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, 2013

September 2013

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. For any site additional information that is of interest or use to members of the Commission will be provided upon request.

GENERAL

The HMWMD continues to revise the policy and guidance for the conditional closure of low threat sites, the purpose of which is to terminate continued monitoring of ground water contamination above State standards, by achieving certain remedial objectives and relying on enforceable institutional controls to prohibit exposure to residual contamination. This approach would rely on natural attenuation to gradually restore ground water quality, eventually achieving state standards at some future date. The draft "Policy for Making Conditional Closure Determinations" and draft "Guidance for the Closure of Low-Threat Sites with Residual Ground water Contamination" has been revised to incorporate changes meant to lower the bar on some very high hurdles built into the documents, hurdles that presently make very few sites eligible for a conditional closure determination. The documents were also revised to incorporate suggested comments and changes received during the public review and comment period in late 2010, including comments received from EPA regarding which sites were and were not eligible for conditional closure. Although in November, 2011 the EPA approved our implementation of the policy and guidance on a provisional basis, only one site applied for a conditional closure determination, the request denied because technical reviewers did not agree that the site met the criteria in the policy.

Also during this past year, the Hazardous Waste Program of the HMWMD, which regulates facilities subject to the Colorado Hazardous Waste Act (CHWA), has come up with a proposal to establish alternate concentration limits (ACL) at low threat sites for the purpose of closing them. Section 264.94(b) of the Colorado Hazardous Waste Regulations states: "The Director will establish an alternate concentration limit for a hazardous constituent if he/she finds that the constituent will not pose a substantial present or potential hazard to human health or the environment as long as the alternate concentration limit is not exceeded." Similar to the WQCC's site-specific standard setting process under § 264.94(b), the HMWMD Director considers a variety of potential adverse effects on ground-water quality when deciding whether to grant an ACL, including such things as: the physical and chemical characteristics of the waste in the regulated unit, including its potential for migration; local hydrogeological characteristics; the proximity of ground water users; the current and future uses of ground water in the area and; the potential for health risks and damage to wildlife, crops, and vegetation. Internal discussions led to the preparation of a plan for the ACL process that was approved by HMWMD Division Director, Gary Baughman and the Department's Director of Environmental Programs, Martha Rudolph. That plan

was incorporated as an appendix in the draft "Guidance for the Closure of Low-Threat Sites with Residual Ground water Contamination," a variant of the conditional closure process. The goal is to finalize and publish the conditional closure guidance and policy by the end of 2013.

In late 2012, a new report from the National Research Council was published entitled "Alternatives for Managing the Nation's Complex Contaminated Ground water Sites," funded by the National Academy of Sciences and the U.S. Department of the Army. It describes the challenges faced by the U.S. attempting to remediate "complex" sites, thousands of which the restoration of ground water is unlikely to be achieved in the next 50 to 100 years due to technological limitations. "The complete removal of contaminants from ground water at possibly thousands of complex sites in the U.S. is unlikely, and no technology innovations appear in the near time horizon that could overcome the challenges of restoring contaminated ground water to drinking water standards," said Michael Kavanaugh, chair of the committee that wrote the report and a principal with Geosyntec Consultants, Inc. in Oakland, Calif. "At many of these complex sites, a point of diminishing returns occurs as contaminants in ground water remain stalled at levels above drinking water standards despite continued active remedial efforts. We are recommending a formal evaluation be made at the appropriate time in the life cycle of a site to decide whether to transition the sites to active or passive long-term management" (The National Academies November 8, 2012 press release, http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=14668). The HMWMD has long recognized this challenge and taken the proactive step of developing procedures like the conditional closure and ACL processes for the purpose of managing low threat sites that have limited ability to meet standards using other "passive long-term management" techniques. With the closure of these sites, the limited resources of the HMWMD can then be applied to other pressing matters, including new sites that come in on a regular basis that do pose a risk and for which available remedial techniques have a chance of improving water quality.

During the August 2012 rulemaking hearing, the WQCC proposed revisions to the Basic Standards for Ground water, Regulation #41 (5 CCR 1002-41), amending ground water standards for a number of constituents to reflect recent changes in toxicity assessments for those organic compounds. These changes have a direct impact on what we do, particularly for those constituents whose allowable concentrations went up (less remediation) as well as those that went down (more remediation or some other actions in response to the change). For example, the State standard for PCE increased to 17 ug/L on January 31, 2013. This change alone resulted in the Hazardous Waste Program closing a half dozen sites because measured concentrations of this constituent exceed the old standard (5 ug/L) but are below the new standard of 17 ug/L. None of these half dozen sites are near municipal water supply wells that are still subject to standards established by EPA's National Primary Drinking Water Regulations, where the maximum contaminant level for PCE is still 5 ug/L. Examples are provided below.

SOLID AND HAZARDOUS WASTE PROGRAM

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. HMWMD is still working to upgrade our solid waste database to better track facility analytical data and compliance data. 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.

Specific Site Summaries:

Black Mountain: Black Mountain solid waste disposal facility had a release of benzene and brine contaminated wastewater to ground water several years ago that occurred because of a ripped impoundment liner. On March 1, 2011we negotiated a mediated settlement with Black Mountain Recycling, LLC. On April 4, 2011 we approved the site-wide ground water characterization report. The ground water contamination plume is delineated and does not leave the property. In addition, the source has been eliminated. The settlement includes requirements for a ground water remediation plan and financial assurance for the corrective action activities. On September 2, 2011 we commented on the proposed ground water remediation plan and are awaiting their response.

The agreement also includes provisions to update the engineering, design and operation plan (EDOP) to improve the design, construction and operation of the facility to minimize solid waste releases and improve ground water protection. On July 31, 2011 we received the revised EDOP and subsequently forward comments on August 8, 2011. The facility responded to the EDOP comments on September 19, 2011.

In early October 2011, the current owner of the facility, Jeff Been, filed for Chapter 11 bankruptcy protection. The facility emerged from bankruptcy during August 2012. The new owners plan on submitting the revised engineering design and operations plan including the updated ground water remediation plan should be received during October 2012.

Cordova Ponds: This property in rural El Paso County was used for illegal disposal of plating waste from a company in Colorado Springs. Soil characterization and remediation occurred in 2011. Under a compliance order issued by the HMWMD that same year, the facility has also been conducting ground water monitoring of the uppermost aquifer to ensure compliance with Regulation 41.

Saunders Trucking: This business located in Colorado Springs illegally disposed of petroleum wastes in an unlined pit. The facility has been monitoring ground water under a consent order with HMWMD to verify no impact above Regulation 41 standards.

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. There have been no significant changes in implementing regulations that alter the way in which HMWMD applies Colorado's water quality standards and classifications for discharges to state waters, including ground water. The Program is awaiting the finalization of the policy and guidance for the conditional closure of low threat sites before either initiating the process at sites or acting requests from facilities.

A review of the Hazardous Waste Program and the various mechanisms contained within the Colorado Hazardous Waste Statute and Regulations governing the protection of state waters may be found in the document entitled "Hazardous Materials and Waste Management Division Report

Describing How Programs Are Assuring Compliance With Water Quality Standards and Classifications" (April 16, 1991). As discussed in that report, water quality standards are used as clean-up criteria unless a site-specific demonstration can be made showing that alternate concentration limits are equally protective of human health and the environment. As was noted earlier in this report, the Hazardous Waste Program has recently begun evaluating the use of this existing flexibility within our regulations for establishing ground water cleanup goals that may differ from the standards established by the Water Quality Control Commission. Section 264.94(b) of the Colorado Hazardous Waste Regulations outlines a process by which an Alternate Concentration Limit (ACL) can be established at a RCRA regulated facility. ACLs are risk-based concentration limits that can be used to establish alternate ground water protection standards that the Hazardous Waste Program determines will not pose a substantial hazard to human health or environmental receptors (given exposure pathways and a variety of other factors). Internal discussions have led to the preparation of a plan defining the process by which ACLs will be established, including how risk plays a role in the process, the level of detail that will be required to support a determination and the public notification and involvement process. The Hazardous Waste Programs first ever attempt to establish an ACL may occur in late 2013 or early 2014
The Hazardous Waste Program's Corrective Action Guidance Document, published in May 2002, provides an overall implementation framework and model scopes-of-work for site characterization, interim actions, evaluation of remedial alternatives and remedy implementation. Section 5.1.3.1 of the Corrective Action Guidance Document states that clean-up standards for ground water are established in "The [Colorado] Basic Standards for Ground water")"CBGWS" of the Water Quality Regulations (Section 3.11.0 in 5 CCR 1002-8). The guidance also informs facilities that they have the option of developing site-specific ground water standards and petitioning the WQCC for their adoption.

Specific Site Summaries:

No Further Action (NFA) Determination: Ace Cleaners, 135 W. County Line Road, Littleton
In early 2000, the HMWMD was notified of PCE contamination beneath the active dry cleaner, Ace Cleaners. Following that initial notification, the responsible party submitted a Corrective Action Plan, triggering the start of the characterization and remediation process at the site. PCE was measured in on-site wells at concentrations on the order of several hundred parts per billion, well above the 5 ug/L CBGWS. Following full delineation of the ground water plume, remedial actions consisting of source area vapor extraction and ground water treatment with chemical oxidants, the combination resulting in the cleanup of ground water such that in 2012, the HMWMD closed the site because all wells yielded samples with PCE below the 5 ug/L CBGWS.

NFA Determination: Tools For Bending, 194 West Dakota Avenue, Denver
Tools For Bending is a custom manufacturer of tools for bending a variety of materials to manufacture other products. In November 2007, they submitted a "Site Characterization Report" that identified Perchloroethane (PCE) in soils and ground water on their property. In 2008, as part of the Corrective Action Plan approved by the HMWMD, they remediated the source by excavating soil, the confirmation soil samples containing no PCE or trichloroethylene (TCE) at concentrations that exceeded the Colorado Soil Evaluation Value for ground water protection or concentrations that are protective of a residential land use exposure scenario. Since 2008, PCE concentrations have been declining, falling below the new CBGWS of 17 ug/L. The PCE concentrations in

ground water have been below this standard since 2010. On the other hand, ground water TCE concentrations have exceeded the CBGWS in almost all site wells since 2007. The highest measured TCE concentrations at the site were consistently found in the up gradient wells, indicating ground water flowing onto the property contains elevated TCE concentrations independent of the Tools For Bending facility. Based on several lines of evidence (including the fact that the Gates Rubber site with its TCE plume is located upgradient), the HMWMD concluded that the TCE concentrations detected in site wells are presumed to be from an upgradient off-site source and is not exacerbated by conditions on the Tools For Bending facility. Therefore, in April 2013 the HMWMD approved the facility's request for a determination of NFA for this site.

NFA Determination: Bayshore Pipeline Release, Firestone

While preparing a property for future development as a residential subdivision, in October 2006 a contractor installing a slurry wall around a pipeline transporting gasoline damaged the pipeline, releasing a large quantity of gasoline into the trench and surrounding soil. Subsequent testing revealed that gasoline pooled behind the slurry wall that paralleled the St. Vrain River. The resulting plume of contamination was characterized and a variety of techniques were employed over the following years, successfully remediating ground water to the extent that the concentration of all fuel related compounds had fallen below the CBGWS. The standards continued to be met even after the developer filled the large ponds behind the slurry wall, indicating that the cleanup had been successful in eliminating all contamination that could potentially be mobilized. In late 2012 the HMWMD approved the responsible party's request for a determination of NFA for this site.

NFA Determination: Golf Acres Laundry, 1528 N Hancock Avenue, Colorado Springs

Located immediately south of the Patty Jewett Golf Course is a strip mall that housed Golf Acres Laundry. The dry cleaner was located on a property owned by the City of Colorado Springs. In 1997, the City of Colorado Springs was notified by the dry cleaner operator of a release of PCE solvent to a concrete pit/sand trap connected to the sanitary sewer located inside the facility. The Colorado Springs Utilities Regulatory Services Division confirmed the release; emptied the pit/sand trap; and commenced an investigation to determine environmental impacts. Testing verified that ground water was contaminated and that the resulting plume extended off-site and beneath the adjoining golf course. Monitoring over the years revealed that the concentrations of PCE in ground water were either stable or declining, with only two of 12 wells exceeding the old CBGWS of 5ug/L. The City of Colorado Springs continued to monitor ground water quality with the expectation that the PCE would degrade over time due to natural attenuation processes. With the CBGWS for PCE changing with the addition of the 17 ug/L standard, Colorado Springs had an opportunity to close the site because the two wells noted above were below this concentration. Of the two concentrations listed for this contaminant in Regulation 41, the HMWMD defaulted to the 17 ug/L value because there were no water supply wells nearby subject to standards established by EPA's National Primary Drinking Water Regulations, where the maximum contaminant level for PCE is still 5 ug/L. In July of 2013, the HMWMD approved the City's request for a determination of NFA for this site.

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 has issued a license for the first new conventional uranium mill in over 25 years.

NORM/TENORM: Program staff continued to work closely with Water Quality Control Division (WQCD) staff and Solid Waste Unit staff to implement the guidance document to address proper management and disposal of water treatment residuals that may contain elevated levels of naturally occurring radioactive material (NORM) or technologically enhanced naturally occurring radioactive materials (TENORM). HMWMD and WQCD staff continue to work together to assess compliance for some of the smaller public water supply systems to help them meet treatment requirements while adequately addressing waste management issues for water treatment residuals. There has been an increase in the number of information requests relative to NORM/TENORM in oil and gas production. The HMWMD is working on how to apply existing policy to the issue of oil and gas production wastes.

Specific Site 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/Cañon 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 on hold while some Comprehensive Environmental Response Compensation Liability Act (CERCLA or Superfund) issues are resolved.

Wells in Lincoln Park show molybdenum contamination is below ground water standards. The Colorado molybdenum ground water standard has changed to 210 ug/L. However, the Nuclear Regulatory Commission cleanup goal of 100 ug/L molybdenum for ground water is applicable. Some uranium contamination remains above standards. The Cotter facility is undergoing full decommissioning and will meet Superfund requirements, in addition to addressing ground water contamination. Approximately 3.78 million gallons of contaminated water was removed and disposed of on site.

UMETCO Uravan: Complete remediation of the Uravan site was accomplished in 2008. ACLs 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.

Schwartzwalder Mine, Jefferson County: The Radiation Control Program licenses the treatment system being used to clean uranium-contaminated ground water before it enters Ralston Creek. Approximately 38.6 million gallons have been treated and discharged.

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 submits a list of state regulations that are either directly applicable to a particular cleanup situation or which are relevant and appropriate requirements (ARARs) to the EPA. Water quality standards are identified after consultation with the WQCD.

Site Specific or Contaminant Specific Summaries:

Summitville Mine Superfund site (SMSS): Summitville is located in Rio Grande County. Discharge from the site impacts the Upper Alamosa Rivers, and remedial activities over the last 20 years have been focused on reducing metal load to the Rivers.

The HMWMD submitted to the WQCC a Use Attainability Analysis (UAA) update for the upper Alamosa River as part of the 2007 Rio Grande Basin Rulemaking specifically addressing the aluminum sources in the Alamosa River watershed. The objective was to evaluate the existing conditions and the attainable conditions of the upper Alamosa River with respect to aluminum in recognition of:

- Natural conditions
- Irreversible human-caused sources (abandoned mines)
- The effectiveness of remedial activities both completed and planned at the SMSS

The data and modeling results indicated that, even if all reversible and irreversible human-caused aluminum sources were completely removed from the Alamosa River basin, attainment of the then applicable aluminum standards in the Alamosa River would not be achieved.

As requested by the WQCC for the 2013 Rio Grande Basin Triennial Review, the HMWMD updated and recalculated aluminum concentrations resulting from the implementation of the final CERCLA remedial actions at Summitville inclusive of a new water treatment plant, SDI seepage collection and long-term Mine Pool management.

During the 2013 rulemaking hearing, the Commission adopted HMWMD's proposed chronic and acute standards in Segments 3a, 3b, 3c, 3d and 8 for the total recoverable and dissolved forms of aluminum during both the snowmelt and non-snowmelt seasons.

California Gulch: The California Gulch Superfund site encompasses much of the Leadville mining district, and impacts California Gulch, Evans Gulch, and the Arkansas River. Discrete cleanup projects at the site have been accomplished and largely completed over the past 15 years.

In the June 2007 Rule Making Hearing for the Upper Arkansas River, CDPHE Remediation Program, in cooperation with the WQCD, the Colorado Attorney General's Office, the Colorado Division of Wildlife, the EPA and the U.S. Fish and Wildlife proposed changes to surface water standards for zinc and cadmium for segments 02b, and 02c of the Upper Arkansas River. The WQCC adopted the proposed recalculation zinc and cadmium standards along with seasonal temporary modification for these segments.

CDPHE and EPA continue to evaluate water quality in the Upper Arkansas River to assess the need for additional response actions at the Site. Recent data show a continued trend of decreasing metals concentrations in segments 02b and 02c of the Upper Arkansas River, with fewer exceedances of the recalculated zinc and cadmium standards. As a result, the seasonal zinc and cadmium temporary modifications in segment 02b and 02c were allowed to expire during the 2013 Triennial Review for the Arkansas River

Central City/Clear Creek: The Central City/Clear Creek Superfund site is located in Clear Creek and Gilpin counties. Over the years, work along the main stem has been completed, including the capping of more than 15 mine waste piles and the construction of a water treatment plant in Idaho Springs to treat the Argo and Big Five tunnel discharges and Virginia Canyon ground water. Work has been completed on the North Fork, with 25 waste piles addressed through removal or erosion control measures, and construction of an on-site repository and sediment control dams. Design has been completed for a new mine drainage water treatment plant on the North Fork of Clear Creek to treat the Gregory Incline and National Tunnel discharges. In preparation for construction of this new plant, the division completed the construction of a mine water conveyance pipeline in 2012. The HMWMD has been negotiating with Black Hawk, Gilpin County and Central City for the past two years to develop a Water Use Agreement, the objective of which is to reach agreement on how the municipalities will operate their North Clear Creek water rights in order to assist the division with meeting the goal of a survivable brown trout population. Over the past year we have also constructed improvements to the Argo Tunnel Water Treatment plant in Idaho Springs. These changes have successfully reduced the amount of sludge produced, which will significantly reduce the HMWMD's operating costs. In fall 2013, the HMWMD will hire a contractor to re-grade and cap the Quartz Hill waste pile in Central City. The objective of this work is to reduce contaminated runoff into North Clear Creek.

1,4-Dioxane: During the August 2012 rulemaking hearing, the WQCC modified the basic standard for 1,4-dioxane based on a change to the underlying toxicity data. The Remediation Program has been working with EPA to determine if 1,4-dioxane in ground water poses a risk to human health at CERCLA sites in Colorado. For sites that are undergoing remediation, the new ground water

standard is being implemented through changes in ground water monitoring programs. In some cases, changes in the remediation systems may be needed to address 1,4-dioxane in ground water. The protectiveness of completed remedies is routinely reviewed through the CERCLA Five Year Review Process. For sites with organic chemicals in ground water, monitoring for 1,4-dioxane is being conducted and remedy protectiveness is being evaluated during the Five Year Review. In addition, **South Adams County Water and Sanitation District (SACWSD)** has measured 1,4-dioxane in some of their ground water supply wells. The EPA Site Assessment Program is conducting a South Adams County 1,4 Dioxane Preliminary Assessment to evaluate potential sources of this contamination. The Preliminary Assessment should be completed this winter.

Colorado Smelter, Pueblo: The HMWMD Remediation Program has been working with EPA on adding the former Colorado Smelter to the Superfund National Priorities List. These discussions are still ongoing, though the community and elected officials appear to be divided in their support or opposition for the listing.

The Federal Facilities Remediation & Restoration Unit: is evaluating technologies for remediating 1,4-dioxane in ground water at facilities they regulate. The 1,4-dioxane is commingled with volatile organic compounds (VOCs) so technologies that treat both the VOCs and the 1,4-dioxane are being closely reviewed and bench scale/field pilot tests are being implemented. The facilities are expected to delineate their plumes to the new ground water standard and remediate the plume to meet the ground water standard.

Former Lowry Air Force Base: At the Former Lowry Air Force Base site, in Denver, a site-specific standard application is currently being prepared for Operable Unit 5 (OU5) by the facility. Active treatment of the TCE plume at OU5 was completed in 2010. The plume area has been reduced by 82%, but the ground water concentrations remain above the standard. It is our understanding that the site-specific standard application has not yet been submitted to the WQCC for consideration.

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. HMWMD requires any applicant that exceeds ground water standards at the property boundary to apply to the WQCC for a variance, a site-specific standard, or a change in point of compliance (unless this will only be temporary during cleanup activities and the applicant can show that no surface water body is impacted and no exposure is occurring during this period). This ensures that the program complies with water quality regulations.