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## **PRELIMINARY ASSESSMENT**

### **GOLD HILL TAILINGS SITE**

**EPA ID# COD983801275**

Prepared for:

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
REGION VIII**

**CONTRACT NO. 68-W9-0025  
WORK ASSIGNMENT NUMBER 28-8JZZ**

**December 21, 1993**



**MORRISON KNUDSEN CORPORATION**  
Environmental Services Division  
7100 East Belleview Avenue, Suite 300  
Englewood, Colorado 80111

# APPROVAL PAGE

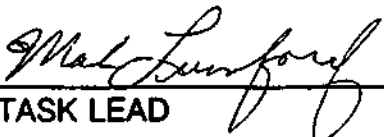
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## **1.0 INTRODUCTION**

Morrison Knudsen Corporation-Environmental Services Division (MK) completed this Preliminary Assessment of the Gold Hill Tailings site in El Paso County, Colorado (EPA ID# COD983801275) under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). Information on the operating history and conditions at the site were collected to assess the potential threat to human health and the environment, and to determine the need for additional CERCLA or other action. This report was prepared in partial fulfillment of Work Assignment 28-8JZZ under ARCS contract number 68-W9-0025.

## **2.0 SITE DESCRIPTION**

### **2.1 Site Location**

The Gold Hill Tailings Site is located in Colorado Springs, Colorado. The tailings pile is 170 acres in size and covers most of the east half of Section 14 and portions of the western edge of Section 13, T. 14 S., R. 67 W. The site is bounded by Fountain Creek and Highway 24 (Midland Expressway) on the north, 21st Street on the west, Rio Grand Street and Moreno Avenue on the south, and residential areas on the east including the A-1 Mobile Village (see Figure 1).

### **2.2 Site History**

The tailings at the site were produced by the milling of ore primarily from the Cripple Creek Mining District in Colorado. A total of 14.3 million tons of ore were processed yielding 12.5 million tons of tailings. Gold was discovered in Cripple Creek in 1891. Ore from Cripple Creek mines was transported by the Midway Railroad Company to ore reduction mills in Colorado Springs. The tailings at the site were produced by the Golden Cycle Mill. In 1901 land was purchased for the construction of the Telluride Mill. This mill, owned by the Telluride Reduction Company (TRC), processed ore using a bromide process (The Westside).

In 1903, the ownership of TRC passed to the General Metals Company of New York. In 1904 the U.S. District Court controlled the mill because of debts. In December of 1905

the mill was purchased by the Golden Cycle Mining Company. Thereafter the mill was known as the Golden Cycle Mill. After process equipment changes were made in order to utilize roasting and cyanide processes, the mill reopened in 1907. In 1907, a coal dust explosion set fire to the complex, and it was almost destroyed. The mill was rebuilt and reopened later that year, and stayed in operation until early 1949, processing 15 million tons of ore (The Westside).

A Sanborn map from 1907 shows 7 furnaces, railroad spurs, various size process and storage tanks inside process buildings, a coal-fired electric generating plant, ore bins and machine and boiler shops.

In 1915, the company's name was changed to the Golden Cycle Mining & Reduction Company. The name was changed again in 1929 to the Golden Cycle Corporation (Mosconi, 1952).

From 1926 to 1932, the mill processed an average of 300,000 tons of ore annually. In 1931, a small capacity cyanide unit was added to the plant. In 1929, a concentrator unit was constructed to treat complex sulfide ores that contain lead, copper and zinc using selective flotation methods. Tailings from the concentrator were further treated with cyanide to recover additional gold and silver. (Mosconi, 1952; Harner, 1933).

An average of 500,000 tons were processed annually from 1933 to 1941. In 1939, a Cottrell Electrical precipitation System was installed at the mill to recover dust passing out of the roasters. This system recovered 97.5% of the flue dust in the roasters. A two story, 50 by 80 foot brick building that was once use for offices at the mill was demolished (GCC, 1939; Old Colorado City Historical Society; Mosconi, 1952).

From December, 1942 to February, 1943 mill operations were modified for the war effort under orders from the War Production Board. Flotation units at the mill were converted to process zinc-lead ores, which do not occur in the Cripple Creek District. These ores were shipped to the mill from zinc-lead mines located in and near Leadville, Montezuma, Kokomo, the Bonanza District, Alma, Clear Creek County, San Juan County, and other mineralized areas of Colorado. Zinc concentrates from the mill were shipped to American Zinc Company smelters in Dumas, Texas and Carondelet, Illinois. Lead concentrates were smelted at ASARCO in Leadville (GCC, 1942; GCC, 1943).

In 1947, two sprinkler lines were installed on the mill tailings dame to reduce the amount of fine sand and dust that blew over Colorado Springs during wind storms. The first sprinkler line consisted of 4,000 feet of 6-, 8- and 10-inch pipe with 120 high-pressure spray nozzles. The second sprinkler line was 2,000 feet long with 80 high-pressure spray nozzles. The sprinkler system was enlarged in 1948. Residents near the mill continued to complain about dust blowing offsite. Approximately 357,440 tons of dirt from hills adjacent to the mill was used to cover the 170 acre tailings pile to a depth of 6 to 8 inches. The covering of the tailings was completed in 1950. (GCC, 1947; Bixler, 1987; Aguillar, 3/13/92; Belgum, 1988)

In 1947, 75% of the ore tonnage processed by the mill consisted of waste dump ore that contained only 5% of the value of high grade ore. In 1948 the mill operated at only 1/3 of its capacity. By February, 1949 mill operations ceased. In 1949, a total of 13,908 tons of waste dump ore was crushed and sold to the City of Colorado Springs for use in street paving during 1950 (GCC, 1947; GCC, 1948; GCC, 1949).

The mill was dismantled throughout 1950. Mill equipment and supplies that could not be used in the new Carlton Mill, constructed by the Golden Cycle Corporation in the Cripple Creek Mining District, were sold for scrap (GCC, 1949; GCC, 1950).

In April, 1966 the Chimney Mesa Addition, which includes the site area, was annexed into Colorado Springs. An aerial photograph of the site area from 1969 shows some units of the Villa de Mesa Condominiums completed. Most of this 11.5 acre development was constructed on the tailings pile. The mill foundations are visible in aerial photographs. A 196-foot tall concrete smokestack at the mill site is still intact. The rest of the site is vacant (Aerials Surveys, 1989; Kucera & Associates, 1969; C. Sprgs. Development Services; MK, 1993).

In 1972, the Golden Cycle Corporation sold the site to William Wiley. Mr. Wiley formed the Gold Hill Mesa Corporation and formed a joint venture with the Fountain Creek Corporation in 1975. In March 1975, the joint venture received a conditional use permit from the Colorado Springs City Planning Commission to conduct a temporary pilot scale surface mining operation known as the Gold Hill Recycle Project on 154 acres of the site. The project was designed to test the feasibility of reworking the tailings for their gold content (Denver Post, 1972; Rocky Mtn. News, 1975; C. Sprgs. City Council, 1975).

In the early and mid-1970s, the Gold Hill Mesa Corporation removed trash and debris that had been dumped at the site. In the spring of 1972, 20 truckloads of trash and debris were removed from the site. In 1973, a five-acre area in the southern portion of the site was planted with grass, evergreen trees and flowering plants. In 1974, the Schuck Corporation of Colorado Springs conducted additional revegetation activities on this portion of the site. A remaining evaluation of the site was performed in 1977 by Nelson, Haley, Patterson & Quirk, Inc. of Colorado Springs (Schooler, 1974; Lovejoy, 1977).

In 1992, the mill site area was declared unsafe and condemned by the Regional Building Department because of its use by youths and transients. Some of the mill structures were reportedly demolished by the Fountain Creek Corporation (FCC), which is the current owner of the mill site. The Colorado Springs City Council was considering the retention of a contractor to demolish the remaining mill structures (Aguillar 3/13/92 and 8/23/93).

The land on which the site is located has been divided into numerous parcels that are currently owned by the FCC of Seattle, Washington and the Villa de Mesa Homeowner's Association. Previous landowners of multiple parcels at the site include the Pacific Building Corporation of Seattle, Langford Development, APM Land, Piranha Properties, Gold Toe Associates, Gold Hill Mesa Corporation and William Wiley. Twelve other previous owners of individual parcels at the site have been identified (El Paso County Assessor's Office). A list of the owners and the previous recorded dates of ownership are shown in Table 1.

### **2.3 Mill Process Description**

Ore was crushed and sent to roasting ovens that were powered by a coal-fired steam electric plant at the mill site. Calcines from the roaster cooling hearths were conveyed to the Chilean mills for grinding in a cyanide solution. The pulp from these mill was fed to blanket tables where wool, cotton and corduroy blankets were used to capture concentrates. A cyanide solution was used to wash concentrates from the blankets. Mercury was then added to the concentrates and the amalgam was retorted to recover "coarse" gold. The retort bullion was melted and cast into bars for shipment to the U.S. Mint in Denver. Mercury was recondensed and reused, however, average yearly losses of 275 pounds of mercury were reported from 1930 to 1933 (Harner, 1993).



Tailings from the blanket tables and overflow pulp from the amalgamation process were sent to a Dorr bowl classifier and sand leaching vats for additional cyanide-leaching. After leaching, sand was washed from the vats into sumps and eventually pumped to the tailings dump. Assays of sand tailings from the leaching process contained an average of 0.012 ounces of gold per ton. Gold was precipitated from leaching solutions using zinc shavings and zinc-dust. Precipitates were dewatered with Merrill presses. Lead acetate, sulfuric acid, hydrochloric acid, hydrated lime and sodium nitrate also were added to aid in the precipitation from leaching solutions (Harner, 1993).

## **2.4 Site Conditions**

An aerial photograph of the site area from 1969 shows some units of the Villa de Mesa Condominiums completed. Most of this 11.5 acre development was constructed on the tailings pile. The mill foundations are visible in aerial photographs. An off-site reconnaissance was conducted by MK on October 1, 1993, and a photographic log is included as Appendix D. A 196-foot tall concrete smokestack at the mill site is still intact. The rest of the site is vacant (Lovejoy, 1977; Kucera & Associates, 1969; MK, 1993).

## **2.5 Geology and Hydrogeology**

The site is underlain by the Pierre Shale Formation. This formation is underlain by the calcareous Niobrara Formation and overlain by the Fox Hills Sandstone, both of Late Cretaceous Age. The thickness of the Pierre Shale ranges from 3,555 to 5,290 feet in the Denver Basin. The southwest edge of the Denver Basin lies a few miles northeast of the site (USGS, 1979).

Surficial geologic maps indicate that Fountain Creek, upstream and downstream from the site, is underlain by the Piney Creek Alluvium. Louvier's Alluvium is found on terraces above Fountain and Monument Creeks, but is absent above the south side of Fountain Creek on Gold Hill Mesa. The surficial deposits present on the east side of Colorado Springs consist of windblown sands (USGS, 1979).

West of the site is a geologically complex area where many formations outcrop at or near hogback ridges. These formations include the Morrison, Ralston Creek, Lykins, Lyons Sandstone, Pikes Peak Granite, Boulder Creek Granodiorite, Niobrara, Carlisle Shale, Greenhorn Limestone and Graneros Shale formations (USGS, 1979).

### **3.0 PRELIMINARY PATHWAY ANALYSIS**

#### **3.1 Waste Characteristics**

Ores sent to the Golden Cycle Mill are classified as sulfo-telluride ores. The gold is present in iron sulfide or pyrites, and in gold silver tellurides of calverite and sylvanite. Ores were processed at the mill with cyanide, mercury, zinc dust and shavings, lead acetate, sulfuric acid, hydrochloric acid, hydrated lime and sodium nitrate (Harner, 1933).

Metals and cyanide are the primary contaminants of concern at this site. Waste sources at the site may include contaminated soils and building foundations in the mill site area, and contaminated soils and tailings in the tailings pile. The tailings pile includes some of the land on which the Villa de Mesa Condominiums are located and may have been eroded from the northeast face onto the west edge of A-1 Mobile Village. Some fill dirt reportedly was placed over all or a portion of the site in 1949, and areas were revegetated. Currently, most of the site is vegetated.

#### **3.2 Ground Water Migration Pathway**

Water rights data from the Colorado State Engineer's office indicates that there are 12 domestic and 3 commercial wells within one mile of the site. Aquifers tapped by these wells are not specified. Water level data are available for five of these wells. Water levels ranged from 14 to 40 feet for wells up to 65 feet deep and 140 feet for a 210-foot deep well. Water levels for irrigation wells completed in alluvium and located between 1 and 4 miles from the site ranged from 8.5 to 44.6 feet deep. Water rights data also indicate that two monitoring wells were drilled on or near the site by Stonebridge Midland Limited of Colorado Springs (CDWR, 1993).

The City of Colorado Springs obtains potable water from various surface water sources including reservoirs on the slopes of Pikes Peak and Fountain Creek upstream from the site. The city also enforces a municipal ordinance requiring city residents to use city water for drinking. The City of Colorado Springs Utilities Department verified that all addresses that have private domestic wells, according to water rights data, do receive city water. The City of Manitou Springs obtains potable water from a reservoir on the west side of Pikes Peak and from French Creek (Dagmar, 1993; McGrady, 1993; Price, 1993).

The nearest drinking water wells to the site are located 3.3 to 3.8 miles to the southeast and are used by the Garden Valley Water & Sanitation District (Figure 3). This district supplies water to the Circle Drive Mobile Home Park (MHP), the Springs Motel, the TransColorado Cement Plant and three office buildings. The MHP consists of 280 to 300 trailers. The District provides water to an estimated 600 residents and 300 workers from 7 wells. These wells are located at Las Vegas Street and Janitell Road, Janitell Road and Fountain Creek, and near South Circle Drive and Janitell Road. The wells are 60 to 65 feet deep and screened in alluvium. No other drinking water wells within the 4-mile target distance limit have been identified (CDH, 1992).

### **3.3 Surface Water Migration Pathway**

The soil covering most of the site surface is characterized as a badland formed from gold ore mill tailings. Soil near the southwest corner of the tailings pile is classified as Razor-Midway soil which is a clayey residuum derived from calcareous shale on uplands. Shale bedrock is within 48 inches of the surface (USDA, 1981).

The north and northeast portions of the tailings pile slope toward Fountain Creek. The southeast and southwest portions of the pile slope toward the east and southwest, respectively. Bear Creek, located south of the site, is the nearest surface water body to the southeast part of the tailings pile. Bear Creek empties into Fountain Creek approximately 0.4 miles downstream from Fountain Creek/Monument Creek confluence (USGS, Colorado Springs quadrangle map).

The steep-sided northeast face of the tailings pile is eroding onto the west edge of A-1 Mobile Village, located downslope and to the east of the pile creating a large depositional area. This area also extends to Fountain Creek. The remainder of the 15-mile target distance limit (TDL) downstream from the probable point of entry is in Fountain Creek (see Figure 4) (Aerial Surveys, 1989; Kucera & Associates, 1969; Landis Aerial Photographs, 1981, 1983, 1985 and 1987; USGS 30' x 60' Colorado Springs quadrangle map; MK, 1993).

There are no drinking water intakes with the TDL. Water is withdrawn from Fountain Creek and used for irrigation purposes. The closest diversion point downstream from the site is about 2.5 miles to the east-southeast in the Fountain Mutual Canal, which originates from a headgate on Fountain Creek. No state or federally-threatened or

endangered species habitats are known to exist in Fountain Creek. Bald eagles occasionally migrate through the area in winter (McGrady, 1993; Price, 1993; Flory, 1993; Loeffler, 1993).

A National Wetland Inventory Map of the Colorado Springs quadrangle shows five palustrine, forested wetland segments along Fountain Creek within 5 downstream miles of the site. Two other portions of the creek downstream from these wetland segments have been mapped as plains streamside environments that are inhabited by emergent hydrophytes, such as rushes, sedges and cattails. These portions of the stream meet the criteria for wetlands defined in 40 CFR 230.3. A summary of wetlands within the 15-mile TDL is shown in Table 2 (USF&WS, 1975; Marr, 1979).

The USGS has stream gauging stations in Fountain Creek upstream from the site near Manitou Springs and approximately 1.75 miles downstream from the site below the confluence with Monument Creek. The mean flow from October, 1990 to September, 1991 for these stations was 10.8 and 49.7 cubic feet/second, respectively (USGS, 1991).

### **3.4 Soil Exposure Pathway**

Portions of the site along Fountain Creek are fenced. There is no fencing or other barriers to prevent access to other areas of the site. There is no fence between the site and the A-1 Mobile Village. Numerous dirt roads and trails cross the site. Visual evidence suggests that the site is used for recreational trail riding (MK, 1993; Aerial Surveys, Inc., 1989).

The Bristol, Buena Vista, Midland and Washington elementary schools lie within one mile of the site. The enrollments of these schools are 339, 324, 205 and 234 students, respectively. The West Junior High School at 1920 West Pikes Peak is also within one mile of the site. Its enrollment is 637 students. The location of these schools are shown in Figure 3. The populations for the target distance categories within one mile of the site are presented in Section 4.5 (Burkman, 1993; USGS 7.5' Colorado Springs quadrangle map).

### **3.5 Air Migration Pathway**

The tailings pile originally was covered in 1949 with dirt from the surrounding hills. In 1974, the site was reportedly revegetated. The northeast face of the tailings pile is severely eroded. It is not known if the cover has been eroded away to expose tailings material on the northeast face (GCC, 1949; Schooler, 1974; MK, 1993; Aerial Surveys, 1989; Kucera & Associates, 1969; Landis, 1981, 1983, 1985 and 1987).

The target populations for the air migration pathway were calculated by estimating the proportion of each census tract within each distance category and multiplying that proportion by the total population for each tract as given in the 1990 Census of Population and Housing for Colorado. The census tract areas included within each distance category were estimated by examining topographic maps. The estimated population for each distance category is given below:

0 to $\frac{1}{4}$ Mile:	2,237
$\frac{1}{4}$ to $\frac{1}{2}$ Mile:	2,449
$\frac{1}{2}$ to 1 Mile:	6,616
1 to 2 Miles:	22,991
2 to 3 Miles:	23,476
3 to 4 Miles:	27,578

The American Peregrine Falcon, a federally-endangered species, is known to breed in the Bear Creek Canyon area, which is within two miles southwest of the site. Bald eagles occasionally migrate through the area during the winter. The Mexican Spotted Owl, a federally-threatened species, is known to occur in areas immediately south of Colorado Springs. This species may be present within the western edge the 4-mile TDL in wooded canyons (Loeffler, 1993).

### **4.0 SUMMARY AND CONCLUSIONS**

The Gold Hill Tailings site is located south of Highway 24 between 8th and 21st Streets in Colorado Springs, and consists of 170 acres of tailings and the Golden Cycle Millsite. The mill operated from 1905 or earlier until 1949. The mill was dismantled in 1950.

Waste characterization samples have not been collected at the site. Gold recovery processes used at the mill included amalgamation, cyanidation, cyanide sand leaching

and cyanide slime leaching. Lead acetate, sulfuric acid, hydrochloric acid, hydrated lime, sodium nitrate and zinc shaving and zinc dust were used to aid in the precipitation from leaching solutions.

Most of the ore processed at the Golden Cycle Mill was silicious or basic ore from the Cripple Creek Mining District that contains very small amounts of silver, lead, copper, zinc, arsenic, antimony and mercury. The mill also processed some complex sulphide ores from other mining districts in Colorado. Mill operations were modified in World War II in order to process zinc lead ores for the war effort.

The north and northeast sides of the tailings pile slope steeply toward Fountain Creek, which is adjacent to the north edge of the site, and A-1 Mobile Village to the east of the northeast face, forming a depositional area. The edge of this area appears to extend onto the A-1 Mobile Village property and may also be within 200 feet of 17 trailers. It is not known if cover material, which was placed on the pile in 1949, has been eroded away to expose tailings material on the northeast face.

The PPE to Fountain Creek from the northeast face of the tailings pile area appears to extend for several hundred feet along the creek. The entire 15-mile downstream target distance limit (TDL) is in Fountain Creek. There are no drinking water intakes within the TDL. Water is diverted from the creek for irrigation purposes. No state or federally-threatened or endangered species habitats are known to exist in the Fountain Creek. Several wetland segments along the creek within the TDL have been identified.

Portions of the site along Fountain Creek are fenced. There are four elementary schools and one junior high within one mile of the site with a combined enrollment of 1,739 students. An estimated 11,302 and 85,267 people reside within one mile and four miles of the site, respectively. The American Peregrine Falcon, a federally-endangered species, is known to breed in the Bear Creek Canyon area, which is within two miles southwest of the site.

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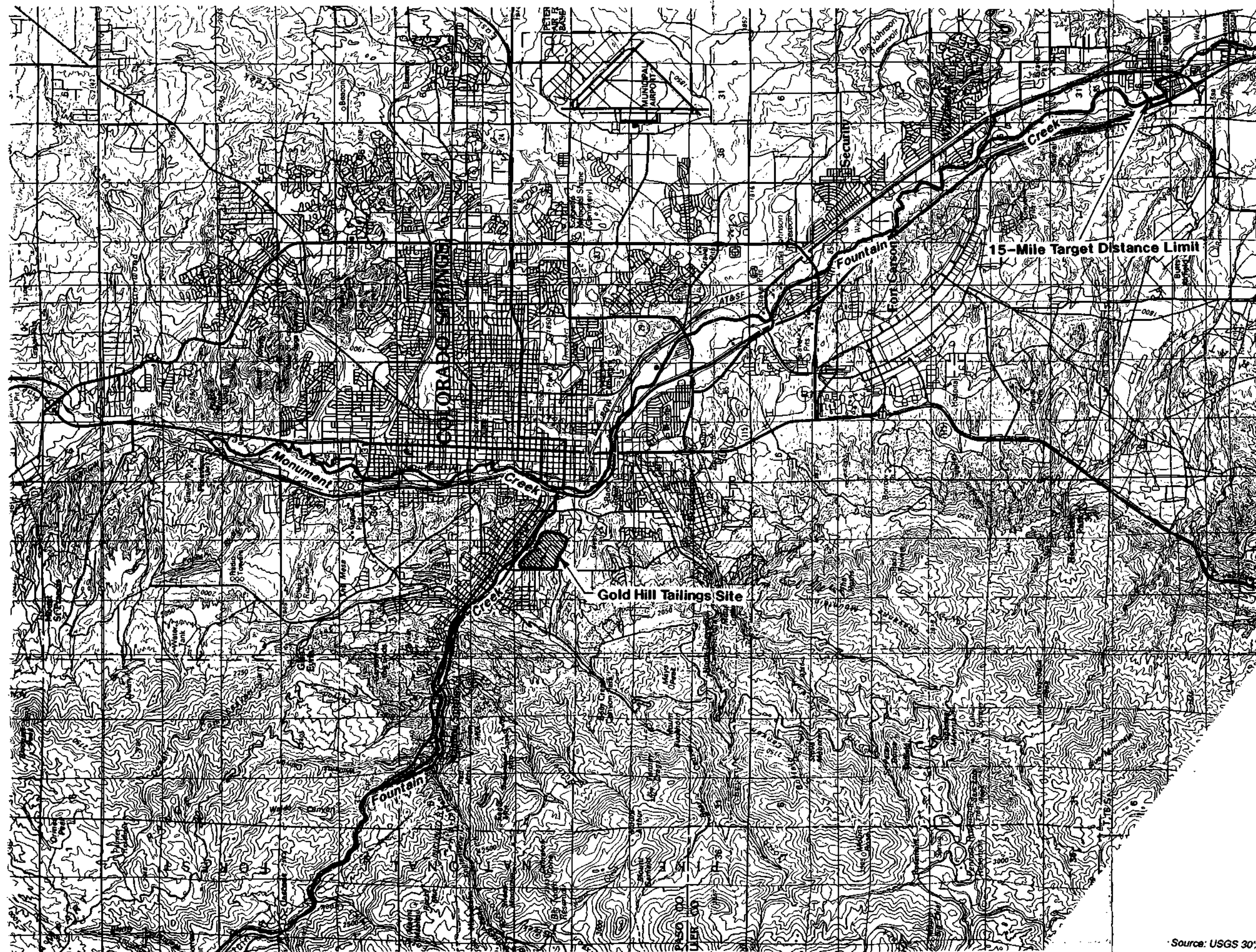
USGS 7.5' quadrangle maps, 1961, photorevised 1969 and 1975.  
Cascade, Colorado  
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Manitou Springs, Colorado  
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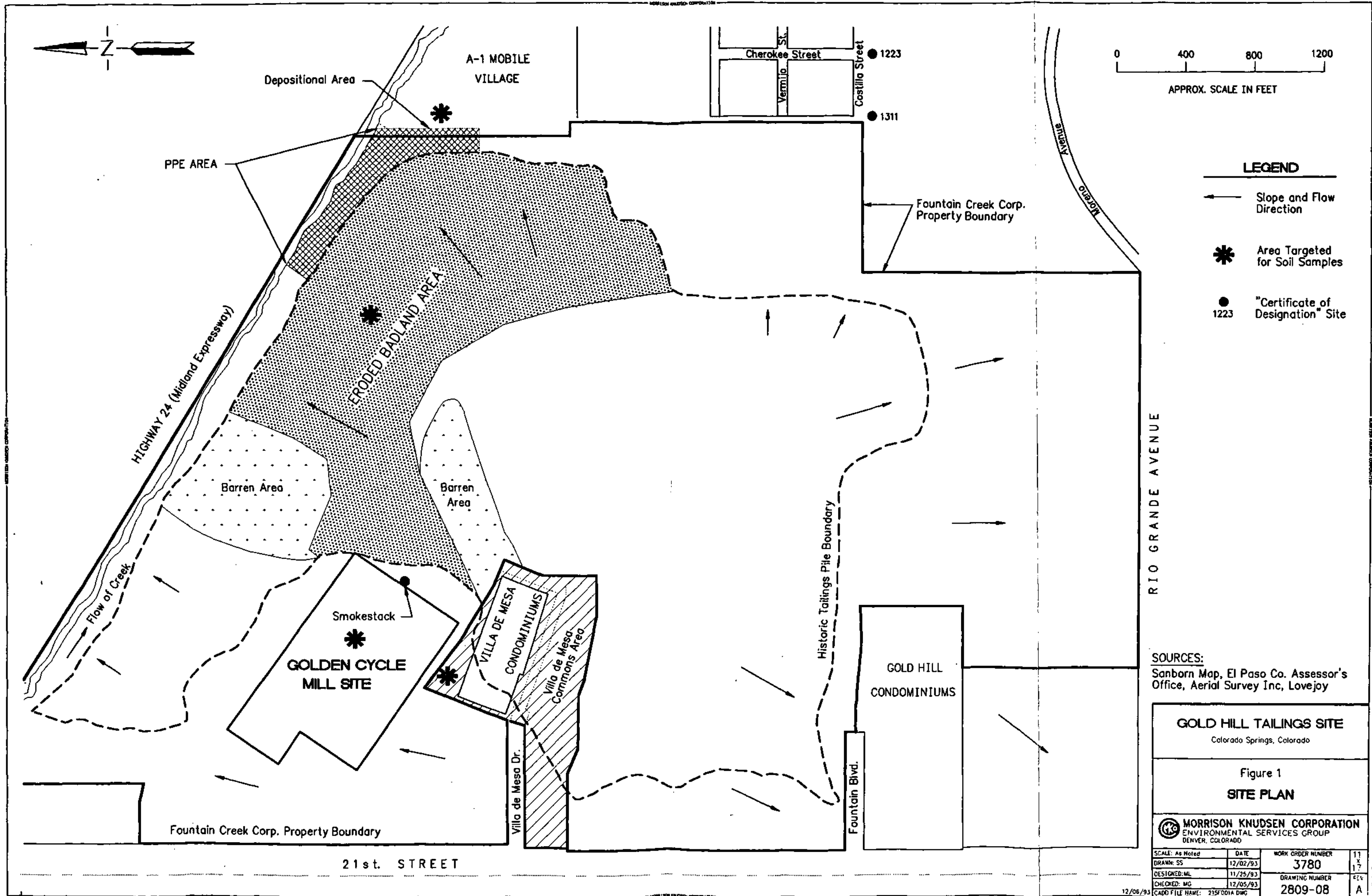
north  
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0 1 2 3  
Scale in Miles

Figure 4

15-Mile Downstream Segment  
Gold Hill Tailings  
Colorado Springs, Colorado

Source: USGS 30'x60' Quad Map of Colorado Springs, Colorado







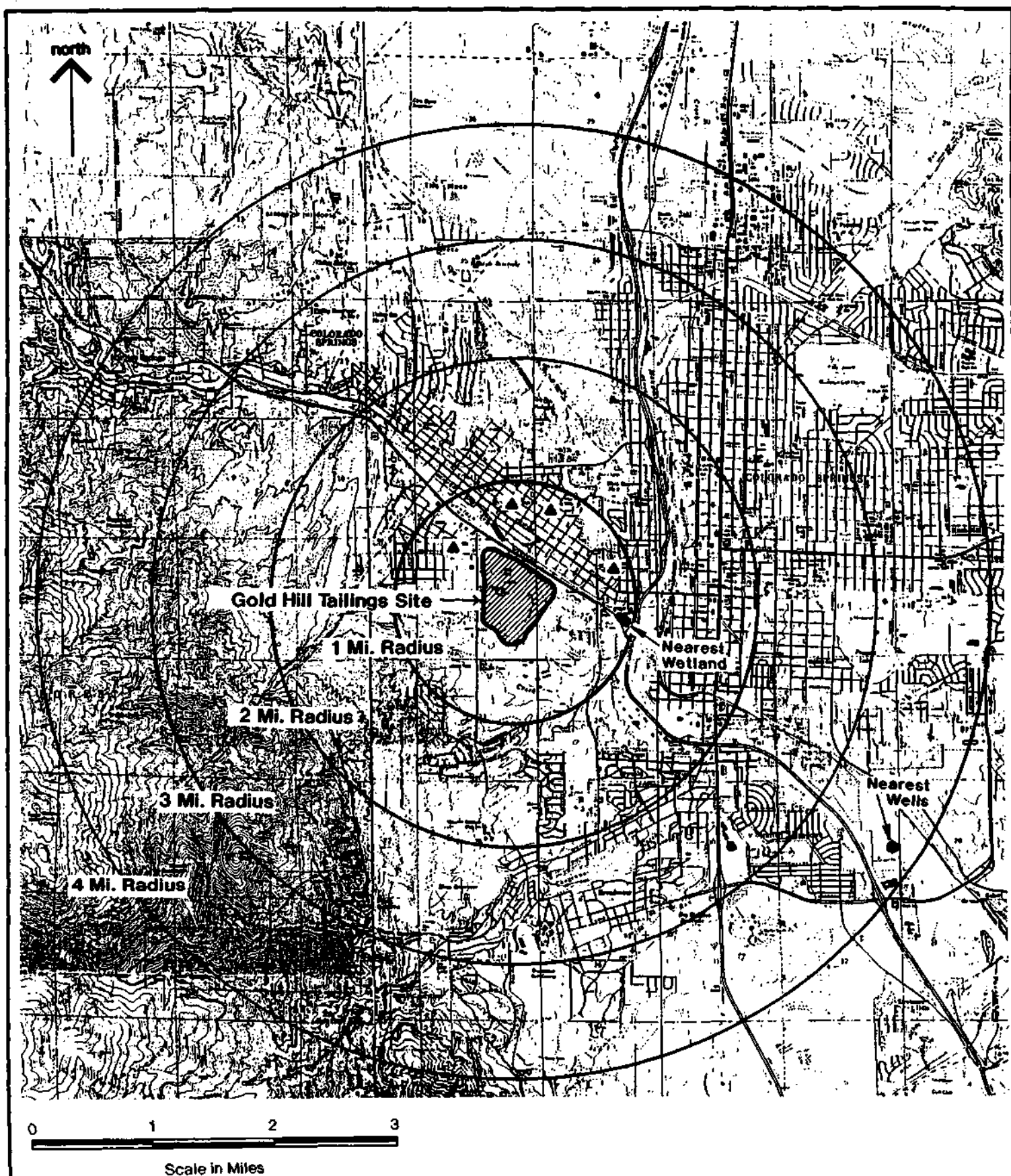


Figure 3

4-Mile Radius Map  
Gold Hill Tailings  
Colorado Springs, Colorado

Legend

▲ School Locations

Source: USGS 7.5' Quad Map of Colorado Springs, Cascade, Pikeview & Manitou Springs, Colorado

**TABLE 1****Land Owners and Dates of Recorded Ownership for Gold Hill Tailings Site**

<u>OWNER</u>	<u>DATES</u>
Fountain Creek Corporation, Seattle	1977, 1980, 1983, 1993
APM Land, Inc.	1989
Langford Development, Inc.	1982
Pacific Building Corporation	1978 - 1980
Piranha Properties	1978 - 1979
Bank of Fountain Valley (*)	1978
Riverview Developments (*)	1978
Richard H. Hadley	1977 - 1978
California Pacific Investments, Inc. (*)	1977
1st National Bankette Corporation (*)	1977
William Wiley	1972 - 1974, 1976 - 1977
Gold Toe Associates	1973
Golden Cycle Corporation	1973
Gold Hill Mesa Corporation	1972 - 1973
W.P. and Clara E. O'Brien (*)	1972
Timothy J. Dennehy, Jr. (*)	1972
Front Range Construction Corp. (*)	1970
Lewson Development Corporation (*)	1968
Gold Hills Land Company (*)	1965
Pikes Peak National Bank (*)	?

(\*) Owned only one parcel that includes portions of the tailings pile.

(Source: El Paso County Assessor's Office Records)

**TABLE 2****Summary of Wetland Frontages Along Fountain Creek  
Within 15 Downstream Miles of Gold Hill Tailings**

Type of Wetland (a)	Frontage Length (in miles)	Stream Distance from Site (in miles)
Palustrine, Forested	0.14	0.57
Palustrine, Forested	0.19	1.57
Palustrine, Forested	0.76	3.37
Palustrine, Forested	0.16	4.32
Palustrine, Forested	0.47	4.48
Plains, Streamside (b)	0.78	4.95
Plains, Streamside	0.93	6.92

a = Meets definition of wetland at 40 CFR 230.3

b = Mapped as a "plains, streamside environment" that is inhabited by emergent hydrophytes, such as rushes, sedges and cattails.

(Source: U.S. Fish & Wildlife Service; Marr & Steward)



**APPENDIX A**  
**EPA PRELIMINARY ASSESSMENT FORM**

D-3



Potential Hazardous Waste Site  
Preliminary Assessment Form - Page 2 of 4

CERCLIS Number:

CoD 983801275

### 5. General Site Characteristics

Predominant Land Uses Within 1 Mile of Site (check all that apply):

- |   |                                      |   |
|---|--------------------------------------|---|
| <input type="checkbox"/> Industrial             | <input type="checkbox"/> Agriculture | <input type="checkbox"/> DOI                    |
| <input checked="" type="checkbox"/> Commercial  | <input type="checkbox"/> Mining      | <input type="checkbox"/> Other Federal Facility |
| <input checked="" type="checkbox"/> Residential | <input type="checkbox"/> DOD         |   |
| <input type="checkbox"/> Forest/Fields          | <input type="checkbox"/> DOE         | <input type="checkbox"/> Other _____            |

Site Setting:

- ☒ Urban  
☐ Suburban  
☐ Rural

Years of Operation:

Beginning Year ~1907

Ending Year 1949

☐ Unknown

Type of Site Operations (check all that apply):

☐ Manufacturing (must check subcategory)

- ☐ Lumber and Wood Products  
☐ Inorganic Chemicals  
☐ Plastic and/or Rubber Products  
☐ Paints; Varnishes  
☐ Industrial Organic Chemicals  
☐ Agricultural Chemicals  
(e.g., pesticides, fertilizers)  
☐ Miscellaneous Chemical Products  
(e.g., adhesives, explosives, ink)  
☐ Primary Metals  
☐ Metal Coating, Plating, Engraving  
☐ Metal Forging, Stamping  
☐ Fabricated Structural Metal Products  
☐ Electronic Equipment  
☐ Other Manufacturing

☒ Mining

- ☒ Metals  
☐ Coal  
☐ Oil and Gas  
☐ Non-metallic Minerals

☐ Retail

- ☐ Recycling  
☐ Junk/Salvage Yard  
☐ Municipal Landfill  
☐ Other Landfill  
☐ DOD  
☐ DOE  
☐ DOI  
☐ Other Federal Facility \_\_\_\_\_  
☐ RCRA

☐ Treatment, Storage, or Disposal

☐ Large Quantity Generator

☐ Small Quantity Generator

☐ Subtitle D

☐ Municipal

☐ Industrial

☐ "Converter"

☐ "Protective Filer"

☐ "Non- or Late Filer"

☐ Not Specified

☐ Other \_\_\_\_\_

Waste Generated:

- ☒ Onsite  
☐ Offsite  
☐ Onsite and Offsite

Waste Deposition Authorized By:

- ☐ Present Owner  
☒ Former Owner  
☐ Present & Former Owner  
☐ Unauthorized  
☐ Unknown

Waste Accessible to the Public:

- ☒ Yes  
☐ No

Distance to Nearest Dwelling,  
School, or Workplace:

potentially <200 Feet

### 6. Waste Characteristics Information

Source Type:

(check all that apply)

- ☐ Landfill  
☐ Surface Impoundment  
☐ Drums  
☐ Tanks and Non-Drum Containers  
☐ Chemical Waste Pile  
☐ Scrap Metal or Junk Pile  
☒ Tailings Pile  
☐ Trash Pile (open dump)  
☐ Land Treatment  
☐ Contaminated Ground Water Plume  
(unidentified source)  
☐ Contaminated Surface Water/Sediment  
(unidentified source)  
☒ Contaminated Soil  
☐ Other \_\_\_\_\_  
☐ No Sources

Source Waste Quantity:

(include units)

12.5 MILLION TONS

UNKNOWN

Tier \*

V

General Types of Waste (check all that apply)

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> Metals                | <input type="checkbox"/> Pesticides/Herbicides           |
| <input type="checkbox"/> Organics                         | <input type="checkbox"/> Acids/Bases                     |
| <input type="checkbox"/> Inorganics                       | <input type="checkbox"/> Oily Waste                      |
| <input type="checkbox"/> Solvents                         | <input type="checkbox"/> Municipal Waste                 |
| <input type="checkbox"/> Paints/Pigments                  | <input checked="" type="checkbox"/> Mining Waste         |
| <input type="checkbox"/> Laboratory/Hospital Waste        | <input type="checkbox"/> Explosives                      |
| <input type="checkbox"/> Radioactive Waste                | <input checked="" type="checkbox"/> Other <u>Cyanide</u> |
| <input type="checkbox"/> Construction/Demolition<br>Waste |  |

Physical State of Waste as Deposited (check all that  
apply):

- ☒ Solid ☐ Sludge ☐ Powder  
☒ Liquid ☐ Gas

Slurry form

\* C = Constituent, W = Wastestream, V = Volume, A = Area

**APPENDIX B**  
**PA WORKSHEET**

# PA WORKSHEET

Site Name Gold Hill Tailings City, State Colorado Springs, Colorado

CERCLIS ID # COD983801275

Reported by Mark Lunsford Date December 21, 1993

**HIGHLIGHTS:**

- A) IS THERE QUALITATIVE OR QUANTITATIVE EVIDENCE OF A RELEASE TO AIR, SURFACE WATER, GROUND WATER, OR SURFACE SOIL? DESCRIBE BRIEFLY.  
More detail in Items GW-1 (for GW), SW-5 (for SW), A-1 (for air), and SE-1 (for soil exposure pathway).

**Yes. Visual evidence suggests that the northeast face of the tailings pile is eroding into Fountain Creek.**

- B) IS THERE EVIDENCE OF AN **IMPACTED** TARGET POPULATION? DESCRIBE.

Pathway	Target	none/target size	Brief description	More discussion in
Ground Water	public drinking water supply	No		
	domestic drinking water supply	No		
Surface Water	drinking water	No		
	fishery	No		
	sens. env.	No		
Soil Exposure	people w/in 200'	Yes	Tailings appear to be within 200' of residents in A-1 Mobile Village, east of the site, and in Villa de Mesa Condominiums.	
	terrestrial sens. env.	No		
Air	population	No		

## SITE INFORMATION

- G-1. Directions to the site (from nearest easily recognized point).

**The site lies southwest of downtown Colorado Springs. From Interstate 25 take Highway 24 (Midlands Expressway) west. The site is south of the highway between 8th and 21st Street.**

- G-2. Are there other potential sources in the neighborhood to be aware of as the site is evaluated? eg. Is the site in an industrial area, near a railroad, along a highway? Are sources with similar contaminants to this site in the vicinity?

**Two "Certificate of Designation" Solid Waste Disposal sites are present on Costilla Street to the southeast of the tailings pile. The Portland Gold Mining Corporation had an ore milling operation near 8th Street and Moreno Avenue to the southeast of the site. Other ore reduction mills were known to exist in the Midland area west of 21st Street in Colorado Springs.**

## Background/Operating History

- G-3. Describe the operating history of the site:

**The Golden Cycle Mill used roasting and cyanide methods during its operation and processed a total of 15 million tons of ore. The mill employed an average of 200 people. Gold recovery processes used at the mill included amalgamation, cyanidation, cyanide sand leaching and cyanide slime leaching. The mill processed tailings mostly from the Cripple Creek Mining District in Colorado.**

Source of Information: **Annual Reports of Golden Cycle Corporation 1930-1950.**

- G-4. Describe site and nature of operations (property size, manufacturing, waste disposal, storage etc.):

**Cooling water from the mill roaster ovens was discharged to a cooling pond. By 1950 mill operations ceased and the mill was dismantled. Mill equipment and supplies that could not be used in the new Carlton Mill, constructed by the Golden Cycle Corporation in the Cripple Creek Mining District, were sold for scrap.**

Source of information: **Annual Reports of Golden Cycle Corporation 1930-1950.**

- G-5. Describe any emergency or remedial actions that have occurred at the site:

**None.**

Source of information: **CDOT, December 1990. Initial Site Assessment, Project IR 025-2 (229), I-25 - South Academy Boulevard to North Academy Boulevard, Colorado Springs.**

- G-6. Are there records or knowledge of accidents or spills involving site wastes? Are there Emergency Response Notification (ERNs) reports for this location?

**No**

Source of information: **CDOT, December, 1990.**

- G-7. Describe existing sampling data and briefly summarize data quality (e.g. sample objective, age/comparability, analytical methods, detection limits, QA/QC, validatability):

**No environmental samples have been collected at the site.**

Source of information: **EPA; Colorado Department of Health**

- G-8. Is there any other local, state or federal regulatory involvement? Describe. Include permits, and names of contact individuals within each government organization. **None.**

AGENCY	PROGRAM	CONTACT	PHONE	PERMIT

- G-9. Attach site sketch or schematic. Include all pertinent features including wells, storage areas, underground storage tanks, source areas, buildings, access roads, areas of ponded water. Refer to figure(s) submitted with text of report if appropriate.

**See Figures 1 and 2 in the Preliminary Assessment narrative.**



## **SOURCE CHARACTERIZATION**

**WC-1. Describe each source at the site, on Table 1, in terms of source type, containment, size/area/volume/quantity, and substances present. See HRS Tables 2-5 and 5-2 for source descriptions, Tables 3-2, 4-2, 4-8, 5-6, 6-3, and 6-9 for containment.**

**The tailings pile is not lined. In 1949, dirt from hills adjacent to the mill was used to begin covering the tailings. The northeast face of the tailings pile is severely eroded. Soils adjacent to the tailings pile may also be contaminated.**

**WC-2. Briefly describe how waste quantity was estimated (eg. historical records or manifests, permit applications, air photo measurements, etc.):**

**Tailings Pile - 12.5 million tons**

**Source of information: Golden Cycle Corporation Annual Reports 1930-1950.**

**WC-3. Describe any restrictions or barriers to accessibility of onsite sources.**

**Portions of the northern part of the site along Fountain Creek are fenced. There is no fencing or other barriers to prevent access to other areas of the site.**

**Source of information: Aerial Surveys, Inc; Kucera & Associates; Offsite reconnaissance by MK**

## GROUND WATER CHARACTERISTICS

GW-1. Any positive or circumstantial evidence of a release to ground water? Describe.

**No**

Source of information:

GW-2. Any positive or circumstantial evidence of a release to drinking water users? Describe analytes, detection limits, background, hits, number of users, locations, QA/QC.

**No**

Source of information: **Dagmar; McGrady; Price**

GW-3. Briefly describe the geologic setting.

**The site is underlain by the Pierre Shale Formation. This formation is underlain by the calcareous Niobrara Formation and overlain by the Fox Hills Sandstone, both of late Cretaceous Age. The thickness of the Pierre Shale ranges from 3,555 to 5,290 feet in the Denver Basin. The southwest edge of this basin lies a few miles northeast of the site.**

GW-4. Describe geologic/hydrogeologic units on Table 2. Give names, descriptions, and characteristics of consolidated and unconsolidated zones beneath the site.

GW-5. Is the site in an area of karst terrain or a karst aquifer? **No**

GW-6. Net Precipitation (per HRS section 3.1.2.2). **+1 (from Figure 3-2)**

## SURFACE WATER CHARACTERISTICS

SW-1. Mean annual precipitation (per HRS section 4.0.2) = 16-24". If less than 20", then count intermittent channels as surface water.

SW-2. Discuss the probable surface water flow pattern from the site to surface waters:

**The north and northeast portions of the tailings pile slope toward Fountain Creek, which flows adjacent to the northern edge of the site. The southeast and southwest portions of the tailings pile slope toward the east and southwest, respectively.**

Source of information: **NOAA Atlas 2; MK; Aerial Surveys, Inc; Kucera & Associates**

SW-3. If surface water exists within 2 miles of the site, describe surface water segments within the 15-mile distance limit.

Segment Name	River/Lake Type	Fresh/Salt Water	Start (mi.)	End (mi.)	Flow in cfs
Fountain Creek	River	Fresh	0	15	11 - 50
Bear Creek	River	Fresh	0	Flows to Fountain Creek	probably < 10

Ground water to surface water distance Not Known Angle  $\theta$  \_\_\_\_\_

SW-4. Provide a schematic diagram or simple figure which describes surface water segments, locates targets, identifies flow direction, PPE(s), etc. Refer to figure(s) submitted with text of report if appropriate.

**See Figure 4 in Preliminary Assessment Report.**

SW-5. Any positive or circumstantial evidence of a release to surface water? Evidence of a release by direct observation? Is the source located in surface water? Describe.

**Yes. The steep-sided, northeast face of the tailings pile is eroding into Fountain Creek, which is adjacent to the northeast face. This is apparent on aerial photographs of the site since 1969. It was also visible in an offsite reconnaissance performed by MK.**

Source of information: **Aerial Surveys, Inc.; Kucera & Associates; MK**

SW-6. Any positive or circumstantial evidence of a release to surface water target populations? Describe analytes, detection limits, background, hits, number of users, locations, QA/QC.

**No. There has been no sampling conducted in Fountain Creek near the site. There are no drinking water intakes in Fountain Creek within 15 downstream miles of the site.**

Source of information: **McGrady; Price; Flory**

SW-8. Is the site or portions thereof located in surface water? **Yes.**

Is the site located in the 1 - <10 yr floodplain? **unknown**

> 10-100 yr? **Yes**

> 100-500 yr? **Yes**

> 500 yr? **No**

SW-9. Two-year 24-hour rainfall **2-2.2"**

## TARGETS

T-1. Discuss ground water usage within four mile of the site:

The nearest drinking water wells to the site are located 3.3 miles to the southeast and are used by the Garden Valley Water and Sanitation District. The district provides water to an estimated 600 residents and 300 workers from 7 wells along Fountain Creek. The wells are 60-65 feet deep and screened in alluvium. No other drinking water wells have been identified.

Source of Information: CDH-2/13/92; Price; McGrady

T-2. Summarize the drinking water population served via Ground Water within 4 miles of the site:

0 - 1/4 mi	<u>0</u>
1/4 - 1/2 mi	<u>0</u>
1/2 - 1 mi	<u>0</u>
1 - 2 mi	<u>0</u>
2 - 3 mi	<u>0</u>
3 - 4 mi	<u>900</u>

Attach calculations for population apportionment in blended systems.

T-3. Identify and locate any of the following surface water targets within 15 miles of the site: drinking water population(s) served by intakes, fisheries, sensitive environments described in Table 4-23 of the HRS, and wetlands as defined in the Federal Register.

Targets	Distance From Site (miles)	SW Body	Flow In cfs	Population Served/Size (units)	Contamination Known/Suspected
Irrigation	2.5	Fountain Mutual Canal	11-50	--	--
Palustrine Forested Wetlands	0.57	Fountain Creek	11-50	--	Metals, Cyanide
Palustrine Forested Wetlands	1.57	Fountain Creek	11-50	--	--
Palustrine Forested Wetlands	3.37	Fountain Creek	11-50	--	--
Palustrine Forested Wetlands	4.32	Fountain Creek	11-50	--	--

T-4. Summarize the population within a four-mile radius of the site:

	<u>Total Pop.</u>	<u>Worker Pop.</u>
Onsite	<u>0</u>	<u>0</u>
0 - 1/4 mi	<u>2,237</u>	
1/4 - 1/2 mi	<u>2,449</u>	
1/2 - 1 mi	<u>6,616</u>	
1 - 2 mi	<u>22,911</u>	
2 - 3 mi	<u>23,476</u>	
3 - 4 mi	<u>27,578</u>	

T-5. Identify and locate any terrestrial sensitive environments described in Table 5-5 of the HRS.

The American Peregrine Falcon, a federally-endangered species, is known to breed in the Bear Creek Canyon area, which is within two miles southwest of the site. Bald eagles occasionally migrate through the area during the winter. The Mexican Spotted Owl, a federally-threatened species, is known to occur in areas immediately south of Colorado Springs. This species may be present within the western edge the 4-mile TDL in wooded canyons.

T-6. Describe any positive or circumstantial evidence of a release to air target populations? Of a release by direct observation where target population exists within 1/4 mile of the site? Describe analytes, detection limits, background, hits, number of users, locations, QA/QC.

The tailings pile was originally covered in 1949 with dirt from the surrounding hills. In 1974, the site was reportedly revegetated. The northeast face of the tailings pile is severely eroded. It is not known if the cover has been eroded away to expose tailings on the northeast face.

T-7. Identify and locate any potential or known resident soil exposure populations, if present. Describe conditions which lead the researcher to suspect contaminated soil within 200' of residences, if this condition exists.

Most of the 11.5 acre Villa de Mesa Condominiums were constructed on the tailings pile. Aerial photographs indicate that as many as 17 trailers in A-1 Mobile Village, adjacent to the northeast face of the tailings pile, may be within 200 feet of an obvious depositional area that lies below the northeast face. This deposited area is believed to extend beyond the site property boundary onto the A-1 Mobile Village property.

**TABLE 1**  
**WASTE CONTAINMENT AND HAZARDOUS SUBSTANCE IDENTIFICATION<sup>1</sup>**

SOURCE TYPE	SIZE (Volume/Area)	ESTIMATED WASTE QUANTITY	SPECIFIC COMPOUNDS	CONTAINMENT <sup>*</sup>	SOURCES OF INFORMATION
Contaminated soil	unknown	unknown	cyanide, mercury, zinc, lead and other metals	none	L.S. Harner Sanborn Map
Tailings Pile	150-170 acres	12.5 million tons	cyanide, mercury, zinc, lead and other metals	none	Golden Cycle Corp. Annual Reports 1930-1950; Lovejoy

<sup>\*</sup>Evaluate containment of each source from the perspective of each migration pathway (e.g., ground water pathway - non-existent, natural or synthetic liner, corroding underground storage tank; surface water - inadequate freeboard, corroding bulk tanks; air - unstabilized slag piles, leaking drums, etc.)

TABLE 2  
HYDROGEOLOGIC INFORMATION

STRATA NAME/DESCRIPTION	THICKNESS (ft.)	HYDRAULIC CONDUCTIVITY (cm/sec)	TYPE OF DISCONTINUITY*	SOURCE OF INFORMATION
<b>Piney Creek Alluvium (along Fountain Creek)</b>	<b>unknown</b>	<b>unknown</b>	<b>none</b>	<b>USGS, 1978 USGS, 1979</b>
<b>Louvier's Alluvium (on terraces above Fountain and Monument Creeks)</b>	<b>unknown</b>	<b>unknown</b>	<b>river</b>	<b>USGS, 1978 USGS, 1979</b>
<b>Pierre shale</b>	<b>3,555-5,290 feet</b>	<b>10<sup>-8</sup></b>	<b>none</b>	<b>USGS, 1978 USGS, 1979</b>

\*Identify the type of aquifer discontinuity within four-miles from the site (e.g., river, strata "pinches out", etc.)



**APPENDIX C**  
**CERCLA ELIGIBILITY FORM**

CERCLA Eligibility Worksheet

Site Name GOLD HILL TAILINGS

City COLORADO SPRINGS State COLORADO

EPA ID Number COD983801275

Note: The site is automatically CERCLA eligible if it is a Federally owned or operated RCRA site.

I. CERCLA Eligibility

Did the facility cease operations prior to November 19, 1980?

yes

If YES, then STOP. The facility is probably a CERCLA site.

If NO, continue to part II

II. RCRA Deferral Factors

Did the facility file a RCRA Part A application?

If YES:

1. Does the facility currently have interim status?
2. Did the facility withdraw its Part A application?
3. Is the facility a known or possible protective filer? (filed in error)
4. Does the facility have a RCRA operating or post closure permit?
5. Is the facility a late (after 11/19/80) or non-filer that has been identified by the EPA or the State? (facility did not know it needed to file under RCRA)

**PA Guidance  
EPA Region VIII  
August 1993**

**Type of facility:**

**Generator\_\_\_\_\_ Transporter\_\_\_\_\_ Recycler \_\_\_\_\_  
TSD (Treatment/Storage/Disposal) \_\_\_\_\_**

**If all answers to questions 1, 2, and 3 are NO, STOP. The facility is a CERCLA eligible site.**

**If answer to #2 or #3 is YES, STOP. The facility is a CERCLA eligible site.**

**If answer to #2 and #3 are NO and any other answer is YES, site is RCRA, continue to part III.**

**III. RCRA Sites Eligible for the NPL**

**Has the facility owner filed for bankruptcy under Federal or State laws? \_\_\_\_\_**

**Has the facility lost RCRA authorization to operate or shown probable unwillingness to carry out corrective action? \_\_\_\_\_**

**Is the facility a TSD that converted to a generator, transporter or recycler facility after November 19, 1980? \_\_\_\_\_**

**IV. Exempted substances:**

**Does the release involve hazardous substances other than petroleum? \_\_\_\_\_**

**PA Guidance  
EPA Region VIII  
August 1993**

**V. Other programs:** The site may never reach the NPL or be a candidate for removal. We need to be able to refer it to any other programs in EPA or state agencies which may have jurisdiction, and thus be able to effect a cleanup. Responses should summarize available information pertaining to the question. Include information in existing files in these programs as part of the PA. Answer all that apply.

**Is there an owner or operator?**

**NPDES-CWA:** Is there a discharge water containing pollutants with surface water through a point source (pipe, ditch, channel, conduit, etc.)?

**CWA (404):** Have fill or dredged material been deposited in a wetland or on the banks of a stream? Is there evidence of heavy equipment operating in ponds, streams or wetlands?

**UIC-SDWA:** Are fluids being disposed of to the subsurface through a well, cesspool, septic system, pit, etc.?

**TSCA:** Is it suspected that there are PCB's on the site which came from a source with greater than 50 ppm PCB's such as oil from electrical transformers or capacitors?

**FIFRA:** Is there a suspected release of pesticides from a pesticide storage site? Are there pesticide containers on site?

**PA Guidance  
EPA Region VIII  
August 1993**

**RCRA (D): Is there an owner or operator who is obligated to manage solid waste storage or disposal units under State solid waste or ground water protection regulations?**

**UST: Is it suspected that there is a leaking underground storage tank containing a product which is a hazardous substance or petroleum?**

**APPENDIX D**  
**PHOTO LOG**

# Color Photo(s)

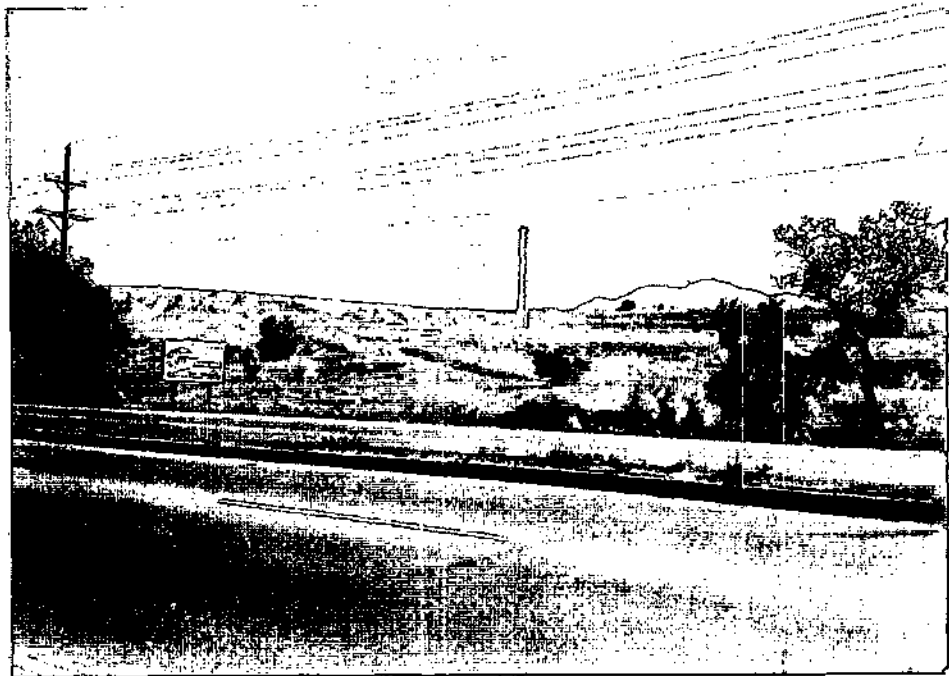
The following pages  
contain color that does  
not appear in the  
scanned images.

To view the actual images, please  
contact the Superfund Records  
Center at (303) 312-6473.



Photo No.

1



Site Name:

Gold Hill

Tailings

Location:

Colorado

Springs, CO

CERCLIS #:

COD983801275

Photographer/Witness M. Lunsford

Date 10-1-93

Time

Direction

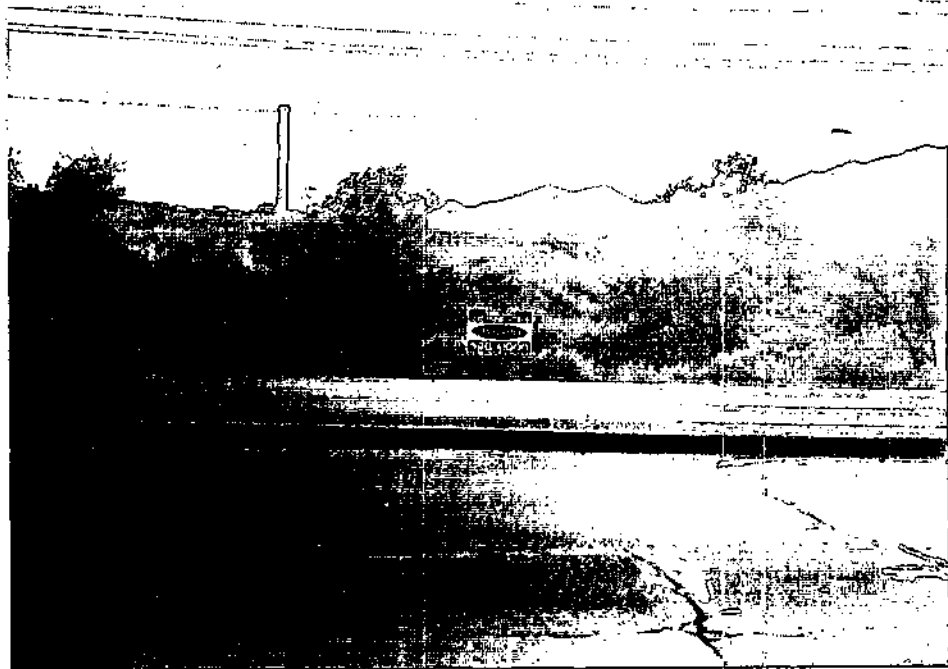
Southeast

Description Smokestack and mill site for the Golden Cycle Mill.

Tailings pile is in background.

Photo No.

2



Photographer/Witness M. Lunsford

Date 10-1-93

Time

Direction

South

Description Smoke stack of Golden Cycle Mill and "For Sale" sign.

From north side of Hwy 24. Fountain Creek is adjacent to the trees.

Page 1

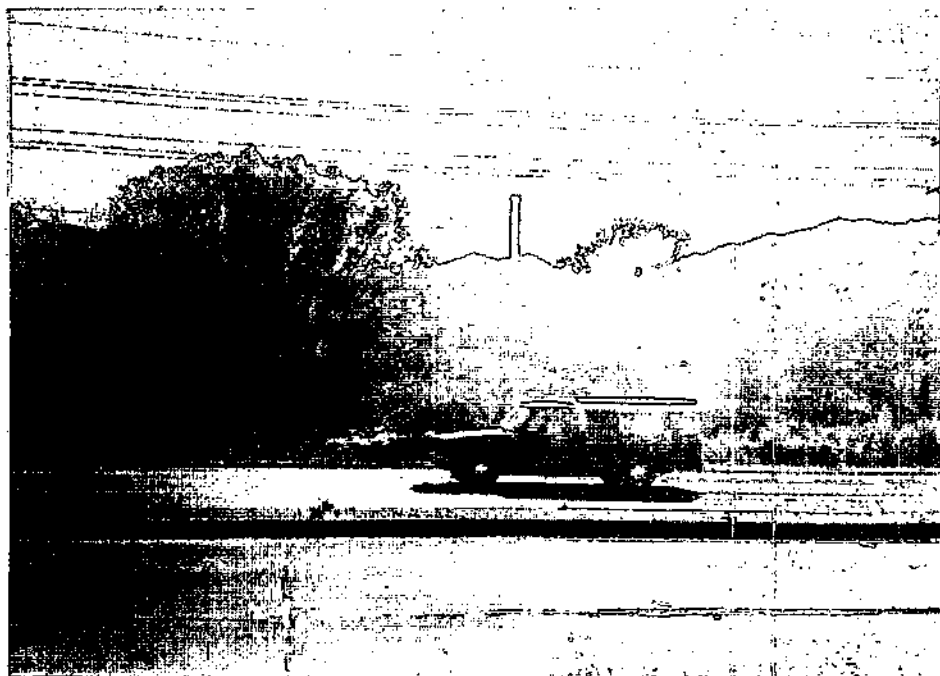
Of 7





Photo No.

3



Site Name:

Gold Hill

Tailings

Location:

Colorado

Spring, CO

CERCLIS #:

COD983801275

Photographer/Witness M. Lunsford

Date 10-1-93

Time

Direction

Southeast

Description Smokestack of Golden Cycle Mill from north side of Hwy 24.

Photo No.

4



Photographer/Witness M. Lunsford

Date 10-1-93

Time

Direction

SSW

Description Northeast slope of tailings pile from north side of Hwy 24.

Page 2

Of 7



Photo No.

5



Site Name:

Gold Hill

Tailings

Location:

Colorado

Springs, CO

CERCLIS #:

COD983801275

Photographer/Witness M. Lunsford

Date 10-1-93

Time

Direction Southeast

Description Northeast slope of Gold Hill Tailings from north side of Hwy 24.

Depositional area and PPE from site to Fountain Creek are behind the trees.

Photo No.

6



Photographer/Witness M. Lunsford

Date 10-1-93

Time

Direction SSW

Description Northeast slope of tailings pile and depositional area adjacent to A-1

Mobile Village. This is general area of the PPE to Fountain Creek.

Page 3

Of 7



Photo No.

7



Site Name:

Gold Hill

Tailings

Location:

Colorado

Springs, CO

CERCLIS #:

COD983801275

Photographer/Witness M. Lunsford

Date 10-1-93 Time \_\_\_\_\_ Direction South

Description Northeast slope of tailing pile and depositional area  
are in background. Gap in trees is PPE to Fountain Creek.

Photo No.

8



Photographer/Witness M. Lunsford

Date 10-1-93 Time \_\_\_\_\_ Direction NW

Description Fountain Creek upstream from 8th Street bridge.

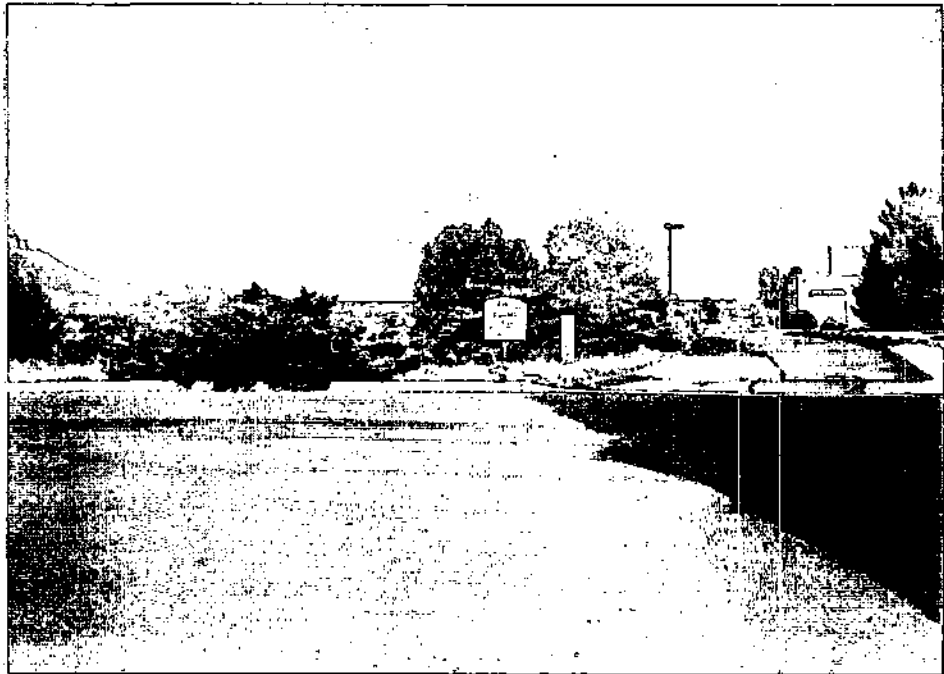
Page 4

Of 7



Photo No.

9



Site Name:

Gold Hill

Tailings

Location:

Colorado

Springs, CO

CERCLIS #:

COD983801275

Photographer/Witness M. Lunsford

Date 10-1-93

Time

Direction

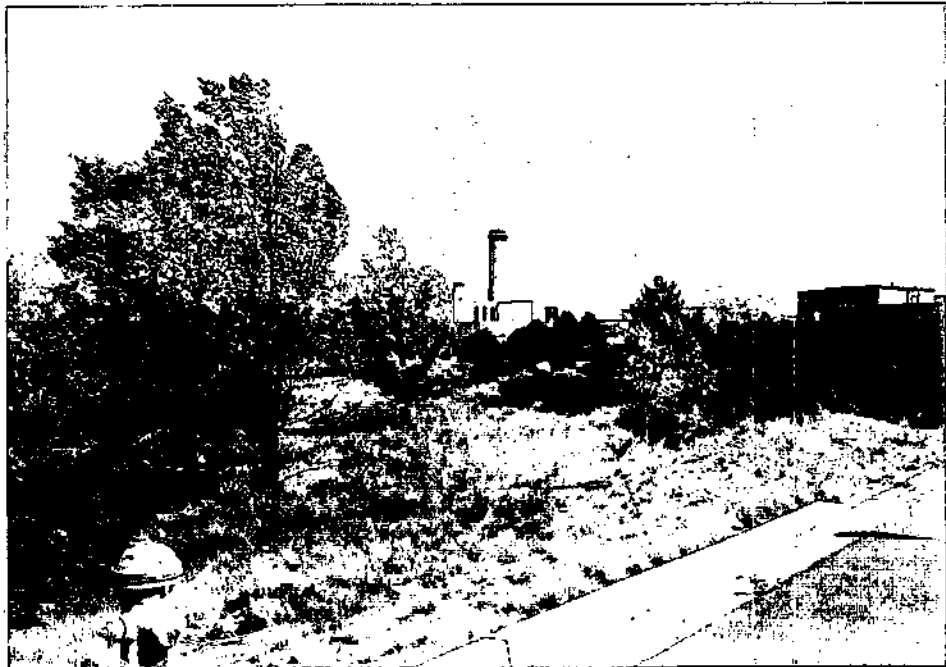
North

Description Edge of Villa de Mesa Condominiums is at right.

Sign is at the end of Villa de Mesa Drive.

Photo No.

10



Photographer/Witness M. Lunsford

Date 10-1-93

Time

Direction

ENE

Description Structures in front of smoke stack are part of the Villa de Mesa

Condominiums. Photos taken from Villa de Mesa Drive.

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Photo No.

11



Site Name:

Gold Hill

Tailings

Location:

Colorado

Springs, CO

CERCLIS #:

COD983801275

Photographer/Witness M. Lunsford

Date 10-1-93

Time \_\_\_\_\_

Direction \_\_\_\_\_

East

Description Southern edge of tailings pile is at left.

View from near Gold Hill Condominiums.

Photo No.

12



Photographer/Witness M. Lunsford

Date 10-1-93

Time \_\_\_\_\_

Direction \_\_\_\_\_

North

Description Highest ground at left is the Gold Hill Tailings Pile.

Photo taken from Rio Grande Street.

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Photo No.

13



Site Name:

Gold Hill

Tailings

Location:

Colorado

Springs, CO

CERCLIS #:

COD983801275

Photographer/Witness M. Lunsford

Date 10-1-93

Time \_\_\_\_\_

Direction \_\_\_\_\_

North

Description The trees at right are the edge of the Portland Heights subdivision.

Gold Hill Tailings pile is at left. Pile at right is

suspected solid fill material separate from the site.

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