



West Virginia Allegany Ballistics Laboratory

Facility and Location

Allegany Ballistics Laboratory (ABL), West Virginia is a 1,628 acre facility located in Mineral County along the West Virginia and Maryland border. The laboratory began operations in 1942. It conducts research and develops and tests solid propellants, rocket motors, ammunition, and armaments for DoD. There are two operating plants at ABL. Plant 1 is owned by the Navy and has approximately 1,576 acres, of which 400 acres are developed. Alliant Technical Systems, Inc. (ATK) has operated Plant 1 under contract to the Navy since 1995. ATK also owns and operates the remaining 52 acres of ABL referred to as Plant 2.

The current source of perchlorate is from loading operations at two plants where perchlorate formulations are mixed and packaged. Wastewater from these operations are collected via a pump truck and taken to a treatment facility that uses ultraviolet (UV) oxidation to treat explosive constituents and an ion exchange system for removing perchlorate. This system was installed in 2004. Spent resin is sent for disposal. Wastewater is sent to a privately owned wastewater treatment plant and discharged to an outfall ditch, which eventually empties into the Potomac River. In the past, rocket casings were rinsed with water and chlorinated solvents while the waste products were burned in disposal pits. A groundwater extraction system was installed in 1998 to address this problem with extracted water being treated through the UV oxidation system. Part of the wastewater from the plant is discharged to the Potomac River with the rest being sent to the ABL steam plant which in turn discharges to an outfall ditch.

Media Sampled and Findings

Drinking Water — In 2007, one sample reported no detection.

Groundwater — In 2011, 9 of 11 samples detected perchlorate from 2.59 to 184 ppb. In 2010, 8 of 11 samples detected perchlorate from 4.67 to 1,950 ppb. In 2009, 30 of 32 samples detected perchlorate from 0.2 to 470 ppb. In 2008, 27 of 29 samples detected perchlorate from 0.2 to 390 ppb. In 2007, 71 of 75 samples detected perchlorate from 0.06 to 860 ppb. Prior to 2007, 226 of 235 samples detected perchlorate from 0.4 to 34,900 ppb.

Soil — In 2008, 41 of 41 samples detected perchlorate from 1.2 to 850 ppb. Prior to 2007, 38 of 38 samples detected perchlorate from 14 to 35,000 ppb.

Storm Water — In 2011, two of four samples detected perchlorate at 0.87 and 43 ppb. In 2010, 5 of 12 samples detected perchlorate from 1.2 to 24 ppb. In 2009, three of seven samples detected perchlorate from 1 to 4.6 ppb.

Surface Water — In 2011, 51 of 67 samples detected perchlorate from 0.6 to 110 ppb. In 2010, 53 of 60 samples detected perchlorate from 1.5 to 250 ppb. In 2009, 58 of 68 samples detected perchlorate from 1.2 to 450 ppb. In 2008, 26 of 33 samples detected perchlorate from 0.64 to 90 ppb. In 2007, 28 of 32 samples detected perchlorate from 0.39 to 140 ppb. Prior to 2007, 137 of 167 samples detected perchlorate from 0.41 to 690 ppb.

Wastewater — In 2011 42 of 60 samples detected perchlorate from 0.52 to 140 ppb. In 2010, 38 of 49 samples detected perchlorate from 26 to 400 ppb. In 2009, 42 of 49 samples detected



perchlorate from 1.6 to 2,300 ppb. In 2008, 26 of 40 samples detected perchlorate from 2.1 to 680 ppb. In 2007, 31 of 45 samples detected perchlorate from 6.6 to 45,000 ppb. Prior to 2007, 205 of 231 samples detected perchlorate from 1.6 to 1,900,000 ppb.

Appropriate Actions

Groundwater, surface water, storm water, and wastewater levels were above the EPA and DoD Preliminary Remediation Goal of 15 ppb. Soil concentrations were below the 55,000 ppb residential and 720,000 ppb industrial soil screening levels recommended by EPA Region III.

Sampling will continue under National Pollutant Discharge Elimination System Permit requirements. ABL drinking water comes from six deep wells and two springs located upgradient of the main facility where production activities occur. The nearest known drinking water intake from the Potomac River is over 35 miles downstream of the ABL. Dispersion modeling calculated a conservative estimate of the concentration of perchlorate in the Potomac River from ABL at several distances downstream of the laboratory. Using the current data, the model predicted that perchlorate concentrations in the Potomac River fall below detectable levels less than a mile from ABL using conservative assumptions. Corrective actions taken to reduce discharges from the GWTP and ABL Plant should lead to a reduction in perchlorate levels in the North Branch of the Potomac.

At Site 1, groundwater is currently captured and treated for volatile organic compounds. On August 13, 2009, West Virginia Department of Environmental Protection (WVDEP) issued a letter establishing a discharge limit for perchlorate from the Site 1 Groundwater Treatment plant of 93.3 ppb (average monthly) and 151.52 ppb (maximum daily) perchlorate discharge. The Navy expanded the groundwater treatment plant to include an ion exchange system to remove perchlorate from extracted groundwater. This system began operating January 2011.

At Building 344 and the Ground Water Treatment Plant (GWTP), Naval Facilities Engineering Command designed a perchlorate treatment system that will result in the removal of perchlorate from Building 344 process waters and the GWTP. The Navy is adding an ion exchange system to treat extracted groundwater for perchlorate in order to ensure that WVDEP discharge limits are met. The treatment system installation was completed in December 2010.

At the explosive wastewater treatment (EWWT) plant, a filter ion exchange system will remove perchlorate from treated wastewater. Many of the wastewater samples were either taken prior to treatment or prior to the ion exchange system going online. An unexpected breakthrough in the ion exchange resin was the cause for the high levels of perchlorate. The wastewater is not directly discharged to the Potomac River but is sent to the publicly owned treatment works for further treatment. The filter ion exchange system installed at the EWWT Plant will remove and/or reduce perchlorate from treated effluent that enters the Plant 1 sanitary sewer system.

The NPDES permit of August 2, 2008 issued by WVDEP established weekly monitoring and an effluent limitation at Plant 1 outlet 004 of 93 ppb (average monthly) and 160 ppb (maximum daily) that became effective in September 2011. The permit also requires monitoring at 13 other outlets at varying frequencies (six monthly, one quarterly, and six semi-annually).



Known sources of perchlorate in the Plant drainage system have been assessed and appropriate corrective measures are being planned to eliminate those sources. Unknown sources of contamination, attributed to past practices on the facility, will be investigated and addressed as necessary to comply with regulatory limits and/or Navy policy.

The elevated level of perchlorate in the wastewater discharge at Outlet 204 in February 2011 is suspected to be the result of a breakthrough in the perchlorate removal system at the facility's Explosive Wastewater Treatment Plant. Corrective action was taken (i.e., the ion exchange media was replaced) and subsequent monthly sampling has produced results at or below the PRG.