

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, 2014

September 2014

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 finalized both the Policy and Guidance for the Conditional Closure of Low Threat Sites with Residual Groundwater Contamination in January 2014 and amended the same in May 2014. The current versions of both the policy and guidance are on the CDPHE website.

The purpose of the policy and guidance is to terminate ground water monitoring at some sites with 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 policy and guidance were 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) and those public comments received in 2014 after the January 2014 release of the final policy and guidance. Some of those comments and suggestions are reflected in the May 2014 final versions of the policy and guidance.

The guidance also incorporates language establishing 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. That plan

was incorporated as Appendix A in the “Guidance for the Closure of Low-Threat Sites with Residual Ground Water Contamination”.

SOLID AND HAZARDOUS WASTE PROGRAMS

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, 2011 we negotiated a mediated settlement with Black Mountain Recycling, LLC.

In early October 2011, Jeff Been, then facility owner, filed for Chapter 11 bankruptcy protection. The facility emerged from bankruptcy during August 2012. The new owners submitted the revised engineering design and operations plan including the updated ground water remediation plan that was subsequently approved and is being implemented.

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. The Division subsequently determined that there was no groundwater contamination.

Saunders Trucking: This business located in Colorado Springs illegally disposed of petroleum wastes in an unlined pit. The facility continues 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. Other than the adoption of the Conditional Closure Policy and Guidance described above, 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.

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 (ACL) are equally protective of human health and the environment. As was noted earlier in this report, the HMWMD finalized both the policy and guidance for the conditional closure of low threat sites, two documents that provide interested parties with a process whereby an ACL can be established at RCRA regulated facilities, as is currently allowed under Section 264.94(b) of the Colorado Hazardous Waste Regulations. Although the policy and guidance for the conditional closure of low threat sites has been in effect for more than half a year, the Hazardous Waste Program has not yet received any requests to establish an ACL in Colorado.

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:

Conditional Closure Determinations:

1. Broomfield Plaza Cleaners operated a dry cleaning facility at 5157 West 120th Avenue, Broomfield, CO from approximately 1978 until approximately 1999 when the dry cleaning machine was removed and the business began operations as a drop-off only facility. The drop-off facility has since ceased operations.

A Corrective Action Plan was submitted in April 2007 and selected in-situ chemical oxidation (ISCO) as the preferred remedial technology for the site. The ISCO included source-area treatment with injections of aqueous potassium and sodium permanganate to treat the chlorinated solvents. The first treatment event consisted of discrete injections completed over three mobilizations between May and September 2008. The second event consisted of continuous, gravity fed, drip injections from March through September 2009.

Performance monitoring was conducted between September 2009 and November 2010, including assessing permanganate activity and documenting decreasing concentrations of chlorinated solvents. A June 2010 analysis of permanganate concentration in monitoring wells indicated that permanganate was no longer active in the source area, initiating the compliance monitoring period, which began in November 2010.

Pre-treatment concentrations of PCE in the source area were as high as 2,500 ug/l. Post-treatment concentrations of PCE in the source area have ranged from non-detect to 270 ug/l, with 122 ug/l detected during the last monitoring event. Concentrations of PCE outside the source area have also decreased with the passage of time.

On March 27, 2014 the Hazardous Waste Program and facility owner placed an environmental covenant on the property prohibiting future use of ground water. With this final act, the Hazardous Waste Program granted a conditional closure determination for the site on May 27, 2014.

2. Gigantic Cleaners #25 Site

This former dry cleaner site (operated from 1977 to 1987) lies in a block that the City of Thornton acquired and planned to redevelop. The Hazardous Waste Program was notified of the release of PCE to ground water in an August 2008 Phase II report. In February 2009, based on a review of that report, the Hazardous Waste Program required the City of Thornton to develop a remediation plan to characterize and remediate the release, which they proposed to do in a Corrective Action Plan approved by the Hazardous Waste Program on May 9, 2011. In the intervening years, the City of Thornton conducted on-site investigations to locate the source area behind the former dry cleaner, excavated all contaminated soil and installed ground water monitoring wells to delineate and monitor the ground water plume. The highest reported PCE concentration in ground water was 420 ppb in the monitoring well closest to the former source area back in 2009, levels having declined to about 100 ppb when last sampled.

In October 2012, the City's consultant formally asked the Hazardous Waste Program to issue a No Further Action determination for the site. The Hazardous Waste Program agreed that: site characterization is adequate; source removal is adequate; contamination of surface water is not possible; a vapor intrusion exposure pathway is unlikely; there were no wells nearby, and; that contaminant concentrations were declining. A statistical analysis indicated that the natural decline rate of PCE in the well with the highest concentration will result in this contaminant falling below the standard in approximately five years.

The last remaining issue was the necessity of placing an enforceable mechanism on the property to prohibit access to ground water contaminated with PCE above state standards. This was done on December 17, 2013 when the Thornton City Council approved an intergovernmental agreement allowing the Hazardous Waste Program to enforce the City's ordinance that bans drilling wells within city limits at the former Gigantic Cleaners site. Following this decision by the City Council, the Hazardous Waste Program granted a conditional closure determination for the site on April 11, 2014.

3. Former Charter Cleaner

The former Charter Cleaners dry cleaner site is located at 16961 East Quincy Avenue, Aurora, Colorado (Site). Investigations completed in 2007 identified environmental impacts in soil and ground water related to chlorinated compounds associated with an operating dry cleaner. A Corrective Action Plan (CAP) was submitted to the Hazardous Waste Program on December 4, 2007. The CAP was implemented, resulting in the complete characterization of the site and implementation of remedial actions in soils and ground water in an effort to achieve state regulatory limits.

Initial remedial efforts consisted of in-situ chemical oxidation (ISCO) using potassium and sodium permanganate. Approximately 11,000 gallons of permanganate was injected into 22 injection points at the site from February 2008 through October 2008. Post-remedial soil

assessment conducted in March 2008 and September 2009 indicated that ISCO treatments effectively remediated the source soil contaminant mass. ISCO was not able to achieve total remediation of PCE and other chlorinated compounds (TCE and DCE) concentrations in ground water.

The CAP was modified in 2011 to conduct in-situ chemical reduction (ISCR) in the form of anaerobic enhanced reductive dechlorination (ERD) using a Large Diameter Treatment Column (LDTC) constructed in the source area, both completed in 2011. The LDTC was installed in May 2011 followed by EHC-Liquid® injections from July 2011 through October 2011. Additionally, *Dehalococcoides* and vinyl chloride reductase bacterial species were injected in the source area on two occasions to further accelerate the treatment of the ground water.

Post-treatment, PCE and TCE concentrations were reduced significantly in the source area monitoring wells. As expected with ERD, the DCE concentrations, a degradation product, increased in the source area. Active remedial efforts were suspended in April 2013. The site completed one year of post-remediation compliance monitoring, testing showing that the contaminant plume has spatially decreased at the source area and at downgradient monitoring points.

Testing showed that PCE and TCE concentrations have fallen below the ground water standard of 17ppb and 5 ppb, respectively. When last sampled, only DCE exceeded the state standard in a limited area of the plume (127 ppb versus a standard of 70 ppb). The expectation is that this contaminant will also fall below the state standard in the next few years. Conditional closure was granted on September 4, 2014.

NFA Determination:

York Cleaners

Ground water sampling conducted during the process of removing an underground storage tank detected PCE contamination that the consultant determined was not attributable to rental center property. Additional testing confirmed that the source of the release was on the adjoining property, coming from York Cleaners located at 6810 N. Academy Blvd. in Colorado Springs. On December 31, 2003, the Hazardous Waste Program sent the property owner and dry cleaner operator a letter notifying them of the release and requested action to characterize and remediate the source of the PCE.

Testing performed in 2004 found soil contamination in association with a drum storage area behind the building and near the dry cleaning machine. A corrective action plan received in April 2005 proposed to use in-situ chemical oxidation techniques to remediate both the soil and ground water contamination followed by monitored natural attenuation. This remedy was proposed because excavation of contaminated soil was deemed to be too difficult considering the proximity of the building foundation. The plan was approved on May 19, 2005.

Ground water was sampled on a periodic basis following the injection of potassium permanganate throughout the soil column in the two source areas, beginning below the pavement and building floor slab and extending downward to and below the local water table. Initial sampling confirmed

that the soil had been remediated and that PCE concentrations in ground water near the dry cleaner decreased rapidly. Post treatment sampling near the dry cleaner showed that PCE concentrations in ground water declined from a high of 805 ppb to values less than the State standard. Continued testing over the years showed no evidence of rebound.

Only one well on the adjoining rental center property continued to exceed standards; concentrations hovering just above and below the PCE standard of 17 ppb. A sample collected from this one remaining location in December 2013 demonstrated that the concentration of PCE had once again fallen below the standard. On January 24, 2014 the Division agreed that the compounds of concern in ground water not only posed no risk, and did not exceed State standards and approved both the findings of the report and their request for No Further Action.

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.

NORM/TENORM: Program staff continued to work closely with 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 has been on hold while some Comprehensive Environmental Response Compensation Liability Act (CERCLA or Superfund) issues are resolved. Recently an Agreement on Consent has been signed between Cotter Corporation, EPA, and CDPHE. The Superfund process of investigation and feasibility studies will start soon. The Cotter facility is undergoing full

decommissioning and will meet Superfund and Colorado requirements. Approximately 6.17 million gallons of contaminated water was removed and disposed of on site.

All wells 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 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: 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.

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 55.4 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:

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. In August 2013, the HMWMD completed improvements to the Argo Tunnel Water Treatment Facility in Idaho Springs. These changes have reduced chemical usage, labor and sludge disposal, which will significantly reduce the HMWMD's operating costs. In August 2014, the HMWMD re-graded and

capped the Quartz Hill waste pile in Central City. The objective of this work is to reduce contaminated runoff into North Clear Creek. A flow-control bulkhead will be constructed in the Argo Tunnel this fall. The bulkhead will prevent future uncontrolled surge events from the Argo Tunnel from impacting Clear Creek. A surge event would likely overwhelm the Argo Tunnel Water Treatment Facility, resulting in a fish kill on the main stem and compromising downstream water supplies.

Due to the uncertainty of ongoing water rights negotiations with the City of Black Hawk and Gilpin County, construction of the North Clear Creek mine water treatment plant is on hold. This plant is planned to be constructed about one mile south of Black Hawk and treat the Gregory Incline and National Tunnel discharges. The City of Black Hawk filed for new water rights to allow it to divert water from the North Fork of Clear Creek immediately below the future treatment plant. Later, Gilpin County filed for additional rights that would also divert from the North Fork of Clear Creek. While the City and County will benefit from the clean water the treatment plant will produce, these new water rights could effectively dry up the North Fork of Clear Creek below the water treatment plant. Negotiations between the agencies, Black Hawk and Gilpin County began in early 2011 with the goal of reaching an agreement to leave enough water in the stream to allow brown trout to survive while still meeting future municipal needs. Central City participated in some of the negotiations, but has withdrawn. A sustainable brown trout fishery in North Clear Creek is a main objective of the OU4 ROD. Design of the water treatment plant is complete and approximately \$19 million of EPA and state funding has been set aside for construction. Selection of a contractor to build the plant was put on hold in March when negotiations stalled. Construction was initially planned to begin later this summer.

HMWMD is conducting the Five-Year Review on behalf of EPA for the Clear Creek Site. A contractor was hired 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 will coordinate with the WQCD staff to determine if any adjustments to the standards are warranted based on the outcome of the assessment and the Five Year Review process.

Colorado Smelter, Pueblo: The HMWMD has been working with EPA on adding the former Colorado Smelter to the Superfund National Priorities List. The Colorado Smelter proposed listing was published in the Federal Register on May 10, 2014 and is expected to be final in September, 2014.

The Federal Facilities Remediation & Restoration Unit: has selected 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 were closely reviewed. Remedies are currently being implemented and consist of in-situ chemical oxidation using Persulfox and pump-and-treat using Hypox treatment. The facilities are expected to remediate the plumes to meet the ground water standards for both the VOCs and the 1,4-dioxane.

Former Lowry Air Force Base: At the Former Lowry Air Force Base in Denver, the facility petitioned the WQCC for site-specific standards at Operable Unit 5 (OU5). Active treatment of the TCE plume at OU5 was completed in 2010. The plume area has been reduced by approximately 82%, but the ground water concentrations remain above the standards for several contaminants.

The HMWMD provided support to the Water Quality Control Division in reviewing documents and performing analyses related to the WQCC hearing, which took place on May 12, 2014. As a result of the hearing, in place of the current TCE standard (5µg/L), the facility was given site-specific standards for OU5 of 11µg/L on base and 12µg/L off base. Discussions with the facility regarding the path forward for reaching the site-specific standards at OU5 are currently ongoing.

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.

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 HMWMD, EPA and WQCD have met with SACWSD regarding elevated concentrations of 1,4-dioxane at the Chemical Sales Company Superfund Site, up-gradient of SACWSD supply wells.

Arsenic: During the process to develop a Focused Feasibility Study for additional remediation to meet water quality standards for cadmium, copper and zinc at the Eagle Mine Superfund Site, stakeholders requested a re-evaluation of arsenic in the Eagle River. Arsenic was not selected as a contaminant of concern in the original Record of Decision because it was not detected in the river. However, now that the 0.02 ug/l water + fish standard has been applied to segments affected by the Eagle Mine, an assessment was needed to determine if arsenic may be present at lower concentrations than earlier analytical methods could attain. Data collected during 2013 indicate that the 0.02 ug/l water + fish standard for arsenic is not attained in the Eagle River in segments affected by the Eagle Mine. This discovery resulted in postponing the release of the Proposed Plan and correspondingly will delay implementation of additional remediation. Additional studies will

be needed to determine the source of the arsenic and to analyze whether or not the proposed additional remediation will result in attaining the applicable standard for arsenic. Attainment of the water + fish standard at other Colorado Superfund Sites has not been assessed, however, this issue may impact additional sites where the water + fish standard has been applied to segments affected by Superfund Sites.

Uranium Mill Tailings Remedial Action (UMTRA) Project

Cleanup of the nine abandoned uranium mill sites in Colorado authorized and required by the Uranium Mill Tailings Radiation Control Act has been completed. The nine Colorado uranium mill tailings sites are: Durango, Grand Junction, Gunnison, Maybell, Naturita, Rifle (2 mill sites) and Slick Rock (also 2 mill sites). Although the main human health concern from mill tailings has been abated through surface remediation, residual risk arises from exposure to groundwater containing uranium and other metals such as arsenic, molybdenum and vanadium. Groundwater contamination, resulting predominantly from the disposal of liquid waste (called raffinate) from the uranium milling process, is present at the majority of the Colorado UMTRA mill sites.

The U.S. Environmental Protection Agency (EPA) recognized the difficulty in restoring groundwater at the abandoned mill sites when it established the cleanup regulations for the UMTRA Title I program in 40 CFR 192. These provisions state that if the Department of Energy (DOE) determines that sole reliance on active remedial procedures is not appropriate and the groundwater can be more reasonably cleaned up through natural flushing, then the period for remedial procedures may be extended to a term not to exceed 100 years if:

- The concentration limits are projected to be satisfied at the end of this extended period.
- Institutional control (IC) is instituted and maintained as part of the remedial action at the processing site and wherever groundwater contamination from the site is found, or is projected to be found. Institutional controls, such as land-use restrictions and environmental covenants, must have a high degree of permanence, must effectively protect public health and the environment, must satisfy beneficial uses of groundwater during the extended period, and must be enforceable by the administrative or judicial branches of government.
- The groundwater is not currently and is not projected to become a source for a public water system subject to provisions of the Safe Drinking Water Act during the extended period.

EPA regulations also allow for the application of Alternate Concentration Limits (ACLs) 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 U.S. Nuclear Regulatory Commission (NRC).

Over the past 15 years, 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. HMWMD does not have the independent authority to approve an ACL for an UMTRA mill site, so the HMWMD informed DOE that the ACLs must be approved through site-specific classifications and standards as set forth

in the Basic Standards for Groundwater, Regulation 41. HMWMD prepared a document titled “Proposal for Site-Specific Groundwater Standards for UMTRA Mill Sites” which was submitted to the DOE (after review by the WQCD Groundwater Quality Coordinator.) If DOE decides to proceed with a request for approval of ACLs through the WQCC process, they will need at least 1 year to prepare the necessary documentation for such a hearing (or hearings). HMWMD will continue to coordinate with the WQCD Groundwater Quality Coordinator on this issue.