



**COLORADO**

**Hazardous Materials  
& Waste Management Division**

Department of Public Health & Environment

**ANNUAL REPORT  
to the COLORADO WATER QUALITY CONTROL COMMISSION  
from the HAZARDOUS MATERIALS and WASTE MANAGEMENT DIVISION  
COLORADO DEPARTMENT OF PUBLIC HEALTH and ENVIRONMENT**

**SB 181 Implementation  
COMPLIANCE WITH WATER QUALITY STANDARDS AND CLASSIFICATIONS  
for the Fiscal Year Ending June 30, 2017**

**November 2017**

This is the annual report provided to the Colorado Water Quality Control Commission (Commission, WQCC) by the Hazardous Materials and Waste Management Division (HMWMD). This report documents HMWMD activities that protect water quality in Colorado, support the mission of the Commission, and implement state water quality standards.

The paragraphs that follow present issues and examples of sites where releases have impacted ground water quality and where HMWMD decisions and actions concerning water quality classifications and standards have established clean-up criteria. There are numerous other examples, not chosen, where the state water quality standards have been used to determine the need for further site investigations or remediation to address chemical releases to the soil, ground water or surface water. Any additional information will be provided to the Commission upon request.

### **HAZARDOUS WASTE PROGRAM**

No major changes have been made in the Hazardous Waste Program over the last year, which is Colorado's equivalent of the Federal RCRA, Subtitle C program. The program is continuing to require groundwater at hazardous waste sites to be remediated to applicable state groundwater standards, while evaluating some low risk sites with low level residual groundwater contamination relative to the HMWMD's Conditional Closure Policy and Guidance (CCP&G). Although the CCP&G have been in effect since 2014, only a handful of conditional closure requests have been approved by the program.

The Hazardous Waste Program is currently involved in the remediation of approximately 200 hazardous waste sites in Colorado, the vast majority of which include impacts to groundwater. The sites range in complexity from the Rocky Flats Department of Energy site in Jefferson County, to your local small business clothes dry cleaning facility.

### **No Further Action Determinations Involving Groundwater**

Over the past year, the Hazardous Waste Program approved the final remediation and closure of ten hazardous waste sites. Eight of these hazardous waste sites involved remediating contaminated groundwater. One of these eight sites was closed pursuant to the program's CCP&G, while the other seven sites with groundwater issues were remediated below WQCD's Regulation 41 Standards.

### **Summary Observations**

Most sites closed by the Hazardous Waste Program exhibit certain characteristics: they are relatively small in size; the source areas, if found, are small in size and are indicative of a limited release to the environment; the ground water contamination is of limited extent; they take between 5 and 10 years to remediate; and contaminant concentrations in ground water are generally under 200 µg/L when they are brought to our attention. These sites have the greatest chance of achieving state ground water standards, assuming that the responsible party has the will and financial resources to perform the necessary work. Those sites with larger source areas with associated higher levels of contamination in soil and ground water take considerably longer to remediate and are, either subject to corrective action for many years, or may be eligible for conditional closure. These longer term cleanups that rely on long-term monitored natural attenuation are required to place an environmental covenant on their property in order to manage the limited risk these sites pose by prohibiting access to the affected ground water until

it is demonstrated that standards have been achieved. The majority of our corrective action sites fall into this category.

## **RADIATION PROGRAM**

The Radiation Program, in part, regulates the operational activities and cleanup of current and former uranium processing, mining, and disposal facilities. It works to isolate the radioactive and heavy-metal wastes and by-products produced in Colorado from the public and environment. This program works in conjunction with Remediation programs in the HMWMD and implements the Water Quality regulations for surface and ground water at those sites. The Program works with the Division of Reclamation, Mining and Safety and with the Oil and Gas Conservation Commission on issues relating to treatment or monitoring of radioactive materials in ground water. The Program issues and oversees licenses for uranium mills and other activities involving radioactive material.

### **Site Specific Summaries**

#### **Lincoln Park/Cotter, Fremont County**

Uranium and molybdenum continue to be monitored in ground water in the Lincoln Park Water Use Area (Operable Unit 2) near the Cotter/Canon City uranium mill tailings site. Ground water concentrations of uranium and molybdenum have declined down gradient of the Old Ponds Area and in Lincoln Park. The investigation into the source, extent, and nature of uranium in ground water found moving north-northwest from the Cotter facility is being conducted pursuant to the Comprehensive Environmental Response Compensation Liability Act (CERCLA or Superfund). The Superfund remedial investigation/feasibility study process has just begun. In addition, the Cotter facility is undergoing full decommissioning of its' radioactive materials license and will meet Superfund and Colorado requirements.

All wells, but one, tested in Lincoln Park show molybdenum contamination is below ground water standards. The Colorado molybdenum ground water standard is 210 ug/L. However, the Nuclear Regulatory Commission (NRC) cleanup goal of 100 ug/L molybdenum for ground water is applicable. Some wells in Lincoln Park show uranium contamination above the Colorado standard of 30 ug/L.

#### **UMETCO/Uravan site, Uravan, Montrose County**

Complete remediation of the Uravan site was accomplished in 2008. ACLs (alternate concentration limits) are in place for several contaminants in ground water. A long-term program of ground water and surface water monitoring is in place to demonstrate that the ACLs continue to be protective of the river and that contaminant concentrations are stable or decreasing now that the source has been removed. At license termination and deletion from the Superfund National Priorities List (NPL), the facility will be transferred to the U.S. Department of Energy for long-term surveillance. EPA is developing a Record of Decision for the site.

**Department of Energy atomic blast sites, Garfield and Rio Blanco Counties** The Radiation Control Program advises the Oil and Gas Conservation Commission on the monitoring and testing of ground water for radioactive materials from gas wells being drilled near the Rulison and Rio Blanco atomic blast sites.

## REMEDIATION PROGRAM

Superfund Activities The Comprehensive Environmental Response Compensation and Liability Act (CERCLA or Superfund) requires that remedies chosen to address hazardous substance releases must either meet existing standards or, in limited cases, waive those standards. During each remedy selection process, the HMWMD provides to EPA, a list of state regulations that are either directly applicable to a particular cleanup situation or which are relevant and appropriate requirements (ARARs). Water quality standards are identified after consultation with the WQCD, and usually help determine clean up levels where remedies require cleanup of surface or groundwater.

### Site Specific or Contaminant Specific Summaries:

#### Bonita Peak Mining District, San Juan County

The Bonita Peak Mining District was added to the Superfund National Priorities List (NPL) in September 2016. This national priority designation was partially in response to the Gold King event in August 2015.

The Bonita Peak Mining District site consists of historic and ongoing releases from legacy mining operations in the Mineral Creek, Cement Creek and Upper Animas drainages which converge into the Animas River near Silverton, Colorado. The site includes 35 mines, seven tunnels, four tailings impoundments, and two study areas where additional information is needed to evaluate environmental concerns.

Water quality in the BPMD has been impaired by acid mine drainage for decades. Since 1998, Colorado has designated portions of the Animas River downstream from Cement Creek as impaired for heavy metals, including lead, iron and aluminum. EPA estimates that the combined discharge of mining impacted water from multiple adits within the site to be approximately 5.4 million gallons per day. Cadmium, copper, manganese and zinc are the known contaminants associated with these discharges.

EPA and CDPHE continue to collect data as part of the Remedial Investigation for the site and plan to begin conducting interim remedial actions during the 2018 construction season. However, a decision document describing the final remedy is not expected in the short-term future.

In the fall of 2015, following the Gold King event, EPA constructed a package water treatment facility at Gladstone to temporarily treat discharge from the Gold King Mine. In 2016, EPA determined that the treatment plant would continue to operate as an interim remedial action until a final remedy is selected. Although the treatment plant is successful at removing a significant percentage of metal (>90%) from the Gold King discharge, it is not intended to achieve water quality standards in Cement Creek or the Animas River downstream of Cement Creek.

#### Broderick Site, Adams County

Broderick Wood Products was a wood-treating facility for power poles and railroad ties from 1947 to 1982, located on West 58th Avenue and Galapagos Street in unincorporated Adams County. Contaminants of concern are PAHs, pentachlorophenol and dioxin. The remedy involved the removal and treatment of contaminated soil, the construction of a slurry wall around the down-gradient portion of the property and the treatment of contaminated groundwater through

a Packaged Water Treatment System (PWTS). Due to requirements of Adams County, the PWTS was operated under a general discharge permit issued by the WQCD.

For several years, the PWTS was unable to operate because the plant was not able to meet the anti-degradation (AD) based effluent limits for iron and manganese. In January 2017 the WQCC released revised AD limits for manganese and iron. The new AD limits will allow the PWTS to commence operations again.

Currently the PWTS is undergoing repairs and is scheduled to be operating by late 2017/early 2018. Remedy effectiveness continues to be evaluated through the collection of site-wide groundwater samples. An updated groundwater monitoring report is under development.

#### Captain Jack Mill, Boulder County

Located approximately one mile south of Ward in Boulder County, the Captain Jack Mill Superfund site was added to the NPL to address soil contamination and acid mine drainage from the Big Five tunnel. Surface remediation was completed in 2012 and removed mine waste from floodplains, consolidated and capped it, and installed run-on and run-off controls. A flow-through bulkhead was installed in the Big Five tunnel in 2017, along with an in-situ treatment system and monitoring arrays. Water quality exiting the tunnel will be monitored for two years. If the in-situ treatment system does not allow attainment of water quality standard in Left Hand Creek downstream of the site, an ex-situ passive treatment system will be required.

#### Central City/Clear Creek, Clear Creek and Gilpin Counties

Over the last 20 years, significant work has been completed within the four operable units that comprise the Central City\Clear Creek Superfund site. Along the main stem of Clear Creek, clean-up efforts have resulting in capping of more than 15 mine waste piles and construction of a water treatment plant in Idaho Springs to treat the Argo and Big Five tunnel discharges and Virginia Canyon ground water. In 2015, a flow-control bulkhead was constructed in the Argo Tunnel to prevent future uncontrolled surge events from the tunnel from impacting Clear Creek. Such an event would likely overwhelm the Argo Tunnel Water Treatment Facility, resulting in a fish kill on the main stem and compromising downstream water supplies.

In 2017 HMWMD completed construction of the North Clear Creek mine water treatment plant. This plant is south of Black Hawk and will treat the Gregory Incline and National Tunnel discharges, along with surface water flowing through Gregory Gulch. HMWMD had hoped to reach an agreement with the City of Black Hawk, Central City and Gilpin County ensure sufficient in-stream flow in the North Fork to allow brown trout to survive while still meeting future municipal needs. However those negotiations were unsuccessful. HMWMD was able to successfully negotiate with the City of Black Hawk to obtain any augmentation water that may be required due to the operations of the water treatment plant, ensuring continuous operation of the treatment plant.

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 frequently exceeds inorganic (metals) standards in several segments. Therefore, in 2014, HMWMD hired a contractor to review the significant amount of surface water data available for the site, and to conduct a water quality assessment using the WQCD's 303(d) listing methodologies. The assessment was conducted using the water quality standards memorialized

in the Records of Decision for the site and the current water quality standards. HMWMD staff then coordinated with the WQCD staff and it was jointly decided to move forward with reclassification of multiple segments of Clear Creek to establish ambient-based standards for those segments where remediation under Superfund has been completed and no further improvements in water quality are expected. However, EPA's water quality staff indicated that they were not prepared to support the proposal, so HMWMD withdrew the proposal prior to the June 2015 hearing. CDPHE is evaluating developing a revised proposal for the next triennial review.

#### Chemical Sales Company, Adams County

HMWMD has been working with EPA to address ground water contaminated with volatile organic compounds (VOCs) at the Chemical Sales Company Superfund site (CSC) for over 20 years. By 2014 HMWMD was implementing the final phases of a remedy to reduce source area concentrations of VOCs at the site. However due to the emergence of 1,4-dioxane as a potential contaminant of concern at sites with VOC contamination, and in response to the detection of 1,4-dioxane in several water supply wells operated by the South Adams County Water and Sanitation District (SACWSD), HMWMD has been working with EPA to further evaluate the nature and extent of 1,4-dioxane contamination emanating from the Chemical Sales site.

In 2017, HMWMD completed The Fifth Five Year Review for the CSC site. The five year review confirms the elevated nature of 1,4-dioxane in SACWSD water supply wells and also suggests CSC is the likely source. Additional groundwater monitoring throughout OU1 and OU2 is currently being undertaken to provide current data. CDPHE is currently negotiating with a consultant to undertake a focused feasibility study to provide viable alternatives for the remediation of the site.

#### Eagle Mine Superfund site, Eagle County

The State and EPA issued two Records of Decision for the Eagle Mine Superfund site in September 2017, for Operable Units 1 and 3. For OU1, the ROD amendment formally adopts the WQCC site-specific standards for copper, cadmium and zinc as ARARs for the remediation. The OU1 decision also requires additional remediation to meet the surface water standards. With regard to the arsenic 0.02 ug/l water + fish standard, the ROD amendment formally waives this standard and replaced it with an alternate remedial goal (ARG) of 3 ug/l to be applied as an effluent limit for the water treatment plant. HMWMD requested that this limit be incorporated into the draft CDPS permit because the current draft of the permit has a "report only" requirement for arsenic. However, through discussion with WQCD staff HMWMD has learned that they are not able to incorporate this ARG into the Eagle Mine CDPS permit. As a result, EPA and HMWMD will need to find another route to create an enforceable arsenic limit for the discharge.

The OU3 ROD addresses additional remediation that will be necessary should the land use at the site change to residential. This OU focuses on soil.

#### Lowry Landfill Superfund site, Arapahoe County

The State supported EPA in the development and completion of EPA's September 2017 Final Fourth Five-Year Review for the Site. Most notably, the Final Fourth Five-Year Review includes recommendations for: (1) Discontinuing potable water injections and conducting an optimization study of the groundwater containment remedy to assess changes in

water levels, capture zones and water chemistry; (2) Conducting a capture zone analysis in accordance with EPA's 2008 guidance and optimizing the remedial extraction systems on-Site and off-Site to ensure the remedy is meeting remedial action objectives; (3) Developing an updated plume map and conceptual site model to ensure there is no potential for future exposure in this area, evaluating the need for a monitoring plan for wells located within the vicinity of the plume edge, and assessing the need for additional institutional controls for the 1,4-dioxane plume area; and (4) Updating the Groundwater Monitoring Plan with current Colorado performance standards and to comply with EPA's 2008 Guidance "A Systematic Approach for Evaluation of Capture Zones at Pump and Treat Systems."

#### Peterson Air Force Base, Colorado Springs

In January 2016, it came to the attention of HMWMD that perfluorinated compounds (PFCs) were detected in the Widefield, Security, and Fountain public water systems, during sampling under EPA's third Unregulated Contaminant Monitoring Rule (UCMR 3). HMWMD immediately began communicating with the U.S. Air Force (USAF) and Peterson Air Force Base (AFB) regarding this issue. The USAF had initiated a national program to identify potential PFC sources at installations across the country. As part of that program, and due to discussions with HMWMD, the CERCLA Preliminary Assessment, to identify potential PFC sources at Peterson AFB, was accelerated from January 2017 to March 2016. Five possible source areas on Peterson AFB were identified during the Preliminary Assessment.

In May 2016, the EPA released lower Health Advisory Levels (HALs) for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). At this time, HMWMD met with USAF and Peterson AFB to inform them of the significant effects the new HALs were having on public water systems in the area. Subsequently, in July 2016, the Air Force announced funding to design and install water treatment systems. Additionally, the Air Force began paying for the delivery of bulk drinking water to private well owners and small systems identified to be above the PFOA/PFOS HALs. Currently, drinking water mitigation measures are in place, and water being served by the affected public water systems is below the EPA HALs. The USAF has installed reverse osmosis units for private well owners whose wells tested above the EPA HALs and continues to sample additional private wells, as requested.

Also in July 2016, the Air Force agreed to accelerate their CERCLA Site Inspection for further source delineation to Fall 2016 instead of Spring 2017. The resulting Site Inspection report, released in July 2017, confirmed findings of the Preliminary Assessment report. More specifically, the Site Inspection report confirmed releases of PFCs from four of the five previously-identified possible source areas. The USAF's follow-on Expanded Site Inspection, to delineate contaminant pathways from confirmed sources off the installation, will begin November 2017. The Air Force's Remedial Investigation, to identify the nature and extent of the contamination, is expected to begin fall 2018.

Concurrently, HMWMD is proposing a site-specific groundwater standard of 70ppt for combined PFOA/PFOS, consistent with EPA's May 2016 Health Advisory. The May 2016 EPA Health Advisory is not an enforceable regulation and cannot be used to compel mitigation or future cleanup actions. Based on review of Colorado's UCMR 3 data, no other large public drinking water systems in the state were identified as having elevated levels of PFOA/PFOS. As such, the standard being proposed is site-specific, applying only to the area of the state where drinking water sources have been affected by PFOA/PFOS contamination. Technical stakeholder and

public outreach meetings associated with the proposed standard took place in September 2017 and October 2017, respectively. The proposal for the PFOA/PFOS site-specific standard was submitted on November 2, 2017. The rule-making hearing is scheduled for April 2018.

### **Uranium Mill Tailings Remedial Action (UMTRA) Project**

EPA regulations allow for the application of alternate concentration limits (ACLs) at the former UMTRA mill sites, if the constituent will not pose a substantial present or potential hazard to human health and the environment as long as the alternate concentration limit is not exceeded. The regulations include a number of factors that must be evaluated, including hydrogeologic characteristics and current and future uses of the groundwater, when seeking an ACL. An application for an ACL at an UMTRA mill site must receive the concurrence of the NRC, but there is no requirement for state approval.

In 2017, the U.S. Department of Energy has proposed ACLs for groundwater at two of the former UMTRA mill sites - Gunnison and New Rifle. A similar proposal is expected for Old Rifle. The NRC reviewed the proposal for New Rifle and did not concur on the proposal. Instead, the NRC had numerous technical concerns about the proposal and DOE will revise the document to address these concerns.

HMWMD has concentrated efforts on ensuring that enforceable and effective institutional controls prevent exposure to groundwater at each of the sites. HMWMD also reviews groundwater monitoring data in reports provided by the DOE. In recent years, DOE has requested HMWMD approval of ACLs for some of the sites. Since HMWMD does not have the independent authority to approve an ACL for an UMTRA mill site, the HMWMD informed DOE that if DOE requires state approval of the ACLs, that approval must be obtained through a site-specific classification and standards process. DOE will most likely rely on the NRC concurrence and not seek a WQCC hearing for ACLs at the UMTRA mill sites.

**Voluntary Cleanup and Redevelopment Activities** The Voluntary Cleanup and Redevelopment Act (VCRA) staff continues to encounter issues related to surface and ground water contamination. The staff works closely with the WQCD on each site-specific decision to assure compliance with the appropriate regulations. Meeting ground water standards is an ongoing issue at VCRA sites. Since these sites are most often the subject of real estate transactions, the buyers and sellers try to ensure that the cost of cleanup does not make the economics of the deal unfeasible. Therefore, most cleanup plans focus on source control or removal, rather than treatment of contaminated ground water plumes. The VCRA staff strives to assure that ground water standards are met at the property boundary. For sites where ground water standards are not achieved at the property boundary HMWMD policy allows applicants to apply to the WQCC for a variance, a site-specific standard, or HMWMD will consider an alternate point of compliance providing the applicant can demonstrate that there is no current or future exposure risk.

The widespread presence of 1,4-dioxane at many VCUP sites continues to pose challenges for the program because many conventional treatment methods, including ex-situ methods, have difficulty achieving the state groundwater standard of 0.35 ug/l.



### **SOLID WASTE AND MATERIALS MANAGEMENT PROGRAM**

No major changes have been made in the Solid Waste Program that alters the way in which HMWMD applies Colorado's water quality standards and classifications. The Solid Waste and Materials Management Program continues to implement water quality standards and classifications in remedial cleanup actions, enforcement actions, and design and operations reviews for new or existing facilities.