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Department of Environmental Protection Successfully Completes Repairs Near Cannonsville Dam

Efforts to plug original boreholes deemed successful; monitoring to stay in place through spring

The New York City Department of Environmental Protection (DEP) today provided the following update on repair and monitoring efforts downstream of Cannonsville Dam.

Repairs to the three original boreholes downstream of Cannonsville Dam have been deemed a success after more than two weeks of monitoring by professional engineers. Workers had completed the second stage of repairs on Aug. 25. That stage focused on using a stiff grout, similar to concrete, to seal shut the original boreholes that created a cloudy discharge of water into the West Branch Delaware River in early July. Grout was first injected through the center of each original borehole, and then it was also pumped at three additional locations around the perimeter of each hole. This pattern was designed to plug the original holes while also allowing the grout to move outward and fill any areas of soil that were eroded by the pressurized groundwater. The second stage of repairs was designed and executed in consultation with engineers from the Federal Energy Regulatory Commission (FERC) and a panel of expert geotechnical engineers from throughout the United States.

During the first stage of repairs, a series of relief wells were installed to reduce pressure from the underground aquifer and provide a new path for that water to flow. By pumping roughly 100 gallons per minute, these relief wells ended the discharge of cloudy water on Aug. 2.

Over the past several weeks, DEP and a team of expert engineers have focused on testing the repairs. This was done by slowly shutting down the relief wells over a period of three days in late August, allowing the groundwater to regain its original artesian pressure. During that time, engineers carefully monitored instruments inside the dam and conditions downstream to ensure the cloudy discharge did not reappear. During more than two weeks of intensive monitoring, no cloudy or dirty water was observed in the river where it had originally appeared in July. Also, instruments inside the dam gradually moved toward levels that were observed before the original boreholes were drilled in July. Because of these observations and others, engineers agreed that the grout has successfully confined the pressurized groundwater to the area below ground where it was originally contained.

While the repairs have been completed successfully and ahead of schedule, DEP will continue many of its extra monitoring efforts until Cannonsville Reservoir refills next spring. These will include near real-time monitoring of turbidity downstream of the dam, maintaining a 24-hour close circuit video feed from the dam, regular analysis of data from safety instrumentation inside the

More Information

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http://www.nyc.gov/html/dep/html/press_releases/15-081pr.shtml[9/18/2015 9:48:32 AM]

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dam, and inspections of the dam by a professional engineer at least twice a week. Projections indicate that Cannonsville Reservoir should refill by the end of next spring. At that time, DEP will return to its regular program of dam safety inspections and monitoring, which is performed at all its dams in the watershed.

DEP has also continued its outreach to local elected officials, emergency management offices and the general public. Over the past several weeks, DEP has hosted public meetings in Deposit, Hancock and Narrowsburg in New York, as well as Matamoras and Easton in Pennsylvania to share information about the successful repairs with communities along the Delaware River. Similar meetings were held for federal, state, county and local elected officials. In addition, DEP will continue its engagement with emergency management officials to examine tools that could be used to improve downstream notification for dam emergencies, especially for communities that are immediately downstream of dams.

Operations at Cannonsville Reservoir returned to normal on Aug. 2. DEP has maintained normal drinking water diversions and downstream releases under the Flexible Flow Management Program since that date.

Background

On July 15, DEP increased drinking water diversions and downstream releases from Cannonsville Reservoir in response to an ongoing turbid discharge from a rock embankment downstream of Cannonsville Dam. While DEP, its regulators, and consulting engineers did not believe the condition represented a threat to dam safety, DEP began drawing down the reservoir out of an abundance of caution to prioritize public safety while repairs proceeded. Reducing reservoir storage at Cannonsville did not posed a risk to the city’s water supply. Normal operations at the reservoir resumed on Aug. 2.

The cloudy discharge below the dam was discovered when workers were drilling borings in preparation for design and construction of a hydroelectric facility planned for the site. All drilling work ceased when the workers noticed the flow of turbid water coming from a rock embankment near the release chamber. An investigation indicated that the drilling released groundwater under natural pressure, known as an artesian condition, several dozen feet below surface level. As the pressurized groundwater flowed upward it also carried sediment to the West Branch Delaware River. The is mobilization of sediment was successfully ended on Aug. 2 when DEP installed and pumped relief wells to reduce the pressure in that underground aquifer. Since July, DEP has continued intensive monitoring at the dam. Monitoring has included daily inspections of the dam by a licensed professional engineer, regular analysis of dam-safety instrumentation, and testing of the turbid sediment to identify and understand its origin. That testing confirmed that the sediment reaching the river was coming from the immediate are of the original boreholes, and not from the earthen embankment dam itself. Federal, state, county and local officials – including officials from New Jersey and Pennsylvania – were regularly updated since the condition at Cannonsville Dam was first discovered.

Placed into service in 1964, Cannonsville Reservoir was the last of New York City’s 19 reservoirs to be built. Water diverted from Cannonsville Reservoir for drinking water enters the West Delaware Tunnel and travels 44 miles to the upper end of Rondout Reservoir. From there, it is carried in the 85-mile-long Delaware Aqueduct. Water is released downstream from Cannonsville Reservoir under the terms of the 1954 U.S. Supreme Court Decree, and a flow program, known as the Flexible Flow Management Program, agreed upon by New York City and the states of Delaware, New Jersey, New York and Pennsylvania. All reservoirs in the city’s Delaware System are meeting their downstream release requirements under the Flexible Flow Management Program while the condition at Cannonsville is repaired.

DEP manages New York City’s water supply, providing more than one billion gallons of high quality water each day to more than 9 million New Yorkers. This includes more than 70 upstate communities and institutions in Ulster, Orange,

Putnam and Westchester counties who consume an average of 110 million total gallons of drinking water daily from New York City's water supply system. This water comes from the Catskill, Delaware, and Croton watersheds that extend more than 125 miles from the City, and the system comprises 19 reservoirs, three controlled lakes, and numerous tunnels and aqueducts. DEP has nearly 6,000 employees, including almost 1,000 scientists, engineers, surveyors, watershed maintainers and other professionals in the upstate watershed. In addition to its \$70 million payroll and \$157 million in annual taxes paid in upstate counties, DEP has invested more than \$1.7 billion in watershed protection programs—including partnership organizations such as the Catskill Watershed Corporation and the Watershed Agricultural Council—that support sustainable farming practices, environmentally sensitive economic development, and local economic opportunity. In addition, DEP has a robust capital program with nearly \$14 billion in investments planned over the next 10 years that will create up to 3,000 construction-related jobs per year. For more information, visit nyc.gov/dep, like us on [Facebook](#), or follow us on [Twitter](#).

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