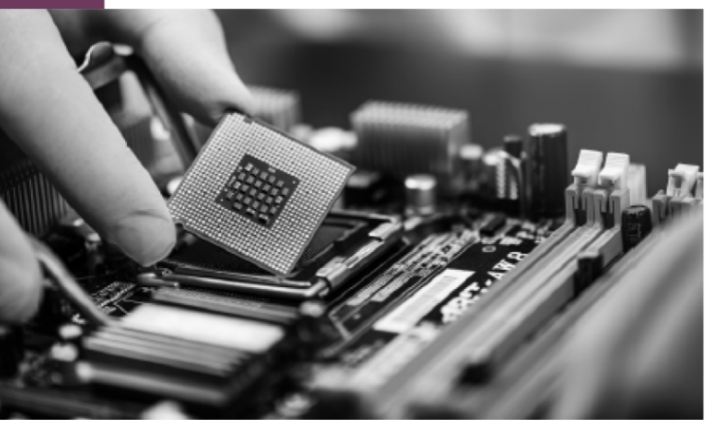
Status of the Hazardous Waste Program in Colorado

2022

Hazardous Materials and Waste Management Division
February 1, 2023



COLORADO
Department of Public Health & Environment

Table of contents

Executive summary

In 2022, the Hazardous Waste Program (the program) within the Hazardous Materials and Waste Management Division (the division) continued successful implementation of its core mission to ensure compliance with hazardous waste laws and regulations. The division is housed within the Colorado Department of Public Health and Environment (the department). In addition, the program began working with EPA, the department's Environmental Justice Program, and the department's other environmental divisions to draft a work plan to identify and implement environmental justice goals for compliance inspections and enforcement affecting disproportionately impacted communities. This work is being conducted under a March 2022 Memorandum of Understanding between the department and EPA to enhance environmental justice.

The Hazardous Waste Program currently consists of **22 staff** and managers in three units:

- Compliance Assurance Unit
- Corrective Action Unit
- Permitting Unit

In 2022, the program's Permitting Unit processed several permit modifications for three Static Detonation Chambers (SDCs) used for the treatment of munitions containing mustard chemical warfare agent (a hazardous waste) at the Pueblo Chemical Depot. The SDCs, which were permitted in 2021, were the first hazardous waste units of this type to be permitted in Colorado. In May 2022, EPA recognized the Permitting Unit with a National Notable Achievement Award for its "outstanding, collaborative approach to successfully issue a Resource Conservation and Recovery Act (RCRA) operating permit for Static Detonation Chambers to enable the safe destruction of waste chemical weapons."

In addition to reviewing and approving numerous clean-up plans and reports for sites that have had a release of hazardous waste into the environment, the program's Corrective Action Unit continues to be involved with a number of contaminated properties that are being transferred and/or redeveloped. Redevelopment often offers opportunities to clean up contamination that was previously inaccessible and lift environmental restrictions on properties. Program involvement at contaminated redevelopment sites ensures the public will not be exposed to any historical contamination that may remain in place, or if disturbed, ensures that it will be safely and properly disposed of and/or managed. In addition, redeveloping contaminated properties can provide economic benefits to the surrounding community, as was recently highlighted by EPA in its profile of the economic benefits of several remediation and redevelopment projects at the Denver Federal Center, overseen by the Corrective Action Unit.

The program also continued to conduct inspections at hazardous waste management facilities. The program identified a large number of facilities this year with hazardous waste compliance issues. As with last year, many of the compliance issues appear to be the result of a high rate of staff turnover or short staffing at the facilities, resulting in inexperienced personnel taking on new responsibilities for hazardous waste management. The program's Compliance Assurance Unit also continued developing and enhancing its online hazardous waste generator training. More than 800 people attended the program's October 2022 online training, a significant increase over last year's participation. Many of the individuals attending the hazardous waste training continue to be trainers at their own organizations, passing their knowledge of the hazardous waste regulations to others.

The following report details some of the achievements of the Hazardous Waste Program over the last year.

195	facilities inspected this year	302	institutional controls in place	2,320	U.S. tons of mustard agent hazardous waste destroyed to date

Hazardous Waste Program background

Colorado's Hazardous Waste Program is responsible for ensuring compliance with laws and regulations pertaining to the management of hazardous waste. The authority for this program is in the Colorado Hazardous Waste Act, 25-15-101 et seq., C.R.S., and the federal Resource Conservation and Recovery Act (RCRA). The EPA authorized Colorado to implement the federal program requirements, and by doing so, the authority to implement requirements for the management of hazardous waste in Colorado rests primarily with the state. The EPA authorized Colorado for the base hazardous waste regulatory program in November 1984. In July 1989, federal authorization was granted to Colorado for significant additions to the base program, including authority for hazardous waste corrective action, which provided authority to investigate and clean up releases of hazardous waste constituents into the soil, surface water, or groundwater at hazardous waste facilities.

Primary elements of the Hazardous Waste Program include compliance assistance, compliance monitoring and enforcement, corrective action, and permitting. Each of these program elements is discussed in the following sections. In addition, this report includes sections discussing ongoing program authorization by EPA and the status of program funding.

As of December 2022, the Hazardous Waste Program regulates six active and permitted treatment, storage and/or disposal facilities (TSDs), and 15 closed TSDs with hazardous waste remaining buried onsite that needs post-closure monitoring and/or maintenance. In addition, the program regulates approximately 122 large-quantity generators, 573 small-quantity generators, 85 transporters, and more than 4339 very small quantity generators of hazardous waste. The program also regulates about 200 facilities at which corrective action (remediation of environmental contamination) is required.

Maintaining authorization

One of the key values held by the regulated community, and one of the legislative directives from SB 00-177, is that Colorado "maintains program authorization by the federal government." When the EPA authorizes a state for the hazardous waste program, it carefully reviews two aspects of the state program:

1. The state's statutory authorities, funding, and staffing, both quantitatively and qualitatively, and;
2. The state's regulations.

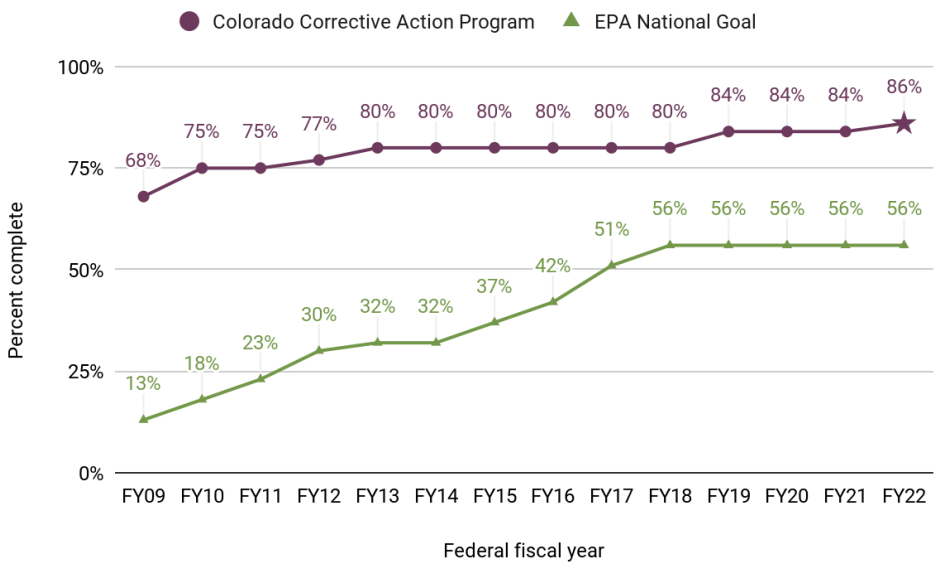
Once a state is authorized, EPA monitors the state program to ensure it is being implemented in a manner that satisfies federal program requirements.

To measure corrective action effectiveness, the EPA has established four national environmental indicators since 1999. These indicators measure the hazardous waste corrective action program's progress on risk containment at contaminated facilities. This approach measures "Human Exposures Under Control,"

"Ground Water Releases Under Control," "Remedy Construction," and "Corrective Action Completeness" at a defined group of high-priority facilities around the country.

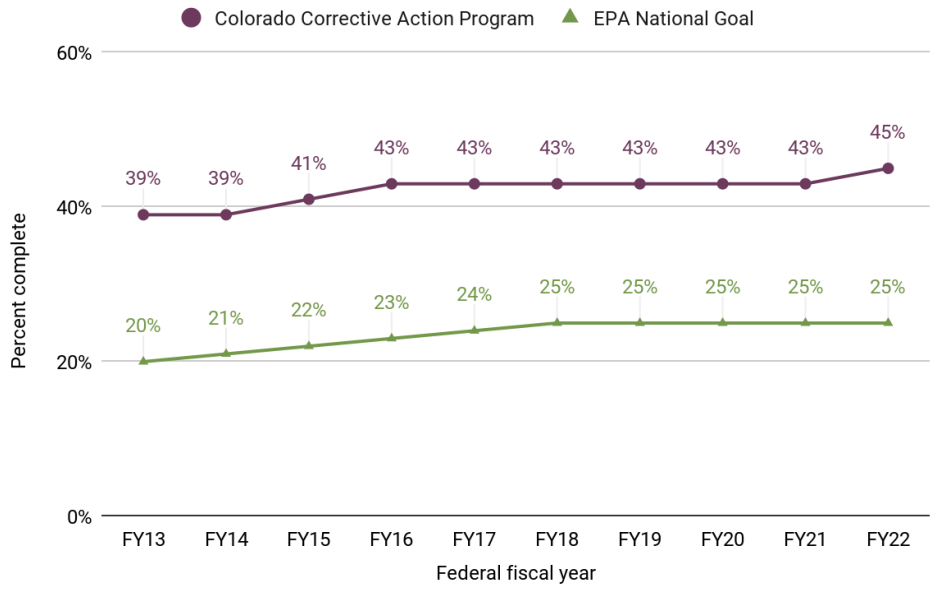
Colorado currently has 44 of these high-priority facilities. The EPA established a national goal for each measurement in federal fiscal year 2006 and updated these goals in federal fiscal year 2009. Human exposures have been under control at 100 percent of sites in Colorado since federal fiscal year 2013, exceeding the EPA National Goal of 87 percent. In addition, 100 percent of groundwater releases have been under control at the 44 high-priority facilities in Colorado since federal fiscal year 2015. Figures 1 and 2 show Colorado's progress on Remedy Construction and Corrective Action Completeness.

Figure 1. Remedy constructed - CA550 (EPA 2020 baseline)



★ 86% = 38 out of 44 Government Performance Results Act (GPRA) 2020 baseline facilities. Still to go: Fort Carson, General Services Administration, Pueblo Chemical Depot, Rocky Mountain Arsenal, EVRAZ-Rocky Mountain Steel Mill, Suncor.

Figure 2. Corrective action complete - CA999 (EPA 2020 baseline)



The Hazardous Waste Program continues to be a leading contributor to national efforts to streamline the corrective action process through active participation in the Interstate Technology and Regulatory Cooperation Work Group (ITRC). State regulators lead this national organization to streamline regulatory approval processes for applying innovative technologies to environmental cleanup.

Inspections

Facility inspections are one tool the program uses to ensure hazardous waste facilities are in compliance with state laws. In 2022, the program completed 195 inspections across all facility types: 30 inspections were for large quantity generators and permitted TSD facilities; 40 inspections were at small quantity generators; 98 were at very small quantity generators; and the program inspected 27 other facilities that were not listed as hazardous waste generators.

Statute requires that active hazardous waste land disposal facilities be inspected monthly. In addition, all federal and state TSDs are inspected every year, as well as 20 percent of large quantity generators, in accordance with the state and EPA Performance Partnership Agreement. The program met these requirements in 2022. The total number of inspections for 2022 remained consistent with the previous year, due to the ongoing COVID restrictions and protocols and an increase in the number of enforcement actions related to hazardous waste compliance issues. On average, the program completed 18.2 inspections for each full-time lead inspector per quarter in 2022.

Inspections also carry administrative responsibilities, such as report preparation, tracking return-to-compliance activities at the facility, and data entry. In 2022, all inspectors performed these administrative tasks on time. Inspections can also result in the issuance of formal and informal enforcement actions. One hundred percent of both formal enforcement actions (compliance orders) and informal enforcement actions (compliance advisories) were timely in 2022, as measured against standards established by EPA and adopted by the Colorado program. All inspection reports become public documents and are available through our online environmental records at www.colorado.gov/cdphe/hmwmd-records-review.

Figure 3. Inspector efficiency

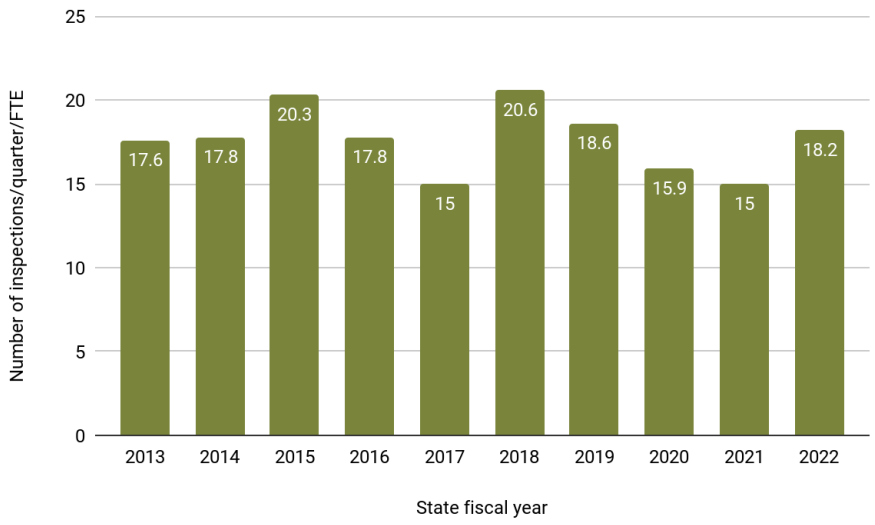


Figure 3 shows the average number of inspections performed by each inspector per calendar quarter. The performance plans for each inspector define the number of completed inspections needed to achieve an outstanding, satisfactory or unsatisfactory performance rating. To perform at a sustainable level, experienced inspectors should be expected to conduct 15 inspections per calendar quarter and 18 per quarter for an outstanding rating in this aspect of their job duties. This standard prevents staff burn-out, but also allows the program to adequately inspect the regulated universe.

Common violations seen on inspections

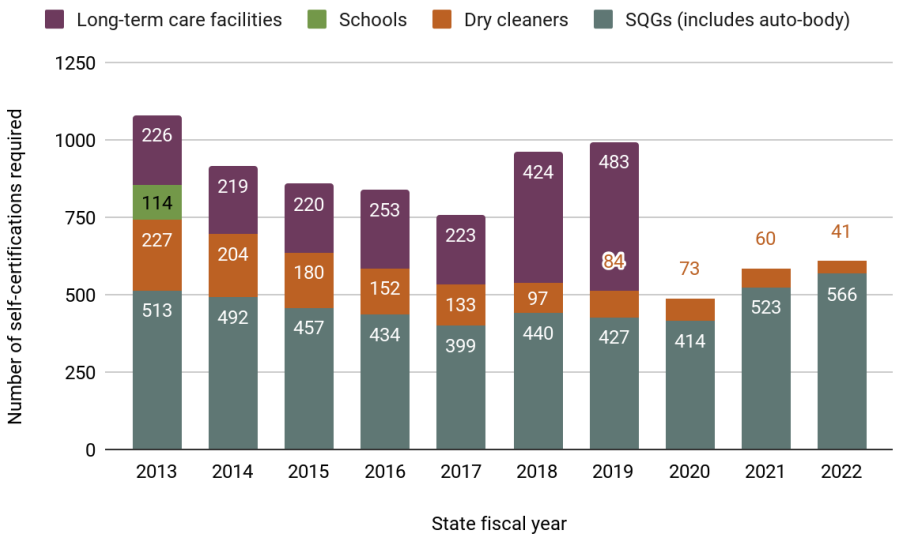
1. Failure to properly label containers with the words "Hazardous waste" and the indication of the hazard(s) posed by the contents of the containers.
2. Preparedness & prevention violations, such as inadequate aisle space, failure to make arrangements with the local authorities, and failure to minimize the possibility of release.
3. Lack of training and training documentation for employees handling hazardous waste.

Self-certification

The Hazardous Waste Program created the self-certification program in 2005, to allow dry cleaning facilities to audit their own waste management, submitting annual checklists as documentation to the department. After launching the program, there appeared to be a quick decrease in violations. The program was expanded to include small quantity generator facilities in 2006 and long-term care facilities in 2013. There were similar improvements as the program rolled out self-certification to these additional facilities, as the self-certification checklist walks the facility through a typical inspection and provides additional waste management guidance. Figure 4 illustrates the self-certifications required by facility type.

In 2021, the self-certification program again did not include healthcare facilities, due to the new Pharmaceutical Rule. This rule makes it easier for these facilities to manage their wastes, allowing the program to ensure that waste pharmaceuticals generated are properly managed and dispositioned.

Figure 4. Self-certification program



As Figure 4 shows, the number of dry cleaners in the self-certification program has continued to decrease over the years as facilities switch from perchloroethylene to alternative chemicals that do not create hazardous waste.

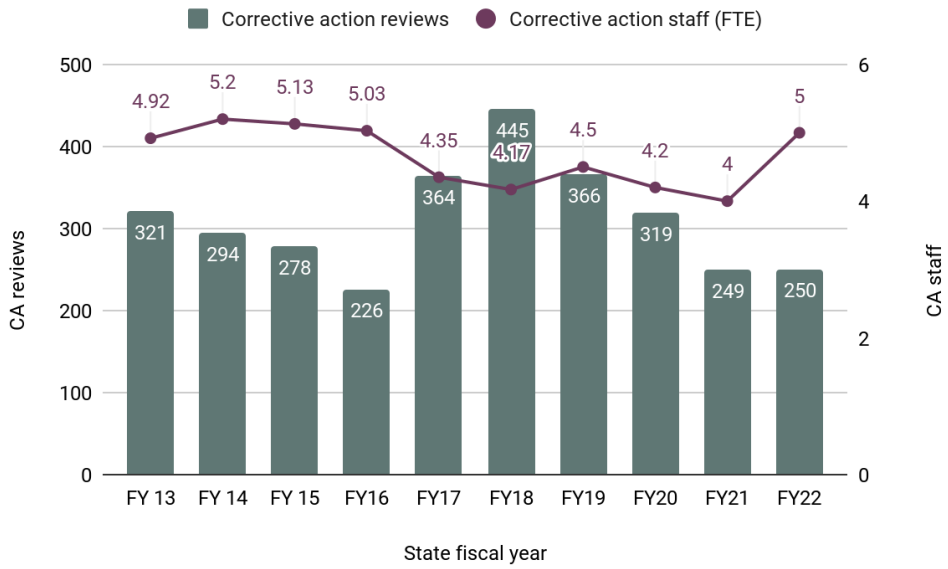
Corrective action

Corrective action, which is the environmental investigation and clean-up portion of the Hazardous Waste Program, continues to be a substantial part of the program's workload. Corrective action staff oversee the investigation and cleanup of more than 200 individual facilities ranging in size from large facilities, such as Fort Carson and Lockheed-Martin, to very small facilities, like neighborhood dry cleaners and plating shops.

As an alternative to the resource-intensive options of a hazardous waste permit or compliance order, the program uses Corrective Action Plans (CAPs) to initiate corrective action at facilities without the need for extensive enforcement. This is a popular mechanism among industries, and while entered into voluntarily, CAPs are enforceable as special permits under hazardous waste regulations. This year, reviewing a simple CAP required 5.6 hours over 50.5 days to complete, compared to 5.1 hours last year, because the simple CAPs processed this year were slightly more involved than last year. This is still well below the target of 10 hours across 30 days set in 2007, although the review timeframe exceeds the goal of 30 days, due to staff workload.

On the other hand, staff processed a complex CAP in approximately 21 hours over 69 days in 2022. This is well below the division's goal of 40 hours across 60 days, with the review timeframe only slightly exceeding the goal of 60 days.

Figure 5. Corrective action reviews and staff levels



The program continued to be productive in completing corrective action reviews this year. Staff completed 50 reviews per full time employee in FY22, compared to 62 reviews per employee in FY21.

Figure 6. Site redevelopment

Breaking and removing concrete in former coke batteries at the EVRAZ steel fabricator in Pueblo.

In 2022, the Corrective Action Unit continued to address a number of property sales and redevelopment proposals occurring at hazardous waste sites where complete remediation of the property has not yet been achieved. These redevelopment activities are typically associated with the demolition and construction of new buildings for the site and reconfiguring it for a new land use. The Corrective Action Unit uses these redevelopment activities as an opportunity to compel additional remediation of soil and groundwater in areas that were previously inaccessible. Ultimately, redevelopment of these sites enhances economic development and results in a cleaner property. This was highlighted by EPA in its recent profile of the economic benefits of several remediation and redevelopment projects conducted at the Denver Federal Center, overseen by the Corrective Action Unit.

Environmental covenants

Senate Bill 01-145 created environmental covenants (ECs), which provide a mechanism for property owners to establish certain restrictions or conditions for their properties, in lieu of a full cleanup, and for those restrictions or conditions to be enforceable by the department. In 2008, via passage of Senate Bill 08-037, the Senate added notice of environmental use restrictions (RNs) to the statute, as a second mechanism to ensure long-term control of residual risks. As such, the program can now approve long-term cleanup plans that rely on institutional controls (i.e. ECs and/or RNs) to manage risks associated with residual contamination, thereby avoiding the difficulty and expense of remediating sites down to unrestricted-use levels. To date, accomplishments include:

- The division created a registry of sites, as required by the statute. There are currently 302 individual institutional controls on the registry, with some large sites having more than one institutional control. Approximately one-third of sites on the registry are hazardous waste sites.
- The Colorado Attorney General's Office (AGO) developed model EC and RN language.
- The program implemented a geographic information system (GIS)-based map web page, which includes the sites with institutional controls and a link to the actual EC or RN document. This tool allows the public to have access to the information, as the map in Figure 7 illustrates.
- After meeting with several local governments to discuss communication and implementation issues, the division created a guidance document regarding what institutional controls are, the opportunities they offer, what is needed to create an EC or RN, and the tracking and notification responsibilities of the state and local governments.
- Division staff and staff from the AGO have developed a policy describing when institutional controls should be finalized within the cleanup process, so remedies cannot be compromised through subsequent property transactions.
- The ArcGIS maps showing properties subject to institutional controls provide an excellent way to partner across state agencies. For example, when the State Engineer of the Division of Water Resources receives a permit for a new well, the office cross-references the site with the institutional controls map to ensure the well will be protective of human health and the environment. The Colorado Oil and Gas Conservation Commission has also used the interactive institutional controls maps.

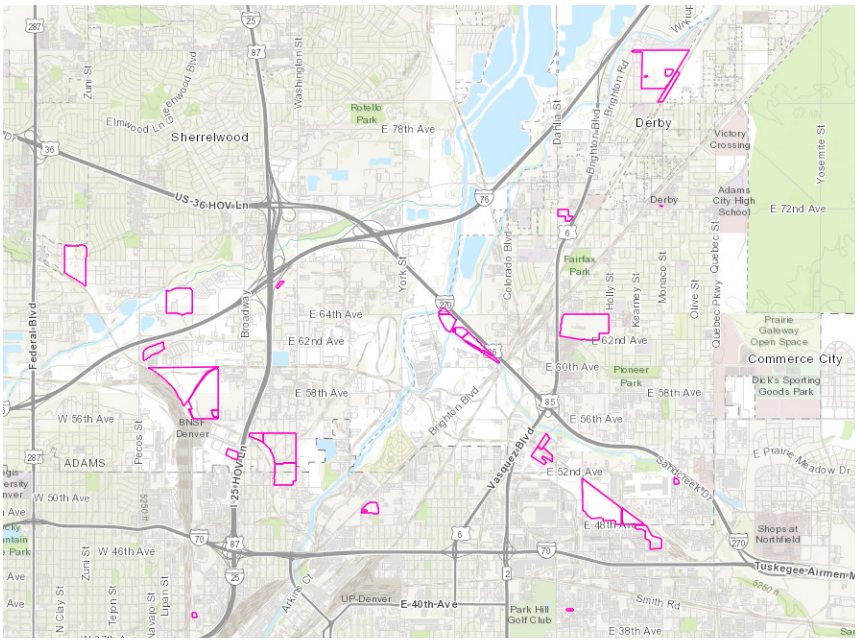


Figure 7. Examples of properties under environmental covenants and use restrictions

CDPHE Institutional Controls Map: https://arcg.is/1eWHrj0

Permitting

Facilities that manage hazardous waste in a manner that requires permitting by the Colorado Hazardous Waste Program are referred to as TSDs. There are currently 21 TSD facilities in Colorado — six are active and required to have an operating permit, and the remaining 15 require a post-closure permit or equivalent enforceable document. Colorado has permits in place for all six of the operating facilities and for 49 of the 50 individual units on those facilities. The only unpermitted unit is at the Pueblo Chemical Depot (PCD), which includes 94 chemical weapons storage igloos (considered a single "unit"). The program does not plan

to permit these igloos, but rather to regulate them under a compliance order until they are emptied and closed by the Army under its Chemical Demilitarization Program, no later than 2023.

The other 15 TSD facilities in Colorado are no longer actively managing hazardous waste, but have left waste or contamination in the ground. These facilities require post-closure care or monitoring controls. Colorado has post-closure controls in place at all of the units at these facilities, and processes to verify the controls remain effective. The Permitting Unit also issues emergency permits to entities that want to treat any potentially-reactive hazardous wastes. This ensures that the disposal method is safe for each specific type of reactive hazardous waste. Common reactive wastes that require an emergency permit are fireworks, ammunition, and unstable chemicals. The program works closely with local health departments, police departments, and bomb squads, who frequently need to dispose of these reactive wastes. In calendar year 2022, 34 emergency detonation permits were issued across the state. Permitting Unit staff conducted inspections for several permitted TSDs in FY2022, and issued a number of Compliance Advisories and Inspection Reports associated with these efforts.

The Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP) is one of Colorado's permitted facilities. This plant began processing mustard chemical warfare agent filled 105mm munitions in 2021. In 2022, the PCAPP facility continued with consistent operation and processing of the remaining 105mm projectiles. The 105mm projectile campaign was completed in July 2022. In 2022, the Permitting Unit reviewed and/or approved 29 permit modifications for PCAPP, as well as approximately four modifications for the PCD permit. In April 2022, trial burn testing of three Static Detonation Chambers (SDCs) at PCD was completed. The Permitting Unit is evaluating the results of the trail burn testing to verify the parameters for full operation of the units.

PCAPP, in conjunction with PCD, applied for a Class 2 permit modification request for the processing of 4.2-inch mustard-filled mortar rounds in the main plant. To facilitate this change, new Improved Cavity Access Machines (iCAMs), were developed for PCAPP. The new iCAMs are similar to those used to drain mustard agent from 155mm and 105mm projectiles. The new design eliminates the need for cutting the mortars, as was the plan with the original design for processing 4.2-inch mortars in the main plant. The division approved a Temporary Authorization Request in October 2022, allowing initial installation and systemization of the new iCAMs. iCAM washout testing commenced on December 2, 2022, with initial introduction of mustard-filled 4.2-inch mortars into the system. Initial test results indicate that the system is fully capable of removing mustard from the 4.2-inch mortar for processing in the main plant.

Full-scale processing of live mortars with agent is prohibited until the division has received and approved the munitions washout testing report and all testing parameters are satisfied. The division will evaluate the tested operational parameters and use the results to set final operating conditions for the iCAM system in the permit.

The on-site Immobilized Cell Bioreactors (ICBs) continues to provide additional treatment for hydrolysate being generated by the main plant munitions processing. The ICBs use microbes to biodegrade hydrolysate, the waste resulting from the neutralization of mustard agent. The bioreactors have proven to be a highly effective and efficient technology for degrading hydrolysate leaving only water (recycled through the plant) and salt cake (taken off site for hazardous waste landfill disposal). As of December 2022, the ICBs had processed approximately 167,000 gallons of hydrolysate. Also as of December 2022, PCAPP has destroyed over 89% of the chemical weapons stockpile and is on track to destroy the remainder of the stockpile in 2023.

Pueblo Chemical Agent-Destruction Pilot Plant (PCAPP)

Munitions processing at PCAPP

703,769
chemical weapons have been destroyed

First runs of the iCAM system successfully flush 4.2" HT mortars

Types of munitions processed

105 - MM M60

4.2" mortars M2 & M2A1

155 MM M104 & M110

Compliance assistance

A goal of the Hazardous Waste Program is for all regulated facilities to be in compliance with state laws and regulations. The traditional inspection and enforcement program is one way to reach that goal. Compliance assistance is another important method for obtaining and maintaining compliance. The General Assembly recognized the value and importance of compliance assistance as one of the expectations set out in SB 00-177, Section 25-15-301.5(2)(g), C.R.S., calling for the department to "establish a preference for compliance assistance with at least 10 percent of the annual budget amount being allocated to compliance assistance efforts." In FY 2022, the program met that requirement with 12.1 percent of staff time devoted to compliance assistance.

Program inspectors incorporate compliance assistance and pollution prevention into compliance inspections when appropriate. Inspectors provided guidance documents and person-to-person consultation on 187 of the 195 inspections performed this year. Three facilities requested site visits this year under the Generator Assistance Program, where a free site visit is offered to help facilities come into or stay in compliance with Colorado's hazardous waste requirements.

FY 2022 by the numbers:

94% of inspections offered compliance assistance.

5,453 web hits for our annual hazardous waste regulations training.

1,795 responses to calls and emails by our Technical Assistance Line.

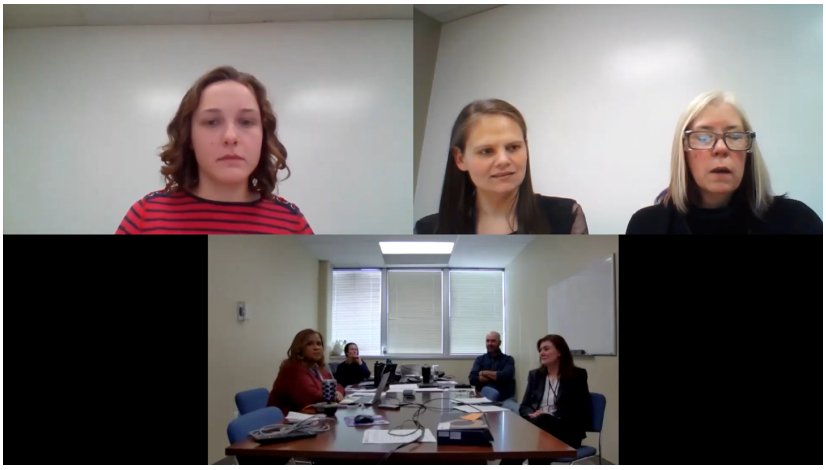
3,159 web hits for hazardous waste regulations and statutes.

10,381 web hits for our main Hazardous Waste Program webpage.

3,368 web hits for hazardous waste management guidance and policy.

Hazardous waste regulations training

As part of its compliance assistance efforts, the Hazardous Waste Compliance Assurance Unit hosts a training every year in October for facilities that generate hazardous waste. In 2020, the COVID-19 pandemic required a shift to the new remote format, however the unit found that by pivoting to a webinar-based platform, it made the training more accessible to a greater number of people and facilities located throughout the state. The hazardous waste inspectors present hazardous waste generator regulations and allow regulated facility personnel the opportunity to ask inspectors questions they may have regarding hazardous waste compliance at their specific sites. All of the presentations, along with related reference materials, are posted on the Hazardous Waste Regulations Training webpage. This allows facilities to access them throughout the year for their own training use.



The October 2022 training drew 812 attendees and 914 registrants. This is an increase from 2019, which had 382 registrants, and 2021, which had 695 registrants. Ninety-two percent of survey respondents agreed or strongly agreed that they would attend this online training again next year. The program implemented live polling this year to allow the audience to interact in a new way, and 97% of survey respondents said it helped them stay engaged in the training.

Program funding

Funding for the Colorado Hazardous Waste Program comes from cash fees and federal grants. The program receives no Colorado General Fund money. Federal funding for the Chemical Demilitarization Project and Rocky Flats Site makes up 20% of overall program funding, with fee revenues and an EPA grant covering the remaining 80% of program funding (see Figure 8). Currently, without considering the project-specific federal funding for the Chemical Demilitarization Project and the Rocky Flats Site, fee revenues fund about 60 percent of program costs, and the EPA grant covers the remaining 40 percent.

The EPA grant has remained essentially flat for more than 15 years, however it increased by 23 percent in 2021 and remained at the increased level in 2022. The fees are occasionally increased to cover increasing program costs. The Colorado Solid and Hazardous Waste Commission passed the last fee increase in 2009.

It is important to note that personnel costs are the largest single expense item for the program. Therefore, managing staffing levels is an important part of managing the program budget. The ability to continue with the current fee level is largely due to the process improvements implemented by staff. The program is committed to using technology, acting on ideas from our regulated entities and stakeholders, and continuous quality improvement. Program expenditures, by percent, are illustrated in Figure 9.

Figure 10 tracks the revenue, including the EPA grant, expenditures, and fund balance for the Hazardous Waste Program. The key data lines on Figure 10 are the total revenue, total expenses, and the cash balance in the Hazardous Waste Service Fund. Figure 10 shows that, based on program projections, the fee level is adequate for at least three more years.

Figure 8. Program funding (approximate)

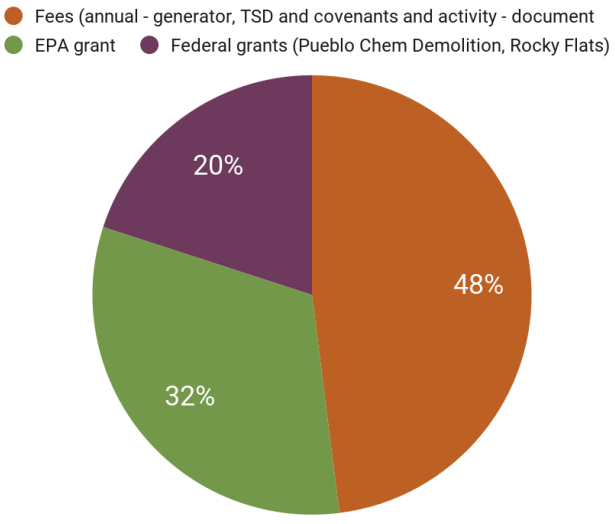


Figure 9. Program expenditures (percent)

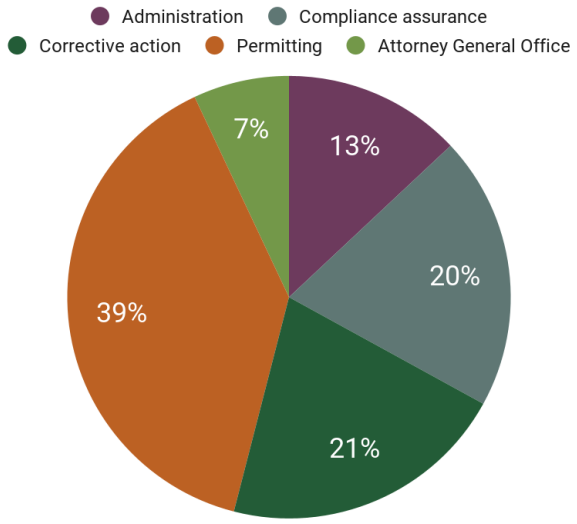
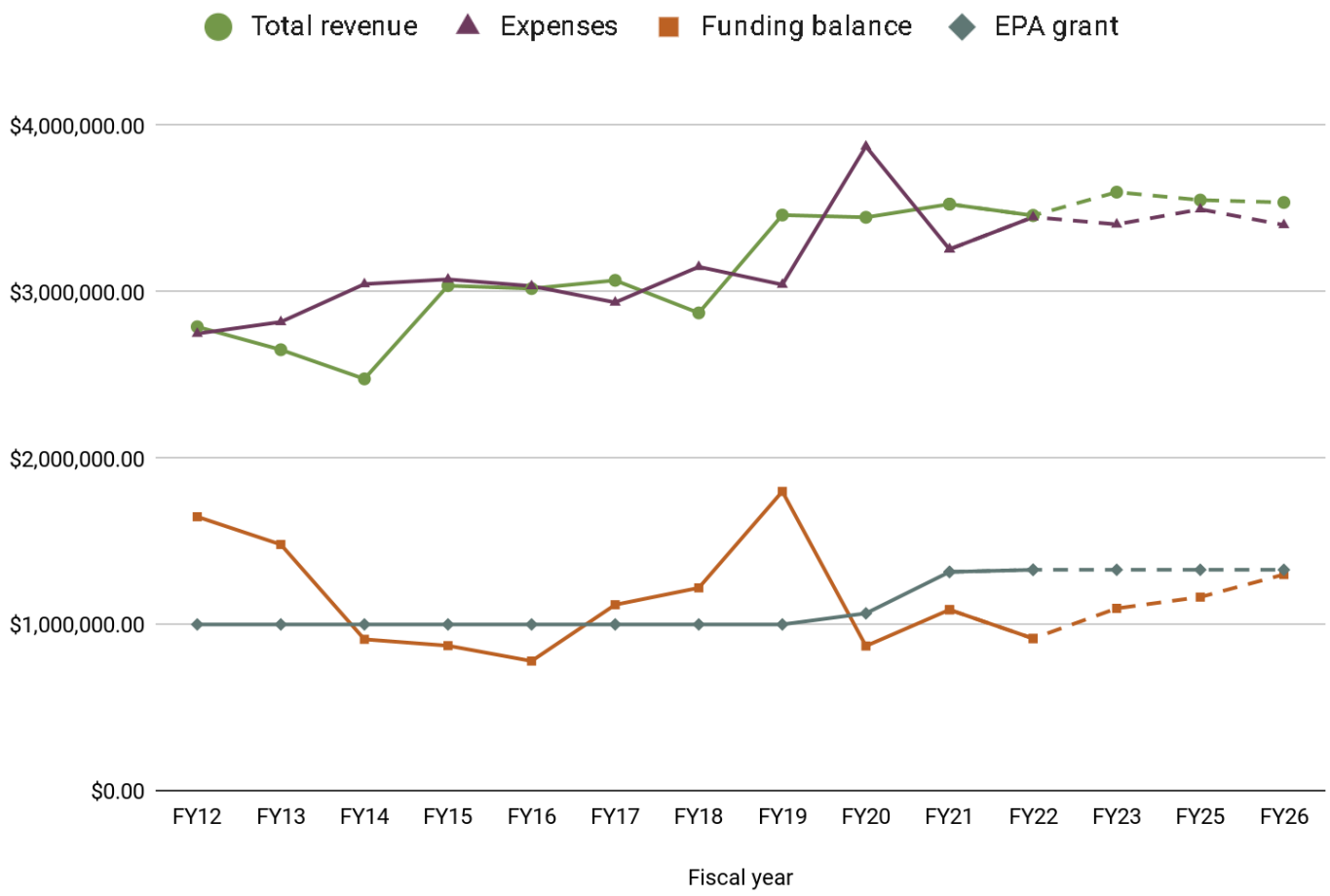


Figure 10. FY22 Hazardous Waste Program budget analysis



Conclusion

As discussed in this report, the division has implemented and maintained significant improvements to the Hazardous Waste Program to satisfy the expectations set out by SB 00-177 (Section 25-15-301.5, C.R.S).

Key accomplishments include:

- Maintaining program authorization by the federal government (i.e. EPA);
- Maintaining a program that is credible and accountable;
- Maintaining a program that is innovative and cost-effective;
- Maintaining an effective inspection rate;
- Training 812 people across the state on Colorado's Hazardous Waste Regulations;
- Emphasizing compliance-assistance efforts.

Efforts undertaken by the Hazardous Waste Program have significantly improved both the efficiency and effectiveness of the program. Major program accomplishments include continuing emphasis on innovative compliance assistance projects; maintaining high inspection efficiency and corrective action efficiency; maintaining high timeliness of enforcement actions; and exceeding national goals set by the Environmental Protection Agency for corrective action, permitting, inspections, and enforcement.

Principal author:
Colleen Brisnehan, Hazardous Waste Program Manager

Contributing authors/technical assistance:
Kris Figur, Hazardous Waste Compliance Assurance Unit Leader
Kevin Mackey, Hazardous Waste Permitting Unit Leader
Richard Mruz, Hazardous Waste Corrective Action Unit Leader
Amy Williams, Data Management
Laura Gurule, Data System Administrator
Laura Dixon, Community Involvement & Communications Manager

Statute:
Section 25-15-301.5(3), C.R.S.

For additional information or copies:
Colleen Brisnehan, Hazardous Waste Program Manager
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530
colleen.brisnehan@state.co.us
(303) 692-3357