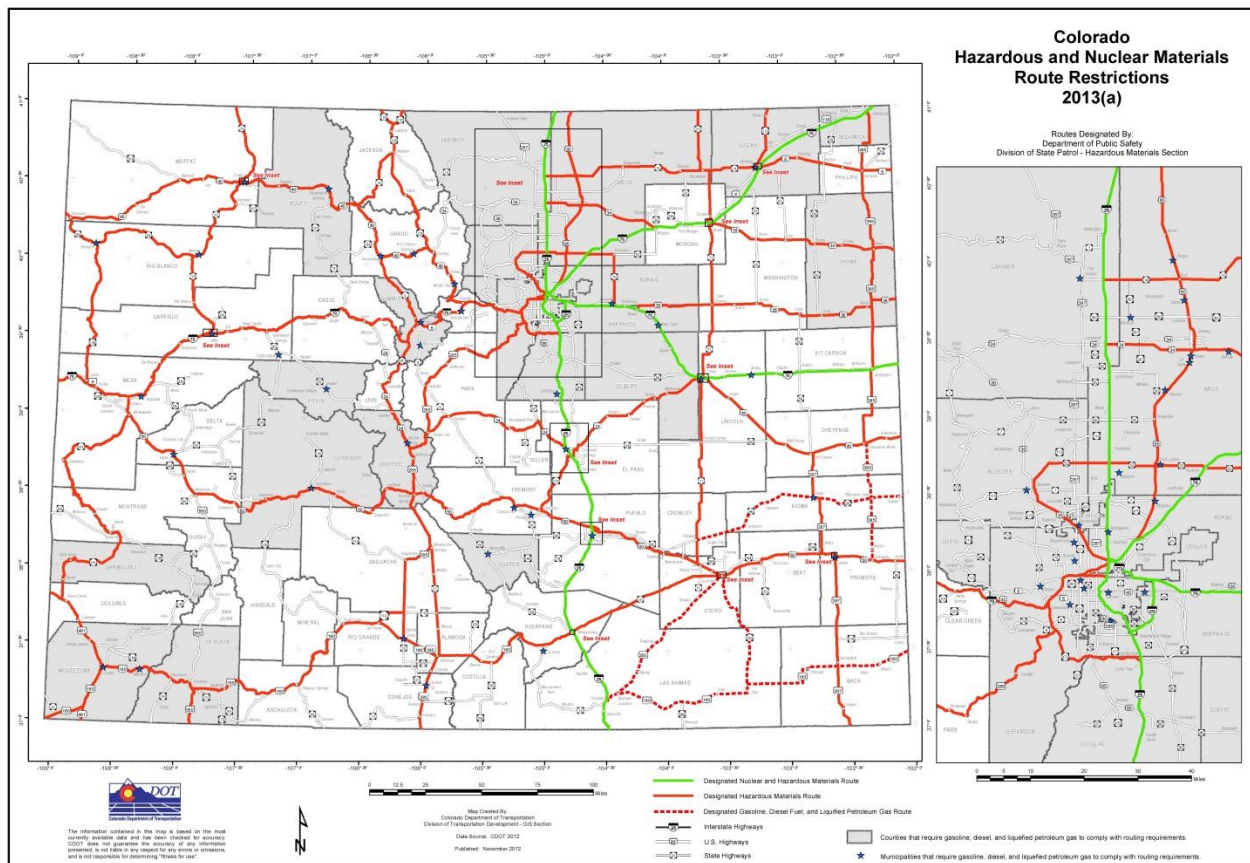


HAZARDOUS MATERIAL RELEASE



DESCRIPTION

A hazardous material (HAZMAT) is any element or compound that, because of handling, storing, processing, or packaging, may have detrimental effects upon the public (especially emergency personnel) and/or the environment (*State Emergency Operations Plan, 2015, p. Tab A-6 to Tab A-7*). Hazardous materials are found in forms and quantities that can potentially cause death, serious injury, long-lasting health effects, and property damage in varying degrees. They may be flammable, corrosive, detonable, toxic, radioactive, oxidizers, disease-causing agents, or highly reactive. They are routinely used and stored in homes and businesses and are also shipped daily on Colorado’s highways, railroads, waterways, and pipelines. Hazardous material releases include spilling, disposal, or other form of discharge into the environment.



Colorado’s HAZMAT routing map provides information on the major roadways designated for the transport of mobile hazardous materials. The red lines are designated hazardous materials routes, and the green lines are designated nuclear and hazardous materials routes.

Source: Colorado State Patrol. Hazardous Materials Routing Map. 2013. [colorado.gov/pacific/sites/default/files/Hazardous Materials Routing Map.pdf](http://colorado.gov/pacific/sites/default/files/Hazardous_Materials_Routing_Map.pdf)

Incidents involving hazardous material releases can apply to fixed facilities as well as mobile, transportation-related accidents. Between 2005 and 2014, approximately 166,000 HAZMAT incidents were reported nationwide. Nearly 86 percent of these were highway incidents, nine percent involved the air industry, and four percent were railroad incidents (*Incident Reports Database Search*, n.d.). These HAZMAT events generally consist of solid, liquid, and/or gaseous contaminants that are released from fixed or mobile containers, and most by accident versus an intentional act. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a HAZMAT release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind, and possibly wildlife.

HAZARDOUS MATERIAL RELEASES IN COLORADO

Hazardous materials used in agriculture, industry, and in the home pose a daily hazard to people and the environment. Coloradans are vulnerable to the adverse effects of accidental leakage of hazardous materials or a deliberate act using these materials. According to the State Emergency Operations Plan, statewide there are approximately 5,800 fixed facilities where reportable concentrations of hazardous materials are used and/or stored, and the oil and gas production industry accounts for approximately 4,200 of those facilities. Between 2010 and 2012, the Colorado Department of Public Health and Environment (CDPHE) recorded 2,718 reported spills or releases. More than one-third of those were at fixed facilities, with the remainder associated with mobile HAZMATs. The steady growth in the use of chemicals has resulted in an increased need to transport these materials, and according to DHSEM, hazardous materials are transported over nearly every roadway throughout the state (*State Emergency Operations Plan*, 2015, p. 12). All roads that permit hazardous material transport are considered potentially at risk of an incident.

Hazardous material releases can also occur at fixed sites, such as abandoned mines, where materials are being stored and/or treated on site. The Colorado Division of Reclamation Mining & Safety estimates that there are over 22,000 abandoned mines in the state (Ogburn, 2015).

In August 2015, the EPA accidentally released 1 million gallons of toxic water from an abandoned mine near Silverton, Colorado into the Animas River. The spill triggered warnings from health officials to steer clear from the river until officials deemed the river safe (Paul & Finley, 2015).

RELATED HAZARDS

Hazardous material releases may be caused by a range of incidents including an industrial or transportation accident, or deliberate criminal act. They can also occur as a result of or in tandem with natural hazard events such as earthquakes and other geologic hazards, floods, windstorms, and winter storms. In addition to causing additional life safety threats, these compound hazard events can also greatly complicate and hinder response efforts and result in major environmental impacts. The large-scale release of hazardous materials in combination with events such as flooding or windstorms can increase the spread of contamination threat zones to large geographic areas and amplify the potential long-term impacts to human and ecological health.

ASSESSING THE RISK OF HAZARDOUS MATERIAL RELEASE

Hazardous material releases can be localized events (such as small releases at a fixed site) or regional events (such as nuclear/radiological events). Several variables come into play when determining a community's risk to hazardous material releases. Factors that help determine a community's vulnerability to this hazard include:

- The size of the community (both geographically and physically)
- The location and number of fixed sites containing potential hazardous material(s)
- The community's proximity to mobile HAZMAT (road and rail) risk areas where releases could occur

One of the difficulties of addressing the hazardous material release hazard is that it takes time and effort to identify all of the potential fixed hazardous material sites in a community. There are several federal, state, and local sources to investigate, and each community will have a different level of vulnerability.

When assessing community risk to hazardous materials release, the first step a community will want to take is to conduct a hazard identification process that will include development of a hazard profile that identifies the potential sources of the hazard, how the hazard has impacted the community in the past, how it could impact the community in the future, and the extent to which the hazard could impact the community.

Once a detailed hazard profile has been assembled, a vulnerability assessment can be conducted to determine the exposure of people and other community assets that could potentially be impacted by a hazardous material release. Community planners will have to evaluate which type of vulnerability analyses will work best for their community's needs based on what types of threats are present. For example: Are air plume analyses needed for airborne releases? Is it necessary to determine vulnerabilities to water systems for potential water-borne releases? Or is it necessary to consider other, more serious types of analyses due to potential radioactive or nuclear risks?

AVAILABLE DATA SOURCES

Environmental Protection Agency (EPA) Toxic Release Inventory Program

Tier II Reports are required by the EPA whenever a hazardous material is released, and are available at the county level from County Emergency Managers and/or the Environmental Protection Agency. [epa.gov/toxics-release-inventory-tri-program](https://www.epa.gov/toxics-release-inventory-tri-program)

U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration

The Pipeline and Hazardous Materials Safety Administration (PHMSA) was established to protect people and the environment from the risks of hazardous materials transportation. The PHMSA website is a good source of hazardous materials incident data and other information relevant for hazardous materials and pipeline safety. [phmsa.dot.gov](https://www.phmsa.dot.gov)

Colorado Department of Transportation (CDOT)

CDOT's Hazmat Routing Overview page provides current Hazmat routes and information related to designating roadways as Hazmat routes. [codot.gov/business/hazmat-routing](https://www.codot.gov/business/hazmat-routing)

EPA's Areal Locations of Hazardous Atmospheres (ALOHA) Program

EPA's ALOHA is a modeling program for the CAMEO (Computer-Aided Management of Emergency Operations) software suite, which is widely used to plan for and respond to chemical spills. ALOHA allows users to enter details about a real or potential chemical release, and will generate threat zone estimates for various types of hazards. The threat zone estimates are shown on a grid in ALOHA, and they can also be plotted on maps in MARPLOT (Mapping Application for Response, Planning, and Local Operational Tasks), Esri's ArcMap, Google Earth, Hazus, and Google Maps.

- ALOHA - epa.gov/cameo/aloha-software
- CAMEO - epa.gov/cameo/what-cameo-software-suite
- MARPLOT - epa.gov/cameo/marplot-software

APPLICABLE PLANNING TOOLS AND STRATEGIES

The table below cites applicable planning tools and strategies that are profiled in this guide.

APPLICABLE PLANNING TOOLS AND STRATEGIES – HAZARDOUS MATERIAL RELEASE	
Addressing Hazards in Plans and Policies	<ul style="list-style-type: none"> • Comprehensive plan • Hazard mitigation plan • Pre-disaster planning
Strengthening Incentives	<ul style="list-style-type: none"> • Development agreement
Protecting Sensitive Areas	<ul style="list-style-type: none"> • 1041 regulations
Improving Site Development Standards	<ul style="list-style-type: none"> • Subdivision and site design standards • Use-specific standards
Improving Buildings and Infrastructure	<ul style="list-style-type: none"> • Critical infrastructure protection
Enhancing Administration and Enforcement	<ul style="list-style-type: none"> • Application submittal requirements • Post-disaster building moratorium