry, while water was encountered at 50-60 feet below ground surface in the other 14 wells. The highest water levels in the test wells were near the salt storage evaporation pond. Water from this area flows outward to other areas, including the exhaust shaft.

DOE believes that the source of the water is from two sources:

1. Runoff of rainfall into and infiltration from the retention ponds located to the south of the WIPP surface facilities, and
2. Infiltration of water from the salt storage area, the salt storage evaporation pond, or remnants of the drilling and tailings pit used during the construction of the WIPP salt shaft.

DOE is nearing completion on a project to line all retention ponds to control water infiltration. This will cut off the source of the water to the air exhaust shaft.

What's New in the Recertification Application?

The Recertification Application documents changes in the water levels of the Culebra Dolomite wells. These changes have been incorporated into groundwater modeling. Results show travel times for water flow that are two to three times longer than they were estimated to be in 1996. These changes will not significantly affect release levels.

See Chapters 2 and 6 of the Recertification Application for more information on groundwater.

EPA will focus on the changes and updates listed above during their technical review of the Recertification Application. EPA will also conduct independent modeling to verify DOE's conclusions about groundwater modeling.

Fact Sheets in this Series:

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