



# COLORADO

## Department of Public Health & Environment

### Annual report

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

### SB 181 Implementation

**Compliance with water quality standards & classifications**  
for the fiscal year ending June 30, 2020

January 2021

## Hazardous Material and Waste Management Division

The division mission, “to improve the quality of the environment and public health for the citizens of Colorado by continuously improving our efforts to ensure proper management of hazardous materials and waste,” fuels our work each and every day in the HMWMD. The division is committed to systematically addressing health equity and environmental justice through the administration of its programs, three of which are listed below, and meaningful decisions impacting the environment are made with the participation of affected citizens.

### Remediation Program

The Remediation Program within HMWMD performs preliminary assessments and site investigations of potentially contaminated sites throughout Colorado, as well as oversees activities at Superfund and federal facilities sites and encourages the voluntary remediation and redevelopment of historically contaminated sites. This section summarizes Remediation Program efforts at federal facilities, Superfund, and Voluntary Cleanup Program (VCUP) sites that protect water quality, and individuals, in Colorado by implementing state water quality standards. Although the program addresses a number of contaminants in groundwater at 32 facilities/sites across the state, the primary categories of contaminants of concern are summarized below. Site-specific examples of each are also highlighted.

#### Volatile organic compounds

The Remediation Program is addressing volatile organic compounds (VOCs) in groundwater at 15 facilities/sites. This includes two active federal facilities, seven former federal facilities, and six Superfund sites across the state. The main VOCs being treated and monitored at these sites are trichloroethylene (TCE), tetrachloroethylene (PCE), 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. Because this contaminant is a relatively newer focus of environmental cleanups, technologies to remove 1,4-dioxane from groundwater are not as readily available. 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 the EPA to address groundwater contaminated with VOCs at the Chemical Sales Company (CSC) Superfund site. By 2014, the final



phases of a remedy had been implemented to reduce source area concentrations of VOCs at the site. However, due to the detection of 1,4-dioxane in several water supply wells operated by South Adams County Water and Sanitation District, it was confirmed that the CSC 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 (FFS) to consolidate and review site data, identify and define applicable remediation alternatives, and provide a detailed analysis for suitable remedial action alternatives. The Draft FFS, published in July 2020, recommended a pilot study to evaluate the effectiveness of in-situ chemical oxidation using alternative delivery methods. This pilot study, expected to start in early 2021, will address source area data gaps and evaluate the effectiveness of this remediation technique. Once the pilot study is complete, the FFS will be finalized, and a remedial path forward will be defined.

## Heavy metals

The Remediation and Radiation Control Programs are addressing heavy metals at 14 sites, including one federal facility and 11 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 of long-term water treatment plants.

## Site specific summary- Central City/Clear Creek Superfund Site

Over the last 20 years, significant work has been completed within the four operable units that make up the Central City/Clear Creek Superfund site. Along the main stem of Clear Creek, cleanup efforts have resulted in capping more than 15 mine waste piles and constructing two water treatment plants. The Argo Tunnel water treatment plant is located in Idaho Springs and treats the Argo, Big Five tunnel discharges, and Virginia Canyon groundwater. The North Clear Creek water treatment plant is located in Black Hawk and treats the National tunnel and Gregory Incline discharges.

Although remedial actions for the Central City/Clear Creek site are nearing completion, and despite significant improvements in water quality in the main stem, ambient water quality exceeds inorganic (metals) standards in several segments. In 2019, the CDPHE Water Quality Control Division (WQCD) completed a 303(d) listing review of the Clear Creek subbasin of the South Platte River basin. Several segments in the basin were included in the 303(d) listing for impairment to aquatic life use due to heavy metals. The Remediation Program and EPA continue to evaluate the need for Comprehensive Environmental Response, Compensation, and Liability



Act (CERCLA) Technical Impracticability waivers of water quality standards on certain stream segments. In addition, the Remediation Program and EPA are preparing a Permit Equivalent Document (PED) for the North Clear Creek water treatment plant that will incorporate substantive provisions of the WQCD permitting regulations.

## Per- and polyfluoroalkyl substances (PFAS)

Per- and polyfluoroalkyl substances (PFAS) are a class of emerging contaminants that includes over 5,000 compounds. PFAS have been used to make fluoropolymer coatings and products that are widely used by consumers, due to their oil and water repellent characteristics. They also have been used to make surfactants, fire fighting foams, and mist suppressants for metal plating operations. The PFAS class includes thousands of anthropogenic 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. EPA Health Advisories, however, are not enforceable regulations and cannot be used to compel mitigation or cleanup actions.

In 2018, the Hazardous Materials & Waste Management Division (the Division) proposed a site-specific groundwater standard of 70ppt for combined PFOA/PFOS in a portion of the Widefield, Windmill Gulch, Sand Creek, Crews Gulch, Fountain Creek Alluvial aquifers and other adjacent confined aquifers (Specified Area 7), consistent with the EPA HALs. This site-specific standard applies to the area of the state in El Paso County where drinking water sources were known to have been affected by PFOA/PFOS contamination. This site-specific standard became effective on June 30, 2018. Also in 2018, the Colorado Solid and Hazardous Waste Commission listed PFOA and PFOS as hazardous constituents in Colorado.

During the past year, the Remediation Program has been addressing PFAS at five federal facilities and two VCUP sites. 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 Peterson Air Force Base (AFB) in El Paso County.

## Site specific summary - Peterson AFB

PFAS were detected in the Widefield, Security, and Fountain public water systems of El Paso County during sampling under EPA's third Unregulated Contaminant Monitoring Rule (UCMR 3). Subsequently, the U.S. Air Force initiated a Comprehensive Environmental Response,



Compensation, and Liability Act (CERCLA) investigation at Peterson AFB to identify potential PFAS source areas and releases. The Peterson AFB Preliminary Assessment report, published in October 2016, identified five possible source areas on the installation. 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 delineate the full nature and extent of the contamination both on and off the installation. The Remedial Investigation was funded by the Air Force in 2020, and fieldwork is expected to begin in early 2021. In the meantime, the Air Force is implementing multiple pilot studies at Peterson AFB, during which multiple new and innovative groundwater and soil cleanup technologies are being tested, including active ex situ and passive in situ remediation techniques, and soil washing.

In addition to the ongoing CERCLA investigation, new drinking water mitigation measures have been installed, including new water treatment facilities for the affected public water systems. At this time, water being served by each of the affected systems is below the May 2016 EPA HALs. For private well owners whose wells tested above the EPA HALs, the Air Force has installed reverse osmosis units and continues to maintain those systems.

## Radionuclides

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

## Site Specific Summary - Lincoln Park, Fremont County

The Cotter/Lincoln Park site consists of a 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 ore processing ceased in 2006. All site operations are regulated primarily by a Colorado Radioactive Materials License, and the site is included in the National Priorities list of Superfund sites.

Radionuclides such as lead, polonium, radium, thorium, and uranium continue to be monitored quarterly in groundwater in the Lincoln Park area adjacent to the former Cotter uranium mill



site. The remedial investigation to define the nature and extent of the groundwater contamination is ongoing.

## Remediation Program 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 as a way to better serve the communities by being transparent with the work being done.

Information regarding sites at both active and former federal facilities can be accessed via the [federal facilities website](#). This website provides information regarding each of the sites as well as CDPHE contacts for additional information.

Information regarding Colorado's Voluntary Cleanup and Redevelopment Program can be accessed via the [VCUP website](#). This website provides a listing 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, Community Advisory Groups and/or Restoration Advisory Boards have been formed 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, such that the agencies can make more-informed decisions regarding CERCLA cleanups. It is also important to hear the voices and concerns of those who live, work and play in the community. The Remediation Program wants all community members to be 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 recycling and beneficial reuse of waste materials throughout Colorado, reviews all permit applications for solid waste sites to determine if the proposed facility is protective of human health, and implements the groundwater standards at over 440 solid waste disposal sites and facilities. These disposal sites manage a wide array of waste streams, ranging from exploration

and production waste, animal mortalities, and waste tires. The Solid Waste Program implements standards using various regulatory tools, such as engineering requirements for waste containment units, geologic and geochemistry site evaluations, and routine groundwater monitoring.

Over the Solid Waste Program's history, small landfills, or those accepting less than 20 tons of waste per day, had a history of non-compliance with groundwater monitoring and landfill liner regulatory requirements. In 2016, the Solid Waste Program asked landfills to come into compliance with groundwater monitoring and liner requirements, or agree to close their landfills. Of the 19 small landfills in Colorado, six chose to close and 13 decided to remain open and to comply with the solid waste regulations.

### Groundwater monitoring

Prior to 2018, most small landfills in Colorado did not have groundwater monitoring well networks that were adequate to determine if their facility was negatively impacting groundwater, in turn negatively impacting the surrounding communities. A large portion of the small landfills had obtained waivers from the Solid Waste Program for groundwater monitoring and/or waivers from lining their landfill cells. To receive a waiver, landfills are required to establish baseline groundwater quality at their sites, which is not possible without adequate groundwater monitoring well networks. After receiving funding from the legislature, the Solid Waste Program installed 39 groundwater monitoring wells at 13 operating municipal solid waste landfills which helped these communities.

After installing the groundwater monitoring wells, the Solid Waste Program hired a contractor to perform groundwater sampling at all of the small landfills to determine if the facilities have had a negative impact on groundwater, and to inform the facilities on their likelihood of qualifying for a waiver for the landfill liner requirements. The Solid Waste Program's contractor has sampled all of the wells at the small landfills at least once, and in some cases, three times.

Currently all of the small landfills are using groundwater monitoring data to revise their engineering design and operations plans (EDOPs), using the Solid Waste Programs small landfill EDOP template as a guide. The Solid Waste Program anticipates having all 13 EDOP revisions by the end of 2021.

Results from the groundwater sampling events at the Town of Granada Landfill and the Springfield Landfill are included below as examples of how the Solid Waste Program's Small Landfill Compliance Initiative has impacted small landfills.

### Site Specific Summary- Town of Granada Landfill

The Town of Granada owns and operates one of the small landfills discussed above. The Solid Waste Program had concerns about groundwater contamination at the site after finding waste placed in groundwater during a site inspection in 2016.

After three sampling events, the Solid Waste Program determined that the landfill may not be negatively impacting groundwater. By working together and using data from the Solid Waste Program's groundwater sampling efforts, the Town of Granada recently submitted a revised EDOP in accordance with the agreement the Town made with the Solid Waste Program.

### Site Specific Summary- Town of Springfield Landfill

To continue the mission of protecting human health and the environment, the Solid Waste Program's contractor installed four groundwater monitoring wells at the Town of Springfield Landfill in 2018. The program worked to listen and serve the community and has funded three sampling events for these wells and determined that the landfill is negatively impacting groundwater.

The Town of Springfield is exploring options for landfill expansion because the landfill is nearing capacity. Based on the groundwater monitoring results, the Town will need a liner for a new cell as well as long term groundwater monitoring, if they decide to expand the landfill at its existing site.

Because of the Solid Waste Program's support, the Town has a better idea of the costs associated with operating a compliant landfill while contemplating the selection of a site for a new landfill, or for the expansion of their current site.

### Landfills with groundwater monitoring

Prior to the Small Landfill Compliance Initiative, 48 of the 61 (79%) operating municipal solid waste landfills in Colorado had groundwater monitoring networks adequate to determine if their landfill was negatively impacting groundwater. Due to the Solid Waste Program's efforts to install 13 wells at small landfills and close six other small landfills, all operating municipal solid waste landfills in Colorado now have groundwater monitoring capability. Offering support to all small landfills regardless of their location within Colorado was a priority for the Solid Waste Program and its Small Landfill Initiative. The program continues their work to embed equitable practices across the Solid Waste Program so that we can protect human health and the environment now, and for years to come.



These groundwater monitoring networks will be crucial to help the Solid Waste Program evaluate new liner and groundwater monitoring waiver requests. These networks will also help landfills supply the analytical data required to support their waivers every five years.

## Hazardous Waste Program

The Hazardous Waste Program, Colorado's equivalent of the Resource Conservation and Recovery Act (RCRA) program, is responsible for ensuring compliance with laws and regulations pertaining to the management of hazardous waste as well as oversees the remediation and cleanup of facilities throughout the State. The Hazardous Waste Program continues to require groundwater remediation at hazardous waste sites to applicable state 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 (CCP&G). Although the CCP&G has been in effect since 2014, the Hazardous Waste Program has only approved five conditional closure requests. The Hazardous Waste Program did not approve any conditional closure requests in 2020.

Currently, the Hazardous Waste Program is involved in remediating approximately 200 hazardous waste sites in Colorado. The majority of the remediation efforts include impacts to groundwater. The sites range in complexity from the Rocky Flats Department of Energy site in Jefferson County, to your local dry cleaning facility. Volatile Organic Compounds (VOCs) are the main contaminant of concern at over 90% of the sites, but Semi-Volatile Organic Compounds, inorganics, and PFAS are also contaminants of concern.

### No Further Action Determinations involving groundwater

Over the past year, the Hazardous Waste Program approved the final remediation and closure of seven hazardous waste sites, four of which involved remediating contaminated groundwater. All of the sites with groundwater impacts were remediated to applicable WQCD Regulation 41 Standards and below is a site specific example.

#### Site specific summary - Bright Cleaners

Bright Cleaners, located at 854 W. Buckley Road, operated as a dry cleaner from 1989 through 2015. In 2015 the property owner performed an environmental investigation of the site to facilitate a property transaction. Investigators determined that soil and groundwater were impacted with chlorinated solvents from dry cleaning operations.

The property owner's environmental consultant, with the Hazardous Waste Program's oversight, did not find significant sources of contamination in soil. Therefore, the site's remediation was centered around cleaning up groundwater contamination. With support from the Hazardous



Waste Program, the property owner's environmental consultant injected a treatment fluid called BOSS 100 into the subsurface to clean up groundwater at the site. They injected BOSS 100 at various depths and locations to remediate groundwater. Ultimately, the property owner's environmental consultant injected about 4500 lbs of BOSS 100 into the subsurface, using 8800 gallons of water, totaling 500 injections at 60 different injection points. It took about two weeks to complete injection activities. To verify that groundwater standards were met and contaminant concentrations were not rebounding, the Hazardous Waste Program supported groundwater monitoring from 2017 to 2019. In 2020 The Hazardous Waste Program issued a No Further Action determination for this site.

### Emerging Contaminants - PFOS/PFOA

A number of organizations have discovered Perfluorooctyl sulfonate and Perfluorooctanoic acid (PFOS/PFOA) in groundwater and drinking water in the State of Colorado. Drinking water systems that found these chemicals are now either treating or using alternative water sources so that no system serves drinking water above the EPA health advisory for PFOS/PFOA. Following these discoveries, the Hazardous Waste Program added PFOS/PFOA to the Appendix VIII list of regulated hazardous constituents in April of 2018. Through this listing, the Hazardous Waste Program requires sites performing corrective action for hazardous waste releases to also evaluate the nature and extent of PFOS/PFOA that may be released due to site operations. The Hazardous Waste Program can only require sites to analyze groundwater for PFOS/PFOA 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.

To date, with support from the Hazardous Waste Program, constituents have performed groundwater investigations at 19 different sites. They detected PFOS/PFOA at 15 of the sites. These sites included: landfills; plating shops; oil and gas facilities; and electronics manufacturers. At the majority of these sites PFOS/PFOA contamination in groundwater is fairly limited, contained within the property boundary or extending a short distance offsite. There are a handful of sites, in or near industrialized areas, where groundwater monitoring shows potential releases of PFAS/PFOA at a corrective action facility commingled with other potential sources in the general area. These sites will take more time to fully investigate as more groundwater data is needed. To date, the Hazardous Waste Program has not required any site to sample for PFOS/PFOA in soil and has not yet required any corrective measures specifically for the remediation of PFOS/PFOA.

The Hazardous Waste Program routinely coordinates with the WQCD during PFOS/PFOA investigations to inform them of our findings and ensure the general public isn't exposed to the

contamination. Information regarding PFOS/PFOA can be found on the [state's PFOS/PFOA website](#).

