

**I-70 Mountain Corridor PEIS Regulated Materials and
Historic Mining Technical Report**

August 2010

Regulated Materials and Historic Mining Technical Report

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Section 1. Purpose of the Report

This *I-70 Mountain Corridor PEIS Regulated Materials and Historic Mining Technical Report* supports the information contained in **Chapter 3, Section 3.6** of the *I-70 Mountain Corridor Programmatic Environmental Impact Statement* (PEIS). It identifies:

- Methods used to identify regulated materials and historic mines and determine potential impacts of alternatives.
- Coordination with local, state, and federal agencies.
- Description of the regulated materials and historic mines in the Corridor.
- Consequences of the Action Alternatives evaluated in the *I-70 Mountain Corridor PEIS*.
- Considerations for Tier 2 Processes.
- Proposed mitigation strategies for regulated materials and historic mines.

Section 2. Background and Methodology

Regulated materials are hazardous substances, hazardous waste, or petroleum products. Regulated materials are transported on the I-70 highway (in the Corridor), and may exist at sites within the Corridor that generate, store, and dispose of these substances, or have been the location of past releases of these substances. The project will also use regulated materials during construction. Historic mining is included in the discussion of regulated materials because mining activities are prevalent in the Corridor, and mine tailings, other mining wastes, tunnel drainage, and mineralized rock have the potential to release contaminants (such as heavy metals and acid drainage or runoff) during and after construction.

Encountering contaminants in soils, groundwater, and surface water can complicate construction and impact nearby residents, workers, and the environment if appropriate steps to mitigate and contain them are not taken. Examples of commonly regulated materials are asbestos; lead-based paint; heavy metals such as cadmium, mercury, and zinc; dry-cleaning solvents; and materials stored in underground storage tanks, such as gasoline and diesel.

Generation, storage, disposal, and release of hazardous substances or petroleum products are regulated under the scope of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). The Environmental Protection Agency works with state, local, and tribal governments to enforce and implement the nation's environmental laws, including CERCLA and RCRA. The Colorado Department of Public Health and Environment (CDPHE), and specifically, the Hazardous Materials and Waste Management Division of CDPHE, implements or supports the Environmental Protection Agency in implementing CERCLA, as well as other statutes. The Colorado Division of Oil and Public Safety (OPS) regulates the cleanup of petroleum contamination from underground storage tank (UST) and leaking underground storage tank (LUST) sites.

The U.S. Department of Transportation and the Colorado Department of Public Safety (CDPS) State Patrol Hazardous Materials Section are responsible for regulating hazardous materials transported on the I-70 highway. The Colorado State Patrol is responsible for reporting spills associated with highway transportation incidents.

Various state and federal programs regulate mine tailings and waste (generally referred to as "mine waste materials" in this Technical Report), depending on where the material is located and its designation under CERCLA. The Colorado Division of Reclamation Mining and Safety regulates current mining operations but does not regulate waste materials from historic mines. Historic mine waste materials are exempt from RCRA hazardous waste regulations but are considered solid waste in Colorado if disturbed and not

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reused. The Colorado Department of Public Health and the Environment Solid Waste Unit of the Hazardous Materials and Waste Management Division has authority over mine tailings not covered by CERCLA. Mining waste materials are excluded from hazardous waste regulations as outlined in the Beville Amendment 40 Code of Federal Regulations 261.4 and Colorado Hazardous Waste Regulations Section 261.4.

The Colorado Department of Transportation searched federal and state environmental agency databases to determine the presence or likely presence of any hazardous substance or petroleum product that may have been released in the Corridor as a result of existing or past actions. This search occurred in 2002, and the data sources reviewed include the following federal and state environmental agency records:

- Federal NPL site list and Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list (Colorado Department of Transportation VISTA database, 2-mile radius).
- Federal RCRA Treatment, Storage, and Disposal (TSD) facilities list (CDOT VISTA database, 2-mile radius).
- Federal RCRA list of large and small generators (CDOT VISTA database, two-mile radius).
- National Response Center (NRC), including federal Emergency Response Notification System (ERNS) list (NRC database, spills along the I-70 highway only).
- Colorado State UST list (Colorado Storage Tank Information System [COSTIS] database, half-mile radius).
- Colorado State LUST list (COSTIS database, half-mile radius).

The types of sites (CERCLIS, RCRA, etc.) in this list are included in the standard environmental record sources contained in the American Society for Testing and Materials (ASTM) E1527 “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.” The current edition is ASTM Designation E 1527 – 05. The radius for each type of site shown in this list is generally consistent with the minimum search distances contained in the ASTM E1527 standard. The ASTM standard allows the minimum search distance to be altered based on the population density of the area, distance that the hazardous substances are likely to migrate based on geologic or hydrogeologic conditions, existing or past-uses of the property, and other factors. CERCLIS and RCRA sites have the potential for larger, more widespread impacts than UST, LUST and spill sites, which tend to be smaller and have more localized impacts. For this reason, the radius used for the CERCLIS and RCRA sites is greater than the minimum search distance in the ASTM E1527 standard to be conservative in assessing the impact of these sites on the project.

A summary of the findings of incidents and regulated materials in the Corridor that are maintained in the federal and state environmental databases for each of the regulatory authorities discussed above is provided in **Section 4**, of this report. Also included in **Section 4** is a description of the environmental site assessments and preliminary site investigation that were completed within the Corridor, either directly or indirectly for CDOT. Despite the fact that much of the information on regulated materials presented in **Section 4** is approximately 8 years old, it provides an overall assessment of the types of sites and regulated materials that may be encountered during construction. Specific information concerning regulated materials, such as numbers and locations of incidents and sites, is dynamic in nature and has the potential to be out of date within months of data collection. For this reason, further evaluation of the information contained in the federal and state environmental agency databases will be performed during the Tier 2 processes.

Section 3. Description of Alternatives

This section summarizes the alternatives considered in the I-70 Mountain Corridor PEIS. A more complete description of these alternatives is available in **Chapter 2** of the PEIS and in the *I-70 Mountain Corridor PEIS Alternatives Screening and Development Technical Report*.

3.1 Minimal Action Alternative

The Minimal Action Alternative provides a range of local transportation improvements along the Corridor without providing major highway capacity widening or dedicated transit components. The Minimal Action Alternative includes elements of the Transportation System Management family and the Localized Highway Improvements family, including: transportation management, interchange modifications, curve safety modifications, and auxiliary lanes. These elements are also incorporated into the other Action Alternative Packages.

3.2 Transit Alternatives

Four Transit alternatives are considered in the PEIS as a reasonable range representing the Fixed Guideway and Rubber Tire Transit families:

- Rail with Intermountain Connection Alternative
- Advanced Guideway System Alternative
- Dual-Mode Bus in Guideway Alternative
- Diesel Bus in Guideway Alternative

3.2.1 Rail with Intermountain Connection

The Rail with Intermountain Connection Alternative would provide rail transit service between the Eagle County Regional Airport and C-470. Between Vail and C-470 the rail would be primarily at-grade running adjacent to the I-70 highway. The segment between Vail and the Eagle County Airport would be constructed within the existing Union Pacific Railroad right-of-way. A new Vail Transportation Center, including new track, would be constructed between Vail and Minturn to complete the connection between the diesel and electric trains. This alternative also includes auxiliary lane improvements at eastbound Eisenhower-Johnson Memorial Tunnels to Herman Gulch and westbound Downieville to Empire and the other Minimal Action Alternative elements except for curve safety modifications at Dowd Canyon, buses in mixed traffic and other auxiliary lane improvements.

3.2.2 Advanced Guideway System

The Advanced Guideway System Alternative would provide transit service between the Eagle County Regional Airport and C-470 with a 24-foot-wide, 118 mile, fully elevated system. The Advanced Guideway System Alternative would use a new technology that provides higher speeds than the other Fixed Guideway Transit technologies studied for the PEIS. Any Advanced Guideway System would require additional research and review before it could be implemented in the Corridor. Although the Federal Transit Administration-researched urban magnetic levitation system is considered in the PEIS, the actual technology would be developed in a Tier 2 process. This alternative includes the same Minimal Action elements as described previously for the Rail with Intermountain Connection Alternative.

3.2.3 Dual-mode Bus in Guideway

This alternative includes a guideway located in the median of the I-70 highway with dual-mode buses providing transit service between the Eagle County Regional Airport and C-470. This guideway would be

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24 feet wide with 3 feet high guiding barriers and would accommodate bidirectional travel. The barriers direct the movement of the bus and separate the guideway from general purpose traffic lanes. While traveling in the guideway, buses would use guidewheels to provide steering control, thus permitting a narrow guideway and providing safer operations. The buses use electric power in the guideway and diesel power when traveling outside the guideway in general purpose lanes. This alternative includes the same Minimal Action Alternative elements as described previously for the Rail with Intermountain Connection Alternative.

3.2.4 Diesel Bus in Guideway

This includes the components of the Dual-mode Bus in Guideway Alternative except that the buses use diesel power at all times.

3.3 Highway Alternatives

Three Highway alternatives are advanced for consideration in the PEIS as a reasonable range and representative of the Highway improvements, including Six-Lane Highway 55 mph, Six-Lane Highway 65 mph, and Reversible/HOV/HOT Lanes. The Highway alternatives considered both 55 and 65 mph design speeds to 1) establish corridor consistency and 2) address deficient areas within the Corridor. The 55 mph design speed establishes a consistent design speed throughout the Corridor, which currently does not exist. The 65 mph design speed further improves mobility and addresses safety deficiencies in key locations such as Dowd Canyon and the Twin Tunnels. Both the 55 mph and the 65 mph design speed options are augmented by curve safety improvements, but the 65 mph design speed constructs tunnels in two of the locations: Dowd Canyon and Floyd Hill/Hidden Valley.

3.3.1 Six-Lane Highway 55 mph Alternative

This alternative includes six-lane highway widening in two locations: Dowd Canyon and the Eisenhower-Johnson Memorial Tunnels to Floyd Hill. This alternative includes auxiliary lane improvements at eastbound Avon to Post Boulevard, both directions on the west side of Vail Pass, eastbound Frisco to Silverthorne and westbound Morrison to Chief Hosa, and the Minimal Action Alternative elements except for buses in mixed traffic and other auxiliary lane improvements.

3.3.2 Six-Lane Highway 65 mph Alternative

This alternative is similar to the Six-Lane Highway 55 mph Alternative; it includes the same six-lane widening and all of the Minimal Action Alternative elements except the curve safety modification at Dowd Canyon. The higher design speed of 65 mph alternatives requires the curve safety modifications near Floyd Hill and Fall River Road to be replaced with tunnels.

3.3.3 Reversible Lanes Alternative

This alternative is a reversible lane facility accommodating high occupancy vehicles and high occupancy toll lanes. It changes traffic flow directions as needed to accommodate peak traffic demands. It includes two additional reversible traffic lanes from the west side of the Eisenhower-Johnson Memorial Tunnels to just east of Floyd Hill. From the Eisenhower-Johnson Memorial Tunnels to US 6, two lanes are built with one lane continuing to US 6 and the other lane to the east side of Floyd Hill. This alternative includes one additional lane in each direction at Dowd Canyon. This alternative includes the same Minimal Action Alternative Elements as the Six-Lane Highway 55 mph Alternative.

3.4 Combination Alternatives

Twelve Combination alternatives, combining Highway and Transit alternatives are considered in the PEIS. Four of these alternatives involve the buildout of highway and transit components simultaneously.

Eight alternatives include preservation options, the intent of which is to include, or not preclude, space for future modes in the I-70 Mountain Corridor. The Combination alternatives all include the Six-Lane Highway 55 mph Alternative for highway components.

Combination Rail and Intermountain Connection and Six-Lane Highway Alternative—This alternative includes the 55 mph six-lane highway widening between Floyd Hill and Eisenhower-Johnson Memorial Tunnels, the Rail and Intermountain Connection transit components, and most of the components of the Minimal Action Alternative. The exception is that only one of the Minimal Action auxiliary lane improvements (from Morrison to Chief Hosa westbound) is included.

Combination Advanced Guideway System and Six-Lane Highway Alternative—This alternative includes the 55 mph six-lane highway widening between Floyd Hill and Eisenhower-Johnson Memorial Tunnels and the Advanced Guideway System transit components. It includes the same Minimal Action Alternative elements as the Combination Rail and Intermountain Connection and Six-Lane Highway Alternative.

Combination Bus in Guideway (Dual-Mode) and Six-Lane Highway Alternative—This alternative includes the 55 mph six-lane highway widening between Floyd Hill and Eisenhower-Johnson Memorial Tunnels and the dual-mode bus in guideway transit components. It includes the same Minimal Action Alternative elements as the Combination Rail and Intermountain Connection and Six-Lane Highway Alternative.

Combination Bus in Guideway (Diesel) and Six-Lane Highway Alternative—This alternative includes the 55 mph six-lane highway widening between Floyd Hill and Eisenhower-Johnson Memorial Tunnels and the diesel bus in guideway transit components. It includes the same Minimal Action Alternative elements as the Combination Rail and Intermountain Connection and Six-Lane Highway Alternative.

Combination Rail & Intermountain Connection and Preservation of Six-Lane Highway Alternative—This alternative includes the Rail and Intermountain Connection Alternative and preserves space to construct the Six-Lane Highway 55 mph at a later point.

Combination Advanced Guideway System and Preservation of Six-Lane Highway Alternative—This alternative includes the Advanced Guideway System and preserves space to construct the Six-Lane Highway 55 mph at a later point.

Combination Bus in Guideway (Dual-Mode) and Preservation of Six-Lane Highway Alternative—This alternative includes the Combination Bus in Guideway (Dual-Mode) Alternative and preserves space to construct the Six-Lane Highway 55 mph at a later point.

Combination Bus in Guideway (Diesel) and Preservation of Six-Lane Highway Alternative—This alternative includes the Bus in Guideway (Diesel) Alternative and preserves space to construct the Six-Lane Highway 55 mph at a later point.

Combination Preservation of Rail and Intermountain Connection and Six-Lane Highway Alternative—This alternative includes the Six-Lane 55 mph Highway Alternative and also preserves space to construct the Rail and Intermountain Connection at a later point.

Combination Preservation of Advanced Guideway System and Six-Lane Highway Alternative—This alternative includes the Six-Lane 55 mph Highway Alternative and also preserves space to construct the Advanced Guideway System at a later point.

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Combination Preservation of Bus in Guideway (Dual-Mode) and Six-Lane Highway Alternative—

This alternative includes the Six-Lane Highway Alternative and also preserves space to construct the Bus in Guideway (Dual-Mode) at a later point.

Combination Preservation of Bus in Guideway (Diesel) and Six-Lane Highway Alternative—

This alternative includes the Six-Lane Highway Alternative and also preserves space to construct the Bus in Guideway (Diesel) at a later point.

3.5 Preferred Alternative—Minimum and Maximum Programs

The Preferred Alternative provides for a range of improvements. Both the Minimum and the Maximum Programs include the Advanced Guideway System Alternative. The primary variation between the Minimum and Maximum Programs is the extent of the highway widening between the Twin Tunnels and the Eisenhower-Johnson Memorial Tunnels. The Maximum Program includes six-lane widening between these points (the Twin Tunnels and the Eisenhower-Johnson Memorial Tunnels), depending on certain events and triggers and a recommended adaptive management strategy.

3.6 No Action Alternative

The No Action Alternative provides for ongoing highway maintenance and improvements with committed funding sources highly likely to be implemented by the 2035 planning horizon. The projected highway maintenance and improvements are committed whether or not any other improvements are constructed with the I-70 Mountain Corridor project. Specific improvements under the No Action Alternative include highway projects, park and ride facilities, tunnel enhancements, and general maintenance activities.

Section 4. Affected Environment

This section provides the following information concerning regulated materials and mine waste materials in the Corridor:

- A summary of the findings of incidents and regulated material sites in the Corridor that are maintained in the federal and state environmental databases for each of the regulatory authorities discussed in **Section 2**.
- Information concerning mill and mine site locations within the Corridor, including information specific to potential water quality issues associated with mill sites, mine wastes, tunnel drainages, and areas containing mineralized rock in the Corridor.
- A description of the environmental site assessments and preliminary site investigation that Yeh and Associates completed within the Corridor, either directly or indirectly for CDOT.

As noted in **Section 2**, the information presented in this technical report is intended to provide a context to the types and scope of issues with regulated materials in the Corridor. At the first tier analysis, this information allows for comparative analysis among alternatives.

Figure 1 through Figure 4 show the locations of mine mills, Clear Creek/Central City Superfund Site Operable Units (OUs), partially remediated and remediated mining-related sites, and areas of intense metal veining. The figures were created using the following sources of information: Clear Creek County plats and survey records, historic pictures of mills, Sanborn Fire Maps for Georgetown-Silver Plume and Idaho Springs, Clear Creek State of the Watershed Report (Fliniau and Norbeck, 1997), Clear Creek Phase II Remedial Investigation (Camp, Dresser, and McKee, 1990), and personal communications from local residents.

Figure 1. Mill Sites, Superfund Operable Units, Remediated Sites, and Highly Mineralized Zones in Western Clear Creek County

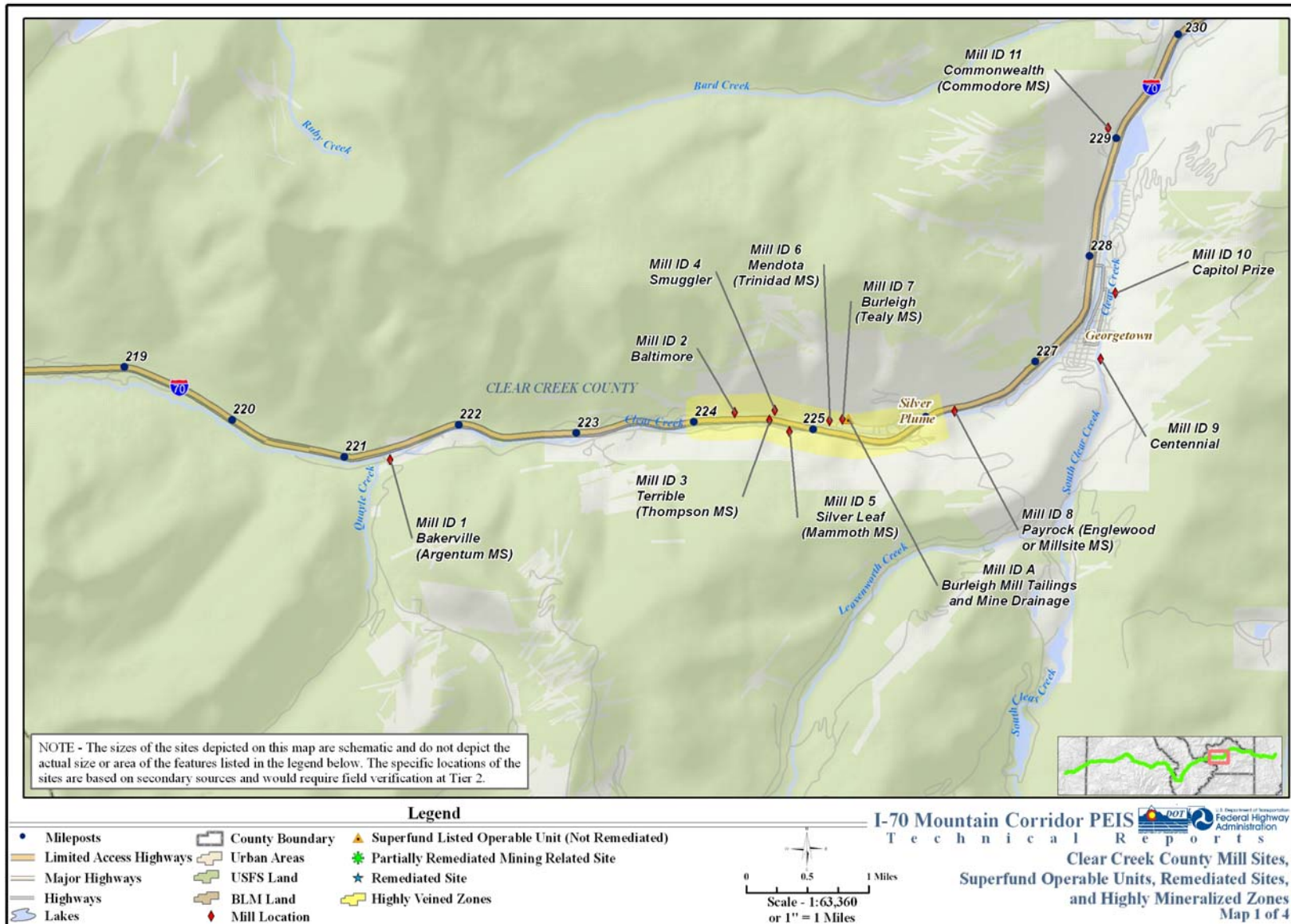


Figure 2. Mill Sites, Superfund Operable Units, Remediated Sites, and Highly Mineralized Zones in Central Clear Creek County

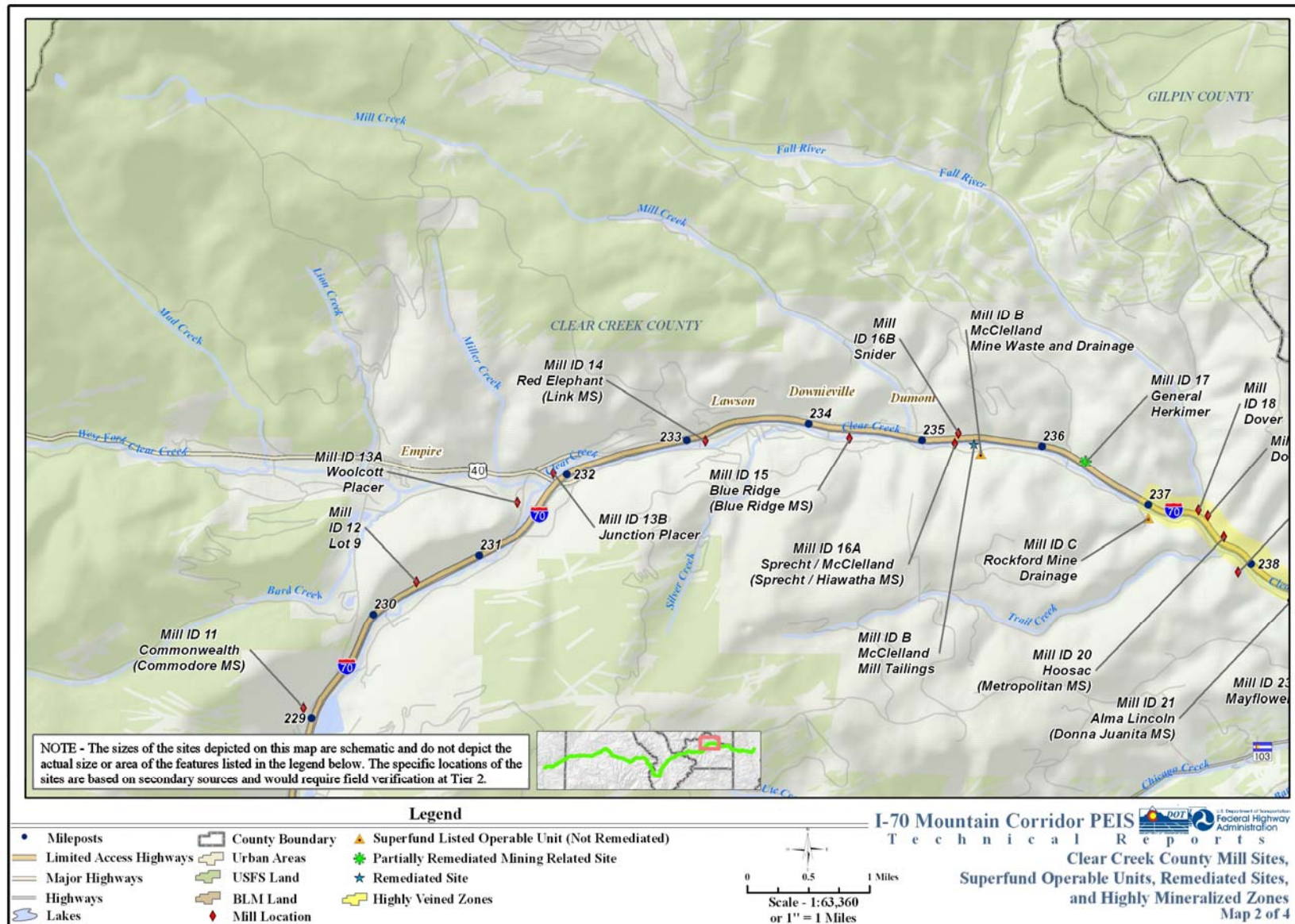


Figure 3. Mill Sites, Superfund Operable Units, Remediated Sites, and Highly Mineralized Zones in Eastern Clear Creek County

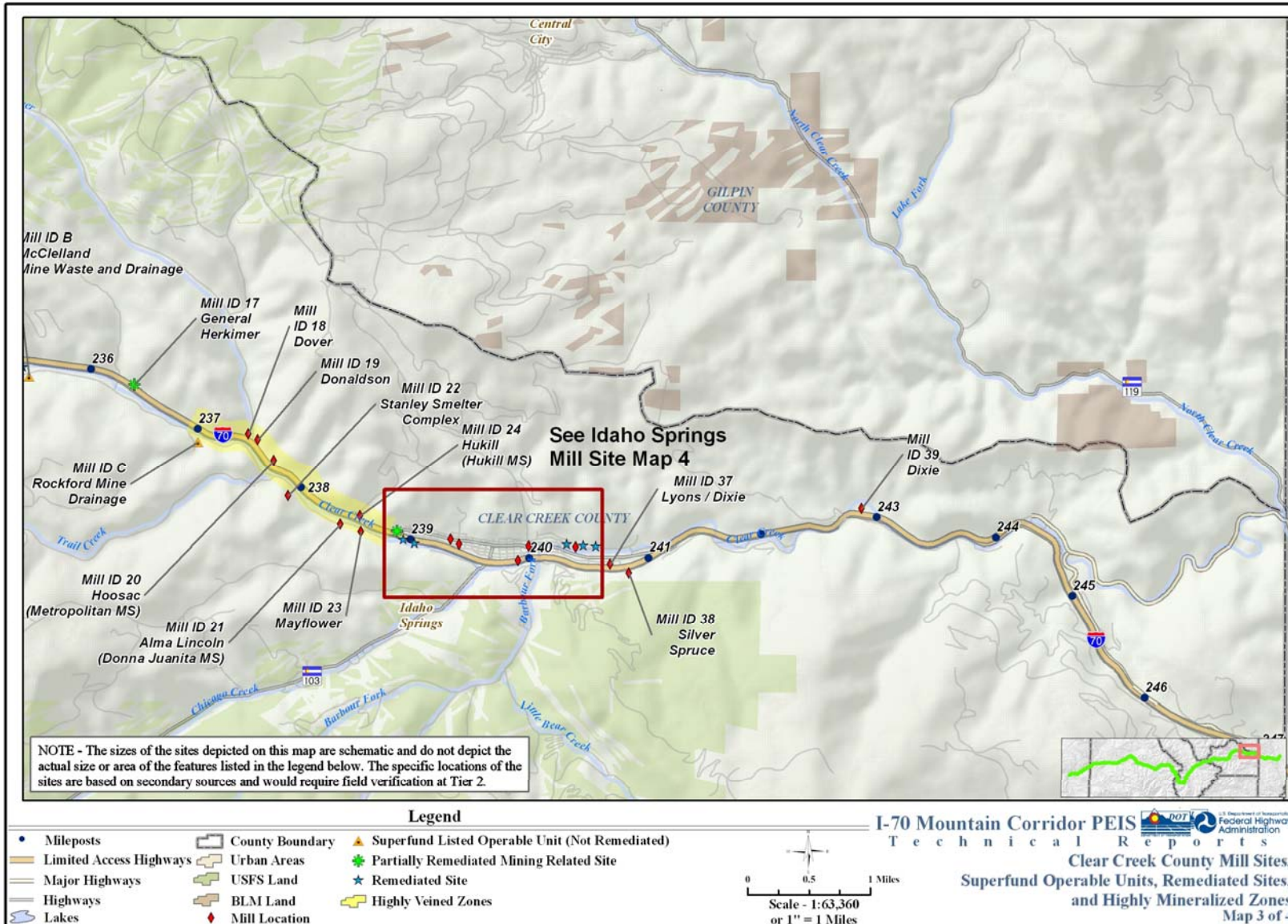
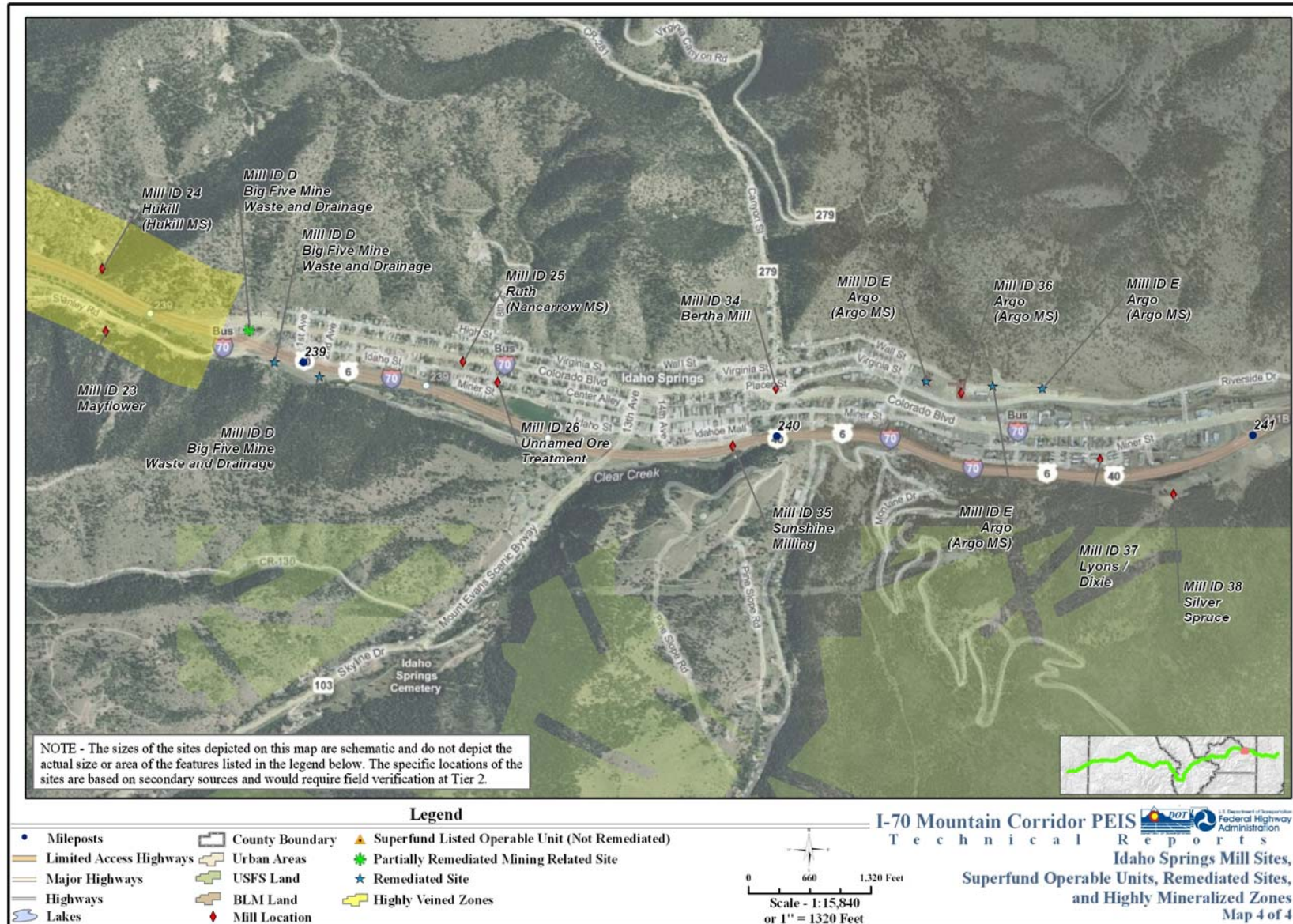


Figure 4. Mill Sites, Superfund Operable Units, Remediated Sites, and Highly Mineralized Zones in Idaho Springs



4.1 Federal and State Environmental Records Review

Federal and state environmental records searches identify the following types of sites:

- **Federal NPL and CERCLIS sites.** These sites are regulated under the Superfund program, and tend to be sites where impacts to soil, groundwater, and/or surface water have occurred over a long timeframe, and therefore, tend to be larger and may have more widespread impacts.
- **Federal RCRA TSD facilities and large- and small- quantity generators of hazardous waste.** Registered generators can be a source of contamination if the materials are mismanaged, and releases from these facilities have greater potential for more widespread impacts than spill and UST/LUST sites.
- **NRC and ERNS spill sites.** Spill sites located along the I-70 highway are related to specific highway incidents and therefore have the potential for small, localized impacts. Most are addressed immediately at the time of occurrence. If a spill were to occur during project construction, it would disrupt construction until it was mitigated.
- **Colorado State UST and LUST sites.** These sites also have the potential for small, localized impacts. Remediation of LUST sites (which frequently consists of excavation and disposal of contaminated soil) tends to occur over a small area and requires less time than the remediation of Superfund or RCRA sites. However, the sites are important because leaks often occur over a long period of time undiscovered and can travel through the soil and enter groundwater.
- **Mine tailings, other mining wastes, tunnel drainage and mineralized rock sites.** Mining activities are prevalent in the Corridor, and mine waste materials have the potential to release contaminants (such as heavy metals and acid drainage or runoff) during and after construction.

The following describes the sites in the Corridor identified from the 2002 review of the federal and state environmental records listed in **Section 2**. The data are intended to provide context to the types and magnitude of issues with regulated materials and is while general and dated provides a reasonable basis for comparison of impacts at the Tier 1 level. New record searches will be performed during Tier 2 processes to characterize and evaluate specific locations of concern.

4.1.1 Federal National Priorities List and Comprehensive Environmental Response, Compensation, and Liability Information System Sites

CERCLIS sites, also referred to as “Superfund Sites,” are regulated under CERCLA. A site qualifies for inclusion on the National Priority List (NPL), or Superfund list, when the Environmental Protection Agency determines a release or threatened release of hazardous substances may endanger public health, welfare, or the environment. One Superfund site is located within the Corridor, and others are located near the Corridor and could contribute to water contamination in the Clear Creek watershed.

The Clear Creek/Central City Superfund site was added to the NPL by the Environmental Protection Agency in 1983. Five historic mine-related “Operable Units” (OU) within the Clear Creek/Central City Superfund site are located within the I-70 Mountain Corridor. The CDPHE is the lead agency responsible for implementing remedial activities at this site (in Colorado, the lead agency for Superfund remediation may be either the Environmental Protection Agency or CDPHE) and works with Environmental Protection Agency for regulatory actions at the Clear Creek/Central City Superfund site. Regulatory actions have included CERCLA investigation, remediation, and Records of Decision. Several OUs near Black Hawk and Central City are located outside the Corridor but contain mine-related materials that contribute to nonpoint source contamination in the lower Clear Creek Basin that results in a reduced fishery, as well as impacts on other aquatic life and habitat. Acidic, heavy-metal laden mine water that drains from historic mines, and mine wastes, such as tailings and waste rock, contribute to the nonpoint source contamination of the basin.

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Table 1 lists the OUs in the immediate area of the I-70 highway, and **Figure 2 through Figure 4** show the locations (by letter) of these OUs. Some of these mine and mill sites have been remediated or are undergoing treatment to reduce impacts on Clear Creek. Sites where remediation has been performed are shown as blue dots on the maps. Partially remediated sites, shown as purple dots, include the McClelland mine waste and tailings and General Herkimer sites. Superfund OUs that have not been remediated, or where remediation failed, are shown as green dots and include Burleigh drainage, McClelland drainage, and Rockford drainage.

Table 1. Sites Listed as Operable Units Within the Clear Creek/Central City Superfund Study Area and Near the I-70 Highway Right-of-Way (as of 2002)

Site (OU) Letter	Site Name	Mill Tailings	Mine Drainage	Mine Waste	Comments
A	Burleigh	Y	Y		Passive mine drainage, treatment failed.
B	McClelland	Y	Y	Y	Mill tailings excavated from Clear Creek and capped. Mine waste pile and drainage remain, but drainage is not designated an OU.
C	Rockford		Y		Named in OU 3 but no action cited in the Record of Decision. Continues to drain into Clear Creek.
D	Big Five		Y	Y	Mine dumps on both sides of Clear Creek excavated from the creek and capped. Drainage in process of being conveyed to Argo treatment plant.
E	Argo	Y	Y		Drainage treated since 1998. Mill tailings partially capped with runoff controls. Water treatment plant is active and currently undergoing expansion.

**Camp, Dresser, and McKee, 1990*

Key to Abbreviations/Acronyms

OU = Operable Units

Clear Creek is a drinking water source for more than 350,000 people living in the Denver metropolitan area and is a favored place for kayaking, rafting, fishing, and wildlife observation. Water quality concerns for the Clear Creek watershed are discussed in **Section 4.2**. The human health hazard associated with these sites involve potential exposure to heavy metals, primarily lead, arsenic, and cadmium. Soil from the tailings piles and waste rock can contain heavy metals. Although the entire Clear Creek/Central City Superfund Site is characterized by historic mining and only certain priority areas have been selected for CERCLA actions at this time, this does not preclude future CERCLA actions at other areas within the Clear Creek/Central City Superfund Site.

The Colorado Department of Public Health and the Environment, with support from the Environmental Protection Agency, initiated cleanup of priority waste piles in Clear Creek County that were deemed to be the highest priority from the perspective of improving the water quality of Clear Creek. The Colorado Department of Public Health and the Environment and Environmental Protection Agency have worked with a number of government entities, developers, individual property owners, and community stakeholders to complete cleanup work at the priority waste pile locations. The cleanup plans for the Clear Creek/Central City Superfund Site call for treatment of contaminated water discharging from a number of different mines, capping of tailings and waste rock piles determined to be the largest sources of contamination, further investigation of groundwater, and identification of contaminated domestic wells. Water treatment equipment has been installed to treat contaminated groundwater from domestic wells, and a water treatment plant is being used to treat water discharging from a number of mines. Site cleanup progresses as required, and as funding allows.

4.1.2 Federal Resource Conservation and Recovery Act Generator Sites

Resource Conservation and Recovery Act sites generate, treat, store, and/or dispose of materials designated as hazardous waste.

One large-quantity generator (LQG) (in Glenwood Springs) and 54 small-quantity generators (SQG) were identified in the 2-mile search area along the I-70 highway or near its interchanges. **Table 2** shows the distribution of these sites by county. No data collected indicate that environmental contamination has occurred at any of the RCRA generator sites identified in the Corridor.

Table 2. Federal and State Listed Generators

County	Number of RCRA LQGs	Number of RCRA SQGs
Garfield	1	10
Eagle	0	8
Summit	0	4
Clear Creek	0	0
Jefferson	2	32
Total	3	54

Key to Acronyms/Abbreviations

LQG = large-quantity generators

SQG = small-quantity generators

4.1.3 National Response Center Database Sites (Hazardous Materials Transport and Spills)

The National Response Center database sites include reported incidents of CERCLA hazardous substance releases or spills.

Two overlapping lists of reported hazardous substance spill incidents in the Corridor include 40 incidents between 1987 and 1997 and 74 incidents between 1990 and 2002. This timeframe, while old, is considered reflective of the types and frequencies of instances likely to occur in the Corridor because it covers a long period –more than a decade – and empirical data of any age are relevant to potential spill trends. Most spills are cleaned up, contained, and monitored immediately following the incident as appropriate by the Colorado State Patrol and/or federal, state, and local hazardous materials emergency response personnel. State and/or federal environmental regulators including CDPHE and Environmental Protection Agency may have become involved when waterways or groundwater contaminated with hazardous materials and long-term cleanup/monitoring were required. **Table 3** shows the distribution of these spill sites by county.

Table 3. Federal and State Listed Releases

County	Number of ERNS Spill Sites (1987 to 1997)	Number of NRC Spill Sites (1990 to 2002)
Garfield	2	10
Eagle	15	14
Summit	6	22
Clear Creek	1	15
Jefferson	16	13
Total	40	74

Key to Acronyms/Abbreviations

ERNS = Emergency Response Notification System

NRC = National Response Center

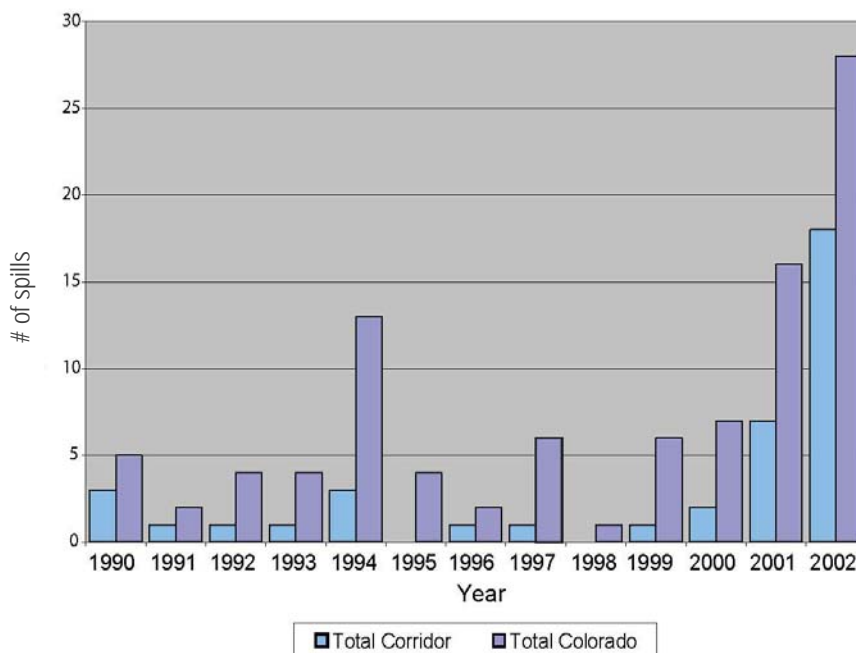
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The I-70 highway is a designated and posted hazardous materials transport route from the intersection with US 6 east of Loveland Pass (milepost 216) to the intersection with I-25 in the Denver metropolitan area (milepost 274), and from the Utah state border (milepost 0) to US 6 at Silverthorne (milepost 205) (*CDPS Rules and Regulations Concerning Hazardous Materials Route Designation*).

Transportation related hazardous materials spills are directly related to traffic crashes. The Colorado Department of Transportation reviewed crashes on the I-70 highway that occurred from August 1996 to December 2001 (J.F. Sato and Associates 2002). This time period, while dated, is a reasonable representation of crash trends on the I-70 highway, which show an expected increase in spills correlated to an increase in vehicle miles traveled. A total of 685 crashes occurred during this approximately five-year period. The primary vehicle involved in crashes was either a truck weighing more than 10,000 pounds or a bus with more than 15 passengers. Trucks also were the secondary vehicle involved in 397 crashes.

Seventy-nine percent of all spills on the I-70 highway in Colorado reported to the NRC have occurred in the Corridor. Reported spills (in the “mobile” category of the NRC database) generally increased in the Corridor and the state between 1990 and 2002, as shown in **Figure 5** below. It is likely that the spike in spills both in the Corridor and in Colorado overall in 2001 and 2002 is related to increases in vehicle miles traveled.

Figure 5. Spill Frequency in the Corridor and State of Colorado (1990 to 2002)



4.1.4 Underground Storage Tank/Leaking Underground Storage Tank Sites

Numerous sites with USTs, ASTs, and LUSTs are clustered at Corridor population centers and near I-70 highway interchanges. These sites are usually retail fuel stations, local/state/federal vehicle maintenance facilities, industrial facilities for bulk fuel storage, and sites associated with ski lift operations. At the time of the records search in 2002, 741 total USTs and 300 active USTs (in use at the time of the records search) were recorded with the Colorado OPS in the five counties adjacent to the I-70 highway, and twenty-three active ASTs were identified in the same five counties. “Inactive” LUST sites are those that

have adequately addressed requirements of the Oil Inspection Section (OIS) of the OPS. “Active” LUST sites are being investigated or cleaned up and monitored under Colorado OPS authority. LUST sites included 28 active LUST sites and 134 inactive LUST in the five Corridor counties. **Table 4** shows the total number of UST and LUSTs in each category, by county.

Table 4. UST and LUST Sites

County	Total USTs on Record	Active USTs on record	Active ASTs	Inactive LUST Sites	Active LUST Sites
Garfield	154	49	0	39	1
Eagle	297	123	22	48	8
Summit	170	73	1	31	12
Clear Creek	117	52	0	14	7
Jefferson	3	3	0	2	0
Total	741	300	23	134	28

Key to Abbreviations/Acronyms

AST = aboveground storage tank

UST = underground storage tank

LUST = leaking underground storage tank

4.2 Mill and Historic Mining Sites

The Corridor passes through areas of substantial historic metals mining and, to a lesser degree, other types of mining (gypsum mines and gravel quarries). The Central City-Idaho Springs District was the first major mining district in Colorado, established in January 1859. Gold and silver were the major metals mined, with lesser amounts of copper, lead, zinc, and uranium mined. Many of the historic mines in the Corridor are in much the same condition as when mining activity ceased, and their present-day features (described in **Section 4.3**) pose hazards and constraints on proposed I-70 highway modifications. Water quality is impaired when heavy metals are released from mined materials and tailings and from acid drainage from abandoned or active mines.

4.2.1 Distribution of Sites

The Environmental Protection Agency lists 789 historic mines within a 2-mile radius of the Corridor, nearly all (754) of which are located between mileposts 222 and 242 in Clear Creek County. Refer to **Figure 1 through Figure 4** for the locations of mine mills, Clear Creek/Central City Superfund Site OUs, partially remediated and remediated mining-related sites, and areas of intense metal veining, as discussed in **Section 4.4** and related subsections. Local stakeholders have raised concerns about mill sites within the I-70 highway right-of-way in Clear Creek County (Clear Creek Foundation [CCF], January 2005; Upper Clear Creek Watershed Association [UCCWA], April 2005).

Additional research performed in 2005 and 2006 identified and characterized mill sites in the Corridor in *Mill Sites in the I-70 Right of Way*. The research found that many of the mill sites were plat filings for potential mills adjacent to mineral claims (Slagel, June 2003). If these mineral claims contained no ore, or minimal ore, the mill sites were not developed. As such, these “undeveloped” mill sites are not shown in traditional record searches. **Table 5** lists mill sites in Clear Creek County from west to east identified through this additional research. Sites are depicted on **Figure 1 through Figure 4**. Mills are shown as numbered red-colored dots. Heavily veined zones in the area of the I-70 highway (mineralized rock) are shown as yellow-highlighted areas, and are based on information from *Geology and Ore Deposits of the Front Range, Colorado* (Lovering and Goddard, 1950).

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Table 5. Mill Sites in the Area of the I-70 Highway (Clear Creek County)

Mill ID #	Survey No.	Name ¹	References ²
1	17078B	Bakerville (Argentum MS)	iii, iv, viii (p.60-62); burned 1871
2	–	Baltimore	iii, vii, x
3	652B	Terrible (Thompson MS)	iii, iv, x
4	–	Smuggler MS	iii, vii
5	249B	Silver Leaf (Mammoth MS)	iv, vii
6	726B	Mendota (Trinidad MS)	i, iii, iv, v (1907), vii, x
7	451B	Burleigh (Tealy MS)	v (1900, 1907), x
8	2266B 1712B	Payrock (Englewood or Millsite MS)	ii, iii
9	–	Centennial	vii
10	–	Capital Prize	vii
11	817B	Commonwealth (Commodore MS)	ii, iv
12	–	Lot 9	i, iv, vii
13A ³	904	Wolcott Placer	ii (several plat maps)
13B	10791	Junction Placer	ii (several plat maps)
14	16416B	Red Elephant (Link MS)	i, ii, iv, vii
15	–	Blue Ridge (Blue Ridge MS)	ii, iii, vii
16A ⁴	12028	Sprecht /McClelland (Sprecht/Hiawatha MS)	ii, vii
16B	604B	Snider	i
17	1194B	General Herkimer	i, ii, iv, vii
18	–	Dover	iii, vi (1907), vii
19	–	Donaldson	iii, vi (1895, 1907—Donaldson), vii
20	1275B	Hoosac (Metropolitan MS)	ii, iv, vii
21	–	Stanley Smelter Complex	ii, iii, vi, vii (Whale ⁵ —1872 Plutus/Salisbury—1890; Stanley—1896, 1900, 1907)

¹ Mill names change over time; more than one name may be shown for the same location. MS: Mill Site.

² References are shown by number: i=Colorado Department of Transportation right-of-way maps for I-70 construction (approximately 1958 to 1971); ii= historical plats from Clear Creek County archives; iii=historical pictures from Clear Creek County archives; iv=map by Slagel (2003); v=Sanborn Fire maps (with years mapped) for Georgetown-Silver Plume areas; vi=Sanborn Fire maps (with years mapped) for Idaho Springs areas; vii=location of mill site in the field, with confirmation from local residents or historians; viii= “The Saga of Upper Clear Creek”(1983) by Erl H. Ellis and Carrie Scott Ellis, a historical description of mining in the region; ix=Bureau of Land Management plat maps; x=U.S. Geological Survey Topographic Map (1906), 1 in.=100 ft. scale

³ Sites 13A and 13B represent placer plats that have shown mill sites on different historical maps. There is no reference in either case to a “Swansea mill,” noted as being located at Empire Junction, in Clear Creek County Foundation’s comments of January 14, 2005.

⁴ This mill, on the south side of Clear Creek, is the only one shown on plat maps of the area. Colorado Department of Transportation right-of-way maps show a mill on the Snider plat but on the north side of Clear Creek. It is presumed that the “Clear Creek Mill” noted in Clear Creek County Foundation’s comments of January 14, 2005, is one of these two sites. Several mills were located near Dumont over time.

⁵ The Colorado Miner, October 16, 1872, refers to the inauguration of a Swansea Furnace at the Whale Mill.

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Mill ID #	Survey No.	Name ¹	References ²
22	1031B	Alma Lincoln (Donna Juanita MS)	ii, iv, vi (1895), vii
23	–	Mayflower	vi (1890, 1907), vii
24	615B	Hukill (Hukill MS)	iv, vii, vi
25	1345B	Ruth (Nancarrow MS)	ii, iv, vi (Chamberlain—1900, 1907; No name—1931)
26	–	Unnamed ore treatment	i, vii
27	–	Unnamed ore treatment	vi (1931), vii
28A	–	Clear Creek/Gilpin	iv, vi (Dewey Bros.—1895; Denver Smelting—1900; Kilton Red.—1907; CC-Gilpin Ore Co.—1931)
28B	–	Sampler/Sampling works	vi (Idaho Conc. & Sampling—1886; CC/Gilpin—1900, 1931)
29	299B	Gem (Becker MS)	iv, vi (R. Mott—1886, 1890; Newton—1895; Newton/State—900; Gem/Newton—1907, Consolidated/Gem—1931)
30	280B	Mixell (Edwards MS)	iv, vi (1900, Boniet—1907), vii
31	–	Hudson	vi (1907)
32	–	Jackson	iii, vi (1900, 1907), vii
33	–	Waltham	vi (1907)—500 feet south of Jackson
34	–	Bertha Mill	vi (Anderson—1900; Bertha—1907)
35	–	Sunshine Milling	vi (1890; Id. Spgs. Reduct. Co.—1907)
36	8580B	Argo (Argo MS)	i, ii, iv, vi (1900, 1907, 1931)—see map
37	–	Lyons/Dixie	i, vii (moved to Dixie #39)
38	–	Silver Spruce	i, ii, vii, ix
39	–	Dixie	iv, vii (see Lyons/Dixie)

Of the 39 mills listed in **Table 5**, three—Centennial, Capital Prize, and Argo (#9, #10, and #36, respectively) —are located well outside the I-70 highway right-of-way. In addition, the Dixie Mill (#39) in Hidden Valley is mostly located outside CDOT right-of-way.

Mill sites 29 through 32 are located near the I-70 highway and SH 103 interchange (Chicago Creek) at Exit 240 (see **Figure 4**). In this area, mine waste tailings are known to exist under the roadway/interchange, the football field to the west, the recreation center to the north, local roads, and possibly the United States Forest Service Ranger Station to the south. When the I-70 highway was initially built, Clear Creek was moved to the south between Chicago Creek on the east end and the Big Five mine tunnel on the west end. The original creek bed was located in the area of a present-day trailer court and football field in Idaho Springs. Because most tailings were dumped in Clear Creek before the 1940s, acidic, metals-rich sediments may be present in this area of the former creek bed.

Mill and mining sites are a particular concern for water quality, and issues associated with water quality from mill sites, mine dump waste, tunnel drainage, and mineralized rock are discussed separately. The potential effect of these sites on the water quality of Clear Creek and its tributaries is discussed below.

4.2.2 Water Quality and Mill Sites

Compared to mine dump waste, mill sites are more likely to present environmental concerns related to water quality because ore processed in milling operations is ground to a fine powder (having the consistency of talcum powder), then mixed with chemicals or mercury to remove the gold. Chemicals used in milling include cyanide and sulfide flotation reagents. The fine ore material is much more reactive (more likely to leach pollutants) than pebble, cobble, or boulder-sized material. However, it should be noted that the waste powder, or “tailings,” were generally dumped into either Clear Creek itself (before the 1940s) or “tailings ponds” adjacent to the mills. Therefore, the amount of remaining materials and associated environmental concern at these mill sites is unclear. Historic leaching of these materials into the environment may have reduced concentrations of heavy metals and other pollutants of concern. In addition, Superfund studies that have been conducted since 1982 have not indicated new sources of water resource contamination from mill sites.

4.2.3 Water Quality and Mine Dump Waste

Even though mine dumps generally have less impact on water quality than mills because the waste rock sizes at mine dumps vary from huge boulders to powder, they do have the potential to degrade water quality. The two OUs within the Corridor that include mine dump wastes are McClelland (Site B) and Big Five (Site D) (see **Section 4.1**). These mine dump waste sites are listed in **Table 6** and shown on **Figure 2 and Figure 4**. Additional mine waste areas (not shown on **Figure 1 through Figure 4**) have been identified and are listed in **Table 6**. Mine dump waste areas are often obscured by development activities (roads, structures, and so forth) or by natural processes and cannot be identified through visual methods alone. It is also unlikely that information inventories would capture all mine dump waste areas. Therefore, more detailed surveys, including sampling activities as appropriate, would need to be performed to identify and characterize mine dumps.

Table 6. Identified Historic Mine Waste Areas Affected by Action Alternatives

Milepost Range	Description
195.3 to 197	Tenmile Canyon Material: Mixture of native material and mine tailings Probable Source: Climax Mine
200	West of Frisco Interchange Material: Mixture of native material and mine tailings Probable Source: Orphan mill site (Excelsior Mine/Mill Site)
224.2	West of Silver Plume Material: Mixture of native material and mine waste Probable Source: Johnny Bull Mine
224.6 to 224.9	Brownville Material: Mixture of native material and mine waste derived from debris flow Probable Source: Brownville debris flow
224.9 to 225.4	Silver Plume Material: Mixture of native material, mine waste, and mine tailings Probable Source: Burleigh Tunnel
235.5 to 235.7	Dumont Material: Mine waste and mine tailings Probable Source: McClelland Mine and mill site

Milepost Range	Description
237.8 to 238.7	Fall River Road to Idaho Springs Material: Mixture of native material, mine waste, and mine tailings Probable Source: Multiple orphan mine sites and Stanley Mill
238.7 to 239.9	Idaho Springs Material: Mixture of mine waste and mine tailings Probable Source: Big Five Tunnel, Black Eagle Mill, and other mill sites
240.0 to 240.7	Idaho Springs Material: Mine waste and mine tailings Probable Source: Argo Tunnel and mill site
240.8 to 241.3	East Idaho Springs Material: Mine tailings Probable Source: Silver Spruce Mill
242.8 to 243	Hidden Valley Material: Mixture of native material, mine waste, and mine tailings Probable Source: Dixie Mill

^a Approximate location of mine waste and mine tailings in existing I-70 highway embankment.

4.2.4 Water Quality and Tunnel Drainage

Tunnel drainage also has water quality impacts that depend on the volume of water flow and the concentrations of metals or acidity of water resources. The largest tunnel drainage site, the Argo Tunnel drainage in Idaho Springs, used to dump approximately 740 pounds of metals into Clear Creek per day (Fliniaux and Norbeck 1997). This quantity has been greatly reduced since treatment of the mine drainage began in April 1998. Other mine tunnel drainage sites in the Corridor have relatively small flows and less impact on water quality than the Argo Tunnel. The locations of tunnel drainage sites are shown as dots on the maps in **Figure 3** and **Figure 4**.

The Argo Tunnel, which is part of the Clear Creek/Central City Superfund Site (see **Section 4.1**), was constructed between 1893 and 1910 to drain water from deep mines along its route from Central City to Idaho Springs. The 4.2-mile long tunnel serviced the mines that were working the rich gold veins in Virginia Canyon, Gilpin Gulch, Russell Gulch, Quartz Hill, Nevadaville, and Central City.

Drainage from this tunnel is the largest single source of metals contamination to Clear Creek. Construction of a 700 gallon-per-minute treatment facility was completed and began operating in 1998. The treatment involves removing metals that are then pressed into a solid waste and disposed of in a solid waste landfill. The treated water is discharged into Clear Creek. Full-time operation of the treatment plant, which also treats drainage from the Big Five Tunnel, prevents approximately 1,200 pounds of metals from entering Clear Creek each day. In addition to water treatment, CDPHE and the Environmental Protection Agency physically stabilized the Argo Mill waste rock and mill tailings piles by regarding and constructing a retaining wall to minimize erosion.

4.2.5 Water Quality and Mineralized Rock

Exposure of mineralized veins of rock can also create metal-rich, acid rock drainage that has the potential to affect water quality. Veins have higher concentrations of metals than mine waste or mill tailings (since the mine waste, by definition, contains concentrations of metals that are too low to profitably process and remove). However, heavily veined areas that are exposed by road cuts along the I-70 highway are limited in size and are slower to react than crushed rock. The highest preponderance of mineralized veins occurs

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from the west end of Idaho Springs (milepost 239) to west of Fall River, (milepost 237) and along Georgetown Hill, from east of Silver Plume (milepost 226) to west of Brown Gulch (milepost 224). In these areas, exposure of mineralized veins to precipitation may affect water quality. Near Fall River, the veins trend northeast and cut across Clear Creek. Near Silver Plume, the veins generally trend east-west and intersect the I-70 highway along Georgetown Hill (Lovering and Goddard, 1950). Areas of heavy veining are shown on **Figure 1 through Figure 4**.

4.3 Environmental Site Assessments and Preliminary Site Investigation

Environmental site assessments are generally performed before property acquisitions in accordance with the latest edition of the ASTM E1527 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. These assessments provide information about a specific location and, although performed under the same standard as the environmental records searches discussed in **Section 4.1**, offer additional discussion of site-specific hazards.

Four environmental site assessments and one preliminary site investigation were performed in the Corridor between 2004 and 2008, generally near existing interchanges within the Corridor to support CDOT projects not specifically related to the I-70 Mountain Corridor PEIS. While limited in scope, these assessments provide site specific information about these interchange locations and a general indication of issues that may be encountered at other interchange locations during project construction.

4.3.1 Colorado Boulevard, Idaho Springs

An Initial Site Assessment (ISA) was performed in April 2004 at Colorado Boulevard in Idaho Springs, Colorado. The ISA was performed in general accordance with ASTM E1527 Standard Practice for Environmental Site Assessments: *Phase I Environmental Site Assessment Process*. Environmental Data Resources, Inc. (EDR) provided the records search for this assessment (EDR, February 2003). Despite the fact that the records search for this ISA was performed approximately 7 years ago, the findings are indicative of those that may be encountered during construction related to mill tailings, placer claims, tunnel drainage, and acid mine drainage. The following findings were included in the ISA:

- It is likely that mill tailings were used as road fill for the eastern portion of Colorado Boulevard. The report states that CDPHE does not require the removal of the tailings where they are discovered and the tailings may be placed back in fills below the roadway without creating a change in conditions.
- Placer claims crossed under Colorado Boulevard in the early 1900s. The extent to which these claims were worked is not known, but there is a potential for voids to exist beneath the roadway.
- The Big 5 Tunnel, which is part of the Clear Creek/Central City Superfund Site, crosses under Colorado Boulevard near the intersection with Stanley Road. It is likely that project construction can be implemented without having an impact on this tunnel.
- Strongly acid water (pH of 2.8) is discharged from the tunnel and collects in a small pond adjacent to the I-70 highway embankment.
- Eight RCRA small-quantity generators of hazardous materials were identified. None of the identified sites were listed as RCRA violators.
- One emergency response notification system incident was reported at 1st Avenue and the I-70 highway on the north side of Clear Creek.
- Fifteen UST sites were identified. Seven of the sites are closed.
- Six LUST sites were identified. Five of the LUST sites have been closed and are no longer active. The OPS files indicated that the five closed LUST sites did not have an impact on groundwater

and received “No Further Action” required letters from OPS. The sixth LUST site (Get Gassed Conoco, 1856 Colorado Boulevard) was the result of a gasoline leak that was discovered on September 3, 1996. Corrective action was ongoing when the ISA was prepared.

- One hundred fifty two registered wells were identified within a 1-mile radius of Colorado Boulevard, including domestic, irrigation, commercial, industrial, livestock, and municipal water wells. Sixty-four of the identified wells are listed as monitoring wells.
- It was recommended that a Preliminary Site Investigation be performed to provide a more complete characterization of the environmental conditions along Colorado Boulevard resulting from previous mining activities and potential groundwater plumes associated with the LUST sites.

4.3.2 Ramp Metering Locations – Idaho Springs and Downieville

A Modified Environmental Site Assessment (M-ESA) was performed in May 2005 to support the Interstate 70 Ramp Metering Projects for the following on-ramps to the eastbound I-70 highway: eastbound Colorado Boulevard in Idaho Springs (Idaho Springs East), northbound SH 103 (Mount Evans-SH 103), the Town of Downieville (Downieville), and southbound US 40 near Empire (Empire Junction). The M-ESA was performed in general accordance with ASTM E1527 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, and CDOT’s guidelines for an M-ESA. Environmental Data Resources, Inc. performed the records search for this assessment (EDR, April 2005), and the findings are indicative of the issues that may arise during construction, despite the fact that the records search was performed approximately 5 years ago. The M-ESA included the following findings:

- The I-70 highway from Idaho Springs to the Empire Junction exit was constructed during the early 1960s on natural materials and fill, some of which contain mine tailings.
- The Central City/Clear Creek Superfund Site is located within a 0.5-mile radius from the Idaho Springs East and Mount Evans-SH 103 ramps.
- Four RCRA facilities (either generating and/or transportation, storage, or disposal [TSD]) were identified within a 1-mile radius of the Mount Evans-SH 103 ramp.
- Four registered UST sites were identified within a 0.5-mile radius of the Mount Evans-SH 103 ramp. At the time of the M-ESA, all four sites had USTs that were inactive but were not known to be leaking.
- Five LUST sites were identified in Idaho Springs within a 0.5-mile radius from the Idaho Springs ramp (three sites) and Mount Evans-SH 103 ramp (two sites). Three of the LUST sites were still open at the time that the M-ESA was prepared: Scorpion Shell, 2808 Colorado Boulevard; Get Gassed, 1856 Colorado Boulevard; and Amoco Oil 5329, 1319 Miner Street. One of these LUST sites (Get Gassed) was also identified in the 2004 Initial Site Assessment.
- The M-ESA did not identify any environmental conditions that pose constraints upon the proposed improvements to the I-70 highway ramps; however, due to extensive historic mining in the area, it was recommended that a sampling program and analyses for the eight RCRA metals (silver, arsenic, barium, cadmium, chromium, mercury, lead and selenium) be conducted.

In response to the May 2005 M-ESA, a preliminary site investigation was performed in June 2005 for the same areas.

- Ten borings were advanced using hand augers to depths of 1 to 4 feet below the existing grade, outside the existing pavement. The borings were drilled at the following general ramp locations: Empire Junction Ramp – Borings ES-01 and ES-02; Downieville Ramp – Borings ES-03, ES-04,

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and ES-05; Mount Evans-SH 103 Ramp – Borings ES-06 and ES-07; and Idaho Springs East Ramp – Borings ES-08, ES-09, and ES-10.

- The RCRA metal concentrations reported in the soil samples obtained from the 10 borings were below the CDPHE residential soil cleanup standards, with the exception of arsenic. Elevated concentrations of arsenic were measured in the samples obtained from Borings ES-05 (Downieville Ramp), ES-06 and ES-07 (Mount Evans-SH 103 Ramp), and ES-08 and ES-09 (Idaho Springs East Ramp). The concentrations in these samples ranged from 3.3 to 14 mg/kg, which exceed residential, commercial, and industrial cleanup standards.
- The measured arsenic concentrations are below the Environmental Protection Agency risk-based target concentration (35 mg/kg in bedrock and alluvium).
- The report recommended that subsurface materials within the project area be handled and monitored in accordance with Section 250 of the CDOT Standard Specifications. Dust suppression should be used, and erosion control practices should be strictly adhered to in accordance with Section 208 of the CDOT Standard Specifications, to mitigate potential impacts on surface water.

4.3.3 Dumont

A Modified Environmental Site Assessment for the I-70 highway and Dumont Eastbound On-Ramp in Clear Creek County, Colorado was performed in February 2007. The M-ESA was performed in general accordance with ASTM E1527 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, and CDOT's guidelines for a M-ESA. Environmental Data Resources, Inc. performed the records search for this assessment (October 2006). Despite the fact that the records search for this M-ESA was performed approximately 4 years ago, the findings are indicative of the issues that may be encountered during construction and are still believed to be valid since the location is limited in extent, and has not undergone major development in the past 4 years. The following findings were included in the M-ESA:

- One closed facility with four registered USTs was identified within a 0.5-mile radius.
- No former hazardous waste sites and records of petroleum spills within the site assessment area were identified.
- Preliminary sampling and testing were performed on a sample of subsurface materials obtained at a depth interval of about 0 to 2 feet below existing grade, adjacent to the ramp. The material consisted of sand with cobbles and boulders that contained debris consistent with mine waste. In five separate attempts to obtain a representative sample, the soil probe was unable to penetrate the soil due to the presence of cobbles and boulders. The reported arsenic concentration was below the detection level and all of the other RCRA metals were below CDPHE's residential cleanup standards.
- The low concentrations of RCRA metals in the near surface soils do not indicate a risk from hazardous materials to the proposed work. Because the subsurface materials contained debris consistent with mine waste, it was recommended that any soil removed during trenching or augering be placed back into the ground at the site. Workers should follow specified health and safety regulations concerning handling of soils with heavy metal content.

4.3.4 Eagle Interchange

A M-ESA for the I-70 highway Eagle Interchange Upgrade in Eagle, Colorado was performed in September 2008. The M-ESA covered the I-70 highway Eagle interchange and extended south along Eby Creek Road (I-70F) approximately 0.28 miles to US 6. In addition, a portion of US 6 was included in the project study area. The M-ESA was performed to support the design and construction of the Eagle

interchange. Environmental Data Resources, Inc. performed the records search for this assessment (June 2008). Due to the relatively recent date of this report, it is believed that the M-ESA findings, which are listed below, are valid:

- Three RCRA non-generator sites were identified. No reported environmental incidents were associated with these facilities that would have an impact on the proposed upgrade project.
- Five LUST sites were identified within a 0.5-mile radius of the proposed upgrade project. The sites are closed and are not considered to pose an environmental risk to the proposed upgrade project.
- One LUST Trust site was identified. The Trust application was for the cleanup of an aboveground storage tank (AST). The cleanup was completed and the LUST files were closed. This site does not appear to pose an environmental risk to the proposed upgrade project.
- Eight registered UST sites were reported within or adjacent to the proposed upgrade project. Five of these sites are closed and are not considered an environmental risk to the proposed upgrade project. No environmental violations were reported for the three existing gas stations that were open at the time that the M-ESA was prepared.
- Two AST sites were identified. One AST site is closed. The other AST site is located on the bluff adjacent to the Eagle River. These two AST sites are not considered an environmental risk to the proposed upgrade project.
- No recognized environmental conditions were identified that would have an impact on the proposed upgrade project. No former hazardous waste sites and petroleum spills were identified within the proposed upgrade project area.

Section 5. Environmental Consequences

Potential impacts on identified hazardous and regulated materials due to construction of alternatives will depend on design factors such as roadway excavation requirements, pier excavation and placement, and tunnel pathways. At the Tier 1 level, a broad area around the I-70 Corridor was evaluated to determine potential for the Action Alternatives to interact with regulated materials and mining wastes. This analysis is presented to provide a relative comparison of alternatives but does not presume to detail impacts to individual sites because none of the Action Alternatives are designed at a level that detailed impacts could be determined. Details on the contamination associated with regulated material and mining sites in many cases is also unknown, and additional characterization of these sites would be required to fully evaluate impacts.

5.1 Direct Impacts

All of the Action Alternatives would interact to some degree with regulated and hazardous material sites such as UST/LUST sites and residual spill material at spill sites. No identified RCRA sites are expected to affect alternatives in the Corridor. Construction of all Action Alternatives in Clear Creek County requires the disturbance and reworking of many mine waste piles, including some designated Clear Creek/Central City Superfund site OUs. All Action Alternatives are likely to affect mine and mill waste, as well as acid mine drainage in the Silver Plume, Georgetown, Empire Junction, Dumont, Fall River, Idaho Springs, and Hidden Valley areas. Elevated transportation segments for the Transit and Highway alternatives minimize and avoid direct impacts in the immediate area of Idaho Springs. A higher degree of impact is expected for the Rail with Intermountain Connection Alternative (because it is constructed primarily at grade adjacent to the I-70 highway and will require substantial cut and fill), Highway alternatives in Clear Creek County (due to the location of Superfund operable units, propensity of mine-related sites and highly mineralized veins), and Combination alternatives (again because of the footprint width and potential correlation to the amount of cut and fill).

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Impacts on water quality from regulated materials and mines would be dependent on the degree of disturbance to specific areas where mill waste, mine dump wastes, and/or mineralized rock exist. Such disturbance is of most concern in areas that might introduce new opportunities for the leaching and transport of pollutants. In general, disturbance of mill site waste, mine dump waste, and mineralized rock areas could affect water quality through transport of windblown dust and leaching/drainage of heavy metals or other contaminants into water bodies. Specific horizontal and vertical characterization of mill waste and mine dump areas has not been performed in most areas of the Corridor. Sites identified on **Figure 1 through Figure 4** provide only general locations.

Of the Transit alternatives, the elevated Advanced Guideway System Alternative has the potential to result in fewer impacts related to regulated materials and historic mining than the Rail with Intermountain Connection or Bus in Guideway Alternatives, based on the likelihood that Advanced Guideway System pier construction requires less excavation and that the footprint width (which is assumed to be correlated with the potential for cut and fill) is less than those of the other Transit alternatives and occurs primarily within the I-70 highway right-of-way. The Bus in Guideway alternatives result in fewer impacts than the Rail with Intermountain Connection Alternative because they will largely be constructed in the median (a previously disturbed area) and require minimal excavation. In addition, the Bus in Guideway alternatives have smaller overall footprints than the Rail with Intermountain Connection Alternative, which is assumed to be correlated to the potential for cut and fill.

The Highway alternatives are relatively similar to each other in overall impacts and have more impacts on historic mine waste materials than the Advanced Guideway System and Bus in Guideway alternatives but fewer impacts than the Rail with Intermountain Connection Alternative.

The Combination Six-Lane Highway with Rail and Intermountain Connection Alternative has the greatest direct impacts on historic mine waste materials due to its larger footprint width, which is assumed to be correlated to a greater potential for cut and fill. The Combination Six-Lane Highway with Advanced Guideway System and Combination Six-Lane Highway with Bus in Guideway alternatives have similar impacts on historic mine waste materials.

The Preferred Alternative has a range of impacts depending on adaptive management strategies used as the need arises. The Minimal Program includes non-infrastructure related components, Advanced Guideway System, and highway improvements up to the Maximum Program that includes the same components as the Six-Lane Highway and Combination Six-Lane Highway with Advanced Guideway System alternatives. Impacts are greater with the Maximum Program, if fully implemented due to additional areas of highway widening compared to the Minimal Program.

5.2 Indirect Impacts

Indirect environmental impacts from regulated materials may result from project construction; hazardous materials transport; or commercial, industrial, and highway operations and maintenance activities. The No Action Alternative is expected to have the fewest indirect impacts, with the Minimal Action Alternative expected to have fewer indirect impacts than all of the alternatives except the No Action Alternative. The No Action Alternative would be associated with a higher incidence of crashes and spills since there would be no improvement to mobility and/or safety. Traffic volumes are anticipated to increase with or without a project. Interchanges may be constructed by private developers, which could result in an increase in the number of gas stations, commercial and industrial activity, and highway maintenance activities in the corridor. The potential for releases of hazardous materials could therefore increase. Activities at gas stations, maintenance shops, and service stations could result in runoff of hazardous materials into surface waters, particularly through tracking of gas, oil, and dirt; spills that occur during refueling; and waste releases to sewer systems.

Historically mined areas are characterized by highly mineralized rock. Rock cuts for future roadway improvements will likely expose mineralized rock, which in the presence of precipitation could produce acid runoff. Highly mineralized areas that could be sources of potential surface water contamination extend from Floyd Hill to Empire (mileposts 233 to 245), as well as Georgetown and Silver Plume (mileposts 223 to 228). The area that has the highest prevalence of mineralized rock extends from just west of Fall River Road to the town of Idaho Springs (mileposts 237.5 to 239). This segment also has the potential for low pH (acid) groundwater (including possible seepage from rock cuts). All of the Action Alternatives include some work in these areas that would have the potential to disturb or expose mineralized rock and acidic groundwater.

Transit alternatives, and to a lesser extent, Highway alternatives, have the potential to induce growth primarily in Summit and Eagle counties, which might cause indirect impacts from increased industrial/commercial activities and related increases in spill incidents. However, a reduction in vehicle trips is anticipated with the Transit alternatives, which would reduce accident areas and result in fewer indirect impacts than the Highway alternatives.

Highway alternatives allow increased truck transport along the I-70 Corridor; however, they also address safety issues and crash areas and, therefore, these factors tend to offset one another. Highway alternatives are associated with minimal induced growth (less than Transit alternatives) in Eagle County and minimal impacts via increased industrial/commercial activities and related increases in spill incidents.

Alternatives that include tunnels (Transit, Highway, Combination, and Preferred Alternative) have considerable potential for indirect impacts related to highway operation and maintenance activities, such as bridge painting, and highway restriping and deicing, as well as construction disturbance and increased acid mine drainage.

The Combination Highway/Transit alternatives allow increased truck transport, which may increase the likelihood of spills. However, these alternatives also address safety issues and crash areas. The Combination Highway/Transit alternatives are associated with possible induced growth in Eagle and Summit counties and, therefore, may cause indirect impacts via increased industrial/commercial activities due to increases in traffic and transport of regulated materials. These alternatives are associated with the greatest amount of indirect impacts.

The Preferred Alternative would have impacts within the range of the other alternatives, with the Maximum Program being similar to the Combination alternatives, and the Minimum Program being less.

5.3 Construction Impacts

Vehicles and equipment such as fuel storage tanks used during construction activities have the potential to release regulated materials such as petroleum products. Releases could be minimized by appropriate construction safety procedures and equipment stockpiling methods, and would be reported and addressed under appropriate regulatory guidance.

5.4 Impacts in 2050

There may be changes to regulated materials and historic mining sites by the year 2050. Acidic, heavy-metal laden mine water that drains from historic mines, and mine wastes, such as tailings and waste rock, contribute to the nonpoint source impacts on the Clear Creek basin that are anticipated to occur through 2050. However, the Environmental Protection Agency and local watershed groups will continue remedial efforts by installing erosion control best management practices and treating acid mine drainage. Construction of the Action Alternatives in the Corridor results in additional erosion, further exposing historic mining tailing and/or mineralized rock unless this material is handled to reduce releases into the environment. A contingency plan for handling these materials will be implemented to mitigate these

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impacts. The impact from historic mining sites is expected to continue to decrease over time, as trends indicate improvements in water quality over the past 30 years. The Action Alternatives are not expected to have any effect on these improving trends through 2050.

Clear Creek is a drinking water source for more than 350,000 people living in the Denver metropolitan area and is a favored place for kayaking, rafting, fishing, and wildlife observation. There will be continued efforts to reduce human exposure to heavy metals, primarily lead, arsenic, and cadmium associated with these historical mine sites. For more on cumulative effects, see **Chapter 4** of the PEIS.

Section 6. Tier 2 Considerations

Phase I Environmental Site Assessments will be conducted in accordance with the ASTM E1527-05 standard practice for all Tier 2 processes. Detailed information will be collected about possible contamination from all known or suspected sites to determine actual direct impacts by defining extent and nature of contamination on these sites as a result of Tier 2 processes. If a Tier 2 process is located in an area of concern for regulated materials or mining-related sites, further assessments will be conducted, particularly for mine mills, mine waste dumps, the Clear Creek/Central City Superfund Sites, and areas of intense mineralization, including environmental conditions along Colorado Boulevard in Clear Creek County, where previous Initial Site Assessments identified mining activities and potential groundwater plumes. In addition, Tier 2 processes will use information gathered from mining historians to evaluate impacts to and from active and historic mines. During Tier 2 processes, road cuts will be evaluated to determine impacts from acid mine drainage and acid rock drainage. Constructed wetlands will be evaluated as a potential treatment and mitigation strategy. Tier 2 processes will also include a wildlife survey for bat caves and other animals to ensure they are protected during construction.

Section 7. Mitigation Strategies

As a general rule, CDOT will take the following steps to minimize and avoid potential environmental impacts resulting from regulated materials and historic mine waste.

- Minimize property acquisition and disturbance of mine wastes, tailings, and drainage tunnels and areas adjacent to or within active and inactive LUST sites.
- Minimize impacts on Clear Creek channel and floodplain both during and after disturbance of mine waste, tailings, and drainage tunnels.
- Manage mine waste and tailings materials onsite, when possible, to minimize potential disposal problems and costs.
- Minimize wind-blown dust from mine tailings on construction sites by wetting or other dust control measures.
- Manage mine waste and tailings materials under CDPHE and Environmental Protection Agency guidance and authority.
- Manage contaminated soil and groundwater under applicable CDPHE, Environmental Protection Agency, Colorado OPS, and CDOT regulations and guidance.
- Follow CDOT procedures and other applicable guidance for the storage and handling of regulated materials, as well as historic mine waste during construction activities
- Work cooperatively with various local, state, and federal agencies and local watershed groups to help avoid further impacts on and possibly improve water quality.

- Develop a monitoring and sampling program, as necessary, to monitor contamination, with consideration of the mining history in the Corridor. Previous studies have identified the need to monitor and sample the eight RCRA metals due to extensive historic mining in the Corridor.
- Any soil removed during trenching or augering will be conducted in accordance with specified health and safety regulations concerning the handling of soils with heavy metal content.

Colorado Department of Public Health and Environment recommended that a Mine-Related Materials memorandum of agreement be developed among CDOT, Federal Highway Administration, Environmental Protection Agency, and CDPHE (with involvement of the Solid Waste and CERCLA programs). This memorandum of agreement would have required that Colorado Department of Transportation's mine waste management be consistent with CERCLA cleanups that have occurred elsewhere in the area.

Colorado Department of Public Health and Environment, CDOT, and Federal Highway Administration representatives did prepare a draft memorandum of agreement which was reviewed for legality in relationship with existing legislation. However, following reviews, it was determined that the memorandum of agreement would not add anything to the overall regulatory process and would only add another layer of procedures that would be redundant with existing procedures. As a result, the lead agencies determined that an memorandum of agreement will not be included in the Final PEIS or Record of Decision.

7.1 Leaking Underground Storage Tank Sites

Disturbance of identified LUST sites require coordination with Colorado OPS to ensure proper handling and disposal of contaminated materials (also see CDOT requirements and best management practices below). Construction activities associated with the alternatives may also uncover petroleum contamination from identified LUST sites or from LUST site contamination that was not indicated by research activities. Should contamination be discovered, construction activities will be temporarily halted until characterization/storage/ disposal/cleanup requirements are discussed with the Colorado OPS or a professional familiar with OPS procedures and requirements. Non-petroleum contaminants may also be encountered and will be handled under CDPHE Solid Waste or RCRA Hazardous Materials regulations and requirements, and Environmental Protection Agency toxic substances requirements if applicable.

7.2 Underground Storage Tank Sites

Underground storage tanks from existing and historic service stations may also be encountered. Underground storage tanks must be removed according to Colorado OPS requirements during excavation/construction activities for any of the alternatives where they are affected by the project footprint. Tank removal generally includes sampling and analysis of underlying soil and soil removal (if necessary) to meet OPS designated standards.

7.3 Dewatering

Excavation and grading activities for all of the alternatives, especially those that include tunnel construction, may encounter groundwater and require dewatering activities. Tunnel construction practices include consolidation grouting to minimize water inflow into the tunnel. However, dewatering activities are sometimes required on the tunnel and at the waste disposal (spoil) areas. When dewatering is necessary, permit acquisition (from CDPHE) for discharge of groundwater into nearby surface water may require:

- Water analyses
- Treatment of groundwater to remove specific contaminants to CDPHE- and Environmental Protection Agency-approved levels prior to discharge

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- Lowering of total suspended solids (TSS) to acceptable levels prior to discharge

Groundwater treatment may be accomplished by filtration, air stripping for volatile compounds, or stage dewatering methods. A permit variance may be necessary to meet discharge standards for certain chemicals.

7.4 Acid Rock Drainage

Excavation of road cuts in areas of mineralized rock has the potential to introduce conditions for the leaching of metals from these excavated materials. Potential areas of mineralized rock requiring excavation will be specifically identified during Tier 2 processes. Tier 2 mitigation plans will ensure that acid rock drainage would not affect Corridor water quality through the implementation of appropriate best management practices and appropriate disposition activities for these materials.

7.5 Metal Highway Structures

Disturbance or replacement of highway structures such as painted guardrails, signs, or metal bridge components requires appropriate characterization and disposal according to CDPHE guidelines and requirements due to metals content and the potential for the paint to contain hazardous levels of lead, cadmium, or other metals.

7.6 Colorado Department of Transportation Requirements

Colorado Department of Transportation contractors are required to comply with Section 250, Environmental, Health and Safety Management of the Colorado Department of Transportation Standard Specifications, when applicable. The specifications provide guidelines and requirements for health and safety measures during construction, the investigation and testing of contaminated materials, and procedures to use if contamination is encountered during construction.

All petroleum products and other regulated materials (for example, fuel, solvents) used for the construction of Action Alternatives will be handled and stored per CDOT best management practices to prevent accidental spillage or other harm to the project area. If suspected regulated or petroleum products are encountered during construction, samples of the material will be collected and analyzed for metals, hydrocarbons, organic chemicals (volatile or semivolatile organic compounds), and other toxicity and characteristic parameters to determine what special handling and disposal requirements are appropriate. The telephone numbers for medical and emergency services will be maintained onsite. If any unplanned occurrence requires assistance, the site supervisor or designated person will contact the appropriate response team.

7.7 Historic Mine Waste

Colorado Department of Transportation and Environmental Protection Agency coordination will be required for the handling of mine waste materials, and specific CDPHE and Environmental Protection Agency approval may be required for construction disturbance of sites that are currently designated as NPL sites within the Clear Creek/Central City Superfund Site. Other Clear Creek historic mining sites that pose considerable threats to Clear Creek might also require specific regulatory actions under CERCLA. Regulatory authority for mine tailings and waste would fall under various state and federal programs, depending on where the waste is located and its designation under CERCLA. Colorado Department of Public Health and Environment will have the lead (and will work with Environmental Protection Agency) for regulatory actions at the Clear Creek/Central City Superfund site, and the CDPHE Solid Waste Division would have authority for mine tailings not covered by CERCLA.

In addition, Federal Highway Administration encourages “participation in transportation projects that include the use and redevelopment of contaminated sites when appropriate.” Alternative implementation

might offer a means to clean up contaminants that might not otherwise be addressed by means of the Federal Highway Administration 1998 Brownfields Economic Redevelopment Initiative. The initiative, administered by Environmental Protection Agency, provides assistance and incentives to agencies for the assessment, cleanup, and economic reuse of contaminated properties known as Brownfields.

Although contaminant sampling and testing has not yet specifically been performed for the mine waste materials within the alternative footprints, it is expected (based on previous studies) that much of these waste materials would have relatively low levels of contaminants and would not be within or from sites requiring specific CERCLA remedial actions. Such materials may be suitable for construction material uses, including backfill and landscaping. These materials would be stabilized and maintained during and after construction to minimize environmental impacts. In certain cases, the proposed improvements, through proper handling and stabilization of these materials, would serve to enhance environmental conditions in the Corridor.

Section 8. References

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