

2024 Annual Report

to the Colorado Water Quality Control Commission
from the Hazardous Materials & Waste Management Division
Colorado Department of Public Health & Environment

SB 89 - 181 Implementation

Compliance with water quality standards & classifications
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COLORADO
Department of Public
Health & Environment

Hazardous Materials and Waste Management Division

The Hazardous Materials and Waste Management Division's mission, "to improve the quality of the environment and public health for the people of Colorado by continuously improving our efforts to ensure proper management of hazardous materials and waste," fuels the division's work each and every day. The Hazardous Materials and Waste Management Division (the division), within the Colorado Department of Public Health and Environment (CDPHE), is committed to systematically addressing health equity and environmental justice issues through the administration of its programs and by ensuring that meaningful decisions impacting the environment are made with the participation of affected communities.

Remediation & Radiation Control Programs

The Remediation Program performs preliminary assessments and site investigations at potentially-contaminated sites throughout Colorado; oversees remediation activities at Superfund and federal facilities sites; facilitates the voluntary remediation and redevelopment of historically-contaminated sites; oversees activities at uranium mill tailings sites; and oversees restoration activities at sites where natural resources were damaged. The Radiation Control Program implements the state water quality standards and regulates the operational activities and cleanup of current and former uranium processing and disposal facilities through radioactive materials licensing. This section summarizes the Remediation Program's efforts at federal facilities, Superfund, and Voluntary Cleanup and Redevelopment Program (VCUP) sites that protect water quality, and in turn, all Coloradans, by implementing state water quality standards. Although the Remediation Program addresses a number of contaminants in groundwater at 36 facilities/sites across the state, we summarize the primary categories of contaminants of concern below. We also highlight site-specific examples of each contaminant, together with examples where the Remediation and Radiation Control Programs are working in tandem to address groundwater contamination.

Volatile organic compounds

The Remediation Program is addressing volatile organic compounds (VOCs) in groundwater at 19 facilities/sites. This includes two active federal facilities, seven former federal facilities, and six Superfund sites across the state. The Remediation Program is mainly focused on treating the volatile organic compounds trichloroethylene, tetrachloroethylene, and their respective breakdown products. Removal methods for these contaminants vary on a site-by-site basis but are readily available and well-proven.

Additionally, the Remediation Program is addressing 1,4-dioxane, another VOC of concern, at two federal facilities and three Superfund sites. Technologies to remove 1,4-dioxane from groundwater are not as readily available, because this contaminant is a relatively-new focus of environmental cleanups. Currently, the Remediation Program and its federal partners are piloting technologies at multiple sites in Colorado to assess site-specific effectiveness and efficiency.

Site specific summary - Chemical Sales Company Superfund site

For over 20 years, the Remediation Program has worked with EPA to address groundwater contaminated with VOCs at the Chemical Sales Company (CSC) Superfund site. By 2014, the Remediation Program, with EPA, implemented the final phases of a remedy to reduce source area concentrations of VOCs at the site. However, after the division detected 1,4-dioxane in several water supply wells operated by South Adams County Water and Sanitation District, it confirmed that the CSC Superfund site contributes to the elevated 1,4-dioxane levels, which are above the state groundwater standard.

In 2018, the Remediation Program secured a contract with a qualified engineering firm to conduct a Focused Feasibility Study to consolidate and review site data, identify and define applicable remediation alternatives, and provide a detailed analysis for suitable remedial action alternatives. The draft Focused Feasibility Study, published in July 2020, recommended a pilot study to evaluate the effectiveness of in-situ chemical oxidation using alternative delivery methods. The Remediation Program completed a pilot study in May 2024 and produced substandard results. The Remediation Program is now conducting a pilot study optimization, which should be completed by the end of 2025.

Hydraulic fracturing in situ chemical oxidation injection at Chemical Sales Company Superfund site



Heavy metals

The Remediation Program is addressing heavy metals at 16 sites, including one federal facility and 15 Superfund sites. Heavy metals contamination is particularly prevalent at former mining sites across the state. Removal methods for these contaminants vary on a site-by-site basis but are readily available and well-proven, including the installation and operation of long-term water treatment plants.

Site specific summary - French Gulch site

French Creek, located in Breckenridge, Colorado, has been impacted by historic mining operations. Since the late 1980s, the Remediation Program has been actively involved in the investigations and cleanup that have occurred at the French Gulch site, approximately two miles upstream of the Blue River confluence.

Starting in late 2023, the Remediation Program began evaluating passive water treatment at the French Gulch site, to replace the current active water treatment plant operated by the Town of Breckenridge and Summit County. The Remediation Program retained a consultant, developed a Statement of Work for investigation, and worked with the EPA to complete a geotechnical investigation and feasibility study to better understand if passive treatment implementation could increase treatment efficacy, lower metals concentrations in the French Stream and Blue River, and decrease costs associated with treating mining impacted water at the site. The field investigations and feasibility study should be completed in Spring 2025.

Although the water treatment plant has been in operation since 2008, improvements in water quality in French Creek and Blue River downstream of the site are limited. The United States Geological Survey completed a surface water investigation in 2022 that showed multiple areas of metal loading into the French Creek and suggested that achieving surface water standards may not be possible through operation of the water treatment plant alone. The Remediation Program's passive water treatment evaluation will include the assessment of other metal loading sources to determine if treatment of additional seeps would improve water quality downstream of the site.

Per- and polyfluoroalkyl substances

Per- and polyfluoroalkyl substances (PFAS) are a class of emerging contaminants that includes over 5,000 human-made compounds. PFAS have been used to make fluoropolymer coatings and products that are widely used by consumers, such as non-stick pans and stain-resistant fabrics, due to their oil and water repellent characteristics. They also have been used to make surfactants, firefighting foams, and mist suppressants for metal plating operations. The PFAS class includes thousands of compounds, many of which are environmentally-persistent and bioaccumulative, therefore posing unique challenges in state environmental cleanup programs.

In May 2016, EPA published a health advisory level (HAL) of 70 parts per trillion (ppt) for combined perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS), two PFAS compounds. In June 2022,

EPA issued interim updated HALs for PFOA and PFOS of 0.04 ppt and 0.02 ppt, respectively. EPA also issued final HALs for perfluorobutane sulfonic acid (PFBS) and hexafluoropropylene oxide dimer acid (HFPO-DA or GenX) at 2,000 ppt and 10 ppt, respectively. EPA health advisories, however, are not enforceable regulations and cannot be used to compel cleanup actions. In April 2024, EPA designated PFOA and PFOS as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, also known as Superfund) and established drinking water Maximum Contaminant Levels (MCLs) at 4.0 ppt under the Safe Drinking Water Act. Additionally, EPA set MCLs for PFBS, PFNA, PFHxS, and GenX, which it is regulating through a Hazard Index (HI) used to determine the health concerns associated with exposure to multiple chemicals.

In June 2018, the Water Quality Control Commission adopted the division's proposed site-specific groundwater standard of 70 ppt for combined PFOA/PFOS in portions of alluvial aquifers in El Paso County. This includes a portion of the Widefield, Windmill Gulch, Sand Creek, Crews Gulch, and Fountain Creek alluvial aquifers and other adjacent confined aquifers, consistent with the 2016 EPA HALs. This site-specific standard applies to the areas where drinking water sources are known to be affected by PFOA/PFOS contamination. Also in 2018, the Colorado Solid and Hazardous Waste Commission listed PFOA and PFOS as hazardous constituents in Colorado.

The Remediation Program continues to actively address PFAS at eight federal facilities and one VCUP site. Further, beginning in fall 2022, the Remediation Program started to include PFAS analysis under the site assessment program. To date, most of the work related to PFAS has focused on soil, groundwater, and surface water investigation and characterization. Pilot studies to test new technologies for soil and groundwater cleanup are currently underway at several federal facilities in Colorado.

Site specific summary - Peterson Space Force Base

During sampling under EPA's third Unregulated Contaminant Monitoring Rule, PFAS were detected in the Widefield, Security, and Fountain public water systems of El Paso County. Subsequently, the U.S. Air Force initiated a CERCLA investigation at Peterson Space Force Base (SFB) to identify potential PFAS source areas and releases. The Preliminary Assessment report, published in October 2016, identified five possible source areas on the base. Results from the site inspection and expanded site inspection, published in 2017 and 2018 respectively, confirmed releases of PFAS from four of the five possible source areas and identified contaminant pathways from confirmed sources off the installation. The next step in the CERCLA process is the remedial investigation, which will define the full nature and extent of contamination both on and off the installation. The division worked with the Air Force to scope the remedial investigation efforts, and fieldwork is currently underway. Additionally, with the division's oversight, the Air Force is implementing multiple pilot studies at Peterson SFB, where new and innovative groundwater and soil cleanup technologies are being tested, including active off-site and passive on-site remediation techniques and soil washing.

In addition to the ongoing CERCLA investigation and pilot studies, with the division's support and oversight, the Space Force installed new drinking water treatment measures, including new water treatment facilities

for the affected public water systems. With the adoption of the new PFAS MCLs, the Department of Defense will re-evaluate its sites to ensure continued protection of public health and the environment.

Radionuclides

The Remediation Program works in conjunction with the Radiation Control Program to implement state water quality standards at three Superfund sites with radionuclide contamination. The primary contaminants addressed are radioactive and heavy-metal wastes and other by-products of uranium processing.

Site specific summary - Lincoln Park Superfund site, Fremont County

The Lincoln Park Superfund site consists of a former uranium processing mill located adjacent to the unincorporated community of Lincoln Park, approximately two miles south of Cañon City. The mill operated continuously from 1958 until 1979 and intermittently until 2006, when ore processing ceased. Site operations were primarily regulated through a Colorado radioactive materials license and are currently being managed directly by the division. In addition to radioactive materials license requirements, the site is also included on the Superfund National Priorities List.

The Remediation Program and Radiation Control Program continue to monitor radionuclides, such as polonium, radium, thorium, and uranium, quarterly in groundwater. The CERCLA remedial investigation at the Lincoln Park Superfund site is ongoing and will define the nature and extent of groundwater contamination.



Data and information accessibility

The Remediation Program strives to make information regarding environmental cleanups at federal facilities, Superfund, and VCUP sites readily accessible. Information regarding Superfund sites in Colorado can be accessed via the [Superfund website](#). This website provides site-specific information for each Superfund site in Colorado as well as a [Superfund sites interactive map](#). The webpages for individual Superfund sites vary, as a function of the lead agency (EPA or CDPHE) and the needs of the specific communities and/or stakeholders. These websites are designed to transparently provide information regarding the work being done, in order to better serve the surrounding communities, while ensuring that information is presented with accessibility and inclusion in mind.

Information regarding sites at both active and former federal facilities can be accessed via the [federal facilities website](#). This website provides an [interactive map of Department of Defense sites](#) and an [interactive map of Formerly Used Defense sites](#). The website also provides CDPHE contacts for additional information.

Information regarding Colorado's VCUP program can be accessed via the [VCUP website](#). This website provides a list of the VCUP sites in Colorado, a [VCUP sites interactive map](#), and CDPHE contacts for additional information.

To establish and maintain open communication and transparency with surrounding communities and stakeholders, the Remediation Program helped form and support Community Advisory Groups and/or Restoration Advisory Boards for environmental cleanups at many federal facilities and Superfund sites. The intent of these groups is to provide a forum for community members and other stakeholders to present and discuss their needs and concerns related to the CERCLA decision-making process, so the agencies can make more-informed decisions regarding CERCLA cleanups. It is important to hear the voices and concerns of those who live, work, and play in the communities the division serves. The Remediation Program strives to ensure that all community members are aware of the ongoing work and ways they can get involved.

Solid Waste and Materials Management Program

The Solid Waste and Materials Management Program (the Solid Waste Program) oversees the engineering design, operation, monitoring, and environmental compliance of solid waste disposal sites, recycling facilities, and the beneficial use of waste materials throughout Colorado. Recycling facilities and solid waste disposal sites are required to implement the engineering and operational requirements adopted by the Solid and Hazardous Waste Commission in the Regulations Pertaining to Solid Waste Sites and Facilities, 6 CCR 1007-2, Part 1 (the Solid Waste Regulations), to ensure that solid waste sites fully contain waste, to prevent negative impacts to groundwater and public health. When a release occurs, the Solid Waste Regulations prescribe steps to characterize and remedy the groundwater impact.

Through its regulatory oversight efforts, the Solid Waste Program implements the groundwater standards at over 440 solid waste disposal sites and facilities. This section details examples of the Solid Waste Program's

efforts to monitor for negative impacts to groundwater at solid waste disposal sites and remediate groundwater contamination when it is discovered.

Volatile organic compounds

The Solid Waste Program currently requires 101 solid waste disposal sites to sample and analyze for volatile organic compounds (VOCs) at points of compliance surrounding their facilities.

One of the most prominent VOCs found leaching from solid waste landfills is 1,4-dioxane. 1,4-dioxane is used to stabilize chemical solvents and is used in numerous industrial manufacturing processes. Landfills with a long operational history may have accepted wastes containing 1,4-dioxane for many years before public health agencies identified its toxicity and mobility.

Site specific summary - Fairplay Landfill

The Fairplay Landfill in Park County is one example of a closed municipal solid waste landfill that detected 1,4-dioxane in groundwater monitoring wells at their facility. The Fairplay Landfill was operated by Park County, and the land is owned by the Bureau of Land Management (BLM). The landfill began operations in 1967, prior to landfill liner requirements.

During the past year, Park County and the BLM have evaluated options for corrective measures that include source removal and long-term household water supplies. The results of this evaluation will inform selection of a final remedy, with input from the public. The next steps are as follows: 1) Park County and the BLM will finalize the assessment of corrective measures; 2) Solid Waste Program will approve the assessment; 3) Park County and the BLM will provide the proposed remedy selection to the Solid Waste Program; 4) Solid Waste Program will provide a determination of adequacy; and 5) Park County and BLM will design and implement the selected remedy.

Heavy metals & inorganics

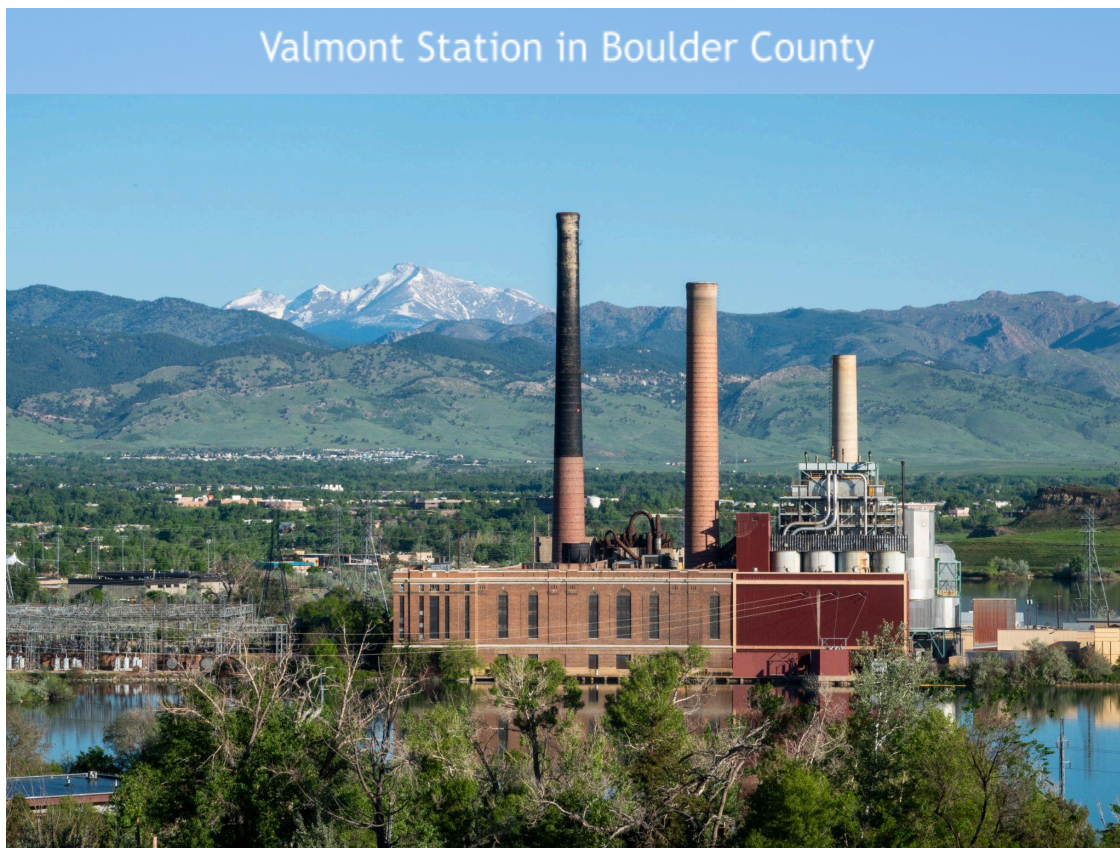
The Solid Waste Program requires sampling and analysis for heavy metals in groundwater at 127 solid waste facilities. In Colorado, there are places where heavy metals and other inorganic constituents are found at higher concentrations, because they are naturally occurring. The Solid Waste Program found that metals are migrating from facilities, or are being mobilized in the groundwater, as a result of leachate and groundwater interactions. Inorganic constituent mobilization in groundwater varies by the facility type and the wastes they accept. Several solid waste sites have detected metals in their groundwater monitoring wells.

The Solid Waste Program has observed nitrates leaching into groundwater at composting facilities and chlorides leaching from exploration and production waste impoundments. Many inorganics in groundwater, like nitrates and chlorides, also come from acid leachate migrating beneath landfills. The Solid Waste Program has also observed boron and selenium migrating from a select number of coal combustion residual disposal units. In all cases, the Solid Waste Program continues to monitor these issues and work with the regulated facilities to ensure they are addressed in a timely and appropriate manner.

Site specific summary - Valmont Station

Valmont Station in Boulder County is one example of a coal combustion residual solid waste landfill that detected selenium in groundwater monitoring wells at concentrations indicative of a release from their facility. The facility was a coal-fired, steam turbine electric generating station that burned coal to produce electricity, owned and operated by Xcel Energy. Coal operations for power generation at the facility started around 1924 and operated until September 2017. The facility has since switched to operating natural gas combustion turbines and solar arrays for producing power. Among other solid waste disposal operations at the facility, coal combustion residuals were disposed of in a landfill at the facility.

During the past year, Xcel Energy has continued to conduct investigations and pilot tests to help evaluate and design options for corrective measures for source control and groundwater remediation. The results of this evaluation will inform selection of a final remedy, with input from the public. Xcel Energy submitted an assessment of corrective measures report, which the Solid Waste Program is reviewing and will conduct a public involvement process prior to approval. The next steps are as follows: 1) Xcel Energy will provide the proposed remedy selection to the Solid Waste Program, 2) Solid Waste Program will provide a determination of adequacy, and 3) Xcel Energy will design and implement the selected remedy.



Per- and polyfluoroalkyl substances

During the past year, the Solid Waste Program began requiring groundwater monitoring for PFAS constituents in order to close an impoundment at a facility where fire training occurred. Given the lack of regulatory framework associated with these compounds, this is the only facility where the Solid Waste Program has required groundwater monitoring for PFAS constituents.

Radionuclides

The Solid Waste Program requires 14 solid waste facilities to sample and analyze for radionuclides as a part of their groundwater monitoring program. Analyzing for radionuclides is typically required at facilities that accept waste streams known to contain elevated radionuclides. The few solid waste facilities required to sample and analyze for radionuclides accept coal combustion residuals, drinking water treatment residuals, and/or exploration and production wastes.

To date, the Solid Waste Program has not found radionuclides in groundwater associated with a release from any solid waste disposal sites. The Solid Waste Program will continue to work with the Radiation Control Program to evaluate groundwater monitoring and waste acceptance requirements to ensure that solid waste facilities are safely managing these contaminants.

Data and information accessibility

The Solid Waste Program provides information to the public via the [Solid Waste and Materials Management website](#). The website includes directories for the different types of solid waste facilities, program guidance documents, a list of current stakeholder processes, Solid Waste Program staff contacts, and solid waste data and reports.

The [Solid waste guidance and policy webpage](#) provides guidance related to groundwater monitoring waivers for small landfills, memorandums of understanding with other state agencies, and engineering design requirements for solid waste facilities that ensure the protection of groundwater while managing solid waste.

Hazardous Waste Program

The Hazardous Waste Program, Colorado's equivalent of the federal Resource Conservation and Recovery Act (RCRA) program, is responsible for ensuring compliance with statutes and regulations pertaining to the management of hazardous waste, as well as overseeing the assessment and cleanup of hazardous waste facilities throughout the state. The Hazardous Waste Program requires hazardous waste sites to remediate groundwater to Colorado groundwater standards. The Hazardous Waste Program also evaluates low-risk sites with low-level residual groundwater contamination, relative to the division's Conditional Closure Policy and Guidance. No conditional closure requests were approved in fiscal year 2024.

Currently, the Hazardous Waste Program is overseeing corrective action activities at approximately 200 hazardous waste sites in Colorado, the majority of which include impacts to groundwater. The sites range in

complexity from the Rocky Flats Department of Energy site in Jefferson County, to small dry cleaning facilities.

Volatile organic compounds & inorganics

VOCs are the main contaminant of concern at over 90% of the sites being addressed in the Hazardous Waste Program. Semi-volatile organic compounds and inorganics are also contaminants of concern.

Site specific summary - Evans Lateral release

The Evans Lateral site is a pipeline release southeast of Evans, in an agricultural area of Weld County. In October 2022, a third-party contractor accidentally ruptured a 6-inch diameter crude oil pipeline while operating heavy machinery to gather clean soil.

Approximately 316 barrels, or 9,900 gallons, of crude oil were released into the unlined clean soil pit. Initial emergency response operations included recovering 110 barrels, or 3,400 gallons, of crude oil to be recycled and used by the midstream company. Soil excavations removed 3,900 cubic yards of

petroleum-contaminated soil for proper disposal. Groundwater exists within 10 feet of the ground surface and was immediately impacted by the release.

Twenty-three groundwater wells were installed and sampled for petroleum constituents. Benzene was detected above the Colorado groundwater standard. As a result, multiple types of remediation efforts were employed. Thirty-one propane-powered air sparge wells and six soil vapor extraction wells were installed in November 2022 and significantly reduced dissolved phase constituents at the release site. Short-term chemical oxidation using sodium persulfate was injected into 19 wells installed close to the groundwater table in 2023, to target residual contaminants. Ashcroft Draw is a surface water body within 125 feet of the release location. Surface water samples have been collected across seven locations to evaluate any impacts.

The site is nearing completion after two years, with a return to ambient conditions prior to the release. This site is a model of success, highlighting the benefit of immediate response activities and strong technical support, resulting in complete remediation of a release to the environment.

Per- and polyfluoroalkyl substances

As previously noted, the Solid and Hazardous Waste Commission added two PFAS constituents, PFOA and PFOS, to the Appendix VIII list of regulated hazardous constituents in 2018. Through this listing, the



Hazardous Waste Program requires sites performing corrective action for hazardous waste releases to also evaluate whether or not these PFAS constituents have been released due to site operations. The Hazardous Waste Program can only require sites to analyze groundwater for PFOA and PFOS, because they are listed as hazardous constituents in the state's regulations. However, the majority of sites that perform monitoring for the Hazardous Waste Program include analyses for a broader range of PFAS compounds as well. The Hazardous Waste Program routinely coordinates with the Water Quality Control Division during PFAS investigations, to inform them of findings and ensure the general public is not exposed to contamination.

To date, with support from the Hazardous Waste Program, facilities have performed groundwater investigations for PFAS at 24 sites, with PFOA/PFOS detected at 18 of those. In addition, investigations at two sites are in process. The sites investigated include: landfills, plating shops, oil and gas facilities, and electronics manufacturers. At the majority of these sites, PFOA/PFOS contamination in groundwater is fairly limited, contained within the property boundary, or extending only a short distance off-site. There are a handful of sites, in or near industrialized areas, where groundwater monitoring shows potential releases of PFOA/PFOS mixed with other potential sources in the general area. These sites will take more time to fully investigate, due to the need for more comprehensive groundwater data. To date, the Hazardous Waste Program has required interim corrective measures for the remediation of PFAS constituents at two facilities. Interim measures implementation is ongoing at one of these facilities, while the other is in the process of evaluating potential technologies.

No further action determinations involving groundwater

Over the past year, the Hazardous Waste Program approved the closure of six hazardous waste sites, all involving contaminated groundwater. All six sites were remediated to Colorado's Regulation 41 groundwater standards.

Data and information accessibility

The Hazardous Waste Program provides information to the public via the [Hazardous Waste Management webpage](#). The webpage includes public notices and proposed and active rulemakings with stakeholder process information. The webpage also includes links to Hazardous Waste Program reports from the past five years, program guidance documents, forms and applications, regulations and statutes, and Hazardous Waste Program staff contacts.

Information regarding hazardous waste site cleanup is available on the division's [environmental cleanup webpage](#). The website includes links to environmental cleanup guidance and policy, environmental covenants and use restrictions, and environmental cleanup contacts.

In summary, the Hazardous Materials and Waste Management Division consistently implements the Colorado groundwater standards under its various programs and authorities. Further, the division strives to transparently provide information and data, with accessibility and inclusion in mind, to better serve those who live, work, and play in the communities the division works.